**Project: Solar Orbiter SWA**

**Author:** **Gethyn Lewis, Chandrasekhar Anekallu,**

**Jim Raines and Andrei Fedorov**

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| Author(s):  G. Lewis |  | Date: |  |
| C. Anekallu |  |  |  |

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# Introduction

## Purpose and Scope

This Data Product Definition Document (DPDD) describes the format and content of the Solar Wind Analyser (SWA) science data. It includes descriptions of the data products and associated metadata, including the data format, content, and any generation pipeline systems. These products will be stored and distributed from the Solar Orbiter Science Archive (SOAR) of the SOC.

The specifications described in this DPDD apply to all SWA science products submitted to ESA’s Solar Orbiter SOC for further archival and exploitation. This document only includes descriptions of science products delivered by the SWA science pipelines run by SWA. It does not address the Low Latency data which is described in [RD9].

## Reference Documents

The documents listed below form a part of this document, to the extent specified and described herein.

|  |  |  |
| --- | --- | --- |
| **Ref.** | **No** | **Title** |
| RD1 |  | CDF User’s Guide v3.5, available from <http://cdf.gsfc.nasa.gov> |
| RD2 | SOL-SGS-OTH-004-TPL\_DPDD | Solar Orbiter SWA Data Product Description Document template |
| RD3 | SOL-SGS-TN-0006 | SOC Engineering Guidelines for External Users |
| RD4 | ESA/SRE(2011)14 | Solar Orbiter definition study report (Red Book) |
| RD5 | SO-SWA-MSSL-RQ-010 | Solar Orbiter SWA Scientific Operations, Algorithms and Processes Requirements Document |
| RD6 | SOL-SGS-ICD-0004 | Solar Orbiter Interface Control Document for Low Latency Data CDF Files |
| RD7 | SOL-SGS-TN-0009 | Metadata Definition for Solar Orbiter Science |
| RD8 | SOL-SGS-PL-0009 | Solar Orbiter Archive Plan |
| RD9 | SO-SWA-MSSL-IF-005 | SWA Low Latency Data Product Description Document |
| RD10 | SOL-SGS-ICD-002 | Data Producer to Archive ICD (DPAICD) |
| RD11 | http://doi.org/10.1051/0004-6361/202038245 | Instrument paper in A&A: The Solar Orbiter Solar Wind Analyser (SWA) Suite |

## Acronyms, Abbreviations and Terms

| **Abbreviation** | **Meaning** |
| --- | --- |
| CCSDS | Consultative committee for space data systems |
| cdf | Common data format |
| CME | Coronal Mass Ejection |
| DPU | Data Processing Unit |
| EAS | Electron Analyser System |
| ESAC | European Space Astronomy Centre |
| FIP | First Ionisation Potential |
| FOV | Field of view |
| HIS | Heavy Ion System |
| LL | Low Latency |
| LLDPDD | Low Latency Data Product Definition Document |
| MHD | Magneto-Hydro-Dynamics |
| MOC | Mission Operations Centre |
| NM | Normal Mode |
| OBT | On board time |
| PAS | Proton Analyser System |
| PHA | Pulse Height Analysis |
| RPW | Radio Plasma Wave |
| S/C | Spacecraft |
| SCET | Space craft elapsed time |
| SEGU | Solar Orbiter engineering guidelines for external users |
| SOAR | Solar Orbiter Archive |
| SOC | Spacecraft Operations Centre |
| SSMM | Solid State Mass Memory |
| SWA | Solar Wind Analyser |
| TBC | To Be Confirmed |
| TBD | To Be Determined |
| TOF | Time of Flight |
| UTC | Universal coordinated time |
| VA | Virtual Appliance |
| VDF | Velocity Distribution Function |
| SOAR | Solar Orbiter Archive |
| OT | Operations Team at MSSL |
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# SWA Instrument Description

## Science Objectives

The overarching objective of SWA is to provide the comprehensive in situ measurements of the solar wind, which are critical if we are to establish the fundamental physical links between the Sun’s highly dynamic and inhomogeneous magnetised atmosphere and the solar wind in all its quiet and disturbed states.

This critical step requires comprehensive in-situ measurements of the various constituents of the solar wind plasma including high time resolution velocity distributions of solar wind ions and electrons and composition up to suprathermal energies – for example, the measurement of heavy ion charge states reflect coronal temperatures at their source. These measurements are vital if we are to discover the fundamental links between e.g. solar eruptions, shocks and the suprathermal ions that are the seed populations of hazardous solar particle events.

The SWA sensors will sample comparatively pristine solar wind plasma at the closest ever distances to the Sun, but also assess their radial evolution. This will provide key information on the evolution of the solar wind with distance from the Sun, providing a separation of those processes which are inherent in the solar wind itself from those which play a role in the formation of the wind near to the Sun. Furthermore, the SWA will for the first time measure the near-Sun solar wind at higher latitudes revealing the latitudinal dependence of these near-Sun phenomena as the spacecraft climbs out of the ecliptic. Solar Orbiter will thus extend our direct measurements of space plasmas into a new realm that will transform our view of the connections from the solar atmosphere into the solar wind, and help us project this understanding to other stellar environments. For further details see RD5.

SWA consists of four separate sensors, 2 Electron Analysers (EAS), a Proton/Alpha sensor (PAS) and a Heavy Ion Sensor (HIS). These sensors are connected to the central Data Processing Unit (DPU) that packets the sensor data and transmits them to the SSMM.

## SWA Operational Modes

The SWA sensors can each be operated in a variety of operational modes. These modes are sensor independent, meaning that each sensor can be a different mode from the other two sensors. The available modes are detailed below.

### Normal Mode

The default operating mode of all the SWA sensors is the ‘Normal Mode’. In this mode the full 3d data set from each sensor will be sent to the SSMM at the default cadence.

### Burst Mode

In ‘Burst Mode’, EAS, HIS and PAS data will be sent to the SSMM at higher cadences. This applies to various data types, not just Normal Mode. This is explained in detail below.

### Triggered Mode

This mode only applies to EAS. During Normal mode, the full, 1 second, 3d data is stored on a rolling buffer that can hold 5 minutes of data. Upon receipt of a ‘trigger’ from the RPW instrument. The entire, 5 minute buffer will be frozen and sent to the SSMM.

### Engineering Mode

All the SWA sensors have the ability to perform some calibration/engineering work. This data is intended to monitor the ‘health’ of the sensors in order to maintain the optimimum sensor configuration. In the event of sensor faults, the engineering mode data can be used in fault diagnosis.

## Calibration

### On-ground Calibration

#### EAS On-ground Calibration

The SWA-EAS instrument has been integrated and calibrated in a number of different phases. In the first phase, MCP pre-selection and characterisation of the MCPs were carried out at LPP, followed by characterisation and performance of the integrated detector and readout subsystem. This included a detailed characterisation of the front-end readout ASICs and a determination of temperature response of the subsystem. Following the integration of the full SWA-EAS FM, the primary phase of the FM ground calibration activity was carried out at UCL/MSSL, where a full calibration of both SWA-EAS sensor heads was performed using dedicated electrical ground support equipment (EGSE) to rotate the sensor within an electron beam of known energy set up in the laboratory’s LEPIC (Low Energy Plasma Instrument Calibration) vacuum chamber. The purpose of this activity was to determine the sensor performance parameters, including the sensor k-factors, relative geometric factors, and the energy and angular response.

#### PAS On-ground Calibration

The PAS on-ground calibration has been performed on the EQM, PFM and the FS using a large diameter, 300eV - 10 keV, He++beam.

The resulting calibration data file contains the following:

***A(ie, iel, iaz)*** The effective aperture in cm2 for each energy, ie = [0….95], each elevation, iel = [0…8], and each azimuth direction, iaz = [0….10] . Thus this is a (96, 9, 11) array. Note that these values already contain cosines since they are the results of the measurement. They also contain the detector efficiency as a function of the energy and individual CEM properties. These values may be updated in flight.

***ΔE(ie, iel, iaz) / E*** The unit-less energy resolution. It is also a (96, 9, 11) array. These values will also be updated in flight if the stepping voltages in the PAS sequencer are modified.

***Ω(ie, iel, iaz)*** The solid angle resolution in steradians (sr). It is also a (96, 9, 11). These values will be updated in flight if the stepping voltages in the PAS sequencer are modified.

***E(ie, iel, iaz)*** The energy per charge in electronvolts (eV). It is also a (96, 9, 11). These values will be updated in flight if the stepping voltages in the PAS sequencer are modified.

***Elev(ie, iel, iaz)*** The elevation angles, rad. It is also a (96, 9, 11). These values will be updated in flight if the stepping voltages in the PAS sequencer are modified.

***Az(iaz)*** Azimuth angles in radians (rad). This is an array of 11 values.

***ΔW(ie, iel, iaz)*** The integrating velocity volume in (cm3 sr / s3). This volume is defined by the measurement scheme rather than the calibration.

For the onboard moments calulation special tables will be included in the calibration data to include:

* Proton velocity value which depends on energy bin index *ie*



Here  is the *E(ie, iel, iaz)* averaged over Elevation and Azimuth

* Elevation angle which depends on elevation bin number *iel*



* Sines and cosines of the main directions, calculated from Aziaz and Eleviel

Sin(Aziaz), Cos(Aziaz), Sin(Eleviel), Cos(Eleviel)

* The Count to partial density conversion factor :



Here,  and is the “velocity”geometrical factor in cm2sr

#### HIS On-ground Calibration

SWA-HIS has been characterised at both subsystem and instrument levels, with subsystem testing taking place at UMich,SwRI, UNH, GFSC, and IRAP. SWA-HIS has been calibrated at the instrument level at three different facilities, during four test sessions. Overall, during these test sessions, a number of aspects of sensor performance were assessed. These included the following: aliveness of the sensor; communication at various speeds; co-incidence logic; energy, elevation, and azimuth acceptance and resolution; TOF and energy resolution for various species; TOF and energy range; constant fraction discrimination thresholds on detectors; operation at high fluxes; and proton and alpha rejec-tion capability. More details can be found in the SWA Instrument paper (RD11).

### In-flight Calibration

#### EAS In-flight Calibration

The EAS in-flight calibration procedure varies the CEM HV and registers the CEM counts. The HV value that corresponds to the plateau of CEM counts is used as a nominal CEM HV until a next CEM gain adjust. This calibration is run by the DPU with a special engineering mode. The results of this are returned as a Low Latency product.

#### PAS In-flight Calibration

The PAS in-flight calibration consists of two parts:

1. CEM gain adjustment. This procedure varies the CEM HV and registers the CEM counts. The HV value that corresponds to the plateau of CEM counts is used as a nominal CEM HV until a next CEM gain adjust. To perform this calibration the DPU starts the “CEM Calibration” procedure. The results of this are returned as a Low Latency product.
2. HVPS levels calibration. This procedure provides a check of the HVPS optics voltages stability. To perform this calibration the DPU sets PAS to the “Ready\_To\_Science” state and then sends the “Engineering scheme” command. The results are packeted in the regular PAS HK packet.

#### HIS In-flight Calibration

# DATA GENERATION AND ANALYSIS PROCESS

The SWA science products are produced by the SWA Instrument Team. The data generation and analysis process is described in this section.

Science data received by the SOC from the SWA team are made available to end users through the Solar Orbiter archive following the policies described in the Archiving Plan [RD8].

The procedure for delivery of the Science data from the SWA Instrument Team to the SOC will be fully compliant with the IT-SOC Science Data Delivery ICD (TBW).

## Scientific Measurement

### EAS

Each of the 2 EAS sensors measure electrons distributed over a spectrum of 64 energies, a 360o azimuthal range of 32 anodes and a 90o altitudinal range of 16 elevations, every second. Individually, each EAS will produce [64,32,16] arrays of data every second. Used together, the 2 EASs provide a full, 3d velocity space distribution covering the 4π space surrounding the EAS instrument every second.

The EAS instrument can operate in various modes or states that will return different subsets of the original 3d data. These are:

* **Normal Mode**: The two EAS sensors each send their respective sampling of the 3D VDF to the DPU every second. The DPU stores these data in a 5-minute rolling buffer. Every 100 seconds one full 64 × 32 × 16 3d distribution from each EAS is compressed and sent to the SSMM.
* **Single Strahl**: Every 100 seconds (offset by 50 seconds from the selection above) a single energy bin slice of the full 3d distribution of each EAS is compressed and sent to the SSMM for telemetry as a low-latency data product. The data array dimensions for this product are thus 2 × 1 × 32 × 16.
* **Burst Mode**: On command, the SWA DPU will place the EAS sensors into burst mode. The DPU will steer the SWA measurements with reference to the magnetic field unit vector provided by the MAG instrument over the Service 20 ’Inter Instrument Communication’ feed at 0.125 second cadence. In response, the EAS sensor whose central plane of field of view passes closest to the magnetic field direction makes measurements at only 2 elevations (but full energy and azimuth). These 2 elevations are chosen such that one set of observations includes the direction along the B-field direction, and the other along the anti-parallel direction. Given that only 2 elevations are sampled in this mode, the resulting 1 × 64 × 32 × 2 array of data can be captured every 0.125 second and transmitted to the DPU for addition to the SSMM and the telemetry stream. These data product can be reassembled on the ground to provide a measurement of the 2D pitch angle distribution of electrons (with some gyrophase information) at 0.125 second cadence.
* **Triggered Mode**: Autonomously, and following the receipt of a trigger flag over the Service 20 ’Inter Instrument Communication’ feed , the SWA/DPU will freeze the rolling buffer containing 5 minutes of 1-second-cadence, samples of the full 3d velocity distribution from each SWA/EAS sensor. The DPU will transmit the resulting 300 samples of 2 × 64 × 32 × 16 data arrays to the SSMM for inclusion in the SWA telemetry stream. It is expected that the trigger flag will be set by the RPW instrument in response to an autonomous evaluation of whether combined in situ data suggests the passage of an event of scientific interest (e.g. an interplanetary shock) passed the spacecraft in the previous 5 minute period.
* **Onboard partial moments**: Every 4 seconds the DPU selects the 3D VDF measurements from each sensor and performs a partial moment calculation (over 3 subsets of energy range and 2 angular ranges for each sensor) and adds the resulting 168 parameters to the SSMM for inclusion in the telemetry stream. Optionally, in the event of low counts, the DPU will add 4 consecutive measurements from EAS and then perform the moment calculation.

The relationship between the EAS modes and states and the DPU is illustrated in Figure 3.1 below.



Figure 3.1: SWA EAS data flow within the sensors and DPU

The DPU will use the full 3d velocity space distributions from both EASs and create a set of on-board electron moments every 4 seconds that are transmitted to the SSMM. The scheme for generation of the onboard moments from EAS by the DPU is shown in Figure 3.2 below.



Figure 3.2: EAS Moment generation scheme

Together with the Housekeeping from each EAS, there are also various engineering modes that allow instrument health monitoring and fault diagnosis to be performed on a semi-regular basis (~1 per week, for a limited duration) in order to ensure that the sensor is maintained in optimum configuration.

### PAS

The Proton-Alpha Sensor (PAS) is designed to continuously determine the 3D distribution functions of the dominant ions of the solar wind, from 200 eV to 20 KeV, without mass and charge selection. In practice, this concerns mostly the proton and alfa populations. These measurements are used to calculate the density, speed, pressure and temperature tensors of the main component of the solar wind.

At full resolution, PAS measures the 3D ion distribution function, in the form of arrays of 96 energies, 11 azimuth angles and 9 elevation angles, in about ~1 second. The energy and the angle of elevation are selected by imposing different high voltages to the electrodes of the deflection system and the electrostatic analyzer. The 11 azimuthal angles correspond to the 11 detectors of the instrument (channeltron’).

In "burst" mode, the measurement rate can reach up to 20 Hz. The phase space sampling is then reduced, for example by 24 energies and 5 deflections, which allows to increase the time cadence of distribution functions measurements. An algorithm (peak tracking procedure) is used to select the peak of the distribution and to center sampling around this peak.

The different types of sampling are programmed in the form of cyclograms. They define the operation of the instrument over periods of several days. In normal mode, the functions are measured every 4 s with, every 300 s, a short burst mode of 9 s (SnapShot). ‘Long’ burst mode is also acquired every day, consisting in 300 s of continuous sampling at high cadence. The sampling frequency during burst or snapshots is generally of 4 distributions / s (4 Hz analysis).

#### PAS frames and samplings

##### Frames and bins location

Figure 3.3 shows the Elevation and angle angles relatively to PAS. Figure 3.4 shows the same in the spacecraft frame. Note the solar orbiter frame corresponds to the RTN Heliocentric frame most of the time with XRT N = −XSC , YRT N = −YSC .

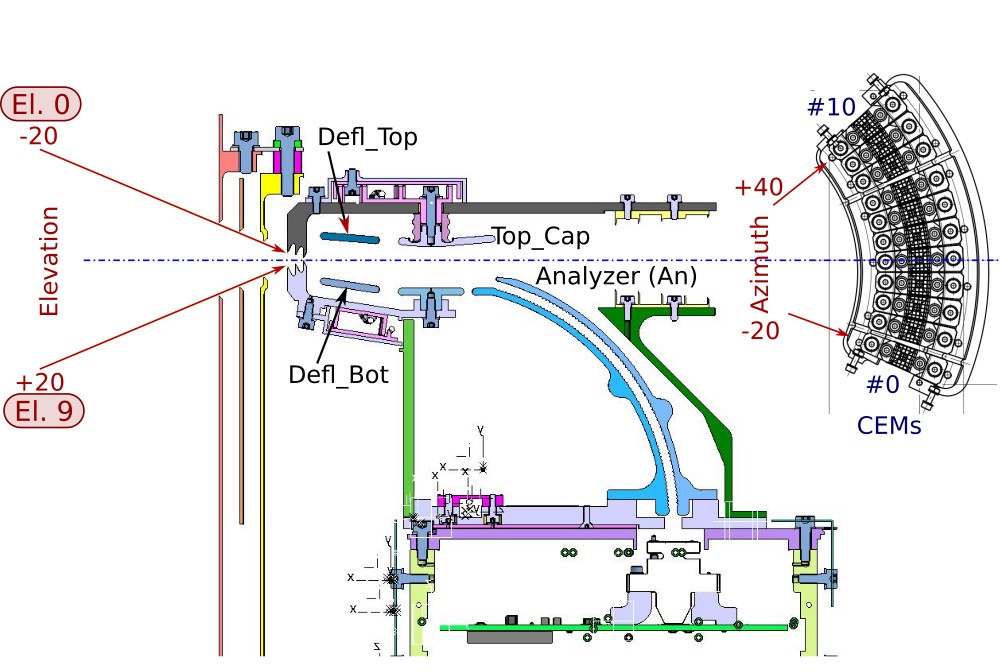


Figure 3.3: Elevation and azimuth bins and angles in the PAS analyzer frame. The CEMs plane (detector plane) is shown from the Analyzer.

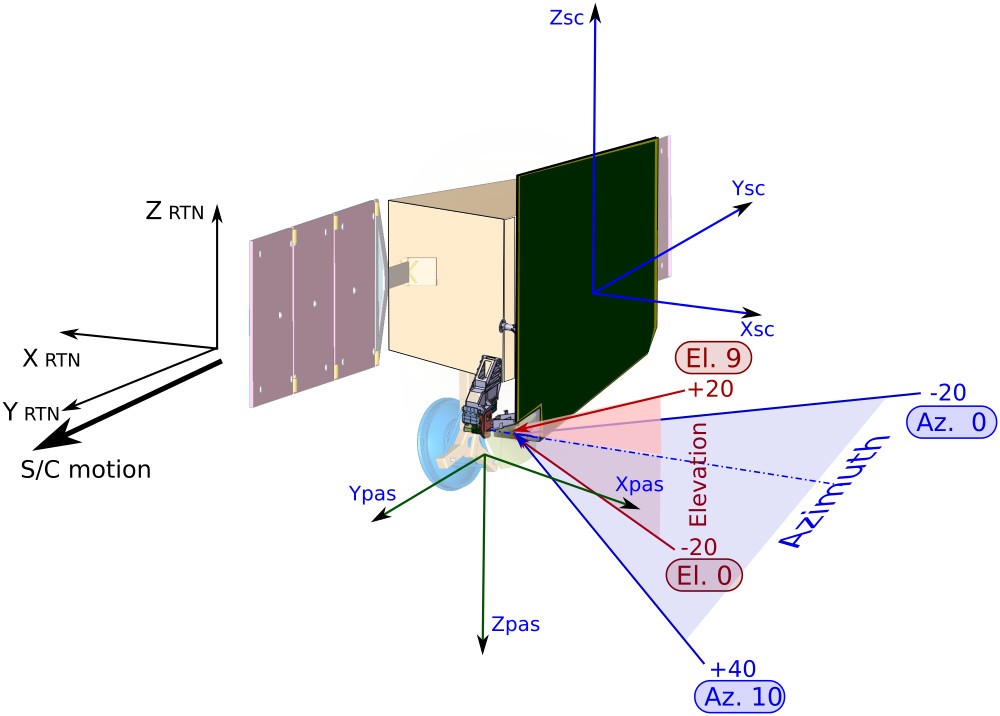


Figure 3.4: Elevation and azimuth bins in the Solar Orbiter frame.

Thus the **ion velocity** unit vector corresponding to the given bin is calculated as follows: For the PAS frame:

*X* = *−cos*(*El*)  *cos*(*Az*)

*Y* = *−cos*(*El*) *· sin*(*Az*)

*V P AS*

*V P AS*

*Z* = *sin*(*El*)

*V P AS*

For the Solar Orbiter (SFR) frame:

*X* = *−cos*(*El*) *· cos*(*Az*)

*V SF R*

*Y* = *cos*(*El*) *· sin*(*Az*)

*V SF R*

*Z* = *−sin*(*El*)

*V SF R*

##### PAS sampling organization

PAS performs the energy-elevation sweep as shown in Figure 3.5. PAS keeps a constant energy while sweeping the elevations. During the sweeping along one elevation bin, PAS accumulates counts in all 11 azimuth bins simultaneously. The result of a complete energy-elevation sweep is a matrix of [11 azimuth, 9 elevations, 96 energies] counts (called ‘sampling’). The real sweeps do not cover the full energy-elevation range when ‘reduced sampling’ are programmed. The reduced sampling may consist of, for example, [11 azimuth, 3 to 7 elevations, 10 to 73 energies]). Supporting information are provided about the start/number of the energy steps and the elevation bins. Since a “peak tracking” procedure runs permanently, the position of the energy x elevation window inside the 9 x 96 frame can change at any time.

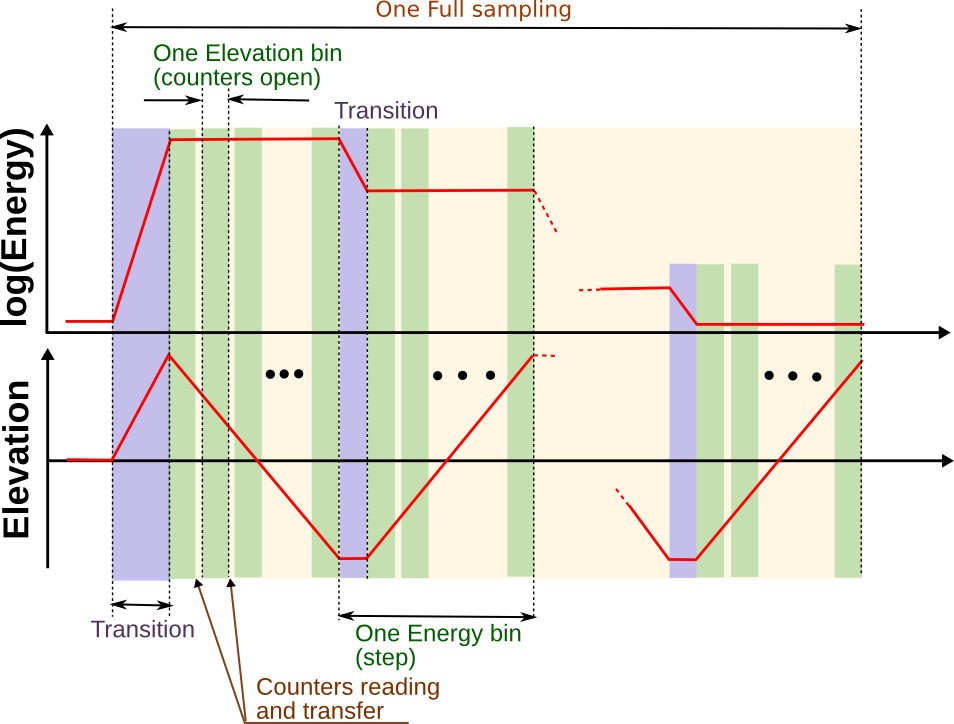


Figure 3.5: PAS measurements scheme

Normally the PAS cyclogram is looking as shown in Figure 3.6. PAS produce one sampling per 4 s. Every 100 s PAS measure a ‘full 3D’ distribution (96 energies x 9 elevations x 11 azimuths) to apply the peak tracking procedure and adapt the energy/elevation window to the solar wind velocity vector. Each 300s PAS performs fast measurements called “SnapShot”. PAS provides “K” number of samplings per second without gaps. These fast cadence snapshots start with a full 3D sampling (to determine the peak of the distribution) and continue with a variable number of reduced sampling, for a total duration of 9 s. The most classically used snapshot is; 1 full 3D + 8x4 reduced samplings (for example, 48 energies and 5 elevations). The long fast measurements, called “Burst Mode” is performed by the ground TC. The nominal duration of the “Burst Mode” is 300s.

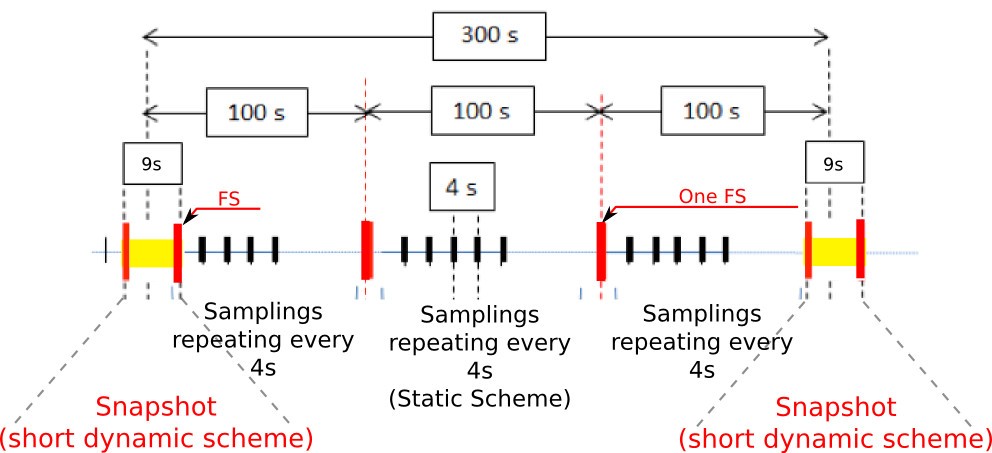


Figure 3.6: PAS Normal mode implementation

#### Caveats

For the moment (16th Oct 2020) the PAS L2 data caveats are as follows:

* + 1. 3D velocity distribution function and 1D differential energy flux are not optimal and are noisy inside the energy range [300 - 500] eV. The geometrical factor of the instrument is decreasing for these energies and a statistical count noise can cause perturbed VDF values.
    2. 3D velocity distribution function and 1D differential energy flux could be irrelevant for energies below 300 eV. The geometrical factor of the instrument is very small here and it cannot be determined with a sufficient accuracy.
    3. In relation with (1), ground calculated density and pressure tensor are not optimal and are noisy inside the solar wind velocity range [260 - 380] km/s.
    4. In relation with (2), ground calculated density and pressure tensor are irrelevant for the solar wind velocity below 260 km/s.

The PAS sensor measures protons and alpha particles distributed over a spectrum of 96 energies, a 66o azimuthal range of 11 anodes and a 45o altitudinal range of 9 elevations, every second. PAS can produce [96,11,9] arrays of data every second.

The relationship between the PAS modes and states and the DPU is illustrated in Figure 3.7 below.



Figure 3.7 SWA PAS data flow within the sensors and DPU

From the normal 3D distributions, SWA DPU will calculate a set of proton/alpha moments every four seconds. The PAS moment product will consist of a single density value, a 3-element velocity vector, and 6 terms from a 9-element pressure tensor. Twenty-five PAS moment products will be packeted into one ccsds packet with the appropriate headers and sent to the SSMM LL01 packet store.

In order to ensure that the sensor is maintained in optimum configuration, the raw PAS data can also contain engineering mode data that allows instrument health monitoring of temperatures and voltages, and fault diagnosis to be performed on a semi-regular basis (~1 per week, for a limited duration). Some of this data will be compressed, packeted with header and sent to the SSMM LL01 packet store. The engineering mode data in the Low Latency packets will be used by the PAS team only. There will be no requirement of the SOC team to process this data.

### HIS

The HIS sensor is a time-of-flight – energy (TOF-E) ion mass spectrometer which measures ions up to 56 amu, identifying them by both mass and charge. The E/q, time-of-flight (TOF) and total energy of ion are measured, along with elevation and azimuthal angle from which they arrived. These measurements are grouped together for a single ion in ion event (PHA) words. (PHA refers to “pulse-height analysed” and is the historic name for ion event words.)

The number of ion event words telemetered for each energy scan is fixed but configurable, based on available resources. Typically, far more events can be measured than can be downlinked, so a sampling algorithm is employed to select the sample sent to the ground. This algorithm works as follows:

1. All ion event words from an E/q scan are divided into 5 priority ranges, based on their average abundance in the solar wind. Priority ranges are defined by large Energy-TOF boxes, defined separately for each E/q.
2. Events are chosen at random from each of these ranges, with the more events selected from ranges containing less abundant ions. In cases where there are insufficient events present in a given range, that number is added to those to be taken from the next range (and so on).
3. The number of events in each range, subdivided by E/q and angle, are recorded to correct the weighting of telemetered ion event words for the effect of the sampling algorithm. For example, if the on-board count (priority rate) for a given E/q step and elevation bin is 10, but only 5 of these ion event words were included in telemetry, then each event word counts for 2 in further processing.

HIS will return several types of data packet that are described in the following sections. The rates of these packets will depend on the operating mode:

* **Normal Mode**. In Normal mode, HIS returns packets every 30 seconds.
* **Normal Low Cadence Mode (Normal LC)**.In Normal mode, HIS returns packets every 300 seconds.
* **Burst Mode**. In Burst mode, HIS returns packets every 4 seconds.

There is also an engineering mode that allows instrument health monitoring and fault diagnosis to ensure that the sensor is maintained in optimum configuration.

In order make maximum use of the variable data volume throughout the mission, i.e. to “fly the telemetry (TM) corridors “properly, HIS needs more data rate options than the those defined above. The new set of HIS mode – data combinations+ data products is given in the following table (originals in **bold**). Each is built off an original mode by including additional data products into telemetry. Since these products are assembled by the flight software anyway, the power used is that same as for the original mode on which a new mode is based. The housekeeping data rate is set independently, so it is not tied to any of these combinations.

|  |  |  |  |
| --- | --- | --- | --- |
| **Mode – Data Combination** | **Ratio to Normal (target)** | **Rate (kbits/s)** | **Name** |
| **Normal LC** | **0.1** | **0.53** | **SWA\_HIS\_LOW\_1TENTH**  **SWA\_HIS\_LOW\_BURST\_1TENTH** |
| **Normal LC + 1 full VDF + 1.5x PHAs** | **0.25** | **1.32** | **SWA\_HIS\_LOW\_QUARTER**  **SWA\_HIS\_LOW\_BURST\_QUARTER** |
| **Normal LC + 1 full VDF + 2x PHAs** | **0.50** | **2.68** | **SWA\_HIS\_LOW\_HALF**  **SWA\_HIS\_LOW\_BURST\_HALF** |
| **Normal LC + 1 full VDF + 4x PHAs** | **0.66**  **(1.0)** | **3.44** | **SWA\_HIS\_LOW\_2THIRDS**  **SWA\_HIS\_LOW\_BURST\_2THIRDS** |
| **Normal** | **1.0** | **5.3** | **SWA\_HIS\_NORMAL**  **SWA\_HIS\_NORMAL\_BURST** |
| **Normal + 1 full VDF** | **2.1** | **11.33** | **SWA\_HIS\_NORMAL\_2X**  **SWA\_HIS\_NORMAL\_BURST\_2X** |
| **Normal + 1 full VDF + 2.2x PHAs** | **3.0** | **15.90** | **SWA\_HIS\_NORMAL\_3X**  **SWA\_HIS\_NORMAL\_BURST\_3X** |
| **Normal + 3 full VDFs + 2x PHAs** | **5.1** | **26.79** | **SWA\_HIS\_NORMAL\_5X**  **SWA\_HIS\_NORMAL\_BURST\_5X** |
| **Burst** | **10.1** | **52.13** | **N/A** |

Table 2: Suggested names for HIS operational modes for inclusion into SOOP Kitchen.

### SWA L0 Data

The data described above are returned in individual CCSDS packets. Once on the ground, these packets are de-commutated and uncompressed to form the L0 raw data packets. These files are still in CCSDS format and are saved in binary format.

The MSSL Operations team is responsible for retrieving the raw CCSDS data and creating the L0 binary packets. The process used to create these data files is a simple C code that searches on the data type, subtype and SID. If the data is compressed it is passed through an uncompressor before being grouped into appropriate files. Table 3.1 shows how the data files are grouped together.

#### SWA PAS L0 data specificity

PAS L0 data is constituted from a single binary file, grouping together all PAS ccsds telemetry packets (Housekeeping, Science data, In-flight calibration), corresponding to the list given in Table 3.1.

Moreover, the PAS L0 data processing software is able to filter out all ccsds packet that are not relative to PAS, and should handle L0 binary files containing all SWA telemetry packets (PID 95..99), and no special filtering by MSSL is possible.

|  |  |
| --- | --- |
| **SWA L0 Data filename** | **Possible Contents**  **Type, SubType, SID, SCOS\_ID** |
| solo\_L0\_swa-dpu-REP\_[YYYYMMDD]\_V01.bin | 200, 248, 0, YIA58970  200, 249, 0, YIA58166  200, 250, 0, YIA58900  200, 251, 0, YIA58901  200, 252, 0, YIA58902  200, 253, 0, YIA58903  201, 200, 0, YIA58904  202, 200, 0, YIA58905  203, 200, 0, YIA58906 |
| solo\_L0\_swa-dpu-HK\_[YYYYMMDD]\_V01.bin | 3, 25, 11, YIA58200  3, 25, 14, YIA58211  3, 25, 15, YIA58998  3, 25, 20, YIA58216  3, 26, 4, YIA58204  3, 26, 5, YIA58205  3, 26, 6, YIA58206  3, 26, 7, YIA58207  3, 26, 8, YIA58208  3, 26, 9, YIA58209  3, 26, 10, YIA58210  3, 26, 12, YIA58214  3, 26, 13, YIA58215 |
| solo\_L0\_swa-eas1-NM\_[YYYYMMDD]\_V01.bin | 21, 3, 0, YIA58703  21, 6, 1, YIA58704  21, 3, 2, YIA58708 (Uncompressed)  21, 6, 3, YIA58709 (Uncompressed) |
| solo\_L0\_swa-eas1-SS\_[YYYYMMDD]\_V01.bin | 21, 6, 8, YIA58712  21, 6, 9, YIA58713 (Uncompressed) |
| solo\_L0\_swa-eas1-TM\_[YYYYMMDD]\_V01.bin | 21, 3, 5, YIA58716 (Uncompressed)  21, 3, 6, YIA58720 (Uncompressed)  21, 6, 7, YIA58724 (Uncompressed)  21, 3, 10, YIA58717  21, 3, 11, YIA58721  21, 6, 12, YIA58725 |
| solo\_L0\_swa-eas1-ENG\_[YYYYMMDD]\_V01.bin | 21, 3, 13, YIA58917  21, 3, 14, YIA58927 (Uncompressed)  21, 3, 14, YIA58946 (Uncompressed)  21, 3, 15, YIA58929 (Uncompressed)  21, 3, 15, YIA58948 (Uncompressed)  21, 6, 16, YIA58931 (Uncompressed)  21, 6, 16, YIA58950 (Uncompressed)  21, 3, 17, YIA58920  21, 3, 17, YIA58940  21, 3, 18, YIA58921  21, 3, 18, YIA58942  21, 6, 19, YIA58922  21 6, 19, YIA58944 |
| solo\_L0\_swa-eas1-HK\_[YYYYMMDD]\_V01.bin | 3, 25, 1, YIA58201 |
| solo\_L0\_swa-eas2-NM\_[YYYYMMDD]\_V01.bin | 21, 3, 30, YIA58701  21, 6, 31, YIA58702  21, 3, 32, YIA58706 (Uncompressed)  21, 6, 33, YIA58707 (Uncompressed) |
| solo\_L0\_swa-eas2-SS\_[YYYYMMDD]\_V01.bin | 21, 6, 38, YIA58710  21, 6, 39, YIA58711 |
| solo\_L0\_swa-eas2-TM\_[YYYYMMDD]\_V01.bin | 21, 3, 35, YIA58714 (Uncompressed)  21, 3, 36, YIA58718 (Uncompressed)  21, 6, 37, YIA58722 (Uncompressed)  21, 3, 40, YIA58715  21, 3, 41, YIA58719  21, 6, 42, YIA58723 |
| solo\_L0\_swa-eas2-ENG\_[YYYYMMDD]\_V01.bin | 21, 3, 43, YIA58918  21, 3, 44, YIA58947 (Uncompressed)  21, 3, 44, YIA58926 (Uncompressed)  21, 3, 45, YIA58928 (Uncompressed)  21, 3, 45, YIA58949 (Uncompressed)  21, 6, 46, YIA58930 (Uncompressed)  21, 6, 46, YIA58951 (Uncompressed)  21, 3, 47, YIA58923  21, 3, 47, YIA58941  21, 3, 48, YIA58924  21, 3, 48, YIA58943  21, 6, 49, YIA58925  21 6, 49, YIA58945 |
| solo\_L0\_swa-eas2-HK\_[YYYYMMDD]\_V01.bin | 3, 25, 2, YIA58202 |
| solo\_L0\_swa-eas-MOM\_[YYYYMMDD]\_V01.bin | 21, 3, 20, YIA58727 |
| solo\_L0\_swa-eas-BM\_[YYYYMMDD]\_V01.bin | 21, 6, 4, YIA58726 (Uncompressed)  21, 6, 4, YIA58889 (Uncompressed) |
| solo\_L0\_swa-pas\_[YYYYMMDD]\_V01.bin | 3, 25, 3, YIA58203  21, 3, 192, YIA58700  21, 6, 193, YIA58705  21, 3, 194, YIA58977 (Uncompressed)  21, 6, 195, YIA58978 (Uncompressed)  21, 3, 196, YIA58979 (Uncompressed)  21, 3, 197, YIA58986 (Uncompressed)  21, 6, 198, YIA58987 (Uncompressed)  21, 3, 199, YIA58980  21, 3, 200, YIA58988  21, 3, 201, YIA58989  21, 3, 202, YIA58981 (Uncompressed)  21, 3, 203, YIA58990 (Uncompressed)  21, 6, 204, YIA58991 (Uncompressed)  21, 3, 205, YIA58982  21, 3, 206, YIA58992  21, 6, 207, YIA58993  21, 3, 208, YIA58883 (Uncompressed)  21, 3, 208, YIA58983 (Uncompressed)  21, 3, 209, YIA58884 (Uncompressed)  21, 3, 209, YIA58994 (Uncompressed)  21, 6, 210, YIA58885 (Uncompressed)  21, 6, 210, YIA58995 (Uncompressed)  21, 3, 211, YIA58886  21, 3, 211, YIA58984  21, 3, 212, YIA58887  21, 3, 212, YIA58996  21, 6, 213, YIA58888  21, 6, 213, YIA58997  21, 6, 214, YIA58985  21, 6, 215, YIA58729 |
| solo\_L0\_swa-his-TEST\_[YYYYMMDD]\_V01.bin | 21, 3, 191, YIA58968 (normal)  21, 3, 191, YIA58969 (burst) |
| solo\_L0\_swa-his-CONFIG\_[YYYYMMDD]\_V01.bin | 21, 3, 128, YIA58800 (normal)  21, 3, 128, YIA58801 (burst) |
| solo\_L0\_swa-his-PHA\_[YYYYMMDD]\_V01.bin | 21, 6, 128, YIA58808 (normal)  21, 6, 128, YIA58809 (burst) |
| solo\_L0\_swa-his-MATRIX\_[YYYYMMDD]\_V01.bin | 21, 6, 129, YIA58802 (normal)  21, 6, 129, YIA58803 (burst) |
| solo\_L0\_swa-his-VDF\_[YYYYMMDD]\_V01.bin | 21, 6, 130, YIA58806 (normal)  21, 6, 130, YIA58807 (burst) |
| solo\_L0\_swa-his-PRIO\_[YYYYMMDD]\_V01.bin | 21, 6, 131, YIA58804 (normal)  21, 6, 131, YIA58805 (burst) |
| solo\_L0\_swa-his-LL\_[YYYYMMDD]\_V01.bin | 21, 6, 132, YIA58810 (normal)  21, 6, 133, YIA58811 (burst)  21, 6, 134, YIA58812 (burst) |
| solo\_L0\_swa-his-HK\_[YYYYMMDD]\_V01.bin | 3, 25, 100, YIA58213  3, 25, 101, YIA58212  3, 25, 102, YIA58184 |

Table . Level L0 grouping of raw packets

## Data Flow Overview



Figure 3.8. SWA data flow schematic

The SWA data processing flows from the MOC data delivery service through a series of processing pipelines and back out to the SOC archive and other archives as illustrated in Figure 3.8

In Figure 3.8 there are six distinct pipelines, shaded green:

1. SWA L0 Pipeline: This is located at MSSL. It retrieves the data from the EDDS and performs a first unpack, decommutating the ccsds packets into relevant files for HIS, PAS and EAS. If a packet has been compressed on-board, it will be uncompressed in this pipeline. The decommutated and uncompressed ccsds packet files are grouped together in 24 hour files and stored at MSSL. They are available to the wider SWA team.
2. SWA Low Latency Pipeline: This pipeline is identical to the SWA pipeline hosted as a virtual machine at SOC. This pipeline will take SOC raw data and produce L0 .cdf files. These will be stored in the MSSL L0 data store.
3. PAS/HIS/EAS L1, L2, L3 Pipeline: These pipelines are hosted at the relevant institute. The pipeline will be fed the L0 data and produce the L1, L2 and L3 data products. These pipelines may also use external data. The higher level products will then be piped back to MSSL where they will be archived.
4. SWA Archive Pipeline: This pipeline simply takes the higher level data products and sends them to the relevant external archives.

## Data Generation

The following sections describe the process used to produce the data products described in section 4.

### SWA L1 Data

The SWA L1 data is the uncalibrated, uncompressed L0 data in CDF format. The individual sensor teams are responsible for generating SWA L1 data from the L0 packets. These CDF files will have the ccsds header data and the ccsds science data combined.

#### SWA EAS L1 Data

MSSL is responsible for generating the SWA EAS L1 data form the L0 source. The EAS L1 data products are, for each EAS, as follows:

* Normal Mode Spectra in counts, one set for each EAS sensor. The angular bin directions are in the EAS sensor reference frames.
* Burst Mode spectra in counts, from one sensor viewing the magnetic field direction. The angular bin directions are in the relevant EAS sensor frame.
* Triggered Mode Spectra in counts, one set for each EAS sensor. The angular bin directions are in the EAS sensor reference frames. This data is at the highest cadence of 1 3d sweep per second for a period of 5 minutes.
* Partial moments calculated on board (6 sets per EAS sensor) in physical units. The frame references are the EAS sensor reference frames.
* Engineering mode data.

#### SWA PAS L1 Data

IRAP is responsible for generating the SWA PAS L1 data form the L0 source. The PAS L1 data products are as follows:

* PAS 3D spectra: unique dataset merging data from various modes (Normal mode, Burst mode and Snapshots). The angular bin directions are in PAS frame. Data records are in chronological order, but with a variable time-resolution, depending on various modes.
* Onboard moments in physical units. In the PAS frame of reference.
* Engineering data: housekeeping parameters, in physical values (Volt, mA, deg.C)
* Inflight Calibration data.

All Data products are made as CDF files according to “SOL-SGS-TN-0009 Metadata Definition for Solar Orbiter Science Data”. As well as being stored in the SWA Master Repository at MSSL with the L0 data. These files will also be stored in CDPP data archive. These files will also be converted to NetCDF format to fit the AMDA tool spec.

#### SWA HIS L1 Data

UMich is responsible for generating the L0 HIS data form the L0 source. This data will be in CDF format. SWA HIS L1 data products are as follows:

* Ion Event (PHA) words. Individual ion event data, containing full information on incident angles (elevation and azimuth), E/q, TOF and SSD energy in digital units. The resolution of this data product can be 30s or 300s. In Burst mode the resolution can be 4s but this can only be run on average 1% of the time due to telemetry constraints. These are downselected for telemetry, so that only a subset are sent to the ground.
* Priority Rates: The full counts (not downselected) of PHA events within a priority range, as a function of E/q and elevation. See below for description of typical use. The resolution of this data product can be 30s or 300s. In Burst mode the resolution can be 4s but this can only be run on average 1% of the time due to telemetry constraints.
* Sensor rates. Counts of unclassified ion event words on the HIS detectors (start MCP, stop MCP, SSD) as a function of E/q, integrated over incident angles, TOF and Energy. Includes full counts of events subject to decimation.S ensor rates also include two coincidence rates: (A) the number of events with a valid TOF and energy (triple coincidence), and (B) a count of those with only a valid TOF (double coincidence). These rates are primarily used to evaluate the performance of the instrument, rather than for science. In particular, they can be used for calculation of ion detection efficiency in-flight [von Steiger et al., 2000]. The resolution of this data product can be 30s or 300s. In Burst mode the resolution can be 4s but this can only be run on average 1% of the time due to telemetry constraints.
* Decimation Rates. Counts of ion event words in each of three TOF ranges as a function of E/q. In order to reduce the processing load in on-board processing caused by light ions and low-TOF noise sources, only a fraction (1 in N) of those events are transmitted to the HIS C&DH board from the HV bubble (i.e. decimated). Separate decimation ranges in E/q and TOF are included for alpha particles, protons and low-TOF events caused by accidental coindences. The fraction transmitted is commandable, from typically 1 in 4 for alphas to zero for low-TOF noise events.
* Rate-Based Velocity Distribution Functions (VDFs): Counts of ion event words for a set of ions subdivided by E/q, elevation and azimuth for a selection of on-board classified ions. Selection of ions to include He2+, C5+, O6+, and Fe10+. Additional ions and charge states may be produced according to science needs and as counting statistics allow. Since these counts are not subject to the effect of the priority sampling algorithm, they represent the best possible statistics. However, because species are separated simply by boxes and no peak overlap removal is performed (see below), the counts are not as accurately assigned to a given species as they would be if formed on the ground. The resolution of this data product can be 30s or 300s. In Burst mode the resolution can be 4s but this can only be run on average 1% of the time due to telemetry constraints.
* Matrix Rates: Counts of ion event words within a specified Energy-TOF range, classified and counted onboard, for each E/q step. Summed over incident angle. HIS has 32 such species boxes intended to roughly select counts of ion event words measured for particular ion species. Classification transforms E/q, TOF and energy into the two dimensions of Energy and TOF. Classification is primarily used for other data products (below and in low-latency). This data product is not in telemetry for most instrument data rates. If resources allow, the following ions may be included are He2+, O6-7+, C4-6+, and Fe10+. Additional ions and charge states may be produced according to science needs and as counting statistics allow. The resolution of this data product can be 30s or 300s. In Burst mode the resolution can be 4s but this can only be run on average 1% of the time due to telemetry constraints.

This data product is not currently being produced for any instrument data configuration. If resources allow, the following ions may be included are He2+, O6-7+, C4-6+, and Fe10+. Additional ions and charge states may be produced according to science needs and as counting statistics allow.

* Low-latency Data. Two rate spectra plus two rate ratios packaged into a single packet. Rate spectra are rate-based VDFs collapsed along both angle dimensions, so that they are only separated by E/q. These packets are handled separately from other science data and are downlinked at high-priority, at essentially the same intervals as housekeeping data.

All Data products are made as CDF files according to “SOL-SGS-TN-0009 Metadata Definition for Solar Orbiter Science Data”. As well as being stored at MSSL, these files shall be stored in NASA’s Space Physics Data Facility (SPDF) data archive.

Illustrations of the higher-level data product flow for EAS and PAS are shown in Figure 3.9 and Figure 3.10 below.



Figure 3.9 Illustration of the SWA-EAS higher level data flow



Figure 3.10 Illustration of the SWA-PAS higher level data flow

### SWA L2 Data

#### SWA EAS L2 Data

The MSSL Operations team is responsible for generating SWA EAS L2 data. The generation of the full set of SWA EASA L2 data products requires a number of auxiliary files including:

* L0 data products;
* EAS Ground Calibration files;
* EAS Flight Calibration files (Obtained from L0 engineering/cal data);
* Spacecraft orbit and attitude information files (e.g. SPICE kernels);
* Spacecraft potential data from the RPW instrument;
* Magnetic field direction associated with each burst mode sample from the MAG instrument.

The set of SWA EAS L2 data products includes the following:

* Normal mode full onboard moment set for electrons in physical units and relevant heliospheric frame (produced by appropriately combining partial moments data with reference to the spacecraft potential from RPW) - at 4 second time resolution;
* Normal mode combined 3D electron distributions expressed as a distribution function with physical units and in a relevant heliospheric frame. These are produced by appropriately combining spectra from the 2 sensors. Time resolution 100 seconds;
* Normal mode combined 3D electron distributions expressed as a differential energy (number) flux and in a relevant heliospheric frame. These are again produced by appropriately combining spectra from the 2 sensors. Time resolution 100 seconds;
* Trigger event combined 3D electron distributions expressed as a distribution function with physical units and in a relevant heliospheric frame. These are produced by appropriately combining spectra from the 2 sensors. Time resolution 1 second for a 5 minute period;
* Trigger event combined 3D electron distributions expressed as a differential energy (number) flux and in a relevant heliospheric frame. These are again produced by appropriately combining spectra from the 2 sensors. Time resolution 1 second for a 5 minute period;
* Burst mode combined 2D electron pitch-angle distributions expressed with physical units and in a frame defined by the magnetic field direction. These are produced by appropriately rebinning the data from 2 elevation scans with respect to the field direction. Time resolution 0.125 seconds for a limited (few minute) period;
* Burst mode combined 2D electron pitch-angle distributions expressed as a differential energy (number) flux and in a frame defined by the magnetic field direction. These are produced by appropriately rebinning the data from 2 elevation scans with respect to the field direction. Time resolution 0.125 seconds for a limited (few minute) period;
* Normal mode combined single energy angle-angle electron distributions expressed as a distribution function with physical units and in a relevant heliospheric frame. These are produced by appropriately combining spectra from the 2 sensors. Time resolution 100 seconds;
* Normal mode combined single energy angle-angle electron distributions expressed as a differential energy (number) flux and in a relevant heliospheric frame. These are produced by appropriately combining spectra from the 2 sensors. Time resolution 100 seconds;
* Ground-calculated electron moments generated from the normal mode combined 3D electron distributions, in physical units and relevant heliospheric frame (produced with reference to the spacecraft potential from RPW) - at 100 second time resolution;
* Ground-calculated electron moments generated from the trigger events combined 3D electron distributions, in physical units and relevant heliospheric frame (produced with reference to the spacecraft potential from RPW) - at 1 second time resolution over a 5 minute period;

Again, all L2 data products described above will be stored, with appropriate metadata, within CDF files according to “SOL-SGS-TN-0009 Metadata Definition for Solar Orbiter Science Data”. These files will be stored in the SWA Master Repository at MSSL, along with the L2 data from the other SWA sensors and the auxiliary data generated from the mission. A number (all, subject to discussion?) of these data files will be submitted to the official ESA Solar Orbiter Archive, to the NASA NSSDC archive and the CDPP data archive in France following PI review and approval.

These files may be converted by the MSSL team to appropriate format (e.g. NetCDF format to fit the AMDA tool spec.) as requested by the archives.

#### SWA PAS L2 Data

IRAP is responsible for generating the SWA PAS L2 data and will produce 3 PAS L2 products:

1. 3D velocity distribution function

2. 1D energy differential flux

3. Ground moments

In this section the CDF variables are shown in bold.

##### 3D velocity distribution function data

The 3D velocity distribution function CDF file consists of 3D arrays (variable “**vdf**”) of [11 azimuth, 9 elevations, 96 energies] of the ion number density in the phase space expressed in *s*3 *·m−*6. Since the instant sampling may cover just a part of the full angular-energy range, the data record contains also the start and number of the elevation bins (“**start\_elevation**”, “**nb\_elevation**”), the start and number of the azimuth bins (“**start\_CEM**”,”**nb\_CEM**”), and the start and number of the energy bins (“**start\_energy**”,”**nb\_energy**”). The user shall use only records of the categories (variable “**Info**”) as follows:

1: Normal sampling, one **“vdf”** each 4 sec

2: Snaphot sampling, “**nb\_K**” VDFs per second

3: Burst sampling, “**nb\_K**” VDFs per second

##### 1D Differential Energy Flux

1D Differential Energy flux CDF file contain original velocity distribution function integrated over elevation and azimuth and converted to the differential energy flux. The value is expressed in *cm−*2 *· s−*1 *·eV/eV* . Since the instant sampling may cover just a part of the full energy range, the data record contains also the start and number of the energy bins (“**start\_energy**”,”**nb\_energy**”). User shall use only records of the categories (variable “**Info**”) as follows:

1: Normal sampling, one **“eflux”** each 4 sec

2: Snaphot sampling, “**nb\_K**” **eflux**s per second

3: Burst sampling, “**nb\_K**” **eflux**s per second

##### PAS Ground Moments

Ground moments contain the number density, the velocity vector, the pressure tensor and the temperature of the proton peak, extracted from the 3D VDF. User shall use only records of the categories (variable “**Info**”) as follows:

1: Normal sampling, one measurement each 4 sec

2: Snaphot sampling, “**nb\_K**” measurements per second

3: Burst sampling, “**nb\_K**” measurements per second

The “**validity**” flag shows the data quality. Do not use the data labeled as “1” since the number density and the pressure could be too low. Use the data labeled “2” with attention because the data could be noisy.

The full description are in the Tables below.

All Data products are made as CDF files according to “SOL-SGS-TN-0009 Metadata Definition for Solar Orbiter Science Data”. As well as being stored at MSSL, the PAS L2 files shall be stored in CDPP data archive after a PI review and approvement. These files shall be converted also to NetCDF format to fit the AMDA tool spec.

All PAS L2 data can be delivered to ESAC archive after a PI review and approvement.

#### SWA HIS L2 Data

UMich is responsible for generating the SWA HIS L2 data. To produce the SWA HIS L2 data, the following auxiliary files are required:

* L0 data products
* HIS Ground Calibration files
* HIS Flight Calibration files (Obtained from L0)
* Spacecraft orbit and attitude information files (e.g. SPICE kernels)

UMich will provide the following SWA HIS L2 data products. These are the same products as L1 but in physical units:

* Ion Event (PHA) Words: Full information about measured ion events in physical units, including E/q (keV/e), time-of-flight (ns), total energy (keV) and elevation (degrees) and azimuth (degrees). Three weights are included to convert PHA count to Phase Space Density (s^3m^6); one weight accounts for detector efficiency, one accounts for prioritization scheme effects, and one accounts for unit conversion. These are the primary science data product from HIS and make up the bulk of HIS telemetry volume in Normal and Normal Low Cadence modes.
* Priority Rates: Total counts of ion event words in each priority range, divided by E/q and elevation angle bin. (Duplicate of L1 version.) These rates are used to correct the weighting of telemetered ion event words for the effect of the sampling algorithm. For example, if the priority rate for a given E/q step and elevation bin is 10, but only 5 of these ion event words were included in telemetry, then each counts for 2 in further processing;
* Sensor Rates: L1 Sensor Rates converted to differential flux units, (cm2 s sr keV) -1.
* Decimation Rates: Duplicate of L1 version since conversion to flux units does not makes sense.
* Matrix rates: L1 Matrix Rates converted to flux units, (cm2 s) -1.
* Rate-Based Velocity Distribution Functions: L1 Rate-Base Velocity Distribution Functions converted to differential flux units, (cm2 s sr keV) -1.

### SWA L3 Data

The SWA team may generate further L3 data products as required. At present these are still TBD, except for HIS (see below). Possible data products that can be further generated from the L1 or L2 and auxiliary data files might include:

* EAS Pitch Angle Distributions generated from the Normal Mode 3D distributions with reference to the magnetic field direction (time resolution 100secs);
* EAS Pitch Angle Distributions generated from the Trigger event 3D distributions with reference to the magnetic field direction (time resolution 1 second for a 5 minute period;
* EAS Moments over reduced energy ranges (e.g. by appropriately combining partial moment data to provide a quantification of the plasma characteristics in only the strahl energy range – time resolution 4 seconds – or by moment integration performed on L2 normal mode 3D distributions over a limited energy range – time resolution 100 seconds);
* PAS All sky maps

In the case of SWA HIS, the Level 3 data is the main composition data. The most accurate and scientifically useful data products are formed via a peak overlap removal algorithm to assign counts to individual ion species in ground processing [von Steiger et al., 2000; Shearer et al., 2014}. This algorithm uses a forward model to predict the peak center location of each of the >75 analyzed ions in time-of-flight -- energy space at each E/q step. This forward model, which includes estimated peak width as well center, is developed from ground calibration and in-flight accumulated data. A set of two-dimensional Gaussian curves is formed from these centers and widths and provides an initial estimate of count vectors assigned each species. A maximum-likehood estimation method (MLE) then shuffles counts among these vectors to remove overlap in the statistically optimal way. Events at each pair of incident angle bins are processed independently to preserve distributions in these dimensions. Count vectors from all angle bins are then recombined and converted to phase-space density (s3 km-6) to form 3D velocity distribution functions (VDFs). Moments of density, velocity and temperature are then computed from these VDFs and used to produce the following data products form SWA/HIS:

* Elemental Abundances: Sum of all ion densities for a particular element as a ratio to those of oxygen.
* Ionic Charge States: Density ratios for specified ion pairs or average charge state, computed as density-weighted average
* Charge State Distributions: Normalized distribution of all charge states analyzed for specified element.
* Kinetic Properties: Moments of velocity distribution functions for specified ions. Includes density (cm-3), bulk velocity (km s-1) and temperature (K).
* Velocity Distributions: Phase space density (s3 km-6) in instrument frame, binned according to speed, incident angles (elevation and azimuth).

These are summarized in Table 3.2 below.

|  |  |
| --- | --- |
| **Data Product** | **Time Resolutions**1 |
| **Elemental Abundances** |  |
| Fe/O | 30s, 300s, 4s2 |
| C/O | 30s, 300s, 4s2 |
| He/O | 30s, 300s, 4s2 |
| Mg/O | 30s, 300s |
| Si/O | 30s, 300s |
| Ne/O | 30s, 300s |
| S/O | >300s3 |
| N/O | >300s |
| **Ionic charge states** |  |
| O7+/O6+ | 30s, 300s, 4s2 |
| C6+/C4+ | 30s, 300s, 4s2 |
| C5+/C4+ | 30s, 300s, 4s2 |
| <QO> | 30s, 300s, 4s2 |
| <QC> | 30s, 300s, 4s2 |
| <QFe> | 30s, 300s, 4s2 |
| **Ionic Charge State Distributions** | |
| Qi(O), i =5,..8 | 30s, 300s |
| Qi(C), i=4,..,6 | 30s, 300s |
| Qi(Fe), i=6,…,20 | 30s, 300s |
| Qi(Si), i=6,…,12 | 30s, 300s |
| Qi(Ne), i=8,…,10 | 30s, 300s |
| Qi(Mg), i=5,…,12 | 30s, 300s |
|  |  |
| Qi(N), i=5,6 | 30s, 300s3 |
| Qi(S), i=6,…,14 | 30s, 300s3 |
| **Kinetic properties (n, vbulk, T)** | |
| He2+ | 30s, 300s, 4s2 |
| C5+ | 30s, 300s, 4s2 |
| O6+ | 30s, 300s, 4s2 |
| Fe10+ | 30s, 300s, 4s2 |
| **Velocity Distributions**4 |  |
| He2+ | 30s, 300s, 4s2 |
| C | 30s, 300s, 4s2 |
| O6+ | 30s, 300s, 4s2 |
| Fe10+ | 30s, 300s, 4s2 |

Table . SWA-HIS Level 2 derived data products in physical units

Note 1: These are the possible time resolutions. For some periods in the solar wind, the highest time-resolution will not provide data with sufficient statistical accuracy. The best, most scientifically useful averaging intervals will be determined based on the counting accuracy achievable.

Note 2: Data at this resolution corresponds to HIS Burst mode, which can only be run on average 1% of the time due to telemetry constraints.

Note 3: These elements are more difficult to resolve. Appropriate time resolutions will be determined in flight.

Note 4: Additional charge states may be produced during periods of high counting statistics.

MSSL will define a set of appropriate physical reference frames in which to produce and store the data (or produce one in which manipulations to other frames (e.g. using SPICE kernels) is straightforward for the community.

\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*

*There are two coordinate reference systems that SWA can use to represent L2 data. Both are used for STEREO mission. SWA team shall define which coordinate system we will use for L2/L3 data products:*

*Solar-Orbit (SO), X is the line connection Solar Orbiter and the Sun center, Y is in the plane of the S/C orbit towards the SC velocity vector.*

*Solar-Equator-Spacecraft (SES) that equals to STEREO* ***HGRTN/RTN :*** *X axis points from Sun center to the spacecraft, and the Y axis is the cross product of the solar rotational axis and X, and lies in the solar equatorial plane (towards the West limb).*

\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*

## Validation

The following sections describe the process by which the data products are validated.

### Instrument Team Validation

Upon ingestion of the raw CCSDS telemetry at MSSL, initial testing will be performed on the raw data. This will include:

* SID counter tests to ensure all packets are present.

### SOC Validation

The SOC will check the data types that the SWA team intends to archive. The SOC might also perform spot checks on contents of the files. The exact procedure in which this routine check will take place is still TBD.

# Data Product Descriptions

SWA data products are formatted in accordance with the rules outlined in [RD7]. This section provides details on the filenames, formats and metadata for each of the products included in the SWA science data.

**Level Source Data Type Format and Metadata content**

|  |  |  |  |
| --- | --- | --- | --- |
| **Level** | **Source** | **Data Type** | **Format and Metadata content** |
| L0 | IT | "Raw" data, unpacked and uncompressed data | Decommutated and uncompressed CCSDS metadata reflect the information that was available in the TM packets only. |
| L1 | IT | "Engineering" data, uncalibrated | CDF, metadata follows Solar Orbiter standard for L1 |
| L2 | IT | "Calibrated" data, science quality | CDF, metadata follows Solar Orbiter standard for L2 (see Section Solar Orbiter Metadata Standard): full attitude information in WCS coordinate frame and time in UTC. |
| *L3* | *IT* | *Higher-level data* | *Data format as appropriate. The format of Level-3 data, calibration data and ancillary data can be chosen depending on the type of data product and the objectives. However, as much as possible standard formats should be used (MPEG, FITS, JPEG2000, CDF, PNG, ...).* |
| CAL | IT | Calibration data | Data format as appropriate. *Not all calibration data are necessarily open to the scientific community.* |
| ANC | IT/SOC | Ancillary data | Data format as appropriate. *Not all ancillary data are necessarily open to the scientific community.* |
| PLN | SOC | Planning data | Files related to mission planning issued by the SOC, for example the E-FECS (see E-FECS ICD). *Not all planning files are necessarily open to the scientific community* |
| LL01 | SOC | LL engineering data, output of LL pipeline | CDF, metadata follow Solar Orbiter standard, with some specifics for LL-01 data: time in OBT, attitude in instrument detector reference frame. |
| LL02 | SOC | Operational LL data, enhanced with S/C HK | CDF, metadata follow Solar Orbiter standard, with some specifics for LL-02 data : time in UTC, attitude in WCS coordinate frame. |
| LL03 | SOC | Visualisation of operational LL data, in "quicklook" format | 'Quicklook' data in PNG or JPEG2000 (details TBC). This level is also used for LL data products derived from (multiple) LL02 products. |

*Note that we do not specify a level for LL TM that has been fully processed and calibrated by the instrument team. These should be classified as 'L2'. Higher level, derived data* products are part of 'L3' data.

## Primary Products Format

The SWA instrument uses the CDF format for its science data products. This section describes the format and record structure of each of the science data file types.

The filename will follow this format:

solo\_[DataLevel]\_swa-[Sensor]-[DataType]\_[StartEpoch- EndEpoch]\_[Version].cdf

An example of this is:

solo\_L0\_swa-eas-NM\_YYYYMMDDTHHMMSS- YYYYMMDDTHHMMSS\_V01.cdf

Where StartTime and EndTime are the coarse seconds from the first and last SCET. It is expected that these files will cover 86400 second periods.

### L0 – Raw data product

#### EAS L0 data products

EAS Level-0 data files are created by decommutating and decompressing CCSDS telemetry data packets for EAS. CCSDS telemetry data is the only required input. Below is detailed description of EAS L0 files.

##### EAS normal mode electron counts

This file contains the Normal Mode Electron Counts data product from EAS[12]. The file format is .cdf.

**Filename**: solo\_L0\_swa-eas[12]-NMc\_[StartTime-EndTime]\_V??.cdf

**Expected data volume and time resolution**: This file contains the data between the start time and end times mentioned in the file name. The start and end times are spacecraft elapsed time (SCET) at 1 second coarse resolution, from the reference point (1 Jan 2000 TBC). The time resolution of the file is nominally 100 seconds. It contains electron counts in 16 bit format covering 64 energies, 32 anodes and 16 deflectors for each time-stamp. It is expected that the file will cover 1 single 24 hour period approximately. In this case there will be 864 records per day.

**Global Attributes**

|  |  |  |
| --- | --- | --- |
| **Name** | **Entry** | **Value** |
| Project | 1 | Solar Orbiter |
| Project | 2 | Cosmic Visions |
| Source Name | 1 | SOLO>Solar Orbiter |
| Discipline | 1 | Space Physics>Interplanetary Studies |
| Data Type | 1 | L0>Level 0 Data |
| Descriptor | 1 | SWA-EAS[12]-NMc |
| Data Version | 1 | 01 |
| Software Version | 1 | 01.00.00 |
| PI Name | 1 | C. J. Owen |
| PI Affiliation | 1 | MSSL-UCL, University College London, UK |
| Instrument Type | 1 | Plasma and Solar Wind |
| Mission Group | 1 | Solar Orbiter |
| Logical Source | 1 | SWA\_L0\_swa-eas[12]-NMc |
| Logical File id | 1 | solo\_L0\_swa-eas[12]-NMc\_yyyymmddTHHMMSS-yyyymmddTHHMMSS\_V01 |
| Logical Source Description | 1 | SWA-EAS[12] Nominal Mode 3D counts data |
| Rules of Use | 1 | Consult with MSSL-UCL before using |
| Generated by | 1 | MSSL-UCL |
| Generation date | 1 | YYYY-MM-DDTHH:MN:SS |
| Mods | 1 | V01 First Version |
| Data Product | 1 | NMc>Nominal Mode Counts |
| Level | 1 | L0>Level 0 Data |
| Instrument | 1 | SWA-EAS>Solar-Wind-Analyser-Electron-Analyser-System |

**Variables**

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Variable\_Name** | **Data\_type** | **DIMS** | **SIZES** | **R\_VARY** | **D\_VARY** |
| SWA\_EAS[12]\_SCET | CDF\_EPOCH | 1 | 1 | T | F |
| **Attribute Name** | **Data Type** | **Value** | | | |
| FIELDNAM | CDF\_CHAR | EAS[12] SCET | | | |
| CATDESC | CDF\_CHAR | Elapsed time of the onboard clock at the time of EAS[12] observation | | | |
| DISPLAY\_TYPE | CDF\_CHAR | time\_series | | | |
| FILLVAL | CDF\_EPOCH | 1900-01-01 00:00:00.000 | | | |
| LABLAXIS | CDF\_CHAR | Spacecraft Elapsed Time (Ticks) | | | |
| UNITS | CDF\_CHAR | s | | | |
| VALIDMIN | CDF\_EPOCH | 2010-01-01 00:00:00.000 | | | |
| VALIDMAX | CDF\_EPOCH | 2039-12-31 23:59:59.999 | | | |
| SCALETYP | CDF\_CHAR | linear | | | |
| SCALEMIN | CDF\_EPOCH | 2010-01-01 00:00:00.000 | | | |
| SCALEMAX | CDF\_EPOCH | 2039-12-31 23:59:59.999 | | | |
| VAR\_TYPE | CDF\_CHAR | support\_data | | | |
| VAR\_NOTES | CDF\_CHAR | The EAS[12] time tag is from the centre of the acquisition interval which is 1 sec | | | |

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Variable\_Name** | **Data\_type** | **DIMS** | **SIZES** | **R\_VARY** | **D\_VARY** |
| SWA\_EAS[12]\_NMc\_Data | CDF\_UINT4 | 1 | 32768 | T | T |
| **Attribute Name** | **Data Type** | **Value** | | | |
| FIELDNAM | CDF\_CHAR | SWA\_EAS[12]\_NMc\_Data | | | |
| CATDESC | CDF\_CHAR | EAS[12] Nominal mode 3D electron distribution counts | | | |
| DISPLAY\_TYPE | CDF\_CHAR | spectrogram | | | |
| FILLVAL | CDF\_UINT4 | 4294967294 | | | |
| FORMAT | CDF\_CHAR | f14.4 | | | |
| LABLAXIS | CDF\_CHAR | Electron Counts | | | |
| UNITS | CDF\_CHAR | Counts/Accum | | | |
| VALIDMIN | CDF\_UINT4 | 0 | | | |
| VALIDMAX | CDF\_UINT4 | 65535 | | | |
| SCALETYP | CDF\_CHAR | linear | | | |
| SCALEMIN | CDF\_UINT4 | 0 | | | |
| SCALEMAX | CDF\_UINT4 | 65535 | | | |
| DEPEND\_0 | CDF\_CHAR | SWA\_EAS[12]\_SCET | | | |
| VAR\_TYPE | CDF\_CHAR | data | | | |

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Variable\_Name** | **Data\_type** | **DIMS** | **SIZES** | **R\_VARY** | **D\_VARY** |
| SWA\_EAS[12]\_Mode | CDF\_UINT4 | 1 | 3 | T | T |
| **Attribute Name** | **Data Type** | **Value** | | | |
| FIELDNAM | CDF\_CHAR | EAS[12] Mode | | | |
| CATDESC | CDF\_CHAR | The EAS[12] Mode data | | | |
| DISPLAY\_TYPE | CDF\_CHAR | time\_series | | | |
| FILLVAL | CDF\_UINT4 | 4294967294 | | | |
| FORMAT | CDF\_CHAR | I10 | | | |
| LABLAXIS | CDF\_CHAR | EAS[12] Mode | | | |
| VALIDMIN | CDF\_UINT4 | 0 | | | |
| VALIDMAX | CDF\_UINT4 | 65535 | | | |
| SCALETYP | CDF\_CHAR | linear | | | |
| SCALEMIN | CDF\_UINT4 | 0 | | | |
| SCALEMAX | CDF\_UINT4 | 65535 | | | |
| VAR\_TYPE | CDF\_CHAR | support\_data | | | |

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Variable\_Name** | **Data\_type** | **DIMS** | **SIZES** | **R\_VARY** | **D\_VARY** |
| SWA\_EAS[12]\_Full3DValidity | CDF\_UINT4 | 1 | 1 | T | F |
| **Attribute Name** | **Data Type** | **Value** | | | |
| FIELDNAM | CDF\_CHAR | EAS[12] Full 3D Validity | | | |
| CATDESC | CDF\_CHAR | The Validity flags related to whole EAS[12] 3D data set | | | |
| DISPLAY\_TYPE | CDF\_CHAR | time\_series | | | |
| FILLVAL | CDF\_UINT4 | 4294967294 | | | |
| FORMAT | CDF\_CHAR | I10 | | | |
| LABLAXIS | CDF\_CHAR | Full 3D validity flag | | | |
| VALIDMIN | CDF\_UINT4 | 0 | | | |
| VALIDMAX | CDF\_UINT4 | 65535 | | | |
| SCALETYP | CDF\_CHAR | linear | | | |
| SCALEMIN | CDF\_UINT4 | 0 | | | |
| SCALEMAX | CDF\_UINT4 | 65535 | | | |
| VAR\_TYPE | CDF\_CHAR | support\_data | | | |

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Variable\_Name** | **Data\_type** | **DIMS** | **SIZES** | **R\_VARY** | **D\_VARY** |
| SWA\_EAS[12]\_ElevationValidity | CDF\_UINT4 | 1 | 1 | T | F |
| **Attribute Name** | **Data Type** | **Value** | | | |
| FIELDNAM | CDF\_CHAR | EAS[12] Elevation Validity | | | |
| CATDESC | CDF\_CHAR | The Validity flags associated with each of the 16 elevations | | | |
| DISPLAY\_TYPE | CDF\_CHAR | time\_series | | | |
| FILLVAL | CDF\_UINT4 | 4294967294 | | | |
| FORMAT | CDF\_CHAR | I10 | | | |
| LABLAXIS | CDF\_CHAR | Elevation validity flag | | | |
| VALIDMIN | CDF\_UINT4 | 0 | | | |
| VALIDMAX | CDF\_UINT4 | 65535 | | | |
| SCALETYP | CDF\_CHAR | linear | | | |
| SCALEMIN | CDF\_UINT4 | 0 | | | |
| SCALEMAX | CDF\_UINT4 | 65535 | | | |
| VAR\_TYPE | CDF\_CHAR | support\_data | | | |

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Variable\_Name** | **Data\_type** | **DIMS** | **SIZES** | **R\_VARY** | **D\_VARY** |
| SWA\_EAS[12]\_DataValidity | CDF\_UINT4 | 1 | 1 | T | F |
| **Attribute Name** | **Data Type** | **Value** | | | |
| FIELDNAM | CDF\_CHAR | EAS[12] Data Validity | | | |
| CATDESC | CDF\_CHAR | The Validity flags associated with each energy count for the 16 elevations | | | |
| DISPLAY\_TYPE | CDF\_CHAR | time\_series | | | |
| FILLVAL | CDF\_UINT4 | 4294967294 | | | |
| FORMAT | CDF\_CHAR | I10 | | | |
| LABLAXIS | CDF\_CHAR | Data validity flag | | | |
| VALIDMIN | CDF\_UINT4 | 0 | | | |
| VALIDMAX | CDF\_UINT4 | 65535 | | | |
| SCALETYP | CDF\_CHAR | linear | | | |
| SCALEMIN | CDF\_UINT4 | 0 | | | |
| SCALEMAX | CDF\_UINT4 | 65535 | | | |
| VAR\_TYPE | CDF\_CHAR | support\_data | | | |

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Variable\_Name** | **Data\_type** | **DIMS** | **SIZES** | **R\_VARY** | **D\_VARY** |
| QUALITY\_FLAG | CDF\_UINT1 | 1 | 1 | T | F |
| **Attribute Name** | **Data Type** | **Value** | | | |
| FIELDNAM | CDF\_CHAR | EAS[12] Data Quality | | | |
| CATDESC | CDF\_CHAR | EAS[12] Data Quality flag | | | |
| DISPLAY\_TYPE | CDF\_CHAR | time\_series | | | |
| FILLVAL | CDF\_UINT4 | 255 | | | |
| LABLAXIS | CDF\_CHAR | EAS[12] data quality | | | |
| VALIDMIN | CDF\_UINT4 | 0 | | | |
| VALIDMAX | CDF\_UINT4 | 4 | | | |
| SCALETYP | CDF\_CHAR | linear | | | |
| SCALEMIN | CDF\_UINT4 | 0 | | | |
| SCALEMAX | CDF\_UINT4 | 4 | | | |
| VAR\_TYPE | CDF\_CHAR | support\_data | | | |

##### EAS single strahl electron counts

This file contains the single strahl electron counts data product from EAS[12]. The file format is .cdf.

**Filename**: solo\_L0\_swa-eas[12]-SSc\_[StartTime-EndTime]\_V??.cdf

**Expected data volume and time resolution**: This file contains the data between the start time and end time mentioned in the file name. The start and end times are spacecraft elapsed time (SCET) at 1 second coarse resolution, from the reference point (1 Jan 2000 TBC). The time resolution of the file is nominally 100 seconds. It contains electron counts in 16 bit format covering 1 energy, 32 anodes and 16 deflectors for each time-stamp. It is expected that the file will cover 1 single 24 hour period approximately. In this case there will be 864 records per day.

**Global Attributes**

|  |  |  |
| --- | --- | --- |
| **Name** | **Entry** | **Value** |
| Project | 1 | Solar Orbiter |
| Project | 2 | Cosmic Visions |
| Source Name | 1 | SOLO>Solar Orbiter |
| Discipline | 1 | Space Physics>Interplanetary Studies |
| Data Type | 1 | L0>Level 0 Data |
| Descriptor | 1 | SWA-EAS[12]-SSc |
| Data Version | 1 | 01 |
| Software Version | 1 | 01.00.00 |
| PI Name | 1 | C. J. Owen |
| PI Affiliation | 1 | MSSL-UCL, University College London |
| Instrument Type | 1 | Plasma and Solar Wind |
| Mission Group | 1 | Solar Orbiter |
| Logical Source | 1 | Solo\_L0\_swa-eas[12]-SSc |
| Logical File id | 1 | solo\_L0\_swa-eas[12]\_SSc\_yyyymmddTHHMMSS-yyyymmddTHHMMSS\_V01 |
| Logical Source Description | 1 | SWA-EAS[12] Single Strahl data |
| Rules of Use | 1 | Consult with MSSL-UCL before using |
| Generated by | 1 | MSSL-UCL |
| Generation date | 1 | YYYY-MM-DDTHH:MN:SS |
| Mods | 1 | V01 First Version |
| Data Product | 1 | SSc>Single Strahl Counts |
| Level | 1 | L0>Level 0 Data |
| Instrument | 1 | SWA-EAS>Solar-Wind-Analyser-Electron-Analyser-System |

**Variables**

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Variable\_Name** | **Data\_type** | **DIMS** | **SIZES** | **R\_VARY** | **D\_VARY** |
| SWA\_EAS[12]\_SCET | CDF\_EPOCH | 1 | 1 | T | F |
| **Attribute Name** | **Data Type** | **Value** | | | |
| FIELDNAM | CDF\_CHAR | EAS[12] SCET | | | |
| CATDESC | CDF\_CHAR | Elapsed time of the onboard clock at the time of EAS[12] observation | | | |
| DISPLAY\_TYPE | CDF\_CHAR | time\_series | | | |
| FILLVAL | CDF\_EPOCH | 1900-01-01 00:00:00.000 | | | |
| LABLAXIS | CDF\_CHAR | Spacecraft Elapsed Time (Ticks) | | | |
| UNITS | CDF\_CHAR | s | | | |
| VALIDMIN | CDF\_EPOCH | 2010-01-01 00:00:00.000 | | | |
| VALIDMAX | CDF\_EPOCH | 2039-12-31 23:59:59.999 | | | |
| SCALETYP | CDF\_CHAR | linear | | | |
| SCALEMIN | CDF\_EPOCH | 2010-01-01 00:00:00.000 | | | |
| SCALEMAX | CDF\_EPOCH | 2039-12-31 23:59:59.999 | | | |
| VAR\_TYPE | CDF\_CHAR | support\_data | | | |
| VAR\_NOTES | CDF\_CHAR | The EAS[12] time tag is from the centre of the acquisition interval which is 1 sec | | | |

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Variable\_Name** | **Data\_type** | **DIMS** | **SIZES** | **R\_VARY** | **D\_VARY** |
| SWA\_EAS[12]\_Mode | CDF\_UINT4 | 1 | 3 | T | T |
| **Attribute Name** | **Data Type** | **Value** | | | |
| FIELDNAM | CDF\_CHAR | EAS[12] Mode | | | |
| CATDESC | CDF\_CHAR | The EAS[12] Mode data | | | |
| DISPLAY\_TYPE | CDF\_CHAR | time\_series | | | |
| FILLVAL | CDF\_UINT4 | 4294967294 | | | |
| FORMAT | CDF\_CHAR | I10 | | | |
| LABLAXIS | CDF\_CHAR | EAS[12] Mode | | | |
| VALIDMIN | CDF\_UINT4 | 0 | | | |
| VALIDMAX | CDF\_UINT4 | 65535 | | | |
| SCALETYP | CDF\_CHAR | linear | | | |
| SCALEMIN | CDF\_UINT4 | 0 | | | |
| SCALEMAX | CDF\_UINT4 | 65535 | | | |
| VAR\_TYPE | CDF\_CHAR | support\_data | | | |

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Variable\_Name** | **Data\_type** | **DIMS** | **SIZES** | **R\_VARY** | **D\_VARY** |
| SWA\_EAS[12]\_DataValidity | CDF\_UINT4 | 1 | 1 | T | F |
| **Attribute Name** | **Data Type** | **Value** | | | |
| FIELDNAM | CDF\_CHAR | EAS[12] Data Validity | | | |
| CATDESC | CDF\_CHAR | The Validity flags associated with each energy count for the 16 elevations | | | |
| DISPLAY\_TYPE | CDF\_CHAR | time\_series | | | |
| FILLVAL | CDF\_UINT4 | 4294967294 | | | |
| FORMAT | CDF\_CHAR | I10 | | | |
| LABLAXIS | CDF\_CHAR | Data validity flag | | | |
| VALIDMIN | CDF\_UINT4 | 0 | | | |
| VALIDMAX | CDF\_UINT4 | 65535 | | | |
| SCALETYP | CDF\_CHAR | linear | | | |
| SCALEMIN | CDF\_UINT4 | 0 | | | |
| SCALEMAX | CDF\_UINT4 | 65535 | | | |
| VAR\_TYPE | CDF\_CHAR | support\_data | | | |

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Variable\_Name** | **Data\_type** | **DIMS** | **SIZES** | **R\_VARY** | **D\_VARY** |
| SWA\_EAS[12]\_EnergyID | CDF\_UINT1 | 1 | 1 | T | F |
| **Attribute Name** | **Data Type** | **Value** | | | |
| FIELDNAM | CDF\_CHAR | EAS[12] EnergyID | | | |
| CATDESC | CDF\_CHAR | The EAS[12] Energy used for Strahl collection | | | |
| DISPLAY\_TYPE | CDF\_CHAR | time\_series | | | |
| FILLVAL | CDF\_UINT4 | 255 | | | |
| FORMAT | CDF\_CHAR | I3 | | | |
| LABLAXIS | CDF\_CHAR | EAS[12] Mode | | | |
| VALIDMIN | CDF\_UINT4 | 0 | | | |
| VALIDMAX | CDF\_UINT4 | 255 | | | |
| SCALETYP | CDF\_CHAR | linear | | | |
| SCALEMIN | CDF\_UINT4 | 0 | | | |
| SCALEMAX | CDF\_UINT4 | 255 | | | |
| VAR\_TYPE | CDF\_CHAR | support\_data | | | |

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Variable\_Name** | **Data\_type** | **DIMS** | **SIZES** | **R\_VARY** | **D\_VARY** |
| SWA\_EAS[12]\_SSc\_Data | CDF\_UINT4 | 1 | 512 | T | T |
| **Attribute Name** | **Data Type** | **Value** | | | |
| FIELDNAM | CDF\_CHAR | EAS[12] Single Strahl Data | | | |
| CATDESC | CDF\_CHAR | Single strahl data from EAS[12] | | | |
| DISPLAY\_TYPE | CDF\_CHAR | spectrogram | | | |
| FILLVAL | CDF\_UINT4 | 4294967294 | | | |
| FORMAT | CDF\_CHAR | I10 | | | |
| LABLAXIS | CDF\_CHAR | Electron Counts | | | |
| UNITS | CDF\_CHAR | Counts/Accum | | | |
| VALIDMIN | CDF\_UINT4 | 0 | | | |
| VALIDMAX | CDF\_UINT4 | 65535 | | | |
| SCALETYP | CDF\_CHAR | linear | | | |
| SCALEMIN | CDF\_UINT4 | 0 | | | |
| SCALEMAX | CDF\_UINT4 | 65535 | | | |
| DEPEND\_0 | CDF\_CHAR | SWA\_EAS[12]\_SCET | | | |
| VAR\_TYPE | CDF\_CHAR | data | | | |

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Variable\_Name** | **Data\_type** | **DIMS** | **SIZES** | **R\_VARY** | **D\_VARY** |
| QUALITY\_FLAG | CDF\_UINT1 | 1 | 1 | T | F |
| **Attribute Name** | **Data Type** | **Value** | | | |
| FIELDNAM | CDF\_CHAR | EAS[12] Data Quality | | | |
| CATDESC | CDF\_CHAR | EAS[12] Data Quality flag | | | |
| DISPLAY\_TYPE | CDF\_CHAR | time\_series | | | |
| FILLVAL | CDF\_UINT4 | 255 | | | |
| LABLAXIS | CDF\_CHAR | EAS[12] data quality | | | |
| VALIDMIN | CDF\_UINT4 | 0 | | | |
| VALIDMAX | CDF\_UINT4 | 4 | | | |
| SCALETYP | CDF\_CHAR | linear | | | |
| SCALEMIN | CDF\_UINT4 | 0 | | | |
| SCALEMAX | CDF\_UINT4 | 4 | | | |
| VAR\_TYPE | CDF\_CHAR | support\_data | | | |

##### EAS Triggered Mode Counts

This file contains the triggered mode electron counts data product from EAS[12]. The file format is .cdf.

**Filename**: solo\_L0\_swa-eas[12]-TMc\_[StartTime-EndTime]\_V??.cdf

**Expected data volume and time resolution**: This file contains the data between the start time and end times mentioned in the file name. The start and end times are spacecraft elapsed time (SCET) at 1 second coarse resolution, from the reference point (1 Jan 2000 TBC). The time resolution of the file is nominally 1 second for 5 minutes. It contains electron counts in 16 bit format covering 64 energies, 32 anodes and 16 deflectors for each time-stamp. It is expected that the file will cover 1 single triggered event. In this case there will be 300 records per event.

**Global Attributes**

|  |  |  |
| --- | --- | --- |
| **Name** | **Entry** | **Value** |
| Project | 1 | Solar Orbiter |
| Project | 2 | Cosmic Visions |
| Source Name | 1 | SOLO>Solar Orbiter |
| Discipline | 1 | Space Physics>Interplanetary Studies |
| Data Type | 1 | L0>Level 0 Data |
| Descriptor | 1 | SWA-EAS[12]-TMc |
| Data Version | 1 | 01 |
| Software Version | 1 | 01.00.00 |
| PI Name | 1 | C. J. Owen |
| PI Affiliation | 1 | MSSL-UCL, University College London, UK |
| Instrument Type | 1 | Plasma and Solar Wind |
| Mission Group | 1 | Solar Orbiter |
| Logical Source | 1 | SWA\_L0\_swa-eas[12]-TMc |
| Logical File id | 1 | solo\_L0\_swa-eas[12]-TMc\_yyyymmddTHHMMSS-yyyymmddTHHMMSS\_V01 |
| Logical Source Description | 1 | SWA-EAS[12] Trigger Mode 3D counts data |
| Rules of Use | 1 | Consult with MSSL-UCL before using |
| Generated by | 1 | MSSL-UCL |
| Generation date | 1 | YYYY-MM-DDTHH:MN:SS |
| Mods | 1 | V01 First Version |
| Data Product | 1 | TMc>Trigger Mode Counts |
| Level | 1 | L0>Level 0 Data |
| Instrument | 1 | SWA-EAS>Solar-Wind-Analyser-Electron-Analyser-System |

**Variables**

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Variable\_Name** | **Data\_type** | **DIMS** | **SIZES** | **R\_VARY** | **D\_VARY** |
| SWA\_EAS[12]\_SCET | CDF\_EPOCH | 1 | 1 | T | F |
| **Attribute Name** | **Data Type** | **Value** | | | |
| FIELDNAM | CDF\_CHAR | EAS[12] SCET | | | |
| CATDESC | CDF\_CHAR | Elapsed time of the onboard clock at the time of EAS[12] observation | | | |
| DISPLAY\_TYPE | CDF\_CHAR | time\_series | | | |
| FILLVAL | CDF\_EPOCH | 1900-01-01 00:00:00.000 | | | |
| LABLAXIS | CDF\_CHAR | Spacecraft Elapsed Time (Ticks) | | | |
| UNITS | CDF\_CHAR | s | | | |
| VALIDMIN | CDF\_EPOCH | 2010-01-01 00:00:00.000 | | | |
| VALIDMAX | CDF\_EPOCH | 2039-12-31 23:59:59.999 | | | |
| SCALETYP | CDF\_CHAR | linear | | | |
| SCALEMIN | CDF\_EPOCH | 2010-01-01 00:00:00.000 | | | |
| SCALEMAX | CDF\_EPOCH | 2039-12-31 23:59:59.999 | | | |
| VAR\_TYPE | CDF\_CHAR | support\_data | | | |
| VAR\_NOTES | CDF\_CHAR | The EAS[12] time tag is from the centre of the acquisition interval which is 1 sec | | | |

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Variable\_Name** | **Data\_type** | **DIMS** | **SIZES** | **R\_VARY** | **D\_VARY** |
| SWA\_EAS[12]\_TMc\_Data | CDF\_UINT4 | 1 | 32768 | T | T |
| **Attribute Name** | **Data Type** | **Value** | | | |
| FIELDNAM | CDF\_CHAR | SWA\_EAS[12]\_TMc\_Data | | | |
| CATDESC | CDF\_CHAR | EAS[12] Trigger mode 3D electron distribution counts | | | |
| DISPLAY\_TYPE | CDF\_CHAR | spectrogram | | | |
| FILLVAL | CDF\_UINT4 | 4294967294 | | | |
| FORMAT | CDF\_CHAR | I10 | | | |
| LABLAXIS | CDF\_CHAR | Electron Counts | | | |
| UNITS | CDF\_CHAR | Counts/Accum | | | |
| VALIDMIN | CDF\_UINT4 | 0 | | | |
| VALIDMAX | CDF\_UINT4 | 65535 | | | |
| SCALETYP | CDF\_CHAR | linear | | | |
| SCALEMIN | CDF\_UINT4 | 0 | | | |
| SCALEMAX | CDF\_UINT4 | 65535 | | | |
| DEPEND\_0 | CDF\_CHAR | SWA\_EAS[12]\_SCET | | | |
| VAR\_TYPE | CDF\_CHAR | data | | | |

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| --- | --- | --- | --- | --- | --- |
| **Variable\_Name** | **Data\_type** | **DIMS** | **SIZES** | **R\_VARY** | **D\_VARY** |
| SWA\_EAS[12]\_Mode | CDF\_UINT4 | 1 | 3 | T | T |
| **Attribute Name** | **Data Type** | **Value** | | | |
| FIELDNAM | CDF\_CHAR | EAS[12] Mode | | | |
| CATDESC | CDF\_CHAR | The EAS[12] Mode data | | | |
| DISPLAY\_TYPE | CDF\_CHAR | time\_series | | | |
| FILLVAL | CDF\_UINT4 | 4294967294 | | | |
| FORMAT | CDF\_CHAR | I10 | | | |
| LABLAXIS | CDF\_CHAR | EAS1 Mode | | | |
| VALIDMIN | CDF\_UINT4 | 0 | | | |
| VALIDMAX | CDF\_UINT4 | 65535 | | | |
| SCALETYP | CDF\_CHAR | linear | | | |
| SCALEMIN | CDF\_UINT4 | 0 | | | |
| SCALEMAX | CDF\_UINT4 | 65535 | | | |
| VAR\_TYPE | CDF\_CHAR | support\_data | | | |

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Variable\_Name** | **Data\_type** | **DIMS** | **SIZES** | **R\_VARY** | **D\_VARY** |
| SWA\_EAS[12]\_Full3DValidity | CDF\_UINT4 | 1 | 1 | T | F |
| **Attribute Name** | **Data Type** | **Value** | | | |
| FIELDNAM | CDF\_CHAR | EAS[12] Full 3D Validity | | | |
| CATDESC | CDF\_CHAR | The Validity flags related to whole EAS[12] 3D data set | | | |
| DISPLAY\_TYPE | CDF\_CHAR | time\_series | | | |
| FILLVAL | CDF\_UINT4 | 4294967294 | | | |
| FORMAT | CDF\_CHAR | I10 | | | |
| LABLAXIS | CDF\_CHAR | Full 3D validity flag | | | |
| VALIDMIN | CDF\_UINT4 | 0 | | | |
| VALIDMAX | CDF\_UINT4 | 65535 | | | |
| SCALETYP | CDF\_CHAR | linear | | | |
| SCALEMIN | CDF\_UINT4 | 0 | | | |
| SCALEMAX | CDF\_UINT4 | 65535 | | | |
| VAR\_TYPE | CDF\_CHAR | support\_data | | | |

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Variable\_Name** | **Data\_type** | **DIMS** | **SIZES** | **R\_VARY** | **D\_VARY** |
| SWA\_EAS[12]\_ElevationValidity | CDF\_UINT4 | 1 | 1 | T | F |
| **Attribute Name** | **Data Type** | **Value** | | | |
| FIELDNAM | CDF\_CHAR | EAS[12] Elevation Validity | | | |
| CATDESC | CDF\_CHAR | The Validity flags associated with each of the 16 elevations | | | |
| DISPLAY\_TYPE | CDF\_CHAR | time\_series | | | |
| FILLVAL | CDF\_UINT4 | 4294967294 | | | |
| FORMAT | CDF\_CHAR | I10 | | | |
| LABLAXIS | CDF\_CHAR | Elevation validity flag | | | |
| VALIDMIN | CDF\_UINT4 | 0 | | | |
| VALIDMAX | CDF\_UINT4 | 65535 | | | |
| SCALETYP | CDF\_CHAR | linear | | | |
| SCALEMIN | CDF\_UINT4 | 0 | | | |
| SCALEMAX | CDF\_UINT4 | 65535 | | | |
| VAR\_TYPE | CDF\_CHAR | support\_data | | | |

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Variable\_Name** | **Data\_type** | **DIMS** | **SIZES** | **R\_VARY** | **D\_VARY** |
| SWA\_EAS[12]\_DataValidity | CDF\_UINT4 | 1 | 64 | T | T |
| **Attribute Name** | **Data Type** | **Value** | | | |
| FIELDNAM | CDF\_CHAR | EAS[12] Data Validity | | | |
| CATDESC | CDF\_CHAR | The Validity flags associated with each energy count for the 16 elevations | | | |
| DISPLAY\_TYPE | CDF\_CHAR | time\_series | | | |
| FILLVAL | CDF\_UINT4 | 4294967294 | | | |
| FORMAT | CDF\_CHAR | I10 | | | |
| LABLAXIS | CDF\_CHAR | Data validity flag | | | |
| VALIDMIN | CDF\_UINT4 | 0 | | | |
| VALIDMAX | CDF\_UINT4 | 65535 | | | |
| SCALETYP | CDF\_CHAR | linear | | | |
| SCALEMIN | CDF\_UINT4 | 0 | | | |
| SCALEMAX | CDF\_UINT4 | 65535 | | | |
| VAR\_TYPE | CDF\_CHAR | support\_data | | | |

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Variable\_Name** | **Data\_type** | **DIMS** | **SIZES** | **R\_VARY** | **D\_VARY** |
| SWA\_EAS[12]\_RPW\_HRTBT | CDF\_EPOCH | 1 | 1 | T | F |
| **Attribute Name** | **Data Type** | **Value** | | | |
| FIELDNAM | CDF\_CHAR | RPW Heartbeat | | | |
| CATDESC | CDF\_CHAR | The RPW Heartbeat data coming in from S20 packet | | | |
| DISPLAY\_TYPE | CDF\_CHAR | time\_series | | | |
| FILLVAL | CDF\_REAL8 | 1900-01-01 00:00:00.000 | | | |
| LABLAXIS | CDF\_CHAR | RPW Heartbeat (Time) | | | |
| UNITS | CDF\_CHAR | s | | | |
| VALIDMIN | CDF\_REAL8 | 2010-01-01 00:00:00.000 | | | |
| VALIDMAX | CDF\_REAL8 | 2039-12-31 23:59:59.999 | | | |
| SCALETYP | CDF\_CHAR | linear | | | |
| SCALEMIN | CDF\_REAL8 | 2010-01-01 00:00:00.000 | | | |
| SCALEMAX | CDF\_REAL8 | 2039-12-31 23:59:59.999 | | | |
| VAR\_TYPE | CDF\_CHAR | support\_data | | | |

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| --- | --- | --- | --- | --- | --- |
| **Variable\_Name** | **Data\_type** | **DIMS** | **SIZES** | **R\_VARY** | **D\_VARY** |
| SWA\_EAS[12]\_RPW\_ShkTrigQlty | CDF\_UINT4 | 1 | 1 | F | F |
| **Attribute Name** | **Data Type** | **Value** | | | |
| FIELDNAM | CDF\_CHAR | EAS[12] RPW Shock Trigger Quality | | | |
| CATDESC | CDF\_CHAR | RPW Shock Trigger quality flag coming in from S20 packet | | | |
| DISPLAY\_TYPE | CDF\_CHAR | time\_series | | | |
| FILLVAL | CDF\_UINT4 | 4294967294 | | | |
| FORMAT | CDF\_CHAR | I10 | | | |
| LABLAXIS | CDF\_CHAR | RPW Shock Trigger quality | | | |
| VALIDMIN | CDF\_UINT4 | 0 | | | |
| VALIDMAX | CDF\_UINT4 | 65535 | | | |
| SCALETYP | CDF\_CHAR | linear | | | |
| SCALEMIN | CDF\_UINT4 | 0 | | | |
| SCALEMAX | CDF\_UINT4 | 65535 | | | |
| VAR\_TYPE | CDF\_CHAR | support\_data | | | |

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| --- | --- | --- | --- | --- | --- |
| **Variable\_Name** | **Data\_type** | **DIMS** | **SIZES** | **R\_VARY** | **D\_VARY** |
| SWA\_EAS[12]\_RPW\_Pot | CDF\_UINT4 | 1 | 1 | T | F |
| **Attribute Name** | **Data Type** | **Value** | | | |
| FIELDNAM | CDF\_CHAR | RPW Potential | | | |
| CATDESC | CDF\_CHAR | RPW potential coming in from S20 packet – set to zero if PA is zero | | | |
| DISPLAY\_TYPE | CDF\_CHAR | time\_series | | | |
| FILLVAL | CDF\_UINT4 | 4294967294 | | | |
| FORMAT | CDF\_CHAR | I5 | | | |
| LABLAXIS | CDF\_CHAR | RPW Potential data | | | |
| VALIDMIN | CDF\_UINT4 | 0 | | | |
| VALIDMAX | CDF\_UINT4 | 65535 | | | |
| SCALETYP | CDF\_CHAR | Linear | | | |
| SCALEMIN | CDF\_UINT4 | 0 | | | |
| SCALEMAX | CDF\_UINT4 | 65535 | | | |
| DEPEND\_0 | CDF\_CHAR | SWA\_EAS[12]\_RPW\_HRTBT | | | |
| VAR\_TYPE | CDF\_CHAR | data | | | |

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| --- | --- | --- | --- | --- | --- |
| **Variable\_Name** | **Data\_type** | **DIMS** | **SIZES** | **R\_VARY** | **D\_VARY** |
| SWA\_EAS[12]\_RPW\_PA | CDF\_UINT1 | 1 | 1 | F | F |
| **Attribute Name** | **Data Type** | **Value** | | | |
| FIELDNAM | CDF\_CHAR | EAS[12] RPW PA | | | |
| CATDESC | CDF\_CHAR | RPW Potential Availability flag coming in from S20 packet | | | |
| DISPLAY\_TYPE | CDF\_CHAR | time\_series | | | |
| FILLVAL | CDF\_UINT1 | 4294967294 | | | |
| FORMAT | CDF\_CHAR | I10 | | | |
| LABLAXIS | CDF\_CHAR | RPW Potential Availability Flag | | | |
| VALIDMIN | CDF\_UINT1 | 0 | | | |
| VALIDMAX | CDF\_UINT1 | 65535 | | | |
| SCALETYP | CDF\_CHAR | linear | | | |
| SCALEMIN | CDF\_UINT1 | 0 | | | |
| SCALEMAX | CDF\_UINT1 | 65535 | | | |
| VAR\_TYPE | CDF\_CHAR | support\_data | | | |

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Variable\_Name** | **Data\_type** | **DIMS** | **SIZES** | **R\_VARY** | **D\_VARY** |
| SWA\_EAS[12]\_RPW\_TF | CDF\_UINT1 | 1 | 1 | F | F |
| **Attribute Name** | **Data Type** | **Value** | | | |
| FIELDNAM | CDF\_CHAR | EAS[12] RPW TF | | | |
| CATDESC | CDF\_CHAR | RPW Trigger Flag coming in from S20 packet | | | |
| DISPLAY\_TYPE | CDF\_CHAR | time\_series | | | |
| FILLVAL | CDF\_UINT1 | 255 | | | |
| FORMAT | CDF\_CHAR | I3 | | | |
| LABLAXIS | CDF\_CHAR | RPW Trigger Flag | | | |
| VALIDMIN | CDF\_UINT1 | 0 | | | |
| VALIDMAX | CDF\_UINT1 | 2 | | | |
| SCALETYP | CDF\_CHAR | linear | | | |
| SCALEMIN | CDF\_UINT1 | 0 | | | |
| SCALEMAX | CDF\_UINT1 | 2 | | | |
| VAR\_TYPE | CDF\_CHAR | support\_data | | | |

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Variable\_Name** | **Data\_type** | **DIMS** | **SIZES** | **R\_VARY** | **D\_VARY** |
| QUALITY\_FLAG | CDF\_UINT1 | 1 | 1 | T | F |
| **Attribute Name** | **Data Type** | **Value** | | | |
| FIELDNAM | CDF\_CHAR | EAS[12] Data Quality | | | |
| CATDESC | CDF\_CHAR | EAS[12] Data Quality flag | | | |
| DISPLAY\_TYPE | CDF\_CHAR | time\_series | | | |
| FILLVAL | CDF\_UINT4 | 255 | | | |
| LABLAXIS | CDF\_CHAR | EAS[12] data quality | | | |
| VALIDMIN | CDF\_UINT4 | 0 | | | |
| VALIDMAX | CDF\_UINT4 | 4 | | | |
| SCALETYP | CDF\_CHAR | linear | | | |
| SCALEMIN | CDF\_UINT4 | 0 | | | |
| SCALEMAX | CDF\_UINT4 | 4 | | | |
| VAR\_TYPE | CDF\_CHAR | support\_data | | | |

##### EAS Burst Mode Counts

This file contains the Burst mode electron (pitch angle) counts data product from EAS. The file format is .cdf.

**Filename**: solo\_L0\_swa-eas-padc\_[StartTime-EndTime]\_V??.cdf

**Expected data volume and time resolution**: This file contains the data between the start time and end times mentioned in the file name. The start and end times are spacecraft elapsed time (SCET) at 1 second coarse resolution, from the reference point (1 Jan 2000 TBC). The time resolution of the file is nominally 0.125 second It contains electron counts in 16 bit format covering 64 energies, 32 anodes and 16 deflectors for each time-stamp. In this case the number of records vary depending on the telemetry availability.

**Global Attributes**

|  |  |  |
| --- | --- | --- |
| **Name** | **Entry** | **Value** |
| Project | 1 | Solar Orbiter |
| Project | 2 | Cosmic Visions |
| Source Name | 1 | SOLO>Solar Orbiter |
| Discipline | 1 | Space Physics>Interplanetary Studies |
| Data Type | 1 | L0>Level 0 Data |
| Descriptor | 1 | SWA-EAS-padc |
| Data Version | 1 | 01 |
| Software Version | 1 | 01.00.00 |
| PI Name | 1 | C. J. Owen |
| PI Affiliation | 1 | MSSL-UCL, University College London, UK |
| Instrument Type | 1 | Plasma and Solar Wind |
| Mission Group | 1 | Solar Orbiter |
| Logical Source | 1 | SWA\_L0\_swa-eas-padc |
| Logical File id | 1 | solo\_L0\_swa-eas-padc\_yyyymmddTHHMMSS-yyyymmddTHHMMSS\_V01 |
| Logical Source Description | 1 | SWA-EAS Electron Pitch Angle counts data |
| Rules of Use | 1 | Consult with MSSL-UCL before using |
| Generated by | 1 | MSSL-UCL |
| Generation date | 1 | YYYY-MM-DDTHH:MN:SS |
| Mods | 1 | V01 First Version |
| Data Product | 1 | padc>Pitch Angle Distribution Counts |
| Level | 1 | L0>Level 0 Data |
| Instrument | 1 | SWA-EAS>Solar-Wind-Analyser-Electron-Analyser-System |

**Variables**

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Variable\_Name** | **Data\_type** | **DIMS** | **SIZES** | **R\_VARY** | **D\_VARY** |
| SWA\_EAS\_SCET | CDF\_EPOCH | 1 | 1 | T | F |
| **Attribute Name** | **Data Type** | **Value** | | | |
| FIELDNAM | CDF\_CHAR | SCET | | | |
| CATDESC | CDF\_CHAR | Elapsed time of the onboard clock at the time of EAS observation | | | |
| DISPLAY\_TYPE | CDF\_CHAR | time\_series | | | |
| FILLVAL | CDF\_EPOCH | 1900-01-01 00:00:00.000 | | | |
| LABLAXIS | CDF\_CHAR | Spacecraft Elapsed Time (Ticks) | | | |
| UNITS | CDF\_CHAR | s | | | |
| VALIDMIN | CDF\_EPOCH | 2010-01-01 00:00:00.000 | | | |
| VALIDMAX | CDF\_EPOCH | 2039-12-31 23:59:59.999 | | | |
| SCALETYP | CDF\_CHAR | linear | | | |
| SCALEMIN | CDF\_EPOCH | 2010-01-01 00:00:00.000 | | | |
| SCALEMAX | CDF\_EPOCH | 2039-12-31 23:59:59.999 | | | |
| VAR\_TYPE | CDF\_CHAR | support\_data | | | |
| VAR\_NOTES | CDF\_CHAR | The EAS time tag is from the centre of the acquisition interval which is 1 sec | | | |

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Variable\_Name** | **Data\_type** | **DIMS** | **SIZES** | **R\_VARY** | **D\_VARY** |
| SWA\_EAS\_PAD\_Data | CDF\_UINT4 | 1 | 4096 | T | T |
| **Attribute Name** | **Data Type** | **Value** | | | |
| FIELDNAM | CDF\_CHAR | EAS PAD Data | | | |
| CATDESC | CDF\_CHAR | EAS electron pitch angle distribution counts | | | |
| DISPLAY\_TYPE | CDF\_CHAR | Spectrogram | | | |
| FILLVAL | CDF\_UINT4 | 4294967294 | | | |
| FORMAT | CDF\_CHAR | I10 | | | |
| LABLAXIS | CDF\_CHAR | Electron Counts | | | |
| UNITS | CDF\_CHAR | Counts/Accum | | | |
| VALIDMIN | CDF\_UINT4 | 0 | | | |
| VALIDMAX | CDF\_UINT4 | 65535 | | | |
| SCALETYP | CDF\_CHAR | linear | | | |
| SCALEMIN | CDF\_UINT4 | 0 | | | |
| SCALEMAX | CDF\_UINT4 | 65535 | | | |
| DEPEND\_0 | CDF\_CHAR | SWA\_EAS\_SCET | | | |
| VAR\_TYPE | CDF\_CHAR | data | | | |

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Variable\_Name** | **Data\_type** | **DIMS** | **SIZES** | **R\_VARY** | **D\_VARY** |
| SWA\_EAS\_Mode | CDF\_UINT4 | 1 | 3 | T | T |
| **Attribute Name** | **Data Type** | **Value** | | | |
| FIELDNAM | CDF\_CHAR | EAS Mode | | | |
| CATDESC | CDF\_CHAR | The EAS Mode data | | | |
| DISPLAY\_TYPE | CDF\_CHAR | time\_series | | | |
| FILLVAL | CDF\_UINT4 | 4294967294 | | | |
| FORMAT | CDF\_CHAR | I10 | | | |
| LABLAXIS | CDF\_CHAR | EAS1 Mode | | | |
| VALIDMIN | CDF\_UINT4 | 0 | | | |
| VALIDMAX | CDF\_UINT4 | 65535 | | | |
| SCALETYP | CDF\_CHAR | linear | | | |
| SCALEMIN | CDF\_UINT4 | 0 | | | |
| SCALEMAX | CDF\_UINT4 | 65535 | | | |
| VAR\_TYPE | CDF\_CHAR | support\_data | | | |

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Variable\_Name** | **Data\_type** | **DIMS** | **SIZES** | **R\_VARY** | **D\_VARY** |
| SWA\_EAS\_Validity | CDF\_UINT4 | 1 | 9 | T | T |
| **Attribute Name** | **Data Type** | **Value** | | | |
| FIELDNAM | CDF\_CHAR | EAS Validity | | | |
| CATDESC | CDF\_CHAR | The Validity flags associated with energies | | | |
| DISPLAY\_TYPE | CDF\_CHAR | time\_series | | | |
| FILLVAL | CDF\_UINT4 | 4294967294 | | | |
| FORMAT | CDF\_CHAR | I10 | | | |
| LABLAXIS | CDF\_CHAR | Full 3D validity flag | | | |
| VALIDMIN | CDF\_UINT4 | 0 | | | |
| VALIDMAX | CDF\_UINT4 | 65535 | | | |
| SCALETYP | CDF\_CHAR | linear | | | |
| SCALEMIN | CDF\_UINT4 | 0 | | | |
| SCALEMAX | CDF\_UINT4 | 65535 | | | |
| VAR\_TYPE | CDF\_CHAR | support\_data | | | |

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Variable\_Name** | **Data\_type** | **DIMS** | **SIZES** | **R\_VARY** | **D\_VARY** |
| SWA\_EAS\_EASUsed | CDF\_UINT1 | 1 | 1 | T | T |
| **Attribute Name** | **Data Type** | **Value** | | | |
| FIELDNAM | CDF\_CHAR | EAS sensor used | | | |
| CATDESC | CDF\_CHAR | The EAS sensor use for Pitch Angle data collection | | | |
| DISPLAY\_TYPE | CDF\_CHAR | time\_series | | | |
| FILLVAL | CDF\_UINT1 | 255 | | | |
| FORMAT | CDF\_CHAR | I10 | | | |
| LABLAXIS | CDF\_CHAR | EAS | | | |
| VALIDMIN | CDF\_UINT1 | 0 | | | |
| VALIDMAX | CDF\_UINT1 | 3 | | | |
| SCALETYP | CDF\_CHAR | linear | | | |
| SCALEMIN | CDF\_UINT1 | 0 | | | |
| SCALEMAX | CDF\_UINT1 | 3 | | | |
| VAR\_TYPE | CDF\_CHAR | support\_data | | | |

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Variable\_Name** | **Data\_type** | **DIMS** | **SIZES** | **R\_VARY** | **D\_VARY** |
| SWA\_EAS\_ElevationUsed | CDF\_UINT1 | 1 | 1 | T | T |
| **Attribute Name** | **Data Type** | **Value** | | | |
| FIELDNAM | CDF\_CHAR | EAS Elevation used | | | |
| CATDESC | CDF\_CHAR | The EAS Elevation used for Pitch Angle data collection | | | |
| DISPLAY\_TYPE | CDF\_CHAR | time\_series | | | |
| FILLVAL | CDF\_UINT1 | 255 | | | |
| FORMAT | CDF\_CHAR | I10 | | | |
| LABLAXIS | CDF\_CHAR | Elevation | | | |
| VALIDMIN | CDF\_UINT1 | 0 | | | |
| VALIDMAX | CDF\_UINT1 | 16 | | | |
| SCALETYP | CDF\_CHAR | linear | | | |
| SCALEMIN | CDF\_UINT1 | 0 | | | |
| SCALEMAX | CDF\_UINT1 | 16 | | | |
| VAR\_TYPE | CDF\_CHAR | support\_data | | | |

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Variable\_Name** | **Data\_type** | **DIMS** | **SIZES** | **R\_VARY** | **D\_VARY** |
| SWA\_EAS\_MagDataUsed | CDF\_UINT4 | 1 | 4 | T | T |
| **Attribute Name** | **Data Type** | **Value** | | | |
| FIELDNAM | CDF\_CHAR | MAG vector | | | |
| CATDESC | CDF\_CHAR | The MAG vector used to calculate pitch angles collected | | | |
| DISPLAY\_TYPE | CDF\_CHAR | time\_series | | | |
| FILLVAL | CDF\_UINT4 | 4294967294 | | | |
| FORMAT | CDF\_CHAR | F14.4 | | | |
| LABLAXIS | CDF\_CHAR | Full 3D validity flag | | | |
| UNITS | CDF\_CHAR | nT | | | |
| VALIDMIN | CDF\_UINT4 | 0 | | | |
| VALIDMAX | CDF\_UINT4 | 65535 | | | |
| SCALETYP | CDF\_CHAR | linear | | | |
| SCALEMIN | CDF\_UINT4 | 0 | | | |
| SCALEMAX | CDF\_UINT4 | 65535 | | | |
| SI\_CONVERSION | CDF\_CHAR | 1E+09>T | | | |
| VAR\_TYPE | CDF\_CHAR | support\_data | | | |

##### EAS Onboard Partial Moments

This file contains onboard calculated partial electron moments from both EAS1 and EAS2. The file format is .cdf.

EAS onboard partial moments are calculated over three energy ranges in two sensor look directions. The three energy ranges are low, core-halo and strahl energy ranges. The look directions are one sensor only and two sensor overlap look directions.

This data product contains variables to describe SCET, data validity, summed distributions usage, spacecraft potential, 78 Moments values and 12 Moments Sums for each sensor. The 78 moments values come from three energy ranges in two sensor look directions. The two sensor look directions are one sensor only look direction and overlap with other sensor direction.

**Filename**: solo\_L0\_swa-eas-OnbPartMoms\_[StartTime-EndTime]\_V??.cdf

**Expected data volume and time resolution**: This file contains the data between the StartTime and EndTime in the file name. The start and end times are spacecraft elapsed time (SCET) at 4 second resolution, from the reference point (1 Jan 2000 TBC). The time resolution of the file is nominally 4 seconds.

**Global Attributes**

|  |  |  |
| --- | --- | --- |
| **Name** | **Entry** | **Value** |
| Project | 1 | Solar Orbiter |
| Project | 2 | Cosmic Visions |
| Source Name | 1 | SOLO>Solar Orbiter |
| Discipline | 1 | Space Physics>Interplanetary Studies |
| Data Type | 1 | L0>Level 0 Data |
| Descriptor | 1 | SWA-EAS-OnbPartMoms |
| Data Version | 1 | 01 |
| Software Version | 1 | 01.00.00 |
| PI Name | 1 | C. J. Owen |
| PI Affiliation | 1 | MSSL-UCL, University College London, UK |
| Instrument Type | 1 | Plasma and Solar Wind |
| Mission Group | 1 | Solar Orbiter |
| Logical Source | 1 | SWA\_L0\_swa-eas-padc |
| Logical File id | 1 | solo\_L0\_swa-eas- OnbPartMoms \_yyyymmddTHHMMSS-yyyymmddTHHMMSS\_V01 |
| Logical Source Description | 1 | SWA-EAS Onboard Partial Moments |
| Rules of Use | 1 | Consult with MSSL-UCL before using |
| Generated by | 1 | MSSL-UCL |
| Generation date | 1 | YYYY-MM-DDTHH:MN:SS |
| Mods | 1 | V01 First Version |
| Data Product | 1 | OnbPartMoms>Onboard Partial Moments |
| Level | 1 | L0>Level 0 Data |
| Instrument | 1 | SWA-EAS>Solar-Wind-Analyser-Electron-Analyser-System |

**Variables**

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Variable\_Name** | **Data\_type** | **DIMS** | **SIZES** | **R\_VARY** | **D\_VARY** |
| SWA\_EAS1\_SCET | CDF\_EPOCH | 1 | 1 | T | F |
| **Attribute Name** | **Data Type** | **Value** | | | |
| FIELDNAM | CDF\_CHAR | EAS1 SCET | | | |
| CATDESC | CDF\_CHAR | Elapsed time of the onboard clock at the time of EAS1 observation | | | |
| DISPLAY\_TYPE | CDF\_CHAR | time\_series | | | |
| FILLVAL | CDF\_EPOCH | 1900-01-01 00:00:00.000 | | | |
| LABLAXIS | CDF\_CHAR | Spacecraft Elapsed Time (Ticks) | | | |
| UNITS | CDF\_CHAR | s | | | |
| VALIDMIN | CDF\_EPOCH | 2010-01-01 00:00:00.000 | | | |
| VALIDMAX | CDF\_EPOCH | 2039-12-31 23:59:59.999 | | | |
| SCALETYP | CDF\_CHAR | linear | | | |
| SCALEMIN | CDF\_EPOCH | 2010-01-01 00:00:00.000 | | | |
| SCALEMAX | CDF\_EPOCH | 2039-12-31 23:59:59.999 | | | |
| VAR\_TYPE | CDF\_CHAR | support\_data | | | |
| VAR\_NOTES | CDF\_CHAR | The EAS1 time tag is from the centre of the acquisition interval which is 1 sec | | | |

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Variable\_Name** | **Data\_type** | **DIMS** | **SIZES** | **R\_VARY** | **D\_VARY** |
| SWA\_EAS2\_SCET | CDF\_EPOCH | 1 | 1 | T | F |
| **Attribute Name** | **Data Type** | **Value** | | | |
| FIELDNAM | CDF\_CHAR | EAS2 SCET | | | |
| CATDESC | CDF\_CHAR | Elapsed time of the onboard clock at the time of EAS2 observation | | | |
| DISPLAY\_TYPE | CDF\_CHAR | time\_series | | | |
| FILLVAL | CDF\_EPOCH | 1900-01-01 00:00:00.000 | | | |
| LABLAXIS | CDF\_CHAR | Spacecraft Elapsed Time (Ticks) | | | |
| UNITS | CDF\_CHAR | s | | | |
| VALIDMIN | CDF\_EPOCH | 2010-01-01 00:00:00.000 | | | |
| VALIDMAX | CDF\_EPOCH | 2039-12-31 23:59:59.999 | | | |
| SCALETYP | CDF\_CHAR | linear | | | |
| SCALEMIN | CDF\_EPOCH | 2010-01-01 00:00:00.000 | | | |
| SCALEMAX | CDF\_EPOCH | 2039-12-31 23:59:59.999 | | | |
| VAR\_TYPE | CDF\_CHAR | support\_data | | | |
| VAR\_NOTES | CDF\_CHAR | The EAS2 time tag is from the centre of the acquisition interval which is 1 sec | | | |

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| --- | --- | --- | --- | --- | --- |
| **Variable\_Name** | **Data\_type** | **DIMS** | **SIZES** | **R\_VARY** | **D\_VARY** |
| SWA\_EAS1\_dataValidity | CDF\_UINT4 | 1 | 1 | T | F |
| **Attribute Name** | **Data Type** | **Value** | | | |
| FIELDNAM | CDF\_CHAR | EAS1 Data Validity | | | |
| CATDESC | CDF\_CHAR | The Validity flags associated with EAS1 | | | |
| DISPLAY\_TYPE | CDF\_CHAR | time\_series | | | |
| FILLVAL | CDF\_UINT4 | 4294967294 | | | |
| FORMAT | CDF\_CHAR | I10 | | | |
| LABLAXIS | CDF\_CHAR | EAS1 validity flag | | | |
| VALIDMIN | CDF\_UINT4 | 0 | | | |
| VALIDMAX | CDF\_UINT4 | 65535 | | | |
| SCALETYP | CDF\_CHAR | linear | | | |
| SCALEMIN | CDF\_UINT4 | 0 | | | |
| SCALEMAX | CDF\_UINT4 | 65535 | | | |
| VAR\_TYPE | CDF\_CHAR | support\_data | | | |

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| --- | --- | --- | --- | --- | --- |
| **Variable\_Name** | **Data\_type** | **DIMS** | **SIZES** | **R\_VARY** | **D\_VARY** |
| SWA\_EAS2\_dataValidity | CDF\_UINT4 | 1 | 1 | T | F |
| **Attribute Name** | **Data Type** | **Value** | | | |
| FIELDNAM | CDF\_CHAR | EAS2 Data Validity | | | |
| CATDESC | CDF\_CHAR | The Validity flags associated with EAS2 | | | |
| DISPLAY\_TYPE | CDF\_CHAR | time\_series | | | |
| FILLVAL | CDF\_UINT4 | 4294967294 | | | |
| FORMAT | CDF\_CHAR | I10 | | | |
| LABLAXIS | CDF\_CHAR | EAS1 validity flag | | | |
| VALIDMIN | CDF\_UINT4 | 0 | | | |
| VALIDMAX | CDF\_UINT4 | 65535 | | | |
| SCALETYP | CDF\_CHAR | linear | | | |
| SCALEMIN | CDF\_UINT4 | 0 | | | |
| SCALEMAX | CDF\_UINT4 | 65535 | | | |
| VAR\_TYPE | CDF\_CHAR | support\_data | | | |

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| --- | --- | --- | --- | --- | --- |
| **Variable\_Name** | **Data\_type** | **DIMS** | **SIZES** | **R\_VARY** | **D\_VARY** |
| SWA\_EAS\_SumEAS1 | CDF\_UINT4 | 1 | 1 | T | F |
| **Attribute Name** | **Data Type** | **Value** | | | |
| FIELDNAM | CDF\_CHAR | Summed EAS1 distributions | | | |
| CATDESC | CDF\_CHAR | This flag indicates if 4 successive 3D distributions are summed to calculate Moments | | | |
| DISPLAY\_TYPE | CDF\_CHAR | time\_series | | | |
| FILLVAL | CDF\_UINT4 | 4294967294 | | | |
| FORMAT | CDF\_CHAR | I10 | | | |
| LABLAXIS | CDF\_CHAR | EAS1 Summed flag | | | |
| VALIDMIN | CDF\_UINT4 | 0 | | | |
| VALIDMAX | CDF\_UINT4 | 65535 | | | |
| SCALETYP | CDF\_CHAR | linear | | | |
| SCALEMIN | CDF\_UINT4 | 0 | | | |
| SCALEMAX | CDF\_UINT4 | 65535 | | | |
| VAR\_TYPE | CDF\_CHAR | support\_data | | | |

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| --- | --- | --- | --- | --- | --- |
| **Variable\_Name** | **Data\_type** | **DIMS** | **SIZES** | **R\_VARY** | **D\_VARY** |
| SWA\_EAS\_SumEAS2 | CDF\_UINT4 | 1 | 1 | T | F |
| **Attribute Name** | **Data Type** | **Value** | | | |
| FIELDNAM | CDF\_CHAR | Summed EAS2 distributions | | | |
| CATDESC | CDF\_CHAR | This flag indicates if 4 successive 3D distributions are summed to calculate Moments | | | |
| DISPLAY\_TYPE | CDF\_CHAR | time\_series | | | |
| FILLVAL | CDF\_UINT4 | 4294967294 | | | |
| FORMAT | CDF\_CHAR | I10 | | | |
| LABLAXIS | CDF\_CHAR | EAS2 Summed flag | | | |
| VALIDMIN | CDF\_UINT4 | 0 | | | |
| VALIDMAX | CDF\_UINT4 | 65535 | | | |
| SCALETYP | CDF\_CHAR | linear | | | |
| SCALEMIN | CDF\_UINT4 | 0 | | | |
| SCALEMAX | CDF\_UINT4 | 65535 | | | |
| VAR\_TYPE | CDF\_CHAR | support\_data | | | |

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| --- | --- | --- | --- | --- | --- |
| **Variable\_Name** | **Data\_type** | **DIMS** | **SIZES** | **R\_VARY** | **D\_VARY** |
| SWA\_EAS\_SCPotential | CDF\_UINT4 | 1 | 1 | T | F |
| **Attribute Name** | **Data Type** | **Value** | | | |
| FIELDNAM | CDF\_CHAR | Spacecraft Potential | | | |
| CATDESC | CDF\_CHAR | Spacecraft Potential used to discard lowest energies – needs conversion. | | | |
| DISPLAY\_TYPE | CDF\_CHAR | time\_series | | | |
| DEPEND\_0 | CDF\_CHAR | SWA\_EAS1\_SCET | | | |
| FILLVAL | CDF\_UINT4 | 4294967294 | | | |
| FORMAT | CDF\_CHAR | I10 | | | |
| LABLAXIS | CDF\_CHAR | Spacecraft Potential | | | |
| VALIDMIN | CDF\_UINT4 | 0 | | | |
| VALIDMAX | CDF\_UINT4 | 65535 | | | |
| SCALETYP | CDF\_CHAR | linear | | | |
| SCALEMIN | CDF\_UINT4 | 0 | | | |
| SCALEMAX | CDF\_UINT4 | 65535 | | | |
| VAR\_TYPE | CDF\_CHAR | data | | | |

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| --- | --- | --- | --- | --- | --- |
| **Variable\_Name** | **Data\_type** | **DIMS** | **SIZES** | **R\_VARY** | **D\_VARY** |
| SWA\_EAS1\_SumMoms | CDF\_UINT4 | 1 | 12 | T | T |
| **Attribute Name** | **Data Type** | **Value** | | | |
| FIELDNAM | CDF\_CHAR | EAS1 Moment Sums | | | |
| CATDESC | CDF\_CHAR | The partial sum of the EAS1 Moments | | | |
| DISPLAY\_TYPE | CDF\_CHAR | time\_series | | | |
| FILLVAL | CDF\_UINT4 | 4294967294 | | | |
| FORMAT | CDF\_CHAR | I10 | | | |
| LABLAXIS | CDF\_CHAR | EAS1 Partial Sum | | | |
| VALIDMIN | CDF\_UINT4 | 0 | | | |
| VALIDMAX | CDF\_UINT4 | 65535 | | | |
| SCALETYP | CDF\_CHAR | linear | | | |
| SCALEMIN | CDF\_UINT4 | 0 | | | |
| SCALEMAX | CDF\_UINT4 | 65535 | | | |
| VAR\_TYPE | CDF\_CHAR | support\_data | | | |

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| --- | --- | --- | --- | --- | --- |
| **Variable\_Name** | **Data\_type** | **DIMS** | **SIZES** | **R\_VARY** | **D\_VARY** |
| SWA\_EAS2\_SumMoms | CDF\_UINT4 | 1 | 12 | T | T |
| **Attribute Name** | **Data Type** | **Value** | | | |
| FIELDNAM | CDF\_CHAR | EAS2 Moment Sums | | | |
| CATDESC | CDF\_CHAR | The partial sum of the EAS2 Moments | | | |
| DISPLAY\_TYPE | CDF\_CHAR | time\_series | | | |
| FILLVAL | CDF\_UINT4 | 4294967294 | | | |
| FORMAT | CDF\_CHAR | I10 | | | |
| LABLAXIS | CDF\_CHAR | EAS2 Partial Sum | | | |
| VALIDMIN | CDF\_UINT4 | 0 | | | |
| VALIDMAX | CDF\_UINT4 | 65535 | | | |
| SCALETYP | CDF\_CHAR | linear | | | |
| SCALEMIN | CDF\_UINT4 | 0 | | | |
| SCALEMAX | CDF\_UINT4 | 65535 | | | |
| VAR\_TYPE | CDF\_CHAR | support\_data | | | |

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| **Variable\_Name** | **Data\_type** | **DIMS** | **SIZES** | **R\_VARY** | **D\_VARY** |
| SWA\_EAS1\_onlyLowEne\_N | CDF\_REAL8 | 1 | 1 | T | F |
| **Attribute Name** | **Data Type** | **Value** | | | |
| FIELDNAM | CDF\_CHAR | EAS1 onlyLowEne Density | | | |
| CATDESC | CDF\_CHAR | Number density from EAS1 only look direction in low energy range | | | |
| COORDINATE\_SYSTEM | CDF\_CHAR | EAS1 | | | |
| DISPLAY\_TYPE | CDF\_CHAR | time\_series | | | |
| DEPEND\_0 | CDF\_CHAR | SWA\_EAS1\_SCET | | | |
| FILLVAL | CDF\_REAL8 | -1E+31 | | | |
| FORMAT | CDF\_CHAR | f14.4 | | | |
| LABLAXIS | CDF\_CHAR | EAS1 OnlyLowEne N | | | |
| VALIDMIN | CDF\_UINT4 | 1E-9 | | | |
| VALIDMAX | CDF\_UINT4 | 1E+3 | | | |
| SCALETYP | CDF\_CHAR | log | | | |
| SCALEMIN | CDF\_UINT4 | 1E-9 | | | |
| SCALEMAX | CDF\_UINT4 | 1E+3 | | | |
| VAR\_TYPE | CDF\_CHAR | data | | | |
| UNITS | CDF\_CHAR | cm^-3 | | | |
| SI\_CONVERSION | CDF\_CHAR | 1E-06>m^-3 | | | |

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| --- | --- | --- | --- | --- | --- |
| **Variable\_Name** | **Data\_type** | **DIMS** | **SIZES** | **R\_VARY** | **D\_VARY** |
| SWA\_EAS1\_onlyLowEne\_V | CDF\_REAL8 | 1 | 3 | T | T |
| **Attribute Name** | **Data Type** | **Value** | | | |
| FIELDNAM | CDF\_CHAR | EAS1 onlyLowEne Velocity | | | |
| CATDESC | CDF\_CHAR | Bulk velocity from EAS1 only look direction in low energy range | | | |
| COORDINATE\_SYSTEM | CDF\_CHAR | EAS1 | | | |
| DISPLAY\_TYPE | CDF\_CHAR | time\_series | | | |
| DEPEND\_0 | CDF\_CHAR | SWA\_EAS1\_SCET | | | |
| FILLVAL | CDF\_REAL8 | -1E+31 | | | |
| FORMAT | CDF\_CHAR | f14.4 | | | |
| LABL\_PTR\_1 | CDF\_CHAR | EAS\_VEL\_LABEL | | | |
| VALIDMIN | CDF\_REAL8 | -10000.0 | | | |
| VALIDMAX | CDF\_REAL8 | +10000.0 | | | |
| SCALETYP | CDF\_CHAR | log | | | |
| SCALEMIN | CDF\_REAL8 | -10000.0 | | | |
| SCALEMAX | CDF\_REAL8 | +10000.0 | | | |
| VAR\_TYPE | CDF\_CHAR | data | | | |
| UNITS | CDF\_CHAR | km s^-1 | | | |
| SI\_CONVERSION | CDF\_CHAR | 1E+03>m s^-1 | | | |
| REPRESENTATION\_1 | CDF\_CHAR | REP\_VEL\_LABEL | | | |

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| --- | --- | --- | --- | --- | --- |
| **Variable\_Name** | **Data\_type** | **DIMS** | **SIZES** | **R\_VARY** | **D\_VARY** |
| SWA\_EAS1\_onlyLowEne\_P | CDF\_REAL8 | 1 | 9 | T | T |
| **Attribute Name** | **Data Type** | **Value** | | | |
| FIELDNAM | CDF\_CHAR | EAS1 onlyLowEne Pressure | | | |
| CATDESC | CDF\_CHAR | Pressure tensor from EAS1 only look direction in low energy range | | | |
| COORDINATE\_SYSTEM | CDF\_CHAR | EAS1 | | | |
| DISPLAY\_TYPE | CDF\_CHAR | time\_series | | | |
| DEPEND\_0 | CDF\_CHAR | SWA\_EAS1\_SCET | | | |
| FILLVAL | CDF\_REAL8 | -1E+31 | | | |
| FORMAT | CDF\_CHAR | f14.4 | | | |
| LABLAXIS | CDF\_CHAR | EAS1 OnlyLowEne P | | | |
| VALIDMIN | CDF\_REAL8 | 1E-6 | | | |
| VALIDMAX | CDF\_REAL8 | 1E+3 | | | |
| SCALETYP | CDF\_CHAR | Log | | | |
| SCALEMIN | CDF\_REAL8 | 1E-6 | | | |
| SCALEMAX | CDF\_REAL8 | 1E+3 | | | |
| VAR\_TYPE | CDF\_CHAR | data | | | |
| UNITS | CDF\_CHAR | nPa | | | |
| SI\_CONVERSION | CDF\_CHAR | 1E-09>P | | | |
| REPRESENTATION\_1 | CDF\_CHAR | REP\_EAS\_PRES\_1 | | | |
| REPRESENTATION\_2 | CDF\_CHAR | REP\_EAS\_PRES\_2 | | | |

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| --- | --- | --- | --- | --- | --- |
| **Variable\_Name** | **Data\_type** | **DIMS** | **SIZES** | **R\_VARY** | **D\_VARY** |
| SWA\_EAS1\_onlyLowEne\_H | CDF\_REAL8 | 1 | 3 | T | T |
| **Attribute Name** | **Data Type** | **Value** | | | |
| FIELDNAM | CDF\_CHAR | EAS1 onlyLowEne Heat Flux | | | |
| CATDESC | CDF\_CHAR | Heat Flux from EAS1 only look direction in low energy range | | | |
| COORDINATE\_SYSTEM | CDF\_CHAR | EAS1 | | | |
| DISPLAY\_TYPE | CDF\_CHAR | time\_series | | | |
| DEPEND\_0 | CDF\_CHAR | SWA\_EAS1\_SCET | | | |
| FILLVAL | CDF\_REAL8 | -1E+31 | | | |
| FORMAT | CDF\_CHAR | f14.4 | | | |
| LABL\_PTR\_1 | CDF\_CHAR | EAS\_HFlux\_LABEL | | | |
| VALIDMIN | CDF\_REAL8 | 1E-05 | | | |
| VALIDMAX | CDF\_REAL8 | 1E+05 | | | |
| SCALETYP | CDF\_CHAR | log | | | |
| SCALEMIN | CDF\_REAL8 | 1E-05 | | | |
| SCALEMAX | CDF\_REAL8 | 1E+05 | | | |
| VAR\_TYPE | CDF\_CHAR | data | | | |
| UNITS | CDF\_CHAR | erg s^-1 cm^-2 | | | |
| SI\_CONVERSION | CDF\_CHAR | 1E-03>J s^-1 m^-2 | | | |
| REPRESENTATION\_1 | CDF\_CHAR | REP\_HFlux\_LABEL | | | |

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| --- | --- | --- | --- | --- | --- |
| **Variable\_Name** | **Data\_type** | **DIMS** | **SIZES** | **R\_VARY** | **D\_VARY** |
| SWA\_EAS1\_onlyCoreHalo\_N | CDF\_REAL8 | 1 | 1 | T | F |
| **Attribute Name** | **Data Type** | **Value** | | | |
| FIELDNAM | CDF\_CHAR | EAS1 onlyCoreHalo Density | | | |
| CATDESC | CDF\_CHAR | Number density from EAS1 only look direction in CoreHalo range | | | |
| COORDINATE\_SYSTEM | CDF\_CHAR | EAS1 | | | |
| DISPLAY\_TYPE | CDF\_CHAR | time\_series | | | |
| DEPEND\_0 | CDF\_CHAR | SWA\_EAS1\_SCET | | | |
| FILLVAL | CDF\_REAL8 | -1E+31 | | | |
| FORMAT | CDF\_CHAR | f14.4 | | | |
| LABLAXIS | CDF\_CHAR | EAS1 OnlyCoreHalo N | | | |
| VALIDMIN | CDF\_UINT4 | 1E-9 | | | |
| VALIDMAX | CDF\_UINT4 | 1E+3 | | | |
| SCALETYP | CDF\_CHAR | log | | | |
| SCALEMIN | CDF\_UINT4 | 1E-9 | | | |
| SCALEMAX | CDF\_UINT4 | 1E+3 | | | |
| VAR\_TYPE | CDF\_CHAR | data | | | |
| UNITS | CDF\_CHAR | cm^-3 | | | |
| SI\_CONVERSION | CDF\_CHAR | 1E-06>m^-3 | | | |

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| --- | --- | --- | --- | --- | --- |
| **Variable\_Name** | **Data\_type** | **DIMS** | **SIZES** | **R\_VARY** | **D\_VARY** |
| SWA\_EAS1\_onlyCoreHalo\_V | CDF\_REAL8 | 1 | 3 | T | T |
| **Attribute Name** | **Data Type** | **Value** | | | |
| FIELDNAM | CDF\_CHAR | EAS1 onlyCoreHalo Velocity | | | |
| CATDESC | CDF\_CHAR | Bulk velocity from EAS1 only look direction in CoreHalo range | | | |
| COORDINATE\_SYSTEM | CDF\_CHAR | EAS1 | | | |
| DISPLAY\_TYPE | CDF\_CHAR | time\_series | | | |
| DEPEND\_0 | CDF\_CHAR | SWA\_EAS1\_SCET | | | |
| FILLVAL | CDF\_REAL8 | -1E+31 | | | |
| FORMAT | CDF\_CHAR | f14.4 | | | |
| LABL\_PTR\_1 | CDF\_CHAR | EAS\_VEL\_LABEL | | | |
| VALIDMIN | CDF\_REAL8 | -10000.0 | | | |
| VALIDMAX | CDF\_REAL8 | +10000.0 | | | |
| SCALETYP | CDF\_CHAR | log | | | |
| SCALEMIN | CDF\_REAL8 | -10000.0 | | | |
| SCALEMAX | CDF\_REAL8 | +10000.0 | | | |
| VAR\_TYPE | CDF\_CHAR | data | | | |
| UNITS | CDF\_CHAR | km s^-1 | | | |
| SI\_CONVERSION | CDF\_CHAR | 1E+03>m s^-1 | | | |
| REPRESENTATION\_1 | CDF\_CHAR | REP\_VEL\_LABEL | | | |

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| **Variable\_Name** | **Data\_type** | **DIMS** | **SIZES** | **R\_VARY** | **D\_VARY** |
| SWA\_EAS1\_onlyCoreHalo\_P | CDF\_REAL8 | 1 | 9 | T | T |
| **Attribute Name** | **Data Type** | **Value** | | | |
| FIELDNAM | CDF\_CHAR | EAS1 onlyCoreHalo Pressure | | | |
| CATDESC | CDF\_CHAR | Pressure tensor from EAS1 only look direction in CoreHalo range | | | |
| COORDINATE\_SYSTEM | CDF\_CHAR | EAS1 | | | |
| DISPLAY\_TYPE | CDF\_CHAR | time\_series | | | |
| DEPEND\_0 | CDF\_CHAR | SWA\_EAS1\_SCET | | | |
| FILLVAL | CDF\_REAL8 | -1E+31 | | | |
| FORMAT | CDF\_CHAR | f14.4 | | | |
| LABLAXIS | CDF\_CHAR | EAS1 OnlyCoreHalo P | | | |
| VALIDMIN | CDF\_REAL8 | 1E-6 | | | |
| VALIDMAX | CDF\_REAL8 | 1E+3 | | | |
| SCALETYP | CDF\_CHAR | Log | | | |
| SCALEMIN | CDF\_REAL8 | 1E-6 | | | |
| SCALEMAX | CDF\_REAL8 | 1E+3 | | | |
| VAR\_TYPE | CDF\_CHAR | data | | | |
| UNITS | CDF\_CHAR | nPa | | | |
| SI\_CONVERSION | CDF\_CHAR | 1E-09>P | | | |
| REPRESENTATION\_1 | CDF\_CHAR | REP\_EAS\_PRES\_1 | | | |
| REPRESENTATION\_2 | CDF\_CHAR | REP\_EAS\_PRES\_2 | | | |

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| **Variable\_Name** | **Data\_type** | **DIMS** | **SIZES** | **R\_VARY** | **D\_VARY** |
| SWA\_EAS1\_onlyCoreHalo\_H | CDF\_REAL8 | 1 | 3 | T | T |
| **Attribute Name** | **Data Type** | **Value** | | | |
| FIELDNAM | CDF\_CHAR | EAS1 onlyCoreHalo Heat Flux | | | |
| CATDESC | CDF\_CHAR | Heat Flux from EAS1 only look direction in CoreHalo range | | | |
| COORDINATE\_SYSTEM | CDF\_CHAR | EAS1 | | | |
| DISPLAY\_TYPE | CDF\_CHAR | time\_series | | | |
| DEPEND\_0 | CDF\_CHAR | SWA\_EAS1\_SCET | | | |
| FILLVAL | CDF\_REAL8 | -1E+31 | | | |
| FORMAT | CDF\_CHAR | f14.4 | | | |
| LABL\_PTR\_1 | CDF\_CHAR | EAS\_HFlux\_LABEL | | | |
| VALIDMIN | CDF\_REAL8 | 1E-05 | | | |
| VALIDMAX | CDF\_REAL8 | 1E+05 | | | |
| SCALETYP | CDF\_CHAR | log | | | |
| SCALEMIN | CDF\_REAL8 | 1E-05 | | | |
| SCALEMAX | CDF\_REAL8 | 1E+05 | | | |
| VAR\_TYPE | CDF\_CHAR | data | | | |
| UNITS | CDF\_CHAR | erg s^-1 cm^-2 | | | |
| SI\_CONVERSION | CDF\_CHAR | 1E-03>J s^-1 m^-2 | | | |
| REPRESENTATION\_1 | CDF\_CHAR | REP\_HFlux\_LABEL | | | |

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| **Variable\_Name** | **Data\_type** | **DIMS** | **SIZES** | **R\_VARY** | **D\_VARY** |
| SWA\_EAS1\_onlyStrahl\_N | CDF\_REAL8 | 1 | 1 | T | F |
| **Attribute Name** | **Data Type** | **Value** | | | |
| FIELDNAM | CDF\_CHAR | EAS1 onlyStrahl Density | | | |
| CATDESC | CDF\_CHAR | Number density from EAS1 only look direction in Strahl range | | | |
| COORDINATE\_SYSTEM | CDF\_CHAR | EAS1 | | | |
| DISPLAY\_TYPE | CDF\_CHAR | time\_series | | | |
| DEPEND\_0 | CDF\_CHAR | SWA\_EAS1\_SCET | | | |
| FILLVAL | CDF\_REAL8 | -1E+31 | | | |
| FORMAT | CDF\_CHAR | f14.4 | | | |
| LABLAXIS | CDF\_CHAR | EAS1 OnlyStrahl N | | | |
| VALIDMIN | CDF\_UINT4 | 1E-9 | | | |
| VALIDMAX | CDF\_UINT4 | 1E+3 | | | |
| SCALETYP | CDF\_CHAR | log | | | |
| SCALEMIN | CDF\_UINT4 | 1E-9 | | | |
| SCALEMAX | CDF\_UINT4 | 1E+3 | | | |
| VAR\_TYPE | CDF\_CHAR | data | | | |
| UNITS | CDF\_CHAR | cm^-3 | | | |
| SI\_CONVERSION | CDF\_CHAR | 1E-06>m^-3 | | | |

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| **Variable\_Name** | **Data\_type** | **DIMS** | **SIZES** | **R\_VARY** | **D\_VARY** |
| SWA\_EAS1\_onlyStrahl\_V | CDF\_REAL8 | 1 | 3 | T | T |
| **Attribute Name** | **Data Type** | **Value** | | | |
| FIELDNAM | CDF\_CHAR | EAS1 onlyStrahl Velocity | | | |
| CATDESC | CDF\_CHAR | Bulk velocity from EAS1 only look direction in Strahl range | | | |
| COORDINATE\_SYSTEM | CDF\_CHAR | EAS1 | | | |
| DISPLAY\_TYPE | CDF\_CHAR | time\_series | | | |
| DEPEND\_0 | CDF\_CHAR | SWA\_EAS1\_SCET | | | |
| FILLVAL | CDF\_REAL8 | -1E+31 | | | |
| FORMAT | CDF\_CHAR | f14.4 | | | |
| LABL\_PTR\_1 | CDF\_CHAR | EAS\_VEL\_LABEL | | | |
| VALIDMIN | CDF\_REAL8 | -10000.0 | | | |
| VALIDMAX | CDF\_REAL8 | +10000.0 | | | |
| SCALETYP | CDF\_CHAR | log | | | |
| SCALEMIN | CDF\_REAL8 | -10000.0 | | | |
| SCALEMAX | CDF\_REAL8 | +10000.0 | | | |
| VAR\_TYPE | CDF\_CHAR | data | | | |
| UNITS | CDF\_CHAR | km s^-1 | | | |
| SI\_CONVERSION | CDF\_CHAR | 1E+03>m s^-1 | | | |
| REPRESENTATION\_1 | CDF\_CHAR | REP\_VEL\_LABEL | | | |

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| **Variable\_Name** | **Data\_type** | **DIMS** | **SIZES** | **R\_VARY** | **D\_VARY** |
| SWA\_EAS1\_onlyStrahl\_P | CDF\_REAL8 | 1 | 9 | T | T |
| **Attribute Name** | **Data Type** | **Value** | | | |
| FIELDNAM | CDF\_CHAR | EAS1 onlyStrahl Pressure | | | |
| CATDESC | CDF\_CHAR | Pressure tensor from EAS1 only look direction in Strahl range | | | |
| COORDINATE\_SYSTEM | CDF\_CHAR | EAS1 | | | |
| DISPLAY\_TYPE | CDF\_CHAR | time\_series | | | |
| DEPEND\_0 | CDF\_CHAR | SWA\_EAS1\_SCET | | | |
| FILLVAL | CDF\_REAL8 | -1E+31 | | | |
| FORMAT | CDF\_CHAR | f14.4 | | | |
| LABLAXIS | CDF\_CHAR | EAS1 OnlyStrahl P | | | |
| VALIDMIN | CDF\_REAL8 | 1E-6 | | | |
| VALIDMAX | CDF\_REAL8 | 1E+3 | | | |
| SCALETYP | CDF\_CHAR | Log | | | |
| SCALEMIN | CDF\_REAL8 | 1E-6 | | | |
| SCALEMAX | CDF\_REAL8 | 1E+3 | | | |
| VAR\_TYPE | CDF\_CHAR | data | | | |
| UNITS | CDF\_CHAR | nPa | | | |
| SI\_CONVERSION | CDF\_CHAR | 1E-09>P | | | |
| REPRESENTATION\_1 | CDF\_CHAR | REP\_EAS\_PRES\_1 | | | |
| REPRESENTATION\_2 | CDF\_CHAR | REP\_EAS\_PRES\_2 | | | |

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| **Variable\_Name** | **Data\_type** | **DIMS** | **SIZES** | **R\_VARY** | **D\_VARY** |
| SWA\_EAS1\_onlyStrahl\_H | CDF\_REAL8 | 1 | 3 | T | T |
| **Attribute Name** | **Data Type** | **Value** | | | |
| FIELDNAM | CDF\_CHAR | EAS1 onlyStrahl Heat Flux | | | |
| CATDESC | CDF\_CHAR | Heat Flux from EAS1 only look direction in Strahl range | | | |
| COORDINATE\_SYSTEM | CDF\_CHAR | EAS1 | | | |
| DISPLAY\_TYPE | CDF\_CHAR | time\_series | | | |
| DEPEND\_0 | CDF\_CHAR | SWA\_EAS1\_SCET | | | |
| FILLVAL | CDF\_REAL8 | -1E+31 | | | |
| FORMAT | CDF\_CHAR | f14.4 | | | |
| LABL\_PTR\_1 | CDF\_CHAR | EAS\_HFlux\_LABEL | | | |
| VALIDMIN | CDF\_REAL8 | 1E-05 | | | |
| VALIDMAX | CDF\_REAL8 | 1E+05 | | | |
| SCALETYP | CDF\_CHAR | log | | | |
| SCALEMIN | CDF\_REAL8 | 1E-05 | | | |
| SCALEMAX | CDF\_REAL8 | 1E+05 | | | |
| VAR\_TYPE | CDF\_CHAR | data | | | |
| UNITS | CDF\_CHAR | erg s^-1 cm^-2 | | | |
| SI\_CONVERSION | CDF\_CHAR | 1E-03>J s^-1 m^-2 | | | |
| REPRESENTATION\_1 | CDF\_CHAR | REP\_HFlux\_LABEL | | | |

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| **Variable\_Name** | **Data\_type** | **DIMS** | **SIZES** | **R\_VARY** | **D\_VARY** |
| SWA\_EAS1\_overlapLowEne\_N | CDF\_REAL8 | 1 | 1 | T | F |
| **Attribute Name** | **Data Type** | **Value** | | | |
| FIELDNAM | CDF\_CHAR | EAS1 overlapLowEne Density | | | |
| CATDESC | CDF\_CHAR | Number density from EAS1 only look direction in low energy range | | | |
| COORDINATE\_SYSTEM | CDF\_CHAR | EAS1 | | | |
| DISPLAY\_TYPE | CDF\_CHAR | time\_series | | | |
| DEPEND\_0 | CDF\_CHAR | SWA\_EAS1\_SCET | | | |
| FILLVAL | CDF\_REAL8 | -1E+31 | | | |
| FORMAT | CDF\_CHAR | f14.4 | | | |
| LABLAXIS | CDF\_CHAR | EAS1 overlapLowEne N | | | |
| VALIDMIN | CDF\_UINT4 | 1E-9 | | | |
| VALIDMAX | CDF\_UINT4 | 1E+3 | | | |
| SCALETYP | CDF\_CHAR | log | | | |
| SCALEMIN | CDF\_UINT4 | 1E-9 | | | |
| SCALEMAX | CDF\_UINT4 | 1E+3 | | | |
| VAR\_TYPE | CDF\_CHAR | data | | | |
| UNITS | CDF\_CHAR | cm^-3 | | | |
| SI\_CONVERSION | CDF\_CHAR | 1E-06>m^-3 | | | |

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| **Variable\_Name** | **Data\_type** | **DIMS** | **SIZES** | **R\_VARY** | **D\_VARY** |
| SWA\_EAS1\_overlapLowEne\_V | CDF\_REAL8 | 1 | 3 | T | T |
| **Attribute Name** | **Data Type** | **Value** | | | |
| FIELDNAM | CDF\_CHAR | EAS1 overlapLowEne Velocity | | | |
| CATDESC | CDF\_CHAR | Bulk velocity from EAS1 overlap look direction in low energy range | | | |
| COORDINATE\_SYSTEM | CDF\_CHAR | EAS1 | | | |
| DISPLAY\_TYPE | CDF\_CHAR | time\_series | | | |
| DEPEND\_0 | CDF\_CHAR | SWA\_EAS1\_SCET | | | |
| FILLVAL | CDF\_REAL8 | -1E+31 | | | |
| FORMAT | CDF\_CHAR | f14.4 | | | |
| LABL\_PTR\_1 | CDF\_CHAR | EAS\_VEL\_LABEL | | | |
| VALIDMIN | CDF\_REAL8 | -10000.0 | | | |
| VALIDMAX | CDF\_REAL8 | +10000.0 | | | |
| SCALETYP | CDF\_CHAR | log | | | |
| SCALEMIN | CDF\_REAL8 | -10000.0 | | | |
| SCALEMAX | CDF\_REAL8 | +10000.0 | | | |
| VAR\_TYPE | CDF\_CHAR | data | | | |
| UNITS | CDF\_CHAR | km s^-1 | | | |
| SI\_CONVERSION | CDF\_CHAR | 1E+03>m s^-1 | | | |
| REPRESENTATION\_1 | CDF\_CHAR | REP\_VEL\_LABEL | | | |

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| **Variable\_Name** | **Data\_type** | **DIMS** | **SIZES** | **R\_VARY** | **D\_VARY** |
| SWA\_EAS1\_overlapLowEne\_P | CDF\_REAL8 | 1 | 9 | T | T |
| **Attribute Name** | **Data Type** | **Value** | | | |
| FIELDNAM | CDF\_CHAR | EAS1 overlapLowEne Pressure | | | |
| CATDESC | CDF\_CHAR | Pressure tensor from EAS1 overlap look direction in low energy range | | | |
| COORDINATE\_SYSTEM | CDF\_CHAR | EAS1 | | | |
| DISPLAY\_TYPE | CDF\_CHAR | time\_series | | | |
| DEPEND\_0 | CDF\_CHAR | SWA\_EAS1\_SCET | | | |
| FILLVAL | CDF\_REAL8 | -1E+31 | | | |
| FORMAT | CDF\_CHAR | f14.4 | | | |
| LABLAXIS | CDF\_CHAR | EAS1 overlapLowEne P | | | |
| VALIDMIN | CDF\_REAL8 | 1E-6 | | | |
| VALIDMAX | CDF\_REAL8 | 1E+3 | | | |
| SCALETYP | CDF\_CHAR | Log | | | |
| SCALEMIN | CDF\_REAL8 | 1E-6 | | | |
| SCALEMAX | CDF\_REAL8 | 1E+3 | | | |
| VAR\_TYPE | CDF\_CHAR | data | | | |
| UNITS | CDF\_CHAR | nPa | | | |
| SI\_CONVERSION | CDF\_CHAR | 1E-09>P | | | |
| REPRESENTATION\_1 | CDF\_CHAR | REP\_EAS\_PRES\_1 | | | |
| REPRESENTATION\_2 | CDF\_CHAR | REP\_EAS\_PRES\_2 | | | |

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| **Variable\_Name** | **Data\_type** | **DIMS** | **SIZES** | **R\_VARY** | **D\_VARY** |
| SWA\_EAS1\_overlapLowEne\_H | CDF\_REAL8 | 1 | 3 | T | T |
| **Attribute Name** | **Data Type** | **Value** | | | |
| FIELDNAM | CDF\_CHAR | EAS1 overlapLowEne Heat Flux | | | |
| CATDESC | CDF\_CHAR | Heat Flux from EAS1 overlap look direction in low energy range | | | |
| COORDINATE\_SYSTEM | CDF\_CHAR | EAS1 | | | |
| DISPLAY\_TYPE | CDF\_CHAR | time\_series | | | |
| DEPEND\_0 | CDF\_CHAR | SWA\_EAS1\_SCET | | | |
| FILLVAL | CDF\_REAL8 | -1E+31 | | | |
| FORMAT | CDF\_CHAR | f14.4 | | | |
| LABL\_PTR\_1 | CDF\_CHAR | EAS\_HFlux\_LABEL | | | |
| VALIDMIN | CDF\_REAL8 | 1E-05 | | | |
| VALIDMAX | CDF\_REAL8 | 1E+05 | | | |
| SCALETYP | CDF\_CHAR | log | | | |
| SCALEMIN | CDF\_REAL8 | 1E-05 | | | |
| SCALEMAX | CDF\_REAL8 | 1E+05 | | | |
| VAR\_TYPE | CDF\_CHAR | data | | | |
| UNITS | CDF\_CHAR | erg s^-1 cm^-2 | | | |
| SI\_CONVERSION | CDF\_CHAR | 1E-03>J s^-1 m^-2 | | | |
| REPRESENTATION\_1 | CDF\_CHAR | REP\_HFlux\_LABEL | | | |

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| **Variable\_Name** | **Data\_type** | **DIMS** | **SIZES** | **R\_VARY** | **D\_VARY** |
| SWA\_EAS1\_overlapCoreHalo\_N | CDF\_REAL8 | 1 | 1 | T | F |
| **Attribute Name** | **Data Type** | **Value** | | | |
| FIELDNAM | CDF\_CHAR | EAS1 overlapCoreHalo Density | | | |
| CATDESC | CDF\_CHAR | Number density from EAS1 overlap look direction in CoreHalo range | | | |
| COORDINATE\_SYSTEM | CDF\_CHAR | EAS1 | | | |
| DISPLAY\_TYPE | CDF\_CHAR | time\_series | | | |
| DEPEND\_0 | CDF\_CHAR | SWA\_EAS1\_SCET | | | |
| FILLVAL | CDF\_REAL8 | -1E+31 | | | |
| FORMAT | CDF\_CHAR | f14.4 | | | |
| LABLAXIS | CDF\_CHAR | EAS1 overlapCoreHalo N | | | |
| VALIDMIN | CDF\_UINT4 | 1E-9 | | | |
| VALIDMAX | CDF\_UINT4 | 1E+3 | | | |
| SCALETYP | CDF\_CHAR | log | | | |
| SCALEMIN | CDF\_UINT4 | 1E-9 | | | |
| SCALEMAX | CDF\_UINT4 | 1E+3 | | | |
| VAR\_TYPE | CDF\_CHAR | data | | | |
| UNITS | CDF\_CHAR | cm^-3 | | | |
| SI\_CONVERSION | CDF\_CHAR | 1E-06>m^-3 | | | |

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| **Variable\_Name** | **Data\_type** | **DIMS** | **SIZES** | **R\_VARY** | **D\_VARY** |
| SWA\_EAS1\_overlapCoreHalo\_V | CDF\_REAL8 | 1 | 3 | T | T |
| **Attribute Name** | **Data Type** | **Value** | | | |
| FIELDNAM | CDF\_CHAR | EAS1 overlapCoreHalo Velocity | | | |
| CATDESC | CDF\_CHAR | Bulk velocity from EAS1 overlap look direction in CoreHalo range | | | |
| COORDINATE\_SYSTEM | CDF\_CHAR | EAS1 | | | |
| DISPLAY\_TYPE | CDF\_CHAR | time\_series | | | |
| DEPEND\_0 | CDF\_CHAR | SWA\_EAS1\_SCET | | | |
| FILLVAL | CDF\_REAL8 | -1E+31 | | | |
| FORMAT | CDF\_CHAR | f14.4 | | | |
| LABL\_PTR\_1 | CDF\_CHAR | EAS\_VEL\_LABEL | | | |
| VALIDMIN | CDF\_REAL8 | -10000.0 | | | |
| VALIDMAX | CDF\_REAL8 | +10000.0 | | | |
| SCALETYP | CDF\_CHAR | log | | | |
| SCALEMIN | CDF\_REAL8 | -10000.0 | | | |
| SCALEMAX | CDF\_REAL8 | +10000.0 | | | |
| VAR\_TYPE | CDF\_CHAR | data | | | |
| UNITS | CDF\_CHAR | km s^-1 | | | |
| SI\_CONVERSION | CDF\_CHAR | 1E+03>m s^-1 | | | |
| REPRESENTATION\_1 | CDF\_CHAR | REP\_VEL\_LABEL | | | |

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| **Variable\_Name** | **Data\_type** | **DIMS** | **SIZES** | **R\_VARY** | **D\_VARY** |
| SWA\_EAS1\_overlapCoreHalo\_P | CDF\_REAL8 | 1 | 9 | T | T |
| **Attribute Name** | **Data Type** | **Value** | | | |
| FIELDNAM | CDF\_CHAR | EAS1 overlapCoreHalo Pressure | | | |
| CATDESC | CDF\_CHAR | Pressure tensor from EAS1 overlap look direction in CoreHalo range | | | |
| COORDINATE\_SYSTEM | CDF\_CHAR | EAS1 | | | |
| DISPLAY\_TYPE | CDF\_CHAR | time\_series | | | |
| DEPEND\_0 | CDF\_CHAR | SWA\_EAS1\_SCET | | | |
| FILLVAL | CDF\_REAL8 | -1E+31 | | | |
| FORMAT | CDF\_CHAR | f14.4 | | | |
| LABLAXIS | CDF\_CHAR | EAS1 overlapCoreHalo P | | | |
| VALIDMIN | CDF\_REAL8 | 1E-6 | | | |
| VALIDMAX | CDF\_REAL8 | 1E+3 | | | |
| SCALETYP | CDF\_CHAR | Log | | | |
| SCALEMIN | CDF\_REAL8 | 1E-6 | | | |
| SCALEMAX | CDF\_REAL8 | 1E+3 | | | |
| VAR\_TYPE | CDF\_CHAR | data | | | |
| UNITS | CDF\_CHAR | nPa | | | |
| SI\_CONVERSION | CDF\_CHAR | 1E-09>P | | | |
| REPRESENTATION\_1 | CDF\_CHAR | REP\_EAS\_PRES\_1 | | | |
| REPRESENTATION\_2 | CDF\_CHAR | REP\_EAS\_PRES\_2 | | | |

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| **Variable\_Name** | **Data\_type** | **DIMS** | **SIZES** | **R\_VARY** | **D\_VARY** |
| SWA\_EAS1\_overlapCoreHalo\_H | CDF\_REAL8 | 1 | 3 | T | T |
| **Attribute Name** | **Data Type** | **Value** | | | |
| FIELDNAM | CDF\_CHAR | EAS1 overlapCoreHalo Heat Flux | | | |
| CATDESC | CDF\_CHAR | Heat Flux from EAS1 overlap look direction in CoreHalo range | | | |
| COORDINATE\_SYSTEM | CDF\_CHAR | EAS1 | | | |
| DISPLAY\_TYPE | CDF\_CHAR | time\_series | | | |
| DEPEND\_0 | CDF\_CHAR | SWA\_EAS1\_SCET | | | |
| FILLVAL | CDF\_REAL8 | -1E+31 | | | |
| FORMAT | CDF\_CHAR | f14.4 | | | |
| LABL\_PTR\_1 | CDF\_CHAR | EAS\_HFlux\_LABEL | | | |
| VALIDMIN | CDF\_REAL8 | 1E-05 | | | |
| VALIDMAX | CDF\_REAL8 | 1E+05 | | | |
| SCALETYP | CDF\_CHAR | log | | | |
| SCALEMIN | CDF\_REAL8 | 1E-05 | | | |
| SCALEMAX | CDF\_REAL8 | 1E+05 | | | |
| VAR\_TYPE | CDF\_CHAR | data | | | |
| UNITS | CDF\_CHAR | erg s^-1 cm^-2 | | | |
| SI\_CONVERSION | CDF\_CHAR | 1E-03>J s^-1 m^-2 | | | |
| REPRESENTATION\_1 | CDF\_CHAR | REP\_HFlux\_LABEL | | | |

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| **Variable\_Name** | **Data\_type** | **DIMS** | **SIZES** | **R\_VARY** | **D\_VARY** |
| SWA\_EAS1\_overlapStrahl\_N | CDF\_REAL8 | 1 | 1 | T | F |
| **Attribute Name** | **Data Type** | **Value** | | | |
| FIELDNAM | CDF\_CHAR | EAS1 overlapStrahl Density | | | |
| CATDESC | CDF\_CHAR | Number density from EAS1 overlap look direction in Strahl range | | | |
| COORDINATE\_SYSTEM | CDF\_CHAR | EAS1 | | | |
| DISPLAY\_TYPE | CDF\_CHAR | time\_series | | | |
| DEPEND\_0 | CDF\_CHAR | SWA\_EAS1\_SCET | | | |
| FILLVAL | CDF\_REAL8 | -1E+31 | | | |
| FORMAT | CDF\_CHAR | f14.4 | | | |
| LABLAXIS | CDF\_CHAR | EAS1 overlapStrahl N | | | |
| VALIDMIN | CDF\_UINT4 | 1E-9 | | | |
| VALIDMAX | CDF\_UINT4 | 1E+3 | | | |
| SCALETYP | CDF\_CHAR | log | | | |
| SCALEMIN | CDF\_UINT4 | 1E-9 | | | |
| SCALEMAX | CDF\_UINT4 | 1E+3 | | | |
| VAR\_TYPE | CDF\_CHAR | data | | | |
| UNITS | CDF\_CHAR | cm^-3 | | | |
| SI\_CONVERSION | CDF\_CHAR | 1E-06>m^-3 | | | |

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| **Variable\_Name** | **Data\_type** | **DIMS** | **SIZES** | **R\_VARY** | **D\_VARY** |
| SWA\_EAS1\_overlapStrahl\_V | CDF\_REAL8 | 1 | 3 | T | T |
| **Attribute Name** | **Data Type** | **Value** | | | |
| FIELDNAM | CDF\_CHAR | EAS1 overlapStrahl Velocity | | | |
| CATDESC | CDF\_CHAR | Bulk velocity from EAS1 overlap look direction in Strahl range | | | |
| COORDINATE\_SYSTEM | CDF\_CHAR | EAS1 | | | |
| DISPLAY\_TYPE | CDF\_CHAR | time\_series | | | |
| DEPEND\_0 | CDF\_CHAR | SWA\_EAS1\_SCET | | | |
| FILLVAL | CDF\_REAL8 | -1E+31 | | | |
| FORMAT | CDF\_CHAR | f14.4 | | | |
| LABL\_PTR\_1 | CDF\_CHAR | EAS\_VEL\_LABEL | | | |
| VALIDMIN | CDF\_REAL8 | -10000.0 | | | |
| VALIDMAX | CDF\_REAL8 | +10000.0 | | | |
| SCALETYP | CDF\_CHAR | log | | | |
| SCALEMIN | CDF\_REAL8 | -10000.0 | | | |
| SCALEMAX | CDF\_REAL8 | +10000.0 | | | |
| VAR\_TYPE | CDF\_CHAR | data | | | |
| UNITS | CDF\_CHAR | km s^-1 | | | |
| SI\_CONVERSION | CDF\_CHAR | 1E+03>m s^-1 | | | |
| REPRESENTATION\_1 | CDF\_CHAR | REP\_VEL\_LABEL | | | |

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Variable\_Name** | **Data\_type** | **DIMS** | **SIZES** | **R\_VARY** | **D\_VARY** |
| SWA\_EAS1\_overlapStrahl\_P | CDF\_REAL8 | 1 | 9 | T | T |
| **Attribute Name** | **Data Type** | **Value** | | | |
| FIELDNAM | CDF\_CHAR | EAS1 overlapStrahl Pressure | | | |
| CATDESC | CDF\_CHAR | Pressure tensor from EAS1 overlap look direction in Strahl range | | | |
| COORDINATE\_SYSTEM | CDF\_CHAR | EAS1 | | | |
| DISPLAY\_TYPE | CDF\_CHAR | time\_series | | | |
| DEPEND\_0 | CDF\_CHAR | SWA\_EAS1\_SCET | | | |
| FILLVAL | CDF\_REAL8 | -1E+31 | | | |
| FORMAT | CDF\_CHAR | f14.4 | | | |
| LABLAXIS | CDF\_CHAR | EAS1 overlapStrahl P | | | |
| VALIDMIN | CDF\_REAL8 | 1E-6 | | | |
| VALIDMAX | CDF\_REAL8 | 1E+3 | | | |
| SCALETYP | CDF\_CHAR | Log | | | |
| SCALEMIN | CDF\_REAL8 | 1E-6 | | | |
| SCALEMAX | CDF\_REAL8 | 1E+3 | | | |
| VAR\_TYPE | CDF\_CHAR | Data | | | |
| UNITS | CDF\_CHAR | nPa | | | |
| SI\_CONVERSION | CDF\_CHAR | 1E-09>P | | | |
| REPRESENTATION\_1 | CDF\_CHAR | REP\_EAS\_PRES\_1 | | | |
| REPRESENTATION\_2 | CDF\_CHAR | REP\_EAS\_PRES\_2 | | | |

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Variable\_Name** | **Data\_type** | **DIMS** | **SIZES** | **R\_VARY** | **D\_VARY** |
| SWA\_EAS1\_overlapStrahl\_H | CDF\_REAL8 | 1 | 3 | T | T |
| **Attribute Name** | **Data Type** | **Value** | | | |
| FIELDNAM | CDF\_CHAR | EAS1 overlapStrahl Heat Flux | | | |
| CATDESC | CDF\_CHAR | Heat Flux from EAS1 overlap look direction in Strahl range | | | |
| COORDINATE\_SYSTEM | CDF\_CHAR | EAS1 | | | |
| DISPLAY\_TYPE | CDF\_CHAR | time\_series | | | |
| DEPEND\_0 | CDF\_CHAR | SWA\_EAS1\_SCET | | | |
| FILLVAL | CDF\_REAL8 | -1E+31 | | | |
| FORMAT | CDF\_CHAR | f14.4 | | | |
| LABL\_PTR\_1 | CDF\_CHAR | EAS\_HFlux\_LABEL | | | |
| VALIDMIN | CDF\_REAL8 | 1E-05 | | | |
| VALIDMAX | CDF\_REAL8 | 1E+05 | | | |
| SCALETYP | CDF\_CHAR | Log | | | |
| SCALEMIN | CDF\_REAL8 | 1E-05 | | | |
| SCALEMAX | CDF\_REAL8 | 1E+05 | | | |
| VAR\_TYPE | CDF\_CHAR | Data | | | |
| UNITS | CDF\_CHAR | erg s^-1 cm^-2 | | | |
| SI\_CONVERSION | CDF\_CHAR | 1E-03>J s^-1 m^-2 | | | |
| REPRESENTATION\_1 | CDF\_CHAR | REP\_HFlux\_LABEL | | | |

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| --- | --- | --- | --- | --- | --- |
| **Variable\_Name** | **Data\_type** | **DIMS** | **SIZES** | **R\_VARY** | **D\_VARY** |
| SWA\_EAS2\_overlapLowEne\_N | CDF\_REAL8 | 1 | 1 | T | F |
| **Attribute Name** | **Data Type** | **Value** | | | |
| FIELDNAM | CDF\_CHAR | EAS2 overlapLowEne Density | | | |
| CATDESC | CDF\_CHAR | Number density from EAS2 overlap look direction in low energy range | | | |
| COORDINATE\_SYSTEM | CDF\_CHAR | EAS2 | | | |
| DISPLAY\_TYPE | CDF\_CHAR | time\_series | | | |
| DEPEND\_0 | CDF\_CHAR | SWA\_EAS2\_SCET | | | |
| FILLVAL | CDF\_REAL8 | -1E+31 | | | |
| FORMAT | CDF\_CHAR | f14.4 | | | |
| LABLAXIS | CDF\_CHAR | EAS2 overlapLowEne N | | | |
| VALIDMIN | CDF\_UINT4 | 1E-9 | | | |
| VALIDMAX | CDF\_UINT4 | 1E+3 | | | |
| SCALETYP | CDF\_CHAR | Log | | | |
| SCALEMIN | CDF\_UINT4 | 1E-9 | | | |
| SCALEMAX | CDF\_UINT4 | 1E+3 | | | |
| VAR\_TYPE | CDF\_CHAR | Data | | | |
| UNITS | CDF\_CHAR | cm^-3 | | | |
| SI\_CONVERSION | CDF\_CHAR | 1E-06>m^-3 | | | |

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Variable\_Name** | **Data\_type** | **DIMS** | **SIZES** | **R\_VARY** | **D\_VARY** |
| SWA\_EAS2\_overlapLowEne\_V | CDF\_REAL8 | 1 | 3 | T | T |
| **Attribute Name** | **Data Type** | **Value** | | | |
| FIELDNAM | CDF\_CHAR | EAS2 overlapLowEne Velocity | | | |
| CATDESC | CDF\_CHAR | Bulk velocity from EAS2 overlap look direction in low energy range | | | |
| COORDINATE\_SYSTEM | CDF\_CHAR | EAS2 | | | |
| DISPLAY\_TYPE | CDF\_CHAR | time\_series | | | |
| DEPEND\_0 | CDF\_CHAR | SWA\_EAS2\_SCET | | | |
| FILLVAL | CDF\_REAL8 | -1E+31 | | | |
| FORMAT | CDF\_CHAR | f14.4 | | | |
| LABL\_PTR\_1 | CDF\_CHAR | EAS\_VEL\_LABEL | | | |
| VALIDMIN | CDF\_REAL8 | -10000.0 | | | |
| VALIDMAX | CDF\_REAL8 | +10000.0 | | | |
| SCALETYP | CDF\_CHAR | Log | | | |
| SCALEMIN | CDF\_REAL8 | -10000.0 | | | |
| SCALEMAX | CDF\_REAL8 | +10000.0 | | | |
| VAR\_TYPE | CDF\_CHAR | Data | | | |
| UNITS | CDF\_CHAR | km s^-1 | | | |
| SI\_CONVERSION | CDF\_CHAR | 1E+03>m s^-1 | | | |
| REPRESENTATION\_1 | CDF\_CHAR | REP\_VEL\_LABEL | | | |

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Variable\_Name** | **Data\_type** | **DIMS** | **SIZES** | **R\_VARY** | **D\_VARY** |
| SWA\_EAS2\_overlapLowEne\_P | CDF\_REAL8 | 1 | 9 | T | T |
| **Attribute Name** | **Data Type** | **Value** | | | |
| FIELDNAM | CDF\_CHAR | EAS2 overlapLowEne Pressure | | | |
| CATDESC | CDF\_CHAR | Pressure tensor from EAS2 overlap look direction in low energy range | | | |
| COORDINATE\_SYSTEM | CDF\_CHAR | EAS2 | | | |
| DISPLAY\_TYPE | CDF\_CHAR | time\_series | | | |
| DEPEND\_0 | CDF\_CHAR | SWA\_EAS2\_SCET | | | |
| FILLVAL | CDF\_REAL8 | -1E+31 | | | |
| FORMAT | CDF\_CHAR | f14.4 | | | |
| LABLAXIS | CDF\_CHAR | EAS2 overlapLowEne P | | | |
| VALIDMIN | CDF\_REAL8 | 1E-6 | | | |
| VALIDMAX | CDF\_REAL8 | 1E+3 | | | |
| SCALETYP | CDF\_CHAR | Log | | | |
| SCALEMIN | CDF\_REAL8 | 1E-6 | | | |
| SCALEMAX | CDF\_REAL8 | 1E+3 | | | |
| VAR\_TYPE | CDF\_CHAR | Data | | | |
| UNITS | CDF\_CHAR | nPa | | | |
| SI\_CONVERSION | CDF\_CHAR | 1E-09>P | | | |
| REPRESENTATION\_1 | CDF\_CHAR | REP\_EAS\_PRES\_1 | | | |
| REPRESENTATION\_2 | CDF\_CHAR | REP\_EAS\_PRES\_2 | | | |

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| --- | --- | --- | --- | --- | --- |
| **Variable\_Name** | **Data\_type** | **DIMS** | **SIZES** | **R\_VARY** | **D\_VARY** |
| SWA\_EAS2\_overlapLowEne\_H | CDF\_REAL8 | 1 | 3 | T | T |
| **Attribute Name** | **Data Type** | **Value** | | | |
| FIELDNAM | CDF\_CHAR | EAS2 overlapLowEne Heat Flux | | | |
| CATDESC | CDF\_CHAR | Heat Flux from EAS2 overlap look direction in low energy range | | | |
| COORDINATE\_SYSTEM | CDF\_CHAR | EAS2 | | | |
| DISPLAY\_TYPE | CDF\_CHAR | time\_series | | | |
| DEPEND\_0 | CDF\_CHAR | SWA\_EAS2\_SCET | | | |
| FILLVAL | CDF\_REAL8 | -1E+31 | | | |
| FORMAT | CDF\_CHAR | f14.4 | | | |
| LABL\_PTR\_1 | CDF\_CHAR | EAS\_HFlux\_LABEL | | | |
| VALIDMIN | CDF\_REAL8 | 1E-05 | | | |
| VALIDMAX | CDF\_REAL8 | 1E+05 | | | |
| SCALETYP | CDF\_CHAR | Log | | | |
| SCALEMIN | CDF\_REAL8 | 1E-05 | | | |
| SCALEMAX | CDF\_REAL8 | 1E+05 | | | |
| VAR\_TYPE | CDF\_CHAR | Data | | | |
| UNITS | CDF\_CHAR | erg s^-1 cm^-2 | | | |
| SI\_CONVERSION | CDF\_CHAR | 1E-03>J s^-1 m^-2 | | | |
| REPRESENTATION\_1 | CDF\_CHAR | REP\_HFlux\_LABEL | | | |

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| --- | --- | --- | --- | --- | --- |
| **Variable\_Name** | **Data\_type** | **DIMS** | **SIZES** | **R\_VARY** | **D\_VARY** |
| SWA\_EAS2\_overlapCoreHalo\_N | CDF\_REAL8 | 1 | 1 | T | F |
| **Attribute Name** | **Data Type** | **Value** | | | |
| FIELDNAM | CDF\_CHAR | EAS2 overlapCoreHalo Density | | | |
| CATDESC | CDF\_CHAR | Number density from EAS2 overlap look direction in CoreHalo range | | | |
| COORDINATE\_SYSTEM | CDF\_CHAR | EAS2 | | | |
| DISPLAY\_TYPE | CDF\_CHAR | time\_series | | | |
| DEPEND\_0 | CDF\_CHAR | SWA\_EAS2\_SCET | | | |
| FILLVAL | CDF\_REAL8 | -1E+31 | | | |
| FORMAT | CDF\_CHAR | f14.4 | | | |
| LABLAXIS | CDF\_CHAR | EAS2 overlapCoreHalo N | | | |
| VALIDMIN | CDF\_UINT4 | 1E-9 | | | |
| VALIDMAX | CDF\_UINT4 | 1E+3 | | | |
| SCALETYP | CDF\_CHAR | log | | | |
| SCALEMIN | CDF\_UINT4 | 1E-9 | | | |
| SCALEMAX | CDF\_UINT4 | 1E+3 | | | |
| VAR\_TYPE | CDF\_CHAR | data | | | |
| UNITS | CDF\_CHAR | cm^-3 | | | |
| SI\_CONVERSION | CDF\_CHAR | 1E-06>m^-3 | | | |

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| --- | --- | --- | --- | --- | --- |
| **Variable\_Name** | **Data\_type** | **DIMS** | **SIZES** | **R\_VARY** | **D\_VARY** |
| SWA\_EAS2\_overlapCoreHalo\_V | CDF\_REAL8 | 1 | 3 | T | T |
| **Attribute Name** | **Data Type** | **Value** | | | |
| FIELDNAM | CDF\_CHAR | EAS2 overlapCoreHalo Velocity | | | |
| CATDESC | CDF\_CHAR | Bulk velocity from EAS2 overlap look direction in CoreHalo range | | | |
| COORDINATE\_SYSTEM | CDF\_CHAR | EAS2 | | | |
| DISPLAY\_TYPE | CDF\_CHAR | time\_series | | | |
| DEPEND\_0 | CDF\_CHAR | SWA\_EAS2\_SCET | | | |
| FILLVAL | CDF\_REAL8 | -1E+31 | | | |
| FORMAT | CDF\_CHAR | f14.4 | | | |
| LABL\_PTR\_1 | CDF\_CHAR | EAS\_VEL\_LABEL | | | |
| VALIDMIN | CDF\_REAL8 | -10000.0 | | | |
| VALIDMAX | CDF\_REAL8 | +10000.0 | | | |
| SCALETYP | CDF\_CHAR | log | | | |
| SCALEMIN | CDF\_REAL8 | -10000.0 | | | |
| SCALEMAX | CDF\_REAL8 | +10000.0 | | | |
| VAR\_TYPE | CDF\_CHAR | data | | | |
| UNITS | CDF\_CHAR | km s^-1 | | | |
| SI\_CONVERSION | CDF\_CHAR | 1E+03>m s^-1 | | | |
| REPRESENTATION\_1 | CDF\_CHAR | REP\_VEL\_LABEL | | | |

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| --- | --- | --- | --- | --- | --- |
| **Variable\_Name** | **Data\_type** | **DIMS** | **SIZES** | **R\_VARY** | **D\_VARY** |
| SWA\_EAS2\_overlapCoreHalo\_P | CDF\_REAL8 | 1 | 9 | T | T |
| **Attribute Name** | **Data Type** | **Value** | | | |
| FIELDNAM | CDF\_CHAR | EAS2 overlapCoreHalo Pressure | | | |
| CATDESC | CDF\_CHAR | Pressure tensor from EAS2 overlap look direction in CoreHalo range | | | |
| COORDINATE\_SYSTEM | CDF\_CHAR | EAS2 | | | |
| DISPLAY\_TYPE | CDF\_CHAR | time\_series | | | |
| DEPEND\_0 | CDF\_CHAR | SWA\_EAS2\_SCET | | | |
| FILLVAL | CDF\_REAL8 | -1E+31 | | | |
| FORMAT | CDF\_CHAR | f14.4 | | | |
| LABLAXIS | CDF\_CHAR | EAS2 overlapCoreHalo P | | | |
| VALIDMIN | CDF\_REAL8 | 1E-6 | | | |
| VALIDMAX | CDF\_REAL8 | 1E+3 | | | |
| SCALETYP | CDF\_CHAR | Log | | | |
| SCALEMIN | CDF\_REAL8 | 1E-6 | | | |
| SCALEMAX | CDF\_REAL8 | 1E+3 | | | |
| VAR\_TYPE | CDF\_CHAR | data | | | |
| UNITS | CDF\_CHAR | nPa | | | |
| SI\_CONVERSION | CDF\_CHAR | 1E-09>P | | | |
| REPRESENTATION\_1 | CDF\_CHAR | REP\_EAS\_PRES\_1 | | | |
| REPRESENTATION\_2 | CDF\_CHAR | REP\_EAS\_PRES\_2 | | | |

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| --- | --- | --- | --- | --- | --- |
| **Variable\_Name** | **Data\_type** | **DIMS** | **SIZES** | **R\_VARY** | **D\_VARY** |
| SWA\_EAS2\_overlapCoreHalo\_H | CDF\_REAL8 | 1 | 3 | T | T |
| **Attribute Name** | **Data Type** | **Value** | | | |
| FIELDNAM | CDF\_CHAR | EAS2 overlapCoreHalo Heat Flux | | | |
| CATDESC | CDF\_CHAR | Heat Flux from EAS2 overlap look direction in CoreHalo range | | | |
| COORDINATE\_SYSTEM | CDF\_CHAR | EAS2 | | | |
| DISPLAY\_TYPE | CDF\_CHAR | time\_series | | | |
| DEPEND\_0 | CDF\_CHAR | SWA\_EAS2\_SCET | | | |
| FILLVAL | CDF\_REAL8 | -1E+31 | | | |
| FORMAT | CDF\_CHAR | f14.4 | | | |
| LABL\_PTR\_1 | CDF\_CHAR | EAS\_HFlux\_LABEL | | | |
| VALIDMIN | CDF\_REAL8 | 1E-05 | | | |
| VALIDMAX | CDF\_REAL8 | 1E+05 | | | |
| SCALETYP | CDF\_CHAR | log | | | |
| SCALEMIN | CDF\_REAL8 | 1E-05 | | | |
| SCALEMAX | CDF\_REAL8 | 1E+05 | | | |
| VAR\_TYPE | CDF\_CHAR | data | | | |
| UNITS | CDF\_CHAR | erg s^-1 cm^-2 | | | |
| SI\_CONVERSION | CDF\_CHAR | 1E-03>J s^-1 m^-2 | | | |
| REPRESENTATION\_1 | CDF\_CHAR | REP\_HFlux\_LABEL | | | |

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| --- | --- | --- | --- | --- | --- |
| **Variable\_Name** | **Data\_type** | **DIMS** | **SIZES** | **R\_VARY** | **D\_VARY** |
| SWA\_EAS2\_overlapStrahl\_N | CDF\_REAL8 | 1 | 1 | T | F |
| **Attribute Name** | **Data Type** | **Value** | | | |
| FIELDNAM | CDF\_CHAR | EAS2 overlapStrahl Density | | | |
| CATDESC | CDF\_CHAR | Number density from EAS2 overlap look direction in Strahl range | | | |
| COORDINATE\_SYSTEM | CDF\_CHAR | EAS2 | | | |
| DISPLAY\_TYPE | CDF\_CHAR | time\_series | | | |
| DEPEND\_0 | CDF\_CHAR | SWA\_EAS2\_SCET | | | |
| FILLVAL | CDF\_REAL8 | -1E+31 | | | |
| FORMAT | CDF\_CHAR | f14.4 | | | |
| LABLAXIS | CDF\_CHAR | EAS2 overlapStrahl N | | | |
| VALIDMIN | CDF\_UINT4 | 1E-9 | | | |
| VALIDMAX | CDF\_UINT4 | 1E+3 | | | |
| SCALETYP | CDF\_CHAR | Log | | | |
| SCALEMIN | CDF\_UINT4 | 1E-9 | | | |
| SCALEMAX | CDF\_UINT4 | 1E+3 | | | |
| VAR\_TYPE | CDF\_CHAR | Data | | | |
| UNITS | CDF\_CHAR | cm^-3 | | | |
| SI\_CONVERSION | CDF\_CHAR | 1E-06>m^-3 | | | |

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| --- | --- | --- | --- | --- | --- |
| **Variable\_Name** | **Data\_type** | **DIMS** | **SIZES** | **R\_VARY** | **D\_VARY** |
| SWA\_EAS2\_overlapStrahl\_V | CDF\_REAL8 | 1 | 3 | T | T |
| **Attribute Name** | **Data Type** | **Value** | | | |
| FIELDNAM | CDF\_CHAR | EAS2 overlapStrahl Velocity | | | |
| CATDESC | CDF\_CHAR | Bulk velocity from EAS2 overlap look direction in Strahl range | | | |
| COORDINATE\_SYSTEM | CDF\_CHAR | EAS2 | | | |
| DISPLAY\_TYPE | CDF\_CHAR | time\_series | | | |
| DEPEND\_0 | CDF\_CHAR | SWA\_EAS2\_SCET | | | |
| FILLVAL | CDF\_REAL8 | -1E+31 | | | |
| FORMAT | CDF\_CHAR | f14.4 | | | |
| LABL\_PTR\_1 | CDF\_CHAR | EAS\_VEL\_LABEL | | | |
| VALIDMIN | CDF\_REAL8 | -10000.0 | | | |
| VALIDMAX | CDF\_REAL8 | +10000.0 | | | |
| SCALETYP | CDF\_CHAR | Log | | | |
| SCALEMIN | CDF\_REAL8 | -10000.0 | | | |
| SCALEMAX | CDF\_REAL8 | +10000.0 | | | |
| VAR\_TYPE | CDF\_CHAR | Data | | | |
| UNITS | CDF\_CHAR | km s^-1 | | | |
| SI\_CONVERSION | CDF\_CHAR | 1E+03>m s^-1 | | | |
| REPRESENTATION\_1 | CDF\_CHAR | REP\_VEL\_LABEL | | | |

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Variable\_Name** | **Data\_type** | **DIMS** | **SIZES** | **R\_VARY** | **D\_VARY** |
| SWA\_EAS2\_overlapStrahl\_P | CDF\_REAL8 | 1 | 9 | T | T |
| **Attribute Name** | **Data Type** | **Value** | | | |
| FIELDNAM | CDF\_CHAR | EAS2 overlapStrahl Pressure | | | |
| CATDESC | CDF\_CHAR | Pressure tensor from EAS2 overlap look direction in Strahl range | | | |
| COORDINATE\_SYSTEM | CDF\_CHAR | EAS1 | | | |
| DISPLAY\_TYPE | CDF\_CHAR | time\_series | | | |
| DEPEND\_0 | CDF\_CHAR | SWA\_EAS2\_SCET | | | |
| FILLVAL | CDF\_REAL8 | -1E+31 | | | |
| FORMAT | CDF\_CHAR | f14.4 | | | |
| LABLAXIS | CDF\_CHAR | EAS2 overlapStrahl P | | | |
| VALIDMIN | CDF\_REAL8 | 1E-6 | | | |
| VALIDMAX | CDF\_REAL8 | 1E+3 | | | |
| SCALETYP | CDF\_CHAR | Log | | | |
| SCALEMIN | CDF\_REAL8 | 1E-6 | | | |
| SCALEMAX | CDF\_REAL8 | 1E+3 | | | |
| VAR\_TYPE | CDF\_CHAR | Data | | | |
| UNITS | CDF\_CHAR | nPa | | | |
| SI\_CONVERSION | CDF\_CHAR | 1E-09>P | | | |
| REPRESENTATION\_1 | CDF\_CHAR | REP\_EAS\_PRES\_1 | | | |
| REPRESENTATION\_2 | CDF\_CHAR | REP\_EAS\_PRES\_2 | | | |

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Variable\_Name** | **Data\_type** | **DIMS** | **SIZES** | **R\_VARY** | **D\_VARY** |
| SWA\_EAS2\_overlapStrahl\_H | CDF\_REAL8 | 1 | 3 | T | T |
| **Attribute Name** | **Data Type** | **Value** | | | |
| FIELDNAM | CDF\_CHAR | EAS2 overlapStrahl Heat Flux | | | |
| CATDESC | CDF\_CHAR | Heat Flux from EAS2 overlap look direction in Strahl range | | | |
| COORDINATE\_SYSTEM | CDF\_CHAR | EAS2 | | | |
| DISPLAY\_TYPE | CDF\_CHAR | time\_series | | | |
| DEPEND\_0 | CDF\_CHAR | SWA\_EAS2\_SCET | | | |
| FILLVAL | CDF\_REAL8 | -1E+31 | | | |
| FORMAT | CDF\_CHAR | f14.4 | | | |
| LABL\_PTR\_1 | CDF\_CHAR | EAS\_HFlux\_LABEL | | | |
| VALIDMIN | CDF\_REAL8 | 1E-05 | | | |
| VALIDMAX | CDF\_REAL8 | 1E+05 | | | |
| SCALETYP | CDF\_CHAR | Log | | | |
| SCALEMIN | CDF\_REAL8 | 1E-05 | | | |
| SCALEMAX | CDF\_REAL8 | 1E+05 | | | |
| VAR\_TYPE | CDF\_CHAR | Data | | | |
| UNITS | CDF\_CHAR | erg s^-1 cm^-2 | | | |
| SI\_CONVERSION | CDF\_CHAR | 1E-03>J s^-1 m^-2 | | | |
| REPRESENTATION\_1 | CDF\_CHAR | REP\_HFlux\_LABEL | | | |

#### PAS L0 data

This PAS L0 data is a single file, constituted of a sequence of ccsds telemetry data packets.

This file shall provide at least all the telemetry products relative to PAS, as listed in Table 3.1, covering a whole 24H period.

Some additional telemetry packets are accepted, like TCs and TC’s acknowledgments, SWA memory dump, SWA events…

PAS data processing software is also able to filter out telemetry packets not related to PAS, and should accept as input a single file with the complete SWA telemetry, i.e. all packets with PID in range [95, 99]

The file format should be;

* a binary file, composed of a sequence of ccsds telemetry packets
* an Ascii file, composed of a sequence a lines, corresponding to the hexadecimal dump of a individuals telemetry packets. Each line may start with a timestamp, in ISO format (yyyy-mm-ddThh:mm:ss.xxxZ)

**Filename**:

solo\_L1\_swa-pas-tm\_yyyymmdd\_V01.bin

solo\_L1\_swa-pas-tm\_yyyymmdd\_V01.ascii

#### HIS L0 data

HIS L0 data products to be defined…

### L1 – Raw data products

*Description of the process used to obtain this type of data*

#### EAS L1 data products

EAS Level-1 data is made at MSSL using the Level-0 data files. Below is detailed description of EAS L1 data.

##### EAS normal mode electron counts

This file contains the Normal Mode 3D Electron Counts data product from EAS[12]. The file format is .cdf.

**Filename**: solo\_L1\_swa-eas[12]-NM3D\_[StartTime-EndTime]\_V??.cdf

**Expected data volume and time resolution**: This file contains the data between the start time and end time in the file name. Time tags are of CDF\_TIME\_TT2000 type. The time resolution of data in these files is nominally 100 seconds but can be 10 or 400 seconds if EAS is working in high cadence mode or low cadence mode, respectively. It contains electron counts from the sensor referenced in the filename covering 64 energies, 32 anodes and 16 deflectors for each time-stamp. It is expected that the file will cover 1 single 24 hour period approximately in case of nominal (100s) or low cadence (~400s) modes. As the file size of EAS 3D data in high cadence is too big, these files will cover 6-hour of observations.

**Global Attributes**

|  |  |  |
| --- | --- | --- |
| **Name** | **Entry** | **Value** |
| Project | 1 | Solar Orbiter |
| Project | 2 | Cosmic Visions |
| Source Name | 1 | SOLO>Solar Orbiter |
| Discipline | 1 | Space Physics>Interplanetary Studies |
| Data Type | 1 | L1>Level 1 Data |
| Descriptor | 1 | SWA-EAS[12]-NM3D |
| Data Version | 1 | 01 |
| Software Version | 1 | 01.00.00 |
| PI Name | 1 | C. J. Owen |
| PI Affiliation | 1 | MSSL-UCL, University College London, UK |
| Instrument Type | 1 | Plasma and Solar Wind |
| Mission Group | 1 | Solar Orbiter |
| Logical Source | 1 | SWA\_L1\_swa-eas[12]-NM3D |
| Logical File id | 1 | solo\_L1\_swa-eas[12]-NMc\_yyyymmddTHHMMSS-yyyymmddTHHMMSS\_V01 |
| Logical Source Description | 1 | SWA-EAS[12] Nominal Mode 3D counts data |
| Rules of Use | 1 | Consult with MSSL-UCL before using |
| Generated by | 1 | MSSL-UCL |
| Generation date | 1 | YYYY-MM-DDTHH:MN:SS |
| Mods | 1 | V01 First Version |
| Data Product | 1 | NM3D>Nominal Mode 3D data |
| Level | 1 | L1>Level 1 Data |
| Instrument | 1 | SWA-EAS>Solar-Wind-Analyser-Electron-Analyser-System |

**Variables**

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Variable\_Name** | **Data\_type** | **DIMS** | **SIZES** | **R\_VARY** | **D\_VARY** |
| EPOCH | CDF\_TIME\_TT2000 | 1 | 1 | T | F |
| **Attribute Name** | **Data Type** | **Value** | | | |
| FIELDNAM | CDF\_CHAR | EAS[12] EPOCH | | | |
| CATDESC | CDF\_CHAR | Epoch in nano-seconds since J2000, encoded as Terrestrial Time on rotating Earth Geoid | | | |
| DISPLAY\_TYPE | CDF\_CHAR | time\_series | | | |
| FILLVAL | CDF\_INT8 | -9223372036854775807 | | | |
| LABLAXIS | CDF\_CHAR | EPOCH | | | |
| UNITS | CDF\_CHAR | ns | | | |
| VALIDMIN | CDF\_INT8 | 1577836800000000000 | | | |
| VALIDMAX | CDF\_INT8 | 1893456000000000000 | | | |
| SCALETYP | CDF\_CHAR | linear | | | |
| SCALEMIN | CDF\_INT8 | 1577836800000000000 | | | |
| SCALEMAX | CDF\_INT8 | 1893456000000000000 | | | |
| SI\_CONVERSION | CDF\_CHAR | 1>1e+09 s | | | |
| VAR\_TYPE | CDF\_CHAR | support\_data | | | |
| VAR\_NOTES | CDF\_CHAR | The EAS[12] time tag is from the centre of the acquisition interval which is 1 sec | | | |

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| --- | --- | --- | --- | --- | --- |
| **Variable\_Name** | **Data\_type** | **DIMS** | **SIZES** | **R\_VARY** | **D\_VARY** |
| SCET | CDF\_REAL8 | 1 | 1 | T | F |
| **Attribute Name** | **Data Type** | **Value** | | | |
| FIELDNAM | CDF\_CHAR | SCET | | | |
| CATDESC | CDF\_CHAR | Elapsed time of the onboard clock at the time of EAS[12] observation | | | |
| DISPLAY\_TYPE | CDF\_CHAR | time\_series | | | |
| FILLVAL | CDF\_REAL8 | -1E31 | | | |
| LABLAXIS | CDF\_CHAR | Spacecraft Elapsed Time (Ticks) | | | |
| UNITS | CDF\_CHAR | s | | | |
| VALIDMIN | CDF\_REAL8 | 1577836800.0 | | | |
| VALIDMAX | CDF\_REAL8 | 1893456000.0 | | | |
| SCALETYP | CDF\_CHAR | linear | | | |
| SCALEMIN | CDF\_REAL8 | 1577836800.0 | | | |
| SCALEMAX | CDF\_REAL8 | 1893456000.0 | | | |
| SI\_CONVERSION | CDF\_CHAR | 1>1 s | | | |
| VAR\_TYPE | CDF\_CHAR | support\_data | | | |
| VAR\_NOTES | CDF\_CHAR | The EAS[12] time tag is from the centre of the acquisition interval which is 1 sec | | | |

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| --- | --- | --- | --- | --- | --- |
| **Variable\_Name** | **Data\_type** | **DIMS** | **SIZES** | **R\_VARY** | **D\_VARY** |
| SWA\_EAS[12]\_ELEVATION | CDF\_REAL8 | 1 | 16 | F | T |
| **Attribute Name** | **Data Type** | **Value** | | | |
| FIELDNAM | CDF\_CHAR | EAS[12] Elevation | | | |
| CATDESC | CDF\_CHAR | The bin-centred elevation angles of the EAS[12] sensor | | | |
| DEPEND\_0 | CDF\_CHAR | EPOCH | | | |
| FILLVAL | CDF\_REAL8 | -1E31 | | | |
| FORMAT | CDF\_CHAR | f14.4 | | | |
| LABLAXIS | CDF\_CHAR | Elevation Angle | | | |
| UNITS | CDF\_CHAR | Degrees | | | |
| VALIDMIN | CDF\_REAL8 | -45.0 | | | |
| VALIDMAX | CDF\_REAL8 | 45.0 | | | |
| SCALETYP | CDF\_CHAR | linear | | | |
| SCALEMIN | CDF\_REAL8 | -45.0 | | | |
| SCALEMAX | CDF\_REAL8 | 45.0 | | | |
| VAR\_TYPE | CDF\_CHAR | support\_data | | | |

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| --- | --- | --- | --- | --- | --- |
| **Variable\_Name** | **Data\_type** | **DIMS** | **SIZES** | **R\_VARY** | **D\_VARY** |
| SWA\_EAS[12]\_ELEVATION\_delta\_upper\_ | CDF\_REAL8 | 1 | 16 | F | T |
| **Attribute Name** | **Data Type** | **Value** | | | |
| FIELDNAM | CDF\_CHAR | EAS[12] Elevation delta upper | | | |
| CATDESC | CDF\_CHAR | Upper half width of elevation bin | | | |
| FORMAT | CDF\_CHAR | f14.4 | | | |
| UNITS | CDF\_CHAR | Degrees | | | |
| VAR\_TYPE | CDF\_CHAR | support\_data | | | |

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| --- | --- | --- | --- | --- | --- |
| **Variable\_Name** | **Data\_type** | **DIMS** | **SIZES** | **R\_VARY** | **D\_VARY** |
| SWA\_EAS[12]\_ELEVATION\_delta\_lower | CDF\_REAL8 | 1 | 16 | F | T |
| **Attribute Name** | **Data Type** | **Value** | | | |
| FIELDNAM | CDF\_CHAR | EAS[12] Elevation delta lower | | | |
| CATDESC | CDF\_CHAR | Lower half width of elevation bin | | | |
| FORMAT | CDF\_CHAR | f14.4 | | | |
| UNITS | CDF\_CHAR | Degrees | | | |
| VAR\_TYPE | CDF\_CHAR | support\_data | | | |

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Variable\_Name** | **Data\_type** | **DIMS** | **SIZES** | **R\_VARY** | **D\_VARY** |
| SWA\_EAS[12]\_AZIMUTH | CDF\_REAL8 | 1 | 32 | F | T |
| **Attribute Name** | **Data Type** | **Value** | | | |
| FIELDNAM | CDF\_CHAR | EAS[12] Azimuth | | | |
| CATDESC | CDF\_CHAR | The bin-centred azimuthal angles of the EAS[12] sensor | | | |
| DEPEND\_0 | CDF\_CHAR | EPOCH | | | |
| FILLVAL | CDF\_REAL8 | -1E31 | | | |
| FORMAT | CDF\_CHAR | f14.4 | | | |
| LABLAXIS | CDF\_CHAR | Azimuthal Angle | | | |
| UNITS | CDF\_CHAR | Degrees | | | |
| VALIDMIN | CDF\_REAL8 | 0.0 | | | |
| VALIDMAX | CDF\_REAL8 | 360.0 | | | |
| SCALETYP | CDF\_CHAR | Linear | | | |
| SCALEMIN | CDF\_REAL8 | 0.0 | | | |
| SCALEMAX | CDF\_REAL8 | 360.0 | | | |
| VAR\_TYPE | CDF\_CHAR | support\_data | | | |

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| --- | --- | --- | --- | --- | --- |
| **Variable\_Name** | **Data\_type** | **DIMS** | **SIZES** | **R\_VARY** | **D\_VARY** |
| SWA\_EAS[12]\_AZIMUTH\_delta\_upper | CDF\_REAL8 | 1 | 32 | F | T |
| **Attribute Name** | **Data Type** | **Value** | | | |
| FIELDNAM | CDF\_CHAR | EAS[12] Azimuth upper delta | | | |
| CATDESC | CDF\_CHAR | Upper half width of azimuth bin | | | |
| FORMAT | CDF\_CHAR | f14.4 | | | |
| UNITS | CDF\_CHAR | Degrees | | | |
| VAR\_TYPE | CDF\_CHAR | support\_data | | | |

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| --- | --- | --- | --- | --- | --- |
| **Variable\_Name** | **Data\_type** | **DIMS** | **SIZES** | **R\_VARY** | **D\_VARY** |
| SWA\_EAS[12]\_AZIMUTH\_delta\_lower | CDF\_REAL8 | 1 | 32 | F | T |
| **Attribute Name** | **Data Type** | **Value** | | | |
| FIELDNAM | CDF\_CHAR | EAS[12] Azimuth lower delta | | | |
| CATDESC | CDF\_CHAR | Lower half width of azimuth bin | | | |
| FORMAT | CDF\_CHAR | f14.4 | | | |
| UNITS | CDF\_CHAR | Degrees | | | |
| VAR\_TYPE | CDF\_CHAR | support\_data | | | |

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| --- | --- | --- | --- | --- | --- |
| **Variable\_Name** | **Data\_type** | **DIMS** | **SIZES** | **R\_VARY** | **D\_VARY** |
| SWA\_EAS[12]\_ENERGY | CDF\_REAL8 | 1 | 64 | T | T |
| **Attribute Name** | **Data Type** | **Value** | | | |
| FIELDNAM | CDF\_CHAR | EAS[12] Energy | | | |
| CATDESC | CDF\_CHAR | The bin-centred Energy values of the EAS[12] sensor | | | |
| DEPEND\_0 | CDF\_CHAR | EPOCH | | | |
| FILLVAL | CDF\_REAL8 | -1E31 | | | |
| FORMAT | CDF\_CHAR | f14.4 | | | |
| LABLAXIS | CDF\_CHAR | Energy | | | |
| UNITS | CDF\_CHAR | ElectronVolts | | | |
| VALIDMIN | CDF\_REAL8 | 0.1 | | | |
| VALIDMAX | CDF\_REAL8 | 6000.0 | | | |
| SCALETYP | CDF\_CHAR | Log | | | |
| SCALEMIN | CDF\_REAL8 | 0.1 | | | |
| SCALEMAX | CDF\_REAL8 | 6000.0 | | | |
| SI\_CONVERSION | CDF\_CHAR | 1.60217646E-19>J | | | |
| VAR\_TYPE | CDF\_CHAR | support\_data | | | |

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| --- | --- | --- | --- | --- | --- |
| **Variable\_Name** | **Data\_type** | **DIMS** | **SIZES** | **R\_VARY** | **D\_VARY** |
| SWA\_EAS[12]\_ENERGY\_delta\_upper | CDF\_REAL8 | 1 | 64 | T | T |
| **Attribute Name** | **Data Type** | **Value** | | | |
| FIELDNAM | CDF\_CHAR | EAS[12] Energy upper delta | | | |
| CATDESC | CDF\_CHAR | Upper half width of energy bin | | | |
| DEPEND\_0 | CDF\_CHAR | EPOCH | | | |
| FORMAT | CDF\_CHAR | f14.4 | | | |
| UNITS | CDF\_CHAR | ElectronVolts | | | |
| VAR\_TYPE | CDF\_CHAR | support\_data | | | |

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| --- | --- | --- | --- | --- | --- |
| **Variable\_Name** | **Data\_type** | **DIMS** | **SIZES** | **R\_VARY** | **D\_VARY** |
| SWA\_EAS[12]\_ENERGY\_delta\_lower | CDF\_REAL8 | 1 | 64 | T | T |
| **Attribute Name** | **Data Type** | **Value** | | | |
| FIELDNAM | CDF\_CHAR | EAS[12] Energy lower delta | | | |
| CATDESC | CDF\_CHAR | Lower half width of energy bin | | | |
| DEPEND\_0 | CDF\_CHAR | EPOCH | | | |
| FORMAT | CDF\_CHAR | f14.4 | | | |
| UNITS | CDF\_CHAR | ElectronVolts | | | |
| VAR\_TYPE | CDF\_CHAR | support\_data | | | |

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| --- | --- | --- | --- | --- | --- |
| **Variable\_Name** | **Data\_type** | **DIMS** | **SIZES** | **R\_VARY** | **D\_VARY** |
| SWA\_EAS[12]\_NM3D\_Data | CDF\_REAL8 | 3 | 16,64,32 | T | T,T,T |
| **Attribute Name** | **Data Type** | **Value** | | | |
| FIELDNAM | CDF\_CHAR | SWA\_EAS[12]\_NM3D\_Data | | | |
| CATDESC | CDF\_CHAR | EAS[12] Nominal mode 3D electron distribution counts | | | |
| DISPLAY\_TYPE | CDF\_CHAR | Spectrogram | | | |
| FILLVAL | CDF\_REAL8 | -1E31 | | | |
| FORMAT | CDF\_CHAR | f14.4 | | | |
| LABLAXIS | CDF\_CHAR | Electron Counts | | | | SCALEMAX | CDF\_REAL8 | 65535.0 |
| UNITS | CDF\_CHAR | Counts/Accum | | | |
| VALIDMIN | CDF\_REAL8 | 0.1 | | | |
| VALIDMAX | CDF\_REAL8 | 65535.0 | | | |
| SCALETYP | CDF\_CHAR | Log | | | |
| SCALEMIN | CDF\_REAL8 | 0.1 | | | |
| DEPEND\_0 | CDF\_CHAR | EPOCH | | | |
| DEPEND\_1 | CDF\_CHAR | SWA\_EAS[12]\_ELEVATION | | | |
| DEPEND\_2 | CDF\_CHAR | SWA\_EAS[12]\_ENERGY | | | |
| DEPEND\_3 | CDF\_CHAR | SWA\_EAS[12]\_AZIMUTH | | | |
| COORDINATE\_SYSTEM | CDF\_CHAR | EAS[12] | | | |
| VAR\_TYPE | CDF\_CHAR | Data | | | |

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| --- | --- | --- | --- | --- | --- |
| **Variable\_Name** | **Data\_type** | **DIMS** | **SIZES** | **R\_VARY** | **D\_VARY** |
| SWA\_EAS[12]\_Mode | CDF\_UINT4 | 1 | 3 | T | T |
| **Attribute Name** | **Data Type** | **Value** | | | |
| FIELDNAM | CDF\_CHAR | EAS[12] Mode | | | |
| CATDESC | CDF\_CHAR | The EAS[12] Mode data | | | |
| DISPLAY\_TYPE | CDF\_CHAR | time\_series | | | |
| DEPEND\_0 | CDF\_CHAR | EPOCH | | | |
| FILLVAL | CDF\_UINT4 | 4294967294 | | | |
| FORMAT | CDF\_CHAR | I10 | | | |
| LABLAXIS | CDF\_CHAR | EAS[12] Mode | | | |
| VALIDMIN | CDF\_UINT4 | 0 | | | |
| VALIDMAX | CDF\_UINT4 | 65535 | | | |
| SCALETYP | CDF\_CHAR | linear | | | |
| SCALEMIN | CDF\_UINT4 | 0 | | | |
| SCALEMAX | CDF\_UINT4 | 65535 | | | |
| VAR\_TYPE | CDF\_CHAR | support\_data | | | |

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| --- | --- | --- | --- | --- | --- |
| **Variable\_Name** | **Data\_type** | **DIMS** | **SIZES** | **R\_VARY** | **D\_VARY** |
| SWA\_EAS[12]\_Full3DValidity | CDF\_UINT4 | 1 | 1 | T | F |
| **Attribute Name** | **Data Type** | **Value** | | | |
| FIELDNAM | CDF\_CHAR | EAS[12] Full 3D Validity | | | |
| CATDESC | CDF\_CHAR | The Validity flags related to whole EAS[12] 3D data set | | | |
| DISPLAY\_TYPE | CDF\_CHAR | time\_series | | | |
| DEPEND\_0 | CDF\_CHAR | EPOCH | | | |
| FILLVAL | CDF\_UINT4 | 4294967294 | | | |
| FORMAT | CDF\_CHAR | I10 | | | |
| LABLAXIS | CDF\_CHAR | Full 3D validity flag | | | |
| VALIDMIN | CDF\_UINT4 | 0 | | | |
| VALIDMAX | CDF\_UINT4 | 65535 | | | |
| SCALETYP | CDF\_CHAR | linear | | | |
| SCALEMIN | CDF\_UINT4 | 0 | | | |
| SCALEMAX | CDF\_UINT4 | 65535 | | | |
| VAR\_TYPE | CDF\_CHAR | support\_data | | | |

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| --- | --- | --- | --- | --- | --- |
| **Variable\_Name** | **Data\_type** | **DIMS** | **SIZES** | **R\_VARY** | **D\_VARY** |
| SWA\_EAS[12]\_ElevationValidity | CDF\_UINT4 | 1 | 1 | T | F |
| **Attribute Name** | **Data Type** | **Value** | | | |
| FIELDNAM | CDF\_CHAR | EAS[12] Elevation Validity | | | |
| CATDESC | CDF\_CHAR | The Validity flags associated with each of the 16 elevations | | | |
| DISPLAY\_TYPE | CDF\_CHAR | time\_series | | | |
| DEPEND\_0 | CDF\_CHAR | EPOCH | | | |
| FILLVAL | CDF\_UINT4 | 4294967294 | | | |
| FORMAT | CDF\_CHAR | I10 | | | |
| LABLAXIS | CDF\_CHAR | Elevation validity flag | | | |
| VALIDMIN | CDF\_UINT4 | 0 | | | |
| VALIDMAX | CDF\_UINT4 | 65535 | | | |
| SCALETYP | CDF\_CHAR | linear | | | |
| SCALEMIN | CDF\_UINT4 | 0 | | | |
| SCALEMAX | CDF\_UINT4 | 65535 | | | |
| VAR\_TYPE | CDF\_CHAR | support\_data | | | |

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| --- | --- | --- | --- | --- | --- |
| **Variable\_Name** | **Data\_type** | **DIMS** | **SIZES** | **R\_VARY** | **D\_VARY** |
| SWA\_EAS[12]\_DataValidity | CDF\_UINT4 | 1 | 1 | T | F |
| **Attribute Name** | **Data Type** | **Value** | | | |
| FIELDNAM | CDF\_CHAR | EAS[12] Data Validity | | | |
| CATDESC | CDF\_CHAR | The Validity flags associated with each energy count for the 16 elevations | | | |
| DEPEND\_0 | CDF\_CHAR | EPOCH | | | |
| DISPLAY\_TYPE | CDF\_CHAR | time\_series | | | |
| FILLVAL | CDF\_UINT4 | 4294967294 | | | |
| FORMAT | CDF\_CHAR | I10 | | | |
| LABLAXIS | CDF\_CHAR | Data validity flag | | | |
| VALIDMIN | CDF\_UINT4 | 0 | | | |
| VALIDMAX | CDF\_UINT4 | 65535 | | | |
| SCALETYP | CDF\_CHAR | linear | | | |
| SCALEMIN | CDF\_UINT4 | 0 | | | |
| SCALEMAX | CDF\_UINT4 | 65535 | | | |
| VAR\_TYPE | CDF\_CHAR | support\_data | | | |

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| --- | --- | --- | --- | --- | --- |
| **Variable\_Name** | **Data\_type** | **DIMS** | **SIZES** | **R\_VARY** | **D\_VARY** |
| EAS[12]\_TO\_SRF | CDF\_REAL8 | 2 | 3,3 | F | T,T |
|  |  |  | | | |
| **Attribute Name** | **Data Type** | **Value** | | | |
| FIELDNAM | CDF\_CHAR | EAS[12] Rotation Matrix | | | |
| CATDESC | CDF\_CHAR | The rotation matrix to go from EAS[12] frame to spacecraft reference frame | | | |
| FORMAT | CDF\_CHAR | f14.5 | | | |
| VAR\_TYPE | CDF\_CHAR | support\_data | | | |

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| --- | --- | --- | --- | --- | --- |
| **Variable\_Name** | **Data\_type** | **DIMS** | **SIZES** | **R\_VARY** | **D\_VARY** |
| QUALITY\_FLAG | CDF\_UINT1 | 1 | 1 | T | F |
| **Attribute Name** | **Data Type** | **Value** | | | |
| FIELDNAM | CDF\_CHAR | EAS[12] Data Quality | | | |
| CATDESC | CDF\_CHAR | EAS[12] Data Quality flag | | | |
| DEPEND\_0 | CDF\_CHAR | EPOCH | | | |
| DISPLAY\_TYPE | CDF\_CHAR | time\_series | | | |
| FILLVAL | CDF\_UINT4 | 255 | | | |
| LABLAXIS | CDF\_CHAR | EAS[12] data quality | | | |
| VALIDMIN | CDF\_UINT4 | 0 | | | |
| VALIDMAX | CDF\_UINT4 | 4 | | | |
| SCALETYP | CDF\_CHAR | linear | | | |
| SCALEMIN | CDF\_UINT4 | 0 | | | |
| SCALEMAX | CDF\_UINT4 | 4 | | | |
| VAR\_TYPE | CDF\_CHAR | support\_data | | | |

##### EAS[12] single strahl electron counts

This file contains the single strahl electron counts data product from EAS[12]. The file format is .cdf.

**Filename**: solo\_L1\_swa-eas[12]-SSc\_[StartTime-EndTime]\_V??.cdf

**Expected data volume and time resolution**: This file contains the data between the start time and end times mentioned in the file name. Time tags are of CDF\_TIME\_TT2000 type. The time resolution of data in this file is nominally 100 seconds. It contains electron counts from the sensor referenced in the file name covering 1 energy, 32 anodes and 16 deflectors for each time-stamp. It is expected that the file will cover 1 single 24 hour period approximately.

**Global Attributes**

|  |  |  |
| --- | --- | --- |
| **Name** | **Entry** | **Value** |
| Project | 1 | Solar Orbiter |
| Project | 2 | Cosmic Visions |
| Source Name | 1 | SOLO>Solar Orbiter |
| Discipline | 1 | Space Physics>Interplanetary Studies |
| Data Type | 1 | L1>Level 1 Data |
| Descriptor | 1 | SWA-EAS[12]-SSc |
| Data Version | 1 | 01 |
| Software Version | 1 | 01.00.00 |
| PI Name | 1 | C. J. Owen |
| PI Affiliation | 1 | MSSL-UCL, University College London |
| Instrument Type | 1 | Plasma and Solar Wind |
| Mission Group | 1 | Solar Orbiter |
| Logical Source | 1 | Solo\_L1\_swa-eas[12]-SSc |
| Logical File id | 1 | solo\_L1\_swa-eas[12]\_SSc\_yyyymmddTHHMMSS-yyyymmddTHHMMSS\_V01 |
| Logical Source Description | 1 | SWA-EAS[12] Single Strahl data |
| Rules of Use | 1 | Consult with MSSL-UCL before using |
| Generated by | 1 | MSSL-UCL |
| Generation date | 1 | YYYY-MM-DDTHH:MN:SS |
| Mods | 1 | V01 First Version |
| Data Product | 1 | SSc>Single Strahl Counts |
| Level | 1 | L1>Level 1 Data |
| Instrument | 1 | SWA-EAS>Solar-Wind-Analyser-Electron-Analyser-System |

**Variables**

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Variable\_Name** | **Data\_type** | **DIMS** | **SIZES** | **R\_VARY** | **D\_VARY** |
| EPOCH | CDF\_TIME\_TT2000 | 1 | 1 | T | F |
| **Attribute Name** | **Data Type** | **Value** | | | |
| FIELDNAM | CDF\_CHAR | EAS[12] EPOCH | | | |
| CATDESC | CDF\_CHAR | Epoch in nano-seconds since J2000, encoded as Terrestrial Time on rotating Earth Geoid | | | |
| DISPLAY\_TYPE | CDF\_CHAR | time\_series | | | |
| FILLVAL | CDF\_INT8 | -9223372036854775807 | | | |
| LABLAXIS | CDF\_CHAR | EPOCH | | | |
| UNITS | CDF\_CHAR | ns | | | |
| VALIDMIN | CDF\_INT8 | 1577836800000000000 | | | |
| VALIDMAX | CDF\_INT8 | 1893456000000000000 | | | |
| SCALETYP | CDF\_CHAR | linear | | | |
| SCALEMIN | CDF\_INT8 | 1577836800000000000 | | | |
| SCALEMAX | CDF\_INT8 | 1893456000000000000 | | | |
| SI\_CONVERSION | CDF\_CHAR | 1>1e+09 s | | | |
| VAR\_TYPE | CDF\_CHAR | support\_data | | | |
| VAR\_NOTES | CDF\_CHAR | The EAS[12] time tag is from the centre of the acquisition interval which is 1 sec | | | |

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| --- | --- | --- | --- | --- | --- |
| **Variable\_Name** | **Data\_type** | **DIMS** | **SIZES** | **R\_VARY** | **D\_VARY** |
| SCET | CDF\_REAL8 | 1 | 1 | T | F |
| **Attribute Name** | **Data Type** | **Value** | | | |
| FIELDNAM | CDF\_CHAR | EAS[12] SCET | | | |
| CATDESC | CDF\_CHAR | Elapsed time of the onboard clock at the time of EAS[12] observation | | | |
| DISPLAY\_TYPE | CDF\_CHAR | time\_series | | | |
| FILLVAL | CDF\_REAL8 | -1E31 | | | |
| LABLAXIS | CDF\_CHAR | Spacecraft Elapsed Time (Ticks) | | | |
| UNITS | CDF\_CHAR | s | | | |
| VALIDMIN | CDF\_REAL8 | 1577836800.0 | | | |
| VALIDMAX | CDF\_REAL8 | 1893456000.0 | | | |
| SCALETYP | CDF\_CHAR | linear | | | |
| SCALEMIN | CDF\_REAL8 | 1577836800.0 | | | |
| SCALEMAX | CDF\_REAL8 | 1893456000.0 | | | |
| VAR\_TYPE | CDF\_CHAR | support\_data | | | |
| VAR\_NOTES | CDF\_CHAR | The EAS[12] time tag is from the centre of the acquisition interval which is 1 sec | | | |

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| **Variable\_Name** | **Data\_type** | **DIMS** | **SIZES** | **R\_VARY** | **D\_VARY** |
| SWA\_EAS[12]\_Mode | CDF\_UINT4 | 1 | 3 | T | T |
| **Attribute Name** | **Data Type** | **Value** | | | |
| FIELDNAM | CDF\_CHAR | EAS[12] Mode | | | |
| CATDESC | CDF\_CHAR | The EAS[12] Mode data | | | |
| DEPEND\_0 | CDF\_CHAR | EPOCH | | | |
| DISPLAY\_TYPE | CDF\_CHAR | time\_series | | | |
| FILLVAL | CDF\_UINT4 | 4294967294 | | | |
| FORMAT | CDF\_CHAR | I10 | | | |
| LABLAXIS | CDF\_CHAR | EAS[12] Mode | | | |
| VALIDMIN | CDF\_UINT4 | 0 | | | |
| VALIDMAX | CDF\_UINT4 | 65535 | | | |
| SCALETYP | CDF\_CHAR | linear | | | |
| SCALEMIN | CDF\_UINT4 | 0 | | | |
| SCALEMAX | CDF\_UINT4 | 65535 | | | |
| VAR\_TYPE | CDF\_CHAR | support\_data | | | |

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| **Variable\_Name** | **Data\_type** | **DIMS** | **SIZES** | **R\_VARY** | **D\_VARY** |
| SWA\_EAS[12]\_ELEVATION | CDF\_REAL8 | 1 | 16 | F | T |
| **Attribute Name** | **Data Type** | **Value** | | | |
| FIELDNAM | CDF\_CHAR | EAS[12] Elevation | | | |
| CATDESC | CDF\_CHAR | The bin-centred elevation angles of the EAS[12] sensor | | | |
| DEPEND\_0 | CDF\_CHAR | EPOCH | | | |
| FILLVAL | CDF\_REAL8 | -1E31 | | | |
| FORMAT | CDF\_CHAR | f14.4 | | | |
| LABLAXIS | CDF\_CHAR | Elevation Angle | | | |
| UNITS | CDF\_CHAR | Degrees | | | |
| VALIDMIN | CDF\_REAL8 | -45.0 | | | |
| VALIDMAX | CDF\_REAL8 | 45.0 | | | |
| SCALETYP | CDF\_CHAR | linear | | | |
| SCALEMIN | CDF\_REAL8 | -45.0 | | | |
| SCALEMAX | CDF\_REAL8 | 45.0 | | | |
| VAR\_TYPE | CDF\_CHAR | support\_data | | | |

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| **Variable\_Name** | **Data\_type** | **DIMS** | **SIZES** | **R\_VARY** | **D\_VARY** |
| SWA\_EAS[12]\_ELEVATION\_delta\_upper | CDF\_REAL8 | 1 | 16 | F | T |
| **Attribute Name** | **Data Type** | **Value** | | | |
| FIELDNAM | CDF\_CHAR | EAS[12] Elevation delta upper | | | |
| CATDESC | CDF\_CHAR | Upper half width of elevation bin | | | |
| FORMAT | CDF\_CHAR | f14.4 | | | |
| UNITS | CDF\_CHAR | Degrees | | | |
| VAR\_TYPE | CDF\_CHAR | support\_data | | | |

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| --- | --- | --- | --- | --- | --- |
| **Variable\_Name** | **Data\_type** | **DIMS** | **SIZES** | **R\_VARY** | **D\_VARY** |
| SWA\_EAS[12]\_ELEVATION\_delta\_lower | CDF\_REAL8 | 1 | 16 | F | T |
| **Attribute Name** | **Data Type** | **Value** | | | |
| FIELDNAM | CDF\_CHAR | EAS[12] Elevation delta lower | | | |
| CATDESC | CDF\_CHAR | Lower half width of elevation bin | | | |
| FORMAT | CDF\_CHAR | f14.4 | | | |
| UNITS | CDF\_CHAR | Degrees | | | |
| VAR\_TYPE | CDF\_CHAR | support\_data | | | |

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| --- | --- | --- | --- | --- | --- |
| **Variable\_Name** | **Data\_type** | **DIMS** | **SIZES** | **R\_VARY** | **D\_VARY** |
| SWA\_EAS[12]\_AZIMUTH | CDF\_REAL8 | 1 | 32 | F | T |
| **Attribute Name** | **Data Type** | **Value** | | | |
| FIELDNAM | CDF\_CHAR | EAS[12] Azimuth | | | |
| CATDESC | CDF\_CHAR | The bin-centred azimuthal angles of the EAS[12] sensor | | | |
| DEPEND\_0 | CDF\_CHAR | EPOCH | | | |
| FILLVAL | CDF\_REAL8 | -1E31 | | | |
| FORMAT | CDF\_CHAR | f14.4 | | | |
| LABLAXIS | CDF\_CHAR | Azimuthal Angle | | | |
| UNITS | CDF\_CHAR | Degrees | | | |
| VALIDMIN | CDF\_REAL8 | 0.0 | | | |
| VALIDMAX | CDF\_REAL8 | 360.0 | | | |
| SCALETYP | CDF\_CHAR | linear | | | |
| SCALEMIN | CDF\_REAL8 | 0.0 | | | |
| SCALEMAX | CDF\_REAL8 | 360.0 | | | |
| VAR\_TYPE | CDF\_CHAR | support\_data | | | |

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| --- | --- | --- | --- | --- | --- |
| **Variable\_Name** | **Data\_type** | **DIMS** | **SIZES** | **R\_VARY** | **D\_VARY** |
| SWA\_EAS[12]\_AZIMUTH\_delta\_upper | CDF\_REAL8 | 1 | 32 | F | T |
| **Attribute Name** | **Data Type** | **Value** | | | |
| FIELDNAM | CDF\_CHAR | EAS[12] Azimuth upper delta | | | |
| CATDESC | CDF\_CHAR | Upper half width of azimuth bin | | | |
| FORMAT | CDF\_CHAR | f14.4 | | | |
| UNITS | CDF\_CHAR | Degrees | | | |
| VAR\_TYPE | CDF\_CHAR | support\_data | | | |

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| **Variable\_Name** | **Data\_type** | **DIMS** | **SIZES** | **R\_VARY** | **D\_VARY** |
| SWA\_EAS[12]\_AZIMUTH\_delta\_lower | CDF\_REAL8 | 1 | 32 | F | T |
| **Attribute Name** | **Data Type** | **Value** | | | |
| FIELDNAM | CDF\_CHAR | EAS[12] Azimuth lower delta | | | |
| CATDESC | CDF\_CHAR | Lower half width of azimuth bin | | | |
| FORMAT | CDF\_CHAR | f14.4 | | | |
| UNITS | CDF\_CHAR | Degrees | | | |
| VAR\_TYPE | CDF\_CHAR | support\_data | | | |

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| **Variable\_Name** | **Data\_type** | **DIMS** | **SIZES** | **R\_VARY** | **D\_VARY** |
| SWA\_EAS[12]\_ENERGY | CDF\_REAL8 | 1 | 1 | T | F |
| **Attribute Name** | **Data Type** | **Value** | | | |
| FIELDNAM | CDF\_CHAR | EAS[12] Energy | | | |
| CATDESC | CDF\_CHAR | The bin-centred Energy value used to obtain the single strahl from the EAS[12] sensor | | | |
| DEPEND\_0 | CDF\_CHAR | EPOCH | | | |
| FILLVAL | CDF\_REAL8 | -1E31 | | | |
| FORMAT | CDF\_CHAR | f14.4 | | | |
| LABLAXIS | CDF\_CHAR | Energy | | | |
| UNITS | CDF\_CHAR | ElectronVolts | | | |
| VALIDMIN | CDF\_REAL8 | 0.1 | | | |
| VALIDMAX | CDF\_REAL8 | 6000.0 | | | |
| SCALETYP | CDF\_CHAR | log | | | |
| SCALEMIN | CDF\_REAL8 | 0.1 | | | |
| SCALEMAX | CDF\_REAL8 | 6000.0 | | | |
| SI\_CONVERSION | CDF\_CHAR | 1.60217646E-19>J | | | |
| VAR\_TYPE | CDF\_CHAR | support\_data | | | |

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| **Variable\_Name** | **Data\_type** | **DIMS** | **SIZES** | **R\_VARY** | **D\_VARY** |
| SWA\_EAS[12]\_DataValidity | CDF\_UINT4 | 1 | 1 | T | F |
| **Attribute Name** | **Data Type** | **Value** | | | |
| FIELDNAM | CDF\_CHAR | EAS[12] Data Validity | | | |
| CATDESC | CDF\_CHAR | The Validity flags associated with each energy count for the 16 elevations | | | |
| DEPEND\_0 | CDF\_CHAR | EPOCH | | | |
| DISPLAY\_TYPE | CDF\_CHAR | time\_series | | | |
| FILLVAL | CDF\_UINT4 | 4294967294 | | | |
| FORMAT | CDF\_CHAR | I10 | | | |
| LABLAXIS | CDF\_CHAR | Data validity flag | | | |
| VALIDMIN | CDF\_UINT4 | 0 | | | |
| VALIDMAX | CDF\_UINT4 | 65535 | | | |
| SCALETYP | CDF\_CHAR | linear | | | |
| SCALEMIN | CDF\_UINT4 | 0 | | | |
| SCALEMAX | CDF\_UINT4 | 65535 | | | |
| VAR\_TYPE | CDF\_CHAR | support\_data | | | |

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| --- | --- | --- | --- | --- | --- |
| **Variable\_Name** | **Data\_type** | **DIMS** | **SIZES** | **R\_VARY** | **D\_VARY** |
| SWA\_EAS[12]\_SSc\_Data | CDF\_REAL8 | 2 | 32, 16 | T | T,T |
| **Attribute Name** | **Data Type** | **Value** | | | |
| FIELDNAM | CDF\_CHAR | EAS[12] Single Strahl Data | | | |
| CATDESC | CDF\_CHAR | Single strahl data from EAS[12] | | | |
| DISPLAY\_TYPE | CDF\_CHAR | spectrogram | | | |
| FILLVAL | CDF\_REAL8 | -1E31 | | | |
| FORMAT | CDF\_CHAR | f14.4 | | | |
| LABLAXIS | CDF\_CHAR | Electron Counts | | | |
| UNITS | CDF\_CHAR | Counts/Accum | | | |
| VALIDMIN | CDF\_REAL8 | 0.1 | | | |
| VALIDMAX | CDF\_REAL8 | 65535.0 | | | |
| SCALETYP | CDF\_CHAR | Log | | | |
| SCALEMIN | CDF\_REAL8 | 0.1 | | | |
| SCALEMAX | CDF\_REAL8 | 65535.0 | | | |
| DEPEND\_0 | CDF\_CHAR | EPOCH | | | |
| DEPEND\_1 | CDF\_CHAR | SWA\_EAS[12]\_AZIMUTH | | | |
| DEPEND\_2 | CDF\_CHAR | SWA\_EAS[12]\_ELEVATION | | | |
| COORDINATE\_SYSTEM | CDF\_CHAR | EAS[12] | | | |
| VAR\_TYPE | CDF\_CHAR | data | | | |

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| **Variable\_Name** | **Data\_type** | **DIMS** | **SIZES** | **R\_VARY** | **D\_VARY** |
| EAS[12]\_TO\_SRF | CDF\_REAL8 | 2 | 3,3 | F | T,T |
|  |  |  | | | |
| **Attribute Name** | **Data Type** | **Value** | | | |
| FIELDNAM | CDF\_CHAR | EAS[12] Rotation Matrix | | | |
| CATDESC | CDF\_CHAR | The rotation matrix to go from EAS[12] frame to spacecraft reference frame | | | |
| FORMAT | CDF\_CHAR | f14.5 | | | |
| VAR\_TYPE | CDF\_CHAR | support\_data | | | |

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| **Variable\_Name** | **Data\_type** | **DIMS** | **SIZES** | **R\_VARY** | **D\_VARY** |
| QUALITY\_FLAG | CDF\_UINT1 | 1 | 1 | T | F |
| **Attribute Name** | **Data Type** | **Value** | | | |
| FIELDNAM | CDF\_CHAR | EAS[12] Data Quality | | | |
| CATDESC | CDF\_CHAR | EAS[12] Data Quality flag | | | |
| DEPEND\_0 | CDF\_CHAR | EPOCH | | | |
| DISPLAY\_TYPE | CDF\_CHAR | time\_series | | | |
| FILLVAL | CDF\_UINT4 | 255 | | | |
| LABLAXIS | CDF\_CHAR | EAS[12] data quality | | | |
| VALIDMIN | CDF\_UINT4 | 0 | | | |
| VALIDMAX | CDF\_UINT4 | 4 | | | |
| SCALETYP | CDF\_CHAR | linear | | | |
| SCALEMIN | CDF\_UINT4 | 0 | | | |
| SCALEMAX | CDF\_UINT4 | 4 | | | |
| VAR\_TYPE | CDF\_CHAR | support\_data | | | |

##### EAS Triggered Mode Counts

This file contains the triggered mode 3D electron counts data product from EAS[12]. The file format is .cdf.

**Filename**: solo\_L1\_swa-eas[12]-TM3D\_[StartTime-EndTime]\_V??.cdf

**Expected data volume and time resolution**: This file contains the data between the start time and end times mentioned in the file name. The time tags are of CDF\_TIME\_TT2000 type. The time resolution of the file is nominally 1 second. For a given trigger received from RPW instrument, EAS saves 3D data for 5 minutes immediately prior to the trigger. It contains electron counts from the sensor referenced in the file name covering 64 energies, 32 anodes and 16 deflectors for each time-stamp. It is expected that a file will cover 24-hours and will contain 3D data for all triggers for that 24-hours..

**Global Attributes**

|  |  |  |
| --- | --- | --- |
| **Name** | **Entry** | **Value** |
| Project | 1 | Solar Orbiter |
| Project | 2 | Cosmic Visions |
| Source Name | 1 | SOLO>Solar Orbiter |
| Discipline | 1 | Space Physics>Interplanetary Studies |
| Data Type | 1 | L1>Level 1 Data |
| Descriptor | 1 | SWA-EAS[12]-TM3D |
| Data Version | 1 | 01 |
| Software Version | 1 | 01.00.00 |
| PI Name | 1 | C. J. Owen |
| PI Affiliation | 1 | MSSL-UCL, University College London, UK |
| Instrument Type | 1 | Plasma and Solar Wind |
| Mission Group | 1 | Solar Orbiter |
| Logical Source | 1 | SWA\_L1\_swa-eas[12]-TM3D |
| Logical File id | 1 | solo\_L1\_swa-eas[12]-TM3D\_yyyymmddTHHMMSS-yyyymmddTHHMMSS\_V01 |
| Logical Source Description | 1 | SWA-EAS[12] Trigger Mode 3D counts data |
| Rules of Use | 1 | Consult with MSSL-UCL before using |
| Generated by | 1 | MSSL-UCL |
| Generation date | 1 | YYYY-MM-DDTHH:MN:SS |
| Mods | 1 | V01 First Version |
| Data Product | 1 | TM3D>Trigger Mode 3D data in Counts |
| Level | 1 | L1>Level 1 Data |
| Instrument | 1 | SWA-EAS>Solar-Wind-Analyser-Electron-Analyser-System |

**Variables**

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Variable\_Name** | **Data\_type** | **DIMS** | **SIZES** | **R\_VARY** | **D\_VARY** |
| EPOCH | CDF\_TIME\_TT2000 | 1 | 1 | T | F |
| **Attribute Name** | **Data Type** | **Value** | | | |
| FIELDNAM | CDF\_CHAR | EAS[12] EPOCH | | | |
| CATDESC | CDF\_CHAR | Epoch in nano-seconds since J2000, encoded as Terrestrial Time on rotating Earth Geoid | | | |
| DISPLAY\_TYPE | CDF\_CHAR | time\_series | | | |
| FILLVAL | CDF\_INT8 | -9223372036854775807 | | | |
| LABLAXIS | CDF\_CHAR | EPOCH | | | |
| UNITS | CDF\_CHAR | ns | | | |
| VALIDMIN | CDF\_INT8 | 1577836800000000000 | | | |
| VALIDMAX | CDF\_INT8 | 1893456000000000000 | | | |
| SCALETYP | CDF\_CHAR | linear | | | |
| SCALEMIN | CDF\_INT8 | 1577836800000000000 | | | |
| SCALEMAX | CDF\_INT8 | 1893456000000000000 | | | |
| SI\_CONVERSION | CDF\_CHAR | 1>1e+09 s | | | |
| VAR\_TYPE | CDF\_CHAR | support\_data | | | |
| VAR\_NOTES | CDF\_CHAR | The EAS[12] time tag is from the centre of the acquisition interval which is 1 sec | | | |

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| **Variable\_Name** | **Data\_type** | **DIMS** | **SIZES** | **R\_VARY** | **D\_VARY** |
| SCET | CDF\_EPOCH | 1 | 1 | T | F |
| **Attribute Name** | **Data Type** | **Value** | | | |
| FIELDNAM | CDF\_CHAR | EAS[12] SCET | | | |
| CATDESC | CDF\_CHAR | Elapsed time of the onboard clock at the time of EAS[12] observation | | | |
| DISPLAY\_TYPE | CDF\_CHAR | time\_series | | | |
| FILLVAL | CDF\_REAL8 | -1E31 | | | |
| LABLAXIS | CDF\_CHAR | Spacecraft Elapsed Time (Ticks) | | | |
| UNITS | CDF\_CHAR | s | | | |
| VALIDMIN | CDF\_REAL8 | 1577836800.0 | | | |
| VALIDMAX | CDF\_REAL8 | 1893456000.0 | | | |
| SCALETYP | CDF\_CHAR | linear | | | |
| SCALEMIN | CDF\_REAL8 | 1577836800.0 | | | |
| SCALEMAX | CDF\_REAL8 | 1893456000.0 | | | |
| VAR\_TYPE | CDF\_CHAR | support\_data | | | |
| VAR\_NOTES | CDF\_CHAR | The EAS[12] time tag is from the centre of the acquisition interval which is 1 sec | | | |

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| **Variable\_Name** | **Data\_type** | **DIMS** | **SIZES** | **R\_VARY** | **D\_VARY** |
| SWA\_EAS[12]\_ELEVATION | CDF\_REAL8 | 1 | 16 | F | T |
| **Attribute Name** | **Data Type** | **Value** | | | |
| FIELDNAM | CDF\_CHAR | EAS[12] Elevation | | | |
| CATDESC | CDF\_CHAR | The bin-centred elevation angles of the EAS[12] sensor | | | |
| FILLVAL | CDF\_REAL8 | -1E31 | | | |
| DEPEND\_0 | CDF\_CHAR | EPOCH | | | |
| FORMAT | CDF\_CHAR | f14.4 | | | |
| LABLAXIS | CDF\_CHAR | Elevation Angle | | | |
| UNITS | CDF\_CHAR | Degrees | | | |
| VALIDMIN | CDF\_REAL8 | -45.0 | | | |
| VALIDMAX | CDF\_REAL8 | 45.0 | | | |
| SCALETYP | CDF\_CHAR | linear | | | |
| SCALEMIN | CDF\_REAL8 | -45.0 | | | |
| SCALEMAX | CDF\_REAL8 | 45.0 | | | |
| VAR\_TYPE | CDF\_CHAR | support\_data | | | |

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| --- | --- | --- | --- | --- | --- |
| **Variable\_Name** | **Data\_type** | **DIMS** | **SIZES** | **R\_VARY** | **D\_VARY** |
| SWA\_EAS[12]\_ELEVATION\_delta\_upper | CDF\_REAL8 | 1 | 16 | F | T |
| **Attribute Name** | **Data Type** | **Value** | | | |
| FIELDNAM | CDF\_CHAR | EAS[12] Elevation delta upper | | | |
| CATDESC | CDF\_CHAR | Upper half width of elevation bin | | | |
| FORMAT | CDF\_CHAR | f14.4 | | | |
| UNITS | CDF\_CHAR | Degrees | | | |
| VAR\_TYPE | CDF\_CHAR | support\_data | | | |

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| --- | --- | --- | --- | --- | --- |
| **Variable\_Name** | **Data\_type** | **DIMS** | **SIZES** | **R\_VARY** | **D\_VARY** |
| SWA\_EAS[12]\_ELEVATION\_delta\_lower | CDF\_REAL8 | 1 | 16 | F | T |
| **Attribute Name** | **Data Type** | **Value** | | | |
| FIELDNAM | CDF\_CHAR | EAS[12] Elevation delta lower | | | |
| CATDESC | CDF\_CHAR | Lower half width of elevation bin | | | |
| FORMAT | CDF\_CHAR | f14.4 | | | |
| UNITS | CDF\_CHAR | Degrees | | | |
| VAR\_TYPE | CDF\_CHAR | support\_data | | | |

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| --- | --- | --- | --- | --- | --- |
| **Variable\_Name** | **Data\_type** | **DIMS** | **SIZES** | **R\_VARY** | **D\_VARY** |
| SWA\_EAS[12]\_AZIMUTH | CDF\_REAL8 | 1 | 32 | F | T |
| **Attribute Name** | **Data Type** | **Value** | | | |
| FIELDNAM | CDF\_CHAR | EAS[12] Azimuth | | | |
| CATDESC | CDF\_CHAR | The bin-centred azimuthal angles of the EAS[12] sensor | | | |
| DEPEND\_0 | CDF\_CHAR | EPOCH | | | |
| FILLVAL | CDF\_REAL8 | -1E31 | | | |
| FORMAT | CDF\_CHAR | f14.4 | | | |
| LABLAXIS | CDF\_CHAR | Azimuthal Angle | | | |
| UNITS | CDF\_CHAR | Degrees | | | |
| VALIDMIN | CDF\_REAL8 | 0.0 | | | |
| VALIDMAX | CDF\_REAL8 | 360.0 | | | |
| SCALETYP | CDF\_CHAR | linear | | | |
| SCALEMIN | CDF\_REAL8 | 0.0 | | | |
| SCALEMAX | CDF\_REAL8 | 360.0 | | | |
| VAR\_TYPE | CDF\_CHAR | support\_data | | | |

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| --- | --- | --- | --- | --- | --- |
| **Variable\_Name** | **Data\_type** | **DIMS** | **SIZES** | **R\_VARY** | **D\_VARY** |
| SWA\_EAS[12]\_AZIMUTH\_delta\_upper | CDF\_REAL8 | 1 | 32 | F | T |
| **Attribute Name** | **Data Type** | **Value** | | | |
| FIELDNAM | CDF\_CHAR | EAS[12] Azimuth upper delta | | | |
| CATDESC | CDF\_CHAR | Upper half width of azimuth bin | | | |
| FORMAT | CDF\_CHAR | f14.4 | | | |
| UNITS | CDF\_CHAR | Degrees | | | |
| VAR\_TYPE | CDF\_CHAR | support\_data | | | |

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| **Variable\_Name** | **Data\_type** | **DIMS** | **SIZES** | **R\_VARY** | **D\_VARY** |
| SWA\_EAS[12]\_AZIMUTH\_delta\_lower | CDF\_REAL8 | 1 | 32 | F | T |
| **Attribute Name** | **Data Type** | **Value** | | | |
| FIELDNAM | CDF\_CHAR | EAS[12] Azimuth lower delta | | | |
| CATDESC | CDF\_CHAR | Lower half width of azimuth bin | | | |
| FORMAT | CDF\_CHAR | f14.4 | | | |
| UNITS | CDF\_CHAR | Degrees | | | |
| VAR\_TYPE | CDF\_CHAR | support\_data | | | |

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| --- | --- | --- | --- | --- | --- |
| **Variable\_Name** | **Data\_type** | **DIMS** | **SIZES** | **R\_VARY** | **D\_VARY** |
| SWA\_EAS[12]\_ENERGY | CDF\_REAL8 | 1 | 64 | T | T |
| **Attribute Name** | **Data Type** | **Value** | | | |
| FIELDNAM | CDF\_CHAR | EAS[12] Energy | | | |
| CATDESC | CDF\_CHAR | The bin-centred Energy values of the EAS[12] sensor | | | |
| DEPEND\_0 | CDF\_CHAR | EPOCH | | | |
| FILLVAL | CDF\_REAL8 | -1E31 | | | |
| FORMAT | CDF\_CHAR | f14.4 | | | |
| LABLAXIS | CDF\_CHAR | Energy | | | |
| UNITS | CDF\_CHAR | ElectronVolts | | | |
| VALIDMIN | CDF\_REAL8 | 0.1 | | | |
| VALIDMAX | CDF\_REAL8 | 6000.0 | | | |
| SCALETYP | CDF\_CHAR | log | | | |
| SCALEMIN | CDF\_REAL8 | 0.1 | | | |
| SCALEMAX | CDF\_REAL8 | 6000.0 | | | |
| SI\_CONVERSION | CDF\_CHAR | 1.60217646E-19>J | | | |
| VAR\_TYPE | CDF\_CHAR | support\_data | | | |

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| **Variable\_Name** | **Data\_type** | **DIMS** | **SIZES** | **R\_VARY** | **D\_VARY** |
| SWA\_EAS[12]\_ENERGY\_delta\_upper | CDF\_REAL8 | 1 | 64 | T | T |
| **Attribute Name** | **Data Type** | **Value** | | | |
| FIELDNAM | CDF\_CHAR | EAS[12] Energy upper delta | | | |
| CATDESC | CDF\_CHAR | Upper half width of energy bin | | | |
| DEPEND\_0 | CDF\_CHAR | EPOCH | | | |
| FORMAT | CDF\_CHAR | f14.4 | | | |
| UNITS | CDF\_CHAR | ElectronVolts | | | |
| VAR\_TYPE | CDF\_CHAR | support\_data | | | |

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| --- | --- | --- | --- | --- | --- |
| **Variable\_Name** | **Data\_type** | **DIMS** | **SIZES** | **R\_VARY** | **D\_VARY** |
| SWA\_EAS[12]\_ENERGY\_delta\_lower | CDF\_REAL8 | 1 | 64 | T | T |
| **Attribute Name** | **Data Type** | **Value** | | | |
| FIELDNAM | CDF\_CHAR | EAS[12] Energy lower delta | | | |
| CATDESC | CDF\_CHAR | Lower half width of energy bin | | | |
| DEPEND\_0 | CDF\_CHAR | EPOCH | | | |
| FORMAT | CDF\_CHAR | f14.4 | | | |
| UNITS | CDF\_CHAR | ElectronVolts | | | |
| VAR\_TYPE | CDF\_CHAR | support\_data | | | |

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| --- | --- | --- | --- | --- | --- |
| **Variable\_Name** | **Data\_type** | **DIMS** | **SIZES** | **R\_VARY** | **D\_VARY** |
| SWA\_EAS[12]\_TM3D\_Data | CDF\_REAL8 | 3 | 16,64,32 | T | T,T,T |
| **Attribute Name** | **Data Type** | **Value** | | | |
| FIELDNAM | CDF\_CHAR | SWA\_EAS[12]\_TM3D\_Data | | | |
| CATDESC | CDF\_CHAR | EAS[12] Trigger mode 3D electron distribution counts | | | |
| DISPLAY\_TYPE | CDF\_CHAR | spectrogram | | | |
| FILLVAL | CDF\_REAL8 | -1E31 | | | |
| FORMAT | CDF\_CHAR | f14.4 | | | |
| LABLAXIS | CDF\_CHAR | Electron Counts | | | |
| UNITS | CDF\_CHAR | Counts/Accum | | | |
| VALIDMIN | CDF\_REAL8 | 0.1 | | | |
| VALIDMAX | CDF\_REAL8 | 65535.0 | | | |
| SCALETYP | CDF\_CHAR | log | | | |
| SCALEMIN | CDF\_REAL8 | 0.1 | | | |
| SCALEMAX | CDF\_REAL8 | 65535.0 | | | |
| DEPEND\_0 | CDF\_CHAR | EPOCH | | | |
| DEPEND\_1 | CDF\_CHAR | SWA\_EAS[12]\_ELEVATION | | | |
| DEPEND\_2 | CDF\_CHAR | SWA\_EAS[12]\_ENERGY | | | |
| DEPEND\_3 | CDF\_CHAR | SWA\_EAS[12]\_AZIMUTH | | | |
| COORDINATE\_SYSTEM | CDF\_CHAR | EAS[12] | | | |
| VAR\_TYPE | CDF\_CHAR | data | | | |

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| --- | --- | --- | --- | --- | --- |
| **Variable\_Name** | **Data\_type** | **DIMS** | **SIZES** | **R\_VARY** | **D\_VARY** |
| SWA\_EAS[12]\_Mode | CDF\_UINT4 | 1 | 3 | T | T |
| **Attribute Name** | **Data Type** | **Value** | | | |
| FIELDNAM | CDF\_CHAR | EAS[12] Mode | | | |
| CATDESC | CDF\_CHAR | The EAS[12] Mode data | | | |
| DEPEND\_0 | CDF\_CHAR | EPOCH | | | |
| DISPLAY\_TYPE | CDF\_CHAR | time\_series | | | |
| FILLVAL | CDF\_UINT4 | 4294967294 | | | |
| FORMAT | CDF\_CHAR | I10 | | | |
| LABLAXIS | CDF\_CHAR | EAS1 Mode | | | |
| VALIDMIN | CDF\_UINT4 | 0 | | | |
| VALIDMAX | CDF\_UINT4 | 65535 | | | |
| SCALETYP | CDF\_CHAR | linear | | | |
| SCALEMIN | CDF\_UINT4 | 0 | | | |
| SCALEMAX | CDF\_UINT4 | 65535 | | | |
| VAR\_TYPE | CDF\_CHAR | support\_data | | | |

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| --- | --- | --- | --- | --- | --- |
| **Variable\_Name** | **Data\_type** | **DIMS** | **SIZES** | **R\_VARY** | **D\_VARY** |
| SWA\_EAS[12]\_Full3DValidity | CDF\_UINT4 | 1 | 1 | T | F |
| **Attribute Name** | **Data Type** | **Value** | | | |
| FIELDNAM | CDF\_CHAR | EAS[12] Full 3D Validity | | | |
| CATDESC | CDF\_CHAR | The Validity flags related to whole EAS[12] 3D data set | | | |
| DEPEND\_0 | CDF\_CHAR | EPOCH | | | |
| DISPLAY\_TYPE | CDF\_CHAR | time\_series | | | |
| FILLVAL | CDF\_UINT4 | 4294967294 | | | |
| FORMAT | CDF\_CHAR | I10 | | | |
| LABLAXIS | CDF\_CHAR | Full 3D validity flag | | | |
| VALIDMIN | CDF\_UINT4 | 0 | | | |
| VALIDMAX | CDF\_UINT4 | 65535 | | | |
| SCALETYP | CDF\_CHAR | linear | | | |
| SCALEMIN | CDF\_UINT4 | 0 | | | |
| SCALEMAX | CDF\_UINT4 | 65535 | | | |
| VAR\_TYPE | CDF\_CHAR | support\_data | | | |

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Variable\_Name** | **Data\_type** | **DIMS** | **SIZES** | **R\_VARY** | **D\_VARY** |
| SWA\_EAS[12]\_ElevationValidity | CDF\_UINT4 | 1 | 1 | T | F |
| **Attribute Name** | **Data Type** | **Value** | | | |
| FIELDNAM | CDF\_CHAR | EAS[12] Elevation Validity | | | |
| CATDESC | CDF\_CHAR | The Validity flags associated with each of the 16 elevations | | | |
| DEPEND\_0 | CDF\_CHAR | EPOCH | | | |
| DISPLAY\_TYPE | CDF\_CHAR | time\_series | | | |
| FILLVAL | CDF\_UINT4 | 4294967294 | | | |
| FORMAT | CDF\_CHAR | I10 | | | |
| LABLAXIS | CDF\_CHAR | Elevation validity flag | | | |
| VALIDMIN | CDF\_UINT4 | 0 | | | |
| VALIDMAX | CDF\_UINT4 | 65535 | | | |
| SCALETYP | CDF\_CHAR | linear | | | |
| SCALEMIN | CDF\_UINT4 | 0 | | | |
| SCALEMAX | CDF\_UINT4 | 65535 | | | |
| VAR\_TYPE | CDF\_CHAR | support\_data | | | |

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| --- | --- | --- | --- | --- | --- |
| **Variable\_Name** | **Data\_type** | **DIMS** | **SIZES** | **R\_VARY** | **D\_VARY** |
| SWA\_EAS[12]\_DataValidity | CDF\_UINT4 | 1 | 1 | T | F |
| **Attribute Name** | **Data Type** | **Value** | | | |
| FIELDNAM | CDF\_CHAR | EAS[12] Data Validity | | | |
| CATDESC | CDF\_CHAR | The Validity flags associated with each energy count for the 16 elevations | | | |
| DEPEND\_0 | CDF\_CHAR | EPOCH | | | |
| DISPLAY\_TYPE | CDF\_CHAR | time\_series | | | |
| FILLVAL | CDF\_UINT4 | 4294967294 | | | |
| FORMAT | CDF\_CHAR | I10 | | | |
| LABLAXIS | CDF\_CHAR | Data validity flag | | | |
| VALIDMIN | CDF\_UINT4 | 0 | | | |
| VALIDMAX | CDF\_UINT4 | 65535 | | | |
| SCALETYP | CDF\_CHAR | linear | | | |
| SCALEMIN | CDF\_UINT4 | 0 | | | |
| SCALEMAX | CDF\_UINT4 | 65535 | | | |
| VAR\_TYPE | CDF\_CHAR | support\_data | | | |

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| --- | --- | --- | --- | --- | --- |
| **Variable\_Name** | **Data\_type** | **DIMS** | **SIZES** | **R\_VARY** | **D\_VARY** |
| SWA\_EAS[12]\_RPW\_TF | CDF\_UINT4 | 1 | 1 | F | F |
| **Attribute Name** | **Data Type** | **Value** | | | |
| FIELDNAM | CDF\_CHAR | EAS[12] RPW TF | | | |
| CATDESC | CDF\_CHAR | RPW Trigger Flag coming in from S20 packet | | | |
| DEPEND\_0 | CDF\_CHAR | SWA\_EAS[12]\_RPW\_HRTBT | | | |
| DISPLAY\_TYPE | CDF\_CHAR | time\_series | | | |
| FILLVAL | CDF\_UINT4 | 4294967294 | | | |
| FORMAT | CDF\_CHAR | I10 | | | |
| LABLAXIS | CDF\_CHAR | RPW Trigger Flag | | | |
| VALIDMIN | CDF\_UINT4 | 0 | | | |
| VALIDMAX | CDF\_UINT4 | 65535 | | | |
| SCALETYP | CDF\_CHAR | linear | | | |
| SCALEMIN | CDF\_UINT4 | 0 | | | |
| SCALEMAX | CDF\_UINT4 | 65535 | | | |
| VAR\_TYPE | CDF\_CHAR | support\_data | | | |

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| --- | --- | --- | --- | --- | --- |
| **Variable\_Name** | **Data\_type** | **DIMS** | **SIZES** | **R\_VARY** | **D\_VARY** |
| EAS[12]\_TO\_SRF | CDF\_REAL8 | 2 | 3,3 | F | T,T |
|  |  |  | | | |
| **Attribute Name** | **Data Type** | **Value** | | | |
| FIELDNAM | CDF\_CHAR | EAS[12] Rotation Matrix | | | |
| CATDESC | CDF\_CHAR | The rotation matrix to go from EAS[12] frame to spacecraft reference frame | | | |
| FORMAT | CDF\_CHAR | f14.5 | | | |
| VAR\_TYPE | CDF\_CHAR | support\_data | | | |

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| --- | --- | --- | --- | --- | --- |
| **Variable\_Name** | **Data\_type** | **DIMS** | **SIZES** | **R\_VARY** | **D\_VARY** |
| QUALITY\_FLAG | CDF\_UINT1 | 1 | 1 | T | F |
| **Attribute Name** | **Data Type** | **Value** | | | |
| FIELDNAM | CDF\_CHAR | EAS[12] Data Quality | | | |
| CATDESC | CDF\_CHAR | EAS[12] Data Quality flag | | | |
| DEPEND\_0 | CDF\_CHAR | EPOCH | | | |
| DISPLAY\_TYPE | CDF\_CHAR | time\_series | | | |
| FILLVAL | CDF\_UINT4 | 255 | | | |
| LABLAXIS | CDF\_CHAR | EAS[12] data quality | | | |
| VALIDMIN | CDF\_UINT4 | 0 | | | |
| VALIDMAX | CDF\_UINT4 | 4 | | | |
| SCALETYP | CDF\_CHAR | linear | | | |
| SCALEMIN | CDF\_UINT4 | 0 | | | |
| SCALEMAX | CDF\_UINT4 | 4 | | | |
| VAR\_TYPE | CDF\_CHAR | support\_data | | | |

##### EAS Burst Mode Counts

This file contains the electron counts data collected for pitch angles calculated on-board from magnetic field vector received from the MAG instrument from the EAS sensor that is in magnetic field direction.. The file format is .cdf.

**Filename**: solo\_L1\_swa-eas-padc\_[StartTime-EndTime]\_V??.cdf

**Expected data volume and time resolution**: This file contains the data between the start time and end time in the file name. The time tags are of CDF\_TIME\_TT2000. The time resolution of the file is 0.125 second. It contains electron counts from an EAS sensor covering 64 energies, 32 anodes and 2 deflectors for each time-stamp. The file size and number of records will vary depending on availability of telemetry.

**Global Attributes**

|  |  |  |
| --- | --- | --- |
| **Name** | **Entry** | **Value** |
| Project | 1 | Solar Orbiter |
| Project | 2 | Cosmic Visions |
| Source Name | 1 | SOLO>Solar Orbiter |
| Discipline | 1 | Space Physics>Interplanetary Studies |
| Data Type | 1 | L1>Level 1 Data |
| Descriptor | 1 | SWA-EAS-padc |
| Data Version | 1 | 01 |
| Software Version | 1 | 01.00.00 |
| PI Name | 1 | C. J. Owen |
| PI Affiliation | 1 | MSSL-UCL, University College London, UK |
| Instrument Type | 1 | Plasma and Solar Wind |
| Mission Group | 1 | Solar Orbiter |
| Logical Source | 1 | SWA\_L1\_swa-eas-padc |
| Logical File id | 1 | solo\_L1\_swa-eas-padc\_yyyymmddTHHMMSS-yyyymmddTHHMMSS\_V01 |
| Logical Source Description | 1 | SWA-EAS Electron Pitch Angle counts data |
| Rules of Use | 1 | Consult with MSSL-UCL before using |
| Generated by | 1 | MSSL-UCL |
| Generation date | 1 | YYYY-MM-DDTHH:MN:SS |
| Mods | 1 | V01 First Version |
| Data Product | 1 | padc>Pitch Angle Distribution Counts |
| Level | 1 | L1>Level 1 Data |
| Instrument | 1 | SWA-EAS>Solar-Wind-Analyser-Electron-Analyser-System |

**Variables**

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Variable\_Name** | **Data\_type** | **DIMS** | **SIZES** | **R\_VARY** | **D\_VARY** |
| EPOCH | CDF\_TIME\_TT2000 | 1 | 1 | T | F |
| **Attribute Name** | **Data Type** | **Value** | | | |
| FIELDNAM | CDF\_CHAR | EAS[12] EPOCH | | | |
| CATDESC | CDF\_CHAR | Epoch in nano-seconds since J2000, encoded as Terrestrial Time on rotating Earth Geoid | | | |
| DISPLAY\_TYPE | CDF\_CHAR | time\_series | | | |
| FILLVAL | CDF\_INT8 | -9223372036854775807 | | | |
| LABLAXIS | CDF\_CHAR | EPOCH | | | |
| UNITS | CDF\_CHAR | ns | | | |
| VALIDMIN | CDF\_INT8 | 1577836800000000000 | | | |
| VALIDMAX | CDF\_INT8 | 1893456000000000000 | | | |
| SCALETYP | CDF\_CHAR | linear | | | |
| SCALEMIN | CDF\_INT8 | 1577836800000000000 | | | |
| SCALEMAX | CDF\_INT8 | 1893456000000000000 | | | |
| SI\_CONVERSION | CDF\_CHAR | 1>1e+09 s | | | |
| VAR\_TYPE | CDF\_CHAR | support\_data | | | |
| VAR\_NOTES | CDF\_CHAR | The EAS[12] time tag is from the centre of the acquisition interval which is 1 sec | | | |

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| --- | --- | --- | --- | --- | --- |
| **Variable\_Name** | **Data\_type** | **DIMS** | **SIZES** | **R\_VARY** | **D\_VARY** |
| SCET | CDF\_REAL8 | 1 | 1 | T | F |
| **Attribute Name** | **Data Type** | **Value** | | | |
| FIELDNAM | CDF\_CHAR | SCET | | | |
| CATDESC | CDF\_CHAR | Elapsed time of the onboard clock at the time of EAS observation | | | |
| DISPLAY\_TYPE | CDF\_CHAR | time\_series | | | |
| FILLVAL | CDF\_REAL8 | -1E31 | | | |
| LABLAXIS | CDF\_CHAR | Spacecraft Elapsed Time (Ticks) | | | |
| UNITS | CDF\_CHAR | s | | | |
| VALIDMIN | CDF\_REAL8 | 1577836800.0 | | | |
| VALIDMAX | CDF\_REAL8 | 1893456000.0 | | | |
| SCALETYP | CDF\_CHAR | linear | | | |
| SCALEMIN | CDF\_REAL8 | 1577836800.0 | | | |
| SCALEMAX | CDF\_REAL8 | 1893456000.0 | | | |
| VAR\_TYPE | CDF\_CHAR | support\_data | | | |
| VAR\_NOTES | CDF\_CHAR | The EAS time tag is from the centre of the acquisition interval which is 1 sec | | | |

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| --- | --- | --- | --- | --- | --- |
| **Variable\_Name** | **Data\_type** | **DIMS** | **SIZES** | **R\_VARY** | **D\_VARY** |
| SWA\_EAS\_PAD\_Data | CDF\_REAL8 | 3 | 2,64,32 | T | T,T,T |
| **Attribute Name** | **Data Type** | **Value** | | | |
| FIELDNAM | CDF\_CHAR | EAS PAD Data | | | |
| CATDESC | CDF\_CHAR | EAS electron pitch angle distribution counts | | | |
| DISPLAY\_TYPE | CDF\_CHAR | Spectrogram | | | |
| FILLVAL | CDF\_REAL8 | -1E31 | | | |
| FORMAT | CDF\_CHAR | f14.4 | | | |
| LABLAXIS | CDF\_CHAR | Electron Counts | | | |
| UNITS | CDF\_CHAR | Counts/Accum | | | |
| VALIDMIN | CDF\_REAL8 | 0.1 | | | |
| VALIDMAX | CDF\_REAL8 | 65535.0 | | | |
| SCALETYP | CDF\_CHAR | log | | | |
| SCALEMIN | CDF\_REAL8 | 0.1 | | | |
| SCALEMAX | CDF\_REAL8 | 65535.0 | | | |
| DEPEND\_0 | CDF\_CHAR | EPOCH | | | |
| DEPEND\_1 | CDF\_CHAR | SWA\_EAS\_ELEVATION | | | |
| DEPEND\_2 | CDF\_CHAR | SWA\_EAS\_ENERGY | | | |
| DEPEND\_3 | CDF\_CHAR | SWA\_EAS\_AZIMUTH | | | |
| VAR\_TYPE | CDF\_CHAR | data | | | |

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| --- | --- | --- | --- | --- | --- |
| **Variable\_Name** | **Data\_type** | **DIMS** | **SIZES** | **R\_VARY** | **D\_VARY** |
| SWA\_EAS\_ELEVATION | CDF\_REAL8 | 1 | 2 | T | T |
| **Attribute Name** | **Data Type** | **Value** | | | |
| FIELDNAM | CDF\_CHAR | EAS Elevation | | | |
| CATDESC | CDF\_CHAR | The bin-centred elevation angles of the EAS sensor | | | |
| DEPEND\_0 | CDF\_CHAR | EPOCH | | | |
| FILLVAL | CDF\_REAL8 | -1E31 | | | |
| FORMAT | CDF\_CHAR | f14.4 | | | |
| LABLAXIS | CDF\_CHAR | Elevation Angle | | | |
| UNITS | CDF\_CHAR | Degrees | | | |
| VALIDMIN | CDF\_REAL8 | -45.0 | | | |
| VALIDMAX | CDF\_REAL8 | 45.0 | | | |
| SCALETYP | CDF\_CHAR | linear | | | |
| SCALEMIN | CDF\_REAL8 | -45.0 | | | |
| SCALEMAX | CDF\_REAL8 | 45.0 | | | |
| VAR\_TYPE | CDF\_CHAR | support\_data | | | |

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| --- | --- | --- | --- | --- | --- |
| **Variable\_Name** | **Data\_type** | **DIMS** | **SIZES** | **R\_VARY** | **D\_VARY** |
| SWA\_EAS[12]\_ELEVATION\_delta\_upper | CDF\_REAL8 | 1 | 2 | F | T |
| **Attribute Name** | **Data Type** | **Value** | | | |
| FIELDNAM | CDF\_CHAR | EAS[12] Elevation delta upper | | | |
| CATDESC | CDF\_CHAR | Upper half width of elevation bin | | | |
| FORMAT | CDF\_CHAR | f14.4 | | | |
| UNITS | CDF\_CHAR | Degrees | | | |
| VAR\_TYPE | CDF\_CHAR | support\_data | | | |

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Variable\_Name** | **Data\_type** | **DIMS** | **SIZES** | **R\_VARY** | **D\_VARY** |
| SWA\_EAS[12]\_ELEVATION\_delta\_lower | CDF\_REAL8 | 1 | 2 | F | T |
| **Attribute Name** | **Data Type** | **Value** | | | |
| FIELDNAM | CDF\_CHAR | EAS[12] Elevation delta lower | | | |
| CATDESC | CDF\_CHAR | Lower half width of elevation bin | | | |
| FORMAT | CDF\_CHAR | f14.4 | | | |
| UNITS | CDF\_CHAR | Degrees | | | |
| VAR\_TYPE | CDF\_CHAR | support\_data | | | |

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| --- | --- | --- | --- | --- | --- |
| **Variable\_Name** | **Data\_type** | **DIMS** | **SIZES** | **R\_VARY** | **D\_VARY** |
| SWA\_EAS\_AZIMUTH | CDF\_REAL8 | 1 | 32 | F | T |
| **Attribute Name** | **Data Type** | **Value** | | | |
| FIELDNAM | CDF\_CHAR | EAS Azimuth | | | |
| CATDESC | CDF\_CHAR | The bin-centred azimuthal angles of the EAS sensor | | | |
| DEPEND\_0 | CDF\_CHAR | EPOCH | | | |
| FILLVAL | CDF\_REAL8 | -1E31 | | | |
| FORMAT | CDF\_CHAR | f14.4 | | | |
| LABLAXIS | CDF\_CHAR | Azimuthal Angle | | | |
| UNITS | CDF\_CHAR | Degrees | | | |
| VALIDMIN | CDF\_REAL8 | 0.0 | | | |
| VALIDMAX | CDF\_REAL8 | 360.0 | | | |
| SCALETYP | CDF\_CHAR | linear | | | |
| SCALEMIN | CDF\_REAL8 | 0.0 | | | |
| SCALEMAX | CDF\_REAL8 | 360.0 | | | |
| VAR\_TYPE | CDF\_CHAR | support\_data | | | |

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Variable\_Name** | **Data\_type** | **DIMS** | **SIZES** | **R\_VARY** | **D\_VARY** |
| SWA\_EAS[12]\_AZIMUTH\_delta\_upper | CDF\_REAL8 | 1 | 32 | F | T |
| **Attribute Name** | **Data Type** | **Value** | | | |
| FIELDNAM | CDF\_CHAR | EAS[12] Azimuth upper delta | | | |
| CATDESC | CDF\_CHAR | Upper half width of azimuth bin | | | |
| FORMAT | CDF\_CHAR | f14.4 | | | |
| UNITS | CDF\_CHAR | Degrees | | | |
| VAR\_TYPE | CDF\_CHAR | support\_data | | | |

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| --- | --- | --- | --- | --- | --- |
| **Variable\_Name** | **Data\_type** | **DIMS** | **SIZES** | **R\_VARY** | **D\_VARY** |
| SWA\_EAS[12]\_AZIMUTH\_delta\_lower | CDF\_REAL8 | 1 | 32 | F | T |
| **Attribute Name** | **Data Type** | **Value** | | | |
| FIELDNAM | CDF\_CHAR | EAS[12] Azimuth lower delta | | | |
| CATDESC | CDF\_CHAR | Lower half width of azimuth bin | | | |
| FORMAT | CDF\_CHAR | f14.4 | | | |
| UNITS | CDF\_CHAR | Degrees | | | |
| VAR\_TYPE | CDF\_CHAR | support\_data | | | |

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Variable\_Name** | **Data\_type** | **DIMS** | **SIZES** | **R\_VARY** | **D\_VARY** |
| SWA\_EAS\_ENERGY | CDF\_REAL8 | 1 | 64 | T | T |
| **Attribute Name** | **Data Type** | **Value** | | | |
| FIELDNAM | CDF\_CHAR | EAS Energy | | | |
| CATDESC | CDF\_CHAR | The bin-centred Energy values of the EAS sensor | | | |
| DEPEND\_0 | CDF\_CHAR | EPOCH | | | |
| FILLVAL | CDF\_REAL8 | -1E31 | | | |
| FORMAT | CDF\_CHAR | f14.4 | | | |
| LABLAXIS | CDF\_CHAR | Energy | | | |
| UNITS | CDF\_CHAR | ElectronVolts | | | |
| VALIDMIN | CDF\_REAL8 | 0.1 | | | |
| VALIDMAX | CDF\_REAL8 | 6000.0 | | | |
| SCALETYP | CDF\_CHAR | log | | | |
| SCALEMIN | CDF\_REAL8 | 0.1 | | | |
| SCALEMAX | CDF\_REAL8 | 6000.0 | | | |
| SI\_CONVERSION | CDF\_CHAR | 1.60217646E-19>J | | | |
| VAR\_TYPE | CDF\_CHAR | support\_data | | | |

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| --- | --- | --- | --- | --- | --- |
| **Variable\_Name** | **Data\_type** | **DIMS** | **SIZES** | **R\_VARY** | **D\_VARY** |
| SWA\_EAS[12]\_ENERGY\_delta\_upper | CDF\_REAL8 | 1 | 64 | T | T |
| **Attribute Name** | **Data Type** | **Value** | | | |
| FIELDNAM | CDF\_CHAR | EAS[12] Energy upper delta | | | |
| CATDESC | CDF\_CHAR | Upper half width of energy bin | | | |
| DEPEND\_0 | CDF\_CHAR | EPOCH | | | |
| FORMAT | CDF\_CHAR | f14.4 | | | |
| UNITS | CDF\_CHAR | ElectronVolts | | | |
| VAR\_TYPE | CDF\_CHAR | support\_data | | | |

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| --- | --- | --- | --- | --- | --- |
| **Variable\_Name** | **Data\_type** | **DIMS** | **SIZES** | **R\_VARY** | **D\_VARY** |
| SWA\_EAS[12]\_ENERGY\_delta\_lower | CDF\_REAL8 | 1 | 64 | T | T |
| **Attribute Name** | **Data Type** | **Value** | | | |
| FIELDNAM | CDF\_CHAR | EAS[12] Energy lower delta | | | |
| CATDESC | CDF\_CHAR | Lower half width of energy bin | | | |
| DEPEND\_0 | CDF\_CHAR | EPOCH | | | |
| FORMAT | CDF\_CHAR | f14.4 | | | |
| UNITS | CDF\_CHAR | ElectronVolts | | | |
| VAR\_TYPE | CDF\_CHAR | support\_data | | | |

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Variable\_Name** | **Data\_type** | **DIMS** | **SIZES** | **R\_VARY** | **D\_VARY** |
| SWA\_EAS\_Mode | CDF\_UINT4 | 1 | 3 | T | T |
| **Attribute Name** | **Data Type** | **Value** | | | |
| FIELDNAM | CDF\_CHAR | EAS Mode | | | |
| CATDESC | CDF\_CHAR | The EAS Mode data | | | |
| DEPEND\_0 | CDF\_CHAR | EPOCH | | | |
| DISPLAY\_TYPE | CDF\_CHAR | time\_series | | | |
| FILLVAL | CDF\_UINT4 | 4294967294 | | | |
| FORMAT | CDF\_CHAR | I10 | | | |
| LABLAXIS | CDF\_CHAR | EAS1 Mode | | | |
| VALIDMIN | CDF\_UINT4 | 0 | | | |
| VALIDMAX | CDF\_UINT4 | 65535 | | | |
| SCALETYP | CDF\_CHAR | linear | | | |
| SCALEMIN | CDF\_UINT4 | 0 | | | |
| SCALEMAX | CDF\_UINT4 | 65535 | | | |
| VAR\_TYPE | CDF\_CHAR | support\_data | | | |

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| --- | --- | --- | --- | --- | --- |
| **Variable\_Name** | **Data\_type** | **DIMS** | **SIZES** | **R\_VARY** | **D\_VARY** |
| SWA\_EAS\_Validity | CDF\_UINT4 | 1 | 9 | T | T |
| **Attribute Name** | **Data Type** | **Value** | | | |
| FIELDNAM | CDF\_CHAR | EAS Validity | | | |
| CATDESC | CDF\_CHAR | The Validity flags associated with energies | | | |
| DEPEND\_0 | CDF\_CHAR | EPOCH | | | |
| DISPLAY\_TYPE | CDF\_CHAR | time\_series | | | |
| FILLVAL | CDF\_UINT4 | 4294967294 | | | |
| FORMAT | CDF\_CHAR | I10 | | | |
| LABLAXIS | CDF\_CHAR | Full 3D validity flag | | | |
| VALIDMIN | CDF\_UINT4 | 0 | | | |
| VALIDMAX | CDF\_UINT4 | 65535 | | | |
| SCALETYP | CDF\_CHAR | linear | | | |
| SCALEMIN | CDF\_UINT4 | 0 | | | |
| SCALEMAX | CDF\_UINT4 | 65535 | | | |
| VAR\_TYPE | CDF\_CHAR | support\_data | | | |

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Variable\_Name** | **Data\_type** | **DIMS** | **SIZES** | **R\_VARY** | **D\_VARY** |
| SWA\_EAS\_EASUsed | CDF\_UINT1 | 1 | 1 | T | T |
| **Attribute Name** | **Data Type** | **Value** | | | |
| FIELDNAM | CDF\_CHAR | EAS sensor used | | | |
| CATDESC | CDF\_CHAR | The EAS sensor use for Pitch Angle data collection | | | |
| DEPEND\_0 | CDF\_CHAR | EPOCH | | | |
| DISPLAY\_TYPE | CDF\_CHAR | time\_series | | | |
| FILLVAL | CDF\_UINT1 | 255 | | | |
| FORMAT | CDF\_CHAR | I10 | | | |
| LABLAXIS | CDF\_CHAR | EAS | | | |
| VALIDMIN | CDF\_UINT1 | 0 | | | |
| VALIDMAX | CDF\_UINT1 | 3 | | | |
| SCALETYP | CDF\_CHAR | linear | | | |
| SCALEMIN | CDF\_UINT1 | 0 | | | |
| SCALEMAX | CDF\_UINT1 | 3 | | | |
| VAR\_TYPE | CDF\_CHAR | support\_data | | | |

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Variable\_Name** | **Data\_type** | **DIMS** | **SIZES** | **R\_VARY** | **D\_VARY** |
| SWA\_EAS\_ElevationUsed | CDF\_UINT1 | 1 | 1 | T | T |
| **Attribute Name** | **Data Type** | **Value** | | | |
| FIELDNAM | CDF\_CHAR | EAS Elevation used | | | |
| CATDESC | CDF\_CHAR | The EAS Elevation used for Pitch Angle data collection | | | |
| DEPEND\_0 | CDF\_CHAR | EPOCH | | | |
| DISPLAY\_TYPE | CDF\_CHAR | time\_series | | | |
| FILLVAL | CDF\_UINT1 | 255 | | | |
| FORMAT | CDF\_CHAR | I10 | | | |
| LABLAXIS | CDF\_CHAR | Elevation | | | |
| VALIDMIN | CDF\_UINT1 | 0 | | | |
| VALIDMAX | CDF\_UINT1 | 3 | | | |
| SCALETYP | CDF\_CHAR | linear | | | |
| SCALEMIN | CDF\_UINT1 | 0 | | | |
| SCALEMAX | CDF\_UINT1 | 3 | | | |
| VAR\_TYPE | CDF\_CHAR | support\_data | | | |

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Variable\_Name** | **Data\_type** | **DIMS** | **SIZES** | **R\_VARY** | **D\_VARY** |
| SWA\_EAS\_MagDataUsed | CDF\_REAL8 | 1 | 3 | T | T |
| **Attribute Name** | **Data Type** | **Value** | | | |
| FIELDNAM | CDF\_CHAR | MAG vector | | | |
| CATDESC | CDF\_CHAR | The MAG vector used to calculate pitch angles collected | | | |
| DISPLAY\_TYPE | CDF\_CHAR | time\_series | | | |
| DEPEND\_0 | CDF\_CHAR | EPOCH | | | |
| FILLVAL | CDF\_REAL8 | -1E+31 | | | |
| FORMAT | CDF\_CHAR | F14.4 | | | |
| LABLAXIS | CDF\_CHAR | Full 3D validity flag | | | |
| UNITS | CDF\_CHAR | nT | | | |
| VALIDMIN | CDF\_REAL8 | -65535.0 | | | |
| VALIDMAX | CDF\_REAL8 | 65535.0 | | | |
| SCALETYP | CDF\_CHAR | linear | | | |
| SCALEMIN | CDF\_REAL8 | -65535.0 | | | |
| SCALEMAX | CDF\_REAL8 | 65535.0 | | | |
| SI\_CONVERSION | CDF\_CHAR | 1E+09>T | | | |
| VAR\_TYPE | CDF\_CHAR | support\_data | | | |

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| --- | --- | --- | --- | --- | --- |
| **Variable\_Name** | **Data\_type** | **DIMS** | **SIZES** | **R\_VARY** | **D\_VARY** |
| EAS\_TO\_SRF | CDF\_REAL8 | 2 | 3,3 | F | T,T |
|  |  |  | | | |
| **Attribute Name** | **Data Type** | **Value** | | | |
| FIELDNAM | CDF\_CHAR | EAS-SRF Rotation Matrix | | | |
| CATDESC | CDF\_CHAR | The rotation matrix that will transform EAS[12] data to spacecraft reference frame | | | |
| FORMAT | CDF\_CHAR | f14.4 | | | |
| VAR\_TYPE | CDF\_CHAR | support\_data | | | |

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Variable\_Name** | **Data\_type** | **DIMS** | **SIZES** | **R\_VARY** | **D\_VARY** |
| EAS\_TO\_MAG | CDF\_REAL8 | 2 | 3,3 | F | T,T |
|  |  |  | | | |
| **Attribute Name** | **Data Type** | **Value** | | | |
| FIELDNAM | CDF\_CHAR | EAS-MAG Rotation Matrix | | | |
| CATDESC | CDF\_CHAR | The rotation matrix that will transform EAS[12] to MAG instrument frame | | | |
| FORMAT | CDF\_CHAR | f14.4 | | | |
| VAR\_TYPE | CDF\_CHAR | support\_data | | | |

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Variable\_Name** | **Data\_type** | **DIMS** | **SIZES** | **R\_VARY** | **D\_VARY** |
| QUALITY\_FLAG | CDF\_UINT1 | 1 | 1 | T | F |
| **Attribute Name** | **Data Type** | **Value** | | | |
| FIELDNAM | CDF\_CHAR | EAS[12] Data Quality | | | |
| CATDESC | CDF\_CHAR | EAS[12] Data Quality flag | | | |
| DEPEND\_0 | CDF\_CHAR | EPOCH | | | |
| DISPLAY\_TYPE | CDF\_CHAR | time\_series | | | |
| FILLVAL | CDF\_UINT4 | 255 | | | |
| LABLAXIS | CDF\_CHAR | EAS[12] data quality | | | |
| VALIDMIN | CDF\_UINT4 | 0 | | | |
| VALIDMAX | CDF\_UINT4 | 4 | | | |
| SCALETYP | CDF\_CHAR | linear | | | |
| SCALEMIN | CDF\_UINT4 | 0 | | | |
| SCALEMAX | CDF\_UINT4 | 4 | | | |
| VAR\_TYPE | CDF\_CHAR | support\_data | | | |

##### EAS Onboard Partial Moments

This file contains on-board calculated partial moments from boh EAS1 and EAS2 sensors. The file format is .cdf.

**Filename**: solo\_L1\_swa-eas-OnbPartMoms\_[StartTime-EndTime]\_V??.cdf

**Expected data volume and time resolution**: This file contains the data between the start time and end time in the file name.Time tags are of CDF\_TIME\_TT2000 type. The time resolution of the file is 4 seconds. On-board partial moments are only calculated when EAS sensors are operating in either nominal cadence or low cadence modes. A file covers full 24-hours and contains approximately 21,600 records.

**Global Attributes**

|  |  |  |
| --- | --- | --- |
| **Name** | **Entry** | **Value** |
| Project | 1 | Solar Orbiter |
| Project | 2 | Cosmic Visions |
| Source Name | 1 | SOLO>Solar Orbiter |
| Discipline | 1 | Space Physics>Interplanetary Studies |
| Data Type | 1 | L1>Level 1 Data |
| Descriptor | 1 | SWA-EAS-OnbPartMoms |
| Data Version | 1 | 01 |
| Software Version | 1 | 01.00.00 |
| PI Name | 1 | C. J. Owen |
| PI Affiliation | 1 | MSSL-UCL, University College London, UK |
| Instrument Type | 1 | Plasma and Solar Wind |
| Mission Group | 1 | Solar Orbiter |
| Logical Source | 1 | SWA\_L1\_swa-eas-OnbPartMoms |
| Logical File id | 1 | solo\_L1\_swa-eas-OnbPartMoms \_yyyymmddTHHMMSS-yyyymmddTHHMMSS\_V01 |
| Logical Source Description | 1 | SWA-EAS Onboard Partial Moments |
| Rules of Use | 1 | Consult with MSSL-UCL before using |
| Generated by | 1 | MSSL-UCL |
| Generation date | 1 | YYYY-MM-DDTHH:MN:SS |
| Mods | 1 | V01 First Version |
| Data Product | 1 | OnbPartMoms>Onboard Partial Moments |
| Level | 1 | L1>Level 1 Data |
| Instrument | 1 | SWA-EAS>Solar-Wind-Analyser-Electron-Analyser-System |

**Variables**

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Variable\_Name** | **Data\_type** | **DIMS** | **SIZES** | **R\_VARY** | **D\_VARY** |
| EPOCH | CDF\_TIME\_TT2000 | 1 | 1 | T | F |
| **Attribute Name** | **Data Type** | **Value** | | | |
| FIELDNAM | CDF\_CHAR | EAS1 EPOCH | | | |
| CATDESC | CDF\_CHAR | Epoch in nano-seconds since J2000, encoded as Terrestrial Time on rotating Earth Geoid | | | |
| DISPLAY\_TYPE | CDF\_CHAR | time\_series | | | |
| FILLVAL | CDF\_INT8 | -9223372036854775807 | | | |
| LABLAXIS | CDF\_CHAR | EAS1 EPOCH | | | |
| UNITS | CDF\_CHAR | ns | | | |
| VALIDMIN | CDF\_INT8 | 1577836800000000000 | | | |
| VALIDMAX | CDF\_INT8 | 1893456000000000000 | | | |
| SCALETYP | CDF\_CHAR | linear | | | |
| SCALEMIN | CDF\_INT8 | 1577836800000000000 | | | |
| SCALEMAX | CDF\_INT8 | 1893456000000000000 | | | |
| SI\_CONVERSION | CDF\_CHAR | 1>1e+09 s | | | |
| VAR\_TYPE | CDF\_CHAR | support\_data | | | |
| VAR\_NOTES | CDF\_CHAR | The EAS[12] time tag is from the centre of the acquisition interval which is 1 sec | | | |

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Variable\_Name** | **Data\_type** | **DIMS** | **SIZES** | **R\_VARY** | **D\_VARY** |
| SCET | CDF\_EPOCH | 1 | 1 | T | F |
| **Attribute Name** | **Data Type** | **Value** | | | |
| FIELDNAM | CDF\_CHAR | EAS1 SCET | | | |
| CATDESC | CDF\_CHAR | Elapsed time of the onboard clock at the time of EAS1 observation | | | |
| DISPLAY\_TYPE | CDF\_CHAR | time\_series | | | |
| FILLVAL | CDF\_REAL8 | -1E31 | | | |
| LABLAXIS | CDF\_CHAR | Spacecraft Elapsed Time (Ticks) | | | |
| UNITS | CDF\_CHAR | s | | | |
| VALIDMIN | CDF\_REAL8 | 1577836800.0 | | | |
| VALIDMAX | CDF\_REAL8 | 1893456000.0 | | | |
| SCALETYP | CDF\_CHAR | linear | | | |
| SCALEMIN | CDF\_REAL8 | 1577836800.0 | | | |
| SCALEMAX | CDF\_REAL8 | 1893456000.0 | | | |
| VAR\_TYPE | CDF\_CHAR | support\_data | | | |
| VAR\_NOTES | CDF\_CHAR | The EAS1 time tag is from the centre of the acquisition interval which is 1 sec | | | |

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| --- | --- | --- | --- | --- | --- |
| **Variable\_Name** | **Data\_type** | **DIMS** | **SIZES** | **R\_VARY** | **D\_VARY** |
| EPOCH\_1 | CDF\_TIME\_TT2000 | 1 | 1 | T | F |
| **Attribute Name** | **Data Type** | **Value** | | | |
| FIELDNAM | CDF\_CHAR | EAS2 EPOCH | | | |
| CATDESC | CDF\_CHAR | Epoch in nano-seconds since J2000, encoded as Terrestrial Time on rotating Earth Geoid | | | |
| DISPLAY\_TYPE | CDF\_CHAR | time\_series | | | |
| FILLVAL | CDF\_INT8 | -9223372036854775807 | | | |
| LABLAXIS | CDF\_CHAR | EAS2 EPOCH | | | |
| UNITS | CDF\_CHAR | ns | | | |
| VALIDMIN | CDF\_INT8 | 1577836800000000000 | | | |
| VALIDMAX | CDF\_INT8 | 1893456000000000000 | | | |
| SCALETYP | CDF\_CHAR | linear | | | |
| SCALEMIN | CDF\_INT8 | 1577836800000000000 | | | |
| SCALEMAX | CDF\_INT8 | 1893456000000000000 | | | |
| SI\_CONVERSION | CDF\_CHAR | 1>1e+09 s | | | |
| VAR\_TYPE | CDF\_CHAR | support\_data | | | |
| VAR\_NOTES | CDF\_CHAR | The EAS[12] time tag is from the centre of the acquisition interval which is 1 sec | | | |

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Variable\_Name** | **Data\_type** | **DIMS** | **SIZES** | **R\_VARY** | **D\_VARY** |
| SCET\_1 | CDF\_EPOCH | 1 | 1 | T | F |
| **Attribute Name** | **Data Type** | **Value** | | | |
| FIELDNAM | CDF\_CHAR | EAS2 SCET | | | |
| CATDESC | CDF\_CHAR | Elapsed time of the onboard clock at the time of EAS2 observation | | | |
| DISPLAY\_TYPE | CDF\_CHAR | time\_series | | | |
| FILLVAL | CDF\_REAL8 | -1E31 | | | |
| LABLAXIS | CDF\_CHAR | Spacecraft Elapsed Time (Ticks) | | | |
| UNITS | CDF\_CHAR | s | | | |
| VALIDMIN | CDF\_REAL8 | 1577836800.0 | | | |
| VALIDMAX | CDF\_REAL8 | 1893456000.0 | | | |
| SCALETYP | CDF\_CHAR | linear | | | |
| SCALEMIN | CDF\_REAL8 | 1577836800.0 | | | |
| SCALEMAX | CDF\_REAL8 | 1893456000.0 | | | |
| VAR\_TYPE | CDF\_CHAR | support\_data | | | |
| VAR\_NOTES | CDF\_CHAR | The EAS2 time tag is from the centre of the acquisition interval which is 1 sec | | | |

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| --- | --- | --- | --- | --- | --- |
| **Variable\_Name** | **Data\_type** | **DIMS** | **SIZES** | **R\_VARY** | **D\_VARY** |
| SWA\_EAS1\_dataValidity | CDF\_UINT4 | 1 | 1 | T | T |
| **Attribute Name** | **Data Type** | **Value** | | | |
| FIELDNAM | CDF\_CHAR | EAS1 Data Validity | | | |
| CATDESC | CDF\_CHAR | The Validity flags associated with EAS1 | | | |
| DISPLAY\_TYPE | CDF\_CHAR | time\_series | | | |
| DEPEND\_0 | CDF\_CHAR | EPOCH | | | |
| FILLVAL | CDF\_UINT4 | 4294967294 | | | |
| FORMAT | CDF\_CHAR | I10 | | | |
| LABLAXIS | CDF\_CHAR | EAS1 validity flag | | | |
| VALIDMIN | CDF\_UINT4 | 0 | | | |
| VALIDMAX | CDF\_UINT4 | 65535 | | | |
| SCALETYP | CDF\_CHAR | linear | | | |
| SCALEMIN | CDF\_UINT4 | 0 | | | |
| SCALEMAX | CDF\_UINT4 | 65535 | | | |
| VAR\_TYPE | CDF\_CHAR | support\_data | | | |

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Variable\_Name** | **Data\_type** | **DIMS** | **SIZES** | **R\_VARY** | **D\_VARY** |
| SWA\_EAS2\_dataValidity | CDF\_UINT4 | 1 | 1 | T | T |
| **Attribute Name** | **Data Type** | **Value** | | | |
| FIELDNAM | CDF\_CHAR | EAS2 Data Validity | | | |
| CATDESC | CDF\_CHAR | The Validity flags associated with EAS2 | | | |
| DISPLAY\_TYPE | CDF\_CHAR | time\_series | | | |
| DEPEND\_0 | CDF\_CHAR | EPOCH\_1 | | | |
| FILLVAL | CDF\_UINT4 | 4294967294 | | | |
| FORMAT | CDF\_CHAR | I10 | | | |
| LABLAXIS | CDF\_CHAR | EAS1 validity flag | | | |
| VALIDMIN | CDF\_UINT4 | 0 | | | |
| VALIDMAX | CDF\_UINT4 | 65535 | | | |
| SCALETYP | CDF\_CHAR | linear | | | |
| SCALEMIN | CDF\_UINT4 | 0 | | | |
| SCALEMAX | CDF\_UINT4 | 65535 | | | |
| VAR\_TYPE | CDF\_CHAR | support\_data | | | |

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| --- | --- | --- | --- | --- | --- |
| **Variable\_Name** | **Data\_type** | **DIMS** | **SIZES** | **R\_VARY** | **D\_VARY** |
| SWA\_EAS\_SumEAS1 | CDF\_UINT4 | 1 | 1 | T | T |
| **Attribute Name** | **Data Type** | **Value** | | | |
| FIELDNAM | CDF\_CHAR | Summed EAS1 distributions | | | |
| CATDESC | CDF\_CHAR | This flag indicates if 4 successive 3D distributions are summed to calculate Moments | | | |
| DISPLAY\_TYPE | CDF\_CHAR | time\_series | | | |
| DEPEND\_0 | CDF\_CHAR | EPOCH | | | |
| FILLVAL | CDF\_UINT4 | 4294967294 | | | |
| FORMAT | CDF\_CHAR | I10 | | | |
| LABLAXIS | CDF\_CHAR | EAS1 Summed flag | | | |
| VALIDMIN | CDF\_UINT4 | 0 | | | |
| VALIDMAX | CDF\_UINT4 | 65535 | | | |
| SCALETYP | CDF\_CHAR | linear | | | |
| SCALEMIN | CDF\_UINT4 | 0 | | | |
| SCALEMAX | CDF\_UINT4 | 65535 | | | |
| VAR\_TYPE | CDF\_CHAR | support\_data | | | |

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Variable\_Name** | **Data\_type** | **DIMS** | **SIZES** | **R\_VARY** | **D\_VARY** |
| SWA\_EAS\_SumEAS2 | CDF\_UINT4 | 1 | 1 | T | T |
| **Attribute Name** | **Data Type** | **Value** | | | |
| FIELDNAM | CDF\_CHAR | Summed EAS2 distributions | | | |
| CATDESC | CDF\_CHAR | This flag indicates if 4 successive 3D distributions are summed to calculate Moments | | | |
| DISPLAY\_TYPE | CDF\_CHAR | time\_series | | | |
| DEPEND\_0 | CDF\_CHAR | EPOCH\_1 | | | |
| FILLVAL | CDF\_UINT4 | 4294967294 | | | |
| FORMAT | CDF\_CHAR | I10 | | | |
| LABLAXIS | CDF\_CHAR | EAS2 Summed flag | | | |
| VALIDMIN | CDF\_UINT4 | 0 | | | |
| VALIDMAX | CDF\_UINT4 | 65535 | | | |
| SCALETYP | CDF\_CHAR | linear | | | |
| SCALEMIN | CDF\_UINT4 | 0 | | | |
| SCALEMAX | CDF\_UINT4 | 65535 | | | |
| VAR\_TYPE | CDF\_CHAR | support\_data | | | |

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| --- | --- | --- | --- | --- | --- |
| **Variable\_Name** | **Data\_type** | **DIMS** | **SIZES** | **R\_VARY** | **D\_VARY** |
| SWA\_EAS\_SCPotential | CDF\_REAL8 | 1 | 1 | T | T |
| **Attribute Name** | **Data Type** | **Value** | | | |
| FIELDNAM | CDF\_CHAR | Spacecraft Potential | | | |
| CATDESC | CDF\_CHAR | Spacecraft Potential used to discard lowest energies | | | |
| DISPLAY\_TYPE | CDF\_CHAR | time\_series | | | |
| DEPEND\_0 | CDF\_CHAR | EPOCH | | | |
| FILLVAL | CDF\_REAL8 | -1E+31 | | | |
| FORMAT | CDF\_CHAR | F14.4 | | | |
| LABLAXIS | CDF\_CHAR | Spacecraft Potential | | | |
| VALIDMIN | CDF\_UINT4 | -100.0 | | | |
| VALIDMAX | CDF\_UINT4 | 100.0 | | | |
| SCALETYP | CDF\_CHAR | linear | | | |
| SCALEMIN | CDF\_UINT4 | -100.0 | | | |
| SCALEMAX | CDF\_UINT4 | 100.0 | | | |
| VAR\_TYPE | CDF\_CHAR | data | | | |
| UNITS | CDF\_CHAR | Volts | | | |
| SI\_CONVERSION | CDF\_CHAR | > | | | |

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| --- | --- | --- | --- | --- | --- |
| **Variable\_Name** | **Data\_type** | **DIMS** | **SIZES** | **R\_VARY** | **D\_VARY** |
| SWA\_EAS1\_SumMoms | CDF\_UINT4 | 1 | 12 | T | T |
| **Attribute Name** | **Data Type** | **Value** | | | |
| FIELDNAM | CDF\_CHAR | EAS1 Moment Sums | | | |
| CATDESC | CDF\_CHAR | The partial sum of the EAS1 Moments | | | |
| DISPLAY\_TYPE | CDF\_CHAR | time\_series | | | |
| DEPEND\_0 | CDF\_CHAR | EPOCH | | | |
| FILLVAL | CDF\_UINT4 | 4294967294 | | | |
| FORMAT | CDF\_CHAR | I10 | | | |
| LABLAXIS | CDF\_CHAR | EAS1 Partial Sum | | | |
| VALIDMIN | CDF\_UINT4 | 0 | | | |
| VALIDMAX | CDF\_UINT4 | 65535 | | | |
| SCALETYP | CDF\_CHAR | linear | | | |
| SCALEMIN | CDF\_UINT4 | 0 | | | |
| SCALEMAX | CDF\_UINT4 | 65535 | | | |
| VAR\_TYPE | CDF\_CHAR | support\_data | | | |

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| --- | --- | --- | --- | --- | --- |
| **Variable\_Name** | **Data\_type** | **DIMS** | **SIZES** | **R\_VARY** | **D\_VARY** |
| SWA\_EAS2\_SumMoms | CDF\_UINT4 | 1 | 12 | T | T |
| **Attribute Name** | **Data Type** | **Value** | | | |
| FIELDNAM | CDF\_CHAR | EAS2 Moment Sums | | | |
| CATDESC | CDF\_CHAR | The partial sum of the EAS2 Moments | | | |
| DISPLAY\_TYPE | CDF\_CHAR | time\_series | | | |
| DEPEND\_0 | CDF\_CHAR | EPOCH\_1 | | | |
| FILLVAL | CDF\_UINT4 | 4294967294 | | | |
| FORMAT | CDF\_CHAR | I10 | | | |
| LABLAXIS | CDF\_CHAR | EAS2 Partial Sum | | | |
| VALIDMIN | CDF\_UINT4 | 0 | | | |
| VALIDMAX | CDF\_UINT4 | 65535 | | | |
| SCALETYP | CDF\_CHAR | linear | | | |
| SCALEMIN | CDF\_UINT4 | 0 | | | |
| SCALEMAX | CDF\_UINT4 | 65535 | | | |
| VAR\_TYPE | CDF\_CHAR | support\_data | | | |

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| --- | --- | --- | --- | --- | --- |
| **Variable\_Name** | **Data\_type** | **DIMS** | **SIZES** | **R\_VARY** | **D\_VARY** |
| SWA\_EAS1\_onlyLowEne\_N | CDF\_REAL8 | 1 | 1 | T | F |
| **Attribute Name** | **Data Type** | **Value** | | | |
| FIELDNAM | CDF\_CHAR | EAS1 onlyLowEne Density | | | |
| CATDESC | CDF\_CHAR | Number density from EAS1 only look direction in low energy range | | | |
| COORDINATE\_SYSTEM | CDF\_CHAR | EAS1 | | | |
| DISPLAY\_TYPE | CDF\_CHAR | time\_series | | | |
| DEPEND\_0 | CDF\_CHAR | EPOCH | | | |
| FILLVAL | CDF\_REAL8 | -1E+31 | | | |
| FORMAT | CDF\_CHAR | f14.4 | | | |
| LABLAXIS | CDF\_CHAR | EAS1 OnlyLowEne N | | | |
| VALIDMIN | CDF\_UINT4 | 1E-9 | | | |
| VALIDMAX | CDF\_UINT4 | 1E+3 | | | |
| SCALETYP | CDF\_CHAR | log | | | |
| SCALEMIN | CDF\_UINT4 | 1E-9 | | | |
| SCALEMAX | CDF\_UINT4 | 1E+3 | | | |
| VAR\_TYPE | CDF\_CHAR | data | | | |
| UNITS | CDF\_CHAR | cm^-3 | | | |
| SI\_CONVERSION | CDF\_CHAR | 1E-06>m^-3 | | | |

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| --- | --- | --- | --- | --- | --- |
| **Variable\_Name** | **Data\_type** | **DIMS** | **SIZES** | **R\_VARY** | **D\_VARY** |
| SWA\_EAS1\_onlyLowEne\_V | CDF\_REAL8 | 1 | 3 | T | T |
| **Attribute Name** | **Data Type** | **Value** | | | |
| FIELDNAM | CDF\_CHAR | EAS1 onlyLowEne Velocity | | | |
| CATDESC | CDF\_CHAR | Bulk velocity from EAS1 only look direction in low energy range | | | |
| COORDINATE\_SYSTEM | CDF\_CHAR | EAS1 | | | |
| DISPLAY\_TYPE | CDF\_CHAR | time\_series | | | |
| DEPEND\_0 | CDF\_CHAR | EPOCH | | | |
| FILLVAL | CDF\_REAL8 | -1E+31 | | | |
| FORMAT | CDF\_CHAR | f14.4 | | | |
| LABL\_PTR\_1 | CDF\_CHAR | EAS\_VEL\_LABEL | | | |
| VALIDMIN | CDF\_REAL8 | -10000.0 | | | |
| VALIDMAX | CDF\_REAL8 | +10000.0 | | | |
| SCALETYP | CDF\_CHAR | log | | | |
| SCALEMIN | CDF\_REAL8 | -10000.0 | | | |
| SCALEMAX | CDF\_REAL8 | +10000.0 | | | |
| VAR\_TYPE | CDF\_CHAR | data | | | |
| UNITS | CDF\_CHAR | km s^-1 | | | |
| SI\_CONVERSION | CDF\_CHAR | 1E+03>m s^-1 | | | |
| REPRESENTATION\_1 | CDF\_CHAR | REP\_VEL\_LABEL | | | |

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| **Variable\_Name** | **Data\_type** | **DIMS** | **SIZES** | **R\_VARY** | **D\_VARY** |
| SWA\_EAS1\_onlyLowEne\_P | CDF\_REAL8 | 1 | 9 | T | T |
| **Attribute Name** | **Data Type** | **Value** | | | |
| FIELDNAM | CDF\_CHAR | EAS1 onlyLowEne Pressure | | | |
| CATDESC | CDF\_CHAR | Pressure tensor from EAS1 only look direction in low energy range | | | |
| COORDINATE\_SYSTEM | CDF\_CHAR | EAS1 | | | |
| DISPLAY\_TYPE | CDF\_CHAR | time\_series | | | |
| DEPEND\_0 | CDF\_CHAR | EPOCH | | | |
| FILLVAL | CDF\_REAL8 | -1E+31 | | | |
| FORMAT | CDF\_CHAR | f14.4 | | | |
| LABLAXIS | CDF\_CHAR | EAS1 OnlyLowEne P | | | |
| VALIDMIN | CDF\_REAL8 | 1E-6 | | | |
| VALIDMAX | CDF\_REAL8 | 1E+3 | | | |
| SCALETYP | CDF\_CHAR | Log | | | |
| SCALEMIN | CDF\_REAL8 | 1E-6 | | | |
| SCALEMAX | CDF\_REAL8 | 1E+3 | | | |
| VAR\_TYPE | CDF\_CHAR | data | | | |
| UNITS | CDF\_CHAR | nPa | | | |
| SI\_CONVERSION | CDF\_CHAR | 1E-09>P | | | |
| REPRESENTATION\_1 | CDF\_CHAR | REP\_EAS\_PRES\_1 | | | |
| REPRESENTATION\_2 | CDF\_CHAR | REP\_EAS\_PRES\_2 | | | |

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| **Variable\_Name** | **Data\_type** | **DIMS** | **SIZES** | **R\_VARY** | **D\_VARY** |
| SWA\_EAS1\_onlyLowEne\_H | CDF\_REAL8 | 1 | 3 | T | T |
| **Attribute Name** | **Data Type** | **Value** | | | |
| FIELDNAM | CDF\_CHAR | EAS1 onlyLowEne Heat Flux | | | |
| CATDESC | CDF\_CHAR | Heat Flux from EAS1 only look direction in low energy range | | | |
| COORDINATE\_SYSTEM | CDF\_CHAR | EAS1 | | | |
| DISPLAY\_TYPE | CDF\_CHAR | time\_series | | | |
| DEPEND\_0 | CDF\_CHAR | EPOCH | | | |
| FILLVAL | CDF\_REAL8 | -1E+31 | | | |
| FORMAT | CDF\_CHAR | f14.4 | | | |
| LABL\_PTR\_1 | CDF\_CHAR | EAS\_HFlux\_LABEL | | | |
| VALIDMIN | CDF\_REAL8 | 1E-05 | | | |
| VALIDMAX | CDF\_REAL8 | 1E+05 | | | |
| SCALETYP | CDF\_CHAR | log | | | |
| SCALEMIN | CDF\_REAL8 | 1E-05 | | | |
| SCALEMAX | CDF\_REAL8 | 1E+05 | | | |
| VAR\_TYPE | CDF\_CHAR | data | | | |
| UNITS | CDF\_CHAR | erg s^-1 cm^-2 | | | |
| SI\_CONVERSION | CDF\_CHAR | 1E-03>J s^-1 m^-2 | | | |
| REPRESENTATION\_1 | CDF\_CHAR | REP\_HFlux\_LABEL | | | |

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| **Variable\_Name** | **Data\_type** | **DIMS** | **SIZES** | **R\_VARY** | **D\_VARY** |
| SWA\_EAS1\_onlyCoreHalo\_N | CDF\_REAL8 | 1 | 1 | T | F |
| **Attribute Name** | **Data Type** | **Value** | | | |
| FIELDNAM | CDF\_CHAR | EAS1 onlyCoreHalo Density | | | |
| CATDESC | CDF\_CHAR | Number density from EAS1 only look direction in CoreHalo range | | | |
| COORDINATE\_SYSTEM | CDF\_CHAR | EAS1 | | | |
| DISPLAY\_TYPE | CDF\_CHAR | time\_series | | | |
| DEPEND\_0 | CDF\_CHAR | EPOCH | | | |
| FILLVAL | CDF\_REAL8 | -1E+31 | | | |
| FORMAT | CDF\_CHAR | f14.4 | | | |
| LABLAXIS | CDF\_CHAR | EAS1 OnlyCoreHalo N | | | |
| VALIDMIN | CDF\_UINT4 | 1E-9 | | | |
| VALIDMAX | CDF\_UINT4 | 1E+3 | | | |
| SCALETYP | CDF\_CHAR | log | | | |
| SCALEMIN | CDF\_UINT4 | 1E-9 | | | |
| SCALEMAX | CDF\_UINT4 | 1E+3 | | | |
| VAR\_TYPE | CDF\_CHAR | data | | | |
| UNITS | CDF\_CHAR | cm^-3 | | | |
| SI\_CONVERSION | CDF\_CHAR | 1E-06>m^-3 | | | |

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| **Variable\_Name** | **Data\_type** | **DIMS** | **SIZES** | **R\_VARY** | **D\_VARY** |
| SWA\_EAS1\_onlyCoreHalo\_V | CDF\_REAL8 | 1 | 3 | T | T |
| **Attribute Name** | **Data Type** | **Value** | | | |
| FIELDNAM | CDF\_CHAR | EAS1 onlyCoreHalo Velocity | | | |
| CATDESC | CDF\_CHAR | Bulk velocity from EAS1 only look direction in CoreHalo range | | | |
| COORDINATE\_SYSTEM | CDF\_CHAR | EAS1 | | | |
| DISPLAY\_TYPE | CDF\_CHAR | time\_series | | | |
| DEPEND\_0 | CDF\_CHAR | EPOCH | | | |
| FILLVAL | CDF\_REAL8 | -1E+31 | | | |
| FORMAT | CDF\_CHAR | f14.4 | | | |
| LABL\_PTR\_1 | CDF\_CHAR | EAS\_VEL\_LABEL | | | |
| VALIDMIN | CDF\_REAL8 | -10000.0 | | | |
| VALIDMAX | CDF\_REAL8 | +10000.0 | | | |
| SCALETYP | CDF\_CHAR | log | | | |
| SCALEMIN | CDF\_REAL8 | -10000.0 | | | |
| SCALEMAX | CDF\_REAL8 | +10000.0 | | | |
| VAR\_TYPE | CDF\_CHAR | data | | | |
| UNITS | CDF\_CHAR | km s^-1 | | | |
| SI\_CONVERSION | CDF\_CHAR | 1E+03>m s^-1 | | | |
| REPRESENTATION\_1 | CDF\_CHAR | REP\_VEL\_LABEL | | | |

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| **Variable\_Name** | **Data\_type** | **DIMS** | **SIZES** | **R\_VARY** | **D\_VARY** |
| SWA\_EAS1\_onlyCoreHalo\_P | CDF\_REAL8 | 1 | 9 | T | T |
| **Attribute Name** | **Data Type** | **Value** | | | |
| FIELDNAM | CDF\_CHAR | EAS1 onlyCoreHalo Pressure | | | |
| CATDESC | CDF\_CHAR | Pressure tensor from EAS1 only look direction in CoreHalo range | | | |
| COORDINATE\_SYSTEM | CDF\_CHAR | EAS1 | | | |
| DISPLAY\_TYPE | CDF\_CHAR | time\_series | | | |
| DEPEND\_0 | CDF\_CHAR | EPOCH | | | |
| FILLVAL | CDF\_REAL8 | -1E+31 | | | |
| FORMAT | CDF\_CHAR | f14.4 | | | |
| LABLAXIS | CDF\_CHAR | EAS1 OnlyCoreHalo P | | | |
| VALIDMIN | CDF\_REAL8 | 1E-6 | | | |
| VALIDMAX | CDF\_REAL8 | 1E+3 | | | |
| SCALETYP | CDF\_CHAR | Log | | | |
| SCALEMIN | CDF\_REAL8 | 1E-6 | | | |
| SCALEMAX | CDF\_REAL8 | 1E+3 | | | |
| VAR\_TYPE | CDF\_CHAR | data | | | |
| UNITS | CDF\_CHAR | nPa | | | |
| SI\_CONVERSION | CDF\_CHAR | 1E-09>P | | | |
| REPRESENTATION\_1 | CDF\_CHAR | REP\_EAS\_PRES\_1 | | | |
| REPRESENTATION\_2 | CDF\_CHAR | REP\_EAS\_PRES\_2 | | | |

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| **Variable\_Name** | **Data\_type** | **DIMS** | **SIZES** | **R\_VARY** | **D\_VARY** |
| SWA\_EAS1\_onlyCoreHalo\_H | CDF\_REAL8 | 1 | 3 | T | T |
| **Attribute Name** | **Data Type** | **Value** | | | |
| FIELDNAM | CDF\_CHAR | EAS1 onlyCoreHalo Heat Flux | | | |
| CATDESC | CDF\_CHAR | Heat Flux from EAS1 only look direction in CoreHalo range | | | |
| COORDINATE\_SYSTEM | CDF\_CHAR | EAS1 | | | |
| DISPLAY\_TYPE | CDF\_CHAR | time\_series | | | |
| DEPEND\_0 | CDF\_CHAR | EPOCH | | | |
| FILLVAL | CDF\_REAL8 | -1E+31 | | | |
| FORMAT | CDF\_CHAR | f14.4 | | | |
| LABL\_PTR\_1 | CDF\_CHAR | EAS\_HFlux\_LABEL | | | |
| VALIDMIN | CDF\_REAL8 | 1E-05 | | | |
| VALIDMAX | CDF\_REAL8 | 1E+05 | | | |
| SCALETYP | CDF\_CHAR | log | | | |
| SCALEMIN | CDF\_REAL8 | 1E-05 | | | |
| SCALEMAX | CDF\_REAL8 | 1E+05 | | | |
| VAR\_TYPE | CDF\_CHAR | data | | | |
| UNITS | CDF\_CHAR | erg s^-1 cm^-2 | | | |
| SI\_CONVERSION | CDF\_CHAR | 1E-03>J s^-1 m^-2 | | | |
| REPRESENTATION\_1 | CDF\_CHAR | REP\_HFlux\_LABEL | | | |

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| **Variable\_Name** | **Data\_type** | **DIMS** | **SIZES** | **R\_VARY** | **D\_VARY** |
| SWA\_EAS1\_onlyStrahl\_N | CDF\_REAL8 | 1 | 1 | T | F |
| **Attribute Name** | **Data Type** | **Value** | | | |
| FIELDNAM | CDF\_CHAR | EAS1 onlyStrahl Density | | | |
| CATDESC | CDF\_CHAR | Number density from EAS1 only look direction in Strahl range | | | |
| COORDINATE\_SYSTEM | CDF\_CHAR | EAS1 | | | |
| DISPLAY\_TYPE | CDF\_CHAR | time\_series | | | |
| DEPEND\_0 | CDF\_CHAR | EPOCH | | | |
| FILLVAL | CDF\_REAL8 | -1E+31 | | | |
| FORMAT | CDF\_CHAR | f14.4 | | | |
| LABLAXIS | CDF\_CHAR | EAS1 OnlyStrahl N | | | |
| VALIDMIN | CDF\_UINT4 | 1E-9 | | | |
| VALIDMAX | CDF\_UINT4 | 1E+3 | | | |
| SCALETYP | CDF\_CHAR | log | | | |
| SCALEMIN | CDF\_UINT4 | 1E-9 | | | |
| SCALEMAX | CDF\_UINT4 | 1E+3 | | | |
| VAR\_TYPE | CDF\_CHAR | data | | | |
| UNITS | CDF\_CHAR | cm^-3 | | | |
| SI\_CONVERSION | CDF\_CHAR | 1E-06>m^-3 | | | |

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| **Variable\_Name** | **Data\_type** | **DIMS** | **SIZES** | **R\_VARY** | **D\_VARY** |
| SWA\_EAS1\_onlyStrahl\_V | CDF\_REAL8 | 1 | 3 | T | T |
| **Attribute Name** | **Data Type** | **Value** | | | |
| FIELDNAM | CDF\_CHAR | EAS1 onlyStrahl Velocity | | | |
| CATDESC | CDF\_CHAR | Bulk velocity from EAS1 only look direction in Strahl range | | | |
| COORDINATE\_SYSTEM | CDF\_CHAR | EAS1 | | | |
| DISPLAY\_TYPE | CDF\_CHAR | time\_series | | | |
| DEPEND\_0 | CDF\_CHAR | EPOCH | | | |
| FILLVAL | CDF\_REAL8 | -1E+31 | | | |
| FORMAT | CDF\_CHAR | f14.4 | | | |
| LABL\_PTR\_1 | CDF\_CHAR | EAS\_VEL\_LABEL | | | |
| VALIDMIN | CDF\_REAL8 | -10000.0 | | | |
| VALIDMAX | CDF\_REAL8 | +10000.0 | | | |
| SCALETYP | CDF\_CHAR | log | | | |
| SCALEMIN | CDF\_REAL8 | -10000.0 | | | |
| SCALEMAX | CDF\_REAL8 | +10000.0 | | | |
| VAR\_TYPE | CDF\_CHAR | data | | | |
| UNITS | CDF\_CHAR | km s^-1 | | | |
| SI\_CONVERSION | CDF\_CHAR | 1E+03>m s^-1 | | | |
| REPRESENTATION\_1 | CDF\_CHAR | REP\_VEL\_LABEL | | | |

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| **Variable\_Name** | **Data\_type** | **DIMS** | **SIZES** | **R\_VARY** | **D\_VARY** |
| SWA\_EAS1\_onlyStrahl\_P | CDF\_REAL8 | 1 | 9 | T | T |
| **Attribute Name** | **Data Type** | **Value** | | | |
| FIELDNAM | CDF\_CHAR | EAS1 onlyStrahl Pressure | | | |
| CATDESC | CDF\_CHAR | Pressure tensor from EAS1 only look direction in Strahl range | | | |
| COORDINATE\_SYSTEM | CDF\_CHAR | EAS1 | | | |
| DISPLAY\_TYPE | CDF\_CHAR | time\_series | | | |
| DEPEND\_0 | CDF\_CHAR | EPOCH | | | |
| FILLVAL | CDF\_REAL8 | -1E+31 | | | |
| FORMAT | CDF\_CHAR | f14.4 | | | |
| LABLAXIS | CDF\_CHAR | EAS1 OnlyStrahl P | | | |
| VALIDMIN | CDF\_REAL8 | 1E-6 | | | |
| VALIDMAX | CDF\_REAL8 | 1E+3 | | | |
| SCALETYP | CDF\_CHAR | Log | | | |
| SCALEMIN | CDF\_REAL8 | 1E-6 | | | |
| SCALEMAX | CDF\_REAL8 | 1E+3 | | | |
| VAR\_TYPE | CDF\_CHAR | data | | | |
| UNITS | CDF\_CHAR | nPa | | | |
| SI\_CONVERSION | CDF\_CHAR | 1E-09>P | | | |
| REPRESENTATION\_1 | CDF\_CHAR | REP\_EAS\_PRES\_1 | | | |
| REPRESENTATION\_2 | CDF\_CHAR | REP\_EAS\_PRES\_2 | | | |

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| **Variable\_Name** | **Data\_type** | **DIMS** | **SIZES** | **R\_VARY** | **D\_VARY** |
| SWA\_EAS1\_onlyStrahl\_H | CDF\_REAL8 | 1 | 3 | T | T |
| **Attribute Name** | **Data Type** | **Value** | | | |
| FIELDNAM | CDF\_CHAR | EAS1 onlyStrahl Heat Flux | | | |
| CATDESC | CDF\_CHAR | Heat Flux from EAS1 only look direction in Strahl range | | | |
| COORDINATE\_SYSTEM | CDF\_CHAR | EAS1 | | | |
| DISPLAY\_TYPE | CDF\_CHAR | time\_series | | | |
| DEPEND\_0 | CDF\_CHAR | EPOCH | | | |
| FILLVAL | CDF\_REAL8 | -1E+31 | | | |
| FORMAT | CDF\_CHAR | f14.4 | | | |
| LABL\_PTR\_1 | CDF\_CHAR | EAS\_HFlux\_LABEL | | | |
| VALIDMIN | CDF\_REAL8 | 1E-05 | | | |
| VALIDMAX | CDF\_REAL8 | 1E+05 | | | |
| SCALETYP | CDF\_CHAR | log | | | |
| SCALEMIN | CDF\_REAL8 | 1E-05 | | | |
| SCALEMAX | CDF\_REAL8 | 1E+05 | | | |
| VAR\_TYPE | CDF\_CHAR | data | | | |
| UNITS | CDF\_CHAR | erg s^-1 cm^-2 | | | |
| SI\_CONVERSION | CDF\_CHAR | 1E-03>J s^-1 m^-2 | | | |
| REPRESENTATION\_1 | CDF\_CHAR | REP\_HFlux\_LABEL | | | |

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| **Variable\_Name** | **Data\_type** | **DIMS** | **SIZES** | **R\_VARY** | **D\_VARY** |
| SWA\_EAS1\_overlapLowEne\_N | CDF\_REAL8 | 1 | 1 | T | F |
| **Attribute Name** | **Data Type** | **Value** | | | |
| FIELDNAM | CDF\_CHAR | EAS1 overlapLowEne Density | | | |
| CATDESC | CDF\_CHAR | Number density from EAS1 only look direction in low energy range | | | |
| COORDINATE\_SYSTEM | CDF\_CHAR | EAS1 | | | |
| DISPLAY\_TYPE | CDF\_CHAR | time\_series | | | |
| DEPEND\_0 | CDF\_CHAR | EPOCH | | | |
| FILLVAL | CDF\_REAL8 | -1E+31 | | | |
| FORMAT | CDF\_CHAR | f14.4 | | | |
| LABLAXIS | CDF\_CHAR | EAS1 overlapLowEne N | | | |
| VALIDMIN | CDF\_UINT4 | 1E-9 | | | |
| VALIDMAX | CDF\_UINT4 | 1E+3 | | | |
| SCALETYP | CDF\_CHAR | log | | | |
| SCALEMIN | CDF\_UINT4 | 1E-9 | | | |
| SCALEMAX | CDF\_UINT4 | 1E+3 | | | |
| VAR\_TYPE | CDF\_CHAR | data | | | |
| UNITS | CDF\_CHAR | cm^-3 | | | |
| SI\_CONVERSION | CDF\_CHAR | 1E-06>m^-3 | | | |

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| **Variable\_Name** | **Data\_type** | **DIMS** | **SIZES** | **R\_VARY** | **D\_VARY** |
| SWA\_EAS1\_overlapLowEne\_V | CDF\_REAL8 | 1 | 3 | T | T |
| **Attribute Name** | **Data Type** | **Value** | | | |
| FIELDNAM | CDF\_CHAR | EAS1 overlapLowEne Velocity | | | |
| CATDESC | CDF\_CHAR | Bulk velocity from EAS1 overlap look direction in low energy range | | | |
| COORDINATE\_SYSTEM | CDF\_CHAR | EAS1 | | | |
| DISPLAY\_TYPE | CDF\_CHAR | time\_series | | | |
| DEPEND\_0 | CDF\_CHAR | EPOCH | | | |
| FILLVAL | CDF\_REAL8 | -1E+31 | | | |
| FORMAT | CDF\_CHAR | f14.4 | | | |
| LABL\_PTR\_1 | CDF\_CHAR | EAS\_VEL\_LABEL | | | |
| VALIDMIN | CDF\_REAL8 | -10000.0 | | | |
| VALIDMAX | CDF\_REAL8 | +10000.0 | | | |
| SCALETYP | CDF\_CHAR | log | | | |
| SCALEMIN | CDF\_REAL8 | -10000.0 | | | |
| SCALEMAX | CDF\_REAL8 | +10000.0 | | | |
| VAR\_TYPE | CDF\_CHAR | data | | | |
| UNITS | CDF\_CHAR | km s^-1 | | | |
| SI\_CONVERSION | CDF\_CHAR | 1E+03>m s^-1 | | | |
| REPRESENTATION\_1 | CDF\_CHAR | REP\_VEL\_LABEL | | | |

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| **Variable\_Name** | **Data\_type** | **DIMS** | **SIZES** | **R\_VARY** | **D\_VARY** |
| SWA\_EAS1\_overlapLowEne\_P | CDF\_REAL8 | 1 | 9 | T | T |
| **Attribute Name** | **Data Type** | **Value** | | | |
| FIELDNAM | CDF\_CHAR | EAS1 overlapLowEne Pressure | | | |
| CATDESC | CDF\_CHAR | Pressure tensor from EAS1 overlap look direction in low energy range | | | |
| COORDINATE\_SYSTEM | CDF\_CHAR | EAS1 | | | |
| DISPLAY\_TYPE | CDF\_CHAR | time\_series | | | |
| DEPEND\_0 | CDF\_CHAR | EPOCH | | | |
| FILLVAL | CDF\_REAL8 | -1E+31 | | | |
| FORMAT | CDF\_CHAR | f14.4 | | | |
| LABLAXIS | CDF\_CHAR | EAS1 overlapLowEne P | | | |
| VALIDMIN | CDF\_REAL8 | 1E-6 | | | |
| VALIDMAX | CDF\_REAL8 | 1E+3 | | | |
| SCALETYP | CDF\_CHAR | Log | | | |
| SCALEMIN | CDF\_REAL8 | 1E-6 | | | |
| SCALEMAX | CDF\_REAL8 | 1E+3 | | | |
| VAR\_TYPE | CDF\_CHAR | data | | | |
| UNITS | CDF\_CHAR | nPa | | | |
| SI\_CONVERSION | CDF\_CHAR | 1E-09>P | | | |
| REPRESENTATION\_1 | CDF\_CHAR | REP\_EAS\_PRES\_1 | | | |
| REPRESENTATION\_2 | CDF\_CHAR | REP\_EAS\_PRES\_2 | | | |

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| **Variable\_Name** | **Data\_type** | **DIMS** | **SIZES** | **R\_VARY** | **D\_VARY** |
| SWA\_EAS1\_overlapLowEne\_H | CDF\_REAL8 | 1 | 3 | T | T |
| **Attribute Name** | **Data Type** | **Value** | | | |
| FIELDNAM | CDF\_CHAR | EAS1 overlapLowEne Heat Flux | | | |
| CATDESC | CDF\_CHAR | Heat Flux from EAS1 overlap look direction in low energy range | | | |
| COORDINATE\_SYSTEM | CDF\_CHAR | EAS1 | | | |
| DISPLAY\_TYPE | CDF\_CHAR | time\_series | | | |
| DEPEND\_0 | CDF\_CHAR | EPOCH | | | |
| FILLVAL | CDF\_REAL8 | -1E+31 | | | |
| FORMAT | CDF\_CHAR | f14.4 | | | |
| LABL\_PTR\_1 | CDF\_CHAR | EAS\_HFlux\_LABEL | | | |
| VALIDMIN | CDF\_REAL8 | 1E-05 | | | |
| VALIDMAX | CDF\_REAL8 | 1E+05 | | | |
| SCALETYP | CDF\_CHAR | log | | | |
| SCALEMIN | CDF\_REAL8 | 1E-05 | | | |
| SCALEMAX | CDF\_REAL8 | 1E+05 | | | |
| VAR\_TYPE | CDF\_CHAR | data | | | |
| UNITS | CDF\_CHAR | erg s^-1 cm^-2 | | | |
| SI\_CONVERSION | CDF\_CHAR | 1E-03>J s^-1 m^-2 | | | |
| REPRESENTATION\_1 | CDF\_CHAR | REP\_HFlux\_LABEL | | | |

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| **Variable\_Name** | **Data\_type** | **DIMS** | **SIZES** | **R\_VARY** | **D\_VARY** |
| SWA\_EAS1\_overlapCoreHalo\_N | CDF\_REAL8 | 1 | 1 | T | F |
| **Attribute Name** | **Data Type** | **Value** | | | |
| FIELDNAM | CDF\_CHAR | EAS1 overlapCoreHalo Density | | | |
| CATDESC | CDF\_CHAR | Number density from EAS1 overlap look direction in CoreHalo range | | | |
| COORDINATE\_SYSTEM | CDF\_CHAR | EAS1 | | | |
| DISPLAY\_TYPE | CDF\_CHAR | time\_series | | | |
| DEPEND\_0 | CDF\_CHAR | EPOCH | | | |
| FILLVAL | CDF\_REAL8 | -1E+31 | | | |
| FORMAT | CDF\_CHAR | f14.4 | | | |
| LABLAXIS | CDF\_CHAR | EAS1 overlapCoreHalo N | | | |
| VALIDMIN | CDF\_UINT4 | 1E-9 | | | |
| VALIDMAX | CDF\_UINT4 | 1E+3 | | | |
| SCALETYP | CDF\_CHAR | log | | | |
| SCALEMIN | CDF\_UINT4 | 1E-9 | | | |
| SCALEMAX | CDF\_UINT4 | 1E+3 | | | |
| VAR\_TYPE | CDF\_CHAR | data | | | |
| UNITS | CDF\_CHAR | cm^-3 | | | |
| SI\_CONVERSION | CDF\_CHAR | 1E-06>m^-3 | | | |

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| **Variable\_Name** | **Data\_type** | **DIMS** | **SIZES** | **R\_VARY** | **D\_VARY** |
| SWA\_EAS1\_overlapCoreHalo\_V | CDF\_REAL8 | 1 | 3 | T | T |
| **Attribute Name** | **Data Type** | **Value** | | | |
| FIELDNAM | CDF\_CHAR | EAS1 overlapCoreHalo Velocity | | | |
| CATDESC | CDF\_CHAR | Bulk velocity from EAS1 overlap look direction in CoreHalo range | | | |
| COORDINATE\_SYSTEM | CDF\_CHAR | EAS1 | | | |
| DISPLAY\_TYPE | CDF\_CHAR | time\_series | | | |
| DEPEND\_0 | CDF\_CHAR | EPOCH | | | |
| FILLVAL | CDF\_REAL8 | -1E+31 | | | |
| FORMAT | CDF\_CHAR | f14.4 | | | |
| LABL\_PTR\_1 | CDF\_CHAR | EAS\_VEL\_LABEL | | | |
| VALIDMIN | CDF\_REAL8 | -10000.0 | | | |
| VALIDMAX | CDF\_REAL8 | +10000.0 | | | |
| SCALETYP | CDF\_CHAR | log | | | |
| SCALEMIN | CDF\_REAL8 | -10000.0 | | | |
| SCALEMAX | CDF\_REAL8 | +10000.0 | | | |
| VAR\_TYPE | CDF\_CHAR | data | | | |
| UNITS | CDF\_CHAR | km s^-1 | | | |
| SI\_CONVERSION | CDF\_CHAR | 1E+03>m s^-1 | | | |
| REPRESENTATION\_1 | CDF\_CHAR | REP\_VEL\_LABEL | | | |

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| **Variable\_Name** | **Data\_type** | **DIMS** | **SIZES** | **R\_VARY** | **D\_VARY** |
| SWA\_EAS1\_overlapCoreHalo\_P | CDF\_REAL8 | 1 | 9 | T | T |
| **Attribute Name** | **Data Type** | **Value** | | | |
| FIELDNAM | CDF\_CHAR | EAS1 overlapCoreHalo Pressure | | | |
| CATDESC | CDF\_CHAR | Pressure tensor from EAS1 overlap look direction in CoreHalo range | | | |
| COORDINATE\_SYSTEM | CDF\_CHAR | EAS1 | | | |
| DISPLAY\_TYPE | CDF\_CHAR | time\_series | | | |
| DEPEND\_0 | CDF\_CHAR | EPOCH | | | |
| FILLVAL | CDF\_REAL8 | -1E+31 | | | |
| FORMAT | CDF\_CHAR | f14.4 | | | |
| LABLAXIS | CDF\_CHAR | EAS1 overlapCoreHalo P | | | |
| VALIDMIN | CDF\_REAL8 | 1E-6 | | | |
| VALIDMAX | CDF\_REAL8 | 1E+3 | | | |
| SCALETYP | CDF\_CHAR | Log | | | |
| SCALEMIN | CDF\_REAL8 | 1E-6 | | | |
| SCALEMAX | CDF\_REAL8 | 1E+3 | | | |
| VAR\_TYPE | CDF\_CHAR | data | | | |
| UNITS | CDF\_CHAR | nPa | | | |
| SI\_CONVERSION | CDF\_CHAR | 1E-09>P | | | |
| REPRESENTATION\_1 | CDF\_CHAR | REP\_EAS\_PRES\_1 | | | |
| REPRESENTATION\_2 | CDF\_CHAR | REP\_EAS\_PRES\_2 | | | |

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| **Variable\_Name** | **Data\_type** | **DIMS** | **SIZES** | **R\_VARY** | **D\_VARY** |
| SWA\_EAS1\_overlapCoreHalo\_H | CDF\_REAL8 | 1 | 3 | T | T |
| **Attribute Name** | **Data Type** | **Value** | | | |
| FIELDNAM | CDF\_CHAR | EAS1 overlapCoreHalo Heat Flux | | | |
| CATDESC | CDF\_CHAR | Heat Flux from EAS1 overlap look direction in CoreHalo range | | | |
| COORDINATE\_SYSTEM | CDF\_CHAR | EAS1 | | | |
| DISPLAY\_TYPE | CDF\_CHAR | time\_series | | | |
| DEPEND\_0 | CDF\_CHAR | EPOCH | | | |
| FILLVAL | CDF\_REAL8 | -1E+31 | | | |
| FORMAT | CDF\_CHAR | f14.4 | | | |
| LABL\_PTR\_1 | CDF\_CHAR | EAS\_HFlux\_LABEL | | | |
| VALIDMIN | CDF\_REAL8 | 1E-05 | | | |
| VALIDMAX | CDF\_REAL8 | 1E+05 | | | |
| SCALETYP | CDF\_CHAR | log | | | |
| SCALEMIN | CDF\_REAL8 | 1E-05 | | | |
| SCALEMAX | CDF\_REAL8 | 1E+05 | | | |
| VAR\_TYPE | CDF\_CHAR | data | | | |
| UNITS | CDF\_CHAR | erg s^-1 cm^-2 | | | |
| SI\_CONVERSION | CDF\_CHAR | 1E-03>J s^-1 m^-2 | | | |
| REPRESENTATION\_1 | CDF\_CHAR | REP\_HFlux\_LABEL | | | |

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| **Variable\_Name** | **Data\_type** | **DIMS** | **SIZES** | **R\_VARY** | **D\_VARY** |
| SWA\_EAS1\_overlapStrahl\_N | CDF\_REAL8 | 1 | 1 | T | F |
| **Attribute Name** | **Data Type** | **Value** | | | |
| FIELDNAM | CDF\_CHAR | EAS1 overlapStrahl Density | | | |
| CATDESC | CDF\_CHAR | Number density from EAS1 overlap look direction in Strahl range | | | |
| COORDINATE\_SYSTEM | CDF\_CHAR | EAS1 | | | |
| DISPLAY\_TYPE | CDF\_CHAR | time\_series | | | |
| DEPEND\_0 | CDF\_CHAR | EPOCH | | | |
| FILLVAL | CDF\_REAL8 | -1E+31 | | | |
| FORMAT | CDF\_CHAR | f14.4 | | | |
| LABLAXIS | CDF\_CHAR | EAS1 overlapStrahl N | | | |
| VALIDMIN | CDF\_UINT4 | 1E-9 | | | |
| VALIDMAX | CDF\_UINT4 | 1E+3 | | | |
| SCALETYP | CDF\_CHAR | log | | | |
| SCALEMIN | CDF\_UINT4 | 1E-9 | | | |
| SCALEMAX | CDF\_UINT4 | 1E+3 | | | |
| VAR\_TYPE | CDF\_CHAR | data | | | |
| UNITS | CDF\_CHAR | cm^-3 | | | |
| SI\_CONVERSION | CDF\_CHAR | 1E-06>m^-3 | | | |

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| **Variable\_Name** | **Data\_type** | **DIMS** | **SIZES** | **R\_VARY** | **D\_VARY** |
| SWA\_EAS1\_overlapStrahl\_V | CDF\_REAL8 | 1 | 3 | T | T |
| **Attribute Name** | **Data Type** | **Value** | | | |
| FIELDNAM | CDF\_CHAR | EAS1 overlapStrahl Velocity | | | |
| CATDESC | CDF\_CHAR | Bulk velocity from EAS1 overlap look direction in Strahl range | | | |
| COORDINATE\_SYSTEM | CDF\_CHAR | EAS1 | | | |
| DISPLAY\_TYPE | CDF\_CHAR | time\_series | | | |
| DEPEND\_0 | CDF\_CHAR | EPOCH | | | |
| FILLVAL | CDF\_REAL8 | -1E+31 | | | |
| FORMAT | CDF\_CHAR | f14.4 | | | |
| LABL\_PTR\_1 | CDF\_CHAR | EAS\_VEL\_LABEL | | | |
| VALIDMIN | CDF\_REAL8 | -10000.0 | | | |
| VALIDMAX | CDF\_REAL8 | +10000.0 | | | |
| SCALETYP | CDF\_CHAR | log | | | |
| SCALEMIN | CDF\_REAL8 | -10000.0 | | | |
| SCALEMAX | CDF\_REAL8 | +10000.0 | | | |
| VAR\_TYPE | CDF\_CHAR | data | | | |
| UNITS | CDF\_CHAR | km s^-1 | | | |
| SI\_CONVERSION | CDF\_CHAR | 1E+03>m s^-1 | | | |
| REPRESENTATION\_1 | CDF\_CHAR | REP\_VEL\_LABEL | | | |

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| **Variable\_Name** | **Data\_type** | **DIMS** | **SIZES** | **R\_VARY** | **D\_VARY** |
| SWA\_EAS1\_overlapStrahl\_P | CDF\_REAL8 | 1 | 9 | T | T |
| **Attribute Name** | **Data Type** | **Value** | | | |
| FIELDNAM | CDF\_CHAR | EAS1 overlapStrahl Pressure | | | |
| CATDESC | CDF\_CHAR | Pressure tensor from EAS1 overlap look direction in Strahl range | | | |
| COORDINATE\_SYSTEM | CDF\_CHAR | EAS1 | | | |
| DISPLAY\_TYPE | CDF\_CHAR | time\_series | | | |
| DEPEND\_0 | CDF\_CHAR | EPOCH | | | |
| FILLVAL | CDF\_REAL8 | -1E+31 | | | |
| FORMAT | CDF\_CHAR | f14.4 | | | |
| LABLAXIS | CDF\_CHAR | EAS1 overlapStrahl P | | | |
| VALIDMIN | CDF\_REAL8 | 1E-6 | | | |
| VALIDMAX | CDF\_REAL8 | 1E+3 | | | |
| SCALETYP | CDF\_CHAR | Log | | | |
| SCALEMIN | CDF\_REAL8 | 1E-6 | | | |
| SCALEMAX | CDF\_REAL8 | 1E+3 | | | |
| VAR\_TYPE | CDF\_CHAR | data | | | |
| UNITS | CDF\_CHAR | nPa | | | |
| SI\_CONVERSION | CDF\_CHAR | 1E-09>P | | | |
| REPRESENTATION\_1 | CDF\_CHAR | REP\_EAS\_PRES\_1 | | | |
| REPRESENTATION\_2 | CDF\_CHAR | REP\_EAS\_PRES\_2 | | | |

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| **Variable\_Name** | **Data\_type** | **DIMS** | **SIZES** | **R\_VARY** | **D\_VARY** |
| SWA\_EAS1\_overlapStrahl\_H | CDF\_REAL8 | 1 | 3 | T | T |
| **Attribute Name** | **Data Type** | **Value** | | | |
| FIELDNAM | CDF\_CHAR | EAS1 overlapStrahl Heat Flux | | | |
| CATDESC | CDF\_CHAR | Heat Flux from EAS1 overlap look direction in Strahl range | | | |
| COORDINATE\_SYSTEM | CDF\_CHAR | EAS1 | | | |
| DISPLAY\_TYPE | CDF\_CHAR | time\_series | | | |
| DEPEND\_0 | CDF\_CHAR | EPOCH | | | |
| FILLVAL | CDF\_REAL8 | -1E+31 | | | |
| FORMAT | CDF\_CHAR | f14.4 | | | |
| LABL\_PTR\_1 | CDF\_CHAR | EAS\_HFlux\_LABEL | | | |
| VALIDMIN | CDF\_REAL8 | 1E-05 | | | |
| VALIDMAX | CDF\_REAL8 | 1E+05 | | | |
| SCALETYP | CDF\_CHAR | log | | | |
| SCALEMIN | CDF\_REAL8 | 1E-05 | | | |
| SCALEMAX | CDF\_REAL8 | 1E+05 | | | |
| VAR\_TYPE | CDF\_CHAR | data | | | |
| UNITS | CDF\_CHAR | erg s^-1 cm^-2 | | | |
| SI\_CONVERSION | CDF\_CHAR | 1E-03>J s^-1 m^-2 | | | |
| REPRESENTATION\_1 | CDF\_CHAR | REP\_HFlux\_LABEL | | | |

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| **Variable\_Name** | **Data\_type** | **DIMS** | **SIZES** | **R\_VARY** | **D\_VARY** |
| SWA\_EAS2\_onlyLowEne\_N | CDF\_REAL8 | 1 | 1 | T | F |
| **Attribute Name** | **Data Type** | **Value** | | | |
| FIELDNAM | CDF\_CHAR | EAS2 onlyLowEne Density | | | |
| CATDESC | CDF\_CHAR | Number density from EAS2 only look direction in low energy range | | | |
| COORDINATE\_SYSTEM | CDF\_CHAR | EAS2 | | | |
| DISPLAY\_TYPE | CDF\_CHAR | time\_series | | | |
| DEPEND\_0 | CDF\_CHAR | EPOCH\_1 | | | |
| FILLVAL | CDF\_REAL8 | -1E+31 | | | |
| FORMAT | CDF\_CHAR | f14.4 | | | |
| LABLAXIS | CDF\_CHAR | EAS2 OnlyLowEne N | | | |
| VALIDMIN | CDF\_UINT4 | 1E-9 | | | |
| VALIDMAX | CDF\_UINT4 | 1E+3 | | | |
| SCALETYP | CDF\_CHAR | log | | | |
| SCALEMIN | CDF\_UINT4 | 1E-9 | | | |
| SCALEMAX | CDF\_UINT4 | 1E+3 | | | |
| VAR\_TYPE | CDF\_CHAR | data | | | |
| UNITS | CDF\_CHAR | cm^-3 | | | |
| SI\_CONVERSION | CDF\_CHAR | 1E-06>m^-3 | | | |

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| **Variable\_Name** | **Data\_type** | **DIMS** | **SIZES** | **R\_VARY** | **D\_VARY** |
| SWA\_EAS2\_onlyLowEne\_V | CDF\_REAL8 | 1 | 3 | T | T |
| **Attribute Name** | **Data Type** | **Value** | | | |
| FIELDNAM | CDF\_CHAR | EAS2 onlyLowEne Velocity | | | |
| CATDESC | CDF\_CHAR | Bulk velocity from EAS2 only look direction in low energy range | | | |
| COORDINATE\_SYSTEM | CDF\_CHAR | EAS2 | | | |
| DISPLAY\_TYPE | CDF\_CHAR | time\_series | | | |
| DEPEND\_0 | CDF\_CHAR | EPOCH\_1 | | | |
| FILLVAL | CDF\_REAL8 | -1E+31 | | | |
| FORMAT | CDF\_CHAR | f14.4 | | | |
| LABL\_PTR\_1 | CDF\_CHAR | EAS\_VEL\_LABEL | | | |
| VALIDMIN | CDF\_REAL8 | -10000.0 | | | |
| VALIDMAX | CDF\_REAL8 | +10000.0 | | | |
| SCALETYP | CDF\_CHAR | log | | | |
| SCALEMIN | CDF\_REAL8 | -10000.0 | | | |
| SCALEMAX | CDF\_REAL8 | +10000.0 | | | |
| VAR\_TYPE | CDF\_CHAR | data | | | |
| UNITS | CDF\_CHAR | km s^-1 | | | |
| SI\_CONVERSION | CDF\_CHAR | 1E+03>m s^-1 | | | |
| REPRESENTATION\_1 | CDF\_CHAR | REP\_VEL\_LABEL | | | |

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| **Variable\_Name** | **Data\_type** | **DIMS** | **SIZES** | **R\_VARY** | **D\_VARY** |
| SWA\_EAS2\_onlyLowEne\_P | CDF\_REAL8 | 1 | 9 | T | T |
| **Attribute Name** | **Data Type** | **Value** | | | |
| FIELDNAM | CDF\_CHAR | EAS2 onlyLowEne Pressure | | | |
| CATDESC | CDF\_CHAR | Pressure tensor from EAS2 only look direction in low energy range | | | |
| COORDINATE\_SYSTEM | CDF\_CHAR | EAS2 | | | |
| DISPLAY\_TYPE | CDF\_CHAR | time\_series | | | |
| DEPEND\_0 | CDF\_CHAR | EPOCH\_1 | | | |
| FILLVAL | CDF\_REAL8 | -1E+31 | | | |
| FORMAT | CDF\_CHAR | f14.4 | | | |
| LABLAXIS | CDF\_CHAR | EAS2 OnlyLowEne P | | | |
| VALIDMIN | CDF\_REAL8 | 1E-6 | | | |
| VALIDMAX | CDF\_REAL8 | 1E+3 | | | |
| SCALETYP | CDF\_CHAR | Log | | | |
| SCALEMIN | CDF\_REAL8 | 1E-6 | | | |
| SCALEMAX | CDF\_REAL8 | 1E+3 | | | |
| VAR\_TYPE | CDF\_CHAR | data | | | |
| UNITS | CDF\_CHAR | nPa | | | |
| SI\_CONVERSION | CDF\_CHAR | 1E-09>P | | | |
| REPRESENTATION\_1 | CDF\_CHAR | REP\_EAS\_PRES\_1 | | | |
| REPRESENTATION\_2 | CDF\_CHAR | REP\_EAS\_PRES\_2 | | | |

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| **Variable\_Name** | **Data\_type** | **DIMS** | **SIZES** | **R\_VARY** | **D\_VARY** |
| SWA\_EAS2\_onlyLowEne\_H | CDF\_REAL8 | 1 | 3 | T | T |
| **Attribute Name** | **Data Type** | **Value** | | | |
| FIELDNAM | CDF\_CHAR | EAS2 onlyLowEne Heat Flux | | | |
| CATDESC | CDF\_CHAR | Heat Flux from EAS2 only look direction in low energy range | | | |
| COORDINATE\_SYSTEM | CDF\_CHAR | EAS2 | | | |
| DISPLAY\_TYPE | CDF\_CHAR | time\_series | | | |
| DEPEND\_0 | CDF\_CHAR | EPOCH\_1 | | | |
| FILLVAL | CDF\_REAL8 | -1E+31 | | | |
| FORMAT | CDF\_CHAR | f14.4 | | | |
| LABL\_PTR\_1 | CDF\_CHAR | EAS\_HFlux\_LABEL | | | |
| VALIDMIN | CDF\_REAL8 | 1E-05 | | | |
| VALIDMAX | CDF\_REAL8 | 1E+05 | | | |
| SCALETYP | CDF\_CHAR | log | | | |
| SCALEMIN | CDF\_REAL8 | 1E-05 | | | |
| SCALEMAX | CDF\_REAL8 | 1E+05 | | | |
| VAR\_TYPE | CDF\_CHAR | data | | | |
| UNITS | CDF\_CHAR | erg s^-1 cm^-2 | | | |
| SI\_CONVERSION | CDF\_CHAR | 1E-03>J s^-1 m^-2 | | | |
| REPRESENTATION\_1 | CDF\_CHAR | REP\_HFlux\_LABEL | | | |

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| **Variable\_Name** | **Data\_type** | **DIMS** | **SIZES** | **R\_VARY** | **D\_VARY** |
| SWA\_EAS2\_onlyCoreHalo\_N | CDF\_REAL8 | 1 | 1 | T | F |
| **Attribute Name** | **Data Type** | **Value** | | | |
| FIELDNAM | CDF\_CHAR | EAS2 onlyCoreHalo Density | | | |
| CATDESC | CDF\_CHAR | Number density from EAS2 only look direction in CoreHalo range | | | |
| COORDINATE\_SYSTEM | CDF\_CHAR | EAS2 | | | |
| DISPLAY\_TYPE | CDF\_CHAR | time\_series | | | |
| DEPEND\_0 | CDF\_CHAR | EPOCH\_1 | | | |
| FILLVAL | CDF\_REAL8 | -1E+31 | | | |
| FORMAT | CDF\_CHAR | f14.4 | | | |
| LABLAXIS | CDF\_CHAR | EAS1 OnlyCoreHalo N | | | |
| VALIDMIN | CDF\_UINT4 | 1E-9 | | | |
| VALIDMAX | CDF\_UINT4 | 1E+3 | | | |
| SCALETYP | CDF\_CHAR | log | | | |
| SCALEMIN | CDF\_UINT4 | 1E-9 | | | |
| SCALEMAX | CDF\_UINT4 | 1E+3 | | | |
| VAR\_TYPE | CDF\_CHAR | data | | | |
| UNITS | CDF\_CHAR | cm^-3 | | | |
| SI\_CONVERSION | CDF\_CHAR | 1E-06>m^-3 | | | |

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| **Variable\_Name** | **Data\_type** | **DIMS** | **SIZES** | **R\_VARY** | **D\_VARY** |
| SWA\_EAS2\_onlyCoreHalo\_V | CDF\_REAL8 | 1 | 3 | T | T |
| **Attribute Name** | **Data Type** | **Value** | | | |
| FIELDNAM | CDF\_CHAR | EAS2 onlyCoreHalo Velocity | | | |
| CATDESC | CDF\_CHAR | Bulk velocity from EAS2 only look direction in CoreHalo range | | | |
| COORDINATE\_SYSTEM | CDF\_CHAR | EAS2 | | | |
| DISPLAY\_TYPE | CDF\_CHAR | time\_series | | | |
| DEPEND\_0 | CDF\_CHAR | EPOCH\_1 | | | |
| FILLVAL | CDF\_REAL8 | -1E+31 | | | |
| FORMAT | CDF\_CHAR | f14.4 | | | |
| LABL\_PTR\_1 | CDF\_CHAR | EAS\_VEL\_LABEL | | | |
| VALIDMIN | CDF\_REAL8 | -10000.0 | | | |
| VALIDMAX | CDF\_REAL8 | +10000.0 | | | |
| SCALETYP | CDF\_CHAR | Log | | | |
| SCALEMIN | CDF\_REAL8 | -10000.0 | | | |
| SCALEMAX | CDF\_REAL8 | +10000.0 | | | |
| VAR\_TYPE | CDF\_CHAR | data | | | |
| UNITS | CDF\_CHAR | km s^-1 | | | |
| SI\_CONVERSION | CDF\_CHAR | 1E+03>m s^-1 | | | |
| REPRESENTATION\_1 | CDF\_CHAR | REP\_VEL\_LABEL | | | |

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| **Variable\_Name** | **Data\_type** | **DIMS** | **SIZES** | **R\_VARY** | **D\_VARY** |
| SWA\_EAS2\_onlyCoreHalo\_P | CDF\_REAL8 | 1 | 9 | T | T |
| **Attribute Name** | **Data Type** | **Value** | | | |
| FIELDNAM | CDF\_CHAR | EAS2 onlyCoreHalo Pressure | | | |
| CATDESC | CDF\_CHAR | Pressure tensor from EAS2 only look direction in CoreHalo range | | | |
| COORDINATE\_SYSTEM | CDF\_CHAR | EAS2 | | | |
| DISPLAY\_TYPE | CDF\_CHAR | time\_series | | | |
| DEPEND\_0 | CDF\_CHAR | EPOCH\_1 | | | |
| FILLVAL | CDF\_REAL8 | -1E+31 | | | |
| FORMAT | CDF\_CHAR | f14.4 | | | |
| LABLAXIS | CDF\_CHAR | EAS2 OnlyCoreHalo P | | | |
| VALIDMIN | CDF\_REAL8 | 1E-6 | | | |
| VALIDMAX | CDF\_REAL8 | 1E+3 | | | |
| SCALETYP | CDF\_CHAR | Log | | | |
| SCALEMIN | CDF\_REAL8 | 1E-6 | | | |
| SCALEMAX | CDF\_REAL8 | 1E+3 | | | |
| VAR\_TYPE | CDF\_CHAR | data | | | |
| UNITS | CDF\_CHAR | nPa | | | |
| SI\_CONVERSION | CDF\_CHAR | 1E-09>P | | | |
| REPRESENTATION\_1 | CDF\_CHAR | REP\_EAS\_PRES\_1 | | | |
| REPRESENTATION\_2 | CDF\_CHAR | REP\_EAS\_PRES\_2 | | | |

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| **Variable\_Name** | **Data\_type** | **DIMS** | **SIZES** | **R\_VARY** | **D\_VARY** |
| SWA\_EAS2\_onlyCoreHalo\_H | CDF\_REAL8 | 1 | 3 | T | T |
| **Attribute Name** | **Data Type** | **Value** | | | |
| FIELDNAM | CDF\_CHAR | EAS2 onlyCoreHalo Heat Flux | | | |
| CATDESC | CDF\_CHAR | Heat Flux from EAS2 only look direction in CoreHalo range | | | |
| COORDINATE\_SYSTEM | CDF\_CHAR | EAS2 | | | |
| DISPLAY\_TYPE | CDF\_CHAR | time\_series | | | |
| DEPEND\_0 | CDF\_CHAR | EPOCH\_1 | | | |
| FILLVAL | CDF\_REAL8 | -1E+31 | | | |
| FORMAT | CDF\_CHAR | f14.4 | | | |
| LABL\_PTR\_1 | CDF\_CHAR | EAS\_HFlux\_LABEL | | | |
| VALIDMIN | CDF\_REAL8 | 1E-05 | | | |
| VALIDMAX | CDF\_REAL8 | 1E+05 | | | |
| SCALETYP | CDF\_CHAR | log | | | |
| SCALEMIN | CDF\_REAL8 | 1E-05 | | | |
| SCALEMAX | CDF\_REAL8 | 1E+05 | | | |
| VAR\_TYPE | CDF\_CHAR | data | | | |
| UNITS | CDF\_CHAR | erg s^-1 cm^-2 | | | |
| SI\_CONVERSION | CDF\_CHAR | 1E-03>J s^-1 m^-2 | | | |
| REPRESENTATION\_1 | CDF\_CHAR | REP\_HFlux\_LABEL | | | |

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| **Variable\_Name** | **Data\_type** | **DIMS** | **SIZES** | **R\_VARY** | **D\_VARY** |
| SWA\_EAS2\_onlyStrahl\_N | CDF\_REAL8 | 1 | 1 | T | F |
| **Attribute Name** | **Data Type** | **Value** | | | |
| FIELDNAM | CDF\_CHAR | EAS2 onlyStrahl Density | | | |
| CATDESC | CDF\_CHAR | Number density from EAS2 only look direction in Strahl range | | | |
| COORDINATE\_SYSTEM | CDF\_CHAR | EAS2 | | | |
| DISPLAY\_TYPE | CDF\_CHAR | time\_series | | | |
| DEPEND\_0 | CDF\_CHAR | EPOCH\_1 | | | |
| FILLVAL | CDF\_REAL8 | -1E+31 | | | |
| FORMAT | CDF\_CHAR | f14.4 | | | |
| LABLAXIS | CDF\_CHAR | EAS2 OnlyStrahl N | | | |
| VALIDMIN | CDF\_UINT4 | 1E-9 | | | |
| VALIDMAX | CDF\_UINT4 | 1E+3 | | | |
| SCALETYP | CDF\_CHAR | log | | | |
| SCALEMIN | CDF\_UINT4 | 1E-9 | | | |
| SCALEMAX | CDF\_UINT4 | 1E+3 | | | |
| VAR\_TYPE | CDF\_CHAR | data | | | |
| UNITS | CDF\_CHAR | cm^-3 | | | |
| SI\_CONVERSION | CDF\_CHAR | 1E-06>m^-3 | | | |

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| **Variable\_Name** | **Data\_type** | **DIMS** | **SIZES** | **R\_VARY** | **D\_VARY** |
| SWA\_EAS2\_onlyStrahl\_V | CDF\_REAL8 | 1 | 3 | T | T |
| **Attribute Name** | **Data Type** | **Value** | | | |
| FIELDNAM | CDF\_CHAR | EAS2 onlyStrahl Velocity | | | |
| CATDESC | CDF\_CHAR | Bulk velocity from EAS2 only look direction in Strahl range | | | |
| COORDINATE\_SYSTEM | CDF\_CHAR | EAS2 | | | |
| DISPLAY\_TYPE | CDF\_CHAR | time\_series | | | |
| DEPEND\_0 | CDF\_CHAR | EPOCH\_1 | | | |
| FILLVAL | CDF\_REAL8 | -1E+31 | | | |
| FORMAT | CDF\_CHAR | f14.4 | | | |
| LABL\_PTR\_1 | CDF\_CHAR | EAS\_VEL\_LABEL | | | |
| VALIDMIN | CDF\_REAL8 | -10000.0 | | | |
| VALIDMAX | CDF\_REAL8 | +10000.0 | | | |
| SCALETYP | CDF\_CHAR | log | | | |
| SCALEMIN | CDF\_REAL8 | -10000.0 | | | |
| SCALEMAX | CDF\_REAL8 | +10000.0 | | | |
| VAR\_TYPE | CDF\_CHAR | data | | | |
| UNITS | CDF\_CHAR | km s^-1 | | | |
| SI\_CONVERSION | CDF\_CHAR | 1E+03>m s^-1 | | | |
| REPRESENTATION\_1 | CDF\_CHAR | REP\_VEL\_LABEL | | | |

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| **Variable\_Name** | **Data\_type** | **DIMS** | **SIZES** | **R\_VARY** | **D\_VARY** |
| SWA\_EAS2\_onlyStrahl\_P | CDF\_REAL8 | 1 | 9 | T | T |
| **Attribute Name** | **Data Type** | **Value** | | | |
| FIELDNAM | CDF\_CHAR | EAS2 onlyStrahl Pressure | | | |
| CATDESC | CDF\_CHAR | Pressure tensor from EAS2 only look direction in Strahl range | | | |
| COORDINATE\_SYSTEM | CDF\_CHAR | EAS2 | | | |
| DISPLAY\_TYPE | CDF\_CHAR | time\_series | | | |
| DEPEND\_0 | CDF\_CHAR | EPOCH\_1 | | | |
| FILLVAL | CDF\_REAL8 | -1E+31 | | | |
| FORMAT | CDF\_CHAR | f14.4 | | | |
| LABLAXIS | CDF\_CHAR | EAS2 OnlyStrahl P | | | |
| VALIDMIN | CDF\_REAL8 | 1E-6 | | | |
| VALIDMAX | CDF\_REAL8 | 1E+3 | | | |
| SCALETYP | CDF\_CHAR | Log | | | |
| SCALEMIN | CDF\_REAL8 | 1E-6 | | | |
| SCALEMAX | CDF\_REAL8 | 1E+3 | | | |
| VAR\_TYPE | CDF\_CHAR | data | | | |
| UNITS | CDF\_CHAR | nPa | | | |
| SI\_CONVERSION | CDF\_CHAR | 1E-09>P | | | |
| REPRESENTATION\_1 | CDF\_CHAR | REP\_EAS\_PRES\_1 | | | |
| REPRESENTATION\_2 | CDF\_CHAR | REP\_EAS\_PRES\_2 | | | |

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| **Variable\_Name** | **Data\_type** | **DIMS** | **SIZES** | **R\_VARY** | **D\_VARY** |
| SWA\_EAS2\_onlyStrahl\_H | CDF\_REAL8 | 1 | 3 | T | T |
| **Attribute Name** | **Data Type** | **Value** | | | |
| FIELDNAM | CDF\_CHAR | EAS2 onlyStrahl Heat Flux | | | |
| CATDESC | CDF\_CHAR | Heat Flux from EAS2 only look direction in Strahl range | | | |
| COORDINATE\_SYSTEM | CDF\_CHAR | EAS2 | | | |
| DISPLAY\_TYPE | CDF\_CHAR | time\_series | | | |
| DEPEND\_0 | CDF\_CHAR | EPOCH\_1 | | | |
| FILLVAL | CDF\_REAL8 | -1E+31 | | | |
| FORMAT | CDF\_CHAR | f14.4 | | | |
| LABL\_PTR\_1 | CDF\_CHAR | EAS\_HFlux\_LABEL | | | |
| VALIDMIN | CDF\_REAL8 | 1E-05 | | | |
| VALIDMAX | CDF\_REAL8 | 1E+05 | | | |
| SCALETYP | CDF\_CHAR | log | | | |
| SCALEMIN | CDF\_REAL8 | 1E-05 | | | |
| SCALEMAX | CDF\_REAL8 | 1E+05 | | | |
| VAR\_TYPE | CDF\_CHAR | data | | | |
| UNITS | CDF\_CHAR | erg s^-1 cm^-2 | | | |
| SI\_CONVERSION | CDF\_CHAR | 1E-03>J s^-1 m^-2 | | | |
| REPRESENTATION\_1 | CDF\_CHAR | REP\_HFlux\_LABEL | | | |

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| **Variable\_Name** | **Data\_type** | **DIMS** | **SIZES** | **R\_VARY** | **D\_VARY** |
| SWA\_EAS2\_overlapLowEne\_N | CDF\_REAL8 | 1 | 1 | T | F |
| **Attribute Name** | **Data Type** | **Value** | | | |
| FIELDNAM | CDF\_CHAR | EAS2 overlapLowEne Density | | | |
| CATDESC | CDF\_CHAR | Number density from EAS2 overlap look direction in low energy range | | | |
| COORDINATE\_SYSTEM | CDF\_CHAR | EAS2 | | | |
| DISPLAY\_TYPE | CDF\_CHAR | time\_series | | | |
| DEPEND\_0 | CDF\_CHAR | EPOCH\_1 | | | |
| FILLVAL | CDF\_REAL8 | -1E+31 | | | |
| FORMAT | CDF\_CHAR | f14.4 | | | |
| LABLAXIS | CDF\_CHAR | EAS2 overlapLowEne N | | | |
| VALIDMIN | CDF\_UINT4 | 1E-9 | | | |
| VALIDMAX | CDF\_UINT4 | 1E+3 | | | |
| SCALETYP | CDF\_CHAR | log | | | |
| SCALEMIN | CDF\_UINT4 | 1E-9 | | | |
| SCALEMAX | CDF\_UINT4 | 1E+3 | | | |
| VAR\_TYPE | CDF\_CHAR | data | | | |
| UNITS | CDF\_CHAR | cm^-3 | | | |
| SI\_CONVERSION | CDF\_CHAR | 1E-06>m^-3 | | | |

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| **Variable\_Name** | **Data\_type** | **DIMS** | **SIZES** | **R\_VARY** | **D\_VARY** |
| SWA\_EAS2\_overlapLowEne\_V | CDF\_REAL8 | 1 | 3 | T | T |
| **Attribute Name** | **Data Type** | **Value** | | | |
| FIELDNAM | CDF\_CHAR | EAS2 overlapLowEne Velocity | | | |
| CATDESC | CDF\_CHAR | Bulk velocity from EAS2 overlap look direction in low energy range | | | |
| COORDINATE\_SYSTEM | CDF\_CHAR | EAS2 | | | |
| DISPLAY\_TYPE | CDF\_CHAR | time\_series | | | |
| DEPEND\_0 | CDF\_CHAR | EPOCH\_1 | | | |
| FILLVAL | CDF\_REAL8 | -1E+31 | | | |
| FORMAT | CDF\_CHAR | f14.4 | | | |
| LABL\_PTR\_1 | CDF\_CHAR | EAS\_VEL\_LABEL | | | |
| VALIDMIN | CDF\_REAL8 | -10000.0 | | | |
| VALIDMAX | CDF\_REAL8 | +10000.0 | | | |
| SCALETYP | CDF\_CHAR | log | | | |
| SCALEMIN | CDF\_REAL8 | -10000.0 | | | |
| SCALEMAX | CDF\_REAL8 | +10000.0 | | | |
| VAR\_TYPE | CDF\_CHAR | data | | | |
| UNITS | CDF\_CHAR | km s^-1 | | | |
| SI\_CONVERSION | CDF\_CHAR | 1E+03>m s^-1 | | | |
| REPRESENTATION\_1 | CDF\_CHAR | REP\_VEL\_LABEL | | | |

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| **Variable\_Name** | **Data\_type** | **DIMS** | **SIZES** | **R\_VARY** | **D\_VARY** |
| SWA\_EAS2\_overlapLowEne\_P | CDF\_REAL8 | 1 | 9 | T | T |
| **Attribute Name** | **Data Type** | **Value** | | | |
| FIELDNAM | CDF\_CHAR | EAS2 overlapLowEne Pressure | | | |
| CATDESC | CDF\_CHAR | Pressure tensor from EAS2 overlap look direction in low energy range | | | |
| COORDINATE\_SYSTEM | CDF\_CHAR | EAS2 | | | |
| DISPLAY\_TYPE | CDF\_CHAR | time\_series | | | |
| DEPEND\_0 | CDF\_CHAR | EPOCH\_1 | | | |
| FILLVAL | CDF\_REAL8 | -1E+31 | | | |
| FORMAT | CDF\_CHAR | f14.4 | | | |
| LABLAXIS | CDF\_CHAR | EAS2 overlapLowEne P | | | |
| VALIDMIN | CDF\_REAL8 | 1E-6 | | | |
| VALIDMAX | CDF\_REAL8 | 1E+3 | | | |
| SCALETYP | CDF\_CHAR | Log | | | |
| SCALEMIN | CDF\_REAL8 | 1E-6 | | | |
| SCALEMAX | CDF\_REAL8 | 1E+3 | | | |
| VAR\_TYPE | CDF\_CHAR | data | | | |
| UNITS | CDF\_CHAR | nPa | | | |
| SI\_CONVERSION | CDF\_CHAR | 1E-09>P | | | |
| REPRESENTATION\_1 | CDF\_CHAR | REP\_EAS\_PRES\_1 | | | |
| REPRESENTATION\_2 | CDF\_CHAR | REP\_EAS\_PRES\_2 | | | |

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| **Variable\_Name** | **Data\_type** | **DIMS** | **SIZES** | **R\_VARY** | **D\_VARY** |
| SWA\_EAS2\_overlapLowEne\_H | CDF\_REAL8 | 1 | 3 | T | T |
| **Attribute Name** | **Data Type** | **Value** | | | |
| FIELDNAM | CDF\_CHAR | EAS2 overlapLowEne Heat Flux | | | |
| CATDESC | CDF\_CHAR | Heat Flux from EAS2 overlap look direction in low energy range | | | |
| COORDINATE\_SYSTEM | CDF\_CHAR | EAS2 | | | |
| DISPLAY\_TYPE | CDF\_CHAR | time\_series | | | |
| DEPEND\_0 | CDF\_CHAR | EPOCH\_1 | | | |
| FILLVAL | CDF\_REAL8 | -1E+31 | | | |
| FORMAT | CDF\_CHAR | f14.4 | | | |
| LABL\_PTR\_1 | CDF\_CHAR | EAS\_HFlux\_LABEL | | | |
| VALIDMIN | CDF\_REAL8 | 1E-05 | | | |
| VALIDMAX | CDF\_REAL8 | 1E+05 | | | |
| SCALETYP | CDF\_CHAR | log | | | |
| SCALEMIN | CDF\_REAL8 | 1E-05 | | | |
| SCALEMAX | CDF\_REAL8 | 1E+05 | | | |
| VAR\_TYPE | CDF\_CHAR | data | | | |
| UNITS | CDF\_CHAR | erg s^-1 cm^-2 | | | |
| SI\_CONVERSION | CDF\_CHAR | 1E-03>J s^-1 m^-2 | | | |
| REPRESENTATION\_1 | CDF\_CHAR | REP\_HFlux\_LABEL | | | |

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| **Variable\_Name** | **Data\_type** | **DIMS** | **SIZES** | **R\_VARY** | **D\_VARY** |
| SWA\_EAS2\_overlapCoreHalo\_N | CDF\_REAL8 | 1 | 1 | T | F |
| **Attribute Name** | **Data Type** | **Value** | | | |
| FIELDNAM | CDF\_CHAR | EAS2 overlapCoreHalo Density | | | |
| CATDESC | CDF\_CHAR | Number density from EAS2 overlap look direction in CoreHalo range | | | |
| COORDINATE\_SYSTEM | CDF\_CHAR | EAS2 | | | |
| DISPLAY\_TYPE | CDF\_CHAR | time\_series | | | |
| DEPEND\_0 | CDF\_CHAR | EPOCH\_1 | | | |
| FILLVAL | CDF\_REAL8 | -1E+31 | | | |
| FORMAT | CDF\_CHAR | f14.4 | | | |
| LABLAXIS | CDF\_CHAR | EAS2 overlapCoreHalo N | | | |
| VALIDMIN | CDF\_UINT4 | 1E-9 | | | |
| VALIDMAX | CDF\_UINT4 | 1E+3 | | | |
| SCALETYP | CDF\_CHAR | log | | | |
| SCALEMIN | CDF\_UINT4 | 1E-9 | | | |
| SCALEMAX | CDF\_UINT4 | 1E+3 | | | |
| VAR\_TYPE | CDF\_CHAR | data | | | |
| UNITS | CDF\_CHAR | cm^-3 | | | |
| SI\_CONVERSION | CDF\_CHAR | 1E-06>m^-3 | | | |

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| **Variable\_Name** | **Data\_type** | **DIMS** | **SIZES** | **R\_VARY** | **D\_VARY** |
| SWA\_EAS2\_overlapCoreHalo\_V | CDF\_REAL8 | 1 | 3 | T | T |
| **Attribute Name** | **Data Type** | **Value** | | | |
| FIELDNAM | CDF\_CHAR | EAS2 overlapCoreHalo Velocity | | | |
| CATDESC | CDF\_CHAR | Bulk velocity from EAS2 overlap look direction in CoreHalo range | | | |
| COORDINATE\_SYSTEM | CDF\_CHAR | EAS2 | | | |
| DISPLAY\_TYPE | CDF\_CHAR | time\_series | | | |
| DEPEND\_0 | CDF\_CHAR | EPOCH\_1 | | | |
| FILLVAL | CDF\_REAL8 | -1E+31 | | | |
| FORMAT | CDF\_CHAR | f14.4 | | | |
| LABL\_PTR\_1 | CDF\_CHAR | EAS\_VEL\_LABEL | | | |
| VALIDMIN | CDF\_REAL8 | -10000.0 | | | |
| VALIDMAX | CDF\_REAL8 | +10000.0 | | | |
| SCALETYP | CDF\_CHAR | log | | | |
| SCALEMIN | CDF\_REAL8 | -10000.0 | | | |
| SCALEMAX | CDF\_REAL8 | +10000.0 | | | |
| VAR\_TYPE | CDF\_CHAR | data | | | |
| UNITS | CDF\_CHAR | km s^-1 | | | |
| SI\_CONVERSION | CDF\_CHAR | 1E+03>m s^-1 | | | |
| REPRESENTATION\_1 | CDF\_CHAR | REP\_VEL\_LABEL | | | |

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| **Variable\_Name** | **Data\_type** | **DIMS** | **SIZES** | **R\_VARY** | **D\_VARY** |
| SWA\_EAS2\_overlapCoreHalo\_P | CDF\_REAL8 | 1 | 9 | T | T |
| **Attribute Name** | **Data Type** | **Value** | | | |
| FIELDNAM | CDF\_CHAR | EAS2 overlapCoreHalo Pressure | | | |
| CATDESC | CDF\_CHAR | Pressure tensor from EAS2 overlap look direction in CoreHalo range | | | |
| COORDINATE\_SYSTEM | CDF\_CHAR | EAS2 | | | |
| DISPLAY\_TYPE | CDF\_CHAR | time\_series | | | |
| DEPEND\_0 | CDF\_CHAR | EPOCH\_1 | | | |
| FILLVAL | CDF\_REAL8 | -1E+31 | | | |
| FORMAT | CDF\_CHAR | f14.4 | | | |
| LABLAXIS | CDF\_CHAR | EAS2 overlapCoreHalo P | | | |
| VALIDMIN | CDF\_REAL8 | 1E-6 | | | |
| VALIDMAX | CDF\_REAL8 | 1E+3 | | | |
| SCALETYP | CDF\_CHAR | Log | | | |
| SCALEMIN | CDF\_REAL8 | 1E-6 | | | |
| SCALEMAX | CDF\_REAL8 | 1E+3 | | | |
| VAR\_TYPE | CDF\_CHAR | data | | | |
| UNITS | CDF\_CHAR | nPa | | | |
| SI\_CONVERSION | CDF\_CHAR | 1E-09>P | | | |
| REPRESENTATION\_1 | CDF\_CHAR | REP\_EAS\_PRES\_1 | | | |
| REPRESENTATION\_2 | CDF\_CHAR | REP\_EAS\_PRES\_2 | | | |

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| **Variable\_Name** | **Data\_type** | **DIMS** | **SIZES** | **R\_VARY** | **D\_VARY** |
| SWA\_EAS2\_overlapCoreHalo\_H | CDF\_REAL8 | 1 | 3 | T | T |
| **Attribute Name** | **Data Type** | **Value** | | | |
| FIELDNAM | CDF\_CHAR | EAS2 overlapCoreHalo Heat Flux | | | |
| CATDESC | CDF\_CHAR | Heat Flux from EAS2 overlap look direction in CoreHalo range | | | |
| COORDINATE\_SYSTEM | CDF\_CHAR | EAS2 | | | |
| DISPLAY\_TYPE | CDF\_CHAR | time\_series | | | |
| DEPEND\_0 | CDF\_CHAR | EPOCH\_1 | | | |
| FILLVAL | CDF\_REAL8 | -1E+31 | | | |
| FORMAT | CDF\_CHAR | f14.4 | | | |
| LABL\_PTR\_1 | CDF\_CHAR | EAS\_HFlux\_LABEL | | | |
| VALIDMIN | CDF\_REAL8 | 1E-05 | | | |
| VALIDMAX | CDF\_REAL8 | 1E+05 | | | |
| SCALETYP | CDF\_CHAR | log | | | |
| SCALEMIN | CDF\_REAL8 | 1E-05 | | | |
| SCALEMAX | CDF\_REAL8 | 1E+05 | | | |
| VAR\_TYPE | CDF\_CHAR | data | | | |
| UNITS | CDF\_CHAR | erg s^-1 cm^-2 | | | |
| SI\_CONVERSION | CDF\_CHAR | 1E-03>J s^-1 m^-2 | | | |
| REPRESENTATION\_1 | CDF\_CHAR | REP\_HFlux\_LABEL | | | |

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| **Variable\_Name** | **Data\_type** | **DIMS** | **SIZES** | **R\_VARY** | **D\_VARY** |
| SWA\_EAS2\_overlapStrahl\_N | CDF\_REAL8 | 1 | 1 | T | F |
| **Attribute Name** | **Data Type** | **Value** | | | |
| FIELDNAM | CDF\_CHAR | EAS2 overlapStrahl Density | | | |
| CATDESC | CDF\_CHAR | Number density from EAS2 overlap look direction in Strahl range | | | |
| COORDINATE\_SYSTEM | CDF\_CHAR | EAS2 | | | |
| DISPLAY\_TYPE | CDF\_CHAR | time\_series | | | |
| DEPEND\_0 | CDF\_CHAR | EPOCH\_1 | | | |
| FILLVAL | CDF\_REAL8 | -1E+31 | | | |
| FORMAT | CDF\_CHAR | f14.4 | | | |
| LABLAXIS | CDF\_CHAR | EAS2 overlapStrahl N | | | |
| VALIDMIN | CDF\_UINT4 | 1E-9 | | | |
| VALIDMAX | CDF\_UINT4 | 1E+3 | | | |
| SCALETYP | CDF\_CHAR | log | | | |
| SCALEMIN | CDF\_UINT4 | 1E-9 | | | |
| SCALEMAX | CDF\_UINT4 | 1E+3 | | | |
| VAR\_TYPE | CDF\_CHAR | data | | | |
| UNITS | CDF\_CHAR | cm^-3 | | | |
| SI\_CONVERSION | CDF\_CHAR | 1E-06>m^-3 | | | |

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| **Variable\_Name** | **Data\_type** | **DIMS** | **SIZES** | **R\_VARY** | **D\_VARY** |
| SWA\_EAS2\_overlapStrahl\_V | CDF\_REAL8 | 1 | 3 | T | T |
| **Attribute Name** | **Data Type** | **Value** | | | |
| FIELDNAM | CDF\_CHAR | EAS2 overlapStrahl Velocity | | | |
| CATDESC | CDF\_CHAR | Bulk velocity from EAS2 overlap look direction in Strahl range | | | |
| COORDINATE\_SYSTEM | CDF\_CHAR | EAS2 | | | |
| DISPLAY\_TYPE | CDF\_CHAR | time\_series | | | |
| DEPEND\_0 | CDF\_CHAR | EPOCH\_1 | | | |
| FILLVAL | CDF\_REAL8 | -1E+31 | | | |
| FORMAT | CDF\_CHAR | f14.4 | | | |
| LABL\_PTR\_1 | CDF\_CHAR | EAS\_VEL\_LABEL | | | |
| VALIDMIN | CDF\_REAL8 | -10000.0 | | | |
| VALIDMAX | CDF\_REAL8 | +10000.0 | | | |
| SCALETYP | CDF\_CHAR | log | | | |
| SCALEMIN | CDF\_REAL8 | -10000.0 | | | |
| SCALEMAX | CDF\_REAL8 | +10000.0 | | | |
| VAR\_TYPE | CDF\_CHAR | data | | | |
| UNITS | CDF\_CHAR | km s^-1 | | | |
| SI\_CONVERSION | CDF\_CHAR | 1E+03>m s^-1 | | | |
| REPRESENTATION\_1 | CDF\_CHAR | REP\_VEL\_LABEL | | | |

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| **Variable\_Name** | **Data\_type** | **DIMS** | **SIZES** | **R\_VARY** | **D\_VARY** |
| SWA\_EAS2\_overlapStrahl\_P | CDF\_REAL8 | 1 | 9 | T | T |
| **Attribute Name** | **Data Type** | **Value** | | | |
| FIELDNAM | CDF\_CHAR | EAS2 overlapStrahl Pressure | | | |
| CATDESC | CDF\_CHAR | Pressure tensor from EAS2 overlap look direction in Strahl range | | | |
| COORDINATE\_SYSTEM | CDF\_CHAR | EAS1 | | | |
| DISPLAY\_TYPE | CDF\_CHAR | time\_series | | | |
| DEPEND\_0 | CDF\_CHAR | EPOCH\_1 | | | |
| FILLVAL | CDF\_REAL8 | -1E+31 | | | |
| FORMAT | CDF\_CHAR | f14.4 | | | |
| LABLAXIS | CDF\_CHAR | EAS2 overlapStrahl P | | | |
| VALIDMIN | CDF\_REAL8 | 1E-6 | | | |
| VALIDMAX | CDF\_REAL8 | 1E+3 | | | |
| SCALETYP | CDF\_CHAR | Log | | | |
| SCALEMIN | CDF\_REAL8 | 1E-6 | | | |
| SCALEMAX | CDF\_REAL8 | 1E+3 | | | |
| VAR\_TYPE | CDF\_CHAR | data | | | |
| UNITS | CDF\_CHAR | nPa | | | |
| SI\_CONVERSION | CDF\_CHAR | 1E-09>P | | | |
| REPRESENTATION\_1 | CDF\_CHAR | REP\_EAS\_PRES\_1 | | | |
| REPRESENTATION\_2 | CDF\_CHAR | REP\_EAS\_PRES\_2 | | | |

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| **Variable\_Name** | **Data\_type** | **DIMS** | **SIZES** | **R\_VARY** | **D\_VARY** |
| SWA\_EAS2\_overlapStrahl\_H | CDF\_REAL8 | 1 | 3 | T | T |
| **Attribute Name** | **Data Type** | **Value** | | | |
| FIELDNAM | CDF\_CHAR | EAS2 overlapStrahl Heat Flux | | | |
| CATDESC | CDF\_CHAR | Heat Flux from EAS2 overlap look direction in Strahl range | | | |
| COORDINATE\_SYSTEM | CDF\_CHAR | EAS2 | | | |
| DISPLAY\_TYPE | CDF\_CHAR | time\_series | | | |
| DEPEND\_0 | CDF\_CHAR | EPOCH\_1 | | | |
| FILLVAL | CDF\_REAL8 | -1E+31 | | | |
| FORMAT | CDF\_CHAR | f14.4 | | | |
| LABL\_PTR\_1 | CDF\_CHAR | EAS\_HFlux\_LABEL | | | |
| VALIDMIN | CDF\_REAL8 | 1E-05 | | | |
| VALIDMAX | CDF\_REAL8 | 1E+05 | | | |
| SCALETYP | CDF\_CHAR | log | | | |
| SCALEMIN | CDF\_REAL8 | 1E-05 | | | |
| SCALEMAX | CDF\_REAL8 | 1E+05 | | | |
| VAR\_TYPE | CDF\_CHAR | data | | | |
| UNITS | CDF\_CHAR | erg s^-1 cm^-2 | | | |
| SI\_CONVERSION | CDF\_CHAR | 1E-03>J s^-1 m^-2 | | | |
| REPRESENTATION\_1 | CDF\_CHAR | REP\_HFlux\_LABEL | | | |

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| **Variable\_Name** | **Data\_type** | **DIMS** | **SIZES** | **R\_VARY** | **D\_VARY** |
| EAS1\_TO\_SRF | CDF\_REAL8 | 2 | 3,3 | F | T,T |
|  |  |  | | | |
| **Attribute Name** | **Data Type** | **Value** | | | |
| FIELDNAM | CDF\_CHAR | EAS1 Rotation Matrix | | | |
| CATDESC | CDF\_CHAR | The rotation matrix to go from EAS1 frame to spacecraft reference frame | | | |
| FORMAT | CDF\_CHAR | f14.5 | | | |
| VAR\_TYPE | CDF\_CHAR | support\_data | | | |

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| **Variable\_Name** | **Data\_type** | **DIMS** | **SIZES** | **R\_VARY** | **D\_VARY** |
| EAS2\_TO\_SRF | CDF\_REAL8 | 2 | 3,3 | F | T,T |
|  |  |  | | | |
| **Attribute Name** | **Data Type** | **Value** | | | |
| FIELDNAM | CDF\_CHAR | EAS2 Rotation Matrix | | | |
| CATDESC | CDF\_CHAR | The rotation matrix to go from EAS2 frame to spacecraft reference frame | | | |
| FORMAT | CDF\_CHAR | f14.5 | | | |
| VAR\_TYPE | CDF\_CHAR | support\_data | | | |

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| **Variable\_Name** | **Data\_type** | **DIMS** | **SIZES** | **R\_VARY** | **D\_VARY** |
| QUALITY\_FLAG | CDF\_UINT1 | 1 | 1 | T | F |
| **Attribute Name** | **Data Type** | **Value** | | | |
| FIELDNAM | CDF\_CHAR | EAS1 Data Quality | | | |
| CATDESC | CDF\_CHAR | EAS1 Data Quality flag | | | |
| DEPEND\_0 | CDF\_CHAR | EPOCH | | | |
| DISPLAY\_TYPE | CDF\_CHAR | time\_series | | | |
| FILLVAL | CDF\_UINT4 | 255 | | | |
| LABLAXIS | CDF\_CHAR | EAS1 data quality | | | |
| VALIDMIN | CDF\_UINT4 | 0 | | | |
| VALIDMAX | CDF\_UINT4 | 4 | | | |
| SCALETYP | CDF\_CHAR | linear | | | |
| SCALEMIN | CDF\_UINT4 | 0 | | | |
| SCALEMAX | CDF\_UINT4 | 4 | | | |
| VAR\_TYPE | CDF\_CHAR | support\_data | | | |

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| **Variable\_Name** | **Data\_type** | **DIMS** | **SIZES** | **R\_VARY** | **D\_VARY** |
| QUALITY\_FLAG\_1 | CDF\_UINT1 | 1 | 1 | T | F |
| **Attribute Name** | **Data Type** | **Value** | | | |
| FIELDNAM | CDF\_CHAR | EAS2 Data Quality | | | |
| CATDESC | CDF\_CHAR | EAS2 Data Quality flag | | | |
| DEPEND\_0 | CDF\_CHAR | EPOCH\_1 | | | |
| DISPLAY\_TYPE | CDF\_CHAR | time\_series | | | |
| FILLVAL | CDF\_UINT4 | 255 | | | |
| LABLAXIS | CDF\_CHAR | EAS2 data quality | | | |
| VALIDMIN | CDF\_UINT4 | 0 | | | |
| VALIDMAX | CDF\_UINT4 | 4 | | | |
| SCALETYP | CDF\_CHAR | linear | | | |
| SCALEMIN | CDF\_UINT4 | 0 | | | |
| SCALEMAX | CDF\_UINT4 | 4 | | | |
| VAR\_TYPE | CDF\_CHAR | support\_data | | | |

#### PAS L1 products

IRAP is responsible for generating the SWA PAS L1 data form the L0 source.

The PAS L1 data products are as follows:

* PAS 3D spectra: unique dataset merging data from various modes (Normal mode, Burst mode and Snapshots). The angular bin directions are in PAS frame. Data records are in chronological order, but with a variable time-resolution, depending on various modes.
* Onboard moments in physical units. In the PAS frame of reference.
* Engineering data: housekeeping parameters, in physical values (Volf, mA, deg.C)
* Inflight Calibration data.

All Data products are made as CDF files according to “SOL-SGS-TN-0009 Metadata Definition for Solar Orbiter Science Data”.

##### PAS 3D spectra

**Filename**: solo\_L1\_swa-pas-3d\_yyyymmdd\_V01.cdf

**Global attributes**

|  |  |  |
| --- | --- | --- |
| Name | Entry | Value |
| Project | 1 | Solar Orbiter |
| Project | 2 | Cosmic Visions |
| Source Name | 1 | SOLO>Solar Orbiter |
| Discipline | 1 | Space Physics>Interplanetary Studies |
| Data Type | 1 | L1>Level 1 Data |
| Descriptor | 1 | SWA-PAS-3d |
| Data Version | 1 | 01 |
| Software Version | 1 | 01.00.00 |
| PI Name | 1 | C. J. Owen |
| PI Affiliation | 1 | MSSL-UCL, University College London, UK |
| Instrument Type | 1 | Plasma and Solar Wind |
| Mission Group | 1 | Solar Orbiter |
| Logical Source | 1 | solo\_L1\_swa-pas-3d |
| Logical File id | 1 | solo\_L1\_swa-pas-3d\_yyyymmdd\_V01 |
| Logical Source Description | 1 | SWA-PAS 3D counts data |
| Rules of Use | 1 | Consult with MSSL-UCL before using |
| Generated by | 1 | MSSL-UCL |
| Generation date | 1 | YYYY-MM-DDTHH:MN:SS |
| Mods | 1 | V01 First Version |
| Data Product | 1 | 3D>3D Counts |
| Level | 1 | L1>Level 1 Data |
| Instrument | 1 | SWA-PAS>Solar-Wind-Analyser Proton-Analyser-Sensor |

**Variables**

|  |  |  |  |
| --- | --- | --- | --- |
| Variable name | Variable type | Dimensions | Record vary |
| Epoch | CDF\_TIME\_TT2000 | [] | True |
| Duration | CDF\_FLOAT | [] | True |
| CCSDS\_coarse\_time | CDF\_UINT4 | [] | True |
| CCSDS\_fine\_time | CDF\_UINT2 | [] | True |
| SCET\_coarse\_time | CDF\_UINT4 | [] | True |
| SCET\_fine\_time | CDF\_UINT2 | [] | True |
| SOURCE | CDF\_UINT1 | [] | True |
| SAMPLE | CDF\_INT2 | [] | True |
| NB\_SAMPLE | CDF\_INT2 | [] | True |
| FIRST\_ENERGY | CDF\_INT2 | [] | True |
| NB\_ENERGY | CDF\_INT2 | [] | True |
| FIRST\_ELEVATION | CDF\_INT2 | [] | True |
| NB\_ELEVATION | CDF\_INT2 | [] | True |
| NB\_CEM | CDF\_INT2 | [] | True |
| INFO | CDF\_UINT1 | [] | True |
| SCHEME | CDF\_UINT1 | [] | True |
| FULL\_3D | CDF\_UINT1 | [] | True |
| COMPRESSED | CDF\_UINT1 | [] | True |
| MAX\_CNT\_ENERGY | CDF\_INT2 | [] | True |
| MAX\_CNT\_ELEVATION | CDF\_INT2 | [] | True |
| MAX\_CNT\_CEM | CDF\_INT2 | [] | True |
| NB\_K | CDF\_INT2 | [] | True |
| K | CDF\_INT2 | [] | True |
| COUNTS | CDF\_UINT2 | [11, 9, 96] | True |
| Energy\_table | CDF\_REAL4 | [96] | False |
| Energy\_delta\_plus | CDF\_REAL4 | [96] | False |
| Energy\_delta\_minus | CDF\_REAL4 | [96] | False |
| CEM\_table | CDF\_REAL4 | [11] | False |
| CEM\_table\_delta | CDF\_REAL4 | [11] | False |
| Elevation\_table | CDF\_REAL4 | [9] | False |
| Elevation\_table\_delta | CDF\_REAL4 | [9] | False |

**Detailed variable attributes**

|  |  |  |
| --- | --- | --- |
| Variable name | Epoch | |
| Attribute name | Data type | Value |
| CATDESC | CDF\_CHAR | Default time |
| FIELDNAM | CDF\_CHAR | Epoch |
| FILLVAL | CDF\_TIME\_TT2000 | 9999-12-31 23:59:59.999999 |
| LABLAXIS | CDF\_CHAR | Epoch |
| UNITS | CDF\_CHAR | ns |
| VALIDMIN | CDF\_TIME\_TT2000 | 2000-01-01 00:00:00:000000 |
| VALIDMAX | CDF\_TIME\_TT2000 | 2029-12-31 23:59:59.999000 |
| VAR\_TYPE | CDF\_CHAR | support\_data |
| SCALETYP | CDF\_CHAR | linear |
| MONOTON | CDF\_CHAR | INCREASE |
| TIME\_BASE | CDF\_CHAR | J2000 |
| TIME\_SCALE | CDF\_CHAR | Terrestrial Time |
| REFERENCE\_POSITION | CDF\_CHAR | Rotating Earth Geoid |
| DELTA\_PLUS\_VAR | CDF\_CHAR | Duration |

|  |  |  |
| --- | --- | --- |
| Variable name | Duration | |
| Attribute name | Data type | Value |
| CATDESC | CDF\_CHAR | Acquisition duration |
| FIELDNAM | CDF\_CHAR | Duration |
| FILLVAL | CDF\_FLOAT | -1,00E+31 |
| LABLAXIS | CDF\_CHAR | Duration |
| UNITS | CDF\_CHAR | s |
| VALIDMIN | CDF\_FLOAT | 0.0 |
| VALIDMAX | CDF\_FLOAT | 60.0 |
| VAR\_TYPE | CDF\_CHAR | support\_data |
| SCALETYP | CDF\_CHAR | linear |
| MONOTON | CDF\_CHAR | INCREASE |
| TIME\_BASE | CDF\_CHAR | J2000 |
| TIME\_SCALE | CDF\_CHAR | Terrestrial Time |

|  |  |  |
| --- | --- | --- |
| Variable name | CCSDS\_coarse\_time | |
| Attribute name | Data type | Value |
| CATDESC | CDF\_CHAR | CCSDS coarse time |
| DEPEND\_0 | CDF\_CHAR | Epoch |
| FIELDNAM | CDF\_CHAR | CCSDS\_coarse\_time |
| FILLVAL | CDF\_UINT4 | 4294967295 |
| FORMAT | CDF\_CHAR | I8 |
| LABLAXIS | CDF\_CHAR | CCSDS\_coarse\_time |
| UNITS | CDF\_CHAR | s |
| VALIDMIN | CDF\_UINT4 | 0 |
| VALIDMAX | CDF\_UINT4 | 4294967294 |
| VAR\_TYPE | CDF\_CHAR | support\_data |
| SCALETYP | CDF\_CHAR | linear |

|  |  |  |
| --- | --- | --- |
| Variable name | CCSDS\_fine\_time | |
| Attribute name | Data type | Value |
| CATDESC | CDF\_CHAR | CCSDS fine time |
| DEPEND\_0 | CDF\_CHAR | Epoch |
| FIELDNAM | CDF\_CHAR | CCSDS\_fine\_time |
| FILLVAL | CDF\_UINT2 | 65535 |
| FORMAT | CDF\_CHAR | I5 |
| LABLAXIS | CDF\_CHAR | CCSDS\_fine\_time |
| UNITS | CDF\_CHAR | 1/65536 s |
| VALIDMIN | CDF\_UINT2 | 0 |
| VALIDMAX | CDF\_UINT2 | 65534 |
| VAR\_TYPE | CDF\_CHAR | support\_data |
| SCALETYP | CDF\_CHAR | linear |

|  |  |  |
| --- | --- | --- |
| Variable name | SCET\_coarse\_time | |
| Attribute name | Data type | Value |
| CATDESC | CDF\_CHAR | SCET coarse time |
| DEPEND\_0 | CDF\_CHAR | Epoch |
| FIELDNAM | CDF\_CHAR | SCET\_coarse\_time |
| FILLVAL | CDF\_UINT4 | 4294967295 |
| FORMAT | CDF\_CHAR | I8 |
| LABLAXIS | CDF\_CHAR | SCET\_coarse\_time |
| UNITS | CDF\_CHAR | s |
| VALIDMIN | CDF\_UINT4 | 0 |
| VALIDMAX | CDF\_UINT4 | 4294967294 |
| VAR\_TYPE | CDF\_CHAR | support\_data |
| SCALETYP | CDF\_CHAR | linear |

|  |  |  |
| --- | --- | --- |
| Variable name | SCET\_fine\_time | |
| Attribute name | Data type | Value |
| CATDESC | CDF\_CHAR | SCET fine time |
| DEPEND\_0 | CDF\_CHAR | Epoch |
| FIELDNAM | CDF\_CHAR | SCET\_fine\_time |
| FILLVAL | CDF\_UINT2 | 65535 |
| FORMAT | CDF\_CHAR | I5 |
| LABLAXIS | CDF\_CHAR | SCET\_fine\_time |
| UNITS | CDF\_CHAR | 1/65536 s |
| VALIDMIN | CDF\_UINT2 | 0 |
| VALIDMAX | CDF\_UINT2 | 65534 |
| VAR\_TYPE | CDF\_CHAR | support\_data |
| SCALETYP | CDF\_CHAR | linear |

|  |  |  |
| --- | --- | --- |
| Variable name | SOURCE | |
| Attribute name | Data type | Value |
| CATDESC | CDF\_CHAR | Source (0: Normal, 1: Snapshot, 2: Burst, 3: Trigger |
| DEPEND\_0 | CDF\_CHAR | Epoch |
| FIELDNAM | CDF\_CHAR | Source |
| FILLVAL | CDF\_UINT1 | 255 |
| FORMAT | CDF\_CHAR | I1 |
| LABLAXIS | CDF\_CHAR | Source |
| UNITS | CDF\_CHAR | unitless |
| VALIDMIN | CDF\_UINT1 | 0 |
| VALIDMAX | CDF\_UINT1 | 15 |
| VAR\_TYPE | CDF\_CHAR | support\_data |
| SCALETYP | CDF\_CHAR | linear |

|  |  |  |
| --- | --- | --- |
| Variable name | SAMPLE | |
| Attribute name | Data type | Value |
| CATDESC | CDF\_CHAR | Current sample |
| DEPEND\_0 | CDF\_CHAR | Epoch |
| FIELDNAM | CDF\_CHAR | SAMPLE |
| FILLVAL | CDF\_INT2 | -32768 |
| FORMAT | CDF\_CHAR | I5 |
| LABLAXIS | CDF\_CHAR | SAMPLE |
| UNITS | CDF\_CHAR | unitless |
| VALIDMIN | CDF\_INT2 | 0 |
| VALIDMAX | CDF\_INT2 | 1000 |
| VAR\_TYPE | CDF\_CHAR | support\_data |
| SCALETYP | CDF\_CHAR | linear |

|  |  |  |
| --- | --- | --- |
| Variable name | NB\_SAMPLE | |
| Attribute name | Data type | Value |
| CATDESC | CDF\_CHAR | Number of samples |
| DEPEND\_0 | CDF\_CHAR | Epoch |
| FIELDNAM | CDF\_CHAR | NB\_SAMPLE |
| FILLVAL | CDF\_INT2 | -32768 |
| FORMAT | CDF\_CHAR | I5 |
| LABLAXIS | CDF\_CHAR | SAMPLE |
| UNITS | CDF\_CHAR | unitless |
| VALIDMIN | CDF\_INT2 | 0 |
| VALIDMAX | CDF\_INT2 | 1000 |
| VAR\_TYPE | CDF\_CHAR | support\_data |
| SCALETYP | CDF\_CHAR | linear |

|  |  |  |
| --- | --- | --- |
| Variable name | FIRST\_ENERGY | |
| Attribute name | Data type | Value |
| CATDESC | CDF\_CHAR | First energy bin |
| DEPEND\_0 | CDF\_CHAR | Epoch |
| FIELDNAM | CDF\_CHAR | EN\_FIRST |
| FILLVAL | CDF\_INT2 | -32768 |
| FORMAT | CDF\_CHAR | I5 |
| LABLAXIS | CDF\_CHAR | FIRST\_ENERGY |
| UNITS | CDF\_CHAR | unitless |
| VALIDMIN | CDF\_INT2 | 0 |
| VALIDMAX | CDF\_INT2 | 96 |
| VAR\_TYPE | CDF\_CHAR | support\_data |
| SCALETYP | CDF\_CHAR | linear |

|  |  |  |
| --- | --- | --- |
| Variable name | NB\_ENERGY | |
| Attribute name | Data type | Value |
| CATDESC | CDF\_CHAR | Number energy bins |
| DEPEND\_0 | CDF\_CHAR | Epoch |
| FIELDNAM | CDF\_CHAR | EN\_NUM |
| FILLVAL | CDF\_INT2 | -32768 |
| FORMAT | CDF\_CHAR | I5 |
| LABLAXIS | CDF\_CHAR | EN\_NUM |
| UNITS | CDF\_CHAR | unitless |
| VALIDMIN | CDF\_INT2 | 0 |
| VALIDMAX | CDF\_INT2 | 96 |
| VAR\_TYPE | CDF\_CHAR | support\_data |
| SCALETYP | CDF\_CHAR | linear |

|  |  |  |
| --- | --- | --- |
| Variable name | FIRST\_ELEVATION | |
| Attribute name | Data type | Value |
| CATDESC | CDF\_CHAR | First elevation bin |
| DEPEND\_0 | CDF\_CHAR | Epoch |
| FIELDNAM | CDF\_CHAR | EL\_FIRST |
| FILLVAL | CDF\_INT2 | -32768 |
| FORMAT | CDF\_CHAR | I5 |
| LABLAXIS | CDF\_CHAR | EL\_FIRST |
| UNITS | CDF\_CHAR | unitless |
| VALIDMIN | CDF\_INT2 | 0 |
| VALIDMAX | CDF\_INT2 | 9 |
| VAR\_TYPE | CDF\_CHAR | support\_data |
| SCALETYP | CDF\_CHAR | linear |

|  |  |  |
| --- | --- | --- |
| Variable name | NB\_ELEVATION | |
| Attribute name | Data type | Value |
| CATDESC | CDF\_CHAR | Number elevation bins |
| DEPEND\_0 | CDF\_CHAR | Epoch |
| FIELDNAM | CDF\_CHAR | EL\_NUM |
| FILLVAL | CDF\_INT2 | -32768 |
| FORMAT | CDF\_CHAR | I5 |
| LABLAXIS | CDF\_CHAR | EL\_NUM |
| UNITS | CDF\_CHAR | unitless |
| VALIDMIN | CDF\_INT2 | 0 |
| VALIDMAX | CDF\_INT2 | 9 |
| VAR\_TYPE | CDF\_CHAR | support\_data |
| SCALETYP | CDF\_CHAR | linear |

|  |  |  |
| --- | --- | --- |
| Variable name | NB\_CEM | |
| Attribute name | Data type | Value |
| CATDESC | CDF\_CHAR | Number CEM |
| DEPEND\_0 | CDF\_CHAR | Epoch |
| FIELDNAM | CDF\_CHAR | EL\_NUM |
| FILLVAL | CDF\_INT2 | -32768 |
| FORMAT | CDF\_CHAR | I5 |
| LABLAXIS | CDF\_CHAR | EL\_NUM |
| UNITS | CDF\_CHAR | unitless |
| VALIDMIN | CDF\_INT2 | 0 |
| VALIDMAX | CDF\_INT2 | 9 |
| VAR\_TYPE | CDF\_CHAR | support\_data |
| SCALETYP | CDF\_CHAR | linear |

|  |  |  |
| --- | --- | --- |
| Variable name | INFO | |
| Attribute name | Data type | Value |
| CATDESC | CDF\_CHAR | Info |
| DEPEND\_0 | CDF\_CHAR | Epoch |
| FIELDNAM | CDF\_CHAR | INFO |
| FILLVAL | CDF\_UINT1 | 255 |
| FORMAT | CDF\_CHAR | I3 |
| LABLAXIS | CDF\_CHAR | INFO |
| UNITS | CDF\_CHAR | unitless |
| VALIDMIN | CDF\_UINT1 | 7 |
| VALIDMAX | CDF\_UINT1 | 11 |
| VAR\_TYPE | CDF\_CHAR | support\_data |
| SCALETYP | CDF\_CHAR | linear |

|  |  |  |
| --- | --- | --- |
| Variable name | SCHEME | |
| Attribute name | Data type | Value |
| CATDESC | CDF\_CHAR | Scheme |
| DEPEND\_0 | CDF\_CHAR | Epoch |
| FIELDNAM | CDF\_CHAR | SCHEME |
| FILLVAL | CDF\_UINT1 | 255 |
| FORMAT | CDF\_CHAR | I3 |
| LABLAXIS | CDF\_CHAR | INFO |
| UNITS | CDF\_CHAR | unitless |
| VALIDMIN | CDF\_UINT1 | 0 |
| VALIDMAX | CDF\_UINT1 | 15 |
| VAR\_TYPE | CDF\_CHAR | support\_data |
| SCALETYP | CDF\_CHAR | linear |

|  |  |  |
| --- | --- | --- |
| Variable name | FULL\_3D | |
| Attribute name | Data type | Value |
| CATDESC | CDF\_CHAR | Full 3D |
| DEPEND\_0 | CDF\_CHAR | Epoch |
| FIELDNAM | CDF\_CHAR | FULL\_3D |
| FILLVAL | CDF\_UINT1 | 255 |
| FORMAT | CDF\_CHAR | I3 |
| LABLAXIS | CDF\_CHAR | INFO |
| UNITS | CDF\_CHAR | unitless |
| VALIDMIN | CDF\_UINT1 | 0 |
| VALIDMAX | CDF\_UINT1 | 1 |
| VAR\_TYPE | CDF\_CHAR | support\_data |
| SCALETYP | CDF\_CHAR | linear |

|  |  |  |
| --- | --- | --- |
| Variable name | COMPRESSED | |
| Attribute name | Data type | Value |
| CATDESC | CDF\_CHAR | Compressed data |
| DEPEND\_0 | CDF\_CHAR | Epoch |
| FIELDNAM | CDF\_CHAR | COMPRESSED |
| FILLVAL | CDF\_UINT1 | 255 |
| FORMAT | CDF\_CHAR | I3 |
| LABLAXIS | CDF\_CHAR | COMPRESSED |
| UNITS | CDF\_CHAR | unitless |
| VALIDMIN | CDF\_UINT1 | 0 |
| VALIDMAX | CDF\_UINT1 | 1 |
| VAR\_TYPE | CDF\_CHAR | support\_data |
| SCALETYP | CDF\_CHAR | linear |

|  |  |  |
| --- | --- | --- |
| Variable name | MAX\_CNT\_ENERGY | |
| Attribute name | Data type | Value |
| CATDESC | CDF\_CHAR | Max count energy bin |
| DEPEND\_0 | CDF\_CHAR | Epoch |
| FIELDNAM | CDF\_CHAR | MAX\_CNT\_ENERGY |
| FILLVAL | CDF\_INT2 | -32768 |
| FORMAT | CDF\_CHAR | I5 |
| LABLAXIS | CDF\_CHAR | MAX\_CNT\_ENERGY |
| UNITS | CDF\_CHAR | unitless |
| VALIDMIN | CDF\_INT2 | 0 |
| VALIDMAX | CDF\_INT2 | 96 |
| VAR\_TYPE | CDF\_CHAR | support\_data |
| SCALETYP | CDF\_CHAR | linear |

|  |  |  |
| --- | --- | --- |
| Variable name | MAX\_CNT\_ELEVATION | |
| Attribute name | Data type | Value |
| CATDESC | CDF\_CHAR | Max count elevation number |
| DEPEND\_0 | CDF\_CHAR | Epoch |
| FIELDNAM | CDF\_CHAR | MAX\_CNT\_ELEVATION |
| FILLVAL | CDF\_INT2 | -32768 |
| FORMAT | CDF\_CHAR | I5 |
| LABLAXIS | CDF\_CHAR | MAX\_CNT\_ENERGY |
| UNITS | CDF\_CHAR | unitless |
| VALIDMIN | CDF\_INT2 | 0 |
| VALIDMAX | CDF\_INT2 | 9 |
| VAR\_TYPE | CDF\_CHAR | support\_data |
| SCALETYP | CDF\_CHAR | linear |

|  |  |  |
| --- | --- | --- |
| Variable name | MAX\_CNT\_CEM | |
| Attribute name | Data type | Value |
| CATDESC | CDF\_CHAR | Max count CEM |
| DEPEND\_0 | CDF\_CHAR | Epoch |
| FIELDNAM | CDF\_CHAR | MAX\_CNT\_CEM |
| FILLVAL | CDF\_INT2 | -32768 |
| FORMAT | CDF\_CHAR | I5 |
| LABLAXIS | CDF\_CHAR | MAX\_CNT\_ENERGY |
| UNITS | CDF\_CHAR | unitless |
| VALIDMIN | CDF\_INT2 | 0 |
| VALIDMAX | CDF\_INT2 | 11 |
| VAR\_TYPE | CDF\_CHAR | support\_data |
| SCALETYP | CDF\_CHAR | linear |

|  |  |  |
| --- | --- | --- |
| Variable name | NB\_K | |
| Attribute name | Data type | Value |
| CATDESC | CDF\_CHAR | Number of sub-samping per second |
| DEPEND\_0 | CDF\_CHAR | Epoch |
| FIELDNAM | CDF\_CHAR | NB\_K |
| FILLVAL | CDF\_INT2 | -32768 |
| FORMAT | CDF\_CHAR | I5 |
| LABLAXIS | CDF\_CHAR | NB\_K |
| UNITS | CDF\_CHAR | unitless |
| VALIDMIN | CDF\_INT2 | 0 |
| VALIDMAX | CDF\_INT2 | 8 |
| VAR\_TYPE | CDF\_CHAR | support\_data |
| SCALETYP | CDF\_CHAR | linear |

|  |  |  |
| --- | --- | --- |
| Variable name | K | |
| Attribute name | Data type | Value |
| CATDESC | CDF\_CHAR | Current sub-sampling |
| DEPEND\_0 | CDF\_CHAR | Epoch |
| FIELDNAM | CDF\_CHAR | K |
| FILLVAL | CDF\_INT2 | -32768 |
| FORMAT | CDF\_CHAR | I5 |
| LABLAXIS | CDF\_CHAR | NB\_K |
| UNITS | CDF\_CHAR | unitless |
| VALIDMIN | CDF\_INT2 | 0 |
| VALIDMAX | CDF\_INT2 | 8 |
| VAR\_TYPE | CDF\_CHAR | support\_data |
| SCALETYP | CDF\_CHAR | linear |

|  |  |  |
| --- | --- | --- |
| Variable name | COUNTS | |
| Attribute name | Data type | Value |
| CATDESC | CDF\_CHAR | 3D counts |
| DEPEND\_0 | CDF\_CHAR | Epoch |
| FIELDNAM | CDF\_CHAR | COUNTS |
| FILLVAL | CDF\_UINT2 | 65535 |
| FORMAT | CDF\_CHAR | I5 |
| LABLAXIS | CDF\_CHAR | COUNTS |
| UNITS | CDF\_CHAR | unitless |
| VALIDMIN | CDF\_UINT2 | 0 |
| VALIDMAX | CDF\_UINT2 | 65534 |
| VAR\_TYPE | CDF\_CHAR | support\_data |
| SCALETYP | CDF\_CHAR | linear |

|  |  |  |
| --- | --- | --- |
| Variable name | Energy\_table | |
| Attribute name | Data type | Value |
| CATDESC | CDF\_CHAR | Center of energy bins |
| FIELDNAM | CDF\_CHAR | Energy table |
| FILLVAL | CDF\_REAL4 | -1,00E+31 |
| FORMAT | CDF\_CHAR | E12.2 |
| LABLAXIS | CDF\_CHAR | Energy\_table |
| UNITS | CDF\_CHAR | eV |
| VALIDMIN | CDF\_REAL4 | 0.0 |
| VALIDMAX | CDF\_REAL4 | 40000.0 |
| VAR\_TYPE | CDF\_CHAR | support\_data |
| SCALETYP | CDF\_CHAR | linear |
| DELTA\_PLUS\_VAR | CDF\_CHAR | Energy\_delta\_plus |
| DELTA\_MINUS\_VAR | CDF\_CHAR | Energy\_delta\_minus |

|  |  |  |
| --- | --- | --- |
| Variable name | Energy\_delta\_plus | |
| Attribute name | Data type | Value |
| CATDESC | CDF\_CHAR | Energy bins delta plus values |
| FIELDNAM | CDF\_CHAR | Energy delta plus |
| FILLVAL | CDF\_REAL4 | -1,00E+31 |
| FORMAT | CDF\_CHAR | E12.2 |
| LABLAXIS | CDF\_CHAR | Energy\_table |
| UNITS | CDF\_CHAR | eV |
| VALIDMIN | CDF\_REAL4 | 0.0 |
| VALIDMAX | CDF\_REAL4 | 40000.0 |
| VAR\_TYPE | CDF\_CHAR | support\_data |
| SCALETYP | CDF\_CHAR | linear |

|  |  |  |
| --- | --- | --- |
| Variable name | Energy\_delta\_minus | |
| Attribute name | Data type | Value |
| CATDESC | CDF\_CHAR | Energy bins delta minus values |
| FIELDNAM | CDF\_CHAR | Energy table delta minus |
| FILLVAL | CDF\_REAL4 | -1,00E+31 |
| FORMAT | CDF\_CHAR | E12.2 |
| LABLAXIS | CDF\_CHAR | Energy\_table |
| UNITS | CDF\_CHAR | eV |
| VALIDMIN | CDF\_REAL4 | 0.0 |
| VALIDMAX | CDF\_REAL4 | 40000.0 |
| VAR\_TYPE | CDF\_CHAR | support\_data |
| SCALETYP | CDF\_CHAR | linear |

|  |  |  |
| --- | --- | --- |
| Variable name | CEM\_table | |
| Attribute name | Data type | Value |
| CATDESC | CDF\_CHAR | Center of CEM bins |
| FIELDNAM | CDF\_CHAR | CEM\_table |
| FILLVAL | CDF\_REAL4 | -1,00E+31 |
| FORMAT | CDF\_CHAR | E12.2 |
| LABLAXIS | CDF\_CHAR | CEM\_table |
| UNITS | CDF\_CHAR | deg |
| VALIDMIN | CDF\_REAL4 | -90.0 |
| VALIDMAX | CDF\_REAL4 | 90.0 |
| VAR\_TYPE | CDF\_CHAR | support\_data |
| SCALETYP | CDF\_CHAR | linear |
| DELTA\_PLUS\_VAR | CDF\_CHAR | CEM\_table\_delta |
| DELTA\_MINUS\_VAR | CDF\_CHAR | CEM\_table\_delta |

|  |  |  |
| --- | --- | --- |
| Variable name | Elevation\_table | |
| Attribute name | Data type | Value |
| CATDESC | CDF\_CHAR | Center of elevation bins |
| FIELDNAM | CDF\_CHAR | Elevation table |
| FILLVAL | CDF\_REAL4 | -1,00E+31 |
| FORMAT | CDF\_CHAR | E12.2 |
| LABLAXIS | CDF\_CHAR | Elevation\_table |
| UNITS | CDF\_CHAR | deg |
| VALIDMIN | CDF\_REAL4 | -90.0 |
| VALIDMAX | CDF\_REAL4 | 90.0 |
| VAR\_TYPE | CDF\_CHAR | support\_data |
| SCALETYP | CDF\_CHAR | linear |
| DELTA\_PLUS\_VAR | CDF\_CHAR | Elevation\_table\_delta |
| DELTA\_MINUS\_VAR | CDF\_CHAR | Elevation\_table\_delta |

|  |  |  |
| --- | --- | --- |
| Variable name | CEM\_table\_delta | |
| Attribute name | Data type | Value |
| CATDESC | CDF\_CHAR | CEM\_table\_delta |
| FIELDNAM | CDF\_CHAR | CEM\_table\_delta |
| FILLVAL | CDF\_REAL4 | -1,00E+31 |
| FORMAT | CDF\_CHAR | E12.2 |
| LABLAXIS | CDF\_CHAR | CEM\_table\_delta |
| UNITS | CDF\_CHAR | deg |
| VALIDMIN | CDF\_REAL4 | 0.0 |
| VALIDMAX | CDF\_REAL4 | 45.0 |
| VAR\_TYPE | CDF\_CHAR | support\_data |
| SCALETYP | CDF\_CHAR | linear |

|  |  |  |
| --- | --- | --- |
| Variable name | Elevation\_table\_delta | |
| Attribute name | Data type | Value |
| CATDESC | CDF\_CHAR | Delta elevation |
| FIELDNAM | CDF\_CHAR | Elevation\_table\_delta |
| FILLVAL | CDF\_REAL4 | -1,00E+31 |
| FORMAT | CDF\_CHAR | E12.2 |
| LABLAXIS | CDF\_CHAR | Delta elevation |
| UNITS | CDF\_CHAR | deg |
| VALIDMIN | CDF\_REAL4 | 0.0 |
| VALIDMAX | CDF\_REAL4 | 45.0 |
| VAR\_TYPE | CDF\_CHAR | support\_data |
| SCALETYP | CDF\_CHAR | linear |

##### PAS onboard moments

**Filename:** solo\_L1\_swa-pas-mom\_yyyymmdd\_V01.cdf

**Global metadata**

|  |  |  |
| --- | --- | --- |
| Name | Entry | Value |
| Project | 1 | Solar Orbiter |
| Project | 2 | Cosmic Visions |
| Source Name | 1 | SOLO>Solar Orbiter |
| Discipline | 1 | Space Physics>Interplanetary Studies |
| Data Type | 1 | L1>Level 1 Data |
| Descriptor | 1 | SWA-PAS-MOM |
| Data Version | 1 | 01 |
| Software Version | 1 | 01.00.00 |
| PI Name | 1 | C. J. Owen |
| PI Affiliation | 1 | MSSL-UCL, University College London, UK |
| Instrument Type | 1 | Plasma and Solar Wind |
| Mission Group | 1 | Solar Orbiter |
| Logical Source | 1 | solo\_L1\_swa-pas-mom |
| Logical File id | 1 | solo\_L1\_swa-pas-mom\_yyyymmdd\_V01 |
| Logical Source Description | 1 | SWA-PAS Onboard calculated moments |
| Rules of Use | 1 | Consult with MSSL-UCL before using |
| Generated by | 1 | MSSL-UCL |
| Generation date | 1 | YYYY-MM-DDTHH:MN:SS |
| Mods | 1 | V01 First Version |
| Data Product | 1 | MOM>Onboard calculated moments |
| Level | 1 | L1>Level 1 Data |
| Instrument | 1 | SWA-PAS>Solar-Wind-Analyser Proton-Analyser-Sensor |

**Variables**

|  |  |  |  |
| --- | --- | --- | --- |
| Variable name | Variable type | Dimensions | Record vary |
| Epoch | CDF\_TIME\_TT2000 | [] | True |
| Half\_interval | CDF\_FLOAT | [] | False |
| CCSDS\_coarse\_time | CDF\_UINT4 | [] | True |
| CCSDS\_fine\_time | CDF\_UINT2 | [] | True |
| SCET\_coarse\_time | CDF\_UINT4 | [] | True |
| SCET\_fine\_time | CDF\_UINT2 | [] | True |
| Sample | CDF\_INT2 | [] | True |
| Validity | CDF\_UINT1 | [] | True |
| sum\_PAS | CDF\_UINT1 | [] | True |
| Density | CDF\_REAL4 | [] | True |
| Velocity | CDF\_REAL4 | [3] | True |
| Pressure | CDF\_REAL4 | [6] | True |

**Detailed variable attributes**

|  |  |  |
| --- | --- | --- |
| Variable name | Epoch | |
| Attribute name | Data type | Value |
| CATDESC | CDF\_CHAR | Default time |
| FIELDNAM | CDF\_CHAR | Epoch |
| FILLVAL | CDF\_TIME\_TT2000 | 9999-12-31 23:59:59.999999 |
| LABLAXIS | CDF\_CHAR | Epoch |
| UNITS | CDF\_CHAR | ns |
| VALIDMIN | CDF\_TIME\_TT2000 | 2000-01-01 00:00:00:000000 |
| VALIDMAX | CDF\_TIME\_TT2000 | 2029-12-31 23:59:59.999000 |
| VAR\_TYPE | CDF\_CHAR | support\_data |
| SCALETYP | CDF\_CHAR | linear |
| MONOTON | CDF\_CHAR | INCREASE |
| TIME\_BASE | CDF\_CHAR | J2000 |
| TIME\_SCALE | CDF\_CHAR | Terrestrial Time |
| REFERENCE\_POSITION | CDF\_CHAR | Rotating Earth Geoid |

|  |  |  |
| --- | --- | --- |
| Variable name | CCSDS\_coarse\_time | |
| Attribute name | Data type | Value |
| CATDESC | CDF\_CHAR | CCSDS\_coarse\_time |
| DEPEND\_0 | CDF\_CHAR | Epoch |
| FIELDNAM | CDF\_CHAR | CCSDS\_coarse\_time |
| FILLVAL | CDF\_UINT4 | 4294967295 |
| FORMAT | CDF\_CHAR | I8 |
| LABLAXIS | CDF\_CHAR | CCSDS\_coarse\_time |
| UNITS | CDF\_CHAR | s |
| VALIDMIN | CDF\_UINT4 | 0 |
| VALIDMAX | CDF\_FLOAT | 1.8446744e+19 |
| VAR\_TYPE | CDF\_CHAR | support\_data |
| SCALETYP | CDF\_CHAR | linear |

|  |  |  |
| --- | --- | --- |
| Variable name | CCSDS\_fine\_time | |
| Attribute name | Data type | Value |
| CATDESC | CDF\_CHAR | CCSDS\_fine\_time |
| DEPEND\_0 | CDF\_CHAR | Epoch |
| FIELDNAM | CDF\_CHAR | CCSDS\_fine\_time |
| FILLVAL | CDF\_UINT2 | 65535 |
| FORMAT | CDF\_CHAR | I5 |
| LABLAXIS | CDF\_CHAR | CCSDS\_fine\_time |
| UNITS | CDF\_CHAR | 1/65536 s |
| VALIDMIN | CDF\_UINT2 | 0 |
| VALIDMAX | CDF\_UINT2 | 65534 |
| VAR\_TYPE | CDF\_CHAR | support\_data |
| SCALETYP | CDF\_CHAR | linear |

|  |  |  |
| --- | --- | --- |
| Variable name | SCET\_coarse\_time | |
| Attribute name | Data type | Value |
| CATDESC | CDF\_CHAR | SCET\_coarse\_time |
| DEPEND\_0 | CDF\_CHAR | Epoch |
| FIELDNAM | CDF\_CHAR | SCET\_coarse\_time |
| FILLVAL | CDF\_UINT4 | 4294967295 |
| FORMAT | CDF\_CHAR | I8 |
| LABLAXIS | CDF\_CHAR | SCET\_coarse\_time |
| UNITS | CDF\_CHAR | s |
| VALIDMIN | CDF\_UINT4 | 0 |
| VALIDMAX | CDF\_FLOAT | 1.8446744e+19 |
| VAR\_TYPE | CDF\_CHAR | support\_data |
| SCALETYP | CDF\_CHAR | linear |

|  |  |  |
| --- | --- | --- |
| Variable name | SCET\_fine\_time | |
| Attribute name | Data type | Value |
| CATDESC | CDF\_CHAR | SCET\_fine\_time |
| DEPEND\_0 | CDF\_CHAR | Epoch |
| FIELDNAM | CDF\_CHAR | SCET\_fine\_time |
| FILLVAL | CDF\_UINT2 | 65535 |
| FORMAT | CDF\_CHAR | I5 |
| LABLAXIS | CDF\_CHAR | SCET\_fine\_time |
| UNITS | CDF\_CHAR | 1/65536 s |
| VALIDMIN | CDF\_UINT2 | 0 |
| VALIDMAX | CDF\_UINT2 | 65534 |
| VAR\_TYPE | CDF\_CHAR | support\_data |
| SCALETYP | CDF\_CHAR | linear |

|  |  |  |
| --- | --- | --- |
| Variable name | sample | |
| Attribute name | Data type | Value |
| CATDESC | CDF\_CHAR | sample # over 25 possibles |
| DEPEND\_0 | CDF\_CHAR | Epoch |
| FIELDNAM | CDF\_CHAR | sample / 25 |
| FILLVAL | CDF\_INT2 | -32767 |
| FORMAT | CDF\_CHAR | I5 |
| LABLAXIS | CDF\_CHAR | sample |
| UNITS | CDF\_CHAR | unitless |
| VALIDMIN | CDF\_INT2 | 0 |
| VALIDMAX | CDF\_INT2 | 25 |
| VAR\_TYPE | CDF\_CHAR | support\_data |
| SCALETYP | CDF\_CHAR | linear |

|  |  |  |
| --- | --- | --- |
| Variable name | validity | |
| Attribute name | Data type | Value |
| CATDESC | CDF\_CHAR | validity flag (0 = OK) |
| DEPEND\_0 | CDF\_CHAR | Epoch |
| FIELDNAM | CDF\_CHAR | validity |
| FILLVAL | CDF\_INT2 | 254 |
| FORMAT | CDF\_CHAR | I3 |
| LABLAXIS | CDF\_CHAR | sample |
| UNITS | CDF\_CHAR | unitless |
| VALIDMIN | CDF\_INT2 | 0 |
| VALIDMAX | CDF\_INT2 | 255 |
| VAR\_TYPE | CDF\_CHAR | support\_data |
| SCALETYP | CDF\_CHAR | linear |

|  |  |  |
| --- | --- | --- |
| Variable name | sum\_PAS | |
| Attribute name | Data type | Value |
| CATDESC | CDF\_CHAR | summation type |
| DEPEND\_0 | CDF\_CHAR | Epoch |
| FIELDNAM | CDF\_CHAR | sum PAS |
| FILLVAL | CDF\_INT2 | 255 |
| FORMAT | CDF\_CHAR | I3 |
| LABLAXIS | CDF\_CHAR | sample |
| UNITS | CDF\_CHAR | unitless |
| VALIDMIN | CDF\_INT2 | 0 |
| VALIDMAX | CDF\_INT2 | 254 |
| VAR\_TYPE | CDF\_CHAR | support\_data |
| SCALETYP | CDF\_CHAR | linear |

|  |  |  |
| --- | --- | --- |
| Variable name | density | |
| Attribute name | Data type | Value |
| CATDESC | CDF\_CHAR | density |
| DEPEND\_0 | CDF\_CHAR | Epoch |
| FIELDNAM | CDF\_CHAR | density |
| FILLVAL | CDF\_REAL4 | -1,00E+31 |
| FORMAT | CDF\_CHAR | E12.2 |
| LABLAXIS | CDF\_CHAR | density |
| UNITS | CDF\_CHAR | particles cm^-3 |
| VALIDMIN | CDF\_REAL4 | 0.0 |
| VALIDMAX | CDF\_REAL4 | 10000.0 |
| VAR\_TYPE | CDF\_CHAR | data |
| SCALETYP | CDF\_CHAR | linear |

|  |  |  |
| --- | --- | --- |
| Variable name | velocity | |
| Attribute name | Data type | Value |
| CATDESC | CDF\_CHAR | velocity |
| DEPEND\_0 | CDF\_CHAR | Epoch |
| FIELDNAM | CDF\_CHAR | velocity |
| FILLVAL | CDF\_REAL4 | -1,00E+31 |
| FORMAT | CDF\_CHAR | E12.2 |
| LABLAXIS | CDF\_CHAR | velocity |
| UNITS | CDF\_CHAR | km/s |
| VALIDMIN | CDF\_REAL4 | -100000.0 |
| VALIDMAX | CDF\_REAL4 | 100000.0 |
| VAR\_TYPE | CDF\_CHAR | data |
| SCALETYP | CDF\_CHAR | linear |

|  |  |  |
| --- | --- | --- |
| Variable name | pressure | |
| Attribute name | Data type | Value |
| CATDESC | CDF\_CHAR | pressure tensor |
| DEPEND\_0 | CDF\_CHAR | Epoch |
| FIELDNAM | CDF\_CHAR | pressure |
| FILLVAL | CDF\_REAL4 | -1,00E+31 |
| FORMAT | CDF\_CHAR | E12.2 |
| LABLAXIS | CDF\_CHAR | pressure |
| UNITS | CDF\_CHAR | J.cm^-3 |
| VALIDMIN | CDF\_REAL4 | 0.0 |
| VALIDMAX | CDF\_REAL4 | 1,00E+30 |
| VAR\_TYPE | CDF\_CHAR | data |
| SCALETYP | CDF\_CHAR | linear |

##### PAS engineering data

**Filename:** solo\_L1\_swa-pas-hsk\_yyyymmdd\_V01.cdf

**Global attributes**

|  |  |  |
| --- | --- | --- |
| Name | Entry | Value |
| Project | 1 | Solar Orbiter |
| Project | 2 | Cosmic Visions |
| Source Name | 1 | SOLO>Solar Orbiter |
| Discipline | 1 | Space Physics>Interplanetary Studies |
| Data Type | 1 | L1>Level 1 Data |
| Descriptor | 1 | SWA-PAS-HSK |
| Data Version | 1 | 01 |
| Software Version | 1 | 01.00.00 |
| PI Name | 1 | C. J. Owen |
| PI Affiliation | 1 | MSSL-UCL, University College London, UK |
| Instrument Type | 1 | Plasma and Solar Wind |
| Mission Group | 1 | Solar Orbiter |
| Logical Source | 1 | solo\_L1\_swa-pas-hsk |
| Logical File id | 1 | solo\_L1\_swa-pas-hsk\_yyyymmdd\_V01 |
| Logical Source Description | 1 | SWA-PAS Housekeepings |
| Rules of Use | 1 | Consult with MSSL-UCL before using |
| Generated by | 1 | MSSL-UCL |
| Generation date | 1 | YYYY-MM-DDTHH:MN:SS |
| Mods | 1 | V01 First Version |
| Data Product | 1 | HSK>Housekeepings |
| Level | 1 | L1>Level 1 Data |
| Instrument | 1 | SWA-PAS>Solar-Wind-Analyser Proton-Analyser-Sensor |

**Variables**

|  |  |  |  |
| --- | --- | --- | --- |
| **Variable name** | **Variable type** | **Dimensions** | **Record vary** |
| Epoch | CDF\_TIME\_TT2000 | [] | True |
| SID\_counter | CDF\_UINT2 | [] | True |
| CCSDS\_coarse\_time | CDF\_UINT4 | [] | True |
| CCSDS\_fine\_time | CDF\_UINT2 | [] | True |
| SCET\_coarse\_time | CDF\_UINT4 | [] | True |
| SCET\_fine\_time | CDF\_UINT2 | [] | True |
| V\_MON\_C | CDF\_REAL4 | [] | True |
| V\_MON\_L | CDF\_REAL4 | [] | True |
| I\_MON\_C | CDF\_REAL4 | [] | True |
| I\_MON\_L | CDF\_REAL4 | [] | True |
| T\_MON\_C | CDF\_REAL4 | [] | True |
| T\_MON\_L | CDF\_REAL4 | [] | True |
| T1\_HEATHER | CDF\_REAL4 | [] | True |
| T2\_HEATHER | CDF\_REAL4 | [] | True |
| PLUS\_24\_V\_CEM\_OUT | CDF\_REAL4 | [] | True |
| PLUS\_5\_V\_CEM\_OUT | CDF\_REAL4 | [] | True |
| PLUS\_12\_V\_HT\_OUT | CDF\_REAL4 | [] | True |
| MINUS\_12\_V\_HT\_OUT | CDF\_REAL4 | [] | True |
| PLUS\_4V\_FPGA\_OUT | CDF\_REAL4 | [] | True |
| 2V5\_FPGA\_OUT | CDF\_REAL4 | [] | True |
| TEMP\_DCDC | CDF\_REAL4 | [] | True |
| TEMP\_FPGA | CDF\_REAL4 | [] | True |
| HK\_I\_PLUS\_24V\_CEM | CDF\_REAL4 | [] | True |
| HK\_I\_PLUS\_5V\_CEM | CDF\_REAL4 | [] | True |
| HK\_I\_PLUS\_12V\_HT | CDF\_REAL4 | [] | True |
| HK\_I\_MINUS\_12V\_HT | CDF\_REAL4 | [] | True |
| HK\_I\_PLUS\_5V\_FPGA | CDF\_REAL4 | [] | True |
| HK\_I\_PLUS\_28V\_PRI | CDF\_REAL4 | [] | True |
| HK\_I\_2V5\_FPGA | CDF\_REAL4 | [] | True |
| T3\_HEATHER | CDF\_REAL4 | [] | True |
| TEMP\_HVPS | CDF\_REAL4 | [] | True |
| TEMP\_EA | CDF\_REAL4 | [] | True |
| HK\_MHV\_POS | CDF\_REAL4 | [] | True |
| HK\_MHV\_NEG | CDF\_REAL4 | [] | True |
| HK\_ANL | CDF\_REAL4 | [] | True |
| HK\_TOP\_DEFL | CDF\_REAL4 | [] | True |
| HK\_TOP\_CAP | CDF\_REAL4 | [] | True |
| HK\_BOT\_DEFL | CDF\_REAL4 | [] | True |
| HEATER\_HK\_CHANNEL\_SELECT | CDF\_UINT1 | [] | True |
| OP\_HEATER\_ON | CDF\_UINT1 | [] | True |
| SEQ\_STATE\_RUNNING | CDF\_UINT1 | [] | True |
| UPLOADED | CDF\_UINT1 | [] | True |
| PRE\_AMP\_1\_OVER\_CURRENT | CDF\_UINT1 | [] | True |
| PRE\_AMP\_2\_OVER\_CURRENT | CDF\_UINT1 | [] | True |
| HV\_DISABLE | CDF\_UINT1 | [] | True |
| HV\_AIRSAFE | CDF\_UINT1 | [] | True |
| MEMORY\_ERROR\_COUNT | CDF\_UINT1 | [] | True |
| IDLE\_1 | CDF\_UINT1 | [] | True |
| IDLE\_2 | CDF\_UINT1 | [] | True |
| ANALYSER\_GAIN | CDF\_UINT1 | [] | True |
| BOTTOM\_DEF\_GAIN | CDF\_UINT1 | [] | True |
| TOP\_DEF\_GAIN | CDF\_UINT1 | [] | True |
| TOP\_CAP\_GAIN | CDF\_UINT1 | [] | True |
| BOTTOM\_DEF\_SIGN | CDF\_UINT1 | [] | True |
| TOP\_DEF\_SIGN | CDF\_UINT1 | [] | True |
| TOP\_CAP\_SIGN | CDF\_UINT1 | [] | True |
| SEQ\_INTERNAL\_STATUS | CDF\_UINT2 | [] | True |

**Detailed variable attributes**

|  |  |  |
| --- | --- | --- |
| Variable name | Epoch | |
| Attribute name | Data type | Value |
| CATDESC | CDF\_CHAR | Default time |
| FIELDNAM | CDF\_CHAR | Epoch |
| FILLVAL | CDF\_TIME\_TT2000 | 9999-12-31 23:59:59.999999 |
| LABLAXIS | CDF\_CHAR | Epoch |
| UNITS | CDF\_CHAR | ns |
| VALIDMIN | CDF\_TIME\_TT2000 | 01/01/1990 00:00 |
| VALIDMAX | CDF\_TIME\_TT2000 | 2029-12-31 23:59:59.999000 |
| VAR\_TYPE | CDF\_CHAR | support\_data |
| SCALETYP | CDF\_CHAR | linear |
| MONOTON | CDF\_CHAR | INCREASE |
| TIME\_BASE | CDF\_CHAR | J2000 |
| TIME\_SCALE | CDF\_CHAR | Terrestrial Time |
| REFERENCE\_POSITION | CDF\_CHAR | Rotating Earth Geoid |

|  |  |  |
| --- | --- | --- |
| Variable name | SID\_counter | |
| Attribute name | Data type | Value |
| CATDESC | CDF\_CHAR | SID\_COUNTER |
| DEPEND\_0 | CDF\_CHAR | Epoch |
| FIELDNAM | CDF\_CHAR | SID\_COUNTER |
| FILLVAL | CDF\_UINT2 | 65535 |
| FORMAT | CDF\_CHAR | I5 |
| LABLAXIS | CDF\_CHAR | SID\_COUNTER |
| VALIDMIN | CDF\_UINT2 | 0 |
| VALIDMAX | CDF\_UINT2 | 65535 |
| VAR\_TYPE | CDF\_CHAR | support\_data |
| SCALETYP | CDF\_CHAR | linear |

|  |  |  |
| --- | --- | --- |
| Variable name | CCSDS\_coarse\_time | |
| Attribute name | Data type | Value |
| CATDESC | CDF\_CHAR | CCSDS\_coarse\_time |
| DEPEND\_0 | CDF\_CHAR | Epoch |
| FIELDNAM | CDF\_CHAR | CCSDS\_coarse\_time |
| FILLVAL | CDF\_UINT4 | 4294967295 |
| FORMAT | CDF\_CHAR | I8 |
| LABLAXIS | CDF\_CHAR | CCSDS\_coarse\_time |
| VALIDMIN | CDF\_UINT4 | 0 |
| VALIDMAX | CDF\_UINT4 | 65534 |
| VAR\_TYPE | CDF\_CHAR | support\_data |
| SCALETYP | CDF\_CHAR | linear |

|  |  |  |
| --- | --- | --- |
| Variable name | CCSDS\_fine\_time | |
| Attribute name | Data type | Value |
| CATDESC | CDF\_CHAR | CCSDS\_fine\_time |
| DEPEND\_0 | CDF\_CHAR | Epoch |
| FIELDNAM | CDF\_CHAR | CCSDS\_fine\_time |
| FILLVAL | CDF\_UINT2 | 65535 |
| FORMAT | CDF\_CHAR | I5 |
| LABLAXIS | CDF\_CHAR | CCSDS\_fine\_time |
| VALIDMIN | CDF\_UINT2 | 0 |
| VALIDMAX | CDF\_UINT2 | 65534 |
| VAR\_TYPE | CDF\_CHAR | support\_data |
| SCALETYP | CDF\_CHAR | linear |

|  |  |  |
| --- | --- | --- |
| Variable name | SCET\_coarse\_time | |
| Attribute name | Data type | Value |
| CATDESC | CDF\_CHAR | SCET\_coarse\_time |
| DEPEND\_0 | CDF\_CHAR | Epoch |
| FIELDNAM | CDF\_CHAR | SCET\_coarse\_time |
| FILLVAL | CDF\_UINT4 | 4294967295 |
| FORMAT | CDF\_CHAR | I8 |
| LABLAXIS | CDF\_CHAR | SCET\_coarse\_time |
| VALIDMIN | CDF\_UINT4 | 0 |
| VALIDMAX | CDF\_UINT4 | 65534 |
| VAR\_TYPE | CDF\_CHAR | support\_data |
| SCALETYP | CDF\_CHAR | linear |

|  |  |  |
| --- | --- | --- |
| Variable name | SCET\_fine\_time | |
| Attribute name | Data type | Value |
| CATDESC | CDF\_CHAR | SCET\_fine\_time |
| DEPEND\_0 | CDF\_CHAR | Epoch |
| FIELDNAM | CDF\_CHAR | SCET\_fine\_time |
| FILLVAL | CDF\_UINT2 | 65535 |
| FORMAT | CDF\_CHAR | I5 |
| LABLAXIS | CDF\_CHAR | SCET\_fine\_time |
| VALIDMIN | CDF\_UINT2 | 0 |
| VALIDMAX | CDF\_UINT2 | 65534 |
| VAR\_TYPE | CDF\_CHAR | support\_data |
| SCALETYP | CDF\_CHAR | linear |

|  |  |  |
| --- | --- | --- |
| Variable name | V\_MON\_C | |
| Attribute name | Data type | Value |
| CATDESC | CDF\_CHAR | PAS CEM High Voltage channeltron 4->10 |
| DEPEND\_0 | CDF\_CHAR | Epoch |
| FIELDNAM | CDF\_CHAR | V\_MON\_C |
| FILLVAL | CDF\_REAL4 | -1,00E+31 |
| FORMAT | CDF\_CHAR | F8.3 |
| LABLAXIS | CDF\_CHAR | V\_MON\_C |
| UNITS | CDF\_CHAR | V |
| VALIDMIN | CDF\_REAL4 | 800.0 |
| VALIDMAX | CDF\_REAL4 | 2500.0 |
| VAR\_TYPE | CDF\_CHAR | support\_data |
| SCALETYP | CDF\_CHAR | linear |
| SCALEMIN | CDF\_REAL4 | 100.0 |
| SCALEMAX | CDF\_REAL4 | 3000.0 |

|  |  |  |
| --- | --- | --- |
| Variable name | V\_MON\_L | |
| Attribute name | Data type | Value |
| CATDESC | CDF\_CHAR | PAS CEM High Voltage channeltron 1-3-11 |
| DEPEND\_0 | CDF\_CHAR | Epoch |
| FIELDNAM | CDF\_CHAR | V\_MON\_L |
| FILLVAL | CDF\_REAL4 | -1,00E+31 |
| FORMAT | CDF\_CHAR | F8.3 |
| LABLAXIS | CDF\_CHAR | V\_MON\_L |
| UNITS | CDF\_CHAR | V |
| VALIDMIN | CDF\_REAL4 | 800.0 |
| VALIDMAX | CDF\_REAL4 | 2500.0 |
| VAR\_TYPE | CDF\_CHAR | support\_data |
| SCALETYP | CDF\_CHAR | linear |
| SCALEMIN | CDF\_REAL4 | 100.0 |
| SCALEMAX | CDF\_REAL4 | 3000.0 |

|  |  |  |
| --- | --- | --- |
| Variable name | I\_MON\_C | |
| Attribute name | Data type | Value |
| CATDESC | CDF\_CHAR | PAS CEM current channeltron 4->10 |
| DEPEND\_0 | CDF\_CHAR | Epoch |
| FIELDNAM | CDF\_CHAR | I\_MON\_C |
| FILLVAL | CDF\_REAL4 | -1,00E+31 |
| FORMAT | CDF\_CHAR | F8.3 |
| LABLAXIS | CDF\_CHAR | I\_MON\_C |
| UNITS | CDF\_CHAR | mA |
| VALIDMIN | CDF\_REAL4 | 50.0 |
| VALIDMAX | CDF\_REAL4 | 220.0 |
| VAR\_TYPE | CDF\_CHAR | support\_data |
| SCALETYP | CDF\_CHAR | linear |
| SCALEMIN | CDF\_REAL4 | 0.0 |
| SCALEMAX | CDF\_REAL4 | 300.0 |

|  |  |  |
| --- | --- | --- |
| Variable name | I\_MON\_L | |
| Attribute name | Data type | Value |
| CATDESC | CDF\_CHAR | PAS CEM current channeltron 1-3-11 |
| DEPEND\_0 | CDF\_CHAR | Epoch |
| FIELDNAM | CDF\_CHAR | I\_MON\_L |
| FILLVAL | CDF\_REAL4 | -1,00E+31 |
| FORMAT | CDF\_CHAR | F8.3 |
| LABLAXIS | CDF\_CHAR | I\_MON\_L |
| UNITS | CDF\_CHAR | mA |
| VALIDMIN | CDF\_REAL4 | 0.0 |
| VALIDMAX | CDF\_REAL4 | 120.0 |
| VAR\_TYPE | CDF\_CHAR | support\_data |
| SCALETYP | CDF\_CHAR | linear |
| SCALEMIN | CDF\_REAL4 | 0.0 |
| SCALEMAX | CDF\_REAL4 | 200.0 |

|  |  |  |
| --- | --- | --- |
| Variable name | T\_MON\_C | |
| Attribute name | Data type | Value |
| CATDESC | CDF\_CHAR | PAS CEM board temperature channeltron 4->10 |
| DEPEND\_0 | CDF\_CHAR | Epoch |
| FIELDNAM | CDF\_CHAR | T\_MON\_C |
| FILLVAL | CDF\_REAL4 | -1,00E+31 |
| FORMAT | CDF\_CHAR | F8.3 |
| LABLAXIS | CDF\_CHAR | T\_MON\_C |
| UNITS | CDF\_CHAR | deg.C |
| VALIDMIN | CDF\_REAL4 | -50.0 |
| VALIDMAX | CDF\_REAL4 | 65.0 |
| VAR\_TYPE | CDF\_CHAR | support\_data |
| SCALETYP | CDF\_CHAR | linear |
| SCALEMIN | CDF\_REAL4 | -100.0 |
| SCALEMAX | CDF\_REAL4 | 100.0 |

|  |  |  |
| --- | --- | --- |
| Variable name | T\_MON\_L | |
| Attribute name | Data type | Value |
| CATDESC | CDF\_CHAR | PAS CEM board temperature channeltron 1-3-11 |
| DEPEND\_0 | CDF\_CHAR | Epoch |
| FIELDNAM | CDF\_CHAR | T\_MON\_L |
| FILLVAL | CDF\_REAL4 | -1,00E+31 |
| FORMAT | CDF\_CHAR | F8.3 |
| LABLAXIS | CDF\_CHAR | T\_MON\_L |
| UNITS | CDF\_CHAR | deg.C |
| VALIDMIN | CDF\_REAL4 | -50.0 |
| VALIDMAX | CDF\_REAL4 | 65.0 |
| VAR\_TYPE | CDF\_CHAR | support\_data |
| SCALETYP | CDF\_CHAR | linear |
| SCALEMIN | CDF\_REAL4 | -100.0 |
| SCALEMAX | CDF\_REAL4 | 100.0 |

|  |  |  |
| --- | --- | --- |
| Variable name | T1\_HEATHER | |
| Attribute name | Data type | Value |
| CATDESC | CDF\_CHAR | PAS CEM Operationnal heater temp1 |
| DEPEND\_0 | CDF\_CHAR | Epoch |
| FIELDNAM | CDF\_CHAR | T1\_HEATHER |
| FILLVAL | CDF\_REAL4 | -1,00E+31 |
| FORMAT | CDF\_CHAR | E12.2 |
| LABLAXIS | CDF\_CHAR | T1\_HEATHER |
| UNITS | CDF\_CHAR | deg.C |
| VALIDMIN | CDF\_REAL4 | -1,00E+30 |
| VALIDMAX | CDF\_REAL4 | -1,00E+30 |
| VAR\_TYPE | CDF\_CHAR | support\_data |
| SCALETYP | CDF\_CHAR | linear |

|  |  |  |
| --- | --- | --- |
| Variable name | T2\_HEATHER | |
| Attribute name | Data type | Value |
| CATDESC | CDF\_CHAR | PAS CEM Operationnal heater temp2 |
| DEPEND\_0 | CDF\_CHAR | Epoch |
| FIELDNAM | CDF\_CHAR | T2\_HEATHER |
| FILLVAL | CDF\_REAL4 | -1,00E+31 |
| FORMAT | CDF\_CHAR | E12.2 |
| LABLAXIS | CDF\_CHAR | T2\_HEATHER |
| UNITS | CDF\_CHAR | deg.C |
| VALIDMIN | CDF\_REAL4 | -1,00E+30 |
| VALIDMAX | CDF\_REAL4 | -1,00E+30 |
| VAR\_TYPE | CDF\_CHAR | support\_data |
| SCALETYP | CDF\_CHAR | linear |

|  |  |  |
| --- | --- | --- |
| Variable name | PLUS\_24\_V\_CEM\_OUT | |
| Attribute name | Data type | Value |
| CATDESC | CDF\_CHAR | PAS +24V CEM voltage |
| DEPEND\_0 | CDF\_CHAR | Epoch |
| FIELDNAM | CDF\_CHAR | PLUS\_24\_V\_CEM\_OUT |
| FILLVAL | CDF\_REAL4 | -1,00E+31 |
| FORMAT | CDF\_CHAR | E12.2 |
| LABLAXIS | CDF\_CHAR | PLUS\_24\_V\_CEM\_OUT |
| UNITS | CDF\_CHAR | V |
| VALIDMIN | CDF\_REAL4 | 21.0 |
| VALIDMAX | CDF\_REAL4 | 30.0 |
| VAR\_TYPE | CDF\_CHAR | support\_data |
| SCALETYP | CDF\_CHAR | linear |

|  |  |  |
| --- | --- | --- |
| Variable name | PLUS\_5\_V\_CEM\_OUT | |
| Attribute name | Data type | Value |
| CATDESC | CDF\_CHAR | PAS +5V voltage |
| DEPEND\_0 | CDF\_CHAR | Epoch |
| FIELDNAM | CDF\_CHAR | PLUS\_5\_V\_CEM\_OUT |
| FILLVAL | CDF\_REAL4 | -1,00E+31 |
| FORMAT | CDF\_CHAR | E12.2 |
| LABLAXIS | CDF\_CHAR | PLUS\_5\_V\_CEM\_OUT |
| UNITS | CDF\_CHAR | V |
| VALIDMIN | CDF\_REAL4 | 4.0 |
| VALIDMAX | CDF\_REAL4 | 6.0 |
| VAR\_TYPE | CDF\_CHAR | support\_data |
| SCALETYP | CDF\_CHAR | linear |

|  |  |  |
| --- | --- | --- |
| Variable name | PLUS\_12\_V\_HT\_OUT | |
| Attribute name | Data type | Value |
| CATDESC | CDF\_CHAR | PAS +12V voltage |
| DEPEND\_0 | CDF\_CHAR | Epoch |
| FIELDNAM | CDF\_CHAR | PLUS\_12\_V\_HT\_OUT |
| FILLVAL | CDF\_REAL4 | -1,00E+31 |
| FORMAT | CDF\_CHAR | E12.2 |
| LABLAXIS | CDF\_CHAR | PLUS\_12\_V\_HT\_OUT |
| UNITS | CDF\_CHAR | V |
| VALIDMIN | CDF\_REAL4 | 10.0 |
| VALIDMAX | CDF\_REAL4 | 16.0 |
| VAR\_TYPE | CDF\_CHAR | support\_data |
| SCALETYP | CDF\_CHAR | linear |

|  |  |  |
| --- | --- | --- |
| Variable name | MINUS\_12\_V\_HT\_OUT | |
| Attribute name | Data type | Value |
| CATDESC | CDF\_CHAR | PAS -12V voltage |
| DEPEND\_0 | CDF\_CHAR | Epoch |
| FIELDNAM | CDF\_CHAR | MINUS\_12\_V\_HT\_OUT |
| FILLVAL | CDF\_REAL4 | -1,00E+31 |
| FORMAT | CDF\_CHAR | E12.2 |
| LABLAXIS | CDF\_CHAR | MINUS\_12\_V\_HT\_OUT |
| UNITS | CDF\_CHAR | V |
| VALIDMIN | CDF\_REAL4 | 10.0 |
| VALIDMAX | CDF\_REAL4 | 16.0 |
| VAR\_TYPE | CDF\_CHAR | support\_data |
| SCALETYP | CDF\_CHAR | linear |

|  |  |  |
| --- | --- | --- |
| Variable name | PLUS\_4V\_FPGA\_OUT | |
| Attribute name | Data type | Value |
| CATDESC | CDF\_CHAR | PAS +4V FPGA voltage |
| DEPEND\_0 | CDF\_CHAR | Epoch |
| FIELDNAM | CDF\_CHAR | PLUS\_4V\_FPGA\_OUT |
| FILLVAL | CDF\_REAL4 | -1,00E+31 |
| FORMAT | CDF\_CHAR | E12.2 |
| LABLAXIS | CDF\_CHAR | PLUS\_4V\_FPGA\_OUT |
| UNITS | CDF\_CHAR | V |
| VALIDMIN | CDF\_REAL4 | 3.0 |
| VALIDMAX | CDF\_REAL4 | 4.0 |
| VAR\_TYPE | CDF\_CHAR | support\_data |
| SCALETYP | CDF\_CHAR | linear |

|  |  |  |
| --- | --- | --- |
| Variable name | 2V5\_FPGA\_OUT | |
| Attribute name | Data type | Value |
| CATDESC | CDF\_CHAR | PAS +2.5V FPGA voltage |
| DEPEND\_0 | CDF\_CHAR | Epoch |
| FIELDNAM | CDF\_CHAR | 2V5\_FPGA\_OUT |
| FILLVAL | CDF\_REAL4 | -1,00E+31 |
| FORMAT | CDF\_CHAR | E12.2 |
| LABLAXIS | CDF\_CHAR | 2V5\_FPGA\_OUT |
| UNITS | CDF\_CHAR | V |
| VALIDMIN | CDF\_REAL4 | 1.3 |
| VALIDMAX | CDF\_REAL4 | 3.0 |
| VAR\_TYPE | CDF\_CHAR | support\_data |
| SCALETYP | CDF\_CHAR | linear |

|  |  |  |
| --- | --- | --- |
| Variable name | TEMP\_DCDC | |
| Attribute name | Data type | Value |
| CATDESC | CDF\_CHAR | PAS DC/DC board temperature |
| DEPEND\_0 | CDF\_CHAR | Epoch |
| FIELDNAM | CDF\_CHAR | TEMP\_DCDC |
| FILLVAL | CDF\_REAL4 | -1,00E+31 |
| FORMAT | CDF\_CHAR | E12.2 |
| LABLAXIS | CDF\_CHAR | TEMP\_DCDC |
| UNITS | CDF\_CHAR | deg.C |
| VALIDMIN | CDF\_REAL4 | -50.0 |
| VALIDMAX | CDF\_REAL4 | 60.0 |
| VAR\_TYPE | CDF\_CHAR | support\_data |
| SCALETYP | CDF\_CHAR | linear |

|  |  |  |
| --- | --- | --- |
| Variable name | TEMP\_FPGA | |
| Attribute name | Data type | Value |
| CATDESC | CDF\_CHAR | PAS FPGA board temperature |
| DEPEND\_0 | CDF\_CHAR | Epoch |
| FIELDNAM | CDF\_CHAR | TEMP\_FPGA |
| FILLVAL | CDF\_REAL4 | -1,00E+31 |
| FORMAT | CDF\_CHAR | E12.2 |
| LABLAXIS | CDF\_CHAR | TEMP\_FPGA |
| UNITS | CDF\_CHAR | deg.C |
| VALIDMIN | CDF\_REAL4 | -50.0 |
| VALIDMAX | CDF\_REAL4 | 55.0 |
| VAR\_TYPE | CDF\_CHAR | support\_data |
| SCALETYP | CDF\_CHAR | linear |

|  |  |  |
| --- | --- | --- |
| Variable name | HK\_I\_PLUS\_24V\_CEM | |
| Attribute name | Data type | Value |
| CATDESC | CDF\_CHAR | PAS +24V CEM current |
| DEPEND\_0 | CDF\_CHAR | Epoch |
| FIELDNAM | CDF\_CHAR | HK\_I\_PLUS\_24V\_CEM |
| FILLVAL | CDF\_REAL4 | -1,00E+31 |
| FORMAT | CDF\_CHAR | E12.2 |
| LABLAXIS | CDF\_CHAR | HK\_I\_PLUS\_24V\_CEM |
| UNITS | CDF\_CHAR | mA |
| VALIDMIN | CDF\_REAL4 | 5.0 |
| VALIDMAX | CDF\_REAL4 | 50.0 |
| VAR\_TYPE | CDF\_CHAR | support\_data |
| SCALETYP | CDF\_CHAR | linear |

|  |  |  |
| --- | --- | --- |
| Variable name | HK\_I\_PLUS\_5V\_CEM | |
| Attribute name | Data type | Value |
| CATDESC | CDF\_CHAR | PAS +5V current |
| DEPEND\_0 | CDF\_CHAR | Epoch |
| FIELDNAM | CDF\_CHAR | HK\_I\_PLUS\_5V\_CEM |
| FILLVAL | CDF\_REAL4 | -1,00E+31 |
| FORMAT | CDF\_CHAR | E12.2 |
| LABLAXIS | CDF\_CHAR | HK\_I\_PLUS\_5V\_CEM |
| UNITS | CDF\_CHAR | mA |
| VALIDMIN | CDF\_REAL4 | 0.5 |
| VALIDMAX | CDF\_REAL4 | 100.0 |
| VAR\_TYPE | CDF\_CHAR | support\_data |
| SCALETYP | CDF\_CHAR | linear |

|  |  |  |
| --- | --- | --- |
| Variable name | HK\_I\_PLUS\_12V\_HT | |
| Attribute name | Data type | Value |
| CATDESC | CDF\_CHAR | PAS +12V current |
| DEPEND\_0 | CDF\_CHAR | Epoch |
| FIELDNAM | CDF\_CHAR | HK\_I\_PLUS\_12V\_HT |
| FILLVAL | CDF\_REAL4 | -1,00E+31 |
| FORMAT | CDF\_CHAR | E12.2 |
| LABLAXIS | CDF\_CHAR | HK\_I\_PLUS\_12V\_HT |
| UNITS | CDF\_CHAR | mA |
| VALIDMIN | CDF\_REAL4 | 40.0 |
| VALIDMAX | CDF\_REAL4 | 80.0 |
| VAR\_TYPE | CDF\_CHAR | support\_data |
| SCALETYP | CDF\_CHAR | linear |

|  |  |  |
| --- | --- | --- |
| Variable name | HK\_I\_MINUS\_12V\_HT | |
| Attribute name | Data type | Value |
| CATDESC | CDF\_CHAR | PAS -12V current |
| DEPEND\_0 | CDF\_CHAR | Epoch |
| FIELDNAM | CDF\_CHAR | HK\_I\_MINUS\_12V\_HT |
| FILLVAL | CDF\_REAL4 | -1,00E+31 |
| FORMAT | CDF\_CHAR | E12.2 |
| LABLAXIS | CDF\_CHAR | HK\_I\_MINUS\_12V\_HT |
| UNITS | CDF\_CHAR | mA |
| VALIDMIN | CDF\_REAL4 | 30.0 |
| VALIDMAX | CDF\_REAL4 | 70.0 |
| VAR\_TYPE | CDF\_CHAR | support\_data |
| SCALETYP | CDF\_CHAR | linear |

|  |  |  |
| --- | --- | --- |
| Variable name | HK\_I\_PLUS\_5V\_FPGA | |
| Attribute name | Data type | Value |
| CATDESC | CDF\_CHAR | PAS +5V FPGA current |
| DEPEND\_0 | CDF\_CHAR | Epoch |
| FIELDNAM | CDF\_CHAR | HK\_I\_PLUS\_5V\_FPGA |
| FILLVAL | CDF\_REAL4 | -1,00E+31 |
| FORMAT | CDF\_CHAR | E12.2 |
| LABLAXIS | CDF\_CHAR | HK\_I\_PLUS\_5V\_FPGA |
| UNITS | CDF\_CHAR | mA |
| VALIDMIN | CDF\_REAL4 | 25.0 |
| VALIDMAX | CDF\_REAL4 | 50.0 |
| VAR\_TYPE | CDF\_CHAR | support\_data |
| SCALETYP | CDF\_CHAR | linear |

|  |  |  |
| --- | --- | --- |
| Variable name | HK\_I\_PLUS\_28V\_PRI | |
| Attribute name | Data type | Value |
| CATDESC | CDF\_CHAR | PAS +28V primary current |
| DEPEND\_0 | CDF\_CHAR | Epoch |
| FIELDNAM | CDF\_CHAR | HK\_I\_PLUS\_28V\_PRI |
| FILLVAL | CDF\_REAL4 | -1,00E+31 |
| FORMAT | CDF\_CHAR | E12.2 |
| LABLAXIS | CDF\_CHAR | HK\_I\_PLUS\_28V\_PRI |
| UNITS | CDF\_CHAR | mA |
| VALIDMIN | CDF\_REAL4 | 120.0 |
| VALIDMAX | CDF\_REAL4 | 450.0 |
| VAR\_TYPE | CDF\_CHAR | support\_data |
| SCALETYP | CDF\_CHAR | linear |

|  |  |  |
| --- | --- | --- |
| Variable name | HK\_I\_2V5\_FPGA | |
| Attribute name | Data type | Value |
| CATDESC | CDF\_CHAR | PAS +2.5V FPGA current |
| DEPEND\_0 | CDF\_CHAR | Epoch |
| FIELDNAM | CDF\_CHAR | HK\_I\_2V5\_FPGA |
| FILLVAL | CDF\_REAL4 | -1,00E+31 |
| FORMAT | CDF\_CHAR | E12.2 |
| LABLAXIS | CDF\_CHAR | HK\_I\_2V5\_FPGA |
| UNITS | CDF\_CHAR | mA |
| VALIDMIN | CDF\_REAL4 | 100.0 |
| VALIDMAX | CDF\_REAL4 | 180.0 |
| VAR\_TYPE | CDF\_CHAR | support\_data |
| SCALETYP | CDF\_CHAR | linear |

|  |  |  |
| --- | --- | --- |
| Variable name | T3\_HEATHER | |
| Attribute name | Data type | Value |
| CATDESC | CDF\_CHAR | PAS MB Operational Heater (Transistor) Temperature |
| DEPEND\_0 | CDF\_CHAR | Epoch |
| FIELDNAM | CDF\_CHAR | T3\_HEATHER |
| FILLVAL | CDF\_REAL4 | -1,00E+31 |
| FORMAT | CDF\_CHAR | E12.2 |
| LABLAXIS | CDF\_CHAR | T3\_HEATHER |
| UNITS | CDF\_CHAR | deg.C |
| VALIDMIN | CDF\_REAL4 | -1,00E+30 |
| VALIDMAX | CDF\_REAL4 | -1,00E+30 |
| VAR\_TYPE | CDF\_CHAR | support\_data |
| SCALETYP | CDF\_CHAR | linear |

|  |  |  |
| --- | --- | --- |
| Variable name | TEMP\_HVPS | |
| Attribute name | Data type | Value |
| CATDESC | CDF\_CHAR | PAS HV Temperature Analyzer Entry |
| DEPEND\_0 | CDF\_CHAR | Epoch |
| FIELDNAM | CDF\_CHAR | TEMP\_HVPS |
| FILLVAL | CDF\_REAL4 | -1,00E+31 |
| FORMAT | CDF\_CHAR | E12.2 |
| LABLAXIS | CDF\_CHAR | TEMP\_HVPS |
| UNITS | CDF\_CHAR | deg.C |
| VALIDMIN | CDF\_REAL4 | -50.0 |
| VALIDMAX | CDF\_REAL4 | 55.0 |
| VAR\_TYPE | CDF\_CHAR | support\_data |
| SCALETYP | CDF\_CHAR | linear |

|  |  |  |
| --- | --- | --- |
| Variable name | TEMP\_EA | |
| Attribute name | Data type | Value |
| CATDESC | CDF\_CHAR | PAS Temperature HV EA board |
| DEPEND\_0 | CDF\_CHAR | Epoch |
| FIELDNAM | CDF\_CHAR | TEMP\_EA |
| FILLVAL | CDF\_REAL4 | -1,00E+31 |
| FORMAT | CDF\_CHAR | E12.2 |
| LABLAXIS | CDF\_CHAR | TEMP\_EA |
| UNITS | CDF\_CHAR | deg.C |
| VALIDMIN | CDF\_REAL4 | -1,00E+30 |
| VALIDMAX | CDF\_REAL4 | -1,00E+30 |
| VAR\_TYPE | CDF\_CHAR | support\_data |
| SCALETYP | CDF\_CHAR | linear |

|  |  |  |
| --- | --- | --- |
| Variable name | HK\_MHV\_POS | |
| Attribute name | Data type | Value |
| CATDESC | CDF\_CHAR | PAS HV MHV positive voltage monitor |
| DEPEND\_0 | CDF\_CHAR | Epoch |
| FIELDNAM | CDF\_CHAR | HK\_MHV\_POS |
| FILLVAL | CDF\_REAL4 | -1,00E+31 |
| FORMAT | CDF\_CHAR | E12.2 |
| LABLAXIS | CDF\_CHAR | HK\_MHV\_POS |
| UNITS | CDF\_CHAR | V |
| VALIDMIN | CDF\_REAL4 | 6000.0 |
| VALIDMAX | CDF\_REAL4 | 6500.0 |
| VAR\_TYPE | CDF\_CHAR | support\_data |
| SCALETYP | CDF\_CHAR | linear |

|  |  |  |
| --- | --- | --- |
| Variable name | HK\_MHV\_NEG | |
| Attribute name | Data type | Value |
| CATDESC | CDF\_CHAR | PAS HV MHV negative voltage monitor |
| DEPEND\_0 | CDF\_CHAR | Epoch |
| FIELDNAM | CDF\_CHAR | HK\_MHV\_NEG |
| FILLVAL | CDF\_REAL4 | -1,00E+31 |
| FORMAT | CDF\_CHAR | E12.2 |
| LABLAXIS | CDF\_CHAR | HK\_MHV\_NEG |
| UNITS | CDF\_CHAR | V |
| VALIDMIN | CDF\_REAL4 | 6000.0 |
| VALIDMAX | CDF\_REAL4 | 6500.0 |
| VAR\_TYPE | CDF\_CHAR | support\_data |
| SCALETYP | CDF\_CHAR | linear |

|  |  |  |
| --- | --- | --- |
| Variable name | HK\_ANL | |
| Attribute name | Data type | Value |
| CATDESC | CDF\_CHAR | PAS HV Analyzer voltage monitor |
| DEPEND\_0 | CDF\_CHAR | Epoch |
| FIELDNAM | CDF\_CHAR | HK\_ANL |
| FILLVAL | CDF\_REAL4 | -1,00E+31 |
| FORMAT | CDF\_CHAR | E12.2 |
| LABLAXIS | CDF\_CHAR | HK\_ANL |
| UNITS | CDF\_CHAR | V |
| VALIDMIN | CDF\_REAL4 | -1,00E+30 |
| VALIDMAX | CDF\_REAL4 | -1,00E+30 |
| VAR\_TYPE | CDF\_CHAR | support\_data |
| SCALETYP | CDF\_CHAR | linear |

|  |  |  |
| --- | --- | --- |
| Variable name | HK\_TOP\_DEFL | |
| Attribute name | Data type | Value |
| CATDESC | CDF\_CHAR | PAS HV Top deflector voltage monitor |
| DEPEND\_0 | CDF\_CHAR | Epoch |
| FIELDNAM | CDF\_CHAR | HK\_TOP\_DEFL |
| FILLVAL | CDF\_REAL4 | -1,00E+31 |
| FORMAT | CDF\_CHAR | E12.2 |
| LABLAXIS | CDF\_CHAR | HK\_TOP\_DEFL |
| UNITS | CDF\_CHAR | V |
| VALIDMIN | CDF\_REAL4 | -1,00E+30 |
| VALIDMAX | CDF\_REAL4 | -1,00E+30 |
| VAR\_TYPE | CDF\_CHAR | support\_data |
| SCALETYP | CDF\_CHAR | linear |

|  |  |  |
| --- | --- | --- |
| Variable name | HK\_TOP\_CAP | |
| Attribute name | Data type | Value |
| CATDESC | CDF\_CHAR | PAS HV Top plate voltage monitor |
| DEPEND\_0 | CDF\_CHAR | Epoch |
| FIELDNAM | CDF\_CHAR | HK\_TOP\_CAP |
| FILLVAL | CDF\_REAL4 | -1,00E+31 |
| FORMAT | CDF\_CHAR | E12.2 |
| LABLAXIS | CDF\_CHAR | HK\_TOP\_CAP |
| UNITS | CDF\_CHAR | V |
| VALIDMIN | CDF\_REAL4 | -1,00E+30 |
| VALIDMAX | CDF\_REAL4 | -1,00E+30 |
| VAR\_TYPE | CDF\_CHAR | support\_data |
| SCALETYP | CDF\_CHAR | linear |

|  |  |  |
| --- | --- | --- |
| Variable name | HK\_BOT\_DEFL | |
| Attribute name | Data type | Value |
| CATDESC | CDF\_CHAR | PAS HV Bottom deflector voltage monitor |
| DEPEND\_0 | CDF\_CHAR | Epoch |
| FIELDNAM | CDF\_CHAR | HK\_BOT\_DEFL |
| FILLVAL | CDF\_REAL4 | -1,00E+31 |
| FORMAT | CDF\_CHAR | E12.2 |
| LABLAXIS | CDF\_CHAR | HK\_BOT\_DEFL |
| UNITS | CDF\_CHAR | V |
| VALIDMIN | CDF\_REAL4 | -1,00E+30 |
| VALIDMAX | CDF\_REAL4 | -1,00E+30 |
| VAR\_TYPE | CDF\_CHAR | support\_data |
| SCALETYP | CDF\_CHAR | linear |

|  |  |  |
| --- | --- | --- |
| Variable name | HEATER\_HK\_CHANNEL\_SELECT | |
| Attribute name | Data type | Value |
| CATDESC | CDF\_CHAR | HEATER HK CHANNEL SELECT |
| DEPEND\_0 | CDF\_CHAR | Epoch |
| FIELDNAM | CDF\_CHAR | HEATER\_HK\_CHANNEL\_SELECT |
| FILLVAL | CDF\_UINT1 | 255 |
| FORMAT | CDF\_CHAR | I3 |
| LABLAXIS | CDF\_CHAR | HEATER HK CHANNEL SELECT |
| UNITS | CDF\_CHAR | unitless |
| VALIDMIN | CDF\_UINT1 | 0 |
| VALIDMAX | CDF\_UINT1 | 254 |
| VAR\_TYPE | CDF\_CHAR | support\_data |
| SCALETYP | CDF\_CHAR | linear |

|  |  |  |
| --- | --- | --- |
| Variable name | OP\_HEATER\_ON | |
| Attribute name | Data type | Value |
| CATDESC | CDF\_CHAR | OP HEATER ON |
| DEPEND\_0 | CDF\_CHAR | Epoch |
| FIELDNAM | CDF\_CHAR | OP\_HEATER\_ON |
| FILLVAL | CDF\_UINT1 | 255 |
| FORMAT | CDF\_CHAR | I3 |
| LABLAXIS | CDF\_CHAR | OP HEATER ON |
| UNITS | CDF\_CHAR | unitless |
| VALIDMIN | CDF\_UINT1 | 0 |
| VALIDMAX | CDF\_UINT1 | 254 |
| VAR\_TYPE | CDF\_CHAR | support\_data |
| SCALETYP | CDF\_CHAR | linear |

|  |  |  |
| --- | --- | --- |
| Variable name | SEQ\_STATE\_RUNNING | |
| Attribute name | Data type | Value |
| CATDESC | CDF\_CHAR | SEQ STATE RUNNING |
| DEPEND\_0 | CDF\_CHAR | Epoch |
| FIELDNAM | CDF\_CHAR | SEQ\_STATE\_RUNNING |
| FILLVAL | CDF\_UINT1 | 255 |
| FORMAT | CDF\_CHAR | I3 |
| LABLAXIS | CDF\_CHAR | SEQ STATE RUNNING |
| UNITS | CDF\_CHAR | unitless |
| VALIDMIN | CDF\_UINT1 | 0 |
| VALIDMAX | CDF\_UINT1 | 254 |
| VAR\_TYPE | CDF\_CHAR | support\_data |
| SCALETYP | CDF\_CHAR | linear |

|  |  |  |
| --- | --- | --- |
| Variable name | UPLOADED | |
| Attribute name | Data type | Value |
| CATDESC | CDF\_CHAR | UPLOADED |
| DEPEND\_0 | CDF\_CHAR | Epoch |
| FIELDNAM | CDF\_CHAR | UPLOADED |
| FILLVAL | CDF\_UINT1 | 255 |
| FORMAT | CDF\_CHAR | I3 |
| LABLAXIS | CDF\_CHAR | UPLOADED |
| UNITS | CDF\_CHAR | unitless |
| VALIDMIN | CDF\_UINT1 | 0 |
| VALIDMAX | CDF\_UINT1 | 254 |
| VAR\_TYPE | CDF\_CHAR | support\_data |
| SCALETYP | CDF\_CHAR | linear |

|  |  |  |
| --- | --- | --- |
| Variable name | PRE\_AMP\_1\_OVER\_CURRENT | |
| Attribute name | Data type | Value |
| CATDESC | CDF\_CHAR | PRE AMP 1 OVER CURRENT |
| DEPEND\_0 | CDF\_CHAR | Epoch |
| FIELDNAM | CDF\_CHAR | PRE\_AMP\_1\_OVER\_CURRENT |
| FILLVAL | CDF\_UINT1 | 255 |
| FORMAT | CDF\_CHAR | I3 |
| LABLAXIS | CDF\_CHAR | PRE AMP 1 OVER CURRENT |
| UNITS | CDF\_CHAR | unitless |
| VALIDMIN | CDF\_UINT1 | 0 |
| VALIDMAX | CDF\_UINT1 | 254 |
| VAR\_TYPE | CDF\_CHAR | support\_data |
| SCALETYP | CDF\_CHAR | linear |

|  |  |  |
| --- | --- | --- |
| Variable name | PRE\_AMP\_2\_OVER\_CURRENT | |
| Attribute name | Data type | Value |
| CATDESC | CDF\_CHAR | PRE AMP 2 OVER CURRENT |
| DEPEND\_0 | CDF\_CHAR | Epoch |
| FIELDNAM | CDF\_CHAR | PRE\_AMP\_2\_OVER\_CURRENT |
| FILLVAL | CDF\_UINT1 | 255 |
| FORMAT | CDF\_CHAR | I3 |
| LABLAXIS | CDF\_CHAR | PRE AMP 2 OVER CURRENT |
| UNITS | CDF\_CHAR | unitless |
| VALIDMIN | CDF\_UINT1 | 0 |
| VALIDMAX | CDF\_UINT1 | 254 |
| VAR\_TYPE | CDF\_CHAR | support\_data |
| SCALETYP | CDF\_CHAR | linear |

|  |  |  |
| --- | --- | --- |
| Variable name | HV\_DISABLE | |
| Attribute name | Data type | Value |
| CATDESC | CDF\_CHAR | HV DISABLE |
| DEPEND\_0 | CDF\_CHAR | Epoch |
| FIELDNAM | CDF\_CHAR | HV\_DISABLE |
| FILLVAL | CDF\_UINT1 | 255 |
| FORMAT | CDF\_CHAR | I3 |
| LABLAXIS | CDF\_CHAR | HV DISABLE |
| UNITS | CDF\_CHAR | unitless |
| VALIDMIN | CDF\_UINT1 | 0 |
| VALIDMAX | CDF\_UINT1 | 254 |
| VAR\_TYPE | CDF\_CHAR | support\_data |
| SCALETYP | CDF\_CHAR | linear |

|  |  |  |
| --- | --- | --- |
| Variable name | HV\_AIRSAFE | |
| Attribute name | Data type | Value |
| CATDESC | CDF\_CHAR | HV AIRSAFE |
| DEPEND\_0 | CDF\_CHAR | Epoch |
| FIELDNAM | CDF\_CHAR | HV\_AIRSAFE |
| FILLVAL | CDF\_UINT1 | 255 |
| FORMAT | CDF\_CHAR | I3 |
| LABLAXIS | CDF\_CHAR | HV AIRSAFE |
| UNITS | CDF\_CHAR | unitless |
| VALIDMIN | CDF\_UINT1 | 0 |
| VALIDMAX | CDF\_UINT1 | 254 |
| VAR\_TYPE | CDF\_CHAR | support\_data |
| SCALETYP | CDF\_CHAR | linear |

|  |  |  |
| --- | --- | --- |
| Variable name | MEMORY\_ERROR\_COUNT | |
| Attribute name | Data type | Value |
| CATDESC | CDF\_CHAR | MEMORY ERROR COUNT |
| DEPEND\_0 | CDF\_CHAR | Epoch |
| FIELDNAM | CDF\_CHAR | MEMORY\_ERROR\_COUNT |
| FILLVAL | CDF\_UINT1 | 255 |
| FORMAT | CDF\_CHAR | I3 |
| LABLAXIS | CDF\_CHAR | MEMORY ERROR COUNT |
| UNITS | CDF\_CHAR | unitless |
| VALIDMIN | CDF\_UINT1 | 0 |
| VALIDMAX | CDF\_UINT1 | 254 |
| VAR\_TYPE | CDF\_CHAR | support\_data |
| SCALETYP | CDF\_CHAR | linear |

|  |  |  |
| --- | --- | --- |
| Variable name | IDLE\_1 | |
| Attribute name | Data type | Value |
| CATDESC | CDF\_CHAR | IDLE 1 |
| FIELDNAM | CDF\_CHAR | IDLE\_1 |
| FILLVAL | CDF\_UINT1 | 255 |
| FORMAT | CDF\_CHAR | I3 |
| LABLAXIS | CDF\_CHAR | IDLE 1 |
| UNITS | CDF\_CHAR | unitless |
| VALIDMIN | CDF\_UINT1 | 0 |
| VALIDMAX | CDF\_UINT1 | 254 |
| VAR\_TYPE | CDF\_CHAR | support\_data |
| SCALETYP | CDF\_CHAR | linear |

|  |  |  |
| --- | --- | --- |
| Variable name | IDLE\_2 | |
| Attribute name | Data type | Value |
| CATDESC | CDF\_CHAR | IDLE 2 |
| DEPEND\_0 | CDF\_CHAR | Epoch |
| FIELDNAM | CDF\_CHAR | IDLE\_2 |
| FILLVAL | CDF\_UINT1 | 255 |
| FORMAT | CDF\_CHAR | I3 |
| LABLAXIS | CDF\_CHAR | IDLE 2 |
| UNITS | CDF\_CHAR | unitless |
| VALIDMIN | CDF\_UINT1 | 0 |
| VALIDMAX | CDF\_UINT1 | 254 |
| VAR\_TYPE | CDF\_CHAR | support\_data |
| SCALETYP | CDF\_CHAR | linear |

|  |  |  |
| --- | --- | --- |
| Variable name | ANALYSER\_GAIN | |
| Attribute name | Data type | Value |
| CATDESC | CDF\_CHAR | ANALYSER GAIN |
| DEPEND\_0 | CDF\_CHAR | Epoch |
| FIELDNAM | CDF\_CHAR | ANALYSER\_GAIN |
| FILLVAL | CDF\_UINT1 | 255 |
| FORMAT | CDF\_CHAR | I3 |
| LABLAXIS | CDF\_CHAR | ANALYSER GAIN |
| UNITS | CDF\_CHAR | unitless |
| VALIDMIN | CDF\_UINT1 | 0 |
| VALIDMAX | CDF\_UINT1 | 254 |
| VAR\_TYPE | CDF\_CHAR | support\_data |
| SCALETYP | CDF\_CHAR | linear |

|  |  |  |
| --- | --- | --- |
| Variable name | BOTTOM\_DEF\_GAIN | |
| Attribute name | Data type | Value |
| CATDESC | CDF\_CHAR | BOTTOM DEF GAIN |
| DEPEND\_0 | CDF\_CHAR | Epoch |
| FIELDNAM | CDF\_CHAR | BOTTOM\_DEF\_GAIN |
| FILLVAL | CDF\_UINT1 | 255 |
| FORMAT | CDF\_CHAR | I3 |
| LABLAXIS | CDF\_CHAR | BOTTOM DEF GAIN |
| UNITS | CDF\_CHAR | unitless |
| VALIDMIN | CDF\_UINT1 | 0 |
| VALIDMAX | CDF\_UINT1 | 254 |
| VAR\_TYPE | CDF\_CHAR | support\_data |
| SCALETYP | CDF\_CHAR | linear |

|  |  |  |
| --- | --- | --- |
| Variable name | TOP\_DEF\_GAIN | |
| Attribute name | Data type | Value |
| CATDESC | CDF\_CHAR | TOP DEF GAIN |
| DEPEND\_0 | CDF\_CHAR | Epoch |
| FIELDNAM | CDF\_CHAR | TOP\_DEF\_GAIN |
| FILLVAL | CDF\_UINT1 | 255 |
| FORMAT | CDF\_CHAR | I3 |
| LABLAXIS | CDF\_CHAR | TOP DEF GAIN |
| UNITS | CDF\_CHAR | unitless |
| VALIDMIN | CDF\_UINT1 | 0 |
| VALIDMAX | CDF\_UINT1 | 254 |
| VAR\_TYPE | CDF\_CHAR | support\_data |
| SCALETYP | CDF\_CHAR | linear |

|  |  |  |
| --- | --- | --- |
| Variable name | TOP\_CAP\_GAIN | |
| Attribute name | Data type | Value |
| CATDESC | CDF\_CHAR | TOP CAP GAIN |
| DEPEND\_0 | CDF\_CHAR | Epoch |
| FIELDNAM | CDF\_CHAR | TOP\_CAP\_GAIN |
| FILLVAL | CDF\_UINT1 | 255 |
| FORMAT | CDF\_CHAR | I3 |
| LABLAXIS | CDF\_CHAR | TOP CAP GAIN |
| UNITS | CDF\_CHAR | unitless |
| VALIDMIN | CDF\_UINT1 | 0 |
| VALIDMAX | CDF\_UINT1 | 254 |
| VAR\_TYPE | CDF\_CHAR | support\_data |
| SCALETYP | CDF\_CHAR | linear |

|  |  |  |
| --- | --- | --- |
| Variable name | BOTTOM\_DEF\_SIGN | |
| Attribute name | Data type | Value |
| CATDESC | CDF\_CHAR | BOTTOM DEF SIGN |
| DEPEND\_0 | CDF\_CHAR | Epoch |
| FIELDNAM | CDF\_CHAR | BOTTOM\_DEF\_SIGN |
| FILLVAL | CDF\_UINT1 | 255 |
| FORMAT | CDF\_CHAR | I3 |
| LABLAXIS | CDF\_CHAR | BOTTOM DEF SIGN |
| UNITS | CDF\_CHAR | unitless |
| VALIDMIN | CDF\_UINT1 | 0 |
| VALIDMAX | CDF\_UINT1 | 254 |
| VAR\_TYPE | CDF\_CHAR | support\_data |
| SCALETYP | CDF\_CHAR | linear |

|  |  |  |
| --- | --- | --- |
| Variable name | TOP\_DEF\_SIGN | |
| Attribute name | Data type | Value |
| CATDESC | CDF\_CHAR | TOP DEF SIGN |
| DEPEND\_0 | CDF\_CHAR | Epoch |
| FIELDNAM | CDF\_CHAR | TOP\_DEF\_SIGN |
| FILLVAL | CDF\_UINT1 | 255 |
| FORMAT | CDF\_CHAR | I3 |
| LABLAXIS | CDF\_CHAR | TOP DEF SIGN |
| UNITS | CDF\_CHAR | unitless |
| VALIDMIN | CDF\_UINT1 | 0 |
| VALIDMAX | CDF\_UINT1 | 254 |
| VAR\_TYPE | CDF\_CHAR | support\_data |
| SCALETYP | CDF\_CHAR | linear |

|  |  |  |
| --- | --- | --- |
| Variable name | TOP\_CAP\_SIGN | |
| Attribute name | Data type | Value |
| CATDESC | CDF\_CHAR | TOP CAP SIGN |
| DEPEND\_0 | CDF\_CHAR | Epoch |
| FIELDNAM | CDF\_CHAR | TOP\_CAP\_SIGN |
| FILLVAL | CDF\_UINT1 | 255 |
| FORMAT | CDF\_CHAR | I3 |
| LABLAXIS | CDF\_CHAR | TOP CAP SIGN |
| UNITS | CDF\_CHAR | unitless |
| VALIDMIN | CDF\_UINT1 | 0 |
| VALIDMAX | CDF\_UINT1 | 254 |
| VAR\_TYPE | CDF\_CHAR | support\_data |
| SCALETYP | CDF\_CHAR | linear |

|  |  |  |
| --- | --- | --- |
| Variable name | SEQ\_INTERNAL\_STATUS | |
| Attribute name | Data type | Value |
| CATDESC | CDF\_CHAR | SEQ INTERNAL STATUS |
| FIELDNAM | CDF\_CHAR | SEQ\_INTERNAL\_STATUS |
| FILLVAL | CDF\_UINT2 | 65535 |
| FORMAT | CDF\_CHAR | I5 |
| LABLAXIS | CDF\_CHAR | SEQ INTERNAL STATUS |
| VALIDMIN | CDF\_UINT2 | 0 |
| VALIDMAX | CDF\_UINT2 | 65534 |
| VAR\_TYPE | CDF\_CHAR | support\_data |
| SCALETYP | CDF\_CHAR | linear |

##### PAS inflight calibration files

**Filename:** solo\_L1\_swa-pas-cal\_yyyymmdd\_V01.cdf

**Global metadata**

|  |  |  |
| --- | --- | --- |
| Name | Entry | Value |
| Project | 1 | Solar Orbiter |
| Project | 2 | Cosmic Visions |
| Source Name | 1 | SOLO>Solar Orbiter |
| Discipline | 1 | Space Physics>Interplanetary Studies |
| Data Type | 1 | L1>Level 1 Data |
| Descriptor | 1 | SWA-PAS-CAL |
| Data Version | 1 | 01 |
| Software Version | 1 | 01.00.00 |
| PI Name | 1 | C. J. Owen |
| PI Affiliation | 1 | MSSL-UCL, University College London, UK |
| Instrument Type | 1 | Plasma and Solar Wind |
| Mission Group | 1 | Solar Orbiter |
| Logical Source | 1 | solo\_L1\_swa-pas-cal |
| Logical File id | 1 | solo\_L1\_swa-pas-cal\_yyyymmdd\_V01 |
| Logical Source Description | 1 | SWA-PAS Inflight calibrations |
| Rules of Use | 1 | Consult with MSSL-UCL before using |
| Generated by | 1 | MSSL-UCL |
| Generation date | 1 | YYYY-MM-DDTHH:MN:SS |
| Mods | 1 | V01 First Version |
| Data Product | 1 | CAL>Inglight calibrations |
| Level | 1 | L1>Level 1 Data |
| Instrument | 1 | SWA-PAS>Solar-Wind-Analyser Proton-Analyser-Sensor |

**Variables**

|  |  |  |  |
| --- | --- | --- | --- |
| **Variable name** | **Variable type** | **Dimensions** | **Record vary** |
| Epoch | CDF\_TIME\_TT2000 | [] | True |
| CCSDS\_coarse\_time | CDF\_UINT4 | [] | True |
| CCSDS\_fine\_time | CDF\_UINT2 | [] | True |
| SCET\_coarse\_time | CDF\_UINT4 | [] | True |
| SCET\_fine\_time | CDF\_UINT2 | [] | True |
| START | CDF\_UINT2 | [] | True |
| FINAL | CDF\_UINT2 | [] | True |
| CURRENT | CDF\_UINT2 | [] | True |
| ACQUISITION | CDF\_UINT2 | [] | True |
| NB\_ACQUISITION | CDF\_UINT2 | [] | True |
| STEP | CDF\_UINT2 | [] | True |
| MAX\_EN | CDF\_UINT2 | [] | True |
| MAX\_EL | CDF\_UINT2 | [] | True |
| MAX\_CEM | CDF\_UINT2 | [] | True |
| MAX\_COUNT | CDF\_UINT2 | [] | True |

**Detailed variable attributes**

|  |  |  |
| --- | --- | --- |
| Variable name | Epoch | |
| Attribute name | Data type | Value |
| CATDESC | CDF\_CHAR | Default time |
| FIELDNAM | CDF\_CHAR | Epoch |
| FILLVAL | CDF\_TIME\_TT2000 | 9999-12-31 23:59:59.999999 |
| LABLAXIS | CDF\_CHAR | Epoch |
| UNITS | CDF\_CHAR | ns |
| VALIDMIN | CDF\_TIME\_TT2000 | 2000-01-01 00:00:00:000000 |
| VALIDMAX | CDF\_TIME\_TT2000 | 2029-12-31 23:59:59.999000 |
| VAR\_TYPE | CDF\_CHAR | support\_data |
| SCALETYP | CDF\_CHAR | linear |
| MONOTON | CDF\_CHAR | INCREASE |
| TIME\_BASE | CDF\_CHAR | J2000 |
| TIME\_SCALE | CDF\_CHAR | Terrestrial Time |
| REFERENCE\_POSITION | CDF\_CHAR | Rotating Earth Geoid |

|  |  |  |
| --- | --- | --- |
| Variable name | CCSDS\_coarse\_time | |
| Attribute name | Data type | Value |
| CATDESC | CDF\_CHAR | CCSDS\_coarse\_time |
| DEPEND\_0 | CDF\_CHAR | Epoch |
| FIELDNAM | CDF\_CHAR | CCSDS\_coarse\_time |
| FILLVAL | CDF\_UINT4 | 4294967295 |
| FORMAT | CDF\_CHAR | I8 |
| LABLAXIS | CDF\_CHAR | |
| VALIDMIN | CDF\_UINT4 | 4294967294 |
| VALIDMAX | CDF\_UINT4 | 4294967294 |
| VAR\_TYPE | CDF\_CHAR | support\_data |
| SCALETYP | CDF\_CHAR | linear |

|  |  |  |
| --- | --- | --- |
| Variable name | CCSDS\_fine\_time | |
| Attribute name | Data type | Value |
| CATDESC | CDF\_CHAR | CCSDS\_fine\_time |
| DEPEND\_0 | CDF\_CHAR | Epoch |
| FIELDNAM | CDF\_CHAR | CCSDS\_fine\_time |
| FILLVAL | CDF\_UINT2 | 65535 |
| FORMAT | CDF\_CHAR | I5 |
| LABLAXIS | CDF\_CHAR | CCSDS\_fine\_time |
| VALIDMIN | CDF\_UINT2 | 65534 |
| VALIDMAX | CDF\_UINT2 | 65534 |
| VAR\_TYPE | CDF\_CHAR | support\_data |
| SCALETYP | CDF\_CHAR | linear |

|  |  |  |
| --- | --- | --- |
| Variable name | SCET\_coarse\_time | |
| Attribute name | Data type | Value |
| CATDESC | CDF\_CHAR | SCET\_coarse\_time |
| DEPEND\_0 | CDF\_CHAR | Epoch |
| FIELDNAM | CDF\_CHAR | SCET\_coarse\_time |
| FILLVAL | CDF\_UINT4 | 4294967295 |
| FORMAT | CDF\_CHAR | I8 |
| LABLAXIS | CDF\_CHAR | SCET\_coarse\_time |
| VALIDMIN | CDF\_UINT4 | 4294967294 |
| VALIDMAX | CDF\_UINT4 | 4294967294 |
| VAR\_TYPE | CDF\_CHAR | support\_data |
| SCALETYP | CDF\_CHAR | linear |

|  |  |  |
| --- | --- | --- |
| Variable name | SCET\_fine\_time | |
| Attribute name | Data type | Value |
| CATDESC | CDF\_CHAR | SCET\_fine\_time |
| DEPEND\_0 | CDF\_CHAR | Epoch |
| FIELDNAM | CDF\_CHAR | SCET\_fine\_time |
| FILLVAL | CDF\_UINT2 | 65535 |
| FORMAT | CDF\_CHAR | I5 |
| LABLAXIS | CDF\_CHAR | SCET\_fine\_time |
| VALIDMIN | CDF\_UINT2 | 65534 |
| VALIDMAX | CDF\_UINT2 | 65534 |
| VAR\_TYPE | CDF\_CHAR | support\_data |
| SCALETYP | CDF\_CHAR | linear |

|  |  |  |
| --- | --- | --- |
| Variable name | START | |
| Attribute name | Data type | Value |
| CATDESC | CDF\_CHAR | START |
| DEPEND\_0 | CDF\_CHAR | Epoch |
| FIELDNAM | CDF\_CHAR | START |
| FILLVAL | CDF\_UINT2 | 65535 |
| FORMAT | CDF\_CHAR | I5 |
| LABLAXIS | CDF\_CHAR | START |
| UNITS | CDF\_CHAR | unitless |
| VALIDMIN | CDF\_UINT2 | 0 |
| VALIDMAX | CDF\_UINT2 | 65534 |
| VAR\_TYPE | CDF\_CHAR | support\_data |
| SCALETYP | CDF\_CHAR | linear |

|  |  |  |
| --- | --- | --- |
| Variable name | FINAL | |
| Attribute name | Data type | Value |
| CATDESC | CDF\_CHAR | FINAL |
| DEPEND\_0 | CDF\_CHAR | Epoch |
| FIELDNAM | CDF\_CHAR | FINAL |
| FILLVAL | CDF\_UINT2 | 65535 |
| FORMAT | CDF\_CHAR | I5 |
| LABLAXIS | CDF\_CHAR | FINAL |
| UNITS | CDF\_CHAR | unitless |
| VALIDMIN | CDF\_UINT2 | 0 |
| VALIDMAX | CDF\_UINT2 | 65534 |
| VAR\_TYPE | CDF\_CHAR | support\_data |
| SCALETYP | CDF\_CHAR | linear |

|  |  |  |
| --- | --- | --- |
| Variable name | CURRENT | |
| Attribute name | Data type | Value |
| CATDESC | CDF\_CHAR | CURRENT |
| DEPEND\_0 | CDF\_CHAR | Epoch |
| FIELDNAM | CDF\_CHAR | CURRENT |
| FILLVAL | CDF\_UINT2 | 65535 |
| FORMAT | CDF\_CHAR | I5 |
| LABLAXIS | CDF\_CHAR | CURRENT |
| UNITS | CDF\_CHAR | unitless |
| VALIDMIN | CDF\_UINT2 | 0 |
| VALIDMAX | CDF\_UINT2 | 65534 |
| VAR\_TYPE | CDF\_CHAR | support\_data |
| SCALETYP | CDF\_CHAR | linear |

|  |  |  |
| --- | --- | --- |
| Variable name | ACQUISITION | |
| Attribute name | Data type | Value |
| CATDESC | CDF\_CHAR | ACQUISITION |
| DEPEND\_0 | CDF\_CHAR | Epoch |
| FIELDNAM | CDF\_CHAR | ACQUISITION |
| FILLVAL | CDF\_UINT2 | 65535 |
| FORMAT | CDF\_CHAR | I5 |
| LABLAXIS | CDF\_CHAR | ACQUISITION |
| UNITS | CDF\_CHAR | unitless |
| VALIDMIN | CDF\_UINT2 | 0 |
| VALIDMAX | CDF\_UINT2 | 65534 |
| VAR\_TYPE | CDF\_CHAR | support\_data |
| SCALETYP | CDF\_CHAR | linear |

|  |  |  |
| --- | --- | --- |
| Variable name | NB\_ACQUISITION | |
| Attribute name | Data type | Value |
| CATDESC | CDF\_CHAR | NB\_ACQUISITION |
| DEPEND\_0 | CDF\_CHAR | Epoch |
| FIELDNAM | CDF\_CHAR | NB\_ACQUISITION |
| FILLVAL | CDF\_UINT2 | 65535 |
| FORMAT | CDF\_CHAR | I5 |
| LABLAXIS | CDF\_CHAR | NB\_ACQUISITION |
| UNITS | CDF\_CHAR | unitless |
| VALIDMIN | CDF\_UINT2 | 0 |
| VALIDMAX | CDF\_UINT2 | 65534 |
| VAR\_TYPE | CDF\_CHAR | support\_data |
| SCALETYP | CDF\_CHAR | linear |

|  |  |  |
| --- | --- | --- |
| Variable name | STEP | |
| Attribute name | Data type | Value |
| CATDESC | CDF\_CHAR | STEP |
| DEPEND\_0 | CDF\_CHAR | Epoch |
| FIELDNAM | CDF\_CHAR | STEP |
| FILLVAL | CDF\_UINT2 | 65535 |
| FORMAT | CDF\_CHAR | I5 |
| LABLAXIS | CDF\_CHAR | STEP |
| UNITS | CDF\_CHAR | unitless |
| VALIDMIN | CDF\_UINT2 | 0 |
| VALIDMAX | CDF\_UINT2 | 65534 |
| VAR\_TYPE | CDF\_CHAR | support\_data |
| SCALETYP | CDF\_CHAR | linear |

|  |  |  |
| --- | --- | --- |
| Variable name | MAX\_EN | |
| Attribute name | Data type | Value |
| CATDESC | CDF\_CHAR | MAX\_EN |
| DEPEND\_0 | CDF\_CHAR | Epoch |
| FIELDNAM | CDF\_CHAR | MAX\_EN |
| FILLVAL | CDF\_UINT2 | 65535 |
| FORMAT | CDF\_CHAR | I5 |
| LABLAXIS | CDF\_CHAR | MAX\_EN |
| UNITS | CDF\_CHAR | unitless |
| VALIDMIN | CDF\_UINT2 | 0 |
| VALIDMAX | CDF\_UINT2 | 65534 |
| VAR\_TYPE | CDF\_CHAR | support\_data |

|  |  |  |
| --- | --- | --- |
| Variable name | MAX\_EL | |
| Attribute name | Data type | Value |
| CATDESC | CDF\_CHAR | MAX\_EL |
| DEPEND\_0 | CDF\_CHAR | Epoch |
| FIELDNAM | CDF\_CHAR | MAX\_EL |
| FILLVAL | CDF\_UINT2 | 65535 |
| FORMAT | CDF\_CHAR | I5 |
| LABLAXIS | CDF\_CHAR | MAX\_EL |
| UNITS | CDF\_CHAR | unitless |
| VALIDMIN | CDF\_UINT2 | 0 |
| VALIDMAX | CDF\_UINT2 | 65534 |
| VAR\_TYPE | CDF\_CHAR | support\_data |

|  |  |  |
| --- | --- | --- |
| Variable name | MAX\_CEM | |
| Attribute name | Data type | Value |
| CATDESC | CDF\_CHAR | MAX\_CEM |
| DEPEND\_0 | CDF\_CHAR | Epoch |
| FIELDNAM | CDF\_CHAR | MAX\_CEM |
| FILLVAL | CDF\_UINT2 | 65535 |
| FORMAT | CDF\_CHAR | I5 |
| LABLAXIS | CDF\_CHAR | MAX\_CEM |
| UNITS | CDF\_CHAR | unitless |
| VALIDMIN | CDF\_UINT2 | 0 |
| VALIDMAX | CDF\_UINT2 | 65534 |
| VAR\_TYPE | CDF\_CHAR | support\_data |

|  |  |  |
| --- | --- | --- |
| Variable name | MAX\_COUNT | |
| Attribute name | Data type | Value |
| CATDESC | CDF\_CHAR | MAX\_COUNT |
| DEPEND\_0 | CDF\_CHAR | Epoch |
| FIELDNAM | CDF\_CHAR | MAX\_COUNT |
| FILLVAL | CDF\_UINT2 | 65535 |
| FORMAT | CDF\_CHAR | I5 |
| LABLAXIS | CDF\_CHAR | MAX\_COUNT |
| UNITS | CDF\_CHAR | unitless |
| VALIDMIN | CDF\_UINT2 | 0 |
| VALIDMAX | CDF\_UINT2 | 65534 |
| VAR\_TYPE | CDF\_CHAR | support\_data |

#### HIS L1 products

HIS L1 products directly reflect data produced on the spacecraft, decompressed, decoded and unpacked into CDF variables.

NOTE: HIS L1 data are still being finalized and not yet publicly available.

##### HIS L1 Sensor Rate Data

**Filename:** solo\_L1\_swa-his-rates\_yyyymmdd\_V01.cdf

**Global metadata**

|  |  |  |
| --- | --- | --- |
| **Name** | **Entry** | **Value** |
| Acknowledgement | 1 | Please acknowledge Chris J. Owen (SWA PI -- UCL MSSL) & Stefano Livi (HIS PI -- SwRI). NASA Contract NNG10EK25C. |
| Data\_product | 1 | Rates> Rates data for HIS instrument |
| Data\_type | 1 | rates\_l1 |
| Data\_version | 1 | 01 |
| Descriptor | 1 | SWA-HIS>Solar Wind Analyzer-Heavy Ion Sensor |
| Discipline | 1 | Space Physics>Interplanetary Studies |
| File\_naming\_convention | 1 | "source\_descriptor\_datatype\_yyyyMMdd |
| Generated\_by | 1 | SO-HIS SOC, University of Michigan |
| Generation\_date | 1 | 20200611 |
| HTTP\_LINK |  |  |
| Instrument\_type | 1 | Particles (space) |
| LEVEL | 1 | 1 |
| LINK\_TEXT |  |  |
| LINK\_TITLE |  |  |
| Logical\_file\_id | 1 | solo\_L1\_swa-his-rates\_00000000\_v01 |
| Logical\_source | 1 | solo\_L1\_swa-his-rates |
| Logical\_source\_description | 1 | solo\_L1\_swa-his-rates |
| Mission\_group | 1 | Solar Orbiter |
| MODS | 1 | Initial Release 6/18/2020. |
| PI\_affiliation | 1 | SWRI |
| PI\_name | 1 | S. Livi |
| Project | 1 | SOLO>Solar Orbiter |
| Rules\_of\_use | 1 | Confidential, for use only within HIS team. Not for publication. |
| Software\_version | 1 | 00.00.00 |
| SOOP\_TYPE |  |  |
| Source\_name | 1 | SOLO>Solar Orbiter |
| spase\_DatasetResourceID |  |  |
| TARGET\_CLASS | 1 | In-Situ |
| TARGET\_NAME | 1 | Solar Wind |
| TARGET\_REGION | 1 | Heliosphere |
| TEXT | 1 | Rate data for HIS instrument |
|  | 2 | Counts of unclassified ion event words on the HIS detectors (start MCP, stop MCP, SSD) as a function of E/q, integrated over incident angles, TOF and Energy. Includes full counts of events subject to decimation. Rates also include two coincidence rates, the number of events with a valid TOF and energy (triple coincidence), and a count of those with only a valid TOF (double coincidence). These rates are primarily used to evaluate the performance of the instrument, rather than for science. In particular, they can be used for calculation of ion detection efficiency in-flight [von Steiger et al., 2000]. The resolution of this data product can be 30s or 300s. In Burst mode the resolution can be 4s but this can only be run on average 1% of the time due to telemetry constraints. |
|  | 3 | Level 1 data are unvalidated and requires substantial processing to use for publication. |
| TIME\_MAX | 1 |  |
| TIME\_MIN | 1 |  |
| Time\_resolution | 1 | 4 sec, 30 sec, or 300 sec |

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Variable\_Name** | **Data\_type** | **DIMS** | **SIZES** | **R\_VARY** | **D\_VARY** |
| EPOCH | CDF\_TIME\_TT2000 | 1 | 0 | T |  |
| **Attribute Name** | **Data Type** | **Value** | | | |
| CATDESC | CDF\_CHAR | Default time | | | |
| FIELDNAM | CDF\_CHAR | EPOCH | | | |
| FILLVAL | CDF\_TIME\_TT2000 | 9999-12-31T23:59:59.999999999 | | | |
| LABLAXIS | CDF\_CHAR | EPOCH | | | |
| MONOTON | CDF\_CHAR | INCREASE | | | |
| REFERENCE\_POSITION | CDF\_CHAR | Rotating Earth Geoid | | | |
| SCALETYP | CDF\_CHAR | linear | | | |
| TIME\_BASE | CDF\_CHAR | J2000 | | | |
| TIME\_SCALE | CDF\_CHAR | Terrestrial Time | | | |
| UNITS | CDF\_CHAR | ns | | | |
| VALIDMAX | CDF\_TIME\_TT2000 | 2049-12-31T23:59:59.999000000 | | | |
| VALIDMIN | CDF\_TIME\_TT2000 | 1990-01-01T00:00:00.000000000 | | | |
| VAR\_NOTES | CDF\_CHAR | Time in seconds since January 1, 2000, 12:00:00.000. Converted from SCET via SPICE time kernel provided by the mission. Currently set to start of accumulation interval. | | | |
| VAR\_TYPE | CDF\_CHAR | support\_data | | | |

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Variable\_Name** | **Data\_type** | **DIMS** | **SIZES** | **R\_VARY** | **D\_VARY** |
| SCET | CDF\_REAL8 | 1 | 0 | T |  |
| **Attribute Name** | **Data Type** | **Value** | | | |
| CATDESC | CDF\_CHAR | SCET | | | |
| DEPEND\_0 | CDF\_CHAR | EPOCH | | | |
| FIELDNAM | CDF\_CHAR | SCET | | | |
| FILLVAL | CDF\_REAL8 | -1.00E+31 | | | |
| FORMAT | CDF\_CHAR | E12.2 | | | |
| LABLAXIS | CDF\_CHAR | SCET | | | |
| SCALEMAX | CDF\_REAL8 | 8.00E+12 | | | |
| SCALEMIN | CDF\_REAL8 | 5.00E+12 | | | |
| SCALETYP | CDF\_CHAR | linear | | | |
| UNITS | CDF\_CHAR | milliseconds | | | |
| VALIDMAX | CDF\_REAL8 | 1.00E+14 | | | |
| VALIDMIN | CDF\_REAL8 | 0 | | | |
| VAR\_NOTES | CDF\_CHAR | Mission elapsed time in spacecraft clock ticks. Note: These are effected by environmental conditions and do not match Earth-based seconds. Beginning of accumulation. | | | |
| VAR\_TYPE | CDF\_CHAR | support\_data | | | |

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Variable\_Name** | **Data\_type** | **DIMS** | **SIZES** | **R\_VARY** | **D\_VARY** |
| ACCUM\_SECONDS | CDF\_REAL8 | 1 | 0 | T |  |
| **Attribute Name** | **Data Type** | **Value** | | | |
| CATDESC | CDF\_CHAR | ACCUM\_SECONDS | | | |
| DEPEND\_0 | CDF\_CHAR | EPOCH | | | |
| FIELDNAM | CDF\_CHAR | ACCUM\_SECONDS | | | |
| FILLVAL | CDF\_REAL8 | -1.00E+31 | | | |
| FORMAT | CDF\_CHAR | E12.2 | | | |
| LABLAXIS | CDF\_CHAR | ACCUM\_SECONDS | | | |
| SCALEMAX | CDF\_REAL8 | 0.3 | | | |
| SCALEMIN | CDF\_REAL8 | 0.003 | | | |
| SCALETYP | CDF\_CHAR | linear | | | |
| UNITS | CDF\_CHAR | seconds | | | |
| VALIDMAX | CDF\_REAL8 | 0.3 | | | |
| VALIDMIN | CDF\_REAL8 | 0.003 | | | |
| VAR\_NOTES | CDF\_CHAR | Accumulation time in seconds for each E/q and elevation step | | | |
| VAR\_TYPE | CDF\_CHAR | support\_data | | | |

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| **Variable\_Name** | **Data\_type** | **DIMS** | **SIZES** | **R\_VARY** | **D\_VARY** |
| QUALITY\_FLAG | CDF\_UINT1 | 1 | 0 | T |  |
| **Attribute Name** | **Data Type** | **Value** | | | |
| CATDESC | CDF\_CHAR | QUALITY\_FLAG | | | |
| DEPEND\_0 | CDF\_CHAR | EPOCH | | | |
| DISPLAY\_TYPE | CDF\_CHAR | time\_series | | | |
| FIELDNAM | CDF\_CHAR | QUALITY\_FLAG | | | |
| FILLVAL | CDF\_UINT1 | 255 | | | |
| FORMAT | CDF\_CHAR | I3 | | | |
| LABLAXIS | CDF\_CHAR | QUALITY\_FLAG | | | |
| SCALEMAX | CDF\_UINT1 | 3 | | | |
| SCALEMIN | CDF\_UINT1 | 0 | | | |
| SCALETYP | CDF\_CHAR | linear | | | |
| UNITS | CDF\_CHAR | NONE | | | |
| VALIDMAX | CDF\_UINT1 | 2 | | | |
| VALIDMIN | CDF\_UINT1 | 0 | | | |
| VAR\_NOTES | CDF\_CHAR | 0=good, 1=caution, 2=bad | | | |
| VAR\_TYPE | CDF\_CHAR | support\_data | | | |

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| **Variable\_Name** | **Data\_type** | **DIMS** | **SIZES** | **R\_VARY** | **D\_VARY** |
| QUALITY\_BITMASK | CDF\_UINT2 | 1 | 0 | T |  |
| **Attribute Name** | **Data Type** | **Value** | | | |
| CATDESC | CDF\_CHAR | QUALITY\_BITMASK | | | |
| DEPEND\_0 | CDF\_CHAR | EPOCH | | | |
| DISPLAY\_TYPE | CDF\_CHAR | time\_series | | | |
| FIELDNAM | CDF\_CHAR | QUALITY\_BITMASK | | | |
| FILLVAL | CDF\_UINT2 | 65535 | | | |
| FORMAT | CDF\_CHAR | I5 | | | |
| LABLAXIS | CDF\_CHAR | QUALITY\_BITMASK | | | |
| SCALEMAX | CDF\_UINT2 | 32 | | | |
| SCALEMIN | CDF\_UINT2 | 0 | | | |
| SCALETYP | CDF\_CHAR | linear | | | |
| UNITS | CDF\_CHAR | NONE | | | |
| VALIDMAX | CDF\_UINT2 | 31 | | | |
| VALIDMIN | CDF\_UINT2 | 0 | | | |
| VAR\_NOTES | CDF\_CHAR | 0:No Issue, 1:Proton Avoidance Triggered, 2:No PHAs Telemetered in Range (range 6/7 prior to Auguest 2020), 4:Elevation Step(s) not represented, 8:Saturation of Input Buffer, 16: Buffer Over Ran. | | | |
| VAR\_TYPE | CDF\_CHAR | support\_data | | | |

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| **Variable\_Name** | **Data\_type** | **DIMS** | **SIZES** | **R\_VARY** | **D\_VARY** |
| MODE | CDF\_UINT1 | 1 | 0 | T |  |
| **Attribute Name** | **Data Type** | **Value** | | | |
| CATDESC | CDF\_CHAR | Mode. 0: Normal Science, 1: Burst 1, 2: Burst 2, 3: Low Cadence. | | | |
| DEPEND\_0 | CDF\_CHAR | EPOCH | | | |
| FIELDNAM | CDF\_CHAR | MODE | | | |
| FILLVAL | CDF\_UINT1 | 255 | | | |
| FORMAT | CDF\_CHAR | I3 | | | |
| LABLAXIS | CDF\_CHAR | MODE | | | |
| SCALEMAX | CDF\_UINT1 | 5 | | | |
| SCALEMIN | CDFUINT1 | 0 | | | |
| SCALETYP | CDF\_CHAR | linear | | | |
| UNITS | CDF\_CHAR | NONE | | | |
| VALIDMAX | CDF\_UINT1 | 3 | | | |
| VALIDMIN | CDF\_UINT1 | 0 | | | |
| VAR\_NOTES | CDF\_CHAR | Normal: Full E/q range in nominal 30 sec scan, Burst1: E/q range optimized for slower solar wind in nominal 4 sec scan, Burst2: E/q range optimized for faster solar wind in nominal 4 sec scan, Low Cadence: Full E/q range in nominal 300 sec scan. | | | |
| VAR\_TYPE | CDF\_CHAR | support\_data | | | |

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| **Variable\_Name** | **Data\_type** | **DIMS** | **SIZES** | **R\_VARY** | **D\_VARY** |
| COMPRESSION\_CODE | CDF\_UINT2 | 1 | 0 | T |  |
| **Attribute Name** | **Data Type** | **Value** | | | |
| CATDESC | CDF\_CHAR | Compression Code Bitmask | | | |
| DEPEND\_0 | CDF\_CHAR | EPOCH | | | |
| FIELDNAM | CDF\_CHAR | COMPRESSION\_CODE | | | |
| FILLVAL | CDF\_UINT2 | 65535 | | | |
| FORMAT | CDF\_CHAR | I5 | | | |
| LABLAXIS | CDF\_CHAR | COMPRESSION\_CODE | | | |
| SCALEMAX | CDF\_UINT2 | 2100 | | | |
| SCALEMIN | CDF\_UINT2 | 0 | | | |
| SCALETYP | CDF\_CHAR | linear | | | |
| UNITS | CDF\_CHAR | NONE | | | |
| VALIDMAX | CDF\_UINT2 | 2047 | | | |
| VALIDMIN | CDF\_UINT2 | 0 | | | |
| VAR\_NOTES | CDF\_CHAR | Compression code bitmask. 0 = Lossy A, 1 = Lossy C. Bits: 0:SSD, 1:Priorities, 2:Starts, 3:Stops, 4:Double Coincidence, 5:Triple Coincidence, 6:Low TOF, 7:Alpha Decimation, 8:Proton Decimation, 9:Position A Singles, 10:Position B Singles. | | | |
| VAR\_TYPE | CDF\_CHAR | support\_data | | | |

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| **Variable\_Name** | **Data\_type** | **DIMS** | **SIZES** | **R\_VARY** | **D\_VARY** |
| STEP\_TABLE | CDF\_UINT1 | **0** |  | **T** |  |
| **Attribute Name** | **Data Type** | **Value** | | | |
| CATDESC | CDF\_CHAR | Step table | | | |
| DEPEND\_0 | CDF\_CHAR | EPOCH | | | |
| DISPLAY\_TYPE | CDF\_CHAR | time\_series | | | |
| FIELDNAM | CDF\_CHAR | STEP\_TABLE | | | |
| FILLVAL | CDF\_UINT1 | 255 | | | |
| FORMAT | CDF\_CHAR | I3 | | | |
| LABLAXIS | CDF\_CHAR | STEP\_TABLE | | | |
| SCALEMAX | CDF\_UINT1 | 20 | | | |
| SCALEMIN | CDF\_UINT1 | 0 | | | |
| SCALETYP | CDF\_CHAR | linear | | | |
| UNITS | CDF\_CHAR | NONE | | | |
| VALIDMAX | CDF\_UINT1 | 15 | | | |
| VALIDMIN | CDF\_UINT1 | 0 | | | |
| VAR\_NOTES | CDF\_CHAR | Science Configuration Packet’s HV Sweep Scan Control Table Identification Number | | | |
| VAR\_TYPE | CDF\_CHAR | support\_data | | | |

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| **Variable\_Name** | **Data\_type** | **DIMS** | **SIZES** | **R\_VARY** | **D\_VARY** |
| MAIN\_ENABLES | CDF\_UINT2 | **0** |  | **T** |  |
| **Attribute Name** | **Data Type** | **Value** | | | |
| CATDESC | CDF\_CHAR | Main enables | | | |
| DEPEND\_0 | CDF\_CHAR | EPOCH | | | |
| DISPLAY\_TYPE | CDF\_CHAR | time\_series | | | |
| FIELDNAM | CDF\_CHAR | MAIN\_ENABLES | | | |
| FILLVAL | CDF\_UINT2 | 65535 | | | |
| FORMAT | CDF\_CHAR | I5 | | | |
| LABLAXIS | CDF\_CHAR | MAIN\_ENABLES | | | |
| SCALEMAX | CDF\_UINT2 | 1500 | | | |
| SCALEMIN | CDF\_UINT2 | 0 | | | |
| SCALETYP | CDF\_CHAR | linear | | | |
| UNITS | CDF\_CHAR | NONE | | | |
| VALIDMAX | CDF\_UINT2 | 1023 | | | |
| VALIDMIN | CDF\_UINT2 | 0 | | | |
| VAR\_NOTES | CDF\_CHAR | Bitmask for enabled rates. 1 = Enabled, Bit1 = Least Significant Bit. Bit 1: SSD Rate, 2: Priority, 3: Start, 4: Stop, 5: Double Coincidence, 6: Triple Coincidence, 7: Low TOF Decimation, 8: Alpha Decimation, 9: Proton Decimation, 10: Position A, 11: Position B. | | | |
| VAR\_TYPE | CDF\_CHAR | support\_data | | | |

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| **Variable\_Name** | **Data\_type** | **DIMS** | **SIZES** | **R\_VARY** | **D\_VARY** |
| SSD\_ENABLES | CDF\_UINT4 | **0** |  | **T** |  |
| **Attribute Name** | **Data Type** | **Value** | | | |
| CATDESC | CDF\_CHAR | SSD enables | | | |
| DEPEND\_0 | CDF\_CHAR | EPOCH | | | |
| DISPLAY\_TYPE | CDF\_CHAR | time\_series | | | |
| FIELDNAM | CDF\_CHAR | SSD\_ENABLES | | | |
| FILLVAL | CDF\_UINT4 | 4294967295 | | | |
| FORMAT | CDF\_CHAR | I5 | | | |
| LABLAXIS | CDF\_CHAR | SSD\_ENABLES | | | |
| SCALEMAX | CDF\_UINT4 | 1E10 | | | |
| SCALEMIN | CDF\_UINT4 | 0 | | | |
| SCALETYP | CDF\_CHAR | linear | | | |
| UNITS | CDF\_CHAR | NONE | | | |
| VALIDMAX | CDF\_UINT4 | 2147483647 | | | |
| VALIDMIN | CDF\_UINT4 | 0 | | | |
| VAR\_NOTES | CDF\_CHAR | Bitmask for enabled SSD rates. 1 = Enabled, Bit1 = Least Significant Bit. | | | |
| VAR\_TYPE | CDF\_CHAR | support\_data | | | |

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| --- | --- | --- | --- | --- | --- |
| **Variable\_Name** | **Data\_type** | **DIMS** | **SIZES** | **R\_VARY** | **D\_VARY** |
| PRIORITY\_ENABLES | CDF\_UINT2 | **0** |  | **T** |  |
| **Attribute Name** | **Data Type** | **Value** | | | |
| CATDESC | CDF\_CHAR | Priority enables | | | |
| DEPEND\_0 | CDF\_CHAR | EPOCH | | | |
| DISPLAY\_TYPE | CDF\_CHAR | time\_series | | | |
| FIELDNAM | CDF\_CHAR | PRIORITY\_ENABLES | | | |
| FILLVAL | CDF\_UINT2 | 65535 | | | |
| FORMAT | CDF\_CHAR | I5 | | | |
| LABLAXIS | CDF\_CHAR | PRIORITY\_ENABLES | | | |
| SCALEMAX | CDF\_UINT2 | 300 | | | |
| SCALEMIN | CDF\_UINT2 | 0 | | | |
| SCALETYP | CDF\_CHAR | linear | | | |
| UNITS | CDF\_CHAR | NONE | | | |
| VALIDMAX | CDF\_UINT2 | 255 | | | |
| VALIDMIN | CDF\_UINT2 | 0 | | | |
| VAR\_NOTES | CDF\_CHAR | Bitmask for enabled Priority rates. 1 = Enabled, Bit1 = Least Significant Bit. | | | |
| VAR\_TYPE | CDF\_CHAR | support\_data | | | |

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| --- | --- | --- | --- | --- | --- |
| **Variable\_Name** | **Data\_type** | **DIMS** | **SIZES** | **R\_VARY** | **D\_VARY** |
| START\_DIMENSIONS | CDF\_UINT1 | **1** | **2** | **T** | T |
| **Attribute Name** | **Data Type** | **Value** | | | |
| CATDESC | CDF\_CHAR | Start dimensions | | | |
| DEPEND\_0 | CDF\_CHAR | EPOCH | | | |
| DISPLAY\_TYPE | CDF\_CHAR | time\_series | | | |
| FIELDNAM | CDF\_CHAR | START\_DIMENSIONS | | | |
| FILLVAL | CDF\_UINT1 | 255 | | | |
| FORMAT | CDF\_CHAR | I5 | | | |
| LABLAXIS | CDF\_CHAR | START\_DIMENSIONS | | | |
| SCALEMAX | CDF\_UINT1 | 65 | | | |
| SCALEMIN | CDF\_UINT1 | 0 | | | |
| SCALETYP | CDF\_CHAR | linear | | | |
| UNITS | CDF\_CHAR | NONE | | | |
| VALIDMAX | CDF\_UINT1 | 64 | | | |
| VALIDMIN | CDF\_UINT1 | 0 | | | |
| VAR\_NOTES | CDF\_CHAR | Number of E/q Steps and Number of Elevation Steps for Start Rate | | | |
| VAR\_TYPE | CDF\_CHAR | support\_data | | | |

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| --- | --- | --- | --- | --- | --- |
| **Variable\_Name** | **Data\_type** | **DIMS** | **SIZES** | **R\_VARY** | **D\_VARY** |
| STOP\_DIMENSIONS | CDF\_UINT1 | 1 | 2 | T | T |
| **Attribute Name** | **Data Type** | **Value** | | | |
| CATDESC | CDF\_CHAR | Stop dimensions | | | |
| DEPEND\_0 | CDF\_CHAR | EPOCH | | | |
| DISPLAY\_TYPE | CDF\_CHAR | time\_series | | | |
| FIELDNAM | CDF\_CHAR | STOP\_DIMENSIONS | | | |
| FILLVAL | CDF\_UINT1 | 255 | | | |
| FORMAT | CDF\_CHAR | I5 | | | |
| LABLAXIS | CDF\_CHAR | STOP\_DIMENSIONS | | | |
| SCALEMAX | CDF\_UINT1 | 65 | | | |
| SCALEMIN | CDF\_UINT1 | 0 | | | |
| SCALETYP | CDF\_CHAR | linear | | | |
| UNITS | CDF\_CHAR | NONE | | | |
| VALIDMAX | CDF\_UINT1 | 64 | | | |
| VALIDMIN | CDF\_UINT1 | 0 | | | |
| VAR\_NOTES | CDF\_CHAR | Number of E/q Steps and Number of Elevation Steps for Stop Rate | | | |
| VAR\_TYPE | CDF\_CHAR | support\_data | | | |

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| **Variable\_Name** | **Data\_type** | **DIMS** | **SIZES** | **R\_VARY** | **D\_VARY** |
| DC\_DIMENSIONS | CDF\_UINT1 | 1 | 2 | **T** | T |
| **Attribute Name** | **Data Type** | **Value** | | | |
| CATDESC | CDF\_CHAR | Double coincidence dimensions | | | |
| DEPEND\_0 | CDF\_CHAR | EPOCH | | | |
| DISPLAY\_TYPE | CDF\_CHAR | time\_series | | | |
| FIELDNAM | CDF\_CHAR | DC\_DIMENSIONS | | | |
| FILLVAL | CDF\_UINT1 | 255 | | | |
| FORMAT | CDF\_CHAR | I5 | | | |
| LABLAXIS | CDF\_CHAR | DC\_DIMENSIONS | | | |
| SCALEMAX | CDF\_UINT1 | 65 | | | |
| SCALEMIN | CDF\_UINT1 | 0 | | | |
| SCALETYP | CDF\_CHAR | linear | | | |
| UNITS | CDF\_CHAR | NONE | | | |
| VALIDMAX | CDF\_UINT1 | 64 | | | |
| VALIDMIN | CDF\_UINT1 | 0 | | | |
| VAR\_NOTES | CDF\_CHAR | Number of E/q Steps and Number of Elevation Steps for Double Coincidence Rate | | | |
| VAR\_TYPE | CDF\_CHAR | support\_data | | | |

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| **Variable\_Name** | **Data\_type** | **DIMS** | **SIZES** | **R\_VARY** | **D\_VARY** |
| TC\_DIMENSIONS | CDF\_UINT1 | 1 | 2 | T | T |
| **Attribute Name** | **Data Type** | **Value** | | | |
| CATDESC | CDF\_CHAR | Triple coincidence dimensions | | | |
| DEPEND\_0 | CDF\_CHAR | EPOCH | | | |
| DISPLAY\_TYPE | CDF\_CHAR | time\_series | | | |
| FIELDNAM | CDF\_CHAR | TC\_DIMENSIONS | | | |
| FILLVAL | CDF\_UINT1 | 255 | | | |
| FORMAT | CDF\_CHAR | I5 | | | |
| LABLAXIS | CDF\_CHAR | TC\_DIMENSIONS | | | |
| SCALEMAX | CDF\_UINT1 | 65 | | | |
| SCALEMIN | CDF\_UINT1 | 0 | | | |
| SCALETYP | CDF\_CHAR | linear | | | |
| UNITS | CDF\_CHAR | NONE | | | |
| VALIDMAX | CDF\_UINT1 | 64 | | | |
| VALIDMIN | CDF\_UINT1 | 0 | | | |
| VAR\_NOTES | CDF\_CHAR | Number of E/q Steps and Number of Elevation Steps for Triple Coincidence Rate | | | |
| VAR\_TYPE | CDF\_CHAR | support\_data | | | |

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| --- | --- | --- | --- | --- | --- |
| **Variable\_Name** | **Data\_type** | **DIMS** | **SIZES** | **R\_VARY** | **D\_VARY** |
| LOW\_TOF\_DIMENSIONS | CDF\_UINT1 | 1 | 2 | T | T |
| **Attribute Name** | **Data Type** | **Value** | | | |
| CATDESC | CDF\_CHAR | Low TOF dimensions | | | |
| DEPEND\_0 | CDF\_CHAR | EPOCH | | | |
| DISPLAY\_TYPE | CDF\_CHAR | time\_series | | | |
| FIELDNAM | CDF\_CHAR | LOW\_TOF\_DIMENSIONS | | | |
| FILLVAL | CDF\_UINT1 | 255 | | | |
| FORMAT | CDF\_CHAR | I5 | | | |
| LABLAXIS | CDF\_CHAR | LOW\_TOF\_DIMENSIONS | | | |
| SCALEMAX | CDF\_UINT1 | 65 | | | |
| SCALEMIN | CDF\_UINT1 | 0 | | | |
| SCALETYP | CDF\_CHAR | linear | | | |
| UNITS | CDF\_CHAR | NONE | | | |
| VALIDMAX | CDF\_UINT1 | 64 | | | |
| VALIDMIN | CDF\_UINT1 | 0 | | | |
| VAR\_NOTES | CDF\_CHAR | Number of E/q Steps and Number of Elevation Steps for Low TOF Rate | | | |
| VAR\_TYPE | CDF\_CHAR | support\_data | | | |

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| **Variable\_Name** | **Data\_type** | **DIMS** | **SIZES** | **R\_VARY** | **D\_VARY** |
| PROTON\_DEC\_DIMENSIONS | CDF\_UINT1 | 1 | 2 | T | T |
| **Attribute Name** | **Data Type** | **Value** | | | |
| CATDESC | CDF\_CHAR | Proton decimation dimensions | | | |
| DEPEND\_0 | CDF\_CHAR | EPOCH | | | |
| DISPLAY\_TYPE | CDF\_CHAR | time\_series | | | |
| FIELDNAM | CDF\_CHAR | PROTON\_DEC\_DIMENSIONS | | | |
| FILLVAL | CDF\_UINT1 | 255 | | | |
| FORMAT | CDF\_CHAR | I5 | | | |
| LABLAXIS | CDF\_CHAR | PROTON\_DEC\_DIMENSIONS | | | |
| SCALEMAX | CDF\_UINT1 | 65 | | | |
| SCALEMIN | CDF\_UINT1 | 0 | | | |
| SCALETYP | CDF\_CHAR | linear | | | |
| UNITS | CDF\_CHAR | NONE | | | |
| VALIDMAX | CDF\_UINT1 | 64 | | | |
| VALIDMIN | CDF\_UINT1 | 0 | | | |
| VAR\_NOTES | CDF\_CHAR | Number of E/q Steps and Number of Elevation Steps for Proton Decimation Rate | | | |
| VAR\_TYPE | CDF\_CHAR | support\_data | | | |

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| --- | --- | --- | --- | --- | --- | --- |
| **Variable\_Name** | **Data\_type** | | **DIMS** | **SIZES** | **R\_VARY** | **D\_VARY** |
| ALPHA\_DEC\_DIMENSIONS | CDF\_UINT1 | 1 | | 2 | T | T |
| **Attribute Name** | **Data Type** | **Value** | | | | |
| CATDESC | CDF\_CHAR | Alpha decimation dimensions | | | | |
| DEPEND\_0 | CDF\_CHAR | EPOCH | | | | |
| DISPLAY\_TYPE | CDF\_CHAR | time\_series | | | | |
| FIELDNAM | CDF\_CHAR | ALPHA\_DEC\_DIMENSIONS | | | | |
| FILLVAL | CDF\_UINT1 | 255 | | | | |
| FORMAT | CDF\_CHAR | I5 | | | | |
| LABLAXIS | CDF\_CHAR | ALPHA\_DEC\_DIMENSIONS | | | | |
| SCALEMAX | CDF\_UINT1 | 65 | | | | |
| SCALEMIN | CDF\_UINT1 | 0 | | | | |
| SCALETYP | CDF\_CHAR | linear | | | | |
| UNITS | CDF\_CHAR | NONE | | | | |
| VALIDMAX | CDF\_UINT1 | 64 | | | | |
| VALIDMIN | CDF\_UINT1 | 0 | | | | |
| VAR\_NOTES | CDF\_CHAR | Number of E/q Steps and Number of Elevation Steps for Alpha Decimation Rate | | | | |
| VAR\_TYPE | CDF\_CHAR | support\_data | | | | |

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| **Variable\_Name** | **Data\_type** | | **DIMS** | **SIZES** | **R\_VARY** | **D\_VARY** |
| POS\_A\_DIMENSIONS | CDF\_UINT1 | 1 | | 2 | T | T |
| **Attribute Name** | **Data Type** | **Value** | | | | |
| CATDESC | CDF\_CHAR | Position A dimensions | | | | |
| DEPEND\_0 | CDF\_CHAR | EPOCH | | | | |
| DISPLAY\_TYPE | CDF\_CHAR | time\_series | | | | |
| FIELDNAM | CDF\_CHAR | POS\_A\_DIMENSIONS | | | | |
| FILLVAL | CDF\_UINT1 | 255 | | | | |
| FORMAT | CDF\_CHAR | I5 | | | | |
| LABLAXIS | CDF\_CHAR | POS\_A\_DIMENSIONS | | | | |
| SCALEMAX | CDF\_UINT1 | 65 | | | | |
| SCALEMIN | CDF\_UINT1 | 0 | | | | |
| SCALETYP | CDF\_CHAR | linear | | | | |
| UNITS | CDF\_CHAR | NONE | | | | |
| VALIDMAX | CDF\_UINT1 | 64 | | | | |
| VALIDMIN | CDF\_UINT1 | 0 | | | | |
| VAR\_NOTES | CDF\_CHAR | Number of E/q Steps and Number of Elevation Steps for Position A Rate | | | | |
| VAR\_TYPE | CDF\_CHAR | support\_data | | | | |

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| --- | --- | --- | --- | --- | --- | --- |
| **Variable\_Name** | **Data\_type** | | **DIMS** | **SIZES** | **R\_VARY** | **D\_VARY** |
| POS\_B\_DIMENSIONS | CDF\_UINT1 | 1 | | 2 | T | T |
| **Attribute Name** | **Data Type** | **Value** | | | | |
| CATDESC | CDF\_CHAR | Position B dimensions | | | | |
| DEPEND\_0 | CDF\_CHAR | EPOCH | | | | |
| DISPLAY\_TYPE | CDF\_CHAR | time\_series | | | | |
| FIELDNAM | CDF\_CHAR | POS\_B\_DIMENSIONS | | | | |
| FILLVAL | CDF\_UINT1 | 255 | | | | |
| FORMAT | CDF\_CHAR | I5 | | | | |
| LABLAXIS | CDF\_CHAR | POS\_B\_DIMENSIONS | | | | |
| SCALEMAX | CDF\_UINT1 | 65 | | | | |
| SCALEMIN | CDF\_UINT1 | 0 | | | | |
| SCALETYP | CDF\_CHAR | linear | | | | |
| UNITS | CDF\_CHAR | NONE | | | | |
| VALIDMAX | CDF\_UINT1 | 64 | | | | |
| VALIDMIN | CDF\_UINT1 | 0 | | | | |
| VAR\_NOTES | CDF\_CHAR | Number of E/q Steps and Number of Elevation Steps for Position B Rate | | | | |
| VAR\_TYPE | CDF\_CHAR | support\_data | | | | |

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| --- | --- | --- | --- | --- | --- |
| **Variable\_Name** | **Data\_type** | **DIMS** | **SIZES** | **R\_VARY** | **D\_VARY** |
| SSD\_DIMENSIONS | CDF\_UINT1 | 1 | 3 | T | T |
| **Attribute Name** | **Data Type** | **Value** | | | |
| CATDESC | CDF\_CHAR | SSD dimensions | | | |
| DEPEND\_0 | CDF\_CHAR | EPOCH | | | |
| DISPLAY\_TYPE | CDF\_CHAR | time\_series | | | |
| FIELDNAM | CDF\_CHAR | SSD\_DIMENSIONS | | | |
| FILLVAL | CDF\_UINT1 | 255 | | | |
| FORMAT | CDF\_CHAR | I5 | | | |
| LABLAXIS | CDF\_CHAR | SSD\_DIMENSIONS | | | |
| SCALEMAX | CDF\_UINT1 | 65 | | | |
| SCALEMIN | CDF\_UINT1 | 0 | | | |
| SCALETYP | CDF\_CHAR | linear | | | |
| UNITS | CDF\_CHAR | NONE | | | |
| VALIDMAX | CDF\_UINT1 | 64 | | | |
| VALIDMIN | CDF\_UINT1 | 0 | | | |
| VAR\_NOTES | CDF\_CHAR | Number of SSDs and Number of E/q Steps and Number of Elevation Steps | | | |
| VAR\_TYPE | CDF\_CHAR | support\_data | | | |

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| --- | --- | --- | --- | --- | --- |
| **Variable\_Name** | **Data\_type** | **DIMS** | **SIZES** | **R\_VARY** | **D\_VARY** |
| PRIORITY\_DIMENSIONS | CDF\_UINT1 | 1 | 3 | T | T |
| **Attribute Name** | **Data Type** | **Value** | | | |
| CATDESC | CDF\_CHAR | Priority dimensions | | | |
| DEPEND\_0 | CDF\_CHAR | EPOCH | | | |
| DISPLAY\_TYPE | CDF\_CHAR | time\_series | | | |
| FIELDNAM | CDF\_CHAR | PRIORITY\_DIMENSIONS | | | |
| FILLVAL | CDF\_UINT1 | 255 | | | |
| FORMAT | CDF\_CHAR | I5 | | | |
| LABLAXIS | CDF\_CHAR | PRIORITY\_DIMENSIONS | | | |
| SCALEMAX | CDF\_UINT1 | 65 | | | |
| SCALEMIN | CDF\_UINT1 | 0 | | | |
| SCALETYP | CDF\_CHAR | linear | | | |
| UNITS | CDF\_CHAR | NONE | | | |
| VALIDMAX | CDF\_UINT1 | 64 | | | |
| VALIDMIN | CDF\_UINT1 | 0 | | | |
| VAR\_NOTES | CDF\_CHAR | Number of Priority Ranges and Number of E/q Steps and Number of Elevation Steps | | | |
| VAR\_TYPE | CDF\_CHAR | support\_data | | | |

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| **Variable\_Name** | **Data\_type** | **DIMS** | **SIZES** | **R\_VARY** | **D\_VARY** |
| START\_RATE | CDF\_INT4 | 2 | 64 16 | T | T T |
| **Attribute Name** | **Data Type** | **Value** | | | |
| CATDESC | CDF\_CHAR | Start rate | | | |
| DEPEND\_0 | CDF\_CHAR | EPOCH | | | |
| DEPEND\_1 | CDF\_CHAR | EOQ | | | |
| DEPEND\_2 | CDF\_CHAR | ELEVATION | | | |
| DISPLAY\_TYPE | CDF\_CHAR | spectrogram | | | |
| FIELDNAM | CDF\_CHAR | START\_RATE | | | |
| FILLVAL | CDF\_INT4 | -2147483648 | | | |
| FORMAT | CDF\_CHAR | I12 | | | |
| LABL\_PTR\_1 | CDF\_CHAR | EOQ\_LABELS | | | |
| LABL\_PTR\_2 | CDF\_CHAR | ELEVATION\_LABELS | | | |
| SCALEMAX | CDF\_INT4 | 1E9 | | | |
| SCALEMIN | CDF\_INT4 | 0 | | | |
| SCALETYP | CDF\_CHAR | linear | | | |
| UNITS | CDF\_CHAR | Counts | | | |
| VALIDMAX | CDF\_INT4 | 80000000 | | | |
| VALIDMIN | CDF\_INT4 | 0 | | | |
| VAR\_NOTES | CDF\_CHAR | Number of counts on Start MCP detector. Dimensions are maximum possible sizes. Consult START\_DIMENSIONS for actual sizes in data. | | | |
| VAR\_TYPE | CDF\_CHAR | data | | | |

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| **Variable\_Name** | **Data\_type** | **DIMS** | **SIZES** | **R\_VARY** | **D\_VARY** |
| STOP\_RATE | CDF\_INT4 | 2 | 64 16 | T | T T |
| **Attribute Name** | **Data Type** | **Value** | | | |
| CATDESC | CDF\_CHAR | Stop rate | | | |
| DEPEND\_0 | CDF\_CHAR | EPOCH | | | |
| DEPEND\_1 | CDF\_CHAR | EOQ\_STEP | | | |
| DEPEND\_2 | CDF\_CHAR | ELEVATION | | | |
| DISPLAY\_TYPE | CDF\_CHAR | spectrogram | | | |
| FIELDNAM | CDF\_CHAR | STOP\_RATE | | | |
| FILLVAL | CDF\_INT4 | -2147483648 | | | |
| FORMAT | CDF\_CHAR | I12 | | | |
| LABL\_PTR\_1 | CDF\_CHAR | EOQ\_LABELS | | | |
| LABL\_PTR\_2 | CDF\_CHAR | ELEVATION\_LABELS | | | |
| SCALEMAX | CDF\_INT4 | 1E9 | | | |
| SCALEMIN | CDF\_INT4 | 0 | | | |
| SCALETYP | CDF\_CHAR | linear | | | |
| UNITS | CDF\_CHAR | Counts | | | |
| VALIDMAX | CDF\_INT4 | 80000000 | | | |
| VALIDMIN | CDF\_INT4 | 0 | | | |
| VAR\_NOTES | CDF\_CHAR | Number of counts on Stop MCP detector. Dimensions are maximum possible sizes. Consult STOP\_DIMENSIONS for actual sizes in data. When only one elevation step, DEPEND\_2 should be ELEVATION\_SUMMED. | | | |
| VAR\_TYPE | CDF\_CHAR | data | | | |

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| **Variable\_Name** | **Data\_type** | **DIMS** | **SIZES** | **R\_VARY** | **D\_VARY** |
| DC\_RATE | CDF\_INT4 | 2 | 64 16 | T | T T |
| **Attribute Name** | **Data Type** | **Value** | | | |
| CATDESC | CDF\_CHAR | Double coincidence rate | | | |
| DEPEND\_0 | CDF\_CHAR | EPOCH | | | |
| DEPEND\_1 | CDF\_CHAR | EOQ | | | |
| DEPEND\_2 | CDF\_CHAR | ELEVATION | | | |
| DISPLAY\_TYPE | CDF\_CHAR | spectrogram | | | |
| FIELDNAM | CDF\_CHAR | DC\_RATE | | | |
| FILLVAL | CDF\_INT4 | -2147483648 | | | |
| FORMAT | CDF\_CHAR | I12 | | | |
| LABL\_PTR\_1 | CDF\_CHAR | EOQ\_LABELS | | | |
| LABL\_PTR\_2 | CDF\_CHAR | ELEVATION\_LABELS | | | |
| SCALEMAX | CDF\_INT4 | 1E9 | | | |
| SCALEMIN | CDF\_INT4 | 0 | | | |
| SCALETYP | CDF\_CHAR | linear | | | |
| UNITS | CDF\_CHAR | Counts | | | |
| VALIDMAX | CDF\_INT4 | 80000000 | | | |
| VALIDMIN | CDF\_INT4 | 0 | | | |
| VAR\_NOTES | CDF\_CHAR | Number of double coincidence events that have a start signal with a corresponding stop signal. Dimensions are maximum possible sizes. Consult DC\_DIMENSIONS for actual sizes in data. | | | |
| VAR\_TYPE | CDF\_CHAR | data | | | |

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| **Variable\_Name** | **Data\_type** | **DIMS** | **SIZES** | **R\_VARY** | **D\_VARY** |
| TC\_RATE | CDF\_INT4 | 2 | 64 16 | T | T T |
| **Attribute Name** | **Data Type** | **Value** | | | |
| CATDESC | CDF\_CHAR | Triple coincidence rate | | | |
| DEPEND\_0 | CDF\_CHAR | EPOCH | | | |
| DEPEND\_1 | CDF\_CHAR | EOQ | | | |
| DEPEND\_2 | CDF\_CHAR | ELEVATION | | | |
| DISPLAY\_TYPE | CDF\_CHAR | spectrogram | | | |
| FIELDNAM | CDF\_CHAR | TC\_RATE | | | |
| FILLVAL | CDF\_INT4 | -2147483648 | | | |
| FORMAT | CDF\_CHAR | I12 | | | |
| LABL\_PTR\_1 | CDF\_CHAR | EOQ\_LABELS | | | |
| LABL\_PTR\_2 | CDF\_CHAR | ELEVATION\_LABELS | | | |
| SCALEMAX | CDF\_INT4 | 1E9 | | | |
| SCALEMIN | CDF\_INT4 | 0 | | | |
| SCALETYP | CDF\_CHAR | linear | | | |
| UNITS | CDF\_CHAR | Counts | | | |
| VALIDMAX | CDF\_INT4 | 80000000 | | | |
| VALIDMIN | CDF\_INT4 | 0 | | | |
| VAR\_NOTES | CDF\_CHAR | Number of triple coincidence events that have a start signal with a corresponding stop and energy signals. Dimensions are maximum possible sizes. Consult TC\_DIMENSIONS for actual sizes in data. | | | |
| VAR\_TYPE | CDF\_CHAR | data | | | |

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| **Variable\_Name** | **Data\_type** | **DIMS** | **SIZES** | **R\_VARY** | **D\_VARY** |
| LOW\_TOF\_RATE | CDF\_INT4 | 2 | 64 16 | T | T T |
| **Attribute Name** | **Data Type** | **Value** | | | |
| CATDESC | CDF\_CHAR | Low TOF rate | | | |
| DEPEND\_0 | CDF\_CHAR | EPOCH | | | |
| DEPEND\_1 | CDF\_CHAR | EOQ | | | |
| DEPEND\_2 | CDF\_CHAR | ELEVATION\_SUMMED | | | |
| DISPLAY\_TYPE | CDF\_CHAR | spectrogram | | | |
| FIELDNAM | CDF\_CHAR | LOW\_TOF\_RATE | | | |
| FILLVAL | CDF\_INT4 | -2147483648 | | | |
| FORMAT | CDF\_CHAR | I12 | | | |
| LABL\_PTR\_1 | CDF\_CHAR | EOQ\_LABELS | | | |
| LABL\_PTR\_2 | CDF\_CHAR | ELEVATION\_SUMMED\_LABELS | | | |
| SCALEMAX | CDF\_INT4 | 1E9 | | | |
| SCALEMIN | CDF\_INT4 | 0 | | | |
| SCALETYP | CDF\_CHAR | linear | | | |
| UNITS | CDF\_CHAR | Counts | | | |
| VALIDMAX | CDF\_INT4 | 80000000 | | | |
| VALIDMIN | CDF\_INT4 | 0 | | | |
| VAR\_NOTES | CDF\_CHAR | Number of double coincidence events below low TOF threshold. Dimensions are maximum possible sizes. Consult LOW\_TOF\_DIMENSIONS for actual sizes in data. | | | |
| VAR\_TYPE | CDF\_CHAR | data | | | |

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| **Variable\_Name** | **Data\_type** | **DIMS** | **SIZES** | **R\_VARY** | **D\_VARY** |
| PROTON\_DEC\_RATE | CDF\_INT4 | 2 | 64 16 | T | T T |
| **Attribute Name** | **Data Type** | **Value** | | | |
| CATDESC | CDF\_CHAR | Proton decimation rate | | | |
| DEPEND\_0 | CDF\_CHAR | EPOCH | | | |
| DEPEND\_1 | CDF\_CHAR | EOQ | | | |
| DEPEND\_2 | CDF\_CHAR | ELEVATION\_SUMMED | | | |
| DISPLAY\_TYPE | CDF\_CHAR | spectrogram | | | |
| FIELDNAM | CDF\_CHAR | PROTON\_DEC\_RATE | | | |
| FILLVAL | CDF\_INT4 | -2147483648 | | | |
| FORMAT | CDF\_CHAR | I12 | | | |
| LABL\_PTR\_1 | CDF\_CHAR | EOQ\_LABELS | | | |
| LABL\_PTR\_2 | CDF\_CHAR | ELEVATION\_SUMMED\_LABELS | | | |
| SCALEMAX | CDF\_INT4 | 1E9 | | | |
| SCALEMIN | CDF\_INT4 | 0 | | | |
| SCALETYP | CDF\_CHAR | linear | | | |
| UNITS | CDF\_CHAR | Counts | | | |
| VALIDMAX | CDF\_INT4 | 80000000 | | | |
| VALIDMIN | CDF\_INT4 | 0 | | | |
| VAR\_NOTES | CDF\_CHAR | Number of double coincidence events within proton TOF range. Dimensions are maximum possible sizes. Consult PROTON\_DEC\_DIMENSIONS for actual sizes in data. | | | |
| VAR\_TYPE | CDF\_CHAR | data | | | |

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| **Variable\_Name** | **Data\_type** | **DIMS** | **SIZES** | **R\_VARY** | **D\_VARY** |
| ALPHA\_DEC\_RATE | CDF\_INT4 | 2 | 64 16 | T | T T |
| **Attribute Name** | **Data Type** | **Value** | | | |
| CATDESC | CDF\_CHAR | Alpha decimation rate | | | |
| DEPEND\_0 | CDF\_CHAR | EPOCH | | | |
| DEPEND\_1 | CDF\_CHAR | EOQ | | | |
| DEPEND\_2 | CDF\_CHAR | ELEVATION\_SUMMED | | | |
| DISPLAY\_TYPE | CDF\_CHAR | spectrogram | | | |
| FIELDNAM | CDF\_CHAR | ALPHA\_DEC\_RATE | | | |
| FILLVAL | CDF\_INT4 | -2147483648 | | | |
| FORMAT | CDF\_CHAR | I12 | | | |
| LABL\_PTR\_1 | CDF\_CHAR | EOQ\_LABELS | | | |
| LABL\_PTR\_2 | CDF\_CHAR | ELEVATION\_SUMMED\_LABELS | | | |
| SCALEMAX | CDF\_INT4 | 1E9 | | | |
| SCALEMIN | CDF\_INT4 | 0 | | | |
| SCALETYP | CDF\_CHAR | linear | | | |
| UNITS | CDF\_CHAR | Counts | | | |
| VALIDMAX | CDF\_INT4 | 80000000 | | | |
| VALIDMIN | CDF\_INT4 | 0 | | | |
| VAR\_NOTES | CDF\_CHAR | Number of double coincidence events within alpha TOF range. Dimensions are maximum possible sizes. Consult ALPHA\_DEC\_DIMENSIONS for actual sizes in data. | | | |
| VAR\_TYPE | CDF\_CHAR | data | | | |

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| **Variable\_Name** | **Data\_type** | **DIMS** | **SIZES** | **R\_VARY** | **D\_VARY** |
| POS\_A\_RATE | CDF\_INT4 | 2 | 64 16 | T | T T |
| **Attribute Name** | **Data Type** | **Value** | | | |
| CATDESC | CDF\_CHAR | Position A rate | | | |
| DEPEND\_0 | CDF\_CHAR | EPOCH | | | |
| DEPEND\_1 | CDF\_CHAR | EOQ | | | |
| DEPEND\_2 | CDF\_CHAR | ELEVATION | | | |
| DISPLAY\_TYPE | CDF\_CHAR | spectrogram | | | |
| FIELDNAM | CDF\_CHAR | POS\_A\_RATE | | | |
| FILLVAL | CDF\_INT4 | -2147483648 | | | |
| FORMAT | CDF\_CHAR | I12 | | | |
| LABL\_PTR\_1 | CDF\_CHAR | EOQ\_LABELS | | | |
| LABL\_PTR\_2 | CDF\_CHAR | ELEVATION\_LABELS | | | |
| SCALEMAX | CDF\_INT4 | 1E9 | | | |
| SCALEMIN | CDF\_INT4 | 0 | | | |
| SCALETYP | CDF\_CHAR | linear | | | |
| UNITS | CDF\_CHAR | Counts | | | |
| VALIDMAX | CDF\_INT4 | 80000000 | | | |
| VALIDMIN | CDF\_INT4 | 0 | | | |
| VAR\_NOTES | CDF\_CHAR | Number of counts on Position A detector. Dimensions are maximum possible sizes. Consult POS\_A\_DIMENSIONS for actual sizes in data. | | | |
| VAR\_TYPE | CDF\_CHAR | data | | | |

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| **Variable\_Name** | **Data\_type** | **DIMS** | **SIZES** | **R\_VARY** | **D\_VARY** |
| POS\_B\_RATE | CDF\_INT4 | 2 | 64 16 | T | T T |
| **Attribute Name** | **Data Type** | **Value** | | | |
| CATDESC | CDF\_CHAR | Position B rate | | | |
| DEPEND\_0 | CDF\_CHAR | EPOCH | | | |
| DEPEND\_1 | CDF\_CHAR | EOQ | | | |
| DEPEND\_2 | CDF\_CHAR | ELEVATION | | | |
| DISPLAY\_TYPE | CDF\_CHAR | spectrogram | | | |
| FIELDNAM | CDF\_CHAR | POS\_B\_RATE | | | |
| FILLVAL | CDF\_INT4 | -2147483648 | | | |
| FORMAT | CDF\_CHAR | I12 | | | |
| LABL\_PTR\_1 | CDF\_CHAR | EOQ\_LABELS | | | |
| LABL\_PTR\_2 | CDF\_CHAR | ELEVATION\_LABELS | | | |
| SCALEMAX | CDF\_INT4 | 1E9 | | | |
| SCALEMIN | CDF\_INT4 | 0 | | | |
| SCALETYP | CDF\_CHAR | linear | | | |
| UNITS | CDF\_CHAR | Counts | | | |
| VALIDMAX | CDF\_INT4 | 80000000 | | | |
| VALIDMIN | CDF\_INT4 | 0 | | | |
| VAR\_NOTES | CDF\_CHAR | Number of counts on Position B detector. Dimensions are maximum possible sizes. Consult POS\_B\_DIMENSIONS for actual sizes in data. | | | |
| VAR\_TYPE | CDF\_CHAR | data | | | |

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| **Variable\_Name** | **Data\_type** | **DIMS** | **SIZES** | **R\_VARY** | **D\_VARY** |
| SSD\_RATE | CDF\_INT4 | 3 | 32 64 16 | T | T T T |
| **Attribute Name** | **Data Type** | **Value** | | | |
| CATDESC | CDF\_CHAR | SSD rate | | | |
| DEPEND\_0 | CDF\_CHAR | EPOCH | | | |
| DEPEND\_1 | CDF\_CHAR | SSD | | | |
| DEPEND\_2 | CDF\_CHAR | EOQ | | | |
| DEPEND\_3 | CDF\_CHAR | ELEVATION | | | |
| DISPLAY\_TYPE | CDF\_CHAR | spectrogram | | | |
| FIELDNAM | CDF\_CHAR | SSD\_RATE | | | |
| FILLVAL | CDF\_INT4 | -2147483648 | | | |
| FORMAT | CDF\_CHAR | I12 | | | |
| LABL\_PTR\_1 | CDF\_CHAR | SSD\_LABELS | | | |
| LABL\_PTR\_2 | CDF\_CHAR | EOQ\_LABELS | | | |
| LABL\_PTR\_3 | CDF\_CHAR | ELEVATION\_LABELS | | | |
| SCALEMAX | CDF\_INT4 | 1E9 | | | |
| SCALEMIN | CDF\_INT4 | 0 | | | |
| SCALETYP | CDF\_CHAR | linear | | | |
| UNITS | CDF\_CHAR | Counts | | | |
| VALIDMAX | CDF\_INT4 | 80000000 | | | |
| VALIDMIN | CDF\_INT4 | 0 | | | |
| VAR\_NOTES | CDF\_CHAR | Number of counts on each solid state detector. Dimensions are maximum possible sizes. Consult SSD\_DIMENSIONS for actual sizes in data. SSDs 30 and 31 were not populated with physical detectors.  In contrast, SSD 29 was disabled in software and will likely remain so. Any signals in these elements are due to electronic noise and not from real particles. When only one elevation step, DEPEND\_2 should be ELEVATION\_SUMMED. | | | |
| VAR\_TYPE | CDF\_CHAR | data | | | |

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| **Variable\_Name** | **Data\_type** | **DIMS** | **SIZES** | **R\_VARY** | **D\_VARY** |
| PRIORITY\_RATE | CDF\_INT4 | 3 | 8 64 16 | T | T T T |
| **Attribute Name** | **Data Type** | **Value** | | | |
| CATDESC | CDF\_CHAR | Priority rate | | | |
| DEPEND\_0 | CDF\_CHAR | EPOCH | | | |
| DEPEND\_1 | CDF\_CHAR | PRIORITY | | | |
| DEPEND\_2 | CDF\_CHAR | EOQ | | | |
| DEPEND\_3 | CDF\_CHAR | ELEVATION | | | |
| DISPLAY\_TYPE | CDF\_CHAR | spectrogram | | | |
| FIELDNAM | CDF\_CHAR | PRIORITY\_RATE | | | |
| FILLVAL | CDF\_INT4 | -2147483648 | | | |
| FORMAT | CDF\_CHAR | I12 | | | |
| LABL\_PTR\_1 | CDF\_CHAR | PRIORITY\_LABELS | | | |
| LABL\_PTR\_2 | CDF\_CHAR | EOQ\_LABELS | | | |
| LABL\_PTR\_3 | CDF\_CHAR | ELEVATION\_LABELS | | | |
| SCALEMAX | CDF\_INT4 | 1E9 | | | |
| SCALEMIN | CDF\_INT4 | 0 | | | |
| SCALETYP | CDF\_CHAR | linear | | | |
| UNITS | CDF\_CHAR | Counts | | | |
| VALIDMAX | CDF\_INT4 | 80000000 | | | |
| VALIDMIN | CDF\_INT4 | 0 | | | |
| VAR\_NOTES | CDF\_CHAR | Number of events in each priority range. 0: double coincidence PHAs (pickup ions), 1: Fe, 2: Mg, Si, S, 3: CNO (except O6+), 4: O6+, 5: Alphas, 6: Protons, 7: Error (low or unrealistically long TOFs). Dimensions are maximum possible sizes. Consult PRIORITY\_DIMENSIONS for actual sizes in data. | | | |
| VAR\_TYPE | CDF\_CHAR | data | | | |

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| **Variable\_Name** | **Data\_type** | **DIMS** | **SIZES** | **R\_VARY** | **D\_VARY** |
| EOQ | CDF\_FLOAT | 1 | 64 | F | T |
| **Attribute Name** | **Data Type** | **Value** | | | |
| CATDESC | CDF\_CHAR | E/q step | | | |
| FIELDNAM | CDF\_CHAR | EOQ | | | |
| FILLVAL | CDF\_FLOAT | -1E31 | | | |
| FORMAT | CDF\_CHAR | E10.3 | | | |
| LABLAXIS | CDF\_CHAR | EOQ | | | |
| SCALEMAX | CDF\_FLOAT | 80 | | | |
| SCALEMIN | CDF\_FLOAT | 0 | | | |
| SCALETYP | CDF\_CHAR | log | | | |
| UNITS | CDF\_CHAR | keV/e | | | |
| VALIDMAX | CDF\_FLOAT | 80 | | | |
| VALIDMIN | CDF\_FLOAT | 0 | | | |
| VAR\_NOTES | CDF\_CHAR | E/q steps spanning the range 0.50 to 75.1 keV/e. Value is midpoint of step. Lower bound is EOQ value minus EOQ\_DELTA, and upper bound is EOQ value plus EOQ\_DELTA. | | | |
| VAR\_TYPE | CDF\_CHAR | support\_data | | | |

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| **Variable\_Name** | **Data\_type** | **Number Elements** | **DIMS** | **SIZES** | **R\_VARY** | **D\_VARY** |
| EOQ\_LABELS | CDF\_CHAR | **5** | **1** | **64** | **F** | T |
| **Attribute Name** | **Data Type** | **Value** | | | | |
| CATDESC | CDF\_CHAR | E/q Labels | | | | |
| FIELDNAM | CDF\_CHAR | EOQ\_LABELS | | | | |
| FORMAT | CDF\_CHAR | A5 | | | | |
| VAR\_TYPE | CDF\_CHAR | meta\_data | | | | |

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| **Variable\_Name** | **Data\_type** | **DIMS** | **SIZES** | **R\_VARY** | **D\_VARY** |
| EOQ\_DELTA | CDF\_FLOAT | 1 | 64 | F | T |
| **Attribute Name** | **Data Type** | **Value** | | | |
| CATDESC | CDF\_CHAR | E/q step delta | | | |
| FIELDNAM | CDF\_CHAR | EOQ | | | |
| FILLVAL | CDF\_FLOAT | -1E31 | | | |
| FORMAT | CDF\_CHAR | E10.3 | | | |
| LABLAXIS | CDF\_CHAR | EOQ | | | |
| SCALEMAX | CDF\_FLOAT | 80 | | | |
| SCALEMIN | CDF\_FLOAT | 0 | | | |
| SCALETYP | CDF\_CHAR | log | | | |
| UNITS | CDF\_CHAR | keV/e | | | |
| VALIDMAX | CDF\_FLOAT | 80 | | | |
| VALIDMIN | CDF\_FLOAT | 0 | | | |
| VAR\_NOTES | CDF\_CHAR | Delta is from the midpoint in EOQ variable. Lower bound is EOQ value minus EOQ\_DELTA, and upper bound is EOQ value plus EOQ\_DELTA. | | | |
| VAR\_TYPE | CDF\_CHAR | support\_data | | | |

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| **Variable\_Name** | **Data\_type** | **Number Elements** | **DIMS** | **SIZES** | **R\_VARY** | **D\_VARY** |
| EOQ\_DELTA\_LABELS | CDF\_CHAR | **5** | **1** | **64** | **F** | T |
| **Attribute Name** | **Data Type** | **Value** | | | | |
| CATDESC | CDF\_CHAR | E/q Delta Labels | | | | |
| FIELDNAM | CDF\_CHAR | EOQ\_DELTA\_LABELS | | | | |
| FORMAT | CDF\_CHAR | A5 | | | | |
| VAR\_TYPE | CDF\_CHAR | meta\_data | | | | |

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| **Variable\_Name** | **Data\_type** | **DIMS** | **SIZES** | **R\_VARY** | **D\_VARY** |
| ELEVATION | CDF\_FLOAT | 1 | 16 | F | T |
| **Attribute Name** | **Data Type** | **Value** | | | |
| CATDESC | CDF\_CHAR | Elevation step | | | |
| FIELDNAM | CDF\_CHAR | ELEVATION | | | |
| FILLVAL | CDF\_FLOAT | -1E31 | | | |
| FORMAT | CDF\_CHAR | E10.3 | | | |
| LABLAXIS | CDF\_CHAR | ELEVATION | | | |
| SCALEMAX | CDF\_FLOAT | 20 | | | |
| SCALEMIN | CDF\_FLOAT | -25 | | | |
| SCALETYP | CDF\_CHAR | linear | | | |
| UNITS | CDF\_CHAR | Degrees | | | |
| VALIDMAX | CDF\_FLOAT | 20 | | | |
| VALIDMIN | CDF\_FLOAT | -25 | | | |
| VAR\_NOTES | CDF\_CHAR | The elevation range is nominally -20 to +16 deg, with +/-3 degree uncertainty.  These values are subject to change after in-flight calibration. Value is the midpoint of the elevation bin. Lower bound is ELEVATION value minus ELEVATION\_DELTA, and upper bound is ELEVATION value plus ELEVATION\_DELTA. | | | |
| VAR\_TYPE | CDF\_CHAR | support\_data | | | |

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| **Variable\_Name** | **Data\_type** | **Number Elements** | **DIMS** | **SIZES** | **R\_VARY** | **D\_VARY** |
| ELEVATION\_LABELS | CDF\_CHAR | 6 | 1 | 16 | F | T |
| **Attribute Name** | **Data Type** | **Value** | | | | |
| CATDESC | CDF\_CHAR | Elevation Labels | | | | |
| FIELDNAM | CDF\_CHAR | ELEVATION\_LABELS | | | | |
| FORMAT | CDF\_CHAR | A6 | | | | |
| VAR\_TYPE | CDF\_CHAR | meta\_data | | | | |

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Variable\_Name** | **Data\_type** | **DIMS** | **SIZES** | **R\_VARY** | **D\_VARY** |
| ELEVATION\_DELTA | CDF\_FLOAT | 1 | 16 | F | T |
| **Attribute Name** | **Data Type** | **Value** | | | |
| CATDESC | CDF\_CHAR | Elevation step delta | | | |
| FIELDNAM | CDF\_CHAR | ELEVATION\_DELTA | | | |
| FILLVAL | CDF\_FLOAT | -1E31 | | | |
| FORMAT | CDF\_CHAR | E10.3 | | | |
| LABLAXIS | CDF\_CHAR | ELEVATION\_DELTA | | | |
| SCALEMAX | CDF\_FLOAT | 20 | | | |
| SCALEMIN | CDF\_FLOAT | -25 | | | |
| SCALETYP | CDF\_CHAR | linear | | | |
| UNITS | CDF\_CHAR | Degrees | | | |
| VALIDMAX | CDF\_FLOAT | 20 | | | |
| VALIDMIN | CDF\_FLOAT | -25 | | | |
| VAR\_NOTES | CDF\_CHAR | Delta is from the midpoint in ELEVATION variable. Lower bound is ELEVATION value minus ELEVATION\_DELTA, and upper bound is ELEVATION value plus ELEVATION\_DELTA. | | | |
| VAR\_TYPE | CDF\_CHAR | support\_data | | | |

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| --- | --- | --- | --- | --- | --- | --- |
| **Variable\_Name** | **Data\_type** | **Number Elements** | **DIMS** | **SIZES** | **R\_VARY** | **D\_VARY** |
| ELEVATION\_DELTA\_LABELS | CDF\_CHAR | 6 | 1 | 16 | F | T |
| **Attribute Name** | **Data Type** | **Value** | | | | |
| CATDESC | CDF\_CHAR | Elevation delta labels | | | | |
| FIELDNAM | CDF\_CHAR | ELEVATION\_DELTA\_LABELS | | | | |
| FORMAT | CDF\_CHAR | A6 | | | | |
| VAR\_TYPE | CDF\_CHAR | meta\_data | | | | |

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| --- | --- | --- | --- | --- | --- |
| **Variable\_Name** | **Data\_type** | **DIMS** | **SIZES** | **R\_VARY** | **D\_VARY** |
| ELEVATION\_SUMMED | CDF\_FLOAT | 1 | 16 | F | T |
| **Attribute Name** | **Data Type** | **Value** | | | |
| CATDESC | CDF\_CHAR | Elevation step when summed to one bin | | | |
| FIELDNAM | CDF\_CHAR | ELEVATION\_SUMMED | | | |
| FILLVAL | CDF\_FLOAT | -1E31 | | | |
| FORMAT | CDF\_CHAR | E10.3 | | | |
| LABLAXIS | CDF\_CHAR | ELEVATION | | | |
| SCALEMAX | CDF\_FLOAT | 20 | | | |
| SCALEMIN | CDF\_FLOAT | -25 | | | |
| SCALETYP | CDF\_CHAR | linear | | | |
| UNITS | CDF\_CHAR | Degrees | | | |
| VALIDMAX | CDF\_FLOAT | 20 | | | |
| VALIDMIN | CDF\_FLOAT | -25 | | | |
| VAR\_NOTES | CDF\_CHAR | This variable is used when elevation is summed. The elevation range is nominally -20 to +16 deg, with +/-3 degree uncertainty.  These values are subject to change after in-flight calibration. Value is the midpoint of the ELEVATION bin. Lower bound is ELEVATION value minus ELEVATION\_DELTA, and upper bound is ELEVATION value plus ELEVATION\_DELTA. Only the first element is used; all others are fill. | | | |
| VAR\_TYPE | CDF\_CHAR | support\_data | | | |

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| --- | --- | --- | --- | --- | --- | --- |
| **Variable\_Name** | **Data\_type** | **Number Elements** | **DIMS** | **SIZES** | **R\_VARY** | **D\_VARY** |
| ELEVATION\_SUMMED\_LABELS | CDF\_CHAR | 6 | 1 | 16 | F | T |
| **Attribute Name** | **Data Type** | **Value** | | | | |
| CATDESC | CDF\_CHAR | Elevation labels when summed to one bin | | | | |
| FIELDNAM | CDF\_CHAR | ELEVATION\_SUMMED\_LABELS | | | | |
| FORMAT | CDF\_CHAR | A6 | | | | |
| VAR\_TYPE | CDF\_CHAR | meta\_data | | | | |

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| --- | --- | --- | --- | --- | --- |
| **Variable\_Name** | **Data\_type** | **DIMS** | **SIZES** | **R\_VARY** | **D\_VARY** |
| ELEVATION\_SUMMED\_DELTA | CDF\_FLOAT | 1 | 16 | F | T |
| **Attribute Name** | **Data Type** | **Value** | | | |
| CATDESC | CDF\_CHAR | Delta for elevation step when summed to one bin | | | |
| FIELDNAM | CDF\_CHAR | ELEVATION\_SUMMED\_DELTA | | | |
| FILLVAL | CDF\_FLOAT | -1E31 | | | |
| FORMAT | CDF\_CHAR | E10.3 | | | |
| LABLAXIS | CDF\_CHAR | ELEVATION\_SUMMED\_DELTA | | | |
| SCALEMAX | CDF\_FLOAT | 20 | | | |
| SCALEMIN | CDF\_FLOAT | -25 | | | |
| SCALETYP | CDF\_CHAR | linear | | | |
| UNITS | CDF\_CHAR | Degrees | | | |
| VALIDMAX | CDF\_FLOAT | 20 | | | |
| VALIDMIN | CDF\_FLOAT | -25 | | | |
| VAR\_NOTES | CDF\_CHAR | Delta is from the midpoint in ELEVATION variable. Lower bound is ELEVATION value minus ELEVATION\_DELTA, and upper bound is ELEVATION value plus ELEVATION\_DELTA. Only the first element is used; all others are fill. | | | |
| VAR\_TYPE | CDF\_CHAR | support\_data | | | |

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| --- | --- | --- | --- | --- | --- | --- |
| **Variable\_Name** | **Data\_type** | **Number Elements** | **DIMS** | **SIZES** | **R\_VARY** | **D\_VARY** |
| ELEVATION\_SUMMED\_DELTA\_LABELS | CDF\_CHAR | 6 | 1 | 16 | F | T |
| **Attribute Name** | **Data Type** | **Value** | | | | |
| CATDESC | CDF\_CHAR | Labels for elevation delta when summed to one bin | | | | |
| FIELDNAM | CDF\_CHAR | ELEVATION\_SUMMED\_DELTA\_LABELS | | | | |
| FORMAT | CDF\_CHAR | A6 | | | | |
| VAR\_TYPE | CDF\_CHAR | meta\_data | | | | |

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| --- | --- | --- | --- | --- | --- |
| **Variable\_Name** | **Data\_type** | **DIMS** | **SIZES** | **R\_VARY** | **D\_VARY** |
| SSD | CDF\_FLOAT | 1 | 32 | F | T |
| **Attribute Name** | **Data Type** | **Value** | | | |
| CATDESC | CDF\_CHAR | SSD | | | |
| FIELDNAM | CDF\_CHAR | SSD | | | |
| FILLVAL | CDF\_FLOAT | -1E31 | | | |
| FORMAT | CDF\_CHAR | E10.3 | | | |
| LABLAXIS | CDF\_CHAR | SSD | | | |
| SCALEMAX | CDF\_FLOAT | 70 | | | |
| SCALEMIN | CDF\_FLOAT | -40 | | | |
| SCALETYP | CDF\_CHAR | linear | | | |
| UNITS | CDF\_CHAR | Degrees | | | |
| VALIDMAX | CDF\_FLOAT | 70 | | | |
| VALIDMIN | CDF\_FLOAT | -36 | | | |
| VAR\_NOTES | CDF\_CHAR | The azimuth range is nominally -33 to +66 degrees, with +/- 3 degree uncertainty.  These values are subject to change after in-flight calibration. Value is the midpoint of the azimuth bin. Lower bound is SSD value minus SSD\_DELTA, and upper bound is SSD value plus SSD\_DELTA. | | | |
| VAR\_TYPE | CDF\_CHAR | support\_data | | | |

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| **Variable\_Name** | **Data\_type** | **Number Elements** | **DIMS** | **SIZES** | **R\_VARY** | **D\_VARY** |
| SSD\_LABELS | CDF\_CHAR | 3 | 1 | 32 | F | T |
| **Attribute Name** | **Data Type** | **Value** | | | | |
| CATDESC | CDF\_CHAR | SSD Labels | | | | |
| FIELDNAM | CDF\_CHAR | SSD\_LABELS | | | | |
| FORMAT | CDF\_CHAR | A3 | | | | |
| VAR\_TYPE | CDF\_CHAR | meta\_data | | | | |

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| --- | --- | --- | --- | --- | --- |
| **Variable\_Name** | **Data\_type** | **DIMS** | **SIZES** | **R\_VARY** | **D\_VARY** |
| SSD\_DELTA | CDF\_FLOAT | 1 | 32 | F | T |
| **Attribute Name** | **Data Type** | **Value** | | | |
| CATDESC | CDF\_CHAR | SSD Delta | | | |
| FIELDNAM | CDF\_CHAR | SSD\_DELTA | | | |
| FILLVAL | CDF\_FLOAT | -1E31 | | | |
| FORMAT | CDF\_CHAR | E10.3 | | | |
| LABLAXIS | CDF\_CHAR | SSD\_DELTA | | | |
| SCALEMAX | CDF\_FLOAT | 35 | | | |
| SCALEMIN | CDF\_FLOAT | 0 | | | |
| SCALETYP | CDF\_CHAR | linear | | | |
| UNITS | CDF\_CHAR | Degrees | | | |
| VALIDMAX | CDF\_FLOAT | 31 | | | |
| VALIDMIN | CDF\_FLOAT | 0 | | | |
| VAR\_NOTES | CDF\_CHAR | Delta is from the midpoint in the SSD variable. Lower bound is SSD value minus SSD\_DELTA, and upper bound is SSD value plus SSD\_DELTA. | | | |
| VAR\_TYPE | CDF\_CHAR | support\_data | | | |

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| **Variable\_Name** | **Data\_type** | **Number Elements** | **DIMS** | **SIZES** | **R\_VARY** | **D\_VARY** |
| SSD\_DELTA\_LABELS | CDF\_CHAR | 3 | 1 | 32 | F | T |
| **Attribute Name** | **Data Type** | **Value** | | | | |
| CATDESC | CDF\_CHAR | SSD delta labels | | | | |
| FIELDNAM | CDF\_CHAR | SSD\_DELTA\_LABELS | | | | |
| FORMAT | CDF\_CHAR | A3 | | | | |
| VAR\_TYPE | CDF\_CHAR | meta\_data | | | | |

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| --- | --- | --- | --- | --- | --- |
| **Variable\_Name** | **Data\_type** | **DIMS** | **SIZES** | **R\_VARY** | **D\_VARY** |
| PRIORITY | CDF\_UINT1 | 1 | 8 | F | T |
| **Attribute Name** | **Data Type** | **Value** | | | |
| CATDESC | CDF\_CHAR | Priority | | | |
| FIELDNAM | CDF\_CHAR | PRIORITY | | | |
| FILLVAL | CDF\_UINT1 | 255 | | | |
| FORMAT | CDF\_CHAR | I3 | | | |
| LABLAXIS | CDF\_CHAR | PRIORITY | | | |
| SCALEMAX | CDF\_UINT1 | 10 | | | |
| SCALEMIN | CDF\_UINT1 | 0 | | | |
| SCALETYP | CDF\_CHAR | linear | | | |
| UNITS | CDF\_CHAR | NONE | | | |
| VALIDMAX | CDF\_UINT1 | 7 | | | |
| VALIDMIN | CDF\_UINT1 | 0 | | | |
| VAR\_NOTES | CDF\_CHAR | 0: double coincidence PHAs (pickup ions), 1: Fe, 2: Mg, Si, S, 3: O6+, 4: CNO (except O6+), 5: Alphas, 6: Protons, 7: Error (low or unrealistically long TOFs). | | | |
| VAR\_TYPE | CDF\_CHAR | support\_data | | | |

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| --- | --- | --- | --- | --- | --- | --- |
| **Variable\_Name** | **Data\_type** | **Number Elements** | **DIMS** | **SIZES** | **R\_VARY** | **D\_VARY** |
| PRIORITY\_LABELS | CDF\_CHAR | **3** | **1** | **8** | **F** | T |
| **Attribute Name** | **Data Type** | **Value** | | | | |
| CATDESC | CDF\_CHAR | Priority Labels | | | | |
| FIELDNAM | CDF\_CHAR | PRIORITY\_LABELS | | | | |
| FORMAT | CDF\_CHAR | A3 | | | | |
| VAR\_TYPE | CDF\_CHAR | meta\_data | | | | |

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| **Variable\_Name** | **Data\_type** | **DIMS** | **SIZES** | **R\_VARY** | **D\_VARY** |
| PRIORITY\_VERSION | CDF\_UINT1 | **0** |  | **T** |  |
| **Attribute Name** | **Data Type** | **Value** | | | |
| CATDESC | CDF\_CHAR | Priority Version | | | |
| DEPEND\_0 | CDF\_CHAR | EPOCH | | | |
| FIELDNAM | CDF\_CHAR | PRIORITY\_VERSION | | | |
| FILLVAL | CDF\_UINT1 | 255 | | | |
| FORMAT | CDF\_CHAR | I3 | | | |
| LABLAXIS | CDF\_CHAR | PRIORITY\_VERSION | | | |
| SCALEMAX | CDF\_UINT1 | 128 | | | |
| SCALEMIN | CDF\_UINT1 | 0 | | | |
| SCALETYP | CDF\_CHAR | linear | | | |
| UNITS | CDF\_CHAR | NONE | | | |
| VALIDMAX | CDF\_UINT1 | 127 | | | |
| VALIDMIN | CDF\_UINT1 | 0 | | | |
| VAR\_NOTES | CDF\_CHAR | Version number of the priority boundaries.  These define the 8 priorities, numbered 1-7, used to prioritize which PHAs are downlinked. | | | |
| VAR\_TYPE | CDF\_CHAR | support\_data | | | |

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| **Variable\_Name** | **Data\_type** | **DIMS** | **SIZES** | **R\_VARY** | **D\_VARY** |
| SPECIES\_BOX\_VERSION | CDF\_UINT1 | **0** |  | **T** |  |
| **Attribute Name** | **Data Type** | **Value** | | | |
| CATDESC | CDF\_CHAR | Species Box Version | | | |
| DEPEND\_0 | CDF\_CHAR | EPOCH | | | |
| FIELDNAM | CDF\_CHAR | SPECIES\_BOX\_VERSION | | | |
| FILLVAL | CDF\_UINT1 | 255 | | | |
| FORMAT | CDF\_CHAR | I3 | | | |
| LABLAXIS | CDF\_CHAR | SPECIES\_BOX\_VERSION | | | |
| SCALEMAX | CDF\_UINT1 | 128 | | | |
| SCALEMIN | CDF\_UINT1 | 0 | | | |
| SCALETYP | CDF\_CHAR | linear | | | |
| UNITS | CDF\_CHAR | NONE | | | |
| VALIDMAX | CDF\_UINT1 | 127 | | | |
| VALIDMIN | CDF\_UINT1 | 0 | | | |
| VAR\_NOTES | CDF\_CHAR | Version number of the species boxes.  These define 32 boxes in E/Q - TOF - E space which are set to the locations of counts for individual ion species. | | | |
| VAR\_TYPE | CDF\_CHAR | support\_data | | | |

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| **Variable\_Name** | **Data\_type** | **DIMS** | **SIZES** | **R\_VARY** | **D\_VARY** |
| SSD\_THRESHOLD\_VERSION | CDF\_UINT1 | **0** |  | **T** |  |
| **Attribute Name** | **Data Type** | **Value** | | | |
| CATDESC | CDF\_CHAR | SSD Threshold Version | | | |
| DEPEND\_0 | CDF\_CHAR | EPOCH | | | |
| FIELDNAM | CDF\_CHAR | SSD\_THRESHOLD\_VERSION | | | |
| FILLVAL | CDF\_UINT1 | 255 | | | |
| FORMAT | CDF\_CHAR | I3 | | | |
| LABLAXIS | CDF\_CHAR | SSD\_THRESHOLD\_VERSION | | | |
| SCALEMAX | CDF\_UINT1 | 128 | | | |
| SCALEMIN | CDF\_UINT1 | 0 | | | |
| SCALETYP | CDF\_CHAR | linear | | | |
| UNITS | CDF\_CHAR | NONE | | | |
| VALIDMAX | CDF\_UINT1 | 127 | | | |
| VALIDMIN | CDF\_UINT1 | 0 | | | |
| VAR\_NOTES | CDF\_CHAR | Version number of the set of SSD thresholds (1 master and 30 trim) used to collect the data. These settings affect the sensitivity of HIS and the noise allowed into the onboard event processing through the SSD subsystem.  Version numbers are given only to sets of values used for science data collection, not for testing. | | | |
| VAR\_TYPE | CDF\_CHAR | support\_data | | | |

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| --- | --- | --- | --- | --- | --- |
| **Variable\_Name** | **Data\_type** | **DIMS** | **SIZES** | **R\_VARY** | **D\_VARY** |
| PROD\_CONF\_TBL\_NUM | CDF\_UINT1 | **0** |  | **T** |  |
| **Attribute Name** | **Data Type** | **Value** | | | |
| CATDESC | CDF\_CHAR | Product Configuration Table Number | | | |
| DEPEND\_0 | CDF\_CHAR | EPOCH | | | |
| FIELDNAM | CDF\_CHAR | PROD\_CONF\_TBL\_NUM | | | |
| FILLVAL | CDF\_UINT1 | 255 | | | |
| FORMAT | CDF\_CHAR | I3 | | | |
| LABLAXIS | CDF\_CHAR | Prod Conf Tbl Num | | | |
| SCALEMAX | CDF\_UINT1 | 128 | | | |
| SCALEMIN | CDF\_UINT1 | 0 | | | |
| SCALETYP | CDF\_CHAR | linear | | | |
| UNITS | CDF\_CHAR | NONE | | | |
| VALIDMAX | CDF\_UINT1 | 127 | | | |
| VALIDMIN | CDF\_UINT1 | 0 | | | |
| VAR\_NOTES | CDF\_CHAR | Product configuration table number used during data collection.  This table sets the dimensions of rate products produced onboard. | | | |
| VAR\_TYPE | CDF\_CHAR | support\_data | | | |

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| --- | --- | --- | --- | --- | --- |
| **Variable\_Name** | **Data\_type** | **DIMS** | **SIZES** | **R\_VARY** | **D\_VARY** |
| PA\_HVPS\_SET\_POINT | CDF\_FOAT | **0** |  | **T** |  |
| **Attribute Name** | **Data Type** | **Value** | | | |
| CATDESC | CDF\_CHAR | PA HVPS set point | | | |
| DEPEND\_0 | CDF\_CHAR | EPOCH | | | |
| FIELDNAM | CDF\_CHAR | PA\_HVPS\_SET\_POINT | | | |
| FILLVAL | CDF\_FLOAT | -1.0e+31 | | | |
| FORMAT | CDF\_CHAR | E10.3 | | | |
| LABLAXIS | CDF\_CHAR | PA\_HVPS\_SET\_POINT | | | |
| SCALEMAX | CDF\_FLOAT | 0 | | | |
| SCALEMIN | CDF\_FLOAT | -32 | | | |
| SCALETYP | CDF\_CHAR | linear | | | |
| UNITS | CDF\_CHAR | kV | | | |
| VALIDMAX | CDF\_FLOAT | 0 | | | |
| VALIDMIN | CDF\_FLOAT | -31 | | | |
| VAR\_NOTES | CDF\_CHAR | This is the voltage setting for the PA HVPS, e.g. -10 kV, -25 kV.  Note:  It is not the reading of the on-board voltage monitor for this supply. Valid [0, -30 kV]. | | | |
| VAR\_TYPE | CDF\_CHAR | support\_data | | | |



















































































































































##### HIS L1 PHA Data

**Filename:** solo\_L1\_swa-his-pha\_yyyymmdd\_V01.cdf

**Global metadata**

|  |  |  |
| --- | --- | --- |
| **Name** | **Entry** | **Value** |
| Acknowledgement | 1 | Please acknowledge Chris J. Owen (SWA PI -- UCL MSSL) & Stefano Livi (HIS PI -- SwRI). NASA Contract NNG10EK25C. |
| Data\_product | 1 | pha> Pulse Height Analysis data for HIS instrument |
| Data\_type | 1 | pha\_l1 |
| Data\_version | 1 | 01 |
| Descriptor | 1 | SWA-HIS>Solar Wind Analyzer-Heavy Ion Sensor |
| Discipline | 1 | Space Physics>Interplanetary Studies |
| File\_naming\_convention | 1 | "source\_descriptor\_datatype\_yyyyMMdd |
| Generated\_by | 1 | SO-HIS SOC, University of Michigan |
| Generation\_date | 1 | 20200611 |
| HTTP\_LINK |  |  |
| Instrument\_type | 1 | Particles (space) |
| LEVEL | 1 | 1 |
| LINK\_TEXT |  |  |
| LINK\_TITLE |  |  |
| Logical\_file\_id | 1 | solo\_L1\_swa-his-pha\_00000000\_v01 |
| Logical\_source | 1 | solo\_L1\_swa-his-pha |
| Logical\_source\_description | 1 | solo\_L1\_swa-his-pha |
| Mission\_group | 1 | Solar Orbiter |
| MODS | 1 | Initial Release 6/18/2020. |
| PI\_affiliation | 1 | SWRI |
| PI\_name | 1 | S. Livi |
| Project | 1 | SOLO>Solar Orbiter |
| Rules\_of\_use | 1 | Confidential, for use only within HIS team. Not for publication. |
| Software\_version | 1 | 00.00.00 |
| SOOP\_TYPE |  |  |
| Source\_name | 1 | SOLO>Solar Orbiter |
| spase\_DatasetResourceID |  |  |
| TARGET\_CLASS | 1 | In-Situ |
| TARGET\_NAME | 1 | Solar Wind |
| TARGET\_REGION | 1 | Heliosphere |
| TEXT | 1 | Pulse Height Analysis data for HIS instrument |
|  | 2 | Ion Event (PHA) words. Individual ion event data, containing full information on incident angles (elevation and azimuth), E/q, TOF and SSD energy in digital units. The resolution of this data product can be 30s or 300s. In Burst mode the resolution can be 4s but this can only be run on average 1% of the time due to telemetry constraints." |
|  | 3 | Level 1 data are unvalidated and requires substantial processing to use for publication. |
| TIME\_MAX | 1 |  |
| TIME\_MIN | 1 |  |
| Time\_resolution | 1 | 4 sec, 30 sec, or 300 sec |

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| **Variable\_Name** | **Data\_type** | **DIMS** | **SIZES** | **R\_VARY** | **D\_VARY** |
| EPOCH | CDF\_TIME\_TT2000 | 1 | 0 | T |  |
| **Attribute Name** | **Data Type** | **Value** | | | |
| CATDESC | CDF\_CHAR | Default time | | | |
| FIELDNAM | CDF\_CHAR | EPOCH | | | |
| FILLVAL | CDF\_TIME\_TT2000 | 9999-12-31T23:59:59.999999999 | | | |
| LABLAXIS | CDF\_CHAR | EPOCH | | | |
| MONOTON | CDF\_CHAR | INCREASE | | | |
| REFERENCE\_POSITION | CDF\_CHAR | Rotating Earth Geoid | | | |
| SCALETYP | CDF\_CHAR | linear | | | |
| TIME\_BASE | CDF\_CHAR | J2000 | | | |
| TIME\_SCALE | CDF\_CHAR | Terrestrial Time | | | |
| UNITS | CDF\_CHAR | ns | | | |
| VALIDMIN | CDF\_TIME\_TT2000 | 1990-01-01T00:00:00.000000000 | | | |
| VALIDMAX | CDF\_TIME\_TT2000 | 2049-12-31T23:59:59.999000000 | | | |
| VAR\_NOTES | CDF\_CHAR | Time in seconds since January 1, 2000, 12:00:00.000. Converted from SCET via SPICE time kernel provided by the mission. Currently set to start of accumulation interval. | | | |
| VAR\_TYPE | CDF\_CHAR | support\_data | | | |

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| **Variable\_Name** | **Data\_type** | **DIMS** | **SIZES** | **R\_VARY** | **D\_VARY** |
| SCET | CDF\_REAL8 | 1 | 0 | T |  |
| **Attribute Name** | **Data Type** | **Value** | | | |
| CATDESC | CDF\_CHAR | SCET | | | |
| DEPEND\_0 | CDF\_CHAR | EPOCH | | | |
| FIELDNAM | CDF\_CHAR | SCET | | | |
| FILLVAL | CDF\_REAL8 | -1.00E+31 | | | |
| FORMAT | CDF\_CHAR | E12.2 | | | |
| LABLAXIS | CDF\_CHAR | SCET | | | |
| SCALEMAX | CDF\_REAL8 | 8.00E+12 | | | |
| SCALEMIN | CDF\_REAL8 | 5.00E+12 | | | |
| SCALETYP | CDF\_CHAR | linear | | | |
| UNITS | CDF\_CHAR | milliseconds | | | |
| VALIDMAX | CDF\_REAL8 | 1.00E+14 | | | |
| VALIDMIN | CDF\_REAL8 | 0 | | | |
| VAR\_NOTES | CDF\_CHAR | Mission elapsed time in spacecraft clock ticks. Note: These are effected by environmental conditions and do not match Earth-based seconds. Beginning of accumulation. | | | |
| VAR\_TYPE | CDF\_CHAR | support\_data | | | |

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| --- | --- | --- | --- | --- | --- |
| **Variable\_Name** | **Data\_type** | **DIMS** | **SIZES** | **R\_VARY** | **D\_VARY** |
| ACCUM\_SECONDS | CDF\_REAL8 | 1 | 0 | T |  |
| **Attribute Name** | **Data Type** | **Value** | | | |
| CATDESC | CDF\_CHAR | ACCUM\_SECONDS | | | |
| DEPEND\_0 | CDF\_CHAR | EPOCH | | | |
| FIELDNAM | CDF\_CHAR | ACCUM\_SECONDS | | | |
| FILLVAL | CDF\_REAL8 | -1.00E+31 | | | |
| FORMAT | CDF\_CHAR | E12.2 | | | |
| LABLAXIS | CDF\_CHAR | ACCUM\_SECONDS | | | |
| SCALEMAX | CDF\_REAL8 | 0.3 | | | |
| SCALEMIN | CDF\_REAL8 | 0.003 | | | |
| SCALETYP | CDF\_CHAR | linear | | | |
| UNITS | CDF\_CHAR | seconds | | | |
| VALIDMAX | CDF\_REAL8 | 0.3 | | | |
| VALIDMIN | CDF\_REAL8 | 0.003 | | | |
| VAR\_NOTES | CDF\_CHAR | Accumulation time in seconds for each E/q and elevation step. | | | |
| VAR\_TYPE | CDF\_CHAR | support\_data | | | |

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| --- | --- | --- | --- | --- | --- |
| **Variable\_Name** | **Data\_type** | **DIMS** | **SIZES** | **R\_VARY** | **D\_VARY** |
| QUALITY\_FLAG | CDF\_UINT1 | 1 | 0 | T |  |
| **Attribute Name** | **Data Type** | **Value** | | | |
| CATDESC | CDF\_CHAR | QUALITY\_FLAG | | | |
| DEPEND\_0 | CDF\_CHAR | EPOCH | | | |
| DISPLAY\_TYPE | CDF\_CHAR | time\_series | | | |
| FIELDNAM | CDF\_CHAR | QUALITY\_FLAG | | | |
| FILLVAL | CDF\_UINT1 | 255 | | | |
| FORMAT | CDF\_CHAR | I3 | | | |
| LABLAXIS | CDF\_CHAR | QUALITY\_FLAG | | | |
| SCALEMAX | CDF\_UINT1 | 3 | | | |
| SCALEMIN | CDF\_UINT1 | 0 | | | |
| SCALETYP | CDF\_CHAR | linear | | | |
| UNITS | CDF\_CHAR | NONE | | | |
| VALIDMAX | CDF\_UINT1 | 2 | | | |
| VALIDMIN | CDF\_UINT1 | 0 | | | |
| VAR\_NOTES | CDF\_CHAR | 0=good, 1=caution, 2=bad | | | |
| VAR\_TYPE | CDF\_CHAR | support\_data | | | |

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Variable\_Name** | **Data\_type** | **DIMS** | **SIZES** | **R\_VARY** | **D\_VARY** |
| QUALITY\_BITMASK | CDF\_UINT2 | 1 | 0 | T |  |
| **Attribute Name** | **Data Type** | **Value** | | | |
| CATDESC | CDF\_CHAR | QUALITY\_BITMASK | | | |
| DEPEND\_0 | CDF\_CHAR | EPOCH | | | |
| DISPLAY\_TYPE | CDF\_CHAR | time\_series | | | |
| FIELDNAM | CDF\_CHAR | QUALITY\_BITMASK | | | |
| FILLVAL | CDF\_UINT2 | 65535 | | | |
| FORMAT | CDF\_CHAR | I5 | | | |
| LABLAXIS | CDF\_CHAR | QUALITY\_BITMASK | | | |
| SCALEMAX | CDF\_UINT2 | 1100 | | | |
| SCALEMIN | CDF\_UINT2 | 0 | | | |
| SCALETYP | CDF\_CHAR | linear | | | |
| UNITS | CDF\_CHAR | NONE | | | |
| VALIDMAX | CDF\_UINT2 | 1023 | | | |
| VALIDMIN | CDF\_UINT2 | 0 | | | |
| VAR\_NOTES | CDF\_CHAR | 0:No Issue, 1:Multi-SSD flag set, 2:No matching priority rate, 4:PHA outside priority rate range, 8:No matching count for PHA in priority range, 16:Bad Start MCP, 32:Uncalibrated TOF, 64:Priority Table Invalid, 128:Low Quality SSD Trim Callibration, 256:Peak on Edge of Priority Range, 512:Bad SSD Assignment. | | | |
| VAR\_TYPE | CDF\_CHAR | support\_data | | | |

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Variable\_Name** | **Data\_type** | **DIMS** | **SIZES** | **R\_VARY** | **D\_VARY** |
| MODE | CDF\_UINT1 | 1 | 0 | T |  |
| **Attribute Name** | **Data Type** | **Value** | | | |
| CATDESC | CDF\_CHAR | Mode. 0: Normal Science, 1: Burst 1, 2: Burst 2, 3: Low Cadence. | | | |
| DEPEND\_0 | CDF\_CHAR | EPOCH | | | |
| FIELDNAM | CDF\_CHAR | MODE | | | |
| FILLVAL | CDF\_UINT1 | 255 | | | |
| FORMAT | CDF\_CHAR | I3 | | | |
| LABLAXIS | CDF\_CHAR | MODE | | | |
| SCALEMAX | CDF\_UINT1 | 5 | | | | |
| SCALEMIN | CDFUINT1 | 0 | | | | |
| SCALETYP | CDF\_CHAR | linear | | | |
| UNITS | CDF\_CHAR | NONE | | | |
| VALIDMAX | CDF\_UINT1 | 2 | | | |
| VALIDMIN | CDF\_UINT1 | 0 | | | |
| VAR\_NOTES | CDF\_CHAR | Normal: Full E/q range in nominal 30 sec scan, Burst1: E/q range optimized for slower solar wind in nominal 4 sec scan, Burst2: E/q range optimized for faster solar wind in nominal 4 sec scan, Low Cadence: Full E/q range in nominal 300 sec scan. | | | |
| VAR\_TYPE | CDF\_CHAR | support\_data | | | |

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| --- | --- | --- | --- | --- | --- |
| **Variable\_Name** | **Data\_type** | **DIMS** | **SIZES** | **R\_VARY** | **D\_VARY** |
| NUM\_PHA | CDF\_UINT2 | 1 | 0 | T |  |
| **Attribute Name** | **Data Type** | **Value** | | | |
| CATDESC | CDF\_CHAR | Number of PHA telemetered | | | |
| DEPEND\_0 | CDF\_CHAR | EPOCH | | | |
| FIELDNAM | CDF\_CHAR | NUM\_PHA | | | |
| FILLVAL | CDF\_UINT2 | 65535 | | | |
| FORMAT | CDF\_CHAR | I5 | | | |
| LABLAXIS | CDF\_CHAR | NUM\_PHA | | | |
| SCALEMAX | CDF\_UINT2 | 35000 | | | | |
| SCALEMIN | CDF\_UINT2 | 0 | | | | |
| SCALETYP | CDF\_CHAR | linear | | | |
| UNITS | CDF\_CHAR | NONE | | | |
| VALIDMAX | CDF\_UINT2 | 32767 | | | |
| VALIDMIN | CDF\_UINT2 | 0 | | | |
| VAR\_NOTES | CDF\_CHAR | Number of PHA telemetered in this scan | | | |
| VAR\_TYPE | CDF\_CHAR | support\_data | | | |

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| --- | --- | --- | --- | --- | --- |
| **Variable\_Name** | **Data\_type** | **DIMS** | **SIZES** | **R\_VARY** | **D\_VARY** |
| PROTON\_DECIMATION\_LEVEL | CDF\_UINT1 | 1 | 0 | T |  |
| **Attribute Name** | **Data Type** | **Value** | | | |
| CATDESC | CDF\_CHAR | Proton Decimation Level | | | |
| DEPEND\_0 | CDF\_CHAR | EPOCH | | | |
| FIELDNAM | CDF\_CHAR | PROTON\_DECIMATION\_LEVEL | | | |
| FILLVAL | CDF\_UINT1 | 255 | | | |
| FORMAT | CDF\_CHAR | I3 | | | |
| LABLAXIS | CDF\_CHAR | PROTON\_DEC\_LVL | | | |
| SCALEMAX | CDF\_UINT1 | 20 | | | |
| SCALEMIN | CDF\_UINT1 | 0 | | | |
| SCALETYP | CDF\_CHAR | linear | | | |
| UNITS | CDF\_CHAR | NONE | | | |
| VALIDMAX | CDF\_UINT1 | 15 | | | |
| VALIDMIN | CDF\_UINT1 | 0 | | | |
| VAR\_NOTES | CDF\_CHAR | Proton Decimation Level. One in 2^N protons are retained when decimation is enabled, where N is the proton decimation level. | | | |
| VAR\_TYPE | CDF\_CHAR | support\_data | | | |

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Variable\_Name** | **Data\_type** | **DIMS** | **SIZES** | **R\_VARY** | **D\_VARY** |
| ALPHA\_DECIMATION\_LEVEL | CDF\_UINT1 | 1 | 0 | T |  |
| **Attribute Name** | **Data Type** | **Value** | | | |
| CATDESC | CDF\_CHAR | Alpha Decimation Level | | | |
| DEPEND\_0 | CDF\_CHAR | EPOCH | | | |
| FIELDNAM | CDF\_CHAR | ALPHA\_DECIMATION\_LEVEL | | | |
| FILLVAL | CDF\_UINT1 | 255 | | | |
| FORMAT | CDF\_CHAR | I3 | | | |
| LABLAXIS | CDF\_CHAR | ALPHA\_DEC\_LVL | | | |
| SCALEMAX | CDF\_UINT1 | 20 | | | |
| SCALEMIN | CDF\_UINT1 | 0 | | | |
| SCALETYP | CDF\_CHAR | linear | | | |
| UNITS | CDF\_CHAR | NONE | | | |
| VALIDMAX | CDF\_UINT1 | 15 | | | |
| VALIDMIN | CDF\_UINT1 | 0 | | | |
| VAR\_NOTES | CDF\_CHAR | Alpha Decimation Level. One in 2^N protons are retained when decimation is enabled, where N is the alpha decimation level. | | | |
| VAR\_TYPE | CDF\_CHAR | support\_data | | | |

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Variable\_Name** | **Data\_type** | **DIMS** | **SIZES** | **R\_VARY** | **D\_VARY** |
| PHA\_EOQ\_STEP | CDF\_UINT1 | 1 | 0 | T |  |
| **Attribute Name** | **Data Type** | **Value** | | | |
| CATDESC | CDF\_CHAR | HIS E/q index of each PHA | | | |
| DEPEND\_0 | CDF\_CHAR | EPOCH | | | |
| DISPLAY\_TYPE | CDF\_CHAR | time\_series | | | |
| FIELDNAM | CDF\_CHAR | PHA\_EOQ\_STEP | | | |
| FILLVAL | CDF\_UINT1 | 255 | | | |
| FORMAT | CDF\_CHAR | I5 | | | |
| LABLAXIS | CDF\_CHAR | PHA\_EOQ\_STEP | | | |
| SCALEMAX | CDF\_UINT1 | 65 | | | |
| SCALEMIN | CDF\_UINT1 | 0 | | | |
| SCALETYP | CDF\_CHAR | linear | | | |
| UNITS | CDF\_CHAR | NONE | | | |
| VALIDMAX | CDF\_UINT1 | 63 | | | |
| VALIDMIN | CDF\_UINT1 | 0 | | | |
| VAR\_NOTES | CDF\_CHAR | E/q index corresponding to the E/q - elevation pair in the HV Step table | | | |
| VAR\_TYPE | CDF\_CHAR | data | | | |

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| --- | --- | --- | --- | --- | --- |
| **Variable\_Name** | **Data\_type** | **DIMS** | **SIZES** | **R\_VARY** | **D\_VARY** |
| PHA\_AZIMUTH\_BIN | CDF\_UINT1 | 1 | 0 |  | T |
| **Attribute Name** | **Data Type** | **Value** | | | |
| CATDESC | CDF\_CHAR | HIS azimuth bin for each PHA | | | |
| DEPEND\_0 | CDF\_CHAR | EPOCH | | | |
| DISPLAY\_TYPE | CDF\_CHAR | time\_series | | | |
| FIELDNAM | CDF\_CHAR | PHA\_AZIMUTH\_BIN | | | |
| FILLVAL | CDF\_UINT1 | 255 | | | |
| FORMAT | CDF\_CHAR | I3 | | | |
| LABLAXIS | CDF\_CHAR | PHA\_AZIMUTH\_BIN | | | |
| SCALEMAX | CDF\_UINT1 | 63 | | | |
| SCALEMIN | CDF\_UINT1 | 0 | | | |
| SCALETYP | CDF\_CHAR | linear | | | |
| UNITS | CDF\_CHAR | NONE | | | |
| VALIDMAX | CDF\_UINT1 | 63 | | | |
| VALIDMIN | CDF\_UINT1 | 0 | | | |
| VAR\_NOTES | CDF\_CHAR | Azimuth bin derived from the Start MCP position | | | |
| VAR\_TYPE | CDF\_CHAR | data | | | |

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Variable\_Name** | **Data\_type** | **DIMS** | **SIZES** | **R\_VARY** | **D\_VARY** |
| PHA\_ELEVATION\_BIN | CDF\_UINT1 | 1 | 0 | T |  |
| **Attribute Name** | **Data Type** | **Value** | | | |
| CATDESC | CDF\_CHAR | HIS elevation angle bin for each PHA | | | |
| DEPEND\_0 | CDF\_CHAR | EPOCH | | | |
| DISPLAY\_TYPE | CDF\_CHAR | time\_series | | | |
| FIELDNAM | CDF\_CHAR | PHA\_ELEVATION\_BIN | | | |
| FILLVAL | CDF\_UINT1 | 255 | | | |
| FORMAT | CDF\_CHAR | I5 | | | |
| LABLAXIS | CDF\_CHAR | PHA\_ELEVATION\_BIN | | | |
| SCALEMAX | CDF\_UINT1 | 15 | | | |
| SCALEMIN | CDF\_UINT1 | 0 | | | |
| SCALETYP | CDF\_CHAR | linear | | | |
| UNITS | CDF\_CHAR | NONE | | | |
| VALIDMAX | CDF\_UINT1 | 15 | | | |
| VALIDMIN | CDF\_UINT1 | 0 | | | |
| VAR\_NOTES | CDF\_CHAR | Elevation angle bin corresponding to the E/q - elevation pair in the HV Step table | | | |
| VAR\_TYPE | CDF\_CHAR | data | | | |

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Variable\_Name** | **Data\_type** | **DIMS** | **SIZES** | **R\_VARY** | **D\_VARY** |
| PHA\_TOF\_BIN | CDF\_UINT2 | 1 | 0 | T |  |
| **Attribute Name** | **Data Type** | **Value** | | | |
| CATDESC | CDF\_CHAR | HIS TOF bin for each PHA | | | |
| DEPEND\_0 | CDF\_CHAR | EPOCH | | | |
| DISPLAY\_TYPE | CDF\_CHAR | time\_series | | | |
| FIELDNAM | CDF\_CHAR | PHA\_TOF\_BIN | | | |
| FILLVAL | CDF\_UINT2 | 65535 | | | |
| FORMAT | CDF\_CHAR | I6 | | | |
| LABLAXIS | CDF\_CHAR | PHA\_TOF\_BIN | | | |
| SCALEMAX | CDF\_UINT2 | 511 | | | |
| SCALEMIN | CDF\_UINT2 | 0 | | | |
| SCALETYP | CDF\_CHAR | linear | | | |
| UNITS | CDF\_CHAR | NONE | | | |
| VALIDMAX | CDF\_UINT2 | 511 | | | |
| VALIDMIN | CDF\_UINT2 | 0 | | | |
| VAR\_NOTES | CDF\_CHAR | Time-Of-Flight bin | | | |
| VAR\_TYPE | CDF\_CHAR | data | | | |

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Variable\_Name** | **Data\_type** | **DIMS** | **SIZES** | **R\_VARY** | **D\_VARY** |
| PHA\_SSD\_ENERGY\_BIN | CDF\_UINT2 | 1 | 0 | T |  |
| **Attribute Name** | **Data Type** | **Value** | | | |
| CATDESC | CDF\_CHAR | HIS SSD energy bin for each PHA | | | |
| DEPEND\_0 | CDF\_CHAR | EPOCH | | | |
| DISPLAY\_TYPE | CDF\_CHAR | time\_series | | | |
| FIELDNAM | CDF\_CHAR | PHA\_SSD\_ENERGY\_BIN | | | |
| FILLVAL | CDF\_UINT2 | 65535 | | | |
| FORMAT | CDF\_CHAR | I6 | | | |
| LABLAXIS | CDF\_CHAR | PHA\_SSD\_ENERGY\_BIN | | | |
| SCALEMAX | CDF\_UINT2 | 511 | | | |
| SCALEMIN | CDF\_UINT2 | 0 | | | |
| SCALETYP | CDF\_CHAR | linear | | | |
| UNITS | CDF\_CHAR | NONE | | | |
| VALIDMAX | CDF\_UINT2 | 511 | | | |
| VALIDMIN | CDF\_UINT2 | 0 | | | |
| VAR\_NOTES | CDF\_CHAR | Solid State Detector Energy Bin. Represents total ion energy after post-acceleration. | | | |
| VAR\_TYPE | CDF\_CHAR | data | | | |

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Variable\_Name** | **Data\_type** | **DIMS** | **SIZES** | **R\_VARY** | **D\_VARY** |
| PHA\_DETECTOR\_ID | CDF\_UINT1 | 1 | 0 | T |  |
| **Attribute Name** | **Data Type** | **Value** | | | |
| CATDESC | CDF\_CHAR | HIS SSD ID | | | |
| DEPEND\_0 | CDF\_CHAR | EPOCH | | | |
| DISPLAY\_TYPE | CDF\_CHAR | time\_series | | | |
| FIELDNAM | CDF\_CHAR | PHA\_DETECTOR\_ID | | | |
| FILLVAL | CDF\_UINT1 | 255 | | | |
| FORMAT | CDF\_CHAR | I3 | | | |
| LABLAXIS | CDF\_CHAR | PHA\_DETECTOR\_ID | | | |
| SCALEMAX | CDF\_UINT1 | 31 | | | |
| SCALEMIN | CDF\_UINT1 | 0 | | | |
| SCALETYP | CDF\_CHAR | linear | | | |
| UNITS | CDF\_CHAR | NONE | | | |
| VALIDMAX | CDF\_UINT1 | 31 | | | |
| VALIDMIN | CDF\_UINT1 | 0 | | | |
| VAR\_NOTES | CDF\_CHAR | ID of Solid State Detector on which ion was measured. Also contains azimuthal angle information, complementing that which is derived from the Start MCP. | | | |
| VAR\_TYPE | CDF\_CHAR | data | | | |

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| --- | --- | --- | --- | --- | --- |
| **Variable\_Name** | **Data\_type** | **DIMS** | **SIZES** | **R\_VARY** | **D\_VARY** |
| PHA\_DECIMATION\_CLASSIFICATION | CDF\_UINT1 | 1 | 0 | T |  |
| **Attribute Name** | **Data Type** | **Value** | | | |
| CATDESC | CDF\_CHAR | HIS decimation classification | | | |
| DEPEND\_0 | CDF\_CHAR | EPOCH | | | |
| DISPLAY\_TYPE | CDF\_CHAR | time\_series | | | |
| SCALETYP | CDF\_CHAR | linear | | | |
| FIELDNAM | CDF\_CHAR | PHA\_DECIMATION\_CLASSIFICATION | | | |
| FILLVAL | CDF\_UINT1 | 255 | | | |
| FORMAT | CDF\_CHAR | I3 | | | |
| LABLAXIS | CDF\_CHAR | PHA\_DECIMATION\_CLASSIFICATION | | | |
| SCALEMAX | CDF\_UINT1 | 3 | | | |
| SCALEMIN | CDF\_UINT1 | 0 | | | |
| UNITS | CDF\_CHAR | NONE | | | |
| VALIDMAX | CDF\_UINT1 | 3 | | | |
| VALIDMIN | CDF\_UINT1 | 0 | | | |
| VAR\_NOTES | CDF\_CHAR | Decimation range, if any, into which ion TOF is classified | | | |
| VAR\_TYPE | CDF\_CHAR | data | | | |

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Variable\_Name** | **Data\_type** | **DIMS** | **SIZES** | **R\_VARY** | **D\_VARY** |
| PHA\_PRIORITIZATION\_ RANGE | CDF\_UINT1 | 1 | 0 | T |  |
| **Attribute Name** | **Data Type** | **Value** | | | |
| CATDESC | CDF\_CHAR | HIS prioritization range | | | |
| DEPEND\_0 | CDF\_CHAR | EPOCH | | | |
| DISPLAY\_TYPE | CDF\_CHAR | time\_series | | | |
| FIELDNAM | CDF\_CHAR | PHA\_PRIORITIZATION\_RANGE | | | |
| FILLVAL | CDF\_UINT1 | 255 | | | |
| FORMAT | CDF\_CHAR | I3 | | | |
| LABLAXIS | CDF\_CHAR | PHA\_PRIORITIZATION\_RANGE | | | |
| SCALEMAX | CDF\_UINT1 | 7 | | | |
| SCALEMIN | CDF\_UINT1 | 0 | | | |
| SCALETYP | CDF\_CHAR | linear | | | |
| UNITS | CDF\_CHAR | NONE | | | |
| VALIDMAX | CDF\_UINT1 | 7 | | | |
| VALIDMIN | CDF\_UINT1 | 0 | | | |
| VAR\_NOTES | CDF\_CHAR | The prioritization range that the ion is classified into according to its E/q, SSD energy and TOF bins | | | |
| VAR\_TYPE | CDF\_CHAR | data | | | |

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Variable\_Name** | **Data\_type** | **DIMS** | **SIZES** | **R\_VARY** | **D\_VARY** |
| PHA\_MULTI\_SSD | CDF\_UINT1 | 1 | 0 | T |  |
| **Attribute Name** | **Data Type** | **Value** | | | |
| CATDESC | CDF\_CHAR | HIS multi-SSD flag | | | |
| DEPEND\_0 | CDF\_CHAR | EPOCH | | | |
| DISPLAY\_TYPE | CDF\_CHAR | time\_series | | | |
| FIELDNAM | CDF\_CHAR | PHA\_MULTI\_SSD | | | |
| FILLVAL | CDF\_UINT1 | 255 | | | |
| FORMAT | CDF\_CHAR | I3 | | | |
| LABLAXIS | CDF\_CHAR | PHA\_MULTI\_SSD | | | |
| SCALEMIN | CDF\_UINT1 | 0 | | | |
| SCALEMAX | CDF\_UINT1 | 1 | | | |
| SCALETYP | CDF\_CHAR | linear | | | |
| UNITS | CDF\_CHAR | NONE | | | |
| VALIDMAX | CDF\_UINT1 | 1 | | | |
| VALIDMIN | CDF\_UINT1 | 0 | | | |
| VAR\_NOTES | CDF\_CHAR | Indicates signal on multiple SSDs during ion measurement | | | |
| VAR\_TYPE | CDF\_CHAR | data | | | |

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Variable\_Name** | **Data\_type** | **DIMS** | **SIZES** | **R\_VARY** | **D\_VARY** |
| PRIORITY\_VERSION | CDF\_UINT1 | **0** |  | **T** |  |
| **Attribute Name** | **Data Type** | **Value** | | | |
| CATDESC | CDF\_CHAR | Priority Version | | | |
| DEPEND\_0 | CDF\_CHAR | EPOCH | | | |
| FIELDNAM | CDF\_CHAR | PRIORITY\_VERSION | | | |
| FILLVAL | CDF\_UINT1 | 255 | | | |
| FORMAT | CDF\_CHAR | I3 | | | |
| LABLAXIS | CDF\_CHAR | PRIORITY\_VERSION | | | |
| SCALEMAX | CDF\_UINT1 | 128 | | | |
| SCALEMIN | CDF\_UINT1 | 0 | | | |
| SCALETYP | CDF\_CHAR | linear | | | |
| UNITS | CDF\_CHAR | NONE | | | |
| VALIDMAX | CDF\_UINT1 | 127 | | | |
| VALIDMIN | CDF\_UINT1 | 0 | | | |
| VAR\_NOTES | CDF\_CHAR | Version number of the priority boundaries.  These define the 8 priorities, numbered 1-7, used to prioritize which PHAs are downlinked. | | | |
| VAR\_TYPE | CDF\_CHAR | support\_data | | | |

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Variable\_Name** | **Data\_type** | **DIMS** | **SIZES** | **R\_VARY** | **D\_VARY** |
| SPECIES\_BOX\_VERSION | CDF\_UINT1 | **0** |  | **T** |  |
| **Attribute Name** | **Data Type** | **Value** | | | |
| CATDESC | CDF\_CHAR | Species Box Version | | | |
| DEPEND\_0 | CDF\_CHAR | EPOCH | | | |
| FIELDNAM | CDF\_CHAR | SPECIES\_BOX\_VERSION | | | |
| FILLVAL | CDF\_UINT1 | 255 | | | |
| FORMAT | CDF\_CHAR | I3 | | | |
| LABLAXIS | CDF\_CHAR | SPECIES\_BOX\_VERSION | | | |
| SCALEMAX | CDF\_UINT1 | 128 | | | |
| SCALEMIN | CDF\_UINT1 | 0 | | | |
| SCALETYP | CDF\_CHAR | linear | | | |
| UNITS | CDF\_CHAR | NONE | | | |
| VALIDMAX | CDF\_UINT1 | 127 | | | |
| VALIDMIN | CDF\_UINT1 | 0 | | | |
| VAR\_NOTES | CDF\_CHAR | Version number of the species boxes.  These define 32 boxes in E/Q - TOF - E space which are set to the locations of counts for individual ion species. | | | |
| VAR\_TYPE | CDF\_CHAR | support\_data | | | |

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| --- | --- | --- | --- | --- | --- |
| **Variable\_Name** | **Data\_type** | **DIMS** | **SIZES** | **R\_VARY** | **D\_VARY** |
| SSD\_THRESHOLD\_VERSION | CDF\_UINT1 | **0** |  | **T** |  |
| **Attribute Name** | **Data Type** | **Value** | | | |
| CATDESC | CDF\_CHAR | SSD Threshold Version | | | |
| DEPEND\_0 | CDF\_CHAR | EPOCH | | | |
| FIELDNAM | CDF\_CHAR | SSD\_THRESHOLD\_VERSION | | | |
| FILLVAL | CDF\_UINT1 | 255 | | | |
| FORMAT | CDF\_CHAR | I3 | | | |
| LABLAXIS | CDF\_CHAR | SSD\_THRESHOLD\_VERSION | | | |
| SCALEMAX | CDF\_UINT1 | 128 | | | |
| SCALEMIN | CDF\_UINT1 | 0 | | | |
| SCALETYP | CDF\_CHAR | linear | | | |
| UNITS | CDF\_CHAR | NONE | | | |
| VALIDMAX | CDF\_UINT1 | 127 | | | |
| VALIDMIN | CDF\_UINT1 | 0 | | | |
| VAR\_NOTES | CDF\_CHAR | Version number of the set of SSD thresholds (1 master and 30 trim) used to collect the data. These settings affect the sensitivity of HIS and the noise allowed into the onboard event processing through the SSD subsystem.  Version numbers are given only to sets of values used for science data collection, not for testing. | | | |
| VAR\_TYPE | CDF\_CHAR | support\_data | | | |

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Variable\_Name** | **Data\_type** | **DIMS** | **SIZES** | **R\_VARY** | **D\_VARY** |
| PA\_HVPS\_SET\_POINT | CDF\_FOAT | **0** |  | **T** |  |
| **Attribute Name** | **Data Type** | **Value** | | | |
| CATDESC | CDF\_CHAR | PA HVPS set point | | | |
| DEPEND\_0 | CDF\_CHAR | EPOCH | | | |
| FIELDNAM | CDF\_CHAR | PA\_HVPS\_SET\_POINT | | | |
| FILLVAL | CDF\_FLOAT | -1.0e+31 | | | |
| FORMAT | CDF\_CHAR | E10.3 | | | |
| LABLAXIS | CDF\_CHAR | PA\_HVPS\_SET\_POINT | | | |
| SCALEMAX | CDF\_FLOAT | 0 | | | |
| SCALEMIN | CDF\_FLOAT | -32 | | | |
| SCALETYP | CDF\_CHAR | linear | | | |
| UNITS | CDF\_CHAR | kV | | | |
| VALIDMAX | CDF\_FLOAT | 0 | | | |
| VALIDMIN | CDF\_FLOAT | -31 | | | |
| VAR\_NOTES | CDF\_CHAR | This is the voltage setting for the PA HVPS, e.g. -10 kV, -25 kV.  Note:  It is not the reading of the on-board voltage monitor for this supply. Valid [0, -30 kV]. | | | |
| VAR\_TYPE | CDF\_CHAR | support\_data | | | |

##### HIS L1 VDF Data































































































































**Filename:** solo\_L1\_swa-his-vdf\_yyyymmdd\_V01.cdf

**Global metadata**

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| --- | --- | --- |
| **Name** | **Entry** | **Value** |
| Acknowledgement | 1 | Please acknowledge Chris J. Owen (SWA PI -- UCL MSSL) & Stefano Livi (HIS PI -- SwRI). NASA Contract NNG10EK25C. |
| Data\_product | 1 | vdf>VDF data for HIS instrument. |
| Data\_type | 1 | vdf\_l1 |
| Data\_version | 1 | 01 |
| Descriptor | 1 | SWA-HIS>Solar Wind Analyzer-Heavy Ion Sensor |
| Discipline | 1 | Space Physics>Interplanetary Studies |
| File\_naming\_convention | 1 | "source\_descriptor\_datatype\_yyyyMMdd |
| Generated\_by | 1 | SO-HIS SOC, University of Michigan |
| Generation\_date | 1 | 20200611 |
| HTTP\_LINK |  |  |
| Instrument\_type | 1 | Particles (space) |
| LEVEL | 1 | 1 |
| LINK\_TEXT |  |  |
| LINK\_TITLE |  |  |
| Logical\_file\_id | 1 | solo\_L1\_swa-his-vdf\_00000000\_v01 |
| Logical\_source | 1 | solo\_L1\_swa-his-vdf |
| Logical\_source\_description | 1 | solo\_L1\_swa-his-vdf |
| Mission\_group | 1 | Solar Orbiter |
| MODS | 1 | Initial Release 6/18/2020. |
| PI\_affiliation | 1 | SWRI |
| PI\_name | 1 | S. Livi |
| Project | 1 | SOLO>Solar Orbiter |
| Rules\_of\_use | 1 | Confidential, for use only within HIS team. Not for publication. |
| Software\_version | 1 | 00.00.00 |
| SOOP\_TYPE |  |  |
| Source\_name | 1 | SOLO>Solar Orbiter |
| spase\_DatasetResourceID |  |  |
| TARGET\_CLASS | 1 | In-Situ |
| TARGET\_NAME | 1 | Solar Wind |
| TARGET\_REGION | 1 | Heliosphere |
| TEXT | 1 | VDF data for HIS instrument. |
|  | 2 | Counts of ion event words for a set of ions subdivided by E/q, elevation and azimuth. Selection of ions to include He2+, C5+, O6+, and Fe10+. Additional ions and charge states may be produced according to science needs and as counting statistics allow. Since these counts are not subject to the effect of the priority sampling algorithm, they represent the best possible statistics. However, because species are separated simply by boxes and no peak overlap removal is performed (see below), the counts are not as accurately assigned to a given species as they would be if formed on the ground. The resolution of this data product can be 30s or 300s. In Burst mode the resolution can be 4s but this can only be run on average 1% of the time due to telemetry constraints. |
|  | 3 | Level 1 data are unvalidated and requires substantial processing to use for publication. |
| TIME\_MAX | 1 |  |
| TIME\_MIN | 1 |  |
| Time\_resolution | 1 | 4 sec, 30 sec, or 300 sec |

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| **Variable\_Name** | **Data\_type** | **DIMS** | **SIZES** | **R\_VARY** | **D\_VARY** |
| EPOCH | CDF\_TIME\_TT2000 | 1 | 0 | T |  |
| **Attribute Name** | **Data Type** | **Value** | | | |
| CATDESC | CDF\_CHAR | Default time | | | |
| FIELDNAM | CDF\_CHAR | EPOCH | | | |
| FILLVAL | CDF\_TIME\_TT2000 | 9999-12-31T23:59:59.999999999 | | | |
| LABLAXIS | CDF\_CHAR | EPOCH | | | |
| MONOTON | CDF\_CHAR | INCREASE | | | |
| REFERENCE\_POSITION | CDF\_CHAR | Rotating Earth Geoid | | | |
| SCALETYP | CDF\_CHAR | linear | | | |
| TIME\_BASE | CDF\_CHAR | J2000 | | | |
| TIME\_SCALE | CDF\_CHAR | Terrestrial Time | | | |
| UNITS | CDF\_CHAR | ns | | | |
| VALIDMIN | CDF\_TIME\_TT2000 | 1990-01-01T00:00:00.000000000 | | | |
| VALIDMAX | CDF\_TIME\_TT2000 | 2049-12-31T23:59:59.999000000 | | | |
| VAR\_NOTES | CDF\_CHAR | Time in seconds since January 1, 2000, 12:00:00.000. Converted from SCET via SPICE time kernel provided by the mission. Currently set to start of accumulation interval. | | | |
| VAR\_TYPE | CDF\_CHAR | support\_data | | | |

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| --- | --- | --- | --- | --- | --- |
| **Variable\_Name** | **Data\_type** | **DIMS** | **SIZES** | **R\_VARY** | **D\_VARY** |
| SCET | CDF\_REAL8 | 1 | 0 | T |  |
| **Attribute Name** | **Data Type** | **Value** | | | |
| CATDESC | CDF\_CHAR | SCET | | | |
| DEPEND\_0 | CDF\_CHAR | EPOCH | | | |
| FIELDNAM | CDF\_CHAR | SCET | | | |
| FILLVAL | CDF\_REAL8 | -1.00E+31 | | | |
| FORMAT | CDF\_CHAR | E12.2 | | | |
| LABLAXIS | CDF\_CHAR | SCET | | | |
| SCALEMAX | CDF\_REAL8 | 8.00E+12 | | | |
| SCALEMIN | CDF\_REAL8 | 5.00E+12 | | | |
| SCALETYP | CDF\_CHAR | linear | | | |
| UNITS | CDF\_CHAR | milliseconds | | | |
| VALIDMAX | CDF\_REAL8 | 1.00E+14 | | | |
| VALIDMIN | CDF\_REAL8 | 0 | | | |
| VAR\_NOTES | CDF\_CHAR | Mission elapsed time in spacecraft clock ticks. Note: These are effected by environmental conditions and do not match Earth-based seconds. Beginning of accumulation. | | | |
| VAR\_TYPE | CDF\_CHAR | support\_data | | | |

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| --- | --- | --- | --- | --- | --- |
| **Variable\_Name** | **Data\_type** | **DIMS** | **SIZES** | **R\_VARY** | **D\_VARY** |
| ACCUM\_SECONDS | CDF\_REAL8 | 1 | 0 | T |  |
| **Attribute Name** | **Data Type** | **Value** | | | |
| CATDESC | CDF\_CHAR | ACCUM\_SECONDS | | | |
| DEPEND\_0 | CDF\_CHAR | EPOCH | | | |
| FIELDNAM | CDF\_CHAR | ACCUM\_SECONDS | | | |
| FILLVAL | CDF\_REAL8 | -1.00E+31 | | | |
| FORMAT | CDF\_CHAR | E12.2 | | | |
| LABLAXIS | CDF\_CHAR | ACCUM\_SECONDS | | | |
| SCALEMAX | CDF\_REAL8 | 0.3 | | | |
| SCALEMIN | CDF\_REAL8 | 0.003 | | | |
| SCALETYP | CDF\_CHAR | linear | | | |
| UNITS | CDF\_CHAR | seconds | | | |
| VALIDMAX | CDF\_REAL8 | 0.3 | | | |
| VALIDMIN | CDF\_REAL8 | 0.003 | | | |
| VAR\_NOTES | CDF\_CHAR | Accumulation time in seconds for each E/q and elevation step. | | | |
| VAR\_TYPE | CDF\_CHAR | support\_data | | | |

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| --- | --- | --- | --- | --- | --- |
| **Variable\_Name** | **Data\_type** | **DIMS** | **SIZES** | **R\_VARY** | **D\_VARY** |
| QUALITY\_FLAG | CDF\_UINT1 | 1 | 0 | T |  |
| **Attribute Name** | **Data Type** | **Value** | | | |
| CATDESC | CDF\_CHAR | QUALITY\_FLAG | | | |
| DEPEND\_0 | CDF\_CHAR | EPOCH | | | |
| DISPLAY\_TYPE | CDF\_CHAR | time\_series | | | |
| FIELDNAM | CDF\_CHAR | QUALITY\_FLAG | | | |
| FILLVAL | CDF\_UINT1 | 255 | | | |
| FORMAT | CDF\_CHAR | I3 | | | |
| LABLAXIS | CDF\_CHAR | QUALITY\_FLAG | | | |
| SCALEMAX | CDF\_UINT1 | 3 | | | |
| SCALEMIN | CDF\_UINT1 | 0 | | | |
| SCALETYP | CDF\_CHAR | linear | | | |
| UNITS | CDF\_CHAR | NONE | | | |
| VALIDMAX | CDF\_UINT1 | 2 | | | |
| VALIDMIN | CDF\_UINT1 | 0 | | | |
| VAR\_NOTES | CDF\_CHAR | 0=good, 1=caution, 2=bad | | | |
| VAR\_TYPE | CDF\_CHAR | support\_data | | | |

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| --- | --- | --- | --- | --- | --- |
| **Variable\_Name** | **Data\_type** | **DIMS** | **SIZES** | **R\_VARY** | **D\_VARY** |
| QUALITY\_BITMASK | CDF\_UINT2 | 1 | 0 | T |  |
| **Attribute Name** | **Data Type** | **Value** | | | |
| CATDESC | CDF\_CHAR | QUALITY\_BITMASK | | | |
| DEPEND\_0 | CDF\_CHAR | EPOCH | | | |
| DISPLAY\_TYPE | CDF\_CHAR | time\_series | | | |
| FIELDNAM | CDF\_CHAR | QUALITY\_BITMASK | | | |
| FILLVAL | CDF\_UINT2 | 65535 | | | |
| FORMAT | CDF\_CHAR | I5 | | | |
| LABLAXIS | CDF\_CHAR | QUALITY\_BITMASK | | | |
| SCALEMAX | CDF\_UINT2 | 65534 | | | |
| SCALEMIN | CDF\_UINT2 | 0 | | | |
| SCALETYP | CDF\_CHAR | linear | | | |
| UNITS | CDF\_CHAR | NONE | | | |
| VALIDMAX | CDF\_UINT2 | 65534 | | | |
| VALIDMIN | CDF\_UINT2 | 0 | | | |
| VAR\_NOTES | CDF\_CHAR | Not yet implemented. | | | |
| VAR\_TYPE | CDF\_CHAR | support\_data | | | |

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Variable\_Name** | **Data\_type** | **DIMS** | **SIZES** | **R\_VARY** | **D\_VARY** |
| MODE | CDF\_UINT1 | 1 | 0 | T |  |
| **Attribute Name** | **Data Type** | **Value** | | | |
| CATDESC | CDF\_CHAR | Mode. 0: Normal Science, 1: Burst 1, 2: Burst 2, 3: Low Cadence. | | | |
| DEPEND\_0 | CDF\_CHAR | EPOCH | | | |
| FIELDNAM | CDF\_CHAR | MODE | | | |
| FILLVAL | CDF\_UINT1 | 255 | | | |
| FORMAT | CDF\_CHAR | I3 | | | |
| LABLAXIS | CDF\_CHAR | MODE | | | |
| SCALEMAX | CDF\_UINT1 | 5 | | | | |
| SCALEMIN | CDFUINT1 | 0 | | | | |
| SCALETYP | CDF\_CHAR | linear | | | |
| UNITS | CDF\_CHAR | NONE | | | |
| VALIDMAX | CDF\_UINT1 | 2 | | | |
| VALIDMIN | CDF\_UINT1 | 0 | | | |
| VAR\_NOTES | CDF\_CHAR | Normal: Full E/q range in nominal 30 sec scan, Burst1: E/q range optimized for slower solar wind in nominal 4 sec scan, Burst2: E/q range optimized for faster solar wind in nominal 4 sec scan, Low Cadence: Full E/q range in nominal 300 sec scan. | | | |
| VAR\_TYPE | CDF\_CHAR | support\_data | | | |

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| --- | --- | --- | --- | --- | --- |
| **Variable\_Name** | **Data\_type** | **DIMS** | **SIZES** | **R\_VARY** | **D\_VARY** |
| VDF\_ION\_ID | CDF\_UINT1 | 1 | 0 | T |  |
| **Attribute Name** | **Data Type** | **Value** | | | |
| CATDESC | CDF\_CHAR | HIS ion id | | | |
| DEPEND\_0 | CDF\_CHAR | EPOCH | | | |
| DISPLAY\_TYPE | CDF\_CHAR | time\_series | | | |
| FIELDNAM | CDF\_CHAR | VDF\_ION\_ID | | | |
| FILLVAL | CDF\_UINT1 | 255 | | | |
| FORMAT | CDF\_CHAR | I5 | | | |
| LABLAXIS | CDF\_CHAR | VDF\_ION\_ID | | | |
| SCALEMAX | CDF\_UINT1 | 31 | | | |
| SCALEMIN | CDF\_UINT1 | 0 | | | |
| SCALETYP | CDF\_CHAR | linear | | | |
| UNITS | CDF\_CHAR | NONE | | | |
| VALIDMAX | CDF\_UINT1 | 31 | | | |
| VALIDMIN | CDF\_UINT1 | 0 | | | |
| VAR\_NOTES | CDF\_CHAR | This VDF was created out of ion event (PHA) words with this ID, which is the result of on-board classification from E/q, SSD energy and TOF bins. Selection of ions to include He2+ and O6+. | | | |
| VAR\_TYPE | CDF\_CHAR | data | | | |

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Variable\_Name** | **Data\_type** | **DIMS** | **SIZES** | **R\_VARY** | **D\_VARY** |
| VDF\_DIMENSIONS | CDF\_UINT1 | 1 | **3** | **T** | T |
| **Attribute Name** | **Data Type** | **Value** | | | |
| CATDESC | CDF\_CHAR | HIS VDF dimensions | | | |
| DEPEND\_0 | CDF\_CHAR | EPOCH | | | |
| DISPLAY\_TYPE | CDF\_CHAR | No\_plot | | | |
| FIELDNAM | CDF\_CHAR | VDF\_DIMENSIONS | | | |
| FILLVAL | CDF\_UINT1 | 255 | | | |
| FORMAT | CDF\_CHAR | I3 | | | |
| LABLAXIS | CDF\_CHAR | VDF\_DIMENSIONS | | | |
| SCALEMAX | CDF\_UINT1 | 64 | | | |
| SCALEMIN | CDF\_UINT1 | 0 | | | |
| SCALETYP | CDF\_CHAR | linear | | | |
| UNITS | CDF\_CHAR | NONE | | | |
| VALIDMAX | CDF\_UINT1 | 64 | | | |
| VALIDMIN | CDF\_UINT1 | 0 | | | |
| VAR\_NOTES | CDF\_CHAR | Size of each VDF dimension. Can change with data configuration. | | | |
| VAR\_TYPE | CDF\_CHAR | data | | | |

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| --- | --- | --- | --- | --- | --- |
| **Variable\_Name** | **Data\_type** | **DIMS** | **SIZES** | **R\_VARY** | **D\_VARY** |
| VDF\_HISTOGRAM | CDF\_UINT4 | **3** | 64 16 32 | T | **T T T** |
| **Attribute Name** | **Data Type** | **Value** | | | |
| CATDESC | CDF\_CHAR | HIS rate-based VDF Histogram | | | |
| DEPEND\_0 | CDF\_CHAR | EPOCH | | | |
| DEPEND\_1 | CDF\_CHAR | EOQ | | | |
| DEPEND\_2 | CDF\_CHAR | ELEVATION | | | |
| DEPEND\_3 | CDF\_CHAR | AZIMUTH | | | |
| DISPLAY\_TYPE | CDF\_CHAR | spectrogram | | | |
| FIELDNAM | CDF\_CHAR | VDF\_HISTOGRAM | | | |
| FILLVAL | CDF\_UINT4 | 4294967295 | | | |
| FORMAT | CDF\_CHAR | I12 | | | |
| LABL\_PTR\_1 | CDF\_CHAR | EOQ\_LABELS | | | |
| LABL\_PTR\_2 | CDF\_CHAR | ELEVATION\_LABELS | | | |
| LABL\_PTR\_3 | CDF\_CHAR | AZIMUTH\_LABELS | | | |
| SCALEMAX | CDF\_UINT4 | 80000000 | | | |
| SCALEMIN | CDF\_UINT4 | 0 | | | |
| SCALETYP | CDF\_CHAR | linear | | | |
| UNITS | CDF\_CHAR | counts per second | | | |
| VALIDMAX | CDF\_UINT1 | 80000000 | | | |
| VALIDMIN | CDF\_UINT1 | 0 | | | |
| VAR\_NOTES | CDF\_CHAR | Counts of ion event (PHA) words for a specific ion subdivided by E/q, elevation and azimuth. See ION\_ID for details | | | |
| VAR\_TYPE | CDF\_CHAR | data | | | |

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Variable\_Name** | **Data\_type** | **DIMS** | **SIZES** | **R\_VARY** | **D\_VARY** |
| AZIMUTH | CDF\_UINT1 | 1 | 32 | F | T |
| **Attribute Name** | **Data Type** | **Value** | | | |
| CATDESC | CDF\_CHAR | HIS azimuth | | | |
| FIELDNAM | CDF\_CHAR | AZIMUTH | | | |
| FILLVAL | CDF\_UINT1 | 255 | | | |
| FORMAT | CDF\_CHAR | I3 | | | |
| LABLAXIS | CDF\_CHAR | AZIMUTH | | | |
| SCALETYP | CDF\_CHAR | linear | | | |
| UNITS | CDF\_CHAR | NONE | | | |
| VALIDMAX | CDF\_UINT1 | 31 | | | |
| VALIDMIN | CDF\_UINT1 | 0 | | | |
| VAR\_NOTES | CDF\_CHAR | Azimuth bin. Can be derived from either Start MCP position or SSD ID. | | | |
| VAR\_TYPE | CDF\_CHAR | support\_data | | | |

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| **Variable\_Name** | **Data\_type** | **Number Elements** | **DIMS** | **SIZES** | **R\_VARY** | **D\_VARY** |
| AZIMUTH\_LABELS | CDF\_CHAR | 3 | 1 | 32 | F | T |
| **Attribute Name** | **Data Type** | **Value** | | | | |
| CATDESC | CDF\_CHAR | AZIMUTH Labels | | | | |
| FIELDNAM | CDF\_CHAR | AZIMUTH\_LABELS | | | | |
| FORMAT | CDF\_CHAR | A3 | | | | |
| VAR\_TYPE | CDF\_CHAR | meta\_data | | | | |

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Variable\_Name** | **Data\_type** | **DIMS** | **SIZES** | **R\_VARY** | **D\_VARY** |
| ELEVATION | CDF\_UINT1 | 1 | 16 | F | T |
| **Attribute Name** | **Data Type** | **Value** | | | |
| CATDESC | CDF\_CHAR | HIS elevation | | | |
| FIELDNAM | CDF\_CHAR | ELEVATION | | | |
| FILLVAL | CDF\_UINT1 | 255 | | | |
| FORMAT | CDF\_CHAR | I3 | | | |
| LABLAXIS | CDF\_CHAR | ELEVATION | | | |
| SCALETYP | CDF\_CHAR | linear | | | |
| UNITS | CDF\_CHAR | NONE | | | |
| VALIDMAX | CDF\_UINT1 | 15 | | | |
| VALIDMIN | CDF\_UINT1 | 0 | | | |
| VAR\_NOTES | CDF\_CHAR | Elevation angle bin corresponding to the E/q - elevation pair in the HV Step table | | | |
| VAR\_TYPE | CDF\_CHAR | support\_data | | | |

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| **Variable\_Name** | **Data\_type** | **Number Elements** | **DIMS** | **SIZES** | **R\_VARY** | **D\_VARY** |
| ELEVATION\_LABELS | CDF\_CHAR | 3 | 1 | 16 | F | T |
| **Attribute Name** | **Data Type** | **Value** | | | | |
| CATDESC | CDF\_CHAR | Elevation Labels | | | | |
| FIELDNAM | CDF\_CHAR | ELEVATION\_LABELS | | | | |
| FORMAT | CDF\_CHAR | A3 | | | | |
| VAR\_TYPE | CDF\_CHAR | meta\_data | | | | |

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Variable\_Name** | **Data\_type** | **DIMS** | **SIZES** | **R\_VARY** | **D\_VARY** |
| EOQ | CDF\_UINT1 | 1 | 64 | F | T |
| **Attribute Name** | **Data Type** | **Value** | | | |
| CATDESC | CDF\_CHAR | HIS E/q | | | |
| FIELDNAM | CDF\_CHAR | EOQ | | | |
| FILLVAL | CDF\_UINT1 | 255 | | | |
| FORMAT | CDF\_CHAR | I3 | | | |
| LABLAXIS | CDF\_CHAR | EOQ | | | |
| SCALETYP | CDF\_CHAR | linear | | | |
| UNITS | CDF\_CHAR | NONE | | | |
| VALIDMAX | CDF\_UINT1 | 63 | | | |
| VALIDMIN | CDF\_UINT1 | 0 | | | |
| VAR\_NOTES | CDF\_CHAR | E/q index table corresponding to the E/q - elevation pairs in the HV Step table | | | |
| VAR\_TYPE | CDF\_CHAR | support\_data | | | |

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| **Variable\_Name** | **Data\_type** | **Number Elements** | **DIMS** | **SIZES** | **R\_VARY** | **D\_VARY** |
| EOQ\_LABELS | CDF\_CHAR | **3** | **1** | **64** | **F** | T |
| **Attribute Name** | **Data Type** | **Value** | | | | |
| CATDESC | CDF\_CHAR | E/q Labels | | | | |
| FIELDNAM | CDF\_CHAR | EOQ\_LABELS | | | | |
| FORMAT | CDF\_CHAR | A3 | | | | |
| VAR\_TYPE | CDF\_CHAR | meta\_data | | | | |

##### HIS L1 Housekeeping Data



















**Filename:** solo\_L1\_swa-his-hk\_yyyymmdd\_V01.cdf

**Global metadata**

|  |  |  |
| --- | --- | --- |
| **Name** | **Entry** | **Value** |
| Acknowledgement | 1 | Please acknowledge Chris J. Owen (SWA PI -- UCL MSSL) & Stefano Livi (HIS PI -- SwRI). NASA Contract NNG10EK25C. |
| Data\_product | 1 | hk>HK data for HIS instrument |
| Data\_type | 1 | hk\_l1 |
| Data\_version | 1 | 01 |
| Descriptor | 1 | SWA-HIS>Solar Wind Analyzer-Heavy Ion Sensor |
| Discipline | 1 | Space Physics>Interplanetary Studies |
| File\_naming\_convention | 1 | "source\_descriptor\_datatype\_yyyyMMdd |
| Generated\_by | 1 | SO-HIS SOC, University of Michigan |
| Generation\_date | 1 | 20200611 |
| HTTP\_LINK |  |  |
| Instrument\_type | 1 | Particles (space) |
| LEVEL | 1 | 1 |
| LINK\_TEXT |  |  |
| LINK\_TITLE |  |  |
| Logical\_file\_id | 1 | solo\_L1\_swa-his-hk\_00000000\_v01 |
| Logical\_source | 1 | solo\_L1\_swa-his-hk |
| Logical\_source\_description | 1 | solo\_L1\_swa-his-hk |
| Mission\_group | 1 | Solar Orbiter |
| MODS | 1 | Initial Release 6/18/2020. |
| PI\_affiliation | 1 | SWRI |
| PI\_name | 1 | S. Livi |
| Project | 1 | SOLO>Solar Orbiter |
| Rules\_of\_use | 1 | Confidential, for use only within HIS team. Not for publication. |
| Software\_version | 1 | 00.00.00 |
| SOOP\_TYPE |  |  |
| Source\_name | 1 | SOLO>Solar Orbiter |
| spase\_DatasetResourceID |  |  |
| TARGET\_CLASS | 1 | In-Situ |
| TARGET\_NAME | 1 | Solar Wind |
| TARGET\_REGION | 1 | Heliosphere |
| TEXT | 1 | Housekeeping data for HIS instrument. |
|  | 2 | Level 1 data are unvalidated and requires substantial processing to use for publication. |
| TIME\_MAX | 1 |  |
| TIME\_MIN | 1 |  |
| Time\_resolution | 1 | Variable. Usually 1 sec, 30 sec, or 60 sec. |

All the variables in the HK CDF have the following attributes:

|  |  |  |
| --- | --- | --- |
| Attribute Name | Data Type | Value |
| DEPEND\_0 | CDF\_CHAR | EPOCH |
| DISPLAY\_TYPE | CDF\_CHAR | Time\_series |
| UNITS | CDF\_CHAR | NONE |
| SCALEMAX | Varies (see below) | Matches VALIDMAX (see below) |
| SCALEMIN | Varies (see below) | 0 |
| VALIDMIN | Varies (see below) | 0 |

The following table three tables summarize all the variables in the HK CDF. The first table lists all the variables with their data types, dimensions, and validmax. The second table defines the dimensions for those variables which are not scalars. The third table gives the VAR\_NOTES for all the variables that have them, which is most.

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
|  | **Variable\_Name** | **Data\_type** | **DIMS** | **SIZES** | **VALIDMAX** |
| 1 | AC\_LINK\_EN | CDF\_UINT1 |  |  | 1 |
| 2 | AC\_LINK\_ERR | CDF\_UINT1 |  |  | 1 |
| 3 | ALPHA\_DECI\_DECR\_THRESH\_REG | CDF\_INT4 |  |  | 65535 |
| 4 | ALPHA\_DECI\_INCR\_REG | CDF\_UINT1 |  |  | 15 |
| 5 | ALPHA\_DECI\_INCR\_THRESH\_REG | CDF INT4 |  |  | 65535 |
| 6 | ALPHA\_DECI\_LEVEL\_REG | CDF\_UINT1 |  |  | 15 |
| 7 | ALPHA\_MAX\_VAL\_REG | CDF\_UINT2 |  |  | 1023 |
| 8 | ALPHA\_MIN\_VAL\_REG | CDF\_UINT2 |  |  | 1023 |
| 9 | ANODE\_STIM\_DELAY | CDF\_UINT1 |  |  | 31 |
| 10 | ANODE\_STIM\_ON | CDF\_UINT1 |  |  | 1 |
| 11 | ANODE\_STIM\_RATE | CDF\_UINT1 |  |  | 7 |
| 12 | ASIC\_ADC\_WAIT | CDF\_UINT1 |  |  | 15 |
| 13 | ASIC\_CONF\_REG | CDF\_INT8 | 1 | 8 | 4294967295 |
| 14 | ASIC\_CS\_MON | CDF\_UINT1 |  |  | 1 |
| 15 | ASIC\_OUT\_OF\_SYSTEM\_EN | CDF\_UINT1 |  |  | 1 |
| 16 | ASIC\_PARITY | CDF\_UINT1 |  |  | 1 |
| 17 | ASIC\_REG\_SWITCH | CDF\_UINT1 |  |  | 1 |
| 18 | ASIC\_RESET | CDF\_UINT1 |  |  | 1 |
| 19 | ASIC\_STIM\_DELAY | CDF\_UINT1 |  |  | 31 |
| 20 | ASIC\_STIM\_ON | CDF\_UINT1 |  |  | 1 |
| 21 | ASIC\_STIM\_RATE | CDF\_UINT1 |  |  | 7 |
| 22 | ASIC\_TP\_RATE | CDF\_UINT1 |  |  | 7 |
| 23 | ASIC\_WRITE\_REG | CDF\_UINT1 |  |  | 1 |
| 24 | BOARD\_ID | CDF\_UINT1 |  |  | 1 |
| 25 | CCSDS\_REJ\_MESSAGE\_CNT | CDF\_UINT1 |  |  | 15 |
| 26 | CDH\_BOARD\_TEMP | CDF\_INT4 | 1 | 3 | 4095 |
| 27 | CDH\_CPU\_TEMP | CDF\_INT4 | 1 | 3 | 4095 |
| 28 | CDH\_GROUND | CDF\_INT4 | 1 | 3 | 4095 |
| 29 | CDH\_OPTO\_LINK\_RX\_EN | CDF\_UINT1 |  |  | 1 |
| 30 | CDH\_OPTO\_LINK\_RX\_RATE | CDF\_UINT1 |  |  | 3 |
| 31 | CDH\_OPTO\_LINK\_STAT\_A | CDF\_UINT1 |  |  | 1 |
| 32 | CDH\_OPTO\_LINK\_STAT\_B | CDF\_UINT1 |  |  | 1 |
| 33 | CDH\_OPTO\_LINK\_TX\_POWER | CDF\_UINT1 |  |  | 7 |
| 34 | CDH\_OPTO\_LINK\_TX\_RATE | CDF\_UINT1 |  |  | 3 |
| 35 | CDH\_OPTO\_RX\_CLOCK\_SYNC\_ERR\_CNT | CDF\_INT4 |  |  | 65535 |
| 36 | CDH\_OPTO\_RX\_CRC\_ERR\_CNT | CDF\_INT4 |  |  | 65535 |
| 37 | CDH\_OPTO\_RX\_HDR\_ERR\_CNT | CDF\_INT4 |  |  | 65535 |
| 38 | CDH\_OPTO\_RX\_SIDE | CDF\_UINT1 |  |  | 1 |
| 39 | CDH\_P1\_5V | CDF\_INT4 | 1 | 3 | 4095 |
| 40 | CDH\_P1\_8V | CDF\_INT4 | 1 | 3 | 4095 |
| 41 | CDH\_P3\_3V\_ADC\_V | CDF\_INT4 | 1 | 3 | 4095 |
| 42 | CDH\_P5V\_DAC\_V | CDF\_INT4 | 1 | 3 | 4095 |
| 43 | CDH\_SWEEP\_DAC\_EN\_LATCHED | CDF\_UINT1 |  |  | 15 |
| 44 | CDH\_SWEEP\_STATE | CDF\_UINT1 |  |  | 7 |
| 45 | CDH\_WDOG\_EN | CDF\_UINT1 |  |  | 1 |
| 46 | CDH\_WDOG\_STATUS | CDF\_UINT1 |  |  | 1 |
| 47 | CHECKSUM | CDF\_INT4 |  |  | 65535 |
| 48 | CMD\_ACC\_CNT | CDF\_INT2 |  |  | 255 |
| 49 | CMD\_ACC\_LAST\_SERVICE | CDF\_INT2 |  |  | 255 |
| 50 | CMD\_ACC\_LAST\_SUBSERVICE | CDF\_INT2 |  |  | 255 |
| 51 | CMD\_ACC\_SSC | CDF\_UINT2 |  |  | 16383 |
| 52 | CMD\_POL\_BOT\_DEF | CDF\_UINT1 |  |  | 1 |
| 53 | CMD\_POL\_TOP\_DEF | CDF\_UINT1 |  |  | 1 |
| 54 | CMD\_POL\_TOP\_PLATE | CDF\_UINT1 |  |  | 1 |
| 55 | CMD\_REJ\_CNT | CDF\_UINT1 |  |  | 1 |
| 56 | CMD\_REJ\_LAST\_SERVICE | CDF\_UINT1 |  |  | 1 |
| 57 | CMD\_REJ\_LAST\_SUBSERVICE | CDF\_UINT1 |  |  | 1 |
| 58 | CMD\_REJ\_SSC | CDF\_UINT2 |  |  | 16383 |
| 59 | CMD\_RNG\_ANALYZER | CDF\_UINT1 |  |  | 1 |
| 60 | CMD\_RNG\_BOT\_DEF | CDF\_UINT1 |  |  | 1 |
| 61 | CMD\_RNG\_TOP\_DEF | CDF\_UINT1 |  |  | 1 |
| 62 | CMD\_RNG\_TOP\_PLATE | CDF\_UINT1 |  |  | 1 |
| 63 | CMD\_VAL\_ANALYZER | CDF\_UINT2 |  |  | 4095 |
| 64 | CMD\_VAL\_BOT\_DEF | CDF\_UINT2 |  |  | 4095 |
| 65 | CMD\_VAL\_MAIN | CDF\_UINT2 |  |  | 4095 |
| 66 | CMD\_VAL\_OFFSET | CDF\_UINT2 |  |  | 4095 |
| 67 | CMD\_VAL\_PA | CDF\_UINT2 |  |  | 4095 |
| 68 | CMD\_VAL\_SSD | CDF\_UINT2 |  |  | 4095 |
| 69 | CMD\_VAL\_START\_A | CDF\_UINT2 |  |  | 4095 |
| 70 | CMD\_VAL\_START\_B | CDF\_UINT2 |  |  | 4095 |
| 71 | CMD\_VAL\_START\_CFD | CDF\_UINT2 |  |  | 4095 |
| 72 | CMD\_VAL\_START\_MCP | CDF\_UINT2 |  |  | 4095 |
| 73 | CMD\_VAL\_STOP\_A | CDF\_UINT2 |  |  | 4095 |
| 74 | CMD\_VAL\_STOP\_B | CDF\_UINT2 |  |  | 4095 |
| 75 | CMD\_VAL\_STOP\_CFD | CDF\_UINT2 |  |  | 4095 |
| 76 | CMD\_VAL\_STOP\_MCP | CDF\_UINT2 |  |  | 4095 |
| 77 | CMD\_VAL\_TOP\_DEF | CDF\_UINT2 |  |  | 4095 |
| 78 | CMD\_VAL\_TOP\_PLATE | CDF\_UINT2 |  |  | 4095 |
| 79 | COINC\_TIMING\_ASIC\_SHAPE | CDF\_INT2 |  |  | 255 |
| 80 | COINC\_TIMING\_ASIC\_WINDOW | CDF\_INT2 |  |  | 255 |
| 81 | COINC\_TIMING\_POS\_TIMEOUT | CDF\_INT2 |  |  | 255 |
| 82 | COINC\_TIMING\_TOF\_TIMEOUT | CDF\_INT2 |  |  | 255 |
| 83 | CONNECTION\_TEST\_CNT | CDF\_UINT1 |  |  | 15 |
| 84 | CPU\_WDOG\_EN | CDF\_UINT1 |  |  | 1 |
| 85 | CPU\_WDOG\_STATUS | CDF\_UINT1 |  |  | 1 |
| 86 | DSCB\_ADC\_EN | CDF\_UINT1 |  |  | 1 |
| 87 | DSCB\_ADC\_WAITS | CDF\_INT4 |  |  | 65535 |
| 88 | DSCB\_ASIC\_CONTROL\_STATE\_ MACHINE | CDF\_UINT1 |  |  | 3 |
| 89 | DSCB\_ASIC\_FLAG | CDF\_UINT1 |  |  | 1 |
| 90 | DSCB\_ASIC\_V\_MON | CDF\_INT4 | 1 | 3 | 4095 |
| 91 | DSCB\_ASIC\_READ\_OUT\_STATE\_ MACHINE | CDF\_UINT1 |  |  | 3 |
| 92 | DSCB\_ASIC\_TEMP | CDF\_INT4 | 1 | 3 | 4095 |
| 93 | DSCB\_ASIC\_WRITE\_STATE\_ MACHINE | CDF\_UINT1 |  |  | 3 |
| 94 | DSCB\_AZIMUTHAL\_SEL | CDF\_UINT1 | 1 | 3\* | 1 |
| 95 | DSCB\_CMD\_NAKS | CDF\_INT4 |  |  | 65535 |
| 96 | DSCB\_COINC | CDF\_UINT1 |  |  | 3 |
| 97 | DSCB\_COMM\_ACTIVE | CDF\_UINT1 |  |  | 1 |
| 98 | DSCB\_DOUBLE\_BIT\_EDAC | CDF\_INT4 |  |  | 65535 |
| 99 | DSCB\_DSCB\_TEMP | CDF\_INT4 | 1 | 3 | 65535 |
| 100 | DSCB\_DSIB\_TEMP | CDF\_INT4 | 1 | 3 | 65535 |
| 101 | DSCB\_FPGA\_BASE | CDF\_INT2 |  |  | 255 |
| 102 | DSCB\_FPGA\_REV | CDF\_INT2 |  |  | 255 |
| 103 | DSCB\_HK\_RATE | CDF\_UINT1 |  |  | 7 |
| 104 | DSCB\_HV\_AUTO\_RESET\_EN | CDF\_UINT1 |  |  | 1 |
| 105 | DSCB\_HV\_EN | CDF\_UINT1 |  |  | 1 |
| 106 | DSCB\_HV\_LIMITED | CDF\_UINT1 |  |  | 1 |
| 107 | DSCB\_HV\_MON\_EN | CDF\_UINT1 |  |  | 1 |
| 108 | DSCB\_HVPS\_TEMP | CDF\_INT4 | 1 | 3 | 65535 |
| 109 | DSCB\_INIT\_BIT | CDF\_UINT1 |  |  | 1 |
| 110 | DSCB\_MCP\_BIAS\_EN | CDF\_UINT1 |  |  | 1 |
| 111 | DSCB\_MCP\_BIAS\_I\_LIMIT\_EN | CDF\_UINT1 |  |  | 1 |
| 112 | DSCB\_MCP\_BIAS\_I\_TRIP | CDF\_UINT1 |  |  | 1 |
| 113 | DSCB\_MCP\_BIAS\_V\_LIMIT\_EN | CDF\_UINT1 |  |  | 1 |
| 114 | DSCB\_MCP\_BIAS\_V\_TRIP | CDF\_UINT1 |  |  | 1 |
| 115 | DSCB\_OFFSET\_I\_MON | CDF\_INT4 | 1 | 3 | 4095 |
| 116 | DSCB\_OFFSET\_V\_MON | CDF\_INT4 | 1 | 3 | 4095 |
| 117 | DSCB\_OPTO\_RX\_CLOCK\_SYNC\_ERR\_CNT | CDF\_INT4 |  |  | 65535 |
| 118 | DSCB\_OPTO\_RX\_CRC\_ERR\_CNT | CDF\_INT4 |  |  | 65535 |
| 119 | DSCB\_OPTO\_RX\_DATA1\_ERR\_CNT | CDF\_INT4 |  |  | 65535 |
| 120 | DSCB\_OPTO\_RX\_DATA2\_ERR\_CNT | CDF\_INT4 |  |  | 65535 |
| 121 | DSCB\_OPTO\_RX\_HDR\_ERR\_CNT | CDF\_INT4 |  |  | 65535 |
| 122 | DSCB\_P1\_5V | CDF\_INT4 | 1 | 3 | 4095 |
| 123 | DSCB\_P3\_3V | CDF\_INT4 | 1 | 3 | 4095 |
| 124 | DSCB\_P3\_3V\_ADC\_REF | CDF\_INT4 | 1 | 3 | 4095 |
| 125 | DSCB\_P5V\_ADC\_REF\_MON | CDF\_INT4 | 1 | 3 | 4095 |
| 126 | DSCB\_P5V\_DAC\_REF\_MON | CDF\_INT4 | 1 | 3 | 4095 |
| 127 | DSCB\_POS\_START | CDF\_UINT1 |  |  | 15 |
| 128 | DSCB\_POS\_START\_ADD\_SUB | CDF\_UINT1 |  |  | 1 |
| 129 | DSCB\_POS\_START\_SEL | CDF\_UINT1 |  |  | 1 |
| 130 | DSCB\_POS\_STOP | CDF\_UINT1 |  |  | 15 |
| 131 | DSCB\_POS\_STOP\_ADD\_SUB | CDF\_UINT1 |  |  | 1 |
| 132 | DSCB\_POS\_STOP\_DUAL\_SEL | CDF\_UINT1 |  |  | 1 |
| 133 | DSCB\_POS\_STOP\_SEL | CDF\_UINT1 |  |  | 1 |
| 134 | DSCB\_RATES\_EN | CDF\_UINT1 |  |  | 1 |
| 135 | DSCB\_INIT\_REG | CDF\_INT2 |  |  | 255 |
| 136 | DSCB\_RESET\_DECI\_LEVEL | CDF\_UINT1 |  |  | 1 |
| 137 | DSCB\_RESET\_FSW | CDF\_UINT1 |  |  | 1 |
| 138 | DSCB\_RESET\_POR | CDF\_UINT1 |  |  | 1 |
| 139 | DSCB\_RESET\_WDOG | CDF\_UINT1 |  |  | 1 |
| 140 | DSCB\_SINGLE\_BIT\_EDAC | CDF\_INT4 |  |  | 65535 |
| 141 | DSCB\_SSD\_I\_MON | CDF\_INT4 | 1 | 3 | 4095 |
| 142 | DSCB\_SSD\_TEMP | CDF\_INT4 | 1 | 3 | 4095 |
| 143 | DSCB\_SSD\_V\_MON | CDF\_INT4 | 1 | 3 | 4095 |
| 144 | DSCB\_START\_MCP\_I\_MON | CDF\_INT4 | 1 | 3 | 4095 |
| 145 | DSCB\_START\_MCP\_TEMP | CDF\_INT4 | 1 | 3 | 4095 |
| 146 | DSCB\_START\_MCP\_V\_MON | CDF\_INT4 | 1 | 3 | 4095 |
| 147 | DSCB\_STARTUP\_POWER | CDF\_UINT1 |  |  | 7 |
| 148 | DSCB\_STARTUP\_RX\_A\_EN | CDF\_UINT1 |  |  | 1 |
| 149 | DSCB\_STARTUP\_RX\_B\_EN | CDF\_UINT1 |  |  | 1 |
| 150 | DSCB\_STARTUP\_TX\_A\_EN | CDF\_UINT1 |  |  | 1 |
| 151 | DSCB\_STARTUP\_TX\_B\_EN | CDF\_UINT1 |  |  | 1 |
| 152 | DSCB\_STOP\_MCP\_I\_MON | CDF\_INT4 | 1 | 3 | 4095 |
| 153 | DSCB\_STOP\_MCP\_TEMP | CDF\_INT4 | 1 | 3 | 4095 |
| 154 | DSCB\_STOP\_MCP\_V\_MON | CDF\_INT4 | 1 | 3 | 4095 |
| 155 | DSCB\_SWEEP\_OVER | CDF\_UINT1 |  |  | 1 |
| 156 | DSCB\_SYSTEM\_FSM | CDF\_UINT1 |  |  | 7 |
| 157 | DSCB\_TOF\_START | CDF\_UINT1 |  |  | 15 |
| 158 | DSCB\_TOF\_START\_ADD\_SUB | CDF\_UINT1 |  |  | 1 |
| 159 | DSCB\_TOF\_STOP | CDF\_UINT1 |  |  | 15 |
| 160 | DSCB\_TOF\_STOP\_ADD\_SUB | CDF\_UINT1 |  |  | 1 |
| 161 | DSCB\_V\_I\_MON\_REF | CDF\_INT4 | 1 | 3 | 4095 |
| 162 | DSCB\_WDOG\_CNT | CDF\_INT2 |  |  | 255 |
| 163 | DSCB\_WDOG\_ON | CDF\_UINT1 |  |  | 1 |
| 164 | EAIS\_PORT\_TEMP | CDF\_INT4 | 1 | 3 | 4095 |
| 165 | ENERGY\_ASIC\_ACQ\_TP | CDF\_UINT1 |  |  | 1 |
| 166 | EVENT\_ERR\_CNT | CDF\_INT2 |  |  | 255 |
| 167 | FDIR\_DSCB\_AUTOMATIC\_LIMIT | CDF\_UINT1 |  |  | 1 |
| 168 | FDIR\_DSCB\_COMM\_LOSS | CDF\_UINT1 |  |  | 1 |
| 169 | FDIR\_DSCB\_DOWNLINK\_ UNDETERMINED | CDF\_UINT1 |  |  | 1 |
| 170 | FDIR\_DSCB\_NOT\_RUNNING | CDF\_UINT1 |  |  | 1 |
| 171 | FDIR\_DSCB\_REG\_INIT | CDF\_UINT1 |  |  | 1 |
| 172 | FDIR\_EMERGENCY\_FAST\_SAFE | CDF\_UINT1 |  |  | 1 |
| 173 | FDIR\_LEVEL | CDF\_UINT1 |  |  | 15 |
| 174 | FDIR\_NOMINAL\_SLOW\_SAFE | CDF\_UINT1 |  |  | 1 |
| 175 | FDIR\_RED\_LIMIT | CDF\_UINT1 |  |  | 1 |
| 176 | FDIR\_RESERVED | CDF\_UINT1 |  |  | 1 |
| 177 | FDIR\_SCIENCE\_AUTO\_MODE\_FAIL | CDF\_UINT1 |  |  | 1 |
| 178 | FDIR\_SOLAR\_ARRAY\_STEERING\_ START | CDF\_UINT1 |  |  | 1 |
| 179 | FDIR\_SOLAR\_ARRAY\_STEERING\_ STOP | CDF\_UINT1 |  |  | 1 |
| 180 | FDIR\_TASK\_TIMEOUT | CDF\_UINT1 |  |  | 1 |
| 181 | FDIR\_THRUSTER\_FIRING\_START | CDF\_UINT1 |  |  | 1 |
| 182 | FDIR\_THRUSTER\_FIRING\_STOP | CDF\_UINT1 |  |  | 1 |
| 183 | FDIR\_YELLOW\_LIMIT | CDF\_UINT1 |  |  | 1 |
| 184 | FPGA\_STEP\_TBL | CDF\_UINT1 |  |  | 3 |
| 185 | FPGA\_STEP\_TBL\_DATA\_ELEV\_ INDEX | CDF\_UINT1 |  |  | 15 |
| 186 | FPGA\_STEP\_TBL\_E\_Q\_INDEX | CDF\_UINT1 |  |  | 63 |
| 187 | FPGA\_STEP\_TBL\_ELEV\_INDEX | CDF\_UINT1 |  |  | 15 |
| 188 | FPGA\_SWEEP\_TBL\_ROW | CDF\_UINT1 |  |  | 127 |
| 189 | FPGA\_SWEEP\_TBL\_SIDE | CDF\_UINT1 |  |  | 1 |
| 190 | FPGA\_SWEEP\_TBL\_DATA\_SIDE | CDF\_UINT1 |  |  | 1 |
| 191 | HK\_EN | CDF\_UINT1 |  |  | 1 |
| 192 | HV\_DISABLED | CDF\_UINT1 |  |  | 1 |
| 193 | HV\_I\_LIM\_PERSISTENCE | CDF\_INT2 |  |  | 255 |
| 194 | HV\_LIMITED | CDF\_UINT1 |  |  | 1 |
| 195 | HV\_V\_LIM\_PERSISTENCE | CDF\_INT2 |  |  | 255 |
| 196 | HVPS\_ANALYZER | CDF\_UINT2 | 1 | 3 | 4095 |
| 197 | HVPS\_ANALYZER\_POL | CDF\_UINT1 | 1 | 3 | 1 |
| 198 | HVPS\_ANALYZER\_RNG | CDF\_UINT1 | 1 | 3 | 1 |
| 199 | HVPS\_BOT\_DEF | CDF\_UINT2 | 1 | 3 | 4095 |
| 200 | HVPS\_BOT\_DEF\_POL | CDF\_UINT1 | 1 | 3 | 1 |
| 201 | HVPS\_BOT\_DEF\_RNG | CDF\_UINT1 | 1 | 3 | 1 |
| 202 | HVPS\_HV\_MAIN\_N | CDF\_UINT2 | 1 | 3 | 4095 |
| 203 | HVPS\_HV\_MAIN\_N\_POL | CDF\_UINT1 | 1 | 3 | 1 |
| 204 | HVPS\_HV\_MAIN\_N\_RNG | CDF\_UINT1 | 1 | 3 | 1 |
| 205 | HVPS\_HV\_MAIN\_P | CDF\_UINT2 | 1 | 3 | 4095 |
| 206 | HVPS\_HV\_MAIN\_P\_POL | CDF\_UINT1 | 1 | 3 | 1 |
| 207 | HVPS\_HV\_MAIN\_P\_RNG | CDF\_UINT1 | 1 | 3 | 1 |
| 208 | HVPS\_N12V\_I | CDF\_INT4 | 1 | 3 | 4095 |
| 209 | HVPS\_P12V\_I | CDF\_INT4 | 1 | 3 | 4095 |
| 210 | HVPS\_TOP\_DEF | CDF\_UINT2 | 1 | 3 | 4095 |
| 211 | HVPS\_TOP\_DEF\_POL | CDF\_UINT1 | 1 | 3 | 1 |
| 212 | HVPS\_TOP\_DEF\_RNG | CDF\_UINT1 | 1 | 3 | 1 |
| 213 | HVPS\_TOP\_PLATE | CDF\_UINT2 | 1 | 3 | 4095 |
| 214 | HVPS\_TOP\_PLATE\_POL | CDF\_UINT1 | 1 | 3 | 1 |
| 215 | HVPS\_TOP\_PLATE\_RNG | CDF\_UINT1 | 1 | 3 | 1 |
| 216 | INTEGRATION\_TIME | CDF\_UINT4 |  |  | 131071 |
| 217 | INTER\_INST\_INFO\_CNT | CDF\_UINT2 |  |  | 1023 |
| 218 | IRAP\_HV\_ON | CDF\_UINT1 |  |  | 1 |
| 219 | IRAP\_HVPS\_TEMP | CDF\_INT4 | 1 | 3 | 4095 |
| 220 | LAST\_ERR\_CODE | CDF\_INT2 |  |  | 255 |
| 221 | LAST\_MACRO\_ACC\_CMD\_CNT | CDF\_UINT1 |  |  | 127 |
| 222 | LAST\_MACRO\_ACC\_SERVICE | CDF\_INT2 |  |  | 255 |
| 223 | LAST\_MACRO\_ACC\_SUBSERVICE | CDF\_INT2 |  |  | 255 |
| 224 | LAST\_MACRO\_CALLER | CDF\_UINT1 |  |  | 127 |
| 225 | LAST\_MACRO\_CMD\_CNT | CDF\_UINT1 |  |  | 127 |
| 226 | LAST\_MACRO\_I\_WAIT | CDF\_INT4 |  |  | 65535 |
| 227 | LAST\_MACRO\_REJ\_CMD\_CNT | CDF\_UINT1 |  |  | 127 |
| 228 | LAST\_MACRO\_REJ\_SERVICE | CDF\_INT2 |  |  | 255 |
| 229 | LAST\_MACRO\_REJ\_SUBSERVICE | CDF\_INT2 |  |  | 255 |
| 230 | LAST\_MACRO\_SEL | CDF\_UINT1 |  |  | 127 |
| 231 | LAST\_MACRO\_TOTAL\_CMDS | CDF\_UINT1 |  |  | 127 |
| 232 | LOW\_TOF\_CUT\_OFF\_REG | CDF\_UINT2 |  |  | 1023 |
| 233 | LVPS\_12V\_DC\_DC\_TEMP | CDF\_INT4 | 1 | 3 | 4095 |
| 234 | LVPS\_5V\_DC\_DC\_TEMP | CDF\_INT4 | 1 | 3 | 4095 |
| 235 | LVPS\_AC\_LINK\_I | CDF\_INT4 | 1 | 3 | 4095 |
| 236 | LVPS\_AC\_LINK\_TEMP | CDF\_INT4 | 1 | 3 | 4095 |
| 237 | LVPS\_AC\_LINK\_V | CDF\_INT4 | 1 | 3 | 4095 |
| 238 | LVPS\_N12V\_OUTPUT\_I | CDF\_INT4 | 1 | 3 | 4095 |
| 239 | LVPS\_N12V\_OUTPUT\_V | CDF\_INT4 | 1 | 3 | 4095 |
| 240 | LVPS\_N5V\_OUTPUT\_I | CDF\_INT4 | 1 | 3 | 4095 |
| 241 | LVPS\_N5V\_OUTPUT\_V | CDF\_INT4 | 1 | 3 | 4095 |
| 242 | LVPS\_P12V\_OUTPUT\_I | CDF\_INT4 | 1 | 3 | 4095 |
| 243 | LVPS\_P12V\_OUTPUT\_V | CDF\_INT4 | 1 | 3 | 4095 |
| 244 | LVPS\_P3\_3V\_DC\_DC\_TEMP | CDF\_INT4 | 1 | 3 | 4095 |
| 245 | LVPS\_P3\_3V\_OUTPUT\_I | CDF\_INT4 | 1 | 3 | 4095 |
| 246 | LVPS\_P3\_3V\_OUTPUT\_V | CDF\_INT4 | 1 | 3 | 4095 |
| 247 | LVPS\_P5V\_OUTPUT\_I | CDF\_INT4 | 1 | 3 | 4095 |
| 248 | LVPS\_P5V\_OUTPUT\_V | CDF\_INT4 | 1 | 3 | 4095 |
| 249 | MACRO\_STATUS | CDF\_UINT1 | 1 | 64 | 1 |
| 250 | MASTER\_SWEEP\_EN | CDF\_UINT1 |  |  | 3 |
| 251 | MASTER\_SWEEP\_EN\_STATUS | CDF\_UINT1 |  |  | 3 |
| 252 | MISSING\_SPACEWIRE\_TIME\_CODE | CDF\_UINT1 |  |  | 1 |
| 253 | MODE\_CHANGE\_REASON | CDF\_UINT1 |  |  | 3 |
| 254 | MRAM\_WR\_EN | CDF\_UINT1 |  |  | 1 |
| 255 | OFFSET\_EN | CDF\_UINT1 |  |  | 1 |
| 256 | OFFSET\_I\_EN\_LIM | CDF\_UINT1 |  |  | 1 |
| 257 | OFFSET\_I\_TRIG | CDF\_UINT1 |  |  | 1 |
| 258 | OFFSET\_V\_EN\_LIM | CDF\_UINT1 |  |  | 1 |
| 259 | OFFSET\_V\_TRIG | CDF\_UINT1 |  |  | 1 |
| 260 | OP\_MODE | CDF\_UINT1 |  |  | 9 |
| 261 | OPTO\_RX\_A\_EN | CDF\_UINT1 |  |  | 1 |
| 262 | OPTO\_RX\_A\_EN\_INIT | CDF\_UINT1 |  |  | 1 |
| 263 | OPTO\_RX\_B\_EN | CDF\_UINT1 |  |  | 1 |
| 264 | OPTO\_RX\_B\_EN\_INIT | CDF\_UINT1 |  |  | 1 |
| 265 | OPTO\_RX\_LOOPBACK | CDF\_UINT1 |  |  | 1 |
| 266 | OPTO\_RX\_RATE | CDF\_UINT1 |  |  | 3 |
| 267 | OPTO\_RX\_SIGNAL\_QUALITY | CDF\_UINT1 |  |  | 1 |
| 268 | OPTO\_RX\_SYNCED | CDF\_UINT1 |  |  | 1 |
| 269 | OPTO\_TX\_A\_EN | CDF\_UINT1 |  |  | 1 |
| 270 | OPTO\_TX\_A\_EN\_INIT | CDF\_UINT1 |  |  | 1 |
| 271 | OPTO\_TX\_B\_EN | CDF\_UINT1 |  |  | 1 |
| 272 | OPTO\_TX\_B\_EN\_INIT | CDF\_UINT1 |  |  | 1 |
| 273 | OPTO\_TX\_EN | CDF\_UINT1 |  |  | 1 |
| 274 | OPTO\_TX\_POWER | CDF\_UINT1 |  |  | 7 |
| 275 | OPTO\_TX\_POWER\_EN | CDF\_UINT1 |  |  | 1 |
| 276 | OPTO\_TX\_RATE | CDF\_UINT1 |  |  | 3 |
| 277 | OPTO\_TX\_READY | CDF\_UINT1 |  |  | 1 |
| 278 | OSC\_ADJ\_POS\_START | CDF\_INT2 |  |  | 255 |
| 279 | OSC\_ADJ\_POS\_STOP | CDF\_INT2 |  |  | 255 |
| 280 | OSC\_ADJ\_TOF\_START | CDF\_INT2 |  |  | 255 |
| 281 | OSC\_ADJ\_TOF\_STOP | CDF\_INT2 |  |  | 255 |
| 282 | PA\_HV\_ON | CDF\_UINT1 |  |  | 1 |
| 283 | PA\_HVPS\_TEMP | CDF\_INT4 | 1 | 3 | 4095 |
| 284 | PA\_HVPS\_V\_MON | CDF\_INT4 | 1 | 3 | 4095 |
| 285 | PACKET\_SUB\_TIME | CDF\_INT4 |  |  | 65535 |
| 286 | PACKET\_WHOLE\_TIME | CDF\_INT8 |  |  | 4294967296 |
| 287 | POS\_CAL\_DONE | CDF\_UINT1 |  |  | 1 |
| 288 | PROCESSOR\_IDLE\_PERCENTAGE | CDF\_UINT1 |  |  | 100 |
| 289 | PROTON\_AVOIDANCE\_STATUS | CDF\_UINT1 |  |  | 1 |
| 290 | PROTON\_DECI\_DECR\_THRESH\_REG | CDF\_INT4 |  |  | 65535 |
| 291 | PROTON\_DECI\_INCR\_REG | CDF\_UINT1 |  |  | 15 |
| 292 | PROTON\_DECI\_INCR\_THRESH\_REG | CDF\_INT4 |  |  | 65535 |
| 293 | PROTON\_DECI\_LEVEL\_REG | CDF\_UINT1 |  |  | 15 |
| 294 | PROTON\_MAX\_VAL\_REG | CDF\_UINT1 |  |  | 1023 |
| 295 | PROTON\_MIN\_VAL\_REG | CDF\_UINT1 |  |  | 1023 |
| 296 | QUALITY\_BITMASK | CDF\_INT4 |  |  | 1 |
| 297 | QUALITY\_FLAG | CDF\_INT2 |  |  | 2 |
| 298 | SAFETY\_CHECKING\_STATUS\_CDH | CDF\_UINT1 |  |  | 1 |
| 299 | SAFETY\_CHECKING\_STATUS\_DSCB | CDF\_UINT1 |  |  | 1 |
| 300 | SAFING\_STATUS\_CDH\_MON\_RED | CDF\_UINT1 | 1 | 40 | 1 |
| 301 | SAFING\_STATUS\_CDH\_MON\_YEL | CDF\_UINT1 | 1 | 40 | 1 |
| 302 | SAFING\_STATUS\_DSCB\_MON\_RED | CDF\_UINT1 | 1 | 24 | 1 |
| 303 | SAFING\_STATUS\_DSCB\_MON\_YEL | CDF\_UINT1 | 1 | 24 | 1 |
| 304 | SEQ\_CNT | CDF\_INT4 |  |  | 65535 |
| 305 | SSD\_EN | CDF\_UINT1 |  |  | 1 |
| 306 | SSD\_I\_EN\_LIM | CDF\_UINT1 |  |  | 1 |
| 307 | SSD\_I\_TRIG | CDF\_UINT1 |  |  | 1 |
| 308 | SSD\_V\_EN\_LIM | CDF\_UINT1 |  |  | 1 |
| 309 | SSD\_V\_TRIG | CDF\_UINT1 |  |  | 1 |
| 310 | START\_ANODE\_A\_OSC\_CNT | CDF\_INT4 |  |  | 65535 |
| 311 | START\_ANODE\_B\_OSC\_CNT | CDF\_INT4 |  |  | 65535 |
| 312 | START\_COLLECTION | CDF\_UINT1 |  |  | 1 |
| 313 | START\_MCP\_EN | CDF\_UINT1 |  |  | 1 |
| 314 | START\_MCP\_I\_EN\_LIM | CDF\_UINT1 |  |  | 1 |
| 315 | START\_MCP\_I\_TRIG | CDF\_UINT1 |  |  | 1 |
| 316 | START\_MCP\_V\_EN\_LIM | CDF\_UINT1 |  |  | 1 |
| 317 | START\_MCP\_V\_TRIG | CDF\_UINT1 |  |  | 1 |
| 318 | START\_STIM\_DELAY | CDF\_UINT1 |  |  | 31 |
| 319 | START\_STIM\_EXT | CDF\_UINT1 |  |  | 1 |
| 320 | START\_STIM\_ON | CDF\_UINT1 |  |  | 1 |
| 321 | START\_STIM\_RATE | CDF\_UINT1 |  |  | 7 |
| 322 | START\_TOF\_OSC\_CNT | CDF\_INT4 |  |  | 65535 |
| 323 | STOP\_MCP\_EN | CDF\_UINT1 |  |  | 1 |
| 324 | STOP\_MCP\_I\_EN\_LIM | CDF\_UINT1 |  |  | 1 |
| 325 | STOP\_MCP\_I\_TRIG | CDF\_UINT1 |  |  | 1 |
| 326 | STOP\_MCP\_V\_EN\_LIM | CDF\_UINT1 |  |  | 1 |
| 327 | STOP\_MCP\_V\_TRIG | CDF\_UINT1 |  |  | 1 |
| 328 | STOP\_TOF\_OSC\_CNT | CDF\_INT4 |  |  | 65535 |
| 329 | SWEEP\_DATA\_A\_ACTIVE | CDF\_UINT1 |  |  | 1 |
| 330 | SWEEP\_DATA\_B\_ACTIVE | CDF\_UINT1 |  |  | 1 |
| 331 | SWEEP\_EDAC\_EN | CDF\_UINT1 |  |  | 1 |
| 332 | SWEEP\_EDP | CDF\_UINT1 |  |  | 1 |
| 333 | SWEEP\_EN\_ANALYZER | CDF\_UINT1 |  |  | 1 |
| 334 | SWEEP\_EN\_BOT\_DEF | CDF\_UINT1 |  |  | 1 |
| 335 | SWEEP\_EN\_TOP\_DEF | CDF\_UINT1 |  |  | 1 |
| 336 | SWEEP\_EN\_TOP\_PLATE | CDF\_UINT1 |  |  | 1 |
| 337 | SWEEP\_SCRUBBING\_EN | CDF\_UINT1 |  |  | 1 |
| 338 | SWEEP\_TBL\_POINTER\_SEL | CDF\_UINT1 |  |  | 1 |
| 339 | SYSTEM\_MODULE\_VERIFY | CDF\_UINT1 |  |  | 1 |
| 340 | TIME\_CODE\_CNT | CDF\_INT2 |  |  | 255 |
| 341 | TIME\_MESSAGE\_CNT | CDF\_INT2 |  |  | 255 |
| 342 | TOF\_CAL\_DONE | CDF\_UINT1 |  |  | 1 |
| 343 | TOF\_CAL\_EN | CDF\_UINT1 |  |  | 1 |
| 344 | TOF\_START\_SEL | CDF\_UINT1 |  |  | 1 | |
| 345 | TOF\_STIM\_DELAY | CDF\_UINT1 |  |  | 31 | |
| 346 | TOF\_STIM\_EXT | CDF\_UINT1 |  |  | 1 |
| 347 | TOF\_STIM\_ON | CDF\_UINT1 |  |  | 1 |
| 348 | TOF\_STIM\_RATE | CDF\_UINT1 |  |  | 7 |
| 349 | WDOG\_RESET\_CNT | CDF\_UINT1 |  |  | 127 |

|  |  |  |  |
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|  | **Variable\_Name** | **Dim Size** | **Meaning of Dimension** |
| 13 | ASIC\_CONF\_REG | 8 | Register Number |
| 27 | CDH\_BOARD\_TEMP | 3 | Ave, Min, Max |
| 28 | CDH\_CPU\_TEMP | 3 | Ave, Min, Max |
| 29 | CDH\_GROUND | 3 | Ave, Min, Max |
| 40 | CDH\_P1\_5V | 3 | Ave, Min, Max |
| 41 | CDH\_P1\_8V | 3 | Ave, Min, Max |
| 42 | CDH\_P3\_3V\_ADC\_V | 3 | Ave, Min, Max |
| 43 | CDH\_P5V\_DAC\_V | 3 | Ave, Min, Max |
| 91 | DSCB\_ASIC\_V\_MON | 3 | Ave, Min, Max |
| 93 | DSCB\_ASIC\_TEMP | 3 | Ave, Min, Max |
| 95 | DSCB\_AZIMUTHAL\_SEL | 3 | Select Number |
| 100 | DSCB\_DSCB\_TEMP | 3 | Ave, Min, Max |
| 101 | DSCB\_DSIB\_TEMP | 3 | Ave, Min, Max |
| 109 | DSCB\_HVPS\_TEMP | 3 | Ave, Min, Max |
| 116 | DSCB\_OFFSET\_I\_MON | 3 | Ave, Min, Max |
| 117 | DSCB\_OFFSET\_V\_MON | 3 | Ave, Min, Max |
| 123 | DSCB\_P1\_5V | 3 | Ave, Min, Max |
| 124 | DSCB\_P3\_3V | 3 | Ave, Min, Max |
| 125 | DSCB\_P3\_3V\_ADC\_REF | 3 | Ave, Min, Max |
| 126 | DSCB\_P5V\_ADC\_REF\_MON | 3 | Ave, Min, Max |
| 127 | DSCB\_P5V\_DAC\_REF\_MON | 3 | Ave, Min, Max |
| 142 | DSCB\_SSD\_I\_MON | 3 | Ave, Min, Max |
| 143 | DSCB\_SSD\_TEMP | 3 | Ave, Min, Max |
| 144 | DSCB\_SSD\_V\_MON | 3 | Ave, Min, Max |
| 145 | DSCB\_START\_MCP\_I\_MON | 3 | Ave, Min, Max |
| 146 | DSCB\_START\_MCP\_TEMP | 3 | Ave, Min, Max |
| 147 | DSCB\_START\_MCP\_V\_MON | 3 | Ave, Min, Max |
| 153 | DSCB\_STOP\_MCP\_I\_MON | 3 | Ave, Min, Max |
| 154 | DSCB\_STOP\_MCP\_TEMP | 3 | Ave, Min, Max |
| 155 | DSCB\_STOP\_MCP\_V\_MON | 3 | Ave, Min, Max |
| 162 | DSCB\_V\_I\_MON\_REF | 3 | Ave, Min, Max |
| 165 | EAIS\_PORT\_TEMP | 3 | Ave, Min, Max |
| 197 | HVPS\_ANALYZER | 3 | Ave, Min, Max |
| 198 | HVPS\_ANALYZER\_POL | 3 | Ave, Min, Max |
| 199 | HVPS\_ANALYZER\_RNG | 3 | Ave, Min, Max |
| 200 | HVPS\_BOT\_DEF | 3 | Ave, Min, Max |
| 201 | HVPS\_BOT\_DEF\_POL | 3 | Ave, Min, Max |
| 202 | HVPS\_BOT\_DEF\_RNG | 3 | Ave, Min, Max |
| 203 | HVPS\_HV\_MAIN\_N | 3 | Ave, Min, Max |
| 204 | HVPS\_HV\_MAIN\_N\_POL | 3 | Ave, Min, Max |
| 205 | HVPS\_HV\_MAIN\_N\_RNG | 3 | Ave, Min, Max |
| 206 | HVPS\_HV\_MAIN\_P | 3 | Ave, Min, Max |
| 207 | HVPS\_HV\_MAIN\_P\_POL | 3 | Ave, Min, Max |
| 208 | HVPS\_HV\_MAIN\_P\_RNG | 3 | Ave, Min, Max |
| 209 | HVPS\_N12V\_I | 3 | Ave, Min, Max |
| 210 | HVPS\_P12V\_I | 3 | Ave, Min, Max |
| 211 | HVPS\_TOP\_DEF | 3 | Ave, Min, Max |
| 212 | HVPS\_TOP\_DEF\_POL | 3 | Ave, Min, Max |
| 213 | HVPS\_TOP\_DEF\_RNG | 3 | Ave, Min, Max |
| 214 | HVPS\_TOP\_PLATE | 3 | Ave, Min, Max |
| 215 | HVPS\_TOP\_PLATE\_POL | 3 | Ave, Min, Max |
| 216 | HVPS\_TOP\_PLATE\_RNG | 3 | Ave, Min, Max |
| 220 | IRAP\_HVPS\_TEMP | 3 | Ave, Min, Max |
| 234 | LVPS\_12V\_DC\_DC\_TEMP | 3 | Ave, Min, Max |
| 235 | LVPS\_5V\_DC\_DC\_TEMP | 3 | Ave, Min, Max |
| 236 | LVPS\_AC\_LINK\_I | 3 | Ave, Min, Max |
| 237 | LVPS\_AC\_LINK\_TEMP | 3 | Ave, Min, Max |
| 238 | LVPS\_AC\_LINK\_V | 3 | Ave, Min, Max |
| 239 | LVPS\_N12V\_OUTPUT\_I | 3 | Ave, Min, Max |
| 240 | LVPS\_N12V\_OUTPUT\_V | 3 | Ave, Min, Max |
| 241 | LVPS\_N5V\_OUTPUT\_I | 3 | Ave, Min, Max |
| 242 | LVPS\_N5V\_OUTPUT\_V | 3 | Ave, Min, Max |
| 243 | LVPS\_P12V\_OUTPUT\_I | 3 | Ave, Min, Max |
| 244 | LVPS\_P12V\_OUTPUT\_V | 3 | Ave, Min, Max |
| 245 | LVPS\_P3\_3V\_DC\_DC\_TEMP | 3 | Ave, Min, Max |
| 246 | LVPS\_P3\_3V\_OUTPUT\_I | 3 | Ave, Min, Max |
| 247 | LVPS\_P3\_3V\_OUTPUT\_V | 3 | Ave, Min, Max |
| 248 | LVPS\_P5V\_OUTPUT\_I | 3 | Ave, Min, Max |
| 249 | LVPS\_P5V\_OUTPUT\_V | 3 | Ave, Min, Max |
| 250 | MACRO\_STATUS | 64 | Macro Number |
| 284 | PA\_HVPS\_TEMP | 3 | Ave, Min, Max |
| 285 | PA\_HVPS\_V\_MON | 3 | Ave, Min, Max |
| 301 | SAFING\_STATUS\_CDH\_MON\_RED | 40 | 0:LVPS\_AC\_LINK\_TEMP |
|  |  |  | 1:LVPS+-12V\_TEMP |
|  |  |  | 2:LVPS\_+3.3V\_TEMP |
|  |  |  | 3:LVPS+-5V\_TEMP |
|  |  |  | 4:PA\_TEMP |
|  |  |  | 5:C&DH\_TEMP |
|  |  |  | 6:C&DH\_CPU\_TEMP |
|  |  |  | 7:IRAP\_HVPS\_TEMP |
|  |  |  | 8:LVPS\_AC\_LINK\_I |
|  |  |  | 9:LVPS\_AC\_LINK\_V |
|  |  |  | 10:LVPS–12V\_V |
|  |  |  | 11:OP\_THERM1 |
|  |  |  | 12:C&DH+1.8V\_CPU\_V |
|  |  |  | 13:+1.5V\_FPGA\_V |
|  |  |  | 14:LVPS+12V\_V |
|  |  |  | 15:LVPS\_+3.3V\_I |
|  |  |  | 16:IRAP\_HVPS\_MAIN\_N |
|  |  |  | 17:IRAP\_HVPS\_DEF\_TOP |
|  |  |  | 18:IRAP\_HVPS\_DEF\_BOT |
|  |  |  | 19:EAIS\_PORT\_TEMP |
|  |  |  | 20:IRAP\_HVPS\_GEOM |
|  |  |  | 21:IRAP\_HVPS\_MAIN\_P |
|  |  |  | 22:IRAP\_HVPS\_ANAL |
|  |  |  | 23:IRAP\_HVPS\_TOP\_PLAT |
|  |  |  | 24:PA\_HVPS\_V |
|  |  |  | 25:OP\_THERM2 |
|  |  |  | 26:C&DH+5V\_DAC\_V |
|  |  |  | 27:C&DH+3.3V\_ADC\_V |
|  |  |  | 28:C&DH\_GROUND |
|  |  |  | 29:IRAP\_HVPS+12V\_I |
|  |  |  | 30:IRAP\_HVPS–12V\_I |
|  |  |  | 31:IRAP\_HVPS\_MAIN\_N2 |
|  |  |  | 32:PA\_HVPS\_V2 |
|  |  |  | 33:LVPS–5V\_I |
|  |  |  | 34:LVPS–12V\_I |
|  |  |  | 35:LVPS+3.3V\_V |
|  |  |  | 36:LVPS+5V\_I |
|  |  |  | 37:LVPS+5V\_V |
|  |  |  | 38:LVPS–5V\_V |
|  |  |  | 39:LVPS+12V\_I |
| 302 | SAFING\_STATUS\_CDH\_MON\_YEL | 40 | Same as SAFING\_STATUS\_CDH\_MON\_RED |
| 303 | SAFING\_STATUS\_DSCB\_MON\_RED | 24 | 0:STARTMCPVMON |
|  |  |  | 1:STOPMCPVMON |
|  |  |  | 2:MCPBIASVMON |
|  |  |  | 3:SSDVMON |
|  |  |  | 4:OFFSETVMON |
|  |  |  | 5:STARTMCPIMON |
|  |  |  | 6:STOPMCPIMON |
|  |  |  | 7:MCPBIASIMON |
|  |  |  | 8:STOP\_TEMP |
|  |  |  | 9:DSCB\_TEMP |
|  |  |  | 10:+5V\_DAC\_REF\_MON |
|  |  |  | 11:+3.3V\_ADC\_REF |
|  |  |  | 12:+5V\_ADC\_REF\_MON |
|  |  |  | 13:ASIC\_V\_MON |
|  |  |  | 14:+3.3V |
|  |  |  | 15:+1.5V |
|  |  |  | 16:SSDIMON |
|  |  |  | 17:OFFSETIMON |
|  |  |  | 18:V\_IMON\_REF |
|  |  |  | 19:HVPS\_TEMP |
|  |  |  | 20:DSIB\_TEMP |
|  |  |  | 21:SSD\_TEMP |
|  |  |  | 22:ASIC\_TEMP |
|  |  |  | 23:START\_TEMP |
| 304 | SAFING\_STATUS\_DSCB\_MON\_YEL | 24 | Same as SAFING\_STATUS\_DSCB\_MON\_YEL |

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|  | **Variable\_Name** | **VAR\_NOTES** | |
| 1 | AC\_LINK\_EN | 0 = Disabled:1 = Enabled | |
| 2 | AC\_LINK\_ERR | Monitors Voltage Regulator Input Undervoltage, 0:OK 1:Error | |
| 3 | ALPHA\_DECI\_DECR\_THRESH\_REG | Invalid when DSCB\_COMM\_ACTIVE is 0 | |
| 4 | ALPHA\_DECI\_INCR\_REG | Invalid when DSCB\_COMM\_ACTIVE is 0 | |
| 5 | ALPHA\_DECI\_INCR\_THRESH\_REG | Invalid when DSCB\_COMM\_ACTIVE is 0 | |
| 6 | ALPHA\_DECI\_LEVEL\_REG | Invalid when DSCB\_COMM\_ACTIVE is 0 | |
| 7 | ALPHA\_MAX\_VAL\_REG | Invalid when DSCB\_COMM\_ACTIVE is 0 | |
| 8 | ALPHA\_MIN\_VAL\_REG | Invalid when DSCB\_COMM\_ACTIVE is 0 | |
| 9 | ANODE\_STIM\_DELAY | Invalid when DSCB\_COMM\_ACTIVE is 0 | |
| 10 | ANODE\_STIM\_ON | Invalid when DSCB\_COMM\_ACTIVE is 0 | |
| 11 | ANODE\_STIM\_RATE | Invalid when DSCB\_COMM\_ACTIVE is 0 | |
| 12 | ASIC\_ADC\_WAIT | Invalid when DSCB\_COMM\_ACTIVE is 0 | |
| 13 | ASIC\_CONF\_REG | Invalid when DSCB\_COMM\_ACTIVE is 0 | |
| 14 | ASIC\_CS\_MON | Invalid when DSCB\_COMM\_ACTIVE is 0 | |
| 15 | ASIC\_OUT\_OF\_SYSTEM\_EN | Invalid when DSCB\_COMM\_ACTIVE is 0 | |
| 17 | ASIC\_REG\_SWITCH | Invalid when DSCB\_COMM\_ACTIVE is 0 | |
| 18 | ASIC\_RESET | Invalid when DSCB\_COMM\_ACTIVE is 0 | |
| 19 | ASIC\_STIM\_DELAY | Invalid when DSCB\_COMM\_ACTIVE is 0 | |
| 20 | ASIC\_STIM\_ON | Invalid when DSCB\_COMM\_ACTIVE is 0 | |
| 21 | ASIC\_STIM\_RATE | Invalid when DSCB\_COMM\_ACTIVE is 0 | |
| 22 | ASIC\_TP\_RATE | Invalid when DSCB\_COMM\_ACTIVE is 0 | |
| 23 | ASIC\_WRITE\_REG | Invalid when DSCB\_COMM\_ACTIVE is 0 | |
| 24 | BOARD\_ID | 0 = EM:1 = FM | |
| 25 | CCSDS\_REJ\_MESSAGE\_CNT | | 0-15 | |
| 26 | CDH\_BOARD\_TEMP | Ave, Min, Max | |
| 27 | CDH\_CPU\_TEMP | Ave, Min, Max | |
| 28 | CDH\_GROUND | Ave, Min, Max | |
| 29 | CDH\_OPTO\_LINK\_RX\_EN | 0 = Disabled:1 = Enabled Invalid when DSCB\_COMM\_ACTIVE is 0 | |
| 30 | CDH\_OPTO\_LINK\_RX\_RATE | 0 = 781.3 Kb/s:1 = 1.563 Mb/s:2 = 3.125 Mb/s:3 = 6.25 Mb/s Invalid when DSCB\_COMM\_ACTIVE is 0 | |
| 31 | CDH\_OPTO\_LINK\_STAT\_A | 0 = Disabled:1 = Enabled Invalid when DSCB\_COMM\_ACTIVE is 0 | |
| 32 | CDH\_OPTO\_LINK\_STAT\_B | 0 = Disabled:1 = Enabled Invalid when DSCB\_COMM\_ACTIVE is 0 | |
| 33 | CDH\_OPTO\_LINK\_TX\_POWER | Defined in C&DH spec Invalid when DSCB\_COMM\_ACTIVE is 0 | |
| 34 | CDH\_OPTO\_LINK\_TX\_RATE | 0 = 781.3 Kb/s:1 = 1.563 Mb/s:2 = 3.125 Mb/s:3 = 6.25 Mb/s Invalid when DSCB\_COMM\_ACTIVE is 0 | |
| 35 | CDH\_OPTO\_RX\_CLOCK\_SYNC\_ERR\_CNT | Stops counting at 65535, must be cleared by command Invalid when DSCB\_COMM\_ACTIVE is 0 | |
| 36 | CDH\_OPTO\_RX\_CRC\_ERR\_CNT | Stops counting at 65535, must be cleared by command Invalid when DSCB\_COMM\_ACTIVE is 0 | |
| 37 | CDH\_OPTO\_RX\_HDR\_ERR\_CNT | Stops counting at 65535, must be cleared by command Invalid when DSCB\_COMM\_ACTIVE is 0 | |
| 38 | CDH\_OPTO\_RX\_SIDE | 0 = A:1 = B | |
| 39 | CDH\_P1\_5V | Ave, Min, Max | |
| 40 | CDH\_P1\_8V | Ave, Min, Max | |
| 41 | CDH\_P3\_3V\_ADC\_V | Ave, Min, Max | |
| 42 | CDH\_P5V\_DAC\_V | Ave, Min, Max | |
| 43 | CDH\_SWEEP\_DAC\_EN\_LATCHED | cdh sweep dav enables latched | |
| 44 | CDH\_SWEEP\_STATE | cdh sweep state | |
| 45 | CDH\_WDOG\_EN | 0 = Disabled:1 = Enabled | |
| 46 | CDH\_WDOG\_STATUS | 0 = Nominal:1 = Watchdog Timeout | |
| 47 | CHECKSUM | CRC of packet (covering application data) | |
| 48 | CMD\_ACC\_CNT | 0-255 | |
| 49 | CMD\_ACC\_LAST\_SERVICE | 0-255 | |
| 50 | CMD\_ACC\_LAST\_SUBSERVICE | 0-255 | |
| 51 | CMD\_ACC\_SSC | 0-16383 | |
| 52 | CMD\_POL\_BOT\_DEF | 0 = POSITIVE:1 = NEGATIVE | |
| 53 | CMD\_POL\_TOP\_DEF | 0 = POSITIVE:1 = NEGATIVE | |
| 54 | CMD\_POL\_TOP\_PLATE | 0 = POSITIVE:1 = NEGATIVE | |
| 55 | CMD\_REJ\_CNT | 0-255 | |
| 56 | CMD\_REJ\_LAST\_SERVICE | 0-255 | |
| 57 | CMD\_REJ\_LAST\_SUBSERVICE | 0-255 | |
| 58 | CMD\_REJ\_SSC | 0-16383 | |
| 59 | CMD\_RNG\_ANALYZER | 0 = LOW\_RANGE:1 = HIGH\_RANGE | |
| 60 | CMD\_RNG\_BOT\_DEF | 0 = LOW\_RANGE:1 = HIGH\_RANGE | |
| 61 | CMD\_RNG\_TOP\_DEF | 0 = LOW\_RANGE:1 = HIGH\_RANGE | |
| 62 | CMD\_RNG\_TOP\_PLATE | 0 = LOW\_RANGE:1 = HIGH\_RANGE | |
| 63 | CMD\_VAL\_ANALYZER | commanded value analyzer | |
| 64 | CMD\_VAL\_BOT\_DEF | commanded value bottom deflector | |
| 65 | CMD\_VAL\_MAIN | commanded value Main | |
| 66 | CMD\_VAL\_OFFSET | commanded value Offset | |
| 67 | CMD\_VAL\_PA | commanded value PA | |
| 68 | CMD\_VAL\_SSD | commanded value SSD | |
| 69 | CMD\_VAL\_START\_A | commanded value Start A | |
| 70 | CMD\_VAL\_START\_B | commanded value Start B | |
| 71 | CMD\_VAL\_START\_CFD | commanded value Start CDF | |
| 72 | CMD\_VAL\_START\_MCP | commanded value Start MCP | |
| 73 | CMD\_VAL\_STOP\_A | commanded value Stop A | |
| 74 | CMD\_VAL\_STOP\_B | commanded value Stop B | |
| 75 | CMD\_VAL\_STOP\_CFD | commanded value Stop CFD | |
| 76 | CMD\_VAL\_STOP\_MCP | commanded value Stop MCP | |
| 77 | CMD\_VAL\_TOP\_DEF | commanded value top deflector | |
| 78 | CMD\_VAL\_TOP\_PLATE | commanded value top plate | |
|  | COINC\_TIMING\_ASIC\_SHAPE | Invalid when DSCB\_COMM\_ACTIVE is 0 | |
|  | COINC\_TIMING\_ASIC\_WINDOW | Invalid when DSCB\_COMM\_ACTIVE is 0 | |
|  | COINC\_TIMING\_POS\_TIMEOUT | Invalid when DSCB\_COMM\_ACTIVE is 0 | |
|  | COINC\_TIMING\_TOF\_TIMEOUT | Invalid when DSCB\_COMM\_ACTIVE is 0 | |
| 79 | CONNECTION\_TEST\_CNT | connection test count | |
| 84 | CPU\_WDOG\_EN | 0 = Disabled:1 = Enabled | |
| 85 | CPU\_WDOG\_STATUS | 0 = Nominal:1 = Watchdog Timeout | |
| 86 | DSCB\_ADC\_EN | 0 = Disabled:1 = Enabled Invalid when DSCB\_COMM\_ACTIVE is 0 | |
|  | DSCB\_ADC\_WAITS | Invalid when DSCB\_COMM\_ACTIVE is 0 | |
|  | DSCB\_ASIC\_CONTROL\_STATE\_ MACHINE | Invalid when DSCB\_COMM\_ACTIVE is 0 | |
|  | DSCB\_ASIC\_FLAG | Invalid when DSCB\_COMM\_ACTIVE is 0 | |
|  | DSCB\_ASIC\_READ\_OUT\_STATE\_ MACHINE | Invalid when DSCB\_COMM\_ACTIVE is 0 | |
| 87 | DSCB\_ASIC\_TEMP | Ave, Min, Max Invalid when DSCB\_COMM\_ACTIVE is 0 | |
| 91 | DSCB\_ASIC\_V\_MON | Ave, Min, Max Invalid when DSCB\_COMM\_ACTIVE is 0 | |
|  | DSCB\_ASIC\_WRITE\_STATE\_ MACHINE | Invalid when DSCB\_COMM\_ACTIVE is 0 | |
|  | DSCB\_AZIMUTHAL\_SEL | Invalid when DSCB\_COMM\_ACTIVE is 0 | |
| 93 | DSCB\_CMD\_NAKS | Stops counting at 65535, must be cleared by command Invalid when DSCB\_COMM\_ACTIVE is 0 | |
| 96 | DSCB\_COINC | 0 = Normal Mode / TOF Only:1 = Energy Mode (Energy and TOF):2 = Energy Only (No TOF):3 = Either Mode (TOF or Energy) Invalid when DSCB\_COMM\_ACTIVE is 0 | |
| 97 | DSCB\_COMM\_ACTIVE | 0 = Disabled:1 = Enabled. Set if FSW state machine is in RUNNING state and DSCB Opto-Link is communicating. | |
| 98 | DSCB\_DOUBLE\_BIT\_EDAC | Stops counting at 65535, must be cleared by command Invalid when DSCB\_COMM\_ACTIVE is 0 | |
| 99 | DSCB\_DSCB\_TEMP | Ave, Min, Max Invalid when DSCB\_COMM\_ACTIVE is 0 | |
| 100 | DSCB\_DSIB\_TEMP | Ave, Min, Max Invalid when DSCB\_COMM\_ACTIVE is 0 | |
|  | DSCB\_FPGA\_BASE | Invalid when DSCB\_COMM\_ACTIVE is 0 | |
| 101 | DSCB\_FPGA\_REV | Detector Section FPGA Revision Invalid when DSCB\_COMM\_ACTIVE is 0 | |
|  | DSCB\_HK\_RATE | Invalid when DSCB\_COMM\_ACTIVE is 0 | |
| 103 | DSCB\_HV\_AUTO\_RESET\_EN | 0 = Disabled:1 = Enabled Invalid when DSCB\_COMM\_ACTIVE is 0 | |
| 105 | DSCB\_HV\_EN | 0 = Disabled:1 = Enabled Invalid when DSCB\_COMM\_ACTIVE is 0 | |
| 106 | DSCB\_HV\_LIMITED | 0 = UNLIMITED:1 = LIMITED-AIRSAFE Invalid when DSCB\_COMM\_ACTIVE is 0 | |
|  | DSCB\_HV\_MON\_EN | Invalid when DSCB\_COMM\_ACTIVE is 0 | |
| 107 | DSCB\_HVPS\_TEMP | Ave, Min, Max Invalid when DSCB\_COMM\_ACTIVE is 0 | |
|  | DSCB\_INIT\_BIT | Invalid when DSCB\_COMM\_ACTIVE is 0 | |
|  | DSCB\_INIT\_REG | Invalid when DSCB\_COMM\_ACTIVE is 0 | |
|  | DSCB\_MCP\_BIAS\_EN | Invalid when DSCB\_COMM\_ACTIVE is 0 | |
|  | DSCB\_MCP\_BIAS\_I\_LIMIT\_EN | Invalid when DSCB\_COMM\_ACTIVE is 0 | |
|  | DSCB\_MCP\_BIAS\_I\_TRIP | Invalid when DSCB\_COMM\_ACTIVE is 0 | |
|  | DSCB\_MCP\_BIA\_V\_LIMIT\_EN | Invalid when DSCB\_COMM\_ACTIVE is 0 | |
|  | DSCB\_MCP\_BIAS\_V\_TRIP | Invalid when DSCB\_COMM\_ACTIVE is 0 | |
| 109 | DSCB\_OFFSET\_I\_MON | Ave, Min, Max Invalid when DSCB\_COMM\_ACTIVE is 0 | |
| 116 | DSCB\_OFFSET\_V\_MON | Ave, Min, Max Invalid when DSCB\_COMM\_ACTIVE is 0 | |
| 117 | DSCB\_OPTO\_RX\_CLOCK\_SYNC\_ERR\_CNT | Stops counting at 65535, must be cleared by command Invalid when DSCB\_COMM\_ACTIVE is 0 | |
| 118 | DSCB\_OPTO\_RX\_CRC\_ERR\_CNT | Stops counting at 65535, must be cleared by command Invalid when DSCB\_COMM\_ACTIVE is 0 | |
| 119 | DSCB\_OPTO\_RX\_DATA1\_ERR\_CNT | Stops counting at 65535, must be cleared by command Invalid when DSCB\_COMM\_ACTIVE is 0 | |
| 120 | DSCB\_OPTO\_RX\_DATA2\_ERR\_CNT | Stops counting at 65535, must be cleared by command Invalid when DSCB\_COMM\_ACTIVE is 0 | |
| 121 | DSCB\_OPTO\_RX\_HDR\_ERR\_CNT | Stops counting at 65535, must be cleared by command Invalid when DSCB\_COMM\_ACTIVE is 0 | |
| 122 | DSCB\_P1\_5V | Ave, Min, Max Invalid when DSCB\_COMM\_ACTIVE is 0 | |
| 123 | DSCB\_P3\_3V | Ave, Min, Max Invalid when DSCB\_COMM\_ACTIVE is 0 | |
| 124 | DSCB\_P3\_3V\_ADC\_REF | Ave, Min, Max Invalid when DSCB\_COMM\_ACTIVE is 0 | |
| 125 | DSCB\_P5V\_ADC\_REF\_MON | Ave, Min, Max Invalid when DSCB\_COMM\_ACTIVE is 0 | |
| 126 | DSCB\_P5V\_DAC\_REF\_MON | Ave, Min, Max Invalid when DSCB\_COMM\_ACTIVE is 0 | |
|  | DSCB\_POS\_START | Invalid when DSCB\_COMM\_ACTIVE is 0 | |
| 127 | DSCB\_POS\_START\_ADD\_SUB | 0 = ADD:1 = SUBTRACT Invalid when DSCB\_COMM\_ACTIVE is 0 | |
|  | DSCB\_POS\_START\_SEL | Invalid when DSCB\_COMM\_ACTIVE is 0 | |
|  | DSCB\_POS\_STOP | Invalid when DSCB\_COMM\_ACTIVE is 0 | |
| 129 | DSCB\_POS\_STOP\_ADD\_SUB | 0 = ADD:1 = SUBTRACT Invalid when DSCB\_COMM\_ACTIVE is 0 | |
|  | DSCB\_POS\_STOP\_DUAL\_SEL | Invalid when DSCB\_COMM\_ACTIVE is 0 | |
|  | DSCB\_POS\_STOP\_SEL | Invalid when DSCB\_COMM\_ACTIVE is 0 | |
| 132 | DSCB\_RATES\_EN | 0 = Disabled:1 = Enabled Invalid when DSCB\_COMM\_ACTIVE is 0 | |
|  | DSCB\_RESET\_DECI\_LEVEL | Invalid when DSCB\_COMM\_ACTIVE is 0 | |
|  | DSCB\_RESET\_FSW | Invalid when DSCB\_COMM\_ACTIVE is 0 | |
|  | DSCB\_RESET\_POR | Invalid when DSCB\_COMM\_ACTIVE is 0 | |
| 135 | DSCB\_RESET\_WDOG | 0=NONE:1=TIMEOUT Invalid when DSCB\_COMM\_ACTIVE is 0 | |
| 140 | DSCB\_SINGLE\_BIT\_EDAC | Stops counting at 65535, must be cleared by command Invalid when DSCB\_COMM\_ACTIVE is 0 | |
| 141 | DSCB\_SSD\_I\_MON | Ave, Min, Max Invalid when DSCB\_COMM\_ACTIVE is 0 | |
| 142 | DSCB\_SSD\_TEMP | Ave, Min, Max Invalid when DSCB\_COMM\_ACTIVE is 0 | |
| 143 | DSCB\_SSD\_V\_MON | Ave, Min, Max Invalid when DSCB\_COMM\_ACTIVE is 0 | |
| 144 | DSCB\_START\_MCP\_I\_MON | Ave, Min, Max Invalid when DSCB\_COMM\_ACTIVE is 0 | |
| 145 | DSCB\_START\_MCP\_TEMP | Ave, Min, Max Invalid when DSCB\_COMM\_ACTIVE is 0 | |
| 146 | DSCB\_START\_MCP\_V\_MON | Ave, Min, Max Invalid when DSCB\_COMM\_ACTIVE is 0 | |
|  | DSCB\_STARTUP\_POWER | Invalid when DSCB\_COMM\_ACTIVE is 0 | |
|  | DSCB\_STARTUP\_RX\_A\_EN | Invalid when DSCB\_COMM\_ACTIVE is 0 | |
|  | DSCB\_STARTUP\_RX\_B\_EN | Invalid when DSCB\_COMM\_ACTIVE is 0 | |
|  | DSCB\_STARTUP\_TX\_B\_EN | Invalid when DSCB\_COMM\_ACTIVE is 0 | |
|  | DSCB\_STARTUP\_TX\_B\_EN | Invalid when DSCB\_COMM\_ACTIVE is 0 | |
| 147 | DSCB\_STOP\_MCP\_I\_MON | Ave, Min, Max Invalid when DSCB\_COMM\_ACTIVE is 0 | |
| 153 | DSCB\_STOP\_MCP\_TEMP | Ave, Min, Max Invalid when DSCB\_COMM\_ACTIVE is 0 | |
| 154 | DSCB\_STOP\_MCP\_V\_MON | Ave, Min, Max Invalid when DSCB\_COMM\_ACTIVE is 0 | |
|  | DSCB\_SWEEP\_OVER | Invalid when DSCB\_COMM\_ACTIVE is 0 | |
|  | DSCB\_SYSTEM\_FSM | Invalid when DSCB\_COMM\_ACTIVE is 0 | |
|  | DSCB\_TOF\_START | Invalid when DSCB\_COMM\_ACTIVE is 0 | |
| 155 | DSCB\_TOF\_START\_ADD\_SUB | 0 = ADD:1 = SUBTRACT Invalid when DSCB\_COMM\_ACTIVE is 0 | |
|  | DSCB\_TOF\_STOP | Invalid when DSCB\_COMM\_ACTIVE is 0 | |
| 159 | DSCB\_TOF\_STOP\_ADD\_SUB | 0 = ADD:1 = SUBTRACT Invalid when DSCB\_COMM\_ACTIVE is 0 | |
| 161 | DSCB\_V\_I\_MON\_REF | Ave, Min, Max Invalid when DSCB\_COMM\_ACTIVE is 0 | |
|  | DSCB\_WDOG\_CNT | Invalid when DSCB\_COMM\_ACTIVE is 0 | |
| 162 | DSCB\_WDOG\_ON | 0 = Disabled:1 = Enabled Invalid when DSCB\_COMM\_ACTIVE is 0 | |
| 164 | EAIS\_PORT\_TEMP | Ave, Min, Max | |
|  | ENERGY\_ASIC\_ACQ\_TP | Invalid when DSCB\_COMM\_ACTIVE is 0 | |
|  | ENERGY\_ASIC\_PARITY | Invalid when DSCB\_COMM\_ACTIVE is 0 | |
| 165 | EVENT\_ERR\_CNT | Count of (5,2) event error messages | |
| 167 | FDIR\_DSCB\_AUTOMATIC\_LIMIT | 0 = Not Occurred:1 = Occurred. DSCB automatic limit monitoring tripped. | |
| 168 | FDIR\_DSCB\_COMM\_LOSS | 0 = Not Occurred:1 = Occurred. DSCB communications failed (not receiving Write ACK, not receiving Read response, not receiving anything, watchdog timeout on higher link speeds). | |
| 169 | FDIR\_DSCB\_DOWNLINK\_ UNDETERMINED | 0 = Not Occurred:1 = Occurred. DSCB failing downlink speed test. | |
| 170 | FDIR\_DSCB\_NOT\_RUNNING | 0 = Not Occurred:1 = Occurred. DSCB not reaching run state after timeout. | |
| 171 | FDIR\_DSCB\_REG\_INIT | 0 = Not Occurred:1 = Occurred. DSCB register initialize/update failed (on startup or before entering a science mode). | |
| 172 | FDIR\_EMERGENCY\_FAST\_SAFE | 0 = Not Occurred:1 = Occurred. Emergency Safe - Loss of S20, pending power down, or thruster firing preceding turnoff. | |
| 173 | FDIR\_LEVEL | 0 = None:1 = Thruster Firing Start:2 = Red Limit:3 = Emergency Fast Safe:4 = Yellow Limit:5 = Nominal Slow Safe:6 = Solar Array Steering Start:7 = DSCB Automatic Limit:8 = Task Timeout:9 = DSCB Not Running:10 = DSCB Downlink Undetermined:11 = DSCB Register Initialization:12 = DSCB Communications Loss:13 = Science Auto-Mode Fail:14 = Thruster Firing Stop:15 = Solar Array Steering Stop | |
| 174 | FDIR\_NOMINAL\_SLOW\_SAFE | 0 = Not Occurred:1 = Occurred. Nominal Slow Safe - Long HV Rampdown. | |
| 175 | FDIR\_RED\_LIMIT | 0 = Not Occurred:1 = Occurred. Analog monitor red limit fail - expectation is that all HV comes down quickly, hence higher priority than S20 loss and thruster firing. | |
| 176 | FDIR\_RESERVED | 0 = Not Occurred:1 = Occurred. | |
| 177 | FDIR\_SCIENCE\_AUTO\_MODE\_FAIL | 0 = Not Occurred:1 = Occurred. Automatically changing a science mode (Burst to Normal, or restarting from an uncorrectable error) failed. Possible reasons are DSCB communication fail (its own FDIR) or a corruption and failed decompression of priorities lookup table. | |
| 178 | FDIR\_SOLAR\_ARRAY\_STEERING\_ START | 0 = Not Occurred:1 = Occurred. | |
| 179 | FDIR\_SOLAR\_ARRAY\_STEERING\_ STOP | 0 = Not Occurred:1 = Occurred. Solar Array Steering End - Return to Science. | |
| 180 | FDIR\_TASK\_TIMEOUT | 0 = Not Occurred:1 = Occurred. Software tasks have timed out. Likely no science data being generated. | |
| 181 | FDIR\_THRUSTER\_FIRING\_START | 0 = Not Occurred:1 = Occurred | |
| 182 | FDIR\_THRUSTER\_FIRING\_STOP | 0 = Not Occurred:1 = Occurred. Thruster Firing Exit - Return to Science. | |
| 183 | FDIR\_YELLOW\_LIMIT | 0 = Not Occurred:1 = Occurred. Analog monitor yellow limit fail. | |
| 184 | FPGA\_STEP\_TBL\_DATA\_ELEV\_INDEX | 0-15 | |
| 186 | FPGA\_STEP\_TBL\_E\_Q\_INDEX | 0-63 | |
| 187 | FPGA\_STEP\_TBL\_ELEV\_INDEX | 0-15 | |
| 188 | FPGA\_SWEEP\_TBL\_ROW | 0-127 | |
| 189 | FPGA\_SWEEP\_TBL\_DATA\_SIDE | 0 = A:1 = B | |
|  | HK\_EN | Invalid when DSCB\_COMM\_ACTIVE is 0 | |
| 191 | HV\_DISABLED | 0 = ENABLED:1 = DISABLED | |
|  | HV\_I\_LIM\_PERSISTENCE | Invalid when DSCB\_COMM\_ACTIVE is 0 | |
| 193 | HV\_LIMITED | 0 = UNLIMITED:1 = LIMITED-AIRSAFE | |
|  | HV\_V\_LIM\_PERSISTENCE | Invalid when DSCB\_COMM\_ACTIVE is 0 | |
| 195 | HVPS\_ANALYZER | Ave, Min, Max When SWEEP\_EN\_ANALYZER is 1, AVG set to fill and MIN/MAX might be swapped. AVG also set to fill when not between MIN/MAX (can happen at end of sweeping). Also, if associated Polarity or Range values vary over avg/min/max, then the avg here is set to fill and the min/max values here may be suspect. | |
| 197 | HVPS\_ANALYZER\_POL | 0: positive; 1: negative. Ave, Min, Max. | |
| 198 | HVPS\_ANALYZER\_RNG | 0: low; 1: high. Ave, Min, Max. | |
| 199 | HVPS\_BOT\_DEF | Ave, Min, Max When SWEEP\_EN\_BOT\_DEF is 1, AVG set to fill and MIN/MAX might be swapped. AVG also set to fill when not between MIN/MAX (can happen at end of sweeping). Also, if associated Polarity or Range values vary over avg/min/max, then the avg here is set to fill and the min/max values here may be suspect. | |
| 200 | HVPS\_BOT\_DEF\_POL | 0: positive; 1: negative. Ave, Min, Max. | |
| 201 | HVPS\_BOT\_DEF\_RNG | 0: low; 1: high. Ave, Min, Max. | |
| 202 | HVPS\_HV\_MAIN\_N | Ave, Min, Max | |
| 203 | HVPS\_HV\_MAIN\_N\_POL | 0: positive; 1: negative. Ave, Min, Max. | |
| 204 | HVPS\_HV\_MAIN\_N\_RNG | 0: low; 1: high. Ave, Min, Max. | |
| 205 | HVPS\_HV\_MAIN\_P | Ave, Min, Max | |
| 206 | HVPS\_HV\_MAIN\_P\_POL | 0: positive; 1: negative. Ave, Min, Max. | |
| 207 | HVPS\_HV\_MAIN\_P\_RNG | 0: low; 1: high. Ave, Min, Max. | |
| 208 | HVPS\_N12V\_I | Ave, Min, Max | |
| 209 | HVPS\_P12V\_I | Ave, Min, Max | |
| 210 | HVPS\_TOP\_DEF | Ave, Min, Max When SWEEP\_EN\_TOP\_DEF is 1, AVG set to fill and MIN/MAX might be swapped. AVG also set to fill when not between MIN/MAX (can happen at end of sweeping). Also, if associated Polarity or Range values vary over avg/min/max, then the avg here is set to fill and the min/max values here may be suspect. | |
| 211 | HVPS\_TOP\_DEF\_POL | 0: positive; 1: negative. Ave, Min, Max. | |
| 212 | HVPS\_TOP\_DEF\_RNG | 0: low; 1: high. Ave, Min, Max. | |
| 213 | HVPS\_TOP\_PLATE | Ave, Min, Max When SWEEP\_EN\_TOP\_PLATE is 1, AVG set to fill and MIN/MAX might be swapped. AVG also set to fill when not between MIN/MAX (can happen at end of sweeping). Also, if associated Polarity or Range values vary over avg/min/max, then the avg here is set to fill and the min/max values here may be suspect. | |
| 214 | HVPS\_TOP\_PLATE\_POL | 0: positive; 1: negative. Ave, Min, Max. | |
| 215 | HVPS\_TOP\_PLATE\_RNG | 0: low; 1: high. Ave, Min, Max. | |
| 216 | INTER\_INST\_INFO\_CNT | 0-1023 | |
| 218 | IRAP\_HV\_ON | 0 = Off:1 = On | |
| 219 | IRAP\_HVPS\_TEMP | Ave, Min, Max | |
| 220 | LAST\_ERR\_CODE | Last (5,2) EID, minus SWA offset | |
| 221 | LVPS\_12V\_DC\_DC\_TEMP | Ave, Min, Max | |
| 234 | LVPS\_5V\_DC\_DC\_TEMP | Ave, Min, Max | |
| 235 | LVPS\_AC\_LINK\_I | Ave, Min, Max | |
| 236 | LVPS\_AC\_LINK\_TEMP | Ave, Min, Max | |
| 237 | LVPS\_AC\_LINK\_V | Ave, Min, Max | |
| 238 | LVPS\_N12V\_OUTPUT\_I | Ave, Min, Max | |
| 239 | LVPS\_N12V\_OUTPUT\_V | Ave, Min, Max | |
| 240 | LVPS\_N5V\_OUTPUT\_I | Ave, Min, Max | |
| 241 | LVPS\_N5V\_OUTPUT\_V | Ave, Min, Max | |
| 242 | LVPS\_P12V\_OUTPUT\_I | Ave, Min, Max | |
| 243 | LVPS\_P12V\_OUTPUT\_V | Ave, Min, Max | |
| 244 | LVPS\_P3\_3V\_DC\_DC\_TEMP | Ave, Min, Max | |
| 245 | LVPS\_P3\_3V\_OUTPUT\_I | Ave, Min, Max | |
| 246 | LVPS\_P3\_3V\_OUTPUT\_V | Ave, Min, Max | |
| 247 | LVPS\_P5V\_OUTPUT\_I | Ave, Min, Max | |
| 248 | LVPS\_P5V\_OUTPUT\_V | Ave, Min, Max | |
| 249 | MACRO\_STATUS | 0: dormant; 1: running | |
| 250 | MASTER\_SWEEP\_EN | 3 = CONTINUOUS:2 = END\_TABLE:1 = END\_ROW:0 = STOPPED | |
| 251 | MASTER\_SWEEP\_EN\_STATUS | 3 = CONTINUOUS:2 = END\_TABLE:1 = END\_ROW:0 = STOPPED | |
| 252 | MISSING\_SPACEWIRE\_TIME\_CODE | 0 = Received:1 = Missed | |
| 253 | MODE\_CHANGE\_REASON | 0 = None:1 = Auto Timed Transition:2 = Command / Macro:3 = Failure | |
| 254 | MRAM\_WR\_EN | 0 = Disabled:1 = Enabled | |
|  | OFFSET\_EN | Invalid when DSCB\_COMM\_ACTIVE is 0 | |
| 255 | OFFSET\_I\_EN\_LIM | 0 = Disabled:1 = Enabled Invalid when DSCB\_COMM\_ACTIVE is 0 | |
| 257 | OFFSET\_I\_TRIG | 0=OK:1=TRIPPED Invalid when DSCB\_COMM\_ACTIVE is 0 | |
| 258 | OFFSET\_V\_EN\_LIM | 0 = Disabled:1 = Enabled Invalid when DSCB\_COMM\_ACTIVE is 0 | |
| 259 | OFFSET\_V\_TRIG | 0=OK:1=TRIPPED Invalid when DSCB\_COMM\_ACTIVE is 0 | |
| 260 | OP\_MODE | 0 = Off:1 = Boot:2 = Boot Maintenance:3 = Safe:4 = LV Engineering: 5 = HV Standby:6 = Normal Science:7 = Burst Science:"8 = Pre-Burst:9 = Pre-Normal | |
|  | OPTO\_RX\_A\_EN | Invalid when DSCB\_COMM\_ACTIVE is 0 | |
| 261 | OPTO\_RX\_A\_EN\_INIT | 0 = Disabled:1 = Enabled Invalid when DSCB\_COMM\_ACTIVE is 0 | |
|  | OPTO\_RX\_B\_EN | Invalid when DSCB\_COMM\_ACTIVE is 0 | |
| 263 | OPTO\_RX\_B\_EN\_INIT | 0 = Disabled:1 = Enabled Invalid when DSCB\_COMM\_ACTIVE is 0 | |
| 265 | OPTO\_RX\_LOOPBACK | 0 = Disabled:1 = Enabled Invalid when DSCB\_COMM\_ACTIVE is 0 | |
| 266 | OPTO\_RX\_RATE | 0 = 781.3 Kb/s:1 = 1.563 Mb/s:2 = 3.125 Mb/s:3 = 6.25 Mb/s Invalid when DSCB\_COMM\_ACTIVE is 0 | |
| 267 | OPTO\_RX\_SIGNAL\_QUALITY | 0 = HIGH:1 = RISE\_GT\_FALL:2 = FALL\_GT\_RISE:3 = FREQ\_MISMATCH Invalid when DSCB\_COMM\_ACTIVE is 0 | |
| 268 | OPTO\_RX\_SYNCED | 0 = UNSYNC:1 = SYNCED Invalid when DSCB\_COMM\_ACTIVE is 0 | |
|  | OPTO\_TX\_A\_EN | Invalid when DSCB\_COMM\_ACTIVE is 0 | |
| 269 | OPTO\_TX\_A\_EN\_INIT | 0 = Disabled:1 = Enabled Invalid when DSCB\_COMM\_ACTIVE is 0 | |
|  | OPTO\_TX\_B\_EN | Invalid when DSCB\_COMM\_ACTIVE is 0 | |
| 271 | OPTO\_TX\_B\_EN\_INIT | 0 = Disabled:1 = Enabled Invalid when DSCB\_COMM\_ACTIVE is 0 | |
| 273 | OPTO\_TX\_EN | 0 = Disabled:1 = Enabled Invalid when DSCB\_COMM\_ACTIVE is 0 | |
|  | OPTO\_TX\_POWER | Invalid when DSCB\_COMM\_ACTIVE is 0 | |
| 274 | OPTO\_TX\_POWER\_EN | 0 = Disabled:1 = Enabled Invalid when DSCB\_COMM\_ACTIVE is 0 | |
| 276 | OPTO\_TX\_RATE | 0 = 781.3 Kb/s:1 = 1.563 Mb/s:2 = 3.125 Mb/s:3 = 6.25 Mb/s Invalid when DSCB\_COMM\_ACTIVE is 0 | |
|  | OPTO\_TX\_READY | Invalid when DSCB\_COMM\_ACTIVE is 0 | |
|  | OSC\_ADJ\_POS\_START | Invalid when DSCB\_COMM\_ACTIVE is 0 | |
|  | OSC\_ADJ\_POS\_STOP | Invalid when DSCB\_COMM\_ACTIVE is 0 | |
|  | OSC\_ADJ\_TOF\_START | Invalid when DSCB\_COMM\_ACTIVE is 0 | |
|  | OSC\_ADJ\_TOF\_STOP | Invalid when DSCB\_COMM\_ACTIVE is 0 | |
| 277 | PA\_HV\_ON | 0 = Off:1 = On | |
| 283 | PA\_HVPS\_TEMP | Ave, Min, Max | |
| 284 | PA\_HVPS\_V\_MON | Ave, Min, Max | |
| 285 | PACKET\_SUB\_TIME | Sub-Seconds timestamp of when the packet accumulation ended and the last data sample was collected | |
| 286 | PACKET\_WHOLE\_TIME | Seconds timestamp of when the packet accumulation ended and the last data sample was collected | |
| 287 | POS\_CAL\_DONE | 0: IN\_PROGRESS, 1: DONE Invalid when DSCB\_COMM\_ACTIVE is 0 | |
| 288 | PROCESSOR\_IDLE\_PERCENTAGE | 0-100 | |
| 289 | PROTON\_AVOIDANCE\_STATUS | 0 = INACTIVE:1 = ACTIVE | |
|  | PROTON\_DECI\_DECR\_THRESH\_REG | Invalid when DSCB\_COMM\_ACTIVE is 0 | |
|  | PROTON\_DECI\_INCR\_REG | Invalid when DSCB\_COMM\_ACTIVE is 0 | |
|  | PROTON\_DECI\_INCR\_THRESH\_REG | Invalid when DSCB\_COMM\_ACTIVE is 0 | |
|  | PROTON\_DECI\_LEVEL\_REG | Invalid when DSCB\_COMM\_ACTIVE is 0 | |
|  | PROTON\_MAX\_VAL\_REG | Invalid when DSCB\_COMM\_ACTIVE is 0 | |
|  | PROTON\_MIN\_VAL\_REG | Invalid when DSCB\_COMM\_ACTIVE is 0 | |
| 290 | QUALITY\_BITMASK | 0:No Issue | |
| 297 | QUALITY\_FLAG | 0=good, 1=caution, 2=bad | |
| 298 | SAFETY\_CHECKING\_STATUS\_CDH | 0 = Disabled:1 = Enabled | |
| 299 | SAFETY\_CHECKING\_STATUS\_DSCB | 0 = Disabled:1 = Enabled | |
| 300 | SAFING\_STATUS\_CDH\_MON\_RED | 0 = NORMAL:1 = SAFED | |
| 301 | SAFING\_STATUS\_CDH\_MON\_YEL | 0 = NORMAL:1 = SAFED | |
| 302 | SAFING\_STATUS\_DSCB\_MON\_RED | 0 = NORMAL:1 = SAFED | |
| 303 | SAFING\_STATUS\_DSCB\_MON\_YEL | 0 = NORMAL:1 = SAFED | |
|  | SSD\_EN | Invalid when DSCB\_COMM\_ACTIVE is 0 | |
| 304 | SSD\_I\_EN\_LIM | 0 = Disabled:1 = Enabled Invalid when DSCB\_COMM\_ACTIVE is 0 | |
| 307 | SSD\_I\_TRIG | 0=OK:1=TRIPPED Invalid when DSCB\_COMM\_ACTIVE is 0 | |
| 308 | SSD\_V\_EN\_LIM | 0 = Disabled:1 = Enabled Invalid when DSCB\_COMM\_ACTIVE is 0 | |
| 309 | SSD\_V\_TRIG | 0=OK:1=TRIPPED Invalid when DSCB\_COMM\_ACTIVE is 0 | |
|  | START\_ANODE\_A\_OSC\_CNT | Invalid when DSCB\_COMM\_ACTIVE is 0 | |
|  | START\_ANODE\_B\_OSC\_CNT | Invalid when DSCB\_COMM\_ACTIVE is 0 | |
|  | START\_COLLECTION | Invalid when DSCB\_COMM\_ACTIVE is 0 | |
|  | START\_MCP\_EN | Invalid when DSCB\_COMM\_ACTIVE is 0 | |
| 310 | START\_MCP\_I\_EN\_LIM | 0 = Disabled:1 = Enabled Invalid when DSCB\_COMM\_ACTIVE is 0 | |
| 315 | START\_MCP\_I\_TRIG | 0=OK:1=TRIPPED Invalid when DSCB\_COMM\_ACTIVE is 0 | |
| 316 | START\_MCP\_V\_EN\_LIM | 0 = Disabled:1 = Enabled Invalid when DSCB\_COMM\_ACTIVE is 0 | |
| 317 | START\_MCP\_V\_TRIG | 0=OK:1=TRIPPED Invalid when DSCB\_COMM\_ACTIVE is 0 | |
|  | START\_STIM\_DELAY | Invalid when DSCB\_COMM\_ACTIVE is 0 | |
| 318 | START\_STIM\_EXT | 0 = Disabled:1 = Enabled Invalid when DSCB\_COMM\_ACTIVE is 0 | |
|  | START\_STIM\_ON | Invalid when DSCB\_COMM\_ACTIVE is 0 | |
|  | START\_STIM\_RATE | Invalid when DSCB\_COMM\_ACTIVE is 0 | |
|  | START\_TOF\_OSC\_CNT | Invalid when DSCB\_COMM\_ACTIVE is 0 | |
|  | STOP\_MCP\_EN | Invalid when DSCB\_COMM\_ACTIVE is 0 | |
| 320 | STOP\_MCP\_I\_EN\_LIM | 0 = Disabled:1 = Enabled Invalid when DSCB\_COMM\_ACTIVE is 0 | |
| 325 | STOP\_MCP\_I\_TRIG | 0=OK:1=TRIPPED Invalid when DSCB\_COMM\_ACTIVE is 0 | |
| 326 | STOP\_MCP\_V\_EN\_LIM | 0 = Disabled:1 = Enabled Invalid when DSCB\_COMM\_ACTIVE is 0 | |
| 327 | STOP\_MCP\_V\_TRIG | 0=OK:1=TRIPPED Invalid when DSCB\_COMM\_ACTIVE is 0 | |
|  | STOP\_TOF\_OSC\_CNT | Invalid when DSCB\_COMM\_ACTIVE is 0 | |
| 328 | SWEEP\_DATA\_A\_ACTIVE | 0 = Inactive:1 = Active | |
| 330 | SWEEP\_DATA\_B\_ACTIVE | 0 = Inactive:1 = Active | |
| 331 | SWEEP\_EDAC\_EN | 0 = Disabled:1 = Enabled | |
| 332 | SWEEP\_EDP | 0 = INACTIVE:1 = ACTIVE | |
| 333 | SWEEP\_EN\_ANALYZER | 0 = STATIC:1 = SWEEP | |
| 334 | SWEEP\_EN\_BOT\_DEF | 0 = STATIC:1 = SWEEP | |
| 335 | SWEEP\_EN\_TOP\_DEF | 0 = STATIC:1 = SWEEP | |
| 336 | SWEEP\_EN\_TOP\_PLATE | 0 = STATIC:1 = SWEEP | |
| 337 | SWEEP\_SCRUBBING\_EN | 0 = Disabled:1 = Enabled | |
| 338 | SWEEP\_TBL\_POINTER\_SEL | 0 = DATA:1 = SCAN | |
|  | SYSTEM\_MODULE\_VERIFY | Invalid when DSCB\_COMM\_ACTIVE is 0 | |
| 339 | TIME\_CODE\_CNT | 0-255 | |
| 341 | TIME\_MESSAGE\_CNT | 0-255 | |
| 342 | TOF\_CAL\_DONE | 0: IN\_PROGRESS, 1: DONE Invalid when DSCB\_COMM\_ACTIVE is 0 | |
| 343 | TOF\_CAL\_EN | 0 = Disabled:1 = Enabled Invalid when DSCB\_COMM\_ACTIVE is 0 | |
|  | TOF\_START\_SEL | Invalid when DSCB\_COMM\_ACTIVE is 0 | |
|  | TOF\_STIM\_DELAY | Invalid when DSCB\_COMM\_ACTIVE is 0 | |
| 346 | TOF\_STIM\_EXT | 0 = Disabled:1 = Enabled Invalid when DSCB\_COMM\_ACTIVE is 0 | | |
|  | TOF\_STIM\_ON | Invalid when DSCB\_COMM\_ACTIVE is 0 | | |
|  | TOF\_STIM\_RATE | Invalid when DSCB\_COMM\_ACTIVE is 0 | | |

### L2 – Science data products

*Detailed description of the content and format of the calibrated data products.*

#### EAS L2 data products

EAS Level-2 data is generated at MSSL and requires the following inputs:

1. EAS Level-1 Science data files
2. Ground calibration files
3. Onboard calibration files
4. SPICE kernels

Below is detailed description of EAS L2 data descriptions.

##### EAS normal mode electron 3D distribution

This file contains the Normal Mode Electron 3D distribution function data product from EAS[12] in the unit specified in the file name. The filename format is .cdf.

**Filename:**solo\_L2\_swa-eas[12]-nm3d-[unit]\_[StartTime-EndTime]\_V??.cdf

**Expected data volume and time resolution**: This file contains the data between the start time and end times mentioned in the file name and in the units mentioned by [unit]. The timetags in this file are of CDF\_TIME\_TT2000 type. The time resolution of data in this file is nominally 100 seconds but can also contain either 10 or 400 seconds resolution when EAS[12] is operated in high or low cadence, respectively. Each file contains 3D electron distribution in one of the following units: phase space density (psd) or differential number flux (dnf) or differential energy flux (def) and has data collected for 64 energies, 32 anodes and 16 deflectors for each time-stamp. It is expected that a file will cover 1 single 24 hour period for when EAS is operated in nominal or low cadence modes. For high cadence EAS data, a six-hour files will be provided.

**Global Attributes**

|  |  |  |
| --- | --- | --- |
| **Name** | **Entry** | **Value** |
| Project | 1 | Solar Orbiter |
| Project | 2 | Cosmic Visions |
| Source Name | 1 | SOLO>Solar Orbiter |
| Discipline | 1 | Space Physics>Interplanetary Studies |
| Data Type | 1 | L2>Level 2 Data |
| Descriptor | 1 | SWA-EAS[12]-NM3D-[unit] |
| Data Version | 1 | 01 |
| Software Version | 1 | 01.00.00 |
| PI Name | 1 | C. J. Owen |
| PI Affiliation | 1 | MSSL-UCL, University College London, UK |
| Instrument Type | 1 | Plasma and Solar Wind |
| Mission Group | 1 | Solar Orbiter |
| Logical Source | 1 | SWA\_L2\_swa-eas[12]-NM3D |
| Logical File id | 1 | solo\_L2\_swa-eas[12]-NM3D-[unit]\_yyyymmddTHHMMSS-yyyymmddTHHMMSS\_V01 |
| Logical Source Description | 1 | SWA-EAS[12] Nominal Mode 3D psd/dnf/def data |
| Rules of Use | 1 | Current best quality data – see caveats file or contact SWA/EAS team for information on use |
| Generated by | 1 | MSSL-UCL |
| Generation date | 1 | YYYY-MM-DDTHH:MN:SS |
| Mods | 1 | V01 First Version |
| Data Product | 1 | NM3D-[unit]>Nominal Mode 3D in one of psd/dnf/def units |
| Level | 1 | L2>Level 2 Data |
| Instrument | 1 | SWA-EAS>Solar-Wind-Analyser-Electron-Analyser-System |

**Variables**

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Variable\_Name** | **Data\_type** | **DIMS** | **SIZES** | **R\_VARY** | **D\_VARY** |
| EPOCH | CDF\_TIME\_TT2000 | 1 | 1 | T | F |
| **Attribute Name** | **Data Type** | **Value** | | | |
| FIELDNAM | CDF\_CHAR | EAS[12] EPOCH | | | |
| CATDESC | CDF\_CHAR | Epoch in nano-seconds since J2000, encoded as Terrestrial Time on rotating Earth Geoid | | | |
| DISPLAY\_TYPE | CDF\_CHAR | time\_series | | | |
| FILLVAL | CDF\_INT8 | -9223372036854775807 | | | |
| LABLAXIS | CDF\_CHAR | EPOCH | | | |
| UNITS | CDF\_CHAR | ns | | | |
| VALIDMIN | CDF\_INT8 | 1577836800000000000 | | | |
| VALIDMAX | CDF\_INT8 | 1893456000000000000 | | | |
| SCALETYP | CDF\_CHAR | linear | | | |
| SCALEMIN | CDF\_INT8 | 1577836800000000000 | | | |
| SCALEMAX | CDF\_INT8 | 1893456000000000000 | | | |
| SI\_CONVERSION | CDF\_CHAR | 1>1e+09 s | | | |
| VAR\_TYPE | CDF\_CHAR | support\_data | | | |
| VAR\_NOTES | CDF\_CHAR | The EAS[12] time tag is from the centre of the acquisition interval which is 1 sec | | | |

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Variable\_Name** | **Data\_type** | **DIMS** | **SIZES** | **R\_VARY** | **D\_VARY** |
| SWA\_EAS[12]\_ELEVATION | CDF\_REAL8 | 1 | 16 | F | T |
| **Attribute Name** | **Data Type** | **Value** | | | |
| FIELDNAM | CDF\_CHAR | EAS[12] Elevation | | | |
| CATDESC | CDF\_CHAR | The bin-centred elevation angles of the EAS[12] sensor | | | |
| DEPEND\_0 | CDF\_CHAR | EPOCH | | | |
| FILLVAL | CDF\_REAL8 | -1E31 | | | |
| FORMAT | CDF\_CHAR | f14.4 | | | |
| LABLAXIS | CDF\_CHAR | Elevation Angle | | | |
| UNITS | CDF\_CHAR | Degrees | | | |
| VALIDMIN | CDF\_REAL8 | -45.0 | | | |
| VALIDMAX | CDF\_REAL8 | 45.0 | | | |
| SCALETYP | CDF\_CHAR | linear | | | |
| SCALEMIN | CDF\_REAL8 | -45.0 | | | |
| SCALEMAX | CDF\_REAL8 | 45.0 | | | |
| VAR\_TYPE | CDF\_CHAR | support\_data | | | |

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Variable\_Name** | **Data\_type** | **DIMS** | **SIZES** | **R\_VARY** | **D\_VARY** |
| SWA\_EAS[12]\_ELEVATION\_delta\_upper | CDF\_REAL8 | 1 | 16 | F | T |
| **Attribute Name** | **Data Type** | **Value** | | | |
| FIELDNAM | CDF\_CHAR | EAS[12] Elevation delta upper | | | |
| CATDESC | CDF\_CHAR | Upper half width of elevation bin | | | |
| FORMAT | CDF\_CHAR | f14.4 | | | |
| LABLAXIS | CDF\_CHAR | Elevation Angle | | | |
| UNITS | CDF\_CHAR | Degrees | | | |
| VAR\_TYPE | CDF\_CHAR | support\_data | | | |

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| **Variable\_Name** | **Data\_type** | **DIMS** | **SIZES** | **R\_VARY** | **D\_VARY** |
| SWA\_EAS[12]\_ELEVATION\_delta\_lower | CDF\_REAL8 | 1 | 16 | F | T |
| **Attribute Name** | **Data Type** | **Value** | | | |
| FIELDNAM | CDF\_CHAR | EAS[12] Elevation delta lower | | | |
| CATDESC | CDF\_CHAR | Lower half width of elevation bin | | | |
| FORMAT | CDF\_CHAR | f14.4 | | | |
| LABLAXIS | CDF\_CHAR | Elevation Angle | | | |
| UNITS | CDF\_CHAR | Degrees | | | |
| VAR\_TYPE | CDF\_CHAR | support\_data | | | |

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| **Variable\_Name** | **Data\_type** | **DIMS** | **SIZES** | **R\_VARY** | **D\_VARY** |
| SWA\_EAS[12]\_AZIMUTH | CDF\_REAL8 | 1 | 32 | F | T |
| **Attribute Name** | **Data Type** | **Value** | | | |
| FIELDNAM | CDF\_CHAR | EAS[12] Azimuth | | | |
| CATDESC | CDF\_CHAR | The bin-centred azimuthal angles of the EAS[12] sensor | | | |
| DEPEND\_0 | CDF\_CHAR | EPOCH | | | |
| FILLVAL | CDF\_REAL8 | -1E31 | | | |
| FORMAT | CDF\_CHAR | f14.4 | | | |
| LABLAXIS | CDF\_CHAR | Azimuthal Angle | | | |
| UNITS | CDF\_CHAR | Degrees | | | |
| VALIDMIN | CDF\_REAL8 | 0.0 | | | |
| VALIDMAX | CDF\_REAL8 | 360.0 | | | |
| SCALETYP | CDF\_CHAR | linear | | | |
| SCALEMIN | CDF\_REAL8 | 0.0 | | | |
| SCALEMAX | CDF\_REAL8 | 360.0 | | | |
| VAR\_TYPE | CDF\_CHAR | support\_data | | | |

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| --- | --- | --- | --- | --- | --- |
| **Variable\_Name** | **Data\_type** | **DIMS** | **SIZES** | **R\_VARY** | **D\_VARY** |
| SWA\_EAS[12]\_AZIMUTH\_delta\_upper | CDF\_REAL8 | 1 | 32 | F | T |
| **Attribute Name** | **Data Type** | **Value** | | | |
| FIELDNAM | CDF\_CHAR | EAS[12] Azimuth delta upper | | | |
| CATDESC | CDF\_CHAR | Upper half width of azimuth bin | | | |
| FORMAT | CDF\_CHAR | f14.4 | | | |
| UNITS | CDF\_CHAR | Degrees | | | |
| VAR\_TYPE | CDF\_CHAR | support\_data | | | |

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| **Variable\_Name** | **Data\_type** | **DIMS** | **SIZES** | **R\_VARY** | **D\_VARY** |
| SWA\_EAS[12]\_AZIMUTH\_delta\_lower | CDF\_REAL8 | 1 | 32 | F | T |
| **Attribute Name** | **Data Type** | **Value** | | | |
| FIELDNAM | CDF\_CHAR | EAS[12] Azimuth delta lower | | | |
| CATDESC | CDF\_CHAR | Lower half width of azimuth bin | | | |
| FORMAT | CDF\_CHAR | f14.4 | | | |
| UNITS | CDF\_CHAR | Degrees | | | |
| VAR\_TYPE | CDF\_CHAR | support\_data | | | |

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| **Variable\_Name** | **Data\_type** | **DIMS** | **SIZES** | **R\_VARY** | **D\_VARY** |
| SWA\_EAS[12]\_ENERGY | CDF\_REAL8 | 1 | 64 | T | T |
| **Attribute Name** | **Data Type** | **Value** | | | |
| FIELDNAM | CDF\_CHAR | EAS[12] Energy | | | |
| CATDESC | CDF\_CHAR | The bin-centred Energy values of the EAS[12] sensor | | | |
| DEPEND\_0 | CDF\_CHAR | EPOCH | | | |
| FILLVAL | CDF\_REAL8 | -1E31 | | | |
| FORMAT | CDF\_CHAR | f14.4 | | | |
| LABLAXIS | CDF\_CHAR | Energy | | | |
| UNITS | CDF\_CHAR | ElectronVolts | | | |
| VALIDMIN | CDF\_REAL8 | 0.1 | | | |
| VALIDMAX | CDF\_REAL8 | 6000.0 | | | |
| SCALETYP | CDF\_CHAR | log | | | |
| SCALEMIN | CDF\_REAL8 | 0.1 | | | |
| SCALEMAX | CDF\_REAL8 | 6000.0 | | | |
| SI\_CONVERSION | CDF\_CHAR | 1.60217646E-19>J | | | |
| VAR\_TYPE | CDF\_CHAR | support\_data | | | |

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| **Variable\_Name** | **Data\_type** | **DIMS** | **SIZES** | **R\_VARY** | **D\_VARY** |
| SWA\_EAS[12]\_ENERGY\_delta\_upper | CDF\_REAL8 | 1 | 64 | T | T |
| **Attribute Name** | **Data Type** | **Value** | | | |
| FIELDNAM | CDF\_CHAR | EAS[12] Energy delta upper | | | |
| CATDESC | CDF\_CHAR | Upper half width of energy bin | | | |
| FORMAT | CDF\_CHAR | f14.4 | | | |
| UNITS | CDF\_CHAR | ElectronVolts | | | |
| VAR\_TYPE | CDF\_CHAR | support\_data | | | |

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| **Variable\_Name** | **Data\_type** | **DIMS** | **SIZES** | **R\_VARY** | **D\_VARY** |
| SWA\_EAS[12]\_ENERGY\_delta\_lower | CDF\_REAL8 | 1 | 64 | T | T |
| **Attribute Name** | **Data Type** | **Value** | | | |
| FIELDNAM | CDF\_CHAR | EAS[12] Energy delta lower | | | |
| CATDESC | CDF\_CHAR | Lower half width of energy bin | | | |
| FORMAT | CDF\_CHAR | f14.4 | | | |
| UNITS | CDF\_CHAR | ElectronVolts | | | |
| VAR\_TYPE | CDF\_CHAR | support\_data | | | |

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| --- | --- | --- | --- | --- | --- |
| **Variable\_Name** | **Data\_type** | **DIMS** | **SIZES** | **R\_VARY** | **D\_VARY** |
| SWA\_EAS[12]\_NM3D-[unit]\_Data | CDF\_REAL8 | 3 | 16,64,32 | T | T,T,T |
| **Attribute Name** | **Data Type** | **Value** | | | |
| FIELDNAM | CDF\_CHAR | SWA\_EAS[12]\_NM3D-[unit]\_Data | | | |
| CATDESC | CDF\_CHAR | EAS[12] Nominal mode 3D electron distribution in phase space density | | | |
| DISPLAY\_TYPE | CDF\_CHAR | spectrogram | | | |
| FILLVAL | CDF\_REAL8 | -1E31 | | | |
| FORMAT | CDF\_CHAR | f14.4 | | | |
| LABLAXIS | CDF\_CHAR | Electron flux | | | |
| UNITS | CDF\_CHAR | s^3 km^-6 for psd  m^-2 s^-1 sr^-1 eV^-1 for dnf  eV m^-2 s^-2 sr^-1 eV^-1 for def | | | |
| VALIDMIN | CDF\_REAL8 | 0.1 | | | |
| VALIDMAX | CDF\_REAL8 | 65535.0 | | | |
| SCALETYP | CDF\_CHAR | log | | | |
| SCALEMIN | CDF\_REAL8 | 0.1 | | | |
| SCALEMAX | CDF\_REAL8 | 65535.0 | | | |
| DEPEND\_0 | CDF\_CHAR | EPOCH | | | |
| DEPEND\_1 | CDF\_CHAR | SWA\_EAS[12]\_ELEVATION | | | |
| DEPEND\_2 | CDF\_CHAR | SWA\_EAS[12]\_ENERGY | | | |
| DEPEND\_3 | CDF\_CHAR | SWA\_EAS[12]\_AZIMUTH | | | |
| COORDINATE\_SYSTEM | CDF\_CHAR | Solar Ecliptic | | | |
| VAR\_TYPE | CDF\_CHAR | data | | | |

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| **Variable\_Name** | **Data\_type** | **DIMS** | **SIZES** | **R\_VARY** | **D\_VARY** |
| EAS[12]\_TO\_SRF | CDF\_REAL8 | 2 | 3,3 | T | T,T |
|  |  |  | | | |
| **Attribute Name** | **Data Type** | **Value** | | | |
| FIELDNAM | CDF\_CHAR | EAS[12] Rotation Matrix | | | |
| CATDESC | CDF\_CHAR | The rotation matrix to go from EAS[12] frame to Spacecraft reference frame | | | |
| FILLVAL | CDF\_REAL8 | -1.0E+31 | | | |
| FORMAT | CDF\_CHAR | f14.6 | | | |
| VAR\_TYPE | CDF\_CHAR | support\_data | | | |

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| --- | --- | --- | --- | --- | --- |
| **Variable\_Name** | **Data\_type** | **DIMS** | **SIZES** | **R\_VARY** | **D\_VARY** |
| EAS[12]\_TO\_RTN | CDF\_REAL8 | 2 | 3,3 | T | T,T |
|  |  |  | | | |
| **Attribute Name** | **Data Type** | **Value** | | | |
| FIELDNAM | CDF\_CHAR | EAS[12] Rotation Matrix | | | |
| CATDESC | CDF\_CHAR | The rotation matrix to go from EAS[12] frame to RTN frame | | | |
| FILLVAL | CDF\_REAL8 | -1.0E+31 | | | |
| FORMAT | CDF\_CHAR | f14.6 | | | |
| VAR\_TYPE | CDF\_CHAR | support\_data | | | |

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| --- | --- | --- | --- | --- | --- |
| **Variable\_Name** | **Data\_type** | **DIMS** | **SIZES** | **R\_VARY** | **D\_VARY** |
| QUALITY\_FLAG | CDF\_UINT1 | 1 | 1 | T | F |
| **Attribute Name** | **Data Type** | **Value** | | | |
| FIELDNAM | CDF\_CHAR | EAS[12] Data Quality | | | |
| CATDESC | CDF\_CHAR | EAS[12] Data Quality flag | | | |
| DISPLAY\_TYPE | CDF\_CHAR | time\_series | | | |
| DEPEND\_0 | CDF\_CHAR | EPOCH | | | |
| FILLVAL | CDF\_UINT4 | 255 | | | |
| LABLAXIS | CDF\_CHAR | EAS[12] data quality | | | |
| VALIDMIN | CDF\_UINT4 | 0 | | | |
| VALIDMAX | CDF\_UINT4 | 4 | | | |
| SCALETYP | CDF\_CHAR | linear | | | |
| SCALEMIN | CDF\_UINT4 | 0 | | | |
| SCALEMAX | CDF\_UINT4 | 4 | | | |
| VAR\_TYPE | CDF\_CHAR | support\_data | | | |

##### EAS single strahl electron distribution

This file contains the calibrated single strahl electron distribution data product from the EAS and in unit specified in the filename. The file format is .cdf.

**Filename**:solo\_L2\_swa-eas[12]-ss-[unit]\_[StartTime-EndTime]\_V??.cdf

**Expected data volume and time resolution**: This file contains the single strahl data between the start time and end times mentioned in the file name and in the units mentioned by [unit] in the file name. The time tags are in CDF\_TIME\_TT2000 format. One file contains Electron fluxes provided in one of the units of psd, dnf and dpf.The time resolution of the file is nominally 100 seconds. It contains strahl electron distribution for one energy from 32 anodes and 16 deflectors for each time-stamp. It is expected that the file will cover 1 single 24 hour period approximately.

**Global Attributes**

|  |  |  |
| --- | --- | --- |
| **Name** | **Entry** | **Value** |
| Project | 1 | Solar Orbiter |
| Project | 2 | Cosmic Visions |
| Source Name | 1 | SOLO>Solar Orbiter |
| Discipline | 1 | Space Physics>Interplanetary Studies |
| Data Type | 1 | L2>Level 2 Data |
| Descriptor | 1 | SWA-EAS[12]-SS-[unit] |
| Data Version | 1 | 01 |
| Software Version | 1 | 01.00.00 |
| PI Name | 1 | C. J. Owen |
| PI Affiliation | 1 | MSSL-UCL, University College London |
| Instrument Type | 1 | Plasma and Solar Wind |
| Mission Group | 1 | Solar Orbiter |
| Logical Source | 1 | Solo\_L2\_swa-eas[12]-SS-[unit] |
| Logical File id | 1 | solo\_L2\_swa-eas[12]\_SS-[unit]\_yyyymmddTHHMMSS-yyyymmddTHHMMSS\_V01 |
| Logical Source Description | 1 | SWA-EAS[12] Single Strahl data in Phase Space Density |
| Rules of Use | 1 | Current best quality data – see caveats file or contact SWA/EAS team for information on use |
| Generated by | 1 | MSSL-UCL |
| Generation date | 1 | YYYY-MM-DDTHH:MN:SS |
| Mods | 1 | V01 First Version |
| Data Product | 1 | SS-[unit]>Single Strahl – [psd/dnf/dpf] |
| Level | 1 | L2>Level 2 Data |
| Instrument | 1 | SWA-EAS>Solar-Wind-Analyser-Electron-Analyser-System |

**Variables**

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Variable\_Name** | **Data\_type** | **DIMS** | **SIZES** | **R\_VARY** | **D\_VARY** |
| EPOCH | CDF\_TIME\_TT2000 | 1 | 1 | T | F |
| **Attribute Name** | **Data Type** | **Value** | | | |
| FIELDNAM | CDF\_CHAR | EAS[12] EPOCH | | | |
| CATDESC | CDF\_CHAR | Epoch in nano-seconds since J2000, encoded as Terrestrial Time on rotating Earth Geoid | | | |
| DISPLAY\_TYPE | CDF\_CHAR | time\_series | | | |
| FILLVAL | CDF\_INT8 | -9223372036854775807 | | | |
| LABLAXIS | CDF\_CHAR | EPOCH | | | |
| UNITS | CDF\_CHAR | ns | | | |
| VALIDMIN | CDF\_INT8 | 1577836800000000000 | | | |
| VALIDMAX | CDF\_INT8 | 1893456000000000000 | | | |
| SCALETYP | CDF\_CHAR | linear | | | |
| SCALEMIN | CDF\_INT8 | 1577836800000000000 | | | |
| SCALEMAX | CDF\_INT8 | 1893456000000000000 | | | |
| SI\_CONVERSION | CDF\_CHAR | 1>1e+09 s | | | |
| VAR\_TYPE | CDF\_CHAR | support\_data | | | |
| VAR\_NOTES | CDF\_CHAR | The EAS[12] time tag is from the centre of the acquisition interval which is 1 sec | | | |

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| **Variable\_Name** | **Data\_type** | **DIMS** | **SIZES** | **R\_VARY** | **D\_VARY** |
| SWA\_EAS[12]\_ELEVATION | CDF\_REAL8 | 1 | 16 | F | T |
| **Attribute Name** | **Data Type** | **Value** | | | |
| FIELDNAM | CDF\_CHAR | EAS[12] Elevation | | | |
| CATDESC | CDF\_CHAR | The bin-centred elevation angles of the EAS[12] sensor | | | |
| DEPEND\_0 | CDF\_CHAR | EPOCH | | | |
| FILLVAL | CDF\_REAL8 | -1E31 | | | |
| FORMAT | CDF\_CHAR | f14.4 | | | |
| LABLAXIS | CDF\_CHAR | Elevation Angle | | | |
| UNITS | CDF\_CHAR | Degrees | | | |
| VALIDMIN | CDF\_REAL8 | -45.0 | | | |
| VALIDMAX | CDF\_REAL8 | 45.0 | | | |
| SCALETYP | CDF\_CHAR | linear | | | |
| SCALEMIN | CDF\_REAL8 | -45.0 | | | |
| SCALEMAX | CDF\_REAL8 | 45.0 | | | |
| VAR\_TYPE | CDF\_CHAR | support\_data | | | |

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| **Variable\_Name** | **Data\_type** | **DIMS** | **SIZES** | **R\_VARY** | **D\_VARY** |
| SWA\_EAS[12]\_ELEVATION\_delta\_upper | CDF\_REAL8 | 1 | 16 | F | T |
| **Attribute Name** | **Data Type** | **Value** | | | |
| FIELDNAM | CDF\_CHAR | EAS[12] Elevation delta upper | | | |
| CATDESC | CDF\_CHAR | Upper half width of elevation bin | | | |
| FORMAT | CDF\_CHAR | f14.4 | | | |
| LABLAXIS | CDF\_CHAR | Elevation Angle | | | |
| UNITS | CDF\_CHAR | Degrees | | | |
| VAR\_TYPE | CDF\_CHAR | support\_data | | | |

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| --- | --- | --- | --- | --- | --- |
| **Variable\_Name** | **Data\_type** | **DIMS** | **SIZES** | **R\_VARY** | **D\_VARY** |
| SWA\_EAS[12]\_ELEVATION\_delta\_lower | CDF\_REAL8 | 1 | 16 | F | T |
| **Attribute Name** | **Data Type** | **Value** | | | |
| FIELDNAM | CDF\_CHAR | EAS[12] Elevation delta lower | | | |
| CATDESC | CDF\_CHAR | Lower half width of elevation bin | | | |
| FORMAT | CDF\_CHAR | f14.4 | | | |
| LABLAXIS | CDF\_CHAR | Elevation Angle | | | |
| UNITS | CDF\_CHAR | Degrees | | | |
| VAR\_TYPE | CDF\_CHAR | support\_data | | | |

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| --- | --- | --- | --- | --- | --- |
| **Variable\_Name** | **Data\_type** | **DIMS** | **SIZES** | **R\_VARY** | **D\_VARY** |
| SWA\_EAS[12]\_AZIMUTH | CDF\_REAL8 | 1 | 32 | F | T |
| **Attribute Name** | **Data Type** | **Value** | | | |
| FIELDNAM | CDF\_CHAR | EAS[12] Azimuth | | | |
| CATDESC | CDF\_CHAR | The bin-centred azimuthal angles of the EAS[12] sensor | | | |
| DEPEND\_0 | CDF\_CHAR | EPOCH | | | |
| FILLVAL | CDF\_REAL8 | -1E31 | | | |
| FORMAT | CDF\_CHAR | f14.4 | | | |
| LABLAXIS | CDF\_CHAR | Azimuthal Angle | | | |
| UNITS | CDF\_CHAR | Degrees | | | |
| VALIDMIN | CDF\_REAL8 | 0.0 | | | |
| VALIDMAX | CDF\_REAL8 | 360.0 | | | |
| SCALETYP | CDF\_CHAR | linear | | | |
| SCALEMIN | CDF\_REAL8 | 0.0 | | | |
| SCALEMAX | CDF\_REAL8 | 360.0 | | | |
| VAR\_TYPE | CDF\_CHAR | support\_data | | | |

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| --- | --- | --- | --- | --- | --- |
| **Variable\_Name** | **Data\_type** | **DIMS** | **SIZES** | **R\_VARY** | **D\_VARY** |
| SWA\_EAS[12]\_AZIMUTH\_delta\_upper | CDF\_REAL8 | 1 | 32 | F | T |
| **Attribute Name** | **Data Type** | **Value** | | | |
| FIELDNAM | CDF\_CHAR | EAS[12] Azimuth delta upper | | | |
| CATDESC | CDF\_CHAR | Upper half width of azimuth bin | | | |
| FORMAT | CDF\_CHAR | f14.4 | | | |
| UNITS | CDF\_CHAR | Degrees | | | |
| VAR\_TYPE | CDF\_CHAR | support\_data | | | |

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| --- | --- | --- | --- | --- | --- |
| **Variable\_Name** | **Data\_type** | **DIMS** | **SIZES** | **R\_VARY** | **D\_VARY** |
| SWA\_EAS[12]\_AZIMUTH\_delta\_lower | CDF\_REAL8 | 1 | 32 | F | T |
| **Attribute Name** | **Data Type** | **Value** | | | |
| FIELDNAM | CDF\_CHAR | EAS[12] Azimuth delta lower | | | |
| CATDESC | CDF\_CHAR | Lower half width of azimuth bin | | | |
| FORMAT | CDF\_CHAR | f14.4 | | | |
| UNITS | CDF\_CHAR | Degrees | | | |
| VAR\_TYPE | CDF\_CHAR | support\_data | | | |

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| --- | --- | --- | --- | --- | --- |
| **Variable\_Name** | **Data\_type** | **DIMS** | **SIZES** | **R\_VARY** | **D\_VARY** |
| SWA\_EAS[12]\_ENERGY | CDF\_REAL8 | 1 | 1 | T | F |
| **Attribute Name** | **Data Type** | **Value** | | | |
| FIELDNAM | CDF\_CHAR | EAS[12] Energy | | | |
| CATDESC | CDF\_CHAR | The bin-centred Energy value used to obtain the single strahl from the EAS[12] sensor | | | |
| DEPEND\_0 | CDF\_CHAR | EPOCH | | | |
| FILLVAL | CDF\_REAL8 | -1E31 | | | |
| FORMAT | CDF\_CHAR | f14.4 | | | |
| LABLAXIS | CDF\_CHAR | Energy | | | |
| UNITS | CDF\_CHAR | ElectronVolts | | | |
| VALIDMIN | CDF\_REAL8 | 0.1 | | | |
| VALIDMAX | CDF\_REAL8 | 6000.0 | | | |
| SCALETYP | CDF\_CHAR | log | | | |
| SCALEMIN | CDF\_REAL8 | 0.1 | | | |
| SCALEMAX | CDF\_REAL8 | 6000.0 | | | |
| SI\_CONVERSION | CDF\_CHAR | 1.60217646E-19>J | | | |
| VAR\_TYPE | CDF\_CHAR | support\_data | | | |

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| **Variable\_Name** | **Data\_type** | **DIMS** | **SIZES** | **R\_VARY** | **D\_VARY** |
| SWA\_EAS[12]\_SS-[unit]\_Data | CDF\_REAL8 | 2 | 32, 16 | T | T,T |
| **Attribute Name** | **Data Type** | **Value** | | | |
| FIELDNAM | CDF\_CHAR | EAS[12] Single Strahl Data | | | |
| CATDESC | CDF\_CHAR | Single strahl data from EAS[12] | | | |
| DISPLAY\_TYPE | CDF\_CHAR | spectrogram | | | |
| FILLVAL | CDF\_REAL8 | -1E31 | | | |
| FORMAT | CDF\_CHAR | f14.4 | | | |
| LABLAXIS | CDF\_CHAR | Electron flux | | | |
| UNITS | CDF\_CHAR | s^3 km^-6 for psd  m^-2 s^-1 sr^-1 eV^-1 for dnf  eV m^-2 s^-2 sr^-1 eV^-1 for def | | | |
| VALIDMIN | CDF\_REAL8 | 0.1 | | | |
| VALIDMAX | CDF\_REAL8 | 65535.0 | | | |
| SCALETYP | CDF\_CHAR | Log | | | |
| SCALEMIN | CDF\_REAL8 | 0.1 | | | |
| SCALEMAX | CDF\_REAL8 | 65535.0 | | | |
| DEPEND\_0 | CDF\_CHAR | EPOCH | | | |
| DEPEND\_1 | CDF\_CHAR | SWA\_EAS[12]\_AZIMUTH | | | |
| DEPEND\_2 | CDF\_CHAR | SWA\_EAS[12]\_ELEVATION | | | |
| COORDINATE\_SYSTEM | CDF\_CHAR | Solar Ecliptic | | | |
| VAR\_TYPE | CDF\_CHAR | data | | | |

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| **Variable\_Name** | **Data\_type** | **DIMS** | **SIZES** | **R\_VARY** | **D\_VARY** |
| EAS[12]\_TO\_SRF | CDF\_REAL8 | 2 | 3,3 | T | T,T |
|  |  |  | | | |
| **Attribute Name** | **Data Type** | **Value** | | | |
| FIELDNAM | CDF\_CHAR | EAS[12] Rotation Matrix | | | |
| CATDESC | CDF\_CHAR | The rotation matrix to go from EAS[12] frame to Spacecraft reference frame | | | |
| FILLVAL | CDF\_REAL8 | -1.0E+31 | | | |
| FORMAT | CDF\_CHAR | f14.6 | | | |
| VAR\_TYPE | CDF\_CHAR | support\_data | | | |

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| --- | --- | --- | --- | --- | --- |
| **Variable\_Name** | **Data\_type** | **DIMS** | **SIZES** | **R\_VARY** | **D\_VARY** |
| EAS[12]\_TO\_RTN | CDF\_REAL8 | 2 | 3,3 | F | T,T |
|  |  |  | | | |
| **Attribute Name** | **Data Type** | **Value** | | | |
| FIELDNAM | CDF\_CHAR | EAS[12] Rotation Matrix | | | |
| CATDESC | CDF\_CHAR | The rotation matrix to go from EAS[12] frame to RTN frame | | | |
| FILLVAL | CDF\_REAL8 | -1.0E+31 | | | |
| FORMAT | CDF\_CHAR | f14.6 | | | |
| VAR\_TYPE | CDF\_CHAR | support\_data | | | |

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| --- | --- | --- | --- | --- | --- |
| **Variable\_Name** | **Data\_type** | **DIMS** | **SIZES** | **R\_VARY** | **D\_VARY** |
| QUALITY\_FLAG | CDF\_UINT1 | 1 | 1 | T | F |
| **Attribute Name** | **Data Type** | **Value** | | | |
| FIELDNAM | CDF\_CHAR | EAS[12] Data Quality | | | |
| CATDESC | CDF\_CHAR | EAS[12] Data Quality flag | | | |
| DISPLAY\_TYPE | CDF\_CHAR | time\_series | | | |
| DEPEND\_0 | CDF\_CHAR | EPOCH | | | |
| FILLVAL | CDF\_UINT4 | 255 | | | |
| LABLAXIS | CDF\_CHAR | EAS[12] data quality | | | |
| VALIDMIN | CDF\_UINT4 | 0 | | | |
| VALIDMAX | CDF\_UINT4 | 4 | | | |
| SCALETYP | CDF\_CHAR | linear | | | |
| SCALEMIN | CDF\_UINT4 | 0 | | | |
| SCALEMAX | CDF\_UINT4 | 4 | | | |
| VAR\_TYPE | CDF\_CHAR | support\_data | | | |

##### EAS Triggered Mode 3D distribution

This file contains the triggered mode 3D electron distribution function data product from the EAS in the units specified in the file name. The file format is .cdf.

**Filename**:solo\_L2\_swa-eas[12]-tm3d-[unit]\_[StartTime-EndTime]\_V??.cdf

**Expected data volume and time resolution**: This file contains the data between the start time and end times mentioned in the file name in the units mentioned by [unit]. The timetags in this file are of CDF\_TIME\_TT2000 type. Time resolution of data provided in these files is 1second. Each file contains 3D electron distribution in one of the following units: phase space density (psd) or differential number flux (dnf) or differential energy flux (def) and has data collected for 64 energies, 32 anodes and 16 deflectors for each time-stamp. It is expected that a file will cover all trigger data in a given 24 hour period. Each trigger data set is of 5 minutes.

**Global Attributes**

|  |  |  |
| --- | --- | --- |
| **Name** | **Entry** | **Value** |
| Project | 1 | Solar Orbiter |
| Project | 2 | Cosmic Visions |
| Source Name | 1 | SOLO>Solar Orbiter |
| Discipline | 1 | Space Physics>Interplanetary Studies |
| Data Type | 1 | L2>Level 2 Data |
| Descriptor | 1 | SWA-EAS[12]-TM3D-[unit] |
| Data Version | 1 | 01 |
| Software Version | 1 | 01.00.00 |
| PI Name | 1 | C. J. Owen |
| PI Affiliation | 1 | MSSL-UCL, University College London, UK |
| Instrument Type | 1 | Plasma and Solar Wind |
| Mission Group | 1 | Solar Orbiter |
| Logical Source | 1 | SWA\_L2\_swa-eas[12]-TM3D-[unit] |
| Logical File id | 1 | solo\_L2\_swa-eas[12]-TM3D-[unit]\_yyyymmddTHHMMSS-yyyymmddTHHMMSS\_V01 |
| Logical Source Description | 1 | SWA-EAS[12] Trigger Mode 3D data in psd/dnf/def |
| Rules of Use | 1 | Current best quality data – see caveats file or contact SWA/EAS team for information on use |
| Generated by | 1 | MSSL-UCL |
| Generation date | 1 | YYYY-MM-DDTHH:MN:SS |
| Mods | 1 | V01 First Version |
| Data Product | 1 | TM3D-[unit]>Trigger Mode 3D in Phase Space Density |
| Level | 1 | L2>Level 2 Data |
| Instrument | 1 | SWA-EAS>Solar-Wind-Analyser-Electron-Analyser-System |

**Variables**

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Variable\_Name** | **Data\_type** | **DIMS** | **SIZES** | **R\_VARY** | **D\_VARY** |
| EPOCH | CDF\_TIME\_TT2000 | 1 | 1 | T | F |
| **Attribute Name** | **Data Type** | **Value** | | | |
| FIELDNAM | CDF\_CHAR | EAS[12] EPOCH | | | |
| CATDESC | CDF\_CHAR | Epoch in nano-seconds since J2000, encoded as Terrestrial Time on rotating Earth Geoid | | | |
| DISPLAY\_TYPE | CDF\_CHAR | time\_series | | | |
| FILLVAL | CDF\_INT8 | -9223372036854775807 | | | |
| LABLAXIS | CDF\_CHAR | EPOCH | | | |
| UNITS | CDF\_CHAR | ns | | | |
| VALIDMIN | CDF\_INT8 | 1577836800000000000 | | | |
| VALIDMAX | CDF\_INT8 | 1893456000000000000 | | | |
| SCALETYP | CDF\_CHAR | linear | | | |
| SCALEMIN | CDF\_INT8 | 1577836800000000000 | | | |
| SCALEMAX | CDF\_INT8 | 1893456000000000000 | | | |
| SI\_CONVERSION | CDF\_CHAR | 1>1e+09 s | | | |
| VAR\_TYPE | CDF\_CHAR | support\_data | | | |
| VAR\_NOTES | CDF\_CHAR | The EAS[12] time tag is from the centre of the acquisition interval which is 1 sec | | | |

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Variable\_Name** | **Data\_type** | **DIMS** | **SIZES** | **R\_VARY** | **D\_VARY** |
| SWA\_EAS[12]\_ELEVATION | CDF\_REAL8 | 1 | 16 | F | T |
| **Attribute Name** | **Data Type** | **Value** | | | |
| FIELDNAM | CDF\_CHAR | EAS[12] Elevation | | | |
| CATDESC | CDF\_CHAR | The bin-centred elevation angles of the EAS[12] sensor | | | |
| DEPEND\_0 | CDF\_CHAR | EPOCH | | | |
| FILLVAL | CDF\_REAL8 | -1E31 | | | |
| FORMAT | CDF\_CHAR | f14.4 | | | |
| LABLAXIS | CDF\_CHAR | Elevation Angle | | | |
| UNITS | CDF\_CHAR | Degrees | | | |
| VALIDMIN | CDF\_REAL8 | -45.0 | | | |
| VALIDMAX | CDF\_REAL8 | 45.0 | | | |
| SCALETYP | CDF\_CHAR | linear | | | |
| SCALEMIN | CDF\_REAL8 | -45.0 | | | |
| SCALEMAX | CDF\_REAL8 | 45.0 | | | |
| VAR\_TYPE | CDF\_CHAR | support\_data | | | |

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Variable\_Name** | **Data\_type** | **DIMS** | **SIZES** | **R\_VARY** | **D\_VARY** |
| SWA\_EAS[12]\_ELEVATION\_delta\_upper | CDF\_REAL8 | 1 | 16 | F | T |
| **Attribute Name** | **Data Type** | **Value** | | | |
| FIELDNAM | CDF\_CHAR | EAS[12] Elevation delta upper | | | |
| CATDESC | CDF\_CHAR | Upper half width of elevation bin | | | |
| FORMAT | CDF\_CHAR | f14.4 | | | |
| LABLAXIS | CDF\_CHAR | Elevation Angle | | | |
| UNITS | CDF\_CHAR | Degrees | | | |
| VAR\_TYPE | CDF\_CHAR | support\_data | | | |

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Variable\_Name** | **Data\_type** | **DIMS** | **SIZES** | **R\_VARY** | **D\_VARY** |
| SWA\_EAS[12]\_ELEVATION\_delta\_lower | CDF\_REAL8 | 1 | 16 | F | T |
| **Attribute Name** | **Data Type** | **Value** | | | |
| FIELDNAM | CDF\_CHAR | EAS[12] Elevation delta lower | | | |
| CATDESC | CDF\_CHAR | Lower half width of elevation bin | | | |
| FORMAT | CDF\_CHAR | f14.4 | | | |
| LABLAXIS | CDF\_CHAR | Elevation Angle | | | |
| UNITS | CDF\_CHAR | Degrees | | | |
| VAR\_TYPE | CDF\_CHAR | support\_data | | | |

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Variable\_Name** | **Data\_type** | **DIMS** | **SIZES** | **R\_VARY** | **D\_VARY** |
| SWA\_EAS[12]\_AZIMUTH | CDF\_REAL8 | 1 | 32 | F | T |
| **Attribute Name** | **Data Type** | **Value** | | | |
| FIELDNAM | CDF\_CHAR | EAS[12] Azimuth | | | |
| CATDESC | CDF\_CHAR | The bin-centred azimuthal angles of the EAS[12] sensor | | | |
| DEPEND\_0 | CDF\_CHAR | EPOCH | | | |
| FILLVAL | CDF\_REAL8 | -1E31 | | | |
| FORMAT | CDF\_CHAR | f14.4 | | | |
| LABLAXIS | CDF\_CHAR | Azimuthal Angle | | | |
| UNITS | CDF\_CHAR | Degrees | | | |
| VALIDMIN | CDF\_REAL8 | 0.0 | | | |
| VALIDMAX | CDF\_REAL8 | 360.0 | | | |
| SCALETYP | CDF\_CHAR | linear | | | |
| SCALEMIN | CDF\_REAL8 | 0.0 | | | |
| SCALEMAX | CDF\_REAL8 | 360.0 | | | |
| VAR\_TYPE | CDF\_CHAR | support\_data | | | |

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Variable\_Name** | **Data\_type** | **DIMS** | **SIZES** | **R\_VARY** | **D\_VARY** |
| SWA\_EAS[12]\_AZIMUTH\_delta\_upper | CDF\_REAL8 | 1 | 32 | F | T |
| **Attribute Name** | **Data Type** | **Value** | | | |
| FIELDNAM | CDF\_CHAR | EAS[12] Azimuth delta upper | | | |
| CATDESC | CDF\_CHAR | Upper half width of azimuth bin | | | |
| FORMAT | CDF\_CHAR | f14.4 | | | |
| UNITS | CDF\_CHAR | Degrees | | | |
| VAR\_TYPE | CDF\_CHAR | support\_data | | | |

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Variable\_Name** | **Data\_type** | **DIMS** | **SIZES** | **R\_VARY** | **D\_VARY** |
| SWA\_EAS[12]\_AZIMUTH\_delta\_lower | CDF\_REAL8 | 1 | 32 | F | T |
| **Attribute Name** | **Data Type** | **Value** | | | |
| FIELDNAM | CDF\_CHAR | EAS[12] Azimuth delta lower | | | |
| CATDESC | CDF\_CHAR | Lower half width of azimuth bin | | | |
| FORMAT | CDF\_CHAR | f14.4 | | | |
| UNITS | CDF\_CHAR | Degrees | | | |
| VAR\_TYPE | CDF\_CHAR | support\_data | | | |

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Variable\_Name** | **Data\_type** | **DIMS** | **SIZES** | **R\_VARY** | **D\_VARY** |
| SWA\_EAS[12]\_ENERGY | CDF\_REAL8 | 1 | 64 | T | T |
| **Attribute Name** | **Data Type** | **Value** | | | |
| FIELDNAM | CDF\_CHAR | EAS[12] Energy | | | |
| CATDESC | CDF\_CHAR | The bin-centred Energy values of the EAS[12] sensor | | | |
| DEPEND\_0 | CDF\_CHAR | EPOCH | | | |
| FILLVAL | CDF\_REAL8 | -1E31 | | | |
| FORMAT | CDF\_CHAR | f14.4 | | | |
| LABLAXIS | CDF\_CHAR | Energy | | | |
| UNITS | CDF\_CHAR | ElectronVolts | | | |
| VALIDMIN | CDF\_REAL8 | 0.1 | | | |
| VALIDMAX | CDF\_REAL8 | 6000.0 | | | |
| SCALETYP | CDF\_CHAR | log | | | |
| SCALEMIN | CDF\_REAL8 | 0.1 | | | |
| SCALEMAX | CDF\_REAL8 | 6000.0 | | | |
| SI\_CONVERSION | CDF\_CHAR | 1.60217646E-19>J | | | |
| VAR\_TYPE | CDF\_CHAR | support\_data | | | |

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Variable\_Name** | **Data\_type** | **DIMS** | **SIZES** | **R\_VARY** | **D\_VARY** |
| SWA\_EAS[12]\_ENERGY\_delta\_upper | CDF\_REAL8 | 1 | 64 | T | T |
| **Attribute Name** | **Data Type** | **Value** | | | |
| FIELDNAM | CDF\_CHAR | EAS[12] Energy delta upper | | | |
| CATDESC | CDF\_CHAR | Upper half width of energy bin | | | |
| FORMAT | CDF\_CHAR | f14.4 | | | |
| UNITS | CDF\_CHAR | ElectronVolts | | | |
| VAR\_TYPE | CDF\_CHAR | support\_data | | | |

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| --- | --- | --- | --- | --- | --- |
| **Variable\_Name** | **Data\_type** | **DIMS** | **SIZES** | **R\_VARY** | **D\_VARY** |
| SWA\_EAS[12]\_ENERGY\_delta\_lower | CDF\_REAL8 | 1 | 64 | T | T |
| **Attribute Name** | **Data Type** | **Value** | | | |
| FIELDNAM | CDF\_CHAR | EAS[12] Energy delta lower | | | |
| CATDESC | CDF\_CHAR | Lower half width of energy bin | | | |
| FORMAT | CDF\_CHAR | f14.4 | | | |
| UNITS | CDF\_CHAR | ElectronVolts | | | |
| VAR\_TYPE | CDF\_CHAR | support\_data | | | |

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Variable\_Name** | **Data\_type** | **DIMS** | **SIZES** | **R\_VARY** | **D\_VARY** |
| SWA\_EAS[12]\_TM3D-[unit]\_Data | CDF\_REAL8 | 3 | 16,64,32 | T | T,T,T |
| **Attribute Name** | **Data Type** | **Value** | | | |
| FIELDNAM | CDF\_CHAR | SWA\_EAS[12]\_TM3D-psd\_Data | | | |
| CATDESC | CDF\_CHAR | EAS[12] Trigger mode 3D electron distribution in psd/dnf/def | | | |
| DISPLAY\_TYPE | CDF\_CHAR | spectrogram | | | |
| DEPEND\_0 | CDF\_CHAR | EPOCH | | | |
| FILLVAL | CDF\_REAL8 | -1E31 | | | |
| FORMAT | CDF\_CHAR | f14.4 | | | |
| LABLAXIS | CDF\_CHAR | Electron flux | | | |
| UNITS | CDF\_CHAR | s^3 km^-6 for psd  m^-2 s^-1 sr^-1 eV^-1 for dnf  eV m^-2 s^-2 sr^-1 eV^-1 for def | | | |
| VALIDMIN | CDF\_REAL8 | 0.1 | | | |
| VALIDMAX | CDF\_REAL8 | 65535.0 | | | |
| SCALETYP | CDF\_CHAR | log | | | |
| SCALEMIN | CDF\_REAL8 | 0.1 | | | |
| SCALEMAX | CDF\_REAL8 | 65535.0 | | | |
| DEPEND\_0 | CDF\_CHAR | SWA\_EAS[12]\_EPOCH | | | |
| DEPEND\_1 | CDF\_CHAR | SWA\_EAS[12]\_ELEVATION | | | |
| DEPEND\_2 | CDF\_CHAR | SWA\_EAS[12]\_ENERGY | | | |
| DEPEND\_3 | CDF\_CHAR | SWA\_EAS[12]\_AZIMUTH | | | |
| COORDINATE\_SYSTEM | CDF\_CHAR | EAS[12] | | | |
| VAR\_TYPE | CDF\_CHAR | data | | | |

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| --- | --- | --- | --- | --- | --- |
| **Variable\_Name** | **Data\_type** | **DIMS** | **SIZES** | **R\_VARY** | **D\_VARY** |
| EAS[12]\_TO\_SRF | CDF\_REAL8 | 2 | 3,3 | T | T,T |
|  |  |  | | | |
| **Attribute Name** | **Data Type** | **Value** | | | |
| FIELDNAM | CDF\_CHAR | EAS[12] Rotation Matrix | | | |
| CATDESC | CDF\_CHAR | The rotation matrix to go from EAS[12] frame to Spacecraft reference frame | | | |
| FILLVAL | CDF\_REAL8 | -1.0E+31 | | | |
| FORMAT | CDF\_CHAR | f14.6 | | | |
| VAR\_TYPE | CDF\_CHAR | support\_data | | | |

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Variable\_Name** | **Data\_type** | **DIMS** | **SIZES** | **R\_VARY** | **D\_VARY** |
| EAS[12]\_TO\_RTN | CDF\_REAL8 | 2 | 3,3 | F | T,T |
|  |  |  | | | |
| **Attribute Name** | **Data Type** | **Value** | | | |
| FIELDNAM | CDF\_CHAR | EAS[12] Rotation Matrix | | | |
| CATDESC | CDF\_CHAR | The rotation matrix to go from EAS[12] frame to RTN frame | | | |
| FILLVAL | CDF\_REAL8 | -1.0E+31 | | | |
| FORMAT | CDF\_CHAR | f14.6 | | | |
| VAR\_TYPE | CDF\_CHAR | support\_data | | | |

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Variable\_Name** | **Data\_type** | **DIMS** | **SIZES** | **R\_VARY** | **D\_VARY** |
| QUALITY\_FLAG | CDF\_UINT1 | 1 | 1 | T | F |
| **Attribute Name** | **Data Type** | **Value** | | | |
| FIELDNAM | CDF\_CHAR | EAS[12] Data Quality | | | |
| CATDESC | CDF\_CHAR | EAS[12] Data Quality flag | | | |
| DISPLAY\_TYPE | CDF\_CHAR | time\_series | | | |
| DEPEND\_0 | CDF\_CHAR | EPOCH | | | |
| FILLVAL | CDF\_UINT4 | 255 | | | |
| LABLAXIS | CDF\_CHAR | EAS[12] data quality | | | |
| VALIDMIN | CDF\_UINT4 | 0 | | | |
| VALIDMAX | CDF\_UINT4 | 4 | | | |
| SCALETYP | CDF\_CHAR | linear | | | |
| SCALEMIN | CDF\_UINT4 | 0 | | | |
| SCALEMAX | CDF\_UINT4 | 4 | | | |
| VAR\_TYPE | CDF\_CHAR | support\_data | | | |

##### EAS Burst Mode (pitch angle data)

This file contains the onboard selected electron pitch angle data rebinned on the ground using calibrated magnetic field data. The file format is .cdf.

**Filename**: solo\_L2\_swa-eas-pad-[unit]\_[StartTime-EndTime]\_V??.cdf

**Expected data volume and time resolution**: This file contains the onboard selected pitch angle data between the start time and end time mentioned in the file name and in units of either psd, dnf or def mentioned by *unit*. The time tags are of CDF\_TIME\_TT2000 format. The time resolution of the file is nominally 0.125 seconds for 10 minutes, nominally, but the duration of the data varies depending on telemetry availability. It contains electron pitch angle data for 64 energies, 32 pitch angles from 2 deflectors for each time-stamp. The amount of data in this file depends on the telemetry available.

**Global Attributes**

|  |  |  |
| --- | --- | --- |
| **Name** | **Entry** | **Value** |
| Project | 1 | Solar Orbiter |
| Project | 2 | Cosmic Visions |
| Source Name | 1 | SOLO>Solar Orbiter |
| Discipline | 1 | Space Physics>Interplanetary Studies |
| Data Type | 1 | L2>Level 2 Data |
| Descriptor | 1 | SWA-EAS-pad-[unit] |
| Data Version | 1 | 01 |
| Software Version | 1 | 01.00.00 |
| PI Name | 1 | C. J. Owen |
| PI Affiliation | 1 | MSSL-UCL, University College London, UK |
| Instrument Type | 1 | Plasma and Solar Wind |
| Mission Group | 1 | Solar Orbiter |
| Logical Source | 1 | SWA\_L2\_swa-eas-pad-[unit] |
| Logical File id | 1 | solo\_L2\_swa-eas-pad-[unit]\_yyyymmddTHHMMSS-yyyymmddTHHMMSS\_V01 |
| Logical Source Description | 1 | SWA-EAS Electron Pitch Angle data in psd/dnf/def |
| Rules of Use | 1 | Current best quality data – see caveats file or contact SWA/EAS team for information on use |
| Generated by | 1 | MSSL-UCL |
| Generation date | 1 | YYYY-MM-DDTHH:MN:SS |
| Mods | 1 | V01 First Version |
| Data Product | 1 | pad-[unit]>Pitch Angle Distribution in psd/dnf/def |
| Level | 1 | L2>Level 2 Data |
| Instrument | 1 | SWA-EAS>Solar-Wind-Analyser-Electron-Analyser-System |

**Variables**

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Variable\_Name** | **Data\_type** | **DIMS** | **SIZES** | **R\_VARY** | **D\_VARY** |
| EPOCH | CDF\_TIME\_TT2000 | 1 | 1 | T | F |
| **Attribute Name** | **Data Type** | **Value** | | | |
| FIELDNAM | CDF\_CHAR | EAS[12] EPOCH | | | |
| CATDESC | CDF\_CHAR | Epoch in nano-seconds since J2000, encoded as Terrestrial Time on rotating Earth Geoid | | | |
| DISPLAY\_TYPE | CDF\_CHAR | time\_series | | | |
| FILLVAL | CDF\_INT8 | -9223372036854775807 | | | |
| LABLAXIS | CDF\_CHAR | EPOCH | | | |
| UNITS | CDF\_CHAR | ns | | | |
| VALIDMIN | CDF\_INT8 | 1577836800000000000 | | | |
| VALIDMAX | CDF\_INT8 | 1893456000000000000 | | | |
| SCALETYP | CDF\_CHAR | linear | | | |
| SCALEMIN | CDF\_INT8 | 1577836800000000000 | | | |
| SCALEMAX | CDF\_INT8 | 1893456000000000000 | | | |
| SI\_CONVERSION | CDF\_CHAR | 1>1e+09 s | | | |
| VAR\_TYPE | CDF\_CHAR | support\_data | | | |
| VAR\_NOTES | CDF\_CHAR | The EAS[12] time tag is from the centre of the acquisition interval which is 1 sec | | | |

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| --- | --- | --- | --- | --- | --- |
| **Variable\_Name** | **Data\_type** | **DIMS** | **SIZES** | **R\_VARY** | **D\_VARY** |
| SWA\_EAS\_PAD-[unit]\_Data | CDF\_REAL8 | 3 | 2,64,32 | T | T,T,T |
| **Attribute Name** | **Data Type** | **Value** | | | |
| FIELDNAM | CDF\_CHAR | EAS pitch angle Data | | | |
| CATDESC | CDF\_CHAR | EAS electron pitch angle distribution in psd/dnf/def | | | |
| DISPLAY\_TYPE | CDF\_CHAR | Spectrogram | | | |
| FILLVAL | CDF\_REAL8 | -1E31 | | | |
| FORMAT | CDF\_CHAR | f14.4 | | | |
| LABLAXIS | CDF\_CHAR | PAD-[unit] | | | |
| UNITS | CDF\_CHAR | s^3 km^-6 for psd  m^-2 s^-1 sr^-1 eV^-1 for dnf  eV m^-2 s^-2 sr^-1 eV^-1 for def | | | |
| VALIDMIN | CDF\_REAL8 | 0.1 | | | |
| VALIDMAX | CDF\_REAL8 | 65535.0 | | | |
| SCALETYP | CDF\_CHAR | log | | | |
| SCALEMIN | CDF\_REAL8 | 0.1 | | | |
| SCALEMAX | CDF\_REAL8 | 65535.0 | | | |
| DEPEND\_0 | CDF\_CHAR | EPOCH | | | |
| DEPEND\_1 | CDF\_CHAR | SWA\_EAS\_ELEVATION | | | |
| DEPEND\_2 | CDF\_CHAR | SWA\_EAS\_ENERGY | | | |
| DEPEND\_3 | CDF\_CHAR | SWA\_EAS\_AZIMUTH | | | |
| VAR\_TYPE | CDF\_CHAR | data | | | |

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Variable\_Name** | **Data\_type** | **DIMS** | **SIZES** | **R\_VARY** | **D\_VARY** |
| SWA\_EAS\_ELEVATION | CDF\_REAL8 | 1 | 2 | T | T |
| **Attribute Name** | **Data Type** | **Value** | | | |
| FIELDNAM | CDF\_CHAR | EAS Elevation | | | |
| CATDESC | CDF\_CHAR | The bin-centred elevation angles of the EAS sensor | | | |
| DEPEND\_0 | CDF\_CHAR | EPOCH | | | |
| FILLVAL | CDF\_REAL8 | -1E31 | | | |
| FORMAT | CDF\_CHAR | f14.4 | | | |
| LABLAXIS | CDF\_CHAR | Elevation Angle | | | |
| UNITS | CDF\_CHAR | Degrees | | | |
| VALIDMIN | CDF\_REAL8 | -45.0 | | | |
| VALIDMAX | CDF\_REAL8 | 45.0 | | | |
| SCALETYP | CDF\_CHAR | linear | | | |
| SCALEMIN | CDF\_REAL8 | -45.0 | | | |
| SCALEMAX | CDF\_REAL8 | 45.0 | | | |
| VAR\_TYPE | CDF\_CHAR | support\_data | | | |

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Variable\_Name** | **Data\_type** | **DIMS** | **SIZES** | **R\_VARY** | **D\_VARY** |
| SWA\_EAS[12]\_ELEVATION\_delta\_upper | CDF\_REAL8 | 1 | 2 | F | T |
| **Attribute Name** | **Data Type** | **Value** | | | |
| FIELDNAM | CDF\_CHAR | EAS[12] Elevation delta upper | | | |
| CATDESC | CDF\_CHAR | Upper half width of elevation bin | | | |
| FORMAT | CDF\_CHAR | f14.4 | | | |
| LABLAXIS | CDF\_CHAR | Elevation Angle | | | |
| UNITS | CDF\_CHAR | Degrees | | | |
| VAR\_TYPE | CDF\_CHAR | support\_data | | | |

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Variable\_Name** | **Data\_type** | **DIMS** | **SIZES** | **R\_VARY** | **D\_VARY** |
| SWA\_EAS[12]\_ELEVATION\_delta\_upper | CDF\_REAL8 | 1 | 2 | F | T |
| **Attribute Name** | **Data Type** | **Value** | | | |
| FIELDNAM | CDF\_CHAR | EAS[12] Elevation delta lower | | | |
| CATDESC | CDF\_CHAR | Lower half width of elevation bin | | | |
| FORMAT | CDF\_CHAR | f14.4 | | | |
| LABLAXIS | CDF\_CHAR | Elevation Angle | | | |
| UNITS | CDF\_CHAR | Degrees | | | |
| VAR\_TYPE | CDF\_CHAR | support\_data | | | |

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| **Variable\_Name** | **Data\_type** | **DIMS** | **SIZES** | **R\_VARY** | **D\_VARY** |
| SWA\_EAS\_AZIMUTH | CDF\_REAL8 | 1 | 32 | F | T |
| **Attribute Name** | **Data Type** | **Value** | | | |
| FIELDNAM | CDF\_CHAR | EAS Azimuth | | | |
| CATDESC | CDF\_CHAR | The bin-centred azimuthal (Pitch angles) angles of the EAS sensor | | | |
| DEPEND\_0 | CDF\_CHAR | EPOCH | | | |
| FILLVAL | CDF\_REAL8 | -1E31 | | | |
| FORMAT | CDF\_CHAR | f14.4 | | | |
| LABLAXIS | CDF\_CHAR | Azimuthal Angle | | | |
| UNITS | CDF\_CHAR | Degrees | | | |
| VALIDMIN | CDF\_REAL8 | 0.0 | | | |
| VALIDMAX | CDF\_REAL8 | 360.0 | | | |
| SCALETYP | CDF\_CHAR | linear | | | |
| SCALEMIN | CDF\_REAL8 | 0.0 | | | |
| SCALEMAX | CDF\_REAL8 | 360.0 | | | |
| VAR\_TYPE | CDF\_CHAR | support\_data | | | |

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| **Variable\_Name** | **Data\_type** | **DIMS** | **SIZES** | **R\_VARY** | **D\_VARY** |
| SWA\_EAS[12]\_AZIMUTH\_delta\_upper | CDF\_REAL8 | 1 | 32 | F | T |
| **Attribute Name** | **Data Type** | **Value** | | | |
| FIELDNAM | CDF\_CHAR | EAS[12] Azimuth delta upper | | | |
| CATDESC | CDF\_CHAR | Upper half width of azimuth bin | | | |
| FORMAT | CDF\_CHAR | f14.4 | | | |
| UNITS | CDF\_CHAR | Degrees | | | |
| VAR\_TYPE | CDF\_CHAR | support\_data | | | |

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| **Variable\_Name** | **Data\_type** | **DIMS** | **SIZES** | **R\_VARY** | **D\_VARY** |
| SWA\_EAS[12]\_AZIMUTH\_delta\_lower | CDF\_REAL8 | 1 | 32 | F | T |
| **Attribute Name** | **Data Type** | **Value** | | | |
| FIELDNAM | CDF\_CHAR | EAS[12] Azimuth delta lower | | | |
| CATDESC | CDF\_CHAR | Lower half width of azimuth bin | | | |
| FORMAT | CDF\_CHAR | f14.4 | | | |
| UNITS | CDF\_CHAR | Degrees | | | |
| VAR\_TYPE | CDF\_CHAR | support\_data | | | |

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| **Variable\_Name** | **Data\_type** | **DIMS** | **SIZES** | **R\_VARY** | **D\_VARY** |
| SWA\_EAS\_ENERGY | CDF\_REAL8 | 1 | 64 | T | T |
| **Attribute Name** | **Data Type** | **Value** | | | |
| FIELDNAM | CDF\_CHAR | EAS Energies | | | |
| CATDESC | CDF\_CHAR | The bin-centred Energy values of the EAS sensor | | | |
| DEPEND\_0 | CDF\_CHAR | EPOCH | | | |
| FILLVAL | CDF\_REAL8 | -1E31 | | | |
| FORMAT | CDF\_CHAR | f14.4 | | | |
| LABLAXIS | CDF\_CHAR | Energy | | | |
| UNITS | CDF\_CHAR | ElectronVolts | | | |
| VALIDMIN | CDF\_REAL8 | 0.1 | | | |
| VALIDMAX | CDF\_REAL8 | 6000.0 | | | |
| SCALETYP | CDF\_CHAR | log | | | |
| SCALEMIN | CDF\_REAL8 | 0.1 | | | |
| SCALEMAX | CDF\_REAL8 | 6000.0 | | | |
| SI\_CONVERSION | CDF\_CHAR | 1.60217646E-19>J | | | |
| VAR\_TYPE | CDF\_CHAR | support\_data | | | |

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| **Variable\_Name** | **Data\_type** | **DIMS** | **SIZES** | **R\_VARY** | **D\_VARY** |
| SWA\_EAS[12]\_ENERGY\_delta\_upper | CDF\_REAL8 | 1 | 64 | T | T |
| **Attribute Name** | **Data Type** | **Value** | | | |
| FIELDNAM | CDF\_CHAR | EAS[12] Energy delta upper | | | |
| CATDESC | CDF\_CHAR | Upper half width of energy bin | | | |
| FORMAT | CDF\_CHAR | f14.4 | | | |
| UNITS | CDF\_CHAR | ElectronVolts | | | |
| VAR\_TYPE | CDF\_CHAR | support\_data | | | |

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| **Variable\_Name** | **Data\_type** | **DIMS** | **SIZES** | **R\_VARY** | **D\_VARY** |
| SWA\_EAS[12]\_ENERGY\_delta\_lower | CDF\_REAL8 | 1 | 64 | T | T |
| **Attribute Name** | **Data Type** | **Value** | | | |
| FIELDNAM | CDF\_CHAR | EAS[12] Energy delta lower | | | |
| CATDESC | CDF\_CHAR | Lower half width of energy bin | | | |
| FORMAT | CDF\_CHAR | f14.4 | | | |
| UNITS | CDF\_CHAR | ElectronVolts | | | |
| VAR\_TYPE | CDF\_CHAR | support\_data | | | |

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| **Variable\_Name** | **Data\_type** | **DIMS** | **SIZES** | **R\_VARY** | **D\_VARY** |
| SWA\_EAS\_EasUsed | CDF\_UINT4 | 1 | 1 | T | F |
| **Attribute Name** | **Data Type** | **Value** | | | |
| FIELDNAM | CDF\_CHAR | EAS sensor used | | | |
| CATDESC | CDF\_CHAR | The EAS sensor used for Burst data collection | | | |
| DEPEND\_0 | CDF\_CHAR | EPOCH | | | |
| FORMAT | CDF\_CHAR | I1 | | | |
| LABLAXIS | CDF\_CHAR | EAS used | | | |
| VALIDMIN | CDF\_UINT1 | 0 | | | |
| VALIDMAX | CDF\_UINT2 | 1 | | | |
| SCALETYP | CDF\_CHAR | linear | | | |
| SCALEMIN | CDF\_UINT1 | 0 | | | |
| SCALEMAX | CDF\_UINT2 | 1 | | | |
| VAR\_TYPE | CDF\_CHAR | support\_data | | | |
| VAR\_NOTES | CDF\_CHAR | 0:EAS1; 1:EAS2 | | | |

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| **Variable\_Name** | **Data\_type** | **DIMS** | **SIZES** | **R\_VARY** | **D\_VARY** |
| EAS\_TO\_SRF | CDF\_REAL8 | 2 | 3,3 | T | T,T |
|  |  |  | | | |
| **Attribute Name** | **Data Type** | **Value** | | | |
| FIELDNAM | CDF\_CHAR | EAS-SRF Rotation Matrix | | | |
| CATDESC | CDF\_CHAR | The rotation matrix to go from EAS[12] frame to Spacecraft reference frame | | | |
| FILLVAL | CDF\_REAL8 | -1.0E+31 | | | |
| FORMAT | CDF\_CHAR | f14.6 | | | |
| VAR\_TYPE | CDF\_CHAR | support\_data | | | |

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| **Variable\_Name** | **Data\_type** | **DIMS** | **SIZES** | **R\_VARY** | **D\_VARY** |
| QUALITY\_FLAG | CDF\_UINT1 | 1 | 1 | T | F |
| **Attribute Name** | **Data Type** | **Value** | | | |
| FIELDNAM | CDF\_CHAR | EAS Data Quality | | | |
| CATDESC | CDF\_CHAR | EAS Data Quality flag | | | |
| DISPLAY\_TYPE | CDF\_CHAR | time\_series | | | |
| DEPEND\_0 | CDF\_CHAR | EPOCH | | | |
| FILLVAL | CDF\_UINT4 | 255 | | | |
| LABLAXIS | CDF\_CHAR | EAS data quality | | | |
| VALIDMIN | CDF\_UINT4 | 0 | | | |
| VALIDMAX | CDF\_UINT4 | 4 | | | |
| SCALETYP | CDF\_CHAR | linear | | | |
| SCALEMIN | CDF\_UINT4 | 0 | | | |
| SCALEMAX | CDF\_UINT4 | 4 | | | |
| VAR\_TYPE | CDF\_CHAR | support\_data | | | |

##### EAS Onboard Moments

This file contains the onboard calculated electron moments data product from EAS. The file format is .cdf.

**Filename**:solo\_L2\_swa-eas-onbmoms\_[StartTime-EndTime]\_V??.cdf

**Expected data volume and time resolution**: This file contains the onboard calculated electron partial moments data combined on the ground to produce one single moments between the start time and end times mentioned in the file name. The start and end times are in UT. The time resolution of the file is nominally 4 seconds. In this case there will be a maximum of 21600 records in the file.

**Global Attributes**

|  |  |  |
| --- | --- | --- |
| **Name** | **Entry** | **Value** |
| Project | 1 | Solar Orbiter |
| Project | 2 | Cosmic Visions |
| Source Name | 1 | SOLO>Solar Orbiter |
| Discipline | 1 | Space Physics>Interplanetary Studies |
| Data Type | 1 | L2>Level 2 Data |
| Descriptor | 1 | swa-eas-onbmoms |
| Data Version | 1 | 01 |
| Software Version | 1 | 01.00.00 |
| PI Name | 1 | C. J. Owen |
| PI Affiliation | 1 | MSSL-UCL, University College London, UK |
| Instrument Type | 1 | Plasma and Solar Wind |
| Mission Group | 1 | Solar Orbiter |
| Logical Source | 1 | SWA\_L2\_swa-eas-onbmoms |
| Logical File id | 1 | solo\_L2\_swa-eas-onbmoms \_yyyymmddTHHMMSS-yyyymmddTHHMMSS\_V01 |
| Logical Source Description | 1 | SWA-EAS Onboard calculated Moments |
| Rules of Use | 1 | Consult with MSSL-UCL before using |
| Generated by | 1 | MSSL-UCL |
| Generation date | 1 | YYYY-MM-DDTHH:MN:SS |
| Mods | 1 | V01 First Version |
| Data Product | 1 | onbmoms>Onboard Moments |
| Level | 1 | L2>Level 2 Data |
| Instrument | 1 | SWA-EAS>Solar-Wind-Analyser-Electron-Analyser-System |

**Variables**

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Variable\_Name** | **Data\_type** | **DIMS** | **SIZES** | **R\_VARY** | **D\_VARY** |
| EPOCH | CDF\_TIME\_TT2000 | 1 | 1 | T | F |
| **Attribute Name** | **Data Type** | **Value** | | | |
| FIELDNAM | CDF\_CHAR | EAS[12] EPOCH | | | |
| CATDESC | CDF\_CHAR | Epoch in nano-seconds since J2000, encoded as Terrestrial Time on rotating Earth Geoid | | | |
| DISPLAY\_TYPE | CDF\_CHAR | time\_series | | | |
| FILLVAL | CDF\_INT8 | -9223372036854775807 | | | |
| LABLAXIS | CDF\_CHAR | EPOCH | | | |
| UNITS | CDF\_CHAR | ns | | | |
| VALIDMIN | CDF\_INT8 | 1577836800000000000 | | | |
| VALIDMAX | CDF\_INT8 | 1893456000000000000 | | | |
| SCALETYP | CDF\_CHAR | linear | | | |
| SCALEMIN | CDF\_INT8 | 1577836800000000000 | | | |
| SCALEMAX | CDF\_INT8 | 1893456000000000000 | | | |
| SI\_CONVERSION | CDF\_CHAR | 1>1e+09 s | | | |
| VAR\_TYPE | CDF\_CHAR | support\_data | | | |
| VAR\_NOTES | CDF\_CHAR | The EAS[12] time tag is from the centre of the acquisition interval which is 1 sec | | | |



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| **Variable\_Name** | **Data\_type** | **DIMS** | **SIZES** | **R\_VARY** | **D\_VARY** |
| SWA\_EAS\_Density | CDF\_REAL8 | 1 | 1 | T | F |
| **Attribute Name** | **Data Type** | **Value** | | | |
| FIELDNAM | CDF\_CHAR | Electron Density | | | |
| CATDESC | CDF\_CHAR | Electron Number Density | | | |
| COORDINATE\_SYSTEM | CDF\_CHAR | Solar Ecliptic | | | |
| DISPLAY\_TYPE | CDF\_CHAR | time\_series | | | |
| DEPEND\_0 | CDF\_CHAR | EPOCH | | | |
| FILLVAL | CDF\_REAL8 | -1E+31 | | | |
| FORMAT | CDF\_CHAR | f14.5 | | | |
| LABLAXIS | CDF\_CHAR | Density | | | |
| VALIDMIN | CDF\_REAL8 | 0 | | | |
| VALIDMAX | CDF\_REAL8 | 1E+3 | | | |
| SCALETYP | CDF\_CHAR | log | | | |
| SCALEMIN | CDF\_REAL8 | 0 | | | |
| SCALEMAX | CDF\_REAL8 | 1E+3 | | | |
| VAR\_TYPE | CDF\_CHAR | data | | | |
| UNITS | CDF\_CHAR | cm^-3 | | | |
| SI\_CONVERSION | CDF\_CHAR | 1E+06>m^-3 | | | |

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| **Variable\_Name** | **Data\_type** | **DIMS** | **SIZES** | **R\_VARY** | **D\_VARY** |
| SWA\_EAS\_SRF\_Velocity | CDF\_REAL8 | 1 | 3 | T | T |
| **Attribute Name** | **Data Type** | **Value** | | | |
| FIELDNAM | CDF\_CHAR | SWA\_EAS\_SRF\_Velocity | | | |
| CATDESC | CDF\_CHAR | Electron bulk velocity in Spacecraft reference frame | | | |
| COORDINATE\_SYSTEM | CDF\_CHAR | SOLO-SRF | | | |
| DISPLAY\_TYPE | CDF\_CHAR | time\_series | | | |
| DEPEND\_0 | CDF\_CHAR | EPOCH | | | |
| FILLVAL | CDF\_REAL8 | -1E+31 | | | |
| FORMAT | CDF\_CHAR | f14.4 | | | |
| LABL\_PTR\_1 | CDF\_CHAR | EAS\_VEL\_LABEL | | | |
| VALIDMIN | CDF\_REAL8 | -2000.0 | | | |
| VALIDMAX | CDF\_REAL8 | +2000.0 | | | |
| SCALETYP | CDF\_CHAR | linear | | | |
| SCALEMIN | CDF\_REAL8 | -2000.0 | | | |
| SCALEMAX | CDF\_REAL8 | +2000.0 | | | |
| VAR\_TYPE | CDF\_CHAR | data | | | |
| UNITS | CDF\_CHAR | km s^-1 | | | |
| SI\_CONVERSION | CDF\_CHAR | 1E+03>m s^-1 | | | |
| REPRESENTATION\_1 | CDF\_CHAR | REP\_VEL\_LABEL | | | |

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| **Variable\_Name** | **Data\_type** | **DIMS** | **SIZES** | **R\_VARY** | **D\_VARY** |
| SWA\_EAS\_RTN\_Velocity | CDF\_REAL8 | 1 | 3 | T | T |
| **Attribute Name** | **Data Type** | **Value** | | | |
| FIELDNAM | CDF\_CHAR | SWA\_EAS\_SRF\_Velocity | | | |
| CATDESC | CDF\_CHAR | Electron bulk velocity in RTN reference frame | | | |
| COORDINATE\_SYSTEM | CDF\_CHAR | SOLO-RTN | | | |
| DISPLAY\_TYPE | CDF\_CHAR | time\_series | | | |
| DEPEND\_0 | CDF\_CHAR | EPOCH | | | |
| FILLVAL | CDF\_REAL8 | -1E+31 | | | |
| FORMAT | CDF\_CHAR | f14.4 | | | |
| LABL\_PTR\_1 | CDF\_CHAR | EAS\_VEL\_LABEL | | | |
| VALIDMIN | CDF\_REAL8 | -2000.0 | | | |
| VALIDMAX | CDF\_REAL8 | +2000.0 | | | |
| SCALETYP | CDF\_CHAR | linear | | | |
| SCALEMIN | CDF\_REAL8 | -2000.0 | | | |
| SCALEMAX | CDF\_REAL8 | +2000.0 | | | |
| VAR\_TYPE | CDF\_CHAR | data | | | |
| UNITS | CDF\_CHAR | km s^-1 | | | |
| SI\_CONVERSION | CDF\_CHAR | 1E+03>m s^-1 | | | |
| REPRESENTATION\_1 | CDF\_CHAR | REP\_VEL\_LABEL | | | |

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| **Variable\_Name** | **Data\_type** | **DIMS** | **SIZES** | **R\_VARY** | **D\_VARY** |
| SWA\_EAS\_SRF\_Pressure | CDF\_REAL8 | 1 | 9 | T | T |
| **Attribute Name** | **Data Type** | **Value** | | | |
| FIELDNAM | CDF\_CHAR | SWA\_EAS\_SRF\_Pressure | | | |
| CATDESC | CDF\_CHAR | Electron Pressure tensor in spacecraft reference frame | | | |
| COORDINATE\_SYSTEM | CDF\_CHAR | SOLO-SRF | | | |
| DISPLAY\_TYPE | CDF\_CHAR | time\_series | | | |
| DEPEND\_0 | CDF\_CHAR | EPOCH | | | |
| FILLVAL | CDF\_REAL8 | -1E+31 | | | |
| FORMAT | CDF\_CHAR | f14.4 | | | |
| LABLAXIS | CDF\_CHAR | Pressure | | | |
| VALIDMIN | CDF\_REAL8 | 1E-6 | | | |
| VALIDMAX | CDF\_REAL8 | 1E+3 | | | |
| SCALETYP | CDF\_CHAR | Log | | | |
| SCALEMIN | CDF\_REAL8 | 1E-6 | | | |
| SCALEMAX | CDF\_REAL8 | 1E+3 | | | |
| VAR\_TYPE | CDF\_CHAR | data | | | |
| UNITS | CDF\_CHAR | nPa | | | |
| SI\_CONVERSION | CDF\_CHAR | 1E-09>P | | | |
| REPRESENTATION\_1 | CDF\_CHAR | REP\_EAS\_PRES\_1 | | | |
| REPRESENTATION\_2 | CDF\_CHAR | REP\_EAS\_PRES\_2 | | | |

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| **Variable\_Name** | **Data\_type** | **DIMS** | **SIZES** | **R\_VARY** | **D\_VARY** |
| SWA\_EAS\_RTN\_Pressure | CDF\_REAL8 | 1 | 9 | T | T |
| **Attribute Name** | **Data Type** | **Value** | | | |
| FIELDNAM | CDF\_CHAR | SWA\_EAS\_RTN\_Pressure | | | |
| CATDESC | CDF\_CHAR | Electron Pressure tensor in RTN reference frame | | | |
| COORDINATE\_SYSTEM | CDF\_CHAR | SOLO-RTN | | | |
| DISPLAY\_TYPE | CDF\_CHAR | time\_series | | | |
| DEPEND\_0 | CDF\_CHAR | EPOCH | | | |
| FILLVAL | CDF\_REAL8 | -1E+31 | | | |
| FORMAT | CDF\_CHAR | f14.4 | | | |
| LABLAXIS | CDF\_CHAR | Pressure | | | |
| VALIDMIN | CDF\_REAL8 | 1E-6 | | | |
| VALIDMAX | CDF\_REAL8 | 1E+3 | | | |
| SCALETYP | CDF\_CHAR | Log | | | |
| SCALEMIN | CDF\_REAL8 | 1E-6 | | | |
| SCALEMAX | CDF\_REAL8 | 1E+3 | | | |
| VAR\_TYPE | CDF\_CHAR | data | | | |
| UNITS | CDF\_CHAR | nPa | | | |
| SI\_CONVERSION | CDF\_CHAR | 1E-09>P | | | |
| REPRESENTATION\_1 | CDF\_CHAR | REP\_EAS\_PRES\_1 | | | |
| REPRESENTATION\_2 | CDF\_CHAR | REP\_EAS\_PRES\_2 | | | |

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| **Variable\_Name** | **Data\_type** | **DIMS** | **SIZES** | **R\_VARY** | **D\_VARY** |
| SWA\_EAS1\_SRF\_Heatflux | CDF\_REAL8 | 1 | 3 | T | T |
| **Attribute Name** | **Data Type** | **Value** | | | |
| FIELDNAM | CDF\_CHAR | SWA\_EAS1\_SRF\_Heatflux | | | |
| CATDESC | CDF\_CHAR | Electron Heat Flux in spacecraft reference frame | | | |
| COORDINATE\_SYSTEM | CDF\_CHAR | SOLO-SRF | | | |
| DISPLAY\_TYPE | CDF\_CHAR | time\_series | | | |
| DEPEND\_0 | CDF\_CHAR | EPOCH | | | |
| FILLVAL | CDF\_REAL8 | -1E+31 | | | |
| FORMAT | CDF\_CHAR | f14.4 | | | |
| LABL\_PTR\_1 | CDF\_CHAR | EAS\_HFlux\_LABEL | | | |
| VALIDMIN | CDF\_REAL8 | 1E-05 | | | |
| VALIDMAX | CDF\_REAL8 | 1E+05 | | | |
| SCALETYP | CDF\_CHAR | log | | | |
| SCALEMIN | CDF\_REAL8 | 1E-05 | | | |
| SCALEMAX | CDF\_REAL8 | 1E+05 | | | |
| VAR\_TYPE | CDF\_CHAR | data | | | |
| UNITS | CDF\_CHAR | erg s^-1 cm^-2 | | | |
| SI\_CONVERSION | CDF\_CHAR | 1E-03>J s^-1 m^-2 | | | |
| REPRESENTATION\_1 | CDF\_CHAR | REP\_HFlux\_LABEL | | | |

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| **Variable\_Name** | **Data\_type** | **DIMS** | **SIZES** | **R\_VARY** | **D\_VARY** |
| SWA\_EAS1\_RTN\_Heatflux | CDF\_REAL8 | 1 | 3 | T | T |
| **Attribute Name** | **Data Type** | **Value** | | | |
| FIELDNAM | CDF\_CHAR | SWA\_EAS1\_RTN\_Heatflux | | | |
| CATDESC | CDF\_CHAR | Electron Heat Flux in RTN reference frame | | | |
| COORDINATE\_SYSTEM | CDF\_CHAR | SOLO-RTN | | | |
| DISPLAY\_TYPE | CDF\_CHAR | time\_series | | | |
| DEPEND\_0 | CDF\_CHAR | EPOCH | | | |
| FILLVAL | CDF\_REAL8 | -1E+31 | | | |
| FORMAT | CDF\_CHAR | f14.4 | | | |
| LABL\_PTR\_1 | CDF\_CHAR | EAS\_HFlux\_LABEL | | | |
| VALIDMIN | CDF\_REAL8 | 1E-05 | | | |
| VALIDMAX | CDF\_REAL8 | 1E+05 | | | |
| SCALETYP | CDF\_CHAR | log | | | |
| SCALEMIN | CDF\_REAL8 | 1E-05 | | | |
| SCALEMAX | CDF\_REAL8 | 1E+05 | | | |
| VAR\_TYPE | CDF\_CHAR | data | | | |
| UNITS | CDF\_CHAR | erg s^-1 cm^-2 | | | |
| SI\_CONVERSION | CDF\_CHAR | 1E-03>J s^-1 m^-2 | | | |
| REPRESENTATION\_1 | CDF\_CHAR | REP\_HFlux\_LABEL | | | |

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| --- | --- | --- | --- | --- | --- |
| **Variable\_Name** | **Data\_type** | **DIMS** | **SIZES** | **R\_VARY** | **D\_VARY** |
| REP\_VEL\_LABEL | CDF\_CHAR | 1 | 3 | F | F |
|  |  |  | | | |
| **Attribute Name** | **Data Type** | **Value** | | | |
| FIELDNAM | CDF\_CHAR | Vector Representation for Velocity | | | |
| CATDESC | CDF\_CHAR | The vector representation for the velocity vector [‘x’,’y’,’z’] | | | |
| FORMAT | CDF\_CHAR | A1 | | | |
| VAR\_TYPE | CDF\_CHAR | support\_data | | | |

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| **Variable\_Name** | **Data\_type** | **DIMS** | **SIZES** | **R\_VARY** | **D\_VARY** |
| REP\_HFlux\_LABEL | CDF\_CHAR | 1 | 3 | F | F |
|  |  |  | | | |
| **Attribute Name** | **Data Type** | **Value** | | | |
| FIELDNAM | CDF\_CHAR | Vector Representation for Heat flux | | | |
| CATDESC | CDF\_CHAR | The vector representation for the Heat flux vector [‘x’,’y’,’z’] | | | |
| FORMAT | CDF\_CHAR | A1 | | | |
| VAR\_TYPE | CDF\_CHAR | support\_data | | | |

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| **Variable\_Name** | **Data\_type** | **DIMS** | **SIZES** | **R\_VARY** | **D\_VARY** |
| REP\_EAS\_PRES\_1 | CDF\_CHAR | 1 | 3 | F | F |
|  |  |  | | | |
| **Attribute Name** | **Data Type** | **Value** | | | |
| FIELDNAM | CDF\_CHAR | Vector Representation for Rows of Pressure Tensor | | | |
| CATDESC | CDF\_CHAR | The vector representation for the rows of the pressure tensor [‘x’,’y’,’z’] | | | |
| FORMAT | CDF\_CHAR | A1 | | | |
| VAR\_TYPE | CDF\_CHAR | support\_data | | | |

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| --- | --- | --- | --- | --- | --- |
| **Variable\_Name** | **Data\_type** | **DIMS** | **SIZES** | **R\_VARY** | **D\_VARY** |
| REP\_EAS\_PRES\_2 | CDF\_CHAR | 1 | 3 | F | F |
|  |  |  | | | |
| **Attribute Name** | **Data Type** | **Value** | | | |
| FIELDNAM | CDF\_CHAR | Vector Representation for Columns of the Pressure Tensor | | | |
| CATDESC | CDF\_CHAR | The vector representation for the columns of the pressure tensor [‘x’,’y’,’z’] | | | |
| FORMAT | CDF\_CHAR | A1 | | | |
| VAR\_TYPE | CDF\_CHAR | support\_data | | | |

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Variable\_Name** | **Data\_type** | **DIMS** | **SIZES** | **R\_VARY** | **D\_VARY** |
| QUALITY\_FLAG | CDF\_UINT1 | 1 | 1 | T | F |
| **Attribute Name** | **Data Type** | **Value** | | | |
| FIELDNAM | CDF\_CHAR | EAS1 Data Quality | | | |
| CATDESC | CDF\_CHAR | EAS1 Data Quality flag | | | |
| DISPLAY\_TYPE | CDF\_CHAR | time\_series | | | |
| DEPEND\_0 | CDF\_CHAR | EPOCH | | | |
| FILLVAL | CDF\_UINT4 | 255 | | | |
| LABLAXIS | CDF\_CHAR | EAS1 data quality | | | |
| VALIDMIN | CDF\_UINT4 | 0 | | | |
| VALIDMAX | CDF\_UINT4 | 4 | | | |
| SCALETYP | CDF\_CHAR | linear | | | |
| SCALEMIN | CDF\_UINT4 | 0 | | | |
| SCALEMAX | CDF\_UINT4 | 4 | | | |
| VAR\_TYPE | CDF\_CHAR | support\_data | | | |

##### Normal Mode EAS Ground Moments

This file contains the ground calculated electron moments data product from EAS Nominal mode electron distributions. The file format is .cdf.

**Filename**:solo\_L2\_swa-eas-NM-GrndMoms\_[StartTime-EndTime]\_V??.cdf

**Expected data volume and time resolution**: This file contains electron moments data between the start time and end times mentioned in the file name. The start and end times are in UT. The time resolution of data in this file follows the resolution of nominal mode electron distributions.

**Global Attributes**

|  |  |  |
| --- | --- | --- |
| **Name** | **Entry** | **Value** |
| Project | 1 | Solar Orbiter |
| Project | 2 | Cosmic Visions |
| Source Name | 1 | SOLO>Solar Orbiter |
| Discipline | 1 | Space Physics>Interplanetary Studies |
| Data Type | 1 | L2>Level 2 Data |
| Descriptor | 1 | SWA-EAS-NM-GrndMoms |
| Data Version | 1 | 01 |
| Software Version | 1 | 01.00.00 |
| PI Name | 1 | C. J. Owen |
| PI Affiliation | 1 | MSSL-UCL, University College London, UK |
| Instrument Type | 1 | Plasma and Solar Wind |
| Mission Group | 1 | Solar Orbiter |
| Logical Source | 1 | solo\_L2\_swa-eas-NM-GrndMoms |
| Logical File id | 1 | solo\_L2\_swa-eas-NM-GrndMoms \_yyyymmddTHHMMSS-yyyymmddTHHMMSS\_V01 |
| Logical Source Description | 1 | SWA-EAS Onboard calculated Moments |
| Rules of Use | 1 | Current best quality data – see caveats file or contact SWA/EAS team for information on use |
| Generated by | 1 | MSSL-UCL |
| Generation date | 1 | YYYY-MM-DDTHH:MN:SS |
| Mods | 1 | V01 First Version |
| Data Product | 1 | NM-GrndMoms>Normal Mode - Ground Moments |
| Level | 1 | L2>Level 2 Data |
| Instrument | 1 | SWA-EAS>Solar-Wind-Analyser-Electron-Analyser-System |

**Variables**

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Variable\_Name** | **Data\_type** | **DIMS** | **SIZES** | **R\_VARY** | **D\_VARY** |
| EPOCH | CDF\_TIME\_TT2000 | 1 | 1 | T | F |
| **Attribute Name** | **Data Type** | **Value** | | | |
| FIELDNAM | CDF\_CHAR | EAS[12] EPOCH | | | |
| CATDESC | CDF\_CHAR | Epoch in nano-seconds since J2000, encoded as Terrestrial Time on rotating Earth Geoid | | | |
| DISPLAY\_TYPE | CDF\_CHAR | time\_series | | | |
| FILLVAL | CDF\_INT8 | -9223372036854775807 | | | |
| LABLAXIS | CDF\_CHAR | EPOCH | | | |
| UNITS | CDF\_CHAR | ns | | | |
| VALIDMIN | CDF\_INT8 | 1577836800000000000 | | | |
| VALIDMAX | CDF\_INT8 | 1893456000000000000 | | | |
| SCALETYP | CDF\_CHAR | linear | | | |
| SCALEMIN | CDF\_INT8 | 1577836800000000000 | | | |
| SCALEMAX | CDF\_INT8 | 1893456000000000000 | | | |
| SI\_CONVERSION | CDF\_CHAR | 1>1e+09 s | | | |
| VAR\_TYPE | CDF\_CHAR | support\_data | | | |
| VAR\_NOTES | CDF\_CHAR | The EAS[12] time tag is from the centre of the acquisition interval which is 1 sec | | | |

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Variable\_Name** | **Data\_type** | **DIMS** | **SIZES** | **R\_VARY** | **D\_VARY** |
| SWA\_EAS\_SCPotential | CDF\_REAL8 | 1 | 1 | T | T |
| **Attribute Name** | **Data Type** | **Value** | | | |
| FIELDNAM | CDF\_CHAR | Spacecraft Potential | | | |
| CATDESC | CDF\_CHAR | Spacecraft Potential used to discard lowest energies | | | |
| DISPLAY\_TYPE | CDF\_CHAR | time\_series | | | |
| DEPEND\_0 | CDF\_CHAR | EPOCH | | | |
| FILLVAL | CDF\_REAL8 | -1E+31 | | | |
| FORMAT | CDF\_CHAR | F14.4 | | | |
| LABLAXIS | CDF\_CHAR | Spacecraft Potential | | | |
| VALIDMIN | CDF\_UINT4 | -100.0 | | | |
| VALIDMAX | CDF\_UINT4 | 100.0 | | | |
| SCALETYP | CDF\_CHAR | linear | | | |
| SCALEMIN | CDF\_UINT4 | -100.0 | | | |
| SCALEMAX | CDF\_UINT4 | 100.0 | | | |
| VAR\_TYPE | CDF\_CHAR | data | | | |
| UNITS | CDF\_CHAR | Volts | | | |
| SI\_CONVERSION | CDF\_CHAR | > | | | |

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Variable\_Name** | **Data\_type** | **DIMS** | **SIZES** | **R\_VARY** | **D\_VARY** |
| SWA\_EAS\_N | CDF\_REAL8 | 1 | 1 | T | F |
| **Attribute Name** | **Data Type** | **Value** | | | |
| FIELDNAM | CDF\_CHAR | Electron Density | | | |
| CATDESC | CDF\_CHAR | Electron Number Density | | | |
| COORDINATE\_SYSTEM | CDF\_CHAR | Solar Ecliptic | | | |
| DISPLAY\_TYPE | CDF\_CHAR | time\_series | | | |
| DEPEND\_0 | CDF\_CHAR | EPOCH | | | |
| FILLVAL | CDF\_REAL8 | -1E+31 | | | |
| FORMAT | CDF\_CHAR | f14.4 | | | |
| LABLAXIS | CDF\_CHAR | Density | | | |
| VALIDMIN | CDF\_UINT4 | 1E-9 | | | |
| VALIDMAX | CDF\_UINT4 | 1E+3 | | | |
| SCALETYP | CDF\_CHAR | log | | | |
| SCALEMIN | CDF\_UINT4 | 1E-9 | | | |
| SCALEMAX | CDF\_UINT4 | 1E+3 | | | |
| VAR\_TYPE | CDF\_CHAR | data | | | |
| UNITS | CDF\_CHAR | cm^-3 | | | |
| SI\_CONVERSION | CDF\_CHAR | 1E-06>m^-3 | | | |

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Variable\_Name** | **Data\_type** | **DIMS** | **SIZES** | **R\_VARY** | **D\_VARY** |
| SWA\_EAS\_Velocity | CDF\_REAL8 | 1 | 3 | T | T |
| **Attribute Name** | **Data Type** | **Value** | | | |
| FIELDNAM | CDF\_CHAR | Electron bulk Velocity | | | |
| CATDESC | CDF\_CHAR | Bulk velocity of electrons | | | |
| COORDINATE\_SYSTEM | CDF\_CHAR | Solar Ecliptic | | | |
| DISPLAY\_TYPE | CDF\_CHAR | time\_series | | | |
| DEPEND\_0 | CDF\_CHAR | EPOCH | | | |
| FILLVAL | CDF\_REAL8 | -1E+31 | | | |
| FORMAT | CDF\_CHAR | f14.4 | | | |
| LABL\_PTR\_1 | CDF\_CHAR | EAS\_VEL\_LABEL | | | |
| VALIDMIN | CDF\_REAL8 | -10000.0 | | | |
| VALIDMAX | CDF\_REAL8 | +10000.0 | | | |
| SCALETYP | CDF\_CHAR | log | | | |
| SCALEMIN | CDF\_REAL8 | -10000.0 | | | |
| SCALEMAX | CDF\_REAL8 | +10000.0 | | | |
| VAR\_TYPE | CDF\_CHAR | data | | | |
| UNITS | CDF\_CHAR | km s^-1 | | | |
| SI\_CONVERSION | CDF\_CHAR | 1E+03>m s^-1 | | | |
| REPRESENTATION\_1 | CDF\_CHAR | REP\_VEL\_LABEL | | | |

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Variable\_Name** | **Data\_type** | **DIMS** | **SIZES** | **R\_VARY** | **D\_VARY** |
| SWA\_EAS\_Pressure | CDF\_REAL8 | 1 | 9 | T | T |
| **Attribute Name** | **Data Type** | **Value** | | | |
| FIELDNAM | CDF\_CHAR | Electron Pressure | | | |
| CATDESC | CDF\_CHAR | Electron Pressure tensor | | | |
| COORDINATE\_SYSTEM | CDF\_CHAR | Solar Ecliptic | | | |
| DISPLAY\_TYPE | CDF\_CHAR | time\_series | | | |
| DEPEND\_0 | CDF\_CHAR | EPOCH | | | |
| FILLVAL | CDF\_REAL8 | -1E+31 | | | |
| FORMAT | CDF\_CHAR | f14.4 | | | |
| LABLAXIS | CDF\_CHAR | Pressure | | | |
| VALIDMIN | CDF\_REAL8 | 1E-6 | | | |
| VALIDMAX | CDF\_REAL8 | 1E+3 | | | |
| SCALETYP | CDF\_CHAR | Log | | | |
| SCALEMIN | CDF\_REAL8 | 1E-6 | | | |
| SCALEMAX | CDF\_REAL8 | 1E+3 | | | |
| VAR\_TYPE | CDF\_CHAR | data | | | |
| UNITS | CDF\_CHAR | nPa | | | |
| SI\_CONVERSION | CDF\_CHAR | 1E-09>P | | | |
| REPRESENTATION\_1 | CDF\_CHAR | REP\_EAS\_PRES\_1 | | | |
| REPRESENTATION\_2 | CDF\_CHAR | REP\_EAS\_PRES\_2 | | | |

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Variable\_Name** | **Data\_type** | **DIMS** | **SIZES** | **R\_VARY** | **D\_VARY** |
| SWA\_EAS1\_Heatflux | CDF\_REAL8 | 1 | 3 | T | T |
| **Attribute Name** | **Data Type** | **Value** | | | |
| FIELDNAM | CDF\_CHAR | Electron Heat Flux | | | |
| CATDESC | CDF\_CHAR | Electron Heat Flux | | | |
| COORDINATE\_SYSTEM | CDF\_CHAR | Solar Ecliptic | | | |
| DISPLAY\_TYPE | CDF\_CHAR | time\_series | | | |
| DEPEND\_0 | CDF\_CHAR | EPOCH | | | |
| FILLVAL | CDF\_REAL8 | -1E+31 | | | |
| FORMAT | CDF\_CHAR | f14.4 | | | |
| LABL\_PTR\_1 | CDF\_CHAR | EAS\_HFlux\_LABEL | | | |
| VALIDMIN | CDF\_REAL8 | 1E-05 | | | |
| VALIDMAX | CDF\_REAL8 | 1E+05 | | | |
| SCALETYP | CDF\_CHAR | log | | | |
| SCALEMIN | CDF\_REAL8 | 1E-05 | | | |
| SCALEMAX | CDF\_REAL8 | 1E+05 | | | |
| VAR\_TYPE | CDF\_CHAR | data | | | |
| UNITS | CDF\_CHAR | erg s^-1 cm^-2 | | | |
| SI\_CONVERSION | CDF\_CHAR | 1E-03>J s^-1 m^-2 | | | |
| REPRESENTATION\_1 | CDF\_CHAR | REP\_HFlux\_LABEL | | | |

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Variable\_Name** | **Data\_type** | **DIMS** | **SIZES** | **R\_VARY** | **D\_VARY** |
| REP\_VEL\_LABEL | CDF\_CHAR | 1 | 3 | F | F |
|  |  |  | | | |
| **Attribute Name** | **Data Type** | **Value** | | | |
| FIELDNAM | CDF\_CHAR | Vector Representation for Velocity | | | |
| CATDESC | CDF\_CHAR | The vector representation for the velocity vector [‘x’,’y’,’z’] | | | |
| FORMAT | CDF\_CHAR | A1 | | | |
| VAR\_TYPE | CDF\_CHAR | support\_data | | | |

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Variable\_Name** | **Data\_type** | **DIMS** | **SIZES** | **R\_VARY** | **D\_VARY** |
| REP\_HFlux\_LABEL | CDF\_CHAR | 1 | 3 | F | F |
|  |  |  | | | |
| **Attribute Name** | **Data Type** | **Value** | | | |
| FIELDNAM | CDF\_CHAR | Vector Representation for Heat flux | | | |
| CATDESC | CDF\_CHAR | The vector representation for the Heat flux vector [‘x’,’y’,’z’] | | | |
| FORMAT | CDF\_CHAR | A1 | | | |
| VAR\_TYPE | CDF\_CHAR | support\_data | | | |

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Variable\_Name** | **Data\_type** | **DIMS** | **SIZES** | **R\_VARY** | **D\_VARY** |
| REP\_EAS\_PRES\_1 | CDF\_CHAR | 1 | 3 | F | F |
|  |  |  | | | |
| **Attribute Name** | **Data Type** | **Value** | | | |
| FIELDNAM | CDF\_CHAR | Vector Representation for Rows of Pressure Tensor | | | |
| CATDESC | CDF\_CHAR | The vector representation for the rows of the pressure tensor [‘x’,’y’,’z’] | | | |
| FORMAT | CDF\_CHAR | A1 | | | |
| VAR\_TYPE | CDF\_CHAR | support\_data | | | |

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Variable\_Name** | **Data\_type** | **DIMS** | **SIZES** | **R\_VARY** | **D\_VARY** |
| REP\_EAS\_PRES\_2 | CDF\_CHAR | 1 | 3 | F | F |
|  |  |  | | | |
| **Attribute Name** | **Data Type** | **Value** | | | |
| FIELDNAM | CDF\_CHAR | Vector Representation for Columns of the Pressure Tensor | | | |
| CATDESC | CDF\_CHAR | The vector representation for the columns of the pressure tensor [‘x’,’y’,’z’] | | | |
| FORMAT | CDF\_CHAR | A1 | | | |
| VAR\_TYPE | CDF\_CHAR | support\_data | | | |

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Variable\_Name** | **Data\_type** | **DIMS** | **SIZES** | **R\_VARY** | **D\_VARY** |
| QUALITY\_FLAG | CDF\_UINT1 | 1 | 1 | T | F |
| **Attribute Name** | **Data Type** | **Value** | | | |
| FIELDNAM | CDF\_CHAR | EAS1 Data Quality | | | |
| CATDESC | CDF\_CHAR | EAS1 Data Quality flag | | | |
| DISPLAY\_TYPE | CDF\_CHAR | time\_series | | | |
| DEPEND\_0 | CDF\_CHAR | EPOCH | | | |
| FILLVAL | CDF\_UINT4 | 255 | | | |
| LABLAXIS | CDF\_CHAR | EAS1 data quality | | | |
| VALIDMIN | CDF\_UINT4 | 0 | | | |
| VALIDMAX | CDF\_UINT4 | 4 | | | |
| SCALETYP | CDF\_CHAR | linear | | | |
| SCALEMIN | CDF\_UINT4 | 0 | | | |
| SCALEMAX | CDF\_UINT4 | 4 | | | |
| VAR\_TYPE | CDF\_CHAR | support\_data | | | |

##### Trigger Mode EAS Ground Moments

This file contains the ground calculated electron moments data product from EAS Trigger mode electron distributions. The file format is .cdf.

**Filename**:solo\_L2\_swa-eas-TM-GrndMoms\_[StartTime-EndTime]\_V??.cdf

**Expected data volume and time resolution**: This file contains electron moments data between the start time and end times mentioned in the file name. The start and end times are in UT. The time resolution of data in this file is 1 second and the number of records depend on the number of triggers on a given day.

**Global Attributes**

|  |  |  |
| --- | --- | --- |
| **Name** | **Entry** | **Value** |
| Project | 1 | Solar Orbiter |
| Project | 2 | Cosmic Visions |
| Source Name | 1 | SOLO>Solar Orbiter |
| Discipline | 1 | Space Physics>Interplanetary Studies |
| Data Type | 1 | L2>Level 2 Data |
| Descriptor | 1 | SWA-EAS-TM-GrndMoms |
| Data Version | 1 | 01 |
| Software Version | 1 | 01.00.00 |
| PI Name | 1 | C. J. Owen |
| PI Affiliation | 1 | MSSL-UCL, University College London, UK |
| Instrument Type | 1 | Plasma and Solar Wind |
| Mission Group | 1 | Solar Orbiter |
| Logical Source | 1 | solo\_L2\_swa-eas-TM-GrndMoms |
| Logical File id | 1 | solo\_L2\_swa-eas-TM-GrndMoms \_yyyymmddTHHMMSS-yyyymmddTHHMMSS\_V01 |
| Logical Source Description | 1 | SWA-EAS ground calculated Moments |
| Rules of Use | 1 | Current best quality data – see caveats file or contact SWA/EAS team for information on use |
| Generated by | 1 | MSSL-UCL |
| Generation date | 1 | YYYY-MM-DDTHH:MN:SS |
| Mods | 1 | V01 First Version |
| Data Product | 1 | NM-GrndMoms>Trigger Mode - Ground Moments |
| Level | 1 | L2>Level 2 Data |
| Instrument | 1 | SWA-EAS>Solar-Wind-Analyser-Electron-Analyser-System |

**Variables**

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Variable\_Name** | **Data\_type** | **DIMS** | **SIZES** | **R\_VARY** | **D\_VARY** |
| EPOCH | CDF\_TIME\_TT2000 | 1 | 1 | T | F |
| **Attribute Name** | **Data Type** | **Value** | | | |
| FIELDNAM | CDF\_CHAR | EAS[12] EPOCH | | | |
| CATDESC | CDF\_CHAR | Epoch in nano-seconds since J2000, encoded as Terrestrial Time on rotating Earth Geoid | | | |
| DISPLAY\_TYPE | CDF\_CHAR | time\_series | | | |
| FILLVAL | CDF\_INT8 | -9223372036854775807 | | | |
| LABLAXIS | CDF\_CHAR | EPOCH | | | |
| UNITS | CDF\_CHAR | ns | | | |
| VALIDMIN | CDF\_INT8 | 1577836800000000000 | | | |
| VALIDMAX | CDF\_INT8 | 1893456000000000000 | | | |
| SCALETYP | CDF\_CHAR | linear | | | |
| SCALEMIN | CDF\_INT8 | 1577836800000000000 | | | |
| SCALEMAX | CDF\_INT8 | 1893456000000000000 | | | |
| SI\_CONVERSION | CDF\_CHAR | 1>1e+09 s | | | |
| VAR\_TYPE | CDF\_CHAR | support\_data | | | |
| VAR\_NOTES | CDF\_CHAR | The EAS[12] time tag is from the centre of the acquisition interval which is 1 sec | | | |

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Variable\_Name** | **Data\_type** | **DIMS** | **SIZES** | **R\_VARY** | **D\_VARY** |
| SWA\_EAS\_SCPotential | CDF\_REAL8 | 1 | 1 | T | T |
| **Attribute Name** | **Data Type** | **Value** | | | |
| FIELDNAM | CDF\_CHAR | Spacecraft Potential | | | |
| CATDESC | CDF\_CHAR | Spacecraft Potential used to discard lowest energies | | | |
| DISPLAY\_TYPE | CDF\_CHAR | time\_series | | | |
| DEPEND\_0 | CDF\_CHAR | EPOCH | | | |
| FILLVAL | CDF\_REAL8 | -1E+31 | | | |
| FORMAT | CDF\_CHAR | F14.4 | | | |
| LABLAXIS | CDF\_CHAR | Spacecraft Potential | | | |
| VALIDMIN | CDF\_UINT4 | -100.0 | | | |
| VALIDMAX | CDF\_UINT4 | 100.0 | | | |
| SCALETYP | CDF\_CHAR | linear | | | |
| SCALEMIN | CDF\_UINT4 | -100.0 | | | |
| SCALEMAX | CDF\_UINT4 | 100.0 | | | |
| VAR\_TYPE | CDF\_CHAR | data | | | |
| UNITS | CDF\_CHAR | Volts | | | |
| SI\_CONVERSION | CDF\_CHAR | > | | | |

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Variable\_Name** | **Data\_type** | **DIMS** | **SIZES** | **R\_VARY** | **D\_VARY** |
| SWA\_EAS\_N | CDF\_REAL8 | 1 | 1 | T | F |
| **Attribute Name** | **Data Type** | **Value** | | | |
| FIELDNAM | CDF\_CHAR | Electron Density | | | |
| CATDESC | CDF\_CHAR | Electron Number Density | | | |
| COORDINATE\_SYSTEM | CDF\_CHAR | Solar Ecliptic | | | |
| DISPLAY\_TYPE | CDF\_CHAR | time\_series | | | |
| DEPEND\_0 | CDF\_CHAR | EPOCH | | | |
| FILLVAL | CDF\_REAL8 | -1E+31 | | | |
| FORMAT | CDF\_CHAR | f14.4 | | | |
| LABLAXIS | CDF\_CHAR | Density | | | |
| VALIDMIN | CDF\_UINT4 | 1E-9 | | | |
| VALIDMAX | CDF\_UINT4 | 1E+3 | | | |
| SCALETYP | CDF\_CHAR | log | | | |
| SCALEMIN | CDF\_UINT4 | 1E-9 | | | |
| SCALEMAX | CDF\_UINT4 | 1E+3 | | | |
| VAR\_TYPE | CDF\_CHAR | data | | | |
| UNITS | CDF\_CHAR | cm^-3 | | | |
| SI\_CONVERSION | CDF\_CHAR | 1E-06>m^-3 | | | |

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Variable\_Name** | **Data\_type** | **DIMS** | **SIZES** | **R\_VARY** | **D\_VARY** |
| SWA\_EAS\_Velocity | CDF\_REAL8 | 1 | 3 | T | T |
| **Attribute Name** | **Data Type** | **Value** | | | |
| FIELDNAM | CDF\_CHAR | Electron bulk Velocity | | | |
| CATDESC | CDF\_CHAR | Bulk velocity of electrons | | | |
| COORDINATE\_SYSTEM | CDF\_CHAR | Solar Ecliptic | | | |
| DISPLAY\_TYPE | CDF\_CHAR | time\_series | | | |
| DEPEND\_0 | CDF\_CHAR | EPOCH | | | |
| FILLVAL | CDF\_REAL8 | -1E+31 | | | |
| FORMAT | CDF\_CHAR | f14.4 | | | |
| LABL\_PTR\_1 | CDF\_CHAR | EAS\_VEL\_LABEL | | | |
| VALIDMIN | CDF\_REAL8 | -10000.0 | | | |
| VALIDMAX | CDF\_REAL8 | +10000.0 | | | |
| SCALETYP | CDF\_CHAR | log | | | |
| SCALEMIN | CDF\_REAL8 | -10000.0 | | | |
| SCALEMAX | CDF\_REAL8 | +10000.0 | | | |
| VAR\_TYPE | CDF\_CHAR | data | | | |
| UNITS | CDF\_CHAR | km s^-1 | | | |
| SI\_CONVERSION | CDF\_CHAR | 1E+03>m s^-1 | | | |
| REPRESENTATION\_1 | CDF\_CHAR | REP\_VEL\_LABEL | | | |

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Variable\_Name** | **Data\_type** | **DIMS** | **SIZES** | **R\_VARY** | **D\_VARY** |
| SWA\_EAS\_Pressure | CDF\_REAL8 | 1 | 9 | T | T |
| **Attribute Name** | **Data Type** | **Value** | | | |
| FIELDNAM | CDF\_CHAR | Electron Pressure | | | |
| CATDESC | CDF\_CHAR | Electron Pressure tensor | | | |
| COORDINATE\_SYSTEM | CDF\_CHAR | Solar Ecliptic | | | |
| DISPLAY\_TYPE | CDF\_CHAR | time\_series | | | |
| DEPEND\_0 | CDF\_CHAR | EPOCH | | | |
| FILLVAL | CDF\_REAL8 | -1E+31 | | | |
| FORMAT | CDF\_CHAR | f14.4 | | | |
| LABLAXIS | CDF\_CHAR | Pressure | | | |
| VALIDMIN | CDF\_REAL8 | 1E-6 | | | |
| VALIDMAX | CDF\_REAL8 | 1E+3 | | | |
| SCALETYP | CDF\_CHAR | Log | | | |
| SCALEMIN | CDF\_REAL8 | 1E-6 | | | |
| SCALEMAX | CDF\_REAL8 | 1E+3 | | | |
| VAR\_TYPE | CDF\_CHAR | data | | | |
| UNITS | CDF\_CHAR | nPa | | | |
| SI\_CONVERSION | CDF\_CHAR | 1E-09>P | | | |
| REPRESENTATION\_1 | CDF\_CHAR | REP\_EAS\_PRES\_1 | | | |
| REPRESENTATION\_2 | CDF\_CHAR | REP\_EAS\_PRES\_2 | | | |

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Variable\_Name** | **Data\_type** | **DIMS** | **SIZES** | **R\_VARY** | **D\_VARY** |
| SWA\_EAS1\_Heatflux | CDF\_REAL8 | 1 | 3 | T | T |
| **Attribute Name** | **Data Type** | **Value** | | | |
| FIELDNAM | CDF\_CHAR | Electron Heat Flux | | | |
| CATDESC | CDF\_CHAR | Electron Heat Flux | | | |
| COORDINATE\_SYSTEM | CDF\_CHAR | Solar Ecliptic | | | |
| DISPLAY\_TYPE | CDF\_CHAR | time\_series | | | |
| DEPEND\_0 | CDF\_CHAR | SWA\_EAS\_EPOCH | | | |
| FILLVAL | CDF\_REAL8 | -1E+31 | | | |
| FORMAT | CDF\_CHAR | f14.4 | | | |
| LABL\_PTR\_1 | CDF\_CHAR | EAS\_HFlux\_LABEL | | | |
| VALIDMIN | CDF\_REAL8 | 1E-05 | | | |
| VALIDMAX | CDF\_REAL8 | 1E+05 | | | |
| SCALETYP | CDF\_CHAR | log | | | |
| SCALEMIN | CDF\_REAL8 | 1E-05 | | | |
| SCALEMAX | CDF\_REAL8 | 1E+05 | | | |
| VAR\_TYPE | CDF\_CHAR | data | | | |
| UNITS | CDF\_CHAR | erg s^-1 cm^-2 | | | |
| SI\_CONVERSION | CDF\_CHAR | 1E-03>J s^-1 m^-2 | | | |
| REPRESENTATION\_1 | CDF\_CHAR | REP\_HFlux\_LABEL | | | |

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Variable\_Name** | **Data\_type** | **DIMS** | **SIZES** | **R\_VARY** | **D\_VARY** |
| REP\_VEL\_LABEL | CDF\_CHAR | 1 | 3 | F | F |
|  |  |  | | | |
| **Attribute Name** | **Data Type** | **Value** | | | |
| FIELDNAM | CDF\_CHAR | Vector Representation for Velocity | | | |
| CATDESC | CDF\_CHAR | The vector representation for the velocity vector [‘x’,’y’,’z’] | | | |
| FORMAT | CDF\_CHAR | A1 | | | |
| VAR\_TYPE | CDF\_CHAR | support\_data | | | |

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Variable\_Name** | **Data\_type** | **DIMS** | **SIZES** | **R\_VARY** | **D\_VARY** |
| REP\_HFlux\_LABEL | CDF\_CHAR | 1 | 3 | F | F |
|  |  |  | | | |
| **Attribute Name** | **Data Type** | **Value** | | | |
| FIELDNAM | CDF\_CHAR | Vector Representation for Heat flux | | | |
| CATDESC | CDF\_CHAR | The vector representation for the Heat flux vector [‘x’,’y’,’z’] | | | |
| FORMAT | CDF\_CHAR | A1 | | | |
| VAR\_TYPE | CDF\_CHAR | support\_data | | | |

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Variable\_Name** | **Data\_type** | **DIMS** | **SIZES** | **R\_VARY** | **D\_VARY** |
| REP\_EAS\_PRES\_1 | CDF\_CHAR | 1 | 3 | F | F |
|  |  |  | | | |
| **Attribute Name** | **Data Type** | **Value** | | | |
| FIELDNAM | CDF\_CHAR | Vector Representation for Rows of Pressure Tensor | | | |
| CATDESC | CDF\_CHAR | The vector representation for the rows of the pressure tensor [‘x’,’y’,’z’] | | | |
| FORMAT | CDF\_CHAR | A1 | | | |
| VAR\_TYPE | CDF\_CHAR | support\_data | | | |

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Variable\_Name** | **Data\_type** | **DIMS** | **SIZES** | **R\_VARY** | **D\_VARY** |
| REP\_EAS\_PRES\_2 | CDF\_CHAR | 1 | 3 | F | F |
|  |  |  | | | |
| **Attribute Name** | **Data Type** | **Value** | | | |
| FIELDNAM | CDF\_CHAR | Vector Representation for Columns of the Pressure Tensor | | | |
| CATDESC | CDF\_CHAR | The vector representation for the columns of the pressure tensor [‘x’,’y’,’z’] | | | |
| FORMAT | CDF\_CHAR | A1 | | | |
| VAR\_TYPE | CDF\_CHAR | support\_data | | | |

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Variable\_Name** | **Data\_type** | **DIMS** | **SIZES** | **R\_VARY** | **D\_VARY** |
| QUALITY\_FLAG | CDF\_UINT1 | 1 | 1 | T | F |
| **Attribute Name** | **Data Type** | **Value** | | | |
| FIELDNAM | CDF\_CHAR | EAS1 Data Quality | | | |
| CATDESC | CDF\_CHAR | EAS1 Data Quality flag | | | |
| DISPLAY\_TYPE | CDF\_CHAR | time\_series | | | |
| DEPEND\_0 | CDF\_CHAR | EPOCH | | | |
| FILLVAL | CDF\_UINT4 | 255 | | | |
| LABLAXIS | CDF\_CHAR | EAS1 data quality | | | |
| VALIDMIN | CDF\_UINT4 | 0 | | | |
| VALIDMAX | CDF\_UINT4 | 4 | | | |
| SCALETYP | CDF\_CHAR | linear | | | |
| SCALEMIN | CDF\_UINT4 | 0 | | | |
| SCALEMAX | CDF\_UINT4 | 4 | | | |
| VAR\_TYPE | CDF\_CHAR | support\_data | | | |

#### PAS L2 Products

IRAP will produce the L2 CDF following files:

* 3D ion distributions expressed as distribution

solo\_L2\_swa-pas-3d-flux\_yyyymmdd\_V01.cdf

* 3D ion distributions expressed as differential flux

solo\_L2\_swa-pas-3d-flux\_yyyymmdd\_V01.cdf

* Ground calculated H+ moments

solo\_L2\_swa-pas-mom\_yyyymmdd\_V01.cdf

##### PAS 3D ion distribution (differential flux)

**Filename**: solo\_L2\_swa-pas-eflux\_yyyymmdd\_V01.cdf

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Item | Value | Dim. | Type | Date |
| **VARIABLE** | **Epoch** |  | **CDF\_TIME\_TT2000** | True |
| CATDESC | Epoch encoded as Ter-  restrial Time on rotat- ing Earth geoid, ns since J2000 |  |  |  |
| DISPLAY\_TYPE | time\_series |  |  |  |
| FIELDNAM | Epoch |  |  |  |
| FILLVAL | -9.22337203685478E+018 |  |  |  |
| FORMAT | I |  |  |  |
| LABLAXIS | Epoch |  |  |  |
| SCALEMAX | 9.22337203685478E+018 |  |  |  |
| SCALEMIN | -9.22337203685478E+018 |  |  |  |
| SCALETYP | linear |  |  |  |
| SI\_CONVERSION | 1.0E-9>s |  |  |  |
| UNITS | ns |  |  |  |
| VALIDMAX | 9.22337203685478E+018 |  |  |  |
| VALIDMIN | -9.22337203685478E+018 |  |  |  |
| VAR\_TYPE | Data |  |  |  |
| **VARIABLE** | **Half\_interval** |  | **CDF\_REAL4** | True |
| CATDESC | Acquisition half interval |  |  |  |
| DEPEND\_0 | Epoch |  |  |  |
| DISPLAY\_TYPE | time\_series |  |  |  |
| FIELDNAM | Half\_interval |  |  |  |
| FILLVAL | -1 |  |  |  |
| FORMAT | F4.2 |  |  |  |
| LABLAXIS | Half-interval |  |  |  |
| SCALEMAX | 10 |  |  |  |
| SCALEMIN | -10 |  |  |  |
| SCALETYP | linear |  |  |  |
| SI\_CONVERSION | 1.0s |  |  |  |
| UNITS | s |  |  |  |
| VALIDMAX | 60 |  |  |  |
| VALIDMIN | -60 |  |  |  |
| VAR\_TYPE | metadata |  |  |  |
| **VARIABLE** | **SCET** |  | **CDF\_REAL8** | True |
| CATDESC | Elapsed time on the onboard clock |  |  |  |
| DEPEND\_0 | Epoch |  |  |  |
| DISPLAY\_TYPE | time\_series |  |  |  |
| FIELDNAM | SCET |  |  |  |
| FILLVAL | -1E+031 |  |  |  |
| FORMAT | f14.3 |  |  |  |
| LABLAXIS | SCET |  |  |  |
| SCALEMAX | 4294970000.0 |  |  |  |
| SCALEMIN | 0.0 |  |  |  |
| UNITS | Ticks |  |  |  |
| VALIDMAX | 4294970000.0 |  |  |  |

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Item | Value | Dim. | Type | Date |
| VALIDMIN | 0.0 |  |  |  |
| VAR\_TYPE | support\_data |  |  |  |
| **VARIABLE** | **Info** |  | **CDF\_UINT1** | True |
| CATDESC | Info  0:Ground 1:Normal 2:Snapshot 3:Burst 4:Engineering 5:Calib |  |  |  |
| DEPEND\_0 | Epoch |  |  |  |
| FIELDNAM | Info |  |  |  |
| FILLVAL | 255 |  |  |  |
| FORMAT | I3 |  |  |  |
| LABLAXIS | Info |  |  |  |
| SCALETYP | linear |  |  |  |
| UNITS | unitless |  |  |  |
| VALIDMAX | 11 |  |  |  |
| VALIDMIN | 7 |  |  |  |
| VAR\_TYPE | support\_data |  |  |  |
| **VARIABLE** | **start\_energy** |  | **CDF\_INT2** | True |
| CATDESC | Start energy bin |  |  |  |
| DEPEND\_0 | Epoch |  |  |  |
| FIELDNAM | start\_energy |  |  |  |
| FILLVAL | -32768 |  |  |  |
| FORMAT | I5 |  |  |  |
| LABLAXIS | Start energy |  |  |  |
| SCALETYP | linear |  |  |  |
| UNITS | unitless |  |  |  |
| VALIDMAX | 96 |  |  |  |
| VALIDMIN | 0 |  |  |  |
| VAR\_TYPE | support\_data |  |  |  |
| **VARIABLE** | **nb\_energy** |  | **CDF\_INT2** | True |
| CATDESC | Number energy bins |  |  |  |
| DEPEND\_0 | Epoch |  |  |  |
| FIELDNAM | nb\_energy |  |  |  |
| FILLVAL | -32768 |  |  |  |
| FORMAT | I5 |  |  |  |
| LABLAXIS | Number energy |  |  |  |
| SCALETYP | linear |  |  |  |
| UNITS | unitless |  |  |  |
| VALIDMAX | 96 |  |  |  |
| VALIDMIN | 0 |  |  |  |
| VAR\_TYPE | support\_data |  |  |  |
| **VARIABLE** | **start\_elevation** |  | **CDF\_INT2** | True |
| CATDESC | Start elevation bin |  |  |  |

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Item | Value | Dim. | Type | Date |
| DEPEND\_0 | Epoch |  |  |  |
| FIELDNAM | start\_elevation |  |  |  |
| FILLVAL | -32768 |  |  |  |
| FORMAT | I5 |  |  |  |
| LABLAXIS | Start elevation |  |  |  |
| SCALETYP | linear |  |  |  |
| UNITS | unitless |  |  |  |
| VALIDMAX | 9 |  |  |  |
| VALIDMIN | 0 |  |  |  |
| VAR\_TYPE | support\_data |  |  |  |
| **VARIABLE** | **nb\_elevation** |  | **CDF\_INT2** | **True** |
| CATDESC | Number elevation bins |  |  |  |
| DEPEND\_0 | Epoch |  |  |  |
| FIELDNAM | nb\_elevation |  |  |  |
| FILLVAL | -32768 |  |  |  |
| FORMAT | I5 |  |  |  |
| LABLAXIS | Number elevation |  |  |  |
| SCALETYP | linear |  |  |  |
| UNITS | unitless |  |  |  |
| VALIDMAX | 9 |  |  |  |
| VALIDMIN | 0 |  |  |  |
| VAR\_TYPE | support\_data |  |  |  |
| **VARIABLE** | **start\_CEM** |  | **CDF\_INT2** | **True** |
| CATDESC | Start CEM |  |  |  |
| DEPEND\_0 | Epoch |  |  |  |
| FIELDNAM | start\_CEM |  |  |  |
| FILLVAL | -32768 |  |  |  |
| FORMAT | I5 |  |  |  |
| LABLAXIS | Start CEM |  |  |  |
| SCALETYP | linear |  |  |  |
| UNITS | unitless |  |  |  |
| VALIDMAX | 1 |  |  |  |
| VALIDMIN | 0 |  |  |  |
| VAR\_TYPE | support\_data |  |  |  |
| **VARIABLE** | **nb\_CEM** |  | **CDF\_INT2** | **True** |
| CATDESC | Number CEM |  |  |  |
| DEPEND\_0 | Epoch |  |  |  |
| FIELDNAM | nb\_CEM |  |  |  |
| FILLVAL | -32768 |  |  |  |
| FORMAT | I5 |  |  |  |
| LABLAXIS | Number CEM |  |  |  |
| SCALETYP | linear |  |  |  |
| UNITS | unitless |  |  |  |
| VALIDMAX | 11 |  |  |  |
| VALIDMIN | 0 |  |  |  |
| VAR\_TYPE | support\_data |  |  |  |

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Item | Value | Dim. | Type | Date |
| **VARIABLE** | **nb\_K** |  | **CDF\_INT2** | True |
| CATDESC | Number of sub-sampings per second |  |  |  |
| DEPEND\_0 | Epoch |  |  |  |
| FIELDNAM | nb\_K |  |  |  |
| FILLVAL | -32768 |  |  |  |
| FORMAT | I5 |  |  |  |
| LABLAXIS | Number K |  |  |  |
| SCALETYP | linear |  |  |  |
| UNITS | unitless |  |  |  |
| VALIDMAX | 8 |  |  |  |
| VALIDMIN | 0 |  |  |  |
| VAR\_TYPE | support\_data |  |  |  |
| **VARIABLE** | **K** |  | **CDF\_INT2** | True |
| CATDESC | Current sub-sampling |  |  |  |
| DEPEND\_0 | Epoch |  |  |  |
| FIELDNAM | K |  |  |  |
| FILLVAL | -32768 |  |  |  |
| FORMAT | I5 |  |  |  |
| LABLAXIS | K |  |  |  |
| SCALETYP | linear |  |  |  |
| UNITS | unitless |  |  |  |
| VALIDMAX | 8 |  |  |  |
| VALIDMIN | 0 |  |  |  |
| VAR\_TYPE | support\_data |  |  |  |
| **VARIABLE** | **PAS\_to\_RTN** | **3x3** | **CDF\_REAL8** | True |
| CATDESC | PAS to RTN transformation matrix |  |  |  |
| COORDINATE\_SYSTEM | SOLO\_SWA\_PAS |  |  |  |
| TARGET\_SYSTEM | SOLO\_SUN\_RTN |  |  |  |
| DEPEND\_0 | Epoch |  |  |  |
| FIELDNAM | PAS\_to\_RTN |  |  |  |
| FILLVAL | -1E+031 |  |  |  |
| FORMAT | E10 |  |  |  |
| LABLAXIS | PAS to RTN |  |  |  |
| SCALETYP | linear |  |  |  |
| UNITS | None |  |  |  |
| VAR\_TYPE | support\_data |  |  |  |
| **VARIABLE** | **vdf** | **11x9x96** | **CDF\_REAL4** | True |
| CATDESC | Distribution function |  |  |  |
| DEPEND\_0 | Epoch |  |  |  |
| DEPEND\_1 | Azimuth |  |  |  |
| DEPEND\_2 | Elevation |  |  |  |
| DEPEND\_3 | Energy |  |  |  |
| FIELDNAM | vdf |  |  |  |
| FILLVAL | -1E+031 |  |  |  |
| FORMAT | E10 |  |  |  |
| LABLAXIS | VDF |  |  |  |

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Item | Value | Dim. | Type | Date |
| SCALETYP | linear |  |  |  |
| UNITS | s^3 m^-6 |  |  |  |
| VALIDMAX | 1 |  |  |  |
| VALIDMIN | 0 |  |  |  |
| VAR\_TYPE | data |  |  |  |
| **VARIABLE** | **Energy** | **96** | **CDF\_REAL4** | False |
| CATDESC | Center of energy bins |  |  |  |
| DELTA\_PLUS\_VAR | delta\_p\_Energy |  |  |  |
| DELTA\_MINUS\_VAR | delta\_m\_Energy |  |  |  |
| FIELDNAM | Energy |  |  |  |
| FILLVAL | -1E+031 |  |  |  |
| FORMAT | E12.2 |  |  |  |
| LABLAXIS | Energy |  |  |  |
| SCALETYP | linear |  |  |  |
| UNITS | eV |  |  |  |
| VALIDMAX | 40000.0 |  |  |  |
| VALIDMIN | 0.0 |  |  |  |
| VAR\_TYPE | support\_data |  |  |  |
| **VARIABLE** | **delta\_p\_Energy** | **96** | **CDF\_REAL4** | False |
| CATDESC | Delta plus energy bins |  |  |  |
| FIELDNAM | delta\_p\_Energy |  |  |  |
| FILLVAL | -1E+031 |  |  |  |
| FORMAT | E12.2 |  |  |  |
| LABLAXIS | Delta plus energy |  |  |  |
| SCALETYP | linear |  |  |  |
| UNITS | eV |  |  |  |
| VALIDMAX | 40000.0 |  |  |  |
| VALIDMIN | 0.0 |  |  |  |
| VAR\_TYPE | support\_data |  |  |  |
| **VARIABLE** | **delta\_m\_Energy** | **96** | **CDF\_REAL4** | False |
| CATDESC | Delta minus energy bins |  |  |  |
| FIELDNAM | delta\_m\_Energy |  |  |  |
| FILLVAL | -1E+031 |  |  |  |
| FORMAT | E12.2 |  |  |  |
| LABLAXIS | Delta minus energy |  |  |  |
| SCALETYP | linear |  |  |  |
| UNITS | eV |  |  |  |
| VALIDMAX | 40000.0 |  |  |  |
| VALIDMIN | 0.0 |  |  |  |
| VAR\_TYPE | support\_data |  |  |  |
| **VARIABLE** | **Azimuth** | **11** | **CDF\_REAL4** | False |
| CATDESC | Center of CEM bins (azimuth) |  |  |  |
| DELTA\_PLUS\_VAR | delta\_Azimuth |  |  |  |
| DELTA\_MINUS\_VAR | delta\_Azimuth |  |  |  |
| FIELDNAM | Azimuth |  |  |  |
| FILLVAL | -1E+031 |  |  |  |

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Item | Value | Dim. | Type | Date |
| FORMAT | E12.2 |  |  |  |
| LABLAXIS | Azimuth (CEM) |  |  |  |
| SCALETYP | linear |  |  |  |
| UNITS | deg |  |  |  |
| VALIDMAX | 90.0 |  |  |  |
| VALIDMIN | -90.0 |  |  |  |
| VAR\_TYPE | support\_data |  |  |  |
| **VARIABLE** | **Elevation** | **9** | **CDF\_REAL4** | False |
| CATDESC | Center of elevation bins |  |  |  |
| DELTA\_PLUS\_VAR | delta\_Elevation |  |  |  |
| DELTA\_MINUS\_VAR | delta\_Elevation |  |  |  |
| FIELDNAM | Elevation |  |  |  |
| FILLVAL | -1E+031 |  |  |  |
| FORMAT | E12.2 |  |  |  |
| LABLAXIS | Elevation |  |  |  |
| SCALETYP | linear |  |  |  |
| UNITS | deg |  |  |  |
| VALIDMAX | 45.0 |  |  |  |
| VALIDMIN | -45.0 |  |  |  |
| VAR\_TYPE | support\_data |  |  |  |
| **VARIABLE** | **delta\_Azimuth** | **11** | **CDF\_REAL4** | False |
| CATDESC | Delta Azimuth (CEM) |  |  |  |
| FIELDNAM | delta\_Azimuth |  |  |  |
| FILLVAL | -1E+031 |  |  |  |
| FORMAT | E12.2 |  |  |  |
| LABLAXIS | Delta Azimuth |  |  |  |
| SCALETYP | linear |  |  |  |
| UNITS | deg |  |  |  |
| VALIDMAX | 45.0 |  |  |  |
| VALIDMIN | 0.0 |  |  |  |
| VAR\_TYPE | support\_data |  |  |  |
| **VARIABLE** | **delta\_Elevation** | **9** | **CDF\_REAL4** | False |
| CATDESC | Delta elevation table |  |  |  |
| FIELDNAM | delta\_Elevation |  |  |  |
| FILLVAL | -1E+031 |  |  |  |
| FORMAT | E12.2 |  |  |  |
| LABLAXIS | Delta elevation |  |  |  |
| SCALETYP | linear |  |  |  |
| UNITS | deg |  |  |  |
| VALIDMAX | 45.0 |  |  |  |
| VALIDMIN | -45.0 |  |  |  |
| VAR\_TYPE | support\_data |  |  |  |
| **VARIABLE** | **Full\_azimuth** | **11x9** | **CDF\_REAL4** | False |
| CATDESC | Full definition azimuth table |  |  |  |
| FIELDNAM | Full\_azimuth |  |  |  |
| FILLVAL | -1E+031 |  |  |  |

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Item | Value | Dim. | Type | Date |
| FORMAT | E10 |  |  |  |
| LABLAXIS | Full Azimuth |  |  |  |
| SCALETYP | linear |  |  |  |
| UNITS | None |  |  |  |
| VALIDMAX | -180.0 |  |  |  |
| VALIDMIN | 180.0 |  |  |  |
| VAR\_TYPE | support\_data |  |  |  |
| **VARIABLE** | **Full\_elevation** | **11x9** | **CDF\_REAL4** | **False** |
| CATDESC | Full definition elevation table |  |  |  |
| FIELDNAM | Full\_elevation |  |  |  |
| FILLVAL | -1E+031 |  |  |  |
| FORMAT | E10 |  |  |  |
| LABLAXIS | FULL\_EL\_TABLE |  |  |  |
| SCALETYP | linear |  |  |  |
| UNITS | deg |  |  |  |
| VALIDMAX | -90.0 |  |  |  |
| VALIDMIN | 90.0 |  |  |  |
| VAR\_TYPE | support\_data |  |  |  |

##### PAS 3D ion (distribution function)

**Filename**: solo\_L2\_swa-pas-vdf\_yyyymmdd\_V01.cdf

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Item | Value | Dim. | Type | Date |
| **VARIABLE** | **Epoch** |  | **CDF\_TIME\_TT2000** | True |
| CATDESC | Epoch encoded as Ter-  restrial Time on rotat- ing Earth geoid, ns since J2000 |  |  |  |
| DISPLAY\_TYPE | time\_series |  |  |  |
| FIELDNAM | Epoch |  |  |  |
| FILLVAL | -9.22337203685478E+018 |  |  |  |
| FORMAT | I |  |  |  |
| LABLAXIS | Epoch |  |  |  |
| SCALEMAX | 9.22337203685478E+018 |  |  |  |
| SCALEMIN | -9.22337203685478E+018 |  |  |  |

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| SCALETYP | linear |  |  |  |
| SI\_CONVERSION | 1.0E-9>s |  |  |  |
| UNITS | ns |  |  |  |
| VALIDMAX | 9.22337203685478E+018 |  |  |  |
| VALIDMIN | -9.22337203685478E+018 |  |  |  |
| VAR\_TYPE | Data |  |  |  |
| **VARIABLE** | **Half\_interval** |  | **CDF\_REAL4** | True |
| CATDESC | Acquisition half interval |  |  |  |
| DEPEND\_0 | Epoch |  |  |  |
| DISPLAY\_TYPE | time\_series |  |  |  |
| FIELDNAM | Half\_interval |  |  |  |
| FILLVAL | -1 |  |  |  |
| FORMAT | F4.2 |  |  |  |
| LABLAXIS | Half-interval |  |  |  |
| SCALEMAX | 10 |  |  |  |
| SCALEMIN | -10 |  |  |  |
| SCALETYP | linear |  |  |  |
| SI\_CONVERSION | 1.0s |  |  |  |
| UNITS | s |  |  |  |
| VALIDMAX | 60 |  |  |  |
| VALIDMIN | -60 |  |  |  |
| VAR\_TYPE | metadata |  |  |  |
| **VARIABLE** | **SCET** |  | **CDF\_REAL8** | True |
| CATDESC | Elapsed time on the onboard clock |  |  |  |
| DEPEND\_0 | Epoch |  |  |  |
| DISPLAY\_TYPE | time\_series |  |  |  |
| FIELDNAM | SCET |  |  |  |
| FILLVAL | -1E+031 |  |  |  |
| FORMAT | f14.3 |  |  |  |
| LABLAXIS | SCET |  |  |  |
| SCALEMAX | 4294970000.0 |  |  |  |
| SCALEMIN | 0.0 |  |  |  |
| UNITS | Ticks |  |  |  |
| VALIDMAX | 4294970000.0 |  |  |  |
| VALIDMIN | 0.0 |  |  |  |
| VAR\_TYPE | support\_data |  |  |  |
| **VARIABLE** | **Info** |  | **CDF\_UINT1** | True |
| CATDESC | Info  0:Ground 1:Normal 2:Snapshot 3:Burst 4:Engineering 5:Calib |  |  |  |
| DEPEND\_0 | Epoch |  |  |  |
| FIELDNAM | Info |  |  |  |
| FILLVAL | 255 |  |  |  |

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| FORMAT | I3 |  |  |  |
| LABLAXIS | Info |  |  |  |
| SCALETYP | linear |  |  |  |
| UNITS | unitless |  |  |  |
| VALIDMAX | 11 |  |  |  |
| VALIDMIN | 7 |  |  |  |
| VAR\_TYPE | support\_data |  |  |  |
| **VARIABLE** | **start\_energy** |  | **CDF\_INT2** | True |
| CATDESC | Start energy bin |  |  |  |
| DEPEND\_0 | Epoch |  |  |  |
| FIELDNAM | start\_energy |  |  |  |
| FILLVAL | -32768 |  |  |  |
| FORMAT | I5 |  |  |  |
| LABLAXIS | Start energy |  |  |  |
| SCALETYP | linear |  |  |  |
| UNITS | unitless |  |  |  |
| VALIDMAX | 96 |  |  |  |
| VALIDMIN | 0 |  |  |  |
| VAR\_TYPE | support\_data |  |  |  |
| **VARIABLE** | **eflux** | **96** | **CDF\_REAL4** | True |
| CATDESC | Energy Flux (Omni-directional) |  |  |  |
| DEPEND\_0 | Epoch |  |  |  |
| DEPEND\_1 | Energy |  |  |  |
| FIELDNAM | eflux |  |  |  |
| FILLVAL | -1E+031 |  |  |  |
| FORMAT | E10 |  |  |  |
| LABLAXIS | eflux |  |  |  |
| SCALETYP | log |  |  |  |
| UNITS | cm-2 s-1 eV/eV |  |  |  |
| VALIDMAX | 1 |  |  |  |
| VALIDMIN | 0 |  |  |  |
| VAR\_TYPE | support\_data |  |  |  |
| **VARIABLE** | **Energy** | **96** | **CDF\_REAL4** | False |
| CATDESC | Center of energy bins |  |  |  |
| DELTA\_PLUS\_VAR | delta\_p\_Energy |  |  |  |
| DELTA\_MINUS\_VAR | delta\_m\_Energy |  |  |  |
| FIELDNAM | Energy |  |  |  |
| FILLVAL | -1E+031 |  |  |  |
| FORMAT | E12.2 |  |  |  |
| LABLAXIS | Energy |  |  |  |
| SCALETYP | linear |  |  |  |
| UNITS | eV |  |  |  |
| VALIDMAX | 40000.0 |  |  |  |
| VALIDMIN | 0.0 |  |  |  |
| VAR\_TYPE | support\_data |  |  |  |
| **VARIABLE** | **delta\_p\_Energy** | **96** | **CDF\_REAL4** | False |
| CATDESC | Delta plus energy bins |  |  |  |

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| FIELDNAM | delta\_p\_Energy |  |  |  |
| FILLVAL | -1E+031 |  |  |  |
| FORMAT | E12.2 |  |  |  |
| LABLAXIS | Delta plus energy |  |  |  |
| SCALETYP | linear |  |  |  |
| UNITS | eV |  |  |  |
| VALIDMAX | 40000.0 |  |  |  |
| VALIDMIN | 0.0 |  |  |  |
| VAR\_TYPE | support\_data |  |  |  |
| **VARIABLE** | **delta\_m\_Energy** | **96** | **CDF\_REAL4** | False |
| CATDESC | Delta minus energy bins |  |  |  |
| FIELDNAM | delta\_m\_Energy |  |  |  |
| FILLVAL | -1E+031 |  |  |  |
| FORMAT | E12.2 |  |  |  |
| LABLAXIS | Delta minus energy |  |  |  |
| SCALETYP | linear |  |  |  |
| UNITS | eV |  |  |  |
| VALIDMAX | 40000.0 |  |  |  |
| VALIDMIN | 0.0 |  |  |  |
| VAR\_TYPE | support\_data |  |  |  |

##### PAS ground calculated moments

**Filename**: solo\_L2\_swa-pas-grnd-mom\_yyyymmdd\_V01.cdf

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Item | Value | Dim. | Type | Date |
| **VARIABLE** | **Epoch** |  | **CDF\_TIME\_TT2000** | True |
| CATDESC | Epoch encoded as Ter-  restrial Time on rotat- ing Earth geoid, ns since J2000 |  |  |  |
| DISPLAY\_TYPE | time\_series |  |  |  |
| FIELDNAM | Epoch |  |  |  |
| FILLVAL | -9.22337203685478E+018 |  |  |  |
| FORMAT | I |  |  |  |
| LABLAXIS | Epoch |  |  |  |
| SCALEMAX | 9.22337203685478E+018 |  |  |  |

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| SCALEMIN | -9.22337203685478E+018 |  |  |  |
| SCALETYP | linear |  |  |  |
| SI\_CONVERSION | 1.0E-9>s |  |  |  |
| UNITS | ns |  |  |  |
| VALIDMAX | 9.22337203685478E+018 |  |  |  |
| VALIDMIN | -9.22337203685478E+018 |  |  |  |
| VAR\_TYPE | Data |  |  |  |
| **VARIABLE** | **Half\_interval** |  | **CDF\_REAL4** | True |
| CATDESC | Acquisition half interval |  |  |  |
| DEPEND\_0 | Epoch |  |  |  |
| DISPLAY\_TYPE | time\_series |  |  |  |
| FIELDNAM | Half\_interval |  |  |  |
| FILLVAL | -1 |  |  |  |
| FORMAT | F4.2 |  |  |  |
| LABLAXIS | Half-interval |  |  |  |
| SCALEMAX | 10 |  |  |  |
| SCALEMIN | -10 |  |  |  |
| SCALETYP | linear |  |  |  |
| SI\_CONVERSION | 1.0s |  |  |  |
| UNITS | s |  |  |  |
| VALIDMAX | 60 |  |  |  |
| VALIDMIN | -60 |  |  |  |
| VAR\_TYPE | metadata |  |  |  |
| **VARIABLE** | **SCET** |  | **CDF\_REAL8** | **True** |
| CATDESC | Elapsed time on the onboard clock |  |  |  |
| DEPEND\_0 | Epoch |  |  |  |
| DISPLAY\_TYPE | time\_series |  |  |  |
| FIELDNAM | SCET |  |  |  |
| FILLVAL | -1E+031 |  |  |  |
| FORMAT | f14.3 |  |  |  |
| LABLAXIS | SCET |  |  |  |
| SCALEMAX | 4294970000.0 |  |  |  |
| SCALEMIN | 0.0 |  |  |  |
| UNITS | Ticks |  |  |  |
| VALIDMAX | 4294970000.0 |  |  |  |
| VALIDMIN | 0.0 |  |  |  |
| VAR\_TYPE | support\_data |  |  |  |
| **VARIABLE** | **Info** |  | **CDF\_UINT1** | True |
| CATDESC | Info  0:Ground 1:Normal 2:Snapshot 3:Burst 4:Engineering 5:Calib |  |  |  |
| DEPEND\_0 | Epoch |  |  |  |
| FIELDNAM | Info |  |  |  |

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| FILLVAL | 255 |  |  |  |
| FORMAT | I3 |  |  |  |
| LABLAXIS | Info |  |  |  |
| SCALETYP | linear |  |  |  |
| UNITS | unitless |  |  |  |
| VALIDMAX | 11 |  |  |  |
| VALIDMIN | 7 |  |  |  |
| VAR\_TYPE | support\_data |  |  |  |
| **VARIABLE** | **validity** |  | **CDF\_UINT1** | True |
| CATDESC | Validity flag : 1,2,3 (the  bigger, the better) |  |  |  |
| DEPEND\_0 | Epoch |  |  |  |
| FIELDNAM | Validity |  |  |  |
| FILLVAL | 254 |  |  |  |
| FORMAT | I3 |  |  |  |
| LABLAXIS | Validity |  |  |  |
| UNITS | unitless |  |  |  |
| VALIDMIN | 0 |  |  |  |
| VALIDMAX | 255 |  |  |  |
| VAR\_TYPE | support\_data |  |  |  |
| SCALETYP | linear |  |  |  |
| **VARIABLE** | **N** |  | **CDF\_REAL4** | True |
| CATDESC | Density |  |  |  |
| DEPEND\_0 | Epoch |  |  |  |
| FIELDNAM | Density |  |  |  |
| FILLVAL | -1E+031 |  |  |  |
| FORMAT | E12.2 |  |  |  |
| LABLAXIS | Density |  |  |  |
| UNITS | particles cm^-3 |  |  |  |
| VALIDMIN | 0.0 |  |  |  |
| VALIDMAX | 10000.0 |  |  |  |
| VAR\_TYPE | data |  |  |  |
| SCALETYP | linear |  |  |  |
| **VARIABLE** | **V\_SRF** | **3** | **CDF\_REAL4** | True |
| CATDESC | Velocity in SRF frame |  |  |  |
| DEPEND\_0 | Epoch |  |  |  |
| FIELDNAM | V\_SRF |  |  |  |
| FILLVAL | -1E+031 |  |  |  |
| FORMAT | E12.2 |  |  |  |
| LABLAXIS | V (SRF) |  |  |  |
| UNITS | km/s |  |  |  |
| VALIDMIN | -100000.0 |  |  |  |
| VALIDMAX | 100000.0 |  |  |  |
| VAR\_TYPE | data |  |  |  |
| SCALETYP | linear |  |  |  |
| **VARIABLE** | **V\_RTN** | **3** | **CDF\_REAL4** | True |
| CATDESC | Velocity in RTN frame |  |  |  |

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| DEPEND\_0 | Epoch |  |  |  |
| FIELDNAM | V\_RTN |  |  |  |
| FILLVAL | -1E+031 |  |  |  |
| FORMAT | E12.2 |  |  |  |
| LABLAXIS | Velocity (RTN) |  |  |  |
| UNITS | km/s |  |  |  |
| VALIDMIN | -100000.0 |  |  |  |
| VALIDMAX | 100000.0 |  |  |  |
| VAR\_TYPE | data |  |  |  |
| SCALETYP | linear |  |  |  |
| **VARIABLE** | **P\_SRF** | **6** | **CDF\_REAL4** | True |
| CATDESC | Pressure tensor in SRF frame |  |  |  |
| DEPEND\_0 | Epoch |  |  |  |
| FIELDNAM | P\_SRF |  |  |  |
| FILLVAL | -1E+031 |  |  |  |
| FORMAT | E12.2 |  |  |  |
| LABLAXIS | Pressure (SRF) |  |  |  |
| UNITS | J.cm^-3 |  |  |  |
| VALIDMIN | 0.0 |  |  |  |
| VALIDMAX | 1E+030 |  |  |  |
| VAR\_TYPE | data |  |  |  |
| SCALETYP | linear |  |  |  |
| **VARIABLE** | **P\_RTN** | **6** | **CDF\_REAL4** | **True** |
| CATDESC | Pressure tensor in RTN frame |  |  |  |
| DEPEND\_0 | Epoch |  |  |  |
| FIELDNAM | P\_RTN |  |  |  |
| FILLVAL | -1E+031 |  |  |  |
| FORMAT | E12.2 |  |  |  |
| LABLAXIS | Pressure (RTN) |  |  |  |
| UNITS | J.cm^-3 |  |  |  |
| VALIDMIN | 0.0 |  |  |  |
| VALIDMAX | 1E+030 |  |  |  |
| VAR\_TYPE | data |  |  |  |
| SCALETYP | linear |  |  |  |
| **VARIABLE** | **TxTyTz\_SRF** | **3** | **CDF\_REAL4** | True |
| CATDESC | Temperature components (Tx, Ty, Tz) in SRF frame |  |  |  |
| DEPEND\_0 | Epoch |  |  |  |
| FIELDNAM | TxTyTz\_SRF |  |  |  |
| FILLVAL | -1E+031 |  |  |  |
| FORMAT | E12.2 |  |  |  |
| LABLAXIS | TxTyTz (SRF) |  |  |  |
| UNITS | eV |  |  |  |
| VALIDMIN | -100000.0 |  |  |  |
| VALIDMAX | 100000.0 |  |  |  |
| VAR\_TYPE | data |  |  |  |
| SCALETYP | linear |  |  |  |
| **VARIABLE** | **TxTyTz\_RTN** | **3** | **CDF\_REAL4** | True |

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| CATDESC | Temperature components (Tx, Ty, Tz) in RTN frame |  |  |  |
| DEPEND\_0 | Epoch |  |  |  |
| FIELDNAM | TxTyTz\_RTN |  |  |  |
| FILLVAL | -1E+031 |  |  |  |
| FORMAT | E12.2 |  |  |  |
| LABLAXIS | TxTyTz (RTN) |  |  |  |
| UNITS | eV |  |  |  |
| VALIDMIN | -100000.0 |  |  |  |
| VALIDMAX | 100000.0 |  |  |  |
| VAR\_TYPE | data |  |  |  |
| SCALETYP | linear |  |  |  |
| **VARIABLE** | **T** |  | **CDF\_REAL4** | True |
| CATDESC | Temperature |  |  |  |
| DEPEND\_0 | Epoch |  |  |  |
| FIELDNAM | T |  |  |  |
| FILLVAL | -1E+031 |  |  |  |
| FORMAT | E12.2 |  |  |  |
| LABLAXIS | Temperature |  |  |  |
| UNITS | eV |  |  |  |
| VALIDMIN | 0.0 |  |  |  |
| VALIDMAX | 1E+030 |  |  |  |
| VAR\_TYPE | data |  |  |  |
| SCALETYP | linear |  |  |  |

#### HIS L2 products

##### HIS L2 Sensor Rate Data

**Filename:** solo\_L2\_swa-his-rates\_yyyymmdd\_V01.cdf

**Global metadata**

|  |  |  |
| --- | --- | --- |
| **Name** | **Entry** | **Value** |
| Acknowledgement | 1 | Please acknowledge Chris J. Owen (SWA PI -- UCL MSSL) & Stefano Livi (HIS PI -- SwRI). NASA Contract NNG10EK25C. |
| Data\_product | 1 | Rates> Rates data for HIS instrument |
| Data\_type | 1 | rates\_l2 |
| Data\_version | 1 | 01 |
| Descriptor | 1 | SWA-HIS>Solar Wind Analyzer-Heavy Ion Sensor |
| Discipline | 1 | Space Physics>Interplanetary Studies |
| File\_naming\_convention | 1 | "source\_descriptor\_datatype\_yyyyMMdd |
| Generated\_by | 1 | SO-HIS SOC, University of Michigan |
| Generation\_date | 1 | 20210216 |
| HTTP\_LINK |  |  |
| Instrument\_type | 1 | Particles (space) |
| LEVEL | 1 | 2 |
| LINK\_TEXT |  |  |
| LINK\_TITLE |  |  |
| Logical\_file\_id | 1 | solo\_L2\_swa-his-rates\_00000000\_V01 |
| Logical\_source | 1 | solo\_L2\_swa-his-rates |
| Logical\_source\_description | 1 | solo\_L2\_swa-his-rates |
| Mission\_group | 1 | Solar Orbiter |
| MODS | 1 | Initial Release 2/16/2021. |
| PI\_affiliation | 1 | SWRI |
| PI\_name | 1 | S. Livi |
| Project | 1 | SOLO>Solar Orbiter |
| Rules\_of\_use | 1 | These Level 2 data require substantial processing for most applications. Users are encouraged to use Level 3 data, which provide the most relevant data products for scientific research. See Data Product Description Document for more information. Contact SWA/HIS team for more information as needed. |
| Software\_version | 1 | 00.00.00 |
| SOOP\_TYPE |  |  |
| Source\_name | 1 | SOLO>Solar Orbiter |
| spase\_DatasetResourceID |  |  |
| TARGET\_CLASS | 1 | In-Situ |
| TARGET\_NAME | 1 | Solar Wind |
| TARGET\_REGION | 1 | Heliosphere |
| TEXT | 1 | Rate data for HIS instrument in physical units. Some corrections for instrument characteristics and measurement techniques have been applied. Per Data Product Description Document, efficiency corrections have not been applied. |
|  | 2 | Counts of unclassified ion event words on the HIS detectors (start MCP, stop MCP, SSD) as a function of E/q, integrated over incident angles, TOF and Energy. Includes full counts of events subject to decimation. Rates also include two coincidence rates, the number of events with a valid TOF and energy (triple coincidence), and a count of those with only a valid TOF (double coincidence). These rates are primarily used to evaluate the performance of the instrument, rather than for science. In particular, they can be used for calculation of ion detection efficiency in-flight [von Steiger et al., 2000]. The resolution of this data product can be 30s or 300s. In Burst mode the resolution can be 4s but this can only be run on average 1% of the time due to telemetry constraints. |
| TIME\_MAX | 1 |  |
| TIME\_MIN | 1 |  |
| Time\_resolution | 1 | 4 sec, 30 sec, or 300 sec |

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Variable\_Name** | **Data\_type** | **DIMS** | **SIZES** | **R\_VARY** | **D\_VARY** |
| EPOCH | CDF\_TIME\_TT2000 | 1 | 0 | T |  |
| **Attribute Name** | **Data Type** | **Value** | | | |
| CATDESC | CDF\_CHAR | Default time | | | |
| FIELDNAM | CDF\_CHAR | EPOCH | | | |
| FILLVAL | CDF\_TIME\_TT2000 | 9999-12-31T23:59:59.999999999 | | | |
| LABLAXIS | CDF\_CHAR | EPOCH | | | |
| MONOTON | CDF\_CHAR | INCREASE | | | |
| REFERENCE\_POSITION | CDF\_CHAR | Rotating Earth Geoid | | | |
| SCALETYP | CDF\_CHAR | linear | | | |
| TIME\_BASE | CDF\_CHAR | J2000 | | | |
| TIME\_SCALE | CDF\_CHAR | Terrestrial Time | | | |
| UNITS | CDF\_CHAR | ns | | | |
| VALIDMAX | CDF\_TIME\_TT2000 | 2049-12-31T23:59:59.999000000 | | | |
| VALIDMIN | CDF\_TIME\_TT2000 | 1990-01-01T00:00:00.000000000 | | | |
| VAR\_NOTES | CDF\_CHAR | Time in seconds since January 1, 2000, 12:00:00.000. Converted from SCET via SPICE time kernel provided by the mission. Currently set to start of accumulation interval. | | | |
| VAR\_TYPE | CDF\_CHAR | support\_data | | | |

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Variable\_Name** | **Data\_type** | **DIMS** | **SIZES** | **R\_VARY** | **D\_VARY** |
| SCET | CDF\_REAL8 | 1 | 0 | T |  |
| **Attribute Name** | **Data Type** | **Value** | | | |
| CATDESC | CDF\_CHAR | SCET | | | |
| DEPEND\_0 | CDF\_CHAR | EPOCH | | | |
| FIELDNAM | CDF\_CHAR | SCET | | | |
| FILLVAL | CDF\_REAL8 | -1.00E+31 | | | |
| FORMAT | CDF\_CHAR | E12.2 | | | |
| LABLAXIS | CDF\_CHAR | SCET | | | |
| SCALEMAX | CDF\_REAL8 | 8.00E+12 | | | |
| SCALEMIN | CDF\_REAL8 | 5.00E+12 | | | |
| SCALETYP | CDF\_CHAR | linear | | | |
| UNITS | CDF\_CHAR | milliseconds | | | |
| VALIDMAX | CDF\_REAL8 | 1.00E+14 | | | |
| VALIDMIN | CDF\_REAL8 | 0 | | | |
| VAR\_NOTES | CDF\_CHAR | Mission elapsed time in spacecraft clock ticks. Note: These are effected by environmental conditions and do not match Earth-based seconds. Beginning of accumulation. | | | |
| VAR\_TYPE | CDF\_CHAR | support\_data | | | |

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Variable\_Name** | **Data\_type** | **DIMS** | **SIZES** | **R\_VARY** | **D\_VARY** |
| ACCUM\_SECONDS | CDF\_REAL8 | 1 | 0 | T |  |
| **Attribute Name** | **Data Type** | **Value** | | | |
| CATDESC | CDF\_CHAR | ACCUM\_SECONDS | | | |
| DEPEND\_0 | CDF\_CHAR | EPOCH | | | |
| FIELDNAM | CDF\_CHAR | ACCUM\_SECONDS | | | |
| FILLVAL | CDF\_REAL8 | -1.00E+31 | | | |
| FORMAT | CDF\_CHAR | E12.2 | | | |
| LABLAXIS | CDF\_CHAR | ACCUM\_SECONDS | | | |
| SCALEMAX | CDF\_REAL8 | 0.3 | | | |
| SCALEMIN | CDF\_REAL8 | 0.003 | | | |
| SCALETYP | CDF\_CHAR | linear | | | |
| UNITS | CDF\_CHAR | seconds | | | |
| VALIDMAX | CDF\_REAL8 | 0.3 | | | |
| VALIDMIN | CDF\_REAL8 | 0.003 | | | |
| VAR\_NOTES | CDF\_CHAR | Accumulation time in seconds for each E/q and elevation step | | | |
| VAR\_TYPE | CDF\_CHAR | support\_data | | | |

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Variable\_Name** | **Data\_type** | **DIMS** | **SIZES** | **R\_VARY** | **D\_VARY** |
| QUALITY\_FLAG | CDF\_UINT1 | 1 | 0 | T |  |
| **Attribute Name** | **Data Type** | **Value** | | | |
| CATDESC | CDF\_CHAR | QUALITY\_FLAG | | | |
| DEPEND\_0 | CDF\_CHAR | EPOCH | | | |
| DISPLAY\_TYPE | CDF\_CHAR | time\_series | | | |
| FIELDNAM | CDF\_CHAR | QUALITY\_FLAG | | | |
| FILLVAL | CDF\_UINT1 | 255 | | | |
| FORMAT | CDF\_CHAR | I3 | | | |
| LABLAXIS | CDF\_CHAR | QUALITY\_FLAG | | | |
| SCALEMAX | CDF\_UINT1 | 3 | | | |
| SCALEMIN | CDF\_UINT1 | 0 | | | |
| SCALETYP | CDF\_CHAR | linear | | | |
| UNITS | CDF\_CHAR | NONE | | | |
| VALIDMAX | CDF\_UINT1 | 2 | | | |
| VALIDMIN | CDF\_UINT1 | 0 | | | |
| VAR\_NOTES | CDF\_CHAR | 0=good, 1=caution, 2=bad | | | |
| VAR\_TYPE | CDF\_CHAR | support\_data | | | |

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Variable\_Name** | **Data\_type** | **DIMS** | **SIZES** | **R\_VARY** | **D\_VARY** |
| QUALITY\_BITMASK | CDF\_UINT2 | 1 | 0 | T |  |
| **Attribute Name** | **Data Type** | **Value** | | | |
| CATDESC | CDF\_CHAR | QUALITY\_BITMASK | | | |
| DEPEND\_0 | CDF\_CHAR | EPOCH | | | |
| DISPLAY\_TYPE | CDF\_CHAR | time\_series | | | |
| FIELDNAM | CDF\_CHAR | QUALITY\_BITMASK | | | |
| FILLVAL | CDF\_UINT2 | 65535 | | | |
| FORMAT | CDF\_CHAR | I5 | | | |
| LABLAXIS | CDF\_CHAR | QUALITY\_BITMASK | | | |
| SCALEMAX | CDF\_UINT2 | 32 | | | |
| SCALEMIN | CDF\_UINT2 | 0 | | | |
| SCALETYP | CDF\_CHAR | linear | | | |
| UNITS | CDF\_CHAR | NONE | | | |
| VALIDMAX | CDF\_UINT2 | 31 | | | |
| VALIDMIN | CDF\_UINT2 | 0 | | | |
| VAR\_NOTES | CDF\_CHAR | 0:No Issue, 1:Proton Avoidance Triggered, 2:No PHAs Telemetered in Range (range 6/7 prior to Auguest 2020), 4:Elevation Step(s) not represented, 8:Saturation of Input Buffer, 16: Buffer Over Ran. | | | |
| VAR\_TYPE | CDF\_CHAR | support\_data | | | |

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Variable\_Name** | **Data\_type** | **DIMS** | **SIZES** | **R\_VARY** | **D\_VARY** |
| MODE | CDF\_UINT1 | 1 | 0 | T |  |
| **Attribute Name** | **Data Type** | **Value** | | | |
| CATDESC | CDF\_CHAR | Mode. 0: Normal Science, 1: Burst 1, 2: Burst 2, 3: Low Cadence. | | | |
| DEPEND\_0 | CDF\_CHAR | EPOCH | | | |
| FIELDNAM | CDF\_CHAR | MODE | | | |
| FILLVAL | CDF\_UINT1 | 255 | | | |
| FORMAT | CDF\_CHAR | I3 | | | |
| LABLAXIS | CDF\_CHAR | MODE | | | |
| SCALEMAX | CDF\_UINT1 | 5 | | | |
| SCALEMIN | CDFUINT1 | 0 | | | |
| SCALETYP | CDF\_CHAR | linear | | | |
| UNITS | CDF\_CHAR | NONE | | | |
| VALIDMAX | CDF\_UINT1 | 3 | | | |
| VALIDMIN | CDF\_UINT1 | 0 | | | |
| VAR\_NOTES | CDF\_CHAR | Normal: Full E/q range in nominal 30 sec scan, Burst1: E/q range optimized for slower solar wind in nominal 4 sec scan, Burst2: E/q range optimized for faster solar wind in nominal 4 sec scan, Low Cadence: Full E/q range in nominal 300 sec scan. | | | |
| VAR\_TYPE | CDF\_CHAR | support\_data | | | |

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| **Variable\_Name** | **Data\_type** | **DIMS** | **SIZES** | **R\_VARY** | **D\_VARY** |
| COMPRESSION\_CODE | CDF\_UINT2 | 1 | 0 | T |  |
| **Attribute Name** | **Data Type** | **Value** | | | |
| CATDESC | CDF\_CHAR | Compression Code Bitmask | | | |
| DEPEND\_0 | CDF\_CHAR | EPOCH | | | |
| FIELDNAM | CDF\_CHAR | COMPRESSION\_CODE | | | |
| FILLVAL | CDF\_UINT2 | 65535 | | | |
| FORMAT | CDF\_CHAR | I5 | | | |
| LABLAXIS | CDF\_CHAR | COMPRESSION\_CODE | | | |
| SCALEMAX | CDF\_UINT2 | 2100 | | | |
| SCALEMIN | CDF\_UINT2 | 0 | | | |
| SCALETYP | CDF\_CHAR | linear | | | |
| UNITS | CDF\_CHAR | NONE | | | |
| VALIDMAX | CDF\_UINT2 | 2047 | | | |
| VALIDMIN | CDF\_UINT2 | 0 | | | |
| VAR\_NOTES | CDF\_CHAR | Compression code bitmask. 0 = Lossy A, 1 = Lossy C. Bits: 0:SSD, 1:Priorities, 2:Starts, 3:Stops, 4:Double Coincidence, 5:Triple Coincidence, 6:Low TOF, 7:Alpha Decimation, 8:Proton Decimation, 9:Position A Singles, 10:Position B Singles. | | | |
| VAR\_TYPE | CDF\_CHAR | support\_data | | | |

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| **Variable\_Name** | **Data\_type** | **DIMS** | **SIZES** | **R\_VARY** | **D\_VARY** |
| STEP\_TABLE | CDF\_UINT1 | **0** |  | **T** |  |
| **Attribute Name** | **Data Type** | **Value** | | | |
| CATDESC | CDF\_CHAR | Step table | | | |
| DEPEND\_0 | CDF\_CHAR | EPOCH | | | |
| DISPLAY\_TYPE | CDF\_CHAR | time\_series | | | |
| FIELDNAM | CDF\_CHAR | STEP\_TABLE | | | |
| FILLVAL | CDF\_UINT1 | 255 | | | |
| FORMAT | CDF\_CHAR | I3 | | | |
| LABLAXIS | CDF\_CHAR | STEP\_TABLE | | | |
| SCALEMAX | CDF\_UINT1 | 20 | | | |
| SCALEMIN | CDF\_UINT1 | 0 | | | |
| SCALETYP | CDF\_CHAR | linear | | | |
| UNITS | CDF\_CHAR | NONE | | | |
| VALIDMAX | CDF\_UINT1 | 15 | | | |
| VALIDMIN | CDF\_UINT1 | 0 | | | |
| VAR\_NOTES | CDF\_CHAR | Science Configuration Packet’s HV Sweep Scan Control Table Identification Number | | | |
| VAR\_TYPE | CDF\_CHAR | support\_data | | | |

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| **Variable\_Name** | **Data\_type** | **DIMS** | **SIZES** | **R\_VARY** | **D\_VARY** |
| MAIN\_ENABLES | CDF\_UINT2 | **0** |  | **T** |  |
| **Attribute Name** | **Data Type** | **Value** | | | |
| CATDESC | CDF\_CHAR | Main enables | | | |
| DEPEND\_0 | CDF\_CHAR | EPOCH | | | |
| DISPLAY\_TYPE | CDF\_CHAR | time\_series | | | |
| FIELDNAM | CDF\_CHAR | MAIN\_ENABLES | | | |
| FILLVAL | CDF\_UINT2 | 65535 | | | |
| FORMAT | CDF\_CHAR | I5 | | | |
| LABLAXIS | CDF\_CHAR | MAIN\_ENABLES | | | |
| SCALEMAX | CDF\_UINT2 | 1500 | | | |
| SCALEMIN | CDF\_UINT2 | 0 | | | |
| SCALETYP | CDF\_CHAR | linear | | | |
| UNITS | CDF\_CHAR | NONE | | | |
| VALIDMAX | CDF\_UINT2 | 1023 | | | |
| VALIDMIN | CDF\_UINT2 | 0 | | | |
| VAR\_NOTES | CDF\_CHAR | Bitmask for enabled rates. 1 = Enabled, Bit1 = Least Significant Bit. Bit 1: SSD Rate, 2: Priority, 3: Start, 4: Stop, 5: Double Coincidence, 6: Triple Coincidence, 7: Low TOF Decimation, 8: Alpha Decimation, 9: Proton Decimation, 10: Position A, 11: Position B. | | | |
| VAR\_TYPE | CDF\_CHAR | support\_data | | | |

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| **Variable\_Name** | **Data\_type** | **DIMS** | **SIZES** | **R\_VARY** | **D\_VARY** |
| SSD\_ENABLES | CDF\_UINT4 | **0** |  | **T** |  |
| **Attribute Name** | **Data Type** | **Value** | | | |
| CATDESC | CDF\_CHAR | SSD enables | | | |
| DEPEND\_0 | CDF\_CHAR | EPOCH | | | |
| DISPLAY\_TYPE | CDF\_CHAR | time\_series | | | |
| FIELDNAM | CDF\_CHAR | SSD\_ENABLES | | | |
| FILLVAL | CDF\_UINT4 | 4294967295 | | | |
| FORMAT | CDF\_CHAR | I5 | | | |
| LABLAXIS | CDF\_CHAR | SSD\_ENABLES | | | |
| SCALEMAX | CDF\_UINT4 | 1E10 | | | |
| SCALEMIN | CDF\_UINT4 | 0 | | | |
| SCALETYP | CDF\_CHAR | linear | | | |
| UNITS | CDF\_CHAR | NONE | | | |
| VALIDMAX | CDF\_UINT4 | 2147483647 | | | |
| VALIDMIN | CDF\_UINT4 | 0 | | | |
| VAR\_NOTES | CDF\_CHAR | Bitmask for enabled SSD rates. 1 = Enabled, Bit1 = Least Significant Bit. | | | |
| VAR\_TYPE | CDF\_CHAR | support\_data | | | |

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| --- | --- | --- | --- | --- | --- |
| **Variable\_Name** | **Data\_type** | **DIMS** | **SIZES** | **R\_VARY** | **D\_VARY** |
| PRIORITY\_ENABLES | CDF\_UINT2 | **0** |  | **T** |  |
| **Attribute Name** | **Data Type** | **Value** | | | |
| CATDESC | CDF\_CHAR | Priority enables | | | |
| DEPEND\_0 | CDF\_CHAR | EPOCH | | | |
| DISPLAY\_TYPE | CDF\_CHAR | time\_series | | | |
| FIELDNAM | CDF\_CHAR | PRIORITY\_ENABLES | | | |
| FILLVAL | CDF\_UINT2 | 65535 | | | |
| FORMAT | CDF\_CHAR | I5 | | | |
| LABLAXIS | CDF\_CHAR | PRIORITY\_ENABLES | | | |
| SCALEMAX | CDF\_UINT2 | 300 | | | |
| SCALEMIN | CDF\_UINT2 | 0 | | | |
| SCALETYP | CDF\_CHAR | linear | | | |
| UNITS | CDF\_CHAR | NONE | | | |
| VALIDMAX | CDF\_UINT2 | 255 | | | |
| VALIDMIN | CDF\_UINT2 | 0 | | | |
| VAR\_NOTES | CDF\_CHAR | Bitmask for enabled Priority rates. 1 = Enabled, Bit1 = Least Significant Bit. | | | |
| VAR\_TYPE | CDF\_CHAR | support\_data | | | |

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| --- | --- | --- | --- | --- | --- |
| **Variable\_Name** | **Data\_type** | **DIMS** | **SIZES** | **R\_VARY** | **D\_VARY** |
| START\_DIMENSIONS | CDF\_UINT1 | **1** | **2** | **T** | T |
| **Attribute Name** | **Data Type** | **Value** | | | |
| CATDESC | CDF\_CHAR | Start dimensions | | | |
| DEPEND\_0 | CDF\_CHAR | EPOCH | | | |
| DISPLAY\_TYPE | CDF\_CHAR | time\_series | | | |
| FIELDNAM | CDF\_CHAR | START\_DIMENSIONS | | | |
| FILLVAL | CDF\_UINT1 | 255 | | | |
| FORMAT | CDF\_CHAR | I5 | | | |
| LABLAXIS | CDF\_CHAR | START\_DIMENSIONS | | | |
| SCALEMAX | CDF\_UINT1 | 65 | | | |
| SCALEMIN | CDF\_UINT1 | 0 | | | |
| SCALETYP | CDF\_CHAR | linear | | | |
| UNITS | CDF\_CHAR | NONE | | | |
| VALIDMAX | CDF\_UINT1 | 64 | | | |
| VALIDMIN | CDF\_UINT1 | 0 | | | |
| VAR\_NOTES | CDF\_CHAR | Number of E/q Steps and Number of Elevation Steps for Start Rate | | | |
| VAR\_TYPE | CDF\_CHAR | support\_data | | | |

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| --- | --- | --- | --- | --- | --- |
| **Variable\_Name** | **Data\_type** | **DIMS** | **SIZES** | **R\_VARY** | **D\_VARY** |
| STOP\_DIMENSIONS | CDF\_UINT1 | 1 | 2 | T | T |
| **Attribute Name** | **Data Type** | **Value** | | | |
| CATDESC | CDF\_CHAR | Stop dimensions | | | |
| DEPEND\_0 | CDF\_CHAR | EPOCH | | | |
| DISPLAY\_TYPE | CDF\_CHAR | time\_series | | | |
| FIELDNAM | CDF\_CHAR | STOP\_DIMENSIONS | | | |
| FILLVAL | CDF\_UINT1 | 255 | | | |
| FORMAT | CDF\_CHAR | I5 | | | |
| LABLAXIS | CDF\_CHAR | STOP\_DIMENSIONS | | | |
| SCALEMAX | CDF\_UINT1 | 65 | | | |
| SCALEMIN | CDF\_UINT1 | 0 | | | |
| SCALETYP | CDF\_CHAR | linear | | | |
| UNITS | CDF\_CHAR | NONE | | | |
| VALIDMAX | CDF\_UINT1 | 64 | | | |
| VALIDMIN | CDF\_UINT1 | 0 | | | |
| VAR\_NOTES | CDF\_CHAR | Number of E/q Steps and Number of Elevation Steps for Stop Rate | | | |
| VAR\_TYPE | CDF\_CHAR | support\_data | | | |

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| --- | --- | --- | --- | --- | --- |
| **Variable\_Name** | **Data\_type** | **DIMS** | **SIZES** | **R\_VARY** | **D\_VARY** |
| DC\_DIMENSIONS | CDF\_UINT1 | 1 | 2 | **T** | T |
| **Attribute Name** | **Data Type** | **Value** | | | |
| CATDESC | CDF\_CHAR | Double coincidence dimensions | | | |
| DEPEND\_0 | CDF\_CHAR | EPOCH | | | |
| DISPLAY\_TYPE | CDF\_CHAR | time\_series | | | |
| FIELDNAM | CDF\_CHAR | DC\_DIMENSIONS | | | |
| FILLVAL | CDF\_UINT1 | 255 | | | |
| FORMAT | CDF\_CHAR | I5 | | | |
| LABLAXIS | CDF\_CHAR | DC\_DIMENSIONS | | | |
| SCALEMAX | CDF\_UINT1 | 65 | | | |
| SCALEMIN | CDF\_UINT1 | 0 | | | |
| SCALETYP | CDF\_CHAR | linear | | | |
| UNITS | CDF\_CHAR | NONE | | | |
| VALIDMAX | CDF\_UINT1 | 64 | | | |
| VALIDMIN | CDF\_UINT1 | 0 | | | |
| VAR\_NOTES | CDF\_CHAR | Number of E/q Steps and Number of Elevation Steps for Double Coincidence Rate | | | |
| VAR\_TYPE | CDF\_CHAR | support\_data | | | |

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| --- | --- | --- | --- | --- | --- |
| **Variable\_Name** | **Data\_type** | **DIMS** | **SIZES** | **R\_VARY** | **D\_VARY** |
| TC\_DIMENSIONS | CDF\_UINT1 | 1 | 2 | T | T |
| **Attribute Name** | **Data Type** | **Value** | | | |
| CATDESC | CDF\_CHAR | Triple coincidence dimensions | | | |
| DEPEND\_0 | CDF\_CHAR | EPOCH | | | |
| DISPLAY\_TYPE | CDF\_CHAR | time\_series | | | |
| FIELDNAM | CDF\_CHAR | TC\_DIMENSIONS | | | |
| FILLVAL | CDF\_UINT1 | 255 | | | |
| FORMAT | CDF\_CHAR | I5 | | | |
| LABLAXIS | CDF\_CHAR | TC\_DIMENSIONS | | | |
| SCALEMAX | CDF\_UINT1 | 65 | | | |
| SCALEMIN | CDF\_UINT1 | 0 | | | |
| SCALETYP | CDF\_CHAR | linear | | | |
| UNITS | CDF\_CHAR | NONE | | | |
| VALIDMAX | CDF\_UINT1 | 64 | | | |
| VALIDMIN | CDF\_UINT1 | 0 | | | |
| VAR\_NOTES | CDF\_CHAR | Number of E/q Steps and Number of Elevation Steps for Triple Coincidence Rate | | | |
| VAR\_TYPE | CDF\_CHAR | support\_data | | | |

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| --- | --- | --- | --- | --- | --- |
| **Variable\_Name** | **Data\_type** | **DIMS** | **SIZES** | **R\_VARY** | **D\_VARY** |
| LOW\_TOF\_DIMENSIONS | CDF\_UINT1 | 1 | 2 | T | T |
| **Attribute Name** | **Data Type** | **Value** | | | |
| CATDESC | CDF\_CHAR | Low TOF dimensions | | | |
| DEPEND\_0 | CDF\_CHAR | EPOCH | | | |
| DISPLAY\_TYPE | CDF\_CHAR | time\_series | | | |
| FIELDNAM | CDF\_CHAR | LOW\_TOF\_DIMENSIONS | | | |
| FILLVAL | CDF\_UINT1 | 255 | | | |
| FORMAT | CDF\_CHAR | I5 | | | |
| LABLAXIS | CDF\_CHAR | LOW\_TOF\_DIMENSIONS | | | |
| SCALEMAX | CDF\_UINT1 | 65 | | | |
| SCALEMIN | CDF\_UINT1 | 0 | | | |
| SCALETYP | CDF\_CHAR | linear | | | |
| UNITS | CDF\_CHAR | NONE | | | |
| VALIDMAX | CDF\_UINT1 | 64 | | | |
| VALIDMIN | CDF\_UINT1 | 0 | | | |
| VAR\_NOTES | CDF\_CHAR | Number of E/q Steps and Number of Elevation Steps for Low TOF Rate | | | |
| VAR\_TYPE | CDF\_CHAR | support\_data | | | |

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| --- | --- | --- | --- | --- | --- |
| **Variable\_Name** | **Data\_type** | **DIMS** | **SIZES** | **R\_VARY** | **D\_VARY** |
| PROTON\_DEC\_DIMENSIONS | CDF\_UINT1 | 1 | 2 | T | T |
| **Attribute Name** | **Data Type** | **Value** | | | |
| CATDESC | CDF\_CHAR | Proton decimation dimensions | | | |
| DEPEND\_0 | CDF\_CHAR | EPOCH | | | |
| DISPLAY\_TYPE | CDF\_CHAR | time\_series | | | |
| FIELDNAM | CDF\_CHAR | PROTON\_DEC\_DIMENSIONS | | | |
| FILLVAL | CDF\_UINT1 | 255 | | | |
| FORMAT | CDF\_CHAR | I5 | | | |
| LABLAXIS | CDF\_CHAR | PROTON\_DEC\_DIMENSIONS | | | |
| SCALEMAX | CDF\_UINT1 | 65 | | | |
| SCALEMIN | CDF\_UINT1 | 0 | | | |
| SCALETYP | CDF\_CHAR | linear | | | |
| UNITS | CDF\_CHAR | NONE | | | |
| VALIDMAX | CDF\_UINT1 | 64 | | | |
| VALIDMIN | CDF\_UINT1 | 0 | | | |
| VAR\_NOTES | CDF\_CHAR | Number of E/q Steps and Number of Elevation Steps for Proton Decimation Rate | | | |
| VAR\_TYPE | CDF\_CHAR | support\_data | | | |

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| --- | --- | --- | --- | --- | --- | --- |
| **Variable\_Name** | **Data\_type** | | **DIMS** | **SIZES** | **R\_VARY** | **D\_VARY** |
| ALPHA\_DEC\_DIMENSIONS | CDF\_UINT1 | 1 | | 2 | T | T |
| **Attribute Name** | **Data Type** | **Value** | | | | |
| CATDESC | CDF\_CHAR | Alpha decimation dimensions | | | | |
| DEPEND\_0 | CDF\_CHAR | EPOCH | | | | |
| DISPLAY\_TYPE | CDF\_CHAR | time\_series | | | | |
| FIELDNAM | CDF\_CHAR | ALPHA\_DEC\_DIMENSIONS | | | | |
| FILLVAL | CDF\_UINT1 | 255 | | | | |
| FORMAT | CDF\_CHAR | I5 | | | | |
| LABLAXIS | CDF\_CHAR | ALPHA\_DEC\_DIMENSIONS | | | | |
| SCALEMAX | CDF\_UINT1 | 65 | | | | |
| SCALEMIN | CDF\_UINT1 | 0 | | | | |
| SCALETYP | CDF\_CHAR | linear | | | | |
| UNITS | CDF\_CHAR | NONE | | | | |
| VALIDMAX | CDF\_UINT1 | 64 | | | | |
| VALIDMIN | CDF\_UINT1 | 0 | | | | |
| VAR\_NOTES | CDF\_CHAR | Number of E/q Steps and Number of Elevation Steps for Alpha Decimation Rate | | | | |
| VAR\_TYPE | CDF\_CHAR | support\_data | | | | |

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Variable\_Name** | **Data\_type** | **DIMS** | **SIZES** | **R\_VARY** | **D\_VARY** |
| POS\_A\_DIMENSIONS | CDF\_UINT1 | 1 | 2 | T | T |
| **Attribute Name** | **Data Type** | **Value** | | | |
| CATDESC | CDF\_CHAR | Proton decimation dimensions | | | |
| DEPEND\_0 | CDF\_CHAR | EPOCH | | | |
| DISPLAY\_TYPE | CDF\_CHAR | time\_series | | | |
| FIELDNAM | CDF\_CHAR | POS\_A\_DIMENSIONS | | | |
| FILLVAL | CDF\_UINT1 | 255 | | | |
| FORMAT | CDF\_CHAR | I5 | | | |
| LABLAXIS | CDF\_CHAR | POS\_A\_DIMENSIONS | | | |
| SCALEMAX | CDF\_UINT1 | 65 | | | |
| SCALEMIN | CDF\_UINT1 | 0 | | | |
| SCALETYP | CDF\_CHAR | linear | | | |
| UNITS | CDF\_CHAR | NONE | | | |
| VALIDMAX | CDF\_UINT1 | 64 | | | |
| VALIDMIN | CDF\_UINT1 | 0 | | | |
| VAR\_NOTES | CDF\_CHAR | Number of E/q Steps and Number of Elevation Steps for Position A Rate. | | | |
| VAR\_TYPE | CDF\_CHAR | support\_data | | | |

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| --- | --- | --- | --- | --- | --- |
| **Variable\_Name** | **Data\_type** | **DIMS** | **SIZES** | **R\_VARY** | **D\_VARY** |
| POS\_B\_DIMENSIONS | CDF\_UINT1 | 1 | 2 | T | T |
| **Attribute Name** | **Data Type** | **Value** | | | |
| CATDESC | CDF\_CHAR | Proton decimation dimensions | | | |
| DEPEND\_0 | CDF\_CHAR | EPOCH | | | |
| DISPLAY\_TYPE | CDF\_CHAR | time\_series | | | |
| FIELDNAM | CDF\_CHAR | POS\_B\_DIMENSIONS | | | |
| FILLVAL | CDF\_UINT1 | 255 | | | |
| FORMAT | CDF\_CHAR | I5 | | | |
| LABLAXIS | CDF\_CHAR | POS\_B\_DIMENSIONS | | | |
| SCALEMAX | CDF\_UINT1 | 65 | | | |
| SCALEMIN | CDF\_UINT1 | 0 | | | |
| SCALETYP | CDF\_CHAR | linear | | | |
| UNITS | CDF\_CHAR | NONE | | | |
| VALIDMAX | CDF\_UINT1 | 64 | | | |
| VAL.DMIN | CDF\_UINT1 | 0 | | | |
| VAR\_NOTES | CDF\_CHAR | Number of E/q Steps and Number of Elevation Steps for Position B Rate | | | |
| VAR\_TYPE | CDF\_CHAR | support\_data | | | |

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| --- | --- | --- | --- | --- | --- |
| **Variable\_Name** | **Data\_type** | **DIMS** | **SIZES** | **R\_VARY** | **D\_VARY** |
| SSD\_DIMENSIONS | CDF\_UINT1 | 1 | 3 | T | T |
| **Attribute Name** | **Data Type** | **Value** | | | |
| CATDESC | CDF\_CHAR | SSD dimensions | | | |
| DEPEND\_0 | CDF\_CHAR | EPOCH | | | |
| DISPLAY\_TYPE | CDF\_CHAR | time\_series | | | |
| FIELDNAM | CDF\_CHAR | SSD\_DIMENSIONS | | | |
| FILLVAL | CDF\_UINT1 | 255 | | | |
| FORMAT | CDF\_CHAR | I5 | | | |
| LABLAXIS | CDF\_CHAR | SSD\_DIMENSIONS | | | |
| SCALEMAX | CDF\_UINT1 | 65 | | | |
| SCALEMIN | CDF\_UINT1 | 0 | | | |
| SCALETYP | CDF\_CHAR | linear | | | |
| UNITS | CDF\_CHAR | NONE | | | |
| VALIDMAX | CDF\_UINT1 | 64 | | | |
| VALIDMIN | CDF\_UINT1 | 0 | | | |
| VAR\_NOTES | CDF\_CHAR | Number of SSDs and Number of E/q Steps and Number of Elevation Steps | | | |
| VAR\_TYPE | CDF\_CHAR | support\_data | | | |

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Variable\_Name** | **Data\_type** | **DIMS** | **SIZES** | **R\_VARY** | **D\_VARY** |
| PRIORITY\_DIMENSIONS | CDF\_UINT1 | 1 | 3 | T | T |
| **Attribute Name** | **Data Type** | **Value** | | | |
| CATDESC | CDF\_CHAR | Priority dimensions | | | |
| DEPEND\_0 | CDF\_CHAR | EPOCH | | | |
| DISPLAY\_TYPE | CDF\_CHAR | time\_series | | | |
| FIELDNAM | CDF\_CHAR | PRIORITY\_DIMENSIONS | | | |
| FILLVAL | CDF\_UINT1 | 255 | | | |
| FORMAT | CDF\_CHAR | I5 | | | |
| LABLAXIS | CDF\_CHAR | PRIORITY\_DIMENSIONS | | | |
| SCALEMAX | CDF\_UINT1 | 65 | | | |
| SCALEMIN | CDF\_UINT1 | 0 | | | |
| SCALETYP | CDF\_CHAR | linear | | | |
| UNITS | CDF\_CHAR | NONE | | | |
| VALIDMAX | CDF\_UINT1 | 64 | | | |
| VALIDMIN | CDF\_UINT1 | 0 | | | |
| VAR\_NOTES | CDF\_CHAR | Number of Priority Ranges and Number of E/q Steps and Number of Elevation Steps | | | |
| VAR\_TYPE | CDF\_CHAR | support\_data | | | |

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| --- | --- | --- | --- | --- | --- |
| **Variable\_Name** | **Data\_type** | **DIMS** | **SIZES** | **R\_VARY** | **D\_VARY** |
| START\_RATE | CDF\_FLOAT | 2 | 64 16 | T | T T |
| **Attribute Name** | **Data Type** | **Value** | | | |
| CATDESC | CDF\_CHAR | Start rate | | | |
| DEPEND\_0 | CDF\_CHAR | EPOCH | | | |
| DEPEND\_1 | CDF\_CHAR | EOQ | | | |
| DEPEND\_2 | CDF\_CHAR | ELEVATION | | | |
| DISPLAY\_TYPE | CDF\_CHAR | spectrogram | | | |
| FIELDNAM | CDF\_CHAR | START\_RATE | | | |
| FILLVAL | CDF\_FLOAT | -1E31 | | | |
| FORMAT | CDF\_CHAR | E10.3 | | | |
| LABL\_PTR\_1 | CDF\_CHAR | EOQ\_LABELS | | | |
| LABL\_PTR\_2 | CDF\_CHAR | ELEVATION\_LABELS | | | |
| SCALEMAX | CDF\_FLOAT | 2.5E9 | | | |
| SCALEMIN | CDF\_FLOAT | 0 | | | |
| SCALETYP | CDF\_CHAR | linear | | | |
| UNITS | CDF\_CHAR | counts per second | | | |
| VALIDMAX | CDF\_FLOAT | 2.04E9 | | | |
| VALIDMIN | CDF\_FLOAT | 0 | | | |
| VAR\_NOTES | CDF\_CHAR | Number of counts on Start MCP detector. Dimensions are maximum possible sizes. Consult START\_DIMENSIONS for actual sizes in data. | | | |
| VAR\_TYPE | CDF\_CHAR | data | | | |

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| --- | --- | --- | --- | --- | --- |
| **Variable\_Name** | **Data\_type** | **DIMS** | **SIZES** | **R\_VARY** | **D\_VARY** |
| STOP\_RATE | CDF\_UINT4 | 2 | 64 16 | T | T T |
| **Attribute Name** | **Data Type** | **Value** | | | |
| CATDESC | CDF\_CHAR | Stop rate | | | |
| DEPEND\_0 | CDF\_CHAR | EPOCH | | | |
| DEPEND\_1 | CDF\_CHAR | EOQ\_STEP | | | |
| DEPEND\_2 | CDF\_CHAR | ELEVATION | | | |
| DISPLAY\_TYPE | CDF\_CHAR | spectrogram | | | |
| FIELDNAM | CDF\_CHAR | STOP\_RATE | | | |
| FILLVAL | CDF\_FLOAT | -1E31 | | | |
| FORMAT | CDF\_CHAR | E10.3 | | | |
| LABL\_PTR\_1 | CDF\_CHAR | EOQ\_LABELS | | | |
| LABL\_PTR\_2 | CDF\_CHAR | ELEVATION\_LABELS | | | |
| SCALEMAX | CDF\_FLOAT | 2.5E9 | | | |
| SCALEMIN | CDF\_FLOAT | 0 | | | |
| SCALETYP | CDF\_CHAR | linear | | | |
| UNITS | CDF\_CHAR | counts per second | | | |
| VALIDMAX | CDF\_FLOAT | 2.04E9 | | | |
| VALIDMIN | CDF\_FLOAT | 0 | | | |
| VAR\_NOTES | CDF\_CHAR | Number of counts on Stop MCP detector. Dimensions are maximum possible sizes. Consult STOP\_DIMENSIONS for actual sizes in data. | | | |
| VAR\_TYPE | CDF\_CHAR | data | | | |

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| --- | --- | --- | --- | --- | --- |
| **Variable\_Name** | **Data\_type** | **DIMS** | **SIZES** | **R\_VARY** | **D\_VARY** |
| DC\_RATE | CDF\_FLOAT | 2 | 64 16 | T | T T |
| **Attribute Name** | **Data Type** | **Value** | | | |
| CATDESC | CDF\_CHAR | Double coincidence rate | | | |
| DEPEND\_0 | CDF\_CHAR | EPOCH | | | |
| DEPEND\_1 | CDF\_CHAR | EOQ | | | |
| DEPEND\_2 | CDF\_CHAR | ELEVATION | | | |
| DISPLAY\_TYPE | CDF\_CHAR | spectrogram | | | |
| FIELDNAM | CDF\_CHAR | DC\_RATE | | | |
| FILLVAL | CDF\_FLOAT | -1E31 | | | |
| FORMAT | CDF\_CHAR | E10.3 | | | |
| LABL\_PTR\_1 | CDF\_CHAR | EOQ\_LABELS | | | |
| LABL\_PTR\_2 | CDF\_CHAR | ELEVATION\_LABELS | | | |
| SCALEMAX | CDF\_FLOAT | 2.5E9 | | | |
| SCALEMIN | CDF\_FLOAT | 0 | | | |
| SCALETYP | CDF\_CHAR | linear | | | |
| UNITS | CDF\_CHAR | counts per second | | | |
| VALIDMAX | CDF\_FLOAT | 2.04E9 | | | |
| VALIDMIN | CDF\_FLOAT | 0 | | | |
| VAR\_NOTES | CDF\_CHAR | Number of double coincidence events that have a start signal with a corresponding stop signal. Dimensions are maximum possible sizes. Consult DC\_DIMENSIONS for actual sizes in data. | | | |
| VAR\_TYPE | CDF\_CHAR | data | | | |

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| --- | --- | --- | --- | --- | --- |
| **Variable\_Name** | **Data\_type** | **DIMS** | **SIZES** | **R\_VARY** | **D\_VARY** |
| TC\_RATE | CDF\_FLOAT | 2 | 64 16 | T | T T |
| **Attribute Name** | **Data Type** | **Value** | | | |
| CATDESC | CDF\_CHAR | Triple coincidence rate | | | |
| DEPEND\_0 | CDF\_CHAR | EPOCH | | | |
| DEPEND\_1 | CDF\_CHAR | EOQ | | | |
| DEPEND\_2 | CDF\_CHAR | ELEVATION | | | |
| DISPLAY\_TYPE | CDF\_CHAR | spectrogram | | | |
| FIELDNAM | CDF\_CHAR | TC\_RATE | | | |
| FILLVAL | CDF\_FLOAT | -1E31 | | | |
| FORMAT | CDF\_CHAR | E10.3 | | | |
| LABL\_PTR\_1 | CDF\_CHAR | EOQ\_LABELS | | | |
| LABL\_PTR\_2 | CDF\_CHAR | ELEVATION\_LABELS | | | |
| SCALEMAX | CDF\_FLOAT | 2.5E9 | | | |
| SCALEMIN | CDF\_FLOAT | 0 | | | |
| SCALETYP | CDF\_CHAR | linear | | | |
| UNITS | CDF\_CHAR | counts per second | | | |
| VALIDMAX | CDF\_FLOAT | 2.04E9 | | | |
| VALIDMIN | CDF\_FLOAT | 0 | | | |
| VAR\_NOTES | CDF\_CHAR | Number of triple coincidence events that have a start signal with a corresponding stop and energy signals. Dimensions are maximum possible sizes. Consult TC\_DIMENSIONS for actual sizes in data. | | | |
| VAR\_TYPE | CDF\_CHAR | data | | | |

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| **Variable\_Name** | **Data\_type** | **DIMS** | **SIZES** | **R\_VARY** | **D\_VARY** |
| LOW\_TOF\_RATE | CDF\_FLOAT | 2 | 64 16 | T | T T |
| **Attribute Name** | **Data Type** | **Value** | | | |
| CATDESC | CDF\_CHAR | Low TOF rate | | | |
| DEPEND\_0 | CDF\_CHAR | EPOCH | | | |
| DEPEND\_1 | CDF\_CHAR | EOQ | | | |
| DEPEND\_2 | CDF\_CHAR | ELEVATION | | | |
| DISPLAY\_TYPE | CDF\_CHAR | spectrogram | | | |
| FIELDNAM | CDF\_CHAR | LOW\_TOF\_RATE | | | |
| FILLVAL | CDF\_FLOAT | -1E31 | | | |
| FORMAT | CDF\_CHAR | E10.3 | | | |
| LABL\_PTR\_1 | CDF\_CHAR | EOQ\_LABELS | | | |
| LABL\_PTR\_2 | CDF\_CHAR | ELEVATION\_LABELS | | | |
| SCALEMAX | CDF\_FLOAT | 2.5E9 | | | |
| SCALEMIN | CDF\_FLOAT | 0 | | | |
| SCALETYP | CDF\_CHAR | linear | | | |
| UNITS | CDF\_CHAR | counts per second | | | |
| VALIDMAX | CDF\_FLOAT | 2.04E9 | | | |
| VALIDMIN | CDF\_FLOAT | 0 | | | |
| VAR\_NOTES | CDF\_CHAR | Number of double coincidence events below low TOF threshold. Dimensions are maximum possible sizes. Consult LOW\_TOF\_DIMENSIONS for actual sizes in data. | | | |
| VAR\_TYPE | CDF\_CHAR | data | | | |

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| **Variable\_Name** | **Data\_type** | **DIMS** | **SIZES** | **R\_VARY** | **D\_VARY** |
| PROTON\_DEC\_RATE | CDF\_FLOAT | 2 | 64 16 | T | T T |
| **Attribute Name** | **Data Type** | **Value** | | | |
| CATDESC | CDF\_CHAR | Proton decimation rate | | | |
| DEPEND\_0 | CDF\_CHAR | EPOCH | | | |
| DEPEND\_1 | CDF\_CHAR | EOQ | | | |
| DEPEND\_2 | CDF\_CHAR | ELEVATION | | | |
| DISPLAY\_TYPE | CDF\_CHAR | spectrogram | | | |
| FIELDNAM | CDF\_CHAR | PROTON\_DEC\_RATE | | | |
| FILLVAL | CDF\_FLOAT | -1E31 | | | |
| FORMAT | CDF\_CHAR | E10.3 | | | |
| LABL\_PTR\_1 | CDF\_CHAR | EOQ\_LABELS | | | |
| LABL\_PTR\_2 | CDF\_CHAR | ELEVATION\_LABELS | | | |
| SCALEMAX | CDF\_FLOAT | 2.5E9 | | | |
| SCALEMIN | CDF\_FLOAT | 0 | | | |
| SCALETYP | CDF\_CHAR | linear | | | |
| UNITS | CDF\_CHAR | counts per second | | | |
| VALIDMAX | CDF\_FLOAT | 2.04E9 | | | |
| VALIDMIN | CDF\_FLOAT | 0 | | | |
| VAR\_NOTES | CDF\_CHAR | Number of double coincidence events within proton TOF range. Dimensions are maximum possible sizes. Consult PROTON\_DEC\_DIMENSIONS for actual sizes in data. | | | |
| VAR\_TYPE | CDF\_CHAR | data | | | |

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| --- | --- | --- | --- | --- | --- |
| **Variable\_Name** | **Data\_type** | **DIMS** | **SIZES** | **R\_VARY** | **D\_VARY** |
| ALPHA\_DEC\_RATE | CDF\_FLOAT | 2 | 64 16 | T | T T |
| **Attribute Name** | **Data Type** | **Value** | | | |
| CATDESC | CDF\_CHAR | Alpha decimation rate | | | |
| DEPEND\_0 | CDF\_CHAR | EPOCH | | | |
| DEPEND\_1 | CDF\_CHAR | EOQ | | | |
| DEPEND\_2 | CDF\_CHAR | ELEVATION | | | |
| DISPLAY\_TYPE | CDF\_CHAR | spectrogram | | | |
| FIELDNAM | CDF\_CHAR | ALPHA\_DEC\_RATE | | | |
| FILLVAL | CDF\_FLOAT | -1E31 | | | |
| FORMAT | CDF\_CHAR | E10.3 | | | |
| LABL\_PTR\_1 | CDF\_CHAR | EOQ\_LABELS | | | |
| LABL\_PTR\_2 | CDF\_CHAR | ELEVATION\_LABELS | | | |
| SCALEMAX | CDF\_FLOAT | 2.5E9 | | | |
| SCALEMIN | CDF\_FLOAT | 0 | | | |
| SCALETYP | CDF\_CHAR | linear | | | |
| UNITS | CDF\_CHAR | counts per second | | | |
| VALIDMAX | CDF\_FLOAT | 2.04E9 | | | |
| VALIDMIN | CDF\_FLOAT | 0 | | | |
| VAR\_NOTES | CDF\_CHAR | Number of double coincidence events within alpha TOF range. Dimensions are maximum possible sizes. Consult ALPHA\_DEC\_DIMENSIONS for actual sizes in data. | | | |
| VAR\_TYPE | CDF\_CHAR | data | | | |

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| --- | --- | --- | --- | --- | --- |
| **Variable\_Name** | **Data\_type** | **DIMS** | **SIZES** | **R\_VARY** | **D\_VARY** |
| POS\_A\_RATE | CDF\_FLOAT | 2 | 64 16 | T | T T |
| **Attribute Name** | **Data Type** | **Value** | | | |
| CATDESC | CDF\_CHAR | Position A rate | | | |
| DEPEND\_0 | CDF\_CHAR | EPOCH | | | |
| DEPEND\_1 | CDF\_CHAR | EOQ | | | |
| DEPEND\_2 | CDF\_CHAR | ELEVATION | | | |
| DISPLAY\_TYPE | CDF\_CHAR | spectrogram | | | |
| FIELDNAM | CDF\_CHAR | POS\_A\_RATE | | | |
| FILLVAL | CDF\_FLOAT | -1E31 | | | |
| FORMAT | CDF\_CHAR | E10.3 | | | |
| LABL\_PTR\_1 | CDF\_CHAR | EOQ\_LABELS | | | |
| LABL\_PTR\_2 | CDF\_CHAR | ELEVATION\_LABELS | | | |
| SCALEMAX | CDF\_FLOAT | 2.5E9 | | | |
| SCALEMIN | CDF\_FLOAT | 0 | | | |
| SCALETYP | CDF\_CHAR | linear | | | |
| UNITS | CDF\_CHAR | counts per second | | | |
| VALIDMAX | CDF\_FLOAT | 2.04E9 | | | |
| VALIDMIN | CDF\_FLOAT | 0 | | | |
| VAR\_NOTES | CDF\_CHAR | Counts/sec on Position A detector. Dimensions are maximum possible sizes. Consult POS\_A\_DIMENSIONS for actual sizes in data. | | | |
| VAR\_TYPE | CDF\_CHAR | data | | | |

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| **Variable\_Name** | **Data\_type** | **DIMS** | **SIZES** | **R\_VARY** | **D\_VARY** |
| POS\_B\_RATE | CDF\_FLOAT | 2 | 64 16 | T | T T |
| **Attribute Name** | **Data Type** | **Value** | | | |
| CATDESC | CDF\_CHAR | Position B rate | | | |
| DEPEND\_0 | CDF\_CHAR | EPOCH | | | |
| DEPEND\_1 | CDF\_CHAR | EOQ | | | |
| DEPEND\_2 | CDF\_CHAR | ELEVATION | | | |
| DISPLAY\_TYPE | CDF\_CHAR | spectrogram | | | |
| FIELDNAM | CDF\_CHAR | POS\_B\_RATE | | | |
| FILLVAL | CDF\_FLOAT | -1E31 | | | |
| FORMAT | CDF\_CHAR | E10.3 | | | |
| LABL\_PTR\_1 | CDF\_CHAR | EOQ\_LABELS | | | |
| LABL\_PTR\_2 | CDF\_CHAR | ELEVATION\_LABELS | | | |
| SCALEMAX | CDF\_FLOAT | 2.5E9 | | | |
| SCALEMIN | CDF\_FLOAT | 0 | | | |
| SCALETYP | CDF\_CHAR | linear | | | |
| UNITS | CDF\_CHAR | counts per second | | | |
| VALIDMAX | CDF\_FLOAT | 2.04E9 | | | |
| VALIDMIN | CDF\_FLOAT | 0 | | | |
| VAR\_NOTES | CDF\_CHAR | Counts/sec on Position B detector. Dimensions are maximum possible sizes. Consult POS\_B\_DIMENSIONS for actual sizes in data. | | | |
| VAR\_TYPE | CDF\_CHAR | data | | | |

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| **Variable\_Name** | **Data\_type** | **DIMS** | **SIZES** | **R\_VARY** | **D\_VARY** |
| SSD\_RATE | CDF\_FLOAT | 3 | 32 64 16 | T | T T T |
| **Attribute Name** | **Data Type** | **Value** | | | |
| CATDESC | CDF\_CHAR | SSD rate | | | |
| DEPEND\_0 | CDF\_CHAR | EPOCH | | | |
| DEPEND\_1 | CDF\_CHAR | SSD | | | |
| DEPEND\_2 | CDF\_CHAR | EOQ | | | |
| DEPEND\_3 | CDF\_CHAR | ELEVATION | | | |
| DISPLAY\_TYPE | CDF\_CHAR | spectrogram | | | |
| FIELDNAM | CDF\_CHAR | SSD\_RATE | | | |
| FILLVAL | CDF\_FLOAT | -1E31 | | | |
| FORMAT | CDF\_CHAR | E10.3 | | | |
| LABL\_PTR\_1 | CDF\_CHAR | SSD\_LABELS | | | |
| LABL\_PTR\_2 | CDF\_CHAR | EOQ\_LABELS | | | |
| LABL\_PTR\_3 | CDF\_CHAR | ELEVATION\_LABELS | | | |
| SCALEMAX | CDF\_FLOAT | 2.4E9 | | | |
| SCALEMIN | CDF\_FLOAT | 0 | | | |
| SCALETYP | CDF\_CHAR | linear | | | |
| UNITS | CDF\_CHAR | counts per second | | | |
| VALIDMAX | CDF\_FLOAT | 2.04E9 | | | |
| VALIDMIN | CDF\_FLOAT | 0 | | | |
| VAR\_NOTES | CDF\_CHAR | Number of counts on each solid state detector. Dimensions are maximum possible sizes. Consult SSD\_DIMENSIONS for actual sizes in data. | | | |
| VAR\_TYPE | CDF\_CHAR | data | | | |

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| --- | --- | --- | --- | --- | --- |
| **Variable\_Name** | **Data\_type** | **DIMS** | **SIZES** | **R\_VARY** | **D\_VARY** |
| PRIORITY\_RATE | CDF\_FLOAT | 3 | 8 64 16 | T | T T T |
| **Attribute Name** | **Data Type** | **Value** | | | |
| CATDESC | CDF\_CHAR | Priority rate | | | |
| DEPEND\_0 | CDF\_CHAR | EPOCH | | | |
| DEPEND\_1 | CDF\_CHAR | PRIORITY | | | |
| DEPEND\_2 | CDF\_CHAR | EOQ | | | |
| DEPEND\_3 | CDF\_CHAR | ELEVATION | | | |
| DISPLAY\_TYPE | CDF\_CHAR | spectrogram | | | |
| FIELDNAM | CDF\_CHAR | PRIORITY\_RATE | | | |
| FILLVAL | CDF\_FLOAT | -1E31 | | | |
| FORMAT | CDF\_CHAR | E10.3 | | | |
| LABL\_PTR\_1 | CDF\_CHAR | PRIORITY\_LABELS | | | |
| LABL\_PTR\_2 | CDF\_CHAR | EOQ\_LABELS | | | |
| LABL\_PTR\_3 | CDF\_CHAR | ELEVATION\_LABELS | | | |
| SCALEMAX | CDF\_FLOAT | 2.5E9 | | | |
| SCALEMIN | CDF\_FLOAT | 0 | | | |
| SCALETYP | CDF\_CHAR | linear | | | |
| UNITS | CDF\_CHAR | counts per second | | | |
| VALIDMAX | CDF\_FLOAT | 2.04E9 | | | |
| VALIDMIN | CDF\_FLOAT | 0 | | | |
| VAR\_NOTES | CDF\_CHAR | Number of events in each priority range. 0: double coincidence PHAs (pickup ions), 1: Fe, 2: Mg, Si, S, 3: CNO (except O6+), 4: O6+, 5: Alphas, 6: Protons, 7: Error (low or unrealistically long TOFs). Dimensions are maximum possible sizes. Consult PRIORITY\_DIMENSIONS for actual sizes in data. | | | |
| VAR\_TYPE | CDF\_CHAR | data | | | |

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| --- | --- | --- | --- | --- | --- |
| **Variable\_Name** | **Data\_type** | **DIMS** | **SIZES** | **R\_VARY** | **D\_VARY** |
| EOQ | CDF\_FLOAT | 1 | 64 | F | T |
| **Attribute Name** | **Data Type** | **Value** | | | |
| CATDESC | CDF\_CHAR | E/q step | | | |
| FIELDNAM | CDF\_CHAR | EOQ | | | |
| FILLVAL | CDF\_FLOAT | -1E31 | | | |
| FORMAT | CDF\_CHAR | E10.3 | | | |
| LABLAXIS | CDF\_CHAR | EOQ | | | |
| SCALEMAX | CDF\_FLOAT | 80 | | | |
| SCALEMIN | CDF\_FLOAT | 0 | | | |
| SCALETYP | CDF\_CHAR | linear | | | |
| UNITS | CDF\_CHAR | NONE | | | |
| VALIDMAX | CDF\_FLOAT | 80 | | | |
| VALIDMIN | CDF\_FLOAT | 0 | | | |
| VAR\_NOTES | CDF\_CHAR | E/q steps spanning the range 0.50 to 75.1 keV/e | | | |
| VAR\_TYPE | CDF\_CHAR | support\_data | | | |

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| **Variable\_Name** | **Data\_type** | **Number Elements** | **DIMS** | **SIZES** | **R\_VARY** | **D\_VARY** |
| EOQ\_LABELS | CDF\_CHAR | **5** | **1** | **64** | **F** | T |
| **Attribute Name** | **Data Type** | **Value** | | | | |
| CATDESC | CDF\_CHAR | E/q Labels | | | | |
| FIELDNAM | CDF\_CHAR | EOQ\_LABELS | | | | |
| FORMAT | CDF\_CHAR | A5 | | | | |
| VAR\_TYPE | CDF\_CHAR | meta\_data | | | | |

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| --- | --- | --- | --- | --- | --- |
| **Variable\_Name** | **Data\_type** | **DIMS** | **SIZES** | **R\_VARY** | **D\_VARY** |
| ELEVATION | CDF\_FLOAT | 1 | 16 | F | T |
| **Attribute Name** | **Data Type** | **Value** | | | |
| CATDESC | CDF\_CHAR | Elevation step | | | |
| FIELDNAM | CDF\_CHAR | ELEVATION | | | |
| FILLVAL | CDF\_FLOAT | -1E31 | | | |
| FORMAT | CDF\_CHAR | E10.3 | | | |
| LABLAXIS | CDF\_CHAR | ELEVATION | | | |
| SCALEMAX | CDF\_FLOAT | 20 | | | |
| SCALEMIN | CDF\_FLOAT | -25 | | | |
| SCALETYP | CDF\_CHAR | linear | | | |
| UNITS | CDF\_CHAR | NONE | | | |
| VALIDMAX | CDF\_FLOAT | 20 | | | |
| VALIDMIN | CDF\_FLOAT | -25 | | | |
| VAR\_NOTES | CDF\_CHAR | The elevation range is nominally -20 to +16 deg, with +/-3 degree uncertainty.  These values are subject to change after in-flight calibration. | | | |
| VAR\_TYPE | CDF\_CHAR | support\_data | | | |

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| **Variable\_Name** | **Data\_type** | **Number Elements** | **DIMS** | **SIZES** | **R\_VARY** | **D\_VARY** |
| ELEVATION\_LABELS | CDF\_CHAR | 6 | 1 | 16 | F | T |
| **Attribute Name** | **Data Type** | **Value** | | | | |
| CATDESC | CDF\_CHAR | Elevation Labels | | | | |
| FIELDNAM | CDF\_CHAR | ELEVATION\_LABELS | | | | |
| FORMAT | CDF\_CHAR | A6 | | | | |
| VAR\_TYPE | CDF\_CHAR | meta\_data | | | | |

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| **Variable\_Name** | **Data\_type** | **DIMS** | **SIZES** | **R\_VARY** | **D\_VARY** |
| SSD | CDF\_FLOAT | 1 | 32 | F | T |
| **Attribute Name** | **Data Type** | **Value** | | | |
| CATDESC | CDF\_CHAR | SSD | | | |
| FIELDNAM | CDF\_CHAR | SSD | | | |
| FILLVAL | CDF\_FLOAT | -1E31 | | | |
| FORMAT | CDF\_CHAR | E10.3 | | | |
| LABLAXIS | CDF\_CHAR | SSD | | | |
| SCALEMAX | CDF\_FLOAT | 35 | | | |
| SCALEMIN | CDF\_FLOAT | 0 | | | |
| SCALETYP | CDF\_CHAR | linear | | | |
| UNITS | CDF\_CHAR | NONE | | | |
| VALIDMAX | CDF\_FLOAT | 31 | | | |
| VALIDMIN | CDF\_FLOAT | 0 | | | |
| VAR\_NOTES | CDF\_CHAR | The azimuth range is nominally -33 to +66 degrees, with +/- 3 degree uncertainty.  These values are subject to change after in-flight calibration. | | | |
| VAR\_TYPE | CDF\_CHAR | support\_data | | | |

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| **Variable\_Name** | **Data\_type** | **Number Elements** | **DIMS** | **SIZES** | **R\_VARY** | **D\_VARY** |
| SSD\_LABELS | CDF\_CHAR | 3 | 1 | 32 | F | T |
| **Attribute Name** | **Data Type** | **Value** | | | | |
| CATDESC | CDF\_CHAR | SSD Labels | | | | |
| FIELDNAM | CDF\_CHAR | SSD\_LABELS | | | | |
| FORMAT | CDF\_CHAR | A3 | | | | |
| VAR\_TYPE | CDF\_CHAR | meta\_data | | | | |

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| **Variable\_Name** | **Data\_type** | **DIMS** | **SIZES** | **R\_VARY** | **D\_VARY** |
| PRIORITY | CDF\_UINT1 | 1 | 8 | F | T |
| **Attribute Name** | **Data Type** | **Value** | | | |
| CATDESC | CDF\_CHAR | Priority | | | |
| FIELDNAM | CDF\_CHAR | PRIORITY | | | |
| FILLVAL | CDF\_UINT1 | 255 | | | |
| FORMAT | CDF\_CHAR | I3 | | | |
| LABLAXIS | CDF\_CHAR | PRIORITY | | | |
| SCALEMAX | CDF\_UINT1 | 10 | | | |
| SCALEMIN | CDF\_UINT1 | 0 | | | |
| SCALETYP | CDF\_CHAR | linear | | | |
| UNITS | CDF\_CHAR | NONE | | | |
| VALIDMAX | CDF\_UINT1 | 7 | | | |
| VALIDMIN | CDF\_UINT1 | 0 | | | |
| VAR\_NOTES | CDF\_CHAR | 0: double coincidence PHAs (pickup ions), 1: Fe, 2: Mg, Si, S, 3: O6+, 4: CNO (except O6+), 5: Alphas, 6: Protons, 7: Error (low or unrealistically long TOFs). | | | |
| VAR\_TYPE | CDF\_CHAR | support\_data | | | |

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| **Variable\_Name** | **Data\_type** | **Number Elements** | **DIMS** | **SIZES** | **R\_VARY** | **D\_VARY** |
| PRIORITY\_LABELS | CDF\_CHAR | **3** | **1** | **8** | **F** | T |
| **Attribute Name** | **Data Type** | **Value** | | | | |
| CATDESC | CDF\_CHAR | Priority Labels | | | | |
| FIELDNAM | CDF\_CHAR | PRIORITY\_LABELS | | | | |
| FORMAT | CDF\_CHAR | A3 | | | | |
| VAR\_TYPE | CDF\_CHAR | meta\_data | | | | |

##### HIS L2 PHA Data

**Filename:** solo\_L2\_swa-his-pha\_yyyymmdd\_V01.cdf

**Global metadata**

|  |  |  |
| --- | --- | --- |
| **Name** | **Entry** | **Value** |
| Acknowledgement | 1 | Please acknowledge Chris J. Owen (SWA PI -- UCL MSSL) & Stefano Livi (HIS PI -- SwRI). NASA Contract NNG10EK25C. |
| Data\_product | 1 | pha> Pulse Height Analysis data for HIS instrument |
| Data\_type | 1 | pha\_l2 |
| Data\_version | 1 | 01 |
| Descriptor | 1 | SWA-HIS>Solar Wind Analyzer-Heavy Ion Sensor |
| Discipline | 1 | Space Physics>Interplanetary Studies |
| File\_naming\_convention | 1 | "source\_descriptor\_datatype\_yyyyMMdd |
| Generated\_by | 1 | SO-HIS SOC, University of Michigan |
| Generation\_date | 1 | 20200611 |
| HTTP\_LINK |  |  |
| Instrument\_type | 1 | Particles (space) |
| LEVEL | 1 | 2 |
| LINK\_TEXT |  |  |
| LINK\_TITLE |  |  |
| Logical\_file\_id | 1 | solo\_L2\_swa-his-pha\_00000000\_v01 |
| Logical\_source | 1 | solo\_L2\_swa-his-pha |
| Logical\_source\_description | 1 | solo\_L2\_swa-his-pha |
| Mission\_group | 1 | Solar Orbiter |
| MODS | 1 | Initial Release 1/27/2021. |
| PI\_affiliation | 1 | SWRI |
| PI\_name | 1 | S. Livi |
| Project | 1 | SOLO>Solar Orbiter |
| Rules\_of\_use | 1 | These Level 2 data require substantial processing for most applications. Users are encouraged to use Level 3 data, which provide the most relevant data products for scientific research. See Data Product Description Document for more information. Contact SWA/HIS team for more information as needed.. |
| Software\_version | 1 | 00.00.00 |
| SOOP\_TYPE |  |  |
| Source\_name | 1 | SOLO>Solar Orbiter |
| spase\_DatasetResourceID |  |  |
| TARGET\_CLASS | 1 | In-Situ |
| TARGET\_NAME | 1 | Solar Wind |
| TARGET\_REGION | 1 | Heliosphere |
| TEXT | 1 | Pulse Height Analysis data for HIS instrument in physical units. Some corrections for instrument characteristics and measurement techniques have been applied. Per Data Product Description Document, efficiency corrections have not been applied. |
|  | 2 | Ion Event (PHA) words. Individual ion event data, containing full information on incident angles (elevation and azimuth), E/q, TOF and SSD energy in digital units. The resolution of this data product can be 30s or 300s. In Burst mode the resolution can be 4s but this can only be run on average 1% of the time due to telemetry constraints." |
|  | 3 | Level 1 data are unvalidated and requires substantial processing to use for publication. |
| TIME\_MAX | 1 |  |
| TIME\_MIN | 1 |  |
| Time\_resolution | 1 | 4 sec, 30 sec, or 300 sec |

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| **Variable\_Name** | **Data\_type** | **DIMS** | **SIZES** | **R\_VARY** | **D\_VARY** |
| EPOCH | CDF\_TIME\_TT2000 | 1 | 0 | T |  |
| **Attribute Name** | **Data Type** | **Value** | | | |
| CATDESC | CDF\_CHAR | Default time | | | |
| FIELDNAM | CDF\_CHAR | EPOCH | | | |
| FILLVAL | CDF\_TIME\_TT2000 | 9999-12-31T23:59:59.999999999 | | | |
| LABLAXIS | CDF\_CHAR | EPOCH | | | |
| MONOTON | CDF\_CHAR | INCREASE | | | |
| REFERENCE\_POSITION | CDF\_CHAR | Rotating Earth Geoid | | | |
| SCALETYP | CDF\_CHAR | linear | | | |
| TIME\_BASE | CDF\_CHAR | J2000 | | | |
| TIME\_SCALE | CDF\_CHAR | Terrestrial Time | | | |
| UNITS | CDF\_CHAR | ns | | | |
| VALIDMIN | CDF\_TIME\_TT2000 | 1990-01-01T00:00:00.000000000 | | | |
| VALIDMAX | CDF\_TIME\_TT2000 | 2049-12-31T23:59:59.999000000 | | | |
| VAR\_NOTES | CDF\_CHAR | Time in seconds since January 1, 2000, 12:00:00.000. Converted from SCET via SPICE time kernel provided by the mission. Currently set to start of accumulation interval. | | | |
| VAR\_TYPE | CDF\_CHAR | support\_data | | | |

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| **Variable\_Name** | **Data\_type** | **DIMS** | **SIZES** | **R\_VARY** | **D\_VARY** |
| SCET | CDF\_REAL8 | 1 | 0 | T |  |
| **Attribute Name** | **Data Type** | **Value** | | | |
| CATDESC | CDF\_CHAR | SCET | | | |
| DEPEND\_0 | CDF\_CHAR | EPOCH | | | |
| FIELDNAM | CDF\_CHAR | SCET | | | |
| FILLVAL | CDF\_REAL8 | -1.00E+31 | | | |
| FORMAT | CDF\_CHAR | E12.2 | | | |
| LABLAXIS | CDF\_CHAR | SCET | | | |
| SCALEMAX | CDF\_REAL8 | 8.00E+12 | | | |
| SCALEMIN | CDF\_REAL8 | 5.00E+12 | | | |
| SCALETYP | CDF\_CHAR | linear | | | |
| UNITS | CDF\_CHAR | milliseconds | | | |
| VALIDMAX | CDF\_REAL8 | 1.00E+14 | | | |
| VALIDMIN | CDF\_REAL8 | 0 | | | |
| VAR\_NOTES | CDF\_CHAR | Mission elapsed time in spacecraft clock ticks. Note: These are effected by environmental conditions and do not match Earth-based seconds. Beginning of accumulation. | | | |
| VAR\_TYPE | CDF\_CHAR | support\_data | | | |

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| **Variable\_Name** | **Data\_type** | **DIMS** | **SIZES** | **R\_VARY** | **D\_VARY** |
| ACCUM\_SECONDS | CDF\_REAL8 | 1 | 0 | T |  |
| **Attribute Name** | **Data Type** | **Value** | | | |
| CATDESC | CDF\_CHAR | ACCUM\_SECONDS | | | |
| DEPEND\_0 | CDF\_CHAR | EPOCH | | | |
| FIELDNAM | CDF\_CHAR | ACCUM\_SECONDS | | | |
| FILLVAL | CDF\_REAL8 | -1.00E+31 | | | |
| FORMAT | CDF\_CHAR | E12.2 | | | |
| LABLAXIS | CDF\_CHAR | ACCUM\_SECONDS | | | |
| SCALEMAX | CDF\_REAL8 | 0.3 | | | |
| SCALEMIN | CDF\_REAL8 | 0.003 | | | |
| SCALETYP | CDF\_CHAR | linear | | | |
| UNITS | CDF\_CHAR | seconds | | | |
| VALIDMAX | CDF\_REAL8 | 0.3 | | | |
| VALIDMIN | CDF\_REAL8 | 0.003 | | | |
| VAR\_NOTES | CDF\_CHAR | Accumulation time in seconds for each E/q and elevation step. | | | |
| VAR\_TYPE | CDF\_CHAR | support\_data | | | |

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| **Variable\_Name** | **Data\_type** | **DIMS** | **SIZES** | **R\_VARY** | **D\_VARY** |
| QUALITY\_FLAG | CDF\_UINT1 | 1 | 0 | T |  |
| **Attribute Name** | **Data Type** | **Value** | | | |
| CATDESC | CDF\_CHAR | QUALITY\_FLAG | | | |
| DEPEND\_0 | CDF\_CHAR | EPOCH | | | |
| DISPLAY\_TYPE | CDF\_CHAR | time\_series | | | |
| FIELDNAM | CDF\_CHAR | QUALITY\_FLAG | | | |
| FILLVAL | CDF\_UINT1 | 255 | | | |
| FORMAT | CDF\_CHAR | I3 | | | |
| LABLAXIS | CDF\_CHAR | QUALITY\_FLAG | | | |
| SCALEMAX | CDF\_UINT1 | 3 | | | |
| SCALEMIN | CDF\_UINT1 | 0 | | | |
| SCALETYP | CDF\_CHAR | linear | | | |
| UNITS | CDF\_CHAR | NONE | | | |
| VALIDMAX | CDF\_UINT1 | 2 | | | |
| VALIDMIN | CDF\_UINT1 | 0 | | | |
| VAR\_NOTES | CDF\_CHAR | 0=good, 1=caution, 2=bad | | | |
| VAR\_TYPE | CDF\_CHAR | support\_data | | | |

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| **Variable\_Name** | **Data\_type** | **DIMS** | **SIZES** | **R\_VARY** | **D\_VARY** |
| QUALITY\_BITMASK | CDF\_UINT2 | 1 | 0 | T |  |
| **Attribute Name** | **Data Type** | **Value** | | | |
| CATDESC | CDF\_CHAR | QUALITY\_BITMASK | | | |
| DEPEND\_0 | CDF\_CHAR | EPOCH | | | |
| DISPLAY\_TYPE | CDF\_CHAR | time\_series | | | |
| FIELDNAM | CDF\_CHAR | QUALITY\_BITMASK | | | |
| FILLVAL | CDF\_UINT2 | 65535 | | | |
| FORMAT | CDF\_CHAR | I5 | | | |
| LABLAXIS | CDF\_CHAR | QUALITY\_BITMASK | | | |
| SCALEMAX | CDF\_UINT2 | 1100 | | | |
| SCALEMIN | CDF\_UINT2 | 0 | | | |
| SCALETYP | CDF\_CHAR | linear | | | |
| UNITS | CDF\_CHAR | NONE | | | |
| VALIDMAX | CDF\_UINT2 | 1023 | | | |
| VALIDMIN | CDF\_UINT2 | 0 | | | |
| VAR\_NOTES | CDF\_CHAR | 0:No Issue, 1:Multi-SSD flag set, 2:No matching priority rate, 4:PHA outside priority rate range, 8:No matching count for PHA in priority range, 16:Bad Start MCP, 32:Uncalibrated TOF, 64:Priority Table Invalid, 128:Low Quality SSD Trim Callibration, 256:Peak on Edge of Priority Range, 512:Bad SSD Assignment. | | | |
| VAR\_TYPE | CDF\_CHAR | support\_data | | | |

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| **Variable\_Name** | **Data\_type** | **DIMS** | **SIZES** | **R\_VARY** | **D\_VARY** |
| MODE | CDF\_UINT1 | 1 | 0 | T |  |
| **Attribute Name** | **Data Type** | **Value** | | | |
| CATDESC | CDF\_CHAR | Mode. 0: Normal Science, 1: Burst 1, 2: Burst 2, 3: Low Cadence. | | | |
| DEPEND\_0 | CDF\_CHAR | EPOCH | | | |
| FIELDNAM | CDF\_CHAR | MODE | | | |
| FILLVAL | CDF\_UINT1 | 255 | | | |
| FORMAT | CDF\_CHAR | I3 | | | |
| LABLAXIS | CDF\_CHAR | MODE | | | |
| SCALEMAX | CDF\_UINT1 | 5 | | | | |
| SCALEMIN | CDFUINT1 | 0 | | | | |
| SCALETYP | CDF\_CHAR | linear | | | |
| UNITS | CDF\_CHAR | NONE | | | |
| VALIDMAX | CDF\_UINT1 | 2 | | | |
| VALIDMIN | CDF\_UINT1 | 0 | | | |
| VAR\_NOTES | CDF\_CHAR | Normal: Full E/q range in nominal 30 sec scan, Burst1: E/q range optimized for slower solar wind in nominal 4 sec scan, Burst2: E/q range optimized for faster solar wind in nominal 4 sec scan, Low Cadence: Full E/q range in nominal 300 sec scan. | | | |
| VAR\_TYPE | CDF\_CHAR | support\_data | | | |

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| **Variable\_Name** | **Data\_type** | **DIMS** | **SIZES** | **R\_VARY** | **D\_VARY** |
| NUM\_PHA | CDF\_UINT2 | 1 | 0 | T |  |
| **Attribute Name** | **Data Type** | **Value** | | | |
| CATDESC | CDF\_CHAR | Number of PHA telemetered | | | |
| DEPEND\_0 | CDF\_CHAR | EPOCH | | | |
| FIELDNAM | CDF\_CHAR | NUM\_PHA | | | |
| FILLVAL | CDF\_UINT2 | 65535 | | | |
| FORMAT | CDF\_CHAR | I5 | | | |
| LABLAXIS | CDF\_CHAR | NUM\_PHA | | | |
| SCALEMAX | CDF\_UINT2 | 35000 | | | | |
| SCALEMIN | CDF\_UINT2 | 0 | | | | |
| SCALETYP | CDF\_CHAR | linear | | | |
| UNITS | CDF\_CHAR | NONE | | | |
| VALIDMAX | CDF\_UINT2 | 32767 | | | |
| VALIDMIN | CDF\_UINT2 | 0 | | | |
| VAR\_NOTES | CDF\_CHAR | Number of PHA telemetered in this scan | | | |
| VAR\_TYPE | CDF\_CHAR | support\_data | | | |

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| **Variable\_Name** | **Data\_type** | **DIMS** | **SIZES** | **R\_VARY** | **D\_VARY** |
| PROTON\_DECIMATION\_LEVEL | CDF\_UINT1 | 1 | 0 | T |  |
| **Attribute Name** | **Data Type** | **Value** | | | |
| CATDESC | CDF\_CHAR | Proton Decimation Level | | | |
| DEPEND\_0 | CDF\_CHAR | EPOCH | | | |
| FIELDNAM | CDF\_CHAR | PROTON\_DECIMATION\_LEVEL | | | |
| FILLVAL | CDF\_UINT1 | 255 | | | |
| FORMAT | CDF\_CHAR | I3 | | | |
| LABLAXIS | CDF\_CHAR | PROTON\_DEC\_LVL | | | |
| SCALEMAX | CDF\_UINT1 | 20 | | | |
| SCALEMIN | CDF\_UINT1 | 0 | | | |
| SCALETYP | CDF\_CHAR | linear | | | |
| UNITS | CDF\_CHAR | NONE | | | |
| VALIDMAX | CDF\_UINT1 | 15 | | | |
| VALIDMIN | CDF\_UINT1 | 0 | | | |
| VAR\_NOTES | CDF\_CHAR | Proton Decimation Level. One in 2^N protons are retained when decimation is enabled, where N is the proton decimation level. | | | |
| VAR\_TYPE | CDF\_CHAR | support\_data | | | |

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| **Variable\_Name** | **Data\_type** | **DIMS** | **SIZES** | **R\_VARY** | **D\_VARY** |
| ALPHA\_DECIMATION\_LEVEL | CDF\_UINT1 | 1 | 0 | T |  |
| **Attribute Name** | **Data Type** | **Value** | | | |
| CATDESC | CDF\_CHAR | Alpha Decimation Level | | | |
| DEPEND\_0 | CDF\_CHAR | EPOCH | | | |
| FIELDNAM | CDF\_CHAR | ALPHA\_DECIMATION\_LEVEL | | | |
| FILLVAL | CDF\_UINT1 | 255 | | | |
| FORMAT | CDF\_CHAR | I3 | | | |
| LABLAXIS | CDF\_CHAR | ALPHA\_DEC\_LVL | | | |
| SCALEMAX | CDF\_UINT1 | 20 | | | |
| SCALEMIN | CDF\_UINT1 | 0 | | | |
| SCALETYP | CDF\_CHAR | linear | | | |
| UNITS | CDF\_CHAR | NONE | | | |
| VALIDMAX | CDF\_UINT1 | 15 | | | |
| VALIDMIN | CDF\_UINT1 | 0 | | | |
| VAR\_NOTES | CDF\_CHAR | Alpha Decimation Level. One in 2^N protons are retained when decimation is enabled, where N is the alpha decimation level. | | | |
| VAR\_TYPE | CDF\_CHAR | support\_data | | | |

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| **Variable\_Name** | **Data\_type** | **DIMS** | **SIZES** | **R\_VARY** | **D\_VARY** |
| PRIORITY\_VERSION | CDF\_UINT1 | **0** |  | **T** |  |
| **Attribute Name** | **Data Type** | **Value** | | | |
| CATDESC | CDF\_CHAR | Priority Version | | | |
| DEPEND\_0 | CDF\_CHAR | EPOCH | | | |
| FIELDNAM | CDF\_CHAR | PRIORITY\_VERSION | | | |
| FILLVAL | CDF\_UINT1 | 255 | | | |
| FORMAT | CDF\_CHAR | I3 | | | |
| LABLAXIS | CDF\_CHAR | PRIORITY\_VERSION | | | |
| SCALEMAX | CDF\_UINT1 | 128 | | | |
| SCALEMIN | CDF\_UINT1 | 0 | | | |
| SCALETYP | CDF\_CHAR | linear | | | |
| UNITS | CDF\_CHAR | NONE | | | |
| VALIDMAX | CDF\_UINT1 | 127 | | | |
| VALIDMIN | CDF\_UINT1 | 0 | | | |
| VAR\_NOTES | CDF\_CHAR | Version number of the priority boundaries.  These define the 8 priorities, numbered 1-7, used to prioritize which PHAs are downlinked. | | | |
| VAR\_TYPE | CDF\_CHAR | support\_data | | | |

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| **Variable\_Name** | **Data\_type** | **DIMS** | **SIZES** | **R\_VARY** | **D\_VARY** |
| SPECIES\_BOX\_VERSION | CDF\_UINT1 | **0** |  | **T** |  |
| **Attribute Name** | **Data Type** | **Value** | | | |
| CATDESC | CDF\_CHAR | Species Box Version | | | |
| DEPEND\_0 | CDF\_CHAR | EPOCH | | | |
| FIELDNAM | CDF\_CHAR | SPECIES\_BOX\_VERSION | | | |
| FILLVAL | CDF\_UINT1 | 255 | | | |
| FORMAT | CDF\_CHAR | I3 | | | |
| LABLAXIS | CDF\_CHAR | SPECIES\_BOX\_VERSION | | | |
| SCALEMAX | CDF\_UINT1 | 128 | | | |
| SCALEMIN | CDF\_UINT1 | 0 | | | |
| SCALETYP | CDF\_CHAR | linear | | | |
| UNITS | CDF\_CHAR | NONE | | | |
| VALIDMAX | CDF\_UINT1 | 127 | | | |
| VALIDMIN | CDF\_UINT1 | 0 | | | |
| VAR\_NOTES | CDF\_CHAR | Version number of the species boxes.  These define 32 boxes in E/Q - TOF - E space which are set to the locations of counts for individual ion species. | | | |
| VAR\_TYPE | CDF\_CHAR | support\_data | | | |

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| **Variable\_Name** | **Data\_type** | **DIMS** | **SIZES** | **R\_VARY** | **D\_VARY** |
| SSD\_THRESHOLD\_VERSION | CDF\_UINT1 | **0** |  | **T** |  |
| **Attribute Name** | **Data Type** | **Value** | | | |
| CATDESC | CDF\_CHAR | SSD Threshold Version | | | |
| DEPEND\_0 | CDF\_CHAR | EPOCH | | | |
| FIELDNAM | CDF\_CHAR | SSD\_THRESHOLD\_VERSION | | | |
| FILLVAL | CDF\_UINT1 | 255 | | | |
| FORMAT | CDF\_CHAR | I3 | | | |
| LABLAXIS | CDF\_CHAR | SSD\_THRESHOLD\_VERSION | | | |
| SCALEMAX | CDF\_UINT1 | 128 | | | |
| SCALEMIN | CDF\_UINT1 | 0 | | | |
| SCALETYP | CDF\_CHAR | linear | | | |
| UNITS | CDF\_CHAR | NONE | | | |
| VALIDMAX | CDF\_UINT1 | 127 | | | |
| VALIDMIN | CDF\_UINT1 | 0 | | | |
| VAR\_NOTES | CDF\_CHAR | Version number of the set of SSD thresholds (1 master and 30 trim) used to collect the data. These settings affect the sensitivity of HIS and the noise allowed into the onboard event processing through the SSD subsystem.  Version numbers are given only to sets of values used for science data collection, not for testing. | | | |
| VAR\_TYPE | CDF\_CHAR | support\_data | | | |

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| **Variable\_Name** | **Data\_type** | **DIMS** | **SIZES** | **R\_VARY** | **D\_VARY** |
| PA\_HVPS\_SET\_POINT | CDF\_FOAT | **0** |  | **T** |  |
| **Attribute Name** | **Data Type** | **Value** | | | |
| CATDESC | CDF\_CHAR | PA HVPS set point | | | |
| DEPEND\_0 | CDF\_CHAR | EPOCH | | | |
| FIELDNAM | CDF\_CHAR | PA\_HVPS\_SET\_POINT | | | |
| FILLVAL | CDF\_FLOAT | -1.0e+31 | | | |
| FORMAT | CDF\_CHAR | E10.3 | | | |
| LABLAXIS | CDF\_CHAR | PA\_HVPS\_SET\_POINT | | | |
| SCALEMAX | CDF\_FLOAT | 0 | | | |
| SCALEMIN | CDF\_FLOAT | -32 | | | |
| SCALETYP | CDF\_CHAR | linear | | | |
| UNITS | CDF\_CHAR | kV | | | |
| VALIDMAX | CDF\_FLOAT | 0 | | | |
| VALIDMIN | CDF\_FLOAT | -31 | | | |
| VAR\_NOTES | CDF\_CHAR | This is the voltage setting for the PA HVPS, e.g. -10 kV, -25 kV.  Note:  It is not the reading of the on-board voltage monitor for this supply. Valid [0, -30 kV]. | | | |
| VAR\_TYPE | CDF\_CHAR | support\_data | | | |

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| **Variable\_Name** | **Data\_type** | **DIMS** | **SIZES** | **R\_VARY** | **D\_VARY** |
| PHA\_EOQ\_STEP | CDF\_UINT1 | 1 | 0 | T |  |
| **Attribute Name** | **Data Type** | **Value** | | | |
| CATDESC | CDF\_CHAR | HIS E/q index of each PHA | | | |
| DEPEND\_0 | CDF\_CHAR | EPOCH | | | |
| DISPLAY\_TYPE | CDF\_CHAR | time\_series | | | |
| FIELDNAM | CDF\_CHAR | PHA\_EOQ\_STEP | | | |
| FILLVAL | CDF\_UINT1 | 255 | | | |
| FORMAT | CDF\_CHAR | I5 | | | |
| LABLAXIS | CDF\_CHAR | PHA\_EOQ\_STEP | | | |
| SCALEMAX | CDF\_UINT1 | 65 | | | |
| SCALEMIN | CDF\_UINT1 | 0 | | | |
| SCALETYP | CDF\_CHAR | linear | | | |
| UNITS | CDF\_CHAR | NONE | | | |
| VALIDMAX | CDF\_UINT1 | 63 | | | |
| VALIDMIN | CDF\_UINT1 | 0 | | | |
| VAR\_NOTES | CDF\_CHAR | E/q index corresponding to the E/q - elevation pair in the HV Step table | | | |
| VAR\_TYPE | CDF\_CHAR | data | | | |

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| **Variable\_Name** | **Data\_type** | **DIMS** | **SIZES** | **R\_VARY** | **D\_VARY** |
| PHA\_EOQ | CDF\_FLOAT | 1 | 0 | T |  |
| **Attribute Name** | **Data Type** | **Value** | | | |
| CATDESC | CDF\_CHAR | HIS E/q f each PHA | | | |
| DEPEND\_0 | CDF\_CHAR | EPOCH | | | |
| DISPLAY\_TYPE | CDF\_CHAR | time\_series | | | |
| FIELDNAM | CDF\_CHAR | PHA\_EOQ | | | |
| FILLVAL | CDF\_FLOAT | -1E31 | | | |
| FORMAT | CDF\_CHAR | E10.3 | | | |
| LABLAXIS | CDF\_CHAR | PHA\_EOQ | | | |
| SCALEMAX | CDF\_FLOAT | 80 | | | |
| SCALEMIN | CDF\_FLOAT | 0 | | | |
| SCALETYP | CDF\_CHAR | log | | | |
| UNITS | CDF\_CHAR | keV/e | | | |
| VALIDMAX | CDF\_FLOAT | 75.0 | | | |
| VALIDMIN | CDF\_FLOAT | 0.5 | | | |
| VAR\_NOTES | CDF\_CHAR | E/q corresponding to the E/q - elevation pair in the HV Step table | | | |
| VAR\_TYPE | CDF\_CHAR | data | | | |

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| **Variable\_Name** | **Data\_type** | **DIMS** | **SIZES** | **R\_VARY** | **D\_VARY** |
| PHA\_AZIMUTH\_BIN | CDF\_UINT1 | 1 | 0 |  | T |
| **Attribute Name** | **Data Type** | **Value** | | | |
| CATDESC | CDF\_CHAR | HIS azimuth bin for each PHA | | | |
| DEPEND\_0 | CDF\_CHAR | EPOCH | | | |
| DISPLAY\_TYPE | CDF\_CHAR | time\_series | | | |
| FIELDNAM | CDF\_CHAR | PHA\_AZIMUTH\_BIN | | | |
| FILLVAL | CDF\_UINT1 | 255 | | | |
| FORMAT | CDF\_CHAR | I3 | | | |
| LABLAXIS | CDF\_CHAR | PHA\_AZIMUTH\_BIN | | | |
| SCALEMAX | CDF\_UINT1 | 63 | | | |
| SCALEMIN | CDF\_UINT1 | 0 | | | |
| SCALETYP | CDF\_CHAR | linear | | | |
| UNITS | CDF\_CHAR | NONE | | | |
| VALIDMAX | CDF\_UINT1 | 63 | | | |
| VALIDMIN | CDF\_UINT1 | 0 | | | |
| VAR\_NOTES | CDF\_CHAR | Azimuth bin derived from the Start MCP position | | | |
| VAR\_TYPE | CDF\_CHAR | data | | | |

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| --- | --- | --- | --- | --- | --- |
| **Variable\_Name** | **Data\_type** | **DIMS** | **SIZES** | **R\_VARY** | **D\_VARY** |
| PHA\_AZIMUTH | CDF\_FLOAT | 1 | 0 |  | T |
| **Attribute Name** | **Data Type** | **Value** | | | |
| CATDESC | CDF\_CHAR | HIS azimuth for each PHA | | | |
| DEPEND\_0 | CDF\_CHAR | EPOCH | | | |
| DISPLAY\_TYPE | CDF\_CHAR | time\_series | | | |
| FIELDNAM | CDF\_CHAR | PHA\_AZIMUTH | | | |
| FILLVAL | CDF\_FLOAT | -1E31 | | | |
| FORMAT | CDF\_CHAR | E10.3 | | | |
| LABLAXIS | CDF\_CHAR | PHA\_AZIMUTH | | | |
| SCALEMAX | CDF\_FLOAT | 70 | | | |
| SCALEMIN | CDF\_FLOAT | -35 | | | |
| SCALETYP | CDF\_CHAR | linear | | | |
| UNITS | CDF\_CHAR | Degrees | | | |
| VALIDMAX | CDF\_FLOAT | 88.0 | | | |
| VALIDMIN | CDF\_FLOAT | -39.26 | | | |
| VAR\_NOTES | CDF\_CHAR | Azimuth angle derived from the Start MCP position | | | |
| VAR\_TYPE | CDF\_CHAR | data | | | |

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| --- | --- | --- | --- | --- | --- |
| **Variable\_Name** | **Data\_type** | **DIMS** | **SIZES** | **R\_VARY** | **D\_VARY** |
| PHA\_ELEVATION\_BIN | CDF\_UINT1 | 1 | 0 | T |  |
| **Attribute Name** | **Data Type** | **Value** | | | |
| CATDESC | CDF\_CHAR | HIS elevation angle bin for each PHA | | | |
| DEPEND\_0 | CDF\_CHAR | EPOCH | | | |
| DISPLAY\_TYPE | CDF\_CHAR | time\_series | | | |
| FIELDNAM | CDF\_CHAR | PHA\_ELEVATION\_BIN | | | |
| FILLVAL | CDF\_UINT1 | 255 | | | |
| FORMAT | CDF\_CHAR | I5 | | | |
| LABLAXIS | CDF\_CHAR | PHA\_ELEVATION\_BIN | | | |
| SCALEMAX | CDF\_UINT1 | 15 | | | |
| SCALEMIN | CDF\_UINT1 | 0 | | | |
| SCALETYP | CDF\_CHAR | linear | | | |
| UNITS | CDF\_CHAR | NONE | | | |
| VALIDMAX | CDF\_UINT1 | 15 | | | |
| VALIDMIN | CDF\_UINT1 | 0 | | | |
| VAR\_NOTES | CDF\_CHAR | Elevation angle bin corresponding to the E/q - elevation pair in the HV Step table | | | |
| VAR\_TYPE | CDF\_CHAR | data | | | |

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| --- | --- | --- | --- | --- | --- |
| **Variable\_Name** | **Data\_type** | **DIMS** | **SIZES** | **R\_VARY** | **D\_VARY** |
| PHA\_ELEVATION | CDF\_FLOAT | 1 | 0 | T |  |
| **Attribute Name** | **Data Type** | **Value** | | | |
| CATDESC | CDF\_CHAR | HIS elevation angle for each PHA | | | |
| DEPEND\_0 | CDF\_CHAR | EPOCH | | | |
| DISPLAY\_TYPE | CDF\_CHAR | time\_series | | | |
| FIELDNAM | CDF\_CHAR | PHA\_ELEVATION | | | |
| FILLVAL | CDF\_FLOAT | -1E31 | | | |
| FORMAT | CDF\_CHAR | E10.3 | | | |
| LABLAXIS | CDF\_CHAR | PHA\_ELEVATION | | | |
| SCALEMAX | CDF\_FLOAT | 20 | | | |
| SCALEMIN | CDF\_FLOAT | -25 | | | |
| SCALETYP | CDF\_CHAR | linear | | | |
| UNITS | CDF\_CHAR | Degrees | | | |
| VALIDMAX | CDF\_FLOAT | 15.8 | | | |
| VALIDMIN | CDF\_FLOAT | -20.2 | | | |
| VAR\_NOTES | CDF\_CHAR | Elevation angle corresponding to the E/q - elevation pair in the HV Step table | | | |
| VAR\_TYPE | CDF\_CHAR | data | | | |

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| --- | --- | --- | --- | --- | --- |
| **Variable\_Name** | **Data\_type** | **DIMS** | **SIZES** | **R\_VARY** | **D\_VARY** |
| PHA\_TOF\_BIN | CDF\_UINT2 | 1 | 0 | T |  |
| **Attribute Name** | **Data Type** | **Value** | | | |
| CATDESC | CDF\_CHAR | HIS TOF bin for each PHA | | | |
| DEPEND\_0 | CDF\_CHAR | EPOCH | | | |
| DISPLAY\_TYPE | CDF\_CHAR | time\_series | | | |
| FIELDNAM | CDF\_CHAR | PHA\_TOF\_BIN | | | |
| FILLVAL | CDF\_UINT2 | 65535 | | | |
| FORMAT | CDF\_CHAR | I6 | | | |
| LABLAXIS | CDF\_CHAR | PHA\_TOF\_BIN | | | |
| SCALEMAX | CDF\_UINT2 | 511 | | | |
| SCALEMIN | CDF\_UINT2 | 0 | | | |
| SCALETYP | CDF\_CHAR | linear | | | |
| UNITS | CDF\_CHAR | NONE | | | |
| VALIDMAX | CDF\_UINT2 | 511 | | | |
| VALIDMIN | CDF\_UINT2 | 0 | | | |
| VAR\_NOTES | CDF\_CHAR | Time-Of-Flight bin | | | |
| VAR\_TYPE | CDF\_CHAR | data | | | |

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Variable\_Name** | **Data\_type** | **DIMS** | **SIZES** | **R\_VARY** | **D\_VARY** |
| PHA\_TOF | CDF\_FLOAT | 1 | 0 | T |  |
| **Attribute Name** | **Data Type** | **Value** | | | |
| CATDESC | CDF\_CHAR | HIS TOF for each PHA | | | |
| DEPEND\_0 | CDF\_CHAR | EPOCH | | | |
| DISPLAY\_TYPE | CDF\_CHAR | time\_series | | | |
| FIELDNAM | CDF\_CHAR | PHA\_TOF | | | |
| FILLVAL | CDF\_FLOAT | -1E31 | | | |
| FORMAT | CDF\_CHAR | E10.3 | | | |
| LABLAXIS | CDF\_CHAR | PHA\_TOF | | | |
| SCALEMAX | CDF\_FLOAT | 350 | | | |
| SCALEMIN | CDF\_FLOAT | 0 | | | |
| SCALETYP | CDF\_CHAR | linear | | | |
| UNITS | CDF\_CHAR | ns | | | |
| VALIDMAX | CDF\_FLOAT | 323.694 | | | |
| VALIDMIN | CDF\_FLOAT | 1.764 | | | |
| VAR\_NOTES | CDF\_CHAR | Time-Of-Flight | | | |
| VAR\_TYPE | CDF\_CHAR | data | | | |

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Variable\_Name** | **Data\_type** | **DIMS** | **SIZES** | **R\_VARY** | **D\_VARY** |
| PHA\_SSD\_ENERGY\_BIN | CDF\_UINT2 | 1 | 0 | T |  |
| **Attribute Name** | **Data Type** | **Value** | | | |
| CATDESC | CDF\_CHAR | HIS SSD energy bin for each PHA | | | |
| DEPEND\_0 | CDF\_CHAR | EPOCH | | | |
| DISPLAY\_TYPE | CDF\_CHAR | time\_series | | | |
| FIELDNAM | CDF\_CHAR | PHA\_SSD\_ENERGY\_BIN | | | |
| FILLVAL | CDF\_UINT2 | 65535 | | | |
| FORMAT | CDF\_CHAR | I6 | | | |
| LABLAXIS | CDF\_CHAR | PHA\_SSD\_ENERGY\_BIN | | | |
| SCALEMAX | CDF\_UINT2 | 511 | | | |
| SCALEMIN | CDF\_UINT2 | 0 | | | |
| SCALETYP | CDF\_CHAR | linear | | | |
| UNITS | CDF\_CHAR | NONE | | | |
| VALIDMAX | CDF\_UINT2 | 511 | | | |
| VALIDMIN | CDF\_UINT2 | 0 | | | |
| VAR\_NOTES | CDF\_CHAR | Solid State Detector Energy Bin. Represents total ion energy after post-acceleration. | | | |
| VAR\_TYPE | CDF\_CHAR | data | | | |

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Variable\_Name** | **Data\_type** | **DIMS** | **SIZES** | **R\_VARY** | **D\_VARY** |
| PHA\_SSD\_ENERGY | CDF\_FLOAT | 1 | 0 | T |  |
| **Attribute Name** | **Data Type** | **Value** | | | |
| CATDESC | CDF\_CHAR | HIS SSD energy for each PHA | | | |
| DEPEND\_0 | CDF\_CHAR | EPOCH | | | |
| DISPLAY\_TYPE | CDF\_CHAR | time\_series | | | |
| FIELDNAM | CDF\_CHAR | PHA\_SSD\_ENERGY | | | |
| FILLVAL | CDF\_FLOAT | -1E31 | | | |
| FORMAT | CDF\_CHAR | E10.3 | | | |
| LABLAXIS | CDF\_CHAR | PHA\_SSD\_ENERGY | | | |
| SCALEMAX | CDF\_FLOAT | 1000 | | | |
| SCALEMIN | CDF\_FLOAT | -110 | | | |
| SCALETYP | CDF\_CHAR | linear | | | |
| UNITS | CDF\_CHAR | keV | | | |
| VALIDMAX | CDF\_FLOAT | 977.854 | | | |
| VALIDMIN | CDF\_FLOAT | -102.4 | | | |
| VAR\_NOTES | CDF\_CHAR | Solid State Detector Energy. Represents total ion energy after post-acceleration. | | | |
| VAR\_TYPE | CDF\_CHAR | data | | | |

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Variable\_Name** | **Data\_type** | **DIMS** | **SIZES** | **R\_VARY** | **D\_VARY** |
| PHA\_DETECTOR\_ID | CDF\_UINT1 | 1 | 0 | T |  |
| **Attribute Name** | **Data Type** | **Value** | | | |
| CATDESC | CDF\_CHAR | HIS SSD ID | | | |
| DEPEND\_0 | CDF\_CHAR | EPOCH | | | |
| DISPLAY\_TYPE | CDF\_CHAR | time\_series | | | |
| FIELDNAM | CDF\_CHAR | PHA\_DETECTOR\_ID | | | |
| FILLVAL | CDF\_UINT1 | 255 | | | |
| FORMAT | CDF\_CHAR | I3 | | | |
| LABLAXIS | CDF\_CHAR | PHA\_DETECTOR\_ID | | | |
| SCALEMAX | CDF\_UINT1 | 31 | | | |
| SCALEMIN | CDF\_UINT1 | 0 | | | |
| SCALETYP | CDF\_CHAR | linear | | | |
| UNITS | CDF\_CHAR | NONE | | | |
| VALIDMAX | CDF\_UINT1 | 31 | | | |
| VALIDMIN | CDF\_UINT1 | 0 | | | |
| VAR\_NOTES | CDF\_CHAR | ID of Solid State Detector on which ion was measured. Also contains azimuthal angle information, complementing that which is derived from the Start MCP. | | | |
| VAR\_TYPE | CDF\_CHAR | data | | | |

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Variable\_Name** | **Data\_type** | **DIMS** | **SIZES** | **R\_VARY** | **D\_VARY** |
| PHA\_DETECTOR\_ANGLE | CDF\_FLOAT | 1 | 0 | T |  |
| **Attribute Name** | **Data Type** | **Value** | | | |
| CATDESC | CDF\_CHAR | HIS SSD ANGLE | | | |
| DEPEND\_0 | CDF\_CHAR | EPOCH | | | |
| DISPLAY\_TYPE | CDF\_CHAR | time\_series | | | |
| FIELDNAM | CDF\_CHAR | PHA\_DETECTOR\_ANGLE | | | |
| FILLVAL | CDF\_FLOAT | -1E31 | | | |
| FORMAT | CDF\_CHAR | E10.3 | | | |
| LABLAXIS | CDF\_CHAR | PHA\_DETECTOR\_ANGLE | | | |
| SCALEMAX | CDF\_FLOAT | 70 | | | |
| SCALEMIN | CDF\_FLOAT | -35 | | | |
| SCALETYP | CDF\_CHAR | linear | | | |
| UNITS | CDF\_CHAR | Degrees | | | |
| VALIDMAX | CDF\_FLOAT | 66.6 | | | |
| VALIDMIN | CDF\_FLOAT | -34.15 | | | |
| VAR\_NOTES | CDF\_CHAR | Angle of Solid State Detector on which ion was measured. Also contains azimuthal angle information, complementing that which is derived from the Start MCP. | | | |
| VAR\_TYPE | CDF\_CHAR | data | | | |

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Variable\_Name** | **Data\_type** | **DIMS** | **SIZES** | **R\_VARY** | **D\_VARY** |
| PHA\_DECIMATION\_CLASSIFICATION | CDF\_UINT1 | 1 | 0 | T |  |
| **Attribute Name** | **Data Type** | **Value** | | | |
| CATDESC | CDF\_CHAR | HIS decimation classification | | | |
| DEPEND\_0 | CDF\_CHAR | EPOCH | | | |
| DISPLAY\_TYPE | CDF\_CHAR | time\_series | | | |
| SCALETYP | CDF\_CHAR | linear | | | |
| FIELDNAM | CDF\_CHAR | PHA\_DECIMATION\_CLASSIFICATION | | | |
| FILLVAL | CDF\_UINT1 | 255 | | | |
| FORMAT | CDF\_CHAR | I3 | | | |
| LABLAXIS | CDF\_CHAR | PHA\_DECIMATION\_CLASSIFICATION | | | |
| SCALEMAX | CDF\_UINT1 | 3 | | | |
| SCALEMIN | CDF\_UINT1 | 0 | | | |
| UNITS | CDF\_CHAR | NONE | | | |
| VALIDMAX | CDF\_UINT1 | 3 | | | |
| VALIDMIN | CDF\_UINT1 | 0 | | | |
| VAR\_NOTES | CDF\_CHAR | Decimation range, if any, into which ion TOF is classified | | | |
| VAR\_TYPE | CDF\_CHAR | data | | | |

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Variable\_Name** | **Data\_type** | **DIMS** | **SIZES** | **R\_VARY** | **D\_VARY** |
| PHA\_PRIORITIZATION\_ RANGE | CDF\_UINT1 | 1 | 0 | T |  |
| **Attribute Name** | **Data Type** | **Value** | | | |
| CATDESC | CDF\_CHAR | HIS prioritization range | | | |
| DEPEND\_0 | CDF\_CHAR | EPOCH | | | |
| DISPLAY\_TYPE | CDF\_CHAR | time\_series | | | |
| FIELDNAM | CDF\_CHAR | PHA\_PRIORITIZATION\_RANGE | | | |
| FILLVAL | CDF\_UINT1 | 255 | | | |
| FORMAT | CDF\_CHAR | I3 | | | |
| LABLAXIS | CDF\_CHAR | PHA\_PRIORITIZATION\_RANGE | | | |
| SCALEMAX | CDF\_UINT1 | 7 | | | |
| SCALEMIN | CDF\_UINT1 | 0 | | | |
| SCALETYP | CDF\_CHAR | linear | | | |
| UNITS | CDF\_CHAR | NONE | | | |
| VALIDMAX | CDF\_UINT1 | 7 | | | |
| VALIDMIN | CDF\_UINT1 | 0 | | | |
| VAR\_NOTES | CDF\_CHAR | The prioritization range that the ion is classified into according to its E/q, SSD energy and TOF bins | | | |
| VAR\_TYPE | CDF\_CHAR | data | | | |

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Variable\_Name** | **Data\_type** | **DIMS** | **SIZES** | **R\_VARY** | **D\_VARY** |
| PHA\_MULTI\_SSD | CDF\_UINT1 | 1 | 0 | T |  |
| **Attribute Name** | **Data Type** | **Value** | | | |
| CATDESC | CDF\_CHAR | HIS multi-SSD flag | | | |
| DEPEND\_0 | CDF\_CHAR | EPOCH | | | |
| DISPLAY\_TYPE | CDF\_CHAR | time\_series | | | |
| FIELDNAM | CDF\_CHAR | PHA\_MULTI\_SSD | | | |
| FILLVAL | CDF\_UINT1 | 255 | | | |
| FORMAT | CDF\_CHAR | I3 | | | |
| LABLAXIS | CDF\_CHAR | PHA\_MULTI\_SSD | | | |
| SCALEMAX | CDF\_UINT1 | 1 | | | |
| SCALEMIN | CDF\_UINT1 | 0 | | | |
| SCALETYP | CDF\_CHAR | linear | | | |
| UNITS | CDF\_CHAR | NONE | | | |
| VALIDMAX | CDF\_UINT1 | 1 | | | |
| VALIDMIN | CDF\_UINT1 | 0 | | | |
| VAR\_NOTES | CDF\_CHAR | Indicates signal on multiple SSDs during ion measurement | | | |
| VAR\_TYPE | CDF\_CHAR | data | | | |

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Variable\_Name** | **Data\_type** | **DIMS** | **SIZES** | **R\_VARY** | **D\_VARY** |
| PHA\_PRIORITY\_WEIGHT | CDF\_FLOAT | 1 | 0 | T |  |
| **Attribute Name** | **Data Type** | **Value** | | | |
| CATDESC | CDF\_CHAR | HIS PHA Priority Weight | | | |
| DEPEND\_0 | CDF\_CHAR | EPOCH | | | |
| DISPLAY\_TYPE | CDF\_CHAR | time\_series | | | |
| FIELDNAM | CDF\_CHAR | PHA\_PRI\_WEIGHT | | | |
| FILLVAL | CDF\_FLOAT | -1E31 | | | |
| FORMAT | CDF\_CHAR | E10.3 | | | |
| LABLAXIS | CDF\_CHAR | PHA\_PRI\_WEIGHT | | | |
| SCALEMAX | CDF\_FLOAT | 8500000 | | | |
| SCALEMIN | CDF\_FLOAT | 0 | | | |
| SCALETYP | CDF\_CHAR | linear | | | |
| UNITS | CDF\_CHAR | NONE | | | |
| VALIDMAX | CDF\_FLOAT | 8126464 | | | |
| VALIDMIN | CDF\_FLOAT | 1 | | | |
| VAR\_NOTES | CDF\_CHAR | The weight of this PHA word after correcting for the effects of sampling for inclusion in telemetry. Should be used for all instead of 1 whenever PHA words are histogrammed. | | | |
| VAR\_TYPE | CDF\_CHAR | data | | | |

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Variable\_Name** | **Data\_type** | **DIMS** | **SIZES** | **R\_VARY** | **D\_VARY** |
| PHA\_PRIORITY\_WEIGHT\_DELTA | CDF\_FLOAT | 1 | 0 | T |  |
| **Attribute Name** | **Data Type** | **Value** | | | |
| CATDESC | CDF\_CHAR | HIS PHA Priority Weight Delta | | | |
| DEPEND\_0 | CDF\_CHAR | EPOCH | | | |
| DISPLAY\_TYPE | CDF\_CHAR | time\_series | | | |
| FIELDNAM | CDF\_CHAR | PHA\_PRI\_WEIGHT\_DELTA | | | |
| FILLVAL | CDF\_FLOAT | -1E31 | | | |
| FORMAT | CDF\_CHAR | E10.3 | | | |
| LABLAXIS | CDF\_CHAR | PHA\_PRI\_WEIGHT\_DELTA | | | |
| SCALEMAX | CDF\_FLOAT | 300000 | | | |
| SCALEMIN | CDF\_FLOAT | 0 | | | |
| SCALETYP | CDF\_CHAR | linear | | | |
| UNITS | CDF\_CHAR | NONE | | | |
| VALIDMAX | CDF\_FLOAT | 262144 | | | |
| VALIDMIN | CDF\_FLOAT | 0 | | | |
| VAR\_NOTES | CDF\_CHAR | The uncertainty of the priority weight as a result of compression in telemetry, where the lower bound in the weight is the priority weight minus the delta and the upper bound in the weight is the priority weight plus the delta. | | | |
| VAR\_TYPE | CDF\_CHAR | data | | | |

##### HIS L2 VDF Data

**Filename:** solo\_L2\_swa-his-vdf\_yyyymmdd\_V01.cdf

[TO BE ADDED]

##### HIS L2 Housekeeping Data

**Filename:** solo\_L2\_swa-his-hk\_yyyymmdd\_V01.cdf

**Global metadata**

|  |  |  |
| --- | --- | --- |
| **Name** | **Entry** | **Value** |
| Acknowledgement | 1 | Please acknowledge Chris J. Owen (SWA PI -- UCL MSSL) & Stefano Livi (HIS PI -- SwRI). NASA Contract NNG10EK25C. |
| Data\_product | 1 | hk>HK data for HIS instrument |
| Data\_type | 1 | hk\_l2 |
| Data\_version | 1 | 01 |
| Descriptor | 1 | SWA-HIS>Solar Wind Analyzer-Heavy Ion Sensor |
| Discipline | 1 | Space Physics>Interplanetary Studies |
| File\_naming\_convention | 1 | "source\_descriptor\_datatype\_yyyyMMdd |
| Generated\_by | 1 | SO-HIS SOC, University of Michigan |
| Generation\_date | 1 | 20200611 |
| HTTP\_LINK |  |  |
| Instrument\_type | 1 | Particles (space) |
| LEVEL | 1 | 2 |
| LINK\_TEXT |  |  |
| LINK\_TITLE |  |  |
| Logical\_file\_id | 1 | solo\_L2\_swa-his-hk\_00000000\_v01 |
| Logical\_source | 1 | solo\_L2\_swa-his-hk |
| Logical\_source\_description | 1 | solo\_L2\_swa-his-hk |
| Mission\_group | 1 | Solar Orbiter |
| MODS | 1 | Initial Release 11/24/2020. |
| PI\_affiliation | 1 | SWRI |
| PI\_name | 1 | S. Livi |
| Project | 1 | SOLO>Solar Orbiter |
| Rules\_of\_use | 1 | These Level 2 data require substantial processing for most applications. Users are encouraged to use Level 3 data, which provide the most relevant data products for scientific research. See Data Product Description Document for more information. Contact SWA/HIS team for more information as needed. |
| Software\_version | 1 | 00.00.00 |
| SOOP\_TYPE |  |  |
| Source\_name | 1 | SOLO>Solar Orbiter |
| spase\_DatasetResourceID |  |  |
| TARGET\_CLASS | 1 | In-Situ |
| TARGET\_NAME | 1 | Solar Wind |
| TARGET\_REGION | 1 | Heliosphere |
| TEXT | 1 | Housekeeping data for HIS instrument. |
|  | 2 | For details see Telemetry Definitions Document, 15164-TELDEF-01. |
|  | 3 | Level 1 data are unvalidated and requires substantial processing to use for publication. |
| TIME\_MAX | 1 |  |
| TIME\_MIN | 1 |  |
| Time\_resolution | 1 | Variable. Usually 1 sec, 30 sec, or 60 sec. |

All the variables in the HK CDF have the following attributes:

|  |  |  |
| --- | --- | --- |
| Attribute Name | Data Type | Value |
| DEPEND\_0 | CDF\_CHAR | EPOCH |
| DISPLAY\_TYPE | CDF\_CHAR | Time\_series |
| SCALEMAX | Varies (see below) | Based on VALIDMAX (see below) |
| SCALEMIN | Varies (see below) | Based on VALIDMIN (see below) |

##### The following table summarizes all the variables in the HK CDF. It lists all the variables with their data types, units, validmin, and validmax. The dimensions and sizes can be found in the first table in the section on HIS L1 Housekeeping Data. Tables that define the dimensions for those variables which are not scalars and which give the VAR\_NOTES for all the variables that have them can also be found in the section on HIS L1 Housekeeping Data.

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
|  | **Variable\_Name** | **Data\_type** | **UNITS** | **VALID- MIN** | **VALID- MAX** |
| 1 | AC\_LINK\_EN | CDF\_UINT1 | **NONE** | **0** | 1 |
| 2 | AC\_LINK\_ERR | CDF\_UINT1 | NONE | 0 | 1 |
| 3 | ALPHA\_DECI\_DECR\_THRESH\_REG | CDF\_INT4 | NONE | 0 | 65535 |
| 4 | ALPHA\_DECI\_INCR\_REG | CDF\_UINT1 | NONE | 0 | 15 |
| 5 | ALPHA\_DECI\_INCR\_THRESH\_REG | CDF INT4 | NONE | 0 | 65535 |
| 6 | ALPHA\_DECI\_LEVEL\_REG | CDF\_UINT1 | NONE | 0 | 15 |
| 7 | ALPHA\_MAX\_VAL\_REG | CDF\_UINT2 | NONE | 0 | 1023 |
| 8 | ALPHA\_MIN\_VAL\_REG | CDF\_UINT2 | NONE | 0 | 1023 |
| 9 | ANODE\_STIM\_DELAY | CDF\_UINT1 | NONE | 0 | 31 |
| 10 | ANODE\_STIM\_ON | CDF\_UINT1 | NONE | 0 | 1 |
| 11 | ANODE\_STIM\_RATE | CDF\_UINT1 | NONE | 0 | 7 |
| 12 | ASIC\_ADC\_WAIT | CDF\_UINT1 | NONE | 0 | 15 |
| 13 | ASIC\_CONF\_REG | CDF\_INT8 | NONE | 0 | 4294967295 |
| 14 | ASIC\_CS\_MON | CDF\_UINT1 | NONE | 0 | 1 |
| 15 | ASIC\_OUT\_OF\_SYSTEM\_EN | CDF\_UINT1 | NONE | 0 | 1 |
| 16 | ASIC\_REG\_SWITCH | CDF\_UINT1 | NONE | 0 | 1 |
| 17 | ASIC\_RESET | CDF\_UINT1 | NONE | 0 | 1 |
| 18 | ASIC\_STIM\_DELAY | CDF\_UINT1 | NONE | 0 | 31 |
| 19 | ASIC\_STIM\_ON | CDF\_UINT1 | NONE | 0 | 1 |
| 20 | ASIC\_STIM\_RATE | CDF\_UINT1 | NONE | 0 | 7 |
| 21 | ASIC\_TP\_RATE | CDF\_UINT1 | NONE | 0 | 7 |
| 22 | ASIC\_WRITE\_REG | CDF\_UINT1 | NONE | 0 | 1 |
| 23 | BOARD\_ID | CDF\_UINT1 | NONE | 0 | 1 |
| 24 | CCSDS\_REJ\_MESSAGE\_CNT | CDF\_UINT1 | NONE | 0 | 15 |
| 25 | CDH\_BOARD\_TEMP | CDF\_FLOAT | C | -68 | 125 |
| 26 | CDH\_CPU\_TEMP | CDF\_FLOAT | C | -68 | 125 |
| 27 | CDH\_GROUND | CDF\_INT4 | NONE | 0 | 4095 |
| 28 | CDH\_OPTO\_LINK\_RX\_EN | CDF\_UINT1 | NONE | 0 | 1 |
| 29 | CDH\_OPTO\_LINK\_RX\_RATE | CDF\_UINT1 | NONE | 0 | 3 |
| 30 | CDH\_OPTO\_LINK\_STAT\_A | CDF\_UINT1 | NONE | 0 | 1 |
| 31 | CDH\_OPTO\_LINK\_STAT\_B | CDF\_UINT1 | NONE | 0 | 1 |
| 32 | CDH\_OPTO\_LINK\_TX\_POWER | CDF\_UINT1 | NONE | 0 | 7 |
| 33 | CDH\_OPTO\_LINK\_TX\_RATE | CDF\_UINT1 | NONE | 0 | 3 |
| 34 | CDH\_OPTO\_RX\_CLOCK\_SYNC\_ERR\_CNT | CDF\_INT4 | NONE | 0 | 65535 |
| 35 | CDH\_OPTO\_RX\_CRC\_ERR\_CNT | CDF\_INT4 | NONE | 0 | 65535 |
| 36 | CDH\_OPTO\_RX\_HDR\_ERR\_CNT | CDF\_INT4 | NONE | 0 | 65535 |
| 37 | CDH\_OPTO\_RX\_SIDE | CDF\_UINT1 | NONE | 0 | 1 |
| 38 | CDH\_P1\_5V | CDF\_FLOAT | V | 0 | 3.3 |
| 39 | CDH\_P1\_8V | CDF\_FLOAT | V | 0 | 3.3 |
| 40 | CDH\_P3\_3V\_ADC\_V | CDF\_FLOAT | V | 0 | 13.2 |
| 41 | CDH\_P5V\_DAC\_V | CDF\_FLOAT | V | 0 | 13.2 |
| 42 | CDH\_SWEEP\_DAC\_EN\_LATCHED | CDF\_UINT1 | NONE | 0 | 15 |
| 43 | CDH\_SWEEP\_STATE | CDF\_UINT1 | NONE | 0 | 7 |
| 44 | CDH\_WDOG\_EN | CDF\_UINT1 | NONE | 0 | 1 |
| 45 | CDH\_WDOG\_STATUS | CDF\_UINT1 | NONE | 0 | 1 |
| 46 | CHECKSUM | CDF\_INT4 | NONE | 0 | 65535 |
| 47 | CMD\_ACC\_CNT | CDF\_INT2 | NONE | 0 | 255 |
| 48 | CMD\_ACC\_LAST\_SERVICE | CDF\_INT2 | NONE | 0 | 255 |
| 49 | CMD\_ACC\_LAST\_SUBSERVICE | CDF\_INT2 | NONE | 0 | 255 |
| 50 | CMD\_ACC\_SSC | CDF\_UINT2 | NONE | 0 | 16383 |
| 51 | CMD\_POL\_BOT\_DEF | CDF\_UINT1 | NONE | 0 | 1 |
| 52 | CMD\_POL\_TOP\_DEF | CDF\_UINT1 | NONE | 0 | 1 |
| 53 | CMD\_POL\_TOP\_PLATE | CDF\_UINT1 | NONE | 0 | 1 |
| 54 | CMD\_REJ\_CNT | CDF\_UINT2 | NONE | 0 | 255 |
| 55 | CMD\_REJ\_LAST\_SERVICE | CDF\_UINT2 | NONE | 0 | 255 |
| 56 | CMD\_REJ\_LAST\_SUBSERVICE | CDF\_UINT2 | NONE | 0 | 255 |
| 57 | CMD\_REJ\_SSC | CDF\_UINT2 | NONE | 0 | 16383 |
| 58 | CMD\_RNG\_ANALYZER | CDF\_UINT1 | NONE | 0 | 1 |
| 59 | CMD\_RNG\_BOT\_DEF | CDF\_UINT1 | NONE | 0 | 1 |
| 60 | CMD\_RNG\_TOP\_DEF | CDF\_UINT1 | NONE | 0 | 1 |
| 61 | CMD\_RNG\_TOP\_PLATE | CDF\_UINT1 | NONE | 0 | 1 |
| 62 | CMD\_VAL\_ANALYZER | CDF\_FLOAT | kV | -5.56 | 0 |
| 63 | CMD\_VAL\_BOT\_DEF | CDF\_FLOAT | kV | -5.56 | 5.56 |
| 64 | CMD\_VAL\_MAIN | CDF\_FLOAT | kV | 0 | 6.25 |
| 65 | CMD\_VAL\_OFFSET | CDF\_FLOAT | kV | 0 | 2 |
| 66 | CMD\_VAL\_PA | CDF\_FLOAT | kV | 0 | 33.48 |
| 67 | CMD\_VAL\_SSD | CDF\_FLOAT | V | 0 | 250 |
| 68 | CMD\_VAL\_START\_A | CDF\_FLOAT | V | 0 | 250 |
| 69 | CMD\_VAL\_START\_B | CDF\_FLOAT | V | 0 | 5 |
| 70 | CMD\_VAL\_START\_CFD | CDF\_FLOAT | V | 0 | 5 |
| 71 | CMD\_VAL\_START\_MCP | CDF\_FLOAT | kV | 0 | 5 |
| 72 | CMD\_VAL\_STOP\_A | CDF\_FLOAT | V | 0 | 5 |
| 73 | CMD\_VAL\_STOP\_B | CDF\_FLOAT | V | 0 | 5 |
| 74 | CMD\_VAL\_STOP\_CFD | CDF\_FLOAT | V | 0 | 5 |
| 75 | CMD\_VAL\_STOP\_MCP | CDF\_FLOAT | kV | 0 | 5 |
| 76 | CMD\_VAL\_TOP\_DEF | CDF\_FLOAT | kV | -5.56 | 5.56 |
| 77 | CMD\_VAL\_TOP\_PLATE | CDF\_FLOAT | kV | -5.56 | 5.56 |
| 78 | COINC\_TIMING\_ASIC\_SHAPE | CDF\_INT2 | NONE | 0 | 255 |
| 79 | COINC\_TIMING\_ASIC\_WINDOW | CDF\_INT2 | NONE | 0 | 255 |
| 80 | COINC\_TIMING\_POS\_TIMEOUT | CDF\_INT2 | NONE | 0 | 255 |
| 81 | COINC\_TIMING\_TOF\_TIMEOUT | CDF\_INT2 | NONE | 0 | 255 |
| 82 | CONNECTION\_TEST\_CNT | CDF\_UINT1 | NONE | 0 | 15 |
| 83 | CPU\_WDOG\_EN | CDF\_UINT1 | NONE | 0 | 1 |
| 84 | CPU\_WDOG\_STATUS | CDF\_UINT1 | NONE | 0 | 1 |
| 85 | DSCB\_ADC\_EN | CDF\_UINT1 | NONE | 0 | 1 |
| 86 | DSCB\_ADC\_WAITS | CDF\_INT4 | NONE | 0 | 65535 |
| 87 | DSCB\_ASIC\_CONTROL\_STATE\_ MACHINE | CDF\_UINT1 | NONE | 0 | 3 |
| 88 | DSCB\_ASIC\_FLAG | CDF\_UINT1 | NONE | 0 | 1 |
| 89 | DSCB\_ASIC\_MONASIC\_V\_MON | CDF\_FLOAT | V | 0 | 5 |
| 90 | DSCB\_ASIC\_READ\_OUT\_STATE\_ MACHINE | CDF\_UINT1 | NONE | 0 | 3 |
| 91 | DSCB\_ASIC\_TEMP | CDF\_FLOAT | C | -67.18 | 124.2 |
| 92 | DSCB\_ASIC\_WRITE\_STATE\_ MACHINE | CDF\_UINT1 | NONE | 0 | 3 |
| 93 | DSCB\_AZIMUTHAL\_SEL | CDF\_UINT1 | NONE | 0 | 1 |
| 94 | DSCB\_CMD\_NAKS | CDF\_INT4 | NONE | 0 | 65535 |
| 95 | DSCB\_COINC | CDF\_UINT1 | NONE | 0 | 3 |
| 96 | DSCB\_COMM\_ACTIVE | CDF\_UINT1 | NONE | 0 | 1 |
| 97 | DSCB\_DOUBLE\_BIT\_EDAC | CDF\_INT4 | NONE | 0 | 65535 |
| 98 | DSCB\_DSCB\_TEMP | CDF\_FLOAT | C | -67.18 | 124.2 |
| 99 | DSCB\_DSIB\_TEMP | CDF\_FLOAT | C | 0 | 125 |
| 100 | DSCB\_FPGA\_BASE | CDF\_INT2 | NONE | 0 | 255 |
| 101 | DSCB\_FPGA\_REV | CDF\_INT2 | NONE | 0 | 255 |
| 102 | DSCB\_HK\_RATE | CDF\_UINT1 | NONE | 0 | 7 |
| 103 | DSCB\_HV\_AUTO\_RESET\_EN | CDF\_UINT1 | NONE | 0 | 1 |
| 104 | DSCB\_HV\_EN | CDF\_UINT1 | NONE | 0 | 1 |
| 105 | DSCB\_HV\_LIMITED | CDF\_UINT1 | NONE | 0 | 1 |
| 106 | DSCB\_HV\_MON\_EN | CDF\_UINT1 | NONE | 0 | 1 |
| 107 | DSCB\_HVPS\_TEMP | CDF\_FLOAT | C | -67.18 | 124.2 |
| 108 | DSCB\_INIT\_BIT | CDF\_UINT1 | NONE | 0 | 1 |
| 109 | DSCB\_INIT\_REG | CDF\_INT2 | NONE | 0 | 255 |
| 110 | DSCB\_MCP\_BIAS\_EN | CDF\_UINT1 | NONE | 0 | 1 |
| 111 | DSCB\_MCP\_BIAS\_I\_LIMIT\_EN | CDF\_UINT1 | NONE | 0 | 1 |
| 112 | DSCB\_MCP\_BIAS\_I\_TRIP | CDF\_UINT1 | NONE | 0 | 1 |
| 113 | DSCB\_MCP\_BIAS\_V\_LIMIT\_EN | CDF\_UINT1 | NONE | 0 | 1 |
| 114 | DSCB\_MCP\_BIAS\_V\_TRIP | CDF\_UINT1 | NONE | 0 | 1 |
| 115 | DSCB\_OFFSET\_I\_MON | CDF\_FLOAT | mA | 0 | 11.9 |
| 116 | DSCB\_OFFSET\_V\_MON | CDF\_FLOAT | kV | 0 | 2.5 |
| 117 | DSCB\_OPTO\_RX\_CLOCK\_SYNC\_ERR\_CNT | CDF\_INT4 | NONE | 0 | 65535 |
| 118 | DSCB\_OPTO\_RX\_CRC\_ERR\_CNT | CDF\_INT4 | NONE | 0 | 65535 |
| 119 | DSCB\_OPTO\_RX\_DATA1\_ERR\_CNT | CDF\_INT4 | NONE | 0 | 65535 |
| 120 | DSCB\_OPTO\_RX\_DATA2\_ERR\_CNT | CDF\_INT4 | NONE | 0 | 65535 |
| 121 | DSCB\_OPTO\_RX\_HDR\_ERR\_CNT | CDF\_INT4 | NONE | 0 | 65535 |
| 122 | DSCB\_P1\_5V | CDF\_FLOAT | V | 0 | 5 |
| 123 | DSCB\_P3\_3V | CDF\_FLOAT | V | 0 | 5 |
| 124 | DSCB\_P3\_3V\_ADC\_REF | CDF\_FLOAT | V | 0 | 5 |
| 125 | DSCB\_P5V\_ADC\_REF\_MON | CDF\_FLOAT | V | 0 | 10 |
| 126 | DSCB\_P5V\_DAC\_REF\_MON | CDF\_FLOAT | V | 0 | 10 |
| 127 | DSCB\_POS\_START | CDF\_UINT1 | NONE | 0 | 15 |
| 128 | DSCB\_POS\_START\_ADD\_SUB | CDF\_UINT1 | NONE | 0 | 1 |
| 129 | DSCB\_POS\_START\_SEL | CDF\_UINT1 | NONE | 0 | 1 |
| 130 | DSCB\_POS\_STOP | CDF\_UINT1 | NONE | 0 | 15 |
| 131 | DSCB\_POS\_STOP\_ADD\_SUB | CDF\_UINT1 | NONE | 0 | 1 |
| 132 | DSCB\_POS\_STOP\_DUAL\_SEL | CDF\_UINT1 | NONE | 0 | 1 |
| 133 | DSCB\_POS\_STOP\_SEL | CDF\_UINT1 | NONE | 0 | 1 |
| 134 | DSCB\_RATES\_EN | CDF\_UINT1 | NONE | 0 | 1 |
| 135 | DSCB\_RESET\_DECI\_LEVEL | CDF\_UINT1 | NONE | 0 | 1 |
| 136 | DSCB\_RESET\_FSW | CDF\_UINT1 | NONE | 0 | 1 |
| 137 | DSCB\_RESET\_POR | CDF\_UINT1 | NONE | 0 | 11mA |
| 138 | DSCB\_RESET\_WDOG | CDF\_UINT1 | NONE | 0 | 1 |
| 139 | DSCB\_SINGLE\_BIT\_EDAC | CDF\_INT4 | NONE | 0 | 65535 |
| 140 | DSCB\_SSD\_I\_MON | CDF\_FLOAT | mA | 0 | 11.9 |
| 141 | DSCB\_SSD\_TEMP | CDF\_FLOAT | C | -67.18 | 124.2 |
| 142 | DSCB\_SSD\_V\_MON | CDF\_FLOAT | V | 0 | 250 |
| 143 | DSCB\_START\_MCP\_I\_MON | CDF\_FLOAT | mA | 0 | 66.17 |
| 144 | DSCB\_START\_MCP\_TEMP | CDF\_FLOAT | C | -67.18 | 124.2 |
| 145 | DSCB\_START\_MCP\_V\_MON | CDF\_FLOAT | kV | 0 | 5 |
| 146 | DSCB\_STARTUP\_POWER | CDF\_UINT1 | NONE | 0 | 7 |
| 147 | DSCB\_STARTUP\_RX\_A\_EN | CDF\_UINT1 | NONE | 0 | 1 |
| 148 | DSCB\_STARTUP\_RX\_B\_EN | CDF\_UINT1 | NONE | 0 | 1 |
| 149 | DSCB\_STARTUP\_TX\_A\_EN | CDF\_UINT1 | NONE | 0 | 1 |
| 150 | DSCB\_STARTUP\_TX\_B\_EN | CDF\_UINT1 | NONE | 0 | 1 |
| 151 | DSCB\_STOP\_MCP\_I\_MON | CDF\_FLOAT | mA | 0 | 66.17 |
| 152 | DSCB\_STOP\_MCP\_TEMP | CDF\_FLOAT | C | -67.18 | 124.2 |
| 153 | DSCB\_STOP\_MCP\_V\_MON | CDF\_FLOAT | kV | 0 | 5 |
| 154 | DSCB\_SWEEP\_OVER | CDF\_UINT1 | NONE | 0 | 1 |
| 155 | DSCB\_SYSTEM\_FSM | CDF\_UINT1 | NONE | 0 | 7 |
| 156 | DSCB\_TOF\_START | CDF\_UINT1 | NONE | 0 | 15 |
| 157 | DSCB\_TOF\_START\_ADD\_SUB | CDF\_UINT1 | NONE | 0 | 1 |
| 158 | DSCB\_TOF\_STOP | CDF\_UINT1 | NONE | 0 | 15 |
| 159 | DSCB\_TOF\_STOP\_ADD\_SUB | CDF\_UINT1 | NONE | 0 | 1 |
| 160 | DSCB\_V\_I\_MON\_REF | CDF\_FLOAT | V | 0 | 5 |
| 161 | DSCB\_WDOG\_CNT | CDF\_INT2 | NONE | 0 | 255 |
| 162 | DSCB\_WDOG\_ON | CDF\_UINT1 | NONE | 0 | 1 |
| 163 | EAIS\_PORT\_TEMP | CDF\_FLOAT | C | -50 | 340 |
| 164 | ENERGY\_ASIC\_ACQ\_TP | CDF\_UINT1 | NONE | 0 | 1 |
| 165 | ENERGY\_ASIC\_PARITY | CDF\_UINT1 | NONE | 0 | 1 |
| 166 | EVENT\_ERR\_CNT | CDF\_INT2 | NONE | 0 | 255 |
| 167 | FDIR\_DSCB\_AUTOMATIC\_LIMIT | CDF\_UINT1 | NONE | 0 | 1 |
| 168 | FDIR\_DSCB\_COMM\_LOSS | CDF\_UINT1 | NONE | 0 | 1 |
| 169 | FDIR\_DSCB\_DOWNLINK\_ UNDETERMINED | CDF\_UINT1 | NONE | 0 | 1 |
| 170 | FDIR\_DSCB\_NOT\_RUNNING | CDF\_UINT1 | NONE | 0 | 1 |
| 171 | FDIR\_DSCB\_REG\_INIT | CDF\_UINT1 | NONE | 0 | 1 |
| 172 | FDIR\_EMERGENCY\_FAST\_SAFE | CDF\_UINT1 | NONE | 0 | 1 |
| 173 | FDIR\_LEVEL | CDF\_UINT1 | NONE | 0 | 15 |
| 174 | FDIR\_NOMINAL\_SLOW\_SAFE | CDF\_UINT1 | NONE | 0 | 1 |
| 175 | FDIR\_RED\_LIMIT | CDF\_UINT1 | NONE | 0 | 1 |
| 176 | FDIR\_RESERVED | CDF\_UINT1 | NONE | 0 | 1 |
| 177 | FDIR\_SCIENCE\_AUTO\_MODE\_FAIL | CDF\_UINT1 | NONE | 0 | 1 |
| 178 | FDIR\_SOLAR\_ARRAY\_STEERING\_ START | CDF\_UINT1 | NONE | 0 | 1 |
| 179 | FDIR\_SOLAR\_ARRAY\_STEERING\_ STOP | CDF\_UINT1 | NONE | 0 | 1 |
| 180 | FDIR\_TASK\_TIMEOUT | CDF\_UINT1 | NONE | 0 | 1 |
| 181 | FDIR\_THRUSTER\_FIRING\_START | CDF\_UINT1 | NONE | 0 | 1 |
| 182 | FDIR\_THRUSTER\_FIRING\_STOP | CDF\_UINT1 | NONE | 0 | 1 |
| 183 | FDIR\_YELLOW\_LIMIT | CDF\_UINT1 | NONE | 0 | 1 |
| 184 | FPGA\_STEP\_TBL | CDF\_UINT1 | NONE | 0 | 3 |
| 185 | FPGA\_STEP\_TBL\_DATA\_ELEV\_ INDEX | CDF\_UINT1 | NONE | 0 | 15 |
| 186 | FPGA\_STEP\_TBL\_E\_Q\_INDEX | CDF\_UINT1 | NONE | 0 | 63 |
| 187 | FPGA\_STEP\_TBL\_ELEV\_INDEX | CDF\_UINT1 | NONE | 0 | 15 |
| 188 | FPGA\_SWEEP\_TBL\_ROW | CDF\_UINT1 | NONE | 0 | 127 |
| 189 | FPGA\_SWEEP\_TBL\_SIDE | CDF\_UINT1 | NONE | 0 | 1 |
| 190 | FPGA\_SWEEP\_TBL\_DATA\_SIDE | CDF\_UINT1 | NONE | 0 | 1 |
| 191 | HK\_EN | CDF\_UINT1 | NONE | 0 | 1 |
| 192 | HV\_DISABLED | CDF\_UINT1 | NONE | 0 | 1 |
| 193 | HV\_I\_LIM\_PERSISTENCE | CDF\_INT2 | NONE | 0 | 255 |
| 194 | HV\_LIMITED | CDF\_UINT1 | NONE | 0 | 1 |
| 195 | HV\_V\_LIM\_PERSISTENCE | CDF\_INT2 | NONE | 0 | 255 |
| 196 | HVPS\_ANALYZER | CDF\_FLOAT | kV | -7.326 | 7.326 |
| 197 | HVPS\_ANALYZER\_POL | CDF\_UINT1 | NONE | 0 | 1 |
| 198 | HVPS\_ANALYZER\_RNG | CDF\_UINT1 | NONE | 0 | 1 |
| 199 | HVPS\_BOT\_DEF | CDF\_FLOAT | kV | -7.326 | 7.326 |
| 200 | HVPS\_BOT\_DEF\_POL | CDF\_UINT1 | NONE | 0 | 1 |
| 201 | HVPS\_BOT\_DEF\_RNG | CDF\_UINT1 | NONE | 0 | 1 |
| 202 | HVPS\_HV\_MAIN\_N | CDF\_FLOAT | kV | -8.25 | 8.25 |
| 203 | HVPS\_HV\_MAIN\_N\_POL | CDF\_UINT1 | NONE | 0 | 1 |
| 204 | HVPS\_HV\_MAIN\_N\_RNG | CDF\_UINT1 | NONE | 0 | 1 |
| 205 | HVPS\_HV\_MAIN\_P | CDF\_FLOAT | kV | -8.25 | 8.25 |
| 206 | HVPS\_HV\_MAIN\_P\_POL | CDF\_UINT1 | NONE | 0 | 1 |
| 207 | HVPS\_HV\_MAIN\_P\_RNG | CDF\_UINT1 | NONE | 0 | 1 |
| 208 | HVPS\_N12V\_I | CDF\_FLOAT | A | -0.132 | 0 |
| 209 | HVPS\_P12V\_I | CDF\_FLOAT | A | 0 | 0.132 |
| 210 | HVPS\_TOP\_DEF | CDF\_FLOAT | kV | -7.326 | 7.326 |
| 211 | HVPS\_TOP\_DEF\_POL | CDF\_UINT1 | NONE | 0 | 1 |
| 212 | HVPS\_TOP\_DEF\_RNG | CDF\_UINT1 | NONE | 0 | 1 |
| 213 | HVPS\_TOP\_PLATE | CDF\_FLOAT | kV | -7.326 | 7.326 |
| 214 | HVPS\_TOP\_PLATE\_POL | CDF\_UINT1 | NONE | 0 | 1 |
| 215 | HVPS\_TOP\_PLATE\_RNG | CDF\_UINT1 | NONE | 0 | 1 |
| 216 | INTEGRATION\_TIME | CDF\_UINT4 | NONE | 0 | 131071 |
| 217 | INTER\_INST\_INFO\_CNT | CDF\_UINT2 | NONE | 0 | 1023 |
| 218 | IRAP\_HV\_ON | CDF\_UINT1 | NONE | 0 | 1 |
| 219 | IRAP\_HVPS\_TEMP | CDF\_FLOAT | C | -67.18 | 124.2 |
| 220 | LAST\_ERR\_CODE | CDF\_INT2 | NONE | 0 | 255 |
| 221 | LAST\_MACRO\_ACC\_CMD\_CNT | CDF\_UINT1 | NONE | 0 | 127 |
| 222 | LAST\_MACRO\_ACC\_SERVICE | CDF\_INT2 | NONE | 0 | 255 |
| 223 | LAST\_MACRO\_ACC\_SUBSERVICE | CDF\_INT2 | NONE | 0 | 255 |
| 224 | LAST\_MACRO\_CALLER | CDF\_UINT1 | NONE | 0 | 127 |
| 225 | LAST\_MACRO\_CMD\_CNT | CDF\_UINT1 | NONE | 0 | 127 |
| 226 | LAST\_MACRO\_I\_WAIT | CDF\_INT4 | NONE | 0 | 65535 |
| 227 | LAST\_MACRO\_REJ\_CMD\_CNT | CDF\_UINT1 | NONE | 0 | 127 |
| 228 | LAST\_MACRO\_REJ\_SERVICE | CDF\_INT2 | NONE | 0 | 255 |
| 229 | LAST\_MACRO\_REJ\_SUBSERVICE | CDF\_INT2 | NONE | 0 | 255 |
| 230 | LAST\_MACRO\_SEL | CDF\_UINT1 | NONE | 0 | 127 |
| 231 | LAST\_MACRO\_TOTAL\_CMDS | CDF\_UINT1 | NONE | 0 | 127 |
| 232 | LOW\_TOF\_CUT\_OFF\_REG | CDF\_UINT2 | NONE | 0 | 1023 |
| 233 | LVPS\_12V\_DC\_DC\_TEMP | CDF\_FLOAT | C | -67.18 | 124.2 |
| 234 | LVPS\_5V\_DC\_DC\_TEMP | CDF\_FLOAT | C | -67.18 | 124.2 |
| 235 | LVPS\_AC\_LINK\_I | CDF\_FLOAT | A | -0.028 | 0.24 |
| 236 | LVPS\_AC\_LINK\_TEMP | CDF\_IFLOAT | C | -67.18 | 124.2 |
| 237 | LVPS\_AC\_LINK\_V | CDF\_FLOAT | V | 0 | 29.14 |
| 238 | LVPS\_N12V\_OUTPUT\_I | CDF\_FLOAT | A | -0.125 | -0.016 |
| 239 | LVPS\_N12V\_OUTPUT\_V | CDF\_FLOAT | V | -14.03 | 0 |
| 240 | LVPS\_N5V\_OUTPUT\_I | CDF\_FLOAT | A | -0.11 | -0.0007 |
| 241 | LVPS\_N5V\_OUTPUT\_V | CDF\_FLOAT | V | -6.02 | 0 |
| 242 | LVPS\_P12V\_OUTPUT\_I | CDF\_FLOAT | A | 0 | 0.11 |
| 243 | LVPS\_P12V\_OUTPUT\_V | CDF\_FLOAT | V | 0 | 14.49 |
| 244 | LVPS\_P3\_3V\_DC\_DC\_TEMP | CDF\_FLOAT | C | -67.18 | 124.2 |
| 245 | LVPS\_P3\_3V\_OUTPUT\_I | CDF\_FLOAT | A | 0 | 1.145 |
| 246 | LVPS\_P3\_3V\_OUTPUT\_V | CDF\_FLOAT | V | 0 | 3.99 |
| 247 | LVPS\_P5V\_OUTPUT\_I | CDF\_FLOAT | A | 0 | 0.1114 |
| 248 | LVPS\_P5V\_OUTPUT\_V | CDF\_FLOAT | V | 0 | 6.07 |
| 249 | MACRO\_STATUS | CDF\_UINT1 | NONE | 0 | 1 |
| 250 | MASTER\_SWEEP\_EN | CDF\_UINT1 | NONE | 0 | 3 |
| 251 | MASTER\_SWEEP\_EN\_STATUS | CDF\_UINT1 | NONE | 0 | 3 |
| 252 | MISSING\_SPACEWIRE\_TIME\_CODE | CDF\_UINT1 | NONE | 0 | 1 |
| 253 | MODE\_CHANGE\_REASON | CDF\_UINT1 | NONE | 0 | 3 |
| 254 | MRAM\_WR\_EN | CDF\_UINT1 | NONE | 0 | 1 |
| 255 | OFFSET\_EN | CDF\_UINT1 | NONE | 0 | 1 |
| 256 | OFFSET\_I\_EN\_LIM | CDF\_UINT1 | NONE | 0 | 1 |
| 257 | OFFSET\_I\_TRIG | CDF\_UINT1 | NONE | 0 | 1 |
| 258 | OFFSET\_V\_EN\_LIM | CDF\_UINT1 | NONE | 0 | 1 |
| 259 | OFFSET\_V\_TRIG | CDF\_UINT1 | NONE | 0 | 1 |
| 260 | OP\_MODE | CDF\_UINT1 | NONE | 0 | 9 |
| 261 | OPTO\_RX\_A\_EN | CDF\_UINT1 | NONE | 0 | 1 |
| 262 | OPTO\_RX\_A\_EN\_INIT | CDF\_UINT1 | NONE | 0 | 1 |
| 263 | OPTO\_RX\_B\_EN | CDF\_UINT1 | NONE | 0 | 1 |
| 264 | OPTO\_RX\_B\_EN\_INIT | CDF\_UINT1 | NONE | 0 | 1 |
| 265 | OPTO\_RX\_LOOPBACK | CDF\_UINT1 | NONE | 0 | 1 |
| 266 | OPTO\_RX\_RATE | CDF\_UINT1 | NONE | 0 | 3 |
| 267 | OPTO\_RX\_SIGNAL\_QUALITY | CDF\_UINT1 | NONE | 0 | 1 |
| 268 | OPTO\_RX\_SYNCED | CDF\_UINT1 | NONE | 0 | 1 |
| 269 | OPTO\_TX\_A\_EN | CDF\_UINT1 | NONE | 0 | 1 |
| 270 | OPTO\_TX\_A\_EN\_INIT | CDF\_UINT1 | NONE | 0 | 1 |
| 271 | OPTO\_TX\_B\_EN | CDF\_UINT1 | NONE | 0 | 1 |
| 272 | OPTO\_TX\_B\_EN\_INIT | CDF\_UINT1 | NONE | 0 | 1 |
| 273 | OPTO\_TX\_EN | CDF\_UINT1 | NONE | 0 | 1 |
| 274 | OPTO\_TX\_POWER | CDF\_UINT1 | NONE | 0 | 7 |
| 275 | OPTO\_TX\_POWER\_EN | CDF\_UINT1 | NONE | 0 | 1 |
| 276 | OPTO\_TX\_RATE | CDF\_UINT1 | NONE | 0 | 3 |
| 277 | OPTO\_TX\_READY | CDF\_UINT1 | NONE | 0 | 1 |
| 278 | OSC\_ADJ\_POS\_START | CDF\_INT2 | NONE | 0 | 255 |
| 279 | OSC\_ADJ\_POS\_STOP | CDF\_INT2 | NONE | 0 | 255 |
| 280 | OSC\_ADJ\_TOF\_START | CDF\_INT2 | NONE | 0 | 255 |
| 281 | OSC\_ADJ\_TOF\_STOP | CDF\_INT2 | NONE | 0 | 255 |
| 282 | PA\_HV\_ON | CDF\_UINT1 | NONE | 0 | 1 |
| 283 | PA\_HVPS\_TEMP | CDF\_FLOAT | C | -67.18 | 124.2 |
| 284 | PA\_HVPS\_V\_MON | CDF\_FLOAT | kV | -46.2 | 0 |
| 285 | PACKET\_SUB\_TIME | CDF\_INT4 | NONE | 0 | 65535 |
| 286 | PACKET\_WHOLE\_TIME | CDF\_INT8 | NONE | 0 | 4294967296 |
| 287 | POS\_CAL\_DONE | CDF\_UINT1 | NONE | 0 | 1 |
| 288 | PROCESSOR\_IDLE\_PERCENTAGE | CDF\_UINT1 | NONE | 0 | 100 |
| 289 | PROTON\_AVOIDANCE\_STATUS | CDF\_UINT1 | NONE | 0 | 1 |
| 290 | PROTON\_DECI\_DECR\_THRESH\_REG | CDF\_INT4 | NONE | 0 | 65535 |
| 291 | PROTON\_DECI\_INCR\_REG | CDF\_UINT1 | NONE | 0 | 15 |
| 292 | PROTON\_DECI\_INCR\_THRESH\_REG | CDF\_INT4 | NONE | 0 | 65535 |
| 293 | PROTON\_DECI\_LEVEL\_REG | CDF\_UINT1 | NONE | 0 | 15 |
| 294 | PROTON\_MAX\_VAL\_REG | CDF\_UINT1 | NONE | 0 | 1023 |
| 295 | PROTON\_MIN\_VAL\_REG | CDF\_UINT1 | NONE | 0 | 1023 |
| 296 | QUALITY\_BITMASK | CDF\_INT4 | NONE | 0 | 65535 |
| 297 | QUALITY\_FLAG | CDF\_INT2 | NONE | 0 | 255 |
| 298 | SAFETY\_CHECKING\_STATUS\_CDH | CDF\_UINT1 | NONE | 0 | 1 |
| 299 | SAFETY\_CHECKING\_STATUS\_DSCB | CDF\_UINT1 | NONE | 0 | 1 |
| 300 | SAFING\_STATUS\_CDH\_MON\_RED | CDF\_UINT1 | NONE | 0 | 1 |
| 301 | SAFING\_STATUS\_CDH\_MON\_YEL | CDF\_UINT1 | NONE | 0 | 1 |
| 302 | SAFING\_STATUS\_DSCB\_MON\_RED | CDF\_UINT1 | NONE | 0 | 1 |
| 303 | SAFING\_STATUS\_DSCB\_MON\_YEL | CDF\_UINT1 | NONE | 0 | 1 |
| 304 | SEQ\_CNT | CDF\_INT4 | NONE | 0 | 65535 |
| 305 | SSD\_EN | CDF\_UINT1 | NONE | 0 | 1 |
| 306 | SSD\_I\_EN\_LIM | CDF\_UINT1 | NONE | 0 | 1 |
| 307 | SSD\_I\_TRIG | CDF\_UINT1 | NONE | 0 | 1 |
| 308 | SSD\_V\_EN\_LIM | CDF\_UINT1 | NONE | 0 | 1 |
| 309 | SSD\_V\_TRIG | CDF\_UINT1 | NONE | 0 | 1 |
| 310 | START\_ANODE\_A\_OSC\_CNT | CDF\_INT4 | NONE | 0 | 65535 |
| 311 | START\_ANODE\_B\_OSC\_CNT | CDF\_INT4 | NONE | 0 | 65535 |
| 312 | START\_COLLECTION | CDF\_UINT1 | NONE | 0 | 1 |
| 313 | START\_MCP\_EN | CDF\_UINT1 | NONE | 0 | 1 |
| 314 | START\_MCP\_I\_EN\_LIM | CDF\_UINT1 | NONE | 0 | 1 |
| 315 | START\_MCP\_I\_TRIG | CDF\_UINT1 | NONE | 0 | 1 |
| 316 | START\_MCP\_V\_EN\_LIM | CDF\_UINT1 | NONE | 0 | 1 |
| 317 | START\_MCP\_V\_TRIG | CDF\_UINT1 | NONE | 0 | 1 |
| 318 | START\_STIM\_DELAY | CDF\_UINT1 | NONE | 0 | 31 |
| 319 | START\_STIM\_EXT | CDF\_UINT1 | NONE | 0 | 1 |
| 320 | START\_STIM\_ON | CDF\_UINT1 | NONE | 0 | 1 |
| 321 | START\_STIM\_RATE | CDF\_UINT1 | NONE | 0 | 7 |
| 322 | START\_TOF\_OSC\_CNT | CDF\_INT4 | NONE | 0 | 65535 |
| 323 | STOP\_MCP\_EN | CDF\_UINT1 | NONE | 0 | 1 |
| 324 | STOP\_MCP\_I\_EN\_LIM | CDF\_UINT1 | NONE | 0 | 1 |
| 325 | STOP\_MCP\_I\_TRIG | CDF\_UINT1 | NONE | 0 | 1 |
| 326 | STOP\_MCP\_V\_EN\_LIM | CDF\_UINT1 | NONE | 0 | 1 |
| 327 | STOP\_MCP\_V\_TRIG | CDF\_UINT1 | NONE | 0 | 1 |
| 328 | STOP\_TOF\_OSC\_CNT | CDF\_INT4 | NONE | 0 | 65535 |
| 329 | SWEEP\_DATA\_A\_ACTIVE | CDF\_UINT1 | NONE | 0 | 1 |
| 330 | SWEEP\_DATA\_B\_ACTIVE | CDF\_UINT1 | NONE | 0 | 1 |
| 331 | SWEEP\_EDAC\_EN | CDF\_UINT1 | NONE | 0 | 1 |
| 332 | SWEEP\_EDP | CDF\_UINT1 | NONE | 0 | 1 |
| 333 | SWEEP\_EN\_ANALYZER | CDF\_UINT1 | NONE | 0 | 1 |
| 334 | SWEEP\_EN\_BOT\_DEF | CDF\_UINT1 | NONE | 0 | 1 |
| 335 | SWEEP\_EN\_TOP\_DEF | CDF\_UINT1 | NONE | 0 | 1 |
| 336 | SWEEP\_EN\_TOP\_PLATE | CDF\_UINT1 | NONE | 0 | 1 |
| 337 | SWEEP\_SCRUBBING\_EN | CDF\_UINT1 | NONE | 0 | 1 |
| 338 | SWEEP\_TBL\_POINTER\_SEL | CDF\_UINT1 | NONE | 0 | 1 |
| 339 | SYSTEM\_MODULE\_VERIFY | CDF\_UINT1 | NONE | 0 | 1 |
| 340 | TIME\_CODE\_CNT | CDF\_INT2 | NONE | 0 | 255 |
| 341 | TIME\_MESSAGE\_CNT | CDF\_INT2 | NONE | 0 | 255 |
| 342 | TOF\_CAL\_DONE | CDF\_UINT1 | NONE | 0 | 1 |
| 343 | TOF\_CAL\_EN | CDF\_UINT1 | NONE | 0 | 1 |
| 344 | TOF\_START\_SEL | CDF\_UINT1 | NONE | 0 | 1 | |
| 345 | TOF\_STIM\_DELAY | CDF\_UINT1 | NONE | 0 | 31 | |
| 346 | TOF\_STIM\_EXT | CDF\_UINT1 | NONE | 0 | 1 |
| 347 | TOF\_STIM\_ON | CDF\_UINT1 | NONE | 0 | 1 |
| 348 | TOF\_STIM\_RATE | CDF\_UINT1 | NONE | 0 | 7 |
| 349 | WDOG\_RESET\_CNT | CDF\_UINT1 | NONE | 0 | 127 |

### L3 – Higher level data products

#### EAS L3 data products

TBD

solo\_L3\_swa-eas-NMpa\_[StartTime-EndTime]\_V01.cdf

solo\_L3\_swa-eas-TMpa\_[StartTime-EndTime]\_V01.cdf

solo\_L3\_swa-eas-MOMred\_[StartTime-EndTime]\_V01.cdf

#### PAS L3 data products

#### HIS L3 data products

##### HIS L3 Composition Data

**Filename:** solo\_L3\_swa-his-comp\_yyyymmdd\_V01.cdf

**Global metadata**

|  |  |  |
| --- | --- | --- |
| **Name** | **Entry** | **Value** |
| Acknowledgement | 1 | Please acknowledge Chris J. Owen (SWA PI -- UCL MSSL) & Stefano Livi (HIS PI -- SwRI). NASA Contract NNG10EK25C. |
| Data\_product | 1 | L3>Level 3 data for HIS instrument |
| Data\_type | 1 | L3>Level 3 |
| Data\_version | 1 | 01 |
| Descriptor | 1 | SWA-HIS>Solar Wind Analyzer-Heavy Ion Sensor |
| Discipline | 1 | Space Physics>Interplanetary Studies |
| File\_naming\_convention | 1 | "source\_descriptor\_datatype\_yyyyMMdd |
| Generated\_by | 1 | SO-HIS SOC, University of Michigan |
| Generation\_date | 1 | 20200611 |
| HTTP\_LINK |  |  |
| Instrument\_type | 1 | Particles (space) |
| LEVEL | 1 | 3 |
| LINK\_TEXT |  |  |
| LINK\_TITLE |  |  |
| Logical\_file\_id | 1 | solo\_L3\_swa-his-comp\_00000000\_v01 |
| Logical\_source | 1 | solo\_L3\_swa-his-comp |
| Logical\_source\_description | 1 | solo\_L3\_swa-his-comp |
| Mission\_group | 1 | Solar Orbiter |
| MODS | 1 | Initial Release 4/07/2021. |
| PI\_affiliation | 1 | SWRI |
| PI\_name | 1 | S. Livi |
| Project | 1 | SOLO>Solar Orbiter |
| Rules\_of\_use | 1 | This data is appropriate for general scientific use.  Users are encouraged to read the Data Product Description Document and pay attention to the quality flag.  Contact the SWA/HIS team for more information and questions about the data. |
| Software\_version | 1 | 00.00.00 |
| SOOP\_TYPE |  |  |
| Source\_name | 1 | SOLO>Solar Orbiter |
| spase\_DatasetResourceID |  |  |
| TARGET\_CLASS | 1 | In-Situ |
| TARGET\_NAME | 1 | Solar Wind |
| TARGET\_REGION | 1 | Heliosphere |
| TEXT | 1 | Level 3 data for HIS instrument. |
|  | 2 | Time series measurements of the elemental abundance, charge state composition, and kinetic properties of heavy ions in the solar wind. |
| TIME\_MAX | 1 |  |
| TIME\_MIN | 1 |  |
| Time\_resolution | 1 | 30sec, 5min, 10min, 30min, 1hr, or 2hr |

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| **Variable\_Name** | **Data\_type** | **DIMS** | **SIZES** | **R\_VARY** | **D\_VARY** |
| EPOCH | CDF\_TIME\_TT2000 | 1 | 0 | T |  |
| **Attribute Name** | **Data Type** | **Value** | | | |
| CATDESC | CDF\_CHAR | Default time | | | |
| FIELDNAM | CDF\_CHAR | EPOCH | | | |
| FILLVAL | CDF\_TIME\_TT2000 | 9999-12-31T23:59:59.999999999 | | | |
| LABLAXIS | CDF\_CHAR | EPOCH | | | |
| MONOTON | CDF\_CHAR | INCREASE | | | |
| REFERENCE\_POSITION | CDF\_CHAR | Rotating Earth Geoid | | | |
| SCALETYP | CDF\_CHAR | linear | | | |
| TIME\_BASE | CDF\_CHAR | J2000 | | | |
| TIME\_SCALE | CDF\_CHAR | Terrestrial Time | | | |
| UNITS | CDF\_CHAR | ns | | | |
| VALIDMIN | CDF\_TIME\_TT2000 | 1990-01-01T00:00:00.000000000 | | | |
| VALIDMAX | CDF\_TIME\_TT2000 | 2049-12-31T23:59:59.999000000 | | | |
| VAR\_NOTES | CDF\_CHAR | Time in seconds since January 1, 2000, 12:00:00.000. Converted from SCET via SPICE time kernel provided by the mission. Currently set to start of accumulation interval. | | | |
| VAR\_TYPE | CDF\_CHAR | support\_data | | | |

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| **Variable\_Name** | **Data\_type** | **DIMS** | **SIZES** | **R\_VARY** | **D\_VARY** |
| SCET | CDF\_REAL8 | 1 | 0 | T |  |
| **Attribute Name** | **Data Type** | **Value** | | | |
| CATDESC | CDF\_CHAR | SCET | | | |
| DEPEND\_0 | CDF\_CHAR | EPOCH | | | |
| FIELDNAM | CDF\_CHAR | SCET | | | |
| FILLVAL | CDF\_REAL8 | -1.00E+31 | | | |
| FORMAT | CDF\_CHAR | E12.2 | | | |
| LABLAXIS | CDF\_CHAR | SCET | | | |
| SCALEMAX | CDF\_REAL8 | 8.00E+12 | | | |
| SCALEMIN | CDF\_REAL8 | 5.00E+12 | | | |
| SCALETYP | CDF\_CHAR | linear | | | |
| UNITS | CDF\_CHAR | milliseconds | | | |
| VALIDMAX | CDF\_REAL8 | 1.00E+14 | | | |
| VALIDMIN | CDF\_REAL8 | 0 | | | |
| VAR\_NOTES | CDF\_CHAR | Mission elapsed time in spacecraft clock ticks. Note: These are effected by environmental conditions and do not match Earth-based seconds. Beginning of accumulation. | | | |
| VAR\_TYPE | CDF\_CHAR | support\_data | | | |

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| **Variable\_Name** | **Data\_type** | **DIMS** | **SIZES** | **R\_VARY** | **D\_VARY** |
| ACCUM\_SECONDS | CDF\_REAL8 | 1 | 0 | T |  |
| **Attribute Name** | **Data Type** | **Value** | | | |
| CATDESC | CDF\_CHAR | ACCUM\_SECONDS | | | |
| DEPEND\_0 | CDF\_CHAR | EPOCH | | | |
| DISPLAY\_TYPE | CDF\_CHAR | time\_series | | | |
| FIELDNAM | CDF\_CHAR | ACCUM\_SECONDS | | | |
| FILLVAL | CDF\_REAL8 | -1.00E+31 | | | |
| FORMAT | CDF\_CHAR | E12.2 | | | |
| LABLAXIS | CDF\_CHAR | ACCUM\_SECONDS | | | |
| SCALEMAX | CDF\_REAL8 | 7000 | | | |
| SCALEMIN | CDF\_REAL8 | 0 | | | |
| SCALETYP | CDF\_CHAR | linear | | | |
| UNITS | CDF\_CHAR | seconds | | | |
| VALIDMAX | CDF\_REAL8 | (varies with cadence of file) | | | |
| VALIDMIN | CDF\_REAL8 | 0.025 | | | |
| VAR\_NOTES | CDF\_CHAR | The summed accumulation time for this time step, equal to the total measurement time for each elevation step throughout the accumulated scans, less measurement time from elevation steps that have not passed quality filtering. | | | |
| VAR\_TYPE | CDF\_CHAR | support\_data | | | |

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| **Variable\_Name** | **Data\_type** | **DIMS** | **SIZES** | **R\_VARY** | **D\_VARY** |
| QUALITY\_FLAG | CDF\_INT2 | 1 | 0 | T |  |
| **Attribute Name** | **Data Type** | **Value** | | | |
| CATDESC | CDF\_CHAR | QUALITY\_FLAG | | | |
| DEPEND\_0 | CDF\_CHAR | EPOCH | | | |
| DISPLAY\_TYPE | CDF\_CHAR | time\_series | | | |
| FIELDNAM | CDF\_CHAR | QUALITY\_FLAG | | | |
| FILLVAL | CDF\_UINT1 | -32768 | | | |
| FORMAT | CDF\_CHAR | I3 | | | |
| LABLAXIS | CDF\_CHAR | QUALITY\_FLAG | | | |
| SCALEMAX | CDF\_UINT1 | 3 | | | |
| SCALEMIN | CDF\_UINT1 | -2 | | | |
| SCALETYP | CDF\_CHAR | linear | | | |
| UNITS | CDF\_CHAR |  | | | |
| VALIDMAX | CDF\_INT2 | 2 | | | |
| VALIDMIN | CDF\_INT2 | 0 | | | |
| VAR\_NOTES | CDF\_CHAR | 0=good, 1=caution, 2=bad | | | |
| VAR\_TYPE | CDF\_CHAR | support\_data | | | |

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| **Variable\_Name** | **Data\_type** | **DIMS** | **SIZES** | **R\_VARY** | **D\_VARY** |
| QUALITY\_BITMASK | CDF\_UINT2 | 1 | 0 | T |  |
| **Attribute Name** | **Data Type** | **Value** | | | |
| CATDESC | CDF\_CHAR | QUALITY\_BITMASK | | | |
| DEPEND\_0 | CDF\_CHAR | EPOCH | | | |
| DISPLAY\_TYPE | CDF\_CHAR | time\_series | | | |
| FIELDNAM | CDF\_CHAR | QUALITY\_BITMASK | | | |
| FILLVAL | CDF\_UINT2 | 65535 | | | |
| FORMAT | CDF\_CHAR | I5 | | | |
| LABLAXIS | CDF\_CHAR | QUALITY\_BITMASK | | | |
| SCALEMAX | CDF\_UINT2 | 32 | | | |
| SCALEMIN | CDF\_UINT2 | 0 | | | |
| SCALETYP | CDF\_CHAR | linear | | | |
| UNITS | CDF\_CHAR |  | | | |
| VALIDMAX | CDF\_UINT2 | 65534 | | | |
| VALIDMIN | CDF\_UINT2 | 0 | | | |
| VAR\_NOTES | CDF\_CHAR | Not yet implemented | | | |
| VAR\_TYPE | CDF\_CHAR | support\_data | | | |

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| **Variable\_Name** | **Data\_type** | **DIMS** | **SIZES** | **R\_VARY** | **D\_VARY** |
| AZIMUTH\_SOURCE | CDF\_INT2 | 1 | 0 | T |  |
| **Attribute Name** | **Data Type** | **Value** | | | |
| CATDESC | CDF\_CHAR | Azimuth source | | | |
| DEPEND\_0 | CDF\_CHAR | EPOCH | | | |
| DISPLAY\_TYPE | CDF\_CHAR | time\_series | | | |
| FIELDNAM | CDF\_CHAR | AZIMUTH\_SOURCE | | | |
| FILLVAL | CDF\_INT2 | -32768 | | | |
| FORMAT | CDF\_CHAR | I3 | | | |
| LABLAXIS | CDF\_CHAR | AZIMUTH\_SOURCE | | | |
| SCALEMAX | CDF\_INT2 | 3 | | | |
| SCALEMIN | CDF\_INT2 | -2 | | | |
| SCALETYP | CDF\_CHAR | linear | | | |
| UNITS | CDF\_CHAR |  | | | |
| VALIDMAX | CDF\_INT2 | 1 | | | |
| VALIDMIN | CDF\_INT2 | 0 | | | |
| VAR\_NOTES | CDF\_CHAR | 0 = Azimuth from SSD Detector; 1 = Azimuth from the position on the Start MCP | | | |
| VAR\_TYPE | CDF\_CHAR | support\_data | | | |

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| **Variable\_Name** | **Data\_type** | **DIMS** | **SIZES** | **R\_VARY** | **D\_VARY** |
| SW\_TYPE | CDF\_INT2 | 1 | 0 | T |  |
| **Attribute Name** | **Data Type** | **Value** | | | |
| CATDESC | CDF\_CHAR | Solar wind type | | | |
| DEPEND\_0 | CDF\_CHAR | EPOCH | | | |
| DISPLAY\_TYPE | CDF\_CHAR | time\_series | | | |
| FIELDNAM | CDF\_CHAR | SW\_TYPE | | | |
| FILLVAL | CDF\_INT2 | -32768 | | | |
| FORMAT | CDF\_CHAR | I3 | | | |
| LABLAXIS | CDF\_CHAR | SW\_TYPE | | | |
| SCALEMAX | CDF\_INT2 | 5 | | | |
| SCALEMIN | CDF\_INT2 | -2 | | | |
| SCALETYP | CDF\_CHAR | linear | | | |
| UNITS | CDF\_CHAR |  | | | |
| VALIDMAX | CDF\_INT2 | 3 | | | |
| VALIDMIN | CDF\_INT2 | 0 | | | |
| VAR\_NOTES | CDF\_CHAR | Solar wind type. 0:Streamer, 1:Coronal hole, 2:CME, 3:Unidentified | | | |
| VAR\_TYPE | CDF\_CHAR | support\_data | | | |

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| --- | --- | --- | --- | --- | --- |
| **Variable\_Name** | **Data\_type** | **DIMS** | **SIZES** | **R\_VARY** | **D\_VARY** |
| NUMBER\_OF\_SCANS | CDF\_INT2 | 1 | 0 | T |  |
| **Attribute Name** | **Data Type** | **Value** | | | |
| CATDESC | CDF\_CHAR | Number of scans | | | |
| DEPEND\_0 | CDF\_CHAR | EPOCH | | | |
| DISPLAY\_TYPE | CDF\_CHAR | time\_series | | | |
| FIELDNAM | CDF\_CHAR | NUMBER\_OF\_SCANS | | | |
| FILLVAL | CDF\_INT2 | -32768 | | | |
| FORMAT | CDF\_CHAR | I3 | | | |
| LABLAXIS | CDF\_CHAR | NUMBER\_OF\_SCANS | | | |
| SCALEMAX | CDF\_INT2 | 250 | | | |
| SCALEMIN | CDF\_INT2 | 0 | | | |
| SCALETYP | CDF\_CHAR | linear | | | |
| UNITS | CDF\_CHAR |  | | | |
| VALIDMAX | CDF\_INT2 | 20 | | | |
| VALIDMIN | CDF\_INT2 | 1 | | | |
| VAR\_NOTES | CDF\_CHAR | Number of scans accumulated for data products. | | | |
| VAR\_TYPE | CDF\_CHAR | support\_data | | | |

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| **Variable\_Name** | **Data\_type** | **DIMS** | **SIZES** | **R\_VARY** | **D\_VARY** |
| HE2\_DENS | CDF\_FLOAT | 1 | 0 | T |  |
| **Attribute Name** | **Data Type** | **Value** | | | |
| CATDESC | CDF\_CHAR | He++ density | | | |
| DEPEND\_0 | CDF\_CHAR | EPOCH | | | |
| DISPLAY\_TYPE | CDF\_CHAR | time\_series | | | |
| FIELDNAM | CDF\_CHAR | HE2\_DENS | | | |
| FILLVAL | CDF\_FLOAT | -1E31 | | | |
| FORMAT | CDF\_CHAR | E10.3 | | | |
| LABLAXIS | CDF\_CHAR | HE2\_DENS | | | |
| SCALEMAX | CDF\_FLOAT | 1E2 | | | |
| SCALEMIN | CDF\_FLOAT | 1E-4 | | | |
| SCALETYP | CDF\_CHAR | log | | | |
| UNITS | CDF\_CHAR | 1/cm^3 | | | |
| VALIDMAX | CDF\_UINT1 | 9999 | | | |
| VALIDMIN | CDF\_UINT1 | 0 | | | |
| VAR\_NOTES | CDF\_CHAR | He++ density | | | |
| VAR\_TYPE | CDF\_CHAR | data | | | |

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| **Variable\_Name** | **Data\_type** | **DIMS** | **SIZES** | **R\_VARY** | **D\_VARY** |
| HE2\_DENS\_ERR | CDF\_FLOAT | 1 | 0 | T |  |
| **Attribute Name** | **Data Type** | **Value** | | | |
| CATDESC | CDF\_CHAR | He++ density error/uncertainty | | | |
| DEPEND\_0 | CDF\_CHAR | EPOCH | | | |
| DISPLAY\_TYPE | CDF\_CHAR | time\_series | | | |
| FIELDNAM | CDF\_CHAR | HE2\_DENS\_ERR | | | |
| FILLVAL | CDF\_FLOAT | -1E31 | | | |
| FORMAT | CDF\_CHAR | E10.3 | | | |
| LABLAXIS | CDF\_CHAR | HE2\_DENS\_ERR | | | |
| SCALEMAX | CDF\_FLOAT | 1E2 | | | |
| SCALEMIN | CDF\_FLOAT | 1E-4 | | | |
| SCALETYP | CDF\_CHAR | log | | | |
| UNITS | CDF\_CHAR | 1/cm^3 | | | |
| VALIDMAX | CDF\_UINT1 | 9999 | | | |
| VALIDMIN | CDF\_UINT1 | 0 | | | |
| VAR\_NOTES | CDF\_CHAR | Estimate of statistical uncertainty due to limited count statistics. Note that these estimates do NOT include systematic error. | | | |
| VAR\_TYPE | CDF\_CHAR | support\_data | | | |

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| --- | --- | --- | --- | --- | --- |
| **Variable\_Name** | **Data\_type** | **DIMS** | **SIZES** | **R\_VARY** | **D\_VARY** |
| HE2\_DENS\_QF | CDF\_INT2 | 1 | 0 | T |  |
| **Attribute Name** | **Data Type** | **Value** | | | |
| CATDESC | CDF\_CHAR | He++ density quality flag | | | |
| DEPEND\_0 | CDF\_CHAR | EPOCH | | | |
| DISPLAY\_TYPE | CDF\_CHAR | time\_series | | | |
| FIELDNAM | CDF\_CHAR | HE2\_DENS\_QF | | | |
| FILLVAL | CDF\_INT2 | -32768 | | | |
| FORMAT | CDF\_CHAR | I3 | | | |
| LABLAXIS | CDF\_CHAR | HE2\_DENS\_QF | | | |
| SCALEMAX | CDF\_INT2 | 3 | | | |
| SCALEMIN | CDF\_INT2 | -2 | | | |
| SCALETYP | CDF\_CHAR | linear | | | |
| UNITS | CDF\_CHAR |  | | | |
| VALIDMAX | CDF\_INT2 | 2 | | | |
| VALIDMIN | CDF\_INT2 | 0 | | | |
| VAR\_NOTES | CDF\_CHAR | Quality Flag: 0=good, 1=caution, 2=bad. Not yet implemented | | | |
| VAR\_TYPE | CDF\_CHAR | support\_data | | | |

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| **Variable\_Name** | **Data\_type** | **DIMS** | **SIZES** | **R\_VARY** | **D\_VARY** |
| HE2\_TH\_VEL | CDF\_FLOAT | 1 | 0 | T |  |
| **Attribute Name** | **Data Type** | **Value** | | | |
| CATDESC | CDF\_CHAR | He++ temperature | | | |
| DEPEND\_0 | CDF\_CHAR | EPOCH | | | |
| DISPLAY\_TYPE | CDF\_CHAR | time\_series | | | |
| FIELDNAM | CDF\_CHAR | HE2\_TH\_VEL | | | |
| FILLVAL | CDF\_FLOAT | -1E31 | | | |
| FORMAT | CDF\_CHAR | E10.3 | | | |
| LABLAXIS | CDF\_CHAR | HE2\_TH\_VEL | | | |
| SCALEMAX | CDF\_FLOAT | 1E9 | | | |
| SCALEMIN | CDF\_FLOAT | 1E4 | | | |
| SCALETYP | CDF\_CHAR | log | | | |
| UNITS | CDF\_CHAR | K | | | |
| VALIDMAX | CDF\_UINT1 | 9.999E10 | | | |
| VALIDMIN | CDF\_UINT1 | 0 | | | |
| VAR\_NOTES | CDF\_CHAR | He++ temperature | | | |
| VAR\_TYPE | CDF\_CHAR | data | | | |

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| **Variable\_Name** | **Data\_type** | **DIMS** | **SIZES** | **R\_VARY** | **D\_VARY** |
| HE2\_TH\_VEL\_ERR | CDF\_FLOAT | 1 | 0 | T |  |
| **Attribute Name** | **Data Type** | **Value** | | | |
| CATDESC | CDF\_CHAR | He++ temperature error/uncertainty | | | |
| DEPEND\_0 | CDF\_CHAR | EPOCH | | | |
| DISPLAY\_TYPE | CDF\_CHAR | time\_series | | | |
| FIELDNAM | CDF\_CHAR | HE2\_TH\_VEL\_ERR | | | |
| FILLVAL | CDF\_FLOAT | -1E31 | | | |
| FORMAT | CDF\_CHAR | E10.3 | | | |
| LABLAXIS | CDF\_CHAR | HE2\_TH\_VEL\_ERR | | | |
| SCALEMAX | CDF\_FLOAT | 1E9 | | | |
| SCALEMIN | CDF\_FLOAT | 1E4 | | | |
| SCALETYP | CDF\_CHAR | log | | | |
| UNITS | CDF\_CHAR | K | | | |
| VALIDMAX | CDF\_UINT1 | 9.999E10 | | | |
| VALIDMIN | CDF\_UINT1 | 0 | | | |
| VAR\_NOTES | CDF\_CHAR | Estimate of statistical uncertainty due to limited count statistics. Note that these estimates do NOT include systematic error. | | | |
| VAR\_TYPE | CDF\_CHAR | support\_data | | | |

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| --- | --- | --- | --- | --- | --- |
| **Variable\_Name** | **Data\_type** | **DIMS** | **SIZES** | **R\_VARY** | **D\_VARY** |
| HE2\_TH\_VEL\_QF | CDF\_INT2 | 1 | 0 | T |  |
| **Attribute Name** | **Data Type** | **Value** | | | |
| CATDESC | CDF\_CHAR | He++ temperature quality flag | | | |
| DEPEND\_0 | CDF\_CHAR | EPOCH | | | |
| DISPLAY\_TYPE | CDF\_CHAR | time\_series | | | |
| FIELDNAM | CDF\_CHAR | HE2\_TH\_VEL\_QF | | | |
| FILLVAL | CDF\_INT2 | -32768 | | | |
| FORMAT | CDF\_CHAR | I3 | | | |
| LABLAXIS | CDF\_CHAR | HE2\_TH\_VEL\_QF | | | |
| SCALEMAX | CDF\_INT2 | 3 | | | |
| SCALEMIN | CDF\_INT2 | -2 | | | |
| SCALETYP | CDF\_CHAR | linear | | | |
| UNITS | CDF\_CHAR |  | | | |
| VALIDMAX | CDF\_INT2 | 2 | | | |
| VALIDMIN | CDF\_INT2 | 0 | | | |
| VAR\_NOTES | CDF\_CHAR | Quality Flag: 0=good, 1=caution, 2=bad. Not yet implemented | | | |
| VAR\_TYPE | CDF\_CHAR | support\_data | | | |

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| --- | --- | --- | --- | --- | --- |
| **Variable\_Name** | **Data\_type** | **DIMS** | **SIZES** | **R\_VARY** | **D\_VARY** |
| HE2\_VEL | CDF\_FLOAT | 1 | 0 | T |  |
| **Attribute Name** | **Data Type** | **Value** | | | |
| CATDESC | CDF\_CHAR | He++ velocity | | | |
| DEPEND\_0 | CDF\_CHAR | EPOCH | | | |
| DISPLAY\_TYPE | CDF\_CHAR | time\_series | | | |
| FIELDNAM | CDF\_CHAR | HE2\_VEL | | | |
| FILLVAL | CDF\_FLOAT | -1E31 | | | |
| FORMAT | CDF\_CHAR | E10.3 | | | |
| LABLAXIS | CDF\_CHAR | HE2\_VEL | | | |
| SCALEMAX | CDF\_FLOAT | 2E3 | | | |
| SCALEMIN | CDF\_FLOAT | 0 | | | |
| SCALETYP | CDF\_CHAR | linear | | | |
| UNITS | CDF\_CHAR | km/s | | | |
| VALIDMAX | CDF\_UINT1 | 9.999E4 | | | |
| VALIDMIN | CDF\_UINT1 | 0 | | | |
| VAR\_NOTES | CDF\_CHAR | He++ velocity | | | |
| VAR\_TYPE | CDF\_CHAR | data | | | |

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| --- | --- | --- | --- | --- | --- |
| **Variable\_Name** | **Data\_type** | **DIMS** | **SIZES** | **R\_VARY** | **D\_VARY** |
| HE2\_VEL\_ERR | CDF\_FLOAT | 1 | 0 | T |  |
| **Attribute Name** | **Data Type** | **Value** | | | |
| CATDESC | CDF\_CHAR | He++ velocity error/uncertainty | | | |
| DEPEND\_0 | CDF\_CHAR | EPOCH | | | |
| DISPLAY\_TYPE | CDF\_CHAR | time\_series | | | |
| FIELDNAM | CDF\_CHAR | HE2\_VEL\_ERR | | | |
| FILLVAL | CDF\_FLOAT | -1E31 | | | |
| FORMAT | CDF\_CHAR | E10.3 | | | |
| LABLAXIS | CDF\_CHAR | HE2\_VEL\_ERR | | | |
| SCALEMAX | CDF\_FLOAT | 2E3 | | | |
| SCALEMIN | CDF\_FLOAT | 0 | | | |
| SCALETYP | CDF\_CHAR | linear | | | |
| UNITS | CDF\_CHAR | km/s | | | |
| VALIDMAX | CDF\_UINT1 | 9.999E4 | | | |
| VALIDMIN | CDF\_UINT1 | 0 | | | |
| VAR\_NOTES | CDF\_CHAR | Estimate of statistical uncertainty due to limited count statistics. Note that these estimates do NOT include systematic error. | | | |
| VAR\_TYPE | CDF\_CHAR | support\_data | | | |

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| **Variable\_Name** | **Data\_type** | **DIMS** | **SIZES** | **R\_VARY** | **D\_VARY** |
| HE2\_VEL\_QF | CDF\_INT2 | 1 | 0 | T |  |
| **Attribute Name** | **Data Type** | **Value** | | | |
| CATDESC | CDF\_CHAR | He++ velocity quality flag | | | |
| DEPEND\_0 | CDF\_CHAR | EPOCH | | | |
| DISPLAY\_TYPE | CDF\_CHAR | time\_series | | | |
| FIELDNAM | CDF\_CHAR | HE2\_VEL\_QF | | | |
| FILLVAL | CDF\_INT2 | -32768 | | | |
| FORMAT | CDF\_CHAR | I3 | | | |
| LABLAXIS | CDF\_CHAR | HE2\_VEL\_QF | | | |
| SCALEMAX | CDF\_INT2 | 3 | | | |
| SCALEMIN | CDF\_INT2 | -2 | | | |
| SCALETYP | CDF\_CHAR | linear | | | |
| UNITS | CDF\_CHAR |  | | | |
| VALIDMAX | CDF\_INT2 | 2 | | | |
| VALIDMIN | CDF\_INT2 | 0 | | | |
| VAR\_NOTES | CDF\_CHAR | Quality Flag: 0=good, 1=caution, 2=bad. Not yet implemented | | | |
| VAR\_TYPE | CDF\_CHAR | support\_data | | | |

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| **Variable\_Name** | **Data\_type** | **DIMS** | **SIZES** | **R\_VARY** | **D\_VARY** |
| C5\_DENS | CDF\_FLOAT | 1 | 0 | T |  |
| **Attribute Name** | **Data Type** | **Value** | | | |
| CATDESC | CDF\_CHAR | Carbon 5 density | | | |
| DEPEND\_0 | CDF\_CHAR | EPOCH | | | |
| DISPLAY\_TYPE | CDF\_CHAR | time\_series | | | |
| FIELDNAM | CDF\_CHAR | C5\_DENS | | | |
| FILLVAL | CDF\_FLOAT | -1E31 | | | |
| FORMAT | CDF\_CHAR | E10.3 | | | |
| LABLAXIS | CDF\_CHAR | C5\_DENS | | | |
| SCALEMAX | CDF\_FLOAT | 1E2 | | | |
| SCALEMIN | CDF\_FLOAT | 1E-4 | | | |
| SCALETYP | CDF\_CHAR | log | | | |
| UNITS | CDF\_CHAR | 1/cm^3 | | | |
| VALIDMAX | CDF\_UINT1 | 9999 | | | |
| VALIDMIN | CDF\_UINT1 | 0 | | | |
| VAR\_NOTES | CDF\_CHAR | Carbon 5 density | | | |
| VAR\_TYPE | CDF\_CHAR | data | | | |

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| **Variable\_Name** | **Data\_type** | **DIMS** | **SIZES** | **R\_VARY** | **D\_VARY** |
| C5\_DENS\_ERR | CDF\_FLOAT | 1 | 0 | T |  |
| **Attribute Name** | **Data Type** | **Value** | | | |
| CATDESC | CDF\_CHAR | Carbon 5 density error/uncertainty | | | |
| DEPEND\_0 | CDF\_CHAR | EPOCH | | | |
| DISPLAY\_TYPE | CDF\_CHAR | time\_series | | | |
| FIELDNAM | CDF\_CHAR | C5\_DENS\_ERR | | | |
| FILLVAL | CDF\_FLOAT | -1E31 | | | |
| FORMAT | CDF\_CHAR | E10.3 | | | |
| LABLAXIS | CDF\_CHAR | C5\_DENS\_ERR | | | |
| SCALEMAX | CDF\_FLOAT | 1E2 | | | |
| SCALEMIN | CDF\_FLOAT | 1E-4 | | | |
| SCALETYP | CDF\_CHAR | log | | | |
| UNITS | CDF\_CHAR | 1/cm^3 | | | |
| VALIDMAX | CDF\_UINT1 | 9999 | | | |
| VALIDMIN | CDF\_UINT1 | 0 | | | |
| VAR\_NOTES | CDF\_CHAR | Estimate of statistical uncertainty due to limited count statistics. Note that these estimates do NOT include systematic error. | | | |
| VAR\_TYPE | CDF\_CHAR | support\_data | | | |

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| **Variable\_Name** | **Data\_type** | **DIMS** | **SIZES** | **R\_VARY** | **D\_VARY** |
| C5\_DENS\_QF | CDF\_INT2 | 1 | 0 | T |  |
| **Attribute Name** | **Data Type** | **Value** | | | |
| CATDESC | CDF\_CHAR | Carbon 5 density quality flag | | | |
| DEPEND\_0 | CDF\_CHAR | EPOCH | | | |
| DISPLAY\_TYPE | CDF\_CHAR | time\_series | | | |
| FIELDNAM | CDF\_CHAR | C5\_DENS\_QF | | | |
| FILLVAL | CDF\_INT2 | -32768 | | | |
| FORMAT | CDF\_CHAR | I3 | | | |
| LABLAXIS | CDF\_CHAR | C5\_DENS\_QF | | | |
| SCALEMAX | CDF\_INT2 | 3 | | | |
| SCALEMIN | CDF\_INT2 | -2 | | | |
| SCALETYP | CDF\_CHAR | linear | | | |
| UNITS | CDF\_CHAR |  | | | |
| VALIDMAX | CDF\_INT2 | 2 | | | |
| VALIDMIN | CDF\_INT2 | 0 | | | |
| VAR\_NOTES | CDF\_CHAR | Quality Flag: 0=good, 1=caution, 2=bad. Not yet implemented | | | |
| VAR\_TYPE | CDF\_CHAR | support\_data | | | |

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| **Variable\_Name** | **Data\_type** | **DIMS** | **SIZES** | **R\_VARY** | **D\_VARY** |
| C5\_TH\_VEL | CDF\_FLOAT | 1 | 0 | T |  |
| **Attribute Name** | **Data Type** | **Value** | | | |
| CATDESC | CDF\_CHAR | Carbon 5 temperature | | | |
| DEPEND\_0 | CDF\_CHAR | EPOCH | | | |
| DISPLAY\_TYPE | CDF\_CHAR | time\_series | | | |
| FIELDNAM | CDF\_CHAR | C5\_TH\_VEL | | | |
| FILLVAL | CDF\_FLOAT | -1E31 | | | |
| FORMAT | CDF\_CHAR | E10.3 | | | |
| LABLAXIS | CDF\_CHAR | C5\_TH\_VEL | | | |
| SCALEMAX | CDF\_FLOAT | 1E9 | | | |
| SCALEMIN | CDF\_FLOAT | 1E4 | | | |
| SCALETYP | CDF\_CHAR | log | | | |
| UNITS | CDF\_CHAR | K | | | |
| VALIDMAX | CDF\_UINT1 | 9.999E10 | | | |
| VALIDMIN | CDF\_UINT1 | 0 | | | |
| VAR\_NOTES | CDF\_CHAR | Carbon 5 temperature | | | |
| VAR\_TYPE | CDF\_CHAR | data | | | |

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| **Variable\_Name** | **Data\_type** | **DIMS** | **SIZES** | **R\_VARY** | **D\_VARY** |
| C5\_TH\_VEL\_ERR | CDF\_FLOAT | 1 | 0 | T |  |
| **Attribute Name** | **Data Type** | **Value** | | | |
| CATDESC | CDF\_CHAR | Carbon 5 temperature error/uncertainty | | | |
| DEPEND\_0 | CDF\_CHAR | EPOCH | | | |
| DISPLAY\_TYPE | CDF\_CHAR | time\_series | | | |
| FIELDNAM | CDF\_CHAR | C5\_TH\_VEL\_ERR | | | |
| FILLVAL | CDF\_FLOAT | -1E31 | | | |
| FORMAT | CDF\_CHAR | E10.3 | | | |
| LABLAXIS | CDF\_CHAR | C5\_TH\_VEL\_ERR | | | |
| SCALEMAX | CDF\_FLOAT | 1E9 | | | |
| SCALEMIN | CDF\_FLOAT | 1E4 | | | |
| SCALETYP | CDF\_CHAR | log | | | |
| UNITS | CDF\_CHAR | K | | | |
| VALIDMAX | CDF\_UINT1 | 9.999E10 | | | |
| VALIDMIN | CDF\_UINT1 | 0 | | | |
| VAR\_NOTES | CDF\_CHAR | Estimate of statistical uncertainty due to limited count statistics. Note that these estimates do NOT include systematic error. | | | |
| VAR\_TYPE | CDF\_CHAR | support\_data | | | |

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| **Variable\_Name** | **Data\_type** | **DIMS** | **SIZES** | **R\_VARY** | **D\_VARY** |
| C5\_TH\_VEL\_QF | CDF\_INT2 | 1 | 0 | T |  |
| **Attribute Name** | **Data Type** | **Value** | | | |
| CATDESC | CDF\_CHAR | Carbon 5 temperature quality flag | | | |
| DEPEND\_0 | CDF\_CHAR | EPOCH | | | |
| DISPLAY\_TYPE | CDF\_CHAR | time\_series | | | |
| FIELDNAM | CDF\_CHAR | C5\_TH\_VEL\_QF | | | |
| FILLVAL | CDF\_INT2 | -32768 | | | |
| FORMAT | CDF\_CHAR | I3 | | | |
| LABLAXIS | CDF\_CHAR | C5\_TH\_VEL\_QF | | | |
| SCALEMAX | CDF\_INT2 | 3 | | | |
| SCALEMIN | CDF\_INT2 | -2 | | | |
| SCALETYP | CDF\_CHAR | linear | | | |
| UNITS | CDF\_CHAR |  | | | |
| VALIDMAX | CDF\_INT2 | 2 | | | |
| VALIDMIN | CDF\_INT2 | 0 | | | |
| VAR\_NOTES | CDF\_CHAR | Quality Flag: 0=good, 1=caution, 2=bad. Not yet implemented | | | |
| VAR\_TYPE | CDF\_CHAR | support\_data | | | |

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| **Variable\_Name** | **Data\_type** | **DIMS** | **SIZES** | **R\_VARY** | **D\_VARY** |
| C5\_VEL | CDF\_FLOAT | 1 | 0 | T |  |
| **Attribute Name** | **Data Type** | **Value** | | | |
| CATDESC | CDF\_CHAR | Carbon 5 velocity | | | |
| DEPEND\_0 | CDF\_CHAR | EPOCH | | | |
| DISPLAY\_TYPE | CDF\_CHAR | time\_series | | | |
| FIELDNAM | CDF\_CHAR | C5\_VEL | | | |
| FILLVAL | CDF\_FLOAT | -1E31 | | | |
| FORMAT | CDF\_CHAR | E10.3 | | | |
| LABLAXIS | CDF\_CHAR | C5\_VEL | | | |
| SCALEMAX | CDF\_FLOAT | 2E3 | | | |
| SCALEMIN | CDF\_FLOAT | 0 | | | |
| SCALETYP | CDF\_CHAR | linear | | | |
| UNITS | CDF\_CHAR | km/s | | | |
| VALIDMAX | CDF\_UINT1 | 9.999E4 | | | |
| VALIDMIN | CDF\_UINT1 | 0 | | | |
| VAR\_NOTES | CDF\_CHAR | Carbon 5 velocity | | | |
| VAR\_TYPE | CDF\_CHAR | data | | | |

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| **Variable\_Name** | **Data\_type** | **DIMS** | **SIZES** | **R\_VARY** | **D\_VARY** |
| C5\_VEL\_ERR | CDF\_FLOAT | 1 | 0 | T |  |
| **Attribute Name** | **Data Type** | **Value** | | | |
| CATDESC | CDF\_CHAR | Carbon 5 velocity error/uncertainty | | | |
| DEPEND\_0 | CDF\_CHAR | EPOCH | | | |
| DISPLAY\_TYPE | CDF\_CHAR | time\_series | | | |
| FIELDNAM | CDF\_CHAR | C5\_VEL\_ERR | | | |
| FILLVAL | CDF\_FLOAT | -1E31 | | | |
| FORMAT | CDF\_CHAR | E10.3 | | | |
| LABLAXIS | CDF\_CHAR | C5\_VEL\_ERR | | | |
| SCALEMAX | CDF\_FLOAT | 2E3 | | | |
| SCALEMIN | CDF\_FLOAT | 0 | | | |
| SCALETYP | CDF\_CHAR | linear | | | |
| UNITS | CDF\_CHAR | km/s | | | |
| VALIDMAX | CDF\_UINT1 | 9.999E4 | | | |
| VALIDMIN | CDF\_UINT1 | 0 | | | |
| VAR\_NOTES | CDF\_CHAR | Estimate of statistical uncertainty due to limited count statistics. Note that these estimates do NOT include systematic error. | | | |
| VAR\_TYPE | CDF\_CHAR | support\_data | | | |

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| **Variable\_Name** | **Data\_type** | **DIMS** | **SIZES** | **R\_VARY** | **D\_VARY** |
| C5\_VEL\_QF | CDF\_INT2 | 1 | 0 | T |  |
| **Attribute Name** | **Data Type** | **Value** | | | |
| CATDESC | CDF\_CHAR | Carbon 5 velocity quality flag | | | |
| DEPEND\_0 | CDF\_CHAR | EPOCH | | | |
| DISPLAY\_TYPE | CDF\_CHAR | time\_series | | | |
| FIELDNAM | CDF\_CHAR | C5\_VEL\_QF | | | |
| FILLVAL | CDF\_INT2 | -32768 | | | |
| FORMAT | CDF\_CHAR | I3 | | | |
| LABLAXIS | CDF\_CHAR | C5\_VEL\_QF | | | |
| SCALEMAX | CDF\_INT2 | 3 | | | |
| SCALEMIN | CDF\_INT2 | -2 | | | |
| SCALETYP | CDF\_CHAR | linear | | | |
| UNITS | CDF\_CHAR |  | | | |
| VALIDMAX | CDF\_INT2 | 2 | | | |
| VALIDMIN | CDF\_INT2 | 0 | | | |
| VAR\_NOTES | CDF\_CHAR | Quality Flag: 0=good, 1=caution, 2=bad. Not yet implemented | | | |
| VAR\_TYPE | CDF\_CHAR | support\_data | | | |

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| **Variable\_Name** | **Data\_type** | **DIMS** | **SIZES** | **R\_VARY** | **D\_VARY** |
| O6\_DENS | CDF\_FLOAT | 1 | 0 | T |  |
| **Attribute Name** | **Data Type** | **Value** | | | |
| CATDESC | CDF\_CHAR | Oxygen 6 density | | | |
| DEPEND\_0 | CDF\_CHAR | EPOCH | | | |
| DISPLAY\_TYPE | CDF\_CHAR | time\_series | | | |
| FIELDNAM | CDF\_CHAR | O6\_DENS | | | |
| FILLVAL | CDF\_FLOAT | -1E31 | | | |
| FORMAT | CDF\_CHAR | E10.3 | | | |
| LABLAXIS | CDF\_CHAR | O6\_DENS | | | |
| SCALEMAX | CDF\_FLOAT | 1E2 | | | |
| SCALEMIN | CDF\_FLOAT | 1E-4 | | | |
| SCALETYP | CDF\_CHAR | log | | | |
| UNITS | CDF\_CHAR | 1/cm^3 | | | |
| VALIDMAX | CDF\_UINT1 | 9999 | | | |
| VALIDMIN | CDF\_UINT1 | 0 | | | |
| VAR\_NOTES | CDF\_CHAR | Oxygen 6 density | | | |
| VAR\_TYPE | CDF\_CHAR | data | | | |

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| **Variable\_Name** | **Data\_type** | **DIMS** | **SIZES** | **R\_VARY** | **D\_VARY** |
| O6\_DENS\_ERR | CDF\_FLOAT | 1 | 0 | T |  |
| **Attribute Name** | **Data Type** | **Value** | | | |
| CATDESC | CDF\_CHAR | Oxygen 6 density error/uncertainty | | | |
| DEPEND\_0 | CDF\_CHAR | EPOCH | | | |
| DISPLAY\_TYPE | CDF\_CHAR | time\_series | | | |
| FIELDNAM | CDF\_CHAR | O6\_DENS\_ERR | | | |
| FILLVAL | CDF\_FLOAT | -1E31 | | | |
| FORMAT | CDF\_CHAR | E10.3 | | | |
| LABLAXIS | CDF\_CHAR | O6\_DENS\_ERR | | | |
| SCALEMAX | CDF\_FLOAT | 1E2 | | | |
| SCALEMIN | CDF\_FLOAT | 1E-4 | | | |
| SCALETYP | CDF\_CHAR | log | | | |
| UNITS | CDF\_CHAR | 1/cm^3 | | | |
| VALIDMAX | CDF\_UINT1 | 9999 | | | |
| VALIDMIN | CDF\_UINT1 | 0 | | | |
| VAR\_NOTES | CDF\_CHAR | Estimate of statistical uncertainty due to limited count statistics. Note that these estimates do NOT include systematic error. | | | |
| VAR\_TYPE | CDF\_CHAR | support\_data | | | |

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| **Variable\_Name** | **Data\_type** | **DIMS** | **SIZES** | **R\_VARY** | **D\_VARY** |
| O6\_DENS\_QF | CDF\_INT2 | 1 | 0 | T |  |
| **Attribute Name** | **Data Type** | **Value** | | | |
| CATDESC | CDF\_CHAR | Oxygen 6 density quality flag | | | |
| DEPEND\_0 | CDF\_CHAR | EPOCH | | | |
| DISPLAY\_TYPE | CDF\_CHAR | time\_series | | | |
| FIELDNAM | CDF\_CHAR | O6\_DENS\_QF | | | |
| FILLVAL | CDF\_INT2 | -32768 | | | |
| FORMAT | CDF\_CHAR | I3 | | | |
| LABLAXIS | CDF\_CHAR | O6\_DENS\_QF | | | |
| SCALEMAX | CDF\_INT2 | 3 | | | |
| SCALEMIN | CDF\_INT2 | -2 | | | |
| SCALETYP | CDF\_CHAR | linear | | | |
| UNITS | CDF\_CHAR |  | | | |
| VALIDMAX | CDF\_INT2 | 2 | | | |
| VALIDMIN | CDF\_INT2 | 0 | | | |
| VAR\_NOTES | CDF\_CHAR | Quality Flag: 0=good, 1=caution, 2=bad. Not yet implemented | | | |
| VAR\_TYPE | CDF\_CHAR | support\_data | | | |

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| **Variable\_Name** | **Data\_type** | **DIMS** | **SIZES** | **R\_VARY** | **D\_VARY** |
| O6\_TH\_VEL | CDF\_FLOAT | 1 | 0 | T |  |
| **Attribute Name** | **Data Type** | **Value** | | | |
| CATDESC | CDF\_CHAR | Oxygen 6 temperature | | | |
| DEPEND\_0 | CDF\_CHAR | EPOCH | | | |
| DISPLAY\_TYPE | CDF\_CHAR | time\_series | | | |
| FIELDNAM | CDF\_CHAR | O6\_TH\_VEL | | | |
| FILLVAL | CDF\_FLOAT | -1E31 | | | |
| FORMAT | CDF\_CHAR | E10.3 | | | |
| LABLAXIS | CDF\_CHAR | O6\_TH\_VEL | | | |
| SCALEMAX | CDF\_FLOAT | 1E9 | | | |
| SCALEMIN | CDF\_FLOAT | 1E4 | | | |
| SCALETYP | CDF\_CHAR | log | | | |
| UNITS | CDF\_CHAR | K | | | |
| VALIDMAX | CDF\_UINT1 | 9.999E10 | | | |
| VALIDMIN | CDF\_UINT1 | 0 | | | |
| VAR\_NOTES | CDF\_CHAR | Oxygen 6 temperature | | | |
| VAR\_TYPE | CDF\_CHAR | data | | | |

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| **Variable\_Name** | **Data\_type** | **DIMS** | **SIZES** | **R\_VARY** | **D\_VARY** |
| O6\_TH\_VEL\_ERR | CDF\_FLOAT | 1 | 0 | T |  |
| **Attribute Name** | **Data Type** | **Value** | | | |
| CATDESC | CDF\_CHAR | Oxygen 6 temperature error/uncertainty | | | |
| DEPEND\_0 | CDF\_CHAR | EPOCH | | | |
| DISPLAY\_TYPE | CDF\_CHAR | time\_series | | | |
| FIELDNAM | CDF\_CHAR | O6\_TH\_VEL\_ERR | | | |
| FILLVAL | CDF\_FLOAT | -1E31 | | | |
| FORMAT | CDF\_CHAR | E10.3 | | | |
| LABLAXIS | CDF\_CHAR | O6\_TH\_VEL\_ERR | | | |
| SCALEMAX | CDF\_FLOAT | 1E9 | | | |
| SCALEMIN | CDF\_FLOAT | 1E4 | | | |
| SCALETYP | CDF\_CHAR | log | | | |
| UNITS | CDF\_CHAR | K | | | |
| VALIDMAX | CDF\_UINT1 | 9.999E10 | | | |
| VALIDMIN | CDF\_UINT1 | 0 | | | |
| VAR\_NOTES | CDF\_CHAR | Estimate of statistical uncertainty due to limited count statistics. Note that these estimates do NOT include systematic error. | | | |
| VAR\_TYPE | CDF\_CHAR | support\_data | | | |

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| **Variable\_Name** | **Data\_type** | **DIMS** | **SIZES** | **R\_VARY** | **D\_VARY** |
| O6\_TH\_VEL\_QF | CDF\_INT2 | 1 | 0 | T |  |
| **Attribute Name** | **Data Type** | **Value** | | | |
| CATDESC | CDF\_CHAR | Oxygen 6 temperature quality flag | | | |
| DEPEND\_0 | CDF\_CHAR | EPOCH | | | |
| DISPLAY\_TYPE | CDF\_CHAR | time\_series | | | |
| FIELDNAM | CDF\_CHAR | O6\_TH\_VEL\_QF | | | |
| FILLVAL | CDF\_INT2 | -32768 | | | |
| FORMAT | CDF\_CHAR | I3 | | | |
| LABLAXIS | CDF\_CHAR | O6\_TH\_VEL\_QF | | | |
| SCALEMAX | CDF\_INT2 | 3 | | | |
| SCALEMIN | CDF\_INT2 | -2 | | | |
| SCALETYP | CDF\_CHAR | linear | | | |
| UNITS | CDF\_CHAR |  | | | |
| VALIDMAX | CDF\_INT2 | 2 | | | |
| VALIDMIN | CDF\_INT2 | 0 | | | |
| VAR\_NOTES | CDF\_CHAR | Quality Flag: 0=good, 1=caution, 2=bad. Not yet implemented | | | |
| VAR\_TYPE | CDF\_CHAR | support\_data | | | |

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| **Variable\_Name** | **Data\_type** | **DIMS** | **SIZES** | **R\_VARY** | **D\_VARY** |
| O6\_VEL | CDF\_FLOAT | 1 | 0 | T |  |
| **Attribute Name** | **Data Type** | **Value** | | | |
| CATDESC | CDF\_CHAR | Oxygen 6 velocity | | | |
| DEPEND\_0 | CDF\_CHAR | EPOCH | | | |
| DISPLAY\_TYPE | CDF\_CHAR | time\_series | | | |
| FIELDNAM | CDF\_CHAR | O6\_VEL | | | |
| FILLVAL | CDF\_FLOAT | -1E31 | | | |
| FORMAT | CDF\_CHAR | E10.3 | | | |
| LABLAXIS | CDF\_CHAR | O6\_VEL | | | |
| SCALEMAX | CDF\_FLOAT | 2E3 | | | |
| SCALEMIN | CDF\_FLOAT | 0 | | | |
| SCALETYP | CDF\_CHAR | linear | | | |
| UNITS | CDF\_CHAR | km/s | | | |
| VALIDMAX | CDF\_UINT1 | 9.999E4 | | | |
| VALIDMIN | CDF\_UINT1 | 0 | | | |
| VAR\_NOTES | CDF\_CHAR | Oxygen 6 velocity | | | |
| VAR\_TYPE | CDF\_CHAR | data | | | |

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| --- | --- | --- | --- | --- | --- |
| **Variable\_Name** | **Data\_type** | **DIMS** | **SIZES** | **R\_VARY** | **D\_VARY** |
| O6\_VEL\_ERR | CDF\_FLOAT | 1 | 0 | T |  |
| **Attribute Name** | **Data Type** | **Value** | | | |
| CATDESC | CDF\_CHAR | Oxygen 6 velocity error/uncertainty | | | |
| DEPEND\_0 | CDF\_CHAR | EPOCH | | | |
| DISPLAY\_TYPE | CDF\_CHAR | time\_series | | | |
| FIELDNAM | CDF\_CHAR | O6\_VEL\_ERR | | | |
| FILLVAL | CDF\_FLOAT | -1E31 | | | |
| FORMAT | CDF\_CHAR | E10.3 | | | |
| LABLAXIS | CDF\_CHAR | O6\_VEL\_ERR | | | |
| SCALEMAX | CDF\_FLOAT | 2E3 | | | |
| SCALEMIN | CDF\_FLOAT | 0 | | | |
| SCALETYP | CDF\_CHAR | linear | | | |
| UNITS | CDF\_CHAR | km/s | | | |
| VALIDMAX | CDF\_UINT1 | 9.999E4 | | | |
| VALIDMIN | CDF\_UINT1 | 0 | | | |
| VAR\_NOTES | CDF\_CHAR | Estimate of statistical uncertainty due to limited count statistics. Note that these estimates do NOT include systematic error. | | | |
| VAR\_TYPE | CDF\_CHAR | support\_data | | | |

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| --- | --- | --- | --- | --- | --- |
| **Variable\_Name** | **Data\_type** | **DIMS** | **SIZES** | **R\_VARY** | **D\_VARY** |
| O6\_VEL\_QF | CDF\_INT2 | 1 | 0 | T |  |
| **Attribute Name** | **Data Type** | **Value** | | | |
| CATDESC | CDF\_CHAR | Oxygen 6 velocity quality flag | | | |
| DEPEND\_0 | CDF\_CHAR | EPOCH | | | |
| DISPLAY\_TYPE | CDF\_CHAR | time\_series | | | |
| FIELDNAM | CDF\_CHAR | O6\_VEL\_QF | | | |
| FILLVAL | CDF\_INT2 | -32768 | | | |
| FORMAT | CDF\_CHAR | I3 | | | |
| LABLAXIS | CDF\_CHAR | O6\_VEL\_QF | | | |
| SCALEMAX | CDF\_INT2 | 3 | | | |
| SCALEMIN | CDF\_INT2 | -2 | | | |
| SCALETYP | CDF\_CHAR | linear | | | |
| UNITS | CDF\_CHAR |  | | | |
| VALIDMAX | CDF\_INT2 | 2 | | | |
| VALIDMIN | CDF\_INT2 | 0 | | | |
| VAR\_NOTES | CDF\_CHAR | Quality Flag: 0=good, 1=caution, 2=bad. Not yet implemented | | | |
| VAR\_TYPE | CDF\_CHAR | support\_data | | | |

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| **Variable\_Name** | **Data\_type** | **DIMS** | **SIZES** | **R\_VARY** | **D\_VARY** |
| FE10\_DENS | CDF\_FLOAT | 1 | 0 | T |  |
| **Attribute Name** | **Data Type** | **Value** | | | |
| CATDESC | CDF\_CHAR | Iron 10 density | | | |
| DEPEND\_0 | CDF\_CHAR | EPOCH | | | |
| DISPLAY\_TYPE | CDF\_CHAR | time\_series | | | |
| FIELDNAM | CDF\_CHAR | FE10\_DENS | | | |
| FILLVAL | CDF\_FLOAT | -1E31 | | | |
| FORMAT | CDF\_CHAR | E10.3 | | | |
| LABLAXIS | CDF\_CHAR | FE10\_DENS | | | |
| SCALEMAX | CDF\_FLOAT | 1E2 | | | |
| SCALEMIN | CDF\_FLOAT | 1E-4 | | | |
| SCALETYP | CDF\_CHAR | log | | | |
| UNITS | CDF\_CHAR | 1/cm^3 | | | |
| VALIDMAX | CDF\_UINT1 | 9999 | | | |
| VALIDMIN | CDF\_UINT1 | 0 | | | |
| VAR\_NOTES | CDF\_CHAR | Iron 10 density | | | |
| VAR\_TYPE | CDF\_CHAR | data | | | |

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| **Variable\_Name** | **Data\_type** | **DIMS** | **SIZES** | **R\_VARY** | **D\_VARY** |
| FE10\_DENS\_ERR | CDF\_FLOAT | 1 | 0 | T |  |
| **Attribute Name** | **Data Type** | **Value** | | | |
| CATDESC | CDF\_CHAR | Iron 10 density error/uncertainty | | | |
| DEPEND\_0 | CDF\_CHAR | EPOCH | | | |
| DISPLAY\_TYPE | CDF\_CHAR | time\_series | | | |
| FIELDNAM | CDF\_CHAR | FE10\_DENS\_ERR | | | |
| FILLVAL | CDF\_FLOAT | -1E31 | | | |
| FORMAT | CDF\_CHAR | E10.3 | | | |
| LABLAXIS | CDF\_CHAR | FE10\_DENS\_ERR | | | |
| SCALEMAX | CDF\_FLOAT | 1E2 | | | |
| SCALEMIN | CDF\_FLOAT | 1E-4 | | | |
| SCALETYP | CDF\_CHAR | log | | | |
| UNITS | CDF\_CHAR | 1/cm^3 | | | |
| VALIDMAX | CDF\_UINT1 | 9999 | | | |
| VALIDMIN | CDF\_UINT1 | 0 | | | |
| VAR\_NOTES | CDF\_CHAR | Estimate of statistical uncertainty due to limited count statistics. Note that these estimates do NOT include systematic error. | | | |
| VAR\_TYPE | CDF\_CHAR | support\_data | | | |

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| **Variable\_Name** | **Data\_type** | **DIMS** | **SIZES** | **R\_VARY** | **D\_VARY** |
| FE10\_DENS\_QF | CDF\_INT2 | 1 | 0 | T |  |
| **Attribute Name** | **Data Type** | **Value** | | | |
| CATDESC | CDF\_CHAR | Iron 10 density quality flag | | | |
| DEPEND\_0 | CDF\_CHAR | EPOCH | | | |
| DISPLAY\_TYPE | CDF\_CHAR | time\_series | | | |
| FIELDNAM | CDF\_CHAR | FE10\_DENS\_QF | | | |
| FILLVAL | CDF\_INT2 | -32768 | | | |
| FORMAT | CDF\_CHAR | I3 | | | |
| LABLAXIS | CDF\_CHAR | FE10\_DENS\_QF | | | |
| SCALEMAX | CDF\_INT2 | 3 | | | |
| SCALEMIN | CDF\_INT2 | -2 | | | |
| SCALETYP | CDF\_CHAR | linear | | | |
| UNITS | CDF\_CHAR |  | | | |
| VALIDMAX | CDF\_INT2 | 2 | | | |
| VALIDMIN | CDF\_INT2 | 0 | | | |
| VAR\_NOTES | CDF\_CHAR | Quality Flag: 0=good, 1=caution, 2=bad. Not yet implemented | | | |
| VAR\_TYPE | CDF\_CHAR | support\_data | | | |

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| --- | --- | --- | --- | --- | --- |
| **Variable\_Name** | **Data\_type** | **DIMS** | **SIZES** | **R\_VARY** | **D\_VARY** |
| FE10\_TH\_VEL | CDF\_FLOAT | 1 | 0 | T |  |
| **Attribute Name** | **Data Type** | **Value** | | | |
| CATDESC | CDF\_CHAR | Iron 10 temperature | | | |
| DEPEND\_0 | CDF\_CHAR | EPOCH | | | |
| DISPLAY\_TYPE | CDF\_CHAR | time\_series | | | |
| FIELDNAM | CDF\_CHAR | FE10\_TH\_VEL | | | |
| FILLVAL | CDF\_FLOAT | -1E31 | | | |
| FORMAT | CDF\_CHAR | E10.3 | | | |
| LABLAXIS | CDF\_CHAR | FE10\_TH\_VEL | | | |
| SCALEMAX | CDF\_FLOAT | 1E9 | | | |
| SCALEMIN | CDF\_FLOAT | 1E4 | | | |
| SCALETYP | CDF\_CHAR | log | | | |
| UNITS | CDF\_CHAR | K | | | |
| VALIDMAX | CDF\_UINT1 | 9.999E10 | | | |
| VALIDMIN | CDF\_UINT1 | 0 | | | |
| VAR\_NOTES | CDF\_CHAR | Iron 10 temperature | | | |
| VAR\_TYPE | CDF\_CHAR | data | | | |

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| **Variable\_Name** | **Data\_type** | **DIMS** | **SIZES** | **R\_VARY** | **D\_VARY** |
| FE10\_TH\_VEL\_ERR | CDF\_FLOAT | 1 | 0 | T |  |
| **Attribute Name** | **Data Type** | **Value** | | | |
| CATDESC | CDF\_CHAR | Iron 10 temperature error/uncertainty | | | |
| DEPEND\_0 | CDF\_CHAR | EPOCH | | | |
| DISPLAY\_TYPE | CDF\_CHAR | time\_series | | | |
| FIELDNAM | CDF\_CHAR | FE10\_TH\_VEL\_ERR | | | |
| FILLVAL | CDF\_FLOAT | -1E31 | | | |
| FORMAT | CDF\_CHAR | E10.3 | | | |
| LABLAXIS | CDF\_CHAR | FE10\_TH\_VEL\_ERR | | | |
| SCALEMAX | CDF\_FLOAT | 1E9 | | | |
| SCALEMIN | CDF\_FLOAT | 1E4 | | | |
| SCALETYP | CDF\_CHAR | log | | | |
| UNITS | CDF\_CHAR | K | | | |
| VALIDMAX | CDF\_UINT1 | 9.999E10 | | | |
| VALIDMIN | CDF\_UINT1 | 0 | | | |
| VAR\_NOTES | CDF\_CHAR | Estimate of statistical uncertainty due to limited count statistics. Note that these estimates do NOT include systematic error. | | | |
| VAR\_TYPE | CDF\_CHAR | support\_data | | | |

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| **Variable\_Name** | **Data\_type** | **DIMS** | **SIZES** | **R\_VARY** | **D\_VARY** |
| FE10\_TH\_VEL\_QF | CDF\_INT2 | 1 | 0 | T |  |
| **Attribute Name** | **Data Type** | **Value** | | | |
| CATDESC | CDF\_CHAR | Iron 10 temperature quality flag | | | |
| DEPEND\_0 | CDF\_CHAR | EPOCH | | | |
| DISPLAY\_TYPE | CDF\_CHAR | time\_series | | | |
| FIELDNAM | CDF\_CHAR | FE10\_TH\_VEL\_QF | | | |
| FILLVAL | CDF\_INT2 | -32768 | | | |
| FORMAT | CDF\_CHAR | I3 | | | |
| LABLAXIS | CDF\_CHAR | FE10\_TH\_VEL\_QF | | | |
| SCALEMAX | CDF\_INT2 | 3 | | | |
| SCALEMIN | CDF\_INT2 | -2 | | | |
| SCALETYP | CDF\_CHAR | linear | | | |
| UNITS | CDF\_CHAR |  | | | |
| VALIDMAX | CDF\_INT2 | 2 | | | |
| VALIDMIN | CDF\_INT2 | 0 | | | |
| VAR\_NOTES | CDF\_CHAR | Quality Flag: 0=good, 1=caution, 2=bad. Not yet implemented | | | |
| VAR\_TYPE | CDF\_CHAR | support\_data | | | |

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| **Variable\_Name** | **Data\_type** | **DIMS** | **SIZES** | **R\_VARY** | **D\_VARY** |
| FE10\_VEL | CDF\_FLOAT | 1 | 0 | T |  |
| **Attribute Name** | **Data Type** | **Value** | | | |
| CATDESC | CDF\_CHAR | Iron 10 velocity | | | |
| DEPEND\_0 | CDF\_CHAR | EPOCH | | | |
| DISPLAY\_TYPE | CDF\_CHAR | time\_series | | | |
| FIELDNAM | CDF\_CHAR | FE10\_VEL | | | |
| FILLVAL | CDF\_FLOAT | -1E31 | | | |
| FORMAT | CDF\_CHAR | E10.3 | | | |
| LABLAXIS | CDF\_CHAR | FE10\_VEL | | | |
| SCALEMAX | CDF\_FLOAT | 2E3 | | | |
| SCALEMIN | CDF\_FLOAT | 0 | | | |
| SCALETYP | CDF\_CHAR | linear | | | |
| UNITS | CDF\_CHAR | km/s | | | |
| VALIDMAX | CDF\_UINT1 | 9.999E4 | | | |
| VALIDMIN | CDF\_UINT1 | 0 | | | |
| VAR\_NOTES | CDF\_CHAR | Iron 10 velocity | | | |
| VAR\_TYPE | CDF\_CHAR | data | | | |

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| **Variable\_Name** | **Data\_type** | **DIMS** | **SIZES** | **R\_VARY** | **D\_VARY** |
| FE10\_VEL\_ERR | CDF\_FLOAT | 1 | 0 | T |  |
| **Attribute Name** | **Data Type** | **Value** | | | |
| CATDESC | CDF\_CHAR | Iron 10 velocity error/uncertainty | | | |
| DEPEND\_0 | CDF\_CHAR | EPOCH | | | |
| DISPLAY\_TYPE | CDF\_CHAR | time\_series | | | |
| FIELDNAM | CDF\_CHAR | FE10\_VEL\_ERR | | | |
| FILLVAL | CDF\_FLOAT | -1E31 | | | |
| FORMAT | CDF\_CHAR | E10.3 | | | |
| LABLAXIS | CDF\_CHAR | FE10\_VEL\_ERR | | | |
| SCALEMAX | CDF\_FLOAT | 2E3 | | | |
| SCALEMIN | CDF\_FLOAT | 0 | | | |
| SCALETYP | CDF\_CHAR | linear | | | |
| UNITS | CDF\_CHAR | km/s | | | |
| VALIDMAX | CDF\_UINT1 | 9.999E4 | | | |
| VALIDMIN | CDF\_UINT1 | 0 | | | |
| VAR\_NOTES | CDF\_CHAR | Estimate of statistical uncertainty due to limited count statistics. Note that these estimates do NOT include systematic error. | | | |
| VAR\_TYPE | CDF\_CHAR | support\_data | | | |

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| **Variable\_Name** | **Data\_type** | **DIMS** | **SIZES** | **R\_VARY** | **D\_VARY** |
| FE10\_VEL\_QF | CDF\_INT2 | 1 | 0 | T |  |
| **Attribute Name** | **Data Type** | **Value** | | | |
| CATDESC | CDF\_CHAR | Iron 10 velocity quality flag | | | |
| DEPEND\_0 | CDF\_CHAR | EPOCH | | | |
| DISPLAY\_TYPE | CDF\_CHAR | time\_series | | | |
| FIELDNAM | CDF\_CHAR | FE10\_VEL\_QF | | | |
| FILLVAL | CDF\_INT2 | -32768 | | | |
| FORMAT | CDF\_CHAR | I3 | | | |
| LABLAXIS | CDF\_CHAR | FE10\_VEL\_QF | | | |
| SCALEMAX | CDF\_INT2 | 3 | | | |
| SCALEMIN | CDF\_INT2 | -2 | | | |
| SCALETYP | CDF\_CHAR | linear | | | |
| UNITS | CDF\_CHAR |  | | | |
| VALIDMAX | CDF\_INT2 | 2 | | | |
| VALIDMIN | CDF\_INT2 | 0 | | | |
| VAR\_NOTES | CDF\_CHAR | Quality Flag: 0=good, 1=caution, 2=bad. Not yet implemented | | | |
| VAR\_TYPE | CDF\_CHAR | support\_data | | | |

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| **Variable\_Name** | **Data\_type** | **DIMS** | **SIZES** | **R\_VARY** | **D\_VARY** |
| O\_CHARGE\_DIST | CDF\_FLOAT | 1 | 4 | T | T |
| **Attribute Name** | **Data Type** | **Value** | | | |
| CATDESC | CDF\_CHAR | Oxygen charge distribution | | | |
| DEPEND\_0 | CDF\_CHAR | EPOCH | | | |
| DEPEND\_1 | CDF\_CHAR | O\_CHARGES | | | |
| DISPLAY\_TYPE | CDF\_CHAR | time\_series | | | |
| FIELDNAM | CDF\_CHAR | O\_CHARGE\_DIST | | | |
| FILLVAL | CDF\_FLOAT | -1E31 | | | |
| FORMAT | CDF\_CHAR | E10.3 | | | |
| LABL\_PTR\_1 | CDF\_CHAR | O\_CHARGE\_LABELS | | | |
| SCALEMAX | CDF\_FLOAT | 1 | | | |
| SCALEMIN | CDF\_FLOAT | 0 | | | |
| SCALETYP | CDF\_CHAR | linear | | | |
| UNITS | CDF\_CHAR |  | | | |
| VALIDMAX | CDF\_UINT1 | 9999 | | | |
| VALIDMIN | CDF\_UINT1 | 0 | | | |
| VAR\_NOTES | CDF\_CHAR | Oxygen charge distribution for charges 5, 6, 7, 8 | | | |
| VAR\_TYPE | CDF\_CHAR | data | | | |

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| **Variable\_Name** | **Data\_type** | **DIMS** | **SIZES** | **R\_VARY** | **D\_VARY** |
| O\_CHARGE\_DIST\_ERR | CDF\_FLOAT | 1 | **4** | T | **T** |
| **Attribute Name** | **Data Type** | **Value** | | | |
| CATDESC | CDF\_CHAR | Oxygen charge distribution error/uncertainty | | | |
| DEPEND\_0 | CDF\_CHAR | EPOCH | | | |
| DISPLAY\_TYPE | CDF\_CHAR | time\_series | | | |
| FIELDNAM | CDF\_CHAR | O\_CHARGE\_DIST\_ERR | | | |
| FILLVAL | CDF\_FLOAT | -1E31 | | | |
| FORMAT | CDF\_CHAR | E10.3 | | | |
| LABLAXIS | CDF\_CHAR | O\_CHARGE\_DIST\_ERR | | | |
| SCALEMAX | CDF\_FLOAT | 1 | | | |
| SCALEMIN | CDF\_FLOAT | 0 | | | |
| SCALETYP | CDF\_CHAR | linear | | | |
| UNITS | CDF\_CHAR |  | | | |
| VALIDMAX | CDF\_UINT1 | 9999 | | | |
| VALIDMIN | CDF\_UINT1 | 0 | | | |
| VAR\_NOTES | CDF\_CHAR | Estimate of statistical uncertainty due to limited count statistics. Note that these estimates do NOT include systematic error. For charges 5, 6, 7, 8. | | | |
| VAR\_TYPE | CDF\_CHAR | support\_data | | | |

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| **Variable\_Name** | **Data\_type** | **DIMS** | **SIZES** | **R\_VARY** | **D\_VARY** |
| O\_CHARGE\_DIST\_QF | CDF\_INT2 | 1 | 0 | T |  |
| **Attribute Name** | **Data Type** | **Value** | | | |
| CATDESC | CDF\_CHAR | Oxygen charge distribution quality flag | | | |
| DEPEND\_0 | CDF\_CHAR | EPOCH | | | |
| DISPLAY\_TYPE | CDF\_CHAR | time\_series | | | |
| FIELDNAM | CDF\_CHAR | O\_CHARGE\_DIST\_QF | | | |
| FILLVAL | CDF\_INT2 | -32768 | | | |
| FORMAT | CDF\_CHAR | I3 | | | |
| LABLAXIS | CDF\_CHAR | O\_CHARGE\_DIST\_QF | | | |
| SCALEMAX | CDF\_INT2 | 3 | | | |
| SCALEMIN | CDF\_INT2 | -2 | | | |
| SCALETYP | CDF\_CHAR | linear | | | |
| UNITS | CDF\_CHAR |  | | | |
| VALIDMAX | CDF\_INT2 | 2 | | | |
| VALIDMIN | CDF\_INT2 | 0 | | | |
| VAR\_NOTES | CDF\_CHAR | Quality Flag: 0=good, 1=caution, 2=bad. Not yet implemented | | | |
| VAR\_TYPE | CDF\_CHAR | support\_data | | | |

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| **Variable\_Name** | **Data\_type** | **DIMS** | **SIZES** | **R\_VARY** | **D\_VARY** |
| C\_CHARGE\_DIST | CDF\_FLOAT | 1 | 3 | T | T |
| **Attribute Name** | **Data Type** | **Value** | | | |
| CATDESC | CDF\_CHAR | Carbon charge distribution | | | |
| DEPEND\_0 | CDF\_CHAR | EPOCH | | | |
| DEPEND\_1 | CDF\_CHAR | C\_CHARGES | | | |
| DISPLAY\_TYPE | CDF\_CHAR | time\_series | | | |
| FIELDNAM | CDF\_CHAR | C\_CHARGE\_DIST | | | |
| FILLVAL | CDF\_FLOAT | -1E31 | | | |
| FORMAT | CDF\_CHAR | E10.3 | | | |
| LABL\_PTR\_1 | CDF\_CHAR | C\_CHARGE\_LABELS | | | |
| SCALEMAX | CDF\_FLOAT | 1 | | | |
| SCALEMIN | CDF\_FLOAT | 0 | | | |
| SCALETYP | CDF\_CHAR | linear | | | |
| UNITS | CDF\_CHAR |  | | | |
| VALIDMAX | CDF\_UINT1 | 9999 | | | |
| VALIDMIN | CDF\_UINT1 | 0 | | | |
| VAR\_NOTES | CDF\_CHAR | Carbon charge distribution for charges 4, 5, 6 | | | |
| VAR\_TYPE | CDF\_CHAR | data | | | |

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| **Variable\_Name** | **Data\_type** | **DIMS** | **SIZES** | **R\_VARY** | **D\_VARY** |
| C\_CHARGE\_DIST\_ERR | CDF\_FLOAT | 1 | **3** | T | **T** |
| **Attribute Name** | **Data Type** | **Value** | | | |
| CATDESC | CDF\_CHAR | Carbon charge distribution error/uncertainty | | | |
| DEPEND\_0 | CDF\_CHAR | EPOCH | | | |
| DISPLAY\_TYPE | CDF\_CHAR | time\_series | | | |
| FIELDNAM | CDF\_CHAR | C\_CHARGE\_DIST\_ERR | | | |
| FILLVAL | CDF\_FLOAT | -1E31 | | | |
| FORMAT | CDF\_CHAR | E10.3 | | | |
| LABLAXIS | CDF\_CHAR | C\_CHARGE\_DIST\_ERR | | | |
| SCALEMAX | CDF\_FLOAT | 1 | | | |
| SCALEMIN | CDF\_FLOAT | 0 | | | |
| SCALETYP | CDF\_CHAR | linear | | | |
| UNITS | CDF\_CHAR |  | | | |
| VALIDMAX | CDF\_UINT1 | 9999 | | | |
| VALIDMIN | CDF\_UINT1 | 0 | | | |
| VAR\_NOTES | CDF\_CHAR | Estimate of statistical uncertainty due to limited count statistics. Note that these estimates do NOT include systematic error. For charges 4, 5, 6. | | | |
| VAR\_TYPE | CDF\_CHAR | support\_data | | | |

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| **Variable\_Name** | **Data\_type** | **DIMS** | **SIZES** | **R\_VARY** | **D\_VARY** |
| C\_CHARGE\_DIST\_QF | CDF\_INT2 | 1 | 0 | T |  |
| **Attribute Name** | **Data Type** | **Value** | | | |
| CATDESC | CDF\_CHAR | Carbon charge distribution quality flag | | | |
| DEPEND\_0 | CDF\_CHAR | EPOCH | | | |
| DISPLAY\_TYPE | CDF\_CHAR | time\_series | | | |
| FIELDNAM | CDF\_CHAR | C\_CHARGE\_DIST\_QF | | | |
| FILLVAL | CDF\_INT2 | -32768 | | | |
| FORMAT | CDF\_CHAR | I3 | | | |
| LABLAXIS | CDF\_CHAR | C\_CHARGE\_DIST\_QF | | | |
| SCALEMAX | CDF\_INT2 | 3 | | | |
| SCALEMIN | CDF\_INT2 | -2 | | | |
| SCALETYP | CDF\_CHAR | linear | | | |
| UNITS | CDF\_CHAR |  | | | |
| VALIDMAX | CDF\_INT2 | 2 | | | |
| VALIDMIN | CDF\_INT2 | 0 | | | |
| VAR\_NOTES | CDF\_CHAR | Quality Flag: 0=good, 1=caution, 2=bad. Not yet implemented | | | |
| VAR\_TYPE | CDF\_CHAR | support\_data | | | |

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| **Variable\_Name** | **Data\_type** | **DIMS** | **SIZES** | **R\_VARY** | **D\_VARY** |
| FE\_CHARGE\_DIST | CDF\_FLOAT | 1 | 15 | T | T |
| **Attribute Name** | **Data Type** | **Value** | | | |
| CATDESC | CDF\_CHAR | Iron charge distribution | | | |
| DEPEND\_0 | CDF\_CHAR | EPOCH | | | |
| DEPEND\_1 | CDF\_CHAR | FE\_CHARGES | | | |
| DISPLAY\_TYPE | CDF\_CHAR | time\_series | | | |
| FIELDNAM | CDF\_CHAR | FE\_CHARGE\_DIST | | | |
| FILLVAL | CDF\_FLOAT | -1E31 | | | |
| FORMAT | CDF\_CHAR | E10.3 | | | |
| LABL\_PTR\_1 | CDF\_CHAR | FE\_CHARGE\_LABELS | | | |
| SCALEMAX | CDF\_FLOAT | 1 | | | |
| SCALEMIN | CDF\_FLOAT | 0 | | | |
| SCALETYP | CDF\_CHAR | linear | | | |
| UNITS | CDF\_CHAR |  | | | |
| VALIDMAX | CDF\_UINT1 | 9999 | | | |
| VALIDMIN | CDF\_UINT1 | 0 | | | |
| VAR\_NOTES | CDF\_CHAR | Iron charge distribution for charges 6 through 20 | | | |
| VAR\_TYPE | CDF\_CHAR | data | | | |

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| **Variable\_Name** | **Data\_type** | **DIMS** | **SIZES** | **R\_VARY** | **D\_VARY** |
| FE\_CHARGE\_DIST\_ERR | CDF\_FLOAT | 1 | **15** | T | **T** |
| **Attribute Name** | **Data Type** | **Value** | | | |
| CATDESC | CDF\_CHAR | Iron charge distribution error/uncertainty | | | |
| DEPEND\_0 | CDF\_CHAR | EPOCH | | | |
| DISPLAY\_TYPE | CDF\_CHAR | time\_series | | | |
| FIELDNAM | CDF\_CHAR | FE\_CHARGE\_DIST\_ERR | | | |
| FILLVAL | CDF\_FLOAT | -1E31 | | | |
| FORMAT | CDF\_CHAR | E10.3 | | | |
| LABLAXIS | CDF\_CHAR | FE\_CHARGE\_DIST\_ERR | | | |
| SCALEMAX | CDF\_FLOAT | 1 | | | |
| SCALEMIN | CDF\_FLOAT | 0 | | | |
| SCALETYP | CDF\_CHAR | linear | | | |
| UNITS | CDF\_CHAR |  | | | |
| VALIDMAX | CDF\_UINT1 | 9999 | | | |
| VALIDMIN | CDF\_UINT1 | 0 | | | |
| VAR\_NOTES | CDF\_CHAR | Estimate of statistical uncertainty due to limited count statistics. Note that these estimates do NOT include systematic error. For charges 6 through 20. | | | |
| VAR\_TYPE | CDF\_CHAR | support\_data | | | |

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| **Variable\_Name** | **Data\_type** | **DIMS** | **SIZES** | **R\_VARY** | **D\_VARY** |
| FE\_CHARGE\_DIST\_QF | CDF\_INT2 | 1 | 0 | T |  |
| **Attribute Name** | **Data Type** | **Value** | | | |
| CATDESC | CDF\_CHAR | Iron charge distribution quality flag | | | |
| DEPEND\_0 | CDF\_CHAR | EPOCH | | | |
| DISPLAY\_TYPE | CDF\_CHAR | time\_series | | | |
| FIELDNAM | CDF\_CHAR | FE\_CHARGE\_DIST\_QF | | | |
| FILLVAL | CDF\_INT2 | -32768 | | | |
| FORMAT | CDF\_CHAR | I3 | | | |
| LABLAXIS | CDF\_CHAR | FE\_CHARGE\_DIST\_QF | | | |
| SCALEMAX | CDF\_INT2 | 3 | | | |
| SCALEMIN | CDF\_INT2 | -2 | | | |
| SCALETYP | CDF\_CHAR | linear | | | |
| UNITS | CDF\_CHAR |  | | | |
| VALIDMAX | CDF\_INT2 | 2 | | | |
| VALIDMIN | CDF\_INT2 | 0 | | | |
| VAR\_NOTES | CDF\_CHAR | Quality Flag: 0=good, 1=caution, 2=bad. Not yet implemented | | | |
| VAR\_TYPE | CDF\_CHAR | support\_data | | | |

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| **Variable\_Name** | **Data\_type** | **DIMS** | **SIZES** | **R\_VARY** | **D\_VARY** |
| SI\_CHARGE\_DIST | CDF\_FLOAT | 1 | 7 | T | T |
| **Attribute Name** | **Data Type** | **Value** | | | |
| CATDESC | CDF\_CHAR | Silicon charge distribution | | | |
| DEPEND\_0 | CDF\_CHAR | EPOCH | | | |
| DEPEND\_1 | CDF\_CHAR | SI\_CHARGES | | | |
| DISPLAY\_TYPE | CDF\_CHAR | time\_series | | | |
| FIELDNAM | CDF\_CHAR | SI\_CHARGE\_DIST | | | |
| FILLVAL | CDF\_FLOAT | -1E31 | | | |
| FORMAT | CDF\_CHAR | E10.3 | | | |
| LABL\_PTR\_1 | CDF\_CHAR | SI\_CHARGE\_LABELS | | | |
| SCALEMAX | CDF\_FLOAT | 1 | | | |
| SCALEMIN | CDF\_FLOAT | 0 | | | |
| SCALETYP | CDF\_CHAR | linear | | | |
| UNITS | CDF\_CHAR |  | | | |
| VALIDMAX | CDF\_UINT1 | 9999 | | | |
| VALIDMIN | CDF\_UINT1 | 0 | | | |
| VAR\_NOTES | CDF\_CHAR | Silicon charge distribution for charges 6 through 12 | | | |
| VAR\_TYPE | CDF\_CHAR | data | | | |

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| **Variable\_Name** | **Data\_type** | **DIMS** | **SIZES** | **R\_VARY** | **D\_VARY** |
| SI\_CHARGE\_DIST\_ERR | CDF\_FLOAT | 1 | **7** | T | **T** |
| **Attribute Name** | **Data Type** | **Value** | | | |
| CATDESC | CDF\_CHAR | Silicon charge distribution error/uncertainty | | | |
| DEPEND\_0 | CDF\_CHAR | EPOCH | | | |
| DISPLAY\_TYPE | CDF\_CHAR | time\_series | | | |
| FIELDNAM | CDF\_CHAR | SI\_CHARGE\_DIST\_ERR | | | |
| FILLVAL | CDF\_FLOAT | -1E31 | | | |
| FORMAT | CDF\_CHAR | E10.3 | | | |
| LABLAXIS | CDF\_CHAR | SI\_CHARGE\_DIST\_ERR | | | |
| SCALEMAX | CDF\_FLOAT | 1 | | | |
| SCALEMIN | CDF\_FLOAT | 0 | | | |
| SCALETYP | CDF\_CHAR | linear | | | |
| UNITS | CDF\_CHAR |  | | | |
| VALIDMAX | CDF\_UINT1 | 9999 | | | |
| VALIDMIN | CDF\_UINT1 | 0 | | | |
| VAR\_NOTES | CDF\_CHAR | Estimate of statistical uncertainty due to limited count statistics. Note that these estimates do NOT include systematic error. For charges 6 through 12. | | | |
| VAR\_TYPE | CDF\_CHAR | support\_data | | | |

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| **Variable\_Name** | **Data\_type** | **DIMS** | **SIZES** | **R\_VARY** | **D\_VARY** |
| SI\_CHARGE\_DIST\_QF | CDF\_INT2 | 1 | 0 | T |  |
| **Attribute Name** | **Data Type** | **Value** | | | |
| CATDESC | CDF\_CHAR | Silicon charge distribution quality flag | | | |
| DEPEND\_0 | CDF\_CHAR | EPOCH | | | |
| DISPLAY\_TYPE | CDF\_CHAR | time\_series | | | |
| FIELDNAM | CDF\_CHAR | SI\_CHARGE\_DIST\_QF | | | |
| FILLVAL | CDF\_INT2 | -32768 | | | |
| FORMAT | CDF\_CHAR | I3 | | | |
| LABLAXIS | CDF\_CHAR | SI\_CHARGE\_DIST\_QF | | | |
| SCALEMAX | CDF\_INT2 | 3 | | | |
| SCALEMIN | CDF\_INT2 | -2 | | | |
| SCALETYP | CDF\_CHAR | linear | | | |
| UNITS | CDF\_CHAR |  | | | |
| VALIDMAX | CDF\_INT2 | 2 | | | |
| VALIDMIN | CDF\_INT2 | 0 | | | |
| VAR\_NOTES | CDF\_CHAR | Quality Flag: 0=good, 1=caution, 2=bad. Not yet implemented | | | |
| VAR\_TYPE | CDF\_CHAR | support\_data | | | |

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| **Variable\_Name** | **Data\_type** | **DIMS** | **SIZES** | **R\_VARY** | **D\_VARY** |
| NE\_CHARGE\_DIST | CDF\_FLOAT | 1 | 4 | T | T |
| **Attribute Name** | **Data Type** | **Value** | | | |
| CATDESC | CDF\_CHAR | Neon charge distribution | | | |
| DEPEND\_0 | CDF\_CHAR | EPOCH | | | |
| DEPEND\_1 | CDF\_CHAR | NE\_CHARGES | | | |
| DISPLAY\_TYPE | CDF\_CHAR | time\_series | | | |
| FIELDNAM | CDF\_CHAR | NE\_CHARGE\_DIST | | | |
| FILLVAL | CDF\_FLOAT | -1E31 | | | |
| FORMAT | CDF\_CHAR | E10.3 | | | |
| LABL\_PTR\_1 | CDF\_CHAR | NE\_CHARGE\_LABELS | | | |
| SCALEMAX | CDF\_FLOAT | 1 | | | |
| SCALEMIN | CDF\_FLOAT | 0 | | | |
| SCALETYP | CDF\_CHAR | linear | | | |
| UNITS | CDF\_CHAR |  | | | |
| VALIDMAX | CDF\_UINT1 | 9999 | | | |
| VALIDMIN | CDF\_UINT1 | 0 | | | |
| VAR\_NOTES | CDF\_CHAR | Neon charge distribution for charges 6 through 9 | | | |
| VAR\_TYPE | CDF\_CHAR | data | | | |

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| **Variable\_Name** | **Data\_type** | **DIMS** | **SIZES** | **R\_VARY** | **D\_VARY** |
| NE\_CHARGE\_DIST\_ERR | CDF\_FLOAT | 1 | **4** | T | **T** |
| **Attribute Name** | **Data Type** | **Value** | | | |
| CATDESC | CDF\_CHAR | Neon charge distribution error/uncertainty | | | |
| DEPEND\_0 | CDF\_CHAR | EPOCH | | | |
| DISPLAY\_TYPE | CDF\_CHAR | time\_series | | | |
| FIELDNAM | CDF\_CHAR | NE\_CHARGE\_DIST\_ERR | | | |
| FILLVAL | CDF\_FLOAT | -1E31 | | | |
| FORMAT | CDF\_CHAR | E10.3 | | | |
| LABLAXIS | CDF\_CHAR | NE\_CHARGE\_DIST\_ERR | | | |
| SCALEMAX | CDF\_FLOAT | 1 | | | |
| SCALEMIN | CDF\_FLOAT | 0 | | | |
| SCALETYP | CDF\_CHAR | linear | | | |
| UNITS | CDF\_CHAR |  | | | |
| VALIDMAX | CDF\_UINT1 | 9999 | | | |
| VALIDMIN | CDF\_UINT1 | 0 | | | |
| VAR\_NOTES | CDF\_CHAR | Estimate of statistical uncertainty due to limited count statistics. Note that these estimates do NOT include systematic error. For charges 6 through 9. | | | |
| VAR\_TYPE | CDF\_CHAR | support\_data | | | |

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| **Variable\_Name** | **Data\_type** | **DIMS** | **SIZES** | **R\_VARY** | **D\_VARY** |
| NE\_CHARGE\_DIST\_QF | CDF\_INT2 | 1 | 0 | T |  |
| **Attribute Name** | **Data Type** | **Value** | | | |
| CATDESC | CDF\_CHAR | Neon charge distribution quality flag | | | |
| DEPEND\_0 | CDF\_CHAR | EPOCH | | | |
| DISPLAY\_TYPE | CDF\_CHAR | time\_series | | | |
| FIELDNAM | CDF\_CHAR | NE\_CHARGE\_DIST\_QF | | | |
| FILLVAL | CDF\_INT2 | -32768 | | | |
| FORMAT | CDF\_CHAR | I3 | | | |
| LABLAXIS | CDF\_CHAR | NE\_CHARGE\_DIST\_QF | | | |
| SCALEMAX | CDF\_INT2 | 3 | | | |
| SCALEMIN | CDF\_INT2 | -2 | | | |
| SCALETYP | CDF\_CHAR | linear | | | |
| UNITS | CDF\_CHAR |  | | | |
| VALIDMAX | CDF\_INT2 | 2 | | | |
| VALIDMIN | CDF\_INT2 | 0 | | | |
| VAR\_NOTES | CDF\_CHAR | Quality Flag: 0=good, 1=caution, 2=bad. Not yet implemented | | | |
| VAR\_TYPE | CDF\_CHAR | support\_data | | | |

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| **Variable\_Name** | **Data\_type** | **DIMS** | **SIZES** | **R\_VARY** | **D\_VARY** |
| MG\_CHARGE\_DIST | CDF\_FLOAT | 1 | 7 | T | T |
| **Attribute Name** | **Data Type** | **Value** | | | |
| CATDESC | CDF\_CHAR | Magnesium charge distribution | | | |
| DEPEND\_0 | CDF\_CHAR | EPOCH | | | |
| DEPEND\_1 | CDF\_CHAR | MG\_CHARGES | | | |
| DISPLAY\_TYPE | CDF\_CHAR | time\_series | | | |
| FIELDNAM | CDF\_CHAR | MG\_CHARGE\_DIST | | | |
| FILLVAL | CDF\_FLOAT | -1E31 | | | |
| FORMAT | CDF\_CHAR | E10.3 | | | |
| LABL\_PTR\_1 | CDF\_CHAR | MG\_CHARGE\_LABELS | | | |
| SCALEMAX | CDF\_FLOAT | 1 | | | |
| SCALEMIN | CDF\_FLOAT | 0 | | | |
| SCALETYP | CDF\_CHAR | linear | | | |
| UNITS | CDF\_CHAR |  | | | |
| VALIDMAX | CDF\_UINT1 | 9999 | | | |
| VALIDMIN | CDF\_UINT1 | 0 | | | |
| VAR\_NOTES | CDF\_CHAR | Magnesium charge distribution for charges 6 through 12 | | | |
| VAR\_TYPE | CDF\_CHAR | data | | | |

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| **Variable\_Name** | **Data\_type** | **DIMS** | **SIZES** | **R\_VARY** | **D\_VARY** |
| MG\_CHARGE\_DIST\_ERR | CDF\_FLOAT | 1 | **7** | T | **T** |
| **Attribute Name** | **Data Type** | **Value** | | | |
| CATDESC | CDF\_CHAR | Magnesium charge distribution error/uncertainty | | | |
| DEPEND\_0 | CDF\_CHAR | EPOCH | | | |
| DISPLAY\_TYPE | CDF\_CHAR | time\_series | | | |
| FIELDNAM | CDF\_CHAR | MG\_CHARGE\_DIST\_ERR | | | |
| FILLVAL | CDF\_FLOAT | -1E31 | | | |
| FORMAT | CDF\_CHAR | E10.3 | | | |
| LABLAXIS | CDF\_CHAR | MG\_CHARGE\_DIST\_ERR | | | |
| SCALEMAX | CDF\_FLOAT | 1 | | | |
| SCALEMIN | CDF\_FLOAT | 0 | | | |
| SCALETYP | CDF\_CHAR | linear | | | |
| UNITS | CDF\_CHAR |  | | | |
| VALIDMAX | CDF\_UINT1 | 9999 | | | |
| VALIDMIN | CDF\_UINT1 | 0 | | | |
| VAR\_NOTES | CDF\_CHAR | Estimate of statistical uncertainty due to limited count statistics. Note that these estimates do NOT include systematic error. For charges 6 through 12. | | | |
| VAR\_TYPE | CDF\_CHAR | support\_data | | | |

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| **Variable\_Name** | **Data\_type** | **DIMS** | **SIZES** | **R\_VARY** | **D\_VARY** |
| MG\_CHARGE\_DIST\_QF | CDF\_INT2 | 1 | 0 | T |  |
| **Attribute Name** | **Data Type** | **Value** | | | |
| CATDESC | CDF\_CHAR | Magnesium charge distribution quality flag | | | |
| DEPEND\_0 | CDF\_CHAR | EPOCH | | | |
| DISPLAY\_TYPE | CDF\_CHAR | time\_series | | | |
| FIELDNAM | CDF\_CHAR | MG\_CHARGE\_DIST\_QF | | | |
| FILLVAL | CDF\_INT2 | -32768 | | | |
| FORMAT | CDF\_CHAR | I3 | | | |
| LABLAXIS | CDF\_CHAR | MG\_CHARGE\_DIST\_QF | | | |
| SCALEMAX | CDF\_INT2 | 3 | | | |
| SCALEMIN | CDF\_INT2 | -2 | | | |
| SCALETYP | CDF\_CHAR | linear | | | |
| UNITS | CDF\_CHAR |  | | | |
| VALIDMAX | CDF\_INT2 | 2 | | | |
| VALIDMIN | CDF\_INT2 | 0 | | | |
| VAR\_NOTES | CDF\_CHAR | Quality Flag: 0=good, 1=caution, 2=bad. Not yet implemented | | | |
| VAR\_TYPE | CDF\_CHAR | support\_data | | | |

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| **Variable\_Name** | **Data\_type** | **DIMS** | **SIZES** | **R\_VARY** | **D\_VARY** |
| N\_CHARGE\_DIST | CDF\_FLOAT | 1 | 2 | T | T |
| **Attribute Name** | **Data Type** | **Value** | | | |
| CATDESC | CDF\_CHAR | Nitrogen charge distribution | | | |
| DEPEND\_0 | CDF\_CHAR | EPOCH | | | |
| DEPEND\_1 | CDF\_CHAR | N\_CHARGES | | | |
| DISPLAY\_TYPE | CDF\_CHAR | time\_series | | | |
| FIELDNAM | CDF\_CHAR | N\_CHARGE\_DIST | | | |
| FILLVAL | CDF\_FLOAT | -1E31 | | | |
| FORMAT | CDF\_CHAR | E10.3 | | | |
| LABL\_PTR\_1 | CDF\_CHAR | N\_CHARGE\_LABELS | | | |
| SCALEMAX | CDF\_FLOAT | 1 | | | |
| SCALEMIN | CDF\_FLOAT | 0 | | | |
| SCALETYP | CDF\_CHAR | linear | | | |
| UNITS | CDF\_CHAR |  | | | |
| VALIDMAX | CDF\_UINT1 | 9999 | | | |
| VALIDMIN | CDF\_UINT1 | 0 | | | |
| VAR\_NOTES | CDF\_CHAR | Nitrogen charge distribution for charges 5 and 6 | | | |
| VAR\_TYPE | CDF\_CHAR | data | | | |

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| **Variable\_Name** | **Data\_type** | **DIMS** | **SIZES** | **R\_VARY** | **D\_VARY** |
| N\_CHARGE\_DIST\_ERR | CDF\_FLOAT | 1 | **4** | T | **T** |
| **Attribute Name** | **Data Type** | **Value** | | | |
| CATDESC | CDF\_CHAR | Nitrogen charge distribution error/uncertainty | | | |
| DEPEND\_0 | CDF\_CHAR | EPOCH | | | |
| DISPLAY\_TYPE | CDF\_CHAR | time\_series | | | |
| FIELDNAM | CDF\_CHAR | N\_CHARGE\_DIST\_ERR | | | |
| FILLVAL | CDF\_FLOAT | -1E31 | | | |
| FORMAT | CDF\_CHAR | E10.3 | | | |
| LABLAXIS | CDF\_CHAR | N\_CHARGE\_DIST\_ERR | | | |
| SCALEMAX | CDF\_FLOAT | 1 | | | |
| SCALEMIN | CDF\_FLOAT | 0 | | | |
| SCALETYP | CDF\_CHAR | linear | | | |
| UNITS | CDF\_CHAR |  | | | |
| VALIDMAX | CDF\_UINT1 | 9999 | | | |
| VALIDMIN | CDF\_UINT1 | 0 | | | |
| VAR\_NOTES | CDF\_CHAR | Estimate of statistical uncertainty due to limited count statistics. Note that these estimates do NOT include systematic error. For charges 5 and 6. | | | |
| VAR\_TYPE | CDF\_CHAR | support\_data | | | |

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| **Variable\_Name** | **Data\_type** | **DIMS** | **SIZES** | **R\_VARY** | **D\_VARY** |
| N\_CHARGE\_DIST\_QF | CDF\_INT2 | 1 | 0 | T |  |
| **Attribute Name** | **Data Type** | **Value** | | | |
| CATDESC | CDF\_CHAR | Nitrogen charge distribution quality flag | | | |
| DEPEND\_0 | CDF\_CHAR | EPOCH | | | |
| DISPLAY\_TYPE | CDF\_CHAR | time\_series | | | |
| FIELDNAM | CDF\_CHAR | N\_CHARGE\_DIST\_QF | | | |
| FILLVAL | CDF\_INT2 | -32768 | | | |
| FORMAT | CDF\_CHAR | I3 | | | |
| LABLAXIS | CDF\_CHAR | N\_CHARGE\_DIST\_QF | | | |
| SCALEMAX | CDF\_INT2 | 3 | | | |
| SCALEMIN | CDF\_INT2 | -2 | | | |
| SCALETYP | CDF\_CHAR | linear | | | |
| UNITS | CDF\_CHAR |  | | | |
| VALIDMAX | CDF\_INT2 | 2 | | | |
| VALIDMIN | CDF\_INT2 | 0 | | | |
| VAR\_NOTES | CDF\_CHAR | Quality Flag: 0=good, 1=caution, 2=bad. Not yet implemented | | | |
| VAR\_TYPE | CDF\_CHAR | support\_data | | | |

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| **Variable\_Name** | **Data\_type** | **DIMS** | **SIZES** | **R\_VARY** | **D\_VARY** |
| S\_CHARGE\_DIST | CDF\_FLOAT | 1 | 9 | T | T |
| **Attribute Name** | **Data Type** | **Value** | | | |
| CATDESC | CDF\_CHAR | Sulpher charge distribution | | | |
| DEPEND\_0 | CDF\_CHAR | EPOCH | | | |
| DEPEND\_1 | CDF\_CHAR | S\_CHARGES | | | |
| DISPLAY\_TYPE | CDF\_CHAR | time\_series | | | |
| FIELDNAM | CDF\_CHAR | S\_CHARGE\_DIST | | | |
| FILLVAL | CDF\_FLOAT | -1E31 | | | |
| FORMAT | CDF\_CHAR | E10.3 | | | |
| LABL\_PTR\_1 | CDF\_CHAR | S\_CHARGE\_LABELS | | | |
| SCALEMAX | CDF\_FLOAT | 1 | | | |
| SCALEMIN | CDF\_FLOAT | 0 | | | |
| SCALETYP | CDF\_CHAR | linear | | | |
| UNITS | CDF\_CHAR |  | | | |
| VALIDMAX | CDF\_UINT1 | 9999 | | | |
| VALIDMIN | CDF\_UINT1 | 0 | | | |
| VAR\_NOTES | CDF\_CHAR | Sulpher charge distribution for charges 6 through 14 | | | |
| VAR\_TYPE | CDF\_CHAR | data | | | |

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| **Variable\_Name** | **Data\_type** | **DIMS** | **SIZES** | **R\_VARY** | **D\_VARY** |
| S\_CHARGE\_DIST\_ERR | CDF\_FLOAT | 1 | **4** | T | **T** |
| **Attribute Name** | **Data Type** | **Value** | | | |
| CATDESC | CDF\_CHAR | Sulpher charge distribution error/uncertainty | | | |
| DEPEND\_0 | CDF\_CHAR | EPOCH | | | |
| DISPLAY\_TYPE | CDF\_CHAR | time\_series | | | |
| FIELDNAM | CDF\_CHAR | S\_CHARGE\_DIST\_ERR | | | |
| FILLVAL | CDF\_FLOAT | -1E31 | | | |
| FORMAT | CDF\_CHAR | E10.3 | | | |
| LABLAXIS | CDF\_CHAR | S\_CHARGE\_DIST\_ERR | | | |
| SCALEMAX | CDF\_FLOAT | 1 | | | |
| SCALEMIN | CDF\_FLOAT | 0 | | | |
| SCALETYP | CDF\_CHAR | linear | | | |
| UNITS | CDF\_CHAR |  | | | |
| VALIDMAX | CDF\_UINT1 | 9999 | | | |
| VALIDMIN | CDF\_UINT1 | 0 | | | |
| VAR\_NOTES | CDF\_CHAR | Estimate of statistical uncertainty due to limited count statistics. Note that these estimates do NOT include systematic error. For charges 6 through 14. | | | |
| VAR\_TYPE | CDF\_CHAR | support\_data | | | |

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| **Variable\_Name** | **Data\_type** | **DIMS** | **SIZES** | **R\_VARY** | **D\_VARY** |
| S\_CHARGE\_DIST\_QF | CDF\_INT2 | 1 | 0 | T |  |
| **Attribute Name** | **Data Type** | **Value** | | | |
| CATDESC | CDF\_CHAR | Sulpher charge distribution quality flag | | | |
| DEPEND\_0 | CDF\_CHAR | EPOCH | | | |
| DISPLAY\_TYPE | CDF\_CHAR | time\_series | | | |
| FIELDNAM | CDF\_CHAR | S\_CHARGE\_DIST\_QF | | | |
| FILLVAL | CDF\_INT2 | -32768 | | | |
| FORMAT | CDF\_CHAR | I3 | | | |
| LABLAXIS | CDF\_CHAR | S\_CHARGE\_DIST\_QF | | | |
| SCALEMAX | CDF\_INT2 | 3 | | | |
| SCALEMIN | CDF\_INT2 | -2 | | | |
| SCALETYP | CDF\_CHAR | linear | | | |
| UNITS | CDF\_CHAR |  | | | |
| VALIDMAX | CDF\_INT2 | 2 | | | |
| VALIDMIN | CDF\_INT2 | 0 | | | |
| VAR\_NOTES | CDF\_CHAR | Quality Flag: 0=good, 1=caution, 2=bad. Not yet implemented | | | |
| VAR\_TYPE | CDF\_CHAR | support\_data | | | |

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| **Variable\_Name** | **Data\_type** | **DIMS** | **SIZES** | **R\_VARY** | **D\_VARY** |
| O7\_O6\_RATIO | CDF\_FLOAT | 1 | 0 | T |  |
| **Attribute Name** | **Data Type** | **Value** | | | |
| CATDESC | CDF\_CHAR | O7/O6 element ratio | | | |
| DEPEND\_0 | CDF\_CHAR | EPOCH | | | |
| DISPLAY\_TYPE | CDF\_CHAR | time\_series | | | |
| FIELDNAM | CDF\_CHAR | O7\_O6\_RATIO | | | |
| FILLVAL | CDF\_FLOAT | -1E31 | | | |
| FORMAT | CDF\_CHAR | E10.3 | | | |
| LABLAXIS | CDF\_CHAR | O7\_O6\_RATIO | | | |
| SCALEMAX | CDF\_FLOAT | 1E3 | | | |
| SCALEMIN | CDF\_FLOAT | 1E-2 | | | |
| SCALETYP | CDF\_CHAR | log | | | |
| UNITS | CDF\_CHAR |  | | | |
| VALIDMAX | CDF\_UINT1 | 9999 | | | |
| VALIDMIN | CDF\_UINT1 | 0 | | | |
| VAR\_NOTES | CDF\_CHAR | O7/O6 Element Ratio | | | |
| VAR\_TYPE | CDF\_CHAR | data | | | |

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| **Variable\_Name** | **Data\_type** | **DIMS** | **SIZES** | **R\_VARY** | **D\_VARY** |
| O7\_O6\_RATIO\_ERR | CDF\_FLOAT | 1 | **0** | T |  |
| **Attribute Name** | **Data Type** | **Value** | | | |
| CATDESC | CDF\_CHAR | O7/O6 element ratio error/uncertainty | | | |
| DEPEND\_0 | CDF\_CHAR | EPOCH | | | |
| DISPLAY\_TYPE | CDF\_CHAR | time\_series | | | |
| FIELDNAM | CDF\_CHAR | O7\_O6\_RATIO\_ERR | | | |
| FILLVAL | CDF\_FLOAT | -1E31 | | | |
| FORMAT | CDF\_CHAR | E10.3 | | | |
| LABLAXIS | CDF\_CHAR | O7\_O6\_RATIO\_ERR | | | |
| SCALEMAX | CDF\_FLOAT | 1E3 | | | |
| SCALEMIN | CDF\_FLOAT | 1E-2 | | | |
| SCALETYP | CDF\_CHAR | log | | | |
| UNITS | CDF\_CHAR |  | | | |
| VALIDMAX | CDF\_UINT1 | 9999 | | | |
| VALIDMIN | CDF\_UINT1 | 0 | | | |
| VAR\_NOTES | CDF\_CHAR | Estimate of statistical uncertainty due to limited count statistics. Note that these estimates do NOT include systematic error. | | | |
| VAR\_TYPE | CDF\_CHAR | support\_data | | | |

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| **Variable\_Name** | **Data\_type** | **DIMS** | **SIZES** | **R\_VARY** | **D\_VARY** |
| O7\_O6\_RATIO\_QF | CDF\_INT2 | 1 | 0 | T |  |
| **Attribute Name** | **Data Type** | **Value** | | | |
| CATDESC | CDF\_CHAR | O7/O6 element ratio quality flag | | | |
| DEPEND\_0 | CDF\_CHAR | EPOCH | | | |
| DISPLAY\_TYPE | CDF\_CHAR | time\_series | | | |
| FIELDNAM | CDF\_CHAR | O7\_O6\_RATIO\_QF | | | |
| FILLVAL | CDF\_INT2 | -32768 | | | |
| FORMAT | CDF\_CHAR | I3 | | | |
| LABLAXIS | CDF\_CHAR | O7\_O6\_RATIO\_QF | | | |
| SCALEMAX | CDF\_INT2 | 3 | | | |
| SCALEMIN | CDF\_INT2 | -2 | | | |
| SCALETYP | CDF\_CHAR | linear | | | |
| UNITS | CDF\_CHAR |  | | | |
| VALIDMAX | CDF\_INT2 | 2 | | | |
| VALIDMIN | CDF\_INT2 | 0 | | | |
| VAR\_NOTES | CDF\_CHAR | Quality Flag: 0=good, 1=caution, 2=bad. Not yet implemented | | | |
| VAR\_TYPE | CDF\_CHAR | support\_data | | | |

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| **Variable\_Name** | **Data\_type** | **DIMS** | **SIZES** | **R\_VARY** | **D\_VARY** |
| C6\_C4\_RATIO | CDF\_FLOAT | 1 | 0 | T |  |
| **Attribute Name** | **Data Type** | **Value** | | | |
| CATDESC | CDF\_CHAR | C6/C4 element ratio | | | |
| DEPEND\_0 | CDF\_CHAR | EPOCH | | | |
| DISPLAY\_TYPE | CDF\_CHAR | time\_series | | | |
| FIELDNAM | CDF\_CHAR | C6\_C4\_RATIO | | | |
| FILLVAL | CDF\_FLOAT | -1E31 | | | |
| FORMAT | CDF\_CHAR | E10.3 | | | |
| LABLAXIS | CDF\_CHAR | C6\_C4\_RATIO | | | |
| SCALEMAX | CDF\_FLOAT | 1E3 | | | |
| SCALEMIN | CDF\_FLOAT | 1E-2 | | | |
| SCALETYP | CDF\_CHAR | log | | | |
| UNITS | CDF\_CHAR |  | | | |
| VALIDMAX | CDF\_UINT1 | 9999 | | | |
| VALIDMIN | CDF\_UINT1 | 0 | | | |
| VAR\_NOTES | CDF\_CHAR | C6/C4 Element Ratio | | | |
| VAR\_TYPE | CDF\_CHAR | data | | | |

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| **Variable\_Name** | **Data\_type** | **DIMS** | **SIZES** | **R\_VARY** | **D\_VARY** |
| C6\_C4\_RATIO\_ERR | CDF\_FLOAT | 1 | **0** | T |  |
| **Attribute Name** | **Data Type** | **Value** | | | |
| CATDESC | CDF\_CHAR | C6/C4 element ratio error/uncertainty | | | |
| DEPEND\_0 | CDF\_CHAR | EPOCH | | | |
| DISPLAY\_TYPE | CDF\_CHAR | time\_series | | | |
| FIELDNAM | CDF\_CHAR | C6\_C4\_RATIO\_ERR | | | |
| FILLVAL | CDF\_FLOAT | -1E31 | | | |
| FORMAT | CDF\_CHAR | E10.3 | | | |
| LABLAXIS | CDF\_CHAR | C6\_C4\_RATIO\_ERR | | | |
| SCALEMAX | CDF\_FLOAT | 1E3 | | | |
| SCALEMIN | CDF\_FLOAT | 1E-2 | | | |
| SCALETYP | CDF\_CHAR | log | | | |
| UNITS | CDF\_CHAR |  | | | |
| VALIDMAX | CDF\_UINT1 | 9999 | | | |
| VALIDMIN | CDF\_UINT1 | 0 | | | |
| VAR\_NOTES | CDF\_CHAR | Estimate of statistical uncertainty due to limited count statistics. Note that these estimates do NOT include systematic error. | | | |
| VAR\_TYPE | CDF\_CHAR | support\_data | | | |

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| **Variable\_Name** | **Data\_type** | **DIMS** | **SIZES** | **R\_VARY** | **D\_VARY** |
| C6\_C4\_RATIO\_QF | CDF\_INT2 | 1 | 0 | T |  |
| **Attribute Name** | **Data Type** | **Value** | | | |
| CATDESC | CDF\_CHAR | C6/C4 element ratio quality flag | | | |
| DEPEND\_0 | CDF\_CHAR | EPOCH | | | |
| DISPLAY\_TYPE | CDF\_CHAR | time\_series | | | |
| FIELDNAM | CDF\_CHAR | C6\_C4\_RATIO\_QF | | | |
| FILLVAL | CDF\_INT2 | -32768 | | | |
| FORMAT | CDF\_CHAR | I3 | | | |
| LABLAXIS | CDF\_CHAR | C6\_C4\_RATIO\_QF | | | |
| SCALEMAX | CDF\_INT2 | 3 | | | |
| SCALEMIN | CDF\_INT2 | -2 | | | |
| SCALETYP | CDF\_CHAR | linear | | | |
| UNITS | CDF\_CHAR |  | | | |
| VALIDMAX | CDF\_INT2 | 2 | | | |
| VALIDMIN | CDF\_INT2 | 0 | | | |
| VAR\_NOTES | CDF\_CHAR | Quality Flag: 0=good, 1=caution, 2=bad. Not yet implemented | | | |
| VAR\_TYPE | CDF\_CHAR | support\_data | | | |

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| **Variable\_Name** | **Data\_type** | **DIMS** | **SIZES** | **R\_VARY** | **D\_VARY** |
| C6\_C5\_RATIO | CDF\_FLOAT | 1 | 0 | T |  |
| **Attribute Name** | **Data Type** | **Value** | | | |
| CATDESC | CDF\_CHAR | C6/C5 element ratio | | | |
| DEPEND\_0 | CDF\_CHAR | EPOCH | | | |
| DISPLAY\_TYPE | CDF\_CHAR | time\_series | | | |
| FIELDNAM | CDF\_CHAR | C6\_C5\_RATIO | | | |
| FILLVAL | CDF\_FLOAT | -1E31 | | | |
| FORMAT | CDF\_CHAR | E10.3 | | | |
| LABLAXIS | CDF\_CHAR | C6\_C5\_RATIO | | | |
| SCALEMAX | CDF\_FLOAT | 1E3 | | | |
| SCALEMIN | CDF\_FLOAT | 1E-2 | | | |
| SCALETYP | CDF\_CHAR | log | | | |
| UNITS | CDF\_CHAR |  | | | |
| VALIDMAX | CDF\_UINT1 | 9999 | | | |
| VALIDMIN | CDF\_UINT1 | 0 | | | |
| VAR\_NOTES | CDF\_CHAR | C6/C5 Element Ratio | | | |
| VAR\_TYPE | CDF\_CHAR | data | | | |

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| **Variable\_Name** | **Data\_type** | **DIMS** | **SIZES** | **R\_VARY** | **D\_VARY** |
| C6\_C5\_RATIO\_ERR | CDF\_FLOAT | 1 | **0** | T |  |
| **Attribute Name** | **Data Type** | **Value** | | | |
| CATDESC | CDF\_CHAR | C6/C5 element ratio error/uncertainty | | | |
| DEPEND\_0 | CDF\_CHAR | EPOCH | | | |
| DISPLAY\_TYPE | CDF\_CHAR | time\_series | | | |
| FIELDNAM | CDF\_CHAR | C6\_C5\_RATIO\_ERR | | | |
| FILLVAL | CDF\_FLOAT | -1E31 | | | |
| FORMAT | CDF\_CHAR | E10.3 | | | |
| LABLAXIS | CDF\_CHAR | C6\_C5\_RATIO\_ERR | | | |
| SCALEMAX | CDF\_FLOAT | 1E3 | | | |
| SCALEMIN | CDF\_FLOAT | 1E-2 | | | |
| SCALETYP | CDF\_CHAR | log | | | |
| UNITS | CDF\_CHAR |  | | | |
| VALIDMAX | CDF\_UINT1 | 9999 | | | |
| VALIDMIN | CDF\_UINT1 | 0 | | | |
| VAR\_NOTES | CDF\_CHAR | Estimate of statistical uncertainty due to limited count statistics. Note that these estimates do NOT include systematic error. | | | |
| VAR\_TYPE | CDF\_CHAR | support\_data | | | |

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| **Variable\_Name** | **Data\_type** | **DIMS** | **SIZES** | **R\_VARY** | **D\_VARY** |
| C6\_C5\_RATIO\_QF | CDF\_INT2 | 1 | 0 | T |  |
| **Attribute Name** | **Data Type** | **Value** | | | |
| CATDESC | CDF\_CHAR | C6/C5 element ratio quality flag | | | |
| DEPEND\_0 | CDF\_CHAR | EPOCH | | | |
| DISPLAY\_TYPE | CDF\_CHAR | time\_series | | | |
| FIELDNAM | CDF\_CHAR | C6\_C5\_RATIO\_QF | | | |
| FILLVAL | CDF\_INT2 | -32768 | | | |
| FORMAT | CDF\_CHAR | I3 | | | |
| LABLAXIS | CDF\_CHAR | C6\_C5\_RATIO\_QF | | | |
| SCALEMAX | CDF\_INT2 | 3 | | | |
| SCALEMIN | CDF\_INT2 | -2 | | | |
| SCALETYP | CDF\_CHAR | linear | | | |
| UNITS | CDF\_CHAR |  | | | |
| VALIDMAX | CDF\_INT2 | 2 | | | |
| VALIDMIN | CDF\_INT2 | 0 | | | |
| VAR\_NOTES | CDF\_CHAR | Quality Flag: 0=good, 1=caution, 2=bad. Not yet implemented | | | |
| VAR\_TYPE | CDF\_CHAR | support\_data | | | |

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| **Variable\_Name** | **Data\_type** | **DIMS** | **SIZES** | **R\_VARY** | **D\_VARY** |
| O\_AVE\_CHARGE | CDF\_FLOAT | 1 | 0 | T |  |
| **Attribute Name** | **Data Type** | **Value** | | | |
| CATDESC | CDF\_CHAR | Oxygen average charge | | | |
| DEPEND\_0 | CDF\_CHAR | EPOCH | | | |
| DISPLAY\_TYPE | CDF\_CHAR | time\_series | | | |
| FIELDNAM | CDF\_CHAR | O\_AVE\_CHARGE | | | |
| FILLVAL | CDF\_FLOAT | -1E31 | | | |
| FORMAT | CDF\_CHAR | E10.3 | | | |
| LABLAXIS | CDF\_CHAR | O\_AVE\_CHARGE | | | |
| SCALEMAX | CDF\_FLOAT | 20 | | | |
| SCALEMIN | CDF\_FLOAT | 0 | | | |
| SCALETYP | CDF\_CHAR | linear | | | |
| UNITS | CDF\_CHAR |  | | | |
| VALIDMAX | CDF\_UINT1 | 9999 | | | |
| VALIDMIN | CDF\_UINT1 | 0 | | | |
| VAR\_NOTES | CDF\_CHAR | Oxygen average charge | | | |
| VAR\_TYPE | CDF\_CHAR | data | | | |

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| **Variable\_Name** | **Data\_type** | **DIMS** | **SIZES** | **R\_VARY** | **D\_VARY** |
| O\_AVE\_CHARGE\_ERR | CDF\_FLOAT | 1 | **0** | T |  |
| **Attribute Name** | **Data Type** | **Value** | | | |
| CATDESC | CDF\_CHAR | Oxygen average charge error/uncertainty | | | |
| DEPEND\_0 | CDF\_CHAR | EPOCH | | | |
| DISPLAY\_TYPE | CDF\_CHAR | time\_series | | | |
| FIELDNAM | CDF\_CHAR | O\_AVE\_CHARGE\_ERR | | | |
| FILLVAL | CDF\_FLOAT | -1E31 | | | |
| FORMAT | CDF\_CHAR | E10.3 | | | |
| LABLAXIS | CDF\_CHAR | O\_AVE\_CHARGE\_ERR | | | |
| SCALEMAX | CDF\_FLOAT | 20 | | | |
| SCALEMIN | CDF\_FLOAT | 0 | | | |
| SCALETYP | CDF\_CHAR | linear | | | |
| UNITS | CDF\_CHAR |  | | | |
| VALIDMAX | CDF\_UINT1 | 9999 | | | |
| VALIDMIN | CDF\_UINT1 | 0 | | | |
| VAR\_NOTES | CDF\_CHAR | Estimate of statistical uncertainty due to limited count statistics. Note that these estimates do NOT include systematic error. | | | |
| VAR\_TYPE | CDF\_CHAR | support\_data | | | |

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| **Variable\_Name** | **Data\_type** | **DIMS** | **SIZES** | **R\_VARY** | **D\_VARY** |
| O\_AVE\_CHARGE\_QF | CDF\_INT2 | 1 | 0 | T |  |
| **Attribute Name** | **Data Type** | **Value** | | | |
| CATDESC | CDF\_CHAR | Oxygen average charge quality flag | | | |
| DEPEND\_0 | CDF\_CHAR | EPOCH | | | |
| DISPLAY\_TYPE | CDF\_CHAR | time\_series | | | |
| FIELDNAM | CDF\_CHAR | O\_AVE\_CHARGE\_QF | | | |
| FILLVAL | CDF\_INT2 | -32768 | | | |
| FORMAT | CDF\_CHAR | I3 | | | |
| LABLAXIS | CDF\_CHAR | O\_AVE\_CHARGE\_QF | | | |
| SCALEMAX | CDF\_INT2 | 3 | | | |
| SCALEMIN | CDF\_INT2 | -2 | | | |
| SCALETYP | CDF\_CHAR | linear | | | |
| UNITS | CDF\_CHAR |  | | | |
| VALIDMAX | CDF\_INT2 | 2 | | | |
| VALIDMIN | CDF\_INT2 | 0 | | | |
| VAR\_NOTES | CDF\_CHAR | Quality Flag: 0=good, 1=caution, 2=bad. Not yet implemented | | | |
| VAR\_TYPE | CDF\_CHAR | support\_data | | | |

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| **Variable\_Name** | **Data\_type** | **DIMS** | **SIZES** | **R\_VARY** | **D\_VARY** |
| C\_AVE\_CHARGE | CDF\_FLOAT | 1 | 0 | T |  |
| **Attribute Name** | **Data Type** | **Value** | | | |
| CATDESC | CDF\_CHAR | Carbon average charge | | | |
| DEPEND\_0 | CDF\_CHAR | EPOCH | | | |
| DISPLAY\_TYPE | CDF\_CHAR | time\_series | | | |
| FIELDNAM | CDF\_CHAR | C\_AVE\_CHARGE | | | |
| FILLVAL | CDF\_FLOAT | -1E31 | | | |
| FORMAT | CDF\_CHAR | E10.3 | | | |
| LABLAXIS | CDF\_CHAR | C\_AVE\_CHARGE | | | |
| SCALEMAX | CDF\_FLOAT | 20 | | | |
| SCALEMIN | CDF\_FLOAT | 0 | | | |
| SCALETYP | CDF\_CHAR | linear | | | |
| UNITS | CDF\_CHAR |  | | | |
| VALIDMAX | CDF\_UINT1 | 9999 | | | |
| VALIDMIN | CDF\_UINT1 | 0 | | | |
| VAR\_NOTES | CDF\_CHAR | Carbon average charge | | | |
| VAR\_TYPE | CDF\_CHAR | data | | | |

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| --- | --- | --- | --- | --- | --- |
| **Variable\_Name** | **Data\_type** | **DIMS** | **SIZES** | **R\_VARY** | **D\_VARY** |
| C\_AVE\_CHARGE\_ERR | CDF\_FLOAT | 1 | **0** | T |  |
| **Attribute Name** | **Data Type** | **Value** | | | |
| CATDESC | CDF\_CHAR | Carbon average charge error/uncertainty | | | |
| DEPEND\_0 | CDF\_CHAR | EPOCH | | | |
| DISPLAY\_TYPE | CDF\_CHAR | time\_series | | | |
| FIELDNAM | CDF\_CHAR | C\_AVE\_CHARGE\_ERR | | | |
| FILLVAL | CDF\_FLOAT | -1E31 | | | |
| FORMAT | CDF\_CHAR | E10.3 | | | |
| LABLAXIS | CDF\_CHAR | C\_AVE\_CHARGE\_ERR | | | |
| SCALEMAX | CDF\_FLOAT | 20 | | | |
| SCALEMIN | CDF\_FLOAT | 0 | | | |
| SCALETYP | CDF\_CHAR | linear | | | |
| UNITS | CDF\_CHAR |  | | | |
| VALIDMAX | CDF\_UINT1 | 9999 | | | |
| VALIDMIN | CDF\_UINT1 | 0 | | | |
| VAR\_NOTES | CDF\_CHAR | Estimate of statistical uncertainty due to limited count statistics. Note that these estimates do NOT include systematic error. | | | |
| VAR\_TYPE | CDF\_CHAR | support\_data | | | |

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| --- | --- | --- | --- | --- | --- |
| **Variable\_Name** | **Data\_type** | **DIMS** | **SIZES** | **R\_VARY** | **D\_VARY** |
| C\_AVE\_CHARGE\_QF | CDF\_INT2 | 1 | 0 | T |  |
| **Attribute Name** | **Data Type** | **Value** | | | |
| CATDESC | CDF\_CHAR | Carbon average charge quality flag | | | |
| DEPEND\_0 | CDF\_CHAR | EPOCH | | | |
| DISPLAY\_TYPE | CDF\_CHAR | time\_series | | | |
| FIELDNAM | CDF\_CHAR | C\_AVE\_CHARGE\_QF | | | |
| FILLVAL | CDF\_INT2 | -32768 | | | |
| FORMAT | CDF\_CHAR | I3 | | | |
| LABLAXIS | CDF\_CHAR | C\_AVE\_CHARGE\_QF | | | |
| SCALEMAX | CDF\_INT2 | 3 | | | |
| SCALEMIN | CDF\_INT2 | -2 | | | |
| SCALETYP | CDF\_CHAR | linear | | | |
| UNITS | CDF\_CHAR |  | | | |
| VALIDMAX | CDF\_INT2 | 2 | | | |
| VALIDMIN | CDF\_INT2 | 0 | | | |
| VAR\_NOTES | CDF\_CHAR | Quality Flag: 0=good, 1=caution, 2=bad. Not yet implemented | | | |
| VAR\_TYPE | CDF\_CHAR | support\_data | | | |

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| --- | --- | --- | --- | --- | --- |
| **Variable\_Name** | **Data\_type** | **DIMS** | **SIZES** | **R\_VARY** | **D\_VARY** |
| FE\_AVE\_CHARGE | CDF\_FLOAT | 1 | 0 | T |  |
| **Attribute Name** | **Data Type** | **Value** | | | |
| CATDESC | CDF\_CHAR | Iron average charge | | | |
| DEPEND\_0 | CDF\_CHAR | EPOCH | | | |
| DISPLAY\_TYPE | CDF\_CHAR | time\_series | | | |
| FIELDNAM | CDF\_CHAR | FE\_AVE\_CHARGE | | | |
| FILLVAL | CDF\_FLOAT | -1E31 | | | |
| FORMAT | CDF\_CHAR | E10.3 | | | |
| LABLAXIS | CDF\_CHAR | FE\_AVE\_CHARGE | | | |
| SCALEMAX | CDF\_FLOAT | 20 | | | |
| SCALEMIN | CDF\_FLOAT | 0 | | | |
| SCALETYP | CDF\_CHAR | linear | | | |
| UNITS | CDF\_CHAR |  | | | |
| VALIDMAX | CDF\_UINT1 | 9999 | | | |
| VALIDMIN | CDF\_UINT1 | 0 | | | |
| VAR\_NOTES | CDF\_CHAR | Iron average charge | | | |
| VAR\_TYPE | CDF\_CHAR | data | | | |

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| --- | --- | --- | --- | --- | --- |
| **Variable\_Name** | **Data\_type** | **DIMS** | **SIZES** | **R\_VARY** | **D\_VARY** |
| FE\_AVE\_CHARGE\_ERR | CDF\_FLOAT | 1 | **0** | T |  |
| **Attribute Name** | **Data Type** | **Value** | | | |
| CATDESC | CDF\_CHAR | Iron average charge error/uncertainty | | | |
| DEPEND\_0 | CDF\_CHAR | EPOCH | | | |
| DISPLAY\_TYPE | CDF\_CHAR | time\_series | | | |
| FIELDNAM | CDF\_CHAR | FE\_AVE\_CHARGE\_ERR | | | |
| FILLVAL | CDF\_FLOAT | -1E31 | | | |
| FORMAT | CDF\_CHAR | E10.3 | | | |
| LABLAXIS | CDF\_CHAR | FE\_AVE\_CHARGE\_ERR | | | |
| SCALEMAX | CDF\_FLOAT | 20 | | | |
| SCALEMIN | CDF\_FLOAT | 0 | | | |
| SCALETYP | CDF\_CHAR | linear | | | |
| UNITS | CDF\_CHAR |  | | | |
| VALIDMAX | CDF\_UINT1 | 9999 | | | |
| VALIDMIN | CDF\_UINT1 | 0 | | | |
| VAR\_NOTES | CDF\_CHAR | Estimate of statistical uncertainty due to limited count statistics. Note that these estimates do NOT include systematic error. | | | |
| VAR\_TYPE | CDF\_CHAR | support\_data | | | |

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| --- | --- | --- | --- | --- | --- |
| **Variable\_Name** | **Data\_type** | **DIMS** | **SIZES** | **R\_VARY** | **D\_VARY** |
| FE\_AVE\_CHARGE\_QF | CDF\_INT2 | 1 | 0 | T |  |
| **Attribute Name** | **Data Type** | **Value** | | | |
| CATDESC | CDF\_CHAR | Iron average charge quality flag | | | |
| DEPEND\_0 | CDF\_CHAR | EPOCH | | | |
| DISPLAY\_TYPE | CDF\_CHAR | time\_series | | | |
| FIELDNAM | CDF\_CHAR | FE\_AVE\_CHARGE\_QF | | | |
| FILLVAL | CDF\_INT2 | -32768 | | | |
| FORMAT | CDF\_CHAR | I3 | | | |
| LABLAXIS | CDF\_CHAR | FE\_AVE\_CHARGE\_QF | | | |
| SCALEMAX | CDF\_INT2 | 3 | | | |
| SCALEMIN | CDF\_INT2 | -2 | | | |
| SCALETYP | CDF\_CHAR | linear | | | |
| UNITS | CDF\_CHAR |  | | | |
| VALIDMAX | CDF\_INT2 | 2 | | | |
| VALIDMIN | CDF\_INT2 | 0 | | | |
| VAR\_NOTES | CDF\_CHAR | Quality Flag: 0=good, 1=caution, 2=bad. Not yet implemented | | | |
| VAR\_TYPE | CDF\_CHAR | support\_data | | | |

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| **Variable\_Name** | **Data\_type** | **DIMS** | **SIZES** | **R\_VARY** | **D\_VARY** |
| FE\_O\_ABUN | CDF\_FLOAT | 1 | 0 | T |  |
| **Attribute Name** | **Data Type** | **Value** | | | |
| CATDESC | CDF\_CHAR | Iron/Oxygen abundance | | | |
| DEPEND\_0 | CDF\_CHAR | EPOCH | | | |
| DISPLAY\_TYPE | CDF\_CHAR | time\_series | | | |
| FIELDNAM | CDF\_CHAR | FE\_O\_ABUN | | | |
| FILLVAL | CDF\_FLOAT | -1E31 | | | |
| FORMAT | CDF\_CHAR | E10.3 | | | |
| LABLAXIS | CDF\_CHAR | FE\_O\_ABUN | | | |
| SCALEMAX | CDF\_FLOAT | 1E1 | | | |
| SCALEMIN | CDF\_FLOAT | 1E-2 | | | |
| SCALETYP | CDF\_CHAR | log | | | |
| UNITS | CDF\_CHAR |  | | | |
| VALIDMAX | CDF\_UINT1 | 9999 | | | |
| VALIDMIN | CDF\_UINT1 | 0 | | | |
| VAR\_NOTES | CDF\_CHAR | Relative elemental abundance of iron with respect to oxygen computed over iron charge states 6-20 to oxygen charge states 5-8. | | | |
| VAR\_TYPE | CDF\_CHAR | data | | | |

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| --- | --- | --- | --- | --- | --- |
| **Variable\_Name** | **Data\_type** | **DIMS** | **SIZES** | **R\_VARY** | **D\_VARY** |
| FE\_O\_ABUN\_ERR | CDF\_FLOAT | 1 | **0** | T |  |
| **Attribute Name** | **Data Type** | **Value** | | | |
| CATDESC | CDF\_CHAR | Iron/Oxygen abundance error/uncertainty | | | |
| DEPEND\_0 | CDF\_CHAR | EPOCH | | | |
| DISPLAY\_TYPE | CDF\_CHAR | time\_series | | | |
| FIELDNAM | CDF\_CHAR | FE\_O\_ABUN\_ERR | | | |
| FILLVAL | CDF\_FLOAT | -1E31 | | | |
| FORMAT | CDF\_CHAR | E10.3 | | | |
| LABLAXIS | CDF\_CHAR | FE\_O\_ABUN\_ERR | | | |
| SCALEMAX | CDF\_FLOAT | 1E1 | | | |
| SCALEMIN | CDF\_FLOAT | 1E-2 | | | |
| SCALETYP | CDF\_CHAR | log | | | |
| UNITS | CDF\_CHAR |  | | | |
| VALIDMAX | CDF\_UINT1 | 9999 | | | |
| VALIDMIN | CDF\_UINT1 | 0 | | | |
| VAR\_NOTES | CDF\_CHAR | Estimate of statistical uncertainty due to limited count statistics. Note that these estimates do NOT include systematic error. | | | |
| VAR\_TYPE | CDF\_CHAR | support\_data | | | |

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| --- | --- | --- | --- | --- | --- |
| **Variable\_Name** | **Data\_type** | **DIMS** | **SIZES** | **R\_VARY** | **D\_VARY** |
| FE\_O\_ABUN\_QF | CDF\_INT2 | 1 | 0 | T |  |
| **Attribute Name** | **Data Type** | **Value** | | | |
| CATDESC | CDF\_CHAR | Iron/Oxygen abundance quality flag | | | |
| DEPEND\_0 | CDF\_CHAR | EPOCH | | | |
| DISPLAY\_TYPE | CDF\_CHAR | time\_series | | | |
| FIELDNAM | CDF\_CHAR | FE\_O\_ABUN\_QF | | | |
| FILLVAL | CDF\_INT2 | -32768 | | | |
| FORMAT | CDF\_CHAR | I3 | | | |
| LABLAXIS | CDF\_CHAR | FE\_O\_ABUN\_QF | | | |
| SCALEMAX | CDF\_INT2 | 3 | | | |
| SCALEMIN | CDF\_INT2 | -2 | | | |
| SCALETYP | CDF\_CHAR | linear | | | |
| UNITS | CDF\_CHAR |  | | | |
| VALIDMAX | CDF\_INT2 | 2 | | | |
| VALIDMIN | CDF\_INT2 | 0 | | | |
| VAR\_NOTES | CDF\_CHAR | Quality Flag: 0=good, 1=caution, 2=bad. Not yet implemented | | | |
| VAR\_TYPE | CDF\_CHAR | support\_data | | | |

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| **Variable\_Name** | **Data\_type** | **DIMS** | **SIZES** | **R\_VARY** | **D\_VARY** |
| C\_O\_ABUN | CDF\_FLOAT | 1 | 0 | T |  |
| **Attribute Name** | **Data Type** | **Value** | | | |
| CATDESC | CDF\_CHAR | Carbon/Oxygen abundance | | | |
| DEPEND\_0 | CDF\_CHAR | EPOCH | | | |
| DISPLAY\_TYPE | CDF\_CHAR | time\_series | | | |
| FIELDNAM | CDF\_CHAR | C\_O\_ABUN | | | |
| FILLVAL | CDF\_FLOAT | -1E31 | | | |
| FORMAT | CDF\_CHAR | E10.3 | | | |
| LABLAXIS | CDF\_CHAR | C\_O\_ABUN | | | |
| SCALEMAX | CDF\_FLOAT | 1E1 | | | |
| SCALEMIN | CDF\_FLOAT | 1E-2 | | | |
| SCALETYP | CDF\_CHAR | log | | | |
| UNITS | CDF\_CHAR |  | | | |
| VALIDMAX | CDF\_UINT1 | 9999 | | | |
| VALIDMIN | CDF\_UINT1 | 0 | | | |
| VAR\_NOTES | CDF\_CHAR | Relative elemental abundance of carbon with respect to oxygen computed over carbon charge states 4-6 to oxygen charge states 5-8. | | | |
| VAR\_TYPE | CDF\_CHAR | data | | | |

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Variable\_Name** | **Data\_type** | **DIMS** | **SIZES** | **R\_VARY** | **D\_VARY** |
| C\_O\_ABUN\_ERR | CDF\_FLOAT | 1 | **0** | T |  |
| **Attribute Name** | **Data Type** | **Value** | | | |
| CATDESC | CDF\_CHAR | Carbon/Oxygen abundance error/uncertainty | | | |
| DEPEND\_0 | CDF\_CHAR | EPOCH | | | |
| DISPLAY\_TYPE | CDF\_CHAR | time\_series | | | |
| FIELDNAM | CDF\_CHAR | C\_O\_ABUN\_ERR | | | |
| FILLVAL | CDF\_FLOAT | -1E31 | | | |
| FORMAT | CDF\_CHAR | E10.3 | | | |
| LABLAXIS | CDF\_CHAR | C\_O\_ABUN\_ERR | | | |
| SCALEMAX | CDF\_FLOAT | 1E1 | | | |
| SCALEMIN | CDF\_FLOAT | 1E-2 | | | |
| SCALETYP | CDF\_CHAR | log | | | |
| UNITS | CDF\_CHAR |  | | | |
| VALIDMAX | CDF\_UINT1 | 9999 | | | |
| VALIDMIN | CDF\_UINT1 | 0 | | | |
| VAR\_NOTES | CDF\_CHAR | Estimate of statistical uncertainty due to limited count statistics. Note that these estimates do NOT include systematic error. | | | |
| VAR\_TYPE | CDF\_CHAR | support\_data | | | |

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| --- | --- | --- | --- | --- | --- |
| **Variable\_Name** | **Data\_type** | **DIMS** | **SIZES** | **R\_VARY** | **D\_VARY** |
| C\_O\_ABUN\_QF | CDF\_INT2 | 1 | 0 | T |  |
| **Attribute Name** | **Data Type** | **Value** | | | |
| CATDESC | CDF\_CHAR | Carbon/Oxygen abundance quality flag | | | |
| DEPEND\_0 | CDF\_CHAR | EPOCH | | | |
| DISPLAY\_TYPE | CDF\_CHAR | time\_series | | | |
| FIELDNAM | CDF\_CHAR | C\_O\_ABUN\_QF | | | |
| FILLVAL | CDF\_INT2 | -32768 | | | |
| FORMAT | CDF\_CHAR | I3 | | | |
| LABLAXIS | CDF\_CHAR | C\_O\_ABUN\_QF | | | |
| SCALEMAX | CDF\_INT2 | 3 | | | |
| SCALEMIN | CDF\_INT2 | -2 | | | |
| SCALETYP | CDF\_CHAR | linear | | | |
| UNITS | CDF\_CHAR |  | | | |
| VALIDMAX | CDF\_INT2 | 2 | | | |
| VALIDMIN | CDF\_INT2 | 0 | | | |
| VAR\_NOTES | CDF\_CHAR | Quality Flag: 0=good, 1=caution, 2=bad. Not yet implemented | | | |
| VAR\_TYPE | CDF\_CHAR | support\_data | | | |

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| --- | --- | --- | --- | --- | --- |
| **Variable\_Name** | **Data\_type** | **DIMS** | **SIZES** | **R\_VARY** | **D\_VARY** |
| HE\_O\_ABUN | CDF\_FLOAT | 1 | 0 | T |  |
| **Attribute Name** | **Data Type** | **Value** | | | |
| CATDESC | CDF\_CHAR | Helium/Oxygen abundance | | | |
| DEPEND\_0 | CDF\_CHAR | EPOCH | | | |
| DISPLAY\_TYPE | CDF\_CHAR | time\_series | | | |
| FIELDNAM | CDF\_CHAR | HE\_O\_ABUN | | | |
| FILLVAL | CDF\_FLOAT | -1E31 | | | |
| FORMAT | CDF\_CHAR | E10.3 | | | |
| LABLAXIS | CDF\_CHAR | HE\_O\_ABUN | | | |
| SCALEMAX | CDF\_FLOAT | 1E1 | | | |
| SCALEMIN | CDF\_FLOAT | 1E-2 | | | |
| SCALETYP | CDF\_CHAR | log | | | |
| UNITS | CDF\_CHAR |  | | | |
| VALIDMAX | CDF\_UINT1 | 9999 | | | |
| VALIDMIN | CDF\_UINT1 | 0 | | | |
| VAR\_NOTES | CDF\_CHAR | Relative elemental abundance of helium with respect to oxygen computed over oxygen charge states 5-8. | | | |
| VAR\_TYPE | CDF\_CHAR | data | | | |

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| --- | --- | --- | --- | --- | --- |
| **Variable\_Name** | **Data\_type** | **DIMS** | **SIZES** | **R\_VARY** | **D\_VARY** |
| HE\_O\_ABUN\_ERR | CDF\_FLOAT | 1 | **0** | T |  |
| **Attribute Name** | **Data Type** | **Value** | | | |
| CATDESC | CDF\_CHAR | Helium/Oxygen abundance error/uncertainty | | | |
| DEPEND\_0 | CDF\_CHAR | EPOCH | | | |
| DISPLAY\_TYPE | CDF\_CHAR | time\_series | | | |
| FIELDNAM | CDF\_CHAR | HE\_O\_ABUN\_ERR | | | |
| FILLVAL | CDF\_FLOAT | -1E31 | | | |
| FORMAT | CDF\_CHAR | E10.3 | | | |
| LABLAXIS | CDF\_CHAR | HE\_O\_ABUN\_ERR | | | |
| SCALEMAX | CDF\_FLOAT | 1E1 | | | |
| SCALEMIN | CDF\_FLOAT | 1E-2 | | | |
| SCALETYP | CDF\_CHAR | log | | | |
| UNITS | CDF\_CHAR |  | | | |
| VALIDMAX | CDF\_UINT1 | 9999 | | | |
| VALIDMIN | CDF\_UINT1 | 0 | | | |
| VAR\_NOTES | CDF\_CHAR | Estimate of statistical uncertainty due to limited count statistics. Note that these estimates do NOT include systematic error. | | | |
| VAR\_TYPE | CDF\_CHAR | support\_data | | | |

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| --- | --- | --- | --- | --- | --- |
| **Variable\_Name** | **Data\_type** | **DIMS** | **SIZES** | **R\_VARY** | **D\_VARY** |
| HE\_O\_ABUN\_QF | CDF\_INT2 | 1 | 0 | T |  |
| **Attribute Name** | **Data Type** | **Value** | | | |
| CATDESC | CDF\_CHAR | Helium/Oxygen abundance quality flag | | | |
| DEPEND\_0 | CDF\_CHAR | EPOCH | | | |
| DISPLAY\_TYPE | CDF\_CHAR | time\_series | | | |
| FIELDNAM | CDF\_CHAR | HE\_O\_ABUN\_QF | | | |
| FILLVAL | CDF\_INT2 | -32768 | | | |
| FORMAT | CDF\_CHAR | I3 | | | |
| LABLAXIS | CDF\_CHAR | HE\_O\_ABUN\_QF | | | |
| SCALEMAX | CDF\_INT2 | 3 | | | |
| SCALEMIN | CDF\_INT2 | -2 | | | |
| SCALETYP | CDF\_CHAR | linear | | | |
| UNITS | CDF\_CHAR |  | | | |
| VALIDMAX | CDF\_INT2 | 2 | | | |
| VALIDMIN | CDF\_INT2 | 0 | | | |
| VAR\_NOTES | CDF\_CHAR | Quality Flag: 0=good, 1=caution, 2=bad. Not yet implemented | | | |
| VAR\_TYPE | CDF\_CHAR | support\_data | | | |

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Variable\_Name** | **Data\_type** | **DIMS** | **SIZES** | **R\_VARY** | **D\_VARY** |
| MG\_O\_ABUN | CDF\_FLOAT | 1 | 0 | T |  |
| **Attribute Name** | **Data Type** | **Value** | | | |
| CATDESC | CDF\_CHAR | Magnesium/Oxygen abundance | | | |
| DEPEND\_0 | CDF\_CHAR | EPOCH | | | |
| DISPLAY\_TYPE | CDF\_CHAR | time\_series | | | |
| FIELDNAM | CDF\_CHAR | MG\_O\_ABUN | | | |
| FILLVAL | CDF\_FLOAT | -1E31 | | | |
| FORMAT | CDF\_CHAR | E10.3 | | | |
| LABLAXIS | CDF\_CHAR | MG\_O\_ABUN | | | |
| SCALEMAX | CDF\_FLOAT | 1E1 | | | |
| SCALEMIN | CDF\_FLOAT | 1E-2 | | | |
| SCALETYP | CDF\_CHAR | log | | | |
| UNITS | CDF\_CHAR |  | | | |
| VALIDMAX | CDF\_UINT1 | 9999 | | | |
| VALIDMIN | CDF\_UINT1 | 0 | | | |
| VAR\_NOTES | CDF\_CHAR | Relative elemental abundance of magnesium with respect to oxygen computed over magnesium charge states 5-12 to oxygen charge states 5-8. | | | |
| VAR\_TYPE | CDF\_CHAR | data | | | |

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Variable\_Name** | **Data\_type** | **DIMS** | **SIZES** | **R\_VARY** | **D\_VARY** |
| MG\_O\_ABUN\_ERR | CDF\_FLOAT | 1 | **0** | T |  |
| **Attribute Name** | **Data Type** | **Value** | | | |
| CATDESC | CDF\_CHAR | Magnesium/Oxygen abundance error/uncertainty | | | |
| DEPEND\_0 | CDF\_CHAR | EPOCH | | | |
| DISPLAY\_TYPE | CDF\_CHAR | time\_series | | | |
| FIELDNAM | CDF\_CHAR | MG\_O\_ABUN\_ERR | | | |
| FILLVAL | CDF\_FLOAT | -1E31 | | | |
| FORMAT | CDF\_CHAR | E10.3 | | | |
| LABLAXIS | CDF\_CHAR | MG\_O\_ABUN\_ERR | | | |
| SCALEMAX | CDF\_FLOAT | 1E1 | | | |
| SCALEMIN | CDF\_FLOAT | 1E-2 | | | |
| SCALETYP | CDF\_CHAR | log | | | |
| UNITS | CDF\_CHAR |  | | | |
| VALIDMAX | CDF\_UINT1 | 9999 | | | |
| VALIDMIN | CDF\_UINT1 | 0 | | | |
| VAR\_NOTES | CDF\_CHAR | Estimate of statistical uncertainty due to limited count statistics. Note that these estimates do NOT include systematic error. | | | |
| VAR\_TYPE | CDF\_CHAR | support\_data | | | |

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Variable\_Name** | **Data\_type** | **DIMS** | **SIZES** | **R\_VARY** | **D\_VARY** |
| MG\_O\_ABUN\_QF | CDF\_INT2 | 1 | 0 | T |  |
| **Attribute Name** | **Data Type** | **Value** | | | |
| CATDESC | CDF\_CHAR | Magnesium/Oxygen abundance quality flag | | | |
| DEPEND\_0 | CDF\_CHAR | EPOCH | | | |
| DISPLAY\_TYPE | CDF\_CHAR | time\_series | | | |
| FIELDNAM | CDF\_CHAR | MG\_O\_ABUN\_QF | | | |
| FILLVAL | CDF\_INT2 | -32768 | | | |
| FORMAT | CDF\_CHAR | I3 | | | |
| LABLAXIS | CDF\_CHAR | MG\_O\_ABUN\_QF | | | |
| SCALEMAX | CDF\_INT2 | 3 | | | |
| SCALEMIN | CDF\_INT2 | -2 | | | |
| SCALETYP | CDF\_CHAR | linear | | | |
| UNITS | CDF\_CHAR |  | | | |
| VALIDMAX | CDF\_INT2 | 2 | | | |
| VALIDMIN | CDF\_INT2 | 0 | | | |
| VAR\_NOTES | CDF\_CHAR | Quality Flag: 0=good, 1=caution, 2=bad. Not yet implemented | | | |
| VAR\_TYPE | CDF\_CHAR | support\_data | | | |

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Variable\_Name** | **Data\_type** | **DIMS** | **SIZES** | **R\_VARY** | **D\_VARY** |
| SI\_O\_ABUN | CDF\_FLOAT | 1 | 0 | T |  |
| **Attribute Name** | **Data Type** | **Value** | | | |
| CATDESC | CDF\_CHAR | Silicon/Oxygen abundance | | | |
| DEPEND\_0 | CDF\_CHAR | EPOCH | | | |
| DISPLAY\_TYPE | CDF\_CHAR | time\_series | | | |
| FIELDNAM | CDF\_CHAR | SI\_O\_ABUN | | | |
| FILLVAL | CDF\_FLOAT | -1E31 | | | |
| FORMAT | CDF\_CHAR | E10.3 | | | |
| LABLAXIS | CDF\_CHAR | SI\_O\_ABUN | | | |
| SCALEMAX | CDF\_FLOAT | 1E1 | | | |
| SCALEMIN | CDF\_FLOAT | 1E-2 | | | |
| SCALETYP | CDF\_CHAR | log | | | |
| UNITS | CDF\_CHAR |  | | | |
| VALIDMAX | CDF\_UINT1 | 9999 | | | |
| VALIDMIN | CDF\_UINT1 | 0 | | | |
| VAR\_NOTES | CDF\_CHAR | Relative elemental abundance of silicon with respect to oxygen computed over silicon charge states 6-14 to oxygen charge states 5-8. | | | |
| VAR\_TYPE | CDF\_CHAR | data | | | |

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Variable\_Name** | **Data\_type** | **DIMS** | **SIZES** | **R\_VARY** | **D\_VARY** |
| SI\_O\_ABUN\_ERR | CDF\_FLOAT | 1 | **0** | T |  |
| **Attribute Name** | **Data Type** | **Value** | | | |
| CATDESC | CDF\_CHAR | Silicon/Oxygen abundance error/uncertainty | | | |
| DEPEND\_0 | CDF\_CHAR | EPOCH | | | |
| DISPLAY\_TYPE | CDF\_CHAR | time\_series | | | |
| FIELDNAM | CDF\_CHAR | SI\_O\_ABUN\_ERR | | | |
| FILLVAL | CDF\_FLOAT | -1E31 | | | |
| FORMAT | CDF\_CHAR | E10.3 | | | |
| LABLAXIS | CDF\_CHAR | SI\_O\_ABUN\_ERR | | | |
| SCALEMAX | CDF\_FLOAT | 1E1 | | | |
| SCALEMIN | CDF\_FLOAT | 1E-2 | | | |
| SCALETYP | CDF\_CHAR | log | | | |
| UNITS | CDF\_CHAR |  | | | |
| VALIDMAX | CDF\_UINT1 | 9999 | | | |
| VALIDMIN | CDF\_UINT1 | 0 | | | |
| VAR\_NOTES | CDF\_CHAR | Estimate of statistical uncertainty due to limited count statistics. Note that these estimates do NOT include systematic error. | | | |
| VAR\_TYPE | CDF\_CHAR | support\_data | | | |

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Variable\_Name** | **Data\_type** | **DIMS** | **SIZES** | **R\_VARY** | **D\_VARY** |
| SI\_O\_ABUN\_QF | CDF\_INT2 | 1 | 0 | T |  |
| **Attribute Name** | **Data Type** | **Value** | | | |
| CATDESC | CDF\_CHAR | Silicon/Oxygen abundance quality flag | | | |
| DEPEND\_0 | CDF\_CHAR | EPOCH | | | |
| DISPLAY\_TYPE | CDF\_CHAR | time\_series | | | |
| FIELDNAM | CDF\_CHAR | SI\_O\_ABUN\_QF | | | |
| FILLVAL | CDF\_INT2 | -32768 | | | |
| FORMAT | CDF\_CHAR | I3 | | | |
| LABLAXIS | CDF\_CHAR | SI\_O\_ABUN\_QF | | | |
| SCALEMAX | CDF\_INT2 | 3 | | | |
| SCALEMIN | CDF\_INT2 | -2 | | | |
| SCALETYP | CDF\_CHAR | linear | | | |
| UNITS | CDF\_CHAR |  | | | |
| VALIDMAX | CDF\_INT2 | 2 | | | |
| VALIDMIN | CDF\_INT2 | 0 | | | |
| VAR\_NOTES | CDF\_CHAR | Quality Flag: 0=good, 1=caution, 2=bad. Not yet implemented | | | |
| VAR\_TYPE | CDF\_CHAR | support\_data | | | |

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Variable\_Name** | **Data\_type** | **DIMS** | **SIZES** | **R\_VARY** | **D\_VARY** |
| NE\_O\_ABUN | CDF\_FLOAT | 1 | 0 | T |  |
| **Attribute Name** | **Data Type** | **Value** | | | |
| CATDESC | CDF\_CHAR | Neon/Oxygen abundance | | | |
| DEPEND\_0 | CDF\_CHAR | EPOCH | | | |
| DISPLAY\_TYPE | CDF\_CHAR | time\_series | | | |
| FIELDNAM | CDF\_CHAR | NE\_O\_ABUN | | | |
| FILLVAL | CDF\_FLOAT | -1E31 | | | |
| FORMAT | CDF\_CHAR | E10.3 | | | |
| LABLAXIS | CDF\_CHAR | NE\_O\_ABUN | | | |
| SCALEMAX | CDF\_FLOAT | 1E1 | | | |
| SCALEMIN | CDF\_FLOAT | 1E-2 | | | |
| SCALETYP | CDF\_CHAR | log | | | |
| UNITS | CDF\_CHAR |  | | | |
| VALIDMAX | CDF\_UINT1 | 9999 | | | |
| VALIDMIN | CDF\_UINT1 | 0 | | | |
| VAR\_NOTES | CDF\_CHAR | Relative elemental abundance of neon with respect to oxygen computed over neon charge states 6-9 to oxygen charge states 5-8. | | | |
| VAR\_TYPE | CDF\_CHAR | data | | | |

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Variable\_Name** | **Data\_type** | **DIMS** | **SIZES** | **R\_VARY** | **D\_VARY** |
| NE\_O\_ABUN\_ERR | CDF\_FLOAT | 1 | **0** | T |  |
| **Attribute Name** | **Data Type** | **Value** | | | |
| CATDESC | CDF\_CHAR | Neon/Oxygen abundance error/uncertainty | | | |
| DEPEND\_0 | CDF\_CHAR | EPOCH | | | |
| DISPLAY\_TYPE | CDF\_CHAR | time\_series | | | |
| FIELDNAM | CDF\_CHAR | NE\_O\_ABUN\_ERR | | | |
| FILLVAL | CDF\_FLOAT | -1E31 | | | |
| FORMAT | CDF\_CHAR | E10.3 | | | |
| LABLAXIS | CDF\_CHAR | NE\_O\_ABUN\_ERR | | | |
| SCALEMAX | CDF\_FLOAT | 1E1 | | | |
| SCALEMIN | CDF\_FLOAT | 1E-2 | | | |
| SCALETYP | CDF\_CHAR | log | | | |
| UNITS | CDF\_CHAR |  | | | |
| VALIDMAX | CDF\_UINT1 | 9999 | | | |
| VALIDMIN | CDF\_UINT1 | 0 | | | |
| VAR\_NOTES | CDF\_CHAR | Estimate of statistical uncertainty due to limited count statistics. Note that these estimates do NOT include systematic error. | | | |
| VAR\_TYPE | CDF\_CHAR | support\_data | | | |

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Variable\_Name** | **Data\_type** | **DIMS** | **SIZES** | **R\_VARY** | **D\_VARY** |
| NE\_O\_ABUN\_QF | CDF\_INT2 | 1 | 0 | T |  |
| **Attribute Name** | **Data Type** | **Value** | | | |
| CATDESC | CDF\_CHAR | Neon/Oxygen abundance quality flag | | | |
| DEPEND\_0 | CDF\_CHAR | EPOCH | | | |
| DISPLAY\_TYPE | CDF\_CHAR | time\_series | | | |
| FIELDNAM | CDF\_CHAR | NE\_O\_ABUN\_QF | | | |
| FILLVAL | CDF\_INT2 | -32768 | | | |
| FORMAT | CDF\_CHAR | I3 | | | |
| LABLAXIS | CDF\_CHAR | NE\_O\_ABUN\_QF | | | |
| SCALEMAX | CDF\_INT2 | 3 | | | |
| SCALEMIN | CDF\_INT2 | -2 | | | |
| SCALETYP | CDF\_CHAR | linear | | | |
| UNITS | CDF\_CHAR |  | | | |
| VALIDMAX | CDF\_INT2 | 2 | | | |
| VALIDMIN | CDF\_INT2 | 0 | | | |
| VAR\_NOTES | CDF\_CHAR | Quality Flag: 0=good, 1=caution, 2=bad. Not yet implemented | | | |
| VAR\_TYPE | CDF\_CHAR | support\_data | | | |

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Variable\_Name** | **Data\_type** | **DIMS** | **SIZES** | **R\_VARY** | **D\_VARY** |
| S\_O\_ABUN | CDF\_FLOAT | 1 | 0 | T |  |
| **Attribute Name** | **Data Type** | **Value** | | | |
| CATDESC | CDF\_CHAR | Sulpher/Oxygen abundance | | | |
| DEPEND\_0 | CDF\_CHAR | EPOCH | | | |
| DISPLAY\_TYPE | CDF\_CHAR | time\_series | | | |
| FIELDNAM | CDF\_CHAR | S\_O\_ABUN | | | |
| FILLVAL | CDF\_FLOAT | -1E31 | | | |
| FORMAT | CDF\_CHAR | E10.3 | | | |
| LABLAXIS | CDF\_CHAR | S\_O\_ABUN | | | |
| SCALEMAX | CDF\_FLOAT | 1E1 | | | |
| SCALEMIN | CDF\_FLOAT | 1E-2 | | | |
| SCALETYP | CDF\_CHAR | log | | | |
| UNITS | CDF\_CHAR |  | | | |
| VALIDMAX | CDF\_UINT1 | 9999 | | | |
| VALIDMIN | CDF\_UINT1 | 0 | | | |
| VAR\_NOTES | CDF\_CHAR | Relative elemental abundance of sulpher with respect to oxygen computed over sulpher charge states 6-14 to oxygen charge states 5-8. | | | |
| VAR\_TYPE | CDF\_CHAR | data | | | |

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Variable\_Name** | **Data\_type** | **DIMS** | **SIZES** | **R\_VARY** | **D\_VARY** |
| S\_O\_ABUN\_ERR | CDF\_FLOAT | 1 | **0** | T |  |
| **Attribute Name** | **Data Type** | **Value** | | | |
| CATDESC | CDF\_CHAR | Sulpher/Oxygen abundance error/uncertainty | | | |
| DEPEND\_0 | CDF\_CHAR | EPOCH | | | |
| DISPLAY\_TYPE | CDF\_CHAR | time\_series | | | |
| FIELDNAM | CDF\_CHAR | S\_O\_ABUN\_ERR | | | |
| FILLVAL | CDF\_FLOAT | -1E31 | | | |
| FORMAT | CDF\_CHAR | E10.3 | | | |
| LABLAXIS | CDF\_CHAR | S\_O\_ABUN\_ERR | | | |
| SCALEMAX | CDF\_FLOAT | 1E1 | | | |
| SCALEMIN | CDF\_FLOAT | 1E-2 | | | |
| SCALETYP | CDF\_CHAR | log | | | |
| UNITS | CDF\_CHAR |  | | | |
| VALIDMAX | CDF\_UINT1 | 9999 | | | |
| VALIDMIN | CDF\_UINT1 | 0 | | | |
| VAR\_NOTES | CDF\_CHAR | Estimate of statistical uncertainty due to limited count statistics. Note that these estimates do NOT include systematic error. | | | |
| VAR\_TYPE | CDF\_CHAR | support\_data | | | |

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Variable\_Name** | **Data\_type** | **DIMS** | **SIZES** | **R\_VARY** | **D\_VARY** |
| S\_O\_ABUN\_QF | CDF\_INT2 | 1 | 0 | T |  |
| **Attribute Name** | **Data Type** | **Value** | | | |
| CATDESC | CDF\_CHAR | Sulpher/Oxygen abundance quality flag | | | |
| DEPEND\_0 | CDF\_CHAR | EPOCH | | | |
| DISPLAY\_TYPE | CDF\_CHAR | time\_series | | | |
| FIELDNAM | CDF\_CHAR | S\_O\_ABUN\_QF | | | |
| FILLVAL | CDF\_INT2 | -32768 | | | |
| FORMAT | CDF\_CHAR | I3 | | | |
| LABLAXIS | CDF\_CHAR | S\_O\_ABUN\_QF | | | |
| SCALEMAX | CDF\_INT2 | 3 | | | |
| SCALEMIN | CDF\_INT2 | -2 | | | |
| SCALETYP | CDF\_CHAR | linear | | | |
| UNITS | CDF\_CHAR |  | | | |
| VALIDMAX | CDF\_INT2 | 2 | | | |
| VALIDMIN | CDF\_INT2 | 0 | | | |
| VAR\_NOTES | CDF\_CHAR | Quality Flag: 0=good, 1=caution, 2=bad. Not yet implemented | | | |
| VAR\_TYPE | CDF\_CHAR | support\_data | | | |

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Variable\_Name** | **Data\_type** | **DIMS** | **SIZES** | **R\_VARY** | **D\_VARY** |
| N\_O\_ABUN | CDF\_FLOAT | 1 | 0 | T |  |
| **Attribute Name** | **Data Type** | **Value** | | | |
| CATDESC | CDF\_CHAR | Nitrogen/Oxygen abundance | | | |
| DEPEND\_0 | CDF\_CHAR | EPOCH | | | |
| DISPLAY\_TYPE | CDF\_CHAR | time\_series | | | |
| FIELDNAM | CDF\_CHAR | N\_O\_ABUN | | | |
| FILLVAL | CDF\_FLOAT | -1E31 | | | |
| FORMAT | CDF\_CHAR | E10.3 | | | |
| LABLAXIS | CDF\_CHAR | N\_O\_ABUN | | | |
| SCALEMAX | CDF\_FLOAT | 1E1 | | | |
| SCALEMIN | CDF\_FLOAT | 1E-2 | | | |
| SCALETYP | CDF\_CHAR | log | | | |
| UNITS | CDF\_CHAR |  | | | |
| VALIDMAX | CDF\_UINT1 | 9999 | | | |
| VALIDMIN | CDF\_UINT1 | 0 | | | |
| VAR\_NOTES | CDF\_CHAR | Relative elemental abundance of nitrogen with respect to oxygen computed over nitrogen charge states 5-6 to oxygen charge states 5-8. | | | |
| VAR\_TYPE | CDF\_CHAR | data | | | |

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Variable\_Name** | **Data\_type** | **DIMS** | **SIZES** | **R\_VARY** | **D\_VARY** |
| N\_O\_ABUN\_ERR | CDF\_FLOAT | 1 | **0** | T |  |
| **Attribute Name** | **Data Type** | **Value** | | | |
| CATDESC | CDF\_CHAR | Nitrogen/Oxygen abundance error/uncertainty | | | |
| DEPEND\_0 | CDF\_CHAR | EPOCH | | | |
| DISPLAY\_TYPE | CDF\_CHAR | time\_series | | | |
| FIELDNAM | CDF\_CHAR | N\_O\_ABUN\_ERR | | | |
| FILLVAL | CDF\_FLOAT | -1E31 | | | |
| FORMAT | CDF\_CHAR | E10.3 | | | |
| LABLAXIS | CDF\_CHAR | N\_O\_ABUN\_ERR | | | |
| SCALEMAX | CDF\_FLOAT | 1E1 | | | |
| SCALEMIN | CDF\_FLOAT | 1E-2 | | | |
| SCALETYP | CDF\_CHAR | log | | | |
| UNITS | CDF\_CHAR |  | | | |
| VALIDMAX | CDF\_UINT1 | 9999 | | | |
| VALIDMIN | CDF\_UINT1 | 0 | | | |
| VAR\_NOTES | CDF\_CHAR | Estimate of statistical uncertainty due to limited count statistics. Note that these estimates do NOT include systematic error. | | | |
| VAR\_TYPE | CDF\_CHAR | support\_data | | | |

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Variable\_Name** | **Data\_type** | **DIMS** | **SIZES** | **R\_VARY** | **D\_VARY** |
| N\_O\_ABUN\_QF | CDF\_INT2 | 1 | 0 | T |  |
| **Attribute Name** | **Data Type** | **Value** | | | |
| CATDESC | CDF\_CHAR | Nitrogen/Oxygen abundance quality flag | | | |
| DEPEND\_0 | CDF\_CHAR | EPOCH | | | |
| DISPLAY\_TYPE | CDF\_CHAR | time\_series | | | |
| FIELDNAM | CDF\_CHAR | N\_O\_ABUN\_QF | | | |
| FILLVAL | CDF\_INT2 | -32768 | | | |
| FORMAT | CDF\_CHAR | I3 | | | |
| LABLAXIS | CDF\_CHAR | N\_O\_ABUN\_QF | | | |
| SCALEMAX | CDF\_INT2 | 3 | | | |
| SCALEMIN | CDF\_INT2 | -2 | | | |
| SCALETYP | CDF\_CHAR | linear | | | |
| UNITS | CDF\_CHAR |  | | | |
| VALIDMAX | CDF\_INT2 | 2 | | | |
| VALIDMIN | CDF\_INT2 | 0 | | | |
| VAR\_NOTES | CDF\_CHAR | Quality Flag: 0=good, 1=caution, 2=bad. Not yet implemented | | | |
| VAR\_TYPE | CDF\_CHAR | support\_data | | | |

### CAL – Calibration data products

### ANC – Ancillary data products

# 

# SWA Data products matrix

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Product Name | Description | Descriptor | Free field | | | Level | | |
| solo\_L0\_swa-eas[12]-NMc\_[StartTime-EndTime]\_V??.cdf | Full 3D VDF | swa-eas[12]-NMc |  | | | L0 | | |
| solo\_L0\_swa-eas[12]-SSc\_[StartTime-EndTime]\_V??.cdf | Single Energy 2D VDF (Low Laterncy) | Swa-eas[12]-SSc |  | | | L0 | | |
| solo\_L0\_swa-eas[12]-TMc\_[StartTime-EndTime]\_V??.cdf | Full 3D VDF in trigger mode | Swa-eas[12]-TMc |  | | | L0 | | |
| solo\_L0\_swa-eas-padc\_[StartTime-EndTime]\_V??.cdf | Onboard selected Pitch angle distributions | Swa-eas-padc |  | | | L0 | | |
| solo\_L0\_swa-eas-OnbPartMoms\_[StartTime-EndTime]\_V??.cdf | On board Electron Moments (4s) | Swa-eas-OnbPartMoms |  | | | L0 | | |
| solo\_L0\_swa-pas-tm\_yyyymmdd\_V01.bin | PAS Level 0 telemetry data in CCSDS binary format | Swa-pas-tm |  | | | L0 | | |
| solo\_L0\_swa-pas-tm\_yyyymmdd\_V01.ascii | PAS Level 0 telemetry data in CCSDS Hex format | Swa-pas-tm | |  | L0 | | | |
| solo\_L1\_swa-eas[12]-NM3D\_[StartTime-EndTime]\_V??.cdf | EAS Full 3D VDFs | Swa-eas[12]-NM3D |  | | | L1 | | |
| solo\_L1\_swa-eas[12]-SSc\_[StartTime-EndTime]\_V??.cdf | Single Energy 2D VDF (Low Laterncy) | swa-eas[12]-SSc |  | | | L1 | | |
| solo\_L1\_swa-eas[12]-TM3D\_[StartTime-EndTime]\_V??.cdf | Full 3D VDF in trigger mode | swa-eas[12]-TM3D |  | | | L1 | | |
| solo\_L1\_swa-eas-padc\_[StartTime-EndTime]\_V??.cdf | Onboard collected electron Pitch angle distributions | swa-eas-padc |  | | | L1 | | |
| solo\_L1\_swa-eas-OnbPartMoms\_[StartTime-EndTime]\_V??.cdf | On board Electron Moments (4s) | swa-eas-OnbPartMoms |  | | | L1 | | |
| solo\_L1\_swa-pas-3d\_yyyymmdd\_V??.cdf | 3D VDFs | swa-pas-3d |  | | | L1 | | |
| solo\_L1\_swa-pas-mom\_yyyymmdd\_V??.cdf | PAS onboard moments | swa-pas-mom |  | | | L1 | | |
| solo\_L1\_swa-pas-hsk\_yyyymmdd\_V??.cdf | PAS House keeping | swa-pas-hsk |  | | | L1 | | |
| solo\_L1\_swa-pas-cal\_yyyymmdd\_V??.cdf | PAS calibration data | swa-pas-cal |  | | | L1 | | |
| solo\_L1\_swa-his-pha\_yyyymmdd\_V??.cdf | Pulse height analysis data | swa-his-pha |  | | | | L1 |
| solo\_L1\_swa-his-vdf\_yyyymmdd\_V??.cdf | HIS VDF data | swa-his-vdf |  | | | L1 | | |
| solo\_L2\_swa-eas[12]-NM3D-[unit]\_[StartTime-EndTime]\_V??.cdf | EAS[12] 3D VDFs in scientific units | swa-eas[12]-NM3D-[unit] |  | | | L2 | | |
| solo\_L1\_swa-eas[12]-SS-[unit]\_[StartTime-EndTime]\_V??.cdf | EAS[12] Strahl data in scientific units | swa-eas[12]-SS-[unit] |  | | | L2 | | |
| solo\_L2\_swa-eas[12]-TM3D-[unit]\_[StartTime-EndTime]\_V??.cdf | EAS[12] 3D VDFs at 1 second resolution in scienctific units | swa-eas[12]-TM3D-[unit] |  | | | L2 | | |
| solo\_L2\_swa-eas-pad-[unit]\_[StartTime-EndTime]\_V??.cdf | EAS Pitch angle data in scientific units | swa-eas-pad-[unit] |  | | | L2 | | |
| solo\_L2\_swa-eas-OnbMoms\_[StartTime-EndTime]\_V??.cdf | EAS Onboard partial moments combined appropriately on the ground | swa-eas-OnbMoms |  | | | L2 | | |
| solo\_L2\_swa-eas-NM-GrndMoms\_[StartTime-EndTime]\_V??.cdf | EAS ground calculated moments from NM3D data | swa-eas-NM-GrndMoms |  | | | L2 | | |
| solo\_L2\_swa-eas-TM-GrndMoms\_[StartTime-EndTime]\_V??.cdf | EAS ground calculated moments from TM3D data | swa-eas-TM-GrndMoms |  | | | L2 | | |
| solo\_L2\_swa-pas-eflux\_yyyymmdd\_V??.cdf | PAS omni-directional flux | swa-pas-eflux |  | | | L2 | | |
| solo\_L2\_swa-pas-grnd-mom\_yyyymmdd\_V00.cdf | PAS ground calculated moments | swa-pas-grnd-mom |  | | | L2 | | |
| solo\_L2\_swa-pas-vdf\_yyyymmdd\_V00.cdf | PAS velocity distribution functions | swa-pas-vdf |  | | | L2 | | |
| solo\_L3\_swa-his-comp\_yyyymmdd\_V01.cdf | HIS Ion Compositions | swa-his-comp |  | | | L3 | | |