

SIRIUSi-XHS-PWR



TECHNICAL REFERENCE MANUAL

SIRIUSi-XHS-PWR V23-1



1. About this document

This is the Technical Reference Manual for SIRIUSi-XHS-PWR Version **V22-1**

SIRIUSi-XHS-PWR (1xHV-1xDC-CT-1000A-UNI, 1xHV-1xDC-CT-250A-UNI, 1xHV-1xDC-CT-1000A-CON) is a high performance, high speed line of SIRIUS® real time data acquisition hardware used for the most demanded power measurements, specially designed for E-mobility applications. Each system also includes a professional license for our award-winning DewesoftX® data acquisition software.

The manual is divided into several chapters. You will find:

- A detailed description of the SIRIUSi-XHS-PWR hardware
- A detailed description of the SIRIUSi-XHS-PWR accessories
- A description of the mechanical connections and variants of current ranges
- A comprehensive introduction to the configuration of the modules using DewesoftX®
- Instruction on how to mount HV cables to UNI device
- Detailed technical data: Specifications, Filtering options, XCP output setup etc.

1.1. Legend

The following symbols and formats will be used throughout the document.



Important

Gives you important information about a subject.
Please read carefully!



Hint

Gives you a hint or provides additional information about a subject.



Example

Give you an example of a specific subject.

Safety symbols in the manual:



Warning

Calls attention to a procedure, practice, or condition that could cause the body injury or death.



Caution

Calls attention to a procedure, practice, or condition that could possibly cause damage to equipment or permanent loss of data.

1.2. Online versions

1.2.1. SIRIUSi-XHS-PWR technical reference manual

The most recent version of this manual can be downloaded from our homepage:

<https://download.dewesoft.com/list/manuals-brochures/hardware-manuals>

In the *Hardware Manuals* section click the download link for the *SIRIUSi-XHS-PWR technical reference manual*.

1.2.2. DewesoftX® tutorials

The DewesoftX® tutorials document provides basics and additional information and examples for working with DewesoftX® and certain parts of the program.

The latest version of the DewesoftX® tutorials can be found here:

<https://download.dewesoft.com/list/manuals-brochures/software-manuals>

In the *Software Manuals* section click the download link of the DewesoftX® tutorials entry.



Important

Read safety instructions first in chapter [2. Safety instructions](#).

2. Safety instructions

Your safety is our primary concern! Please be safe!



Warning

Prior to first usage it is recommended to read Safety Reference Manual in a separate document:

[SIRIUSi-XHS-PWR, Safety Reference Manual, V22-2](#)

3. Getting started

This chapter will help you to install the software, connect your SIRIUSi-XHS system to the PC via ethernet and will show you how to configure DewesoftX®.

To follow these steps, you need the following items:

- your brand new SIRIUSi-XHS-PWR system (included in the shipment)
- your network cable (included in the shipment)
- your PC with Windows 10 (older versions like Windows® 7 may also work)

3.1. Software installation

For optimal working, we recommend that you install the latest version of Dewesoft. If you already have installed the older version Dewesoft is recommended that you find the newest version on the website under the Support/Downloads/DewesoftX section. You can also check if a newer version is available in software.

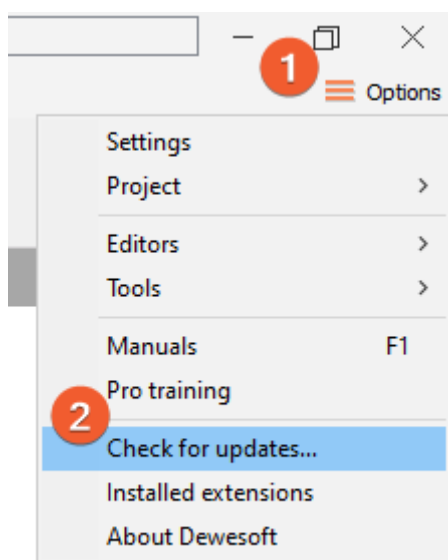


Image 1: Check for update

3.2. Connecting SIRIUSi-XHS-PWR®

In this chapter, you can see the basic instructions for connecting SIRIUSi-XHS-PWR devices. Advanced connections are described in the following chapters.

3.2.1. Standalone unit connection

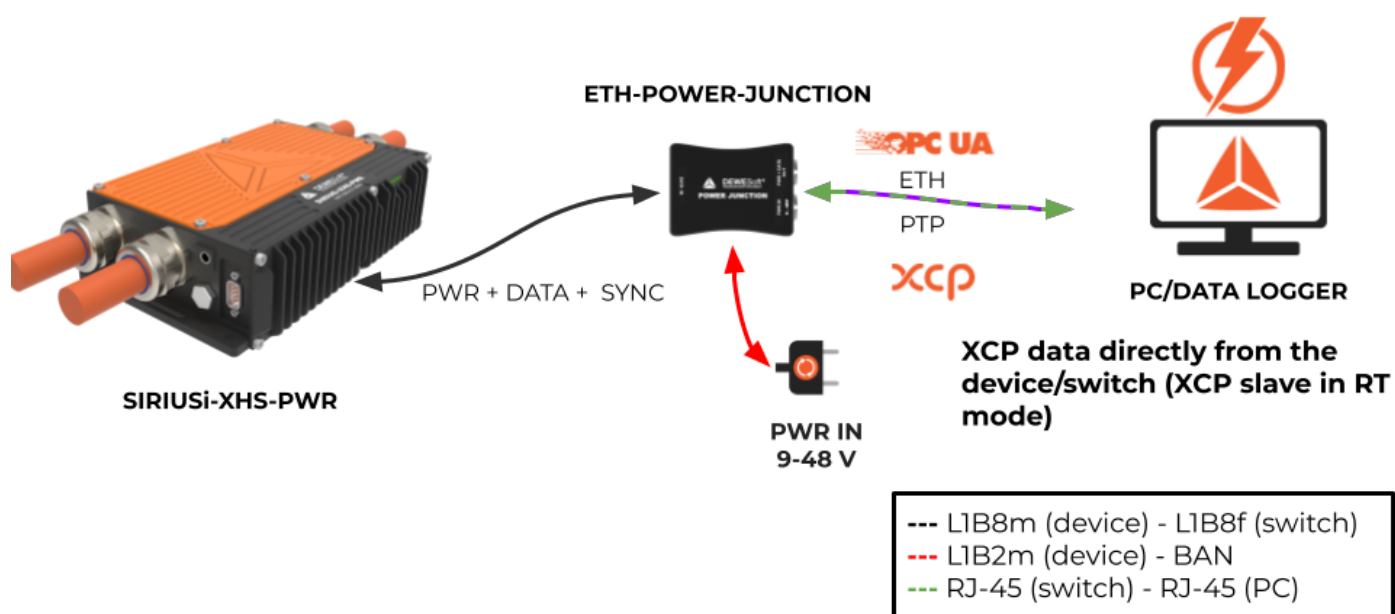


Image 2: Connection of SIRIUSi-XHS-PWR standalone device to PC

List of required accessories:

Function	Dewesoft order code
Power supply	PS-120-L1B2f (default), L1B2f-BAN-Xm*
Ethernet Power Junction	ETH-POWER-JUNCTION
Power + Data	L1B8m-L1T8f-CAT7-Xm**
Ethernet Connection to PC	RJ45-CAT7-Xm***

*Available in different lengths. Standard length is 3 m (L1B2f-BAN-3m).

**Available in different lengths up to 5 m. Standard length is 3 m (L1B8m-L1T8f-CAT7-3m).

***Available in different lengths. Standard length is 3 m (RJ45-CAT7-3m).

3.2.2. Multiple units connection

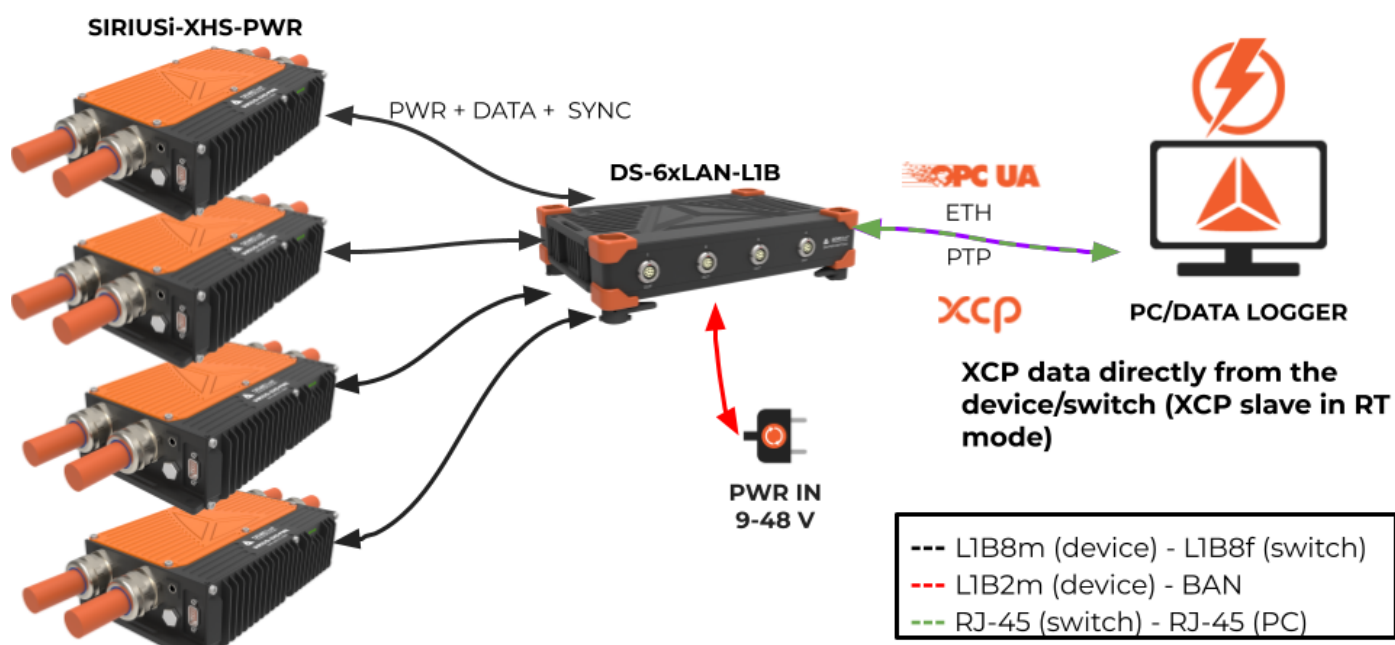


Image 3: Connection of multiple SIRIUSi-XHS-PWR units to PC using PoE

List of required accessories:

Function	Dewesoft order code
Power supply	PS-120-L1B2f (default), L1B2f-BAN-Xm*
Switch	DS-6xLAN-L1B
Power + Data	L1B8m-L1T8f-CAT7-Xm**
Ethernet Connection to PC	RJ45-CAT7-Xm***

*Available in different lengths. Standard length is 3 m (L1B2f-BAN-3m).

**Available in different lengths up to 5 m. Standard length is 3 m (L1B8m-L1T8f-CAT7-3m).

***Available in different lengths. Standard length is 3 m (RJ45-CAT7-3m).

4.1. Main features

- **HYBRID ADC TECHNOLOGY:** The SIRIUSi-XHS-PWR comes standard with Hybrid ADC technology capable of doing both high bandwidth transient recording and very high dynamic alias-free acquisition. Software-selectable per channel and able to run simultaneously.
- **PRECISE CURRENT MEASUREMENTS:** SIRIUSi-XHS-PWR features an integrated patented DC-CT current transducer for the most demanding applications such as very high current peaks as well as leakage current measurement.
- **SAFETY:** Designed and tested according to the EN 61010-1 safety standard. Including high voltage interlock safety solution on the chassis covers and on the cabling. Additionally, multiple temperature sensors are distributed inside the chassis to monitor the temperature and to initiate shutdown in case of overheating.
- **HIGH ISOLATION:** High channel-to-channel and channel-to-ground isolation prevents damage to the systems from excessive voltage and avoids ground loops.
- **PERFECT SYNCHRONIZATION:** Even though users can select some channels to be high bandwidth and some to be alias-free, filtering is made in the way that all signals are perfectly time aligned with zero phase shift using PTPv2 synchronization method.
- **OPEN PROTOCOLS:** SIRIUSi-XHS-PWR uses interfaces for simple and reliable integration to other systems, such as Ethernet, OPC-UA, automotive standard XCP protocol and CAN for in-vehicle sensor readout and communication with ECU.
- **EXTREME CONDITIONS:** Comes in ruggedized chassis and can withstand the harshest environmental conditions operating in temperature range from -20 °C to +70 °C. All the units are dust- and waterproof with IP67 rating.
- **CONNECTIVITY:** A single cable to connect the power supply, data interface, and synchronization simplifies in-vehicle setup. Universal high voltage harness design allows a wide range of cable sizes and connector types.
- **SOFTWARE INCLUDED WITH FREE LIFETIME UPGRADES:** The easy-to-use but rich in functionality, award-winning DewesoftX software is included. All upgrades to the software are free forever with no hidden licensing costs.

4.1.1. Hybrid ADC technology

Everything you ever wanted out of a high-end data acquisition system - both high bandwidth and high dynamic mode are available and the software is selectable per channel:

- a) **High bandwidth mode:** with more than 5 MHz bandwidth and 15 Ms/sec sampling rate, XHS can perfectly acquire impulse, step and square signals without any ringing or overshoot. Such a mode is perfect for transient recording and power analysis. Such acquisition mode is typically in SAR ADCs.
- b) **Alias free mode:** up to 2 MS/s data can be acquired with extremely high dynamic range, similar to our dual Sigma-Delta SIRIUS dual-core. The data is totally alias-free, so all higher frequencies are fully rejected. Such a mode is perfect for sound, vibration, and general data recording applications. Such acquisition mode is typically in Sigma-Delta ADCs.

Usually, you would need two totally separate devices for the above-mentioned applications. But on SIRIUS XHS you can select channel per channel, depending on the application, the appropriate mode of ADC operation.

4.1.2. DC-CT current transducer

SIRIUSi-XHS-PWR features an integrated patented DC-CT current transducer for the most demanding applications such as very high current peaks as well as leakage current measurement. It represents the latest current sensing technology with ranges up to 2000 A.

This innovative principle includes a current-controlled variable reluctance - a vital component, composed of a kind of infinity winding, embedded into a gap-less core retaining all of the good properties of high permeability materials.

The integrated zero-flux current transducer is independent in terms of power - not drawing extra current from the tested battery source.

4.1.3. Perfect synchronization

If you mix channels from Sigma-Delta and SAR devices (high bandwidth and alias-free), then channels are delayed due to Sigma-delta filtering group delay. But with SIRIUS XHS, due to the nature of the chosen filter, both modes are perfectly aligned and synchronized.

As on any Dewesoft devices, data can be synchronized to other data sources, such as vehicle bus interface, GPS, IMU, video, and others.

Devices can be synchronized between each other using PTPv2 mechanism.

4.1.4. Perfect amplifiers for power measurements

Voltage: Highly isolated CATII 1000 V, from 200 V to 2000 V range, >5 MHz bandwidth with down to 0.03% accuracy, this device is perfect for direct connection of high voltage signal.

- Sampling rate: 15 MS/sec
- Input voltage ranges: ± 2000 V ... ± 20 V
- Analog AAF: 1 MHz, 6th order
- Bandwidth: 5 MHz
- Input impedance: 10 M Ω
- Isolation: CATII 1000V

Current: DCCT technology, up to 2000 A range (peak), >500 kHz bandwidth, with down to 0.01% gain linearity, this device is perfect for direct connection to the in-vehicle high current lines.

- Zero-flux transducer
- Sampling rate: 15 MS/sec
- Input current ranges: ± 2000 A ... ± 200 A (SIRIUSi-XHS-PWR-1xHV-1xDC-CT-1000A-UNI, SIRIUSi-XHS-PWR-1xHV-1xDC-CT-1000A-CON),
 ± 500 A ... ± 50 A (SIRIUSi-XHS-PWR-1xHV-1xDC-CT-250A-UNI)
- Analog AAF: 1 MHz, 6th order
- Measurement of residual current in core
- High accuracy
- High bandwidth
- Low noise
- Temperature stability
- Low power consumption

4.1.5. E-mobility power device

The SIRIUS XHS-PWR device is well suited for in-vehicle measurements. In-built patented DC-CT current transducers allow very precise current measurements even in most demanding applications such as very high current peaks as well as the leakage current measurement.

POWERTRAIN EFFICIENCY

From test bench to in-vehicle verification. SIRIUSi-XHS-PWR provides safe and precise power measurement from the main high-voltage battery. Additional torque and speed measurement from wheel/axle yield data for overall powertrain efficiency by calculating ratio between output mechanical power and input electrical power.

REAL-DRIVE TESTING

Perform standardized driving cycles such as WLTP, NEDC, WMTC, etc. and determine driving range and full power analysis.

TOTAL POWER CONSUMPTION

Use multiple SIRIUSi-XHS-PWR devices for total power consumption analysis, not only main battery and power train but also auxiliary systems such as air conditioning and in-car entertainment systems.

TRANSIENT ANALYSIS

With 5 MHz bandwidth SIRIUS-XHS offers transient analysis and helps identifying unwanted EMI effects using harmonic analysis.

4.1.6. Open interface protocols

In today's world of open toolchain and intercommunication, each device should be compliant with standard protocols. All protocols can be used at the same time.

OPC UA: is the industry standard. Actually, it is more than a standard, it is a perfect framework where the device can be described and set up in any system, including SCADA, MES, ERP, mobile devices and others.

XCP: Starting with version 1.4., XCP became a very powerful interface protocol in the automotive industry for data exchange. In the modern age of e-mobility, the required sampling rates are much higher than ever and 1 GBIT XCP interface allows data transfers with as high as 5 Ms/sec.

CAN: Vehicle bus systems can be read through the CAN interface.

5. SIRIUSi-XHS-PWR Devices

5.1. SIRIUSi-XHS-PWR-1xHV-1xDC-CT-1000A-UNI



Image 32: SIRIUSi-XHS-PWR-1xHV-1xDC-CT-1000A-UNI

5.1.1. SIRIUSi-XHS-PWR-1xHV-1xDC-CT-1000A-UNI specifications

SIRIUSi-XHS-PWR specifications		SIRIUSi-XHS-PWR-1xHV-1xDC-CT-1000A-UNI	
Input types		Voltage, Current (single phase)	
Inputs		Voltage	
ADC Type		Hybrid ADC - alias free up to 2 MS/s, 16-bit up to 15 MS/s	
Sampling Rate		Simultaneous 15 MS/s	
Filtering		AAF 1 MHz (6th order)	
Analog bandwidth (-3 dB)		5 MHz	
Voltage ranges		±2000 V, ±1000 V, ±400 V, ±200 V	
Working voltage (continuous)		1000 VDC or 1000 VAC	
Measuring voltage (max.)		±2000 V (see 1)	
Input Accuracy	Signal frequency	Accuracy	
	DC	±0.03 % of reading ±0.02 % of range ±0.04 V	
	DC	±0.03 % of reading ±0.02 % of range	
	Up to 10 kHz	±0.1 % of reading ±0.05 % of range	
	Up to 100 kHz	±4 % of reading ±0.1 % of range	

	Up to 1000 kHz	±5 % of reading ±0.5 % of range			
Noise floor, Typ.	Sample rate / Range →	2000 V	1000 V	400 V	200 V
	15 MS/s	-88 dB	-87 dB	-85 dB	-81 dB
	1 MS/s	-97 dB	-94 dB	-89 dB	-83 dB
	100 kS/s	-108 dB	-107 dB	-101 dB	-96 dB
	10 kS/s	-118 dB	-117 dB	-111 dB	-106 dB
CMR, Typ. (Min.)	101 dB (88 dB) @ 50 Hz, 75 dB (68 dB) @ 400 Hz				
Gain Drift	Typical 20 ppm/K, max. 40 ppm/K				
Offset Drift	Typical 1.5 mV/K + 1 ppm of range/K, max 3 mV/K + 2 ppm of range/K				
Gain Linearity	< 0.01 %				
Input Coupling	DC				
Input Impedance	10 MΩ 1 pF				
Inputs	Current				
ADC Type	HybridADC - alias free up to 2 MS/s, 16-bit up to 15 MS/s				
Sampling Rate	Simultaneous 15 MS/s				
Filtering	AAF 1 MHz (6th order)				
Analogue bandwidth (-3 dB)	> 500 kHz				
Current ranges	±2000 A, ±1000 A, ±400 A, ±200 A				
Working current (continuous)	±1000 ADC				
Measuring current	±2000 ADC				
Maximum withstand peak current	min. -1700 A, max. 2000 A (see 2)				
Primary / Secondary Ratio	1 : 1680				
Input Accuracy (Ip @ 10 Arms)	Signal frequency	Accuracy			
	DC	±0.1 % of reading ±50 ppm of range ±0.05 A			
	Up to 10 kHz	±0.3 % of reading			
	Up to 20 kHz	±0.8 % of reading			
	Up to 200 kHz	±4 % of reading			
Gain drift (current)	typ. 40 ppm/K				
Offset drift	typ. 200 uA/K				
Linearity error @ 1000 A range	typ. 50 ppm				
Hysteresis	typ. 50 uA/A				
Flatness DC - 50 Hz Overall accuracy @ 25°C	typ. 5 mdB				
Flatness 50 Hz - 1 kHz Overall accuracy @ 25°C	typ. 20 mdB				
HV harness					
Cable size (single core)	120 mm2	95 mm2	70 mm2	50 mm2	35 mm2
Rated DC current	344 A	292 A	245 A	198 A	158 A
Cable gland	M32	M32	M32	M25	M25
General specifications					

Power	
Power Supply	9 - 48 V DC (see 3) PWR + DATA + SYNC (Lemo 1T 8-pin)
Power consumption	Typ. 13 W (Max. 23 W)
Environmental	
Operating Temperature	-20 °C to 70 °C
Storage Temperature	-40 °C to 85 °C
IP rating	IP67
Shock & Vibration	EN 60068-2-6:2008 Environmental testing -- Part 2-6: Tests - Test Fc: Vibration (sinusoidal) EN 60068-2-27:2009 Environmental testing -- Part 2-27: Tests - Test Ea and guidance: Shock
Interfaces	
Ethernet	GbE (XCP, OPC UA) incl. IEEE1588v2 synchronization (PTP) (LEMO 1T 8-pin)
CAN	CAN 2.0 (DSUB-9)
Synchronization	IEEE1588v2 synchronization (PTP) (LEMO 1T 8-pin), IRIG (D-SUB9)
High-Voltage Interlock	HW ready (chassis covers + cables)
Additional Specifications	
Grounding	M6 insert
Dimensions	245 x 151 x 63 mm
Weight (incl. cables and connectors)	4.4 kg (max. 7 kg)

1) ± 2000 V is measuring range. Device is designed according to IEC 61010-1. Maximum continuous working voltage is 1000 VDC or 1000 VAC.

2) ± 2000 A is measuring range. Unit can withstand peak value of 2000 A for 100 ms with 1 s recovery time.

3) At the Power Supply lower than 12 V, the maximum measuring current is limited to ± 850 A

5.1.2. SIRIUSi-XHS-PWR-1xHV-1xDC-CT-1000A-UNI Technical drawing

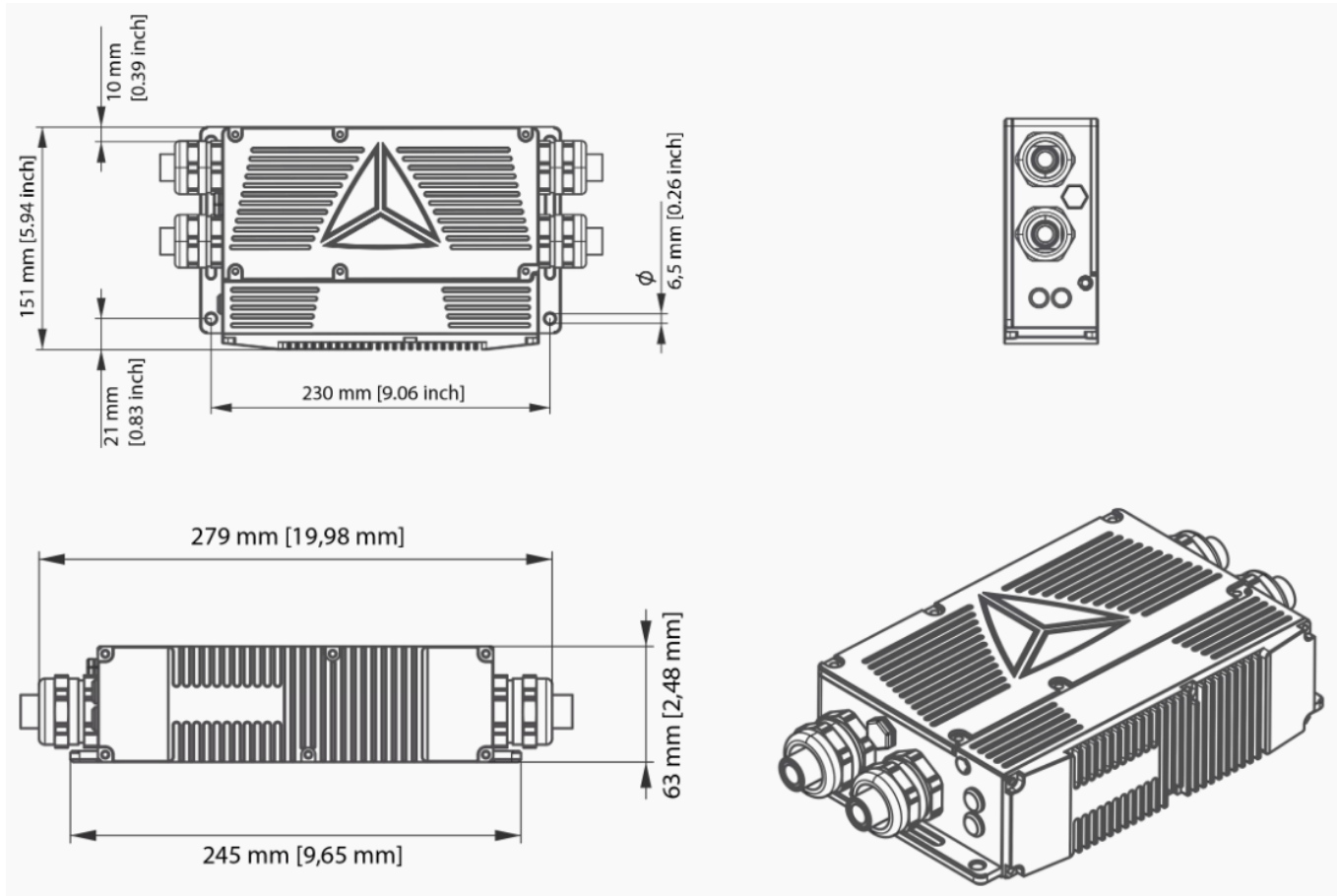


Image 33: SIRIUSi-XHS-PWR-1xHV-1xDC-CT-1000A dimensions

5.1.3. SIRIUSi-XHS-PWR-1xHV-1xDC-CT-1000A-UNI HV parts

Device	No. of cable glands	Size of cable gland	Cable type	No. of cables	Cable size
SIRIUSi-XHS-PWR-1xHV-1xDC-CT-1000A-UNI	4	M32x1.5 (bg 232VA)	Single core	2	60 - 120 mm ²
SIRIUSi-XHS-PWR-1xHV-1xDC-CT-1000A-UNI	4	REDUCER + M25x1.5 (bg 225VA)	Single core	2	35 - 50 mm ²

5.2. SIRIUSi-XHS-PWR-1xHV-1xDC-CT-1000A-CON



Image 34: SIRIUSi-XHS-PWR-1xHV-1xDC-CT-1000A-CON

5.2.1. SIRIUSi-XHS-PWR-1xHV-1xDC-CT-1000A-CON specifications

SIRIUSi-XHS-PWR specifications		SIRIUSi-XHS-PWR-1xHV-1xDC-CT-1000A-CON	
Input types		Voltage, Current (single phase)	
Inputs		Voltage	
ADC Type		Hybrid ADC - alias free up to 2 MS/s, 16-bit up to 15 MS/s	
Sampling Rate		Simultaneous 15 MS/s	
Filtering		AAF 1 MHz (6th order)	
Analog bandwidth (-3 dB)		5 MHz	
Voltage ranges		±2000 V, ±1000 V, ±400 V, ±200 V	
Working voltage (continuous)		1000 VDC or 1000 VAC	
Measuring voltage (max.)		±2000 V (see 1)	
Input Accuracy	Signal frequency	Accuracy	
	DC	±0.03 % of reading ±0.02 % of range ±0.04 V	
	DC	±0.03 % of reading ±0.02 % of range	
	Up to 10 kHz	±0.1 % of reading ±0.05 % of range	
	Up to 100 kHz	±4 % of reading ±0.1 % of range	

	Up to 1000 kHz	±5 % of reading ±0.5 % of range			
Noise floor, Typ.	Sample rate / Range →	2000 V	1000 V	400 V	200 V
	15 MS/s	-88 dB	-87 dB	-85 dB	-81 dB
	1 MS/s	-97 dB	-94 dB	-89 dB	-83 dB
	100 kS/s	-108 dB	-107 dB	-101 dB	-96 dB
	10 kS/s	-118 dB	-117 dB	-111 dB	-106 dB
CMR, Typ. (Min.)	101 dB (88 dB) @ 50 Hz, 75 dB (68 dB) @ 400 Hz				
Gain Drift	Typical 20 ppm/K, max. 40 ppm/K				
Offset Drift	Typical 1.5 mV/K + 1 ppm of range/K, max 3 mV/K + 2 ppm of range/K				
Gain Linearity	< 0.01 %				
Input Coupling	DC				
Input Impedance	10 MΩ 1 pF				
Inputs	Current				
ADC Type	HybridADC - alias free up to 2 MS/s, 16-bit up to 15 MS/s				
Sampling Rate	Simultaneous 15 MS/s				
Filtering	AAF 1 MHz (6th order)				
Analogue bandwidth (-3 dB)	> 500 kHz				
Current ranges	±2000 A, ±1000 A, ±400 A, ±200 A				
Working current (continuous)	±1000 ADC				
Measuring current	±2000 ADC				
Maximum withstand peak current	min. -1700 A, max. 2000 A (see 2)				
Primary / Secondary Ratio	1 : 1680				
Input Accuracy (I _p @ 10 Arms)	Signal frequency	Accuracy			
	DC	±0.1 % of reading ±50 ppm of range ±0.05 A			
	Up to 10 kHz	±0.3 % of reading			
	Up to 20 kHz	±0.8 % of reading			
	Up to 200 kHz	±4 % of reading			
Gain drift (current)	typ. 40 ppm/K				
Offset drift	typ. 200 uA/K				
Linearity error @ 1000 A range	typ. 50 ppm				
Hysteresis	typ. 50 uA/A				
Flatness DC - 50 Hz Overall accuracy @ 25°C	typ. 5 mdB				
Flatness 50 Hz - 1 kHz Overall accuracy @ 25°C	typ. 20 mdB				
HV connectors	PowerLok 500 Series				
Device connectors	PL00X-501-10D10-2 (+), PL00Y-501-10D10-2 (-)				
Mating connectors (cable)	PL18X-501-?-2-5 (+), PL18Y-501-?-2-5 (-) (see3)				
General specifications					
Power					

Power Supply	9 - 48 V DC (see 4) PWR + DATA + SYNC (Lemo 1T 8-pin)
Power consumption	Typ. 13 W (Max. 23 W)
Environmental	
Operating Temperature	-20 °C to 70 °C
Storage Temperature	-40 °C to 85 °C
IP rating	IP67
Shock & Vibration	EN 60068-2-6:2008 Environmental testing -- Part 2-6: Tests - Test Fc: Vibration (sinusoidal) EN 60068-2-27:2009 Environmental testing -- Part 2-27: Tests - Test Ea and guidance: Shock
Interfaces	
Ethernet	GbE (XCP, OPC UA) incl. IEEE1588v2 synchronization (PTP) (LEMO 1T 8-pin)
CAN	CAN 2.0 (DSUB-9)
Synchronization	IEEE1588v2 synchronization (PTP) (LEMO 1T 8-pin), IRIG (D-SUB9)
High-Voltage Interlock	HW ready (chassis covers + cables)
Additional Specifications	
Grounding	M6 insert
Dimensions	245 x 151 x 63 mm
Weight	4.4 kg

1) ± 2000 V is measuring range. Device is designed according to IEC 61010-1. Maximum continuous working voltage is 1000 VDC or 1000 VAC.

2) ± 2000 A is measuring range. Unit can withstand peak value of 2000 A for 100 ms with 1 s recovery time.

3) ? denotes HV cable size, e.g. PL18X-501-95-2-5 is designed for 95mm² cable cross-section

4) At the Power Supply lower than 12 V, the maximum measuring current is limited to ± 850 A

5.2.2. SIRIUSi-XHS-PWR-1xHV-1xDC-CT-1000A-CON Technical drawing

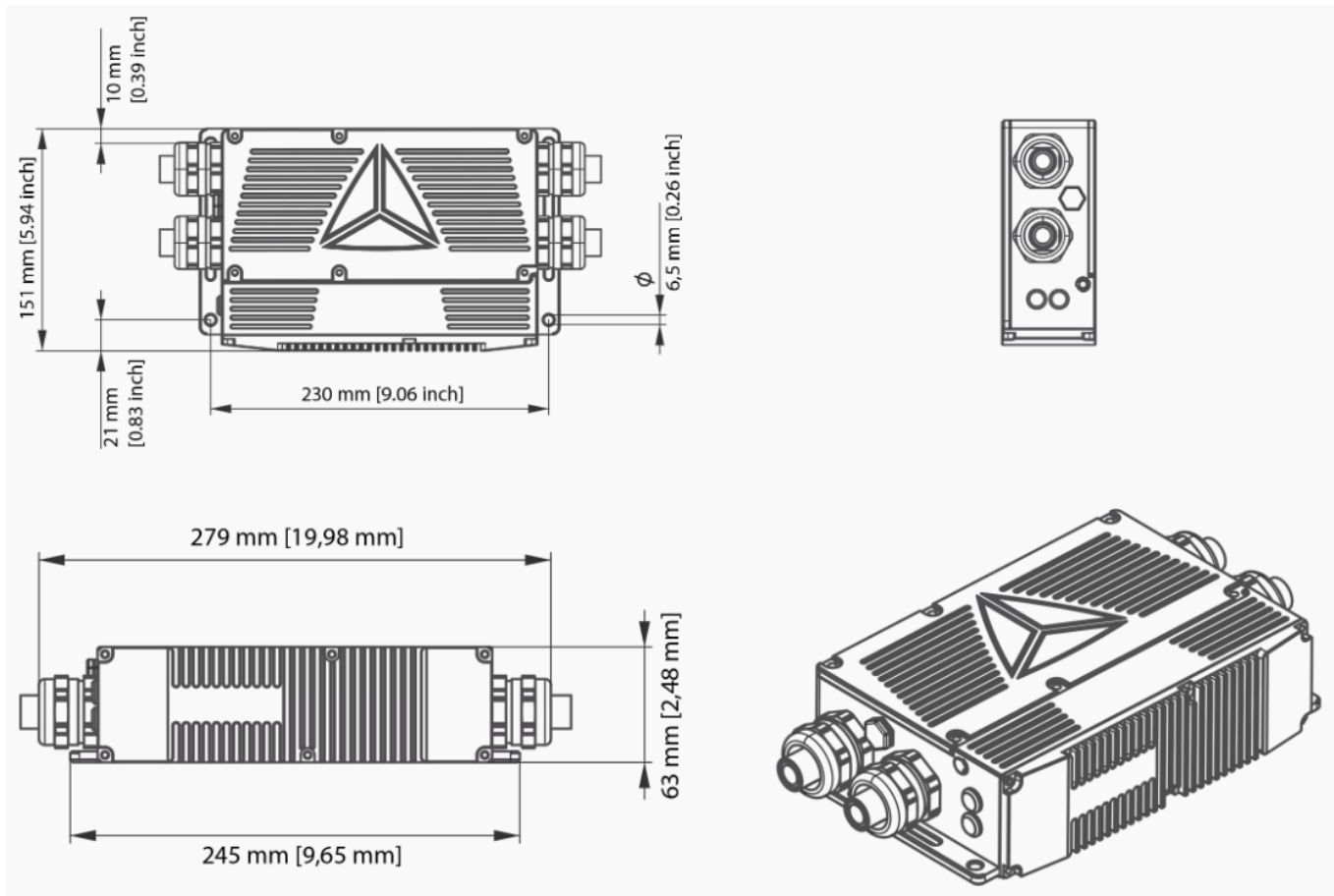


Image 35: SIRIUSi-XHS-PWR-1xHV-1xDC-CT-1000A dimensions

5.3. SIRIUSi-XHS-PWR-1xHV-1xDC-CT-250A-UNI



Image 36: SIRIUSi-XHS-PWR-1xHV-1xDC-CT-250A-UNI

5.3.1. SIRIUSi-XHS-PWR-1xHV-1xDC-CT-250A-UNI specifications

SIRIUSi-XHS-PWR specifications		SIRIUSi-XHS-PWR-1xHV-1xDC-CT-250A-UNI	
Input types		Voltage, Current (single phase)	
Inputs		Voltage	
ADC Type		Hybrid ADC - alias free up to 2 MS/s, 16-bit up to 15 MS/s	
Sampling Rate		Simultaneous 15 MS/s	
Filtering		AAF 1 MHz (6th order)	
Analog bandwidth (-3 dB)		5 MHz	
Voltage ranges		±2000 V, ±1000 V, ±400 V, ±200 V	
Working voltage (continuous)		1000 VDC or 1000 VAC	
Measuring voltage (max.)		±2000 V (see 1)	
Input Accuracy	Signal frequency	Accuracy	
	DC	±0.03 % of reading ±0.02 % of range ±0.04 V	
	Up to 1kHz	±0.03 % of reading ±0.02 % of range	
	Up to 10 kHz	±0.1 % of reading ±0.05 % of range	

	Up to 100 kHz	±4 % of reading ±0.1 % of range			
	Up to 1000 kHz	±5 % of reading ±0.5 % of range			
Noise floor, Typ.	Sample rate / Range →	2000 V	1000 V	400 V	200 V
	15 MS/s	-88 dB	-87 dB	-85 dB	-81 dB
	1 MS/s	-97 dB	-94 dB	-89 dB	-83 dB
	100 kS/s	-108 dB	-107 dB	-101 dB	-96 dB
	10 kS/s	-118 dB	-117 dB	-111 dB	-106 dB
CMR, Typ. (Min.)	101 dB (88 dB) @ 50 Hz, 75 dB (68 dB) @ 400 Hz				
Gain Drift	Typical 20 ppm/K, max. 40 ppm/K				
Offset Drift	Typical 1.5 mV/K + 1 ppm of range/K, max 3 mV/K + 2 ppm of range/K				
Gain Linearity	< 0.01 %				
Input Coupling	DC				
Input Impedance	10 MΩ 1 pF				
Inputs	Current				
ADC Type	HybridADC - alias free up to 2 MS/s, 16-bit up to 15 MS/s				
Sampling Rate	Simultaneous 15 MS/s				
Filtering	AAF 1 MHz (6th order)				
Analogue bandwidth (-3 dB)	> 500 kHz				
Current ranges	±500 A, ±250 A, ±100 A, ±50 A				
Working current (continuous)	Limited with the rated current of HV harness (see 2)				
Measuring current	±500 ADC				
Maximum withstand peak current	min. -500 A, max. 500 A				
Primary / Secondary Ratio	1 : 1680				
Input Accuracy (I _p @ 10 Arms)	Signal frequency	Accuracy			
	DC	±0.1 % of reading ±50 ppm of range ±0.05 A			
	Up to 10kHz	±0.3 % of reading			
	Up to 20 kHz	±0.8 % of reading			
	Up to 200kHz	±4 % of reading			
Gain drift (current)	typ. 40ppm/K				
Offset drift	typ. 200 uA/K				
Linearity error @ 250 A range	typ. 50 ppm				
Hysteresis	typ. 50 uA/A				
Flatness DC - 50 Hz Overall accuracy @ 25°C	typ. 5 mdB				
Flatness 50 Hz - 1 kHz Overall accuracy @ 25°C	typ. 20 mdB				
Cable size (multi core)	6 mm2				
Rated DC current	54 A				
General specifications					
Power					

Power Supply	9 - 48 V DC PWR + DATA + SYNC (Lemo 1T 8-pin)
Power consumption	Typ. 13 W (Max. 20 W)
Environmental	
Operating Temperature	-20 to 70 °C
Storage Temperature	-40 to 85 °C
IP rating	IP67
Shock & Vibration	EN 60068-2-6:2008 Environmental testing -- Part 2-6: Tests - Test Fc: Vibration (sinusoidal) EN 60068-2-27:2009 Environmental testing -- Part 2-27: Tests - Test Ea and guidance: Shock
Interfaces	
Ethernet	GbE (XCP, OPC UA) incl. IEEE1588v2 synchronization (PTP) (LEMO 1T 8-pin)
CAN	CAN 2.0 (DSUB9)
Synchronization	IEEE1588v2 synchronization (PTP) (LEMO 1T 8-pin), IRIG (D-SUB9)
High-Voltage Interlock	YES (chassis covers + cables)
Additional Specifications	
Grounding	M6 insert
Dimensions	245 x 109 x 63 mm
Weight	2.3 kg

1) ± 2000 V is measuring range. Device is designed according to IEC 61010-1. Maximum continuous working voltage is 1000 VDC or 1000 VAC.

2) ± 500 A is measuring range. Maximum current is limited with specified rated current of HV harness (connectors and cables).

5.3.2. SIRIUSi-XHS-PWR-1xHV-1xDC-CT-250A Technical drawing

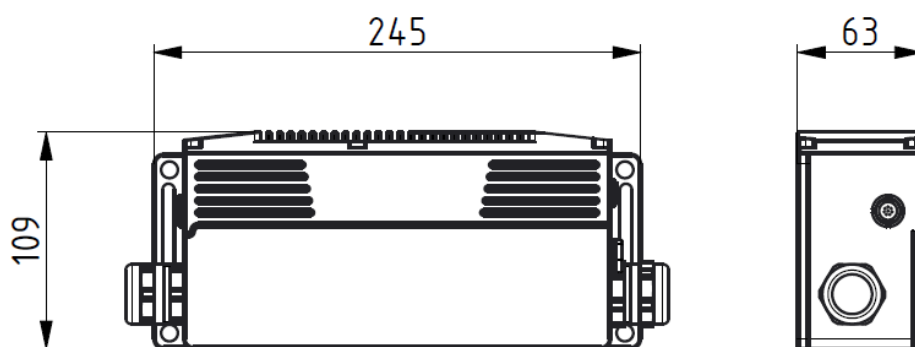


Image 37: SIRIUSi-XHS-PWR-1xHV-1xDC-CT-250A-UNI dimensions

5.3.3. SIRIUSi-XHS-PWR-1xHV-1xDC-CT-250A-UNI HV parts

Device	No. of cable	Size of cable	Cable type	No. of cables	Cable size
--------	--------------	---------------	------------	---------------	------------

	glands	gland			
SIRIUSi-XHS-PWR-1xHV-1xDC-CT-250A-UNI	2	M25x1.5 (bg 225VA)	Multi core	1	6 mm ²

5.4. SIRIUSi-XHS-PWR connectors

SIRIUSi-XHS-PWR provides power supply, data interface and synchronization in just one cable. CAN connection demands additional cable.

5.4.1. SIRIUSi-XHS-PWR: Power, Data, SYNC: LIT8m

Power supply, data interface (GbE) and synchronization (PTPv2) are enabled via a single cable connected to the LEMO 1T series 8-pin connector on the device.

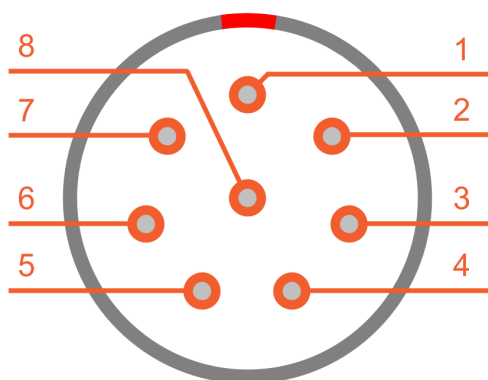


Image 38: PWR+DATA connector: pin-out (8-pin LEMO male)

Pin	Name	Description
1	P1_p	Pair 1 +
2	P1_n	Pair 1 -
3	P2_p	Pair 2 +
4	P2_n	Pair 2 -
5	P3_p	Pair 3 +
6	P3_n	Pair 3 -
7	P4_p	Pair 4 +
8	P4_n	Pair 4 -

PWR+DATA connector (on the device): EEJ.1T.308.CLDY
Mating connector (for the cable): FGJ.1T.308.CLLC65Z

5.4.2. SIRIUSi-XHS-PWR: CAN

5.4.2.1. SIRIUSi-XHS-PWR: CAN: D9m (default)

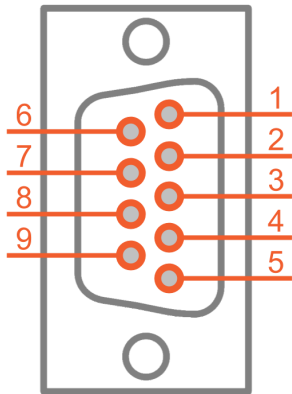


Image 39: CAN connector: pin-out (DSUB-9 male)

Pin	Name	Description
1	RES	Reserved for 5V
2	CAN_LOW	CAN low
3	GND_CAN	Digital Ground Isolated
4	Clock_sync	Clock sync pin
5	PPS sync	PPS
6	GND	Sync GND
7	CAN_HIGH	CAN high
8	Trig_Sync	Trigger sync pin
9	RES	Reserved for 12V

5.4.2.2. SIRIUSi-XHS-PWR: CAN: F102S7f (optional)

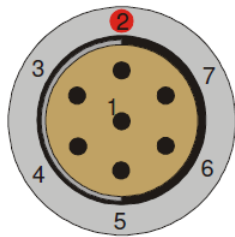


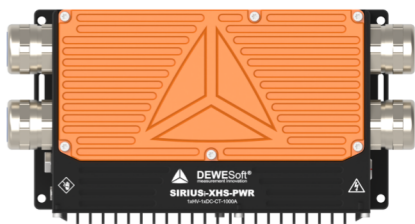
Image 40: CAN connector: pin-out (Fischer DEU 102 A055-SC)

Pin	Name	Description
1	-	Reserved
2	CAN_H	CAN high
3	CAN_L	CAN low
4	Power +	Power supply, plus
5	Power +	Power supply, plus
6	Power GND	Power supply ground
7	Power GND	Power supply ground
Shield	Shield	

6. UNI cabling instructions

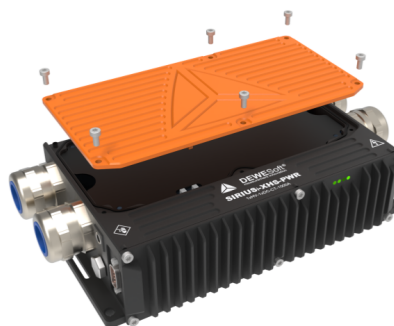
6.1. SIRIUSi-XHS-PWR-1xHV-1xDC-CT-1000A-UNI assembly instructions

1



Congratulations!
You are the owner of SIRIUSi-XHS-PWR DAQ device.

2



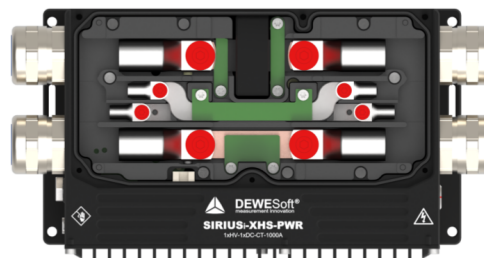
- A. Unscrew 6x T20 (M4x8) screws on the orange cover.
- B. Remove orange aluminum cover.

3



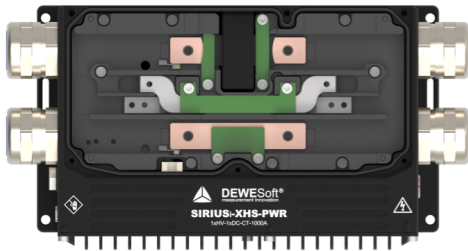
- A. Remove the protection lid (PCB-COVER).

4



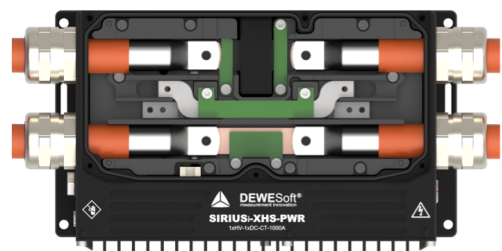
- A. Unscrew 6x H5 (4x M6x16, 4x M4x8) screws shown in red.
- B. Remove cable lugs (if included).

5



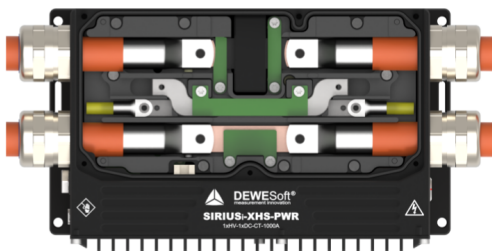
This should be your top view.

6



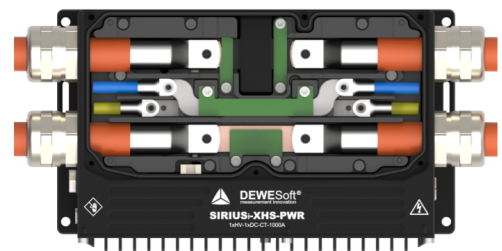
- A. Crimp HV cables and shield according to the [crimping recommendations](#).
- B. Place HV cables through cable glands.

7



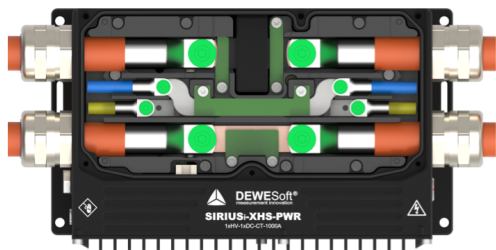
- A. Place the SHIELD cable from HV- cable to the SHIELD Busbar_B

8



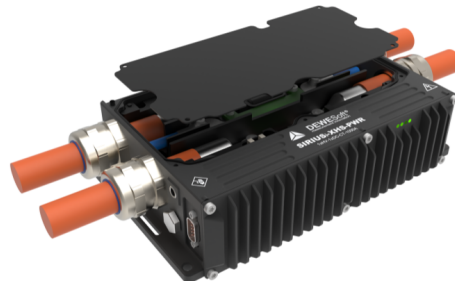
- A. Place the SHIELD cable from HV+ cable to the SHIELD Busbar_A

9



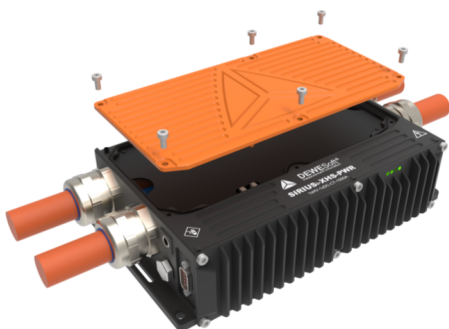
- A. Mount HV cables with 4x H5 M6x16 screws according to the [mounting recommendations](#).
- B. Mount SHIELD cables with 4x H5 M4x8 screws according to the [mounting recommendations](#).

10



- A. Place back protection lid (PCB-COVER)

11



- A. Place back orange aluminum cover.
- B. Screw back 6x T20 (M4x8) screws from STEP 2.

12



Congratulations!
You are ready to measure!

6.2. SIRIUSi-XHS-PWR-1xHV-1xDC-CT-250A-UNI assembly instructions

1



Congratulations!
You are the owner of SIRIUSi-XHS-PWR DAQ device.

2



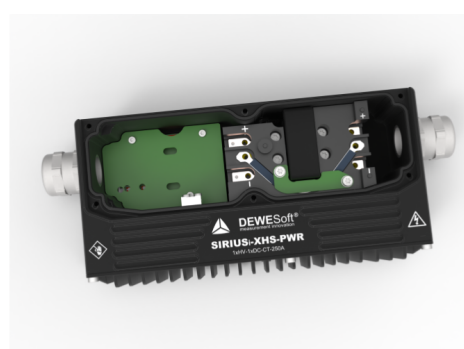
- A. Unscrew 6x T20 (M4x8) screws on the orange cover.
- B. Remove orange aluminum cover.

3



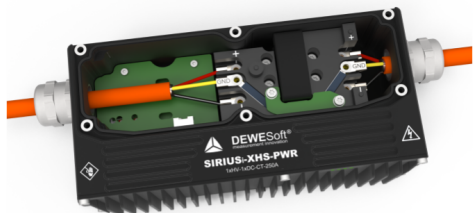
- A. Remove the protection lid (PCB-COVER).

4



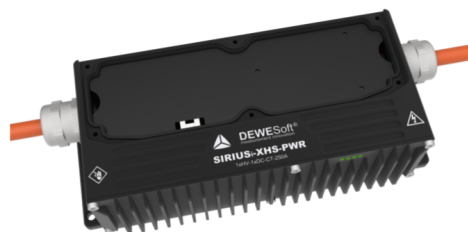
- A. Crimp the multicore cable according to [crimping recommendations](#).
- B. Mount + cable, - cable and shield cable to denoted contacts according to [mounting recommendations](#).
- C. Use M4x14 screws for mounting the cable wires through cable lugs..

5



A. Place back protection lid (PCB-COVER).

6



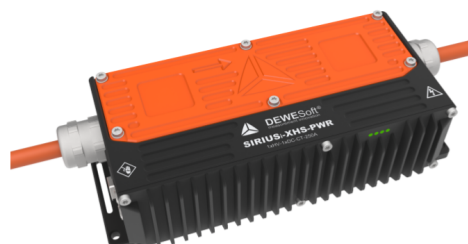
A. Place back orange aluminum cover.

7



A. Screw back 6x T20 (M4x8) screws from STEP 2.

8



Congratulations!
You are ready to measure!

6.3. Crimping recommendations

Below find the recommended equipment (crimping tool, crimping dies) and parts (cables, cable lugs) for crimping the high voltage cables.



Warning

Crimping of high voltage components should be performed by trained personnel. Improper crimping may result in high contact resistance which can cause damage to equipment or the whole system.



Hint

Use a crimping tool and crimping dies that fit to cable lugs. There is a difference between the DIN-series and R-series standard of crimping dies and cable lugs. At Dewesoft HQ, we use crimping solutions from [Intercable](#). There are also other solutions available, of course.

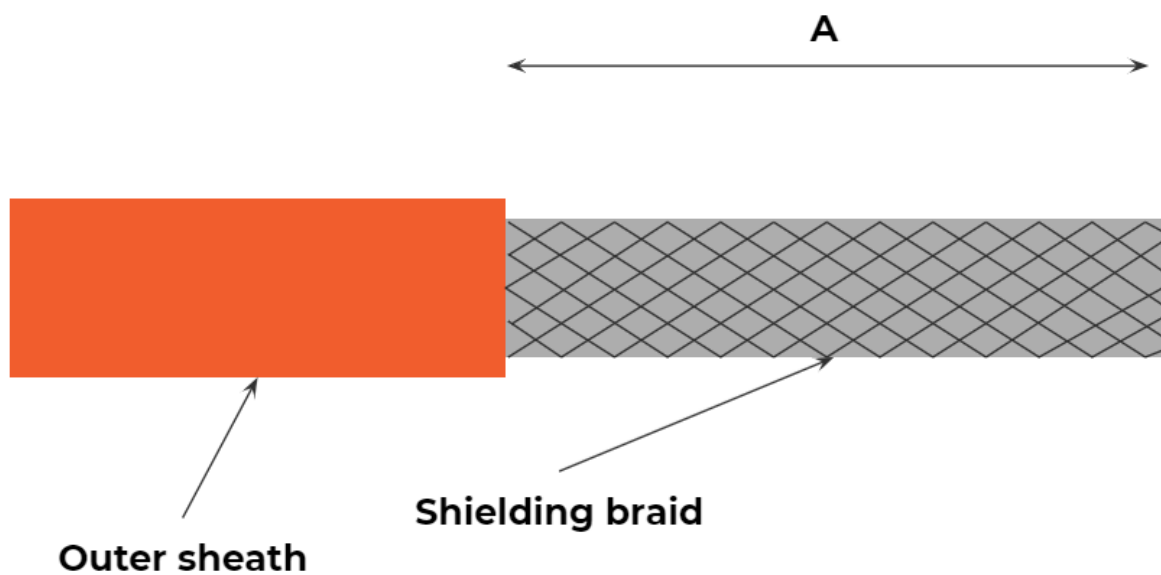
Cable size (mm ²)	Crimping tool	Crimping die	Cable lug	Bolt hole
6	Mechanical	-	ICR64SL	M4
35	Hydraulic	MFI35-CK	ICF356S	M6
50		MFI50-CK	ICF506S	
70		MFI70-CK	ICF706S	
95		MFI95-CK	ICF956S	



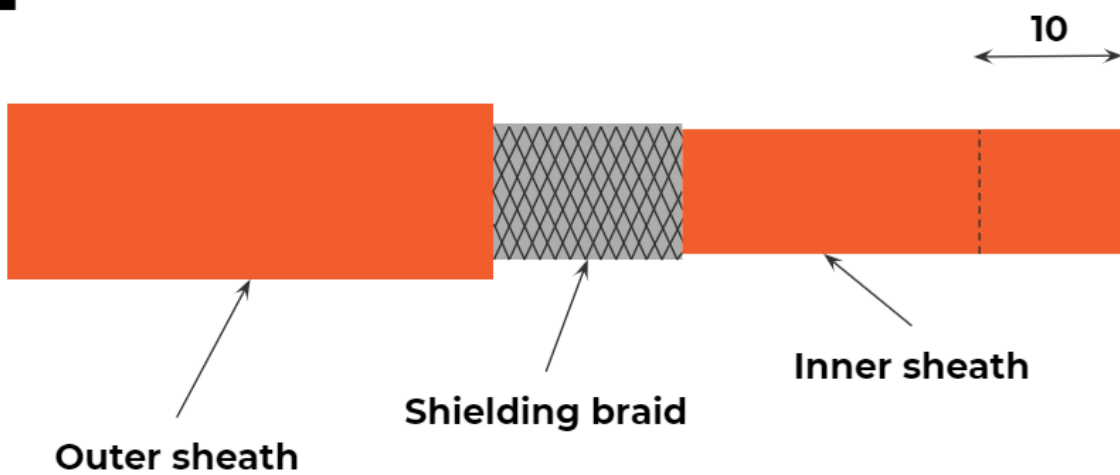
Important

Check the recommended cable lug parts for dimensions. Cable lugs should be narrower as standard sized cable lugs.

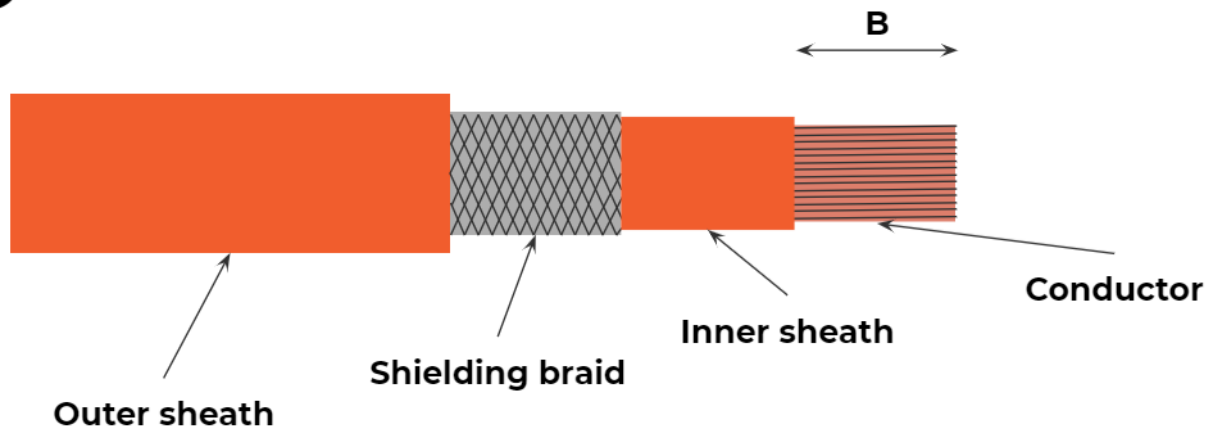
1



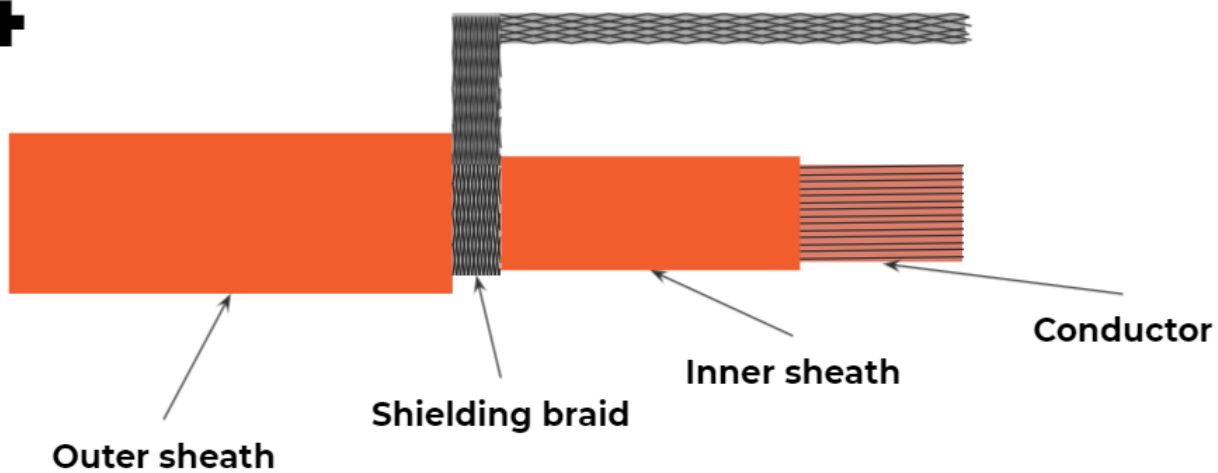
2

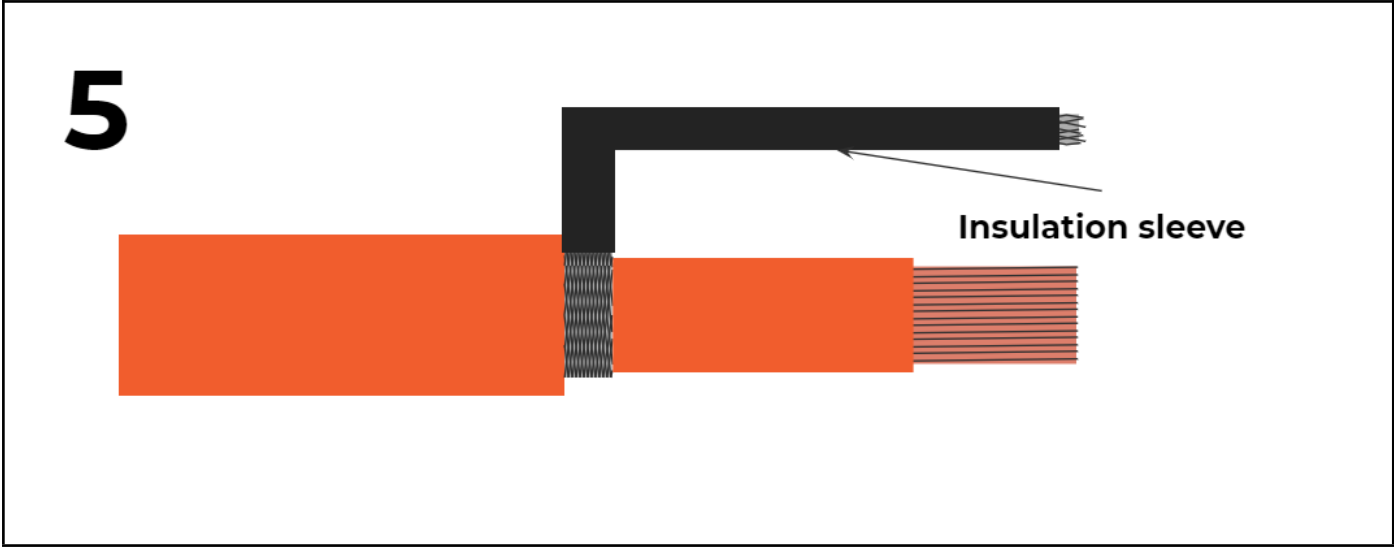


3



4





1. Strip and remove outer sheath to the dimension A
2. Comb out shielding braid and cut 10 mm of cable.
3. Strip and remove inner sheath to the distance B.
4. Roll shielding braid, cut off the tip.
5. Place a thermal insulation sleeve on the shield - ready for crimping.

Cable size (mm2)	A (mm)	B (mm)
6	35	9
35	62	18
50	62	21
70	57	23
95	58	26



Caution

Shielding braid shall not be cut or broken during the cutting procedure. Shielding braid should be combed out.

6.4. Mounting recommendations

Mounting of high-voltage conductor cables is performed with H5 M6 hex key screws.
Recommended torque for bolted joints is **7.2 Nm**.

Mounting of the shield is performed with H5 M6 hex key screws.
Recommended torque for bolted joints is **7.2 Nm**.



Important

Mounting of the high-voltage conductor cables and shield should be done using a torque wrench.

7. Filtering

SIRIUSi-XHS-PWR features Hybrid ADC technology.

Some channels can be selected as high bandwidth others as high dynamic - signals are still perfectly time aligned with zero phase shift.

User can select three different filtering modes in DewesoftX software:

- **Off** (Full High-bandwidth mode)
- **1 MHz** (High-bandwidth mode + 1 MHz LPF On - Analog anti-aliasing filter)
- **AAF** (High-dynamic mode - 1 MHz LPF is turned On)

Filter Mode	High-bandwidth	1 MHz LPF	High-dynamic
Max. SR	15 MS/s	15 MS/s	2 MS/s
SW settings	Off	1 MHz	AAF
Bandwidth (-3 dB)	5 MHz	1 MHz	0.49 fs
Passband frequency (-0.1 dB)	500 kHz	500 kHz	0.45 fs
Passband flatness	± 0.1 dB	± 0.1 dB	± 0.1 dB
Alias-free bandwidth	-	7.5 MHz	0.45 fs
HW filter	-	✓	✓
Stopband frequency	-	7.5 MHz	0.55 fs
Stopband attenuation	-	-100 dB	-100 dB

7.1. High-bandwidth mode

High-bandwidth mode (LPF off)

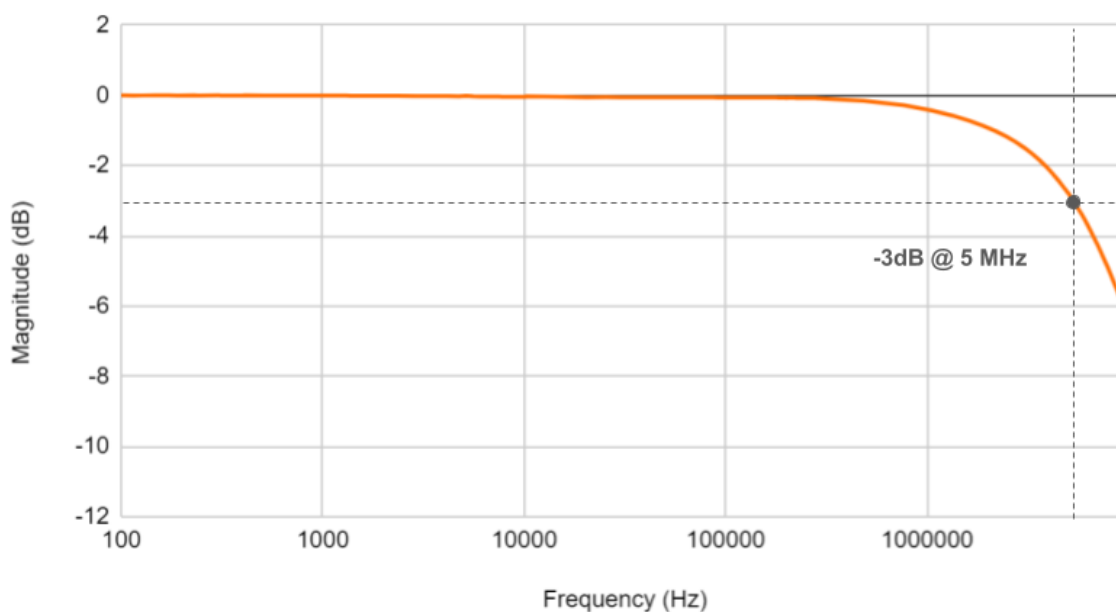


Image 45: Typical frequency response in high-bandwidth mode (Off)

7.2. High-bandwidth mode: Analog AAF 1 MHz LPF

High-bandwidth mode (LPF on) analog 1MHz AAF

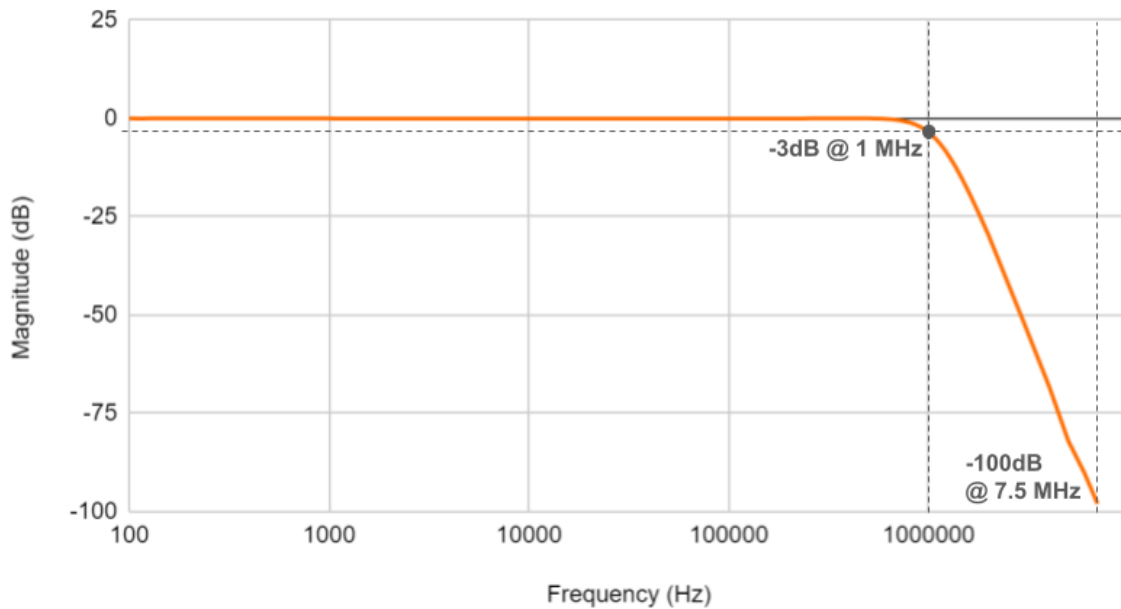


Image 46: Typical frequency response in high-bandwidth mode with analog anti-aliasing filter (1MHz)

7.3. High-dynamic mode: AAF

High-Dynamic mode (AAF)

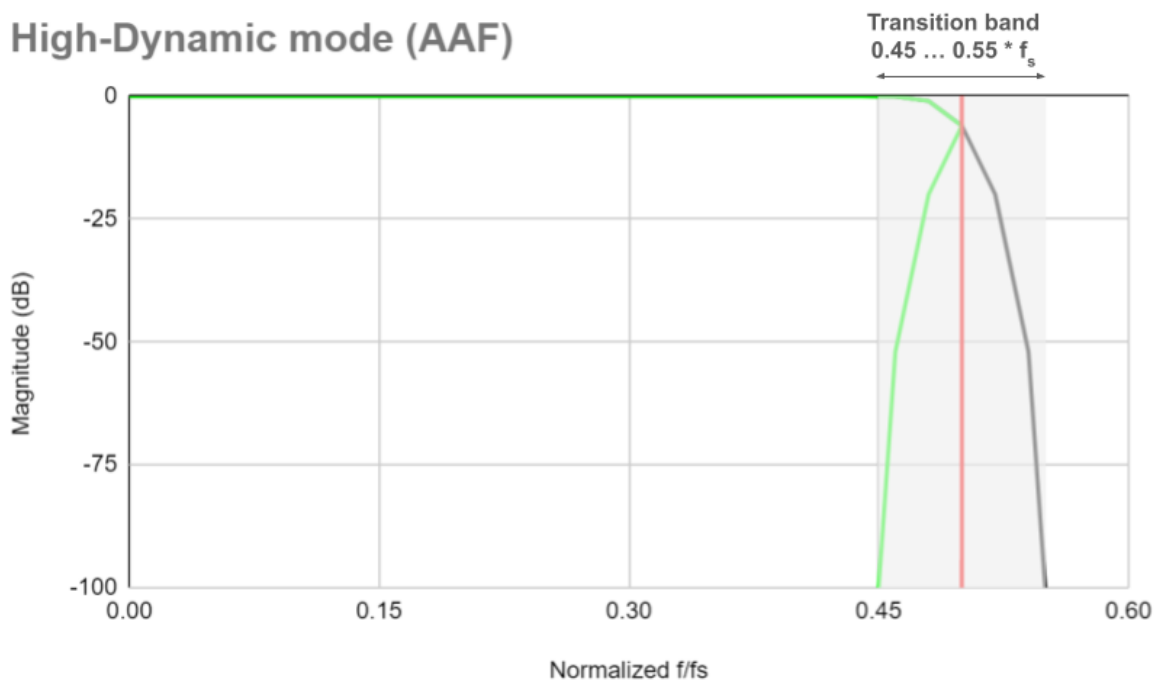


Image 47: Typical frequency response in high-dynamic mode with anti-aliasing filter (AAF) - Magnitude in dB.

High-Dynamic mode (AAF)

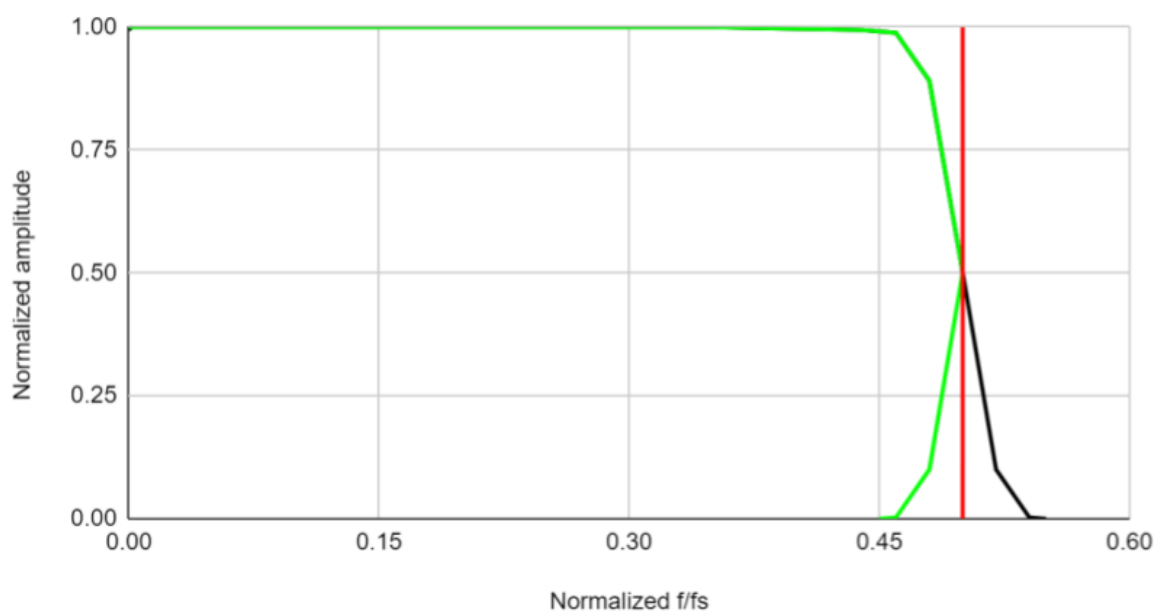


Image 48: Typical frequency response in high-dynamic mode with anti-aliasing filter (AAF) - Normalized amplitude.

9. Order codes

Product Code	Description
SIRIUSi-XHS-PWR-1xHV-1xDC-CT-1000A-UNI	SIRIUSi-XHS-PWR-1xHV-1xDC-CT-1000A-UNI; Input: 1xHigh-Voltage, 1xCurrent; Voltage ranges: ± 2000 V to 200 V, 4 ranges; Current ranges: ± 2000 A to 200 A, 4 ranges; A/D converter: Hybrid ADC - 24-bit alias free up to 2 MS/s, 16-bit up to 15 MS/s; Power supply: 9-60 V DC on LIT8m connector (Power+Data+Sync); 1x CAN 2.0b BUS isolated on DSUB9m; Synchronization: IEEE 1588v2 PTP; IP rating: IP67; Dewesoft-X included;
SIRIUSi-XHS-PWR-1xHV-1xDC-CT-250A-UNI	SIRIUSi-XHS-PWR-1xHV-1xDC-CT-250A-UNI; Input: 1xHigh-Voltage, 1xCurrent; Voltage ranges: ± 2000 V to 200 V, 4 ranges; Current ranges: ± 500 A to 50 A, 4 ranges; A/D converter: Hybrid ADC - 24-bit alias free up to 2 MS/s, 16-bit up to 15 MS/s; Power supply: 9-60 V DC on LIT8m connector (Power+Data+Sync); 1x CAN 2.0b BUS isolated on DSUB9m; Synchronization: IEEE 1588v2 PTP; IP rating: IP67; Dewesoft-X included;
SIRIUSi-XHS-PWR-1xHV-1xDC-CT-1000A-CON	SIRIUSi-XHS-PWR-1xHV-1xDC-CT-1000A-CON; Input: 1xHigh-Voltage, 1xCurrent; Voltage ranges: ± 2000 V to 200 V, 4 ranges; Current ranges: ± 2000 A to 200 A, 4 ranges; A/D converter: Hybrid ADC - 24-bit alias free up to 2 MS/s, 16-bit up to 15 MS/s; Power supply: 9-60 V DC on LIT8m connector (Power+Data+Sync); 1x CAN 2.0b BUS isolated on DSUB9m; Synchronization: IEEE 1588v2 PTP; IP rating: IP67; Dewesoft-X included; HV connectors: Amphenol PL 500 Series
DS-6xLAN-LIB	DS-6xLAN-LIB 6-port network switch; Downlink (PWR+DATA): 4x up to 1 Gbps: 4x LIB8f (front panel); Uplink (DATA): 2x up to 1 Gbps: 2x RJ45 (back panel); POWER IN/OUT: 9-48 VDC LEMO 1B 2-pin; Current limit: total 15 A
DS-6xLAN-RJ45	DS-6xLAN-RJ45 6-port network switch; Downlink (PWR+DATA): 4x up to 1 Gbps: 4x RJ45 (front panel); Uplink (DATA): 2x up to 1 Gbps: 2x RJ45 (back panel); POWER IN/OUT: 9-48 VDC LEMO 1B 2-pin; Current limit: total 15 A
ETH-POWER-JUNCTION	Ethernet/EtherCAT Power Junction; Data Uplink: GbE (RJ45); Power IN supply: 9-48 V DC (Lemo 1B 2-pin); Current limit: 3 A; Power OUT + Data: Unregulated Power IN; Data Downlink: GbE (Lemo 1B 8-pin); Max. cable length: 10 m (each cable);
LIB8m-LIT8f-CAT7-Xm	CAT7 network cable to connect XHS-PWR (Lemo 1T) and DS-6xLAN-LIB switch (Lemo 1B) assuring PWR+DATA+SYNC. Cable length: max. 10 m
RJ45-LIT8f-CAT7-Xm	CAT7 network cable to connect XHS-PWR (Lemo 1T) and DS-6xLAN-RJ45 switch (RJ45) assuring PWR+DATA+SYNC. Cable length: max. 10 m
RJ45-Xm	Network cable; Cable length: max. 10 m
L12Bf-BAN-Xm	Banana DC power supply cable; Connectors: Lemo L12B2f - 2x Banana; Cable length: max. 10 m
D9fw-D9m-L00B4f-Xm-CAN-SYNC	Cable for CAN+SYNC on SIRIUS-XHS-PWR; D-SUB9 female connector IP67 (CAN+SYNC); Breakout box: D-SUB9 male (CAN), L004f (SYNC);

	Cable length: 10 m
L00B4m-L00B4m-Xm	Synchronization cable; Fits to: All Dewesoft devices with L00B4m sync connector; Cable length: Xm
CL-SET-120	Cable lug set; 120 mm ² HV harness; 4x cable lugs (Part number: ICF1206S); M6 mount; Used with SIRIUSi-XHS-PWR-1xHV-1xDC-CT-1000A-UNI
CL-SET-95	Cable lug set; 95 mm ² HV harness; 4x cable lugs (Part number: ICF956S); M6 mount; Used with SIRIUSi-XHS-PWR-1xHV-1xDC-CT-1000A-UNI
CL-SET-70	Cable lug set; 70 mm ² HV harness; 4x cable lugs (Part number: ICF706S); M6 mount; Used with SIRIUSi-XHS-PWR-1xHV-1xDC-CT-1000A-UNI
CL-SET-50	Cable lug set; 50 mm ² HV harness; 4x cable lugs (Part number: ICF506S); M6 mount; Used with SIRIUSi-XHS-PWR-1xHV-1xDC-CT-1000A-UNI
CL-SET-35	Cable lug set; 35 mm ² HV harness; 4x cable lugs (Part number: ICF356S); M6 mount; Used with SIRIUSi-XHS-PWR-1xHV-1xDC-CT-1000A-UNI
CL-SET-6	Cable lug set; 6 mm ² HV harness; 4x cable lugs (Part number: ICR64SL); M4 mount; Used with SIRIUSi-XHS-PWR-1xHV-1xDC-CT-250A-UNI
CG-SET-M32-IP67	Cable gland set; M32 size; 4x cable gland (Part number: BG 232VA); Used with SIRIUSi-XHS-PWR-1xHV-1xDC-CT-1000A-UNI
CG-SET-M25-IP67	Cable gland set; M25 size; 4x cable gland (Part number: BG 225VA); Used with SIRIUSi-XHS-PWR-1xHV-1xDC-CT-1000A-UNI and SIRIUSi-XHS-PWR-1xHV-1xDC-CT-250A-UNI
REDUCER-SET-M32-M25	Reducer / thread adapter set; 4x adapter from M32 to M25; Used with SIRIUSi-XHS-PWR-1xHV-1xDC-CT-1000A-UNI

10. General product information and instructions

10.1. Environmental Considerations

Information about the environmental impact of the product.

10.2. Product End-of-Life Handling

Observe the following guidelines when recycling a Dewesoft system:

System and Components Recycling

Production of these components required the extraction and use of natural resources. The substances contained in the system could be harmful to your health and to the environment if the system is improperly handled at its end of life! Please recycle this product in an appropriate way to avoid an unnecessary pollution of the environment and to keep natural resources.



This symbol indicates that this system complies with the European Union's requirements according to Directive 2002/96/EC on waste electrical and electronic equipment (WEEE). Please find further information about recycling on the Dewesoft web site www.dewesoft.com

Restriction of Hazardous Substances

This product has been classified as Monitoring and Control equipment and is outside the scope of the 2002/95/EC RoHS Directive. However, we take care of our environment and the product is lead-free.

11. Notice

The information contained in this document is subject to change without notice.

Note:

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11.1. Warranty Information

The copy of the specific warranty terms applicable to your Dewesoft product and replacement parts can be obtained from your local sales and service office. To find a local dealer for your country, please visit <https://dewesoft.com/support/distributors>.

11.2. Calibration

Every instrument needs to be calibrated at regular intervals. We recommend annual calibration. Before your Dewesoft data acquisition system is delivered, it is calibrated. Detailed calibration reports for your Dewesoft system can be requested. We retain them for at least one year, after system delivery.

11.3. Support

Dewesoft has a team of people ready to assist you if you have any questions or any technical difficulties regarding the system. For any support please contact your local distributor first or Dewesoft directly.

E-mail: support@dewesoft.com

Address:

Dewesoft d.o.o.

Gabrsko 11a

1420 Trbovlje Slovenia

Europe Tel.: +386 356 25 300

Web: <http://www.dewesoft.com>

The telephone hotline is available Monday to Friday from 07:00 to 16:00 CET (GMT +1:00)

11.4. Service/repair

The team of Dewesoft also performs any kinds of repairs to your system to assure a safe and proper operation in the future. For information regarding service and repairs please contact your local distributor first or Dewesoft directly on <https://dewesoft.com/support/rma-service>.

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Product families (KRYPTON, SIRIUS, DSI, DS-NET, IOLITE) and technologies (DualCoreADC, SuperCounter, GrandView) are registered trademarks as well.

When used as the logo or as part of any graphic material, the registered trademark sign is used as a part of the logo.

When used in text representing the company, product or technology name, the ® sign is not used. The Dewesoft triangle logo is a registered trademark but the ® sign is not used in the visual representation of the triangle logo.

11.8. Documentation version history

Version	Date	Notes
V20-1	17.09.2020	Initial document version.
V21-1	26.06.2021	Updated: - Safety - General product information and instructions
V21-2	03.11.2021	Updated: - 3.2. Connecting SIRIUSi-XHS-PWR (schematics updated) - 3.2.4.1. Autodetect (added chapter) - 3.2.4.1. Autodetect (added chapter) - 4. System overview (updated image and subchapters with Key features) - 5. Specification - 5.1.1. SIRIUSi-XHS-PWR-1xHV-1xDC-CT-1000A specifications (updated) - 5.1.2. SIRIUSi-XHS-PWR-1xHV-1xDC-CT-500A specifications (added) - 5.1.3. SIRIUSi-XHS-PWR-1xHV-1xDC-CT-250A specifications (added) - 5.2. Dimensions (added) - 5.3. SIRIUSi-XHS-PWR connectors (added) - 5.4. HV part components (added) - 6. UNI cabling instructions (added) - 7. Filtering (added) - 8. Accessories (added) - 9. Ordering codes (added)
V22-1	06.12.2022	Updated: - 2. Safety instructions update - 3.2.4. LED (added) - 3.2.5.2 Synchronization settings (added PTP in, IRIG out) - 3.2.7. RT mode (update) - SIRIUSi-XHS-PWR-1xHV-1xDC-CT-500A (removed) - 5.1.1. SIRIUSi-XHS-PWR-1xHV-1xDC-CT-1000A-UNI specifications (updated) - 5.2. SIRIUSi-XHS-PWR-1xHV-1xDC-CT-1000A-CON (added) - 5.3.1. SIRIUSi-XHS-PWR-1xHV-1xDC-CT-250A-UNI specifications (updated) - 5.5. Magnitude response (added) - 6.2. SIRIUSi-XHS-PWR-1xHV-1xDC-CT-250A-UNI assembly instructions (added) - 8. Accessories (updated) - 9. Order codes (updated)
V23-1		Updated: - 8.5 DS-MOUNT-6 (added)