SIRIUSi-XHS-PWR

▲ DEWESoft®

TECHNICAL REFERENCE MANUAL

SIRIUSi-XHS-PWR V23-1

Table of contents

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.
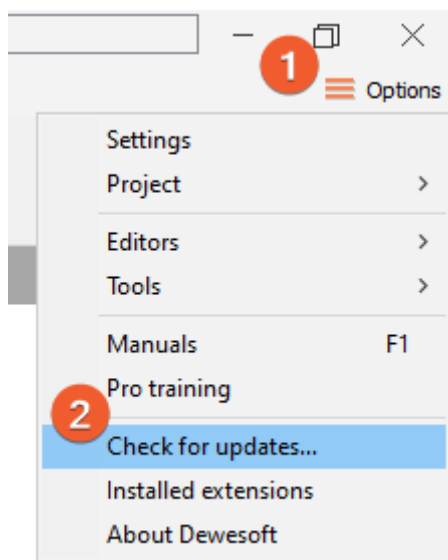
Image 1: Check for update

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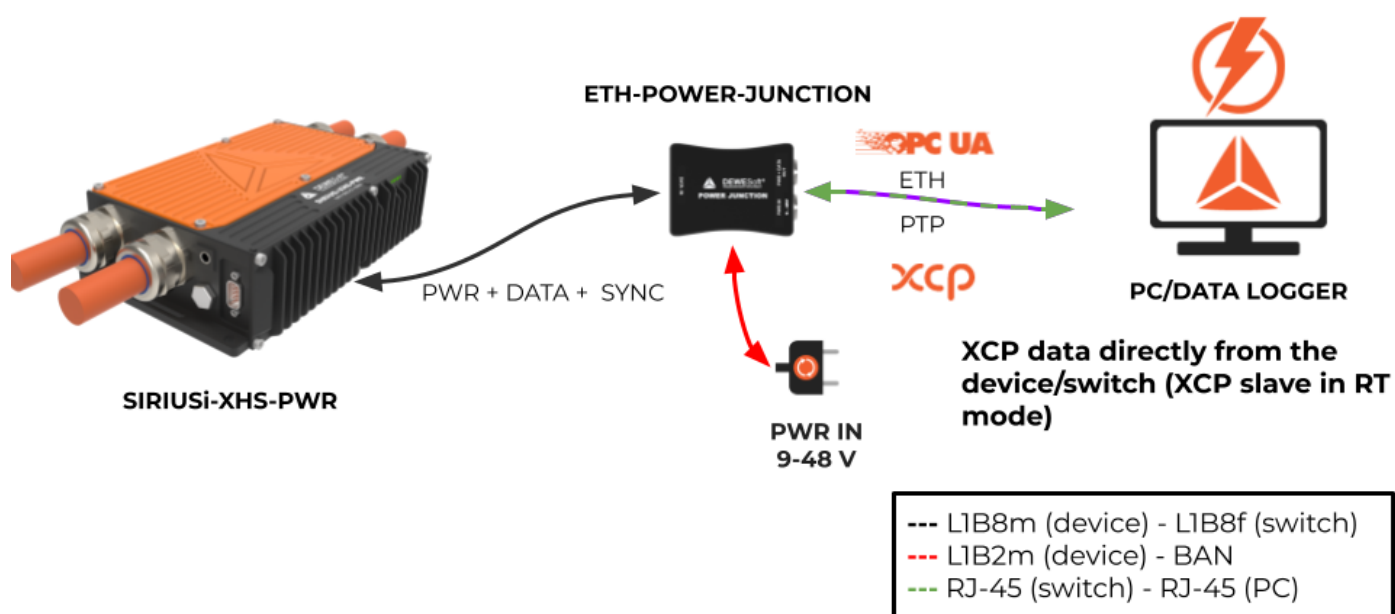
Image 2: Connection of SIRIUSi-XHS-PWR standalone device to PC

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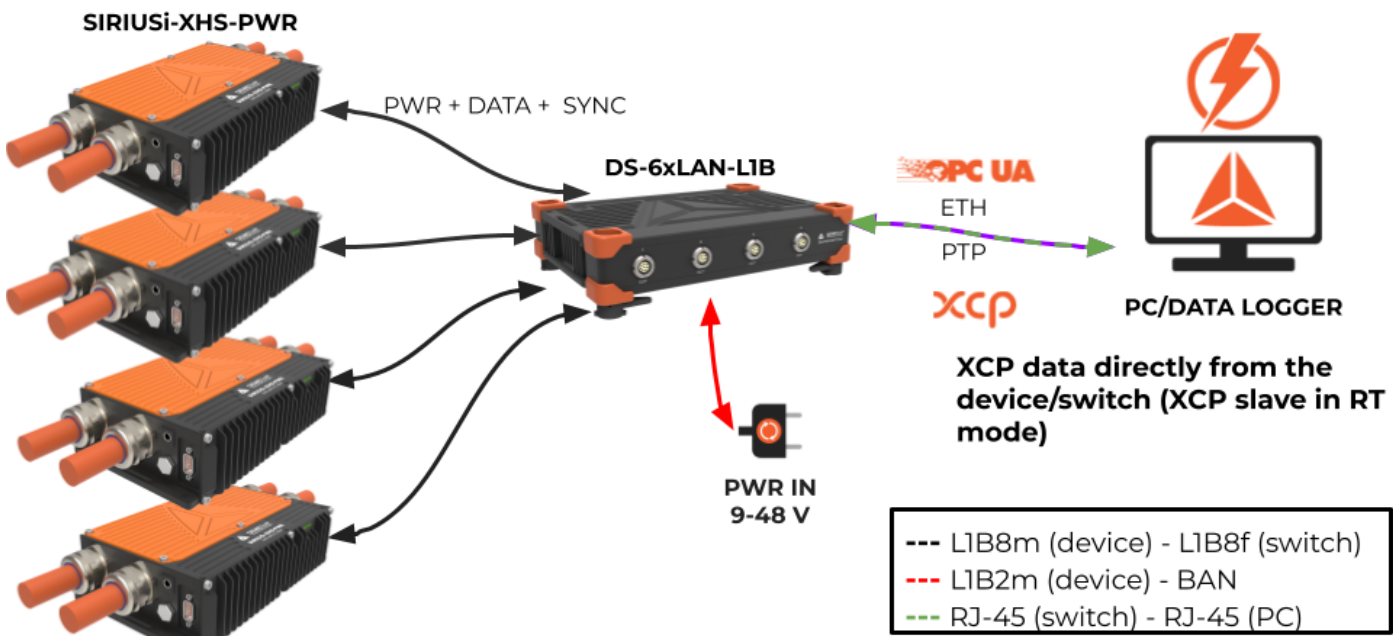
Image 3: Connection of multiple SIRIUSi-XHS-PWR units to PC using PoE

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).

3.2.3. Network settings

As SIRIUSi-XHS® is a network device with static IP, you need to adjust the Network Card settings when connecting it via Ethernet. The ethernet port on your SBOX, data logger, or PC should be configured in a way to match the IP address of the SIRIUSi-XHS-PWR® device.

Example

SIRIUSi-XHS-PWR® has the default IP address 192.168.10.1
Your network adapter should be set to:
- IP: 192.168.10.x, where x is number from 2-255
- Subnet mask: 255.255.255.0
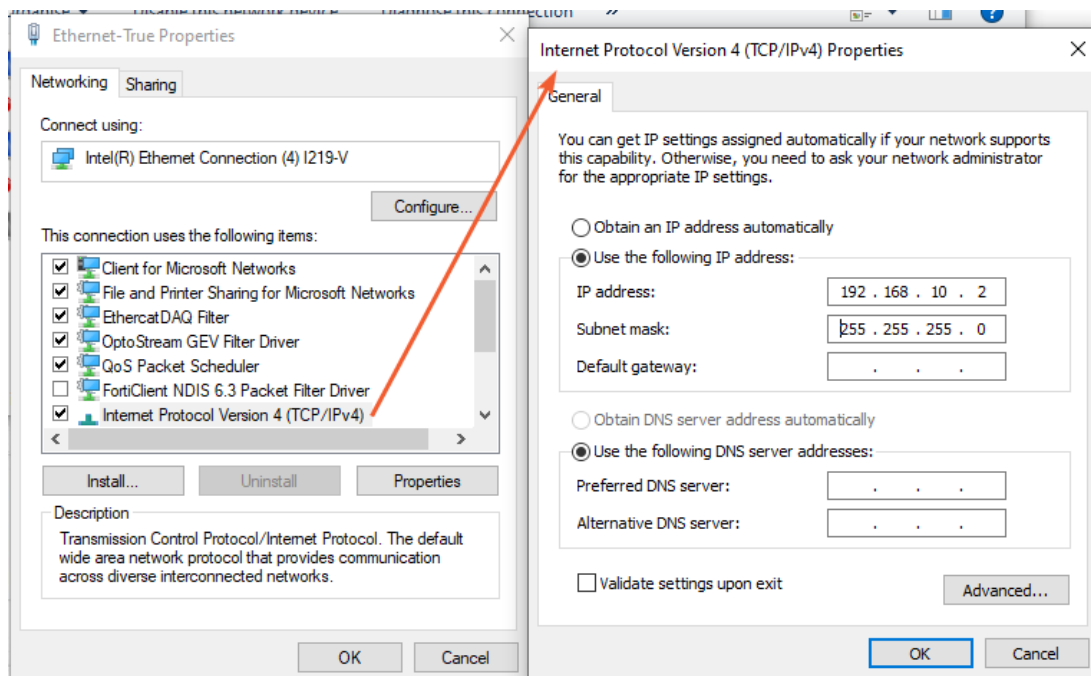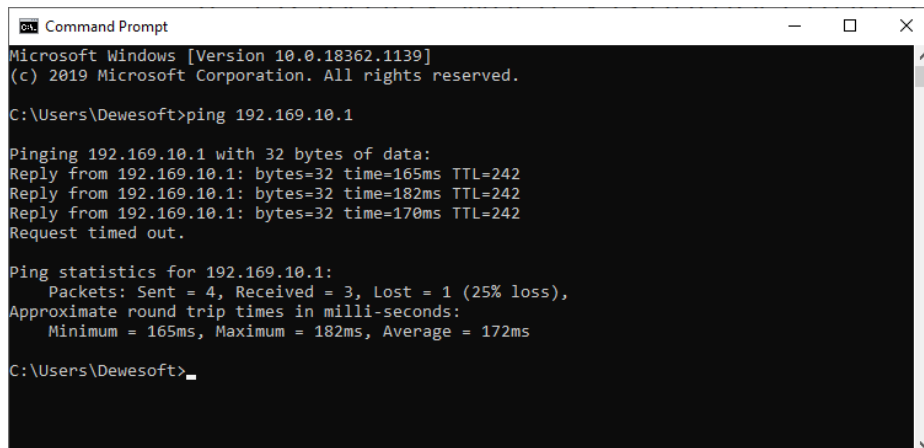
Image 4: Setting up IP address

3.2.3.1. Troubleshooting

If Dewesoft doesn't detect your devices you should try pinging them via command prompt. In command prompt write: ping IP replace IP with IP that is set on your device.
The result should be something like this:

Image 5: ping IP in Command Prompt

3.2.4. LED Status

Image 6: LED on SIRIUSi-XHS-PWR

#	Name	Function
1	S	Solid green - OPC UA, Blinking green - RT, Heartbeat green - Not initialized yet, Fast blinking green - Upgrade
2	L	Solid green - Link connected
3	A	Blinking green - Activity on the bus
4	PWR	Solid green - Power ON

3.2.5. DewesoftX® Settings SIRIUSi-XHS-PWR

SIRIUSi-XHS-PWR devices have static IP.
When adding a new device open DewesoftX® and go to Options->Settings as shown in Image 6.
Click on the Options button at the top right, and then on the Settings item in the pop-up to open the DewesoftX® settings dialogue.
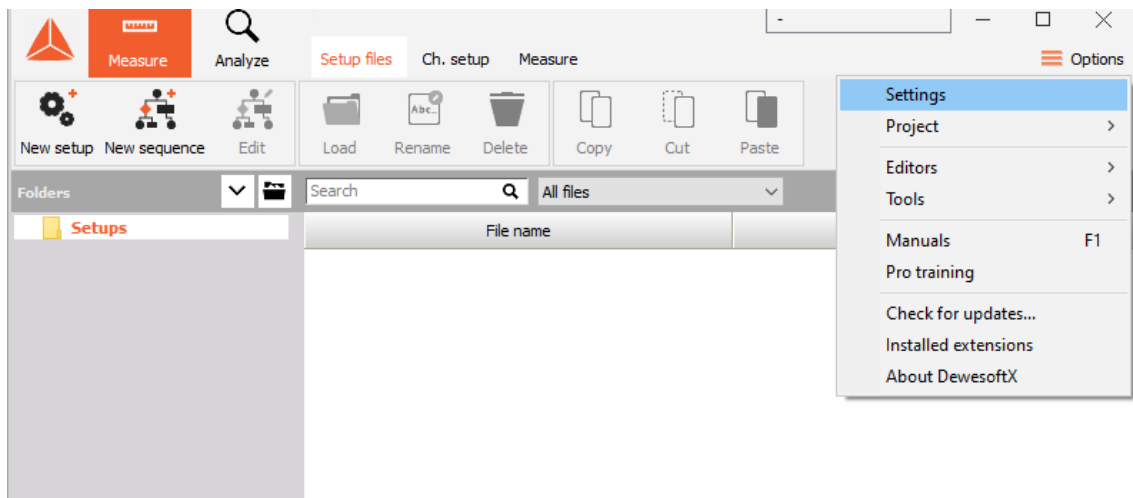
Image 7: Settings
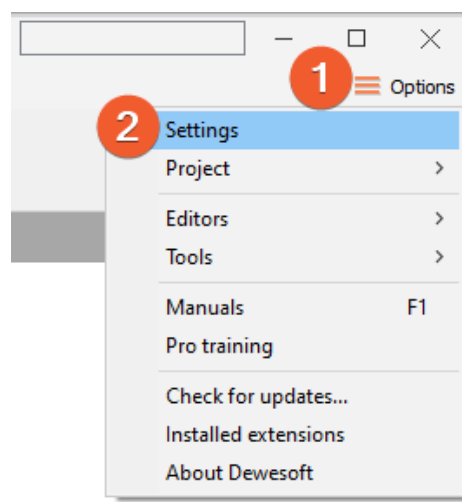
Image 8: DewesoftX® settings

3.2.5.1. Autodetect

The device is automatically detected and added in HW settings when connected directly to the network port on your SBOX, data logger, or PC. When multiple devices are connected over switch then the devices will be automatically detected but will not be automatically added to the HW settings. All the found devices will be listed in the Network devices settings. The devices can be easily added by pressing the plus button.
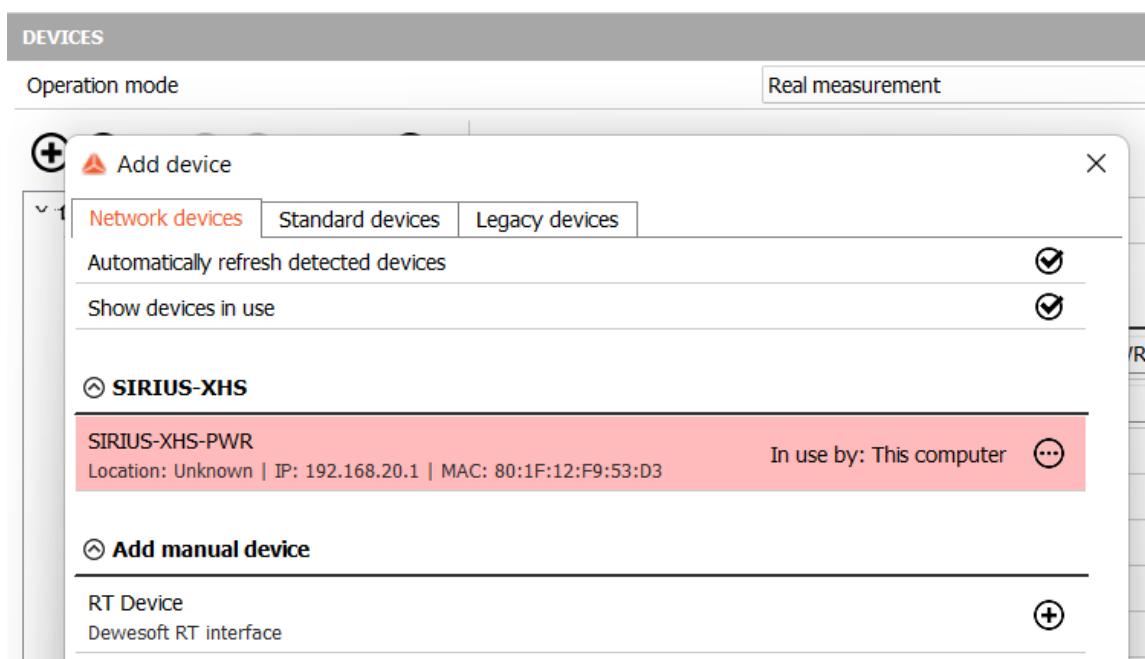
Image 9: Auto detect of connected devices

If the IP of the SIRIUSi-XHS device doesn't match the settings of the network port the device will still be found but the error is shown.
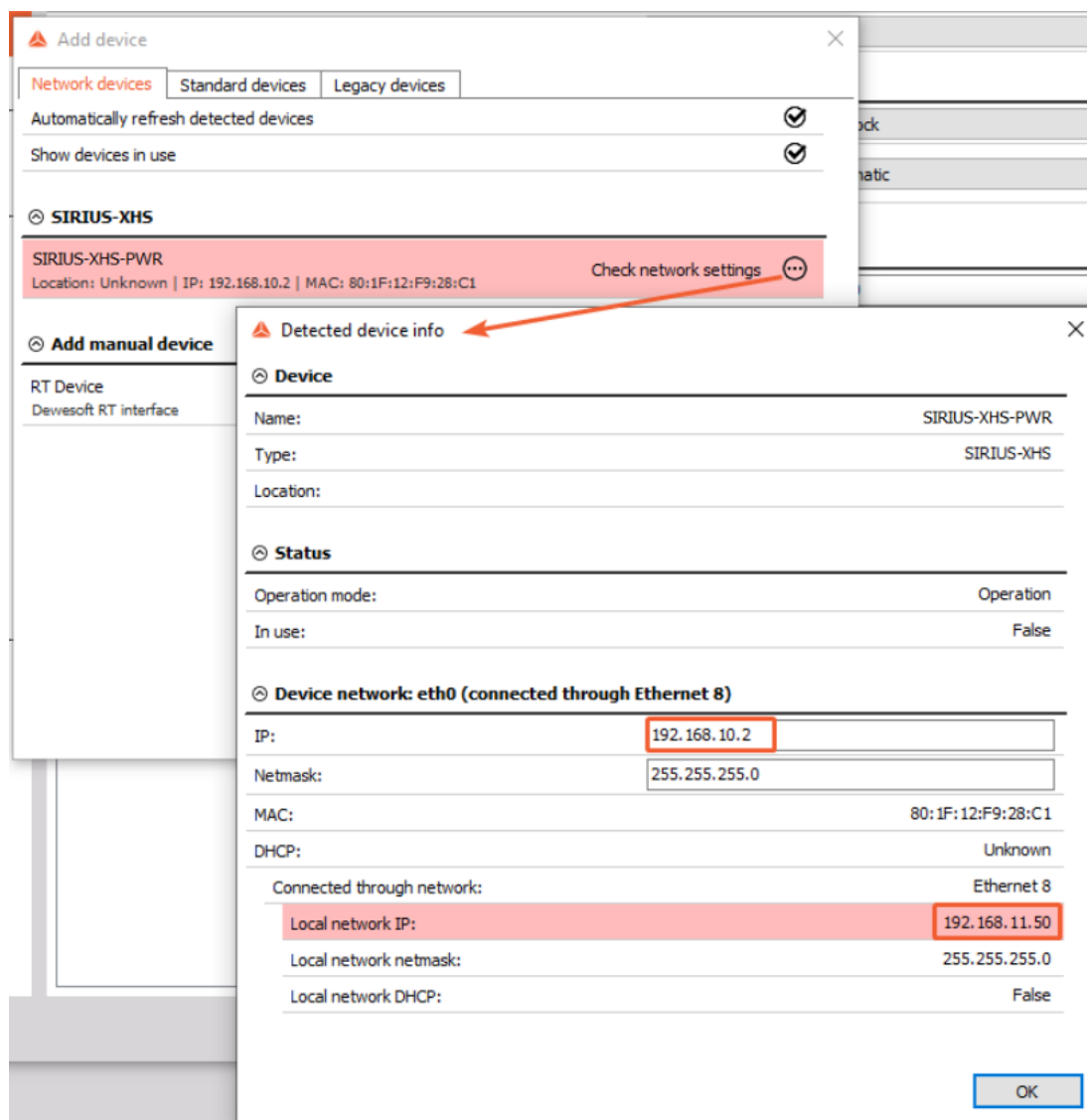
Image 10: Changing the IP in autodetect

💡 **NOTE**
If you have two devices with the same IP address, only one will be detected.

3.2.5.2. Synchronization settings

Before measurement you need to set synchronization in the settings menu. SIRIUSi-XHS-PWR devices are synchronized with the PTP synchronization method.

There are two ways on how to setup synchronization according to time source:
- External (using external clock master)
- DAQ device (one of the SIRIUSi-XHS-PWR devices is PTP master)

This is done by selecting Local system and selecting time source:
- as External, External (Clock provider) as PTP and Dewesoft DAQ Devices (Clock slave) as PTP.

Image 11: Setting synchronization with external time source

- as DAQ device and Dewesoft DAQ Devices (Clock slave) as PTP.

Image 12: Setting synchronization with DAQ device as a time source

- In case of mixed system the SIRIUS-XHS-PWR device can be configured as PTP in / IRIG out
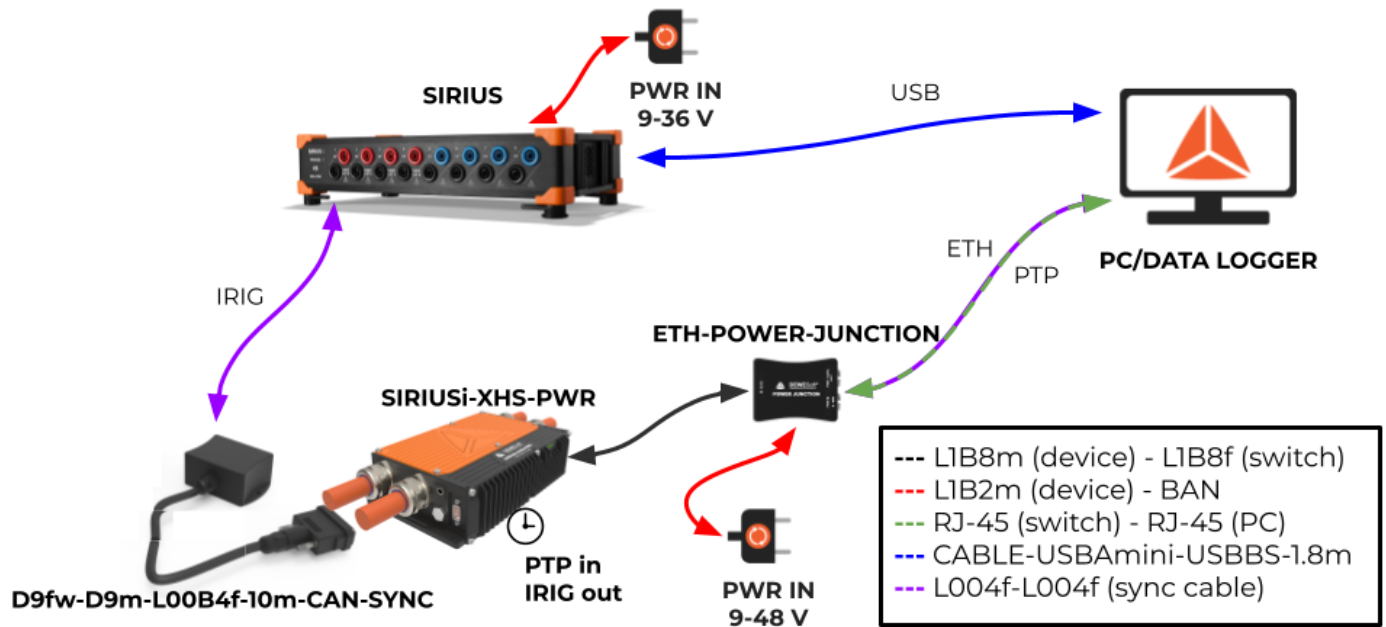
Image 13: Connection of SIRIUS-XHS-PWR (PTP in, IRIG out) with SIRIUS USB device
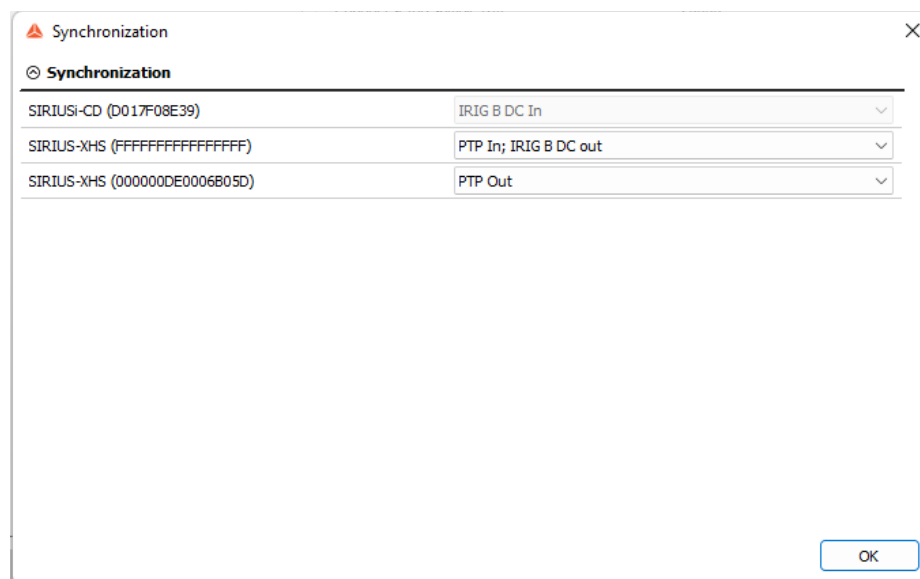
Image 14: Synchronization configuration of SIRIUS-XHS-PWR device to option PTP in, IRIG out

3.2.6. Channel Setup SIRIUSi-XHS-PWR

The sampling rate will be set for all connected SIRIUSi-XHS-PWR units: of course only up to the max. sampling rate of the individual units.

In channel setup mode you can set the wanted sample rate, range etc. and select channels you want to measure.
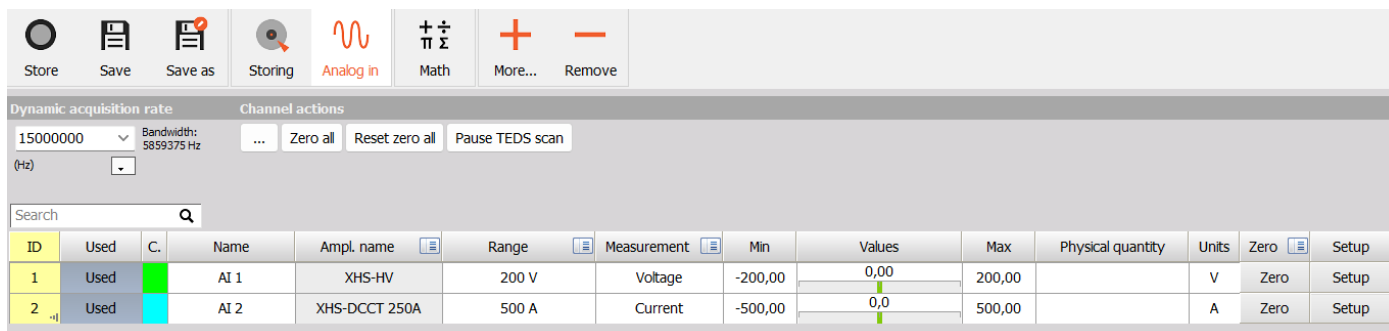
Image 15: Channel setup

3.2.7. RT mode

SIRIUSi-XHS-PWR can also be treated as a stand-alone device and can run without the use of DewesoftX - we also refer to this as the RT mode. When the device is connected over Network connection, the user has an option to enable the RT-mode inside DewesoftX. Once the RT mode is enabled, all the device settings are locked and can not be changed.

> **Important**
> Device is treated as RT device only when connected over Ethernet connection. The maximum output rate is then 2 MHz (XCP out RT)

3.2.7.1. How to enable the RT mode

The Real-time controller module is added in the Ch. setup the same way as any other module. If the module can not be selected, you need to re-check in settings if the RT device is properly configured and recognized.
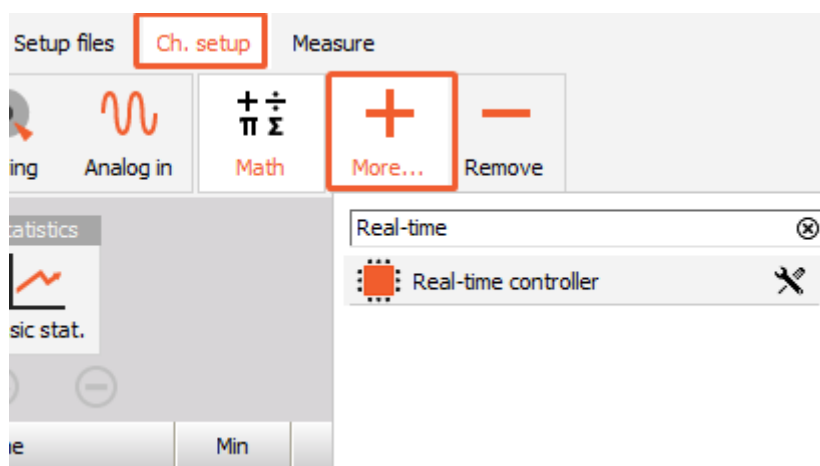
Image 16: Adding RT controller module

When SIRIUSi-XHS-PWR device is connected over network all the RT modules (RTC device, XCP output RT, CAN output RT) will be enabled and additionally a new setup status will appear at the top of DewesoftX window.
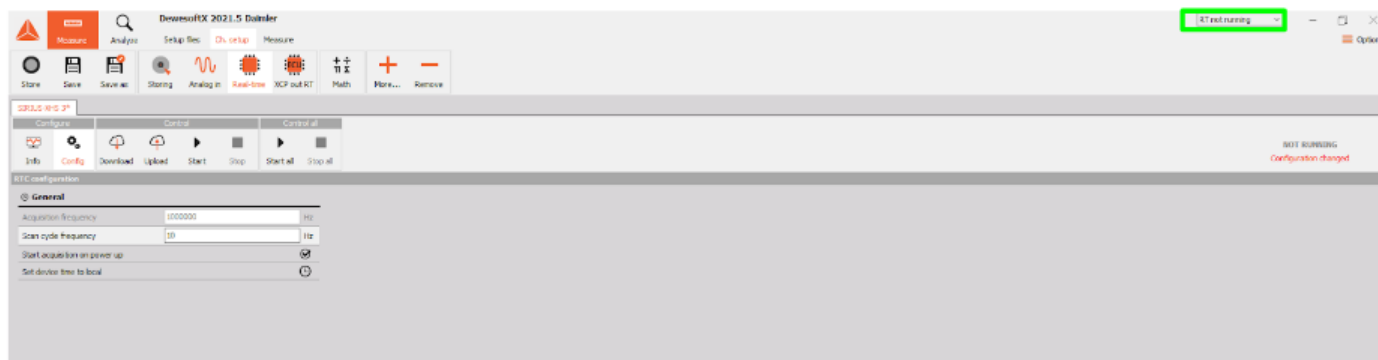
Image 17: Start/Stop RT mode

The status gives the user an overview of the current status of the device. If the RT-mode is disabled, you will see "RT not running" status, if RT-mode is enabled you will see RT running status. The setup status also has a functional behavior, meaning that you can enable/disable the RT-mode over the status and do not need to go to the RTC module.
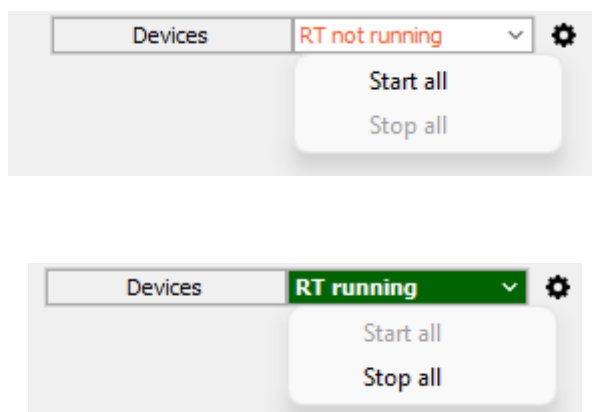
Image 18: Dropdown menu to Start/Stop RT mode

When multiple devices are connected in the system and one of them has the RT-mode enabled and the second one has the RT-mode disabled the status "RT running (1/2)" will be presented.

> **Important**
> When RT mode is running on the device, all the AI properties (Range, sample-rate, etc..) are locked. To change the AI properties the user needs to stop the RT mode.

There is also an additional option "Start acquisition on power up" , for setting the device directly to RT-mode right away the device is reconnected back to power supply. For this option to work properly, the device needs to be in the RT mode when unplugged from the power supply. **Start acquisition on power up is enabled by default.**
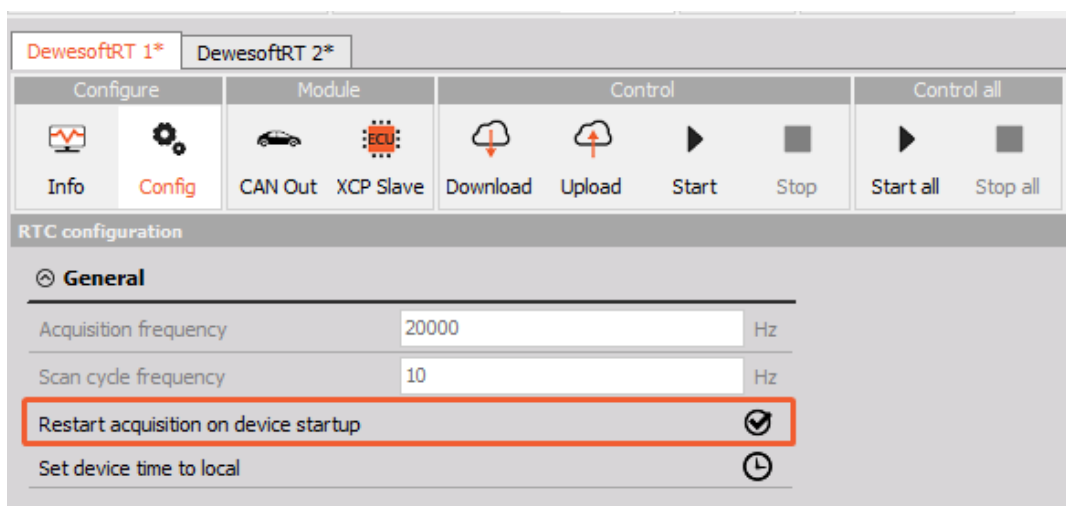
Image 19: Start acquisition on power up

> **!** **Warning**
> **Do nott start the RT mode if devices are not synchronized.**
> Before starting RT mode, go to measure mode and make sure devices are synced. It can take up to 60 seconds before the devices are synchronized.

3.3. Simple Measurement

This chapter describes measurement basics, how to configure SIRIUSi-XHS-PWR and gives some details on the measurement setup.

3.3.1. Help - Manual

Note that this document is just a quick start guide. For detailed information about DewesoftX® consult the Manual. To open the manual press the F1 button or click on the Options button and then select Manual from the pop-up menu.
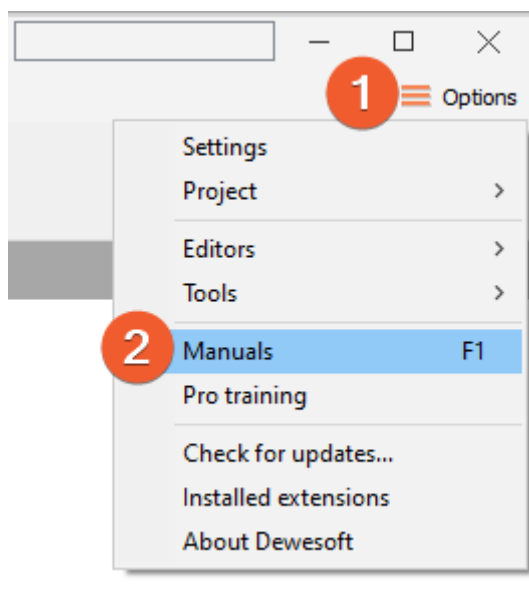
Image 20: Help - Manual

When DewesoftX® has started up, you will be in Measure mode and see the Setup files list. Click on Ch. setup (on the right of Setup files) to switch to the Channel setup mode.
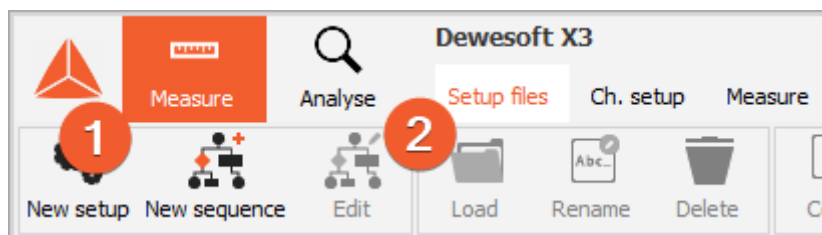
Image 21: Setup files

3.3.2. Analog In - Channel setup

In the analog channel setup screen you can see all channels of your connected SIRIUSi-XHS-PWR units. Per default only the first channel will be set to Used. Unused channels will not show up in measure mode and can thus not be used for display, calculations or storing: thus, we will also set the other channels to the used. Then you can click into the selected region to toggle Used/Unused for all channels at once. The selected channels will also be highlighted in the small preview image of the device. When you press the Setup button of a channel - detailed configuration window will appear.
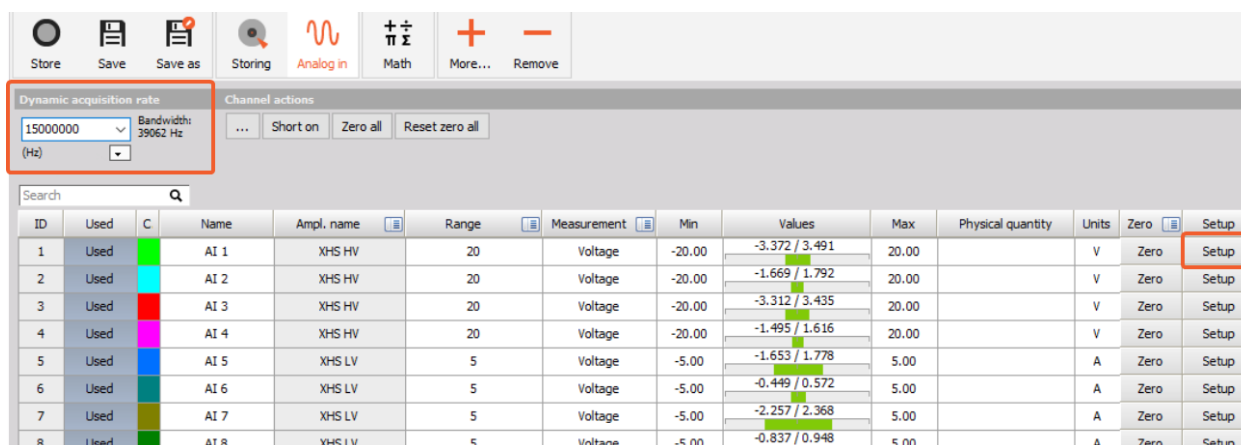
Image 22: Analog IN - Preview of all available channels

In Channel setup it is also possible to configure the channel by choosing a measuring range and/or enabling/disabling analog low-pass filter. In this mode it is available to define additional scaling and check the signal in channel preview.
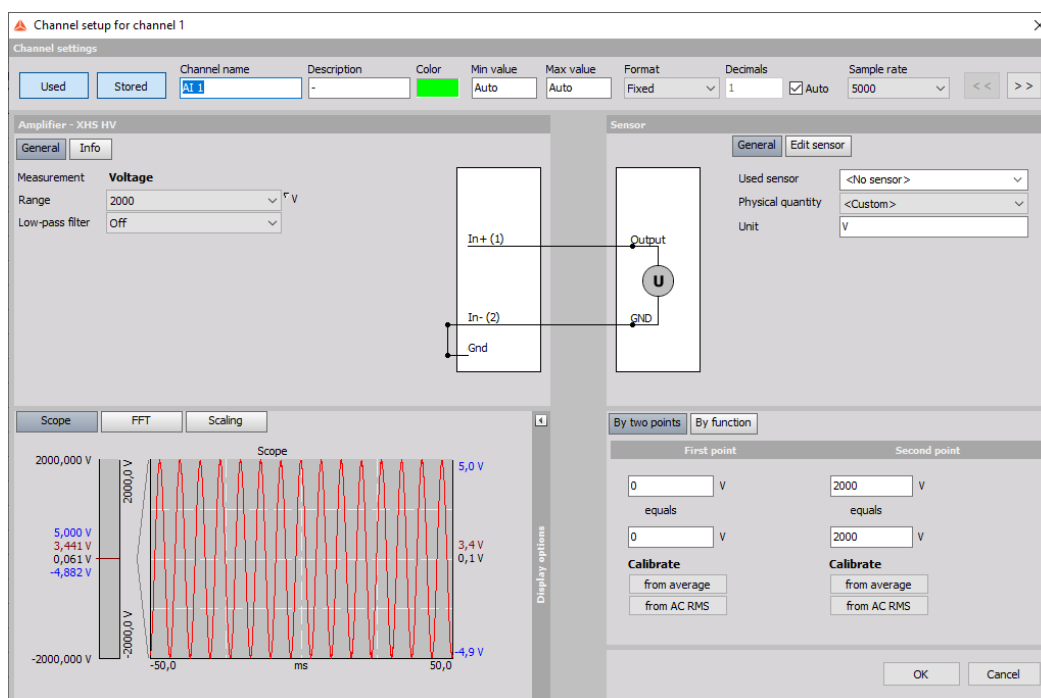
Image 23: Channel setup configuration

3.3.3. Sample rate

One of the most important settings is the sample rate. The sample rate defines how many data points, SIRIUSi-XHS-PWR will transfer to DewesoftX®. Higher sample rate also means that more data needs to be transferred via ethernet to your computer.

The sampling speed mainly depends on your application. To display your signal in a time domain with a good time resolution, you should sample 10 to 20 times faster than the frequency of the signal that you want to measure, e.g. 1 kS/s for a 50 Hz sine-wave. If you have a lot of high frequency components, it may be necessary to sample 100 times faster, e.g. 5 kS/s for the 50 Hz sine-wave, or even more. If you display only the frequency domain (FFT analysis), a 2.5 times faster sampling would be sufficient (125 S/s for the 50 Hz sine-wave). The higher the sampling rate, the better the time resolution. But also the file size will increase.
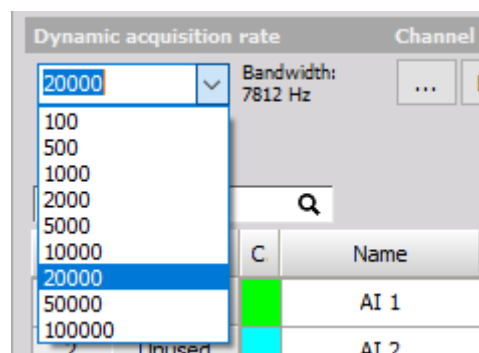
Image 24: Sample rate

3.3.4. Measurement Mode

A click on Measure (at the right side of Ch. setup in Image 11) will take you to the Recorder screen measure mode where you can already see live data.
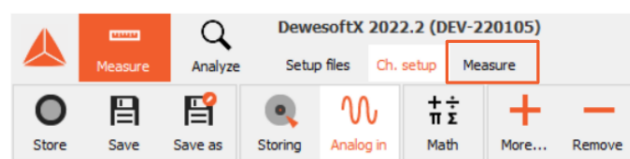
Image 25: Measure mode button

💡 **Hint**
When switching to Measure mode the data will not be stored automatically.

In measure mode you can have several measurement screens. DewesoftX® will create 2 default screens: Recorder and Custom but you can also create new screens or change the widgets of the existing screens as you like.

The most important sections of the Measure mode:
Recorder widget displays all your measurement channels. You can use the channel-selector list to assign measurement channels to the instruments. Each instrument has different settings.

To start storing the data to a file, press the Store button. When you are done, press the Stop button to stop recording.

Now DewesoftX® has created a datafile with all the data that you have seen during the recording session. You can now click the Analysis button (on the left-top of the screen to the right of the Measure button) to go to Analysis mode.

3.3.5. Analyze Mode

When you have just stopped a measurement, DewesoftX® will automatically open the last recorded data file in Review mode, so that you can start the analysis right away.
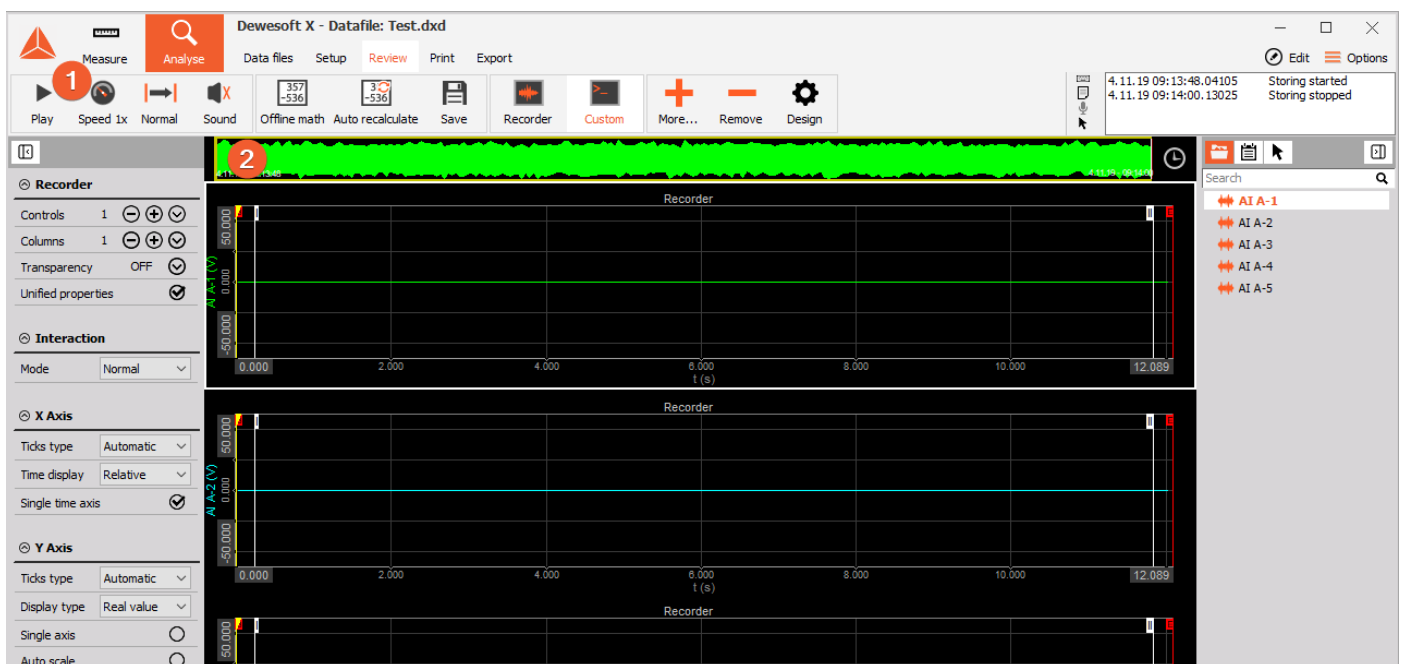
Image 26: Analyze mode

The Review mode is much like the measurement mode. You will see the same measurement screens, the channel-selector list and the properties of the currently selected instrument.
Differences are:
(1) you have additional tool-buttons
(2) there is a Signal overview window which will show you the whole data of one selected channel of the data file

Now you can use the cursors to analyze your data, zoom in and out of the data, click Offline math to add computations based on your data, etc. You can also change the design of your measurement screens, print reports based on your data and export the data to other file formats for further analysis.

3.4. Advanced configuration

Note, that the DewesoftX® launcher has already done the hardware setup for you – you can check this in the Settings dialogue. Click the Settings button (1) – and then click the Settings Menu item (2).
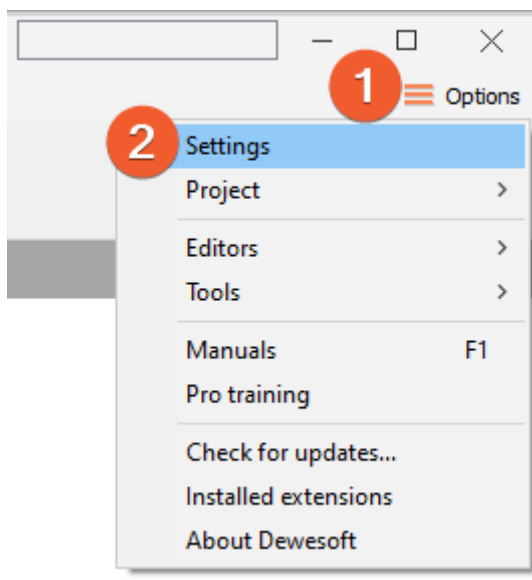
Image 27: Open settings dialogue

3.5. Firmware upgrade

- Download the Dewesoft upgrade package (.dxu file) from the Dewesoft downloads page under the section Drivers.
- Copy the file into the Firmwares folder of your Dewesoft installation (e.g. D:\DewesoftX\System\Firmwares).
- Connect the Dewesoft instrument to the PC and run DewesoftX
- Go to settings under the Update tab:
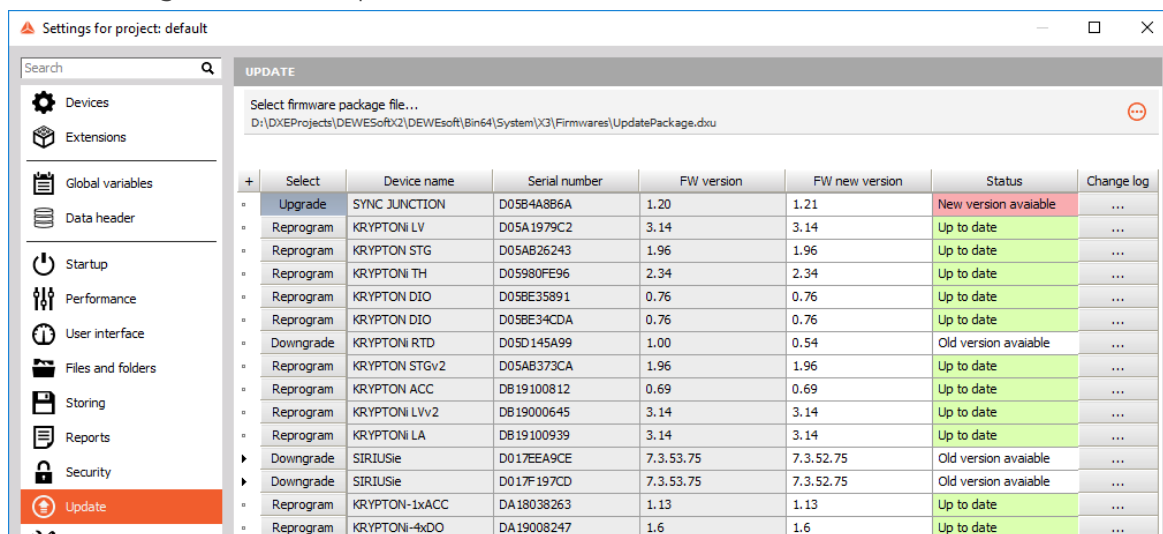
Image 28: Firmware update

- If the firmware package isn't selected, select it by pressing the button and find the folder with the firmware file in it.
- Select the device you want to upgrade and start the firmware upgrade by pressing the "Upgrade" button.

3.6. Licensing

SIRIUSi-XHS-PWR or any other Dewesoft device already comes with an embedded Dewesoft license. You can check the license details with all the available options in the Licensing tab (1) by pressing the three dotted button (6). However if the user decides to upgrade the license with an additional extension, Dewesoft will require a new license registration. The registration can be made online (2) or offline by importing an offline license (5) in case the system doesn't have an internet connection. Offline license can be pre-registered on a different PC with the internet connection. If needed, the license can also be written on the actual device (5).

Active and embedded licenses are seen under Active licenses tab (5). If the license is recognized as none active, it usually means that the wrong license was entered.
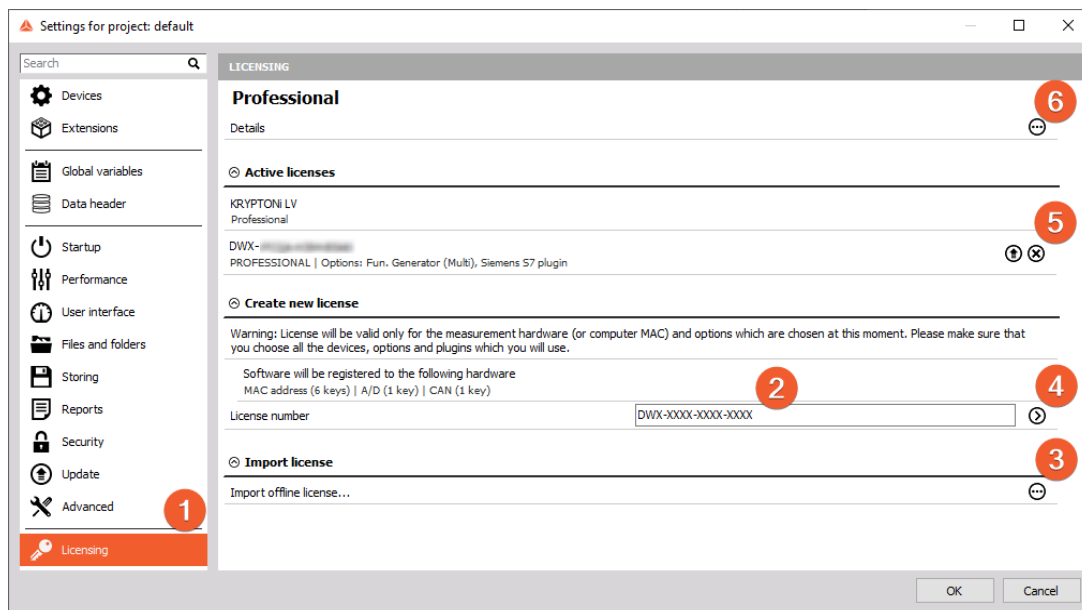
Image 29: Licensing

All licenses regarding SIRIUSi-XHS-PWR will only work when the SIRIUSi-XHS-PWR system is connected to your PC and the device has been activated in the hardware setup.

3.7. Troubleshooting

If your SIRIUSi-XHS-PWR device is not found by DewesoftX®:

- If you did not restart Windows after the software installation, restart now
- Make sure that you have started DewesoftX® version X3 SP12 or higher
- Make sure that the external power supply is connected and okay
- Disconnect the network cable and reconnect it. If this does not work, try to connect the network cable to another Ethernet port of your PC
- Try to restart DewesoftX®
- Try to restart the PC

4. System overview

SIRIUSi-XHS-PWR

SIRIUSi-XHS-PWR is a DAQ device designed for direct in-vehicle measurement of current, voltage, and power having the power lines running through. It features an integrated patented DC-CT current transducer for very precise current measurements. Your ideal system for e-mobility applications.
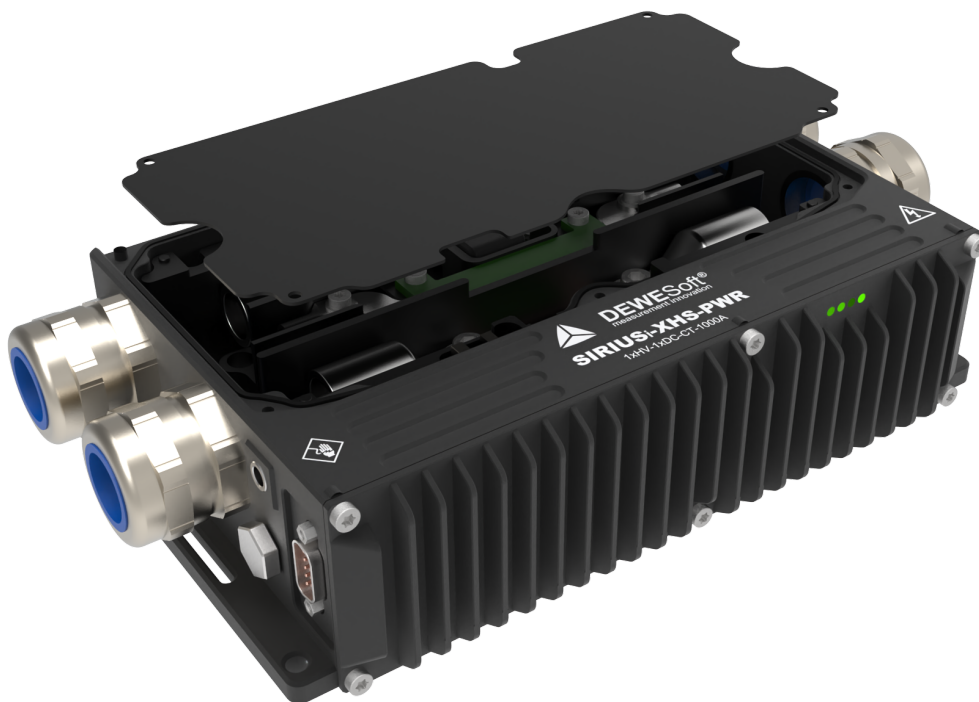
Image 30: SIRIUSi-XHS-PWR-1xHV-1xDC-CT-1000A-UNI device

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 MΩ
- 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.

4.1.7. Power analyzer

Dewesoft software will automatically calculate and store not only raw data from the voltage and current transducers but also all the power parameters: P, Q, S, D, Cos φ, power factor, P, Q, cos φ for each harmonic and other relevant power parameters.
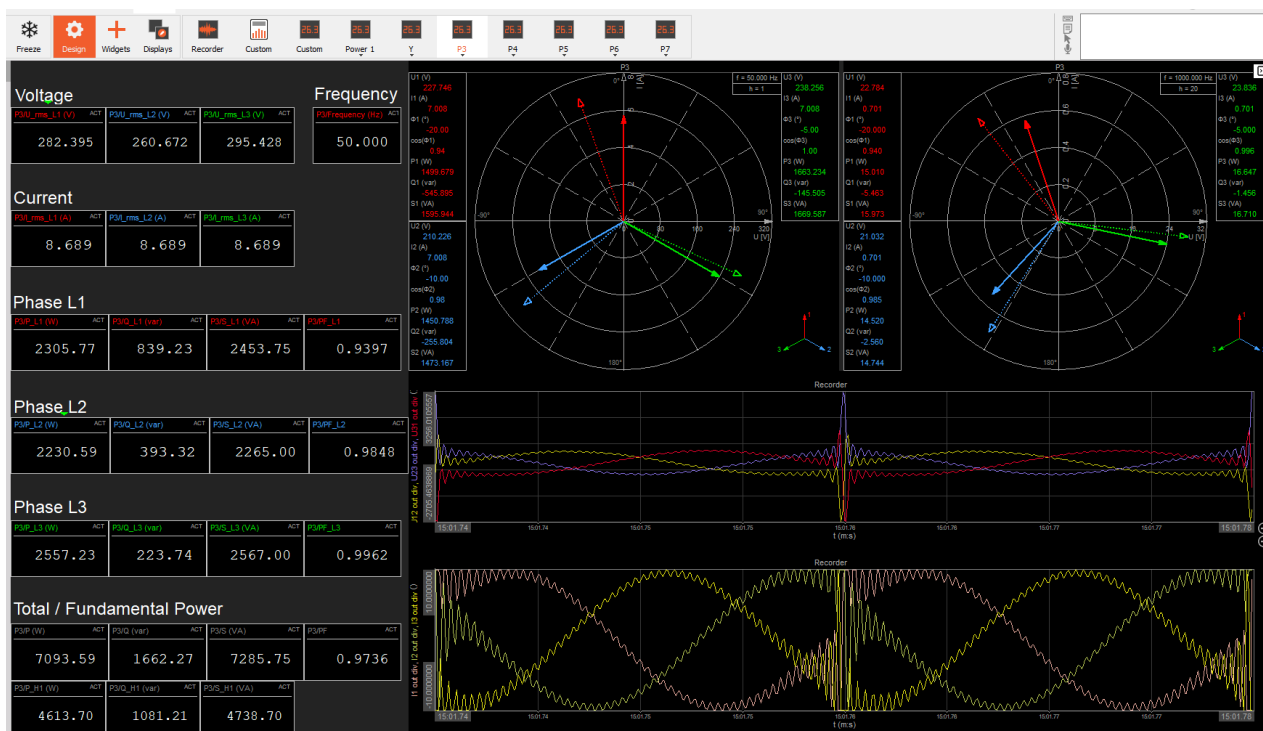
Image 31: Power Analyzer

Each parameter can visually be displayed in a time recorder, digital or analog display.

Using a computer graphics card as a multi-threaded calculation platform, the Dewesoft power module can calculate all those parameters up to a full speed of 15 Ms/sec.

4.1.8. Data Acquisition Software Included for Free

All Dewesoft data acquisition systems are bundled with award winning Dewesoft X Professional DAQ software. Dewesoft X is the world's most advanced and easy-to-use data acquisition and analysis software. Dewesoft X's flexibility and power will help you unleash the DAQ system to its full potential and gives you many advantages over other DAQ systems. Functionalities like plug-and-play, hardware auto-detection, smart TEDS sensors, advanced storing and data analysis features will take your measurement and analysis needs to a whole new level.

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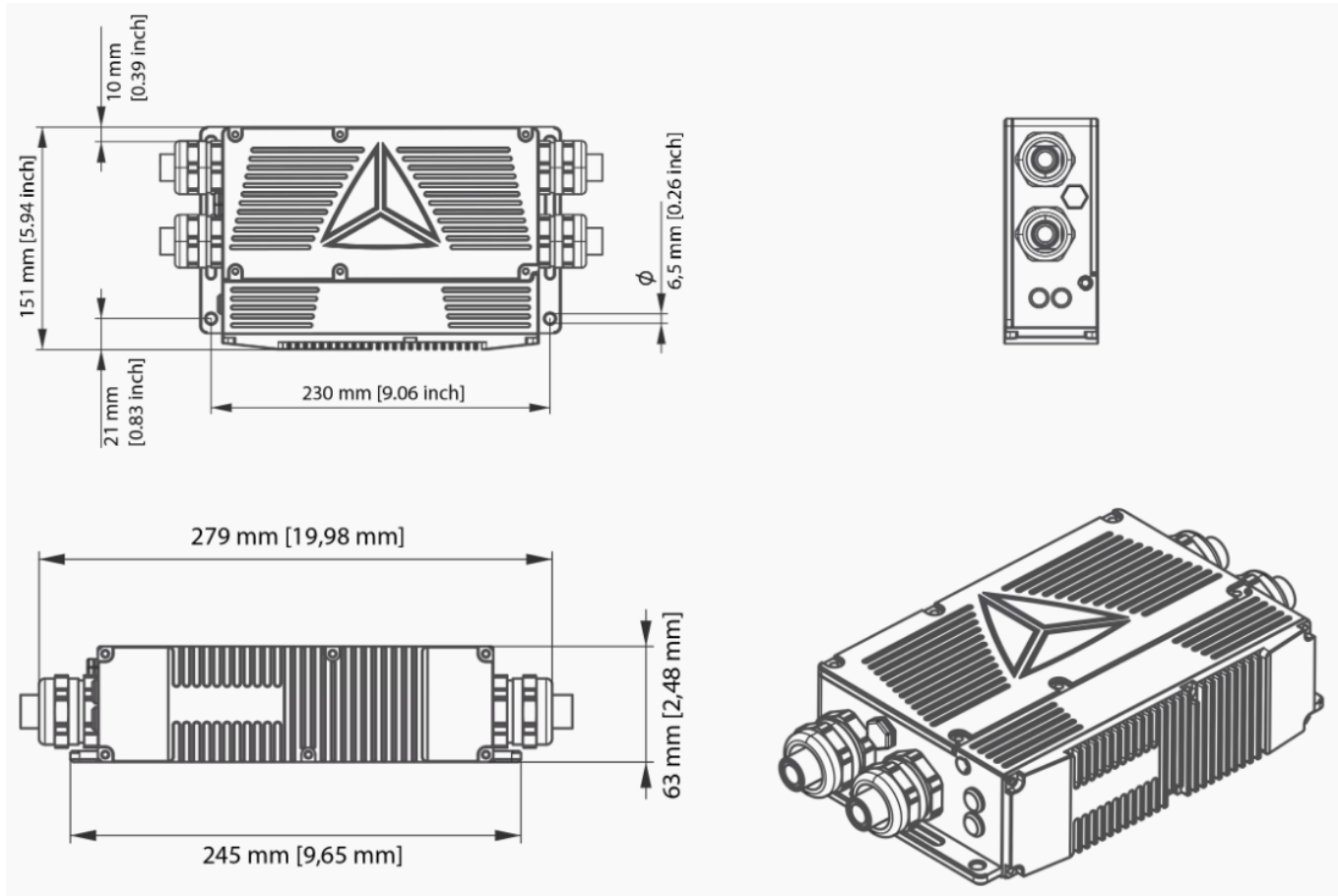
Image 33: SIRIUSi-XHS-PWR-1xHV-1xDC-CT-1000A dimensions

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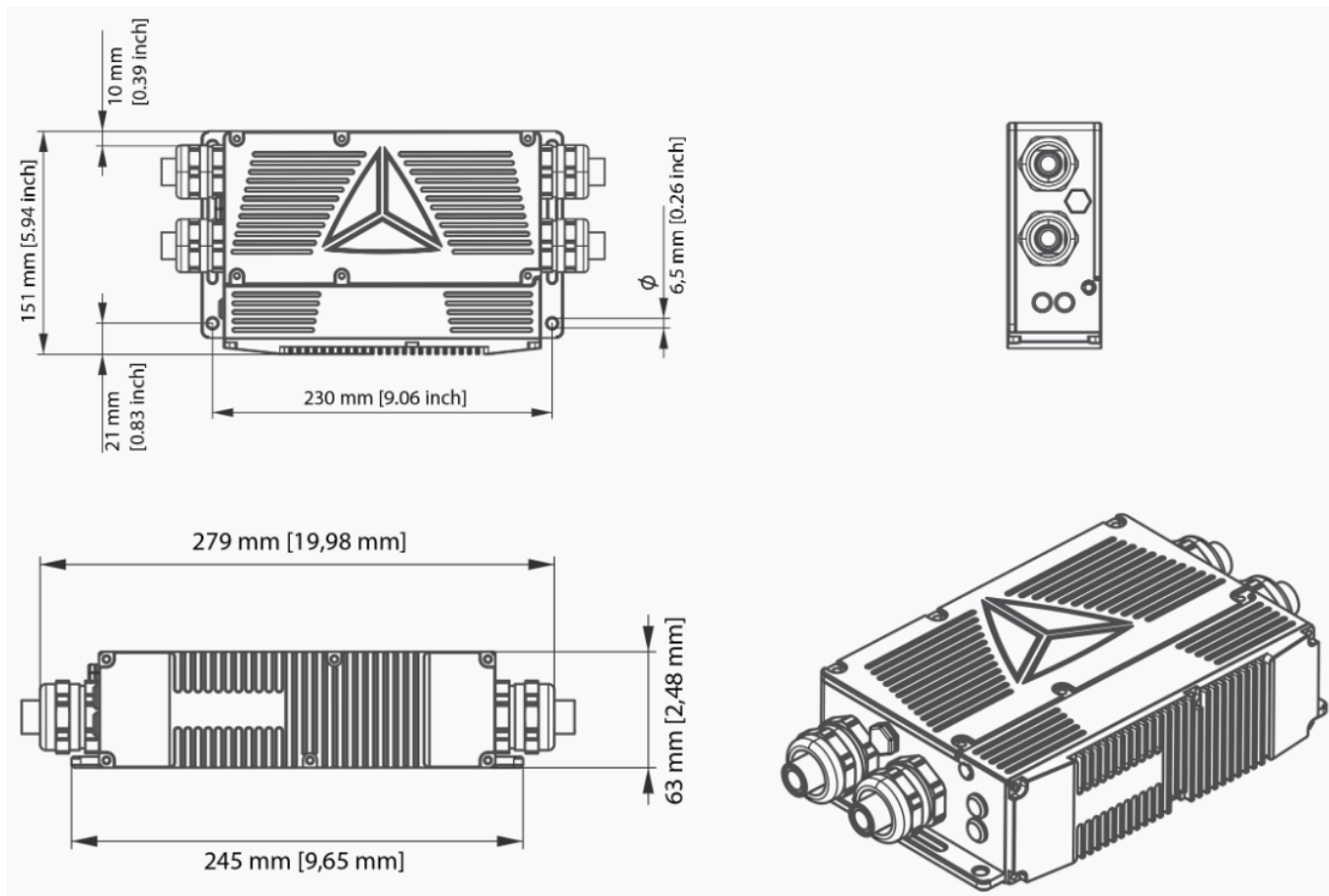
Image 35: SIRIUSi-XHS-PWR-1xHV-1xDC-CT-1000A dimensions

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 (Ip @ 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 conitnuous 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
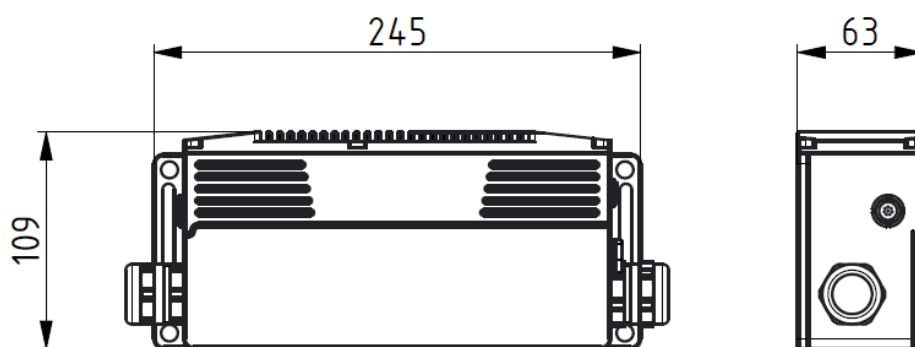

Image 37: SIRIUSi-XHS-PWR-1xHV-1xDC-CT-250A-UNI dimensions

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 mm2

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: L1T8m

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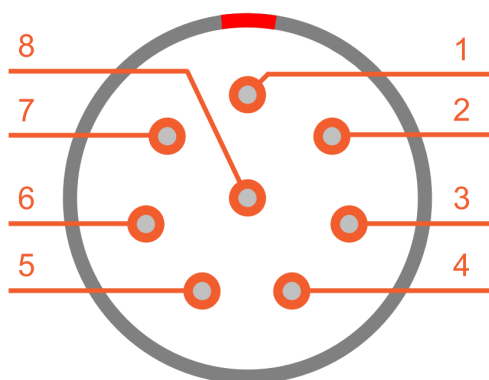
Image 38: PWR+DATA connector: pin-out (8-pin LEMO male)

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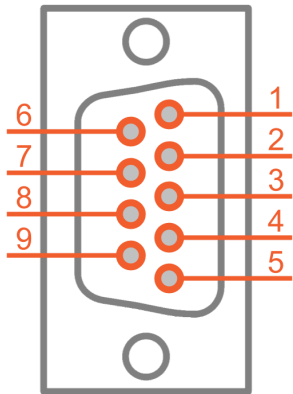
Image 39: CAN connector: pin-out (DSUB-9 male)

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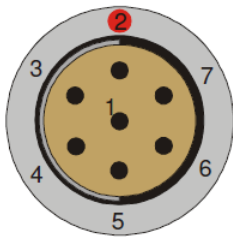
Image 40: CAN connector: pin-out (Fischer DEU 102 A055-SC)

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	

5.5. Magnitude response

5.5.1. Voltage measurement

XHS-HV High-Bandwidth LP off

Image 41: Magnitude response of HV input in high-bandwidth mode

XHS-HV High-Bandwidth LP 1 MHz
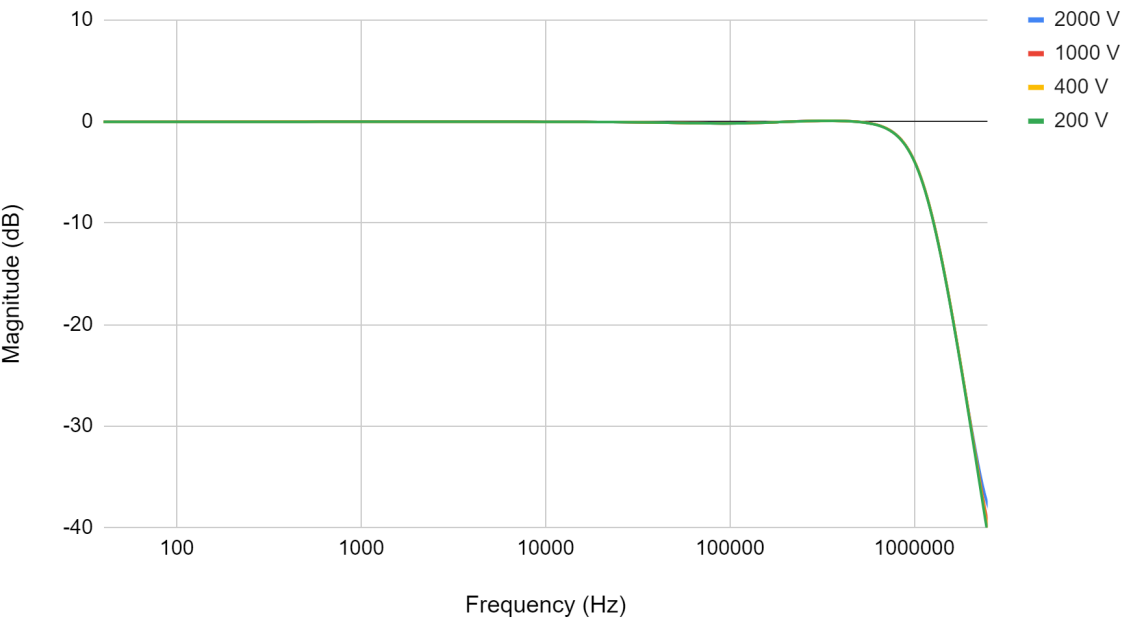
Image 42: Magnitude response of HV input using 1 MHz LP filter

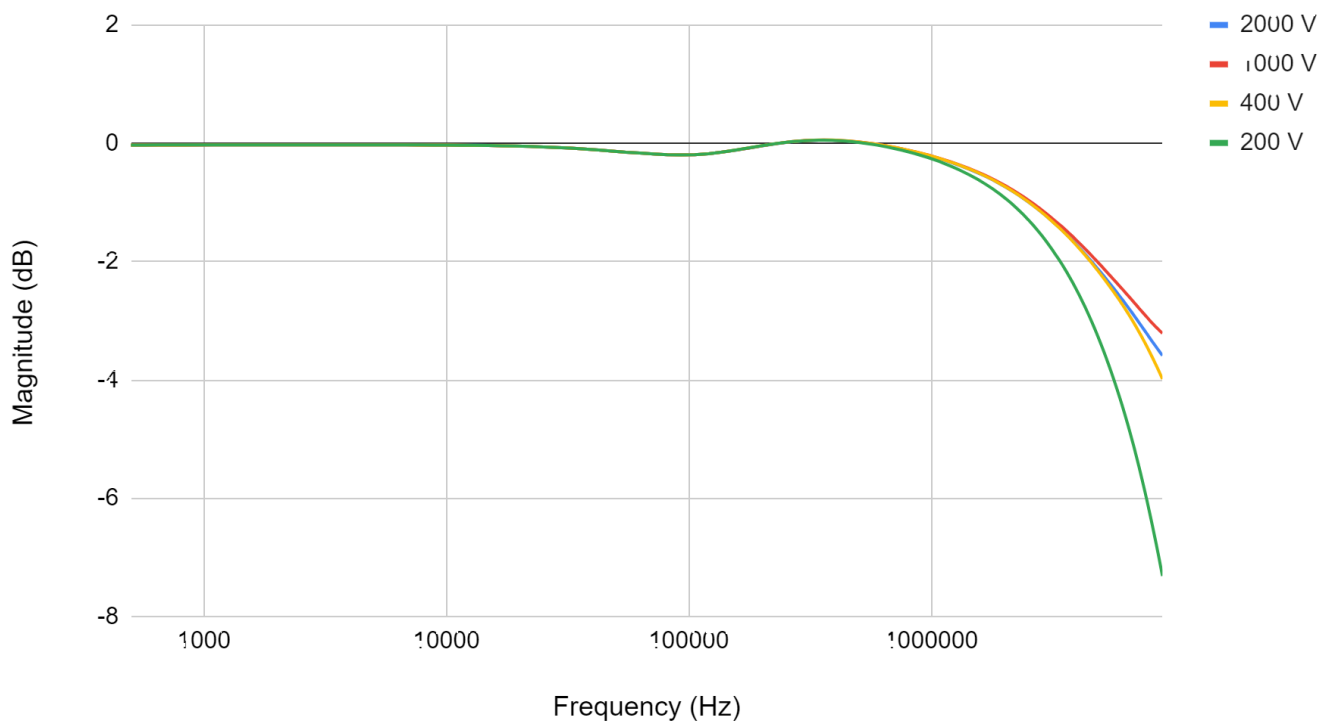## XHS-HV High-Dynamic

1 MS/s, LP 1 MHz
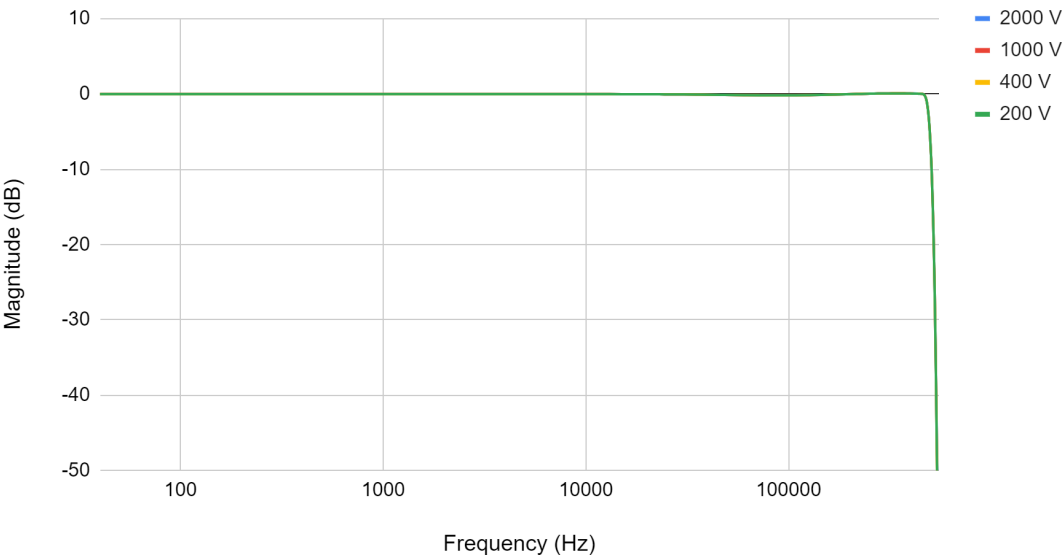
Image 43: Magnitude response of HV input in high-dynamic mode

5.5.2. Current measurement
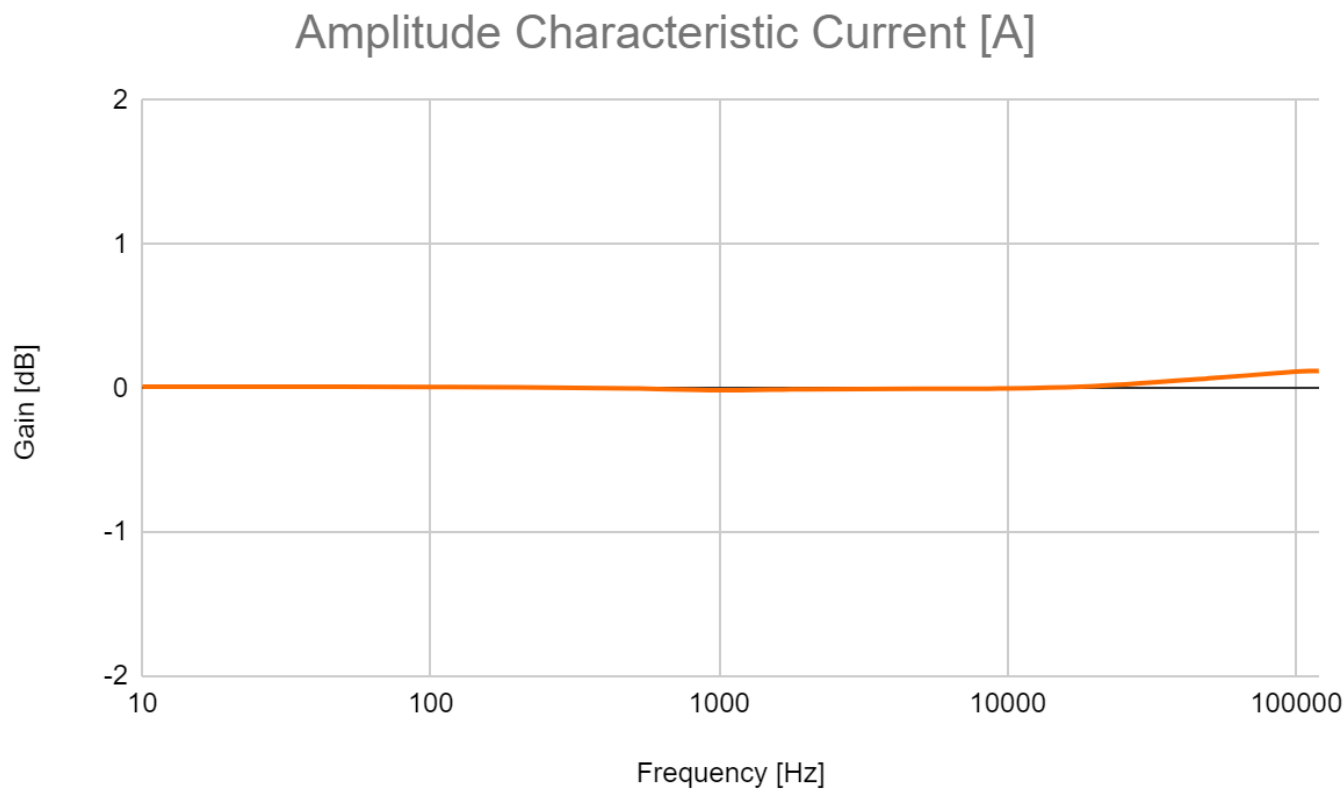
Image 44: Magnitude response of DC-CT input

6. UNI cabling instructions

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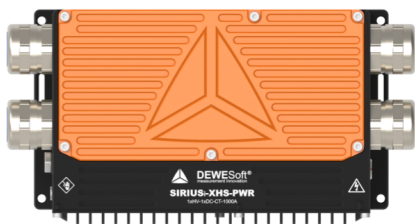
1

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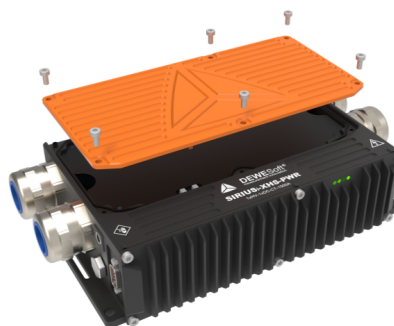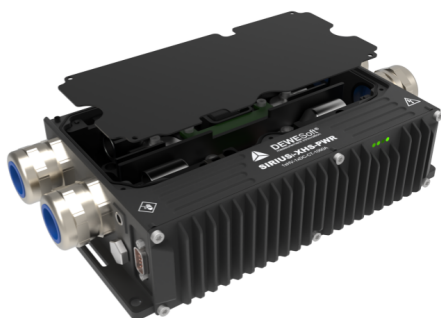
A.   Remove the protection lid (PCB-COVER).

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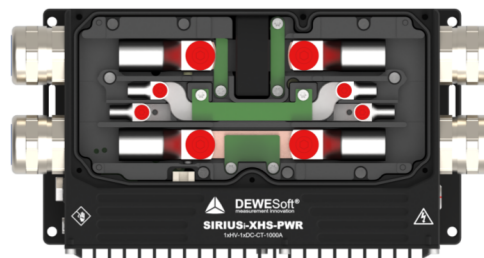
A.   Unscrew 6x H5 (4x M6x16, 4x M4x8) screws shown in red.
B.   Remove cable lugs (if included).

5
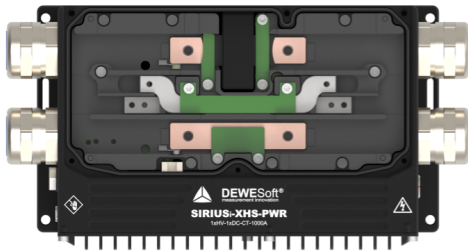
This should be your top view.

6
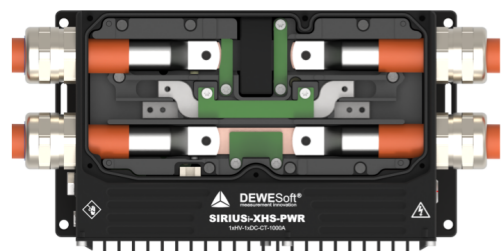
A. Crimp HV cables and shield according to the crimping recommendations.
B. Place HV cables through cable glands.

7
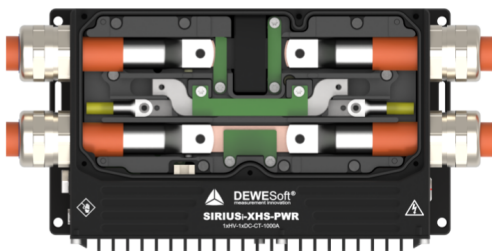
A. Place the SHIELD cable from HV- cable to the SHIELD Busbar_B

8
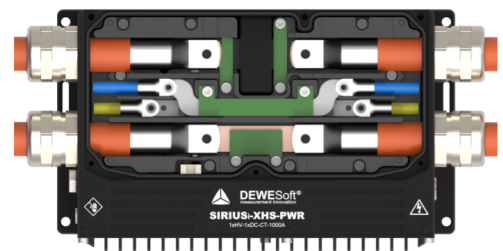
A. Place the SHIELD cable from HV+ cable to the SHIELD Busbar_A

9
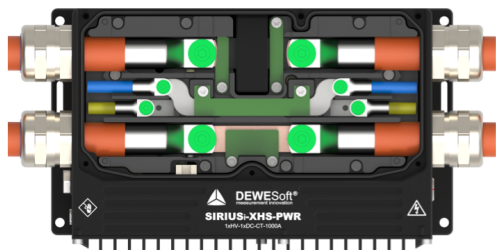
A. Mount HV cables with 4x H5 M6x16 screws according to the mounting recommendations.
B. Mount SHIELD cables with 4x H5 M4x8 screws according to the mounting recommendations.

10
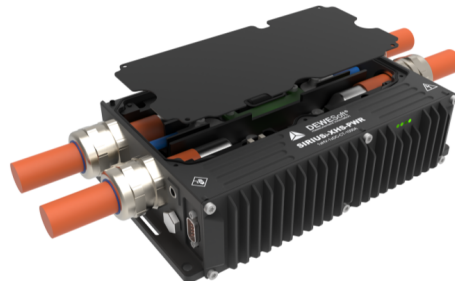
A. Place back protection lid (PCB-COVER)

11
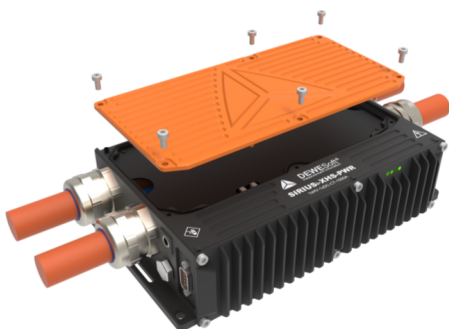
A. Place back orange aluminum cover.
B. Screw back 6x T20 (M4x8) screws from STEP 2.

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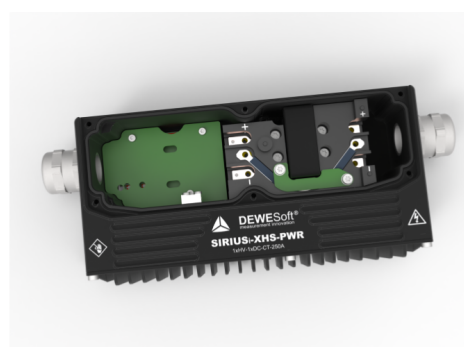
A. Crimp the multicore cable according to crimping recommendations.
B. Mount + cable, - cable and shield cable to denoted contacts according to mounting recommendations.
C. Use M4x14 screws for mounting the cable wires through cable lugs..

5
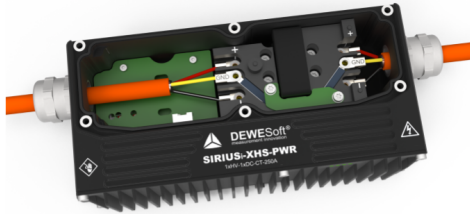
A.   Place back protection lid (PCB-COVER).

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 (mm2)	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

A

Outer sheath

Shielding braid

2

10

Outer sheath

Shielding braid

Inner sheath

3

B

Outer sheath

Shielding braid

Inner sheath

Conductor

4

Outer sheath

Shielding braid

Inner sheath

Conductor
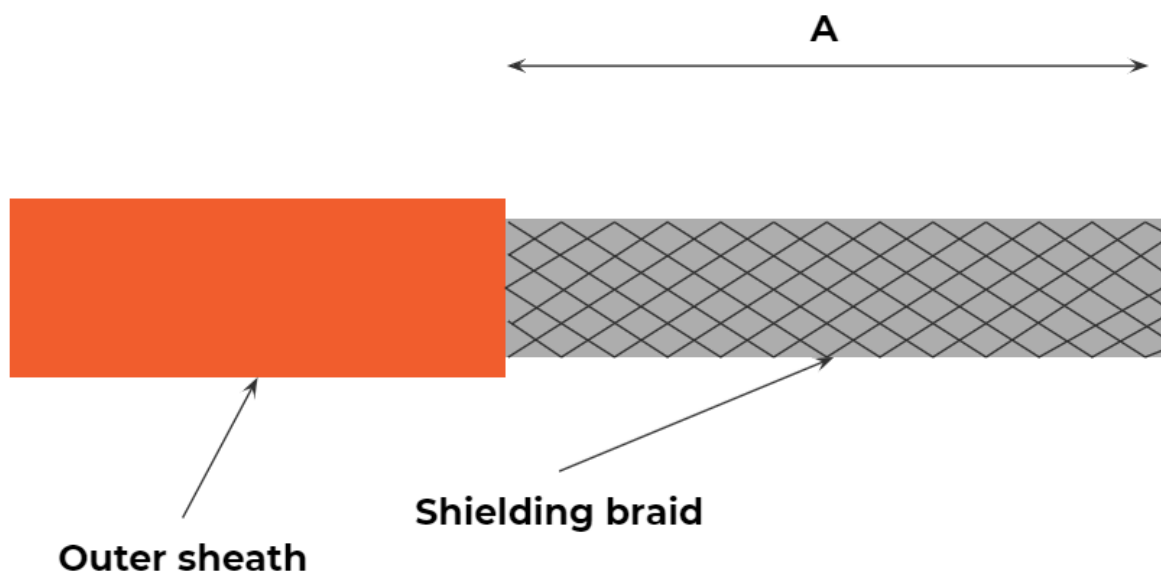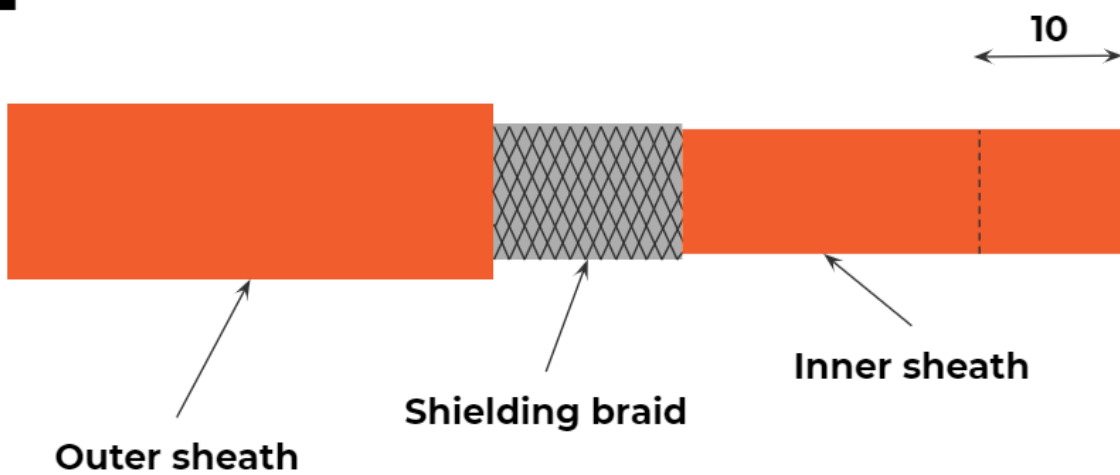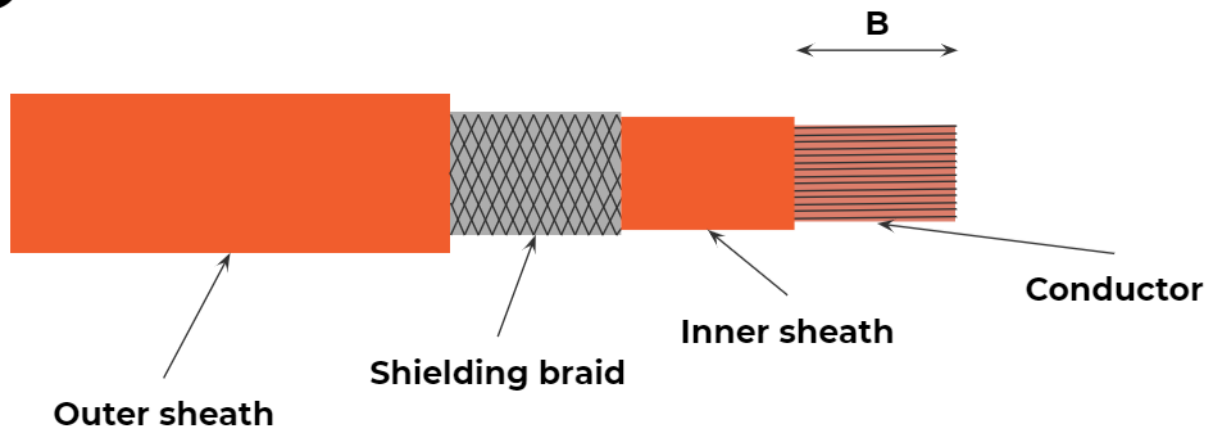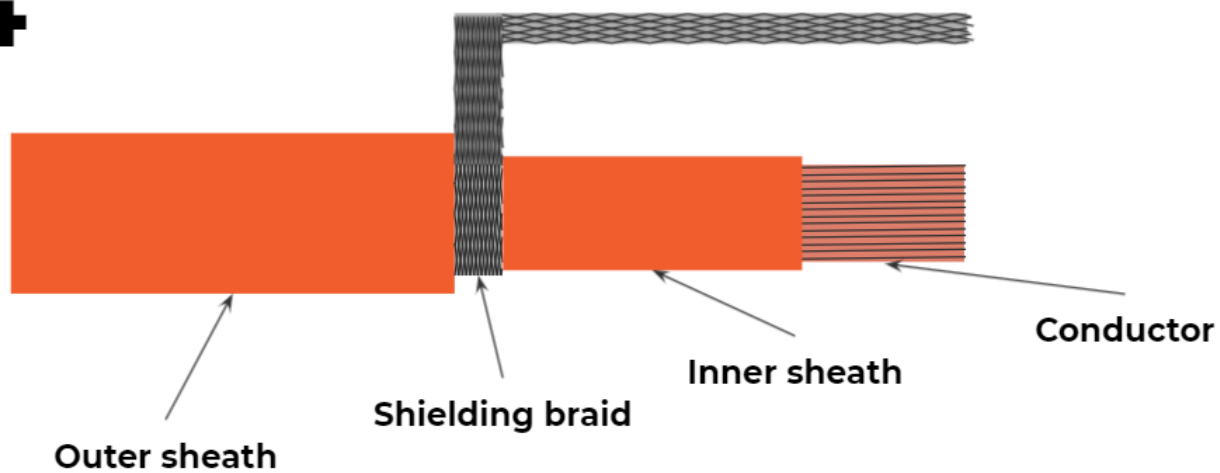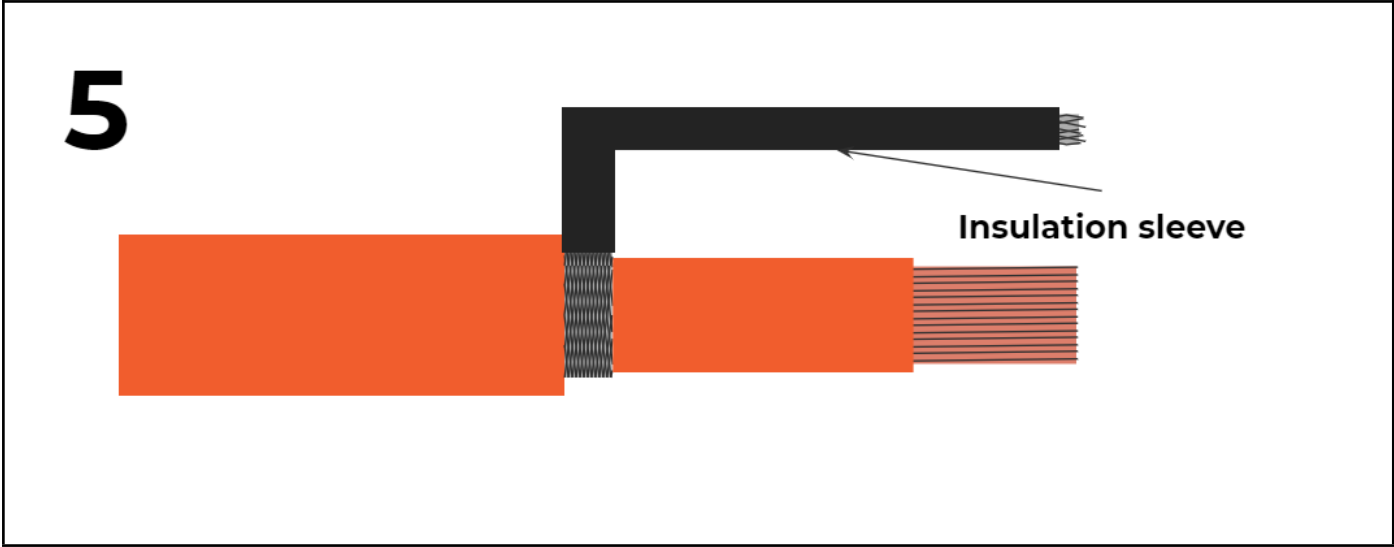
Insulation sleeve

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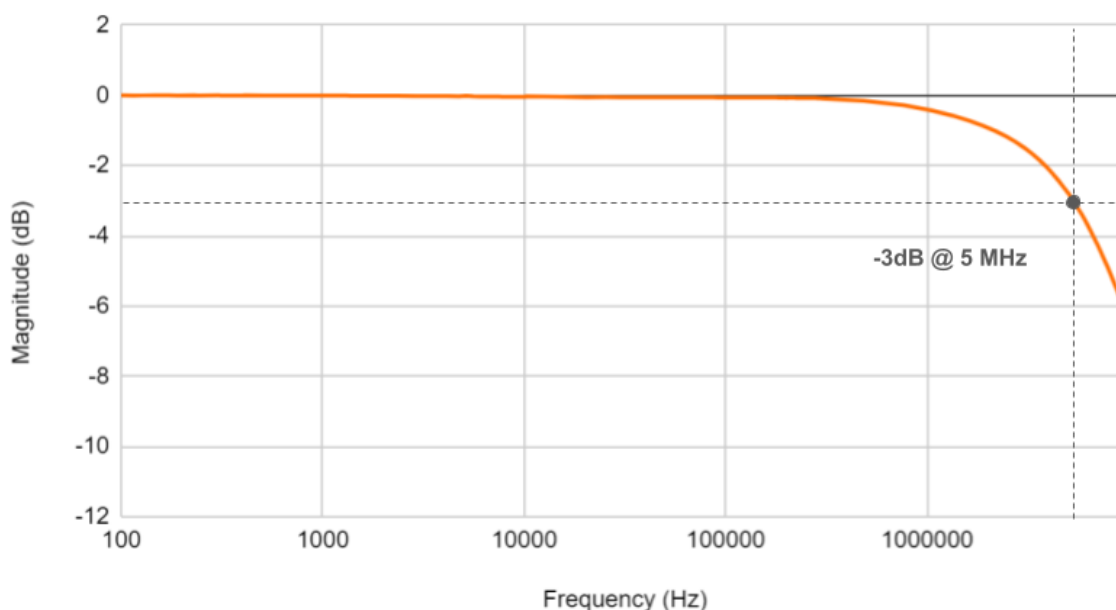
Image 45: Typical frequency response in high-bandwidth mode (Off)

7.2. High-bandwidth mode: Analog AAF 1 MHz LPF
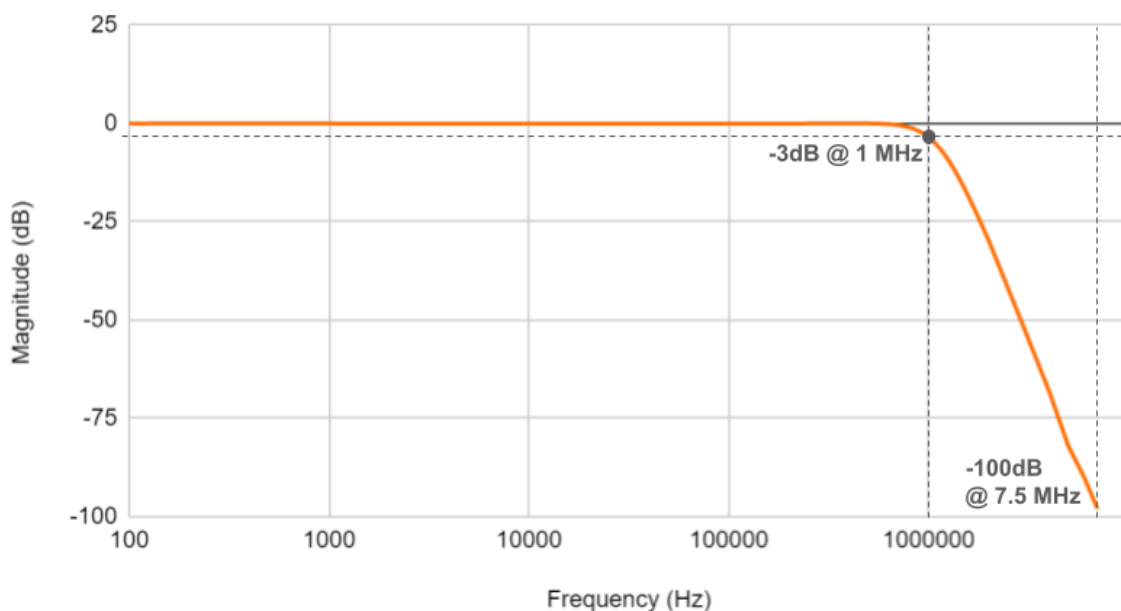
Image 46: Typical frequency response in high-bandwidth mode with analog anti-aliasing filter (1MHz)

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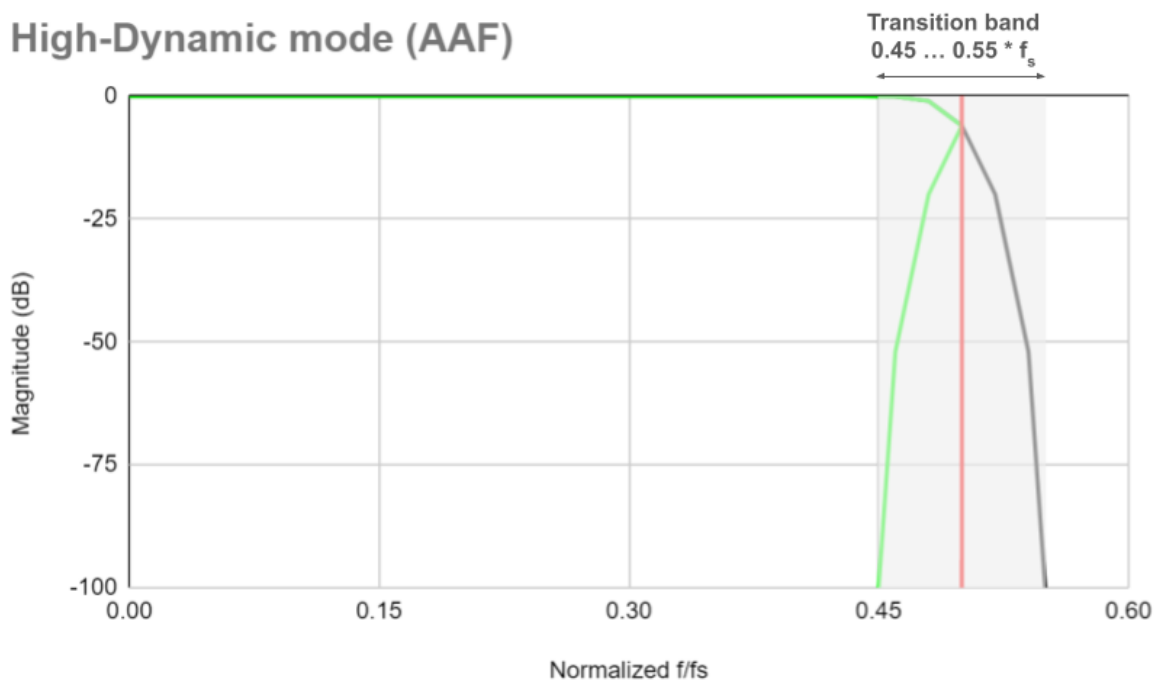
Image 47: Typical frequency response in high-dynamic mode with anti-aliasing filter (AAF) - Magnitude in dB.

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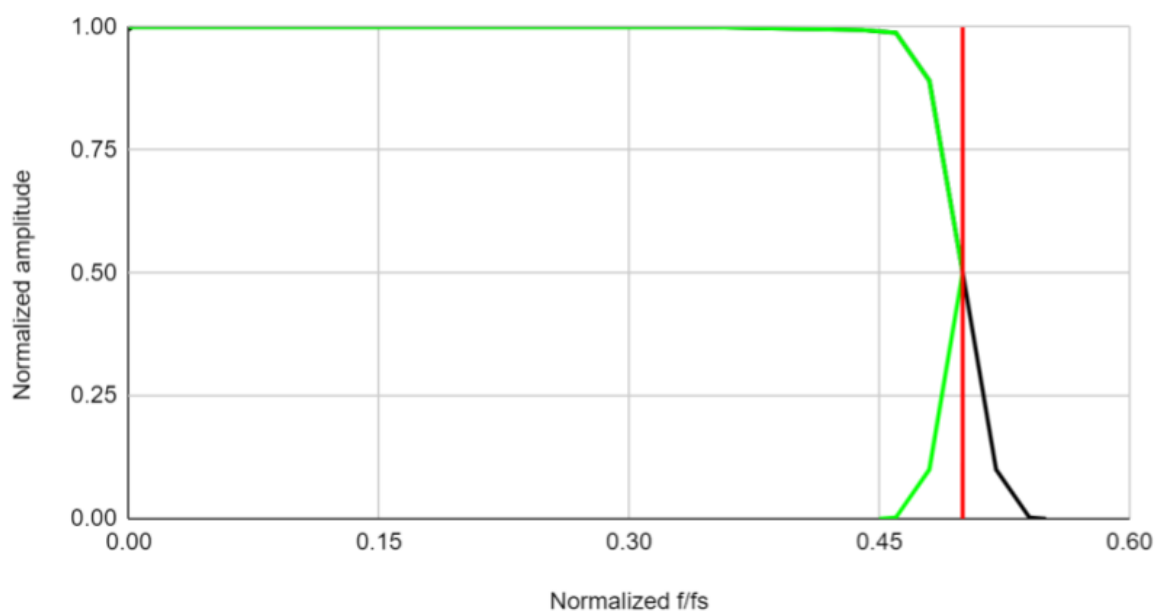
Image 48: Typical frequency response in high-dynamic mode with anti-aliasing filter (AAF) - Normalized amplitude.

8. Accessories

8.1. ETH-POWER-JUNCTION

ETH-POWER-JUNCTION combines data and power line for the SIRIUSi-XHS-PWR device. It is intended to be used with a single SIRIUSi-XHS-PWR unit.

> **!** **Warning**
> Current limit of ETH-POWER-JUNCTION is 3 A. It can be also used with EtherCAT devices, such as KRYPTON. In that case the current limit is 1.5 A.

Image 49: ETH-POWER-JUNCTION

8.1.1. ETH-POWER-JUNCTION Specifications

Data specification	
Data Uplink	GbE
Data Rate	1000 Mbps Full Duplex bus speed
Max. Power IN cable length	10 m
Connector type	RJ45
Power IN specification	
Power Supply	9-48 V DC
Max. Power IN cable length	10 m
Connector type	Lemo 1B 2-pin
Power OUT + Data specification	
Power Supply	Unregulated Power IN
Max. Power OUT cable length	10 m
Current	3 A per channel
Data Downlink	GbE
Data Rate	1000 Mbps Full Duplex bus speed
Connector type	Lemo 1B 8-pin
Environmental specification	
Operating Temperature	-40 to 70°C
Storage Temperature	-40 to 85°C
Shock & Vibration	Shock: SIST EN 60068-2-27:2009 (100 g, 6 ms) Random vibration

8.1.2. ETH-POWER-JUNCTION Connectors

Name	Connector	Description
POWER IN	L1B2m (EXJ.1B.302.HLD)	Power supply 9-48 V DC, LEMO 1B 2-pin male connector
PWR + DATA OUT	L1B8f (EXG.1B.308.HLN)	Combined power and data. Connection to SIRIUSi-XHS-PWR device using L1B8m-L1T8f-CAT7-Xm cable.
DATA IN	RJ45	Data transfer to SBOX, data logger or PC using RJ45-Xm cable..

8.2. DS-6xLAN-L1B

DS-6xLAN-L1B is a 6-port GbE network switch with 4 downlink ports on the front panel and 2 uplink ports on the back panel.Downlink ports have LEMO 1B Series 8-pin connectors with combined power and data. Uplink ports are RJ45.

> **!** **Warning**
> Current limit of DS-6xLAN-L1B is 3 A per channel. Total current limit of DS-6xLAN-L1B is 15 A.

Image 50: DS-6xLAN-L1B switch

8.2.1. DS-6xLAN-L1B Specifications

Switch	
Internal switch	IGS-5225-4T2S
Downlink ports	Front panel: 4x (1Gb) LEMO 8-pin: (EXG.1B.308.HLN) PWR+DATA
Uplink ports	Back panel: 2x (1Gb) RJ45 DATA only
ESD Protection	Air 8KV, Contact 6KV
Enclosure	IP50 aluminum case
LED Indicator	System: Power (Green) Per 10/100/1000T Ports: 10/100Mbps LNK/ACT (Orange) 1000 LNK/ACT (Green) Per SFP Interface: 100 LNK/ACT (Orange) 1000 LNK/ACT (Green)
Dimensions (W x D x H)	200x139x42 (196x135x35 without click-in mechanism)
Power IN/OUT	9-48 VDC input (LEMO 1B 2-pin) Power IN:EXJ.1B.302.HLD Power OUT: EXG.1B.302.HLN
Power Consumption (limit)	Typ. 13 W per downlink channel Max. 23 W per downlink channel
Current	3 A per channel (15 A total)
Max. cable length	10 m (PWR IN) 10 m (PWR+DATA) 10 m (DATA)
Standards Conformance	
Regulatory Compliance	FCC Part 15 Class A, CE EN 55011 (CISPR 11) EN61000
Stability Testing	IEC60068-2-32 (free fall) IEC60068-2-27 (shock) IEC60068-2-6 (vibration)
Standards Compliance	IEEE 1588v2 PTP Peer-to-peer End-to-end
Environment	
Operating Temperature	-40 to 70°C
Storage Temperature	-40 to 85°C
Humidity	5 ~ 95% (non-condensing)

8.2.2. DS-6xLAN-L1B Connectors

Name	Connector	Description
FRONT PANEL connectors		
OUT	L1B8f (EXG.1B.308.HLN)	4x GbE downlink ports. Combined power and data outputs. Connection to SIRIUSi-XHS-PWR devices using L1B8m-L1T8f-CAT7-Xm cable.
BACK PANEL connectors		
POWER IN	L1B2m (EXJ.1B.302.HLD)	Power supply 9-48 V DC, LEMO 1B 2-pin male connector.
POWER OUT	L1B2f (EXG.1B.302.HLN)	Daisy-chained power supply, LEMO 1B 2-pin female connector.
UPLINK	RJ45	2x GbE uplink ports, RJ45 connectors on copper transceiver.
GND	4mm safety Banana	Banana socket for grounding. In addition, there is also an M3 insert for grounding.

8.3. DS-6xLAN-RJ45

DS-6xLAN-L1B is a 6-port GbE network switch with 4 downlink ports on the front panel and 2 uplink ports on the back panel.Downlink ports have LEMO 1B Series 8-pin connectors with combined power and data. Uplink ports are RJ45.

> **!** **Warning**
> Current limit of DS-6xLAN-L1B is 3 A per channel. Total current limit of DS-6xLAN-L1B is 15 A.

Image 51: DS-6xLAN-RJ45 switch

8.3.1. DS-6xLAN-RJ45 Specifications

Switch	
Internal switch	IGS-5225-4T2S
Downlink ports	Front panel: 4x (1Gb) LEMO 8-pin: (EXG.1B.308.HLN) PWR+DATA
Uplink ports	Back panel: 2x (1Gb) RJ45 DATA only
ESD Protection	Air 8KV, Contact 6KV
Enclosure	IP50 aluminum case
LED Indicator	System: Power (Green) Per 10/100/1000T Ports: 10/100Mbps LNK/ACT (Orange) 1000 LNK/ACT (Green) Per SFP Interface: 100 LNK/ACT (Orange) 1000 LNK/ACT (Green)
Dimensions (W x D x H)	200x139x42 (196x135x35 without click-in mechanism)
Power IN/OUT	9-48 VDC input (LEMO 1B 2-pin) Power IN:EXJ.1B.302.HLD Power OUT: EXG.1B.302.HLN
Power Consumption (limit)	Typ. 13 W per downlink channel Max. 23 W per downlink channel
Current	3 A per channel (15 A total)
Max. cable length	10 m (PWR IN) 10 m (PWR+DATA) 10 m (DATA)
Standards Conformance	
Regulatory Compliance	FCC Part 15 Class A, CE EN 55011 (CISPR 11) EN61000
Stability Testing	IEC60068-2-32 (free fall) IEC60068-2-27 (shock) IEC60068-2-6 (vibration)
Standards Compliance	IEEE 1588v2 PTP Peer-to-peer End-to-end
Environment	
Operating Temperature	-40 to 70°C
Storage Temperature	-40 to 85°C
Humidity	5 ~ 95% (non-condensing)

8.3.2. DS-6xLAN-RJ45 Connectors

Name	Connector	Description
FRONT PANEL connectors		
OUT	RJ45	4x GbE downlink ports. Combined power and data outputs. Connection to SIRIUSi-XHS-PWR devices using L1B8m-L1T8f-CAT7-Xm cable.
BACK PANEL connectors		
POWER IN	L1B2m (EXJ.1B.302.HLD)	Power supply 9-48 V DC, LEMO 1B 2-pin male connector.
POWER OUT	L1B2f (EXG.1B.302.HLN)	Daisy-chained power supply, LEMO 1B 2-pin female connector.
UPLINK	RJ45	2x GbE uplink ports, RJ45 connectors on copper transceivers.
GND	4mm safety Banana	Banana socket for grounding. In addition, there is also an M3 insert for grounding.

8.4. D9fw-D9m-L00B4f-Xm-CAN-SYNC

The CAN-SYNC adapter cable combines CAN and sync signals on the DB9 connector. It gives the user an option to output IRIG signal from the SIRIUSi-XHS-PWR device.

Image 52: D9fw-D9m-L00B4f-Xm-CAN-SYNC adapter cable

8.4.1. Connectors

Name	Connector	Description
CAN-SYNC	D9f	Combo CAN+SYNC connector for connection to SIRIUSi-XHS-PWR device. Connection to SIRIUSi-XHS-PWR unit is IP67 rated.
CAN	D9m	For reading the CAN data
Sync	L004f	To output various synchronization source, such as IRIG-B-DC

8.5. DS-MOUNT-6

Aluminium mounting plate with easy click mechanism for mounting DS-6xLAN-L1B/RJ45 and DS-IRIG and DS-IRIG Clock. Fits also to SIRIUS slice, R2, R4, SBOX, BP2i, BP4i.
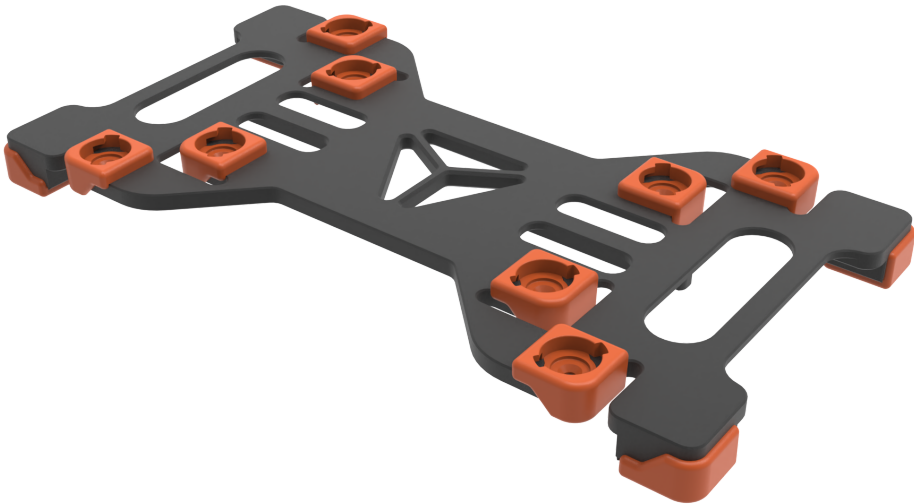

Image 53: DS-MOUNT-&
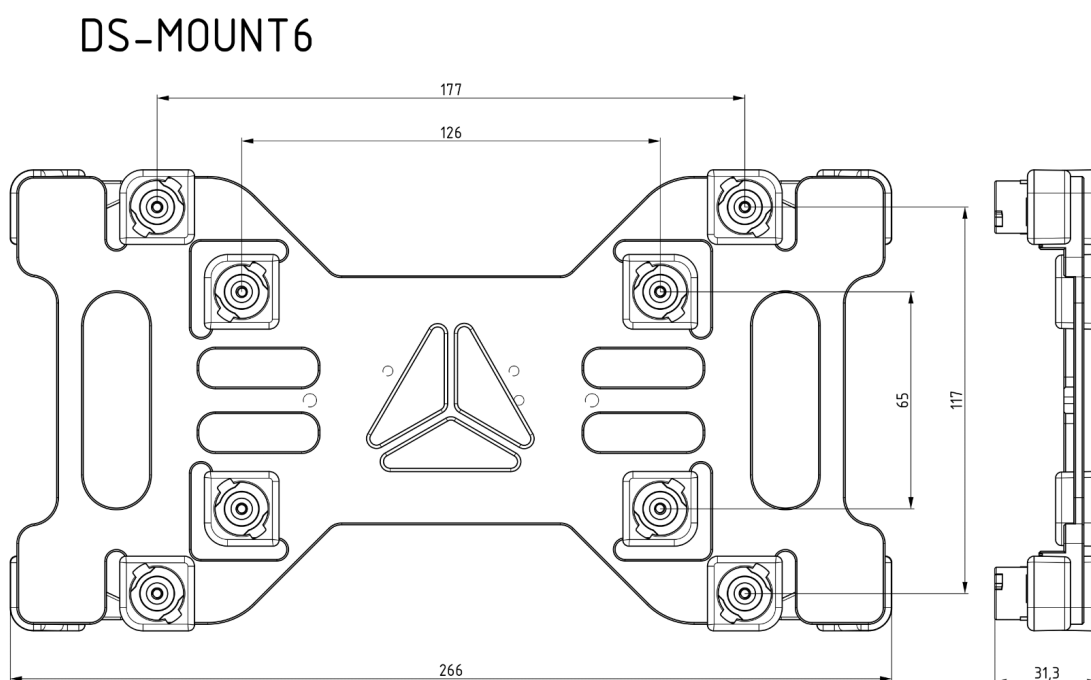
8.5.1. DS-MOUNT-6 Technical drawing

dimensions

Image 54: DS-MOUNT-6 dimensions

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 L1T8m 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 L1T8m 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 L1T8m 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-L1B	DS-6xLAN-L1B 6-port network switch; Downlink (PWR+DATA): 4x up to 1 Gbps: 4x L1B8f (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);
L1B8m-L1T8f-CAT7-Xm	CAT7 network cable to connect XHS-PWR (Lemo 1T) and DS-6xLAN-L1B switch (Lemo 1B) assuring PWR+DATA+SYNC. Cable length: max. 10 m
RJ45-L1T8f-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 L1B2f - 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	Sychronization cable; Fits to: All Dewesoft devices with L00B4m sync connector; Cable length: Xm
CL-SET-120	Cable lug set; 120 mm2 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 mm2 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 mm2 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 mm2 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 mm2 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 mm2 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/distributers.

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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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)