

SIRIUSi-XHS®

 **DEWESoft®**

TECHNICAL REFERENCE MANUAL

SIRIUSi-XHS® V26-2

HYBRID ADC
HIGH BANDWIDTH 5MHz @ 15 MS/s
ALIAS-FREE HIGH DYNAMIC UP TO 1MS/s



1.2. Online versions

1.2.1. Online SIRIUSi-XHS® technical reference manual

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

<https://dewesoft.com/download/manuals>

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

1.2.2. DewesoftX User Manual

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® manual can be found here:

<https://manual.dewesoft.com/x/introduction>



Important

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

2.2. Connecting SIRIUSi-XHS®

In this chapter, you can see the basic instructions for connecting SIRIUSi-XHS® devices over a 3.0 USB and RJ-45 Ethernet connection. Advanced connections are described in the following chapters.



Important

The XHS device is not supported on Windows 7 OS.

2.2.1. Connection over 3.0 USB

First connect the power supply cable (PS-120-L1B2f) to the PWR-IN 2-pin LEMO 1B male connector. Then connect the USB cable with the USB-C connector to the appropriate connector on the back of the XHS device. Finally, connect the other side of the USB cable with the USB-A or USB-C to 3.0 USB connector on the PC. The 3.0 USB connector is usually coloured blue.



Connection over 3.0 USB

When the device is connected via 3.0 USB the device is automatically detected and added to the HW list and all 8 channels can run with the full sample rate of 15 MS/s.



Important

A **good quality USB 3.0** cable needs to be used otherwise the device can be recognized as a 2.0 USB device and can not acquire data at high sampling rates (higher than 1M). Recommended cable length for standard cable is up to 1.8 m. For longer cables, an active fibre extender can be used; [more in accessories](#).



Important

When using a 3.0 connection the default **Windows power settings** turn off the device after some time. This setting can be turned off in Windows power-saving settings. This is mostly important for long-term measurement

2.2.2. Connection over EtherNET

First, connect the power supply cable (PS-120-L1B2f) to the PWR IN 2-pin LEMO 1B male connector. Then connect the Ethernet Cable with the RJ-45 connector to the appropriate GLAN connector on the back of the XHS device. Finally, connect the other side of the ethernet cable to the LAN port of the PC.

When the connection is established over ethernet the device is automatically added only if connected directly to PC, if any switch is in between you will need to add the device manually. When the device is added also all the RT features and modules in DewesoftX are available.



Connection over Ethernet

2.2.2.1. Ethernet configuration on the PC

A SIRIUSi-XHS® can work in two different operation modes.

Sirius-XHS® will be properly connected to DewesoftX software when the IP address of the device and the IP address of the network card, where the device is connected, are in the same subnet. More information is available in the [FAQ](#) section.

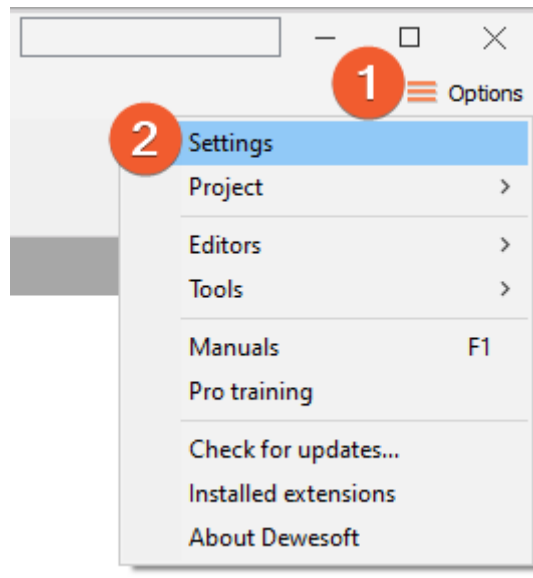
Warning



As a network device with DHCP enabled it can use dynamic IP assignment. The DHCP server has to be running to locate the device with DewesoftX software. When a DHCP-enabled device is connected to a network without a DHCP server, the device has no IP address configuration and it is unreachable over the network. Locating the device in that scenario is described in the [FAQ](#) section.

2.2.2.2. DewesoftX settings for SIRIUSi-XHS®

The connected device will show up in the DewesoftX settings. 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.



Settings in DewesoftX

In case the SIRIUSi-XHS® device is connected via USB, the device will automatically be listed under the Dewesoft devices.

In case the device is connected via Ethernet, the device is treated as a RT connection. To add it to the DewesoftX you can use multiple procedures which are described in the following chapter

2.2.2.3. 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 a network switch then the devices will be automatically detected but will not be automatically added to the HW settings list. All the found devices will be listed in the Network devices settings. The devices can be easily added by pressing the plus button.



Important

DewesoftX has to be set as a firewall exception, otherwise, Windows can block connection to the device. In the [FAQ](#) section, you can find the chapter describing the procedure.

2.2.2.5. Sample rate

When connecting the device via Ethernet there is a limitation of sample rate, depending on how many channels we want to use. Take notice that the SIRIUSi-XHS device has a 1Gbit Ethernet port. Channels up to 2MS/s can be filtered and if filtered their sample size is 4B. Channels above 2MS/s are unfiltered with a sample size of 2B.

Nr. of channels used in measure	Max sample rate per channel
2	15 MS/s
4	7.5 MS/s
6	5 MS/s
8	2 MS/s



Important

You can run all 8 channels on SIRIUSi-XHS® device on 2 MS/s if you have a good PC with an embedded network card. We do not recommend using a USB-Ethernet adapter as its performance can be poorer.

2.3. Synchronization

Before measurement you need to set the synchronization for the used system. The synchronization is set in HW settings under the Local system. When only one SIRIUSi-XHS® device is connected, the synchronization can be set as “Standalone”.



Synchronization options

When you have more than one device connected in system configuration, you can either choose between External time synchronization or you can choose XHS device to be a master synchronization source.

As an external source the SIRUSi-XHS® device accepts the following synchronization signals:

- PPS
- PTPv2
- IRIG-B-DC

The SIRIUSi-XHS device can generate (can be a master source for other devices) the following signals (For both options to be enabled please use the latest FW on the web-page):

- PTPv2
- IRIG-B-DC



Hint

When the SIRIUSi-XHS device is connected over USB, PTP synchronization can be used if the device is simultaneously connected over Ethernet.



Important

GPS synchronisation is not currently supported. Synchronization works relative to the PPS signal and not to the absolute GPS time.

2.3.1. System configuration with multiple devices synchronized with PTPv2

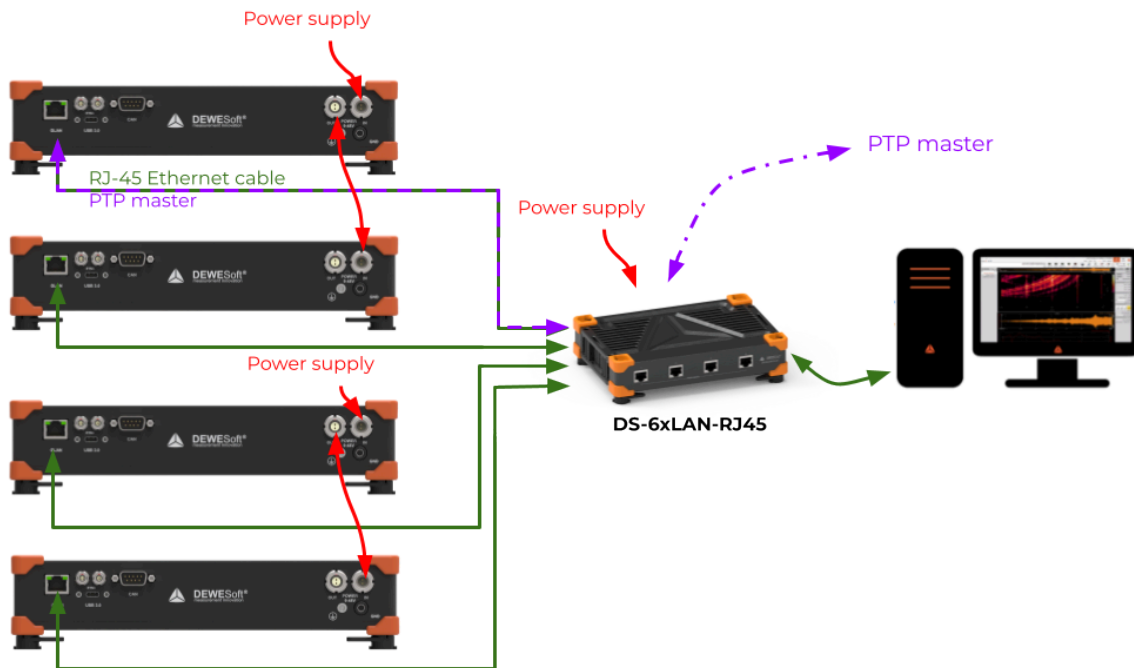
When you use multiple SIRIUSi-XHS® devices in one system configuration and want to synchronize them with PTP they need to be connected to the same Ethernet switch that also supports the PTP synchronization. For this purpose, a Dewesoft DS-18xLAN-RJ45 switch can be used. The switch is described in the [Accessories chapter](#).



Warning

Don't start the RT mode if devices are not synchronized.

When going to a measurement screen, devices need a certain amount of time to be synchronized. With PTP synchronization it can take up to 60 seconds.



System configuration over EtherNET with PTP synchronization

The SIRIUSi-XHS can work in two different configurations; as a PTP master or PTP slave. SIRIUS-XHS device does not support the free mode option of the PTPv2 synchronization, where the devices decide which device is the master clock and which are then set in slave mode.

When the device is a PTP master, its synchronization settings must be set to “PTP out”. When there is another PTP master in the measurement chain, the device can become a PTP slave, with synchronization settings set to “PTP in”.

2.3.1.1. Recommended/Tested PTPv2 switches

Other PTP switches that were tested and are confirmed from our site:

- DS-6xLAN-RJ45
- PLANET IGS-5225-4T2S
- PLANET IGS-5225-8P2S2X
- Cisco Catalyst IE3200

2.3.2. A system with old-generation devices and SIRIUS-XHS (PTPin-IRIGout option)

SIRIUSi-XHS® can be used as a bridge between the PTP and IRIG-B synchronization. The SIRIUS-XHS devices can be synchronized with the PTPv2 signal and in the same step output the IRIG-B signal to other devices in the measuring chain that only supports IRIG-B. That means you can use our older generation SIRIUS devices with the new XHS ones in one measurement.

3.1. Main features

- **HYBRID ADC SIGNAL CONDITIONING TECHNOLOGY:** HybridADC offers the best of both worlds. The high dynamic alias-free acquisition of 32-bit ADC systems with up to 2 MS/s acquisition rate and high bandwidth (5MHz) of 16-bit ADCs up to 15 MS/s. Modes are software selectable for every input channel.
 - **HIGH-SPEED DATA ACQUISITION - 15 MS/s @ 5 MHz BANDWIDTH:** SIRIUS XHS offers up to 15 MS/s sampling rate with 5 MHz bandwidth. It captures transients down to microsecond levels. The sampling rate is software selectable for every analogue input channel.
 - **HIGH DYNAMIC ALIAS-FREE ACQUISITION:** SIRIUS XHS implements alias-free filtering which allows the acquisition of analogue signals with up to 150 dB dynamic range at 2 MS/s sampling rate.
- **PERFECT SYNCHRONIZATION:** even though users can select some channels to be high bandwidth and some to be alias-free, filtering is made in a way that all signals are perfectly time aligned with zero phase shift.
- **MODERN DATA INTERFACES:** GLAN interface allows the distribution of devices with PTPv2 synchronization; the USB3 interface allows the fastest data transfers with a quick connection to the computer.
- **OPEN PROTOCOLS:** data is transferred to any host using open OPC UA industry-standard protocol; in parallel the data is available over XCP protocol, allowing connection to ECU calibration software packages.
- **HIGH GALVANIC ISOLATION:** High channel-to-channel and channel-to-ground isolation up to CAT II 1000V prevents damage to the systems from excessive voltage and avoids ground loops.
- **SMALLEST FORM FACTOR:** With the standard Sirius size you can easily carry the XHS in your backpack along with your laptop for field measurements.
- **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.

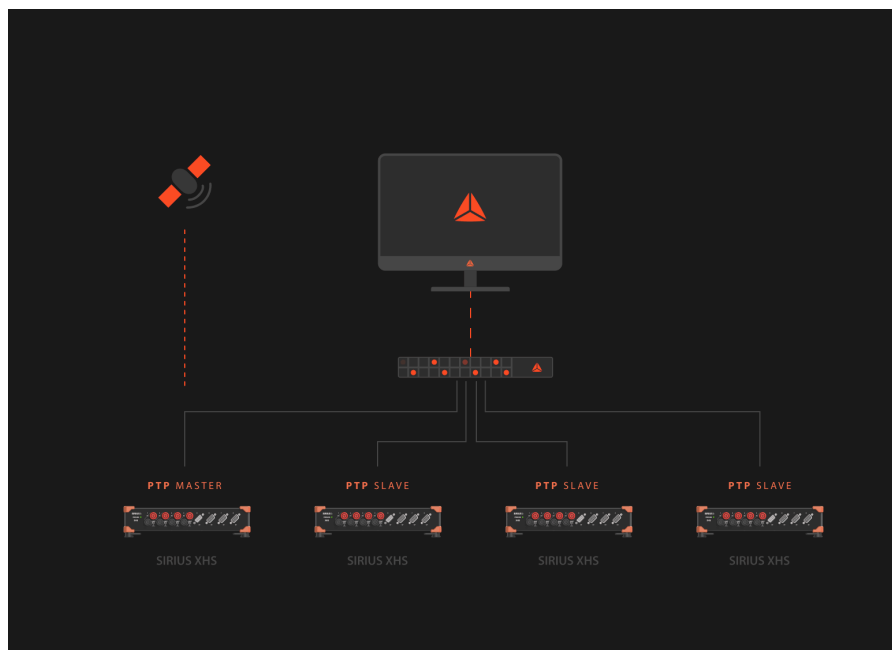
3.1.1. Hybrid ADC technology

User can select for each channel two modes of operation:

- High bandwidth mode:** with 5 MHz bandwidth and 15 MS/s 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.
- Alias free mode:** up to 2 MS/s data can be acquired with extremely high dynamic range, similar to 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 SIRIUSi-XHS® you can select channel per channel, depending on the application, the appropriate mode of ADC operation.

3.1.2. 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 device, data can be synchronized to other data sources, such as vehicle bus interface, GPS, IMU, video, and others.

Devices can be synchronized with each other using the PTPv2 mechanism, IRIG or PPS signal. This also provides absolute time synchronization using in-house time servers or GPS.

3.1.3. Open interface protocols

In today's world of open toolchains 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 output RT: 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 2 MS/s.

CAN: All SIRIUSi-XHS devices support the CAN read and transmit option.

CAN output RT: When the device is connected over the network, the RT mode can be enabled. The RT mode also enables the possibility to transfer data over the CAN protocol. Currently, the maximum output rate over CAN in RT mode is 1000 Hz.

3.1.4. Data Acquisition Software Included for Free

All Dewesoft data acquisition systems are bundled with award-winning DewesoftX Professional DAQ software. DewesoftX is the world's most advanced and easy-to-use data acquisition and analysis software. DewesoftX'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.

3.2. System specifications

3.2.1. Modular system specifications

Power specs	
Power Supply	9 - 48 V DC
Power consumption	Typ. 30 W
Environmental	
Operating Temperature	-10 to 50 °C
Storage Temperature	-40 to 85 °C
Humidity	5 to 95 % RH non condensing @ 60 °C
IP rating	IP20
Shock & Vibration	Shock (EN 60068-2-27:2009) 75 g, 6 ms, half-sine (25x pos./neg in each axis) Random Vibration (EN 60721-3-2: 1997 - Class 2M2) Sweep sinus Vibration (EN 60068-2-6:2008)
Dimensions	266 mm x 149 mm x 55 mm 266 mm x 149 mm x 69 mm (extended slice)
Weight	2,4 kg
Interfaces	
Ethernet	1 GbE (XCP, OPC UA) incl. IEEE1588v2 synchronization (PTP) (RJ45)
USB	USB 3.0 (Type C)
CAN	CAN 2.0, CAN-FD (DSUB9)
Sync Input/Output	
Level (Input/Output)	TTL compatible
Max. Output Current	±24 mA (±50 mA for 1 sec)
Synchronization	
Delay between slices	± 1 µs (to the reference clock)
Max. Sync-cable length	100 m (Master/Slave), 200 m (IRIG)

3.4. Single slice: Rear side

The SIRIUSi-XHS® chassis has the following connectors at the rear side:



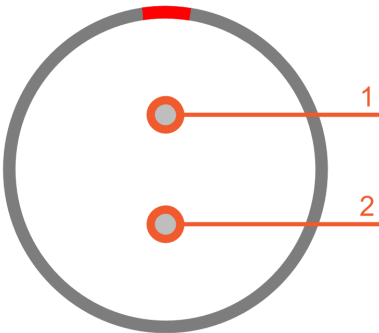
SIRIUSi-XHS® Rear side

Name	Description
CAN	CAN bus DSUB-9 male connector
SYNC	Two 4-pin LEMO 00 series female sync connectors
USB	USB-C to transfer the data to the SBOX or PC
GND	Protective Ground banana plug and M4 screw insert.
POWER IN	2-pin LEMO 1B series male connector
POWER OUT	2-pin LEMO 1B series female connector
GLAN	RJ-45 connector

3.5. Connectors

3.5.1. Power supply

3.5.1.1. Power in connector

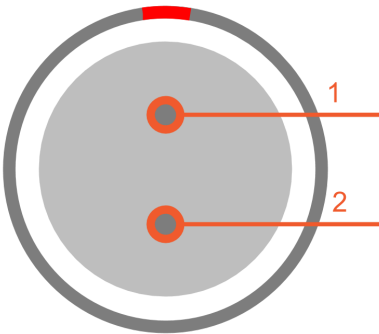


Pin	Name	Description
1	V +	Supply
2	V -	Ground

Power in connector: pin-out (2-pin LEMO male)

Power In connector (on the device): ECJ.1B.302.CLD
Mating connector (for the cable): FGJ.1B.302.CLLD52Z

3.5.1.2. Power out connector



Pin	Name	Description
1	V+	Supply
2	V-	Ground

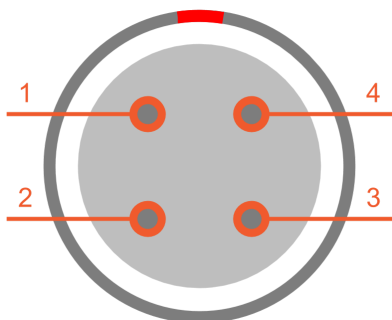
Power out connector: pin-out (2-pin LEMO female)

Power Out connector (on the device): ECG.1B.302.CLN
Mating connector (for the cable): FGG.1B.302.CLAD52Z

The Power Out power plug can be used to daisy-chain several devices together. Daisy chain cable: L1B2m-L1B2f

3.5.2. SYNC connector

The sync connectors are required when you want to use multiple SIRIUSi-XHS® slices in the same system configuration. The signal that is transferred over this cable makes sure that the measurement data of the different slices are perfectly synchronized with each other.



Sync connector: pin-out (4-pin LEMO female)

Pin	Name	Description
1	CLK	Clock
2	Trigg	Trigger
3	GPS-PPS	GPS - PPS
4	DGND	Digital Ground

Interface connector: EEG.00.304.CLL

Mating connector: FGG.00.304.CLAD27Z

Important



When IRIG-synchronization is used, the IRIG differential signals are on pins 1, 2.
When PPS-GPS synchronization is used, the PPS signal is on pin 3.
Clock / Trigger option is not supported.

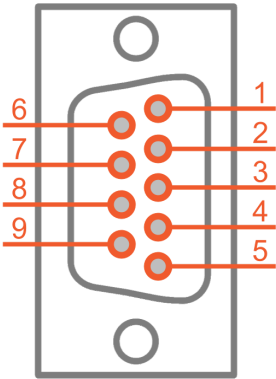


Sync cable

3.5.3. CAN / CAN-FD

A Controller Area Network (CAN bus) is a vehicle bus standard often used in automotive applications. SIRIUSi-XHS slices have a CAN connector (DSUB9) on the backside, with CAN or CAN-FD available.

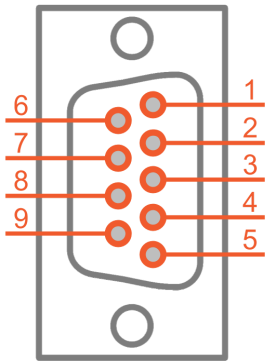
Up to Hardware version 1.4



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

Pin	Name	Description
1	RES	Reserved
2	CAN_LOW	CAN low
3	DGND	Digital Ground
4	RES	Reserved
5	+5 V	5 V, 100 mA supply
6	RES	Reserved
7	CAN_HIGH	CAN high
8	RES	Reserved
9	RES	Reserved

Hardware version 1.6 and later



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

Pin	Name	Description
1	+5V	5 V supply (max. current: 500 mA)
2	CAN_LOW	CAN low
3	DGND	Digital Ground
4	RES	Reserved
5	RES	Reserved
6	DGND	Digital Ground
7	CAN_HIGH	CAN high
8	RES	Reserved
9	+12V	12 V supply (max. current: 200 mA)



Important

CAN RT transmit is currently supported up to 1 kHz with and without transmit delay.



Important

CAN-FD is supported only on devices that have the compatible hardware, hardware version 1.6 and later.



Important

Oscillator frequency is 40 MHz for CAN-FD and 10 MHz for CAN.

3.5.4. GND connector

For correct measurements, it is highly recommended to ground the SIRIUSi-XHS®. The GND connector is usually a banana connector.



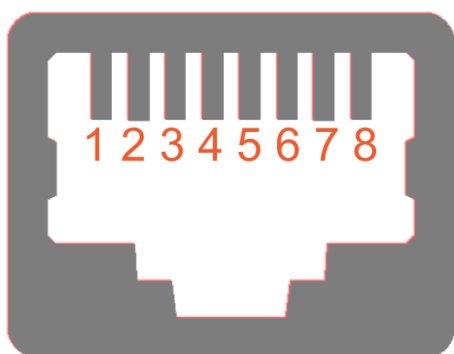
Warning

It is mandatory to connect a ground cable to the GND connector when you are working with high voltages: e.g. when you are working with the HV modules.

3.5.5. Ethernet Connector

The connector used on the device is a standard ethernet connector (RJ45).

A standard ethernet cable with a standard connector can be used to connect SIRIUSi-XHS® with a PC.



GLAN connector: pin-out (RJ-45 female)

Pin	Name	Description
1	Tx A+	Transmitting pair A+
2	Tx A-	Transmitting pair A-
3	Rx B+	Receiving pair B+
4	Tx C+	Transmitting pair C+
5	Tx C-	Transmitting pair C-
6	Rx B-	Receiving pair B-
7	Rx D+	Receiving pair D+
8	Rx C-	Receiving pair C-

Each RJ45 connector has two LEDs:

- **GREEN** LED indicates that SIRIUS-XHS is connected to another device (PC, SBOX etc).
- **YELLOW** LED is active only when the data transfer is active.

3.5.6. USB connector

The USB connector is used to connect the SIRIUSi-XHS device and transfer the data to the SBOX (or PC). With XHS devices type USB-C connector is used. **USB 3.0** has a maximum signalling rate of 5 Gbit/s.



USB-C connector on the device

4. SIRIUSi-XHS® measurement modules

4.1. SIRIUSi-XHS® slice configuration

SIRIUSi-XHS® device is currently only available in a standalone single slice version.

4.1.1. Standard modular slices

4.1.1.1. SIRIUSi-XHS-4xHV-4xLV



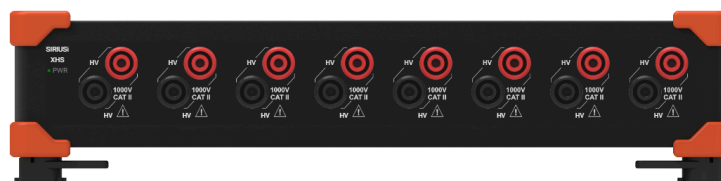
SIRIUSi 4xHV-4xLV

4.1.1.2. SIRIUSi-XHS-4xHV-4xLV-BAN



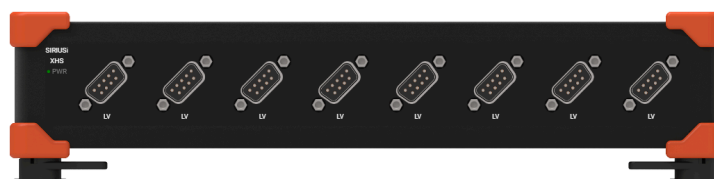
SIRIUSi 4xHV-4xLV-BAN

4.1.1.3. SIRIUSi-XHS-8xHV



SIRIUSi 8xHV

4.1.1.4. SIRIUSi-XHS-8xLV



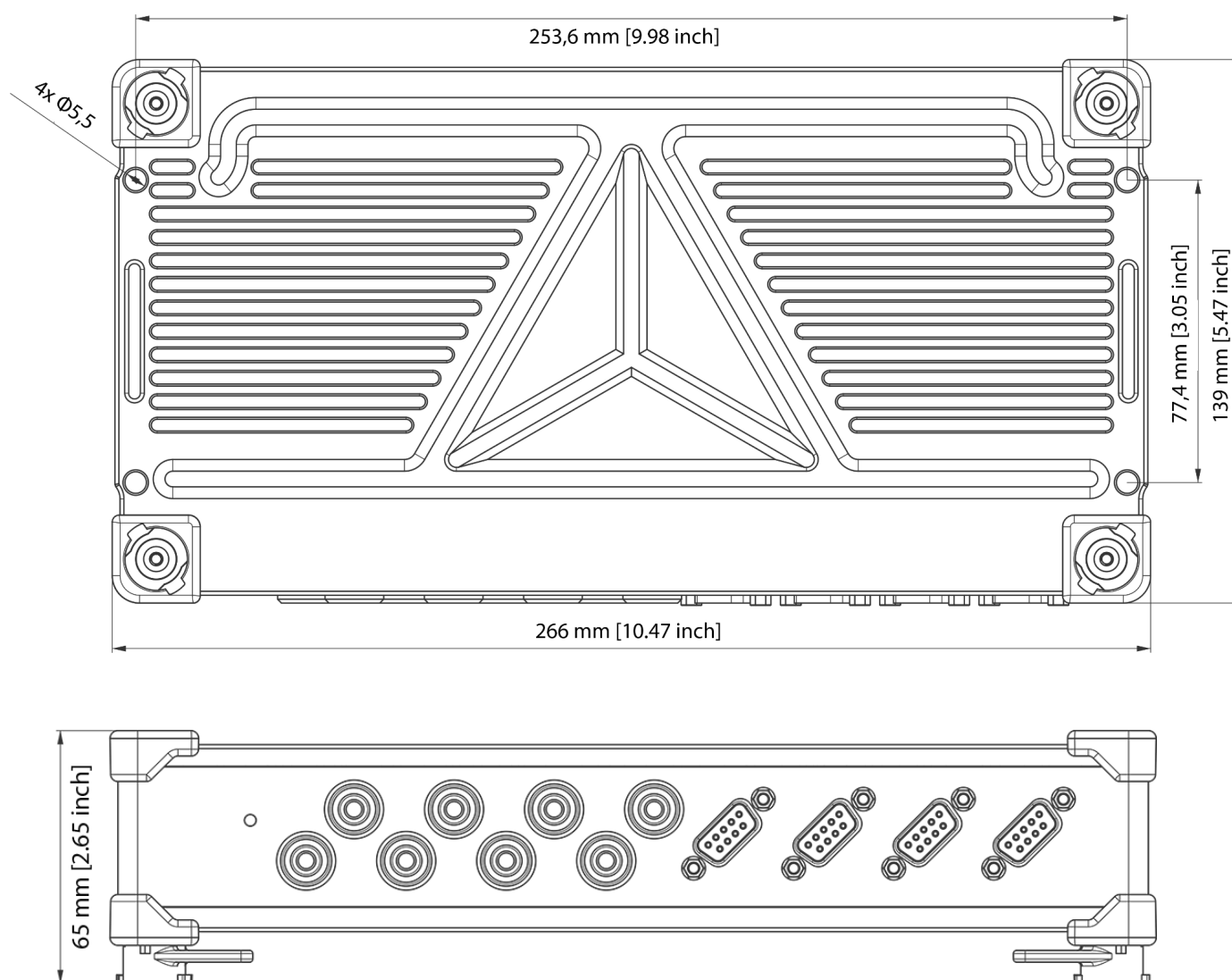
SIRIUSi 8xLV

4.2. SIRIUSi-XHS® specifications

	XHS-HV	XHS-LV	XHS-ACC	XHS-UNI	XHS-CHG
Connectors	BANANA	DB9, BNC, BANANA	BNC	DB9	BNC
Channels per slice	8	8	8	8	8
Data rate / channel	15 MS/s	15 MS/s	15 MS/s	15 MS/s	15 MS/s
Resolution	16-bit (24-bit @ 2 MS/s)	16-bit (24-bit @ 2 MS/s)	16-bit (24-bit @ 2 MS/s)	16-bit (24-bit @ 2 MS/s)	16-bit (24-bit @ 2 MS/s)
Bandwidth	5 MHz	5 MHz	5 MHz	5 MHz	5 MHz
Voltage ranges	±2000 V ... ±200 V	±100 V ... ±50 mV	±10 V ... ±200 mV	±100 V ... ±50 mV	±10 V ... ±100 mV
Input coupling	DC	DC, AC 1 Hz	DC, AC 0.1 Hz, AC 1 Hz	DC, AC 0.1 Hz, AC 1 Hz	
Sensor excitation	✗	2.5..30 V bipolar, 2..24 V unipolar, max. 0.2 A / 2 W	IEPE 2 mA, 4 mA, 8 mA, 12 mA, 16 mA, 20 mA	Voltage; Unipolar and Bipolar 0.15 V .. 24 V Current: 100 µA - 100 mA, IEPE	IEPE 2 mA, 4 mA, 8 mA, 12 mA, 16 mA, 20 mA
Bridge connection	✗	✗	✗	✓	✗
Programmable shunt	✗	✗	✗	✗	✗
IEPE input	✗	DSI-ACC	✓	✓	✓
Resistance	✗	✗	✗	✓	✗
Temperature (PTx)	✗	DSI-RTD	✗	✓	✗
Thermocouple	✗	DSI-TH	✗	DSI-TH	✗
Potentiometer	✗	✗	✗	✗	✗
LVDT	✗	DSI-LVDT	✗	DSI-LVDT	✗
Charge	✗	DSI-CHG	✗	DSI-CHG	✓
Current	✗	ext. shunt DSI20mA, DSI5A	ext. shunt	ext. shunt DSI20mA, DSI5A	ext. shunt
TEDS	✗	✓	✓	✓	✓
Isolation voltage	CATII 1000 V	420 Vdc (300 Vacrms)	140 Vdc (100 Vacrms)	420 Vdc (300 Vacrms)	100 Vdc (100 Vacrms)
Maximum Power consumption	28 W	57 W	45 W	49 W	43 W
Advanced functions	High voltage, high bandwidth, high isolation	High sensor excitation and multi range	Sensor error detection, high speed	Sensor error detection, high speed	High-bandwidth and DC charge
Optional counters	✓	✓	✓	✓	✓

Rev: 1782974900

4.3. SIRIUSi-XHS® dimensions



Dimensions of SIRIUSi-XHS device

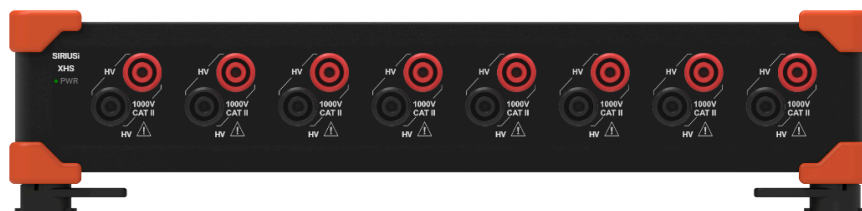
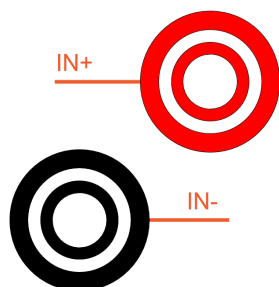
4.5. HV: Specifications

The HV modules offer safety and isolation for high voltage measurements up to 2000 V.

Inputs					
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 Mode					
Ranges	±2000 V, ±1000 V, ±400 V, ±200 V				
Input Accuracy	Signal frequency	Accuracy			
	DC to 1 kHz	±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	-84 dB	-82 dB	-79 dB	-75 dB
	1 MS/s	-95 dB	-93 dB	-85 dB	-78 dB
	100 kS/s	-108 dB	-106 dB	-100 dB	-95 dB
	10 kS/s	-117 dB	-115 dB	-109 dB	-104 dB
CMR, Typ.	101 dB @ 50 Hz, 74 dB @ 400 Hz				
Channel Crosstalk	-116 dB typ. @ 50 Hz, -89 dB typ. @ 1 kHz				
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				
Overvoltage category	CAT II 1000 V				
Maximum input voltage	2000 Vdc or 2000 Vpk (1414 Vacrms)				
Additional Specifications					
Input connector	Banana				
Rev: 1698322800					

4.5.1. HV: Banana connector

4.5.1.1. HV: Banana connector Pinout



SIRIUSi-XHS-8xHV

HV connector: pin-out (Banana plug)

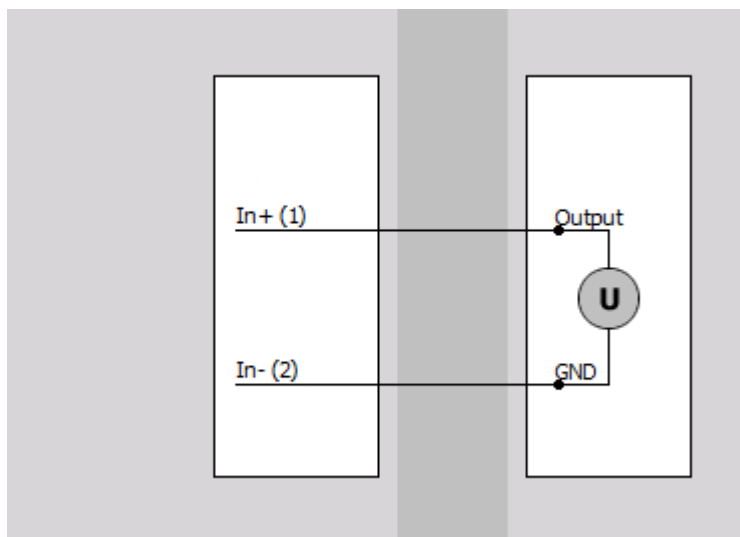


Warning

It is mandatory to connect a ground cable to the GND connector of the SIRIUS® when you are working with high voltages.

4.5.1.2. HV: Banana connector Wiring diagram

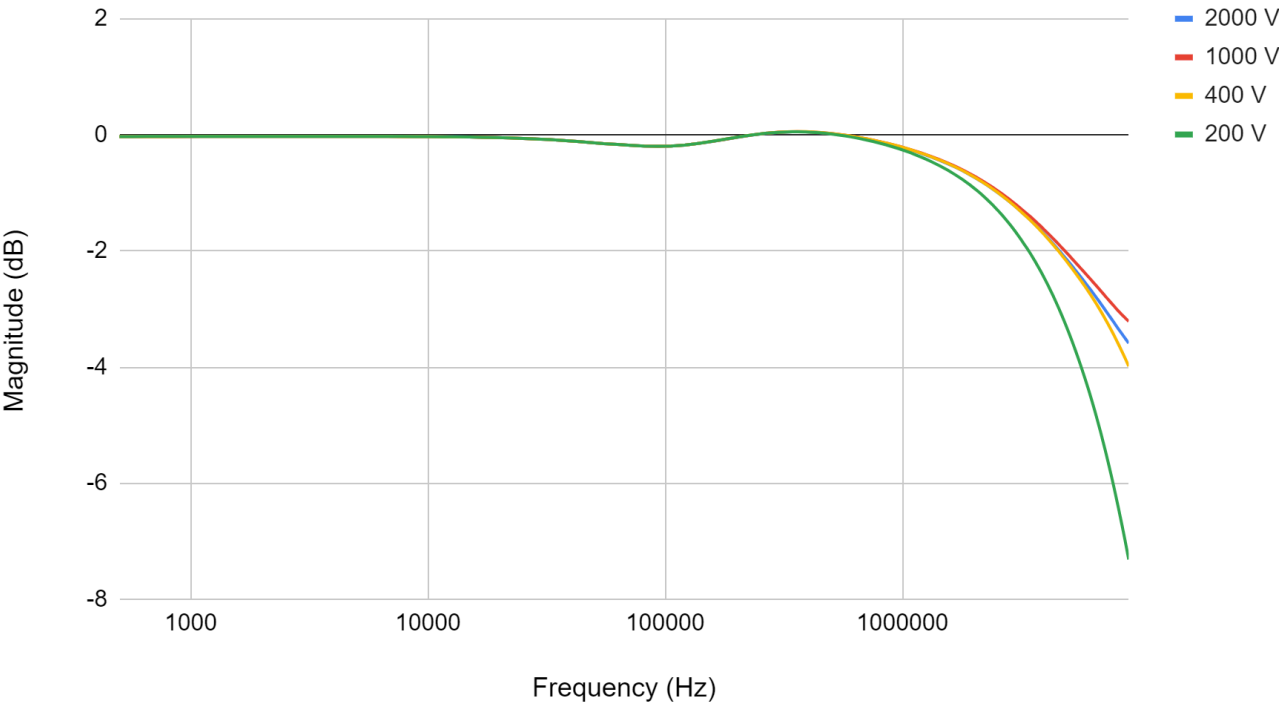
4.5.1.2.1. Voltage



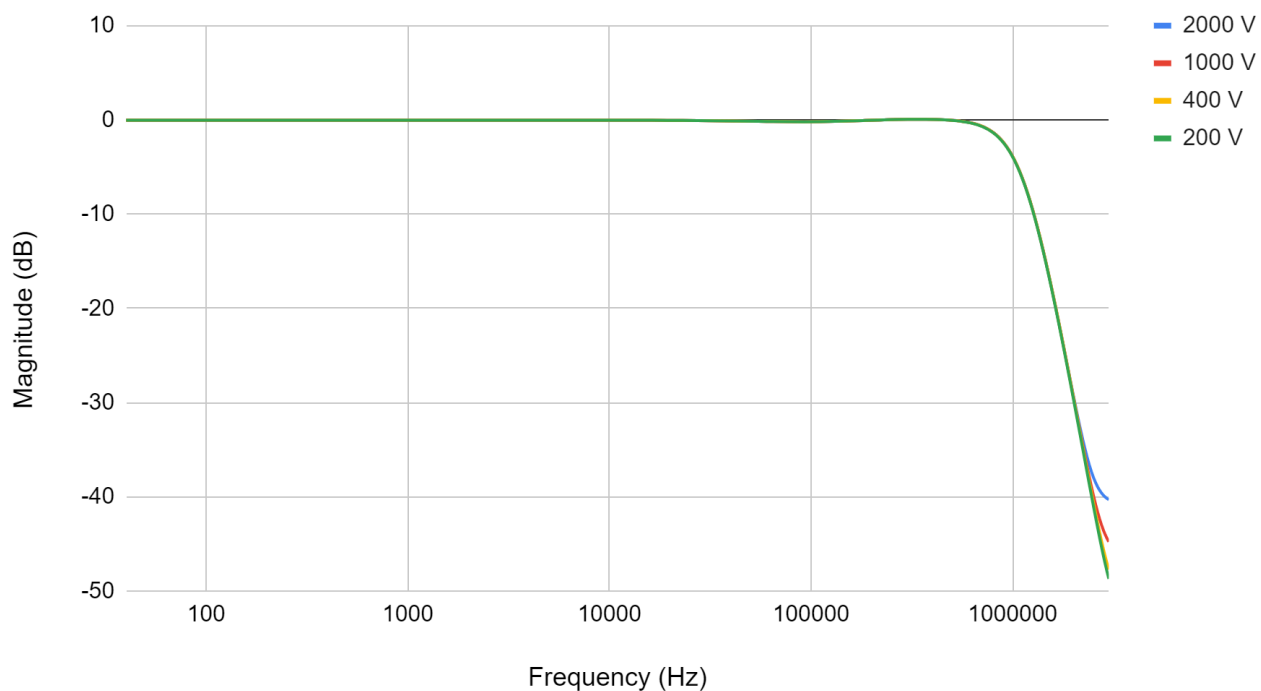
4.5.2. Magnitude response

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

XHS-HV High-Bandwidth LP off

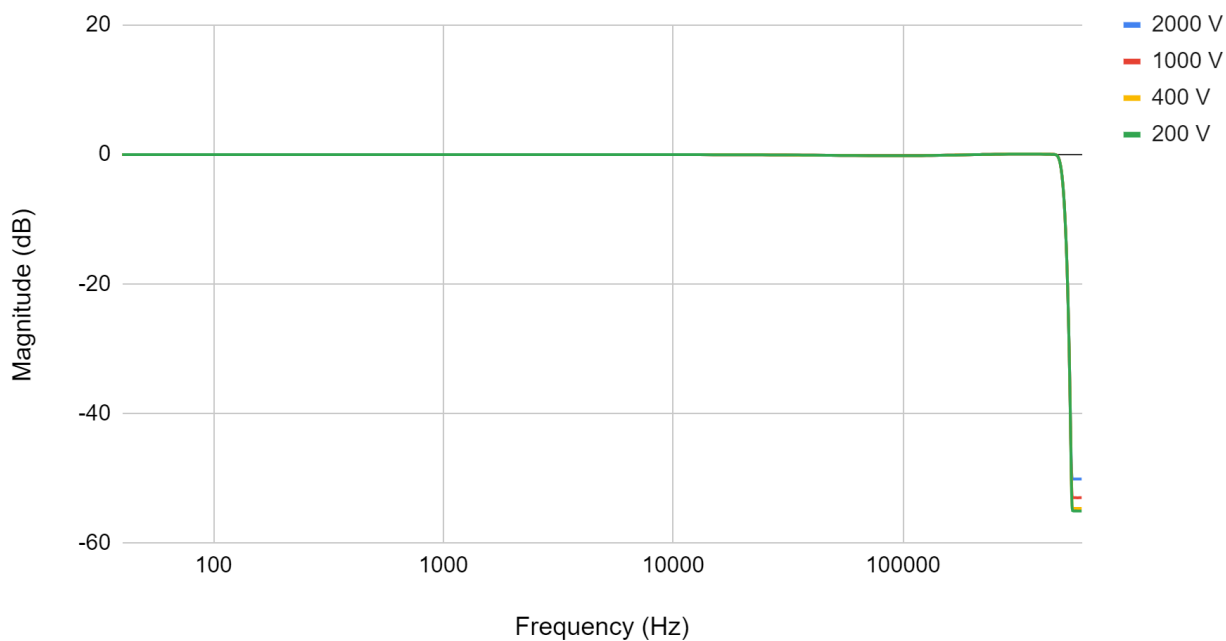


XHS-HV High-Bandwidth LP 1 MHz



XHS-HV High-Dynamic

1 MS/s, LP 1 MHz



4.6. LV: Specifications

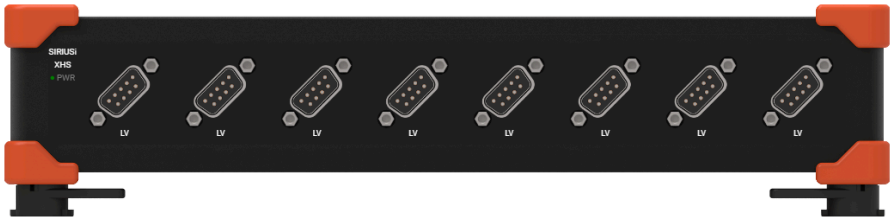
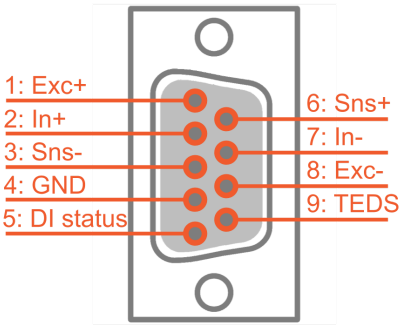
The LV modules are perfect for low voltage and current measurements in combination with current clamps.

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 Mode					
Ranges	±100, 50, 20, 10, 5, 2.5, 1, 0.5, 0.25, 0.1 and 0.05 V				
Input Accuracy	DC	±0.03 % of reading ±0.02 % of range ±100 µV (2 mV for Ranges ≥ 10 V)			
	Up to 1 kHz	±0.03 % of reading ±0.02 % of range			
	Up to 10 kHz	±0.1 % of reading ±0.05 % of range			
	Up to 100 kHz	±2 % of reading ±0.1 % of range			
	Up to 1000 kHz	±5 % of reading ±0.5 % of range			
Noise floor, Typ.	Sample rate, filter \ Range →	100 V	5 V	0.5 V	0.05 V
	15 MS/s, Filter off	-82 dB	-78 dB	-65 dB	-51 dB
	1 MS/s, Filter on	-94 dB	-95 dB	-88 dB	-69 dB
	100 kS/s, Filter on	-104 dB	-105 dB	-100 dB	-81 dB
	10 kS/s, Filter on	-113 dB	-114 dB	-107 dB	-87 dB
CMR, Typ.	Frequency \ Range →	100 V	5 V	0.5 V	0.05 V
	50 Hz	91 dB	102 dB	98 dB	100 dB
	400 Hz	86 dB	75 dB	90 dB	98 dB
	10 kHz	66 dB	74 dB	82 dB	83 dB
Channel Crosstalk	Range ≥ 10 V: -105 dB @ 10 kHz Range < 10 V: -120 dB @ 10 kHz				
Gain Drift	Typical 10 ppm/K, max. 30 ppm/K				
Offset Drift	Range ≥ 10 V: Typ. 100 µV/K + 1 ppm of range/K, Max 250 µV/K + 2 ppm of range/K Range < 10 V: Typ. 4 µV/K + 1 ppm of range/K, Max 8 µV/K + 2 ppm of range/K				
Gain Linearity	< 0.03 %				
Input Coupling (see 1)	DC, AC 1 Hz				
Input Impedance	Range < 10 V: 10 MΩ; Range ≥ 10 V: 1 MΩ 110 pF between INx to GND				
Overvoltage Protection	Range ≥ 10 V: 300 V continuous Range < 10 V: 100 V (200 V peak for 10 msec)				
Max. common mode voltage Isolation voltage	420 Vdc (300 Vacrms)				
Excitation Voltage					
Polarity	Unipolar or Bipolar Software selectable (programmable 16-bit DAC)				
Excitation Level	Unipolar 1 .. 24 V; Predefined levels: 1, 2, 2.5, 5, 10, 12, 15, 20 and 24 VDC				
Excitation Level	Bipolar 2.5 .. 30 V; Predefined levels: 2.5, 5, 10, 12, 15, 24 and 30 VDC				
Drift	±10 ppm/K ±150 µV/K				

Stability 10% to 90% load (bipolar)	< 0.01 %
Current limit	200 mA (2 Watt max. per Channel, 12 Watt max. per Slice)
Additional Specifications	
Input connector	DSUB 9, BNC, Banana (others on request)
TEDS support	Standard + DSI® adapters
Rev: 1701403200	
1) In- must be within ± 10 V referred to GND (iso); for Ranges ≥ 10 V the DC value of In- is not rejected	

4.6.1. LV: DSUB9 connector

4.6.1.1. LV: DSUB9 connector Pinout



SIRIUSi-XHS-8xLV

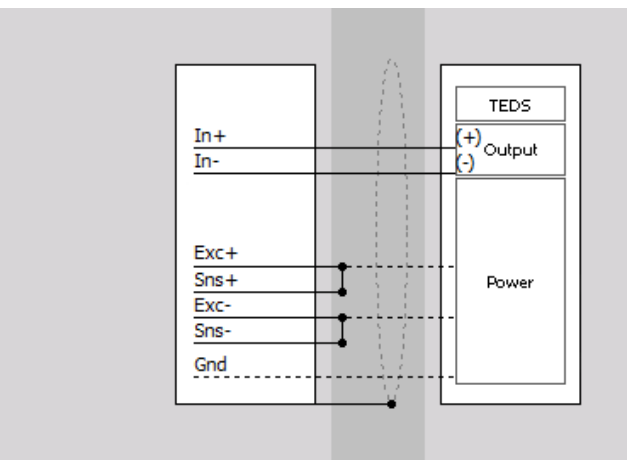
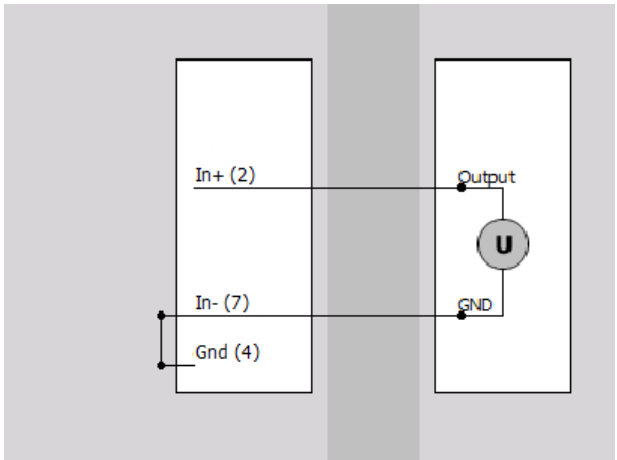
LV connector: pin-out (DSUB-9 female)

4.6.1.2. LV: DSUB9 connector Wiring diagram

4.6.1.2.1. LV: Voltage

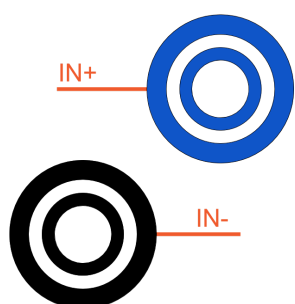
Single ended

Differential



4.6.2. LV: BAN connector

4.6.2.1. LV: BAN connector Pinout



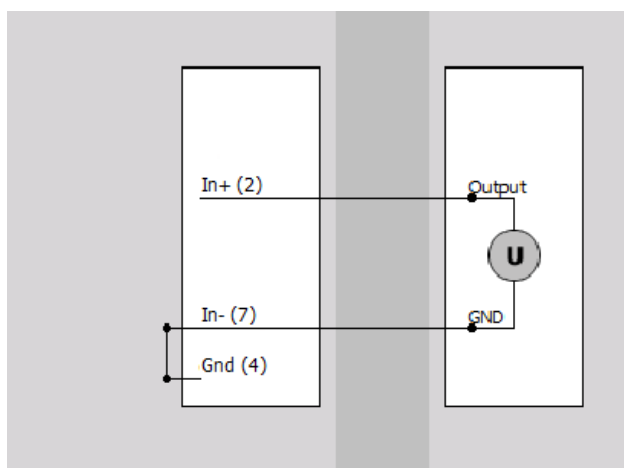
SIRIUSi-XHS-8xLV

LV connector: pin-out (Banana plug)

4.6.2.2. LV: BANconnector Wiring diagram

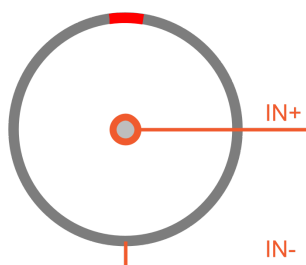
4.6.2.2.1. LV: Voltage

Single ended



4.6.3. LV: BNC connector

4.6.3.1. LV: BNC connector Pinout



LV-BNC connector: pin-out (BNC)

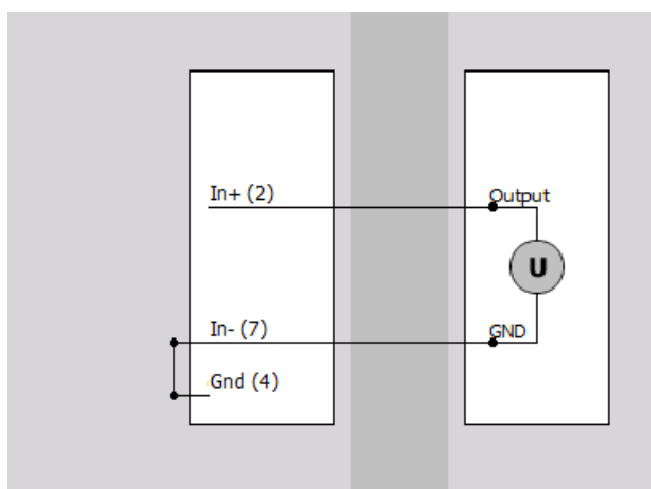


SIRIUSi-XHS-8xLV-BNC

4.6.3.2. LV: BNC connector Wiring diagram

4.6.3.2.1. LV: Voltage

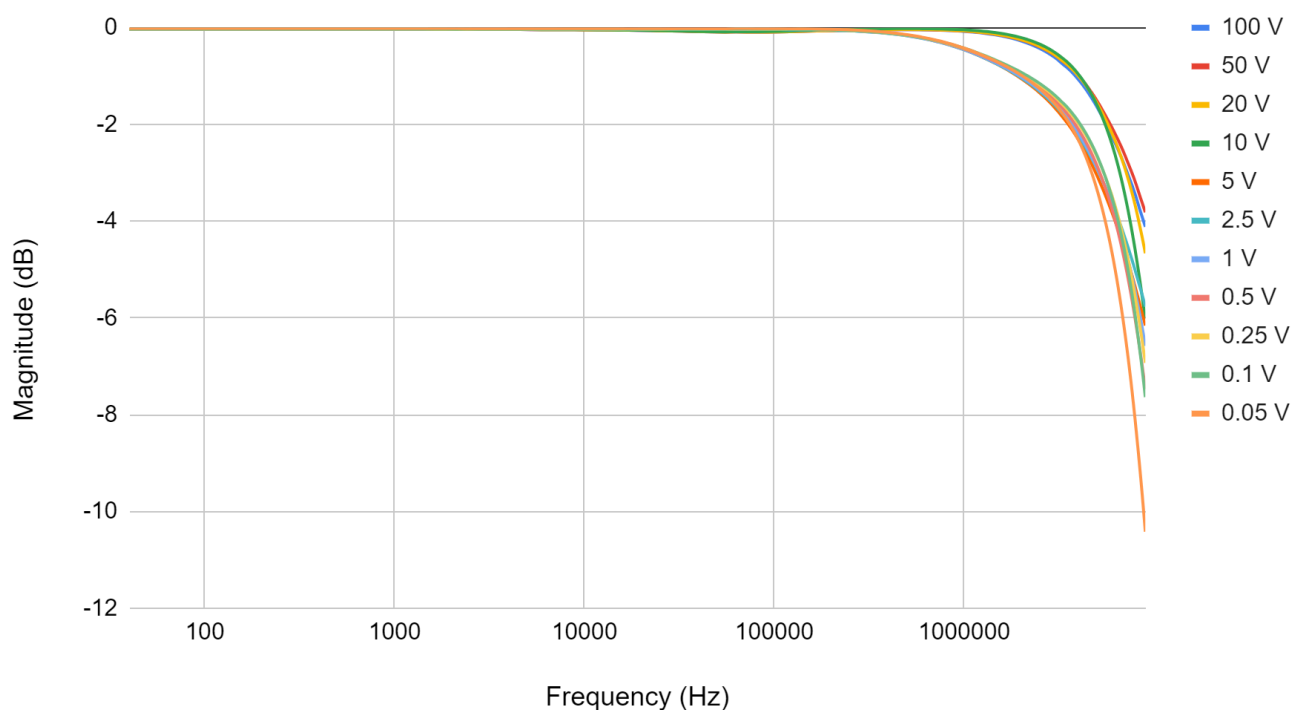
Single ended



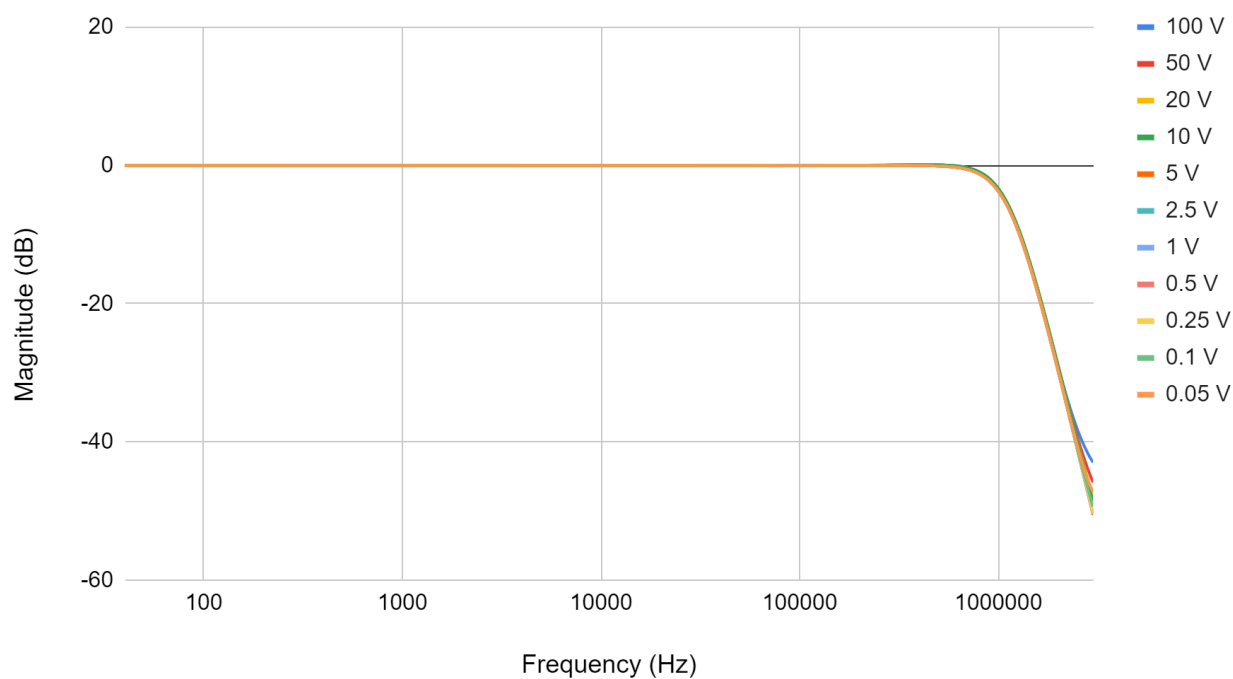
4.6.4. Magnitude response

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

XHS-LV High-Bandwidth LP off

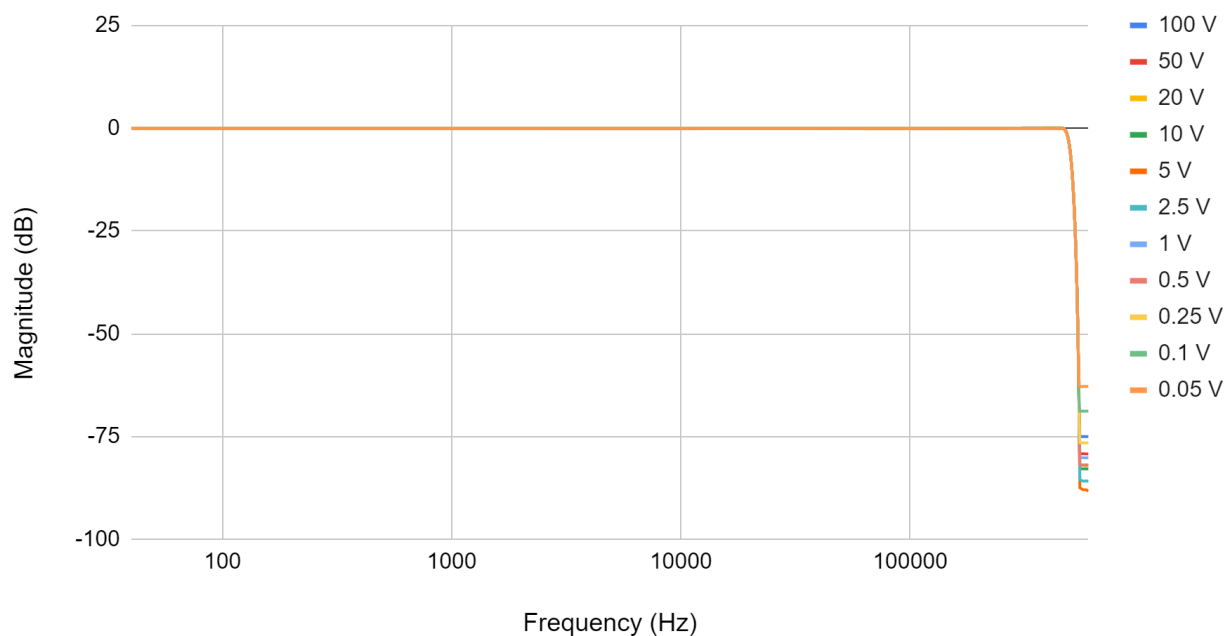


XHS-LV High-Bandwidth LP 1 MHz



XHS-LV High-Dynamic AAF

1 MS/s, LP 1MHz



8. Safety instructions

Your safety is our primary concern! Please be safe!

8.1. Safety symbols in the manual

Safety reference manual for the IOLITE Data Acquisition Devices can be found in <https://dewesoft.com/download> section. Search for keyword: **Safety technical reference manual**



Warning

Calls attention to a procedure, practice, or condition that could cause 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.

8.2. General Safety Instructions



Warning

The following general safety precautions must be observed during all phases of operation, service, and repair of this product. Failure to comply with these precautions or with specific warnings elsewhere in this manual violates safety standards of design, manufacture, and intended use of the product. Dewesoft d.o.o. assumes no liability for the customer's failure to comply with these requirements.

All accessories shown in this document are available as an option and will not be shipped as standard parts.

8.1.1. Environmental Considerations

The product is an electronic instrument designed with consideration for environmental impact during its design and use phase. The materials and components used comply with the requirements of the RoHS Directive (2011/65/EU) and the REACH Regulation (EC No. 1907/2006), with no intentional use of restricted or prohibited hazardous substances. During normal operation, the product does not generate direct environmental emissions and features low power consumption. The device is designed for long-term use and serviceability, supporting an extended product lifetime. The product enclosure is made of aluminum, and selected components of the product are suitable for material recycling.

8.1.2. Product End-of-Life Handling

At the end of its service life, the product shall not be disposed of as unsorted municipal waste and shall be collected separately in accordance with the WEEE Directive (2012/19/EU).



The crossed-out wheeled bin symbol on the product, packaging, or accompanying documentation indicates that the equipment must be returned to an authorized collection point for waste electrical and electronic equipment. Recycling, recovery, and disposal activities shall be carried out by authorized operators in compliance with applicable local, national, and EU environmental regulations.

For proper treatment, recovery and recycling of old products and batteries, please take them to applicable collection points in accordance with your national legislation. Penalties may be applicable for incorrect disposal of this waste, in accordance with national legislation.

8.1.3. General safety and hazard warnings for all Dewesoft systems

Safety of the operator and the unit depend on following these rules.

- Use this system under the terms of the specifications only to avoid any possible danger.
- Read your manual before operating the system.
- Observe local laws when using the instrument.
- DO NOT touch internal wiring!
- DO NOT use higher supply voltage than specified!
- Use only original plugs and cables for harnessing.
- You may not connect higher voltages than rated to any connectors.
- The power cable and connector serve as Power-Breaker. The cable must not exceed 3 meters, the disconnect function must be possible without tools.
- Maintenance must be executed by qualified staff only.
- During the use of the system, it might be possible to access other parts of a more comprehensive system. Please read and follow the safety instructions provided in the manuals of all other components regarding warning and security advice for using the system.
- With this product, only use the power cable delivered or defined for the host country.
- DO NOT connect or disconnect sensors, probes or test leads, as these parts are connected to a voltage supply unit.
- Ground the equipment: For Safety Class 1 equipment (equipment having a protective earth terminal), a non-interruptible safety earth ground must be provided from the mains power source to the product input wiring terminals.
- Please note the characteristics and indicators on the system to avoid fire or electric shocks. Before connecting the system, please read the corresponding specifications in the product manual carefully.
- The inputs must not unless otherwise noted (CATx identification), be connected to the mains circuit of category II, III and IV.
- The power cord separates the system from the power supply. Do not block the power cord, since it has to be accessible for the users.
- DO NOT use the system if equipment covers or shields are removed.
- If you assume the system is damaged, get it examined by authorized personnel only.

- Adverse environmental conditions are Moisture or high humidity Dust, flammable gases, fumes or dissolver Thunderstorm or thunderstorm conditions (except assembly PNA) Electrostatic fields, etc.
- The measurement category can be adjusted depending on module configuration.
- Any other use than described above may damage your system and is attended with dangers like short-circuiting, fire or electric shocks.
- The whole system must not be changed, rebuilt or opened.
- DO NOT operate damaged equipment: Whenever it is possible that the safety protection features built into this product have been impaired, either through physical damage, excessive moisture, or any other reason, REMOVE POWER and do not use the product until the safe operation can be verified by service-trained personnel. If necessary, return the product to Dewesoft sales and service office for service and repair to ensure that safety features are maintained.
- If you assume a more riskless use is not provided anymore, the system has to be rendered inoperative and should be protected against inadvertent operation. It is assumed that a more riskless operation is not possible anymore if the system is damaged obviously or causes strange noises. the system does not work anymore. The system has been exposed to long storage in adverse environments. The system has been exposed to heavy shipment strain.
- Warranty void if damages caused by disregarding this manual. For consequential damages, NO liability will be assumed!
- Warranty void if damage to property or persons caused by improper use or disregarding the safety instructions.
- Unauthorized changing or rebuilding the system is prohibited due to safety and permission reasons (CE).
- Be careful with voltages >25 VAC or >35 VDC! These voltages are already high enough in order to get a perilous electric shock by touching the wiring.
- The product heats during operation. Make sure there is adequate ventilation. Ventilation slots must not be covered!
- Only fuses of the specified type and nominal current may be used. The use of patched fuses is prohibited.
- Prevent using metal bare wires! Risk of short circuit and fire hazard!
- DO NOT use the system before, during or shortly after a thunderstorm (risk of lightning and high energy over-voltage). An advanced range of application under certain conditions is allowed with therefore designed products only. For details, please refer to the specifications.
- Make sure that your hands, shoes, clothes, the floor, the system or measuring leads, integrated circuits and so on, are dry.
- DO NOT use the system in rooms with flammable gases, fumes or dust or in adverse environmental conditions.
- Avoid operation in the immediate vicinity of high magnetic or electromagnetic fields, transmitting antennas or high-frequency generators, for exact values please refer to the enclosed specifications.
- Use measurement leads or measurement accessories aligned with the specification of the system only. Fire hazard in case of overload!
- Do not switch on the system after transporting it from a cold into a warm room and vice versa. The thereby created condensation may damage your system. Acclimatise the system unpowered to room temperature.
- Do not disassemble the system! There is a high risk of getting a perilous electric shock. Capacitors still might be charged, even if the system has been removed from the power supply.
- The electrical installations and equipment in industrial facilities must be observed by the security regulations and insurance institutions.

- The use of the measuring system in schools and other training facilities must be observed by skilled personnel.
- The measuring systems are not designed for use in humans and animals.
- Please contact a professional if you have doubts about the method of operation, safety or the connection of the system.
- Please be careful with the product. Shocks, hits and dropping it from already- lower level may damage your system.
- Please also consider the detailed technical reference manual as well as the security advice of the connected systems.
- This product has left the factory in safety-related flawless and in proper condition. In order to maintain this condition and guarantee safety use, the user has to consider the security advice and warnings in this manual.

EN 61326-3-1:2008

IEC 61326-1 applies to this part of IEC 61326 but is limited to systems and equipment for industrial applications intended to perform safety functions as defined in IEC 61508 with SIL 1-3.

The electromagnetic environments encompassed by this product family standard are industrial, both indoor and outdoor, as described for industrial locations in IEC 61000-6-2 or defined in 3.7 of IEC 61326-1.

Equipment and systems intended for use in other electromagnetic environments, for example, in the process industry or in environments with potentially explosive atmospheres, are excluded from the scope of this product family standard, IEC 61326-3-1.

Devices and systems according to IEC 61508 or IEC 61511 which are considered as “operationally well-tried”, are excluded from the scope of IEC 61326-3-1.

Fire-alarm and safety-alarm systems, intended for the protection of buildings, are excluded from the scope of IEC 61326-3-1.

9. Warranty information

Notice

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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>.

9.1. 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.

9.2. 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.

Dewesoft d.o.o.
Gabrsko 11a
1420 Trbovlje Slovenia

Europe Tel.: +386 356 25 300
Web: <http://www.dewesoft.com>
Email: support@dewesoft.com

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

9.3. 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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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.

9.7. Documentation version

Doc-Version	Date [dd.mm.yyyy]	Notes
V26-2	04.08.2026	Added SIRIUS XR rack system overview (XR5/XR9) and XR rack slices
V26-1	02.07.2026	- Corrected the options available through SYNC connector - Added XHS UNI wiring diagrams - Updated "UNI: specifications" - Added XHS CHG - Added slew rate information - Added frequency responses for 1 MHz filter - Maximum power consumption numbers added
V24-2	10.6.2024	Corrected wiring diagram and corrected specifications (Unipolar excitation) for XHS LV
V24-1	11.4.2024	Added XHS UNI
V23-2	14.12.2023	- Added new CNT - Added CAN-FD and additional CAN functionalities
V23-1	02.06.2023	- Update Connection over 3.0 USB - Chapters "Ethernet configuration on the PC", "DewesoftX settings for SIRIUSi-XHS®", "Autodetect", "Configuring the IP address inside discovery module" updated and moved under "Connection over EtherNET" - Removed the 10MHz clock column in chapter "Sample rate" table - Example and Troubleshooting in "Ethernet configuration on the PC" moved to "FAQ section" - Picture update with new DewesoftX version in "Autodetect" and "Configuring the IP address inside the discovery module" - Added chapter Device overview - Updated chapter "Synchronization"; added subchapter "A system with old-generation devices and SIRIUS-XHS (PTPin-IRIGout option)" - Added hint in chapter "Measurement Mode" - Picture update in "Analyze Mode" - Added chapter "RT mode" - Picture update in chapter "Firmware upgrade" - Chapter Troubleshooting moved to FAQ section - Added CAN and CAN output RT in chapter "Open interface protocols" - Updated chapter "USB connector" - Updated chapter "Connection of multiple SIRIUSi-XHS devices with SBOX"

- Added chapter "System for more demanding measurements with SIRIUSi-XHS"
- Updated chapter "Multiple devices over EtherNET" and "Storing on high sample rates"
- Removed chapters "Two XHS devices with different Dividers" and "Measure on 15MS/s with additional Math channels"
- "HV: Filter modes", "LV: Filter modes", "ACC: Filter modes" renamed to "Magnitude response"
- Added chapters "LV: BAN connector"
- Added description in chapter "Filtering"
- Added subchapter "Advanced channels" in "Filtering"
- Added warning in chapter "DS-6xLAN-RJ45"
- Added subchapter "Fibre Optic USB 3.0 Extender" in "Accessories"
- Chapter "Troubleshooting" renamed to "FAQ section"
- Added subchapters "Setting static IP on the PC", "Locating the XHS device", "Setting Firewall exception", "Connecting SIRIUSi-XHS with automatic IP assignment to network without DHCP server" and "Troubleshooting"
- Grammar fixes

V22-1	27.10.2022	Autodetection, standard single slices, Added accessories, LED indicators, Different system connections, Additional channels, Added synchronization options, Added Filter specifications,
V21-2	4.4.2021	Licensing, PTP synchronization
V20-1	18.1.2021	Added XCP option, Few small fixes
V20-1	13.05.2020	Initial version