

4.2.1.2. Single slice: Rear side

The SIRIUS® USB chassis has following connectors at the rear side:



SIRIUS rear side

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

Analog-out connectors

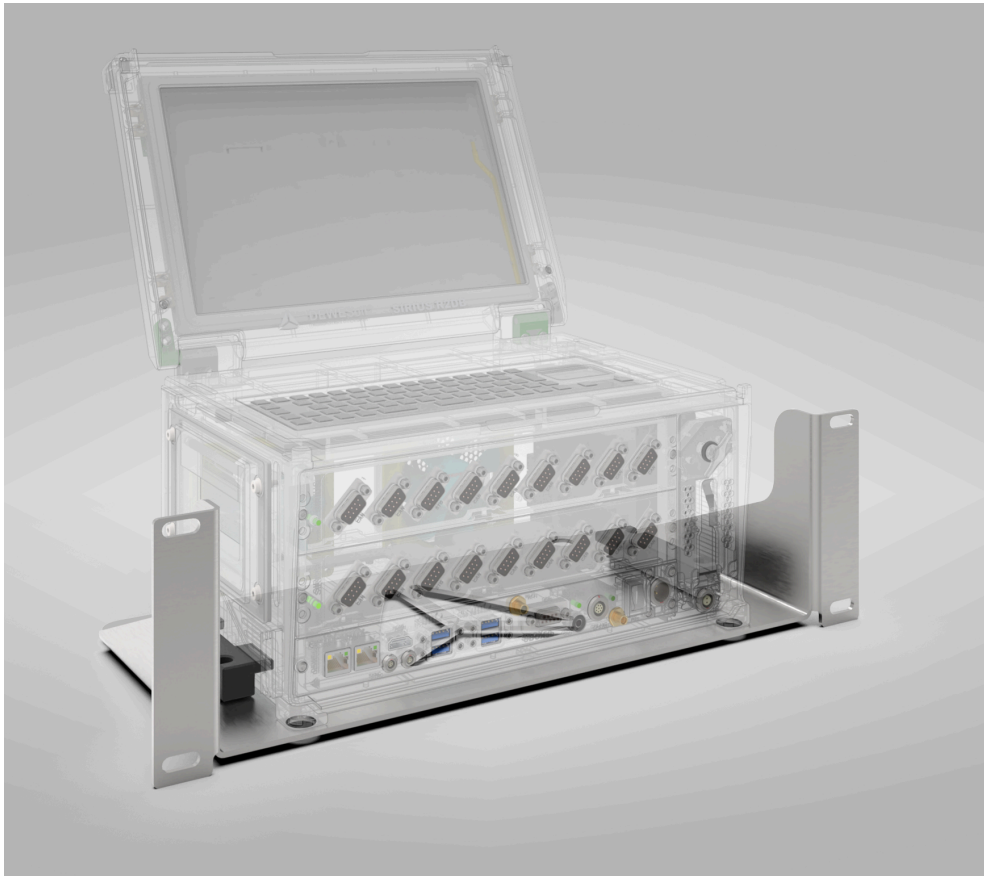
The optional analog output version of the SIRIUS Single Slice has 8 additional BNC connectors for the analog output channels on the rear side (for detailed information see chapter: Analog out option).



Rear side connectors of the analog-out version

4.3.3. 19" Mounting Kit for SIRIUS R1x, R2x

We have a mounting kit available and it fits R1DB, R1B, R2DB, R2B, R2D.



R2DB mounted on 19" mounting kit

4.3.4. USB hubs vs. native ports

USB, short for Universal Serial Bus, is an industry standard that defines the cables, connectors and communications protocols.

USB 2.0 has a theoretical maximum bandwidth of 480 Mbit/s (High Speed or High Bandwidth). Due to bus access constraints, the effective throughput of the High Speed signalling rate is limited to about 30 MB/s.

The SIRIUS slices use the USB 2.0 protocol for communication to the PC/SBOX and they have USB Type A receptacles. This is enough, even for 8 SIRIUS high-speed channels @ 1MS/s.

USB 3.0 a new SuperSpeed transfer mode, with associated new backwards-compatible plugs, receptacles, and cables. The SuperSpeed plugs and receptacles have blue inserts (in comparison to the black ones of USB 2.0). The theoretical maximum data signalling rate of the new SuperSpeed mode is 5.0 Gbit/s. However the specification considers it reasonable to achieve only around 3.2 Gbit/s (0.4 GB/s or 400 MB/s).

4.4. Connectors

4.4.1. General

4.4.1.1. USB Connector

USB connectors are used by:

- SIRIUS® measurement slices to transfer the measurement data to the SBOX (or PC)
- SIRIUS® SBOX: to connect SIRIUS® USB slices or other USB devices. The USB connector can transfer data and provide power to connected devices (5 VDC)

SIRIUS® SBOX: to connect SIRIUS® USB slices or other USB devices. The USB connector can transfer data and provide power to connected devices (5 VDC)

USB 2.0 has a maximum signaling rate of 480 Mbit/s (High Speed or High Bandwidth).

The below Illustrations show Mini and Standard size USB 2.0 sockets.



USB 2.0 Mini



2x USB 2.0

USB 3.0 "SuperSpeed" has backwards-compatible plugs, receptacles, and cables.

SuperSpeed plugs and receptacles are identified with a distinct logo and blue inserts in standard format receptacles.



Hint

DewesoftX® USB cables have thumb screws to the right and left of the connector so that you can firmly secure the USB cable.



2x USB 3.0

5. SIRIUS® measurement modules

5.1. Data transfer overview

Dewesoft offers SIRIUS® slices that can use different data-transfer technologies:

- USB
 - high data-throughput allows for high sampling rates (up to 1 MS/s)
 - extra connectors for power and synchronisation required
 - direct connection to USB ports on the PC
- Standard EtherCAT®
 - only one single cable needed for data, synchronisation and power
 - Data-throughput allows for sampling rates up to 20 kS/s
 - direct connection to standard Ethernet port on the PC possible
- DS-EtherCAT+
 - this is a Dewesoft enhancement to the EtherCAT® standard, so that we can combine the advantages of Standard Ethernet and USB data-transfer

5.1.1. USB data transfer

USB is a high speed data bus being able to transmit full speed data for all channels to the measurement PC. The SIRIUS® USB slices allow sampling rates of up to 1 MHz (high-speed) and can be directly connected to native USB ports on the measurement PC (or SBOX). In comparison to the EtherCAT® version, the SIRIUS®-USB slices need extra connectors for power supply and synchronisation.

5.1.2. EtherCAT® data transfer

EtherCAT® - Ethernet for Control Automation Technology - is a 100 Mbit/s Ethernet-based fieldbus system. The protocol is standardized in IEC 61158 and is suitable for both hard and soft real-time requirements. EtherCAT® can be used for applications that require short data update times with low communication jitter (for precise synchronisation purposes).



Important

When connecting EtherCAT® devices to the computer please make sure that you connect the EtherCAT® cable directly to the Ethernet card of your PC without the use of network switches or hubs.

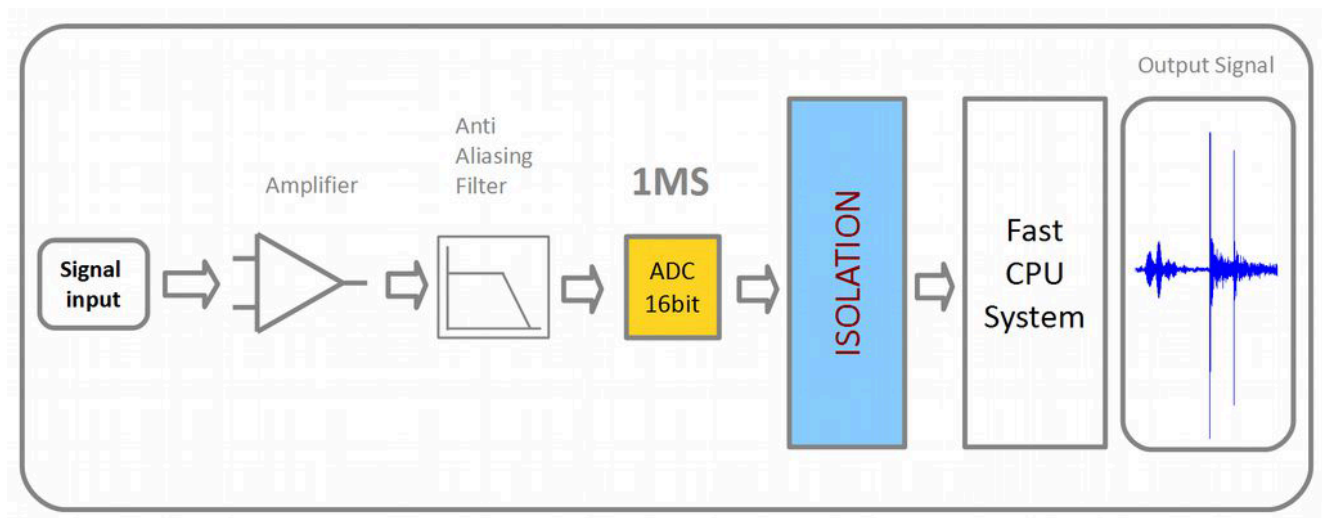


Important

The EtherCAT version of SIRIUS works with a range of 9 - 36V, and not up to 48V, even though the range is up to 48V for other product lines with EtherCAT.

5.2.3. SIRIUS®-HS series: high speed and bandwidth

This series combines high bandwidth with alias free acquisition with 16-bit of up to 1 MS/sec acquisition rate. The analog anti-aliasing filter (100 kHz, 5th order Bessel) is combined with a free programmable digital IIR filter block inside the FPGA. For bandwidth requirements of up to 2 MHz the complete filter chain can be bypassed.

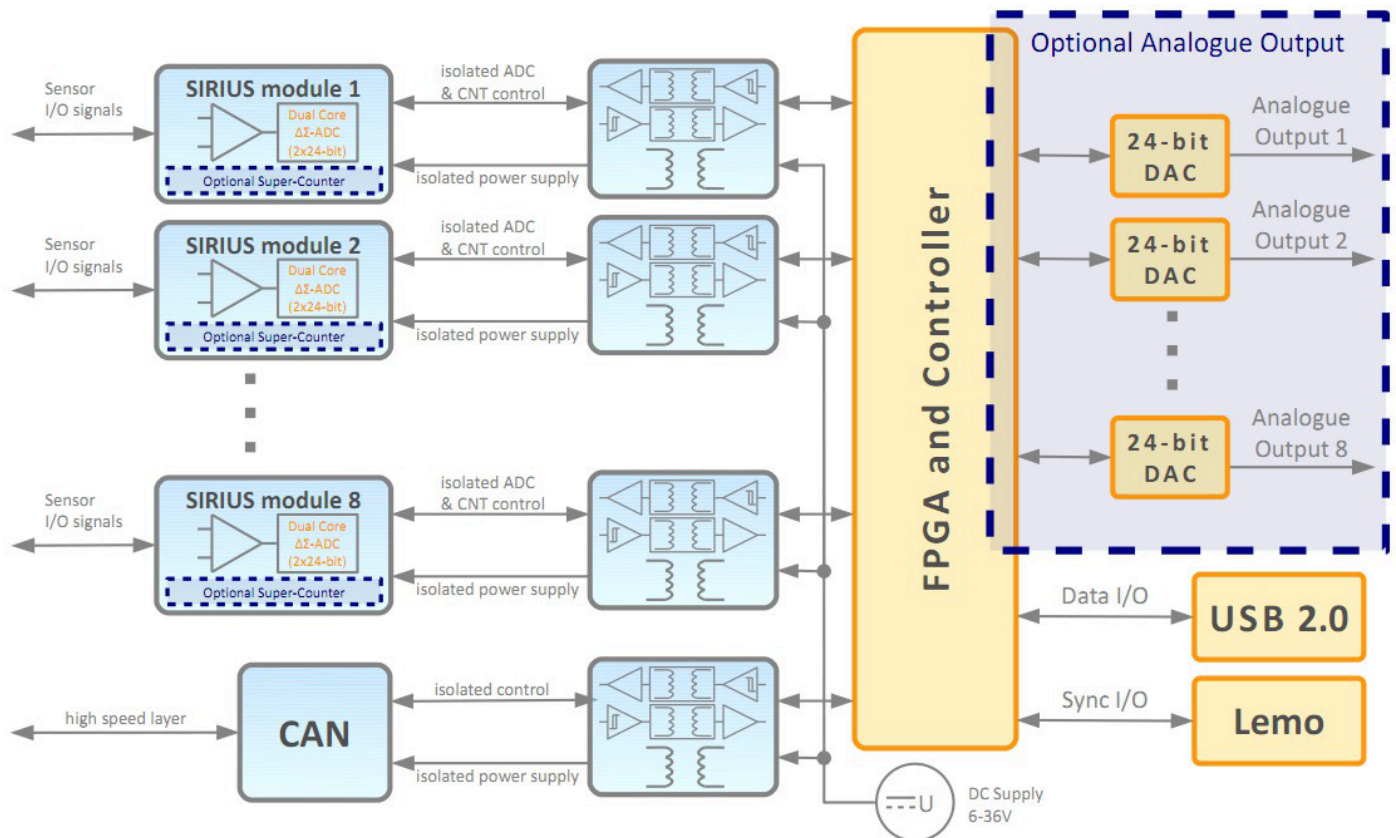


SIRIUS High Speed

5.2.5. Isolated version: USB

The (standard) SIRIUSi modules are isolated between each other and the main board. Some modules generate power for electronics and for external pins: this power supply is again isolated against other modules, the main board and the housing.

Inside of one module, the power supply pins, counter and analog inputs are not isolated between themselves (they have the same ground) that is available on the GND connector pin (e.g. The analog input and the counter of one ACC+ module share the same GND).



Isolated motherboard



Warning

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.

5.5. SIRIUS® HD and HS specifications

SIRIUS HS

	HS-HV	HS-LV	HS-ACC	HS-CHG	HS-STG
Connectors	BANANA	DSUB-9, BNC, BANANA	BNC	BNC, TNC	DSUB-9
Counter version	✗	✓	✓	✓	✓
Isolated version	✓	✓	✓	✓	✓
Differential version	✗	✓	✓	✓	✓
EtherCAT version	✓	✓	✓	✗	✓
Rack version	✓	✓	✓	✓	✓
Fanless version	✓	✓ (see 1)	✗	✗	✗
Channels per slice	8	8	8	8	8
Data rate / channel	1 MS/s	1 MS/s	1 MS/s	1 MS/s	1 MS/s
Resolution	16-bit	16-bit	16-bit	16-bit	16-bit
Bandwidth	2 MHz	1 MHz	500 kHz	500 kHz	1 MHz
Voltage ranges	±2000 V ... ±20 V	±100 V ... ±50 mV	±10 V ... ±200 mV	±10 V ... ±100 mV	±50 V ... ±20 mV
Input coupling	DC	DC, AC 1 Hz (3, 10 Hz SW)	DC, AC 1 Hz (3, 10 Hz SW)	DC, AC 0.1 Hz, 1 Hz, 10 Hz, 100 Hz	DC, AC 1 Hz (3, 10 Hz SW)
Sensor excitation	✗	2...30 V bipolar, 0...24 V unipolar, max. 0.2 A / 2 W	IEPE 4 mA, 8 mA	IEPE 4, 8, 12 mA	0...20 V max. 0.8 W, 0...60 mA max 0.5 W
Bridge connection	✗	Full	✗	✗	Full, ½, ¼ 350 Ω, ¼ 120 Ω, 3 or 4 wire
Programmable shunt	✗	✗	✗	✗	59.88 kΩ, 175 kΩ bipolar
IEPE input	✗	DSI-ACC	✓	✓	DSI-ACC
Resistance	✗	✗	✗	✗	✓
Temperature (PTx)	✗	DSI-RTD	✗	✗	✓
Thermocouple	✗	DSI-TH	✗	✗	DSI-TH
Potentiometer	✗	✗	✗	✗	✓
LVDT	✗	DSI-LVDT	✗	✗	DSI-LVDT
Charge	✗	DSI-CHG	✗	1 k ...100 k pC	DSI-CHG
Current	✗	ext. shunt, DSI	ext. shunt	ext. shunt	ext. shunt, DSI
TEDS	✗	✓	✓	✓	✓
Isolation voltage	CAT II 1000 V	1000 V	1000 V	1000 V	1000 V
Power consumption per channel	1 W/ch	1.2 W/ch	2 W/ch	1.2 W/ch	2 W/ch
Advanced functions	High voltage, high bandwidth, high isolation	High sensor power and multi range	Sensor error detection, high speed	Sensor error detection in IEPE and CHG mode (injection)	High speed, supports all strain types and high input range

(1) Fanless operation only for BNC or Banana version (without excitation)

5.7. General specification

The general specifications apply to all SIRIUS® measurement slices unless otherwise noted at the specific measurement slice.

Power	
Power Supply	9 - 36 V DC
Power consumption	Typ. 15 - 35 W
Environmental	
Operating Temperature	-10 to 50 °C (40 °C for fanless series)
Storage Temperature	-40 to 85 °C
Humidity	5 to 95 % RH non condensing @ 60 °C
IP rating	IP20 (IP50 for fanless series)
Shock & Vibration	Vibration sweep sinus (EN 60068-2-6:2008) Vibration random (EN 60721-3-2: 1997 - Class 2M2) Shock (EN 60068-2-27:2009) MIL-STD-810D
Dimensions	266 mm x 149 mm x 55 mm 266 mm x 149 mm x 69 mm (extended slice)
Acquisition rate	
Time base accuracy	Typical 5 ppm, Max: 20 ppm
Synchronisation	
Delay between slices	50 nsec
Max. Sync-cable length	100 m (Master/Slave), 200 m (IRIG)
EtherCAT®: Max. cable length	100 m
Sync Input / Output	
Level (Input/Output)	TTL compatible
Max. Output Current	±24 mA (±50 mA for 1 sec)

5.21. HS-CHG / HS-CHG+

The CHG modules are perfect for high-speed, high-sample-rate, wide-bandwidth charge measurements and also sound and vibration IEPE channels.

5.21.1. HS-CHG: Specifications

Inputs					
Input types	Voltage IEPE Charge				
ADC Type	16-bit SAR				
Sampling Rate	Simultaneous 1 MS/s				
Filtering	See "HS general specifications"				
Analog bandwidth (see 1)	500 kHz				
Voltage Mode					
Ranges	±10, ±5, ±2, ±1, ±0.5, ±0.2, ±0.1 Volt				
Input Accuracy	Signal frequency	Accuracy			
	DC	±0.05 % of reading ±0.02 % of range ±50 µV			
	up to 10kHz	±0.1 % of reading ±0.05 % of range			
	up to 100kHz	±2 % of reading ±0.1 % of range			
Typ. Noise floor	Sample rate/Range →	10 V	5 V	1 V	0.1 V
	1 MS/s	-88 dB	-87 dB	-85 dB	-68 dB
	200 kS/s	-89 dB	-89 dB	-88 dB	-83 dB
	20 kS/s	<-100 dB	<-100 dB	<-100 dB	-92 dB
Typical CMR	50 Hz / 1 kHz	>140 / 120 dB	>140 / 124 dB	>140 / 126 dB	>140 / 126 dB
Gain Drift	Typical 10 ppm/K, max. 30 ppm/K				
Offset Drift	Typical 0.5 µV/K + 10 ppm of range/K, max 3 µV/K + 20 ppm of range/K				
Gain Linearity	<0.02 %				
Inter Channel Phase-mismatch	0.02° * fin [kHz] + 0.1°				
Channel Cross talk	-110 dB @ 1 kHz; -90 dB @ 10 kHz				
Input Coupling	DC or AC (0.1 Hz, 1 Hz, 10 Hz or 100 Hz)				
Input Impedance	1 MΩ / 100 pF				
Overvoltage Protection	50 V continuous; 200 V peak (10 msec)				
IEPE mode					
Excitation	4 or 8 mA				
Compliance voltage	25 Volt				
Output Impedance	>100 kΩ				
Sensor detection	Shortcut: <4 Volt; Open: >19 Volt				

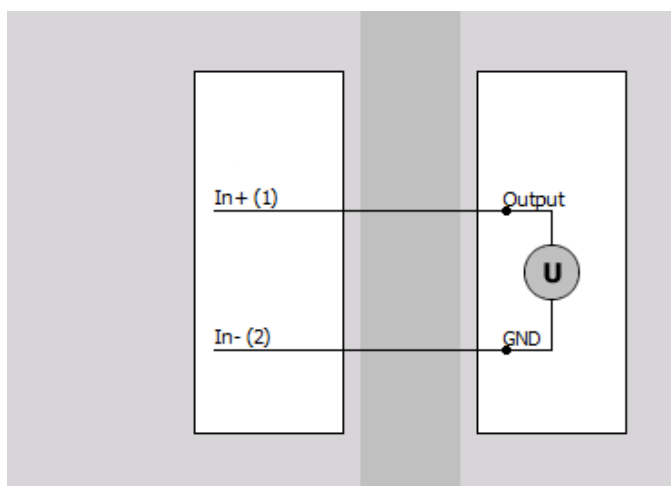
Charge mode	
Charge ranges	±100 000, 50 000, 20 000, 10 000, 5000, 2000, 1000 pC
Input Accuracy	±0.5 % of reading ±0.05 % of range ±2 pC
Offset Accuracy (See 2)	±2 pC
Input Coupling	0.01 Hz, 0.03 Hz, 0.1 Hz, 0.5 Hz, 1 Hz, 10 Hz or 100 Hz
Counters (only on HS-CHG+ type)	
Inputs	1 digital counter input 3 digital inputs Fully synchronised with analog data
Counter Modes	counting, waveform timing, encoder, tacho, gear-tooth sensor
General Counter Specifications	See "SIRIUS counter specification"
Additional Specifications	
Input connector	BNC (others on request)
TEDS support	IEPE mode only
1) 200 kHz for Charge ranges 2) Offset Accuracy taken into account with Input Coupling <= 0.1 Hz, for others it is negligible.	

5.21.2. HS-CHG

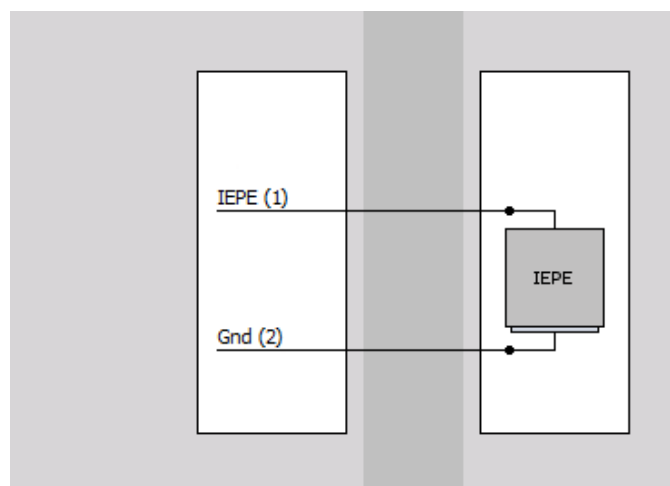


5.21.2.1. HS-CHG: Voltage, IEPE, Charge

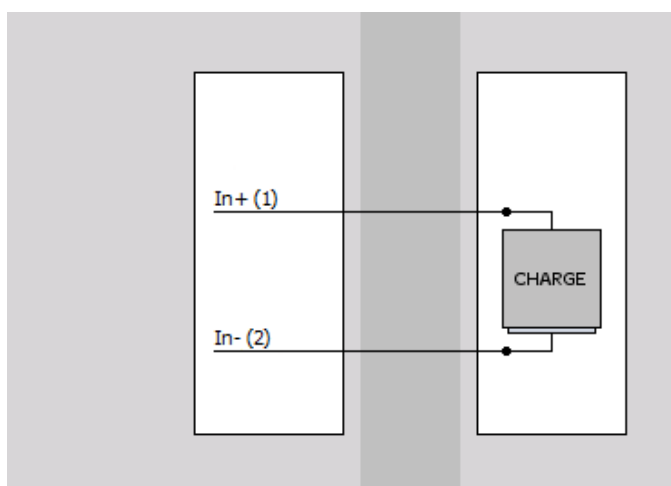
Voltage



IEPE



Charge



V23-1	03.04.2023	• 5.26. CAN: new chapter • Added or updated specifications for multiple amplifiers and systems including: ◦ Enclosure overview ◦ Charging power on some systems ◦ Derating information ◦ Overvoltage protection information ◦ Bridge mode accuracy and additional information for all strain amplifiers ◦ SBOX RAM capabilities ◦ Display information • 5.25 Analog Out: added note on switching slices with AO on R2/R4/R8 Systems • 8.3. Strain amplifiers: new chapter • Excluded Appendix chapter • Changed renders for R1 / R2 systems • 6.1.5.1. Analog filter: additional information on SW LP filters • Updated descriptions of connections for STG and LV amplifiers
V23-2	19.09.2023	• Open sky conditions added in GPS technical specifications • Added LED blinking configuration on new version of SBOXre • Modified the Accessories section, all accessories are now available in different accessories manuals
V24-1	29.01.2024	• SIRIUS-HV-TB added • SIRIUS HV amplifier specifications • SBOXse and SBOXfe v2 added • 4.11.4. SIRIUS-R8DB: Amplifier side: Added a note on how to remove slices from R8 system • 5.12.2 SIRIUS LV: broken link to Accessories manual was replaced to Current transducers manual
V24-2	10.6.2024	• SIRIUS CAN-FD default upgrade of HD and DualCore modular • SIRIUS mini tech specs update • SIRIUS MULTI added analog bandwidth of AO
V25-1	31.1.2025	• Updated SIRIUS-HS-CHG specifications • Added voltage levels for GPS connector Remote-on pin • Added STG-L1B7f, UNI-L1B7f pinouts

11.1. Previous versions history

Version	Date [dd.mm.yyyy]	Notes
1.3.0	13.11.2014	• New orange logo and style • non-isolated is now called differential • Added CHG, LV, HD-ACC, HS-CHG, HS-HV, HS-LV, HS-STG • Replaced STGM with STGMv2, HV with HVv2 and STG with STGv2