

SIRIUS®

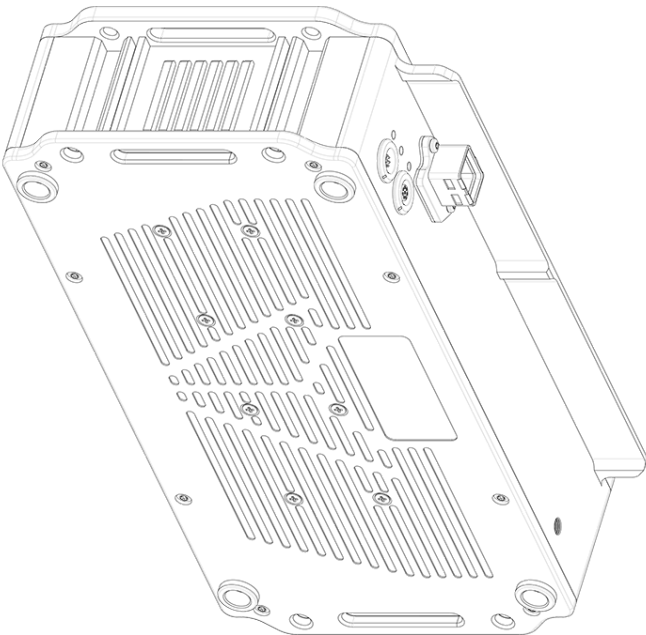
 **DEWEsoft®**

TECHNICAL REFERENCE MANUAL

SIRIUS® V25-1



4.7.2. SIRIUSiwe: Rear side



SIRIUSiwe Rear side

Name	Description
EtherCAT IN	EtherCAT® port 8-pin LEMO male connector
EtherCAT OUT	EtherCAT® port 8-pin LEMO female connector
USB	USB 2.0 B-type connector, Watertight push-pull
GND	M4 insert, Protective ground

5.6. SIRIUS® Waterproof specifications

	SIRIUSiwe-6xSTGM-2xSTGM+	SIRIUSwe-HD-16xSTGS	SIRIUSiwe-6xLV-2xLV+
Analog inputs			
Analog inputs	8 ch voltage Full / half / quarter bridge strain	16 ch voltage Full / half / quarter bridge strain	8 ch voltage Full bridge strain, current (ext. Shunt)
ADC type	2x 24-bit delta-sigma DUALCOREADC® with anti-aliasing filter	24-bit delta-sigma with anti-aliasing filter	2x 24-bit delta-sigma DUALCOREADC® with anti-aliasing filter
Sampling rate on USB	Simultaneous 200 kS/sec	Simultaneous 200 kS/sec	Simultaneous 200 kS/sec
Sampling rate on EtherCAT®	Simultaneous 20 kS/sec	Simultaneous 10 kS/sec	Simultaneous 20 kS/sec
Ranges	±10 V, ±1 V, ±100 mV, ±10 mV	±10 V, ±1 V, ±100 mV, ±10 mV	±200 V, ±10 V, ±1 V, ±100 mV
Bridge ranges	2 mV/V ... 1000 mV/V, free programmable	2 mV/V ... 1000 mV/V, free programmable	2 mV/V ... 1000 mV/V, free programmable
Dynamic Range@10kS	-152 dB	-137 dB	-152 dB
Input coupling	DC	DC	DC, AC 1 Hz (3 Hz, 10 Hz per SW)
Input impedance	10 MΩ	10 MΩ	200 V Range: 1 MΩ; all other ranges 10 MΩ between IN+ or In- against GND
Bridge modes	Full / Half / Quarter Br 120 / 350 Ω 3-wire; internal bridge completion	Full / Half / Quarter Br 120 / 350 Ω 3-wire; internal bridge completion	Full
Internal shunt resistor	100 kΩ (others on request), Sns+ or Sns- to In+ or In-	100 kΩ (others on request), Sns+ to In+ or In-	✗
Excitation voltage	0 - 15 VDC bipolar software programmable (16-bit DAC), max 44 mA	0 - 12 VDC bipolar software programmable (16-bit DAC), max 44 mA	0 - 24 V DC unipolar 2 - 30 V DC bipolar software programmable (16-bit DAC), max 200 mA / 2 W
Temperature derating	✗	✗	-40 °C ... 40 °C : ✗ 40 °C ... 60 °C : linear from total 8W Exc power to 1W Exc power
TEDS	Supported, DSI® adapters	Supported, DSI® adapters	Supported, DSI® adapters
Overvoltage protection	IN+ to IN-: 50 V continuous; 200 V peak (10 msec)	IN+ to IN-: 50 V continuous; 200 V peak (10 msec)	200 V Range: 300 V; all other ranges: 100 V (250 V peak for 10 msec)
Counter inputs	2x Supercounter® (6 Digital In, 2 Digital out)	✗	2x Supercounter® (6 Digital In, 2 Digital out)
Isolation Voltage	1000 V channel-channel, channel-ground	Differential (ground loop isolated)	1000 V channel-channel, channel-ground
Input connectors	DSUB-9 CNT: 7-pin LEMO female	DSUB-9	DSUB-9 CNT: 7-pin LEMO female
Power			
Power supply	9 - 36 V DC	9 - 36 V DC	9 - 36 V DC
Power consumption	Typ. 11 W (Max. 20 W)	Typ. 14 W (Max. 24 W)	Typ. 14 W (Max. 42 W, temperature derating applies)

Environmental			
Operating Temperature	-40 °C ... 60 °C	-40 °C ... 50 °C	-40 °C ... 60 °C
Storage Temperature	-40 °C ... 85 °C	-40 °C ... 85 °C	-40 °C ... 85 °C
Humidity	5 to 100 % RH	5 to 100 % RH	5 to 100 % RH
IP rating	IP65 / IP67	IP65 / IP67	IP65 / IP67
Shock	60 g @ 6 ms 50x, half sine, all axis 100 g @ 4 ms 50x, half sine, all axis	60 g @ 6 ms 50x, half sine, all axis 100 g @ 4 ms 50x, half sine, all axis	60 g @ 6 ms 50x, half sine, all axis 100 g @ 4 ms 50x, half sine, all axis
Vibration	Random: Profile breakpoints: 24 Hz - 0.023 g ² /Hz 60 Hz - 0.28 g ² /Hz 100 Hz - 0.28 g ² /Hz 240 Hz - 0.056 g ² /Hz 2 kHz - 0.056 g ² /Hz Profile RMS / Peak = 11.5 g / 34.5 g (up to 15 / 45 g with absorbers) 6 hrs in each axis, 18 hrs total	Random: Profile breakpoints: 24 Hz - 0.023 g ² /Hz 60 Hz - 0.28 g ² /Hz 100 Hz - 0.28 g ² /Hz 240 Hz - 0.056 g ² /Hz 2 kHz - 0.056 g ² /Hz Profile RMS / Peak = 11.5 g / 34.5 g (up to 15 / 45 g with absorbers) 6 hrs in each axis, 18 hrs total	Random: Profile breakpoints: 24 Hz - 0.023 g ² /Hz 60 Hz - 0.28 g ² /Hz 100 Hz - 0.28 g ² /Hz 240 Hz - 0.056 g ² /Hz 2 kHz - 0.056 g ² /Hz Profile RMS / Peak = 11.5 g / 34.5 g (up to 15 / 45 g with absorbers) 6 hrs in each axis, 18 hrs total
Physical			



Important

See corresponding specifications of amplifier modules for more details.

5.19. HD-STGS

The STGS module is a universal amplifier perfectly fitting for high-count strain gauge and voltage measurements.



Hint

Internally, potentiometer mode is actually a half-bridge connection. Pin IN- is connected to the half-bridge point.

5.19.1. HD-STGS: Specification

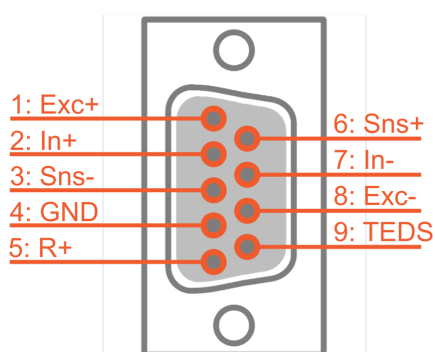
Inputs				
Input types	Voltage Full/Half/Quarter bridge strain (120 Ω and 350 Ω) Potentiometer Current (ext. Shunt)			
ADC Type	24-bit delta-sigma with anti-aliasing filter			
Sampling Rate Simultaneous	200 kS/sec			
Voltage Mode				
Ranges	±10 V	±1 V	±100 mV	±10 mV
Gain Accuracy	±0.05 % of reading			
Offset Accuracy	±2 mV	±0.2 mV	±0.1 mV	±0.1 mV
Offset Accuracy after Balance Amplifier	±0.2 mV	±0.02 mV	±0.01 mV	±0.01 mV
Dynamic Range @ 10 kS	-137 dB	-137 dB	-130 dB	-112 dB
Typ. Noise floor @ 10 kS	-105 dB	-104 dB	-95 dB	-75 dB
Typ. CMR @ 400 Hz / 1 kHz	86 / 84 dB	96 / 95 dB	112 / 102 dB	112 / 102 dB
Gain Drift	Typical 10 PPM/K, max. 40 PPM/K			
Offset Drift	Typical 0.3 μV/K + 5 ppm of range/K, max 2 μV/K + 10 ppm of range/K			
Gain Linearity	<0.02 %			
Inter Channel Phase-mismatch	0.02° * fin [kHz] + 0.1° (@ 200 kS/sec)			
Channel Cross talk	-120 dB @ 10 kHz			
Input Coupling	DC			
Input Impedance	10 MΩ			
Max. common mode voltage	±12 V			
Overvoltage Protection	In + to In-: 50 V continuous; 200 V peak (10 msec)			
Excitation Voltage				
Excitation Voltage	Free programmable (16-bit DAC)			
Predefined levels	0, 1, 2.5, 5, 10 and 12 VDC			
Accuracy	±0.05 % ±2 mV			
Drift	±50 ppm/K ±100 μV/K			
Stability 10 % to 90 % load	<0.01 %			
Current limit	45 mA (350 mW max. power)			
Protection	Continuous short to ground			
Bridge Connection Types				
Bridge types	Full / Half / Quarter bridge (3-wire)			

Ranges	2 mV/V...1000 mV/V free programmable
Internal Bridge Completion	½ bridge and ¼ bridge 120 Ω and 350 Ω
Bridge Completion Accuracy	0.05 %; TCR: 5 ppm/K (others on request)
Internal Shunt Resistor	100 kΩ (others on request)
Maximum sensor resistance	5 kΩ for Full and Half bridge measurements
Typ. Shunt Resistor Accuracy	0.05 %; TCR: 10 ppm/K (others on request)
Input Short, Sensor Offset Adjust	Software selectable
Additional Specifications	
Input connector	DSUB-9
TEDS support	Standard + DSI® adapters

5.19.2. HD-STGS



SIRIUSi-HD-16xSTGS



HD-STGS connector: pin-out (DSUB-9 female)

Pin	Name	Description
1	Exc +	Excitation +
2	In+	Input +
3	Sns-	Sense -
4	GND	Ground
5	R+	¼ Bridge/Shunt
6	Sns+	Sense +
7	In-	Input -
8	Exc-	Excitation -
9	TEDS	TEDS

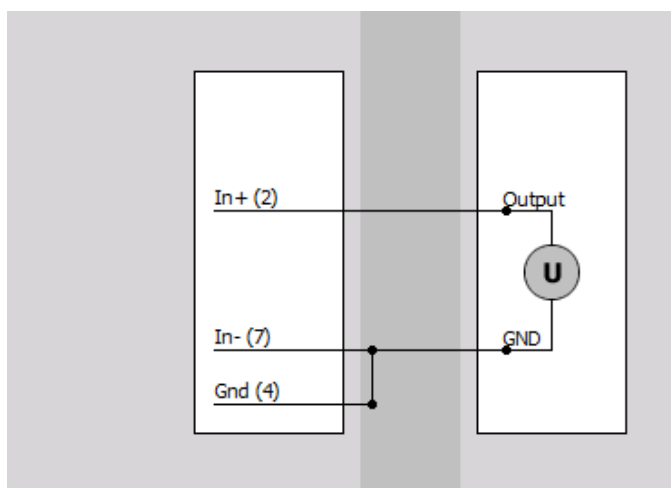


Caution

DSUB-9 mating connector backshells shall be no more than 15.0 mm wide in order to populate all 16 channels at once

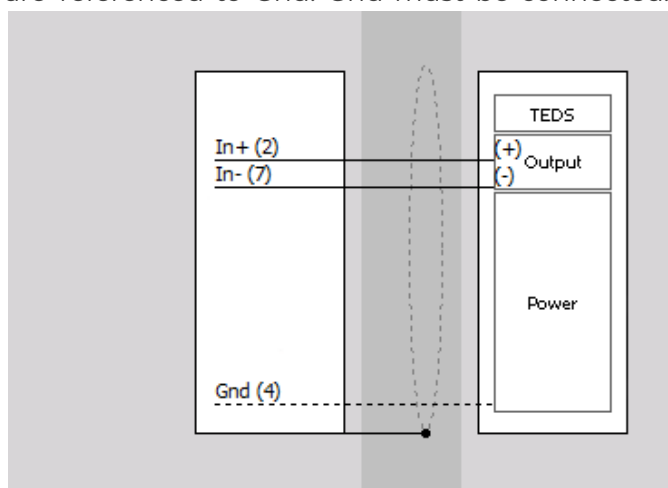
5.19.2.1. HD-STGS: Voltage

Voltage - Single ended



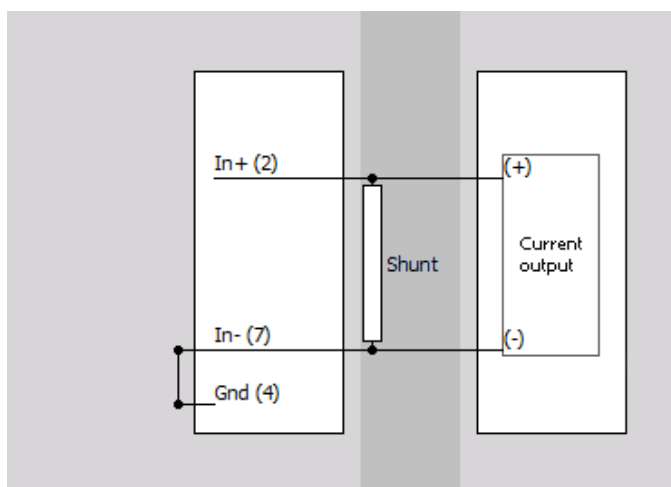
Voltage – Differential

Use only when sensor Output (+) and Output (-) are referenced to Gnd. Gnd must be connected.

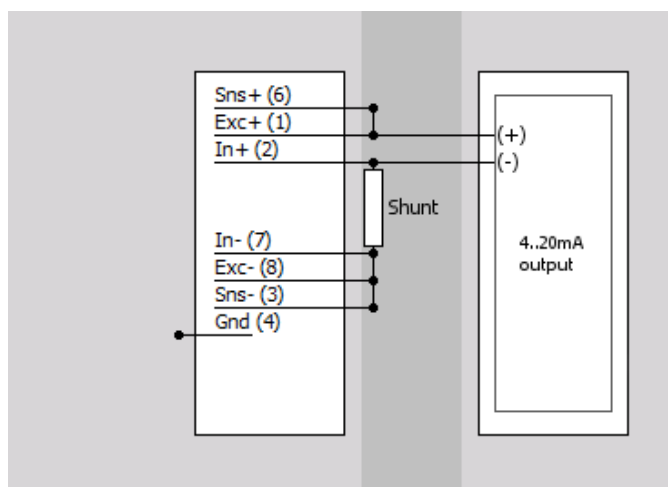


5.19.2.2. HD-STGS: Current

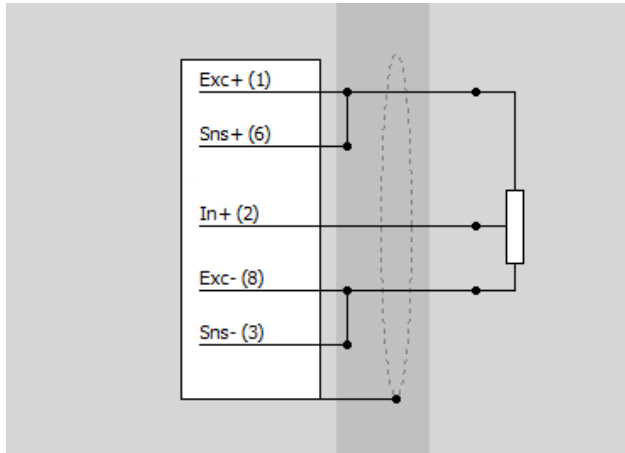
External direct shunt



External loop powered shunt

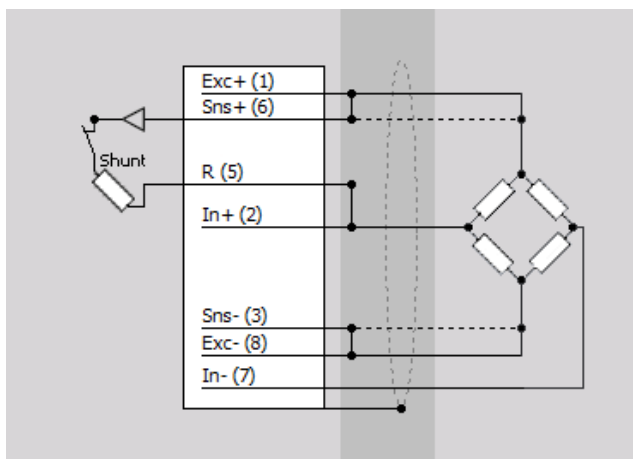


5.19.2.3. HD-STGS: Potentiometer

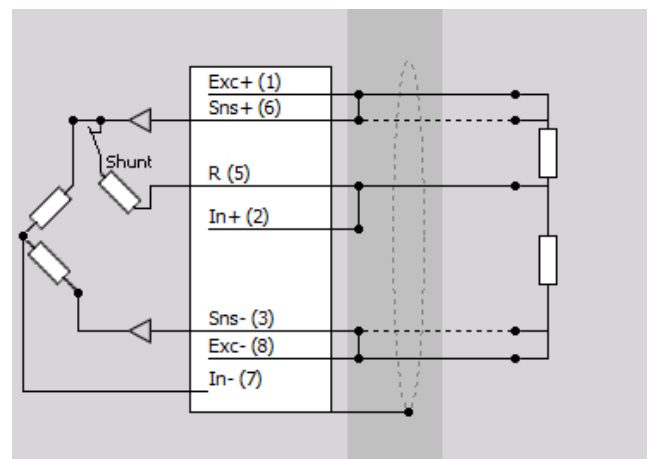


5.19.2.4. HD-STGS: Bridge

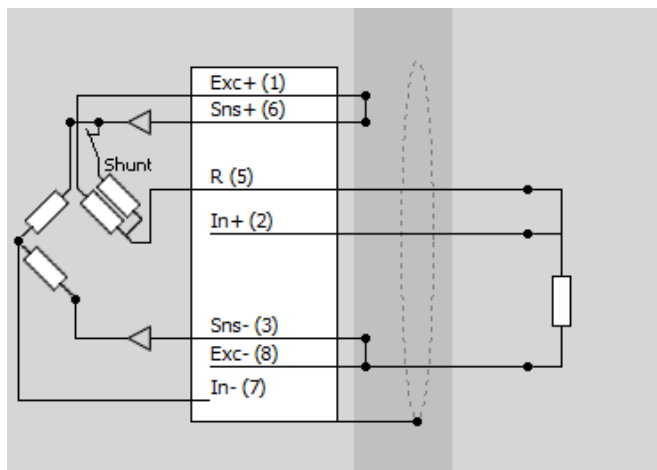
Full bridge



Half bridge



Quarter bridge – 3 wire



5.19.2.4.1. HD-STGS: Bridge

Bridge range	Set excitation	Accuracy
2 mV/V	1 V	0.057 % of reading + 100 uV/V
20 mV/V	1 V	0.11 % of reading + 100 uV/V
200 mV/V	1 V	0.2 % of reading + 200 uV/V
1000 mV/V	1 V	0.24 % of reading + 200 uV/V
2 mV/V	2.5 V	0.055 % of reading + 40 uV/V
20 mV/V	2.5 V	0.082 % of reading + 40 uV/V
200 mV/V	2.5 V	0.12 % of reading + 80 uV/V
1000 mV/V	2.5 V	0.11 % of reading + 800 uV/V
2 mV/V	5 V	0.054 % of reading + 20 uV/V
20 mV/V	5 V	0.075 % of reading + 20 uV/V
200 mV/V	5 V	0.094 % of reading + 40 uV/V
1000 mV/V	5 V	0.088 % of reading + 400 uV/V
2 mV/V	10 V	0.055 % of reading + 10 uV/V
20 mV/V	10 V	0.066 % of reading + 20 uV/V
200 mV/V	10 V	0.066 % of reading + 200 uV/V
1000 mV/V	10 V	0.079 % of reading + 200 uV/V
2 mV/V	12 V	0.055 % of reading + 8.4 uV/V
20 mV/V	12 V	0.066 % of reading + 17 uV/V
200 mV/V	12 V	0.066 % of reading + 170 uV/V
1000 mV/V	12 V	0.078 % of reading + 170 uV/V

9. Warranty information

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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. The standard norm across nearly every industry is 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>

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 kind of repairs to your system to assure 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>.

9.4. Restricted rights

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10. Safety instructions

Your safety is our primary concern! Please be safe!

10.1. Safety symbols in the 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.

10.2. 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.

10.2.1. Environmental considerations

Information about the environmental impact of the product.

10.2.2. Product End-of-Life handling

Observe the following guidelines when recycling a Dewesoft system:

10.2.3. 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 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.

10.2.4. General safety and hazard warnings for all Dewesoft systems

The 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 any 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 of 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 main 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 the 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 the 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 applications 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 enclosed specifications.
- Use measurement leads or measurement accessories aligned with the specification of the system only. Fire hazard in case of overload!
- Lithium ion batteries are classified as not hazardous when used according to the recommendations of the manufacturer described in Battery Safety Data Sheet, which is available for download from our homepage: <http://www.dewesoft.com/download>.
- 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. Acclimatize 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 flawlessness 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.

11. Documentation version history

Version	Date [dd.mm.yyyy]	Notes
V20-1	01.07.2020	The NEW SIRIUS manual - Reworked and revised version
V20-2	19.10.2020	- HS filtering description updated - Corrected pin-out on Multi module
V21-1	26.01.2021	Modes added and Input termination, impedance updated in General Counter specifications
V21-2	26.02.2021	- Updated section 11.2.4. General safety and hazard warnings for all Dewesoft systems - Removed Sirius LV 20V range in SIRIUS dual core specifications table 4.8.4. Added scope of supply for R2DB
V22-1	25.01.2022	- Updated naming for R8D and R8DB - Front side was renamed to Amplifier side - Rear side was renamed to Display side 4.3.2. Added a description of the Krypton side holder 5.3.3. Added pictures of other SIRIUSiwe devices 5.7.3. Included information on Low-pass filters on Sirius HS 6.1.3.3 Bandwidth vs. Aliasing-free bandwidth - updated picture - Added products: - SIRIUSi 8xMIC200 - SIRIUSi 8xUNI
V22-2	18.07.2022	5.5. Sirius HS-ACC fixed the minimum voltage range 5.6. SIRIUSwe updated information about internal shunt resistor 4.4.2.1. SBOX GPS updated pinouts for 10Hz and 100Hz GPS 4.4.3. Added VGPS-DISP pinout 5.4. General specifications: added Power consumption for UNI and MIC200 amplifiers 5.25 Analog Out: Correction for Signal conditioning option for HD series
V22-3	16.12.2022	5.22.1. HS-HVv2: Specifications changed Gain Drift and Offset Drift 5.22.2. HS-HVv3: Specifications added specs of an upgraded version of HS-HV 4.5.1. SIRIUS-SBOXe/fe: Specifications added specs for SBOXe v2, the upgraded version 4.11.1. SIRIUS-SBOXre - changed description to match new specifications, - Added specifications table for SBOXre v1 and SBOXre v2 4.11.2. SIRIUS-R8: Specifications changed table of specifications according to the version of SBOXre

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