DEWETRON



XR MODULES

VALID FOR REVISION 1.X

TECHNICAL REFERENCE



EN ISO 14001

ISO 9001



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Preface

Thank you!

Thank you very much for your investment in DEWETRON‘s unique data acquisition systems. These are top-quality instruments which are designed to provide you years of reliable service. This guide has been prepared to help you get the most from your investment, starting from the day you take it out of the box, and extending for years into the future.

This guide includes important startup notes, as well as safety notes and information about keeping your DEWETRON system in good working condition over time. However, this manual cannot and is not intended to replace adequate training.

This documentation contains operating as well as safety and care instructions that must be observed by the user. Faultless operation can only be guaranteed by observing these instructions.

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Safety

Safety instructions

The following section contains warning and safety instructions that must be observed by the user. Faultless operation can only be guaranteed if these instructions are observed.

General safety instructions

- Use this system under the terms of the specifications only to avoid any possible danger. If the unit is used in a manner not specified by the manufacturer the protection can be impaired.
- Maintenance is to be executed by qualified staff only.
- DO NOT use the system if equipment covers or shields are removed. If you assume the system is damaged, have it examined by authorized personnel only.
- Any other use than described above may damage your system and is attended with dangers such as short-circuits, fire or electric shocks.
- The whole system must not be changed, rebuilt or opened (except for changing DAQP modules).
- Reinstall filler panels of unused DAQP slots to guarantee proper cooling of the installed modules. The warranty is void if the modules overheat due to missing filler panels.
- 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 environmental.
  - the system has been exposed to heavy shipment strain.
- The warranty is void if damages caused by disregarding this manual. For consequential damages NO liability will be assumed.
- The warranty is void if damages 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). Exception: changing DAQP/PAD/HSI/TRION/TRION3 modules.
- Prevent using metal bare wires as there is a 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 overvoltage). An advanced range of application under certain conditions is allowed with therefore designed products only. For details refer to the specifications.
- Make sure that your hands, shoes, clothes and as well as the floor, the system or measuring leads, integrated circuits etc. are dry.
- Use measurement leads or measurement accessories aligned to the specification of the system only. Fire hazard in case of overload.
- Do not disassemble the system. There is a high risk of getting a perilous electric shock. Capacitors still might charged, even the system has been removed from the power supply.
- The measuring systems are not designed for use at humans and animals.
- Contact a professional if you have doubts about the method of operation, safety or the connection of the system.
- Handle the product with care. Shocks, hits and dropping it even from an already lower level may damage your system.
- Also consider the detailed technical reference manual as well as the security advices of the connected systems.

Electrical safety instructions

- 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.
- The system is grounded via a protective conductor in the power supply cord. To avoid electric shocks, the protective conductor has to be connected with the ground of the power network. Before connecting the input or output connectors of the system, make sure that there is a proper grounding to guarantee potential free usage. For countries, in which there is no proper grounding, refer to your local legally safety regulations for safety use.
- DC systems: Every DC system has a grounding connected to the chassis (black safety banana plug).
- Note the characteristics and indicators on the system to avoid fire or electric shocks. Before connecting the system, carefully read and understand the corresponding specifications in the product manual.
- The inputs are not, unless otherwise noted (CATx identification), for connecting to the main circuits of category II, III and IV. The measurement category can be adjusted depending on module configuration.
- The power cord or the main power switch separates the system from the power supply. Do not block the power cord or main switch, since it has to be accessible for the users.
- Any direct voltage output is protected with a fuse against short-circuits and reverse-polarity, but is NOT galvanically isolated (except it is explicit marked on the system).
- Supply overvoltage category is II.
- The system must be connected and operated to an earthed wall socket at the AC mains power supply only (except for DC systems).
- DO NOT touch any exposed connectors or components if they are live wired. The use of metal bare wires is not allowed. There is a risk of short-circuits and fire hazard.
- The assembly of the system is equivalent to protection class I. For power supply, only the correct power socket of the public power supply must be used, except the system is DC powered.
- Be careful with voltages >25 V_{AC} or >35 V_{DC}. These voltages are already high enough in order to get a perilous electric shock by touching the wiring.
- Unless otherwise stated, the maximum input voltage for measuring cards is 70 V_{DC} and 46.7 V_{PEAK}
- The electrical installations and equipments in industrial facilities must be observed by the security regulations and insurance institutions.

Ambient safety notices

- This product is intended for use in industrial locations. As a result, this product may cause interference if used in residential areas. Such use must be avoided unless the user takes special measures to reduce electromagnetic emissions to prevent interferences to the reception of radio and television broadcasts.
- 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.
- Any use in wet rooms, outdoors or in adverse environmental condition is not allowed. Adverse environmental conditions are:
  - Moisture or high humidity
  - Dust, flammable gases, fumes or dissolver
  - Thunderstorm or thunderstorm conditions (except assembly PNA)
  - Electrostatic fields etc.
- DO NOT use the system in rooms with flammable gases, fumes or dust or in adverse environmental conditions.
- Direct exposure of any DEWETRON product to strong sunlight or other heat radiation shall be prevented, as this could excessively heat up the product and lead to permanent damage of the product.
- The use of the measuring system in schools and other training facilities must be observed by skilled personnel.

Safety notices during operation

- During the use of the system, it might be possible to access another parts of a more comprehensive system. Read and follow the safety instructions provided in the manuals of all other components regarding warning and security advices for using the system.
- The product heats during operation. Make sure there is adequate ventilation. Ventilation slots must not covered. Only fuses of the specified type and nominal current may be used. The use of patched fuses is prohibited.

Standards and norms

This product has left the factory in safety-related flawless and proper condition. In order to maintain this condition and guarantee safety use, the user has to consider the security advices 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 welltried”, are excluded from the scope of IEC 61326-3-1.

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

Electromagnetic compatibility

Class A – Federal communications commission

This equipment has been tested and found to comply with the limits stated in EN55011 for Class A products. These limits are designed to provide reasonable protection against harmful interference when the equipment is operated in a commercial environment.

This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the instruction manual, may cause harmful interference to radio communications.

Operation of this equipment in a residential area is likely to cause harmful interference in which case the user is required to correct the interference at their own expense.

Typographic conventions

Safety and warning notices

WARNING



Indicates a hazardous situation that, if not avoided, could result in death or serious injury.

CAUTION



Indicates a hazardous situation that, if not avoided, could result in minor or moderate injury.

Notices

NOTICE

This text indicates situations or operation errors which could result in property damage or data loss.

INFORMATION

This text indicates important information or operating instructions. Not observing these instructions could inhibit or impede you from successfully completing the tasks described in this documentation.

Symbols


Denotes a warning that alerts you to take precautions to avoid injury. When this symbol is shown on the product, refer to the technical reference manual (ISO 7000-4034; 2004-01).


Indicates hazardous voltages.


Observe precautions for handling electrostatic sensitive devices.


Indicates the chassis terminal (IEC 60417-5020; 2002-10).

Direct current (IEC 60417-5031; 2002-10)


Alternate current (IEC 60417-5032; 2002-10)

Both direct and alternating current (IEC 60417-5033; 2002-10)


Three-phase alternating current (IEC 60417-5032-1; 2002-10)


Protective conductor terminal (IEC 60417-5019; 2006-08)


Equipment protected throughout by double insulation or reinforced insulation (IEC 60417-5172; 2003-02)

On (power) (IEC 60417-5007; 2002-10)


Off (power) (IEC 60417-5008; 2002-10)

General information

Environmental considerations

The following information refers to the environmental impact of the product and the product end-of-life handling. Observe the following guidelines when recycling a DEWETRON system:

- System and components recycling



The production of these components has 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. 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 of Electrical and Electronic Equipment (WEEE). Further information about recycling can be found on the DEWETRON website (www.dewetron.com).

- Restriction of hazardous substances

  This product has been classified as Monitoring and Control equipment, and is outside the scope of the 2011/65/EU RoHS Directive. This product is known to contain lead.

Problematic network stacks

Often intrusive IT software or network processes can interfere with the primary function of the DEWETRON system: to record data. Therefore we recommend strongly against the installation of IT/MIS software and running their processes on any DEWETRON data acquisition system, and cannot guarantee the performance of our systems if they are so configured.

Warranty information

A copy of the specific warranty terms applicable to your DEWETRON product and replacement parts can be obtained from your local sales and service office.

Legal information

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Printing history

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Modules overview

XR-RTD8

- Amplifier with integrated A/D conversion
- 8 isolated resistance temperature detector channels
- RS-485 or CAN interface
- Supported sensors: Pt100 to Pt2000; 5 kΩ



XR-TH8-S

- Intelligent amplifier with integrated A/D conversion
- 8 input channels for thermocouples
- Supported thermocouple types: K, J, T, R, S, N, E, L, C, U, B
- RS-485 or CAN interface



XR-LA8

- Intelligent amplifier with integrated A/D conversion
- 8 galvanically isolated input channels
- RS-485 or CAN interface
- Loop-powered 4 to 20 mA sensors



XR-V8

- Intelligent amplifier with integrated A/D conversion
- 8 channel isolated data acquisition
- RS-485 or CAN interface



XR-RTD8

- Amplifier with integrated A/D conversion
- 8 isolated resistance temperature detector channels
- RS-485 or highspeed CAN (2.0B) interface programmable
- Dust tight and waterproof (IP 68)



Module specifications

XR-RTD8 module			
Input channels	8 isolated resistance temperature detector channels		
Input ranges	Resistor: 0 to 5000 Ω Pt100(385); Pt200(385); Pt500(385); Pt1000(385); Pt2000(385); PT100(3961)		
Accuracy[1)]	**Pt100 a = 0.00385** ±0.25 °C @ -200 to 100 °C ±0.4 °C @ 100 to 400 °C ±0.8 °C @ 400 to 800 °C	**Pt100 a = 0.003916** ±0.25 °C @ -200 to 100 °C ±0.4 °C @ 100 to 400 °C ±0.8 °C @ 400 to 800 °C	**Pt200 a = 0.00385** ±0.25 °C @ -200 to 100 °C ±0.4 °C @ 100 to 400 °C ±0.5 °C @ 400 to 630 °C
	Pt500 a = 0.00385 ±0.25 °C @ -200 to 100 °C ±0.4 °C @ 100 to 250 °C	**Pt1000 a = 0.00385** ±0.25 °C @ -200 to 100 °C ±0.4 °C @ 100 to 400 °C ±0.8 °C @ 400 to 600 °C	**Pt2000 a = 0.00385** ±0.25 °C @ -200 to 100 °C ±0.4 °C @ 100 to 200 °C
	Resistance accuracy: 0.03 % of reading ±0.1 Ω		
Sampling rate	Max. 200 S/s per channel for CAN Max. 10 S/s per channel for RS-485		
Bandwidth (-3 dB)	48 Hz		
ADC type	20-bit Delta Sigma Converter		
Input connector	HCP.1S.304.CLNP		
Connection type	2-wire, 3-wire jumper selectable, 4-wire		
Noise	Typ. 0.02 °C (Pt100 @ 1 Hz readout)		
Resolution	0.01 °C for all types		
Constant current	390 µA		
Input impedance	Typ. >100 MΩ		
Bias current	Typ. 10 nA		
Sensor fault detection	Module indicates fullscale if input is open		
Interface	**RS-485**	**CAN 2.0B**	
– Communication speed	9600 bps (2400–115 200 programmable)	50 kBd to 1000 kBd	
– Standard settings	9600 bps, 8 data bits, 1 stop bit, no parity, module address 00 hex	500 kBd, Intel format	
– Readout speed	Depending on baudrate and number of channels (typ. 80 ch/s @ 9600 bps)	200 Hz[2)], 100 Hz, 50 Hz, 20 Hz, 10 Hz, 5 Hz, 2 Hz, 1 Hz, 0.5 Hz, 0.2 Hz or 0.1 Hz, 0.05 Hz, 0.02 Hz, 0.01 Hz, programmable	
– Data format	-	16-bit Intel or Motorola	
– Identifier types	-	Standard, extended	

Tab. 1: Module specifications XR-RTD8 module

XR-RTD8 module	
Max. gain drift	25 ppm/°C
Max. offset drift	25 ppm of range /°C
Isolation[3] voltage	350 V_{DC} (channel to channel and channel to bus, power and chassis)
Rated input voltage to earth according to IEC/EN 61010-2-30	70 V_{DC} (46.7 V_{PEAK})
Overvoltage protection	15 V_{DC}
CMRR (50/60 Hz)	130 dB
MTBF[4]	315,418 h
IP rating	IP 68; immersion depth 3 m
Bus/power connector	LEMO HEG.1B.304.CLNP
Power supply voltage	7 to 40 V
Power consumption	
– Sample rate ≤ 10 S/s	0.7 W
– Sample rate 20 to 100 S/s	0.9 W
– Sample rate 200 S/s	1.1 W
Weight	Typ. 560 g (~1.23 lbs)
Dimensions	
– Base module (W x D x H)	129 x 72 x 50.2 mm (5.1 x 2.8 x 2 in.) incl. mounting holes
– Mounting holes distance	119 x 7 mm (4.7 x 0.3 in.), 4.2 mm (0.165 in.) diameter
Environmental	
– Storage temperature	-40 °C to +85 °C (-40 °F to +185 °F)
– Operating temperature	-40°C to +85 °C (-40 °F to +185 °F)
– Relative humidity (MIL202)	0 to 100 % at 60 °C

Tab. 1: Module specifications XR-RTD8 module

1) 1 year, 23 °C ±5 °C
2) At 200 S/s the accuracy is reduced; multiply accuracy values with 3
3) For safety reasons maximum allowed voltage: 70 V_{DC} (46.7 V_{PEAK})
4) Mean time between failure

Connections

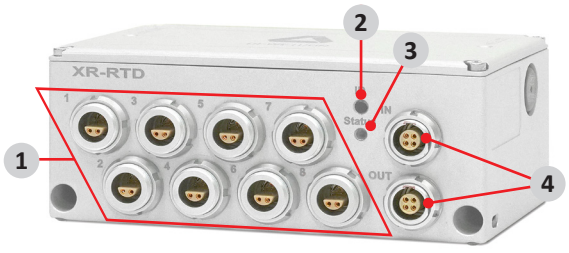
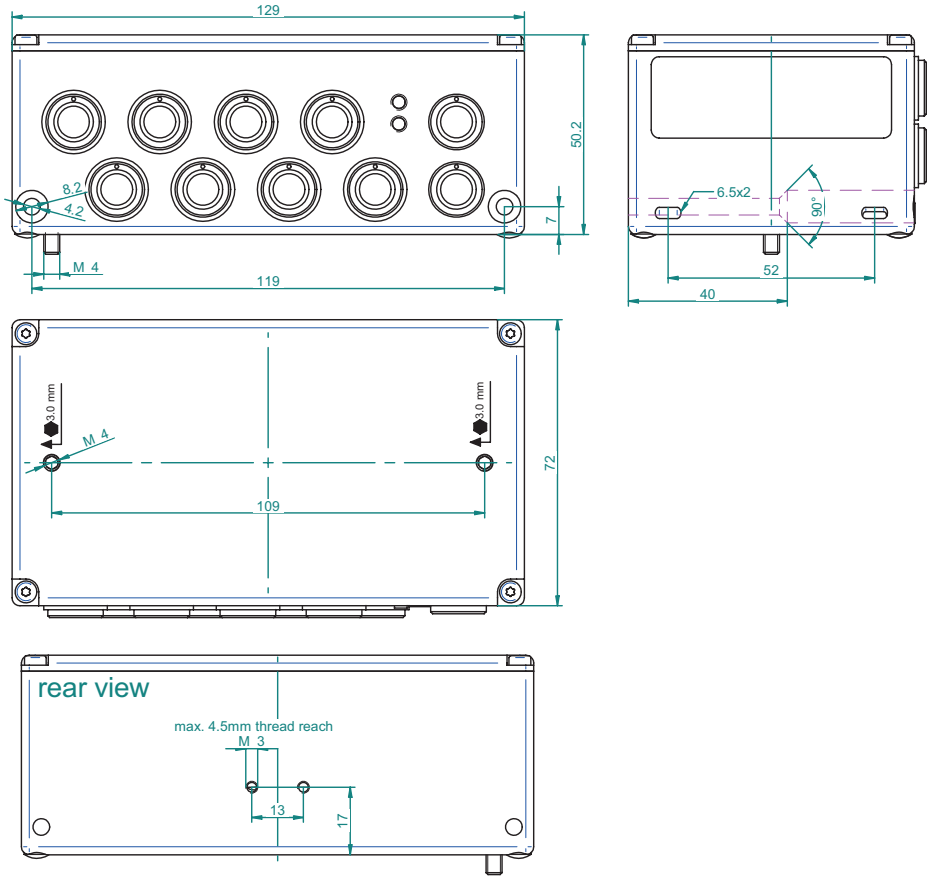


Fig. 1: Connections XR-RTD8

No.	Element	Description		
1.	RTD input connectors HCP.1S.304.CLNP		The XR-RTD8 module offers 8 isolated Resistor Temperature Detector input channels. Shield is on housing. Pin assignment: **1.** Excitation (+) **3.** Sense (-) **Shield:** Chassis GND **2.** Sense (+) **4.** Excitation (-)	
2.	ID button	Use the ID button to define the module address via software. **INFORMATION** For detailed information on how to use the button to *Change from RS-485 to CAN mode on page 27*.		
3.	State LED	Indicates the status of the device		
4.	RS-485/CAN interface connector 4-pin LEMO series connector		This connector can be used to connect the module to other XR series modules.	
			Pin assignment RS-485: **1.** RS-485 (A) **3.** Power supply (+) **2.** RS-485 (B) **4.** GND	Pin assignment CAN: **1.** CAN high **3.** Power supply (+) **2.** CAN low **4.** GND

Tab. 2: Connections and ports XR-RTD8

Dimensions*



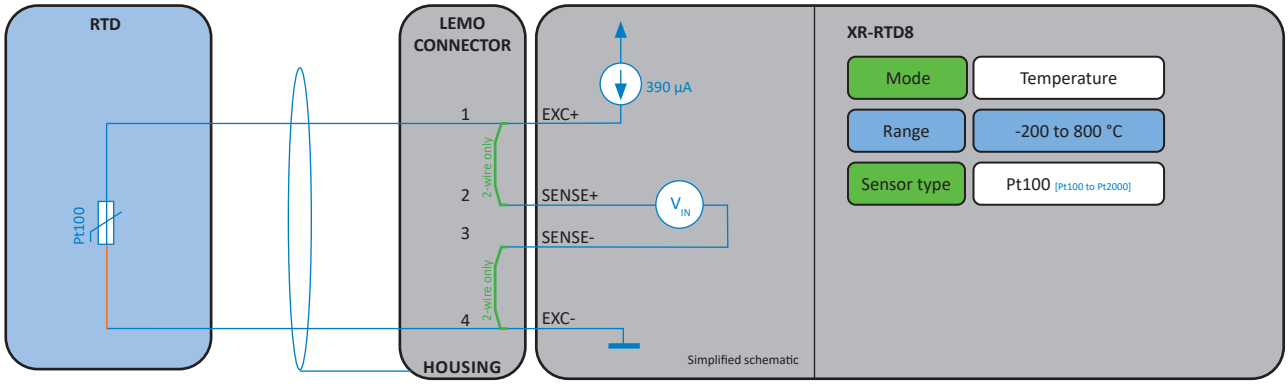
*) Dimensions in mm (1 inch = 25.4 mm)

Fig. 2: Dimensions XR-RTD8

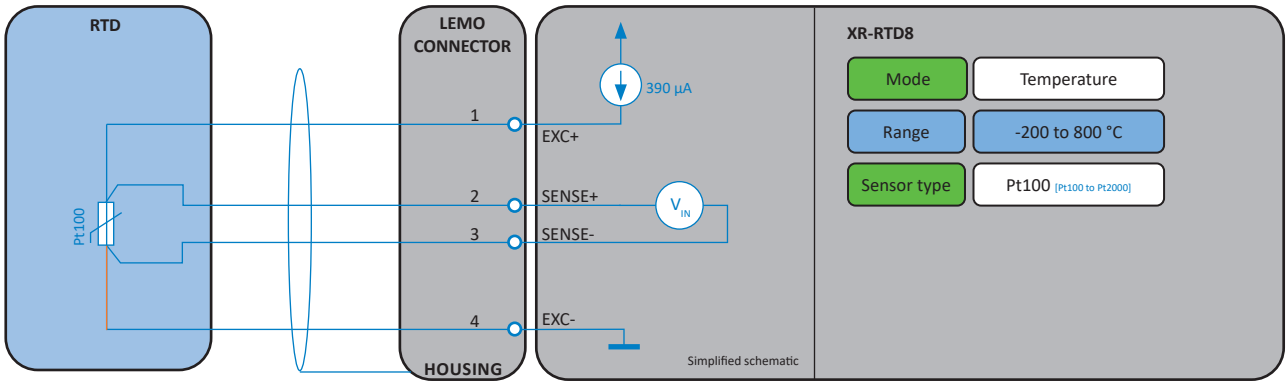
Sensor connection

2-wire connection

For a 2-wire measurement connect Pin1 to Pin2 and Pin3 to Pin4 inside the LEMO connector.



4-wire connection

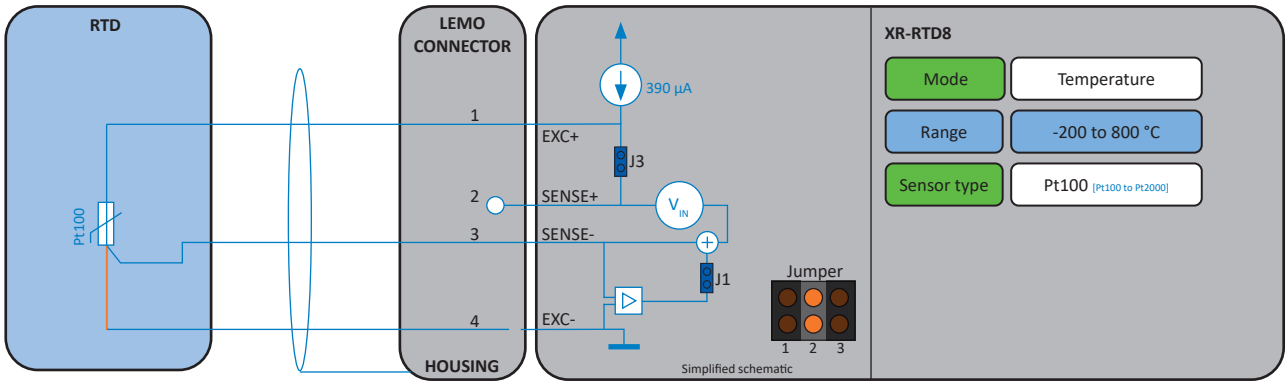


3-wire connection

Two jumper must be set inside the module on the appropriate channel. The standard factory setting is 4-wire mode.

A customer modification is possible, but it is recommended to order them already configured. This is the only way to ensure that the modules are sealed and IP 68 compliant.

The required jumpers (SPN02SXCN-RC) have 2 mm contact centers and are not included in the scope of delivery.



XR-TH8-S

- 8-channel universal thermocouple inputs
- Intelligent amplifier with integrated A/D conversion
- Cold junction compensation for every channel
- Available thermocouple types:
  - K, J, T, R, S, N, E, L, C, U, B
  - Isolated
- RS-485 or CAN interface programmable



Module specifications

Module specifications XR-TH8-S module							
Input channels	8 isolated thermocouple channels						
Input signals	K, J, T, R, S, N, E, L, C, U, B, ±150 mV						
Sampling rate	Max. 200 S/s per channel for CAN Max. 10 S/s per channel for RS-485						
Bandwidth (-3 dB)	48 Hz						
ADC type	20-bit Delta Sigma Converter						
Input connector	Mini thermocouple connector						
Resolution	0.02 °C for all types						
Input noise	Type K: 0.2 °C @ 100 S/s; 0.05 °C @ 10 S/s; 0.02 @ 1 S/s						
Input impedance	Typ. 100 MΩ						
Bias current	Typ. <1 nA						
Open thermocouple detection	Module indicates full-scale if input is open						
Accuracy[1] (inluding CJC error)	**-270 to -200 °C**	**-200 to -100 °C**	**-100–0 °C**	**0 to 100 °C**	**100–400 °C**	**400–1000 °C**	**>1000 °C**
– Type K (-270 to 1372 °C)	10.0 °C[4]	1.0 °C	0.5 °C	0.4 °C	0.4 °C	0.6 °C	0.8 °C
– Type J (-210 to 1200 °C)	0.9 °C[4]	1.0 °C	0.4 °C	0.3 °C	0.4 °C	0.5 °C	-
– Type T (-270 to 400 °C)	6.5 °C[4]	1.0 °C	0.5 °C	0.4 °C	0.4 °C	-	-
– Type R (-50 to 1760 °C)	-	-	2.8 °C	1.8 °C	1.3 °C	1.1 °C	1.2 °C
– Type S (-50 to 1760 °C)	-	-	2.4 °C	1.8 °C	1.4 °C	1.1 °C	1.3 C°
– Type N (-270 to 1300 °C)	16.0 °C[4]	1.3 °C	0.6 °C	0.5 °C	0.5 °C	0.5 °C	0.6 °C
– Type E (-270 to 1000 °C)	5.5 °C[4]	0.8 °C	0.4 °C	0.3 °C	0.3 °C	0.4 °C	-
– Type L (0 to 900 °C)	-	-	-	0.4 °C	0.4 °C	0.5 °C	-
– Type C (0 to 2300 °C)	-	-	-	0.8 °C	0.7 °C	0.8 °C	2.0 °C
– Type U (-200 to 600 °C)	-	1.0 °C	0.6 °C	0.4 °C	0.4 °C	0.4 °C	-
– Type B (0 to 1820 °C)	-	-	-	90.2 °C[2]	9.0 °C	2.3 °C	1.2 °C
Voltage accuracy[1]	±0.02 % of reading ± 9 µV						
Max. gain drift	25 ppm/°C						
Max. offset drift	25 ppm of range/°C						
Isolation[3] voltage	1500 V_{AC} (channel to channel and channel to bus, power and chassis)						
Rated input voltage to earth according to IEC/EN 61010-2-30	70 V_{DC} (46.7 V_{PEAK})						

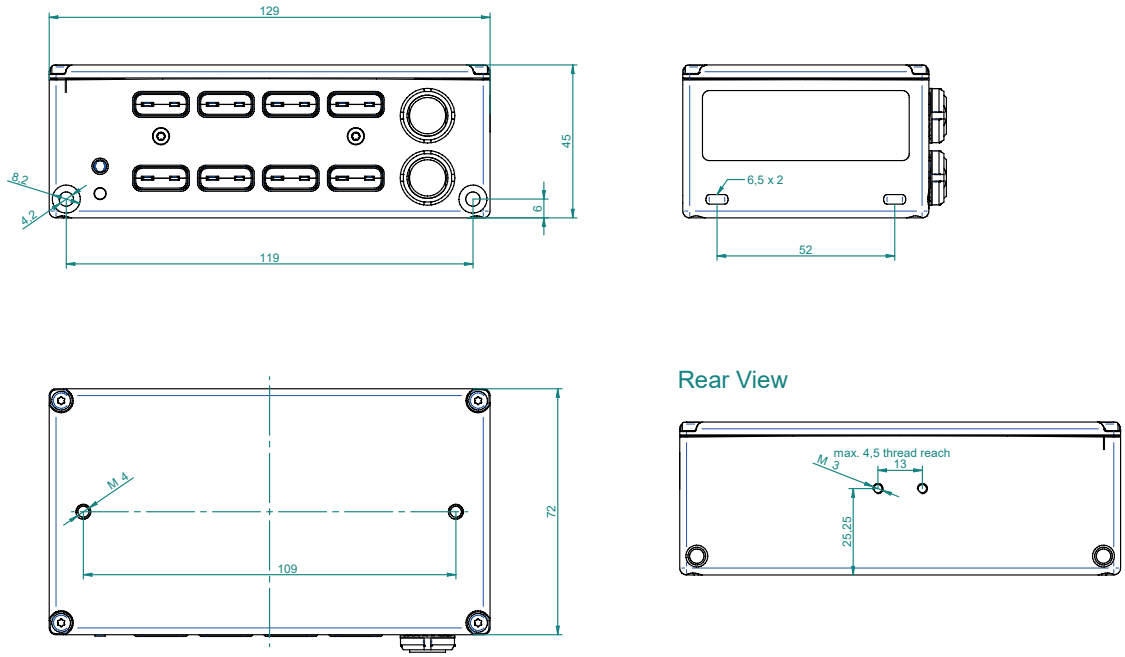
Tab. 3: Module specifications XR-TH8-S module

Module specifications XR-TH8-S module		
Overvoltage protection	15 V_{DC}	
CMRR (50/60 Hz) @ 0.01 to 10 S/s	130 dB	
Interface	**RS-485**	**CAN 2.0B**
– Communication speed	9600 bps (2400–115 200 programmable)	50 kBd to 1000 kBd
– Standard settings	9600 bps, 8 data bits, 1 stop bit, no parity, module address 00 hex	500 kBd, Intel format
– Readout speed	Depending on Bdrate and number of channels (typ. 80 ch/s @ 9600 bps)	200 Hz[4], 100 Hz, 50 Hz, 20 Hz, 10 Hz, 5 Hz, 2 Hz, 1 Hz, 0.5 Hz, 0.2 Hz or 0.1 Hz, 0.05 Hz, 0.02 Hz, 0.01 Hz, programmable
– Data format	-	16-bit Intel or Motorola
– Identifier types	-	Standard, extended
MTBF[5]	415,835 h	
IP rating	No IP rating	
Bus/power connector	HEG.1B.304.CLNP	
Power supply voltage	7 to 40 V	
Power consumption		
– Sample rate ≤10 S/s	0.7 W	
– Sample rate 20 to 100 S/s	0.9 W	
– Sample rate 200 S/s	1.1 W	
Dimensions		
– Base module (W x D x H)	129 x 72 x 45 mm (5.1 x 2.8 x 1.8 in.) incl. mounting holes	
– Mounting holes distance	119 x 6 mm (4.7 x 0.2 in.), 4.2 mm (0.17 in.) diameter	
Weight	Typ. 440 g (~0.95 lbs)	
Environmental		
– Storage temperature	-40 °C to +100 °C (-40 °F to +212 °F)	
– Operating temperature	-40°C to +85 °C (-40 °F to +185 °F)	
– Relative humidity (MIL202)	0 to 100 % at 60 °C	

Tab. 3: Module specifications XR-TH8-S module

1) 1 year, 23 °C ±5 °C
2) calculated specification; not verified.
3) For safety reasons maximum allowed voltage: 70 V_{DC} (46.7 V_{PEAK})
4) At 200 S/s the accuracy is reduced; multiply accuracy values with 3
5) Mean time between failure

Dimensions*



*) Dimensions in mm (1 inch = 25.4 mm)

Fig. 3: Dimensions XR-TH8-S

Connection

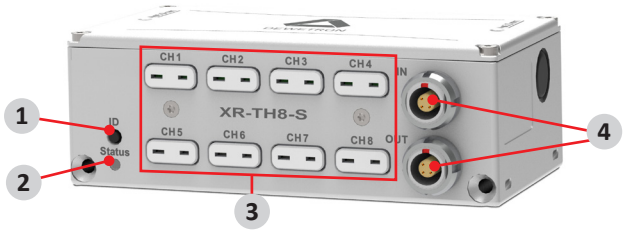


Fig. 4: Connections XR-TH8-S

No.	Element	Description	
1.	ID button	Use the ID button to define the module address via software. **INFORMATION** For detailed information on how to use the button for a module reset refer to chapter *Change from RS-485 to CAN mode on page 27*.	
2.	State LED	Indicates the status of the device	
3.	Thermocouple connectors		The XR-TH8-S module supports up to 8 thermocouples. Connect only thermocouple types which match with the connector types. If the module is equipped with type K connectors, you are allowed to connect type K thermocouples only. The white universal connector supports all types of thermocouple connectors. Fore more information about the thermocouple types refer to *Tab. 5: Thermocouple types on page 20.*

Tab. 4: Connections and ports XR-TH8-S

No.	Element	Description		
4.	RS-485/CAN interface connector 4-pin LEMO series connector		This connector can be used to connect the module to the EPAD2-BASE module or other XR series modules.	
		Pin assignment RS-485 **1.** RJ-485 (A) **3.** Power supply (+) **2.** RJ-485 (B) **4.** GND	Pin assignment CAN 2.0B **1.** CAN high **3.** Power supply (+) **2.** CAN low **4.** GND	

Tab. 4: Connections and ports XR-TH8-S

Thermocouple types

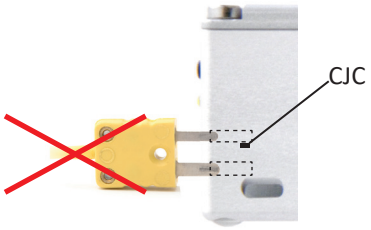
Type	IEC color code	ANSI color code	Temperature range	Alloy combination		Comments
K	green	yellow	-270 to 1372 °C (-454 to 2501 °F)	Ni	CrNi	Wide temperature range, most popular calibration
J	black	black	-210 to 1200 °C (-346 to 2193 °F)	Fe	CuNi	Used in vacuum, reduced and inert atmosphere
T	brown	blue	-270 to 400 °C (-454 to 752 °F)	Cu	CuNi	Low temperature and cryogenic applications
R	orange	green	-50 to 1760 °C (-58 to 3214 °F)	Pt13Rh	Pt	High temperature
S	orange	green	-50 to 1760 °C (-58 to 3214 °F)	Pt10Rh	Pt	High temperature
U	orange	green	-200 to 600 °C (-328 to 1112 °F)	Cu	CuNi	Also known as RX and SX extension wire.
N	rose	orange	-270 to 1300 °C (-450 to 2372 °F)	NiCrSi	NiSi	Alternative to type K. More stable at high temperature
E	purple	purple	-270 to 1000 °C (-454 to 1832 °F)	NiCr	CuNi	Highest EMF change per degree
B	grey	grey	0 to 1820 °C (32 to 3308 °F)	Pt30Rh	Pt6Rh	High temperature, common use in glass industry
C[1)]	no standard IEC color	red*	0 to 2300 °C (32 to 4172 °F)	W5Re	W26Re	Highest temperature range

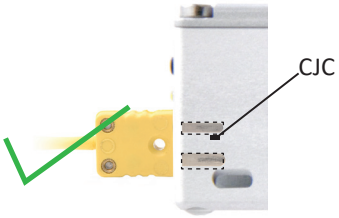
Tab. 5: Thermocouple types

1) No official symbol or standard designation

CJC

The XR-TH8-S comes with an integrated cold junction compensation sensor with an absolute accuracy of ±0.2 °C. In order to achieve this accuracy the sensor has to be connected for at least 1 minutes to the thermocouple connector (CJC equilibrium time).





INFORMATION

Make sure that the plug is completely plugged in. This will ensure that the CJC temperature measurement works properly.

XR-V8

- 8 channel isolated data acquisition
- RS-485 or CAN interface programmable
- Dust tight and waterproof (IP 68)



Module specifications

XR-V8 module		
Input channels	8 isolated voltage input channels	
Input ranges	Physical input range: ±50 V Software selectable: ±100 mV, ±500 mV, ±1 V, ±2.5 V, ±5 V, ±10 V	
Sampling rate	Max. 200 S/s per channel for CAN Max. 10 S/s per channel for RS-485	
Bandwidth (-3 dB)	48 Hz	
ADC Type	20-bit Delta Sigma Converter	
Input connector	D-SUB-25	
Resolution	100 µV for all ranges	
Input impedance	1 MΩ	
DC accuracy[1)]	±0.02 % of reading ±900 µV	
Max. gain drift	20 ppm/°C	
Max. offset drift	20 ppm of range /°C	
Linearity	0.002 %	
Isolation[2)] voltage	350 V_{DC} (channel to channel and channel to bus, power and chassis)	
Rated input voltage to earth according to IEC/EN 61010-2-30	70 V_{DC} (46.7 V_{PEAK})	
Overvoltage protection	350 V_{DC}	
Common mode voltage[2)]	350 V_{DC} /250 V_{AC} @ 50 Hz	
CMRR (50/60 Hz)	110 dB (140 dB @ DC)	
Interface	**RS-485**	**CAN 2.0B**
– Communication speed	9600 bps (2400–115 200 programmable)	50 kBd to 1000 kBd
– Standard settings	9600 bps, 8 data bits, 1 stop bit, no parity, module address 00 hex	500 kBd, Intel format
– Readout speed	Depending on baudrate and number of channels (typ. 80 ch/s @ 9600 bps)	200 Hz[3)], 100 Hz, 50 Hz, 20 Hz, 10 Hz, 5 Hz, 2 Hz, 1 Hz, 0.5 Hz, 0.2 Hz or 0.1 Hz, 0.05 Hz, 0.02 Hz, 0.01 Hz, programmable
– Data format	-	16-bit Intel or Motorola
– Identifier types	-	Standard, extended
Bus/power connector	LEMO HEG.1B.304.CLNP	
Power consumption		
– Sample rate ≤10 S/s	0.7 W	
– Sample rate 20 to 100 S/s	0.9 W	
– Sample rate 200 S/s	1.1 W	
Power supply voltage	7 to 40 V	
MTBF[4)]	662,849 h	

Tab. 6: Module specifications XR-V8 module

XR-V8 module	
IP rating	IP 68; immersion depth 3 m
Weight	Typ. 310 g (~0.7 lbs)
Dimensions	
– Base module (W x D x H)	129 x 72 x 34 mm (5.1 x 2.8 x 1.3 in.) incl. mounting holes
– Mounting holes distance	119 x 7 mm (4.7 x 0.3 in.), 4.2 mm (0.17 in.) diameter
Environmental	
– Storage temperature	-40 °C to +85 °C (-40 °F to +185 °F)
– Operating temperature	-40 °C to +85 °C (-40 °F to +185 °F)
– Relative humidity (MIL202)	0 to 100 % at 60 °C (140 °F)

Tab. 6: Module specifications XR-V8 module

1) 1 year, 23 °C ±5 °C
2) For safety reasons maximum allowed voltage: 70 V_{DC} (46.7 V_{PEAK})
3) At 200 S/s the accuracy is reduced; multiply accuracy values with 3
4) Mean time between failure

Dimensions*

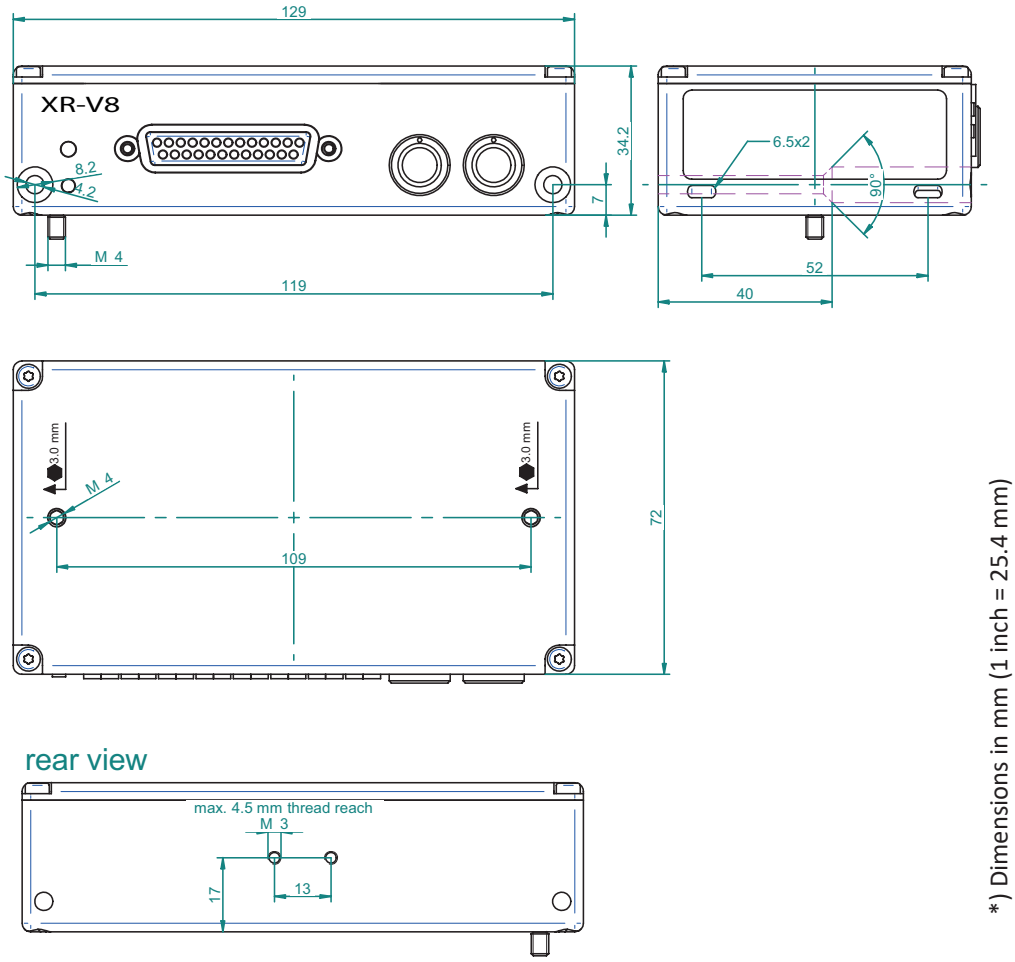


Fig. 5: Dimensions XR-V8

Connection

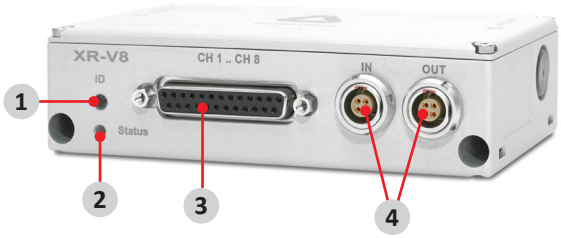
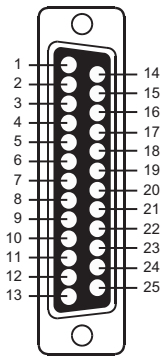


Fig. 6: Connections XR-V8

No.	Element	Description		
1.	ID button	Use the ID button to define the module address via software. **INFORMATION** For detailed information on how to use the button to *Change from RS-485 to CAN mode on page 27*.		
2.	Status LED	Indicates the status of the device		
3.	Voltage input connector 25-pin D-SUB connector		The CPAD3-V8 module offers 8 differential voltage input channels. Pin assignment: **1.** Channel 0 (+) **2.** Channel 0 (-) **3.** Channel 1 (+) **4.** Channel 1 (-) **5.** Channel 2 (+) **6.** Channel 2 (-) **7.** Channel 3 (+) **8.** Channel 3 (-) **9.** Channel 4 (+) **10.** Channel 4 (-) **11.** Channel 5 (+) **12.** Channel 5 (-) **13.** Channel 6 (+)	**14.** Channel 6 (-) **15.** Channel 7 (+) **16.** Channel 7 (-) **17.** Reserved **18.** Reserved **19.** Reserved **20.** Power supply (+) **21.** Reserved **22.** GND **23.** Reserved **24.** Reserved **25.** Reserved
4.	XR interface connector 4-pin LEMO series connector		This connector can be used to connect the module to other XR series modules.	
			Pin assignment RS-485 **1.** RS-485 (A) **3.** Power supply (+) **2.** RS-485 (B) **4.** GND	Pin assignment CAN 2.0B **1.** CAN high **3.** Power supply (+) **2.** CAN low **4.** GND

Tab. 7: Connections and ports XR-V8

XR-LA8

- Intelligent amplifier with integrated A/D conversion
- 8 galvanically isolated input channels
- RS-485 or CAN interface



Module specifications

XR-LA8 module		
Input channels	8 isolated current inputs	
Input range	±30 mA	
DC accuracy[1)2)]	0.03 % of reading ±1 µA	
Sampling rate	Max. 200 S/s per channel for CAN Max. 10 S/s per channel for RS-485	
Bandwidth (-3 dB)	48 Hz	
ADC type	20-bit Delta Sigma Converter	
Input connector	LEMO EGB.1B.304	
Resolution	0.3 µA	
Input impedance	50 Ω 0.1 %	
Max. gain drift	23 ppm/°C	
Max. offset drift	25 ppm of range /°C	
Isolation[3)] voltage	350 V_{DC} (channel to channel and channel to bus, power and chassis)	
Rated input voltage to earth according to IEC/EN 61010-2-30	70 V_{DC} (46.7 V_{PEAK})	
CMRR (50/60 Hz)	130 dB	
Interface	**RS-485**	**CAN 2.0B**
– Communication speed	9600 bps (2400–115 200 programmable)	50 kBd to 1000 kBd
– Standard settings	9600 bps, 8 data bits, 1 stop bit, no parity, module address 00 hex	500 kBd, Intel format
– Readout speed	Depending on baudrate and number of channels (typ. 80 ch/s @ 9600 bps)	200 Hz[2)], 100 Hz, 50 Hz, 20 Hz, 10 Hz, 5 Hz, 2 Hz, 1 Hz, 0.5 Hz, 0.2 Hz or 0.1 Hz, 0.05 Hz, 0.02 Hz, 0.01 Hz, programmable
– Data format	-	16-bit Intel or Motorola
– Identifier types	-	Standard, extended
MTBF[4)]	372,042 h	
IP rating	IP tbd.	
Bus/power connector	LEMO EGG.1B.304	
Power supply voltage	7 to 40 V	
Power consumption – Sample rate ≤10 S/s – Sample rate 20 to 100 S/s – Sample rate 200 S/s	 0.7 W 0.9 W 1.1 W	
Weight	Typ. 560 g (~1.23 lbs)	

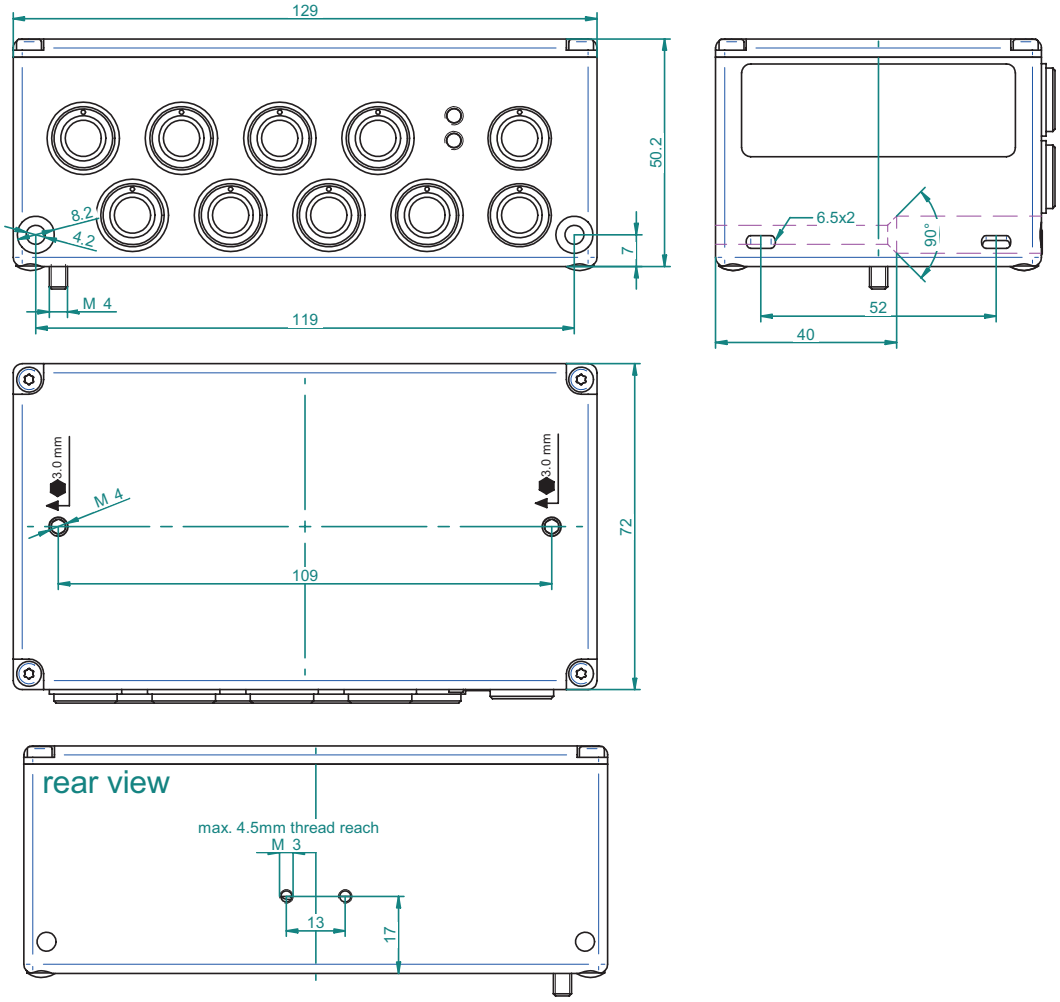
Tab. 8: Module specifications XR-LA8 module

XR-LA8 module	
Dimensions	
– Base module (W x D x H)	129 x 72 x 50.2 mm (5.1 x 2.8 x 2 in.) incl. mounting holes
– Mounting holes distance	119 x 7 mm (4.7 x 0.3 in.), 4.2 mm (0.165 in.) diameter
Environmental	
– Storage temperature	-40 °C to +85 °C (-40 °F to +185 °F)
– Operating temperature	-40°C to +85 °C (-40 °F to +185 °F)
– Relative humidity (MIL202)	0 to 100 % at 60 °C

Tab. 8: Module specifications XR-LA8 module

1) 1 year, 23 °C ±5 °C
2) At 200 S/s the accuracy is reduced; multiply accuracy values with 5
3) For safety reasons maximum allowed voltage: 70 V_{DC} (46.7 V_{PEAK})
4) Mean time between failure

Dimensions*



*) Dimensions in mm (1 inch = 25.4 mm)

Fig. 7: Dimensions XR-LA8

Connection

Interfaces

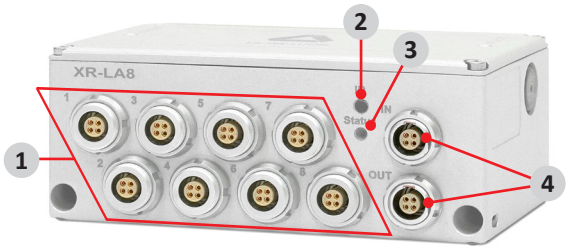


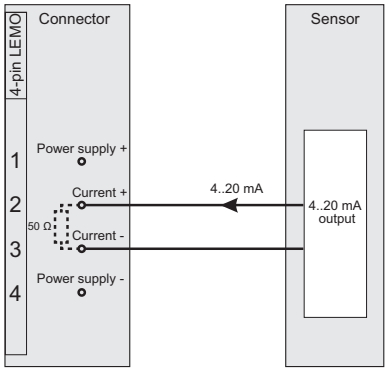
Fig. 8: Connections XR-LA8

No.	Element	Description		
1.	Current input connectors EGB.1B.304		The XR-LA module offers 8 differential voltage input channels Pin assignment: **1.** Power supply (+) **3.** Current (+) **2.** Power supply (-) **4.** Current (-) Shield is on housing.	
2.	ID button	Use the ID button to define the module address via software. **INFORMATION** For detailed information on how to use the button to *Change from RS-485 to CAN mode on page 27*.		
3.	State LED	Indicates the status of the device		
4.	RS-485/CAN interface connector 4-pin LEMO series connector		This connector can be used to connect the module to the EPAD2-BASE module or other XR series modules.	
			Pin assignment RS-485: **1.** RS-485 (A) **3.** Power supply (+) **2.** RS-485 (B) **4.** GND	Pin assignment CAN 2.0B: **1.** CAN high **3.** Power supply (+) **2.** CAN low **4.** GND

Tab. 9: Connections and ports XR-LA8

Signal connection

Current measurement (4 to 20 mA loop)



Loop powered sensor

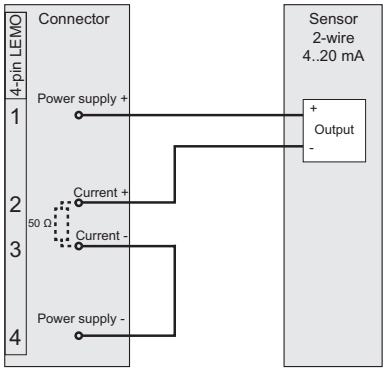


Fig. 9: Signal connection

INFORMATION

The XR-LA8 module also uses the module power supply as a sensor supply. Thus, if the sensor is supplied via the module, it must be ensured that the module is supplied accordingly.

Working with the system

Change from RS-485 to CAN mode

If the module could not be detected from the software anymore a possible reason could be that the module has been set to a different address or baud rate. With the reset function you can set the module back to its default settings:

- Press the ID button while powering on the module for at least 3 seconds, until the LED displays the current configuration:
  - 1x blinking: RS485 mode
  - 2x blinking: CAN mode
- By short pressing the ID button (below 0.5 s), the mode can be changed between RS-485 and CAN
- To store the current mode, press the ID button for at least 3 s. When releasing the button the module changes in the selected mode with default settings.

RS-485 mode default settings

- Baud rate: 9600 Bd
- Checksum: deactivated
- Address: 0x00

CAN mode default settings

- Identifier type: Extended
- Data Identifier: Bit 29 to Bit 25 = 0
- Bit 24 to Bit 1: Module serial number
- Bit 0: = ChnBit (0 for Channel 0 to 3; 1 for Channel 4 to 7)
- Data Format: Intel
- Baud Rate: 500 kBd
- Sample rate: 1 Hz
  The status LED will indicate that by blinking with 1 Hz.)

Default data identifier example:

- Module Serial Number: 0341581

  The module will send the data of channel 0 to 3 on identifier:
- 341581*2= 683162 = 0xA6C9A
- Data of channel 5 to 7 on identifier:
- 341581*2+1= 683163 = 0xA6C9B

Operation with OXYGEN

Using XR modules in RS-485 mode with a DEWEx system

The following chapter describes the use of XR modules in RS-485 mode on a DEWE/DEWE2/DEWE3 system. For connecting an XR module with your hardware, proceed as follows:

1. Connect the DEWE/DEWE2/DEWE3 device to the XR module.

   All DEWE/DEWE2/DEWE3 products (except TRIONet) have a connector on the housing marked with *EPAD* (see *Fig. 10*).



Fig. 10: Connection of XR *modules*

2. Open the OXYGEN software and navigate to the *System Settings*.
3. Expand the *System Settings* menu fully across the screen.
4. Select the *DAQ Hardware* section and ensure the slider button next to the XR series is activated (*Fig. 11).* Changes take effect on application restart.

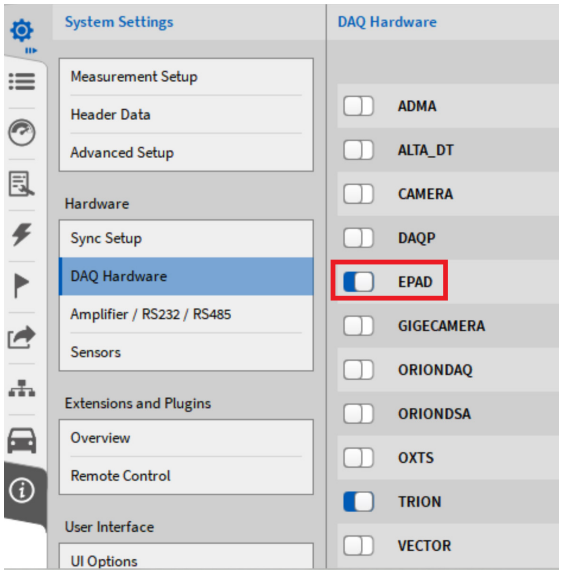


Fig. 11: Enabling the EPAD series in the DAQ hardware setup

5. Select the proper Serial Port for your XR module by clicking on the *Select ports…* button (*Fig. 12*). Systems in **Europe** are typically assigned to **COM2** and systems in the **USA** are typically assigned to **COM3**).



Fig. 12: Selection of the proper COM port

6. Press the *Scan for modules* button (*Fig. 13*). The system will scan the selected Serial Port for any present XR module. The status can be seen in the lower right corner of the software.

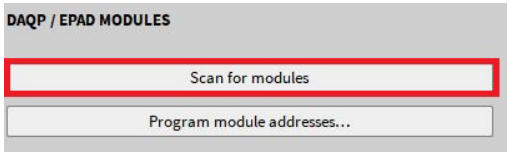


Fig. 13: Scan for modules button

7. If an XR module is found, the user will be presented with a message in the lower right corner of the software (*Fig. 14*) stating that the software has found an XR module.



Fig. 14: XR found message

8. If you have multiple XR modules daisy chained together, it is possible to select the *Program module addresses…* button (*Fig. 15*).

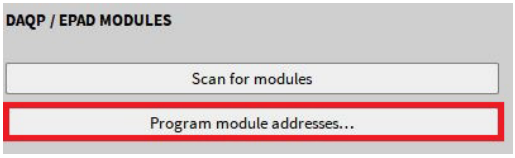


Fig. 15: Program module addresses button

9. Select the starting XR address (cannot be 0) and then select *Start programming* (*Fig. 16*)

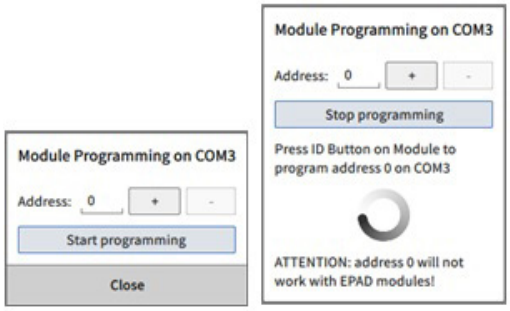


Fig. 16: EPAD programming procedure

10. Once the programming has begun, the software will ask you to press the black ID button (*Fig. 17*) on the first XR module.

    It will then increment the address in the software by one. At this point, press the black *ID* button on the next XR module and so on.



Fig. 17: ID button on the front of an XR module

11. When finished programming, select the *Stop Programming* button (*Fig. 1313*).

The XR module is now connected to your DEWE/DEWE2/DEWE3 system.

Troubleshooting

If no XR module is found during the scan for modules although it is connected, check the following items and then rescan for XR modules:

- Ensure your XR is compatible with OXYGEN (in OXYGEN 3.x and higher all XR modules are supported).
- Check to see if the XR module is properly connected to the system.
- Make sure the LED beneath the ID push button is illuminated when the XR is connected to the system.
- Choose another COM port, and rescan for the XR modules.
- If using several XR modules, ensure that the terminating resistor is in place

XR channel list

- After the programming of the XR module(s) is finished, close the *System Settings* menu and fully open the *Data Channels* menu across the screen.
- The XR module(s) are now visible in the system overview at the top of the *Channel List* ① and are available in a separate EPAD channel section in the *Channel List* ② (*Fig. 18*).
- The *Channel List* can also be filtered to EPAD channels.
- By clicking the *Up and Down* arrow next to the picture of the XR module, the user can quickly navigate between several EPAD modules connected to the system.

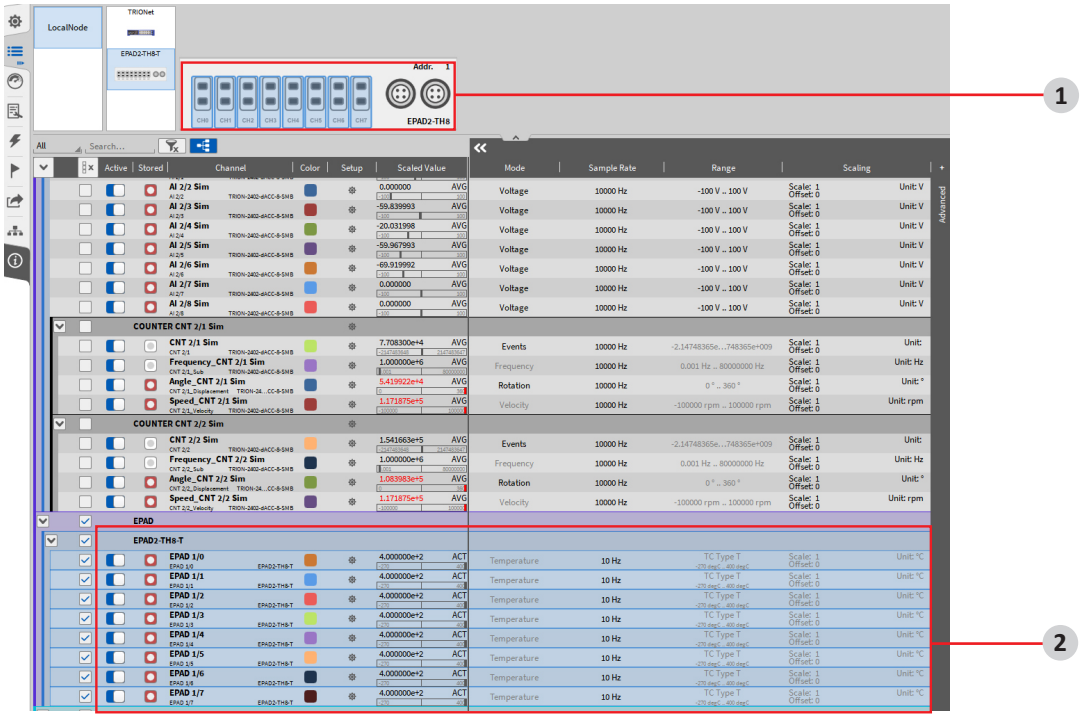


Fig. 18: XR channel list

INFORMATION

If no thermocouple is connected to an XR channel, the value 1372.0 °C (2501.6 °F) is displayed.

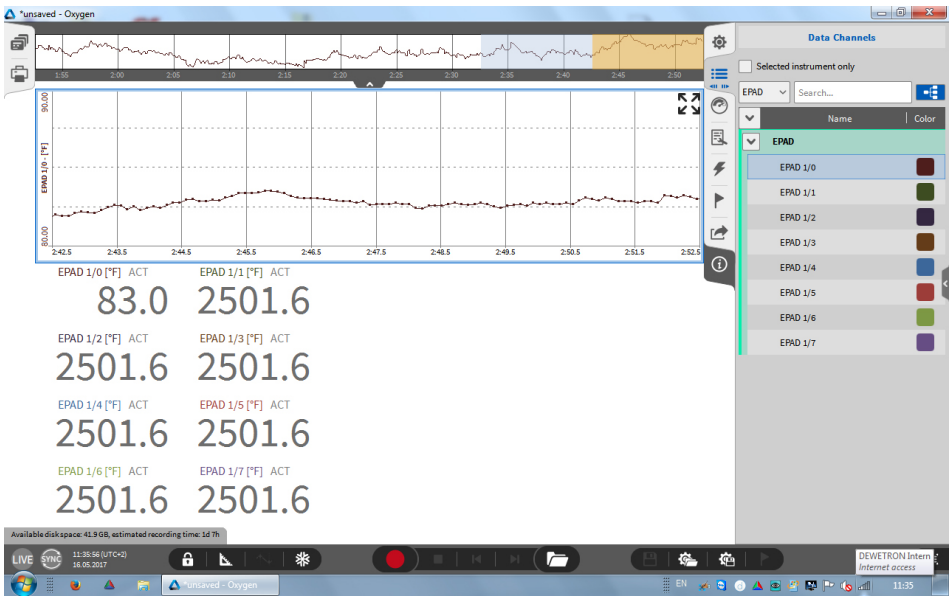


Fig. 19: XR channel list

Mounting examples

The XR modules are prepared for various mounting options:

DIN rail



Fig. 20: DIN rail

Cable strap

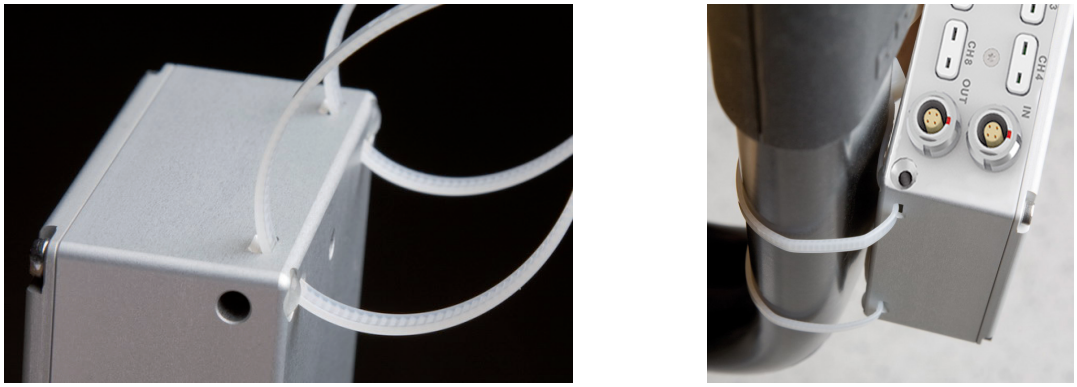


Fig. 21: Cable strap

Bolt down

2 screws with 4.2 mm diameter are required for the bolt down mounting option.



Fig. 22: Bolt down

Stack

2 long M4 Allen head screws are required for the stack mounting option.



Fig. 23: Stack

Further specifications

General environmental specifications

The following table shows the general environmental specifications. These are valid for all module types unless otherwise noted. All modules are manufactured according ISO9001 and ISO14001.

Environmental specifications	
Storage temperature	-40 °C to +85 °C (-40 °F to +185 °F)
Operating temperature	-40 °C to +85 °C (-40 °F to +185 °F)
Enhanced temperature range	On request
Relative humidity (MIL202)	0 to 95 % at 60 °C, non condensing

Tab. 10: General environmental specifications

Hardware specifications

Cable length and modules per CAN bus

There are several parameters that have to be considered when building a CAN bus network with XR modules.

- Baud rate: A higher baud rate allows a higher sample rate or using more XR modules. On the other hand, it reduces the maximum cable length.
- Sample rate: Every baud rate allows a certain aggregated sample rate. Lowering the baud rate allows using more modules at the full sample rate.
- Cable length: The baud rate and the number of connected modules limit the cable length. Every module limit the bus length by 2 meter.
- Number of modules: The maximum is 30 XR modules per bus.

Baud rate [kBd]	Sample rate [S/s]	Recommended maximum	
		Bus cable Length [m]	Modules [pcs]
1000	200	4.2	12
	100	4.2	12
	50	4.4	13
	10	4.4	13
	1	4.6	14
500	200	50	6
	100	38	12
	50	19	23
	10	17	30
	1	19	30
250	200	42	3
	100	50	6
	50	50	12
	10	50	30
	1	50	30

Tab. 11: Cable length and modules per CAN bus

Staying below the above mentioned limits allow a stable CAN bus communication. If more modules are required, use a separate CAN bus.

NOTICE

Never set the baud rate higher than the cable length allows as this will end up in an unstable bus. It could happen that you have to disconnect and reset the modules module by module.

Power supply considerations

Depending on the power supply only a certain number of modules can be connected. If longer cables are used this number is reduced because of the cable resistance.

	Bus length (m)	Max. XR modules
12 V, 1 A (EPAD connector)	10	10
	50	6
	100	3
24 V, 1.5 A (External power supply)	10	30
	50	22
	100	12

Tab. 12: Typical configurations

Voltage specifications

Isolation voltage

This value indicates the highest voltage which can be applied between an input pin and the reference potential without causing an isolation breakdown (uncontrolled current flow).

The isolation voltage is basically limited by creepage and clearance distances, the insulation material, and the used components. The given specification is proofed by high voltage tests on a systematical basis and by sample testing on the released product.

Exceeding the isolation voltage causes the damage of the measurement input in most every case, also other components inside the measurement unit could be affected. Exceeding the isolation voltage is furthermore a threat to life and physical condition (electric shocks, burn).

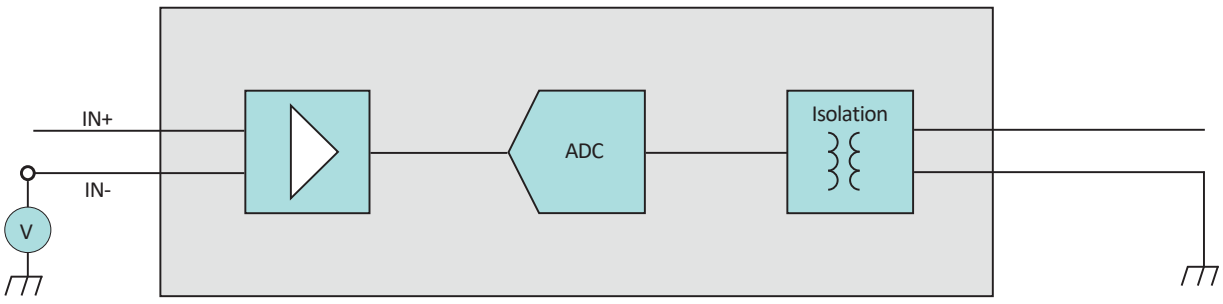


Fig. 24: Isolation Voltage

Input ranges

Like all measurement devices DEWETRON measurement equipment provides one or more input ranges. An input range indicates the highest possible value which can be displayed, similar to the limit position of a dial instrument.

INFORMATION

The value of the input range does not give any information concerning the allowable scope of application (please refer to rated input according to IEC/EN 61010-2-30).

Max. DC voltage @ AC coupling

The given value refers to input AC coupled inputs only.

'Max. DC voltage @AC coupling' specifies the highest allowed direct voltage component on the measurement input, when the coupling mode is switched to 'Coupling AC'.

Rated input according to IEC/EN 61010-2-30

Rated input indicates the allowable scope of application of a measurement input according to the IEC/EN 61010-2-30 (Safety Requirements for Electrical Equipment for Measurement, Control, and Laboratory Use - Part 2-030: Particular Requirements for Equipment Having Testing or Measuring Circuits). DEWETRON equipment (respectively measurement inputs) are always specified according to this stated standard, the compliance tests are done by a 3rd party laboratory.

The value rated input specifies the highest possible voltage which can be applied to the measurement input. The IEC/EN 61010-2-30 additionally describes certain measurement categories within a public power grid (see also overvoltage categories IEC/EN 60664-1). Thus, measurement circuits are allowed to be applied according to their specification to the power grid categories as stated on the next page.

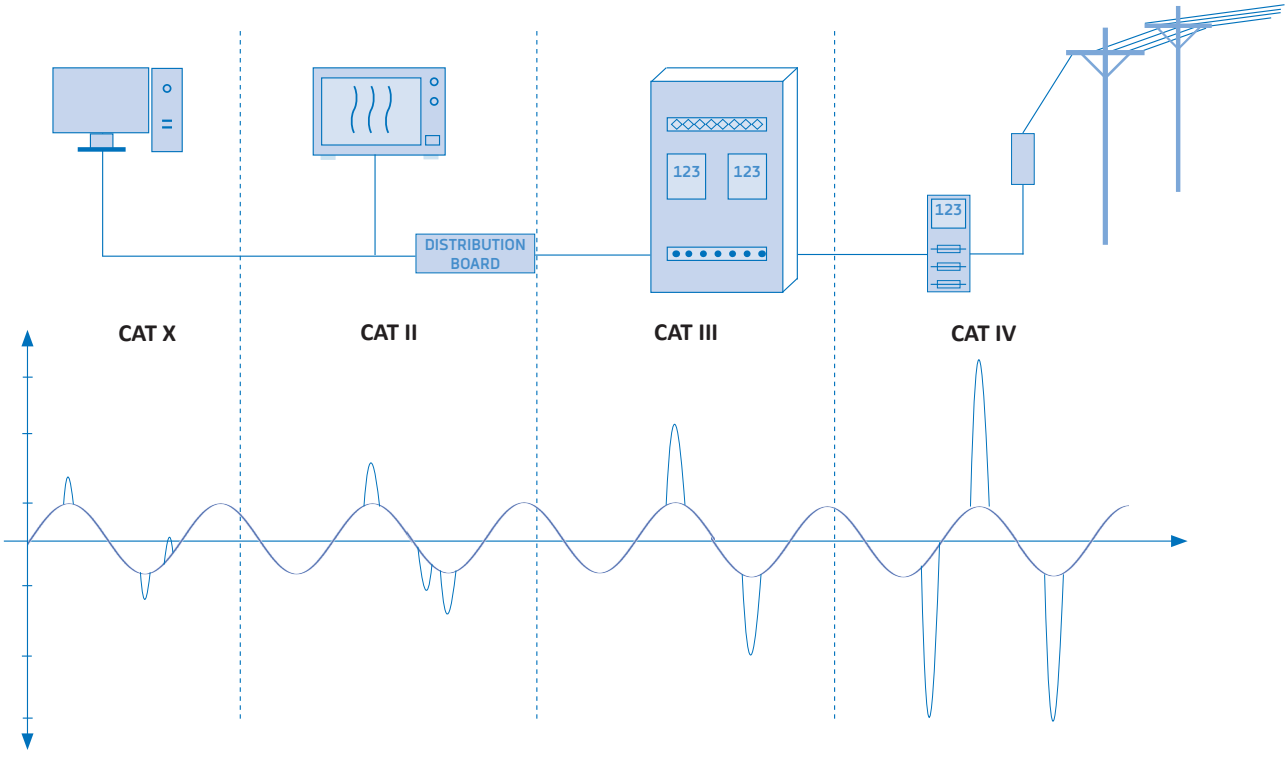


Fig. 25: Power grid categories

The isolation is tested according to the IEC/EN 61010-2-30. The level of the isolation voltage depends on the rated input voltage and on the measurement category. Since potential overvoltage phenomena are higher within higher power grid categories, the isolation voltage needs to be higher too.

If there is no measurement category specified, the measurement input is not appropriate to be applied to a public power grid.

Examples

- Rated input 600 V CAT II: The measurement input can be connected to a public power grid within the category II as long as the voltage of the grid does not exceed 600 VRMS. If there is a measurement category specified, the voltage

value stated is always considered to be RMS.

- Rated input 600 V_{RMS}: This measurement input is not intended to be connected to a public power grid. The input would be suitable for measurements within an on-board power system of a train for instance.

Relation between rated input, input ranges and isolation voltage

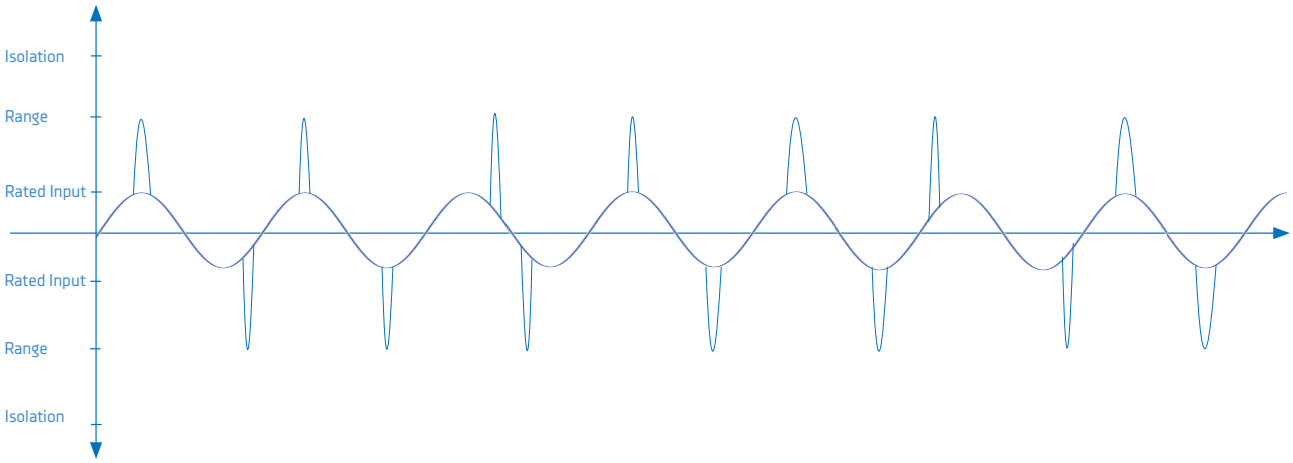


Fig. 26: Relation between rated input, input ranges and isolation voltage

Common mode voltage

Common mode voltage indicates the highest possible voltage between the two input pins of a channel (e.g. IN+ and IN-) and the reference potential (GND) without clipping the wanted signal.

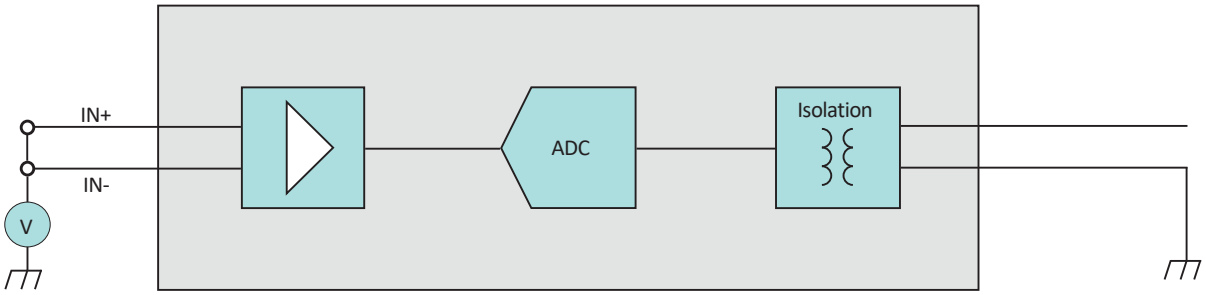


Fig. 27: Common mode voltage

In the very most cases the value of the ‘common mode voltage’ corresponds to the value of the ‘isolation voltage’. Overvoltage protection. This value indicates the highest possible voltage which will not overload the input protection circuit when applied between two pins of one channel.

Exceeding this value causes the damage of the measurement input in most every case, also other components inside the measurement unit could be affected and it is furthermore a threat to life and physical condition (electric shocks, burn).

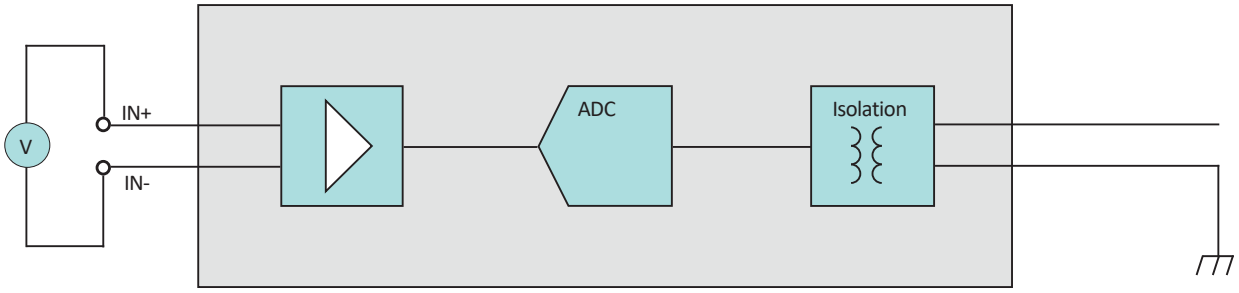


Fig. 28: Overvoltage protection

Bus pin fault protection

The specification 'Bus pin fault protection' refers to the wiring of bus systems (e.g. CAN, RS-485, etc.) only. The value indicates the highest voltage which will not destroy the bus input or output when applied between the bus wiring and ground by accident.

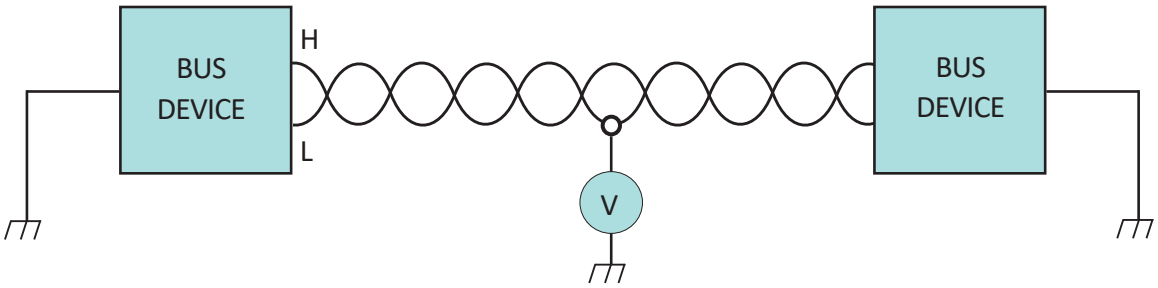


Fig. 29: Bus pin fault protection

IP rating

Depending on the installation site and conditions, electrical and electronic devices and equipment must be protected by an enclosure against the ingress of dirt, dust, water or even body parts and objects in order to prevent hazards to persons or failure, e.g. due to water, corrosion or possibly conductive dirt. Mechanical stress due to impact must also be prevented for reliable function and safe use. For this purpose, a group classification has been made in the form of the IP protection classes, which facilitates the selection of devices and housings according to the application requirements.

The IP (ingress protection) codes indicate waterproofness, protection against ingress of foreign bodies and protection against contact. The rating consists of the letters IP followed by two digits, the higher the number the better the protection. Sometimes a number is replaced by X, which indicates that the enclosure is not rated for that specification.

The protection class is always built up according to the following scheme: IPXX(x)

- The 1st digit stands for protection against contact and especially against foreign bodies,
- The 2nd digit stands for water protection,
- The 3rd digit can be occupied by supplementary letters for protection against contact.

If only one of the numbers is important, an X is assigned to the other digit. This is how combinations such as IP5X and IPX4 come about.

Tab. 13 shows the various rating classes:

1st digit	Intrusion protection	2nd digit	Moisture protection	3rd digit	Contact protection
0	No protection.	0	No protection.	A	Protected against access to hazardous active parts with the back of the hand.
1	Protected against solid objects over 50 mm, e.g. accidental touch by hands.	1	Protected against vertically falling drops of water, e.g. condensation.	B	Protected against access to dangerous active parts with a finger.
2	Protected against solid objects over 12 mm, e.g. fingers.	2	Protected against direct sprays of water up to 15 degrees from the vertical.	C	Protected against access to dangerous active parts with a tool.
3	Protected against solid objects over 2.5 mm, e.g. tools & wires.	3	Protected against direct sprays of water up to 60 degrees from the vertical.	D	Protected against access to dangerous active parts with a wire.
4	Protected against solid objects over 1 mm, e.g. wires and nails.	4	Protected against water splashed from all directions, limited ingress permitted.	-	--

Tab. 13: IP rating reference chart

1st digit	Intrusion protection	2nd digit	Moisture protection	3rd digit	Contact protection
5	Protected against dust limited ingress, no harmful deposits.	5	Protected against low pressure jets of water from all directions, limited ingress permitted.	-	
6	Totally protected against dust.	6	Protected against strong jets of water, e.g. on ships deck, limited ingress permitted.	-	
-	-	7	Protection against temporary immersion in water.	-	
-	-	8	Protection against permanent immersion in water (water-proof).	-	
-	-	9	Protection against high pressure and steam cleaners.	-	

Tab. 13: IP rating reference chart

Accessories and options

General accessories and options for XR modules



XPAD-TERM-L

Termination connector for XR modules with LEMO EGG.1B.304 connector, the last module of the RS-485/CAN bus must be terminated with this connector.



XPAD-CBL-LL-0.2

XR connecting cable 0.2 m with LEMO FGG.1B.304 connector on both sides, for daisychaining stacked XR modules.



XPAD-CBL-LL-0.5

XR connecting cable 0.5 m with LEMO FGG.1B.304 connector on both sides, for connecting XR series modules to an instrument with LEMO EGG.1B.304 EPAD interface or to EPAD-BASE2 or for daisy-chaining XR modules.

XPAD-CBL-LL-x



XR 2/5/10 m connecting cable with LEMO FGG.1B.304 connector on both sides, for connecting XR series modules to an instrument with LEMO EGG.1B.304 EPAD interface or for daisychaining XR modules.

- XPAD-CBL-LL-2: 2 m cable length
- XPAD-CBL-LL-5: 5 m cable length
- XPAD-CBL-LL-10: 10 m cable length



CPAD-CBL-LD9-2

Adapter cable 2 m to connect XR series modules to CAN interface, LEMO FGG.1B.304 plug to a D-SUB-9 socket, use only for DEWETRON systems with power supply on CAN connector.



EPAD-ADAP-D15L

Adapter to convert EPAD interface from D-SUB-15 connector to Lemo 1B.304.



XPAD-DIN-RAIL

Adapter to snap XR modules onto a DIN rail.



CPAD-CBL-LD9-2-POW

Adapter cable 2 m to connect XR series modules to CAN interface, LEMO FGG.1B.304 plug to a D-SUB-9 socket, additional 2 banana plugs for module power supply.

PAD-OPT2

25-pin D-SUB connector with screw terminal, for all PAD modules with 25-pin D-SUB socket, except PAD-TH8-P and xPAD2/CPAD3-TH8.

Mating connectors for EPAD/CPAD and XR modules

LEMO-FGA.1B304.CLAD52Z	LEMO-FGA.1B.304 mating connector, for cable diameter 4.2 to 5.2 mm
LEMO-FGB.1B.304.CLAD52Z	LEMO-FGB.1B.304 mating connector, for cable diameter 4.2 to 5.2 mm
LEMO-FGA.1B304.CLAD62Z	LEMO-FGA.1B.304 mating connector, for cable diameter 5.2 to 6.2 mm
LEMO-FGB.1B.304.CLAD62Z	LEMO-FGB.1B.304 mating connector, for cable diameter 5.2 to 6.2 mm

Maintenance and service

The information in this section is designed for use by qualified service personal.

Cleaning the system

- Clean surface of the chassis with dry lint-free cloth.
- Use a dry velocity stream of air to clean the chassis interior.

  Do not use harsh chemical cleaning agents.

NOTICE



Many components within the chassis are sensitive to static discharge damage. Always wear a ground wrist strap and service the unit only in static-free environment.

WARNING



Risk of injury

Disconnect all cables before servicing the unit.

System recovery

For more information regarding a total recovery refer to the corresponding total recovery technical reference manual shipped with your DEWE3 system.

Updates

Windows and antivirus/security software

Before installing Windows software updates consult with DEWETRON for compatibility guidance. Also keep in mind that the use of any antivirus or other security software may slow down your system and may cause data loss.

Software updates

NOTICE

The system BIOS is protected by password. Any change in the BIOS may cause a system crash. When the system is booting, do not press ESC-button on keyboard. This may clear the BIOS settings and cause system faults.

Any change in the file structure as deleting or adding files or directories might cause a system crash.

Before installing software updates contact DEWETRON or your local distributor. Use only software packages which are released by DEWETRON. Further information is also available in the Internet (http://www.dewetron.com).

After power off the system wait at least 10 seconds before switching the system on again. Otherwise the system may not boot correct. This prolongs also the life of all system components.

Calibration

Every instrument needs to be calibrated at regular intervals. The standard norm across nearly every industry is annual calibration. Before your DEWETRON data acquisition system is delivered, it is calibrated at our DEWETRON headquarter. Each of this system is delivered with a certificate of compliance with our published specifications. Detailed cali-

bration reports from our calibration system are available for purchase with each order. We retain them for at least one year, so calibration reports can be purchased for up to one year after your system was delivered.

This manual contains no calibration information. For self calibration, there is a seperate calibration kit available. The-CAL-KIT contains the required cables, software and instructions.

Training

DEWETRON offers training at various offices around the world several times each year. DEWETRON headquarters in Austria have a very large and professional conference and seminar center, where training classes are conducted on a regular basis starting with sensors and signal conditioning, A/D technology and software operation.

Dewetron Inc. in the USA also has a dedicated training facility connected to its headquarters, located in Rhode Island.

For more information about training services visit https://www.dewetron.com/academy.

Support

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

For Asia and Europe contact:

DEWETRON GmbH
Parkring 4
8074 Grambach
AUSTRIA

Tel.: +43 316 3070
Fax: +43 316 3070-90
E-Mail: support@dewetron.com
Web: http://www.dewetron.com

The telephone hotline is available
Monday to Friday between
08:00 and 17:00 CET (GMT +1:00).

For the Americas contact:

DEWETRON Inc. (HQ USA)
2850 South County Trail, Unit 1
East Greenwich, RI 02818
USA

Tel.: +1 401 284 3750
Toll-free: +1 866 598 3393
Fax: +1 401 284 3750
Email: support@dewetron.com
Web: http://www.dewetron.com

The telephone hotline is available
Monday to Friday between
08:00 and 16:30 EST

Service and repairs

We are very sorry that your DEWETRON system is not operating properly. Our team is here to ensure that your DEWETRON product is returned to peak performance as quickly as possible.

Help us to provide you with the best support by following the RMA policy.

Some problems can be solved remotely by our support team. To facilitate a quicker resolution to the problem and save unnecessary shipping costs, we ask you to first have your problem investigated by our technical support before sending your product. Contact details for our support can be found on our website. Describe the error accurately and with as much detail as possible. This helps expedite the repair process.

If a repair is necessary, complete our online RMA form. You will then receive an RMA (Return Material Authorization) number and detailed instructions that identify where to ship the damaged product.

Products arriving at our repair department without RMA require follow-up calls and investigation, which lead to a longer turnaround. Only the team of DEWETRON is allowed to perform any kinds of repairs to your system to assure a safe and proper operation in future.

INFORMATION

Only the team of DEWETRON is allowed to perform any kinds of repairs to your system to assure a safe and proper operation in future. For information regarding service and repairs contact your local distributor first or DEWETRON directly.

INFORMATION

Any spare parts (screws, backplanes, cables etc.) must be obtained from DEWETRON only.

CE certificate of conformity

Manufacturer	DEWETRON GmbH
Address	Parkring 4 8074 Grambach, Austria Tel.: +43 316 3070-0 Fax: +43 316 3070-90 Email: sales@dewetron.com http://www.dewetron.com
Name of product	**XR series modules**
Kind of product	*Amplifiers with integrated A/D conversion*

The product meets the regulations of the following EC-directives:

2014/35/EU

Directive of the European Parliament and of the Council of 26 February 2014 on the harmonization of the laws of the Member States relating to the making available on the market of electrical equipment designed for use within certain voltage limits

2014/30/EU

Directive of the European Parliament and of the Council of 26 February 2014 on the harmonisation of the laws of the Member States relating to electromagnetic compatibility (recast)

The accordance is proved by the observance of the following standards:

LVEMC	**Safety**	IEC 61010-1:2010 and IEC 61010-2-30:2010, Pol. deg. 2	
	Emissions	EN 61000-6-4	EN 55011 Class B
	Immunity	EN 61000-6-2	Group standard

Graz, December 12, 2022

Place / Date of the CE-marking

Ing. Thomas Propst / Manager Total Quality