

TECHNICAL REFERENCE MANUAL

IOLITE® V26-1



Physical			
Dimensions	483 x 148 x 133 mm	266 x 169 x 139 mm	321 x 155 x 151 mm
Weight	IOLITE-RACK: 2.85 kg IOLITE-GATE (4× RJ45): 260 g IOLITE-GATE-L (2× LEMO, 2× RJ45): 280g	2.6 kg	2.6 kg
1) Extended operating temperature range depends of module configuration			

Hint



For detailed explanation of IOLITE-R8 and IOLITE-R8r chassis shock and vibration specifications check this [LINK](#).

Interface	IOLITE Single channel	IOLITE Multi channel
Data interface	EtherCAT	EtherCAT
Data Rate	100 Mbps Full Duplex bus speed	100 Mbps Full Duplex bus speed
Sync Accuracy	< 200 ns within same EtherCAT chain < 2 µs using sync for multiple EtherCAT chains below 1 sample to Sirius®	< 200 ns within same EtherCAT chain < 2 µs using sync for multiple EtherCAT chains below 1 sample to Sirius®
Bus connectors	Ethernet RJ45	Ethernet RJ45
Max. cable length between devices	100 m	100 m
Max. Throughput per Chain	From 6 MB/s to 10 MB/s (see 1)	From 6 MB/s to 10 MB/s
Data interface connection	Ethernet RJ45, Single cable for data, power and sync, daisy chainable	Ethernet RJ45, single cable for data, power and sync, daisy chainable (see 2)
Power		
Power supply	9 V - 48 V	9 V - 48 V
Power consumption	~2 W (see individual modules)	~4 W (see individual modules)
Power supply connector	-	SCDN-THR 3.81/04/90G 3.2SN BK BX
Environmental		
Operating Temperature	-20 to 60 °C	-40 to 85 °C
Storage Temperature	-20 to 60 °C	-40 to 85 °C
Humidity	95 %, no condensation	95 %, no condensation
IP rating	IP20	IP20
Physical		
Dimensions	82 x 62 x 52 mm (might differ for different modules)	137 x 119 x 35 (might differ for different modules)
Weight	130 g (might differ for different modules)	530 g (might differ for different modules)
1) 55 per chain (@ 20 kS/s total sample rate per device), multiple chains possible. Additional power injectors are necessary.		
2) Passive PoE is supported for devices produced after September 2024.		

¹ Not supported with OBSIDIAN
² Third party ECAT master Data rate = 1 kS/s
³ Available for devices produced after September 2024.
⁴ Not supported with OBSIDIAN in Standalone mode

	8xTH	8xTH-HS	4xTH	8xRTD	8xRTD-HS	8xRTDp	8xRTD v3
Connectors	MINI TC	MINI TC	LEMO REDEL 2P series	LOB6f, Terminal block	LOB6f, Terminal block	LOB6f	Terminal block 2-way 24-pole
Channels per module	8x	8x	4x	8x	8x	8x	8x
Data rate per channel IOLITE	100 S/s	100 S/s, upgradable to 10 kS/s	10 kS/s	100 S/s	100 S/s, upgradable to 10 kS/s	100 S/s	10 kS/s
Data rate per channel OBSIDIAN	100 S/s	100 S/s, upgradable to 5 kS/s	not supported	100 S/s	100 S/s, upgradable to 5 kS/s	100 S/s	5 kS/s
Resolution	24-bit	24-bit	24-bit	24-bit	24-bit	24-bit	24-bit
Bandwidth	✗	0.49*fs (max. 1 kHz)	0.49*fs (max. 1 kHz)	✗	0.49*fs (max. 1 kHz)	✗	0.49*fs (max. 1 kHz)
Voltage mode ranges	±1 V, ±100 mV	±1 V, ±100 mV	±100 mV	±1 V, ±100 mV	±1 V, ±100 mV	±1 V, ±100 mV	±1 V, ±100 mV
Input coupling	DC	DC	DC	DC	DC	DC	DC
Sensor excitation	✗	✗	✗	244 uA / 440 uA	150 uA / 400 uA	0.4 mA / 2 mA	225 nA / 2 uA / 17.2 uA / 145 uA / 420 uA / 1.7 mA
Bridge connection	✗	✗	✗	✗	✗	✗	✗
Programmable shunt	✗	✗	✗	✗	✗	✗	✗
IEPE input	✗	✗	✗	✗	✗	✗	✗
Resistance	✗	✗	✗	1 kΩ, 10 kΩ	1 kΩ, 10 kΩ	100 Ω, 1 kΩ, 10 kΩ	100 Ω, 1 kΩ, 10 kΩ, 100 kΩ, 1 MΩ, 10 MΩ
Temperature (PTx)	✗	✗	✗	PT100, 200, 500, 1000, 2000	PT100, 200, 500, 1000, 2000	PT100, 200, 500, 1000, 2000	PT100, 200, 500, 1000, 2000
Thermocouple	K, J, T, R, S, N, E, C, B	K, J, T, R, S, N, E, C, B	K	✗	✗	✗	✗
Current	✗	✗	✗	✗	✗	✗	✗
Potentiometer	✗	✗	✗	✗	✗	✗	✗
LVDT	✗	✗	✗	✗	✗	✗	✗
Charge	✗	✗	✗	✗	✗	✗	✗
TEDS	✗	✗	✗	✗	✗	✗	✗
Isolation voltage	1000 V	1000 V	CATII 1000 V	1000 V	1000 V	150 V	150 V

Isolation arrangement	Ch-Ch & Ch-GND	Ch-Ch & Ch-GND	Ch-Ch & Ch-GND	Ch-Ch & Ch-GND	Ch-Ch & Ch-GND	Ch-Ch & Ch-GND	Ch-Ch & Ch-GND
Power consumption per module	3.2 W	Typ. 2.6 W, Max. 3.4 W	Typ. 2.6 W, Max. 3.7 W	Typ. 2.1 W, Max. 2.7 W	Typ. 3.5 W, Max. 4.3 W	Typ. 2.1 W, Max. 2.7 W	Typ. 4 W, Max. 5.5 W
Waterproof version	✗	✓ (IP65)	✗	✗	✓	✗	✗
Passive PoE functionality	✓ ³	✓	✗ (not available in modular)	✓ ³	✓	✓ ³	✓
Advanced functions	High isolation, support of main TC types	High isolation, support of main TC types	High isolation	High isolation	High isolation	Pulsed excitation, Cryogenic temperature range, High isolation	Fully isolated, support of Pt sensors and thermistors, high resistance range
Standalone version support in OBSIDIAN	✓	✗	✗	✗	✗	✗	✗

¹ Not supported with OBSIDIAN

² Third party ECAT master Data rate = 1 kS/s

³ Available for devices produced after September 2024.

⁴ Not supported with OBSIDIAN in Standalone mode

	32xDI	32xDO ¹	8xDI-4xDO ¹	16xAO	4xCNT	4xCAN-FD
Connectors	Terminal block	Terminal block	Terminal block	Terminal block	LIB7f	D-SUB9
Channels per module	32x	32x	8x digital in, 4x digital out	16x	4x	4x
Data rate per channel IOLITE	20 kS/s	✗	✗	✗	20 kS/s	up to 5.9 Mbit/s
Data rate per channel OBSIDIAN	10 kS/s	not supported	not supported	1 kS/s	20 kS/s	up to 5.9 Mbit/s
Resolution	digital	digital	digital	16-bit	100 MHz timebase 5 ppm, 20 ppm max	Digital
Bandwidth	✗	✗	✗	✗	10 MHz	✗
Voltage mode ranges	✗	open collector	✗	±10 V	TTL (Low: <0.8 V, High > 2 V)	✗
Input coupling	✗	✗	✗	✗	✗	✗
Sensor excitation	✗	✗	✗	✗	5 V, 12 V	5 V (max. 240 mA), 12 V (max. 100 mA)
Bridge connection	✗	✗	✗	✗	✗	✗
Programmable shunt	✗	✗	✗	✗	✗	✗

6.5. TEMPERATURE MEASUREMENT

IOLITE includes modules specially designed for temperature measurements. Supported are most common temperature sensors such as thermocouples and resistance temperature detectors (RTD).

List of temperature modules:

- IOLITEir-8xTH (rack version), IOLITEi-8xTH (modular version)
- IOLITEir-8xTH-HS (rack version)
- IOLITEir-8xRTD (rack version), IOLITEi-8xRTD (modular version)
- IOLITEir-8xRTD-T24f (rack version), IOLITEi-8xRTD-T24f (modular version)
- IOLITEir-8xRTD-HS (rack version)

6.5.1. IOLITEi 8xTH

IOLITEi TH modules (IOLITEir-8xTH and IOLITEi-8xTH) are isolated DAQ devices for temperature measurements using thermocouples. Isolated thermocouple modules can acquire data from any kind of thermocouple (K, J, T, R, S, N, E, C, B). It offers sensor break detection in software as well as using LED indicators.



IOLITEir-8xTH



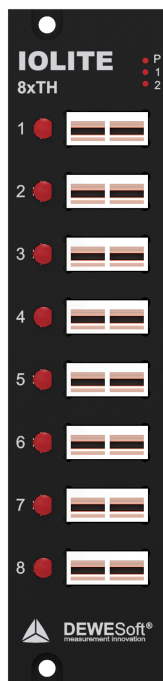
IOLITEi-8xTH

6.5.1.1. IOLITEi 8xTH: Specifications

Inputs		
Input type	Isolated universal thermocouple and voltage	
Number of channels	8	
ADC Type	24-bit delta-sigma	
Sampling Rate	Simultaneous 100 S/s	
Voltage Mode		
Ranges	±1 V	±100 mV
Input Accuracy	±0.02 % of reading ±100 µV	±0.02 % of reading ±10 µV
Typical Noise floor @ 10/100 S/sec	-114 dB / -105 dB	-109 dB / -100 dB
Gain Drift	Typical 4 ppm/K (max. 10 ppm/K)	Typical 4 ppm/K (max. 10 ppm/K)
Offset Drift	Typical 0.05 µV/K (max. 0.2 µV/K)	Typical 0.05 µV/K (max. 0.2 µV/K)
Gain Linearity	<0.01%	<0.01%
Input Coupling	DC	DC
Input Impedance	100 MΩ	100 MΩ
Temperature Mode		
Thermocouple Types	K, J, T, R, S, N, E, C, B	
Accuracy	±0.02 % of reading ±0.5 °C ±10 µV	
Sampling rates	10, 20, 40, 80, 100 S/sec	
Typical Noise	0.007 °C RMS@Type K @ 10 S/sec 0.02 °C RMS@Type K @ 100 S/sec	
Additional Specifications		
Input connectors	Mini Thermocouple connector (copper)	
Isolation voltage	1000 Vpeak channel to ground & channel to channel	
Power supply	9 - 48 V DC	
Power consumption	3.2 W	
Weight	230 g	

6.5.1.2. IOLITEi 8xTH: Miniature Thermocouple Connector

IOLITEi 8xTH module has 8 miniature thermocouple-connectors for temperature measurement.



IOLITEi-8xTH front

6.5.1.2.1. IOLITEi 8xTH: Miniature Thermocouple Connector: Pinout

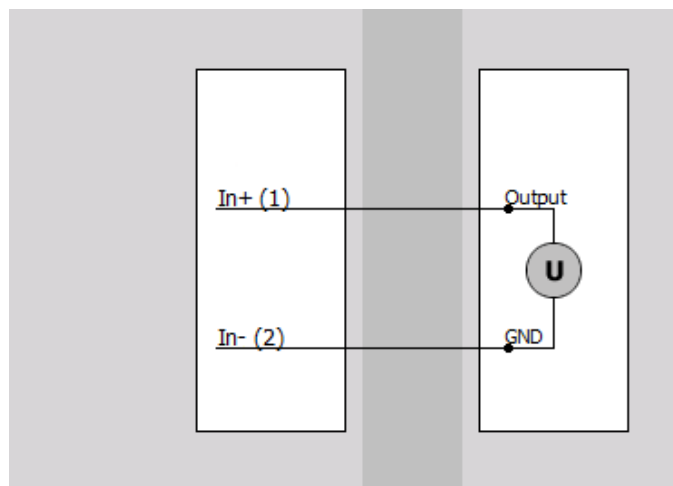


TH connector: pin-out (Mini TC female)

Pin	Name	Description
1	In+	Input+
2	In-	Input-

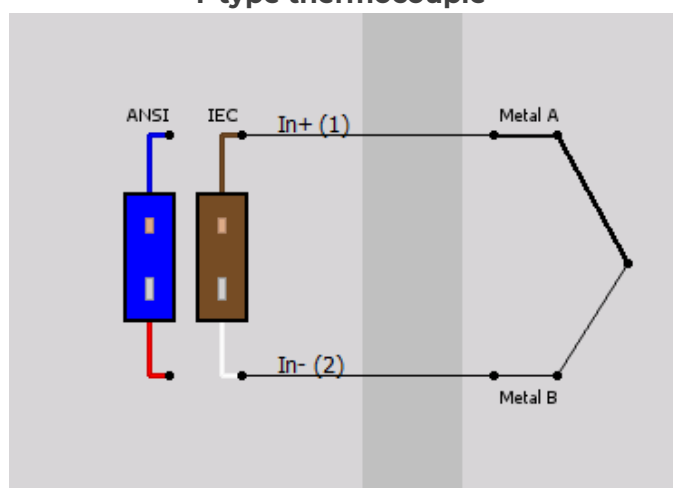
6.5.1.2.2. IOLITEi 8xTH: Miniature Thermocouple Connector: Wiring diagram

Voltage

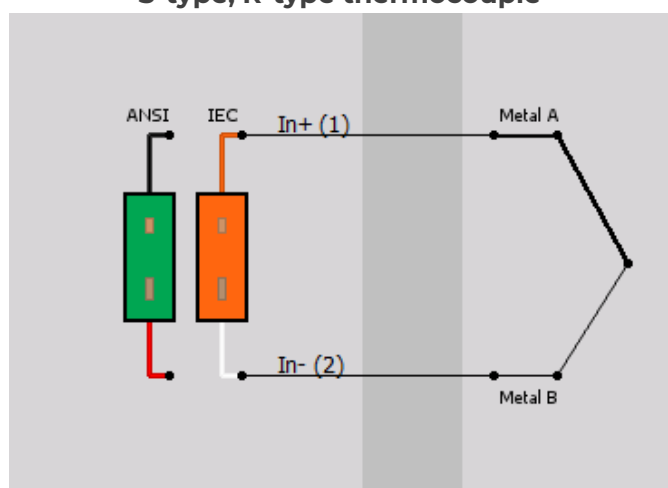


Temperature

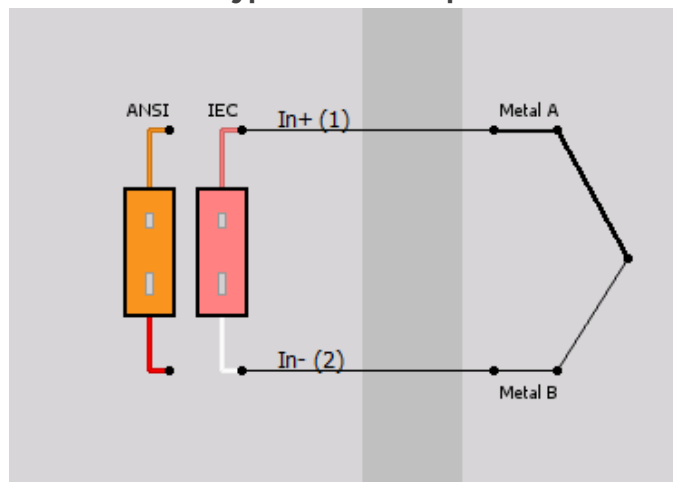
T-type thermocouple



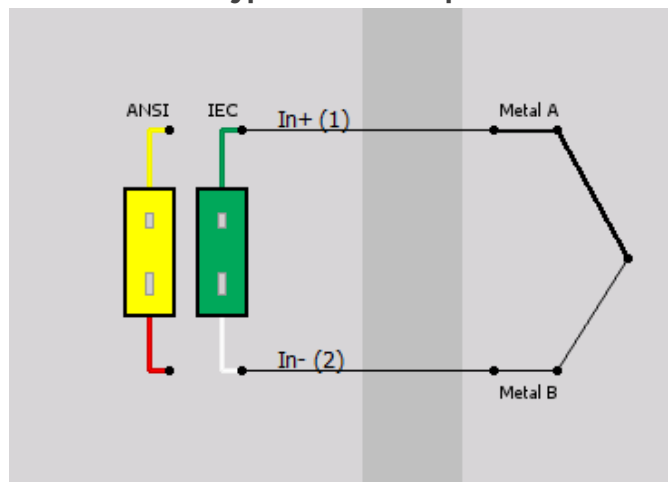
S-type, R-type thermocouple



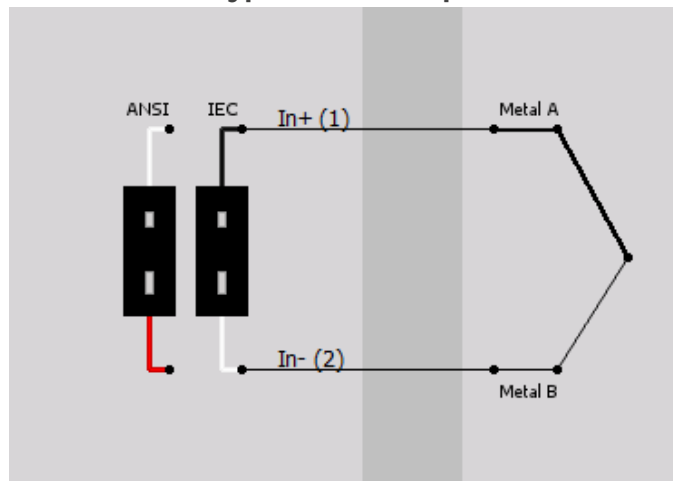
N-type thermocouple



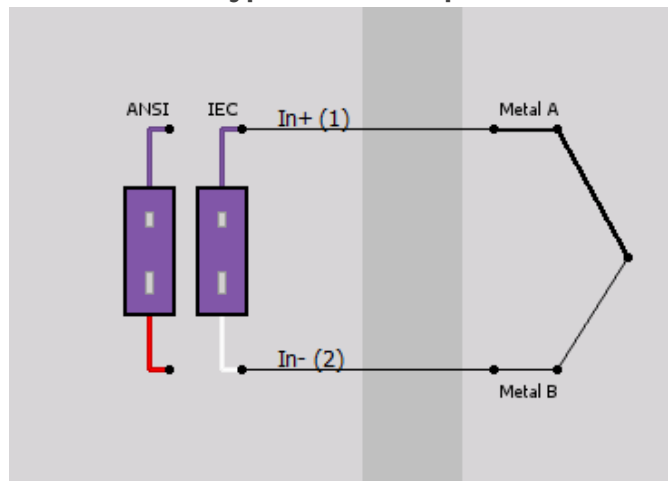
K-type thermocouple



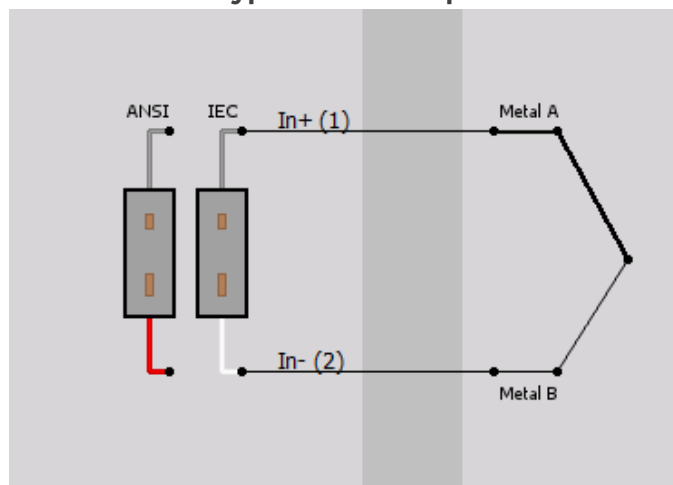
J-type thermocouple



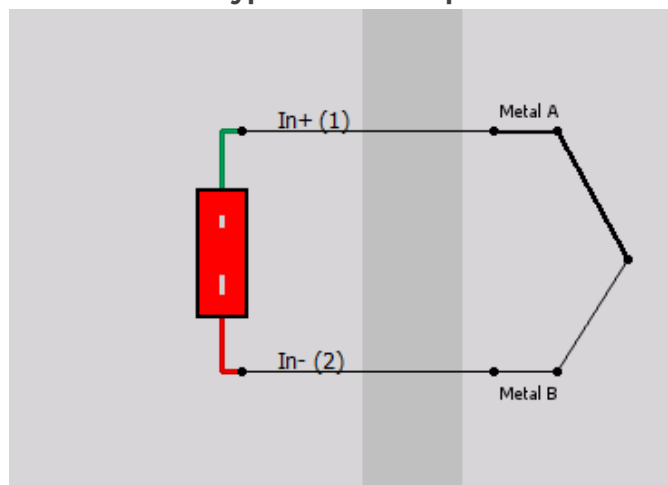
E-type thermocouple



B-type thermocouple



C-type thermocouple



6.5.6. IOLITEi 8xRTD-HS

The IOLITEi 8xRTD-HS module is used for measurements with universal platinum thermometer probes, thermistors, as well as for resistance and voltage measurements. It is a perfect choice for thermal shock measurements with sampling rate up to 10 kS/s.

IOLITEi 8xRTD-HS module has 8 isolated measurement channels and it comes with LEMO 0B 6-pin connectors (IOLITEir-8xRTD-HS and IOLITEi-8xRTD-HS) or with 4-pin terminal block connectors (IOLITEir-8xRTD-HS-T2A4f and IOLITEi-8xRTD-HS-T2A4f).



*IOLITEir-8xRTD-HS,
IOLITEi-8xRTD-HS*



*IOLITEir-8xRTD-HS-T2A4f,
IOLITEi-8xRTD-HS-T2A4f*

6.5.6.1. IOLITEi 8xRTD-HS: Specifications

Analog inputs		
Input types	Voltage, Resistance or Universal PTxxx inputs	
Number of channels	8	
ADC Type	24-bit delta-sigma	
Sampling Rate IOLITE	Simultaneous 10, 20, 40, 50, 80, 100, 200, 500, 1k, 2k, 5k, 10k S/s (license for high rates)	
Sampling Rate OBSIDIAN	Simultaneous 10, 20, 40, 50, 80, 100, 200, 500, 1k, 2k, 5k (license for high rates)	
Voltage mode		
Ranges	±1 V	±100 mV
Input Accuracy	±0.02 % of reading ±0.01 % of range	±0.02 % of reading ±0.02 % of range
Typical Noise Floor @ 10 / 100 / 1k / 10k S/s	-130 dB / -120 dB / -110 dB / -104 dB	-120 dB / -108 dB / -98 dB / -90 dB
Offset Drift	Typ. 0.05 µV/K (Max. 0.2 µV/K)	Typ. 0.01 µV/K (Max. 0.1 µV/K)
Gain Drift	Typ. 2 ppm/K (Max. 10 ppm/K)	
Gain Linearity	< 0.007 %	
Input Coupling	DC	
Input Impedance	10 MΩ	
Temperature mode		
Ranges	PT500, PT1000, PT2000	PT100, PT200
Excitation current	150 uA	400 uA
Measurement range	-200 °C to +850 °C	
Accuracy	±0.02 % of reading ±0.2 °C	
Temperature Drift	Typ. ±2 ppm/K (Max. ±10 ppm/K)	
Input Connection	3-wire or 4-wire	
Resistance mode		
Ranges	0...10 kΩ	0...1 kΩ
Excitation current	150 uA	400 uA
Accuracy	±0.02 % of reading ±0.008 % of range	
Input Connection	3-wire or 4-wire	
Additional Specifications		
Rack	IOLITEir-8xRTD-HS	
Input connectors	Lemo 0B 6pin EEA.0B.306.CLN Waterproof version: Lemo 0T 6pin EEA.0T.306.CLN	Terminal Block Weidmueller SL 2.50-04
Isolation voltage	1000 Vpeak channel to ground & channel to channel	
Power supply	9 - 48 V DC	
Power consumption	Typ. 3.5 W (Max. 4.3 W)	
Weight	325 g	225 g
Dimensions	128.4 x 115.4 x 30.1 mm	
Additional Specifications		

Modular	IOLITEi-8xRTD-HS	
Input connectors	Lemo 0B 6pin EEA.0B.306.CLN	Terminal Block Weidmueller SL 2.50-04
Isolation voltage	1000 V _{peak} channel to ground & channel to channel	
Power supply	9 - 48 V DC	
Power consumption	Typ. 3.5 W (Max. 4.7 W)	
Weight	585 g	485 g
Dimensions	137 x 115.0 x 35.0 mm	



Hint

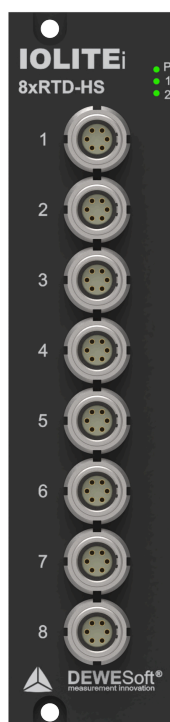
The higher sample rate is unlocked with a device license key. This upgrade raises the maximum possible sample rate of the IOLITEi 8xRTD-HS from 100 S/s to 10 kS/s.

6.5.6.2. IOLITEi 8xRTD-HS: Connectors

IOLITEi 8xRTD is offered with LEMO 0B 6-pin connectors or with 4-pin terminal block connectors.

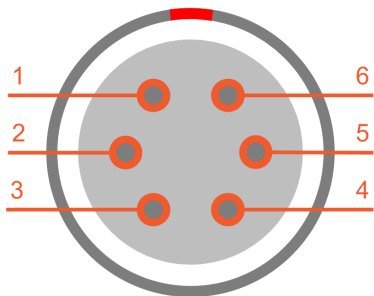
6.5.6.2.1. IOLITEi 8xRTD-HS: Lemo Connector

IOLITEir-8xRTD-HS and IOLITEi-8xRTD-HS modules have eight 6-pin LEMO 0B female connectors.



IOLITEir-8xRTD-HS front

6.5.6.2.1.1. IOLITEi 8xRTD-HS: Lemo Connector: Pinout



IOLITEi 8xRTD-HS connector: pin-out (6-pin LEMO female)

Pin	Name	Description
1	In+	Input+
2	In-	Input-
3	NC	Do not connect
4	Exc+	Excitation+
5	Exc-	Excitation-
6	iGnd	Isolated Ground

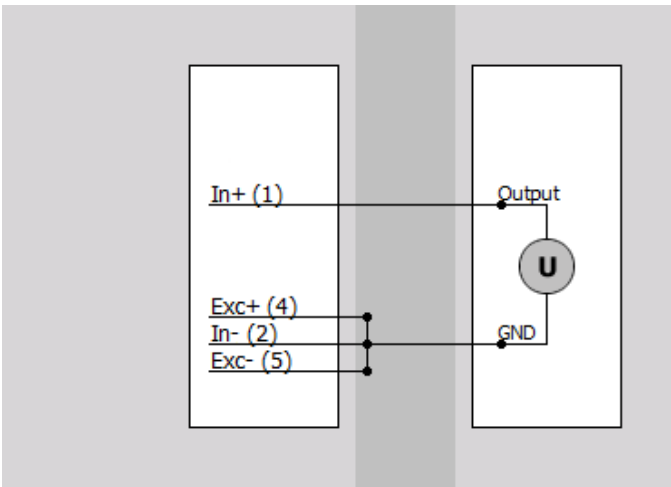
RTD connector (on the device): EEA.0B.306.CLN
Mating connector (for the cable): FGA.0B.306.CLAD22Z

6.5.6.2.1.2. Waterproof version: IOLITEirw-8xRTD-HS

Connector on the module: EEA.0T.306.CLN
Mating connector: FGA.0T.306.CLAC45

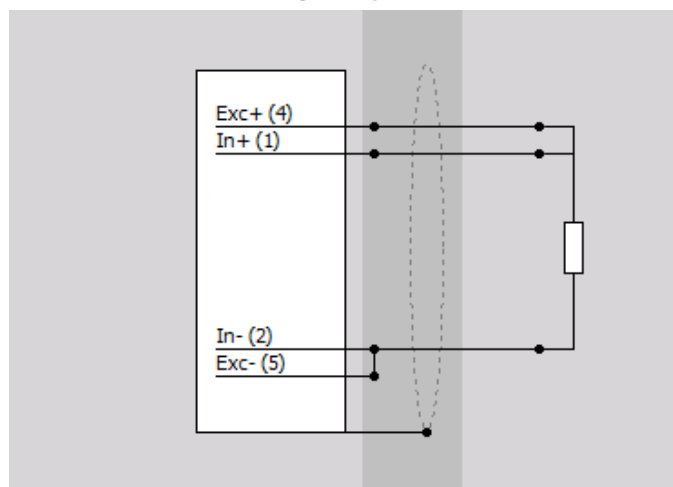
6.5.6.2.1.3. IOLITEi 8xRTD-HS: L0B6f Connector: Wiring diagram

Voltage

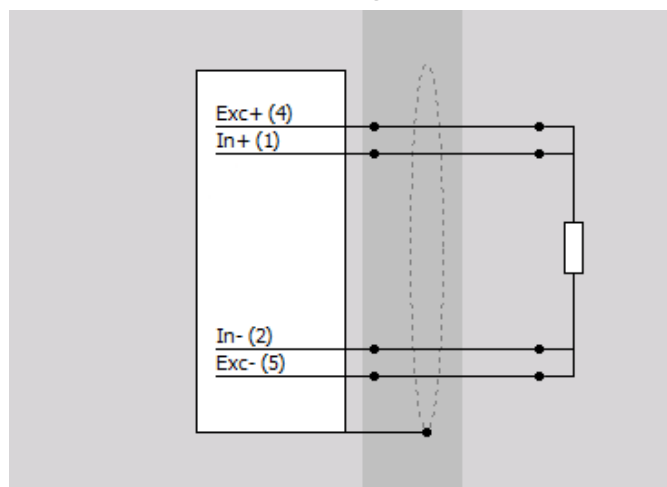


Resistance

3-wire

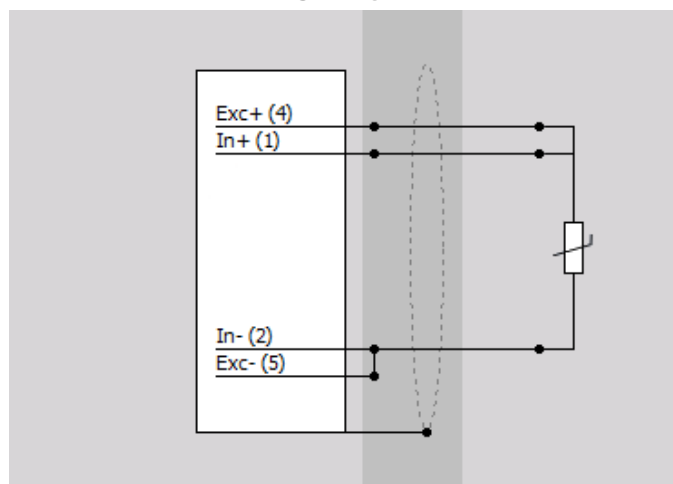


4-wire



Temperature

3-wire



4-wire

