IOLITE®

DEWESoft®

TECHNICAL REFERENCE MANUAL

IOLITE® V23-5

1. Table of contents

2. About this document

This is the Technical Reference Manual for IOLITE® Systems.

IOLITE® is an industrial real time data acquisition hardware line that comes in many different form factors and can be equipped with a wide range of different amplifiers so that you can use it for virtually any measurement task. Each system also includes a professional license for our award-winning DewesoftX® data acquisition software.

The manual is divided into several chapters. You will find:

- A detailed description of the IOLITE® hardware and the main combination and expansion options
- A description of the connection variants and the pin assignments on the inputs and outputs
- A comprehensive introduction to the configuration of the modules using DewesoftX®
- Detailed technical data: Specifications, etc.

2.1. Legend

The following symbols and formats will be used throughout the document.

Important
Gives you important information about a subject.
Please read carefully!

Hint
Gives you a Hint or provides additional information about a subject.

Example
Gives you an example to a specific subject.

Safety symbols in the manual:

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

2.2. Online versions

2.2.1. IOLITE® Technical Reference Manual

The most recent version of this manual can be downloaded from our homepage:
https://download.dewesoft.com/list/manuals-brochures/hardware-manuals
In the *Hardware Manuals* section click the download link for the *IOLITE® technical reference manual*.

2.2.2. DewesoftX® User Manual

The DewesoftX® User Manual document provides basics and additional information and examples for working with DewesoftX® and certain parts of the program.
The latest version of the DewesoftX® tutorials can be found here:
https://download.dewesoft.com/list/manuals-brochures/software-manuals
In the Software Manuals section click the download link of the DewesoftX® User Manual entry.

Important
Read safety instructions first in chapter 10. Safety instructions.

3. Getting started

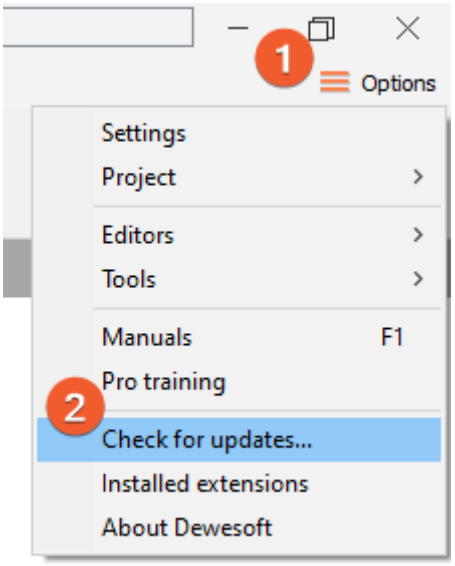
This chapter will help you to install the software, connect your IOLITE® system to the PC via EtherCAT® and will show you how to configure DewesoftX®.

To follow these steps, you need the following items:

- your brand new IOLITE system (included in the shipment)
- your Sirius USB stick (included in the shipment)
- your PC with Windows 10
- Note: older versions like Windows® 7 may also work

3.1. Software installation

For optimal working, we recommend that you install the latest version of DewesoftX®. If you already have DewesoftX® installed, please check if a newer version is already available. You can either check on the website under Support/Downloads/DewesoftX section or directly in software under the Options/Check for updates. In both cases the changelog is included



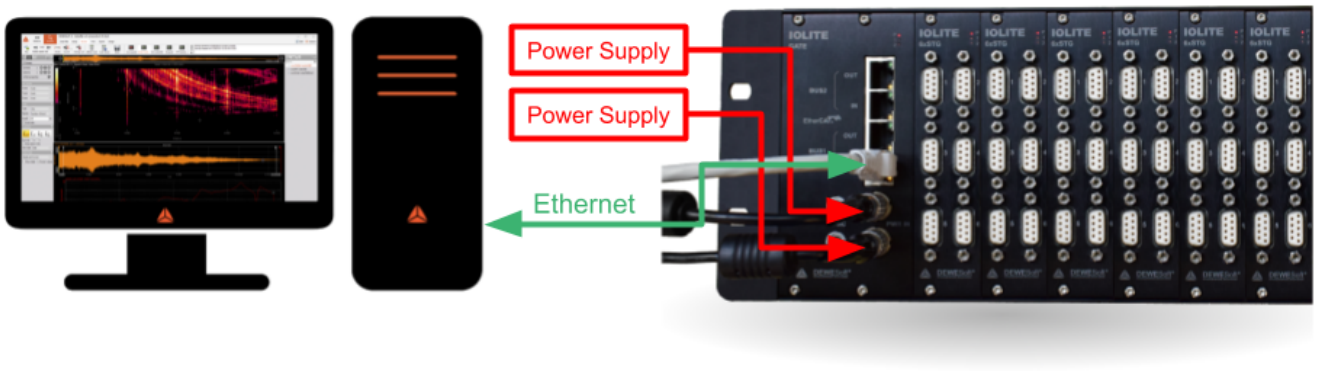
Check for updates

3.2. Connecting IOLITE®

In this chapter, you can see the basic instructions for connecting IOLITE® devices. Advanced connections are described in the following chapters.

IOLITE-R12

First connect the power supply cable (PS-120-L1B2f) to the PWR IN 2-pin LEMO 1B male connector. Then connect a standard ethernet cable to the IN connector of BUS 1 on IOLITE-GATE. Finally connect the other side of the ethernet cable to the LAN port of the PC. You can find advanced connections in chapter 3.3.1.4. Connection of IOLITE-R12.



Connection of IOLITE-R12 standalone device to PC

IOLITE-R8

First connect the power supply cable (PS-120-L1B2f) to the PWR IN 2-pin LEMO 1B male connector. Then connect L1T8f-RJ45-1M cable (LEMO side) to the IN connector of BUS 1 on the IOLITE-R8 back panel. Finally connect the other side of the L1T8f-RJ45-1M cable (RJ45 side) to the LAN port of PC. You can find advanced connections in chapter 3.3.2.4. Connection of IOLITE-R8.

Connection of IOLITE-R8 standalone device to PC

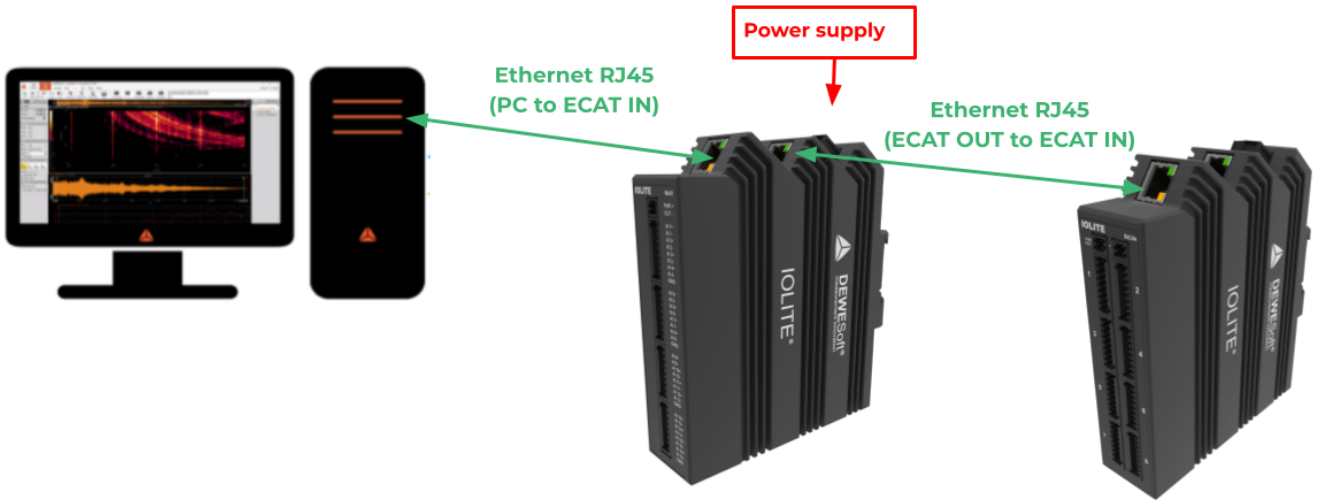
IOLITEi - multichannel

First connect the power supply cable (2x2 OMNIMATE SL 2.50 / BLF 2.50/180) to the PWR IN 2x2 TBLOCK connector. Then connect RJ-45 cable to the IN connector. Finally connect the other side (RJ45) to the LAN port of the PC. You can find advanced connections in chapter 3.3.2.4. Connection of IOLITE-R8.

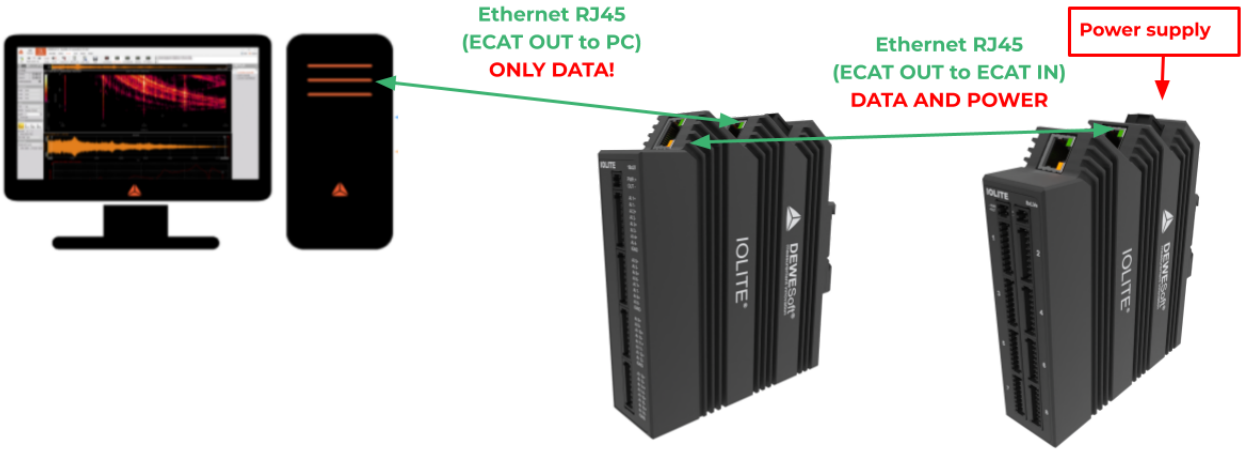
Connection without passive PoE

Connection of IOLITEi multi-channel modulardevice to PC

Connection with passive PoE (**RECOMMENDED**)

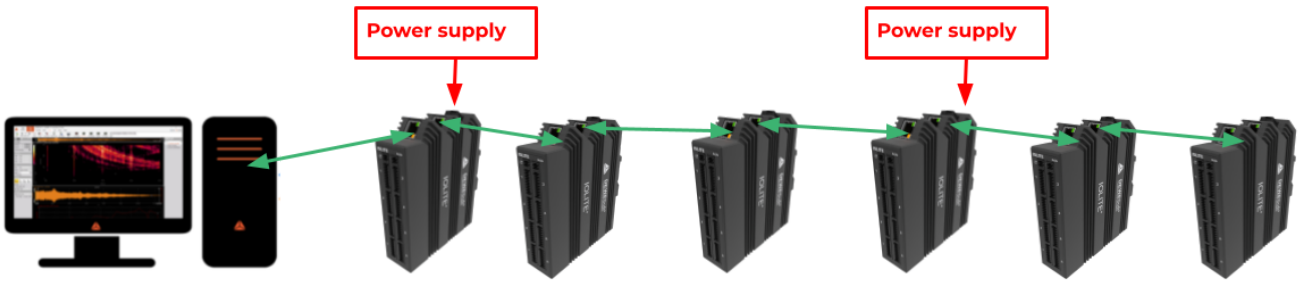


Connection with passive PoE in case the PC is the last in line



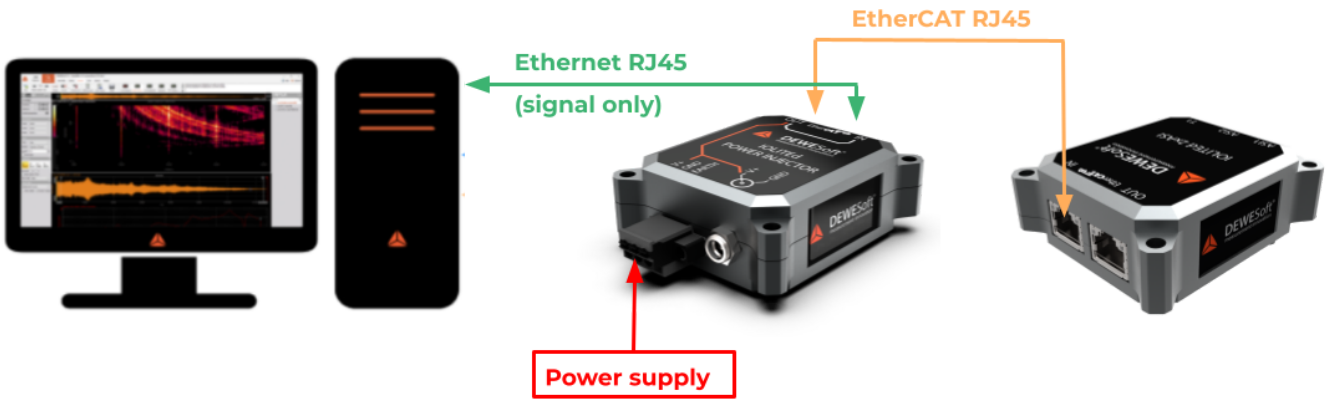
Caution

Power over Ethernet (PoE) functionality is only available on modular versions of the following IOLITE amplifiers: 8xSTGS, 8xRTD-HS, 8xTH-HS, 16xLV, 8xLVe, 8xACC. With this functionality the device can also act as a power injector and doesn't require additional devices if chained.



IOLITEi -single channel

First connect the power supply cable (RJ-45) to the IOLITEi Power junction. Then connect RJ-45 cable to the IN connector. Finally connect the other side (RJ45) to the LAN port of the PC. You can find advanced connections in chapter 4.3.2.4. Connection of IOLITE.

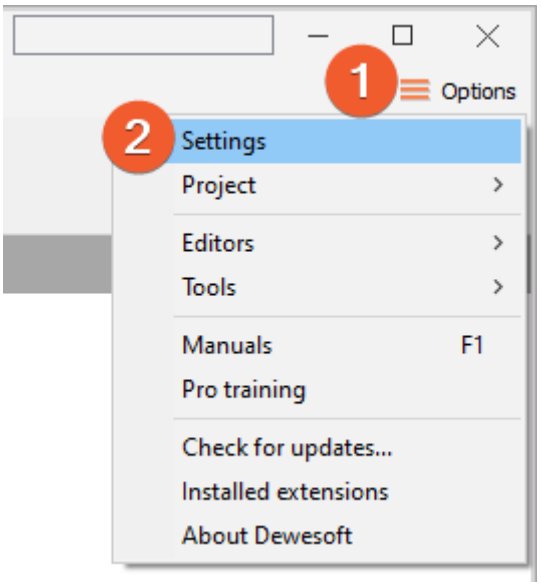


Connection of IOLITEi single-channel standalone device to PC

Warning
Do not plug the powered network cable directly into the PC network port. It may damage the PC.

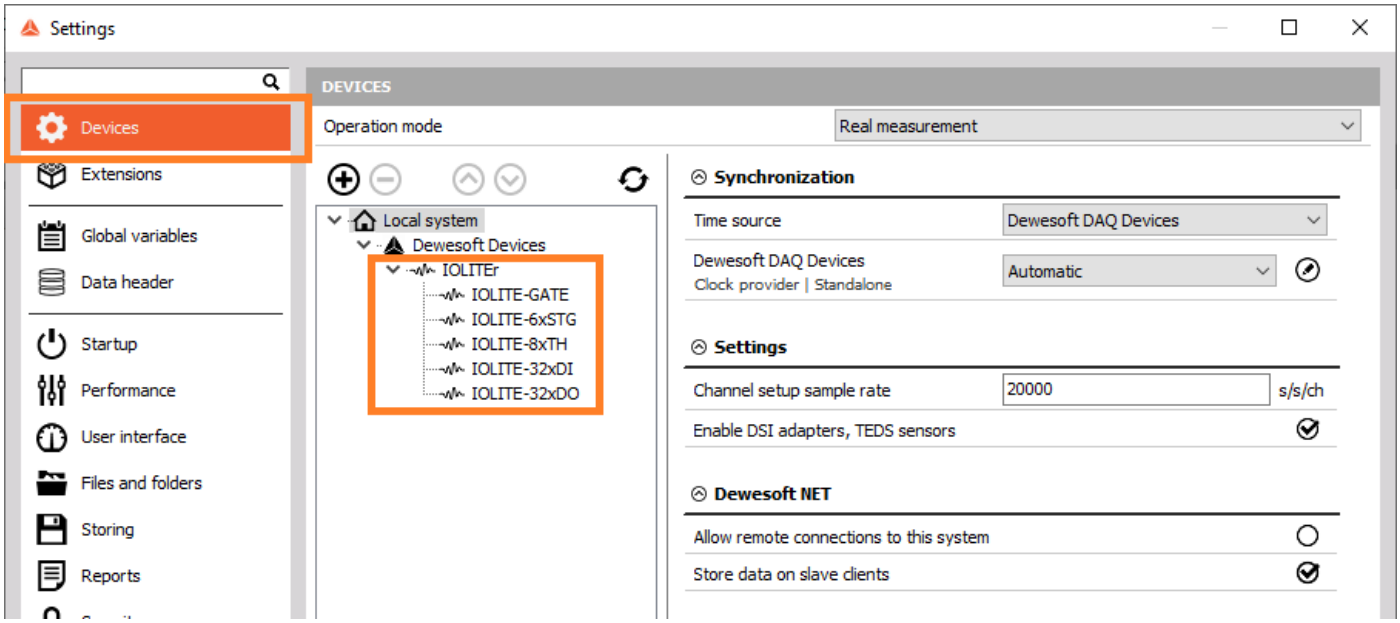
3.2.1. DewesoftX® Settings IOLITE®

The connected device will show up in the DewesoftX® settings. Click on the Options button at the top right, and then on the Settings item in the pop-up to open the DewesoftX® settings dialogue.



DewesoftX® settings

In the Devices section, you can see the connected IOLITE® slices. When you select one of them, the properties pane at the right will show the related data e.g. Serial number, Firmware version, etc.



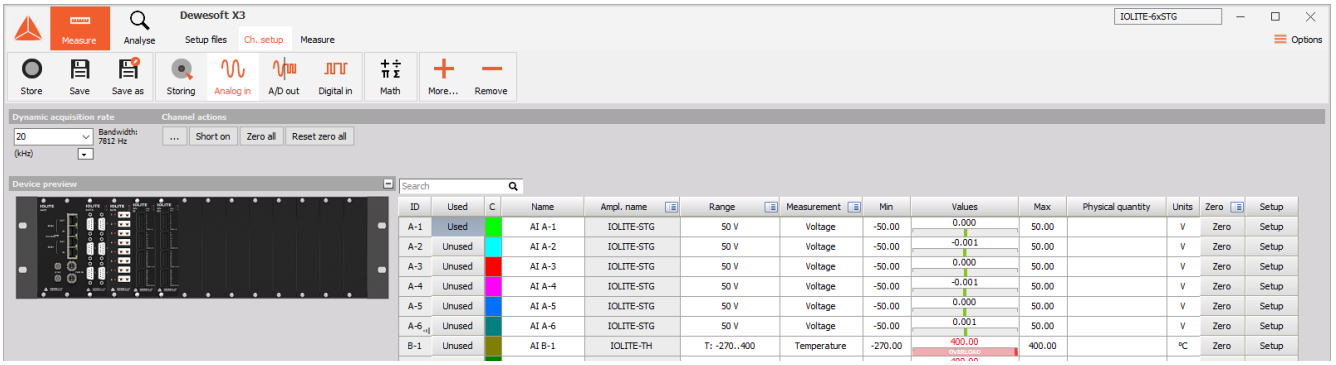
DewesoftX® settings: Devices

3.2.2. Channel Setup IOLITE®

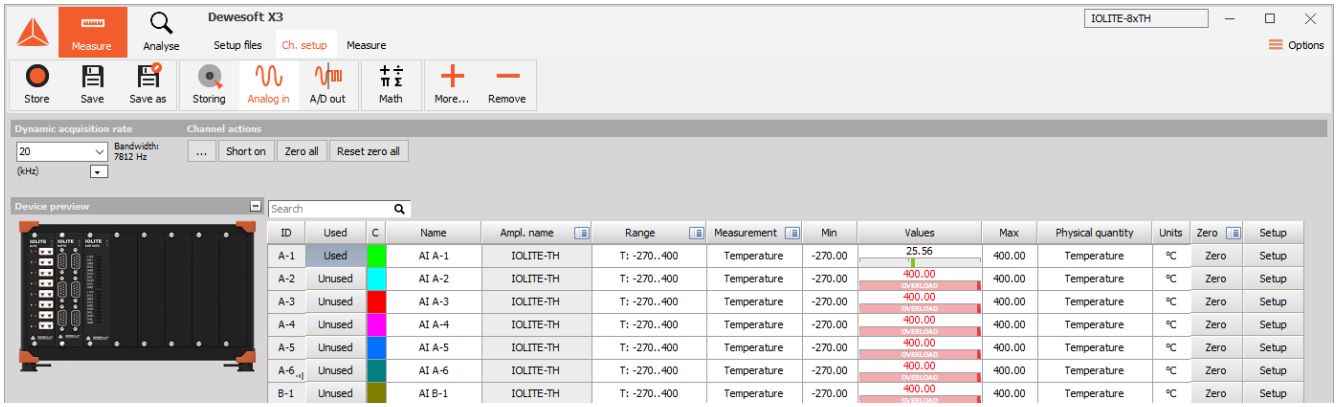
In the channel setup you can see a preview of the connected devices on the left side.

When you click on a connector in the image the corresponding channel in the Channel setup grid will automatically be selected. This also works the other way around: when you select a channel (or multiple channels) in the setup grid, the corresponding connectors in the image will be highlighted.

The sampling rate will be set for all connected IOLITE® slices: of course only up to the max. sampling rate of the individual slices.



Channel setup IOLITE-R12



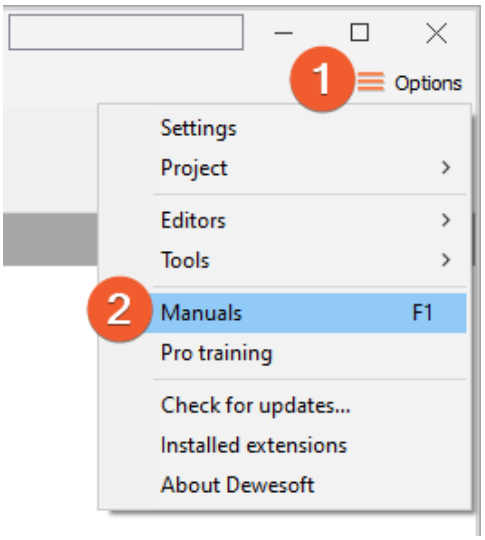
Channel setup IOLITE-R8

3.3. Simple Measurement

This chapter describes measurement basics, how to configure IOLITE® and gives some details on the measurement setup.

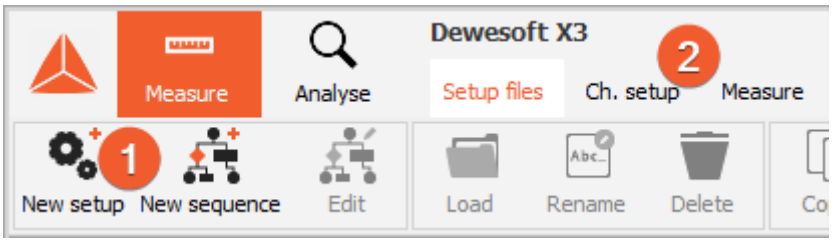
3.3.1. Help - Manual

Note that this document is just a quick start guide. For detailed information about DewesoftX® consult the Manual. To open the manual press the F1 button or click on the Options button ❶ and then select Manual from the pop-up menu ❷.



Help - Manual

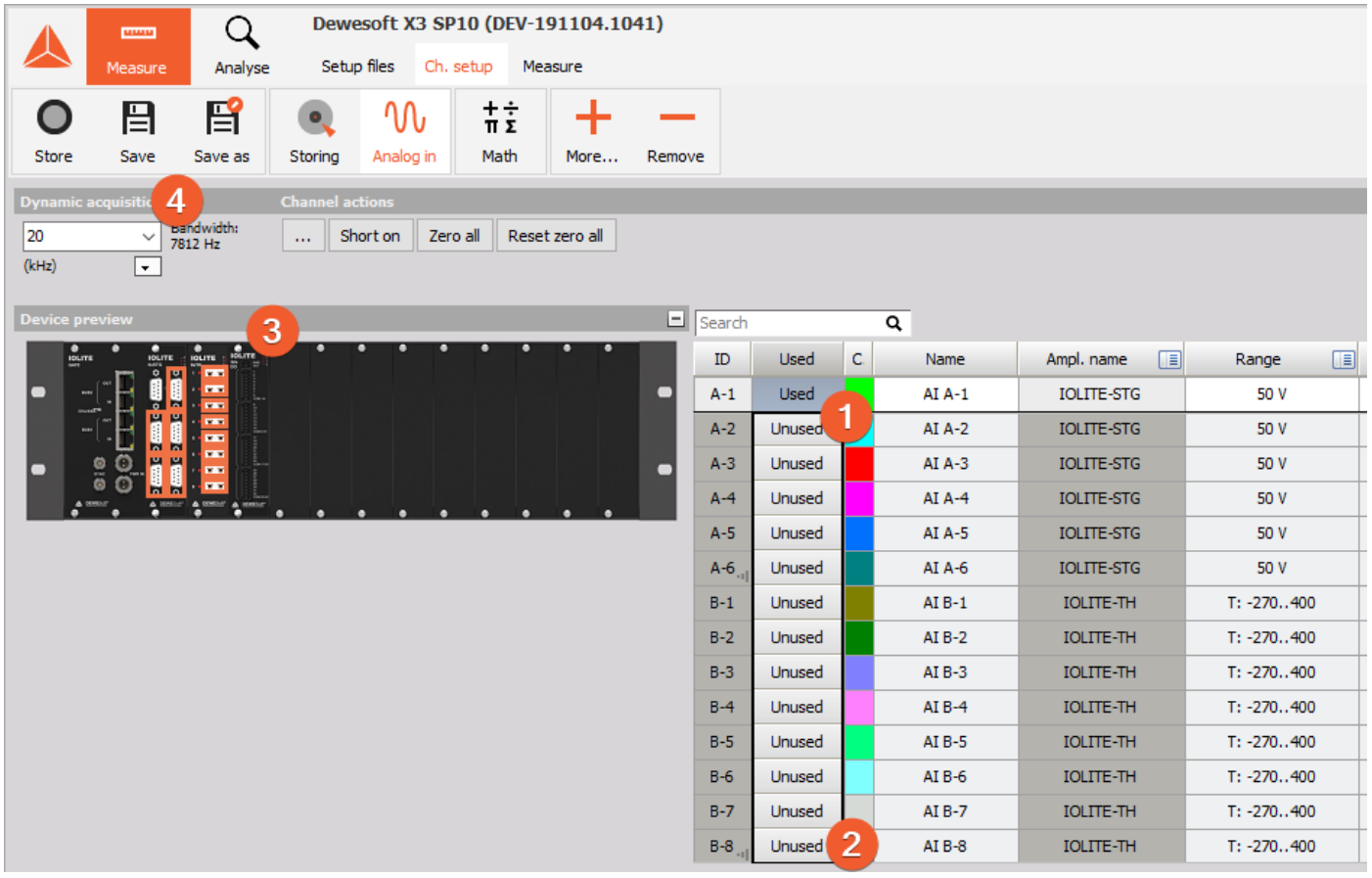
When DewesoftX® has started up, you will be in Measure mode and see the Setup files list or you can create a New setup ❶. Click on Ch. setup (on the right of Setup files) to switch to the Channel setup mode ❷. In the channel setup you can see a preview of the connected devices on the upper left side.



Setup files

3.3.2. Analog channel setup

In the analog channel setup screen you can see all channels of your connected IOLITE® systems. Per default only the first channel will be set to used. Unused channels will not show up in measure mode and can thus not be used for display, calculations or storing: thus, we will also set the other channels to the used. You can left-click on the Used column of channel 2 ❶, hold the mouse button and move the mouse down to channel 8 ❷: then release the mouse button and all channels will be selected – this is shown by the black rectangle around the buttons. Then you can click into the selected region to toggle Used/Unused for all channels at once. The selected channels will also be highlighted in the small preview image of the device ❸.
When you press the Setup button of a channel (the column at the right edge of the channel table – not shown in this screen-shot), you can change all the settings of the channel amplifier.
You can also change the sample rate of the IOLITE® ❹.



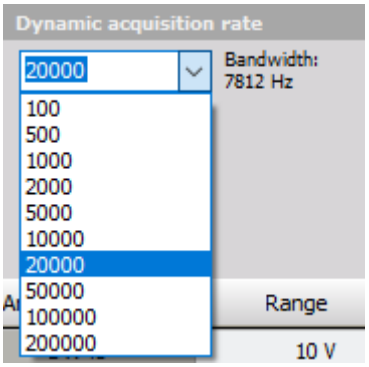
ID	Used	C	Name	Ampl. name	Range
A-1	Used		AI A-1	IOLITE-STG	50 V
A-2	Unused		AI A-2	IOLITE-STG	50 V
A-3	Unused		AI A-3	IOLITE-STG	50 V
A-4	Unused		AI A-4	IOLITE-STG	50 V
A-5	Unused		AI A-5	IOLITE-STG	50 V
A-6	Unused		AI A-6	IOLITE-STG	50 V
B-1	Unused		AI B-1	IOLITE-TH	T: -270..400
B-2	Unused		AI B-2	IOLITE-TH	T: -270..400
B-3	Unused		AI B-3	IOLITE-TH	T: -270..400
B-4	Unused		AI B-4	IOLITE-TH	T: -270..400
B-5	Unused		AI B-5	IOLITE-TH	T: -270..400
B-6	Unused		AI B-6	IOLITE-TH	T: -270..400
B-7	Unused		AI B-7	IOLITE-TH	T: -270..400
B-8	Unused		AI B-8	IOLITE-TH	T: -270..400

Channel setup screen

3.3.3. Sample rate

One of the most important settings is the sample rate. The sample rate defines how many data points IOLITE® will transfer to DewesoftX®. A higher sample rate also means that more data needs to be transferred via EtherCAT® to your computer.

The sampling speed mainly depends on your application. To display your signal in a time domain with a good time resolution, you should sample 10 to 20 times faster than the frequency of the signal that you want to measure, e.g. 1 kS/s for a 50 Hz sine-wave. If you have a lot of high frequency components, it may be necessary to sample 100 times faster, e.g. 5 kS/s for the 50 Hz sine-wave, or even more. If you display only the frequency domain (FFT analysis), a 2.5 times faster sampling would be sufficient (125 S/s for the 50 Hz sine-wave). The higher the sampling rate, the better the time resolution. But also the file size will increase.



Sample rate

3.3.4. Measurement Mode

A click on Measure (at the right side of Ch. setup in Illustration below) will take you to the Recorder screen measure mode where you can already see live data.

Hint

When switching to Measure mode the data will not be stored automatically.

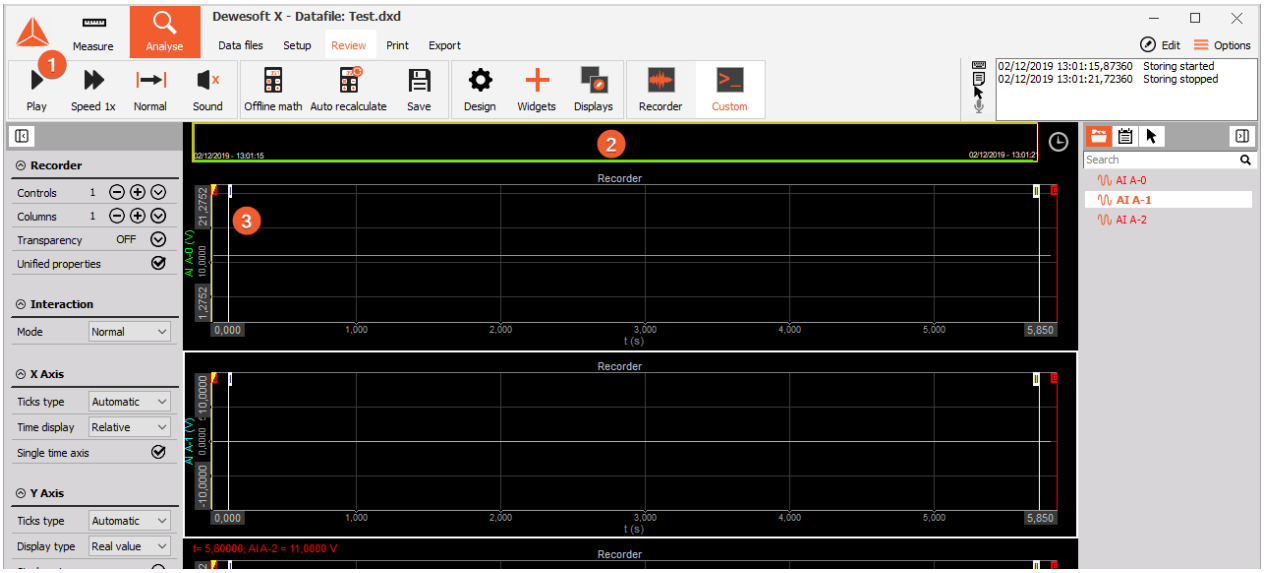
Measure mode

In measure mode you can have several measurement screens ❺. DewesoftX® will create 2 default displays: Recorder and Custom but you can also create new displays or change the widgets on existing displays as you like.
The most important sections of the Measure mode are highlighted in screen-shot Illustration “Measure mode”:
❶ shows the live measurement data in different widgets which are depending on the selected measurement screen. In this case we see a simple recorder widget where data is presented in the time domain. You can use the channel-selector list ❷ to assign measurement channels to the widgets. Each widget has different settings, ❸ shows the settings of the currently selected recorder widget.
To start storing the data, press the Store button ❹. When you are done with recording, press the Stop button.

Now DewesoftX® has created a data file with all the data that you have seen during the recording session. You can now click the Analyse button (on the left-top of the screen to the right of the Measure button) to go to Analyse mode.

3.3.5. Analyse Mode

When you have just stopped a measurement, DewesoftX® will automatically open the last recorded data file in Review mode, so that you can start the analysis right away.



Analyse mode

The Review mode is much like the measurement mode. You will see the same measurement displays, the channel-selector list and the properties of the currently selected widget.
Differences are:

❶ you have additional tool-buttons

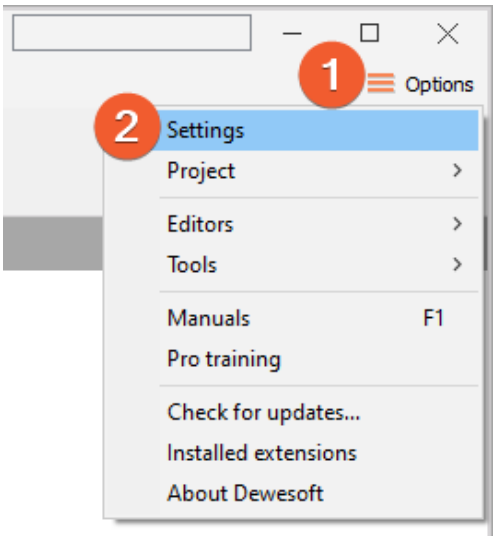
❷ there is a Signal overview window which will show you the whole data of one selected channel of the data file

❸ there are additional cursors (Yellow and two white cursors)

Now you can use the cursors to analyse your data, zoom in and out of the data, click Offline math to add computations based on your data, etc. You can also change the design of your measurement displays, print reports based on your data and export the data to other file formats for further analysis.

3.4. Advanced configuration

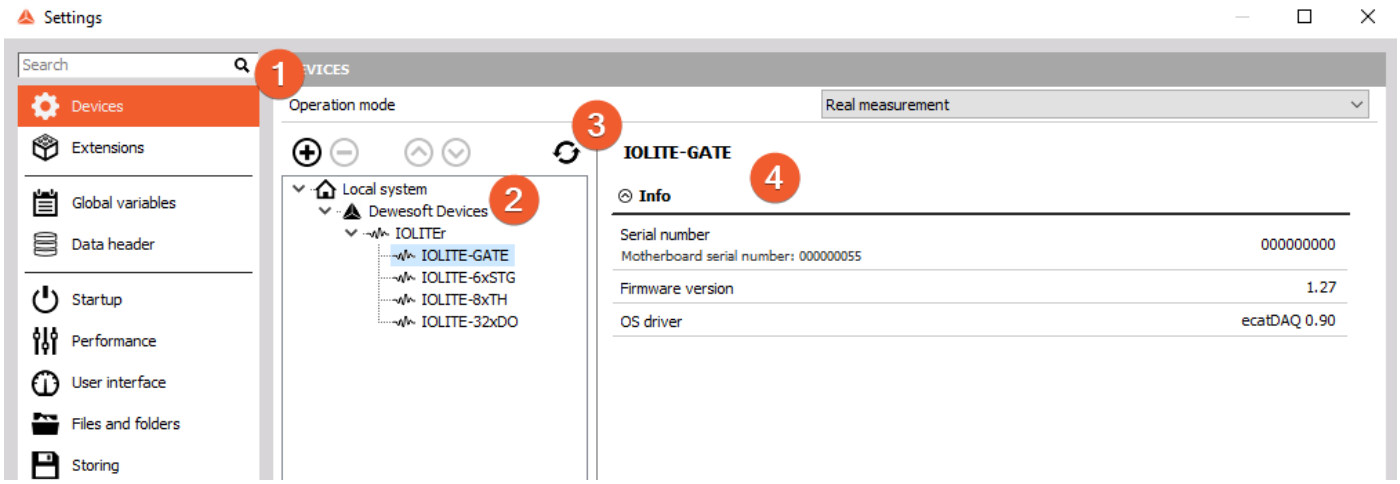
Note, that the Dewesoft launcher has already done the hardware setup for you – you can check this in the Settings dialogue. Click the Options button ❶ – and then click the Settings menu item ❷.



Open settings dialogue

The settings window will appear where all the currently connected devices will be seen.

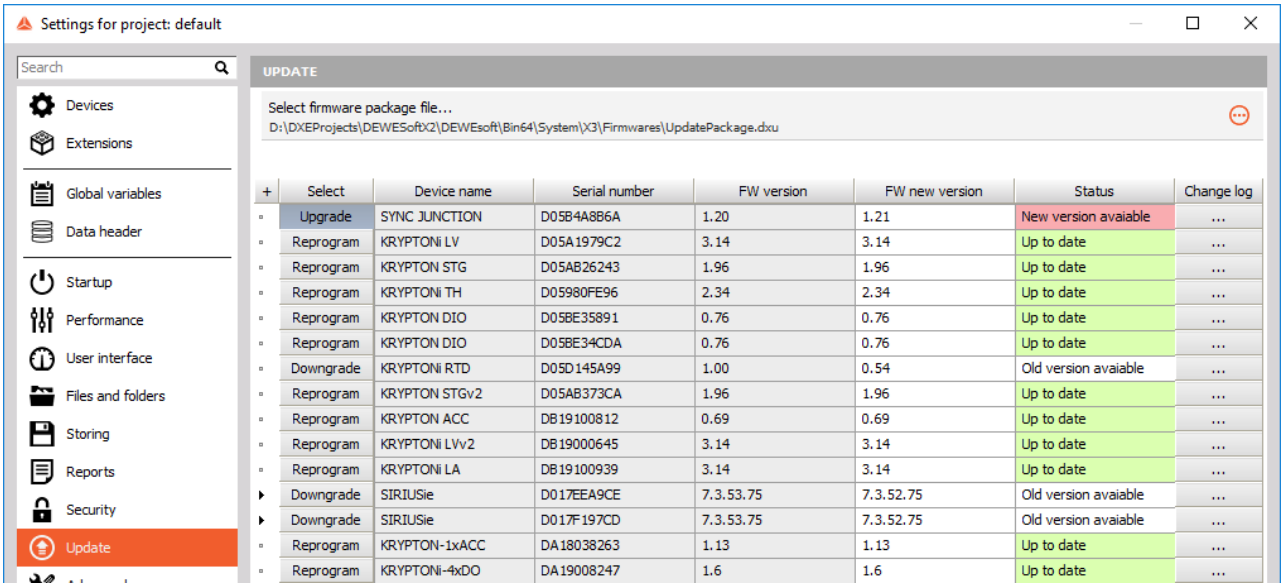
If you add a device while this screen is open (or if your device is not shown yet), you can press the Refresh button ❸ to scan for devices. When you select a device from the list you will see all the device details and settings in the right area ❹.



Real measurement mode

3.5. Firmware upgrade

- Download the Dewesoft upgrade package (.dxu file) from the Dewesoft downloads page under the section Drivers.
- Copy the file into the Firmwares folder of your DewesoftX® installation (e.g. D:\DewesoftX\System\Firmwares).
- Connect the Dewesoft instrument to the PC and run DewesoftX®.
- Go to settings under the Update tab:



+	Select	Device name	Serial number	FW version	FW new version	Status	Change log
	Upgrade	SYNC JUNCTION	D05B4A8B6A	1.20	1.21	New version avaiable	...
	Reprogram	KRYPTONi LV	D05A1979C2	3.14	3.14	Up to date	...
	Reprogram	KRYPTON STG	D05AB26243	1.96	1.96	Up to date	...
	Reprogram	KRYPTONi TH	D05980FE96	2.34	2.34	Up to date	...
	Reprogram	KRYPTON DIO	D05BE35891	0.76	0.76	Up to date	...
	Reprogram	KRYPTON DIO	D05BE34CDA	0.76	0.76	Up to date	...
	Downgrade	KRYPTONi RTD	D05D145A99	1.00	0.54	Old version avaiable	...
	Reprogram	KRYPTON STGv2	D05AB373CA	1.96	1.96	Up to date	...
	Reprogram	KRYPTON ACC	DB19100812	0.69	0.69	Up to date	...
	Reprogram	KRYPTONi LVv2	DB19000645	3.14	3.14	Up to date	...
	Reprogram	KRYPTONi LA	DB19100939	3.14	3.14	Up to date	...
▸	Downgrade	SIRIUSie	D017EEA9CE	7.3.53.75	7.3.52.75	Old version avaiable	...
▸	Downgrade	SIRIUSie	D017F197CD	7.3.53.75	7.3.52.75	Old version avaiable	...
	Reprogram	KRYPTON-1xACC	DA18038263	1.13	1.13	Up to date	...
	Reprogram	KRYPTONi-4xDO	DA19008247	1.6	1.6	Up to date	...

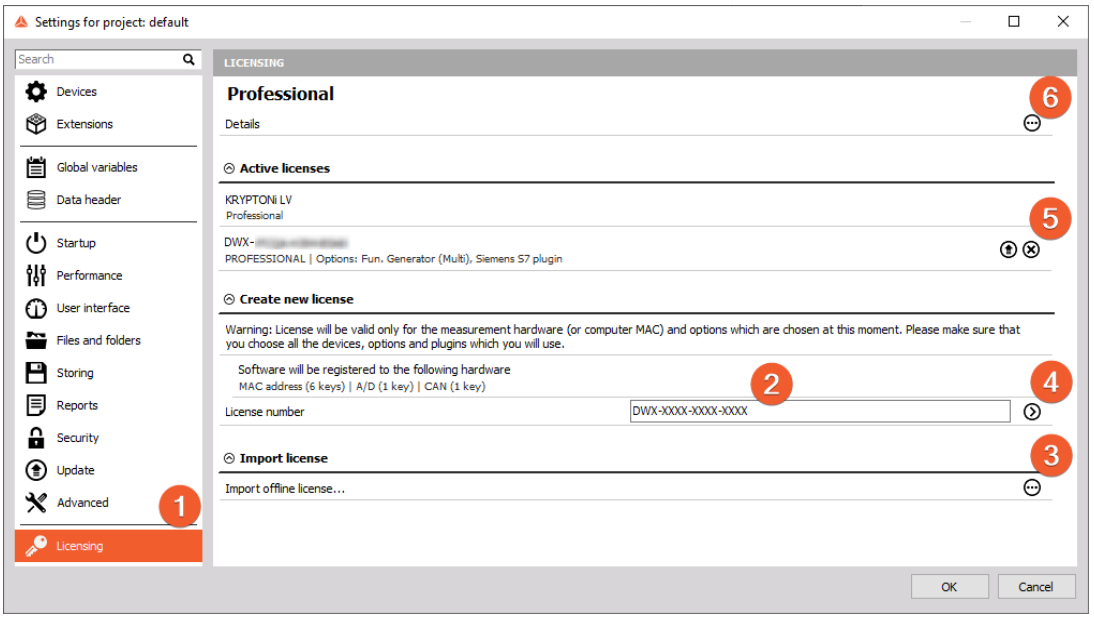
Firmware update settings

- If the firmware package isn't selected, select it by pressing the button and find the folder with the firmware file in it.
- Select the device you want to upgrade and start the firmware upgrade by pressing the "Upgrade" button.

3.6. Licensing

IOLITE or any other Dewesoft device already comes with an embedded DewesoftX® license. You can check the license details with all the available options in the Licensing tab 1 by pressing the three dotted button 6. However, if the user decides to upgrade the license with an additional extension, DewesoftX® will require a new license registration. The registration can be made online 2 or offline by importing an offline license 5 in case the system doesn't have an internet connection. Offline license can be registered on a different PC with the internet connection. If needed, the license can also be written on the actual device 5.

Active and embedded licenses are seen under Active licenses tab 5. If the license is recognized as none active, it usually means that the wrong license was entered.



Active licenses tab

All licenses regarding IOLITE® will only work when the IOLITE® system is connected to your PC and the device has been activated in the hardware setup.

3.7. Troubleshooting

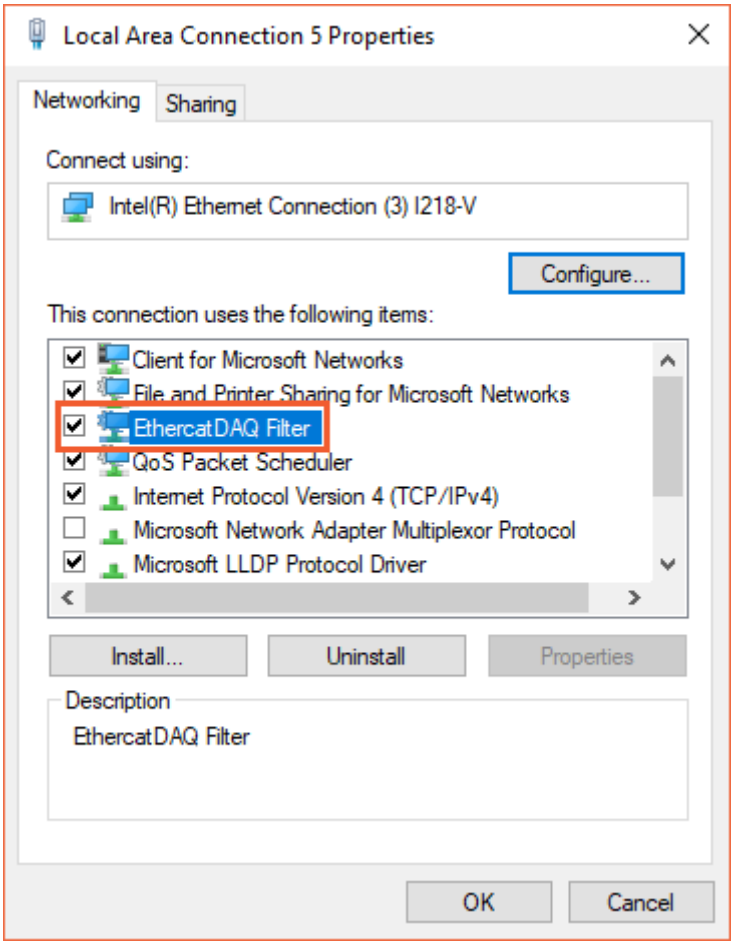
If your IOLITE® device is not found by DewesoftX®:

- If you did not restart Windows after the software installation, restart now
- Make sure that you have started Dewesoft version X3 SP8 or higher
- Make sure that the external power supply is connected and okay
- Disconnect the EtherCAT® cable and reconnect it. If this does not work, try to connect the EtherCAT® cable to another Ethernet port of your PC
- Try to restart DewesoftX®
- Try to restart the PC
- Make sure to connect the data-cable directly to the Ethernet card of your PC. Do not use any switches or hubs

3.7.1. Additional instructions for troubleshooting with EtherCAT devices

If the computer is still having trouble recognizing the Dewesoft EtherCAT devices, here are some additional steps:

- Check if there is an Ethercat DAQ Filter driver installed on your computer like shown on the picture below. If the driver is installed, make sure the checkbox is checked in front of the driver.



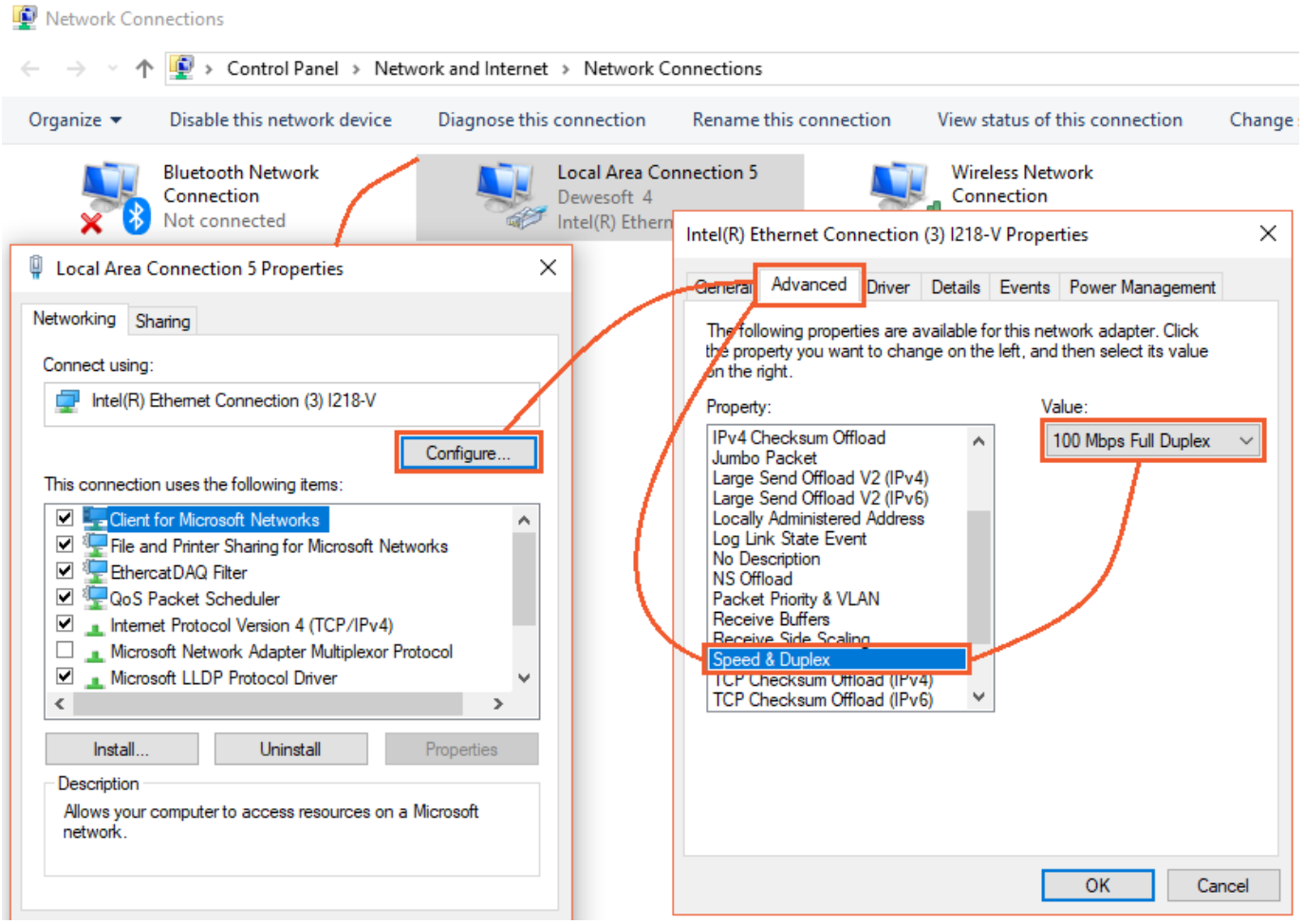
Ethernet properties

- If the driver is not installed, it can be downloaded from our web page.

EthercatDAQ Filter Driver v0.90

Signed drivers (ver. 0.90 / 06/04/2017) for all Dewesoft EtherCAT devices. Works on Microsoft Windows 7, 8 and 10 (32 and 64 bit OS). Works only with Dewesoft X2 SP8 or newer. Warning: Please uninstall the old EthercatDAQ driver version before installing the new one.

- If the driver is already installed and the devices are still not recognized, the Speed & Duplex of the network card needs to be adjusted manually.
    - Go to network connections
    - Right-click on the connection where the EtherCAT devices are connected
    - Go to configure, advanced options, find Speed & Duplex, change the value to 100 Mbps Full Duplex

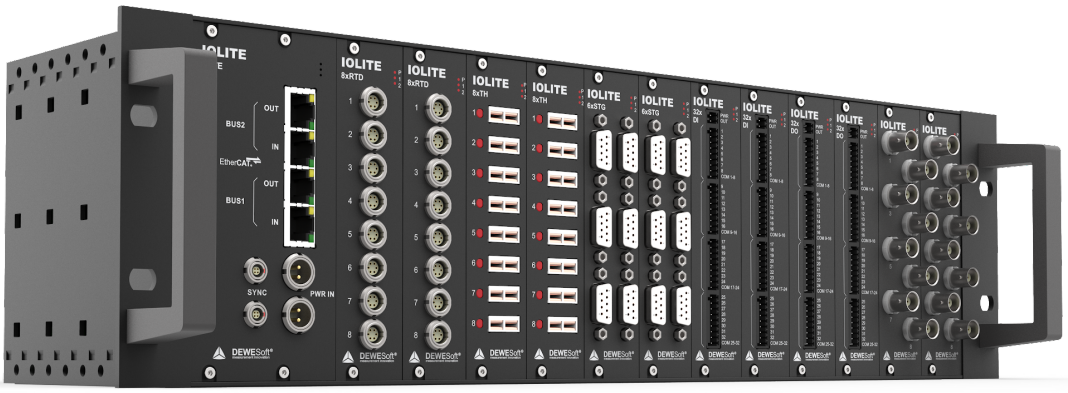


Ethernet advanced properties

4. System Overview

IOLITE

Data acquisition and real-time control front-end system for industrial applications. All-in-one solution for real-time control and feedback monitoring

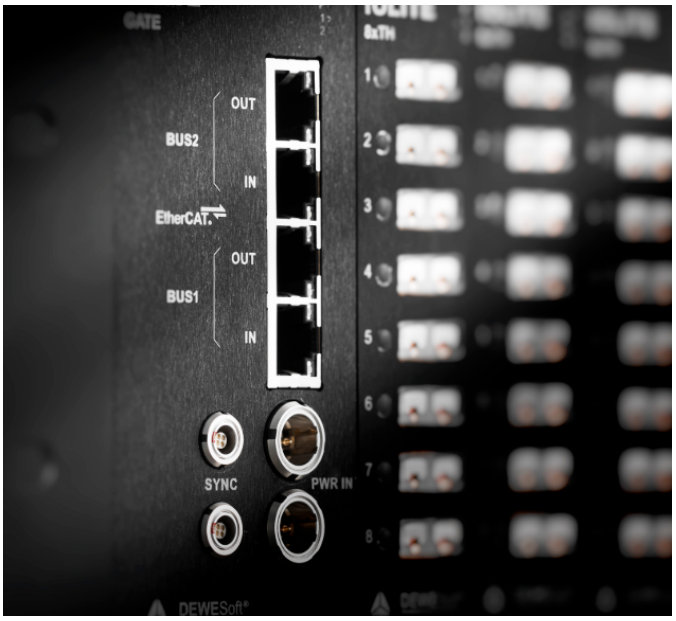


Voltage
Strain / Stress
Quarter Bridge
Half Bridge
Full Bridge
Thermocouple
Digital IO
IEPE
Charge
Current
LVDT
RTD
Resistance
DSI Compatible
TEDS Compatible
EtherCAT
IP50
-10 °C to +50 °C

4.1. Main features

- **DUAL ETHERCAT:** IOLITE uses two EtherCAT buses in parallel. EtherCAT's primary bus is used for full speed buffered data acquisition to a computer. The EtherCAT secondary bus is mainly used for real-time data to any 3rd party control system.
- **GREAT SIGNAL CONDITIONING**: IOLITE features high-quality amplifiers which offer great signal quality and up to 20 kHz sampling rate.
- **REDUNDANT POWER SUPPLY**: Together with dual EtherCAT interface provides maximum system reliability.
- **MULTIPLE CHASSIS OPTION**: IOLITE can be configured in the 19-inch cabinet compatible chassis (IOLITE-R12) or in more rugged Sirius-like compatible chassis (IOLITE-R8).
- **GREAT PRICE/PERFORMANCE**: IOLITE offers a great price/performance ratio and is suitable for test-bed and industrial applications.
- **SOFTWARE INCLUDED WITH FREE LIFETIME UPGRADES**: Easy to use, yet very robust in functionality, award-winning DewesoftX® software is included. The software comes with lifetime free upgrades and no hidden costs, bringing you intuitive configuration, smart sensors, advanced storage and analysis capabilities.

4.1.1. Redundant Bus Systems



IOLITE front

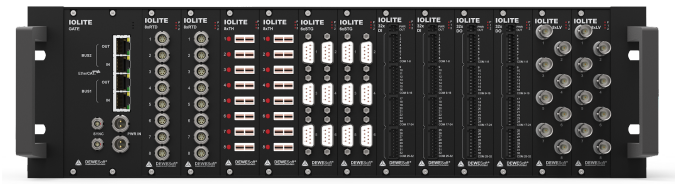
Each IOLITE system has two fully independent Ethercat bus systems that work in parallel.

Primary Bus
Primary bus is used for perfectly timed and synchronized data acquisition via Dewesoft X software.

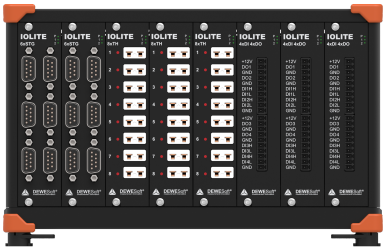
Secondary Bus
The secondary bus can be used in two ways:

- low latency front-end interface for real-time controllers
- redundant data acquisition bus system for critical applications

4.1.2. Input Slots and Amplifiers



IOLITE-R12



IOLITE-R8

IOLITE-R8r

The IOLITE chassis can be configured with up to 12 slots, each featuring high-quality input amplifiers. Currently, the following amplifiers are available:

- **6xSTG**: universal analogue and strain gauge amplifiers. Compatible with Dewesoft smart interface DSI adapters
- **8xSTGS:** A dedicated module for strain measurement with low drift and high stability
- **8xLV**: Isolated 8-channel low voltage module
- **16xLV:** 16-channel low voltage module.
- **8xLA:** Isolated 8-channel low current module.
- **8xTH, 8xTH-HS**: Isolated thermocouple amplifier
- **8xRTD, 8xRTD-HS:** isolated amplifiers for measurements with a resistance temperature detector
- **32xDI**: 32 channel digital input
- **32xDO**: 32 channel digital output with watchdog functionality
- **8xDI 4xDO**: 8 digital input and 4 digital output channels.
- **4xCNT**: 4 channel digital counter input with SuperCounter® technology.
- **16xAO**: 16 analogue out channels

Full technical specifications in 4. Module Overview

4.1.3. Redundant Power Supply

Each IOLITE system is equipped with a redundant power supply completing the feature set for the ideal and reliable front-end system.

If the primary power supply fails, the system will be powered by a secondary power supply without any interruption or system shutdown/restart.

4.1.4. Feedback Monitoring

Monitoring

What is really amazing is that IOLITE offers the operator to acquire and monitor the data in daily operation as well as while tuning the control systems.

Apart from monitoring the input channels on the data acquisition bus, the system can also monitor the outputs from the controller. Let's say we regulate the switch-off valve by monitoring the pressure. DewesoftX® can show the pressure signal as well as the digital output signal coming from the controller, all fully synchronized.

This allows the operator to prove that the control system is operating correctly every time.

4.2. System specifications

System	IOLITE R12	IOLITE R8	IOLITE R8r
Number of slots	12	8	8
Synchronization	2x SIRIUS® SYNC on L00B4f	2x SIRIUS® SYNC on L00B4f	2x SIRIUS® SYNC on L00B4f
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®	< 200 ns within same EtherCAT chain < 2 µs using sync for multiple EtherCAT chains below 1 sample to Sirius®
Dual EtherCAT® interface			
Number of buses	Two (both with buffered DAQ or real time)	Two (both with buffered DAQ or real time)	Two (both with buffered DAQ or real time)
Data Rate	Dual 100 Mbit bus speed	Dual 100 Mbit bus speed	Dual 100 Mbit bus speed
Max. Throughput per Chain	From 6 MB/s to 10 MB/s	From 6 MB/s to 10 MB/s	From 6 MB/s to 10 MB/s
Bus 1 connectors	2x Ethernet RJ45	2x Lemo 1T	2x Lemo 1T
Bus 2 connectors	2x Ethernet RJ45	2x Ethernet RJ45	2x Ethernet RJ45
Minimum delay (analog input to EtherCAT® bus)	70 µs	70 µs	70 µs
Minimum EtherCAT® cycle time	100 µs	100 µs	100 µs
Power			
Power supply	Dual redundant 9 - 48 V DC	Dual redundant 9 - 48 V DC	Dual redundant 9 - 48 V DC
Power consumption	9 W to 11 W (incl. IOLITE-GATE) IOLITE-GATE: Max. 1.9 W	8 W (Max: 9 W)	2.2W
Maximum input current	10 A	10 A	10 A
Environmental			
Operating Temperature	-10 to 50 °C (-40 to 85 °C optional) (see 1)	-10 to 50 °C (-40 to 85 °C optional) (see 1)	-10 to 50 °C (-40 to 85 °C optional) (see 1)
Storage Temperature	-40 to 85 °C	-40 to 85 °C	-40 to 85 °C
Humidity	5 to 95 % RH non-condensing at 50 °C	5 to 95 % RH non-condensing at 50 °C	5 to 95 % RH non-condensing at 50 °C
IP rating	IP30	IP40	IP50
Shock	Shock (EN 60068-2-27:2009)	Shock (EN 60068-2-27:2009)	50g 6ms, half sine 25x in all six directions (150x total) (-X, +X, -Y, +Y, -Z and +Z)
Vibration	Vibration random (MIL-STD-810D) Vibration random (EN 60721-3-2: 1997 - Class 2M2)	Random: Profile breakpoints: 10 Hz - 0.75 g^2/Hz 150 Hz - 0.015 g^2/Hz Profile RMS / Peak = 3.4 g / 10.2 g 4 hrs in each axis, 12 hrs total	Random: Profile breakpoints: 24 Hz - 0.04 g^2/Hz 60 Hz - 0.5 g^2/Hz 100 Hz - 0.5 g^2/Hz 240 Hz - 0.01 g^2/Hz 2 kHz - 0.01 g^2/Hz

			Profile RMS / Peak = 15 g / 45 g 2 hrs in each axis, 6 hrs total
Physical			
Dimensions	483 x 148 x 133 mm	266 x 169 x 139 mm	321 x 155 x 151 mm
Weight	3.1 kg (incl. IOLITE-GATE) 230 g (IOLITE-GATE)	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 only on IOLITE-16xLV, IOLITE-8xSTGS, IOLITEi-8xTH-HS, IOLITEi-8xRTD-HS, IOLITE-8xLVe, IOLITE-8xACC.
All other modules have power and data separated. Daisy-chain for data is available with Ethernet RJ45 cable, Daisy-chain for power is available with T3B2m-T3B2m-0.1m cable

4.3. Enclosure Overview

IOLITE can be configured in the 19-inch cabinet compatible chassis (IOLITE-R12) or in more rugged Sirius-like compatible chassis (IOLITE-R8).

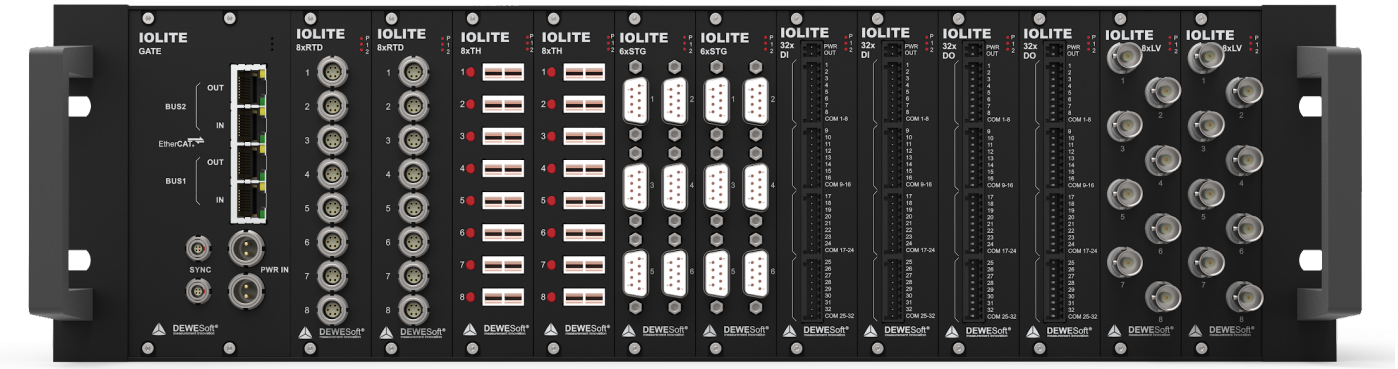
4.3.1. IOLITE-R12: Cabinet Mount Chassis

Standard IOLITE chassis is compatible and can be mounted in any 19-inch rack cabinet. This is perfect for the test-bed installations.

IOLITE height is 4U and can host up to 12 IOLITE modules. It includes a cooling system with four fans on the back panel.

4.3.1.1. IOLITE-R12: Cabinet Mount Chassis: Renders

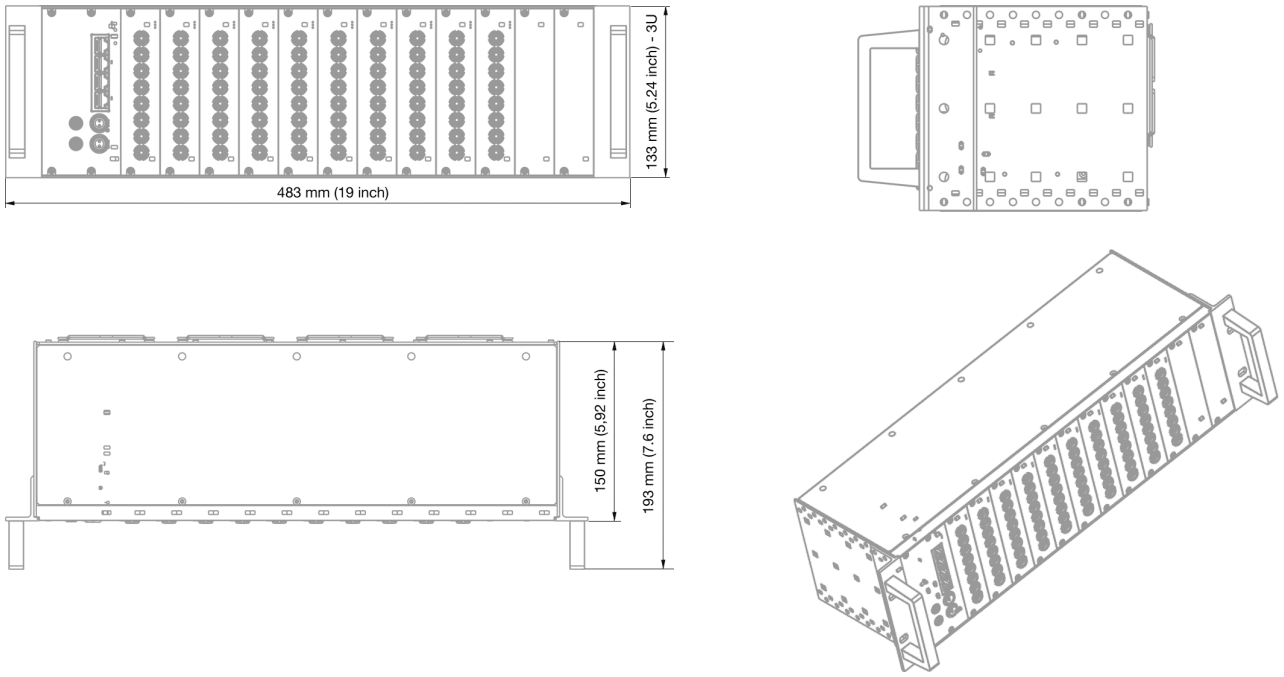
Mounting of IOLITE-R12 in the 19" cabinet



IOLITE-R12 (Cabinet Mount Chassis) Front panel

Cooling system on the Back panel of IOLITE-R12

4.3.1.2. IOLITE-R12: Cabinet Mount Chassis: Dimensions



Technical Drawings of IOLITE-R12

4.3.1.3. IOLITE-GATE

The IOLITE-GATE module serves as a gateway between IOLITE measurement modules and either PC, other Dewesoft EtherCAT devices or 3rd party control masters. It includes dual EtherCAT bus, redundant power supply inputs and provides synchronization with Dewesoft USB devices.
IOLITE-GATE is mounted in the first slot from left inside the IOLITE-R12 19-inch rack cabinet chassis.

IOLITE-GATE module

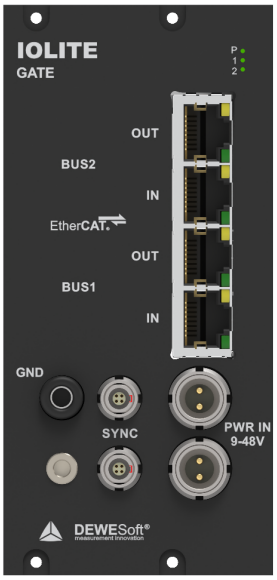
4.3.1.3.1. IOLITE-GATE: Connectors

The IOLITE-GATE module is available with either:

- 4x RJ45 connectors for dual EtherCAT bus. Primary bus (BUS 1) for buffered data and Secondary bus (BUS 2) for unbuffered data have IN and OUT connectors.
- 2x RJ45 connectors and 2 x LEMO connectors for dual EtherCAT bus. Primary bus (BUS 1) for buffered data (with either LEMO or RJ45 connectors) and Secondary bus (BUS 2) for unbuffered data (with RJ45 connectors) have IN and OUT connectors.

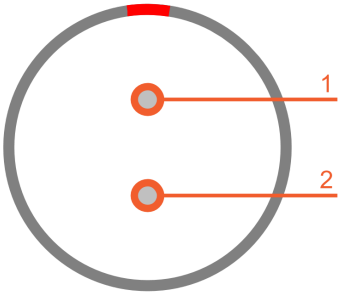
Two 2-pin LEMO 1B connectors are used for redundant power supply (PWR IN).

Synchronization with Dewesoft USB data acquisition devices or connection to clock master is on IOLITE-GATE enabled by connecting a synchronization cable to two SYNC inputs (4-pin LEMO 00).



IOLITE-GATE front

4.3.1.3.1.1. IOLITE-GATE: Power in: Pinout



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

Pin	Name	Description
1	V +	Supply
2	V -	Ground

For the power supply an unregulated DC voltage between 9 V and 48 V is required, which is connected to the 2-pin LEMO 1B male connector on the IOLITE-GATE front.

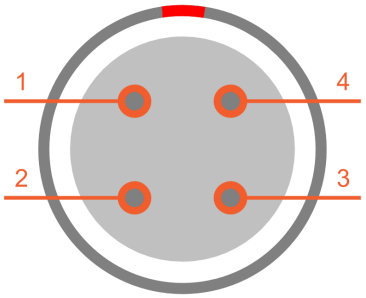
PWR IN connector (on the device): EXJ.1B.302.HLD
Mating connector (for the cable): FGJ.1B.302.CLLD42Z

4.3.1.3.1.2. IOLITE-GATE: Sync: Pinout

The sync connectors are required when you want to synchronize the data from IOLITE with Dewesoft USB devices for the same measurement. The signal that is transferred over sync cable makes sure that the measurement data of IOLITE and Dewesoft USB devices are perfectly synchronized to each other.

The other use of a sync connector is to connect directly to IOLITE, a signal from the clock master.

Hint
There is no distinction between the IN and OUT – it does not matter which connector you use. When IRIG-synchronization is used, the IRIG signal is on pins 1, 2.



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

Pin	Name	Description
1	CLK	Clock
2	TRIG	Trigger
3	RES	PPS
4	GND	Ground

SYNC connector (on the device): EEG.00.304.CLL
Mating connector (for the cable): FGG.00.304.CLAD27Z

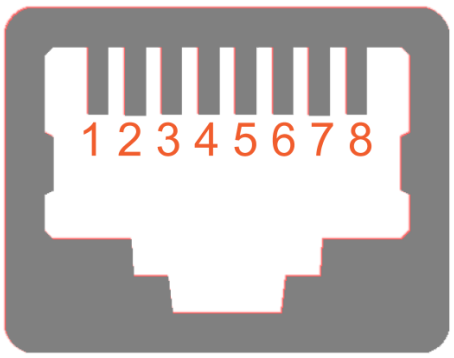
4.3.1.3.1.3. IOLITE-GATE: RJ45: Pinout

The IOLITE-GATE module includes RJ45 connectors that enable data transfer and synchronization via dual EtherCAT bus.

The same connectors are used on Primary bus (BUS 1) for buffered data and on Secondary bus (BUS 2) for unbuffered data.

Each RJ45 connector has two LEDs:
- **GREEN** LED indicates that IOLITE is connected to another device (Dewesoft EtherCAT device, PC or 3rd party control master).
- **YELLOW** LED is active only when the data transfer is active.

Connector used on the device is a standard Ethernet connector (RJ45).
Standard ethernet cable with standard connector can be used to connect IOLITE-GATE with a PC.



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

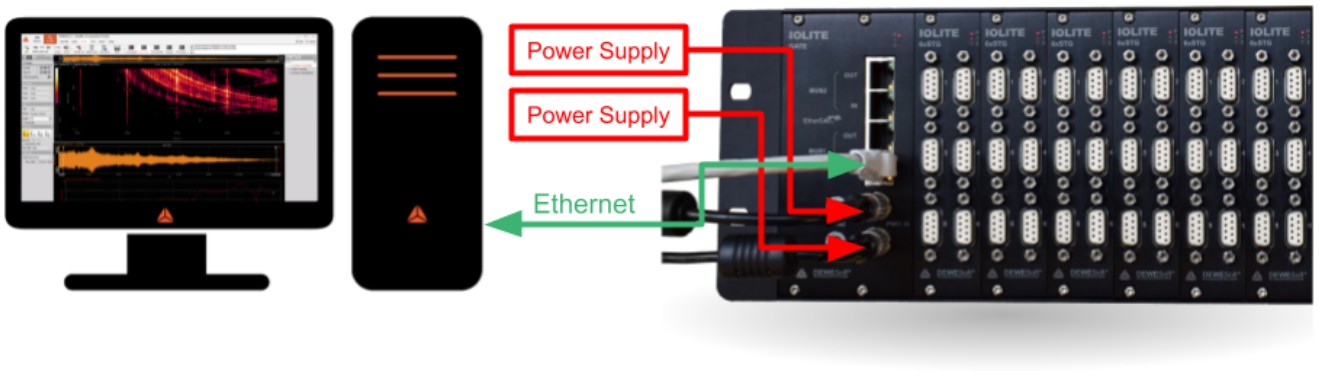
Pin	Name	Description
1	TX_P	Transmission +
2	TX_N	Transmission -
3	RX_P	Reception +
4	-	-
5	-	-
6	RX_N	Reception -
7	-	-
8	-	-

4.3.1.4. IOLITE-GATE: Connection of IOLITE-R12 standalone device to PC

First connect the power supply cable (PS-120-L1B2f) to the PWR IN 2-pin LEMO 1B connector. To increase system reliability connect the redundant power supply to other PWR IN connectors.

Hint
To improve the redundancy of the system, it is recommended that the device is powered with two power supplies connected to different electrical fuses!

Then connect a standard ethernet cable to the IN connector of BUS 1 on IOLITE-GATE. Finally, connect the other side of the ethernet cable to the LAN port of PC.



Connection of IOLITE-R12 standalone device to PC

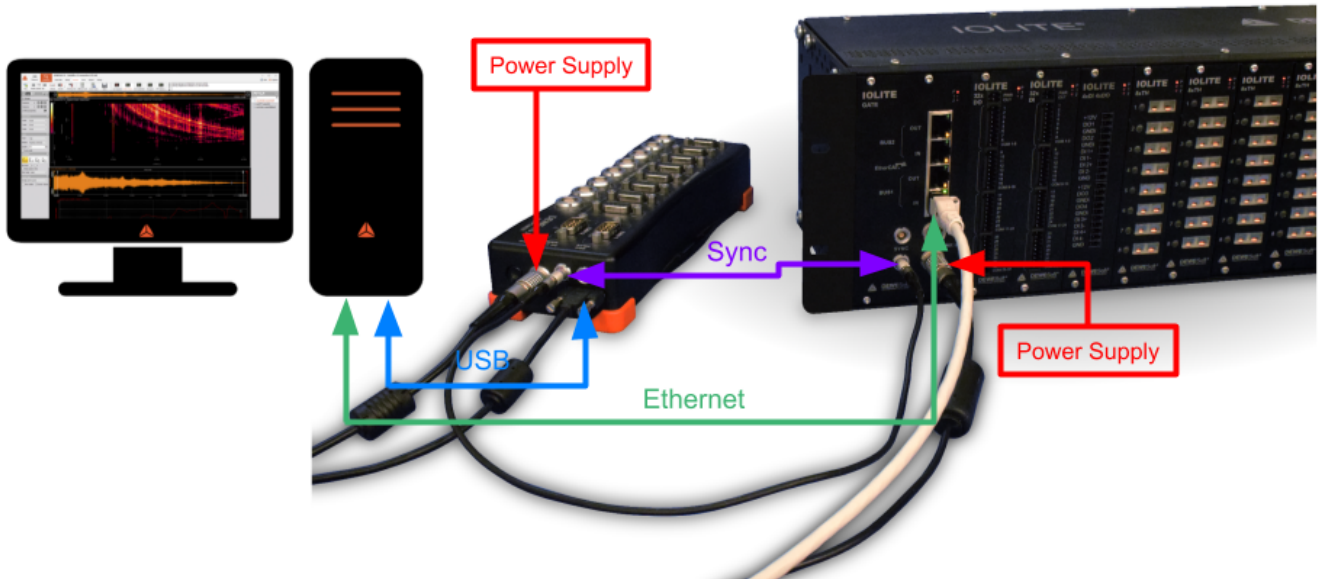
List of required cables:

Function	Dewesoft order code
Power supply	PS-120-L1B2f (default)
Ethercat	CABLE-UTP-CAT.6-3m (default), CABLE-UTP-CAT.6-1m

4.3.1.5. IOLITE-GATE: Connection of IOLITE-R12 and DEWE-43A device

The connection of the IOLITE device to the PC is the same as in 3.3.1.4.
Connect power supply cable to DEWE-43A (PS-60W-12V-5A-L1B2f). Then connect the USB cable (CABLE-USBAmini-USBBS-1.8m) to the USB port on the connector side of DEWE-43A. Finally connect the other side of the USB cable to the USB port on the PC.

In order to have synchronized data between IOLITE and DEWE-43A, connect SYNC cable (e.g. L00B4m-L00B4m-0.2m) to the SYNC connector on IOLITE-GATE and the other side of cable to the SYNC connector on DEWE-43A.



Connection of IOLITE-R12 and DEWE-43A device

List of required cables:

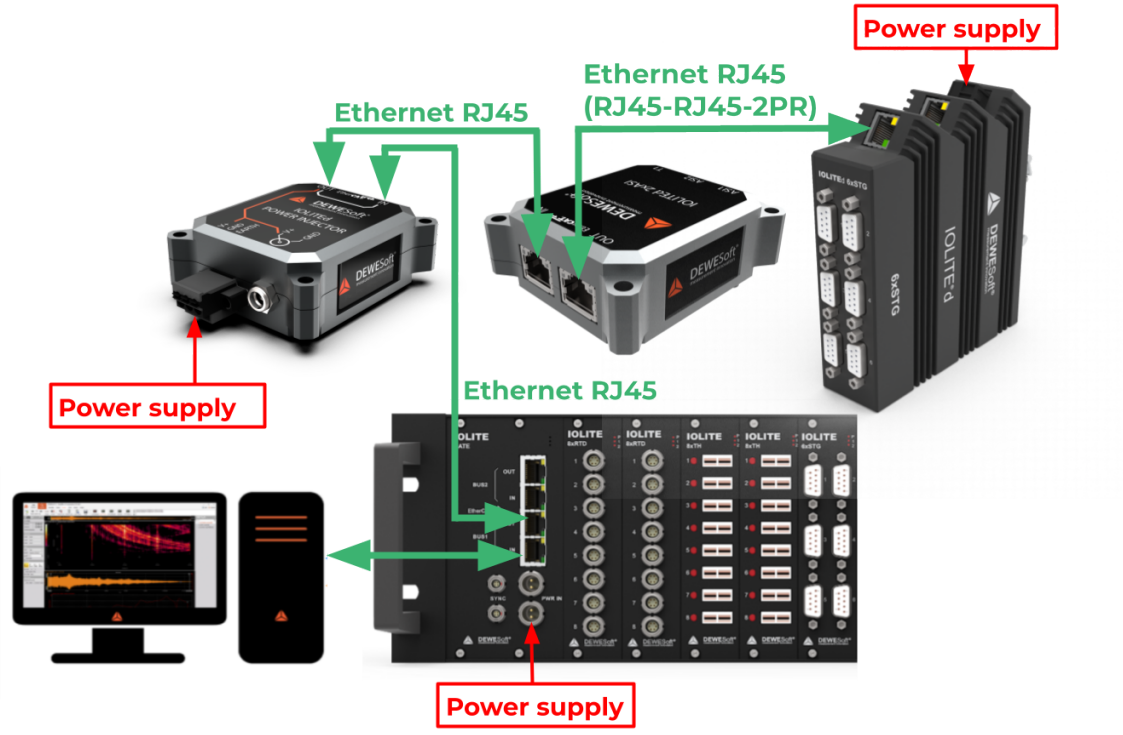
Function	Dewesoft order code
Power supply	IOLITE-R12: PS-120-L1B2f (default) DEWE-43A: PS-60W-12V-5A-L1B2f (default)
Ethernet	RJ45-RJ45
USB	CABLE-USBAmini-USBBS-1.8m (default), CABLE-USBAmini-USBBS-1m
Synchronization	L00B4m-L00B4m-0.2m (default), L00B4m-L00B4m-0.5m, L00B4m-L00B4m-3m

4.3.1.6. IOLITE-GATE: Connection of IOLITE-R12 standalone device to IOLITE - single channel and IOLITE - multi channel (with PoE and without PoE)

Connect power supply cable to IOLITE-R12 (PS-120W-L1B2f).Then connect RJ45-RJ-45 cable to IN connector of BUS 1 on IOLITE-GATE.

Use the RJ45-RJ45 cable to connect the IOLITE-R12 to IOLITE POWER-INJECTOR and then with an additional RJ45-RJ45 cable to the IOLITE - single channel device. You need to connect the PS with the cable to the IOLITE POWER INJECTOR.

Use the RJ45 to RJ45 cable again to connect the data line to IOLITE - multi channel device. The IOLITE - multi channel device will need an additional Power supply. If using PoE compatible devices, check the connection below.

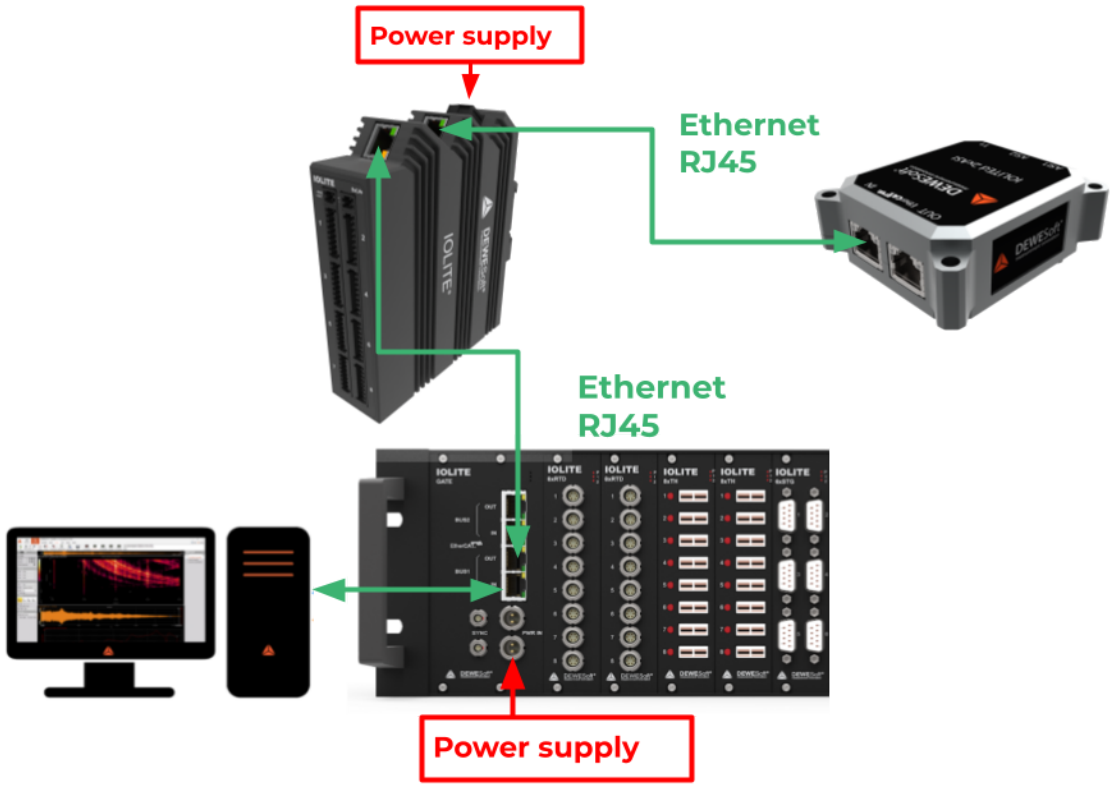


Connection of IOLITE-R12, IOLITE - single channel and IOLITE - multi channel without PoE

Function	Dewesoft order code
Power supply	IOLITE-R12: PS-120-L1B2f (default) IOLITE POWER-INJECTOR IOLITE-multichannel:
EtherNET	IOLITE-R8 to IOLITE single channel: RJ-45 - RJ-45 IOLITE single channel to IOLITE multi channel: RJ-45 - RJ-45

Connect power supply cable to IOLITE-R12 (PS-120W-L1B2f). Then connect RJ45-RJ-45 cable to the IN connector of BUS 1 on IOLITE-GATE.

Use the RJ45-RJ45 cable to connect the IOLITE-R12 to IOLITE multi-channel and then with an additional RJ45-RJ45 cable to the IOLITE - single channel device. You need to connect the PS with the cable to the IOLITE multi-channel with PoE.



Connection of IOLITE-R12, IOLITE - single channel and IOLITE - multi channel with PoE

Function	Dewesoft order code
Power supply	IOLITE-R12: PS-120-L1B2f (default) IOLITE POWER-INJECTOR IOLITE-multichannel:
EtherNET	IOLITE-R8 to IOLITE single channel: RJ-45 - RJ-45 IOLITE single channel to IOLITE multi channel: RJ-45 - RJ-45

4.3.2. IOLITE-R8: Boxed Chassis

In addition to a 19-inch rack cabinet compatible chassis, IOLITE is also available in standalone aluminum chassis compatible with Sirius data acquisition instruments.

The chassis provides 8 slots for IOLITE input and output slices to be installed.

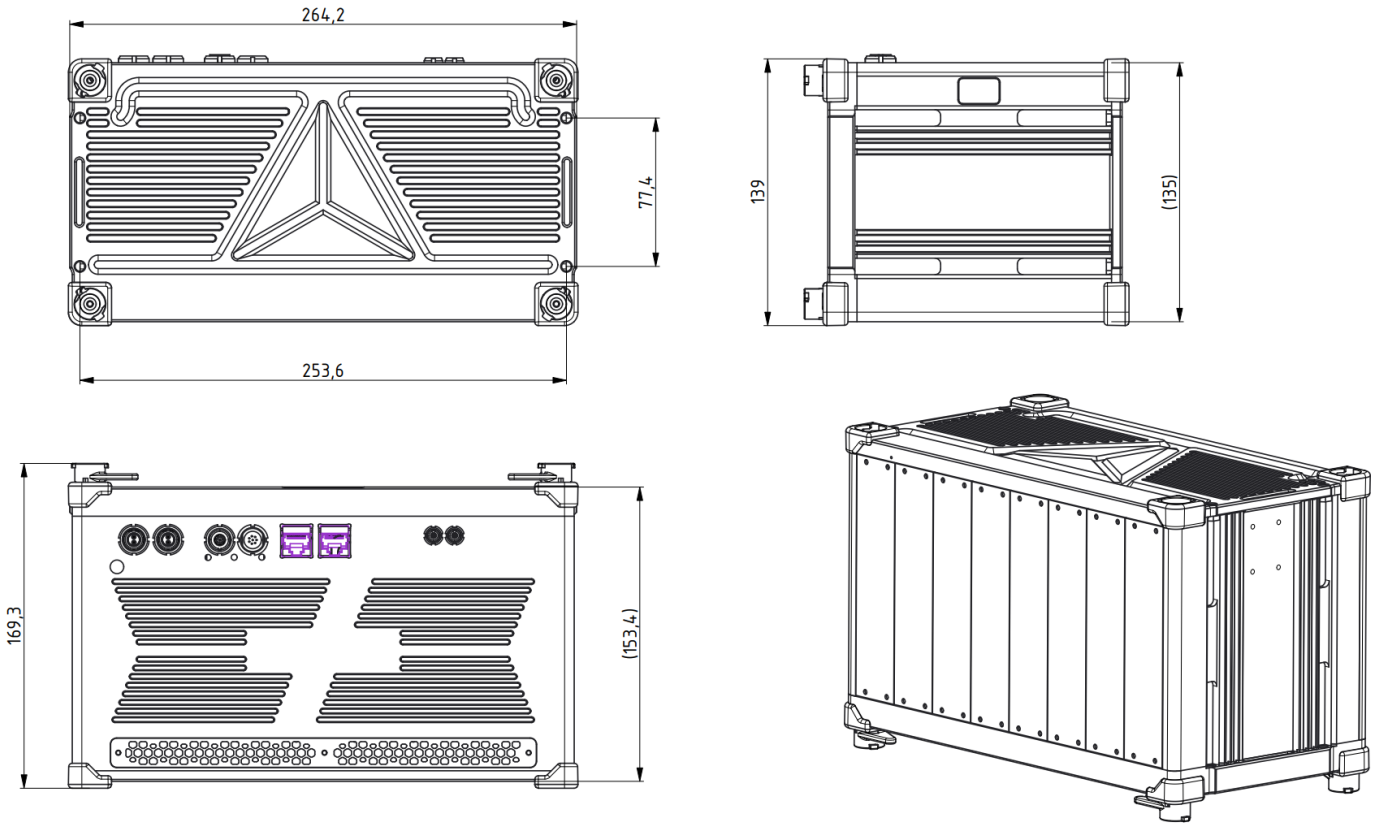
IOLITE-R8 includes EtherCAT gateway and cooling system.

4.3.2.1. IOLITE-R8: Boxed Chassis: Renders

IOLITE-R8 Front panel

IOLITE-R8 Back panel

4.3.2.2. IOLITE-R8: Boxed Chassis: Dimensions



Technical Drawings of IOLITE-R8

4.3.2.3. IOLITE-R8: Boxed Chassis: Connectors

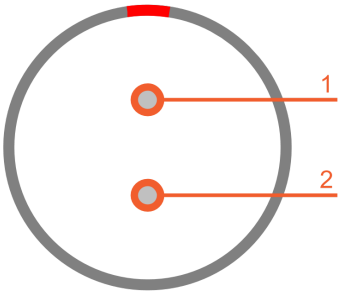
The IOLITE-R8 chassis also enables dual EtherCAT bus. There are two 8-pin LEMO 1B connectors on the back panel of IOLITE-R8 used for data transfer and synchronization on the primary bus (BUS 1) for buffered data. The OUT connector on BUS 1 also enables power supply for external Dewesoft EtherCAT devices.
Secondary bus (BUS 2) for unbuffered data has two RJ45 connectors (IN and OUT) for data transfer and synchronization to 3rd party control master.

Two 2-pin LEMO 1B connectors are used for redundant power supply (PWR IN).

Above the PWR IN connector is a GND socket for grounding the IOLITE-R8.

Synchronization with Dewesoft USB data acquisition devices or connection to clock master is on IOLITE-R8 enabled by connecting a synchronization cable to two SYNC inputs (4-pin LEMO 00).

4.3.2.3.1. IOLITE-R8: Boxed Chassis: Power in: Pinout



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

Pin	Name	Description
1	V +	Supply
2	V -	Ground

For the power supply an unregulated DC voltage between 9 and 48 Volts is required, which is connected to the LEMO 1B connector on the rear side of the chassis.

PWR IN connector (on the device): EXJ.1B.302.HLD
Mating connector (for the cable): FGJ.1B.302.CLLD42Z

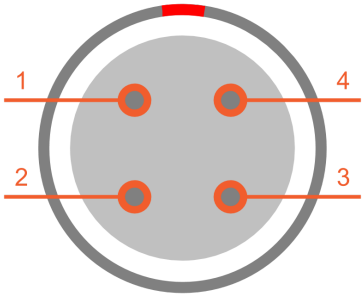
4.3.2.3.2. IOLITE-R8: Boxed Chassis: Sync: Pinout

The sync connectors are required when you want to synchronize the data from IOLITE with Dewesoft USB devices for the same measurement. The signal that is transferred over sync cable makes sure that the measurement data of IOLITE and Dewesoft USB devices are perfectly synchronized to each other.

The other use of a sync connector is to connect directly to IOLITE a signal from the clock master.

Hint

There is no distinction between the IN and OUT – it does not matter which connector you use. When IRIG-synchronisation is used, the IRIG signal is on pins 1, 2.



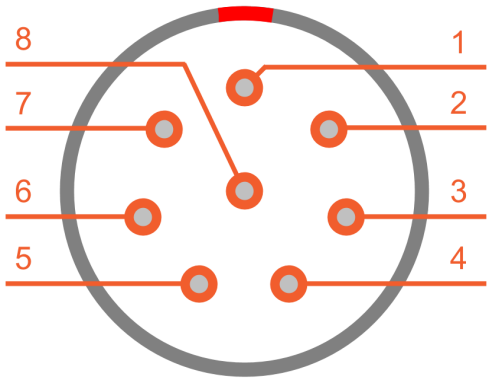
Sync connector: pin-out (4-pin LEMO female)

Pin	Name	Description
1	CLK	Clock
2	TRIG	Trigger
3	RES	PPS
4	GND	Ground

SYNC connector (on the device): EEG.00.304.CLL
Mating connector (for the cable): FGG.00.304.CLAD27Z

4.3.2.3.3. IOLITE-R8: Boxed Chassis: BUS 1: IN: Pinout

The IN connector of the primary EtherCAT bus (BUS 1) is a 8-pin LEMO 1B male connector.



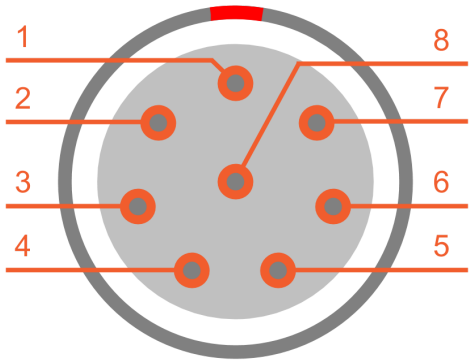
EtherCAT connector: pin-out (8-pin LEMO male)

BUS 1 IN connector (on the device): EEJ.1B.308.CLD
Mating connector (for the cable): FGJ.1T.308.CLL.1433

Pin	Name	Description
1	TX_P	Transmission +
2	TX_N	Transmission -
3	RX_P	Reception +
4	RX_N	Reception -
5	NC	Not connected
6	NC	Not connected
7	GND	Ground
8	GND	Ground

4.3.2.3.4. IOLITE-R8: Boxed Chassis: BUS 1: OUT: Pinout

The OUT connector of the primary EtherCAT bus (BUS 1) is a 8-pin LEMO 1B female connector.
OUT connector enables power supply for external Dewesoft EtherCAT devices.



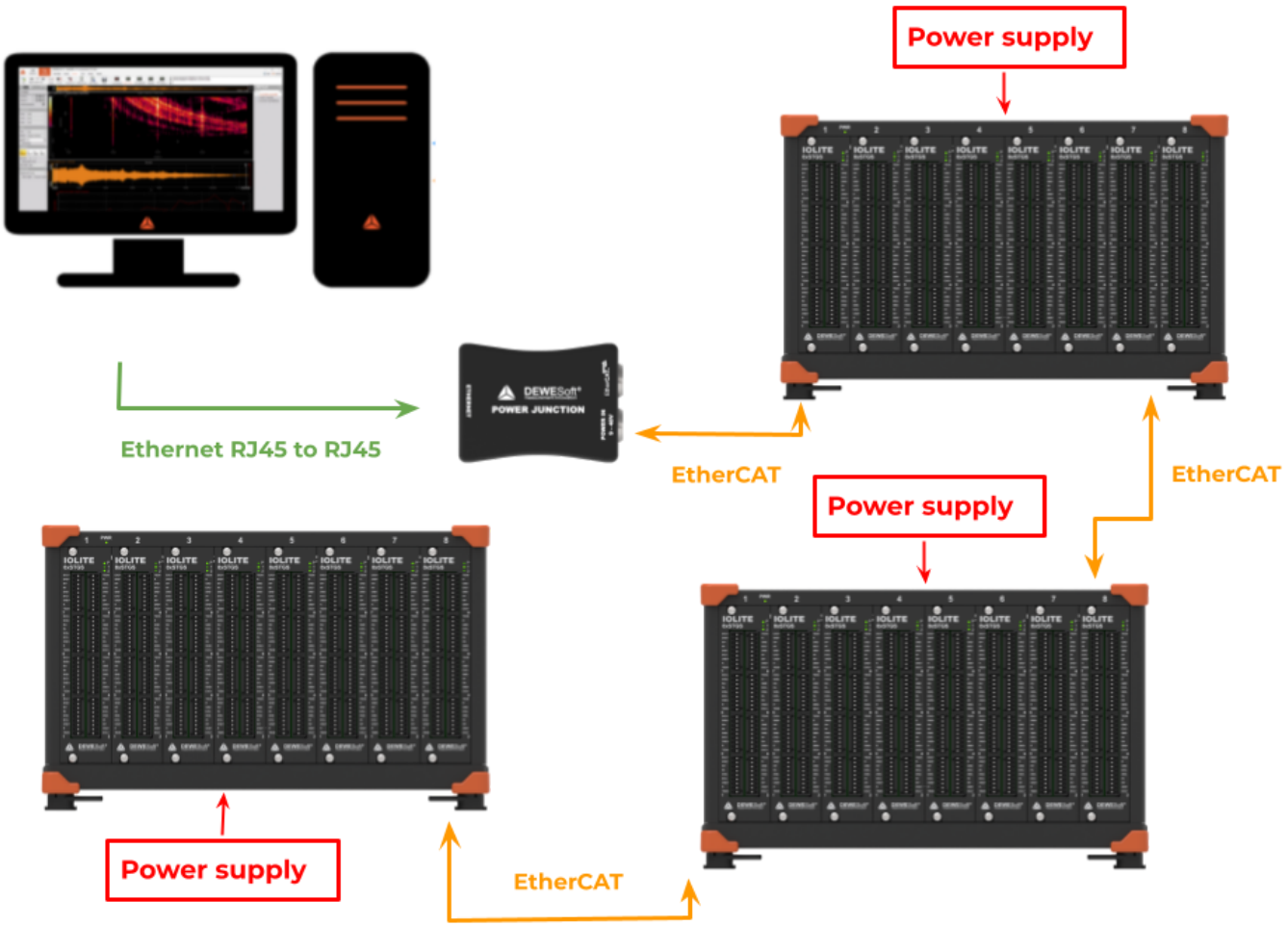
EtherCAT connector: pin-out (8-pin LEMO female)

BUS 1 OUT connector (on the device): EEG.1B.308.CLN
Mating connector (for the cable): FGG.1T.308.CLA.1433

Pin	Name	Description
1	TX_P	Transmission +
2	TX_N	Transmission -
3	RX_P	Reception +
4	RX_N	Reception -
5	VCC	Power OUT
6	VCC	Power OUT
7	GND	Ground
8	GND	Ground

Important

Pins 5 and 6 of the ECAT IN 8-pin LEMO connector are not connected. You can not power multiple R8r systems with the ECAT line and should always provide a separate power supply and connect it to the Power in connector of each of the systems. However, you can power other devices with ECAT OUT!



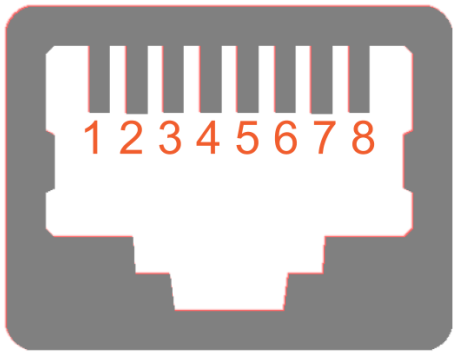
Connection of IOLITE-R8 system with Ethercat line

4.3.2.3.5. IOLITE-R8: Boxed Chassis: BUS 2: RJ45: Pinout

IOLITE-R8 includes two RJ45 connectors on Secondary bus (BUS 2) for unbuffered data.

Each RJ45 connector has two LEDs:
- **GREEN** LED indicates that IOLITE is connected to another device.
- **YELLOW** LED is active only when the data transfer is active.

Connector used on the device is a standard ethernet connector (RJ45).
Standard ethernet cable with standard connector can be used to connect IOLITE-GATE with a PC.



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

Pin	Name	Description
1	TX_P	Transmission +
2	TX_N	Transmission -
3	RX_P	Reception +
4	-	-
5	-	-
6	RX_N	Reception -
7	-	-
8	-	-

4.3.2.4. IOLITE-R8: Boxed Chassis: Connection of IOLITE-R8 standalone device to PC

First connect the power supply cable (PS-120-L1B2f) to the PWR IN LEMO 1B 2-pin connector. To increase system reliability connect redundant power supply to other PWR IN connectors.

Important
To improve the redundancy of the system, it is recommended that the device is powered with two power supplies connected to different electrical fuses!

Then connect L1T8f-RJ45-1M cable (LEMO side) to the IN connector of BUS 1 on the IOLITE-R8 back panel. Finally, connect the other side of the L1T8f-RJ45-1M cable (RJ45 side) to the LAN port of the PC.

Connection of IOLITE-R8 standalone device to PC

List of required cables:

Function	Dewesoft order code
Power supply	PS-120-L1B2f (default)
EtherCAT	L1T8f-RJ45-1M (default), L1T8f-RJ45-3M, L1T8f-RJ45-5M

4.3.2.5. IOLITE-R8: Boxed Chassis: Connection of IOLITE-R8 and KRYPTON® device

The connection of the IOLITE device to the PC is the same as in 2.3.2.4.

Use EtherCAT to EtherCAT expansion cable (e.g. L1T8m-L1T8f-1M) and connect it to OUT connector on BUS 1 of IOLITE-R8 on one side and the IN connector of the KRYPTON device on the other side.

Connection of IOLITE-R8 and KRYPTON® device

List of required cables:

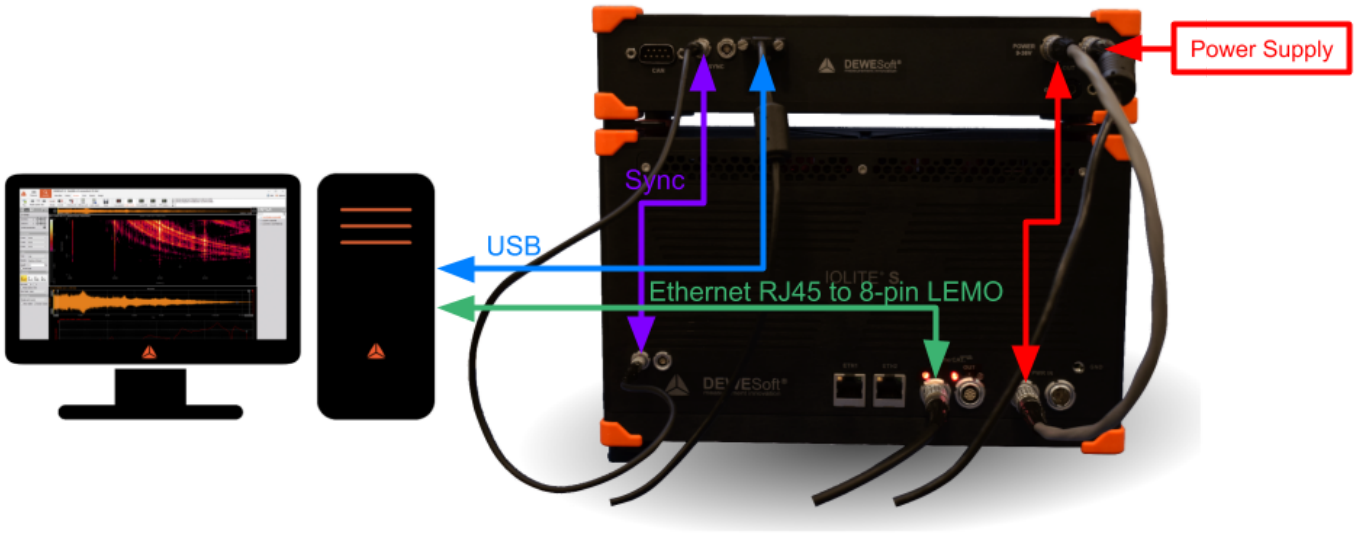
Function	Dewesoft order code
Power supply	PS-120-L1B2f (default)
EtherCAT	IOLITE to PC: L1T8f-RJ45-1M (default), L1T8f-RJ45-3M, L1T8f-RJ45-5M IOLITE to KRYPTON: L1T8m-L1T8f-02M, L1T8m-L1T8f-0.4M, L1T8m-L1T8f-1M, L1T8m-L1T8f-2.5M

4.3.2.6. IOLITE-R8: Boxed Chassis: Connection of IOLITE-R8 and Sirius® device

Connect power supply cable to Sirius (PS-120W-L1B2f). Then connect the USB cable (CABLE-USBAmini-USBBS-1.8m) to the USB port on the back panel of the Sirius device. Finally connect the other side of the USB cable to the USB port on PC.

Use power supply daisy chain cable (e.g. L1B2m-L1B2f-0.4m) to enable power supply for IOLITE-R8.
Then connect L1T8f-RJ45-1M cable (LEMO side) to the IN connector of BUS 1 on the IOLITE-R8 back panel. Finally connect the other side of the L1T8f-RJ45-1M cable (RJ45 side) to the LAN port of PC.

In order to have synchronized data between IOLITE and Sirius, connect SYNC cable (e.g. L00B4m-L00B4m-0.2m) to the SYNC connector on IOLITE-GATE and the other side of cable to the SYNC connector on Sirius.



Connection of IOLITE-R8 and Sirius® device

List of required cables:

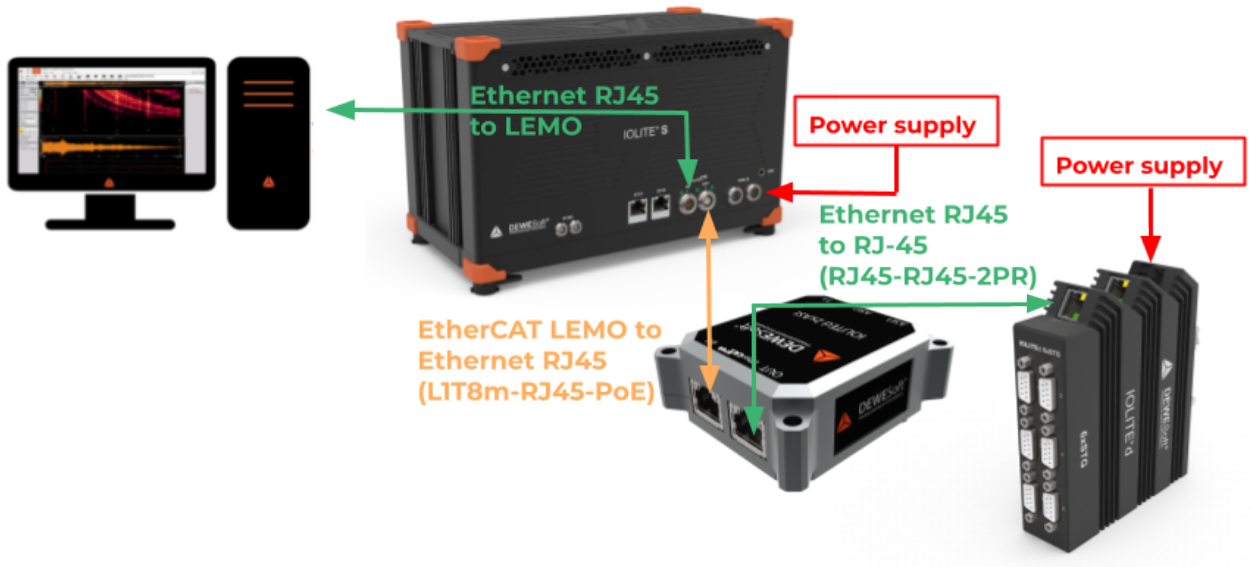
Function	Dewesoft order code
Power supply	Sirius: PS-120-L1B2f (default) Sirius to IOLITE: L1B2m-L1B2f-0.2m, L1B2m-L1B2f-0.4m, L1B2M-L1B2F-3m
EtherCAT	IOLITE to PC: L1T8f-RJ45-1M (default), L1T8f-RJ45-3M, L1T8f-RJ45-5M
USB	CABLE-USBAmini-USBBS-1.8m (default), CABLE-USBAmini-USBBS-1m
Synchronization	L00B4m-L00B4m-0.2m (default), L00B4m-L00B4m-0.5m, L00B4m-L00B4m-3m

4.3.2.7. IOLITE-R8: Boxed Chassis: Connection of IOLITE multi and single channel device

Connect power supply cable to IOLITE-R8 (PS-120W-L1B2f).Then connect L1T8f-RJ45-1M cable (LEMO side) to IN connector of BUS 1 on IOLITE-R8 back panel.

Use the L1T8m-RJ-45 cable to connect the IOLITE - single channel device. An additional power cable is not needed, as the device can power over Ethernet cable.

Use a RJ-45 - RJ-45 cable to connect the IOLITE - multichannel device. An additional Power supply is needed for the device with the cable.



Function	Dewesoft order code
Power supply	IOLITE-R8: PS-120-L1B2f (default)
EtherNET	IOLITE-R8 to IOLITE single channel: RJ-45 - RJ-45 IOLITE single channel to IOLITE multi channel: RJ-45 - RJ-45

4.3.3. IOLITE-R8r: Ruggedized Boxed Chassis

In addition to standard R8 chassis, IOLITE is also available in ruggedized version.

The chassis provides 8 slots for IOLITE input and output slices to be installed.

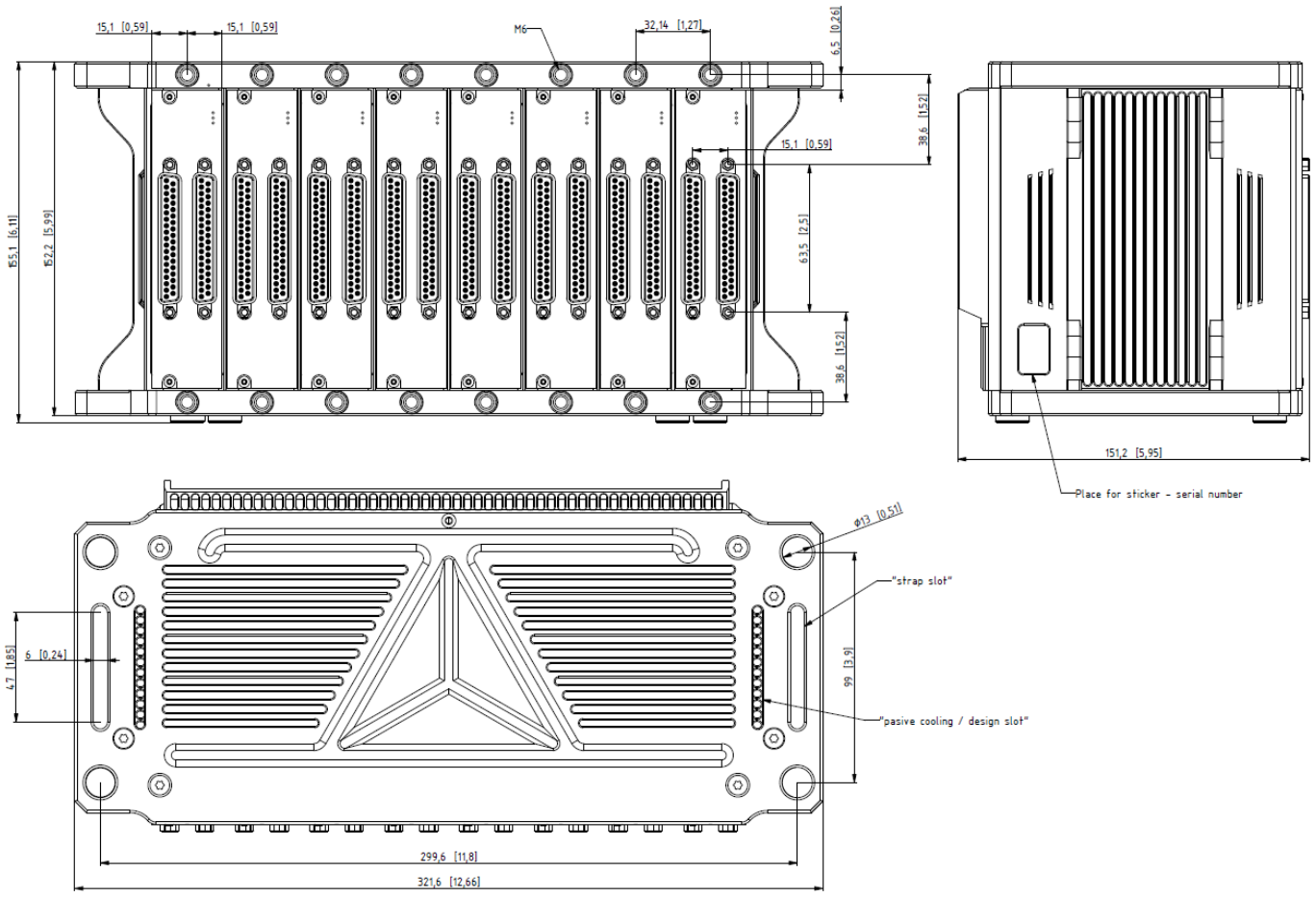
IOLITE-R8r includes EtherCAT gateway and has a passive cooling system.

4.3.3.1. IOLITE-R8r: Ruggedized Boxed Chassis: Renders

IOLITE-R8r Front panel

IOLITE-R8r Back panel

4.3.3.2. IOLITE-R8r: Ruggedized Boxed Chassis: Dimensions



Technical Drawings of IOLITE-R8r

4.3.3.3. IOLITE-R8r: Ruggedized Boxed Chassis: Connectors

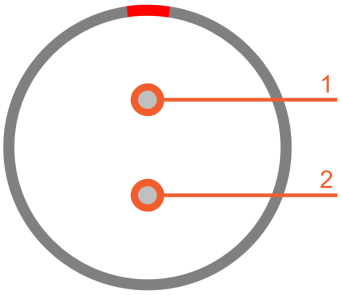
The IOLITE-R8r chassis also enables dual EtherCAT bus. There are two 8-pin LEMO 1T connectors on the back panel of IOLITE-R8r used for data transfer and synchronisation on the primary bus (BUS 1) for buffered data. The OUT connector on BUS 1 also enables power supply for external Dewesoft EtherCAT devices.
Secondary bus (BUS 2) for unbuffered data has two RJ45 connectors (IN and OUT) for data transfer and synchronization to 3rd party control master.

Two 2-pin LEMO 1T connectors are used for redundant power supply (PWR IN).

Above the PWR IN connector is a GND socket for grounding the IOLITE-R8r.

Synchronization with Dewesoft USB data acquisition devices or connection to clock master is on IOLITE-R8r enabled by connecting a synchronization cable to two SYNC inputs (4-pin LEMO 00).

4.3.3.3.1. IOLITE-R8r: Ruggedized Boxed Chassis: Power in: Pinout



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

Pin	Name	Description
1	V +	Supply
2	V -	Ground

For the power supply an unregulated DC voltage between 9 and 48 Volts is required, which is connected to the LEMO 1B connector on the rear side of the chassis.

PWR IN connector (on the device): ECJ.1B.302.CLA
Mating connector (for the cable): FGJ.1B.302.CLLD42Z

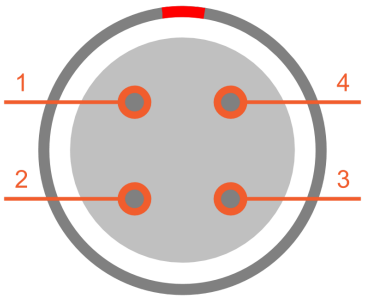
4.3.3.3.2. IOLITE-R8r: Ruggedized Boxed Chassis: Sync: Pinout

The sync connectors are required when you want to synchronize the data from IOLITE with Dewesoft USB devices for the same measurement. The signal that is transferred over sync cable makes sure that the measurement data of IOLITE and Dewesoft USB devices are perfectly synchronized to each other.

The other use of a sync connector is to connect directly to IOLITE a signal from the clock master.

Hint

There is no distinction between the IN and OUT – it does not matter which connector you use. When IRIG-synchronization is used, the IRIG signal is on pins 1, 2.



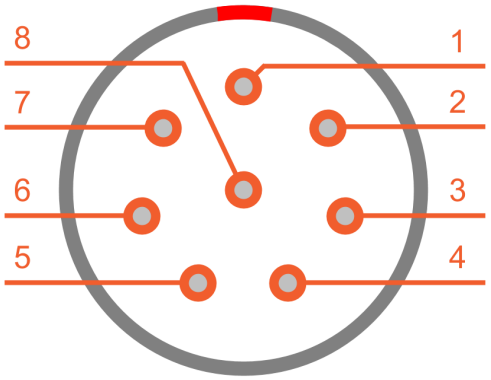
Sync connector: pin-out (4-pin LEMO female)

Pin	Name	Description
1	CLK	Clock
2	TRIG	Trigger
3	RES	PPS
4	GND	Ground

SYNC connector (on the device): XBG.00.304.CLL
Mating connector (for the cable): FGG.00.304.CLAD27Z

4.3.3.3.3. IOLITE-R8r: Ruggedized Boxed Chassis: BUS 1: IN: Pinout

The IN connector of the primary EtherCAT bus (BUS 1) is a 8-pin LEMO 1B male connector.



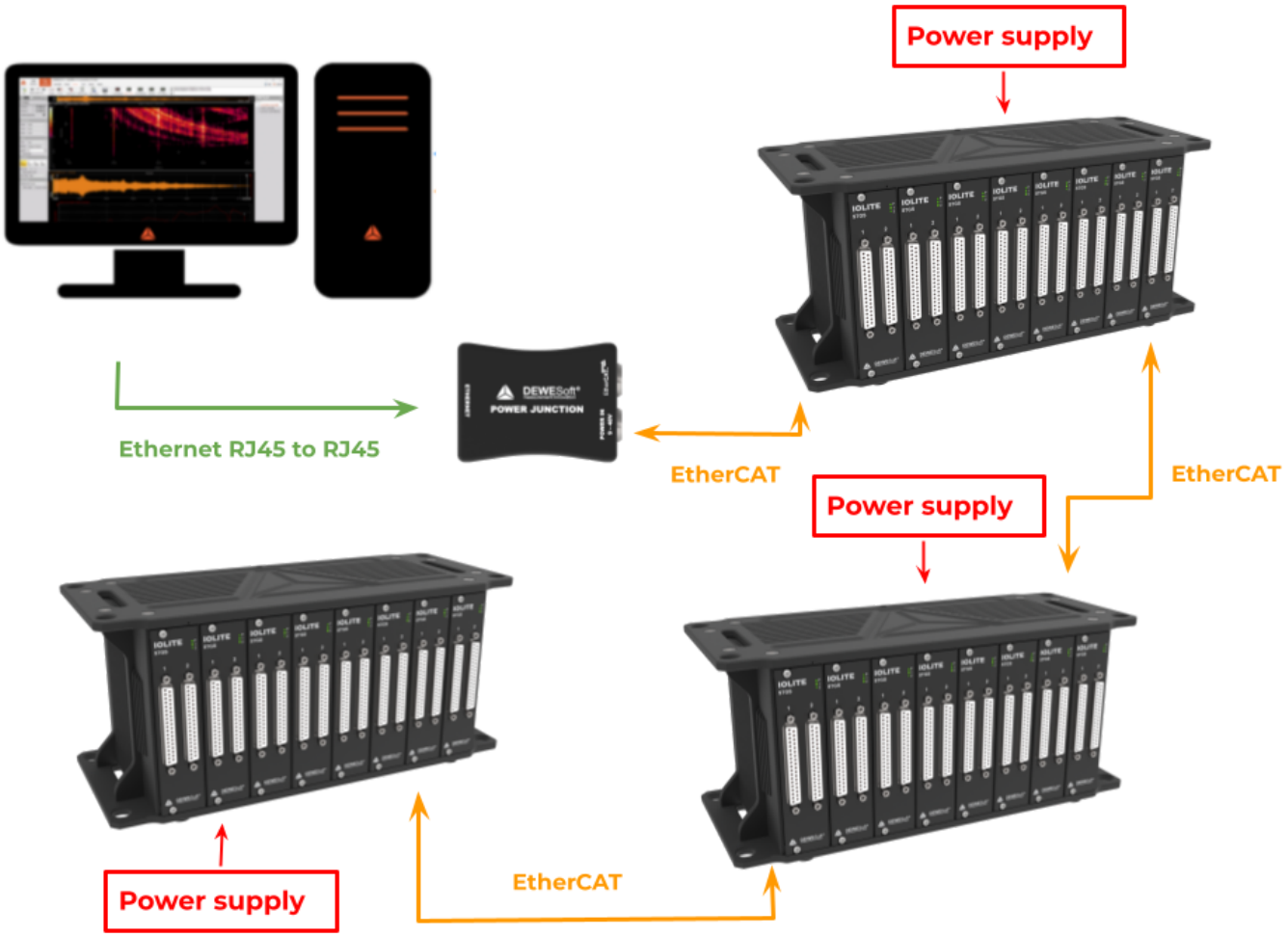
EtherCAT connector: pin-out (8-pin LEMO male)

Pin	Name	Description
1	TX_P	Transmission +
2	TX_N	Transmission -
3	RX_P	Reception +
4	RX_N	Reception -
5	NC	Do not connect
6	NC	Do not connect
7	GND	Ground
8	GND	Ground

BUS 1 IN connector (on the device): EEJ.1T.308.CLDY
Mating connector (for the cable): FGJ.1T.308.CLL.1433

Important

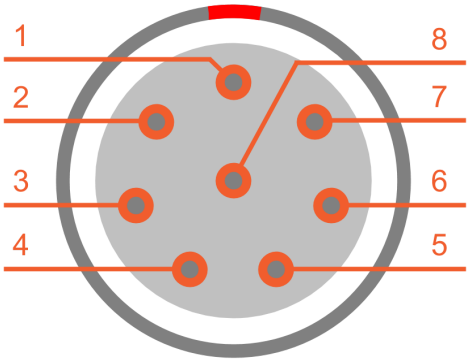
Pins 5 and 6 of the ECAT IN 8-pin LEMO connector are not connected. You can not power multiple R8r systems with the ECAT line and should always provide a separate power supply and connect it to the Power in connector of each of the systems. However, you can power other devices with ECAT OUT!



Connection of IOLITE-R8r system with Ethercat line

4.3.3.3.4. IOLITE-R8r: Ruggedized Boxed Chassis: BUS 1: OUT: Pinout

The OUT connector of the primary EtherCAT bus (BUS 1) is a 8-pin LEMO 1T female connector.
OUT connector enables power supply for external Dewesoft EtherCAT devices.



EtherCAT connector: pin-out (8-pin LEMO female)

Pin	Name	Description
1	TX_P	Transmission +
2	TX_N	Transmission -
3	RX_P	Reception +
4	RX_N	Reception -
5	VCC	Power OUT
6	VCC	Power OUT
7	GND	Ground
8	GND	Ground

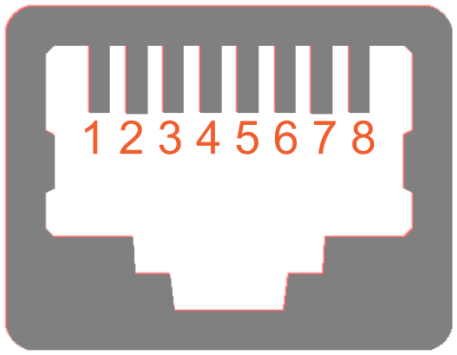
BUS 1 OUT connector (on the device): EEG.1T.308.CLNY
Mating connector (for the cable): FGG.1T.308.CLA.1433

4.3.3.3.5. IOLITE-R8r: Ruggedized Boxed Chassis: BUS 2: RJ45: Pinout

IOLITE-R8r includes two RJ45 connectors on Secondary bus (BUS 2) for unbuffered data.

Each RJ45 connector has two LEDs:
- **GREEN** LED indicates that IOLITE is connected to another device.
- **YELLOW** LED is active only when the data transfer is active.

Connector used on the device is a standard ethernet connector (RJ45).
Standard ethernet cable with standard connector can be used to connect IOLITE-GATE with a PC.



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

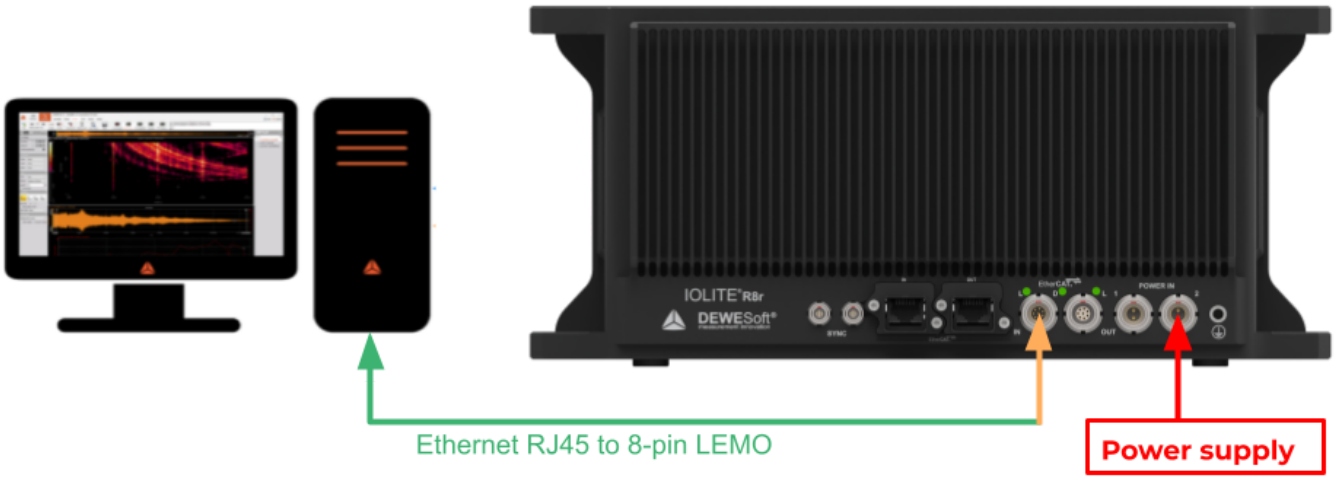
Pin	Name	Description
1	TX_P	Transmission +
2	TX_N	Transmission -
3	RX_P	Reception +
4	-	-
5	-	-
6	RX_N	Reception -
7	-	-
8	-	-

4.3.3.4. IOLITE-R8r: Ruggedized Boxed Chassis: Connection of IOLITE-R8r standalone device to PC

First connect the power supply cable (PS-120-L1B2f) to the PWR IN LEMO 1B 2-pin connector. To increase system reliability connect redundant power supply to other PWR IN connectors.

Important
To improve the redundancy of the system, it is recommended that the device is powered with two power supplies connected to different electrical fuses!

Then connect L1T8f-RJ45-1M cable (LEMO side) to the IN connector of BUS 1 on the IOLITE-R8r back panel. Finally, connect the other side of the L1T8f-RJ45-1M cable (RJ45 side) to the LAN port of the PC.



Connection of IOLITE-R8r standalone device to PC

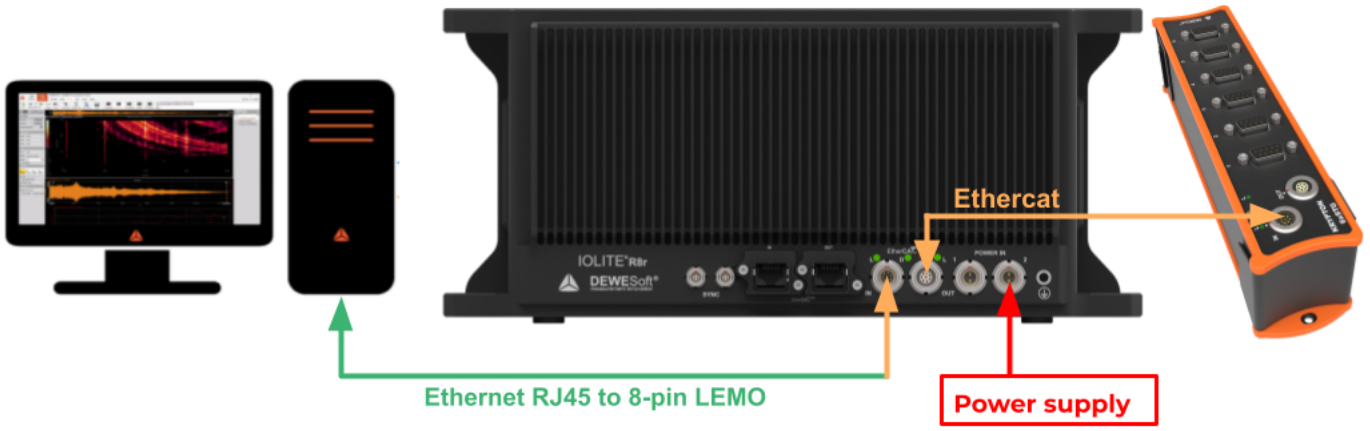
List of required cables:

Function	Dewesoft order code
Power supply	PS-120-L1B2f (default)
EtherCAT	L1T8f-RJ45-1M (default), L1T8f-RJ45-3M, L1T8f-RJ45-5M

4.3.3.5. IOLITE-R8r: Ruggedized Boxed Chassis: Connection of IOLITE-R8r and KRYPTON® device

The connection of the IOLITE device to the PC is the same as in 2.3.2.4.

Use EtherCAT to EtherCAT expansion cable (e.g. L1T8m-L1T8f-1M) and connect it to OUT connector on BUS 1 of IOLITE-R8r on one side and the IN connector of the KRYPTON device on the other side.



Connection of IOLITE-R8r and KRYPTON® device

List of required cables:

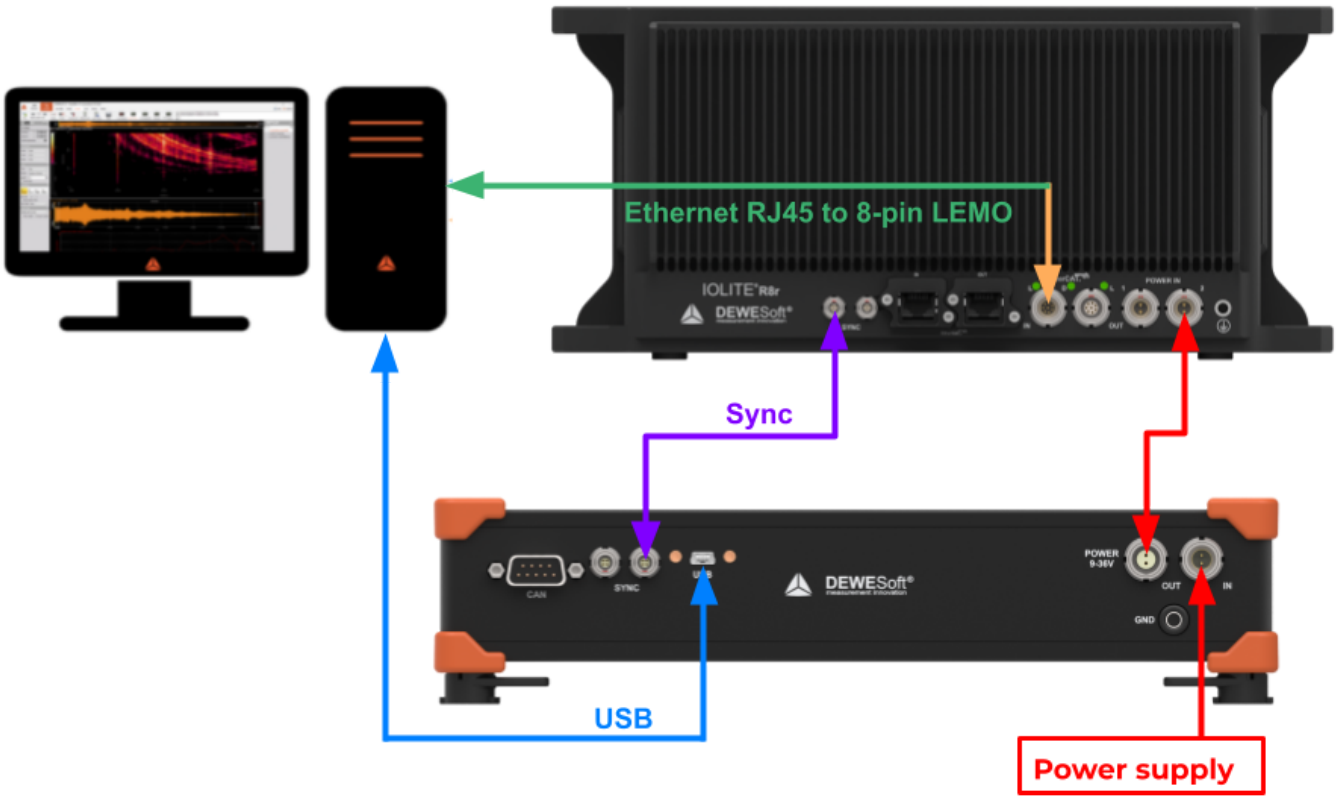
Function	Dewesoft order code
Power supply	PS-120-L1B2f (default)
EtherCAT	IOLITE to PC: L1T8f-RJ45-1M (default), L1T8f-RJ45-3M, L1T8f-RJ45-5M IOLITE to KRYPTON: L1T8m-L1T8f-02M, L1T8m-L1T8f-0.4M, L1T8m-L1T8f-1M, L1T8m-L1T8f-2.5M

4.3.3.6. IOLITE-R8r: Ruggedized Boxed Chassis: Connection of IOLITE-R8r and Sirius® device

Connect power supply cable to Sirius (PS-120W-L1B2f). Then connect the USB cable (CABLE-USBAmini-USBBS-1.8m) to the USB port on the back panel of the Sirius device. Finally connect the other side of the USB cable to the USB port on the PC.

Use power supply daisy chain cable (e.g. L1B2m-L1B2f-0.4m) to enable power supply for IOLITE-R8r. Then connect L1T8f-RJ45-1M cable (LEMO side) to the IN connector of BUS 1 on the IOLITE-R8r back panel. Finally connect the other side of the L1T8f-RJ45-1M cable (RJ45 side) to the LAN port of the PC.

In order to have synchronized data between IOLITE and Sirius, connect SYNC cable (e.g. L00B4m-L00B4m-0.2m) to the SYNC connector on IOLITE-GATE and the other side of cable to the SYNC connector on Sirius.



Connection of IOLITE-R8r and Sirius® device

List of required cables:

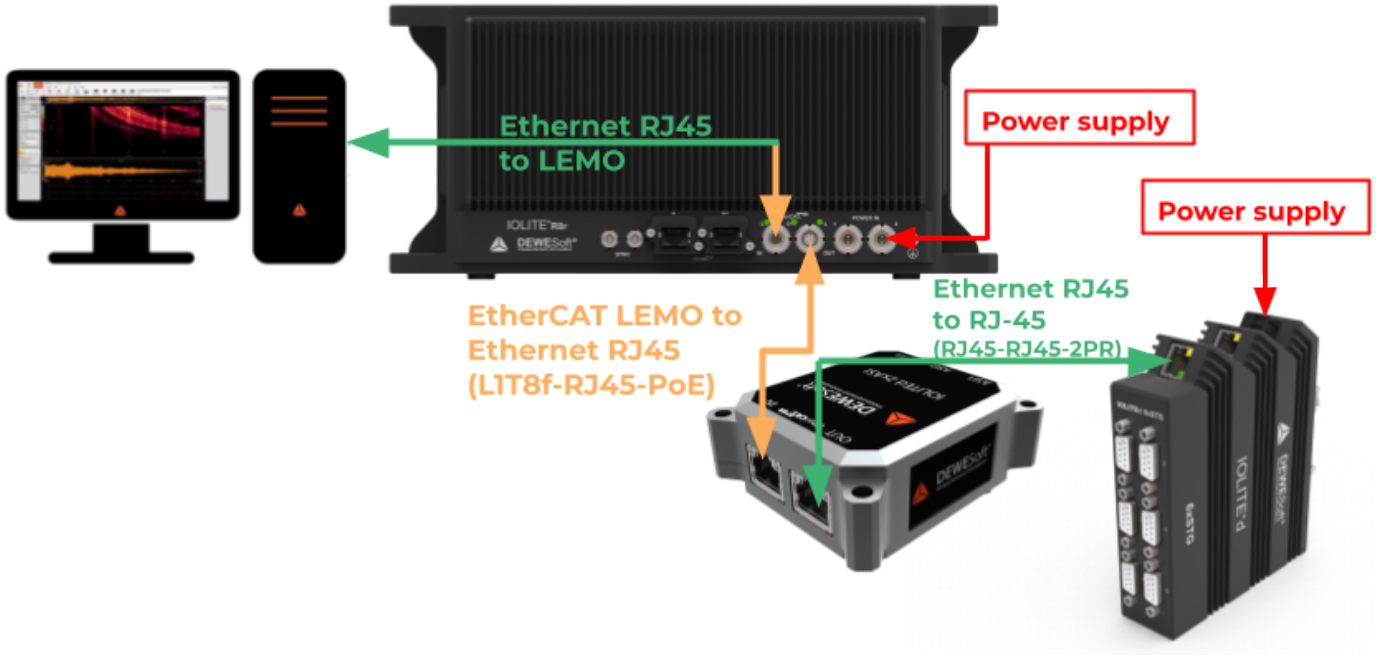
Function	Dewesoft order code
Power supply	Sirius: PS-120-L1B2f (default) Sirius to IOLITE: L1B2m-L1B2f-0.2m, L1B2m-L1B2f-0.4m, L1B2M-L1B2F-3m
EtherCAT	IOLITE to PC: L1T8f-RJ45-1M (default), L1T8f-RJ45-3M, L1T8f-RJ45-5M
USB	CABLE-USBAmini-USBBS-1.8m (default), CABLE-USBAmini-USBBS-1m
Synchronization	L00B4m-L00B4m-0.2m (default), L00B4m-L00B4m-0.5m, L00B4m-L00B4m-3m

4.3.3.7. IOLITE-R8r: Ruggedized Boxed Chassis: Connection of IOLITE multi and single channel device

Connect power supply cable to IOLITE-R8r (PS-120W-L1B2f).Then connect L1T8f-RJ45-1M cable (LEMO side) to IN connector of BUS 1 on IOLITE-R8r back panel.

Use the L1T8m-RJ-45 cable to connect the IOLITE - single channel device. An additional power cable is not needed, as the device can power over Ethernet cable.

Use a RJ-45 - RJ-45 cable to connect the IOLITE - multichannel device. An additional Power supply is needed for the device with the cable.



Connection of IOLITE-R8r and two different IOLITE devices

Function	Dewesoft order code
Power supply	IOLITE-R8r: PS-120-L1B2f (default) IOLITE-multichannel:
EtherNET	IOLITE-R8r to IOLITE single channel: RJ-45 - RJ-45 IOLITE single channel to IOLITE multi channel: RJ-45 - RJ-45

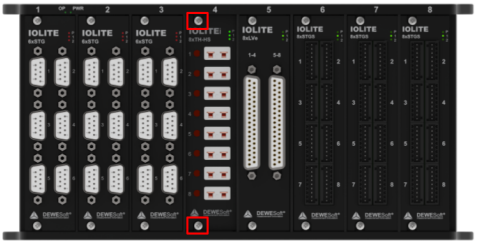
4.3.4. IOLITEr slices: Mounting/Removing/Replacing from Rack Chassis

IOLITE rack slices (IOLITEr) can be mounted in all rack chassis versions: IOLITE-R12, IOLITE-R8 and IOLITE-R8r; as well as OBSIDIAN-R8 and, OBSIDIAN-R8w.

Warning
When mounting or removing IOLITEr slices TURN OFF the equipment! IOLITEr slices ARE NOT hot swappable.

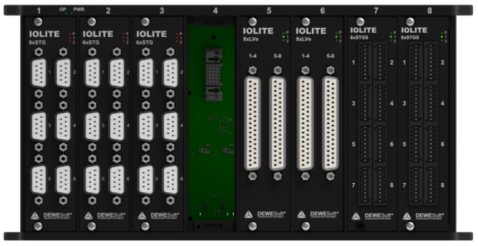
4.3.4.1. IOLITEr slices: Replacing the slice - Instructions

1



Turn off the device!
Unscrew two M2.5x5 TRX panhead screws.

2

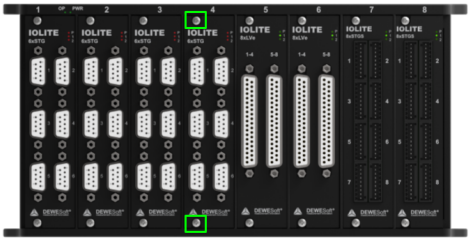


Remove the IOLITEr slice.

3

Insert the new slice by sliding it on rails.

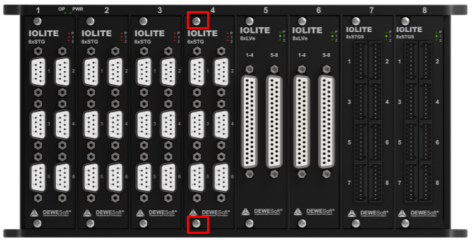
4



Screw two M2.5x5 TRX panhead screws.
You are ready to measure!

4.3.4.2. IOLITEr slices: Removing the slice - Instructions

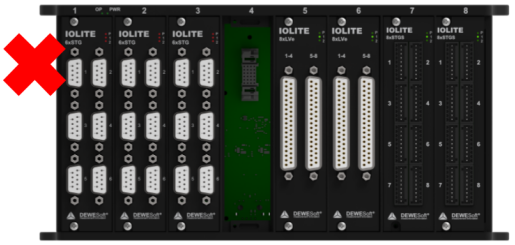
1



Turn off the device!

Unscrew two M2.5x5 TRX panhead screws.

2

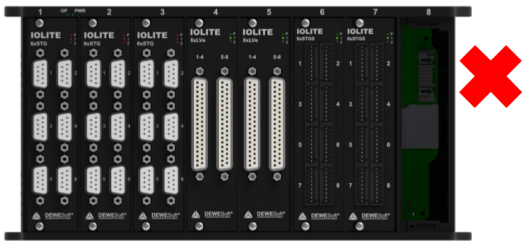


Remove the IOLITEr slice.

Important

By removing the IOLITEr slice the EtherCAT chain gets broken. IOLITEr slices right to the removed IOLITEr slice will not be detected.

3

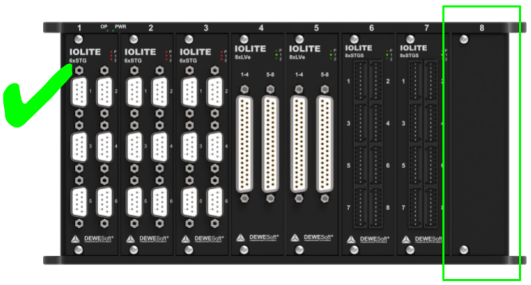


Shift the IOLITEr slices in a way that the EtherCAT chain is not broken.

Caution

By removing the IOLITEr slice the empty slot is exposed. Unwanted parts or larger objects can get into the chassis causing permanent damage of the equipment. Use front ALU cover to close the empty slot.

4



Cover the empty slot with front ALU cover. Screw two M2.5x5 TRX panhead screws.

You are ready to measure!

4.3.5. IOLITE: Multi channel device

IOLITE multi-channel modules are fully compatible with the DIN rail mount. Chassis offers an easy clip-in mechanism for mounting to all standard industrial DIN rail mounts.

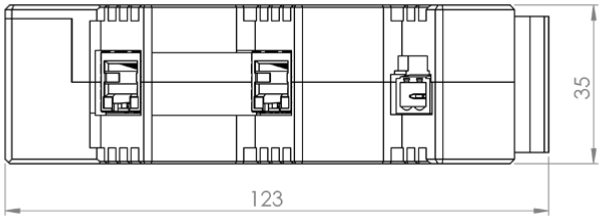
IOLITE DAQ devices use RJ45 connectors which allow easy connection of modules with standard low-cost Ethernet/EtherCAT cables.

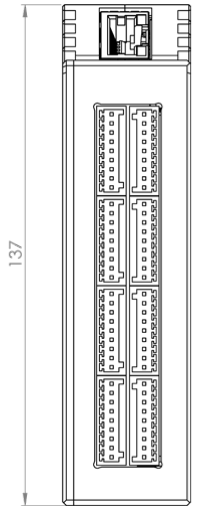
Important
For the power supply we have two terminal block connectors so the devices can be daisy chained with each other.

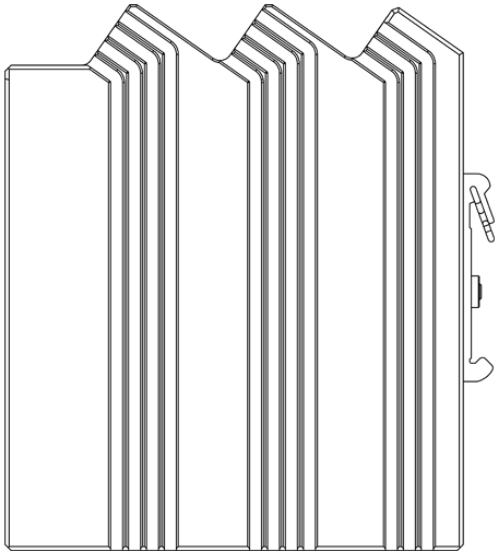
4.3.5.1. IOLITE - Multi channel: Renders

IOLITE multi channel device

4.3.5.2. IOLITE - Multi channel: Dimension

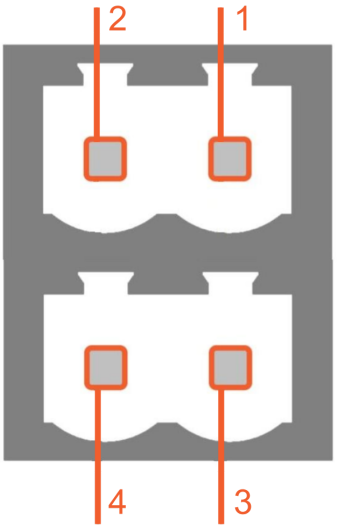






4.3.5.3. IOLITE - Multi channel: Connectors

4.3.5.3.1. IOLITE - Multi channel: PWR IN

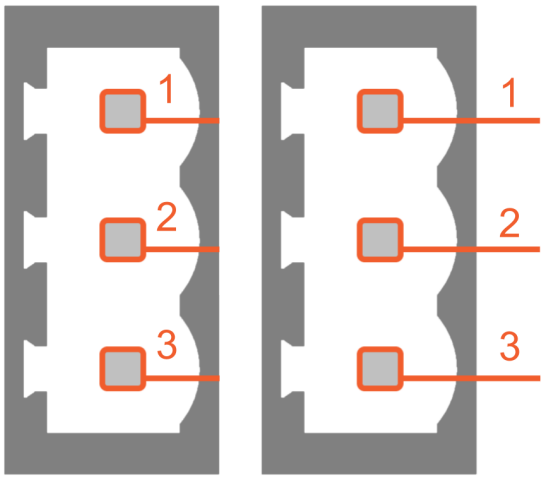


Power in connector: pin-out (4-pin male)

Pin	Name	Description
1	+	PWR +
2	-	PWR -
3	+	PWR +
4	-	PWR -

Connector (on the device):
SCDN-THR 3.81/04/90G 3.2SN BK BX

Mating Connectors (for the cable):
BCF 3.81/02/180 SN BK BX



Power in connector: pin-out (two 3-pin connectors)

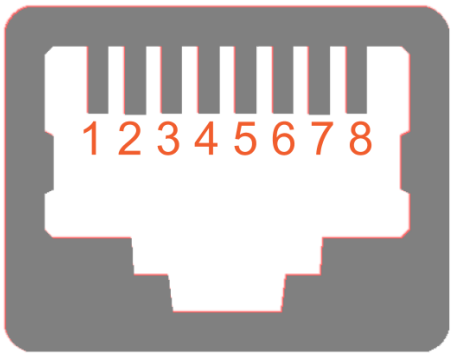
Pin	Name	Description
1	Chassis	Connected to chassis
2	-	PWR-
3	+	PWR +

Connector (on the device):
2x3 OMNIMATE SC 3.81/03/180

Mating Connectors (for the cable):
2x3 OMNIMATE BCF 3.81/03/180;

4.3.5.3.2. EtherNET - IN (Data, Sync)

Connector used on the device is a standard Ethernet connector (RJ45).
Standard ethernet cable with standard connector can be used to connect IOLITE - Multi channel to PC.

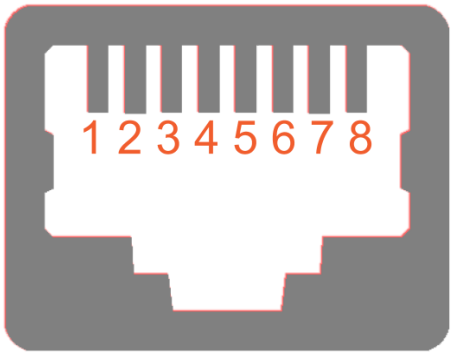


EtherCAT connector: pin-out (RJ-45 female)

Pin	Name	Description
1	TX_P	Transmission +
2	TX_N	Transmission -
3	RX_P	Reception +
4	-	-
5	-	-
6	RX_N	Reception -
7	-	-
8	-	-

4.3.5.3.3. EtherNET - OUT (Data, Sync)

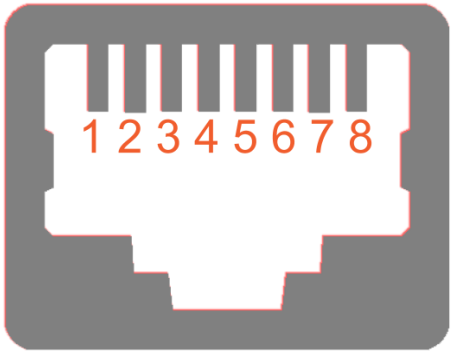
Connector used on the device is a standard Ethernet connector (RJ45).
Standard ethernet cable with standard connector can be used to connect IOLITE Multi channel device with an additional IOLITE Multi channel device



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

Pin	Name	Description
1	TX_P	Transmission +
2	TX_N	Transmission -
3	RX_P	Reception +
4	-	-
5	-	-
6	RX_N	Reception -
7	-	-
8	-	-

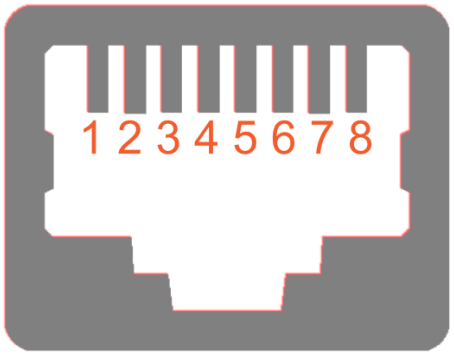
4.3.6.3.1. PoE - ECAT - IN (Data, Sync, PWR)



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

Pin	Name	Description
1	TX_P	Transmission +
2	TX_N	Transmission -
3	RX_P	Reception +
4	DC +	PoE +
5	DC +	PoE +
6	RX_N	Reception -
7	DC -	PoE -
8	DC -	PoE -

4.3.6.3.2. PoE - ECAT - OUT (Data, Sync, PWR)



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

Pin	Name	Description
1	TX_P	Transmission +
2	TX_N	Transmission -
3	RX_P	Reception +
4	DC +	PoE +
5	DC +	PoE +
6	RX_N	Reception -
7	DC -	PoE -
8	DC -	PoE -

Caution

If the device is supplied on PWR IN, PoE voltage (DC+ / DC- on ECAT OUT) is equal to Vin (PWR+ /PWR-) on PWR IN (max. current 3 A). If you chain the devices, the voltage on ECAT OUT is the same as connected to the ECAT IN. There is no protection.
If PoE with power and PWR IN are connected at the same time, PWR IN power will be chosen, but only if it is within the specifications (9-48 V).

Be sure to check the connection possibilities in chapter 3.2. Connecting IOLITE®.

4.3.6. IOLITE: Single channel device

IOLITE single-channel modules are small and can be placed next to your measurement points. They offer screw holes for easy mounting with screws or any other method.

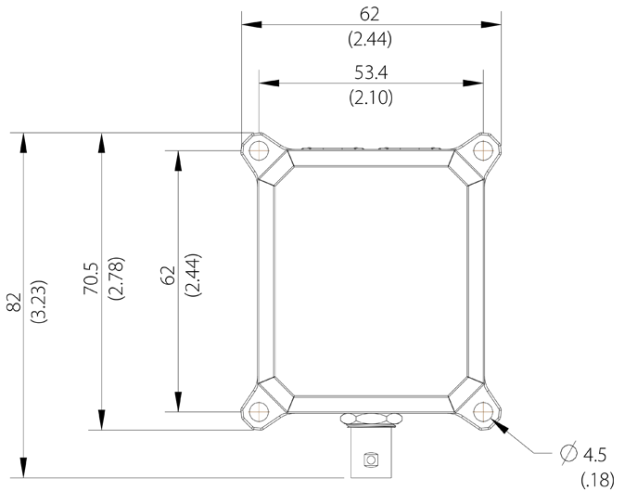
Multiple IOLITE modules can be daisy-chained together with a single cost-effective Ethernet/EtherCAT cable with RJ45 connectors. Devices can span up to 100m apart.

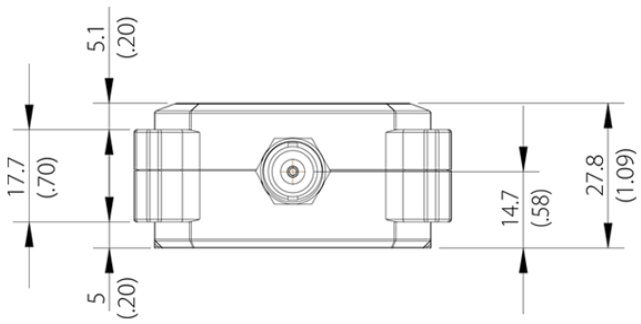
Single EtherCAT cable is enough for power, data, and synchronization between devices.

4.3.6.1. IOLITE - Single channel: Renders

IOLITE single channel device

4.3.6.2. IOLITE - Single channel: Dimensions

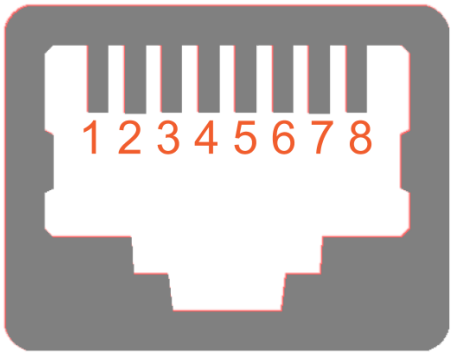




4.3.6.3. IOLITE - Single channel: Connectors

4.3.6.3.1. EtherNET - IN (Data, Sync, PWR)

Connector used on the device is a standard Ethernet connector (RJ45).
Standard ethernet cable with standard connector can be used to connect IOLITE-Single channel with a PC.

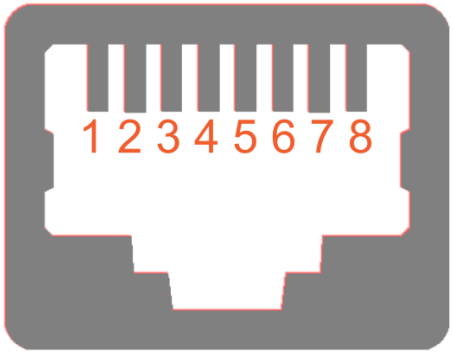


EtherCAT connector: pin-out (RJ-45 female)

Pin	Name	Description
1	TX_P	Transmission +
2	TX_N	Transmission -
3	RX_P	Reception +
4	DC +	PoE +
5	DC +	PoE +
6	RX_N	Reception -
7	DC -	PoE -
8	DC -	PoE -

4.3.6.3.2. EtherNET - OUT (Data, Sync, PWR)

Connector used on the device is a standard Ethernet connector (RJ45).
Standard ethernet cable with standard connector can be used to connect IOLITE-Single channel with a PC.



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

Pin	Name	Description
1	TX_P	Transmission +
2	TX_N	Transmission -
3	RX_P	Reception +
4	DC +	PoE +
5	DC +	PoE +
6	RX_N	Reception -
7	DC -	PoE -
8	DC -	PoE -

Caution

USB passive PoE injector with 0.5m RJ45 cable is included (labeled with PoE sign). It is for testing purposes only and can only power 1 device. Make sure to connect the right end of the injector to the device, otherwise the communication will not work.

6. Module Overview

	6xSTG	8xSTGS	8xLV	8xLVe	16xLV	4xHV	8xLA	8xACC
Connectors	DSUB-9	Terminal block, DSUB-37	BNC, Terminal block	Terminal block, DSUB-37	Terminal block	Banana plug	BNC, Terminal block	BNC
Channels per module	6x	8x	8x	8x	16x	4x	8x	8x
Data rate per channel IOLITE	20 kS/s	20 kS/s	20 kS/s	20 kS/s	20 kS/s	40 kS/s	20 kS/s	40 kS/s
Data rate per channel OBSIDIAN	20 kS/s	20 kS/s	20 kS/s	20 kS/s	5 kS/s	✗	20 kS/s	20 kS/s
Resolution	24-bit	24-bit	24-bit	24-bit	24-bit	24-bit	24-bit	24-bit
Bandwidth	0.49*fs	0.433*fs	0.49*fs	0.433*fs	0.433*fs	0.433*fs	0.49*fs	0.433*fs
Voltage mode ranges	±50 V, ±10 V, ±1 V, ±100 mV	✗	±100 V, ±10 V (±10 V, ±1 V on request)	±100 V, ±5 V	±200 V, ±10 V	±2000 V, ±1000 V, ±400 V, ±200 V	✗	±10 V, ±5 V, ±1 V, ±200 mV
Input coupling	DC, AC 1 Hz	DC	DC	DC	DC	DC	DC	DC, AC 1 Hz, AC 0.1 Hz
Sensor excitation	0..24 V (unipolar), 0..12 V (bipolar), 0..44 mA (current), max. 0.55 W/ch	1 V, 2 V, 5 V	✗	0...24V (unipolar)	✗	✗	✗	2 mA, 4 mA, 6 mA
Bridge connection	Full, ½, ¼ 350 Ω, ¼ 120 Ω 3-wire	Full, ½, ¼ 350 Ω, ¼ 120 Ω 3-wire, 4-wire (optional)	✗	✗	✗	✗	✗	✗
Programmable shunt	100 kΩ	100 kΩ	✗	✗	✗	✗	✗	✗
IEPE input	DSI-ACC	✗	✗	✗	✗	✗	✗	✓
Resistance	✓	✗	✗	✗	✗	✗	✗	✗
Temperature (PTx)	DSI-RTD[1]	✗	✗	✗	✗	✗	✗	✗
Thermocouple	DSI-TH[1]	✗	✗	✗	✗	✗	✗	✗
Current	20 mA (internal shunt), DSI-5A, DSIi-10A, DSIi-20A	✗	✗	✗	✗	✗	±20 mA, ±2 mA	✗
Potentiometer	✓	✓	✗	✓	✗	✗	✗	✗
LVDT	DSI-LVDT	✗	✗	✗	✗	✗	✗	✗
Charge	DSI-CHG	✗	✗	✗	✗	✗	✗	✗
TEDS	✓	✓ (except DB37)	✗	✓	✗	✗	✗	✓
Isolation voltage	Differential	Differential	450 V	250 V	250 V	CAT II 1000 V	450 V	250V
Isolation arrangement	None	Ch-GND	Ch-Ch & Ch-GND	Ch-GND	Ch-GND	Ch-Ch & Ch-GND	Ch-Ch & Ch-GND	Ch-GND
Power consumption per module	Typ. 5.4 W, Max. 11.1 W	Typ. 2.7 W, Max. 5.1 W	Typ. 2.4 W, Max. 3.5 W	Typ. 3.3 W Max. 4.2 W	Typ. 3.4 W, Max. 4.2 W	Typ. 2.6 W Max. 3 W	Typ. 2.4 W, Max. 3.5 W	Typ. 4.5 W, Max. 6 W
Waterproof version	✓	✓	✗	✓	✗	✗	✗	✗
PoE functionality	✗	✓	✗	✓	✓	✗	✗	✓
Advanced functions	Supports all strain types, high input range	Supports all strain types, low power consumption	High isolation, high input range	High isolation, high input range	High isolation, high input range	High isolation, high input range	High isolation, high input range	IEPE, supports TEDS, high channel density

[1] Not supported on the OBSIDIAN

Caution

IOLITErw (waterproof of rack versions) currently fit only to OBSIDIAN-R8w and IOLITE-R12 chassis.

	8xTH	8xTH-HS	8xRTD	8xRTD-HS	8xRTDp[1]	32xDI	32xDO[1]	8xDI-4xDO[1]	4xCNT	16xAO
Connectors	MINI TC	MINI TC	L0B6f, Terminal block	L0B6f, Terminal block	L0B6f	Terminal block	Terminal block	Terminal block	L1B7f	Terminal block
Channels per module	8x	8x	8x	8x	8x	32x	32x	8x digital in, 4x digital out	4x	16x
Data rate per channel IOLITE	100 S/s	100 S/s, upgradable to 10 kS/s	100 S/s	100 S/s, upgradable to 10 kS/s	100 S/s	20 kS/s	✗	✗	20 kS/s	20 kS/s
Data rate per channel OBSIDIAN	100 S/s	100 S/s, upgradable to 5 kS/s	100 S/s	100 S/s, upgradable to 5 kS/s	100 S/s,	10 kS/s	not supported	not supported	5 kS/s	1 kS/s
Resolution	24-bit	24-bit	24-bit	24-bit	24-bit	digital	digital	digital	100 MHz timebase 5 ppm, 20 ppm max	16-bit
Bandwidth	✗	0.49*fs (max. 1 kHz)	✗	0.49*fs (max. 1 kHz)	✗	✗	✗	✗	10 MHz	✗
Voltage mode ranges	±1 V, ±100 mV	±1 V, ±100 mV	±1 V, ±100 mV	±1 V, ±100 mV	±1 V, ±100 mV	✗	open collector	✗	TTL (Low: <0.8 V, High > 2 V)	±10 V
Input coupling	DC	DC	DC	DC	DC	✗	✗	✗	✗	✗
Sensor excitation	✗	✗	244 uA / 440 uA	150 uA / 400 uA	0.4 mA / 2 mA	✗	✗	✗	5 V, 12 V	✗
Bridge connection	✗	✗	✗	✗	✗	✗	✗	✗	✗	✗
Programmable shunt	✗	✗	✗	✗	✗	✗	✗	✗	✗	✗
IEPE input	✗	✗	✗	✗	✗	✗	✗	✗	✗	✗
Resistance	✗	✗	1 kΩ, 10 kΩ	1 kΩ, 10 kΩ	100 Ω, 1 kΩ, 10 kΩ	✗	✗	✗	✗	✗
Temperature (PTx)	✗	✗	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	✗	✗	✗	✗	✗	✗	✗	✗
Current	✗	✗	✗	✗	✗	✗	✗	✗	✗	✗
Potentiometer	✗	✗	✗	✗	✗	✗	✗	✗	✗	✗
LVDT	✗	✗	✗	✗	✗	✗	✗	✗	✗	✗
Charge	✗	✗	✗	✗	✗	✗	✗	✗	✗	✗
TEDS	✗	✗	✗	✗	✗	✗	✗	✗	✗	✗
Isolation voltage	1000 V	1000 V	1000 V	1000 V	1000 V	1000 V	1000 V	1000 V	✗	✗

Isolation arrangement	Ch-Ch & Ch-GND	Ch-Ch & Ch-GND	Ch-Ch & Ch-GND	Ch-Ch & Ch-GND	Ch-Ch & Ch-GND	Ch-GND, groups of 8 ch.	Ch-GND, groups of 8 ch.	Ch-GND, group of 4/8 ch	Ch-GND	Ch-GND
Power consumption per module	3.2 W	Typ. 2.6 W, Max. 3.4 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. 1.2 W, Max. 1.9 W	Typ. 1.2 W, Max. 2.0 W	Typ. 1.1 W, Max. 1.8 W	Typ. 1.9 W	Typ. 4.3 W, Max. 7.2 W
Waterproof version	✗	✗	✗	✗	✗	✗	✗	✗	✓	✗
PoE functionality	✗	✓	✗	✓	✗	✗	✗	✗	✗	✗
Advanced functions	High isolation, support of main TC types	High isolation, support of main TC types	High isolation	High isolation	Pulsed excitation, Cryogenic temperature range, High isolation	✗	Watchdog	High sink current, watchdog	Supercounter technology	✗

[1] **Not supported on the OBSIDIAN**

Caution

IOLITErw (waterproof of rack versions) currently fit only to OBSIDIAN-R8w and IOLITE-R12 chassis.

Overview for single channel devices

	1xACC	1xSTG	4xDI	4xDO	1xAO
Connector	BNC	DB9	DSUB15HD male	DSUB15HD female	BNC
Number of channels per module	1	1	4	4	1
Data rate per channel	40 kS/s	40 kS/s	20 kS/s		
Resolution	24-bit	24-bit	Digital	Digital	18-bit
Bandwidth	0.49 fs	0.49 fs	✗	✗	✗
Voltage ranges	±10 V, ±5 V, ±1 V, ±200 mV	±50 V, ±10 V, ±1 V, ±100 mV	Digital (Low: < 1 V, High: > 2 V)	✗	±10 V
Input coupling	DC, AC 0.1 Hz, 1 Hz	DC, AC 1 Hz			
Sensor excitation	IEPE 4 mA, 8 mA	Unipolar 0 - 24 V Bipolar 0 - 12 V	✗	✗	✗
Bridge connection	✗	Full, ½, ¼ 350 Ω, ¼ 120 Ω 3 wire	✗	✗	✗
Programmable shunt	✗	100 kΩ	✗	✗	✗
IEPE input	✓	DSI-ACC	✗	✗	✗
Resistance	✗	✓	✗	✗	✗
Temperature (PTx)	✗	DSI-RTD	✗	✗	✗
Thermocouple	✗	DSI-TH	✗	✗	✗
Current	✗	2 mA, 20 mA (internal shunt)	✗	✗	✗
Potentiometer	✗	✓	✗	✗	✗
LVDT	✗	DSI-LVDT	✗	✗	✗
Charge	✗	DSI-CHG	✗	✗	✗
TEDS	✓ (IEPE only)	✓	✗	✗	✗
Isolation	125 Vrms Isolation CH, GND	125 Vrms Isolation CH, GND	CH-CH, GND-GND	CH-GND	✗
Power consumption	2W	2.5W	2.5W	2.5W	2W

6.1. VOLTAGE MEASUREMENT

The IOLITE product family includes two types of low voltage (LV) modules: 8-ch fully isolated module and 16-ch module.
Below is the list of LV products:

- IOLITEir-8xLV (rack version), IOLITEi-8xLV (modular version)
- IOLITEir-8xLV-10V (rack version), IOLITEi-8xLV-10V (modular version)
- IOLITEir-8xLV-T2A2f (rack version), IOLITEi-8xLV-T2A2f (modular version)
- IOLITEir-8xLV-10V-T2A2f (rack version), IOLITEi-8xLV-10V-T2A2f (modular version)
- IOLITEr-16xLV (rack version)

6.1.1. IOLITEi 8xLV

IOLITEi 8xLV is the perfect choice for general-purpose low voltage input data acquisition due to its high accuracy and high isolation. The 8-channel module has channel-to-channel isolation and comes with either BNC (IOLITEir-8xLV and IOLITEi-8xLV) or terminal block connectors (IOLITEir-8xLV-T2A2f and IOLITEi-8xLV-T2A2f) and a maximum range of 100 V.

IOLITEir-8xLV

IOLITEi-8xLV

IOLITEir-8xLV-T2A2f

IOLITEi-8xLV-T2A2f

6.1.1.1. IOLITEi 8xLV: Specifications

Analog input		
Input type	Isolated voltage	
Number of channels	8	
ADC Type	24-bit oversampled SAR	
Sampling Rates	Simultaneous 20k, 10k, 5k, 2k, 1k, 500, 200, 100 S/s (software-selectable)	
Voltage Mode		
Ranges	±100 V	±10 V
Accuracy	±0.03 % of reading ±50 mV	±0.03 % of reading ±5 mV
Typ. SNR (10 kS/s, -1 dBFS sine wave @ 1 kHz)	91 dB	90 dB
Typical noise floor @ 10 kS	-105 dB	-98 dB
Typ. THD (10 kS/s, -1 dBFS sine wave @ 1 kHz)	-91 dB	-91 dB
Typ. SFDR (10 kS/s, -1 dBFS sine wave @ 1 kHz)	93 dB	92 dB
Typical IMR @ 400 Hz / 1 kHz	98 dB / 90 dB	83 dB / 75 dB
Gain Drift	Typical 10 ppm/K, Max. 40 ppm/K	
Offset Drift	Typical 2 ppm of range/K, Max. 10 ppm of range/K	
Gain Linearity	< 0.02 %	
Input Coupling	DC	
Input Impedance	1 MΩ	
Overvoltage Protection	In+ to In-: 200 V continuous, 350 Vpeak (100 ms)	
Analog input performance		
Bandwidth (-3 dB)	0.49*fs	
Alias-free Bandwidth	DC to 0.453*fs	
Alias Rejection	-100 dB (all sample rates)	
Delay Through ADC	37 / fs	
Oversampling	32	
Additional Specifications		
Rack	**IOLITEir-8xLV**	
Input Connectors	BNC	Terminal block 2 pole OMNIMATE SL 2.50 / BLF 2.50/180
Power supply	9 - 48 V DC	
Isolation Voltage	450 Vpeak channel to ground & channel to channel	
Power Consumption	Typ. 2.4 W, Max. 3.5 W	
Weight	310 g	270 g
Slice Dimensions	128.4 x 127.6 x 30.1 mm	
Additional Specifications		
Modular	**IOLITEi-8xLV**	
Input Connectors	BNC	Terminal block 2 pole OMNIMATE SL 2.50 / BLF 2.50/180
Power supply	9 - 48 V DC	

Isolation Voltage	450 Vpeak channel to ground & channel to channel	
Power Consumption	Typ. 2.7 W, Max. 3.3 W	
Weight	545 g	505 g
Slice Dimensions	137 x 115.0 x 35.0 mm	

6.1.1.2. IOLITEi 8xLV: Connectors

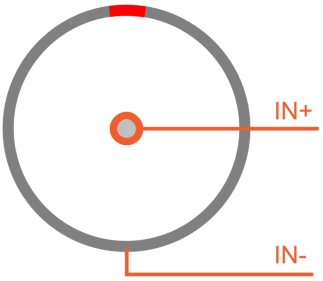
IOLITEi 8xLV (rack and standalone version) is available with BNC and terminal block connectors.

6.1.1.2.1. IOLITEi 8xLV: BNC Connector

The IOLITEi-8xLV and IOLITEir-8xLV modules have 8 BNC connectors for analog input.

IOLITEir-8xLV front

6.1.1.2.1.1. IOLITEi 8xLV: BNC Connector: Pin out



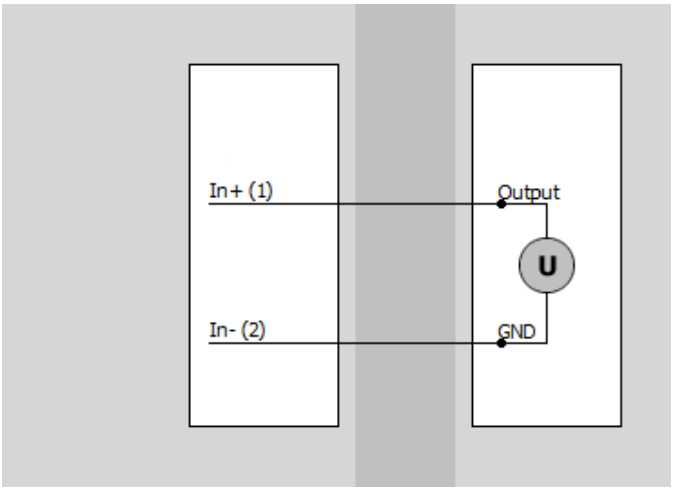
LV connector: pin-out (BNC)

Pin	Name	Description
1	IN+	Analog input
2	IN-	Analog input -

Note
IOLITEi-8xLV has a single-ended input where IN- (Analog input -) represents isolated ground.

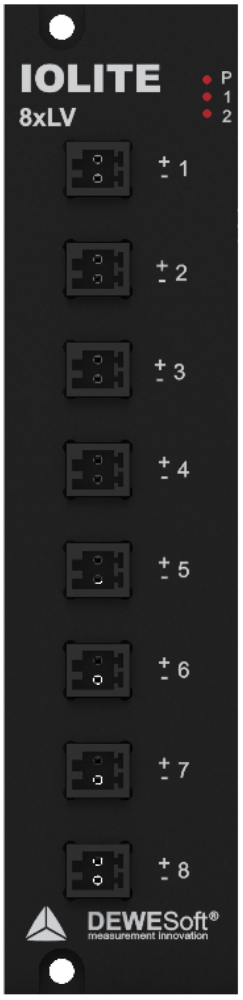
6.1.1.2.1.2. IOLITEi 8xLV: BNC Connector: Wiring diagram

Voltage



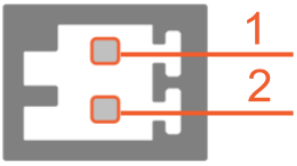
6.1.1.2.2. IOLITEi 8xLV: T2A2f Connector

IOLITEi-8xLV-T2A2f and IOLITEir-8xLV-T2A2f modules have 8 Omnimate terminal block connectors for analog input.



IOLITEir-8xLV-T2A2f front

6.1.1.2.2.1. IOLITEi 8xLV: T2A2f Connector: Pin out



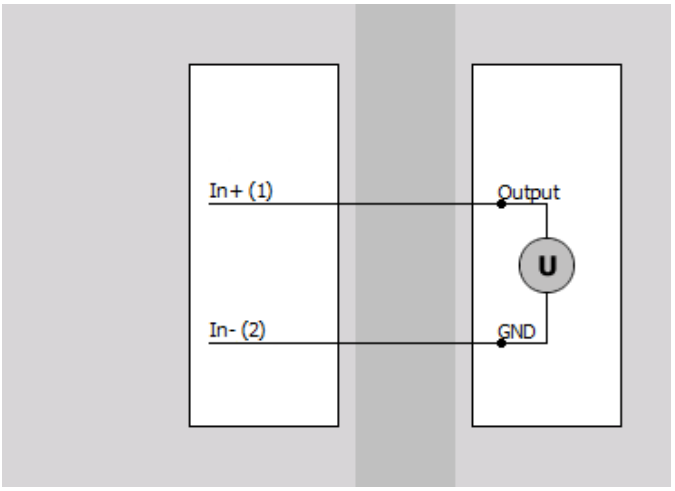
LV connector: pin-out (T2A2f)

Pin	Name	Description
1	IN+	Analog input +
2	IN-	Analog input -

Connector (on the device): OMNIMATE Signal SL 2.50/02/180G 3.2SN BK BX
Mating connector (for the cable): OMNIMATE Signal BLF 2.50/02/180

6.1.1.2.2.2. IOLITEi 8xLV: T2A2f Connector: Wiring diagram

Voltage



6.1.2. IOLITEi 8xLV-10V

IOLITEi 8xLV-10V is the 8-channel module with channel-to-channel isolation and comes with either BNC (IOLITEir-8xLV-10V and IOLITEi-8xLV-10V) or terminal block connectors (IOLITEir-8xLV-10V-T2A2f and IOLITEi-8xLV-10V-T2A2f) and a maximum range of 10 V.

6.1.2.1. IOLITEi 8xLV-10V: Specifications

Analog input		
Input type	Isolated voltage	
Number of channels	8	
ADC Type	24-bit oversampled SAR	
Sampling Rates	Simultaneous 20k, 10k, 5k, 2k, 1k, 500, 200, 100 S/s (software-selectable)	
Voltage Mode		
Ranges	**±10 V**	**±1 V**
Accuracy	±0.03 % of reading ±5 mV	±0.03 % of reading ±0.5 mV
Typ. SNR (10 kS/s, -1 dBFS sine wave @ 1 kHz)	95 dB	90 dB
Typ. noise floor @ 10 kS	-106 dB	-94 dB
Typ. THD (10 kS/s, -1 dBFS sine wave @ 1 kHz)	-96 dB	-96 dB
Typ. SFDR (10 kS/s, -1 dBFS sine wave @ 1 kHz)	97 dB	96 dB
Typ. IMR @ 400 Hz / 1 kHz	87 dB / 79 dB	88 dB / 81 dB
Typ. Crosstalk @ 10 kHz	-109 dB	-101 dB
Gain Drift	Typical 10 ppm/K, Max. 40 ppm/K	
Offset Drift	Typical 1 µV/K + 5 ppm of range/K, Max. 10 µV/K + 15 ppm of range/K	
Gain Linearity	< 0.03 %	
Input Coupling	DC	
Input Impedance	500 kΩ	
Overvoltage Protection	In+ to In-: 200 V continuous, 350 Vpeak (100 ms)	
Analog input performance		
Bandwidth (-3 dB)	0.49*fs	
Alias-free Bandwidth	DC to 0.453*fs	
Alias Rejection	-100 dB (all sample rates)	
Delay Through ADC	37 / fs	
Oversampling	32	
Additional Specifications		
Power supply	9 - 48 V DC	
Isolation Voltage	450 Vpeak channel to ground & channel to channel	
Power Consumption	Typ. 3 W, Max. 3.6 W	
Input Connectors	**BNC**	**Terminal block 2 pole OMNIMATE SL 2.50 / BLF 2.50/180**

Weight	310 g	270 g
Slice Dimensions	128.4 x 127.6 x 30.1 mm	128.4 x 115.4 x 30.1 mm

6.1.2.2. IOLITEi 8xLV-10V: Connectors

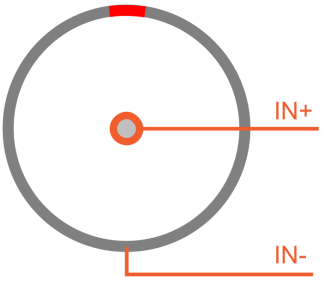
IOLITEi 8xLV-10V (rack and modular version) is available with BNC and terminal block connectors.

6.1.2.2.1. IOLITEi 8xLV-10V: BNC Connector

IOLITEir-8xLV-10V and IOLITEi-8xLV-10V modules have 8 BNC connectors for analog input.

IOLITEir-8xLV-10V front

6.1.2.2.1.1. IOLITEi 8xLV-10V: BNC Connector: Pin out

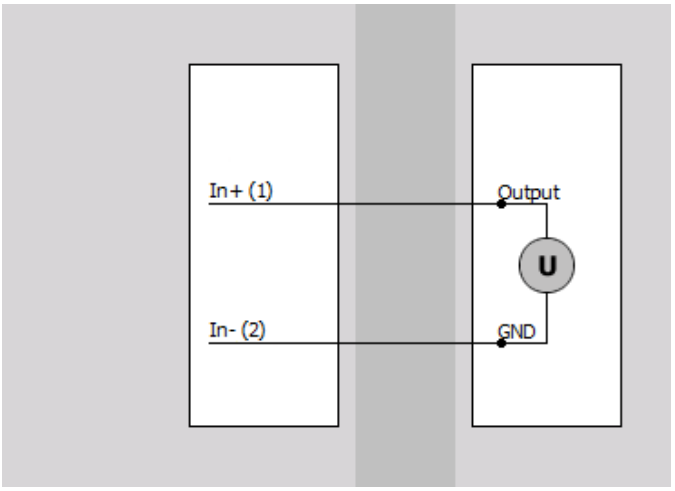


LV connector: pin-out (BNC)

Pin	Name	Description
1	IN+	Analog input
2	IN-	Analog input -

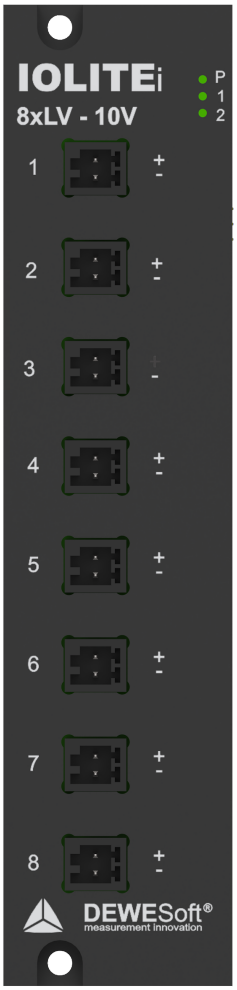
6.1.2.2.1.2. IOLITEi 8xLV-10V: BNC Connector: Wiring diagram

Voltage



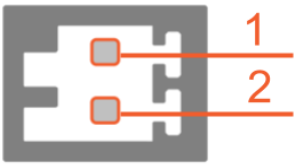
6.1.2.2.2. IOLITEi 8xLV: T2A2f Connector

IOLITEir-8xLV-10V-T2A2f and IOLITEi-8xLV-10V-T2A2f modules have 8 Omnimate terminal block connectors for analog input.



IOLITEir-8xLV-10V-T2A2f front

6.1.2.2.2.1. IOLITEi 8xLV-10V: T2A2f Connector: Pin out



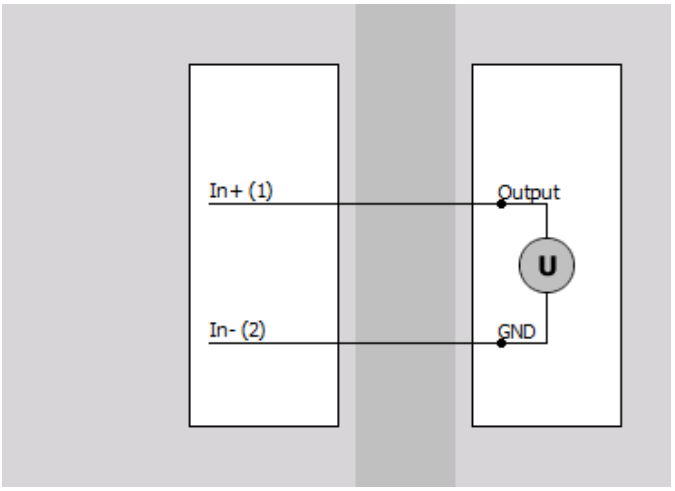
LV connector: pin-out (TBLOCK male)

Pin	Name	Description
1	IN+	Analog input +
2	IN-	Analog input -

Connector (on the device): OMNIMATE Signal SL 2.50/02/180G 3.2SN BK BX
Mating connector (for the cable): OMNIMATE Signal BLF 2.50/02/180

6.1.2.2.2.2. IOLITEi 8xLV-10V: T2A2f Connector: Wiring diagram

Voltage



6.1.3. IOLITE 16xLV

IOLITE 16xLV modules have terminal block connectors for analog input. The 16-channel low voltage module comes with channel-to-ground isolation and a range of 200 V.

IOLITEr-16xLV

IOLITE-16xLV

6.1.3.1. IOLITEr-16xLV: Specifications

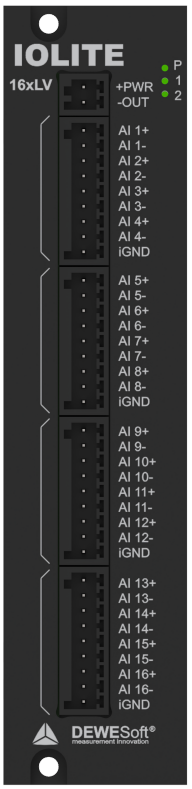
Analog input		
Input type	Voltage	
Number of channels	16	
ADC Type	24-bit oversampled sigma-delta	
Sampling Rates IOLITE	Simultaneous 20k, 10k, 5k, 2k, 1k, 500, 200, 100 S/s (software-selectable)	
Sampling Rates OBSIDIAN	Simultaneous 5k, 2k, 1k, 500, 200, 100 S/s (software-selectable)	
Voltage Mode		
Ranges	**±200 V**	**±10 V**
Accuracy	±0.03 % of reading ±40 mV	±0.03 % of reading ±2 mV
Typ. SNR (10 kS/s, -1 dBFS sine wave @ 1 kHz)	103 dB	101 dB
Typical noise floor @ 10 kS	-109 dB	-104 dB
Typ. THD (10 kS/s, -1 dBFS sine wave @ 1 kHz)	-93 dB	-108 dB
Typ. SFDR (10 kS/s, -1 dBFS sine wave @ 1 kHz)	95 dB	111 dB
Typical CMR @ 400 Hz / 1 kHz	-88 dB / -87 dB	-82 dB / -80 dB
Crosstalk @ 1 kHz	-118 dB	-120 dB
Gain Drift	Typical 10 ppm/K, Max. 40 ppm/K	
Offset Drift	Typical 2 ppm of range/K, Max. 5 ppm of range/K	
Gain Linearity	< 0.01 %	
Input Coupling	DC	
Input Impedance	800 kΩ	
Max. common mode voltage	±200 V	
Overvoltage Protection	In+ to In-: 200 V continuous, 350 Vpeak (100 ms)	
Analog input performance		
Bandwidth (-3 dB)	0.433*fs	
Alias-free Bandwidth	DC to 0.45*fs (DC to 0.499*fs @ 20 kS/s)	
Alias Rejection	-105 dB (all sample rates)	
Delay Through ADC	34 / fs	
Oversampling	128	
Additional Specifications		
Rack	**IOLITEr-16xLV**	
Input Connectors	Terminal block 9 pole OMNIMATE SL 2.50 / BLF 2.50/180	
Power supply	9 - 48 V DC	
Isolation Voltage	250 V functional isolation (channel to power supply ground)	
Power Consumption	Typ. 3.4 W (Max. 3.9 W)	

Weight	230 g
Slice Dimensions	128.4 x 115.4 x 30.1 mm
Modular	**IOLITE-16xLV**
Input Connectors	Terminal block 9 pole OMNIMATE SL 2.50 / BLF 2.50/180
Power supply	9 - 48 V DC
Isolation Voltage	250 V functional isolation (channel to power supply ground)
Power Consumption	Typ. 3.6 W (Max. 4.5 W)
Weight	530g
Slice Dimensions	136.75 x 115.0 x 35.0 mm

6.1.3.2. IOLITE 16xLV: Connectors

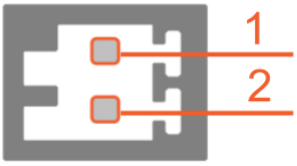
IOLITEr-16xLV and IOLITE-16xLV modules have four 9-pin terminal block connectors (T2A9f) with 2.50 mm pitch for voltage input. 8 pins on a 9-pin connector bank are used for digital inputs and pin 9 for common GND.

Additionally, there is a 2-pin terminal block connector with a 2.50 mm pitch for PWR OUT function.



IOLITEr-16xLV front

6.1.3.2.1. IOLITE 16xLV: T2A2f Power OUT Connector: Pinout



LV connector: pin-out (TBLOCK male)

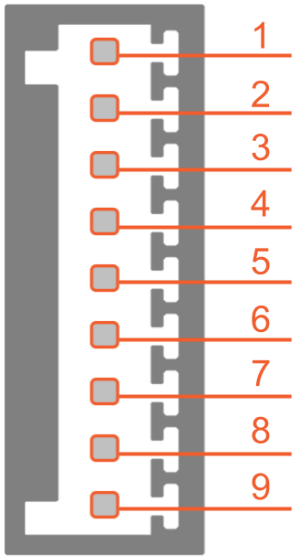
Pin	Name	Description
1	+PWR OUT	V_{supply} output
2	-PWR OUT	Non-isolated GND

Connector (on the device): OMNIMATE Signal SL 2.50/02/90G
Mating connector (for the cable): OMNIMATE Signal BLF 2.50/02/180

Caution

PWR OUT pins are intended to supply external loads. Do not connect the external power supply to the PWR OUT pins! It can damage the equipment.
Current limit of PWR OUT source is 2 A per module.
Current limit of the IOLITE system is 16 A!

6.1.3.2.2. IOLITE 16xLV: T2A9f Analog input: Pinout



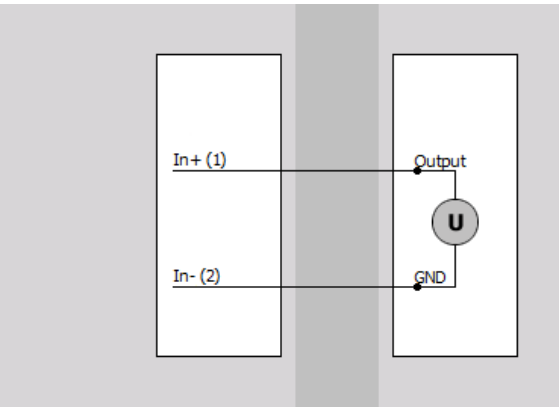
Analog in connector: pin-out (terminal block male)

Pin	Name	Description
1	IN 1 +	Analog input 1
2	IN 1 -	Input ground 1
3	IN 2 +	Analog input 2
4	IN 2 -	Input ground 2
5	IN 3 +	Analog input 3
6	IN 3 -	Input ground 3
7	IN 4 +	Analog input 4
8	IN 4 -	Input ground 4
9	iGND	Common isolated ground

AI connector (on the device): OMNIMATE Signal SL 2.50/09/90G
Mating connector (for the cable): OMNIMATE Signal BLF 2.50/09/180

6.1.3.2.3. IOLITE 16xLV: T2A9f Connector: Wiring diagram

Voltage

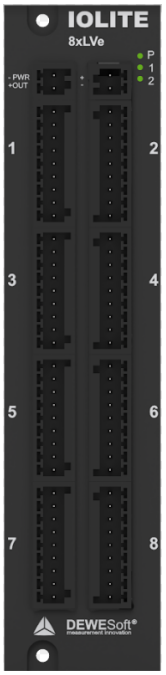


6.1.4. IOLITE 8xLVe

The 8-channel low voltage module comes with unipolar excitation in the range between 2V and 24V. IOLITE 8xLVe module comes with either DSUB-37 (IOLITEr-8xLVe-D37f and IOLITE-8xLVe-D37f) or terminal block connectors (IOLITEr-8xLVe and IOLITE-8xLVe) for analog input.

IOLITEr-8xLVe-D37f

IOLITE-8xLVe-D37f



IOLITEr-8xLVe

IOLITE-8xLVe

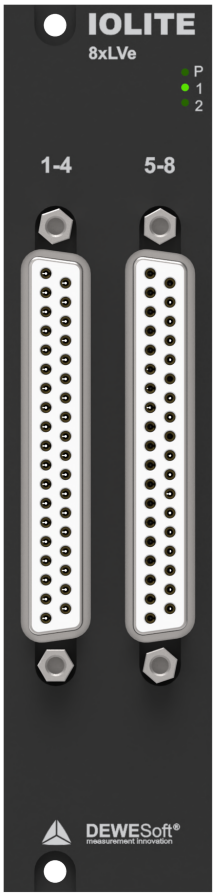
4.1.4.1. IOLITE 8xLVe: Specifications

Inputs		
Input types	Voltage, Potentiometer, Current (Ext. shunt)	
ADC Type	24-bit delta-sigma with anti-aliasing filter (-3dB @ 160 kHz) Butterworth 2nd order	
Sampling Rate	Simultaneous 20 kS/s	
Voltage Mode		
Ranges	**±100 V**	**±5 V**
Accuracy	±0.03 % of reading ±0.02 % of range	
Typ. Noise floor @ 10 kS/sec	-114 dB	-99 dB
Typ. THD (10 kS/s, -1 dBFS sine wave @ 1 kHz)	-	-103 dB
Typ. SFDR (10 kS/s, -1 dBFS sine wave @ 1 kHz)	-	114 dB
Typ. CMR @ 50 Hz / 400 Hz / 1 kHz	116 dB / 98 dB / 94 dB	121 dB / 104 dB / 99 dB
Gain Linearity	<0.02 %	<0.01 %
Gain Drift	Typical 5 ppm/K, Max. 20 ppm/K	
Offset Drift	Typical 5 ppm of range/K, Max. 10 ppm of range/K	
Channel Crosstalk	-130 dB	
Input Coupling	DC	

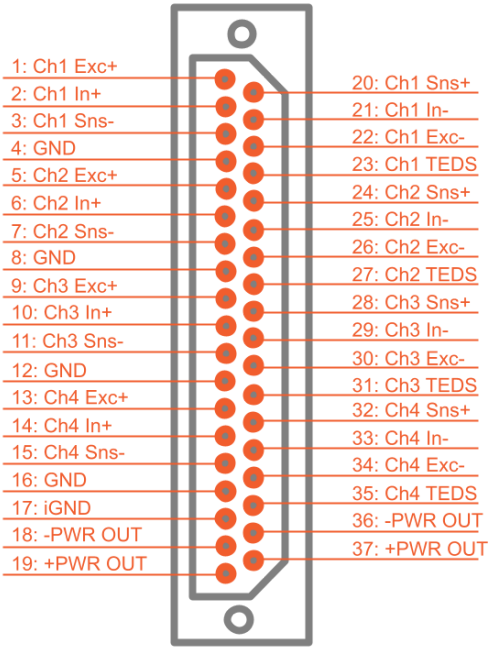
Input Impedance	800 kΩ (between In+ and In-)	
Max. common mode voltage	±200 V	
Input Overvoltage Protection	In+ to In-: 200 V continuous, 350 Vpeak (100 ms)	
Isolation	250 V functional isolation (channel to power supply ground)	
Analog input performance		
Bandwidth (-3 dB)	0.433*fs	
Alias-free Bandwidth	DC to 0.499*fs (DC to 0.44*fs @ < 5 kS/s)	
Alias Rejection	-105 dB (all sample rates)	
Delay Through ADC	34 / fs	
Oversampling	128	
Excitation Voltage		
Excitation voltage	Unipolar 2 ... 24V DC	
Current limit	2.8 W max. power per channel, 22.4 W per slice	
Excitation accuracy	0.05% ± 2 mV	
Drift	±20 ppm/K ± 60 µV/K	
Stability 10% to 90% load	< 0.06 @ 5 V exc (< 0.01 @ 24 V exc)	
Noise @ 10 V / 350 Ω	<150 µVrms @ 10 kS	
Line regulation over 10 Ω of change	<0.04 % @ 120 Ω load	
Protection	Continuous short to ground	
Additional Specifications		
Rack	**IOLITEr-8xLVe**	
Input connector	Terminal block	DSUB-37
Power consumption	Analog input only: Typ. 3.3 W (Max. 4.2 W) With Excitation: 6.9 W 120 Ω load @ 5 V, 38 W 120 Ω load @ 20 V	
TEDS support	Yes	
Power supply	9 - 48 V DC	
Power Consumption	Typ. 2.7 W Max. 5.1 W (120 Ω @ 5 V load)	
Weight	310 g	300 g
Slice Dimensions	128.4 x 118.4 x 30.14 mm	
Additional Specifications		
Modular	**IOLITE-8xLVe**	
Input connector	Terminal block	DSUB-37
Power consumption	Analog input only: Typ. 3.3 W (Max. 4.2 W) With Excitation: 6.9 W 120 Ω load @ 5 V, 38 W 120 Ω load @ 20 V	
TEDS support	Yes	
Power supply	9 - 48 V DC	
Power Consumption	Typ. 2.7 W Max. 5.1 W (120 Ω @ 5 V load)	
Weight	550 g	540 g
Slice Dimensions	136.75 x 115.0 x 35.0 mm	

6.1.4.1. IOLITE 8xLVe: Connectors

6.1.4.1.1. IOLITE 8xLVe: DSUB Connector: Pinout



IOLITEr-8xLVe-D37f front

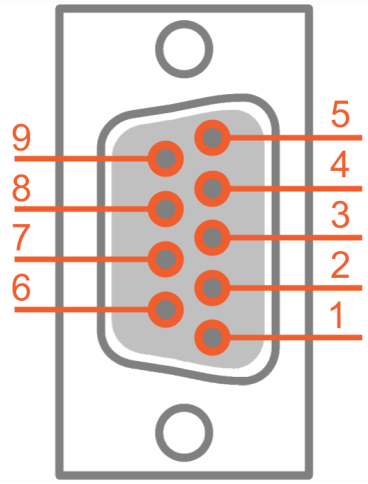


IOLITEr-8xLVe-D37f connector: Pin-out

Note

There is a 2xD37m to 4xD9f with TEDS adapter available (D37m-4xD9f-TEDS). The D37m-4xD9f adapter simplifies the calibration of the IOLITE 8xLVe-D37 module.

The adapter has a male D-SUB37 connector to connect it to the IOLITE module and breakout lines to four female D-SUB9 connectors with Dewesoft's standard pinout with TEDS.

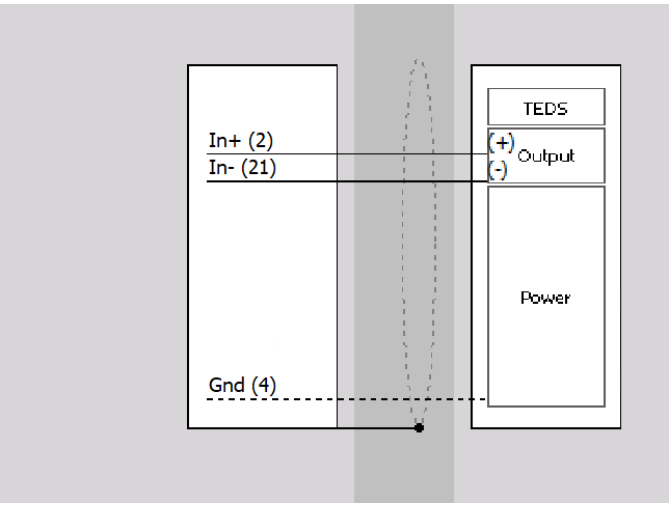


D37m-4xD9f-TEDS: *pin-out (DSUB-9 female)*

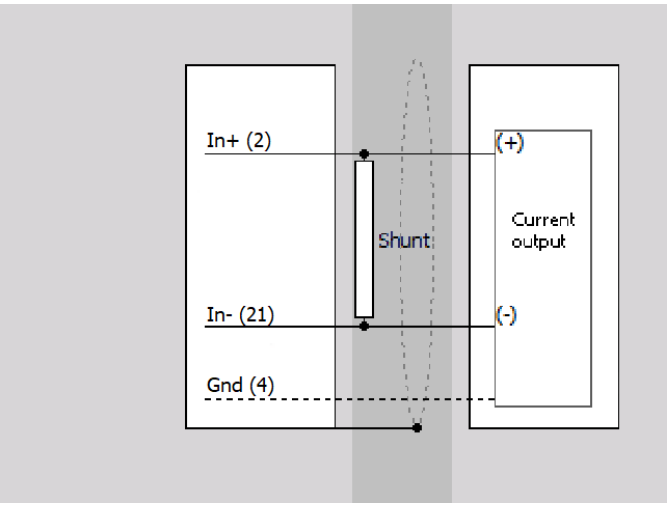
Pin	Name	Description
1	Exc+	Excitation+
2	In+	Input+
3	Sns-	Sense-
4	GND	Ground
5	NC	Do not connect
6	Sns+	Sense+
7	In-	Input-
8	Exc-	Excitation-
9	TEDS	TEDS

6.1.4.1.2. IOLITE 8xLVe: DSUB Connector: Wiring diagram

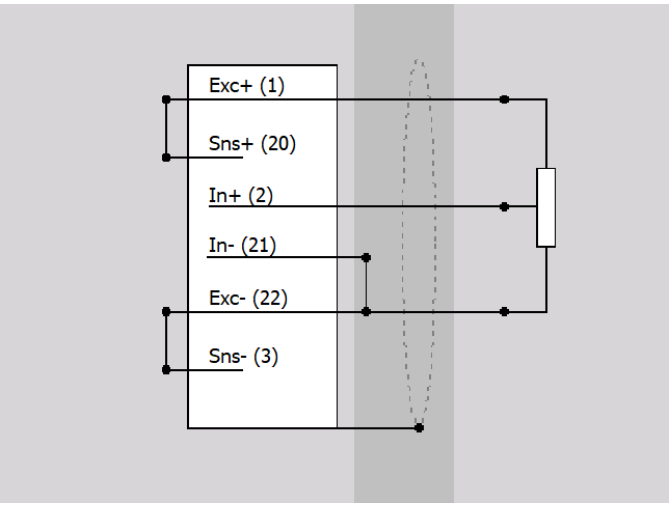
Voltage



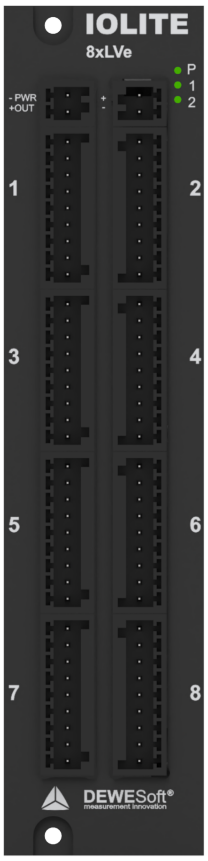
Current



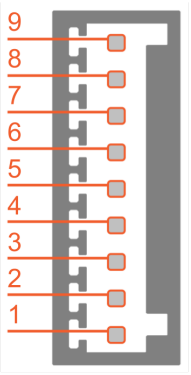
Potentiometer



6.1.4.1.3. IOLITE 8xLVe: T2A9f Connector: Pinout

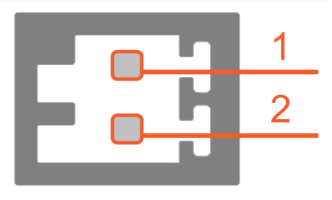


IOLITEr-8xLVe



IOLITEr-8xLVe: T2A9f Analog input: Pinout

Pin	Name	Description
1	TEDS	TEDS
2	NC	Not connected
3	GND	Ground
4	Exc-	Excitation-
5	Exc+	Excitation+
6	Sns-	Sense-
7	Sns+	Sense+
8	In-	Input-
9	In+	Input+



IOLITEr-8xLVe: T2A2f Power OUT: Pinout

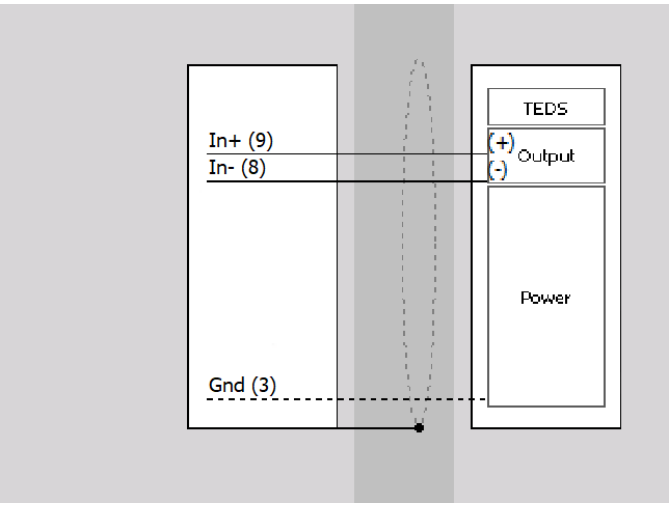
Pin	Name	Description
1	+PWR OUT	V_{supply} output
2	-PWR OUT	Non-isolated GND

Caution

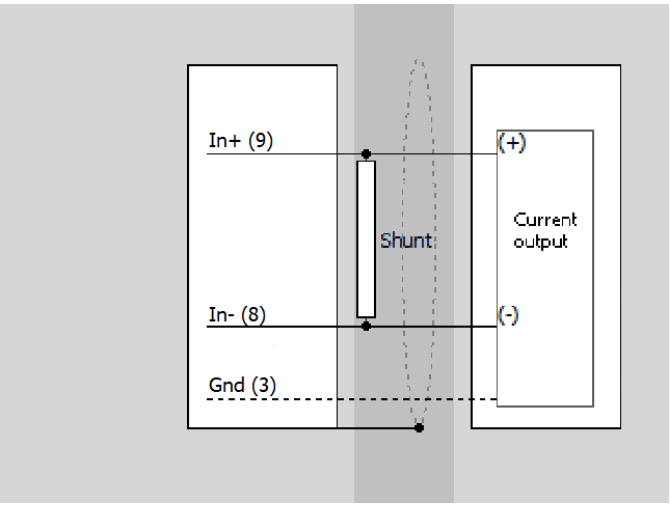
PWR OUT pins are intended to supply external loads. Do not connect the external power supply to the PWR OUT pins! It can damage the equipment.
Current limit of PWR OUT source is 2 A per module.
Current limit of the IOLITE system is 16 A!

6.1.4.1.4. IOLITE 8xLVe: T2A9f Connector: Wiring diagram

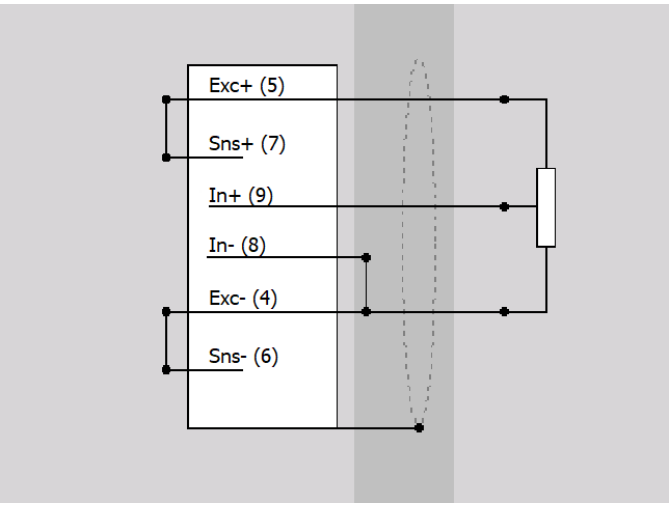
Voltage



Current



Potentiometer



6.1.4. IOLITEi 4xHV

The 4-channel high voltage module with a range of up to 2 kV and CATII 1000V isolation is perfect for high voltage measurements up to 40 kS/s.

IOLITEir-4xHV

Note
The IOLITE 4xHV is currently supported on DewesoftX version 2024.1 RC and will be supported in other later versions.

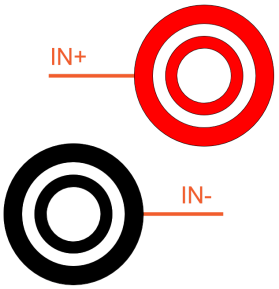
4.1.4.1. IOLITEi 4xHV: Specifications

Analog inputs	**IOLITEi 4xHV**			
Input type	Voltage			
Number of channels	4			
ADC Type	24-bit delta-sigma with anti-aliasing filter			
Sampling Rate	Simultaneous 40 kS/s per channel (software-selectable)			
Anti-aliasing filter	-3 dB @ 150 kHz (Butterworth 3rd order)			
Voltage mode				
Ranges	**±2000 V**	**±1000 V**	**±400 V**	**±200 V**
Input Accuracy	±0.03 % of reading ±0.02 % of range			
Typ. Dynamic Range @ 10 kS	-137 dB	-137 dB	-137 dB	- 132 dB
Typ. Noise floor @ 10 kS	-113 dB	-112 dB	-109 dB	-104 dB
Typ. THD (40 kS/s, -6 dBFS sine wave @ 1 kHz)	N/A	N/A	N/A	-103 dB
Typ. CMR @ 20 kS/s	80 dB @ 50 Hz, 64 dB @ 400 Hz			
Gain Drift	Typical 10 ppm/K, max. 25 ppm/K			
Offset Drift	Typical 100 µV/K + 2 ppm of range/K, max 200 µV/K + 4 ppm of range/K			
Gain Linearity	< 0.02% (2000 V range), < 0.01% (other ranges)			
Input Coupling	DC			
Input Impedance	10 MΩ			
Overvoltage protection	CAT II 1000 V			
Analog input performance				
Bandwidth (-3 dB)	0.433*fs (0.49*fs < 5 kS/s)			
Alias-free Bandwidth	DC to 0.499*fs (DC to 0.45*fs @ < 5 kS/s)			
Alias Rejection	-105 dB (all sample rates)			
Delay Through ADC	34 / fs			
Oversampling	128			
Additional Specifications				
Rack	**IOLITEir-4xHV**			
Input connector	4mm safety banana jack			
Power supply	9 - 48 V DC			
Power Consumption	Typ. 2.6 W (max. 3 W)			
Weight	310 g			
Slice Dimensions	128.4 x 115.4 x 30.1 mm			

6.1.4.1. IOLITE 4xHV: Connectors

6.1.4.1.1. IOLITE 4xHV: Banana Connector: Pinout

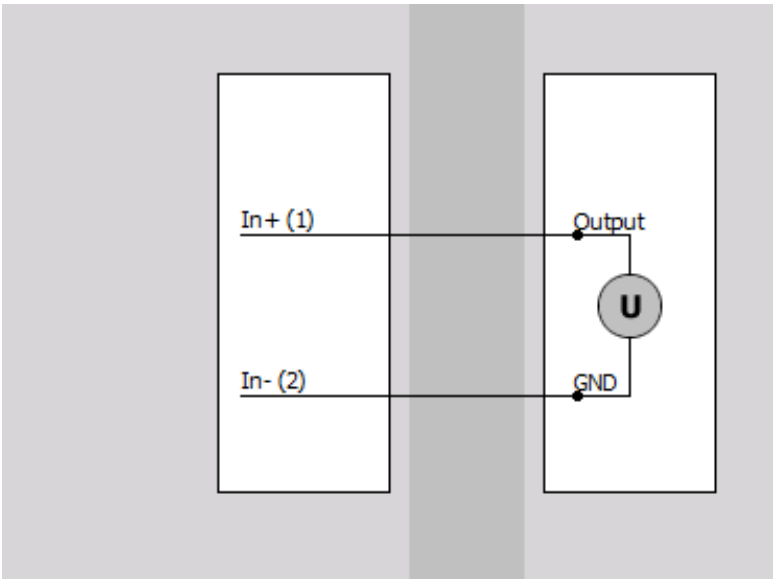
IOLITEr-4xHV front



IOLITEr-4xHV connector: Pin-out

6.1.4.1.2. IOLITE 4xHV: Banana plug Connector: Wiring diagram

Voltage



6.2. CURRENT MEASUREMENT

IOLITE includes an 8-channel isolated module dedicated for current measurement:

- IOLITEir-8xLA (rack version), IOLITEi-8xLA (modular version)
- IOLITEir-8xLA-T2A2f (rack version), IOLITEi-8xLA-T2A2f (modular version)

6.2.1. IOLITEi 8xLA

The IOLITEi 8xLA is a multi channel low current measurement module. It is a perfect device for data acquisition in control applications requiring an input current range of ±20 mA. It features channel to channel isolation and comes with either BNC (IOLITEir-8xLA, IOLITEi-8xLA) or terminal block (IOLITEir-8xLA-T2A2f, IOLITEi-8xLA-T2A2f) connectors.

IOLITEir-8xLA

IOLITEi-8xLA

IOLITEir-8xLA-T2A2f

IOLITEi-8xLA-T2A2f

6.2.1.1. IOLITEi 8xLA: Specifications

Analog input		
Input type	Isolated current	
Number of channels	8	
ADC Type	24-bit oversampled SAR	
Sampling Rates	Simultaneous 20k, 10k, 5k, 2k, 1k, 500, 200, 100 S/s (software-selectable)	
Current Mode		
Ranges	**±20 mA**	**±2 mA**
Accuracy	±0.05 % of reading ±10 µA	±0.05 % of reading ±2 µA
Typical noise floor @ 10 kS/sec	-100 dB	-100 dB
Crosstalk (20 kS/sec, -1 dBFS @ 1 kHz)	-121 dB	-128 dB
Gain Drift	Typical 10 ppm/K, Max. 40 ppm/K	
Offset Drift	Typical 5 ppm of range/K, Max. 15 ppm of range/K	
Gain Linearity	< 0.05 %	
Input Coupling	DC	
Input Impedance	50 Ω	
Overvoltage Protection	In+ to In-: 30 V continuous	
Overcurrent Protection	In+ to In-: 70 mA continuous	
Analog input performance		
Bandwidth (-3 dB)	0.49 fs	
Alias-free Bandwidth	DC to 0.453 fs	
Alias Rejection	-100 dB (all sample rates)	
Delay Through ADC	37 / fs	
Oversampling	32	
Additional Specifications		
Power supply	9 - 48 V DC	
Isolation Voltage	450 Vpeak channel to ground & channel to channel	
Power Consumption	Typ. 2.8 W, Max. 3.5 W	
Input Connectors	**BNC**	**Terminal block 2 pole OMNIMATE SL 2.50 / BLF 2.50/180**
Weight	310 g	270 g
Slice Dimensions	128.4 x 127.6 x 30.1 mm	128.4 x 115.4 x 30.1 mm

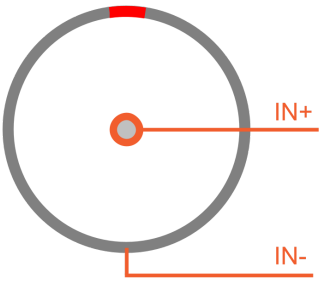
6.2.1.2. IOLITEi 8xLA: Connectors

IOLITEi 8xLA (rack and standalone version) is available with BNC and terminal block connectors.

6.2.1.2.1. IOLITEi 8xLA: BNC Connector

IOLITE-8xLA Front

6.2.1.2.1.1. IOLITEi 8xLA: BNC Connector: Pinout

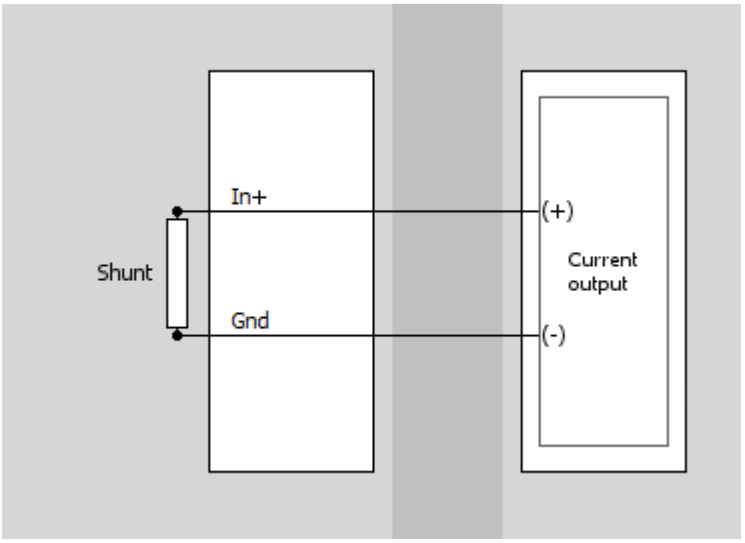


IOLITEi 8xLA connector: pin-out (BNC)

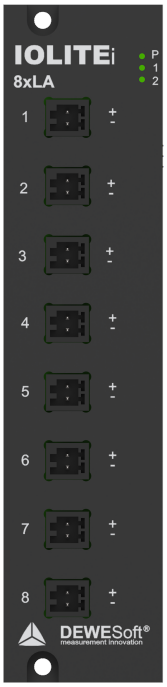
Pin	Name	Description
1	IN+	Analog input +
2	IN-	Analog input -

6.2.1.2.1.2. IOLITEi 8xLA: BNC Connector: Wiring diagram

Current

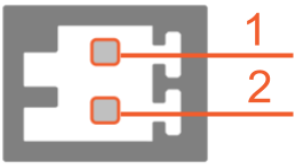


6.2.1.2.2. IOLITEi 8xLA: T2A2f Connector



IOLITE-8xLA-T2A2f front

6.2.1.2.2.1. IOLITEi 8xLA: T2A2f Connector: Pinout



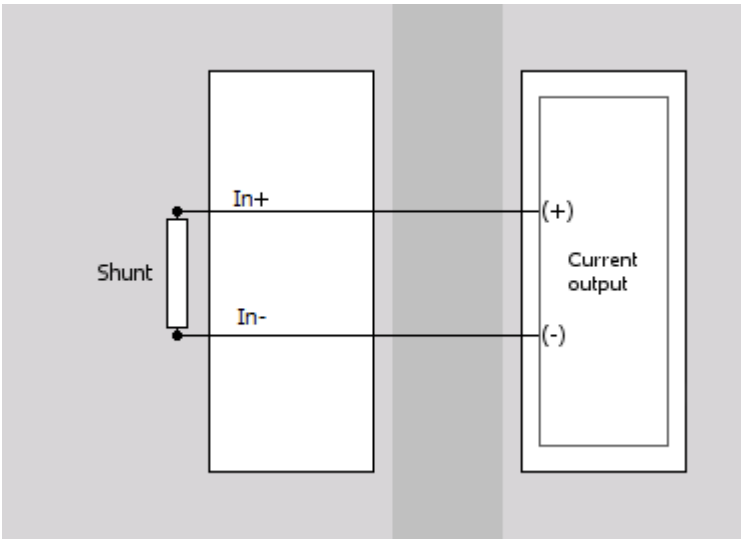
IOLITEi 8xLA-T2A2f connector: pin-out (TBLOCK male)

Pin	Name	Description
1	IN+	Analog input +
2	IN-	Analog input -

Connector (on the device): OMNIMATE Signal SL 2.50/02/180G 3.2SN BK BX
Mating connector (for the cable): OMNIMATE Signal BLF 2.50/02/180

6.2.1.2.2.2. IOLITEi 8xLA: T2A2f Connector: Wiring diagram

Current



6.3. STRAIN AND STRESS MEASUREMENT

The IOLITE product family offers 6-channel and single channel universal modules and 8-channel strain gauge. Both types of modules can be used in various bridge configurations.
List of universal and strain gauge modules:

- IOLITEr-6xSTG (rack version), IOLITE-6xSTG (modular version)
- IOLITEr-8xSTGS (rack version)
- IOLITEr-8xSTGS-D37 (rack version)
- IOLITEi-1xSTG (modular version)

6.3.1. IOLITE 6xSTG

IOLITEr-6xSTG and IOLITE-6xSTG modules have universal 6 channel differential voltage, current and Full / Half / Quarter bridge input with DSUB-9 connector. Compatible with DSI adapters for IEPE, CHG, 200 V, RTD, TH measurements.

IOLITEr-6xSTG

IOLITE-6xSTG

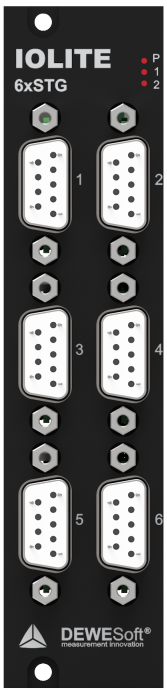
6.3.1.1. IOLITE 6xSTG: Specifications

Analog inputs				
Input type	Voltage Full / half / quarter bridge strain Current Potentiometer Resistance			
Number of channels	6			
ADC Type	24-bit SAR with anti-aliasing filter			
Sampling Rate	Simultaneous 20 kS/s per channel (software-selectable)			
Voltage Mode				
Ranges	**±50 V**	**±10 V**	**±1 V**	**±100 mV**
Input Accuracy	±0.03 % of reading, ±0.02 % of range, ±0.1 mV			
Typical Dynamic Range @ 10 kS	-100 dB	-110 dB	-130 dB	-145 dB
Typical Noise floor @ 10 kS	-103 dB	-97 dB	-103 dB	-94 dB
Typical CMR @ 400 Hz / 1 kHz	71 dB / 66 dB	72 dB / 66 dB	96 dB / 88 dB	96 dB / 87 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%			
Input Coupling	DC, AC 1Hz			
Input Impedance	Range ≥ 10 V; 1 MΩ between IN+ and IN- Range < 10 V: 20 MΩ			
Overvoltage Protection	In+ to In-: 50 V continuous, 200 V peak (10 msec)			
Current Mode				
Ranges	20 mA		2 mA	
Input Accuracy	±0.03 % of reading, ±0.02 % of range, ±2.1 µA			
Internal Shunt Resistor	50 Ω			
Analog input performance				
Bandwidth (-3 dB)	0.49*fs			
Alias-free Bandwidth	DC to 0.453*fs			
Alias Rejection	-100 dB (all sample rates)			
Delay Through ADC	37 / fs			
Oversampling	32			
Excitation Voltage				
Excitation Voltage	Free programmable (16-bit DAC)			
Predefined Levels	Bipolar: 0, 1, 2, 5, 10 and 12 VDC Unipolar: 0, 2, 5, 10, 15, 24 VDC			
Accuracy	±0.05 % ±2 mV			
Drift	±50 ppm/K ±100 µV/K			
Stability 10 % to 90 % Load	< 0.01 %			
Current Limit	42 mA (550 mW max. power)			
Protection	Continuous short to ground			
Excitation Current				
Excitation Current	Free programmable (16-bit DAC)			

Predefined Levels	0, 2, 4, 8, 16, 44 mA
Accuracy	±0.1 % ±2 µA (<10 mA), ±0.5 % ±5 µA (>10 mA)
Bridge measurement	
Bridge Connection Types	full bridge strain, ½ bridge strain, ¼ bridge strain (3-wire)
Ranges	2...1000 mV/V free programmable
Internal Bridge Completion	½ bridge and ¼ bridge 120 and 350 Ω
Bridge Completion Accuracy	0.05 %; TCR: 5 ppm/K (others on request)
Internal Shunt Resistor	100 kΩ (others on request)
Shunt Resistor Accuracy	0.05 %; TCR: 10 ppm/K (others on request)
Input Short, Sensor Offset Adjust	Software-selectable
Additional Specifications	
Input connectors	D-SUB9
TEDS support	Standard + DSI adapters
Power supply	9 - 48 V DC
Power Consumption	5.4 W, Max. 11.1 W (7.9 W 120 Ω @ 5 V load, 8.8 W 350 Ω @ 10 V load)
Weight	340 g
Slice Dimensions	128.4 x 115.4 x 30.1 mm

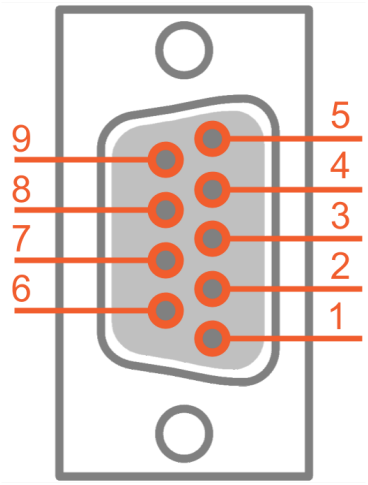
6.3.1.2. IOLITE 6xSTG: D-SUB9 Connector

The IOLITE 6xSTG module has 6 standard D-SUB9 female connectors for voltage or strain measurement.



IOLITEr-6xSTG front

6.3.1.2.1. IOLITE 6xSTG: D-SUB9 Connector: Pinout



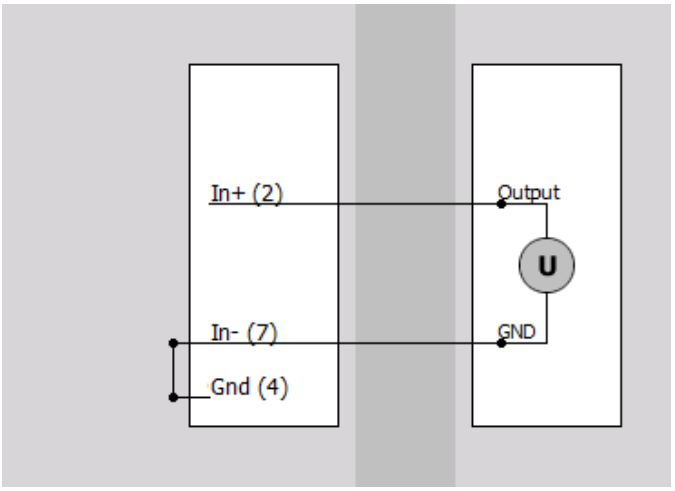
IOLITE 6xSTG connector: pin-out (DSUB-9 female)

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

6.3.1.2.2. IOLITE 6xSTG: D-SUB9 Connector: Wiring diagram

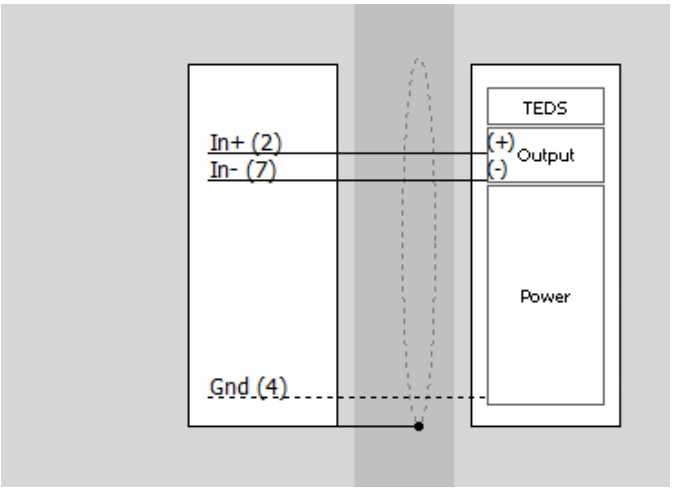
Voltage

Single ended

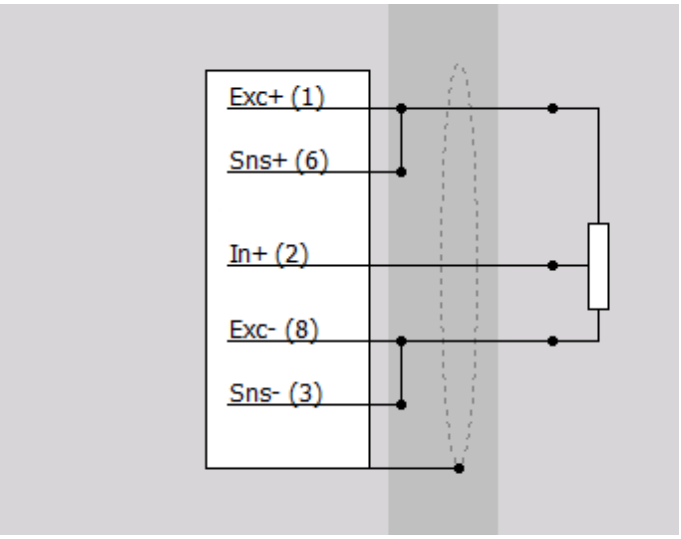


Differential

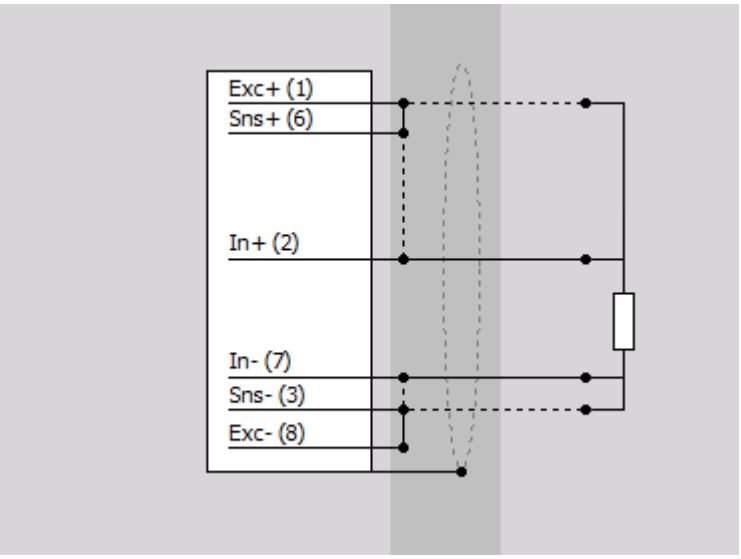
Use only when sensor Output (+) and Output (-) are referenced to Gnd. Gnd must be connected.



Potentiometer

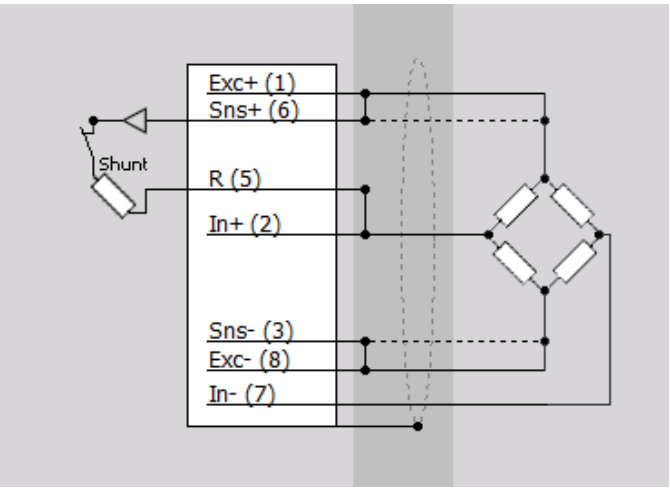


Resistance

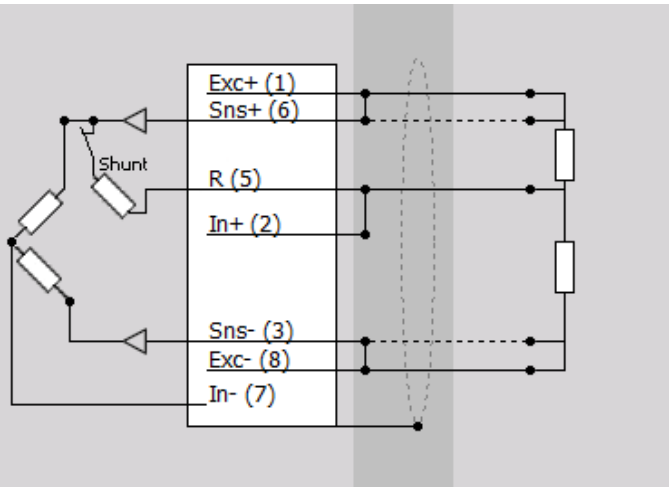


Bridge

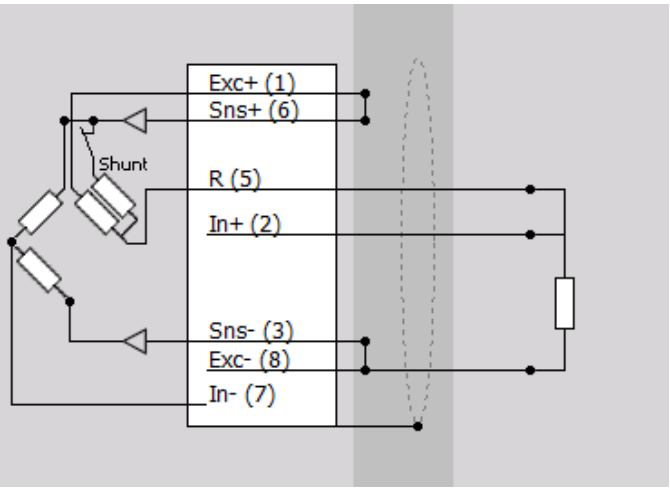
Full bridge



Half bridge

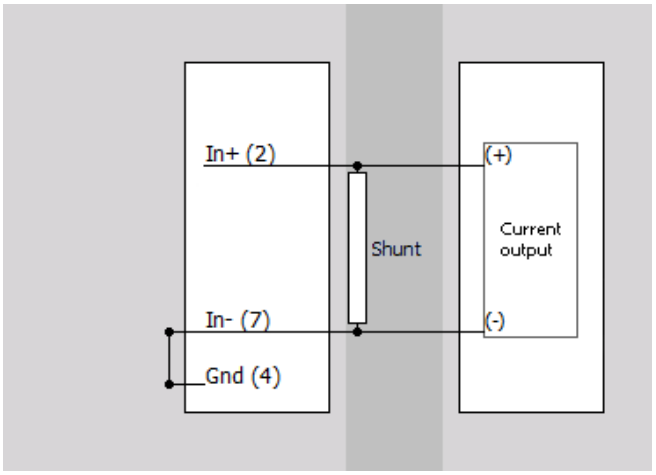


Quarter bridge

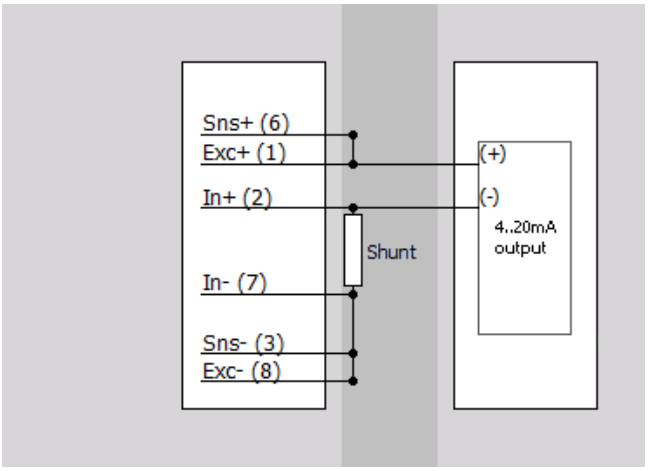


Current

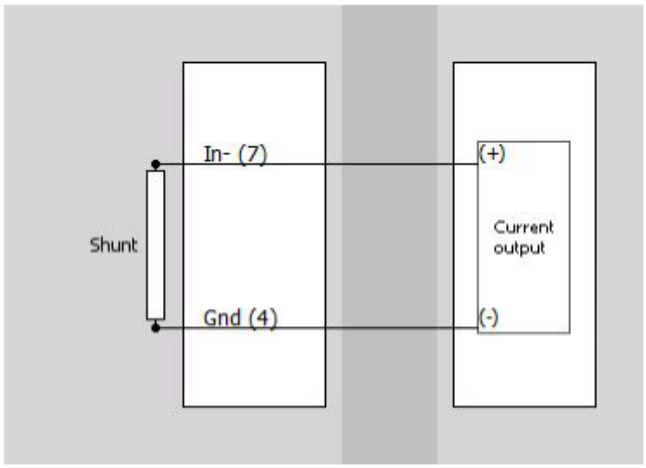
External direct shunt



External loop powered shunt



Internal shunt

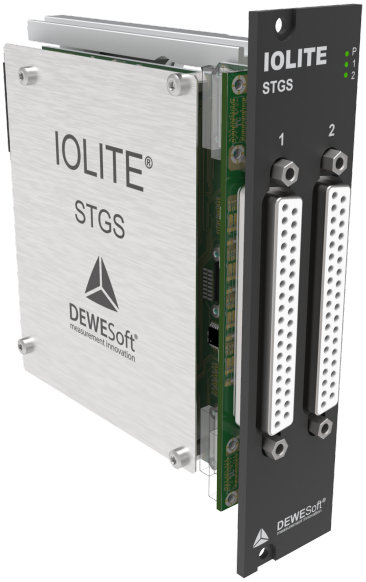


6.3.2. IOLITE 8xSTGS

IOLITE 8xSTGS is an 8-channel module dedicated for strain measurement supporting inputs for Full, Half and Quarter bridge configuration. STGS module is available with terminal block input connectors (IOLITEr-8xSTGS and IOLITE-8xSTGS) and optionally with D-SUB37 input connectors (IOLITEr-8xSTGS-D37 and IOLITE-8xSTGS-D37).

IOLITEr-8xSTGS

IOLITE-8xSTGS



IOLITEr-8xSTGS-D37

IOLITE-8xSTGS-D37

6.3.2.1. IOLITE 8xSTGS: Specifications

Analog inputs	**IOLITE 8xSTGS**		
Input type	Full / half / quarter bridge strain (3-wire), Potentiometer		
Number of channels	8		
ADC Type	24-bit oversampled sigma-delta with anti-aliasing filter		
Sampling Rate	Simultaneous 20 kS/s per channel (software-selectable)		
Analog input performance (see 1)			
Ranges	**1 V**	**0.1 V**	**0.02 V**
Gain accuracy	0.02 % of reading	0.02 % of reading	0.02 % of reading
Offset accuracy	210 uV	30 uV	14 uV
Offset Accuracy after Balance Amplifier	21 uV	3 uV	1.4 uV
Typical Noise floor @ 10 kS/s / 1 kS/s / 100 S/s	-107 / -114 / -122 dB	-99 / -107 / -117 dB	-87 / -96 / -108 dB
Typical Dynamic Range @ 10 kS/s / 1 kS/s / 100 S/s	-132 / -139 / -145 dB	-122 / -132 / -139 dB	-112 / -120 / -130 dB
Typ. Crosstalk @ 1 kHz	-120 dB	-126 dB	-114 dB
Typ. CMR @ 50 Hz / 400 Hz / 1 kHz	76 / 74 / 73 dB	97 / 90 / 84 dB	108 / 91 / 83 dB
Gain Drift	Typical 10 ppm/K (max. 20 ppm/K)		
Offset Drift	Typical 0.03 µV/K + 2.5 ppm of range/K, max 0.1 µV/K + 9 ppm of range/K		
Gain Linearity	< 0.01 %		
Input Coupling	DC		
Overvoltage Protection	In+ to In-: 6 V continuous		
Bandwidth (-3 dB)	0.433*fs (0.49*fs < 5 kS/s)		
Alias-free Bandwidth	DC to 0.499*fs (DC to 0.44*fs @ < 5 kS/s)		
Alias Rejection	-105 dB (all sample rates)		
Delay Through ADC	34 / fs		
Oversampling	128		
Excitation Voltage			
Excitation Voltage	Unipolar: 1 V, 2 V, 5 V (see 2)		
Excitation Accuracy	±3 % of set ±50 mV		
Sense Accuracy	±0.02 % of reading ±0.25 mV		
Sense Drift	Typical 10 µV/K + 10 ppm of reading/K, max 20 µV/K + 20 ppm of reading/K		
Current Limit	42 mA		
Protection	Continuous short to ground		
Bridge measurement			
Bridge Connection Types	full bridge strain, ½ bridge strain, ¼ bridge strain (3-wire)		
Ranges	2 mV/V ... 1000 mV/V free programmable (software ranges)		
	Range \ Excitation	1 V	2 V	5 V
Accuracy				

	200 mV/V	±0.035 % of reading ±210 µV/V	±0.028 % of reading ±105 µV/V	±0.025 % of reading ±42 µV/V
	20 mV/V	±0.027 % of reading ±14 µV/V	±0.027 % of reading ±15 µV/V	±0.024 % of reading ±6 µV/V
	2 mV/V	±0.027 % of reading ±14 µV/V	±0.024 % of reading ±7 µV/V	±0.022 % of reading ±2.8 µV/V
Internal Bridge Completion	¼ bridge 120 Ω and 350 Ω			
Bridge Completion Accuracy	±125 µV/V, TCR: 5 ppm/K (others on request)			
Internal Shunt Resistor	100 kΩ software selectable to SNS+ or SNS- and In+ or In-			
Shunt Resistor Accuracy	0.05 %; TCR: 10 ppm/K (others on request)			
Input Short, Sensor Offset Adjust	Software-selectable			
Additional Specifications				
Rack	**IOLITEr-8xSTGS**			
Input connectors	Terminal Block Weidmueller SL 2.50-04		DSUB-37	
TEDS support	Available		Not available	
Power supply	9 - 48 V DC			
Power Consumption	Typ. 2.7 W Max. 5.1 W (120 Ω @ 5 V load)			
Weight	340 g		330 g	
Slice Dimensions	128.4 x 118.4 x 30.14 mm			
Additional Specifications				
Modular	**IOLITE-8xSTGS**			
Input connectors	Terminal Block Weidmueller SL 2.50-04		DSUB-37	
TEDS support	Available		Not available	
Power supply	9 - 48 V DC			
Power Consumption	Typ. 2.6 W; Max. 4.7 W (120 Ω @ 5 V load)			
Weight	570 g		560 g	
Slice Dimensions	136.75 x 115.0 x 35.0 mm			
1) Voltage ranges are describing the input for the bridge mode and are not supported as voltage mode.				
2) Ratiometric method				

6.3.2.1. IOLITE 8xSTGSv2: Specifications

Analog inputs	**IOLITE STGSv2**		
Input type	Full / half / quarter bridge strain (3-wire, 4-wire), Potentiometer		
Number of channels	8		
ADC Type	24-bit oversampled sigma-delta with anti-aliasing filter		
Sampling Rate	Simultaneous 20 kS/s per channel (software-selectable)		
Voltage Mode			
Ranges	**±1 V**	**±100 mV**	**±20 mV**
Gain accuracy	0.02 % of reading	0.02 % of reading	0.02 % of reading
Offset accuracy	210 uV	30 uV	14 uV
Typical Noise floor @ 10 kS/s / 1 kS/s / 100 S/s	-107 / -114 / -122 dB	-99 / -107 / -117 dB	-87 / -96 / -108 dB
Typical Dynamic Range @ 10 kS/s / 1 kS/s / 100 S/s	-131/ -139/ -144 dB	-123/ -133/ -141 dB	-111 / -123 / -131 dB
Typ. Crosstalk @ 1 kHz	-137dB	-131dB	-121dB
Typ. CMR @ 50 Hz / 400 Hz / 1 kHz	81 / 80 / 77 dB	100 / 92 / 84 dB	110 / 91 / 84 dB
Gain Drift	Typical 10 ppm/K (max. 20 ppm/K)		
Offset Drift	Typical 0.03 µV/K + 2.5 ppm of range/K, max 0.1 µV/K + 9 ppm of range/K		
Gain Linearity	< 0.01 %		
Input Coupling	DC		
Overvoltage Protection	In+ to In-: 6 V continuous		
Analog input performance			
Bandwidth (-3 dB)	0.433*fs (0.49*fs < 5 kS/s)		
Alias-free Bandwidth	DC to 0.499*fs (DC to 0.44*fs @ < 5 kS/s)		
Alias Rejection	-105 dB (all sample rates)		
Delay Through ADC	34 / fs		
Oversampling	128		
Excitation Voltage			
Excitation Voltage	Unipolar: 1 V, 2 V, 5 V (see 1)		
Excitation Accuracy	±3 % of set ±50 mV		
Sense Accuracy	±0.02 % of reading ±0.25 mV		
Sense Drift	Typical 10 µV/K + 10 ppm of reading/K, max 20 µV/K + 20 ppm of reading/K		
Current Limit	42 mA		
Protection	Continuous short to ground		
Bridge measurement			
Bridge Connection Types	full bridge strain, ½ bridge strain, ¼ bridge strain (4-wire), ¼ bridge strain (3-wire)		
Ranges	2 mV/V ... 1000 mV/V free programmable (software ranges)		
	Range \ Excitation	1 V	2 V	5 V
Accuracy	200 mV/V	±0.035 % of	±0.028 % of	±0.025 % of reading ±42 µV/V

		reading ±210 µV/V	reading ±105 µV/V	
	20 mV/V	±0.027 % of reading ±14 µV/V	±0.027 % of reading ±15 µV/V	±0.024 % of reading ±6 µV/V
	2 mV/V	±0.027 % of reading ±14 µV/V	±0.024 % of reading ±7 µV/V	±0.022 % of reading ±2.8 µV/V
Internal Bridge Completion	¼ bridge 120 Ω and 350 Ω			
Bridge Completion Accuracy	±125 µV/V, TCR: 5 ppm/K (others on request)			
Internal Shunt Resistor	100 kΩ software selectable to SNS+ or SNS- and In+ or In-			
Shunt Resistor Accuracy	0.05 %; TCR: 10 ppm/K (others on request)			
Input Short, Sensor Offset Adjust	Software-selectable			
	Bridge type	Selectable connections	Internal SW on:	Additonal compensation
	Full	6 or 4 Wires	4 wires SNS + and EXC + & SNS- and EXC -	
	Half	5 or 3 Wires	3 wires SNS + and EXC + & SNS- and EXC -	
	QB 3W	SNS + and EXC + & SNS- and EXC -	SNS + and EXC + & SNS- and EXC -	Lead wire compensation available
Internal switch configurations	QB 4W	SNS + and EXC +	SNS + and EXC +	
Sensor current measurement				
Bridge configuration	Full / Half		QB	
Current measuring line	EXC+ line		R Line	
Current limit	50 mAdc			
Resolution	0.1 mAdc			
Additional math caculus	Resistance, Power			
Sample rate	1 Hz			
Additional Specifications				
Rack	**IOLITEr-8xSTGSv2**			
Input connectors	Terminal block, DSUB-37			
TEDS support	Available for Terminal block			
Power supply	9 - 48 V DC			
Power Consumption	Typ. 3.1 W Max. 6 W (120 Ω @ 5 V load)			
Weight	340 g			
Slice Dimensions	128.4 x 118.4 x 30.14 mm			
Additional Specifications				
Modular	**IOLITE-8xSTGSv2**			
Input connectors	Terminal block, DSUB-37			
TEDS support	Available for Terminal block			
Power supply	9 - 48 V DC			

Power Consumption	Typ. 3.1 W Max. 6 W (120 Ω @ 5 V load)
Weight	570 g
Slice Dimensions	136.75 x 115.0 x 35.0 mm
1) Ratiometric method	

Note
The IOLITE 8xSTGS 4-wire functionality is optional and can be used with DewesoftX versions 2023.6 or higher.

Note
There is a sensor disconnect functionality, which shows an overload on the channels if no sensor is connected to the channel.

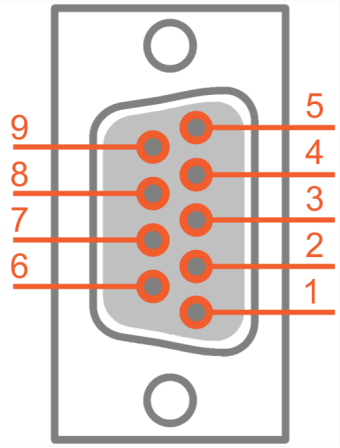
6.3.2.1.1. IOLITE 8xSTGS: Bridge Accuracy Specifications

Bridge range	Set excitation	IOLITE-8xSTGS
2 mV/V	1 V	0.022 % of reading + 14 uV/V
20 mV/V	1 V	0.031 % of reading + 14 uV/V
200 mV/V	1 V	0.028 % of reading + 210 uV/V
2 mV/V	2 V	0.022 % of reading + 7.0 uV/V
20 mV/V	2 V	0.026 % of reading + 15 uV/V
200 mV/V	2 V	0.027 % of reading + 110 uV/V
2 mV/V	5 V	0.022 % of reading + 2.8 uV/V
20 mV/V	5 V	0.026 % of reading + 6.0 uV/V
200 mV/V	5 V	0.027 % of reading + 42 uV/V

Note

There is a 2xD37m to 4xD9f available (D37m-4xD9f). The D37m-4xD9f adapter simplifies the calibration of the IOLITE 8xSTGS module.

The adapter has a male D-SUB37 connector to connect it to the IOLITE module and breakout lines to four female D-SUB9 connectors with Dewesoft's standard pinout for universal and strain measurements.

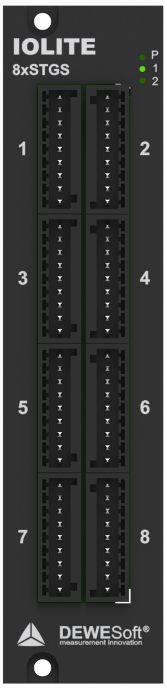


D37m-4xD9f: *pin-out (DSUB-9 female)*

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	NC	Do not connect

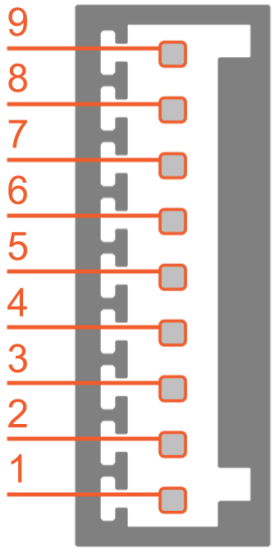
6.3.2.2. IOLITE 8xSTGS: Connectors

6.3.2.2.1. IOLITE 8xSTGS: T2A9f Connectors



IOLITEr-8xSTGS Front

6.3.2.2.1.1. IOLITE 8xSTGS: T2A9f Connector: Pinout



Analog in connector: pin-out (terminal block male)

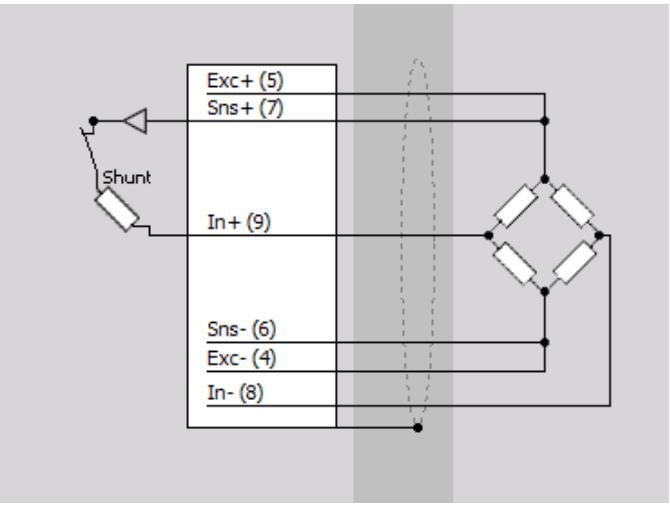
Pin	Name	Description
9	IN +	Input+
8	IN -	Input-
7	SNS +	Sense+
6	SNS -	Sense-
5	EXC +	Excitation+
4	EXC -	Excitation-
3	GND	Ground
2	R	¼ Bridge / Shunt
1	TEDS	TEDS

AI connector (on the device): OMNIMATE Signal SL 2.50/09/90G
Mating connector (for the cable): OMNIMATE Signal BLF 2.50/09/180

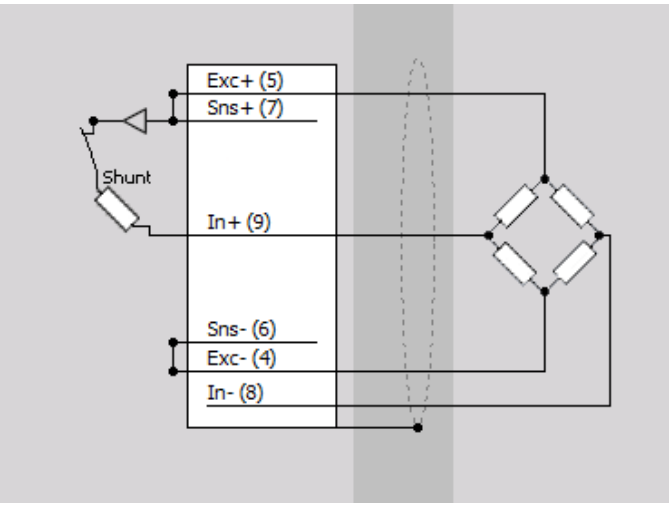
6.3.2.2.1.2. IOLITE 8xSTGS: T2A9f Connector: Wiring diagram

Bridge

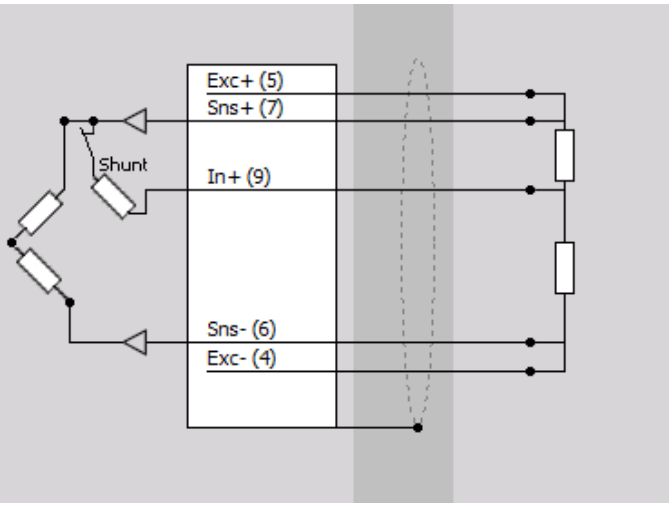
Full bridge (6-wire)



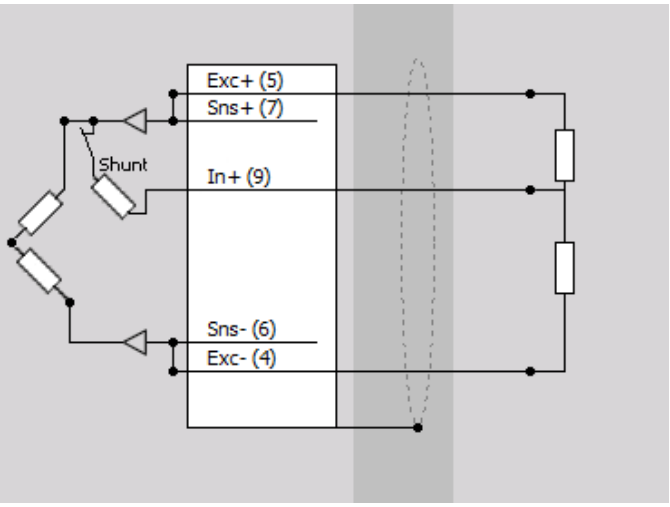
Full bridge (4-wire)



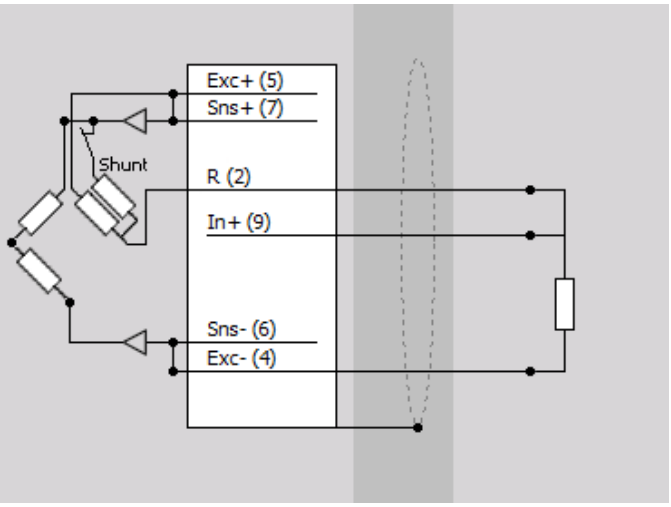
Half bridge (5-wire)



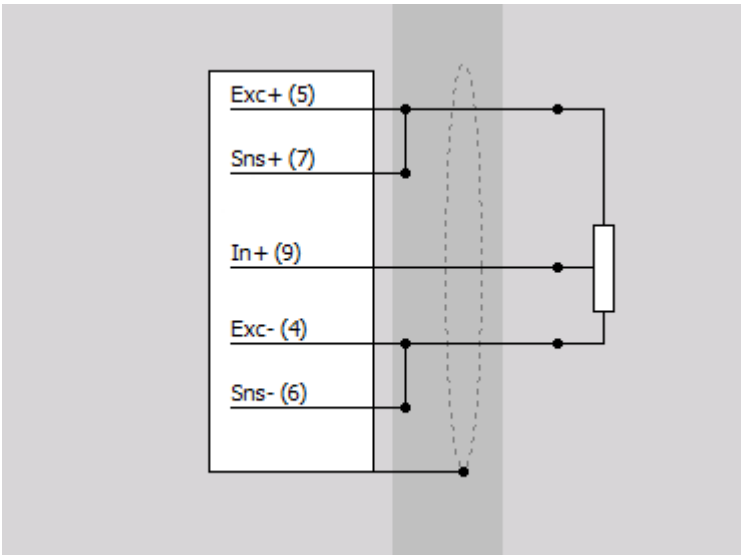
Half bridge (3-wire)



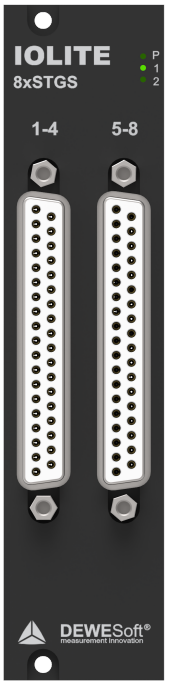
Quarter bridge



Potentiometer



6.3.2.2.2. IOLITE 8xSTGS-D37: D-SUB37 Connectors



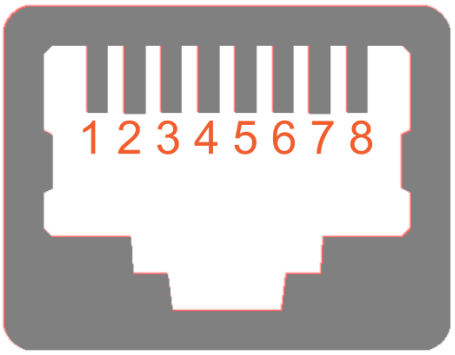
IOLITEr-8xSTGS-D37 Front

6.3.2.2.2.1. 2xD37m-8xRJ45f adapters: Pinout

The 2xD37m-8xRJ45f breakout adapter allows full functionality with RJ45 connectors. The adapter fits with IOLITE 8xSTGS-D37 or the IOLITE 8xLVe-D37 modules.

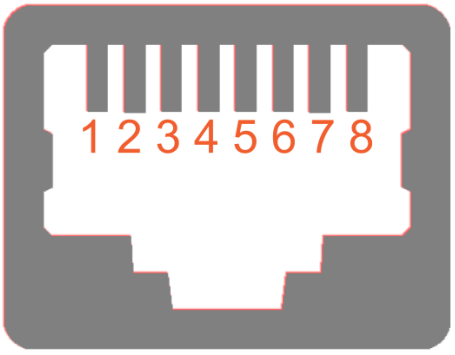
The 2xD37m-8xRJ45f-QB-CAT-m is only suitable for quarter bridges, having a mirrored design suited to rewire the sensor in case the RJ45 connector gets damaged on one side. It fits on the IOLITE 8xSTGS-D37 module.

2xD37m-8xRJ45f: *RJ-45 Connector pinout*



Pin	Name	Description
1	EXC -	Excitation-
2	SNS -	Sense-
3	IN +	Input+
4*	GND	Ground
5**	R (8xSTGS) TEDS (8xLVe)	¼ Bridge / Shunt TEDS
6	IN -	Input-
7	EXC +	Excitation+
8	SNS +	Sense+

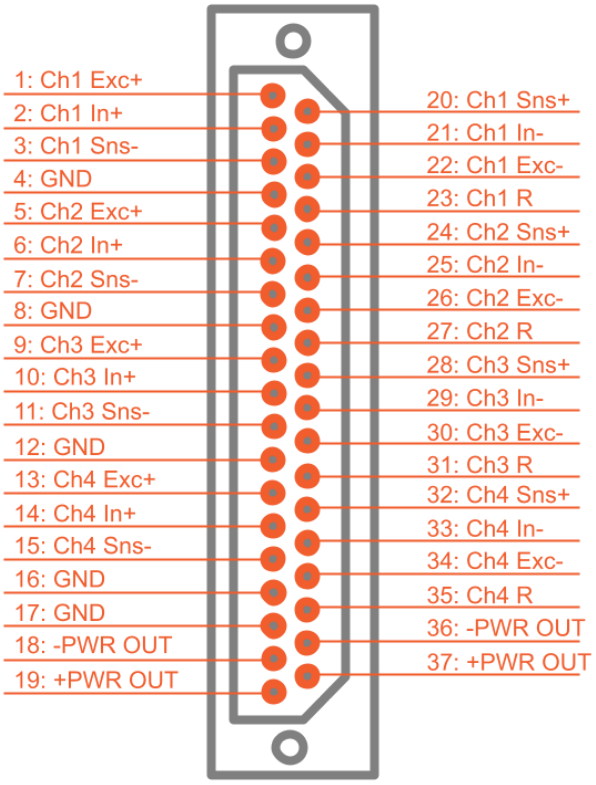
* In the case of IOLITE 8xSTGS modules., there is Ch-GND isolation. In case of IOLITE 8xLVe GND is non-isolated.
** In the case of IOLITE 8xSTGS pin 5 is R-pin for bridge and shunt measurements.. In case of IOLITE 8xLVe pin 5 is reserved for TEDS.



2xD37m-8xRJ45f-QB-CAT-m*: RJ-45 Connector pinout (mirrored)*

Pin	Name	Description
1	EXC-	Excitation -
2	R	R
3	IN+	Input +
4	GND	Ground
5	GND	Ground
6	IN+	Input +
7	R	R
8	EXC-	Excitation -

6.3.2.2.2.2. IOLITE 8xSTGS: D-SUB37 Connector: Pinout



Warning

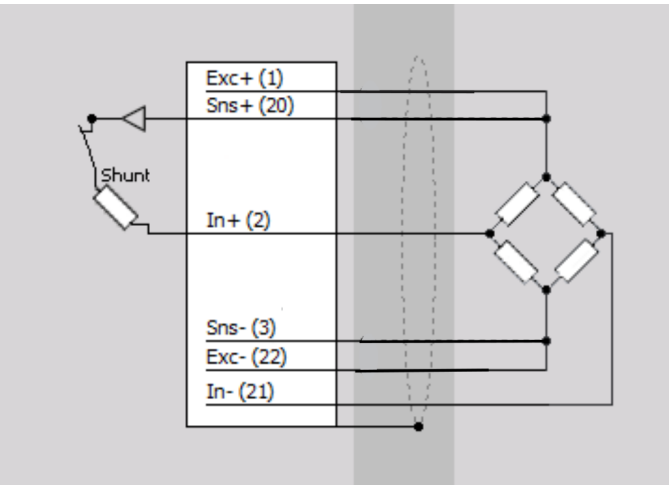
PWR OUT pins are intended to supply external loads. Do not connect the external power supply to the PWR OUT pins! It can damage the equipment.
There is no protection on the module. Current limit of the IOLITE system is 16 A!
Incorrect connection can damage the equipment or cause data loss. The connection of PWR OUT must be made according to the pinout below:

Pin	Name	Description
19, 37	+PWR OUT	V_{supply} output
18, 36	-PWR OUT	Non-isolated GND

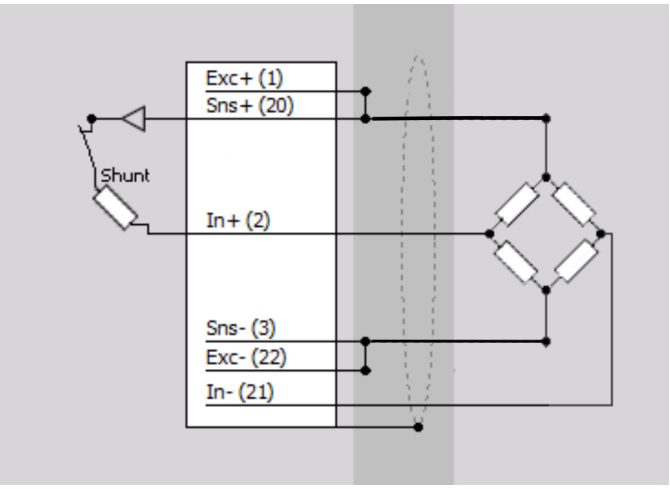
6.3.2.2.2.3. IOLITE 8xSTGS: D-SUB37 Connector: Wiring diagram

Bridge

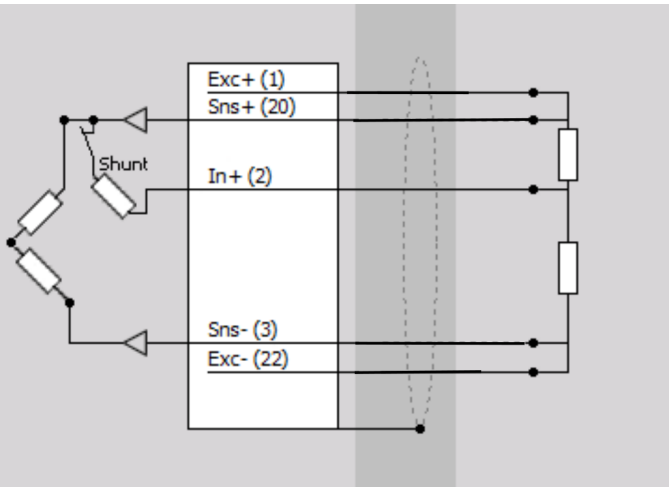
Full bridge (6-wire)



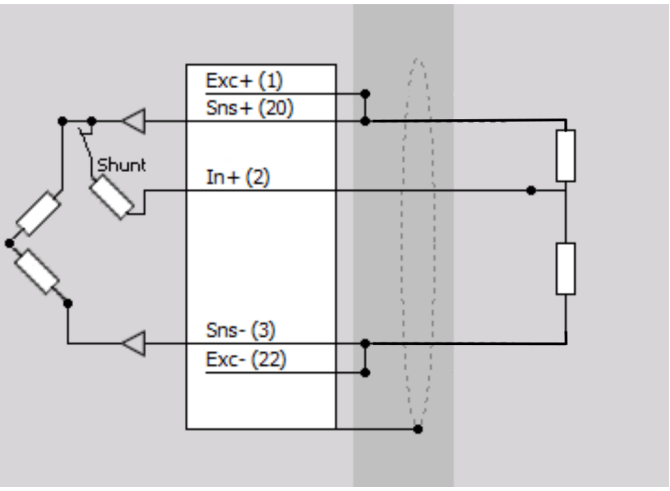
Full bridge (4-wire)



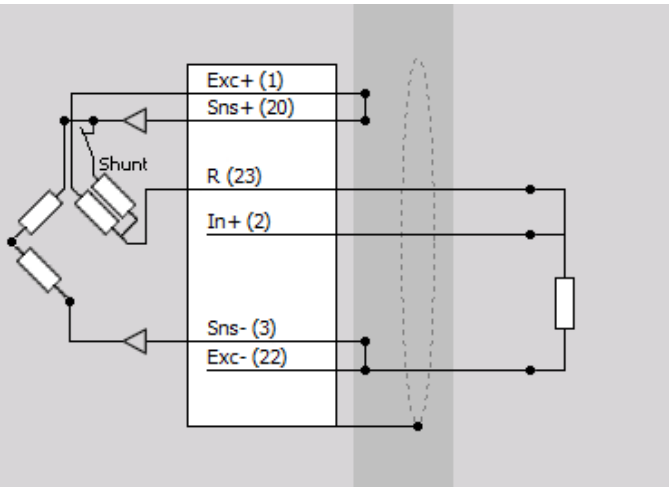
Half bridge (5-wire)



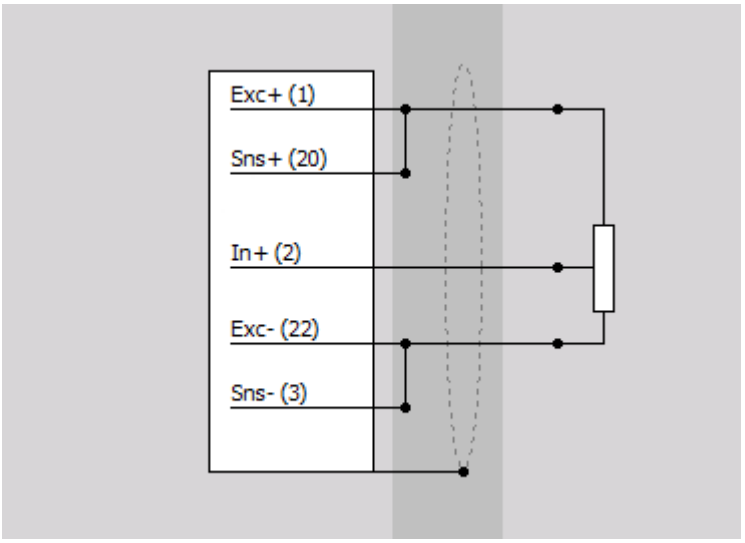
Half bridge (3-wire)



Quarter bridge



Potentiometer



6.3.3. IOLITEi-1xSTG

IOLITEi-1xSTG is a single channel strain gauge amplifier with internal quarter, half and full-bridge configurations. Low noise voltage and current source excitation are available with freely settable levels. Input ranges span from 50V to 100mV. Data transferred over the EtherCAT to a PC running powerful and easy to use.

IOLITEi-1xSTG module

6.3.3.1. IOLITEi-1xSTG: Specifications

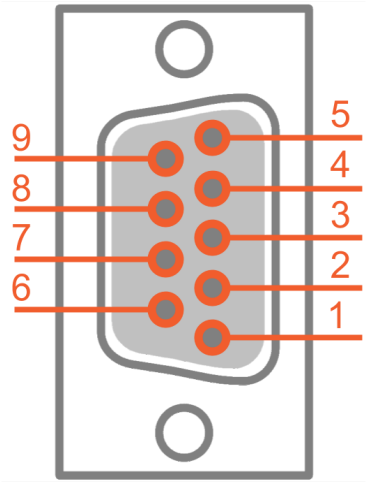
Analog input - Voltage				
Input types	Voltage, current, full bridge strain, half bridge strain, quarter bridge strain			
Number of channels	1			
Input connector	DB9			
ADC Type	24-bit SAR with anti-aliasing filter			
Sampling Rate	40 kS/s			
Voltage Ranges	**±50 V**	**±10 V**	**±1 V**	**±100 mV**
Typ. Input Accuracy	±0.03 % of reading ±0.02 % of range ±0.1 mV			
Typ. SNR (10 kS/sec, -1 dBFS sine wave @ 1 kHz)	89 dB	88 dB	88 dB	87 dB
Type. SFDR (10 kS/sec, -1 dBFS sine wave @ 1 kHz)	100 dB	110 dB	130 dB	145 dB
Typ. Noise floor @ 10 kS/sec	-103 dB	-99 dB	-103 dB	-96 dB
Typical CMR @ 400 Hz / 1 kHz	71 dB / 66 dB	72 dB / 66 dB	96 dB / 88 dB	96 dB / 87 dB
Gain Drift	typ. 10 ppm/K (max. 40 ppm/K)			
Offset Drift	typ. 0.3 µV/K + 5 ppm of range/K (max. 2 µV/K + 10 ppm of range/K)			
Gain Linearity	< 0.02 %			

Input Coupling	DC, AC 1 Hz
Input Impedance	Range ≥ 10 V; 1 MΩ between IN+ and IN- Range < 10 V: 20 MΩ
Overvoltage Protection	Range ≥ 10 V; 200 V Range < 10 V: 50 V
Isolation	125 Vrms channel to ground isolation
TEDS support	Standard + DSI adapters
Analog input - Current	
Current ranges	2 mA, 20 mA
Input Accuracy	±0.03 % of reading, ±0.02 % of range, ±2.1 µA
Internal Shunt resistor	50 Ω
Analog input performance	
Bandwidth (-3 dB)	0.49 fs
Alias-free Bandwidth	DC to 0.453 fs
Alias Rejection	-100 dB (all sample rates)
Delay Through ADC	37 / fs
Oversampling	32
Excitation voltage	
Excitation voltage	Free programmable (16-bit DAC)
Predefined Levels	Unipolar 0 - 24 V, Bipolar 0 - 12 V
Accuracy	±0.05 % ±2 mV
Drift	±50 ppm/K ±100 µV/K
Stability 10 % to 90 % Load	<0.01 %
Current Limit	42 mA (400 mW max. Power)
Protection	Continuous short to ground
Bridge Connection Types	full bridge strain, ½ bridge strain, ¼ bridge strain (3 wire)
Bridge ranges	20...10000 mV/V free programmable
Internal Bridge Completion	½ bridge and ¼ bridge 120 and 350 Ω
Bridge Completion Accuracy	0.05 %; TCR: 2 ppm/K (others on request)
Internal Shunt Resistor	100 kΩ (others on request)
Shunt Resistor Accuracy	0.1 %; TCR: 10 ppm/K (others on request)
Input Short, Sensor Offset Adjust	Software-selectable
Power	
Power consumption	2.5 W
Environmental	
IP rating	IP20
Physical	
Dimensions	82 x 67 x 28 mm
Weight	130 g

6.3.3.2. IOLITEi-1xSTG: D-SUB9 Connector

IOLITEi-1xSTG module has a standard D-SUB9 female connectors for voltage or strain measurement.

6.3.3.2.1. IOLITEi-1xSTG: D-SUB9 Connector: Pinout



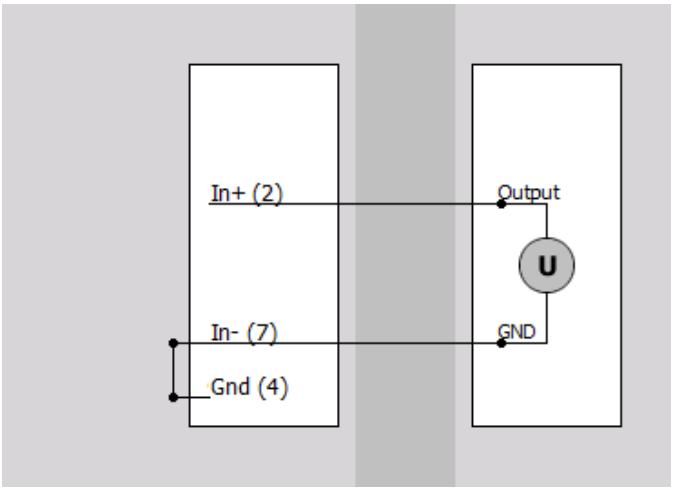
IOLITEi-1xSTG connector: pin-out (DSUB-9 female)

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

6.3.3.2.2. IOLITEi-1xSTG: D-SUB9 Connector: Wiring diagram

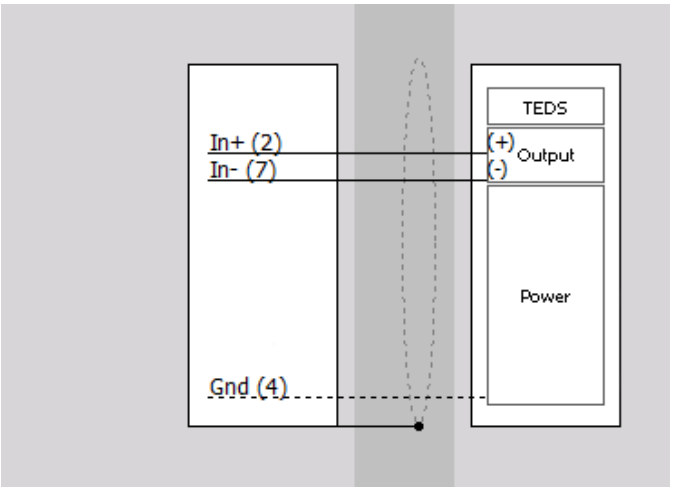
Voltage

Single ended

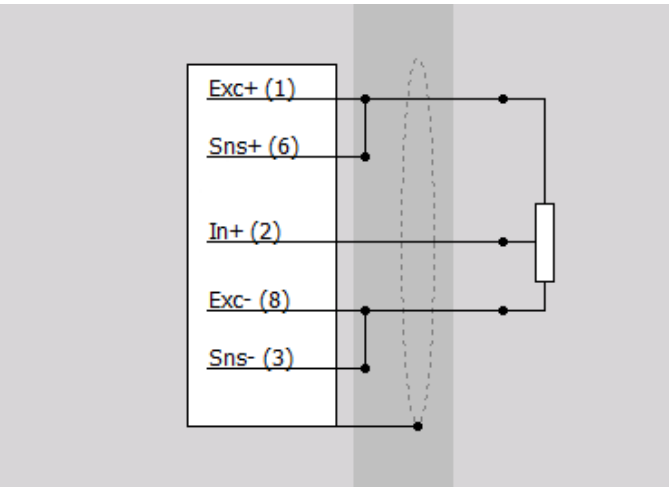


Differential

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

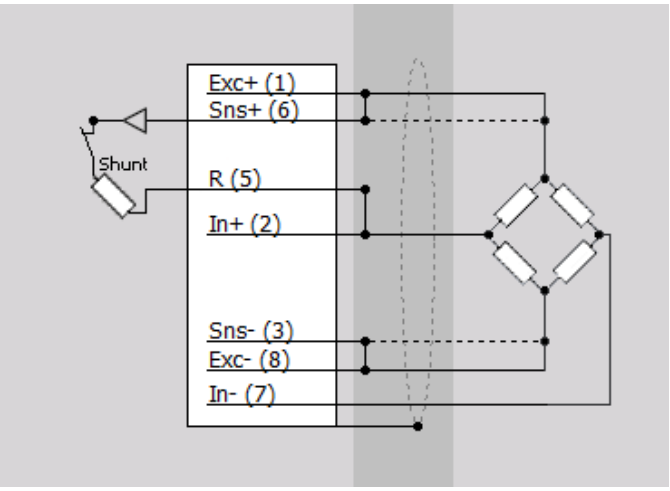


Potentiometer

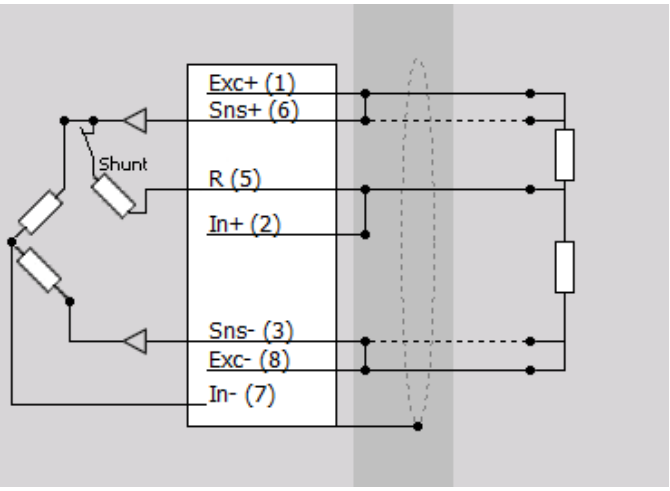


Bridge

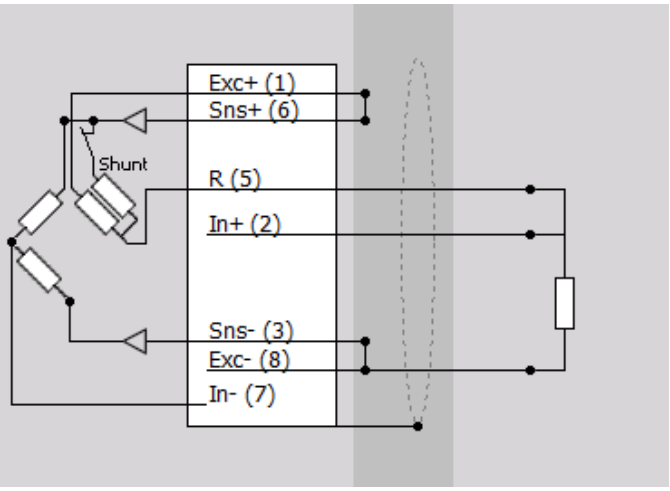
Full bridge



Half bridge

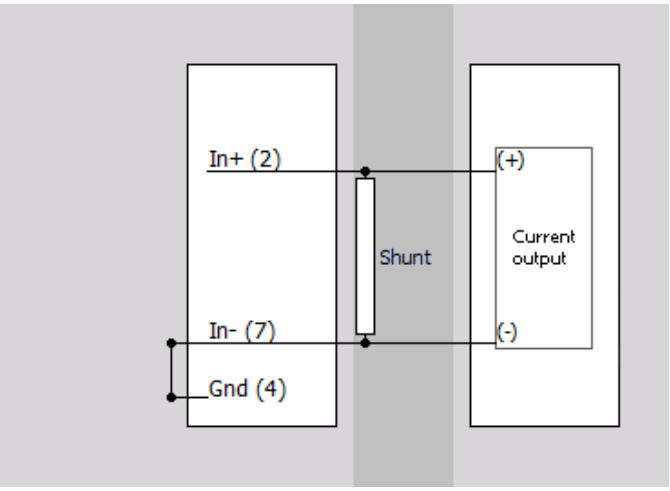


Quarter bridge

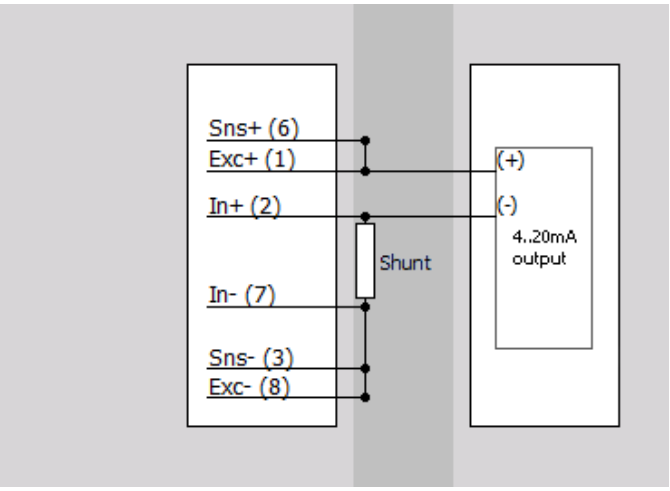


Current

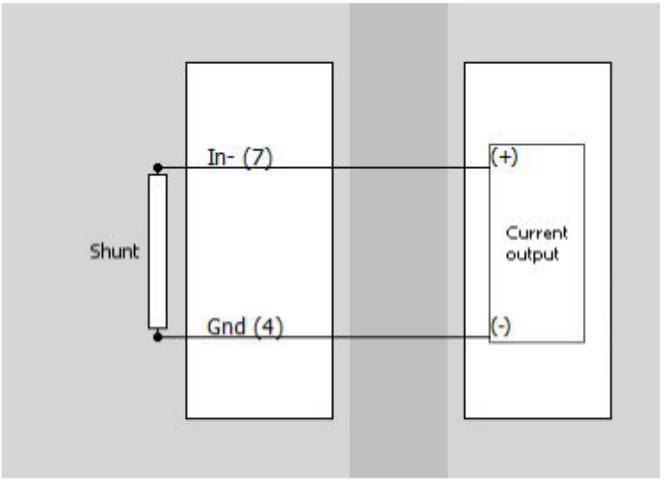
External direct shunt



External loop powered shunt



Internal shunt



6.4. 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)

6.4.1. 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

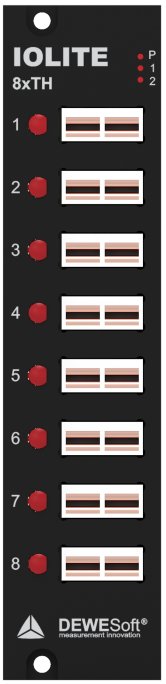
IOLITEi-8xTH

6.4.1.1. 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	

6.4.1.2. IOLITEi 8xTH: Miniature Thermocouple Connector

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



IOLITEir-8xTH front

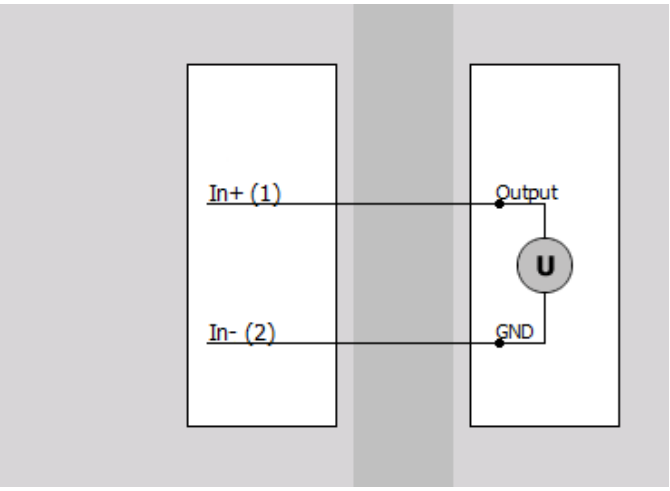
6.4.1.2.1. IOLITEi 8xTH: Miniature Thermocouple Connector: Pinout

TH connector: pin-out (Mini TC female)

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

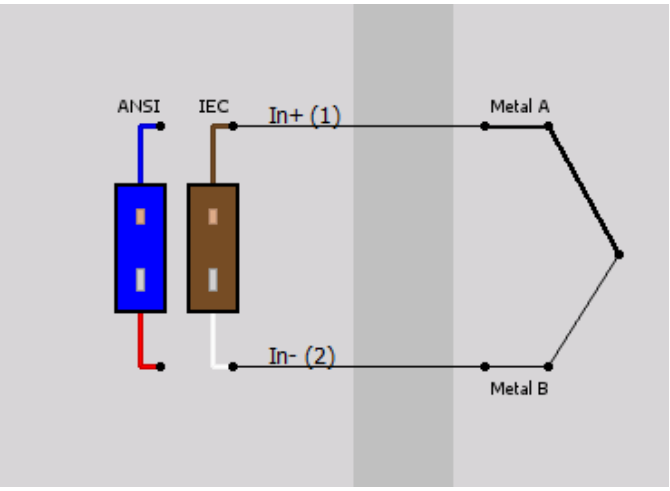
6.4.1.2.2. IOLITEi 8xTH: Miniature Thermocouple Connector: Wiring diagram

Voltage

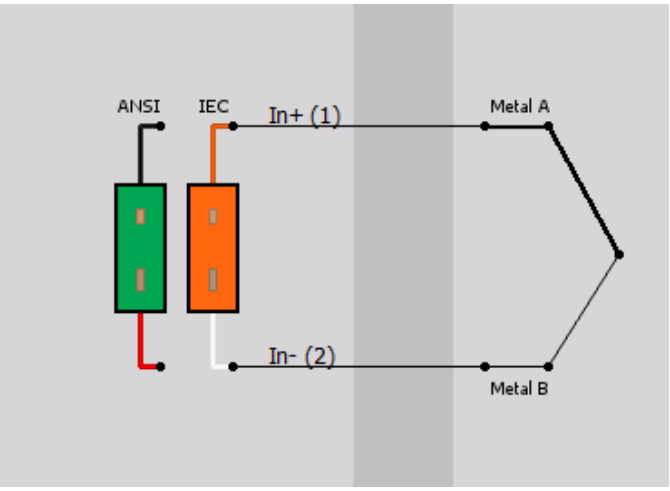


Temperature

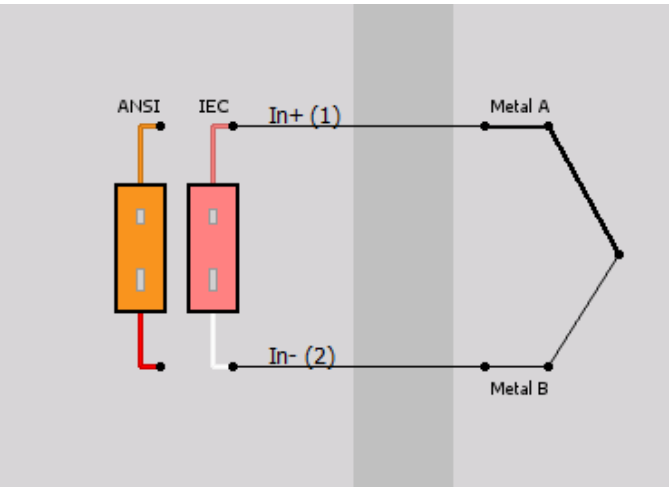
T-type thermocouple



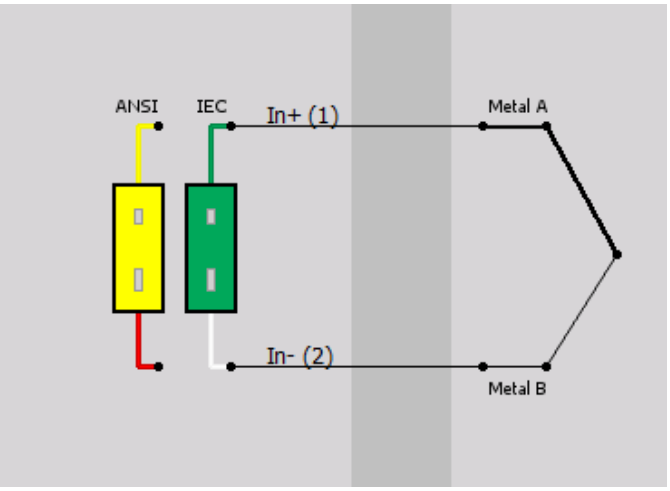
S-type, R-type thermocouple



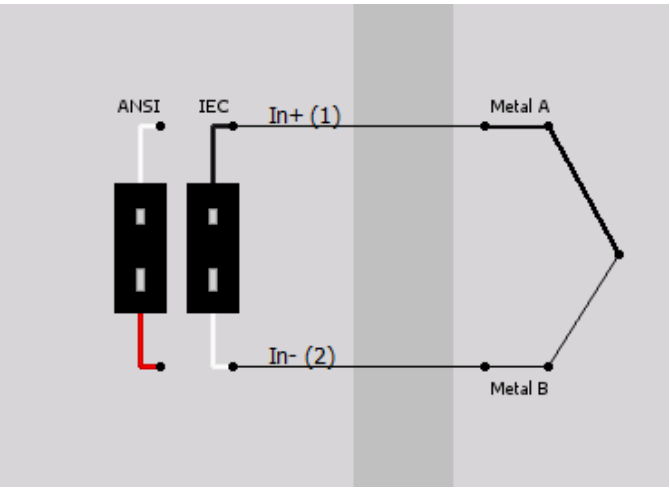
N-type thermocouple



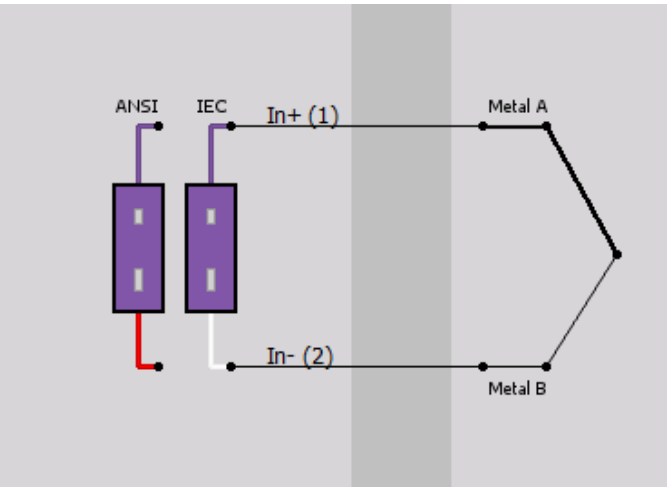
K-type thermocouple



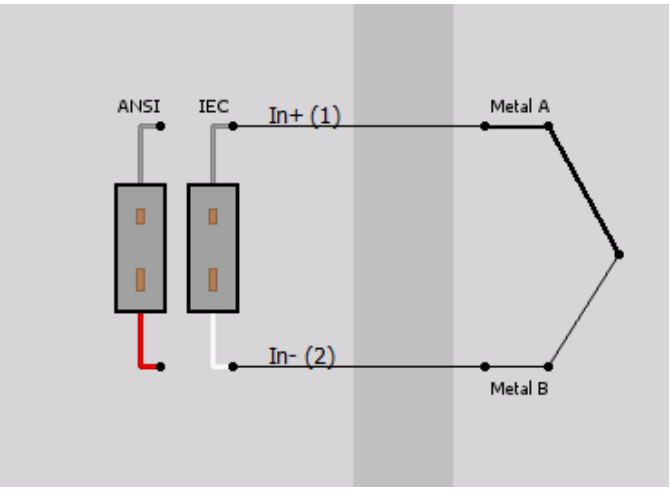
J-type thermocouple



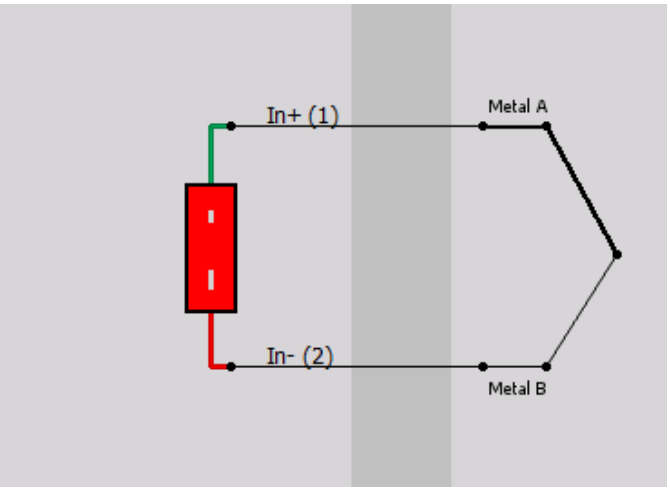
E-type thermocouple



B-type thermocouple



C-type thermocouple



6.4.2. IOLITEi 8xTH-HS

IOLITEi TH-HS (IOLITEir-8xTH-HS and IOLITEi-8xTH-HS) modules 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. IOLITE TH-HS is a perfect choice for thermal shock measurements with sampling rate up to 10 kS/s.

IOLITEir-8xTH-HS

IOLITEi-8xTH-HS

6.4.2.1. IOLITEi 8xTH-HS: Specifications

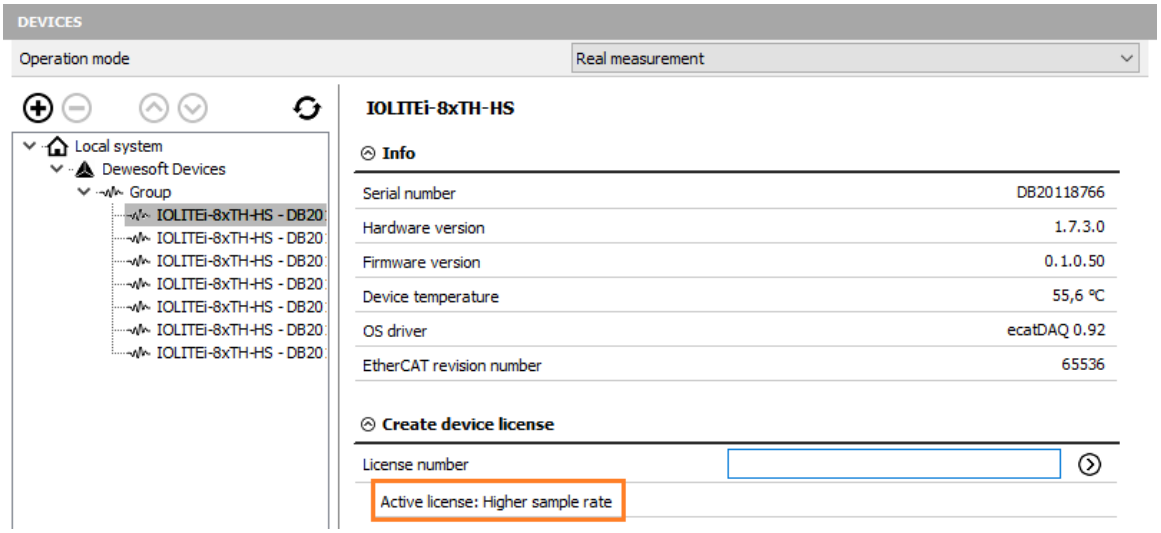
Inputs		
Input type	Isolated universal thermocouple and voltage	
Number of channels	8	
ADC Type	24-bit delta-sigma	
Sampling Rate IOLITE	Simultaneous 10, 20, 40, 50, 80, 100, 200, 500, 1k, 2k, 5k, 10k S/s (optional)	
Sampling Rate OBSIDIAN	100 S/s	
Voltage Mode		
Ranges	**±1 V**	**±100 mV**
Input Accuracy	±0.02 % of reading ±50 µV	±0.02 % of reading ±7 µV
Typical Noise Floor @ 10 / 100 / 1k / 10k S/s	-130 dB / -120 dB / -110 dB / -104 dB	-120 dB / -110 dB / -100 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	100 MΩ	
Temperature Mode		
Thermocouple Types	K, J, T, R, S, N , E, C, B	
Accuracy	±0.02 % of reading ±0.5 °C ±7 µV	
Typical Noise	0.002 °C RMS @ Type K @ 10 S/s 0.006 °C RMS @ Type K @ 100 S/s 0.02 °C RMS @ Type K @ 1 kS/s 0.05 °C RMS @ Type K @ 10 kS/s	
Additional Specifications		
Rack	IOLITEir-8xTH-HS	
Input connectors	Mini Thermocouple connector (copper)	
Isolation voltage	1000 Vpeak channel to ground & channel to channel	
Power supply	9 - 48 V DC	
Power consumption	Typ. 2.6 W (Max. 3.4 W)	
Weight	290 g	
Slice Dimensions	128.4 x 115.4 x 30.1 mm	
Additional Specifications		
Modular	**IOLITEi-8xTH-HS**	
Input connectors	Mini Thermocouple connector (copper)	
Isolation voltage	1000 Vpeak channel to ground & channel to channel	
Power supply	9 - 48 V DC	
Power consumption	Typ. 2.6 W (Max. 3.8 W)	
Weight	555 g	
Slice Dimensions	137 x 115.0 x 35.0 mm	

6.4.2.1. IOLITEi 8xTH-HS: Specifications: Accuracy table

Temperature	Type K	Type J	Type T	Type R	Type S	Type N	Type E	Type B	Type C
-200 °C	1.00 °C	0.86 °C	0.98 °C	✗	✗	1.24 °C	0.71 °C	✗	✗
-100 °C	0.75 °C	0.69 °C	0.77 °C	✗	✗	0.85 °C	0.67 °C	✗	✗
0 °C	0.68 °C	0.64 °C	0.68 °C	1.82 °C	1.79 °C	0.77 °C	0.62 °C	✗	1.07 °C
100 °C	0.69 °C	0.65 °C	0.67 °C	1.46 °C	1.47 °C	0.76 °C	0.62 °C	7.96 °C	0.96 °C
400 °C	0.75 °C	0.71 °C	0.72 °C	1.26 °C	1.31 °C	0.77 °C	0.67 °C	2.30 °C	0.95 °C
700 °C	0.81 °C	0.75 °C	✗	1.23 °C	1.30 °C	0.82 °C	0.73 °C	1.67 °C	1.01 °C
1000 °C	0.88 °C	0.82 °C	✗	1.23 °C	1.31 °C	0.88 °C	0.83 °C	1.47 °C	1.07 °C
1300 °C	0.96 °C	✗	✗	1.26 °C	1.34 °C	0.98 °C	✗	1.40 °C	1.17 °C
1700 °C	✗	✗	✗	1.36 °C	1.45 °C	✗	✗	1.45 °C	1.34 °C

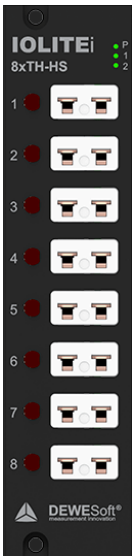
Hint

The higher sample rate is unlocked with a device license key as it is shown on the image below. This upgrade raises the maximum possible sample rate of the IOLITEi 8xTH-HS from 100 S/s to 10 kS/s.



6.4.2.2. IOLITEi 8xTH-HS: Miniature Thermocouple Connector

IOLITEir-8xTH-HS and IOLITEi-8xTH-HS modules has 8 miniature thermocouple-connectors for temperature measurement.



IOLITEir-8xTH-HS front

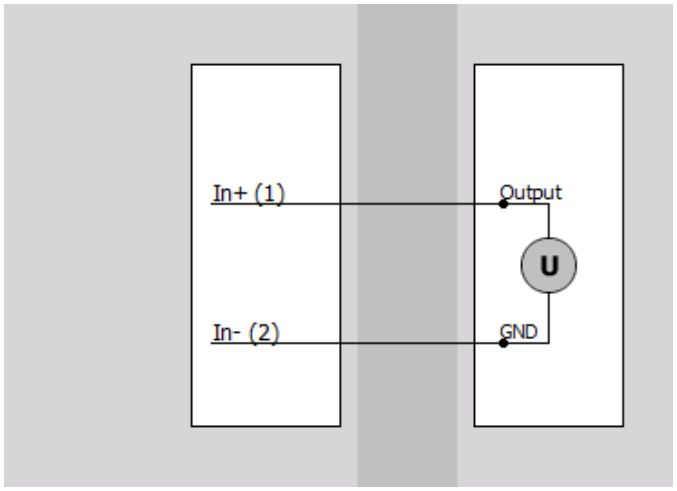
6.4.2.2.1. IOLITEi 8xTH-HS: Miniature Thermocouple Connector: Pinout

TH-HS connector: pin-out (Mini TC female)

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

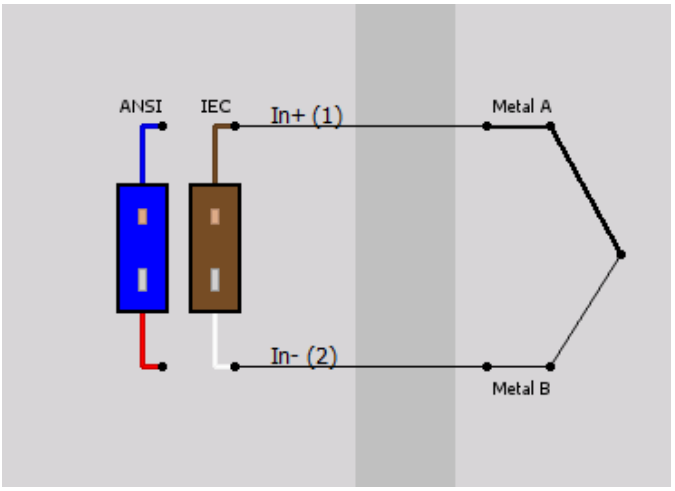
6.4.2.2.2. TH-HS: Miniature Thermocouple Connector: Wiring diagram

Voltage

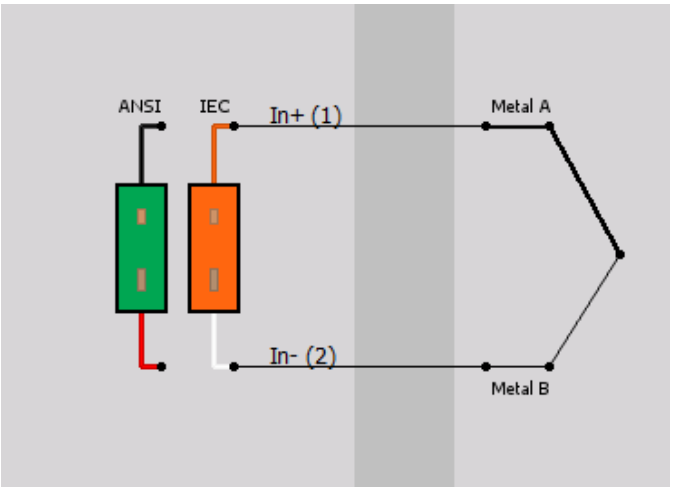


Temperature

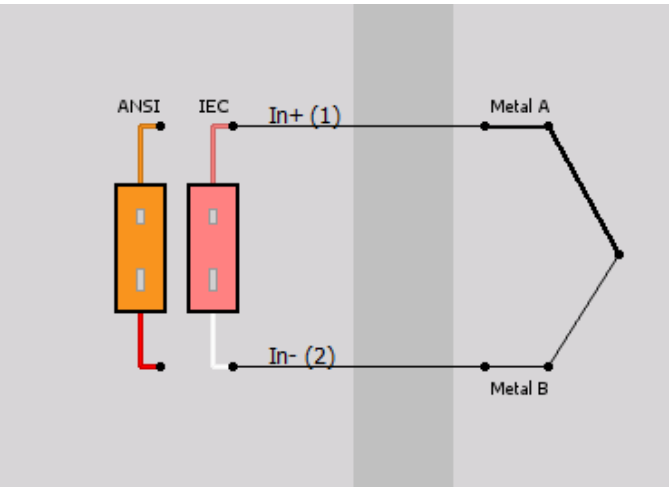
T-type thermocouple



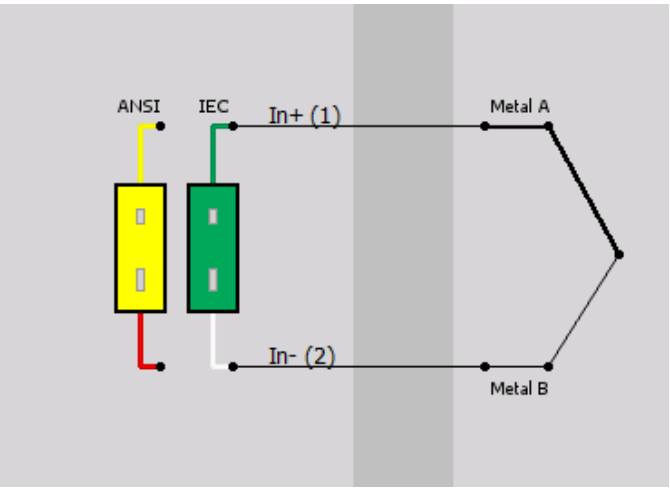
S-type, R-type thermocouple



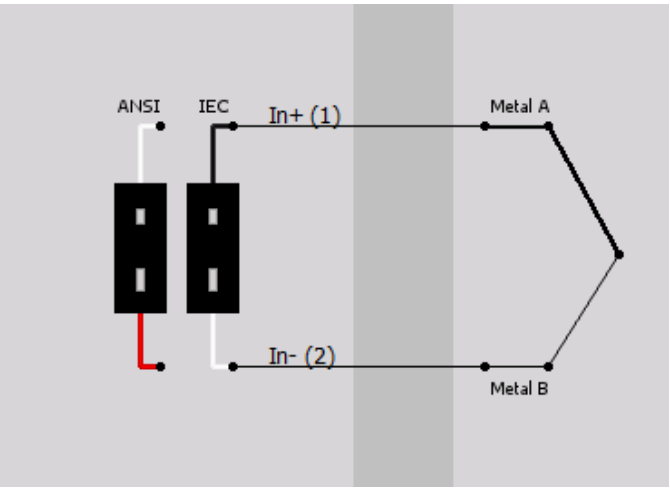
N-type thermocouple



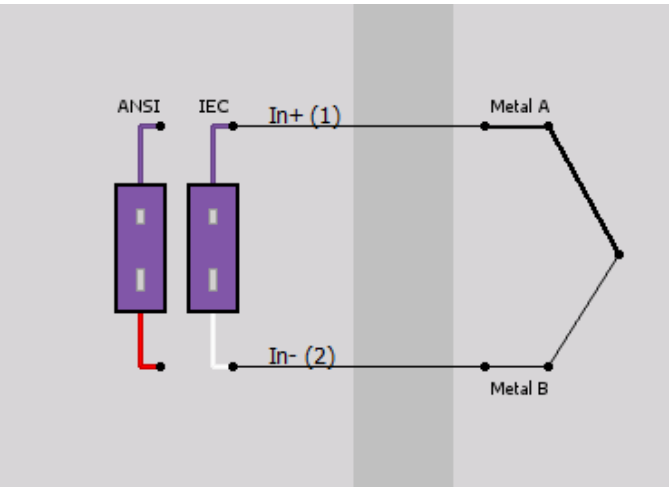
K-type thermocouple



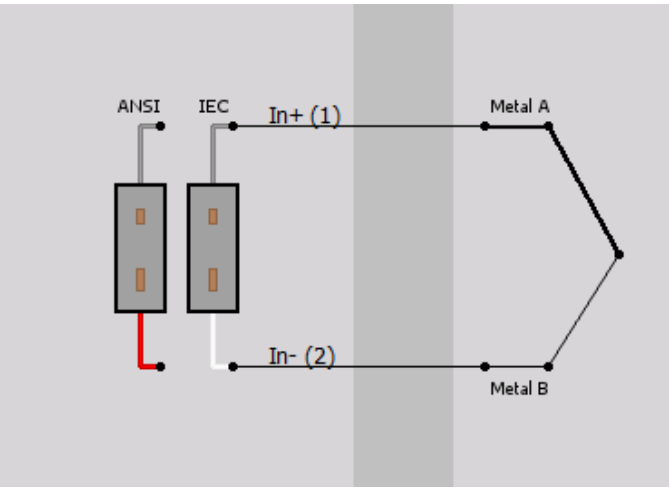
J-type thermocouple



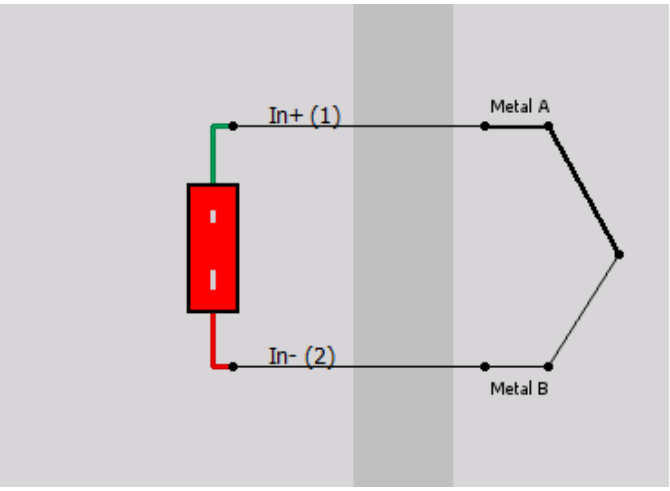
E-type thermocouple



B-type thermocouple



C-type thermocouple



6.4.3. IOLITEi 8xRTD

The IOLITEi 8xRTD module is used for measurements with universal platinum thermometer probes, thermistors, as well as for resistance and voltage measurements.

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

IOLITEir-8xRTD

IOLITEi-8xRTD

6.4.3.1. IOLITEi 8xRTD: Specifications

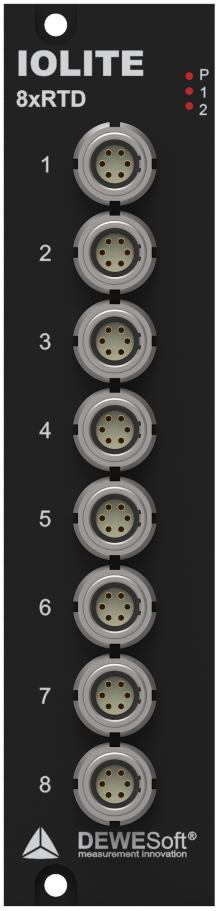
Analog inputs		
Input types	Voltage, Resistance or Universal PTxxx inputs	
Number of channels	8	
ADC Type	24-bit delta-sigma	
Sampling Rate	Simultaneous 100 S/s	
Voltage Mode		
Ranges	**±1 V**	**±100 mV**
Input Accuracy	±0.02 % of reading ±0.01 % of range ±10 µV	
Typical Noise floor @ 10/100 s/sec	-117 dB / -107 dB	-111 dB / -101 dB
Gain Drift	Typical 4 ppm/K (max. 10 ppm/K)	
Offset Drift	Typical 0.05 µV/K (max. 0.2 µV/K)	
Gain Linearity	< 0.01 %	
Input Coupling	DC	
Input Impedance	1 MΩ	
Temperature Mode		
Types	**PT100, PT200, PT500, PT1000, PT2000**	
Measurement range	-200 °C to +850 °C	
Accuracy	±0.05 % of reading ±0.2 °C	
Temperature Drift	typ. ±5 ppm/K (max. ±12 ppm/K ±0.003 °C/K)	
Input Connection	3-wire or 4-wire	
Resistance Mode		
Ranges	**0...10 kΩ**	**0...1 kΩ**
Accuracy	±0.02 % of reading ±0.01 % of range	
Input Connection	3-wire or 4-wire	
Additional Specifications		
Input connectors	Lemo 0B 6pin EEA.0B.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. 2.1 W, Max. 2.7 W	
Weight	260 g	
Dimensions	128.4 x 115.4 x 30.1 mm	

6.4.3.2. IOLITEi 8xRTD: Connectors

IOLITEi 8xRTD is offered with LEMO 0B 6-pin connectors (IOLITEir-8xRTD and IOLITEi-8xRTD) or with 4-pin terminal block connectors (IOLITEir-8xRTD-T2A4f and IOLITEi-8xRTD-T2A4f).

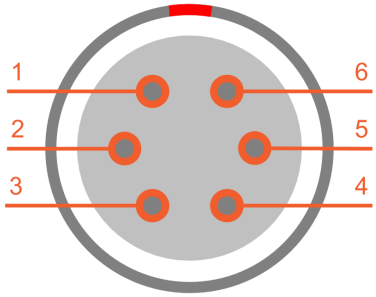
6.4.3.2.1. IOLITEi 8xRTD: LEMO L0B6f Connector

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



IOLITEir-8xRTD front

6.4.3.2.1.1. IOLITEi-8xRTD: LEMO L0B6f Connector: Pinout



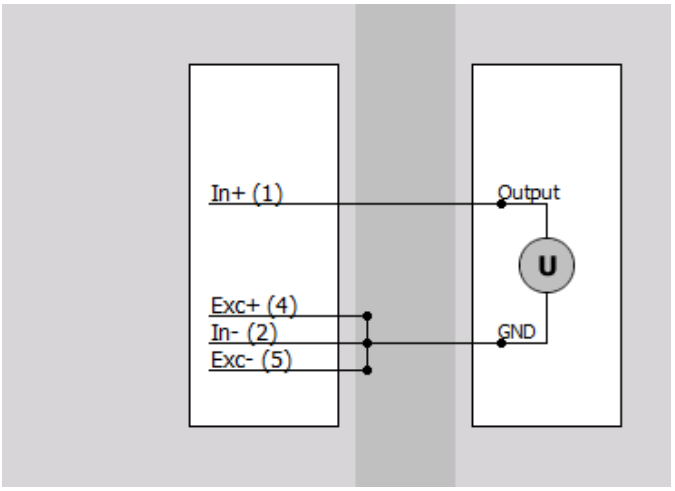
IOLITEi 8xRTD connector: pin-out (6-pin LEMO female)

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

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

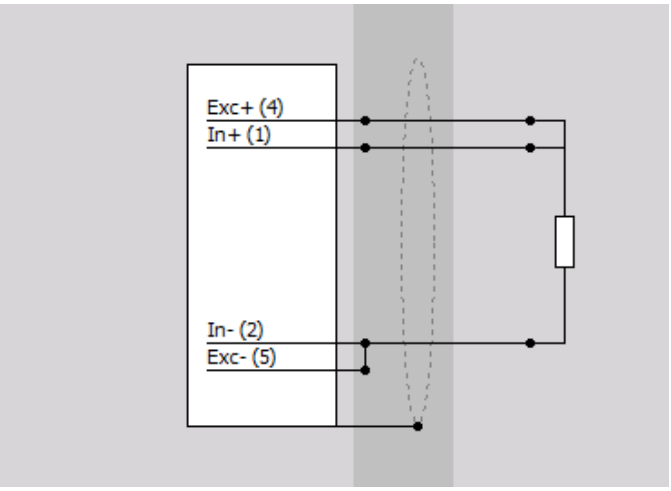
6.4.3.2.1.2. IOLITEi-8xRTD: LEMO L0B6f Connector: Wiring diagram

Voltage

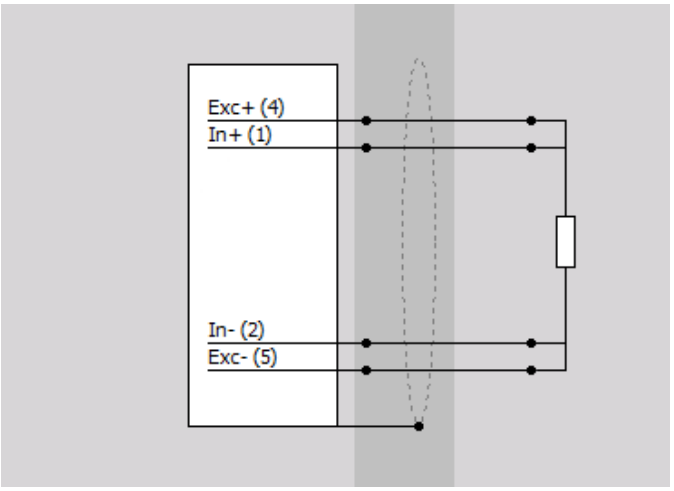


Resistance

3-wire

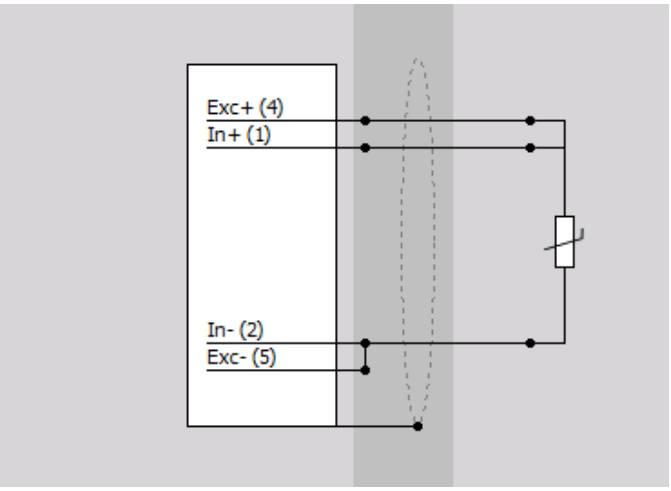


4-wire

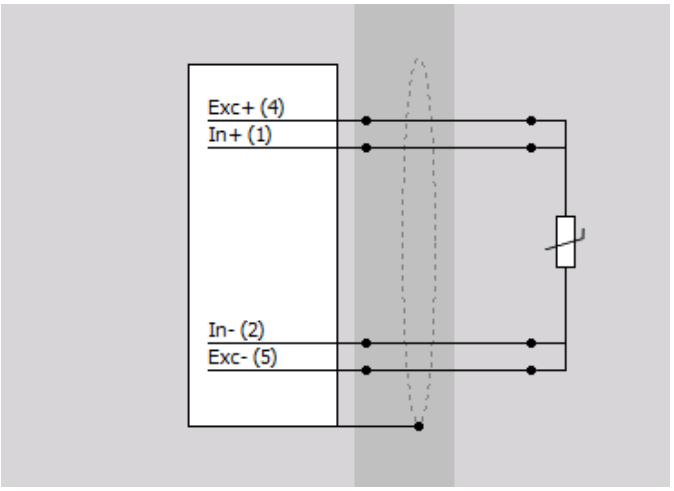


Temperature

3-wire

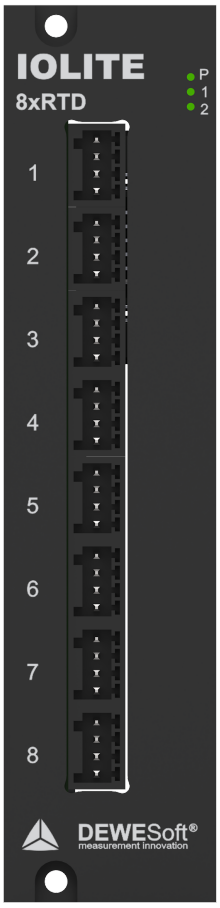


4-wire



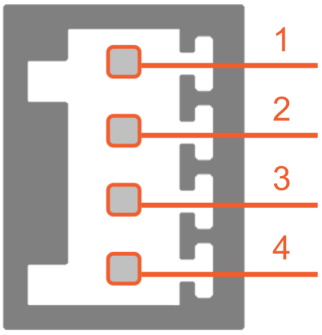
6.4.3.2.2. IOLITEi-8xRTD-T2A4f: Terminal block connector

IOLITEi-8xRTD-T2A4f and IOLITEir-8xRTD-T2A4f modules have 8 terminal block Weidmueller SL 2.50-04 (T2A4f) female connectors.



IOLITEir-8xRTD-T2A4f front

6.4.3.2.2.1. IOLITEi 8xRTD: T2A4f Connector: Pinout

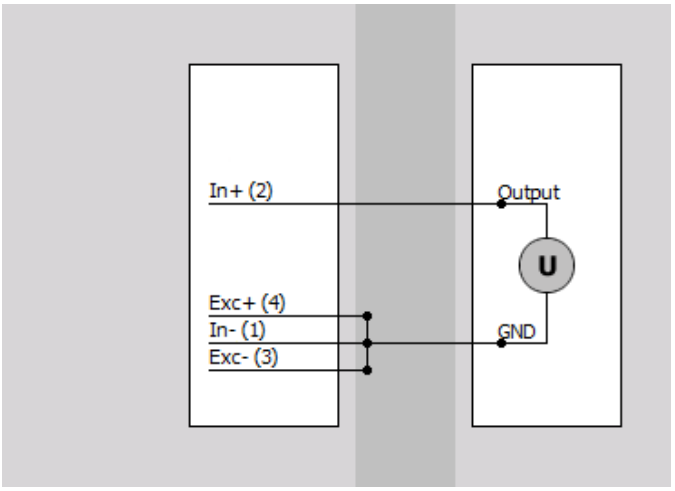


RTD connector: pin-out (TBLOCK male)

Pin	Name	Description
1	In-	Input-
2	In+	Input+
3	Exc-	Excitation-
4	Exc+	Excitation+

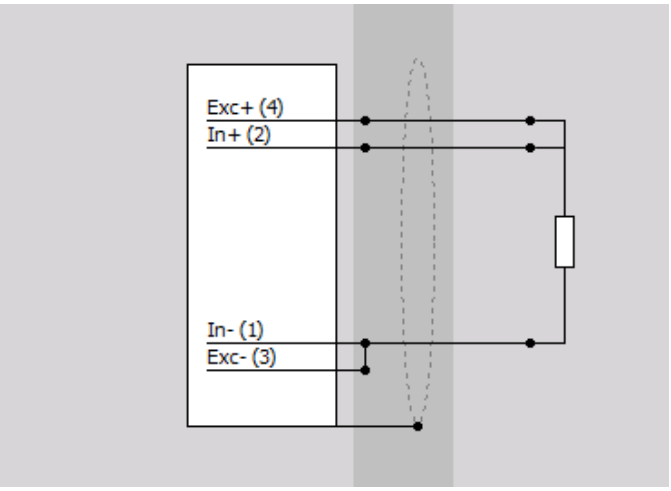
6.4.3.2.2.2. IOLITEi 8xRTD: T2A4f Connector: Wiring diagram

Voltage

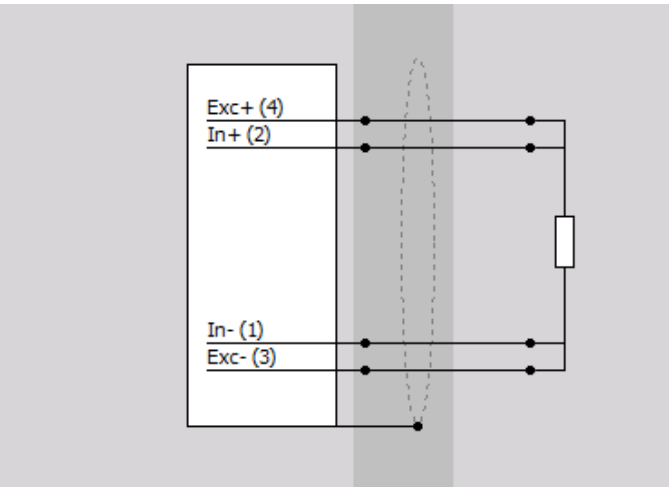


Resistance

3-wire

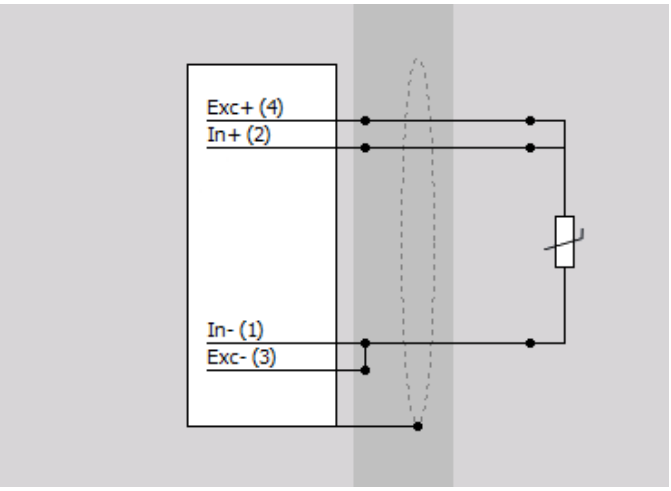


4-wire

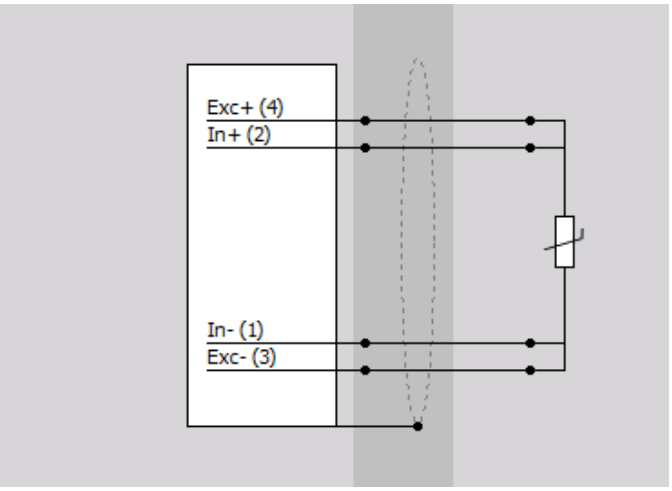


Temperature

3-wire



4-wire



6.4.4. 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

6.4.4.1. 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 (optional)	
Sampling Rate OBSIDIAN	100 S/s	
Voltage mode		
Ranges	**±1 V**	**±100 mV**
Input Accuracy	±0.02 % of reading ±0.01 % 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	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 Vpeak 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

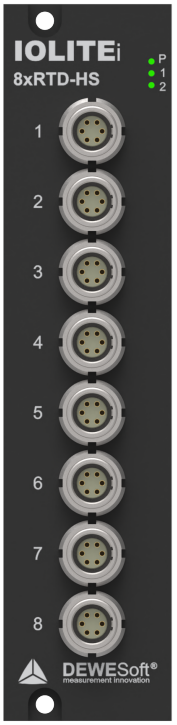
The higher sample rate is unlocked with a device license key. This upgrade raises the maximum possible sample rate of the IOLITEi 8xRTD-HS from 100 S/s to 10 kS/s.

6.4.4.2. IOLITEi 8xRTD-HS: Connectors

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

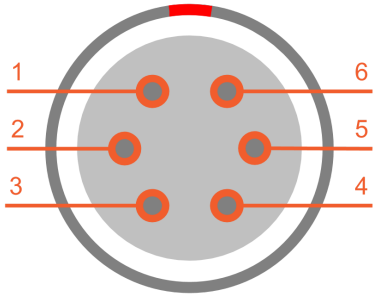
6.4.4.2.1. IOLITEi 8xRTD-HS: L0B6f Connector

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



IOLITEir-8xRTD-HS front

6.4.4.2.1.1. IOLITEi 8xRTD-HS: L0B6f Connector: Pinout



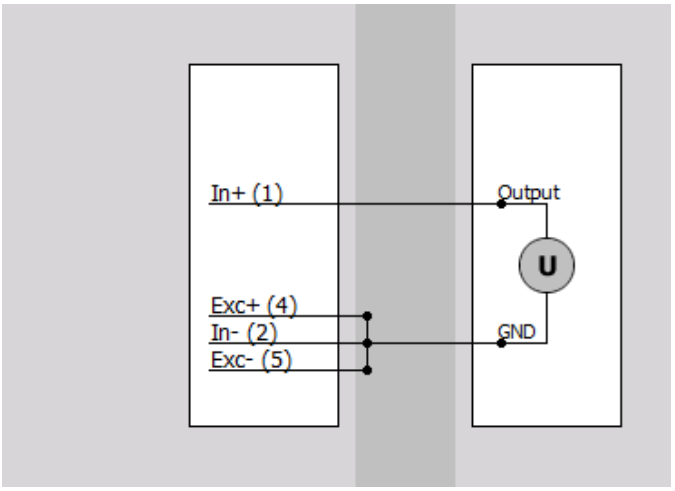
IOLITEi 8xRTD-HS connector: pin-out (6-pin LEMO female)

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

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

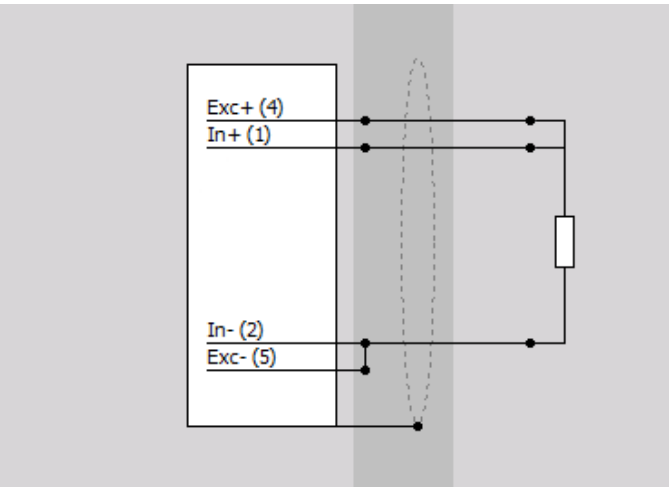
6.4.4.2.1.2. IOLITEi 8xRTD-HS: L0B6f Connector: Wiring diagram

Voltage

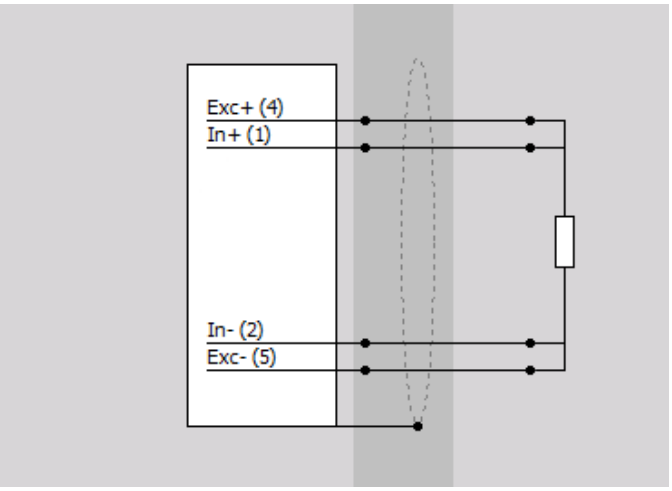


Resistance

3-wire

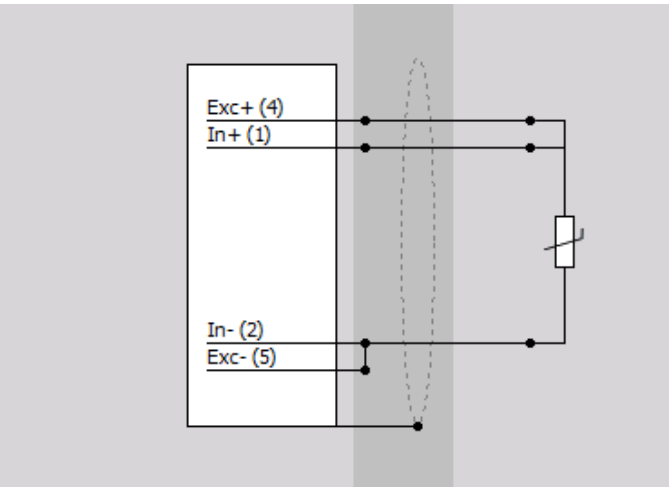


4-wire

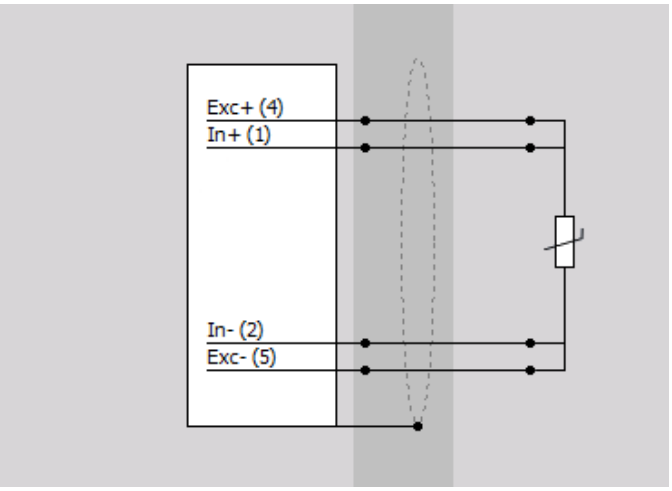


Temperature

3-wire

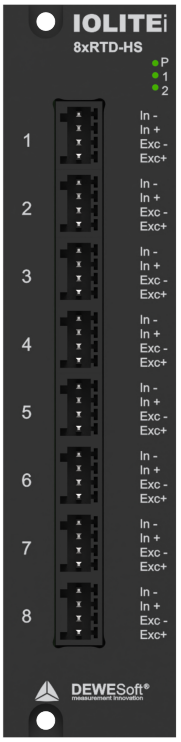


4-wire



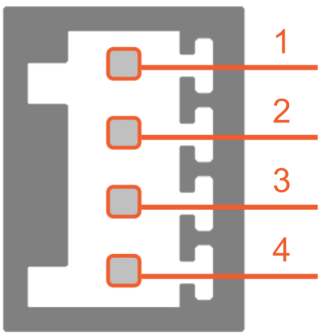
6.4.4.2.2. IOLITEi 8xRTD-HS: T2A4f connector

IOLITEir-8xRTD-HS-T2A4f and IOLITEi-8xRTD-HS-T2A4f modules have 8 terminal block Weidmueller SL 2.50-04 (T2A4f) female connectors.



IOLITEir-8xRTD-HS-T2A4f

6.4.4.2.2.1. IOLITEi 8xRTD-HS: T2A4f connector: Pinout

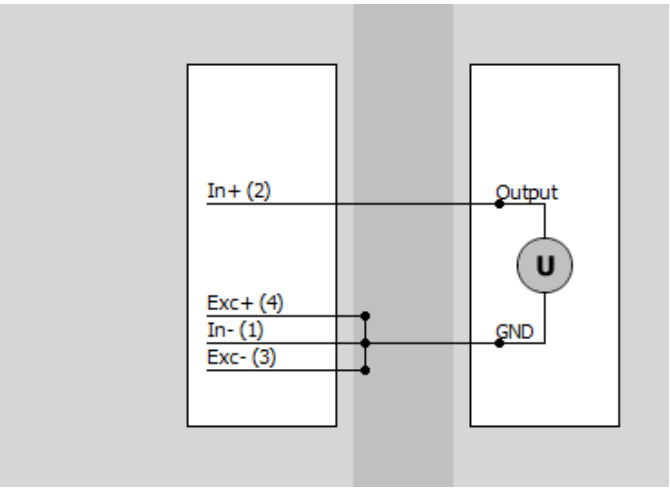


RTD connector: pin-out (TBLOCK male)

Pin	Name	Description
1	In-	Input-
2	In+	Input+
3	Exc-	Excitation-
4	Exc+	Excitation+

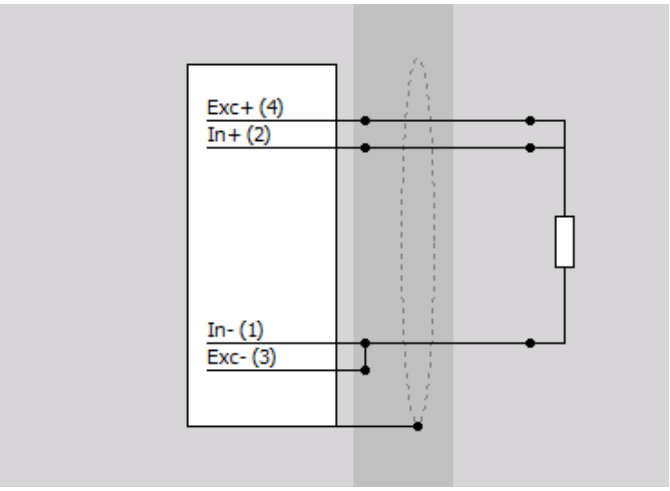
6.4.4.2.2.2. IOLITEi 8xRTD-HS: T2A4f Connector: Wiring diagram

Voltage

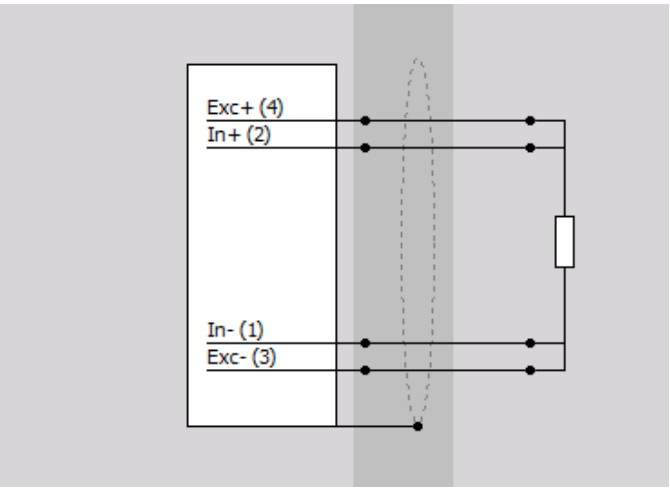


Resistance

3-wire

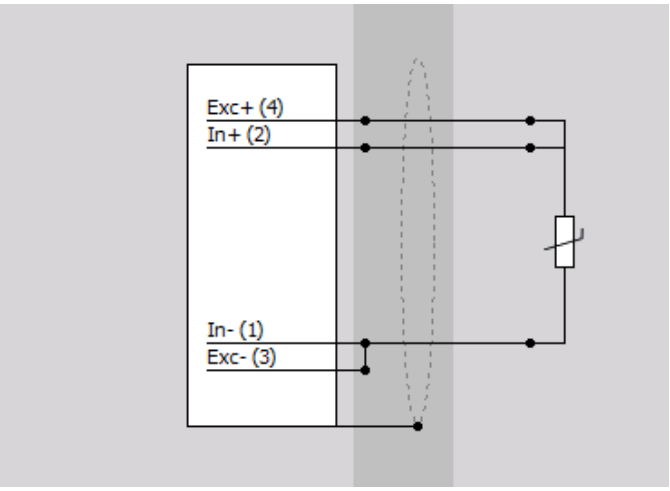


4-wire

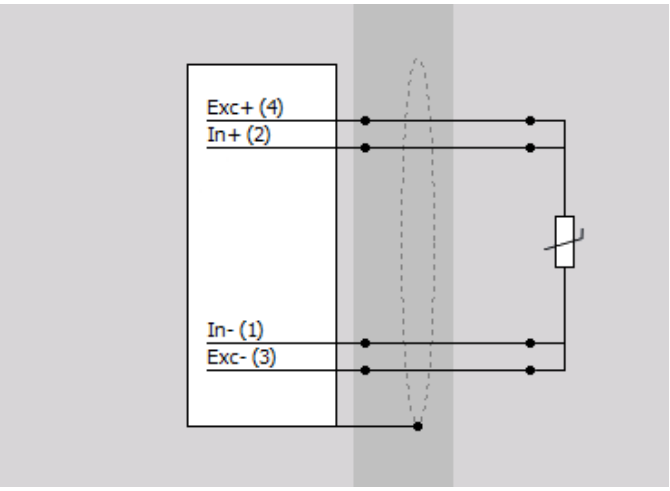


Temperature

3-wire



4-wire



6.5. VIBRATION AND SOUND MEASUREMENT

The IOLITE product family includes solutions for vibration and sound measurement with:

- IOLITEr-8xACC (rack version) and IOLITE-8xACC (standalone version)
- IOLITEi-1xACC module,
- IOLITE-3xMEMS-ACC - sensing device with integrated triaxial MEMS sensor.

Together with our software these modules are also a good choice for machine condition monitoring solutions for rotating machinery.

6.5.1. IOLITE 8xACC

The IOLITE 8xACC module is a perfect choice for sound and vibration measurements with IEPE channels.

IOLITE 8xACC (IOLITE-8xACC and IOLITEr-8xACC) modules have channel-to-ground isolation and come with BNC connectors.

IOLITEr-8xACC

IOLITE-8xACC

6.5.1.1. IOLITE 8xACC: Specifications

Analog inputs					
Input type		Voltage, IEPE			
Number of channels		8			
ADC Type		24-bit delta-sigma with anti-aliasing filter			
Sampling Rate IOLITE		Simultaneous 40 kS/sec per channel (software-selectable)			
Sampling Rate OBSIDIAN		Simultaneous 20 kS/sec per channel (software-selectable)			
Voltage Mode					
Ranges		**±10 V**	**±5 V**	**±1 V**	**±0.2 V**
Input Accuracy	DC	±0.02 % of reading ±0.02 % of range			
Noise floor, Typ.	10 kS/s	-116 dB	-116 dB	-114 dB	-105 dB
Dynamic Range, Typ.	10 kS/s	-151 dB	-151 dB	-150 dB	-140 dB
CMR, Typ. @ 40 kS/sec	0 dBFS sine wave @ 50 Hz	113 dB	113 dB	111 dB	102 dB
	0 dBFS sine wave @ 400 Hz	112 dB	112 dB	110 dB	102 dB
	0 dBFS sine wave @ 1 kHz	109 dB	108 dB	108 dB	102 dB
THD, Typ.	40 kS/s, -1 dBFS sine wave @ 1 kHz	-104 dB	-104 dB	-104 dB	-102 dB
SFDR, Typ.	40 kS/s, -1 dBFS sine wave @ 1 kHz	106 dB	106 dB	99 dB	96 dB
Gain Linearity		< 0.02 %			
Gain Drift		Typ. 5 ppm/K (Max. 15 ppm/K)			
Offset Drift		Typ. 0.5 µV/K + 0.5 ppm of range/K (Max. 2 µV/K + 2 ppm of range/K)			
Channel Cross talk, Typ. @ 1 kHz		-140 dB	-140 dB	-140 dB	-130 dB
Input Coupling		DC, AC 0.1 Hz, 1 Hz			
Input Impedance		1 MΩ			
Overvoltage Protection		In+ to In-: 50 V continuous, 200 V peak (10 msec)			
Isolation voltage		250 Vpeak channel to ground			
Analog input performance					
Sampling rate		**SR < 5 kS/s**		**SR ≥ 5 kS/s**	
Bandwidth (-3 dB)		0.49*fs		0.433*fs	
Alias-free Bandwidth		DC to 0.44*fs		DC to 0.499*fs	
Alias Rejection		-105 dB			
Delay Through ADC		34 / fs			
Oversampling		128			
IEPE input					
Excitation		2 mA, 4 mA, 6 mA			
Compliance voltage		28 V			
Output Impedance		>50 kΩ			

Sensor detection	Shortcut: <4 V; Open: >19 V
Additional Specifications	
Rack	**IOLITEr-8xACC**
Input connector	BNC
TEDs support	IEPE mode only (Class 1)
Power supply	9 - 48 V DC
Power Consumption	Analog input only: Typ. 3.6 W (Max. 4 W) IEPE: Typ. 4.8 W @ 4 mA (Max. 6 W @ 6 mA)
Weight	320 g
Slice Dimensions	128.4 x 127.6 x 30.1 mm
Additional Specifications	
Modular	**IOLITE-8xACC**
Input connector	BNC
TEDs support	IEPE mode only (Class 1)
Power supply	9 - 48 V DC
Power Consumption	Analog input only: Typ. 3.7 W (Max. 4.5 W) IEPE: Typ. 4.9 W @ 4 mA (Max. 6.4 W @ 6 mA)
Weight	575 g
Slice Dimensions	136.75 x 127.2 x 35.0 mm

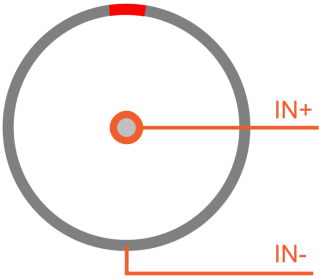
Note

There is a sensor disconnect functionality, which shows an overload on the channels if no sensor is connected to the channel.

6.5.1.2. IOLITE 8xACC: BNC Connector

IOLITEr-8xACC

6.5.1.2.1. IOLITE 8xACC: BNC Connector: Pinout



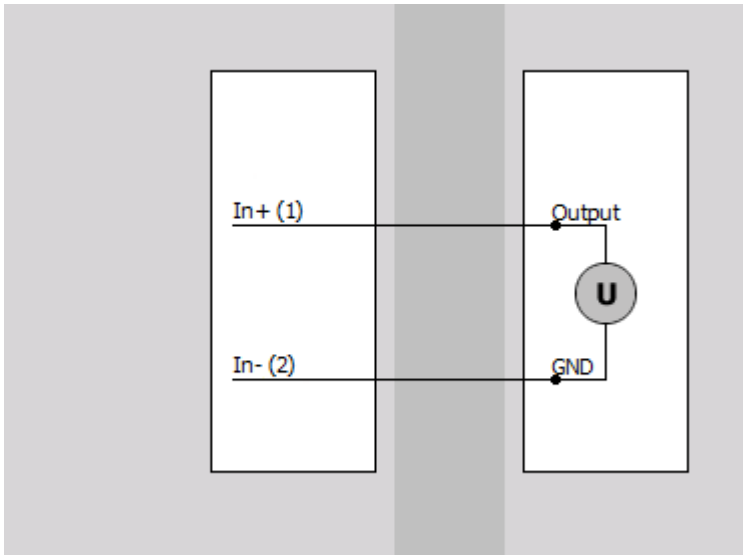
ACC connector: pin-out (BNC)

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

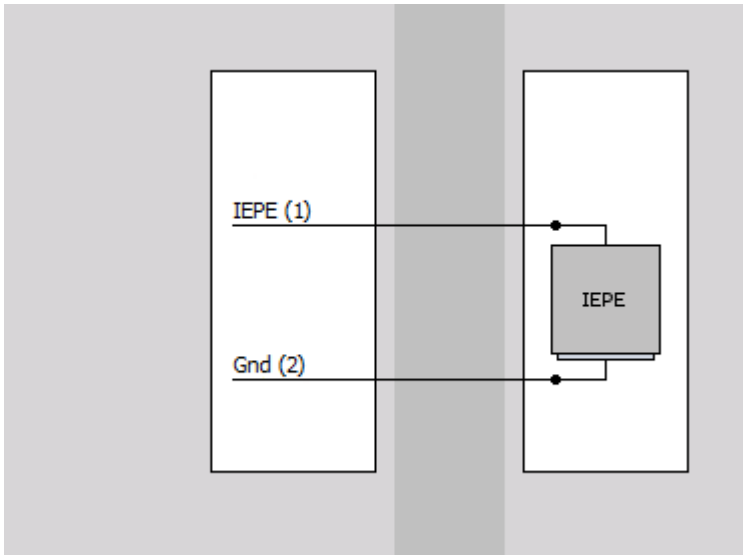
Note
IOLITE 8xACC has a single-ended input where IN- (Analog input -) represents isolated ground.

6.5.1.2.2. IOLITE 8xACC: BNC Connector: Wiring diagram

Voltage



IEPE



6.5.2. IOLITEi-1xACC

IOLITEi-1xACC is a single channel signal conditioner for IEPE sensors with high-precision isolated front end and EtherCAT bus on the back side.

IOLITEi-1xACC module

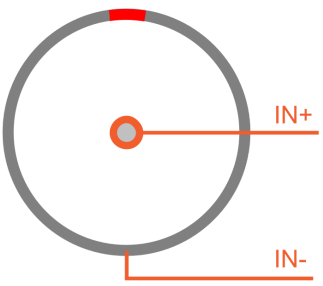
6.5.2.1. IOLITEi-1xACC: Specifications

Analog inputs				
Input types	Voltage, IEPE			
Number of channels	1			
Input connector	BNC			
ADC Type	24-bit SAR with anti-aliasing filter			
Sampling Rate	40 kS/s (50 kS/s while using it standalone)			
Voltage Ranges	**±10 V**	**±5 V**	**±1 V**	**±200 mV**
Typ. Input Accuracy	±0.03 % of reading ±0.02 % of range ±0.1 mV			
Typ. SNR (10 kS/sec, -1 dBFS sine wave @ 1 kHz)	90 dB	90 dB	89 dB	88 dB
Type. SFDR (10 kS/sec, -1 dBFS sine wave @ 1 kHz)	113 dB	110 dB	109 dB	106 dB
Typ. Noise floor @ 10 kS/sec	-100 dB	-99 dB	-99 dB	-98 dB
Typical CMR @ 400 Hz / 1 kHz	130 dB / 120 dB	122 dB / 119 dB	104 dB / 97 dB	90 dB / 84 dB
Gain Drift	typ. 10 ppm/K (max. 40 ppm/K)			
Offset Drift	typ. 0.3 µV/K + 5 ppm of range/K (max. 2 µV/K + 10 ppm of range/K)			

Gain Linearity	< 0.02 %
Input Coupling	DC, AC 0.1 Hz, 1 Hz
Input Impedance	1 MΩ
Overvoltage Protection	In+ to In-: 50 V continuous, 200 V peak (10 msec)
Isolation	125 Vrms channel to ground isolation
Analog input performance	
Bandwidth (-3 dB)	0.49 fs
Alias-free Bandwidth	DC to 0.453 fs
Alias Rejection	-100 dB (all sample rates)
Delay Through ADC	37 / fs
Oversampling	32
IEPE input	
Excitation	4 mA, 8 mA
Compliance voltage	24 V
Sensor detection	Shortcut: <4 V; Open: >19 V
TEDS support	IEPE mode only
Power	
Power consumption	2 W
Environmental	
IP rating	IP20
Physical	
Dimensions	93 x 67 x 28 mm
Weight	130 g

6.5.2.2. IOLITEi-1xACC: BNC Connector

6.5.2.2.1. IOLITEi-1xACC: BNC Connector: Pinout



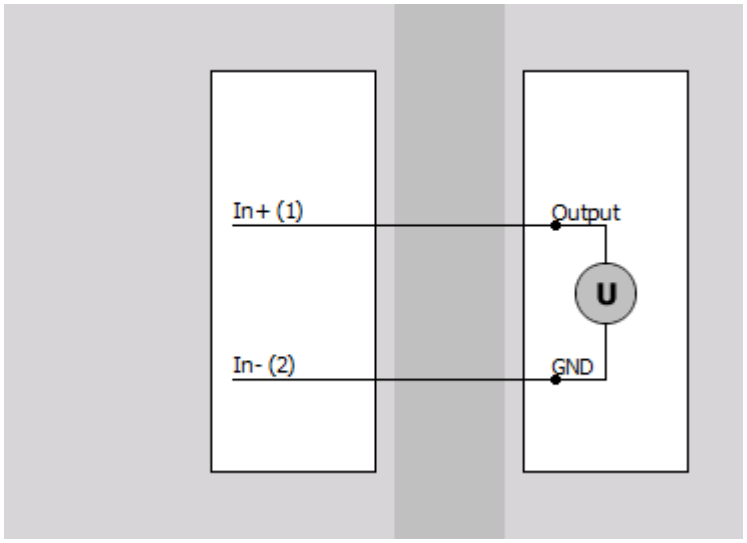
ACC connector: pin-out (BNC)

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

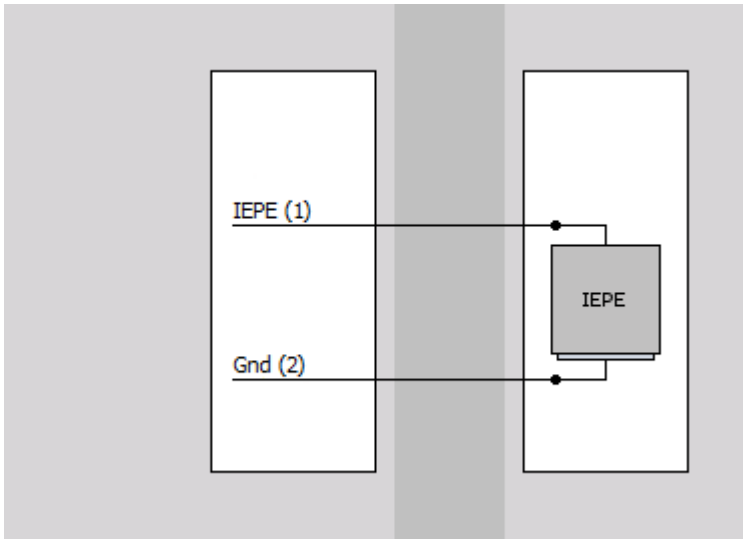
Note
IOLITE 8xACC has a single-ended input where IN- (Analog input -) represents isolated ground.

6.5.2.2.2. IOLITEi-1xACC: BNC Connector: Wiring diagram

Voltage



IEPE



6.5.3. IOLITE-3xMEMS-ACC

IOLITE-3xMEMS-ACC is an integrated sensing device. Acceleration is measured by a triaxial MEMS accelerometer inside the device that is tightly attached to the mechanical chassis. Analog to digital conversion is done inside the device, eliminating any noise pick up in analog cabling. Microprocessor inside the device transmits the acceleration samples over EtherCAT protocol into DEWESoft software running on a Windows PC, or alternatively to any controller running EtherCAT master on any platform. Scaling is automatic in DEWESoft software, therefore the data in g or m/s2 is readily available to the user. MEMS sensor internal temperature is also available as a data channel in DEWESoft software under System monitor channels.

IOLITE-3xMEMS-ACC

IOLITEw-3xMEMS-ACC can be supplied in a waterproof aluminum enclosure with cable glands. The enclosure is designed to be mounted outdoors. Cables are to be inserted through the cable glands at the installation location and crimped to the male RJ45 connectors. Female RJ45 connectors of the 3xMEMS-ACC are located inside the waterproof enclosure. The top lid is to be fixed to the enclosure using an O-ring seal and four bolts after the connectors are mated. The outdoor enclosure automatically vents air to equalize pressure inside the enclosure to the outside air pressure while it does not allow water to pass into the enclosure. This prolongs the life span of the seal and increases durability of the enclosure.

IOLITEw-3xMEMS ACC

6.5.3.1. IOLITE-3xMEMS-ACC: Specifications

MEMS Accelerometer	3xMEMS-ACC-8g			3xMEMS-ACC-40g		
	Min.	**Typ.**	**Max.**	**Min.**	**Typ.**	**Max.**
Measurement ranges	+-2 g		+-8 g	+-10 g		+-40 g
-3 dB bandwidth		1000 Hz			1000 Hz	
Sample rate			4 kHz			4 kHz
Dynamic range		96 dB			96 dB	
Noise density (lowest range)		25 µg/√Hz			75 µg/√Hz	
Residual noise (+-2 g range, 50 Hz bandwidth)		100 µg RMS				
Residual noise (+-2 g range, 125 Hz bandwidth)		150 µg RMS				
Offset error	-25 mg	10 mg	25 mg	-100 mg	30 mg	100 mg
Offset temperature drift (-20 .. 60 degC)	-0.15 mg / degC	+-0.02 mg / degC	0.15 mg / degC	-0.75 mg / degC	+-0.2 mg / degC	0.75 mg / degC
Semsitivity temperature drift (-20 .. 60 degC)		+-0.01 % / degC			+-0.01 % / degC	
Linearity error (smallest range)		0.1 % FS			0.1 % FS	
Crossaxis sensitivity	-1 %		1 %		1 %	
MEMS Inclinometer	Typ					
Accuracy and resolution valid in range	+-15 deg					
Accuracy and resolution valid for bandwidth	< 0.1 deg					
Relative accuracy (23 degC)	0.01 deg					
Resolution	0.001 deg					

6.6. ANALOG OUTPUT

The IOLITE AO module comes in the following options:

- IOLITEr-16xAO (rack version), IOLITE-16xAO (modular version)
- IOLITE-1xAO (modular version)

6.6.1. IOLITE 16xAO

IOLITE 16xAO is a 16-channel analog voltage output module with terminal block input connectors. The modules IOLITEr-16xAO and IOLITE-16xAO can output voltage in the range of and is a perfect tool for signal conditioning.

IOLITEr-16xAO

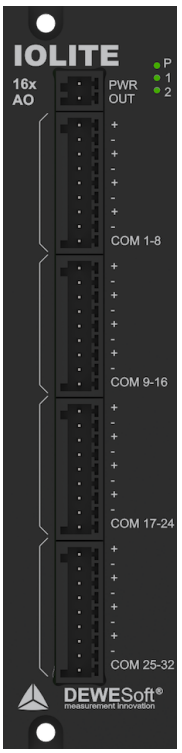
IOLITE-16xAO

6.6.1.1. IOLITE 16xAO: Specifications

Analog Output	
Output types	Voltage
Number of channels	16
Output connector	Terminal block
DAC Resolution	16-bit
Update Rate	20000 S/s (see 1)
Full Scale Output Range	±10 V (see 2)
Accuracy (typ.)	0.05 % ±1.5 mV (0 to 20 mA load)
Temperature gain drift (typ.)	±10 ppm/K
Temperature offset drift (typ.)	±5 uV/K
Output impedance	< 1 Ω DC
Minimal load resistance	500 Ω load @ 10 V output
Settling time (0.05 % of set value)	140 µs
Max slew rate	0.20 V/µs
Max capacitive load (2 % overshoot)	10 nF
Output protection	Short circuit protected
Current limit	20 mA per channel (160 mA per module)
Isolation	Channel to ground
Additional Specifications	
Output connectors	Terminal block, 2 pole, 4 x 9 pole OMNIMATE SL 2.50 / BLF 2.50/180
Power supply	9 - 48 V DC
Power out	max. 2 A
Power consumption	Typ. 4.5 W, Max. 8 W
Weight	210 g
Slice Dimensions	128.4 x 115.4 x 30.1 mm

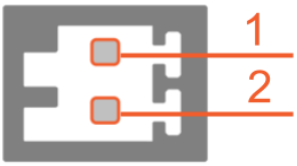
1) Only asynchronous mode is supported in Dewesoft, function generator is not supported
2) Only DC output voltage, function generator not supported

6.6.1.2. IOLITE 16xAO: Terminal block Connectors



IOLITEr-16xAO Front

6.6.1.2.1. IOLITE 16xAO: T2A2f Power Out Connector: Pinout



PWR OUT connector: pin-out (TBLOCK male)

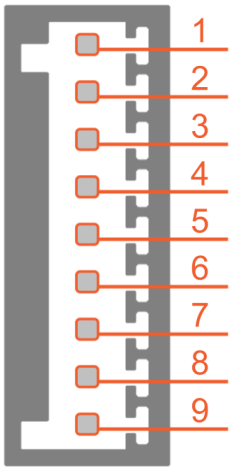
Pin	Name	Description
1	+PWR OUT	V_{supply} output
2	-PWR OUT	Non-isolated GND

Connector (on the device): OMNIMATE Signal SL 2.50/02/90G
Mating connector (for the cable): OMNIMATE Signal BLF 2.50/02/180

Caution

PWR OUT pins are intended to supply external loads. Do not connect the external power supply to the PWR OUT pins! It can damage the equipment.
Current limit of PWR OUT source is 2 A per module.
Current limit of the IOLITE system is 16 A!

6.6.1.2.2. IOLITE 16xAO: T2A9f connector: Pinout



AO connector: pin-out (TBLOCK male)

Pin	Name	Description
1	AO 1	Analog out 1
2	iGND	Ground
3	AO 2	Analog out 2
4	iGND	Ground
5	AO 3	Analog out 3
6	iGND	Ground
7	AO 4	Analog out 4
8	iGND	Ground
9	iGND	Ground

Connector (on the device): OMNIMATE Signal SL 2.50/09/90G 3.2SN BK BX
Mating connector (for the cable): OMNIMATE Signal BLF 2.50/09/180

6.6.2. IOLITE-1xAO

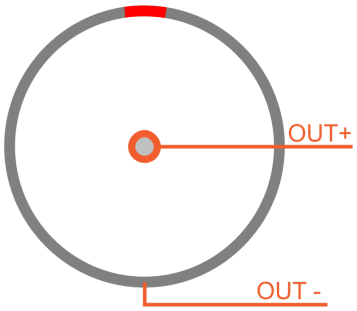
Low-latency, high precision analog output with excellent dynamic performance. Under 100 microseconds of etherCAT-to-analog delay possible(on a real-time EtherCAT controller).

IOLITE-1xAO Front

6.6.2.1. IOLITE-1xAO: Specifications

Analog Output	
Output types	Voltage
Number of channels	1
Output connector	BNC
DAC Resolution	18-bit
Update Rate	1000 S/sec
Function Generator function	Supported
Full Scale Output Range	±10 V
Accuracy (typ.)	0.1 % ±1 mV (0 to 20 mA load)
Temperature gain drift (typ.)	±10 ppm/K
Temperature offset drift (typ.)	±5 uV/K
SNR @ 1000 S/s output rate	92 dB (sine wave, 250 Hz, ±9 V)
THD	-90 dB
Output impedance	0.45 Ω DC
Maximum output current	20 mA
Settling time (0.05 % of set value)	30 µs @ 1000 Ω load, -10 V to 10 V step
Max slew rate	2.5 V/µs @ 1000 Ω load
Max capacitive load (2 % overshoot)	10 nF
Maximum load	500 Ω
Output protection	Short circuit protected
Isolation	X
Power	
Power consumption	2 W
Environmental	
IP rating	IP20
Physical	
Dimensions	93 x 67 x 28 mm
Weight	130 g

6.6.2.2. IOLITE-1xAO BNC Connector: Pinout



AO connector: pin-out (BNC)

Pin	Name	Description
1	Out+	Output +
2	Out-	Output -

6.7. DIGITAL AND COUNTER MEASUREMENT

IOLITE digital input / output and counter products are represented with six different module types:

- IOLITEr-32xDI (rack version)
- IOLITEr-32xDO (rack version)
- IOLITEr-8xDI-4xDO (rack version)
- IOLITEr-4xCNT (rack version), IOLITE-4xCNT (modular version)
- IOLITEi-4xDI (modular version)
- IOLITEi-4xDO (modular version)

IOLITEr-32xDI, IOLITEr-32xDO, IOLITEr-8xDI-4xDO include a power out option, where unregulated power supply voltage is brought to the 2-pin PWR OUT connector.

Digital output modules also offer watchdog functionality.

They are a perfect choice for control applications.

IOLITE 4xCNT includes SUPERCOUNTER® technology.

Hint
IOLITEi-4xDO offers a software option for PWM output.

Hint
Find out more about Watchdog feature in Watchdog User Manual:
https://download.dewesoft.com/list/manuals-brochures/software-manuals
In the *Software Manuals* section click the download link of the Watchdog User Manual entry.

6.7.1. IOLITE 32xDI

The IOLITE 32xDI module has 32 digital inputs. The modules IOLITEr-32xDI and IOLITE-32xDI offer input range of 48 V with an isolated common GND in groups of 8 channels.

IOLITEr-32xDI

IOLITE-32xDI

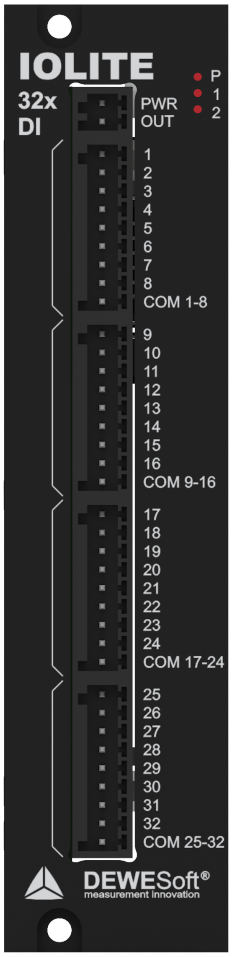
6.7.1.1. IOLITE 32xDI: Specifications

Digital Input	
Isolated Input Channels	32
Input low level	-1 V ~ +1 V
Input high level	-48 V ~ -3 V, +3 V ~ +48 V
Input high current @ 5 V	UIN < 1 mA
Input high current @ 30 V	UIN < 1 mA
Sampling rate	Simultaneous 20 kS/s
Overvoltage protection	100 V continuous (250 Vpeak)
Isolation voltage peak	1000 V Isolated common GND, groups of 8 ch
Additional Specifications	
Input connectors	Terminal block, 2 pole, 4 x 9 pole OMNIMATE SL 2.50 / BLF 2.50/180
Power supply	9 - 48 V DC
Power out	max. 2 A (unprotected)
Power consumption	Typ. 1.2 W, Max. 1.9 W
Weight	220 g
Slice Dimensions	128.4 x 115.4 x 30.1 mm

6.7.1.2. IOLITE 32xDI: Connectors

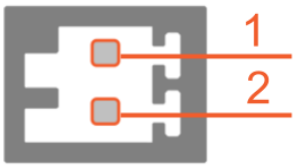
IOLITE 32xDI modules have 9-pin terminal block connectors with 2.50 mm pitch for digital input. 8 pins on a 9-pin connector bank are used for digital inputs and pin 9 for common GND.

Additionally, there is a 2-pin terminal block connector with a 2.50 mm pitch for PWR OUT function.



IOLITEr-32xDI front

6.7.1.2.1. IOLITE 32xDI: Power Out: Pinout



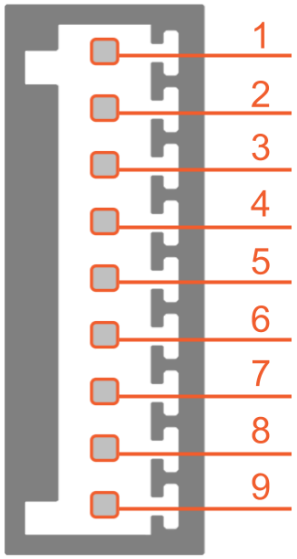
PWR OUT connector: pin-out (terminal block male)

Pin	Name	Description
1	+PWR OUT	V_{supply} output
2	-PWR OUT	Non-isolated GND

PWR OUT connector (on the device): OMNIMATE Signal SL 2.50/02/90G
Mating connector (for the cable): OMNIMATE Signal BLF 2.50/02/180

Caution
PWR OUT pins are intended to supply external loads. Do not connect the external power supply to the PWR OUT pins! It can damage the equipment.
Current limit of PWR OUT source is 2 A per module.
Current limit of the IOLITE system is 16 A!

6.7.1.2.2. IOLITE 32xDI: Digital Input: Pinout



Digital in connector: pin-out (terminal block male)

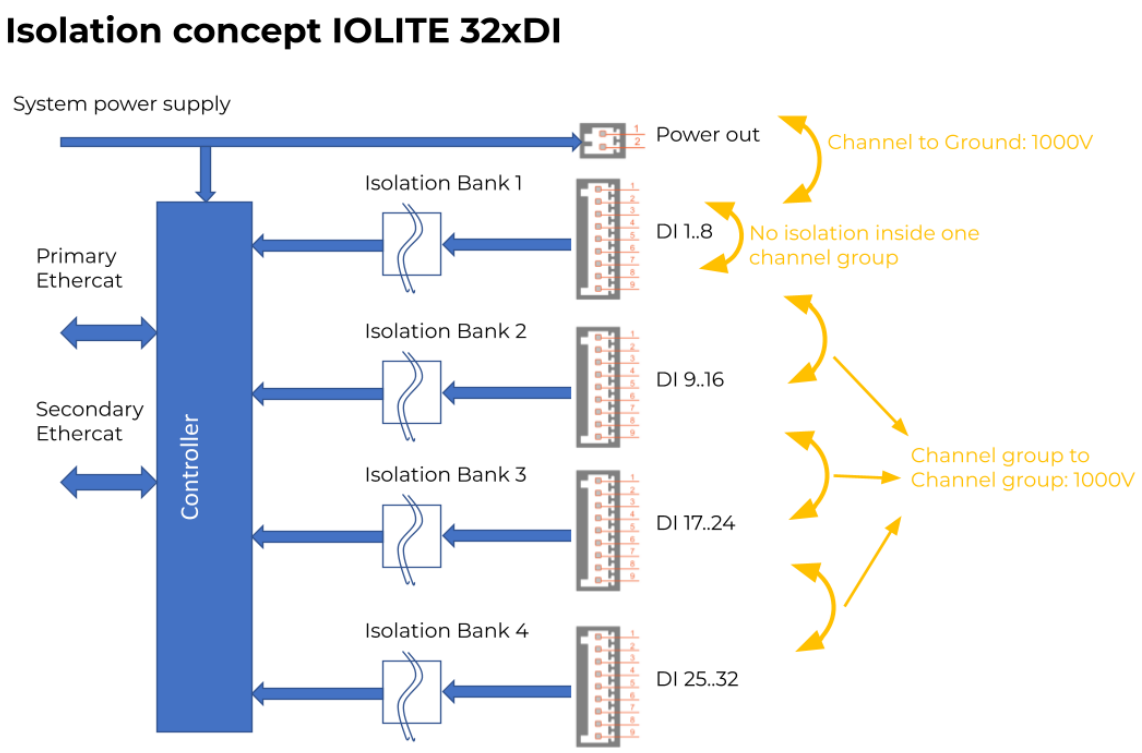
Pin	Name	Description
1	DI 1	Digital input 1
2	DI 2	Digital input 2
3	DI 3	Digital input 3
4	DI 4	Digital input 4
5	DI 5	Digital input 5
6	DI 6	Digital input 6
7	DI 7	Digital input 7
8	DI 8	Digital input 8
9	COM	Common

DI connector (on the device): OMNIMATE Signal SL 2.50/09/90G
Mating connector (for the cable): OMNIMATE Signal BLF 2.50/09/180

Important
The common pin is not shared through all the 32 channels, but by groups of 8 channels.

6.7.1.3. IOLITE 32xDI: Isolation concept

Diagram below is showing the bank-to-bank isolation concept for digital inputs in groups of 8 channels.



IOLITE 32xDI isolation concept

6.7.2. IOLITE 32xDO

The IOLITE 32xDO module has 32 digital outputs. Modules IOLITEr-32xDO and IOLITE-32xDO offer watchdog function and solid state relay compatibility with maximum 0.5 A sink current and 50 V switching voltage. Module includes isolation of common GND in groups of 8 channels.

IOLITEr-32xDO

IOLITE-32xDO

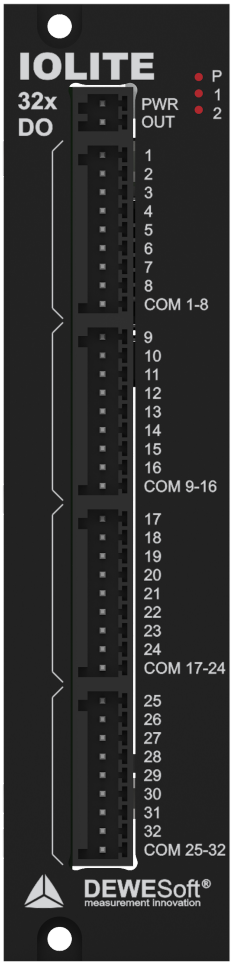
6.7.2.1. IOLITEr-32xDO: Specifications

Digital Output	
Isolated Output Channels	32
Compatibility	Solid state relay
Maximum sink current	0.5 A
Maximum switching voltage	50 V
Maximum update rate	depending on EtherCAT master
Isolation voltage peak	1000 V Isolated common GND, groups of 8 ch
Additional Specifications	
Input connectors	Terminal block, 2 pole, 4 x 9 pole OMNIMATE SL 2.50 / BLF 2.50/180
Power supply	9 - 48 V DC
Power out	max. 2 A (unprotected)
Power consumption	Typ. 1.2 W, Max. 2.0 W
Weight	230 g
Slice Dimensions	128.4 x 115.4 x 30.1 mm

6.7.2.2. IOLITE 32xDO: Connectors

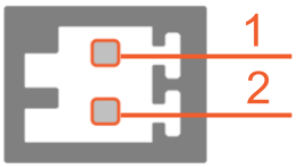
IOLITE 32xDO modules have 9-pin terminal block connectors with 2.50 mm pitch for digital output. 8 pins on a 9-pin connector bank are used for digital outputs and pin 9 for common GND.

Additionally, there is a 2-pin terminal block connector with a 2.50 mm pitch for PWR OUT function.



IOLITEr-32xDO front

6.7.2.2.1. IOLITEr-32xDO: Power Out: Pinout



PWR OUT connector: pin-out (terminal block male)

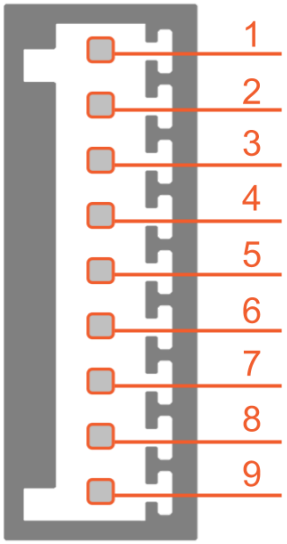
Pin	Name	Description
1	+PWR OUT	V_{supply} output
2	-PWR OUT	Non-isolated GND

PWR OUT connector (on the device): OMNIMATE Signal SL 2.50/02/90G
Mating connector (for the cable): OMNIMATE Signal BLF 2.50/02/180

Caution

PWR OUT pins are intended to supply external loads. Do not connect the external power supply to the PWR OUT pins! It can damage the equipment.
Current limit of PWR OUT source is 2 A per module.
Current limit of the IOLITE system is 16 A!

6.7.2.2.2. IOLITEr-32xDO: Digital Output: Pinout



Digital out connector: pin-out (terminal block male)

Pin	Name	Description
1	DO 1	Digital output 1
2	DO 2	Digital output 2
3	DO 3	Digital output 3
4	DO 4	Digital output 4
5	DO 5	Digital output 5
6	DO 6	Digital output 6
7	DO 7	Digital output 7
8	DO 8	Digital output 8
9	COM	Common

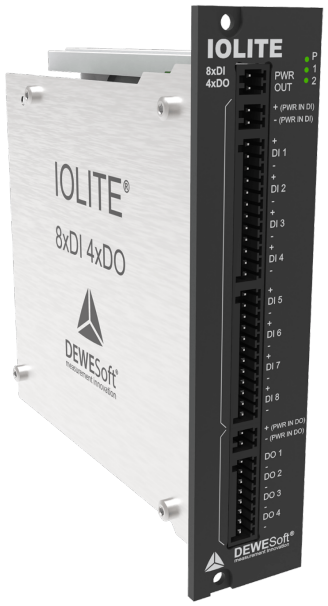
DO connector (on the device): OMNIMATE Signal SL 2.50/09/90G
Mating connector (for the cable): OMNIMATE Signal BLF 2.50/09/180

Important
The common pin is not shared through all the 32 channels, but by groups of 8 channels. Isolation concept is shown in the case of 32xDI.

Hint
Check how to use DO as a switch on this LINK.

6.7.3. IOLITE-8xDI-4xDO

The IOLITE 8xDI-4xDO module has 8 digital inputs and 4 digital outputs. Digital IN and OUT banks are isolated from each other and can be powered by separate external power supplies. Module comes in rack version and offers watchdog function and is a perfect choice for more demanding industrial applications such as valve control, with a maximum sink current 0.5 A and maximum switching voltage 50 V.



IOLITEr-8xDI-4xDO

IOLITE-8xDI-4xDO

6.7.3.1. IOLITE 8xDI-4xDO: Specifications

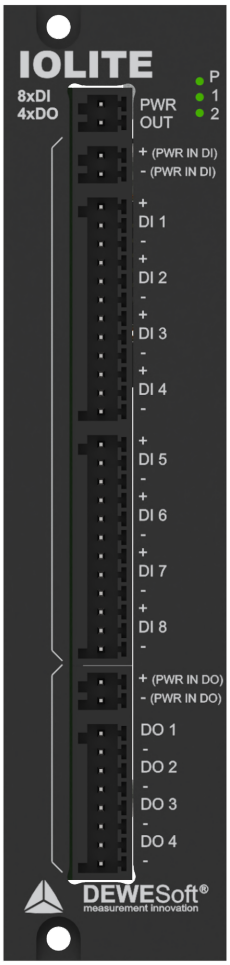
Digital Input	
Isolated Input Channels	8
Input low level	-1 V ~ +1 V
Input high level	-48 V ~ -3 V, +3 V ~ +48 V
Input high current @ 5 V	UIN < 1 mA
Input high current @ 30 V	UIN < 1 mA
Sampling rate	Simultaneous 40 kS/s
Overvoltage protection	100 V continuous (250 Vpeak)
Isolation voltage peak	1000 V Isolated common GND
Digital Output	
Isolated Output Channels	4
Compatibility	Solid state relay
Maximum sink current	0.5 A
Maximum switching voltage	50 V
Maximum update rate	depending on EtherCAT master
Isolation voltage peak	1000 V Isolated common GND
Additional Specifications	
Input connectors	Terminal block (3 x 2 pole, 2 x 12 pole, 1 x 8 pole) OMNIMATE SL 2.50 / BLF 2.50/180
Power supply	9 - 48 V DC
Power out	max. 2 A (unprotected)
Power consumption	Typ. 1.1 W, Max. 1.8 W
Weight	184 g
Slice Dimensions	128.4 x 115.4 x 30.1 mm

6.7.3.2. IOLITE 8xDI-4xDO: Connectors

IOLITEr-8xDI-4xDO and IOLITE-8xDI-4xDO modules have 2-pin terminal block connector for external power supply and two time 12-pin terminal block connectors for digital inputs.
Additionally there is 2-pin terminal block connector for external power supply and 8-pin terminal block connector for digital outputs.
Digital IN and OUT banks are isolated from each other.

Additionally, there is a 2-pin terminal block connector for PWR OUT function.

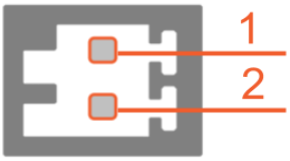
All terminal block connectors have a 2.50 mm pitch.



IOLITEr-8xDI-4xDO front

Hint
Connection of digital input/output channel is explained in detail LINK.

6.7.3.2.1. IOLITE 8xDI-4xDO: Power Out: Pinout



PWR OUT connector: pin-out (terminal block male)

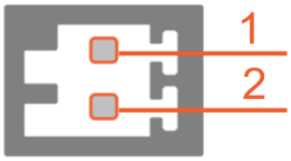
Pin	Name	Description
1	+PWR OUT	V_{supply} output
2	-PWR OUT	Non-isolated GND

PWR OUT connector (on the device): OMNIMATE Signal SL 2.50/02/90G
Mating connector (for the cable): OMNIMATE Signal BLF 2.50/02/180

Caution

PWR OUT pins are intended to supply external loads. Do not connect the external power supply to the PWR OUT pins! It can damage the equipment.
Current limit of PWR OUT source is 2 A per module.
Current limit of the IOLITE system is 16 A!

6.7.3.2.2. IOLITE 8xDI-4xDO: Power In: Pinout

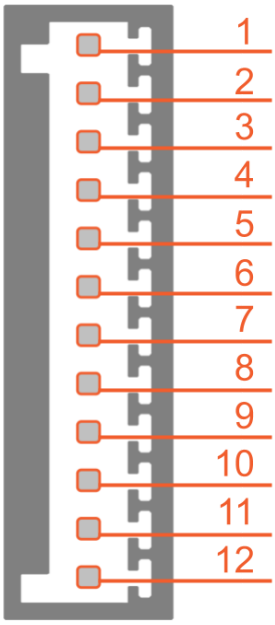


PWR IN connector: pin-out (terminal block male)

Pin	Name	Description
1	+ PWR IN DI	Input voltage
2	- PWR IN DI	Input ground

PWR IN connector (on the device): OMNIMATE Signal SL 2.50/02/90G
Mating connector (for the cable): OMNIMATE Signal BLF 2.50/02/180

6.7.3.2.3. IOLITE 8xDI-4xDO: Digital Input: Pinout

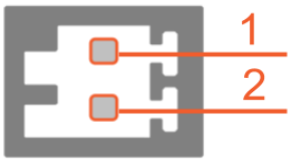


Digital in connector: pin-out (terminal block male)

Pin	Name	Description
1	+	Input voltage
2	DI 1	Digital input 1
3	-	Input ground
4	+	Input voltage
5	DI 2	Digital input 2
6	-	Input ground
7	+	Input voltage
8	DI 3	Digital input 3
9	-	Input ground
10	+	Input voltage
11	DI 4	Digital input 4
12	-	Input ground

DO connector (on the device): OMNIMATE Signal SL 2.50/09/90G
Mating connector (for the cable): OMNIMATE Signal BLF 2.50/09/180

6.7.3.2.4. IOLITE 8xDI-4xDO: Power In: Pinout

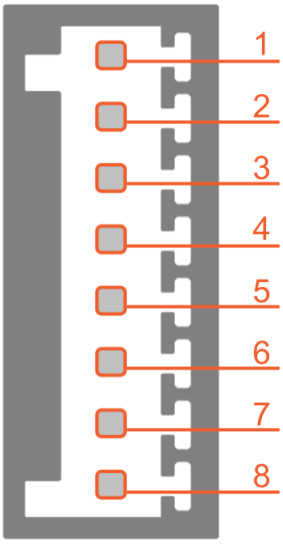


Power in connector: pin-out (terminal block male)

Pin	Name	Description
1	+ PWR IN DO	Input voltage
2	- PWR IN DO	Output ground

PWR IN connector (on the device): OMNIMATE Signal SL 2.50/02/90G
Mating connector (for the cable): OMNIMATE Signal BLF 2.50/02/180

6.7.3.2.5. IOLITE 8xDI-4xDO: Digital Output: Pinout



Digital out connector: pin-out (terminal block male)

Pin	Name	Description
1	DO 1	Digital output 1
2	-	Output ground
3	DO 2	Digital output 2
4	-	Output ground
5	DO 3	Digital output 3
6	-	Output ground
7	DO 4	Digital output 4
8	-	Output ground

DO connector (on the device): OMNIMATE Signal SL 2.50/09/90G
Mating connector (for the cable): OMNIMATE Signal BLF 2.50/09/180

6.7.4. IOLITEi-4xDI

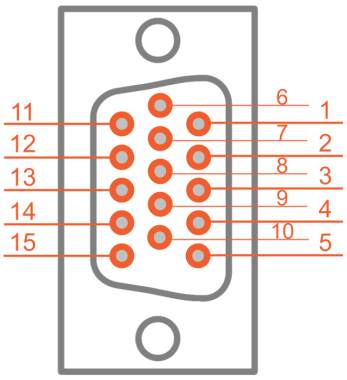
Robust, isolated digital inputs are suitable for reading data off digital sensors as well as for demanding test automation tasks. Three power supply voltages (5V, 12V and device voltage supply level) available on the front connector. EtherCAT interface, signal and power over the same cable.

IOLITEi-4xDI module

6.7.4.1. IOLITEi-4xDI: Specifications

Digital Input	
Input type	Digital
Number of channels	4
Connector	DSBU15HD Male
Compatibility	TTL / CMOS Voltage Levels
Input low level	UIN < 1 V
Input high level	UIN > 2 V
Input high current @ 5 V UIN	3 mA typ.
Input high current @ 30 V UIN	6 mA typ.
Propagation delay	< 1 µs
Max. sampling rate	40 kS/sec
Overvoltage protection	30 V Continuous, 65 V peak
Isolation	Galvanic isolation CH, GND
Non-Isolated Sensor Power Supply	
Output Voltage +5 V	5 V +/- 10 %, 300 mA max.
Output Voltage +12 V	12 V +/-10 %, 100 mA max.
Output Voltage +Vecat	EtherCAT Bus Supply Voltage, 200 mA max.
Power	
Power consumption	2.5 W
Environmental	
IP rating	IP20
Physical	
Dimensions	82 x 67 x 28 mm
Weight	130 g

6.7.4.2. IOLITEi-4xDI: DSUB-15 Connector: Pinout



DSUB-15 HD male for IOLITEi-4xDI

Pin	IOLITEi-4xDI	
	Name	**Description**
1	DI1 +	Digital input CH1 +
2	DI2 +	Digital input CH2 +
3	DI3 +	Digital input CH3 +
4	DI4 +	Digital input CH4 +
5	NC	-
6	DI1 -	Digital input CH1 -
7	DI2 -	Digital input CH2 -
8	DI3 -	Digital input CH3 -
9	DI4 -	Digital input CH4 -
10	NC	-
11	+5V/300mA	5 V supply, max. 300 mA
12	+12V/130mA	12 V supply, max.130 mA
13	GND	Ground
14	GND	Ground
15	V_{supply}/200mA	Supply voltage, max. 200 mA

6.7.5. IOLITEi-4xDO

Isolated digital outputs with high current capability can drive motors, pumps or valves as well as trigger pure digital signals. Three power supply voltages (5V, 12V and device voltage supply level) available on the front connector. EtherCAT interface, signal and power over the same cable.

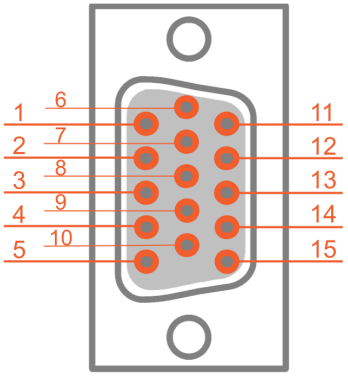
IOLITEi-4xDO module

6.7.5.1. IOLITEi-4xDO: Specifications

Digital Output	
Output type	Digital
Number of channels	4
Connector	DSUB15HD Female
Maximum update rate	depends on EtherCAT master cycle time
Output type	open collector with active internal pullup to 5 V
Sink	max 50 V, 2 A (resistive load, unprotected)
Source	5 V, max. 40 mA (internally limited)
Max. switching frequency for internal PWM	100 kHz
Isolation	Galvanic isolation CH, GND
Non-Isolated Sensor Power Supply	
Output Voltage +5 V	5 V +/- 10 %, 300 mA max. Max. combined load on +5 V and +12 V pins: 1.5 W reduced by the load already present on +Vin pin
Output Voltage +12 V	12 V +/-10 %, 100 mA max. Max. combined load on +5 V and +12 V pins: 1.5 W reduced by the load already present on +Vin pin
Output Voltage +Vecat	EtherCAT Bus Supply Voltage, 200 mA max. (see 1.)
Power	
Power consumption	2.5 W
Environmental	

IP rating	IP20
Physical	
Dimensions	82 x 67 x 28mm
Weight	130 g

6.7.5.2. IOLITEi-4xDO: DSUB-15 Connector: Pinout



DSUB-15 HD female for IOLITEi-4xDO

Pin	IOLITEi-4xDO	
	Name	**Description**
1	DO1	Digital output CH1
2	DO2	Digital output CH2
3	DO3	Digital output CH3
4	DO4	Digital output CH4
5	Vext +	External voltage
6	GNDi	Isolated ground
7	GNDi	Isolated ground
8	GNDi	Isolated ground
9	GNDi	Isolated ground
10	NC	-
11	+5V/300mA	5 V supply, max. 300 mA
12	+12V/130mA	12 V supply, max.130 mA
13	GND	Ground
14	GND	Ground
15	V_{supply}/200mA	Supply voltage, max. 200 mA

6.7.6. IOLITE-4xCNT

IOLITE CNT has 4 channels, each capable of 3x digital inputs, 1x event counter, encoder, period, pulse-width, duty-cycle, and precise frequency and angle measurement using patented SUPERCOUNTER® technology.

IOLITEr-4xCNT

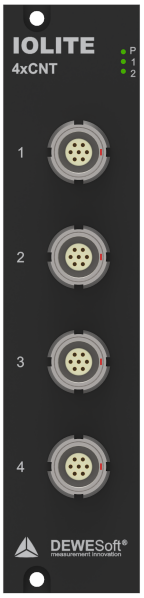
IOLITE-4xCNT

6.7.6.1. IOLITE 4xCNT: Specifications

Counter	
Number of channels	4
Timebase	100 MHz
Time base accuracy	Typical: 5 ppm, Max: 20 ppm
Max. bandwidth	10 MHz
Input Filter	500 ns, 1 µs, 2 µs, 4 µs, 5 µs and 7.5 µs
Input Level Compatibility	TTL (Low: <0.8 V, High >2 V)
Input impedance	100 kΩ pull-up to +3.3 V
Input Protection	±25 V continuous
Counter modes	counting, waveform timing, encoder, gear-tooth sensor
Isolated Sensor Power Supply	
Output Voltage +5 V	5 V +/- 10 % 100 mA max. (400 mA to supply 4 channels)
Output Voltage +12 V	12 V +/-10 % 50 mA max. (100 mA to supply 4 channels)
Isolation	Ch to GND isolation
Additional Specifications	
Input connector	7-pin LEMO 1B series EEG.1B.307.CLNY
Power Consumption @ 24 V	Typ. 1.9 W
Power supply	9 - 48 V DC
Slice Dimensions	128.4 x 115.4 x 30.1 mm

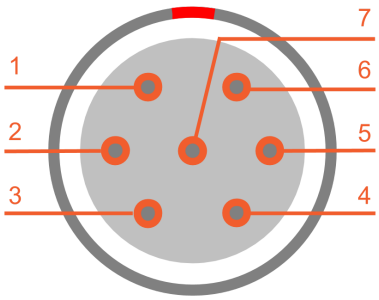
6.7.6.2. IOLITE 4xCNT: LEMO L1B7f Connector

IOLITE-4xCNT and IOLITEr-4xCNT modules have four 7-pin LEMO connectors for digital, counter and encoder inputs.



IOLITEr-4xCNT Front

6.7.6.2.1. CNT: LEMO L1B7f Connector: Pinout



CNT connector: pin-out (7-pin LEMO female)

Connector on the module: EGG.1B.307.CLL
Mating cable connector: FGG.1B.307.CLAD52

Pin	Name	Description
1	IN0/A	Digital input 0/A
2	IN1/B	Digital input 1/B
3	IN2/Z	Digital input 2/Z
4	GND	Ground
5	+5V	5 V supply
6	+12V	12 V supply
7	GND	Ground

7. IOLITE Accessories

Optional IOLITE Accessories and Sensors can be found in a separate documents depending on the functionality, which are available for download from our homepage:
https://dewesoft.com/download/manuals

7.1. IOLITE Power injector

IOLITE Power Injector is a passive PoE power injector. It merges a 12-48V DC power source and the EtherCAT communication into a single CAT6 cable. The IOLITE single channel devices need the IOLITE Power injector as the first device in the chain.

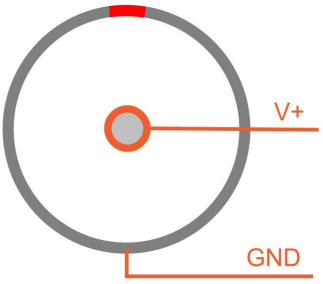
IOLITE Power injector

7.1.1. General specifications

General specifications	
Digital interface	EtherCAT
EtherCAT connector	RJ45
Power connectors	Wire terminal, 2mm jack
Erath connectors	Wire terminal
Wire terminal connector type	MC 1,5 / 3-STF-3.81
Power consumption	< 500 mW
Supply Voltage	12 V - 48 V
Operating temperature	-20 .... 60 degC
IP rating	IP20
Weight	105 g
Housing material	Aluminum

7.1.2. IOLITE Power Injector: Connector

7.1.2.1. IOLITE Power Injector: 2 mm Jack Pinout



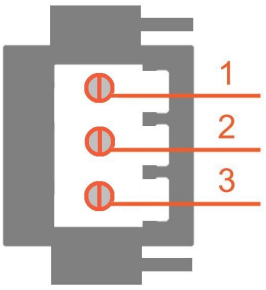
Power in connector: pin-out (2 mm DC jack, male)

Pin	Name	Description
1	V +	Supply
2	GND	Ground

For the power supply an unregulated DC voltage between 12 V and 48 V is required.

Connector (on the device): 2 mm DC power jack - PJ-067A

7.1.2.2. IOLITE Power Injector: Phoenix MC 1,5/3 Pinout



Power in connector: pin-out (Phoenix MC 1,5/3)

Pin	Name	Description
1	V +	Supply
2	GND	Ground
3	EARTH	Earth

For the power supply an unregulated DC voltage between 12 V and 48 V is required.

Connector (on the device): Wire terminal, Phoenix MC 1,5/ 3-GF-3.81
Mating connector (for the cable): Wire terminal, Phoenix MC 1,5/ 3-STF-3,81

7.2. IOLITE Repeater

Daisy-chains increase the distance for signal, synchronization and power between IOLITE single channel instruments. Suggested length of the cable is up to 50 m, after that IOLITE Repeater is needed for power and communication purposes.

IOLITE-REPEATER

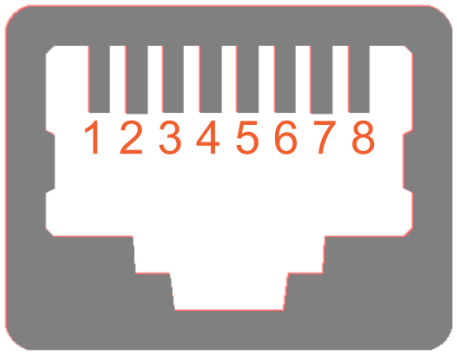
7.2.1. General specifications

General specifications of the IOLITE Repeater device	
Digital interface	EtherCAT
EtherCAT connector	RJ45
Power consumption	1200 mW
Supply Voltage	12 V - 48 V
Operating temperature	-20 .... 60 degC
IP rating	IP20
Weight	105 g
Housing material	Aluminum

7.2.2. Connectors

Connector used on the device is a standard ethernet connector (RJ45). Standard ethernet cable with standard connector can be used to connect IOLITE-REPEATER with a device.

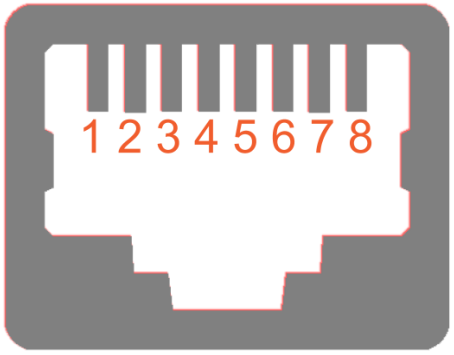
7.2.2.1. EtherNET - IN



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

Pin	Name	Description
1	TX_P	Transmission +
2	TX_N	Transmission -
3	RX_P	Reception +
4	DC +	PoE +
5	DC +	PoE +
6	RX_N	Reception -
7	DC -	PoE -
8	DC -	PoE -

7.2.2.2. EtherNET - OUT



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

Pin	Name	Description
1	TX_P	Transmission +
2	TX_N	Transmission -
3	RX_P	Reception +
4	DC +	PoE +
5	DC +	PoE +
6	RX_N	Reception -
7	DC -	PoE -
8	DC -	PoE -

Hint

The power over ethernet (PoE) is passive. This means that there are no data signals on the power supply pins.

9. Warranty information

Notice
The information contained in this document is subject to change without notice.

Note:
Dewesoft d.o.o. shall not be liable for any errors contained in this document. Dewesoft MAKES NO WARRANTIES OF ANY KIND WITH REGARD TO THIS DOCUMENT, WHETHER EXPRESS OR IMPLIED. DEWESOFT SPECIFICALLY DISCLAIMS THE IMPLIED WARRANTIES OF MERCHANTABILITY AND FITNESS FOR A PARTICULAR PURPOSE. Dewesoft shall not be liable for any direct, indirect, special, incidental, or consequential damages, whether based on contract, tort, or any other legal theory, in connection with the furnishing of this document or the use of the information in this document.

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

Use Slovenian law for duplication or disclosure. Dewesoft d.o.o. Gabrsko 11a, 1420 Trbovlje, Slovenia / Europe.

9.5. Copyright

9.6. Trademarks

We take pride in our products and we take care that all key products and technologies are registered as trademarks all over the world. The Dewesoft name is a registered trademark. Product families (KRYPTON, Sirius, DSI, DS-NET, IOLITE) and technologies (DualCoreADC, SuperCounter, GrandView) are registered trademarks as well. When used as the logo or as part of any graphic material, the registered trademark sign is used as a part of the logo. When used in text representing the company, product or technology name, the ® sign is not used. The Dewesoft triangle logo is a registered trademark but the ® sign is not used in the visual representation of the triangle logo.

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:

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.

10.2.3. 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!
- 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
1.0.0	10.11.2019	• Initial version

V20-1	14.07.2020	• Added devices:
		  ○ LV modules (IOLITEi-8xLV, IOLITEi-8xLV-10V, IOLITEi-8xLV-TBLOCK, IOLITEi-8xLV-10V-TBLOCK)
		  ○ DIO module (IOLITEi-8xDI-4xDO)
		  ○ RTD module (IOLITEi-8xRTD-T2A4f)
		  ○ CNT module (IOLITE-4xCNT)
		• Updated template

V21-1	25.02.2021	• Added devices:
		  ○ 16xLV
		  ○ 8xLA
		  ○ 8xSTGS
		  ○ IOLITE multichannel
		  ○ IOLITE signal channel
		  ○ IOLITE4xMEMS-ACC
		  ○ IOLITE accessories
		• Changed naming of the devices

V21-2	30.04.2021	• Added devices:
		  ○ IOLITE-R8r platform
		  ○ 16xAO
		• Updated naming of the devices
		• Updated specifications

V21-3	12.05.2021	• Minor fixes
V22-1	24.01.2022	• 8xSTGS: Correction of wiring diagrams for Bridge mode • Updated maximum voltage protection in LA specifications • Removed chapter Appendix • Added chapter 3.3.4. IOLITEr slices: Mounting/Removing/Replacing from Rack Chassis • Added products: ○ IOLITEi-8xTH-HS
V22-2	11.11.2022	• IOLITE-GATE, IOLITE-R8, IOLITE-R8r: PWR-IN Connector, Mating Connector Part Number • 8xSTGS Pinout correction • EtherCAT Sync Accuracy update • Added Shock & Vibration Specs for IOLITE Chassis • Added Hints with links to connection examples for digital I/O modules

		• Added products ○ IOLITEir-8xRTD-HS, IOLITEir-8xRTD-HS-T2A4f

V23-1	24.01.2023	• Added products:
		  ○ IOLITEir-LVe, IOLITEir-LVe-D37
		• Added pinout for 2xD37m to 8xRJ45 adapter for IOLITE-R8r-8xSTGS-D37 for quarter bridge applications
		• Changed IOLITE single amplifiers' overview table structure to unify with all product lines
		• Added technical specifications for:
		  ○ IOLITEr-16xLV
		  ○ IOLITEr-8xSTGS
		  ○ IOLITE-6xSTG

V23-2	06.04.2023	• Added renders and other information for modular versions of all amplifiers that are available in both versions • Added adapters D37m-4xD9f and D37m-4xD9f-TEDS for IOLITE 8xLVe • Updated naming of the devices • 3.3.3.3.3. IOLITE-R8r: Ruggedized Boxed Chassis: BUS 1: IN: Pinout: corrected the pinout according to the power functionalities • Updated Bridge Accuracy Specifications • Added the PoE option for new modular IOLITE amplifiers
V23-3	28.07.2023	• Added 2xD37m-8xRJ45 adapters • Added descriptions for adapters D37m-4xD9f and D37m-4xD9f-TEDS for IOLITE 8xLVe • Refreshing all specifications tables • Renamed standalone devices to modular devices
V23-4	2.10.2023	• Modified the Accessories section - added a link to the new Accessories manuals and deleted some of them from this manual. • Additional technical drawings of IOLITE-R8 boxed solution

V23-5	28.11.2023	• Updated specifications for multiple modules (separating the rack and modular)
		• Updated Overview specifications
		• Updated Isolation specifications (naming)
		• Added:
		  ○ IOLITE 4xHV
		  ○ IOLITE 8xSTGSv2