

TECHNICAL REFERENCE MANUAL

IOLITE® V21-3



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## 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

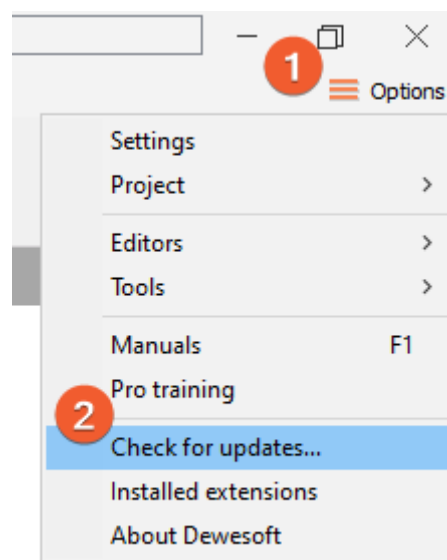
This chapter will help you to install the software, connect your IOLITE® system to the PC via EtherCAT® and will show you how to configure DewesoftX®.

To follow these steps, you need the following items:

- your brand new Sirius 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



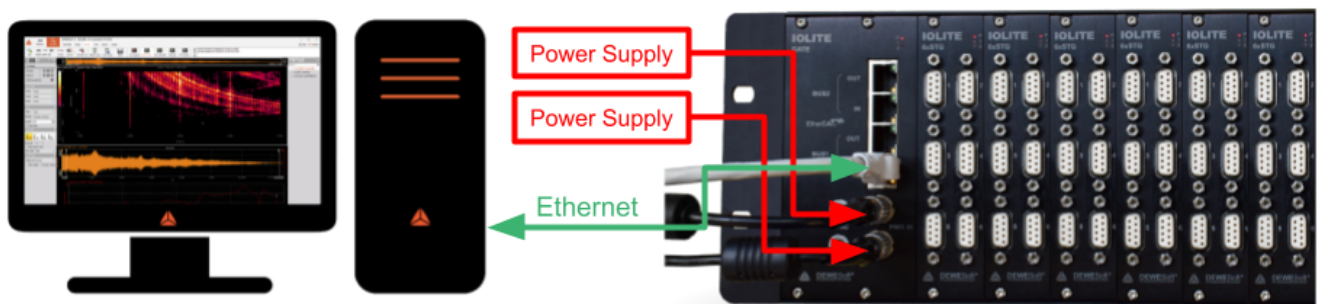
*Check for updates*

### 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 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 LIT8f-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 LIT8f-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

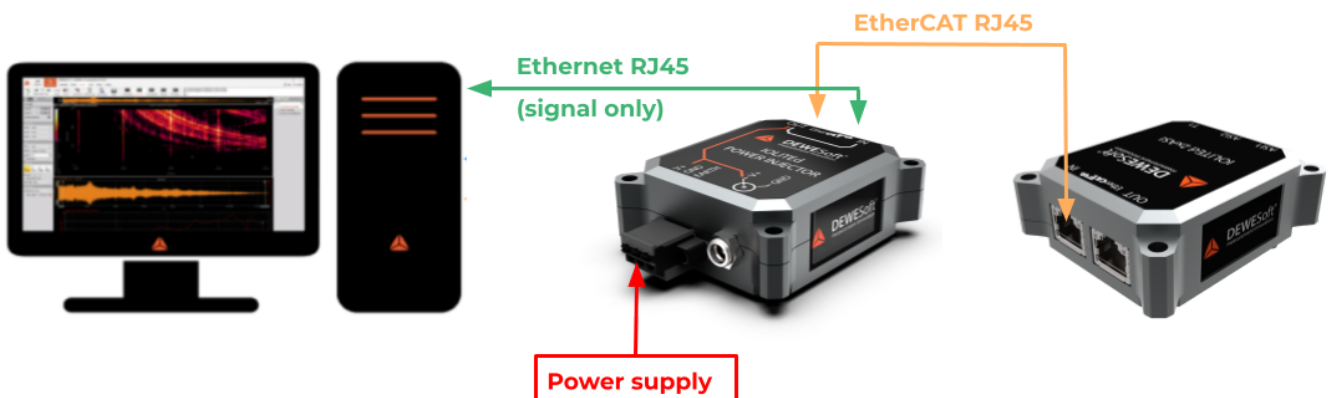
First connect the power supply cable (2x2 OMNIMATE SL 2.50 / BLF 2.50/180) to the PWR IN 2x2 TBLOCK connector. Then connect RJ-45 cable to the IN connector. Finally connect the other side of the other side (RJ45) to the LAN port of the PC. You can find advanced connections in chapter [3.3.2.4. Connection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



Connection of IOLITEi multi-channel standalone device to PC

## 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 of 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

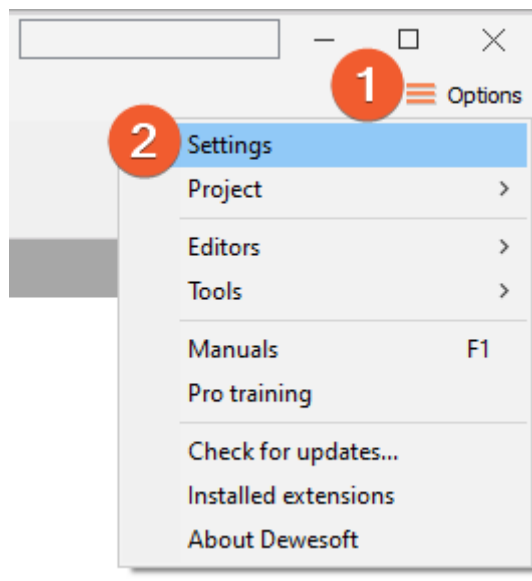


**Warning**

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

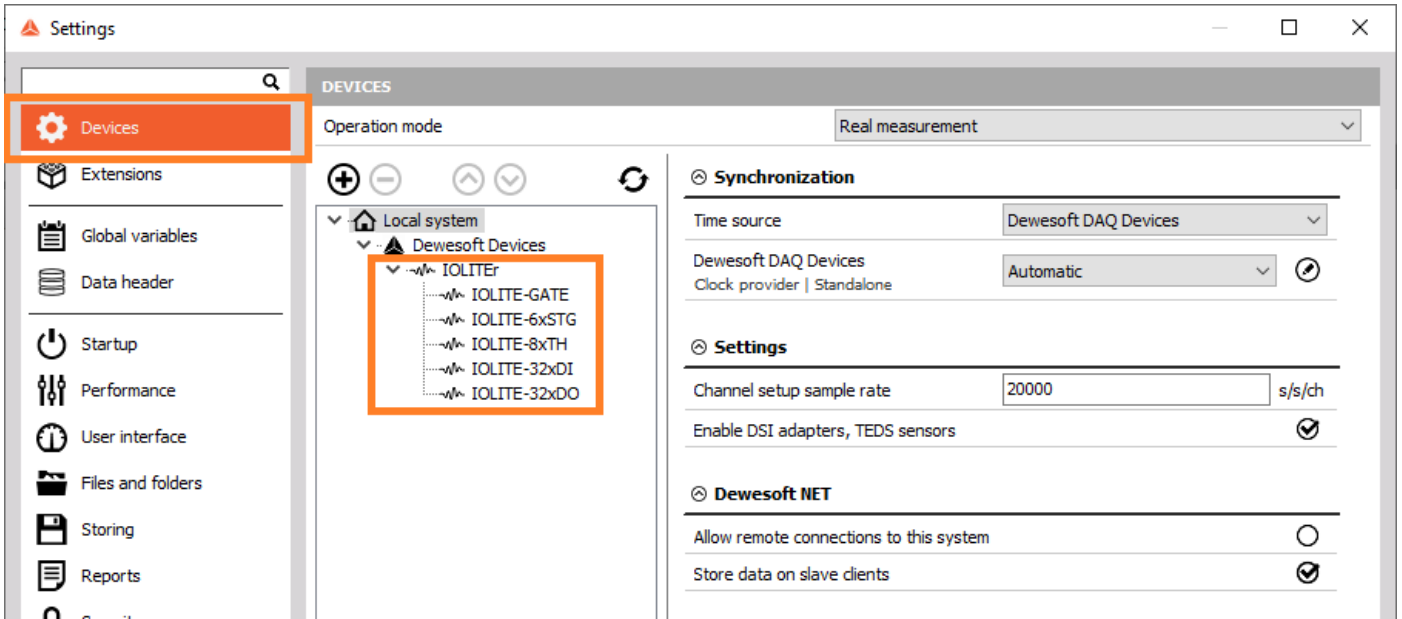
**3.2.1. DewesoftX® Settings IOLITE®**

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

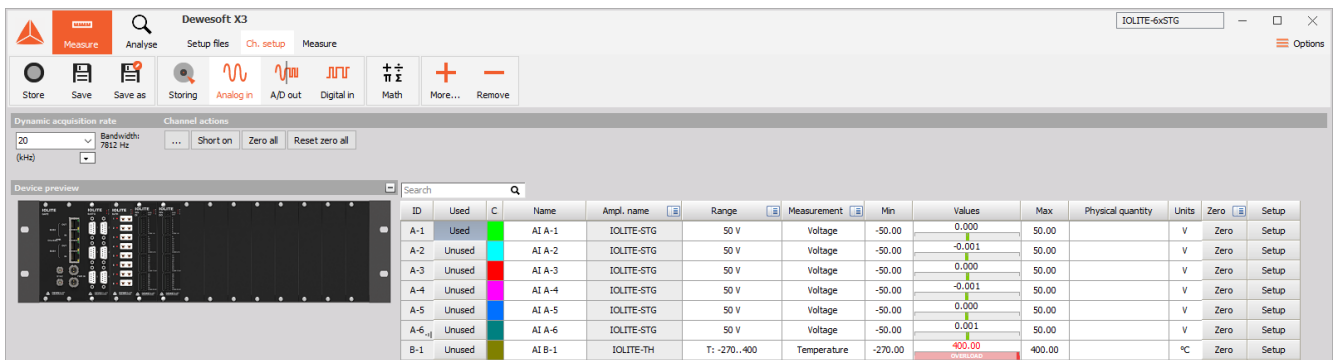
### 3.2.2. Channel Setup IOLITE®

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

ID	Used	C	Name	Ampl. name	Range	Measurement	Min	Values	Max	Physical quantity	Units	Zero	Setup
A-1	Used		AI A-1	IOLITE-TH	T: -270..400	Temperature	-270.00	25.56	400.00	Temperature	°C	Zero	Setup
A-2	Unused		AI A-2	IOLITE-TH	T: -270..400	Temperature	-270.00	400.00	400.00	Temperature	°C	Zero	Setup
A-3	Unused		AI A-3	IOLITE-TH	T: -270..400	Temperature	-270.00	400.00	400.00	Temperature	°C	Zero	Setup
A-4	Unused		AI A-4	IOLITE-TH	T: -270..400	Temperature	-270.00	400.00	400.00	Temperature	°C	Zero	Setup
A-5	Unused		AI A-5	IOLITE-TH	T: -270..400	Temperature	-270.00	400.00	400.00	Temperature	°C	Zero	Setup
A-6 <sub>1</sub>	Unused		AI A-6	IOLITE-TH	T: -270..400	Temperature	-270.00	400.00	400.00	Temperature	°C	Zero	Setup
B-1	Unused		AI B-1	IOLITE-TH	T: -270..400	Temperature	-270.00	400.00	400.00	Temperature	°C	Zero	Setup

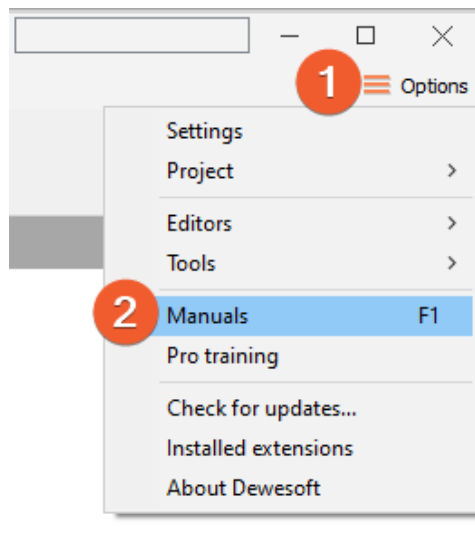
Channel setup IOLITE-R8

### 3.3. Simple Measurement

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

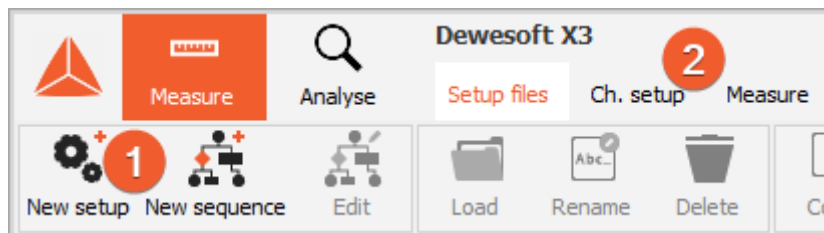
#### 3.3.1. Help - Manual

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 ① and then select Manual from the pop-up menu ②.



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 ①. Click on Ch. setup (on the right of Setup files) to switch to the Channel setup mode ②. 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 **1**, hold the mouse button and move the mouse down to channel 8 **2**: 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 **3**.

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® **4**.

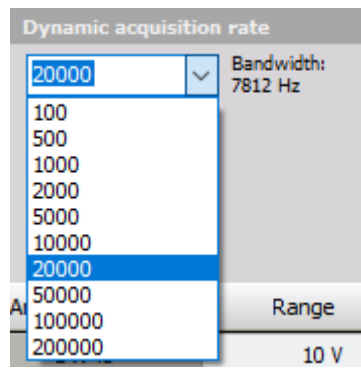
ID	Used	C	Name	Ampl. name	Range
A-1	Used		AI A-1	IOLITE-STG	50 V
A-2	Unused		AI A-2	IOLITE-STG	50 V
A-3	Unused		AI A-3	IOLITE-STG	50 V
A-4	Unused		AI A-4	IOLITE-STG	50 V
A-5	Unused		AI A-5	IOLITE-STG	50 V
A-6	Unused		AI A-6	IOLITE-STG	50 V
B-1	Unused		AI B-1	IOLITE-TH	T: -270..400
B-2	Unused		AI B-2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

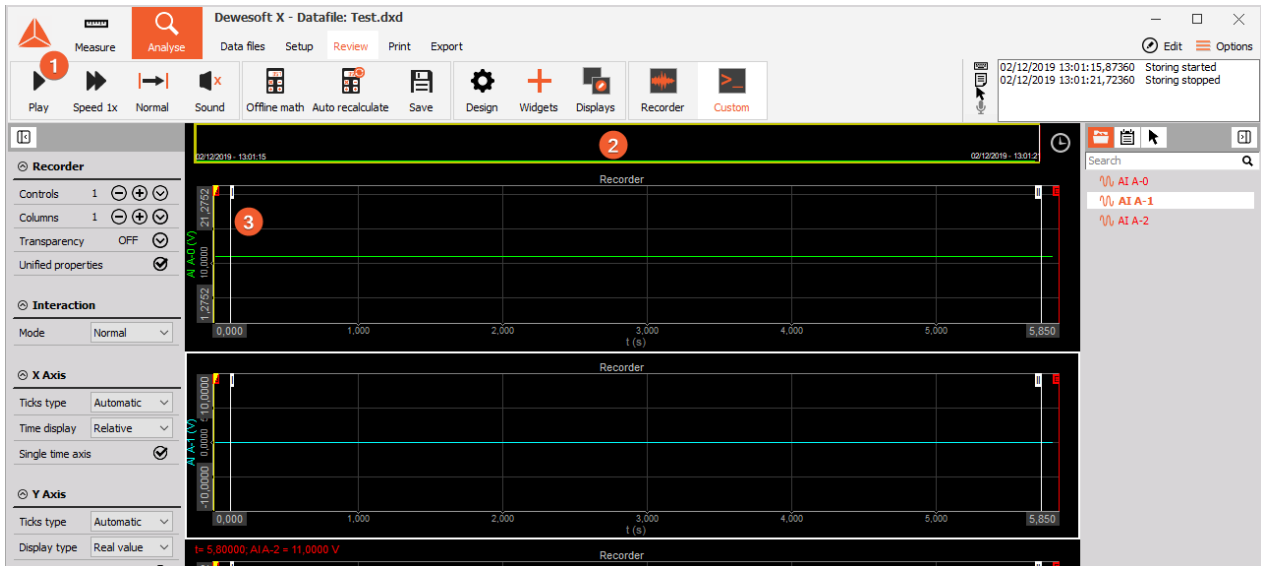
1 shows the live measurement data in different widgets which are depending on the selected measurement screen. In this case we see a simple recorder widget where data is presented in the time domain. You can use the channel-selector list (2) to assign measurement channels to the widgets. Each widget has different settings, (3) shows the settings of the currently selected recorder widget.

To start storing the data, press the Store button (4). 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.

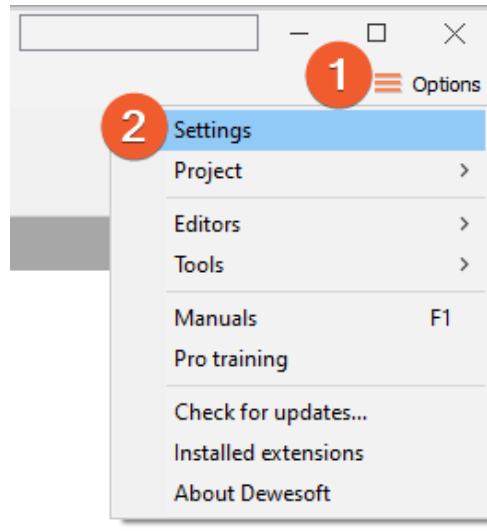
Differences are:

- ① you have additional tool-buttons
- ② there is a Signal overview window which will show you the whole data of one selected channel of the data file
- ③ 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

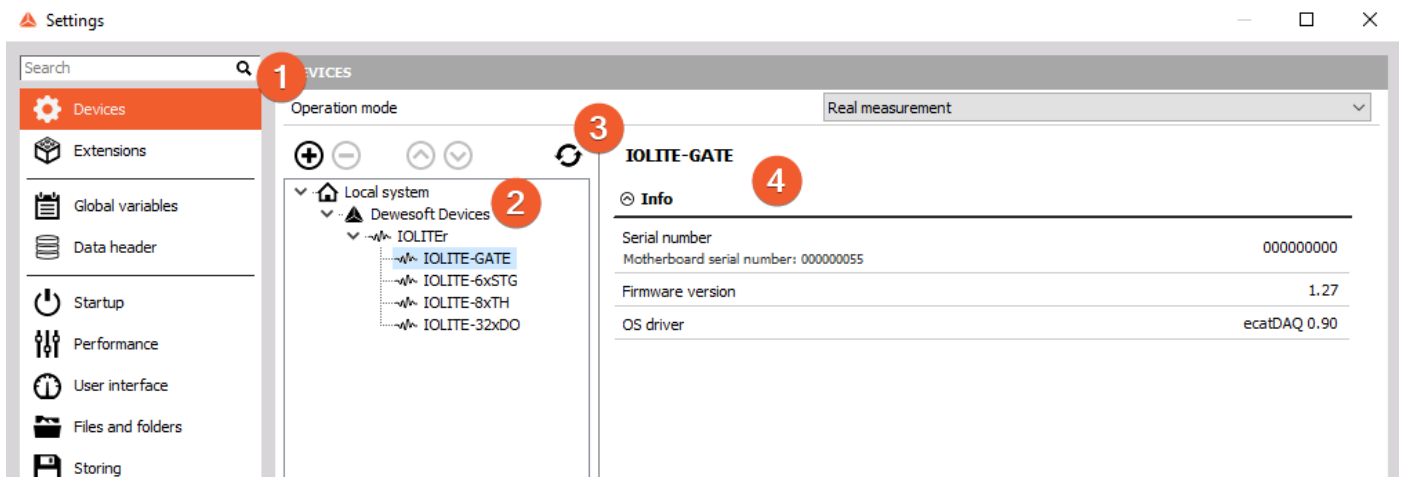
Note, that the Dewesoft launcher has already done the hardware setup for you – you can check this in the Settings dialogue. Click the Options button **1** – and then click the Settings menu item **2**.



Open settings dialogue

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

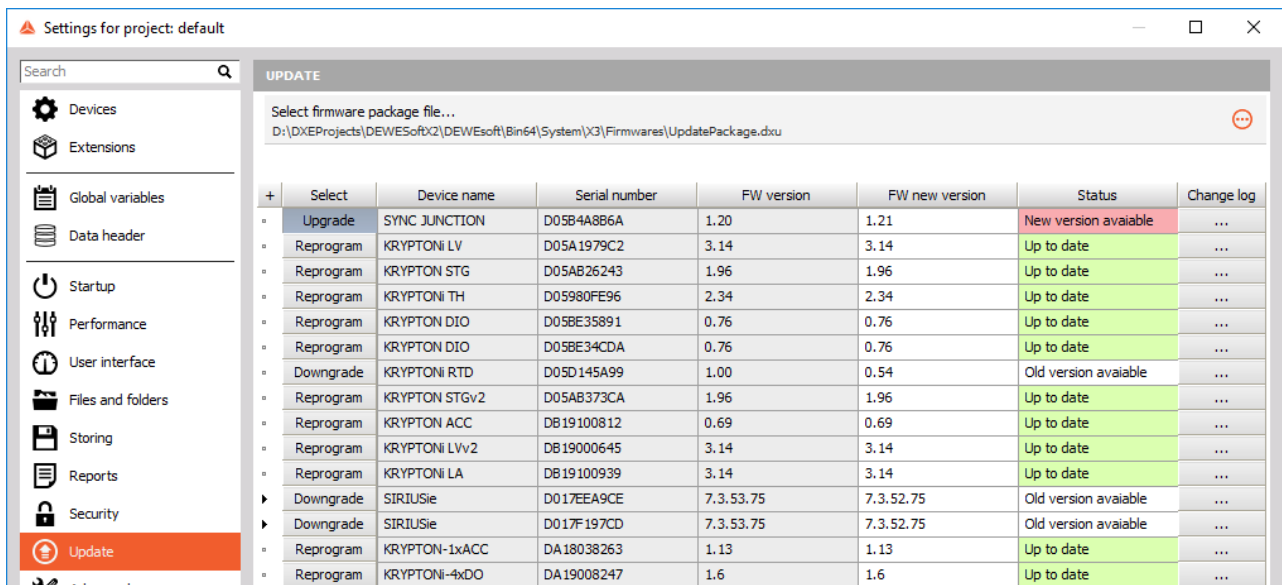
If you add a device while this screen is open (or if your device is not shown yet), you can press the Refresh button **3** to scan for devices. When you select a device from the list you will see all the device details and settings in the right area **4**.



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:



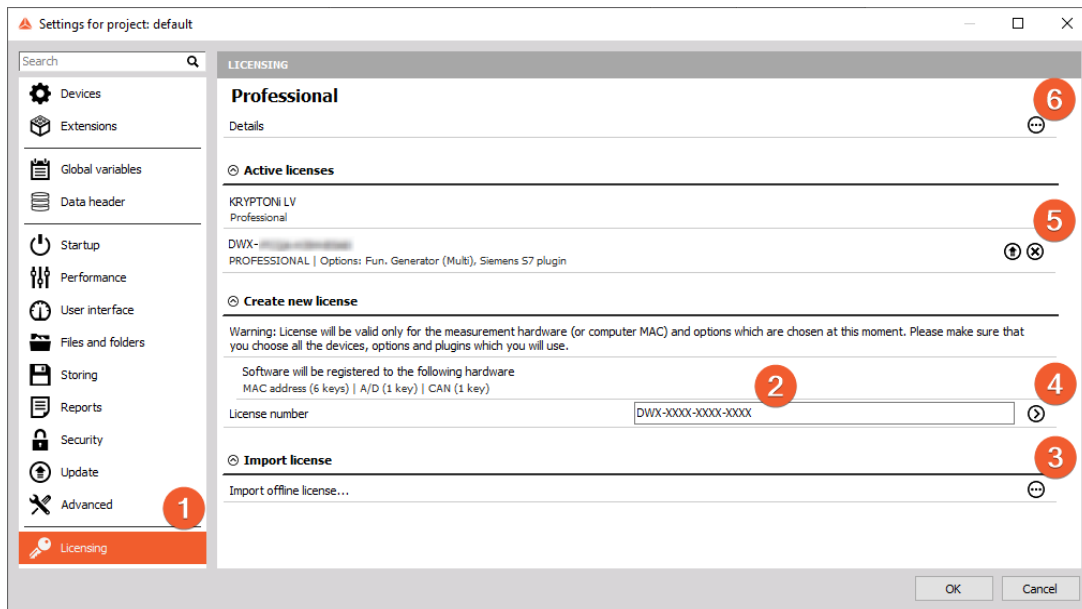
Firmware update settings

- 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

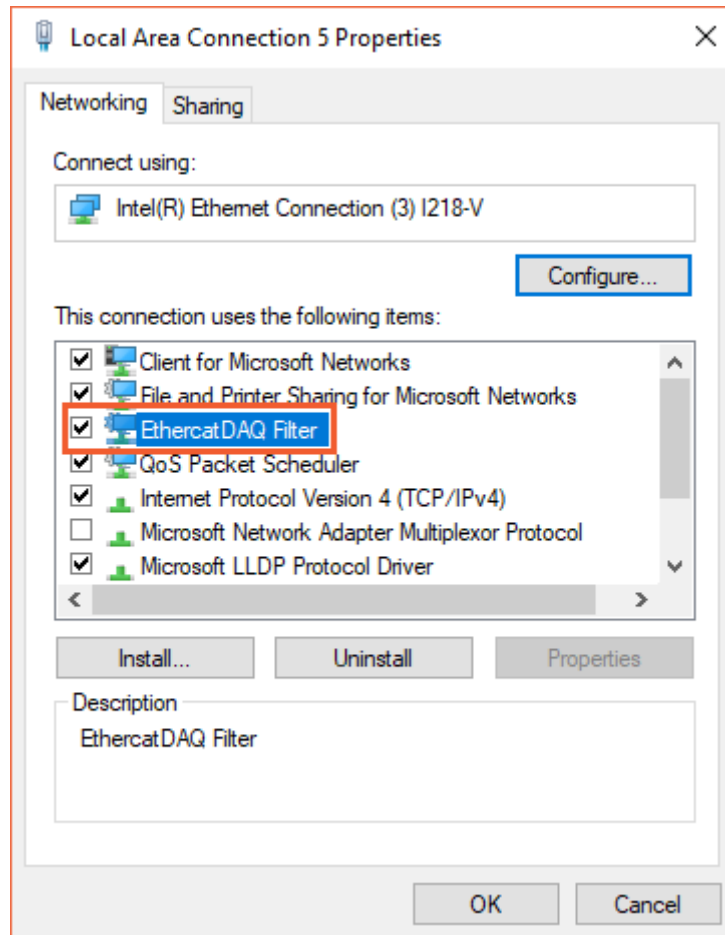
If your IOLITE® device is not found by DewesoftX®:

- 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*

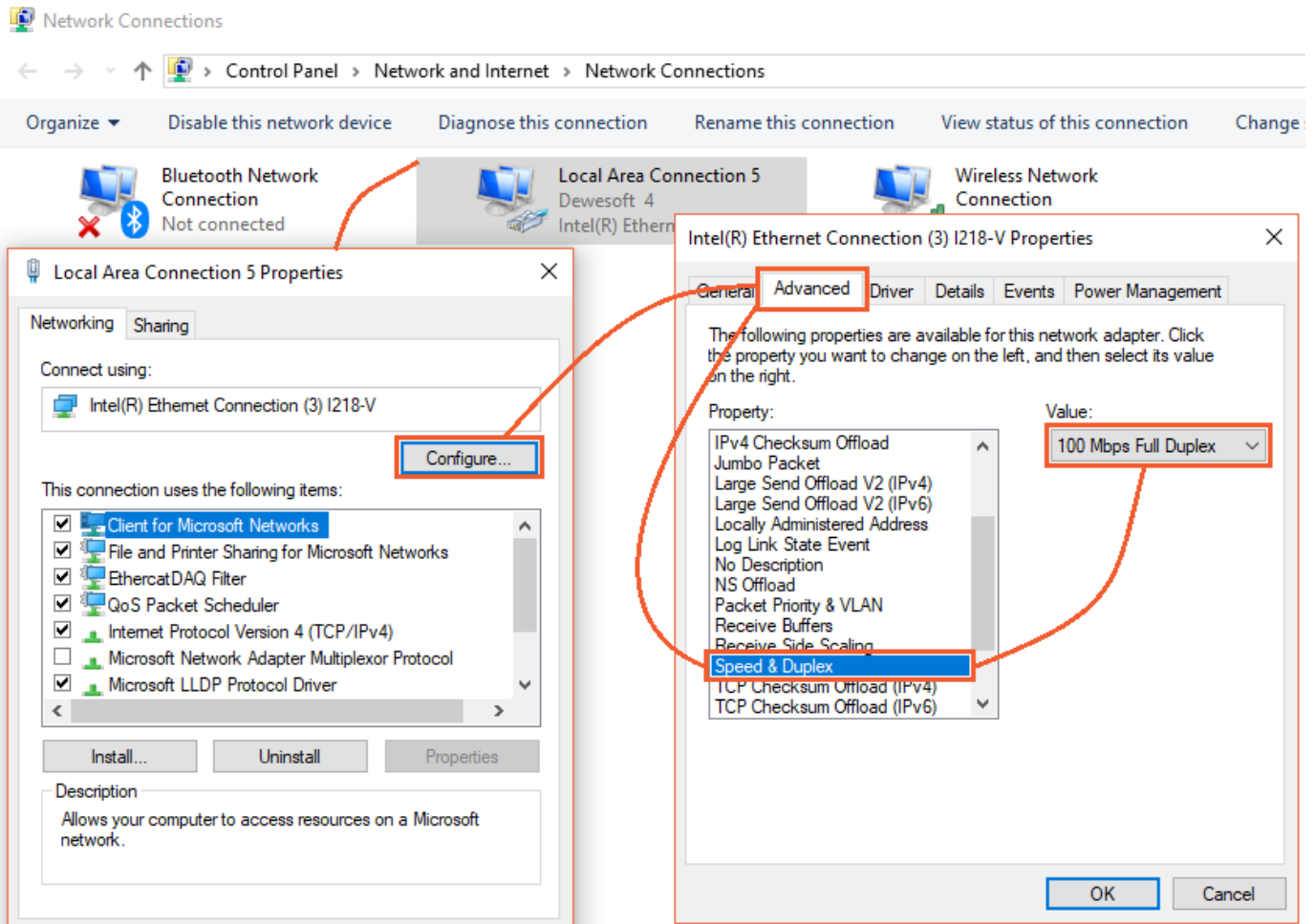
- If the driver is not installed, it can be downloaded from our [web page](#).

#### 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

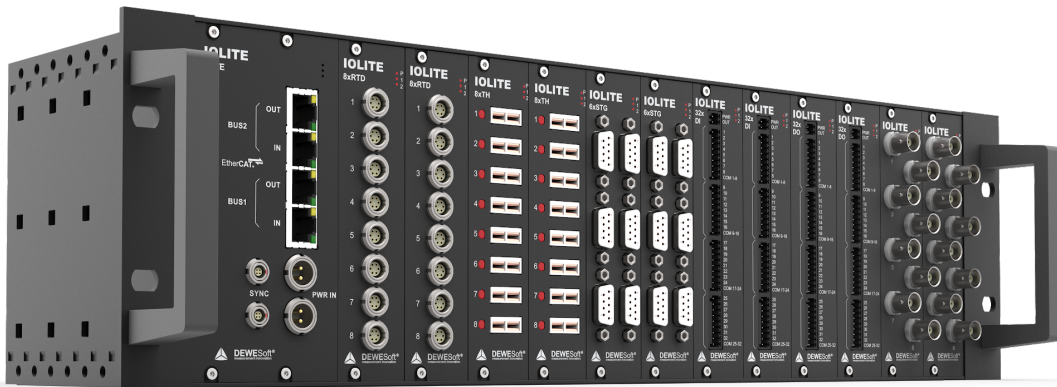


*Ethernet advanced properties*

## 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



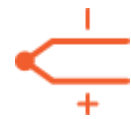
Quarter Bridge



Half Bridge



Full Bridge



Thermocouple



Digital IO

**IEPE**

IEPE



Charge



Current

**LVDT**

LVDT



PT100

RTD



Resistance



DSI  
Compatible



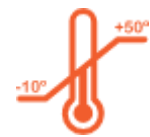
TEDS  
Compatible

**EtherCAT**

EtherCAT



IP50

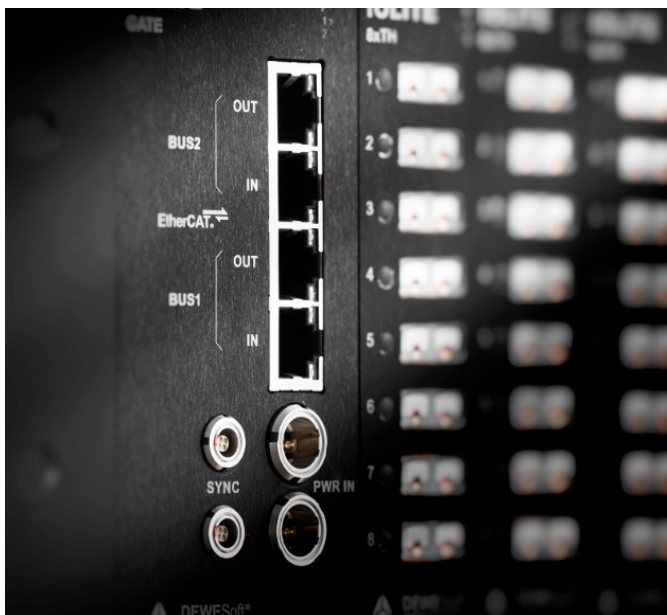


-10 °C to +50 °C

## 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

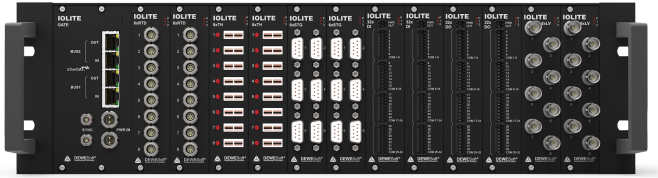
Primary bus is used for perfectly timed and synchronized data acquisition via Dewesoft X software.

#### Secondary Bus

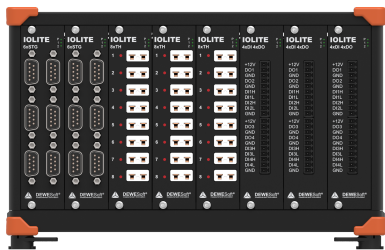
The secondary bus can be used in two ways:

- 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

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 gage 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:** Isolated thermocouple amplifier
- **8xRTD:** 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 [5. 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	below 1 sample to Sirius®	below 1 sample to Sirius®	below 1 sample to Sirius®
<b>Dual EtherCAT® interface</b>			
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
<b>Power</b>			
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
<b>Environmental</b>			
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
<b>Physical</b>			
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

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
Synchronization	1 $\mu$ s	1 $\mu$ s
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 and sync, daisy chainable (see 2)
<b>Power</b>		
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
<b>Environmental</b>		
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
<b>Physical</b>		
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) Power and data are 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

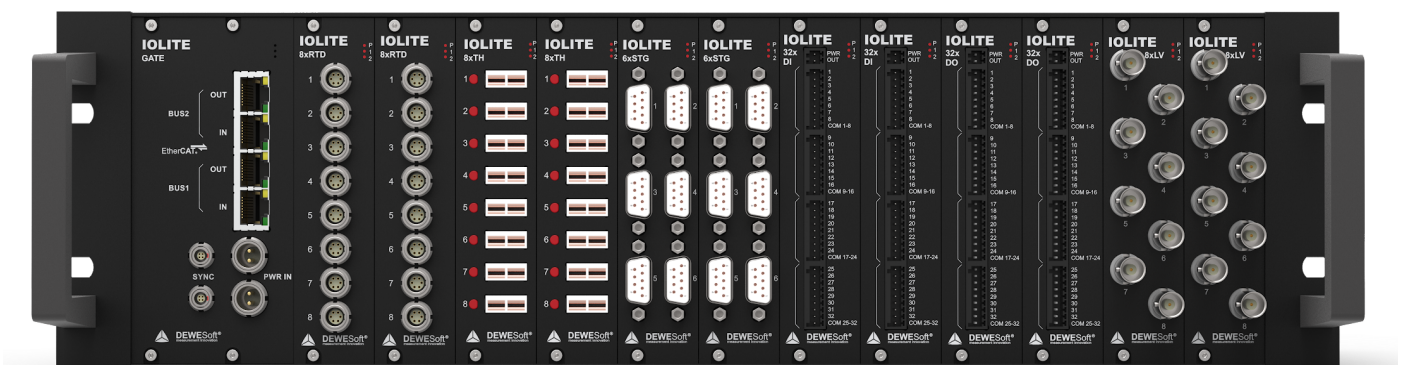
Standard IOLITE chassis is compatible and can be mounted in any 19-inch rack cabinet. This is perfect for the test-bed installations.

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*



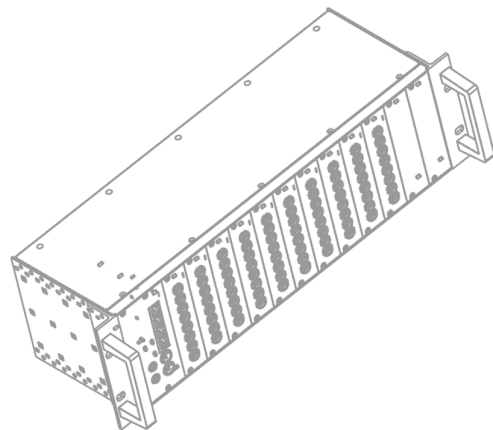
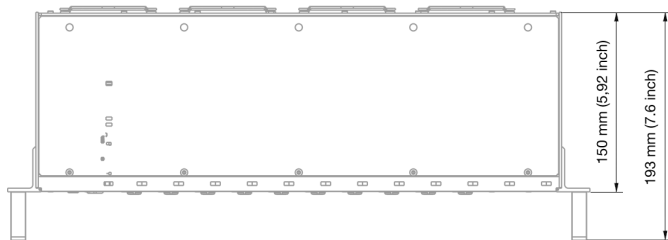
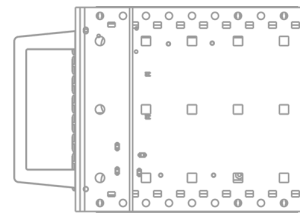
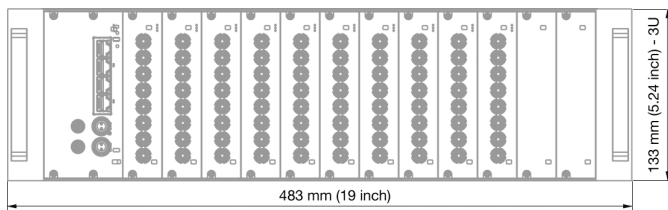
*IOLITE-R12 (Cabinet Mount Chassis) Front panel*





*Cooling system on the Back panel of IOLITE-R12*

#### 4.3.1.2. IOLITE-R12: Cabinet Mount Chassis: Dimensions

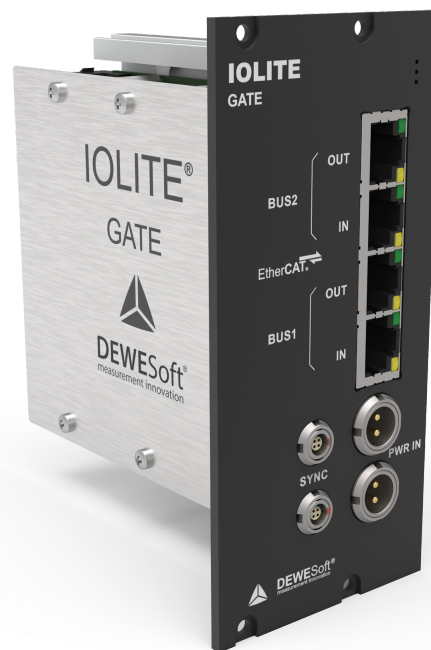


*Technical Drawings of IOLITE-R12*

### 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.



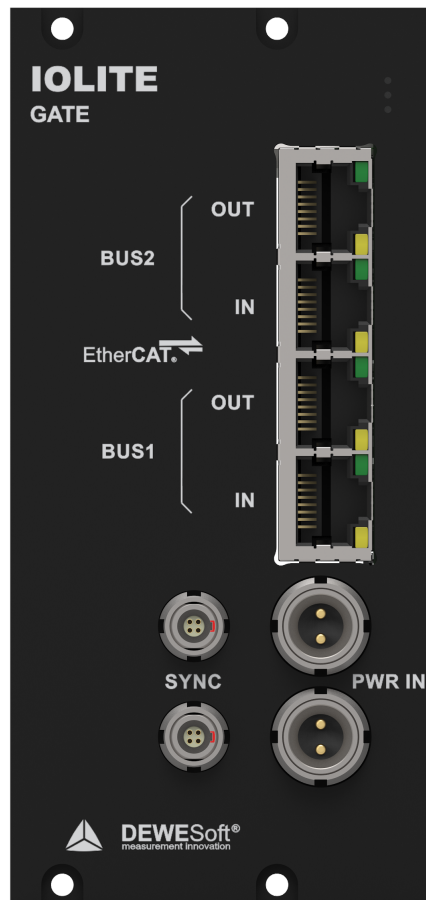
*IOLITE-GATE module*

#### 4.3.1.3.1. IOLITE-GATE: Connectors

The IOLITE-GATE module includes 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.

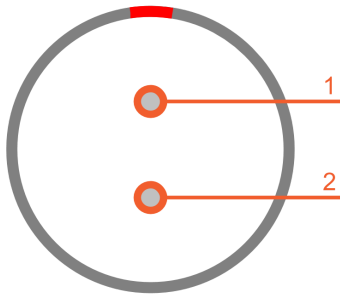
Two 2-pin LEMO 1B connectors are used for redundant power supply (PWR IN).

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): FGG.1B.302.CLAD52Z

#### 4.3.1.3.1.2. IOLITE-GATE: Sync: Pinout

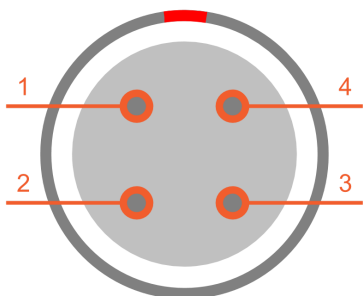
The sync connectors are required when you want to synchronize the data from IOLITE with Dewesoft USB devices for the same measurement. The signal that is transferred over sync cable makes sure that the measurement data of IOLITE and Dewesoft USB devices are perfectly synchronized to each other.

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-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

#### 4.3.1.3.1.3. IOLITE-GATE: RJ45: Pinout

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

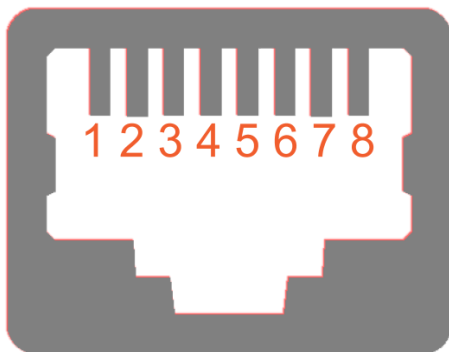
The same connectors are used on Primary bus (BUS 1) for buffered data and on Secondary bus (BUS 2) for unbuffered data.

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

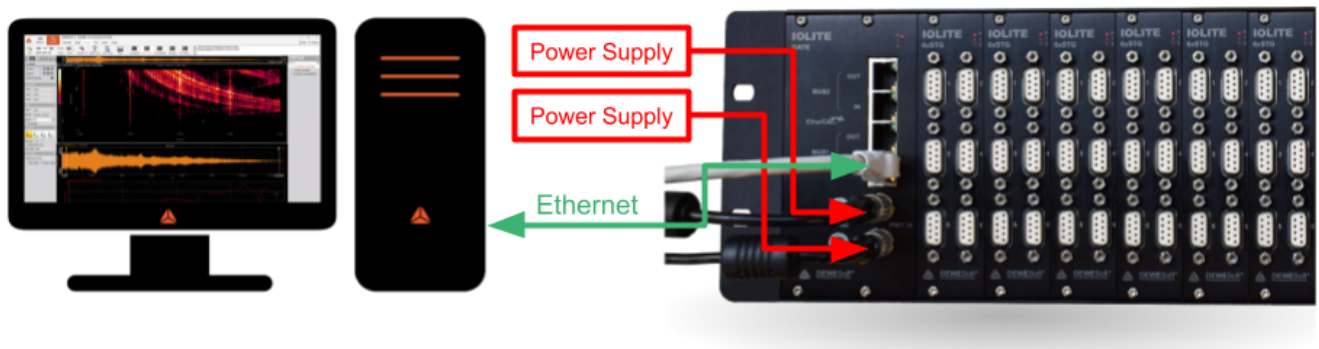
First connect the power supply cable (PS-120-L1B2f) to the PWR IN 2-pin LEMO 1B connector. To increase system reliability connect the redundant power supply to other PWR IN connectors.



**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:

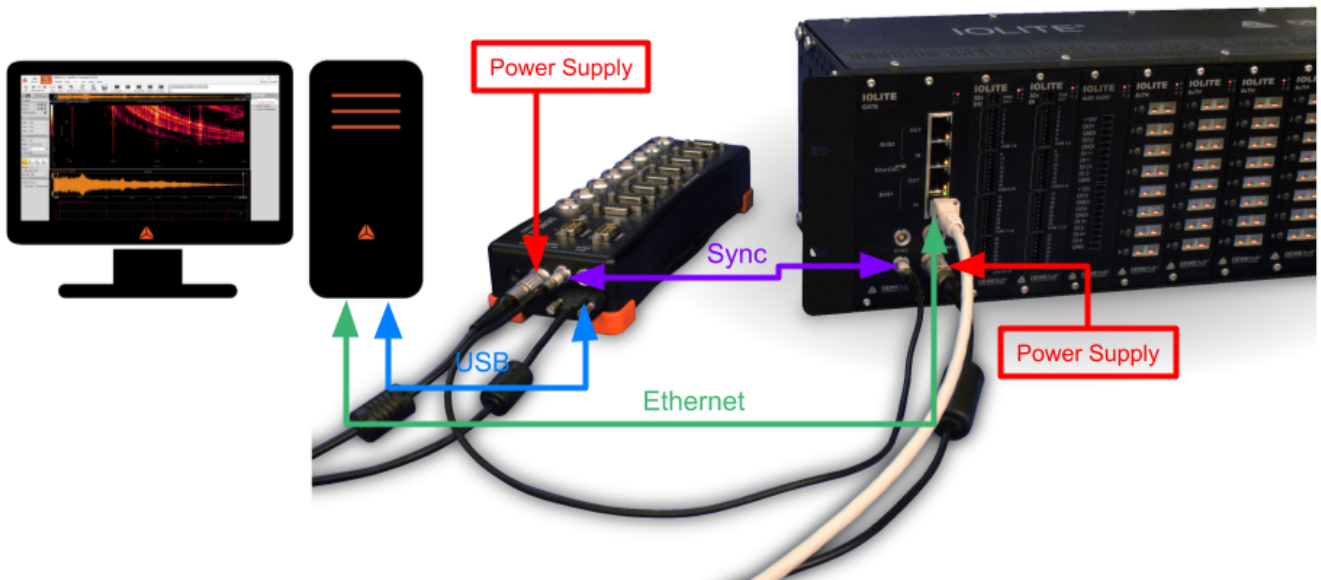
Function	Dewesoft order code
Power supply	PS-120-L1B2f (default)
Ethercat	CABLE-UTP-CAT.6-3m (default), CABLE-UTP-CAT.6-1m

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

The connection of the IOLITE device to PC is the same as in [2.3.1.4](#).

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 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:

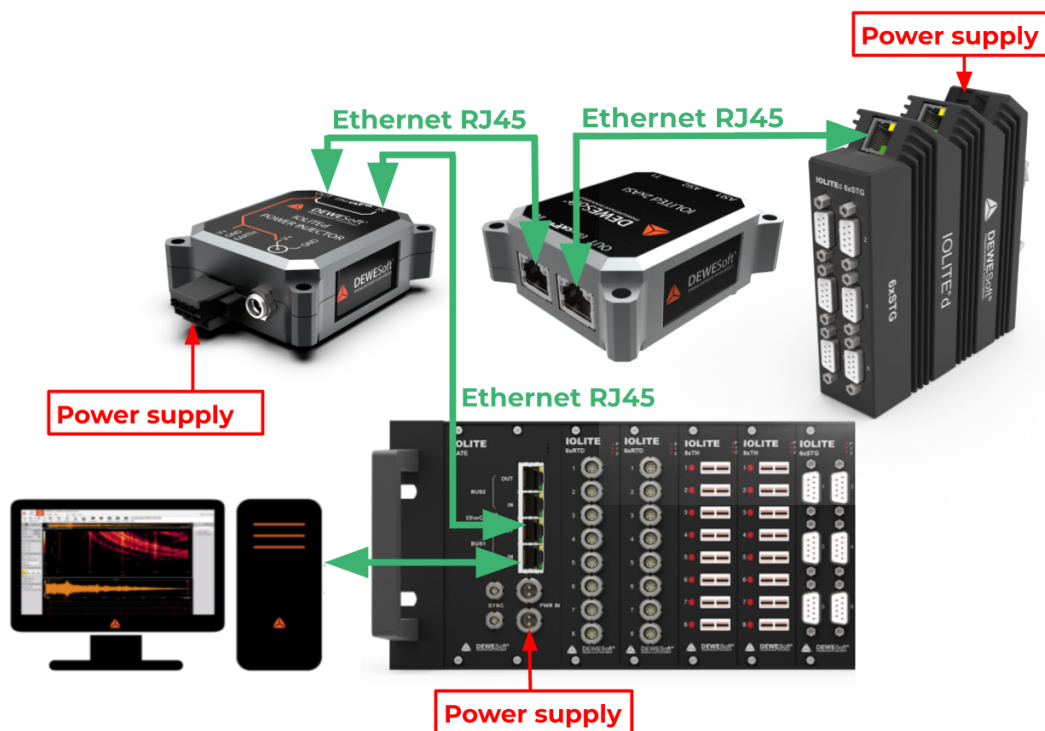
Function	Dewesoft order code
Power supply	IOLITE-R12: PS-120-L1B2f (default) DEWE-43A: PS-60W-12V-5A-L1B2f (default)
Ethernet	RJ45-RJ45
USB	CABLE-USBAmini-USBBS-1.8m (default), CABLE-USBAmini-USBBS-1m
Synchronization	L00B4m-L00B4m-0.2m (default), L00B4m-L00B4m-0.5m, L00B4m-L00B4m-3m

#### 4.3.1.6. IOLITE-GATE: Connection of IOLITE-R12 standalone device to IOLITE - single channel and IOLITE - multi channel

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.



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

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 19-inch rack cabinet compatible chassis, IOLITE is also available in standalone aluminium 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

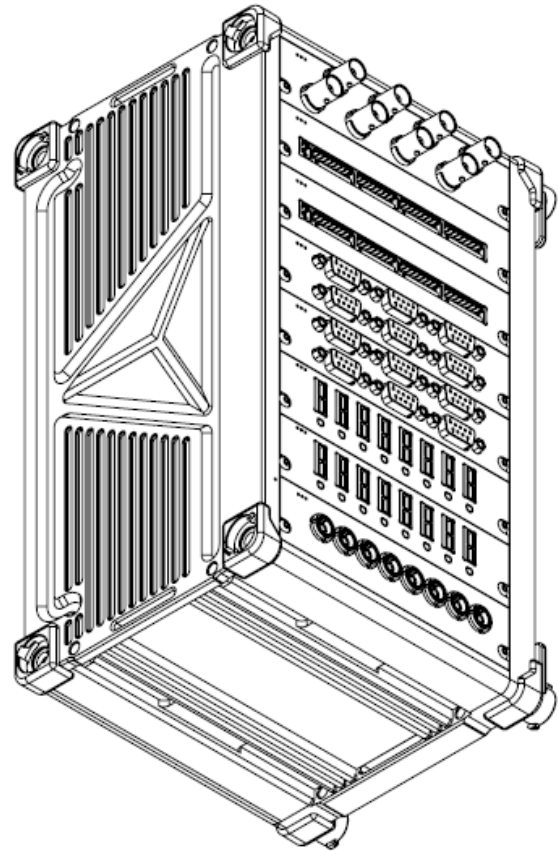
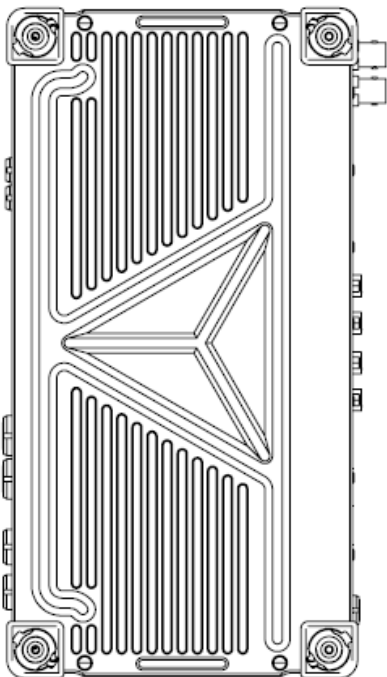
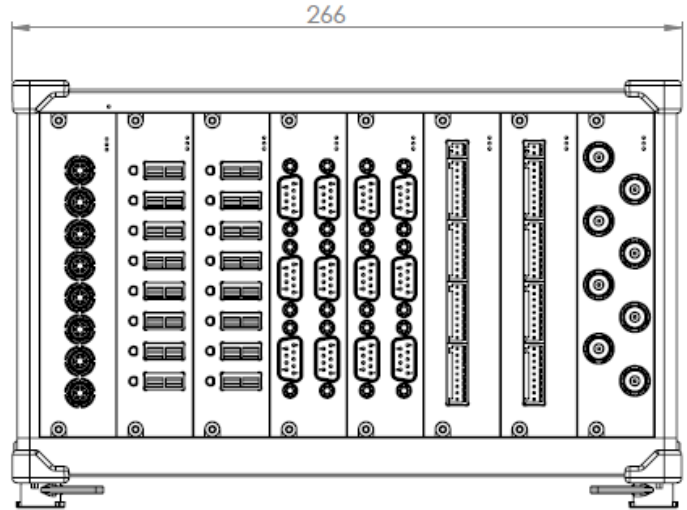
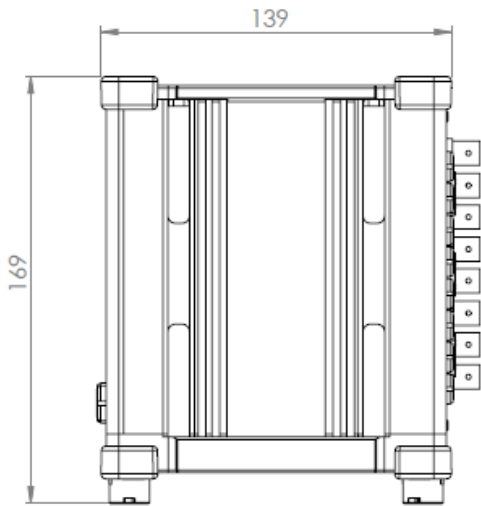


*IOLITE-R8 Front panel*



*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 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.

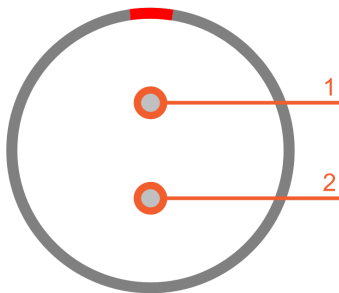
Secondary bus (BUS 2) for unbuffered data has two RJ45 connectors (IN and OUT) for data transfer and synchronization to 3rd party control master.

Two 2-pin LEMO 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): FGG.1B.302.CLAD52Z

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

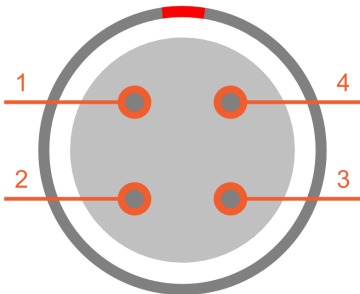
The sync connectors are required when you want to synchronize the data from IOLITE with Dewesoft USB devices for the same measurement. The signal that is transferred over sync cable makes sure that the measurement data of IOLITE and Dewesoft USB devices are perfectly synchronized to each other.

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)

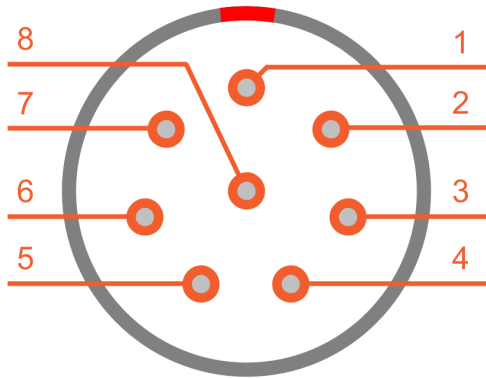
Pin	Name	Description
1	CLK	Clock
2	TRIG	Trigger
3	RES	PPS
4	GND	Ground

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

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



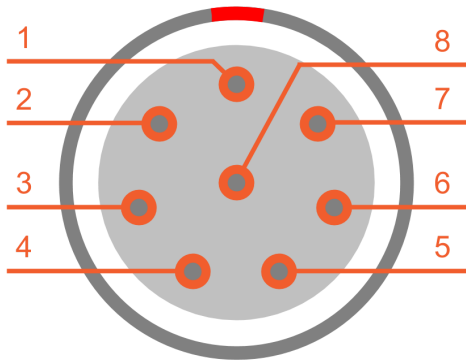
*EtherCAT connector: pin-out (8-pin LEMO male)*

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

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

#### 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)*

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.1B.308.CLN  
Mating connector (for the cable): FGG.1T.308.CLA.1433*

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

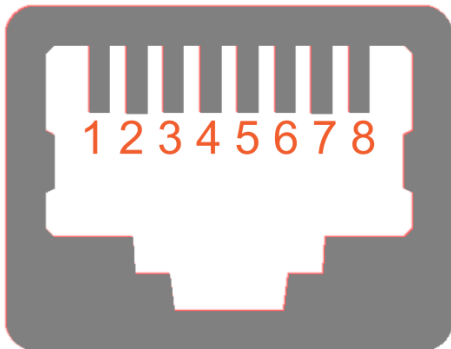
IOLITE-R8 includes two RJ45 connectors on Secondary bus (BUS 2) for unbuffered data.

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 LIT8f-RJ45-1M cable (LEMO side) to IN connector of BUS 1 on the IOLITE-R8 back panel. Finally, connect the other side of the LIT8f-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	LIT8f-RJ45-1M (default), LIT8f-RJ45-3M, LIT8f-RJ45-5M

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

The connection of the IOLITE device to PC is the same as in [2.3.2.4.](#)

Use EtherCAT to EtherCAT expansion cable (e.g. LIT8m-LIT8f-1M) and connect it to OUT connector on BUS 1 of IOLITE-R8 on one side and to IN connector of KRYPTON device on the other side.



Connection of IOLITE-R8 and KRYPTON® device

List of required cables:

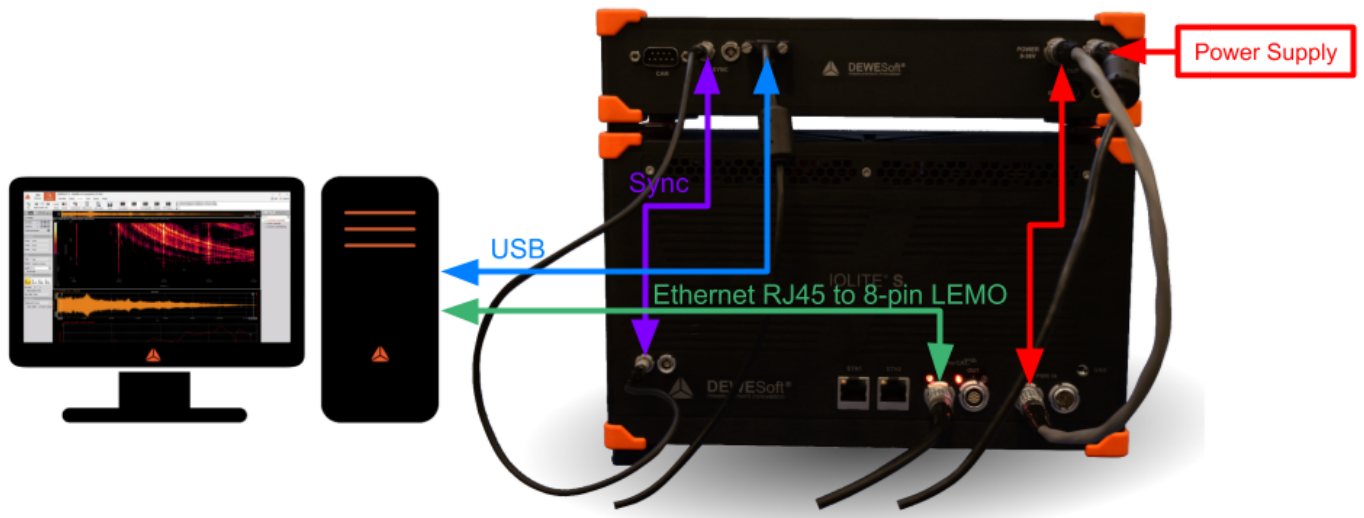
Function	Dewesoft order code
Power supply	PS-120-L1B2f (default)
EtherCAT	IOLITE to PC: LIT8f-RJ45-1M (default), LIT8f-RJ45-3M, LIT8f-RJ45-5M IOLITE to KRYPTON: LIT8m-LIT8f-02M, LIT8m-LIT8f-0.4M, LIT8m-LIT8f-1M, LIT8m-LIT8f-2.5M

#### 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-USBAmiini-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:

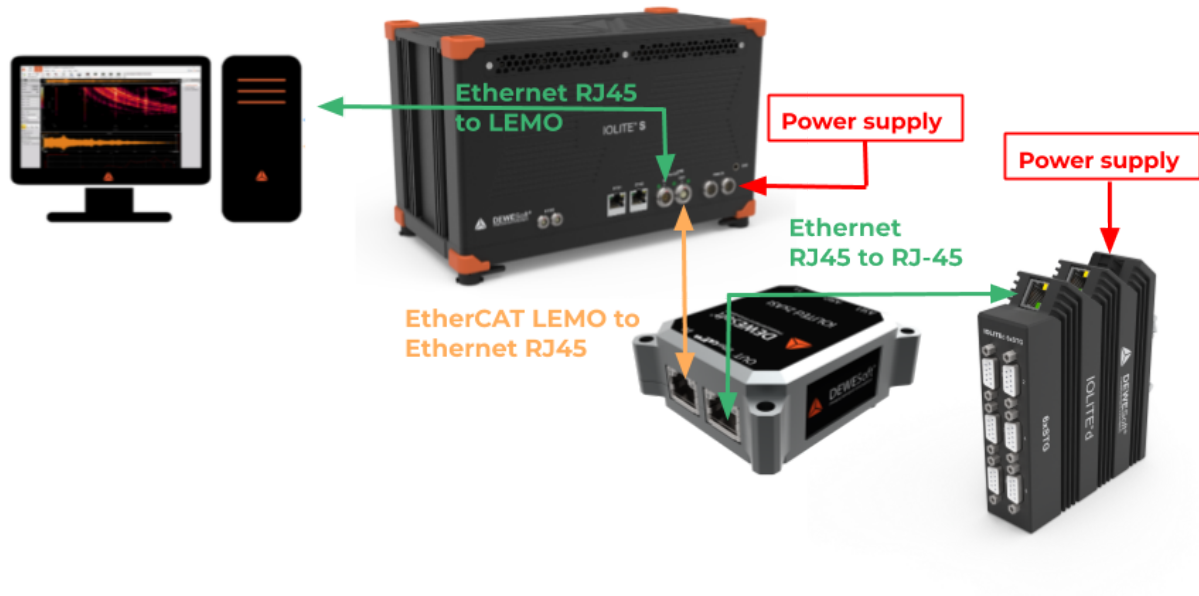
Function	Dewesoft order code
Power supply	Sirius: PS-120-L1B2f (default) Sirius to IOLITE: L1B2m-L1B2f-0.2m, L1B2m-L1B2f-0.4m, L1B2M-L1B2F-3m
EtherCAT	IOLITE to PC: LIT8f-RJ45-1M (default), LIT8f-RJ45-3M, LIT8f-RJ45-5M
USB	CABLE-USBAmini-USBBS-1.8m (default), CABLE-USBAmini-USBBS-1m
Synchronization	L00B4m-L00B4m-0.2m (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 LIT8f-RJ45-1M cable (LEMO side) to IN connector of BUS 1 on IOLITE-R8 back panel.

Use the LIT8m-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) IOLITE-multichannel:
EtherNET	IOLITE-R8 to IOLITE single channel: RJ-45 - RJ-45 IOLITE single channel to IOLITE multi channel: RJ-45 - RJ-45

### 4.3.3. 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

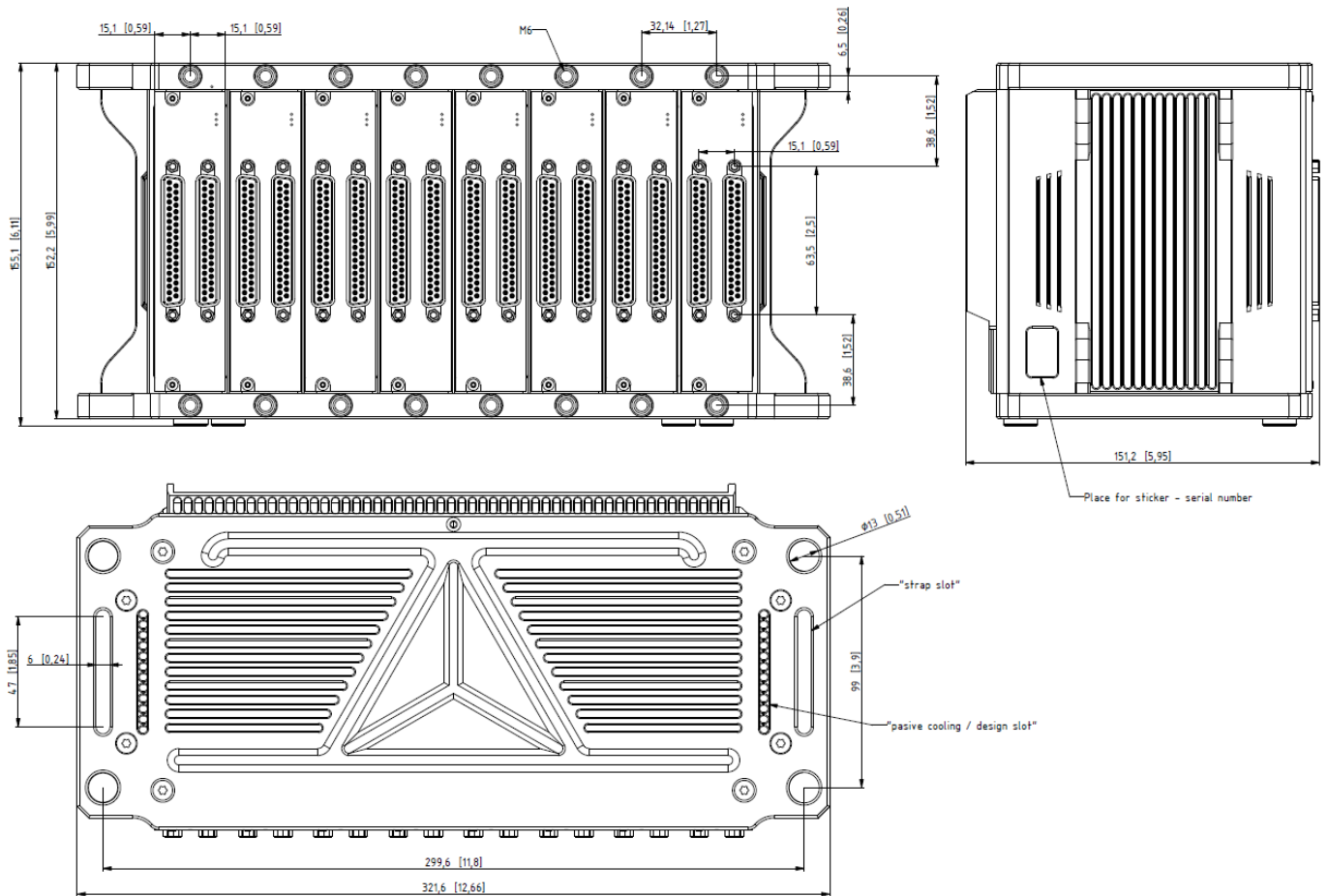


*IOLITE-R8r Front panel*



*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 IT connectors on the back panel of IOLITE-R8r 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.

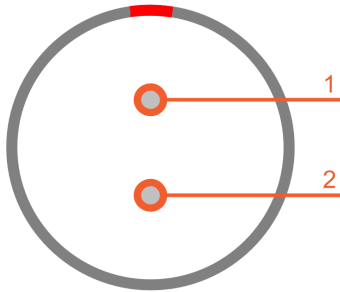
Two 2-pin LEMO IT connectors are used for redundant power supply (PWR IN).

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): FGG.1B.302.CLAD52Z*

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

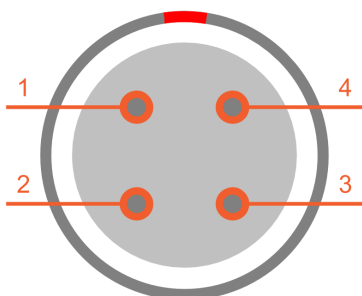
The sync connectors are required when you want to synchronize the data from IOLITE with Dewesoft USB devices for the same measurement. The signal that is transferred over sync cable makes sure that the measurement data of IOLITE and Dewesoft USB devices are perfectly synchronized to each other.

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-synchronisation is used, the IRIG signal is on pins 1, 2.



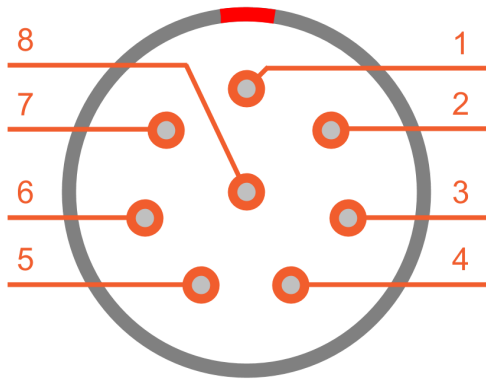
Sync connector: pin-out (4-pin LEMO female)

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

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

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

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



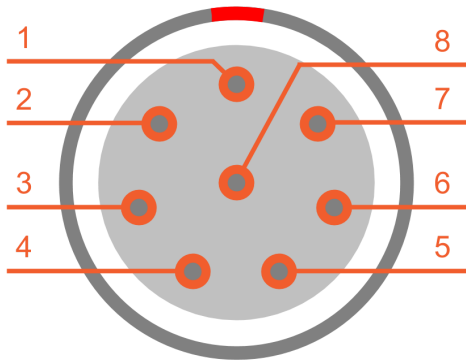
*EtherCAT connector: pin-out (8-pin LEMO male)*

Pin	Name	Description
1	TX_P	Transmission +
2	TX_N	Transmission -
3	RX_P	Reception +
4	RX_N	Reception -
5	VCC	Power IN
6	VCC	Power IN
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*

#### 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

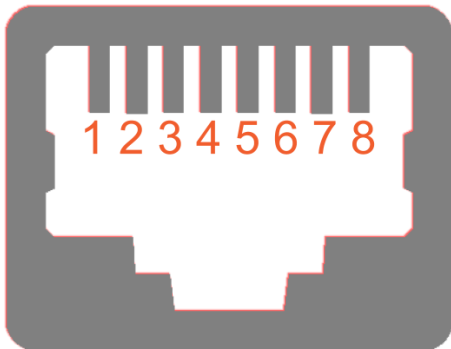
IOLITE-R8r includes two RJ45 connectors on Secondary bus (BUS 2) for unbuffered data.

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 LIT8f-RJ45-1M cable (LEMO side) to IN connector of BUS 1 on the IOLITE-R8r back panel. Finally, connect the other side of the LIT8f-RJ45-1M cable (RJ45 side) to the LAN port of the PC.



Connection of IOLITE-R8r standalone device to PC

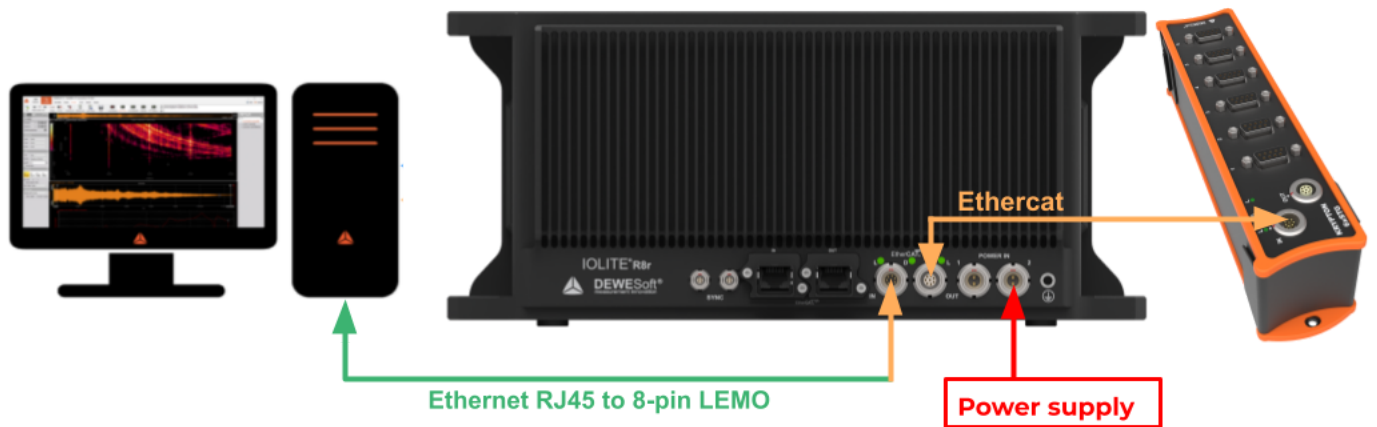
List of required cables:

Function	Dewesoft order code
Power supply	PS-120-L1B2f (default)
EtherCAT	LIT8f-RJ45-1M (default), LIT8f-RJ45-3M, LIT8f-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 PC is the same as in [2.3.2.4](#).

Use EtherCAT to EtherCAT expansion cable (e.g. LIT8m-LIT8f-1M) and connect it to OUT connector on BUS 1 of IOLITE-R8r on one side and to IN connector of KRYPTON device on the other side.



Connection of IOLITE-R8r and KRYPTON® device

List of required cables:

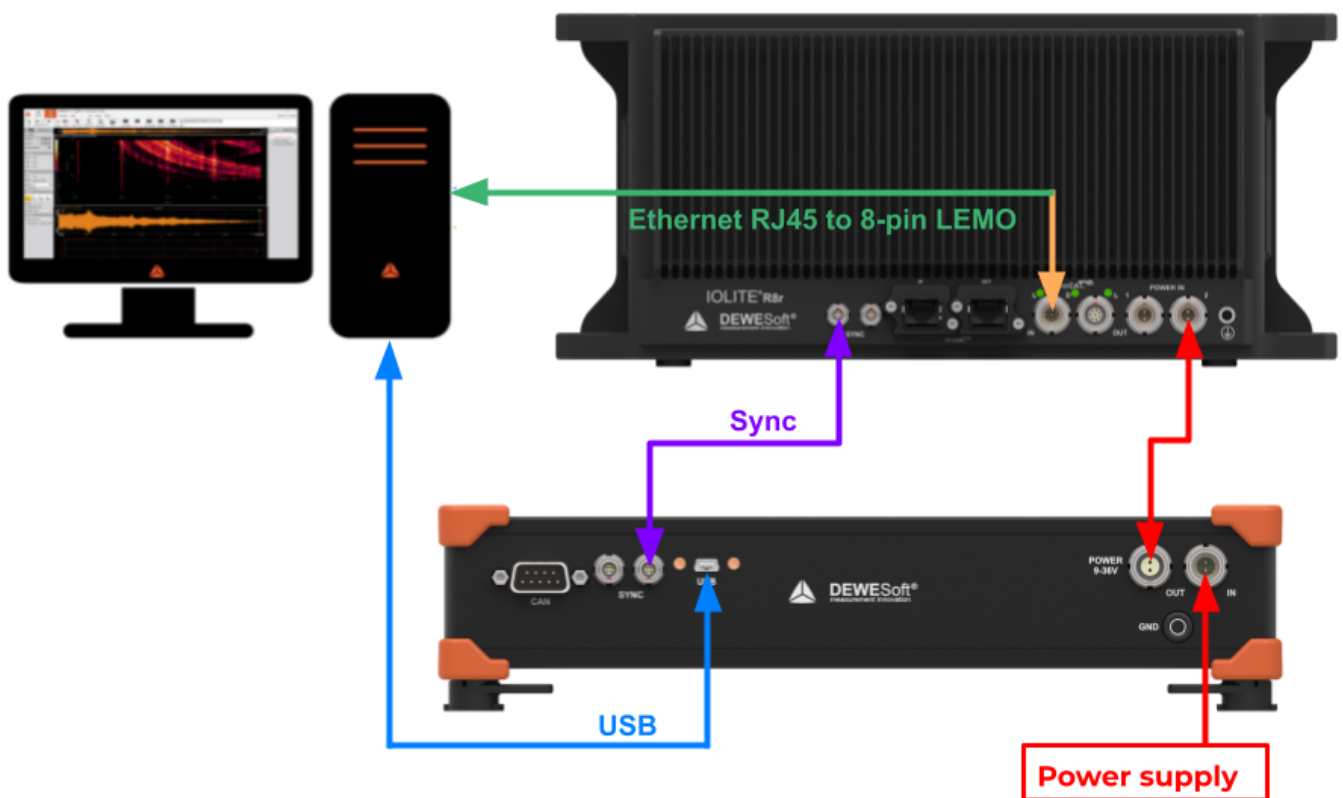
Function	Dewesoft order code
Power supply	PS-120-L1B2f (default)
EtherCAT	IOLITE to PC: LIT8f-RJ45-1M (default), LIT8f-RJ45-3M, LIT8f-RJ45-5M IOLITE to KRYPTON: LIT8m-LIT8f-02M, LIT8m-LIT8f-0.4M, LIT8m-LIT8f-1M, LIT8m-LIT8f-2.5M

#### 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 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 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: LIT8f-RJ45-1M (default), LIT8f-RJ45-3M, LIT8f-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

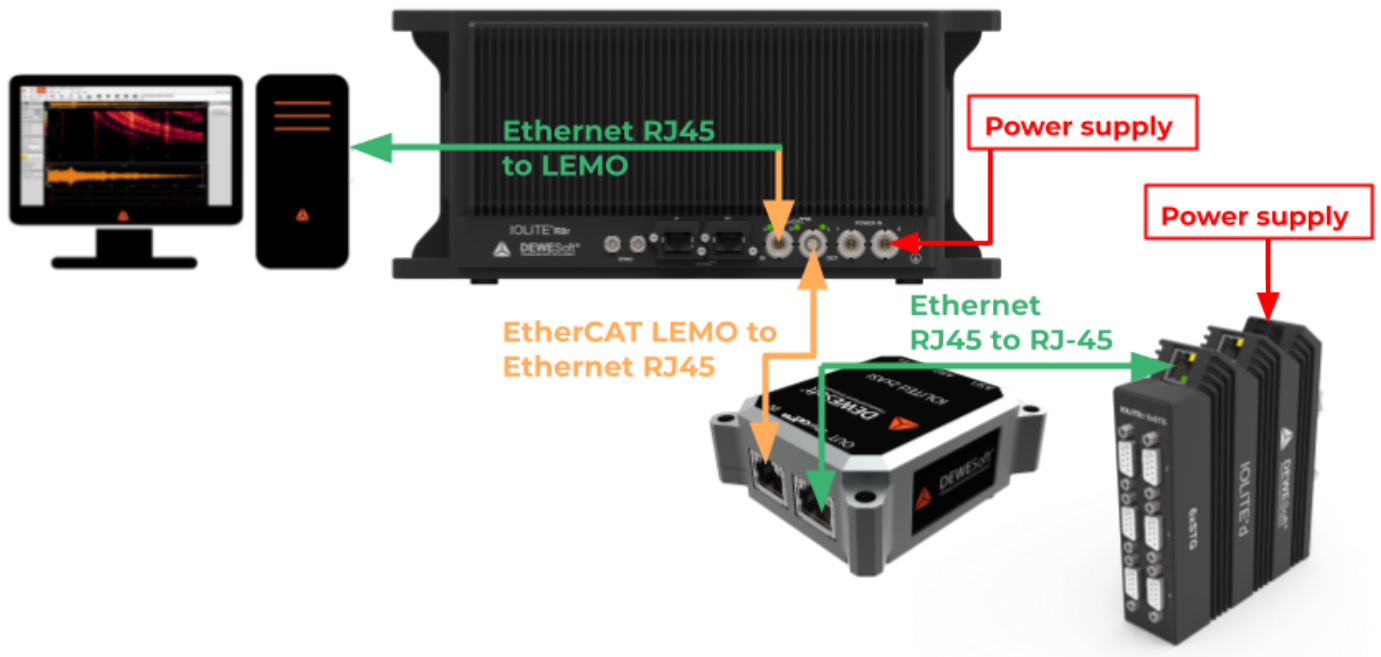
#### 4.3.3.7. IOLITE-R8r: Ruggedized Boxed Chassis: Connection of IOLITE multi and single channel device

Connect power supply cable to IOLITE-R8r (PS-120W-L1B2f). Then connect LIT8f-RJ45-1M cable (LEMO side) to IN connector of BUS 1 on IOLITE-R8r back panel.

Use the LIT8m-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. IOLITEi: Multi channel device

IOLITEi 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.

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



**Important**

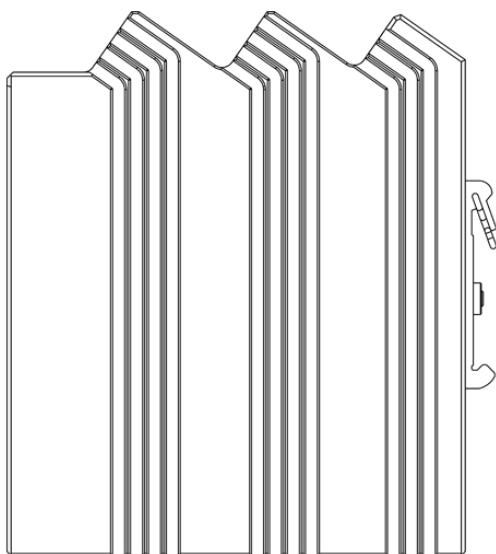
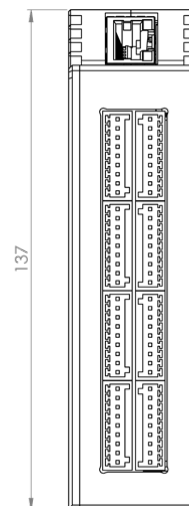
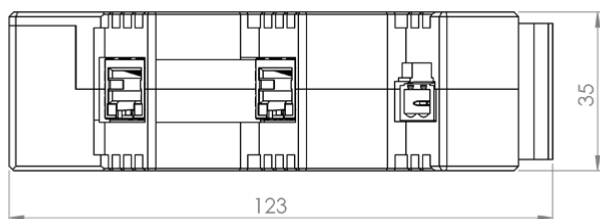
For the power supply we have two TBLOCK connectors so the devices can be daisy chained with each other.

##### 4.3.4.1. IOLITE - Multi channel: Renders



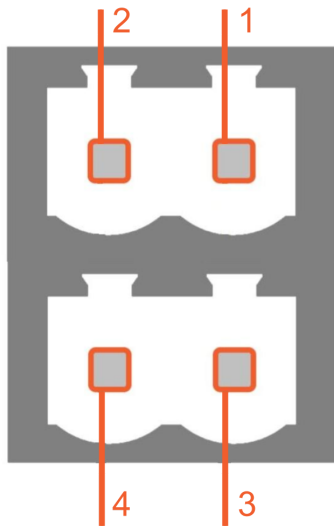
*IOLITE multi channel device*

#### 4.3.4.2. IOLITE - Multi channel: Dimension



### 4.3.4.3. IOLITE - Multi channel: Connectors

#### 4.3.4.3.1. IOLITE - Multi channel: PWR IN



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

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

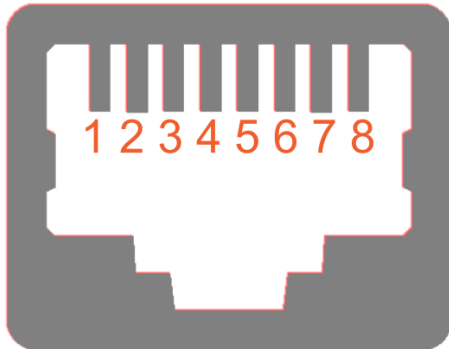
Connector (on the device):  
SCDN-THR 3.81/04/90G 3.2SN BK BX

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

#### 4.3.4.3.2. EtherNET in

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.



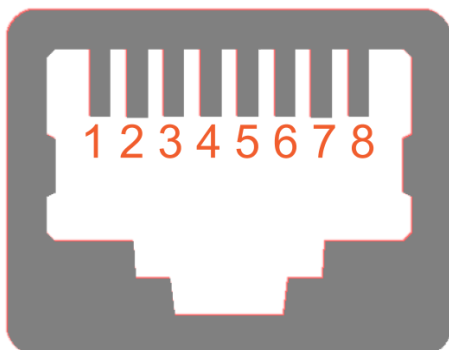
*EtherCAT connector: pin-out (RJ-45 female)*

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

#### 4.3.4.3.3. EtherNET out

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	-	-

### 4.3.5. 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.

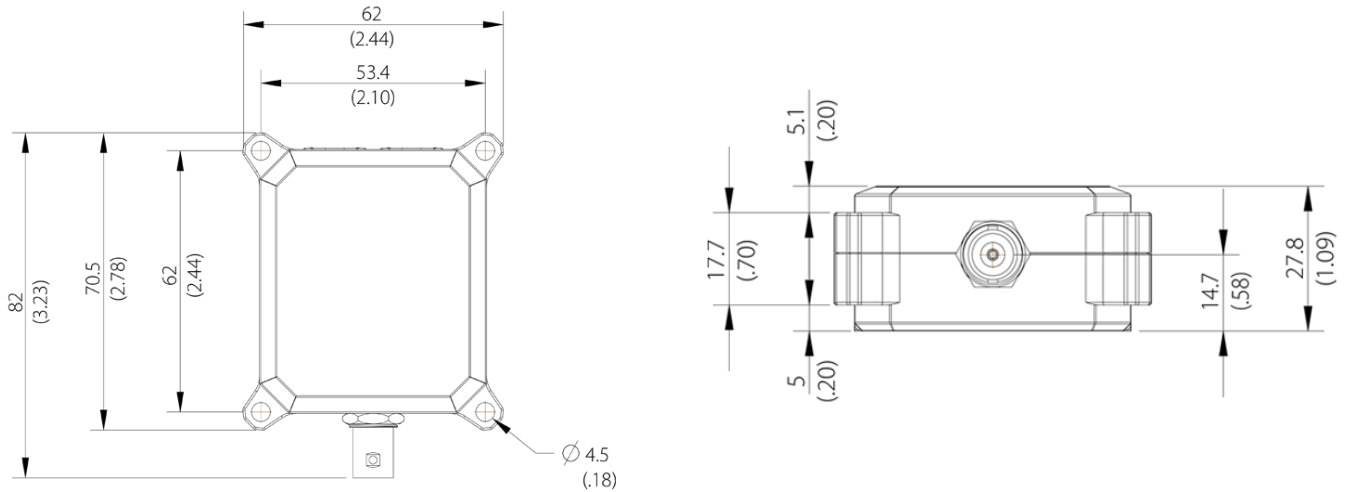
Single EtherCAT cable is enough for power, data, and synchronization between devices.

#### 4.3.5.1. IOLITE - Single channel: Renders



*IOLITE single channel device*

### 4.3.5.2. IOLITE - Single channel: Dimensions

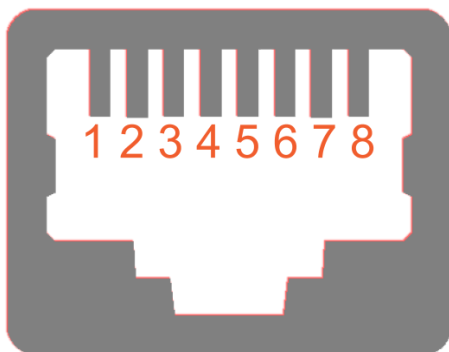


### 4.3.5.3. IOLITE - Single channel: Connectors

#### 4.3.5.3.1. 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.



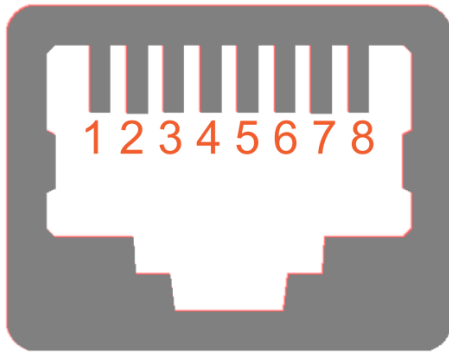
*EtherCAT connector: pin-out (RJ-45 female)*

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 -

#### 4.3.5.3.2. 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 -



## 5. Module Overview

Multichannel modules that comes as slices for the rack system or as a single device:

	6xSTG	8xSTGS	8xLV	16xLV	8xLA	8xTH	8xRTD
<b>Connectors</b>	DB9	Terminal block, DB37, DB9 Micro-D	BNC, Terminal block	Terminal block	BNC, Terminal block	Thermocouple	LOB6f, Terminal block
<b>#ch per module</b>	6x	8x	8x	16x	8x	8x	8x
<b>Data rate / channel</b>	20 kS/sec	20 kS/sec	20 kS/sec	20 kS/sec	20 kS/sec	100 S/sec	100 S/sec
<b>Resolution</b>	24-bit	24-bit	24-bit	24-bit	24-bit	24-bit	24-bit
<b>Bandwidth</b>	0.49*fs	0.433*fs	0.49*fs	0.433*fs	0.49*fs		
<b>Voltage ranges</b>	±50 V, ±10 V, ±1 V, ±100 mV	±1 V, ±100 mV, ±20 mV	±100 V, ±10 V (±10 V, ±1 V on request)	±200 V, ±10 V (±20 V, ±1 V on request)		±1 V, ±100 mV	±1 V, ±100 mV
<b>Input coupling</b>	DC, AC 1 Hz	DC	DC	DC	DC	DC	DC
<b>Sensor excitation</b>	0..12 V (bipolar), 0..24 V (unipolar), 0..44 mA (current) max. 0.55 W/ch	1 V, 2 V, 5 V					
<b>Bridge connection</b>	Full, ½, ¼ 350 Ω, ¼ 120 Ω 3-wire	Full, ½, ¼ 350 Ω, ¼ 120 Ω 3-wire					
<b>Programmable shunt</b>	100 kΩ	100 kΩ					
<b>IEPE input</b>	DSI-ACC						
<b>Current</b>	20 mA (internal shunt), DSI-5A				±20 mA, ±2 mA		
<b>Temperature (PTx)</b>	DSI-RTD						PT100, 200, 500, 1000, 2000
<b>Thermocouple</b>	DSI-TH					K, J, T, R, S, N, E, C, U, B	
<b>Resistance</b>							1 kΩ, 10 kΩ
<b>Potentiometer</b>	✓	✓					
<b>LVDT</b>	DSI-LVDT						
<b>Charge</b>	DSI-CHG						
<b>TEDS</b>	✓	✓ (except DB37)					
<b>Isolation voltage</b>	Differential	Differential	450 V	250 V	450 V	1000 V	1000 V
<b>Power consumption per module</b>	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. 3.4 W, Max. 4.2 W	Typ. 2.4 W, Max. 3.5 W	3.2 W	Typ. 2.1 W, Max. 2.7 W
<b>Advanced functions</b>	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, support of main TC types	High isolation

	32xDI	32xDO	8xDI-4xDO	4xCNT	16xAO
<b>Connectors</b>	Terminal block	Terminal block	Terminal block	LIB7f	Terminal block
<b>#ch per module</b>	32x	32x	8x digital in, 4x digital out	4x	16x
<b>Data rate / channel</b>	40 kS/sec			20 kS/sec	20 kS/sec
<b>Resolution</b>	digital	digital	digital	100 MHz timebase 5 ppm, 20 ppm max	16-bit
<b>Bandwidth</b>				10 MHz	
<b>Voltage ranges</b>		open collector		TTL (Low: <0.8 V, High > 2 V)	±10 V
<b>Input coupling</b>					
<b>Sensor excitation</b>				5 V, 12 V	
<b>Bridge connection</b>					
<b>Programmable shunt</b>					
<b>IEPE input</b>					
<b>Current</b>					
<b>Temperature (PTx)</b>					
<b>Thermocouple</b>					
<b>Resistance</b>					
<b>Potentiometer</b>					
<b>LVDT</b>					
<b>Charge</b>					
<b>TEDS</b>					
<b>Isolation voltage</b>	1000 V	1000 V	1000 V		
<b>Power consumption per module</b>	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
<b>Advanced functions</b>		Watchdog	High sink current, watchdog	Supercounter technology	

Overview for single channel devices

	<b>1xACC</b>	<b>1xSTG</b>	<b>4xDI</b>	<b>4xDO</b>	<b>1xAO</b>
<b>Input / Output types</b>	Input: Voltage, IEPE	Input: Voltage, Strain	Input: Digital	Output: Digital	Output: Voltage
<b>Number of channels per module</b>	1	1	4	4	1
<b>Connector</b>	BNC	DB9	DSUB15HD male	DSUB15HD female	BNC
<b>Data rate per channel</b>	40 kS/s	40 kS/s	20 kS/s		
<b>Resolution</b>	24-bit	24-bit	Digital	Digital	18-bit
<b>Bandwidth</b>	0.49 fs	0.49 fs	X	X	X
<b>Alias-free Bandwidth</b>	0.453 fs	0.453 fs	X	X	X
<b>Alias Rejection</b>	-100 dB (all sample rates)	-100 dB (all sample rates)	X	X	X
<b>Delay Through ADC</b>	37 / fs	37 / fs	X	X	X
<b>Oversampling</b>	32	32	X	X	X
<b>Voltage ranges</b>	±10 V, ±5 V, ±1 V, ±200 mV	±50 V, ±10 V, ±1 V, ±100 mV	Digital (Low: <1 V, High: > 2 V)	X	±10 V
<b>Isolation</b>	125 Vrms Isolation CH, GND	125 Vrms Isolation CH, GND	CH-CH, GND-GND	CH-GND	X
<b>Power supply</b>	12-48V	12-48V	12-48V	12-48V	12-48V
<b>Power consumption</b>	2W	2.5W	2.5W	2.5W	2W
<b>Operating temperature</b>	-20..60 °C	-20..60 °C	-20..60 °C	-20..60 °C	-20..60 °C
<b>Storage temperature</b>	-20..60 °C	-20..60 °C	-20..60 °C	-20..60 °C	-20..60 °C
<b>Dimensions</b>	82 x 62 x 28 mm	71 x 62 x 28 mm	71 x 62 x 28 mm	71 x 62 x 28 mm	82 x 62 x 28 mm
<b>Weight</b>	130 g	130 g	130 g	130 g	130 g

## 5.1. DIO: Digital Input / Output Module

IOLITE digital input / output modules are available in five different forms divided according to the number of digital inputs and outputs:

- 32 digital inputs
- 32 digital outputs
- 8 digital inputs and 4 digital outputs
- 4 digital inputs
- 4 digital outputs

Each module, except the 4xDI and 4xDO, includes 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.



### 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.

### 5.1.1. IOLITEi-32xDI



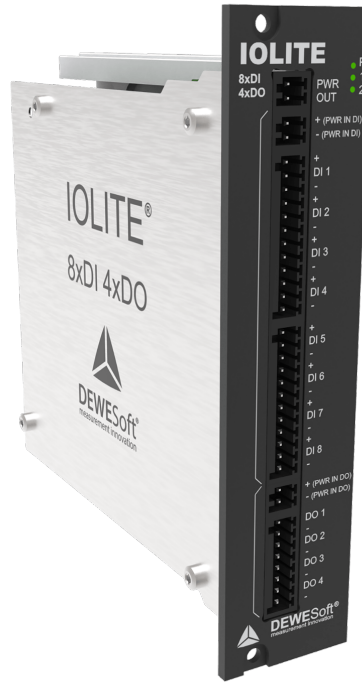
IOLITEi-32xDI module

### 5.1.2. IOLITEi-32xDO



*IOLITEi-32xDO module*

### 5.1.3. IOLITE-8xDI-4xDO



*IOLITEi-8xDI-4xDO module*

### 5.1.4. 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*

### 5.1.5. 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*

## 5.1.6. DIO: Specifications

### IOLITEi-32xDI

<b>Digital Input</b>	
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/sec
Overvoltage protection	100 V continuous (250 Vpeak)
Isolation voltage peak	1000 V channel to ground & channel to channel
<b>Additional Specifications</b>	
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

### IOLITEi-32xDO

<b>Digital Output</b>	
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 channel to ground, no channel to channel isolation
<b>Additional Specifications</b>	
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



IOLITE-8xDI-4xDO

<b>Digital Input</b>	
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 20 kS/sec
Overvoltage protection	100 V continuous (250 Vpeak)
Isolation voltage peak	1000 V channel to ground & channel to channel
<b>Digital Output</b>	
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 channel to ground, no channel to channel isolation
<b>Additional Specifications</b>	
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

IOLITEi-4xDO

<b>Digital Output</b>	
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
<b>Non-Isolated Sensor Power Supply</b>	
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.)
<b>Power</b>	
Power consumption	2.5 W
<b>Environmental</b>	
IP rating	IP20
<b>Physical</b>	
Dimensions	71 x 62 x 28mm
Weight	130 g

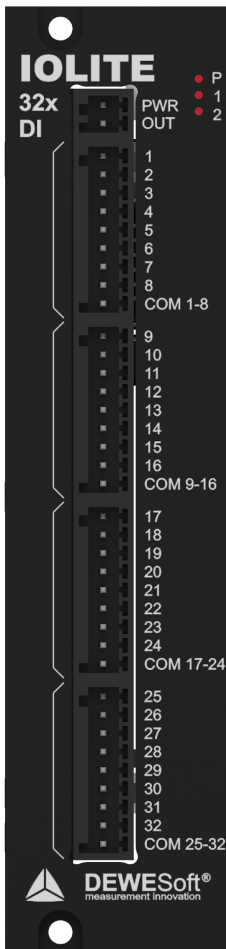
IOLITEi-4xDI

<b>Digital Input</b>	
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 $\mu$ s
Max. sampling rate	40 kS/sec
Overvoltage protection	30 V Continuous, 65 V peak
Isolation	Galvanic isolation CH, GND
<b>Non-Isolated Sensor Power Supply</b>	
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.
<b>Power</b>	
Power consumption	2.5 W
<b>Environmental</b>	
IP rating	IP20
<b>Physical</b>	
Dimensions	71 x 62 x 28 mm
Weight	130 g

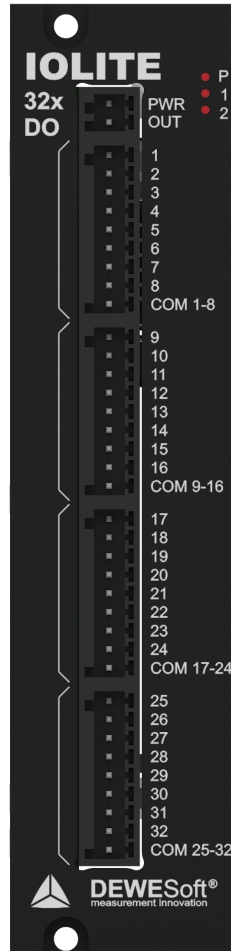
### 5.1.7. DIO: Connectors

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

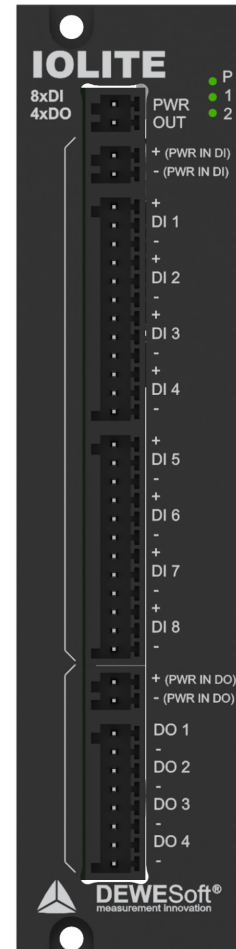
Additionally, there is a 2-pin terminal block connector with a 2.50 mm pitch for PWR OUT function.



IOLITEi-32xDI front

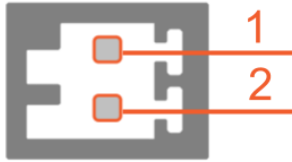


IOLITEi-32xDO front



IOLITE-8xDI-4xDO front

### 5.1.7.1. IOLITEi-32xDI/IOLITEi-32xDO: Power Out: Pinout



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

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

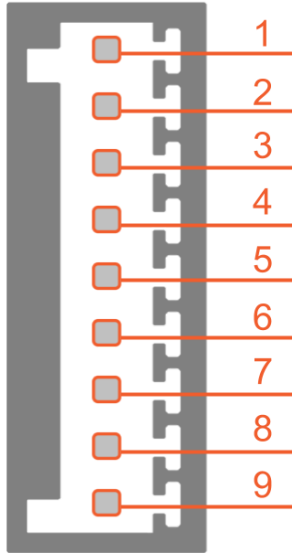
PWR OUT connector (on the device): OMNIMATE Signal SL 2.50/02/90G  
Mating connector (for the cable): OMNIMATE Signal BLF 2.50/02/180



#### 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!

### 5.1.7.2. IOLITEi-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

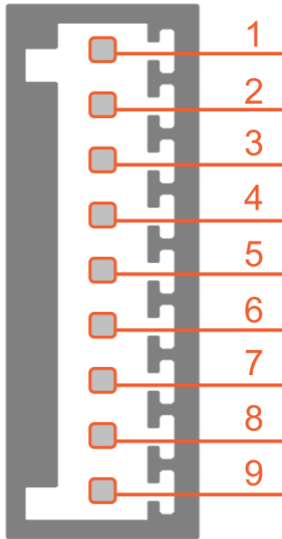
Mating connector (for the cable): OMNIMATE Signal BLF 2.50/09/180



#### Important

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

### 5.1.7.3. IOLITEi-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

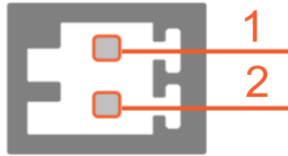
DO connector (on the device): OMNIMATE Signal SL 2.50/09/90G  
Mating connector (for the cable): OMNIMATE Signal BLF 2.50/09/180



#### Important

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

#### 5.1.7.4. IOLITEi-8xDI-4xDO: Power Out: Pinout



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

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

PWR OUT connector (on the device): OMNIMATE Signal SL 2.50/02/90G

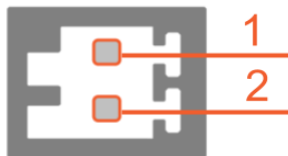
Mating connector (for the cable): OMNIMATE Signal BLF 2.50/02/180



#### 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!

#### 5.1.7.5. IOLITEi-8xDI-4xDO: Power In: Pinout



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

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

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



### 5.1.7.6. IOLITEi-8xDI-4xDO: Digital Input: Pinout

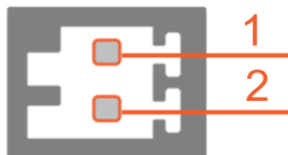


Digital in connector: pin-out (terminal block male)

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

### 5.1.7.7. IOLITEi-8xDI-4xDO: Power In: Pinout

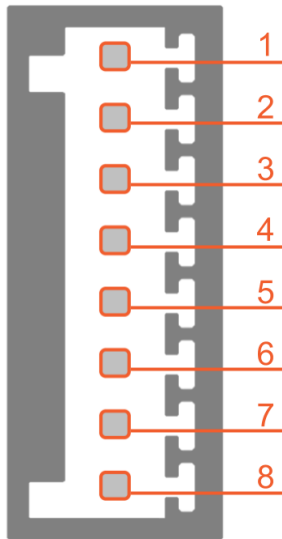


Power in connector: pin-out (terminal block male)

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

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

### 5.1.7.8. IOLITEi-8xDI-4xDO: Digital Output: Pinout



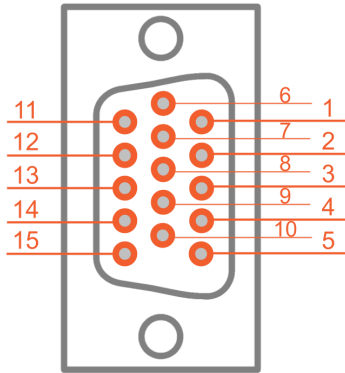
Digital out connector: pin-out (terminal block male)

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

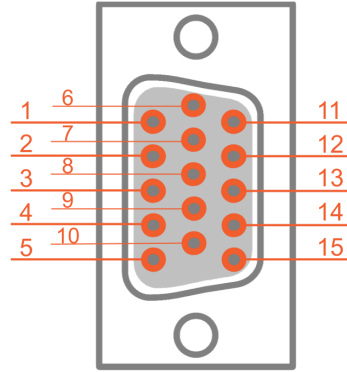
DO connector (on the device): OMNIMATE Signal SL 2.50/09/90G

Mating connector (for the cable): OMNIMATE Signal BLF 2.50/09/180

### 5.1.7.9. IOLITEi-4xDO and 4xDI Connectors: Pinout



DSUB-15 HD male for IOLITEi-4xDI



DSUB-15 HD female for IOLITEi-4xDO

Pin	4xDI		4xDO	
	Name	Description	Name	Description
1	DI1 +	Digital input CH1 +	DO1	Digital output CH1
2	DI2 +	Digital input CH2 +	DO2	Digital output CH2
3	DI3 +	Digital input CH3 +	DO3	Digital output CH3
4	DI4 +	Digital input CH4 +	DO4	Digital output CH4
5	NC	-	Vext +	External voltage
6	DI1 -	Digital input CH1 -	GNDi	Isolated ground
7	DI2 -	Digital input CH2 -	GNDi	Isolated ground
8	DI3 -	Digital input CH3 -	GNDi	Isolated ground
9	DI4 -	Digital input CH4 -	GNDi	Isolated ground
10	NC	-	NC	-
11	+5V/300mA	5 V supply, max. 300 mA	+5V/300mA	5 V supply, max. 300 mA
12	+12V/130mA	12 V supply, max.130 mA	+12V/130mA	12 V supply, max.130 mA
13	GND	Ground	GND	Ground
14	GND	Ground	GND	Ground
15	V <sub>supply</sub> /200mA	Supply voltage, max. 200 mA	V <sub>supply</sub> /200mA	Supply voltage, max. 200 mA

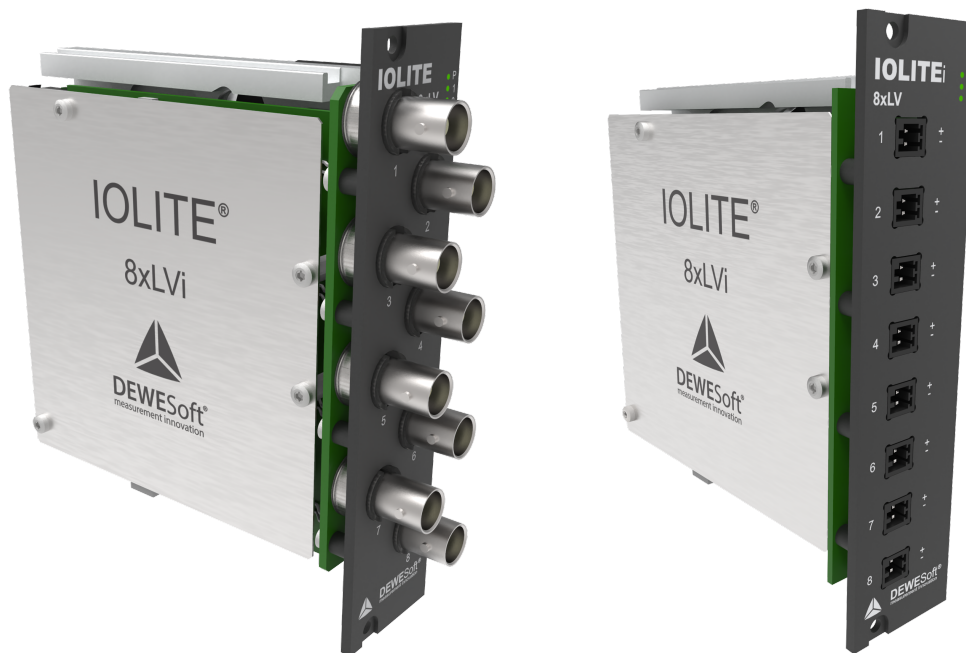
## 5.2. LV: Low Voltage Module

The LV modules come in two different solutions:

- 8-channel
  - 8xLV (100 V and 10 V range)
  - 8xLV-10V (10 V and 1 V range)
- 16-channel
  - 16xLV (200 V and 10 V range)

### 5.2.1. 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 or terminal block connectors and a range of either 10 or 100 V.



*IOLITEi-8xLV (left) and IOLITEi-8xLV-T2A2f (right) modules*

### 5.2.2. IOLITE-16xLV

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



*IOLITE-16xLV module*

### 5.2.3. LV: Specifications

#### IOLITEi-8xLV

<b>Analog input</b>		<b>IOLITEi-8xLV</b>	
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)		
<b>Voltage Range</b>	<b>±100 V</b>	<b>±10 V</b>	
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 CMR @ 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)		
<b>Analog input performance</b>			
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		
<b>Additional Specifications</b>			
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		
<b>Input Connectors</b>	<b>BNC</b>	<b>Terminal block 2 pole OMNIMATE SL 2.50 / BLF 2.50/180</b>	
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	

IOLITE-16xLV

<b>Analog input</b>		<b>IOLITE-16xLV</b>	
Input type	Voltage		
Number of channels	16		
ADC Type	24-bit oversampled sigma-delta		
Sampling Rates	Simultaneous 20k, 10k, 5k, 2k, 1k, 500, 200, 100 S/s (software-selectable)		
<b>Voltage Range</b>		<b>±200 V</b>	<b>±10 V</b>
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		
Overvoltage Protection	In+ to In-: 200 V continuous, 350 Vpeak (100 ms)		
<b>Analog input performance</b>			
Bandwidth (-3 dB)	0.433*fs		
Alias-free Bandwidth	0.499*fs		
Alias Rejection	-105 dB (all sample rates)		
Delay Through ADC	34 / fs (Sinc5 filter 3 / fs)		
Oversampling	128		
<b>Additional Specifications</b>			
Power supply	9 - 48 V DC		
Isolation Voltage	250 V functional isolation (channel to power supply ground)		
Power Consumption	Typ. 3.4 W (Max. 4.2 W)		
<b>Input Connectors</b>		<b>Terminal block 9 pole OMNIMATE SL 2.50 / BLF 2.50/180</b>	
Slice Dimensions	128.4 x 115.4 x 30.1 mm		
Weight	230 g		

## 5.2.4. LV: Connectors

### 5.2.4.1. IOLITEi-8xLV: BNC Connector

IOLITE LV module has 8 BNC connectors for analog input.



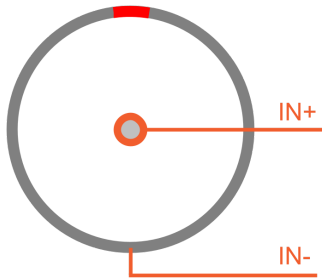
*IOLITEi-8xLV front*



*IOLITEi-8xLV-10V front*



### 5.2.4.2. IOLITEi-8xLV: BNC Connector: Pin out

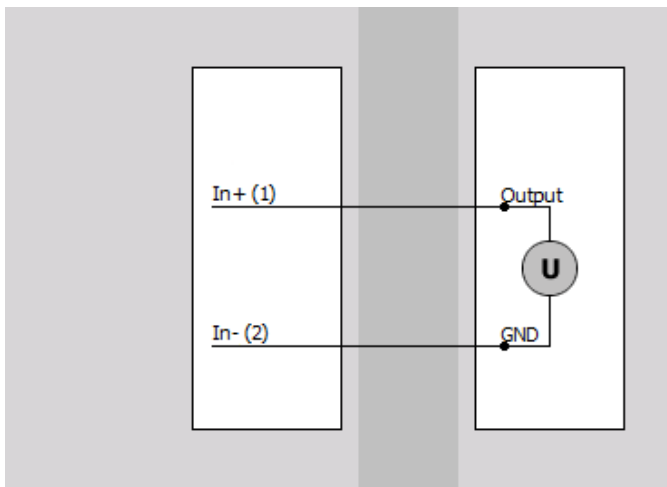


LV connector: pin-out (BNC)

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

### 5.2.4.3. LV: BNC Connector: Wiring diagram

#### 5.2.4.3.1. LV: Voltage

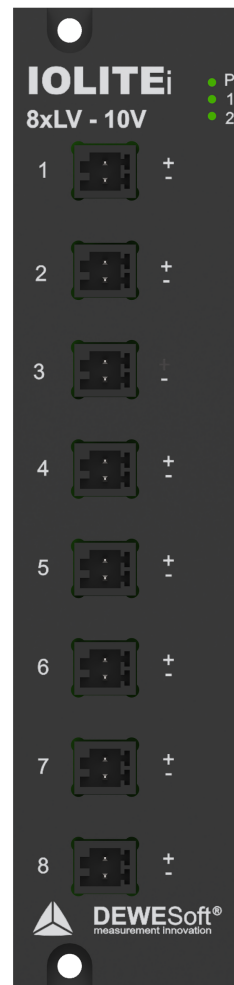


#### 5.2.4.4. IOLITEi-8xLV: T2A2f Connector

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

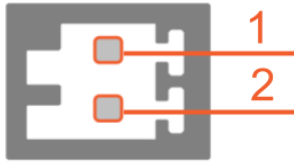


*IOLITEi-8xLV-T2A2f front*



*IOLITEi-8xLV-10V-T2A2f front*

### 5.2.4.5. IOLITEi-8xLV: T2A2f Connector: Pin out



LV connector: pin-out (TBLOCK male)

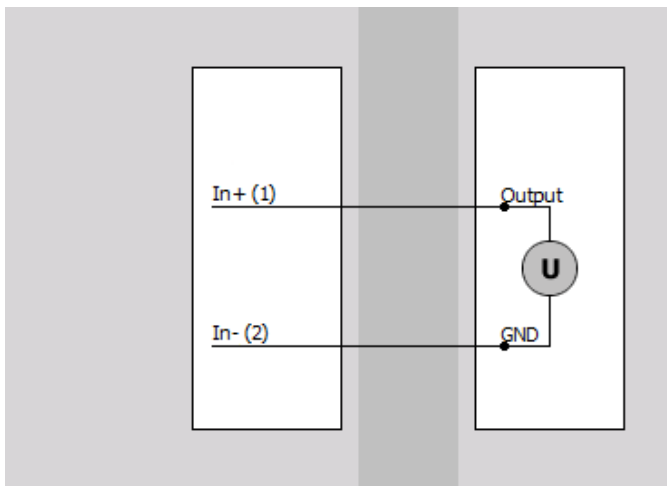
Pin	Name	Description
1	IN+	Analog input +
2	IN-	Analog input -

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

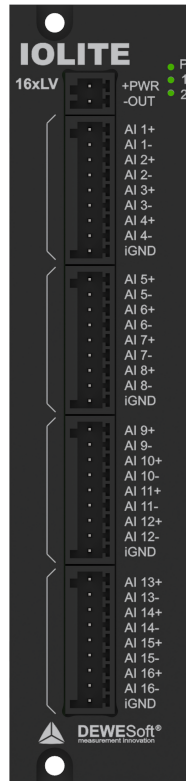
### 5.2.4.6. 8xLV: T2A2f Connector: Wiring diagram

#### 5.2.4.6.1. 8xLV: Voltage



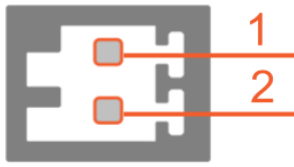
### 5.2.4.7. IOLITE-16xLV Connectors

IOLITE-16xLV modules have 4 T2A9f connectors for analog input.



*IOLITE-16xLV front*

#### 5.2.4.8. IOLITE-16xLV: T2A2f Power OUT Connector: Pinout



LV connector: pin-out (TBLOCK male)

Pin	Name	Description
1	+PWR OUT	V <sub>supply</sub> output
2	-PWR OUT	Non-isolated GND

Connector (on the device): OMNIMATE Signal SL 2.50/02/90G

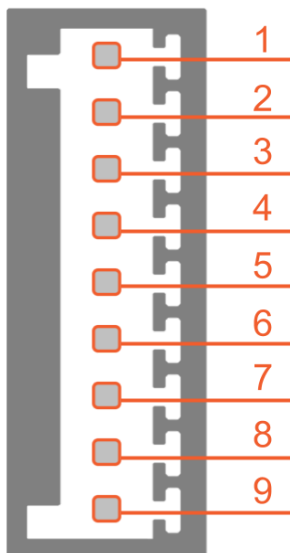
Mating connector (for the cable): OMNIMATE Signal BLF 2.50/02/180



#### 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!

#### 5.2.4.9. IOLITE-16xLV: T2A9f Analog input: Pinout



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

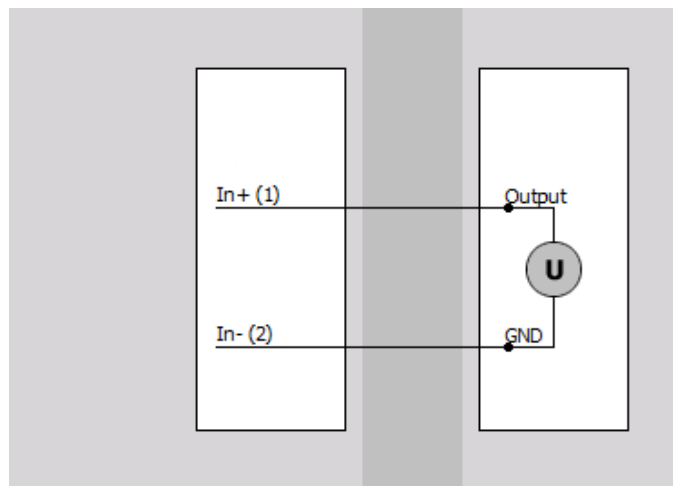
Pin	Name	Description
1	IN 1 +	Analog input 1
2	IN 1 -	Input ground 1
3	IN 2 +	Analog input 2
4	IN 2 -	Input ground 2
5	IN 3 +	Analog input 3
6	IN 3 -	Input ground 3
7	IN 4 +	Analog input 4
8	IN 4 -	Input ground 4
9	iGND	Common isolated ground

AI connector (on the device): OMNIMATE Signal SL 2.50/09/90G

Mating connector (for the cable): OMNIMATE Signal BLF 2.50/09/180

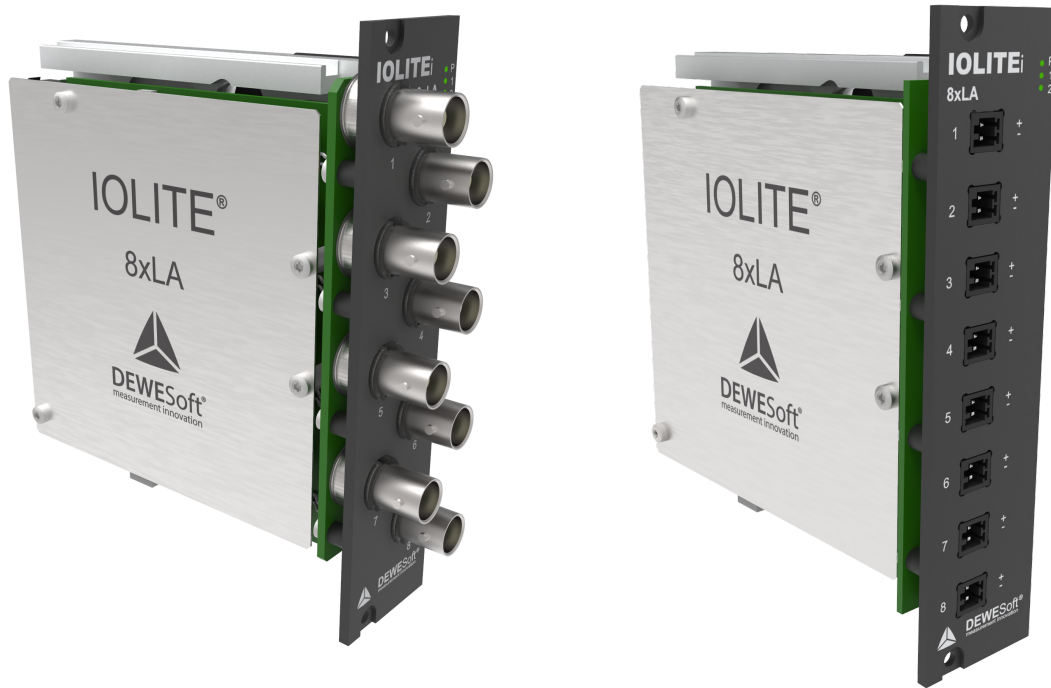
## 5.2.4.10. 16xLV: T2A9f Connector: Wiring diagram

### 5.2.4.10.1. 16xLV: Voltage



### 5.3. LA: Low Amperage

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  $\pm 20$  mA. It features channel to channel isolation and comes with either BNC or terminal block connectors.



*IOLITEi-8xLA (left) and IOLITEi-8xLA-T2A2f (right) modules*

### 5.3.1. LA: Specifications

<b>Analog input</b>		<b>IOLITEi-8xLA</b>	
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)		
<b>Current Range</b>	<b>±20 mA</b>	<b>±2 mA</b>	
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-: 20 V continuous, 30 V <sub>peak</sub> (100 ms)		
Overcurrent Protection	In+ to In-: 70 mA continuous		
<b>Analog input performance</b>			
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		
<b>Additional Specifications</b>			
Power supply	9 - 48 V DC		
Isolation Voltage	450 V <sub>peak</sub> channel to ground & channel to channel		
Power Consumption	Typ. 2.8 W, Max. 3.5 W		
<b>Input Connectors</b>	<b>BNC</b>	<b>Terminal block 2 pole OMNIMATE SL 2.50 / BLF 2.50/180</b>	
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	

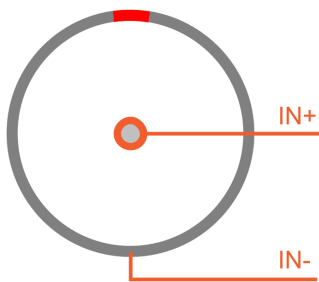


### 5.3.2. LA: BNC Connector



IOLITE-8xLA Front

#### 5.3.2.1. 8xLA: BNC Connector: Pinout

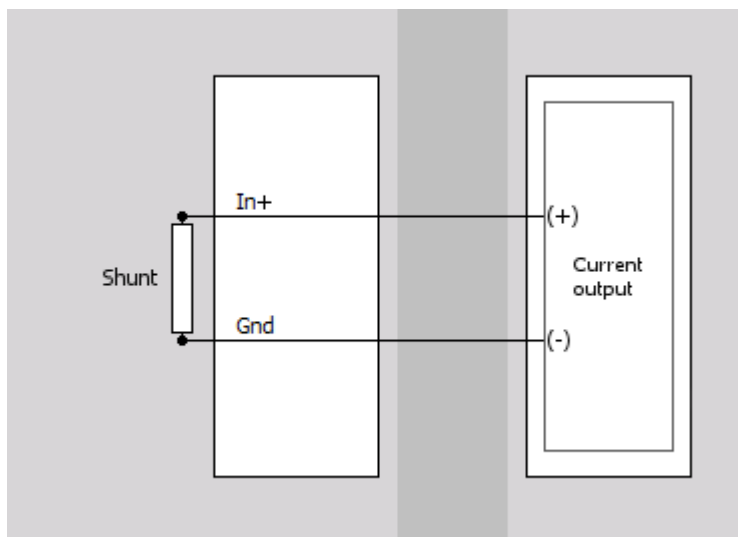


LV connector: pin-out (BNC)

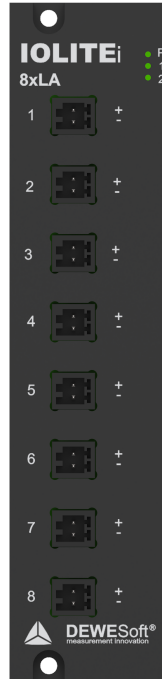
Pin	Name	Description
1	IN+	Analog input +
2	IN-	Analog input -

### 5.3.2.2. 8xLA: BNC Connector: Wiring diagram

#### 5.3.2.2.1. 8xLA: Current

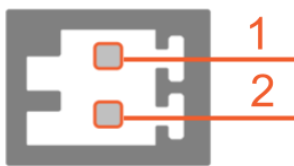


### 5.3.3. LA: T2A2f Connector



IOLITE-8xLA-T2A2f front

#### 5.3.3.1. 8xLA: T2A2f Connector: Pinout



LA connector: pin-out (TBLOCK male)

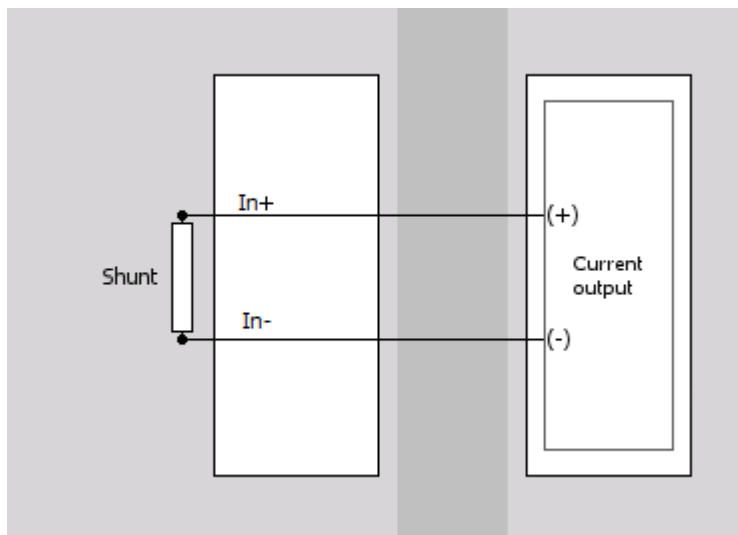
Pin	Name	Description
1	IN+	Analog input +
2	IN-	Analog input -

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

### 5.3.3.2. 8xLA: T2A2f Connector: Wiring diagram

#### 5.3.3.2.1. 8xLA: Current



## 5.4. RTD: Resistance Temperature Detector Module

IOLITEi RTD module with 6-pin LEMO 0B input connectors 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.



*IOLITEi-8xRTD module*

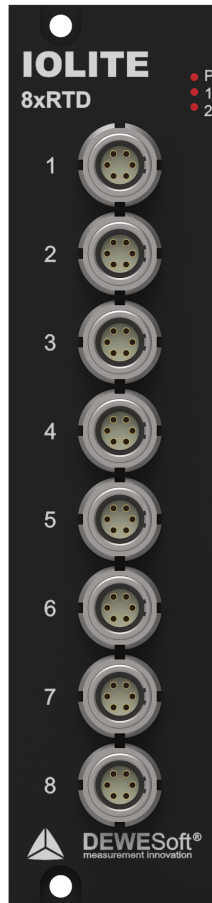
### 5.4.1. RTD: Specifications

IOLITEi-8xRTD and IOLITEi-8xRTD-T2A4f

<b>Analog inputs</b>		
Input types	voltage, resistor or universal PTxxx inputs	
Number of channels	8	
ADC Type	24-bit delta-sigma	
Sampling Rate	Simultaneous 100 S/sec	
<b>Voltage Ranges</b>	<b>±1 V</b>	<b>±100 mV</b>
Input Accuracy	±0.02 % of reading ±0.01 % of range ±10 µV	±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	
<b>Temperature</b>	<b>PT500, PT1000, PT2000</b>	<b>PT100, PT200</b>
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	
Resolution	< 0.001 °C	
<b>Resistance</b>	<b>0...10 kΩ</b>	<b>0...1 kΩ</b>
Accuracy	±0.02 % of reading ±0.01 % of range	
Input Connection	3-wire or 4-wire	
<b>Additional Specifications</b>		
Input connectors	Lemo 0B 6pin EEA.0B.306.CLN, Terminal Block Weidmueller SL 2.50-04	
Isolation voltage	1000 V <sub>peak</sub> 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	

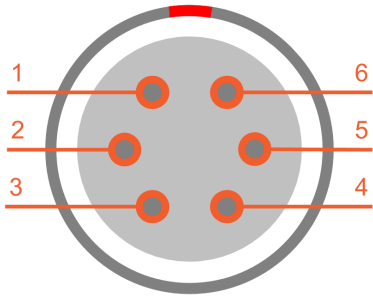
### 5.4.2. RTD: LEMO L0B6f Connector

IOLITEi-8xRTD and IOLITEi-8xRTDp module have eight 6-pin LEMO 0B female connectors.



*IOLITEi-8xRTD front*

### 5.4.2.1. RTD: LEMO L0B6f Connector: Pinout



RTD connector: pin-out (6-pin LEMO female)

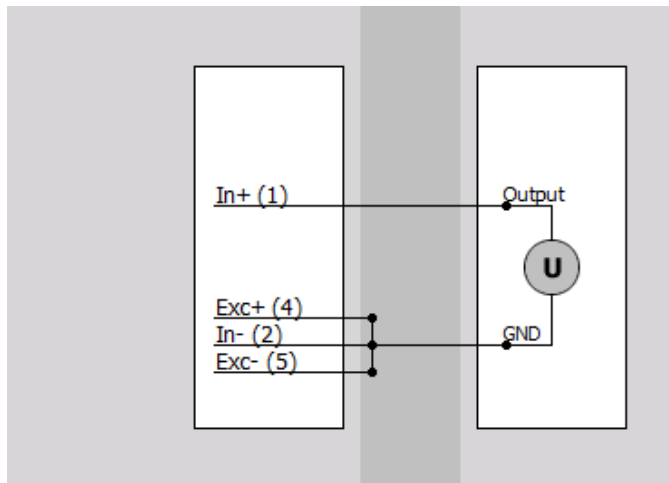
Pin	Name	Description
1	In+	Input+
2	In-	Input-
3	NC	Do not connect
4	Exc+	Excitation+
5	Exc-	Excitation-
6	NC	Do not connect

RTD connector (on the device): EEA.0B.306.CLN

Mating connector (for the cable): FGA.0B.306.CLAD22Z

### 5.4.2.2. RTD: LEMO L0B6f Connector: Wiring diagram

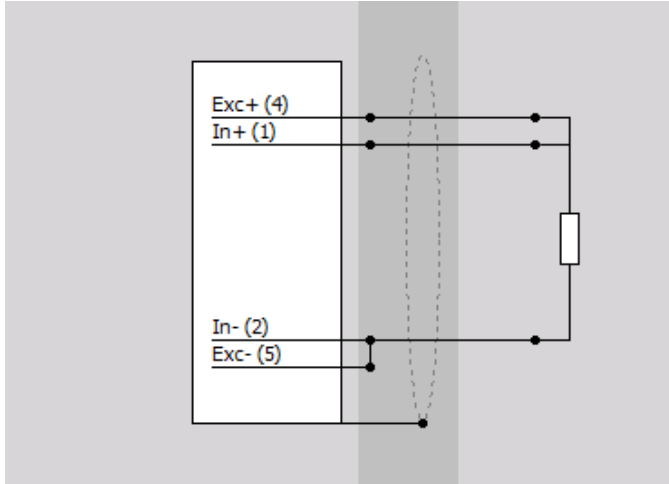
#### 5.4.2.2.1. RTD: Voltage



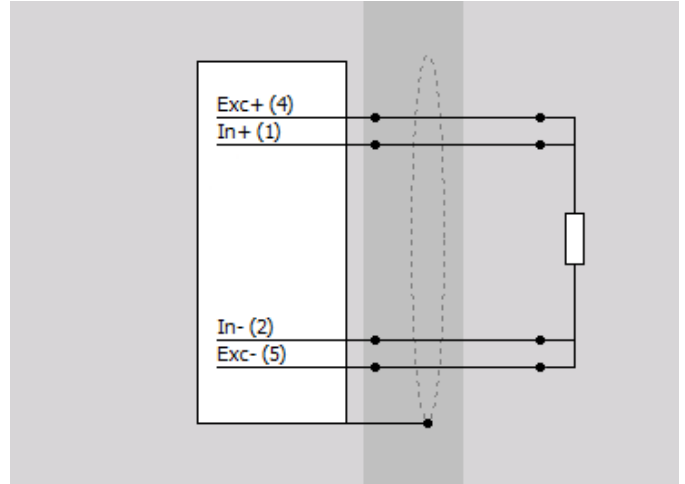


5.4.2.2.2. RTD: Resistance

3-wire

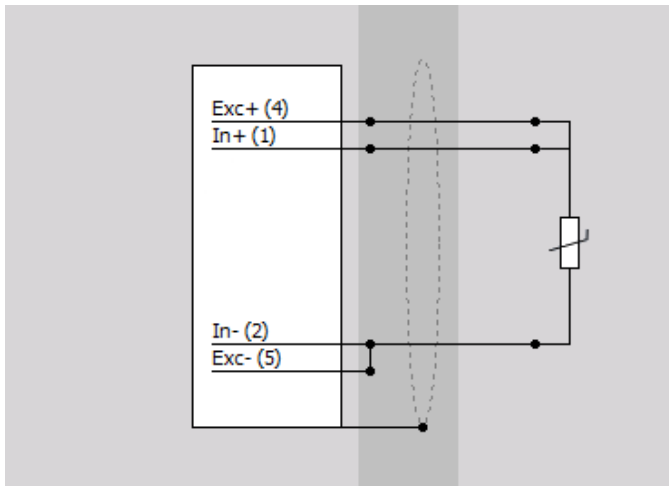


4-wire

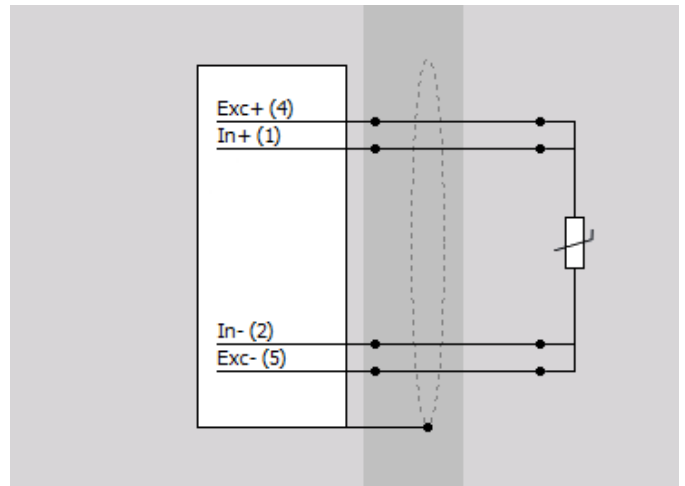


5.4.2.2.3. RTD: Temperature

3-wire



4-wire



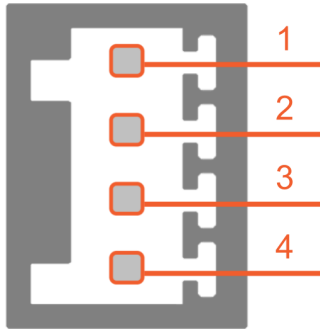
### 5.4.3. RTD-T2A4f: Terminal block connector

IOLITEi-8xRTD-T2A4f module has 8 terminal block Weidmueller SL 2.50-04 (T2A4f) female connectors.



*IOLITEi-8xRTD-T2A4f front*

### 5.4.3.1. RTD-T2A4f: Terminal block connector: Pinout

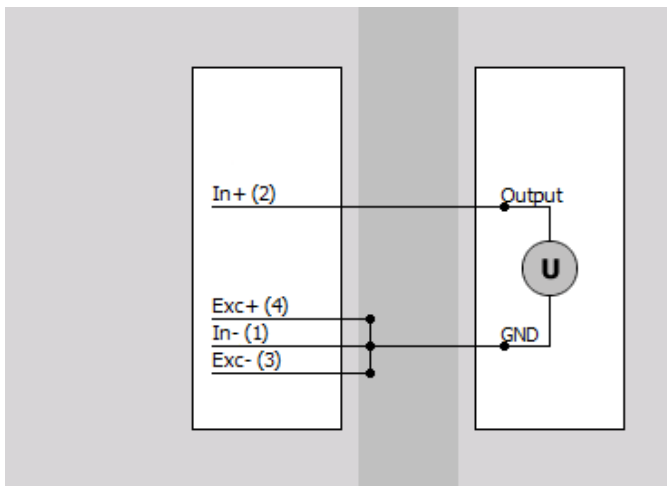


Pin	Name	Description
1	In-	Input-
2	In+	Input+
3	Exc-	Excitation-
4	Exc+	Excitation+

RTD connector: pin-out (TBLOCK male)

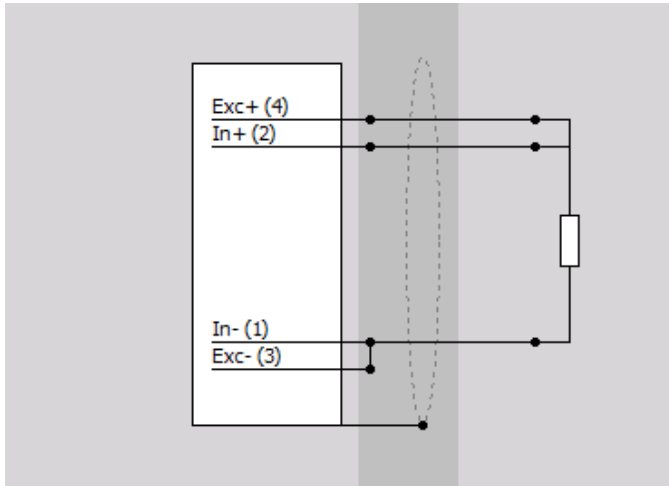
### 5.4.3.2. RTD-T2A4f: T2A4f Connector: Wiring diagram

#### 5.4.3.2.1. RTD: Voltage

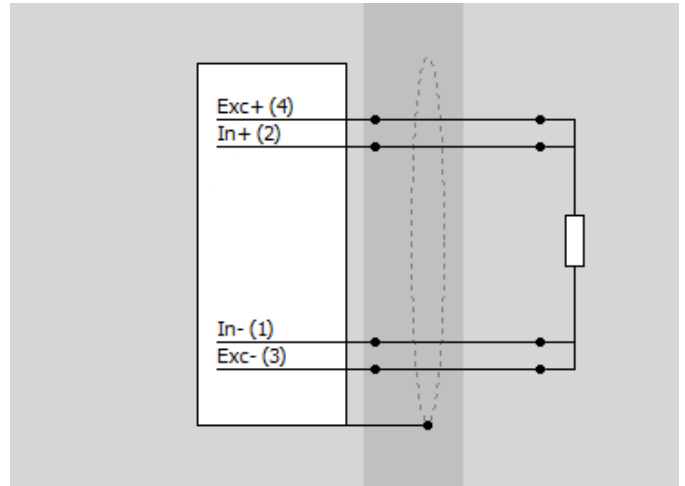


5.4.3.2.2. RTD: Resistance

3-wire

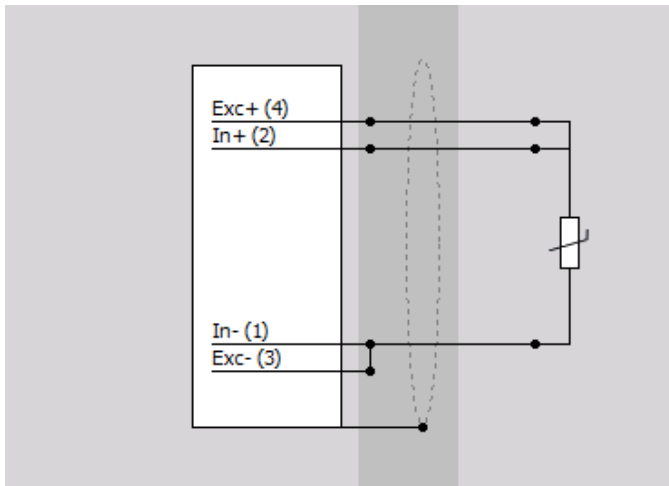


4-wire

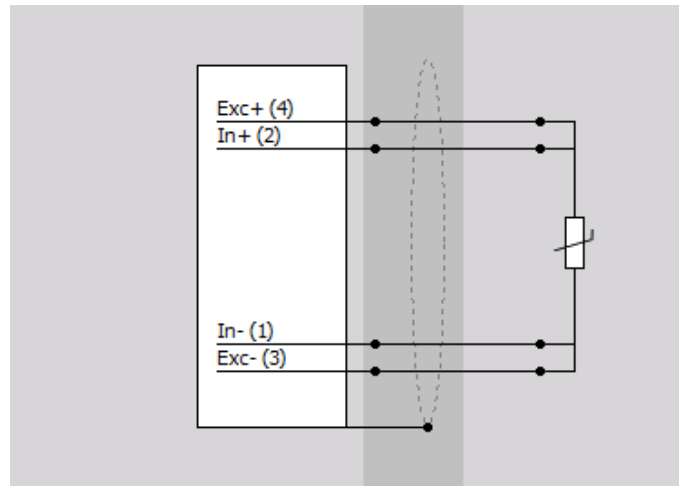


5.4.3.2.3. RTD: Temperature

3-wire



4-wire



## 5.5. STG: Strain Gauge Module

IOLITE STG can be found in the following options:

- IOLITE 6xSTG slot slice
- IOLITE 6xSTG single slice
- IOLITEi 1xSTG single channel slice

### 5.5.1. IOLITE-6xSTG

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.



*IOLITE-6xSTG module*

### 5.5.2. 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.



5.5.3. IOLITEi-1xSTG module

### 5.5.4. STG: Specifications

#### IOLITE 6xSTG

Analog inputs - Voltage				
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/sec per channel (software-selectable)			
Voltage 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	1 MΩ	1 MΩ	20 MΩ	20 MΩ
Overvoltage Protection	In+ to In-: 50 V continuous, 200 V peak (10 msec)			
Analog inputs - Current				
Current ranges	20 mA		2 mA	

Input Accuracy	$\pm 0.03$ % of reading, $\pm 0.02$ % of range, $\pm 2.1$ $\mu$ A
Internal Shunt Resistor	50 $\Omega$
<b>Analog input performance</b>	
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
<b>Excitation Voltage</b>	
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	$\pm 0.05$ % $\pm 2$ mV
Drift	$\pm 50$ ppm/K $\pm 100$ $\mu$ V/K
Stability 10 % to 90 % Load	< 0.01 %
Current Limit	42 mA (550 mW max. power)
Protection	Continuous short to ground
<b>Excitation Current</b>	
Excitation Voltage	Free programmable (16-bit DAC)
Predefined Levels	0, 2, 4, 8, 16, 44 mA
Accuracy	$\pm 0.1$ % $\pm 2$ $\mu$ A (<10 mA), $\pm 0.5$ % $\pm 5$ $\mu$ A (>10 mA)
<b>Bridge measurement</b>	
Bridge Connection Types	full bridge strain, $\frac{1}{2}$ bridge strain, $\frac{1}{4}$ bridge strain (3-wire)
Ranges	2...1000 mV/V free programmable
Internal Bridge Completion	$\frac{1}{2}$ bridge and $\frac{1}{4}$ bridge 120 and 350 $\Omega$
Bridge Completion Accuracy	0.05 %; TCR: 5 ppm/K (others on request)
Internal Shunt Resistor	100 k $\Omega$ (others on request)
Shunt Resistor Accuracy	0.05 %; TCR: 10 ppm/K (others on request)
Input Short, Sensor Offset Adjust	Software-selectable
<b>Additional Specifications</b>	
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 $\Omega$ @ 5 V load, 8.8 W 350 $\Omega$ @ 10 V load)
Weight	340 g
Slice Dimensions	128.4 x 115.4 x 30.1 mm

IOLITEi 1xSTG

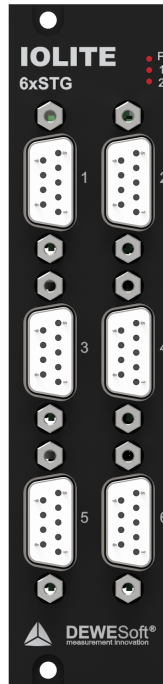
<b>Analog input - Voltage</b>				
Input types	Voltage, current, full bridge strain, half bridge strain, quarter bridge strain			
Number of channels	1			
Input connector	DB9			
ADC Type	24-bit SAR with anti-aliasing filter			
Sampling Rate	40 kS/s			
<b>Voltage Ranges</b>	<b>±50 V</b>	<b>±10 V</b>	<b>±1 V</b>	<b>±100 mV</b>
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			
<b>Analog input - Current</b>				
Current ranges	2 mA, 20 mA			
Input Accuracy	±0.03 % of reading, ±0.02 % of range, ±2.1 µA			
Internal Shunt resistor	50 Ω			
<b>Analog input performance</b>				
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			
<b>Excitation voltage</b>				
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
<b>Power</b>	
Power consumption	2.5 W
<b>Environmental</b>	
IP rating	IP20
<b>Physical</b>	
Dimensions	71 x 62 x 28 mm
Weight	130 g

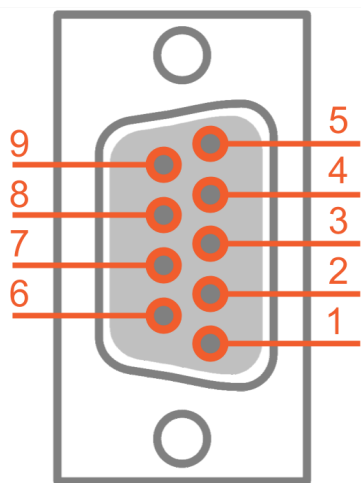
### 5.5.5. STG: D-SUB9 Connector

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



IOLITE-6xSTG front

#### 5.5.5.1. D-SUB9 Connector: Pinout



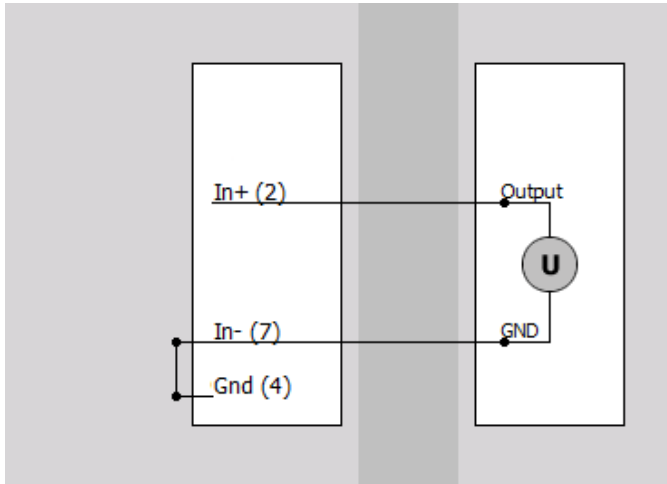
STG connector: pin-out (DSUB-9 female)

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

### 5.5.5.2. STG: D-SUB9 Connector: Wiring diagram

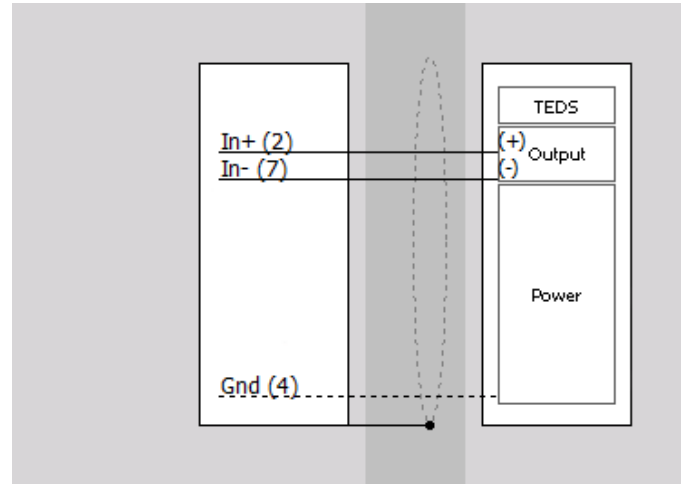
#### 5.5.5.2.1. STG: Voltage

##### Single ended

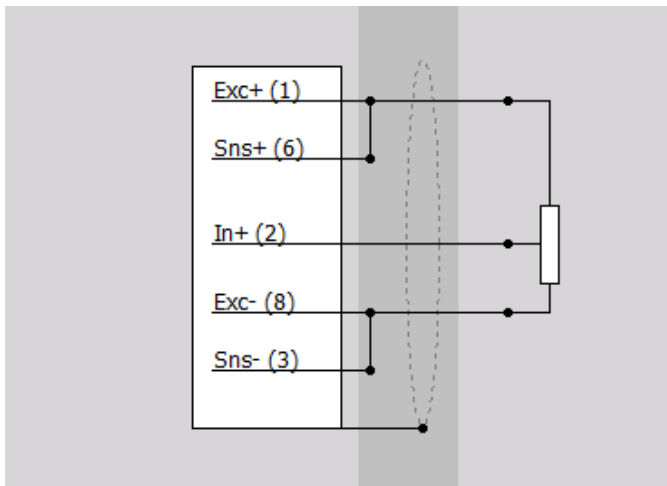


##### Differential

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

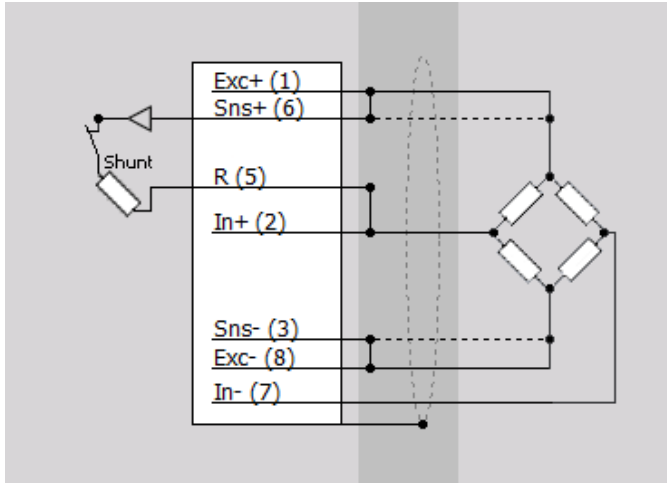


#### 5.5.5.2.2. STG: Potentiometer

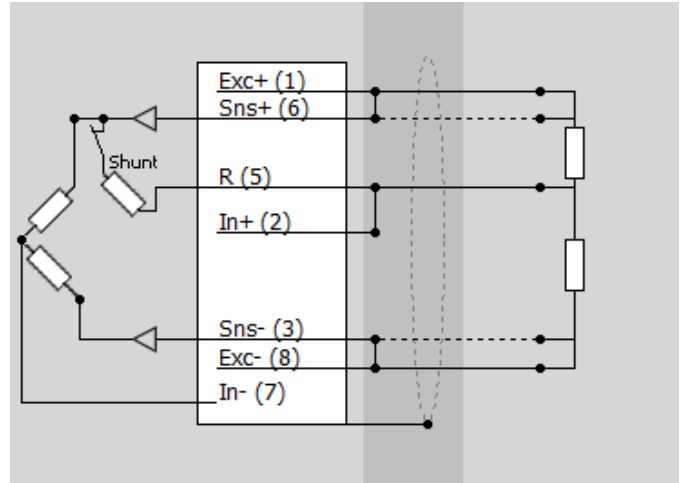


5.5.5.2.3. STG: Bridge

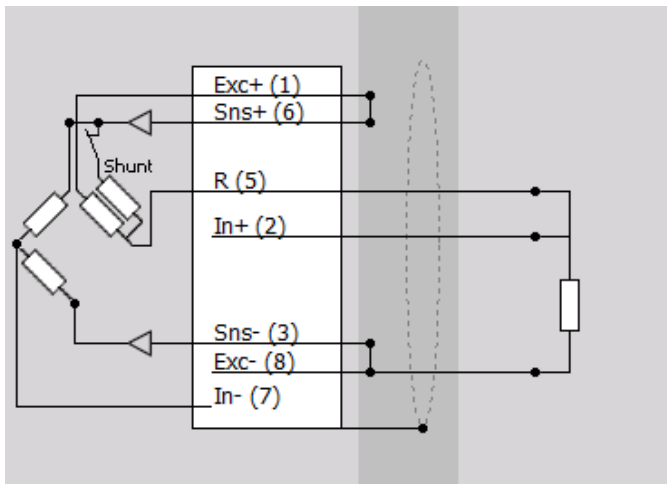
Full bridge



Half bridge

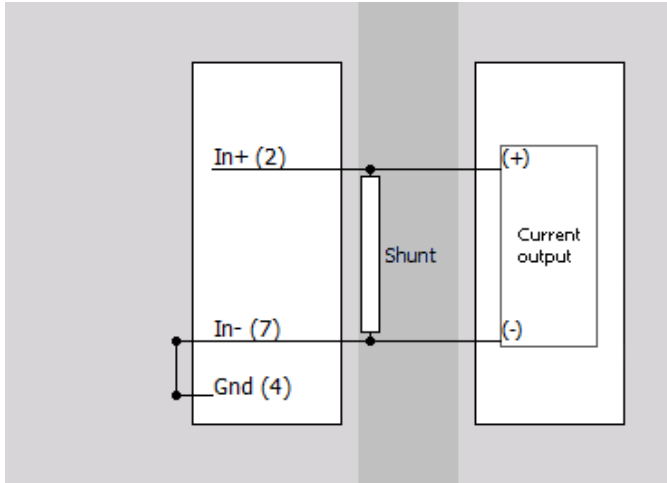


Quarter bridge

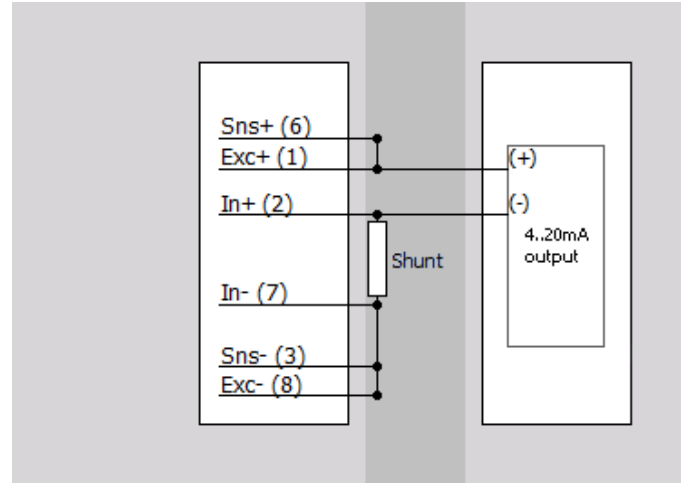


5.5.5.2.4. STG: Current

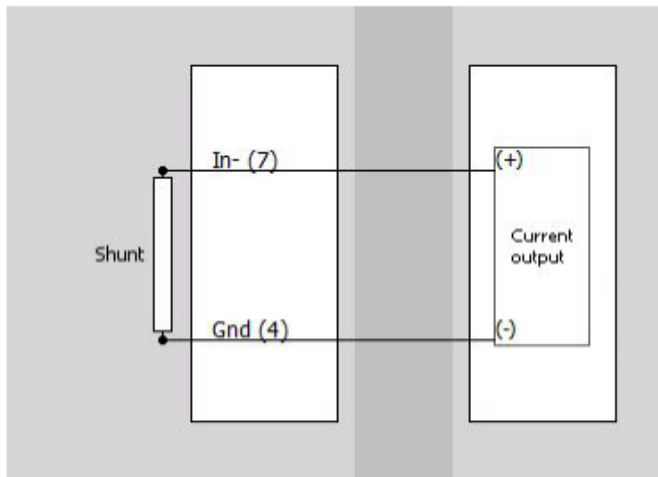
External direct shunt



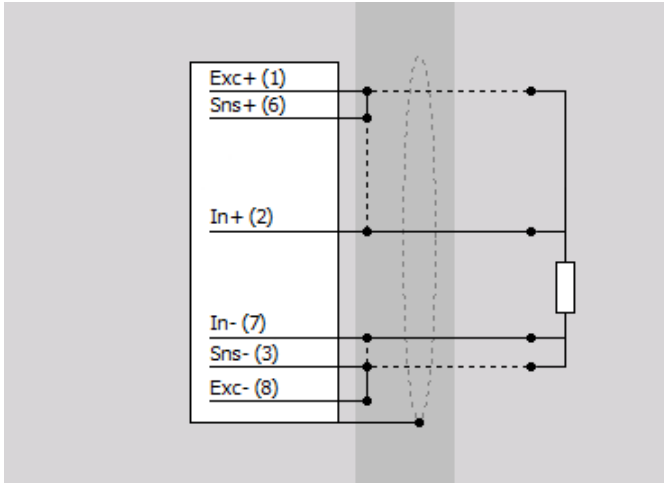
External loop powered shunt



Internal shunt



### 5.5.5.2.5. STG: Resistance



## 5.6. STGS: Strain Gauge Module

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 and optionally with D-SUB37 input connectors.

The module can be found in the following options:

- IOLITEr-8xSTGS as a slot slice
- IOLITEr-8xSTGS-D37 as a slot slice
- IOLITE-8xSTGS as a standalone module
- IOLITE-8xSTGS-D37 as a standalone module



*IOLITEr-8xSTGS (left) and IOLITEr-8xSTGS-D37 (right) module*

## 5.6.1. STGS: Specifications

<b>Analog inputs</b>			
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/sec per channel (software-selectable)		
<b>Voltage Ranges</b>	<b>±1 V</b>	<b>±100 mV</b>	<b>±20 mV</b>
Input Accuracy	±0.03 % of reading, ±0.02 % of range, ±0.1 mV		
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	-134 / -133 / -133 dB	-131 / -130 / -129 dB	-121 / -119 / -120 dB
Typ. Crosstalk @ 1 kHz	-120 dB	-126 dB	-114 dB
Typ. CMR @ 50 Hz / 400 Hz / 1 kHz	84 / 85 / 76 dB	108 / 104 / 99 dB	118 / 117 / 113 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	< 0.02 %		
Input Coupling	DC		
<b>Analog input performance</b>			
Bandwidth (-3 dB)	0.433*fs (Sinc5 filter 0.204*fs)		
Alias-free Bandwidth	DC to 0.499*fs		
Alias Rejection	-105 dB (all sample rates)		
Delay Through ADC	34 / fs (Sinc5 filter 3 / fs)		
Oversampling	128		
<b>Excitation Voltage</b>			
Excitation Voltage	Unipolar: 1 V, 2 V, 5 V (see 1)		
Current Limit	42 mA		
Protection	Continuous short to ground		
<b>Bridge measurement</b>			
Bridge Connection Types	full bridge strain, ½ bridge strain, ¼ bridge strain (3-wire)		
Ranges	2 mV/V, 20 mV/V, 200 mV/V (2 mV/V ... 1000 mV/V free programmable)		
Internal Bridge Completion	¼ bridge 120Ω and 350 Ω		
Bridge Completion Accuracy	0.05 %; 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		
<b>Additional Specifications</b>			
Input connectors	Terminal block, D-SUB37, D-SUB9 Micro-D		

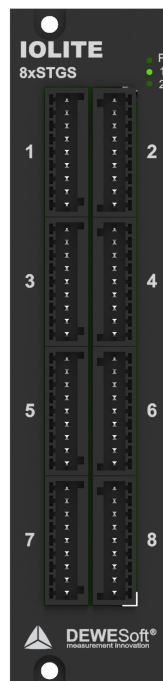


TEDS support	Available for Terminal block, D-SUB9 Micro-D (see 2)
Power supply	9 - 48 V DC
Power Consumption	Typ. 2.7 W, Max. 5.1 W (120 Ω @ 5 V load)
Weight	340 g
Slice Dimensions	128.4 x 118.4 x 30.14 mm

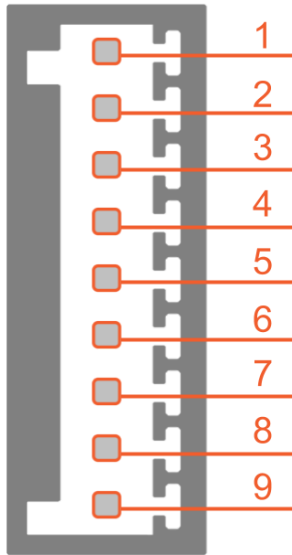
1) Ratiometric method

2) Not compatible with DSI adapters

### 5.6.2. STGS: T2A9f Connectors



### 5.6.2.1. STGS: T2A9f Connector: Pinout



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

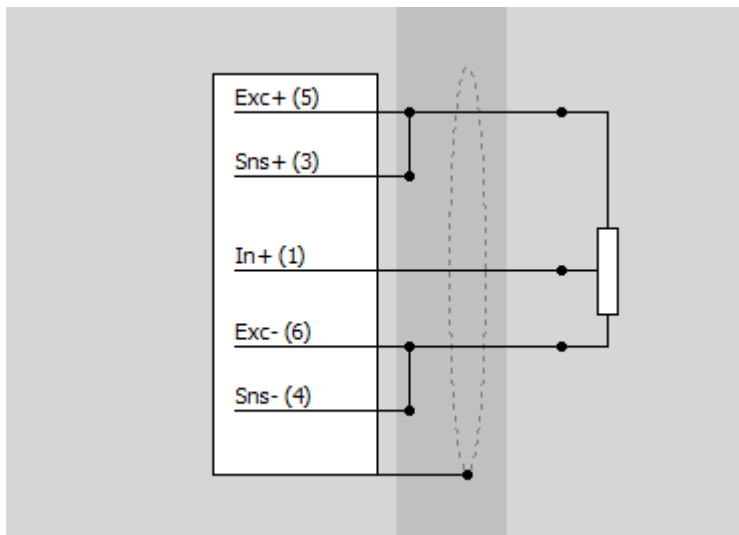
Pin	Name	Description
1	IN +	Input+
2	IN -	Input-
3	SNS +	Sense+
4	SNS -	Sense-
5	EXC +	Excitation+
6	EXC -	Excitation-
7	iGND	Isolated ground
8	R	¼ Bridge / Shunt
9	TEDS	TEDS

AI connector (on the device): OMNIMATE Signal SL 2.50/09/90G

Mating connector (for the cable): OMNIMATE Signal BLF 2.50/09/180

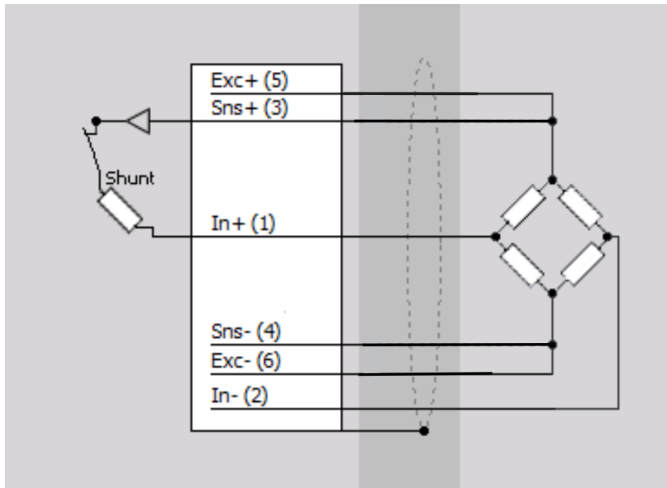
## 5.6.2.2. STGS: Wiring diagram

### 5.6.2.2.1. STGS: T2A9f: Potentiometer

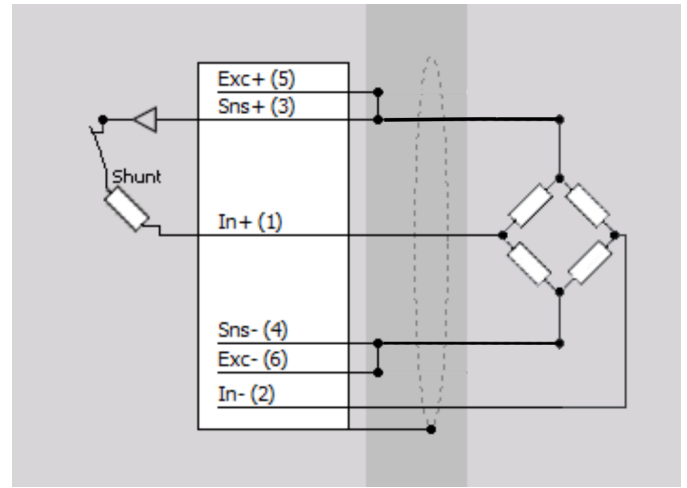


5.6.2.2.2. STGS: T2A9f: Bridge

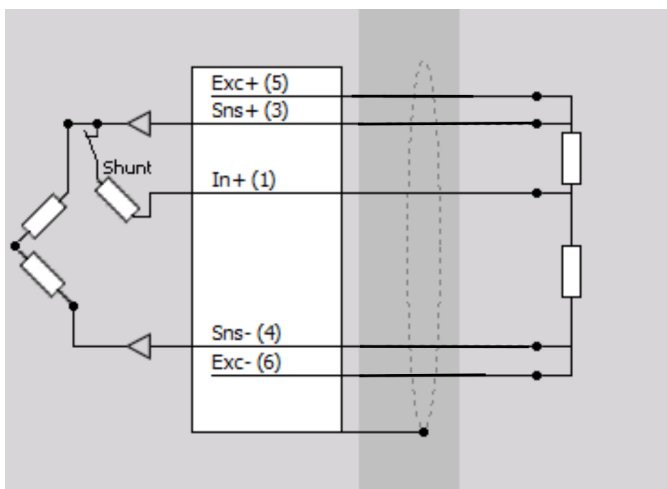
Full bridge (6-wire)



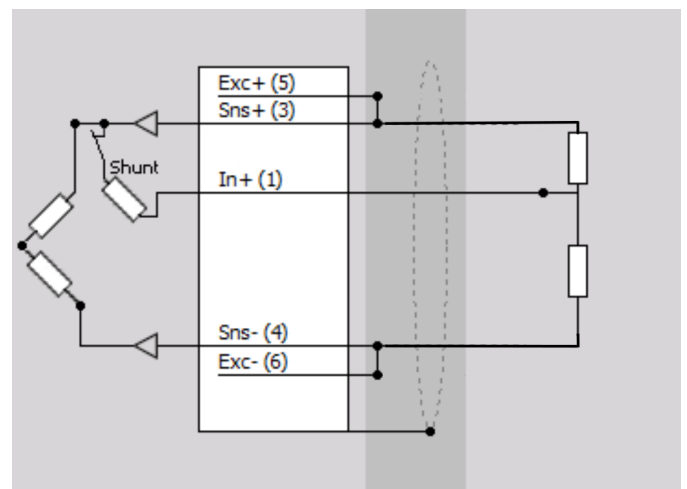
Full bridge (4-wire)



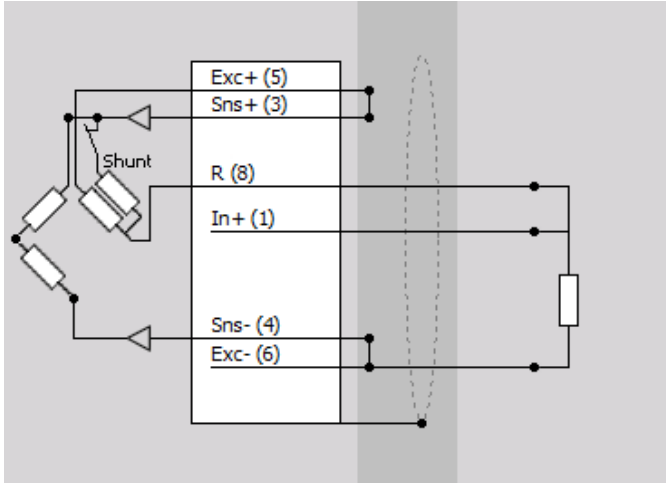
Half bridge (5-wire)



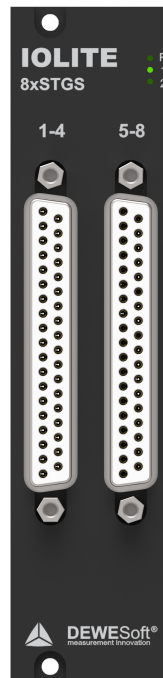
Half bridge (3-wire)



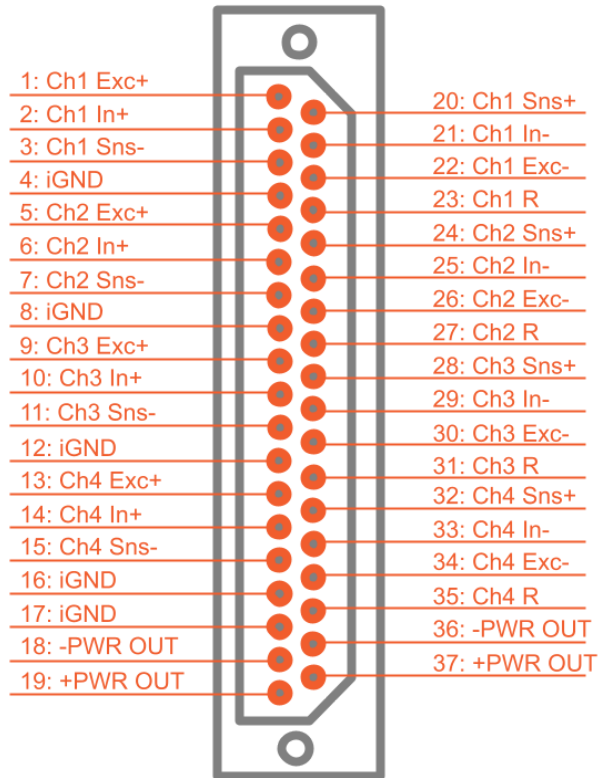
### Quarter bridge



### 5.6.3. STGS: D37 Connectors



### 5.6.3.1. STGS: 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.

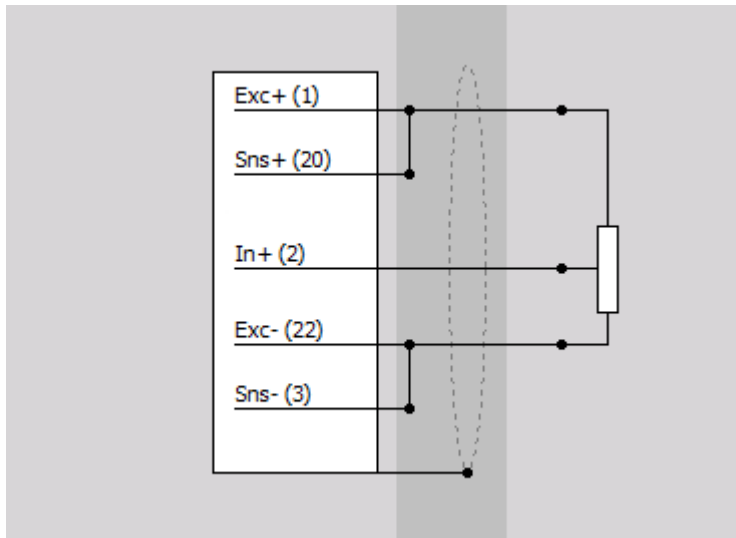
There is no protection on the module. Current limit of IOLITE system is 16 A!

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	$V_{\text{supply}}$ output
18, 36	-PWR OUT	Non-isolated GND

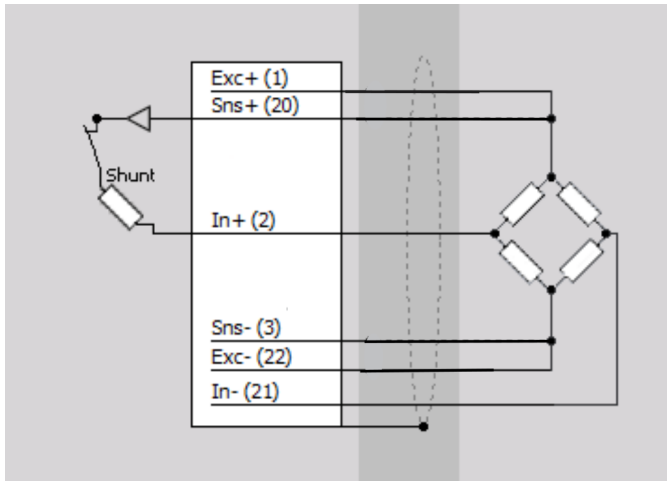
### 5.6.3.2. STGS: Wiring diagram

#### 5.6.3.2.1. STGS: D-SUB37: Potentiometer

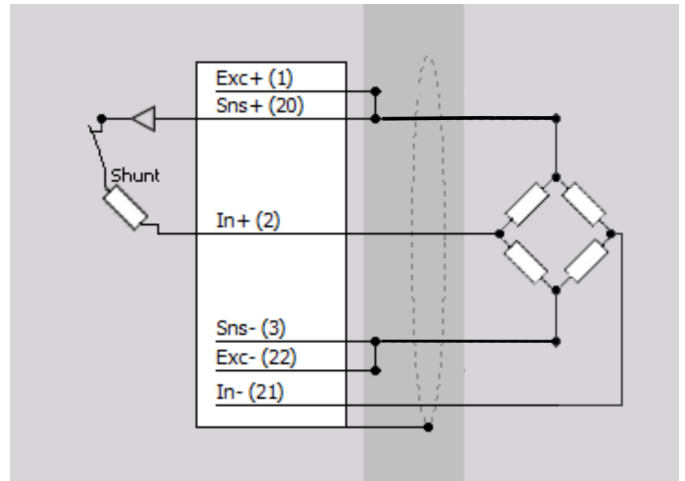


5.6.3.2.2. STGS: D-SUB37: Bridge

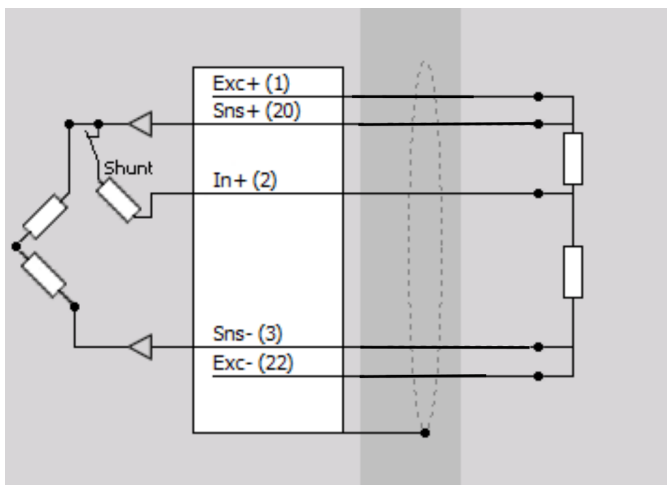
**Full bridge (6-wire)**



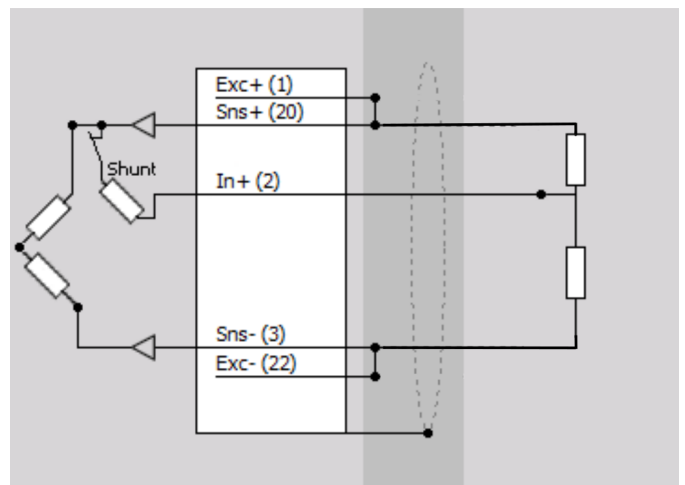
**Full bridge (4-wire)**



**Half bridge (5-wire)**

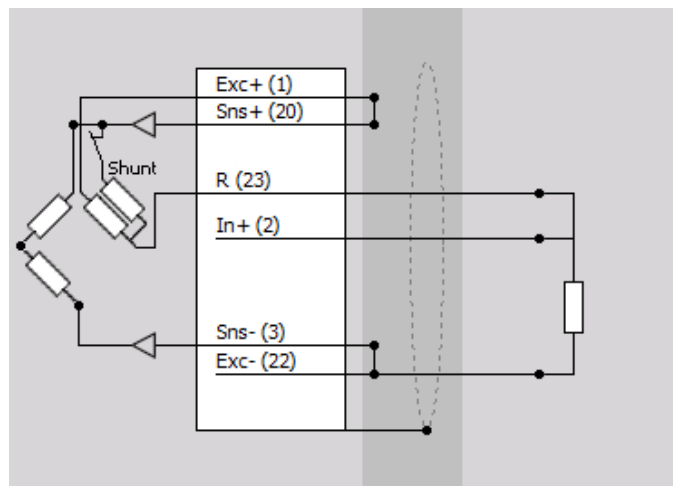


**Half bridge (3-wire)**





### Quarter bridge



## 5.7. TH: Thermocouple Module

IOLITE TH 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.



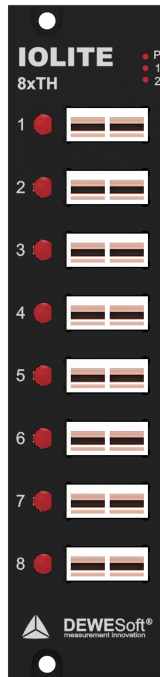
*IOLITEi-8xTH module*

## 5.7.1. TH: Specifications

<b>Inputs</b>		
Input type	Isolated universal thermocouple and voltage	
Number of channels	8	
ADC Type	24-bit delta-sigma	
Sampling Rate	Simultaneous 100 S/sec	
<b>Voltage Ranges</b>	<b>±1 V</b>	<b>±100 mV</b>
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)	
Offset Drift	Typical 0.05 µV/K (max. 0.2 µV/K)	
Gain Linearity	<0.01%	
Input Coupling	DC	
Input Impedance	100 MΩ	
Thermocouple	TC Types: K, J, T, R, S, N, E, C, B	
Accuracy	±0.02 % of reading ±0.5 °C ±10 µV	
Resolution	< 0.001 °C	
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	
<b>Additional Specifications</b>		
Input connectors	Mini Thermocouple connector (copper)	
Isolation voltage	1000 V <sub>peak</sub> channel to ground & channel to channel	
Power supply	9 - 48 V DC	
Power consumption	3.2 W	
Weight	230 g	
Slice Dimensions	128.4 x 115.4 x 30.1 mm	

### 5.7.2. TH: Miniature Thermocouple Connector

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



*IOLITEi-8xTH front*

#### 5.7.2.1. TH: Miniature Thermocouple Connector: Pinout

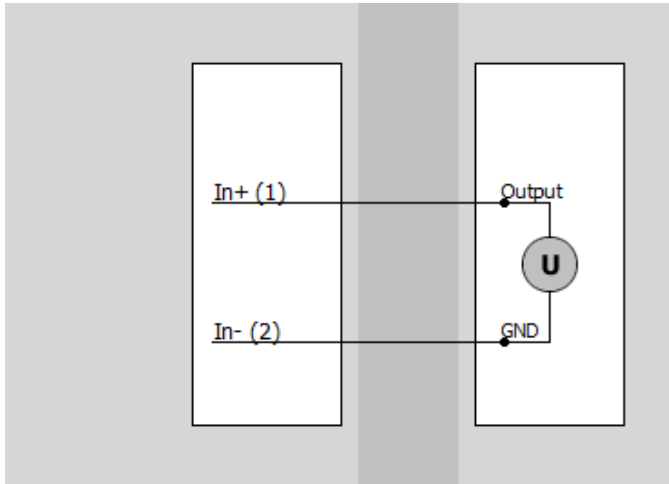


*TH connector: pin-out (Mini TC female)*

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

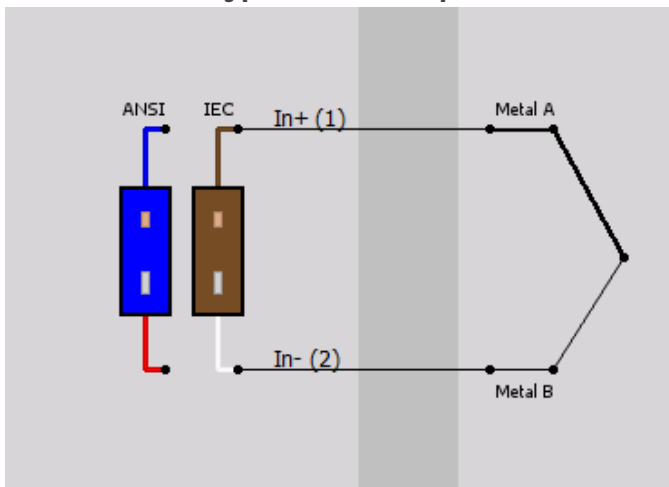
### 5.7.2.2. TH: Miniature Thermocouple Connector: Wiring diagram

#### 5.7.2.2.1. TH: Voltage

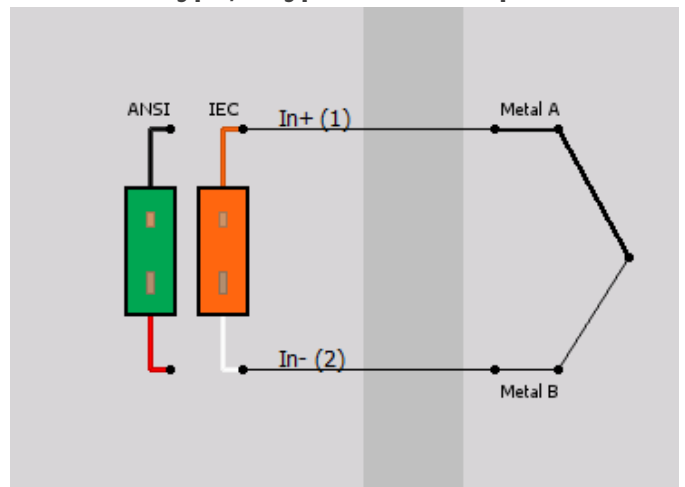


#### 5.7.2.2.2. TH: Temperature

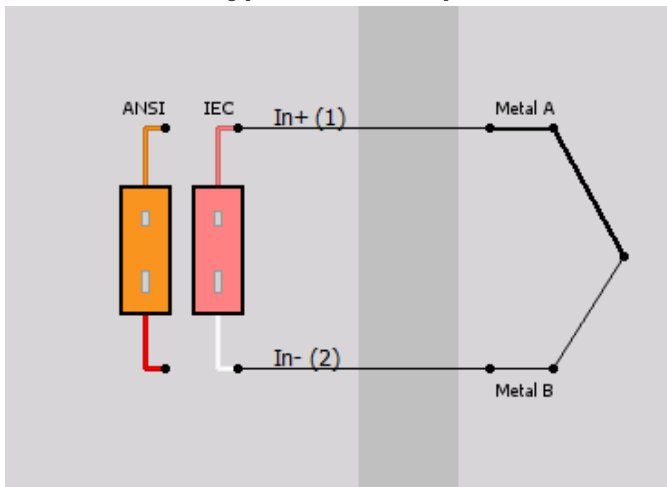
**T-type thermocouple**



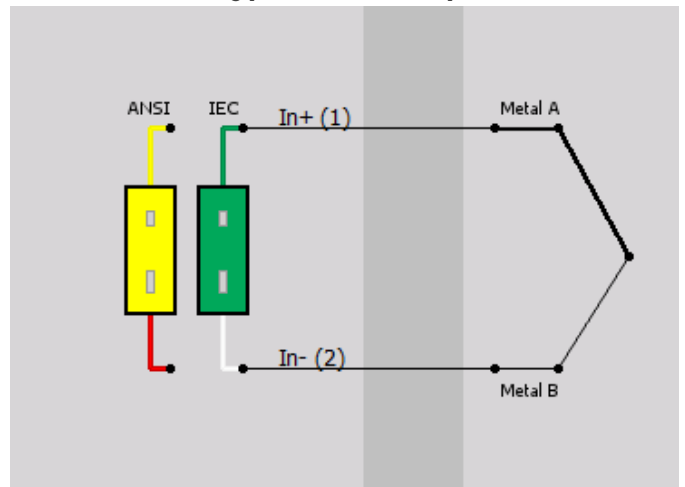
**S-type, R-type thermocouple**



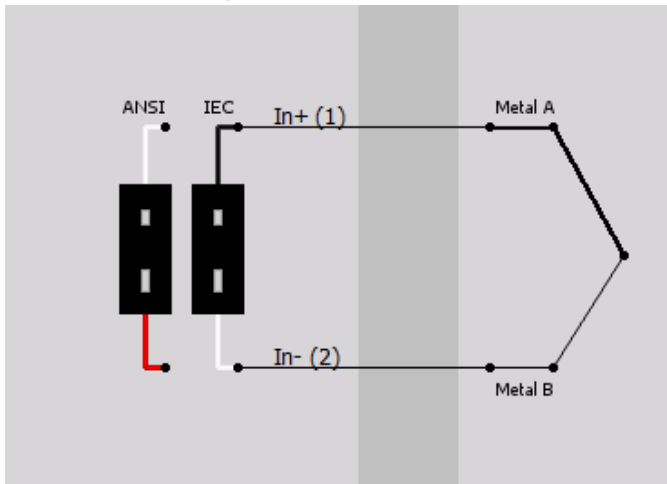
**N-type thermocouple**



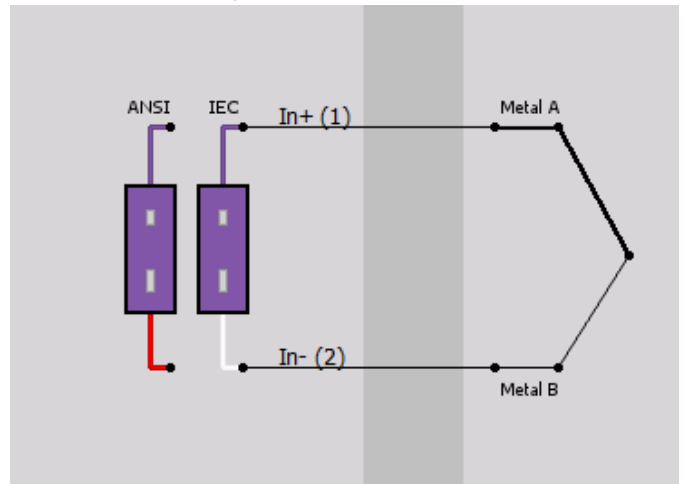
**K-type thermocouple**



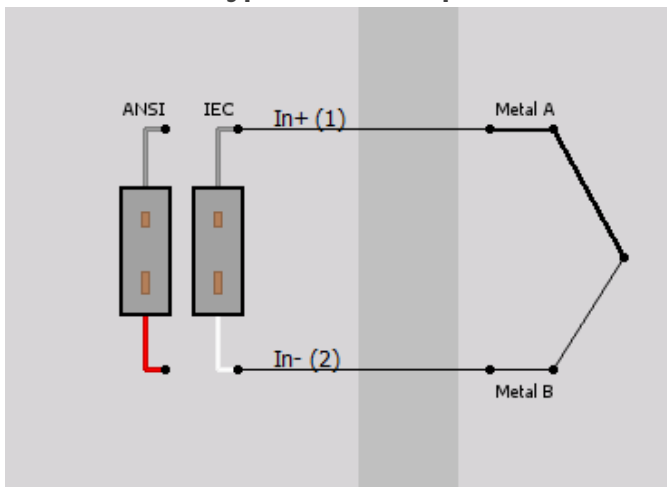
**J-type thermocouple**



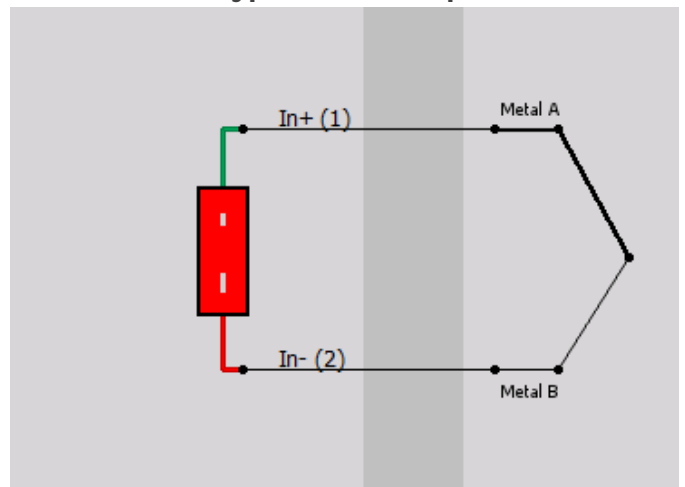
**E-type thermocouple**



**B-type thermocouple**



**C-type thermocouple**



## 5.8. CNT: Counter Module

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.



*IOLITE-4xCNT Module*

### 5.8.1. CNT: Specifications

<b>Counter</b>	
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 $\mu$ s, 2 $\mu$ s, 4 $\mu$ s, 5 $\mu$ s and 7.5 $\mu$ s
Input Level Compatibility	TTL (Low: <0.8 V, High >2 V)
Input impedance	100 k $\Omega$ pull-up to +3.3 V
Input Protection	$\pm$ 25 V continuous
Sensor supply	5 V / 100 mA, 12 V / 50 mA
Counter modes	counting, waveform timing, encoder, gear-tooth sensor
<b>Additional Specifications</b>	
Input connector	7-pin LEMO 1B series EEG.1B.307.CLNY Preliminary: Terminal block OMNIMATE Signal SL Series SL 2.50/09/90G
Power Consumption	Typ. 1.9 W
Power supply	9 - 48 V DC
Slice Dimensions	128.4 x 115.4 x 30.1 mm



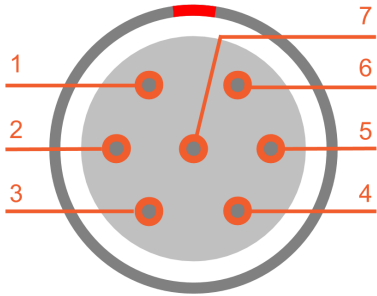
### 5.8.2. CNT: LEMO L1B7f Connector

IOLITE-4xCNT module has four 7-pin LEMO connectors for digital, counter and encoder inputs.



*IOLITE-4xCNT Front*

### 5.8.2.1. CNT: LEMO L1B7f Connector: Pinout



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

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

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

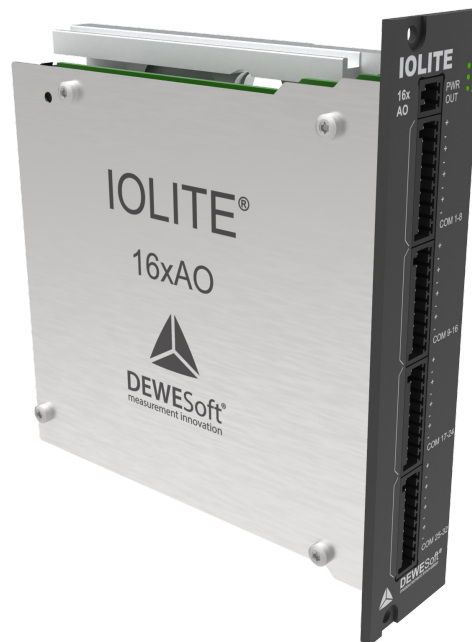
## 5.9. AO: Analog output module

The IOLITE AO module comes in the following options:

- 16xAO slot slice
- 16xAO single slice
- 1xAO single channel device

### 5.9.1. IOLITE 16xAO

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



*IOLITE-16xAO Module*

### 5.9.2. 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

### 5.9.3. AO: Specifications

#### IOLITE-16xAO

<b>Analog Output</b>	
Output types	Voltage
Number of channels	16
Output connector	Terminal block
DAC Resolution	16-bit
Update Rate	20000 S/sec (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
<b>Additional Specifications</b>	
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. 4.3 W, Max. 7.2 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

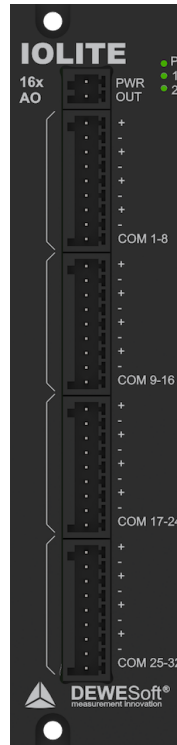
IOLITE-1xAO

<b>Analog Output</b>	
Output types	Voltage
Number of channels	1
Output connector	BNC
DAC Resolution	18-bit
Update Rate	1000 S/sec (see 1)
Full Scale Output Range	±10 V (see 2)
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
<b>Power</b>	
Power consumption	2 W
<b>Environmental</b>	
IP rating	IP20
<b>Physical</b>	
Dimensions	82 x 62 x 28 mm
Weight	130 g

1) Only asynchronous mode is supported in Dewesoft, function generator is not supported

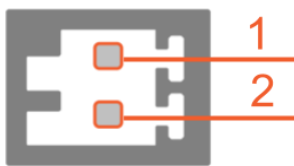
2) Only DC output voltage, function generator not supported

### 5.9.4. IOLITE 16xAO: Terminal block Connectors



IOLITE-16xAO Front

#### 5.9.4.1. IOLITE-16xAO: T2A2f Power Connector: Pinout



LV connector: pin-out (TBLOCK male)

Pin	Name	Description
1	+PWR OUT	$V_{\text{supply}}$ 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



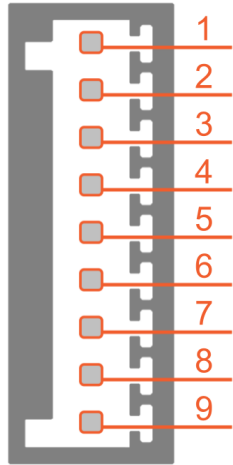
#### Caution

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!

### 5.9.4.2. IOLITE-16xAO: T2A9f connector: Pinout

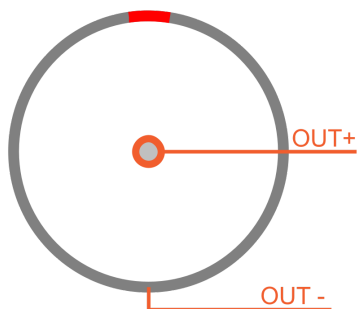


AO connector: pin-out (TBLOCK male)

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

### 5.9.4.3. IOLITE-1xAO BNC Connector: Pinout



AO connector: pin-out (BNC)

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



## 5.10. ACC: Accelerometer

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 Front*

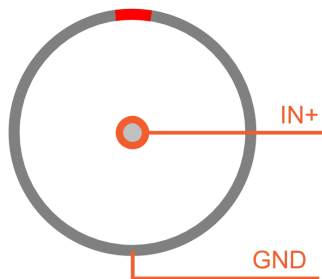
### 5.10.1. ACC: Specifications

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			
<b>Voltage Ranges</b>	<b>±10 V</b>	<b>±5 V</b>	<b>±1 V</b>	<b>±200 mV</b>
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
<b>Analog input performance</b>	
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
<b>IEPE input</b>	
Excitation	4 mA, 8 mA
Compliance voltage	24 V
Output Impedance	
Sensor detection	Shortcut: <4 V; Open: >19 V
TEDS support	IEPE mode only
<b>Power</b>	
Power consumption	2 W
<b>Environmental</b>	
IP rating	IP20
<b>Physical</b>	
Dimensions	82 x 62 x 28 mm
Weight	130 g
<b>Rev: 1593518446</b>	

## 5.10.2. ACC: BNC Connector

### 5.10.2.1. ACC: BNC Connector: Pinout

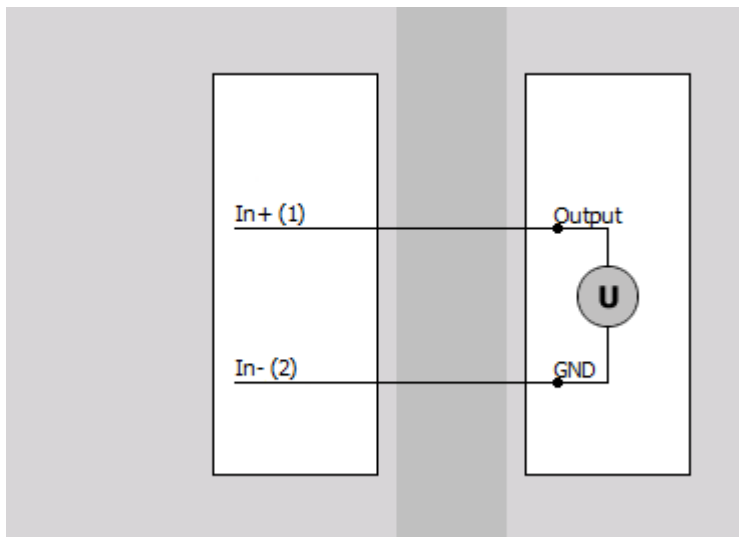


ACC connector: pin-out (BNC)

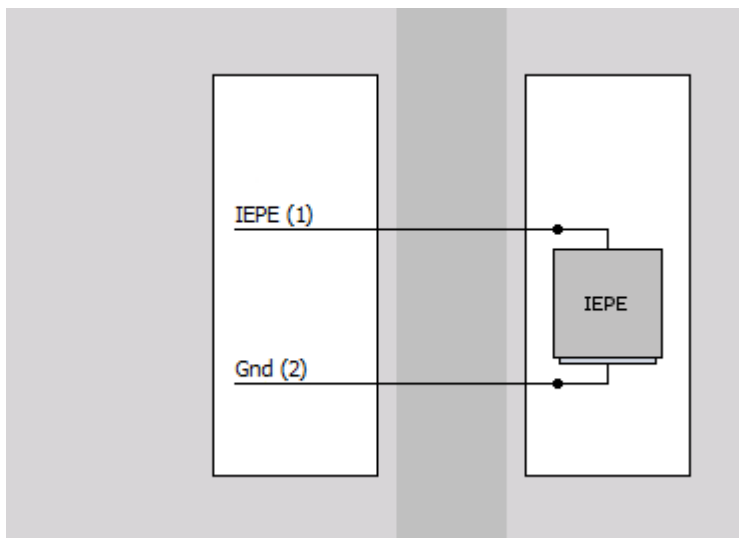
Pin	Name	Description
1	IN+	Input +
2	GND	Ground

### 5.10.2.2. ACC: BNC Connector: Wiring diagram

#### 5.10.2.2.1. ACC: Voltage



#### 5.10.2.2.2. ACC: IEPE



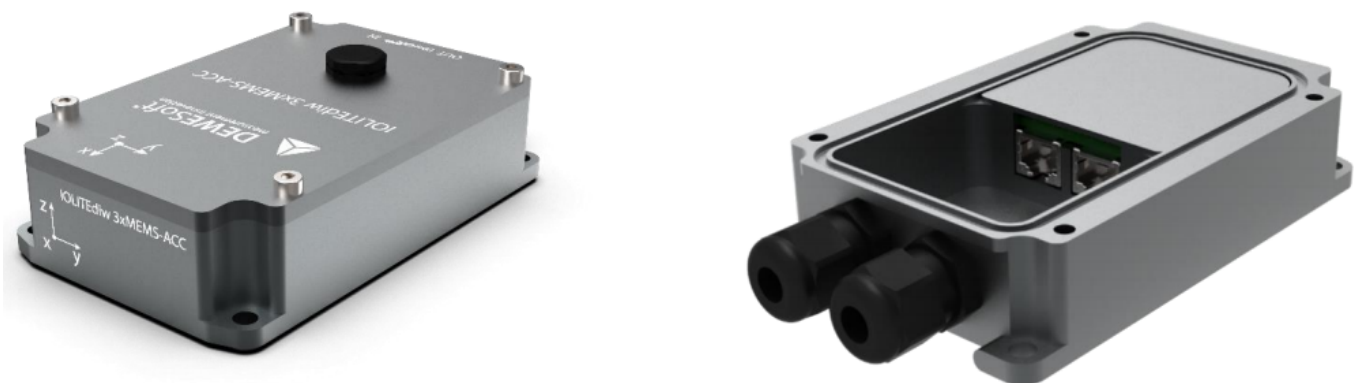
## 5.11. IOLITE-3xMEMS-ACC

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/s<sup>2</sup> 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 aluminium enclosure with cable glands. The enclosure is designed to be mounted outdoor. 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*

### 5.11.1. 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
Sensitivity 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 %	
<b>MEMS Inclinometer</b>	<b>Typ</b>					
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. ECAT Accessories

### 6.1. 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.



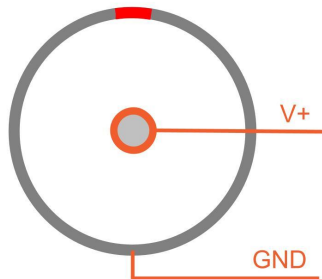
*IOLITE Power injector*

#### 6.1.1. General specifications

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

## 6.1.2. IOLITE Power Injector: Connector

### 6.1.2.1. IOLITE Power Injector: 2 mm Jack Pinout



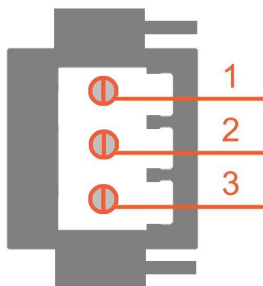
Power in connector: pin-out (2 mm DC jack, male)

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

### 6.1.2.2. 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

## 6.2. IOLITE Repeater

Daisy-chains and increases the distance for signal, synchronization and power between IOLITEi single channel instruments. Suggested length of the cable is up to 50 m.



### 6.2.1. General specifications

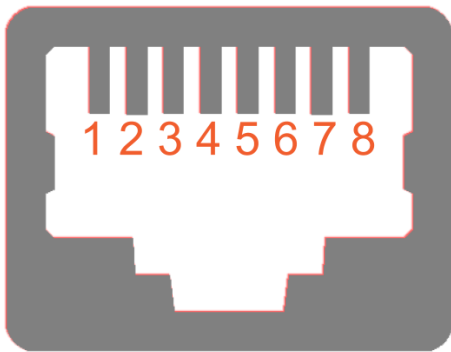
General specifications of the IOLITE Repeater device	
<b>Digital interface</b>	EtherCAT
<b>EtherCAT connector</b>	RJ45
<b>Power consumption</b>	1200 mW
<b>Supply Voltage</b>	12 V - 48 V
<b>Operating temperature</b>	-20 ... 60 degC
<b>IP rating</b>	IP20
<b>Weight</b>	105 g
<b>Housing material</b>	Aluminium



## 6.2.2. Connectors

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

### 6.2.2.1. 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 -

### 6.2.2.2. 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 is passive. This means that there are no data signals on the power supply pins.

## 7. Accessories

Optional Accessories and Sensors (e.g. DSI®-adapters, Battery Packs, Current Clamps, etc.) can be found in a separate document, which is available for download from our homepage:

<https://download.dewesoft.com/download-file/accessories-and-sensors-technical-reference-manual.pdf>

In the *HW Manuals* section click the download link for the *Manual for DewesoftX® Accessories and Sensors*.

## 8. Appendix

### 8.1. Glossary and abbreviations

This glossary includes explanations of some of the most important terms and abbreviations that are used in documentation.

#### **AAF**

AAF or Anti Aliasing Filter in short.

#### **Bit**

Bit, the basic unit of information storage, a single binary digit that is either 0 or 1.

#### **Baud (Bd)**

Baud is synonymous to symbols per second per second. It is the unit of symbol rate, also known as baud rate or modulation rate; the number of distinct symbol changes.

A baud rate, by definition, means the number of times a signal in a communications channel changes state or varies.



#### **Example**

A 2400 baud rate means that the channel can change states up to 2400 times per second. This is often confused with the bit rate (expressed in bit/s), which is related, but may be different. The number of bits per baud is determined by the modulation technique.



#### **Example**

If we use a baud rate of 2400 and a phase modulation (which can transmit four bits per baud), this means that we can transfer 9600 bit/s.  $2400 \text{ baud} \times 4 \text{ bits per baud} = 9600 \text{ bps}$ .

The baud rate (communication speed) between the DS GATE and the measurement modules can be configured via software.

## **CJC**

Cold junction compensation.

Thermocouples measure the temperature difference between two points, not absolute temperature. To measure a single temperature one of the junctions - normally the cold junction - is maintained at a known reference temperature, and the other junction is at the temperature to be sensed.

Having a junction of known temperature, while useful for laboratory calibration, is not convenient for most measurement and control applications. Instead, they incorporate an artificial cold junction using a thermally sensitive device such as a thermistor or diode to measure the temperature of the input connections at the instrument, with special care being taken to minimize any temperature gradient between terminals. Hence, the voltage from a known cold junction can be simulated, and the appropriate correction applied. This is known as cold junction compensation.

## **dB**

The decibel (dB) is a logarithmic unit that indicates the ratio of a physical quantity (usually power or intensity) relative to a specified or implied reference level. A ratio in decibels is ten times the logarithm to base 10 of the ratio of two power quantities.

## **Dewesoft**

Dewesoft refers to the company.

DewesoftX® refers to the software suite for data acquisition, data processing, data analysis and much more.

## **Dynamic Range**

Dynamic Range is the ratio of a specified full scale input range to the minimum detectable value (peak spurious signal). The value for dynamic range is expressed in decibels (dB).

## **DSP**

A digital signal processor (DSP) is a specialized microprocessor with an optimized architecture for the fast operational needs of digital signal processing.

The measurement modules use DSPs to process the measured data.

## **FFT**

Fast Fourier transformation (FFT) can be used to show the frequency components of the acquired signals in amplitude and frequency. DewesoftX® has a built-in visual control that makes FFT easy to use.

## **FPGA**

A field-programmable gate array (FPGA) is an integrated circuit designed to be configured by the customer or designer.

After manufacturing; hence *field-programmable*.

## **GND**

The electrical ground (aka. earth).

## **GPS**

The Global Positioning System (GPS) is a space-based global navigation satellite system that provides reliable location and time information in all weather and at all times and anywhere on or near the Earth when and where there is an unobstructed line of sight to four or more GPS satellites.

## **Hz**

The hertz (symbol: Hz) is the SI unit of frequency defined as the number of cycles per second of a periodic signal.

## **IRIG-B**

The Inter Range Instrumentation Group (IRIG) is the standards body of the Range Commanders Council (RCC). They publish a number of standards: e.g. IRIG time-codes. The different time-codes defined in the Standard have alphabetic designations. A, B, D, E, G, and H. IRIG-B has a Bit rate of 100 Hz.

## **LED**

A light-emitting diode is a semiconductor light source. It is used in all modules of the Sirius® system to indicate the status of the modules.

## **LEMO**

LEMO is the name of the high quality push-pull connectors that are used for cable connections: e.g. the power-supply cable and the sync cables of the Sirius® system. The company that produces these connectors is also called LEMO ([www.lemo.com](http://www.lemo.com))

## **Microsoft®**

Corporation is a public multinational corporation head-quartered in Redmond, Washington, USA that develops, manufactures, licenses, and supports a wide range of products and services predominantly related to computing through its various product divisions.

DewesoftX® is a Windows® based application and thus a Windows® operating system must be installed on the measurement PC where DewesoftX® is installed.

## **NET Option**

aka. Dewesoft's NET, DEWE NET

With DEWE-NET your measurement system can be controlled remotely with ease of use you couldn't imagine before. DEWE-NET also serves as the center of Distributed Data Acquisition systems where you have multiple systems located either together or scattered across an entire continent. IRIG and GPS time will take care that data will stay synchronised, no matter how long the acquisition runs.

## **OS**

An operating system (OS) is a set of system software running on a device that manages the system hardware.

This may refer to the operating system of a PC (Windows is required for DewesoftX®) or to the operating system of the Sirius® system.

## **PC**

Sirius® systems are typically connected to a Personal Computer which runs DewesoftX® to fetch the measurement data.

## **RMS**

Root Mean Square (RMS), also known as the quadratic mean, is a statistical measure of the magnitude of a varying quantity. It is especially useful when variables are positive and negative, e.g., sinusoids. RMS is used in various fields, including electrical engineering.

## **RTD**

Resistance thermometers, also called resistance temperature detectors or resistive thermal devices (RTDs), are temperature sensors that exploit the predictable change in electrical resistance of some materials with changing temperature; e.g. Pt100 and Pt1000.

## **SNR**

Signal to Noise Ratio (SNR) is the ratio of the RMS value of the full scale input range to the total RMS noise measured with the inputs shorted together. The value for SNR is expressed in decibels (dB).

## **SNTP**

Simple Network Time Protocol (SNTP) is a protocol for synchronising the clocks of computer systems over packet switched, variable-latency data networks. It is a simpler and less accurate version of the Network Time Protocol (NTP).

## **Synchronization cable**

These synchronization cables can be used to synchronise several Sirius® chassis with each other.

## **USB**

Universal Serial Bus is a specification to establish communication between devices and a host controller (usually PCs). Sirius® systems use a USB connection to connect to a PC.

## **Windows®**

A PC operating system by Microsoft®. DewesoftX® will work on Windows® XP, Windows® Vista and Windows®. Windows® is a registered trademark of Microsoft Corporation in the United States and other countries.

## 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

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## 9.5. Copyright

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## 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 GmbH assumes no liability for the customer's failure to comply with these requirements.

All accessories shown in this document are available as an option and will not be shipped as standard parts.

#### 10.2.1. Environmental considerations

Information about the environmental impact of the product.

#### 10.2.2. Product End-of-Life handling

Observe the following guidelines when recycling a Dewesoft system:

### 10.2.3. System and components recycling

Production of these components required the extraction and use of natural resources. The substances contained in the system could be harmful to your health and to the environment if the system is improperly handled at its end of life! Please recycle this product in an appropriate way to avoid unnecessary pollution of the environment and to keep natural resources.



This symbol indicates that this system complies with the European Union's requirements according to Directive 2002/96/EC on waste electrical and electronic equipment (WEEE). Please find further information about recycling on the Dewesoft web site [www.dewesoft.com](http://www.dewesoft.com)

Restriction of Hazardous Substances

This product has been classified as Monitoring and Control equipment and is outside the scope of the 2002/95/EC RoHS Directive. However, we take care of our environment and the product is lead-free.

### 10.2.4. General safety and hazard warnings for all Dewesoft systems

The safety of the operator and the unit depend on following these rules.

- Use this system under the terms of the specifications only to avoid any possible danger.
- Read your manual before operating the system.
- Observe local laws when using the instrument.
- DO NOT touch internal wiring!
- DO NOT use any higher supply voltage than specified!
- Use only original plugs and cables for harnessing.
- You may not connect higher voltages than rated to any connectors.
- The power cable and connector serve as Power-Breaker. The cable must not exceed 3 meters, the disconnect function must be possible without tools.
- Maintenance must be executed by qualified staff only.
- During the use of the system, it might be possible to access other parts of a more comprehensive system. Please read and follow the safety instructions provided in the manuals of all other components regarding warning and security advice for using the system.
- With this product, only use the power cable delivered or defined for the host country.
- DO NOT connect or disconnect sensors, probes or test leads, as these parts are connected to a voltage supply unit.
- Ground the equipment: For Safety Class 1 equipment (equipment having a protective earth terminal), a non-interruptible safety earth ground must be provided from the mains power source to the product input wiring terminals.
- Please note the characteristics and indicators of the system to avoid fire or electric shocks. Before connecting the system, please read the corresponding specifications in the product manual carefully.
- The inputs must not, unless otherwise noted (CATx identification), be connected to the main circuit of category II, III and IV.
- The power cord separates the system from the power supply. Do not block the power cord, since it has to be accessible for the users.
- DO NOT use the system if equipment covers or shields are removed.
- If you assume the system is damaged, get it examined by authorized personnel only.
- Adverse environmental conditions are Moisture or high humidity Dust, flammable gases, fumes or dissolver Thunderstorm or thunderstorm conditions (except assembly PNA) Electrostatic fields, etc.

- The measurement category can be adjusted depending on the module configuration.
- Any other use than described above may damage your system and is attended with dangers like short-circuiting, fire or electric shocks.
- The whole system must not be changed, rebuilt or opened.
- DO NOT operate damaged equipment: Whenever it is possible that the safety protection features built into this product have been impaired, either through physical damage, excessive moisture, or any other reason, REMOVE POWER and do not use the product until the safe operation can be verified by service-trained personnel. If necessary, return the product to the Dewesoft sales and service office for service and repair to ensure that safety features are maintained.
- If you assume a more riskless use is not provided anymore, the system has to be rendered inoperative and should be protected against inadvertent operation. It is assumed that a more riskless operation is not possible anymore if the system is damaged obviously or causes strange noises. the system does not work anymore. the system has been exposed to long storage in adverse environments. the system has been exposed to heavy shipment strain.
- Warranty void if damages caused by disregarding this manual. For consequential damages, NO liability will be assumed!
- Warranty void if damage to property or persons caused by improper use or disregarding the safety instructions.
- Unauthorized changing or rebuilding the system is prohibited due to safety and permission reasons (CE).
- Be careful with voltages >25 VAC or >35 VDC! These voltages are already high enough in order to get a perilous electric shock by touching the wiring.
- The product heats during operation. Make sure there is adequate ventilation. Ventilation slots must not be covered!
- Only fuses of the specified type and nominal current may be used. The use of patched fuses is prohibited.
- Prevent using metal bare wires! Risk of short circuit and fire hazard!
- DO NOT use the system before, during or shortly after a thunderstorm (risk of lightning and high energy over-voltage). An advanced range of applications under certain conditions is allowed with therefore designed products only. For details please refer to the specifications.
- Make sure that your hands, shoes, clothes, the floor, the system or measuring leads, integrated circuits and so on, are dry.
- DO NOT use the system in rooms with flammable gases, fumes or dust or in adverse environmental conditions.
- Avoid operation in the immediate vicinity of high magnetic or electromagnetic fields, transmitting antennas or high-frequency generators, for exact values please refer to enclosed specifications.
- Use measurement leads or measurement accessories aligned with the specification of the system only. Fire hazard in case of overload!
- 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	<ul style="list-style-type: none"> <li>Initial version</li> </ul>
V20-1	14.07.2020	<ul style="list-style-type: none"> <li>Added devices: <ul style="list-style-type: none"> <li>LV modules (IOLITEi-8xLV, IOLITEi-8xLV-10V, IOLITEi-8xLV-TBLOCK, IOLITEi-8xLV-10V-TBLOCK)</li> <li>DIO module (IOLITEi-8xDI-4xDO)</li> <li>RTD module (IOLITE-RTD-TBLOCK)</li> <li>CNT module (IOLITE-4xCNT)</li> </ul> </li> <li>Updated template</li> </ul>
V21-1	25.02.2021	<ul style="list-style-type: none"> <li>Added devices: <ul style="list-style-type: none"> <li>16xLV</li> <li>8xLA</li> <li>8xSTGS</li> <li>IOLITE multichannel</li> <li>IOLITE signal channel</li> <li>IOLITE4xMEMS-ACC</li> <li>IOLITE accessories</li> </ul> </li> <li>Changed naming of the devices</li> </ul>
V21-2	30.04.2021	<ul style="list-style-type: none"> <li>Added devices: <ul style="list-style-type: none"> <li>IOLITE-R8r platform</li> <li>16xAO</li> </ul> </li> <li>Updated naming of the devices</li> <li>Updated specifications</li> </ul>
V21-3	12.05.2021	<ul style="list-style-type: none"> <li>Minor fixes</li> </ul>