IOLITE X

DEWESoft®

TECHNICAL REFERENCE MANUAL

V24-1

1. Table of contents

2. About this document

This is the Technical Reference Manual for IOLITE® X Systems.

IOLITE® X is an industrial real time data acquisition hardware line that comes in a distributable form factor and offers different amplifiers. 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® X hardware
- 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
It gives you important information about the subject.
Please read carefully!

Hint
It gives you a hint or provides additional information about a subject.

Example
Gives you an example of a specific subject.

2.2. Online versions

2.2.1. Device Technical Reference Manual

The most recent version of this manual can be downloaded from our homepage:
https://dewesoft.com/download/manuals

2.2.2. DEWESoft® User Manual

The DEWESoft® User Manual document provides basics and additional information and examples for working with DEWESoft® and certain parts of the program.
The latest version of the DEWESoft® tutorials can be found here:
https://dewesoft.com/download/manuals

3. Getting started

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

To follow these steps, you need the following items:
- your brand new IOLITE X system (included in the shipment)
- your 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
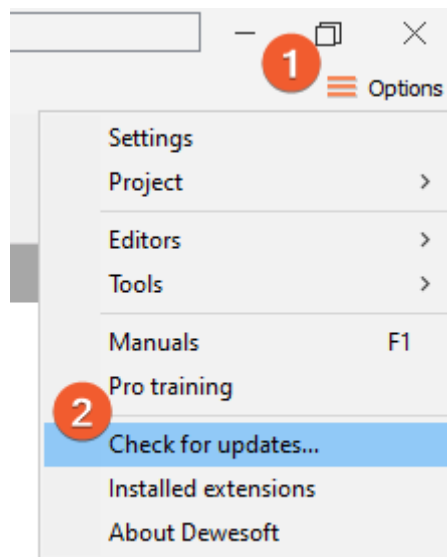
Check for updates

3.2. Connecting IOLITE® X

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

The IOLITE X line has a GbE with PTPv2 (IEEE1588v2) synchronization and PoE++ power delivery (Power over Ethernet). This way you can connect, synchronize and power up multiple devices in a range of up to 100m (depending on the configuration).

IOLITE X

First connect the power supply cable to the PWR IN 2x3 TBLOCK connector. Then connect RJ-45 cable to the IN connector. Finally connect the other side (RJ45) to the LAN port of the PC.

3.2.1. Default configurations

3.2.1.1. Connection to the PC
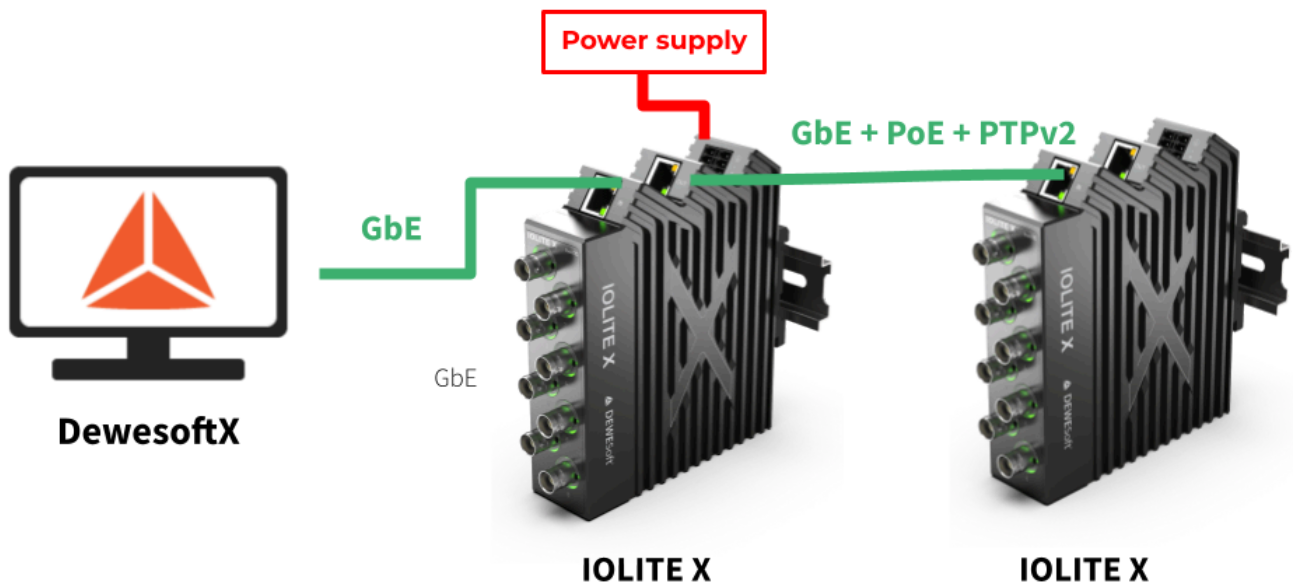
3.2.1.2. Daisy chain connection with PoE
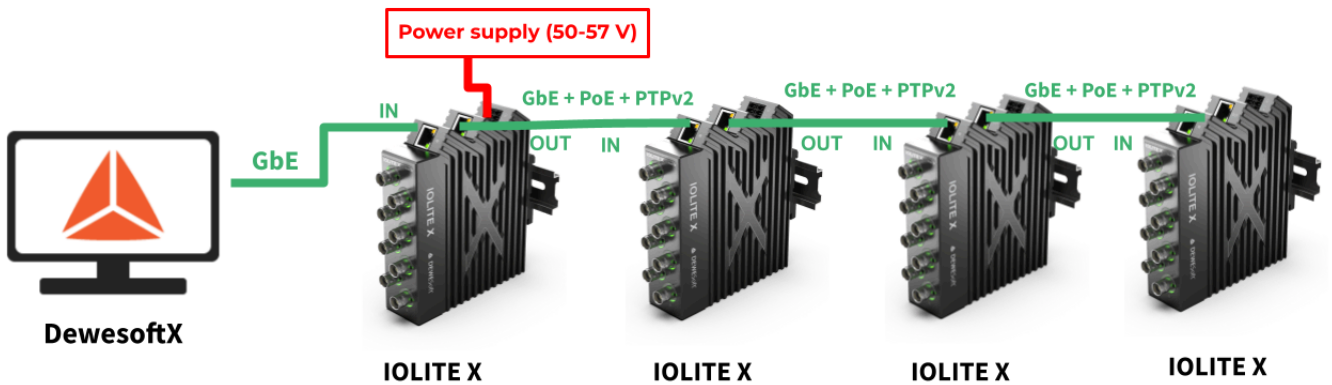
Important

This device supports PoE++ power delivery and requires a certain voltage level to work! The device that is first in line, has to be powered with **48 V - 57 V to enable the PoE.**

Caution

When connecting devices with Power over Ethernet be sure to connect them at least 2 cm apart to ensure better cooling of the devices. The devices can get extremely hot during operation.

3.2.1.3. Daisy chain connection without PoE
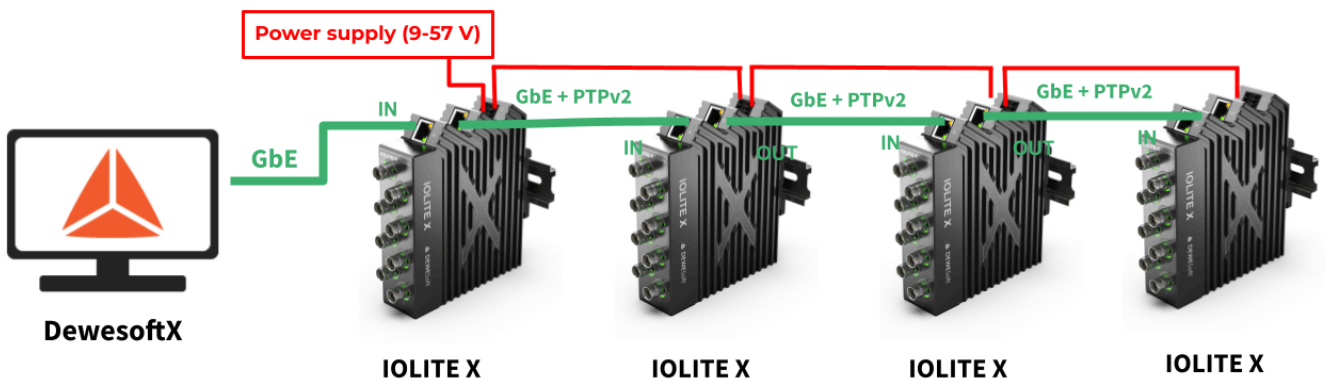
3.2.2. DewesoftX® Settings IOLITE® X

3.2.2.1. Ethernet configuration on the PC

IOLITE X will be properly connected to DewesoftX software when the IP address of the device and the IP address of the network card, where the device is connected, are in the same subnet.

Warning

! As a network device with DHCP enabled it can use dynamic IP assignment. The DHCP server has to be running to locate the device with DewesoftX software. When a DHCP-enabled device is connected to a network without a DHCP server, the device has no IP address configuration and it is unreachable over the network.

3.2.2.2. DewesoftX settings for X module

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.
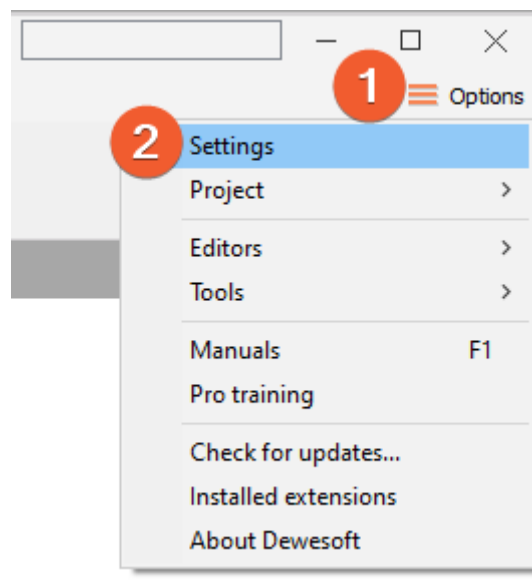
Settings in DewesoftX

In case the device is connected via Ethernet, the device is treated as a RT connection. To add it to the DewesoftX you can use multiple procedures which are described in the following chapter.

3.2.2.3. Autodetect

The device is automatically detected and added in HW settings when connected directly to the network port on your SBOX, data logger, or PC.

When multiple devices are connected over a network switch then the devices will be automatically detected but will not be automatically added to the HW settings list. All the found devices will be listed in the Network devices settings. The devices can be easily added by pressing the plus button.
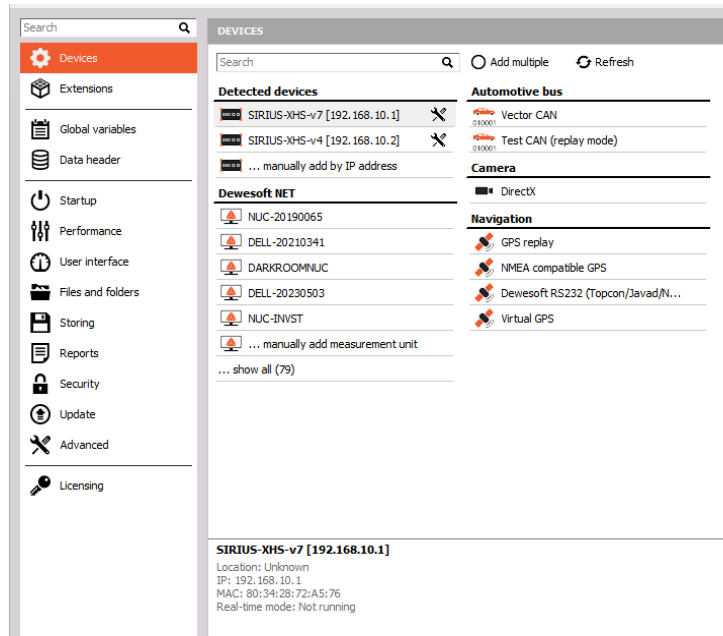
Autodetect

3.2.2.4. Configuring the IP address inside the discovery module

If the device is not automatically detected, the use has to add the device manually with an IP address (default: 192.168.10.1)
 The user can modify the IP of the X device to match it to the IP of the network card. When the IP addresses will match, the user will be able to add the device in the settings.

NOTE
If you have two devices with the same IP address, only one will be detected. Configure the devices' IP addresses one device at a time so that each device has a unique IP address.
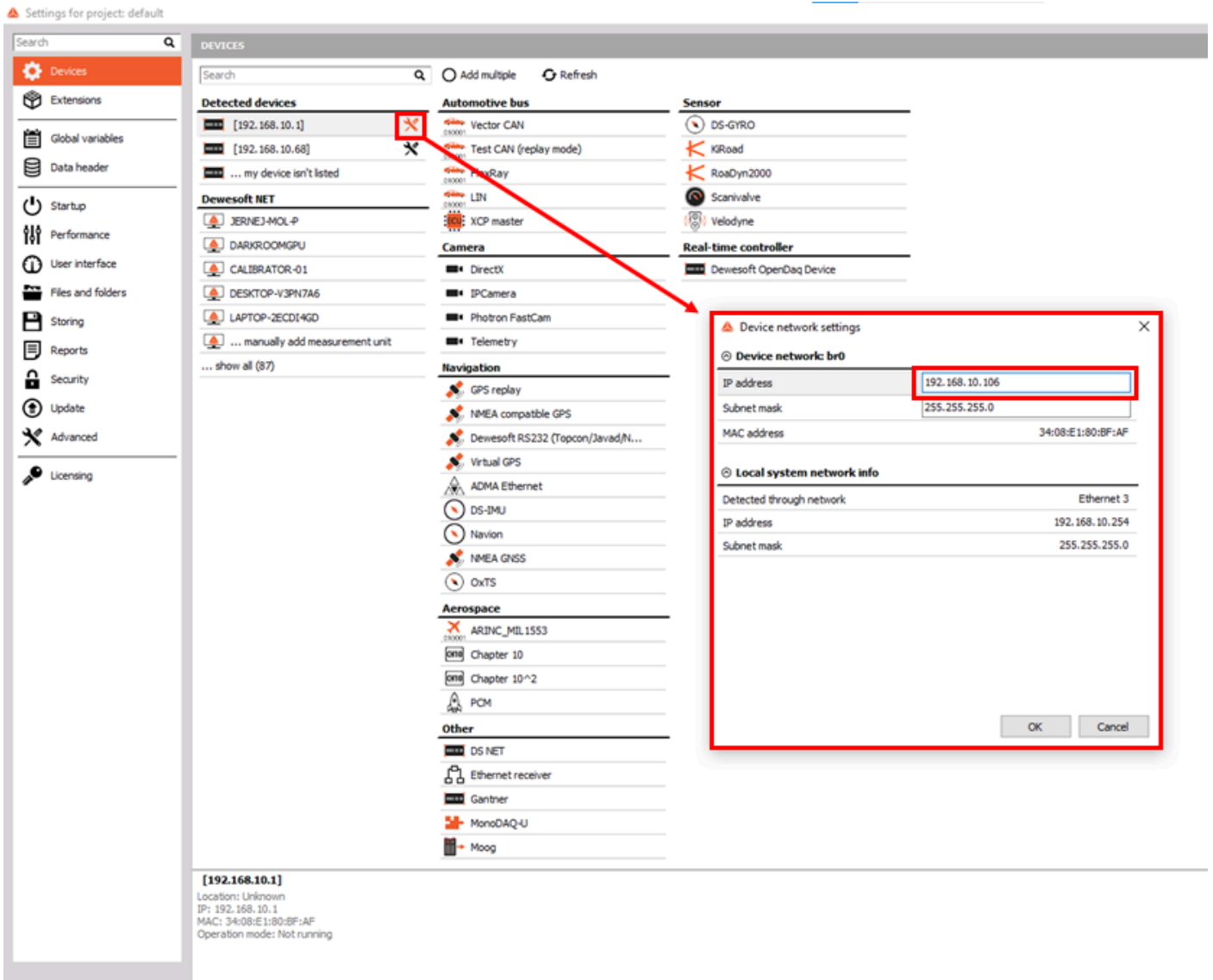
3.2.3. Device overview

After the device is properly added it will be listed in the HW tree view list. When you select the device the properties pane at the right will show the related data e.g. Serial number, Firmware version, IP address etc.
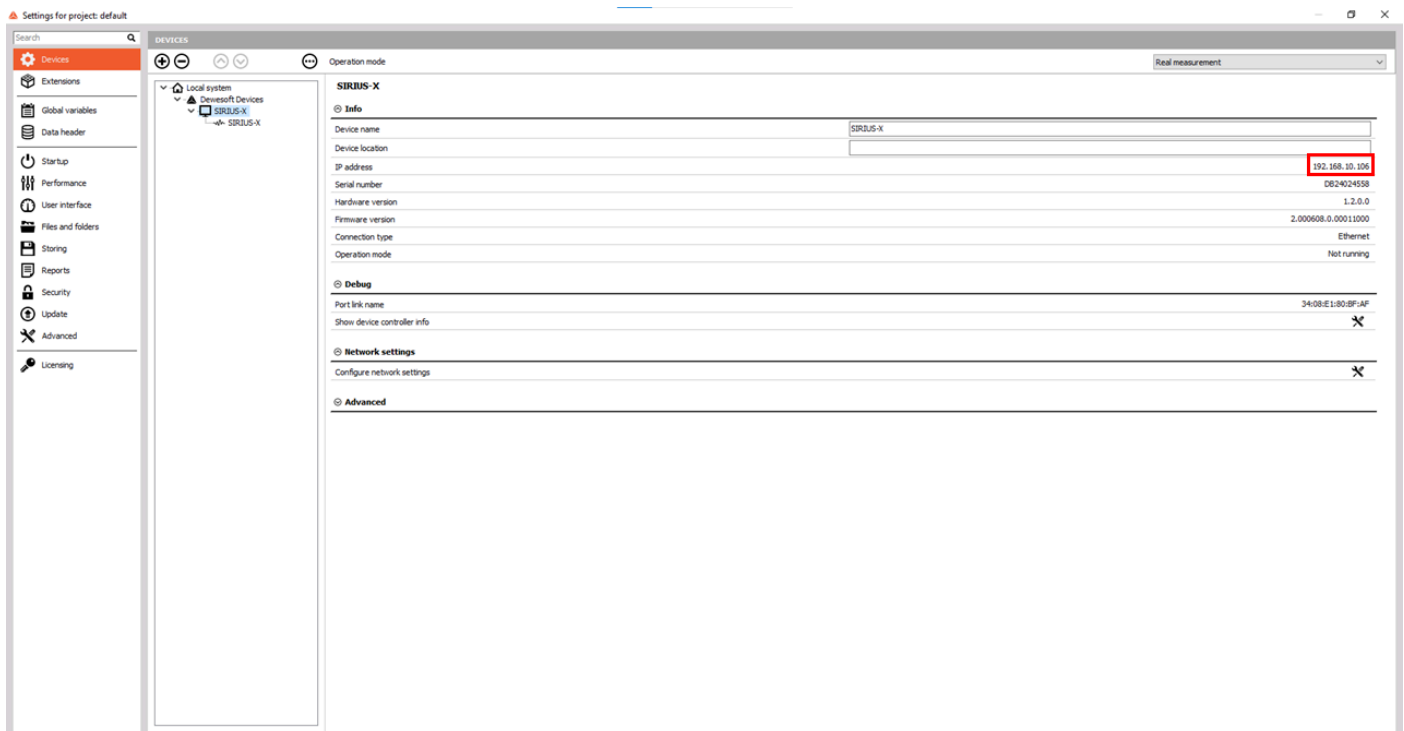
X device overview

3.2.3.1. Connecting settings

Under the connecting setting you will see the IP address of the device, which relates to the IP of the currently connected device. Changing this IP will not change the IP of the device, but will search for a device with the IP address you entered.

You have an additional button to "Shut down the device" remotely. This will shut down the application on the device. To enable back the amplification you need to power-cycle the device.

You have an additional button "Clear static configuration", which clears the configuration on the device.

3.2.3.2. Network settings

Under Network settings you will find the connection parameters and device MAC address. In the field "Configure IP address" the device IP address to static or dynamic (DHCP). If set to static you can configure it in the bottom three fields. In the last row, you can save the configuration.

Important
If you set the device to dynamic IP and connect the device to a network without the DHCP server, you can not locate the device with DewesoftX.

3.3. Simple Measurement

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

3.3.1. Help - Manual

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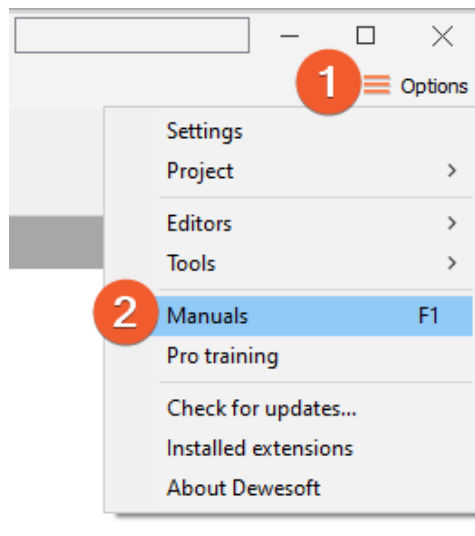
Help - Manual

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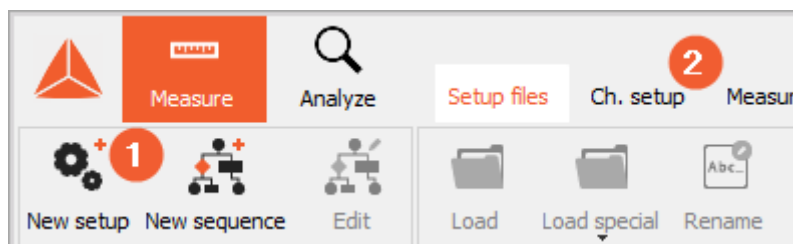
Setup files

3.3.2. Analog channel setup

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

When you press the Setup button of a channel (the column at the right edge of the channel table – not shown in this screen-shot), you can change all the settings of the channel amplifier.

You can also change the sample rate of the IOLITE® X ❹.

ID	Used	C	Name	Ampl. name	Range	Measurement	Min	Values	Max	Physical quantity	Units	Zero	Setup
1	Used		AI 1	XHS HV	20	Voltage	-20.00	-3.372 / 3.491	20.00		V	Zero	Setup
2	Used		AI 2	XHS HV	20	Voltage	-20.00	-1.669 / 1.792	20.00		V	Zero	Setup
3	Used		AI 3	XHS HV	20	Voltage	-20.00	-3.312 / 3.435	20.00		V	Zero	Setup
4	Used		AI 4	XHS HV	20	Voltage	-20.00	-1.495 / 1.616	20.00		V	Zero	Setup
5	Used		AI 5	XHS LV	5	Voltage	-5.00	-1.653 / 1.778	5.00		A	Zero	Setup
6	Used		AI 6	XHS LV	5	Voltage	-5.00	-0.449 / 0.572	5.00		A	Zero	Setup
7	Used		AI 7	XHS LV	5	Voltage	-5.00	-2.257 / 2.368	5.00		A	Zero	Setup
8	Used		AI 8	XHS LV	5	Voltage	-5.00	-0.837 / 0.948	5.00		A	Zero	Setup

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® X will transfer to DewesoftX®. A higher sample rate also means that more data needs to be transferred to your computer.

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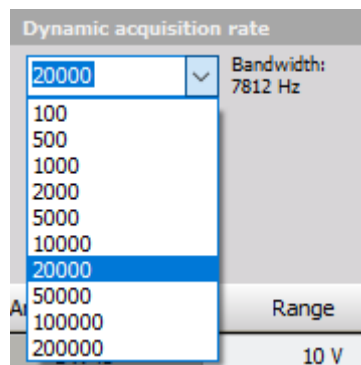
Sample rate

3.3.4. Measurement Mode

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

Hint

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

Measure mode

In measure mode you can have several measurement screens ❺. DewesoftX® will create 2 default displays: Recorder and Custom but you can also create new displays or change the widgets on existing displays as you like.

The most important sections of the Measure mode are highlighted in screen-shot Illustration "Measure mode":

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

To start storing the data, press the Store button ❹. When you are done with recording, press the Stop button.

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

3.3.5. Analyse Mode

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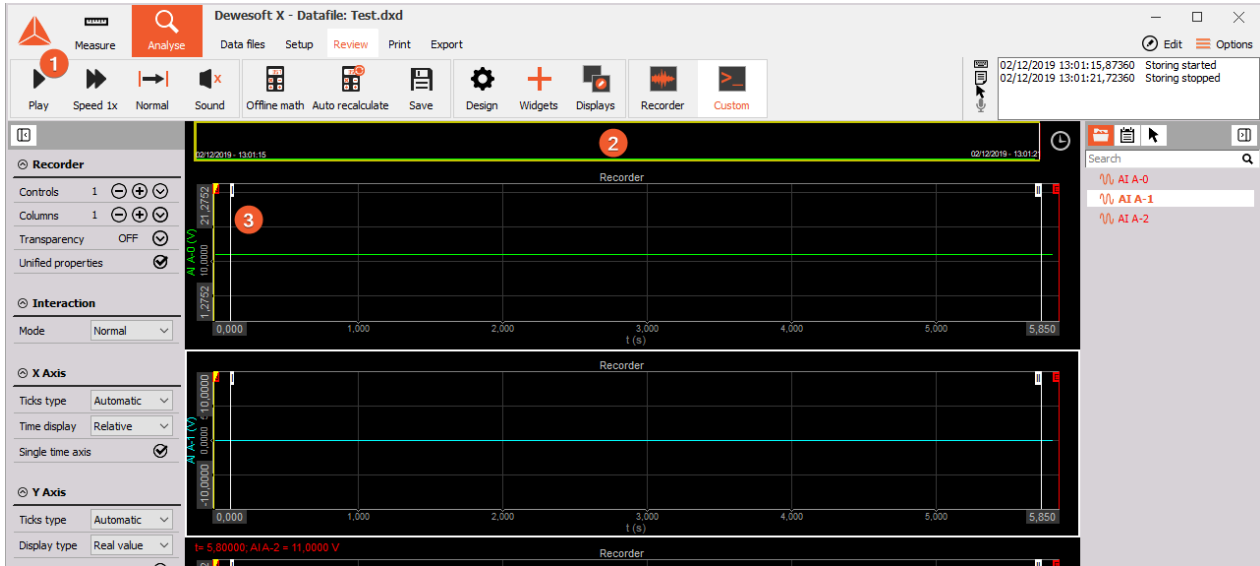
Analyse mode

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

Differences are:

❶ you have additional tool-buttons

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

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

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

3.4. Firmware upgrade

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

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

Firmware update settings

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

3.5. Licensing

IOLITE X 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 ❶ by pressing the three dotted button ❻. 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 ❷ or offline by importing an offline license ❺ 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 ❺.

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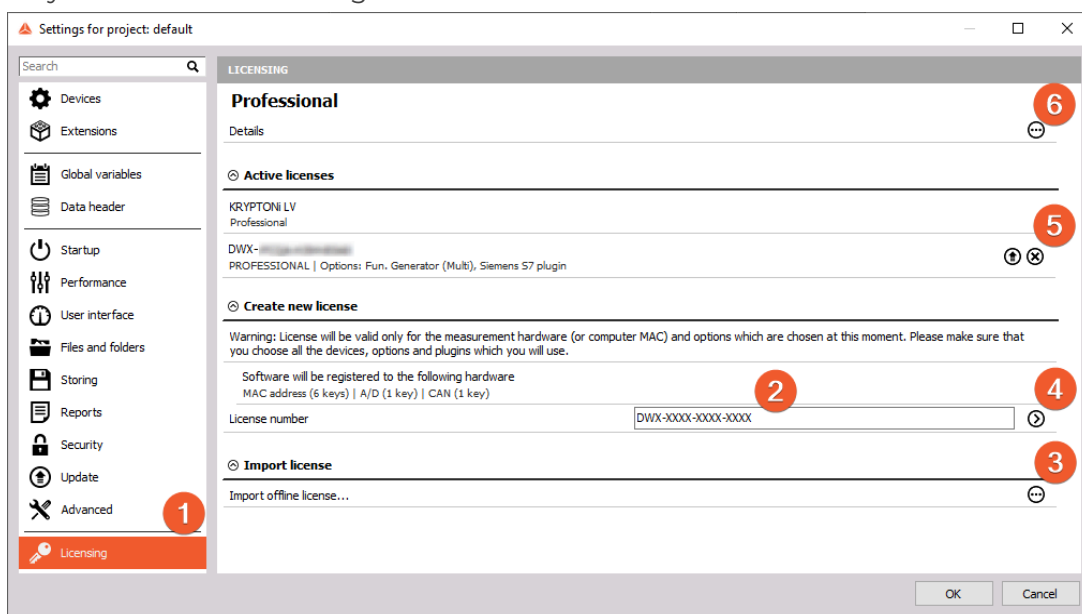
Active licenses tab

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

3.6. Troubleshooting

If your IOLITE® X device is not found by DewesoftX®:
- If you did not restart Windows after the software installation, restart now
- Make sure that the external power supply is connected and okay
- Disconnect the EtherNET cable and reconnect it. If this does not work, try to connect the EtherNET 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

4. System Overview

IOLITE X

Small in size, but powerful and easily distributed
for monitoring and industrial applications.

openDAQ SDK compliant.

Voltage	Strain / Stress	Resistance
Quarter Bridge	Half Bridge	Full Bridge
IEPE	DSI Compatible	TEDS Compatible

4.1. Main features

- **GREAT SIGNAL CONDITIONING**: IOLITE X features high-quality amplifiers which offer great signal quality and up to200kS/s sampling rate.
- **POWER OVER ETHERNET:** Active PoE++ (Power over Ethernet) power delivery, makes it easily daisy chainable.
- **PTPv2 SYNCHRONIZATION:** Precision Time Protocol (PTPv2) synchronization for easier connectivity and synchronized measurements.
- **OpenDAQ COMPLIANT:** IOLITE X devices are compliant with the OpenDaq, open data acquisition platform. Discover, configure and receive data from any OpenDAQ compatible sensors, devices and instruments in your favorite programming environment.
- **GREAT PRICE/PERFORMANCE**: IOLITE X 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.
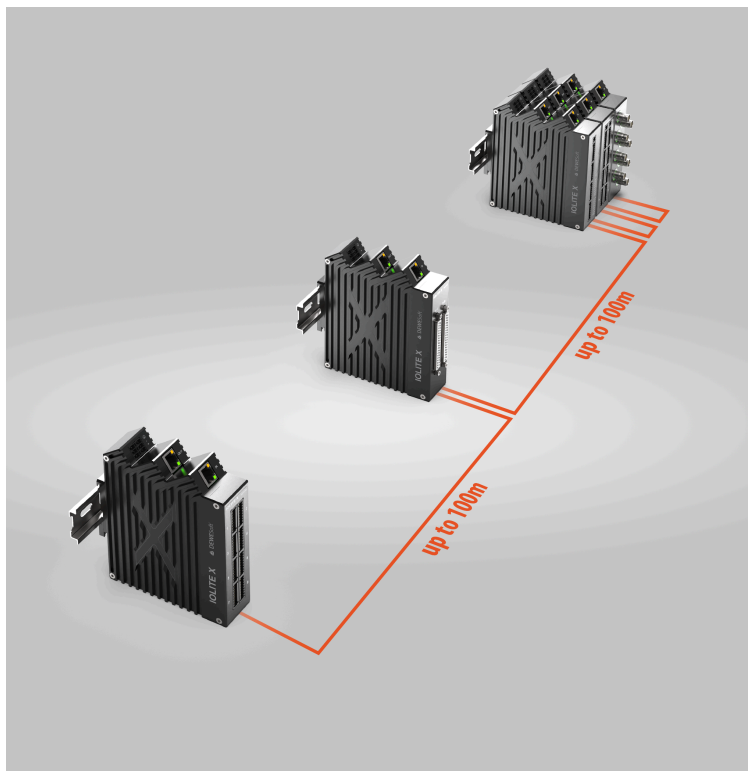
4.1.1. Perfect for industrial applications

IOLITE X chassis offers an easy clip-in mechanism for mounting to all standard industrial DIN rail mounts. This makes them perfect for mounting in industrial cabinets. IOLITE X devices use RJ45 connectors which allow easy connection of modules up to 100m and reduce cost by using standard low-cost Ethernet cables.

4.1.2. Intuitive and easy to use

Easy connectivity due to the need for only one cable for data, power and synchronization. Plug-and-play technology with smart sensors and advanced TEDS is supported by default. This makes performing measurements with the Dewesoft DAQ systems easier than riding a bike. You will be ready to measure in no time.

4.2. System specifications

	IOLITE X
GLAN	
Data interface	Ethernet 1 GbE incl. IEEE1588v2 synchronization (PTPv2)
Data Rate	1 Gbps
Sync Accuracy	100 ns
Bus connectors	Ethernet RJ45, single cable for data, power and sync, daisy chainable
Power over Ethernet	48 - 57 V DC (PoE++ power delivery)
Max. cable length between devices	100 m
Max. Throughput per Chain	up to 90W
Power	
Power supply	9 - 57 V DC
Power supply connector	SCDN-THR 3.81/04/90G 3.2SN BK BX
Environmental	
Operating Temperature	-40 to 70 °C
Storage Temperature	-40 to 85 °C
Humidity	95 %, no condensation
IP rating	IP20
Shock	Shock: SIST EN 60068-2-27:2009 10 g, 6 ms, half-sine 25x pos./neg in each axis 150x total
Vibration	Random: Profile breakpoints: 10 Hz - 0.75 g²/Hz 150 Hz - 0.015 g²/Hz Profile RMS / Peak = 3.5 g / 10.5 g 1 hrs in each axis, 3 hrs total
Physical	
Dimensions	137 x 119* x 35 (* depending on the front connectors)
Rev: 1712304000	

	X 8xSTGS	X 8xLVe	X 16xLV	X 8xACC
Connectors	Terminal block, DSUB-37	Terminal block, DSUB-37	Terminal block	BNC
Channels per module	8x	8x	16x	8x
Data rate per channel	50 kS/s	200 kS/s	100 kS/s	200 kS/s
Resolution	24-bit	24-bit	24-bit	24-bit
Bandwidth	0.433*fs	0.433*fs	0.433*fs	0.433*fs
Voltage mode ranges	✗	±100 V, ±5 V	±200 V, ±10 V	±10 V, ±5 V, ±1 V, ±200 mV
Input coupling	DC	DC	DC	DC, AC 1 Hz, AC 0.1 Hz
Sensor excitation	1 V, 2 V, 5 V	0...24V (unipolar)	✗	2 mA, 4 mA, 6 mA
Bridge connection	Full, ½, ¼ 350 Ω, ¼ 120 Ω 3-wire, 4-wire (optional)	✗	✗	✗
Programmable shunt	100 kΩ	✗	✗	✗
IEPE input	✗	✗	✗	✓
Resistance	✗	✗	✗	✗
Temperature (PTx)	✗	✗	✗	✗
Thermocouple	✗	✗	✗	✗
Current	✗	✗	✗	✗
Potentiometer	✓	✓	✗	✗
LVDT	✗	✗	✗	✗
Charge	✗	✗	✗	✗
TEDS	✓ (only TB)	✓	✗	✓
Isolation voltage	Differential	250 V	250 V	250V
Isolation arrangement	Ch-GND	Ch-GND	Ch-GND	Ch-GND
PoE functionality	✓	✓	✓	✓
Advanced functions	Supports all strain types, low power consumption	High isolation, high input range	High isolation, high input range	IEPE, supports TEDS, high channel density
Rev: 1712304000				

4.2.1. IOLITE X: Multi channel device

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

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

> **Important**
> For the power supply we have two terminal block connectors so the devices can be daisy chained with each other if PoE is not used.

4.2.1.1. IOLITE X - Multi channel: Renders

IOLITE X multi channel device

4.2.1.2. IOLITE X - Multi channel: Dimension
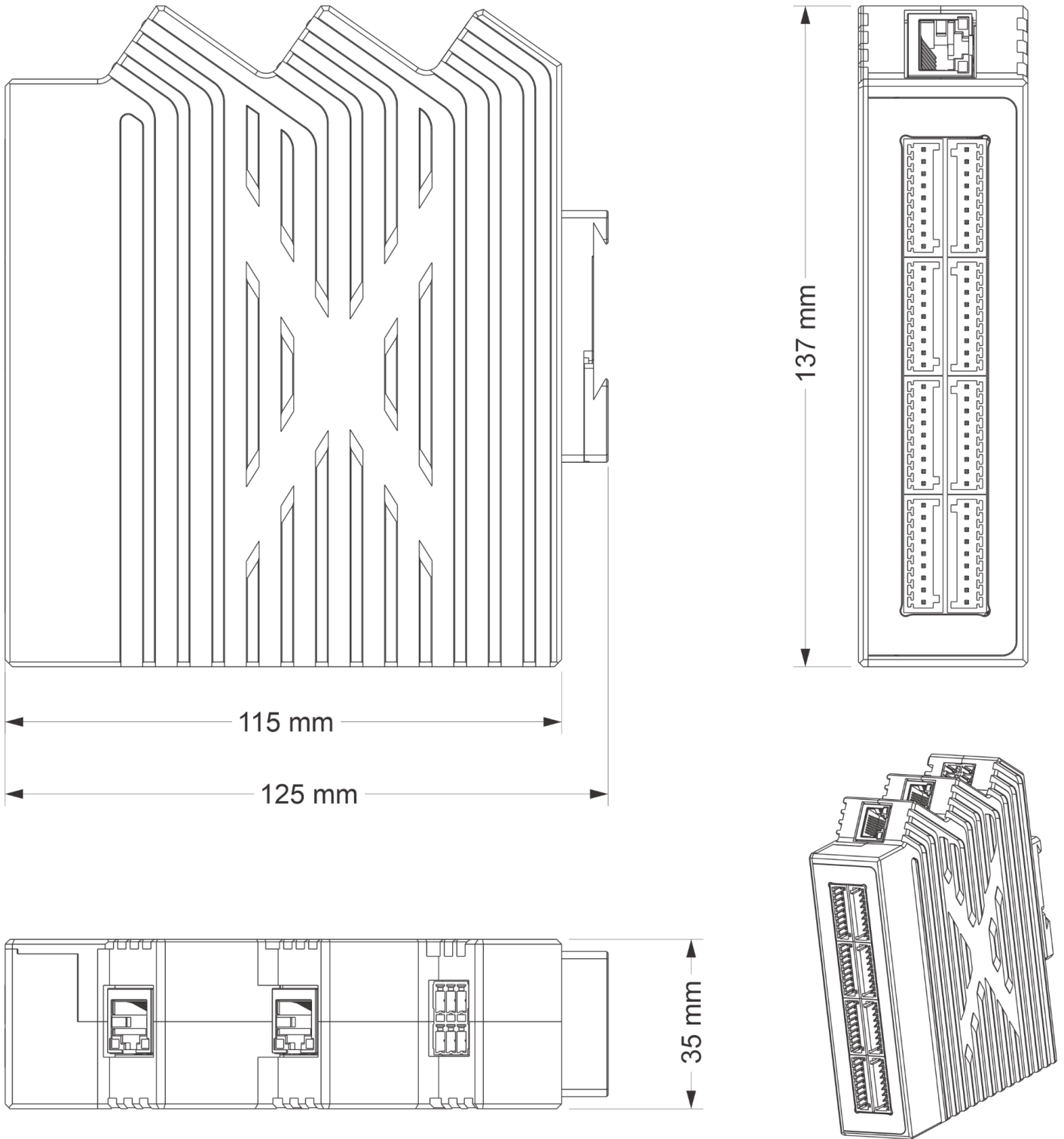
4.2.1.3. IOLITE X - Multi channel: Connectors

4.2.1.3.1. IOLITE X - Multi channel: PWR IN
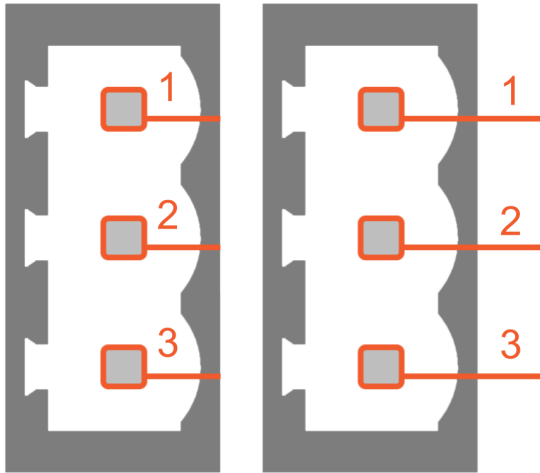
Power in connector: pin-out (two 3-pin connectors)

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

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

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

4.2.1.3.2. IN (Data, Sync, PWR)
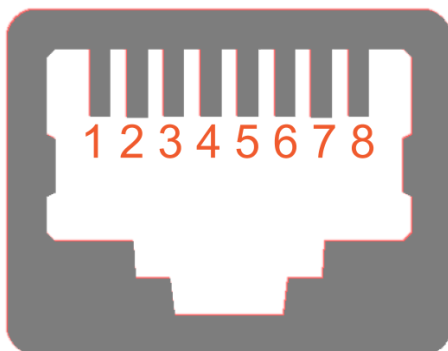
IN connector: pin-out (RJ45 female)

Pin	Name	Description
1	P1_p	Pair 1 +
2	P1_n	Pair 1 -
3	P2_p	Pair 2 +
4	P2_n	Pair 2 -
5	P3_p	Pair 3 +
6	P3_n	Pair 3 -
7	P4_p	Pair 4 +
8	P4_n	Pair 4 -

4.2.1.3.3. OUT (Data, Sync, PWR)
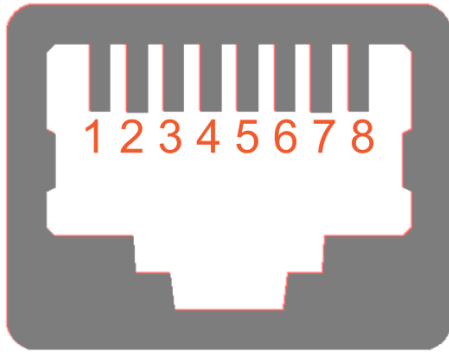
OUT connector: pin-out (RJ45 female)

Pin	Name	Description
1	P1_p	Pair 1 +
2	P1_n	Pair 1 -
3	P2_p	Pair 2 +
4	P2_n	Pair 2 -
5	P3_p	Pair 3 +
6	P3_n	Pair 3 -
7	P4_p	Pair 4 +
8	P4_n	Pair 4 -

Caution

If PoE and PWR IN are connected at the same time, the device will be powered from PWR IN (9-57 V).

PoE on output is enabled if PWR IN voltage is in 48 V to 57 V range.

5. Module Overview

5.1. VOLTAGE MEASUREMENT

The IOLITE X product family includes two types of low voltage (LV) modules: 8-ch module with excitation and 16-ch module.
Below is the list of LV products:
- IOLITE X 16xLV
- IOLITE X 8xLVe

5.1.1. VOLTAGE MEASUREMENT

5.1.2. IOLITE X 16xLV

IOLITE X 16xLV is the perfect choice for general-purpose low voltage input data acquisition due to its high accuracy and high isolation.

IOLITE X 16xLV

5.1.2.1. IOLITE X 16xLV: Specifications

Analog input		IOLITE X 16xLV	
Input type		Voltage	
Number of channels		16	
ADC Type		24-bit delta-sigma with anti-aliasing filter (-3 dB @ 160 kHz) Butterworth 2nd order	
Sampling Rates		Simultaneous up to 100 kS/s	
Voltage mode			
Voltage ranges		**±200 V**	**±10 V**
Input Accuracy	DC	±0.03 % of reading ±40 mV	±0.03 % of reading ±2 mV
Noise floor, Typ.	10 kS/s / 100 kS/s	-115dB / -106 dB	-102 dB / -95 dB
Dynamic Range	10 kS/s / 100 kS/s	-154 dB / -146 dB	-144 dB / -138 dB
CMR, Typ. -1 dBFS on 10V and -6dB on 200V sine wave @ 50 Hz / 400 Hz / 1 kHz	10 kS/s	-100dB /-100dB /-97dB	-100dB /-100dB /-100dB
	100 kS/s	-101dB /-101dB /-100dB	-95dB /-95dB /-94dB
THD, Typ. -1 dBFS on 10V and -6dB on 200V sine wave @ 1 kHz	10 kS/s / 100 kS/s	-93 dB / -93 dB	-106 dB / -102 dB
SFDR, Typ. -1 dBFS on 10V and -6dB on 200V sine wave @ 1 kHz	10 kS/s / 100 kS/s	95 dBc / 95 dBc	107 dBc / 104 dBc
SNR Typ. -1 dBFS on 10V and -6dB on 200V sine wave @ 1 kHz	10 kS/s / 100 kS/s	94 dB / 94 dB	107 dB / 104 dB
Gain Linearity		< 0.01 %	
Gain Drift		Typical 10 ppm/K, Max. 40 ppm/K	
Offset Drift		Typical 2 ppm of range/K, Max. 5 ppm of range/K	
Crosstalk (0 dBFS @ 1 kHz)		-115 dB	-130 dB
Input Coupling		DC	
Input Impedance		800 kΩ	
Max. common mode voltage		±200 V	
Overvoltage Protection		In+ to In-: 200 V continuous, 350 Vpeak (100 ms)	
Analog input performance			
Sample rate		**SR ≤ 2 kS/s**	**SR > 2 kS/s**
Bandwidth (-3 dB)		0.489*fs	0.433*fs
Alias-free Bandwidth		DC to 0.44*fs	DC to 0.499*fs
Alias Rejection		-105 dB (all sample rates)	
Delay Through ADC		34 / fs	
Oversampling		32	
Additional Specifications			

Modular		IOLITE X 16xLV
	Input Connectors	Terminal block 9 pole OMNIMATE SL 2.50 / BLF 2.50/180
	Power supply	9 - 57 V DC, Power over Ethernet: 48 - 57 V DC (PoE++ power delivery)
	Isolation Voltage	250 V functional isolation (channel to power supply ground)
Power consumption	TB @Typ. 24 V / MAX. 56 V	Voltage mode: Typ. 5.8 W / Max. 7.4 W
	PoE @Min. 48 V / MAX. 56 V	Voltage mode: Typ. 7.2 W / Max. 7.8W
	Weight	1250 g
	Slice Dimensions	137 x 115.0 x 35.0 mm
Rev: 1712304000		

6.1.1.2. IOLITE X 16xLV: Connectors

IOLITE X 16xLV (rack and standalone version) is available with terminal block connectors.

5.1.2.2.1. IOLITE X 16xLV: T2A9f Connector: Pin out
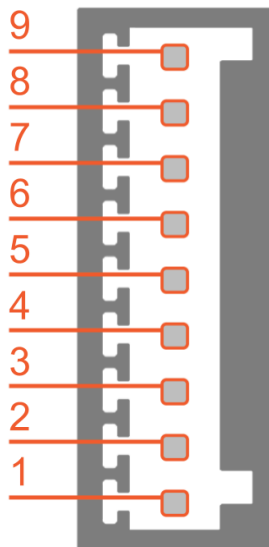
Analog in connector: pin-out (terminal block male)

Pin	Name	Description
9	IN +	Input+
8	IN -	Input-
7	IN +	Input+
6	IN -	Input-
5	IN +	Input+
4	IN -	Input-
3	IN +	Input+
2	IN -	Input-
1	iGND	iGND

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

IOLITE 16xLV: T2A2f Power OUT Connector: Pinout
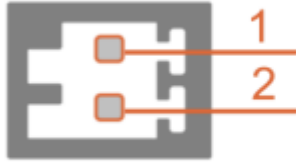
LV connector: pin-out (TBLOCK male)

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

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

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

5.1.2.2.2. IOLITE X 16xLV: T2A9f Connector: Wiring diagram
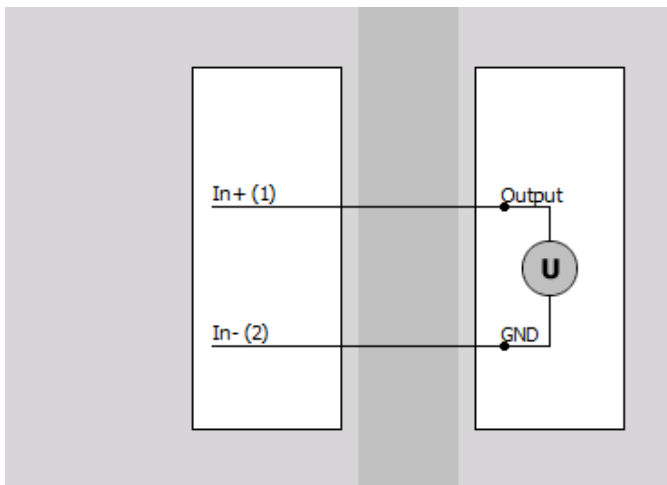
Voltage

5.1.3. IOLITE X 8xLVe

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

IOLITE X 8xLVe TB

IOLITE X 8xLVe D37f

5.1.3.1. IOLITE X 8xLVe: Specifications

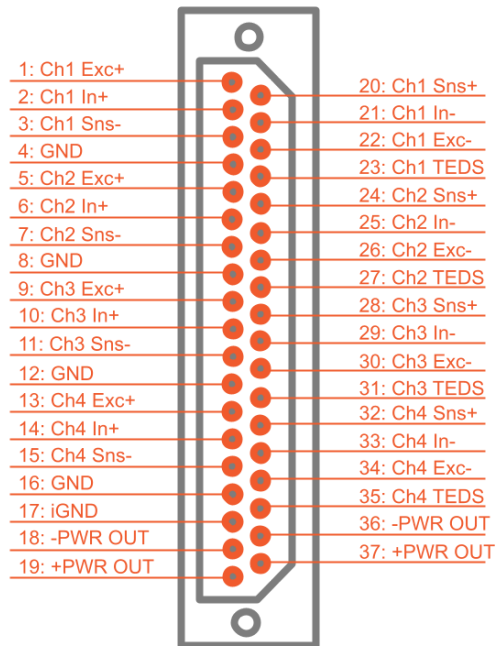| Inputs		IOLITE X 8xLVe	
Input types		Voltage, Potentiometer, Current (Ext. shunt)	
Number of channels		8	
ADC Type		24-bit delta-sigma with anti-aliasing filter (-3 dB @ 160 kHz) Butterworth 2nd order	
Sampling Rate		Simultaneous up to 200 kS/s	
Voltage Mode			
Ranges	**SR**	**±100 V**	**±5 V**
Accuracy		±0.03 % of reading ±0.02 % of range	
Noise floor, Typ.	10kS/s/ 100kS/s / 200kS/s	-118 dB / -109 dB / -107 dB	-103 dB / -93 dB / -90 dB
Dynamic Range, Typ.	10kS/s/ 100kS/s / 200kS/s	-149 dB / -149 dB / -149 dB	-133 dB / -133dB / -132 dB
CMR, Typ. 0 dBFS sine wave @ 50 Hz / 400 Hz / 1 kHz	10kS/s	-113dB /-102dB /-99dB	-100dB /-98dB /-97dB
	100kS/s	-105dB /-100dB /-98dB	-90dB /-89dB /-89dB
	200kS/s	-103dB /-100dB /-97dB	-87dB /-86dB /-86dB
THD, Typ. -1 dBFS sine wave @ 1 kHz	10kS/s/ 100kS/s / 200kS/s	-94 dB / -94 dB / -94 dB	-112 dB / -105 dB / -102 dB
SFDR, Typ. -1 dBFS sine wave @ 1 kHz	10kS/s/ 100kS/s / 200kS/s	-104 dBc / -93 dBc/ -94 dBc	-109 dBc / -107 dBc/ -105 dBc
SNR, Typ. -1 dBFS sine wave @ 1 kHz	10kS/s/ 100kS/s / 200kS/s	107 dB / 102 dB / 100 dB	98 dB / 88 dB / 85 dB
Gain Linearity		<0.02 %	<0.01 %
Gain Drift		Typical 5 ppm/K, Max. 20 ppm/K	
Offset Drift		Typical 5 ppm of range/K, Max. 10 ppm of range/K	
Channel Crosstalk typ. @ 1 kHz		-131	
Input Coupling		DC	
Input Impedance		800 kΩ (between In+ and In-)	
Input Overvoltage Protection		In+ to In-: 200 V continuous, 350 Vpeak (100 ms)	
Max. common mode voltage		±200 V	
Isolation		250 V functional isolation (channel to power supply ground)	
Analog input performance			
Sample rate		**SR ≤ 2 kS/s**	**SR > 2 kS/s**
Bandwidth (-3 dB)		0.489*fs	0.433*fs
Alias-free Bandwidth		DC to 0.44*fs	DC to 0.499*fs
Alias Rejection		-105 dB (all sample rates)	
Delay Through ADC		34 / fs	
Oversampling		32	
Excitation Voltage			
Excitation voltage		Unipolar 2 … 24V DC	

Current limit	2.8 W max. power per channel, 22.4 W per slice	
Excitation accuracy	0.05 % ± 2 mV	
Drift	±20 ppm/K ± 60 µV/K	
Stability 10 % to 90 % load	< 0.06 @ 5 V exc (< 0.01 @ 24 V exc)	
Noise @ 10 V / 350 Ω	<150 µVrms @ 10 kS	
Load regulation over 10 Ω of change	< 0.04 % @ 120 Ω load	
Protection	Continuous short to ground	
Additional Specifications		
Modular	**IOLITE X 8xLVe**	
Input connector	Terminal block	DSUB-37
TEDS support	Yes	
Power supply	9 - 57 V DC, Power over Ethernet: 48 - 57 V DC (PoE++ power delivery)	
Power consumption	TB @Typ. 24 V / MAX. 56 V	Analog input only: Typ. 5.2 W/ MAX. 7.3 W Excitation: Typ 9.4 W 120 Ω load @ 5 V / 40.7 W 120 Ω load @ 20 V MAX: 11.5W 120 Ω load @ 5 V / 45.7 W 120 Ω load @ 20 V
	PoE @min 48 V / MAX. 56 V	Analog input only: min: 7.1W / MAX. 7.5 W Excitation min 11.4 W 120 Ω load @ 5 V / 45.2 W 120 Ω load @ 20 V MAX 11.8 W 120 Ω load @ 5 V / 46.4 W 120 Ω load @ 20 V
Weight	615 g	610 g
Slice Dimensions	137 x 115.0 x 35.0 mm	
Rev: 1712304000		

5.1.3.2. IOLITE X 8xLVe: Connectors

5.1.3.2.1. IOLITE X 8xLVe: DSUB Connector: Pinout

1: Ch1 Exc+
2: Ch1 In+
3: Ch1 Sns-
4: GND
5: Ch2 Exc+
6: Ch2 In+
7: Ch2 Sns-
8: GND
9: Ch3 Exc+
10: Ch3 In+
11: Ch3 Sns-
12: GND
13: Ch4 Exc+
14: Ch4 In+
15: Ch4 Sns-
16: GND
17: iGND
18: -PWR OUT
19: +PWR OUT

20: Ch1 Sns+
21: Ch1 In-
22: Ch1 Exc-
23: Ch1 TEDS
24: Ch2 Sns+
25: Ch2 In-
26: Ch2 Exc-
27: Ch2 TEDS
28: Ch3 Sns+
29: Ch3 In-
30: Ch3 Exc-
31: Ch3 TEDS
32: Ch4 Sns+
33: Ch4 In-
34: Ch4 Exc-
35: Ch4 TEDS
36: -PWR OUT
37: +PWR OUT

IOLITE X 8xLVe D37f connector: Pin-out

5.1.3.2.2. IOLITE X 8xLVe: DSUB Connector: Wiring diagram

Voltage
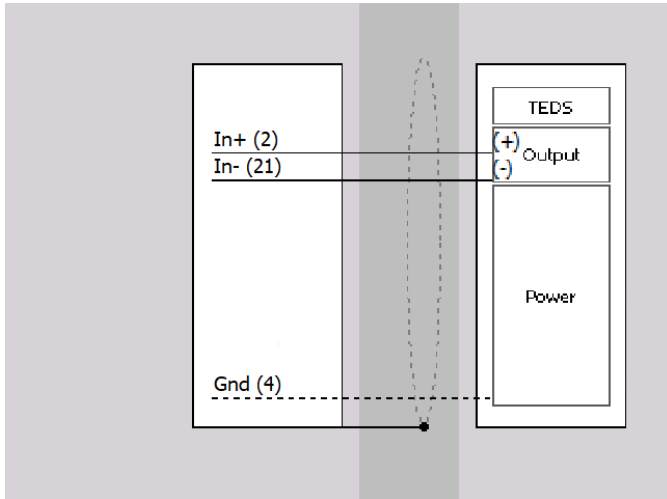
Current
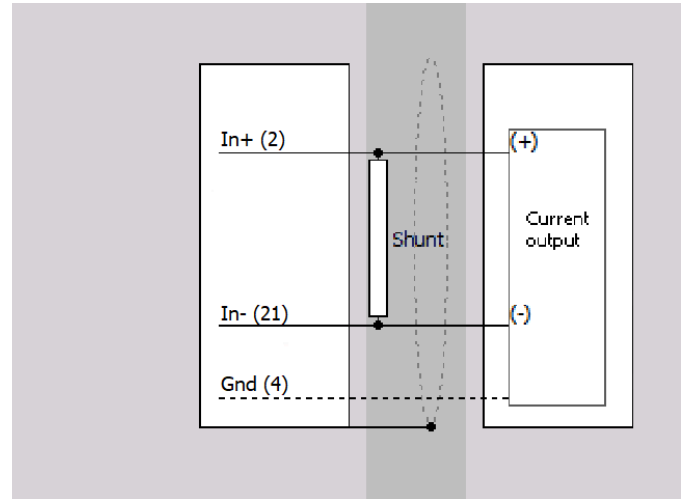
Potentiometer
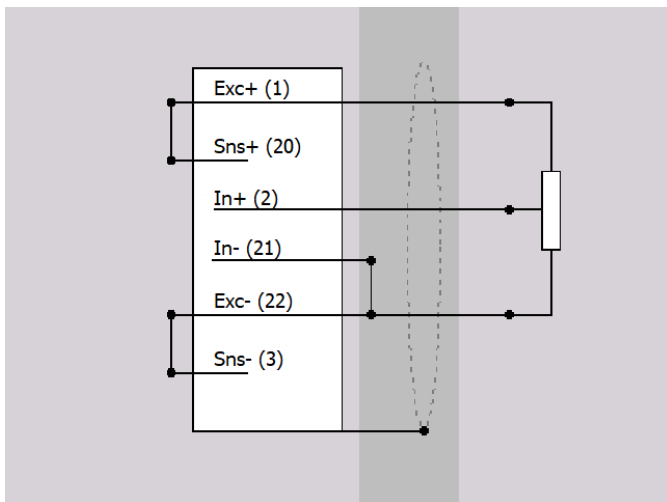
5.1.3.2.3. IOLITE X 8xLVe: T2A9f Connector: Pinout
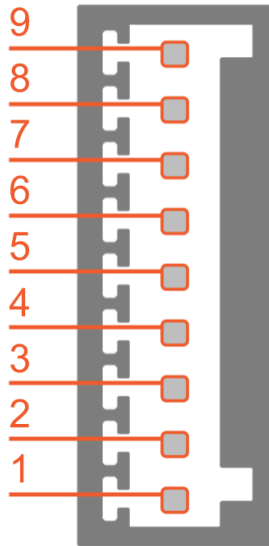
Analog in connector: pin-out (terminal block male)

Pin	Name	Description
9	IN +	Input+
8	IN -	Input-
7	SNS +	Sense+
6	SNS -	Sense-
5	EXC +	Excitation+
4	EXC -	Excitation-
3	GND	Ground
2	NC	NC
1	TEDS	TEDS

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

5.1.3.2.4. IOLITE X 8xLVe: T2A9f Connector: Wiring diagram

Voltage
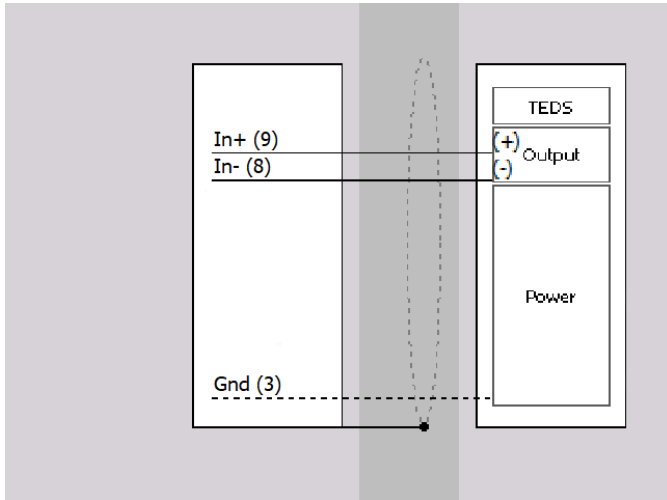
Current
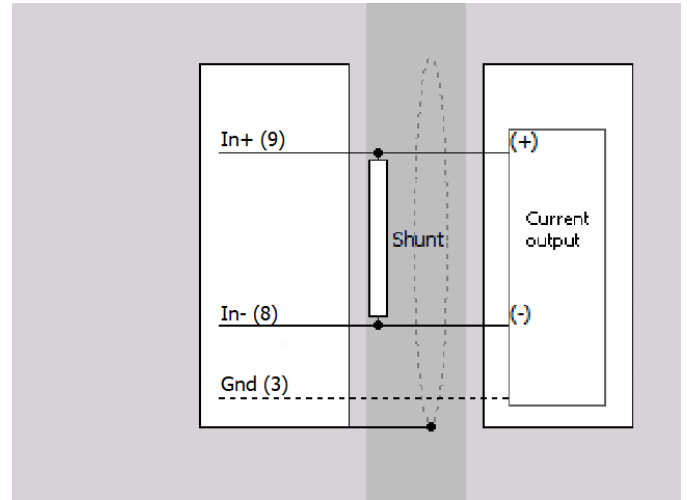
Potentiometer
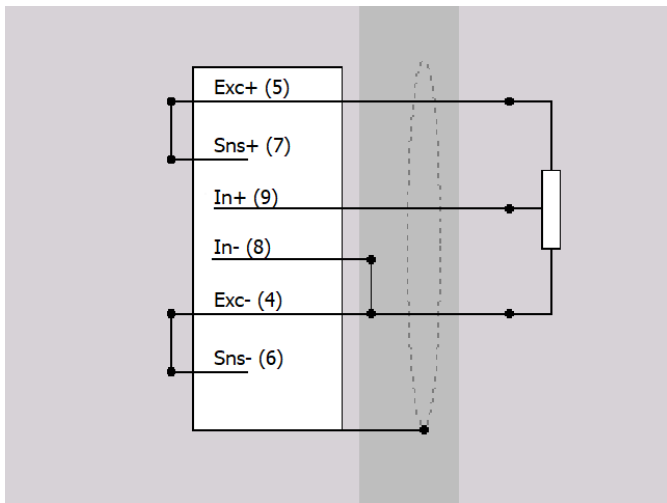
5.2. STRAIN AND STRESS MEASUREMENT

The IOLITE X product family offers an 8-channel strain gauge module that can be used in various bridge configurations.
List of strain gauge modules:
- IOLITE X 8xSTGS

5.2.1. IOLITE X 8xSTGS

IOLITE X 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.

IOLITE X 8xSTGS
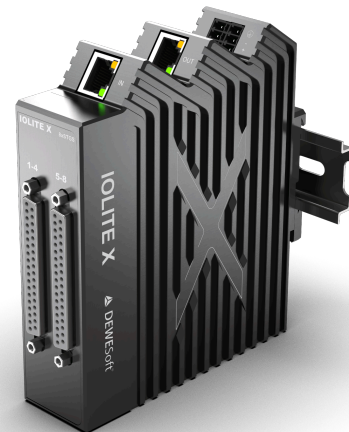
IOLITE X 8xSTGS D37

5.2.1.2. IOLITE X 8xSTGS: Connectors

5.2.1.2.1. IOLITE X 8xSTGS: T2A9f Connector: Pinout
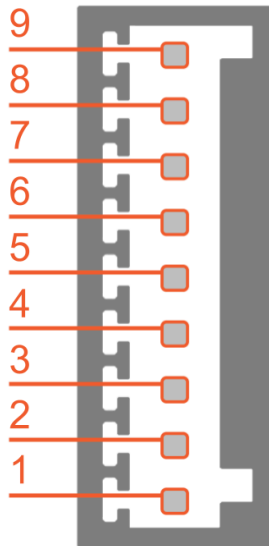
Analog in connector: pin-out (terminal block male)

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

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

5.2.1.2.3. IOLITE X 8xSTGS: D-SUB37 Connector: Pinout

1: Ch1 Exc+
2: Ch1 In+
3: Ch1 Sns-
4: GND
5: Ch2 Exc+
6: Ch2 In+
7: Ch2 Sns-
8: GND
9: Ch3 Exc+
10: Ch3 In+
11: Ch3 Sns-
12: GND
13: Ch4 Exc+
14: Ch4 In+
15: Ch4 Sns-
16: GND
17: GND
18: -PWR OUT
19: +PWR OUT

20: Ch1 Sns+
21: Ch1 In-
22: Ch1 Exc-
23: Ch1 R
24: Ch2 Sns+
25: Ch2 In-
26: Ch2 Exc-
27: Ch2 R
28: Ch3 Sns+
29: Ch3 In-
30: Ch3 Exc-
31: Ch3 R
32: Ch4 Sns+
33: Ch4 In-
34: Ch4 Exc-
35: Ch4 R
36: -PWR OUT
37: +PWR OUT
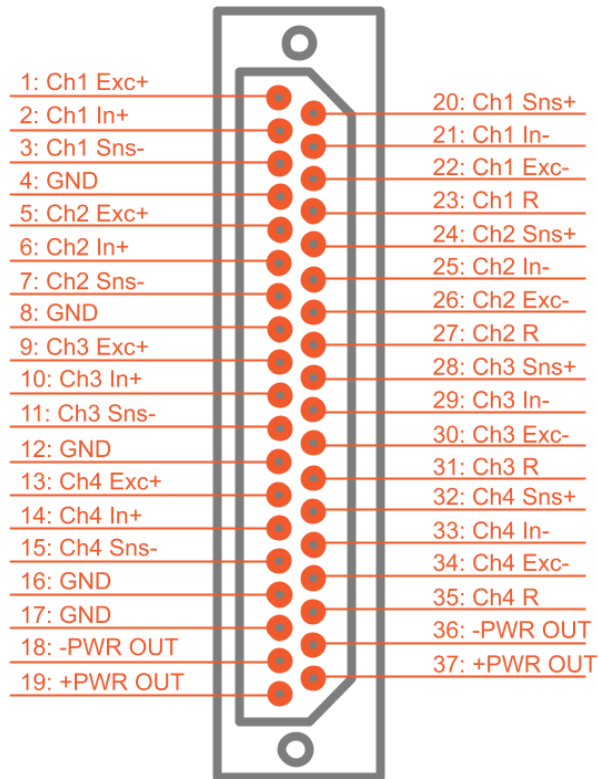
! Warning

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.

Incorrect connection can damage the equipment or cause data loss. The connection of PWR OUT must be made according to the pinout below:

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

5.3. VIBRATION AND SOUND MEASUREMENT

The IOLITE X product family includes solutions for vibration and sound measurement with:
- IOLITE X 8xACC

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

5.3.1. IOLITE X 8xACC

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

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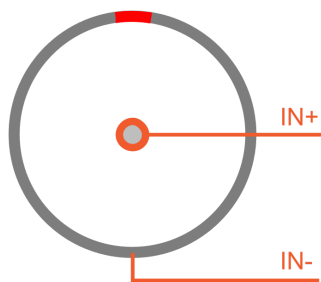

IOLITE X-8xACC

5.3.1.1. IOLITE X 8xACC: Specifications

Analog inputs	IOLITE X 8xACC			
Input type	Voltage, IEPE			
Number of channels	8			
ADC Type	24-bit delta-sigma with anti-aliasing filter (-3 dB @ 160 kHz) Butterworth 2nd order			
Sampling Rate	Simultaneous 200 kS/sec per channel (software-selectable)			
Voltage Mode				
Voltage Ranges	**±10 V**	**±5 V**	**±1 V**	**±0.2 V**
Input Accuracy DC	±0.02 % of reading ±0.02 % of range			
Noise floor, Typ. — 10 kS/s / 100 kS/s / 200 kS/s	-116 dB / -107 dB / -105 dB	-116 dB / -107 dB / -105 dB	-115 dB / -105 dB / -103 dB	-105 dB / -95 dB / -93 dB
Dynamic Range, Typ. — 10 kS/s / 100 kS/s / 200 kS/s	-158 dB / -149 dB / -150 dB	-156 dB / -150 dB / -150 dB	-155 dB / -152 dB / -148 dB	-145 dB / -140 dB / -139 dB
CMR, Typ. 0 dBFS sine wave @ 50 Hz / 400 Hz / 1 kHz — 10 kS/s	117 dB / 117 dB / 117 dB	117 dB / 115 dB / 116 dB	115 dB / 115 dB / 114 dB	106 dB / 105 dB / 104 dB
— 100 kS/s	107 dB / 107 dB / 107 dB	107 dB / 107 dB / 107 dB	105 dB / 105 dB / 104 dB	96 dB / 96 dB / 95 dB
— 200 kS/s	106 dB / 106 dB / 106 dB	106 dB / 106 dB / 106 dB	103 dB / 103 dB / 102 dB	93 dB / 93 dB / 93 dB
THD, Typ. -1 dBFS sine wave @ 1 kHz — 10 kS/s / 100 kS/s / 200 kS/s	-105 dB / -103 dB / -99 dB	-104 dB / -102 dB / -98 dB	-103 dB / -102 dB / -98 dB	-101 dB / -101 dB / -99 dB
SFDR, Typ. -1 dBFS sine wave @ 1 kHz — 10 kS/s / 100 kS/s / 200 kS/s	106 dBc / 106 dBc / 101 dBc	106 dBc / 105 dBc / 101 dBc	106 dBc / 105 dBc / 90 dBc	98 dBc / 97 dBc / 90 dBc
SNR, Typ. -1 dBFS sine wave @ 1 kHz — 10 kS/s / 100 kS/s / 200 kS/s	106 dB / 103 dB / 101 dB	102 dB / 100 dB / 98 dB	104 dB / 99 dB / 88 dB	92 dB / 87 dB / 87 dB
Gain Linearity	< 0.02 %			
Gain Drift	Typical 6 ppm/K, max. 15 ppm/K			
Offset Drift	Typical 0.5 µV/K + 0.5 ppm of range/K, max 2 µV/K + 2 ppm of range/K			
Channel Cross talk typ. @ 1 kHz	-130 dB	-130 dB	-130 dB	-125 dB
Input Coupling	DC, AC 0.1 Hz, 1 Hz			
Input Impedance	1 MΩ			
Overvoltage Protection	In+ to In-: 50 V continuous, 200 V peak (10 msec)			
Analog input performance				
Sample rate	**SR ≤ 2 kS/s**		**SR > 2 kS/s**	
Bandwidth (-3 dB)	0.489*fs		0.433*fs	
Alias-free Bandwidth	DC to 0.44*fs		DC to 0.499*fs	
Alias Rejection	-105 dB (all sample rates)			
Delay Through ADC	34 / fs			
Oversampling	128			
IEPE input				
Excitation	2 mA, 4 mA, 6 mA			

Excitation accuracy	10%	
Compliance voltage	24 V	
Output Impedance	>60 kΩ	
Sensor detection	Shortcut: <4 V; Open: >19 V	
Additional Specifications		
Modular	**IOLITE X 8xACC**	
Input connector	BNC	
Isolation voltage	250 Vpeak channel to ground	
TEDs support	IEPE mode only (class 1)	
Power supply	9 - 57 V DC, Power over Ethernet: 48 - 57 V DC (PoE++ power delivery)	
Power consumption	TB @Typ. 24 V / MAX. 56 V	Voltage mode: Typ. 5.88 W / Max. 7.4 W IEPE mode: Typ. 7.3 W @4 mA, 8.6 W @6 mA / Max. 7.9 W@4 mA, 9.3 W @6 mA
	PoE @Min. 48 V / MAX. 56 V	Voltage mode: min. 7.2 W / Max. 7.6 W IEPE mode: min. 8.5 W @4 mA, 8.9 W @6 mA / Max. 9.2 W@4 mA, 9.5 W @6 mA
Weight	600 g	
Slice Dimensions	137 x 115.0 x 35.0 mm	

5.3.1.2. IOLITE X 8xACC: Connectors

5.3.1.2.1. IOLITE X 8xACC: BNC Connector: Pinout

ACC connector: pin-out (BNC)

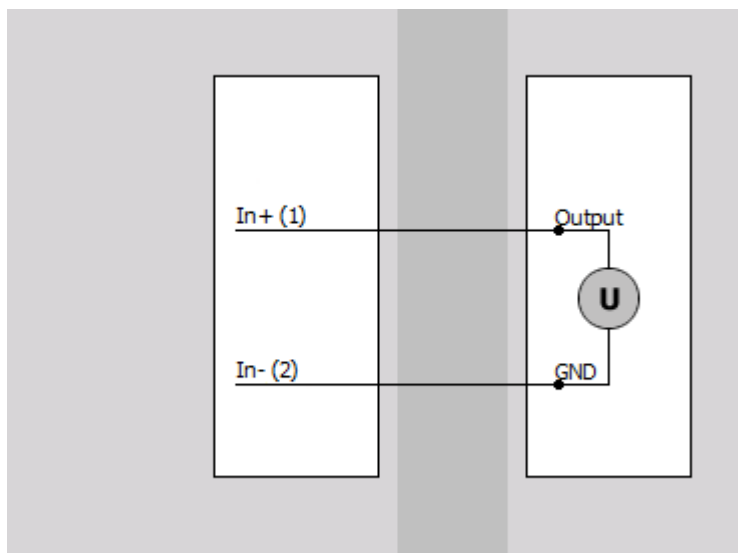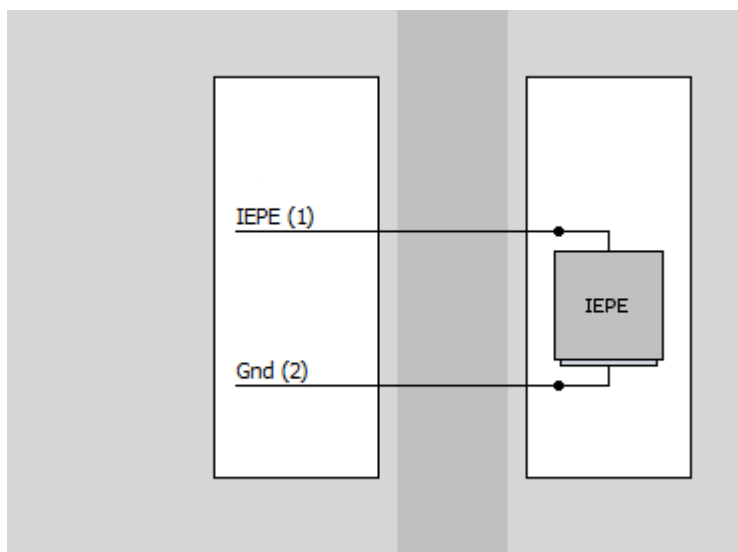| Pin	Name	Description
1	IN+	Input +
2	IN-	Input -

Note

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

5.3.1.2.2. IOLITE X 8xACC: BNC Connector: Wiring diagram

Voltage

IEPE

6. IOLITE X Accessories

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

7. Warranty information

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The copy of the specific warranty terms applicable to your Dewesoft product and replacement parts can be obtained from your local sales and service office. To find a local dealer for your country, please visit https://dewesoft.com/support/distributors.

7.1. 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.

7.2. 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
Email: Support@dewesoft.com
The telephone hotline is available Monday to Friday from 07:00 to 16:00 CET (GMT +1:00)

7.3. Service/repair

The team of Dewesoft also performs any kinds of repairs to your system to assure a 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.

7.4. Restricted Rights

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

7.5. Printing History

Version 2.0.0, Revision 217 Released 2015 Last changed: 23. July 2018 at 16:54.

7.6. Copyright

7.7. 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.

8. Safety instructions

Your safety is our primary concern! Please be safe!

8.1. 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.

8.2. General Safety Instructions

! **Warning**

The following general safety precautions must be observed during all phases of operation, service, and repair of this product. Failure to comply with these precautions or with specific warnings elsewhere in this manual violates safety standards of design, manufacture, and intended use of the product. Dewesoft d.o.o. assumes no liability for the customer's failure to comply with these requirements.

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

8.2.1. Environmental Considerations

Information about the environmental impact of the product.

8.2.2. Product End-of-Life Handling

Observe the following guidelines when recycling a Dewesoft system:

8.2.3. System and Components Recycling

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

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

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

8.2.4. General safety and hazard warnings for all Dewesoft systems

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 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 on 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 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 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 application under certain conditions is allowed with therefore designed products only. For details please refer to the specifications.
- Make sure that your hands, shoes, clothes, the floor, the system or measuring leads, integrated circuits and so on, are dry.
- DO NOT use the system in rooms with flammable gases, fumes or dust or in adverse environmental conditions.
- Avoid operation in the immediate vicinity of high magnetic or electromagnetic fields, transmitting antennas or high-frequency generators, for exact values please refer to enclosed specifications.
- Use measurement leads or measurement accessories aligned with the specification of the system only. Fire hazard in case of overload!
- Lithium ion batteries are classified as not hazardous when used according to the recommendations of the manufacturer described in Battery Safety Data Sheet, which is available for download from this link.
- Do not switch on the system after transporting it from a cold into a warm room and vice versa. The thereby created condensation may damage your system. Acclimatise the system unpowered to room temperature.
- 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.

8.3. Documentation version history

Version	Date	Notes
V24-1	13.4.2024	Initial version - Product line release