

TECHNICAL REFERENCE MANUAL

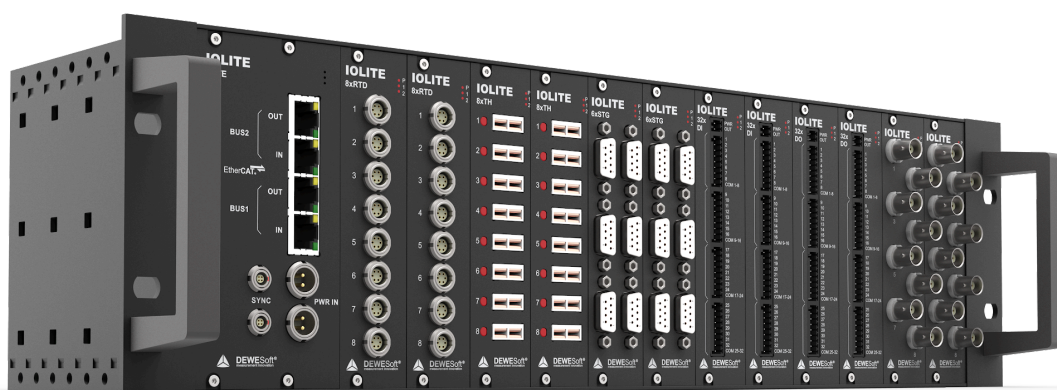
IOLITE® V26-1



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

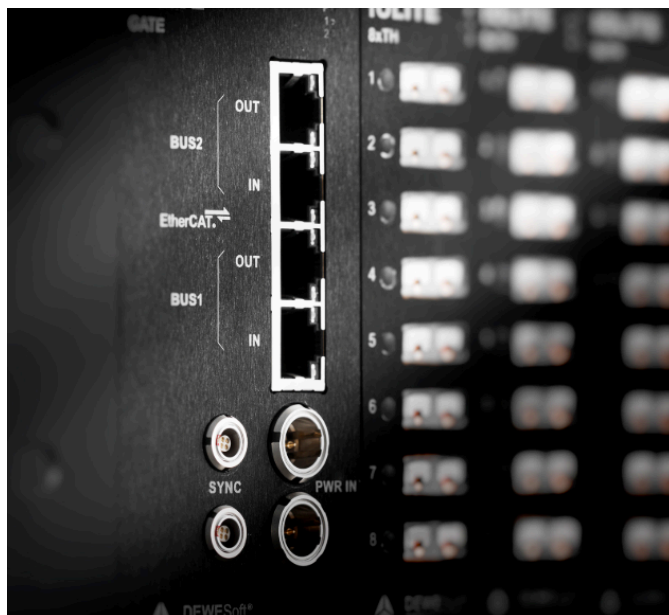


-10 °C to +50 °C

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

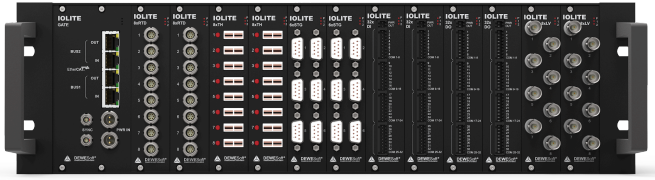
Primary bus is used for perfectly timed and synchronized data acquisition via Dewesoft X software.

Secondary Bus

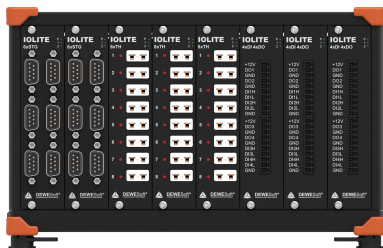
The secondary bus can be used in two ways:

- 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



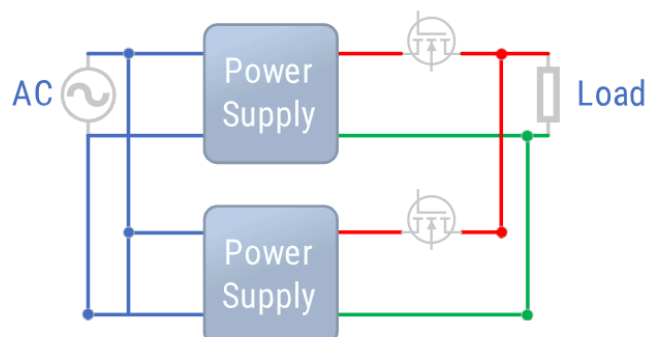
IOLITE-R8r

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

- **6xSTG:** universal analogue and strain gauge amplifiers. Compatible with Dewesoft smart interface DSI adapters
- **8xSTGS:** A dedicated module for strain measurement with low drift and high stability
- **8xLV:** Isolated 8-channel low voltage module
- **16xLV:** 16-channel low voltage module.
- **8xLA:** Isolated 8-channel low current module.
- **8xLVe:**
- **4xHV:**
- **8xTH, 8xTH-HS:** Isolated thermocouple amplifier
- **4xTH:**
- **8xRTD, 8xRTD-HS, 8xRTDp:** isolated amplifiers for measurements with a resistance temperature detector
- **8xACC:**
- **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
- **4xCAN-FD:**

Full technical specifications in [6. Module Overview](#)

4.1.3. Redundant Power Supply



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

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

4.1.4. Feedback Monitoring



Monitoring

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

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

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

4.2. System specifications

System	IOLITE R12	IOLITE R8	IOLITE R8r
Number of slots	12	8	8
Synchronization	2x SIRIUS® SYNC on L00B4f	2x SIRIUS® SYNC on L00B4f	2x SIRIUS® SYNC on L00B4f
Sync Accuracy	< 200 ns within same EtherCAT chain < 2 µs using sync for multiple EtherCAT chains below 1 sample to Sirius®	< 200 ns within same EtherCAT chain < 2 µs using sync for multiple EtherCAT chains below 1 sample to Sirius®	< 200 ns within same EtherCAT chain < 2 µs using sync for multiple EtherCAT chains below 1 sample to Sirius®
Dual EtherCAT® interface			
Number of buses	Two (both with buffered DAQ or real time)	Two (both with buffered DAQ or real time)	Two (both with buffered DAQ or real time)
Data Rate	Dual 100 Mbit bus speed	Dual 100 Mbit bus speed	Dual 100 Mbit bus speed
Max. Throughput per Chain	From 6 MB/s to 10 MB/s	From 6 MB/s to 10 MB/s	From 6 MB/s to 10 MB/s
Bus 1 connectors	IOLITE-GATE: 2x Ethernet RJ45 IOLITE-GATE-L: 2x Lemo 1T	2x Lemo 1T	2x Lemo 1T
Bus 2 connectors	2x Ethernet RJ45	2x Ethernet RJ45	2x Ethernet RJ45
Minimum delay (analog input to EtherCAT® bus)	70 µs	70 µs	70 µs
Minimum EtherCAT® cycle time	100 µs	100 µs	100 µs
Power			
Power supply	Dual redundant 9 - 48 V DC	Dual redundant 9 - 48 V DC	Dual redundant 9 - 48 V DC
Power consumption	9 W to 11 W (incl. IOLITE-GATE) IOLITE-GATE: Max. 1.9 W	8 W (Max: 9 W)	2.2W
Maximum input current	10 A	10 A	10 A
Environmental			
Operating Temperature	-10 to 50 °C (-40 to 85 °C optional) (see 1)	-10 to 50 °C (-40 to 85 °C optional) (see 1)	-10 to 50 °C (-40 to 85 °C optional) (see 1)
Storage Temperature	-40 to 85 °C	-40 to 85 °C	-40 to 85 °C
Humidity	5 to 95 % RH non-condensing at 50 °C	5 to 95 % RH non-condensing at 50 °C	5 to 95 % RH non-condensing at 50 °C
IP rating	IP30	IP40	IP50
Shock	Shock (EN 60068-2-27:2009)	Shock (EN 60068-2-27:2009)	50g 6ms, half sine 25x in all six directions (150x total) (-X, +X, -Y, +Y, -Z and +Z)
Vibration	Vibration random (MIL-STD-810D) Vibration random (EN 60721-3-2: 1997 - Class 2M2)	Random: Profile breakpoints: 10 Hz - 0.75 g²/Hz 150 Hz - 0.015 g²/Hz Profile RMS / Peak = 3.4 g / 10.2 g 4 hrs in each axis, 12 hrs total	Random: Profile breakpoints: 24 Hz - 0.04 g²/Hz 60 Hz - 0.5 g²/Hz 100 Hz - 0.5 g²/Hz 240 Hz - 0.1 g²/Hz 2 kHz - 0.1 g²/Hz Profile RMS / Peak = 15 g / 45 g 2 hrs in each axis, 6 hrs total

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

Hint



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

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

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

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

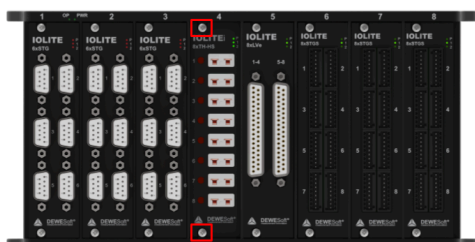


Warning

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

4.3.4.1. IOLITEr slices: Replacing the slice - Instructions

1



Turn off the device!

Unscrew two M2.5x5 TRX panhead screws.

2



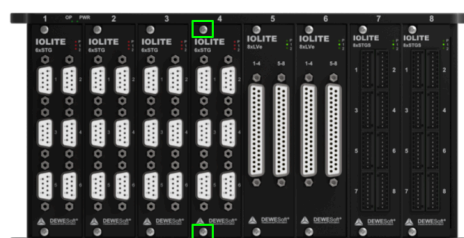
Remove the IOLITEr slice.

3



Insert the new slice by sliding it on rails.

4

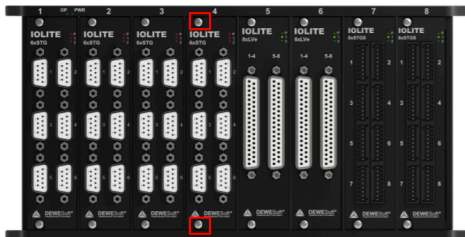


Screw two M2.5x5 TRX panhead screws.

You are ready to measure!

4.3.4.2. IOLITEr slices: Removing the slice - Instructions

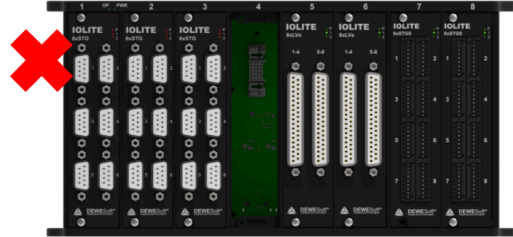
1



Turn off the device!

Unscrew two M2.5x5 TRX panhead screws.

2



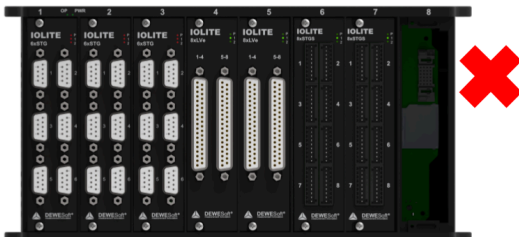
Remove the IOLITEr slice.



Important

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

3



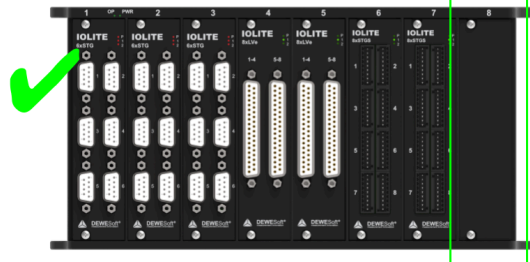
Shift the IOLITEr slices in a way that the EtherCAT chain is not broken.



Caution

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

4



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

You are ready to measure!

4.3.4.3. IOLITEr slices: Replacing the slice - DS-TOOL-IOLITEr-HANDLE

DS-TOOL-IOLITEr-HANDLE is a tool for easier removal of IOLITEr modules from IOLITE and OBSIDIAN rack chassis.



3D printed tool for easier removal of IOLITEr slices from rack systems