

TECHNICAL REFERENCE MANUAL

IOLITE® V26-1



6. Module Overview

	4xUNI	6xUNI	8xUNI	6xSTG	8xSTGS	8xLV	8xLVe
Connectors	D-SUB9, LEMO 2T 10-pin, LEMO REDEL 2P 8-pin	D-SUB9	DSUB-37	DSUB-9	Terminal block, DSUB-37	BNC, Terminal block	Terminal block, DSUB-37
Channels per module	4x	6x	8x	6x	8x	8x	8x
Data rate per channel IOLITE	40 kS/s	40 kS/s	40 kS/s	20 kS/s	20 kS/s	20 kS/s	20 kS/s
Data rate per channel OBSIDIAN	20 kS/s	20 kS/s	20 kS/s	20 kS/s	20 kS/s	20 kS/s	20 kS/s
Resolution	24-bit	24-bit	24-bit	24-bit	24-bit	24-bit	24-bit
Bandwidth	0.437*fs	0.433*fs	0.433*fs	0.49*fs	0.433*fs	0.49*fs	0.433*fs
Voltage mode ranges	±100 V, ±10 V, ±1 V, ±100 mV	±100 V, ±10 V, ±1 V, ±100 mV	±100 V, ±10 V, ±1 V, ±100 mV	±50 V, ±10 V, ±1 V, ±100 mV	✗	±100 V, ±10 V (±10 V, ±1 V on request)	±100 V, ±5 V
Input coupling	DC, AC 0.15 Hz	DC, AC 0.15 Hz	DC, AC 0.15 Hz	DC, AC 1 Hz	DC	DC	DC
Sensor excitation	0..24 V (unipolar) 0..12 V (bipolar) 0..100 mA (current) Max. 0.8 W/ch 2 mA, 4 mA, 6 mA (IEPE)	0..24 V (unipolar), 0..12 V (bipolar), 0..100 mA (current), Max. 0.6 W/chn (IOLITEr), Max. 0.8 W/chn (IOLITE) 2 mA ... 20 mA (IEPE)	0..24 V (unipolar), 0..12 V (bipolar), 0..100 mA (current), Max. 0.6 W/chn (IOLITEr), Max. 0.8 W/chn (IOLITE) 2 mA ... 20 mA (IEPE)	0..24 V (unipolar), 0..12 V (bipolar), 0..100 mA (current), Max. 0.6 W/chn (IOLITEr), Max. 0.8 W/chn (IOLITE) 2 mA ... 20 mA (IEPE)	1 V, 2 V, 5 V	✗	0..24V (unipolar)
Bridge connection	Full, ½, ¼ 350 Ω or ¼ 120 Ω (3-wire or 4-wire), ¼ CC (2-wire or 4-wire)	Full, ½, ¼ 350 Ω or ¼ 120 Ω (3-wire or 4-wire), ¼ CC (2-wire or 4-wire)	Full, ½, ¼ 350 Ω or ¼ 120 Ω (3-wire or 4-wire), ¼ CC (2-wire or 4-wire)	Full, ½, ¼ 350 Ω, ¼ 120 Ω 3-wire	Full, ½, ¼ 350 Ω, ¼ 120 Ω 3-wire, 4-wire (optional)	✗	✗
Programmable shunt	100 kΩ	100 kΩ	100 kΩ	100 kΩ	100 kΩ	✗	✗
IEPE input	✓	✓	✓	DSI-ACC ⁴	✗	✗	✗
Resistance	✓	✓	✓	✓	✗	✗	✗
Temperature (PTx)	✓	✓	✓	✓ (possible FW upgrade needed)	✗	✗	✗
Thermocouple	DSI-TH ⁴	DSI-TH ⁴	DSI-TH ⁴	DSI-TH ⁴	✗	✗	✗
Current	20 mA (internal shunt),	20 mA (internal shunt),	20 mA (internal shunt),	20 mA (internal shunt), DSI-5A,	✗	✗	✗

	external shunt, DSI-5A, DSII-10A, DSII-20A	external shunt, DSI-5A, DSII-10A, DSII-20A	external shunt, DSI-5A, DSII-10A, DSII-20A	DSII-10A, DSII-20A			
Potentiometer	✓	✓	✓	✓	✓	✗	✓
LVDT	DSI-LVDT	DSI-LVDT	DSI-LVDT	DSI-LVDT	✗	✗	✗
Charge	DSI-CHG ⁴	DSI-CHG ⁴	DSI-CHG ⁴	DSI-CHG ⁴	✗		✗
TEDS	✓	✓	✓	✓	✓ (except DB37)	✗	✓
Isolation voltage	CATII 150 V (IOLITEhi 4xUNI: CATII 1000V)	250V	250V	Differential	Differential	450 V	250 V
Isolation arrangement	Ch-Ch & Ch-GND	Ch-GND	Ch-GND	None	Ch-GND	Ch-Ch & Ch-GND	Ch-GND
Power consumption per module	Typ. 4.8 W Max. 5.5 W	Typ. 6.1 W Max. 7.3 W	Typ. 6.9 W, Max. 8.2 W	Typ. 5.4 W, Max. 11.1 W	Typ. 2.7 W, Max. 5.1 W	Typ. 2.4 W, Max. 3.5 W	Typ. 3.3 W Max. 4.2 W
Waterproof version	✓ (IP67)	✓ (IP67)	✓ (IP67)	✓ (IP67)	✓ (IP67)	✗	✓ (IP67)
Passive PoE functionality	✓ ³	✓ ³	✓ ³	✓ ³	✓	✓ ³	✓
Advanced functions	Fully isolated, high input range, connect almost any sensor, supports TEDS	High input range, connect almost any sensor, supports TEDS, high channel density	High input range, connect almost any sensor, supports TEDS, high channel density	Supports all strain types, high input range	Supports all strain types, low power consumption	High isolation, high input range	High input range, powerful sensor supply
Standalone version support in OBSIDIAN	✗	✗	✗	✗	✓	✓	✗

¹ Not supported with OBSIDIAN

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

³ Available for devices produced after September 2024.

⁴ Not supported with OBSIDIAN in Standalone mode

	16xLV	16xLV-10V	4xLV	4xHV	8xLA	16xLA	8xACC
Connectors	Terminal block	Terminal block	BANANA	Banana plug	BNC, Terminal block	Terminal block	BNC
Channels per module	16x	16x	4x	4x	8x	16x	8x
Data rate per channel IOLITE	20 kS/s	20 kS/s	40 kS/s	40 kS/s	20 kS/s	20 kS/s	40 kS/s
Data rate per channel	5 kS/s	5 kS/s	20 kS/s	20 kS/s	20 kS/s	not supported	20 kS/s

6.4. STRAIN AND STRESS MEASUREMENT

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

List of universal and strain gauge modules:

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

6.4.1. IOLITE 6xSTG

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



IOLITEr-6xSTG



IOLITE-6xSTG

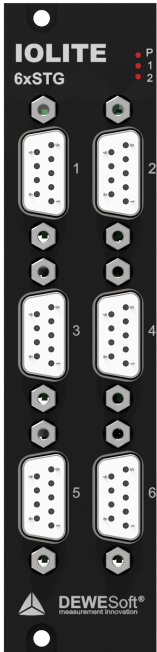
6.4.1.1. IOLITE 6xSTG: Specifications

Analog inputs				
Input type	Voltage Full / half / quarter bridge strain Current Potentiometer Resistance Temperature			
Number of channels	6			
ADC Type	24-bit OSAR with anti-aliasing filter			
Sampling Rate	Simultaneous 20 kS/s per channel (software-selectable)			
Voltage Mode				
Ranges	±50 V	±10 V	±1 V	±100 mV
Input Accuracy	±0.03 % of reading, ±0.02 % of range, ±0.1 mV			
Typical Dynamic Range @ 10 kS	-100 dB	-110 dB	-130 dB	-145 dB
Typical Noise floor @ 10 kS	-103 dB	-97 dB	-103 dB	-94 dB
Typical CMR @ 400 Hz / 1 kHz	71 dB / 66 dB	72 dB / 66 dB	96 dB / 88 dB	96 dB / 87 dB
Gain Drift	Typical 10 ppm/K (max. 40 ppm/K)			
Offset Drift	Typical 0.3 µV/K + 5 ppm of range/K, max 2 µV/K + 10 ppm of range/K			
Gain Linearity	< 0.02%			
Input Coupling	DC, AC 1Hz			
Input Impedance	Range ≥ 10 V: 1 MΩ between IN+ and IN- Range < 10 V: 20 MΩ			
Overvoltage Protection	In+ to In-: 50 V continuous, 200 V peak (10 msec)			
Max. Common Mode Voltage	±50 V (signal + common mode)		±5 V (signal + common mode)	
Current Mode				
Ranges	20 mA		2 mA	
Input Accuracy	±0.03 % of reading, ±0.02 % of range, ±2.1 µA			
Internal Shunt Resistor	50 Ω			
Analog input performance				
Bandwidth (-3 dB)	0.49*fs			
Alias-free Bandwidth	DC to 0.453*fs			
Alias Rejection	-100 dB (all sample rates)			
Delay Through ADC	37 / fs			
Oversampling	32			
Excitation Voltage				
Excitation Voltage	Free programmable (16-bit DAC)			
Predefined Levels	Bipolar: 0, 1, 2, 5, 10 and 12 VDC Unipolar: 0, 2, 5, 10, 15, 24 VDC			
Accuracy	±0.05 % ±2 mV			
Drift	±50 ppm/K ±100 µV/K			
Stability 10 % to 90 % Load	< 0.01 %			
Current Limit	42 mA (550 mW max. power)			

Protection	Continuous short to ground
Excitation Current	
Excitation Current	Free programmable (16-bit DAC)
Predefined Levels	0, 2, 4, 8, 16, 44 mA
Accuracy	±0.1 % ±2 µA (<10 mA), ±0.5 % ±5 µA (>10 mA)
Bridge measurement	
Bridge Connection Types	full bridge strain, ½ bridge strain, ¼ bridge strain (3-wire)
Ranges	2...1000 mV/V free programmable
Internal Bridge Completion	½ bridge and ¼ bridge 120 and 350 Ω
Bridge Completion Accuracy	0.05 %; TCR: 5 ppm/K (others on request)
Internal Shunt Resistor	100 kΩ (others on request)
Shunt Resistor Accuracy	0.05 %; TCR: 10 ppm/K (others on request)
Input Short, Sensor Offset Adjust	Software-selectable
Resistance measurement	
Supported ranges	50000 Ω, 10000 Ω, 3000 Ω, 1000 Ω, 100 Ω (software support)
Temperature Mode ¹	
RTD Types	PT100, PT200, PT500, PT1000, PT2000
Measurement range	-200 °C to +850 °C
Accuracy	±0.05 % of reading ±0.2 °C
Sampling Rate	Simultaneous 100 S/s
Temperature Drift	typ. ±5 ppm/K (max. ±12 ppm/K ±0.003 °C/K)
Input Connection	3-wire or 4-wire
Additional Specifications	
Input connectors	DSUB-9
TEDS support	Standard + DSI adapters
Power supply	9 - 48 V DC
Power Consumption	5.4 W, Max. 11.1 W (7.9 W 120 Ω @ 5 V load, 8.8 W 350 Ω @ 10 V load)
Weight	340 g
Slice Dimensions	128.4 x 115.4 x 30.1 mm
¹Calibration and firmware update needed	

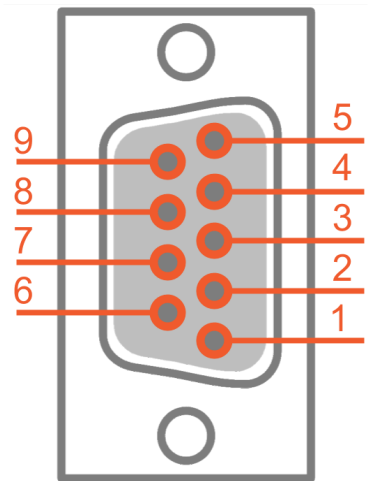
6.4.1.2. IOLITE 6xSTG: D-SUB9 Connector

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



IOLITEr-6xSTG front

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



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

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



Hint

We recommend the usage of a mating connector in the backshell part number [1478762-9](#) (TE/AMPLIMITE).

6.4.1.2.2. Waterproof version: IOLITErw-6xSTG

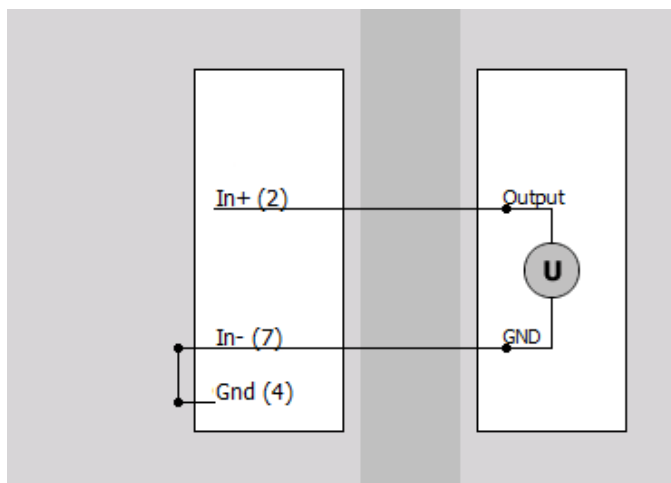
Connector on the module: DSUB9 IP67 connector (772-E09-213R011)

Mating connector: compatible with DSUB9m IP67 and standard non-waterproof connectors

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

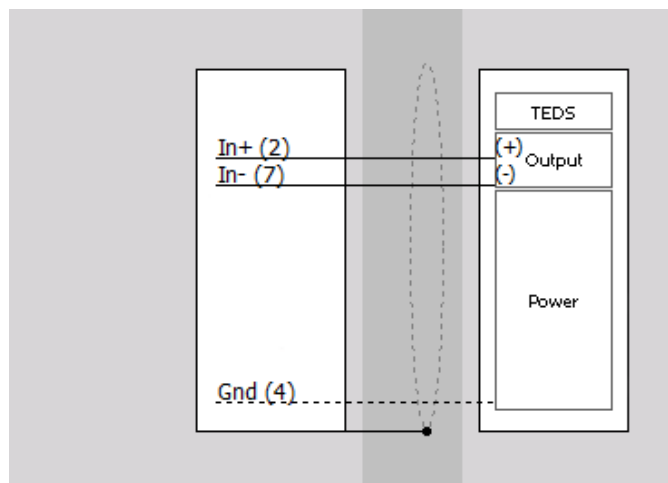
Voltage

Single ended

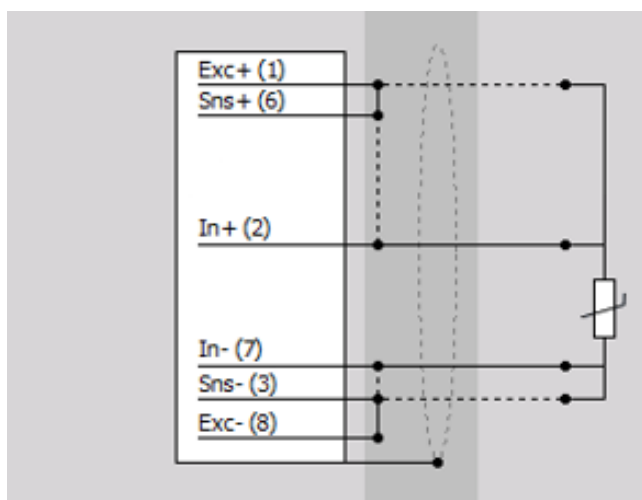


Differential

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



Temperature



6.6. VIBRATION AND SOUND MEASUREMENT

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

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

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

6.6.1. IOLITE 8xACC

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

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



IOLITEr-8xACC



IOLITE-8xACC

6.6.1.1. IOLITE 8xACC: Specifications

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

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



Note

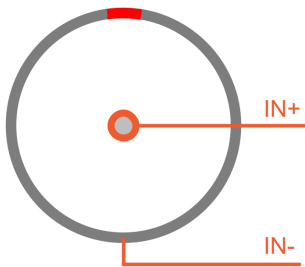
There is a sensor disconnect functionality, which shows an overload on the channels if no sensor is connected to the channel.

6.6.1.2. IOLITE 8xACC: BNC Connector



IOLITEr-8xACC

6.6.1.2.1. IOLITE 8xACC: BNC Connector: Pinout



ACC connector: pin-out (BNC)

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



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