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DEWESoft®
measurement innovation

KRYPTON

Technical Reference Manual

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1. Table of Contents

1. Table of Contents	2
2. About this document	6
3. KRYPTON	7
3.1. General specifications	8
4. KRYPTON modules	9
4.1. Overview KRYPTON Multichannel	10
4.1.1. KRYPTON Multichannel form factor	11
4.1.1.1. KRYPTON single width	11
4.1.1.2. KRYPTON dual width	12
4.2. Overview KRYPTON ONE	13
4.2.1. KRYPTON ONE form factor	14
4.3. ACC: Accelerometer	15
4.3.1. ACC: specifications	15
4.3.2. KRYPTON-4xACC	17
4.3.3. KRYPTON-8xACC	17
4.3.4. KRYPTONi-1xACC	18
4.3.5. ACC: Connectors	18
4.3.6. ACC: Wiring diagrams	19
4.3.6.1. ACC: Voltage	19
4.3.6.2. ACC: IEPE	19
4.4. AO: Analog Out	20
4.4.1. AO: specifications	20
4.4.2. KRYPTON-1xAO	21
4.4.3. AO: connectors	21
4.5. CAN: Controller Area Network	22
4.5.1. CAN: specifications	22
4.5.2. KRYPTONi-2xCAN-USB	23
4.5.3. KRYPTONi-1xCAN	23
4.5.4. CAN: connectors	23
4.6. CNT: Counter	24
4.6.1. CNT: specifications	24
4.6.2. KRYPTON-1xCNT	25
4.6.3. CNT: connectors	25
4.7. DIO: Digital Input/Output	26



4.7.1. DIO: specifications	26
4.7.2. KRYPTONi-16xDI	28
4.7.3. KRYPTONi-8xDI-8xDO	29
4.7.4. KRYPTONi-16xDO	29
4.7.5. KRYPTONi-4xDI	30
4.7.6. KRYPTONi-4xDO	30
4.7.3. DIO: connectors	31
4.7.3.1. KRYPTON Multichannel DIO modules: connectors	31
4.8. HV: High Voltage	32
4.8.1. HV: specifications	32
4.8.2. KRYPTONi-1xHV	33
4.8.3. HV: connectors	33
4.8.4. HV: wiring diagrams	34
4.8.4.1. HV: Voltage	34
4.9. LV: Low Voltage	35
4.9.1. LV: specifications	35
4.9.2. KRYPTONi-4xLV	37
4.9.3. KRYPTONi-8xLV	37
4.9.4. KRYPTONi-1xLV	38
4.9.5. LV: connectors	38
4.9.6. LV: wiring diagrams	39
4.9.6.1. LV: Voltage	39
4.10. RTD: Resistance Temperature Detector	40
4.10.1. RTD: specifications	40
4.10.2. KRYPTONi-8xRTD	41
4.10.3. RTD: connectors	41
4.10.4. RTD: wiring diagrams	42
4.10.4.1. RTD: Voltage	42
4.10.4.2. RTD: Resistance	42
4.10.4.3. RTD: Temperature (3-wire)	43
4.10.4.4. RTD: Temperature (4-wire)	43
4.11. STG: Strain Gauge	44
4.11.1. STG: specifications	44
4.11.2. KRYPTON-3xSTG	47
4.11.3. KRYPTON-3xSTG-L2B10f	47
4.11.4. KRYPTON-6xSTG	48
4.11.5. KRYPTON-6xSTG-L2B10f	48
4.11.6. KRYPTONi-1xSTG	49
4.11.7. STG: connectors	49



4.11.8. STG: wiring diagrams	50
4.11.8.1. STG: Voltage (single-ended)	50
4.11.8.2. STG: Voltage (differential)	51
4.11.8.3. STG: Full-Bridge	51
4.11.8.4. STG: Half-Bridge	52
4.11.8.5. STG: Quarter-Bridge	52
4.11.8.6. STG: Current (External direct shunt)	53
4.11.8.7. STG: Current (External loop powered shunt)	53
4.11.8.8. KRYPTONi-1xSTG: Current (Internal shunt)	54
4.11.8.8. STG: Potentiometer	54
4.12. TH: Thermocouple	55
4.12.1. TH: specifications	55
4.12.2. KRYPTONi-8xTH	57
4.12.3. KRYPTONi-16xTH	57
4.12.4. KRYPTONi-1xTH-HV	58
4.12.3. TH: connectors	58
4.12.4. TH: wiring diagrams	59
4.12.4.2. KRYPTONi-8xTH, KRYPTONi-16xTH: Voltage	59
4.12.4.2. KRYPTONi-8xTH, KRYPTONi-16xTH: Temperature (T-type thermocouple)	59
4.12.4.2. KRYPTONi-8xTH, KRYPTONi-16xTH: Temperature (S-type, R-type thermocouple)	60
4.12.4.2. KRYPTONi-8xTH, KRYPTONi-16xTH: Temperature (N-type thermocouple)	60
4.12.4.2. KRYPTONi-8xTH, KRYPTONi-16xTH: Temperature (K-type thermocouple)	61
4.12.4.2. KRYPTONi-8xTH, KRYPTONi-16xTH: Temperature (J-type thermocouple)	61
4.12.4.2. KRYPTONi-8xTH, KRYPTONi-16xTH: Temperature (E-type thermocouple)	62
4.12.4.2. KRYPTONi-8xTH, KRYPTONi-16xTH: Temperature (B-type thermocouple)	62
4.12.4.2. KRYPTONi-8xTH, KRYPTONi-16xTH: Temperature (C-type thermocouple)	63
4.12.4.2. KRYPTONi-1xTH-HV: Temperature (K-type thermocouple)	63
5. KRYPTON CPU	64
5.1. KRYPTON CPU: specifications	65
5.2. KRYPTON CPU: dimensions	66
5.3. KRYPTON CPU: accessories and cables	66
5.4. KRYPTON CPU: Dewesoft license	66
6. KRYPTON Accessories	67
6.3. KRYPTON Power Supply	67
6.1. ECAT Power Junction	67
6.2. ECAT Power Injector	68
6.4. ECAT Sync Junction	69



6.4.1 ECAT Sync Junction: Specifications	70
6.5. ECAT GPS Junction	71
6.6. KRYPTON Cables	71
7. Connection overview	72
8. Safety	72
X. Documentation version	76



2. About this document

This is the Technical Reference Manual for Krypton Version 2.0.0.

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

- A description of the system and the main combination and expansion options
- The description of the connection variants and the pin assignments on the inputs and outputs
- A comprehensive introduction to the configuration of the slices using DEWESoft software.
- Technical data

Only DEWESoft® Version X2-SP4 or higher support Krypton.

Only DEWESoft® Version X3-SP1 or higher support Krypton One.



3. KRYPTON

Rugged and distributed data acquisition modules with EtherCAT interface for analog and digital I/O and IP67 degree of protection.

Main features

DISTRIBUTED DAQ: KRYPTON DAQ modules were designed for distributed measurements to bring data acquisition closer to sensors. This introduces many advantages opposed to traditional DAQ systems. KRYPTON allows distributing DAQ units down to single channel.

ETHERCAT DAQ: EtherCAT protocol with 100Mb bus speed is used for data transmission, data synchronization, and power supply. Kryptons are connected with a single cable for data, power, and sync.

UP TO 100m BETWEEN UNITS: KRYPTON units can be distributed over the large area with the distances up to 100 meters between DAQ nodes.

RUGGED IP67: All KRYPTON modules are rugged with the IP67 degree of protection and ready for testing in extreme weather and harsh environments.

1, 3, 4, 6, 8 and 16 CHANNEL UNITS: KRYPTON DAQ modules are available in various configurations spanning from tiny single channel units up to bigger 16-channel units. Instruments can be distributed down to the single channel.

UP TO 40 kHz/CH SAMPLING RATE: Most KRYPTON ONE channel units can achieve in the EtherCAT line sampling rate up to 40 kS/second. Most KRYPTON MULTICHANNEL units can achieve in the EtherCAT line sampling rate up to 20 kS/second.

UNIVERSAL ANALOG INPUTS: Universal analog inputs are available that can accept voltage and full/half/quarter bridge signals natively as well as IEPE, charge, thermocouples, RTD, current, resistance and LVDT signals with the use of DSI adapters.

SOFTWARE INCLUDED WITH FREE LIFETIME UPGRADES: Easy to use, yet very robust in functionality, award-winning DEWESoft X3 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.



3.1. General specifications

	MULTICHANNEL	ONE
Communication		
Data interface	EtherCAT	
Data Rate	100Mbit bus speed	
Sync Accuracy	below 1 sample to Sirius®	
EtherCAT®	Max. Cable Length 100m	
Max. Throughput per Chain	600kS/s	
Max. Number of Slices	100 (additional power injectors required)	
Cabling	LEMO 1T EtherCAT® hybrid cable	
Single cable for	Power supply Data interface Synchronization	
Power specification		
Power Supply	9-48VDC	9-50VDC
Environmental specification		
Operating Temperature	-40 to 85°C	
Storage Temperature	-40 to 85°C	
Shock & Vibration	Shock: SIST EN 60068-2-27:2009 (100g, 6 ms) Random vibration (13g rms)	



4. KRYPTON modules

KRYPTON are small, rugged and modular data acquisition modules for field measurements and harsh environment.

Traditional DAQ systems are single boxes with many input channels, which means long and expensive sensor cabling is needed.

KRYPTON takes opposite approach. We kept the same advantages of other Dewesoft DAQ devices (plug and play, sensor auto-detection), but we are bringing DAQ units closer to the origin of data - near the sensors.

That greatly reduces the cost of the sensor cabling, chances of wiring errors and greatly improves the signal quality.

KRYPTON DAQ modules are extremely robust. We machine each one out of aluminium bricks and install industrial grade electronics. Units are then sealed with thermally conductive and electrically isolative rubber. As a final touch we add rubber band around KRYPTON chassis to further protect unit from the shocks. The result is IP67 degree of protection. Units are waterproof, vibration proof, and can withstand shocks up to 100G.

KRYPTON can operate in extremely harsh environments and is rated to work in temperature span from -40°C to +85°C.

Extensive testing in our laboratories ensure bulletproof quality and worry-free testing under extreme conditions.

KRYPTON DAQ modules are designed to be as small as possible and very flexible. Their small size allows them to fit perfectly in tight places and can be placed near the sensors. This results in short sensor cables which will not only save cost but also improve the signal quality.



4.1. Overview KRYPTON Multichannel

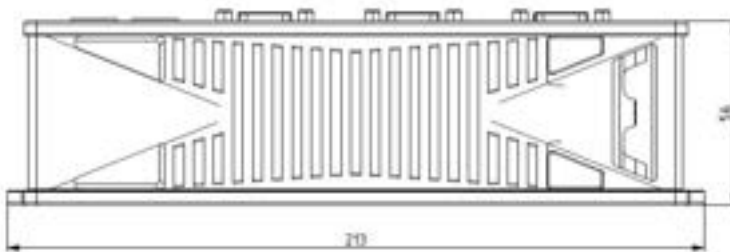
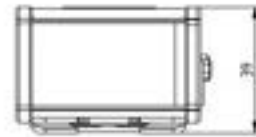
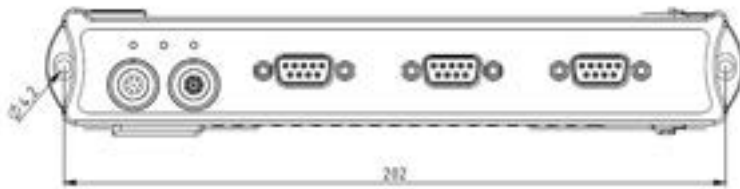
	STG	TH	RTD	ACC	LV	DIO
Connectors	DB9, L2B10f	Thermocouple	L0B6f	BNC	BNC	DB25
#ch per module	3x, 6x	8x, 16x	8x	4x, 8x	4x, 8x	16xDI, 16xDO 8xDI, 8xDO
Data rate / channel	20 kHz	100 Hz	100 Hz	20 kHz	20 kHz	20 kHz
Resolution	24 bit					digital
Bandwidth	0.49 fs	?	?	0.49 fs	0.49 fs	-
Voltage ranges	±10V, ±1V, ±100mV, ±10mV	1V, 100 mV	1V, 100 mV	10V, 5V,1V,200mV	±50 V	CMOS compatible
Input coupling	DC	DC	DC	DC, AC 0.1Hz, 1Hz	DC	
Sensor excitation	0...15 V max. 0.4W/ch (45mA limit)	-	-	IEPE 4 mA, 8 mA	-	?
Bridge connection	Full, ½, ¼ 350Ω, ¼ 120Ω 3 wire	-	-	-	-	
Programmable shunt	100 kΩ	-	-	-	-	
IEPE input	DSI-ACC	-	-	✓	-	
Resistance	DSI20mA, DSI5A	-	10kΩ	-	-	
Temperature (PTx)	DSI-RTD	-	PT100, 200, 500, 1000, 2000	-	-	
Thermocouple	DSI-TH	K, J, T, R, S, N, E, C, B	-	-	-	
Potentiometer	✓	-	-	-	-	
LVDT	DSI-LVDT	-	-	-	-	
Charge	DSI-CHG	-	-	-	-	
Current	ext. shunt	-	-	ext. shunt	-	
TEDS	✓	-	-	✓	-	
Isolation voltage	Differential	1000 V	1000 V	Differential	1000 V	250 V
Power consumption per module	2.4W (4W 120Ω @ 5V load) 3xSTG; 5.9W (8.9W 120Ω @ 5V load) 6xSTG	2.5 W (8xTH) 4 W (16xTH)	2.5 W	4.6 W	3.5 W (4xLV) 6.7W (8xLV)	2 W
Advanced functions	Supports all strain types and high input range	High voltage, high isolation	High voltage, high isolation	Sensor error detection, high dynamic range	High sensor power and multi range	



4.1.1. KRYPTON Multichannel form factor

4.1.1.1. KRYPTON single width

KRYPTON - single

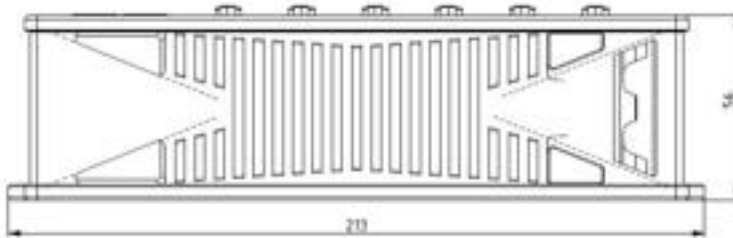
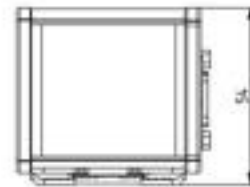
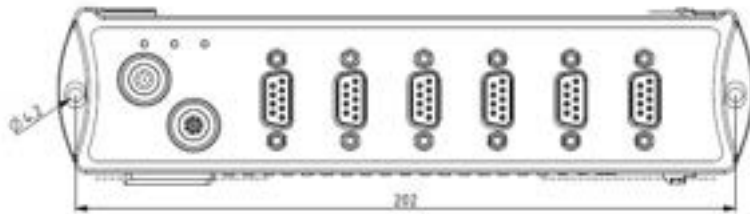


All dimensions are in mm.



4.1.1.2. KRYPTON dual width

KRYPTON - dual



All dimensions are in mm.

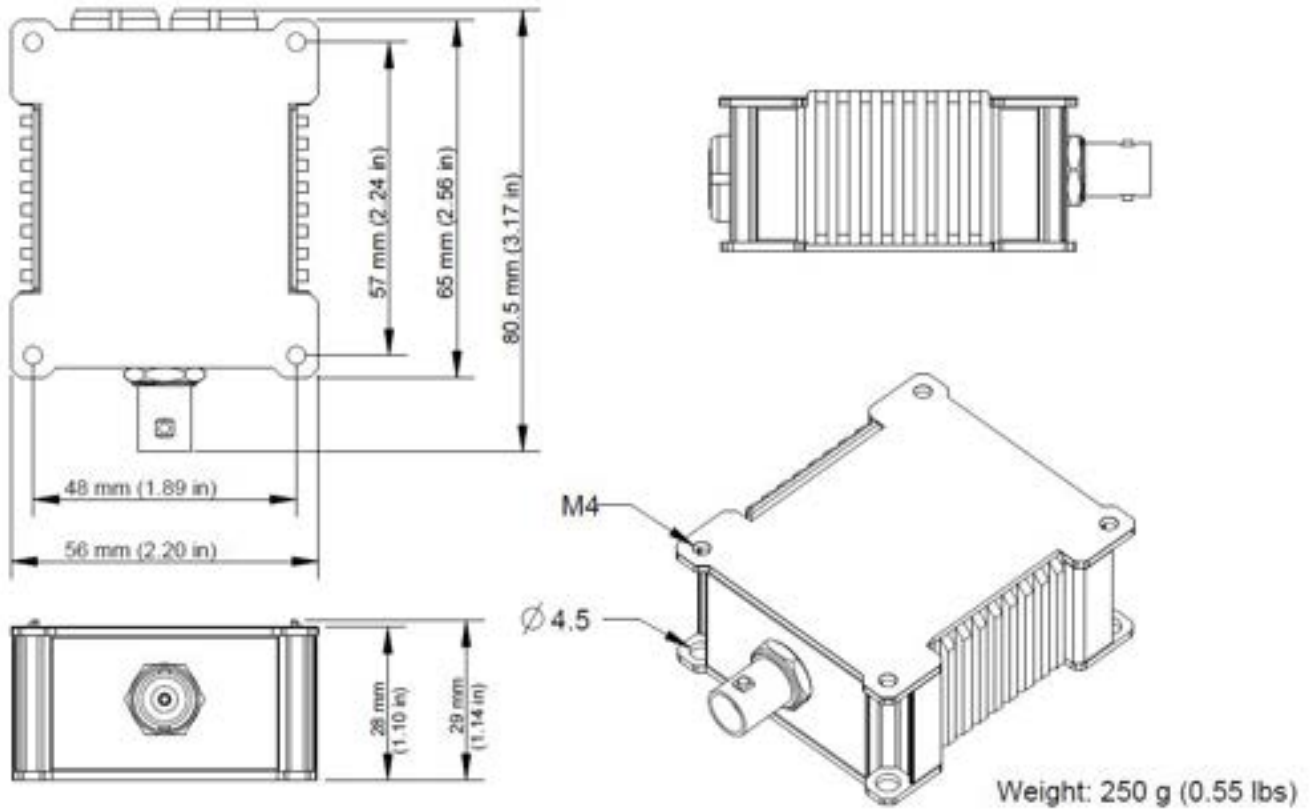


4.2. Overview KRYPTON ONE

	AO	DI	DO	ACC	STG	LV	HV	TH-HV	CNT
Connectors	BNC	DSUB15HD Male	DSUB15HD Female	BNC	DB9	BNC	Banana jack	Thermo- couple	L1T7f
#ch per module	1	4	4	1	1	1	1	1	1
Data rate / channel	1000Hz	40 kHz	40 kHz	40 kHz	40 kHz	40 kHz	40 kHz	100Hz	100Hz
Data interface	EtherCAT, 100 Mbit/s								
Data interface connectors	Lemo 1T (1 cable for data, power and sync, daisy chainable)								
Resolution	18 bit	digital	digital	24 bit	24 bit	24 bit	24 bit		
Bandwidth	Analog 50kHz			0.49*fs	0.49*fs	0.49*fs	0.49*fs		
Voltage ranges	±10V	5V ±10% 12V ±10%		±10V ±5V ±1V ±200mV	±50V ±10V ±1V ± 100mV	±50V ±10V ±1V ±100mV	±1000V		
Power supply	9 -50 V	9 -50 V	9 -50 V	9 -50 V	9 -50 V	9 -50 V	9 -50 V	9 -50 V	9 -50 V
Power consumption	2W	1.5W	2W	2W	3W	1.5W	1W	1.3W	1.2W
Temperature range	-40 to 85°C	-40 to 85°C	-40 to 85°C	-40 to 85°C	-40 to 85°C	-40 to 85°C	-40 to 85°C	-40 to 85°C	-40 to 85°C
Storage temperature	-40 to 85°C	-40 to 85°C	-40 to 85°C	-40 to 85°C	-40 to 85°C	-40 to 85°C	-40 to 85°C	-40 to 85°C	-40 to 85°C
Dimension	62x56x29 mm	62x56x29 mm	62x56x29 mm	62x56x29 mm	62x56x29 mm	62x56x29 mm	62x56x36 mm	62x56x36 mm	62x56x29 mm
Weight	250 g	250 g	250 g	250 g	250 g	250 g			250g



4.2.1. KRYPTON ONE form factor



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4.3. ACC: Accelerometer

The ACC modules have BNC input connectors and are perfect for sound and vibration IEPE channels.

4.3.1. ACC: specifications

KRYPTON-4xACC, 8xACC

Analog inputs				
Input type	Voltage, IEPE			
Number of channels	4 (4xACC), 8 (8xACC)			
ADC Type	24bit delta-sigma with anti-aliasing filter			
Sampling Rate	Simultaneous 20kS/sec per channel (software-selectable)			
Voltage Ranges	±10V	±5V	±1V	±200mV
Input Accuracy	±0.03% of reading ±0.02% of range ±0.2mV			
Offset Accuracy after Balance Amplifier	0.048 mV	0.024 mV	0.0049 mV	0.0017 mV
Typical Dynamic Range@10kS	-140 dB	-137 dB	-138 dB	-134 dB
Typical noise floor@10kS	-109,43 dB	-109,46 dB	-109,54 dB	-104,64 dB
Type. THD (20 kS/s, -1 dBFS sine wave @1 kHz)	-94,72 dB	-94,49 dB	-93,98	-95,32 dB
Type. SFDR (10 kS/s, -1 dBFS sine wave @1 kHz)	96,84 dB	96,83 dB	96,56 dB	93,77 dB
Gain Drift				
Offset Drift				
Gain Linearity				
Input Coupling	DC, AC 0.1Hz, 1Hz			
Input Impedance	1 MΩ			
Oversampling	32			
Overtolerance Protection	In+ to In-: 50V continuous, 200V peak (10msec)			
Analog input performance				
Bandwidth (-3dB)	0.49 fs			
Alias-free Bandwidth	DC to 0.453 fs			
Alias Rejection	-100dB (all sample rates)			
Delay Through ADC	37 / fs			
Oversampling	32			
IEPE input				
Excitation	4 mA, 8 mA			
Compliance voltage	25 Volt			
Output Impedance	>100 kΩ			
Sensor detection	Shortcut: <4Volt; Open: > 19Volt			
Additional Specifications				
Input connector	BNC			



TEDs support	IEPE mode only	
Environmental rating (see 1)	IP67	
Amplifier type	4xACC	8xACC
Power Consumption	3 W	4,56 W
Weight	700g	1000g
Slice Dimensions	213x39x56 mm	213x54x56mm
Dimensions with Connectors	213x39x66.8 mm	213x54x66.8 mm

KRYPTONi-1xACC

Analog inputs				
Input types	Voltage, IEPE			
Number of channels	1 (isolated)			
ADC Type	24bit SAR with anti-aliasing filter			
Sampling Rate	Simultaneous 40kS/sec per channel (software-selectable)			
Voltage Ranges	±10V	±5V	±1V	±200mV
Typ. Input Accuracy	±0.03% of reading ±0.02% of range ±0.1mV			
Offset Accuracy after Balance Amplifier	0.1mV	0.03mV	0.01mV	0.001mV
Typ. SNR (10 kS/s, -1 dBFS sine wave @1 kHz)	90 dB	90 dB	89 dB	88 dB
Type. SFDR (10 kS/s, -1 dBFS sine wave @1 kHz)	113 dB	110 dB	109 dB	106 dB
Typ. Noise floor@10kS	-100 dB	-99 dB	-99 dB	-98 dB
Typical CMR @ 400Hz/1kHz	-130/-120 dB	-122/-119 dB	-104/-97 dB	-90/-84 dB
Gain Drift	typ. 10ppm/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			
Isolation	125 Vrms channel to ground isolation			
Overvoltage Protection	In+ to In-: 50V continuous, 200V peak (10msec)			
Analog input performance				
Bandwidth (-3dB)	0.49 fs			
Alias-free Bandwidth	DC to 0.453 fs			
Alias Rejection	-100dB (all sample rates)			
Delay Through ADC	37 / fs			
Oversampling	32			
IEPE input				
Excitation	4 mA, 8 mA			
Compliance voltage	24 V			
Output Impedance				

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Sensor detection	Shortcut: <4V; Open: > 19V
Additional Specifications	
Input connector	BNC
TEDs support	IEPE mode only
Environmental rating (see 1)	IP67
Power Consumption	2 W
Weight	250 g
Dimensions	62x56x29 mm

1) Depending on the mating connector types

4.3.2. KRYPTON-4xACC

KRYPTON-4xACC module has 4 BNC connectors for voltage and IEPE measurements.

CAUTION: Inputs are single ended, isolated sensors must be used.



4.3.3. KRYPTON-8xACC

KRYPTON-8xACC module has 8 BNC connectors for voltage and IEPE measurements.

CAUTION: Inputs are single ended, isolated sensors must be used.





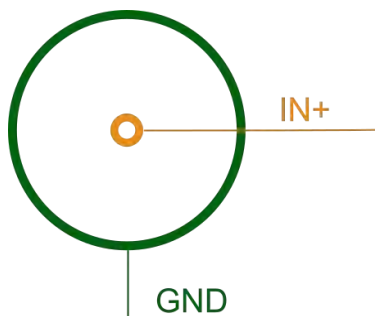
4.3.4. KRYPTONI-1xACC

Single channel isolated KRYPTON module with IEPE and voltage inputs. KRYPTONI-1xACC has BNC connector.



4.3.5. ACC: Connectors

BNC

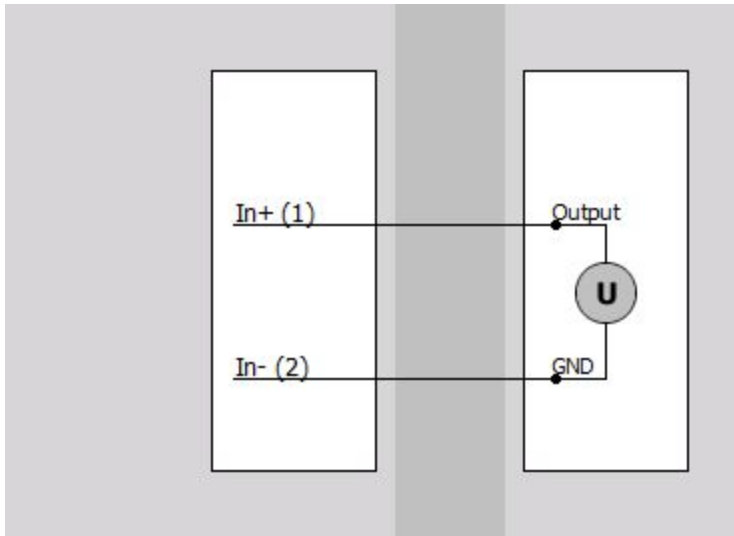


Pin	Name	Description
1	In+	Input+
2	In-	Input-

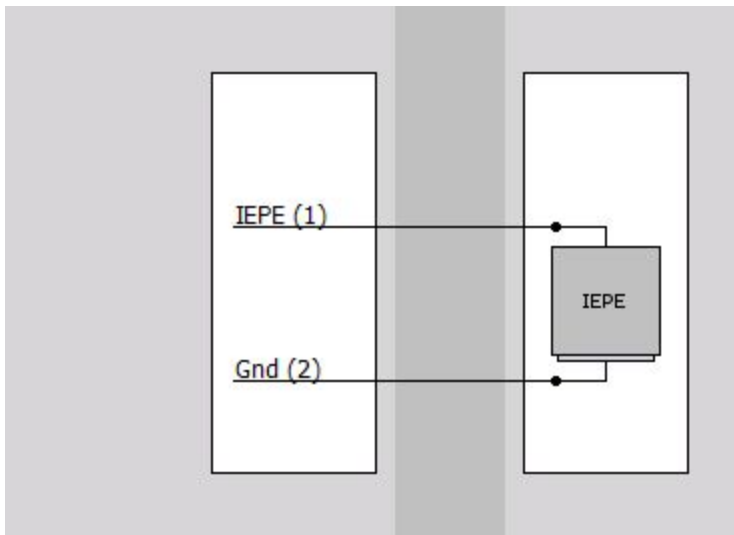


4.3.6. ACC: Wiring diagrams

4.3.6.1. ACC: Voltage



4.3.6.2. ACC: IEPE





4.4. AO: Analog Out

Single channel analog output module has BNC connector and is perfect module for sensor external excitation.

4.4.1. AO: specifications

KRYPTON-1xAO

Analog output specification	
DAC Resolution	18 bit
Sampling Rate	1000 S/sec
Number of channels	1
Full Scale Output Range	±10 V
Analog bandwidth	50 kHz
Accuracy (typ.)	0.1%±1mV (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 Ohm DC
Maximum output current	20 mA
Settling time (0.05% of set value)	30 us @ 1000 Ohm load, -10 V to 10 V step
Max slew rate	2.5 V/us @ 1000 Ohm load
Max capacitive load (2% overshoot)	10 nF
Maximum load	500 Ohm
Output protection	Short circuit protected
Additional Specifications	
Output connector	BNC
Environmental rating (see 1)	IP67
Power consumption (typ.)	2 W
Weight	250 g
Dimensions	62x56x29 mm

1) Depending on the mating connector types

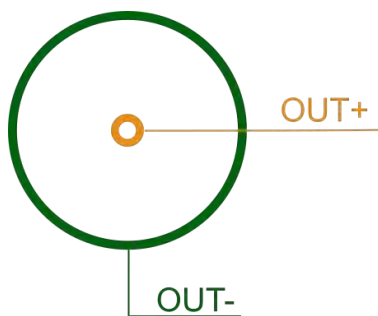


4.4.2. KRYPTON-1xAO



4.4.3. AO: connectors

BNC



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



4.5. CAN: Controller Area Network

KRYPTON CAN interfaces are intended for CAN acquisition in harsh environment. KRYPTON CAN devices support OBDII, J1939 standard protocols and can output CAN messages.

4.5.1. CAN: specifications

KRYPTONi-2xCAN-USB, 1xCAN

	KRYPTONi-2xCAN USB	KRYPTONi-1xCAN
CAN ports specification		
Number of ports	2	1
Interface type	CAN 2.0B	CAN 2.0B
Interface data rate	up to 1 Mbit/sec	up to 1 Mbit/sec
Special protocols	OBDII, J1939, CAN out	OBDII, J1939, CAN out
Sampling rate	> 10 kHz per channel Software selectable	
Galvanic isolation (Sensor supply not isolated)	Isolated	Isolated
Bus pin fault protection	±36 V	
Power specification		
Power supply	6 - 50 V DC Startup voltage 7V	9 - 50 V DC
Maximum sensor power consumption	5 W max total (max 3W on 15V)	
Maximum power consumption	5.5 W	
Environmental specification		
Interface	USB 2.0	EtherCAT, 100 Mbit/s Lemo 1T (1 cable for data, power and sync, daisy chainable)
Connector type	9 pin D-SUB	9 pin D-SUB
Physical dimensions	213x54x56 mm (slice) 213x54x71 mm (with connectors)	62x56x29 mm
Weight	1050 g 2.30 lbs	200 g 0.44 lbs
Operating temperature	-20°C to +60°C	-40°C to +85°C
Storage temperature	-40°C to +70°C	-40°C to +70°C
Humidity	-	-
IP protection	IP65 / IP67	IP65 / IP67



4.5.2. KRYPTONI-2xCAN-USB

KRYPTONI-2xCAN-USB has 2 CAN ports and it uses USB 2.0 as an interface.

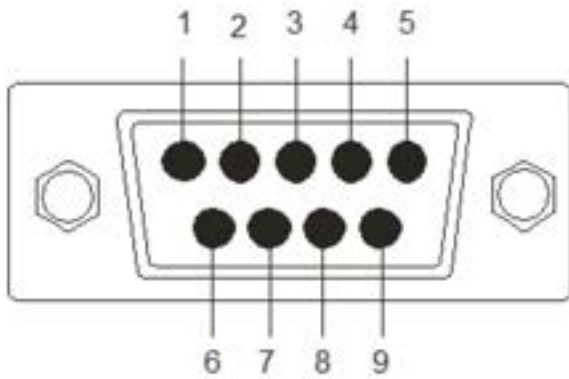


4.5.3. KRYPTONI-1xCAN

KRYPTONI-1xCAN is a single port CAN device that uses EtherCAT as an interface.

4.5.4. CAN: connectors

DSUB-9



Pin	Name	Description
1	+5V	5V supply max. current: 500mA
2	CAN_LOW	CAN low
3	DGND	Digital Ground
4	RES	Reserved
5	RES	Reserved
6	DGND	Digital Ground
7	CAN_HIGH	CAN high
8	RES	Reserved
9	+12V	12supply max. current: 200mA



4.6. CNT: Counter

Single channel KRYPTON counter module utilizes a patented technology called SUPERCOUNTER® in every of its counter/encoder inputs and in smallest possible form. It supports counting, waveform timing, encoder, tacho, gear-tooth sensor.

4.6.1. CNT: specifications

KRYPTON-1xCNT

Counter	
Number of channels	1
Timebase	100 MHz
Time base accuracy Typical	Typical: 5 ppm, Max: 20 ppm
Max. bandwidth	10 MHz
Input Filter	500 ns, 1µs, 2µs, 4µs, 5µs and 7.5µs
Input Level Compatibility	TTL (Low: <0.8, High > 2V)
Input impedance	100kΩ pull-up to +3.3V
Input Protection	±25Volt continuous
Sensor supply	5V/100mA, 12V/10mA
Additional Specifications	
Input connector	7-pin LEMO 1T series
Environmental rating	IP67
Amplifier type	
Power consumption	1,2 W
Weight	250 g
Dimensions	62x56x29 mm



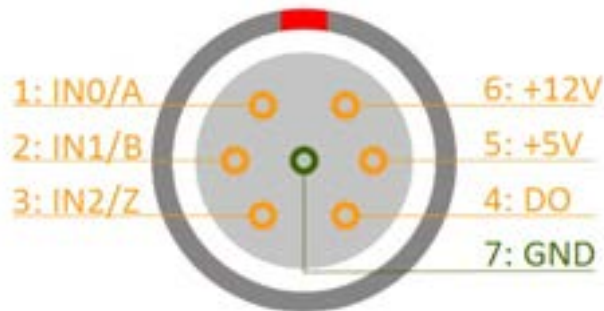
4.6.2. KRYPTON-1xCNT

KRYPTON-1xCNT has LEMO 7-pin L1T7f connector .



4.6.3. CNT: connectors

LEMO L1T7f



Mating connector: FGG.1T.307.CLAC45

Pin	Name	Description
1	IN0/A	Input A
2	IN1/B	Input B
3	IN2/Z	Input Z
4	GND	Ground
5	+5V	5V supply max. current: 100mA
6	+12V	12V supply max. current: 10mA
7	GND	Ground



4.7. DIO: Digital Input/Output

KRYPTON digital input/output modules are perfect choice for control applications.

4.7.1. DIO: specifications

KRYPTONi-16xDI, 8xDI-8xDO, 16xDO

	16xDI	8xDI-8xDO	16xDO
Digital Input			
Isolated Input Channels	16	8	-
Compatibility	CMOS Configuration		-
Input low level	UIN < 0.8V		-
Input high level	UIN > 2.4V		-
Input high current @5V	UIN < 1.8 mA		-
Input high current @30V	UIN < 6 mA		-
Propagation delay	< 1 µsec		-
Sampling rate	Simultaneous 20kS/sec		-
Overvoltage protection	40V continuous (65V peak)		-
Isolation voltage peak	250V channel/ground & channel/channel		-
Digital Output			
Isolated Output Channels	-	8	16
Compatibility	-	Open collector with 10kΩ pull-up to +5V	
Maximum sink current	-	150mA (not protected)	
Maximum switching voltage	-	50V	
Propagation delay	-	< 20µsec	
Maximum update rate	-	depending on EtherCAT master	
Isolation voltage peak	-	250V channel to ground, no channel to channel isolation	
General Specifications			
Environmental rating	IP67		
Power consumption	2 W		
Weight	700 g		
Slice Dimensions	213x39x56 mm		
Dimensions with Connectors	213x39x58.2mm		



KRYPTONI-4xDI

Inputs	
Input type	Digital
Input Channels	4
Compatibility	TTL / CMOS Voltage Levels
Input low level	$U_{IN} < 1 \text{ V}$
Input high level	$U_{IN} > 2 \text{ V}$
Input high current @5 V U_{IN}	3 mA typ.
Input high current @ 30 V U_{IN}	6 mA typ.
Propagation delay	< 1 us
Max. sampling rate	20 kS/sec
Overvoltage protection	30 V Continuous, 65 V peak
Isolation voltage	Functional Isolation CH-CH and CH-GND
Non-Isolated Power Supply	
Output Voltage +5 V	5 V +/- 10 %
	300 mA max. (see 1)
Output Voltage +12 V	12V +/-10 %
	100 mA max. (see 1)
Output Voltage +Vecat	EtherCAT Bus Supply Voltage
	200 mA max. (see 1)
Additional Specifications	
Connector	DSUB15HD Male
Power consumption	1.5 W typ.
Weight	250 g
Dimensions	62x56x29 mm

1) Max. combined load on +5V and +12V pins: 1.5 W reduced by the load already present on +Vin pin



KRYPTONi-4xDO

Digital output specifications	
Number of output channels	4
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	galvanically isolated channel-ground
Non-isolated power supply (front connector) specifications	
Output voltage +5V	5V +/-10%
	300 mA max. (see 1)
Output voltage +12V	12V +/-10%
	100 mA max. (see 1)
Output voltage +Vin	Vin
	200 mA max. (see 1)
Additional Specifications	
Front connector	DSUB15HD Female
Power consumption	2 W typ.
Weight	250 g
Dimensions	62x56x29 mm

1) Max. combined load on +5V and +12V pins: 1.5 W reduced by the load already present on +Vin pin

4.7.2. KRYPTONi-16xDI

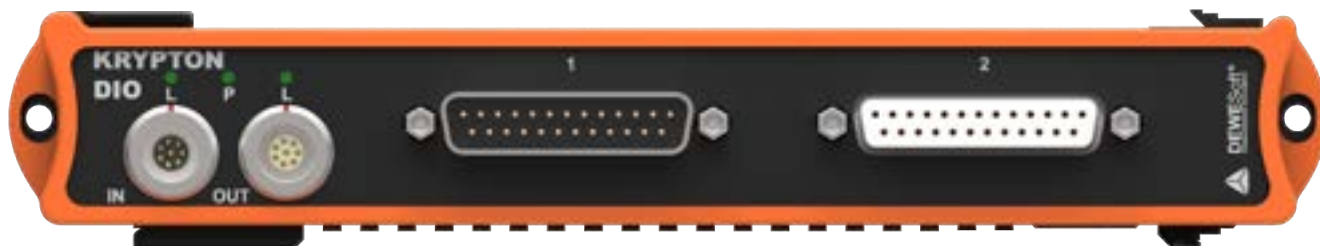
KRYPTONi-16xDI module has 16 digital input channels: 8 on each of the two 25-pin DSUB male connectors.





4.7.3. KRYPTONi-8xDI-8xDO

KRYPTONi-8xDI-8xDO module has 8 digital input channels (25-pin DSUB male connector) and 8 digital output channels (25-pin DSUB female connector).



4.7.4. KRYPTONi-16xDO

KRYPTONi-16xDO module has 16 digital output channels: 8 on each of the two 25-pin DSUB female connectors.





4.7.5. KRYPTONI-4xDI

Single channel isolated KRYPTON module with 4 digital inputs and power supply on the front 15-pin DSUB male connector.



4.7.6. KRYPTONI-4xDO

Single channel isolated KRYPTON module with 4 digital outputs and power supply on the front 15-pin DSUB female connector. Output type is open collector with max 2 A sink current.





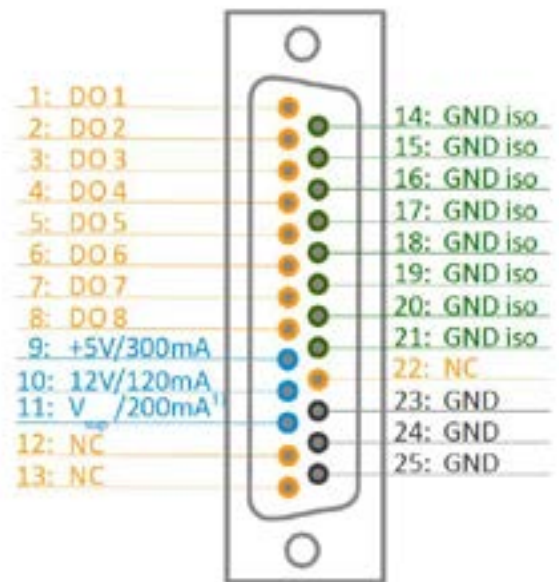
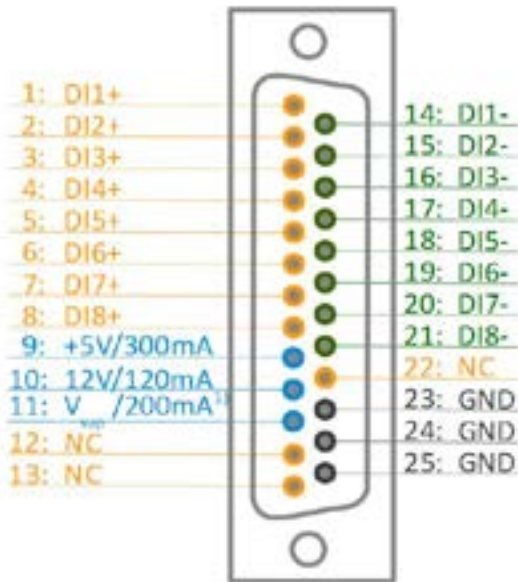
4.7.3. DIO: connectors

4.7.3.1. KRYPTON Multichannel DIO modules: connectors

DSUB-25

Digital input: DSUB-25 male

Digital output: DSUB-25 female





4.8. HV: High Voltage

Single channel high voltage input DAQ device. Isolation category is CATII 1000V.

4.8.1. HV: specifications

Analog Input	
Input types	Voltage
Number of channels	1 (isolated)
ADC Type	24bit SAR with anti-aliasing filter
Sampling Rate	40kS/sec (software-selectable)
Input range	±1000V
Input accuracy	
Offset Accuracy after Balance Amplifier	0.015V
Typ. Noise floor@10kS	-102.8dB
Typ. Noise floor@40kS	-96.8dB
Typ. CMR @ 400Hz/1kHz	
Gain Drift	
Offset Drift	
Gain Linearity	
Inter-channel Phase Mismatch	
Input Coupling	DC
Input Impedance	10M
Protection class	CAT III 600 V; CAT II 1000 V
Overvoltage Protection	+2 KVpeak
Analog input performance	
Bandwidth (-3dB)	0.49 fs
Alias-free Bandwidth	DC to 0.453 fs
Alias Rejection	-100dB (all sample rates)
Delay Through ADC	37 / fs
Oversampling	32
Additional Specifications	
Input connector	4mm safety banana jack
TEDS support	Not available
Power Consumption	1W
Weight	
Dimensions	62x56x36 mm



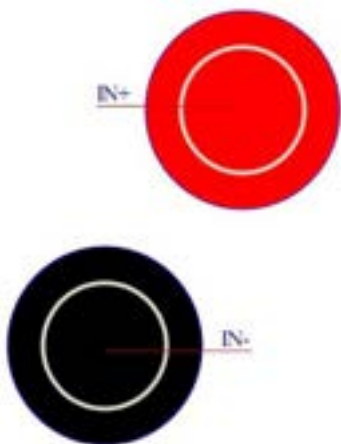
4.8.2. KRYPTONI-1xHV

KRYPTONI-1xHV has banana front connector for high voltage measurement.



4.8.3. HV: connectors

BANANA

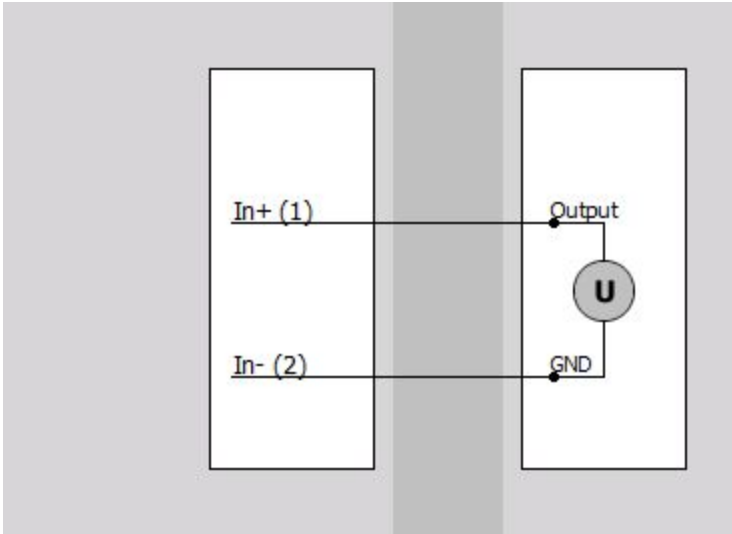


Pin	Name	Description
1	In+	Input+
2	In-	Input-



4.8.4. HV: wiring diagrams

4.8.4.1. HV: Voltage





4.9. LV: Low Voltage

KRYPTON LV modules are rugged isolated DAQ devices for low voltage measurements.

4.9.1. LV: specifications

KRYPTONi-4xLV, 8xLV

Analog input	
Input type	Isolated voltage
Number of channels	4 (4xLV) 8 (8xLV)
ADC Type	24-bit oversampled SAR with 41 kHz anti-aliasing filter
Sampling Rates	Simultaneous 20k, 10k, 5k, 2k, 1k, 500, 200, 100 S/s (software-selectable)
Voltage Range	±50 V
Accuracy	±0.03% of reading ±5 mV
Offset Accuracy after Balance Amplifier	0,15 mV
Typ. SNR (10 kS/s, -1 dBFS sine wave @1 kHz)	104dB
Typical noise floor@10kS	-110,4 dB
Type. THD (10 kS/s, -1 dBFS sine wave @1 kHz)	-104,9 dB
Type. SFDR (10 kS/s, -1 dBFS sine wave @1 kHz)	105,5 dB
Typical CMR@400Hz/1kHz	105dB/94dB
Gain Drift	Typical 10 ppm/K, max. 20 ppm/K
Offset Drift	Typical 5µV/K, 10µV/K
Gain Linearity	<0.01%
Inter-channel Phase Mismatch	$0.02^\circ * Fin[kHz] + 0.1^\circ$
Input Coupling	DC
Input Impedance	1 MΩ
Noise	0.7mVRMS
Overvoltage Protection	In+ to In-: 200V continuous, 350Vpeak(100msec)
Analog input performance	
Bandwidth (-3dB)	0.49 fs
Alias-free Bandwidth	DC to 0.453 fs
Alias Rejection	-100dB (all sample rates)
Delay Through ADC	37 / fs
Oversampling	32
Additional Specifications	
Input Connector	BNC
Isolation Voltage	1000 Vpeak channel/ground & channel/channel



Environmental Rating (see 1)	IP67	
Amplifier type	4xLV	8xLV
Power Consumption	3.8 Watt	6.8 Watt
Weight	700g	1000g
Slice Dimensions	213x39x56 mm	213x54x56mm
Dimensions with Connectors	213x39x66.8mm	213x54x66.8mm

1) Depending on the mating connector types

KRYPTONi-1xLV

Analog inputs				
Input types	Voltage			
Number of channels	1 (isolated)			
ADC Type	24bit SAR with anti-aliasing filter			
Sampling Rate	Simultaneous 40kS/sec per channel (software-selectable)			
Voltage Ranges	±50V	±10V	±1V	±100mV
Input Accuracy	±0.03% of reading, ±0.02% of range, ±0.1mV			
Offset Accuracy after Balance Amplifier		0.11 mV	0.01 mV	0.0014 mV
Typical SNR @ 10kS/s	96.97 dB	96.15 dB	94.10 dB	88.69 dB
Typical Dynamic Range@10kS	-130 dB	-132 dB	-137 dB	-138 dB
Typical Noise floor@10kS	-108.3 dB	-102.6 dB	-107.2 dB	-100.1 dB
Typical CMR @ 400Hz/1kHz				
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	1MΩ		20MΩ	
Isolation				
Overvoltage Protection	200V		50V	
Analog input performance				
Bandwidth (-3dB)	0.49 fs			
Alias-free Bandwidth	DC to 0.453 fs			
Alias Rejection	-100dB (all sample rates)			
Delay Through ADC	37 / fs			
Oversampling	32			
Additional Specifications				
Input connector	BNC			
Environmental rating	IP67			

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Power Consumption	1.5W
Weight	250 g
Dimensions	62x56x29 mm

4.9.2. KRYPTONi-4xLV

KRYPTONi-4xLV has 4 BNC input connectors for voltage measurement.



4.9.3. KRYPTONi-8xLV

KRYPTONi-8xLV has 8 BNC input connectors for voltage measurement.





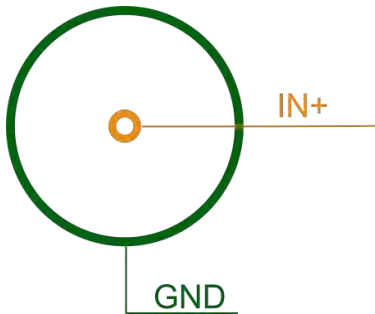
4.9.4. KRYPTONI-1xLV

KRYPTONI-1xLV is a single channel low voltage module with BNC connector.



4.9.5. LV: connectors

BNC

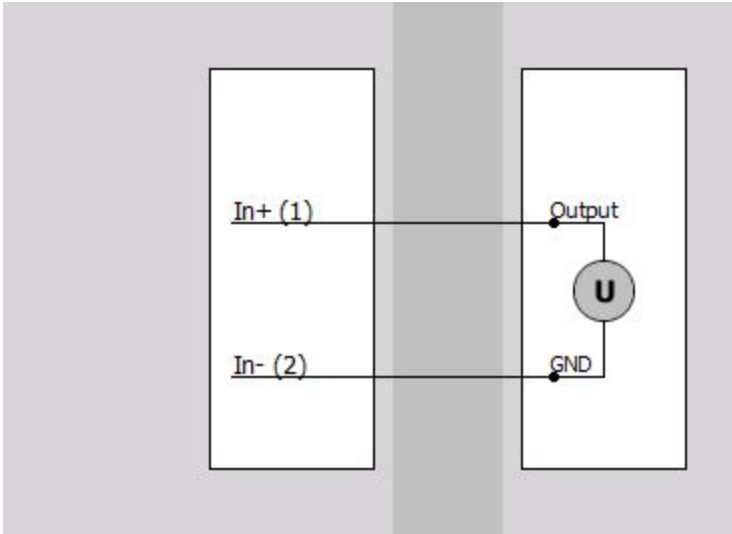


Pin	Name	Description
1	In+	Input+
2	In-	Input-



4.9.6. LV: wiring diagrams

4.9.6.1. LV: Voltage





4.10. RTD: Resistance Temperature Detector

KRYPTON 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.

4.10.1. RTD: specifications

KRYPTONi-8xRTD

Analog inputs		
Input types	voltage, resistor or universal Ptxxx inputs	
Number of channels	8 (8xRTD)	
ADC Type	24bit delta-sigma	
Sampling Rate	Simultaneous 100 S/sec	
Voltage Ranges	±1V	±100mV
Input Accuracy	±0.02% of reading ±10 µV	±0.02% of reading ±10 µV
Typical SNR@10/100 s/sec	108/98 dB	108/98 dB
Gain Drift	Typical 3 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	1MΩ	
Temperature Thermistor types	PT100, PT200, PT500, PT1000, PT2000	
Accuracy	±0.05% of reading ±0.2 °C	
Resolution	<0.001°C	
Resistance	0...10kΩ	0...1kΩ
Accuracy	±0.02% of reading ±0.01% of range	
Input Connection	3 wire or 4 wire	
Resolution	<0.001 °C	
Additional Specifications		
Input connector	Lemo 0B 6pin EEA.0B.306.CLN	
Isolation voltage	1000 V _{peak} channel/ground & channel/channel	
Environmental rating (see 1)	IP65	
Power consumption	2.5 W	
Weight	720 g	
Dimensions	213x39x56 mm	

1) Depending on the mating connector types

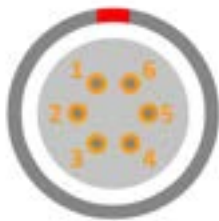


4.10.2. KRYPTONi-8xRTD



4.10.3. RTD: connectors

LEMO L0B6f



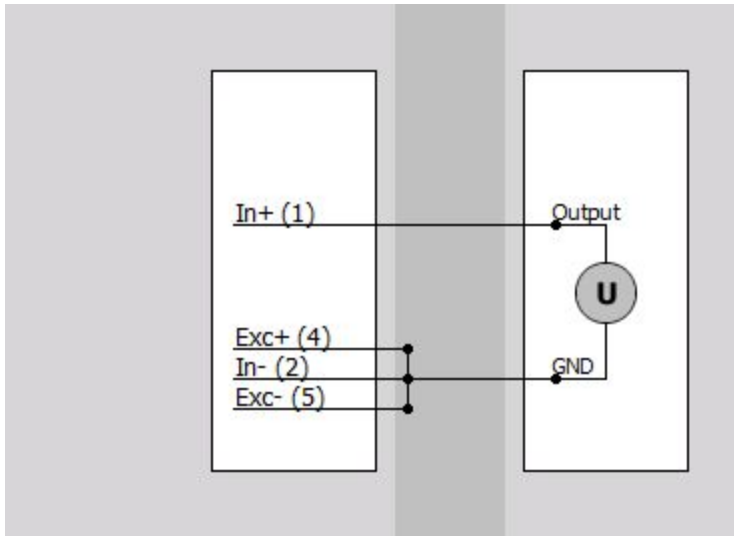
Mating connector: FGA.0B.306.CLAD21Z

Pin	Name	Description
1	In+	Input+
2	In-	Input-
3	Res	Do not connect
4	EXC+	Excitation+
5	EXC-	Excitation-
6	GND	Ground Isolated

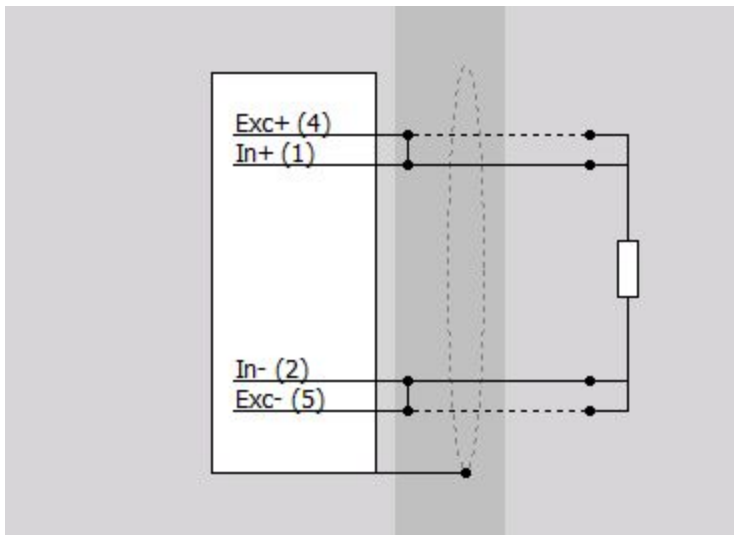


4.10.4. RTD: wiring diagrams

4.10.4.1. RTD: Voltage

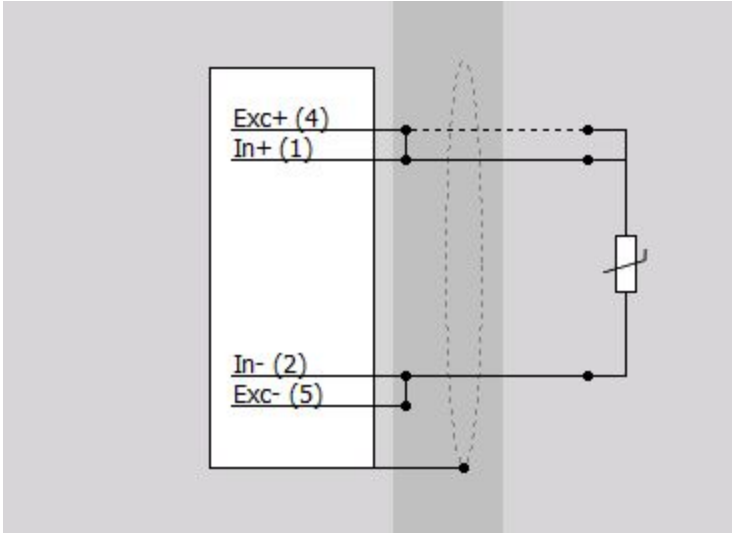


4.10.4.2. RTD: Resistance

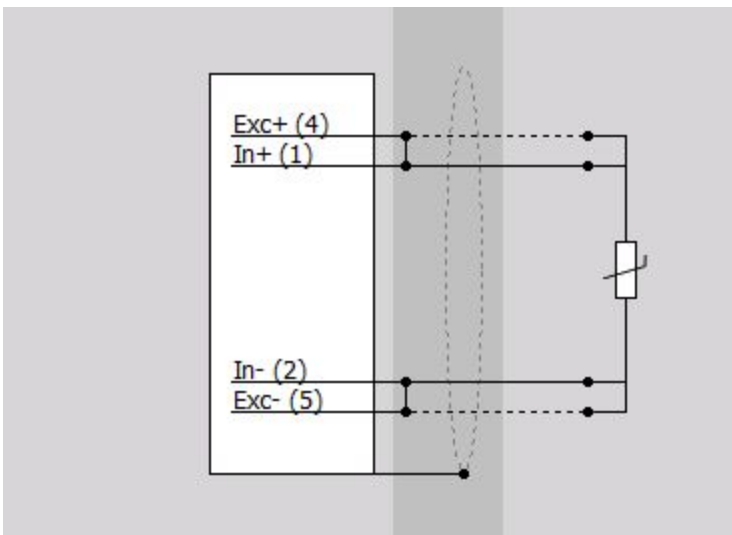




4.10.4.3. RTD: Temperature (3-wire)



4.10.4.4. RTD: Temperature (4-wire)





4.11. STG: Strain Gauge

KRYPTON STG modules have universal differential voltage and Full/Half/Quarter bridge input. STG modules are available in 1, 3 and 6 channel configurations and are compatible with DSI adapters.

4.11.1. STG: specifications

KRYPTON-3xSTG, 6xSTG

Analog inputs				
Input type	Voltage Full/half/quarter strain			
Number of channels	3 (3xSTG), 6 (6xSTG)			
ADC Type	24-bit oversampled SAR with 41 kHz anti-aliasing filter			
Sampling Rate	Simultaneous 20k, 10k, 5k, 2k, 1k, 500, 200, 100 S/s (software-selectable)			
Voltage Ranges	±10V	±1V	±100mV	±10mV
Input Accuracy	±0.03% of reading, ±0.02% of range, ±0.1mV			
Offset Accuracy after Balance Amplifier	0.2mV	0.02mV	0.01mV	0.01mV
Typical Dynamic Range@10kS	139dB	139dB	129dB	110dB
Typical Noise Floor@10kS	107dB	107dB	97dB	78dB
Typical CMR @ 400Hz/1kHz	86dB/84dB	96dB/95dB	112dB/102dB	112dB/102dB
Gain Drift	Typical 10 ppm/K (max. 40 ppm/K)			
Offset Drift	Typical 0.3 μ V/K + 5 ppm of range/K, max 2 μ V/K + 10 ppm of range/K			
Gain Linearity	< 0.02%			
Input Coupling	DC			
Input Impedance	10 M Ω			
Overvoltage Protection	In+ to In-: 50 V continuous, 200 V peak (10 ms)			
Analog input performance				
Bandwidth (-3dB)	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	0, 1, 2.5, 5, 10 and 15VDC			
Accuracy	±0.05% ±2mV			
Drift	±50 ppm/K ±100 μ V/K			
Stability 10% to 90% Load	<0.01%			



Current Limit	45mA (400mW max. Power)		
Protection	Continuous short to ground		
Bridge Connection Types	full bridge strain, ½ bridge strain, ¼ bridge strain (3-wire)		
Ranges	2...1000mV/V free programmable		
Internal Bridge Completion	½ bridge and ¼ bridge 120 and 350Ω		
Bridge Completion Accuracy	0.05 %; TCR: 2ppm/K (others on request)		
Internal Shunt Resistor	100kΩ (others on request)		
Shunt Resistor Accuracy	0.1%; TCR: 10ppm/K (others on request)		
Input Short, Sensor Offset Adjust	Software-selectable		
Additional Specifications			
Input connector	DB9; L2B10f		
TEDs support	Standard + DSI adapters		
Environmental rating	IP67		
Amplifier type	3xSTG	6xSTG	
Power Consumption	3.5W (4.8W 120Ω @ 5V load)	6xSTG: 5.9W (8.9W load 120Ω @ 5V)	
Weight	740g	1100g	
Slice Dimensions	213x39x56 mm	213x54x56mm	
Dimensions with Connectors	213x39x58.2 mm	213x54x58.2 mm	



KRYPTONi-1xSTG

Analog inputs				
Input types	Voltage, full bridge strain, half bridge strain, quarter bridge strain			
Number of channels	1 (isolated)			
ADC Type	24bit SAR with anti-aliasing filter			
Sampling Rate	Simultaneous 40kS/sec per channel (software-selectable)			
Voltage Ranges	±50V	±10V	±1V	±100mV
Input Accuracy	±0.03% of reading, ±0.02% of range, ±0.1mV			
Offset Accuracy after Balance Amplifier	0.35mV	0.1mV	0.01mV	0.001mV
Typical SNR @ 10kS/s	89.12 dB	88.72 dB	88.86 dB	87.60 dB
Typical Dynamic Range@10kS	100dB	110dB	130dB	145dB
Typical Noise floor@10kS	-102.8 dB	-99.6 dB	-103.1 dB	-99.8 dB
Typical CMR @ 400Hz/1kHz	-71dB/-66dB	-72dB/-66dB	-96dB/-88dB	-96dB/-87dB
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	1MΩ		20MΩ	
Isolation				
Overvoltage Protection	200V		50V	
Analog input performance				
Bandwidth (-3dB)	0.49 fs			
Alias-free Bandwidth	DC to 0.453 fs			
Alias Rejection	-100dB (all sample rates)			
Delay Through ADC	37 / fs			
Oversampling	32			
Excitation Voltage				
Excitation voltage	Free programmable (16 bit DAC)			
Predefined Levels	Unipolar 0 - 24V, Bipolar 0 - 12V			
Accuracy	±0.05% ±2mV			
Drift	±50ppm/K ±100µV/K			
Stability 10% to 90% Load	<0.01%			
Current Limit	42mA (400mW max. Power)			
Protection	Continuous short to ground			
Bridge Connection Types	full bridge strain, ½ bridge strain, ¼ bridge strain (3-wire)			
Bridge ranges	20...10000mV/V free programmable			
Internal Bridge Completion	½ bridge and ¼ bridge 120 and 350Ω			
Bridge Completion Accuracy	0.05 %; TCR: 2ppm/K (others on request)			
Internal Shunt Resistor	100kΩ (others on request)			

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Shunt Resistor Accuracy	0.1%; TCR: 10ppm/K (others on request)
Input Short, Sensor Offset Adjust	Software-selectable
Additional Specifications	
Input connector	DB9
TEDs support	Standard + DSI adapters
Environmental rating	IP67
Power Consumption	2.8W
Weight	250 g
Dimensions	62x56x29 mm

4.11.2. KRYPTON-3xSTG

KRYPTON-3xSTG module has 3 DSUB-9 female connectors for voltage or strain measurement.



4.11.3. KRYPTON-3xSTG-L2B10f

KRYPTON-3xSTG-L2B10f module has 3 LEMO L2B10f connectors for voltage or strain measurement.





4.11.4. KRYPTON-6xSTG

KRYPTON-6xSTG module has 6 DSUB-9 female connectors for voltage or strain measurement.



4.11.5. KRYPTON-6xSTG-L2B10f

KRYPTON-6xSTG-L2B10f module has 6 LEMO L2B10f connectors for voltage or strain measurement.





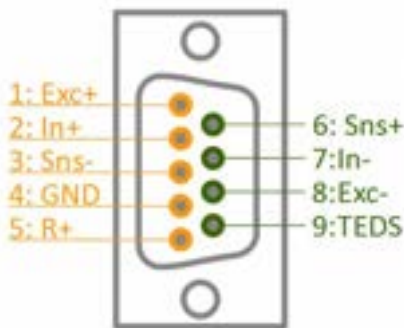
4.11.6. KRYPTONI-1xSTG

KRYPTONI-1xSTG is the world's only single channel perfect strain gauge DAQ device. KRYPTONI-1xSTG is isolated and includes internal shunt for two current input ranges (20 mA, 2 mA). Module has one DSUB-9 female input connector.



4.11.7. STG: connectors

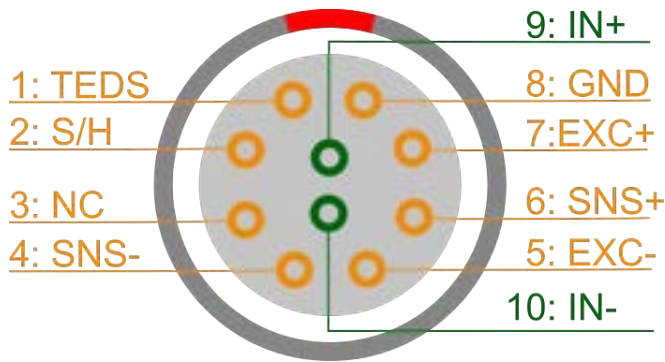
DSUB-9



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



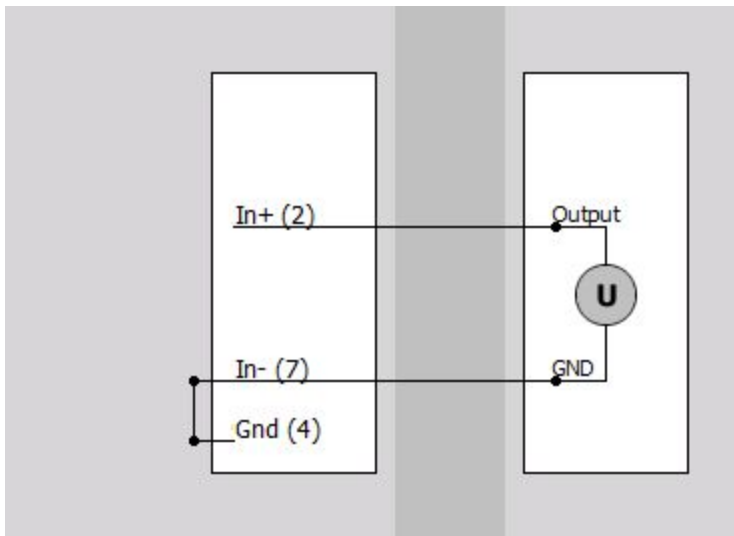
L2B10f



Pin	Name	Description
1	TEDS	TEDS
2	S/H	¼ Bridge / Shunt
3	NC	Not connected
4	SNS-	Sense-
5	EXC-	Excitation-
6	SNS+	Sense+
7	EXC+	Excitation+
8	GND	Ground
9	IN+	Input+
10	IN-	Input-

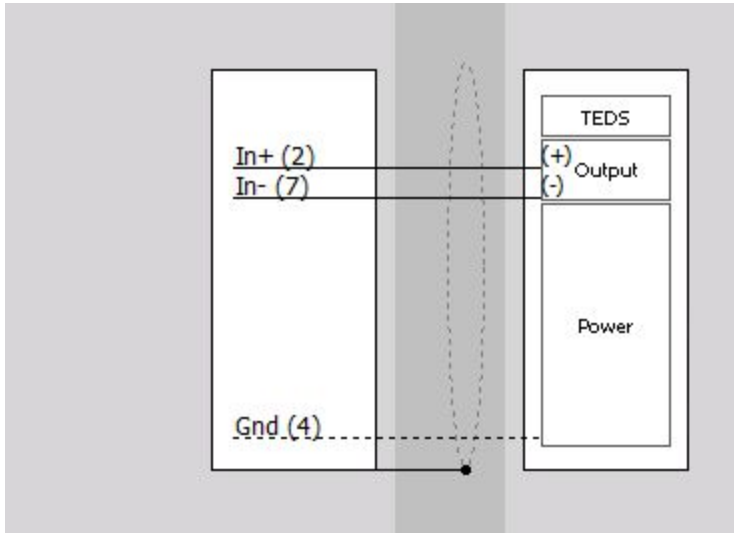
4.11.8. STG: wiring diagrams

4.11.8.1. STG: Voltage (single-ended)



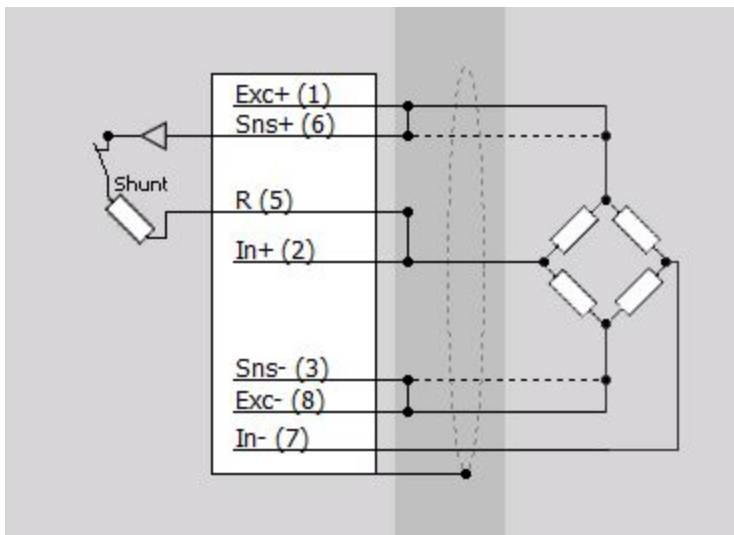


4.11.8.2. STG: Voltage (differential)



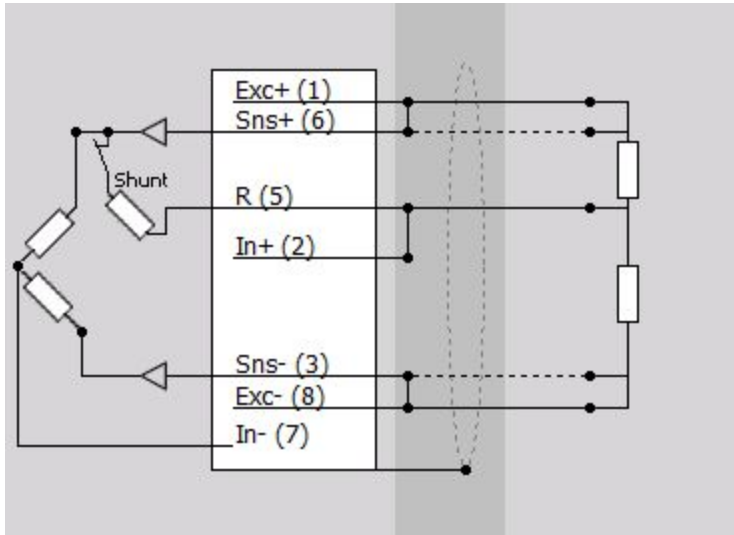
Use only when the sensor is powered by the excitation voltage of the module.

4.11.8.3. STG: Full-Bridge

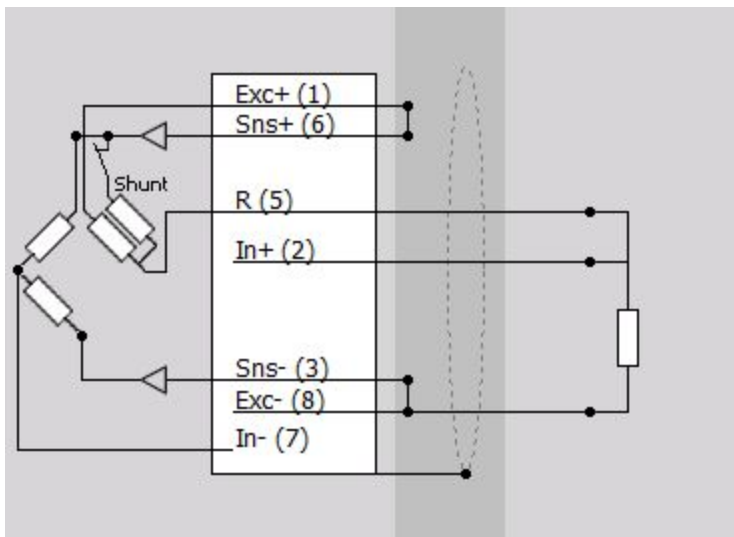




4.11.8.4. STG: Half-Bridge

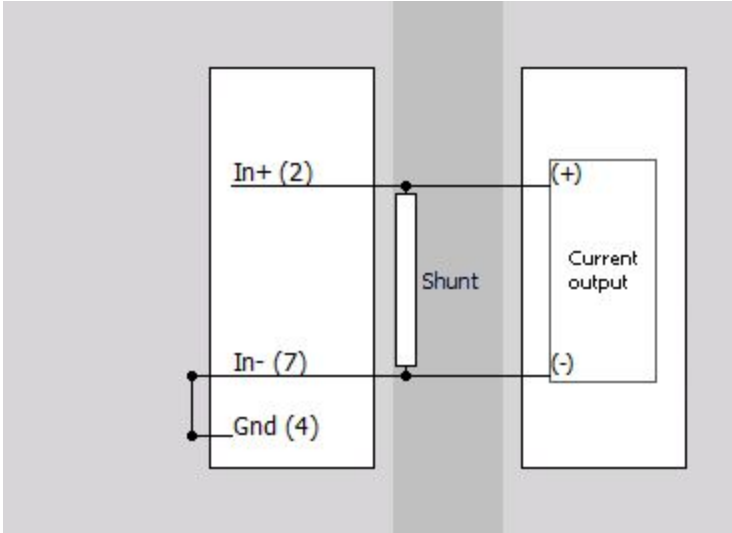


4.11.8.5. STG: Quarter-Bridge

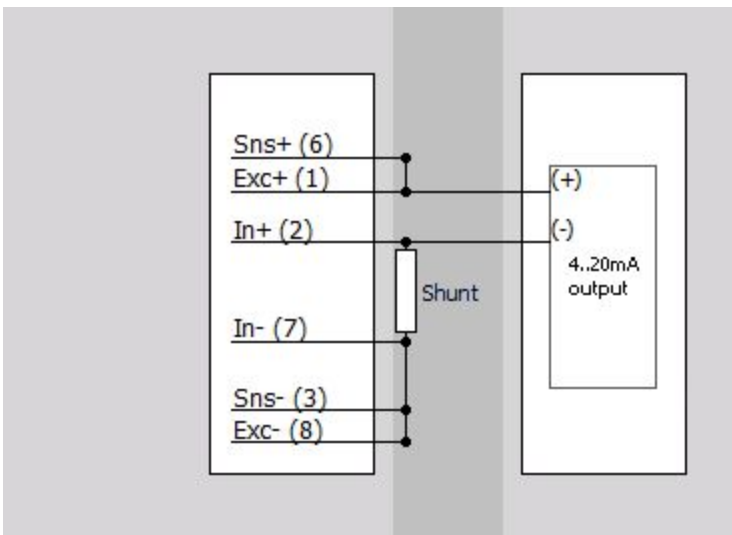




4.11.8.6. STG: Current (External direct shunt)

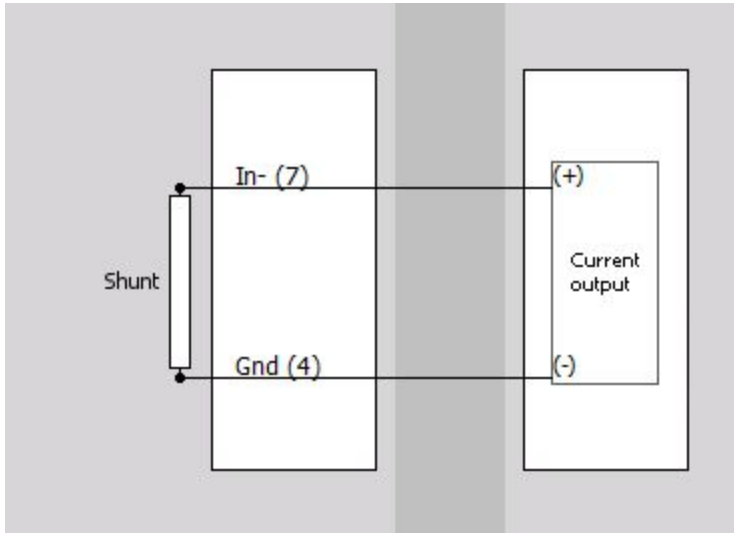


4.11.8.7. STG: Current (External loop powered shunt)



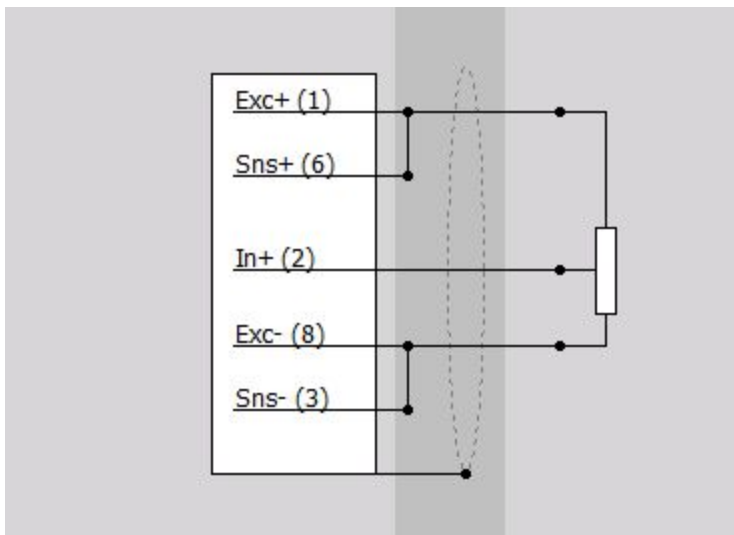


4.11.8.8. KRYPTONI-1xSTG: Current (Internal shunt)



This feature is limited only to KRYPTONI-1xSTG.

4.11.8.8. STG: Potentiometer





4.12. TH: Thermocouple

KRYPTON TH modules are isolated rugged DAQ devices for temperature measurements using thermocouples.

4.12.1. TH: specifications

KRYPTONi-8xTH, 16xTH

Analog inputs		
Input type	Isolated universal thermocouple and voltage	
Number of channels	8 (8xTH)	16 (16xTH)
ADC Type	24bit delta-sigma	
Sampling Rate	Simultaneous 100S/sec	
Voltage Ranges	±1V	±100mV
Input Accuracy	±0.02% of reading ±10 μV	±0.02% of reading ±10 μV
Typical Noise Floor@10/100 s/sec	115/106 dB	110/106 dB
Gain Drift	Typical 3 ppm/K (max. 10 ppm/K)	
Offset Drift	0.03 μV/K	
Gain Linearity	<0.01%	
Input Coupling	DC	
Input Impedance	1 MΩ	
Thermocouple		
Input type	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	100, 80, 40, 20, 10 s/sec	
Typical Noise	0.007 °C RMS@Type K @10 s/sec	0.02 °C RMS@Type K @100s/sec
Additional Specifications		
Input connector	Mini Thermocouple connector (copper)	
Isolation voltage	1000 Vpeak channel/ground & channel/channel	
Environmental rating (see 1)	IP67	
Amplifier type	8xTH	16xTH
Power consumption	2.5 W	4W
Weight	720 g	1000 g
Dimensions	213x39x56 mm	213x54x56mm

1) Depending on the mating connector types, for non corrosive liquids only, IP65 standard



KRYPTONi-1xTH-HV

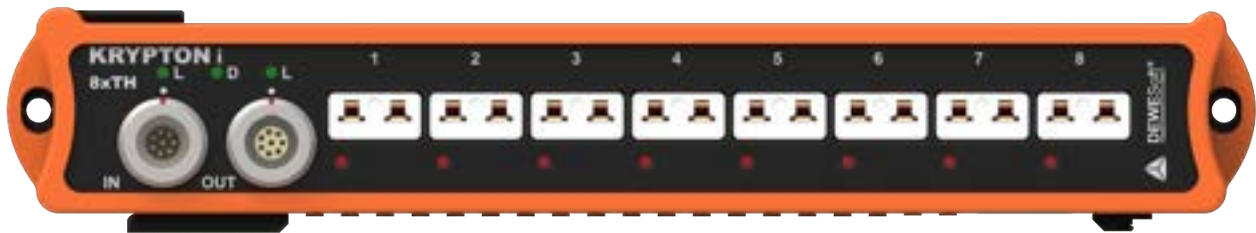
Inputs		
Input types	thermocouple and voltage	
Number of channels	1 (isolated)	
ADC Type	24bit delta-sigma	
Sampling Rate	Simultaneous 100S/sec	
Voltage Ranges	±1V	±0.1V
Input Accuracy		
Typical SNR@10/100 s/sec		
Gain Drift		
Offset Drift		
Gain Linearity		
Input Coupling	DC	
Input Impedance	100 MΩ	
Isolation voltage	CAT III 600V, CAT II 1000 V	
Input Impedance	100 MΩ	
Thermocouple		
TC type	Type K	
Accuracy	±0.02% of reading ±0.5°C ±10μV	
Resolution	<0.001°C	
Sampling rates	100, 80, 40, 20, 10 s/sec	
Typical Noise	0.007°C RMS@Type K @10 s/sec	
Additional Specifications		
Input connector	Lemo REDEL	
Environmental rating	IP68	
Power consumption	1.24 W	
Weight		
Dimensions	62x56x36 mm	



Temperature	Type K	Type J	Type T	Type R	Type S	Type N	Type E	Type B	Type C
-200°C	1.19°C	1.00°C	1.18°C			1.52°C	0.95°C		
-100°C	0.84°C	0.76°C	0.87°C			0.99°C	0.74°C		
0°C	0.75°C	0.70°C	0.76°C	2.35°C	2.32°C	0.88°C	0.67°C		1.22°C
100°C	0.76°C	0.70°C	0.73°C	1.83°C	1.87°C	0.85°C	0.67°C	11.62°C	1.14°C
400°C	0.81°C	0.76°C	0.73°C	1.53°C	1.61°C	0.84°C	0.70°C	2.98°C	1.09°C
700°C	0.88°C	0.79°C		1.46°C	1.56°C	0.88°C	0.76°C	2.04°C	1.14°C
1000°C	0.97°C	0.86°C		1.42°C	1.53°C	0.95°C	0.84°C	1.70°C	1.25°C
1300°C	1.09°C			1.42°C	1.54°C	1.03°C		1.57°C	1.39°C
1700°C				1.55°C	1.69°C			1.57°C	1.63°C

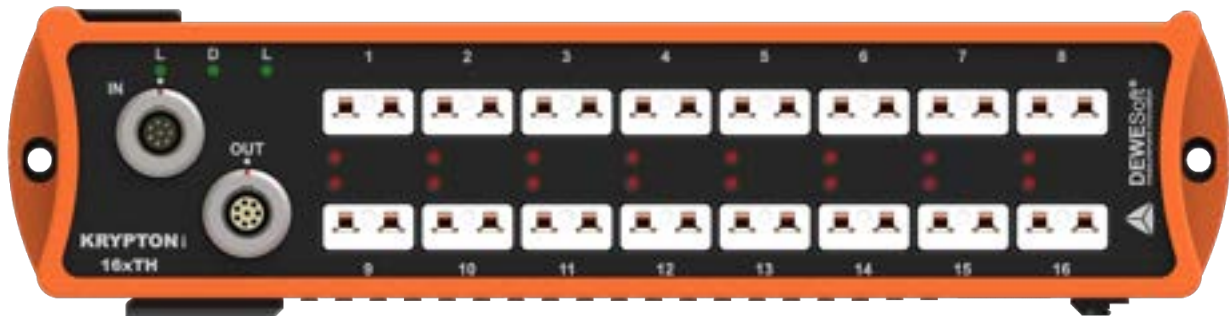
4.12.2. KRYPTONi-8xTH

KRYPTONi-8xTH module has 8 thermocouple-connectors for temperature measurement.



4.12.3. KRYPTONi-16xTH

KRYPTONi-16xTH module has 16 thermocouple-connectors for temperature measurement.





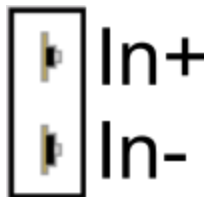
4.12.4. KRYPTONi-1xTH-HV

KRYPTONi-1xTH-HV is a single channel isolated module with LEMO REDEL H02 input connector for thermocouple temperature measurement. KRYPTONi-1xTH-HV is a perfect solution as thermocouple input for high voltage potential for battery measurements.



4.12.3. TH: connectors

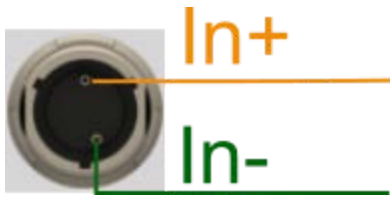
TC



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



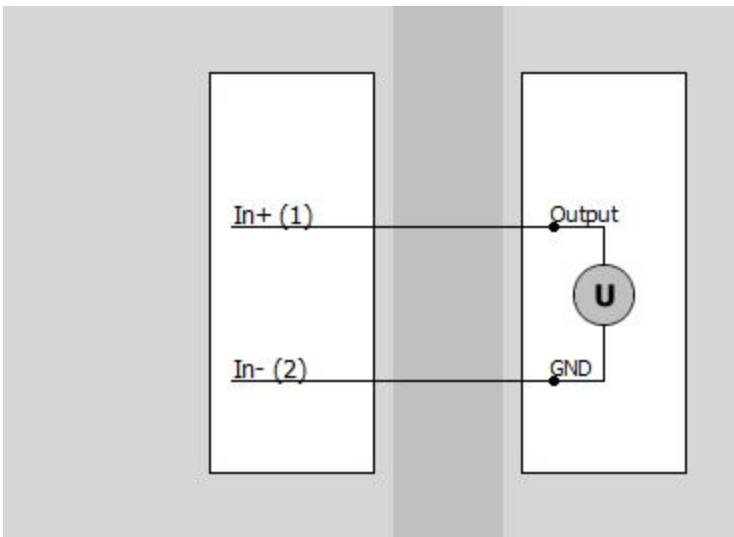
LEMO REDEL H02



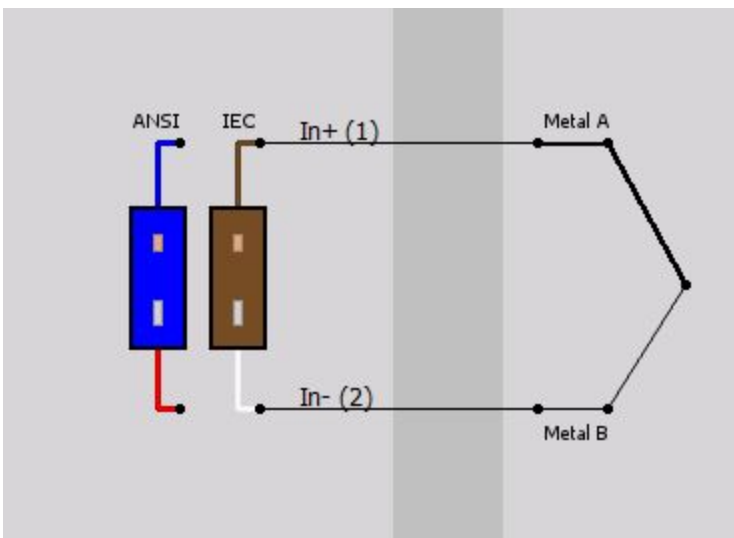
Pin	Name	Description
1	In+	Input+
2	In-	Input-

4.12.4. TH: wiring diagrams

4.12.4.2. KRYPTONi-8xTH, KRYPTONi-16xTH: Voltage

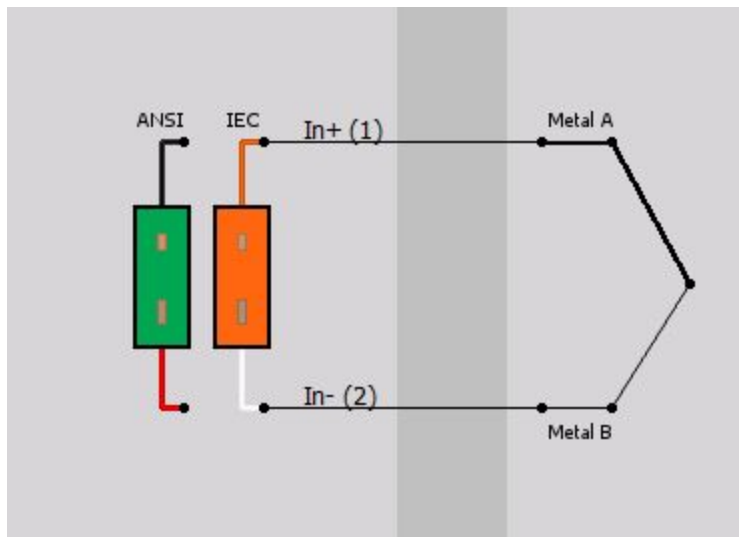


4.12.4.2. KRYPTONi-8xTH, KRYPTONi-16xTH: Temperature (T-type thermocouple)

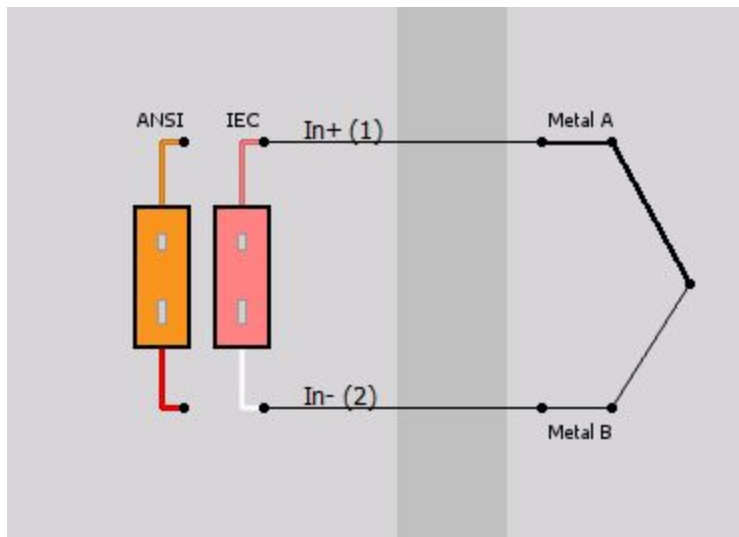




4.12.4.2. KRYPTONi-8xTH, KRYPTONi-16xTH: Temperature (S-type, R-type thermocouple)

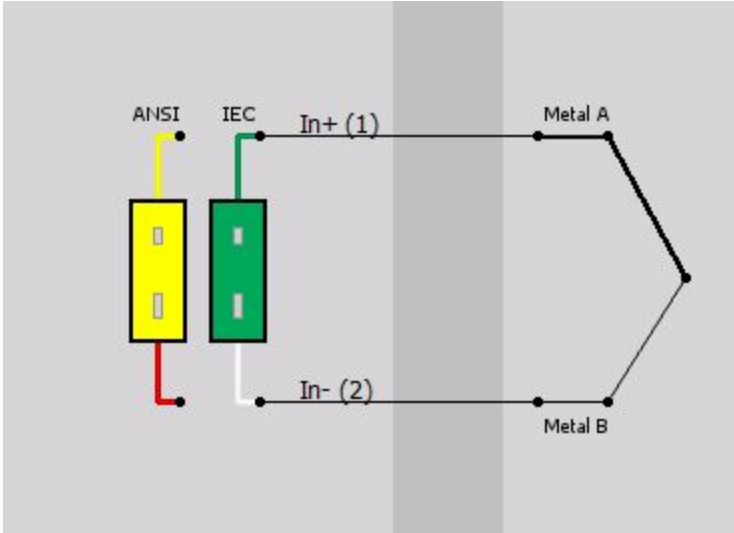


4.12.4.2. KRYPTONi-8xTH, KRYPTONi-16xTH: Temperature (N-type thermocouple)

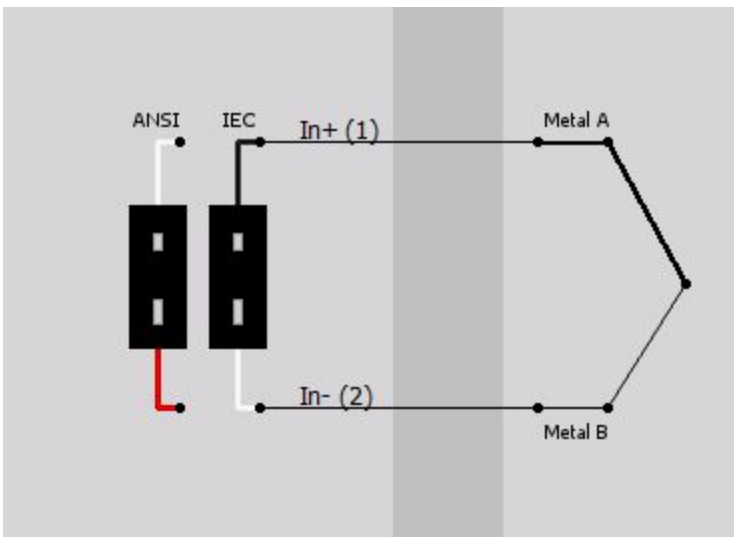




4.12.4.2. KRYPTONi-8xTH, KRYPTONi-16xTH: Temperature (K-type thermocouple)

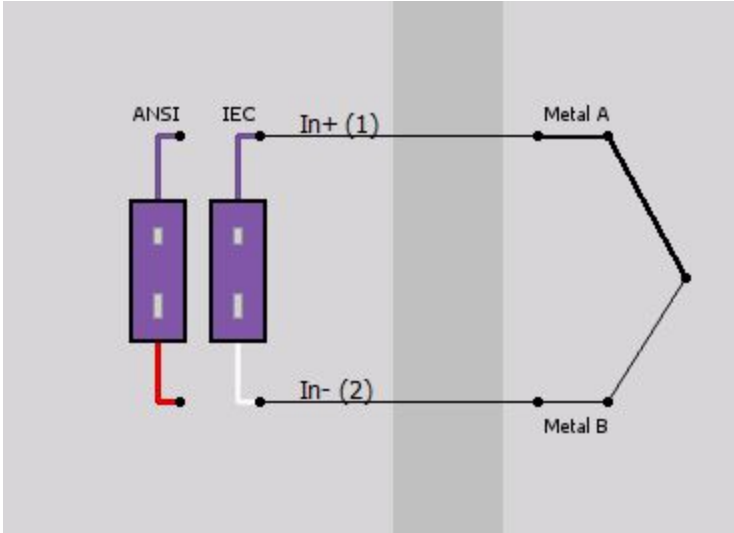


4.12.4.2. KRYPTONi-8xTH, KRYPTONi-16xTH: Temperature (J-type thermocouple)

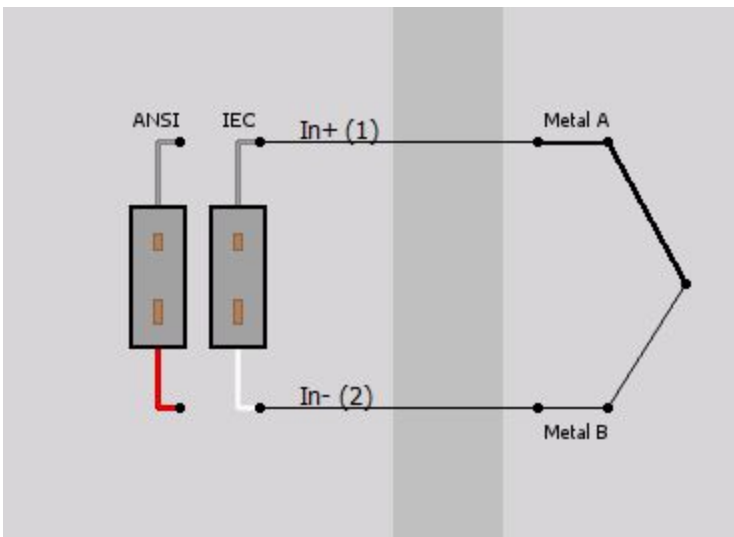




4.12.4.2. KRYPTONi-8xTH, KRYPTONi-16xTH: Temperature (E-type thermocouple)

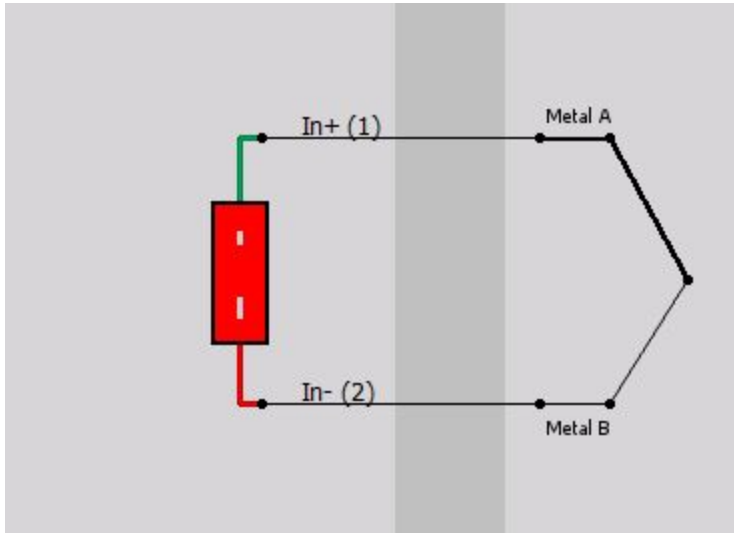


4.12.4.2. KRYPTONi-8xTH, KRYPTONi-16xTH: Temperature (B-type thermocouple)

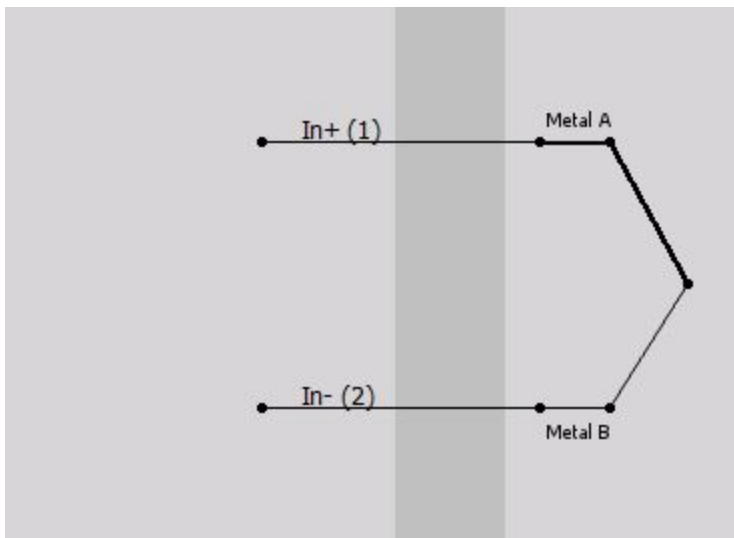




4.12.4.2. KRYPTONi-8xTH, KRYPTONi-16xTH: Temperature (C-type thermocouple)



4.12.4.2. KRYPTONi-1xTH-HV: Temperature (K-type thermocouple)





5. KRYPTON CPU

Small, highly portable and extremely rugged IP67 data logger for data recording in harsh environments.

Main features

IP67 DEGREE OF PROTECTION: KRYPTON CPU is designed for testing in extremely harsh environments. The unit is fully waterproof, dustproof and can withstand shocks up to 100G.

EXTREME OPERATING TEMPERATURE: KRYPTON CPU is able to operate in extreme temperatures ranging from -40°C to 70°C.

SMALLEST DATA LOGGER: KRYPTON CPU is very small data logger and is ready to be placed in tight places and for applications where space is limited.

QUAD CORE CPU: KRYPTON CPU is equipped with powerful Intel Atom quad-core CPU and fast 4GB memory.

SSD STORAGE: Internal SSD drive provides fast and reliable data storage for all your measurement channels.

3 USB PORTS: KRYPTON CPU has 3 USB 2.0 ports for connecting USB peripheral devices or any of our USB data acquisition systems like DEWE-43A and/or SIRIUS.

GLAN AND WiFi INTERFACES: One gigabit LAN port with RJ45 connector and WiFi adapter ensure a fast and reliable network connection.

ETHERCAT INTERFACE: Built-in EtherCAT interface port with synchronization for USB and EtherCAT DAQ devices like SIRIUS waterproof and KRYPTON.



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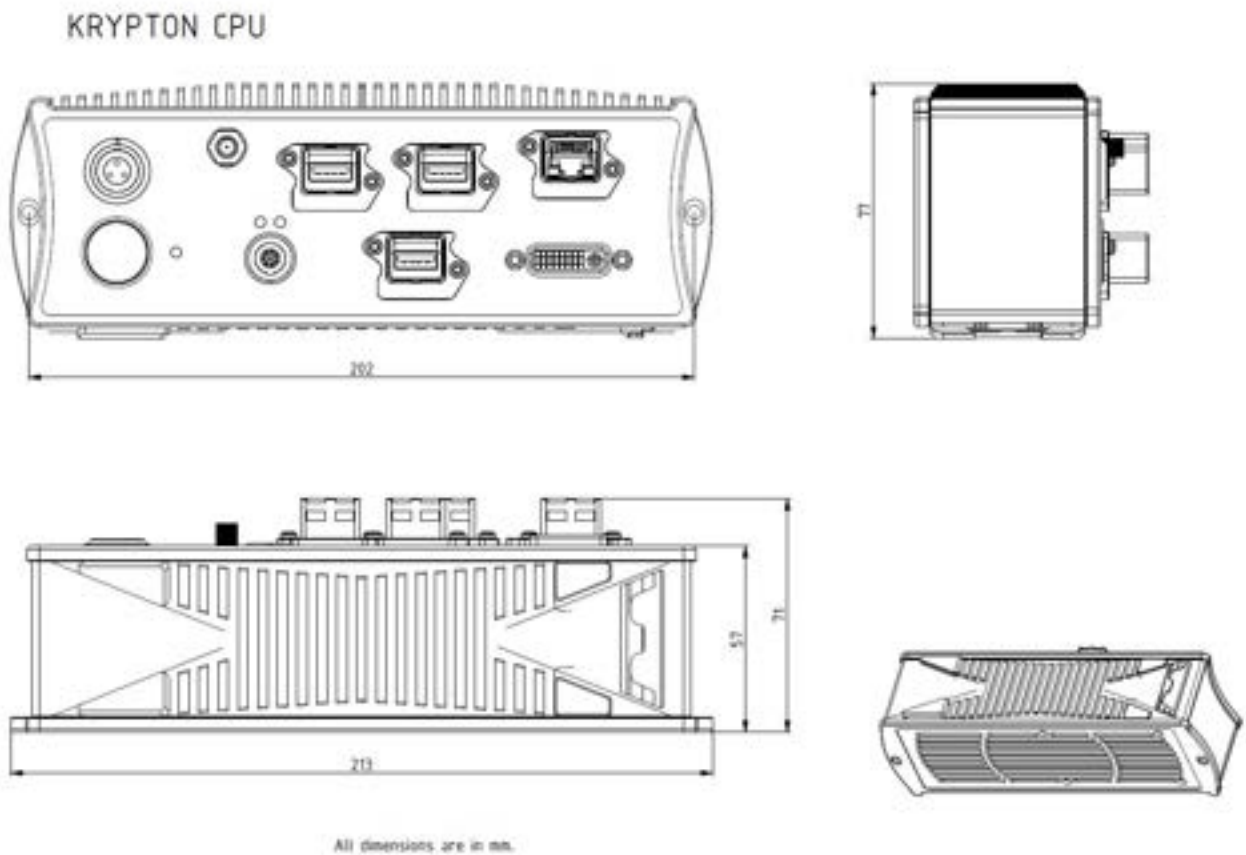


5.1. KRYPTON CPU: specifications

Computer specification	
CPU	Intel Atom Quad Core E3845-4G
RAM	4 GB
Storage	240 GB SATA SSD
USB	3x USB 2.0
Ethernet	1x GLAN (Snap-In), 1x WLAN
EtherCAT®	100 Mbps Full Duplex, L1T8f (Lemo)
Video	DVI-D
Power specification	
Power supply	9 .. 48 V
Power consumption	7.7 W (CPU LOAD 0%) 19.9 W (CPU LOAD 100% + GPU LOAD 100%)
Environmental specification	
IP rating	IP67
Operating Temperature	-40°C .. 70°C
Shock & Vibration	Shock: SIST EN 60068-2-27:2009 (100g, 6 ms) Random vibration (13g rms)
Dimension (W x D x H)	231 x 77 x 57 mm



5.2. KRYPTON CPU: dimensions



5.3. KRYPTON CPU: accessories and cables

5.4. KRYPTON CPU: Dewesoft license



6. KRYPTON Accessories

6.3. KRYPTON Power Supply

The KRYPTON Power Supply is available as an option in our web-shop: Article number: PS-120-L1T8m. You can connect the LEMO 8-pin connector of the KRYPTON Power Supply directly to the OUT connector of the KRYPTON module.

Output Voltage	24 VDC
Current	5 A
Power	120 W
Connector	LEMO 8-pin male L1T8m
Article number	PS-120-L1T8m

6.1. ECAT Power Junction

The ECAT Power Junction box (article number: ECAT-POWER-JUNCTION) can be used to inject power into the Ethernet connection between your PC and the KRYPTON modules: so that you only have one cable for power and data to your KRYPTON modules.

Connector Label	Connector type	Info
POWER IN	2-pin LEMO	9-48VDC: e.g. for connection from the Power-Out connector of a Sirius® slice
Ethernet	RJ-45	Ethernet data connection to your PC The Ethernet cable should always be shielded! You can use an EIA568-B straight or crossover cable.
EtherCAT	8-pin LEMO	Power and Data connection to your KRYPTON module/s use any of the ECAT to ECAT expansion cables (e.g. L1T8m-L1T8f-10M)



6.2. ECAT Power Injector

The ECAT Power Injector box (article number: ECAT-POWER-INJECTOR) can be used to inject power into the Ethernet connection between KRYPTON modules, when you can have a very long measurement chain.

Connector Label	Connector type	Info
POWER IN	2-pin LEMO	9-48VDC: e.g. for connection from the Power-Out connector of a Sirius® slice
Ethernet	RJ-45	Ethernet data connection to your PC The Ethernet cable should always be shielded! You can use an EIA568-B straight or crossover cable.
EtherCAT	8-pin LEMO	Power and Data connection to your KRYPTON module/s use any of the ECAT to ECAT expansion cables (e.g. L1T8m-L1T8f-10M)



6.4. ECAT Sync Junction

The ECAT Sync Junction box can be used to inject the sync signal into the EtherCAT line. The source of the sync signal must be IRIG B DC: thus, the sync signal of Sirius USB slices can be directly connected to the ECAT Sync Junction box.

Connector Label	Connector type	Info
IN	8-pin LEMO	EtherCAT® input connector: e.g. connection to the PC via L1T8f-RJ45-1M cable
OUT	8-pin LEMO	EtherCAT® output connector to your Krypton slice/s use any of the ECAT to ECAT expansion cables (e.g. L1T8m-L1T8f-10M).
SYNC	4-pin LEMO	Input connector for the IRIG-B-DC signal (TTL level), e.g. external, or directly from Sirius USB Note: the two SYNC connectors are directly connected, so you can use the other connector as output (to daisy-chain the same sync signal to other devices: e.g. DEWE-43, DS-CAM, etc.)



6.4.1 ECAT Sync Junction: Specifications

Communication	
Data interface	EtherCAT
Data Rate	100Mbit bus speed
Sync Accuracy	below 1 sample to Sirius®
EtherCAT®	Max. Cable Length 100m
Max. Throughput per Chain	600kS/s
Max. Number of Slices	100 (additional power injectors required)
Cabling	LEMO 1T EtherCAT® hybrid cable
Single cable for	Power supply Data interface Synchronization
Power specification	
Power Supply	9-48Vdc
Current	8Adc max
Environmental specification	
Operating Temperature	-40 to 70°C
Storage Temperature	-40 to 85°C
Shock & Vibration	Shock: SIST EN 60068-2-27:2009 (100g, 6 ms) Random vibration



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6.5. ECAT GPS Junction

ECAT GPS Junction is used for synchronization between SIRIUS-EtherCAT or KRYPTON series to SIRIUS, IRIG-B-DC or GPS. Additionally power injection over L1B2m (eg. PS-120-L1B2f) and Ethernet over RJ45.

Connector Label	Connector type	Info
IN	8-pin LEMO	EtherCAT® input connector: e.g. connection to the PC via L1T8f-RJ45-1M cable
OUT	8-pin LEMO	EtherCAT® output connector to your Krypton slice/s use any of the ECAT to ECAT expansion cables (e.g. L1T8m-L1T8f-10M).
SYNC	4-pin LEMO	Input connector for the IRIG-B-DC signal (TTL level), e.g. external, or directly from Sirius USB Note: the two SYNC connectors are directly connected, so you can use the other connector as output (to daisy-chain the same sync signal to other devices: e.g. DEWE-43, DS-CAM, etc.)
GPS	GPS ANT SMA Female Jack connector	Synchronization between SIRIUS-EtherCAT or KRYPTON series to GPS.



6.6. KRYPTON Cables



7. Connection overview



8. Safety

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.
- DO NOT service or adjust alone. Do not attempt internal service or adjustment unless another person, capable of rendering first aid and resuscitation, is present.
- 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 environmental. The system has been exposed to heavy shipment strain.
- DO NOT touch any exposed connectors or components if they are live wired. The use of metal bare wires is not allowed.
- There is a risk of short circuit and fire hazard!
- Warranty void if damages caused by disregarding this manual. For consequential damages, NO liability will be assumed!
- Warranty void if damages 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!
- 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 at 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 flawless 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.



X. Documentation version

Doc-Version	Date [dd.mm.yyyy]	Notes
1.0.0	23.11.2015	Initial version
1.1.0	14.04.2016	Added RTD module Added ECAT Power Injector Added "Table 7: Max. Error by Thermocouple type"
1.1.1	02.06.2016	Table 11: Krypton RTD Specifications Updated <i>Accuracy</i> Added <i>Temperature drift</i>
1.1.2	17.07.2018	Added excitation information for RTD and TH
2.0.0	20.09.2018	Added KRYPTON-4xACC, KRYPTON-8xACC Added KRYPTON-6xSTG Added KRYPTONi-2xCAN-USB Added KRYPTON ONE product line: KRYPTONi-1xACC KRYPTON-1xAO KRYPTONi-1xCAN KRYPTON-1xCNT KRYPTONi-4xDI KRYPTONi-4xDO KRYPTONi-1xHV KRYPTONi-1xLV KRYPTONi-1xSTG KRYPTONi-1xTH-HV Added KRYPTON-CPU Added ECAT GPS Junction