BD|SENSORS
pressure measurement

LV 3

Universal Charge Amplifier

Special characteristics

- Digital charge amplifier for piezoelectric sensors
- Measuring range freely selectable
- Signal output ± 10V
- Ethernet system interface
- Compact, robust design

CE

Technical Data		
Charge inputs		1
Measuring range	[pC]	± 50 ... ± 600 000
Calibrated measuring ranges	[% F_{nom}]	100
Signal output, analogue		
Output voltage	[V]	–10 ... + 10
Output voltage limiting	[V]	± 11.5
Max. output current, short-circuit resistant	[mA]	10
Output resistance	[Ω]	< 5
Interference suppression between input and output (GND) (0 ... 1000 Hz)	[dB]	> 60
Output interference signal (0.1 Hz ...1 MHz); peak-to-peak; over the full measuring range ± 50 … ± 600 000 pC up to 30 kHz filter frequency	[mV]	< 30
Time from switch–on to stable output values	[ms]	375
Measurement accuracy		
Accuracy class (at 25 °C)	[%]	< ± 0.5
Repeatability (at 25 °C)	[%FS]	< ± 0.05
Reset/Measure (operate) step	[pC]	< ± 2 (typ. < 1)
Drift (at 20°C)	[pC/s]	< ± 0.05

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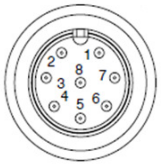
Frequency response of the analogue signal output		
Bandwidth (–3dB)		
measuring range 50 pC up to 32.000 pC	[kHz]	30
measuring range 32.000 pC up to 40.000 pC	[kHz]	24
measuring range 40.000 pC up to 60.000 pC	[kHz]	16
measuring range 60.000 pC up to 80.000 pC	[kHz]	12
measuring range 80.000 pC up to 100.000 pC	[kHz]	9.6
measuring range 100.000 pC up to 120.000 pC	[kHz]	8
measuring range 120.000 pC up to 180.000 pC	[kHz]	5.3
measuring range 180.000 pC up to 250.000 pC	[kHz]	3.8
measuring range 250.000 pC up to 400.000 pC	[kHz]	2.4
measuring range 400.000 pC up to 600.000 pC	[kHz]	1.6
Low-pass filter, up to 20 kHz selectable	[Hz]	1 ... 20000; 30000
Filter characteristics		Bessel, 5th order
High-pass filter, selectable	[Hz]	0.15; 1.5; Off
Offset		
Output voltage offset	[V]	± 10
Resolution	[mV]	10
Signal output, digital		
Resolution	[Bit]	12
Accuracy	[%FS]	< ± 1
Sampling rate for peak value acquisition	[kHz]	10
Control signals (electrically isolated)		
Input voltage range		
High	[V]	12 ... 30
Low	[V]	0 ... 5
Input current	[mA]	4 (at 24 V)
LED displays		
IP address not configured		Flashing green–blue
Connection via Ethernet		Constant blue
Measuring		Constant green
Reset		Constant red
Overload		Flashing red–blue
SensorTeach function in the range of 600000 pC		Flashing yellow, 1 Hz
SensorTeach function in the range of 6000 pC		Flashing yellow, 2 Hz
Ready for firmware update		Flashing white, 2 Hz
Bootloader mode		Flashing red, 1 Hz
Connections		
System input/output		M12 plug, pin-compatible with CMA amplifier, 8 pins
Ethernet input		M12 socket, 4 pins, with protective cap
Digital input/output		M12 socket, 5 pins, with protective cap
Sensor input		BNC socket
Ethernet communication interface		
System interface for parameterizing the amplifier and transmitting measured values at max. 1 kHz transmission rate		
Transmission protocol	[MBit/s]	TCP/IP, can be networked per IEEE802
Transfer rate, max	[Mbit/s]	10
Topology (twisted pairs)		2
Connecting socket		M12, socket with protective cap
Cable type		UTP category 5 or shielded twisted pair (STP)
Digital control signals		
System input/output		Voltage supply; Reset/Measure; Sensorteach; TEDS; Analog output signal
Ethernet input		PC/PLC connection, measured–value streaming

Digital input	
Number	1
Active input level selectable (High/Low) [V]	0 or 24
Input voltage range [V]	0...30
Switching voltages	
logic High level [V]	12...30
logic Low level [V]	0...5
Input current at 24 V, typ [mA]	4
Reserve polarity protection [V]	-30...0
Electrical isolation from supply and output Isolation voltage, functional, typ. [V_{DC}]	100
Latency periods of the electronic digital input. [ms]	2
Digital output	
Number	2
Switching actions, any combination individually selectable for each output	Limit value switch 1 or 2, overload, manual, system failure
Response time [ms]	0.1
Active voltage level selectable for each output (High/Low) [V]	0 or 24
Output voltage (equal to supply voltage), nom. [V]	24
Voltage drop with load, max. [V]	1
Output current at operating temperature [mA]	350
Short-circuit current, typ. [A]	0.7
Short-circuit period	Unlimited
Electrical isolation from supply and bus potential isolation, functional, typ. [V_{DC}]	100
Latency times of the electronic digital outputs [ms]	2
General data	
Supply voltage Overvoltage and reverse polarity protection [V_{DC}]	24 (18...30)
Isolation voltage, functional, typ. [V_{DC}]	100
Supply current (24 V) [mA]	120
Vibration resistance 20...2000 Hz; Duration 16 min; Cycle 2 min. [m/s^2]	100
Impact; Duration 1 ms [m/s^2]	2000
Nominal (rated) temperature range (non-condensing) [°C]	0...60
Operating temperature range (non-condensing) [°C]	-40...+80
Relative humidity (maximum) (non-condensing) [%]	93, at +40C° ± 2C°
Dimension (L x W x H) [mm]	115 x 64 x 35
Weight [g]	350
Housing material	die-cast aluminium
Degree of protection, with connected cable or with protective caps	IP60
EMC conformance	
According to EN61326-1: 2007, EN61326-2-3: 2007	In an industrial environment

Pin assignment

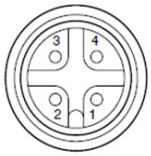
Connector plug, system input/output

Pin No	Signal name	Description	Value	Colour code KAB 168...
1	Ground supply	-	-	wh (white)
2	-	-	-	bn (brown)
3	Reset	Digital input, active High	+ 12... +30 V	gn (green)
4	not assigned	not assigned	-	ye (yellow)
5	Charge out	Output signal	± 10 V	gy (grey)
6	Output ground	Output signal ground	-	pk (pink)
7	not assigned	not assigned	-	bl (blue)
8	Voltage supply	Voltage supply between Pin 8 and 1	+18 … +30V	rd (red)



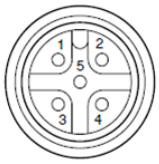
Ethernet connecting socket

Pin no.	Signal name
1	TX +
2	RX +
3	TX -
4	RX -

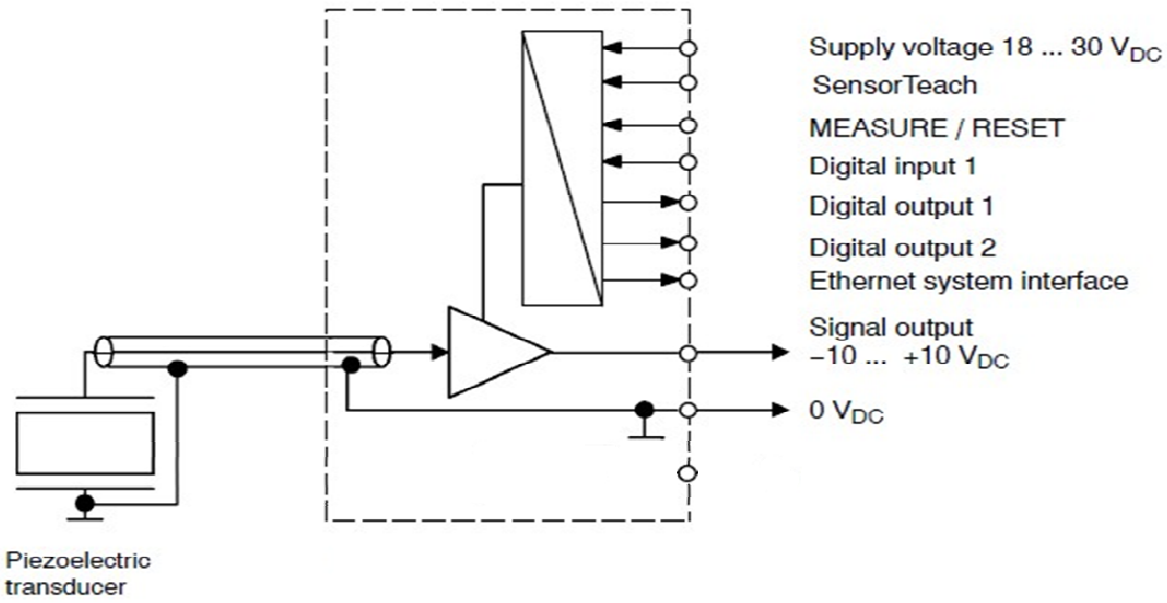


Connector plug, digital input / output

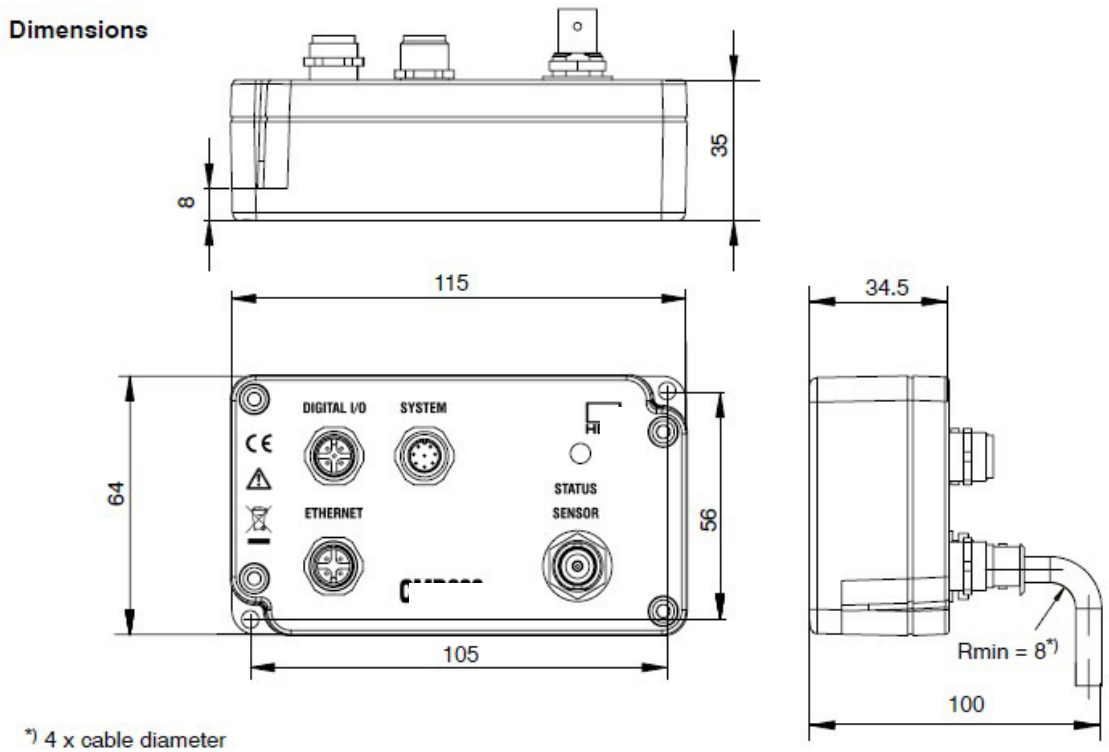
Pin no.	Signal name	Description	Value
1	VCC	Input or output	VCC / 350 mA
2	Digital Out	Supply for output 1, 2	+18... +30 V
3	Digital Out	Digital output 2	VCC / 350 mA
4	Digital In	Digital input 1	+12... +30 V
5	Ground supply	-	-



Block diagram



Dimensions (mm)



Accessories (not included in scope of supply)		
Name	**quantity**	**BDS-order number**
Ethernet cable	2 m	BDV4650
Lumberg system cable	10 m	BDV4631

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