

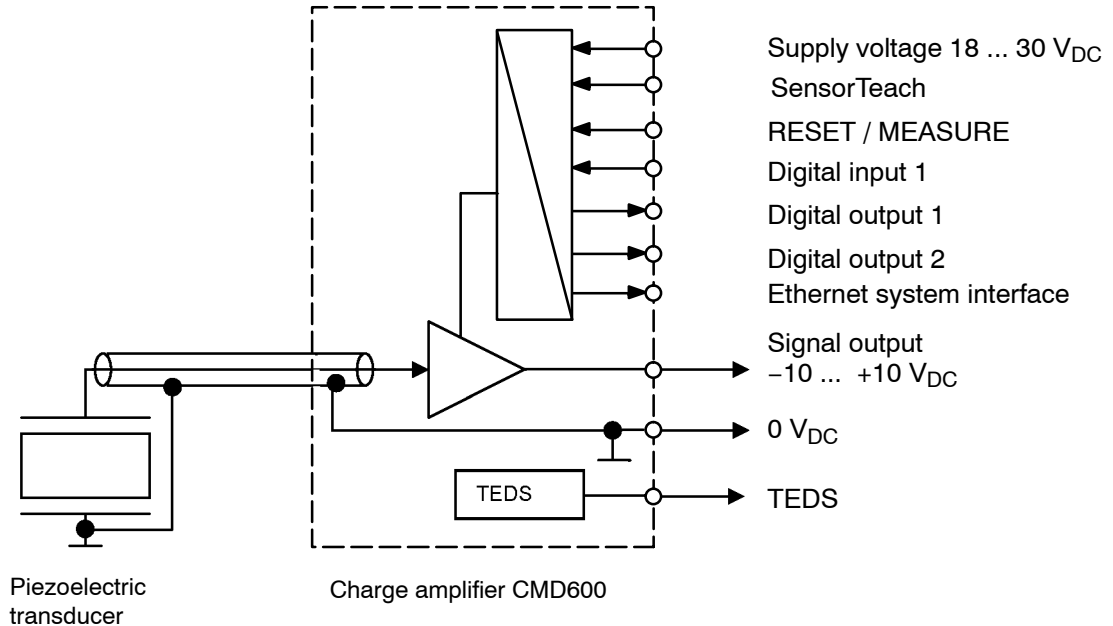
PACEline CMD600



Special features

- Digital charge amplifier for piezoelectric sensors
- Two separate parameter sets (measuring programs)
- Measuring range freely selectable or via SensorTeach
- TEDS sensor detection
- Signal output $\pm 10V$
- Fast, configurable, digital inputs/outputs
- All signal inputs/outputs electrically isolated
- Ethernet system interface
- Compact, robust design; IP60
- Comfortable parameterization software, LabView driver and Siemens-S7 operation blocks

Block diagram CMD600



Specifications (data per VDI/VDE 2638 standards)

Charge amplifier		CMD600	
Transducers that can be connected		Piezoelectric sensors	
Charge inputs		1	
Measuring range, freely adjustable or via SensorTeach for fast learning processes		pC	$\pm 50 \dots \pm 600\,000$
Calibrated measuring ranges		% F_{nom}	100
Signal output, analog			
Output voltage		V	-10 ... + 10
Signal source		current measured value, Min-Max value, peak-peak value	
Output voltage limiting		V	11,5
Max. output current, short-circuit proof		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 $\pm 50 \dots$ $\pm 600\,000$ pC up to 30 kHz filter frequency		mV	< 30
Time from switch-on to stable output values		ms	300
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
Frequency response of the analog signal output			
Bandwidth (-3dB)			
measuring range 50 pC to 60.000 pC		kHz	0 ... 30
measuring range 60.000 pC to 120.000pC		kHz	0 ... 15
measuring range 120.000 pC to 250.000pC		kHz	0 ... 7
measuring range > 250.000 pC		kHz	0 ... 3
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)
Reset time (5 x RC)			
measuring range < 6.000 pC		ms	3
measuring range > 6.000 pC		ms	80

Peak-value memory		
Number		3
Function		Min., max., peak-to-peak value
Update rate	ms	0.1
Clearing peak-value memory	ms	2
Limit value switches		
Number		2
Functions		Switching threshold, hysteresis (2-point control)
Signal source (user-selectable)		Current measured value
Hysteresis		adjustable
Update	ms	0.1
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
Device identification		blue, yellow, red, green, flashing, 2 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
Switching actions , any combination selectable		Clear peak value memory (Min./Max.) once / Hold analog output signal RUN/HOLD
Response time	ms	0.1
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
Reverse polarity protection	V	-30 ... 0
Electrical isolation from supply and signal output		
Isolation voltage, functional, typ.	V _{DC}	100
Latency periods of the digital input	ms	2

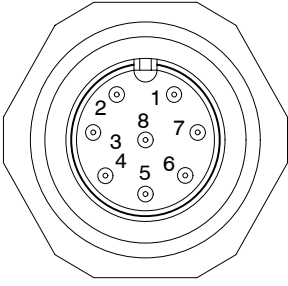
Digital output		
Number		2
Switching actions , any combination individually selectable for each output		Limit value switch1 or 2, overload, manual, system failure, Toggle parameter set
Response time	ms	0.1
Active voltage level selectable for each output (High/Low)	V	0 or 24
Output voltage (equal to supply 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 voltage, functional, typ.	V _{DC}	100
Latency times of the 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), without digital outputs	mA	160
Number of parameter sets / Measurement programs in the device		2 plus factory setting, stored in EEPROM
Typical time for switching between parameter sets without range switching (6.000 pC) with range switching (6.000 pC)	ms ms	5 160
Vibration resistance 20 ... 2000 Hz; Duration 16 min.; Cycle 2 min. Impact ; Duration 1 ms	m/s ² m/s ²	100 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 +40°C ± 2°C
Dimensions (L x W x H)	mm	115 x 64 x 35
Weight	g	350
Housing material		Die-cast aluminum
Degree of protection , with connected cable or with protective caps		IP60
EMC conformance		
acc. to EN61326-1: 2007, EN61326-2-3: 2007		in an industrial environment

Filter data and sampling rate

Desired frequency	Phase delay (µs)
30 kHz	8,2
20 kHz	28
10 kHz	46
1 kHz	400
100 Hz	4
10 Hz	40

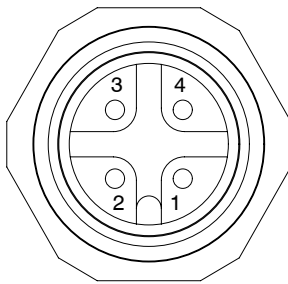
Pin assignment

Connector plug, system input/output (Viwe of pins in CMD600)



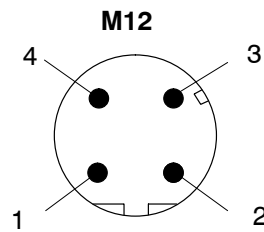
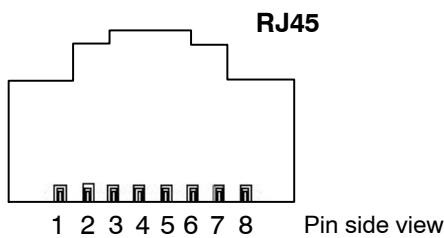
Pin No.	Signal name	Description	Value	Color code KAB 168...
1	Ground supply	-	-	wt
2	Sensorteach	Digital input, active High	+12 ... +30 V	bn
3	Reset	Digital input, active High	+12 ... +30 V	gn
4	TEDS	-	-	ye
5	Charge out	Output signal	± 10 V	gy
6	Output ground	Output signal ground	-	pk
7	not assigned	not assigned	-	bl
8	Voltage supply	Voltage supply between Pin 8 and 1	+18 ... +30 V	rd

Ethernet connecting socket (Viwe of pins in CMD600)



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

Pin assignement of Ethernet cable CMD600 on PC



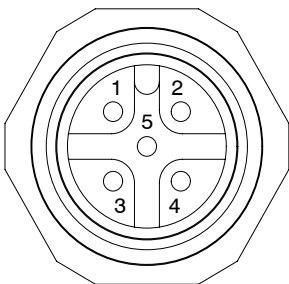
Patch cable

RJ45	M12
1	1
2	3
3	2
6	4

Cross cable (1-KAB284-2)

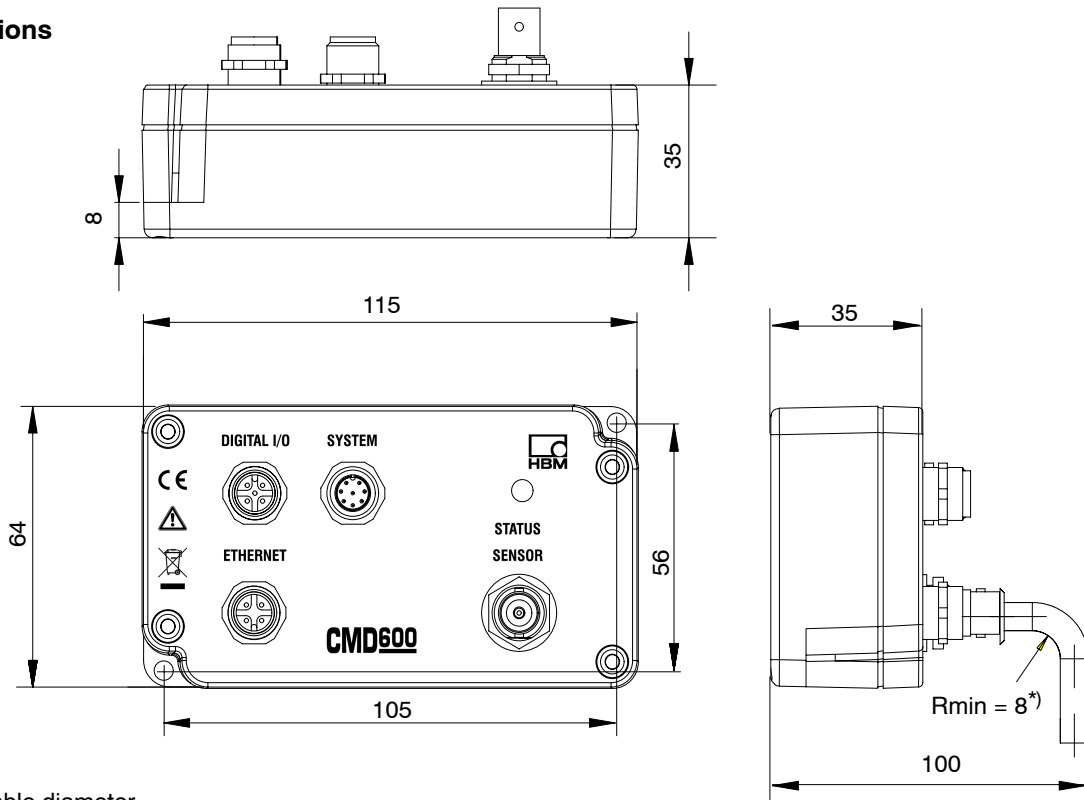
RJ45	M12
1	2
2	4
3	1
6	3

Connector plug, digital input/output (Viwe of pins in CMD600)



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

Dimensions



*) 4 x cable diameter

Scope of supply

Ordering code	
1-CMD600	Single channel charge amplifier for piezoelectric sensors, measuring range 50 to 600000 pC; including protective caps
1-CON-P3001	BNC to UNF 10/32 sensor adapter
CD-ROM with operating manual, CMD600 command set, CMD600 Assistant parameterization software ¹⁾	

¹⁾ The latest updated Software Assistant is available for free download from <http://www.hbm.com/support>

Accessories (not included in scope of supply)

1-KAB168-5	8-wire cable to the processing electronics, M12 x 1 cable plug, 5 m long, free ends
1-KAB168-20	8-wire cable to the processing electronics, M12 x 1 cable plug, 20 m long, free ends
1-KAB143-3	Sensor connection cable, coaxial, 3 m long
1-KAB284-2	CMD600 to PC Ethernet cable, M12 to RJ45, 2 m long
1-CON-S1002	Cable Socket for Digital-I/O, M12x1, 5 poles, straight

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