

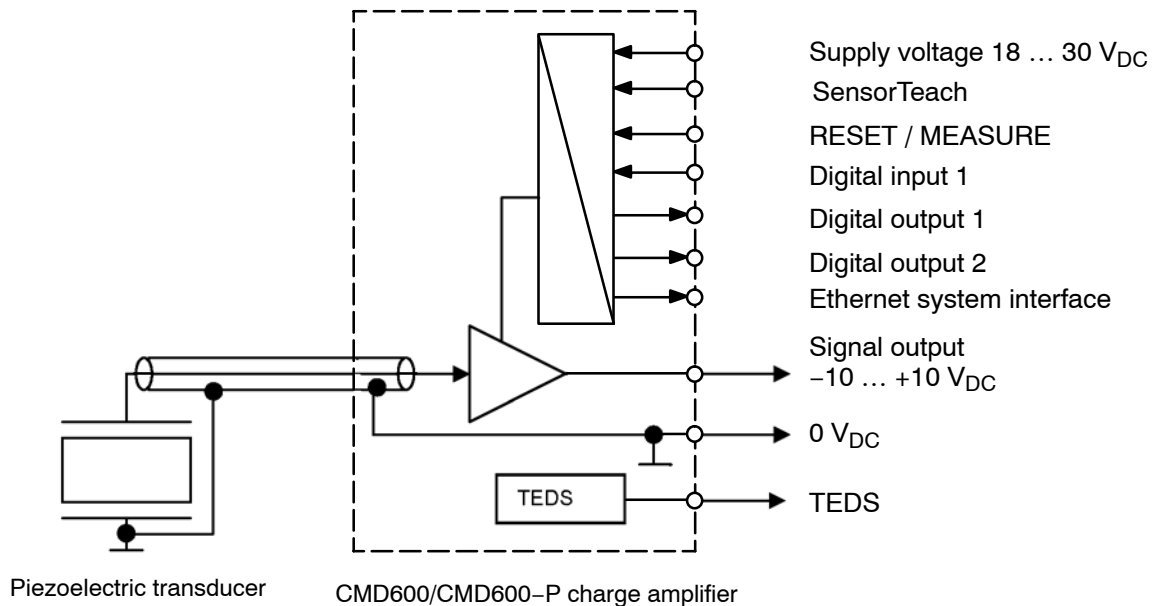
# CMD600/ CMD600-P

## Special features

- Digital charge amplifier for piezoelectric sensors
- Two separate parameter sets (measurement programs)
- Measuring range adjustable as required or via SensorTeach
- TEDS sensor detection
- Signal output  $\pm 10$  V
- Fast and configurable digital inputs/outputs
- All signal inputs and outputs electrically isolated
- Ethernet system interface
- Compact, robust design, IP60
- IP65 version (CMD600-P)
- User-friendly parameterization software, LabView drivers and Siemens S7 operation blocks



CMD600/CMD600-P block diagram



## Specifications (data per VDI/VDE/DKD 2638 standards)

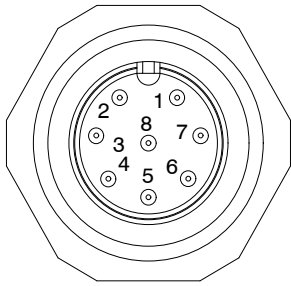
Charge amplifier		CMD600/CMD600-P
Transducers that can be connected		Piezoelectric sensors
Charge inputs		1
Measuring range adjustable as required or via SensorTeach for fast teach-in processes	pC	± 50 ... ± 600 000
Calibrated measuring ranges	% F <sub>nom</sub>	100
<b>Signal output, analog</b>		
Output voltage	V	-10 ... +10
Signal source		current measured value, min./max. value, peak-to-peak value
Output voltage limiting	V	± 11
Output current, max., 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 ± 50 ... ± 600 000 pC up to 30 kHz filter frequency	mV	< 30
Time from switch-on to stable output values	ms	375
TEDS as per IEEE1451.4		1-wire
<b>Measurement accuracy</b>		
Accuracy class (at 25°C)	%	< ± 0.5
Repeat accuracy (at 25°C)	%FS	< ± 0.05
Reset/Measure (operate) step	pC	< ± 2 (typ. < 1)
Drift (at 20°C)	pC/s	< ± 0.05
<b>Analog signal output frequency response</b>		
Measurement frequency range (-3 dB)		
Measuring range 50 pC to 32 000 pC	kHz	30
Measuring range 32 000 pC to 40 000 pC	kHz	24
Measuring range 40 000 pC to 60 000 pC	kHz	16
Measuring range 60 000 pC to 80 000 pC	kHz	12
Measuring range 80 000 pC to 100 000 pC	kHz	9.6
Measuring range 100 000 pC to 120 000 pC	kHz	8
Measuring range 120 000 pC to 180 000 pC	kHz	5.3
Measuring range 180 000 pC to 250 000 pC	kHz	3.8
Measuring range 250 000 pC to 400 000 pC	kHz	2.4
Measuring range 400 000 pC to 600 000 pC	kHz	1.6
Low-pass filter, selectable up to 20 kHz	Hz	1 ... 20 000; 30 000
Runtime at 30 kHz cut-off frequency	μs	8.2
Runtime at 20 kHz cut-off frequency	μs	28
Runtime at 10 kHz cut-off frequency	μs	46
Runtime at 1 kHz cut-off frequency	μs	400
Runtime at 100 Hz cut-off frequency	ms	4
Runtime at 10 Hz cut-off frequency	ms	40
Filter characteristics		Fifth-order Bessel
High-pass filter, selectable	Hz	0.15; 1.5; Off
<b>Offset</b>		
Output voltage offset for current measurement signal	V	± 10
Resolution	mV	10
<b>Signal output, digital</b>		
Resolution	Bit	14
Accuracy	%FS	< ± 1
Sampling rate for peak value acquisition	kHz	10

<b>Control signals (electrically isolated)</b>		
<b>Input voltage range</b>		
High	V	12 ... 30
Low	V	0 ... 5 or open input
<b>Input current</b>	mA	4, at 24 V Supply
<b>Reset time (5 x RC)</b>		
Measuring range < 6000 pC	ms	3
Measuring range > 6000 pC (adaptive reset from firmware 3.61)		
Output voltage > 2V	ms	80
1 ... 2 V	ms	60
0.1 ... 1 V	ms	40
50 mV ... 0.1 V	ms	20
0 ... 50 mV	ms	13
<b>Peak-value memories</b>		
Number		3
Function		Min., max., peak-to-peak value
Update rate	ms	0.1
Peak-value memory clearing	ms	2
<b>Limit value switches</b>		
Number		2
Functions		Switching threshold, hysteresis (2-point control)
Signal source		Current measured value
Hysteresis		Adjustable as required
Update	ms	0.1
<b>LED displays</b>		
<b>IP address not configured</b>		Flashing green-blue
<b>Connection via Ethernet</b>		Constant blue
<b>Measure</b>		Constant green
<b>Reset</b>		Constant red
<b>Overload</b>		Flashing red-blue or red-green
<b>SensorTeach function in the 600 000 pC range</b>		Flashing yellow, 1 Hz
<b>SensorTeach function in the 6000 pC range</b>		Flashing yellow, 2 Hz
<b>Ready for firmware update</b>		Flashing white, 2 Hz
<b>Bootloader mode</b>		Flashing red, 1 Hz
<b>Device identification</b>		Blue, yellow, red and green in succession, 2 Hz
<b>Unit connections</b>		
<b>System input/output</b>		M12 plug, pin-compatible with CMA amplifier, 8 pins
<b>Ethernet input</b>		M12 socket, 4 pins, with protective cap
<b>Digital input/output</b>		M12 plug, 5 pins, with protective cap
<b>Sensor input</b>		CMD600: BNC socket; CMD600-P: 10-32 UNF, socket, tightening torque $\leq 1.5$ Nm
<b>Ethernet communications interface</b>		
System interface for amplifier parameterization and transmission of measured values at max. 1 kHz transfer rate		
<b>Transmission protocol</b>	Mbit/s	TCP/IP, can be networked per IEEE802
<b>Transfer rate, max.</b>	Mbit/s	10
<b>Topology (twisted pairs)</b>		2
<b>Connector socket</b>		M12, socket with protective cap
<b>Cable type</b>		UTP category 5 or shielded twisted pair (STP)
<b>Digital control signals</b>		
<b>System input/output</b>		Voltage supply; Reset/Measure; SensorTeach; TEDS; analog output signal
<b>Ethernet input</b>		PC/PLC connection, measured value streaming
<b>Digital input</b>		
<b>Number</b>		1
<b>Switching actions, selectable</b>		One-off, peak-value memory clearing (min./max.), RUN/HOLD analog output signal hold
<b>Response time</b>	ms	0.1

<b>Input voltage range</b>	V	0 ... 30
<b>Active input level can also be selected inverted</b>	V	0 or 24
<b>Switching voltages</b>		
Logical High level	V	12 ... 30
Logical Low level	V	0 ... 5 or open input
<b>Input current at 24 V, typical</b>	mA	4
<b>One-way fitting</b>	V	-30 ... 0
<b>Digital input latency times</b>	ms	2
<b>Digital output</b>		
<b>Number</b>		2
<b>Switching actions, selectable</b>		Limit value switch 1 or 2, overload, manual actuation, device error, parameter set selection
<b>Response times</b>	ms	0.1
<b>Active voltage level can also be selected inverted, separately for each output</b>	V	0 or 24
<b>Output voltage</b> (like supply voltage), nom.	V	24
<b>Voltage drop</b> with load, max.	V	1
<b>Output current</b> at operating temperature	mA	350
<b>Short-circuit current, typical</b>	A	0.7
<b>Short-circuit period</b>		unlimited
<b>Latency times of digital outputs</b>	ms	2
<b>General data</b>		
<b>Supply voltage</b> overvoltage and one-way fitting	V <sub>DC</sub>	24 (18 ... 30)
<b>Voltage supply buffer capacitor</b>	μF	220
<b>Electrical isolation</b>		Electrical isolation of signal input and signal output from the voltage supply. Electrical isolation of signal input/signal output from the digital I/Os including the control inputs (Reset/Operate, SensorTeach). No electrical isolation of the digital I/Os and control inputs (Reset/operate, SensorTeach) from the voltage supply. The CMD600 housing must be grounded.
<b>Supply current</b> (24 V), without digital outputs	mA	160
<b>Number of parameter sets/measurement programs in the device</b>		2 plus factory settings, saved in EEPROM
<b>Typical switching times between parameter sets,</b> in the measuring range < 6000 pC without range selection in all other cases	ms ms	5 160
<b>Vibration resistance</b> 20 ... 2000 Hz, duration 16 min., cycle 2 min. <b>Impact</b> ; duration 1 ms	m/s <sup>2</sup> m/s <sup>2</sup>	100 2000
<b>Nominal (rated) temperature range</b> , non-condensing	°C	0 ... 60
<b>Operating temperature range</b> , non-condensing	°C	-40 ... +80
<b>Relative humidity (maximum)</b> , non-condensing	%	93, at +40°C ± 2°C
<b>Dimensions (L x W x H)</b>	mm	115 x 64 x 35
<b>Weight</b>	g	350
<b>Housing material</b>		Die-cast aluminum
<b>Degree of protection</b> , with connected cable or with protective caps		CMD600: IP60; CMD600-P: IP65
<b>EMC conformity</b>		
in accordance with EN 61326-1: 2007, EN 61326-2-3: 2007		in an industrial environment

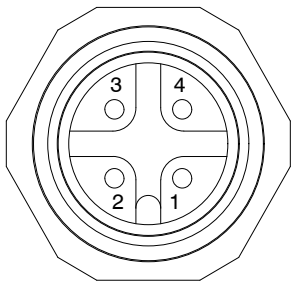
## Connector pin assignment

### SYSTEM input/output connector plug (view of pins in CMD600/CMD600-P)



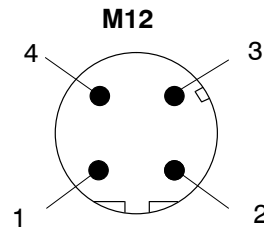
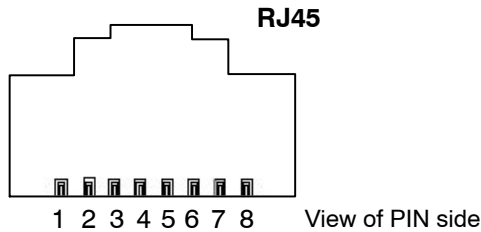
PIN no.	Signal name	Description	Values	Color code KAB 168...
1	Supply ground	-	-	wh
2	SensorTeach	Digital input, active High	+12 ... +30 V	br
3	RESET/MEASURE	Digital input, active High	+12 ... +30 V	gn
4	TEDS	-	-	ye
5	Charge out	Output signal	± 10 V	gy
6	Ground output	Ground output signal	-	pk
7	no function	no function	-	bu
8	Voltage supply	Voltage supply between pins 8 and 1	+18 ... +30 V	rd

### ETHERNET connector socket (view of pins in CMD600/CMD600-P)



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

### CMD600/CMD600-P Ethernet cable pin assignment to PC



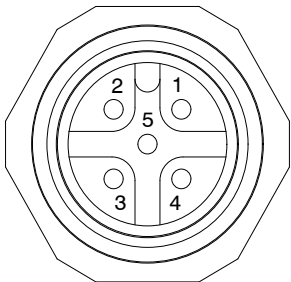
#### Patch cable

RJ45	M12
1	1
2	3
3	2
6	4

#### Crossover cable (1-KAB284-2)

RJ45	M12
1	2
2	4
3	1
6	3

### DIGITAL I/O connector socket (digital input/digital outputs, view of pins in CMD600/CMD600-P)

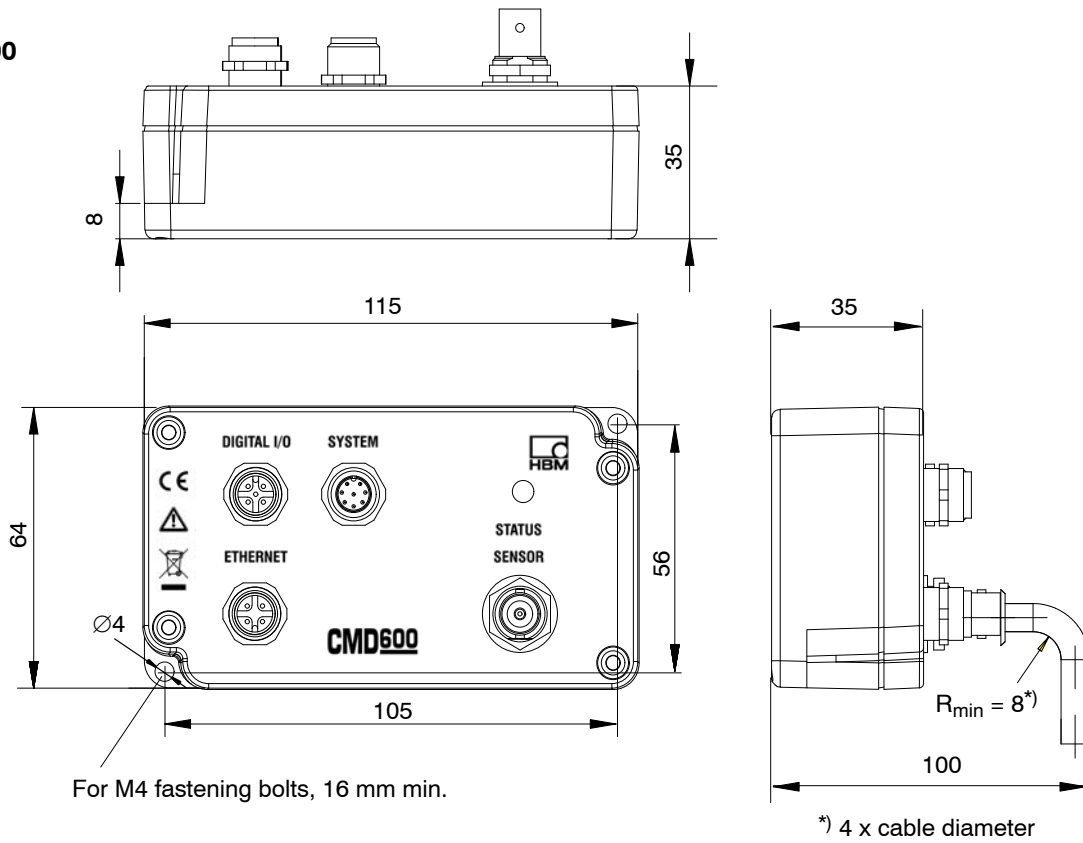


PIN no.	Signal name	Description	Values
1	Digital Out	Digital output 1	VCC/ 350 mA max.
2	VCC	Supply for digital output 1/2	+18 ... +30 V
3	Digital Out	Digital output 2	VCC/ 350 mA max.
4	Digital In	Digital input 1	+12 ... +30 V
5	Supply ground	-	-

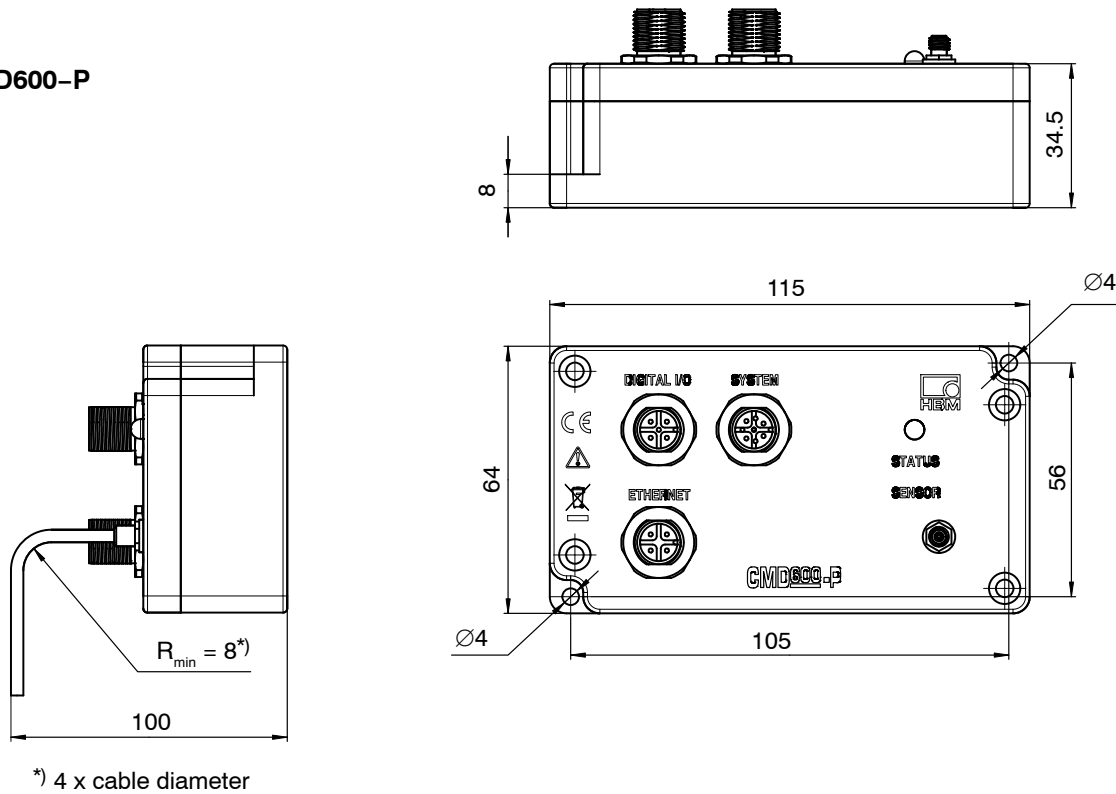
# Dimensions

Dimensions in mm (1 mm = 0.03937 inches)

## CMD600



## CMD600-P



## Scope of supply

Ordering number	
1-CMD600	Single-channel charge amplifier for piezoelectric sensors, measuring range 50 ... 600 000 pC; includes protective caps, protection class IP60, transducer connection with BNC
1-CMD600-P	Single-channel charge amplifier for piezoelectric sensors, measuring range 50 ... 600 000 pC; includes protective caps, protection class IP65, transducer connection with 10-32 UNF
CD-ROM with operating manual, CMD600/CMD600-P command set, CMD600 Assistant parameterization software <sup>1)</sup>	

<sup>1)</sup> You can obtain the latest version of the CMD600 Assistant free of charge from <http://www.hbm.com/support>

## Accessories

Ordering number	
1-KAB168-5	8-wire cable for voltage supply and processing electronics, M12 x 1 cable plug, 5 m long, free ends
1-KAB168-20	8-wire cable for voltage supply and processing electronics, M12 x 1 cable plug, 20 m long, free ends
1-KAB143-x	Sensor connection cable, coaxial, 10-32 UNF plug at both ends, available in 2 m, 3 m and 7 m lengths
1-KAB145-x	Sensor connection cable, coaxial, 10-32 UNF plug at both ends, robust design, available in 0.2 m and 3 m lengths
1-KAB176-x	Sensor connection cable, with 10-32 UNF plug and BNC connector plug, coaxial, available in 2 m and 3 m lengths
1-CON-P3001	BNC to 10-32 UNF sensor adapter
1-KAB284-2	CMD600/CMD600-P Ethernet cable to PC, M12 to RJ45, 2 m long
1-CON-S1002	Connector socket for digital I/O, M12 x 1, 5-pin, straight

Subject to modifications.  
All product descriptions are for general information  
only. They are not to be understood as a guarantee  
of quality or durability.

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