

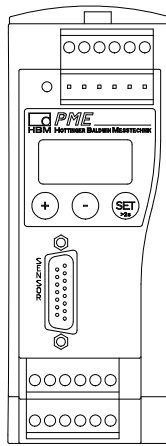


# PME

## Industrial Measurement Electronics



## Specifications for single-channel module: MP30



<b>Accuracy class</b>		<b>0.03</b>	
<b>Supply voltage</b>	V <sub>DC</sub>	24; Potential separation from measuring system (typ. 500 V <sub>DC</sub> )	
<b>Permitted supply voltage range</b>	V <sub>DC</sub>	18...30	
<b>Power consumption, max.</b>	W	9	
<b>Amplifier</b>			
<b>Carrier frequency (± 1 %)</b>	Hz	600	
<b>Bridge excitation voltage U<sub>B</sub> (± 5 %)</b>	V <sub>rms</sub>	5	2.5 <sup>1)</sup>
<b>Transducers that can be connected</b> S.G full bridge	Ω	60...5000	
<b>Permitted length of cable between transducer and amplifier, max.</b>	m	500	
<b>Maximum permitted common-mode voltage</b>	V	± 5	
<b>Common-mode rejection</b>			
0...60 Hz	dB	> 120	
0...600 Hz	dB	> 94	
<b>Linearity deviation (typically), range 2 mV/V</b>	%	0.02	
<b>Noise voltage</b> , when U <sub>B</sub> =5 V, relative to the input, measuring range ± 3 mV/V			
0...1 Hz	μV/V <sub>PP</sub>	0.05	
0...20 Hz	μV/V <sub>PP</sub>	0.2	
<b>Measurement frequency range, adjustable (-1 dB)</b>	Hz	0.05 ... 20	
<b>Max. display resolution</b>		999 999 digits at 6.67 % of amplifier input range	
<b>Min. display resolution</b>		10 digits at 100 % of amplifier input range	
<b>Input sensitivity</b>	mV/V	0.15 ... 3	
Ranges (selectable via DIP switch)			
at U <sub>B</sub> =5 V	mV/V	0.15 ... 3	
at U <sub>B</sub> =2.5 V	mV/V	0.3 ... 6	
<b>Low pass filter</b>	Hz	0.05 ... 20	
		Adjustable in steps of 0.05 to 20 Hz (Bessel and Butterworth filter characteristics)	
<b>Effect of change in operating voltage in the specified range,</b> relative to full scale			
on zero point	%	< 0.01	
on sensitivity	%	< 0.01	
<b>Effect of change in ambient temperature of 10 K</b>		<b>with Autocal</b>	<b>without Autocal</b>
on zero point	μV/V	0.1	0.5
on sensitivity	%	0.01 typ.; 0.02 max.	0.05
<b>Long-term drift over 48 hours</b> measuring range 3 mV/V (30 minutes after switching on)	μV/V	< 0.2	< 2

<sup>1)</sup> in conjunction with Zener barriers for explosion protection

## Filter data

### MP30

#### Bessel

Nominal value / Hz	(-1dB)/Hz	(-3dB)/Hz	Phase delay / ms	Rise time (10-90%) / ms	Overshoot / %
20	18.5	36.0	4.3	10.0	0
10	9.8	19.3	8.2	18.3	0
5	4.9	9.6	16.4	36.6	0
2	2.1	4.1	38.7	86.4	0
1	1.0	1.99	79.3	175	0
0.5	0.50	0.97	160	359	0
0.2	0.20	0.39	400	898	0
0.1	0.10	0.20	800	1795	0
0.05	0.05	0.10	1600	3590	0

#### Butterworth

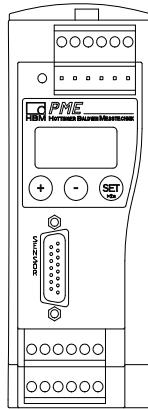
Nominal value / Hz	(-1dB)/Hz	(-3dB)/Hz	Phase delay / ms	Rise time (10-90%) / ms	Overshoot / %
20	19.5	26.2	7.8	12.8	6.8
10	9.8	15.5	13.5	21.8	1.7
5	4.9	7.7	27	43.6	1.7
2	1.96	3.1	67	109	1.7
1	0.98	1.55	135	218	1.7
0.5	0.49	0.77	270	436	1.7
0.2	0.2	0.3	670	1090	1.7
0.1	0.1	0.16	1350	2180	1.7
0.05	0.05	0.08	2700	4360	1.7

#### Notes

The phase delays have been determined up to digitization. For the total phase delays up to the analog output, about 4.5 ms have to be added; for interface output, the current update rate has to be taken into account.

If not specified otherwise, all specifications apply for a bridge excitation voltage of 5 V.

## Specifications for single-channel module: MP55



<b>Accuracy class</b>		<b>0.1</b>		
<b>Supply voltage</b>	$V_{DC}$	24; Potential separation from measuring system (typ. 500 $V_{DC}$ )		
<b>Permitted supply voltage range</b>	$V_{DC}$	18...30		
<b>Power consumption, max.</b>	W	9		
<b>Amplifier</b>				
<b>Carrier frequency (<math>\pm 1\%</math>)</b>	kHz	4.8		
<b>Excitation voltage <math>U_B</math> (<math>\pm 5\%</math>)</b>	$V_{rms}$	5	2.5	1
<b>Transducers that can be connected</b>				
Strain gauge half and full bridges	$\Omega$	220...5000	110...5000	60...5000
Inductive half and full bridges, LVDTs	mH	8...160	4...160	2...160
<b>Permitted length of cable between transducer and amplifier, max.</b>	m	500		
<b>Maximum permitted common-mode voltage</b>	V	$\pm 5$		
<b>Common-mode rejection</b>				
0...500 Hz	dB	120		
0...4800 Hz	dB	72		
<b>Maximum differential voltage</b>	mV	$\pm 30$		
<b>Linearity deviation (typical)</b>	%	0.025		
<b>Noise voltage, at <math>U_B=5</math> V, by reference to input</b>		Range (mV/V)		
		3	50	500
0...10 Hz	$\mu V/V_{SS}$	0.2	3	30
0...500 Hz	$\mu V/V_{SS}$	1.5	25	250
<b>Measurement frequency range, adjustable (-1 dB)</b>	Hz	0.05...500		
<b>Max. display resolution</b>		999 999 digits at 6.67 % of amplifier input range		
<b>Min. display resolution</b>		10 digits at 100 % of amplifier input range		
<b>Input sensitivities</b>		low	middle	high
Ranges (selectable via DIP switch)				
at $U_B=5$ V	mV/V	0.15...3	2.5...50	25...500
at $U_B=2.5$ V	mV/V	0.3...6	5...100	50...1000
at $U_B=1$ V	mV/V	0.75...15	12.5...250	125...2500
<b>Low pass filter</b>		Adjustable in steps of 0.05 to 500 Hz (Bessel and Butterworth filter characteristics)		
<b>Effect of change in operating voltage in the specified range, relative to full scale</b>				
on zero point	%	< 0.01		
on sensitivity	%	< 0.01		
<b>Effect of 10 K change in ambient temperature of 10 K, at <math>U_B=5</math> V</b>				
on zero point full bridge	$\mu V/V$	3 mV/V	50 mV/V	500 mV/V
on zero point half bridge	$\mu V/V$	1	10	100
on sensitivity	%	10	20	100
<b>Long-term drift over 48 hours</b>				
Range 3 mV/V (30 minutes after switching on)	$\mu V/V$	0.05	0.05	0.05
			1	

## Filter data

### MP55

#### Bessel

Nominal value / Hz	(-1dB)/Hz	(-3dB)/Hz	Phase delay / ms	Rise time (10-90%) / ms	Overshoot / %
500	690	780	0.1	0.5	16
200	250	315	0.4	0.9	0
100	99.5	189	0.85	1.85	0
50	50.4	97.5	1.68	3.5	0
20	20.0	39.2	4.1	8.8	0
10	9.8	19.2	8.3	17.9	0
5	4.92	9.58	16.5	36.3	0
2	1.97	3.86	41.0	90.2	0
1	0.99	1.95	81.6	179	0
0.5	0.50	0.97	164	359	0
0.2	0.20	0.39	410	898	0
0.1	0.10	0.20	820	1795	0
0.05	0.05	0.10	1640	3590	0

#### Butterworth

Nominal value / Hz	(-1dB)/Hz	(-3dB)/Hz	Phase delay / ms	Rise time (10-90%) / ms	Overshoot / %
500	690	780	0.1	0.5	16
200	240	295	0.55	1.1	3.0
100	100.0	142.4	1.38	2.23	5.2
50	49.9	69.7	3.0	4.9	4.6
20	20.8	31.2	6.9	10.8	2.5
10	10.4	15.6	13.8	21.6	2.5
5	5.2	7.8	27.6	43.2	2.5
2	2.08	3.12	69	108	2.5
1	1.04	1.56	138	216	2.5
0.5	0.52	0.78	276	432	2.5
0.2	0.21	0.31	690	1080	2.5
0.1	0.10	0.16	1380	2160	2.5
0.05	0.05	0.08	2760	4320	2.5

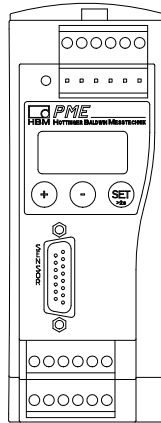
#### Notes

The specified values were determined at a modulation of 5 % of the measurement range.

The phase delays have been determined up to digitization. For the total phase delays up to the analog output, about 0.6 ms have to be added; for interface output, the current update rate has to be taken into account.

If not specified otherwise, all specifications apply for a bridge excitation voltage of 5 V.

## Specifications for single-channel module: MP60



<b>Accuracy class</b>		<b>0.05</b>
<b>Supply voltage</b>	$V_{DC}$	24; potential separation from measuring system (typ. 500 $V_{DC}$ )
<b>Permitted supply voltage range</b>	$V_{DC}$	18...30
<b>Power consumption, max.</b>	W	9
<b>Amplifier</b>		
<b>Transducers that can be connected</b>		HBM torque transducer type series T10F-KF1, T4WAS3, T30FN – T34FN in conjunction with MP07; T10F-SF1 and SU2 can be connected directly Incremental transducer Frequency signal sources
<b>Input</b> Cable length	m	Differ. inputs for symmetrical and asymmetrical freq. signals 70
<b>Input level<sup>1)</sup></b> Each line to measurement earth Signal amplitude	V $V_{pp}$	-5 ... +5 > 1
<b>Hysteresis</b> , switch over threshold selectable in steps	V	0.25
<b>Trigger level</b>	V	± 5 (adjustable in steps of 250 mV)
<b>Input impedance<sup>2)</sup></b> (input level -5 V... +5 V)	k $\Omega$	>100
<b>Input filter</b>		Glitch filter, disconnectable
<b>Detection of direction of rotation</b>		via additional ± 90 ° phase-shifted frequency signal
<b>Frequency quadrupling</b> <b>Input range</b> Frequency measurement	kHz	connectable 0.0001...1 0.001...10 0.02...20 0.01...100 0.1...1000 0...999999 0...5 × 10 <sup>6</sup> 0...1 × 10 <sup>9</sup> (Kilo-Pulses)
Pulse counting	pul.	
<b>Resolution</b> (for frequency measurement)	%	0.01 of measurement value
<b>Maximum pulse rate</b>	pul./s	1 000 000
<b>Linearity deviation</b>	%	0.01
<b>Low-pass filter</b>	Hz	disconnectable and adjustable in steps of 0.05 to 500 Hz (Bessel and Butterworth filter characteristics)
Sampling rate with filter deactivated	1/s	4800
<b>Calibration accuracy</b>	%	0.01
<b>Long-term drift over 48 hours</b> 30 minutes after switching on	%	< 0.01
<b>Effect of change in operating voltage in the specified range</b> (in relation to full scale) on sensitivity	%	0.01
<b>Effect of 10 K change in ambient temperature</b> on sensitivity	%	0.01

<sup>1)</sup> Levels of up to ± 30 V are permitted and are internally limited to ± 5V

<sup>2)</sup> The input impedance for level > ± 5 V is approx. 3 k $\Omega$

## Filter data

### MP60

#### Bessel

Nominal value / Hz	(-1dB)/Hz	(-3dB)/Hz	Phase delay / ms	Rise time (10-90%) / ms	Overshoot / %
Aus	800	1500	0.15	0.3	1
500	480	750	0.20	0.5	1.7
200	204	375	0.31	0.8	0
100	102	185	0.79	1.7	0
50	47.5	90.8	1.75	3.7	0
20	20.3	40.1	4.0	8.8	0
10	9.8	19.2	8.3	18.3	0
5	4.8	9.5	16.7	36.7	0
2	2.0	3.99	39.9	86.7	0
1	1.0	1.95	81.0	178	0
0.5	0.49	0.97	164	359	0
0.2	0.20	0.39	409	899	0
0.1	0.10	0.20	818	1800	0
0.05	0.05	0.10	1636	3600	0

#### Butterworth

Nominal value / Hz	(-1dB)/Hz	(-3dB)/Hz	Phase delay / ms	Rise time (10-90%) / ms	Overshoot / %
Aus	800	1500	0.15	0.3	1
500	480	750	0.20	0.5	1.7
200	205	357	0.31	0.8	7.8
100	101	148	1.1	2.5	3.0
50	50.3	70.5	2.8	4.6	3.8
20	20.0	31.2	6.7	10.8	1.8
10	10.1	15.4	14.0	22.1	2.0
5	5.0	7.7	28.0	44.2	2.0
2	2.0	3.4	61.7	99.6	0.5
1	1.0	1.7	123	199	0.5
0.5	0.5	0.85	246	398	0.5
0.2	0.2	0.27	802	1254	4.7
0.1	0.1	0.14	1604	2508	4.7
0.05	0.05	0.07	3208	5016	4.7

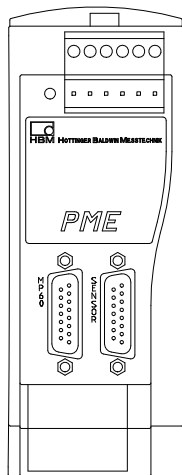
#### Notes

The specified values were determined at a modulation of 5 % of the measurement range.

The phase delays have been determined up to digitization. For the total phase delays up to the analog output, about 0.6 ms have to be added; for interface output, the current update rate has to be taken into account.



**MP07 excitation voltage module** for use with HBM torque transducers with square wave supply, with MP60 (DP) connected



<b>Supply voltage</b>	$V_{DC}$	24
<b>Supply voltage range</b>	$V_{DC}$	18...30
<b>Output voltages</b>	V	+15 V, 100 mA -15 V, 100 mA
Measurement/CAL	$V_{pp}$	54/80; 24...25 kHz
<b>Potential separation</b> (type-tested as per EN 6100-1:1993)		
Supply voltage for $\pm 15$ V	$V_{DC}$	500
Supply voltage for driving CAL signal	$V_{DC}$	500
Driving CAL signal for $\pm 15$ V	$V_{DC}$	500
<b>Power consumption, max.</b>	W	7.5 (T32FNA)
<b>Effect of change in operating voltage in the specified range</b>		
on output voltage $\pm 15 V_{DC}$	%	0.5 of full scale
on output voltage 54/75 $V_{pp}$	%	2 of full scale
<b>Effect of change in ambient temperature of 10 K</b>		
on output voltage $\pm 15 V_{DC}$	%	0.5 of full scale
on output voltage 54/75 $V_{pp}$	%	1 of full scale
<b>Long-term drift over 48 hours</b>		
all output voltages	%	1
<b>Nominal temperature range</b>	$^{\circ}C$ [ $^{\circ}F$ ]	0...50 [32...122]
<b>Operating temperature range</b>	$^{\circ}C$ [ $^{\circ}F$ ]	-20...+50 [-4...122]
<b>Storage temperature range</b>	$^{\circ}C$ [ $^{\circ}F$ ]	-20...+70 [-4...158]
<b>Degree of protection</b>		IP20
<b>Dimensions (W x H x D), approx.</b>	mm	59 x 150 x 152
<b>Weight, approx.</b>	g	565

## General specifications for single-channel modules: MP30, MP55, MP60

<p><b>Analog output</b></p> <p>Impressed voltage</p> <p>Permitted load resistance, min.</p> <p>Internal resistance, max.</p> <p>Impressed current</p> <p>Permitted load resistance, max.</p> <p>Internal resistance, min.</p> <p>The analog output may show gross, net, positive and negative peaks and peak-to-peak values.</p> <p><b>Analog output scale range, min.</b></p> <p><b>Analog output scale range, max.</b></p> <p><b>Output noise voltage, typically</b></p> <p><b>Long-term drift over 48 hours</b> (30 minutes after switching on)</p> <p><b>Effect of 10 K change in ambient temperature (in addition to the digital value)</b></p> <p>on zero point</p> <p>voltage</p> <p>current</p> <p>on sensitivity</p>	<p>V</p> <p>kΩ</p> <p>Ω</p> <p>mA</p> <p>Ω</p> <p>kΩ</p> <p>mV<sub>noise</sub></p> <p>mV</p> <p>mV</p> <p>μA</p> <p>%</p>	<p>± 10</p> <p>10</p> <p>10</p> <p>± 20; 4...20</p> <p>500</p> <p>100</p> <p>0.17 V (0.5 V<sup>1)</sup>) at 100 % of amplifier input range</p> <p>10 V at 3.67 % (1 %<sup>1)</sup>) of amplifier input range</p> <p>10</p> <p>&lt; 3</p> <p>3</p> <p>6</p> <p>0,05</p>
<p><b>Additional functions</b></p> <p><b>Limit switches</b></p> <p>Number</p> <p>Reference level</p> <p>Hysteresis</p> <p>Adjustment accuracy</p> <p>Response time</p>	<p>%</p> <p>%</p> <p>ms</p>	<p>4</p> <p>Gross, net, peak values</p> <p>0...100</p> <p>0.0033</p> <p>1</p>
<p><b>Peak-value stores</b></p> <p>Number</p> <p>Function</p> <p>Updating time</p> <p><b>Clear peak value store</b></p> <p><b>Hold current sample/peak value</b></p> <p><b>Discharge rate of the envelope</b></p>	<p>ms</p> <p>ms</p> <p>ms</p> <p>Physic. unit/s</p>	<p>2</p> <p>Positive, negative, peak-to-peak</p> <p>1</p> <p>2</p> <p>2</p> <p>0 to 999999</p>
<p><b>Control outputs</b></p> <p>Number</p> <p>Nominal voltage, external power supply</p> <p>Permitted supply voltage range</p> <p>Output current, max.</p> <p>Short-circuit current, typical</p> <p>Short-circuit period</p> <p>Isolation voltage, typical</p> <p>Functions:</p> <p>Output 1</p> <p>Output 2</p> <p>Output 3, output 4</p> <p><b>Control inputs</b></p> <p>Number</p> <p>Functions</p> <p>Input voltage range, LOW</p> <p>Input voltage range, HIGH</p> <p>Input current, typical, HIGH level = 24 V</p> <p>Isolation voltage, typical</p>	<p>V</p> <p>V</p> <p>A</p> <p>A</p> <p>V<sub>rms</sub></p> <p>V</p> <p>V</p> <p>mA</p> <p>V<sub>rms</sub></p>	<p>4</p> <p>24</p> <p>18...30</p> <p>0.5 / 0.1<sup>1)</sup></p> <p>0.8 / 0.2<sup>1)</sup></p> <p>unlimited</p> <p>500</p> <p>selectable: LIV1 – LIV4, error<sup>2)</sup>, idle, signal F1<sup>1)</sup> (typically up to 300 kHz), counting pulse (1.6 μs width)<sup>1)</sup></p> <p>selectable: LIV1 – LIV4, error<sup>2)</sup>, idle, signal F2<sup>1)</sup> (typically up to 300 kHz), direction of rotation<sup>1)</sup></p> <p>selectable: LIV1 – LIV4, error<sup>2)</sup></p> <p>4</p> <p>tare, zero setting, peak-value/current value, parameter set selection, shunt<sup>1)</sup></p> <p>0...5</p> <p>10...30</p> <p>12</p> <p>500</p>
<p><b>Parameter memory (EEPROM)</b></p>		<p>4 ( plus factory setting)</p>

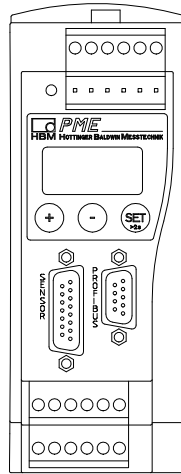
<sup>1)</sup> only MP60

<sup>2)</sup> Errors are output at the digital output upon occurrence of an initial calibration error, hardware, ADC, gross, net, analog output, measuring range overflow, or CAN send error.

## General specifications for single-channel modules: MP30, MP55, MP60 ... continued

<b>Interface</b> Sampling rate, approx. Protocol Hardware bus link  Baud rate Maximum length of cable	  kBit/s m	Maximum 1000 samples/s CAN 2.0B, CAL/CANopen compatible in accordance with ISO 11898  1000 500 250 125 100 50 20 10 25 100 250 500 600 1000 1000 1000
<b>Display</b> Type Keyboard  <b>Nominal temperature range</b> <b>Service temperature range</b> <b>Storage temperature range</b>	  °C [ °F] °C [ °F] °C [ °F]	2-lines, 8-digit alphanumeric, LCD Keypad with 3 touch-sensitive control buttons  0...50 [ 32...122] -20...+50 [ -4...122] -20...+70 [ -4...158]
<b>Degree of protection</b> <b>Dimensions, overall (W x H x D)</b> <b>Weight, approx.</b>	 mm g	IP20  59 x 150 x 152 750
<b>Mechanical stress</b> (test similar to DIN IEC 60068, part 2–6) Vibration (30 min each direction) <b>Impact</b> (3 times each direction, impact duration 11ms) (test similar to DIN IEC 60068, part 2–27)	 m/s <sup>2</sup> m/s <sup>2</sup>	 25 (5...65 Hz) 200

## MP30DP, MP55DP, MP60DP single-channel modules

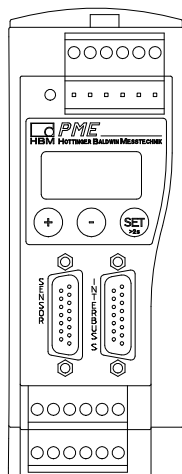


Specifications see basic version, with Profibus DP interface expansion:

<b>Protocol</b>		Profibus DP slave, as per DIN 19245-3
<b>Baud rate, max.</b>	MBaud	12
<b>Participant address</b>		3 – 123, can be set via keyboard
<b>Profibus ID number</b>		04CF (hex)
<b>Configuration data</b>	Bytes	5
<b>Parameter data, max.</b>	Bytes	6 (+7byte DP Standard)
<b>Input data, max.</b>	Bytes	26
<b>Output data, max.</b>	Bytes	18
<b>Update rate, input data</b>	ms	1 ms at 1 measurement value, < 3.4 ms otherwise
<b>Update rate, output data</b>	ms	<10 (taring, zeroing, limit value); <1 s (parameter sets)
<b>Diagnosis data</b>		1byte version and 4byte module diagnostics
<b>Profibus connection</b>		9-pin sub-D (DIN 19245-3), potential-separated from power supply and measurement earth
<b>CAN Bus (PDO rate), max.</b>	Meas/s	20
<b>Supply voltage</b>	V	24 (18...30)
<b>Supply current</b>	mA	approx. 320

<sup>1)</sup> 00B2 (hex) for MP55DP  
0466 (hex) for MP60DP

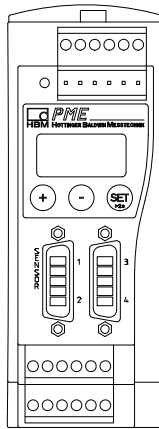
## MP55IBS single-channel module



Specifications see basic version, with Interbus S interface expansion:

Protocol		Interbus-S slave, to IEC61158
<b>Baud rate</b>	kBit/s	500 (2 MBit/s by using solderable resistors)
<b>Operating mode</b>		Remote bus 2-wire
<b>Input data, max.</b>	byte	20
<b>Output data, max.</b>	byte	20
<b>Update rate, input data</b>	ms	< 1 (4 bytes data, step 1)
<b>Update rate, output data</b>	ms	< 10 (taring, zeroing) < 100 (limit value) < 500 (parameter sets)
<b>PCP</b>		Not supported
<b>CAN Bus (PDO rate), max.</b>	Meas/s	20
<b>Supply voltage MP55IBS</b>	V	24 (18...30)
<b>Supply current (at 24 V)</b>	mA	approx. 300
<b>Interbus-S connection</b>		DB 15-pin female connector Y-cable for connection to two 9-pin sub-D connectors Inputs isolated from supply and measurement ground

## MP01 multi-channel module



<b>Accuracy class</b>		0.1
<b>Supply voltage</b>	V <sub>DC</sub>	24; potential separation from measurement system (typically 500 V <sub>DC</sub> ) type-tested in accordance with EN61010-1:1993
<b>Permitted supply voltage range</b>	V <sub>DC</sub>	18...30
<b>Power consumption, max.</b>		
Without transducer excitation	W	9
Using 4 supplied transducers (20 mA each)	W	6
<b>DC amplifier</b>		
<b>Transducers that can be connected</b>		voltage source, current source, 2-wire transmitter, Pt100, thermocouple (types J, K, S, T)
<b>Number of channels, max.</b>		4 channels
With Pt100		2 channels
<b>Sampling rate</b>		
In single-channel operation	1/s	1200 measurements
Combined sampling rate in multi-channel operation	1/s	600 measurements (with thermocouples the cold junction counts as an additional channel)
<b>Voltage source</b>		
<b>Nominal measuring range</b>	V	± 10
<b>Input signal range</b>	V	± 10.8
<b>Scaling:</b>		
Max. display resolution	d	999 999 for 40 % of the nominal measuring range
Min. display resolution	d	10 for 100 % of the nominal measuring range
<b>Current source</b>		
<b>Nominal measuring range</b>	mA	± 20
<b>Input signal range</b>	mA	± 20.5
<b>Scaling:</b>		
Max. display resolution	d	999 999 for 40 % of the nominal measuring range
Min. display resolution	d	10 for 100 % of the nominal measuring range
<b>2-wire transmitter</b>		
<b>Nominal measuring range</b>	mA	4...20
<b>Input signal range</b>	mA	± 20.5
<b>Scaling:</b>		
Max. display resolution	d	999 999 for 40 % of the nominal measuring range
Min. display resolution	d	10 for 100 % of the nominal measuring range
<b>Excitation voltage, typically</b>	V	14
<b>Pt100</b>		
<b>Nominal measuring range</b>	Ω	18.5...390, corresponding to -200...850 °C as per IEC 751
<b>Input signal range</b>	Ω	0...450
<b>Scaling</b>		fixed allocation of the input quantity to temperature, max. 2 decimal places
<b>Supply current, typically</b>	mA	1

## MP01 multi-channel module ... continued

<b>Thermocouple</b>		
<b>Nominal measuring range</b>		corresponds to the linearization table for the type of thermocouple; see below
<b>Input signal range</b>	mV	± 100
<b>Scaling</b>		fixed allocation of the input quantity to temperature, max. 2 decimal places
<b>Linearization:</b>		
Type J	°C [ °F]	-200...+1000 [-328...1832]
Type K	°C [ °F]	-200...+1360 [-328...2480]
Type S	°C [ °F]	0...+1700 [ 32...3092]
Type T	°C [ °F]	-260...+400 [-436...752]
<b>Effect of line resistance, typically</b>	μV/kΩ	< 35 <sup>1)</sup>
<b>Cold-spot compensation via internal cold junction at the connecting terminal</b>		
<b>Maximum permitted common-mode voltage</b>	V	± 10
<b>Common-mode rejection</b>		
DC typ.	dB	90
50 Hz typ.	dB	80
60 Hz typ.	dB	80
<b>Linearity deviation</b>	%	0.05
<b>Low-pass filter</b>		Bessel or Butterworth filter characteristics
<b>Cut-off frequency at -1 dB:</b>		
Single channel operation, adjustable	Hz	0.05...250
Multi-channel operation, adjustable	Hz	0.05...20
<b>Effect of change in operating voltage in the specified range</b>		
on zero point	%	< 0.01 of full scale
on sensitivity	%	< 0.01 of full scale
<b>Effect of 10K change in ambient temperature</b>		
on zero point		
Voltage	mV	3
Current	mA	0.01
Pt100	Ω	0.5 <sup>2)</sup>
Thermovoltage	μV	50 <sup>1)</sup>
on sensitivity	%	0.1
<b>Long-term drift over 48 hours</b> (30min. after switching on)		
Voltage	mV	3
Current	mA	0.01
Pt100	Ω	0.5 <sup>2)</sup>
Thermovoltage	μV	50 <sup>1)</sup>
<b>Warm-up characteristics in measurement using thermocouples after 30 minutes, typically</b>	°C	2.5
<b>Analog output</b>		
<b>Function</b>		The analog output can display gross, net, positive, and negative peaks and peak-to-peak values.
<b>Impressed voltage</b>	V	± 10
Permissible load resistance	kΩ	min. 10
Internal resistance	Ω	max. 10
<b>Impressed current</b>	mA	± 20; +4...+20
Permissible load resistance	Ω	max. 500
Internal resistance	kΩ	min. 100
<b>Noise voltage, typically</b>	mV <sub>SS</sub>	10
<b>Long-term drift over 48 hours</b> (30 min. after switching on)	mV	3

<sup>1)</sup> 50 μV corresponds for thermocouple J at 0 °C to an error of about 1 °C. The actual accuracy of measurement depends additionally on the thermocouple used and its tolerances (Class 1, 2 etc.: see IEC-584-2). <sup>2)</sup> 0.5 Ω corresponds for the Pt100 at 0 °C to an error of about 1 °C

## MP01 multi-channel module ... continued

<b>Effect of 10 K change in ambient temperature</b> (in addition to digital value)			
on zero point	Voltage	mV	<3
	Current	μA	<6
on sensitivity		%	<0.1
<b>Scaling:</b>			
Voltage, current, 2-wire transmitter		V	min. 0.5 for 100 % of the nominal measuring range
		V	max. 10 for 3.5 % of the nominal measuring range
Pt100, thermocouples		V	10 at min. 10 °C [ 50 °F] ; 10 at max. 10000 °C [ 18032 °F]
<b>Additional functions</b>			
<b>Limit switches</b>			
Number (per channel)			2
Balancing value			gross, net, peak values
Hysteresis, adjustable		%	0...100
Adjustment accuracy		%	0.0033
Response time		ms	3.4
Response and drop-out delay, adjustable		s	0...50
<b>Peak-value stores</b>			
Number (per channel)			2
Function			positive, negative, peak-to-peak
Updating time in single-channel operation		ms	1
Updating time in multi-channel operation		ms	3.4
Clear, reaction time		ms	<5
Hold, reaction time		ms	<5
<b>Control outputs</b>			
Number (control outputs can be freely allocated to individual channels)			4
Function:			Peak value 1 ... peak value 4, error <sup>1)</sup>
Nominal voltage		V	24; ext. supply voltage
Permitted supply voltage		V	18...30
Output current, max.		A	0.5
Short-circuit current, typically		A	0.8
Short-circuit period			unlimited
Isolation voltage, typically		V <sub>DC</sub>	500
<b>Control inputs</b>			
Number (control inputs can be freely allocated to individual channels)			4
Functions:			tare, zero setting, peak value/current value, parameter set selection
Input voltage range LOW		V	0...5
Input voltage range HIGH		V	10...30
Input current typically (HIGH level=24 V)		mA	12
Isolation voltage, typically		V <sub>DC</sub>	500
<b>CAN interface</b>			
PDO rate max. in single-channel operation		M.value/s	max. 500 measurements
PDO rate max. in multi-channel operation		M.value/s	max. 100 measurements per channel
Protocol			CAN 2.0B, CAL/CANopen compatible
Hardware bus interfacing			in accordance with ISO 11898
Baud rate		kBit/s	1000 500 250 125 100 50 20 10
Maximum length of cable		m	25 100 250 500 600 1000 1000 1000

<sup>1)</sup> Errors are output at the digital output upon occurrence of an initial calibration error, hardware, ADC, gross, net, analog output, measuring range overflow, or CAN send error.



## MP01 multi-channel module ... continued

Parameter memory (EEPROM)		4 (plus factory setting)
Display		2-line, 8-position, alphanumeric; LCD
Keyboard	keys	Keypad with 3 touch-sensitive control buttons
Nominal temperature range	°C [ °F]	0...50 [ 32...122]
Service temperature range	°C [ °F]	-10...50 [ 14...122]
Storage temperature range	°C [ °F]	-20...70 [ -4...158]
Degree of protection to DIN IEC 60529		IP20
Dimensions (W x H x D)	mm	59 x 150 x 152
Weight, approx.	g	750
<b>Mechanical stress</b> : see specifications of single-channel modules, page 11		

## Filter data

### MP01

#### Bessel

Nominal value / Hz	(-1dB)/Hz	(-3dB)/Hz	Phase delay / ms	Rise time (10-90%) / ms	Overshoot / %
250	250	390	0.1	1.0	1.0
100	99.5	188	0.85	1.8	0
50	50.1	97.3	1.68	3.5	0
20	20.0	39.2	4.1	8.8	0
10	9.8	19.2	8.3	18.1	0
5	4.9	9.6	16.6	36.1	0
2	1.97	3.86	41	89.8	0
1	0.99	1.94	82	179	0
0.5	0.49	0.97	164	359	0
0.2	0.20	0.39	410	898	0
0.1	0.10	0.20	820	1795	0
0.05	0.05	0.10	1640	3590	0

#### Butterworth

Nominal value / Hz	(-1dB)/Hz	(-3dB)/Hz	Phase delay / ms	Rise time (10-90%) / ms	Overshoot / %
250	250	390	0.1	1.0	1.0
100	100	141	1.38	2.3	4.0
50	49.8	69.2	3.0	4.9	4.2
20	20.6	31.6	6.8	10.8	2.4
10	10.3	15.8	13.6	21.6	2.4
5	5.1	7.9	27	43.2	2.4
2	2.1	3.2	68	108	2.4
1	1.0	1.6	136	216	2.4
0.5	0.50	0.79	272	432	2.4
0.2	0.21	0.32	680	1080	2.4
0.1	0.10	0.16	1360	2160	2.4
0.05	0.05	0.08	2720	4320	2.4

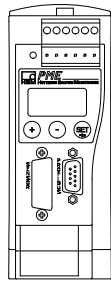
## Notes

The specified values were determined at a modulation of 5 % of the measurement range.

The phase delays have been determined up to digitization. For the total phase delays up to the analog output, about 1.5 ms have to be added; for interface output, the current update rate has to be taken into account.

The specified values apply for the single-channel mode. The maximum filter frequency for multi-channel mode is 20 Hz. The values change only marginally in multi-channel mode.

# CANopen Profibus-DP-Gateway MP70DP, MP70DPS7



Profibus DP <sup>1)</sup>		
<b>Protocol</b>		Profibus DP slave, as per DIN 19245-3
<b>Baud rate, max.</b>	Mbaud	12
<b>Participant address</b>		3 – 123, can be set via keyboard
<b>Profibus ID number</b>		0465 (hex)
<b>Configuration data, max.</b>	bytes	40
<b>Parameter data, max.</b>	bytes	20 (+7 bytes DP standard)
<b>Input data, max.</b>	bytes	240
<b>Output data, approx.</b>	bytes	240
<b>Update rate, input data</b>	ms	2 ms/channel
<b>Update rate, output data</b>	ms	<10 (taring, zeroing)
	ms	<100 (limit value level)
	ms	<500 (parameter sets)
<b>Diagnosis data</b>		14 byte module diagnosis
<b>Profibus connection</b>		9-pin sub-D (DIN 19245-3), potential-separated from power supply and measurement earth
<b>Measurement channels that can be connected, max.</b>		8 Channels (MP01, MP30, MP55, MP60)
<b>CAN Bus (PDO rate), max.</b>	Meas/s	1
The gateway module send rate to a controller and between the MP70DP(-S7) and the slave modules depends on the number of channels and the type of mathematical calculation that is performed.		
<b>Supply voltage</b>	V <sub>DC</sub>	24 (18-30)
<b>Permitted supply voltage range</b>	V <sub>DC</sub>	18...30
<b>Power consumption, max.</b>	W	9
<b>Parameter memory (EEPROM)</b>		4 ( plus factory settings)
<b>Display</b>		
Description		2-lines, 8-digit alphanumeric, LCD
Keyboard		Keypad with 3 touch-sensitive control buttons
<b>Nominal temperature range</b>	°C [°F]	0...50
<b>Operating temperature range</b>	°C [°F]	-20...+50
<b>Storage temperature range</b>	°C [°F]	-20...+70
<b>Degree of protection</b>		IP20
<b>Dimensions (B x H x T), approx.</b>	mm	59 x 150 x 152
<b>Weight, approx.</b>	g	700
<b>Mechanical stress</b>		
(test similar to DIN IEC 60068, part 2-6)		
<b>Vibration</b> (30 min each direction)	m/s <sup>2</sup>	25 (5...65 Hz)
<b>Impact</b> (3 times each direction, impact duration 11ms)	m/s <sup>2</sup>	200
(test similar to DIN IEC 60068, part 2-27)		
<b>CAN</b>		
<b>Interface</b>		
Protocol		CAN 2.0B, CAL/CANopen compatible
Hardware bus link		in accordance with ISO 11898
Baud rate		1000    500    250    150    20    10
Maximum length of cable		25    100    250    500    1000    1000
<b>Additional functions</b> Mathematical calculations		Summing of gross values from up to 8 channels Summing, averaging, multiplication of the signal values of up to 8 measurement channels. Gross, net, or min/max values are available as signal values.

<sup>1)</sup> Not for MP70S7

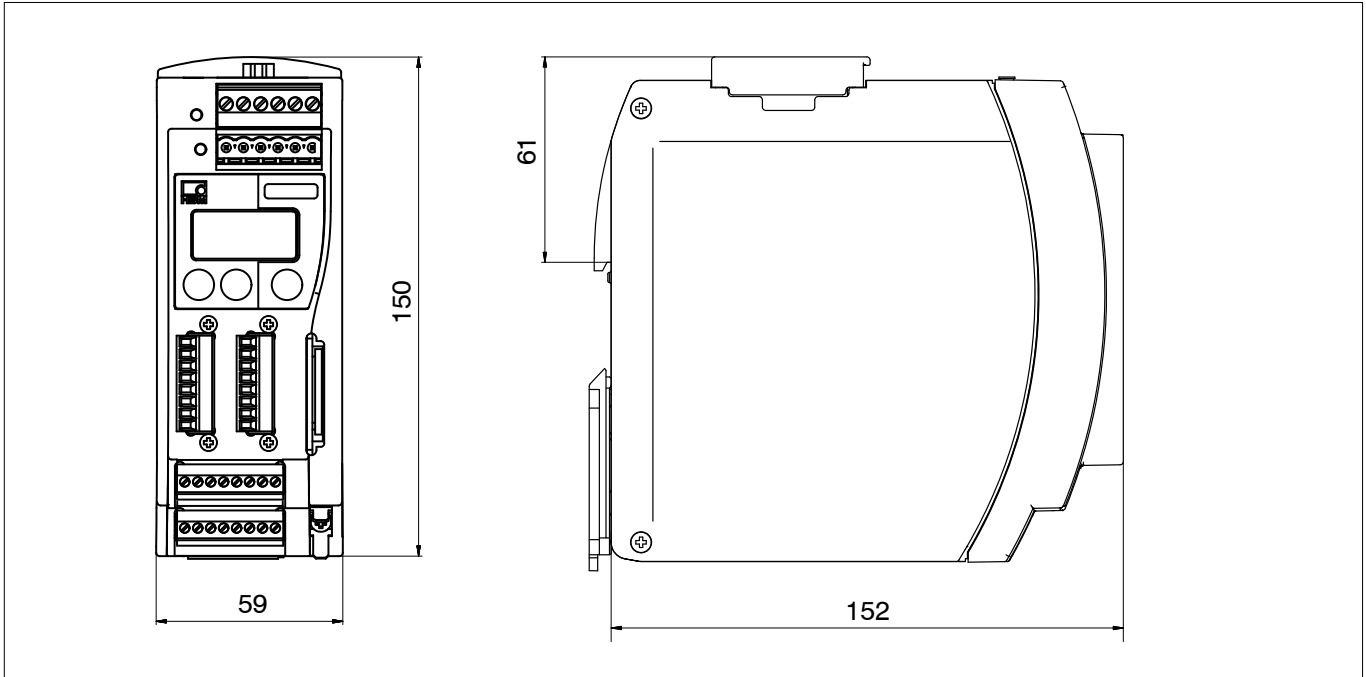
## MP70DPS7

The MP70DPS7 module is an extension of the DP version. An additional analog output and four control inputs and outputs each are available through plug terminals.

<b>Analog output</b> Impressed voltage Permitted load resistance, min. Internal resistance. max. Impressed current Permitted load resistance, max. Internal resistance. min. The analog output may show gross, net, positive and negative peaks and peak-to-peak values. <b>Analog output scale range, min.</b> <b>Analog output scale range, max.</b> <b>Output noise voltage, typically</b>	V k $\Omega$ $\Omega$ mA $\Omega$ k $\Omega$     mV <sub>noise</sub>	$\pm 10$ 10 10 $\pm 20$ ; 4...20 500 100  0.17 V at 100 % of amplifier input range 10 V at 3.67 % of amplifier input range 10
<b>Long-term drift over 48 hours</b> (30 minutes after switching on) <b>Effect of 10 K change in ambient temperature (in addition to the digital value)</b> on zero point voltage current on sensitivity	mV  mV $\mu$ A %	< 3  3 6 0,05
<b>Control outputs</b> Number Nominal voltage, external power supply Permitted supply voltage range Output current, max. Short-circuit current, typical Short-circuit period Isolation voltage, typical Functions: Output 1 Output 2 Output 3, output 4 <b>Control inputs</b> Number Functions  Input voltage range, LOW Input voltage range, HIGH Input current, typical, HIGH level = 24 V Isolation voltage, typical	V V A A  V <sub>rms</sub>         V V mA V <sub>rms</sub>	4 24 18...30 0.5 0.8 unlimited 500  selectable: LIV1 – LIV4, error <sup>1)</sup> , idle  selectable: LIV1 – LIV4, error <sup>1)</sup> , idle  selectable: LIV1 – LIV4, error <sup>1)</sup>  4 tare, zero setting, peak-value/current value, parameter set selection  0...5 10...30 12 500

<sup>1)</sup> Errors are output at the digital output upon occurrence of an initial calibration error, hardware, ADC, gross, net, analog output, measuring range overflow, or CAN send error.

## Dimensions of the PME modules:



### Scope of supply:

PME module

Plug terminals for voltage supply / CAN and digital I/O:

	HBM order number	Phoenix order number
1 x Supply/CAN	3-3312.0426	MV STBW 2,5/6-ST-5,08
1 x Digital-IN	3-3312.0427	MV STBW 2,5/6-ST-5,08
1 x Digital-OUT	3-3312.0428	MV STBW 2,5/6-ST-5,08

10-pin ribbon cable jack-connector

The PME system CD with documentation and PME Assistant for parameterization and control of the modules (latest version) are available free at <http://www.hbm.com/support>.

### Accessories:

15-pin Sub-D connector for transducer,

Order no.: 3.3312-0182

Setup-Toolkit (USB-to-CAN interface converter)

Order no.: 1-PME-Setup-USB

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