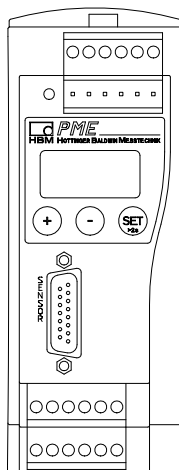


PME

Industrial Measurement Electronics

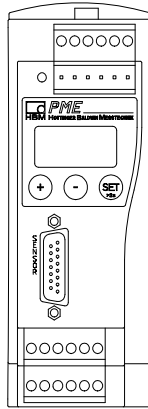
Specifications for single-channel module: MP30



Accuracy class		0.03	
Supply voltage	V_{DC}	24; Potential separation from measuring system (typ. 500 V_{DC})	
Permitted supply voltage range	V_{DC}	18...30	
Power consumption, max.	W	7	
Amplifier			
Carrier frequency ($\pm 1\%$)	Hz	600	
Bridge excitation voltage U_B ($\pm 5\%$)	V_{rms}	5	2.5 ¹⁾
Transducers that can be connected S.G full bridge	Ω	60...5000	
Permitted length of cable between transducer and amplifier, max.	m	500	
Maximum permitted common-mode voltage	V	± 5	
Common-mode rejection			
0...60 Hz	dB	> 120	
0...600 Hz	dB	> 94	
Linearity deviation (typically), range 2 mV/V	%	0.02	
Noise voltage , when $U_B=5$ V, relative to the input, measuring range ± 3 mV/V			
0...1 Hz	$\mu V/V_{PP}$	0.05	
0...20 Hz	$\mu V/V_{PP}$	0.2	
Measurement frequency range, adjustable (-1dB)	Hz	0.05 ... 20	
Max. display resolution		999 999 digits at 6.67 % of amplifier input range	
Min. display resolution		10 digits at 100 % of amplifier input range	
Input sensitivity	mV/V	0.15 ... 3	
Low pass filter	Hz	0.05 ... 20	
		Adjustable in steps of 0.05 to 20 Hz (Bessel and Butterworth filter characteristics)	
Effect of change in operating voltage in the specified range, relative to full scale			
on zero point	%	< 0.01	
on sensitivity	%	< 0.01	
Effect of change in ambient temperature of 10 K		with Autocal	without Autocal
on zero point	$\mu V/V$	0.1	0.5
on sensitivity	%	0.01 typ.; 0.02 max.	0.05
Long-term drift over 48 hours measuring range 3 mV/V (30 minutes after switching on)	$\mu V/V$	< 0.2	< 2

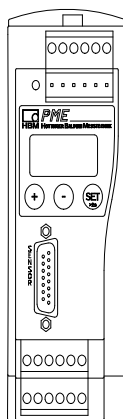
¹⁾ in conjunction with Zener barriers for explosion protection

Specifications for single-channel module: MP55



Accuracy class		0.1		
Supply voltage	V_{DC}	24; Potential separation from measuring system (typ. 500 V_{DC})		
Permitted supply voltage range	V_{DC}	18...30		
Power consumption	W	7 max.		
Amplifier				
Carrier frequency ($\pm 1\%$)	kHz	4.8		
Excitation voltage U_B ($\pm 5\%$)	V_{rms}	5	2.5	1
Transducers that can be connected				
Strain gauge half and full bridges	Ω	220...5000	110...5000	60...5000
Inductive half and full bridges, LVDTs	mH	8...160	4...160	2...160
Permitted length of cable between transducer and amplifier, max.	m	500		
Maximum permitted common-mode voltage	V	± 5		
Common-mode rejection				
0...500 Hz	dB	120		
0...4800 Hz	dB	72		
Maximum differential voltage	mV	± 30		
Linearity deviation (typical)	%	0.025		
Noise voltage, at $U_B=5$ V, by reference to input		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
Measurement frequency range, adjustable (-1 dB)	Hz	0.05...500		
Max. display resolution		999 999 digits at 6.67 % of amplifier input range		
Min. display resolution		10 digits at 100 % of amplifier input range		
Input sensitivities		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
Low pass filter		Adjustable in steps of 0.05 to 500 Hz (Bessel and Butterworth filter characteristics)		
Effect of change in operating voltage in the specified range, relative to full scale				
on zero point	%	< 0.01		
on sensitivity	%	< 0.01		
Effect of 10 K change in ambient temperature of 10 K, at $U_B=5$ V				
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
Long-term drift over 48 hours				
Range 3 mV/V (30 minutes after switching on)	$\mu V/V$	0.05	0.05	0.05
			1	

Specifications for single-channel module: MP60

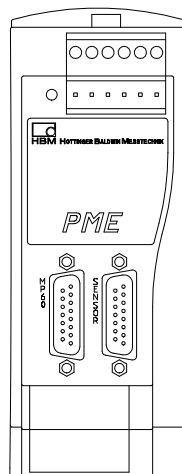


Accuracy class		0.05
Supply voltage	V_{DC}	24; potential separation from measuring system (typ. 350 V_{rms})
Permitted supply voltage range	V_{DC}	18...30
Power consumption, max.	W	4.5
Amplifier		
Transducers that can be connected		HBM torque transducer type series T10F-KF1, T4WAS3, T30FN – T34FN in conjunction with MP07; T10F-SF1 and SU2 can be connected directly Incremental transducer Frequency signal sources
Input Cable length	m	Differ. inputs for symmetrical and asymmetrical freq. signals 70
Hysteresis , switch over threshold selectable in steps	V	0.25
Input level¹⁾ Each line to measurement earth Signal amplitude	V V_{pp}	-5 ... +5 > 1
Trigger level	V	± 5 (adjustable in steps of 250 mV)
Input impedance²⁾ (input level -5 V... +5 V)	k Ω	>100
Input filter		Glitch filter, disconnectable
Detection of direction of rotation		via additional ± 90 ° phase-shifted frequency signal
Frequency quadrupling Input range Frequency measurement	kHz	connectable 0.0001...1 0.001...10 0.02...20 0.01...100 0.1...1000
Pulse counting	pul.	0...999999 0...5 × 10 ⁶ 0...1 × 10 ⁹ (Kilo-Pulses)
Resolution (for frequency measurement)	%	0.01 of measurement value
Maximum pulse rate	pul./s	1 000 000
Linearity deviation	%	0.01
Low-pass filter Sampling rate with filter deactivated	Hz 1/s	disconnectable and adjustable in steps of 0.05 to 500 Hz (Bessel and Butterworth filter characteristics) 4800
Calibration accuracy	%	0.01
Long-term drift over 48 hours 30 minutes after switching on	%	< 0.01
Effect of change in operating voltage in the specified range (in relation to full scale) on sensitivity	%	0.01
Effect of 10 K change in ambient temperature on sensitivity	%	0.01

¹⁾ Levels of up to ± 30 V are permitted and are internally limited to ± 5V

²⁾ The input impedance for level > ± 5 V is approx. 3 k Ω

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



Supply voltage	V_{DC}	24
Supply voltage range	V_{DC}	18...30
Output voltages	V	+15 V, 100 mA -15 V, 100 mA
Measurement/CAL	V_{pp}	54/80; 24...25 kHz
Potential separation (type-tested as per EN 6100-1:1993)		
Supply voltage for ± 15 V	V_{rms}	350
Supply voltage for driving CAL signal	V_{rms}	350
Driving CAL signal for ± 15 V	V_{rms}	350
Power consumption, max.	W	7.5 (T32FNA)
Effect of change in operating voltage in the specified range		
on output voltage $\pm 15 V_{DC}$	%	0.5 of full scale
on output voltage 54/75 V_{pp}	%	2 of full scale
Effect of change in ambient temperature of 10 K		
on output voltage $\pm 15 V_{DC}$	%	0.5 of full scale
on output voltage 54/75 V_{pp}	%	1 of full scale
Long-term drift over 48 hours		
all output voltages	%	1
Nominal temperature range	$^{\circ}C$ [$^{\circ}F$]	0...50 [32...122]
Operating temperature range	$^{\circ}C$ [$^{\circ}F$]	-20...+50 [-4...122]
Storage temperature range	$^{\circ}C$ [$^{\circ}F$]	-20...+70 [-4...158]
Degree of protection		IP20
Dimensions (W x H x D), approx.	mm	55 x 146 x 156
Weight, approx.	g	565

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

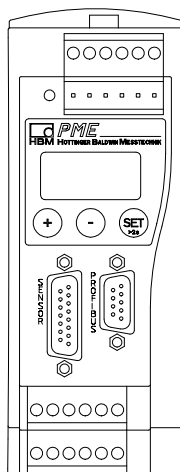
Analog output Impressed voltage Permitted load resistance, min. Internal resistance, max. Impressed current Permitted load resistance, max. Internal resistance, min. The analog output may show gross, net, positive and negative peaks and peak-to-peak values. Analog output scale range, min. Analog output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

¹⁾ only MP60

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

Interface 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
Display Type Keyboard Nominal temperature range Service temperature range Storage temperature range	 °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]
Degree of protection Dimensions, overall (W x H x D) Weight, approx.	 mm g	IP20 55 x 146 x 156 750

MP30DP, MP55DP, MP60DP single-channel modules

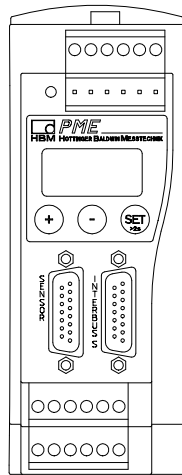


Specifications see basic version, with Profibus DP interface expansion:

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

¹⁾ 00B2 (hex) for MP55DP
0466 (hex) for MP60DP

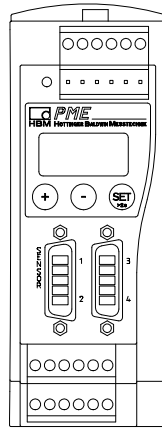
MP55IBS single-channel module



Specifications see basic version, with Interbus S interface expansion:

Protocol		Interbus-S slave, to IEC61158
Baud rate	kBit/s	500 (2 MBit/s by using solderable resistors)
Operating mode		Remote bus 2-wire
Input data, max.	byte	20
Output data, max.	byte	20
Inputs update rate	ms	< 1 (4 bytes data, step 1)
Outputs update rate, max.	ms	< 10 (taring, zeroing) < 100 (limit value) < 500 (parameter sets)
PCP		Not supported
CAN Bus (PDO rate), max.	Meas/s	20
Supply voltage MP55IBS	V	24 (18...30)
Supply current (at 24 V)	mA	approx. 300
Interbus-S connection		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



MP01

Accuracy class		0.1
Supply voltage	V _{DC}	24; potential separation from measurement system (typically 350 V _{DC}) type-tested in accordance with EN61010-1:1993
Permitted supply voltage range	V _{DC}	18...30
Power consumption		
Without transducer excitation	W	4.5
Using 4 supplied transducers (20 mA each)	W	6
DC amplifier		
Transducers that can be connected		voltage source, current source, 2-wire transmitter, Pt100, thermocouple (types J, K, S, T)
Number of channels, max.		4 channels
With Pt100		2 channels
Sampling rate		
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)
Voltage source		
Nominal measuring range	V	± 10
Input signal range	V	± 10.8
Scaling:		
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
Current source		
Nominal measuring range	mA	± 20
Input signal range	mA	± 20.5
Scaling:		
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
2-wire transmitter		
Nominal measuring range	mA	4...20
Input signal range	mA	± 20.5
Scaling:		
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
Excitation voltage, typically	V	14
Pt100		
Nominal measuring range	Ω	18.5...390, corresponding to -200...850 °C as per IEC 751
Input signal range	Ω	0...450
Scaling		fixed allocation of the input quantity to temperature, max. 2 decimal places
Supply current, typically	mA	1

MP01 multi-channel module ... continued

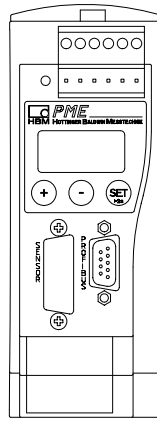
Thermocouple		
Nominal measuring range		corresponds to the linearization table for the type of thermocouple; see below
Input signal range	mV	± 100
Scaling		fixed allocation of the input quantity to temperature, max. 2 decimal places
Linearization:		
Type J	°C [°F]	-200...+1000 [-328...1832]
Type K	°C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

¹⁾ 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). ²⁾ 0.5 Ω corresponds for the Pt100 at 0 °C to an error of about 1 °C

MP01 multi-channel module ... continued

Scaling:		
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]
Additional functions		
Limit switches		
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
Peak-value stores		
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
Control outputs		
Number (control outputs can be freely allocated to individual channels)		4
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 _{rms}	350
Control inputs		
Number (control inputs can be freely allocated to individual channels)		4
Input voltage range LOW	V	0...5
Input voltage range HIGH	V	10...30
Input current typically (HIGH level=24 V)	mA	12
CAN interface		
Sampling rate in single-channel operation	1/s	max. 500 measurements
Sampling rate in multi-channel operation	1/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
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	55 x 146 x 156
Weight, approx.	g	750

MP70DP CANopen Profibus-DP-Gateway



Profibus DP		
Protocol		Profibus DP slave, as per DIN 19245-3
Baud rate, max.	Mbaud	12
Participant address		3 – 123, can be set via keyboard
Profibus ID number		0465 (hex)
Configuration data, max.	bytes	40
Parameter data, max.	bytes	20 (+7 bytes DP standard)
Input data, max.	bytes	240
Output data, approx.	bytes	240
Inputs update rate	ms	2 ms/channel
Outputs update rate¹⁾	ms	<10 (taring, zeroing)
	ms	<100 (limit value level)
	ms	<500 (parameter sets)
Diagnosis data		14 byte module diagnosis
Profibus connection		9-pin sub-D (DIN 19245-3), potential-separated from power supply and measurement earth
Measurement channels that can be connected, max.		8 Channels (MP55, MP01, MP09, MP60)
Supply voltage	V _{DC}	24 (18-30)
Permitted supply voltage range	V _{DC}	18...30
Power consumption	W	7
CAN		
Parameter memory (EEPROM)		4 (plus factory settings)
Display		
Description		2-lines, 8-digit alphanumeric, LCD
Keyboard		Keypad with 3 touch-sensitive control buttons
Nominal temperature range	°C [°F]	0...50
Operating temperature range	°C [°F]	-20...+50
Storage temperature range	°C [°F]	-20...+70
Degree of protection		IP20
Dimensions (B x H x T), approx.	mm	55 x 146 x 156
Weight, approx.	g	700
Interface		
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
Additional functions	Mathematical calculations	Sum of gross values from 8 channels Mean of gross values from 8 channels For multiplication of 2 channels

¹⁾ Only for MP70DPS7

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