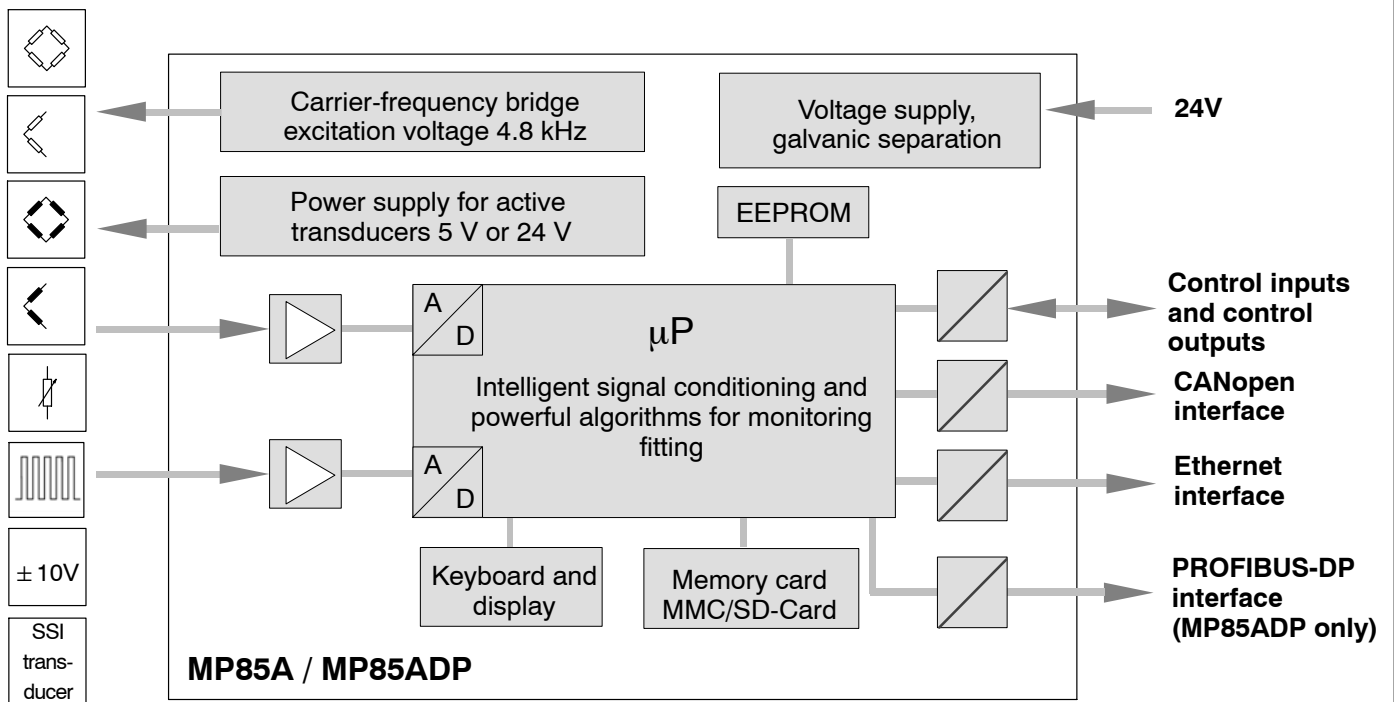


MP85A/ MP85ADP FASTpress



Special features

- 100% quality control of the production process
- Powerful algorithms for monitoring fitting, testing and press-fitting processes
- Universal twin-channel amplifier for many commercially available sensors with TEDS sensor detection
- Memory function for results, curves and device settings
- Convenient integration into the automation system by means of standardized fieldbus interfaces



Description

Integrated quality assurance in production and laboratory

With the MP85A(DP), quality assurance can be integrated into the production process. Functional safety, economic efficiency and product liability are of paramount importance. Permanent monitoring is indispensable, especially where quality assurance is only possible during the actual manufacturing process.

Typical examples include:

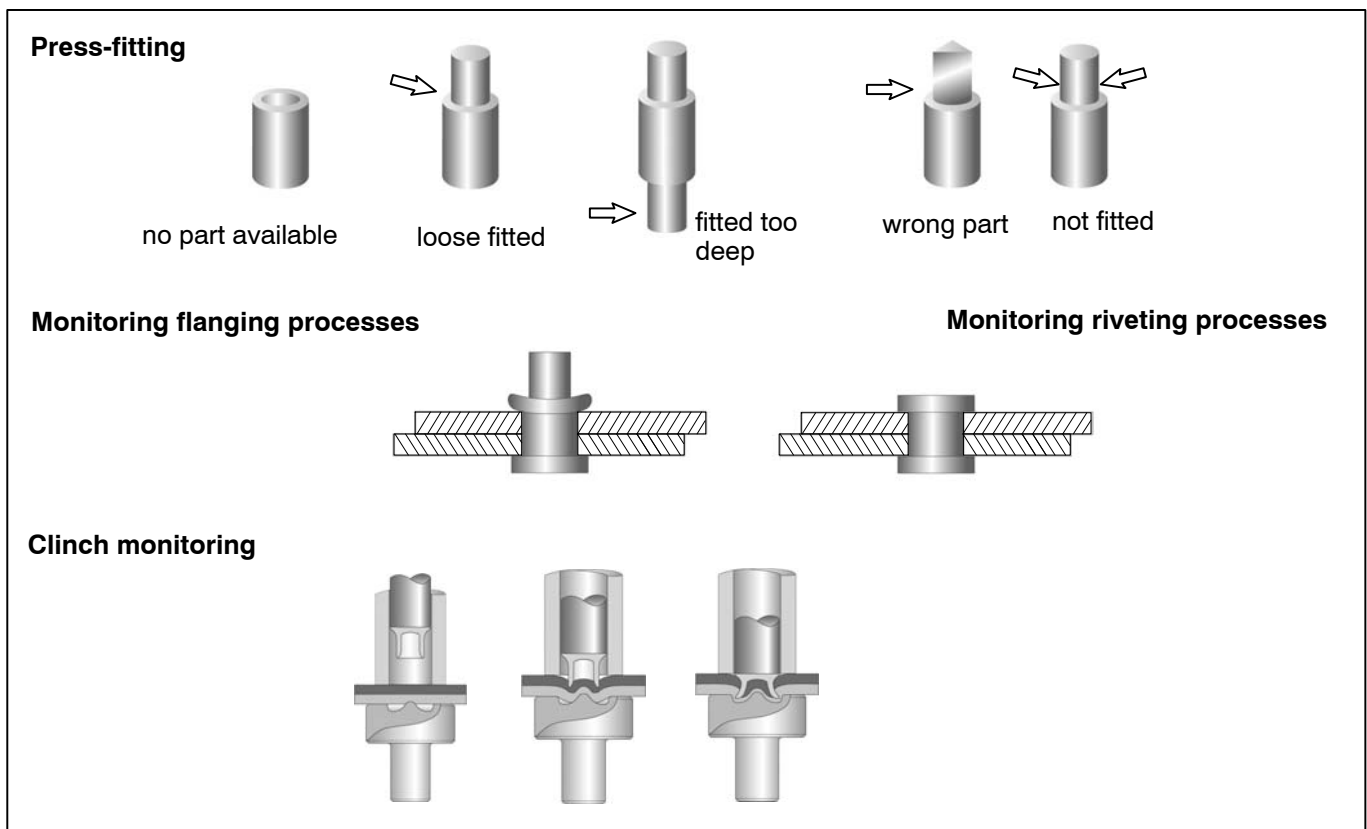
- Press-fitting
- Fitting
- Riveting and clinching
- Flanging and roller-burnishing

MP85A(DP) includes all the functions necessary for 100% checking, together with user-friendly, flexible software that allows the user to configure variable test sequences without in-depth programming knowledge.

Performance features and advantages:

- Easy configuration and commissioning with the free parameterization and visualization software PME Assistant. Download from www.hbm.com -> Support -> Software
- Precise standard-compliant process analysis to meet requirements
- Flexible system for monitoring different workpieces, 1000 different device settings and 1000 different workpieces/processes can be stored
- Storage of results, curves and statistics, as well as the device settings in the device itself on a memory card or external PC
- Continuous traceability thanks to integrated process control and the statistics functions of the stored processes
- Integration via digital inputs/outputs or integrated fieldbus interfaces to primary control systems, such as a PLC control or process control systems
- Flexible application, tailored for use at manual workstations
- Expansion of existing machines and retrofitting of test systems possible

Possible fitting situations



Twin-channel fitting monitoring

Solutions for mounting processes

The MP85A(DP) monitors 2 measured quantities, such as force and displacement or time. Production and machine status can be monitored using the mounting characteristic curve by means of freely adjustable evaluation criteria. This allows the operator to control the quality and the output of production.

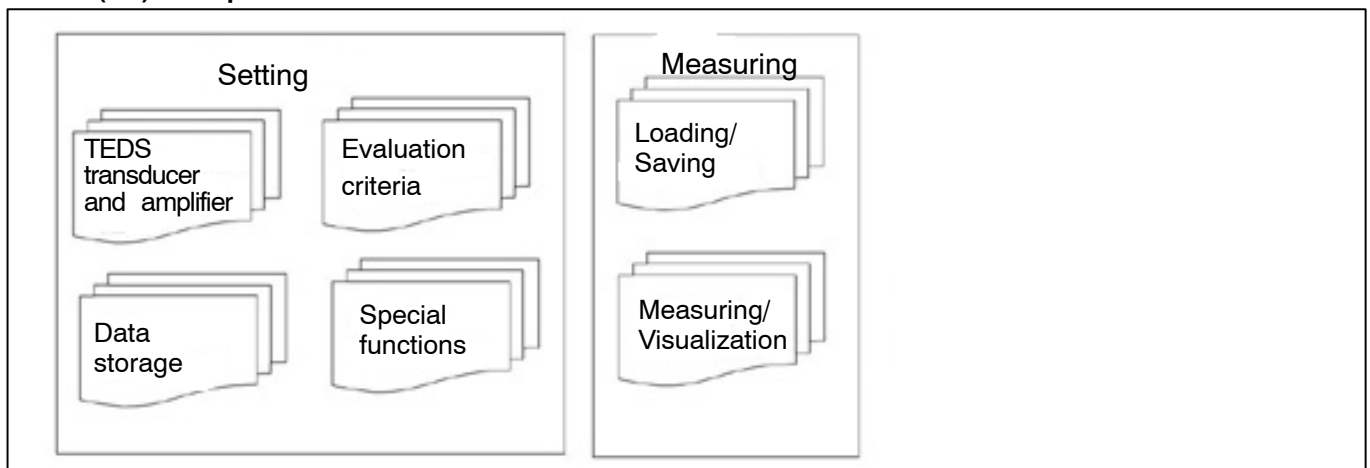
Monitoring is either by tolerance band, envelope curve or by max. 9 freely definable tolerance windows. The system monitors:

- Thread-in force
- Block force
- End position
- Limit values
- Complete force/displacement curve
- Partial process curves

OK / NOK testing controls production and helps to minimize downtime. Warning limits monitor the production process, making machine protection possible, control signals control Start/Stop. Limit value cutoff implemented either via digital inputs, Ethernet or PROFIBUS-DPV1 interface (optional).

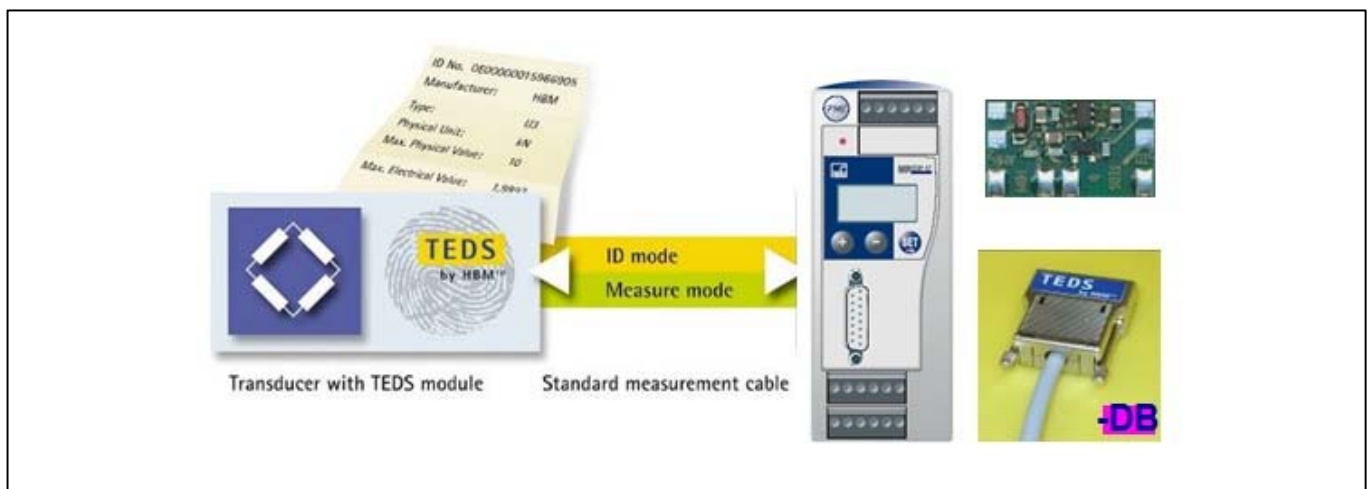
All the individual and cumulative results, process curves and minimum/maximum values of both channels are stored.

MP85A(DP) FASTpress function blocks



Immediate utilization of evaluation criteria

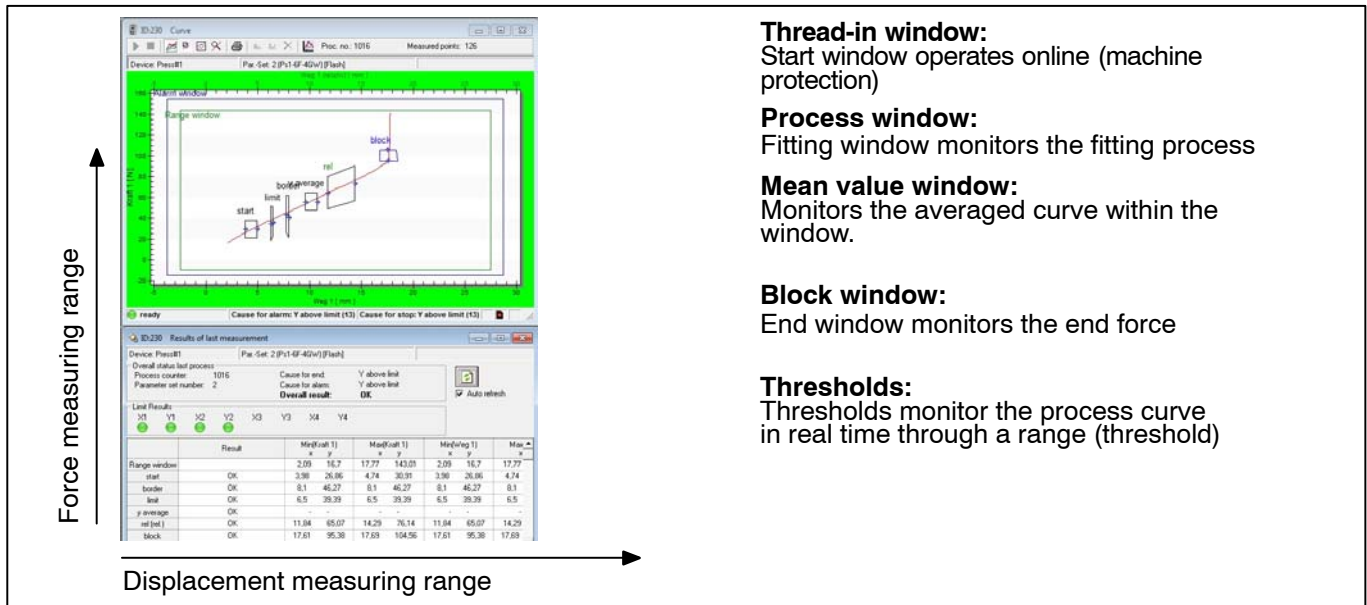
- Sensor data does not need to be set manually when using sensors with TEDS technology
- The TEDS data is read via the sense leads from the sensor (instead of an additional cable). The cable and the connector can be deployed as usual.
- The MP85A(DP) is ready for use within seconds



Process analysis with tolerance windows / measurement and visualization

The following windows are used to evaluate the production process:

- 1 alarm window Limits at which an alarm is triggered. This window is used to protect the machine.
- 1 range window Defines the range in which measured values are stored, within which all the other tolerance windows are positioned.
- 1...9 tolerance windows For analyzing the fitting process. In the case of tolerance windows, there is a free choice of incoming and outgoing sides; the windows can be evaluated in real time. Mean value windows are also possible. All window types can be freely used and can also be overlapped.
- x/y limit values Optional for monitoring minimum/maximum values at process start/end.



- Thread-in window:** Start window operates online (machine protection)
- Process window:** Fitting window monitors the fitting process
- Mean value window:** Monitors the averaged curve within the window.
- Block window:** End window monitors the end force
- Thresholds:** Thresholds monitor the process curve in real time through a range (threshold)

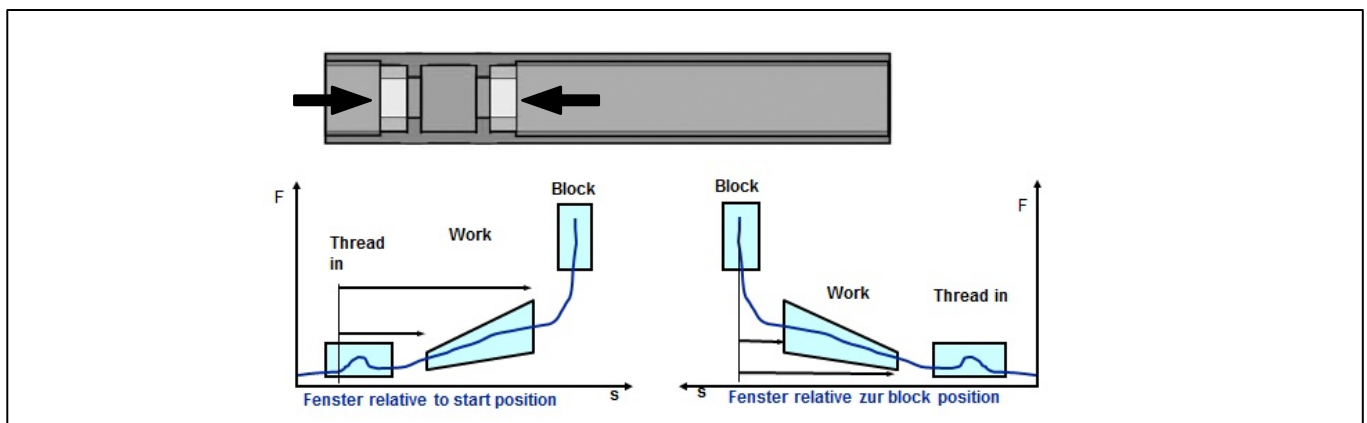
Coordinate systems:

Tolerance window coordinates can be defined absolutely or relatively (dynamically). Use the relative system of coordinates if the absolute position of the fitting pieces (e.g. bearing/shaft) is not always the same. It is possible to mix these two window types.

Application:

Analysis with tolerance windows – Press-fitting female connectors

With relative x coordinates, all that is measured is the movement from the start or end position, *relative* to the x axis of the two fitting pieces.

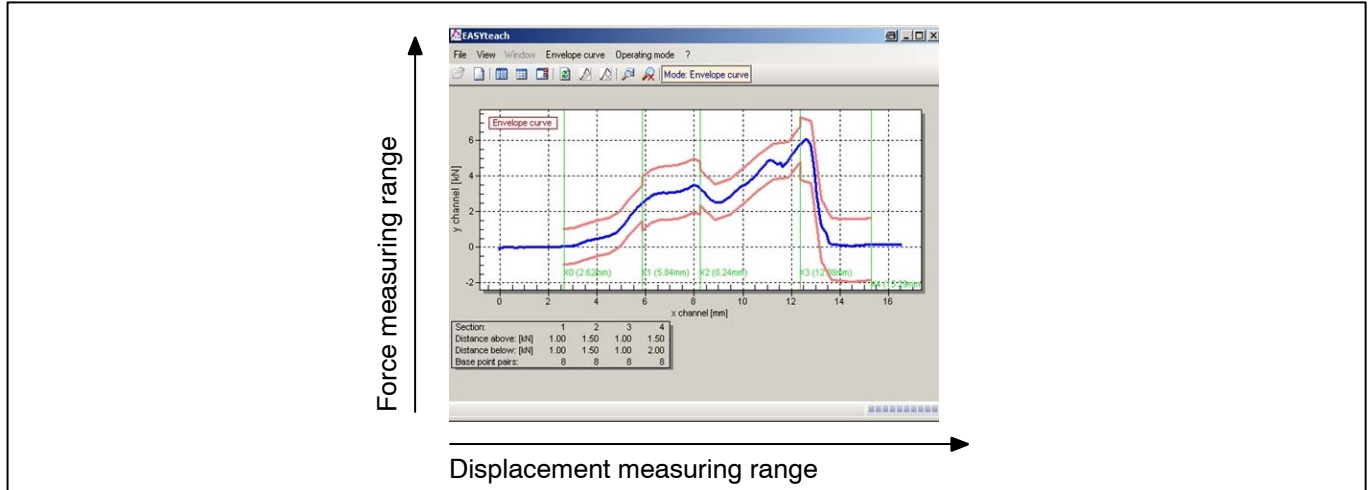


Application:

Process analysis with a tolerance band or envelope curve

In these analyses, the curve trace is monitored partially (tolerance band) or continuously (envelope curve). If just one measured value lies outside the range, the test operation will be rated NOK. In envelope curve analysis, up to 4 segments with different tolerance limits can be selected.

One or more reference curves first have to be measured (teach-in) and then the tolerance band or envelope curve of max. 64 interpolation points is adapted to it/them. The automatic generation of tolerance band or envelope curves based on previously measured process curves can also be implemented manually retrospectively by mouse click.



Start/Stop conditions

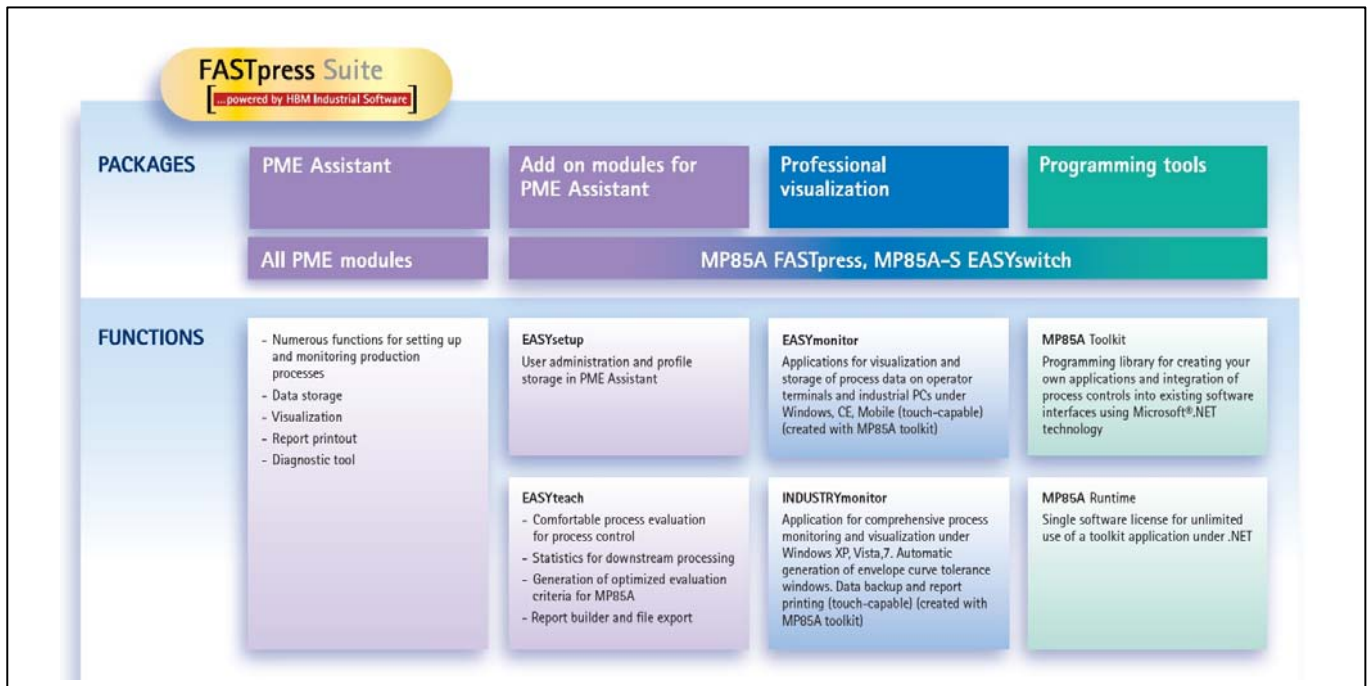
The start/stop conditions are used to synchronize measurement with the production process. Signalling is optional via CANopen, PROFIBUS-DPV1, digital input or internal trigger.

Start/stop conditions are available for a wide variety of applications, such as:

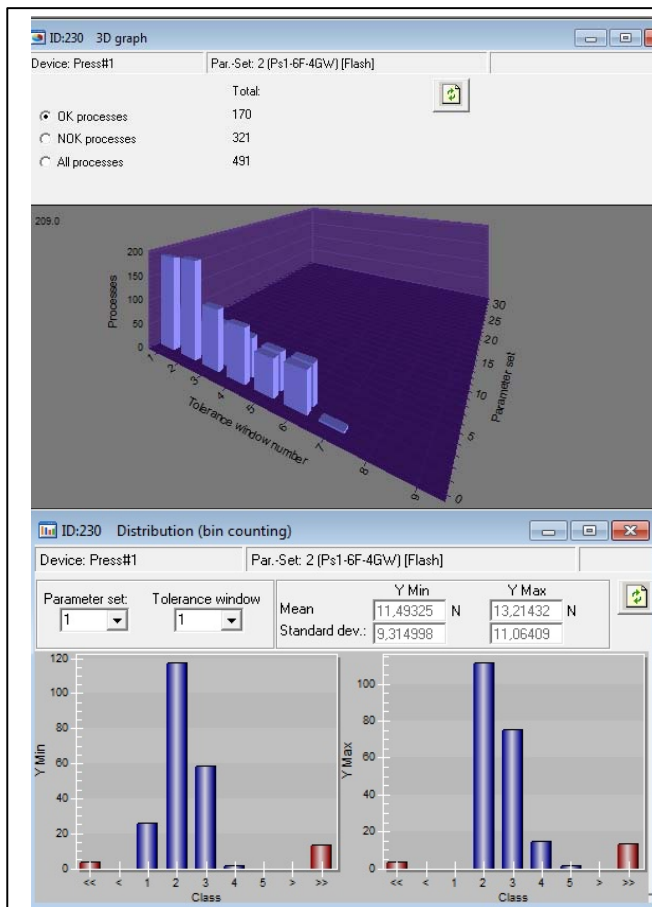
- External start and stop signal
- Setpoint y and overshoot time
- Setpoint x and overshoot time
- Setpoint x and setpoint y
- Standstill recognition
- Return detection for channel x

Operation and visualization

Standard operator panels (IPCs) can be used to visualize the process in situ. The device can also be integrated at a later date into existing systems. Connection is made via the (Fast) Ethernet interface of the MP85A(DP) devices. Numerous modules of the FASTpress Suite are provided as software solutions.



Quality control / Statistics / Counting



Quality and tool wear for the fitting process can be assessed using the statistics functions.

Statistics graphics can be called to clearly display OK/ NOK processes.

Global statistics with a process counter are grouped by parameter sets.

The tolerance window result can be read at a glance for each parameter set.

This allows

- Tool wear
 - Component tolerances or
 - Damage to a machine
- to be detected early.

The graphic display in Counting can be used to analyze the distribution of the OK/NOK processes individually for each tolerance window.

Counting automatically calculates the distribution of the minima and maxima with accompanying standard deviation.

The statistics data are stored in the device.

Data management / Loading and storing

The screenshot shows the 'Retrieve saved data' window. It displays process information for 'Process counter: 01219' and 'Process Data File: 16.04__01001219_238.R85'. A graph shows a curve with points labeled 'start', 'border', 'limit', 'rel', and 'block'. Below the graph is a table with process parameters and their results.

	Result	Min(y) x y	Max(y) x y	Min(x) x y	Max(x) x y
Range window		2,214000 9,384000	17,850000 109,434998	2,214000 9,384000	17,850000 109,434
start	OK	3,747000 12,966000	4,505000 14,561000	- -	- -
border	OK	8,542000 24,104000	8,542000 24,104000	- -	- -
limit	OK	6,519000 19,172001	6,519000 19,172001	- -	- -
y average	OK	- -	- -	- -	- -
rel (rel.)	OK	12,836000 34,231998	14,852000 39,075001	- -	- -
block	OK	17,736000 59,910999	17,780001 70,228996	- -	- -

Below the table is a 'Select file' dialog box with a file list table:

File	Date	Size (Byte)	Status	Par. set	Process	Subdirectory
01000013_011.D85	2015-07-22 11:37:39	4346	NOK	1	13	
01000013_011.R85	2015-07-22 11:37:38	23281	-	1	13	
16.04__01001219_238.C85	2015-07-14 16:10:03	2979	OK	1	1219	
16.04__01001219_238.R85	2015-07-14 16:10:07	12578	-	1	1219	
16.04__01001220_238.D85	2015-07-14 16:10:09	1680	NOK	1	1220	
16.04__01001221_238.C85	2015-07-14 16:10:59	2267	OK	1	1221	

With the MP85A(DP), it is possible to store results, curves, statistics and the device settings. This allows processes to be analyzed later on and ensures 100% traceability.

You can choose whether to store the data on your PC or on the memory card in the device. Storage on a memory card can be set up as a circular buffer for the last 1,000 or 10,000 curves. In both cases, curves and/or results can be stored in ASCII or Qdas format:

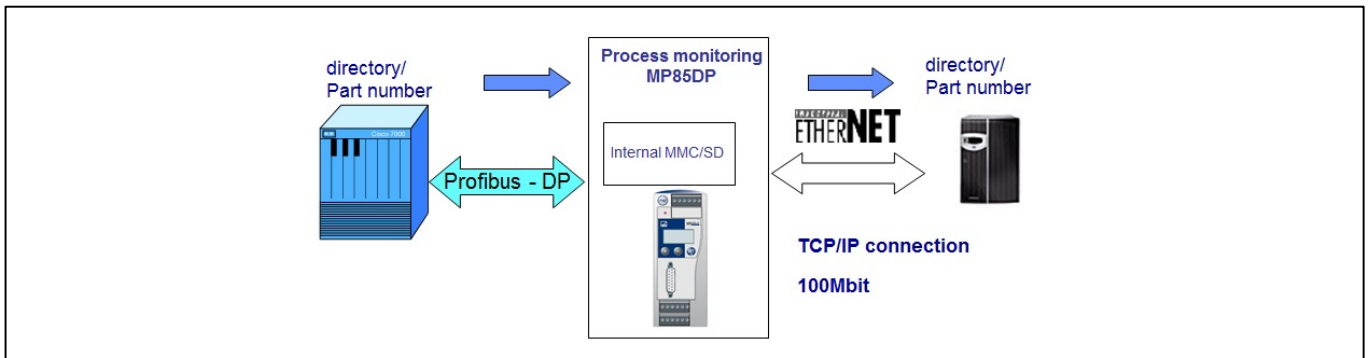
- NOK processes only or
- OK processes only or
- All processes

The data on the memory card can then be transcribed to the PC. A report with all process information can be printed for each process if necessary.

A free HBM software tool can be used to automatically convert process data and results after storage in the data format I-P.M.

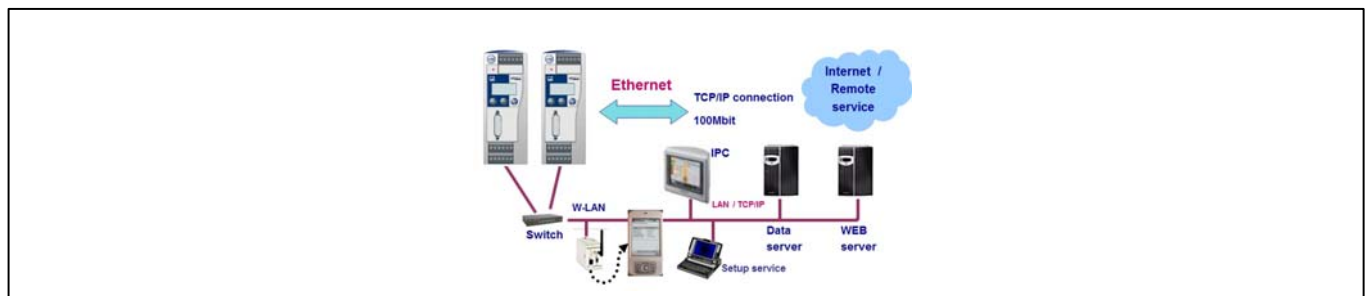
Management of production data

The MP85A(DP) offers the possibility of saving workpiece or component numbers in the ongoing production in the curve and result files. This ensures assignment and archiving.



Utilizing an existing infrastructure

The devices can be integrated in a network via the standard Ethernet interface. This makes it possible to set up production lines right up to remote maintenance.



Specifications

Basic device		MP85A / MP85ADP
Accuracy class		0.1
Supply voltage, Overvoltage and reverse polarity protection	V_{DC}	24
Isolation voltage, without transients Functional potential separation between the supply and transducer connection. Must not be used for safety considerations.	V_{DC}	< 60
Permissible supply voltage range	V	18...30
Power consumption MP85A, typically MP85ADP, typically MP85A / MP85ADP, max.	W W W	7 9 10
Behavior in the event of a supply voltage failure		Automatic data retention after power failure
Typical backup battery life (CR2032) for the realtime clock	Years	5
Evaluation unit specifications		
Max. number of triple measurement values (channel x), (channel y), (time)		4000 (automatic data reduction)
Sampling rate	Hz	2400
Start conditions		Internal start signal, External start signal Setpoint x, Setpoint y Setpoint x + Setpoint y
Stop conditions		Internal stop signal, external stop signal Setpoint y + Overshoot time, Setpoint x + Overshoot time Setpoint x + Setpoint y + Overshoot time Standstill recognition, Return channel x
Process end conditions		External signal Simultaneously with end of start condition Setpoint x, setpoint y Setpoint x and setpoint y
Number of parameter sets / Measurement programs in the device		31 plus factory setting
Number of parameter sets on the optional SD/MMC		31 in XML format 1000 in binary format
Typical switching between parameter sets	ms	200
Evaluation		
Tolerance band		64 interpolation points, adjusted as required in calibration mode
Envelope curve		4 tolerance ranges, 64 interpolation points, freely selectable
Tolerance windows, maximum number		9
Type of window		Oblique or straight
Evaluation methods per window		Real time evaluation (online for machine protection) Analyzing the course of the curve in the window (min/max) Analyzing the mean x or y value in the window Analyzing vertical or horizontal thresholds (online)
x coordinates for the tolerance window		Absolute or relative to the start position, or relative to the end position
y coordinates for the tolerance window		Absolute or relative to F_{min} of tolerance window 2, relative to F_{max} of tolerance window 2 or relative to F_{mean} of tolerance window 2
Typical duration of offline evaluation, end window	ms	6
Typical duration of offline evaluation, straight window	ms	5 + 0.1/measurement pair in window
Typical duration of offline evaluation, oblique window	ms	10 + 0.3/measurement pair in window
x and y limit values		4 each Limit value monitoring can optionally also be included in the overall process evaluation, e.g. as min/max monitoring for process start/end.
Statistics (separate for each parameter set in Flash device memory)		
Maximum number of fitting processes		4 x 10 ⁹
Number of histogram classes for 2 values (x_{max} , x_{min} , y_{max} , y_{min})		9 per tolerance window

Transducer and amplifier							
Carrier frequency	kHz	4.8 ± 1 %					
Bridge excitation voltage	V _{rms}	2.5 ± 5 %					
Transducers that can be connected Strain gages, half and full bridges Inductive half and full bridges, LVDTs Potentiometric transducers	Ω mH Ω	170 ... 2000 4 ... 160 170 ... 2000					
Input sensitivities		Measuring range (mV/V)					
	mV/V	4	100	1000			
Length of transducer cable, max.	m	500					
Scaling range, max.	Digits	999999, at 10% of the input measuring range					
Scaling range, min.	Digits	100, at 100% of the input measuring range					
Permissible common-mode voltage, max.	V	± 5.5					
Common-mode rejection 0...60 Hz 0...1000 Hz 0...4800 Hz	dB	> 120					
	dB	> 96					
	dB	> 50					
Linearity error	%	< 0.03					
Noise voltage, typically 0...1 Hz 0...10 Hz 0...100 Hz 0...1000 Hz		Measuring range (mV/V)					
		4	100	1000			
	μV/V _{pp}	0.1	2.5	25			
	μV/V _{pp}	0.25	6	60			
	μV/V _{pp}	1	25	250			
Sampling rate, max.	1/s	2400					
Measurement frequency range, adjustable 4th order low-pass with Bessel characteristic		Nominal (rated) value f_c (Hz)	-1dB (Hz)	-3dB (Hz)	Phase delay (ms)	Rise time (ms)	Overshoot (%)
		1000	980	1400	0.550	0.260	4
		500	440	690	0.860	0.510	1.5
		200	190	320	1.6	1.11	1.5
		100	100	160	2.9	2.13	1.3
		50	51	83	4.6	4.24	1
		20	25	41	8.2	8.36	1
		10	13	21	15.5	16.8	0
		5	6.1	10.3	30.2	33.4	0
		2	3.1	5.2	60	67	0
		1	1.6	2.6	119	137	0
		0.5	0.79	1.30	240	272	0
		0.2	0.19	0.32	950	1070	0
		0.1	0.09	0.16	2500	2170	0
	0.05	0.049	0.081	3750	4280	0	
Shunt calibration	mV/V	1 ± 3%					
Effect of operating voltage on zero point on sensitivity	% f.s.	< 0.01					
	% f.s.	< 0.01					
Effect of 10K change in ambient temperature on full bridge zero point on half bridge zero point on sensitivity		Measuring range (mV/V)					
		4	100	1000			
	μV/V	1	20	200			
	μV/V	10	40	200			
	%	0.05	0.05	0.05			
Long-term drift over 48 h (measuring range 4 mV/V; 0.5 h after activation)	μV/V	2					

DC-voltage transducers		
Transducers that can be connected		DC-voltage transducers, voltage sources
Nominal (rated) measuring range	V	± 10
Input signal range	V	± 10.5
Scaling range, max.	Digits	999999, at 10% of the input measuring range
Scaling range, min.	Digits	100, at 10% of the input measuring range
Internal resistance of the signal source	kΩ	≤ 1
Permissible common-mode voltage, max.	V	2
Measurement frequency range, adjustable (-1 dB)	Hz	0.05 ... 1000
Filter characteristics		Bessel, 4th order
Linearity error	%	< 0.03
Sampling rate, max.	1/s	2400
Incremental encoder		
Transducers that can be connected		Incremental transducers (up/down counter with zero index signal)
Voltage supply		5 V, max. 150 mA or 24 V, max. 300 mA
2-channel mode		Time-division multiplex method
Inputs (F1 (±), F2 (±), Ix (±))		Differential inputs (RS422), TTL level 5 V
Input level		
Low level	V	< 0.8
High level	V	> 2
Each line to measurement ground, max.	V	± 14
Level difference (Low/High)	V	> 1.2
Hysteresis	V	0.07
Permissible common-mode voltage, max.	V	-7 / +12
Input impedance, typical	kΩ	10
Detection of direction of rotation		via ± 90° phase-shifted signal F2
Input range pulse counting	Pulses	0 ... 999999
Maximum pulse rate	Pulses /s	1 000 000
Interval between 2 successive edges F1(±), F2(±)	ns	> 400
Scaling range, max.	Digits	20 at 1 pulse
Scaling range, min.	Digits	1 at 10000 pulses
Measurement frequency range, adjustable (-1 dB)	Hz	0.05 ... 1000
Sampling rate, max.	1/s	2400
SSI transducers		
Transducers that can be connected		Displacement and angle transducers with SSI interface
Voltage supply		5 V, max. 150 mA or 24 V, max. 300 mA
2-channel mode		Time-division multiplex method
Data input D(±)		Differential input (RS422), TTL level 5 V. The voltage levels must be complementary to each other and display a difference of min. 1.2 V.
Input levels, data input D (±)		
Low level	V	< 0.8
High level	V	> 2
Each line to measurement ground, max.	V	± 14
Hysteresis	V	0,07
Permissible common-mode voltage, max.	V	-7 ... +12
Clock output CI (±)		Differential output (RS422), TTL level 5 V
Differential output voltage CI(±), without load, max.	V	5.8
Differential output voltage CI(±), RL = 50 ohm, min.	V	2
Common-mode voltage at CI (±), max.	V	3
Short-circuit current, clock output CI (±), typically	mA	100
Resolution, single turn	Bit	12, 13
Resolution, multi-turn	Bit	24, 25
Scaling range, max.	Digits	20 at 1 pulse
Scaling range, min.	Digits	1 at 10000 pulses
Measurement frequency range, adjustable (-1dB)	Hz	0.05 ... 1000
Sampling rate, max.	1/s	1200
Baud rates	kBaud	100, 200, 500, 1000
Coding		Gray code

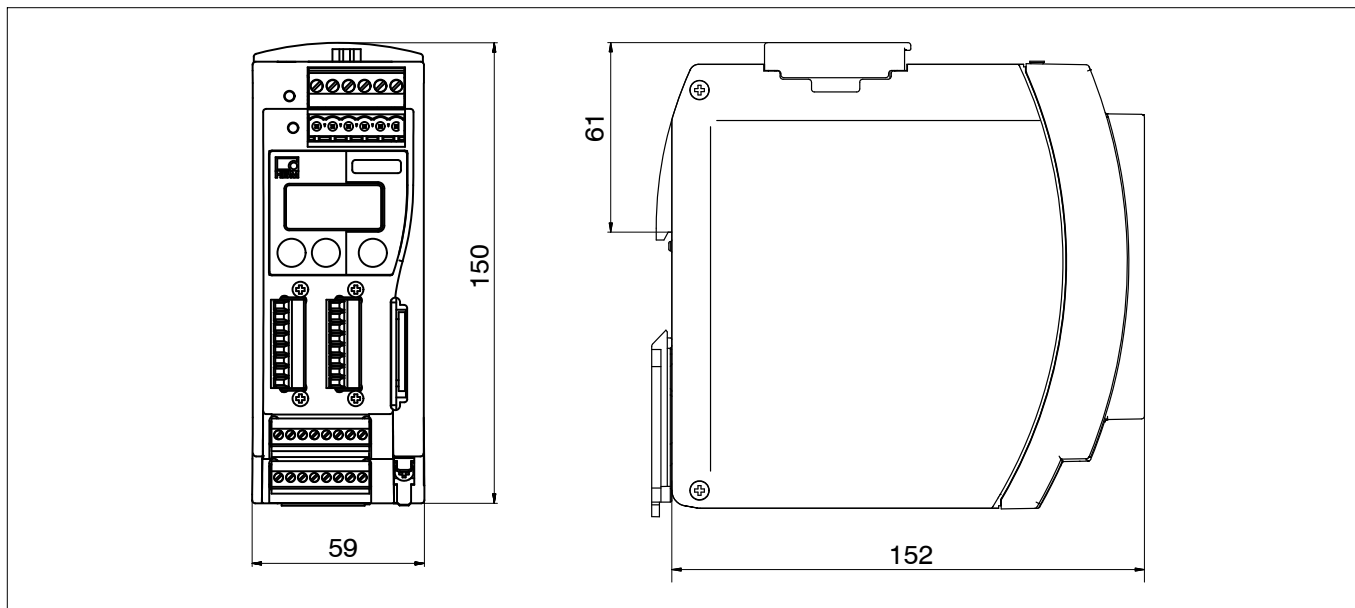
Potentiometric displacement transducer		Potentiometric sensors (termination resistance 170 ... 2000 Ohm) are supplied with 4.8 kHz carrier frequency (see specifications "Transducer and amplifier")
Note: If potentiometric sensors of type TR50, TR75 or TR100 are used from the company novotechnik (termination resistance > 2 kOhm), the accuracy class of the measurement chain changes to 0.25. The same applies to other sensors where the termination resistance is more than 2 kOhm, as a linear characteristic curve is no longer given in these cases.		

General specifications		
Limit value switch		
Number		4 per channel
Reference level		Gross
Hysteresis	%	1 ... 100
Adjustment accuracy	Digit	1
Response time, typically (fc=1000 Hz)	ms	< 2
Control outputs		
Number		4 (MP85ADP) / 8 (MP85A), galvanic separation
Function		Process OK/NOK, process started/running, process finished/valid, limit values 1–4, transducer test result, tolerance window result, memory card status, channel x/y status, transfer memory status, channel x/y error, heartbeat (watchdog), parameter set selection, parameter set No. (Flash), piezosensor reset, digital output via SDO specification
Nominal (rated) voltage, external power supply	V _{DC}	24
Permissible supply voltage range	V	10 ... 30
Maximum output current per output	A	0.5
Short-circuit current, typically (U _{ext.} = 24 V, R _L < 0.1 ohm)	A	0.8
Short-circuit period		unlimited

Control inputs		
Number		1 (MP85ADP) / 5 (MP85A), galvanic separation
Function		Zero balance, shunt calibration, parameter set selection, start/stop process, transducer test, save/delete statistics
Input voltage range LOW	V	0 ... 5
Input voltage range HIGH	V	10 ... 30
Input current, typically, (High level = 24 V)	mA	12
Ethernet interface		
Transmission protocol	MBit/s	TCP/IP, can be networked per IEEE802
Transfer rate, max.	MBit/s	10 and 100 (automatic selection)
Topology (twisted pairs)		2
LED display for Receiver, Transmitter (RxD/TxD) and Link		2
Line length, maximum	m	100
Cable type		UTP category 5 or shielded twisted pair (STP)
Connecting socket		RJ-45
CAN interface		
Protocol		CAN 2.0B; CANopen compatible
Hardware bus link		to ISO 11898
PDO rate, max.	Measured values/s	100
Baud rates	kBits/s	1000 500 250 125 100 50 20 10
Maximum line lengths	m	25 250 500 1000 600 1000 1000 1000
Termination resistor		Connectable by switch
Connection		Terminals
PROFIBUS-DP interface (MP85ADP only)		
Protocol		PROFIBUS-DP Slave, as per DIN19245-3
Baud rate, max.	MBaud	12
Node address		3-123, set via the keyboard
PROFIBUS ID number		Hex 699
Configuration data	Byte	5
Parameter data , max.	Byte	6 (+7DP standard)
Function		Access to and parameterization of all MP85ADP functions (remote control)
Parameterization (asynchronous)		per DPV1 standard
Input data , max.	Byte	142
Output data, max.	Byte	40
Input data update rate	ms	1 (for 4 measured values)
Output data update rate	ms	< 10, for zero setting, limit values
Diagnostic data	Byte	48
PROFIBUS connection		9-pin sub-D (DIN19245-3), galvanic separation from power supply and measurement ground

Memory card		
Function		Storage of: Parameter sets, curves and results, statistics, circular buffer of last 1,000/10,000 curves
Usable types		MMC or SD card (no SDHC (High Capacity) or similar)
Usable sizes	MByte	8, 16, 32, 64, 128, 256, 512, 1024, 2048
Data transmission rate, typically	kBytes/s	2–8
File system		DOS, FAT 16 format
Display		
Type		2-line, 8-character alphanumeric, LCD
Keypad		
		Touch-sensitive keypad with three keys, pressure-sensitive
Temperature range		
Nominal (rated) temperature range	°C	0 ... 50
Operating temperature range	°C	-20 ... +50
Storage temperature range	°C	-20 ... +70
Degree of protection		
		IP20
Dimensions (W x H x D)		
	mm	59 x 150 x 152
Weight, approx.		
	g	929
Mechanical stress capability (test similar to DIN IEC 60068, Part 2–6)		
Oscillation (30 mins in each direction)	m/s ²	50 (5 ... 65 Hz)
Impact (3 times in each direction; impact duration 11 ms) (test similar to DIN IEC 60068, Part 2–27)	m/s ²	200

Dimensions of the PME modules:



Scope of supply

- 4 plug-in screw terminals, coded
 - 1x voltage supply and CAN, 6-pin
 - 2 x transducers, 8-pin
 - 1x In/Out digital, 8-pin

Phoenix order number:
MV STBW 2.5/6-ST-5.08 GY
MCVW 1.5/8-ST-3.81 GY
MC 1.5/8-ST-3.5 GY

HBM order number:
3-3312.0426
3-3312.0422
3-3312.0421

FASTpress Suite system CD with:

- Free PME Assistant setup software
- Online Help with Tricks&Tips
- Quick Reference Guide for beginners

PME Assistant Plus tools (demo version) with:

- EASYsetup (user administration)
- EASYteach (statistical process analysis and report generation)

MP85A Toolkit (demo version):

- Function module kit for creating separate interfaces on operator panels via Ethernet under Windows XP, Windows CE and WindowsMobile

EASYMonitor CE (demo version):

- Production software for operation via a terminal using the operating system Windows CE

EASYmonitor mobile: Application for operation via a PDA or pocket PC

INDUSTRYmonitor (demo version):

- Production software for operation on Touch Panels with max. 12 MP85A(DP)-(S)-process controllers

Accessories (not included in the scope of supply):

- Memory card MMC or SD card, e. g. from Transcend (www.transcend.de)
- Standard flat ribbon cable, 10-pin, 1.27 mm pitch (HBM order number : 4-3131.0037)

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measure and predict with confidence

