Operating Manual

English

MP85A

MP85A(-S), MP85ADP(-S), MP85ADP-PN(-S), FASTpress and EASYswitch

托驰（上海）工业传感器有限公司
上海市嘉定区华江路348号1号楼707室
电话：+86 021 51069888
传真：+86 021 51069009
邮箱：zhang@yanatoo.com
网址：www.sensor-hbm.com

1 Safety instructions

This operating manual applies to the devices

- MP85A
- MP85ADP
- MP85ADP-PN
- MP85A-S
- MP85ADP-S and
- MP85ADP-PN-S

In this manual, the designation MP85A process controller is used for all device versions. If information/data refers only to specific device versions, this will be clearly indicated in the text and one of the above designations used.

Intended use

The device is to be used exclusively for measurement tasks and directly related control tasks within the operating limits detailed in the specifications. Use for any purpose other than the above is deemed improper use.

The device complies with the safety requirements of DIN EN 61010 Part 1 (VDE 0411 Part 1).

Any person instructed to carry out installation, startup or operation of the device must have read and understood the operating manual and in particular the technical safety instructions.

In the interests of safety, the device should only be operated by qualified personnel and as described in the operating manuals. During use, compliance with the legal and safety requirements for the relevant application is also essential. The same applies to the use of accessories.

The device is not intended for use as a safety component. Please also refer to the “Additional safety precautions” section. Proper and safe operation requires correct transportation, storage, siting and installation, and careful operation.

This operating manual must be kept and handed over if the MP85A process controller is sold or passed on.

Operating conditions

- Protect the device from direct contact with water.
- Protect the device from moisture and weather conditions such as rain or snow. The device has an IP rating of IP20 (DIN EN 60529).
- Do not expose the device to direct sunlight
- Comply with the maximum permitted ambient temperatures and the data on maximum humidity as stated in the specifications.
- The design or safety features of the device must not be modified without our express consent. In particular, any repair or soldering work on motherboards (replacement of components) is prohibited. When exchanging complete modules, use only genuine parts from HBM.
- The device is delivered from the factory with a fixed hardware and software configuration. Changes can only be made within the range of possibilities described in the corresponding documentation.
- The device is maintenance free.
- Please note the following points when cleaning the housing:
  - Disconnect the device from all current and voltage supplies before cleaning it.
  - Clean the housing with a soft, slightly damp (not wet!) cloth. *Never* use solvent as this could damage the label or housing.
  - When cleaning, ensure that no liquid gets into the device or connections.
- In accordance with national and local environmental protection and material recovery and recycling regulations, old equipment that can no longer be used must be disposed of separately and not with normal household garbage, see section 15, page 154.

Qualified personnel

Qualified persons are individuals entrusted with the installation, fitting, startup and operation of the product and with the relevant qualifications for their work.

This includes people who meet at least one of the three following criteria:

- They are project personnel who are familiar with the safety concepts relating to measurement and automation technology.
- They are measurement or automation plant operating personnel and have been instructed on how to handle the machinery. They are familiar with the operation of the equipment and technologies described in this document.
- As startup or service engineers, they have successfully completed the training to qualify them for repairing automation systems. Moreover, they are authorized to start up, ground and label circuits and equipment in accordance with safety engineering standards.

Working safely

- The device must not be directly connected to the mains power supply. The supply voltage must be between 18 and 30 V_{DC}.
- Error messages may only be acknowledged once the cause of the error is removed and there is no further danger.
- Maintenance and repair work on an open device with the power on may only be carried out by trained personnel who are aware of the dangers involved.
- Automation equipment and devices must be designed so as to ensure adequate protection or locking against unintentional actuation (e.g. access control, password protection, etc.).
- For devices operating in networks, safety precautions must be taken for both the hardware and software, to make sure that an open circuit or other interruptions to signal transmission do not cause undefined states or loss of data in the automation device.
- After entering settings and carrying out password-protected activities, ensure that all connected control systems remain in a safe condition until the switching performance of the device has been tested.

Additional safety precautions

Additional safety precautions to meet the requirements of the relevant national and local accident prevention regulations must be implemented in plants where malfunctions could cause major damage, loss of data or even personal injury.

This can be achieved by mechanical interlocking, error signaling, limit value switches, etc.

The performance and scope of supply of the device cover only a small proportion of test and measuring equipment. Before starting up the device in a plant, first perform a project planning and risk analysis, taking into account all the safety aspects of measurement and automation engineering, to minimize residual risk. This particularly concerns the protection of personnel and equipment. In the event of a fault, appropriate precautions must produce safe operating conditions.

General dangers of failing to follow the safety instructions

This is a state-of-the-art device that is safe to operate. However, there may be residual risks if the device is installed or operated incorrectly.

2 Markings used

2.1 Markings used in this document

Important instructions for your safety are highlighted. Following these instructions is essential in order to prevent accidents and damage to property.

Symbol	Meaning
	This marking warns of a *potentially* dangerous situation in which failure to comply with safety requirements *may* result in minor to moderate physical injury.
	This marking draws your attention to a situation in which failure to comply with safety requirements *may* result in damage to property.
 **Important**	This marking draws your attention to *important information* about the product or its handling.
 **Tip**	This marking indicates tips for use or other information that is useful to you.
Emphasis *See …*	Italics are used to emphasize and highlight text and identify references to sections of the manual, diagrams, or external documents and files.

2.2 Symbols on the device

CE mark

With the CE mark, the manufacturer guarantees that the product complies with the requirements of the relevant EC directives (the Declaration of Conformity can be found on the HBM website (www.hbm.com) under HBMdoc).

Pay attention to the supply voltage

This symbol indicates that the supply voltage must be between 18 and 30 V_{DC}.

Statutory waste disposal marking

In accordance with national and local environmental protection and material recovery and recycling regulations, old devices that can no longer be used must be disposed of separately and not with normal household garbage. Also see section 15, page 154.

Battery disposal

In accordance with national and local environmental protection and material recovery and recycling regulations, old batteries that can no longer be used must be disposed of separately and not with normal household garbage.

ESD marking

Electrostatic discharges in the area of the MMC/SD card can lead to malfunctions or failure of the device. Touch a grounded metal component before touching the device in this area.

3 Introduction

3.1 About this documentation

The MP85A process controller documentation comprises:

- This operating manual.

  This mainly describes setting up the hardware (transducer, device and PC with software).

- The online help features of the PME Assistant and the add-on software modules.

  These tools describe device setup and function using the software.

- A quick start guide for fast startup of the MP85A process controller and all software modules.
- A separate operating manual with an object dictionary and an interface description for Ethernet, CAN bus, PROFIBUS and Profinet communication.
- A quick start guide for the entire FASTpress suite, i.e. for all software modules and the MP85A process controller.

3.2 Scope of supply

- 1 MP85A, MP85ADP or MP85ADP-PN and/or MP85A-S, MP85ADP-S or MP85ADP-PN-S
- 4 plug-in screw terminals, coded

	Phoenix order number	HBM order number
1x power supply and CAN, 6-pin	MV STBW 2.5/6-ST-5.08 GY	3-3312.0426
2x transducers, 8-pin	MCVW 1.5/8-ST-3.81 GY	3-3312.0422
1x I/O 1, 8-pin	MC 1.5/8-ST-3.5 GY	3-3312.0421

Additionally for MP85A or MP85A-S:

	Phoenix order number	HBM order number
1x I/O 2, 8-pin	MC 1.5/8-ST-3.5 GY	3-3312.0421

- Additional spring for housing installation (included in pack)
- Ribbon cable female connector, 10-pin (order no.: 3-3312.0060)
- 1 FASTpress Suite system CD with:
  - Free PME Assistant setup software
  - Online help with tricks & tips
  - Quick Reference Guide for beginners
- PME Assistant PLUS (demo version of software add-on modules) with:

  EASYsetup (user administration) and EASYteach (statistical process analysis)
- MP85A Toolkit (demo version):

  Function module kit for creating your own interfaces on operator panels via Ethernet in Windows®, Windows® CE and Windows Mobile®
- EASYmonitor CE:

  Production software (demo version, for operation on touch panels in Windows® CE)
- INDUSTRYmonitor (demo version):

  Production software for operation on touch panels with max. 12 MP85A process controllers

3.3 Accessories

- Memory card: MMC or SD card, e.g. Transcend (www.transcend.de), no SDHC (High Capacity), SDXC (eXtended Capacity), SecureMMC or equivalent cards
- PROFIBUS Profinet gateway (1-NL51N-DPL)

- Standard ribbon cable, 10-pin, pitch 1.27 mm (4-3131.0037)
- Ethernet crossover cable, 2 m, (1-KAB239-2)
- Cable shield terminal (1-CON-A 1023)

3.4 General

The MP85A process controller from the PME product line is a twin-channel amplifier, suitable for connecting transducers that use very different technologies. As well as Ethernet and CAN, the MP85ADP(-S) also includes a PROFIBUS interface, and in the MP85ADP-PN(-S) the PROFIBUS interface features a Profinet gateway.

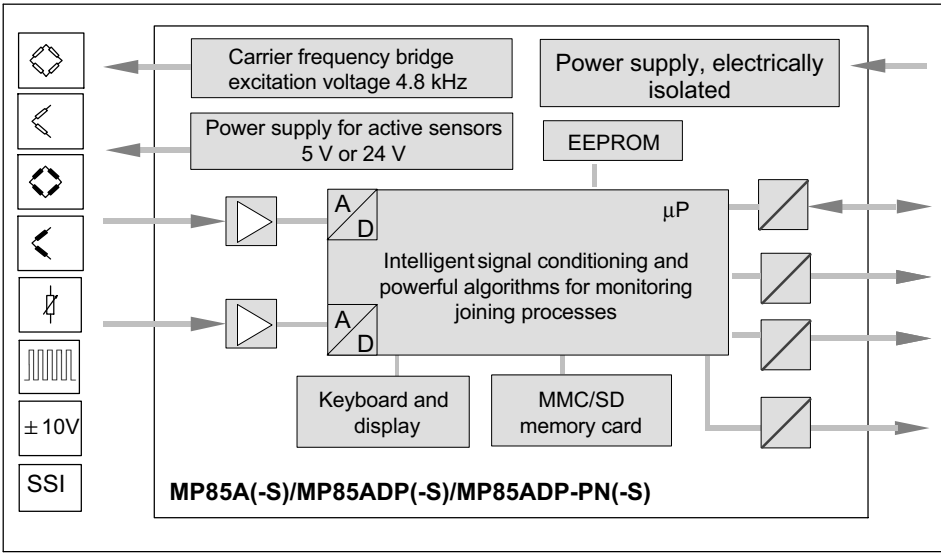


Fig. 3.1 Block diagram of the MP85A process controller

The PME Assistant provides a simple and free user interface for device parameterization in Microsoft Windows. For this you will require an Ethernet (crossover) cable (order no. 1-KAB239-2) for direction connection to a PC or a USB → CAN interface converter (when using the CAN interface), which must be ordered separately (order no.: 1-PMESETUP-USB).

All device parameters can be set with the PME Assistant software. You can set the Ethernet or CAN bus interface directly on the device. The PME Assistant also enables you to set up other devices from the PME family (MP01 … MP70).

4 Installing/removing the MP85A (schematic diagrams)

The device must be mounted on a support rail to DIN EN 60715, which is connected to a grounded conductor. Both the support rail and the device must be free of paint, varnish and dirt at the mounting location.

Important

Automation equipment and devices must be designed so as to ensure adequate protection or locking against unintentional actuation (e.g. access control, password protection, etc.).

Protect the device from direct contact with water. The IP rating is IP20.

4.1 Mechanical installation/removal

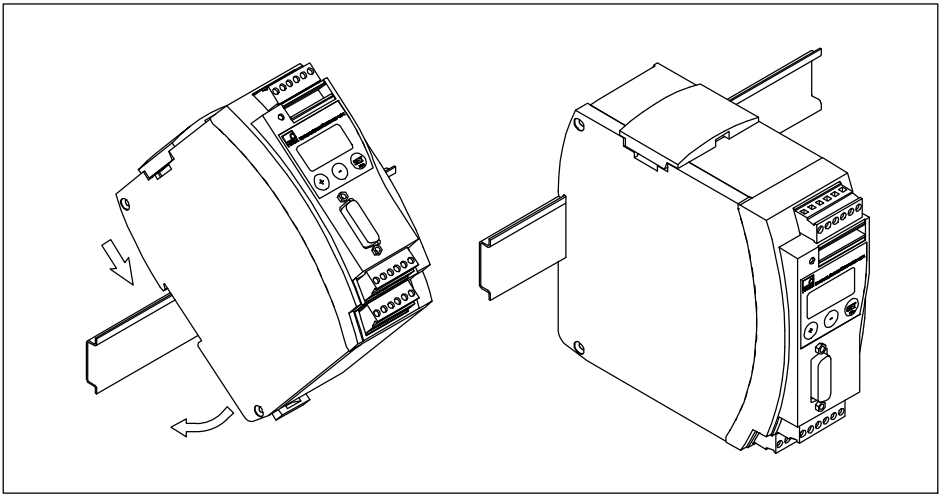


Fig. 4.1 Installation on a support rail

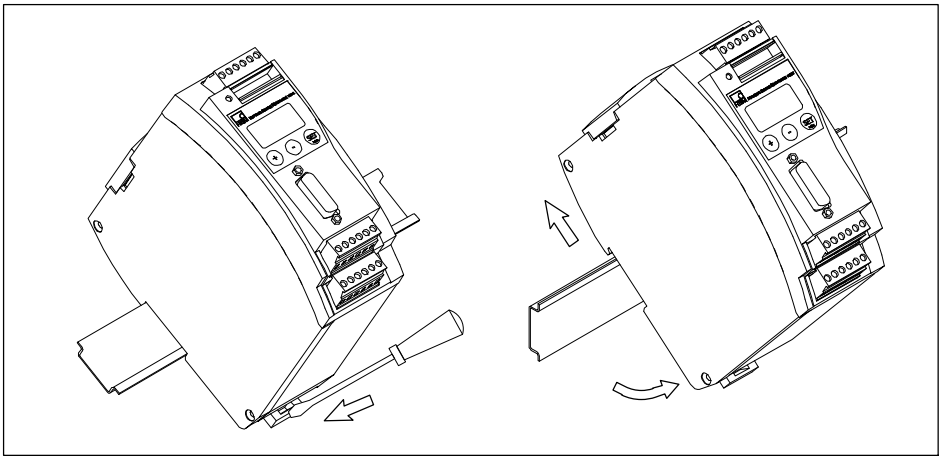


Fig. 4.2 Removal

Important

The support rail must be connected to a grounded conductor ⏚.

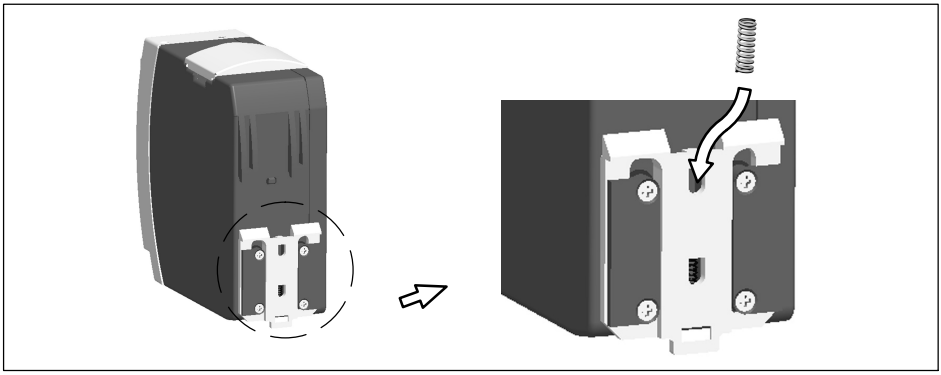


Fig. 4.3 Installing a second spring for more stable fastening of the MP85A process controller on the support rail

4.2 Connecting several devices

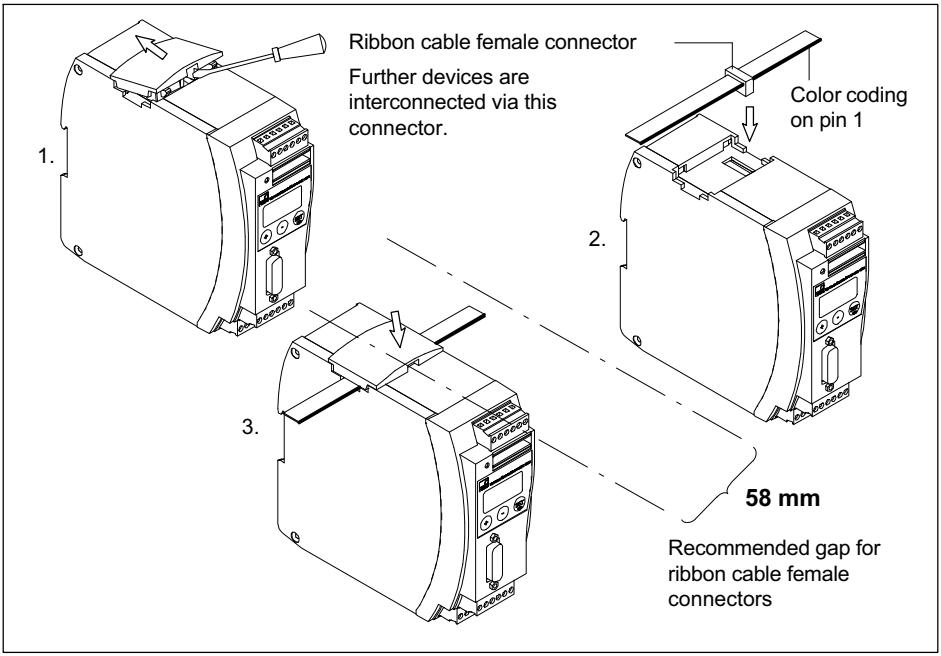


Fig. 4.4 Connecting a ribbon cable

You can connect up to four MP85A process controllers via a ribbon cable. This cable takes care of the local supply voltage, CAN bus connection and carrier frequency synchronization between the devices.

5 Electrical connection

5.1 General notes on connection

The MP85A process controller operates on safety extra low voltage (SELV, supply voltage 18 … 30 V_{DC}). This voltage can also supply one or more further loads inside a control cabinet. If the device is running on a DC voltage network[1)], you must take additional precautions to dissipate surges.

To ensure sufficient immunity to interference, the bus lines (CAN bus and PROFIBUS DP in the MP85ADP(-S)) must be shielded twisted-pair cables. Use at least Cat 5 cables for Profinet. The transducer cables must also be shielded. Connect the shield of the transducer cable to the MP85A process controller using the shortest possible cable ($<$ 5 cm) and a Faston blade connector (4.8 mm).

Shield the power supply and digital control input/output connection cables as well, if the cables are longer than 30 m or are routed outside closed buildings.

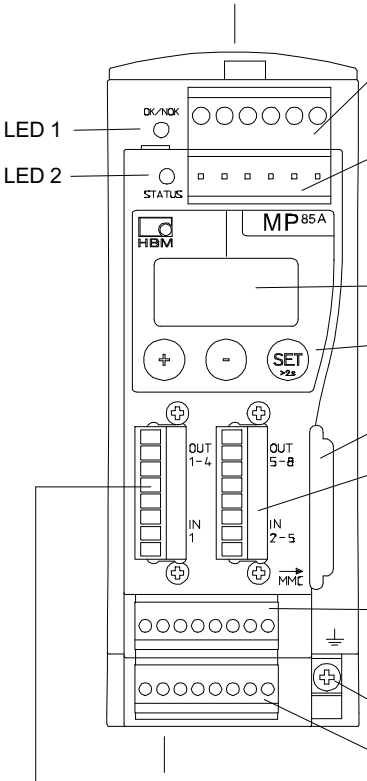
Notice

Electrostatic discharges can lead to malfunctions or failure of the device. This is indicated by the following symbol on the device:

Touch a grounded metal component before touching the device or use a grounding strip during installation if necessary.

1) Distribution system for electrical energy that covers a large physical area (e.g. several control cabinets), which may also supply loads with large nominal currents.

5.2 Overview of MP85A(-S) functions



Local connection of CAN bus, supply voltage and synchronization between devices

LED 1

LED 2

Screw terminal 1:

Power supply and CAN bus, synchronization

Screw terminal 2: (same assignment as screw terminal 1)

CAN adapter for PC/laptop connection, parameterization via CAN bus

2-line LCD

Control keys

Module for MultiMedia card (MMC)/SD card

Screw terminal 4:

4 electrically isolated control inputs or switch test inputs (24 V level, relative to input ground screw terminal 3)
4 electrically isolated control outputs (24 V level, power supply via screw terminal 3)

Screw terminal 5:

Transducer connection channel x including transducer excitation

Cable shield connection for transducers

Screw terminal 6:

Transducer connection channel y including transducer excitation

Connection 7:

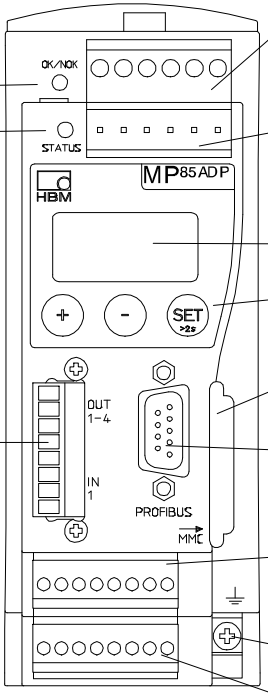
RJ45 socket for Ethernet connection (see page 63)

Screw terminal 3:

1 electrically isolated control input or switch test input (24 V level) incl. input ground,
4 electrically isolated control outputs (24 V level), excitation of external supply for control outputs or rotary/SSI encoder

5.3 Overview of MP85ADP(-S)/MP85ADP-PN(-S) functions

Local connection of CAN bus, supply voltage and synchronization between devices



Screw terminal 1:
Power supply and CAN bus, synchronization

LED 1

LED 2

Screw terminal 2: (same assignment as screw terminal 1)
CAN adapter for PC/laptop connection, parameterization via CAN bus

2-line LCD

Control keys

Module for MultiMedia card (MMC)/SD card

Connection 4:
9-pin D-sub socket for PROFIBUS DP or Profinet gateway connection

Screw terminal 5:
Transducer connection channel x including transducer excitation

Cable shield connection for transducers

Screw terminal 6:
Transducer connection channel y including transducer excitation

Connection 7:
RJ45 socket for Ethernet connection (see page 63)

Screw terminal 3:
1 electrically isolated control input or switch test input (24 V level) incl. input ground, 4 electrically isolated control outputs (24 V level), excitation of external supply for control outputs or rotary/SSI encoder

5.4 Supply voltage and control inputs/outputs

Four (MP85A(-S)) or three (MP85ADP(-S)/MP85ADP-PN(-S)) plug-in screw terminals are available for connecting the power supply and control inputs and outputs. You can assign the functions of the control inputs and outputs as you wish using the PME Assistant (“Digital inputs/outputs” menu).

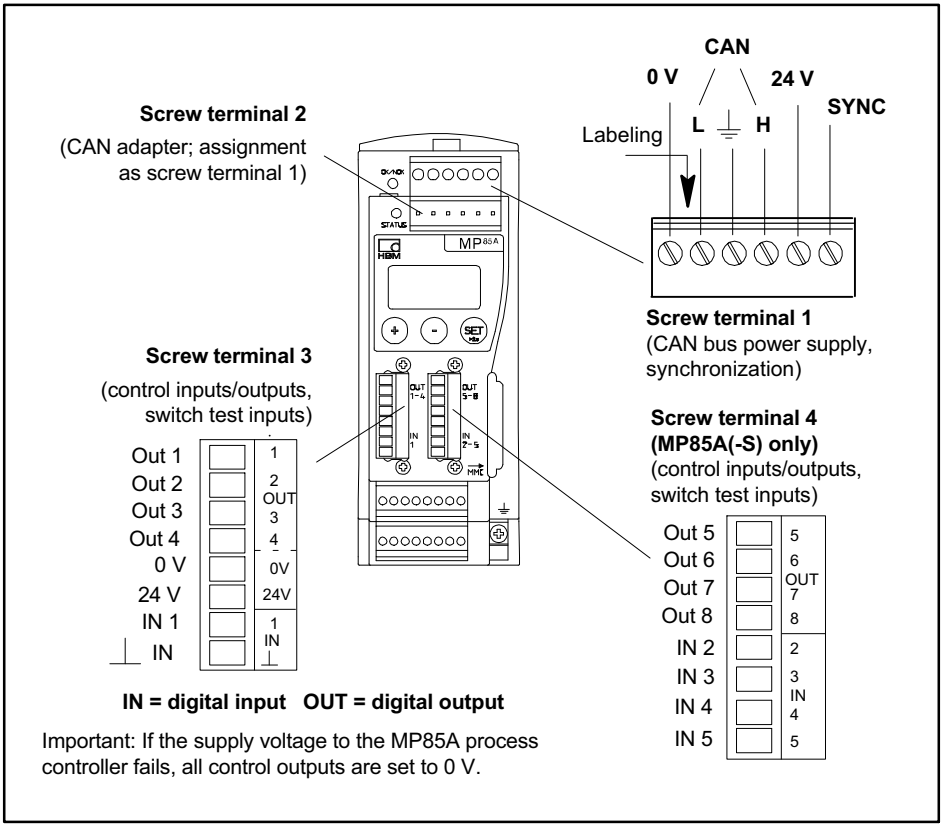


Fig. 5.1 Screw terminal assignment

The screw terminals are coded to stop them being inserted in the wrong socket. The sockets have coding tabs, screw terminals 1 and 2 have coding pins. The coding lugs are broken off for screw terminals 3 and 4.

In addition, screw terminals 3 and 4 and screw terminals 5 and 6 have different contact spacing.

5.4.1 Connecting the power supply

Notice

Connect the MP85A process controller to an external supply voltage of 18 … 30 V_{DC} (24 V_{nom}).

Procedure

- ► Attach wire end ferrules to the wire ends of the power supply.
- ► Screw the wire ends to screw terminal 1.
- ► Insert the screw terminal in the uppermost socket.
- ► Switch on the power supply.

5.4.2 External supply voltage for control outputs

Example: PLC connection (p-switched)

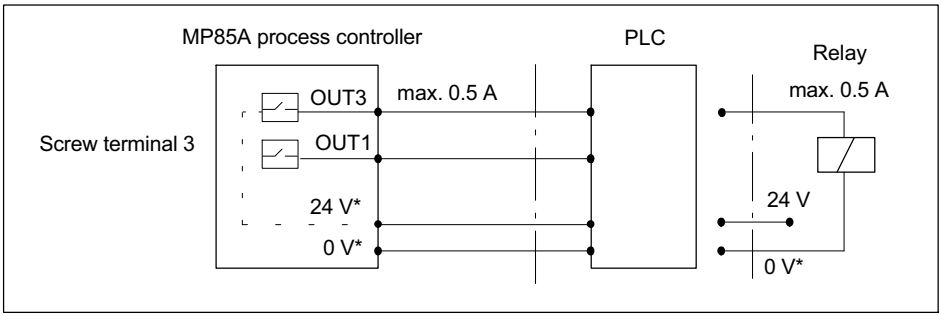


Fig. 5.2 Connection to a PLC
**) The control outputs must be supplied with an external voltage (0 V and 24 V) via screw terminal 3. This external voltage is electrically isolated from the measurement ground.*

The **control outputs** are available at screw terminals 3 and 4 and are electrically isolated from the internal supply voltage:

- At screw terminal 3: Control outputs 1 … 4
- At screw terminal 4: Control outputs 5 … 8 (for versions with -S only)

5.4.3 Reference potential for control inputs/switch test inputs

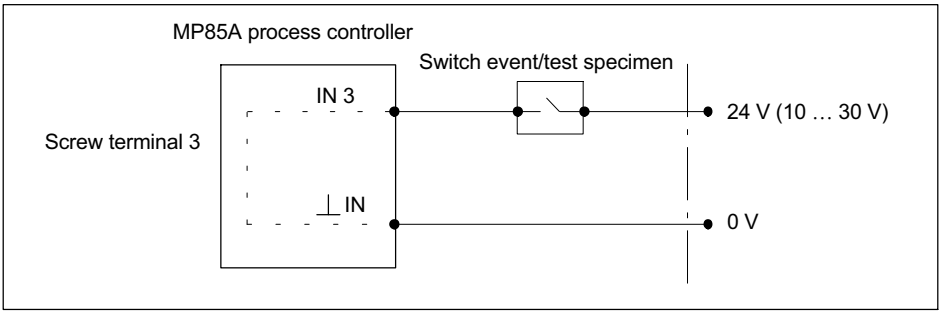


Fig. 5.3 Connection of control input/switch test input

The **control inputs** are available at screw terminals 3 and 4 and are electrically isolated from the internal supply voltage and from the control outputs.

- At screw terminal 3: Control input 1
- At screw terminal 4: Control inputs 2 … 5 (MP85A//MP85A-S only)

For the control inputs, connect an external reference potential (⊥IN), to which the control input signals refer.

Information

The digital inputs of the MP85A process controller are edge-controlled on the transition from 0 V to control voltage (e.g. 24 V). The set digital input function is implemented only once with the rising edge. The subsequent presence of control voltage does not cause any further action.

5.5 Transducer

Two transducers can be connected to screw terminals 5 and 6, independently of one another. The two measurement channels are parameterized using the PME Assistant (“Transducer” menu).

5.5.1 Synchronization of carrier frequencies

Synchronization prevents interference occurring due to minor differences between the carrier frequencies of several amplifiers, i.e. mutual interference between amplifiers.

Synchronization is advisable for transducers with carrier frequency excitation when

- The transducer cables of several devices run side by side,
- The measuring points are unshielded and close together.

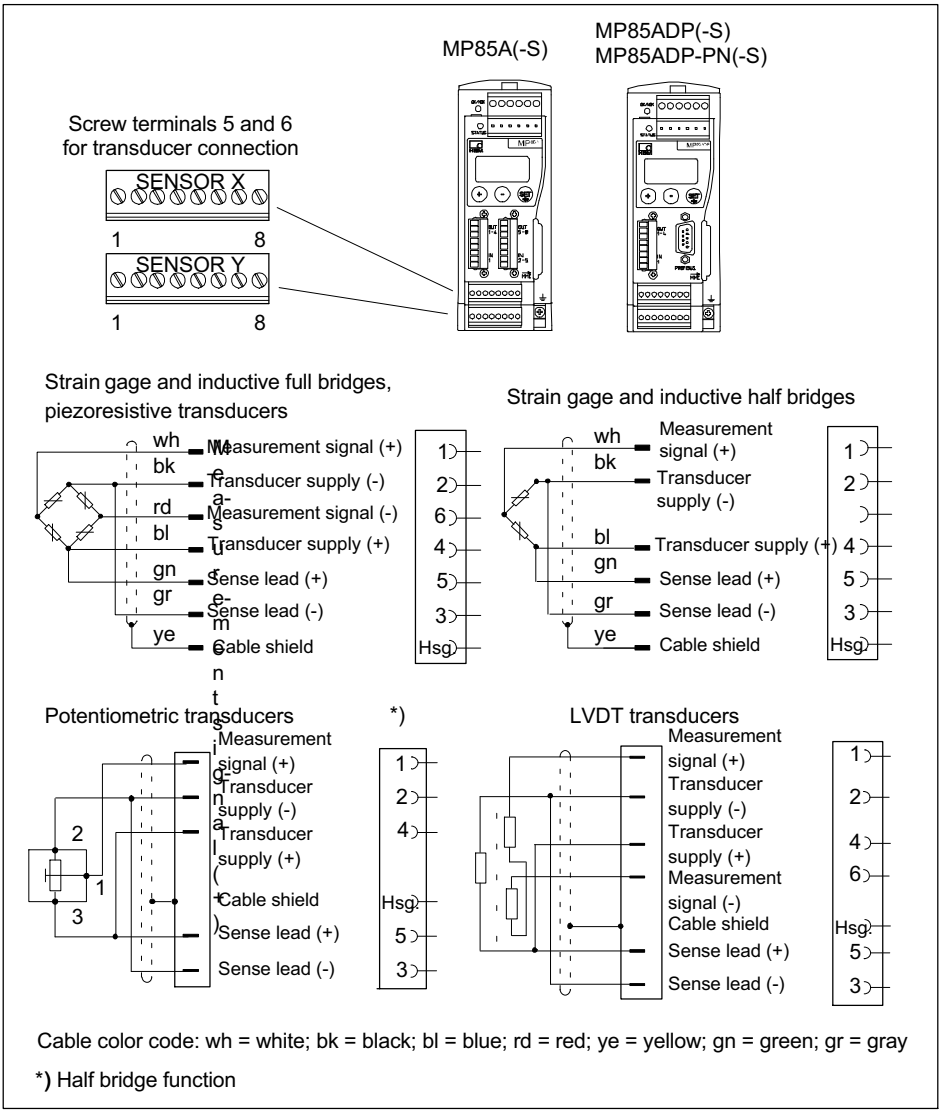
Even if you are not using a CAN bus, always use the ribbon cable for synchronization between devices, see section 4.2 on page 20.

Important

*To synchronize several devices, specify one device as the **master** and set all other devices as **slaves**. Perform settings via the PME Assistant program (Basic settings -> “Hardware synchronization” menu).*

5.5.2 Strain gage and displacement transducers, potentiometric and LVDT sensors

In carrier-frequency amplifier mode, you can connect the transducer models shown in Fig. 5.4, page 28.



Cable color code: wh = white; bk = black; bl = blue; rd = red; ye = yellow; gn = green; gr = gray

*) Half bridge function

Fig. 5.4 Connecting different transducers in carrier-frequency amplifier mode

TEDS for half and full bridge sensors

If you are using full and half bridge sensors in a 6-wire circuit, TEDS (zero-wire) modules can be used as an option. These are then connected to the existing sense leads.

In the MP85A, the TEDS function cannot be used for sensors in a 4-wire circuit.

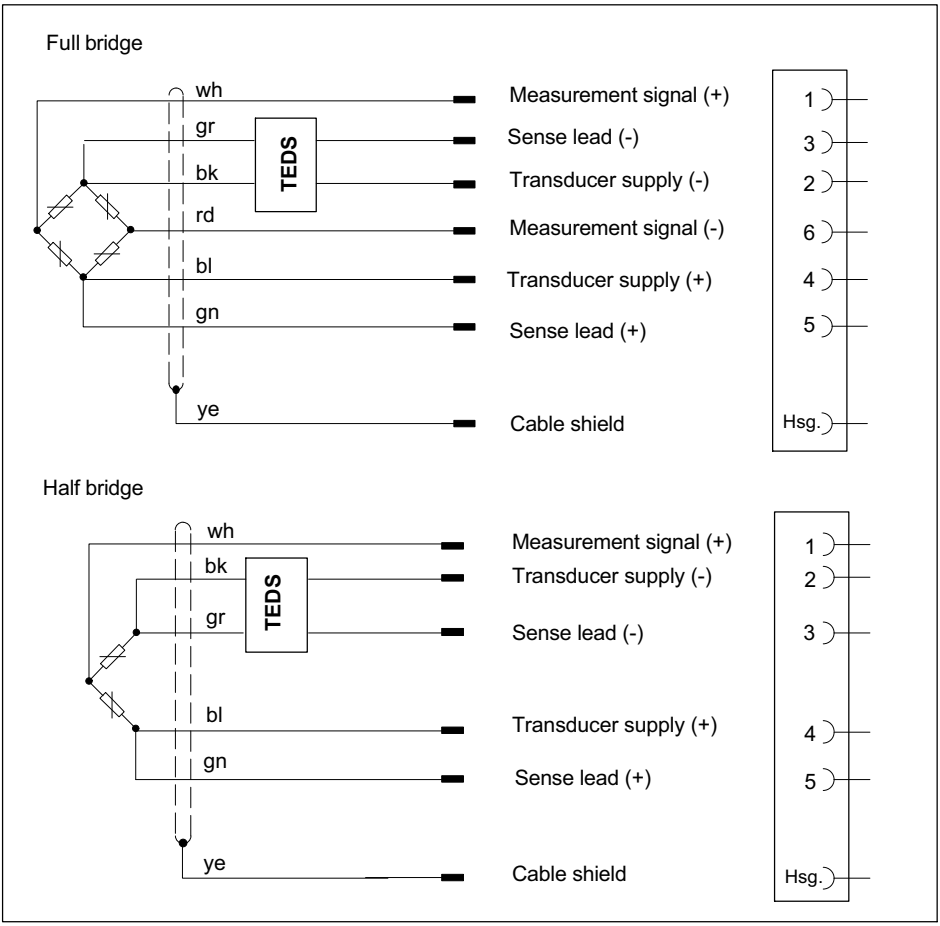


Fig. 5.5 Pin assignment (zero-wire TEDS) for sensors in a full and half bridge configuration (6-wire circuit)

If the cables of transducers in a 6-wire circuit are >50 m in length, you must loop resistors with half the value of the transducer's bridge resistance ($R_B/2$) in the sense leads.

When connecting a transducer in a 4-wire configuration, connect the sense leads to the appropriate transducer supply cables (pin 3 to pin 2 and pin 5 to pin 4). For transducer cables >50 m in length, use a resistor with half the value of the transducer's bridge resistance ($R_B/2$) for each cable, instead of the above connection.

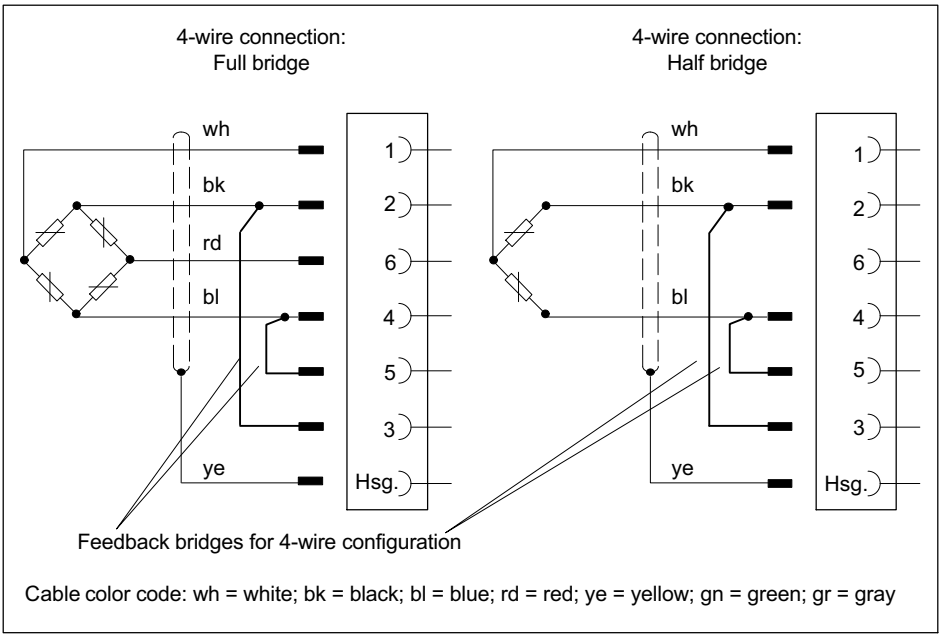


Fig. 5.6 Transducer connection in 4-wire configuration (no TEDS possible)

Open circuit detection

MP85A process controllers have open circuit detection for the connected transducers.

The bridge excitation voltage cables and measurement signal cables are monitored. In measurement signal and bridge excitation voltage cables, a broken wire in a single lead is also reported as a fault.

With sense leads, a broken wire is only detected and reported as a fault if this occurs in **both** leads. This also means that if the connection is faulty (e.g. if the feedback bridges are missing when full or half bridges are connected in a 4-wire configuration) an error message appears (display: Transducer error).

If a single sense lead is broken, only an increased measured value is displayed.

5.5.3 Incremental, SSI and DC sensors

Fig. 5.7, on page 32, shows how these transducer models are connected in incremental, SSI or DC sensor mode.

A supply voltage is available at screw terminals 5 and 6, pins 7 and 8 for feeding incremental encoders, transducers with an SSI interface and sensors with a voltage signal. You can select an internal or external power supply using switch S1. To do this, open the device (see section 6) and – for an external supply – set switch S1 to “24 V external”.

- Transducer supplied from MP85A process controller:

  Transducer supply voltage 5 V ±10%, 150 mA max. (for both channels together). In this case, the supply voltage is **not** electrically isolated from the measurement system.

- Transducer supplied from an external power pack:

  Connect a voltage between 10 … 30 V_{DC} (24 V_{DC} nominal), including ground, to screw terminal 3, pins 5 and 6. A current of max. 300 mA (for both channels together) can then be drawn at screw terminals 5 and 6, pins 7 and 8.

  This external supply voltage is electrically isolated from the measurement ground and simultaneously supplies the digital control outputs.

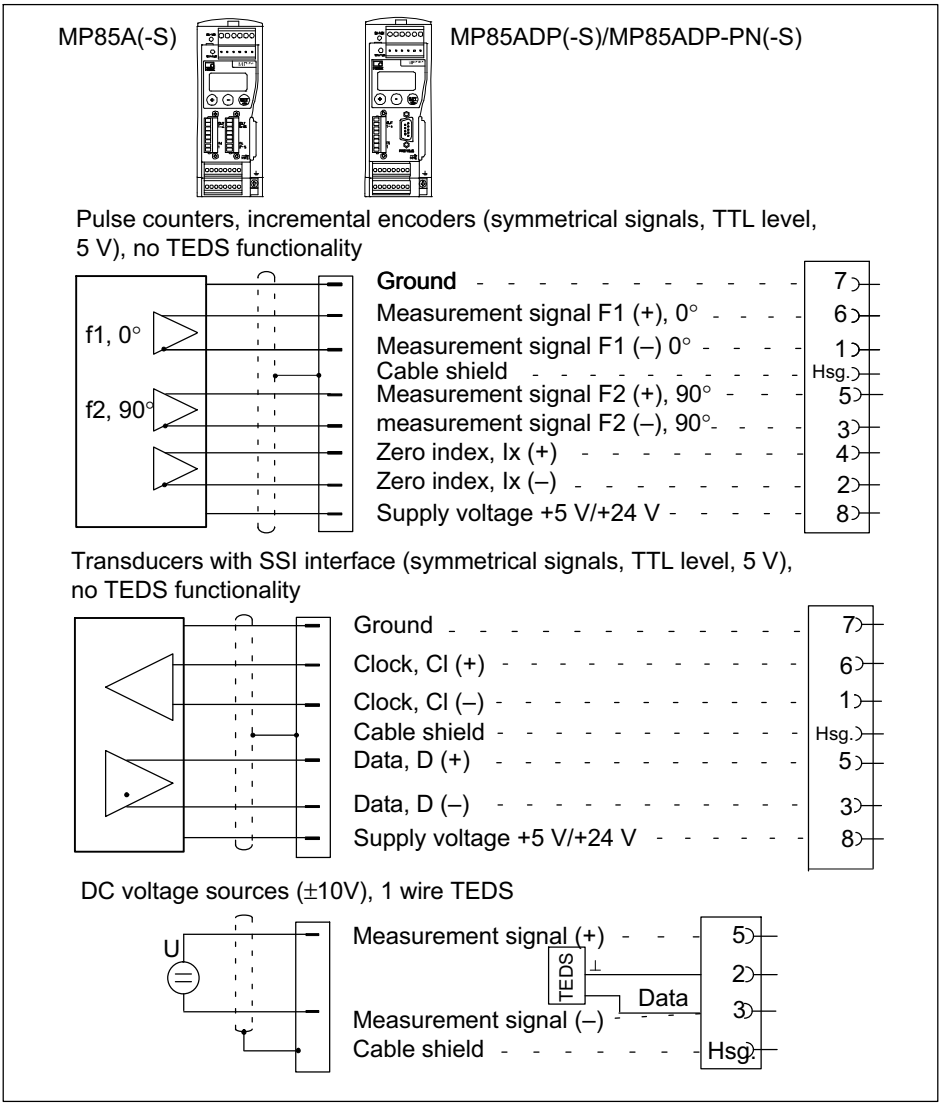


Fig. 5.7 Connecting active sensors

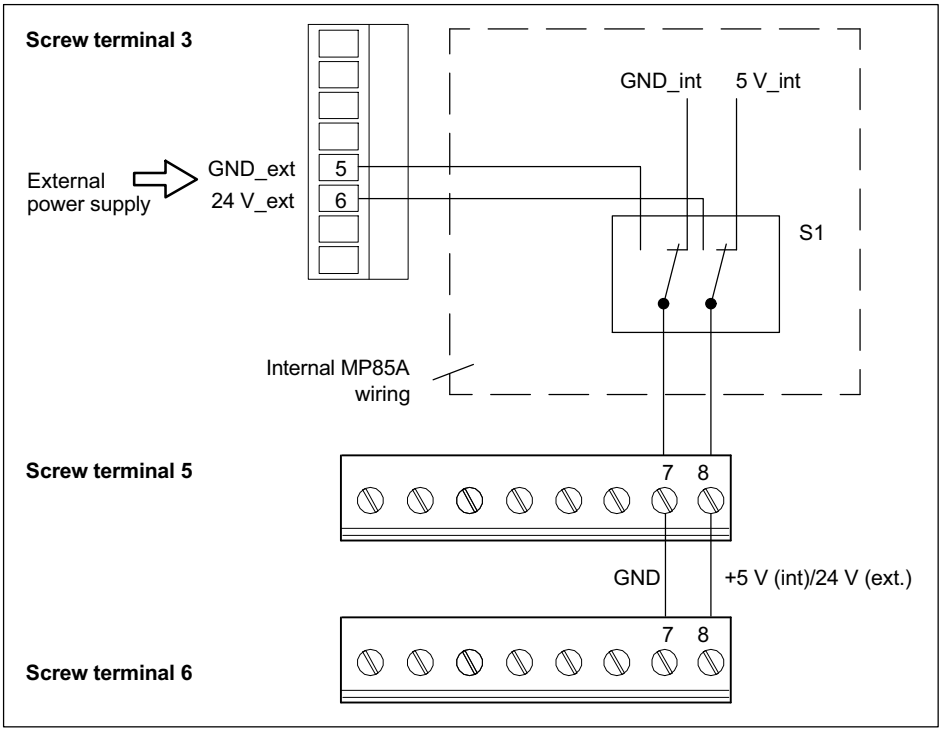


Fig. 5.8 Power supply of active sensors (schematic diagram)

Important

The amplitudes of the measurement signal and zero index signal must each be at least 1.2 V.
The voltage to measurement ground must not exceed 14 V in any line. If necessary, the voltage must be reduced by means of a voltage divider.

5.5.4 Piezoelectric measurement chains

A charge amplifier is required to operate the piezoelectric sensors on the MP85A process controller, which converts the electrical charge generated by the sensor into a 10 V voltage signal.

The CMD or CMA charge amplifier models from HBM or charge amplifiers from other manufacturers with a 10 V output signal are suitable for this purpose.

The charge amplifier can be supplied either with the internal voltage of 5 V or an external supply voltage made available at pins 7 and 8 of terminal screws 5 and 6 of the MP85A (see section 5.5.3, active sensors, Fig. 5.7). You can select an internal or external power supply using switch S1. To do this, open the device (see section 6) and – for an external supply – set switch S1 to “24 V external”.

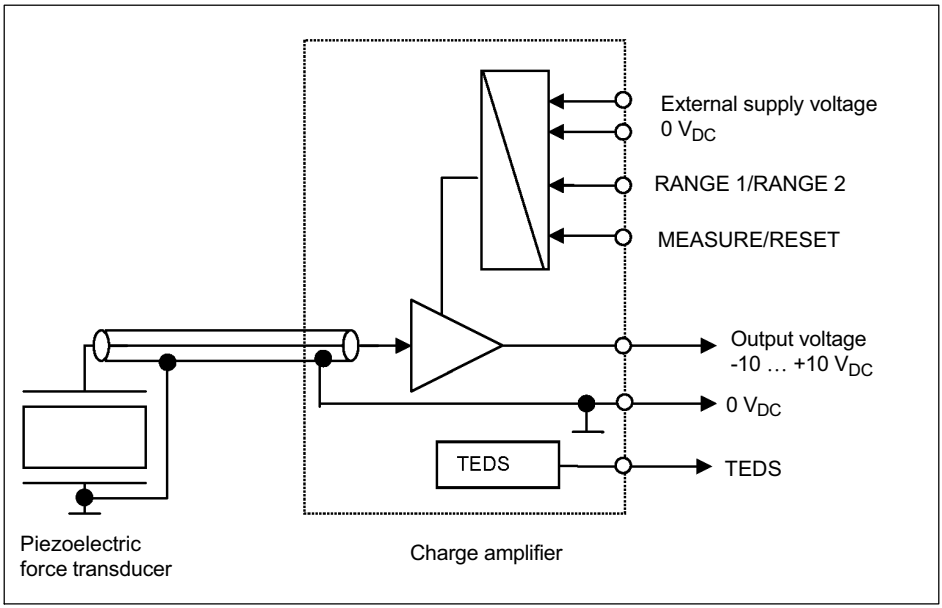


Fig. 5.9 Block diagram of piezoelectric measurement chain, example with external supply voltage

The measurement channel of the MP85A process controller must be set to 10 V (PME Assistant, “Transducer” menu). Before starting a measurement, reset the charge amplifier (pin 3): MEASURE/RESET. With an input voltage of 0 V at pin 3, the charge amplifier is in MEASURE mode. If a voltage of 24 V is present at pin 3, the charge amplifier switches to RESET.

Tip

The Reset signal can be generated externally or via the MP85A process controller. For the latter, route the process signal “Reset piezo sensor” to a digital output of the MP85A process controller (PME Assistant, “Digital outputs” menu, Positive circuit logic).

TEDS

The CMD and CMA charge amplifiers from HBM have TEDS functionality, which is available for the voltage input in the MP85A process controller from hardware version V1.07.

For operation without TEDS, connect the measurement ground directly to pin 3 of the MP85A process controller. You then do not require the cable for the TEDS module.

Measuring range selection

The (analog) CMA charge amplifier from HBM has measuring range switchover RANGE1/RANGE2, which takes place via pin 2 of the charge amplifier. The switching signal can be supplied by an external control system or the digital outputs of the MP85A process controller. If a voltage of 0 V is present at pin 2, measuring range 1 (100 % F_{nom}) is enabled on the charge amplifier. If a voltage of 24 V_{DC} is present at pin 2, measuring range 2 is enabled (20 % of nominal (rated) force = 100% output span). The (digital) CMD charge amplifier has 2 internal parameter sets. You can therefore switch the measuring range via the digital input, for example. You can find further information in the operating manual of the CMD.

In both cases, please note that the changed measuring range must also be enabled in the MP85A process controller, either automatically via the TEDS function or using the scaling option of the input channel.

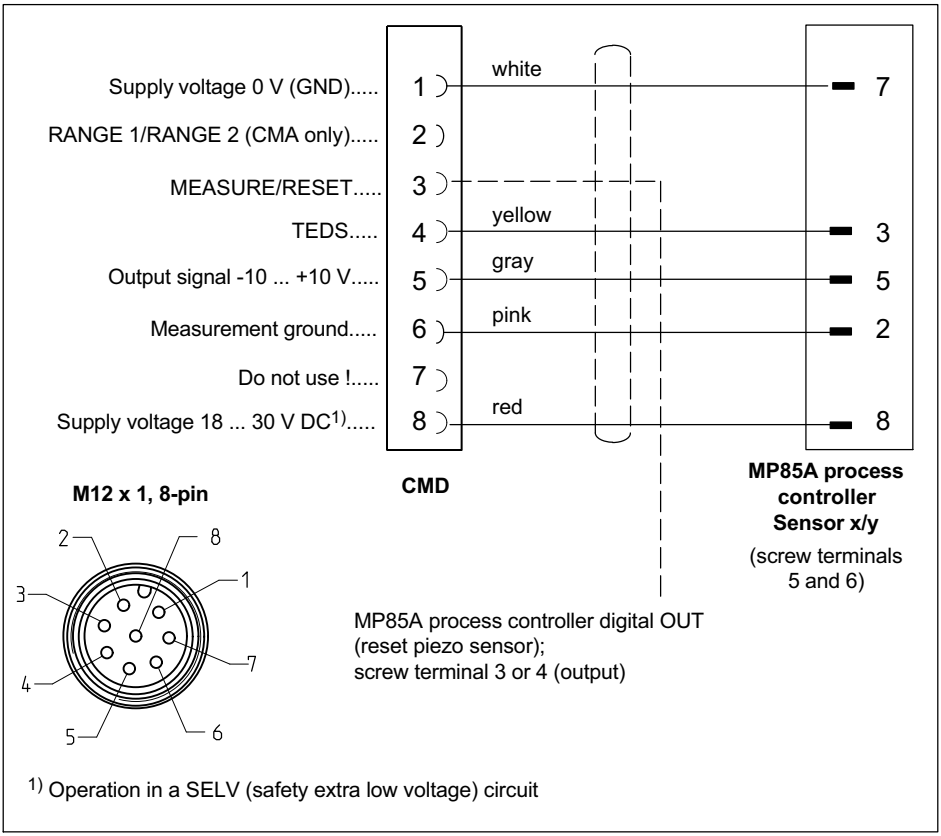


Fig. 5.10 Connection of the piezoelectric CMA/CMD charge amplifier

CAUTION

Although the output signal is still in the range -10 ... +10 V, force can still be present after a RESET. The addition of further loads can lead to an overload and therefore damage to components and danger to persons.

Make sure that the force transducer is not overloaded, even if the output signal is still in the -10 ... +10 V range.

Tip

You can find detailed information in the operating manual “PACEline piezoelectric force measurement chain”, for example.

5.6 TEDS (transducer electronic data sheet) chips

5.6.1 TEDS connection

TEDS (transducer electronic data sheet) allows you to store the transducer data (characteristic values) in a chip as per IEEE 1451.4. Transducers with a TEDS module can be connected to the MP85A process controller; the characteristics of the transducer can be read out and the amplifier can be automatically set.

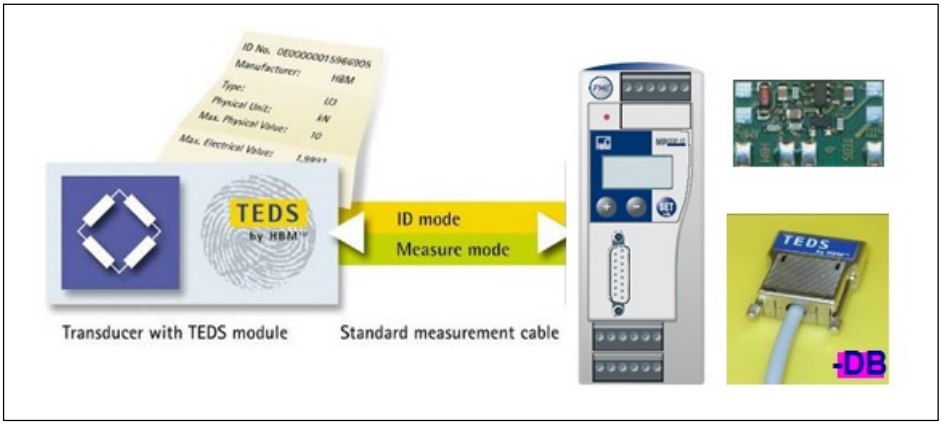


Fig. 5.11 MP85A process controller with TEDS technology

The MP85A has two types of TEDS systems:

1. **Zero-wire TEDS** for bridge sensors (half bridges, full bridges and potentiometric sensors). The existing sense leads are used to transmit the TEDS data to the amplifier. No further leads are necessary.

2. **1-wire TEDS** for signals from sensors with a voltage output. Here, the TEDS module is connected to the MP85A by a separate cable.

Important

If bridge sensors are connected in a 4-wire configuration, TEDS functionality is not available, as the sense leads are bridged.
If pulse (incremental) and SSI encoders are connected, likewise, there is no TEDS functionality.

You can find the circuitry of both TEDS versions in sections 5.5.2, page 27, and 5.5.3, page 31.

The MP85A supports the following TEDS templates:

- “Wheatstone 33” for full and half bridge strain gage sensors, and also for LVDT sensors: TEDS zero-wire technology.
- “Displacement 11” for half bridge inductive displacement sensors.
- “Poti 39” for potentiometric sensors.
- “Highlevelvo 30” for sensors with +/-10 V DC signal output (also HBM CMA and CMD charge amplifiers).

5.6.2 Parameterization with TEDS

If a transducer with a TEDS module containing parameterization data for a sensor is connected, you can stipulate that the amplifier is automatically set when the MP85A process controller is switched on. A new TEDS is then also automatically detected when an active transducer is replaced.

Select the appropriate entries in the TEDS dialog in the PME Assistant program (TEDS menu) to monitor TEDS functionality and protect the scaling from manipulation. You can also enable TEDS functions individually for each channel. Using TEDS for piezoelectric measurement chains is described in section 5.5.4 on page 33.

Settings with the PME Assistant

In the PME Assistant, select the desired conversion unit in the “Transducer” area. If you wish to use the unit stored in the TEDS instead, disable this function in the TEDS dialog.

When the TEDS is enabled, its scaling data will be read out and converted to the required physical unit. If the unit stored in the TEDS and the required conversion unit are incompatible because they describe different quantities, for example (e.g. torque transducer connected, conversion unit is “N”), an error message is generated and scaling does not take place.

If a scaling error is reported when the TEDS is enabled, this may be because the value range specified by the two characteristic curve points is so great or so small that the measured values cannot be displayed with the set decimal places. You then need to adapt the number of decimal places in the “Amplifier” area. It may possibly help to change to a different power of ten, e.g. “N” to “kN”.

The PME Assistant displays this information for each channel in the “TEDS” area with the “TEDS error status”. For accurate analysis, view the data stored in the TEDS. To do this, you need the TEDS Editor and suitable hardware, e.g. the HBM TEDSdongle, to connect the sensors.

The data for the minimum and maximum bridge excitation voltage in the TEDS is also checked.

If, instead of using the PME Assistant, you are parameterizing directly, e.g. by bus command, you must use Object 2122 to set the required conversion unit before enabling TEDS.

The available units are in the selection list provided by the PME Assistant.

Important

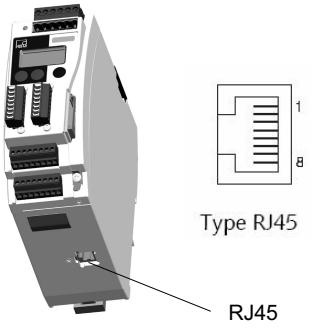
If several transducers are connected to an MP85A process controller in parallel, their TEDS data cannot not be used. Error-free readout and the totaling of individual parameters are not possible for TEDS connected in parallel. In this case, make sure that the TEDS functionality is disabled for the channels in question in the TEDS dialog.

5.7 Interfaces

Use the PME Assistant to set and parameterize the device via the Ethernet or CAN interface. In automated systems, the devices are integrated in the machine control system via fieldbus interfaces.

5.7.1 Ethernet interface

An RJ45 socket for the Ethernet connection is located on the underside of the MP85A process controller as standard.



Function	Pin
Transmitter +	1
Transmitter –	2
Receiver +	3
line termination	4
	5
Receiver –	6
line termination	7
	8

Fig. 5.12 Ethernet connection

The device can therefore also be integrated in an Ethernet network. It supports speeds of 10 Mbit/s and 100 Mbit/s, as well as half and full duplex mode. The transmission mode and speed are automatically adapted to the existing network.

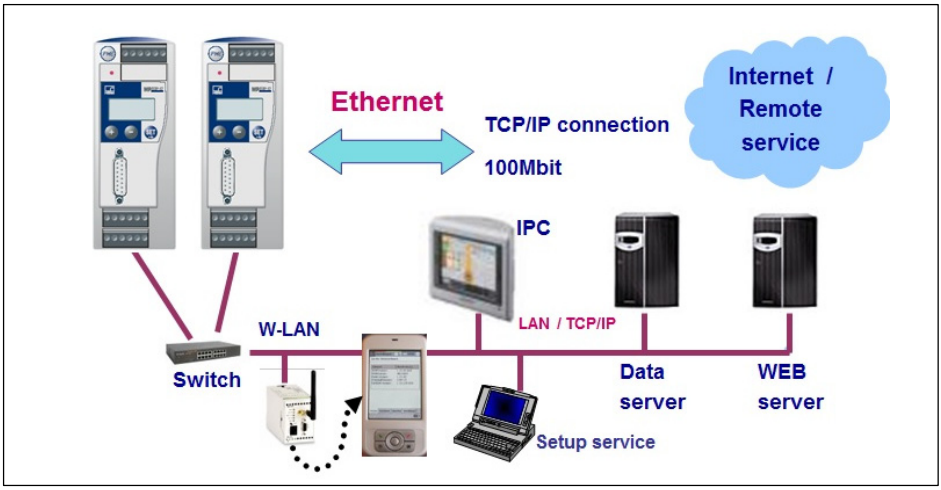


Fig. 5.13 Integrating the MP85A process controller in an Ethernet network

Use only cables that are Category 5 (Cat 5) or higher for this purpose. This enables line lengths of up to 100 m to be achieved.

Notes on operation in an Ethernet network

In order to avoid network problems, you should check the following points before connection to an Ethernet network:

- Are the connected device addresses unique, i.e. there are no duplicate IP addresses?
- Does the network have sufficient reserves for the transmission of the planned data or could the network load become too great?
- Are there nodes that could put strain on the network due to broadcasts, i.e. data sent to all nodes?

In order to prevent measurement processes from being disrupted by other network nodes, you can also operate the devices in a separate network from your company network. Connection to the company network would then only be necessary if external access to the measurement devices themselves is necessary. If access to the generated data alone is required, you can achieve this using a PC connected “between” the networks, i.e. linked to the devices via one network card and to the company network via a second network card.

If you are operating several devices in one Ethernet network, we recommend the use of an **industrial** Ethernet switch. If the devices are to be connected to the company network, we also recommend the use of a managed switch, as experience shows that these (higher quality) devices are less susceptible to disturbances. The network with the measuring instruments and any PCs integrated in it are then connected to the company network via the managed switch.

In order to achieve the best possible separation between the network containing the measuring instruments and the rest of the company network, you can also use a router that separates both networks and only transmits messages between the two networks when necessary.

5.7.2 CAN interface

The CAN bus is connected via screw terminal 1. A maximum of 32 CAN nodes can be connected in one bus segment (as per CANopen specification).

The CAN bus requires a termination resistor of 120 Ω in the first and last bus nodes. The bus line can have two termination resistors maximum. The MP85A process controller has an integrated termination resistor, which you can enable using toggle switch S2.

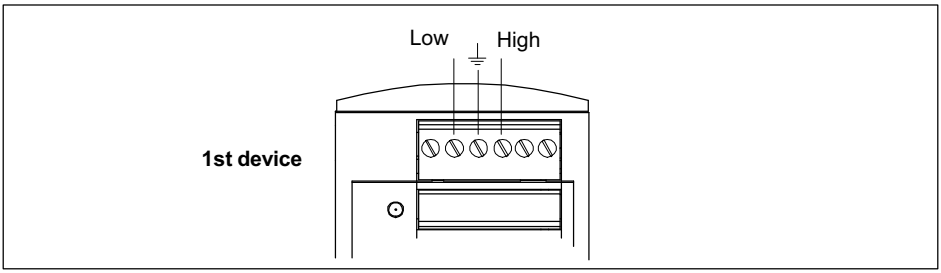


Fig. 5.14 CAN interface connection

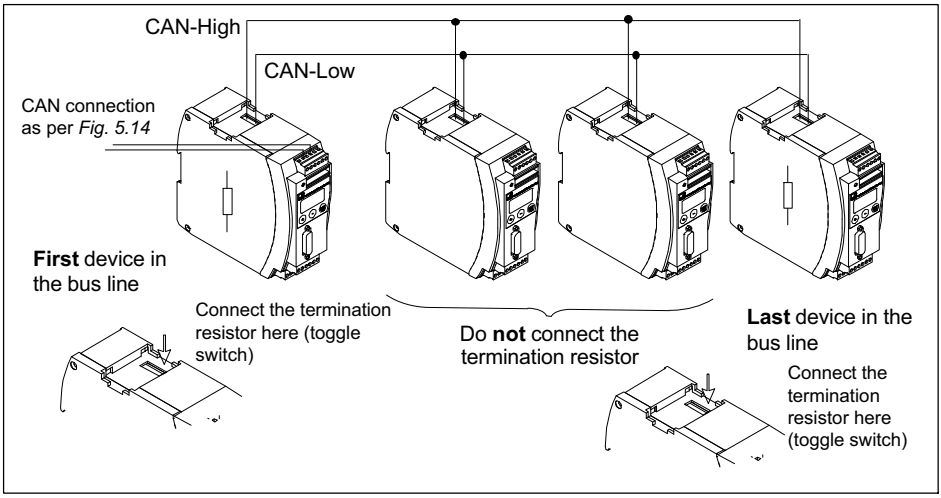


Fig. 5.15 CAN bus mode with several transducers (max. 32 as per standard)

Important

If the first or last device in the bus line is not a PME device, you must connect a 120Ω resistor to each of these external devices.
The baud rate of all devices must be identical to that of the CAN master. For longer cables, reduce the baud rate according to the CAN specifications.

5.7.3 PROFIBUS interface (MP85ADP/MP85ADP-S only)

The front of the MP85ADP(-S) features a 9-pin D-sub connector for the PROFIBUS connection.

Installation:

- ► Connect the MP85ADP(-S) to the supply voltage (24 V).
- ► Use the keyboard or the Setup program to set the required PROFIBUS address.
- ► Connect the PROFIBUS line to the MP85ADP(-S).
  Make sure that termination resistors are connected at the first and last

PROFIBUS nodes (there is usually a slide switch on the housing of the PROFIBUS connector for this purpose).

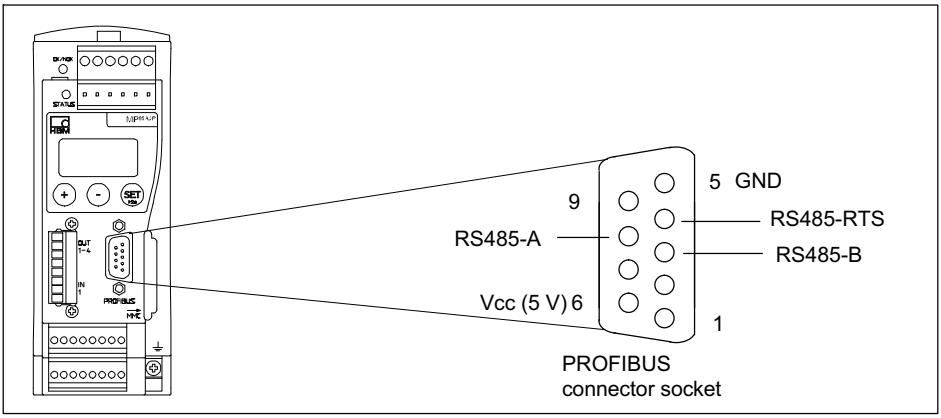


Fig. 5.16 PROFIBUS connection as per standard

Example:

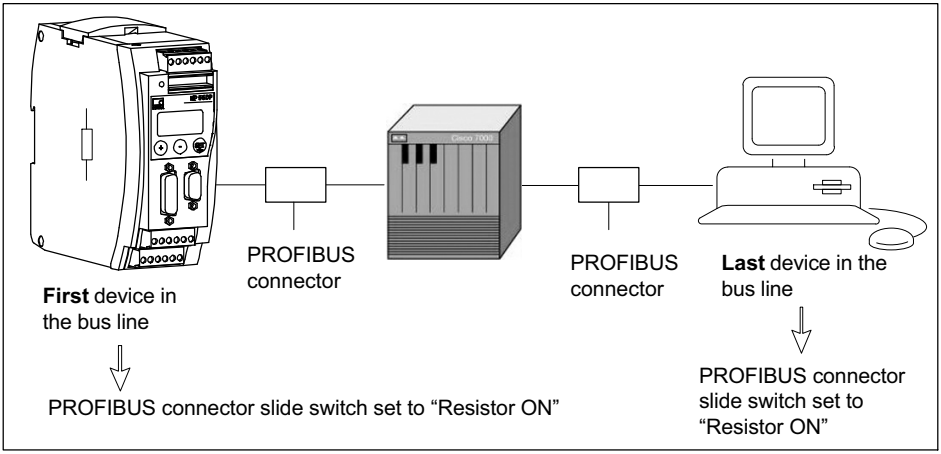


Fig. 5.17 PROFIBUS operation

5.7.4 Profinet interface (MP85ADP-PN/MP85ADP-PN-S only)

The Profinet gateway (1-NL51N-DPL) can be plugged directly into the D-sub connector of the PROFIBUS interface and secured with 2 screws. This produces a 1:1 connection for the MP85ADP(-S) in a Profinet network.

X1: Power supply

X2: Ethernet (Profinet) interface

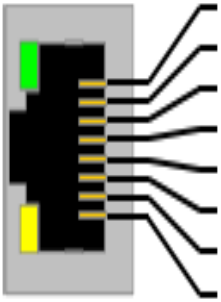
X3: PROFIBUS interface

Fig. 5.18 Profinet gateway connections

Pin assignment of power supply (X1) for the gateway:

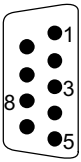
Power supply (Mini Combicon, X1)	Pin	Signal	Description
	1	0 V/GND	Power supply GND, 1 nF/2000 V to shield/ housing
	2	+24 V	Power supply +24 V

Pin assignment of Ethernet socket on gateway:

Ethernet socket	Pin	Signal	Description
	1	TX+	Transmit data +
	2	TX–	Transmit data –
	3	RX+	Receive data +
	4		Connected to PE via an RC element*)
	5		Connected to PE via an RC element*)
	6	RX–	Receive data –
	7		Connected to PE via an RC element*)
	8		Connected to PE via an RC element*)
		PE	Metal housing on PE

*) with Bob Smith termination

Assignment of PROFIBUS interface:

PROFIBUS	Pin	Signal	Description
	3	RX/TX+	Receive/transmit data +
	5	GND	Reference potential, 1 nF/2000 V to PE
	8	RX/TX–	Receive/transmit data –
	Shield	PE	Metal shell

6 Switch settings/Replacing the battery

Important

You must open the device to set the supply voltage and change the battery. Changes should therefore be made before installation. Otherwise, you would have to remove the MP85A process controller from the support rail.

6.1 Changing the supply voltage for active sensors

Use switch S1 to select either an internal 5 V supply or an external 24 V supply (10 … 30 V_{DC}, nominal 24 V_{DC}) as the supply voltage for active sensors. **The factory setting is 5 V internal sensor supply voltage.**

To set switch S1, proceed as shown in Fig. 6.1.

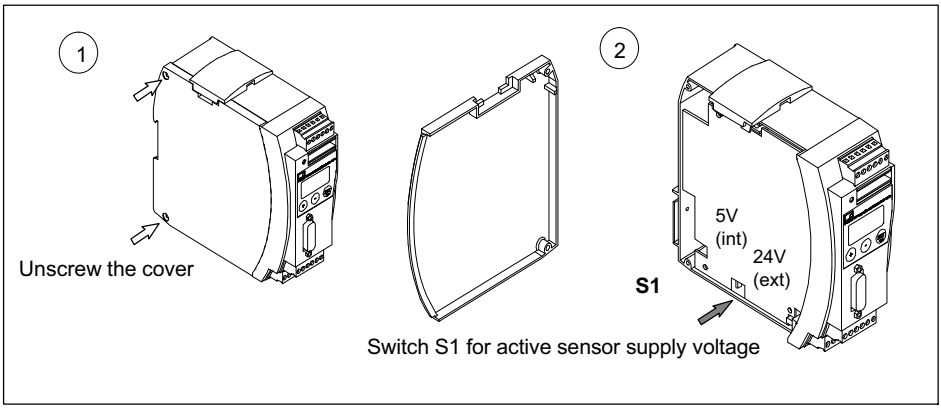


Fig. 6.1 Opening the housing, position of switch S1

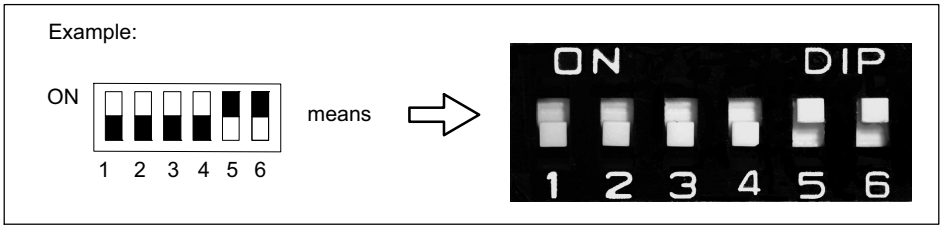


Fig. 6.2 Switch convention

6.2 Replacing the battery

The MP85A process controller has a real-time clock, which is powered by a CR2031 lithium battery. It can be removed from the battery holder and replaced at the point shown in Fig. 6.3. You should replace the battery approximately every 5 years.

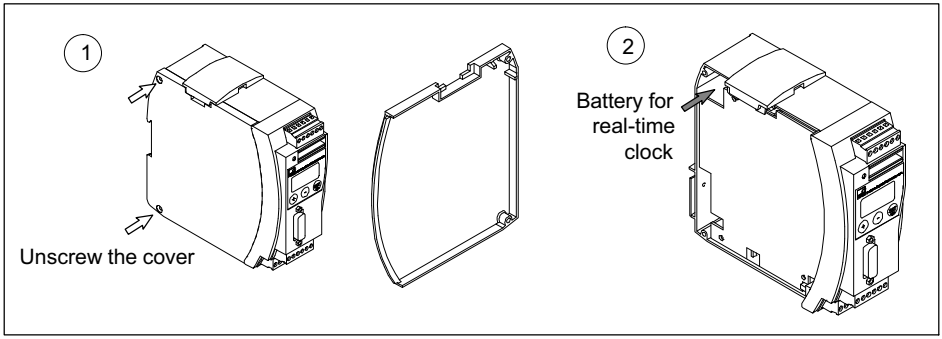


Fig. 6.3 Opening the housing, position of battery

Notice

The battery may be damaged if inserted incorrectly. Also, buffering of the real-time clock may not work.
Please note the battery polarity shown in Fig. 6.4 when inserting the battery.

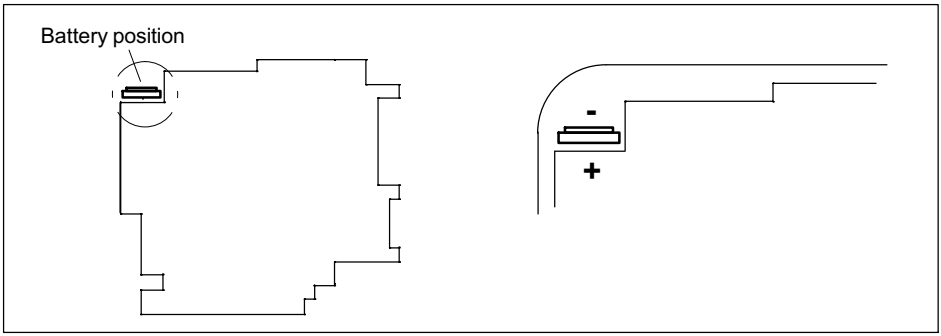


Fig. 6.4 Correct battery position

The buffer battery is only required for the integrated real-time clock. The device functions are not affected by the battery. However, the time is also saved with the curve and results files. Therefore, set the correct time and date in the device (PME Assistant: “Basic settings” menu).

There is no automatic summer/winter time switchover.

6.3 CAN termination resistor

Switch the CAN termination resistor on or off using switch S2 (*see Fig. 6.5*).

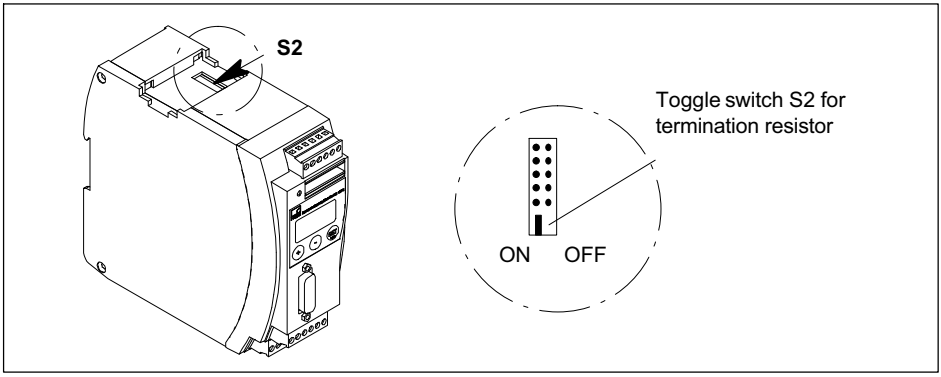


Fig. 6.5 Switch for CAN bus termination resistor

7 Starting up/Setup mode

To prepare the MP85A process controller for a measurement task, ensure the following requirements are met and/or perform the relevant steps:

- You require an MP85A process controller and either the PME Assistant or INDUSTRYmonitor program.
- Set up the hardware: transducer, MP85A process controller, PC with software (see section 7.2).
- Install the software (see section 7.3).

To connect the MP85A process controller to a PC, you will need the following:

- An Ethernet (crossover) cable (see section 7.2.2) for Ethernet operation,
- A CAN adapter (see section 7.2.3), either PCAN USB-to-CAN or PCAN card, for operation via the CAN interface.

Connect the MP85A process controller to a PC via the Ethernet cable or the CAN adapter. Once you have launched the software, you can set up the MP85A process controller with the PME Assistant (see section 7.4).

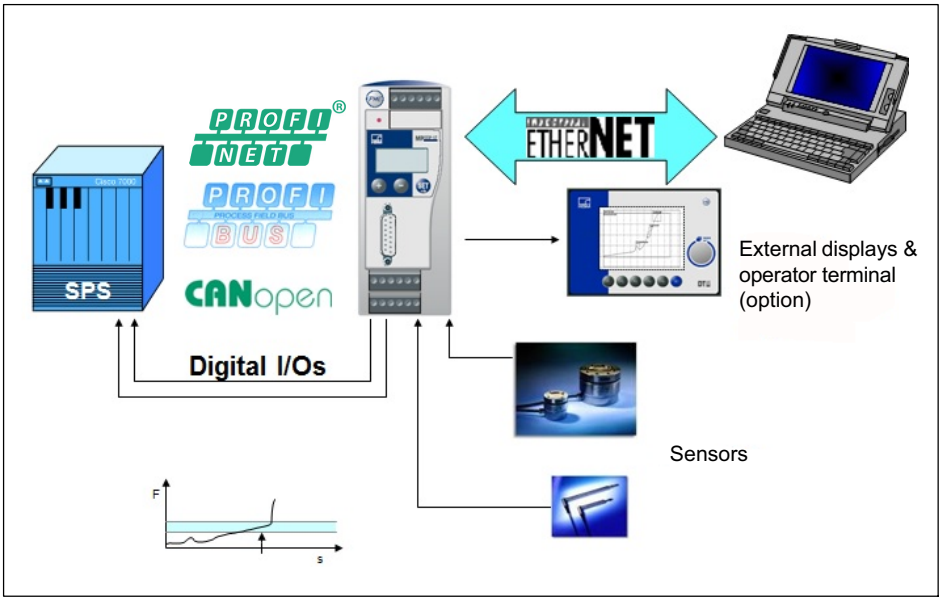


Fig. 7.1 System configuration with the MP85A process controller

Tip

To prevent false future statistics, you can temporarily disable statistical processing in the PME Assistant ("Data backup" menu).
For a quick guide to operating the measurement system, see the FASTpress Suite quick start guide.
Detailed instructions can be found in the PME Assistant's online help. To open Help, the PME Assistant must be installed.

7.1 Operation

7.1.1 Device settings, measured values, process status, PROFIBUS, memory card, error types, firmware update, device backup

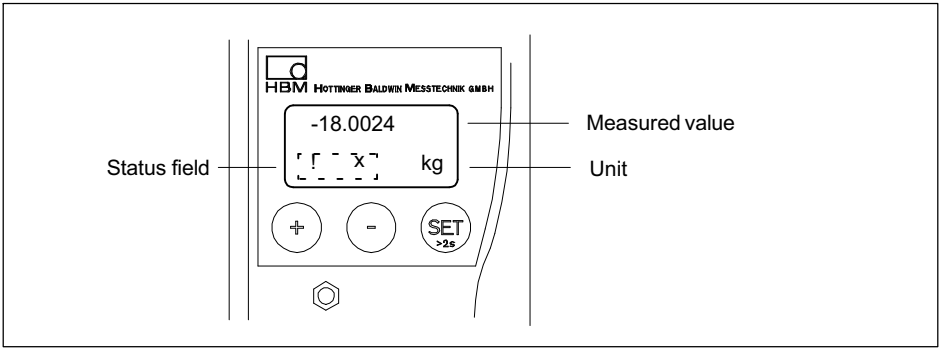
The display of the MP85A process controller shows measured values and status information for measurement channels, process status, digital inputs/ outputs and parameter set backup; devices with PROFIBUS interface also show the PROFIBUS status.

You can switch between individual displays and menus with the device keyboard.

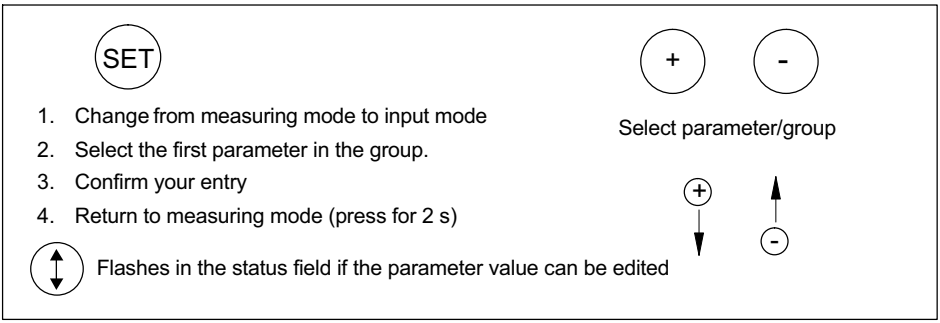
Use the device menu to set the Ethernet, CAN bus or PROFIBUS addresses. In addition, a menu is available for device identification (serial number, firmware and hardware version, etc.) and for backing up the 31 flash parameter sets.

All other device settings take place in the software via the PME Assistant or INDUSTRYmonitor program.

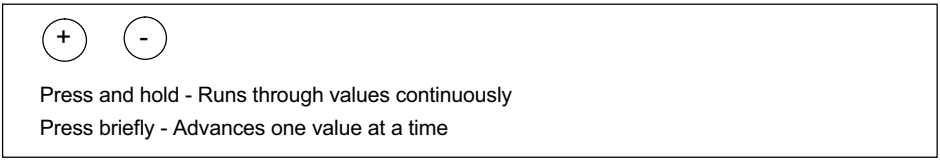
Display in measuring mode:



Function of keys:



Keys:



During measurement, if you press ⊕ ⊖, the following will be displayed:

1. Measured values

- MVx Measured value for channel x
- MVy Measured value for channel y

2. Process status, “ProcStat”

- Alarm The last process was terminated via the alarm window
- OK The last process was OK
- NOK The last process was not OK
- Started A process was started and has not yet finished

3. Status of digital inputs and outputs

The MP85A(-S) has 5 inputs and 8 outputs.

The MP85ADP(-S) and MP85ADP-PN(-S) have 1 input and 4 outputs.

- Input

  ■ □ □ □ □ ■ set, □ not set

- Output

  ■ □ □ □ □ □ □ □ ■ set, □ not set

4. PROFIBUS status (MP85ADP(-S) and MP85ADP-PN(-S) only)

BD_SEAR (baud rate search)

WT_PARM (waiting for parameterization)

WT_CONF (waiting for configuration)

DATA_EX (cyclic data traffic)

ERROR (bus error)

5. Status of the memory card (MMC/SD Card)

Using the optional memory card, you can choose to save measured curves, measurement results and/or parameter sets (measurement programs).

You can use either an SD card or a MultiMedia (MMC) card up to 2 GB. Use the PME Assistant (“Data backup” menu) to select what to save and on which medium (memory card or PC).

You can save up to 300,000 measured curves on a memory card with 1 GB storage capacity. In addition, you can save up to 31 parameter sets in XML format and up to 1000 parameter sets in binary format.

You can upload parameter sets in XML format to the device using the keyboard. Binary parameter sets can only be uploaded using the PME Assistant or the interface.

Important

Use only standard MMC/SD cards, not MMCplus™, SecureMMC, MMCmobile™, SDHC (SD High Capacity), SDXC cards (SD eXtended Capacity) or other cards. Format the MMC or SD card with FAT16; FAT32, NTFS or other formats are not permitted. Reformat your card if necessary.

Tip

To optimize the access times of the MMC/SD card, defragment or reformat it at regular intervals.

Displays relating to the MMC/SD card

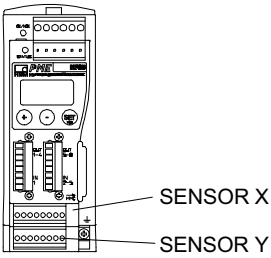
Display	Meaning
Unused	Do not save any data to the memory card. When anything else is displayed, you should save data to the memory card.
No memory card	The device has no memory card inserted.
Init...	The memory card is initialized automatically on insertion.
SET → STOP	The memory card is ready to save. Pressing SET changes the status to Stop. You can then remove the memory card.
Saving	Data is being copied onto the memory card. Once copying is complete, the status changes to “Ready” and SET → STOP appears on the display.

Display	Meaning
Stopped	**Press the SET key before removing the memory card from the device. This ensures that all files are closed correctly. Otherwise, data could be lost.** The display briefly shows the message “MMC/SD Disk Closed” or, in the event of an error, “MMC DiskClose Err”. The MMC/SD card then changes to “Stopped” status and can be removed from the device. If there is no more space left on the memory card, it automatically changes to “Stopped” status. This status only ends when the memory card is removed from the device. Re-initialization then follows automatically.

6. Error types

During measurement, the **!** character in the status field of the PME Assistant (in measuring mode) indicates an MP85A process controller error.

Errors are displayed one after the other (accessible via ⊕ ⊖).

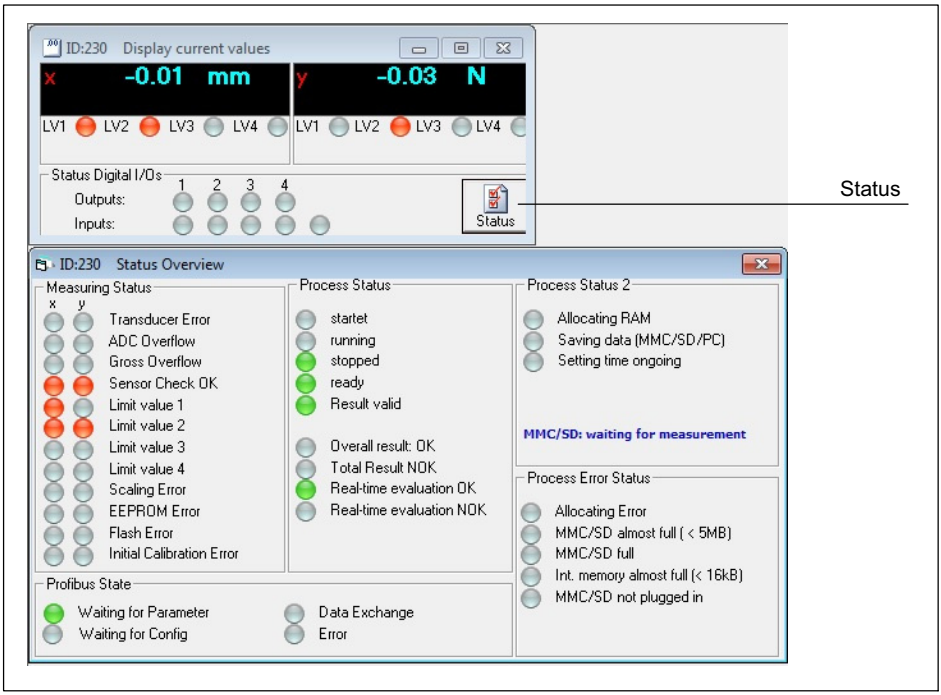


- ERROR x (relating to the SENSOR X screw terminal)
- ERROR y (relating to the SENSOR Y screw terminal)

Tip

The relevant device status and an error list are clearly displayed in the Status Overview dialog of the PME Assistant. Open the dialog via the “Status” button in the Measured Value display window.

The meaning of the displays and possible corrective measures for error messages are shown in the online help (open with F1). Further valuable tips and setting tools can be found in the FAQ section.



Possible error messages are summarized in section 12, “Error messages”, on page 107.

7. Firmware update (F Update)

To update the firmware, use the PME Update program. You can also find a description of the procedure in the online help. With the program, you can also simultaneously transfer a new firmware version to several devices. To prevent conflict with ongoing processing (no measurements or evaluations can take place during an update), from firmware version 2.22 or higher you can stipulate that firmware updates should go ahead only following manual confirmation on the device (F Update: Permitted!). If confirmation does not occur within 15 minutes, the firmware is not updated.

The firmware update program is available on the system CD or can be downloaded from the HBM website.

We recommend saving the device settings (device backup) before an update.

8. Device backup

All MP85A process controller settings can be saved to the MMC/SD card via the integrated keyboard and then transferred to another MP85A process controller, for example.

Via the device menu, you can save all 31 flash parameter sets, including all interface settings of the MP85A process controller, as a backup (“S-Status Save”) on the memory card, then re-import them onto the MP85A process controller if necessary. For importing, you can choose whether to do this without interface parameters (“S-Status Restore”) or with interface settings (“S-Status Load-Com”) (see section 7.1.3). Confirm the action by pressing the SET key. Progress is shown in % on the device display.

Important

No measurements or evaluations take place during device backup and the device takes longer to respond to the software and control systems!

7.1.2 Overview of all groups and parameters

SET (+) (-) → **Groups**

	CAN BUS	ETHERNET	PROFIBUS	ADDITIONAL FUNCTION	SYSTEM STATE
(+) Up	Baud rate	MAC address	Address	Ampl.Type (amplifier type)	S-Status Save
	Address	IP-Adr.1	**Main GRP**	PrgVers (firmware version)	S-Status Restore
(-) Down	**Main GRP**	IP-Adr.2		SrNo (serial number)	S-Status Load-Com
		IP-Adr.3		HW vers. (hardware version)	**Main GRP**
↓		IP-Adr.4		SD/MMCLo	
		SubNetM1 (subnet mask)		**Main GRP**	
		SubNetM2			
		SubNetM3			
		SubNetM4			
		IPGatew1			
		IPGatew2			
		IPGatew3			
		IPGatew4			
List of parameters		**Main GRP**			

Main GRP: Press (SET) to return to group

SD/MMCLo:

Gives you the option of importing a parameter set (XML format only) that was previously saved on the MMC/SD card using the PME Assistant or INDUSTRYmonitor. Use keys (+) and (-) to select the required parameter set.

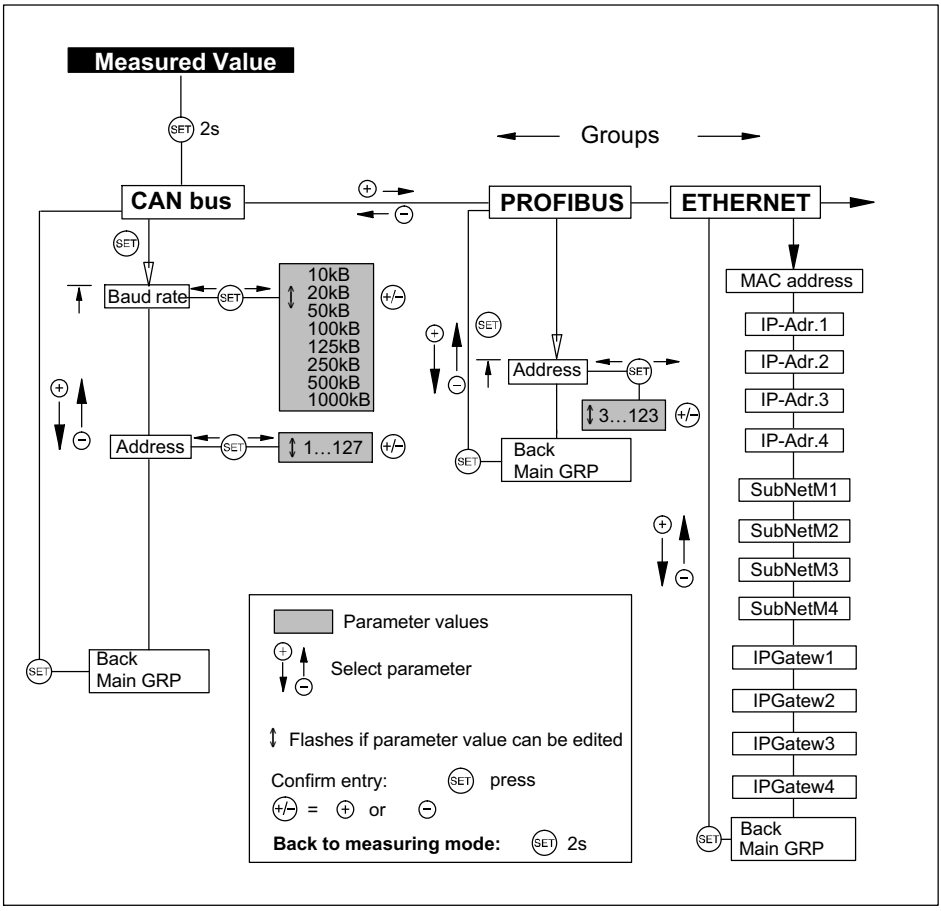
IP gateway:

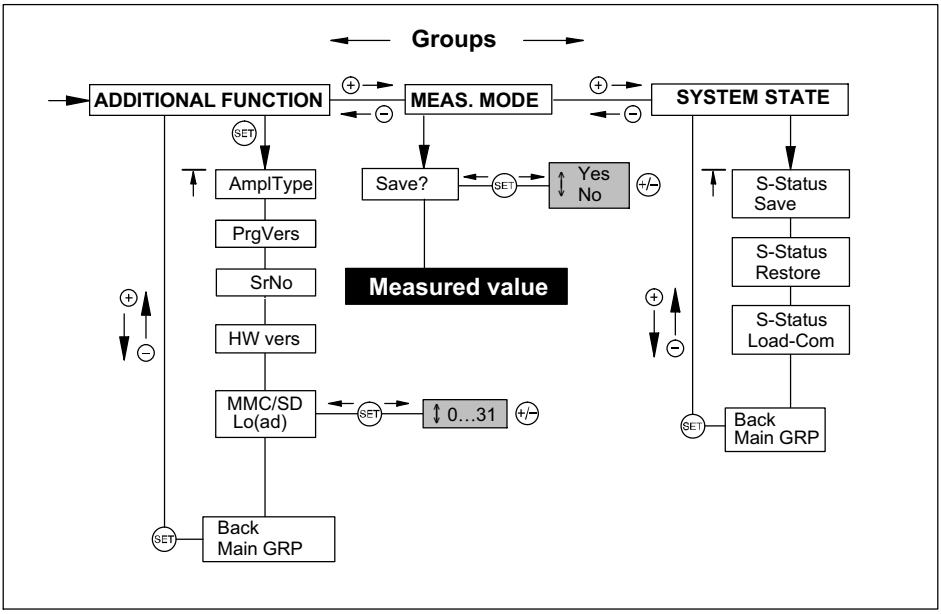
From firmware version 2.20, you can enter the gateway address for cross-segment device access in the Ethernet network.

System state:

From firmware version 2.22, you can save the MP85A process controller settings to an MMC/SD card and export them to another MP85A process controller, for example. “S-Status Restore” restores all settings, “S-Status LoadCom” restores all settings except the addresses (CAN/Ethernet/PROFIBUS).

7.1.3 Setting parameters on the device





7.2 Hardware setup

7.2.1 Power supply/transducers

► Connect the **power supply cable and transducers** to the module as described in section 5.

► Switch on the **power supply**.

► The device performs a function test (approx. 10 s) and then, if this is successful, goes into measuring mode. **During the self-test, the control outputs stay at 0 V.**

If **!** appears on the display or the status LED glows red, an error has occurred. Please see section 12 “Error messages”, on page 107.

► Connect the **bus system**.

To find out how to connect several devices to a bus, see sections 4.2 (page 20) and 5.7 (page 40). Note that devices should be synchronized to ensure error-free operation.

7.2.2 Connection via Ethernet

Connect the MP85A process controller to your PC. For a direct connection, use an Ethernet crossover cable (1-KAB239-2) or make sure the Ethernet interface of your PC has an autocrossing function. The port (RJ45 socket) is located on the underside of the MP85A process controller.

Use only cables that are Category 5 (Cat 5) or higher for this purpose. This enables line lengths of up to 100 m to be achieved. When operating several devices in an Ethernet network, we recommend the use of an **industrial** Ethernet switch.

Tip

You can find further information on establishing connections and interface settings in the operating manual "CAN/PROFIBUS/Ethernet MP85A(-S), MP85ADP(-S) FASTpress and EASYswitch interface descriptions".

7.2.3 Connecting the CAN adapter (USB)

If the PC does not have its own CAN bus socket, you can use the CAN-to-USB adapter (1-PMESETUP-USB).

► Insert the USB-to-CAN adapter into a free USB port on your PC.

Your PC will detect the adapter (Plug and Play). A CD is included with the adapter. This CD contains the installation drivers, which are automatically installed during the installation of the PME Assistant and when the USB-to-CAN adapter is plugged in.

7.3 Installing the PME Assistant software

Install the PME Assistant using the supplied system CD. You can also find the latest version on the HBM website: www.hbm.com/download -> Services & Support -> Downloads -> Firmware & Software.

System requirements

To run the PME Assistant software, you need a PC that meets the following requirements:

- Intel Pentium 2 GHz processor or equivalent
- Windows® XP or higher
- Microsoft Internet Explorer 7.0 (or higher)
- Main memory (RAM)
  - 512 MB for Windows® XP
  - 2 GB from Windows Vista™
  - 3 GB from Windows® 10
- Graphics card with resolution of at least 1024 x 768 pixels
- 20 MB of free memory on your hard disk

  The NTFS file system is required if you are recording numerous processes and more than 65,000 files may be generated on the PC during a test.
- Microsoft or 100% compatible mouse
- Installed standard printer
- Interface: Ethernet or USB CAN interface from PEAK
- The following fonts must be installed: Arial (TT), Courier, MS Sans Serif, Small Fonts, Tahoma, Times New Roman (TT), Verdana and Wingdings. The fonts are normally installed with Windows®.

Important

The minimum requirements listed above are sufficient if you have only connected one device. Suitable, more powerful PC hardware is necessary if you also wish to transfer result and curve files from several devices to the PC.

You can find further information in the “FASTpress Suite” quick start guide.

7.4 Using the PME Assistant

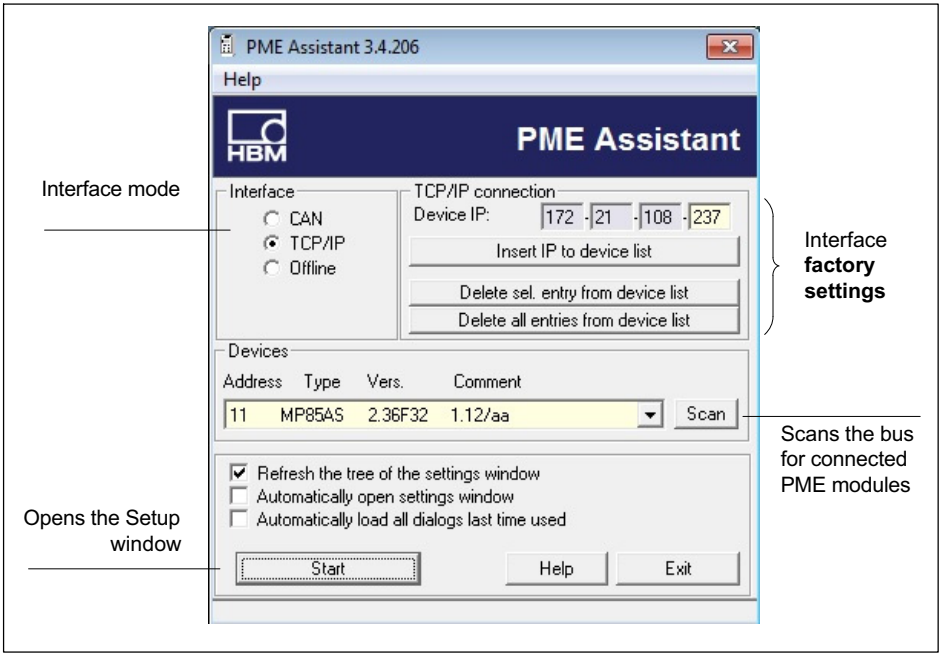


Fig. 7.2 Start window

7.4.1 Using the Ethernet interface

Launch the PME Assistant program and enter the required interface connection in the Start window:

- ► In the Interface field, select “TCP/IP”. The PME Assistant now gives you the option of using the preset IP address or setting a new one.
- ► Make sure that the IP address of the MP85A process controller differs from the address of the network being used in no more than one segment. The address cannot be assigned automatically via DHCP.

  At this point, enter a zero in the subnet mask. Set all other segments in the subnet mask to 255.
- ► Now use the “Add IP to device list” button to transfer the IP address of the MP85A process controller to the device list.

  Alternatively, you can also press the “Scan” button to run a bus scan. In this case, all the devices found will be displayed in the device list.
- ► If several MP85A process controllers are connected to the Ethernet network, e.g. via a switch, make sure that each address has only been used once. If you do not know the settings, you can find them out using the keyboard of the MP85A process controller (see section 7.1.2). The MP85A process controller automatically sets the transmission speed to 10 Mbit or 100 Mbit.
- ► Use the “Start” button to launch the PME Assistant.

7.4.2 Using the USB interface

To configure the USB interface, launch the PME Assistant program and proceed as follows:

- ► In the Interface field, select “CAN”. The PME Assistant now gives you the option of selecting the CAN network you wish to use.
- ► The baud rate in the CAN network must be the same for all nodes. On delivery, the baud rate of the MP85A process controller is set to 1 MBit/s. Enter the baud rate your network uses.

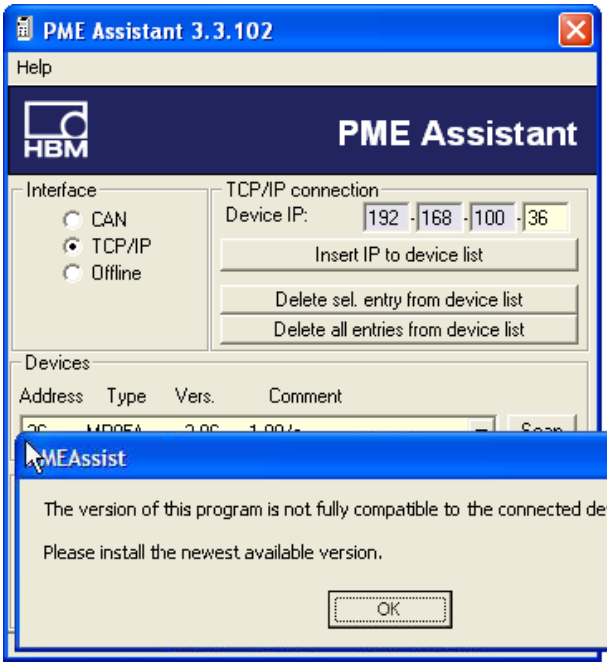
  If you select “Use as standard”, this network will be selected automatically the next time the system starts up.

- If several MP85A process controllers are connected to the CAN network, make sure that each address has only been used once. If you do not know the settings, you can find them out using the keyboard of the MP85A process controller (see section 7.1.2).
- Click the “Save” button. The PME Assistant now searches for devices connected to the CAN network and includes them in the device list.
- Use the “Start” button to launch the PME Assistant.

Tip

For more information, see the online help of the PME Assistant or INDUSTRY-monitor programs.

7.5 Automatic version detection



If the system detects MP85A process controllers that use firmware that is not fully compatible with your version of the PME Assistant, the following message appears:

You can find out the device firmware via the display of the MP85A, the PME Assistant or the INDUSTRYmonitor program.

The latest PME Assistant is always compatible with **all** MP85A process controllers. You can find the latest software and firmware versions on the HBM website: www.hbm.com -> Services & Support -> Downloads -> Firmware & Software.

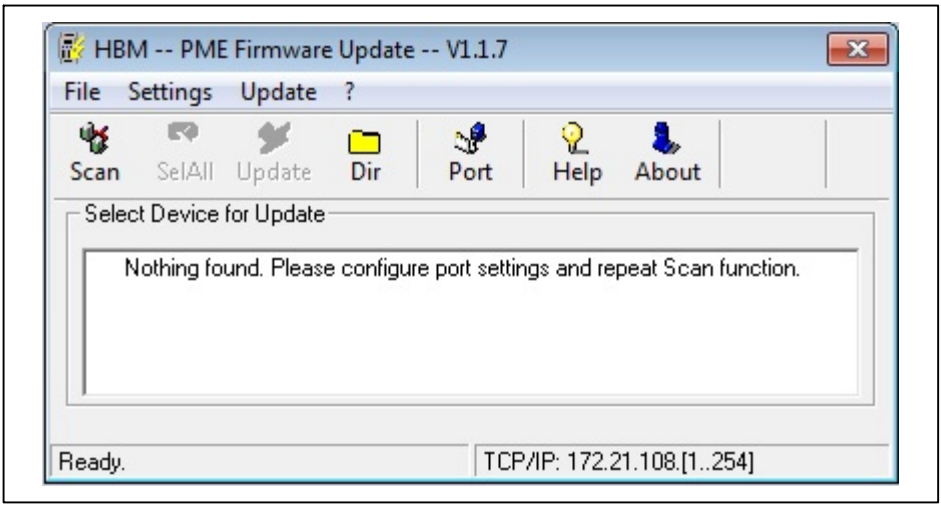
7.6 Firmware updates

The firmware update program is installed using the supplied system CD. The latest program and firmware versions can also be found on the HBM website: www.hbm.com -> Services & Support -> Downloads -> Firmware & Software.

New functions are often implemented via firmware and can then be copied onto existing devices.

Important

The device settings remain unchanged when the firmware is updated. Nevertheless, we recommend saving all your settings on the PC via the PME Assistant before an update.



With the program, you can also simultaneously transfer a new firmware version to several devices. To prevent conflict with ongoing processing (no measurements or evaluations can take place during an update), from firmware version 2.22 or higher you can stipulate that firmware updates should go ahead only following manual confirmation on the device (F Update: Permitted!). If confirmation does not occur within 15 minutes, no changes are made to the firmware.

7.7 Offline mode

In offline mode, you can use the PME Assistant without an MP85A process controller to create a device setting (parameter set) and save it to a PC in XML format. You can then import this device setting to the MP85A process controller later on.

Starting offline mode:

► Launch the PME Assistant.

► Select the “Offline” interface.

► Select the required device type from the device list.

► Click the “Start” button to launch the Assistant.

You can now make device settings without an MP85A process controller being connected. In the “Save/Load parameters” menu, you can save the settings to your PC or load existing settings for viewing and further processing.

8 Measurement procedure

You can start/stop measurement manually with the PME Assistant in Setup mode, internally via a start condition, or externally via a digital input or the field-bus interfaces.

When measurement starts, the measured quantities acquired by the sensors are copied to the internal memory of the MP85A process controller as x/y value pairs with a time stamp, and rated as OK or NOK based on the windows you have defined, an envelope curve or a tolerance band. In addition, you can incorporate limit monitoring in the analysis. The most recent measured curve can also be graphically displayed instantly. Independently from the display, you can have all processes saved in the background.

8.1 Data reduction

y=f(x)

Measured quantity y (force) is recorded and rated as a function of a measured quantity x (displacement). The measurement points are also given a time stamp.

Advantage: Intelligent data reduction. Curve points are only generated when there is a sufficiently large change to x or y. The values Δx and Δy can be selected as desired.

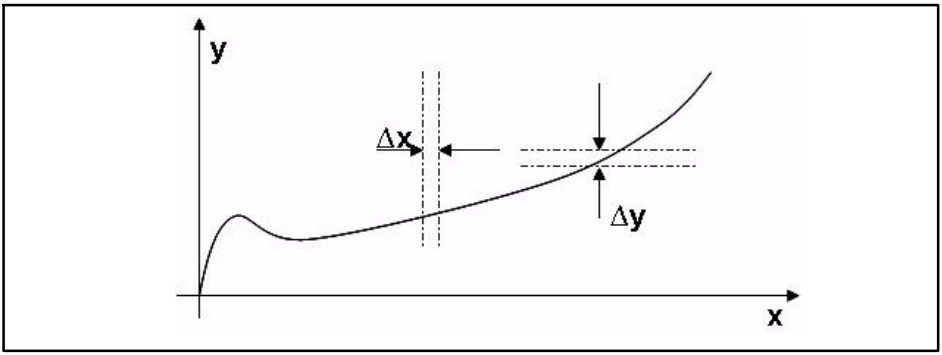


Fig. 8.1 Force/displacement-driven process curve determination

y=f(t)

A measured quantity on channel y is recorded as a function of time.

Advantage: There is no need for the x sensor (the displacement sensor on a press, for example).

Condition: Reproducible feed rates, as otherwise the curve would sometimes be compressed and sometimes stretched, depending on the feed rate.

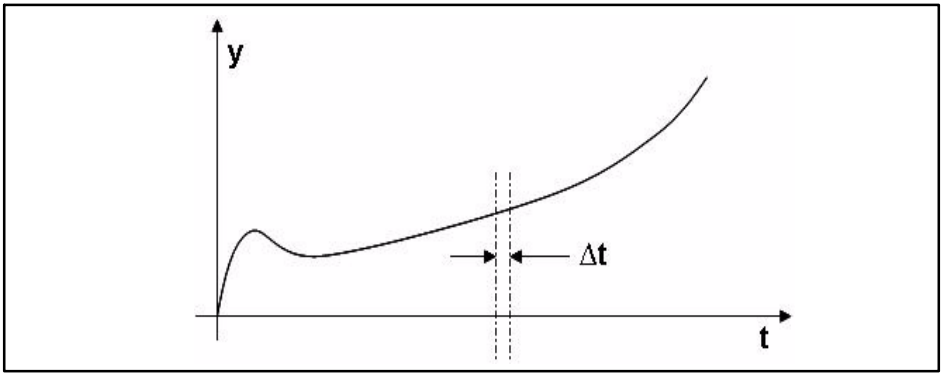


Fig. 8.2 Time-driven process curve determination

Important

If you do not record enough measurement points, the defined window or envelope curve may not be analyzed as expected. You should record at least 200 to 500 measurement points to enable correct analysis.

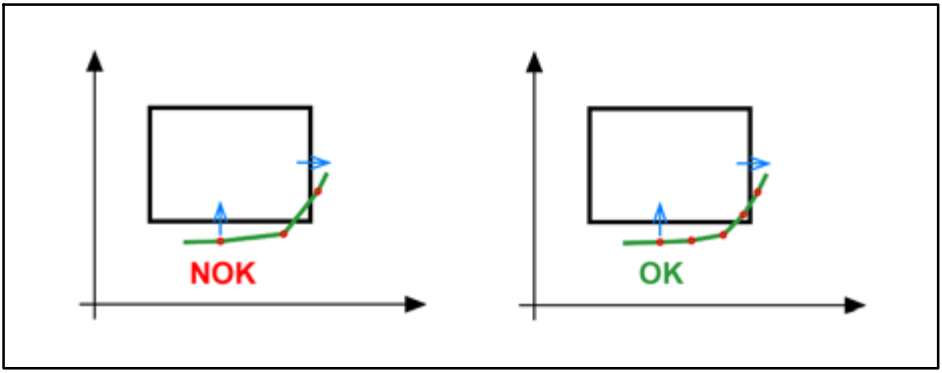


Fig. 8.3 Example of too few measurement points

The graph on the left implies that the result is OK. However, the process is rated as NOK: As there are no measurement points within the window, there is no entry or exit and the result is NOK. Increase the number of measured values by reducing Δx and/or Δy. If at least one measured value then lies within the window, the result of analysis is OK (right-hand graph).

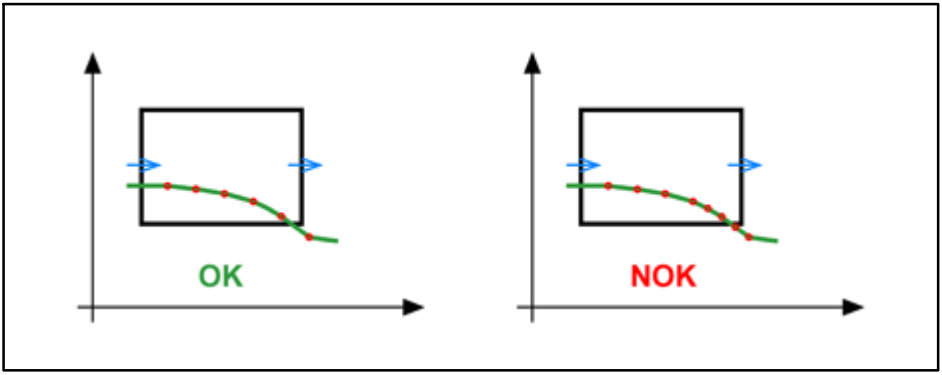


Fig. 8.4 Example of too few measurement points

The graph on the left implies that the result is NOK. However, the process is rated as OK: The penultimate plotted measurement point lies within the window (OK). The final plotted measurement point is already to the right outside the window, therefore the y-coordinate is no longer relevant. The last measured value before this point does lie within the window, however, and is there-

fore OK. Increase the number of measured values, e.g. by reducing Δy (right-hand graph). The exit at the lower edge is then recognized, because the y-value is already below the lower edge of the window before the right edge of the window.

8.2 Classification

Classifying x or y

Measured quantities on channel x, such as length, thickness and diameter, or on channel y, such as force, weight, torque, etc., can be divided into 5 groups per window. This way, you can sort springs, for example, automatically by spring rate.

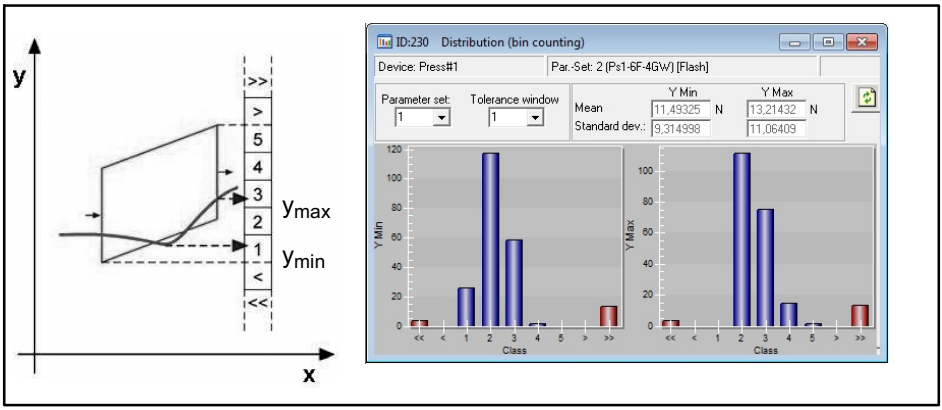


Fig. 8.5 Classifying the measured values of a tolerance window

Important

Statistics and classification can only be used with the 31 flash parameter sets, not with parameter sets from a memory card or PC.

8.3 Limit monitoring in real time

You can assign and monitor a total of eight limit values in real time for channels x and y. A switching signal of your choice can be assigned to each limit value. For example, you can switch a press from “fast” to “slow”. The circuit logic can also be inverted.

8.4 Hiding external tolerances

To hide external tolerances, as caused by different positioning heights of workpiece holders, for example, you have a choice of various options:

1. Relative x-coordinates
2. Relative y-coordinates

In the first case, you can also select whether analysis should be based on an end position (Fig. 8.6) or on the y-channel (Fig. 8.7), e.g. if the pin being press-fitted is touched (force build-up). Displacement is set to zero at this time, and a second relative axis is plotted to which the coordinates of the evaluation elements now refer.

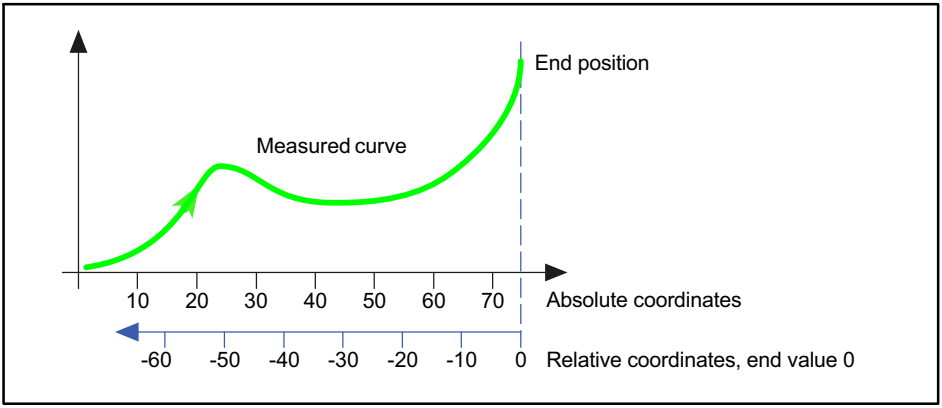


Fig. 8.6 Reference values for relative x-coordinates, based on end position

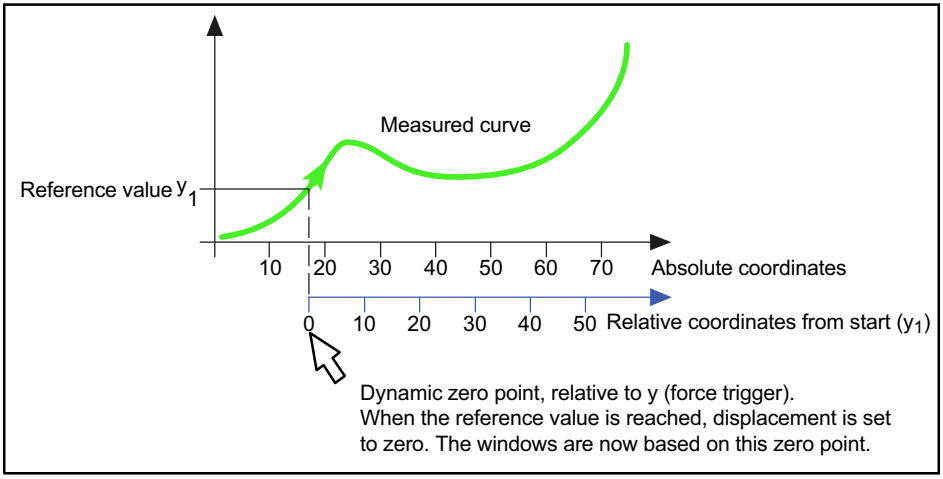


Fig. 8.7 Reference values for relative x-coordinates relative, based on y-value

Using the relative y-coordinates option, you can have the curve analyzed relative to the minimum, maximum or mean value that was reached within the *second* tolerance window. The windows that are linked in this manner are shifted up or down parallel to the y-axis, depending on the position of the value. The selected reference value also applies to all other windows with relative y-coordinates.

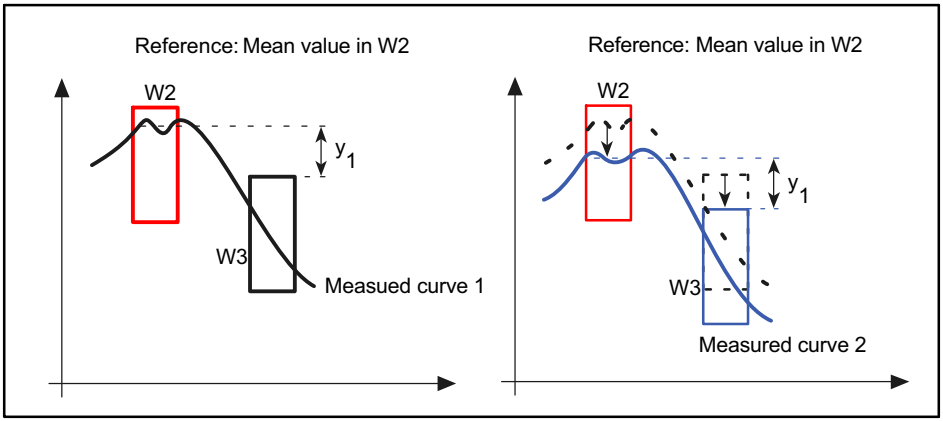


Fig. 8.8 Reference values for relative y-coordinates, based on mean value

Fig. 8.8 shows two measured curves: On the left, measured curve 1 with a mean value in the upper section of window 2; on the right, measured curve 2 with a mean value in the center of window 2. This means that window 3 is also shifted down as compared with the graph on the left.

8.5 Evaluation criteria

The MP85A process controller has different window types to allow the universal evaluation of different curve shapes using the window method. These window types can be mixed as desired for each measured curve. If you wish to monitor the entire process seamlessly, an envelope curve is available.

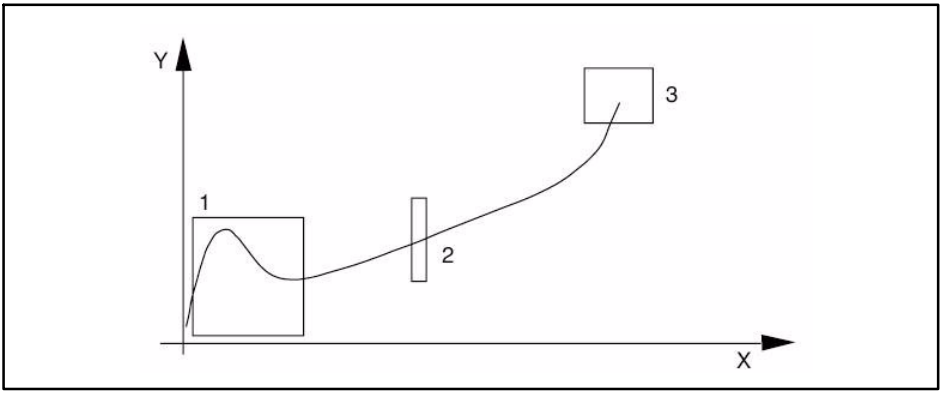


Fig. 8.9 Evaluation method using tolerance windows

Thread-in window

Checks that the fitting partners thread in correctly and are not askew.

A real-time signal indicates a thread-in problem (e.g. the window is exited from the top). Use this for press control, e.g. for initiating the press return stroke.

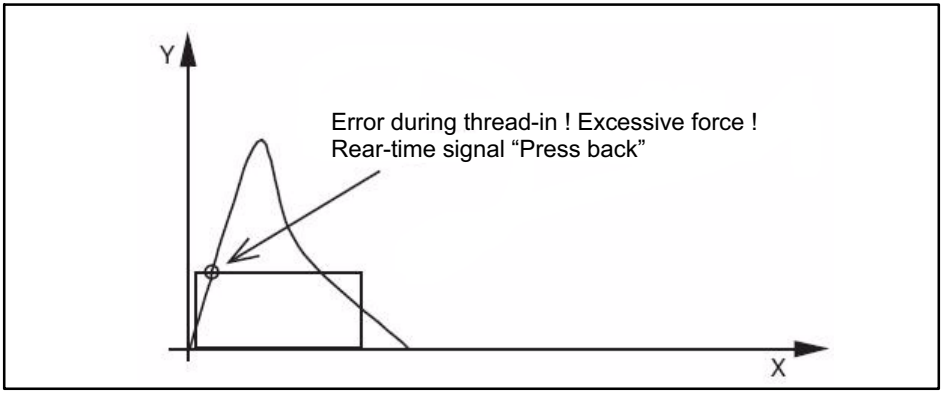


Fig. 8.10 Online window

Progress window

Checks the profile of a curve in the window area.

The curve must run through the window from the entry to the exit side, without violating any of the other window limits. The entry and the exit sides can be selected as desired (left, right, top, bottom, any).

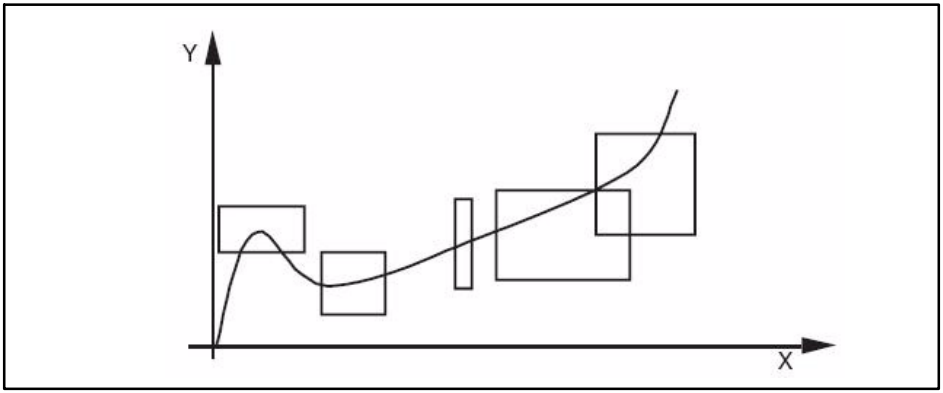


Fig. 8.11 Progress window

Block window

The block window monitors the block size and block force of a press-fitting process. With this window type, the curve must enter at the given entry side and must not exit the window. The entry side can be freely selected (left, right, top, bottom, any).

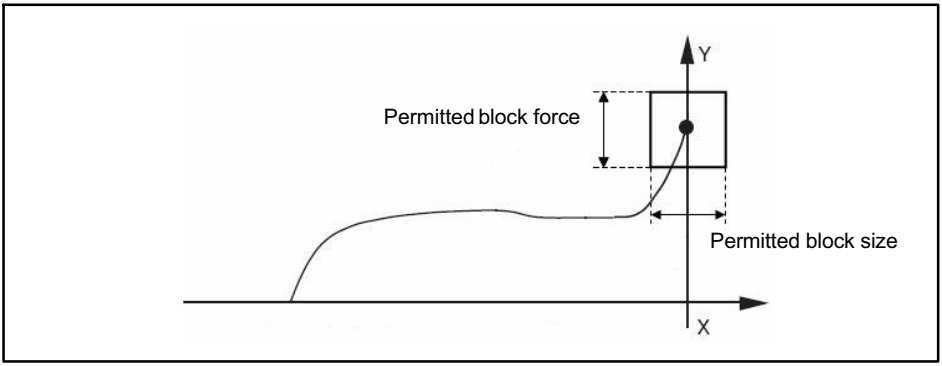


Fig. 8.12 Block window

Thresholds

Thresholds monitor the process continuously in very restricted ranges. The thresholds can be positioned vertically or horizontally. To protect the machine, these evaluation elements can also monitor the process in real time and send signals to the control system via a digital output or the fieldbus.

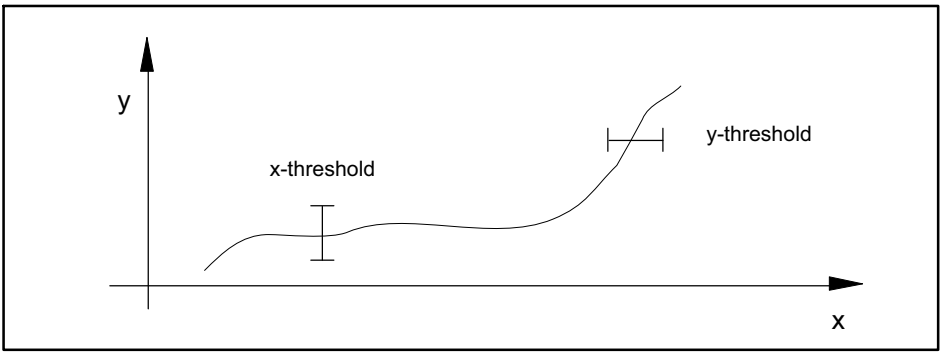


Fig. 8.13 Thresholds

Envelope curve

The envelope curve continuously monitors the process in max. 4 adjustable ranges. The process must enter the envelope curve on one side and exit on the other. The tolerance width of the envelope curve can be selected as desired and can therefore be adapted to process requirements. Evaluation takes place at the end of the process.

Important

In envelope curve mode, only processes without returning x-values can be monitored correctly.

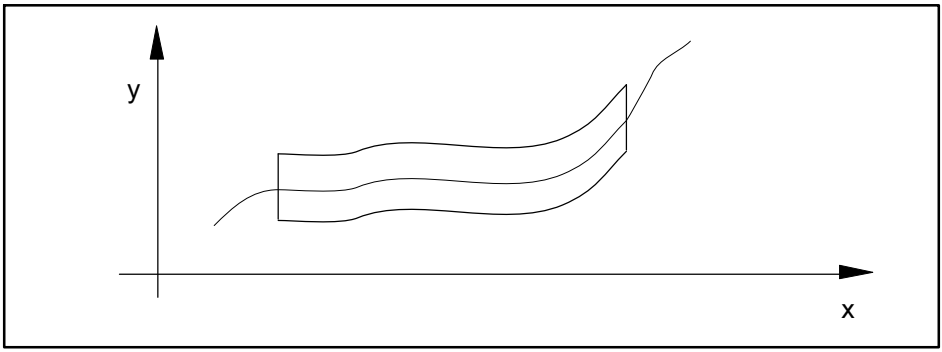


Fig. 8.14 Envelope curve

Tolerance band

The tolerance band covers the complete process. In OK processes, the first to last measurement points must lie *within* the tolerance band (in contrast to the envelope curve, which must be entered and exited). Evaluation takes place at the end of the process.

Important

In tolerance band mode, only processes without returning x-values can be monitored correctly.

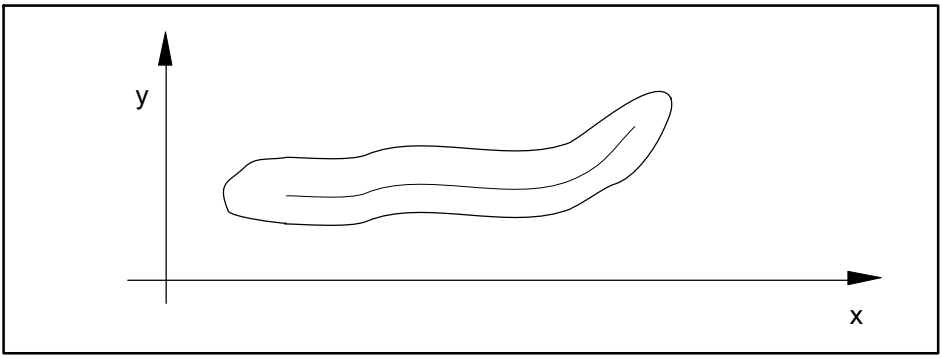


Fig. 8.15 Tolerance band

Limit monitoring

In firmware version 2.22 and higher, the limit values can also be included in the total result for process monitoring. This allows you to monitor the minimum and maximum values at the start and end of a process, for example. This option is particularly helpful for the “envelope curve” and “tolerance band” evaluation processes: in the diagram below, the start and end of the measured curve are monitored to check they are inside the area marked yellow.

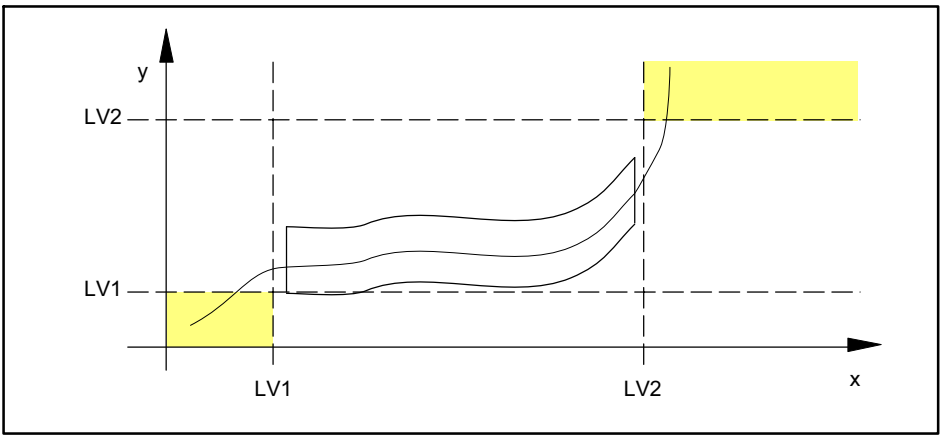


Fig. 8.16 Limit monitoring

Tip

You can find a more detailed description of all evaluation criteria with examples, diagrams and tips and tricks in the online help of the PME Assistant and the add-on software modules. Launch the PME Assistant and press F1 to open Help.

8.6 Measurement programs (parameter sets)

You can enable a total of 31 measurement programs for 31 different workpieces from the MP85A process controller's internal (flash) memory. A measurement program comprises a workpiece-specific parameter set, the amplifier settings for the sensors, measurement acquisition and saving, the assignment of the digital inputs/outputs and the evaluation methods.

The parameter sets are imported from the flash memory of the MP85A process controller to the RAM via digital input/outputs, bus commands or the PME Assistant (section10.6) or INDUSTRYmonitor programs.

Important

Parameter sets may only be switched or imported after the end of a process, not during a measurement. You can only start the next process once parameter set switchover is complete (also see section 10.1, Machine control system).

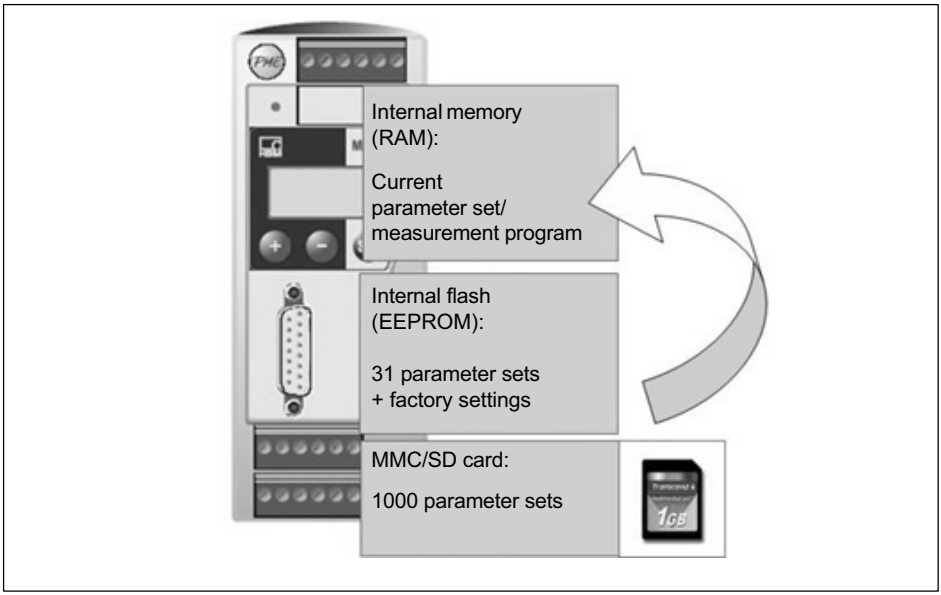


Fig. 8.17 Measurement program processing

In addition, e.g. for data backup, you can transfer parameter sets to the MMC/PC card of the MP85A process controller or connected computer. You require the PME Assistant or INDUSTRYmonitor software for transfer to a PC.

Tip

The optional memory card (MMC/SD card) can store another 1000 parameter sets in binary data format, in addition to the 31 parameter sets in XML data format. The method of functioning and processing speed are identical for both file types.

Processing the system parameters

The system parameters include the basic settings, interface settings, passcode and settings for data backup and MP85A process controller statistics. You can find a complete list of all system parameters in the MP85A interface description.

All settings marked * (system parameters) in the PME Assistant are not overwritten when parameter sets are imported (including, from firmware version 2.30, importing from the flash EPROM). The system parameters are only restored as well during a restore process from PC -> flash. Otherwise, the last settings made remain valid.

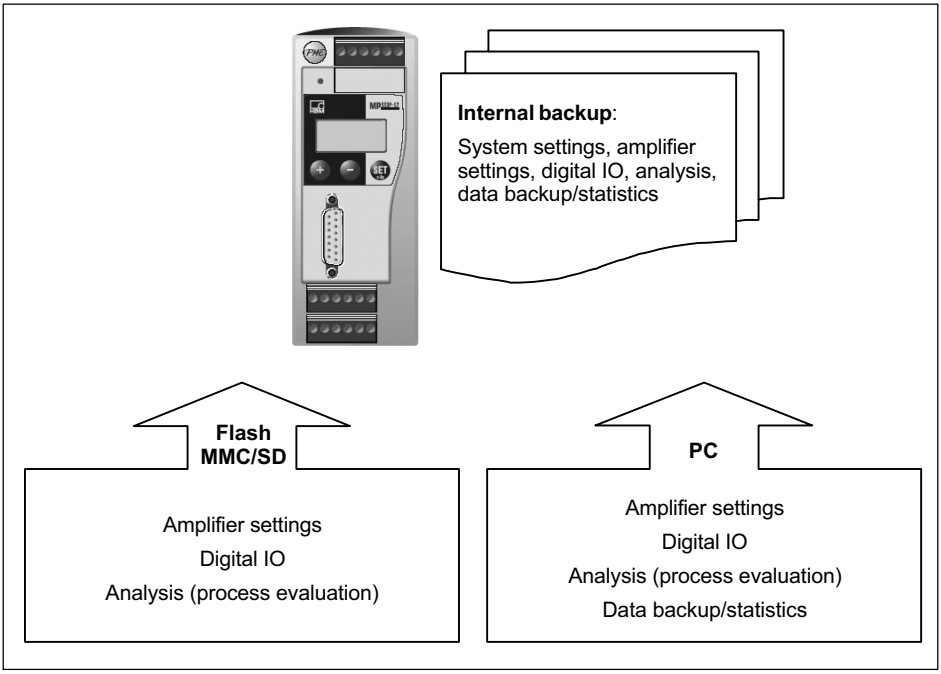


Fig. 8.18 Importing parameter sets from an external source (PC/MMC/SD card) or flash

9 Switch test (EASYswitch)

The switch test and haptic test features are only available in EASYswitch versions MP85A-S, MP85ADP-S and MP85ADP-PN-S (marked with -S for switch test).

9.1 Switch test

In the EASYswitch versions, all the switching characteristics are recorded and evaluated based on specific features such as actuating force, release force, differential force and differential travel.

In addition to these mechanical parameters, the electrical switching point can also be recorded. To do this, a switch test window is positioned on the main points.

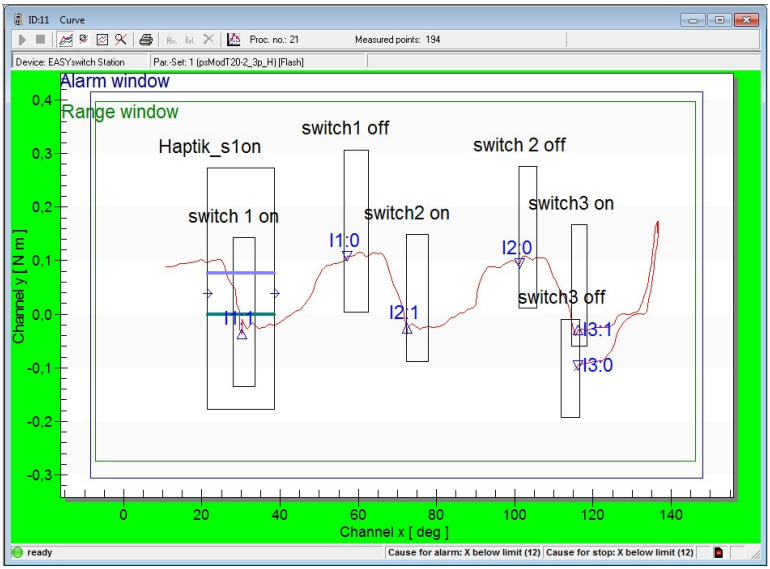


Fig. 9.1 Switch test

Here, you can test and evaluate up to 5 switches or switching elements in a single operation.

The test verifies whether the switching process of the switch lies within the relevant switch test window and whether the specified switching function (make/break) is complied with.

The electrical check takes place via the digital inputs. Evaluation takes place at the end of the process.

Tip

As the MP85ADP-S and MP85ADP-PN-S only have one digital switch test input, the (virtual) inputs 2 to 5 may be set via PROFIBUS commands, so that the switch event can be entered, see MP85A interface description.

The **switch test inputs** are available at screw terminals 3 and 4 and are electrically isolated from the internal supply voltage and the control outputs.

- At screw terminal 3: Control input 1
- At screw terminal 4: Control inputs 2 … 5 (MP85A/MP85A-S only)

For the control inputs, connect an external reference potential (⊥IN), to which the control input signals refer.

Information

The digital inputs of the MP85A process controller are edge-controlled on the transition from 0 V to control voltage (e.g. 24 V). The set digital input function is implemented only once with the rising edge. The subsequent presence of control voltage does not cause any further action.

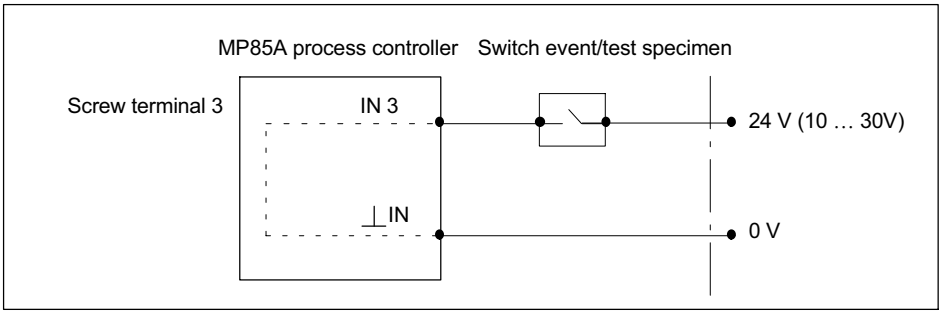


Fig. 9.2 Connection of control input/switch test input

Entry and exit sides are not needed for the switch test window. You can monitor this with additional progress windows.

The switch coordinates displayed in the switch test window, i.e. the coordinates at which the switch changes state, are stored in the statistics. In addition, “No switching” is signaled for OK or NOK, when the switch has not change its state or the switching process is repeated because of multiple switching (chatter).

Switch windows can also be parameterized as windows with defined sequences. This ensures that on/off switching processes are handled in the correct sequence. Evaluation follows at the end of the process, i.e. you cannot then select evaluation in real time.

In the graphs, IX:1, the number of the digital input and 1, and the symbol △ on the curve are displayed at the switching times for making; Ix:0 and the symbol ▽ are displayed for breaking. If the switch at digital input 1 has closed, for example, △ I1:1 is shown on and above the curve (see diagram on page 85).

Repeated switching (chatter)

The EASYswitch version includes analysis for detecting unwanted repeated switching (chatter) of an electrical switch.

Chatter is detected and the switching window test is assessed as NOK if the switch-on or switch-off process takes place two or more times within the switch test window defined by the user.

The switching operations must be longer than one millisecond in order to be detected; in this case they are displayed as a triangle in the graphic view of the

MP85A software (PME Assistant or INDUSTRYmonitor) and saved in the results.

This analysis can be disabled separately for each switching operation (“Ignore chatter”).

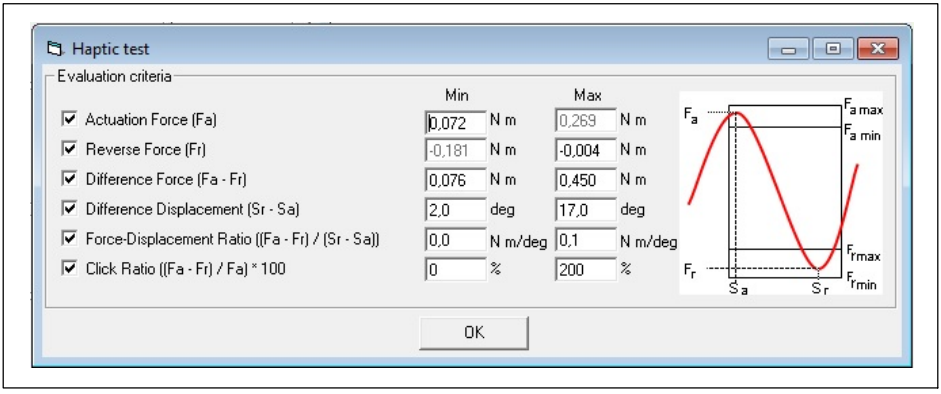
A more extensive evaluation of chatter over time does not take place.

Information

The chatter of each individual switching operation is analyzed and plotted a maximum of 16 times. If a switching process is subject to further chatter, the measurement ends at this point.
Analysis, statistics and data logging are then only performed up until this point.

9.2 Haptic test

The haptic test determines how the switch in this window changes its state, that is, the “feel” on actuation. You can enter the characteristic values required for this in the haptic test dialog via the PME Assistant or INDUSTRYmonitor. Any combination or all the characteristic values listed can be tested. The test is NOK as soon as one of the enabled characteristic values is not OK. The individual characteristic values are clearly shown in the graph below.



For the haptic test, the curve must enter and exit the window at the sides and the window must always be rectangular. The curve is not permitted to enter or exit the window at the top or bottom.

Tip

For additional security, you can set up additional progress windows to evaluate the process curve in real time, which helps to protect the machine. With a potentially faulty switch, a limit force shutdown takes place with a response time of approx. 2 ms.

You can find further information in the PME Assistant online help and the interface description of the MP85A process controller.

10 Communication with a control system

10.1 MP85A process controller in the machine control system

For integration in a machine control system, digital inputs/outputs and the CAN bus, PROFIBUS-DP, Profinet and Ethernet digital interfaces are available. In all cases, the same device functions (object table) of the MP85A process controller are accessed. Firstly, control commands can be exchanged between the MP85A process controller and the machine control system to ensure that production runs smoothly; secondly, status information can be exchanged and indicated to the machine operator. The signals described below are available in real time as control inputs/outputs (e.g. for protection of the machine).

MP85A(DP)(-S) ⇒ digital input PLC	**Description**
Process started/running	Shows whether a measurement is underway
Process complete/valid	Shows that the process has taken place and the result is available. The next process may only be started once this signal has been sent
Process OK/NOK	Shows the result of a process
Reset piezosensor	Allows you to set a channel with piezoelectric sensor to zero until measurement starts. This enables the zero drift of these sensors to be suppressed.
Result tolerance window x	With this message, specific windows can be checked and evaluated
Limit value …, channel …	The limit value status of this channel is output
Transducer test result	Shows the result of a transducer test
Error channel x/y	There is a measurement error in the affected channel. This could be a transducer error (e.g. in the connection), an error in the A/D converter, the scaling, amplifier calibration (initial calibration), a TEDS error or a gross overflow.
MMC/SD card memory full	The MultiMedia/SD card is almost full, there are less than 5 MB remaining. Replace the card with a new card or delete files.

MP85A(DP)(-S) ⇒ digital input PLC	**Description**
Heartbeat	The output switches between ON and OFF at a frequency of 1 Hz, and can be used as a watchdog function
Clipboard full	The internal clipboard is almost full, there are less than 16 kB remaining. This message indicates a problem during the saving of measured data, e.g. the specified PC could not be reached.
Set outputs per data word	You can set the digital outputs by means of the SDO object 2320 (hex), subindex 0. With this option, you can forward individual bits of the bytes transferred with this object to the relevant outputs.
Specify flash parameter set	Allows you to define the number of a parameter set loaded from the flash: the parameter set number is output as a binary number (bit 0 to bit 4). Parameter sets loaded from the MMC/SD card or PC cannot be queried.
Loading parameter set	With this function you can check the time required to load a parameter set: you can only start the next process after switchover, which can take up to 200 ms, and the MP85A process controller is only ready for measurement once more after switchover. As long as the signal is active, no new process can be started

PLC ⇒ control input MP85A(DP)(-S)	**Description**
Sensor zero balance	Enables zero balance of the sensor
Shunt calibration	Enables the shunt resistance, e.g. for generating a defined signal
Transducer test	Performs a transducer test

PLC ⇒ control input MP85A(DP)(-S)	Description
Load parameter set	Loads a parameter set. If only three different parameter sets are required, for example, you can use just two inputs for parameter set loading, bit 0* and bit 1*; you do not have to occupy all bits (parameter set 0 is the default setting). By means of signal conditioning, determine whether the zero value is retained during loading or whether to use the zero value from the parameter set. Via data backup, you can define whether the device name is retained during loading or whether to use the device name from the parameter set.
Start/end process	Use this input to start/end a process or the measurement. If you enter further start, stop or end conditions in the control settings, these will apply in addition.
Store/clear statistics	Saves the statistical data from the RAM in the flash EPROM.
Switch test 1 ... 5	MP85A-S, MP85ADP-S and MP85ADP-PN-S only: Here, define which inputs to use for a switch test. The inputs must be connected to a supply voltage via the switch under test, so that its status can be recognized. As the MP85ADP-S only has one digital input, you can use the four so-called virtual inputs: in this case, the status of the virtual input is sent via a PROFIBUS command (cyclical transmission). The switching times are also shown during a haptic test, if an input has been assigned.

You have two methods of process control:

1. By means of complete backup of all process data, i.e. saving curves and results with no loss of data.
2. By means of a process-optimized sequence whereby data backup is interrupted on a new process, so that the next process can be started even more quickly.

Both methods are described in the following sections; all signal diagrams are based on positive circuit logic.

10.2 Test process sequence over time

a.) Saving curves and results without loss of data

If you opt for the “no data loss” storage method and want to save curves and/or results on the memory card or externally via bus, the diagram in Fig. 10.1 on page 94 applies.

The Ready signal only returns to 1 when

- the process is completely finished,
- all the data has been saved in its entirety, and
- the device is ready to save the data for the next process.

Important

If the process data (curves and results) cannot be saved (e.g. because the memory is full or faulty), the next process cannot be started, as the MP85A process controller does not enable the Ready signal.
When backing up data to a PC (external storage), the PME Assistant or INDUSTRYmonitor must remain open.

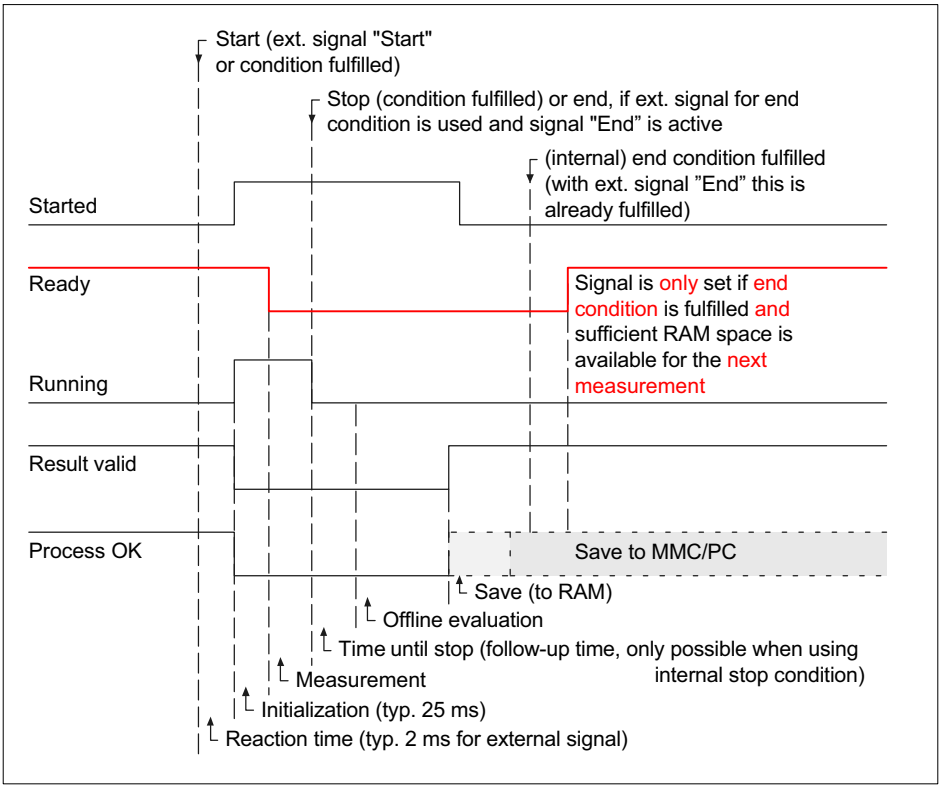


Fig. 10.1 Process data backup with no data loss

b.) Process-optimized saving of curves and results

If you opt for the “process-optimized saving” method and want to save curves and/or results on the memory card or externally via bus, the diagram in Fig. 10.2 on page 95 applies.

The difference between this and “Saving without data loss” is that the Ready signal can already return to 1 even though the device is not yet ready to save new data.

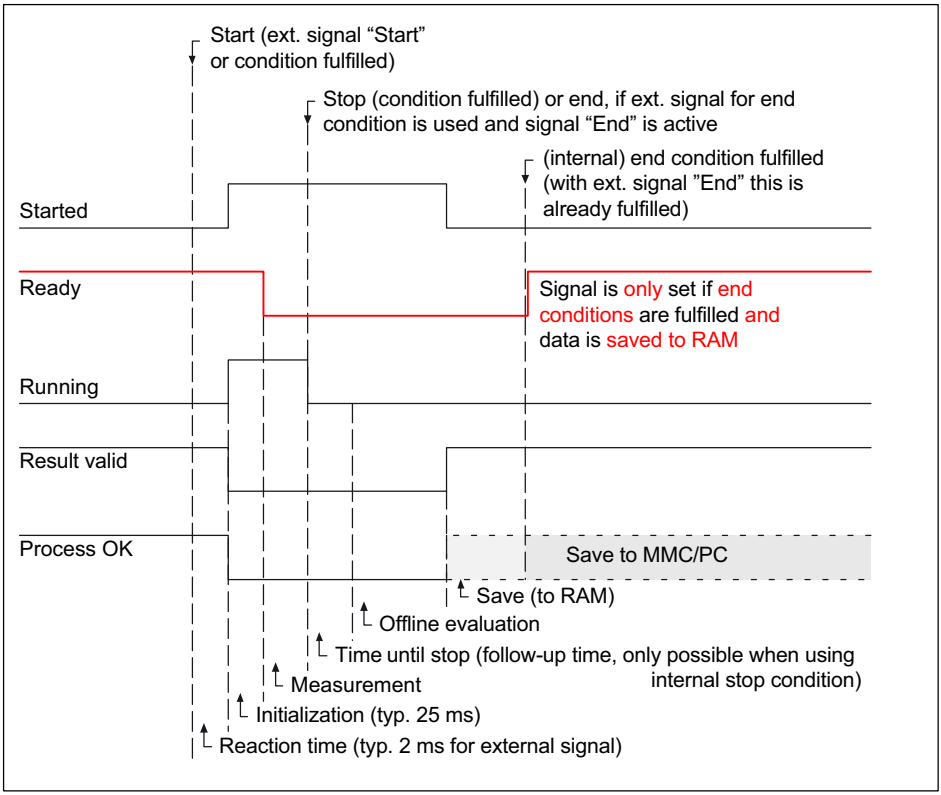


Fig. 10.2 Process-optimized procedure

This means that result and curve files may not have been transferred if a new measurement is started immediately. You should therefore only choose this method if very fast processes have to be monitored and the results and curves are merely used for random spot checks.

10.3 Transducer test

Initiate the transducer test via a digital input or a bus signal. At low filter limit frequencies, you have to wait until the filter settling time has elapsed before the test. A pulse of at least 5 ms duration at the digital input is required for the transducer test. The result is typically available another 10 ms later.

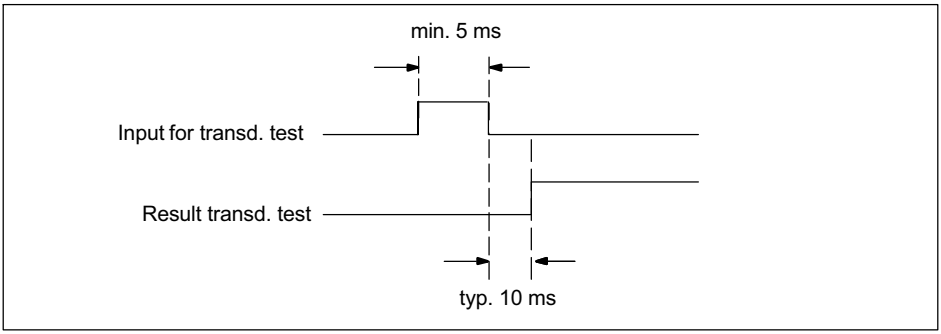


Fig. 10.3 Time diagram for a transducer test

10.4 Zero balance

Initiate zero balance via a digital input or a bus signal. At low filter limit frequencies, you have to wait until the filter settling time has elapsed before zero balance. For zero balance, a pulse of at least 5 ms duration at the digital input is required. Zero balance is completed another 5 ms later.

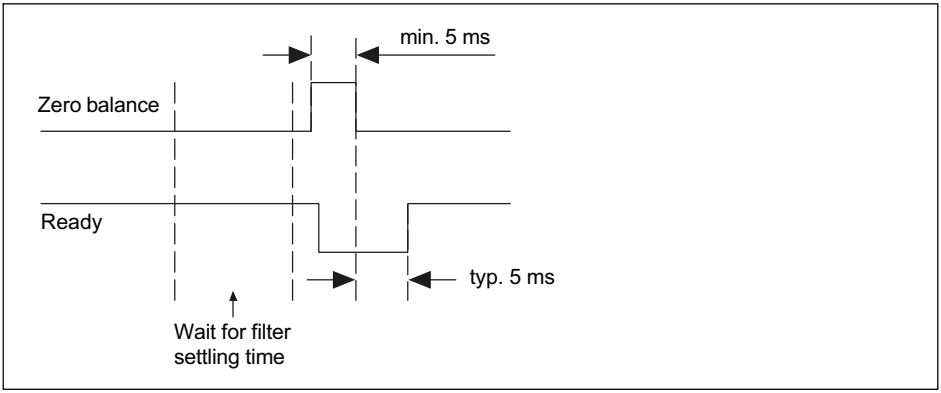


Fig. 10.4 Time diagram for zero balance

10.5 Simulation of digital outputs

It can be helpful, particularly during startup or service, to check the downstream system components and processes by simulating and enabling the digital outputs. For this purpose, the digital outputs of the MP85A process controller can be enabled/disabled via software commands.

The composition of the data word that is transferred for enabling/disabling the digital outputs depends on the configuration of the data word bits on the digital outputs.

You can view the status of the digital inputs and outputs via the “Measured value display” menu.

Example: Enabling digital output 1

- ► Set digital output 1 in the “Digital outputs” menu to “Data word bit 0” (positive circuit logic).
- ► Sending to address SDO 2320 Index 0 (hex) => 1 (dec) via a software command (e.g. “SDO terminal”) sets digital output 1 to High.
- ► Sending data word 0 (dec) to address SDO 2320 Index 0 (hex) disables digital output 1 once more.

10.6 Parameter sets (measurement programs)

The MP85A process controller offers you the option of using 31 different measurement programs (parameter sets) in the internal flash memory and saving them so they are power failure-proof. A further 1000 measurement programs can be saved on the optional (MMC/SD) memory card.

Important

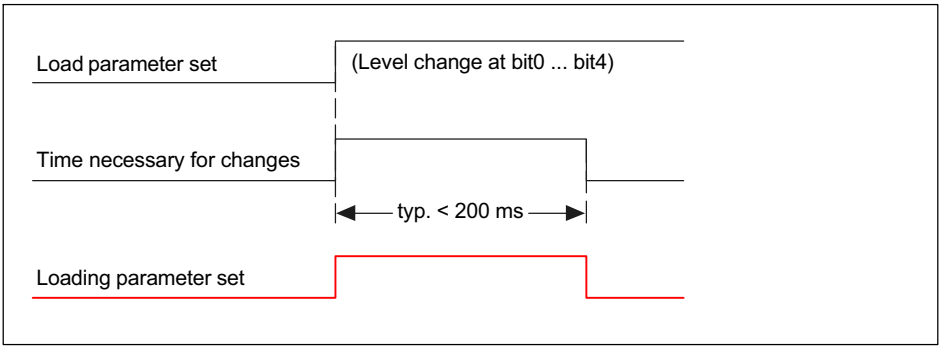
You can only switch or load parameter sets when a process has ended, not during a measurement. You can only start the next process once parameter set switchover is complete (also see section 10.1, Machine control system).

Parameter sets saved to PC cannot be used by the device or software for ongoing operation. They must therefore be saved in the flash memory or on the memory card.

Tip

When working with fieldbuses, parameter sets can also be switched to flash and the memory card in cyclic operation. You can find further information on this in the interface description of the MP85A process controller.

It typically takes less than 200 ms to enable a new parameter set. At very low filter limit frequencies, the filter settling time must be added to this. If you use digital inputs for switching, switchover occurs when the level changes at the input (edge).



Bit 4	Bit 3	Bit 2	Bit 1	Bit 0	Enable parameter set
0	0	0	0	1	1
0	0	0	1	0	2
0	0	0	1	1	3
0	0	1	0	0	4
0	0	1	0	1	5
0	0	1	1	0	6
0	0	1	1	1	7
0	1	0	0	0	8
0	1	0	0	1	9
0	1	0	1	0	10
0	1	0	1	1	11

0	1	1	0	0	12
0	1	1	0	1	13
0	1	1	1	0	14
0	1	1	1	1	15
1	0	0	0	0	16
1	0	0	0	1	17
1	0	0	1	0	18
1	0	0	1	1	19
1	0	1	0	0	20
1	0	1	0	1	21
1	0	1	1	0	22
1	0	1	1	1	23
1	1	0	0	0	24
1	1	0	0	1	25
1	1	0	1	0	26
1	1	0	1	1	27
1	1	1	0	0	28
1	1	1	0	1	29
1	1	1	1	0	30
1	1	1	1	1	31

10.7 Evaluation/backup process times

With the MP85A process controller FASTpress, you can reliably monitor and document virtually all processes in industrial production. The system can manage up to 10 cycles per second (without backing up process data).

The maximum number of process cycles is largely dependent on:

- The number of process curve measurement points (adjustable)
- The number of evaluation criteria (tolerance windows)
- Whether process data are to be saved (OK only, NOK only, all)
- Whether several MP85A process controllers should be operated in a network (network load)
- The performance of the storage medium

You can determine some of these points via the PME Assistant or INDUSTRY-monitor program (“Setting evaluation parameters” and “Data backup” menus).

Data is transferred to the memory card at a speed of 2 to 8 kB per second, depending on the size of the files being transferred. The total backup time results consists of the process time and the backup time on the destination computer.

Important

If the process data is saved via Ethernet, backup depends on the network load. Take this into consideration if you have short process cycle times.

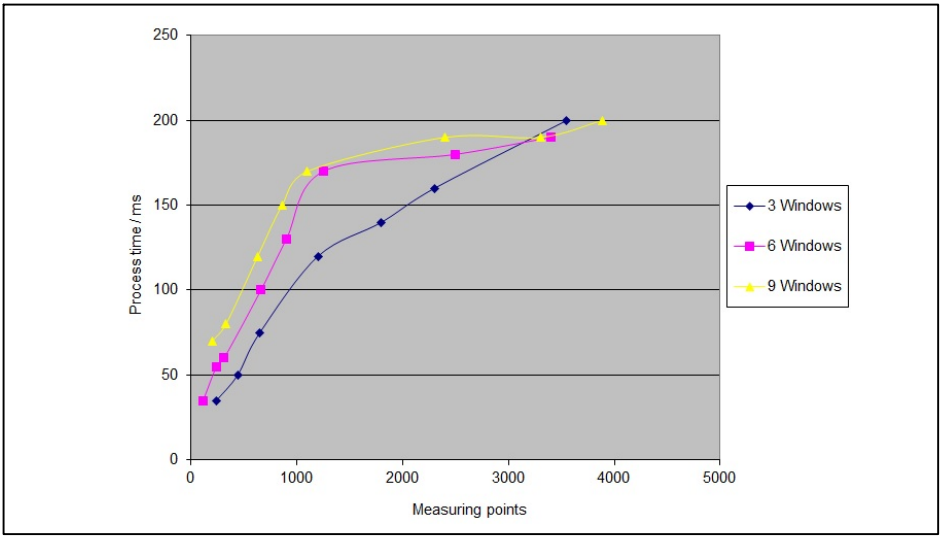


Fig. 10.5 Internal device evaluation times (without backing up process data)

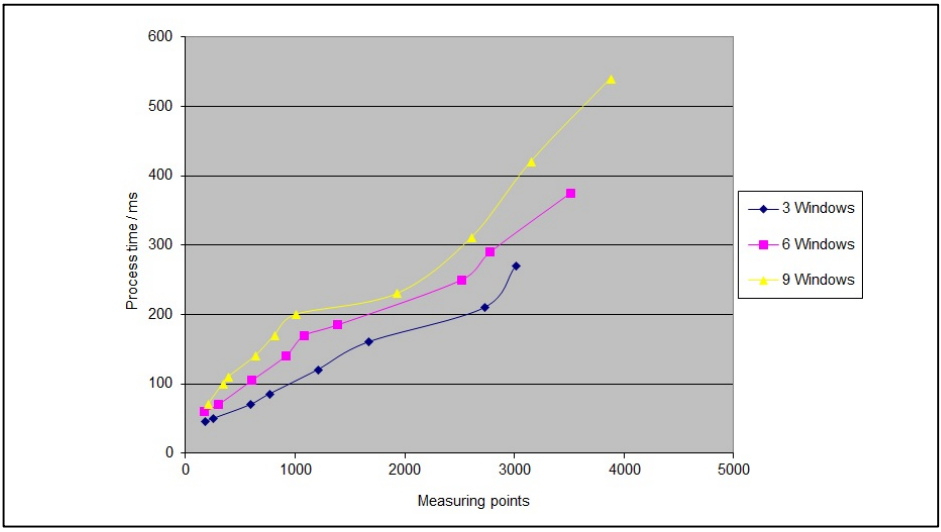


Fig. 10.6 Internal device evaluation times (with data backup to MMC/SD card)

While not all measured curve data has been saved to the PC, the files have the extension **.tmp**. Once data transfer is complete, the files are renamed with the extension **C85** or **D85**. This ensures that downstream software can reliably detect the backup status and only accesses the process data when backup is complete.

Typical process times during ongoing production in combination with PLC machine control

The table below shows the approximate times required if the MP85A process controller is exchanging cyclical data with a PLC via PROFIBUS, saving data to an MMC/SD card or transferring it via Ethernet. The INDUSTRYmonitor software is running on the PC. The values that are actually achieved depend on which hardware is used (PC), the network components (switch), and the network load. Times can vary widely from one process to another with Ethernet in particular, due to the latency time.

Configuration (cyclical data was also exchanged via PROFIBUS)	Time requirement in s (approx.)
1 x MP85A process controller, 500 measurement points, save curves and results on MMC/SD card	2
3 x MP85A process controller, 600 measurement points, save curves and results on MMC/SD card	2
1 x MP85A process controller, 500 measurement points, output curves and results via Ethernet, Ethernet connected directly	4 / 5
3 x MP85A process controllers, 500 measurement points, output curves and results via Ethernet, Ethernet connected via switch	4 / 5
3 x MP85A process controllers, 600 measurement points, output curves and results via Ethernet, Ethernet connected via switch	4 / 6
3 x MP85A process controllers, 600 measurement points, output curves only via Ethernet, Ethernet connected via switch	2 – 3

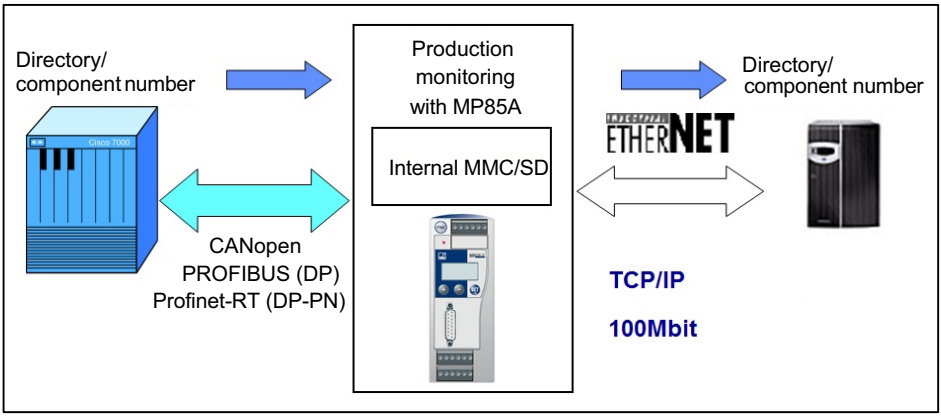
10.8 Process data backup/production data management

For quality control purposes, all process data can be saved. You can save process curves and/or process results and statistical data (separate files). This data can be saved internally on the memory card or externally to a PC via the bus interface. You can define which data is saved in the PME Assistant in the “Data backup” area or with the INDUSTRYmonitor or EASYmonitorCE program.

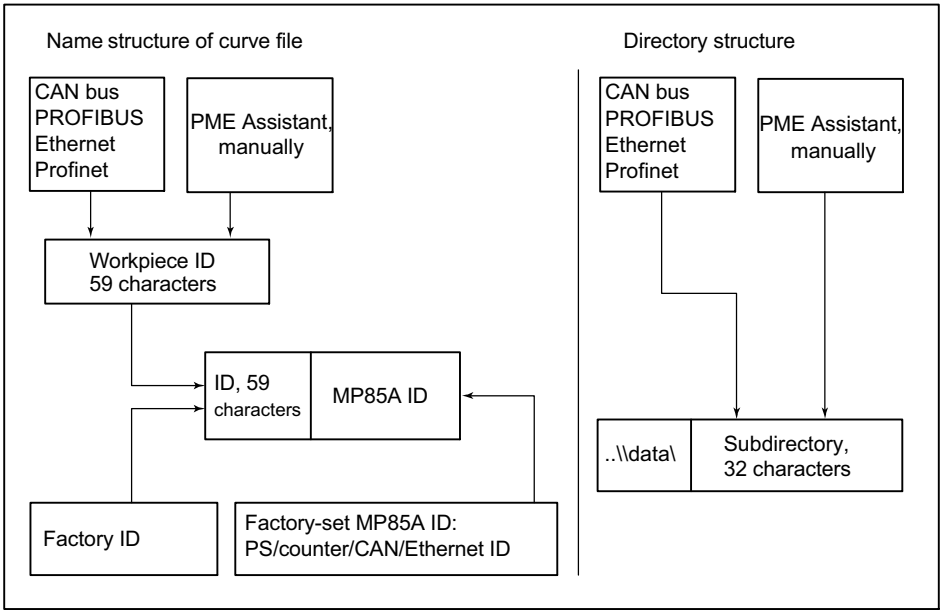
If the data is to be saved on the memory card, you have a choice of two methods (in both cases, data can be transferred from the memory card to the PC followed by a display):

1. Ring buffer for the last 1,000 or 10,000 processes.
2. Unlimited storage up to the capacity of the memory card.

   Example: With a 2 GB MMC/SD card and typical process curves of approx. 3 kB, up to 600,000 processes can be stored.



You can also add a component designation to the file name of saved process data and saved it in directories of your choice on the destination system. This enables efficient production data management. The information is transferred to the MP85A process controller via the PME Assistant, the INDUSTRYmonitor or the bus interface.



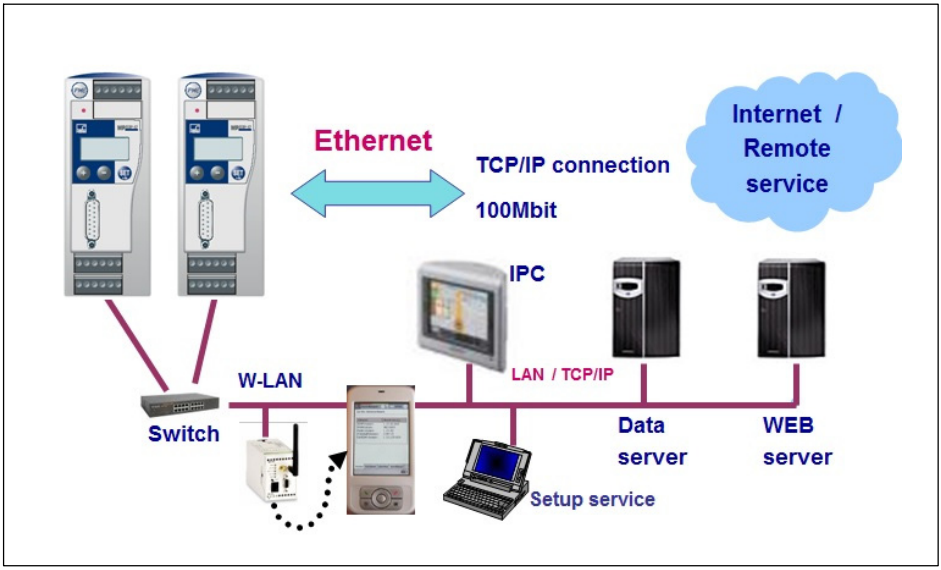
Important

A control system or master with DPV1 functionality is required for transfer via PROFIBUS. You can find out more about the required objects in the MP85A process controller interface description.
To enable process curves and results to be saved on the PC or server, you must launch the software, e.g. PME Assistant, INDUSTRYmonitor or EASY-monitorCE (HBM software for industrial use).

11 Display and control options

11.1 FASTpress Suite software

The FASTpress Suite is measurement software for HBM devices from the PME family. You can use it to accomplish a variety of measurement and control tasks quickly and easily without spending time on programming.



Use the PME Assistant dialogs to quickly parameterize the devices and start measuring mode.

You can also use the software without a device in “offline” mode to preconfigure the most important settings or to modify an existing setup file for later transfer to a device.

To get started quickly with monitoring your production processes, make use of the INDUSTRYmonitor production software and the EASYmonitor example application provided for the MP85A process controller.

Here, higher speeds are achieved for displaying measured curves and for data transmission, especially for network operation with several devices. With each process controller, up to 1000 measurement programs can be saved and used.

Create your own applications for the MP85A process controller in programming environments such as C# and VB.NET and integrate them in your destination system, or use the examples provided in the source code (EASYMonitor) and adapt them to your production environment.

Important

To save curves and process data during ongoing processes, the backup option must be enabled in the MP85A process controller and either the PME Assistant, EASYmonitor or INDUSTRYmonitor must be launched on the destination system. Only one application at a time may access the MP85A process controller, however; multi-master capability is not available.

You can find further information in the “FASTpress Suite” quick start guide.

12 Error messages/operating state (LED display)

Depending on the display mode, various error messages may be displayed on the LCD display of the MP85A process controller (or the PME Assistant), instead of the measured value.

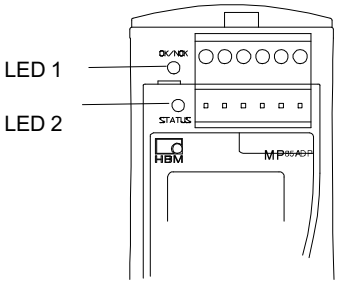
Current errors are displayed continuously. Press the ⊕ key to go to the “ERROR” display mode.

Error message	Cause	Remedy
TransdErr	Input signal overflow, transducer not connected, transducer incorrectly connected, amplifier not adapted to transducer model, no sense leads connected	Connect transducer, see pin assignment, connect sense leads
ADC Ovfl.	Input signal of measurement channel A/D converter too large	Adapt hardware measuring range (menu: Preparing for measurement/Amplifier/Transducer)
Grv Ovfl.	Gross value overflow of a measurement channel	Reduce display by one decimal place (menu: Preparing for measurement/Amplifier/Transducer)
Scal.Err	Input characteristic curve too steep	Change input characteristic curve (menu: Preparing for measurement/Amplifier/Calibrate characteristic curve)
Flash error	An error occurred while reading out data from the flash EPROM of the MP85A process controller.	This may be a one-off read error, please repeat the process. If the error occurs again, please contact HBM Service.
CAN bus error	An error has occurred on the CAN bus	Check that the termination resistors are present or whether a channel is faulty. Then switch the devices back on. If this does not help, connect the devices to the CAN bus one at a time, to find out which device is faulty.

Error message	Cause	Remedy
InCab Err	Invalid initial calibration values in the memory of the MP85A process controller	Reboot, send MP85A process controller to the manufacturer (HBM)
CAN Tx	PDOs are not accepted in the CAN bus	Check CAN bus configuration

Operating state of the MP85A process controller:

The LEDs indicate the operating states (ready for measurement, overflow, etc.) of the device. In the MP85ADP(-S), however, the PFOFIBUS state is displayed instead of the CAN status (as in the MP85A). This is also the case in the MP85DP-PN(-S), but in this case it indicates a Profinet error.



Operating state

LED1 (OK/NOK)

LED 1 (OK/NOK)/Process state	Red LED	Yellow LED	Green LED	LED flashes
Initialization after device is switched on	x			
Alarm	x			x

LED 1 (OK/NOK)/Process state	Red LED	Yellow LED	Green LED	LED flashes
Process has started		x		x
Overall result OK			x	
Overall result NOK	x			

LED 2 (status)

LED 2 (status)/Device status	Red LED	Yellow LED	Green LED	LED flashes
Initialization after device is switched on	x			
One of the following errors is present: EEPROM error, initial calibration error, scaling error, MMC/SD error or CAN bus error	x			
Transducer error, ADC overflow or gross overflow (one or both measurement channels)	x			x
LCD error	x			x
CAN bus: Transmit/receive data			x	x
“Pre-operational” state		x		
“Operational” state			x	

MP85ADP PROFIBUS status	Red LED	Yellow LED	Green LED	LED flashes
Error state	x			
BD_SEAR, WT_PARM, WT_CONF states		x		
DATA_EX status			x	

The Ethernet status LEDs are located on the underside of the MP85A process controller.

Ethernet status LED	Green LED	Yellow LED
Physical connection present	-	on
Transmit/receive data	-	flashing
100 MBit transmission speed	on	-
10 MBit transmission speed	-	on or flashing

Tip

The relevant device status and error overview are clearly displayed in the “Status overview” window. Open the window by clicking the “Status” button in the “Measured value display” window (Fig. 12.1 on page 111).

The meaning of the displays and possible corrective measures for error messages are listed in the online help (open Help with F1). You can find further helpful tips and information on settings in the FAQs section of the online help.

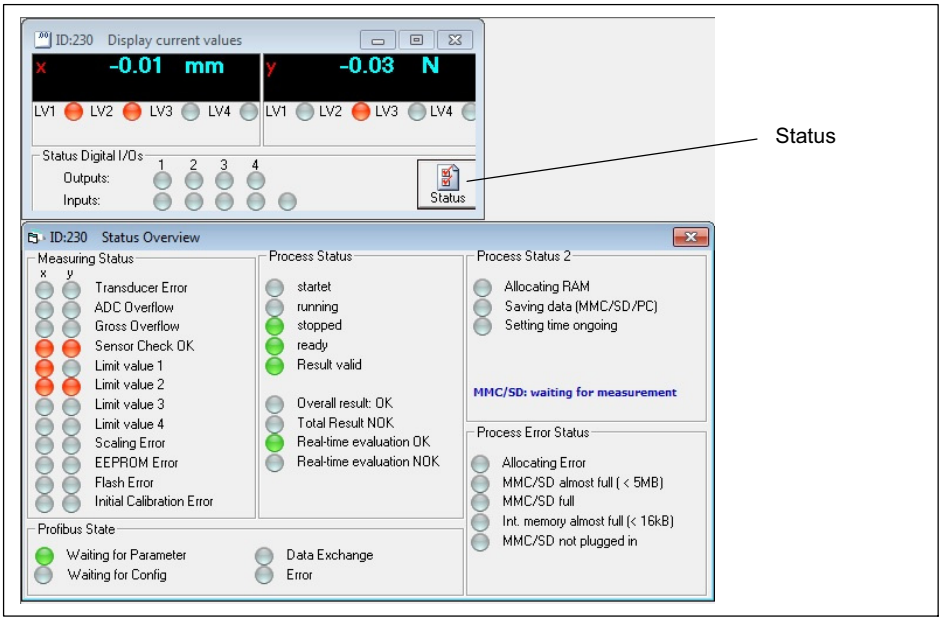


Fig. 12.1 Opening the status display

Operation and error state of the Profinet RT gateway:

The SYS and COM status LEDs are located on top of the Profinet RT gateway.

SYS LED	Green LED	Yellow LED
Firmware starts, operating system running.	on	–
This state may only occur briefly. If the LED remains yellow permanently, there is a hardware fault. Please contact HBM Service.	–	on
The bootloader is active. The firmware is being loaded from the flash memory into the gateway. If this state persists permanently, there is a hardware fault. Please contact HBM Service.	flashing yellow/green	
No power supply or hardware fault. Please contact HBM Service.	off	

COM LED	Red LED	Green LED
No configuration or stack error.	–	irregular flashing
The PROFIBUS is configured but the application has not yet enabled bus communication.	–	regular flashing
Communication to the slave has been established.	–	on
Communication to at least one slave is disconnected.	regular flashing	–
Communication to one or all slaves is disconnected.	on	–

13 FAQs: Frequently asked questions (MP85A and PME Assistant)

Tip

The times in the flow diagrams in this section are shown distorted for a clearer view, not in the original scale; the levels apply to a positive circuit logic.

13.1 How do I set the interface on the MP85A?

Ethernet interface

Parameterization can *only be done manually*. In the PME Assistant, you can only view the interface parameters. During configuration, the PME Assistant must not be connected to the MP85A via this interface.

On the MP85A, enter the Ethernet (IP address) and the subnet mask. Operation with dynamic addresses (DHCP) is not possible. Please clarify with your network administrator which IP address (Ethernet address) and subnet mask you should use. If you would like to set up only one direct connection between a PC and the MP85A, you can use any address, e.g. 192.168.169.xxx. The last group of three digits (xxx) must be a number between 1 and 254 and must be different for the PC and the MP85A. In this case, make sure that you use a crossover cable, not an ordinary Ethernet cable.

Setting the address and subnet mask on the MP85A

1. Press and hold the ***SET*** key for *at least two seconds*.
   The ***CAN BUS*** display appears.
2. Press the **+** key until ***ETHERNET*** appears on the display.
3. Press the ***SET*** key.
4. The MAC address is displayed.
5. Press the **+** key. The first part of the IP address appears.
6. Press ***SET***, then you will be able to change the value with the **+** or **-** key. Otherwise, press **+** to go to the next part of the address.

7. If you have changed a digit, press the ***SET*** key.
8. After the IP address has been displayed, you will see the subnet mask. Change it as required.
9. Press and hold the ***SET*** key for at least two seconds to save your changes. ***Save?*** will now flash on the display.
10. Press the ***SET*** key to confirm.
    A flashing double arrow and ***Yes*** appear on the second line.
11. Press the ***SET*** key to confirm.

CAN bus interface

Most parameters can be changed *only manually*; the PME Assistant must not be connected to the MP85A via this interface during configuration. Exit the program if necessary.

Tip

You do not have to exit or close the online help when you exit the PME Assistant.

Setting the baud rate on the MP85A:

1. Press and hold the ***SET*** key for *at least two seconds*.
   The ***CAN BUS*** display appears.
2. Press the ***SET*** key again.
   Baud rate appears along with the currently set value.
3. Press the ***SET*** key once more.
   A flashing double arrow appears to the left in front of the currently set baud rate.
4. Press the **+** or **-** keys to change this value.
5. When the desired figure is shown, press the SET key.
6. Now press and hold the ***SET*** key for at least two seconds.
   Save? will now flash on the display.

7. Press the ***SET*** key to confirm.
   A flashing double arrow and ***Yes*** appear on the second line.
8. Press the ***SET*** key to confirm.

PROFIBUS interface (MP85ADP only)

You can only set the PROFIBUS address in the PME Assistant. All other parameterization of the PROFIBUS system must be done using the relevant software from other manufacturers, e.g. PROFIBUS software from Siemens.

13.2 How do I set an IP address on my PC?

In Windows Vista and Windows 7

- ► Use the Windows Start menu to open the Control Panel -> Network and Sharing Center. Then *View status* (Windows Vista) for the desired connection. In Windows 7, click on your *LAN connection* to view the status.
- ► Click on *Properties* and specify an administrator account or confirm the security prompt.
- ► Select *Internet protocol version 4 (TCP/IPv4)* and click on *Properties*.
- ► Click on *Use the following IP address* and enter an address in which the first three groups of digits match those of the MP85A and only the last group of digits contains a different number between 1 and 254. The last group of digits must not match the group of digits in the MP85A!
- ► For the *Subnet mask*, enter the same groups of digits as the MP85A.
- ► Next, click *OK* or Close to close all open dialogs.

Example:

The IP address of the MP85A is 192.168.169.80, the subnet mask is 255.255.255.0.

On the PC, enter ***192.168.169.123*** as the IP address and ***255.255.255.0*** as the subnet mask.

In Windows®XP

- ► Via the Windows Start menu go to Settings –> Network Connections. From the context menu (right-click), select the Properties of the desired LAN connection.
- ► Select *Internet protocol (TCP/IP)* and click on *Properties*.
- ► Click on *Use the following IP address* and enter an address in which the first three groups of digits match those of the MP85A and only the last group of digits contains a different number between 1 and 254. The last group of digits must not match the group of digits in the MP85A!
- ► For the *Subnet mask*, enter the same groups of digits as the MP85A.
- ► Then click *OK* to close all open dialogs. You may have to restart the PC to enable the setting.

Example:

The IP address of the MP85A is 192.168.169.80, the subnet mask is 255.255.255.0.

- ► On the PC, enter ***192.168.169.123*** as the IP address and ***255.255.255.0*** as the subnet mask.

13.3 How do I connect the PME Assistant to the MP85A?

Tip

The interface must be installed and configured.

Procedure

1. Switch on the power supply to the PME device(s).
2. Connect the PC interface to the PME device(s).
3. Launch the PME Assistant.
4. Enter the interface you are using.

CAN bus: If applicable, select the CAN network you are using (*Change*).

Ethernet (MP85A only): If you do not want to search through all the addresses of this segment (all addresses in the yellow field) for the Ethernet interface (*Scan*), you can enter individual IP addresses and have them added to the list of available devices. Each time you click on *Add IP to device list*, the software checks whether a device from the PME family can be found at the address in question. If not, it is added to the list of devices.

5. Use the ***Scan*** button to start a scan of the interface to determine the assigned addresses.
6. Click on ***Start*** to open the configuration program.

All (**Devices**) from the PME family entered or found in the device list are displayed in the tree view in the left-hand area of the program window. Here you can click on an address to set it.

Notes

- If you see the message “This software version is not fully compatible with the device version you are using”, you should update the PME Assistant via the Internet.
- MP85A only: If you wish to connect via the Ethernet interface but another connection has been established via this interface, you must confirm that you wish to disconnect the existing connection and establish a new one by entering the number shown in the dialog. This prevents any inadvertent disconnection: Connection to your PC *disconnects the other connection*, i.e. the other connection (PLC, other PC) receives *no more data*.

13.4 How can I find the file system on my PC, and which should I use?

In the root directory of your hard disk (e.g. c:\), open the **Properties** context menu. The file system used is shown on the third line of the following dialog (**General)** tab.

The NTFS file system is required if you are recording numerous processes and more than 65,000 files may be generated on the PC during a test.

Tip

If your hard disk was not already formated with NTFS at the factory, we recommend that you have this done. Your PC supplier will generally provide you with a conversion program. Otherwise, try launching CONVERT.EXE (in the SYSTEM32 subdirectory of Windows) with the parameters `c: /fs:ntfs` *, if c: is the drive that needs to be converted* `(CONVERT.EXE c: /fs:ntfs)`*. Conversion does not involve any loss of data. However, you should back up your hard disk beforehand for peace of mind.*

13.5 When I launch the PME Assistant, what do the options do?

To enable windows to be generated more quickly, the default setting of ***Update menu tree of setting window*** is disabled (see Start window of the PME Assistant). The program then assumes that the device settings are unchanged. If you have manually changed a setting in the device, or if you have worked in ***Offline*** mode in the meantime, all settings must be read again, i.e. you need to enable ***Update menu tree of setting window***.

Tip

Enable ***Open settings window automatically*** *to open the setting window automatically 5 seconds after the program is launched.*

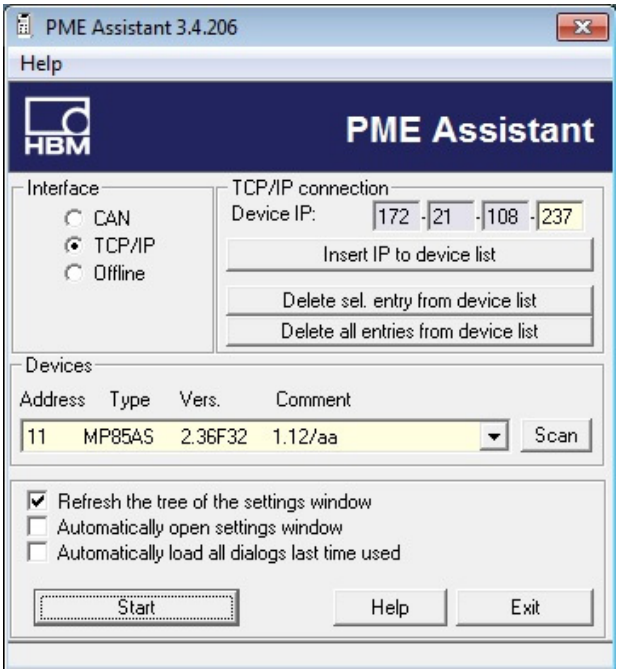
Load most recent dialogs automatically shows you all windows and dialogs in the same size and position as they were when you last ended the program.

To launch the program automatically with Windows, create a shortcut to the program (PMEASSIST.EXE) in your Windows startup folder. Disable ***Update menu tree of setting window*** and enable ***Open setting window automatically*** and ***Load most recent dialogs automatically***. This way, the program is also launched the next time Windows is started, and all program windows you last opened are opened this time, too.

If you have saved a window group (**File** –> **Save window group**), you can also enter this file as a start parameter: Create a shortcut to the PME Assistant and

enter the file and full path after PMEASSIST.EXE. These windows are then reopened when the program is launched.

PME Assistant Start window



13.6 What happens if I connect via an existing Ethernet connection?

If you wish to connect via the Ethernet interface but another connection to the MP85A is in place via this interface, you must confirm that you wish to disconnect the existing connection and establish a new one by entering the number shown in the dialog. This prevents inadvertent disconnection.

Important

Connection to your PC disconnects the other connection, i.e. the other connection (PLC, other PC) does not receive any more data.

13.7 What are the requirements for an MMC/SD card?

An MMC/SD card for plugging into the MP85A must satisfy the following conditions:

- Only standard MMC/SD cards are permitted, not Secure MMC, MMC*plus*TM, MMC*mobile*TM, SDHC (SD High Capacity) or SDXC (SD eXtended Capacity) cards.
- The maximum permitted size of memory card is 2 GB.
- The card must be formatted with the FAT16 file system. FAT32, NTFS and other formats are not permitted.

Reformat your card if necessary. In Windows, select **Format** in the data carrier's context menu, and use the ***FAT (Standard)*** setting as the ***File system***.

Tip

To optimize the access times of the MMC/SD card, you should defragment or reformat it at regular intervals.

13.8 What is the relationship between the data rate and the filter settings?

During measurement, initially a particular (internal) data rate is used, depending on the filter you are using, see table.

Low-pass filter	Internal data rate (in measurements per second)
0.05 Hz	1.15
0.1 Hz	2.3
0.2 Hz	4.6

Low-pass filter	Internal data rate (in measurements per second)
0.5 Hz	17
1 Hz	37.5
2 Hz	75
5 Hz	150
10 Hz	300
20 Hz	600
50 Hz	1200
100 Hz	2400

Tip

SSI transducers are always scanned 1200 times a second.

13.9 What does data reduction do and how do I set it?

To avoid unnecessarily increasing the amount of data generated, the number of values to be checked (and possibly saved) is limited: **Data reduction.** In this way you can determine how high the display resolution of the relevant channel should be. As soon as the current measured value for *either* the x-channel *or* the y-channel exceeds the old measured value, a

triple measured value is saved, i.e. the values for *both* channels plus the time value. This way, the *resolution* of your measured values in the x and y-directions will always be at least as good as specified here.

Important

You should record at least 200 to 500 measurement points to enable correct analysis.

Only these values also need to be checked in relation to the *range window*, the *tolerance band* and the *envelope curve* or *tolerance window*. The *alarm window*, *start*, *stop* and *end conditions* and the *external inputs* are *immediately* checked and analyzed in the scale determined by the *data rate*. In transducers with SSI interface only, the MP85A always reads out the measured value 1200 times a second, by sending a transfer signal to the transducer.

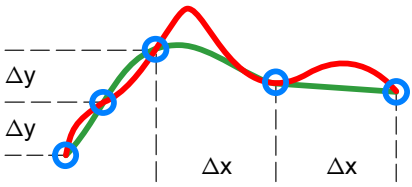
The advantage of this is measurement with a high internal data rate and excellent time resolution, as only the *relevant* values require (time-consuming) further processing. The MP85A can record 4000 values in total for further processing. If the measurement is not finished by then, it is stopped and the error message “Buffer overflow” is displayed.

As a test, perform a sample measurement “manually” to see the current resolution. The measurement points used for analysis are also displayed in the graph (**Graph** –> **Graphic settings** –> **Curve with connected points**). The number of measurement points actually used is shown on the right-hand side right at the top of the window (toolbar) after measurement. This enables you to decide whether the number of plotted measurement points is high enough, i.e. if resolution is sufficiently high for analysis. Also see the examples below.

Tip

Alternatively, you can click on the ***Automatically adapt alarm and range windows*** *in the* ***Alarm window*** *tab. In addition, the Δx and Δy of data reduction is set to practical values for these ranges. Moreover, the alarm window is set to the measuring range of the transducers, enlarged by 15% in all directions, and the range window to a range enlarged by 10%.*

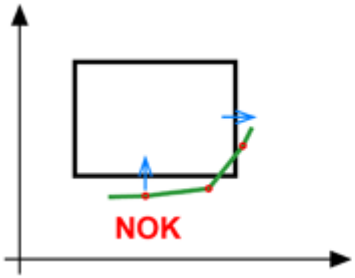
The number of measured values in the x-direction shown in the diagram below is insufficient for achieving the *precise* course of the curve, if this is required. Here, you must reduce the values for the differences in the x or y-direction entered in the **Control settings** tab.

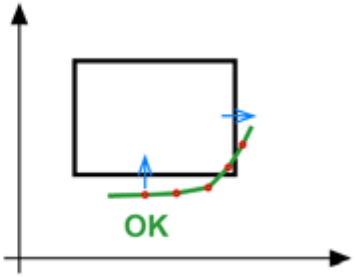


measured = actual course of curve?

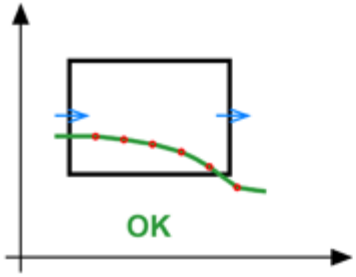
If you record too few measurement points, the defined windows or envelope curve may not be analyzed as expected.

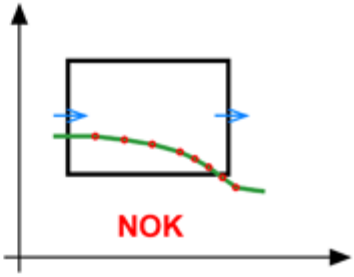
Examples of too few measurement points (x or y too large)





The graph on the left implies that the result is OK. However, the process is rated as NOK: As there are no measurement points within the window, there is no entry or exit and the result is NOK. Increase the number of measured values by reducing x and/or y. If at least one measured value then lies within the window, the result of analysis is OK (right-hand graph).





The graph on the left implies that the result is NOK. However, the process is rated as OK: The penultimate plotted measurement point lies within the window (OK). The final plotted measurement point is already to the right outside the window, therefore the y-coordinate is no longer relevant. Increase the number of measured values, e.g. by reducing y (right-hand graph). The exit at the lower edge is then recognized (the y-value is already too low before the right edge of the window).

Tip

The graphs do not necessarily show the measured values actually analyzed for the start or stop condition. The values plotted on the graphs are the triple measured value resulting from data reduction, whereas the start and stop conditions are analyzed immediately using the acquired (raw) data.

13.10 What options are there for starting, stopping and ending measurement?

Important

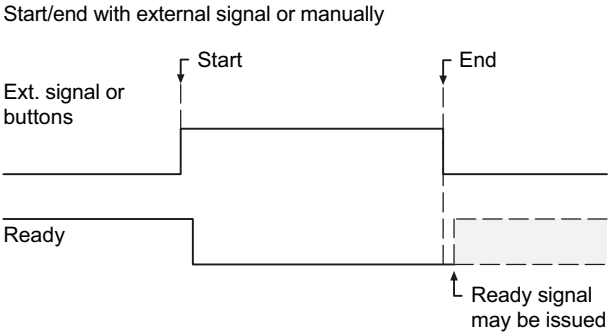
While the end condition is not fulfilled, data is not saved in the RAM and *no ready signal* is output, i.e. *the test bench is at a standstill for this time*.

Different sequences take place in the MP85A and therefore in the output signals, from “Process started” to “Process finished”, to “Result valid”, depending on which start, stop and end conditions you are using. You can find out about the different cases, the associated options and resulting signal curves below. The time of the ready signal and thus the possible start of the next process is illustrated by ready signal may be issued” in the flow diagrams: the time still needed after this depends on the data backup method you selected, process-optimized or with no data loss.

Start/end via external signal, manual or via interface commands

Start and end the process with an external signal (digital inputs) or manually via  and  . Interface commands have the same function - they work like manual control.

Flow diagram a) for start/end conditions



Notes

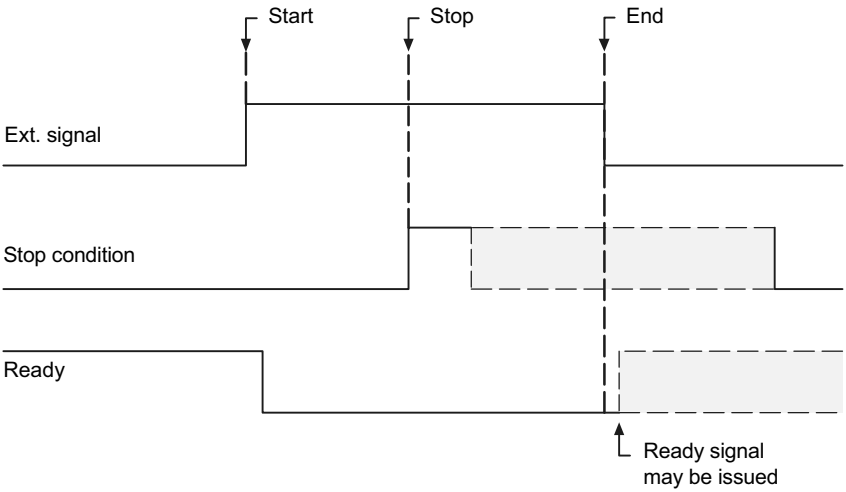
- The stop and end times are identical with both an external signal and manual control. You can mix these two operating modes, i.e. the process starts either when you click on the button or the digital “Start” signal is present. The same applies to the end of the process.
- Only level changes (edges) of the external signal are analyzed.
- With a manual start, you cannot end the process by means of a condition; instead, you must end it manually with an external signal or an interface command.

Start via external signal, stop via condition, end via external signal

Start and end the process with an external signal (digital inputs). The measurement should be stopped by means of a condition, e.g. a value is too low.

Flow diagram b) for start/stop/end conditions

Start with external signal, stop with (internal) condition, end with external signal



Notes

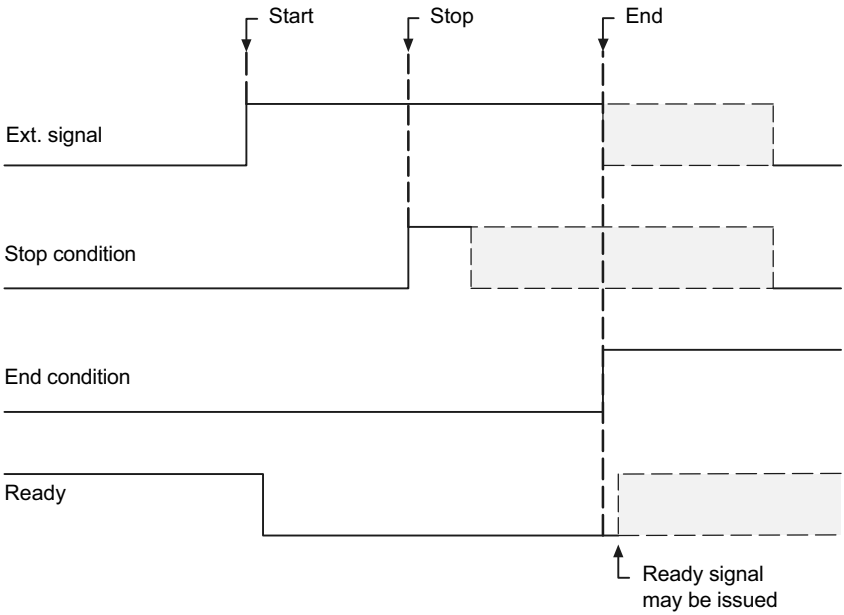
- The process is halted immediately without waiting for your stop condition when the external signal goes to “End”, you click on  or the relevant interface command arrives.
- Only level changes (edges) of the external signal are analyzed.

Start via external signal, stop and end via conditions

Start the process with an external signal (digital inputs). The measurement should be stopped and ended by means of conditions, e.g. a value is too low.

Flow diagram c) for start/stop/end conditions

Start with external signal, stop with (internal) condition, end with (internal) condition

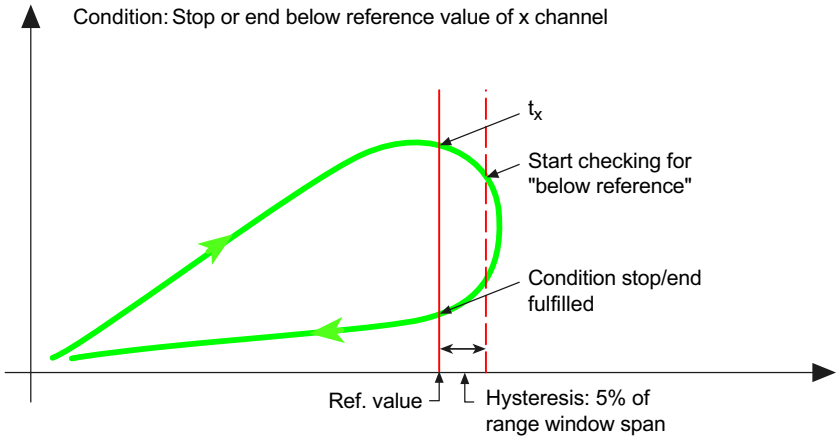


Notes

- The process is halted immediately without waiting for your stop or end conditions when the external signal returns to “End”, you click on  or the relevant interface command arrives.
- The stop and end conditions are only analyzed when a value has already dropped *below* the reference value plus hysteresis or risen *above* the reference value minus hysteresis once. The hysteresis (5% of the range window) is necessary to ensure that noise or minor signal interference does not already interrupt the measurement at time t_x. The percentage refers to the relevant axis of the range window.

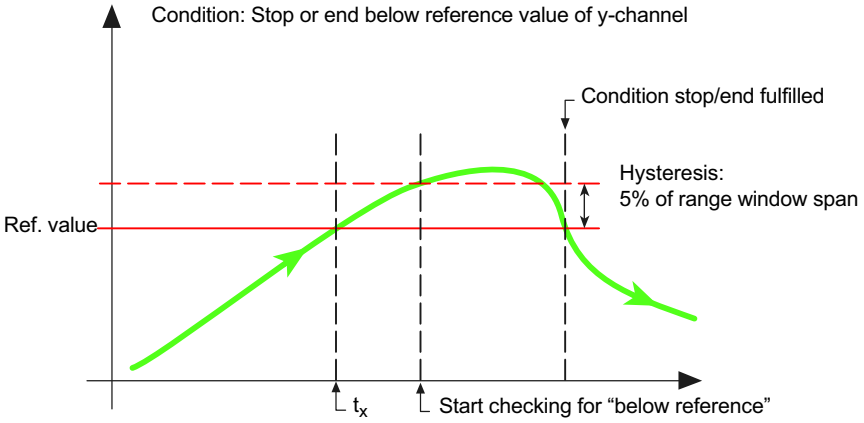
Example of stop/end condition: Below reference value of x-channel

For the condition *below reference value*, hysteresis is *above* the reference value.



Example of stop/end condition: Below reference value of y-channel

For the condition *below reference value*, hysteresis is *above* the reference value.

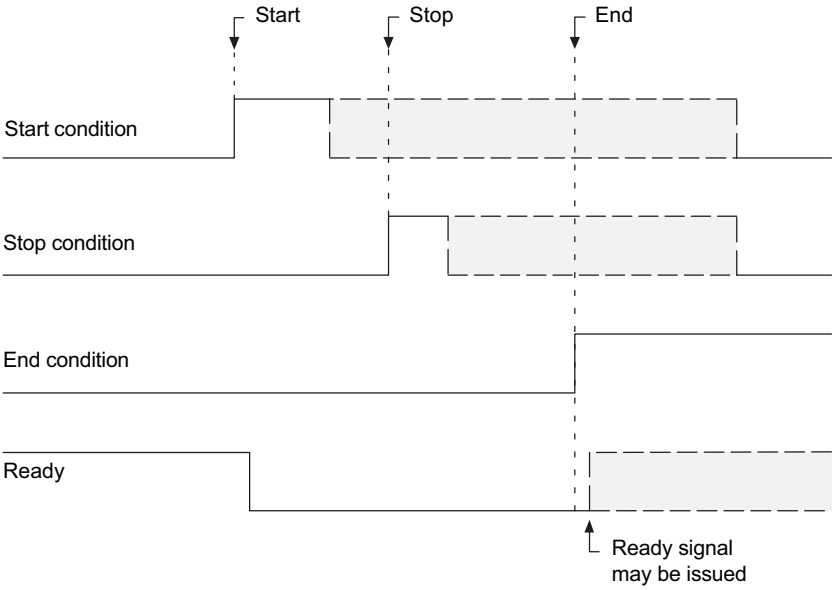


Start/stop/end via conditions

Start, stop and end the process by means of various conditions, e.g. start when a value exceeds the reference value, stop and end when certain values fall below the reference value.

Flow diagram d) for start/stop/end conditions

Start via (internal) condition, stop via (internal) condition, end via (internal) condition

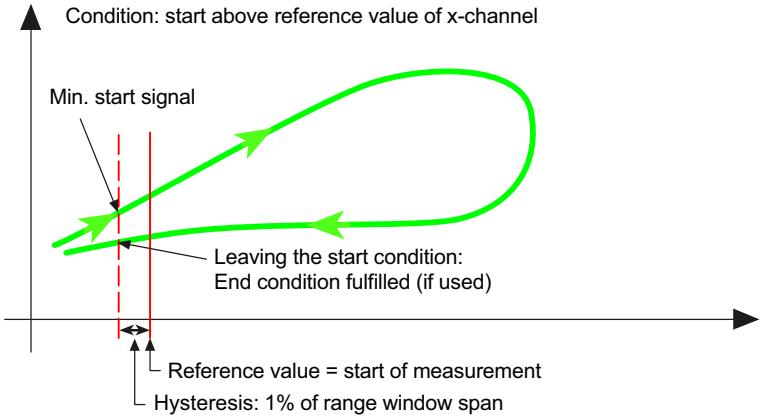


Notes

- The process is halted immediately without waiting for your stop or end conditions if you click on  or the relevant interface command arrives.
- The conditions are only analyzed when a value has already dropped *below* the reference value plus hysteresis or risen *above* the reference value minus hysteresis once. The hysteresis is 1% of the range window for the start condition, and 5% of the range window for the stop and end conditions. The percentage refers to the relevant axis of the range window. The hysteresis is necessary to ensure that noise or minor signal interference does not already interrupt the measurement at time t_x.

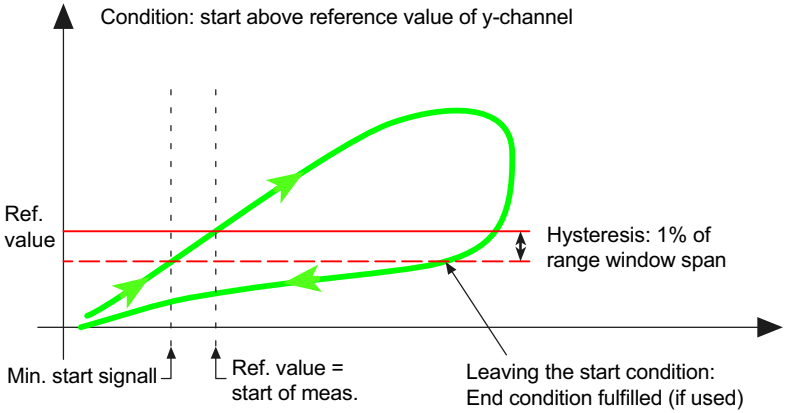
Example of start condition: Above reference value of x-channel

For the condition *above reference value*, hysteresis is *below* the reference value.



Example of start condition: Above reference value of y-channel

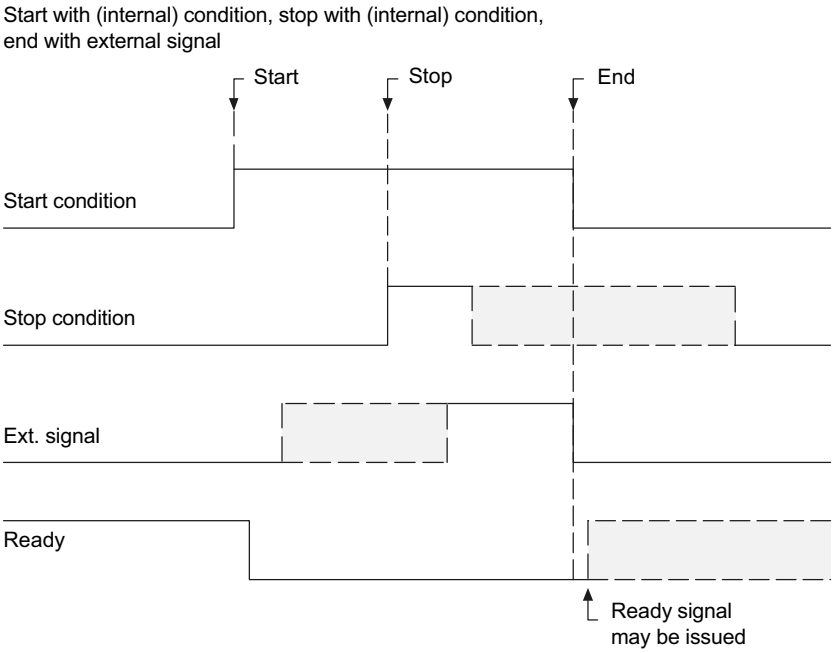
For the condition *above reference value*, hysteresis is *below* the reference value.



Start/stop via conditions, end via external signal

Start and stop the process by means of various conditions, e.g. start when a value exceeds the reference value, stop when a value is below the reference value. The end is determined by an external signal (digital inputs).

Flow diagram e) for start/stop/end conditions



Notes

- The process is halted immediately without waiting for your stop condition when the external signal goes to “End”, you click on  or the relevant interface command arrives.
  Only level changes (edges) of the external signal are analyzed.
- The conditions are only analyzed when a value has already dropped *below* the reference value plus hysteresis or risen *above* the reference value minus hysteresis once. The hysteresis is 1% of the range window for the

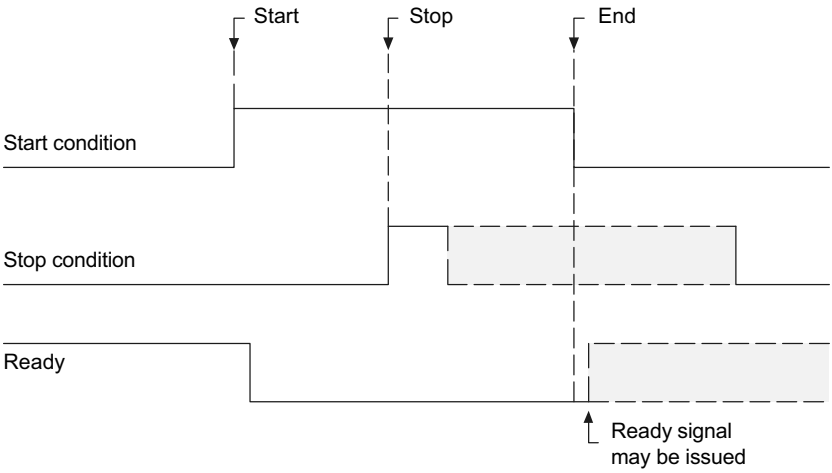
start condition, and 5% of the range window for the stop condition. The percentage refers to the relevant axis of the range window. Therefore, set the start condition reference value sufficiently far above or below the initial (idle) state of your signal (minimum start signal), so that the hysteresis for the start condition can ensure that minor signal interference does not start the process prematurely. The start condition ceasing to apply shown in the examples is irrelevant in this case. The hysteresis for the stop condition is necessary to ensure that noise or minor signal interference does not already interrupt the measurement at time tx.

Start/stop via conditions, end when start condition no longer applies

Start and stop the process by means of various conditions, e.g. start when a value exceeds the reference value, stop when a value is below the reference value. The *end* of the measurement is reached when this start condition no longer applies, i.e. if measurement was started when a value exceeded the reference value, the value needs to fall below this point once more, plus the hysteresis for the start condition (1%).

Flow diagram f) for start/stop/end conditions

Start with (internal) condition, stop with (internal) condition, end when "leaving start condition"



Notes

- The process is halted immediately without waiting for your stop condition if you click on  or the relevant interface command arrives.
- The conditions are only analyzed when a value has already dropped *below* the reference value plus hysteresis or risen *above* the reference value minus hysteresis once. The hysteresis is 1% of the range window for the start condition, and 5% of the range window for the stop condition. The percentage refers to the relevant axis of the range window. Therefore, set the start condition reference value sufficiently far above or below the initial (idle) state of your signal (minimum start signal), so that the hysteresis for the start condition can ensure that minor signal interference does not start the process prematurely. The hysteresis for the stop condition is necessary to ensure that noise or minor signal interference does not already interrupt the measurement at time t_x.

13.11 How do I work in setup mode?

In a system's test or setup phase, in particular, when often only a few sample parts are available, it is extremely helpful to gain a lot of information about the actual process curve beforehand. Proceed as follows:

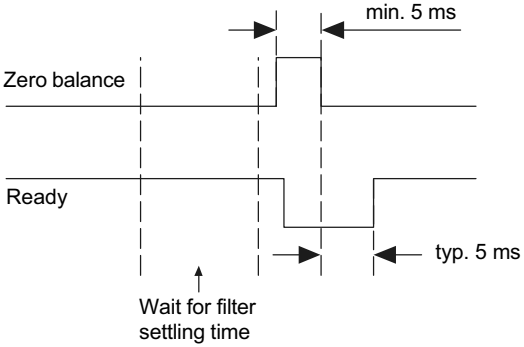
1. Disable statistical processing and therefore also the OK/NOK counters, to prevent the falsification of statistical analysis.
2. Manually start and stop process monitoring.
3. Determine several curves.
   Tolerance windows: View several process curves (**Graph** –> Curve history) to ascertain the tolerance windows.
   Tolerance band: Have the tolerance band generated automatically from one of the measured curves.
4. Print out a report to document the process curves and evaluation parameters.
   With EASYteach from the FASTpress Suite, you have at your disposal a range of further special methods of process evaluation and documentation.
5. Save all process and evaluation parameters so they are power failure-proof, in a parameter set in the flash EPROM of the MP85A, on the (optional)

MMC/SD card or on your PC.
Also see the SAVE/LOAD PARAMETERS menu

6. Have several “samples” (pilot series) produced and check the selected parameters.

13.12 How long does zero balance take and what does it involve?

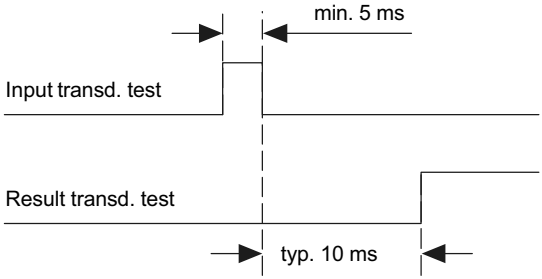
At low filter limit frequencies, you need to wait for the filter settling time to elapse *before* zero balance. For zero balance, a pulse of at least 5 ms duration is required at the digital input. Zero balance is completed another 5 ms later.



Only level *changes*, i.e. the *edges*, are analyzed at the inputs.

13.13 What takes place during a transducer test and what are the important points?

At low filter limit frequencies, you need to wait for the filter settling time to elapse *before* the test. A pulse of at least 5 ms duration at the digital input is required for the transducer test. The result is typically available another 10 ms later.



Only level *changes* , i.e. the *edges*, are analyzed at the inputs.

13.14 What are the limitations for (transducer) scaling?

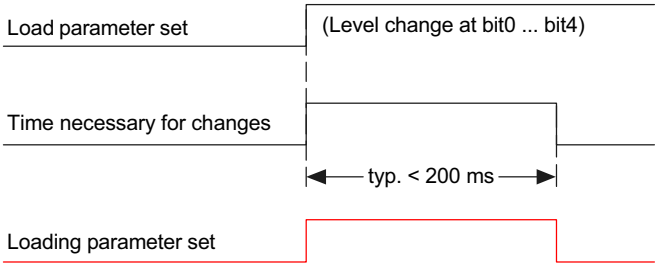
Scaling can extend from a 1 million-digit resolution for 1/30 of the measuring range to a 10-digit resolution for the entire measuring range.

Let's say that 2 mV/V is set as the measuring range. Then, the minimum scale that can be set is 0.066 mV/V over 1 million increments, i.e. 30 million for the full measuring range. The decimal places are contained in these figures. Therefore, entering 50,000 for 50 kN maximum capacity will give rise to a resolution of 50,000 increments.

If used as a counter or for SSI sensors, the scale can be from 20 digits for one pulse (1:20) to 10,000 pulses per displayed digit (10,000:1).

13.15 What must I bear in mind when switching parameter sets?

It typically takes less than 200 ms to enable a new parameter set. At very low filter limit frequencies, you need to *add* the filter settling time to this. If you use digital inputs for switching, switchover occurs when the level *changes* at the input (edge).



Notes

- Only level *changes* , i.e. the *edges*, are analyzed at the inputs.
- Switchover must be complete before you can start a new process. To check, use the “Loading parameter set” signal.

13.16 How can I find out/track changes to device settings?

Via the **Options** –> **Change log** menu, you can track changes to the configuration that took place using this PC and by the currently logged in (Windows) user. When this option is enabled, all changes are logged in encrypted form (internal parameter IDs) in the ChangeLog.LOG file. The file is created in the storage folder.

To disable this option, enter the same password as when you enabled it.

13.17 What error messages are there for measurement/the process status, and how can I correct errors?

The messages in square brackets are shown on the display of the MP85A.

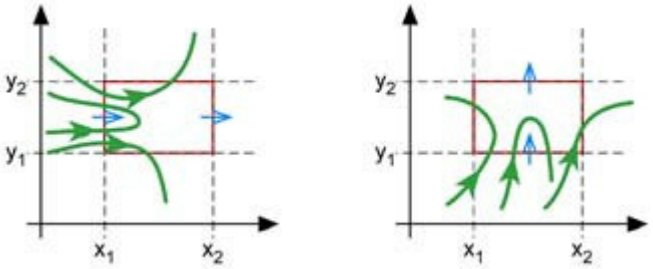
Message	Cause	Remedy
Transducer error [TransdErr]	Amplifier overflow in the MP85A	Check the connected transducer and the type of connection (are sense leads connected?). A displacement transducer may be incorrectly positioned (core extended too far), or the transducer or a cable may be faulty.
ADC overflow [ADC Ovfl]	The A/D converter has overflowed	This indicates a similar problem to a transducer error. The measurement signal may be too large; check the measuring range.
Gross overflow [Grv Ovfl]	The gross measured value is outside the measuring range	This can happen if excessive tare loads are present. The indicated net value plus tare load adds up to the gross value.
Scaling error [Scal.Err]	An incorrect scale was specified	Please check the entered values and see FAQ “What are the limitations for (transducer) scaling?” on page 135.
EEPROM error	An error occurred when reading out the EEPROM of the MP85A	This may be a one-off read error; please repeat the process. If the error reoccurs, please contact HBM Service or HBM Support (see PME Assistant online help).
Flash error	An error occurred when reading out the flash EPROM.	This may be a one-off read error; please repeat the process. If the error reoccurs, please contact HBM Service or HBM Support (see PME Assistant online help).
CAN bus error	An error has occurred on the CAN bus	Check that the termination resistors are present and whether a channel is faulty. Then switch the devices back on. If this does not help, connect the devices to the CAN bus one at a time, to find out which device is faulty.

Message	Cause	Remedy
Initial calibration error [InCalErr]	The factory calibration of the MP85A is faulty	This may be a one-off error; please reboot (switch off and then on again after approx. 30 seconds). If the error reoccurs, please contact HBM Service or HBM Support (see PME Assistant online help).
Memory allocation error	The internal memory (RAM) no longer has any space for process data	This error occurs if the data is not being copied fast enough or at all from the RAM to the storage destination. If you also see a status message saying that the MMC/SD card is full, replace it. If you also see a message saying that the internal memory is nearly full, check whether the data can be output fast enough via the storage destination. If necessary, reduce the scope of the output data, or select a different storage destination.
MMC/SD card faulty [!]	The MMC/SD card was not recognized, or was recognized incorrectly	If you have just inserted a new card, check that it is the correct type (standard MMC) and has the right format (FAT16).

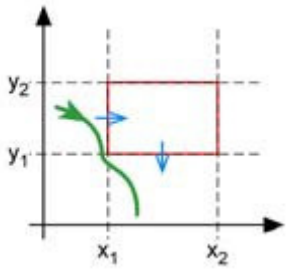
13.18 What do the error messages for tolerance window violations mean?

If the specified entry and exit sides of a tolerance window are violated, several possible error messages may be shown. To make it easier for you to understand the relevance of the error messages, the diagrams below show examples of possible (incorrect) curves.

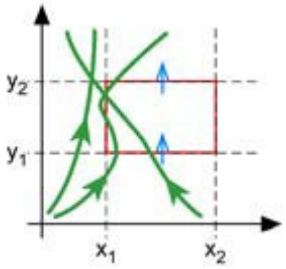
Exit condition not fulfilled



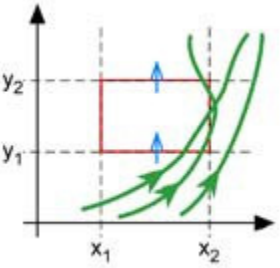
Exit before inset condition fulfilled



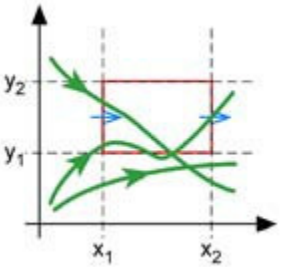
Min. x error (x too small)



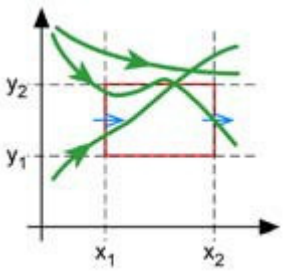
Max. x error (x too large)



Min. y error (y too small)



Max. y error (y too large)



13.19 What do the LEDs on the MP85A mean?

LED 1 (OK/NOK)

LED 1 (OK/NOK)/Process state	Red LED	Yellow LED	Green LED	LED flashes
Initialization after device is switched on	X			
Alarm	X			X
Process has started		X		X
Overall result OK			X	
Total result NOK	X			

LED 2 (status)

LED 2 (status)/MP85A device status	Red LED	Yellow LED	Green LED	LED flashes
Initialization after device is switched on	X			
One of the following errors is present: EEPROM error, initial calibration error, scaling error, MMC/SD error or CAN bus error	X			
Transducer error, ADC overflow or gross overflow (one or both measurement channels)	X			X
LCD error	X			X
CAN bus: Transmit/receive data			X	X
“Pre-operational” state		X		
“Operational” state			X	

MP85ADP only: PROFIBUS status

MP85ADP PROFIBUS status	Red LED	Yellow LED	Green LED	LED flashes
Error state	X			
States BD_SEAR,WT_PARM, WT_CONF		X		
DATA_EX status			X	

Ethernet port

Ethernet port LED status	Green LED	Yellow LED
Physical connection present		on
Transmit/receive data		flashing
100 MBit/s data transfer rate	on	
10 MBit/s data transfer rate		on or flashing

Profinet RT gateway

SYS LED	Green LED	Yellow LED
Firmware starts, operating system running.	on	–
This state may only occur briefly. If the LED remains yellow permanently, there is a hardware fault. Please contact HBM Service.	–	on
The bootloader is active. The firmware is being loaded from the flash memory into the gateway. If this state persists permanently, there is a hardware fault. Please contact HBM Service.	flashing yellow/green	
No power supply or hardware fault. Please contact HBM Service.	off	

COM LED	Red LED	Green LED
No configuration or stack error.	–	irregular flashing
The PROFIBUS is configured but the application has not yet enabled bus communication.	–	regular flashing
Communication to the slave has been established.	–	on
Communication to at least one slave is disconnected.	regular flashing	–
Communication to one or all slaves is disconnected.	on	–

13.20 What do I have to look out for when saving process data (curves/results)?

With the ***No data loss*** backup method, all data in its entirety is transferred to the chosen destination system (PC or internal MMC/SD card). If the data cannot be saved there, however, e.g. because the memory is full, the signal "Process finished" is *not output* and the next process *cannot be started*, i.e. **the test bench is at a standstill**.

External storage medium

With this option, the selected data are transferred via the interface. As a rule, the PC saves the data in this case. For the fastest possible data transfer rates, use the Fast Ethernet interface (100 Mbits).

Backup to a PC only takes place if there is connection between the PC and the MP85A and the PME Assistant, EASYmonitor or INDUSTRYmonitor program *has been launched.* The open program must be minimized, however. The EASYmonitor and INDUSTRYmonitor programs belong to the FASTpress Suite.

In the default settings, the files are located in the installation directory for the PME Assistant, in the DATA directory. However, you can specify an alternative directory via the **File** → **Define storage directory** menu. The user logged into Windows must have write permission for the chosen storage directory.

The NTFS file system is necessary if you are recording numerous processes and more than 65,000 files may be generated during a test that will be written to a single directory.

For operation with data backup in the network, we recommend the INDUSTRYmonitor program, which has been optimized especially for fast data transfer and enables short machine cycle times.

Backup to a MultiMedia/SD card

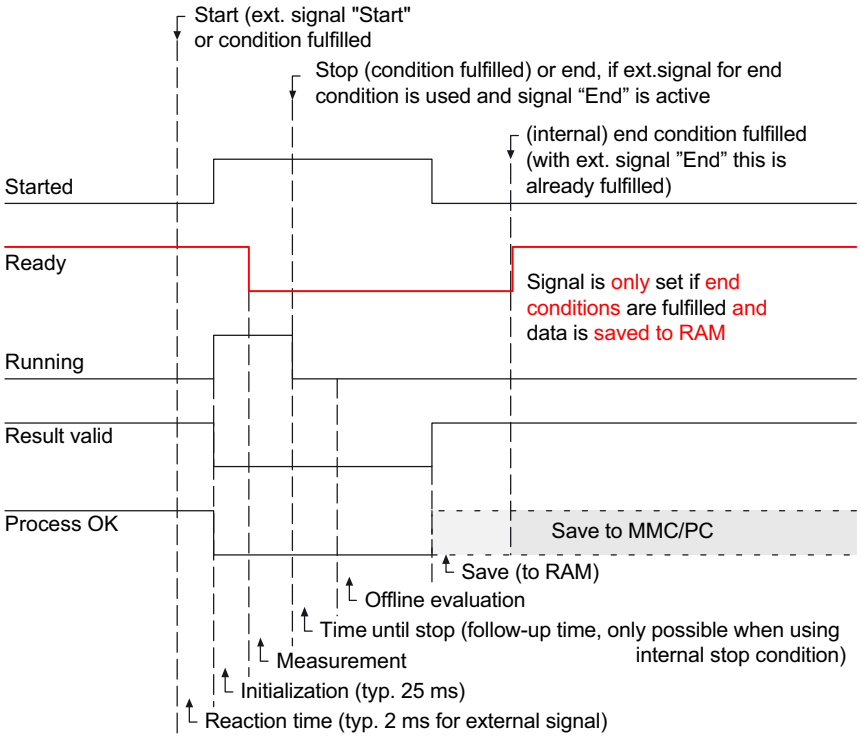
On the optional MMC/SD memory card, you can save measured curves, measurement results and parameter sets, as you wish. The number of values that can be saved varies depending on the card. For example, a measured curve with 600 triple values (two channels plus time) requires just under 15 kB, which

means that about 300,000 measured curves can be stored on one 1 GB card. The card can also be removed during a measurement to read out data.

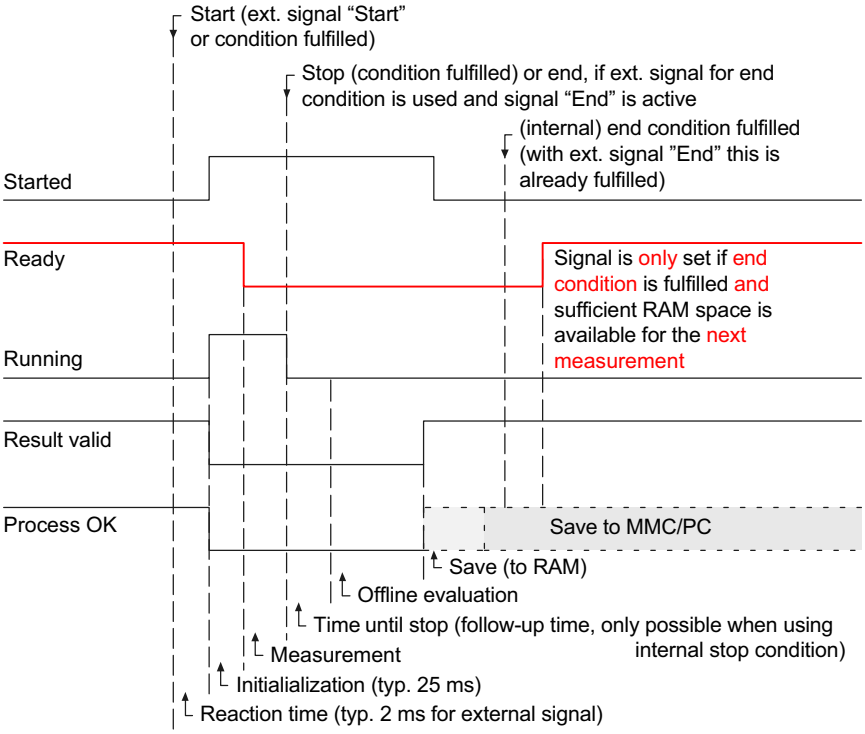
Do not use high-speed cards. The speed of data transfer is limited by the device itself. To optimize the access times of the MMC/SD card, you should defragment or reformat it at regular intervals.

The files are always copied onto the MMC/SD card in the MP85 subdirectory. If this directory is not yet present, it is generated. Further subdirectories are created in this directory, if necessary.

13.21 What does the flow diagram of a process-optimized measurement look like?



13.22 What does the flow diagram of a measurement with no data loss look like?



13.23 What causes a digital output to be set?

A digital output can be set by the following events:

- The limit value was reached in a channel.
- There is a measurement error in a channel.
- A transducer test has been performed.
- A defined process state has been reached.
- A certain tolerance window is OK.

- The transfer or MMC/SD card memory is nearly full.
- The output was set via the interface.

13.24 How can I generate a log printout of a process?

► Load the process(es) you wish to log via **MEASURE + VIEW** –> **Display saved data**. The file selection dialog enables you to enter various search criteria and search several subfolders.

► Open the print preview via  .

► In the dialog box, click  to print the desired number of pages you require.

You can choose portrait or landscape format just before printing, or preset the required orientation in Windows.

You can integrate your company logo in the display and the printout: To do this, copy the file containing your logo, LOGO.BMP or LOGO.GIF (bitmap or GIF format), to the PME Assistant installation directory. The logo will then appear below the overall result.

13.25 How can I transfer all the settings of one MP85A to another device (cloning)?

You can save all the settings of an MP85A on the MMC/SD card using the keyboard of the MP85A, and then transfer them to another MP85A.

Procedure for saving settings

► Press and hold the ***SET*** key for *at least two seconds*. The ***CAN BUS*** display appears.

► Press the **+** key several times until ***System-State*** is displayed.

► Press the ***SET*** key. ***S-Status Save*** (Save system state) appears.

► Press the ***SET*** key to confirm. The data is now saved on the MMC/SD card. Wait until the process is complete and the measured value is displayed once more.

Procedure for loading settings

- ► Press and hold the ***SET*** key for *at least two seconds*. The ***CAN BUS*** display appears.
- ► Press the **+** key several times until ***System-State*** is displayed.
- ► Press the ***SET*** key. ***S-Status Save*** is displayed.
- ► Press the **+** key. ***S-Status Restore*** (Restore system state) is displayed.
- ► If you do not wish to change the settings for the interfaces, press the **+**, key again so that ***S-Status Load-Com*** appears (load settings without changing communication settings).
- ► Press the ***SET*** key to confirm. The data is now imported from the MMC/SD card. Wait until the process is complete. Progress is shown on the display.

For information on ejecting the MMC/SD card, see the PME Assistant online help.

13.26 How do I do a firmware update, and can it be prevented?

You can update the firmware using the PME Update program. With the program, you can also simultaneously transfer a new firmware version to several devices. To prevent a conflict with ongoing processing (no measurements or analyses can take place during an update), from firmware version 2.22 or higher you can stipulate that firmware updates should go ahead only if manually approved on the device (***F Update: Permitted!***), see General settings (Basic settings).

13.26.1 Downloading the firmware update

Download the new firmware from the following address:

www.hbm.com -> Services & Support -> Downloads -> Firmware & Software

When you have started the PME Assistant and the connected devices have been scanned, you will see the firmware version used by your device in the **Vers.** column of the **Device list**. If necessary, open the list to see the correct device (ID).

13.26.2 Procedure for updating the firmware

The device settings remain unchanged when the firmware is updated. Nevertheless, we recommend saving all your settings on the PC via the PME Assistant before an update.

- ► Unzip the file containing the new firmware into the DOWNLOAD subdirectory of the PME Assistant.
- ► Start the PME Update program.
  When the PME Assistant is installed, the program is automatically installed in the same directory and is then available via the **Programs** menu of Windows.
- ► Enter the interfaces you are using via 

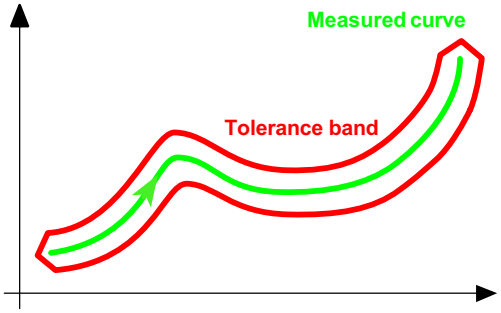
.
- ► Perform a device scan via 

.
- ► Select the PMEs that you wish to update.
- ► Click on 

to transfer the new firmware.

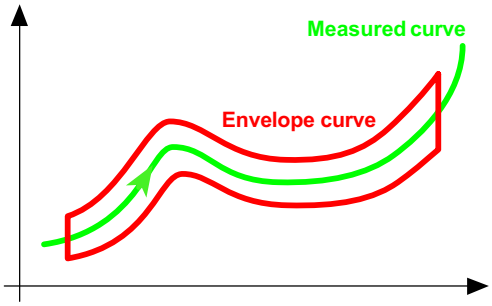
The PME Update program has its own Help function.

13.27 What does a tolerance band look like?



Here, the measured curve must remain within the area covered by the tolerance band, i.e. it must not enter or exit.

13.28 What does an envelope curve look like?



With an envelope curve, the measured curve must enter or exit at the sides.

13.29 What is TEDS?

Transducer electronic data sheet. The TEDS module consists of a chip with a number that is globally unique (sensor ID), which is generally installed in the transducer. It contains all the transducer data in accordance with standard IEEE 1451.4.

Standard IEEE 1451.4 permits various methods of reading out the data from the TEDS module. In the MP85A, different readout processes are used,

depending on the transducer, e.g. the sense leads for full and half bridge transducers, and an additional lead for a 10 V input.

You can find further information in the standard publications; see Institute of Electrical & Electronics Engineers (IEEE) at http://www.ieee.org, National Institute of Standards and Technology (NIST) at http://www.nist.gov and http://ieee1451.nist.gov.

14 Software and firmware updates

You can download the latest version of the PME Assistant from the HBM website: www.hbm.com -> Services & Support -> Downloads -> Firmware & Software.

When you start the PME Assistant, you will see the number of the version you are using in the window title, e.g. “PME Assistant 2.1 R123” means Version 2.1, Release 123. If you see a message saying that your Assistant version does not support all functions of the connected MP85A, please download the latest version of the PME Assistant. For further assistance, see the program’s online help.

To update the firmware, use the PME Update program. The device settings remain unchanged even when the firmware is updated. Nevertheless, we recommend backing up the device settings before an update.

Important

With the program, you can also simultaneously transfer a new firmware version to several devices. To prevent a conflict with ongoing processing (no measurements or analyses can take place during an update*), from firmware version 2.22 or higher you can stipulate that firmware updates should go ahead only if manually approved on the device (**F Update: Permitted!**).*

When you have started the PME Assistant and the connected devices have been scanned, you will see the firmware version used by your device in the **Vers.** column of the **Device list**. If necessary, open the list to see the correct device (ID).

Procedure for updating the firmware

► Download the new firmware from the HBM website: www.hbm.com -> Services & Support -> Downloads -> Firmware & Software

► Unzip the file containing the new firmware into the DOWNLOAD subdirectory of the PME Assistant.

► Launch the PME Update program.

When the PME Assistant is installed, the program is automatically installed in the same directory and is then available via the **Programs** menu of Windows.

► Enter the interface you are using (e.g. CAN bus or Ethernet) via 

.

► Perform a device scan via 

.

► Then select the PMEs that you wish to update.

► Click on 

to transfer the new firmware.

The PME Update program has its own Help function.

15 Waste disposal and environmental protection

All electrical and electronic products must be disposed of as hazardous waste. The correct disposal of old equipment prevents ecological damage and health hazards.

Statutory waste disposal marking

In accordance with national and local environmental protection and material recovery and recycling regulations, old devices that can no longer be used must be disposed of separately and not with normal household garbage.

Battery disposal

In accordance with national and local environmental protection and material recovery and recycling regulations, old batteries that can no longer be used must be disposed of separately and not with normal household garbage.

Packaging

The original HBM packaging is made from recyclable material and can be sent for recycling. Keep the packaging for at least the duration of the warranty.

For ecological reasons, empty packaging should not be returned to us.

16 Technical support

If any problems occur during work with the MP85A process controller, please contact our hotline.

E-mail support

Software@HBM.com

Telephone support

Telephone support is available on all working days from 09:00 AM to 5:00 PM (CET):

+49 (0) 6151 803-0

Extended support can be obtained by means of a service contract.

Fax support

+49 (0) 6151 803-9100

Firmware and software

You can find the latest device firmware and software at www.hbm.com -> Services & Support -> Downloads > Firmware & Software.

Seminars

HBM also offers seminars in your company or at our training center. Here you can find out all about the device and software programming. You can find further information at www.hbm.com -> Services & Support -> HBM Academy -> Seminars.

HBM on the Internet

www.hbm.com

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托驰（上海）工业传感器有限公司
上海市嘉定区华江路348号1号楼707室
电话：+86 021 51069888
传真：+86 021 51069009
邮箱：zhang@yanatoo.com
网址：www.sensor-hbm.com

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