Manual

MTP200ia-E, MTP200ib-E

WINSMART-Support from MTP200-Version 4.0
MODBUS-RTU Communication

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Disclaimer

We have checked the content of the printed document for compliance with the described hardware and software. Nevertheless, deviations cannot be excluded and consequently we cannot assume any guarantee for complete accordance. The data in this printed document are checked regularly. Corrections and additions are made in the following version in each case. We would be grateful for any suggestions for improvement.

Subject to technical modifications

Table of contents

Classification of safety instructions

This manual contains instructions that you have to observe for your personal safety as well as to avoid material damage. These instructions are highlighted using a triangular warning sign and shown as follows, depending on the degree of risk.

HAZARD

means that death or severe physical injury will occur if the appropriate precautionary measures are not taken.

WARNING

means that death or severe physical injury may occur if the appropriate precautionary measures are not taken.

CAUTION

with a triangular warning sign means that minor physical injury may occur if the appropriate precautionary measures are not taken.

CAUTION

without a triangular warning sign means that material damage may occur if the appropriate precautionary measures are not taken.

ATTENTION

means that an undesired result or state may ensue if the corresponding instruction is not followed.

NOTE

denotes important information about the product, handling of the product or the respective part of the documentation, is aimed at drawing special attention to the latter and should be complied with.

In addition to the instructions in this manual, the generally applicable safety and accident prevention regulations must be observed.

If the information contained in this document should not be sufficient in any specific case, you can obtain more detailed information from our telephone service.

Please read this manual carefully prior to installation and commissioning.

CE mark

This product meets the specifications according to the EMC Directive 89/336/EEC and the Low Voltage Directive 73/23/EEC.

General instructions

This device left the plant in flawless condition in terms of its safety features. To preserve this condition and ensure safe operation of the device, the user has to observe the instructions and warning notes indicated in this operating manual.

NOTE

For the sake of clarity the manual does not contain complete detailed information on all product types and can therefore not take into account every conceivable case with respect to installation, operation and maintenance.

Should you wish further information or should special problems arise that are not treated in sufficient detail in the manual, you can obtain the necessary information by telephone.

Moreover, we point out that the content of the manual shall not constitute part of or amend a previous or existing contract, agreement or legal relationship. All obligations of Mütec Instruments GmbH shall result from the respective contract of purchase, which also contains the complete and solely valid warranty terms. These contractual warranty terms shall neither be extended nor limited by the information contained in the manual.

The content reflects the technical state of the art regarding printing. It is subject to technical modifications in the course of further development.

WARNING

Devices with the type of protection designated as “intrinsic safety” lose their conformity certification as soon as they have been operated in circuits that do not meet the values specified in the test certificate. Flawless and safe operation of this device requires proper transport, proper storage, installation and assembly as well as careful operation and maintenance. The device may only be used for the purposes specified in this operating manual.

DISCLAIMER

All modifications to the device fall within the responsibility of the user unless expressly specified otherwise in the operating manual.

QUALIFIED PERSONNEL

are persons who are familiar with installation, assembly, repair and operation of the product and have the qualifications necessary for their work, such as:

- Training, instruction and/or authorization to operate and maintain equipment/systems in accordance with the standards of safety technology for electrical circuits, high pressures and corrosive as well as hazardous media.
- In the case of equipment with explosion protection: training, instruction and/or authorization to perform work on electrical circuits for potentially explosive equipment.
- Training or instruction in accordance with the standards of safety technology regarding care and use of appropriate safety equipment.

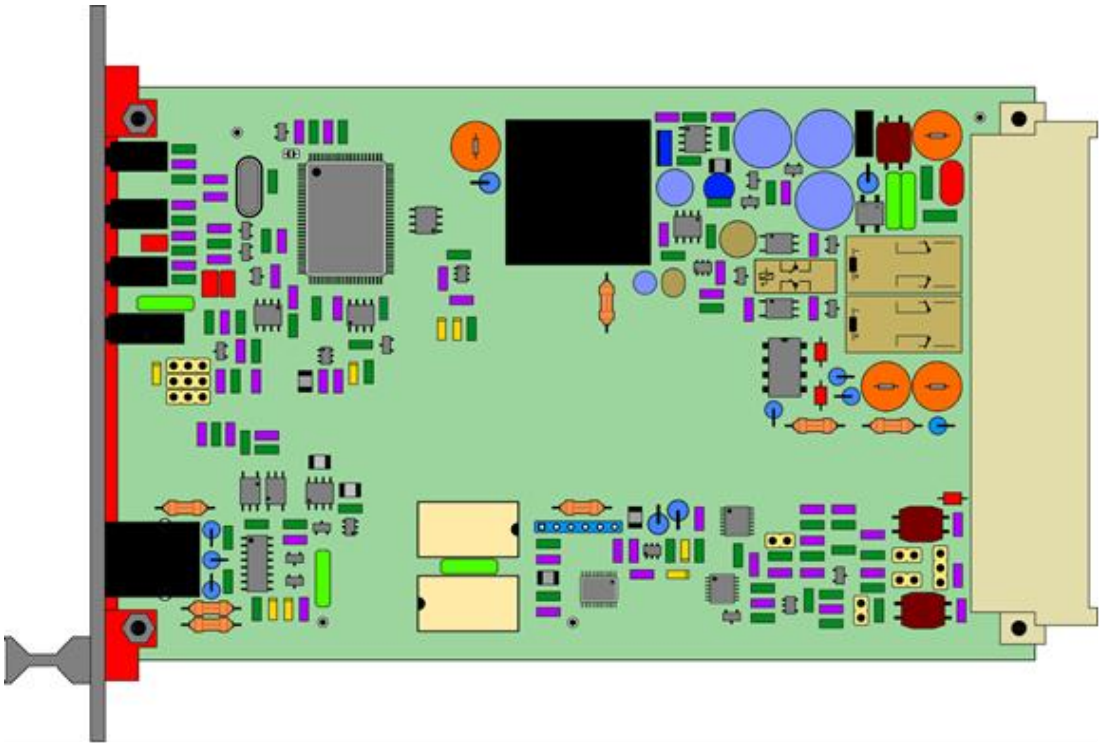
CAUTION

Potentially electrostatic components may be destroyed by voltage that is far below the limits of human perception. Such voltage occurs even when you touch a component or electrical connections of a component and are not electrostatically discharged. The damage that occurs to a component because of overvoltage usually cannot be detected immediately and does not become noticeable until after a longer operating period.

Introduction

MTP200ia-E, MTP200ib-E

Transmitter Supply Unit with SIL2-Level as per IEC/EN 61508



Features:

- 2 Processors (8- and 16-Bit) with parallel monitoring
- 4 A/D- converters (24-Bit, 12-Bit, 2x 10-Bit)
- 1 D/A- converter (15-Bit)
- 5 Self monitoring circuits
- 5 Galvanic separated alarm outputs (3x relay contact, 2x transistor)
- 4 Intrinsically safe measurement signal input [Ex ia / ib] IIC
- Guaranteed input signal resolution up to 18 Bit
- 0.01 °C resolution by the temperature measuring with PT 100
- 1 Analog output for constant current or voltage
- 1 Galvanic separated RS232-Schnittstelle
- 1 Galvanic separated RS485 interface
- All mains power supply with undervoltage switching off, one switching current limitation

1. General information for installation and operation

Identification in accordance with Guideline 94/9/EG:

CE 0158 Ex II (1) G

device group

intrinsically safe equipment with external circuits
for connection for category 1 devices

for explosive mixtures of air and flammable gases,
steams or vapours

Identification of explosion protection:

[Ex ia] IIC

assosiated electrical equipment in
accordance with European standards

explosion protection

equipment group

Safety instructions:

If it is assumed that safe operation is not longer possible, the device must be taken out of service and secured against accidental operation.
Reasons for this can be:

- visible damage of the device
- failure of electrical function
- longer storage at temperatures over 85°C
- heavy transport stress

Before the device is put back into operation, a professional routine check must be performed in accordance with DIN EN 61010, Part 1. This examination should be made at manufacturers' side. Repair work at ex-devices may be accomplished only under attention by §9 of the ex regulation (Elex V).

Devices with intrinsically safe circuits may be never operated in not-intrinsically safe circuits. If ex devices in not-intrinsically safe circuits are operated, these need to be marked particularly and the ex labels must be removed absolutely, so these devices do not find use for intrinsically safe electric circuits later again. A later check of the devices on observance of the conditions for the explosion protection is possible with a disproportionately high expenditure only and is rejected therefore usually.

Proper use

The MTP200i..-E transmitter can be used for exact measurement of temperature with a Pt100 sensor or a thermoelectric couple in Ex-area. Two additional inputs for an own safe current or voltage signal enlarge the use of the assembly to the receiving multicoupler.

The Pt100/slide-wire sensor at the contacts d28, z28, d30 and z30 corresponds the explosion protection „intrinsic safety“ category for "ia" or "ib".

The thermocouple/mV input at the contacts d32 and z32 corresponds the explosion protection „intrinsic safety“ category for "ia" or "ib".

The +/-20mA-input at the contacts d24 and d26 and the +/-10V-input at the contacts z24 and z26 corresponds the explosion protection „intrinsic safety“ category for "ia" or "ib".

The maximum ambient temperature range of -20 °C to +60 °C may not be exceeded.

The transmitter MTP200i..-E belongs to equipment of explosion protection (EX ia) IIC or (EX ib) IIC and has to be operated always outside of potentially explosive areas. Only electrical circuits certified as intrinsically safe may be connected to both circuits. Before operation, the intrinsically safety must be verified for both the supply circuit connection for MTP200i…-E signal circuit with the connected equipment, including wires.

The EG Examination Certificate and the regulations of EN 60079-14: 1996 ff must be observed.

Installation and operation

The installation of the MTP200i..-E transmitter has to take place in such a way that clearance of bright parts of intrinsically safe electric circuits amount to the metallic housing parts at least 3 mm and to the bright parts of the not-intrinsically safe electric circuits at least 6 mm.

According to the EN 60079-11 connecting units for the outside intrinsically safe electric circuits need to be arranged in such a way that bright parts are at least 50 mm away from connecting pieces or bright conductors of not-intrinsically safe electric circuits.

The contact connections of the multipole connector to the intrinsically safe electric circuits and the not-intrinsically safe electric circuits are characterized on the type plate clearly.

For the safe operation a protective grounding connection at the 19” rack must be made, in order to ensure via the MTP 200’s front plate a firm integration into the potential equalization.

The assembly/disassembly, installation, operation, and maintenance may be only performed by qualified personnel in the automation industry under appropriate regulations and the MTP200i..-TE operating instructions. The technical data and power requirement information should be noted for the Installation.

2. Electrical maximum values

Not intrinsically safe electric circuits:

Not intrinsically supply circuit (contacts d/z2, d/z4)

Voltage		DC	19 ... 30	V
		AC	18 … 28	V
Max. voltage	Um	AC/DC	250	V

not intrinsically safe RS485-interface circuit (contacts b16, b18)
not intrinsically safe RS232-interface circuit (connection front socket)

Voltage		DC	6	V
Current intensity			100	mA
Max. voltage	Um	AC/DC	48	V

not intrinsically safe relay contact circuit (contacts d/z6, d8, d10/12, z8/10, d14, z12/14)

Voltage		DC	30	V
Current intensity			1	A
Or				
Voltage		AC	125	V
Current intensity			0.5	A
Max. voltage	Um	AC/DC	125	V

not intrinsically safe digital output circuit (contacts d/z16 and d/z18)

Voltage		DC	28	V
Current intensity			50	mA
Max. voltage	Um	AC/DC	125	V

not intrinsically safe analog output circuit (contacts d/z 20)

Voltage		DC	28	V
Current intensity			50	mA
Max. voltage	Um	AC/DC	125	V

Intrinsically safe electric circuits:

Pt-100/slide-wire sensor input circuit (contacts d/z28 and d/z30)
in the explosion protection EEx ia IIC **(MTP200ia-E)** or EEx ib IIC **(MTP200ib-E)**

Voltage	Uo	DC	12	V
Current intensity	Io		6.5	mA
Power	Po		10	mW
Max. outer capacity	Co		1.2	µF
Max. outer inductivity	Lo		700	mH

Input circuit for thermocouple/mV (contacts d/z32)
in the explosion protection EEx ia IIC **(MTP200ia-E)** or EEx ib IIC **(MTP200ib-E)**

Voltage	Uo	DC	6	V
Current intensity	Io		0.7	mA
Power	Po		1.1	mW
Max. outer capacity	Co		10	µF
Max. outer inductivity	Lo		1000	mH

for the connection of an intrinsically safe electric circuit with the following maximum values:

Voltage	Ui	DC	10	V
Effective inside capacity	Ci		240	nF
Effective inside inductivity	Li		negligible	

+/-20mA-Input circuit (contacts d24 and d26)

in the explosion protection EEx ia IIC **(MTP200ia-E)** or EEx ib IIC **(MTP200ib-E)**

for the connection of an intrinsically safe circuit with following maximum values:

Voltage	Ui	DC	30	V
Current intensity	Ii		110	mA
Power	Pi		700	mW
Effective inside capacity	Ci		negligible	
Effective inside inductivity	Li		negligible	

+/-10V-Input circuit (contacts z24 and z26)

in the explosion protection EEx ia IIC **(MTP200ia-E)** or EEx ib IIC **(MTP200ib-E)**

Voltage	Uo	DC	6	V
Max. outer capacity	Co		10	µF

for the connection of an intrinsically safe electric circuit with the following maximum values:

Voltage	Ui	DC	30	V
Current intensity	Ii		110	mA
Power	Pi		700	mW
Effective inside capacity	Ci		negligible	
Effective inside inductivity	Li		negligible	

Ambient temperature area	Tamb	-20 to +70	°C

3. Technical Features

The processor-controlled MTP200i..-E universal measuring transducer with limit signal transmitter of the DuoTec® series meets all requirements for temperature, resistance, current and voltage measurement in process automation thanks to its functionality.

Reciprocal monitoring of the dual processor system (DuoTec® technology) in combination with further safety measures in accordance with EN 61508 ensures that the unit meets the SIL2 level.

Configuration, parameterization and calibration are interface-controlled and can be carried out easily and quickly through user-friendly support provided by the WINSMART® PC program. Automatic logging of the configuration selected in the device enables rapid and reliable documentation after completion of the programming work.

The related electrical equipment meets all requirements of the basic specification EN 60079-0:2004 and is EMC-tested.

- 16-Bit-processor and 8-Bit- processor in accordance with DuoTec®-technology
- Intrinsically safe measuring inputs as per protection class [Ex ia] IIC or [Ex ib] IIC
- Thermocouple measurement input with internal or external Pt 100 reference junction
- Pt-100-measuring input in 2-, 3- und 4-wire circuit
- Potentiometer / resistance type remote sensor measurement input for 0-600 or 0-5000 Ohm
- mV-measuring input for +70/-35 mV
- Voltage-measuring input for +/-10 V
- Current-measuring input for +/-20 mA
- Analog output for 0/4-20 mA or 0/2-10 V
- Output signal control by read back of mA-value
- 2 relay outputs for limit value monitoring and/or maintenance requirement report
- 2 passive short-circuit-proof 50mA- transistor output for the limit value monitoring and/or maintenance requirement report
- 1 relay output for the maintenance requirement report
- COM-interface at the front for online entrance
- Galvanic separated RS485-interface
- Alternative AC or DC supply with large voltage supply range and under voltage cut-off

4. Fault conditions and fault signalling

No.	Error source Error cause	Alarm LED	Analogue output in error event (programmable)	Alarms (programmable)	Restart after error elimination	Remark
1	EEPROM: check sum incorrect	constant light	alarm value or instantaneous value	--- , on, off, active	MTP200 must be reconfigured, reparametered, and calibrated	Parameter table in RAM loaded with default values
2	16-Bit-controller: RAM/EPROM memory incorrect	constant light	alarm value or fixed value	--- , on, off, active	automatic (after system reset))	Parameter set or program damaged
3	8-Bit-controller: Communication, RAM or µP defective	constant light	alarm value or fixed value	--- , on, off, active	automatic	
4	8-Bit-controller: 5V-supply Incorrect	constant light	alarm value or instantaneous value	--- , on, off, active	automatic	with ≥ 4 % deviation from the reference value
5	16-Bit-controller: 3V3- supply Incorrect	constant light	alarm value or instantaneous value	--- , on, off, active	automatic	with ≥ 4 % deviation from the reference value
6	Analog output: signal deviation	constant light	alarm value or instantaneous value	--- , on, off, active	automatic	configurable: from ≥ 0.2 %
7	A/D-Converter: signal deviation in mV- measurement circuit	constant light	alarm value or instantaneous value	--- , on, off, active	automatic	configurable: from ≥ 0.2 %
8	A/D-Converter: signal deviation in resistance measuring circuit	constant light	alarm value or instantaneous value	--- , on, off, active	automatic	configurable: from ≥ 0.2 %
9	Transmitter: sensor- oder wire break	constant light	alarm value or fixed value	--- , on, off, active	automatic	
10	Alarm outputs: Relay contacts Rel1, Rel2 or Rel3 defective	constant light	alarm value or instantaneous value	--- , on, off, active	automatic	Parallel contact of relay serves as reference!

In general an alarm only remains queued for maintenance requirement for the duration of the fault, signalled by Rel3 and the alarm LED. The fault source is shown in the Diagnostic Manager in the fields **Current Faults** and **Fault Memory.** A short fault occurring is represented by a blinking alarm LED and the diagnostic manager only indicated in the fault memory. Each case of faults is recorded and can be distinguished between a present fault and a no longer fault by using the diagnostic manager.

5. Technical Data

ANALOGUE INPUT (AI1 … AI4)

A parameterizable filter of first order of (0.1 – 99.9)s!

mA-measuring input AE1

Measurement range:	-22 .... +22 mA, free configurable
Input resistance:	100 Ω

V-measuring input AE2

Measurement range:	-11 .... +11 V, free configurable
Input resistance:	10 kΩ

Pt-100-resistor thermometer (DIN IEC 751) AE3

Connection:	2-, 3- and 4-wire-technology
Measuring range:	-200 °C to +800 °C
Scale range:	min 5 °C, max. 1000 °C
Measuring current:	1 mA
Measure value accuracy:	0.01 K
Perm. pipe resistance:	≤100 Ω

Slide-wire sensor/Potentiometer (DIN 43822) AE3

Connection:	2-, 3- and 4-wire-technology
Measuring range:	0 … 600 Ω resp. 0 … 5000 Ω
Scale range:	min 3 Ω, max. 600 resp. 5000 Ω
Measuring current:	1/0.2 mA
Measure value accuracy:	0.01/0.1 Ω
Perm. pipe resistance:	≤100 Ω

mV-measuring input AE4

Measurement range:	-35 .... +70 mV, free configurable
Input resistance:	>1 MΩ

Thermocouple (DIN IEC 584) AE4

Input resistance:	>1 MΩ
Cold compensation	internally or externally with PT 100

Type	Beginning [°C]	End [°C]	Accuracy [°C]	Measuring ranger [°C]
B	0	1800	0.4	≥ 20 / ≤ 1800
E	-200	1000	0.2	≥ 10 / ≤ 1200
J	-200	1000	0.2	≥ 10 / ≤ 1200
K	-200	1200	0.2	≥ 10 / ≤ 1400
R	0	1700	0.3	≥ 15 / ≤ 1700
S	0	1700	0.3	≥ 15 / ≤ 1700
T	-200	400	0.2	≥ 10 / ≤ 600

Thermocouple (DIN 43710) AE4

Input resistance:	>1 MΩ
Cold compensation	internally or externally with PT 100

Type	Beginning [°C]	End [°C]	Accuracy [°C]	Measuring ranger [°C]
L	-200	900	0.2	≥ 10 / ≤ 1100
U	-200	600	0.2	≥ 10 / ≤ 800

ANALOGUE OUTPUT (AO)

A parameterizable filter of first order of (0.1 – 9.9)s!
Galvanic isolation between input, analogue output and power supply!

	Constant current	**Voltage**
Max. range:	0...22 or 22...0 mA	0...11 or 11...0 V
Standard range:	0/4-20 mA	0/2-10 V
Load resistance:	max. 500 Ω at 20 mA	min. 50 kΩ
Accuracy:	0.02 % of final value	0.02 % of final value
Load resistance influence:	< 0.005 %	0.5 % at R_L=100 kΩ
Rise time:	< 150 ms	< 150 ms

CONTACT OUTPUTS (REL1, REL2), TRANSISTOR OUTPUT (DO1, DO2)

Devices with intrinsically safe circuit may be connected over the contact and transistor output with devices with operating voltages under 250V only!

Alarm conditions are indicated with yellow front-side LED's!

Number:	4 independently adjustable limit values
Setting:	physically values with WINSMART®-Program
Accuracy:	like measured value accuracy
Alarm type:	free configurable
Alarm output:	2x relay contact and 2x transistor output
Alarm delay:	free configurable from 0 ... 9.9 s
Switching hysteresis:	free configurable from 0 ... 99.9 %
Mode of operation:	operating or zero current principle
Alarm function:	input signal monitoring and maintenance requirement report

Contact outputs REL1/REL2

Contact:	Opening or closing contact (corresponding to jumper adjustment)
Breaking capacity:	max. 62.5 VA resp. max. 30 W
Voltage:	max. 125 V AC or 110 V DC
Switching current:	max. 1 A
Min. contact voltage:	10 mVDC
Min. contact current:	10 µA
Contact material:	AG Pd + 10 µAu
Relay-type:	as per IEC 947-5-1 resp. EN60947

Transistor output DO1/DO2

Switching performance:	< 1.4 W
Switching Voltage:	< 28 VDC
Switching current:	< 50 mA

CONTACT OUTPUT (REL3) for MAINTENANCE REQUIREMENT

Devices with intrinsically safe circuit may be connected over the contact of the relay with devices with operating voltages under 250 V only!

Alarm conditions are indicated with a red front-side LED!

Mode of operation:	zero current principle
Alarm function:	maintenance requirement report
Contact position:	closed in good condition
Switching performance:	max. 62.5 VA resp. max. 30 W
Switching Voltage:	max. 125 V AC or 110 V DC
Switching current:	max. 1 A
Min. contact voltage:	10 mVDC
Min. contact current:	10 µA
Contact material:	AG Pd + 10 µAu
Relay-type:	as per IEC 947-5-1 resp. EN60947

INTERFACES (COM, RS485)

Galvanic separation of COM and RS485 to power supply and all other circuit elements!

RS232/COM:	via front socket for PC-connection with Mütec-interface cable
RS485:	Half-duplex, without scheduling
Baud rate / Device address:	9600 bps, 1-248

POWER SUPPLY

Power supply indicator:	green LED signal = good condition
Power supply range:	19 … 30 VDC or 18 … 28 VAC
Power consumption:	1.2 W (at 24VDC and 4 mA at analogue output)
	1.5 W (at 24VDC and 20 mA at analogue output)

GENERAL DATA

Measuring value accuracy

Maximum:	< 0.04 % from final value
Typical:	< 0.02 % from final value

Temperature coefficient

Maximum:	< 0.01 %/K
Typical:	< 0.005 %/K

Galvanic separation

Input/output/supply:	300 V_{eff} (rated insulation voltage, overvoltage category II, Contamination level 2, safe separation as per EN 61010, EN 50178); 2.5 kV AC testing voltage (50 Hz, 1 min.);
Input/output:	375 V (peak value as per EN 60079-11)
Input/supply:	375 V (peak value as per EN 60079-11)

Environmental condition:

Acceptable temperature:	-20 °C ... +70 °C
Storage/transport:	-30 °C ... +80 °C
Acceptable humidity (at operating):	10 % … 95 % r.F. without condensation

Electric connection

Female multipoint connector:	48-core according to DIN 41612 – form of construction F

Proceeding of self-monitoring

mV-measuring input:	1 monitoring cycle with adjustable tolerance
Resistance-measuring input:	1 monitoring cycle with adjustable tolerance
Analog output:	1 monitoring cycle with adjustable tolerance
Power supplies:	2 monitoring cycles
Sensor-/wire-break:	1 monitoring cycle
Ref.-voltage:	redundant and monitored
Semi conductor-memory:	cyclic running tests secure relative integrity
µP-controller:	parallel monitoring / DuoTec-technology
Relay (REL1 … REL3):	indirect contact monitoring
Maintenance requirement:	constant light of red front-LED and REL3-contakt opened

A maintenance requirement report always occurs via the relay contact of the REL3, which is operated in zero signal current principle. The relay contact closed in the status offers the option of series connection with further REL-3 pins of other devices and thus common alarm monitoring. The relays REL-1 and REL-2 and the transistor outputs DO1 and DO2 can be involved in the alarm signalling.

Conformity

Ex-directive (ATEX):	EN 60079-0, EN 60079-11, EN 60079-26
EMV-directive 2004/108/EG:	EN 61000-6-2, EN 61000-6-4, EN 61326-1

ATEX: Maximum values of [Ex ia] IIC-circuits

Pt-100/resistance input

Maximum voltage U_o	12	V
Maximum current I_o	6.5	mA
Maximum power P_o	10	mW
Maximum capacity C_o	1.2	µF
Maximum inductivity L_o	700	mH

mV/Thermocouple input

Maximum voltage U_o	6	V
Maximum current I_o	0.7	mA
Maximum power P_o	1.1	mW
Maximum capacity C_o	10	µF
Maximum inductivity L_o	1000	mH

+/-20mA-input and **+/-10V-input**

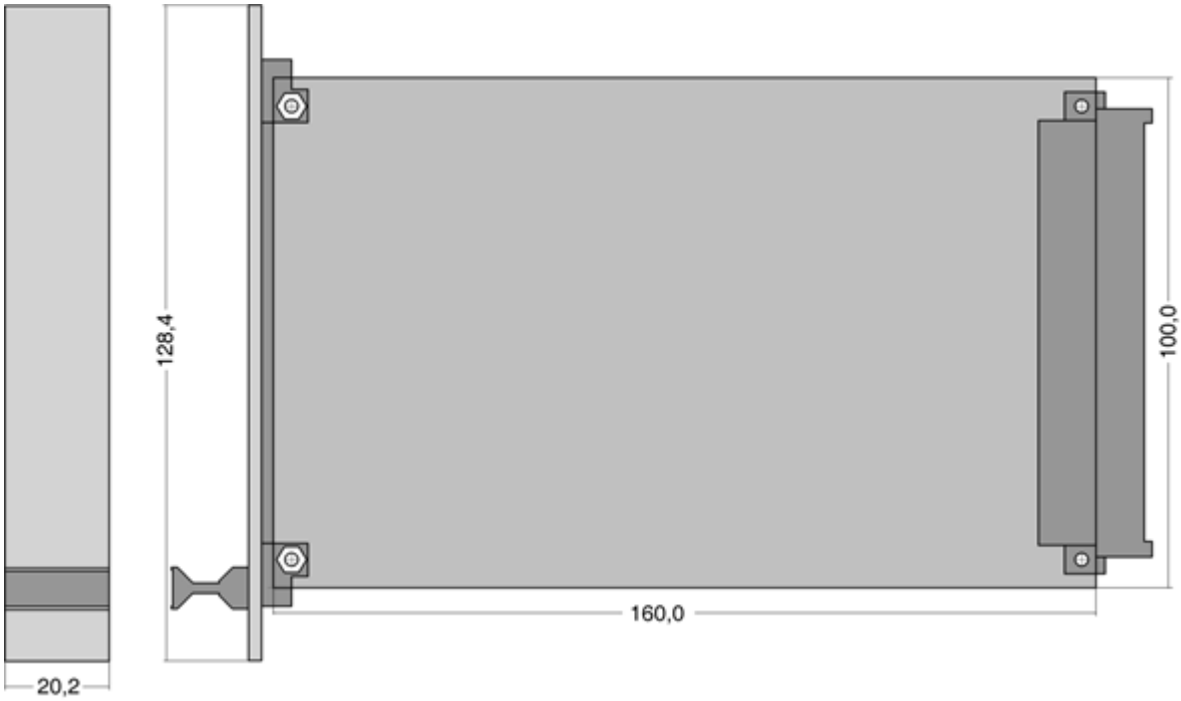
Maximum voltage U_i	30	V
Maximum current I_i	110	mA
Maximum power P_i	700	mW
Maximum capacity C_i	negligible	
Maximum inductivity L_i	negligible	

Mounting

The device can only be operated outside a potentially explosive area!

Form of construction:	19”-europecard with 4 TE front panel
Protection class:	IP20
Mounting:	for the required protection class the device has to be installed in a rack or in an appropriate housing
Mounting/Position	free
Weight	220 g

DIMENSIONS OF THE MTP200ia-E



5.1. Configuration protocol

A configuration dated protocol can be created for the MTP200 using the **WINSMART® program** with the command **Print configuration**.

The TAG number, unit-specific device address, serial number and version number are logged as identification in the unit software.

The extensive comments saved in the device, with a maximum of 2000 ASCII characters, are printed out in a protocol with the first 60 characters.

All parameters for input, output and the alarm settings are listed in a table. In addition, the permissible tolerance deviations of the measuring input, analogue output and user for the monitoring circuit are listed in a table.

MÜTEC GmbH **Configuration protocol for MTP200** **07-05-2012**

TAG No.: Rack45-18 Software version: 4.0
Serial No.: 08_245 Device address: 1

INPUT

Sensor type	PT-100 3-wire-switching	
Measuring range beginning	0	°C
Measuring range ending	200	°C
Filter time	0.5	s

OUTPUT

Area beginning	4.00	mA
Area ending	20.00	mA
MIN-limit	3.60	mA
MAX-limit	20.50	mA
Alarm value	21.00	mA
Filter time	0.5	s

ALARM 1

Alarm type	MIN-Alarm	
Function	zero signal current	
Alarm value	40	°C
Hysteresis	1.0	%
Alarm delay	0.5	S

ALARM 2

Alarm type	MAX-Alarm	
Function	zero signal current	
Alarm value	160	°C
Hysteresis	1.0	%
Alarm delay	0.5	s

ALARM 3

Alarm type	MIN-Alarm	
Function	zero signal current	
Alarm value	20	°C
Hysteresis	1.0	%
Alarm delay	0.5	s

ALARM 4

Alarm type	MAX-Alarm	
Function	zero signal current	
Alarm value	180	°C
Hysteresis	1.0	%
Alarm delay	0.5	s
Time window for rate of change alarm	4	s

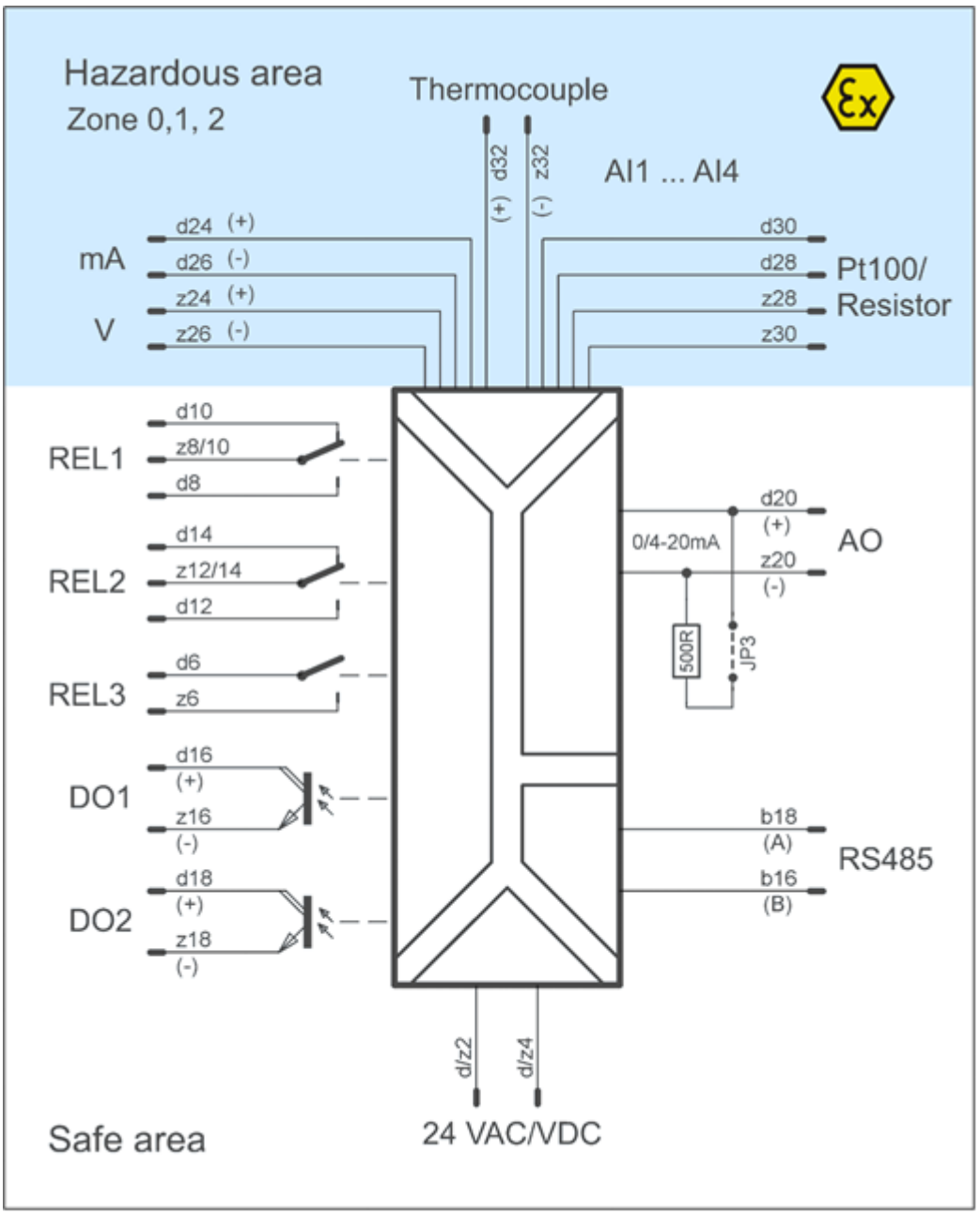
MONITORING MEASURES

mV-Input - maximum tolerance	+/- 1.0	%
Resistance Input - maximum tolerance	+/- 1.0	%
Analog Output - maximum tolerance	+/- 1.0	%

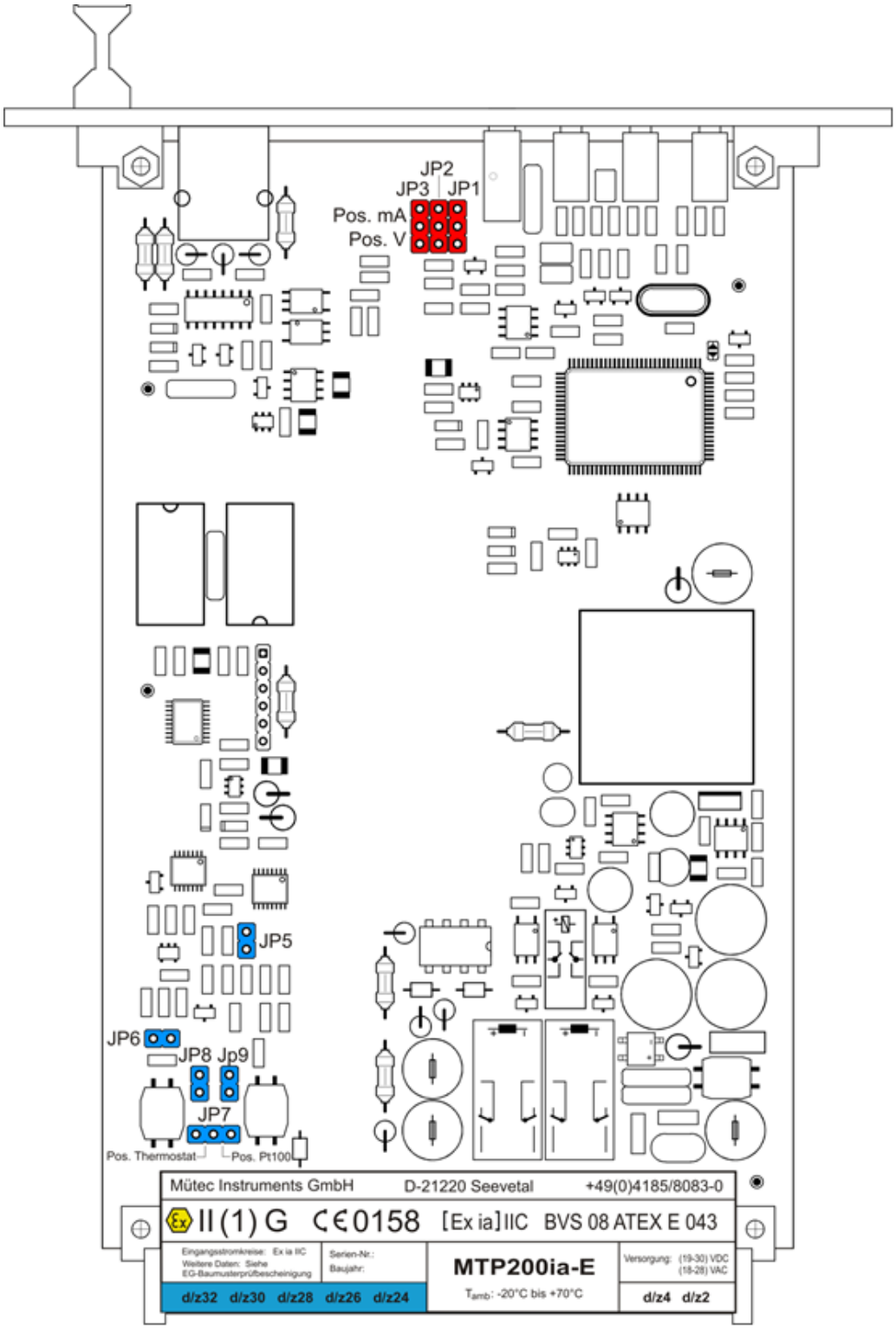
OUTPUT

Fault sources:	Analogue Output	Relay 1	Relay 2	Logic 1	Logic 2
8-Bit-Processor	Alarm value	on	active	-	-
Supply/8-Bit-uP	Alarm value	on	active	-	-
Supply/16-Bit-uP	Alarm value	on	active	-	-
mV-Measuring circuit	Alarm value	active	active	on	on
Resistance circuit	Alarm value	on	active	on	on
Output signal	Alarm value	active	active	off	off
Sensor / wire break	Alarm value	on	active	off	off
RAM-/EPROM-memory	Alarm value	on	active	-	-
EEROM-memory	Alarm value	on	active	-	-
Relay 1 - 3	Alarm value	on	active	-	-

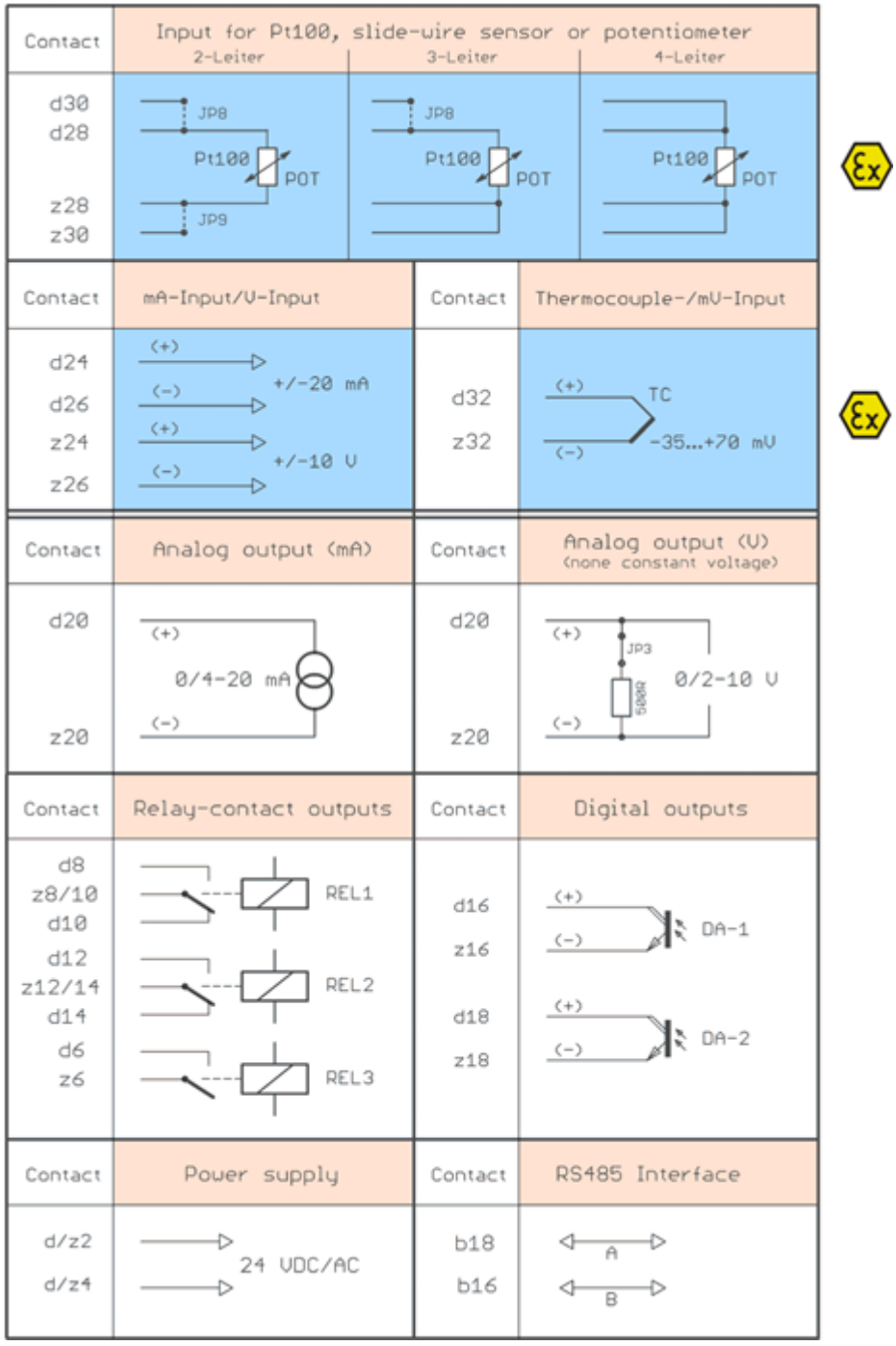
5.2. Basic Circuit Diagram

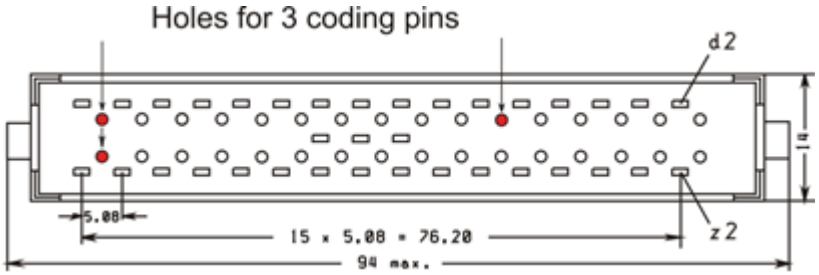


5.3. General view



5.4. Contacts and female multipoint connector's coding





5.5. Jumper-settings

Jumper JP1 – JP3:

Via Jumper JP3 the analog output is switched from constant current (mA) to voltage (V). At the same time, the Jumper JP1 and JP2 have to be reconnected, thereby it is possible to measure the selected output signal at the test socket in the front.

Jumper JP5, JP6, JP7, JP8 and JP9:

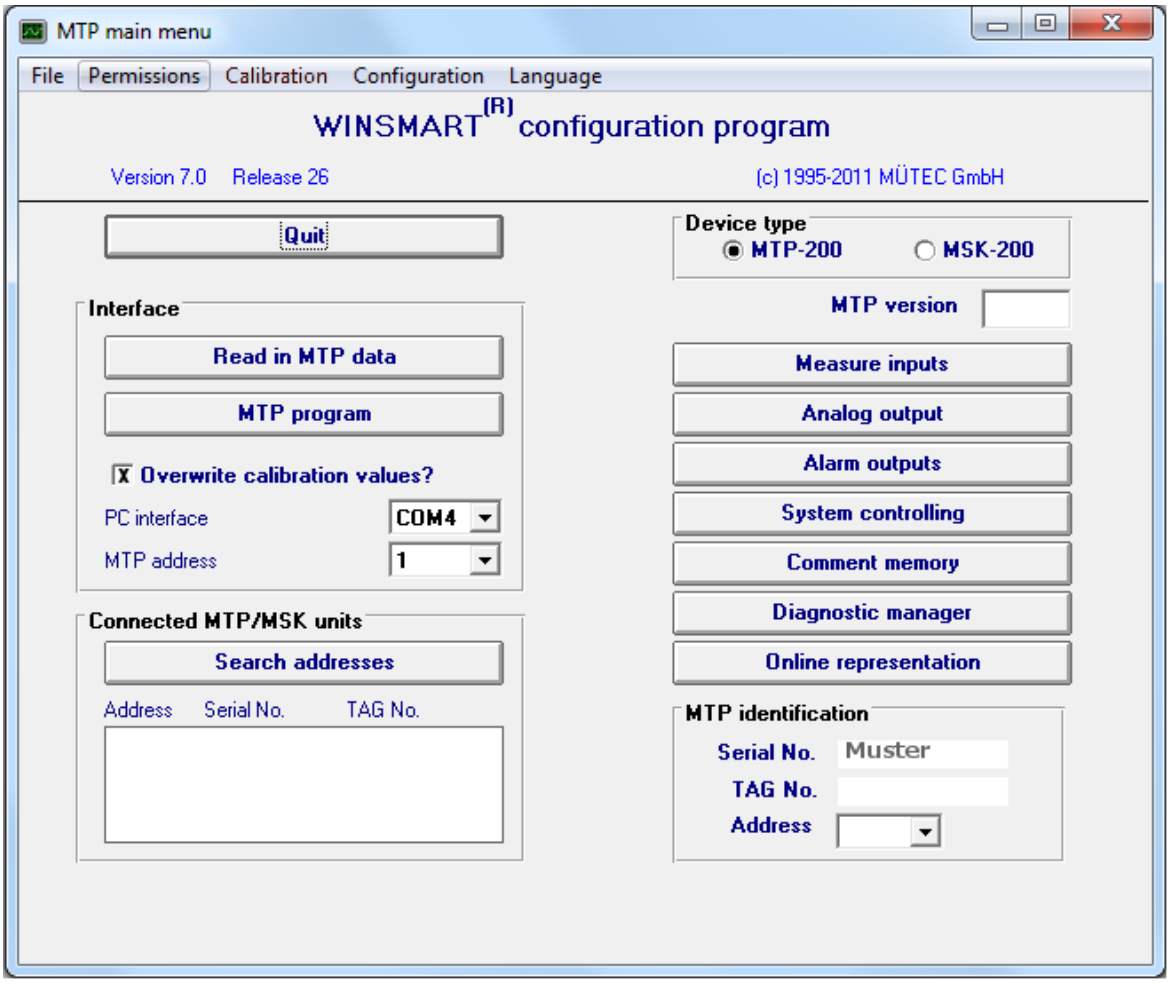
Measuring input for:	JP-5	JP-6	JP-7	JP-8	JP-9
Voltage (V)	X	X	X*	X	X
Voltage (mV)	X	--	X*	X	X
Current (mA)	X	X	X*	X	X
Thermocouple with internal TVG	X	--	X*	X	X
Thermocouple with external TVG	X	--	--	X	X
Thermocouple with thermostat	X	--	X**	X	X
Pt-100/2- wire-circuit	X	X	--	X	X
Pt-100/3- wire-circuit	X	X	--	X	--
Pt-100/4- wire-circuit	X	X	--	--	--
Potentiometer/0-600 Ω 2-wire-circuit	X	X	--	X	X
Potentiometer/0-600 Ω 3- wire- circuit	X	X	--	X	--
Potentiometer/0-600 Ω 4- wire- circuit	X	X	--	--	--
Potentiometer/0-5000 Ω 2- wire- circuit	--	X	--	X	X
Potentiometer/0-5000 Ω 3- wire- circuit	--	X	--	X	--
Potentiometer/0-5000 Ω 4- wire- circuit	--	X	--	--	--

X* = JP7 in Position Pt100, X** = JP7 in Position Thermostat

X = Jumper closed
-- = Jumper opened

After pressing the button **JUMPER FINDER** in the WINSMART's masks **Measuring Input** and **Analog Output**, the position of the jumpers is shown according to the component diagram section.

6. Configuration program



The illustration above shows the opening screen of the WINSMART configuration program for the MTP200 and MTP200 with the corresponding version and release number of the program.

The command **File** in the menu bar is used to access existing configuration files and for saving and printing of the current configuration. Two of the three operating levels, which can be accessed by using the command **Permission**, are secured by passwords. The operating level for calibration of measure inputs and analogue outputs has a special importance. Only after password input and the command **Calibration** it is possible to access one of two masks.

To communicate with the WINSMART program it is necessary to enter the COM address in the field **PC Interface** and **MTP address** (left area of the screen in the section **Interface**). A device with unknown address can be identified by using the function **Search address**. After finding the device address the **Serial-No.** and **TAG-No.** will be shown.

Administration of access rights for three operating levels secured by codes and calibration for the measuring input and analogue output. The WINSMART configuration program supports both MTP200 and MSK200.

For information about the MTP200, which will not be covered in the following description, refer to the existing MTP200 manual.

The buttons arranged below offer access to configuration and parameter settings for the MTP200 input and output. The desired settings for the SIL2 monitoring circuit can be made in the relevant screen with the button **System Controlling**. The **Diagnostic Manager** reports the status of the device and also saves faults that arise even briefly. The **online display** offers the user a precise analogue and digital illustration of the measured input magnitudes and output signals.

6.1. Menu bar and commands

6.1.1. File → Load configuration

The MTP200 parameter set saved in a file with extension ***.MTP** on the hard drive is loaded into the Windows configuration program. Thus a parameter set already created and saved can be copied fast and reliably into other devices, if the same configuration is needed for these.

6.1.2. File → Save configuration

The MTP200 parameters of the configuration program are saved on the hard drive in a file with the extension ***.MTP** and archived. For later duplication into another MTP200, the file must only be loaded in the set-up program and transferred in the MTP200 with the command **MTP program**.

6.1.3. File → Print configuration

All MTP200 parameters of the configuration program and the first 60 characters of the comments are printed out as a dated protocol and the device characteristic data on a DIN-A4 page. The printer available under Windows is used. The character font and print format are fixed and cannot be changed by the user.

6.1.4. File → Print comment

The extensive comments saved in the device as dated protocol with a maximum 2000 ASCII characters and the device characteristic data are printed out on a DIN-A4 page. The printer available under Windows is used. The character font and print format are fixed and cannot be changed by the user.

6.1.5. File → Quit program

The message **Program quitting** appears with a request for confirmation by **OK** or **Cancel.**

6.1.6. Access rights → Enter password

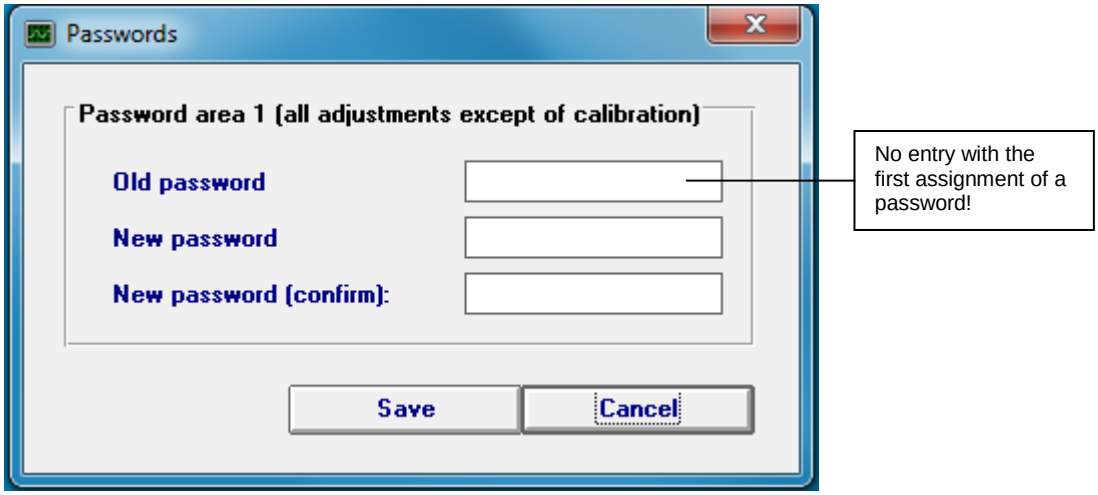
After the corresponding password is entered, entry is enabled to the otherwise locked functions of the configuration program.

The configuration program is divided into 3 access areas:
The open program area contains no settings and so is always accessible.
Password level 1 contains all parameter settings.

Free input to this level is secured only after password assignment

Password level 2 contains calibration excluding configuration. This input is secured by a password assigned by the manufacturer (**5180**). Of course this password can be replaced with a new one by the user. Furthermore password 2 gives access to all parameters and functions of the device.

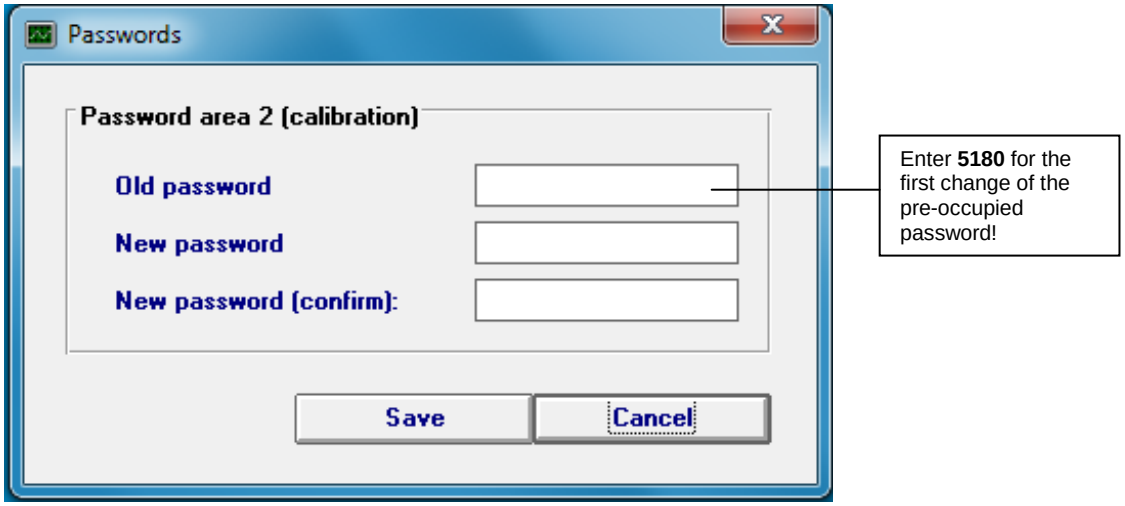
6.1.7. Access rights → Change password → Password level 1



Password level 1 covers all parameter settings of the MTP200 and is only enabled for authorised personnel (e.g. maintenance staff, service technician) to access all configurable settings.

The password may have a maximum of 20 alphanumeric characters and is entered and saved in the corresponding fields as in the screen.

6.1.8. Access rights → Change password → Password level 2



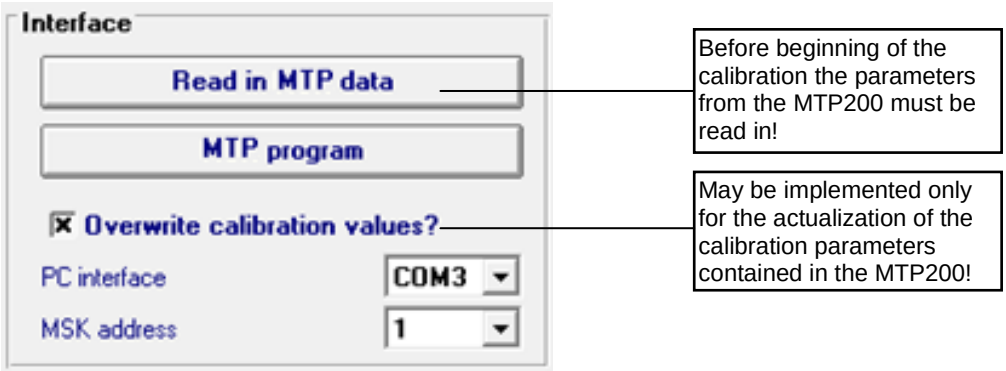
Password level 2 secures parameter settings for calibration and the function **Overwrite calibration values.** It is reserved exclusively for technicians with special knowledge of the device and its functions.

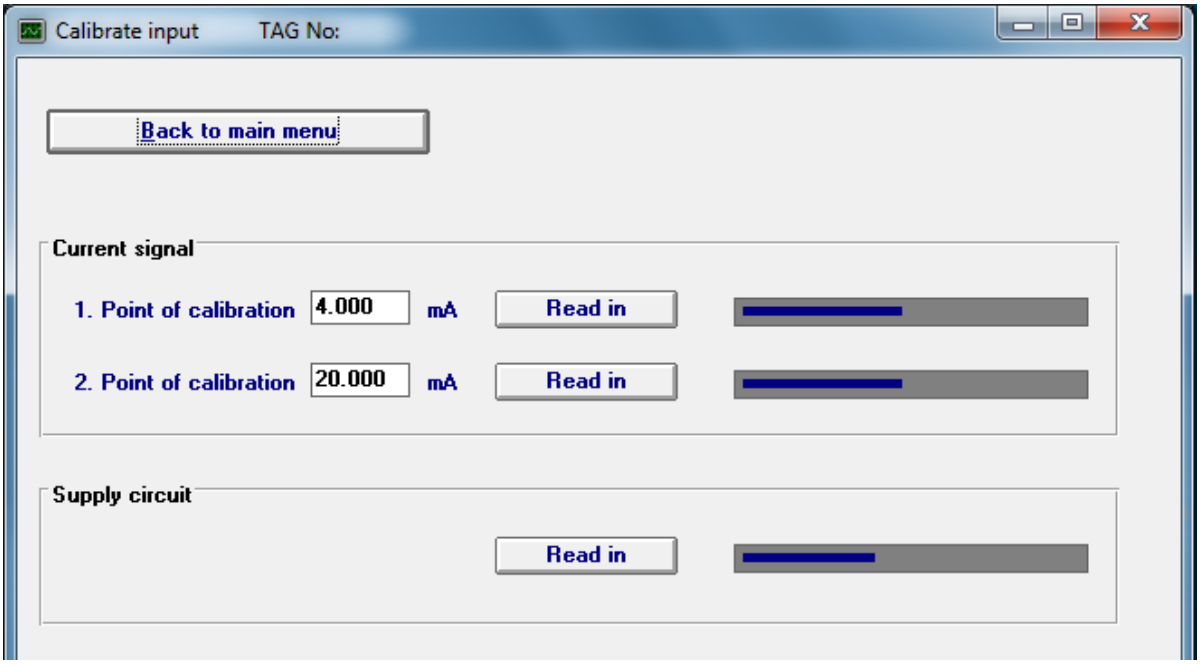
Password level 2 is secured by a password (**5180**) assigned by the manufacturer.

A newly assigned password may have a maximum of 20 alphanumeric characters and is entered and saved according to the indicated fields as in the screen

6.1.9. Calibration → Calibrate input → PT-100

A calibration is only necessary for the analogue in- and output signal. Before calibration the parameter set must be read from MTP200 into WINSMART-program. In addition, you have to select the resistance measurement input for the Pt 100 calibration (see section 10.1 Measurement inputs).





The JP8/JP9 jumpers define the Pt 100 input configuration as a 2-wire, 3-wire or 4-core circuit. For the resistance measurement, too, only one valid set of parameters can be stored in the MTP200. For this reason you should carry out recalibration after every change in the Pt 100 input configuration whenever maximum accuracy is required.

Every calibration has to take place in 2 steps. The calibration points can be freely selected within the characteristic curve range available, but we recommend that you place the calibration points within the measuring range for a high degree of accuracy. For the 1st calibration procedure the Pt 100 simulator at the MTP200 input is set to the desired temperature value, and the command to **Read** in is triggered. The messages **Measurement running** and **finished** appear one after the other in the mask. After acknowledgement with OK the 1st calibration value is accepted and shown analogously as a bar in the mask. The proportional representation in the bar chart serves as a check and helps to avoid calibration errors.

Same calibration values for the 1st and 2nd calibration point ⇒same bar lengths ⇒ no measured value illustration possible ⇒ output jumps!

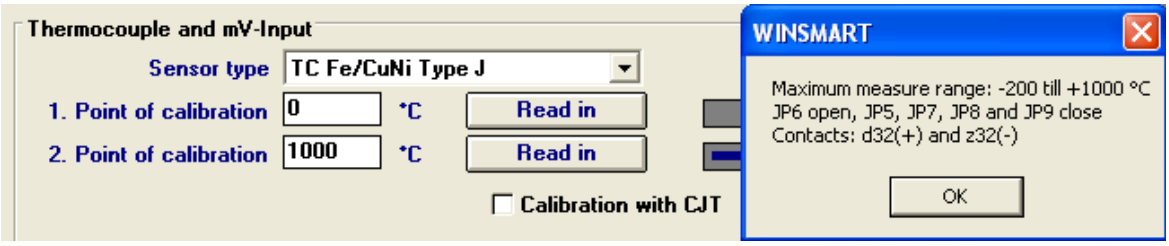
Next, the second calibration point is simulated with the measuring input mA value, confirming calibration with **Read** and finalized with **OK**.

For monitoring the supply circuits at the contacts d/z30 and d/z32 a reference level at 20mA is needed, which can be simulated easily with a current sink. The voltage value is recorded by clicking the button **Read** and is figured in bar units for monitoring.

Finally the calibration values needs to be transferred to the MTP200. Therefor mark the box **Overwrite calibration values?** with a cross and click the button **MTP program**. The transfer starts and the question **Existing parameters will be overwritten. Continue anyway?** appears in the screen. This procedure is started with **OK** and the next message reads: **Transferring parameters**. A final OK completes the procedure and the calibration.

6.1.10. Calibration → Calibrate input → Thermocouple

The set of parameters from the MTP200 has to be read in before beginning the calibration. For calibration of the thermocouple measurement input place the jumpers according to the specifications in the WINSMART mask for activation of the thermocouple measurement input (see section 10.4 Measurement inputs).



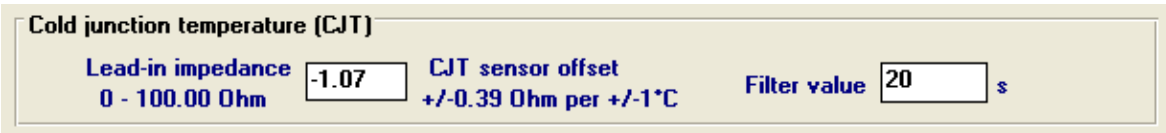
For the 2-point calibration you can freely select the calibration points within the characteristic curve range. In the case of high accuracy requirements, we always recommend the required measuring range as the calibration range. Before starting calibration, you have to clarify the question of whether or not to take the temperature reference junction (TRJ) into account, i.e. should the ambient temperature measured by the TRJ apply as the reference temperature or 0°C. For calibration with the TRJ you have to mark the box **Take TRJ into account in the calibration** in the mask.

The calibration procedure begins with simulation of the temperature value for the 1st calibration point and entry of the command **Read in**. The messages **Measurement running** and **finished** appear one after the other in the mask. After acknowledgement with **OK** the calibration value is accepted and shown analogously as a bar in the mask. The proportional representation in the bar chart serves as a check and helps to avoid calibration errors (equal calibration values ⇒ equal bar lengths ⇒ measured value display not possible ⇒ output jumps back and forth. The same procedure is repeated for the 2nd calibration point. Transfer of the calibration values to the MTP200 marks the conclusion of the calibration procedure. For this mark the box **Overwrite calibration values** in the main MTP menu, and start the transfer with the button **Program MTP** (see screen area Interface). The message **Existing parameters will be overwritten. Still continue**? appears in the mask. Use **OK** to start the process; the next message is: **Transfer parameters**. A last **OK** ends the entire transfer process and thus the calibration as well.

Temperature reference junction (TRJ)

The TRJ calibration requires a correctly calibrated resistance input as a 2-wire circuit in a range from 0 – 50 Ω.

The internal TRJ consists of a Pt 100 sensor placed in the terminal block so that the KL19 + KL20 are not necessary. The terminals KL19 + KL20 are used for connection of an external Pt 100 sensor in a 2-wire circuit only in the case of an external TRJ. Then you have to use a standard terminal block with the terminals KL17 to KL20. A more or less substantial error in the cold junction temperature results from the lead resistance of an internal/external Pt 100 sensor.



There are two options for error correction:

One is to enter the measured resistance value of the lead directly in the mask. The second option is to correct the sensor error as well as the lead resistance. In this case the read-off TRJ temperature value of the online mask and a precise measured value of the cold junction temperature are required. You can calculate the lead resistance for the TRJ calibration via the resistance gradient of the Pt 100 sensor at 0.39 Ω/°C and enter it in the mask.

Example 1:	**TRJ-value** in the online-mask	=	27.40	°C
	Measured cold junction temperature	=	22.80	°C
	ΔT = (27,4 - 22,8) °C	=	4.60	°C
	Load resistance = 0.39 Ω/°C x 4.6 °C	=	**1.79**	**Ω**

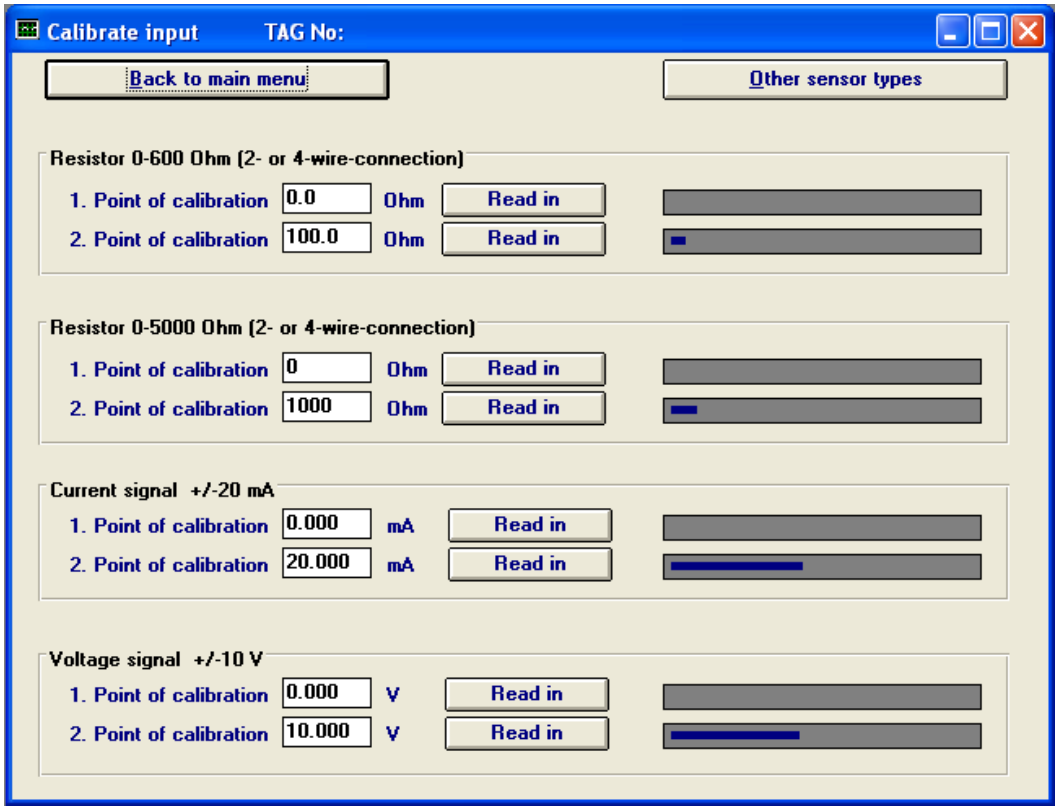
Example 2:	**TRJ-value** in the online-mask	=	24.10	°C
	Measured cold junction temperature	=	25.00	°C
	ΔT = (24,1 - 25,0) °C	=	-0.90	°C
	Load resistance = 0.39 Ω/°C x (-0.9) °C	=	**-0.35**	**Ω**

The TRJ calibration has to be carried out while using an external and an internal Pt 100 sensor.

A filter of the 1st order is parameterized by means of the filter time of up to 999 seconds for the temperature reference junction (TRJ). The greater the filter time, the greater the damping of temperature fluctuations.

6.1.11. Calibration → Calibrate input → Resistance, Current and Voltage

After reading in the set of parameters from the MTP200, you have to activate the resistance measurement input for the 2-wire or 4-wire circuit as the active input by using the jumpers (see section 10.4 Measurement inputs).



Resistance input for 2- or 4-wire-circuit:

The input is defined as a 2-wire or 4-wire circuit using the jumpers JP8/JP9, and the calibration is defined accordingly on this basis. If the input configuration is changed later, the calibration should be repeated for maximum accuracy. For the 2-point calibration within the characteristic curve range you can freely select the calibration points, but we always recommend using the required measuring range for the calibration range. The calibration procedure is the same as for a thermocouple input (10.1.10).

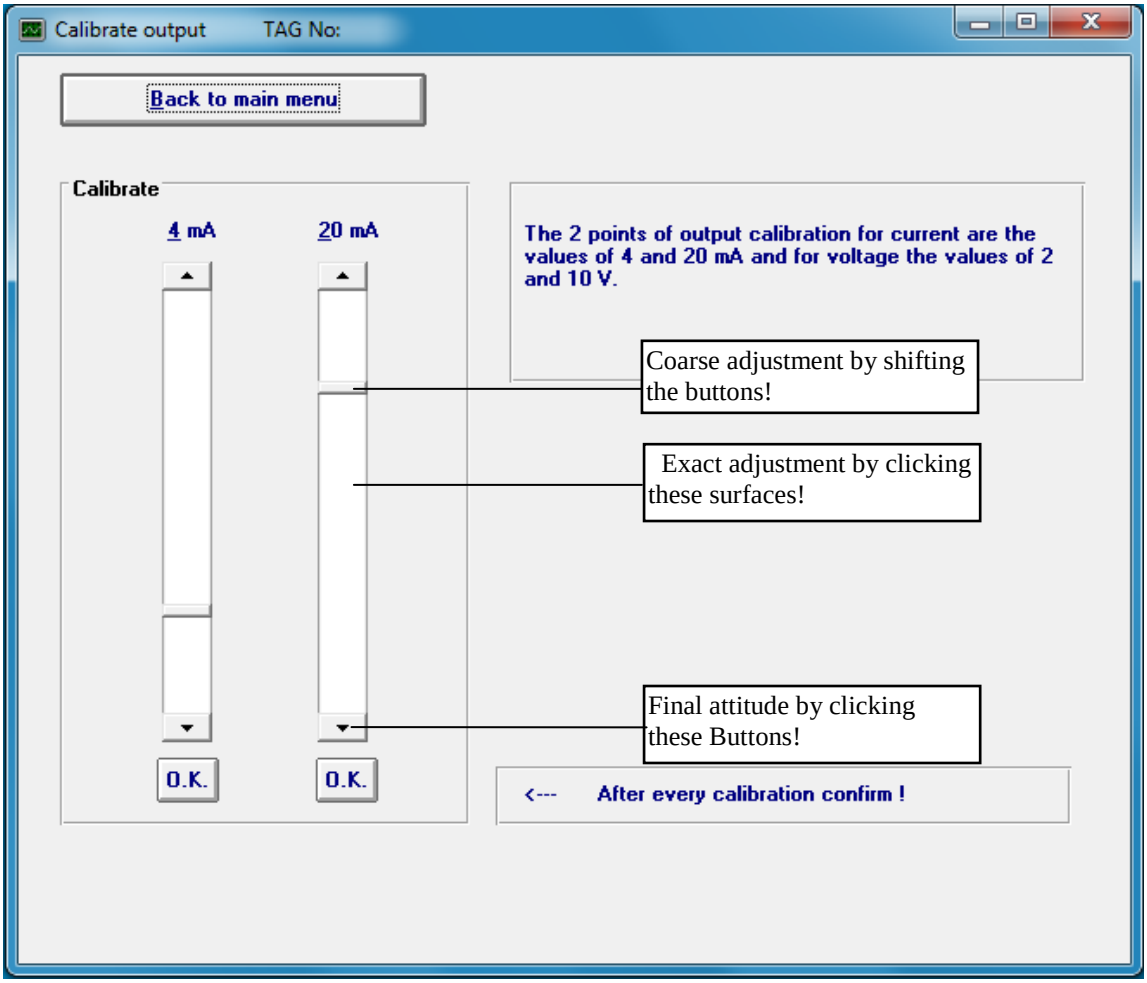
Current input:

A bi-directional mA signal can be measured with the mA input at KL13/14. The calibration points can thus be placed in a range from -20 mA to +20 mA. The 2-point calibration takes place as already described.

Voltage input:

A bi-directional V signal can be measured with the V input at KL15/14. The 2 calibration points, placed in a range from -10 V to +10 V, are recorded in the same way as previously documented.

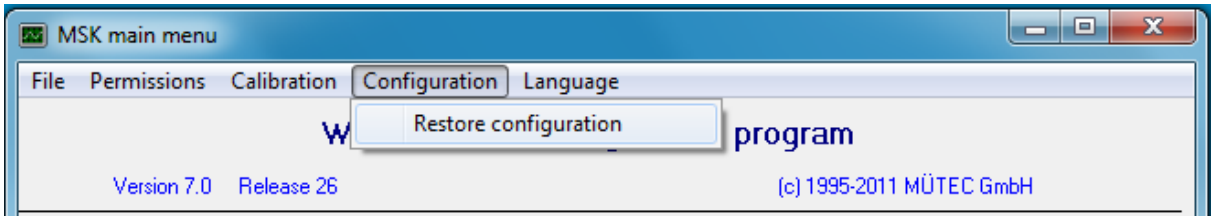
6.1.12. Calibration → Calibrate output → Current or voltage



Before beginning each calibration, the parameter set must be read from the MTP200. A 4½-place digital circuit analyser is connected to the MTP200 output terminals and the output signal is adjusted with the jumper 3 for constant current or voltage.
The calibration screen contains 2 V and 10 V for voltage output or 4 mA and 20 mA for current output marked by sliding controls. The alignment procedure for the coarse, exact and final adjustment is free selectable and is confirmed with the **OK** button. After comparing the ZERO and SPAN value the determined calibration parameters need to be transferred to the MTP200 by clicking **MTP program** and **Overwrite calibration values**

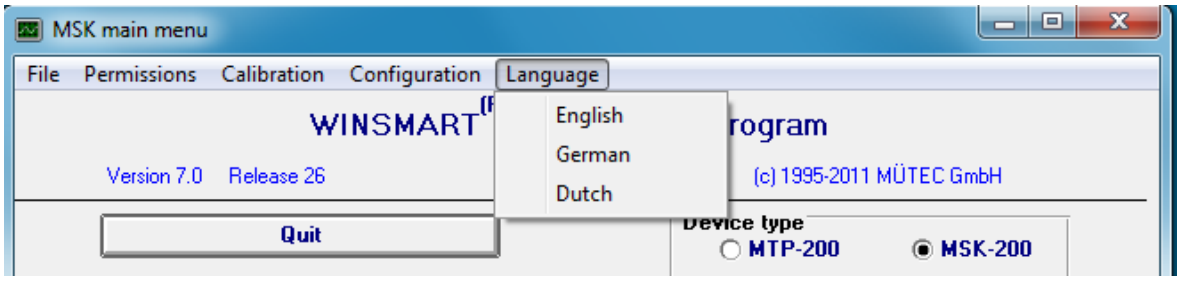
The output signal 0/2-10 V is generated by a constant current 0/4-20 mA, which runs over a resistive shunt of 500 Ω, assuming that JP1…JP3 is set on "V".
Therefore a voltage results in a fault of 1 % in the case of a burden resistance of 50 kΩ, which is completely eliminated by recalibration.

6.1.13. Restore configuration



The **Configuration** of the device contains all MTP200 values and is automatically saved as an entry under Windows with **Read MTP data**. Thus each device can be reset to the original operating condition with the command **Restore configuration,** under the condition that both procedures are executed at the same PC. After the command **Restore configuration**, all values in the Windows screens and in the MTP200 are reset with the original data set. This procedure offers the convenient option to reset a device provided with erroneous calibration values or reset parameters with manufacturer values.

6.1.14. Language → English, German, Dutch



There are three language versions in the **WINSMART** program selectable.

6.2. Interface and connected devices

Communication between the MTP 200 and the Windows PC is made by the front-side COM/RS232 or RS485 interface at the contacts of mounting rail bus connector.

By plugging on the COM-cable at the front socket, the change over from RS485- (offline) to COM-interface (online) is made automatically.

After disconnection of COM-connection, the RS485 interface is reactivated.

The RS232 interface and the RS485 interface are galvanic separated from analog output, auxiliary power and all other circuits parts.

6.2.1. Reading MTP data

The command **Read MTP data** starts a data transmission of the entire parameter set of the MTP200 to the configuration program. The interface connection will only work if the correct entries are made in the screen for the serial COM interface (COM1 to COM20)) and MTP address (1-255). Should the MTP address be unknown or not marked on the device, then the unknown address can be determined with the command **Search for addresses**. After conclusion of the correct transmission, the message **Reading parameters** appears and must be confirmed with OK.

6.2.2. Programming MTP data

The command **Program MTP** transfers the parameter set contained from WINSMART program to the MTP200. After command input the following message appears on the screen: **Existing parameters will be overwritten. Continue anyway?**

With **OK** the procedure is started, after which the confirmation appears **Transferring parameters** and is confirmed with **OK** to complete the transmission.

6.2.3. Overwriting calibration values

If the box for **Overwrite calibration values** is selected in the input screen, the calibration parameters for analogue input or analogue output can be transferred to the MTP200 with the command **Program MTP**, possibly updated in the configuration program.
The message then appears in the screen:
Existing parameters will be overwritten. Continue anyway?
The procedure is started with **OK** and the next message reads:
Transferring parameters. A final **OK** completes the transmission

6.2.4. PC interface

The addresses COM1 to COM20 are selectable.

6.2.5. MTP-address

The MTP address setting regulates communication over the interface with the receiver. The PC, as the master device, sends a transmission with the device address that is read with each MTP200 (slave) by using the COM interface in case of an individual compound or using the RS485 interface in case of a multidrop connection. Only the MTP device with the set address communicates to the master. Consequently, MTP devices with same address may not be connected.

6.2.6. Connected MTP devices → Search for addresses

A search function lists the connected and addressable MTP devices with their specific characteristic data such as **address**, **serial number** and **TAG number**.

6.3. MTP identification

6.3.1. Serial No.

The **serial number** is a 8-digit manufacturer-specific unit number ensuring clear identification for each MTP200. It consists of a date code (year + calendar week) and a sequential number.

The **serial number** cannot be edited!

6.3.2. TAG No.

The **TAG number** can contain maximum 8 alphanumeric characters as user-defined device identification.

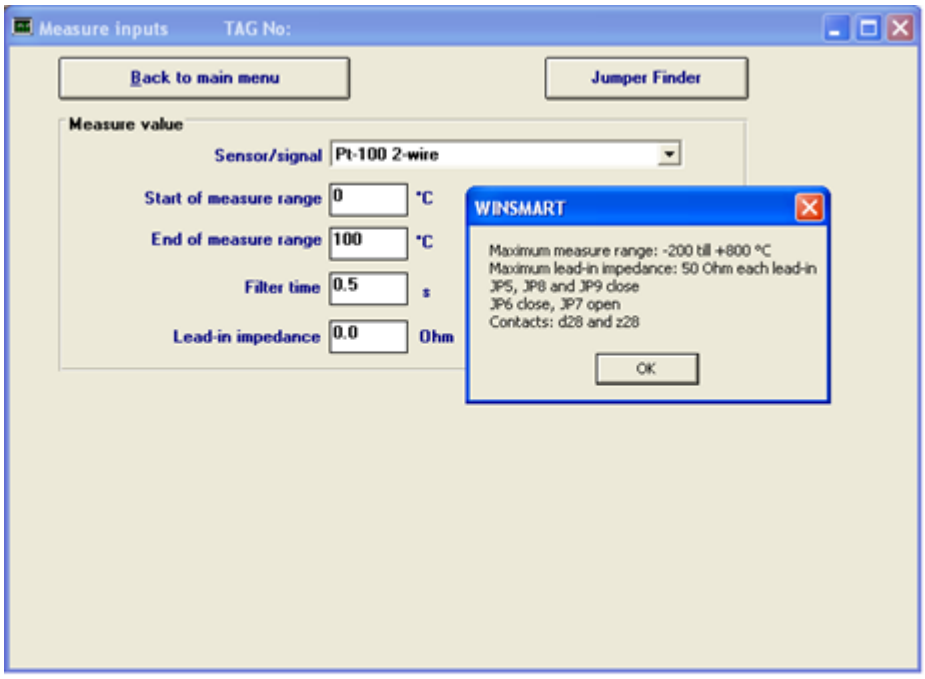
6.3.3. Address

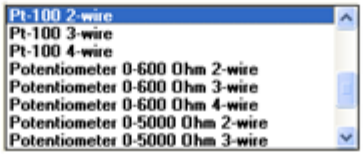
For the device address**,** a maximum entry of 3 digits in the **address** field is set. Setting a device address involves:

1. Selection of device address with max. 3 digits in the **MTP identification** field;
2. Setting of the current device address in the **Interface** field;
3. Execute the Program MTP command and confirm;
4. Read back the MTP data with the command Read MTP data (after finishing these actions, the new device address is indicated in the field MTP identification).

For a successful device connection the 3 digits address in the **MTP identification** field and in the **Interface** field has to be correspond with the device address.

6.4. Measuring input





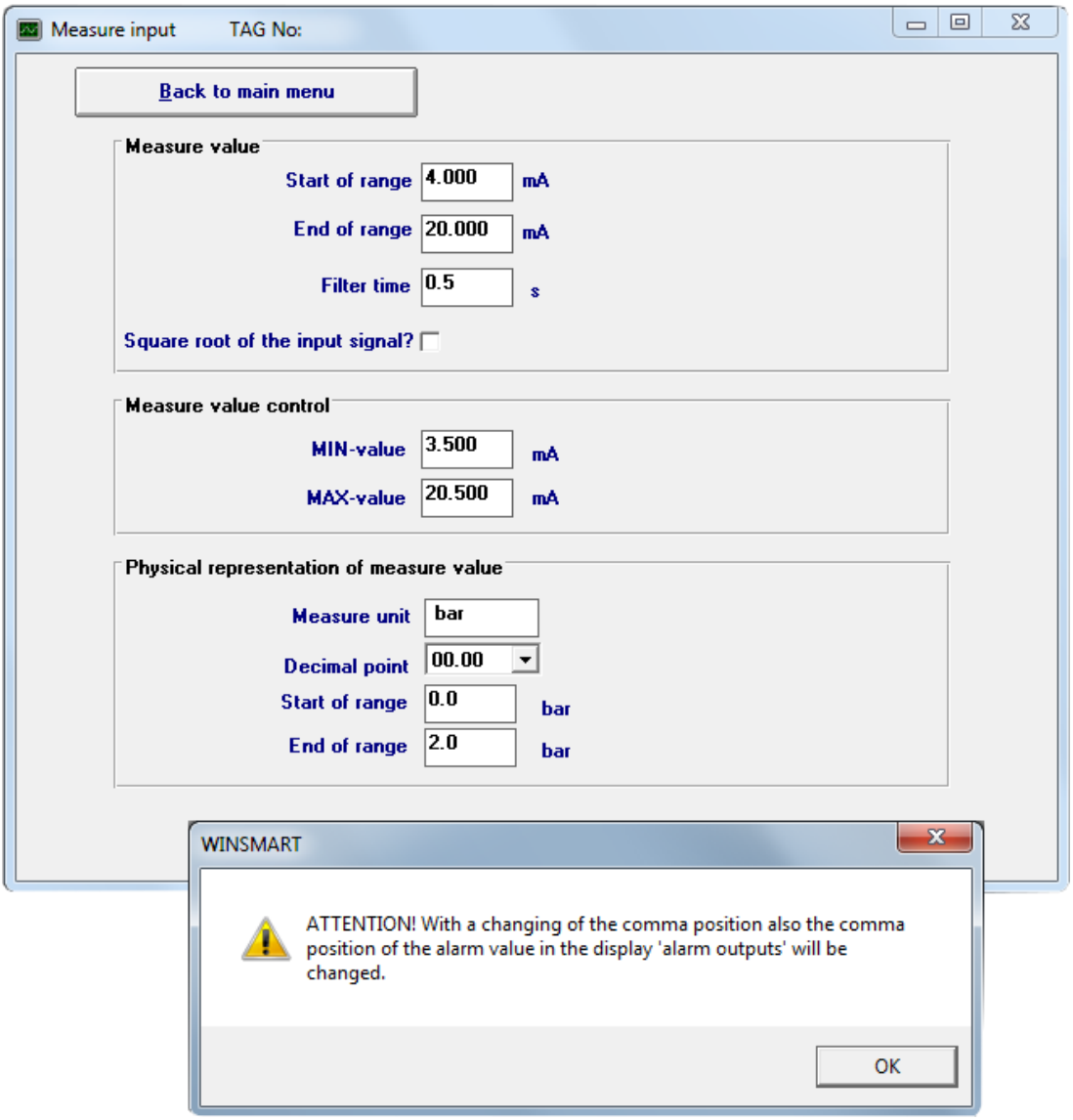
All available sensor types and measuring signals for selection and parameterization are listed in the mask of measurement inputs. Of the four different measurement inputs at the terminals of the MTP200, only one can be activated and parameterized in each case. After the sensor type or measured variable has been specified, a window appears with the information for the:

1. Maximum available measuring range
2. Jumpers to be opened/closed
3. Terminal assignment for measurement input

A filter time of minimum 0.1 to maximum 99.9 seconds defines a first order filter for the measure signal. With a larger filter time, the measured value is more damped.

For compensation of the lead resistance in the case of a resistance sensor with a 2-wire connection you can enter the resistance value directly in the mask. The total value of the feed and return circuit resistance may not exceed 100 ohms.

There in the mask measure input specified measuring range (e.g. 0.000 to 2.000 bar) complies 0 to 100 % of range for the limit value monitoring. The minimum adjustable limit value is 0.000 bar and the maximum 2.000 bar.
For a correct parameterization of MTP200 make adjust first the measuring range and second the limit values. If you changed later the measuring range, always check the limit value alarms as well.

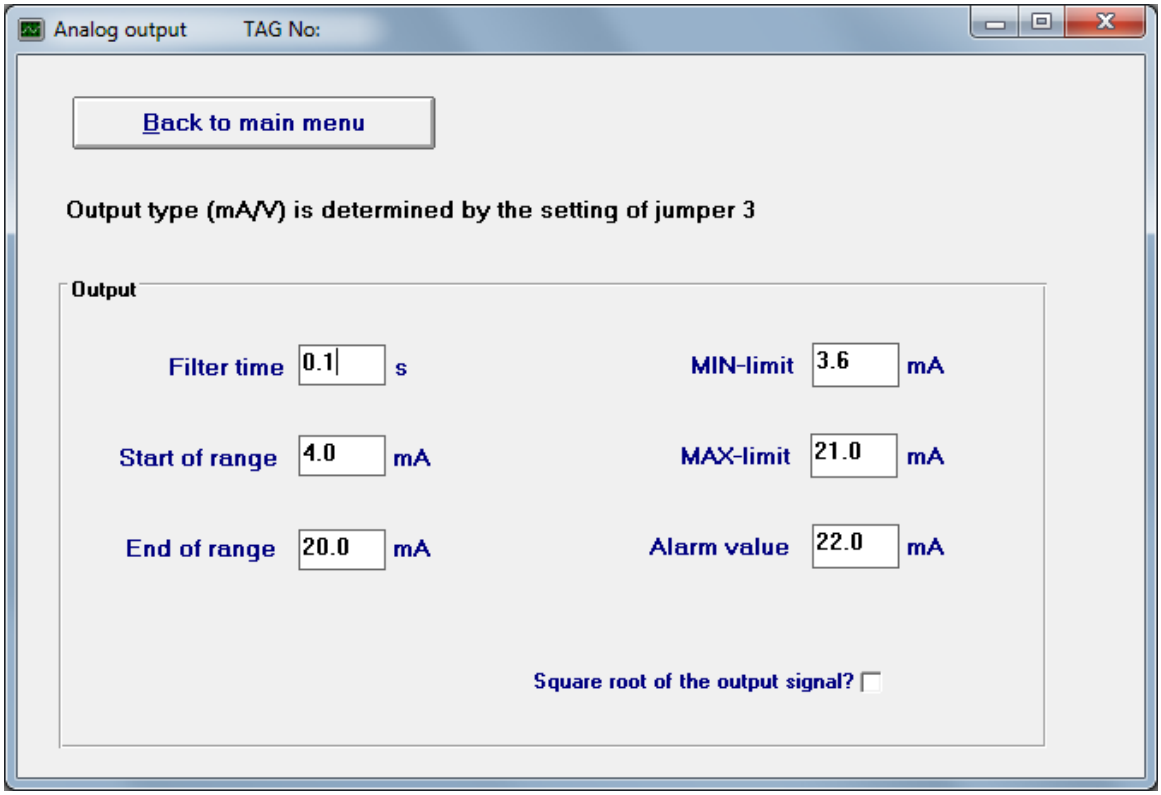


For standardized measurement signals further entries must be made in rubric **Physical representation of measure value**. They are needed for a representation in the online mask.

Unit:	Physical unit of measured variable (bar, °C, K, etc.)
Decimal point:	None, 1, 2 or 3 places after the decimal point
Start of range:	Physical measure value at start of range
End of range:	Physical measure value at end of range
MIN value:	Minimal measure value for initiation of fault alarm
MAX value	Maximal measure value for initiation of fault alarm

For a correct limit value control must be placed the minimal measure value and the maximal measure value out of the range from the measured range because an exceedance of this limits triggers the maintenance alarm. Same values for area limit-MIN and area limit-MAX are not allowed and lead after the programming of the MTP200 for a maintenance alarm!

6.5. Analogue output



The **Filter time** of minimum 0.1 seconds up to maximum 9.9 seconds defines a first order filter for the output signal. The analogue value is more strongly dampened with increasing filter time.

For analogue output the illustration range is set by the definition of values for **Start of range** and **End of Range**.

This applies during voltage output amounting to a max. output range 0 - 11 V or with current output 0 - 22 mA. Exceedance can be reliably prevented within the illustrated range by the input **MIN limit** and **MAX limit** of the defined output range.

The **Alarm value** function defines a fixed value for analogue output. This is activated if a correct recording of the measured value is no longer possible in the input due to a fault and is programmed in the screen for **System controlling** with the function **Alarm value** for analogue output.

Square root extraction can be realized by activating the button **Square root of the output signal**.

All adjustments made in this mask are stored and activated by the command **Program MTP**.

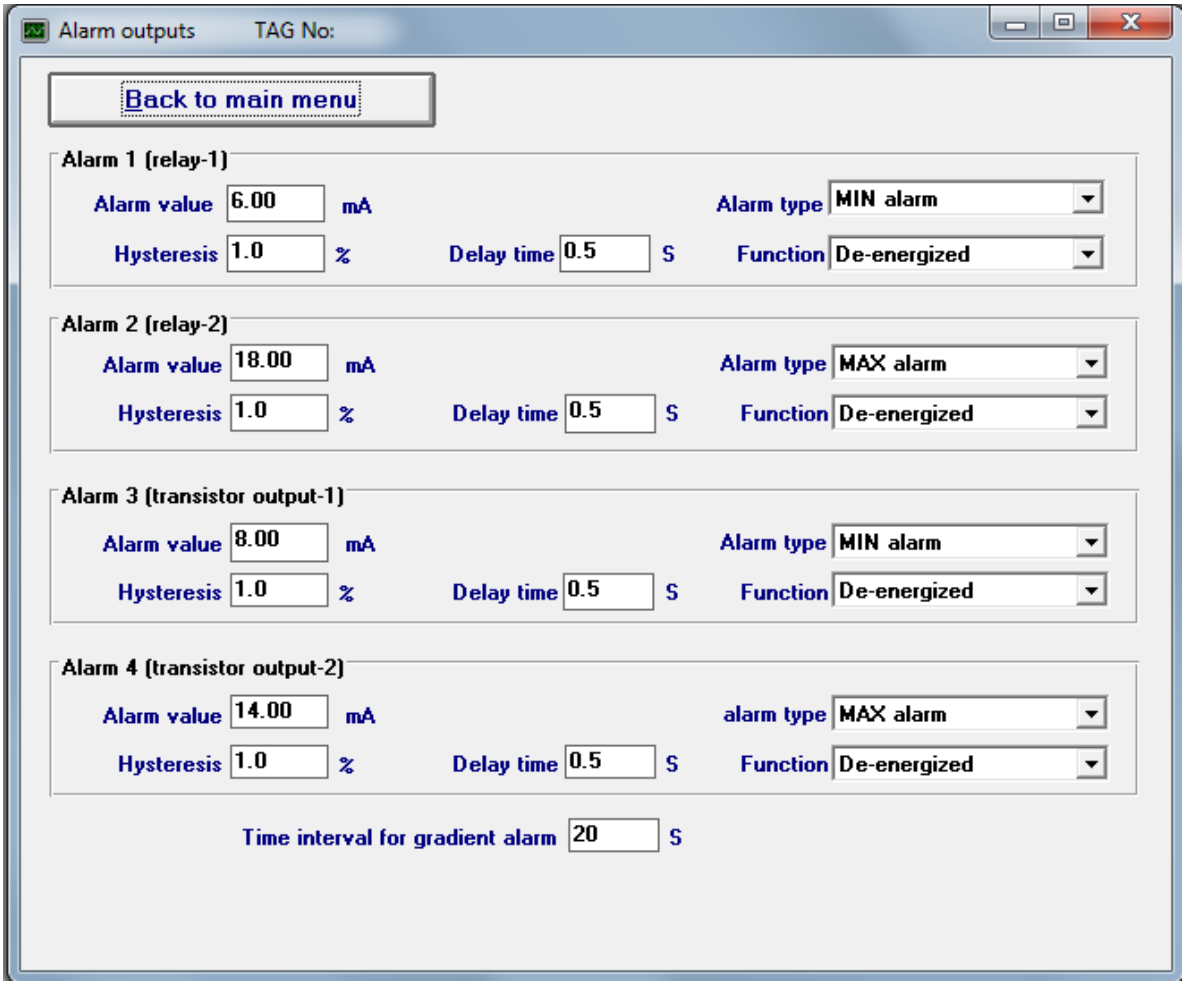
In principle it is possible to register an alarm value of 0. In this case the breakage monitoring at mA-output can not differentiate between alarm value and line break. The result is a constant switching of relay-3.

During voltage exit neither a short circuit nor an interruption of the connection to the burden can be recognized!

mA-values for an output signal without and with square root extraction:

Input signal	Output signal without square root extraction	Output signal with square root extraction
0 %	4.00 mA	4.00 mA
25 %	8.00 mA	12.00 mA
50 %	12.00 mA	15.31 mA
75 %	16.00 mA	17.86 mA
100 %	20.00 mA	20.00 mA

6.6. Alarm outputs



The mask for the alarm outputs enables quick setting of all parameters due to the clear display of the three alarms available (2x relay contact output, 1x transistor output).

A value between 0 and 99.9% of the measuring range is assigned to each **alarm value hysteresis**. For a measuring range of 500°C a temperature level **hysteresis of** 2% corresponding to 10°C, with an activated **MAX alarm** of up to 400°C is only reverse with a temperature level of < 390 °C. An **alarm delay** up to a maximum of 9.9 seconds guarantees that briefly exceeded alarm values do not activate the alarm.

Available alarm types:

MAX alarm	with rising measured value
MIN alarm	with falling measured value
Gradient MAX alarm	with rising and falling function line
Gradient MIN alarm	with rising and falling function line

Available alarm functions:

Open circuit principle:	in good status the relay is not under current
Closed circuit principle:	in good status the relay is under current
No function:	alarm output is switched off

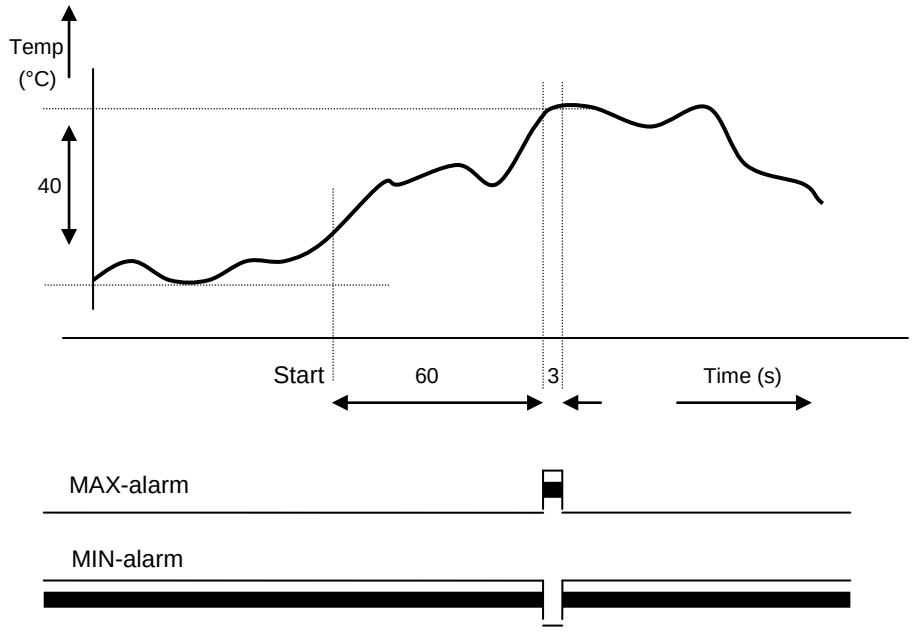
The gradient alarm needs a time interval as an additional parameter. It shows a time period between 0 and 9999 seconds, in which 20 samples are collected and used as the basic for the gradient alarm calculation.

Alarm value and alarm type are available in the online mask. Activated limiting value alarms are marked in red.

6.6.1. Differentiated gradient alarm and the parameter settings

1. Example:

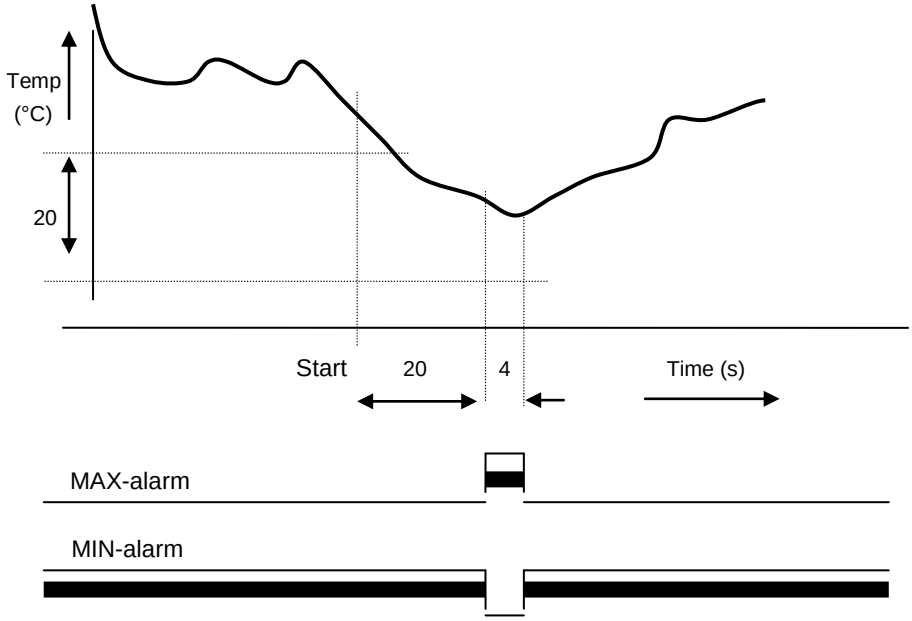
Alarm value	=	40 °C
Alarm type	=	Gradient-MAX + MIN-alarm
Time interval	=	60 s (20 samples in 60s)



Every time interval contains 20 samples. The minimum pulse duration at the alarm output is 0.05 x 60 s = 3 s!

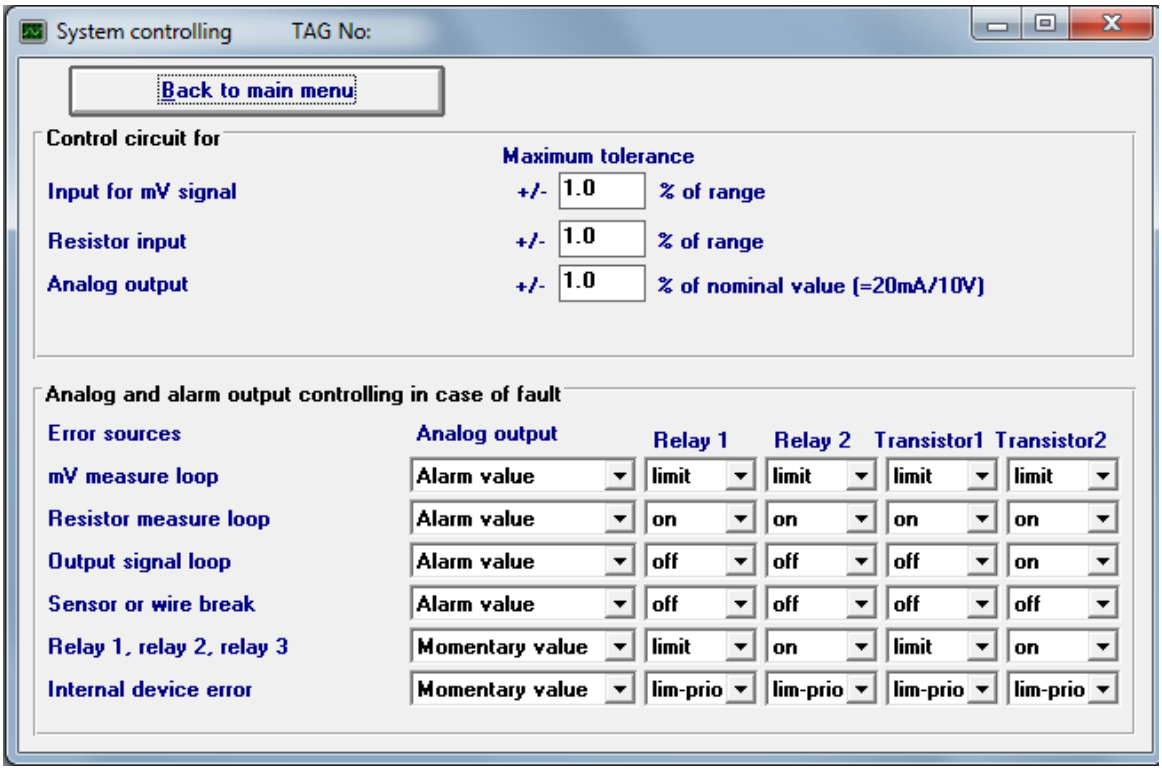
2. Example:

Alarm value	=	- 20 °C
Alarm type	=	Gradienten-MAX + MIN-Alarm
Time interval	=	20 s (20 samples in 20s)



Every time interval contains 20 samples. The minimum pulse duration at the alarm output is 0.05 x 20 s = 1 s!

6.7. Monitoring conditions



A deviation fault between +/- (0.2 - 5.0) % is configured for mA measuring input and analogue output respectively.

A tolerance beyond that activates an alarm for maintenance requirement by the relay 3 and a constant light alarm LED on the front of the unit.

All faults in 6 fault sources, identifiable in the system, are summarized together in the screen. Each fault source has optionally different settings for analogue output and the alarm outputs are to be assigned determining behaviour in the fault event. The configuration for the alarm outputs (function, alarm type etc.) takes place exclusively in the **Alarm output** screen, where defined alarm outputs are dimmed out **no function** switched off and in the **System controlling** screen. In the fault event, the functions of analogue output and alarm outputs defined are overlaid in the **System controlling** screen to ensure controlled behaviour.

Alarm outputs can be switched off by **no function.** Therefore they are not available in the mask **System controlling** for maintenance requirement alarm.

No fault source is assigned to the 16-bit processor, because in the fault event for analogue output and alarm outputs, no safe condition can be guaranteed. It is of course possible with hardware operation, that a failure of the master processor could activate the SIL2 alarm for maintenance requirement.

Analogue output in the event of fault:

Function	Ranking	Definition
alarm value	★★★	The output signal jumps to the alarm value defined in the **analogue output** mask!
frozen value	★★	The output signal remains at the value before fault occurrence and is in an offline mode!
instantaneous value	★	The output signal is updated and in online mode, but can be erroneous!

Relay and transistor outputs in the event of fault:

Function	Ranking	Definition
on	★★★★	The alarm output is switched on and the device required maintenance!
off	★★★	The alarm output is switched off!
lim-prio	★★	The alarm output is switched off, only there is no limit value alarm.
limit	★	The alarm function is only the limit value monitoring!

Truth table for limit values and maintenance alarm:

Function	Limit value alarm	Maintenance alarm	Alarm output	Notes
on	**x**	**on**	**on**	Only the fault alarm switched the alarm output!
off	**x**	**on**	**off**	The fault alarm switches off the limit value alarm!
lim-pro	**x**	**on**	**off**	The fault alarm switches off the limit value alarm, but not an existing limit value alarm!
	on (alarm exists!)	**on**	**on**	
limit	**off**	**x**	**on**	Only the limit value alarm switched the alarm output
	on	**x**	**off**	

x=optional (on or off)

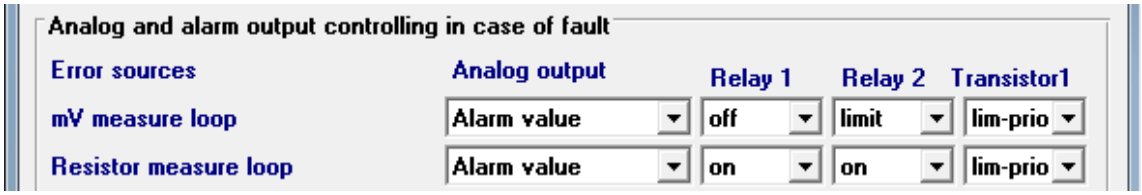
With a fault occurrence, the behaviour of the analogue output and alarm outputs correspond to the parameterization in the mask **System controlling** without taking account of the ranking. After the occurrence of a second fault the highest rank of the functions involved determines the behaviour of the analogue output and alarm outputs.
(See some examples on next page)

First example:

1. Fault: measure loop

Control of outputs:	Alarm value	off	limit	lim-prio

2. Fault occurs later: mA-Input



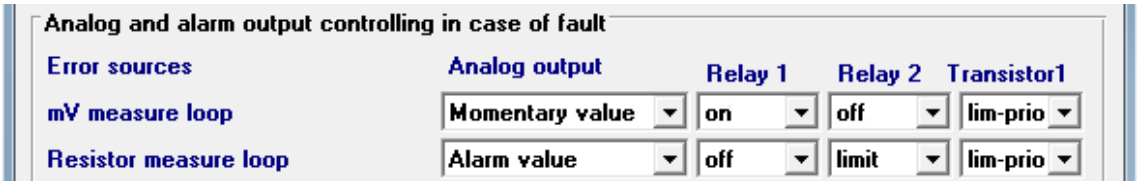
Control of outputs:	Alarm value	on	on	on

The behaviour of the outputs determined by the ranking:

Analogue output	stays on **Alarm value**
Relay 1	changes from relay **off** to relay **on**
Relay 2	changes from relay **limit** to relay **on**
Logic 1	stays on **lim-prio**

Second example:

2fault occur parallel

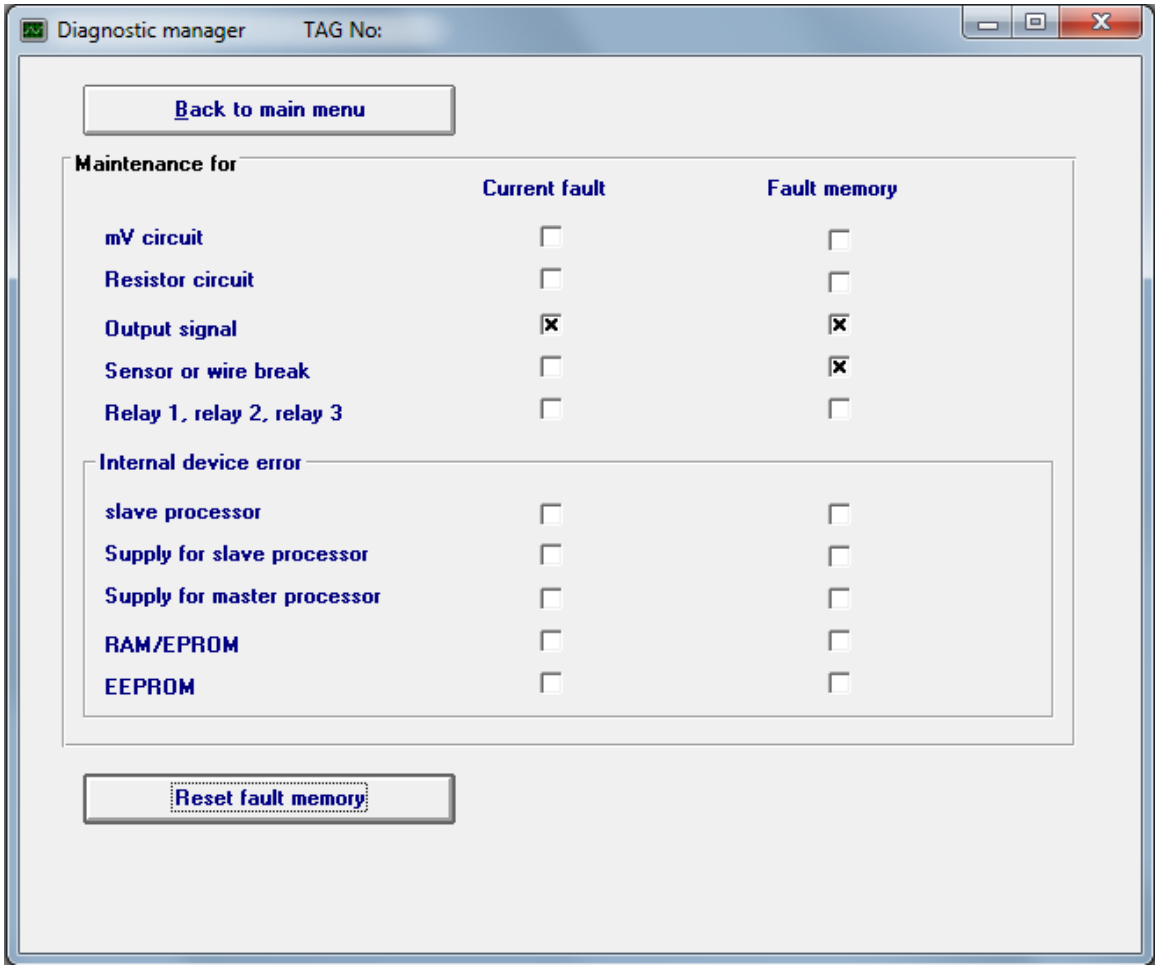


Control of outputs:	Alarm value	on	off	lim-prio

The behaviour of the outputs determined by the ranking:

Analogue output	changes to **Alarm value**
Relay 1	is switched **on**
Relay 2	is switched **off**
Logic 1	stays on **lim-prio**

6.8. Diagnostic manager



The **Diagnostic Manager** records all occurred faults clearly inside and outside the MTP200. All 11 monitoring functions are listed in a table and provided with windows for **Current fault** and **Fault memory** respectively.

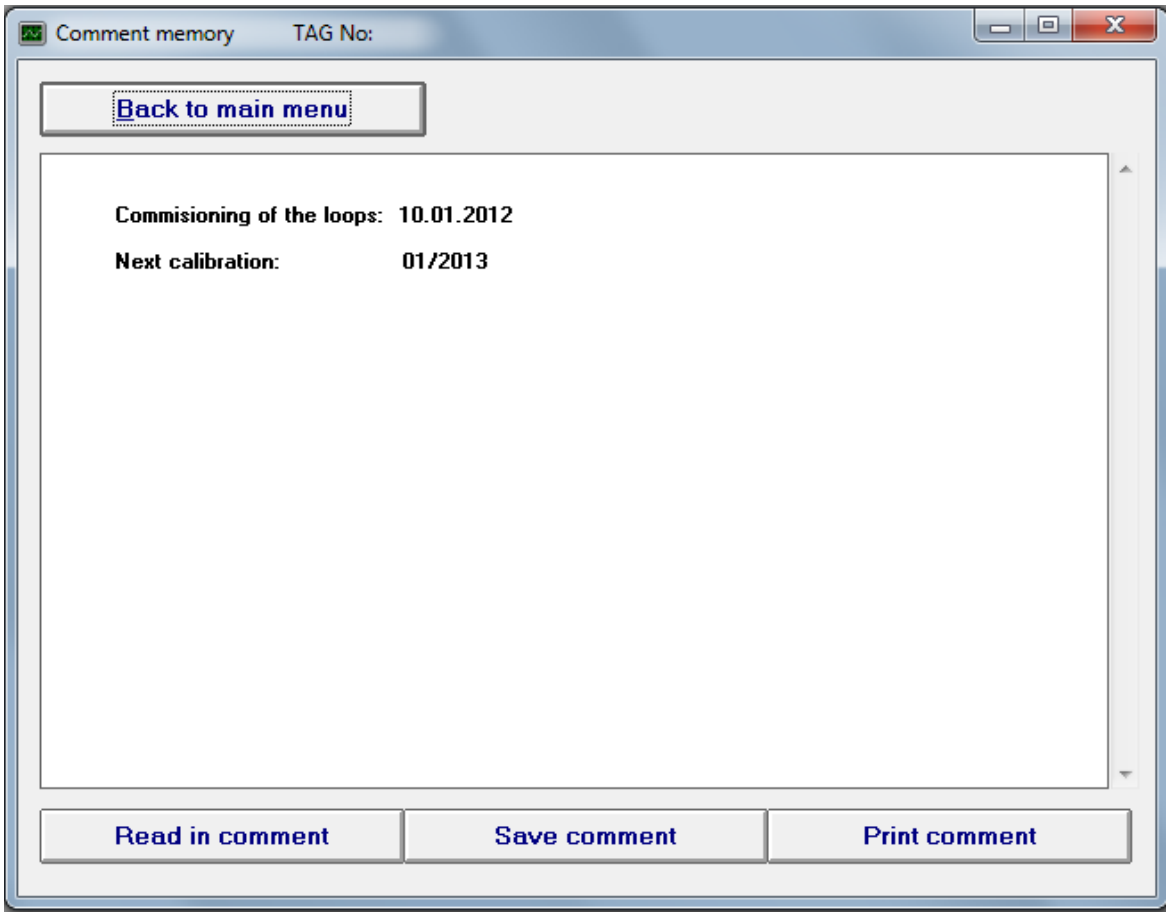
Each current fault is signalled as a maintenance alarm by the continuous red lighted alarm LED and relay 3. The diagnostic manager shows the source of these faults in the window **current faults** and **fault memory**. It is not possible to delete the **fault memory** for a current fault in case the fault is not solved.

The identification of the **fault memory** occurs with a cross, if the determined case of a fault is terminated independent of the duration. Thus the fault cause can be always seen with brief fault events.

By pressing the button **Reset fault memory**, all **fault memory** will be deleted under the condition that these faults are removed.

The **diagnostic manager** documents also short-time occurring faults. After a supply power breakdown the fault memory will be deleted.

6.9. Comment memory

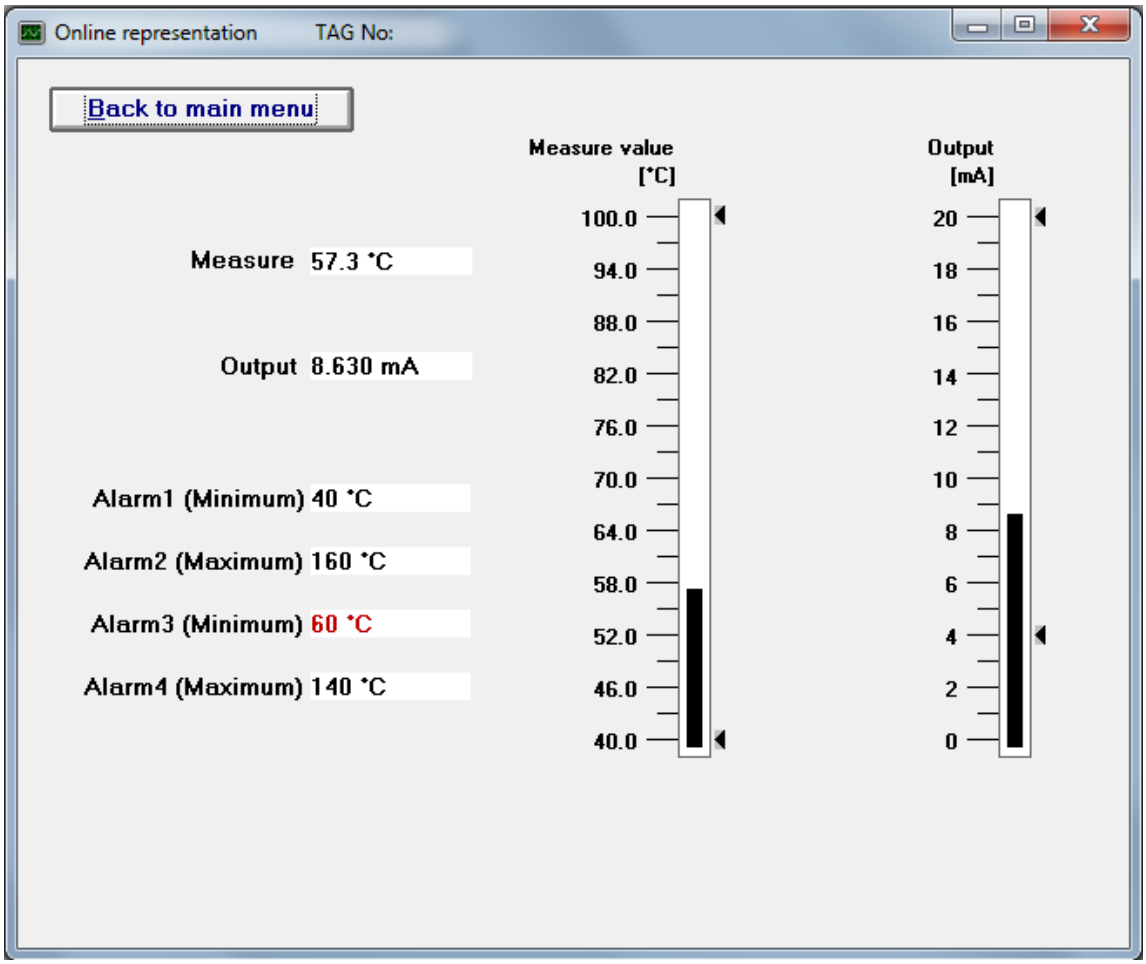


The **comment memory** offers the user a convenient option of saving comments or notes in the MTP200 device. The allowed capacity for comments is a maximum 2000 ASCII characters and may be sufficiently dimensioned for most applications. For protocols, this text can be printed out with the command **Print comment** under **Windows**. The character font and print format are fixed and cannot be edited.

Read comment: text is loaded into the WINSMART program from the MTP200

Save comment: text is written into the MTP200 from the WINSMART program

6.10. Online representation



The **online representation** shows the input and output signal both analogue and digital. Additional the alarms with their limit values are figured. During exceeded limit value or alarm activation, the value is displayed in red. Unused alarms (**no function**) are not recorded in the **online display**.