Smart Transmitter Series **MTP 200-SIL2/AK4**
Smart 2-Wire-Supply unit Series **MSK 200- SIL2/AK4**

High Availability **DuoTec**®-Failsafe Technology
TÜV certificate for DIN 19250 Class AK4
and conform to IEC61508 SIL 2

DuoTec®-Failsafe Technology increases safety and accuracy thus lowering total costs

Introduction

To achieve a maximum safety in production processes, new innovative technologies have to guarantee safety of these processes, in order to note and indicate any disruptions from optimal conditions as soon as possible. With the DuoTec-Failsafe technology developed by Mütec Instruments, these criteria are met by means of self-monitoring security. Additionally measuring accuracy and reliability is increased and lifetime cost of instruments reduced.
DuoTec-Failsafe is the only Interface worldwide with self-monitoring and has achieved DIN 19250 TÜV-certification according to AK4 and it is conform to IEC61508 SIL2.
With the experience of more than 1000 installed systems worldwide and more than 190 gasoline- and chemical tankers equipped with this system during a period of approx 35 years, we venture to express:

"With DuoTec your system is in safe hands"

Application

DuoTec-systems consist of the transmitter (MTP200) and the 2-wire-supply unit (MSK200). They are the Interface between the system (sensors in the field) and the PCS or PLC. The system accepts practically all electrical standard signals (mA, mV, V) and temperature sensors (Pt100, TC). Hazardous area protection to **EExia** (area 0) is available. Two-wire transmitter are supplied directly by the supply unit to **EExib** (area 1) or **EExia** (area 0). The systems itself are not installed in an ex-area. Output signals such as 4-20mA or 0-10VDC, 4 limit values and a maintenance accessory relay are available. All information's are available by serial Interface (RS 232/RS 485).
The measuring transmitter and the measuring transmitter power supply system include limit switches, thus an separate limit switch card is not necessary.

Safety due to Request Class 4 (AK4) and IEC 61508 SIL2

DuoTec Failsafe systems are TÜV-certified according to the „fundamental considerations of security for MSR-protection systems" DIN 19250 for request class 4 and it is conform to IEC61508 SIL2. Request class 4 or SIL2 is the highest class which can be achieved with a single channel system. The higher AK5 or SIL3 only can be achieved by means of redundancy. Additional IEC73, VDE/VDI 2180 and NAMUR-recommendations 21 have been observed.
AK4/SIL2 requirements are achieved by means of 2 micro processors. Additional to the evaluation of measuring values, permanent checks on the whole range of function of the processors is performed. This includes the measuring circuit as well as the output circuit, the auxiliary power supply, the relay contacts and the hard- and software itself. Every 100 ms 10 individual diagnoses are done. If one individual diagnosis is not plausible, a maintenance alarm is tripped and the measured circuit is still maintained, e.g. for a security loop of a collected alarm. The error will be indicated by means of a red Error-LED in the front of the system as well as in the software. If it is only a short-term error (e.g. intermittent contact), this is indicated in the error memory of the software, as well as by means of a blinking LED at the front of the system.
Also measuring accuracy (which has a laboratory-like characteristic of +/-0,01%), is controlled by DuoTec-Failsafe. This is achieved by means of the software adjustable tolerance range, which allows a user selectable deviation from the measuring value. If the systems are used redundantly, even higher security is achieved.

Investigation of well known institutes and multinational enterprises have shown, that a parallel wiring (single wiring sensor to system) offers a multiple higher safety in comparison with a security bounded PLC.

Economic view

❒ No routine check is necessary as the system itself indicates errors and localizes them. Thus even a expensive search of error is needless.

❒ By means of Bus-technology the whole configuration, parameterisation, set-point and alarm settings can be executed safe against manipulation form a central place at the plant. This saves time-expensive ways and keeps the maintenance personnel in safe environment. In case of service security levels have not to be visited for finding of cause.

❒ Measuring inputs are wired individually (parallel). By means of this multifunction of the measuring transmitter deviation between different types of system is not necessary and thus planning storekeeping is much easier.

❒ Easy installation, simple loop-checks, status information's and a protocol of configuration ease putting into service.

❒ Comprehensive documentation of all parameters can be printed, which offers obvious advantages for ISO-certified companies.

❒ Due to transparency of the software requirements for training is minimal.

❒ As well as a single system, completely wired racks, switchboards and redundant power supplies can be supplied.

Main benefits

◆ **Self monitoring by means of 2 micro processors, master-slave-principle**
◆ **DIN 19250 AK4 Certificate and IEC 61508 SIL2**
◆ **Diagnosis manager with error memory**
◆ **4 limit values, 1 maintenance requirement alarm**
◆ **Configuration using WINDOWS-WINSMART**
◆ **Online-display**
◆ **Bus-connection (RS 232 and RS 485)**
◆ **Input: multi-functional**

Technical Features

The entire philosophy of the binary processor technique of **DuoTec**® sets new standard in safety, accuracy and reduction of costs.

❒ Service-level in the front according to DIN IEC 73 and NAMUR NE44 with LED for auxiliary energy, maintenance request and limit values. Furthermore, test sockets for the output circuit and a HART-protocol-terminal (for MSK 200).

❒ Low temperature error of 0,1% per 10°C in a temperature range of–20 up to +70°C.

❒ Highest long-term stability 0,1% for 3 years.

❒ Automatic adjustment of supply voltage at the measuring circuit resistance.

❒ No mechanic components such as trim-pots, switches etc. which are highly susceptible to fault.

❒ The primary pulsed combinational circuit system is insensitive to deviations in voltage. It saves energy, lowers the ambient temperature and increases the lifetime-period.

❒ 20 Bit AD-transformation, separately adjustable input and output filter, monitoring of gradients.

❒ The master-processor at the output (monitoring intelligence) communicates bi-directional with the slave-processor (field intelligence). This cross checking structure increases the redundancy of the system.

❒ The online integrated diagnosis manager shows existing and historical errors.

❒ With the Bus-system, the total cost of ownership (TCO) can be reduced by up to 70% depending on the plant.

❒ Clearly structured documentation is provided on a standard DIN A4-page.

Result: DuoTec increases security and accuracy and simultaneously lowers total costs.

Technical data SMART-transmitter supply system MSK 200 SIL2/AK4

MSK 200
2-wire-supply system in **DuoTec- Technology** with self monitoring
Output: 0/4-20 mA, 1-5/0-10 VDC (actual value)
Galvanic separation between auxiliary energy, input and output
4 individually adjustable limit values
2 relay contact outputs, 2 transistor outputs, 1 collective alarm relay contact AK4
Configuration ON-LINE by means of **WINDOWS-WINSMART**-Software
RS 232-interface on the front panel, RS 485-interface from the multi-pin plug
Auxiliary power supply 24 VDC/AC
Form of construction: 19", 4TE, 3HE

MSK 200-T
as above, but form of construction: mounting rail, DIN EN 50022

Option: „iExa"
Input EExia IIC (zone 0) (by form 19": Option „iEx": EExib IIC (Zone 1)

Option: „SIL2/AK4" Certification according DIN 19250 AK4 and IEC 61508 SIL2

Technical data SMART-universal measuring transmitter MTP 200 SIL2/AK4

MTP 200
Universal measuring transmitter in **DuoTec-Technology** with self monitoring
Input: Resistor and Pt100 in 2-, 3- and 4-wire-configuration,
 all sorts of thermo couples, mA, mV, V
Output: 0/4-20 mA, 1-5/0-10 VDC
Galvanic separation between auxiliary energy, input and output
4 individually adjustable limit values
2 relay contact outputs, 2 transistor outputs, 1 collective alarm relay contact
Configuration ON-LINE by means **WINDOWS -WINSMART**-Software
RS 232-interface on the front-panel, RS 485 interface from the multi-pin plug
Auxiliary power supply: 24VAC/DC
Form of construction: 19", 4TE, 3HE

MTP 200-T
as above, but form of construction: mounting rail, DIN EN 50022

Option: „iExa"
Input EExia IIC (zone 0)

Option: „SIL2/AK4" Certification according DIN 19250 AK4 and IEC 61508 SIL2

## Technical data Measuring data collector / Gateway coupler

MDS 248
Measuring data collector for interconnection of interfaces of max. 31 MTP / MSK 200-systems
Transfer protocol: RTU-MODBUS
Baud-rate to MTP- / MSK 200 and PC: 9600 bps
Auxiliary power supply 24 VDC/AC, form of construction: 19", 4TE, 3HE

MDS 200
Measuring data collector for linking up to 20 measuring transmitter of a 19"-Racks (20x 4TE)
and the GWK 200.
Transfer protocol: RTU-MODBUS
Baud-rate to MTP-/MSK 200 systems: 9600 bps
Baud-rate to GWK 200: 19200 bps
Auxiliary power supply 24 VDC/AC, form of construction: 19", 4TE, 3HE

GWK 200
Gateway-coupler for link between MDS 200, measuring transmitter and the PC as well as PCS.
Transfer protocol: RTU-MODBUS; Baud-rate: 19200 bps
With 99 MDS 200 and 20 MTP-/MSK 200 per MDS 200 up to 1980 systems can be wired.
Auxiliary power supply 24 VDC/AC, form of construction: 19", 4TE, 3HE

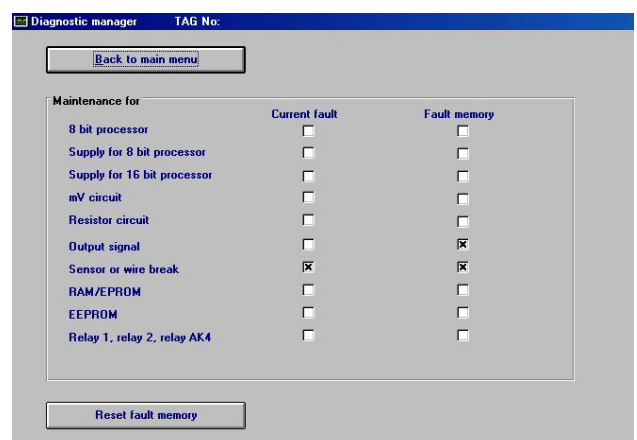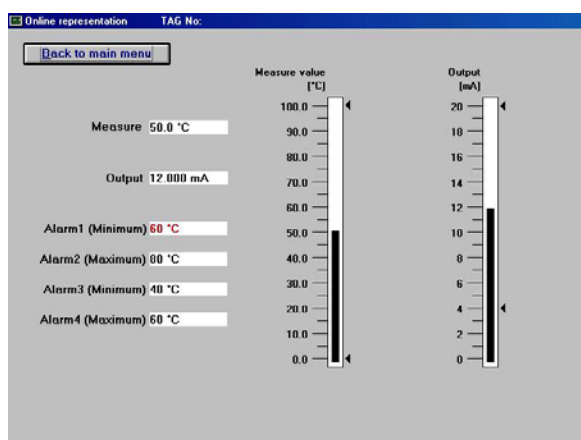## Comfortable configuration with WINDOWS-Software WINSMART

Systems can be configured and parameters modified from the measure monitoring by means of a Notebook with the RS232-Interface on the front panel or by the RS485-Bus. The Software **WINSMART** which is WINDOWS based is very clear and easy to operate. All input data like: choice of thermo couples, Pt100, mA-, mV-signal, all output data, limit values, tolerance ranges, measuring accuracy, filter (also on the output) etc. can easily be adjusted by a Mouse click. Even a survey of MIN- and MAX-gradient is integrated in the mask for limit value adjustment. Input or change of data is protected against manipulations by means of an access code.
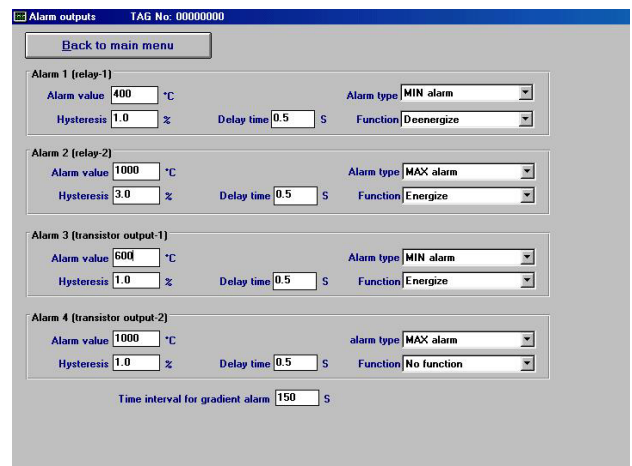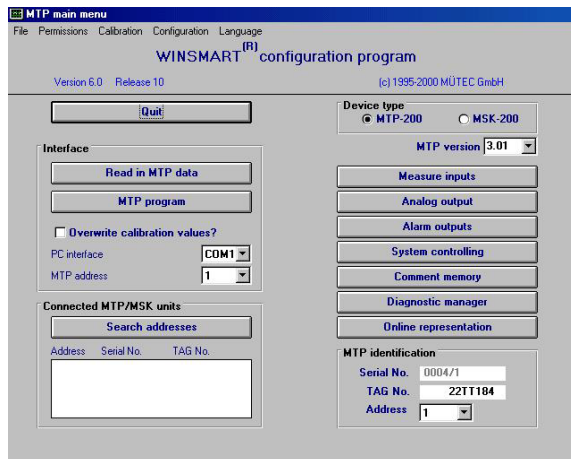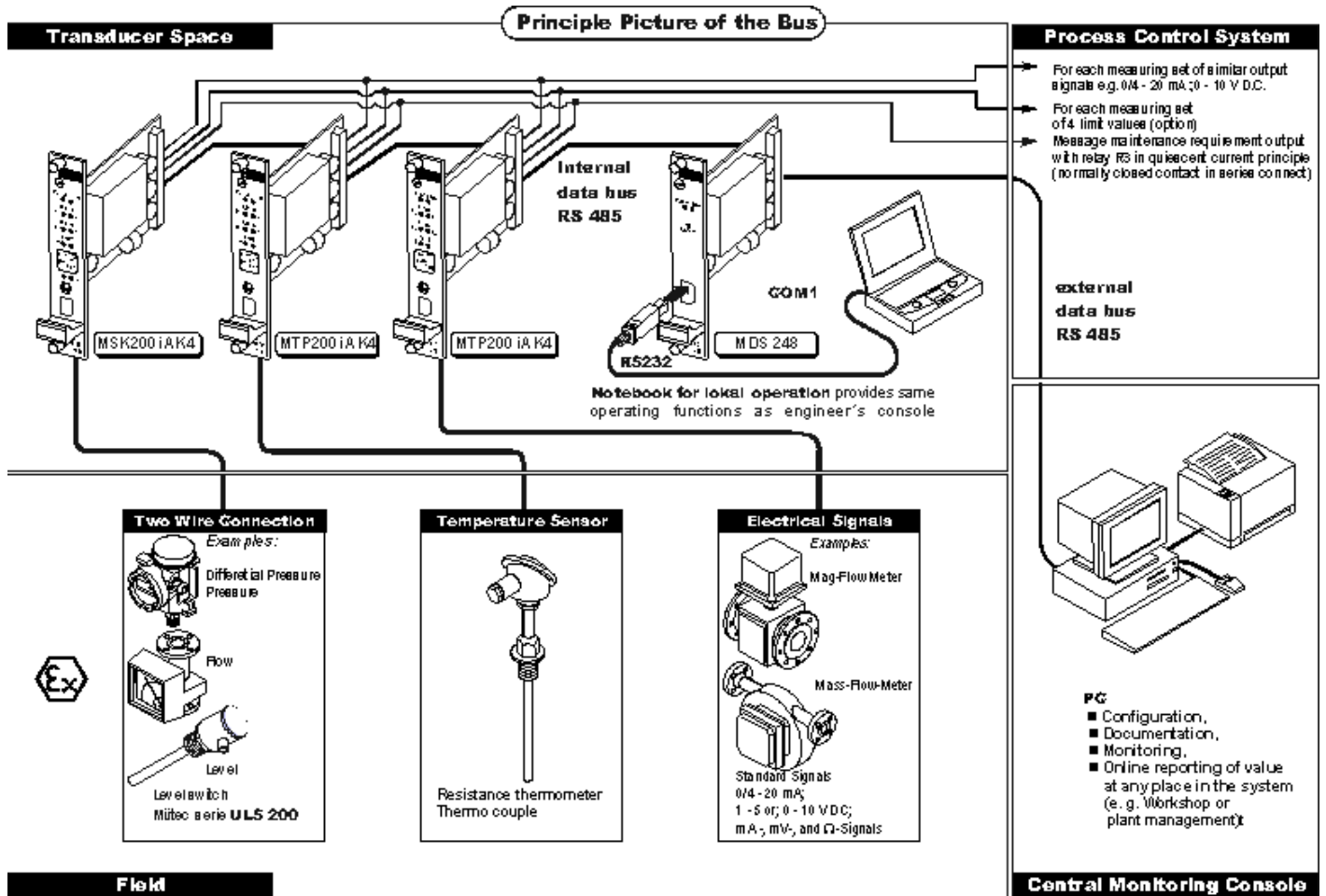

Finding and elimination of errors by means of the diagnosis manager

WINDOWS-WINSMART displays the measuring value in analogue and digital forms in an online-mask. If the limit value is exceeded, this is indicated at the system itself and in the software. A permanent monitoring of limit values thus also is guaranteed over great distances.

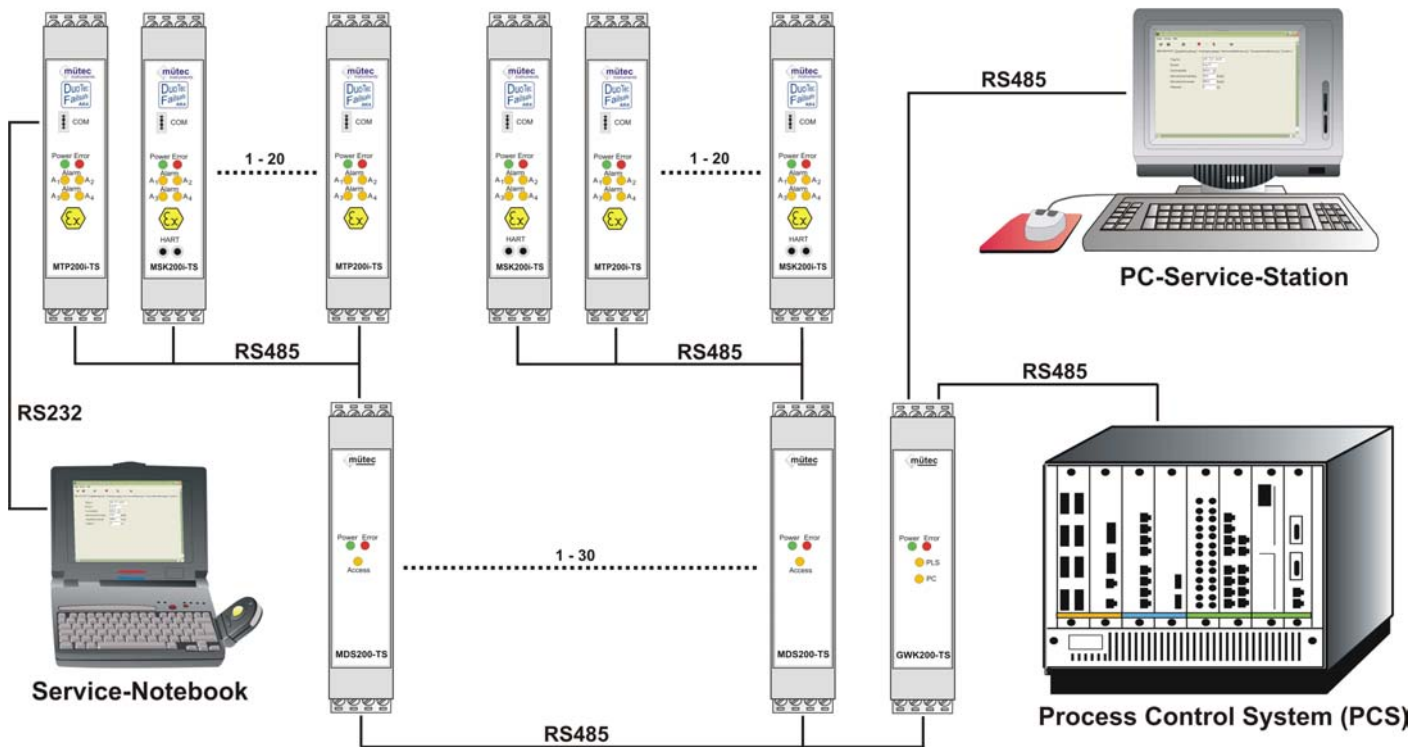The diagnosis manager integrated in **WINDOWS-WINSMART** displays „current fault" and „fault memory". Thus it is guaranteed that even short-term errors like intermittent contacts can be localized. Only by „Reset fault memory" in the diagnosis manager can the error-memory be deleted. A text-memory freely available for user enables a documentation of history of the measuring transmitter and supply system.

Principle Picture of the Bus

Transducer Space

Process Control System

- For each measuring set of similar output signals e.g. 0/4 - 20 mA; 0 - 10 V D.C.
- For each measuring set of 4 limit values (option)
- Message maintenance requirement output with relay R3 in quiescent current principle (normally closed contact in series connect)

Internal data bus RS 485

external data bus RS 485

MSK200 iA K4   MTP200 iA K4   MTP200 iA K4

COM1

RS232   MDS 248

Notebook for lokal operation provides same operating functions as engineer's console

Two Wire Connection

Examples:
Differential Pressure
Pressure
Flow
Level
Level switch
Mütec serie ULS 200

Temperature Sensor

Resistance thermometer
Thermo couple

Electrical Signals

Examples:
Mag-Flow Meter
Mass-Flow-Meter
Standard Signals
0/4 - 20 mA;
1 - 5 or; 0 - 10 VDC;
mA-, mV-, and Ω-Signals

PC
- Configuration,
- Documentation,
- Monitoring,
- Online reporting of value at any place in the system (e. g. Workshop or plant management)t

Field

Central Monitoring Console

WINSMART-Network-Version

RS485

PC-Service-Station

MTP200i-TS   MSK200i-TS   MTP200i-TS   MSK200i-TS   MTP200i-TS   MSK200i-TS

1 - 20   1 - 20

RS485   RS485   RS485

RS232

Service-Notebook

MDS200-TS   MDS200-TS   GWK200-TS

1 - 30

RS485

Process Control System (PCS)

MSK200i-TS: 2-Wire-Transmitter-Power-Supply
MTP200i-TS: Smart-Transducer

WINSMART® Trademark of Mütec Instruments GmbH

DuoCompact and Racks

DuoCOMPACT is a housing for 4 resp. 8 DuoTec-FAILSAFE units. The use of 19"- and DIN-rail technology is the easiest way to combine multiples of the system. The housing is mounted on a DIN-rail and can be wired firmly. Additionally, the cards can be changed even while the process is running). This means even hard-wired systems can be exchanged easily. Thus **DuoCOMPACT** offers, compared to the mounting area needed, the best possible density of function like multi-inputs, analog- and Bus-communication, 4 limit values and diagnosis/indication of error. Due to the modular construction design, extension or modification, and exchange etc. can be undertaken without problems. Additionally, Series **DuoCOMPACT 208** has a redundant voltage supply with integrated diode decoupling.

And DuoTec-systems also are available in racks (19"-Racks) and switchboards according to clients requirements.
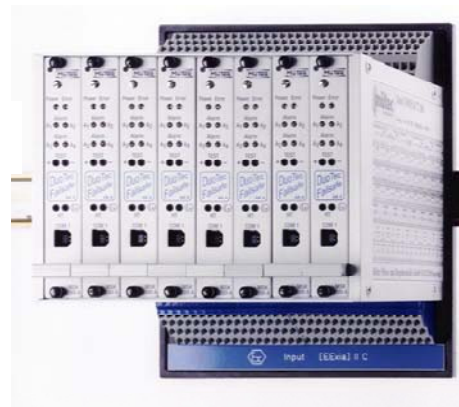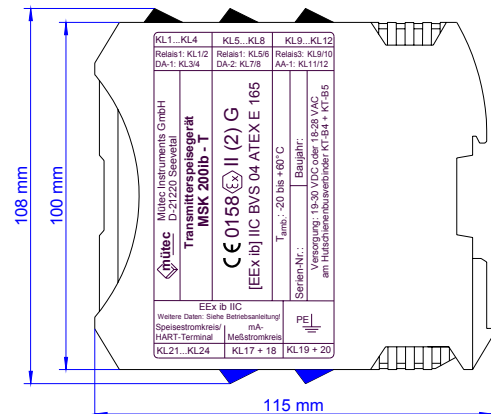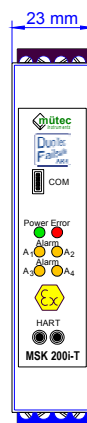
Cabinets
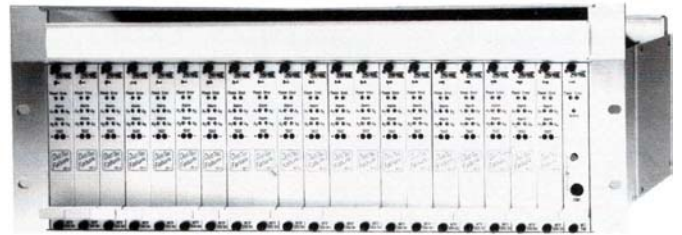
Racks

DuoCompact

DIN-Rail devices

The devices MTP200-T and MSK200-T are designed for picking up directly on a DIN rail. Despite the high function density of devices the small form of construction is only 22.5 cm broad. Deductible clamps make a comfortable wiring.

Test adapter

For fast and secure configuration, calibration and for testing a test adapter is available. The system is easy to use and fits all system types of series MSK 200 and MTP 200.

Certificates

Service

Advice, putting into work, special makings, racks to customer wishes etc.

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