SIL2-Interface/ -Signal Conditioners
Series DuoTec
Certified according IEC 61508/ 61511 SIL2
DIN-Rail- and 19"-Mounting

Since 1970 - Mütec Instruments GmbH

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 certification according IEC 61508 SIL2.

With the experience of more than many 10000 installed systems worldwide during a period of 40 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-power-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 of IEC 61508 SIL2

In addition to standard applications the devices are suitable for fail-safe installations. Fail-safe installations are designed to minimize risk of damage and harm to equipment and personnal by maintaining a safely operation in case of emergency or even controlled shut-down of production line.

World-wide applicable safety standard IEC 61508 and IEC 61511, functional safety of electrical/electronic/programmable electronic safety-related systems, require detailed documentation about remaining risk in emergency situations. Remaining risk of a fail-safe function is calculated from failure probability of all connected/ effected components within the electrical loop.

Four (4) Safety Integrity Levels (SIL 1 to SIL 4) define the level of safety measure for each plant component. Selecting one of the Safety Integrity Levels also determines limiting value of remaining risk. Most common selection for circuit calculation is SIL 2, rarely is SIL 3 used.

Mütec Instruments GmbH was the first company seeking certification for its transmitters and transmitter power supplies. Initial certification was established in 1999 by TÜV Nord according to DIN19250 for class SIL 4. Starting in August of 2004, all devices are now IEC/EN 61508 SIL2 certified.

The enhanced certification along with our vast experience from long term installations in a wide array of diverse applications guarantees highest safety and reliable operation. Additional the devices are proven and on the vendor lists of many well known companies.

Continuous self monitoring

The principle design in the DuoTec systems consist of two (2) independent microprocessors. These microprocessors continuously monitor themselves and all involved functions while processing measurements. These functions include the measurement circuit, output circuit, power supply circuit, relay contacts, microprocessor hardware, and software. Within 100ms a total of 10 single diagnostic functions are initiated. If any of the diagnostic functions don't pass a plausibility algorithm a service alarm is generated. In any event, a open contact (closed-circuit current) is available for either a safety loop or group alarm. A front-sided red LED visually indicates an alarm directly at the transmitter and is displayed on a connected monitor via our WINSMART software. In case of an intermittant alarm, for instance a loose cable connection, this error is protocoled in the error register and visually indicated by a blinking LED at the transmitter.
Since the DuoTec system independently monitors itself routine maintenance is not required. A detailed error description allows for fast and efficient error analysis. In case of an error an automatic procedure to safely shut-down a production line can be initiated.

Main benefits

- ◆ **IEC 61508 SIL2 and TÜV-Certificate according to DIN 19250 AK4**
- ◆ **Self monitoring by 2 micro processors with diagnosis manager with error memory**
- ◆ **4 limit alarms, 1 service alarm**
- ◆ **Optional 2 analog outputs**
- ◆ **Bus-connection (RS 232 and RS 485) and configuration software WINSMART**
- ◆ **DIN-rail or 19"-mounting**
- ◆ **Input: multi-functional / power supply**

Further benefits

- ▪ Optional for hazardous area protection to Exia (area 0) according to ATEX.

- ▪ Diagnosismanager with analyse of the error and error memory (e.g. for the early recognise of loose connection). That means a routine maintenance or a cost intensive error fault detection is not necessary and ensures a high available plant.

- ▪ 1 error-relays as collection alarm.

- ▪ All devices with 2 free configurable relais and two transistors equipped and for limit monitoring and/or error monitoring applicable. Therefore all DuoTec-devices has the function of limit monitoring.

- ▪ Only 2 types of devices: Universal transmitter MTP for e.g. Pt100, Thermocouple, current, voltage, potentiometer etc. and the power supply MSK for giving supply to 2-wire-sensorsas well as current and voltage input. By means of this multifunctional the DuoTec-Series a stocking up of many transmitters with different inputs and functionalities is not necessary. That means optimal resp. cost effective storage and a maximum amount of flexibility.

- ▪ Front sockets for HART-signal lead through by MSK 200 (optional via analog output).

- ▪ Galvanic separation between input, output and supply and interface as well as 5 galvanic separated alarm outputs (3 * relays, 2 * transistor).

- ▪ All devices for DIN-rail or 19"-mounting with identical functions and a uniform software, so that with the same technology/ function (and software) are different mountings could be used.

- ▪ At the DIN-rail mounting the supply can be carried our via a adapter in between a conventional DIN-rail or alternative via a clamp. Via the adapter a bus connection (RS485-interface can be used as well.

Technical data SMART-transmitter power supply MSK 200 SIL2

MSK 200-E   2-wire-supply system in **DuoTec- Technology** with self monitoring, isolator
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
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-TE   as above, but form of construction: mounting rail, DIN EN 50022, 1 transistor output

Option: „iExa"   ATEX II (1) G [Ex ia] IIC

Option: „SIL2"   IEC 61508 / 61511 SIL2

Technical data SMART-universal measuring transmitter MTP 200 SIL2

MTP 200-E   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-TE   as above, but form of construction: mounting rail, DIN EN 50022, 1 transistor output

Option: „iExa"   ATEX II (1) G [Ex ia] IIC

**Option: „SIL2"**   IEC 61508 / 61511 SIL2

Technical data SMART-transmitter power supply with two analog outputs MSK 200-TV2 SIL2

MSK 200-TV2   2-wire-supply system in **DuoTec- Technology** with self monitoring, isolator
2 analog outputs: 0/4-20 mA, 1-5/0-10 VDC (actual value)
HART via analog output 1
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 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: mounting rail, DIN EN 50022

Option: „iExa"   ATEX II (1) G [Ex ia] IIC

Option: „SIL2"   IEC 61508 / 61511 SIL2

Further Technical Data See Manual

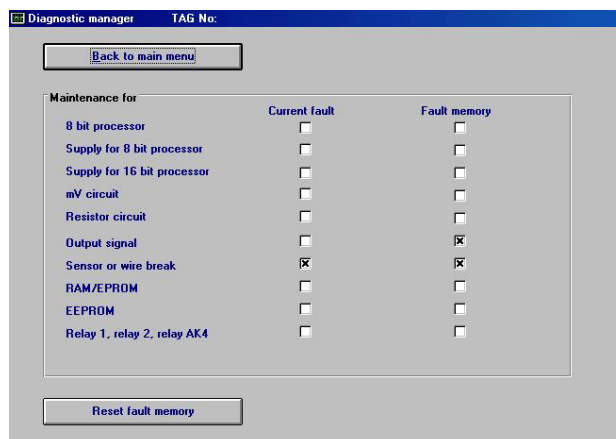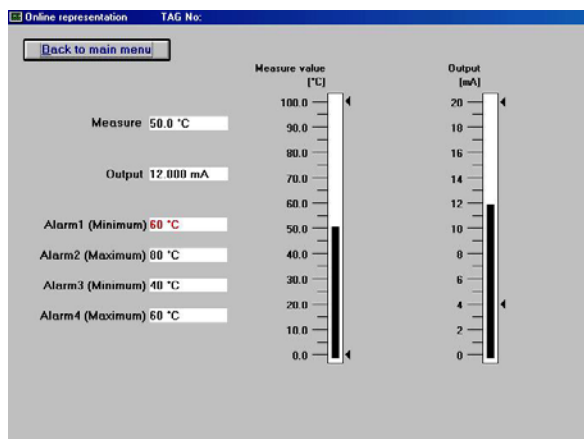## Comfortable configuration with WINDOWS-Software WINSMART

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.
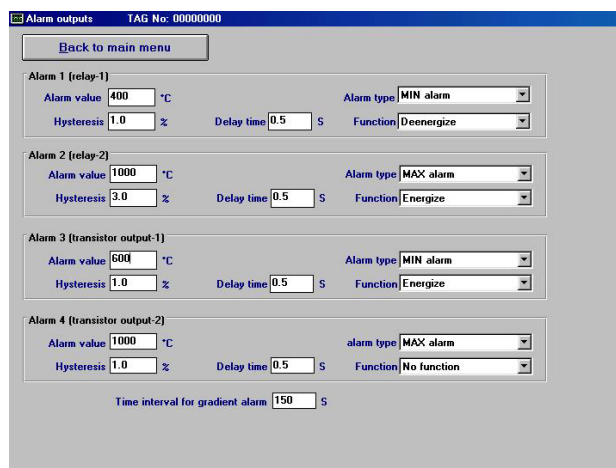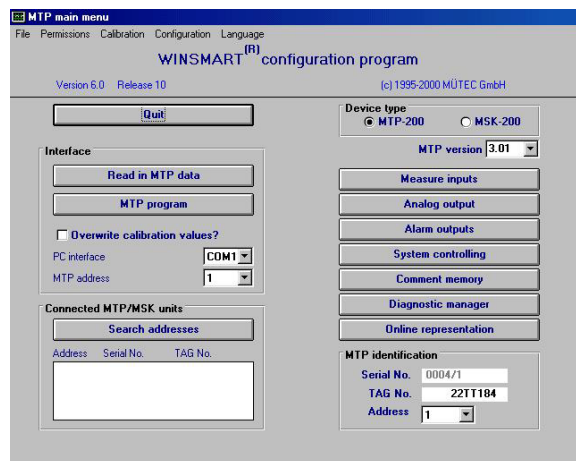
Finding and elimination of errors by means of the diagnosis manager

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

Internal data bus RS 485

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)

external data bus RS 485

COM1

MSK200 iAK4   MTP200 iA K4   MTP200 iA K4   RS232   MDS 248

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

Two Wire Connection
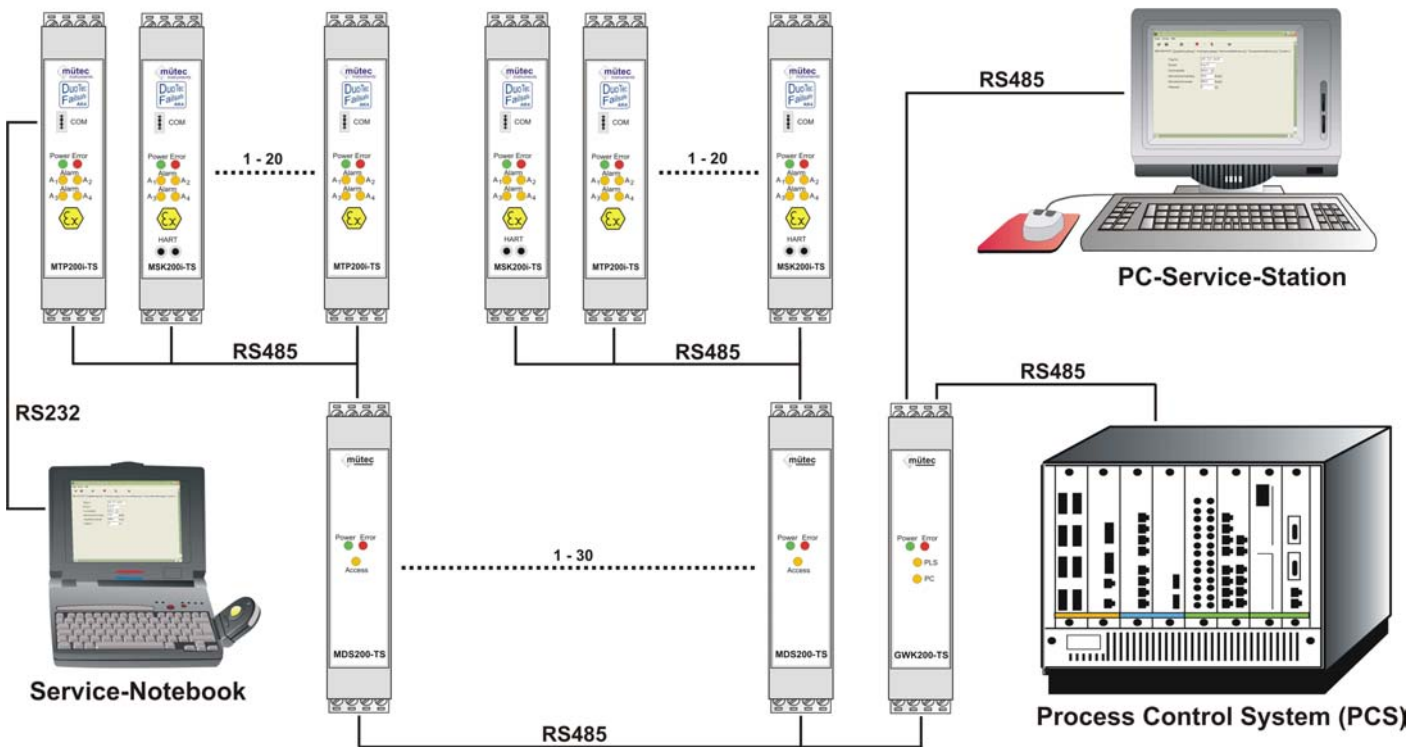Examples:
Differential Pressure
Pressure
Flow
Level
Levelswitch
Mütec serie ULS 200

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

Field

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

Central Monitoring Console

WINSMART-Network-Version

RS485

PC-Service-Station

1 - 20   1 - 20

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

RS485   RS485   RS485

RS232

1 - 30

MDS200-TS   MDS200-TS   GWK200-TS

Service-Notebook

RS485

Process Control System (PCS)

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

WINSMART® Trademark of Mütec Instruments GmbH

19"-Racks and -Cabinets

The DuoTec-devices can be delivered in 19"-Racks and / or cabinets according individual customer requirements.
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Cabinets

Racks

DIN-Rail devices

The devices MTP200-TE and MSK200-TE 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 mm broad. Deductible clamps make a comfortable wiring.
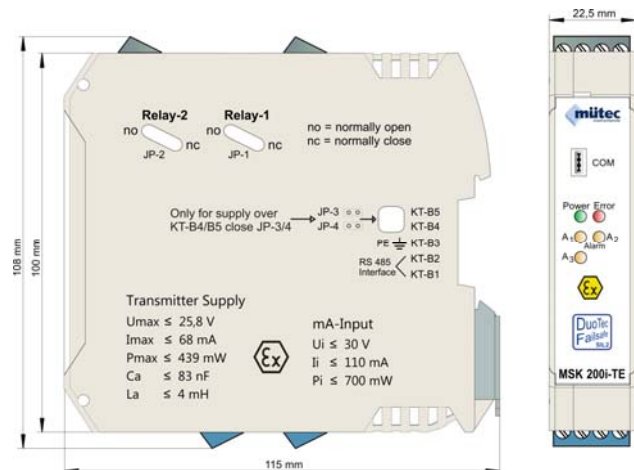
More models

MTP300i-SIL

Beside the DuoTec-Series are more transmitters offered, which are certified according to IEC 61508/ IEC 61511. Moreover Mütec develops Hard- und Software according to customer requests and licensed with appropriate certificates.

MTP300d-CJC

Service

Our Service:

- **Individual developments of Hard- and Software also under consideration of certificates like ATEX, SIL, etc. and quality requirements**
- **Customized versions**
- **Individual consulting**
- **Pin-compatible 19"-devices**
- **Customized racks and cabinets**
- **Putting into operation**
- **Repairs of 19"- and DIN-rail devices**

Certificates

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DuoTec® und **WINSMART®** sind eingetragene Warenzeichen der Firma Mütec®.
Änderungen jederzeit vorbehalten.