



Industrial electronics

Product catalog 2017

www.ghm-messtechnik.de

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Quality is GHM
Uncompromising measurement

Industrial electronics

Modern industry places increasingly higher requirements on all systems and components involved in the production process. With modern systems there is an expectation that downtimes are reduced to a minimum and that maximum process efficiency is achieved. Furthermore, the cost savings and associated competitive ability of a new acquisition are important requirements and a major emphasis for every machine modernisation. We meet these requirements with our modern product platform which is produced using state-of-the-art development methods and production processes in our factory.

Industry is facing the upcoming Industry 4.0 future project in the coming years. After the first industrial revolution in the area of mechanisation and mass production, we now have the intelligent factory in the digital revolution. Work should take place in a resource-saving manner with better integration of customer requirements in the value-added chain. In order to achieve this goal, increasingly more process values from the widest variety of production processes will have to be combined without losing the information that is relevant for the users on site.

GHM Messtechnik is also taking on this challenge and, in collaboration with its customers, developing highly efficient devices and systems for the next industrial revolution.



Our customers

Our customers come from a wide variety of areas in machinery and plant construction.

The following areas are emphasised:

- Food and beverage
- Plant and machinery construction
- Industrial and laboratory furnace construction
- Gas and oil industry
- Ship construction
- Plastics industry
- Chemical and pharmaceutical industry

This broad spectrum is the basis for an outstanding product assortment which satisfies the widest variety of requirements of numerous sectors. And if we do not have the right product in our portfolio, we are capable of quickly developing and producing the right product for the task on short notice, thanks to our application-based development and in-house production depth.

Our products

Our product spectrum in the area of industrial electronics extends from process value detection to signal processing, display, control and regulation, to actuators for intervening in the process. In this connection, our products always pursue the goal of being as efficient as possible in all areas of the product life cycle, and that applies particularly for:

- space-saving assembly
- quick and uncomplicated integration
- short wiring times
- simple commissioning without software, whenever possible
- use of intuitively operated configuration software, wherever it is necessary
- clear process information for operators in order to minimise downtimes
- fulfilment of necessary regulations, such as EN 14597 or SIL
- long service life

The true cost efficiency is evident over the entire period of use, beginning with the integration, followed by commissioning, and then long service times during the operation life. Our products satisfy this demand with solutions ranging from the simple sensor via standard isolating amplifier to the modular automation unit.

No guarantee is taken for statements or indications referring to prices, product texts and/or product pictures; errors and technical changes excepted.



Industrial electronics

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E Industrial electronics

E1

Multifunctional controller / Displays / Controller

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Multifunction controller



Features

- PID control function
- Multi-Loop system
- Program controller function
- Process control with more than 100 functions
- Process calculations with mathematical library
- Screen recorder function
- Data logger function
- Communications card with various field buses
- Process visualisation with 3.5" TFT display
- Process control with 4 function keys and touch display
- Modular I/O concept

Application areas

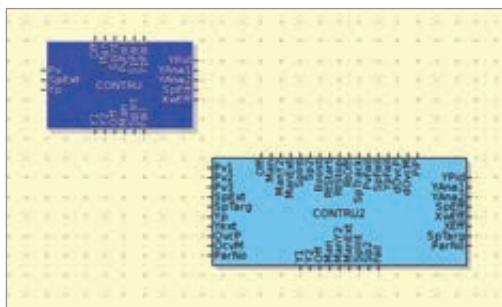
- Industrial plants
- Food industry
- Machine construction
- Power generation
- Water supply
- Hardening plants
- Plastics industry
- Shipbuilding
- Pharmaceutical industry

Product information

Function

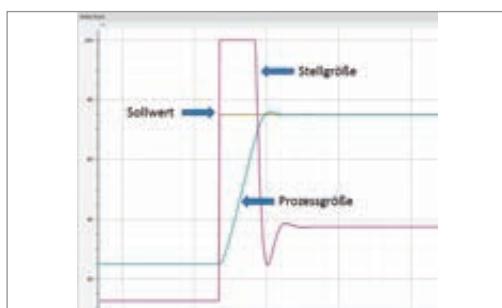
The GHM ONE is the centrepiece of development for control technology in the GHM Group, and serves as a basis for further development in industrial compact controllers. The GHM ONE is a multifunction platform with a modern and innovative concept for measuring, controlling, computing, data recording, visualisation, operating and regulation. Adaptation to the requirements of the systems takes place with a single software package, "GHM CAT", which can be operated without any programming skills.

The core of the GHM ONE is a high-precision PID controller with self-tuning that can be adapted for the widest range of control and regulation tasks. In the process, the aim is optimal regulation of the process according to the operating company's requirements. In this connection, product quality, process stability, and a minimisation of process times are emphasised. The GHM ONE offers various controller functions that can be combined using efficient function blocks to create an overall application in order to implement these requirements. (Fig. 1)



(Fig. 1)

The newly developed algorithm for self-tuning already uses the optimal controller parameters in numerous processes and thereby assures short commissioning times. The controller algorithm developed specially for the GHM ONE is the basis for short adjustment times with only minor deviations of the control variable. (Fig. 2)

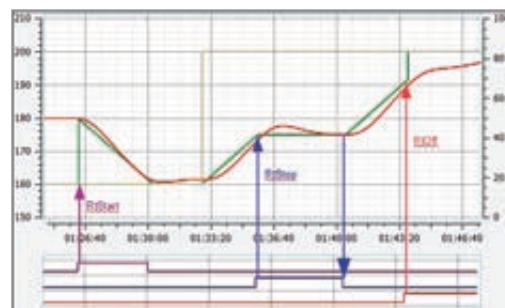


(Fig. 2)

The control quality can be influenced at any time by the user or even by the process in order to also continuously ensure the optimum utilisation of energy and material during the operating time. For instance, sensible adaptation of the setpoint is always a challenge in order to avoid putting product quality at risk or subjecting the switching equipment to excessive stress. The GHM ONE controller offers the possibility of a setpoint ramp for this purpose. The setpoint jump of the operator or the SCADA system is automatically implemented as a ramp. (Fig. 3)

The ramp function can be activated and deactivated again at any time. Normally, the regulation of non-linear segments or of systems with various load structures also poses a challenge. The GHM ONE supports the user in this connection with the possibility

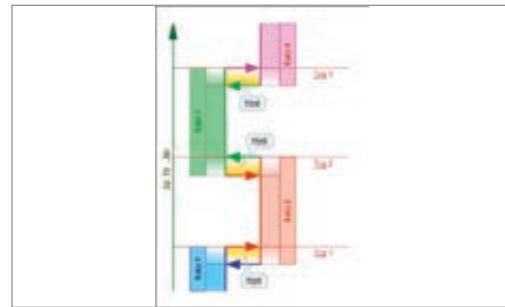
Multifunction controller



(Fig. 3)

of process-dependent PID parameters, among other things. Therefore, a suitable set of parameters can be used for various phases of the process.

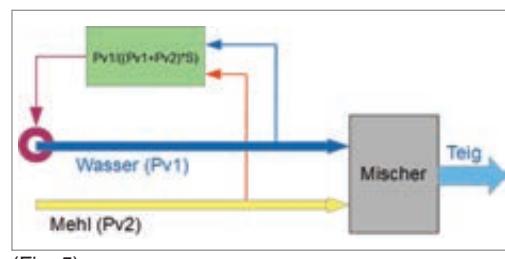
(Fig. 4)



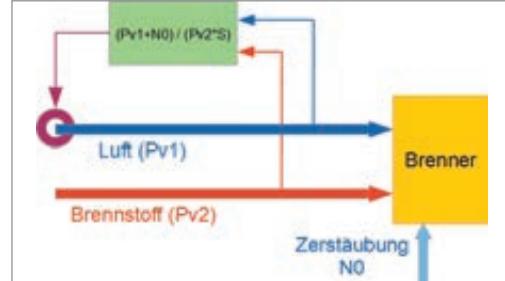
(Fig. 4)

In the process, the switching takes place either automatically or via operator command.

In addition to the regulation of a process factor, there is always the requirement of controlling the relationship of process factors. The control module supports the user in this connection with special functions for actual value processing. Therefore, the user can create a regulation of the mixture ratio of materials (Fig. 5) or even correct a stoichiometric combustion air ratio. (Fig. 6) The user can even implement the requirement of a three-component regulation without programming skills. (Fig. 7)



(Fig. 5)

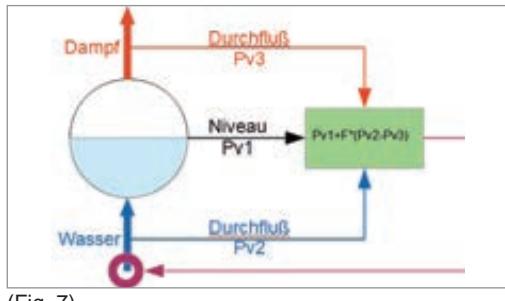


(Fig. 6)

Multifunction controller

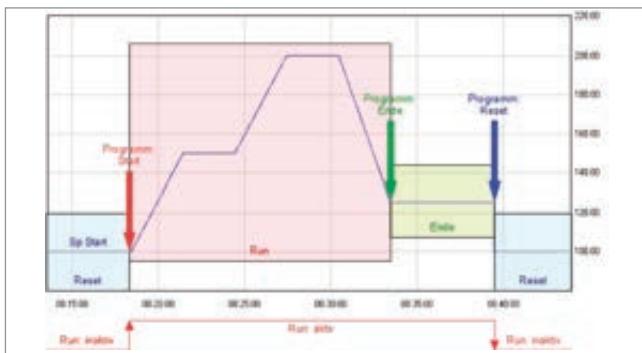
Product information

Since the controller module can be used multiple times in GHM ONE, it is possible for the user to also build more complex control structures, such as cascade control to increase the control quality of intricate processes or an override control (forced control) to avoid excessive stress of components. Of course, it is also possible to build a multi-loop control system without difficulty.



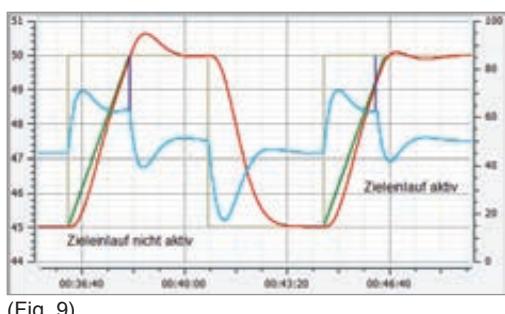
(Fig. 7)

In many processes a temperature profile or various mixture ratio play an important role during production. In order to ensure that the user does not have to create an elaborate profiler on their own, GHM ONE offers a profiler with profile editor. (Fig. 8)



(Fig. 8)

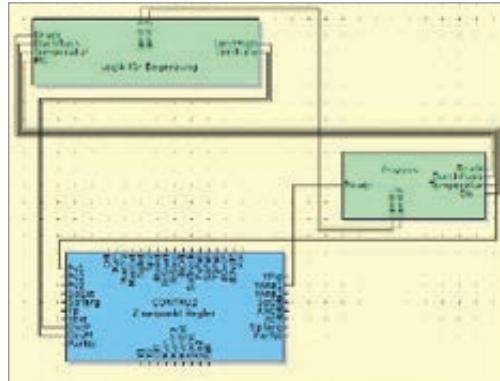
This profiler can be used multiple times within an application. An essential element for setpoint profiles is the ramp function. With an external profiler the user is repeatedly faced with the situation of a heavy overshoot occurring at the end of a ramp. GHM ONE knows to counteract this disadvantage with a connection between the profiler and the controller module. (Fig. 9)



(Fig. 9)

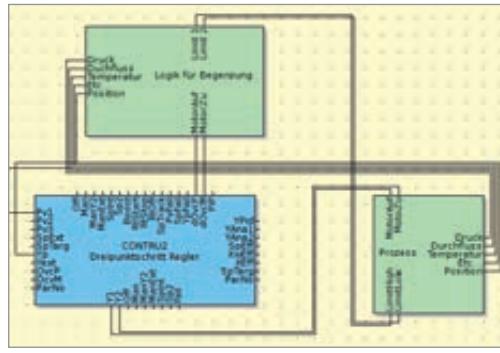
For this purpose, the controller module has a newly developed finish function. This function ensures that undesired jumps of the variable at the end of the ramp are avoided. Therefore, a gentle approach to the setpoint is realised. The computing functions of GHM ONE can be used for the calculation of process factors, such as a heat quantity. It is also possible to use the results for additional control processes.

For instance, a limit control can be effectively implemented in a chemical application (Fig. 10) or the regulation of the C-level in carbonisation processes.



(Fig. 10)

The logic modules can also be optimally used in this connection. (Fig. 11)



(Fig. 11)

Along with the functions for control technology that are expected in today's industry, the GHM ONE controller offers numerous additional functions such as individual adaptation of the operation and visualisation, the possibility of integration of process control, the recording and visualisation of process variables, and communications modules for integration into various process landscapes. This all makes GHM ONE the complete solution for smaller to medium-sized processes.

Product information

Multifunction controller

Advantage

- Industrial controller and mini PLC in one device
- No programming skills required to create an application
- Individual operation and monitoring concepts for a wide variety of processes
- Modular hardware concept for optimal adaptation to the process
- Possible saving of individual controllers, data recorders, and visualisation systems

Equipment	Function	Input	Output	Installation	Page
GHM-ONE	Measure/Control/Regulate			control panel installation	13

Subject to errors and changes.

Product information

Multifunction controller GHM-ONE MSR9696H



- Visualisation system with 3.5“ TFT display
- Control unit with 4 function keys and touch display
- Modular I/O concept
- PID control function
- Multi-Loop system
- Profiler function
- Process control with more than 100 functions
- Process calculation with mathematical library
- Screen recorder function
- Data logger function
- Communications card with various field buses

Features

The GHM ONE is a multifunction unit that can be specifically adapted to process and control requirements with the GHM CAT configuration software. Therefore, the system becomes an ideal control, regulating, and operating unit.

The GHM ONE gives the user the possibility of effectively implementing their ideas in the areas of automation and visualisation without the need for programming skills. The platform is an ideal basis for a wide range of applications, including:

- Industrial furnaces
- Laboratory ovens
- Heat treatment systems
- Microbreweries
- Dryers
- Test stands
- Building automation
- Climate control
- Pasteurisation systems

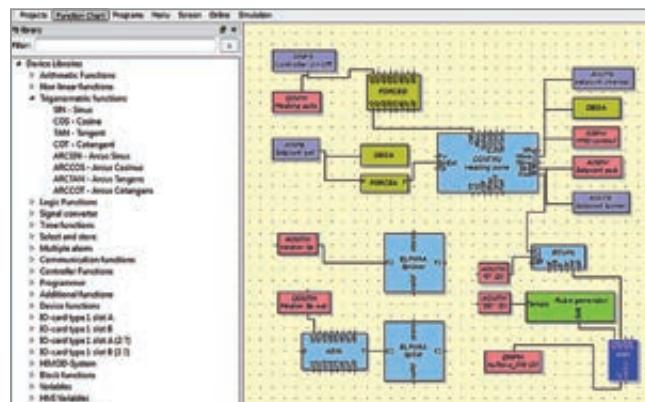
The MSR9696H is based on a powerful processor which, in combination with a relay card and mains adapter card, serves as the base unit. The base unit can be adapted to applications with a communications card and up to 2 I/O cards. The number of physical inputs and outputs can be expanded with external I/O's. This modular layout enables specific adaptation of the hardware to the automation task. The creation of the application itself takes place in the MSR 9696H with the „Configuration and Application Tool“ CAT. The software assists the user with more than 100 complete function blocks and intuitive operation for the implementation of their ideas.

This saves time when creating applications with high operational reliability.

Multifunction controller

Quick and easy to put ideas into practice

The creation of applications is child's play with the MSR 9696H. Based on the concept of connecting of existing function blocks, the user creates applications comprising process controls, mathematical calculations and process regulation in the shortest possible time. For this purpose the CAT configuration software provides a function library with more than 100 tested functions from the following areas:



- Input and output signals
- Computing functions
- Logic functions
- Signal conversion
- Time functions
- Memory functions
- Communications functions
- Profiler functions
- Regulating functions

The user only has to combine and connect these functions in the editor and thereby implement their idea without the need for any programming skills. Testing of the individual functions is omitted, because they are provided ready-to-use, and were not created by the user. Therefore, the user can concentrate entirely on implementing their idea. In addition to the support provided to the user by the function library, the CAT configuration tool offers additional functions in the editor. For instance, the user can structure their application in order to maintain an overview, create their own function blocks for recurring functions in order to save time, and test sub-areas of their application independently of other project areas with simulation functions.

With consistent use of the latest software architectures and functions, it is possible for the user to realise their application with CAT without an extensive familiarisation period.

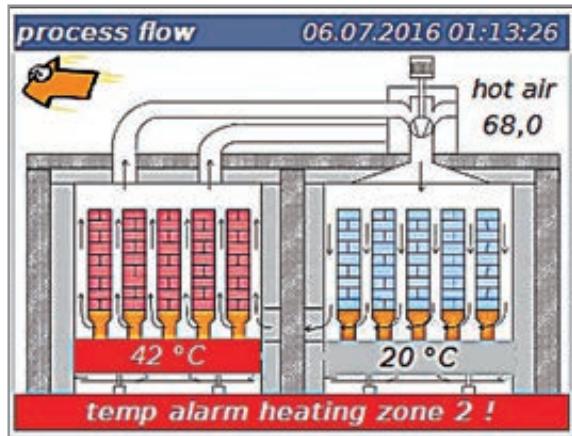
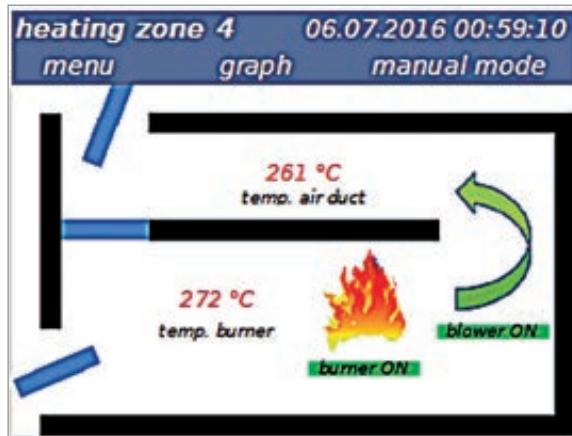
Product information

Individual operating and monitoring concepts

The work does not end with the creation of pure process control and regulation for modern machine and system parts. The process technician must provide the operator on site with the possibility of effectively monitoring and operating the system. The user must also remain well-informed in the event of a fault in order to keep the system downtime to an absolute minimum. Standard operating concepts are of little help in this connection. Therefore, the MSR 9696H is based on a concept that enables individual design of the operation and visualisation.

For this purpose, the CAT software provides an image editor that makes it possible to realise the widest range of operating and monitoring concepts with a few simple standard functions. In addition to the individual operating screens, there are standards screens such as:

Regulator operation	Program controller operation
Trend visualisation	Parameter dialogue



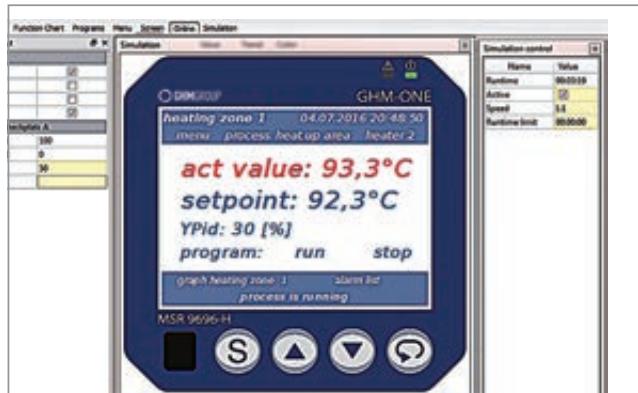
available in the screen editor. With the combination of standard operating screens and individually designed screen, an efficient interface between the operator and the process is created in the shortest time.

Thanks to the efficient software structure, even complex operating structures are easy to realise with the image editor.

Multifunction controller

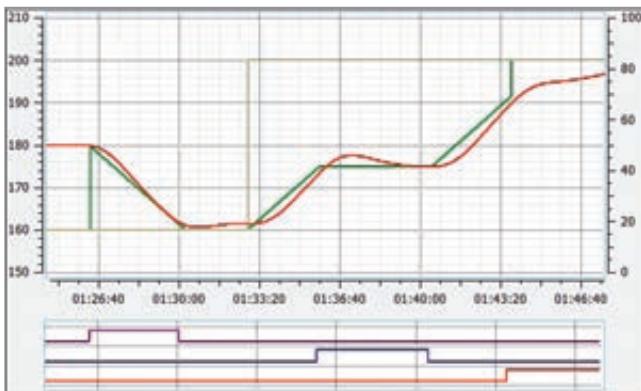
Commissioning and testing quickly and easily

Of course, the process technician's work is not finished with the creation of an application and its operation. The application still has to be tested and commissioned afterwards. For this important and in some cases lengthy phase, the new GHM platform provides various functions to streamline this phase.



An essential point is the PC simulation of the complete application. The entire application can be tested on a PC independently of the actual process. For this purpose, the CAT software has a simulation environment for the MSR 9696H and for connected I/O assemblies. With this environment, the user is capable of testing the entire application, including operation on the PC, without endangering the real process. Simply test the application at a desk without risk.

There are additional testing functions available to the user for the on-site system commissioning phase. An essential component is an integrated online trend function that allows the user to view all analogue and digital signals online in a trend and thereby quickly and easily monitor the desired functions. Of course, there are also debugging and various forcing functions available for the testing.



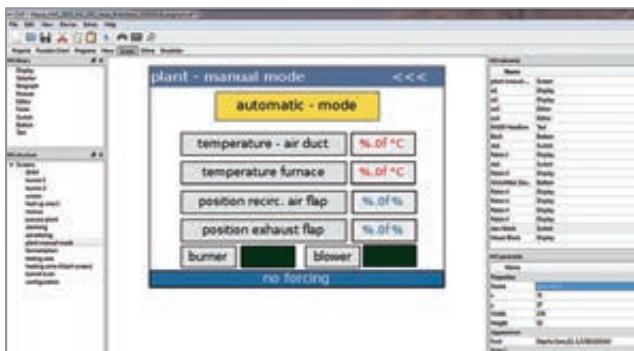
Simulation on a PC significantly shortens testing and commissioning times and increases system safety.

Product information

Application designer in CAT

CAT software configuration tool

The CAT (Configuration and Application Tool) tool enables the user to completely configure the GHM ONE. It essentially comprises the function plan editor, the HMI editor, the menu editor, the simulation, and commissioning assistance with debugging function and online diagrams.



The major functions are:

- Creation of the application from finished functions found in various libraries
- Graphic linking of functions in the function plan editor
- Automatic alignment of connections
- Parameterisation of functions
- Creation of operating structure and visualisation (HMI)
- Creation of test menus for parameterisation on the GHM ONE
- Creation of programs for the program controller
- Simulation of the overall application on the PC, including simulation of control paths
- Online device function with debugging functions for application testing
- Transfer of applications to the GHM ONE.
- Firmware update function
- Online help for all functions

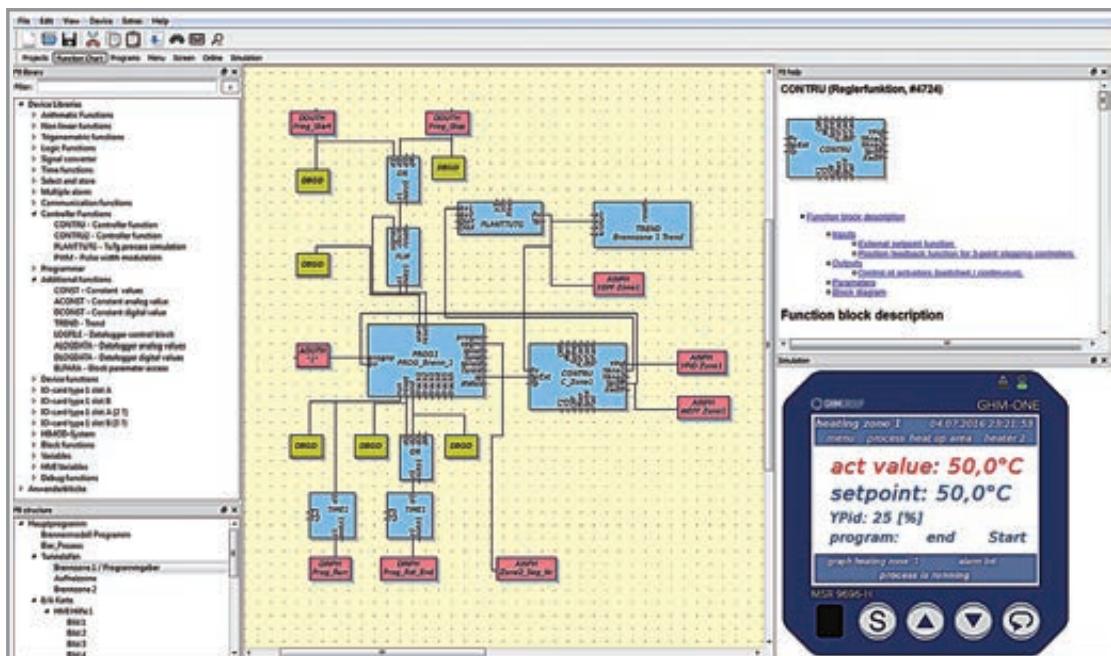
Multifunction controller

The core of the application creation is the function plan editor with the function module library. With the help of the function modules, the user assembles their application without the need for any programming skills. Three are more than 100 tested functions in the library which can be easily placed on the desktop and connected using the mouse. Declaring of variables and complex assignment of functions are omitted. In this manner, the user can effectively create their system or process from finished modules. The application operating and monitoring screens are then created based on the function block application. Therefore, specific information can be displayed for the person on site and detailed screens can be created for service technicians. These screens are freely configurable. It is even possible to integrate process screens or other graphics. The user can also create text-based operating screens in order to enable efficient input of several types of process data.

After the application has been created, it can also be tested in the CAT tool. With the simulation, the software offers an exact representation of the device in all its functions. Even the hardware inputs and outputs can be simulated. Therefore, the user can test the application in an initial step without any risk for the system. Support of the user by the CAT software continues in the scope of the commissioning with various forcing and debugging functions and a refined online visualisation of analogue and digital values. With this wide variety of information and intervention possibilities, efficient commissioning is practically assured.

All configurations for the GHM One takes place in a single tool. The elaborate orientation in various software packages for controllers, data monitors, data loggers, mini-SCADA and mini-PLC can be dispensed with.

Application commissioning and testing times are minimised with a complete device simulation.



Product information

Communication channels

The expansion of the MSR9696H with additional analogue and digital signals from the field is possible with the optional communications card. The expansion can take place via the GHM I/O system, in which case no additional bus coupler is required in the field. The hardware concept of the MSR 9696H also provides the possibility of connecting external I/O and other field bus participants via various field bus system

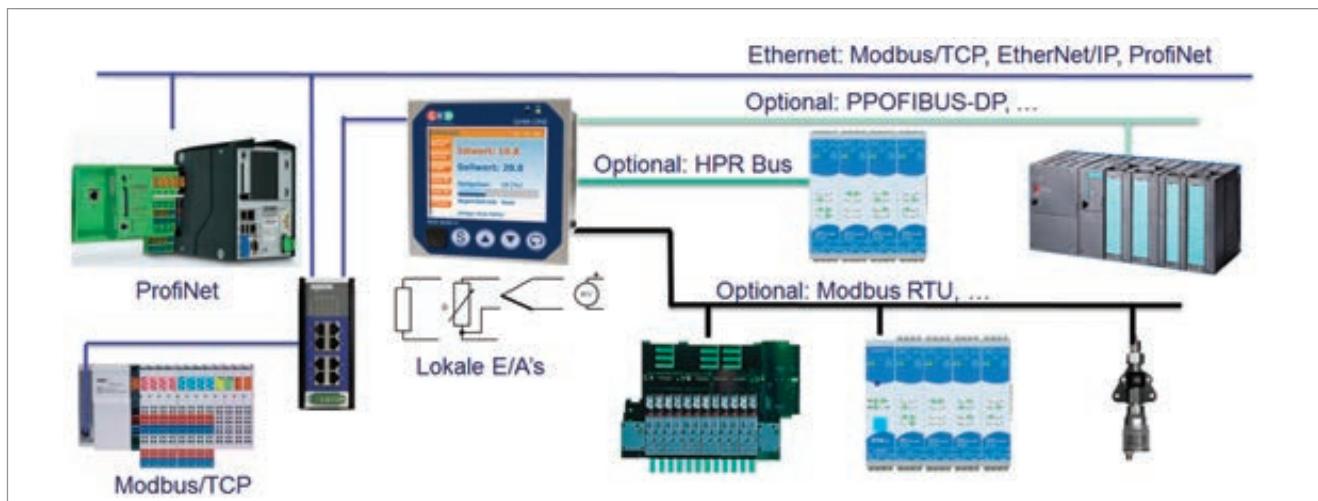
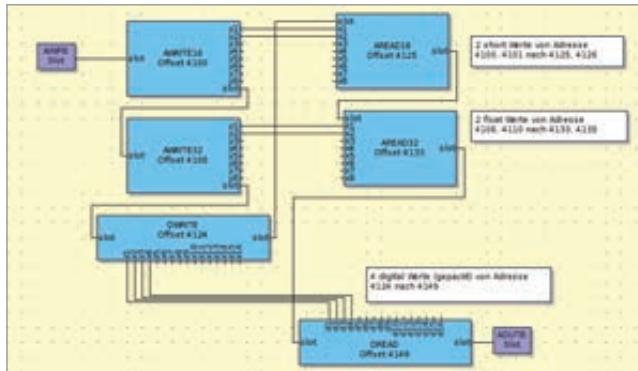
- ModbusTCP
- Modbus RTU (* in preparation)
- CanOpen (* in preparation)

In the modern world of automation it is becoming increasingly important that devices exchange data with other devices M2M. The user can address this task with various interfaces to the PLC and control system level. For this purpose, the MSR 9696H offers

- Profinet (*currently without a certificate / certification pending)
- Profibus DP (* in preparation)
- ModbusTCP
- Modbus RTU (* in preparation)

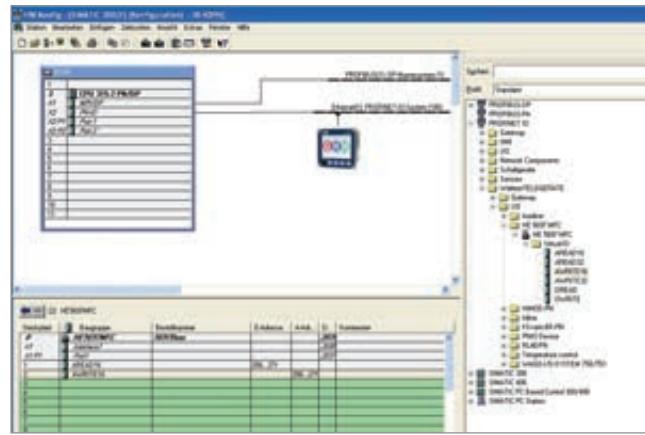
as possible connections. With this communications concept, the device can be individually integrated into various process areas. In addition to I/O systems, field-bus compatible sensors and actuators connected directly to the MSR 9696H with the standard systems. The overall configuration of the process values for external communication is created exclusively in CAT.

The files required for the master systems such as Profinet and Profibus are included. Integration takes place with the standard systems of the respective manufacturer. Therefore, integration ex-



Multifunction controller

isting systems is possible without extensive additional work. The user relies on standards that are established in the market.



Time-saving integration of the MSR 9696H in superordinate SCADA or PLC worlds with the help of standard field buses. Simple expansion of the MSR 9696H I/O with external field bus systems.

Product information

Control technology, profiler

The function library provides controller modules as a basis for control-related tasks. These modules can be operated as

- 2-point controllers
- 3-point controllers
- Motor step controllers

In the process, it is possible to operate the controllers as analog or switching controllers. A wide spectrum of setpoint and actual value functions and setpoint functions round out the scope of module functions. Additional functions are available for specific tasks, such as:

- Boost function
- Soft start
- Smooth switching
- PID parameter adaptation

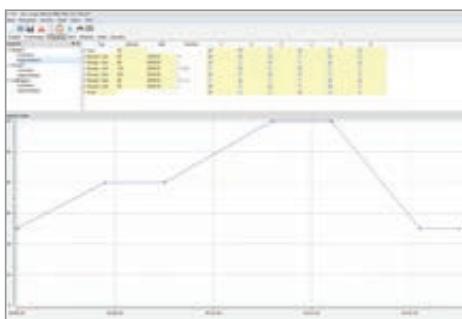
in order to assist the user in the realisation of tasks. With the help of several controller modules, even complex control technology structures can be implemented. This enables implementation of solutions such as

- Cascade regulation
- Limit control
- Ratio control
- Multi-Loop control / multi-variable control

and other control strategies with the assistance of standard functions. Of course, all controllers have the possibility of self-tuning.



But that is not all when it comes to control technology and process control. The library also provides a profiler that is needed in many cases to adopt the control for certain processes. This is necessary whenever the material structure must be influenced over the course of a process. The profiler comprises up to 20 programs with 60 segments each. One analogue and 6 digital tracks are available per segment. The program structure is realised in CAT with simple input of the segment times and setpoints.



With the help of finished controller modules, realisation of control technology tasks is possible without extensive knowledge in the area of control technology.

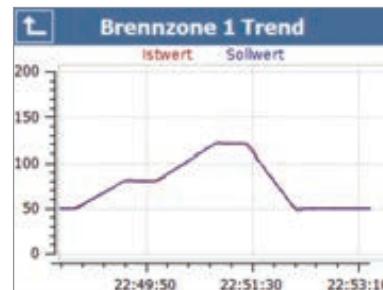
Multifunction controller

Data recording

In many areas of industry, the recording of process data is an essential element of quality assurance. The GHM One library offers the possibility of realising a data logger and a data recorder in the device. Configuration of the data logger takes place directly in CAT with function blocks. This makes it possible to log digital and analogue signals in various time periods.

The analogue data can be recorded as minimum, maximum or mean values over a specific time period. The data is saved in the device on an eMMC chip and can be read via the Ethernet port via FTP. The device has a data storage capacity of 2GB. The readout of data via USB ports on the front and rear sides is in preparation. The data is provided to the user in a standard ASCII format (csv) for further processing and analysis.

The trend representation on the device takes place on predefined operating screens. Up to 4 curves can be represented in one trend. By cascading the function, various time periods can be represented. Since the trend block can be opened multiple times in the HMI application, it is possible to use the GHM one as a multi-channel recorder.



The trend representation is independent of the logger function, and so various process signals can be displayed and recorded. The library also provides an alarm block. this block can be used to display alarm lists in plain text on the device. The alarms can be acknowledged on the device and even used for further processing within the application.



Data recording, data logging and alarming round out the performance spectrum of GHM ONE. No additional devices are required for visualisation and data backup.

Product information

Multifunction controller

Device front

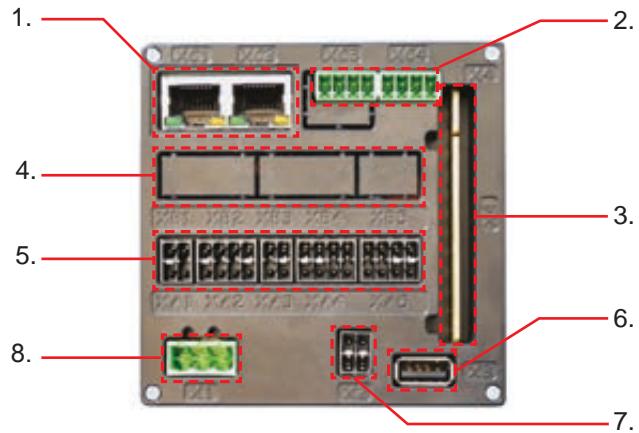


1. Definable red/green status display LEDs
2. 3.5" TFT colour touch display
3. 4 freely configurable operating keys
4. USB device
 - Load / read application
 - Debugging function (online representation)
 - Write / read parameters

General

- Protection rating IP 65 (front side only! rear side IP 20)
- Outside dimensions 96mm x 96 mm x 115 mm (installation lengthwithout plugs and cables)

Device rear side



1. Ethernet communications interface
(see detailed description under ,Communication')
2. Serial RS485 Modbus / HPR bus communications interface
3. Relay card with 4 changeover contacts
(see detailed description under ,Relay outputs')
4. I/O card - slot B
(see detailed description under ,Standard I/O card')
5. I/O card - slot A
6. USB host (see detailed description under ,Data transfer')
7. Transmitter power supply
8. Power supply

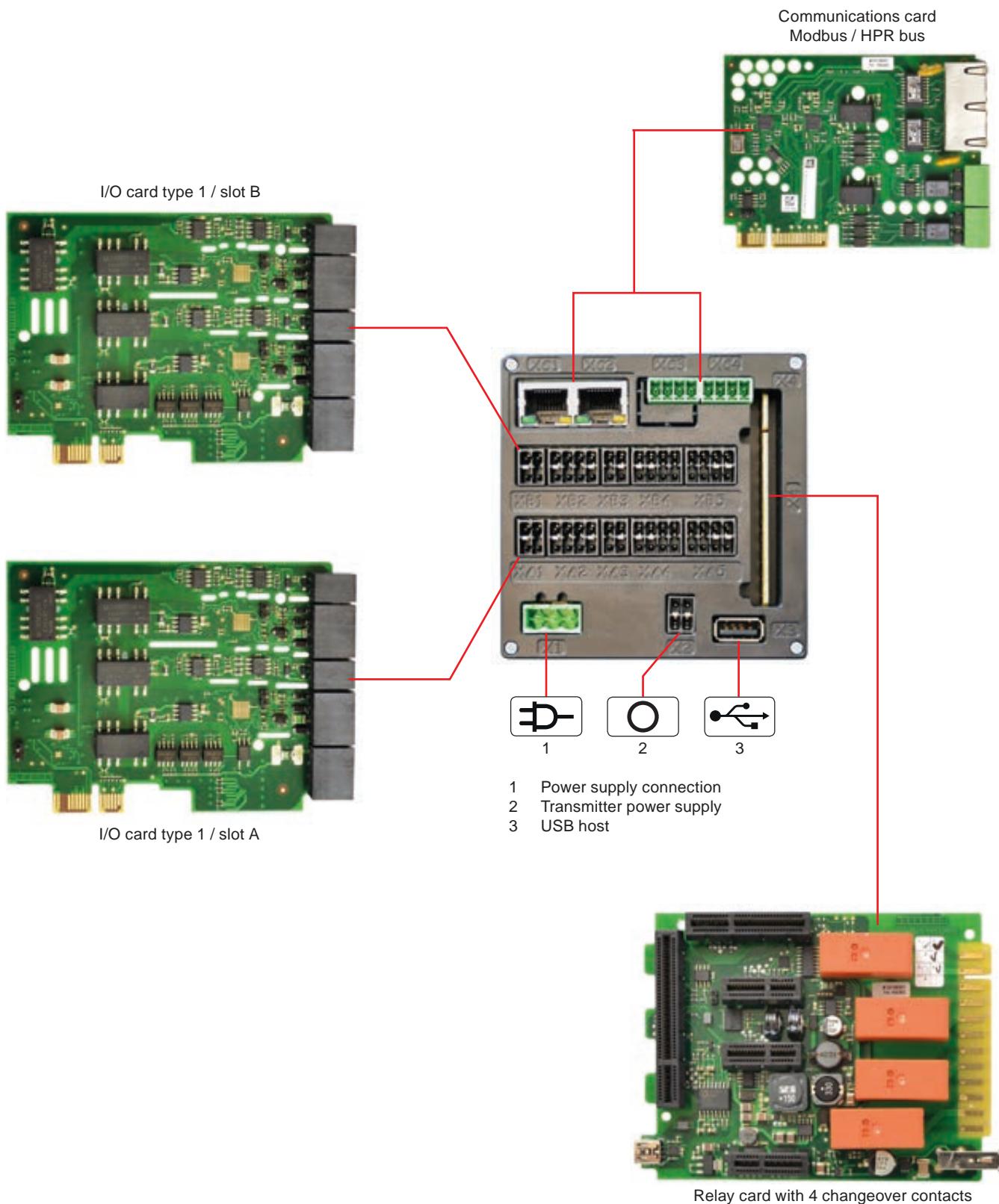


- Coding protection of terminals
- Easy to use spring-type terminals
- Lockable circuit board terminal for relay connections

Product information

Multifunction controller

Overview of slots / rear side connections



Product information

Multifunction controller

Functions in detail

MSR9696H base unit



Base unit general technical data

Controls / device front

Keys : 4 freely assigned keys
Touch function : Resistive touch display

Display

Front LEDs : 1 red freely assigned LED
1 green freely assigned LED
Display : 3.5" TFT display
320 x 240 pixel QVGA resolution

Data logger

Storage medium : eMMC chip
Storage capacity : approx. 1 GB
Storage rate : >= 1 second

Auxiliary energy

Supply voltage : 100 – 240 V AC or 24 V DC
Power consumption : Typically 10W
Electrical connection : Spring-type terminal, 3-pin
Conductor cross-section : 0.25mm to 2.5mm
Galvanic isolation : I/O level / auxiliary energy / processor

Environmental conditions

Operating temperature : 0..+55 °C
Storage temperature : -20..+70°C
Relative air humidity : 95%, non-condensing

Air and creep distances

Degree of contamination : 2
Overvoltage category : II
Maximum elevation : 2000m
Rated voltage category a : 230V
Test voltage category a : 3000 VAC 1min.
Rated voltage category b : 50V
Test voltage category b : 520 VAC 1min.

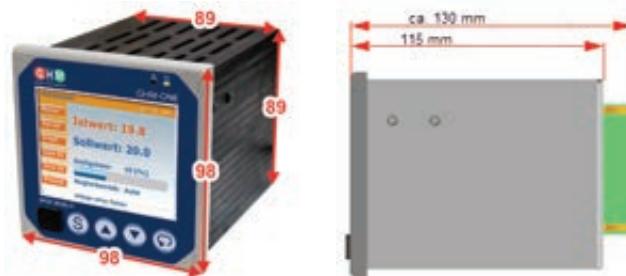
Housing

Type : Device for control panel installation
Protection rating : IP65 front side
IP20 lens tube and rear side

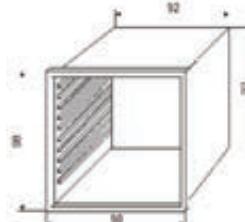
Dimensions

width / height / depth : 98 mm x 98 mm x 115 mm (without plug)
98 mm x 98 mm x 130 mm (with plug)

Housing dimensions in mm



Dimensions for the control panel cutout



Minimum spacing between devices



Outputs (relay card)

The relay card is a base card with 4 relays designed as change-over contacts. It is not possible to exchange the relay card with other I/O cards.

Relay

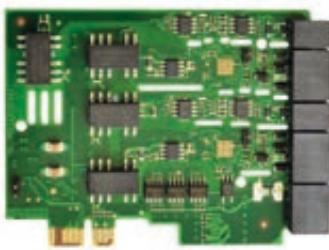
Type : Changeover contacts
Number : 4
Electrical connection : Spring-type terminal
Conductor cross-section : 0.25mm to 1.5mm
Switching voltage : <250V AC < 4A

Note:

If a control contactor is connected to a relay output, an RC protective circuit (RC snubber) required according to the contactor manufacturer specifications in order to prevent high voltage peaks. Varistor protective circuits are not recommended.

Product information

Option 1: I/O card type 1



Up to 2 I/O cards can be installed in the device.
The type ,1' card has:

- 2 analogue universal inputs
TC / RTD / -1000..+1000mV / 0..+20mA)
- 2 analogue standard inputs
(0..+10V / 0..+20mA)
- 2 analogue standard outputs
(0..+10V / 0..+20mA)
- 6 digital inputs or outputs

Analogue universal input

The card is equipped with 2 analogue universal inputs

Galvanic isolation

The two universal inputs are galvanically isolated from each other. There is also galvanic isolation for the power supply, the digital inputs and outputs, analogue outputs, and the processor and the communications. There is a galvanic connection to the corresponding analogue standard input (terminal X2 / terminal X4).

Converter resolution : > 18 Bit

Cycle time : 50ms

Galvanic isolation : corresponding to category a

RTD measurements

Input type : Resistance

Connection type : 3-wire

Measuring ranges

Pt100 / Pt1000	-200..+850°C
Ni100 / Ni1000	-60..+300°C
KTY 11-6	-50..+125°C

Measured current

Pt100 / Ni100	I < 0,5mA
Pt1000 / Ni 1000	I < 50µA
KTY 11-6	I < 50µA

Accuracy : ≤ 1K

Temperature drift : ≤ 0.08% / 10K

Measuring circuit monitoring : Short-circuit and interruption

Multifunction controller

Thermocouple measurements

Input type : Voltage measurement
Connection type : 2-wire
Input resistance : >10 MΩ

Thermocouples

Type	Measuring range	Accuracy	Resolution
L	-200..+900°C	≤ 2 K	0,05 K
J	-210..+1200°C	≤ 2 K	0,05 K
K	-270..+1370°C	≤ 2 K	0,08 K
N	-196..+1299°C	≤ 2 K	0,08 K
S	-50..+1760°C	≤ 2 K	0,07 K
R	-50..+1760°C	≤ 2 K	0,07 K
T	-270..+400°C	≤ 2 K	0,02 K
E	-270..+1000°C	≤ 2 K	0,04 K
B	+25..+1820°C	≤ 3 K	0,1 K
W	0..+2299°C	≤ 3 K	0,1 K

Temperature drift : ≤ 0.08% / 10K

Measuring circuit monitoring : Interruption

Cold-junction compensation : internal / auxiliary error < 2 K

Resistance measurement

Input type : Resistance measurement
Connection type : 2-wire
Measuring range : 0..20 kΩ
Detection range : Measuring range + 10%
Accuracy : ≤ 0.1%
Temperature drift : ≤ 0.08% / 10K
Measuring circuit monitoring : Exceeding the detection range

Current measurement

Input type : Current
Connection type : 2-wire
Measuring range : 0..20mA
Detection range : Measuring range + 10%
Input impedance : max. 50Ω
Accuracy : ≤ 0.1%
Temperature drift : ≤ 0.08% / 10K
Measuring circuit monitoring : Exceeding and/or undercutting the detection range

Analogue standard input

The card is equipped with 2 analogue standard inputs.

Galvanic isolation

The two standard inputs are galvanically isolated from each other. There is also galvanic isolation for the power supply, the digital inputs and outputs, analogue outputs, and the processor and the communications. There is a galvanic connection to the corresponding analogue universal input (terminal X2 / terminal X4).

Converter resolution : > 18 Bit

Cycle time : 50ms

Galvanic isolation : corresponding to category a

Current measurement

Input type : Current
Connection type : 2-wire
Measuring range : 0..20mA
Detection range : Measuring range + 10%
Input impedance : max. 50Ω
Accuracy : ≤ 0.1%
Temperature drift : ≤ 0.08% / 10K
Measuring circuit monitoring : Exceeding and/or undercutting the detection range

Product information

Multifunction controller

Voltage measurement

Input type	: Voltage
Connection type	: 2-wire
Measuring range	: 0..10V
Detection range	: Measuring range + 10%
Input impedance	: typically 1.2MΩ
Accuracy	: ≤ 0.1%
Temperature drift	: ≤ 0.08% / 10K
Measuring circuit monitoring	: Exceeding and/or

Analog output

The card is equipped with 2 analogue standard outputs

Galvanic isolation

The two standard outputs are galvanically isolated from each other. There is also galvanic isolation for the power supply, the digital inputs and outputs, analogue outputs, and the processor and the communications.

Converter resolution : 12 Bit

Linearity : < 0.1%

Accuracy : < 0.2%

Temperature drift : ≤ 0.1% / 10K

Cycle time : 50ms

Galvanic isolation : corresponding to category a

Current output

Dynamic range : 0..+22mA

Output resistance : max. 500Ω

Voltage output

Dynamic range : 0..+11V

Output load : RL ≥ 1 kΩ

Digital inputs and outputs

The I/O card is equipped with six inputs/outputs; the function for the respective signal can be configured in CAT. The supply of the inputs/outputs must be provided externally.

Galvanic isolation

The inputs/outputs are not galvanically isolated from each other. There is galvanic isolation for the power supply, the analogue inputs and outputs and the processor and the communications.

Supply voltage : 24V DC +/- 20%

Galvanic isolation : corresponding to category a

Digital outputs : maximum output current 100 mA

Counter input

Two digital inputs (Inputs 1 and 3) can be configured as counter inputs

Limit frequency : 10kHz

Output signal : Pulses per time unit (configurable)

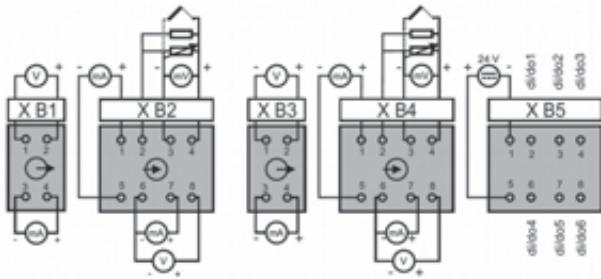
Electrical connections

Electrical connection : Spring-type terminal

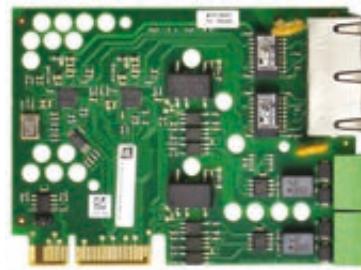
Conductor cross-section : 0.25 mm to 1.5 mm
(with wire end ferrule / without plastic sleeve)

Conductor cross-section : 0.25 mm to 0.75 mm
(with wire end ferrule / without plastic sleeve)

I/O card connections



Option 2: Modbus / HPR bus communications card



The communications card is equipped with 2 Ethernet ports (IEEE 802.3) and 2 RS485 interfaces.

Ethernet

Connection : RJ-45

Function : 10/100 Mbit/s
Auto-negation
Auto-MDIX

Protocol : IP via DHCP or fix

LED : Link / data

Protocol : ModBusTCP Slave
ModBusTCP Master
FT server

Product information

Multifunction controller

Ordering code

GHM-ONE

MSR9696H - - - - -

GHM	
Multi-function controller	
1. I/O card slot A	
0	No card in slot A
1	I/O card with 2 universal inputs 2 standard signal inputs 2 analogue standard signal outputs 6 digital inputs or outputs
2	I/O card with 2 universal inputs 2 high-impedance mV inputs for O ₂ measurement 2 analogue standard signal outputs 6 digital inputs or outputs
2. I/O card slot B	
0	No card in slot B
1	I/O card with 2 universal inputs 2 standard signal inputs 2 analogue standard signal outputs 6 digital inputs or outputs
2	I/O card with 2 universal inputs 2 high-impedance mV inputs for O ₂ measurement 2 analogue standard signal outputs 6 digital inputs or outputs
3. Communication card	
0	No communication card
1	Communication card with 2 x Ethernet; 2 x RS485 (Modbus TCP / Modbus RTU and HPR-Bus)
2	PROFINET, Ethernet/Modbus RTU, HPR-BUS
4. Auxiliary voltage	
1	230 V AC
2	24 V DC
5. Options	
0	No options
Zubehör	
	USB connecting cable for connection of a PC, length 1.5 m

GHM-CAT software

GHM-CAT-LZ -

GHM	
1. Software licenses	
1	One license dongle
2	3 license dongle
5	5 license dongle
10	10 license dongle

Displays



Characteristics

Display	7-segment 7.6, 10, 14, 20 mm
Color Display	Red, green, blue, yellow Bar-graph Red, green
Case	Panel mounting 48x24 mm
Front dimensions	48x48 mm 72x24 mm 96x48 mm Field case
Connection	Slide-in terminals Clamp terminals

Applications

- Industry metrology
- Indicating of process data
- Alarm display
- Indicating state for drum-, machine- and tank-engineering
- Temperature measurement

Product information

Function and Advantages

Simple user-friendly programming, or, to be precise, the setting of the operating parameters of each digital display, makes the trouble-free adaptation of the display systems and the fixed measuring instruments to the customized application possible. We also have large displays in our portfolio to display information on ongoing processes or to display key process data..

The multitude of modifiable settings of each display remains very clearly arranged and simple thanks to the menu-driven parametrization, even without separate parametrization software. As manufacturer and supplier of digital displays, and the many years of experience gained there while, we provide our customers a high degree of flexibility and efficiency in start-up.

All devices built-in the instrument panel of this product group can be supplied in sturdy, closed plastic casings for front face panel installation in the prevalent casing dimensions of 48x24 mm, 48x48 mm, 72x24 mm, 96x24 mm and 96x48 mm. Auxiliary power of the field measuring devices, digital fixed measuring instruments and panel meter is potential-free from the measurement input.

General

Measuring Input – Sensor type

- Industry standard signal 0/4..20 mA
- Industry standard signal 0/2..10 V DC
- Voltage AC/DC
- Current AC/DC
- RTD Pt100/Pt1000
- Thermocouple type J, K, N

Instrumentation – Connection

- 2-wire connection
- 3-wire connection

Output

- Analogue output active 0/4..20 mA
- Analogue output active 0/2..10 V DC
- Impulse output 0/18 V DC
- Relay output change-over contact
- Transistor output PNP

Features

- 7-segment displays character height 7, 10, 14.2 and 20 mm
- Display color red, yellow, green, blue (EP9648)
- Loop powered displays
- Graphic recorder
- Large size displays LED dot matrix
max. 100mm character height
- Large size displays 7-segment
character height from 50 up to 150 mm

Product information

Device Overview

Device	Measuring principle	Monitoring	BCD	Voltage	Current	Power	Resistance	DMS	Temperature	Impulse/ Frequency	Rotary/ Flow	Quantity/ Level	Counting	0/4...20 mA 0/2...10 V DC	Page
Panelmeter DIN 48x24															
BA4824N														•	27
BCD4824			•												28
DP4824A									•					•	29
DP4824B														•	30
SP4824														•	31
GIA0420		•												•	32
DP4848A								•					•		33
Panelmeter DIN 72x24															
BA7224N													•		34
BCD7224				•											35
Panelmeter DIN 96x24															
BA9624N													•		36
BA9624B		•											•		37
Panelmeter DIN 96x48															
GA9648									•	•	•	•	•	•	38
EP9648									•					•	40
SP9648														•	41
S9648	•						•							•	42
T9648	•							•							43
DMS9648	•							•							44
TA9648	•											•			45
DF9648	•										•				46
A9648	•			•											48
V9648	•			•											49
DR9648	•								•	•					50
PR9648	•								•	•	•				51
SZ9648	•								•			•			52
UZ9648	•								•			•			53
LF9648	•							•							54
pH9648	•							•							55
Connection diagram XX96															57
Field case															
S1010	•												•		58
TA1010	•											•			59
T1010	•						•								60
DR1010	•										•				61
PR1010	•									•					62
UZ1010	•											•			63
LF1010	•							•							64
GIA0420 VO	•												•		65
Special devices															
Integra 1530	•		•	•	•										66
migra SC/MC									•	•	•				67
migan									•				•		69

Mistakes reserved, technical specifications subject to change without notice.

Product information

Bar Graph Display BA4824N



- Universal version for 0/4..20 mA, 0..10 V DC
- Red LED indicator (optionally green)
- Vertical and horizontal installation
- All areas can be selected via connecting terminal
- Display area adjustable via potentiometer

Characteristics

Series BA bar graph displays are especially well suited for representing continuously changing measurements. With their small design, they can be easily integrated into control panels and diagrams.

The version BA4824N is especially well-suited for processing input signals 0/4..20 mA, 0..10 V DC (limit value adjustable from 5..50 V DC). Adaptation to the corresponding input signal takes place via the connecting terminal. The display zero point and limit value can be adjusted via separate potentiometers.

Technical data

Auxiliary power

Auxiliary voltage : 24 V DC ± 10 % isolated
Power consumption : approximately 1.5 VA
Operating temperature : 0..+60 °C
CE Conformity : EN 61010-1 2001, EN 61326-1: 1997, EN 55011: 1998

Measurement input

Current input : 0/4..20 mA,
Voltage input : 0..10 V DC (adjustable limit value)
Input resistance : Ri at: 10 V = 100 kΩ, 20 mA = 100 Ω

Accuracy

Resolution : 10 digit
Basic precision : +/- 1 digit
Temperature coefficient : 100 ppm/K

Display

Range : 10 segments
Colour : red, optionally green
Housing : DIN 48 x 24 mm, installation depth 100 mm

Design : PC/ABS blend, black colour, UL94V-0
Panel aperture 42 x 21 mm

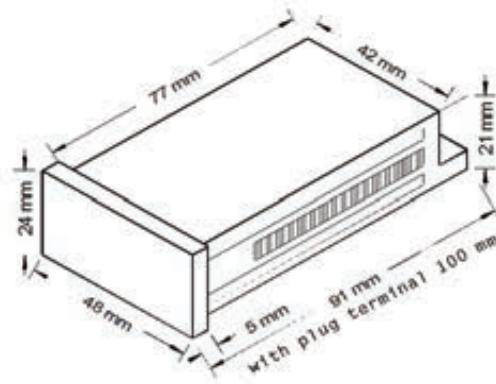
Fastening : locking screw element for wall thickness up to 50 mm

Weight : 60 g
Connection : rear plug terminals, max. 1.5 mm²
Protection class IP00

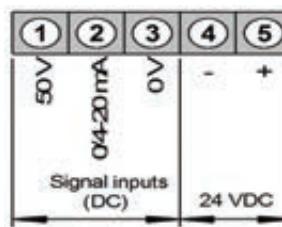
Ingress protection : Front IP54 or IP65

Displays

Dimensions



Connection diagram



Ordering code

1. 2. 3. 4. 5. 6. 7.
BA [] - [] - [] - [] - [] - [] - []

1. Construction	4824N	10 segments
2. Installation	1	Vertical
	2	Horizontal
3. Bar colour	1	Red display
	2	Green display
4. Auxiliary voltage	5	24 V DC with electrical isolation
5. Input signal	0	Universal version
6. Measuring range scale 0..100 %	10	Universal version
7. Ingress protection	1	IP54
	2	IP65

Product information

BCD Panelmeter BCD4824



- Display red or green 3-digit
- LED 10 mm or 14.2 mm
- Input BCD parallel or multiplex
- Supply voltage 10..30 V DC, optional 5 V DC

Characteristics

Digital Panelmeter BCD4824 was designed for monitoring and measurement applications, specially in connection with SPS automation. The multiplex mode minimize the number of input lines. The small case is suitable for installation in control units and panel boards.

Technical data

Power supply

Supply voltage : 10..30 V DC
 Power consumption : approx. 1.2 VA
 Operating temperature : -10..+60 °C
 CE-conformity : IEC 61326, IEC 61000-4-2/3/4/5/6/8

Display

: 3-digit
 LED 10 mm or 14.2 mm

Color : red or green
 Decimals : single points selectable

Inputs

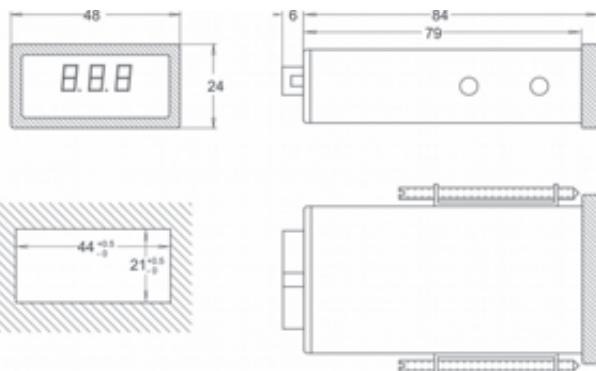
Control : Parallel or multiplex
 Voltage level : Low-Signal 0..3 V DC;
 High-Signal 10..30 V DC,
 or TTL-level
 Input resistance : approx. 20 kΩ
 minimal rise time of the
 Strobe inputs 10 ms

Case
 Type : DIN 48x24 mm, mounting depth 97 mm
 : slide-in case according to
 DIN 43700, Noryl SE1 GFN2
 panel cut-out 44x21 mm

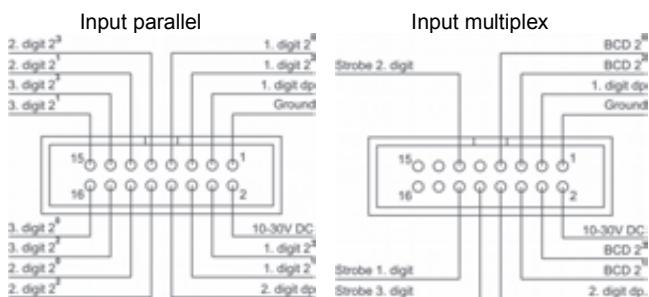
Weight : approx. 60 g
 Connection : terminal strip 16 pole,
 IP54 or IP65
 terminals IP20 acc. to BGV A3

Displays

Dimensions



Connection diagram



Ordering code

1. 2. 3. 4. 5.
 BCD - - - -

1. Model	
4824	
2. Display	
1	LED red 10 mm
2	LED green 10 mm
3	LED red 14.2 mm
4	LED green 14.2 mm
3. Supply voltage	
5	10..30 V DC
7	5 V DC
4. Input	
1	0..3 V DC low; 10..30 V DC high, parallel
2	5 V TTL-level, parallel
3	0..3 V DC low; 10..30 V DC high, multiplex
4	5 V TTL-level, multiplex
5. Protection class	
1	IP54
2	IP65
Accessories	connection cable with terminal strip and pigtail
AK16K-AE-3	16x0.25 mm ² length 3 m
AK16K-AE-10	16x0.25 mm ² length 10 m
AK16K-AE-20	16x0.25 mm ² length 20 m

Product information

Digital Panelmeter DP4824A



- Multipurpose input for 0/4..20 mA, 0/2..10 V and potentiometer
- Input for RTD sensor Pt100/Pt1000
- Adjustable display range ± 1999 Digit

Characteristics

The universal conception of the multipurpose input allows indication of all physical dimensions, which can be converted to 0/4..20 mA, 0/2..10 V DC. Other models of the DP4824A are for temperature measurement with Pt100 and Pt1000 sensors. The input configuration is switch selectable from the side, without opening the case. Input and supply voltage are isolated. The display range is adjustable with 20-turn trim pot's for initial value and span.

Technical data

Power supply

Supply voltage	: 10.8..30 V DC; 17..30 V AC
Frequency AC	: 47..63 Hz
Power consumption	: approx. 1.2 VA
Working temperature	: -10..+60 °C
CE-conformity	: EN 55022, IEC 61000-4-2/4/11

Input

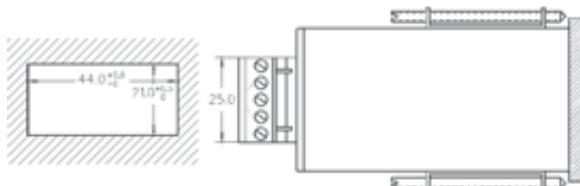
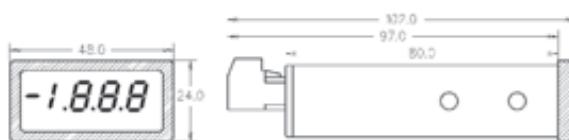
Voltage	: 0/2..10 V DC
Input resistance	: $R_i = 40 \text{ k}\Omega$
Overload	: max. 48 V
Current	: 0/4..20 mA
Input resistance	: $R_i = 125 \Omega$
Overload	: max. 60 mA
Potentiometer	: min. 1 kΩ, max. 100 kΩ
Pt100	: -100.0..+199.9 °C / -100..+600 °C
Sensor current	: approx. 1 mA (low self heating)
Pt1000	: -50.0..100.0 °C
Sensor current	: approx. 0.2 mA (low self heating)
Accuracy	: < 0.05 % +/-1 Digit

Display

Conversion rate	: approx. 2 / s
Range / color	: 3 ½ digit, red or green, 7.6 mm
Decimal point	: switch selectable
Overflow	: negative overflow " □□ ", positive overflow " □ "
Case	: DIN 48x24 mm, mounting depth 97 mm
Type	: slide-in case acc. to DIN 43700, material Noryl SE1 GFN2 panel cut-out 44x21 mm
Weight	: 100 g
Connection	: plug-in terminal, max. 1.5 mm²
Protection class	: front IP54 or IP65, terminals IP20 acc. to BGV A3

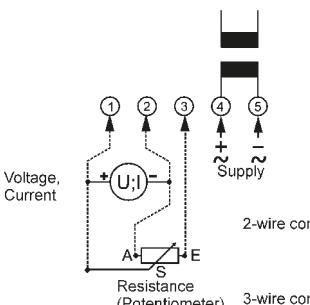
Displays

Dimensions

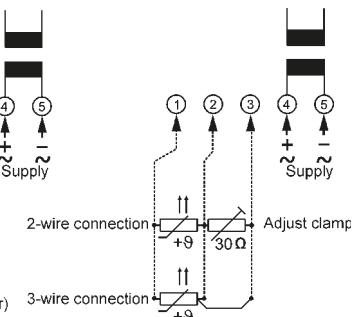


Connection diagram

Standard signal



Pt100/Pt1000



Ordering code

DP4824A - - - -

1. Display	
1	3 ½-digit LED red 7.6mm
2	3 ½-digit LED green 7.6mm
2. Input	
10	industry standard signal
20	custom input (on request)
50	Pt100
53	Pt1000
3. Protection class	
1	IP54
2	IP65
4. Unit (appears on the face plate)	

Product information

Digital Panelmeter DP4824B



- Multipurpose input for 0/4..20 mA, 0/2..10 V and potentiometer
- 2 trim pot's for initial and end value
- Adjustable display range ± 1999 Digit

Characteristics

The universal conception of the multipurpose input allows indication of all physical dimensions, which can be converted to 0/4..20 mA, 0/2..10 V DC. The input configuration is switch selectable from the side, without opening the case. Input and supply voltage are isolated. The display range is adjustable with 20-turn trim pot's for initial value and span.

Technical data

Power supply

Supply voltage	: 10.8..30 V DC
Power consumption	: approx. 1.2 VA
Working temperature	: -10..+60 °C
CE-conformity	: EN 55022, IEC 61000-4-2/4/11

Input

Voltage	: 0/2..10 V DC
Input resistance	: $R_i = 40 \text{ k}\Omega$
Overload	: max. 48 V
Current	: 0/4..20 mA
Input resistance	: $R_i = 125 \Omega$
Overload	: max. 60 mA
Potentiometer	: min. 1 kΩ, max. 100 kΩ
Accuracy	: < 0.025 % +/-1 Digit

Display

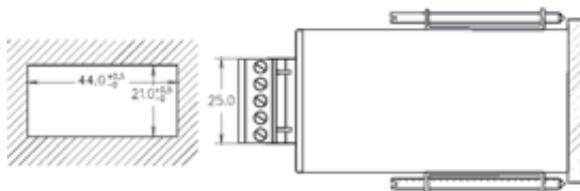
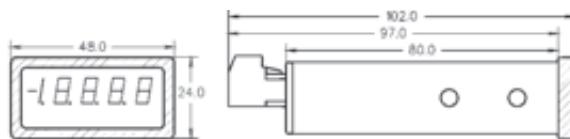
Conversion rate	: approx. 2/s
Range / color	: 4 1/2-digit, red or green, 8mm
Decimal point	: switch selectable
Overflow	: flashing "0000," with leading sign

Case

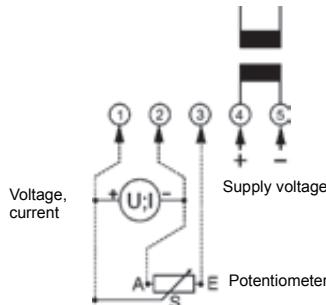
Type	: DIN 48x24 mm, mounting depth 97 mm
	: slide-in case according to DIN 43700, material Noryl SE1 GFN2, panel cut-out 44x21 mm
Weight	: 100 g
Connection	: plug-in terminal, max. 1.5 mm
Protection class	: front IP54 or IP65 terminals IP20 acc. to BGV A3

Displays

Dimensions



Connection diagram



Ordering code

1. 2. 3. 4.
DP4824B - - - -

1. Display

5	4 1/2-digit, LED red 8 mm
2	4 1/2-digit, LED green 8 mm

2. Input

10	multipurpose device
20	custom input (on request)

3. Protection class

1	IP54
2	IP65

4. Unit (appears on the face plate)

Product information

Loop Powered Panelmeter SP4824



- LED-display without separate supply voltage
- Free adjustable indicating range
- Switch selectable conversion rate 3/s or 0,5/s

Characteristics

Loop powered Panelmeter SP4824 can be used for indicating and measurement applications in process technology and automation. The small case is suitable for installation in control units and panel boards. The input allows indication of any physical dimension, which are stated in a signal of 4..20mA.

Technical data

Input

Current input	: 4..20 mA
Overload range	: -100..+150 mA
Voltage drop	: 2.5..3.4 V, depends on chosen display brightness
Accuracy	: 0.1 % , +/- 1 Digit
Operating temp.	: -10..+60 °C
CE- conformity	: EN 55022, IEC 61000-4-2/4

Display

Indicating range	: -1999..+1999
Span	: adjustable 0..4000 Digits
Zero point	: adjustable -100..+25 % of the span
Brightness	: adjustable ≈ 40..100 %
Conversion rate	: 3/s switchable 0.5/s
Height	: 7.6 mm
Overflow indication	: "- / " for negative and " / " for positive overflow
Color	: red

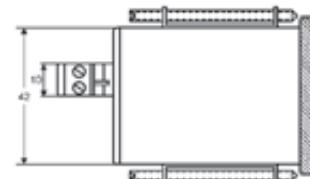
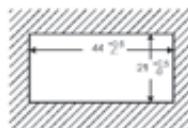
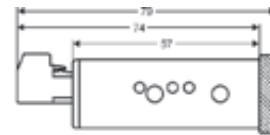
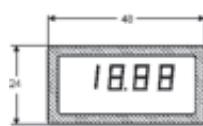
Weight

- Panel case	: approx. 50 g
- Field case	: approx. 270 g
Connection	: slide-in terminal strip, max. 1.5 mm ² , AWG16
Protection class	: front IP54 or IP65 terminals IP20 acc. to BGV A3

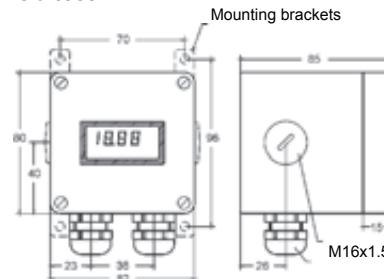
Displays

Dimensions

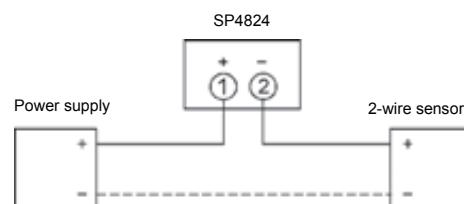
Panel case



Field case



Connection diagram



Ordering code

SP4824 - - - -

1. Device type	
1	panel case
2	field case 82x80x85 mm (WxHxD)
2. Display characteristics	
S	increasing (Standard)
F	decreasing
3. Protection class	
1	IP54
2	IP65
4. Unit (appears on the face plate)	
Accessories	
10031201	mounting brackets

Product information

Display GIA 0420 N



- Self-supplying, no additional auxiliary supply necessary
- Freely scalable
- Integrated self-diagnostic

Characteristics

The GIA 0420 is a microprocessor-controlled displaying device for 4..20 mA standard signals.

Any transmitter (with 4..20 mA output) can be connected to the device. The range adjustment of the GIA 0420 to the transmitter is done by entering the initial and final value and the decimal point position. No additional auxiliaries are needed for this adjustment, but the three buttons on the back side of the device.

The GIA 0420 doesn't need a separate auxiliary supply but is directly supplied by the measuring current. It has an integrated self-diagnostic which checks the device that it works correctly. This self-diagnostic together with the transmitter's check for "sensor break" and "sensor short circuit" and range exceeding or falling below ensures an optimum of operational reliability.

Technical data

Measuring input

Input signal	: 4..20 mA (2-wire)
Accuracy	: $\pm 0.2\%$ FS ± 1 digit
Measuring rate	: 5 measurements / seconds
Voltage load	: 3,5 V
Power supply	: self-supplying: devices is supplied directly from measuring current
Working temperature	: 0..50 °C
Filter	: adjustable in 3 stages
Switching output	: 1x electrically isolated open collector switching output
Storage	: min- / max-memory via buttons

Display

Display	: LCD display
Height	: 10 mm
Display range	: -1999..+9999 digit initial and final value adjustable

Connection

: 2-pole screw / clamp terminals,
max. cross section up to 1.5 mm²

Housing

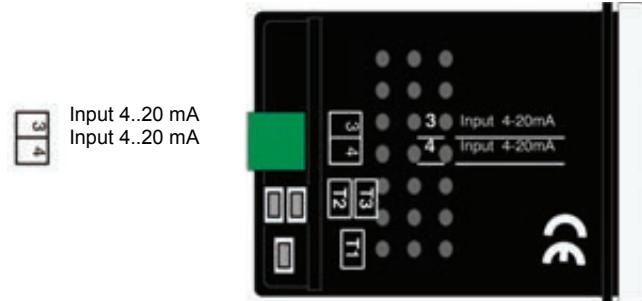
: fibre-reinforced Noryl,
front screen made of polycarbonate
: front IP54

Displays

Dimensions

Housing : 24 x 48 x 65 mm (H x W x D)
Panel cutout : 21.7 x 45 mm [± 0.5 mm] (H x W)

Connection diagram



Design type

010N	Input signal: 0..20 V (3-wire) Input resistance: approx. 100 kOhm Power supply: 12..28 V, < 10 mA
ex	with ATEX protection for explosive areas

Ordering code

1. 2.
GIA -

1. Design type	
0420N	Display 0..20 mA
010N	Display 0..10 V
0420N-ex	Display 0..20 mA with Ex-protection
010N-ex	Display 0..10 V with Ex-protection
2. Option	
00	without option

Product information

Digital Panelmeter DP4848A



- Multipurpose input for 0/4..20 mA, 0/2..10 V and potentiometer
- Input for RTD sensor Pt100/Pt1000
- Adjustable display range -199..999 Digit

Characteristics

In spite of the small device size, the large display provides a good view from afar. Other models of the DP4848A are for temperature measurement with Pt100 and Pt1000 sensors. The input configuration is switch selectable from the side, without opening the case. Input and supply voltage are isolated. The display range is adjustable with 20-turn trim pot's for initial value and span.

Technical data

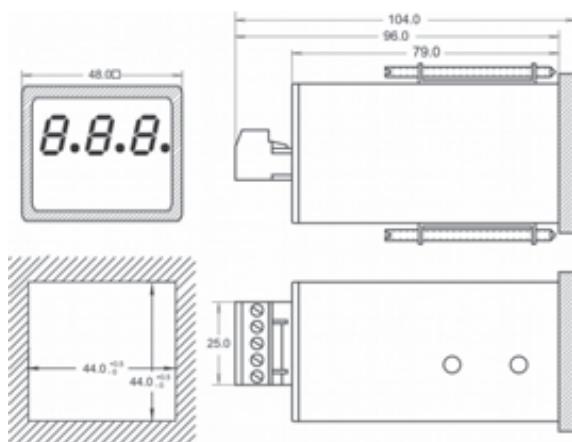
Power supply

Supply voltage	: 10.8..30 V DC; 17..30 V AC
Frequency AC	: 47..63 Hz
Power consumption	: approx. 1.2 VA
Working temperature	: -10..+60 °C
CE-conformity	: EN 55022, IEC 61000-4-2/4/11

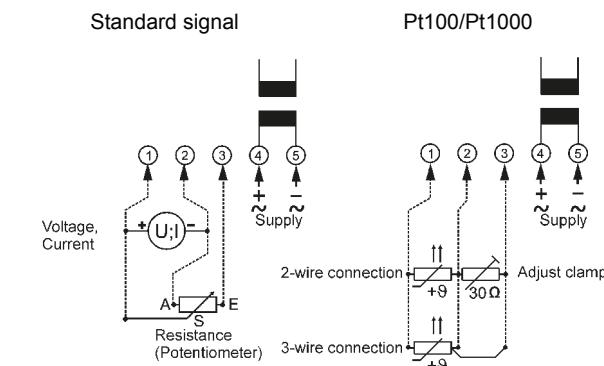
Input

Voltage	: 0/2..10 V DC
Input resistance	: $R_i = 40 \text{ k}\Omega$
Overload	: max. 48 V
Current	: 0/4..20 mA
Input resistance	: $R_i = 125 \Omega$
Overload	: max. 60 mA
Potentiometer	: min. 1 kΩ, max. 100 kΩ
Pt100	: -19.9..+99.9 °C / -100..+600 °C
Sensor current	: approx. 1 mA (low self heating)
Pt1000	: -19.9..99.9 °C
Sensor current	: approx. 0.2 mA (low self heating)
Accuracy	: < 0.05 % +/- 1 Digit
Display	
Conversion rate	: approx. 2 / s
Range / color	: 3 digit, red or green, 7.6 mm
Decimal point	: switch selectable
Overflow	: display flashes with 2 Hz
Case	: DIN 48x48 mm, mounting depth 96 mm
Type	: slide-in case, acc. to DIN 43700, material Noryl SE1 GFN2 panel cut-out 44x44 mm
Weight	: 100 g
Connection	: plug-in terminal, max. 1.5 mm
Protection class	: front IP54 or IP65 terminals IP20 acc. to BGV A3

Dimensions



Connection diagram



Ordering code

1. 2. 3. 4.
DP4848A - [] - [] - [] - []

1. Display	
3	3-digit LED red 14.2mm
4	3-digit LED green 14.2mm
2. Input	
10	industry standard signal
20	custom input (on request)
50	Pt100
53	Pt1000
3. Protection class	
1	IP54
2	IP65
4. Unit (appears on the face plate)	

Product information

Displays

Bar Graph Display BA7224N



- Universal version for 0/4..20 mA, 0..10 V DC
- Red LED indicator (optionally green)
- Vertical and horizontal installation
- All areas can be selected via connecting terminal
- Display area adjustable via potentiometer

Characteristics

Series BA bar graph displays are especially well suited for representing continuously changing measurements. With their small design, they can be easily integrated into control panels and diagrams.

The version BA7224N is especially well-suited for processing input signals 0/4..20 mA, 0..10 V DC (limit value adjustable from 5..50 V DC). Adaptation to the corresponding input signal takes place via the connecting terminal. The display zero point and limit value can be adjusted via separate potentiometers.

Technical data

Auxiliary power

Auxiliary voltage : 24 V DC ± 10 % isolated
Power consumption : approximately 1.5 VA
Operating temperature : 0..+60 °C
CE Conformity : EN 61010-1 2001, EN 61326-1: 1997, EN 55011: 1998

Measurement input

Current input : 0/4..20 mA,
Voltage input : 0..10 V DC (adjustable limit value)
Input resistance : Ri at: 10 V = 100 kΩ, 20 mA = 100 Ω

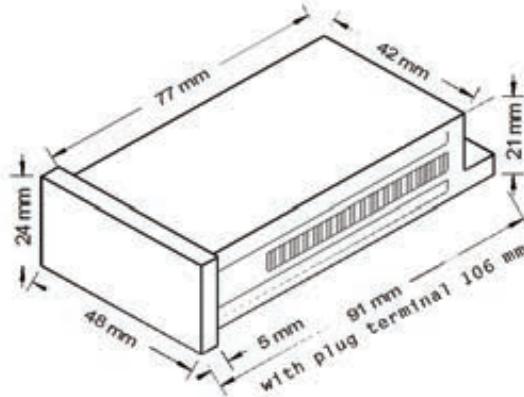
Accuracy

Resolution : 20 digit
Basic precision : +/- 1 digit
Temperature coefficient : 100 ppm/K

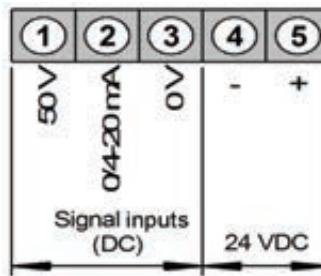
Display

Range : 20 segments
Colour : red, optionally green
Housing
mm : DIN 72 x 24 mm, installation depth 106
Design : PC/ABS blend, black colour, UL94V-0
Panel aperture 66 x 21 mm
Fastening : locking screw element for wall thickness up to 50 mm
Weight : 80 g
Connection : rear plug terminals, max. 1.5 mm²
Protection class IP00
Ingress protection : Front IP54 or IP65

Dimensions



Connection diagram



Ordering code

1. 2. 3. 4. 5. 6. 7.
BA [] - [] - [] - [] - [] - [] - []

1. Construction	
7224N	20 segments
2. Installation	
1	Vertical
2	Horizontal
3. Bar colour	
1	Red display
2	Green display
4. Auxiliary voltage	
5	24 V DC with electrical isolation
5. Input signal	
0	Universal version
6. Measuring range scale 0..100 %	
10	Universal version
7. Ingress protection	
1	IP54
2	IP65

Product information

BCD Panelmeter BCD7224



- Display red or green 5-digit
- LED 10 mm or 14.2 mm
- Input BCD parallel or multiplex
- Supply voltage 10..30 V DC, optional 5 V DC

Characteristics

Digital Panelmeter BCD7224 was designed for monitoring and measurement applications, specially in connection with SPS automation. The multiplex mode minimize the number of input lines. The small case is suitable for installation in control units and panel boards.

Technical data

Power supply

Supply voltage	: 10..30 V DC
Power consumption	: approx. 1.2 VA
Operating temperature	: -10..+60 °C
CE-conformity	: IEC 61326, IEC 61000-4-2/3/4/5/6/8

Display

: 5-digit
LED 10 mm or 14.2 mm

Color
Decimals

: red or green
single selection

Inputs

Control
Voltage level

: parallel or multiplex
: low-signal 0..3 V DC;
high-signal 10..30 V DC,
or TTL-level

Input resistance

: approx. 20 kΩ
minimal rise time of the
strobe inputs 10 ms

Case

Type

: DIN 72x24 mm, mounting depth 85 mm
: slide-in case according to
DIN 43700, Noryl SE1 GFN2
panel cut-out 68x21 mm

Weight

: approx. 60 g

Connection

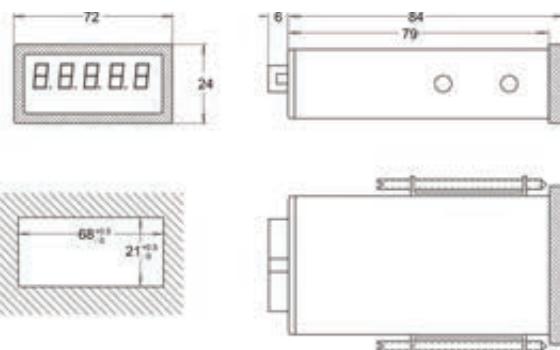
: terminal strip 16 pole,

Protection class

: IP54 or IP65
terminals IP20 acc. to BGV A3

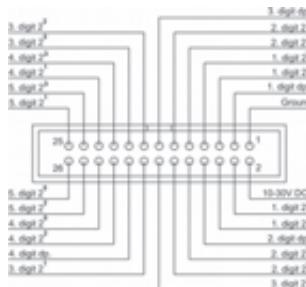
Displays

Dimensions

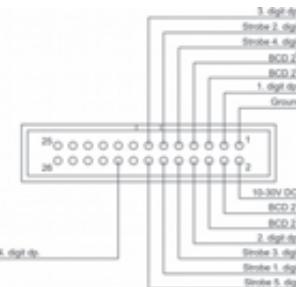


Connection diagram

Input parallel



Input multiplex



Ordering code

1. 2. 3. 4. 5.
BCD - - - -

1. Model	
7224	
2. Display	
1	LED red 10 mm
2	LED green 10 mm
3	LED red 14.2 mm
4	LED green 14.2 mm
3. Supply voltage	
5	10..30 V DC
7	5 V DC
4. Input	
1	0..3 V DC low; 10..30 V DC high, parallel
2	5 V TTL-level, parallel
3	0..3 V DC low; 10..30 V DC high, multiplex
4	5 V TTL-level, multiplex
5. Protection class	
1	IP54
2	IP65
Accessories	connection cable with terminal strip and pigtailed
AK26K-AE-3	26x0.25 mm ² length 3 m
AK26K-AE-10	26x0.25 mm ² length 10 m
AK26K-AE-20	26x0.25 mm ² length 20 m

Product information

Bargraph indicator BA9624N



- Universal design for 0/4..20 mA, 0..10 V DC
- Red LED display (optional green)
- Vertical and horizontal mounting
- All ranges selectable via terminal
- Display area selectable via potentiometer

Features

Bargraph indicators of the BA series are especially suited to display constantly changing readings. Due to the compact housing they can be easily integrated into control panels and graphs. The BA9624N design is particularly suitable for processing unit signals 0/4-20 mA and 0 to 10 V DC. The adaptation to the respective input signal results from the terminal. The indicator's zero point and full-scale value can be adjusted via separate potentiometer.

Technical data

Power supply

Power voltage : 24 V DC \pm 10 %
 Current consumption : ca. 2.0 VA
 Operating temperature : 0..+60 °C
 CE-compliance : EN 61010-1: 2001, EN 61326-1: 1997,
 EN 55011: 1998

Measuring input

Current input : 0/4 ..20 mA
 Voltage input : 0..10 V DC
 Input resistance : Ri at: 10 V = 124 kΩ, 20 mA = 100 Ω

Accuracy

Resolution : 30 digits
 Basic accuracy : +/- 1 Digit
 Temperature coefficient : 100 ppm/K

Indicator

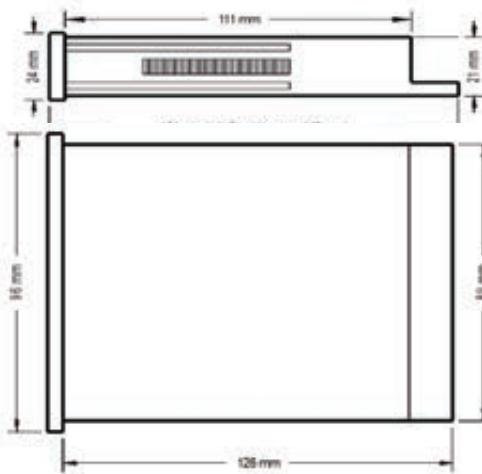
Scope : 30 segments
 Colour : red, optional green

Housing

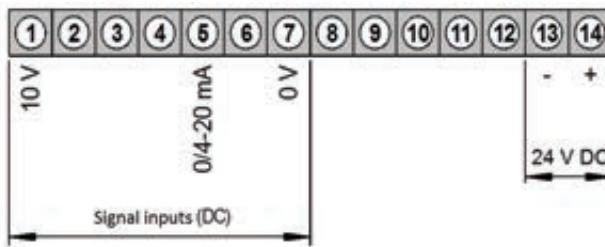
: DIN 96 x 24 mm
 installation depth 134 mm,
 (T=148 mm incl. terminals)
 Design : PC/ABS-Blend, black colour, UL94V-0
 control panel cut-out 89 x 21 mm
 Attachment : Snap-in screw to 50 mm, wall thickness
 Weight : 300 g
 Connection : Rear connection terminals, max 2.5 mm²,
 protection class IP00
 Protection class : Front IP54 or IP65

Displays

Dimensions



Terminal assignment



Ordering code

1. 2. 3. 4. 5. 6. 7.
 BA - - - - - -

1. Model	
9624N	30 segments
2. Mounting	
1	vertical
2	horizontal
3. Bargraph colour	
1	red
2	green
4. Power supply	
5	24 V DC with galvanic isolation
5. Input signal	
0	universal design
6. Measuring range scale 0..100 %	
10	universal design
7. Protection class	
1	IP54
2	IP65

Product information

Bargraph Indicator BA9624B



- Multipurpose inputs for 0/4..20 mA and 0..10 V DC
- Bargraph with 30 segments red, yellow or green programmable
- Horizontal or vertical mounting
- Integrated integrated 3-digit display red, free adjustable in the range -99..999 Digit
- Increasing or decreasing trend indication
- Bargraph or dot operation
- Display time 0.01..10 s programmable

Characteristics

Multi-color Bargraph Displays can be used for monitoring analog trend indication. The small cases are suitable for installation in control units and panel boards.

The BA9624B includes a 3-digit display for alarm values and programming functions. The multipurpose input is designed for industry standard signals 0/4..20 mA and 0..10 V DC. 4 front buttons makes the programming for the application possible.

Technical data

Power supply

Supply voltage	: 85..265 V AC, 50/60 Hz; 10..30 V AC/DC
Power consumption	: approx. 5 VA
Operating temp.	: 0..50 °C
CE-conformity	: EN 61010, EN60664-1

Input

Current	: 0/4..20 mA, Ri 100 Ω
Voltage	: 0..10 V DC, Ri 200 kΩ

Indicator

Bargraph	: 30 segments LED tricolor
Display	: 3-digits, 8 mm red ; -99..999 Digit
Display time	: programmable from 0.01..10 s
Overflow	: flashing upper or lower bargraph segments
Accuracy	: ± 0.2 %; 1 segment (bargraph); ±1 digit (display)

Output

2 Relay	: SPDT, 250 V AC / 5 A or 30 V DC / 5 A
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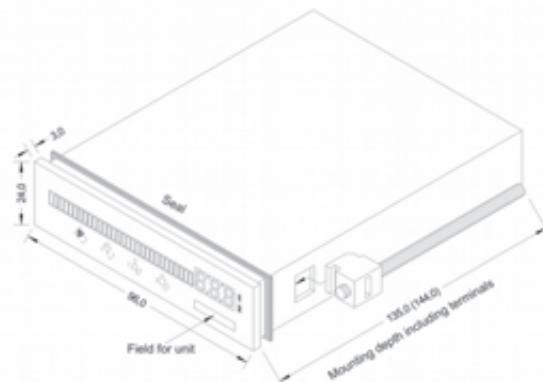
Case

Type	: DIN 96x24 mm, mounting depth 120 mm : slide-in case according to DIN 43700, Polycarbonate / frame ABS : panel cut-out 92x22 mm
Installation	: 2 clips, up to 50 mm wall thickness
Weight	: 0.29 kg
Protection class	: front IP65, terminals IP00

Connection : screw terminals, with pressure plate,
max. 2.5 mm² according to BGV A3

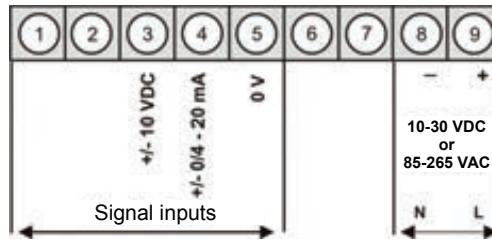
Displays

Dimensions

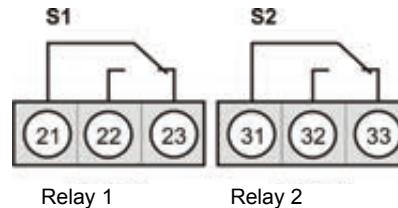


Connection diagrams

Input



Output



Ordering code

1. 2. 3. 4. 5.
BA9624B - - - - -

1. Mounting direction

1	vertical
2	horizontal

2. Display color

3	bargraph tricolor red/yellow/green 7-segment display red
---	---

3. Supply voltage

0	85..265 V AC
5	10..30 V AC/DC

4. Measuring range, scale 0-100 %

10	0/4..20 mA, 0..10 V DC
----	------------------------

5. Protection class (front)

2	IP65
---	------

Product information

Displays

Universal Display GA 9648



- Universal input for standard signals, frequency, Pt100/Pt1000 and thermocouples
- Self-diagnostics
- Integrated electrically isolated transmitter supply
- Interface

Characteristics

The GA 9648 is a microprocessor-controlled displaying device for universal use.

It has a universal input for standard signals (0..20 mA, 4..20 mA, 0..50 mV, 0..1 V, 0..2 V and 0..10 V), resistance thermometers (Pt100 and Pt1000), thermocouples (type J, K, N, S and T) and frequency (TTL and switch contact). Additionally the device provides functions like flow measurement, rotation speed measurement and counter.

The GA 9648 saves the highest and lowest measured value in the min/max value memory.

Furthermore it automatically detects impermissible operating states like display or system error and displays a corresponding error code.

Technical Data

Measuring inputs

Measuring type	Input signal	Measuring range	Note
Voltage signal	0..10 V	0..10 V	$R_i \geq 200 \text{ kOhm}$
	0..2 V	0..2 V	$R_i \geq 10 \text{ kOhm}$
	0..1 V	0..1 V	$R_i \geq 10 \text{ kOhm}$
	0..50 mV	0..50 mV	$R_i \geq 10 \text{ kOhm}$
Current signal	4..20 mA	4..20 mA	$R_i = \sim 125 \text{ Ohm}$
	0..20 mA	0..20 mA	$R_i = \sim 125 \text{ Ohm}$
Resistance	Pt100	-50.0..+200.0 °C	3-wire connection
		-200..+850 °C	
	Pt1000	-200..+850 °C	2-wire connection

Thermocouple	NiCr-Ni type K	-70.0..+250.0 °C	
		-270..+1372 °C	
	Pt10Rh-Pt type S	-50..+1750 °C	
		-270..+1350 °C	
	NiCrSi-NiSi type N	-100.0..+300.0 °C	
		-270..+1350 °C	
Fe-CuNi type J	70.0..+300.0 °C		
	-170..+950 °C		
Cu-CuNi type T	-70.0..+200.0 °C		
	-270..+400 °C		
Frequency	TTL signal	0..10 kHz	
	switching contact NPN	0..3 kHz	internal pull-up-resistor is switched on
	switching contact PNP	0..1 kHz	internal pull-down-resistor is switched on
Flow	TTL signal, switching contact NPN, PNP	analog to frequency	
Rotation speed	TTL signal, switching contact NPN, PNP	0..9999 U/min	switchable predis-tributor (1..1000), pulse frequency: max. 600000 pulses/min.
Rotation speed	TTL signal, switching contact NPN, PNP	0..9999 U/min	switchable predis-tributor (1..1000), pulse frequency: max. 600000 pulses/min.
	TTL signal, switching contact NPN, PNP	0..9999 U/min	switchable predis-tributor (1..1000), pulse frequency: max. 10000 pulses/min.

Accuracy

Standard signal : < 0.2 % FS ±1digit (at 0.50 mV: < 0.3 % FS ±1digit)

Resistance thermometer : < 0.3 % FS ±1digit

Thermocouple : < 0.3 % FS ±1digit

(at type S: < 0.5 % FS ±1digit)

Frequency : < 0.1 % FS ±1digit

Measuring rate

Standard signal : 100 measurements / second

Temperature : 4 measurements / second

Frequency : 100 measurements / second

Power supply : 230 V AC, 50 / 60 Hz

Power consumption : approx. 5 VA

Working temperature : -20..+50 °C

continued on next page

Product information

Display

Display	: LED display
Height	: 13 mm
Display range	: -1999..+9999 digit initial, final value and decimal point freely selectable
Operation	: via 4 buttons or via interface
Interface	: EASYBus interface, electrically isolated
Transmitter supply	: 24 V DC ±5 %, 22 mA, electr. isolated at DC supply: 18 V DC
Electric connection	: via screw / clamp terminals wire cross section from 0.14..1.5 mm ²
Protection class	: front IP54, with optional sealing IP65

Dimensions

Housing

Size	: 48 x 96 mm (H x W)
Mounting depth	: 115 mm (incl. screw / clamp terminals)
Panel mounting	: by fixing clamps
Panel cutout	: 43.0 x 90.5 mm [±0.5 mm] (H x W)

Connection diagram

15	EASYBus interface
14	EASYBus interface
13	input: 0..10 V
12	input: 0..1 V, 0..2 V, mA, frequency, Pt100, Pt1000
11	input: 0..50 mV, thermocouple, Pt100
10	input: GND, Pt100, Pt1000
9	transmitter supply (-)
8	transmitter supply (+)
2	power supply
1	power supply



Options

230A	supply voltage: 230 V AC (standard)
012D	supply voltage: 12 V DC (11..14 V)
024D	supply voltage: 24 V DC (22..27 V)
024A	supply voltage: 24 V AC (±5 %)
115A	supply voltage: 115 V AC (±5 %)
AA	analog output 0..20 mA, 4..20 mA (selectable)
AV	analog output 0..10 V

Displays

Ordering code

GA9648 - - -

1. Supply voltage

230A	230 V AC (standard)
012D	12 V DC
024D	24 V DC
024A	24 V AC
115A	115 V AC

2. Analog output

00	no analog output (standard)
AA	analog output 0..20 mA, 4..20 mA
AV	analog output 0..10 V

3. Option

00	without option
IP	sealing to increase protection class to IP65

Special design types (upon request)

SA1

Selectable scaling

with input 0..10 V and control input 24 V
The device has a 0..10 V standard signal input and a 24 V control input. By means of the 24 V control input it is possible to switch between two freely programmable scalings.

SA2

Input ±10 V DC

SA3

Set-point controller

This special design type makes the GA 9648 to a microprocessor-controlled set-point controller for universal use. The output value can be set via button 2 and 3 and then be output as analog signal corresponding to selected analog output type.

Accessories

- **EAK 36**

Unit stickers (black with white characters), 36 different units, for labeling of display devices

Product information

Economy Panelmeter EP9648



- Multipurpose input for 0/4..20 mA, 0..10 V and Pt100
- LED-Display 14,2 mm red, yellow, green or blue or 20.3 mm red
- Indicating range and decimal point free programmable
- Programmable display time

Characteristics

The Economy Panelmeter EP9648 is a technical advancement of the DP9648. With universal input conditions and easy programming the Panelmeter receive a powerful instrument for monitoring, measurement and control applications. As highlight the device offers a self acting display brightness. A built-in photo sensor controls the ambient brightness and corrects the display brightness.

Technical data

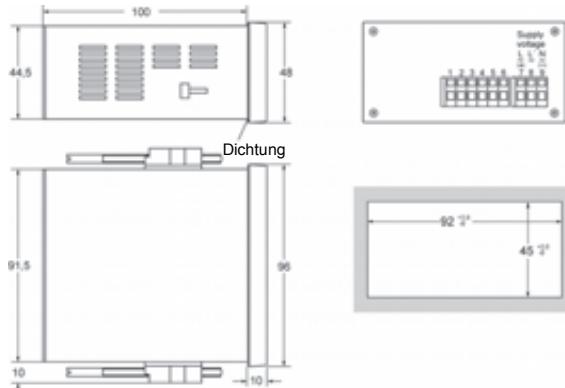
Power supply

Supply voltage	: 230 / 115 V AC 50/60 Hz ±10 % or 24 V DC ± 20 %
Power consumption:	3 VA
Working temp.	: -10..+60 °C
CE- conformity	: EN 55022, EN 60555, IEC 61000-4-3/4/5/11/13
Input	
Current	: 0/4..20 mA, Ri 10 Ω, overload max. 3-times
Voltage	: 0..10 V, Ri 100 kΩ, overload max. 3-times
Pt100	: -100..400 °C sensor current < 1 mA (low self heating)
Accuracy	: voltage/current ± 0.1 %, ± 1 digit; Pt100 ± 0.2 °C, ± 1 digit
Display	: LED 14.2 mm yellow, green, blue or 20.3mm red
Indicating range	: -1999..2000 Digit
Decimal point	: programmable
Overflow indication	: "-1999" or " 9999 ", flashing with 2 Hz
Display brightness	: programmable from 2..100 %, with photo sensor (only display red, optional)
Analog output	
Voltage	: 0..10 V DC, linearized, short circuit proof max. 5 mA
Accuracy	: 0.1 %
Case	: panel case DIN 96x48 mm, material PA6-GF; UL94V-0

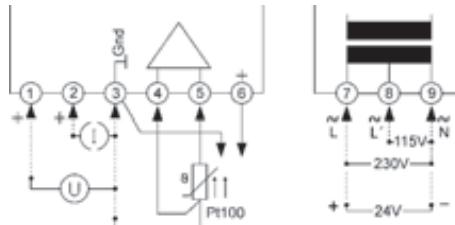
Displays

Dimensions	: front 96x48 mm, mounting depth 100mm
Weight	: max. 390 g
Connection	: clamp terminals, 0.08..1.5 mm ² AWG28..AWG14
Protection class	: front IP65, terminals IP20 acc. to BGV A3

Dimensions



Connection diagram



Ordering code

EP9648 - - - - - -

1. Display				
1	LED red	14.2 mm		
3	LED red	20.3 mm		
4	LED yellow	14.2 mm		
6	LED green	14.2 mm		
8	LED blue	14.2 mm		
2. Model				
15	Industry standard signal 0/4..20 mA, 0..10 V DC and Pt100			
3. Supply voltage				
0	230 VAC	±10 % 50-60Hz		
5	24 V DC	±20 %		
4. Options				
00	without option			
07	self acting display brightness (only display LED red 1 and 3)			
5. Unit appears in the unit field				
6. Additional text above the display (3x90 mm HxW)				

Product information

Loop powered Panelmeter SP9648



- LED-display without separate supply voltage
- Free adjustable indicating range
- Switch selectable conversion rate 3/s or 0,5/s

Characteristics

Loop powered Panelmeter SP9648 can be used for indicating and measurement applications in process technology and automation. The small case is suitable for installation in control units and panel boards. The input allows indication of any physical dimension, which are stated in a signal of 4..20mA.

Technical data

Input

Current input	: 4..20 mA
Overload range	: -100..150 mA
Voltage drop	: 2.5..3.4 V, depends on chosen display brightness
Accuracy	: 0.1 % , +/- 1 Digit
Operating temp.	: -10..+60 °C
CE- conformity	: EN 55022, IEC 61000-4-2/4

Display

Indicating range	: -1999..+1999
Span	: adjustable 0..4000 Digits
Zero point	: adjustable -100..+25 % of the span
Brightness	: adjustable ≈ 40..100 %
Conversion rate	: 3/s or 0.5/s switchable
Height	: 7.6 mm
Overflow indication	: "-/ for negative and " / " for positive overflow
Color	: red
Case	: DIN96x48 mm mounting depth 69 mm acc. to DIN 43700, material Noryl GFN 2 SE 1 field case polycarbonate RAL 7035

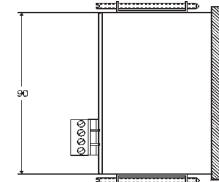
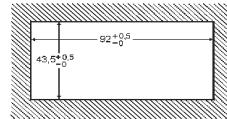
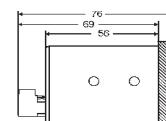
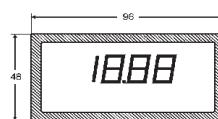
Weight

- Panel case	: approx. 170 g
- Field case	: approx. 366 g
Connection	: slide-in terminal strip, max. 1.5 mm ² , AWG16
Protection class	: front IP54 or IP65 terminals IP20 acc. to BGV A3

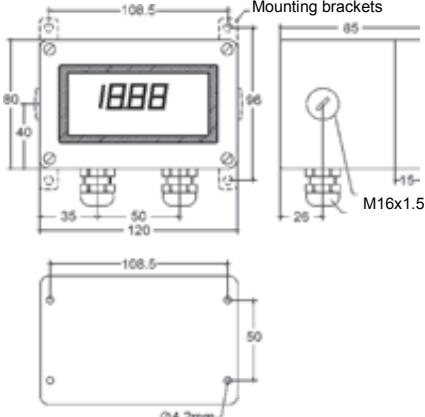
Displays

Dimensions

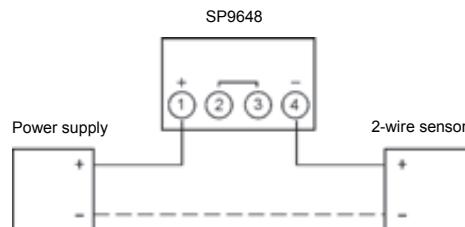
Panel case



Field case



Connection diagram



Ordering code

SP9648 - - - -

1. Device type	
1	panel case
2	field case 120x80x85 mm (WxDxH)
2. Display characteristic	
S	increasing (Standard)
F	decreasing
3. Protection class	
1	IP54
2	IP65
4. Unit (appears on the face plate)	
Accessories	
10031201	mounting brackets

Product information

Standard Signal Panelmeter S9648



- Measuring input for standard signals 0/4..20 mA or 0..10 V and Potentiometer
- Integrated transmitter supply
- LED-Display 14.2 mm red, indicating range $\pm 9999(0)$ Digit
- Max. 4 alarm outputs, relay SPDT or transistor

Characteristics

The Standard Signal Panelmeter S9648 has been designed for measuring industry standard signals 0/4..20 mA or 0..10 V DC. The device offers an integrated transmitter supply for direct connection of 2- and 3-wire transmitters for e.g. pressure or temperature. Indicating range and decimal point are free programmable in the range $\pm 9999(0)$ digit.

Technical data

Power supply

Supply voltage : 230 V AC $\pm 10\%$; 115 V AC $\pm 10\%$,
24 V AC $\pm 10\%$ or 24 V DC $\pm 15\%$

Power consumption : max. 3.5 VA, with analog output 5 VA

Operating temp. : -10..+55 °C

CE-conformity : EN 55022, EN 60555,
IEC 61000-4-3/4/5/11/13

Input

Current : 0/4..20 mA $R_i = 10 \Omega$
Voltage : 0..10 V $R_i > 100 \text{ k}\Omega$

Potentiometer : 0..1 kΩ / 100 kΩ

Accuracy : $< 0.1\% \pm 2$ digit

Transmitter supply : U_0 approx. 24 V, R_i ca. 150 Ω, max. 50 mA
(max. 25 mA with 4 relays)

Display

Indicating range : $\pm 9999(0)$ digit with leading zero suppression

Parameter display : LED 2-digit red, 7 mm
(parameter and output indicator)

Output

Relay : SPDT < 250 V AC < 250 VA < 2 A,
 < 300 V DC < 50 W < 2 A

Transistor : max. 35 V AC / DC max. 100 mA,
with short circuit protection

Analog : 0/4..20 mA burden $\leq 500 \Omega$; 0/2..10 V
burden $> 500 \Omega$, isolated

- Accuracy : 0.1%; TK 0.01 %/K

Case : panel case DIN 96x48 mm,
material PA6-GF; UL94V-0

Dimensions : front 96x48 mm, mounting depth 100,

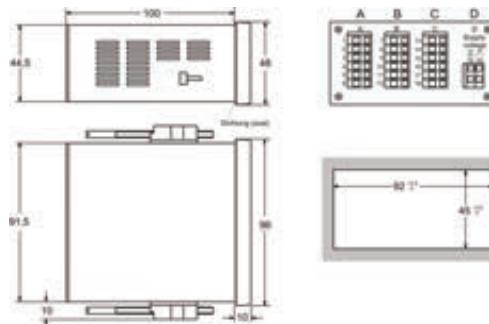
Weight : max. 390 g

Connection : clamp terminals, 0.08..1.5 mm²
AWG28..AWG14

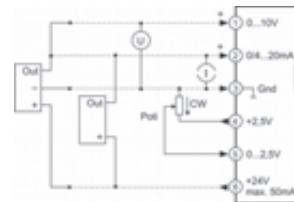
Protection class : front IP65, terminals IP20 acc. to BGV A3

Displays

Dimensions



Connection diagram



Ordering code

S9648 - - - - - - -

1. Terminal strip A

1	input standard signals, 0/4..20 mA, 0..10 V DC and potentiometer, integrated transmitter supply 24 V max. 50 mA*
---	--

2. Terminal strip B

00	not installed
2R	2 relay outputs
2T	2 electronic outputs
S1**	2. input standard signals, integrated transmitter supply 24 V max. 50 mA*

3. Terminal strip C

00	not installed
2R	2 relay outputs
2T	2 electronic outputs
AO	analog output 0/4..20 mA, 0/2..10 V

4. Terminal strip D; supply voltage

0	230 V AC $\pm 10\%$ 50-60Hz
1	115 V AC $\pm 10\%$ 50-60Hz
4	24 V AC $\pm 10\%$ 50-60Hz
5	24 V DC $\pm 15\%$

5. Options

00	without option
01	min-and max-peak hold
02	difference-, average-, larger-, smaller value
08	analog output separate programmable

6. Unit (appears in the unit field)

7. Additional text placed above the display (3x90 mm HxW)

Attention!

* Terminal strip A+B together max. 50 mA

** no isolation to terminal strip A, only in connection with option 02

Connection diagram for terminal strips B-D see page 34

Product information

Temperature Panelmeter T9648



- Measuring input for Pt100, Pt1000 or Thermocouple
- LED-Display 14.2 mm red
- Max. 4 alarm outputs relay SPDT or transistor

Characteristics

The Temperature Panelmeter T9648 is suitable for measurement of temperatures in connection with RTD sensors Pt100, Pt1000 and thermocouples Fe-CuNi (J), NiCr-Ni (K), Pt10Rh-Pt (S). Devices for other temperature sensors are available on request. The measuring input is isolated. The measuring range can be limited in the configuration level. It is identical with the range of the analog output.

Technical data

Power supply

Supply voltage : 230 V AC $\pm 10\%$; 115 V AC $\pm 10\%$;
24 V AC $\pm 10\%$ or 24 V DC $\pm 15\%$

Power consumption : max. 3.5 VA, with analog output 5 VA

Operating temp. : -10..+55 °C

CE- conformity : EN55022, EN60555,
IEC61000-4-3/4/5/11/13

Input

Pt100 : -100..+600 °C

Pt1000 : -50..+200 °C

Accuracy : Pt100 or Pt1000 < 0.1 % ± 2 Digit,
max. 100 Ohm line resistance

Thermocouple : Fe-CuNi (J) 0..+800 °C,
NiCr-Ni (K) 0..+1200 °C

Pt10Rh-Pt (S) 0..+1600 °C
built-in cold junction

Accuracy : < 0.1 % ± 2 Digit with compensating line

Display : LED red, 14.2 mm

Indicating range : $\pm 9999(0)$ Digit

Parameter display : LED 2-digit red, 7 mm
(parameter - and output indicator)

Output

Relay SPDT : < 250 V AC < 250 VA < 2 A,
< 300 V DC < 50 W < 2 A

Transistor : max. 35 V AC/DC, 100 mA,
short circuit protected

Analog output : 0/4..20 mA burden \leq 500 Ω ; 0/2..10 V
burden > 500 Ω , isolated
automatic output changing
(burden depending)

- Accuracy : 0.1%; TK 0.01 %/K

Case : panel case DIN 96x48 mm,
material PA6-GF; UL94V-0

Dimensions : front 96x48 mm, mounting depth 100 mm

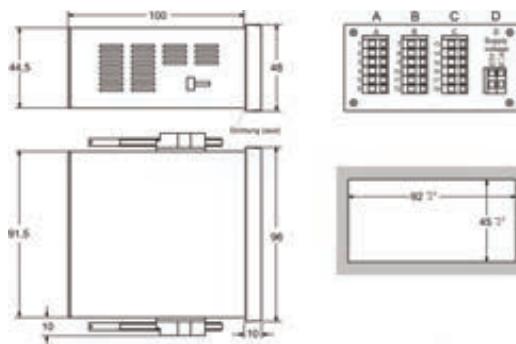
Weight : max. 390 g

Connection : clamp terminals, 0.08..1.5 mm 2
AWG28..AWG14

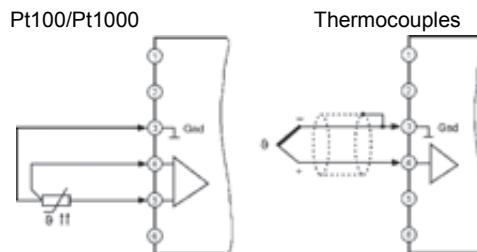
Protection class : front IP65, terminals IP20 acc. to BGV A3

Displays

Dimensions



Connection diagram



Order code

T9648 - - - - - - -

1. Terminal strip A

1	input Pt100
3	input Pt1000
5	input thermocouple

2. Terminal strip B

00	not installed
2R	2 relay outputs
2T	2 electronic outputs
T1*	2 nd input Pt100
T3*	2 nd input Pt1000

3. Terminal strip C

00	not installed
2R	2 relay outputs
2T	2 electronic outputs
AO	analog output 0/4..20 mA, 0/2..10 V

4. Terminal strip D; supply voltage

0	230 V AC $\pm 10\%$ 50-60Hz
1	115 V AC $\pm 10\%$ 50-60Hz
4	24 V AC $\pm 10\%$ 50-60Hz
5	24 V DC $\pm 15\%$

5. Options

00	without option
01	min-and max-peak hold
02	difference-, average-, larger-, smaller value
07	display brightness programmable

6. Unit (appears in the unit field)

7. Additional text placed above the display (3x90 mm HxW)

*In connection with terminal strip A, only Pt100 or Pt1000; Pt100 and Pt1000 can not be mixed. Not isolated to terminal strip A.

Product information

DMS Bridge Panelmeter DMS9648



- Weight-force-pressure-torque with DMS bridges
- 1- or 2-way action, pressure or traction programmable
- Bridge sensitivity programmable
- Max. 8 parameter sets programmable
- Max. 4 alarm outputs, relay or transistor

Characteristics

The DMS Bridge Panelmeter DMS9648 is designed for measuring forces, pressure and torques with DMS bridges. The device offers a programmable bridge supply 5/10 V DC; max. 50 mA output current. Measuring errors due to line resistance can be compensated by using a sense line.

Technical data

Power supply

Supply voltage : 230 V AC $\pm 10\%$; 115 V AC $\pm 10\%$;
24 V AC $\pm 10\%$ or 24 V DC $\pm 15\%$

Power consumption : max. 3.5 VA, with analog output 5 VA

Operating temperature : -10..+55 °C

CE- conformity : EN 55022, EN 60555,
IEC 61000-4-3/4/5/11/13

Input

Bridge supply : 5 V DC or 10 V DC ; programmable;
max. 50 mA

Bridge resistance : at 5 V min. 100 Ω; at 10 V min. 200 Ω

Bridge sensitivity : 0.900..6.600 mV/V programmable

Sense line : compensated line resistance

of max. 10 Ω

Accuracy : < 0.1 % ± 2 Digit

Display : LED red, 14.2 mm

Indicating range : $\pm 9999(0)$ Digit

Additional display : LED 2 digit red, 7 mm

(parameter - and status indicator)

Output

Relay SPDT : < 250 V AC < 250 VA < 2 A,
< 300 V DC < 50 W < 2 A

Transistor : max. 35 V AC/DC, 100 mA,
with short-circuit-proof

Analog output : 0/4..20 mA burden \leq 500 Ω;
0/2..10 V burden $>$ 500 Ω, isolated

output changes automatically

- Accuracy : 0.1 %; TK 0.01 %/K

Case : panel mounting DIN 96x48,
material PA6-GF; UL94V-0

Dimensions : front 96x48 mm, mounting depth 100 mm

Weight : max. 390 g

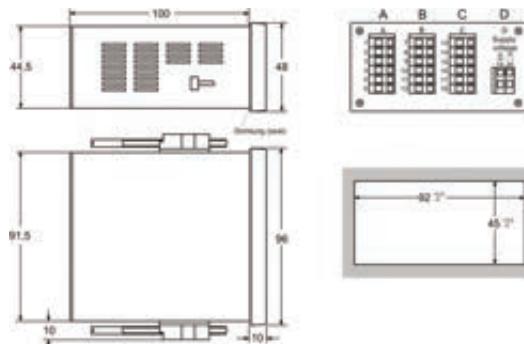
Connection : clamp terminals, 0.08..1.5 mm²

AWG28..AWG14

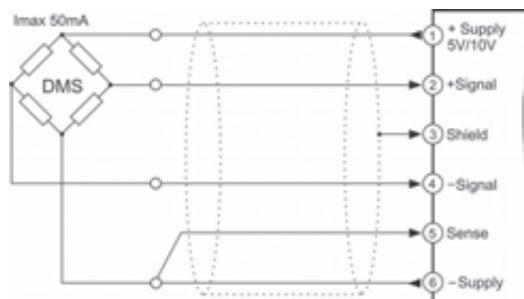
: front IP65, terminals IP20 acc. to BGV A3

Displays

Dimensions



Connection diagram



Ordering code

DMS9648 - - - - - - -

1. Terminal strip A

1	input DMS bridge, 1 parameter set
2	input DMS bridge, 8 parameter sets

2. Terminal strip B

00	not installed
2R	2 relay outputs
2T	2 electronic outputs

3. Terminal strip C

00	not installed
2R	2 relay outputs
2T	2 electronic outputs
AO	analog output 0/4..20 mA, 0/2..10 V

4. Terminal strip D; supply voltage

0	230 V AC $\pm 10\%$ 50-60Hz
1	115 V AC $\pm 10\%$ 50-60Hz
4	24 V AC $\pm 10\%$ 50-60Hz
5	24 V DC $\pm 15\%$

5. Options

00	without option
01	min- and max- peak hold
07	display brightness programmable
08	analog output separately and independent from the indicating range programmable (only DMS9648-1)

6. Unit (appears in the unit field)

7. Additional text placed above the display (3x90 mm HxW)

Connection diagram for terminal strips B-D see page 34

Product information

Tank Display TA9648



- Inputs for standard signals 0/4..20 mA or 0/2..10 V
- 2nd input for pressure transmitter at pressure loaded tanks
- Input automatic level correction
- 6 standard- and custom sized tanks selectable
- Max. 4 alarm outputs, relay SPDT or transistor

Characteristics

The Tank Display TA9648 offers content measurement of tanks with no linear connection between level and content. Measurement will be realized by hydrostatic pressure or distance sensors. The device offers the possibility to connect a level sensor. Reaching a certain level, the displayed value will be corrected automatically to the value according to the position of the installed sensor.

Technical data

Power supply

Supply voltage : 230 V AC $\pm 10\%$; 115 V AC $\pm 10\%$,
24 V AC $\pm 10\%$ or 24 V DC $\pm 15\%$
Power consumption : max. 3.5 VA, with analog output 5 VA
Operating temp. : -10..+55 °C
CE-conformity : EN 55022, EN 60555,
IEC 61000-4-3/4/5/11/13

Input

Current : 0/4..20 mA; $R_i = 10 \Omega$
overload 2-times; 4-times for max. 5 s
Voltage : 0/2..10 V DC; $R_i = 100 \text{ k}\Omega$
overload max. 100 V
Accuracy : < 0.1 % ± 2 Digit
Transmitter supply : U_o appr. 24 V; R_i appr. 150 Ω ; max. 50 mA
(max. 25 mA, with 4 relays)

Display

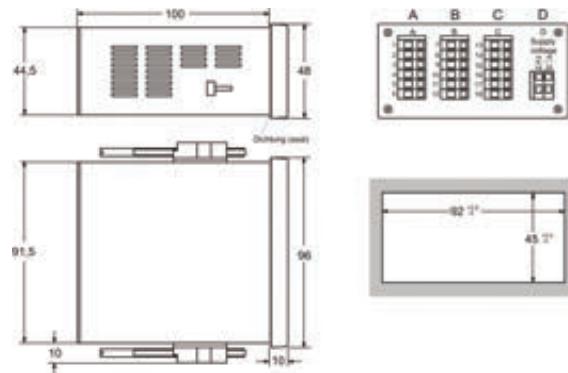
Indicating range : 999999 Digit with leading zero suppression
Parameter display : LED 2 digit red, 7 mm
(parameter - and output indicating)

Output

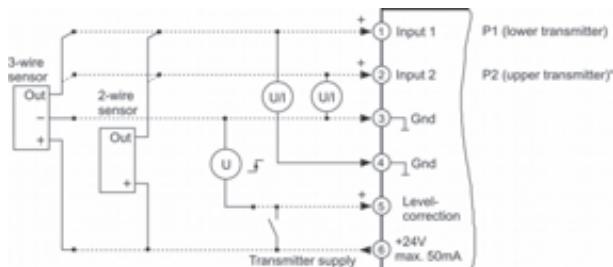
Relay : SPDT < 250 V AC < 250 VA < 2 A,
< 300 V DC < 50 W < 2 A
Transistor : max. 35 V AC/DC max. 100 mA,
with short circuit protection
Analog : 0/4..20 mA burden $\leq 500 \Omega$; 0/2..10 V
burden $> 500 \Omega$, isolated
automatic output changing
- Accuracy : 0.1 %; TK 0.01 %/K
Case : panel case DIN 96x48mm,
material PA6-GF; UL94V-0
Dimensions : front 96x48 mm, mounting depth 100 mm
Weight : max. 390 g
Connection : clamp terminals, 0.08..1.5 mm²
AWG28..AWG14
Protection class : front IP65, terminals IP20 acc. to BGV A3

Displays

Dimensions



Connection diagram



* only with pressure loaded tanks

Ordering code

TA9648 - - - - - - -

1. Terminal strip A

1	2 inputs 0/4..20 mA, 1 input for level correction, Integrated, transmitter supply 24V max. 50 mA
2	as 1, but inputs 0/2..10 V

2. Terminal strip B

00	not installed
2R	2 relay outputs
2T	2 electronic outputs

3. Terminal strip C

00	not installed
2R	2 relay outputs
2T	2 electronic outputs
AO	analog output 0/4..20 mA, 0/2..10 V

4. Terminal strip D; supply voltage

0	230 V AC $\pm 10\%$ 50-60Hz
1	115 V AC $\pm 10\%$ 50-60Hz
4	24 V AC $\pm 10\%$ 50-60Hz
5	24 V DC $\pm 15\%$

5. Options

00	without option
----	----------------

6. Unit (appears in the unit field)

7. Additional text placed above the display (3x90 mm HxW)

Product information

Flow Meter DF9648



- Measuring range programmable ±99999 Digit
- Measuring unit programmable
- 2 totalizers programmable
- Pulse output for external evaluation
- Max. 4 alarm outputs, relay or electronic
- Isolated analog output 0/4..20 mA, 0/2..10 V

Characteristics

The Flow-Meter DF9648 is used in food technology, chemical and pharmaceutical industry and water technology.
In connection with any type of pulse flow sensor the current flow rate and total flow can be measured, displayed and converted to an analog output signal. The dosage of quantity may be realized by using the alarm outputs. The optional pulse output allows an external summation of the flow quantity.

Technical data

Power supply

Supply voltage : 230 V AC ±10 %; 115 V AC ±10 %;
24 V AC ±10 % or 24 V DC ±15 %
Power consump. : max. 3.5 VA, with analog output 5 VA
Operating temp. : -10..+55 °C
CE-conformity : EN 55022, EN 60555, IEC 61000-4-3/4/5/11/13

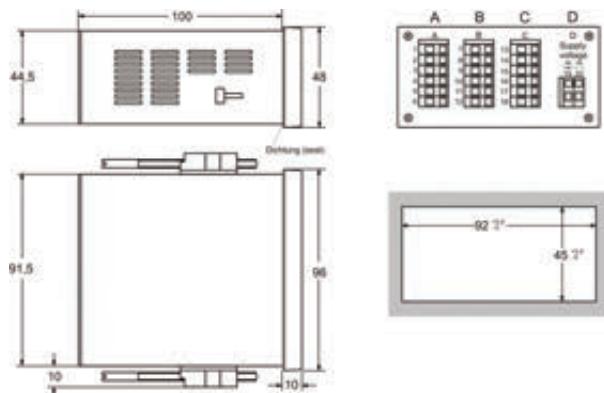
Measuring input

Type : sensor with ac-output (coil), Namur-sensor or Hall-sensor (rectangular-signal) programmable
alternative external pulses 0/5..24 VDC
- Coil : switching threshold programmable ±5..±2000 mV,
pull-down resistor 100 kΩ
- NPN sensor : low level < 0.9 V, high level > 2.1 V
pull-up resistor 20 kΩ
- PNP sensor : low level < 0.9 V, high level > 2.1 V
pull-down resistor 20 kΩ
- Namur : low level < 1.2 mA, high level > 2.1 mA,
hysteresis approx. 0.5 mA
pull-down resistor 1 kΩ
- Relay : pulse width min. 5 ms
Frequency : input A or B 0.1 Hz..15 kHz
(contact max. 30 Hz)
input A and B together 0.1 Hz..8 kHz
(contact max. 30 Hz)
Reset-input : low level < 0.9 V, high level > 2.1 V,
pull-down resistor 20 kΩ
pulse width min. 5 ms,
reset at rising edge
Accuracy : ≤ 0.1 % ±1 Digit
Sensor supply : 8 V DC stabilized (Namur), 24 V DC
(coil, NPN, PNP, Push-Pull), Ri approx. 150 Ω,
max. 50 mA (25 mA with 4 relay output)

Displays

Display	: LED red, 14.2 mm
Parameter	: LED 2-digit red, 7 mm (parameter - and output indicator)
Display range	: flow -99999..99999 Digit, totalizer -99999..0..99999 Digit, with leading zero suppression, max. 3 decimals, daily totalizer not voltage safe, total totalizer voltage safe
Output	
Relay	: SPDT <250 V AC<250 VA<2 A, <300 V DC<50 W<2 A
Transistor	: max. 35 V AC/DC / 100 mA, with short circuit protection
Analog	: 0/4..20 mA burden ≤500 Ω; 0/2..10 V load >500 Ω, isolated automatic output changing (burden dependent)
Accuracy	: 0.1 %; TK 0.01 %/K
Pulse output	: transistor ≤ 5 Hz, relays ≤ 0.1 Hz (max. 500,000 switching cycles) pulse width 100 ms
Case	: panel case DIN96x48 mm, material PA6-GF; UL94V-0
Dimensions	: front 96x48 mm, mounting depth 100 mm,
Weight	: max. 390 g
Connection	: clamp terminals, 2 mm² single wire, 1.5 mm² flexible wire, AWG14
Protection class	: front IP65, terminals IP20, acc. to BGV A3

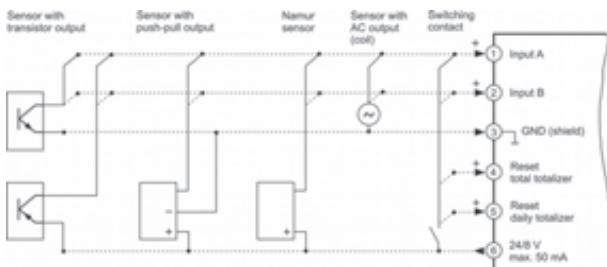
Dimensions



Product information

Displays

Connection diagram



Ordering code

DF9648 - - - - - - -

1. Terminal strip A

1	Input for sensors with AC-signals (coil), pulse signal (Namur, NPN, PNP, Push-Pull) or switching contact
2	as 1, but additional input for addition/subtraction

2. Terminal strip B

00	not installed
2R	2 relay outputs
2T	2 electronic outputs (alarm/pulse output)*

3. Terminal strip C

00	not installed
2R	2 relay outputs
2T	2 electronic outputs
AO	analog output

4. Terminal strip D supply voltage

0	230 V AC	±10 % 50-60Hz
1	115 V AC	±10 % 50-60Hz
4	24 V AC	±10 % 50-60Hz
5	24 V DC	±15 %

5. Options

00	without option
11	*pulse output (only at terminal strip B)

6. Unit

appears in the unit field

7. Additional text above the display (3x90 mm HxW)

* Strip B: output A1 = alarm, A2 = pulse output

Connection diagram for terminal strips B-D see page 34

Product information

Digital Amperemeter A9648



- Measuring range programmable 0..6/60 A
- LED-Display 14.2 mm red, indicating range $\pm 9999(0)$ Digit
- Max. 4 alarm outputs, relay SPDT or electronic

Characteristics

The Digital Amperemeter A9648 has been designed to measure DC and AC current signals. Five basic models are selectable and possible to measure currents from 0.0..900 mA to 0..60.0A. The measuring range is free programmable. Measuring of bipolar currents are possible. For example -20..+20 mA. Additional the free programmable display range within $\pm 9999(0)$ digit can be assigned to a programmed current measurement range. This can be important, if the measured current is a degree for another physical dimension.

Technical data

Power supply

Supply voltage : 230 V AC $\pm 10\%$; 115 V AC $\pm 10\%$,
24 V AC $\pm 10\%$ or 24 V DC $\pm 15\%$

Power consumption : max. 3.5 VA, with analog output 5 VA

Operat. temperature : -10..+55 °C

CE-conformity : EN 55022, EN 60555,
IEC 61000-4-3/4/5/11/13

Input : model 1-4 = 0..0.9 mA up to 6 A DC/AC_{TRMS}

model 5 = 0..4.5 up to 60 A AC_{TRMS}

Input resistant : model 1 = 20 Ω, model 2 = 2 Ω,

model 3 = 0.2 Ω, model 4 = 0.02 Ω,

model 5 = integrated current transformer

Over load : 2-times; 4-times max. 5 s

Basic accuracy : < 0.1 % ± 2 Digit (DC); 0.5 % ± 2 Digit (AC)

Display : LED red, 14.2 mm, $\pm 9999(0)$ Digit

Parameter display : LED 2-digit red, 7 mm
(parameter and output indicator)

Output

Relay : SPDT < 250 V AC < 250 VA < 2 A,
< 300 V DC < 50 W < 2 A

Electronic : max. 35 V AC/DC max.100 mA,
short circuit protected

Analog : 0/4 ... 20 mA burden $\leq 500 \Omega$; 0/2 ... 10 V
burden > 500 Ω, isolated
automatic output changing

- Accuracy : 0.1 %; TK 0.01 %/K

Case : panel case DIN 96x48,
material PA6-GF; UL94V-0

Dimensions : front 96x48 mm, mounting depth 100,
120 mm (with transformer)

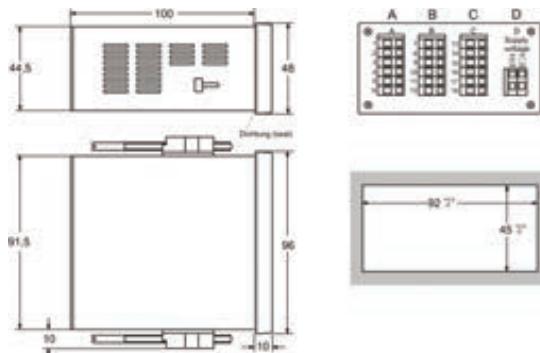
Weight : max. 390 g

Connection : clamp terminals, 0.08..1.5 mm²
AWG28..AWG14

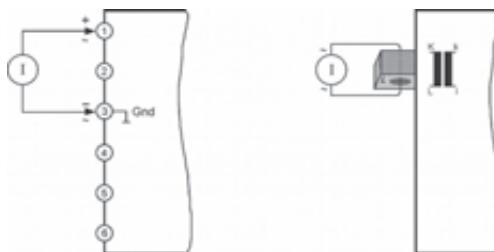
Protection class : front IP65, terminals IP20 acc. to BGV A3

Displays

Dimensions



Connection diagram



Ordering code

A9648 - - - - - - -

1. Terminal strip A

1	0..9.99 mA DC/AC _{TRMS} clamp terminal
2	0..99.99 mA DC/AC _{TRMS} clamp terminal
3	0..999.9 mA DC/AC _{TRMS} clamp terminal
4	0..6.000 A DC/AC _{TRMS} clamp terminal
5	0..60.00 A AC _{TRMS} winding transformer

2. Terminal strip B

00	not installed
2R	2 relay outputs
2T	2 electronic outputs

3. Terminal strip C

00	not installed
2R	2 relay outputs
2T	2 electronic outputs

4. Terminal strip D; supply voltage

0	230 V AC $\pm 10\%$ 50-60Hz
1	115 V AC $\pm 10\%$ 50-60Hz
4	24 V AC $\pm 10\%$ 50-60Hz
5	24 V DC $\pm 15\%$

5. Options

00	without option
01	min- and max-peak hold
07	display brightness programmable

6. Unit appears in the unit field

7. Additional text above the display (3x90 mm HxW)

Connection diagram for terminal strips B-D see page 34

Product information

Digital Voltmeter V9648



- Measuring and indicating range separate programmable
- LED display 14.2 mm red, indicating range $\pm 9999(0)$ digit
- Max. 4 alarm outputs, relay SPDT or transistor

Characteristics

The Digital Voltmeter V9648 has been designed to measure DC and AC (TRMS) voltage signals. Three basic models all are selectable and makes the possibility to measure voltages from 0..30.00 mV up to 0..999.9 V. Within a model the measurement range is free programmable. Measuring of bipolar voltages is also possible with basic models 1 and 2. For example -5..+5 V; or -10..+10 V in basic model 2. Additional a free programmable display range within $\pm 9999(0)$ digit can be assigned to a programmed voltage measurement range.

Technical data

Power supply

Supply voltage : 230 V AC $\pm 10\%$; 115 V AC $\pm 10\%$,
24 V AC $\pm 10\%$ or 24 V DC $\pm 15\%$

Power consumption : max. 3.5 VA, with analog output 5 VA

Operating temp. : -10..+55 °C

CE-conformity : EN 55022, EN 60555,
IEC 61000-4-3/4/5/11/13

Input

Input resistance : model 1 = 130 kΩ, model 2 = 1.3 MΩ,
model 3 = 2.6 MΩ

Overload : model 1 and 2 = 300 V DC/AC_{TRMS},
model 3 = 1200 V DC/AC_{TRMS}

Accuracy : < 0.1 % ± 2 digit (DC); 0.5 % ± 2 digit (AC)
crest-factor < 3 \Rightarrow max. 2 % error,
crest-factor < 5 \Rightarrow max. 5 % error

Display

Indicating range : $\pm 9999(0)$ digit

Additional display : LED 2-digit red, 7 mm
(parameter - and output indicator)

Output

Relay : SPDT < 250 V AC < 250 VA < 2 A,
< 300 V DC < 50 W < 2 A

Transistor : max. 35 V AC/DC, 100 mA,
with short circuit protection

Analog output : 0/4..20 mA burden $\leq 500 \Omega$; 0/2..10 V,
burden $> 500 \Omega$, with isolation

-Accuracy : 0.1 %; TK 0.01 %/K

Case : panel case DIN 96x48 mm,
material PA6-GF; UL94V-0

Dimensions : front 96x48 mm, mounting depth 100mm

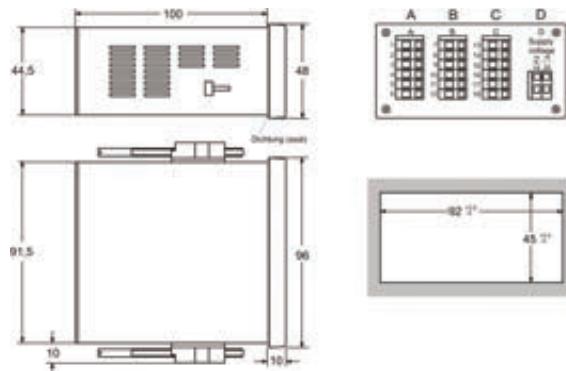
Weight : max. 390 g

Connection : clamp terminals, 0.08..1.5 mm²,
AWG28..AWG14

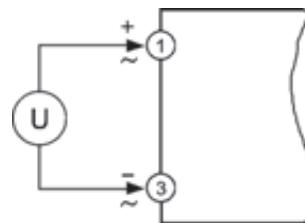
Protection class : front IP65, terminals IP20 acc. to BGV A3

Displays

Dimensions



Connection diagram



Ordering code

V9648 - - - - - - -

1. Terminal strip A

Measuring range programmable:

1	0..4000 mV DC/AC _{TRMS}
---	----------------------------------

2	0..250.0 V* DC/AC _{TRMS} * includes e.g. ± 5 V, ± 10 V
---	--

3	0..999.9 V DC/AC _{TRMS}
---	----------------------------------

2. Terminal strip B

00	not installed
----	---------------

2R	2 relay outputs
----	-----------------

3. Terminal strip C

00	not installed
----	---------------

2R	2 relay outputs
----	-----------------

2T	2 electronic outputs
----	----------------------

AO	analog output 0/4..20 mA, 0/2..10 V DC
----	--

4. Terminal strip D; supply voltage

0	230 V AC $\pm 10\%$ 50-60Hz
---	-----------------------------

1	115 V AC $\pm 10\%$ 50-60Hz
---	-----------------------------

4	24 V AC $\pm 10\%$ 50-60Hz
---	----------------------------

5	24 V DC $\pm 15\%$
---	--------------------

5. Options

00	without option
----	----------------

01	min- and max-peak hold
----	------------------------

07	display brightness programmable
----	---------------------------------

6. Unit appears in the unit field

7. Additional text above the display (3x90 mm HxW)

Connection diagram for terminal strips B-D see page 34

Product information

Speed Indicator DR9648



- Pulse inputs for switch contacts, PNP-, Namur-sensors and rotary encoder
- Programmable input prescaler
- Time base min^{-1}
- Integrated transmitter-supply
- Max. 4 alarm outputs, electronic or relay SPDT

Characteristics

The Speed Indicator DR9648 has been designed for field applications in process control and automation. Parameters for operation mode can be programmed. The DR9648 can be used wherever processes based per minute, just as speed should be measured and displayed.

Technical data

Power supply

Supply voltage	: 230 V AC $\pm 10\%$; 115 V AC $\pm 10\%$; 24 V AC $\pm 10\%$ or 24 V DC $\pm 15\%$
Power consumption	: max. 3.5 VA
Working temp.	: -20..+55 °C
CE- conformity	: EN 55022, EN 60555, IEC 61000-4-3/4/5/11/13

Input

PNP sensor	: $R_i = 6.3 \text{ k}\Omega$ level: < 4 V low; > 8.5 V high; hysteresis > 2.5 V; max. 35 V DC
Namur sensor	: R_i approx. $1 \text{ k}\Omega$ (< 4 mA) level: < 1 mA low; > 2.2 mA high; hysteresis > 0.5 mA; max. 35 V DC
Frequency max.	: input E1 = 1 Hz..30 Hz, (switch contact) input E2 = 1 Hz..15 kHz, (PNP- or Namur sensor)
Time base	: min^{-1}
Accuracy	: $\leq 0.003\% \pm 1 \text{ Digit}$
Min. pulse width	: electronic 50 μs , contact 5 ms
Hold	: 24 V DC or switch contact
Transmitter supply	: 8 V (Namur), 24 V DC (PNP), R_i approx. 150Ω , max. 50 mA

Display

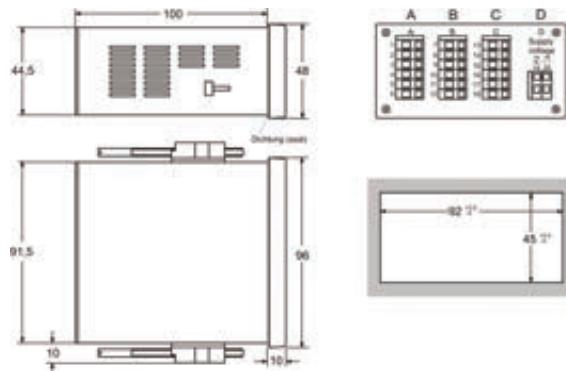
Indicating range	: 0..99999 digit
Additional display	: LED 2-digit red, 7 mm (parameter- and switch indicator)

Output

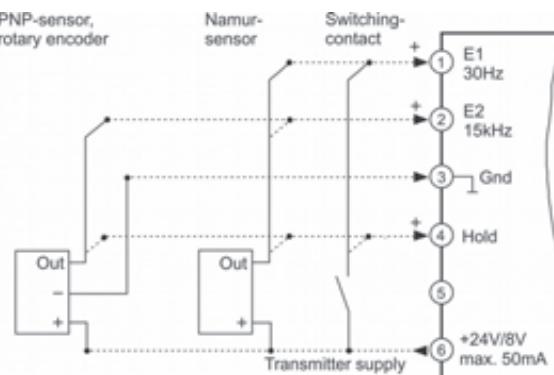
Relay	: SPDT < 250 V AC < 250 VA < 2 A, < 300 V DC < 50 W < 2 A
Transistor	: max. 35 V AC/DC, 100mA, short circuit proof
Case	: panel case DIN 96x48, material PA6-GF; UL94V-0
Dimensions	: front 96x48 mm, mounting depth 100mm
Weight	: max. 390 g
Connection	: clamp terminals, 0.08..1.5 mm ² , AWG28..AWG14
Protection class	: front IP65, terminals IP20, acc. to BGV A3

Displays

Dimensions



Connection diagram



Ordering code

DR9648 - - - - - - -

1. Terminal strip A

1	2 pulse inputs hold input, integrated transmitter supply 24V max. 50 mA
---	---

2. Terminal strip B

00	not installed
2R	2 relay outputs
2T	2 electronic outputs

3. Terminal strip C

00	not installed
2R	2 relay outputs
2T	2 electronic outputs

4. Terminal strip D; Supply voltage

0	230 V AC $\pm 10\%$ 50-60Hz
1	115 V AC $\pm 10\%$ 50-60Hz
4	24 V AC $\pm 10\%$ 50-60Hz
5	24 V DC $\pm 15\%$

5. Options

00	without option
----	----------------

6. Unit appears in the unit field

7. Additional text above the display (3x90 mm HxW)

Connection diagram for terminal strips B-D see next page

Product information

Productivity Meter PR9648



- 2 digital inputs for summation, difference and ratio measurement
- Input prescaler programmable
- LED-Display 14.2 mm red, ±99999 Digit
- Max. 4 alarm outputs, relay SPDT or transistor

Characteristics

The Productivity-Meter PR9648 analysis impulse rates, representing a speed, flow, passing time or revolutions per time. The displayed values therefore always refer to a determined time unit and represent productivity. There are extensive functions programmable. Since impulses and unit of a displayed value can take any relation, the device offers extensive conversion possibilities.

Technical data

Power supply

Supply voltage	: 230 V AC ±10 %; 115 V AC ±10 %; 24 V AC ±10 % or 24 V DC ±15 %
Power consumption	: max. 3.5 VA, with analog output 5 VA
Operating temp.	: -10...+55 °C

CE- conformity

: EN 55022, EN 60555,

: IEC 61000-4-3/4/5/11/13

Input

PNP sensor

: $R_i = 6.3 \text{ k}\Omega$
level: < 4 V low; > 8.5 V high;
hysteresis > 2.5 V; max. 35 V DC

Namur sensor

: R_i approx. 1 kΩ (< 4 mA)
level: < 1 mA low; > 2.2 mA high;
hysteresis > 0.5 mA; max. 35 V DC

Pulse frequency

: input A or B = 0.1 Hz..15 kHz,
A and B together = 0.1 Hz..8 kHz,
contact = 0.1 Hz..30 Hz,
2-channel rotary encoder = 0.1 Hz..10 kHz

Min. pulse width

: electronic 50 µs, contact 5 ms
Time base : sec⁻¹, min⁻¹, h⁻¹

Accuracy

: ≤ 0.003 % ± 1 Digit

Hold input

: 24 V DC or contact

Transmitter supply

: 8 V(Namur), 24 V DC(pnp), R_i appr. 150 Ω,
max. 50 mA (25 mA with 4 relay outputs)

Display

Parameter display

: LED red, 14.2 mm, -99999..99999 Digit
: LED 2-digit red, 7 mm
(parameter and output indicator)

Output

Relay

: SPDT < 250 V AC < 250 VA < 2 A,
< 300 V DC < 50 W < 2 A

Transistor

: max. 35 V AC/DC, 100 mA,
with short circuit protection

Analog output

: 0/4..20 mA burden ≤ 500 Ω; 0/2..10 V,
burden > 500 Ω, with isolation

-Accuracy

: 0.1 %; TK 0.01 %/K

Case

: panel case DIN 96x48 mm,
material PA6-GF; UL94V-0

Dimensions

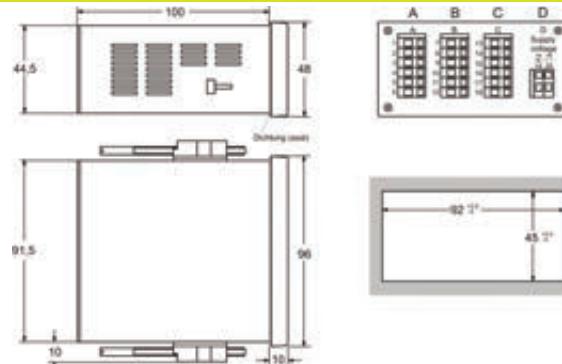
: front 96x48 mm, mounting depth 100mm

: max. 390 g

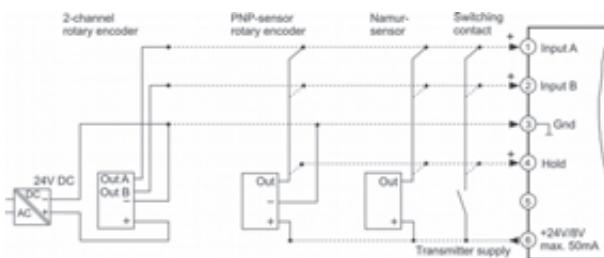
Displays

Connection : clamp terminals, 0.08..1.5 mm²,
AWG28..AWG14
Protection class : front IP65, terminals IP20 acc. to BGV A3

Dimensions



Connection diagram



Ordering code

PR9648 - - - - - - -

1. Terminal strip A

1	2 configurable impulse inputs, display conversion programmable, hold input, integrated transmitter supply 24V max. 50 mA
---	---

2. Terminal strip B

00	not installed
2R	2 relay outputs
2T	2 electronic outputs

3. Terminal strip C

00	not installed
2R	2 relay outputs
2T	2 electronic outputs
AO	analog output 0/4..20 mA, 0/2..10 V DC

4. Terminal strip D; supply voltage

0	230 V AC ±10 % 50-60Hz
1	115 V AC ±10 % 50-60Hz
4	24 V AC ±10 % 50-60Hz
5	24 V DC ±15 %

5. Options

00	without option
01	min- and max- peak hold

6. Unit (appears in the unit field)

7. Additional text placed above the display (3x90 mm HxW)

Connection diagram for terminal strips B-D see page 34

Product information

Standard Counter SZ9648



- 1 input for contact (debounced) max. 30 Hz
- 1 input for electronic max. 15 kHz
- Auto reset or external reset
- LED-Display 14.2 mm red, indicating range 0..999999 Digit
- Max. 4 alarm outputs, relay SPDT or transistor

Characteristics

The Standard Counter SZ9648 is available as totalizing counter or preselect counter. It operates in up-counting function. The device offers separate counting inputs for proximity switch, light barriers, other electronic signals and for mechanical contacts.

Technical data

Power supply

Supply voltage : 230 V AC $\pm 10\%$; 115 V AC $\pm 10\%$;
24 V AC $\pm 10\%$ or 24 V DC $\pm 15\%$

Power consumption : max. 3.5 VA

Operating temp. : -10..+55 °C Standard

CE conformity : EN 55022, EN 60555,
IEC 61000-4-3/4/5/11/13

Input

PNP sensor : $R_i = 6,3 \text{ k}\Omega$
level: < 4 V low; > 8.5 V high;
hysteresis > 2.5 V; max. 35 V DC

Namur sensor : R_i approx. 1 k Ω (< 4 mA)
level: < 1 mA low; > 2.2 mA high;
hysteresis > 0.5 mA; max. 35 V DC

Counting frequency : input A = 30 Hz max.,
debounced for contact
input B = 15 kHz, electronic

Counting loss : 100 μs at reset;
20 ms changing of preselect value

Min. pulse width : electronic pulse 50 μs , switch contact 5 ms

External reset : min. pulse width ≥ 10 ms

Transmitter supply : 8 V DC (Namur), 24 V DC (PNP),
 R_i approx. 150 Ω , max. 50 mA
(25 mA with 4 relay outputs)

Display

Indicating range : LED red, 14.2 mm
0..999999 Digit with leading zero suppression

Additional display : LED 2-digit red, 7 mm
(parameter - and output indicator)

Output

Relay : SPDT < 250 V AC < 250 VA < 2 A,
< 300 V DC < 50 W < 2 A

Transistor : max. 35 V AC / DC, 100mA,
short circuit proof

Case : panel case DIN 96x48,

material PA6-GF; UL94V-0

Dimensions : front 96x48 mm, mounting depth 100mm

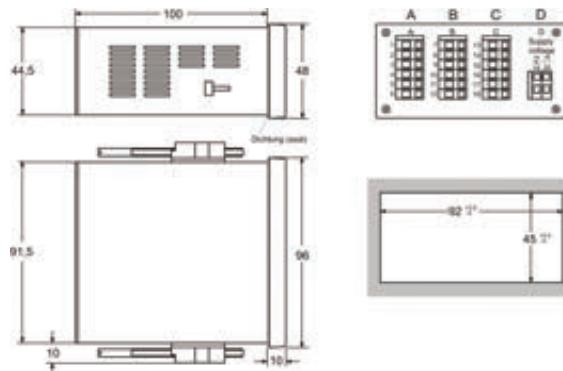
Weight : max. 390 g

Connection : clamp terminals, 0.08..1.5 mm²,
AWG28..AWG14

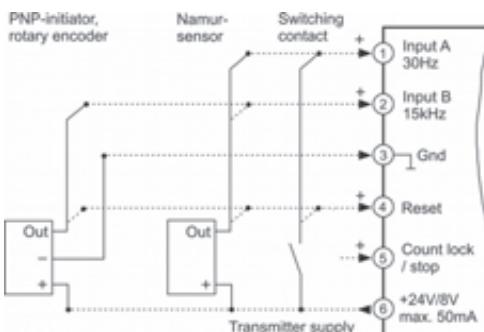
Protection class : front IP65, terminals IP20 acc. to BGV A3

Displays

Dimensions



Connection diagram



Ordering code

SZ9648 - - - - - - -

1. Terminal strip A

1	2 count inputs 30 Hz and 15 kHz, 2 additional control inputs, integrated transmitter supply 24V max. 50 mA
---	--

2. Terminal strip B

00	not installed
2R	2 relay outputs
2T	2 electronic outputs

3. Terminal strip C

00	not installed
2R	2 relay outputs
2T	2 electronic outputs

4. Terminal strip D; supply voltage

0	230 V AC $\pm 10\%$ 50-60Hz
1	115 V AC $\pm 10\%$ 50-60Hz
4	24 V AC $\pm 10\%$ 50-60Hz
5	24 V DC $\pm 15\%$

5. Options

00	without option
----	----------------

6. Unit (appears in the unit field)

7. Additional text placed above the display (3x90 mm HxW)

Connection diagram for terminal strips B-D see page 34

Product information

Universal Counter UZ9648



- Counting, length measurement, metering, positioning
- 2 digital input channels for summation- and subtraction
- Integrated transmitter supply
- Max. 4 preselect outputs, relay SPDT or transistor

The universal counter UZ9648 has been designed for field application in process control and automation. Parameters for operation mode can be programmed. The counter can be used wherever quantity processes should be measured, displayed and monitored.

Technical data

Power supply

Supply voltage : 230 V AC $\pm 10\%$; 115 V AC $\pm 10\%$;
24 V AC $\pm 10\%$ or 24 V DC $\pm 15\%$

Power consumption : max. 3.5 VA, 5 VA with analog output

Operating temp. : -10..+55 °C

CE- conformity : EN 55022, EN 60555,

IEC 61000-4-3/4/5/11/13

Input

PNP sensor : $R_i = 6.3 \text{ k}\Omega$

level: < 4 V low; > 8.5 V high;
hysteresis > 2.5 V; max. 35 V DC

Namur sensor : R_i approx. 1 k Ω (< 4 mA)

level: < 1 mA low; > 2.2 mA high;
hysteresis > 0.5 mA; max. 35 V DC

Pulse frequency : input A or B = 15 kHz,

A and B together = 6 kHz,
contact = 30 Hz debounced,
2-channel rotary encoder = 8 kHz

Counting loss : 100 μs at reset;

20 ms changing of preselect value

Min. pulse width : electronic 50 μs , contact 5 ms

: reset impulse ≥ 10 ms

External reset : 8 V DC (Namur), 24 V DC (PNP),

R_i approx. 150 Ω , max. 50 mA
(25 mA with 4 relay outputs)

Display

Indicating range : LED red, 14.2 mm

: -99999..999999 Digit

Additional display : LED 2-digit red, 7 mm
(parameter - and output indicator)

Output

Relay : SPDT < 250 V AC < 250 VA < 2 A,
< 300 V DC < 50 W < 2 A

Transistor : max. 35 V AC/DC, 100 mA,
with short circuit protection

Analog output : 0/4..20 mA burden $\leq 500 \Omega$; 0/2..10 V,
burden $> 500 \Omega$, with isolation

-Accuracy : 0.1 %; TK 0.01 %/K

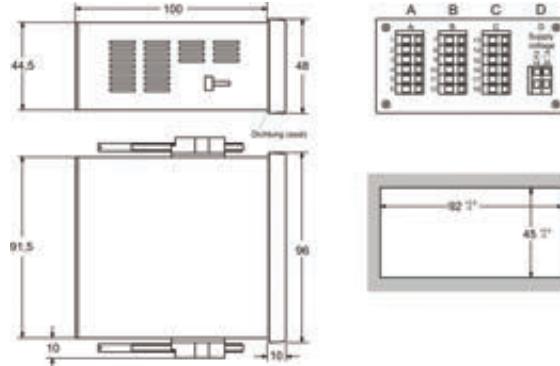
Case : panel case DIN 96x48 mm,
material PA6-GF; UL94V-0

Dimensions : front 96x48 mm, mounting depth 100mm

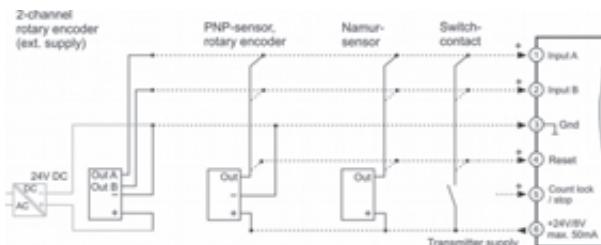
Displays

Weight	: max. 390 g
Connection	: clamp terminals, 0.08..1.5 mm ² , AWG28..AWG14
Protection class	: front IP65, terminals IP20 acc. to BGV A3

Dimensions



Connection diagram



Ordering code

UZ9648 - - - - - - -

1. Terminal strip A

1	2 configurable count inputs, display conversion, wide range of count functions, integrated transmitter supply 24V max. 50 mA
---	---

2. Terminal strip B

00	not installed
2R	2 relay outputs
2T	2 electronic outputs

3. Terminal strip C

00	not installed
2R	2 relay outputs
2T	2 electronic outputs
AO	analog output 0/4..20 mA, 0/2..10 V DC

4. Terminal strip D; supply voltage

0	230 V AC $\pm 10\%$ 50-60Hz
1	115 V AC $\pm 10\%$ 50-60Hz
4	24 V AC $\pm 10\%$ 50-60Hz
5	24 V DC $\pm 15\%$

5. Options

00	without option
----	----------------

6. Unit (appears in the unit field)

7. Additional text placed above the display (3x90 mm HxW)

Product information

Conductivity Meter LF9648



Characteristics

The Conductivity Meter LF9648 has been designed for the measurement of conductivity, as a degree of the purity or concentration of a liquid. In connection with 4-electrode-conductivity cells a high accuracy and insensitivity of contamination can be achieved. A further advantage is a broad range of application with only one cell. Only for measurement in ultra-pure water a special 2-electrode conductivity cell must be used.

Technical data

Power supply

Supply voltage : 230 V AC $\pm 10\%$; 115 V AC $\pm 10\%$;
24 V AC $\pm 10\%$ or 24 V DC $\pm 15\%$

Power consumption : max. 3.5 VA, 5 VA with analog output

Operating temp. : -10..+55 °C

CE-conformity : EN 61326-1:2013

EN 60664-1:2007

Inputs

MR conductivity : 0..2.000(0) $\mu\text{S}/\text{cm}$ up to
0.2000 / 200(0) mS/cm (at 25 °C)

-Cell constant : 0.080..9.999

-Accuracy : 0.5 % of the measuring value, ± 2 Digit

-Temperature comp. : non linear for ultra pure water and natural
water or linear programmable from
0.000..9.999 %/K

MR temperature : -50.0..+200.0 °C; Sensor Pt100 or Pt1000
-Accuracy : ± 0.2 °C

Display

Indicating range : 2000(0) Digit with leading zero suppression

Parameter display : LED 2-digit red, 7 mm
(parameter - and output indicator)

Outputs

Relay : SPDT < 250 V AC < 250 VA < 2 A,
< 300 V DC < 50 W < 2 A

Transistor : transistor, <35 V AC/DC, max.100 mA,
short circuit protected

Analog output

Active : 0/4..20 mA burden $\leq 500 \Omega$;
0/2..10 V burden $>500 \Omega$, isolated
automatic burden changing
(burden dependent)

Passive : 4..20 mA, ext.
burden = $RA[\Omega] \leq (\text{supply} - 5 \text{ V}) \div 0.02 \text{ A}$;
supply voltage 5..30 V DC,

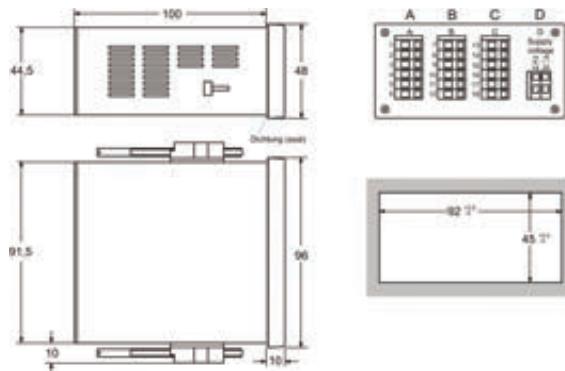
Accuracy : 0.1 %; TK 0.01 %/K
Case : panel mounting DIN 96x48 mm,
material PA6-GF; UL94V-0

Dimensions : front 96x48 mm, mounting depth 100 mm,
max. 390 g

Connection : clamp terminals, 0.08..1.5 mm 2 ,
AWG28..AWG14

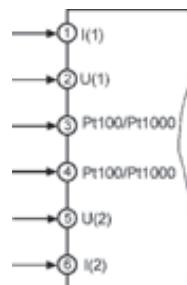
Displays

Dimensions



Connection diagram

Terminal strip A



Ordering code

LF9648 - - - - - - -

1. Terminal strip A

1	input for 2- or 4-electrode-cells, temperature compensation via Pt100
3	as 1, but temperature compensation via Pt1000

2. Terminal strip B

00	not installed
2R	2 relay outputs
2T	2 electronic outputs

3. Terminal strip C

00	not installed
2R	2 relay outputs
2T	2 electronic outputs
AO	analog output 0/4..20 mA, 0/2..10 V DC
2A	2 analog outputs 4..20 mA passive

4. Terminal strip D Supply voltage

0	230 V AC	$\pm 10\%$ 50-60Hz
1	115 V AC	$\pm 10\%$ 50-60Hz
4	24 V AC	$\pm 10\%$ 50-60Hz
5	24 V DC	$\pm 15\%$

5. Options

00	without option
01	min- and max-peak hold
14	measuring/monitoring acc. to USP<645>

6. Unit appears on the unit field

7. Additional text above the display (3x90 mm HxW)

Connection diagram for terminal strip B-D see page 34

Product information

pH and ORP Panelmeter pH9648



- LED-Display 14,2 mm red
- Measuring range programmable -1..+15 pH / ±1500 mV
- Temperature compensation via Pt100/Pt1000 sensor
- Analog output 0/4..20 mA or 0/2..10 V for pH/ORP
- Max. 4 alarm outputs relay or transistor

Characteristics

The pH and ORP Panelmeter pH9648 is suitable for pH and ORP measurement in food technology, chemistry within pharmaceutical and sewage-water technology. The pH9648 operates with all common pH- and ORP electrodes. It is recommended to connect the Impedance-Converter pH40 for cable length > 5 m.

Technical data

Power supply

Supply voltage : 230 V AC ±10 %; 115 V AC ±10 %;
24 V AC ±10 % or 24 V DC ±15 %

Power consumption: max. 3.5 VA, with analog output 5 VA

Operating temperature : -10..+55 °C

CE- conformity : EN 55022, EN 60555,
IEC 61000-4-3/4/5/11/13

Input

pH/ORP

Measuring range : -1.00..+15.00 pH or -1500..+1500 mV

R_i : > $10^{12} \Omega$

Input current : < 10^{-12} A

Accuracy : 0.2 % measuring value, ±2 Digit

pH setup : electrode zero point 4.00..10.00 pH
slope 40.0..70.0 mV/pH

ORP setup : ± 200 mV

Calibration mode : - **1- or 2-point-calibration**

Buffer selection possible:

-Schott

-WTW

-Ingold (Mettler Toledo)

-Puffer acc. to DIN 19266

-or manual buffer input

- Data entering for zero point and slope

- ORP offset

Temperature

Sensor : RTD, Pt100 or Pt1000,
(2- or 3-wire connection)

Unit : programmable °C, °F

Measuring range : -40.0..+160.0 °C (-40.0..+320.0 °F)

Accuracy : ± 0.1 %, ±1Digit

Transmitter supply : 24 V DC, R_i approx. 150 Ω,
max. 50 mA (25 mA with 4 relay outputs)

Display

Parameter display : LED red, 14.2 mm
(Parameter - and output indicator)

Displays

Output

Relay SPDT : < 250 V AC < 250 VA < 2 A,
< 300 V DC < 50 W < 2 A

Transistor : < 35 V AC/DC, max. 100 mA,
short-circuit-proof

Analog output
active

: 0/4..20 mA burden ≤ 500 Ω;
0/2..10 V burden > 500 Ω, isolated
automatic output changing
(burden dependent)

Analog output
passive

: 4..20 mA, ext. burden =
 $RA[\Omega] \leq (U_B - 5 \text{ V}) \div 0,02 \text{ A}$;
supply voltage 5..30 V DC

Accuracy : 0.1 %

Panel case

Dimensions : DIN 96x48 mm, material PA6-GF; UL94V-0

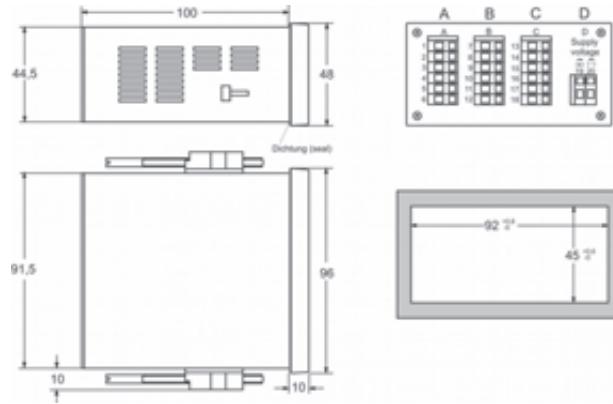
Dimensions : Front 96x48 mm, mounting depth 100 mm,

Weight : max. 390 g

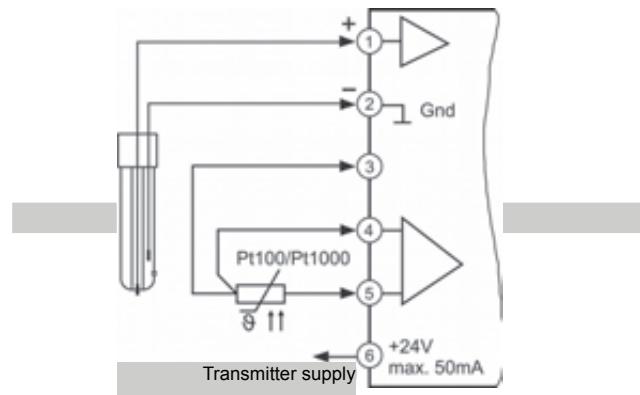
Connection : clamp terminals, 2.5 mm² single wire,
1.5 mm² flex wire, AWG14

Protection class : Front IP65, terminals IP20,
finger save acc. to BGV A3

Dimensions



Connection diagram input



Product information

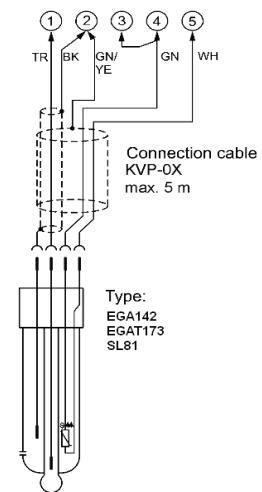
Displays

Ordering code

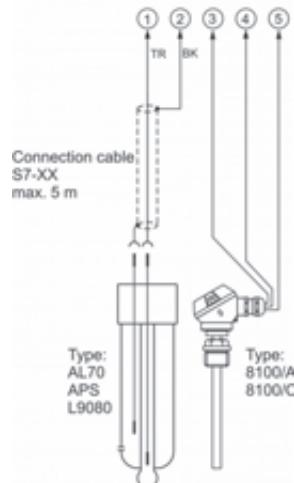
pH9648 - - - - - - -

1. Terminal strip A	
13	input pH / ORP electrode, temperature compensation via Pt100 / Pt1000
2. Terminal strip B	
00	not installed
2R	2 relay outputs
2T	2 electronic outputs
3. Terminal strip C	
00	not installed
2R	2 relay outputs
2T	2 electronic outputs
AO	analog output 0/4..20 mA, 0/2..10 V DC
2A	2 analog outputs 4..20 mA passive
4. Terminal strip B supply voltage	
0	230 V AC ±10 % 50-60Hz
1	115 V AC ±10 % 50-60Hz
4	24 V AC ±10 % 50-60Hz
5	24 V DC ±15 %
5. Options	
00	without option
6. Unit appears in the unit field	
7. Additional text above the display (3x90 mm HxW)	

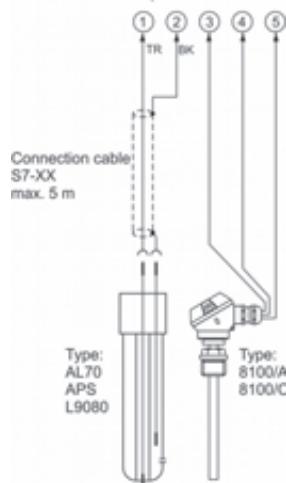
pH-electrode
with ext. temperature sensor



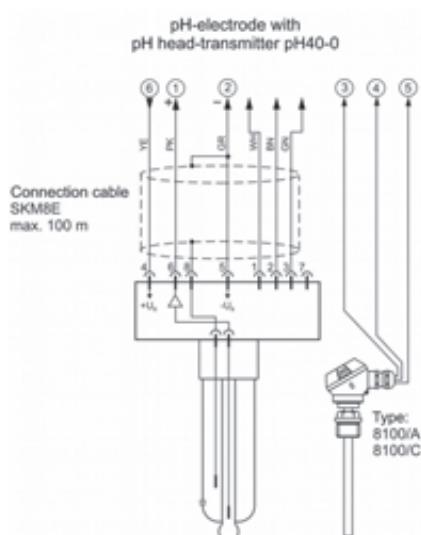
pH-electrode
with ext. temperature sensor



ORP-electrode
with ext. temperature sensor



Connection examples pH9648



Product information

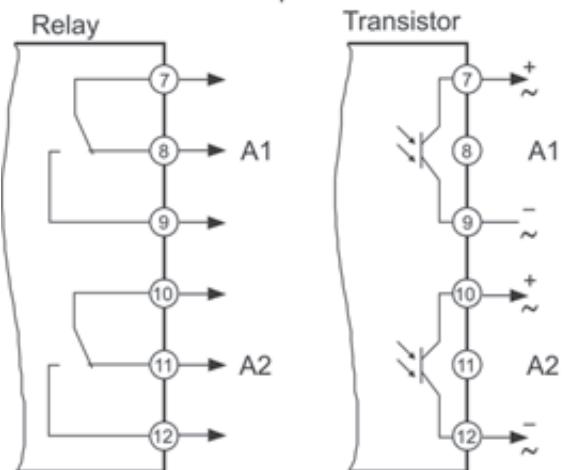
Displays

Connection Diagrams X9648, Terminals B-D**Terminal strips B, C, D**

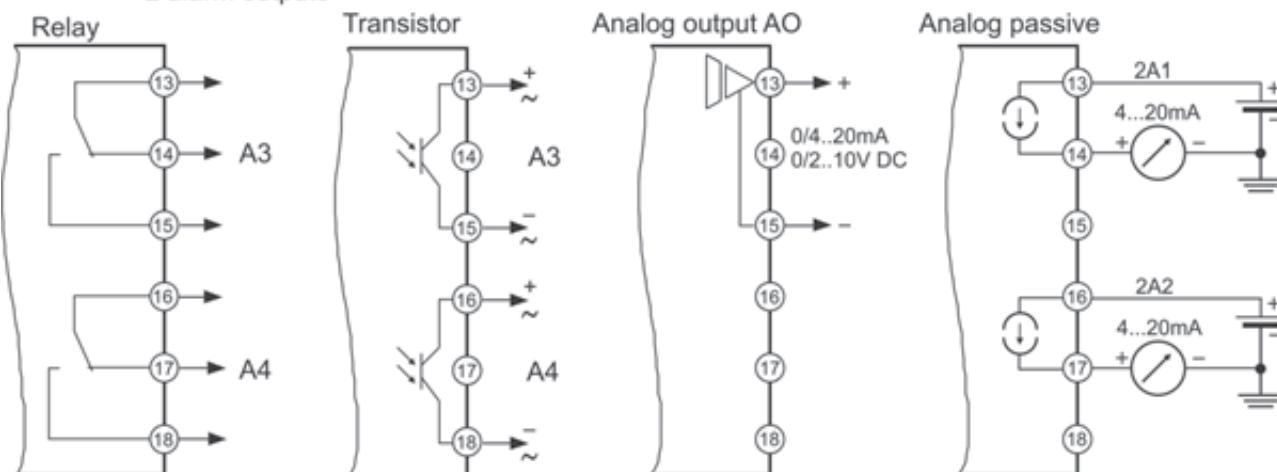
Terminal strip A belongs to each article.

Terminal strip B (varies with versions)

2 alarm outputs

**Terminal strip C (varies with versions)**

2 alarm outputs

**Terminal strip D supply voltage (varies with version)**

Product information

Standard Signal Meter S1010



- Measuring input for standard signals 0/..20 mA or 0/..10 V
- LED display 14.2 mm red, indicating range $\pm 9999(0)$ digit
- Max. 2 alarm outputs, relay SPDT
- Analog output 0/..20 mA, 0/..10 V
- Field case with snap-lid, cable glands 2 x M16x1.5

Characteristics

The Standard Signal Meter S1010 has been designed for measuring industry standard signals 0/..20 mA or 0/..10 V DC. The device offers an integrated transmitter supply for direct connection of 2- and 3-wire transmitters for e.g. pressure or temperature. Indicating range and decimal point are free programmable in the range $\pm 9999(0)$ digit.

Technical data

Power supply

Supply voltage : 230 V AC $\pm 10\%$; 115 V AC $\pm 10\%$,
24 V AC $\pm 10\%$ or 24 V DC $\pm 15\%$

Power consumption : max. 3.5 VA

Operating temp. : -20..+55 °C

CE-conformity : EN 55022, EN 60555,
IEC 61000-4-3/4/5/11/13

Input

Current : 0/..20 mA $R_i = 10 \Omega$

Voltage : 0/..10 V $R_i = >100 \text{ k}\Omega$

Potentiometer : 0..1 kΩ / 100 kΩ

Accuracy : $< 0.1\% \pm 2$ digit

Transmitter supply : U_0 approx. 24 V, R_i ca. 150 Ω, max. 50 mA
(max. 25 mA with relay and analog output)

Display

Indicating range : $\pm 9999(0)$ digit with leading zero suppression

Parameter display : LED 2-digit red, 7 mm
(parameter and output indicator)

Output

Relay : SPDT $< 250 \text{ V AC} < 250 \text{ VA} < 2 \text{ A}$,
 $< 300 \text{ V DC} < 50 \text{ W} < 2 \text{ A}$

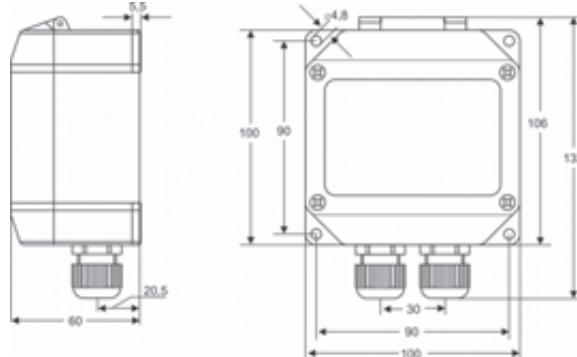
Analog : 0/..20 mA burden $\leq 500 \Omega$; 0/..10 V
burden $> 500 \Omega$, without isolation,
automatically output changing

- accuracy : 0.1 %; TK 0.01 %/K

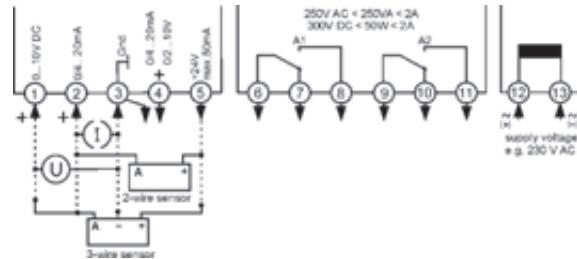
Displays

Field case	: material PA6-GF 15/15
Dimensions	: 100x100x60 mm
Weight	: max. 350 g
Cable glands	: 2 x M16x1.5
Connection	: clamp terminals, 0.08..1.5 mm ² , AWG28..AWG14
Protection class	: front IP65, terminals IP20 acc. to BGV A3

Dimensions



Connection diagram



Ordering code

S1010 - - - - - -

1. Input		
1	standard signals 0/..20 mA, 0/..10 V DC, integrated transmitter supply 24V max. 50 mA	
2. Alarm output		
00	not installed	
2R	2 relay outputs	
3. Analog output		
00	not installed	
AO	analog output 0/..20 mA, 0/..10 V DC	
4. Supply voltage		
0	230 V AC $\pm 10\%$ 50-60Hz	
1	115 V AC $\pm 10\%$ 50-60Hz	
4	24 V AC $\pm 10\%$ 50-60Hz	
5	24 V DC $\pm 15\%$	
5. Options		
00	without option	
01	min- and max-peak hold	
07	display brightness programmable	
08	analog output free programmable	
09	1xM20x1,5 multi (2xØ6mm), 1xM20x1,5	
6. Unit (appears in the unit field)		
7. Additional text placed above the display (3x70 mm HxW)		

Product information

Tank Display TA1010



- Inputs for standard signals 0/4..20 mA or 0/2..10 V
- 2nd input for pressure transmitter at pressure loaded tanks
- Input automatic level correction
- 6 standard- and custom sized tanks selectable
- Max. 2 alarm outputs, relay SPDT
- Field case with snap lid, cable glands 2 x M16x1.5

Characteristics

The Tank Display TA1010 offers content measurement of tanks with no linear connection between level and content. Measurement will be realized by hydrostatic pressure or distance sensors. The device offers the possibility to connect a level sensor. Reaching a certain level, the displayed value will be corrected automatically to the value according to the position of the installed sensor.

Technical data

Power supply

Supply voltage : 230 V AC ±10 %; 115 V AC ±10 %,
24 V AC ±10 % or 24 V DC ±15 %

Power consumption : max. 3.5 VA

Operating temp. : -20..+55 °C

CE-conformity : EN 55022, EN 60555,
IEC 61000-4-3/4/5/11/13

Input

Current : 0/4..20 mA; $R_i = 10 \Omega$
overload 2-times; 4-times for max. 5 s

Voltage : 0/2..10 V DC; $R_i = 100 \kOmega$
overload max. 100 V

Accuracy : < 0.15 % ±2 digit

Transmitter supply : U_0 approx. 24 V;
 R_i approx. 150 Ω ; max. 50 mA

Display : LED red, 14.2 mm

Indicating range : 999999 Digit, with leading zero suppression

Parameter display : LED 2 digit red, 7 mm
(parameter - and output indicator)

Output

Relay : SPDT < 250 V AC < 250 VA < 2 A,
< 300 V DC < 50 W < 2 A

Analog : 0/4..20 mA burden ≤ 500 Ω ; 0/2..10 V
burden > 500 Ω , **without** isolation,
automatic output changing

- Accuracy : 0.1 %; TK 0.01 %/K

Field case : material PA6-GFGFK 15/15

Dimensions : 100x100x60 mm

Weight : max. 450 g

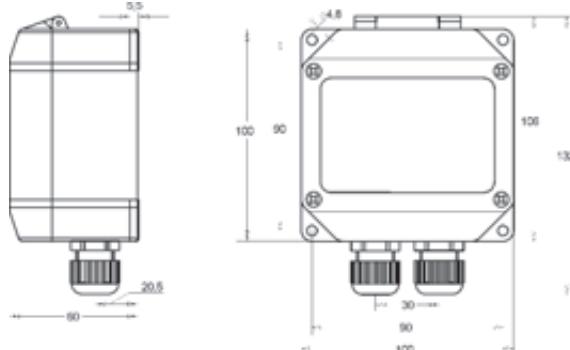
Cable gland : 2 x M16x1.5

Displays

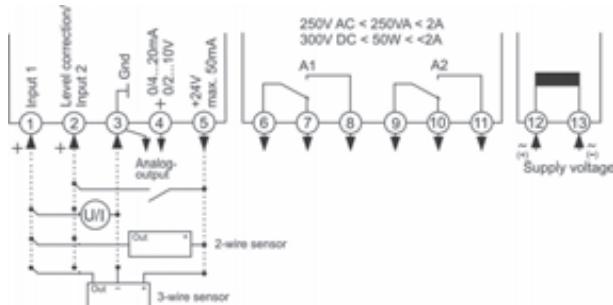
Connection : clamp terminals, 0.08..1.5 mm²,
AWG28..AWG14

Protection class : front IP65, terminals IP20, acc. to BGV A3

Dimensions



Connection diagram



Ordering code

TA1010 - - - - - -

1. Input	
01	1 x 0/4..20 mA, 1 x input for level correction
11	2 x 0/4..20 mA
02	1 x 0/2..10 V, 1 x input for level correction
22	2 x 0/2..10 V
2. Alarm output	
00	not installed
2R	2 relay
3. Analog output	
00	not installed
AO	analog output 0/4..20 mA, 0/2..10 V DC
4. Supply voltage	
0	230 V AC ±10 % 50-60Hz
1	115 V AC ±10 % 50-60Hz
4	24 V AC ±10 % 50-60Hz
5	24 V DC ±15 %
5. Options	
00	without option
09	1xM20x1.5 multi (2xØ 6mm), 1xM20x1.5
6. Unit (appears in the unit field)	
7. Additional text placed above the display (3x70 mm HxW)	

Product information

Temperature-Meter T1010



- Measuring input Pt100 -100.0..+600.0 °C
Pt1000 -50.0..+200.0 °C
- LED-Display 14.2 mm red, indicating range ±9999(0) Digit
- Max. 2 alarm outputs, relay SPDT
- Analog output 0/4..20 mA, 0/2..10 V
- Field case with snap lid, 2 x M16x1.5

Characteristics

The Temperature-Meter T1010 is suitable for measurement of temperatures in connection with RTD sensors Pt100, Pt1000. Devices for other temperature sensors are available on request. The measuring input is isolated. The measuring range can be limited in the configuration level. This is identical with the range of the analog output.

Technical data

Power supply

Supply voltage : 230 V AC ±10 %; 115 V AC ±10 %,
24 V AC ±10 % or 24 V DC ±15 %

Power consumption : max. 3.5 VA

Operating temp. : -20..+55 °C

CE-conformity : EN55022, EN60555,

IEC61000-4-3/4/5/11/13

Input

Pt100; Pt1000 : -100..+600 °C ; -50..+200 °C
Accuracy : Pt100 or Pt1000 < 0.1% ±2 Digit,

max. 100 Ω line resistance

Display

Indicating range : LED red, 14.2 mm
Additional display : ±9999(0) digit, with leading zero suppression

: LED 2-digit red, 7 mm
(Parameter - and output indicator)

Output

Relay : SPDT < 250 V AC < 250 VA < 2 A,
< 300 V DC < 50 W < 2 A

Analog : 0/4..20 mA burden ≤ 500 Ω; 0/2..10 V
burden > 500 Ω, no isolation,
automatic output changing
(burden dependent)

- Accuracy : 0.1 %; TK 0.01 %/K

Field case : Material PA6-GF/GFK 15/15
Dimensions : 100x100x60 mm

Weight : max. 450 g

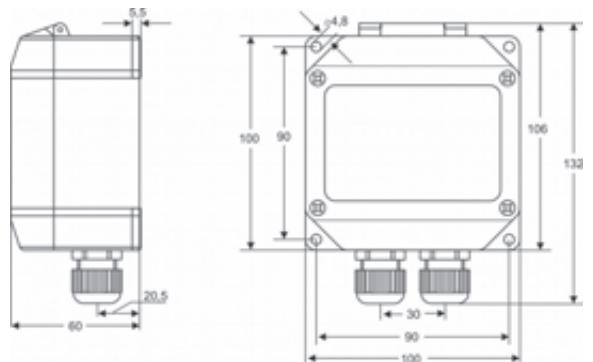
Cable gland : 2 x M16x1.5

Connection : clamp terminals, 0.08..1.5 mm²,
AWG28..AWG14

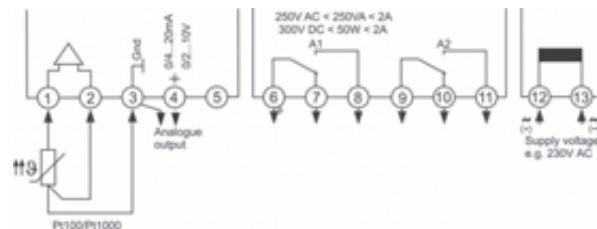
Protection class : front IP65, terminals IP20 acc. to BGV A3

Displays

Dimensions



Connection diagram



Ordering code

T1010 - - - - - - -

1. Input		
1	Pt100	-100.0..+600.0°C
3	Pt1000	-50.0..+200.0°C
2. Alarm output		
00	not installed	
2R	2 relay SPDT	
3. Analog output		
00	not installed	
A0	analog output 0/4..20 mA, 0/2..10 V DC	
4. Supply voltage		
0	230 V AC ±10 % 50-60Hz	
1	115 V AC ±10 % 50-60Hz	
4	24 V AC ±10 % 50-60Hz	
5	24 V DC ±15 %	
5. Options		
00	without option	
01	min-max-value hold	
07	display brightness programmable	
09	1xM20x1.5 multi (2xØ 6 mm), 1xM20x1.5	
6. Unit (appears in the unit field)		
7. Additional text above the display (3x70 mm HxW)		

Product information

Speed Indicator DR1010



- Pulse inputs for switch contacts, PNP-, Namur-sensors and rotary encoder
- Programmable input prescaler
- Time base min^{-1}
- Integrated transmitter-supply
- Max. 2 alarm outputs, relay SPDT
- Field case with snap-lid, 2 x M16x1.5

Characteristics

The Speed Indicator DR1010 has been designed for field applications in process control and automation. Parameters for operation mode can be programmed. The DR1010 can be used wherever processes based per minute, just as speed should be measured and displayed.

Technical data

Power supply

Supply voltage : 230 V AC $\pm 10\%$; 115 V AC $\pm 10\%$;
24 V AC $\pm 10\%$ or 24 V DC $\pm 15\%$

Power consumption : max. 3.5 VA

Operating temp. : -20..+55 °C

CE- conformity : EN 55022, EN 60555,
IEC 61000-4-3/4/5/11/13

Input

PNP sensor : $R_i = 6.3 \text{ k}\Omega$

- level : < 4 V low; > 8.5 V high;

- hysteresis : > 2.5 V; max. 35 V DC

Namur sensor : R_i approx. 1 k Ω (< 4 mA)

- level : < 1 mA low; > 2.2 mA high;

- hysteresis : > 0.5 mA; max. 35 V DC

Frequency max. : input E1 = 1 Hz..30 Hz, (switch contact)
input E2 = 1 Hz..15 kHz,
(PNP- or Namur sensor)

Time base : min^{-1}

Accuracy : $\leq 0.003\% \pm 1$ Digit

Min. pulse width : electronic 50 μs , contact 5 ms

Hold : 24 V DC or switch contact

Transmitter supply : 8 V (Namur), 24 V DC (PNP), R_i appr. 150 Ω ,
max. 50 mA

Display : LED red, 14.2 mm

Indicating range : 0..99999 digit

Additional display : LED 2-digit red, 7 mm
(parameter- and switch indicator)

Output

Relay : SPDT < 250 V AC < 250 VA < 2 A,
< 300 V DC < 50 W < 2 A

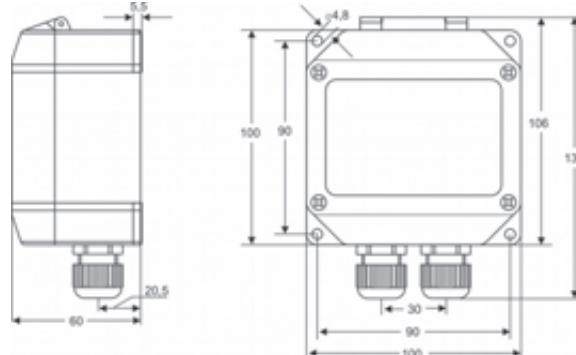
Field case : material PA6-GF 15/15

Dimensions : 100x100x60 mm

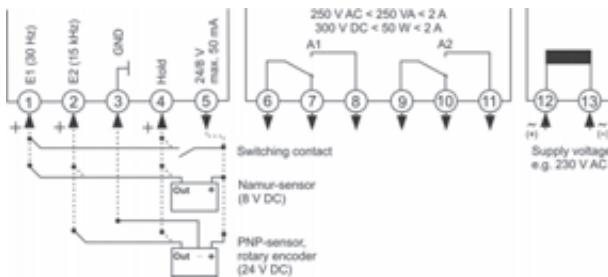
Displays

Weight	: max. 450 g
Cable glands	: 2 x M16x1.5
Connection	: clamp terminals, 0.08..1.5 mm ² , AWG28..AWG14
Protection class	: front IP65, terminals IP20, acc. to BGV A3

Dimensions



Connection diagram



Ordering code

DR1010 - - - - - -

1. Input	
1	2 pulse inputs, hold input, integrated transmitter supply 24V max. 50 mA
2. Alarm output	
00	not installed
2R	2 relay outputs
3. Supply voltage	
0	230 V AC $\pm 10\%$ 50-60Hz
1	115 V AC $\pm 10\%$ 50-60Hz
4	24 V AC $\pm 10\%$ 50-60Hz
5	24 V DC $\pm 15\%$
4. Options	
00	without option
09	1 x M20x1.5 multi (2 x Ø6 mm), 1 x M20x1.5
5. Unit (appears in the unit field)	
6. Additional text placed above the display (3x70 mm HxW)	

Product information

Productivity Meter PR1010



- 2 digital inputs for summation, difference, ratio measurement
- Input prescaler programmable
- LED-Display 14.2 mm red, ±99999 Digit
- Max. 2 alarm outputs, relay SPDT
- Field case with snap-lid, 2 x M16x1.5

Characteristic

The Productivity-Meter PR1010 analysis impulse rates, representing a speed, flow, passing time or revolutions per time. The displayed values therefore always refer to a determined time unit and represent productivity. There are extensive functions programmable. Since impulses and unit of a displayed value can take any relation, the device offers extensive conversion possibilities.

Technical data

Power supply

Supply voltage : 230 V AC ±10 %; 115 V AC ±10 %;
24 V AC ±10 % or 24 V DC ±15 %

Power consumption : max. 3.5 VA

Operating temp. : -20..+55 °C

CE- conformity : EN 55022, EN 60555,
IEC 61000-4-3/4/5/11/13

Input

PNP sensor : $R_i = 6.3 \text{ k}\Omega$

level: < 4 V low; > 8.5 V high;
hysteresis > 2.5 V; max. 35 V DC

Namur sensor : R_i approx. 1 kΩ (< 4 mA)

level: < 1 mA low; > 2.2 mA high;
hysteresis > 0.5 mA; max. 35 V DC

Pulse frequency : input A or B = 0.1 Hz..15 kHz,

A and B together = 0.1 Hz..8 kHz,
contact = 0.1 Hz..30 Hz,
2-channel encoder = 0.1 Hz..10 kHz

Min. pulse width : electronic 50 µs, contact 5 ms

Time base : sec⁻¹, min⁻¹, h⁻¹

Accuracy : ≤ 0.003 % ± 1 Digit

Transmitter supply : 8 V (Namur), 24 V DC, R_i approx. 150 Ω,
max. 50 mA

Display

Indicating range : -99999..99999 Digit

Parameter display : LED 2-digit red, 7 mm
(parameter and output indicator)

Output

Relay : SPDT < 250 V AC < 250 VA < 2 A,
< 300 V DC < 50 W < 2 A

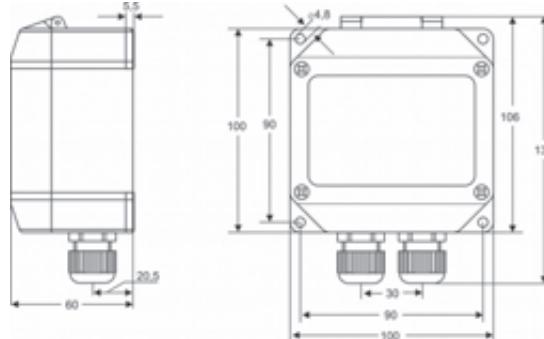
Analog output : 0/4..20 mA burden ≤ 500 Ω; 0/2..10 V,
burden > 500 Ω, **without** isolation

-Accuracy : 0.1 %; TK 0.01 %/K

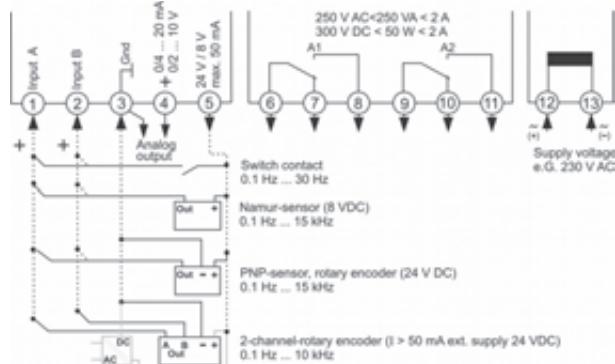
Displays

Field case	: material PA6-GF 15/15
Dimensions	: 100x100x60 mm
Weight	: max. 450 g
Cable gland	: 2 x M16x1.5
Connection	: clamp terminals, 0.08..1.5 mm², AWG28..AWG14
Protection class	: front IP65, terminals IP20 acc. to BGV A3

Dimensions



Connection diagram



Ordering code

PR1010 - - - - - -

1. Input		
1	2	2 configurable pulse inputs, display conversion programmable, integrated transmitter supply 24V 50 mA
2. Alarm output		
00	2R	not installed 2 relay outputs
3. Analog output		
00	AO	not installed analog output 0/4..20 mA, 0/2..10 V DC
4. Supply voltage		
0	1	230 V AC ±10 % 50-60Hz
1	4	115 V AC ±10 % 50-60Hz
4	5	24 V AC ±10 % 50-60Hz
5	24 V DC	±15 %
5. Options		
00	09	without option 1 x M20x1.5 multi (2 x Ø6 mm), 1 x M20x1.5
6. Unit (appears in the unit field)		
7. Additional text placed above the display (3x70 mm HxW)		

Product information

Universal Counter UZ1010



- Counting, length measurement, metering, positioning
- 2 digital input channels for summation- and subtraction
- Integrated transmitter-supply
- Max. 2 preselect outputs, relay SPDT
- Field case with snap lid, cable glands 2xM16x1.5

Characteristics

The universal counter UZ1010 has been designed for field application in process control and automation. Parameters for operation mode can be programmed. The counter can be used wherever quantity processes should be measured, displayed and monitored.

Technical data

Power supply

Supply voltage : 230 V AC ±10 %; 115 V AC ±10 %;
24 V AC ±10 % or 24 V DC ±15 %

Power consumption : max. 3.5 VA

Operating temp. : -20..+55 °C

CE- conformity : EN 55022, EN 60555,
IEC 61000-4-3/4/5/11/13

Input

PNP sensor : $R_i = 6.3 \text{ k}\Omega$
level: < 4 V low; > 8.5 V high;

hysteresis > 2.5 V; max. 35 V DC

Namur sensor : R_i approx. 1 kΩ (< 4 mA)

level: < 1 mA low; > 2.2 mA high;
hysteresis > 0.5 mA; max. 35 V DC

Counting frequency : input A or B = 15 kHz

A and B together = 6 kHz,
debounced for contact= 30 Hz

Counting loss : 100 µs at reset;

20 ms changing of preselect value

Min. pulse width : electronic pulse 50 µs, switch contact 5 ms

External reset : min. pulse width ≥ 10 ms

Transmitter-supply : 8 V DC (Namur), 24 V DC (PNP),
 R_i approx. 150 Ω, max. 50 mA

Display : LED red, 14.2 mm

Indicating range : -99999..999999 digit

Additional display : LED 2-digit red, 7 mm
(parameter- and output indicator)

Output

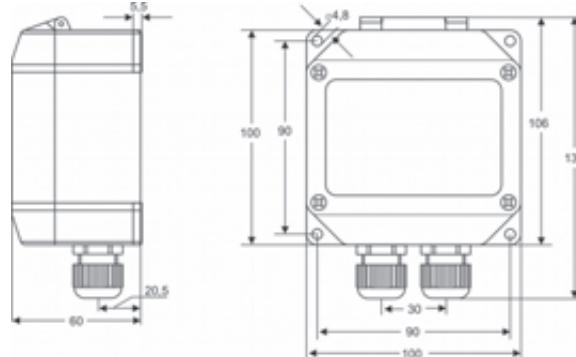
Relay : SPDT < 250 V AC < 250 VA < 2 A,
< 300 V DC < 50 W < 2 A

Field case : material PA6-GF 15/15
Dimensions : 100x100x60 mm

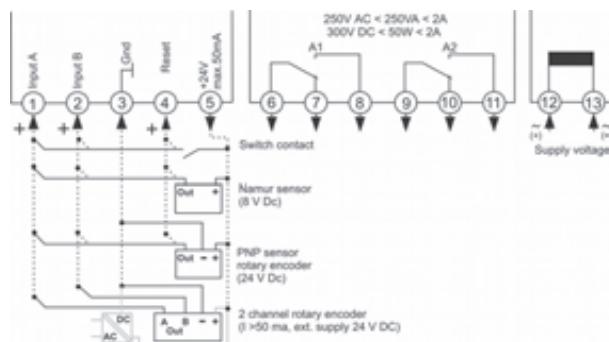
Displays

Weight	: max. 450 g
Cable glands	: 2 x M16x1.5
Connection	: clamp terminals, 0.08..1.5 mm ² , AWG28..AWG14
Protection class	: front IP65, terminals IP20 acc. to BGV A3

Dimensions



Connection diagram



Ordering code

1. 2. 3. 4. 5. 6.
UZ1010 - - - - -

1. Input		
1	2	2 configurable count inputs, wide range of count functions, display conversion, reset input, integrated transmitter supply 24V max. 50 mA
2. Alarm output		
00		not installed
2R		2 relay outputs
3. Supply voltage		
0	230 V AC	±10 % 50-60Hz
1	115 V AC	±10 % 50-60Hz
4	24 V AC	±10 % 50-60Hz
5	24 V DC	±15 %
4. Options		
00		without options
09		1xM20x1.5 multi (2xØ6 mm), 1xM20x1.5
5. Unit (appears in the unit field)		
6. Additional text placed above the display (3x70 mm HxW)		

Product information

Conductivity Meter LF1010



Characteristics

The Conductivity-Meter LF1010 has been designed for the measurement of conductivity, as a degree of the purity or concentration of a liquid. In connection with 4-electrode-conductivity cells a high accuracy and insensitivity of contamination can be achieved. A further advantage is a broad range of application with only one cell. Only for measurement in ultra-pure water a special 2-electrode conductivity cell must be used.

Technical data

Power supply

Supply voltage : 230 V AC $\pm 10\%$; 115 V AC $\pm 10\%$;
24 V AC $\pm 10\%$ or 24 V DC $\pm 15\%$

Power consumption : max. 3.5 VA

Operating temp. : -20..+55 °C

CE-conformity : EN 61326-1:2013
EN 60664-1:2007

Inputs

MR conductivity : 0..2.000(0) $\mu\text{S}/\text{cm}$ up to
0..2000 / 200(0) mS/cm (at 25 °C)

-Cell constant : 0.080..9.999

-Accuracy : 0.5 % of the measuring value, ± 2 Digit

-Temperature comp. : non linear for ultra pure water and natural
water or linear programmable from
0.000..9.999 %/K

MR temperature : -50..200.0 °C; Sensor Pt100 or Pt1000

-Accuracy : ± 0.2 °C

Display : LED red, 14.2 mm

Indicating range : 2000(0) Digit with leading zero suppression
Parameter display : LED 2-digit red, 7 mm
(Parameter - and output indicator)

Outputs

Relay : SPDT < 250 V AC < 250 VA < 2 A,
< 300 V DC < 50 W < 2 A

Field case : Material PA6-GF15/15, keypad polyester

Dimensions : 100x100x60 mm

Weight : max. 450 g

Connection : clamp terminals

single wire *flexi wire*

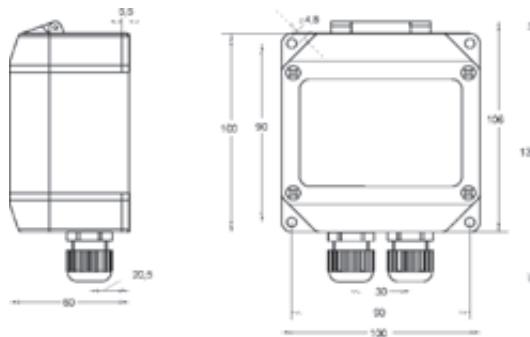
Terminals 1-4 : 0.75 mm², AWG18 0.5 mm², AWG 20

Terminals 5-15 : 2.5 mm², AWG13 1.5 mm², AWG 15

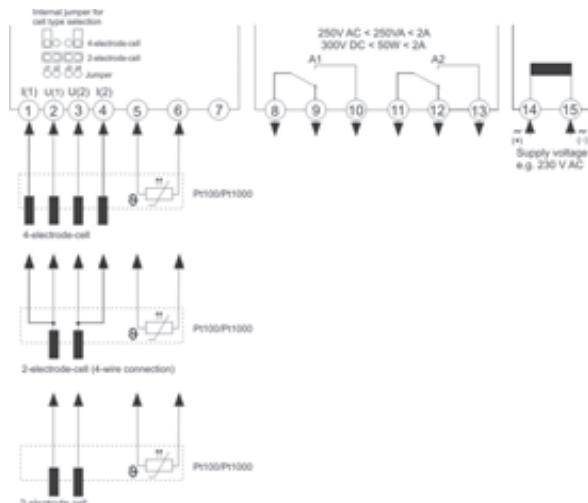
Protection class : IP65, terminals IP20 acc. to BGV A3

Displays

Dimensions



Connection diagram



Ordering code

LF1010 - - - - - -

1. Input

1	input for 2- or 4-electrode-cells, temperature compensation via Pt100
3	as 1, but temperature compensation via Pt1000

2. Alarm output

00	not installed
2R	2 relay

3. Supply voltage

0	230 V AC	$\pm 10\%$ 50-60Hz
1	115 V AC	$\pm 10\%$ 50-60Hz
4	24 V AC	$\pm 10\%$ 50-60Hz
5	24 V DC	$\pm 15\%$

4. Options

00	without option
01	min- and max-peak hold
09	1xM20x1.5 Multi (2xØ6 mm), 1xM20x1.5
14	measuring and monitoring of ultra-pure water acc. to USP<645>

5. Unit appears on the unit field

6. Additional text above the display (3x70 mm HxW)

Product information

Plug-In Display GIA 0420 VO(T)



Characteristics

The GIA 0420 VO is a microprocessor-controlled displaying device for 4..20 mA standard signals.

Any transmitter (with 4..20 mA output) can be connected to the device. The range adjustment of the GIA 0420 to the transmitter is done by entering the initial and final value and the decimal point position. No additional auxiliaries are needed for this adjustment, but the three buttons accessible after removal of the cover. The device is mounted by easy plug-in of the special adapter (elbow-type plug according to EN 175301-803/A)

The GIA 0420 VO doesn't need a separate auxiliary supply but is directly supplied by the measuring current. It has an integrated self-diagnostic which checks the device that it works correctly. This self-diagnostic together with the transmitter's check for "sensor break" and "sensor short circuit" and range exceeding or falling below ensures an optimum of operational reliability.

Technical data

Measuring input

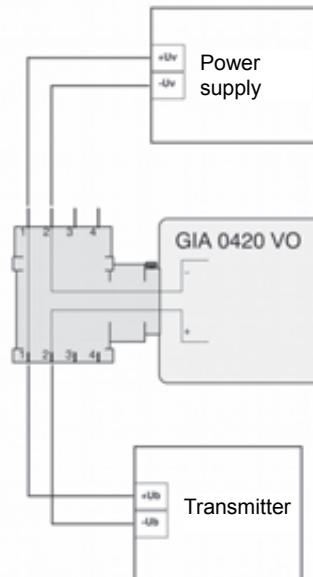
Input signal	: 4..20 mA (2-wire)
Accuracy	: $\pm 0.2\%$ FS ± 1 digit
Measuring rate	: 5 measurements / seconds
Filter	: adjustable
Voltage load	: approx. 2 V at option S2: approx. 3 V at option ex: approx. 3.5 V
Power supply	: self-supplying: devices is supplied directly from measuring current
Working temperature	: 0..50 °C
Display	
Display	: LCD display
Height	: 10 mm
Display range	: -1999..+9999 digit
Decimal point	: any position
Scaling	: freely scalable via 3 buttons (accessible after cover has been removed)
Connection	
Connection	: special plug design for elbow-type plug (EN 175301-803/A) for easy plug-in
Housing	
Housing	: ABS, front screen made of polycarbonate
Protection class	: front IP65

Displays

Dimensions

Housing : 48.5 x 48.5 x 35.5 mm (L x W x D)
without elbow-type plug

Connection diagram



Design types

VO	With elbow-type plug special adapter design for elbow-type plug (EN 175301-803/A) for easy plug-in (standard, as per description)	
WK	With cable connection electric connection via 2 m long connection cable with loose ends for connection to any standard signal source 4..20 mA	

Ordering code

1. 2. 3.
GIA0420 - -

1. Design type	
VO	elbow-type plug (standard)
WK	cable connection
2. Buttons	
0	without buttons at front, buttons for scaling are accessible after top cover has been removed
T	with buttons, 3 operating buttons freely accessible
3. Option	
00	without option
S1	display with 1 electrically isolated switching output; delivered incl. 1 m connection cable (just in combination with option "ex")
S2	display with 2 electrically isolated switching outputs; delivered incl. 1 m connection cable (not in combination with option "ex")
ex	with ex-protection for explosive areas (available: end of 2 nd quarter 2011)

Other design types (input signal: 0..10 V) upon request.

Ein Unternehmen der

Product information

Power-Meter Integra 1530



- Measuring and indicating of all mains parameter of 3- and 4-wire systems
- Mains line voltage from 100 up to 485 V AC
- Current and voltage transmitter programmable
- Measuring range programmable

Characteristics

The Integra will measure and communicate many electrical parameters, including THD values. Integra 1530 combines a basic accuracy of 0.2 % with fast response, a range of output options, and a large clear LED display. The display provides a wide viewing angle without parallax issues and fast response at low ambient temperatures. 52 electrical and mains power parameter could be configured and displayed. Additional an serial interface RS485 with protocol Modbus™ and JCNII is deliverable. The Integra 1530 detects the protocol automatically.

Technical data

Power supply

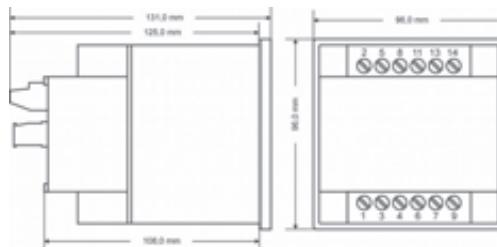
Supply voltage	: 100..250 V AC or 12..48 V DC
Frequency	: 45..66 Hz
Power consumption	: 6 VA
Operating temperature	: 0..55 °C
CE-conformity	: IEC 688:1992, EN 61326-A, IEC 1010-1 UL E20300, UL 61010B-1

Measuring capabilities

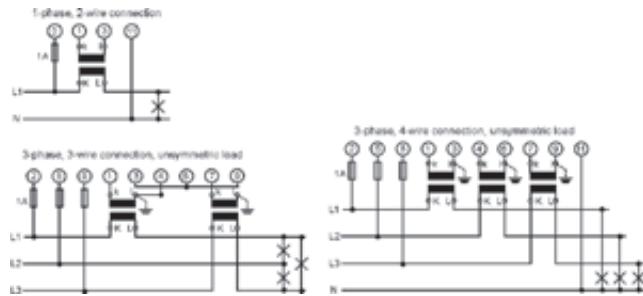
Voltage	: 80..120 % of the nominal value
Current	: 5..120 % of the nominal value
Frequency	: 45..66 Hz
Active power [W]	: 5..120 % of nominal
Reactive power [VAR]	: 5..120 % of nominal
Apparent power [VA]	: 5..120 % of nominal
Power factor	: lagging 0.8..1..0.8 leading
Harmonic distortion	: up to the 31st harmonic wave 0..40 %
Basic accuracy	: 0.2 %
Display	: 3 x 11 mm LED red, 4-digit
Outputs	
Relay	: 2 relay SPDT
Impulse	: relay SPST, NO
Analog	: 0/4..20 mA, or -1..0..1 mA
Serial interface	: RS485 2400, 4800, 9600, 19200 Baud Protocol MODBUS
Case	: DIN 96x96 mm, Polycarbonate
Connection	: screw clamp (load) and slide-in terminals max. 3mm²
Protection class	: front IP54

Displays

Dimensions



Connection diagram



Ordering code

1530 - - - - - - -

1. Mains	
1	1-phase; L1-N
3	3-phase; L1-L2-L3, asymmetric load
4	3-phase; L1-L2-L3-N, asymmetric load
2. Measuring voltage	
1	L1-N; 1-phase, 57..139 V AC
2	L1-N; 1-phase, 140..277 V AC
3	L1-L2; 3-phase, 100..240 V AC
4	L1-L2; 3-phase, 241..480 V AC
3. Measuring current	
1	1 AAC
5	5 AAC
4. Supply voltage	
0	100..250 V AC
5	12..48 V DC
5. Relay output (relay 1 and 2)	
0	without
1	1 impulse output 1/kWh
2	2 impulse outputs
6. Analog output	
00	without
01	0/4..20 mA
03	-1..0..1 mA
11	2 outputs as 01
33	2 outputs as 03
7. Serial interface	
0	without
1	RS485 Modbus
2	Lonworks
3	Profibus
8. Options	
00	without option

Product information

Graphic display series migra SC/MC



- LED-dot matrix
- Character size 30..100 mm
- Single colour red (SC), multi colour red, yellow, green (MC)
- Up to 320 characters, depending on character height
- Interface RS485, Profibus, AS-Interface or Ethernet
- Protection class IP54 or IP65

Characteristics

The migra SC/MC graphics and text compatible large size LED display can be used universally for display of production data or as an information board.

The modular design allows cost-effective models of various sizes with different character heights and number of digits.

Thanks to the high resolution LED dot matrix display, characters as well as graphics are crystal clear.

Especially important information can be colour-highlighted with the multicolour model (MC).

Technical data

Power supply

Supply voltage : 230 V AC 50 Hz, 24 V DC ±20 %
Power consumption : 30 W max. depends to the character size
Operating temp. : 0..50 °C

Input

Digital : pulse counter, A/D-converter
Interface : Profibus, AS-Interface, Serial RS485, Ethernet, Modbus

Display

: LED dot matrix; 64x16 Pixel per module,
30, 40, 55 mm at 3 mm pixel diameter,

50, 75, 100 mm at 5 mm pixel diameter

SC : single color red

MC : multi color red, yellow, green
ASCII full graphic character set

Angle of radiation : ±75°

Field case

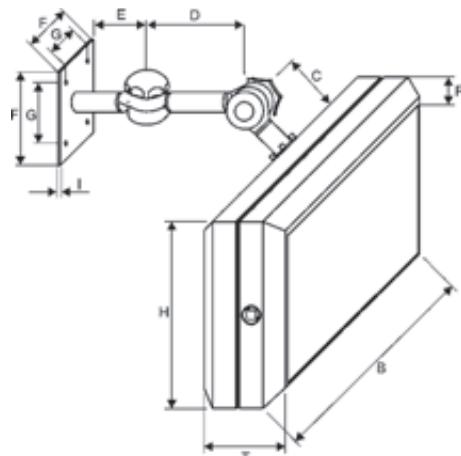
: material aluminum,
powder coated, RAL 7016

Dimensions : see table

Protection class : IP54 or IP65

Displays

Dimensions



	[mm]
C	60
D	110
E	74
F	100
G	70
I	7
R	21
T	87

Dimensions H and B

Number of modules/pixel height [mm]

3 mm

	1 module		2 modules		3 modules		4 modules	
	H	B	H	B	H	B	H	B
1 module	202	368	202	620	202	920	202	1150
2 modules	238	368	238	620	238	920	238	1150
3 modules	280	368	280	620	280	920	280	1150
4 modules	338	368	338	620	338	920	338	1150

5 mm

	1 module		2 modules		3 modules		4 modules	
	H	B	H	B	H	B	H	B
1 module	202	620	202	1080	202	1559	202	2047
2 modules	238	620	238	1080	238	1559	238	2047
3 modules	448	620	448	1080	448	1559	448	2047
4 modules	571	620	571	1080	571	1559	571	2047

Ordering code next page

Product information

Displays

Ordering code

migra - - - - - -

1. Display 1 basic module	
SC-3	3 mm single color red (indoor mounting)
MC-3	3 mm multi color red/yellow/green (indoor mounting)
SC-5	5 mm single color red (indoor mounting)
MC-5	5 mm multi color red/yellow/green (indoor mounting)
2. Extended module (1 module = 64x16 Pixel)	
n	
3. Mounting position (f.e. 1x4 = 1 line with 4 modules)	
For each 4x4 module 1 basic module is necessary	
4. Input	
0	pulse counter
1	A/D converter 4-steps
3	serial RS 485
4	Profibus DP, include cable plug
5	Ethernet TCP/IP
6	AS-Interface
B	radio controlled clock DCF77
D	Modbus RTU
E	WLAN
5. Supply voltage	
0	230 V AC ±10 % 50-60Hz
5	24 V DC ±15 %
6. Protection class	
0	IP54
1	IP65
7. Mounting	
1	multi hinge*
2	mounting angle *
3	suspension eyes for chains
8. Options	
00	without
03	heating with controller
06	sensor for display brightness (only SC-5, MC-5)

* 2 multi hinge/mounting angle are necessary for more than 2 modules in line

* 3 multi hinge/mounting angle are necessary for more than 3 modules in line

Product information

Large size display series migan



- LED-7 Segment
- Character height 60..150 mm
- Max. 6/8 digit at digital and interface, 4 digit at analog input
- Analog inputs 0/4..20 mA, 0..10 V
- Digital pulse counter up to 15 kHz, Profibus, AS-Interface or Ethernet
- Protection class IP54 or IP65

Characteristics

The large size numeric display can be used universally as a process display unit or as an information board. The modular design allows for cost-effective models of various size, and with different character heights and number of digits. Thus integration into existing equipment or systems is easy and simple. The display can be controlled with different inputs.

For example: field bus systems , A-D converter, pulse converter.... Custom devices with different digits even units are possible.

Technical data

Power supply

Supply voltage : 230 V AC ±10 %; 110 V AC ±10 %;
or 24 V DC ±20 %

Power consumption : max. 16 W per digit, it depends on the
number and size of the digits.

Operating temp. : 0..50 °C

Input

Analogue : 0/4..20 mA, 0..10 V

Digital : pulse counter

Interface : Profibus, AS-interface or Ethernet

Count frequency : max. 15 kHz,

Display : LED red; 60, 100, and 150 mm height

Indicating range : max. 6 / 8 digit with digital- and
interface input,

4 digit with analog input

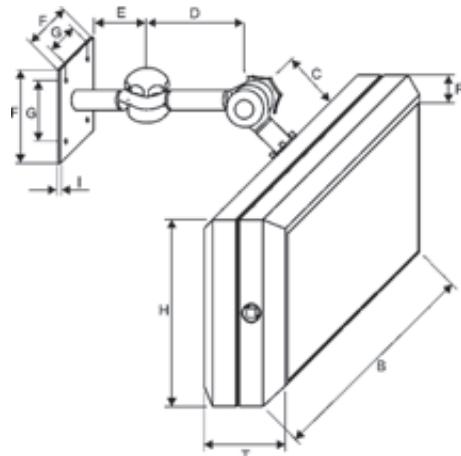
Field case : material Aluminum, powder coated
RAL 7016

Dimensions : see table

Protection class : IP54 or IP65

Displays

Dimensions



	[mm]
C	60
D	110
E	74
F	100
G	70
I	7
R	21
T	87

Dimensions H and B

Number of digits / character height

	60mm		100mm		150mm	
	B	H	B	H	B	H
2 digits	305	202	305	202	368	238
3 digits	305	202	440	202	440	238
4 digits	305	202	440	202	620	238
5 digits	440	202	620	202	720	238
6 digits	440	202	620	202	820	238
7 digits	440	202	720	202	920	238
8 digits	620	202	820	202	1080	238

Ordering code next page

Product information

Displays

Ordering code

migan - - - - - - - -

1. Character size [mm]	
1	60
2	100
3	150
4	200
5	250
2. Number of digits	
n	
3. Input	
0	pulse counter
1	A/D converter 4-times
4	Profinet DP, incl. cable plug
5	Ethernet TCP/IP
6	AS-Interface
7	BCD parallel
8	BCD multiplex
9	Pt100 2-, 3-wire
A	incremental input
B	radio controlled clock DCF77
C	Profinet IO
D	Modbus RTU
4. Supply voltage	
0	230 V AC ±10 % 50-60Hz
1	115 V AC ±10 % 50-60Hz
5	24 V DC ±15 %
5. Protection class	
0	IP54
1	IP65
6. Mounting	
1	multi hinge*
2	mounting angle *
3	suspension eyes for chains
4	multi hinge with hinge extension
5	mounting frame
7. Additional text on the face plate (please state in clear text)**	
8. Options	
00	without
03	heating with controller
04	colon for clock display
05	custom display color

* for more than 7 digits 100/150mm character heights 2 multi hinge or mounting angles are necessary.

** each unit character the case size changes with 1 digit.

Product information

Controller



Characteristics

System	2-point-controller, 3-point-controller, 3-point-step-controller, Difference-controller, Continuous-controller, Setpoint adjuster
Output	Relay-switching contact, Bistable 0/12V DC, Alarm outputs, Continuous outputs
Case	Panel case DIN 48x24 mm, DIN 48x48 mm, DIN 96x48 mm, DIN 96x96 mm

Applications

- Extruder machines
- Heating control systems
- Facility engineering
- Wide range of instrumentation

Product information

Function

The controllers are ideally adapted for most of the controlling tasks due to their multifunction inputs and due to their compact construction design can be quickly retrofitted.

The setpoint devices adapt themselves automatically to the measurement task at the output defined by the collar.

The industrial standard casing provide for the trouble-free replacement of the controllers

Benefits

- Little storage necessary due to multifunctional inputs
- Wide range of controlling functions
- Compact construction design
- Standard casing

Device Overview

Device	Function	Input	Output	Mounting	Page
GIA20EB	2-point-controller, 3-point-controller, 2-point-controller with min-/max-alarm function	RTD (Pt100, Pt1000), Thermocouple, standard signals, frequency	2 Transistor (Low-side, High-side, Push-pull)	Panel case DIN 48X24mm	73
GIR230	2-point-controller, 3-point-controller, 2-point-controller with min-/max-alarm function	RTD (Pt100, Pt1000), Thermocouple, NTC , standard signals, frequency	2 relay SPST, 1 transistor NPN	Panel case DIN 48X24mm	75
GIR230DIF	Difference-controller, 2-point-controller, 3-point-controller, 2-point-controller with min-/max-alarm function	RTD (Pt1000), Thermocouple, NTC , standard signals	2 relay SPST, 1 transistor NPN	Panel case DIN 48x24 mm	78
GIR300	2-point-controller, 3-point-controller, 2-point-controller with min-/max-alarm function	RTD (Pt100, Pt1000), Thermocouple, NTC , standard signals, frequency	2 potential free relay switching outputs Relay 1: normally closed Relay 2: normally open	Panel case DIN 72x36 mm	80
GIR360	Universal display and regulating unit	Digital signal 0..5 V (0..28 V)	2 potential free relay switching outputs Relay 1: normally closed Relay 2: normally open	Panel case DIN 72x36 mm	82
EC9648	Difference-controller, 2-point-controller, 3-point-controller, 2-point-controller with min-/max-alarm function	RTD (Pt100), Thermocouple, standard signals frequency	Relay SPDT, transistor, bistable 0/6 V DC, analog output	Panel case DIN 96x48 mm	84
R1140	2-point-controller, 3-point-controller, 3-point-step-controller continuous-controller	RTD (Pt100), Thermocouple, standard signal s	Relay, bistable 0/18 V DC, continuous 0/4..20 mA	Panel case DIN 96x48 mm	87
R1300	2-point-controller, 3-point-controller, 3-point-step-controller, continuous controller	RTD (Pt100), Thermocouple, standard signals	Relay SPDT, bistable 0/18 V DC, continuous 0/4..20 mA, 0/2..10 V DC	Panel case DIN 96x96 mm	89
TTM-002, TTM-004, TTM-005, TTM-009	2-point-controller, 3-point-controller, continuous controller	RTD (Pt100), Thermocouple, standard signals	Relay SPST, bistable 0/12 V DC, continuous 4..20 mA	Panel case DIN 48x24 mm DIN 48x48 mm DIN 48x96 mm DIN 96x96 mm	90
GRA	2-point-controller or min-/max-alarm function	4..20 mA, 2-wire or 0..10 V, 3-wire	1 transistor OC	Plug-on case Field mounting	91
SG4824	Setpoint adjuster	-	0/4..20 mA, 0/2..10 V DC	Panel case DIN 48x24 mm	93
SG9648	Setpoint adjuster	Control inputs for set- point ramp	0/4..20 mA, 0/2..10 V DC	Panel case DIN 96x48 mm	94
SG1010	Setpoint adjuster	Control inputs for set- point ramp	0/4..20 mA, 0/2..10 V DC	Field case 100x100x60 mm	95

Mistakes reserved, technical specifications subject to change without notice.

Product information

Universal Measuring and Controlling Device GIA 20 EB



- Universal inputs for standard signals, frequency, Pt100 / Pt1000 and thermocouples
- 2 integrated switching outputs
- Self-monitoring and diagnostic system
- Interface

Characteristics

The GIA 20 EB is a microprocessor-controlled displaying, monitoring and controlling device for universal use.

It has a universal input for standard signals (0..20 mA, 4..20 mA, 0..50 mV, 0..1 V, 0..2 V and 0..10 V), resistance thermometers (Pt100 and Pt1000), thermocouples (type J, K, N, S and T) and frequency (TTL and switch contact). Additionally it provides functions like rotation speed measurement or counter.

The GIA 20 EB is equipped with switching outputs. The output functions can be configured as 2-point controller, min/max alarm, 3-point controller, 2-point controller with min/max alarm, etc. The relay state is indicated by 2 additional LEDs below the 7-segment display.

The device identifies impermissible operating states like display or system errors and displays a corresponding error code.

Technical data

Measuring inputs

Design type	Input signal	Measuring range	Note
Voltage signal	0..10 V	0..10 V	R _i ≥ 300 kOhm
	0..2 V	0..2 V	R _i ≥ 10 kOhm
	0..1 V	0..1 V	R _i ≥ 10 kOhm
	0..50 mV	0..50 mV	R _i ≥ 10 kOhm
Current signal	4..20 mA	4..20 mA	R _i = ~ 125 Ohm
	0..20 mA	0..20 mA	R _i = ~ 125 Ohm
Resistance	Pt100	-50.0..+200.0 °C	3-wire connection
	Pt100	-200..+850 °C	
	Pt1000	-200..+850 °C	2-wire connection

Controller

Thermocouple	NiCr-Ni type K	-270.0..+1350 °C	
	Pt10Rh-Pt type S	-50..+1750 °C	
	NiCrSi-NiSi type N	-270..+1300 °C	
	Fe-CuNi type J	-170..+950 °C	
	Cu-CuNi type T	-270..+400 °C	
Frequency	TTL signal	0..10 kHz	
	Switching contact NPN	0..3 kHz	internal pull-up-resistor is switched on
	Switching contact PNP	0..1 kHz	internal pull-down-resistor is switched on
Rotation speed	TTL signal switching contact NPN, PNP	0..9999 U/min	switchable predis-tributor (1..1000), pulse frequency: max. 600000 pulses/min.
Up / down counter	TTL signal switching contact NPN, PNP	0..9999 U/min	switchable predis-tributor (1..1000), pulse frequency: max. 10000 pulses/min.

Switching outputs

Switching behavior : 2 switch. outputs, not electrically isolated
: selectable: low-side, high-side or push-pull
Connection data : low-side: 28 V / 1 A
high-side: Uv / 200 mA

Output functions

Description	Function	
	Output 1	Output 2
2-point controller	digital 2-point controller	---
3-point controller	digital 2-point controller	digital 2-point controller
2-point controller with min/max alarm	digital 2-point controller	min/max alarm
Min/max alarm, together	---	min/max alarm
Min/max alarm, individual	max alarm	min alarm

Accuracy

Standard signal : < 0.2 % FS ±1digit
(for 0..50 mV: < 0.3 % FS ±1digit)
Resistance thermometer : < 0.5 % FS ±1digit
Thermocouple : < 0.3 % FS ±1digit
(for type S: < 0.5 % FS ±1digit)
Frequency : < 0.2 % FS ±1digit

continued on next page

Product information

Controller

Measuring rate

Standard signal	: 100 measurements / second
Temperature	: 4 measurements / second
Frequency	: 100 measurements / second

Power supply

Power supply	: 9..28 V DC
Power consumption	: max. 30 mA (without switching output)
Working temperature	: -20..+50 °C

Display

Display	: red LED display
Height	: 10 mm
Display range	: -1999..+9999 digit initial / final value and decimal point freely adjustable

Electric connection

Electric connection	: via screw / clamp terminals: 2-pole for interface and 9-pole for remaining connections wire cross section from 0.14..1.5 mm ²
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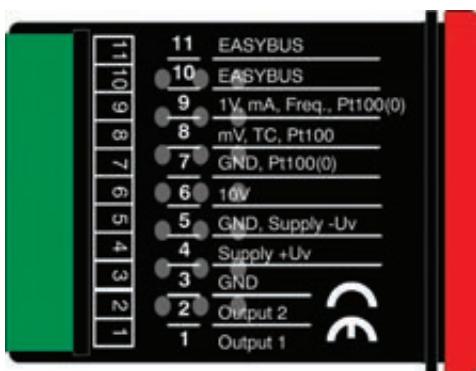
Protection class

Protection class	: front IP54
------------------	--------------

Dimensions

Housing	: glass fibre reinforced Noryl front panel: polycarbonate
Size	: 24 x 48 mm (H x W)
Mounting depth	: approx. 65 mm (incl. screw / clamp terminals)
Panel mounting	: by VA fixing clamps
Allowed panel thickness	: from 1..10 mm
Panel cutout	: 21.7 x 45.0 mm [±0.5 mm] (H x W)

Connection diagram



Supply voltages

028	Supply voltage: 9..28 V DC (Standard)
G12	Design type with electrically isolated supply: 11..14 V
G24	Design type with electrically isolated supply: 22..27 V

Ordering code

1. 2.
GIA20EB - -

1. Supply voltage	
028	9..28 V DC (standard)
G12	electrically isolated supply: 11..14 V
G24	electrically isolated supply: 22..27 V
2. Option	
00	without option

Special design types (upon request)

- SA1 **Tare and hold function**
(only for 4..20 mA input)
If the external switch gets closed the display is set to 0 (tare function).
As long as the switch stays closed the display is updated.
Once the switch is opened the display is frozen (hold function).
- SA2 **Max value display**
(only for 4..20 mA input)
The currently measured value is displayed if the external switch is closed.
The highest measured value is displayed if the external switch is opened.
- SA3 **Frequency input for 10..100 mV**
The device provides a frequency input with connection possibility for:
frequency (10..100 mV signals)
- SA4 **Measuring input 0..30V**
The original measuring input 0..10 V is changed to a measuring input for 0..30 V signals. All adjustments for this input have to be done at the menu point 0..10 V.
- SA5 **Delayed measured value displaying**
This special design type can be used to suppress short-term perturbations of signal normally changing very slowly.
This special design type influences only standard signal measurements.

Accessories

- **FS3T**
Front panel with 3 operating buttons:
for comfortable configuration, if switching points have to be consistently adjusted, for calling the min and max values, etc.
- **GNR 10**
Power supply and relay module for supplying a GIA 20 EB
(input: 230VAC, power supply for device and transmitter, 2 relay outputs)

Product information

Displaying and Controlling Device GIR 230 ...



- Choose between 5 input types
- 2 relay outputs and 1 NPN switching output
- Self-monitoring and diagnostic system

Characteristics

The GIR 230... is a microprocessor-controlled displaying, monitoring and controlling device for universal use.

The device is available with several input types (each device has one of them): standard signals (0..20 mA, 4..20 mA, 0..10 mA), resistance thermometer (Pt100 and Pt1000), thermocouples (type J, K, N, S and T) and NTC. The GIR 230... provides switching outputs. The output functions can be configured as 2-point controller, min/max alarm, 3-point controller, 2-point controller with min/max alarm, etc. The relay state is indicated by 2 additional LEDs below the 7-segment display.

The GIR 230... identifies impermissible operating states like display or system errors and displays a corresponding error code.

Technical data

Measuring inputs

Design type	Input signal	Measuring range	Note
NS	0..10 V	0..10 V	
	4..20 mA	4..20 mA	
	0..20 mA	0..20 mA	
Pt	Pt100	-50.0..+200.0 °C	3-wire connection
	Pt100	-200..+850 °C	
	Pt1000	-200..+850 °C	2-wire connection
TC	NiCr-Ni type K	-270.0..+1350 °C	
	Pt10Rh-Pt type S	-50..+1750 °C	
	NiCrSi-NiSi type N	-270..+1300 °C	

	Fe-CuNi type J	-170..+950 °C	
	Cu-CuNi type T	-270..+400 °C	
	standard signal 0..50 mV	0..50 mV	
FR	frequency	TTL signal	0..10 kHz
		Switching contact NPN	0..1 kHz
		Switching contact PNP	0..1 kHz
rotation speed	TTL signal switching contact NPN, PNP	0..9999 U/min	switchable pre-distributor (1..1000), pulse frequency: max. 600000 pulses/min.
counter	TTL signal switching contact NPN, PNP	0..9999 U/min	switchable pre-distributor (1..1000), pulse frequency: max. 10000 pulses/min.
NTC	NTC 10K	-40.0..+120.0 °C	10k, 2-wire

Switching outputs

Design type	Outputs	Switching functions
NS	2x relay outputs 230V switching, (normally-open)	2-point 3-point
		2-point with alarm
	1x NPN output, ground switching (open collector)	3-point with alarm min/max alarm
FR	1x relay outputs 230V switching, (normally-open)	2-point 2-point with alarm min/max alarm
	1x NPN output, ground switching (open collector)	
NTC		

Accuracy

NS	: < 0.2 % FS ±1digit
Pt	: < 0.5 % FS ±1digit
TC	: < 0.3 % FS ±1digit (0..50 mV) : < 0.3 % FS ±1digit (thermocouples)
FR	: < 0.5 % FS ±1digit (type S)
NTC	: < 0.2 % FS ±1digit : < 0.5 % FS ±1digit

Measuring rate

NS	: 100 measurements / second
Pt	: 4 measurements / second
TC	: 4 measurements / second
FR	: 4 measurements / second
NTC	: 4 measurements / second

continued on next page

Product information

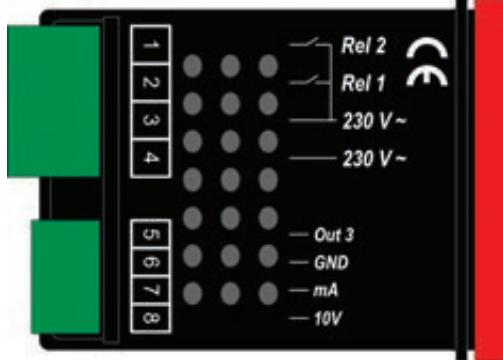
Power supply	: 230 V, 50/60 Hz
Power consumption	: 2 VA
Working temperature	: -20..+50 °C
Display	
Display	: red LED display
Height	: 10 mm
Display range	: -1999..+9999 digit initial / final value and decimal point freely adjustable
Operation	: via 3 buttons
Electric connection	: via screw / clamp terminals: 2-pole for interface and 9-pole for remaining connections wire cross section from 0.14..1.5 mm ²
Protection class	: front IP54

Dimensions

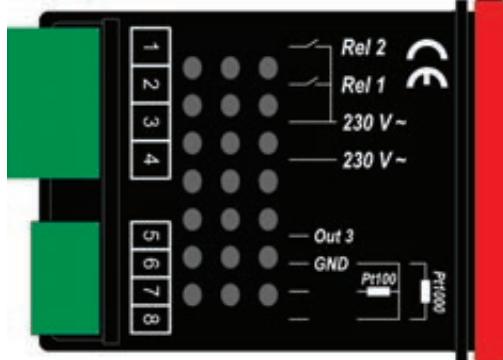
Housing	: glass fibre reinforced Noryl front panel: polycarbonate buttons: ABS
Size	: 24 x 48 mm (H x W)
Mounting depth	: approx. 65 mm (incl. screw / clamp terminals)
Panel mounting	: by VA fixing clamps
Allowed panel thickness	: from 1..10 mm
Panel cutout	: 21.7 x 45.0 mm [±0.5 mm] (H x W)

Connection diagram

GIR 230 NS

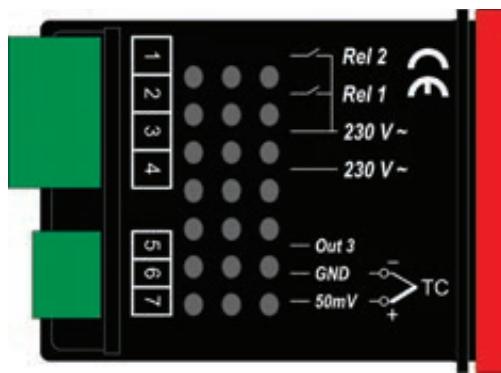


GIR 230 Pt

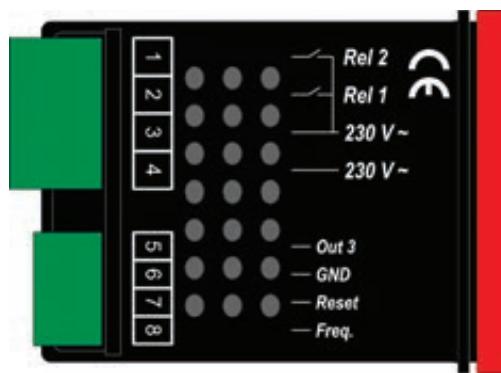


Controller

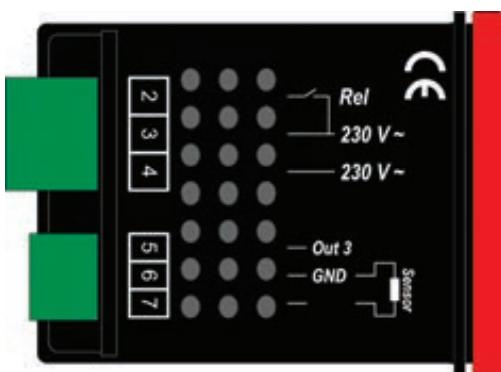
GIR 230 TC



GIR 230 FR



GIR 230 NTC



Design types

NS	Standard signal input controller with measuring input for standard signals (4..20 mA, 0..20 mA, 0..10 V)
Pt	Resistance input controller with measuring input for Pt100 and Pt1000
TC	Thermocouple input (J, K, N, S and T) controller with measuring input for thermocouples and 0..50 V
FR	Frequency input controller with measuring input for frequency
NTC	Controller with measuring input for NTC (only 1 relay output)

continued on next page

Product information

Controller

Ordering code

1.
GIR230

1. Design type	
NS	standard signal
Pt	resistance signal
TC	thermocouple signal
FR	frequency signal
NT	NTC

Special design types (upon request)

- SA1 **Supply voltage: 12..24 V DC**
2 relay outputs, +Uv switching
1 NPN output, ground switching
- SA2 **Supply voltage: 12..24 V AC**
2 relay outputs, supply voltage switching
1 NPN output, ground switching
- SA3 **Supply voltage: 12..24 V DC
with electric isolation**
2 relay outputs, +Uv switching
1 NPN output, ground switching

Product information

Differential Controller GIR 230 ... / DIF



- Choose between 3 input types
- Temperature difference sensor 1 – sensor 2
- Self-monitoring and diagnostic system

Characteristics

The GIR 230 ... / DIF is a microprocessor-controlled displaying, monitoring and regulating device for universal use.

The device has 2 inputs for standard signals, Pt1000 or NTC. The difference between both inputs (sensor 1 – sensor 2) is displayed and used for all regulating uses. The GIR 230 ... / DIF provides switching outputs. The output functions can be configured as 2-point controller, min/max alarm, 3-point controller, 2-point controller with min/max alarm, etc. The relay state is indicated by 2 additional LEDs below the 7-segment display.

The GIR 230 ... identifies impermissible operating states like display or system errors and displays a corresponding error code.

Technical data

Measuring inputs

Design type	Input signal	Measuring range	Note
NS	0..10 V	0..10 V	
	420 mA	4..20 mA	
	0..20 mA	0..20 mA	
Pt1000	Pt1000	-200..+850 °C	2-wire connection
NTC	NTC, 10K	-40.0..+120.0 °C	2-wire

Switching outputs

Design type	Outputs	Switching functions
NS	2x relay outputs 230V switching, (normally-open)	2-point 3-point 2-point with alarm 3-point with alarm min/max alarm
Pt1000		
NTC	1x NPN output, ground switching (open collector)	

Accuracy

NS	: < 0.2 % FS ±1digit
Pt1000	: < 0.5 % FS ±1digit
NTC	: < 0.5 % FS ±1digit

Measuring rate

NS	: 100 measurements / second
Pt1000	: 4 measurements / second
NTC	: 4 measurements / second

Power supply	: 230 V, 50/60 Hz
Power consumption	: 2 VA
Working temperature	: -20..+50 °C

Display

Display	: red LED display
Height	: 10 mm
Display range	: -1999..+9999 digit initial / final value and decimal point freely adjustable

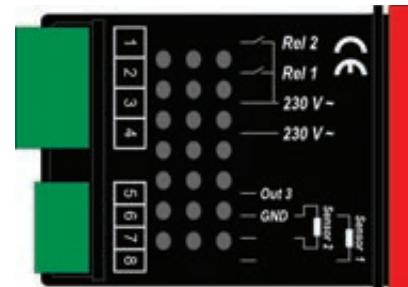
Operation	: via 3 buttons
Electric connection	: via screw / clamp terminals: 2-pole for interface and 9-pole for remaining connections wire cross section from 0.14..1.5 mm ²
Protection class	: front IP54

Dimensions

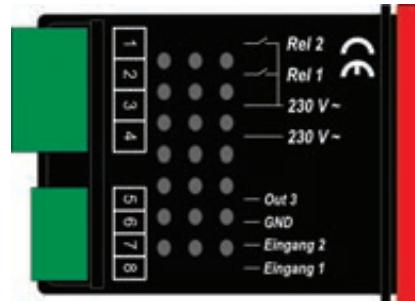
Housing	: glass fibre reinforced Noryl front panel: polycarbonate buttons: ABS
Size	: 24 x 48 mm (H x W)
Mounting depth	: approx. 65 mm (incl. screw / clamp terminals)
Panel mounting	: by VA fixing clamps
Allowed panel thickness	: from 1..10 mm
Panel cutout	: 21.7 x 45.0 mm [±0.5 mm] (H x W)

Connection diagram

GIR 230 Pt1000 / DIF and GIR 230 NTC / DIF



GIR 230 NS / DIF - ...



continued on next page

Product information

Controller

Design types

NS	Standard signal input differential controller with 2 inputs for standard signal (4..20 mA, 0..20 mA, 0..10 V)
Pt	Resistance input differential controller with 2 inputs for Pt1000
NT	Differential controller with 2 inputs for NTC

Ordering code

1. 2.
GIR230 / **DIF** -

1. Design type	
NS	standard signal input
Pt	resistance input
NT	NTC input
2. Measuring input ONLY at type NS (GIR 230 NS / DIF ...)	
420A	input signal: 4..20 mA
020A	input signal: 0..20 mA
010V	input signal: 0..10 V

Product information

Universal meter and frequency device GIR 300



- Universal inputs for standard signals, frequency, Pt100, Pt1000 and thermocouples
- 2 integrated switching outputs (galvanically isolated)
- Quick regulating and monitoring behaviour
- 72x36 design
- Easy operation - high precision - affordable price

Characteristics

The GIR 300 is a universal microprocessor-controlled display, monitoring and regulating device.

The device has a universal input with connections for:

- Standard signals (0-20 mA, 4-20 mA, 0-50 mV, 0-1 V, 0-2 V and 0-10 V),
- Resistance temperature sensors (Pt 100 and Pt 1000),
- Thermocouples (type K, J, N, T and S)
- Frequency (TTL and switching contact)

It also offers functions such as speed measurement, metering, etc. There are also two switching outputs that can be configured together as a 2-point regulator, 3-point regulator, 2-point regulator with min/max alarm or separately for min/max alarm. The status of the switching contacts is indicated with 2 LEDs. LED 1 displays the status of the contact of Relay 1 and LED 2 displays the status of the contact of Relay 2.
(LED ON = contact is closed).

The device also has an EASYBus interface as standard equipment. The EASYbus interface has an interface converter that enables communication with a superordinate computer and makes the device a full-featured EASYBus module.

The GIR 300 is delivered tested and fully calibrated.

Technical data

- Measurement input** : Universal input for
 Standard signals : 4-20 mA, 4-20 mA, 0-1 V, 0-2 V, 0-10 V
 and 0-50 mV
 Resistance thermometer: Pt100 (3-wire), Pt1000 (2-wire)
 Thermocouples : Types J, K, N, S, T
 Frequency, speed : TTL signal, switching contact
 Incrementer / decrementer : TTL signal, switching contact
 Serial interface

Controller	
Measurement rates	: approx. 100 measurements / s (with standard signal) or approx. 4 measurements / s (for temperature and frequency)
Measuring and display ranges, resolution:	Temperature: (Display unit can be switched from °C to °F) Pt100: -200..+850 °C or -50.0..+200.0 °C; Pt1000: -200..+850 °C; Type J: -170..+950 °C; Type K: -270..+1350 °C; Type N: -270..+1300 °C; Type S: -50..+1750 °C; Type T: -270..+400 °C
Standard signals	: -1999.. 9999 digit, start, end value and DP freely variable
Recommended range	: ≤ 2000 digit
Frequency	: 0.000 Hz.. 10 kHz, display freely scalable
Speed	: 0.000 rpm..9999 rpm, activatable prescaler: 1-1000
Incrementer / decrementer	: Meter count retained even with power failure 0.. 9999 (10 million with prescaler), pulse frequency: ≤ 10 kHz, activatable prescaler: 1-1000
Serial interface	: Display and regulation for values received via the interface.
Accuracy: (at nominal temperature = 25 °C)	
Standard signals	: < 0.2 % FS ±1 digit (at 0-50 mV: < 0.3 % FS ±1 digit)
Resistance thermometer	: < 0.5 % FS ±1 digit
Thermocouples	: < 0.3 % FS ±1 digit (with Type S: < 0.5 % FS ±1 digit)
Comparison position accuracy	: ± 1 °C
Frequency, speed, meter	: < 0.1 % FS ±1 digit
Outputs	: 2 potential free relay switching outputs Relay 1: Normally open (NO) Relay 2: 'normally closed'
Switching functions	: 2-point, 3-point, 2-point with alarm, min/max alarm at 1 output, min/max alarm at 2 outputs
Switching points, switching hysteresis	: freely selectable
Reaction time	: ≤ 20 ms with standard signal ≤ 0.5 s with temperature and frequency
Display	: approx. 13 mm high, 4-digit red LED display
Interface	: serial interface, galvanically isolated, EASYBus compatible
Miscellaneous	: constant self-diagnosis, digital filter function, measuring range limiting
Voltage supply	: 9.. 28 V DC (standard)
Optional	: G24: 22-27 V DC, galvanically isolated
Current consumption	: max. 70 mA
Nominal temperature	: 25 °C
Working temperature	: -20..+50 °C
Relative humidity	: 0..80 % relative humidity (non-condensing)
Storage temperature	: -30..+70 °C
Electrical connection	: via screw/plug-in terminal Conductor cross-section of 0.14..1.5 mm²
Scope of delivery	: Device, operating manual

continued on next page

Product information

Controller

Dimensions

Housing	:
Dimensions	: 36 x 72 mm (front frame dimensions)
Installation depth	: approx. 75 mm (including screw/plug-in terminals)
Panel fastening	: with retaining clamps
Possible panel thickness	:
Panel cutout	: 32.0+0.5 x 68.5+0.5 mm (H x W)

Ordering code

1.
GIR300 -

1. Voltage supply	
028	9-28 V DC
G24	22..27 V DC galv. isolated

Connection diagram



Product information

Controller

Universal display and regulating unit GIR 360



- 2 integrated switching outputs (galvanically isolated)
- Quick regulating and monitoring behaviour
- 72x36 design
- Serial EASYBus interface

Characteristics

The GIR 360 is a universal microprocessor-controlled display, monitoring and regulating device.

The device has 3 inputs and is used for frequency measurement, meter function, speed measurement, etc.

There are also two switching outputs that can be configured together as a 2-point regulator, 3-point regulator, 2-point regulator with min/max alarm or separately for min/max alarm.

The status of the switching contacts is indicated with 2 LEDs. LED 1 displays the status of the contact of Relay 1 and LED 2 displays the status of the contact of Relay 2. (LED ON = contact is closed).

The device also has an EASYBus interface as standard equipment. The EASYbus interface has an interface converter that enables communication with a superordinate computer and makes the device a full-featured EASYBus module.

Technical data

Measurement input

Input 1	:	Frequency, speed, metering input A
Input voltage	:	0..5 V (0..28 V with pre-resistance)
Input level	:	Low < 0.5 V; High > 2.2 V
NPN	:	PullUp resistance 7 kOhm against 3.3 V
PNP	:	PullDown resistance 7 kOhm against GND
Min. pulse width	:	50 us
Input 2	:	Metering input B, gate, direction
Input voltage	:	0..5 V (0..28 V with pre-resistance)
Input level	:	Low < 0.5 V; High > 2.2 V
NPN	:	PullUp resistance 7 kOhm against 3.3 V
PNP	:	PullDown resistance 7 kOhm against GND
Min. pulse width	:	50 us
Input 3	:	Reset input
Input level	:	Low < 1 V; High > 8 V
Min. pulse width	:	50 ms

Measuring and metering ranges:

Frequency	:	0..10 kHz
Speed	:	max. 10000 rpm, activatable prescaler: 1..1000
Meter	:	-2,147,483,647.. 2,147,483,647
Display range		
Frequency / speed	:	-1999..9999, variable decimal point
Meter	:	-1999999..999999, variable decimal point
Functions		
		: Frequency measurement, Speed measurement, Incrementer, decrementer, Incrementer / decrementer with directional input, Totaliser A+B, Differential counter A-B, Phase discriminator
Outputs		: 2 potential-free relay switching outputs Relay 1: Normally open (NO) Relay 2: Normally closed (NC)
Switching functions	:	: 2-point, 3-point, 2-point with alarm, min/max alarm at 1 output, min/max alarm at 2 outputs
Switching points, switching hysteresis		: freely selectable
Display	:	: approx. 10 mm high, 6-digit red LED display
Interface	:	: serial interface, galvanically isolated, EASYBus compatible
Miscellaneous	:	: constant self-diagnosis, digital filter function, measuring range limiting
Voltage supply		: 9..28 V DC (standard)
Optional		: G24: 22-27 V DC, galvanically isolated
Current consumption		: max. 70 mA
Nominal temperature		: 25 °C
Working temperature		: -20..+50 °C
Relative humidity		: 0..80 % relative humidity (non-condensing)
Storage temperature		: -30..+70 °C
Electrical connection		: via screw/plug-in terminal Conductor cross-section of 0.14..1.5 mm ² .
Scope of delivery		: Device, operating manual

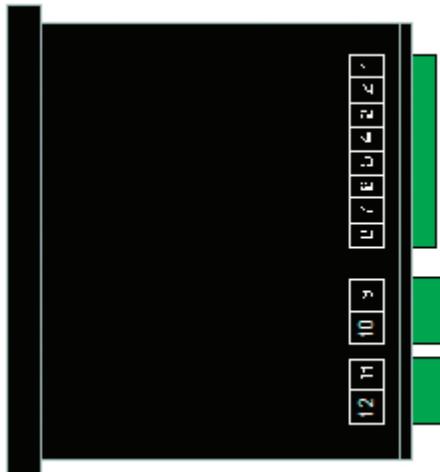
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Product information

Dimensions

Housing :
 Dimensions : 36 x 72 mm (front frame dimensions)
 Installation depth : approx. 75 mm (including screw/plug-in terminals)
 Panel fastening : with retaining clamps
 Possible panel thickness :
 Panel cutout : 32.0+0.5 x 68.5^{+0.5} mm (H x W)

Connection diagram



- 1 EASYBus interface
- 2 EASYBus interface
- 3 Reset input (meter)
- 4 Input 2 (meter)
- 5 Input 1 (frequency, speed, meter)
- 6 Input: GND
- 7 Supply voltage GND
- 8 Supply voltage +Uv
- 9 Output 2: Relay, NC
- 10 Output 2: Relay, input

Controller

11 Output 1: Relay, input

12 Output 1; relay, NO

Connection specifications

	Intermediate connection	Operating values	Limit values
Supply voltage	7 and 8	9..28 V	0..30 V
Output 1: Relay: Normally open (NO)	11 and 12		253 V AC 5A ohmic load
Output 2: Relay: Normally closed (NC)	9 and 10		253 V AC 5A ohmic load
Input 1	4 and 6	0..3.3 V	-1..10 V ≤10 mA
Input 2	5 and 6	0..3.3 V	-1..10 V ≤10 mA
Reset input	3 and 6	0..10 V	-1..20 V
EASYBus interface	1 and 2	12..36 V	-1..42 V

Ordering code

1.
GIR360 -

1. Voltage supply	
028	9-28 V DC
G24	22..27 V DC galv. isolated

Product information

Controller

Universal Displaying and Controlling Device EC9648



- On/off control mode
- Universal input for standard signals, frequency, Pt100/Pt1000 and thermocouples
- Switching outputs variably configurable

Characteristics

The EC9648 is a microprocessor-controlled displaying, monitoring and controlling device for universal use.

It has a universal input for standard signals (0..20 mA, 4..20 mA, 0.50 mV, 0.1 V, 0.2 V and 0.10 V), resistance thermometers (Pt100 and Pt1000), thermocouples (type J, K, N, S and T) and frequency (TTL and switch contact). Additionally the device provides functions like flow measurement, rotation speed measurement and counter.

The EC9648 has switching outputs which can be configured as 2-point controller, min/max alarm, 3-point controller, 2-point controller with min/max alarm, etc. The state of the switching outputs (relays) is indicated by LED "1" and "2".

The EC 9648 saves the highest and lowest measured value in the min/max value memory.

Furthermore it automatically detects impermissible operating states like display or system error and displays a corresponding error code.

Technical data

Measuring inputs

Accuracy

Standard signal	: < 0.2 % FS ±1digit (at 0..50 mV: < 0.3 % FS ±1digit)
Resistance thermometer	: < 0.3 % FS ±1digit
Thermocouple	: < 0.3 % FS ±1digit (at type S: < 0.5 % FS ±1digit)
Frequency	: < 0.1 % FS ±1digit

Measuring type	Input signal	Measuring range	Note
Voltage signal	0..10 V	0..10 V	R _i ≥ 200 kOhm
	0..2 V	0..2 V	R _i ≥ 10 kOhm
	0..1 V	0..1 V	R _i ≥ 10 kOhm
	0..50 mV	0..50 mV	R _i ≥ 10 kOhm
Current signal	4..20 mA	4..20 mA	R _i = ~125 Ohm
	0..20 mA	0..20 mA	R _i = ~125 Ohm
Resistance	Pt100	-50.0.. +200.0 °C -200.. +850 °C	3-wire connection
	Pt1000	-200.. +850 °C	2-wire connection
	NiCr-Ni type K	-70.0.. +250.0 °C -270.. +1372 °C	
Thermocouple	Pt10Rh-Pt type S	-50.. +1750 °C	
	NiCrSi-NiSi type N	-100.0.. +300.0 °C -270.. +1350 °C	
	Fe-CuNi type J	70.0.. +300.0 °C -170.. +950 °C	
Frequency, flow	Cu-CuNi type T	-70.0.. +200.0 °C -270.. +400 °C	
	TTL signal	0..10 kHz	
	switching contact NPN	0..3 kHz	internal pull-up-resistor is switched on
Rotation speed	switching contact PNP	0..1 kHz	internal pull-down-resistor is switched on
	TTL signal, switching contact NPN, PNP	0..9999 U/min	switchable predis-tributor (1..1000), pulse frequency: max. 600000 pulses/min.
	Up / down counter	0..9999 U/min	switchable predis-tributor (1..1000), pulse frequency: max. 10000 pulses/min.
	reset input		reset: R < 1 kOhm opening: R > 100 kOhm

Output functions

Description	Functions	
	Output 1	Output 2
2-point controller	2-point controller	---
3-point controller	2-point controller	2-point controller
2-point controller with min/max alarm	2-point controller	min/max alarm
min/max alarm, together	---	min/max alarm
min/max alarm, individual	max alarm	min alarm

continued on next page

Product information

Measuring rate

Standard signal	: 100 measurements / second
Temperature	: 4 measurements / second
Frequency	: 100 measurements / second

Power supply	: 230 V AC, 50 / 60 Hz
Power consumption	: approx. 5 VA
Working temperature	: -20..+50 °C

Display

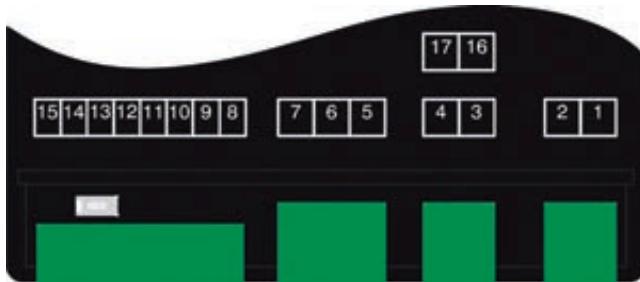
Display	: LED display
Height	: 13 mm
Display range	: -1999..+9999 digit initial, final value and decimal point freely selectable
Operation	: via 4 buttons or via interface
Interface	: EASYBus interface, electrically isolated
Transmitter supply	: 24 V DC ±5 %, 22 mA, electr. isolated at DC supply: 18 V DC
Electric connection	: via screw / clamp terminals wire cross section from 0.14..1.5 mm ²
Protection class	: front IP54, with optional sealing IP65

Dimensions

Housing

Size	: 48 x 96 mm (H x W)
Mounting depth	: approx. 115 mm (incl. screw / clamp terminals)
Panel mounting	: by fixing clamps
Panel cutout	: 43.0 x 90.5 mm [±0.5 mm] (H x W)

Connection diagram



17	output 3: analog output -
16	output 3: analog output +
15	EASYBus interface
14	EASYBus interface
13	input: 0..10 V
12	input: 0..1 V, 0..2 V, mA, frequency, Pt100, Pt1000
11	input: 0..50 mV, thermocouple, Pt100
10	input: GND, Pt100, Pt1000, thermocouple
9	transmitter supply (-)
8	transmitter supply (+)
7	output 2: relay, normally-close
6	output 2: relay, normally-open
5	output 2: relay, input
4	output 1: relay, normally-open or analog output (+)
3	output 1: relay, input or analog output (-)
2	power supply 230 V AC
1	power supply 230 V AC

Controller

Design types / options

230A	supply voltage: 230 V AC (standard)
012D	supply voltage: 12 V DC (11..14 V)
024D	supply voltage: 24 V DC (22..27 V)
024A	supply voltage: 24 V AC (±5 %)
115A	supply voltage: 115 V AC (±5 %)
R1	output 1 = potential-free relay switching output (normally-open, 5 A / 250 V AC)
H1	output 1 = control output for external semiconductor relay (15 mA / 6 V DC)
R2	output 2 = potential-free relay switching output (switch-over contact, 10 A / 250 V AC)
H2	output 2 = control output for external semiconductor relay (15 mA / 6 V DC)
R3	additional output 3 = potential-free relay switching contact (change-over, 1 A / 40 V AC or 30 V DC)
H3	additional output 3 = control output for external semi- conductor relay (5 mA / 14 V DC)
N3	additional output 3 = electrically isolated NPN switching contact (max. 1 A / 30 V DC)
AA1	output 1 = freely scalable analog output 0(4)..20 mA, no additional 3 rd output possible
AV1	output 1 = freely scalable analog output 0..10 V, no additional 3 rd output possible
AA3	output 3 = freely scalable analog output 0(4)..20 mA
AV3	output 3 = freely scalable analog output 0..10 V
NS/DIF	2-channel differential controller The EC 9648 NS/DIF ... is a displaying, monitoring and regulating device for difference measurements. The measuring inputs are designed for following standard signals: (2x) 4..20 mA, (2x) 0..20 mA or (2x) 0..10 V Please state your desired input signal at order trans- action.
SW	Set-point controller This design type uses the 0..10 V standard signal in- put as set-point input.

continued on next page

Product information

Controller

Ordering code

1. 2. 3. 4. 5.
EC9648 - - - - -

1. Supply voltage	
230A	230 V AC (standard)
012D	12 V DC
024D	24 V DC
024A	24 V AC
115A	115 V AC
2. Output 1	
R1	output 1 = relay switching output, normally-open contact (standard)
H1	output 1 = control output for semiconductor relay
AA1	output 1 = analog output 0(4)..20 mA (no 3 rd output possible)
AV1	output 1 = analog output 0..10 V (no 3 rd output possible)
3. Output 2	
R2	output 2 = relay switching output, change-over contact (standard)
H2	output 2 = control output for semiconductor relay
4. Output 3	
00	no 3 rd output (standard)
R3	output 3 = relay switching output, change-over
H3	output 3 = control output for semiconductor relay
N3	output 3 = NPN switching output
AA3	output 3 = analog output 0(4)..20 mA
AV3	output 3 = analog output 0..10 V
5. Option	
00	without option
NS/DIF	differential controller (please state meas. input)
	420
	020
	010
SW	set-point controller
IP	sealing to increase protection class to IP65

Accessories

- **EAK 36**

Unit stickers (black with white characters), 36 different units, for labeling of display devices

Product information

Temperature Controller R1140



Characteristics

- 2-point, 3-point-, 3-point-stepping- or continuous-controller
- Input for Pt100 (RTD), Thermocouple and standard signal 0/4...20 mA.
- Control method PID with auto-tuning
- 2. set value, start-up function, set value ramp
- Control output relay, electronic output 0/18V or continuous output 0/4..20 mA

Technical data

Power supply

Supply voltage : 230 V AC \pm 10 %, 24 V DC \pm 25 %
 Power consumption : < 3.5 VA
 Operating temp. : 0..50 °C
 Storage temp. : -30..70°C
 CE-conformity : EMC acc. to 2014/30/EU; EN61326-1;
 safety requirements acc. to EN61010-1

Input

RTD : Pt100, 2- or 3-wire
 -Monitoring : break of sensor/short circuit
 -Accuracy : \leq 0.2 %
 Thermocouple : L, J, K, S
 -Monitoring : break of sensor, internal cold junction,
 reverse polarity protection
 -Accuracy : \leq 0.25 %
 Current : 0/4..20 mA, burden max. 10 Ω
 -Accuracy : \leq 0.2 %

Output

Electronic : 0/18 V DC bistable, max. 10 mA
 Relay : controller <250 V AC <250 VA <3 A
 alarm <250 V AC <250 VA <3 A
 Continuous : 0/4..20 mA, burden max. 500 Ω ;
 usabale as control output or for
 retransmission of prcoess value

Display

Process value : LED 4-digit red 10 mm
 Setpoint value : LED 4-digit red 7.6 mm
 Decimal point : programmable
 Operating indication : LED yellow

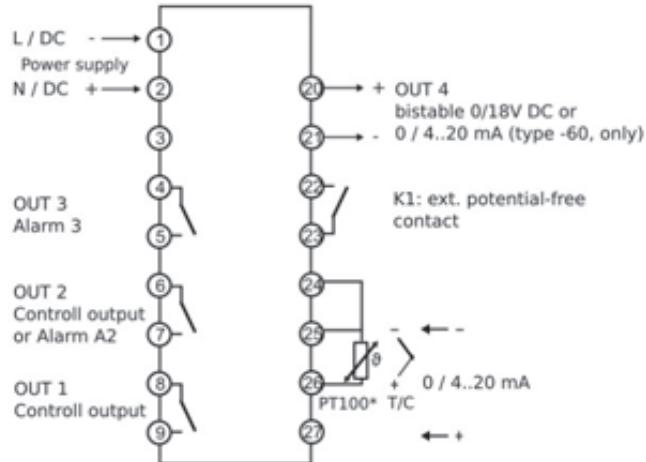
Housing

Dimesions R1140 : panel mounting DIN 48 x 96 mm,
 mounting depth 122 mm
 Panel cut-out : 45 +0.6 mm x 92+0.8 mm
 Dimesions R1180 : panel mounting DIN 96 x 48 mm,
 mounting depth 122 mm
 Panel cut-out : 92+0.8 mm x 45 +0.6 mm
 Material : Noryl; UL94V-1

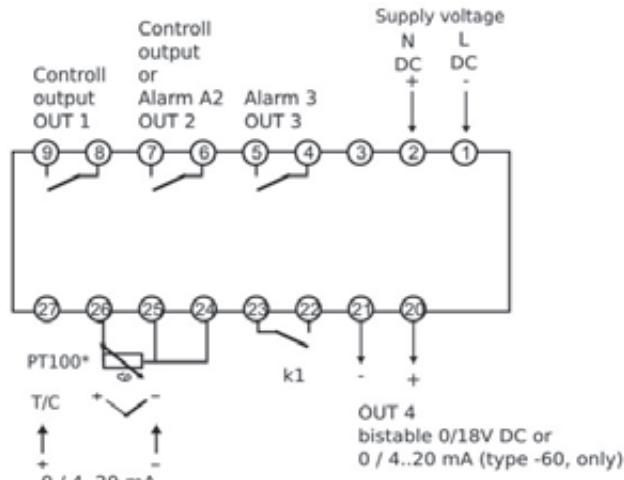
Controller

Weight : approx. 420 g
 Connection : Screw terminals. Insulation class C.
 Protection class : front IP50, terminals IP20, acc. to BGV A3

2-, 3-point and continuous-controller



Connection diagram R1140, 48 x 96 housing



Connection diagram R1180, 96 x 48 housing

Ordering code

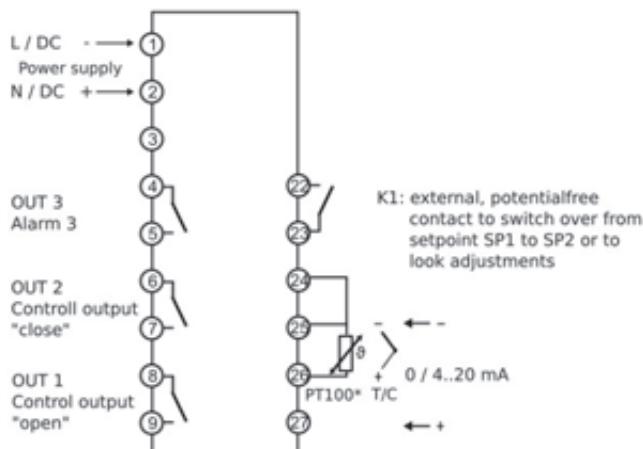
1. R 2. - 3. -00- MA1 4. -

1. Housing	
1140	48 x 96 mm
1180	96 x 48 mm
2. Output	
10	2-point-, 3-point-controller
60	2-point-, 3-point-, and continuous- controller
3. Interface	
MA1	without interface
4. Supply voltage	
1	230 V AC \pm 10 %
5	24 V DC \pm 25 %

Product information

Controller

3-point-stepping-controller



Ordering code

1. R1140 2. 14 3. -00- MA1 4.

1. Housing	1140	48 x 96 mm
2. Output	14	3-point-stepping-controller
3. Interface	MA1	With interface
4. Supply voltage	1	230 V AC ± 10 %
	5	24 V DC ± 25 %

Connection diagram R1140 3-point-stepping-controller

Product information

Temperature Controller R1300



Characteristics

- 2-point, 3-point-, 3-point-step and continuous-controller
- Input for Pt100 (RTD), Thermocouple and standard signals
- Measuring ranges programmable
- Control method PID with auto-tuning
- 2. set value, start-up function, set value ramp
- Control output relay, electronic output 0/18V or continuous output 0/4..20 mA ; 0/2..10 V, burden dependent
- RS485-interface
- Analog set value input 0/4..20 mA; 0..10 V
- Alarm output relay SPDT
- True value analog output 0/4..20 mA, 0/2..10 V, burden dependent

Technical data

Power supply

Supply voltage : 230 V AC \pm 10 %, 24 V DC \pm 20 %
Power consumption : < 4 W

Operating temp. : 0..50 °C

CE-conformity : EN50081-2, EN50082-2, EN61010

Input

RTD : Pt100, 2- or 3-wire
: sensor break/short circuit

-Accuracy : $\leq 0.2 \%$

Thermocouple : L, J, K, S
: sensor break, internal cold junction

-Accuracy : $\leq 0.25 \%$

Current : 0/4..20 mA

Voltage : 0..10 V

-Accuracy : $\leq 0.2 \%$

Output

Electronic : 0/18 V DC bistable, max. 10 mA

Relay : controller <250 V AC <250 VA <3 A
alarm <250 V AC <250 VA <3 A

Continuous : 0/4..20 mA, burden max. 500 Ω
0/2..10 V, load >1 kΩ

Display

True value : LED 4-digit, red 10 mm

Set value : LED 4-digit, red 10 mm

Decimal point : programmable

Operating indication : LED green

Case : panel mounting DIN 96x96 mm,
material Noryl; UL94V-1

Dimensions : front 96x96 mm, mounting depth 122 mm

Panel cut-out : 92 +0.5 mm x 92 +0.5 mm

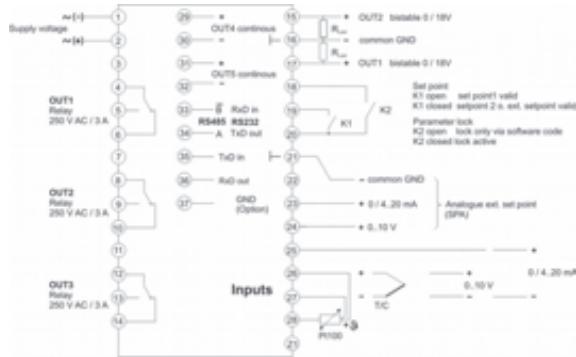
Weight : approx. 450 g

Connection : slide-in terminals,

Protection class : front IP54, terminals IP20, acc. to BGV A3

Controller

Connection diagram



Ordering code

1. 2.
R1300 - -

1. Interface

MA1	without interface
MA2	with interface RS485

2. Supply voltage

1	230 V AC \pm 10 %
5	24 V DC \pm 20 %

Output variations

OUT1	control: relay, bistable 0/18 V DC
OUT2	control/alarm: relay, bistable 0/18 V DC
OUT3	alarm relay
OUT4	continuous: set value, true value output 0/4..20 mA, 0/2..10 V*
OUT5	continuous: set value, true value output 0/4..20 mA, 0/2..10 V*

* burden dependent

Product information

Temperature Controller TTM-002, -004, -005, -009



Characteristics

- 2-, 3-point- or continuous controller
- Measuring input for Pt100, thermocouple or voltage/current
- Measuring range programmable
- Control performance PID with auto-tuning
- Process output relay, electronic output 0/12 V or continuous 4..20 mA
- Alarm output relay, alarm function programmable

Technical data

Power supply

Supply voltage	: 100..240 V AC or 24 V AC/DC
Power consumption	: < 10 VA at 240 V AC
CE-conformity	: EN 50081-2, EN 50082-2, IEC 1010-1
Certification	: UL3121-1 (UL/CUL)
Measuring input	
Pt100	: Pt100/JPt100 range -199.(.9)..500(.0) °C 2- or 3-wire connection

Thermocouple

Type J	: Fe-CuNi -200..+850/-199.9..+850.0 °C
Type K	: NiCr-Ni -200..+1372/-199.9..+990.0 °C
Type N	: NiCrSi-NiSi -200..+1300/-199.9..+990.0 °C
Type R	: PtRh-Pt87/13 0..1700°C
Type S	: PtRh-Pt90/10 0..1700°C
Type T	: Cu-CuNi -200..+400/-199.9..+390.0 °C
Type B	: Pt30Rh/Pt6Rh 0..1800 °C break of sensor, built-in cold junction

Voltage

Current	: 0/1..5 V DC -1999..+9999 Digit
Sensor correction	: 4..20 mA -1999..+9999 Digit

Sensor correction

Accuracy	: programmable
Sampling rate	: ± 0.3 % +1 digit of the measuring range

Output

Electronic	: 0/12 V DC bistable, max. 20 mA
Relay	: process output <250 V AC <250 VA <3 A alarm output <250 V AC <250 VA <2.4 A
Continuous	: 4..20 mA, burden max. 600 Ω

Display

Process value	: LED 4-digit green 7.6, 10 or 12 mm
Set value	: LED 4-digit red 5 or 8 mm
Decimal point	: programmable
Status indicator	: LED red or green

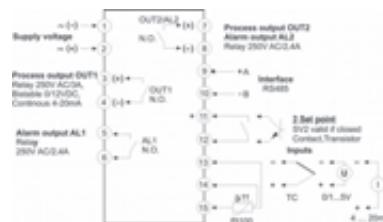
Case

Dimensions	HxDxD
TTM-002	: 48x24x97 mm DIN48x24
TTM-004	: 48x48x77 mm DIN48x48
TTM-005	: 48x96x77 mm DIN48x96
TTM-009	: 96x96x77 mm DIN96x96
Protection class	: front IP65
Terminals	: screw terminals max 2.5 mm²

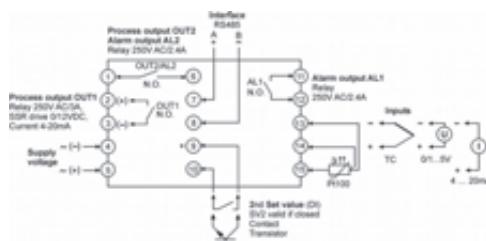
Controller

Connection diagram

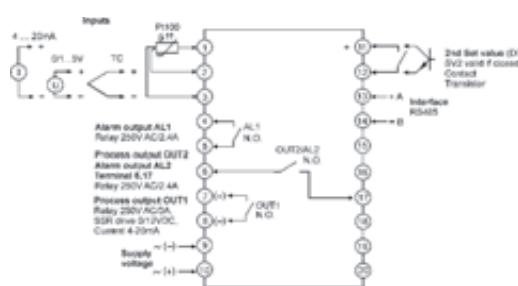
TTM-002



TTM-004



TTM-005/009



Ordering code

1. 2. 3. 4. 5. 6.

TTM - - - - - -

1. Model

002	DIN 48x24
004	DIN 48x48
005	DIN 48x96
009	DIN 96x96

2. Input

0	thermocouple; Pt100, JPt100
2	current, voltage

3. Process output OUT1

R	relay SPST
P	electronic bistable 0/12 V DC for SSR relay
I	continuous, current 4..20 mA

4. Options

AB	AL1 relay SPST (standard) OUT2 / AL2 relay SPST (3-point-controller)
----	---

5. Interface

0	without interface
ME	serial interface RS485, 2. set value SV2

6. Supply voltage

0	100..240 V AC
5	24 V AC/DC

Product information

Plug-In Controller / Display GRA ... VO



- Self-supplying plug-in display / controller
- Extreme fast controlling and monitoring
- Programmable switching outputs

Characteristic

The GRA 0420 VO and GRA 010 VO are microprocessor-controlled displaying, monitoring and controlling devices for universal use.

The devices have an input for standard signal 4..20 mA (GRA 0420 VO) or 0..10 V (GRA 010 VO). The connection is done by simply plug-in a special plug design for elbow-type plug according to EN 175301-803/A to a transmitter.

They provide a switching output (NPN output) that can be configured as 2-point controller or min/max alarm. The output state is indicated by an additional LED below the left side of the 7-segment display.

The GRA ... identifies impermissible operating states like display or system errors and displays a corresponding error code.

Technical data

Measuring inputs

	GRA 0420 VO	GRA 010 VO
Input signal	4..20 mA (2-wire)	0..10 V (3-wire)
Voltage load	< 5.5 V	---
Input resistance	---	30 Ohm
Power supply	self-supplying	12..28 V / < 10 mA

Switching outputs

	GRA 0420 VO	GRA 010 VO
Switching outputs	1x electrically isolated open-collector switching output test voltage: 50V	1x open-collector switching output, “supply +” switching

Controller

Display

Display : red LED display
Height : 7 mm
Display range : -1999..+9999 digit
initial / final value and decimal point freely adjustable

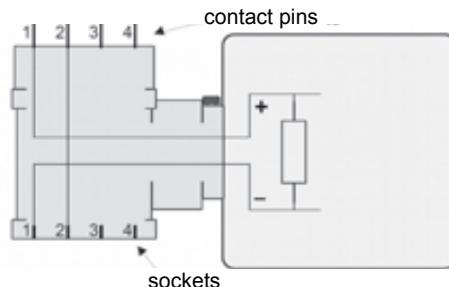
Accuracy

: < 0.2 % FS ±1digit
Measuring rate : 50 measurements / second
Operation : via 3 buttons
Working temperature : -25..+50 °C
Electric connection : special plug design for elbow-type plug (EN 175301-803/A) for easy plug-in
Protection class : front IP65

Dimensions

Housing : ABS; front screen: polycarbonate; membrane keypad
Size : 48.5 x 48.5 x 35.5 mm (L x W x D)
without elbow-type plug
50.5 x 90 x 39.5 mm (L x W x D)
with elbow-type plug

Connection diagram



GRA 0420 VO

Contact pin 2 is directly connected to the socket. The GRA 0420 VO is between contact pin 1 (+) and socket 1 (-). Contact pins 3 and 4 are used for the switching output.

GRA 010 VO

Contact pins 1, 3 and 4 are directly connected to the corresponding sockets. The GRA 010 VO is connected to contact 1 (signal +), contact 3 (supply +) and contact 4 (GND / signal -). The contact pin 2 is used for the switching output (“supply +”-switching).

Design types

GRA 0420 VO	Self-supplying plug-in controller / display special adapter design for elbow-type plug (EN 175301-803/A) for easy plug-in, output: 4..20 mA, with 1 electrically isolated switching output
GRA 010 VO	Plug-in controller / display special adapter design for elbow-type plug (EN 175301-803/A) for easy plug-in, output: 0..10 V, with 1 “+Ub”-switching output

continued on next page

Product information

Controller

GRA 0420 WK	Controller / display with cable connection approx. 2m long connection cable with loose ends for connecting to any standard signal source and for switching output; housing with mounting holes, can be directly mounted to any surface; output 4..20 mA; with 1 electrically isolated switching output	
GRA 010 WK	Controller / display with cable connection approx. 2m long connection cable with loose ends for connecting to any standard signal source and for switching output; housing with mounting holes, can be directly mounted to any surface; output: 0..10 V; with 1 "+Ub"-switching output	

Options

S2	2 electrically isolated switching outputs, outputs with increased switching power, connection via separate M8 socket
OT	Cover without buttons e.g. if the adjustment of the device should not be directly accessible for the user

Ordering code

1. 2. 3.
GRA - -

1. Input signal type	
0420	4..20 mA (standard)
010	0..10 V
2. Connection type	
VO	elbow-type plug (standard)
WK	cable connection
3. Option (combination of multiple options upon request)	
00	without option
S2	2 electrically isolated switching outputs
OT	cover without buttons

Product information

Set Point Adjuster SG4824



- Output 0/4..20 mA, 0/2..10 V DC internal selectable set point adjustable via front side poti
- Display 3-digit, 7,6 mm red or green
- Supply voltage 24V DC (10.8..30 V), isolated

Characteristics

SG4824 is a set point adjuster for monitoring and control applications in process technology and automation. The small case is suitable for installation in control units and panel boards. The universal conception of the multipurpose output allows simulation and digital indication of any physical dimensions, which are stated as a signal of 0..20 mA, 4..20 mA, 0..10 V or 2..10 V DC. The corresponding display can be adjusted in the range from -99..+999 digit.

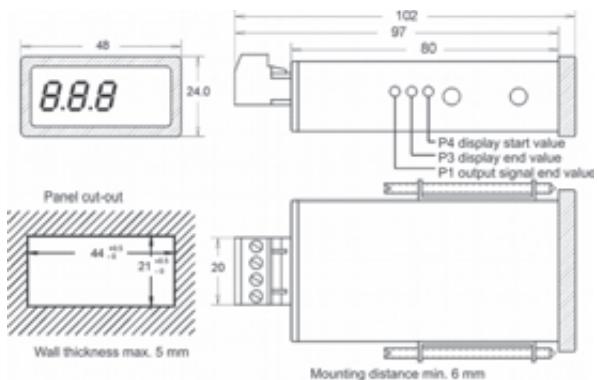
Technical data

Power supply

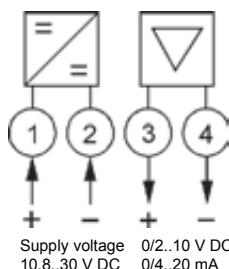
Supply voltage	: 10.8..30 V DC
Power consumption	: < 2 VA
Operating temperature	: -10..+50 °C
CE-conformity	: EN 55022, IEC 61000-4-2/4/11
Output	
Voltage	: 0/2..10 V burden ≥ 2 kΩ (I ≤ 5 mA)
Current	: 0/4..20 mA burden ≤ 500 Ω (U ≤ 10 V)
Accuracy	: < 0.2 % ± 1 digit
Display	: LED red or green 7.6 mm
Indicating range	: -99..+999 Digit
Conversion rate	: 4/s
Decimal point	: switch selectable
Overflow indication	: “---” for negative overflow “E E E” for positive overflow
Case	: slide-in case acc. to DIN 43700 material Noryl GFN 2 SE 1
Weight	: approx. 100 g
Electrical connection	: plug-in screw terminals, max. 1.5 mm²
Protection class	: front IP50 adjustment screw type, terminals IP54 adjustment knob type, IP20 acc. to BGV A3

Controller

Dimensions



Connection diagram



Ordering code

SG4824 - - - -

1. Display	
1	3-digit LED red 7.6 mm
2	3-digit LED green 7.6 mm
2. Model	
1	standard device
2	custom device (on request)
3. Set point controlling	
1	screw driver
2	rotary knob
4. Unit (appears on the face plate)	

Product information

Set Point Adjuster SG9648



- Output 0/4..20 mA, 0/2..10 V DC
- Set point adjustment with front buttons or external signals
- Indicating range and decimal point programmable
- Set point output isolated

Characteristics

The Set point adjuster SG9648 has been designed for generating adjustable set point value signals 0/4..20mA and 0/2..10V DC. Any display value can be assigned to the respective output signal. The operator can work with real values. The adjustment speed is programmable.

Technical data

Power supply

Supply voltage : 230 V AC $\pm 10\%$; 115 V AC $\pm 10\%$;
24 V AC $\pm 10\%$ or 24 V DC $\pm 15\%$

Power consumption : 5 VA

Operating

temperature : -20..+55 °C

CE-conformity : EN 55022, EN 60555,
IEC 61000-4-3/4/5/11/13

Input

Control : 0/24 V DC Ri 6.3 kΩ < 4 V low,
>8.5 V high, hysteresis >2.5 V,
max. 35 VDC

Transmitter supply : 24 V DC (ppn), Ri approx. 150 Ω,
max. 50 mA

Display : LED red, 14.2 mm

Indicating range : $\pm 9999(0)$ Digit

Additional display : LED 2-digit red, 7 mm
(Parameter - and status indicator)

Output

Relay SPDT : < 250 V AC < 250 VA < 2 A,
< 300 V DC < 50 W < 2 A

Transistor : max. 35V AC/DC, max. 100mA,
short-circuit-proof

Analog output : 0/4..20 mA burden $\leq 500 \Omega$; 0/2..10 V
burden $> 500 \Omega$, isolated
output changes burden dependent

- Accuracy : 0.1 %; TK 0.01 %/K

Case : panel case DIN 96x48 mm,
material PA6-GF; UL94V-0

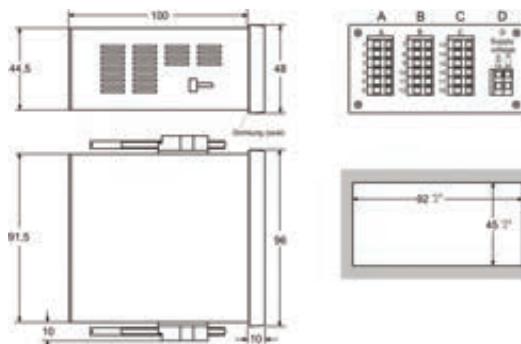
Dimensions : front 96x48 mm, mounting depth 100 mm,
Weight : max. 390 g

Electrical connection: clamp terminals, 0.08..1.5 mm²
AWG28..AWG14

Protection class : front IP65, terminals IP20, acc. to BGV A3

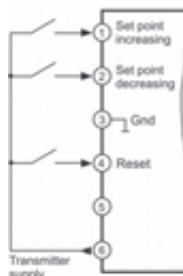
Controller

Dimensions

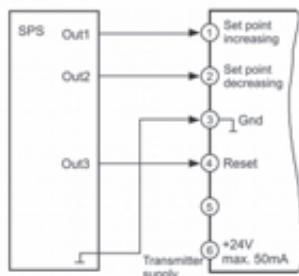


Connection diagram

Actuation via
voltage free contacts



Actuation via ext. logic signals
(e.g. PLC-outputs)



Ordering code

SG9648 - - - - - - -

1. Terminal strip A

0	not installed, set point adjustment via front buttons, adjustment speed dynamically, (Power-on)-reset to the last stored value or programmed reset value
1	as 0, but additional 2 control inputs for ext. ad- justment, ext. reset to a programmed reset value adjustment speed dynamically

2. Terminal strip B

00	not installed
2R	2 relay outputs
2T	2 transistor outputs

3. Terminal strip C (standard)

AO	analog output 0/4..20 mA, 0/2..10 V
----	-------------------------------------

4. Terminal strip D supply voltage

0	230 V AC	$\pm 10\% 50-60Hz$
1	115 V AC	$\pm 10\% 50-60Hz$
4	24 V AC	$\pm 10\% 50-60Hz$
5	24 V DC	$\pm 15\%$

5. Options

00	without option
----	----------------

6. Unit appears on the front panel

7. Additional text above the display (3x90 mm HxW)

Product information

Set Point Adjuster SG1010



- Output 0/4..20 mA, 0/2..10 V DC
- Set point adjustment with front buttons or external signals
- Indicating range and decimal point programmable
- Set point output isolated

Characteristics

The Set point adjuster SG1010 has been designed for generating adjustable set point value signals 0/4..20mA and 0/2..10V DC. Any display value can be assigned to the respective output signal. The operator can work with real values. The adjustment speed is programmable.

Technical data

Power supply

Supply voltage : 230 V AC $\pm 10\%$; 115 V AC $\pm 10\%$;
24 V AC $\pm 10\%$ or 24 V DC $\pm 15\%$

Power consumption : 5 VA

Operating temperature : -20..+55 °C

CE-conformity : EN 55022, EN 60555,
IEC 61000-4-3/4/5/11/13

Input

Control : 0/24 V DC Ri 6.3 kΩ < 4 V low,
> 8.5 V high, hysteresis >2.5 V,
max. 35 VDC

Transmitter supply : 24 V DC (pnp), Ri approx. 150 Ω,
max. 50 mA

Display

Indicating range : ±9999(0) Digit with leading zero suppression
Additional display : LED 2 digit red, 7 mm
(Parameter - and status indicator)

Output

Relay SPDT : < 250 V AC < 250 VA < 2 A,
< 300 V DC < 50 W < 2 A

Analog output : 0/4..20 mA burden $\leq 500 \Omega$; 0/2..10 V
burden $> 500 \Omega$, **not** isolated
output changes burden dependent

- Accuracy : 0.1 %; TK 0.01 %/K

Field case : material PA6-GF 15/15

Dimensions : 100x100x60 mm

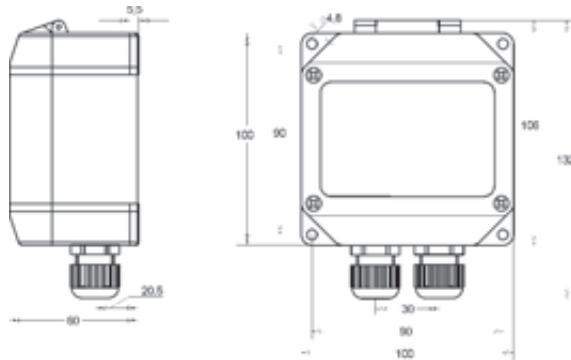
Weight : max. 350 g

Electrical connection: clamp terminals, 2.5 mm² single wire,
1.5 mm² flexi wire, AWG14

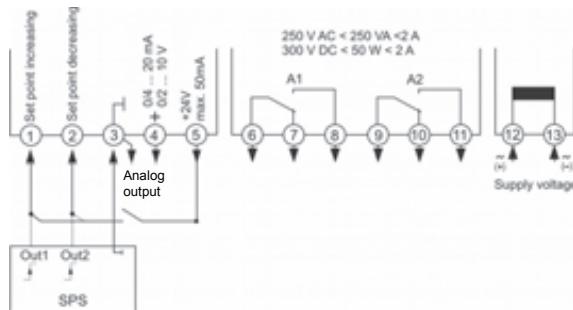
Protection class : IP65, terminals IP20, BGV A3

Controller

Dimensions



Connection diagram



Ordering code

SG1010 - - - - - -

1. Set point adjustment

0	Set point adjustment via front buttons, adjustment speed dynamically
1	as 0, but additional control inputs, adjustment speed dynamically or linear programmable

2. Alarm output

00	not installed
2R	2 relay outputs

3. Analog output (standard)

AO	analog output 0/4..20 mA, 0/2..10 V
----	-------------------------------------

4. Supply voltage

0	230 V AC	±10 % 50-60Hz
1	115 V AC	±10 % 50-60Hz
4	24 V AC	±10 % 50-60Hz
5	24 V DC	±15 %

5. Options

00	without option
09	1xM20x1.5 multi (2xØ6 mm), 1xM20x1.5

6. Unit appears on the lid

7. Additional text above the display (3x70mm HxW)

E Industrial electronics

E2

Transmitters / Signal conditioning

Page

- Rail systems 98

Transmitter / Signal Conditioning



PROFIBUS

Characteristics

System Direct connection of sensors
Converting of Industry Standard Signals

Measuring input

- Voltage
- Current
- Power
- Frequency
- Resistance

Applications

- Industry Instrumentation
- Process Instrumentation
- Mechanical Engineering and Construction
- -Applications
- Interface Profibus DP

Product information

Function

According to the basic standard DIN 1319 a measuring transducer is measuring equipment which transforms an input value corresponding to a fixed relation in an output value. This output value which is given in the form of industrial standard signals, can be further processed in the standard way by display devices or programmable logic controllers (PLC).

Transmitters / Signal conditioning

Advantages

- Direct connection of sensors
- Galvanic separation of the input signal to the output
- No ground loops
- Signal adaptation to downstream devices
- Compact construction design
- DIN rail mounting TS35 acc. to DIN EN 60715
- Field case

General

Measuring inputs

- 0/4..20 mA
- 0/2..10 V DC
- Voltage AC/DC
- Current AC/DC
- Resistance / Potentiometer

Outputs

- Analogue output active 0/4..20 mA
- Analogue output active 0/2..10 V DC
- Impulse output 0/18 V DC
- Relay output SPDT
- Transistor output PNP

Measuring mode – Connection types

- 2-wire
- 3-wire
- Plug-in terminals
- Screw terminals

Specials

- Without supply
- Field bus Profibus DP
- Custom devices on request
- Integrated display
- Device for rail vehicles (FT500)

Device Overview

Measuring input					Standard Signal 0/4..20mA; 0/2..10 V	Temperature	DMS	Resistance	Profibus-PAn	Page
Device	Voltage	Current	Power	Frequency						
CT500P		•								101
CT500		•								102
CVT500	•	•								103
VT500	•									104
WM500			•							105
MU125						•				107
MU500L						•				109
MU500						•				110
MU500-Ex						•				111
TC500						•				112
AF500					•					113
FT500*				•						114
RT500								•		115
DMS50							•		•	116
DMS50Ex							•		•	118
UT125					•	•		•		120
PMT50-1					•				•	122
PMT50Ex-1					•				•	124
PMT50-2/-3					•			•	•	126
PMT50Ex-2/-3					•			•	•	128

* Available for rail vehicles.

Mistakes reserved, technical specifications subject to change without notice.

Product information

AC Current Transmitter CT500P



- 1- and 2-channel device
- Measuring ranges 0..1 A / 0..5 A AC
- Arithmetic average value measurement RMS calibrated
- Frequency range 45..400 Hz
- Loop voltage 14..30 V DC

Characteristics

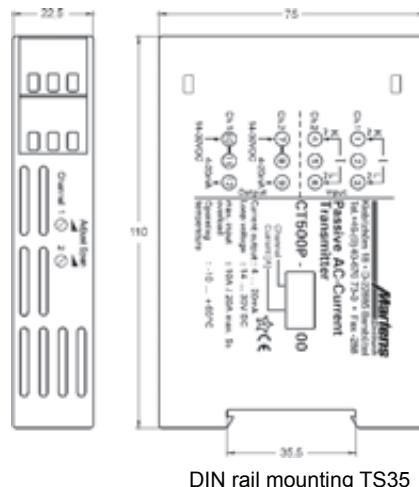
The transmitter converts AC current from 0..1 A or 0..5 A to the proportional standard signal 4..20 mA.
The CT500P operates like an 2-wire transmitter, which is supplied from the measuring device (e.g. SPS input circuit board).

Technical data

Power supply	
Loop voltage	: 14..30 V DC
Operating temperature	: -10..+60 °C
CE-conformity	: EN55022, EN60555, IEC61000-4-4/5
Input	: 1- or 2-channels
Current	: 0..1 A or 0..5 A AC, overload max. 10 A
R _i	: < 20 mΩ
Frequency	: 45..400 Hz fundamental wave, 16 ^{2/3} Hz on request
End value	: adjustable ± 5 %
Output	: 4..20 mA, burden R _{max.} = (U _B - 14 V) ÷ 20 mA
Current	: 4..20 mA
Rise time (T ₉₀)	: ≤ 1 s
Accuracy	: ≤ 0.2 %
Case	: Polycarbonate, UL94V-0
	TS 35 acc. to DIN EN 60715:2001-09
Weight	: approx. 200 g
Connection	: screw terminals, max. 2.5 mm ²
Protection class	: case IP30, terminals IP20 acc. to BGV A3

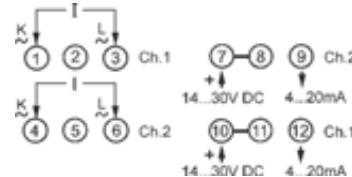
Transmitters / Signal conditioning

Dimensions



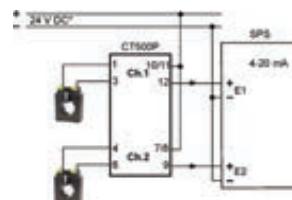
DIN rail mounting TS35

Connection diagrams

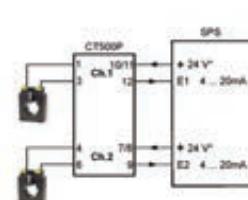


Circuit examples

passive PLC-input



active PLC-input



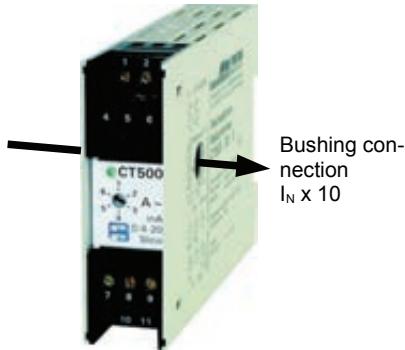
Ordering code

1. - 2. - 3.
CT500P - - -

1. Number of channels	
1	
2	
2. Input direct connection / via transformer	
1	1 A
5	5 A
3. Options	
00	without option
Accessories	
KA-500	terminal cover for measuring voltages > 400V AC

Product information

AC Current Transmitter CT500



- 12 measuring ranges selectable 0..6 A / 0..60 A AC
- Average function selectable
- Frequency range 40..2000 Hz

Characteristics

AC current transmitter CT500 converts true r.m.s. current measuring values of all types of waveform into industry standard signals for process control systems.

For example, the load current of an frequency converter can be detected and converted.

Technical data

Power supply

Supply voltage : 85..265 V AC or 10..30 V AC/DC

Frequency : 40..400 Hz

Power consumption: < 3 VA

Operating temperature : -10..+60 °C

CE-conformity : EN 55022, EN 60555,
IEC 61000-4-3/4/5/11/13

Input

Current

Terminals : 0..1 / 2 / 3 / 4 / 5 / 6 AAC, over load max. 9 A

Bushing connection: 0..10 / 20 / 30 / 40 / 50 / 60 A,
over load max. 90 A,
cable diameter max. 8 mm

R_i : < 20 mΩ

Frequency : 40..2000 Hz fundamental wave,
162/3 Hz on request

Start value : adjustable ± 5 %

End value : adjustable ± 35 %

Output

Current : 0/4..20 mA, selectable, burden ≤ 1 kΩ

Voltage : 0/2..10 V DC, selectable,
load max. 15 mA, short circuit proof
(parallel with the voltage output max. 5 mA)

Rise time (T₉₀) : ≤ 150 ms

Accuracy : ≤ 0.5 %; single adjustment ≤ 0.2 %

Case : Polycarbonate, UL94V-0
TS 35 acc. to DIN EN 60715:2001-09

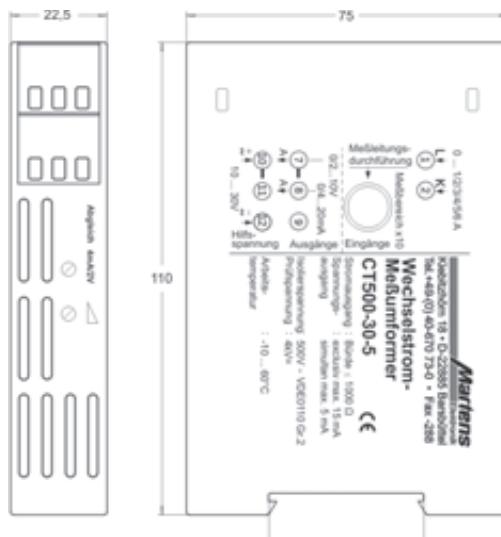
Weight : approx. 200 g

Connection : terminals, max. 2.5 mm²

Protection class : case IP30,
terminals IP20, acc. to BGV A3

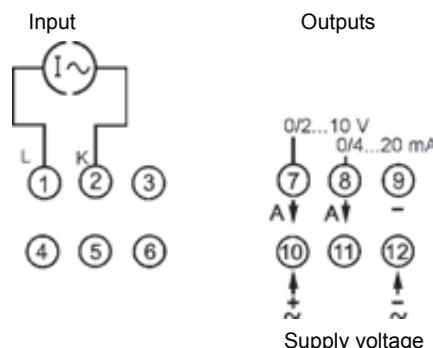
Transmitters / Signal conditioning

Dimensions



DIN rail mounting TS35

Connection diagrams



Ordering code

1. - 2.
CT500 - -

1. Measuring ranges	
30	0..1 / 2 / 3 / 4 / 5 / 6 and 0..10 / 20 / 30 / 40 / 50 / 60 AAC
	custom range on request
2. Supply voltage	
0	85..265 V AC
5	10..30 V DC
Accessories	
KA-VT	terminal cover for measuring voltages >400 V AC

Product information

Current and Voltage Transmitter CVT500



- Measuring input for DC- and sinusoidal AC-signals
- Arithmetic average value measurement RMS calibrated
- Frequency range 40..200 Hz

Characteristics

Transmitter CVT 500 convert current or voltage signals to proportional industry standard signal 0/4..20 mA, 0/2..10 V DC. Direct measurement of currents up to 5 A and voltages up to 400 V are possible.

Technical data

Power supply

Supply voltage : 230 V AC $\pm 10\%$ or 24 V DC $\pm 15\%$

Frequency AC : 47..63 Hz

Power consumption: < 3 VA

Operating temperature

: -10..+50 °C

CE-conformity : EN 55022, EN 60555, IEC 61000-4-3/4/5/11/13

Inputs

Accuracy : $\leq 0.5\% (\leq 0.2\% \text{ single adjustment})$

Frequency : 40..200 Hz (other ranges on request)

Standard measuring ranges

Current : 0..0.1 A and 0..0.5 A sinusoidal or DC

R_i : 20 mΩ (5 A-input) or 100 mΩ (1 A-input)

Overload : 2-times, 4-times max. 5 s

Voltage : 0..0.125 V and 0..0.250 V AC or DC

R_i : 600 kΩ (125 V-) or 1,2 MΩ (250 V-input)

Overload : max. 500 V AC/DC

Custom measuring ranges

Voltage : end value in range 0.1..400 V AC/DC

R_i : 4.8 kΩ/V

Overload : 5-times U_N, max. 500 V AC/DC

Current : end value in range 0.001..5 A AC/DC

R_i : 100 mΩ ÷ (custom range [A])

Overload : 2-times, 4-times max. 5 s

End value : adjustable $\pm 5\%$

Output

Output changing

Voltage/current : link between terminal 8 and 9

Current output : 0/4..20 mA selectable, burden $\leq 500\Omega$

Rise time (T₉₀) : < 650 ms

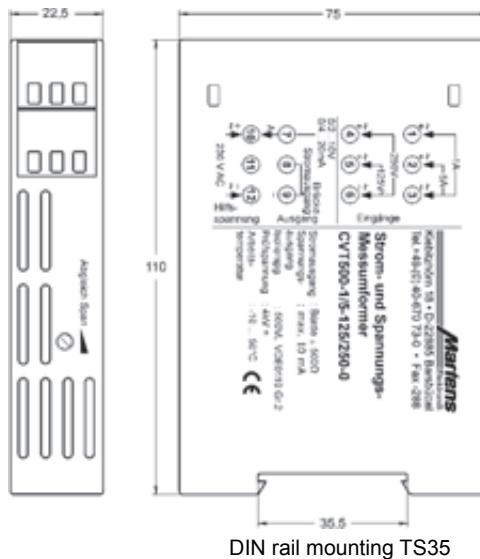
Burden error : < 0.1 % (R_L = <200 Ω), < 0.2 % (R_L = <500 Ω)

Voltage : 0/2..10 V selectable, load max. 10 mA

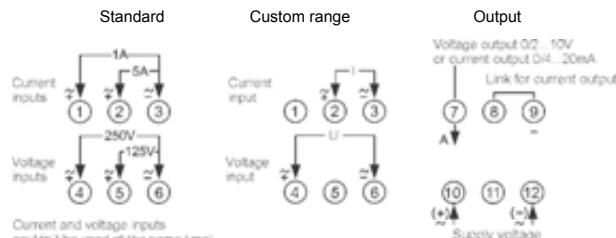
Transmitters / Signal conditioning

Case	: Polycarbonate, UL94V-0
Weight	: approx. 200 g
Connection	: screw terminals, max. 2.5 mm ²
Protection class	: case IP30, terminals IP20 acc. to BGV A3

Dimensions



Connection diagram



Ordering code

CVT500 - - -

1. Current ranges	
0	not installed (custom measuring range voltage)
1 / 5	standard device 0..1 A and 0..0.5 A AC / DC
2. Voltage ranges	
0	not installed (custom measuring range current)
125 / 250	standard device 0..125 V and 0..250 V AC/DC
3. Supply voltage	
0	230 V AC $\pm 10\%$
5	24 V DC $\pm 15\%$

Product information

AC Voltage Transmitter VT500



- 6 measuring ranges selectable 0..600 V AC
- Average function selectable
- Frequency range 40..2000 Hz

Characteristics

Voltage transmitter VT500 converts true r.m.s. voltage measuring values of all types of waveforms into industry standard signals for process control systems. For example, the load voltage of an frequency converter can be detected and converted.

Technical data

Power supply

Supply voltage : 85..265 V AC or 10..30 V AC/DC

Frequency : 40..400 Hz

Power consumption : <3 VA

Operating temperature

: -10..+60 °C

CE-conformity : EN 55022, EN 60555,
IEC 61000-4-3/4/5/11/13

Input

Voltage AC : 0..100 / 200 / 300 / 400 / 500 / 600 V AC,
overload max. 1200 V max. 5 s

R_i : 720 kΩ

Frequency : 40..2000 Hz fundamental wave,
162/3 Hz on request

Start value : adjustable ± 5 %

End value : adjustable ± 35 %

Output

Current : 0/4..20 mA, selectable, burden ≤ 1 kΩ

Voltage : 0/2..10 V DC, selectable,
load max. 15 mA, short-circuit-proof
(parallel with the voltage output max. 5 mA)

Rise time (T₉₀) : ≤ 150 ms

Accuracy : ≤ 0.5 %; single adjustment ≤ 0.2 %

Case : Polycarbonate, UL94V-0
TS 35 acc. to DIN EN 60715:2001-09

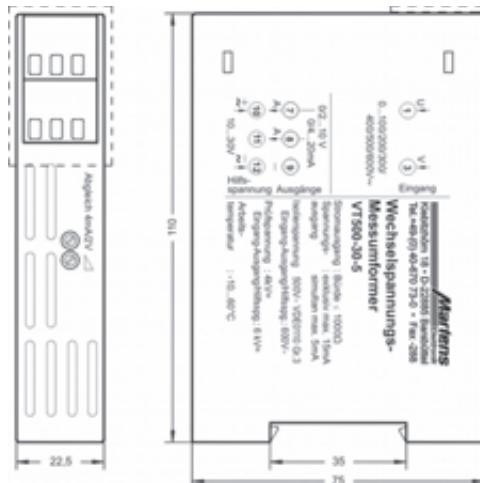
Weight : approx. 200 g

Connection : screw terminals, max. 2.5 mm²

Protection class : case IP30,
terminals IP20 acc. to BGV A3

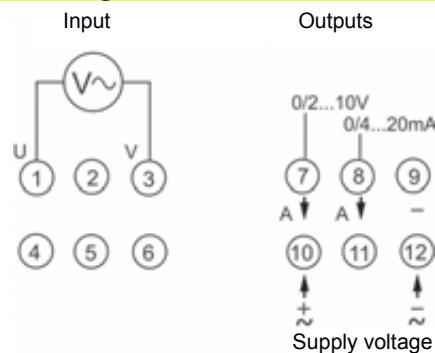
Transmitters / Signal conditioning

Dimensions



DIN rail mounting TS35

Connection diagram



Ordering code

1. VT500 - -
2.

1. Measuring ranges	
30	0..100 / 200 / 300 / 400 / 500 / 600 V AC
custom range on request	

2. Supply voltage

0	85..265 V AC
5	10..30 V DC

Accessories

KA-VT	terminal cover for measuring voltages > 400 V AC
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Product information

Active Power Transmitter WM500



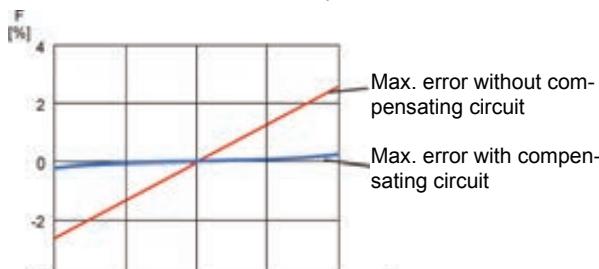
- For 1- and 3-phase power systems with symmetric load
- Current measuring range 1 A or 5 A
- Power-factor ($\cos \varphi$) selectable 0.72 or 1
- Frequency range 45..400 Hz

Characteristics

Active-power transmitter WM500 converts active-power of symmetric 1-3 phase power supply systems into proportional industry standard signals. Devices without compensating circuits can be used to measure active-power of phase-angle controlled equipments or electric motor drives controlled by frequency inverters. Devices with integrated compensating circuits (only for sinusoidal voltage) compensate errors which depends on different deviation from line voltages to nominal voltages. Both types work with any curve shape variations of the measuring current.

Error compensation

The results of the error compensation



Deviation from line voltage to nominal voltage

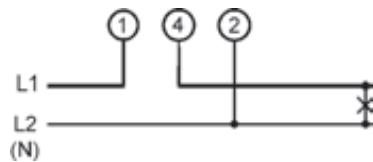
In practice an additional error up to 3 % can occur when 3-phase line voltages are not symmetrical. The WM500 with built-in compensating circuit* eliminates this error nearly completely.

*Note: The device with compensating circuit must be connected to the measuring voltage at any time of operation!

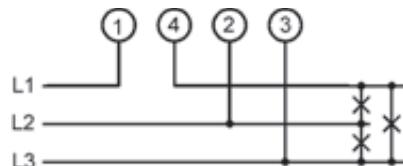
Transmitters / Signal conditioning

Connection diagrams

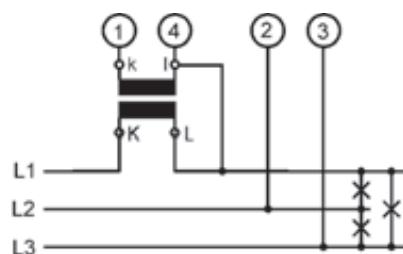
Direct access 1-phase



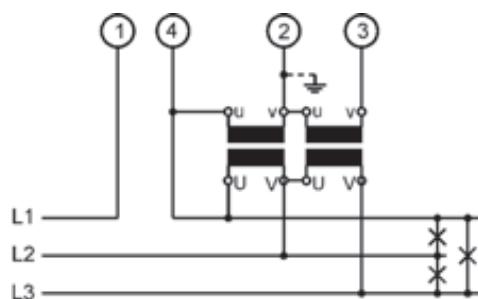
Direct access 3-phase



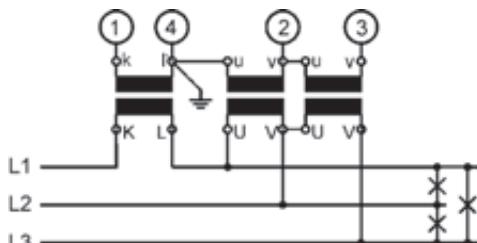
Current transformer connection



Voltage transformer connection



Current and voltage transformer connection



Product information

Technical data

Power supply

Supply voltage : 230 V AC $\pm 10\%$ or 24 V DC $\pm 15\%$
 Frequency : 47..63 Hz
 Power consumption: < 3 VA
 Operating temperature : -10..+50 °C
 CE-conformity : EN 55022, EN 60555, IEC 61000-4-4/5

Inputs

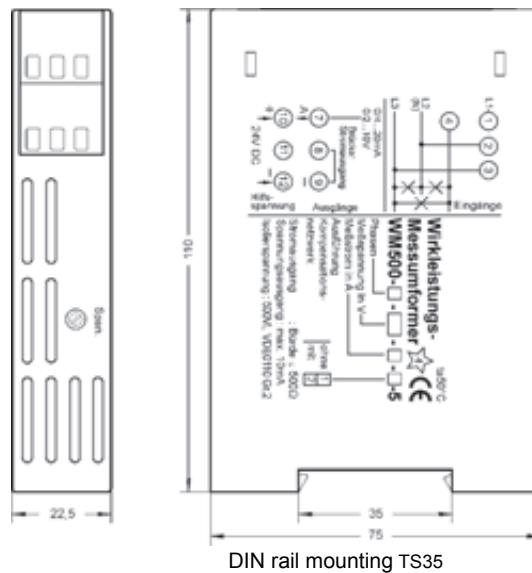
Current : 0..1 A: $R_i = 82 \text{ m}\Omega$,
 over load 2-times, 4-times for max. 5 s
 0..5 A: $R_i = 10 \text{ m}\Omega$,
 over load 2-times, 4-times for max. 5 s,
 Frequency range : 45..400 Hz, Crest-factor: 3
 Curve shape : insignificant
 Voltage : 0..440 V, $R_i = 3.4 \text{ k}\Omega/\text{V}$, over load max. 700 V
 Frequency range : 45..400 Hz
 Curve shape : insignificant, without compensating circuit
 Curve shape : sinusoidal, with compensating circuit
 End value : adjustable -30..5 %

Outputs

Programmable output
 Voltage → current : link between terminal 8 and 9
 Current : 0/4..20 mA selectable, burden $\leq 500 \Omega$
 Burden error : < 0.1 % ($R_L = 0 \dots 200 \Omega$),
 < 0.2 % ($R_L = 0 \dots 500 \Omega$)
 Voltage : 0/2 ..10 V selectable, load max. 10 mA
 Adjustment : $P = U \times I \times \sqrt{3} \times \cos\phi = 20 \text{ mA} (10 \text{ V})^*$
 * $\cos\phi=1$
 Accuracy : < 0.2 %
 Rise time (T_{90}) : < 500 ms
 Case : Polycarbonate, UL94V-0
 TS 35 acc. to DIN EN 60715:2001-09
 Weight : approx. 200 g
 Connection : screw terminals, max. 2.5 mm²
 Protection class : case IP30,
 terminals IP20 acc. to BGV A3

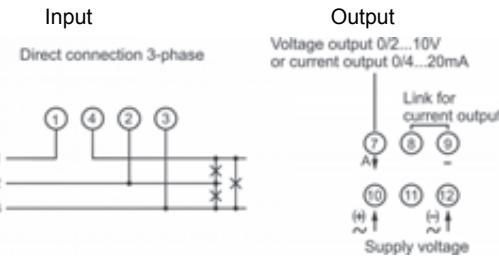
Transmitters / Signal conditioning

Dimensions



DIN rail mounting TS35

Connection diagram



Ordering code

WM500 - - - - -

1. Power supply system	
1	1-phase
3	3-phase
2. Measuring voltage	
100	100 V AC
110	110 V AC
230	230 V AC
400	400 V AC
440	440 V AC
3. Measuring current	
1	1 AAC
5	5 AAC
4. Model	
1	without compensating circuit
2	with compensating circuit
5. Supply voltage	
0	230 V AC $\pm 10\%$
5	24 V DC $\pm 15\%$

Note!

Please quote the active-power measurement range and transformation ratio of the current transformer.

Temperature Measuring Transducer MU125



- Universal input for Pt100, Pt1000, thermocouple, NTC and resistance measurement value
- Configuration via front DIP switches
- Analog actual value output 4 .. 20mA
- Zero point and limit value can be adjusted via trim potentiometers on the front
- With Pt100 and Pt1000 sensors, monitoring of sensor break and short-circuit
- Wide-range mains adapter or 24 V DC
- Optional supply via carrier rail bus
- Removable coded screw terminals or optional push-in terminals
- Housing width 12.5 mm
- Carrier rail mounting TS35 EN60715

Characteristics

Devices of the MU125 series convert a temperature measurement value or resistance measurement value from various sensors to a current signal of 4..20mA.

The universal configurability of the measuring inputs reduces the stock requirement for various applications.

The housing width of only 12.5 mm enables space-saving installation in the switch cabinet.

Measurement inputs

Switchable via DIP switch:

	Measuring range	Basic precision	Temperature deviation *)
Pt100	-50.. 50°C	0.4%	0.01%/K
	0.. 50°C	0.6%	0.02%/K
	0..100°C	0.4%	0.02%/K
	0..150°C	0.4%	0.01%/K
	0..200°C	0.3%	0.01%/K
	0..250°C	0.3%	0.01%/K
	0..300°C	0.2%	0.005%/K
	0..500°C	0.2%	0.005%/K
Pt1000	-50.. 50°C	0.4%	0.01%/K
	-30.. 70°C	0.4%	0.01%/K
	-20.. 40°C	0.4%	0.01%/K
	0.. 50°C	0.6%	0.02%/K
	0..100°C	0.4%	0.02%/K
	0..150°C	0.4%	0.01%/K
	0..200°C	0.3%	0.01%/K
	0..250°C	0.3%	0.005%/K
FeCuNi	0..250°C	1.0%	0.04%/K
	0..500°C	0.5%	0.03%/K
NiCrNi	-50..250°C	0.7%	0.05%/K
	0..500°C	0.5%	0.04%/K
	0..750°C	0.4%	0.03%/K
	0..1000°C	0.3%	0.02%/K
	0..1250°C	0.3%	0.02%/K
PtRhPt	0..1500°C	1.0%	0.04%/K
NTC $R_{25}=10\text{k}\Omega$ $B_{25/85}=3977\text{K}$	0..100°C	1.0%	0.01%/K
	0..200°C	1.5%	0.01%/K
NTC $R_{25}=10\text{k}\Omega$ $B_{25/85}=3977\text{K}$	-20.. 50°C	1.5%	0.01%/K
	0.. 100°C	1.0%	0.01%/K
Resistance $R_{25}=2\text{k}\Omega$ $B_{25/85}=3528\text{K}$	0.. 2kΩ	0.3%	0.005%/K
	0.. 5kΩ	0.5%	0.01%/K
	0..10kΩ	0.3%	0.005%/K

*) Measurement deviation depending on the environmental temperature in the switch cabinet (-10..+60°C)

**) Adjusting zero point and limit value via the integrated trim potentiometers makes it possible to also connect KTY sensors for these measuring ranges. The linearisation must then be accomplished with the help of a parallel resistor.

(Special measurement ranges available on request)

Product information

Technical data

Wide-range power supply

Supply voltage : 20..125VDC and
20..250VAC (47..63Hz), max. 1.5W

24V power supply

Supply voltage : 24V DC +/-15%, max. 1.5W

Combined data

Rated voltage : 253V AC
Test voltage : 3kV AC between
supply // input = output
Working temperature : -10..60°C
Storage temperature : -20..80°C
Humidity : 10..90% (no condensation)

Measurement inputs

Pt100 : linearised,
measuring current approx. 1.6mA
Pt1000 : linearised,
measuring current approx. 130µA
In the event of a sensor break or short
circuit, the analog output drops to 0mA.
The operation LED blinks red
Thermocouple : linearised with comparison position
compensation
(optionally without internal
compensation)
NTC : linearised for $B_{25/85}=3977K$ or 3528K
Max. load 200µW (averaged)
Linear resistance : Mb. 0..2kΩ: approx. 1.4mA
Mbs. 0.5kΩ, 0..10kΩ: approx. 300µA
Zero point setting : +/-40% of the factory measuring range
(= end value – start value)
via 12-turn trim potentiometer
End value
reduction : -50% based on the factory end value
via 12-turn trim potentiometer
Note: The measuring accuracy drops
proportionally with the narrowing of the
measuring range

Potentiometer setting
limits : Limitation of the aforementioned
adjustment ranges
Pt100 -50..500°C (..600°C)
Pt1000 -50..250°C (..300°C)
FeCuNi -100..500°C (..800°C)
NiCrNi -150..1250°C
PtRhPt 0..1500°C (..1600°C)
NTC (10kΩ) -20..100°C (..150°C)
NTC (2kΩ) -40..100°C (-50°C..150°C)
R linear 0..10kΩ
(values in parentheses apply for optional,
customer-specific special measuring
ranges that are configured at the factory)

Analog output : 4..20mA, max. burden 400Ω,
no galvanic isolation
from the input signal
(max. burden error of 0.2% at 400Ω)

Dimensions (WxDxH) : 12.5 x 114 x 108mm
Material : PA6.6, light grey,
Flammability class V0 (UL94)

Weight : 120g
Protection rating : IP20
Screw terminals : 0.2..2.5 mm², AWG 24..14,
removable, coded

Push-in terminals
(spring-type
terminals) : 0.5..1.5 mm², AWG 25..16,
Double connection (12A between
the connections), removable, coded

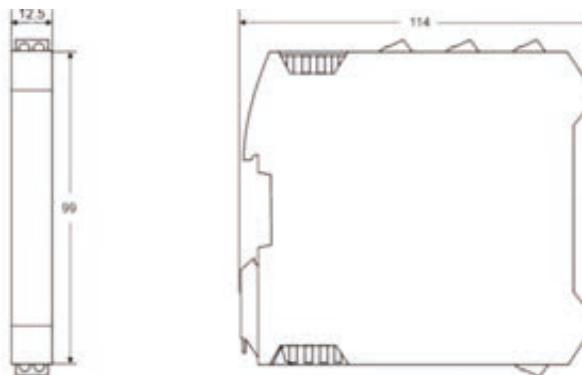
Power Rail : 8A over the entire bus system
(power supply via removable terminals
0.2..2.5 mm², AWG 24..14)

Transmitters / Signal conditioning

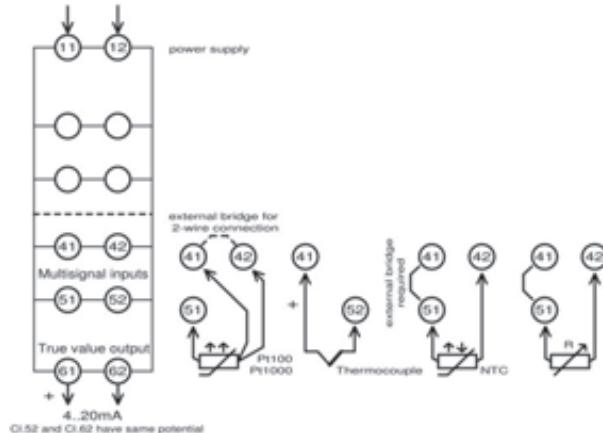
A service mode for the trim potentiometers on the front offers
the following possibilities:

- 1) A check of whether potentiometers are positioned at the calibrated factory settings
- 2) The pre-adjustment of a new output characteristic curve only with connection of a current measuring device.
(a temperature calibrator is not necessary)
- 3) Specification of a constant value at the current output, e.g. in order to test the reaction of connected devices.
(Limited range from 5.6..20mA)

Dimensions



Connection diagram



Ordering code

1. MU - 2.

1. Device version	
125L	Supply voltage 24V DC +/- 15%
125LP	Supply voltage: 24V DC +/-15% with carrier rail bus connection *)
125M	Wide-range mains adapter 20..125VDC / 20..253V AC
4. Options	
00	No options
01	Push-in terminals (plug-in)

*) see separate Power-Rail information sheet

Product information

Temperature Transmitter MU500L



Characteristics

Temperature transmitter MU500L accept field signals of Pt100 or Pt1000 RTD sensors to the input which is filtered, isolated and converted into industry standard signals for process control systems. Special circuit design makes it possible, to produce any useful measurement ranges.

Technical data

Power supply

Supply voltage	: 230 V AC $\pm 10\%$; 24 V DC $\pm 20\%$
Frequency AC	: 47..63 Hz
Power consumption	: <1.5 VA
Operating temperature	: -10..+60 °C
CE- conformity	: EN5022, EN60555 IEC61000-4-3/4/5/11/13

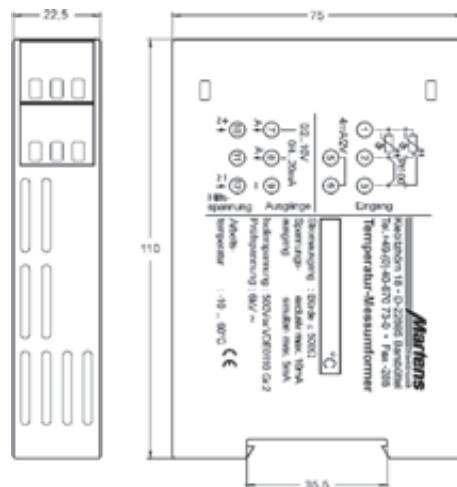
Measuring input *

Start value Pt100	: in the range -100 °C.. +100 °C
Span Pt100	: in the range 50..600 °C
Start value Pt1000	: in the range -50 °C..+50 °C
Span Pt1000	: in the range 10..200 °C
Sensor current	: ca. 0.6 mA (no self heating)
Line resistance	: max. 10 Ω, automatic compensation at 3-wire connection
Start value adjustment	: approx. $\pm 10\%$
4mA/2V adjustment	: approx. $\pm 1\text{ mA}$ or $\pm 0.5\text{ V}$
Span	: approx. $\pm 10\%$
Broken line	: output shows max. value
short circuit	: output shows min. value
Outputs	
Current	: 0/4..20 mA, max. 500 Ω
Voltage	: 0/2..10 V, max. 10 mA, simultaneously to the current output max. 1 mA
Accuracy	: $\leq 0.2\%$
Temperature error	: $\leq 0.01\text{ }^{\circ}\text{K}$
Case	: PC, UL94V-0 acc. to DIN EN 60715:2001-09
Weight	: approx. 140g
Connection	: screw terminals with pressure plate, max. 2.5 mm ²
Protection class	: case IP30, terminals IP20, BGVA3

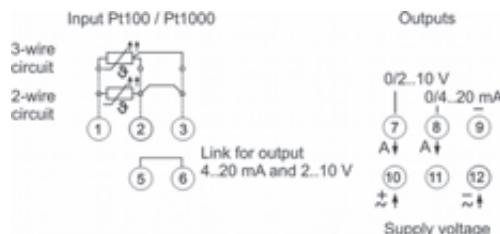
*Minimal and maximal range for start value and span of the measuring range.

Transmitters / Signal conditioning

Dimensions



Connection diagram



Ordering code

1. 2. 3.
MU500L - - -

1. Device type	
51	Pt100
53	Pt1000
2. Supply voltage	
0	230 V AC $\pm 10\%$
5	24 V DC $\pm 15\%$
3. Measuring range	
Please state in clear text e. g.: -50..+100 °C	

Product information

Universal Transmitter MU500



Characteristics

Temperature transmitter MU500 accept field signals of Pt100 or Pt1000 RTD sensors to the input which is filtered, isolated and converted into industry standard signals for process control systems. The multipurpose design of inputs and outputs, also the wide range of the supply voltage reduces the number of types. The small case allows space-saving mounting.

Technical data

Power supply

Supply voltage	: 85..265 V AC/110..125 V DC or 10..30 V AC/10..42 V DC
Frequency AC	: 40..400 Hz
Power consumption	: max. 2.2 W , max. 3.3 VA
Operating temperature	: -10..+60 °C
CE-conformity	: EN55022, EN60555-2 IEC61000-4-4/5/11/13

Input

RTD Pt100	: 13 ranges, switch selectable
- Sensor current	: Pt100 approx. 1 mA
RTD Pt1000	: 16 ranges, switch selectable
- Sensor current	: Pt1000 approx. 0.25 mA
Line resistance	: max. 100 Ω
Accuracy	: ≤ 0.2 %
Zero adjust	: Pt100 approx. ± 8 Ω (≤ 20 °C) Pt1000 approx. ± 8 Ω (≤ 2 °C)
End value	: adjustable approx. +/-20 %

Sensor error;
- broken or shorted line: output rises to max. output value

Outputs

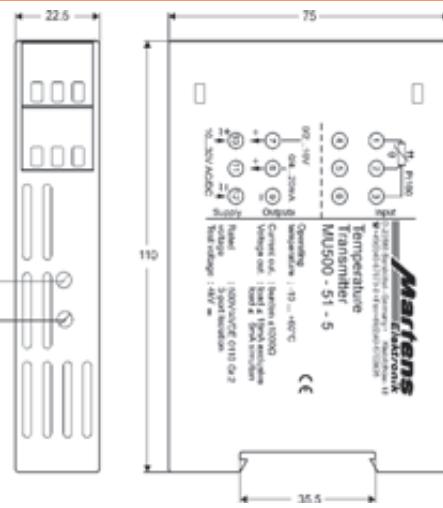
Current	: 0/4..20 mA switch selectable burden ≤ 1 kΩ
Voltage	: 0/2..10 V switch selectable load max. 15 mA, short-circuit-proof (simultaneously to the current output max. 5 mA)

Case

Weight	: approx. 200 g
Protection class	: case IP30, terminals IP20, BGV A3
Electrical connection	: screw terminals with pressure plate, max. 2.5 mm²

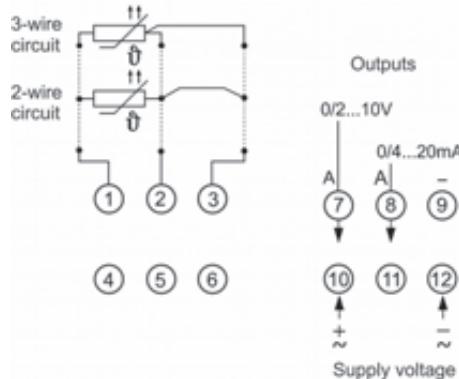
Transmitters / Signal conditioning

Dimensions



Connection diagram

Input Pt100 / Pt1000



Ordering code

MU500 - -

1. Device type

51	Pt100, 13 measuring ranges
53	Pt1000, 16 measuring ranges

2. Supply voltage

0	85..265 V AC
5	10..30 V AC/DC

Product information

Universal Transmitter MU500Ex



Characteristics

Temperature transmitters series MU500-Ex offer an intrinsically safe input and convert RTD sensor signals (Pt100 or Pt1000) into industry standard signals. The device includes a full 3-port isolation.

Technical data

Power supply

Supply voltage	: 85..253 V AC/110..125 V DC 10..30 V AC/DC
Frequency AC	: 40..400 Hz
Power consumption	: < 3.3 VA
Operating temperature	: -10..+60 °C
CE-conformity	: ATEX directive 94/9/EG EMC directive 2004/108/EG
Standards	: EN 60079-0:2013, EN 60079-11:2012, EN 61326-1:2004-05
Explosion protection	
Approval	: TÜV 03 ATEX 2283,
Marking	: II (1) G [Ex ia Ga] IIC or II (1) D [Ex ia Da] IIIC
MU500Ex- ... -51	: U ₀ I ₀ P ₀ C ₀ L ₀ 1.3 V <3mA <3mW 29µF 100mH
MU500Ex- ... -53	: 4.9 V <3mA <3mW 2.2µF 100mH
Ci, Li	: 5 nF, ca. 0 mH

The intrinsically safe circuit is galvanically separated from the non-intrinsically safe circuits up to a peak crest value of the voltage of 375 V.

Measuring input

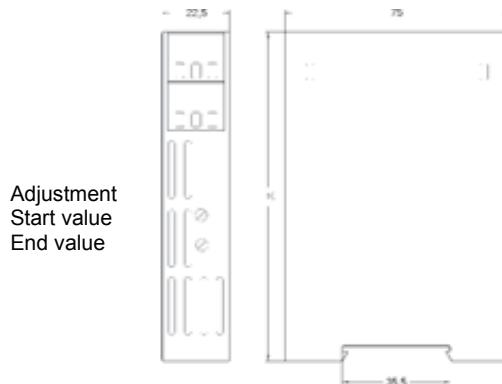
Sensor current	: Pt100 approx 1 mA, Pt1000 approx. 0.25 mA
Line resistance	: max. 100 Ω, automatic compensation with 3-wire connection
Zero adjust	: Pt100 approx. ± 8 Ω, (≤ 20 °C) Pt1000 approx. ± 8 Ω (≤ 2 °C)
End value	: approx. +/-20 % adjustable
Sensor error	: output rises to max. output (voltage output >12V DC current output > 25 mA)

Transmitters / Signal conditioning

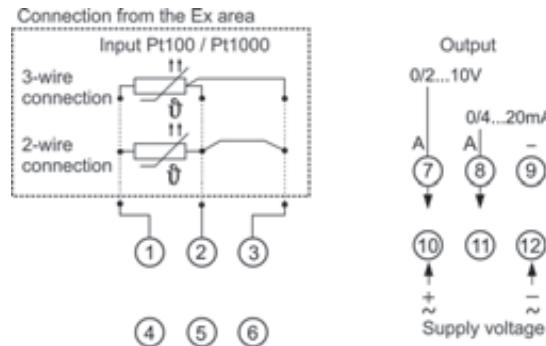
Outputs

Current	: 0/4..20 mA DC switch selectable, burden ≤ 1 kΩ
Voltage	: 0/..10 V DC switch selectable, load max. 15 mA, short-circuit-proof (simultaneously with current output 5 mA)
Rated voltage	: 253 V AC or 125 V DC (Um) acc. to EN 60079-0
Accuracy	: ≤ 0.2 %
Case	: Polycarbonate UL94V-0 TS 35 acc. to DIN EN 60715:2001-09
Weight	: approx. 200 g
Protection class	: case IP30, terminals IP20 (BGV A3)
Connection	: screw terminals with pressure plate max. 2.5 mm ²
Mounting	: installation in dry, clean and well monitored areas

Dimensions



Connection diagram



Ordering code

1. 2. 3.
MU500Ex - - -

1. Device type	
51	Pt100, 13 measuring ranges
53	Pt1000, 16 measuring ranges
2. Supply voltage	
0	85..253 V AC/110..125 V DC
5	10..30 V AC/DC
3. Options	
00	without option

Product information

Thermocouple Transmitter TC500



Characteristics

Thermocouple Transmitter TC500 converts thermovoltages into standard industry signals 0/..20 mA or 0/..10 V DC. The measuring range is programmable via rotary switches at the side.

Technical data

Power supply

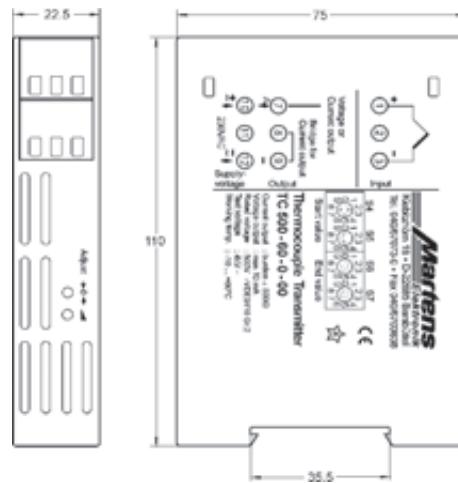
Supply voltage	: 230 V AC $\pm 10\%$ or 24 V DC $\pm 15\%$
Frequency AC	: 47..63 Hz
Power consumption	: < 3.5 VA
Operating temperature	: -10..+60 °C
CE-conformity	: EN55022, EN60555-2 IEC61000-4-4/5/11/13

Input

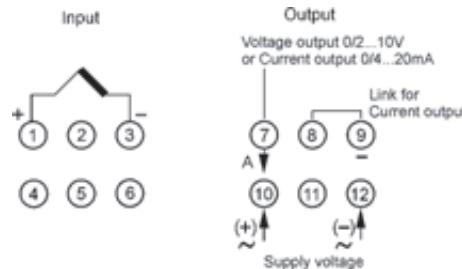
Thermocouple	: Fe-CuNi, in range -100..+800 °C
Type J	: NiCr-Ni, in range -150..+1200 °C
Type K	: Pt10Rh-Pt, in range 0..+1600 °C
Output	
Current	: 0..20 mA, 4..20 mA switch selectable, burden $\leq 500 \Omega$
Voltage	: 0..10 V, 2..10 V switch selectable, load max. 10 mA, short-circuit-proof
Start value	: adjustable approx. $\pm 5\%$
End value	: adjustable approx. $\pm 5\%$
Broken line	: outputs takes the end value +1 %, overflow indication
Short-circuit	: no indication (output takes terminal temperature)
Accuracy	: $\leq 0.15\%$, 1 °C
Temperature coefficient	: $\leq 0.01\%/\text{K}$
Case	: Polycarbonate, UL94 V-0 TS35 acc. to DIN EN 60715:2001-09
Weight	: approx. 200 g
Connection	: screw terminals with pressure plate max. 2.5 mm ²
Protection class	: case IP30 terminals IP20 acc. to BGV A3

Transmitters / Signal conditioning

Dimensions



Connection diagram



Ordering code

1. 2. 3.
TC500 - - -

1. Input	
60	Thermocouple J, K, S programmable, output 0/..20 mA or 0/..10 V DC
2. Supply voltage	
0	230 V AC $\pm 10\%$
5	24V DC $\pm 15\%$
3. Options	
00	without option

Product information

Analog Frequency Transmitter AF500



- Output frequency from 0..0.01Hz/20 kHz programmable
- Inputs for 0/4..20 mA, 0/2..10 V DC
- Teach-in programming for analog start- and end value
- Outputs transistor and relay SPDT
- Power- and programming indicator via 2-color LED

Characteristics

Analog frequency transmitter AF500 converts standard industry signals 0/4..20 mA or 0/2..10 V DC into a proportional frequency. The output frequency is programmable with rotary switches at the case side.

Technical data

Power supply

Supply voltage : 230 V AC $\pm 10\%$ or 24 V DC $\pm 15\%$
 Frequency : 47..63 Hz
 Power consumption: < 3 VA
 Operating temperature : -10..+60 °C
 CE-conformity : EN 55022, EN 60555, IEC 61000-4-4/5/11/13

Input

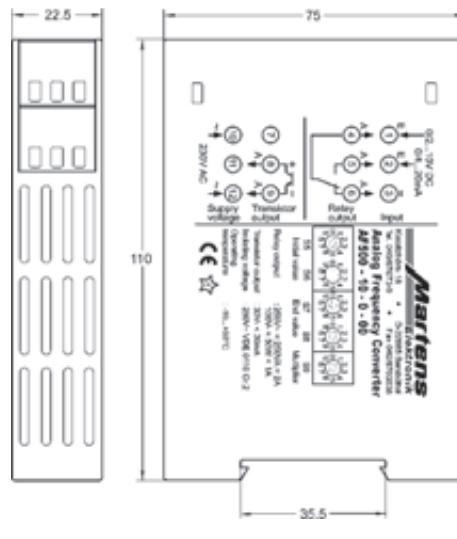
Current : 0/4..20 mA, switch selectable
 - Ri : 51 Ω
 Voltage : 0/2..10 V DC, switch selectable
 - Ri : 20 kΩ
 Start value : via software programmable 0..25 %
 End value : via software programmable -15..+10 %

Output

Transistor : max. 30 V DC, load max. 30 mA
 - Frequency range : 0..0.01 Hz , 0..20 kHz duty cycle 0.5
 Relay SPDT : 250 V AC < 250 VA < 2 A,
 100 V DC < 50 W < 1 A
 - Frequency range : 0..0.01 Hz, 0..9.9 Hz, duty cycle 0.5
 Accuracy : 0.1 % of the end value
 Case : Polycarbonate, UL94V-0
 TS 35 acc. to DIN EN 60715:2001-09
 Weight : approx. 140 g
 Connection : screw terminal, max. 2.5 mm²
 Protection class : case IP30,
 terminals IP20 acc. to BGV A3

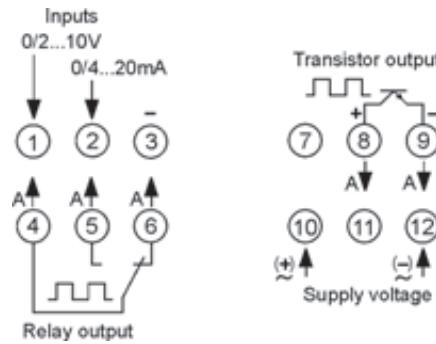
Transmitters / Signal conditioning

Dimensions



DIN rail mounting TS35

Connection diagrams



Ordering code

1. 2. 3.
 AF500 - - -

1. Measuring range	
10	0/4..20 mA, 0/2..10 V DC output frequency from 0..0.01 up to 20 kHz
2. Supply voltage	
0	230 V AC $\pm 10\%$
5	24 V DC $\pm 15\%$
3. Options	
00	without option

Product information

Frequency Analog Transmitter FT500



- Frequency ranges from 0..0.01Hz/20 kHz programmable
- start- and end value of the measuring range programmable
- Multipurpose inputs for 24 V sensors, switching contacts and Namur actors
- Integrated transmitter supply

Characteristics

Frequency transmitter FT 500 are used to convert an impulse frequency range into industry standard signals. The transmitter accepts impulses from proximity switch, contact switch, light barriers and Namur proximity switches. Start- and end value will be programmed with 5 rotary switches. Increasing or decreasing output characteristic is therefore programmable.

Technical data

Power supply

Supply voltage : 85..265 V AC or 10..30 V AC / DC
Frequency : 47..63 Hz
Power consumption : < 4 VA

Operating temperature : -10..+60 °C

CE- conformity : EN 55022, EN 60555, IEC 61000-4-4/5/11/13
Input

Frequency range : 0..0.01 Hz/20 kHz

Pulse cycle : min. 20 µs (electronic) and
min. 5 ms (contacts)

Start value : programmable 0..25 %

End value : programmable -15..+ 5 %

Impulse input
(Terminals 2, 3) : low- signal -30 V..+3 V,
high- signal +10 V..+35 V

R_i : > 10 kΩ

Transmitter supply
(Terminal 1) : approx. 20 V DC,
25 mA short circuit current

Namur input
(Terminals 4, 5) : acc. to DIN 19234, Namur
R_i : approx. 1 kΩ

Output
Current : 0/4..20 mA selectable,
burden ≤ 1 kΩ

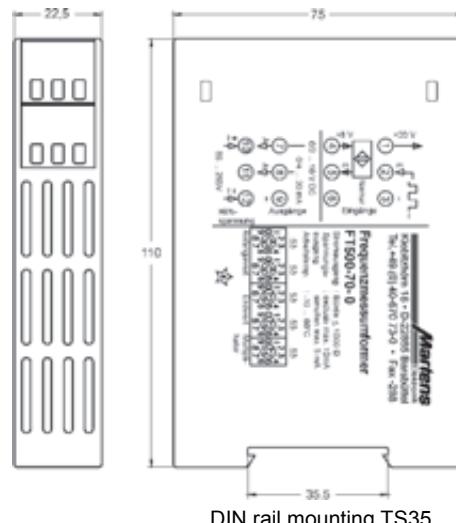
Voltage : 0/2..10 V DC,
load max. 10 mA, short-circuit-proof
(parallel with current output, 5 mA)
Accuracy : 0.1 % Measuring end value
Rise time (T₉₀) : < 130 ms

Transmitters / Signal conditioning

Case

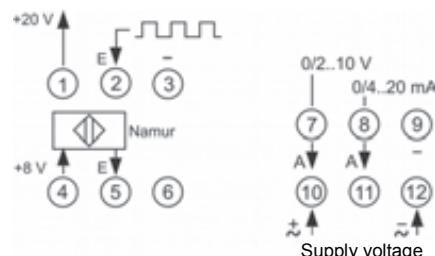
: Polycarbonate, UL94V-0
TS 35 acc. to DIN EN 60715:2001-09
Weight : approx. 140 g
Connection : screw terminals, max. 2.5 mm²
Protection class : case IP30,
terminals IP20, acc. to BGV A3

Dimensions



DIN rail mounting TS35

Connection diagram



Ordering code

1. 2. 3.
FT500 - - -

1. Measuring range	
70	0..0.01Hz up to 20 kHz, output 0/4..20 mA and 0/2..10 V DC
2. Supply voltage	
0	85..265 V AC
5	10..30 V AC / DC
3. Options	
00	without option

Product information

Resistance Transmitter RT500



- Measuring range 0..50 Ω up to 100 kΩ
- Processor technology with 12 Bit AD/DA-converter
- Teach-in programming for start- and end-value
- Increase or decrease output characteristic programmable
- Operation mode indicated by use of a 2-color LED

Characteristics

RT500 transmitter converts a resistance- or potentiometer signal into industry standard signals. Initial and final value may be in the range of 0..100 kOhm. Easy programming by means of Teach-in. The measuring range will be selected automatically. The input circuit is designed in 3-wire technology and can provide compensation of the line resistance. The linear output signal is generated between minimum and maximum input resistance.

Technical data

Power supply

Supply voltage	: 85..265 V AC or 10..30 V AC/DC
Frequency	: 47..63 Hz
Power consumption	: < 3 VA
Operating temperature	: -10..+50 °C
CE-conformity	: EN 55022, EN6 0555, IEC 61000-4-4/5/11/13

Input

Measuring range	: R _{max} : 50 Ω..100 kΩ, Condition: ΔR ≥ 0.5 R _{max}
Solution	: 600..3000 Digit (depends on measuring range)

Sampling frequency	: 250 Hz real-time processing
Line resistance	: max. 10 Ω, line compensation in 3-wire-circuits

Outputs

Current	: 0/4..20 mA, selectable, burden ≤ 1 kΩ
Voltage	: 0/2..10 V, selectable, load max. 15 mA short-circuit-proof (parallel with current output max. 5 mA)

Attention! No isolation between in- and output.

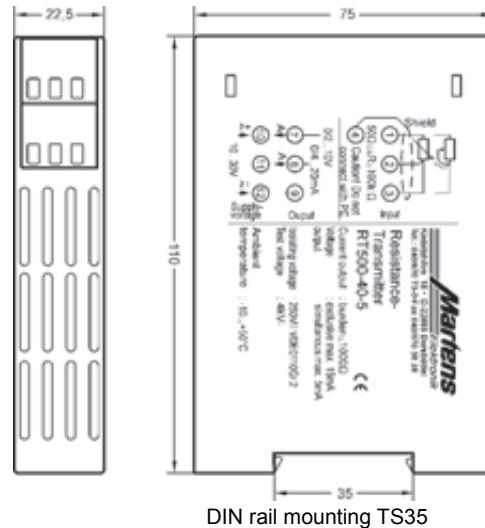
Rise time (T ₉₀)	: < 8 ms
Accuracy	: ± 0.2 % of the measuring range
Case	: Polycarbonate, UL94V-0 TS 35 acc. to DIN EN 60715:2001-09

Weight	: approx. 200 g
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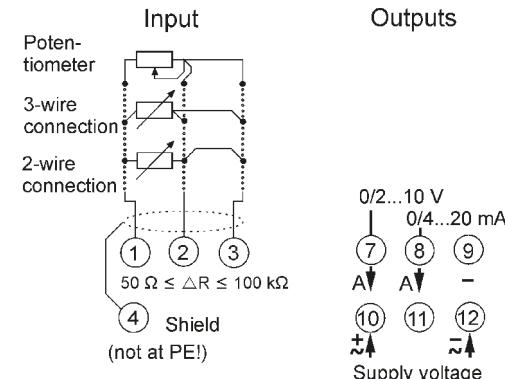
Transmitters / Signal conditioning

Connection : screw terminals, max. 2.5 mm²
Protection class : case IP30,
terminals IP20 acc. to BGV A3

Dimensions



Connection diagram



Ordering code

1. 2.
RT500 - -

1. Measuring range

40	R _{max} in range 50 Ω up to 100 kΩ programmable (see examples)
----	---

2. Supply voltage

0	85..265 V AC
5	10..30 V AC/DC

Examples:

- 1.) Range 15..90 Ω
- 2.) Range 0..1000 Ω
- 3.) Range 100..200 Ω

Attention!

Minimal span 0.5 x R_{max}

Product information

Transmitter DMS50



- Weight – Force – Pressure – Torque with DMS-strain gauges
- Bridge sensitivity 0.100..5.000 mV/V
- Teach-in function
- Tare function
- Min- and Max peak storage (not voltage safe)
- Integrated bridge supply 2.5 V, 5 V, 10 V max. 120 mA
- Bus-interface Modbus / Profibus

Characteristics

The DMS50 converts the output signal of standard strain gauges (DMS measuring bridges) into a standard signal 0/4..20 mA or 0/2..10 DC. The bridge supply and an external control input for the tare function are integrated.

If several strain gauges are required in an application, these must be connected parallel. The bridge current must not exceed 120 mA in this case. Where appropriate, a SBB1616 measuring amplifier is to be interposed for a feed current up to 200 mA.

Technical data

Power supply

Supply voltage : 230 V AC $\pm 10\%$; 115 V AC $\pm 10\%$
or 24 V DC $\pm 15\%$

Power consumption

: max. 7 VA

Operating temperature

: -10..+55 °C

CE- conformity

: EN 55022, EN 60555, EN 61326

Input

DMS

Bridge-supply : 2.5 V/ 5 V/ 10 V DC ;
programmable; max. 120 mA

Bridge sensitivity : 0.100..5.000 mV/V

Sense line : compensated line resistance
of max. 10 Ω

Accuracy : < 0.025 % ± 2 digit

Tare external : ext. contact or 24 V DC signal

Display : graphic LCD-Display 128x64 pixel,
backlight white

Indicating range : ± 9999 Digit

Transmitters / Signal conditioning

Outputs

Relay SPDT, A1-A4 : < 250 V AC < 250 VA < 2 A
 $\cos \varphi \geq 0.3$

Analog output : 0/4..20 mA burden $\leq 500 \Omega$;
0/2..10 V burden $> 500 \Omega$, isolated
output changes automatically

Accuracy : 0.2 %; TK 0.01 %/K

Fault indication at error in the DMS measuring circuit
→ Analog output 0 mA, < 3.6 mA or > 21.5 mA, programmable
→ Alarm contact(s) min. or max. programmable

Bus system

Modbus : RS485, RTU or ASCII max. 38400 Bd

Profibus : Profibus DP

Connection : 9 pole D-SUB plug in the front

Case

: Polyamide (PA) 6.6 , UL94V-0,
acc. to DIN EN 60715, DIN rail TS35

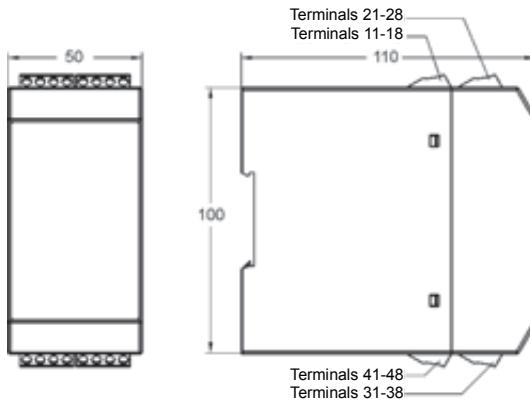
DIN rail TS35

: approx. 450 g

Weight : screw terminals 0.14..2.5 mm²
AWG 26..AWG14

Protection class : case IP30,
terminals IP20 acc. to BGV A3

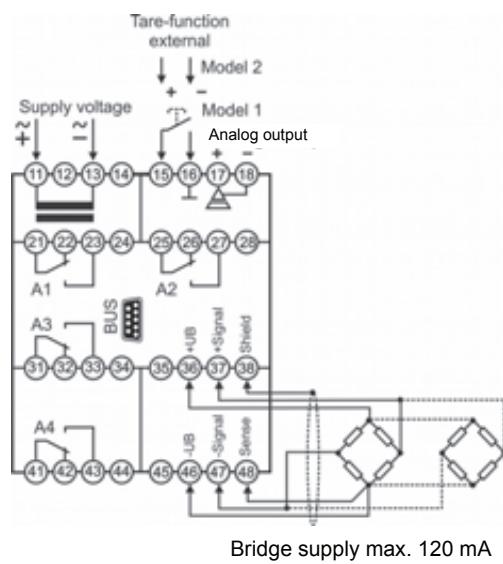
Dimensions



Continue next page

Product information

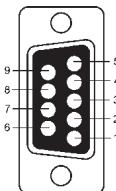
Connection diagram



Bus connection

Modbus		
PIN	Signal	EIA / TIA-485 name
5	D1	B / B'
9	D0	A / A'
1	Common	C / C'
Profibus		
3	RxD / TxD-P	
5	DGND	
6	VP / +5V max 10 mA	
8	RxD / TxD-N	

9 pole D-Sub connector
in the front



Transmitters / Signal conditioning

Ordering code

DMS50 - - - - - -

1. Model	
1	input DMS strain gauge, input ext. tare-function via contact
2	as 1, but isolated input for external tare function via 24 V DC electronic signal
2. Alarm outputs	
00	not installed
2R	2 relay outputs, A1, A2 SPDT
3. Alarm outputs/BUS configuration	
00	not installed
2R	2 relay outputs, A3, A4 SPDT
MB	Modbus RTU/ASCII, RS485
PB	Profibus DP
4. Analog output	
AO	0/4..20 mA; 0/2..10 V DC
5. Supply voltage	
0	230 V AC, ± 10 % 50-60 Hz
1	115 V AC, ± 10 % 50-60 Hz
5	24 V DC, ± 15 %
6. Options	
00	without option

Product information

Transmitter DMS50Ex



PROFIBUS

- Weight – Force – Pressure – Torque with DMS strain gauges
- Bridge sensitivity 0.500..5.000 mV/V
- Teach-in function
- Tare function
- Min- and Max peak storage (not voltage safe)
- Integrated bridge supply 2.5 V, 5 V max. 40 mA
- Bus-interface Modbus / Profibus

Characteristics

The DMS50Ex converts the output signal of standard strain gauges (DMS measuring bridges) into a standard signal 0/4..20 mA or 0/2..10 DC. The bridge supply and an external control input for the tare function are integrated.

If several strain gauges are required in an application, these must be connected parallel. The bridge current must not exceed 40 mA in this case.

Technical data

Power supply

Supply voltage	: 230 V AC $\pm 10\%$; 115 V AC $\pm 10\%$ 24 V DC $\pm 15\%$ Um = 253 V AC or 125 V DC
Power consumption	: max. 5 VA
Operating temperature	: -10...+55 °C
CE- conformity	: ATEX- directive 94/9/EG (certificate DMS50ATEX.001) EN 60079-0:2006 EN 60079-11:2007 EN 61241-0:2006 EN 61241-11:2006 IEC 61326 05/2004, IEC 61000-4-2, IEC 61000-4-3, IEC 61000-4-4, IEC 61000-4-5, IEC 61000-4-6, IEC 61000-4-8, IEC 61000-4-11, CISPR16-1/16-2

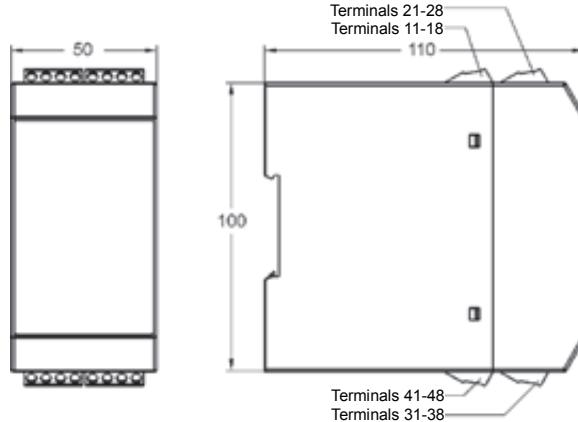
Explosion protection

Certification	: Ex II (1) G [Ex ia] IIC/IIB or Ex II (1) D [Ex iaD]
Approval	: TÜV 08 ATEX 554171
Input	
DMS	
Bridge supply	: 2.5 V / 5 V DC programmable, max. 40 mA
Bridge sensitivity	: 0.500..5.000 mV/V
Sense line	: compensated line resistance of max. 10 Ω
Accuracy	: < 0.025 % ± 2 digit
Max. no load voltage U_0	: 14.5 V
Max. short circuit curr. I_0	: 163 mA
Max. power consump. P_0	: 590 mW

Transmitters / Signal conditioning

Explosion protection	Ex ia / IIC	ia / IIB
Max. external inductivity	: 100mH	100mH
Max. external capacity	: 25 µF	120 µF
Internal capacity	: negligible	
Internal inductivity	: negligible	
Tare-function	: external contact	
Display		
Indicating range		graphic LCD-Display 128x64 pixel, with back-light white
Outputs		: ± 9999 Digit
Relay SPDT A1-A2	: < 250 V AC < 250 VA < 2 A $\cos \varphi \geq 0.3$ < 300 V DC < 40 W < 2 A	
Analog output	: 0/4..20 mA burden $\leq 500 \Omega$; 0/2..10 V burden $> 500 \Omega$, isolated output changes burden depending	
Accuracy	: 0.2 %; TK 0.01 %/K	
Fault indication at error in the DMS measuring circuit		
→ Analog output 0 mA, < 3.6 mA or > 21.5 mA, programmable		
→ Alarm contact(s) min. or max. programmable		
Bus system		
Modbus	: RS485, RTU or ASCII max. 38400 Bd	
Profibus	: Profibus DP	
Connection	: 9 pole D-SUB connector in the front	
Case		: Polyamide (PA) 6.6 , UL94V-0, acc. to DIN EN 60715, DIN rail TS35
Weight	: approx. 450 g	
Connection	: screw terminals 0.14..2.5 mm ² AWG 26..AWG14	
Protection class	: case IP30, terminals IP20 acc. to BGV A3	

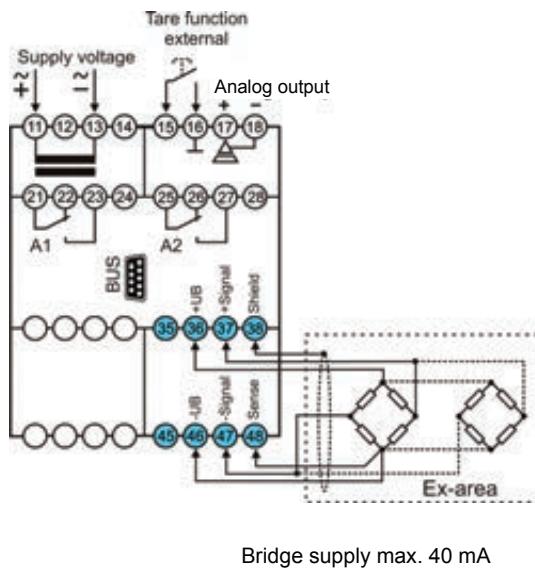
Dimensions



Continue next page

Product information

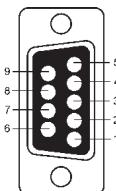
Connection diagram



Bus connection

Modbus		
PIN	Signal	EIA / TIA-485 name
5	D1	B / B'
9	D0	A / A'
1	Common	C / C'
Profibus		
3	RxD / TxD-P	
5	DGND	
6	VP / +5V max 10 mA	
8	RxD / TxD-N	

9 pole D-Sub connector
in the front



Transmitters / Signal conditioning

Ordering code

DMS50Ex - - - - - -

1. Model	
1	input DMS strain gauge, input external tare-function via contact, voltage free, intrinsically safe ATEX II (1) G [Ex ia] IIC/IIB ATEX II (1) D [Ex iaD]
2. Alarm outputs	
00	not installed
2R	2 relay SPDT A1, A2
3. BUS configuration	
00	not installed
MB	Modbus RS485 RTU, ASCII
PB	Profibus DP
4. Analog output	
AO	0/4..20 mA; 0/2..10 V DC
5. Supply voltage	
0	230 V AC ±10 % 50-60 Hz
1	115 V AC ±10 % 50-60 Hz
5	24 V DC ±15 %
6. Options	
00	without option

Universal Transmitter UT125



- Transmitter for electrical signals
- Universal input for standard signals, Pt100, thermocouple, potentiometer
- Configuration via front-side DIP switch
- Analog output 4..20 mA
- With Pt100 sensors, monitoring of sensor break and short-circuit
- Wide-range power supply or 24 V DC
- Housing width 12.5 mm
- Removal coded screw terminals
- Carrier rail mounting TS35 EN60715

Characteristics

The UT125 series of universal transmitters are designed for the affordable transformation of standard signals, temperatures and potentiometer statuses into a current signal of 4..20 mA. The universal configurability of the measuring inputs reduces the stock requirement for various applications. The measuring inputs and actual value output are not galvanically isolated. The housing width of only 12.5 mm enables space-saving installation in the switch cabinet.

Measurement inputs

Configuration via DIP switch

Standard signals	: 0/2..10 V and 0/4..20 mA
Potentiometer	: Rated value 500 Ω..20 kΩ
Pt100	: -50..50 °C 0..50 °C 0..100 °C 0..150 °C 0..200 °C 0..300 °C 0..500 °C
Thermocouple	
FeCuNi, Type J	: 0..250 °C 0..500 °C
NiCrNi, Type K	: 0..500 °C 0..750 °C 0..1000 °C
PtRhPt, Type S	: 0..1500 °C

(Special measurement ranges available on request)

Technical data

Wide-range power supply

Supply voltage : 20..125 VDC and
20..250 VAC (47..63 Hz), max. 1.5 W

24V power supply

Supply voltage : 24 V DC +/-15 %, max. 1.5 W

Combined data

Rated voltage : 253 V AC
Test voltage : 3 kV AC between power supply // input = output
Working temperature : -10..60 °C
Storage temperature : -20..80 °C
Air humidity : 10..90% (no condensation)

Measurement inputs

Voltage : 0/2..10 V, Ri approx. 20 kΩ
Current : 0/4..20 mA, Ri approx. 60 kΩ
Pt100 : linearised, measurement current 1.6 mA
Recognition of sensor break or short circuit: Actual value drops to approx. 0mA

Thermocouple : linearised with comparison point compensation

Resistance : Potentiometer (3-wire)
Rated value 500 Ω..20 kΩ

Intern. reference voltage approx. 1.5 V
Analog output : 4..20 mA, max. burden 400 Ω,
No galvanic isolation from the input signal

Input signal	Basic precision-actual value output	Temperature deviation *)
0/2..10 V	0.2 %	0.004 %/K
0/4..20 mA	0.2 %	0.004 %/K
Potentiometer	1 %	0.007 %/K
Pt100 -50..50 °C	0.5 %	0.03 %/K
Pt100 0..50 °C	0.9 %	0.04 %/K
Pt100 0..100 °C	0.5 %	0.03 %/K
Pt100 0..150 °C	0.2 %	0.02 %/K
Pt100 0..200 °C	0.4 %	0.02 %/K
Pt100 0..300 °C	0.3 %	0.01 %/K
Pt100 0..500 °C	0.2 %	0.007 %/K
FeCuNi 0..250 °C	1.0 %	0.04 %/K
FeCuNi 0..500 °C	0.5 %	0.03 %/K
NiCrNi 0..500 °C	0.5 %	0.04 %/K
NiCrNi 0..750 °C	0.4 %	0.03 %/K
NiCrNi 0..1000 °C	0.3 %	0.02 %/K
PtRhPt 0..1500 °C	1.0 %	0.04 %/K

*) Measurement deviation depending on the environmental temperature in the switch cabinet (-10..+60°C)

Housing

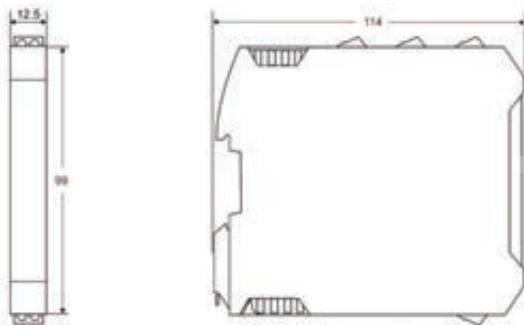
Dimensions (W x D x H) : 12.5 x 114 x 108 mm
Material : PA6.6, light grey, Flammability class V0 (UL94)

Weight : 120 g
Protection rating : IP20
Screw terminals : 0.2..2.5 mm², AWG 24..14, removable, coded
Push-in terminals (spring-type terminal) : 0.5..1.5 mm², AWG 25..16, Double connection (12A between the connections), removable, coded
Power Rail : 8A over the entire bus system (Supply via removable terminals 0.2..2.5 mm², AWG 24..14)

Product information

Transmitters / Signal conditioning

Dimensions



Ordering code

UT -

1. Device version

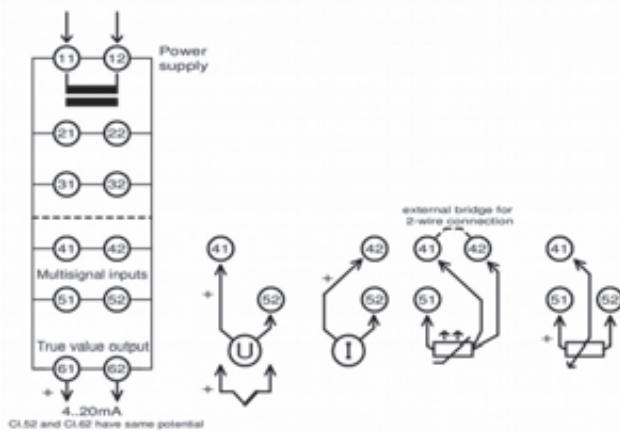
125L	Supply voltage 24 V DC +/- 15 %
125LP	Supply voltage 24 V DC +/- 15 % with carrier rail bus connection *)
125M	Wide-range power supply 20..125 V DC / 20..253 V AC

2. Options

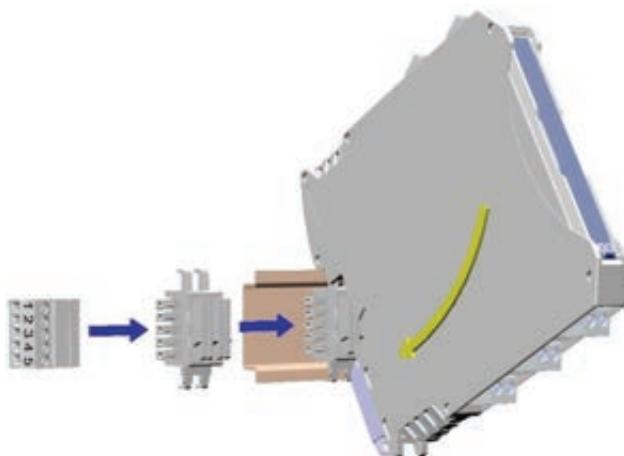
00	No options
01	Push-in terminals (plug-in)

*) Supply including matching bus adapter piece; see also separate Power Rail information sheet

Connection diagram



Power Rail



The power supply of multiple devices can be concentrated in the mounting carrier rail (TS35) of a bus system.

An equivalent version is available for the entire series of GHM power rail devices in 12.5 mm wide housing.

Product information

Standard Signal Transmitter PMT50-1



PROFIBUS

- Signal conditioning – Linearisation – Characteristic adjustment
- Input for standard signals 0/2..10 V and 0/4..20 mA
- Measuring range programmable
- Linearisation and characteristic adjustment programmable via 32 bases
- Automatic input fault detection

Characteristics

The programmable universal transmitter PMT50 operates with analog input signals. The device converts input signals to analog output 0/4..20 mA; 0/2..10 V DC. Optional a serial interface is available. The device offers a linearisation function for any sensor curves and a simulator function. The integrated transmitter supply 24 V DC max. 30 mA allows the feeding of 2-and 3-wire transmitter. 4 alarm outputs for monitoring and controlling are available.

Technical data

Power supply

Supply voltage	: 230 V AC $\pm 10\%$ 115 V AC $\pm 10\%$ 24 V DC $\pm 15\%$
Power consumption	: < 5 VA
Operating temperature	: -10..+55 °C
CE – conformity	: IEC 61326 05/2004, IEC 61000-4-2, IEC 61000-4-3, IEC 61000-4-4, IEC 61000-4-5, IEC 61000-4-6, IEC 61000-4-8, IEC 61000-4-11, CISPR16-1/16-2

Input

R _i	: 0/2..10 V, 0/4..20 mA : current 10 Ω : voltage 10 kΩ
Accuracy	: < 0.1 %, ± 1 Digit
Transmitter supply	: 24 V DC max. 30 mA
Fault detection	: break of wire (only 4 mA / 2 V)

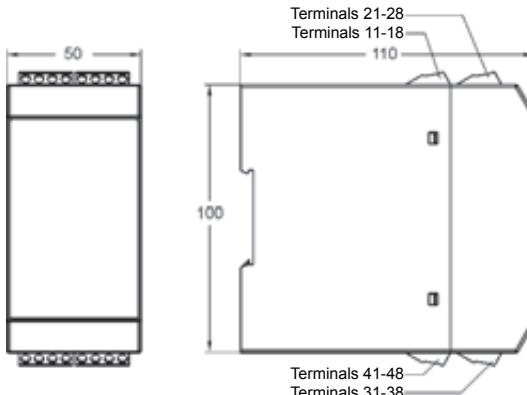
Outputs

Alarm outputs	: relay SPDT < 250 V AC < 250 VA < 2 A cos φ ≥ 0,3 < 300 V DC < 40 W < 2 A
---------------	--

Transmitters / Signal conditioning

Analog output	: 0/4..20 mA burden $\leq 500\Omega$, 0/2..10 V burden $> 500\Omega$, isolated output burden depending
Fault indication	: break of wire in the measuring circuit → analog output programmable 0 mA, < 3.6 mA or >21.5 mA → alarm relay(s) min. or max. programmable
Bus system	
Modbus	: RS485, RTU or ASCII max. 38400 Baud
Profibus	: Profibus DP
Connection	: 9pol. D-SUB connector in the front
Display	: graphic-LCD-Display, 128 x 64 Pixel, with white LCD backlight
Case	: Polyamide (PA) 6.6 , UL94V-0 acc. to DIN EN 60715, DIN rail TS35
Weight	: approx. 450 g
Connection	: screw terminals 0.14..2.5 mm ² AWG 26..AWG14
Protection class	: case IP30, terminals IP20 acc. to BGV A3

Dimensions



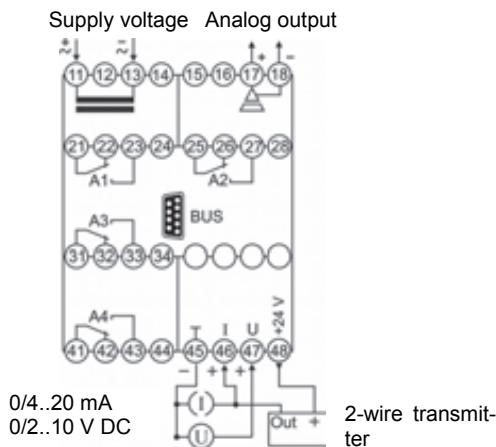
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Product information

Connection diagram

Model PMT50-1

Standard signals 0/4..20 mA, 0/2..10 V



Transmitters / Signal conditioning

Ordering code

PMT50 - - - - - -

1. Model/input

1 standard signals 0/4..20 mA, 0/2..10 V DC

2. Analog output

AO 0/4..20 mA, 0/2..10 V DC, isolated

3. Alarm outputs

00 not installed

2R 2 relay outputs, A1, A2 SPDT

4. Alarm outputs/BUS configuration

00 not installed

2R 2 relay outputs, A3, A4 SPDT

MB Modbus RTU/ASCII, RS485

PB Profibus DP

5. Supply voltage

0 230 V AC, ± 10 % 50-60 Hz

1 115 V AC, ± 10 % 50-60 Hz

5 24 V DC, ± 15 %

6. Options

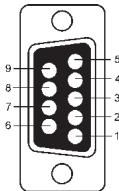
00 without option

Bus connection

Modbus

PIN	Signal	EIA/TIA-485 name
5	D1	B / B'
9	D0	A / A'
1	Common	C / C'

9 pole D-Sub connector
in the front



Product information

Standard Signal Transmitter PMT50Ex-1



PROFIBUS

- Signal conditioning – Linearisation – Characteristic adjustment
- Input for standard signals 0/2..10 V and 0/4..20 mA
- Measuring range programmable
- Linearisation and characteristic adjustment programmable via 32 bases
- Automatic input fault detection

Characteristics

The programmable universal transmitter PMT50Ex operates with analog input signals. The device converts input signals to an analog output 0/4..20 mA; 0/2..10 V DC. Optional a serial interface is available. The device offers a linearisation function for any sensor curves and a simulator function. The integrated transmitter supply 16 V DC max. 20 mA allows the feeding of 2- and 3-wire transmitter. 2 alarm outputs for monitoring and controlling are available.

Technical data

Power supply

Supply voltage	: 230 V AC ±10 % 115 V AC ±10 % 24 V DC ±15 % Um = 253 V AC and 125 V DC (terminals 11, 13)
Power consumption	: < 5 VA
Operating temperature	: -10..+55 °C
CE-conformity	: ATEX-directive 94/9/EG (certificate PMT50ATEX.001) EN 60079-0:2006 EN 60079-11:2007 EN 61241-0:2006 EN 61241-11:2006 IEC 61326 05/2004, IEC 61000-4-2, IEC 61000-4-3, IEC 61000-4-4, IEC 61000-4-5, IEC 61000-4-6, IEC 61000-4-8, IEC 61000-4-11, CISPR16-1/16-2

Explosion protection

Marking	: II (1) G [Ex ia] IIC/IIB or II (1) D [Ex iaD]
Approval	: TÜV 08 ATEX 554329

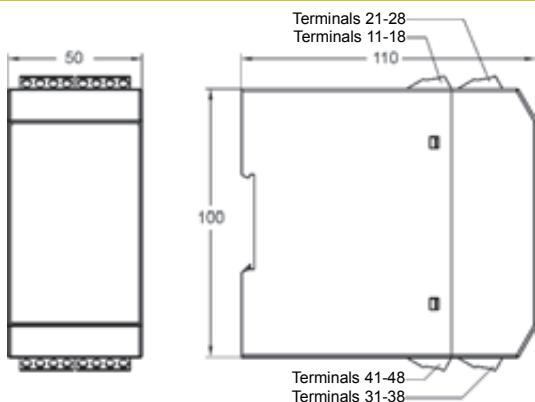
Transmitters / Signal conditioning

Input	: 0/2..10 V DC, 0/4..20 mA		
Fault detection	: broken line in the measuring circuit		
R _i	: current 10 Ω voltage 10 kΩ (terminals 45, 46, 47)		
Accuracy	: < 0.1 %, ±1 Digit		
Max. U ₀ no load	: 18.9 V		
Max. I ₀ short circuit	: 92.5 mA		
Max. output power P ₀	: 580 mW		
Resistance	: 272 Ω		
Characteristic curve	: trapezoidal		
Internal inductivity	: 4 μH		
Internal capacity	: 1.2 nF		
Transmitter supply	: 16 V DC, max. 20 mA (terminals 48)		
Explosion protection	Ex ia/IIC or	ia/IIC	ia/IIB
Max. external inductivity	: 2,3 mH	: 0,1 mH	: 5 mH
Max. external capacity	: 0,12 μF	: 0,22 μF	: 0,76 μF
Max. values U _i	: 30 V		
I _i	: 52 mA		
P _i	: 980 mW		
Outputs			
Alarm outputs	: relay SPDT < 250 V AC < 250 VA < 2 A cos φ ≥ 0,3 < 300 V DC < 40 W < 2 A (terminals 21, 22, 23; 25, 26, 27)		
Analog output	: 0/4..20 mA burden ≤ 500 Ω 0/2..10 V burden > 500 Ω isolated output changes burden depending		
Accuracy	: 0.2 %; TK 0.01 %/K (terminals 17, 18)		
Fault indicating	: break of wire in the measuring circuit → analog output programmable 0 mA, < 3.6 mA or > 21.5 mA → alarm relay(s) min. or max. programmable		
Bus system			
Modbus	: RS485, RTU or ASCII max. 38400 Baud		
Profibus	: Profibus DP		
Connection	: 9pol. D-SUB connector in the front		
Display	: graphic-LCD-Display, 128 x 64 Pixel with white back-light		
Case	: Polyamide (PA) 6.6, UL94V-0		
Weight	: approx. 450 g		
Connection	: screw clamps 0.14..2.5 mm ² AWG 26..AWG14		
Protection class	: case IP30, terminals IP20 acc. to BGV A3		

Continue next page

Product information

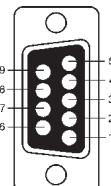
Dimensions



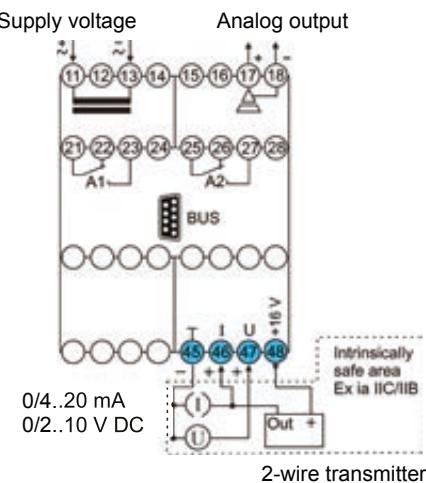
Bus connection

Modbus		
PIN	Signal	EIA / TIA-485 name
5	D1	B / B'
9	D0	A / A'
1	Common	C / C'
Profibus		
3	RxD / TxD-P	
5	DGND	
6	VP / +5V max 10 mA	
8	RxD / TxD-N	

9 pol. D-Sub connector
in the front



Connection diagram



Transmitters / Signal conditioning

Ordering code

1. 2. 3. 4. 5. 6.
PMT50Ex - - - - - -

1. Model/input

1	Standard signals 0/4..20 mA, 0/2..10 V DC
	Intrinsically safe EX II (1) G [Ex ia] IIC/IIB EX II (1) D [Ex iaD]

2. Analog output

AO	0/4..20 mA, 0/2..10 V DC, isolated
----	------------------------------------

3. Alarm outputs

00	not installed
2R	2 relay outputs, A1, A2 SPDT

4. BUS configuration

00	not installed
MB	Modbus RTU/ASCII, RS485
PB	Profibus DP

5. Supply voltage

0	230 V AC, ± 10 % 50-60 Hz
1	115 V AC, ± 10 % 50-60 Hz
5	24 V DC, ± 15 %

6. Options

00	without option
----	----------------

Product information

Temperature Transmitter PMT50-2 /-3



- Signal conditioning – linearisation – output characteristic transformation
- Input for resistance and Potentiometer or RTD Pt100/Pt1000 and thermocouples
- Measuring range programmable
- Linearisation or transformation of output characteristic via 32 base-points programmable
- Automatic fault detection in the measuring circuit

Characteristics

The programmable universal transmitter PMT50 operates with analog input signals. The device converts input signals to analog output 0/4..20 mA; 0/2..10 V DC. Optional a serial interface is available. The device offers a linearisation function for any sensor curves and a simulator function. The integrated transmitter supply 24 V DC max. 30 mA allows the feeding of 2-and 3-wire sensors. 4 alarm outputs for monitoring and controlling are available.

Technical data

Power supply

Supply voltage : 230 V AC ±10 %
115 V AC ±10 %
24 V DC ±15 %

Power consumption : < 5 VA

Operating temperature : -10..+55 °C

CE – conformity : IEC61326 05/2004, IEC 61000-4-2,
IEC 61000-4-3, IEC 61000-4-4,
IEC 61000-4-5, IEC 61000-4-6,
IEC 61000-4-8, IEC 61000-4-11,
CISPR16-1/16-2

Inputs

Fault detection : type -2: (only resistance measurement)
broken line;
type -3: broken line (Pt100 / Pt1000, TC)
and short circuit (only Pt100 / Pt1000)

Device type 2

Input : resistance 0..100 kΩ,
potentiometer min.1 kΩ.. max. 100 kΩ
Accuracy : < 0.2 %, ±1 Digit

Transmitters / Signal conditioning

Device type 3

Input : Pt100 (3-wire) -100.0..+600.0 °C
Pt1000 (3-wire) -100.0..+300.0 °C
Thermocouple (TC)
type J -100.0..+800.0 °C
type K -150..+1200 °C
type N -150..+1200 °C
type S -50..+1600 °C
: < 0.1 %, ±1 Digit

Accuracy
Outputs

Alarm outputs : relay SPDT
< 250 V AC < 250 VA < 2 A
 $\cos \Phi \geq 0.3$
< 300 V DC < 40 W < 2 A

Analog output : 0/4..20 mA burden ≤ 500 Ω,
0/2..10 V burden > 500 Ω isolated

output changes automatically
(burden depending)
: for broken line or short circuit detection
→ analog output (programmable)
0 mA, < 3.6 mA or >21.5 mA
→ Alarm relays

min. or max. programmable
Fault indication : RS485, RTU or ASCII
max. 38400 Baud

Profibus : Profibus DP
Connection : 9 pole D-SUB plug in the front

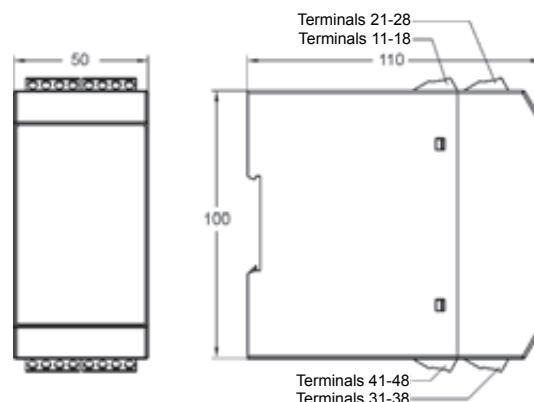
Display : Graphic-LCD-Display
128 x 64 Pixel,
with white LCD backlit

Case : Polyamide (PA) 6.6 , UL94V-0
TS35 acc. to DIN EN 60715:2001-09
Weight : approx. 450 g

Connection : screw terminals 0.14..2.5 mm²
AWG 26..AWG14

Protection class : case IP30, terminals IP20 acc. to
BGV A3

Dimensions



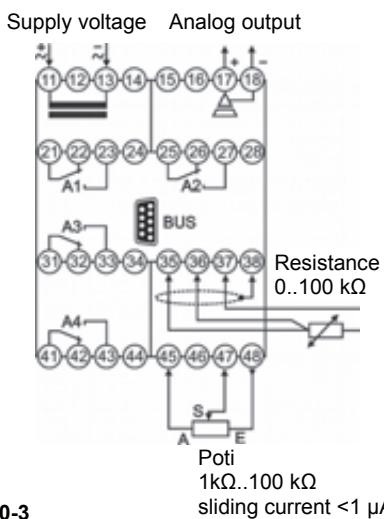
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Product information

Connection diagrams

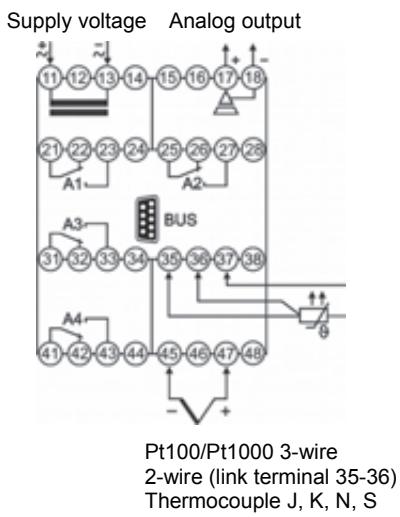
Device type PMT50-2

Resistance, Potentiometer



Device type PMT50-3

Pt100, Pt1000, thermocouple



Transmitters / Signal conditioning

Ordering code

1. 2. 3. 4. 5. 6.
PMT50 - - - - - -

1. Device type/input	
2	Resistance in the range 0..100 kΩ Poti 1 kΩ..100 kΩ
3	RTD Pt100, 3-wire, -100.0..+600.0 °C RTD Pt1000, 3-wire, -100.0..+300.0 °C Thermocouple J (Fe-CuNi), -100.0..+800.0 °C K (NiCr-Ni), -150..+1200 °C N (NiCrSi-NiSi), -150..+1200 °C S (Pt10Rh-Pt), -50..+1600 °C
2. Analog output	
AO	0/4..20 mA, 0/2..10 V DC isolated
3. Alarm outputs	
00	not installed
2R	2 relay outputs, A1, A2 SPDT
4. Alarm output/BUS configuration	
00	not installed
2R	2 relay outputs, A3, A4 SPDT
MB	Modbus RTU/ASCII, RS485
PB	Profibus DP
5. Supply voltage	
0	230 V AC, ± 10 % 50-60 Hz
1	115 V AC, ± 10 % 50-60 Hz
5	24 V DC, ± 15 %
6. Options	
00	without option

Bus connection

Modbus

PIN	Signal	EIA/TIA-485 Name
5	D1	B / B'
9	D0	A / A'
1	Common	C / C'

9-pol. D-Sub plug
in the front

Profibus

3	RxD / TxD-P
5	DGND
6	VP / +5V max. 10 mA
8	RxD / TxD-N

Product information

Temperature Transmitter PMT50Ex-2 /-3



- Signal conditioning – linearisation – output characteristic transformation
- Input for resistance and Potentiometer or RTD Pt100/Pt1000 and thermocouples
- Measuring range programmable
- Linearisation or transformation of output characteristic via 32 base-points programmable
- Automatic input fault detection

Characteristics

The programmable Temperature Transmitter PMT50 operates with RTD and thermocouple input signals. The device convert the signal to analog output 0/4..20 mA; 0/2..10 V DC. Optional a serial interface is available. The device offers a linearisation function for any sensor curves and a simulator function. The integrated transmitter supply 24 V DC max. 30 mA allows the feeding of 2-and 3-wire sensors. 4 alarm outputs for monitoring and controlling are available.

Technical data

Power supply

Supply voltage	: 230 V AC ±10 % 115 V AC ±10 % 24 V DC ±15 % Um = 253 V AC or 125 V DC (terminals 11 and 13)
Power consumption	: < 5 VA
Operating temperature	: -10..+55 °C
CE-conformity	: ATEX-directive 94/9/EG (certificate PMT50ATEX.001) EN 60079-0:2006 EN60079-11:2007 EN 61241-0:2006 EN61241-11:2006 IEC61326 05/2004, IEC 61000-4-2, IEC 61000-4-3, IEC 61000-4-4, IEC 61000-4-5, IEC 61000-4-6, IEC 61000-4-8, IEC 61000-4-11, CISPR16-1/16-2
Explosion protection	: II (1) G [Ex ia] IIC/IIB bzw. II (1) D [Ex iAD]

Approval

: TÜV 08 ATEX 554329

Device type 2

Input	: resistance 0..20 kΩ (terminals 35, 36, 37, 38)
Fault detection	: broken line

Accuracy : < 0.2 %, ±1 Digit

Transmitters / Signal conditioning

Max. U ₀ no load	: 1.4 V
Max. I ₀ short circuit	: 2,5 mA
Max. output power P ₀	: 3 mW
Resistance	: 5600 Ω
Characteristic curve	: trapezoidal
Internal inductivity	: 4 µH
Internal capacity	: 135 nF
Explosion protection	Ex ia/IIC ia/IIB
Max. external inductivity	: 100 mH 100 mH
Max. external capacity	: 25 µF 120 µF
Input	
Accuracy	: Potentiometer min. 1 kΩ..max. 100 kΩ (terminals 45, 47, 48)
Max. values U ₀	: <0.2 %, ±1 Digit
Max. I ₀	: 9.6 V
Max. P ₀	: 56 mA
Resistance R	: 200 mW
Characteristic curve	: 259 Ω
Internal inductivity	: trapezoidal
Internal capacity	: 4 µH
Explosion protection	Ex ia/IIC ia/IIB
Max. external inductivity	: 5 mH 20 mH
Max. external capacity	: 0.48 µF 2 µF

Device type 3

Input	: Pt100 (3-wire) -100.0..+600.0 °C Pt1000 (3-wire) -100.0..+300.0 °C thermocouple (TC) type J -100.0..+800.0 °C type K -150..+1200 °C type N -150..+1200 °C type S -50..+1600 °C (terminals 35, 36, 37; 45, 47)
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Fault detection : broken line (Pt100 / Pt1000,TC) or short circuit (only Pt100 / Pt1000)

Accuracy : < 0.1 %, ±1 Digit

Max. voltage no load U ₀	: 1.4 V
Max. short circuit curr. I ₀	: 2.5 mA
Max. output power P ₀	: 3 mW
Resistance R	: 5600 Ω
Characteristic curve	: trapezoidal

Internal inductivity	: 4 µH
Internal capacity	: 135 nF
Explosion protection	Ex ia/IIC ia/IIB
Max. external inductivity	: 100 mH 100 mH
Max. external capacity	: 25 µF 120 µF

Outputs

Alarm outputs	: relay SPDT < 250 V AC < 250 VA < 2 A cos Phi ≥ 0.3
	< 300 V DC < 40 W <2 A (terminals 21, 22, 23; 25, 26, 27)

Analog output	: 0/4..20 mA burden ≤ 500 Ω 0/2..10 V burden > 500 Ω, isolated output changes automatically (burden depending)
- Accuracy	: 0.2 %; TK 0.01 % / K (terminals 17, 18)

Fault function

	: for broken line or short circuit detection → analog output (programmable)
	: 0 mA, < 3.6 mA or >21.5 mA
	→ alarm relays min. or max. programmable

Bus system

Modbus	: RS485, RTU or ASCII max. 38400 Baud
Profibus	: Profibus DP

Connection : 9 pole D-SUB plug in the front

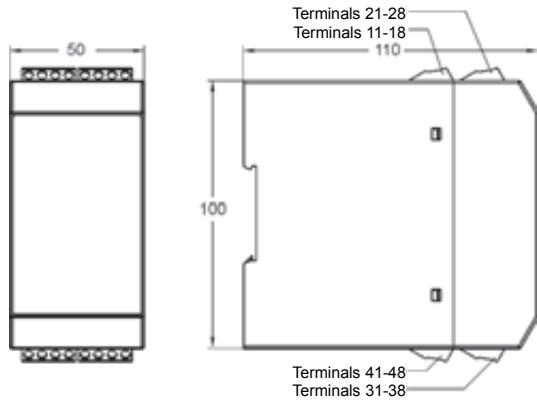
Display : graphic-LCD-display, 128 x 64 Pixel
with white LCD backlit

Product information

Case	: Polyamide (PA) 6.6, UL94V-0 TS35 acc. to DIN EN 60715:2001-09
Weight	: approx. 450 g
Connection	: screw terminals 0.14..2.5 mm ² AWG 26..AWG14

Protection class	: case IP30, terminals IP20 acc. to BGV A3
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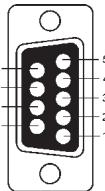
Dimensions



Bus connection

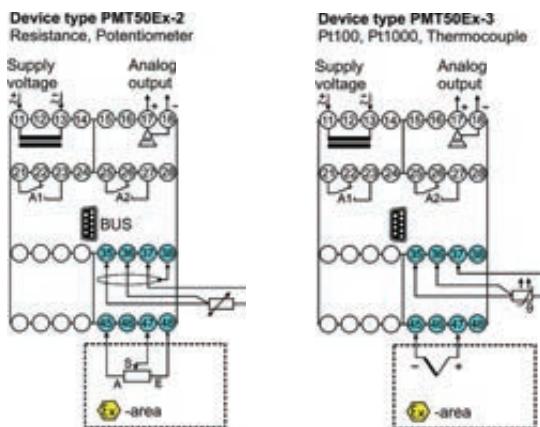
Modbus		
PIN	Signal	EIA / TIA-485 Name
5	D1	B / B'
9	D0	A / A'
1	Common	C / C'
Profibus		
3	RxD / TxD-P	
5	DGND	
6	VP / +5V max. 10 mA	
8	RxD / TxD-N	

9 pol. D-Sub plug
in the front



Transmitters / Signal conditioning

Connection diagram



Ordering code

PMT50Ex - - - - - -

1. Device type/input	
2	Resistance in the range 0..20 kΩ Poti 1 kΩ..100 kΩ
3	RTD Pt100, 3-wire, -100.0..+600.0 °C RTD Pt1000, 3-wire, -100.0..+300.0 °C Thermocouple J (Fe-CuNi), -100.0..+800.0 °C K (NiCr-Ni), -150..+1200 °C N (NiCrSi-NiSi), -150..+1200 °C S (Pt10Rh-Pt), -50..+1600 °C
	Inputs intrinsically safe EX II (1) G [Ex ia] IIC/IIB EX II (1) D [Ex iaD]
2. Analog output	
AO	0/4..20 mA, 0/2..10 V DC isolated
3. Alarm outputs	
00	not installed
2R	2 relay outputs, A1, A2 SPDT
4. BUS configuration	
00	not installed
MB	Modbus RTU/ASCII, RS485
PB	Profibus DP
5. Supply voltage	
0	230 V AC, ± 10 % 50-60 Hz
1	115 V AC, ± 10 % 50-60 Hz
5	24 V DC, ± 15 %
6. Options	
00	without option

E Industrial electronic

E3

Isolating converter

Page

- Devices for rail systems

132

Isolating Converter



Characteristics

System	3-port isolation Signal conditioning $0..20 \text{ mA} \Leftrightarrow 4..20 \text{ mA}$ $0..10 \text{ V} \Leftrightarrow 2..10 \text{ V}$ Decoupling Transmitter supply into the Ex-area Safety barriers for RTD (Pt100/Pt1000) and 0/4..20 mA
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Applications

- Industry Instrumentation
- Process Instrumentation
- Oil- and Gas industry
- -Applications

Product information

Function

Isolating amplifiers are suitable for potential separation or to convert standard signals. The universal design of the inputs and outputs and the wide back-up voltage ranges limit the variety of models to two designs. Furthermore, the transmitter allows for the direct connection of 2 active wire sensors (4..20 mA) and 3 wire sensors. They also guarantee a high degree of safety for signals from the Ex-range.

Safety barriers are available as accessories to setup Ex measuring circuits for devices without Ex certification.

Advantages

- Safe 3-port signal isolation
- Transmitter supply for active sensors
- Universal inputs
- Range switchover
- Signal output in the ex range (only TV501Ex)
- Outputs 0/4..20 mA simultaneous 0/2..10 V DC
- 22.5mm standard case for DIN rail mounting TS35

Device Overview

Signal	Input				Output			
Device	0/4..20 mA	0/2..10 V	Transmitter supply	Switching contact (Namur)	0/4..20 mA	0/2..10 V	Switching contact	Page
TV125M	•*	•*			•	•		134
ST125M	•*	•*	•		•	•		134
TV125L	•*	•*			•			136
ST500	•	•	•		•	•		138
TV500	•	•			•	•		138
ST500Ex	•*	•*	•*		•	•		139
TV500Ex	•*	•*			•	•		139
TV500H	•	•			•	•		140
TV500L	•	•			•	•		141
TV500P	•	•			•			142
TW500	•	•			•			143
TV501Ex	•	•			•*	•*		144
TS125/TS225				•*				145
TS500							•	147
TS500Ex				•*			•	148
Accessories								
Safety Barrier 9001	•				•			149

* Intrinsically safe

Mistakes reserved, technical specifications subject to change without notice.

Product information

Universal Isolating Amplifier TV125M / ST125M



- Standard inputs and outputs with adjustment function
- Safe electrical isolation between input / output / power supply by reinforced insulation in accordance to DIN EN 61010-1
- Functional safety to EN61508 SIL2
- Input intrinsically safe for the connection of sensors in the Ex-zone 0 and 20 possible
- Equipment installation in ex-zone 2
- Wide range power supply for AC and DC supply
- Power rail supply
- Output accuracy < 0.2% of full scale
- Operating display and status messages bi-color LED
- Configuration via front panel dip switches
- Coded Plug-in terminal blocks
- Small design, width 12.5 mm
- Mounting rail TS 35 and EN60715

Characteristics

Isolation amplifiers of series TV/ST125M are suitable for potential separation or to convert the standard signals. The universal design of inputs and outputs, and the internal power supply with wide-range power supply enable a wide spectrum of applications with only one type of device.

Alternatively the power supply can be carried out via a mounting rail bus connector. The pluggable terminal strips allow a simple and time-saving wiring.

The configuration of input and output signals is done by front panel dip switches in a very easy and fast way.

Because of the microprocessor design it's possible to interpret undershooting or exceedance of the measurement range and reported about by a bi-color status LED on the front panel. In case of an error the output is then set to a defined initial value or ending value.

The initial value and the end value of the measuring range can be adjusted by means of two front-mounted trimmers.

The device version of ST125 additionally provides a transmitter power supply for external 2-, 3- and 4-conductor sensors.

Isolating converters

Technical data

Explosion protection

Gas : II (1) G [Ex ia Ga] IIC/IIB

Dust : II (1) D [Ex ia Da] IIIC

Intrinsically safe + Zone 2: II 3 G nA nC [ic] IIB T4 Gc *

Ignition protection type „n“: II 3 G nA nC IIB T4 Gc X *

*) Installation in a clean environment in a conductive, earthed housing (switch cabinet) with a minimum protection rating of IP54.

Characteristics intrinsically safe circuits

	All types (Terminals 41, 42)	ST125M(MP)-Ex (Terminals 51, 52)
U₀	27,6 V	25,9 V
I₀	1,3 mA	92,6 mA
P₀	9,6 mW	598 mW
U_i	26 V	-
I_i	113 mA	-
P_i	660 mW	-
	max. inductivity capacity	
C_i	1 nF	1 nF
L_i	240 nH	240 nH
	IIB / IIIC	
C₀	667 nF	769 nF
L₀	200 mH	8 mH
	IIC	
C₀	85 nF	99 nF
L₀	100 mH	2 mH

External Power

Auxiliary voltage

Wide-range power supply : 20..125 V DC / 85..253 V AC (47..63Hz)

Power-Rail-supply : 24 V DC +/- 15 %

Wide-range power supply	: < 4 VA
Power-Rail-supply	: < 2 W
Conformity	: Directive 2014/35/EU
EMC	: Directive 2014/30/EU
Standards	: EN 61010-1: 2010, EN 61326-1: 2013, EN 61326-3-1: 2008,
Rated voltage	: 253 V AC, 125 V DC according to EN 60079-11 300 V AC/DC according to DIN EN 61010-1 with overvoltage Category 2 and Degree of Contamination 2 between all circuits. Safe separation with amplified isolation
Test voltage	: 3kV AC Input/Output/Power supply
Ambient conditions	
Working temperature	: -10..60°C
Storage temperature	: -20..80°C
Relatvive air humidity	: 10..90% (no condensation)

Input

Voltage input	: 0..10V oder 2..10 V switchable, R _i = 30 kΩ. overload max. 26 V DC
Current input	: 0..20 mA or 4..20 mA switchable; R _i = 51 Ω, 113mA
Measuring span	: adjustable ± 2 %
Zero point	: adjustable ± 2 %

Product information

Output

Voltage output : 0...10 V or 2...10 V switchable, Load > 500 Ω .

Current output : 0..20 mA or 4..20 mA switchable, Load < 600 Ω .

Step response T90 : 40 ms

Standard error : < 0,2 % of the end value

Temperature coefficient : < 0,01 % / K

Transmitter feed

Rated voltage at 20 mA output current : > 15 V DC; terminals 51, 52
> 14 V DC; terminals 51, 41, $R_i = 300 \Omega$

Housing

Material : Polyamid (PA) 6.6, UL94V-0

Weight : 91g

Protection class : Housing IP30, terminals IP20 BGV A3

Colour : light grey

Installation width : 12,5 mm

Dimension (HxT) : 108 x 114 mm

Assembly : Mounting rail assembly TS35

DIN EN 60715

Safety Integrity

Level : SIL 2 (parameters in accordance with EN 61508 and SN 29500) for input types 4..20 mA or 2..10 V and output types 4..20 mA or 2..10 V

Device type : B

HFT : 0

Error signalling : Output 0 V respective 0 mA

Reaction time : Normal function → error: 40 ms, error → normal function: 1s (self resetting)

Controls, functional description

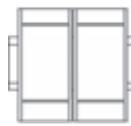


Status-LED	Message
Green LED illuminates	Operating voltage connected
Red and green LED illuminates	See manual tab. 7: Status messages
Red LED illuminates	Electronic defect

Configuration:

DIP	On	Off
S1	Voltage input	Current input
S2	Voltage output	Current output
S3	Input: S1 = On: 0 ... 10 V, S1 = Off: 0 ... 20 mA	Input: S1 = On: 2 ... 10 V, S1 = Off: 4 ... 20 mA
S4	Output: S2 = On: 0 ... 10 V, S2 = Off: 0 ... 20 mA	Output: S2 = On: 2 ... 10 V, S2 = Off: 4 ... 20 mA

Mounting

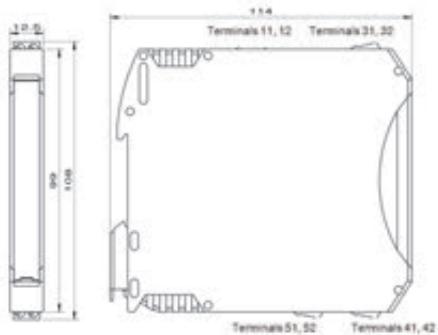


Carrier rail mounting TS35,
DIN EN 60715

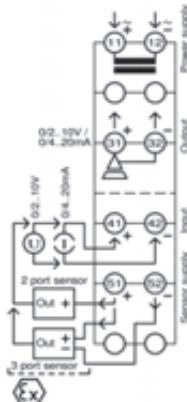
Mounting of multiple units without distance is only permitted in horizontal orientation.

Isolating converters

Mechanical design / dimensions



Connection diagram



Power supply:
85...253 VAC / 20 ... 125 VDC
or 24 VDC +/- 15 %

Output:
0/2 ... 10V or 0/4...20 mA

Input:
0/2 ... 10 V or 0/4...20 mA

Order code

1. 2. 3. 4.

1. Device version

TV125M Wide-range mains adapter

TV125MP Mounting rail bus connection *), Auxiliary voltage 24 V DC +/- 15 %

ST125M Transmitter feed, Wide-range mains adapter

ST125MP Transmitter feed, mounting rail bus connection *), Auxiliary voltage 24 V DC +/- 15 %

2. Explosion protection

00 No intrinsically safe input and no intrinsically safe transmitter feed. The devices TV125MP and ST125MP may be installed in zone 2 according to ATEX-ignition protection type "n"

Ex In case of installing the devices out of the ex-zone: Input and transmitter feed are intrinsically safe in accordance to ignition protection type "ia" for zones 0 and 20. The devices TV125MP and ST125MP may be installed in zone 2 according to ATEX-ignition protection type „ic“

3. Input

10 0/2...10 V / 0/4...20 mA

4. Options

00 without option

01 Push-in terminals (plug-in)

* see separate information sheet power rail

Product information

Isolating converters

Universal Isolating Amplifier TV125L



- **Safe galvanic isolation between input / output / auxiliary voltage** with reinforced isolation in accordance with DIN EN 61010-1
- Step response T_{90} 40ms
- Output deviation < 0.2% of the limit value
- Overload protection of the current input with automatically resetting fuse
- Operating display and status messages via two-colour LED
- **Configuration via front DIP switches**
- Plug-in terminal strips
- Narrow installation width of 12.5 mm for carrier rail mounting TS 35

Characteristics

Isolating amplifiers of the series TV125L are suitable for potential isolation or for conversion of unit signals. The universal layout of the inputs and the output enables a broad range of applications with only one type of device. The plug-in terminal strips enable simple and time-saving wiring. The configuration is also quick and easy with the front DIP switches.

Brief information

The input measuring ranges can be switched between 0..20 mA and 4..20 mA or 0..10 V and 2..10 V with a DIP switch on the front. The input measuring ranges can be switched between 0..20 mA and 4..20 mA or 0..10 V and 2..10 V with a DIP switch on the front.

With the microprocessor-controlled measurement logging, undercutting and exceeding of the measurement range are detected and indicated via a two-colour status LED on the front side. Then the current output is set to a defined starting or final value.

The current input is protected with an automatically resetting fuse (PTC) against static overvoltages up to 32 V AC/DC.

The required auxiliary energy is less than 0.5 VA.

The three circuits: Inputs, outputs, and auxiliary voltage, are galvanically separated with amplified isolation.

Technical data

Auxiliary power

Auxiliary voltage : 18 - 30V DC

Power consumption : < 0.5 VA

Conformity : CE; Directive 2004/108/EC

EMC : DIN EN 61326-1: 2013-07, Class A

Standards : DIN EN 61010-1: 2011-07,
DIN EN 61010-2: 2011-07

Rated voltage: 300 V AC/DC in accordance with DIN EN 61010-1
with Overvoltage category 2 and
Degree of contamination 2 between all
circuits.
Safe separation with amplified isolation

Test voltage : 3 kV AC, 50 Hz, 1 min

Input / Output / Auxiliary power

Environmental conditions

Working temperature : -10..60°C

Storage temperature : -20..60°C

Air humidity : < 95% (no condensation)

Inputs

Voltage input : Switchable, 0..10V or 2..10 V.
 $R_i = 47 \text{ k}\Omega$. Max. overload 32 V AC

Current input : Switchable, 0..20 mA or 4..20 mA.
 $R_i = 48 \Omega + 15 \Omega$ (RiPTC).
Max. overload 32 V AC/DC in
accordance with
DIN EN 61010-2-30

Output

Current output : Switchable, 0..20 mA or 4..20 mA.
Load < 150 Ω .

Step response : 40 ms

Standard error : < 0.2 % of final value

Temperature coefficient : < 0.01 % / K

Casing

Material : Polyamide (PA) 6.6 , UL94V-0,

Weight : 91g

Protection rating : Housing IP30, terminals IP20 BGV A3

Colour : light grey

Installation width : 12.5 mm

Dimensions (HxD) : 108 x 114 mm

Installation : Carrier rail mounting
TS35 DIN EN 60715

Product information

Operation

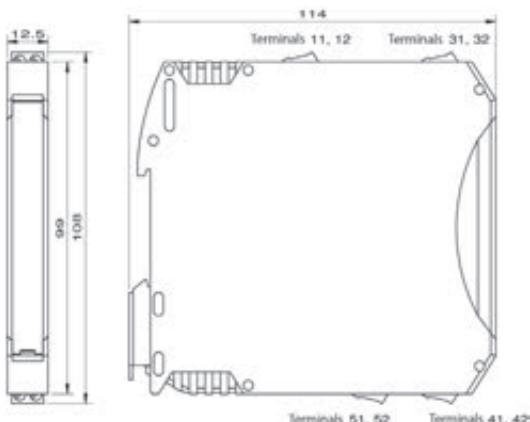


TV 125L	Status LED	Message
	Green LED illuminates	Operating voltage applied
	Red and green LED blink alternately with 2 Hz	measuring range undercutting or measuring range exceeding
	Red LED illuminates	Failure of the unit, please return to manufacturer!

Configuration

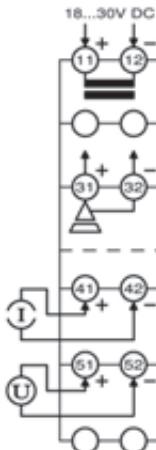
Inp.	Outp.	Input	Output
S1	S2		
Off	Off	4..20 mA, 2..10 V	4..20 mA
Off	On	4..20 mA, 2..10 V	0..20 mA
On	Off	0..20 mA, 0..10 V	4..20 mA
On	On	0..20 mA, 0..10 V	0..20 mA

Dimensions



Isolating converters

Connection diagram



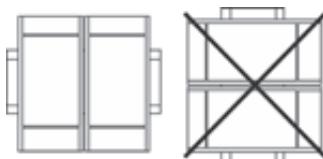
Auxiliary voltage: 18 – 30 V DC

Current output: 0/4 – 20 mA

Current input 0/4 – 20 mA

Voltage input: 0/2 – 10 V

Installation



Carrier rail mounting TS35, DIN EN 60715
The gapless installation of multiple devices is now permissible with horizontally installed carrier rails.

Ordering code

1. 2. 3. 4.
TV - - - -

1. Device version

125L Auxiliary voltage 18..30 V DC

125LP Auxiliary voltage 18..30 V DC
Tragschienenbusanschluss *)

2. Metering range

10 Inputs 0/4..20 mA and 0/2..10 V
Outputs 0/4..20 mA

3. Auxiliary voltage

5 18..30 V DC

4. Options

00 without option

01 Push-in-clamp (plug-in)

*) siehe gesondertes Informationsblatt Power-Rail

Product information

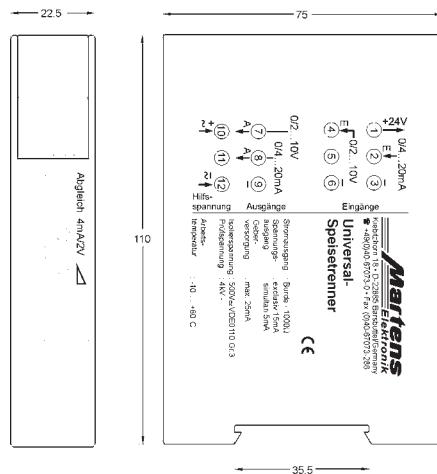
Isolating Signal Converter TV500 / ST500

With integr. transmitter supply



Isolating converters

Dimensions



DIN rail mounting TS35

Characteristics

TV500 isolating signal converter can be used to isolate and convert field signals 0/4..20 mA or 0/2..10 V DC into industry standard signals for process control systems. The ST500 provides a fully floating isolated transmitter supply.

Technical data

Power supply

Supply voltage : 100..265 V AC or 10.8..30 V AC/DC

Frequency AC : 47..63 Hz

Power consumption: < 3.5 VA

Operating

temperature : -10..+60 °C

CE-conformity : EN 55022, EN 60555-2,
IEC 61000-4-4/5/11/13

Inputs

Current : 0/4..20 mA selectable, $R_i = 25 \Omega$
overload max. 100 mA

Voltage : 0/2..10 V DC selectable,
 R_i approx. 40 k Ω , overload max. 100 V

Span and start value

4 mA/2 V : adjustable approx. $\pm 5\%$

Transmitter supply : approx. 24 V DC, R_i approx. 150 Ω ,
(only ST500) short-circuit current approx. 35 mA

Outputs

Current : 0/4..20 mA selectable,
burden max. 1 k Ω

Voltage : 0/2..10 V selectable,
load max. 15 mA, short-circuit-proof
(parallel with the current output max. 5 mA)

Rise time (T_{90}) : model 10: < 20 ms, max. frequency 18 Hz
model 11: < 100 μ s, max. frequency 1 kHz

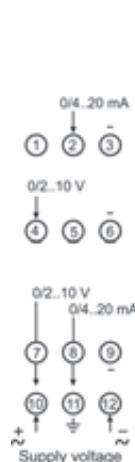
Accuracy : $\leq 0.2\%$
(single range adjustment $\leq 0.1\%$)

Case : standard case polycarbonate 8020 UL94V-1
acc. to DIN EN 60715:2001-09, DIN rail TS35

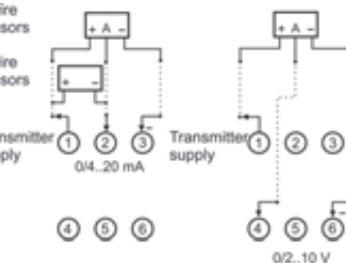
Weight : approx. 200 g
Connection : screw terminals, max. 2.5 mm 2
Protection class : case IP30,
terminals IP20 acc. to BGV A3

Connection diagram

Signal converter
TV500



Power feed signal converter
ST500



Ordering code

1. 2. 3.
_____ - _____ - _____

1. Model

TV500 signal converter

ST500 power feed signal converter

2. Measuring range

10 inputs 0/4..20 mA and 0/2..10 V

outputs 0/4..20 mA and 0/2..10 V

11 as 10, but rise time $T_{90} < 100 \mu$ s

3. Supply voltage

0 100..265 V AC

5 10.8..30 V AC/DC

Product information

Isolating Signal Converter TV500Ex / ST500Ex

With integr. transmitter supply



Characteristics

TV500 isolating signal converter can be used to isolate and convert field signals 0/4..20 mA or 0/2..10 V DC out of the intrinsically safe area. The ST500 provides a fully floating isolated transmitter supply.

Technical data

Power supply

Supply voltage : 85..253 V AC/110..125 V DC or 10..30 V AC/DC

Frequency : 40..400 Hz

Power consumption : < 3.5 VA

Operating temperature : -10..+55 °C

CE-conformity : ATEX directive 94/9/EG
EMC directive 2004/108/EG

Standards : EN 60079-0:2013,
EN 60079-11:2012,
EN 61326-1:2004-05

Explosion protection

Certification : TÜV 97 ATEX 1150, 2. annex

Approval : II (1) G [Ex ia Ga] IIC,
II (1) D [Ex ia Da] IIIC

Inputs

Current : 0/4..20 mA selectable, Ri 25 Ω
overload max. 100 mA

Voltage : 0/2..10 V DC selectable,
Ri 40 kΩ, overload max. 100 V

Span and start value

4 mA/2 V : adjustable approx. ± 20 %

Transmitter supply : approx. 20 V DC, Ri approx. 300 Ω,
(only ST500Ex) short-circuit current < 27 mA

Outputs

Current : 0/4..20 mA selectable,
burden max. 1 kΩ

Voltage : 0/2..10 V selectable,
load max. 15 mA, short-circuit-proof
(parallel with current output max. 5 mA)

Rise time (t₉₀) : < 100 ms

Accuracy : 0.25 %

Case : standard case polycarbonate 8020 UL94V-1
acc. to DIN EN 60715:2001-09, TS35

Weight : approx. 200 g

Connection : screw terminals, max. 2.5 mm²

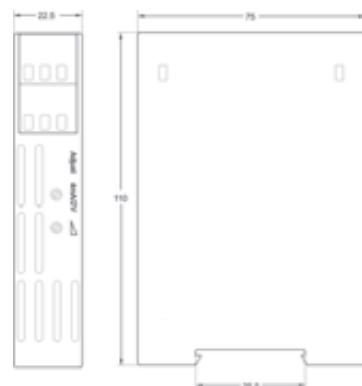
Protection class : case IP30,
terminals IP20 acc. to BGV A3

Isolating converters

Mounting area

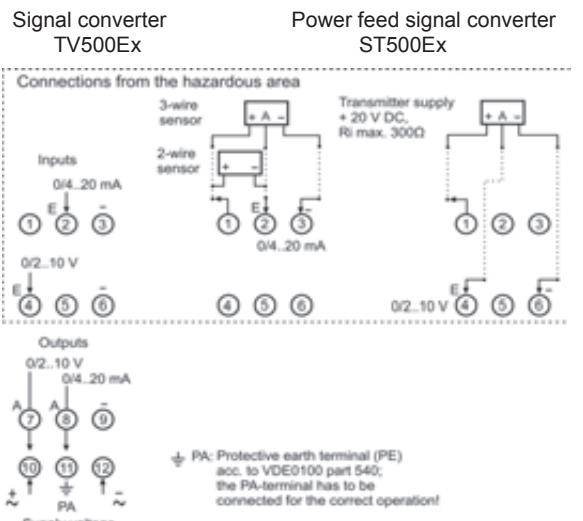
Mounting in dry, clean and well monitored areas
For more details see user manual.

Dimensions



DIN rail mounting TS35

Connection diagram



Ordering code

1. 2. 3.
 □ - □ - □

1. Model	
TV500Ex	signal converter
ST500Ex	power feed signal converter
2. Measuring range	
10	inputs 0/4..20 mA and 0/2..10V outputs 0/4..20 mA and 0/2..10V
3. Supply voltage	
0	85..253 V AC
5	10..30 V AC/DC

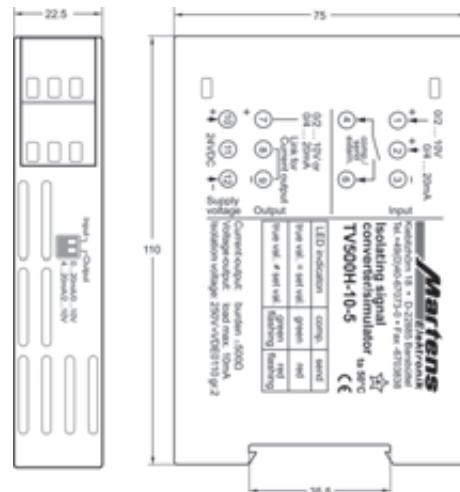
Product information

Isolating Signal Converter TV500H



Isolating converters

Dimensions



DIN rail mounting TS35

Characteristics

The TV500H brings the function of an isolating signal converter together with a set point adjuster and offers comparator and hold function. This combination offers therefore the possibility, to simulate a measuring value and the easy way to change the sensor without process interruption.

Technical data

Power supply

Supply voltage : 230 V AC $\pm 10\%$ 47..63 Hz or
24 V DC $\pm 15\%$

Power consumption : < 3 VA

Operating temperature : -10...+50 °C

CE-conformity : EN 55022, EN 60555-2
IEC 61000-4-3/4/5/11/13

Input

Current : 0/4..20 mA selectable, $R_i = 43 \Omega$,
overload max. 100 mA

Voltage : 0/2..10 V selectable, $R_i = 175 \text{ k}\Omega$,
overload max. 100 V

Output

Programmable output

Voltage → current : link between terminal 8 and 9
Current : 0/4..20 mA selectable, burden < 500 Ω

Voltage : 0/2..10 V selectable, load max. 10 mA

Accuracy : < 0.2 %

Rise time (T_{90}) : < 40 ms

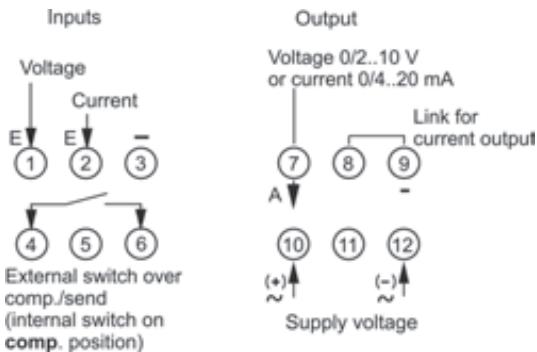
Case : standard polycarbonate 8020 UL94V-1
acc. to DIN EN 60715:2001-09

Weight : approx. 200 g

Electrical connection : screw terminals, max. 2.5 mm²

Protection class : case IP30,
terminals IP20 acc. to BGV A3

Connection diagram



Ordering code

1.
TV500H - 10 -

1. Supply voltage

0	230 V AC $\pm 10\%$
5	24V DC $\pm 15\%$

Product information

Isolating Signal Converter TV500L



Characteristics

Isolating signal converter TV500L can be used to isolate and convert unipolar or bipolar field signals into industry standard unipolar 0/4..20 mA and 0/2..10 V DC or bipolar signals for process control systems. The output characteristic curve is programmable for increasing or decreasing performance.

Technical data

Power supply

Supply voltage : 230 V AC \pm 10 % or 24 V DC \pm 15 %
Frequency AC : 47..63 Hz

Power consumption : < 3 VA (at 24 V DC, 80 mA)

Operating temperature : -10..+50 °C
CE-conformity : EN 55022, EN 60555,
IEC 61000-4-3/4/5/11/13

Inputs

Current : \pm 20 mA or 0/4..20 mA selectable,
 $R_i = 43 \Omega$, overload max. 100 mA
Voltage : \pm 10V or 0/2..10 V selectable,
 $R_i = 40 \text{ k}\Omega$, overload max. 100 V
Start value : adjustable \pm 1.5 %
End value : adjustable \pm 1.5 %
Accuracy : < 0.3 %,
(single range adjustment < 0.1 %)

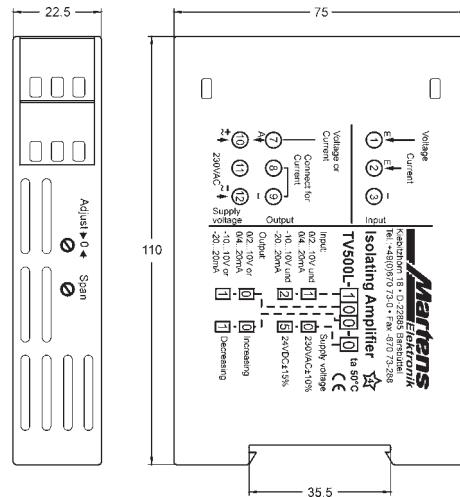
Output

Programmable output

Voltage \rightarrow current : link between terminal 8 and 9
Current : 0/4..20 mA selectable, burden $\leq 400 \Omega$;
 ± 20 mA, burden $\leq 150 \Omega$
Burden error : < 0.1 % ($R_L = 0.200 \Omega$),
< 0.2 % ($R_L = 0.400 \Omega$)
Voltage : 0/2..10V selectable, load max. 10 mA;
 ± 10 V, load max. 5 mA
Rise time (T_{90}) : < 40 ms
Case : standard case polycarbonate 8020 UL94V-1
acc. to DIN EN 60715:2001-09, TS35
Weight : approx. 200 g
Electrical connection : screw terminals, max. 2.5 mm²
Protection class : case IP30,
terminals IP20, acc. to BGV A3

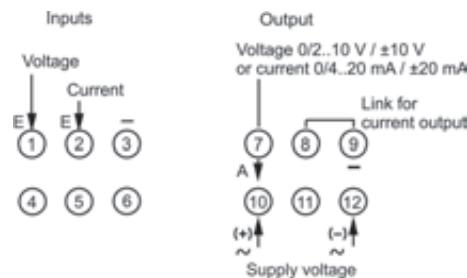
Isolating converters

Dimensions



DIN rail mounting TS35

Connection diagram



Ordering code

1. 2. 3. 4.
TV500L - -

1. Inputs

1	0/4..20 mA and 0/2..10 V DC
2	\pm 20 mA and \pm 10 V DC

2. Outputs

0	0/4..20 mA and 0/2..10 V DC
1	\pm 20 mA and \pm 10 V DC

3. Characteristic curve

0	increasing
1	decreasing (inverted)*

4. Supply voltage

0	230 V AC \pm 10 %
5	24V DC \pm 15 %

* please state input- and output signal in clear text

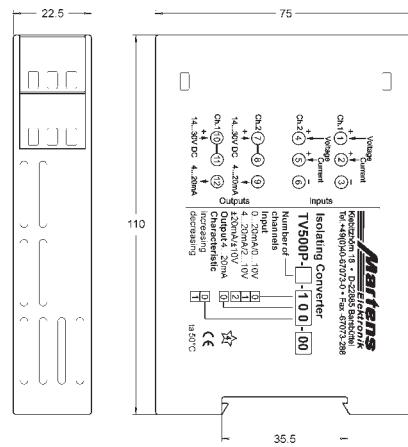
Product information

Isolating Signal Converter TV500P



Isolating converters

Dimensions



DIN rail mounting TS35

Characteristics

Loop powered signal converter series TV500P are highly compact devices to isolate and adapt standard signals to active inputs of SPC- and DC-systems.

The device is loop powered via the 4-20 mA output.

Technical data

Power supply

Supply voltage : 14..30 V DC (loop voltage)

Operating temperature

: -10..+50 °C

CE-conformity

: EN 55022, IEC 61000-4-3/4/5

Inputs

Current : 0..20, 4..20 mA or ± 20 mA

R_i = 43 Ω, overload max. 100 mA

Voltage

: 0..10, 2..10 V or ±10 V

R_i = 160 kΩ, overload max. 100 V

End value 20 mA : adjustable ± 5 %

Accuracy : < 0.2 %, (single range adjustment < 0.1 %)

Outputs

Current : 4..20 mA,

Burden : R_{max} = (U_B-14 V) ÷ 20 mA

Rise time T₉₀ : < 70 ms

Note!

Output switches to 22 mA, if the input signal fall below -34 % or exceeds +34 % of the input signal.

Case : standard case polycarbonate 8020 UL94V-1 acc. to DIN EN 60715:2001-09

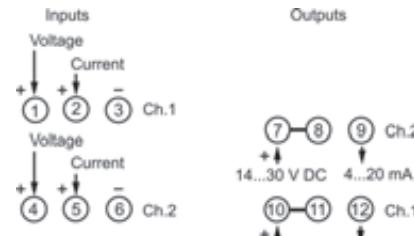
Weight : approx. 200 g

Electrical connection

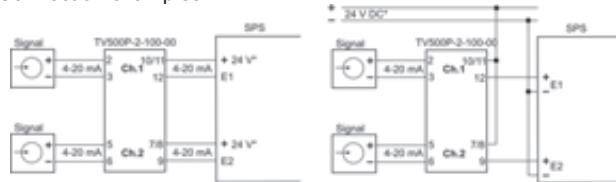
: screw terminals, max. 2.5 mm²

Protection class : case IP30, terminals IP20, acc. to BGV A3

Connection diagram



Connection examples



Ordering code

1. 2. 3. 4. 5.
TV500P - [] - [] [] [] - []

1. No. of channels

1	1 channel
2	2 channels

2. Inputs

0	0..20 mA and 0..10 V DC
1	4..20 mA and 2..10 V DC
2	± 20 mA and ± 10 V DC

3. Output

0	4..20 mA passive
---	------------------

4. Characteristic curve

0	increasing
1	decreasing (inverted)

5. Options

00	without option
----	----------------

Product information

Isolating Signal Converter TW500

Loop powered 0(4)..20 mA



Characteristics

Loop powered signal isolator TW 500 are highly compact devices to isolate DC-current signals 0(4)..20 mA without power supply. Up to 3 channels are deliverable in one 22.5 mm DIN rail housing.

Technical data

Input

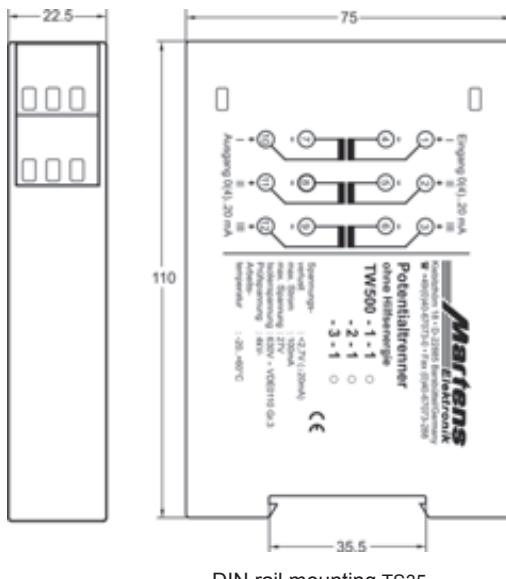
Current	: 0(4)..20 mA DC
Max. current	: 100 mA
Max. voltage	: 27 V DC
Voltage drop	: < 2.7 V ($I \leq 20$ mA)
Test voltage	: 4 kV DC input / output
Rated voltage	: 630 V acc. to VDE 0110 group 2
Operating temperature	: -20..+60 °C
CE-conformity	: EN55022, IEC61000-4-2/4

Output

Current	: 0(4)..20 mA
Max. current	: max. input current
Burden	: < 1200 Ω ($I \leq 20$ mA)
Rise time (T_{90})	: < 30 ms
Accuracy	: < 0.1 %
Burden error	: < 0.0008 %/Ω
Temperature coefficient	: < 0.001 %/°C
Ripple	: < 0.2 %
Case	: standard case polycarbonate 8020 UL94V-1 acc. to DIN EN 60715:2001-09, DIN rail TS35
Weight	: approx. 140 g
Connection	: screw terminals, max. 2.5 mm ²
Protection class	: case IP30, terminals IP20, acc. to BGV A3

Isolating converters

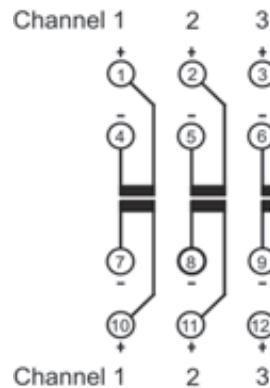
Dimensions



DIN rail mounting TS35

Connection diagram

Input 0(4) ... 20mA DC



Output 0(4) ... 20mA DC

Note:

Not used outputs must be shorted by a link.

Ordering code

1.
TW500 - - 1

1. Model

1	1-channel
2	2-channels
3	3-channels

Product information

Isolating Signal Converter TV501Ex

Intrinsically safe outputs



Characteristics

Isolating signal converter TV501 can be used to isolate and convert 0/4..20 mA and 0/2..10 V signals to the hazardous area. The universal design of the in- and outputs and the wide range of supply voltage limits the devices into 2 models.

Technical data

Power supply

Supply voltage : 85..253 V AC / 110..125 V DC or 10..30 V AC/DC

Frequency AC : 40..400 Hz

Power consumption : < 3.5 VA

Operating temperature : -10..+55 °C

CE-conformity : ATEX directive 94/9/EG
EMC directive 2004/108/EG

Standards : EN 60079-0:2013,
EN 60079-11:2012,
EN 61326-1:2004-05

Inputs

Current : 0/4..20 mA DC, selectable, $R_i = 25 \Omega$,
overload max. 100 mA

Voltage : 0/2..10 V DC, selectable, R_i ca. 40 k Ω ,
overload max. 100 V

Span : adjustable approx. ± 5 %

Zero point : adjustable approx. ± 5 %

Explosion protection

Certification : TÜV 97 ATEX 1164

Approval : II (1) G [Ex ia Ga] IIC or
II (1) D [Ex ia Da] IIIC

Outputs

Current : 0/4..20 mA DC, selectable
burden ≤ 320 Ω (TV501Ex-..-10)
burden ≤ 1 k Ω (TV501Ex-..-20)

Voltage : 0/2..10 V DC, selectable,
max. 15 mA short-circuit-proof,
(parallel with voltage output max. 5 mA)

Rise time (T_{90}) : < 20 ms

Accuracy : ≤ 0.3 %

Case : standard case polycarbonate 8020 UL94V-1
DIN rail mounting TS35

Weight : approx. 200 g

Electrical connection : screw terminals, max. 2.5 mm²

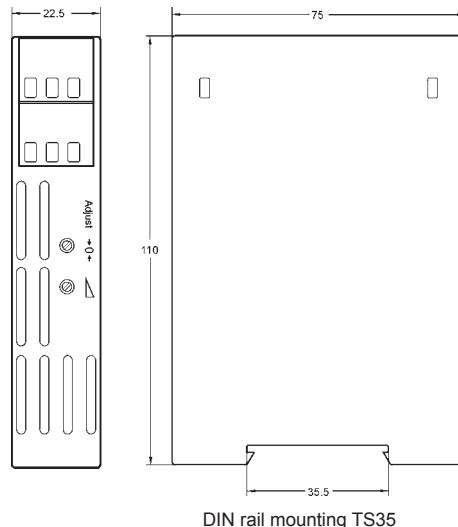
Protection class : case IP30, terminals IP20
acc. to BGV A3

Isolating converters

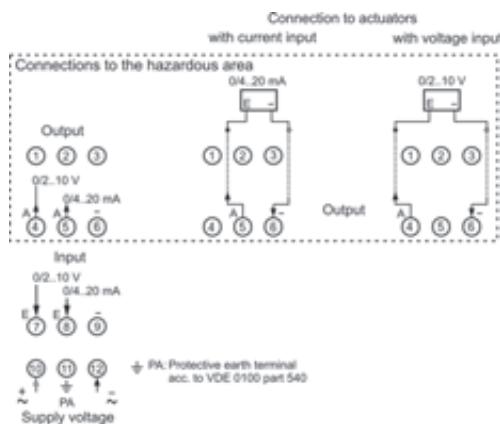
Mounting area

Mounting in dry, clean and well monitored areas
For more details see user manual.

Dimensions



Connection diagram



Ordering code

1. 2. 3.
TV501Ex - - -

1. Measuring range

10	inputs 0/4..20 mA and 0/2..10V DC outputs 0/4..20 mA burden 320 Ω , 0/2..10 VDC
----	--

20	inputs 0/4..20 mA and 0/2..10V DC outputs 0/4..20 mA burden 1 k Ω , 0/2..10 VDC
----	--

2. Supply voltage

0	85..253 V AC
5	10..30 V AC/DC

3. Options

00	without option
----	----------------

Product information

Switch amplifier TS125 and TS225



- 1 or 2 channel version
- Safe galvanic isolation between input / output / auxiliary voltage
- Functional safety up to SIL2 EN61508
- Inputs for switching contacts, Namur initiators, or optocouplers
- Intrinsically safe inputs for connection of sensors in Ex Zones 0 and 20
- Device installation in Ex Zone 2 possible
- Galvanic isolation in accordance with the requirements for amplified isolation (EN60664)
- Switchable monitoring of the input circuit for wire breaks and short-circuit
- Relay outputs as normally open contacts or changeovers (invertible effect)
- Wide-range mains adapter or 24 V DC
- Configuration via front DIP switches
- Plug-in coded terminal strips
- Housing width of 12.5 or 22.5mm
- Carrier rail mounting TS35 EN60755
- Operating display, switching status and error message display via LEDs

Characteristics

Switch amplifiers of the series TS125 and TW255 are used in switch cabinets for the conversion and isolation of digital switching signals, as well as in explosion-prone areas.

The devices are available in one- or two-channel versions. Passive sensors, such as switching contacts, Namur initiators, or passive electronic outputs of third-party devices, can be connected to the intrinsically safe inputs.

The TS125 series in 12.5 mm wide carrier rail housing offers relay outputs with output make circuit. The TW225 series in 22.5 mm wide carrier rail housing offers relay outputs with changeover function. The plug-in terminal strips enable simple and time-saving wiring. The configuration is also quick and easy with the front DIP switches.

Technical data

Explosion protection

Gas:	II (1) G [Ex ia Ga] IIC/IIB
Dust:	II (1) D [Ex ia Da] IIIC
Intrinsically safe + Zone	II 3 G nA nC [ic] IIB T4 Gc *)
Protection rating 'n':	II 3 G nA nC IIB T4 Gc X *)

*) Manufacturer's certificate, requires installation in an earthed, conductive housing (minimum protection rating IP54)

Wide-range mains

Isolating converters

Auxiliary voltage:	20..125VDC and 20..250VAC, (47..63Hz), max. 1.5W
ATEX thresholds:	$U_o = 8.7V$; $I_o = 19mA$; $P_o = 42mW$ $L_i = 20\mu H$; $C_i = 10nF$
	IIB/IIIC: $L_o = 100\mu H$ $1mH$ $100mH$ $C_o = 12.9\mu F$ $7.3\mu F$ $2.8\mu F$
	IIC : $L_o = 100\mu H$ $1mH$ $100mH$ $C_o = 2.2\mu F$ $1.2\mu F$ $0.4\mu F$

24V mains adapter

Auxiliary voltage:	24V DC +/-15%, max. 1.5W
ATEX thresholds:	$U_o = 8.7V$; $I_o = 17mA$; $P_o = 37mW$ $L_i = 20\mu H$; $C_i = 10nF$
	IIB/IIIB: $L_o = 100\mu H$ $1mH$ $100mH$ $C_o = 13.9\mu F$ $7.3\mu F$ $2.9\mu F$
	IIC/IIIC: $L_o = 100\mu H$ $1mH$ $100mH$ $C_o = 2.2\mu F$ $1.3\mu F$ $0.4\mu F$

Combined data

Um (according to ATEX):	253V AC / 125V DC
Test voltage :	3kV AC between input/output/auxiliary voltage

Working temperature : -10..60°C

Storage temperature : -20..80°C

Air humidity : 10..90% (no condensation)

Measuring inputs (in accordance with EN60947-5-6 Namur)

Open circuit voltage :	approx. 8V
Short circuit voltage :	approx. 8mA
Switching points :	inactive <= 1.2mA, active >= 2.1mA, hyst. < > 0.5mA

Error recognition

-Wire break :	<0.2mA
-Short circuit :	>7mA

Relay outputs

Switching voltage :	<250V AC <2A <500VA <125V DC <0.2A <25W < 30V DC <2A <60W
---------------------	---

Switching frequency : max. 5Hz

-delay : max. 30ms

Casing

Dimensions (WxDxH)	TS125: 12.5 x 114 x 108mm TS225: 22.5 x 114 x 108mm
--------------------	--

Material : PA6.6, light grey,
Flammability class V0 (UL94)

Weight : TS125: 120g; TS225: 140g

Protection rating : IP20

Terminals : 0.2 - 2.5mm², AWG 24 - 14
Removable coded terminals

Functional safety :

SIL2 in accordance with EN61508
(specific data on request)

Product information

Isolating converters

Operation

- Green Power ON operating display

TS125...-1, TS125...-2, TS225...-1 TS225...-2

Operating elements per channel Ch.1 / Ch.2

- LEDs A1 / A2 : yellow with active relay
blinks red with error status (wire break or short circuit)
- Switch INV : off: active input switches on the assigned relay
on: active input switches off the assigned relay

(condition as delivered underlined)

Applications with functional safety (SIL2) require switch **INV = off** and **ERR = on** !

TS125...-F, TS225...-F

Single-channel isolating amplifier with additional error relay or parallel relay. Operating elements :

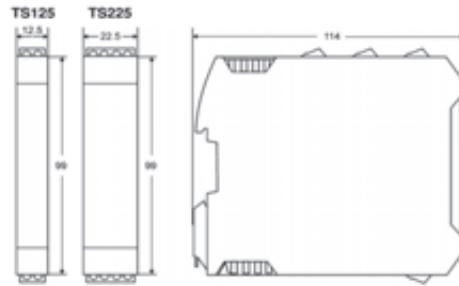
- LED A1 : yellow with active Relay A1
blinks red with error status (wire break or short circuit)
- LED A2 : yellow with active Relay A2 (if switch ERR-Ch.2 = off)
blinks red/yellow with active Relay A2 with error status
blinks red with inactive Relay A2 with error status (if switch ERR-Ch.2 = on)
- Switch INV-Ch.1 : off: active input Ch.1 switches on Relay A1
on: active input Ch.1 switches off Relay A1
- Switch ERR-Ch.1 : off: Error recognition via Relay A1 inactive
on: Error recognition active With error status, switches off Relay A1
- Switch INV-Ch.2 : off: active input Ch.1 or alternatively an error status*) switch on Relay A2
on: active input Ch.1 or alternatively an error status*) switch off Relay A2
- Switch ERR-Ch.2 : off: Error recognition via relay A2 inactive (A2 switches parallel to A1)
*) on: Error recognition active (see Switch INV-Ch.2)

(condition as delivered underlined)

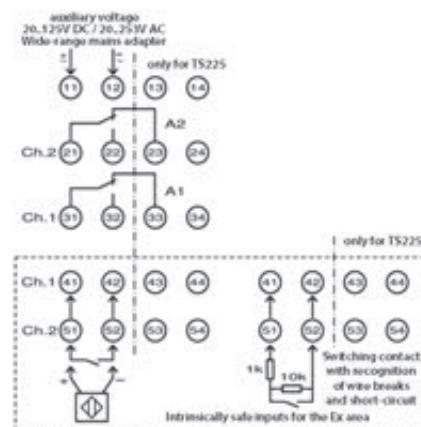
Applications with functional safety (SIL2) require switch **INV-Ch.2 = on, ERR-Ch.2 = on** !

INV-Ch.1 = off, INV-Ch.2 = on, ERR-Ch.2. = off simulates a changeover contact with Relay A1 / A2

Dimensions



Connection diagram



Ordering code

1. 2. 3. 4.
TS - - - -

1. Device version	
125L	Housing width 12.5mm, Relay NO contacts, Auxiliary voltage 24V DC +/-15%
125LP	Housing width 12.5mm, Relay NO contacts, Auxiliary voltage 24V DC +/-15% with DIN-rail bus connector / Power Rail *)
125M	Housing width 12.5mm, Relay NO contacts, Wide-range mains adapter 20..125 VDC, 20..250 VAC
225M	Housing width 22.5mm, Relay changeover contacts, Wide-range mains adapter 20..125 VDC, 20..250 VAC
2. Explosion protection	
00	Installation of the device TV125L in Zone 2 permitted, in accordance with ATEX ignition protection rating 'n'
Ex	With installation of the devices outside the Ex area: Inputs intrinsically safe in accordance with ATEX ignition protection rating 'ia' for Zones 0 and 20 The device TS125L may be installed in Zone 2 in accordance with ATEX ignition protection rating 'ic'.
3. Number of channels	
1	Single channel
2	Dual channel
F	Single channel with additional error relay or parallel relay
4. Options	
00	without option

*) see separate information sheet Power Rail

Product information

Isolating Switching Repeater TS500



Characteristics

Isolating switching repeater TS500 can be used for monitoring and controlling digital signals. The input is suitable for switching contact, proximity switch acc. Namur DIN EN 60947-5-6, or passive electronic outputs of other devices. The output can be delivered as relay SPDT or transistor (voltage free).

Technical data

Power supply

Supply voltage : 230 V AC $\pm 10\%$, 47..63 Hz
24 V $\pm 15\%$

Power consumption : < 2 W

Operating temperature : -10..+55 °C

CE-conformity : EN 55022, EN 60555,
IEC 61000-4-4/5/11/13

Inputs

Namur (acc. to DIN EN 60947-5-6)

- No load voltage : approx. 8 V

- max. current : approx. 8 mA

- Switching points : inactive ≤ 1.2 mA, active ≥ 2.1 mA,
hysteresis approx. 0.5 mA

- Break of wire : ≤ 0.1 mA

- Short circuit : ≥ 7.5 mA

Switching contact

Output

Relay SPDT : < 253 V AC < 100 VA < 2 A;
< 100 V DC < 50 W < 2 A

- max. frequency : 5 Hz

- max. delay : 20 ms (2-channel: 50 ms)
max. 35 V DC, max. 50 mA, voltage free
(short-circuit-proof)

- voltage drop : ≤ 3.5 V active (at load 50 mA)
- max. frequency : 2 kHz

Case : standard case ploy carbonate 8020 UL94V-1
acc. to DIN EN 60715:2001-09, TS35

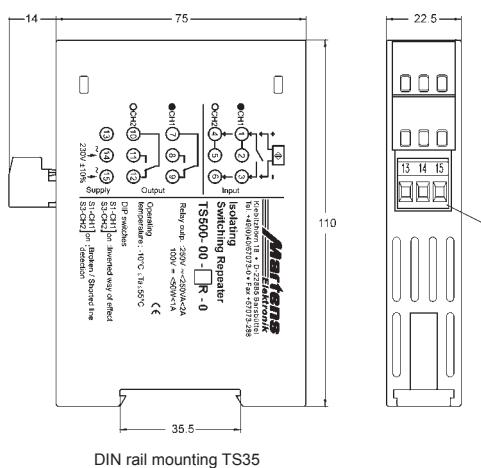
Weight : approx. 200 g

Electrical connection: screw terminals, max. 2.5 mm²

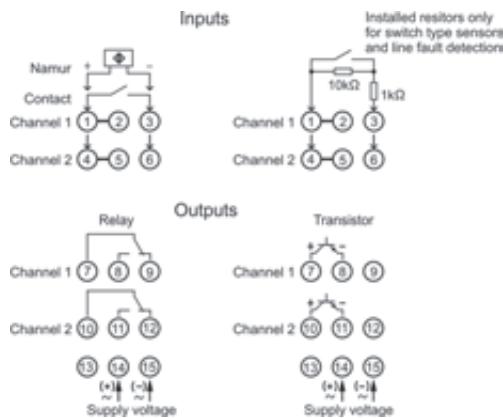
Protection class : case IP30,
terminals IP20 acc. to BGV A3

Isolating converters

Dimensions



Connection diagram



Ordering code

TS500 - - -

1. Model	
00	Standard
2. Output	
1R	1-channel relay output
2R	2-channels relay output
1T	1-channel transistor output
2T	2-channels transistor output
3. Supply voltage	
0	230 V AC $\pm 10\%$
5	24 V DC $\pm 15\%$

Note:

The TS500 is also available as Ex-ia.

Product information

Isolating Switching Repeater TS500-Ex



Characteristics

Isolating switching repeater TS500-Ex can be used for monitoring and controlling digital signals out of the hazardous area. The intrinsically safe input is suitable for switching contact, proximity switch according to Namur DIN EN 60947-5-6, or passive electronic outputs of other devices. The devices must be installed out of the Ex-area because only the input is intrinsically safe.

Technical data

Explosion protection

Certification : DMT 99 ATEX E 079
Approval : ATEX II (1) G [Ex ia] IIC/IIB or (1) D [Ex iaD]

Power supply

Supply voltage : 230 V AC $\pm 10\%$, 47..63 Hz
24 V $\pm 15\%$

Power consumption : < 2 W

Operating temperature : -10..+55 °C

CE-conformity : ATE-directive 94/9/EG,
Standards : EN 60079-0:2006, EN 60079-11:2007,
EN 61241-0:2006, EN 61241-11:2006

Inputs (intrinsically safe)

Namur (acc. to DIN EN 60947-5-6)

- No load voltage : approx. 8 V
- max. current : approx. 8 mA
- Switching points : inactive ≤ 1.2 mA, active ≥ 2.1 mA, hysteresis approx. 0.5 mA
- Break of wire : ≤ 0.1 mA
- Short circuit : ≥ 7.5 mA

Switching contact

Output

Relay SPDT : < 253 V AC < 100 VA < 2 A;
< 100 V DC < 50 W < 2 A

- max. frequency : 5 Hz
- max. delay : 20 ms (2-channel: 50 ms)

Transistor : max. 35 V DC, max. 50 mA, voltage free (short-circuit-proof), safety voltage 253 V AC/125 V DC

- voltage drop : ≤ 3.5 V active (at load 50 mA)
- max. frequency : 2 kHz

Case : standard case poly carbonate 8020 UL94V-1 acc. to DIN EN 60715:2001-09, TS35

Weight : approx. 200 g

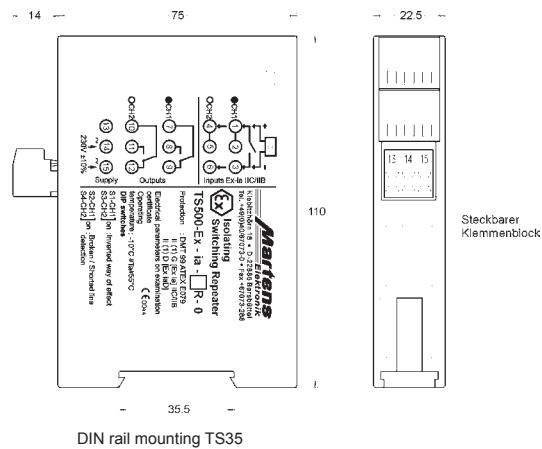
Electrical connection: screw terminals, max. 2.5 mm²

Protection class : case IP30, terminals IP20 acc. to BGV A3

More details see user manual

Isolating converters

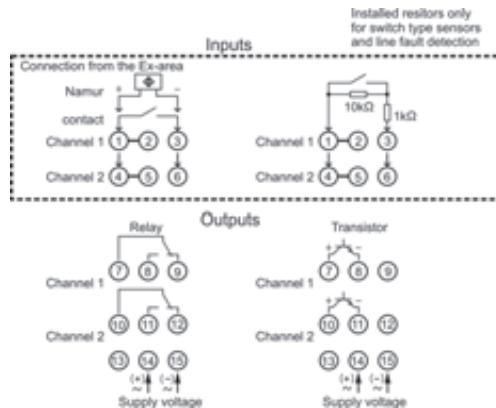
Dimensions



DIN rail mounting TS35

Stackbarer Klemmenblock

Connection diagram



Ordering code

TS500-Ex - ia - -

1. Output

1R	1-channel relay output
2R	2-channels relay output
1T	1-channel transistor output
2T	2-channels transistor output

2. Supply voltage

0	230 V AC $\pm 10\%$
5	24 V DC $\pm 15\%$

Product information

Safety Barriers Series 9001



Characteristics

Safety barriers of the series 9001 can be used for varied applications in the area of the automation. They allow the intrinsically safe mode of a HART transmitter, actuator, voltage free contact, temperature sensor, DMS, magnet valves, Display... The compact size makes an easy and space saving mounting possible.

Technical data

Installation	: valid in zone 2 and Division 2
Mounting	: DIN EN 60715 TS35
Explosion protection	: II 3 (1) G Ex nA [ia Ga] IIC/IIB T4 Gc II (1) D [Ex ia Da] IIIC
Dimensions	: 12.2x104x70 mm (WxHxD)

Model 01

0(4)..20mA	
Nominal voltage	: 24 V DC
R _i	: min. 286 Ω max. 319 Ω
I _{max}	: 75 mA
U ₀	: 28 V
I ₀	: 100 mA
P ₀	: 700 mW

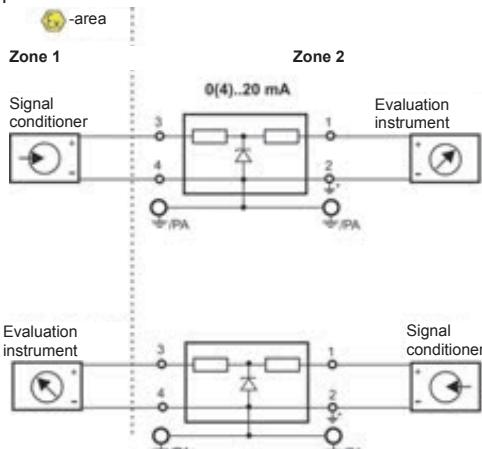
Model 02

Pt100/Pt1000	
Nominal voltage	: 0,7 V DC
R _i	: min. 39 Ω max. 40 Ω
I _{max}	: 17 mA
U ₀	: 1,6 V
I ₀	: 50 mA
P ₀	: 20 mW

Isolating converters

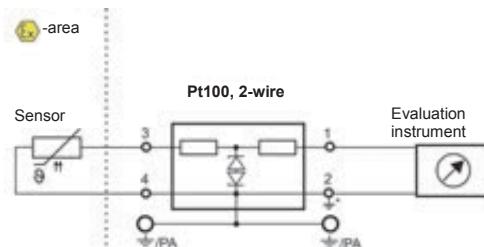
Connection examples

9001-01

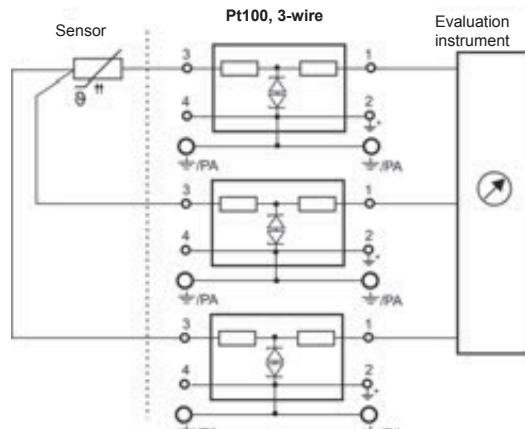


The calculation of the burden for the signal conditioner must be including the line resistant of the safety barrier.

9001-02



The line resistant of the safety barrier must be calibrated at the evaluation instrument.



* only in connection with the isolated mounting of the safety-barrier.

Ordering code

1.
9001 -

1. Model	
01	0(4)..20 mA
02	Pt100 / Pt1000

E Industrial electronics

E4

Safety and monitoring

	Page
▪ Monitoring relay	152
▪ Battery controller	157
▪ Monitoring realy / Temperature limit value	161
▪ Safety relay	175
▪ Isolations guard	176

Safety and Monitoring



Characteristics

System	Current, voltage, power, temperature
Principle	Vibration, insulation resistance, safety end switch, safety-temperature limiting/-monitoring
Evaluation	Standard-signals, switching outputs with display
Mounting	Switch panel case, DIN rail mounting TS35

Applications

- Monitoring of AC Power systems
- Temperature limiter acc. to SIL2
- Battery guard for solar systems and wind power stations
- Insulation guard for health care facility's and railway vehicles
- Pressure monitoring, filling height
- Live saving in machine controls for cutters, mixing machines etc.

Product information

Safety and monitoring

Device Overview

Device	Function	Input	Measuring / indicating range	Page
MR50	Limit switch, 4 alarm outputs, analog output	0/4..20 mA, 0/2..10 V DC	±9999 Digit	154
MR50Ex	Limit switch, 2 alarm outputs, analog output	0/4..20 mA, 0/2..10 V DC	±9999 Digit	155
BW500	Battery guard, 1 alarm output	12, 24, 48, 60 V DC	11..14 V 22..28 V 44..56 V 55..70 V	157
CVG500	Limit switch, 1 alarm output	0..1 AAC/0..5 AAC 0..125 V AC / 0..250 V AC	0..100%	158
GS500	Limit switch, 1 alarm output	0/4..20 mA, 0/2..10 V DC	0..100%	159
GS1000	Limit switch, 2 alarm output, analog output	0/4..20 mA, 0/2..10 V DC	0..100%	160
GS1000	Limit switch, 2 alarm output, analog output	Pt100, Thermocouple J, K, S	-50..600 °C, 0..1600 °C	161
GS125	Limit switch, 2 alarm output, analog output	0/4..20 mA, 0/2..10 V DC, Pt100, Thermocouple J, K, S	0..100%, -50..500 °C, 0..1500 °C	163
TG50	Temperature guard, 4 alarm output, analog output	Pt100, Thermocouple J, K, N, S	-100..600 °C, -100..1600 °C	165
TG50Ex	Temperature guard with Ex, 2 alarm output, analog output	Pt100, Thermocouple J, K, N, S	-100..600 °C, -100..1600 °C	167
TB225	Temperature limiter/guard, 2 alarm output, analog output	0/4..20 mA, 0/2..10 V DC, Pt100, Thermocouple J, K, N, S	0..100%, -100..600 °C, -100..1600 °C	169
STL50	Safety temperature limiter/guard, 1 alarm output	Pt100, Thermocouple J, K, N, S	-100..+600 °C -100..+1600 °C	171
STL50Ex	Safety temperature limiter/guard, 1 alarm output	Pt100, Thermocouple J, K, N, S	-100..+600 °C -100..+1600 °C	173
SD9648	Alarm Display	Analog signal 0/4..20 mA, 0/24 V DC or voltage free contacts	Free text	175
IW1000	Insulation guard	Insulation resistance	1 kΩ..5,5 MΩ	176

Mistakes reserved, technical specifications subject to change without notice.

Product information

Monitoring Relay MR50



- Input standard signals 0/4..20 mA, 0/2..10 V DC
- Measuring range programmable
- Max. 4 alarm outputs
- Isolated analog output 0/4..20 mA, 0/2..10 V DC

Characteristics

The Monitoring Relay MR50 has inputs for industry standard signals 0/4..20 mA and 0/2..10 V DC. Measuring value and programmed unit are shown in the display. The integrated transmitter supply offers direct connection of loop powered sensors. Simple programming, up to 4 alarm outputs (SPDT) and optional available fully isolated free programmable analog output 0/4..20 mA; 0/2..10 V DC meets the demand for different applications.

Technical data

Power supply

Supply voltage : 230 V AC $\pm 10\%$, 115 V AC $\pm 10\%$, or
24 V DC $\pm 15\%$

Power consumption : max. 5 VA

Operating temperature : -10..+55 °C

CE-conformity : Norm IEC 61326 05/2004,
IEC 61000-4-2/3/4/5/6/8/11, CISPR16-1/16-2

Input

R_i : 0/4..20 mA; 0/2..10 V DC
: current 10 Ω,
voltage 10 kΩ

Fault detection : break of wire

Accuracy : <0,1 %, ±1 Digit

Transmitter supply : 24 V DC max. 30mA

Outputs

Relay SPDT : < 250 V AC < 250 VA < 2 A
 $\cos\phi \geq 0,3$, < 300 V DC < 40 W < 2 A

Analog output : 0/4..20 mA, burden $\leq 500 \Omega$;
0/2..10 V burden $>500 \Omega$, isolated,
output changes automatically
(burden dependent)

Accuracy : 0.2 %; TK 0.01 %/K

Fault function at break of wire:

→ Analog output : 0 mA, < 3.6 mA or >21.5 mA
→ Alarm contact(s) : min. or max. programmable

Display : graphic LCD-display with 128 x 64 Pixel,
and white back-light

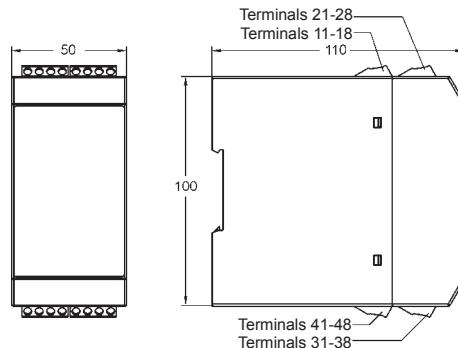
Case : Polyamide (PA) 6.6 , UL94V-0
acc. to DIN EN 60715:2001-09

Weight : approx. 450 g
Connection : screw terminals 0.14..2.5 mm²
(AWG 26..14)

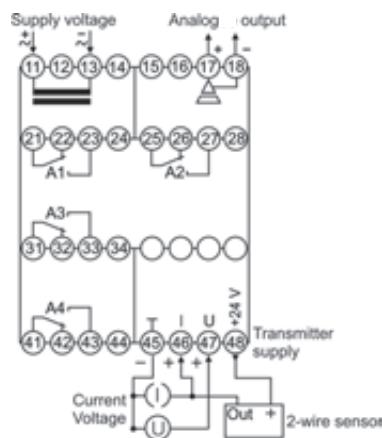
Protection class : case IP30, terminals IP20, BGV A3

Safety and monitoring

Dimensions



Connection diagram



Ordering code

MR50 - - - - - -

1. Input

1	standard signals 0/4..20 mA, 0/2..10 V DC, transmitter supply 24 V DC, max. 30 mA
---	--

2. Alarm output A1, A2

2R	2 relays SPDT
----	---------------

3. Alarm output A3, A4

00	not installed
2R	2 relays SPDT

4. Analog output

00	not installed
AO	0/4..20 mA, 0/2..10 V DC

5. Supply voltage

0	230 V AC, $\pm 10\%$ 50-60 Hz
1	115 V AC, $\pm 10\%$ 50-60 Hz
5	24 V DC, $\pm 15\%$

6. Options

00	without option
----	----------------

Product information

Monitoring Relay MR50Ex



- Input standard signals 0/4..20 mA, 0/2..10 V DC
- Measuring range programmable
- Max. 2 alarm outputs
- Isolated analog output 0/4..20 mA, 0/2..10 V DC

Characteristics

The Monitoring Relay MR50Ex has inputs for industry standard signals 0/4..20 mA and 0/2..10 V DC. Measuring value and the programmed unit are shown in the display. The integrated transmitter supply offers direct connection of loop powered sensors. Simple programming, up to 2 alarm outputs (SPDT) and an optional available fully isolated free programmable analog output 0/4..20mA; 0/2..10 V DC meets the demand for different applications.

Technical data

Power supply

Supply voltage	: 230 V AC $\pm 10\%$, 115 V AC $\pm 10\%$, 24 V DC $\pm 15\%$ $U_m=253$ V AC or 125 V DC (terminals 11 and 13)
Power consumption	: max. 5 VA
Operating temperature	: -10..+55 °C
CE-conformity	: ATEX-directive 94/9/EG (certificate MR50ATEX.001) EN 60079-0:2006 EN 60079-11:2007 EN 61241-0:2006 EN 61241-11:2006, IEC 61000-4-2 IEC 61000-4-3 IEC 61000-4-4 IEC 61000-4-5 IEC 61000-4-6 IEC 61000-4-8 IEC 61000-4-11 CISPR16-1/16-2

Inputs

Explosion protection	: Ex II (1) G [Ex ia] IIC/IIB or II (1) D [Ex iaD]
Approval	: TÜV 08 ATEX 554329
Input	: 0/4..20 mA; 0/2..10 V DC
R _i	: current 10 Ω, voltage 10 kΩ
Fault detection	: break of wire in the measuring circuit (terminals 45, 46 and 47)
Accuracy	: < 0.1 %, ± 1 Digit
Temperature coefficient	: 0.01 %/K

Safety and monitoring

Safety data

Max. no load voltage U_0	: 18.9 V
Max. short circuit curr. I_0	: 92.5 mA
Max. output power P_0	: 580 mW
Resistance R	: 272 Ω
Characteristics	: trapezoidal
Internal inductivity	: 4 μH
Internal capacity	: 1.2 nF
Transmitter supply	: approx. 16 V DC max. 20 mA (terminal 48)

Explosion protection

Max. ext. inductivity	: 2.3 mH	: 0.1 mH	: 5 mH
Max. ext. capacity	: 0.12 μF	: 0.22 μF	: 0.76 μF

At connecting of externally supplied active intrinsically safe circuits the rules for the interconnection of intrinsically safe circuits have to be observed.

Max. values	U_i : 30 V
	I_i : 52 mA
	P_i : 980 mW

Outputs

Relay SPDT	: < 250 V AC < 250 VA < 2 A $\cos \varphi \geq 0.3$, < 300 V DC < 40 W < 2 A (terminals 21, 22, 23; 25, 26, 27)
Analog output	: 0/4..20 mA, burden $\leq 500 \Omega$; 0/2..10 V burden $> 500 \Omega$, isolated, output changes automatically (burden dependent)

Accuracy

for connection at electrical equipments with supply voltage of max. 230V (terminals 17 and 18)

Fault function	: break of wire in the measuring circuit: → analog output 0 mA, < 3.6 mA or > 21.5 mA → alarm contact(s) min. or max. programmable
----------------	--

Display

Case	: Polyamide (PA) 6.6 , UL94V-0 acc. to DIN EN 60715:2001-09
Weight	: approx. 450 g
Connection	: screw terminals 0.14..2.5 mm ² (AWG 26..14)

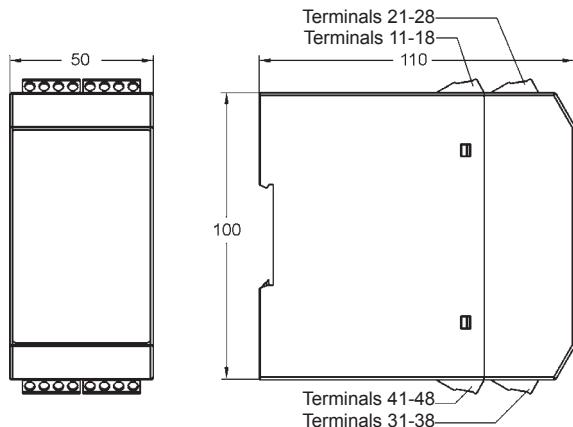
Protection class

: case IP30, terminals IP20, BGV A3

Continue next page

Product information

Dimensions



Safety and monitoring

Ordering code

MR50Ex - - - - - -

1. Input

1	standard signals 0/4..20 mA, 0/2..10 V DC, transmitter supply approx. 16 V DC, max. 20 mA, inputs intrinsically safe
---	---

2. Alarm output A1, A2

2R	2 relay SPDT
----	--------------

3. Alarm output A3, A4

00	not available
----	---------------

4. Analog output

00	not installed
AO	0/4..20 mA, 0/2..10 V DC

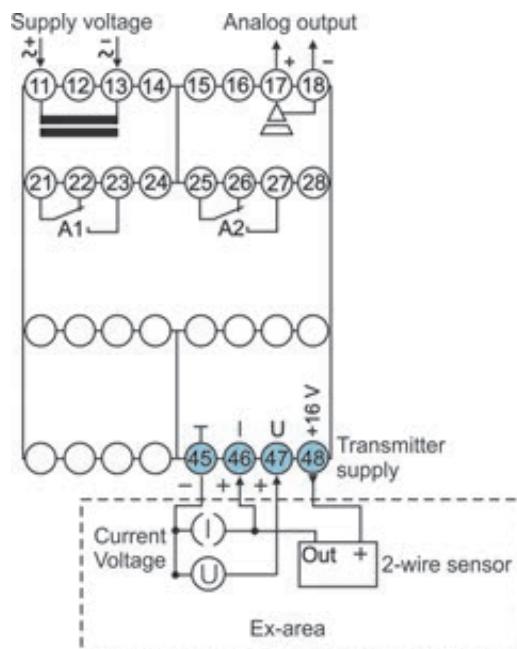
5. Supply voltage

0	230 V AC, ± 10 % 50-60 Hz
1	115 V AC, ± 10 % 50-60 Hz
5	24 V DC, ± 15 %

6. Options

00	without option
----	----------------

Connection diagram



Product information

Battery Voltage Guard BW500



- Monitoring of battery voltages 12 V, 24 V, 48 V or 60 V
- Alarm function under-voltage / over-voltage selectable
- Time delay adjustable
- Measuring voltage and supply voltage are identical

Characteristics

The BW500 is designed for monitoring of battery voltages. Under-voltage or over-voltage can be selected.

Under-voltage:

The relay switches off, if the voltage falls under the limit value and if the delay time ran off.

If the voltage exceeds the limit value + hysteresis, the relay will be activated.

Over-voltage:

The relay switches on, if the voltage exceeds the limit value and if the delay time ran off.

If the voltage falls under the limit value - hysteresis, the relay will be deactivated.

Technical data

Power supply

Battery voltage : 12 V, 24 V, 48 V or 60 V DC, -30..+40 %

Current consump. : 14 mA (24 mA at 12 V type)
with activated relay

Operating temp. : -10..+60 °C

CE- conformity : EN 50022, EN 60555, IEC 61000-4-4/5/11/13
vibration,- shock- and jolt-inspection
acc. to IEC 68-2-6/27/29

Measuring input/measuring range

12 V : 11..14 V

24 V : 22..28 V

48 V : 44..56 V

60 V : 55..70 V

Scale error : ≤2 %

Output

Relay SPDT : 250 VAC < 250 VA < 2 A; 300 V= < 50 W < 2 A

Alarm function : under-voltage/over-voltage selectable

Hysteresis : 2..16 % adjustable

(related to the nominal battery voltage)

Time delay : in 2-steps switch selectable

1..60 s or 5..300 s adjustable

Case

: standard case polycarbonate 8020 UL 94 V-1
acc. to DIN EN 60715:2001-09, DIN rail TS35

Weight

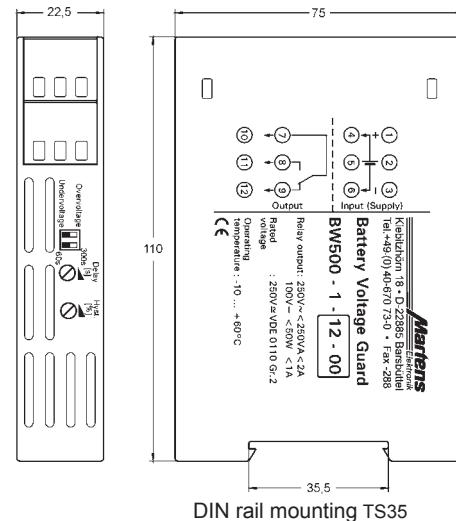
: approx. 100 g

Connection : screw terminals, max. 2.5 mm²

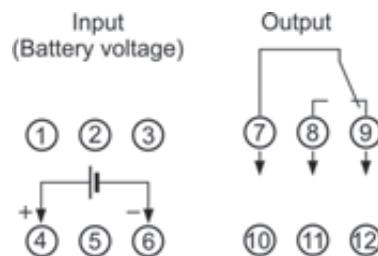
Protection class : case IP30, terminal IP20, acc. to BGV A3

Safety and monitoring

Dimensions



Connection diagram



Ordering code

1. 2. 3.
BW500 - [] - [] - []

1. No. of inputs

1

2. Battery voltage / measuring scale

12V	11..14 V
24V	22..28 V
48V	44..56 V
60V	55..70 V

3. Options

00	without option
----	----------------

Product information

Current and Voltage Monitoring Relay CVG500



- Arithmetic average value measuring RMS calibrated (AC or DC)
- Contact function min/max selectable
- Hysteresis and time delay adjustable

Characteristics

CVG500 monitoring relays can be used for monitoring current or voltage levels. The standard model is designed for input 0...1/5 A and 0...125/250 V AC/DC. Models with inputs in range of 0...1 mA/5 AAC/DC or 0...50 mV/400 V AC/DC are available.

Technical data

Power supply

Supply voltage	: 230 V AC $\pm 10\%$ or 24 V DC -30/+40 %
Frequency AC	: 47..63 Hz
Power cons.	: < 3 VA
Operating temp.	: -10..+50 °C (-25 °C..+70 °C on request)
CE-conformity	: EN 55022, EN 60555, IEC 61000-4-3/4/5/11/13

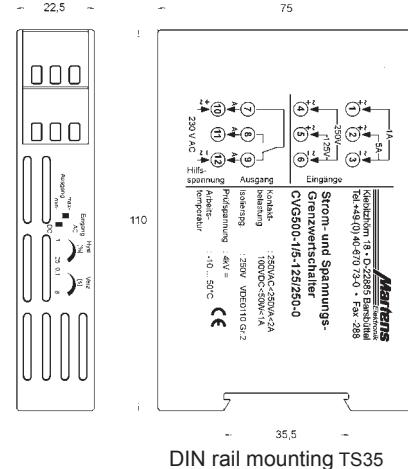
Inputs

Scale error	: $\leq 2\%$
Frequency AC	: 40..200 Hz (other ranges on request)
Standard ranges	
Current	: 0..1 A and 0..5 AAC (sinusoidal) or DC
Ri	: 20 mΩ (5 A input) or 100 mΩ (1 A input)
Over-load	: 2-times, 4-times for max. 5 seconds
Voltage	: 0..125 V and 0..250 V sinusoidal or DC
Ri	: 600 kΩ (125 V input) or 1.2 MΩ (250 V input)
Over-load	: max. 300 V AC/DC
Custom ranges	
Voltage	: end value in the range 0.05..400 VAC/DC
Ri	: 4.8 kΩ/V
Over-load	: 5-times nominal voltage, max. 500 V AC / DC
Current	: end value in the range 0.001..5 A AC/DC
Ri	: = 100 mΩ ÷ (measuring range [A])
Over-load	: 2-times, 4-times for max. 5 seconds
Output	
Relay SPDT	: 250 VAC < 250 VA < 2 A; 100 V= < 50 W < 1 A
Switching function	: min. / max. selectable
Hysteresis	: 1..25 %
Time delay	: 0.1..8 seconds

Safety and monitoring

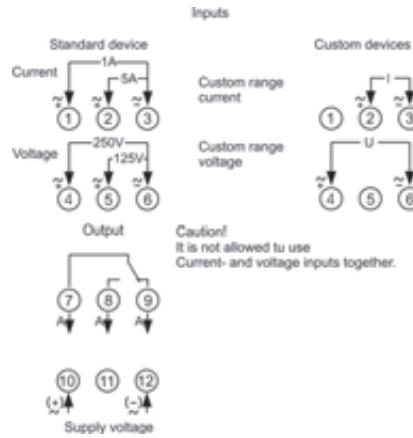
Case	: standard case polycarbonate 8020 UL 94 V-1 acc. to DIN EN 60715:2001-09, DIN rail TS35
Weight	: approx. 200 g
Protection class	: case IP30, terminals IP20, (BGV A3)
Connection	: screw terminals, max. 2.5 mm ²

Dimensions



DIN rail mounting TS35

Connection diagram



Ordering code

1. 2. 3.
CVG500 - - -

1. Current measuring ranges

0	not installed (at custom range voltage)
1/5	standard range 0..1 A and 0..5 AAC/DC custom range state in clear text

2. Voltage measuring ranges

0	not installed (at custom range current)
125/250	standard range 0..125 V and 0..250 V AC/DC custom range state in clear text

3. Supply voltage

0	230 V AC $\pm 10\%$
5	24 V DC -30..40 %

Product information

Monitoring Relay GS500



- Input 0/4..20 mA, 0/2..10 V DC
- Contact function min/max selectable
- Hysteresis and switching delay adjustable

Characteristics

The GS500 can be used for monitoring physical processes presented as industry standard signal. Limit value can be set from 0..100%. The adjustable switching delay prevents that short signal peaks does not activate the alarm. By an adjustable switching hysteresis a frequently switching can be suppressed with small signal variations.

Technical data

Power supply

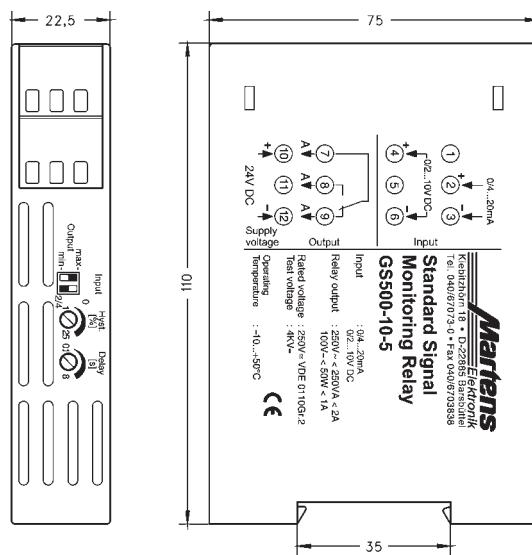
Supply voltage : 230 V AC $\pm 10\%$ or 24 V DC -30/+40 %
 Frequency AC : 47..63 Hz
 Power consumption : <3 VA
 Operating temperature : -10..+50 °C
 (-25..+70 °C special device)
 CE-conformity : EN 55022, IEC 61000-4-3/4/5/11/13, EN 60555

Inputs

Scale error : $\leq 2\%$
 Repeatability : $\leq 0.1\%$
Current
 Range : 0/4..20 mA selectable
 Input resistance : 125 Ω
 Over-load : 2-times, 4-times for max. 5 seconds
Voltage
 Range : 0/2..10 V DC selectable
 Input resistance : 40 k Ω
 Over-load : max. 100 V DC
Outputs
 Relay SPDT : 250 V AC < 250 V A < 2 A;
 100 V DC < 50 W < 1 A
 : min./max. selectable
 : 1..25 %
 : 0.1..8 seconds
Case
 : standard case polycarbonate
 8020 UL 94 V-1 acc. to
 DIN EN 60715:2001-09, DIN rail TS35
 Weight : approx. 200 g
 Connection : screw terminals, max. 2.5 mm 2
 Protection class : case IP30, terminals IP20 acc. to BGV A3

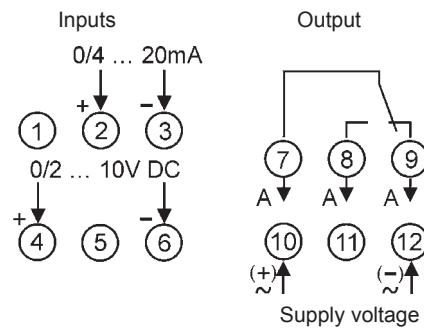
Safety and monitoring

Dimensions



DIN rail mounting TS35

Connection diagram



Caution:

It is not permissible to use current and voltage inputs at the same time!

Ordering code

1. GS500 - - 2.

1. Measuring range

10	Standard device 0/4..20 mA, 0/2..10 V DC
----	--

2. Supply voltage

0	230 V AC	$\pm 10\%$
5	24 V DC	-30..40 %

Product information

Monitoring Relay GS1000



- 1 or 2 adjustable limit values min/max selectable
- Measuring inputs for standard signals and Potentiometer
- True value output 0..10 V, 0..20 mA or 4..20 mA

Characteristics

GS1000 limit value relays can be used for monitoring in process and automation systems. The multipurpose input allows controlling of all physical dimensions which can be converted to standard signal 0/4..20 mA, 0/2..10 V DC. An optional transmitter supply for 2-wire-transmitters (4...20 mA) will offer additional fields of application..

Technical data

Power supply

Supply voltage	: $U_c \pm 10\%$
Frequency	: 47..63 Hz
Power consumption	: 4 VA
Operating temperature	: -10..+60 °C
CE - conformity	: EN 55022, EN 60555-2 IEC 61000-4-2/4/5/11/13

Input

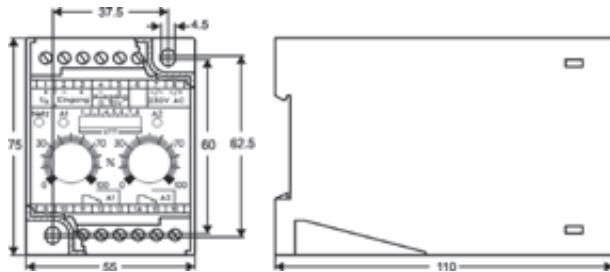
Voltage	: $R_i 4 \text{ k}\Omega/V$, over-load max. 3-times
Current	: $R_i 125 \Omega$, over-load max. 100 mA
Potentiometer	: reference voltage $U_A = 2.5 \text{ V DC}$ load max. 5 mA for potentiometer 1 $\text{k}\Omega$..100 $\text{k}\Omega$
Transmitter supply	: 2-wire sensor $U_A \approx 15 \text{ V DC}$
Switching hysteresis	: approx. 1 %
Scale accuracy	: 2 %
Repeatability	: 0.2 %

Output

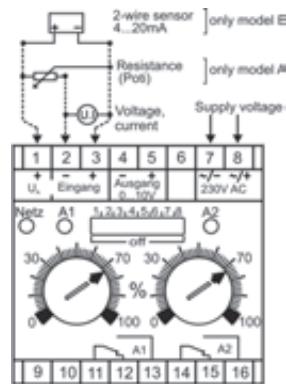
Relay	: 250 V AC < 250 VA < 2 A 100 V DC < 50 W < 1 A
Voltage	: 0..10 V DC, max. 10 mA
Current (optional)	: 0..20 mA or 4..20 mA, burden max. 500 Ω
Accuracy	: 0.3 %
Case	: Polycarbonate 8020 UL94V-1
Weight	: approx. 400 g
Connection	: screw terminals with pressure plate max. 4mm ²
Protection class	: case IP40, terminals IP20, acc. to BGV A3

Safety and monitoring

Dimensions



Connection diagram



Ordering code

1. 2. 3. 4.

GS1000 - - - -

1. Limit outputs (relay SPDT)

1	1 limit contact max. 250 V AC/2 A
2	2 limit contacts max. 250 V AC/2 A

2. True value output

1	0..10 V (max. 10 mA) standard
2	0..20 mA burden max. 500 Ω
3	4..20 mA burden max. 500 Ω

3. Supply voltage

0	230 V $\pm 10\%$ 50-60Hz
1	115 V $\pm 10\%$ 50-60Hz
5	20..28 V DC isolated

4. Input

10	multipurpose device A input signal via DIP-switch configurable: 0..20 mA / 4..20 mA 0..2.5 V / 0..5 V / 0..10 V and Potentiometer
20	multipurpose device B * transmitter supply approx. 15 V DC for 2 wire sensors 4..20 mA input signal via DIP-switch configurable: 0..20 mA / 4..20 mA 0..2.5 V / 0..5 V / 0..10 V

Product information

Temperature Limit Value Relay GS1000



Characteristics

The monitoring device GS1000 can be used for monitoring of temperatures in process and automation systems.

Technical data

Power supply

Supply voltage	: $U_c \pm 10\%$
Frequency	: 47..63 Hz
Power consumption	: 4 VA
Operating temperature	: -10..+60 °C
CE - conformity	: EN 55022, EN60555-2 IEC61000-4-2/4/5/11/13

Input

RTD Pt100	: sensor current 1 mA
Thermocouple	: $R_i > 1 M\Omega$
Switching hysteresis	: approx. 1 %
Scale accuracy	: 2 %
Repeatability	: 0.2 %
Accuracy	: RTD Pt100 0.7 % Thermocouple 0.3 % non linearized

Temperature coefficient
- Pt100 / Thermocouple

: 0.035 %/K

Outputs

Limit relay	: 250 V AC < 250 VA < 2 A 100 V DC < 50 W < 1 A
-------------	--

True value

- Voltage	: 0..10 V DC, max. 10 mA
- Current (optional)	: 0..20 mA or 4..20 mA, burden max. 500 Ω

Case

Weight	: Polycarbonate UL94V-0 acc. to DIN EN 60715:2001-09
Electrical connection	: approx. 400 g

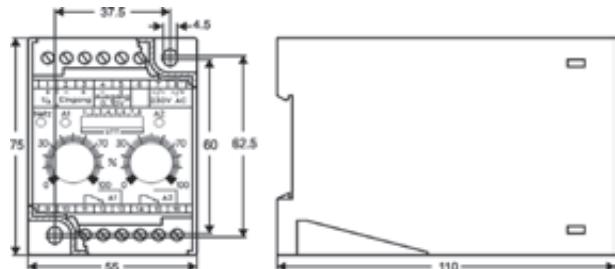
Electrical connection : Screw terminals with pressure plate,
max. 4 mm²

Protection class

: case IP40, terminals IP20 BGV A3

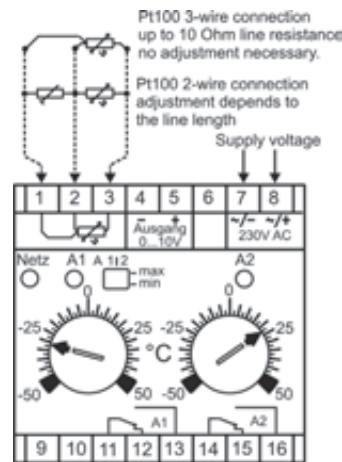
Safety and monitoring

Dimensions

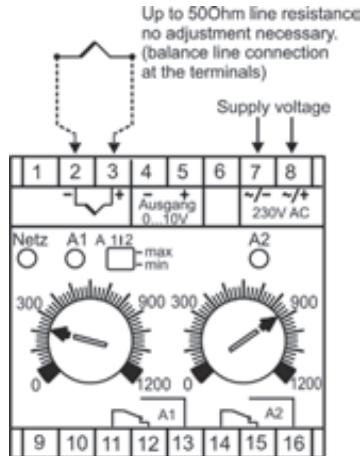


Connection diagrams

Pt100 scale °C



Thermocouple scale °C



Continue next page

Product information

Safety and monitoring

Ordering code

1. 2. 3. 4.
GS1000 - - - -

1. Limit contact (SPDT)	
1	1 contact max. 250 V AC/2 A
2	2 contacts max. 250 V AC/2 A
2. True value output	
1	0..10 V (max. 10 mA) standard
2	0..20 mA burden max. 500Ω
3	4..20 mA burden max. 500Ω
3. Supply voltage	
0	230 V ±10 % 50-60Hz
1	115 V ±10 % 50-60Hz
4	24 V ±10 % 50-60Hz
5	20..28 V DC isolated
4. Measuring input /scale	
51	Pt100, -50..+50 °C
52	Pt100, 0..50 °C
53	Pt100, 0..100 °C
535	Pt100, 0..150 °C
54	Pt100, 0..200 °C
55	Pt100, 0..300 °C
56	Pt100, 0..400 °C
57	Pt100, 0..600 °C
61	Fe-CuNi (J), 0..300 °C
62	Fe-CuNi (J), 0..450 °C
63	Fe-CuNi (J), 0..600 °C
71	NiCr-Ni (K), 0..600 °C
72	NiCr-Ni (K), 0..900 °C
73	NiCr-Ni (K), 0..1200 °C
81	PtRh-Pt (S), 0..1200 °C
82	PtRh-Pt (S), 0..1600 °C

Product information

Limit value switch GS125



Colour change of the scale lighting depending on the switch status



- Universal input for unit signals,
- Pt100, thermocouple, potentiometer, switchable via front-side DIP switch
- 1 or 2 relay outputs
- Universal relay connection
- Adjustable min/max contact function
- Actual value output 4 .. 20mA
- 2-colour illuminated scales for limit value adjustment, colour depends on switch status
- With Pt100 sensors, monitoring of sensor break and short-circuit
- Wide-range mains adapter or 24 V DC
- Functional safety up to SIL2
- Housing width 12.5 mm
- Removal coded terminals
- Carrier rail mounting TS35 EN60715
- Safe galvanic isolation between input / output / auxiliary voltage

Technical data

Limit value switches of the series GS125 are used in switch cabinets for process monitoring or for simple process regulation.

Both temperatures and derived variables such as voltage, current and resistance are used as control signals. In the process, 1 or 2 limit values can be monitored.

The universal configurability of the measuring inputs reduces the stock requirement for various applications.

The housing width of only 12.5mm enables space-saving installation in the switch cabinet. The scales for the limit value setting, illuminated red or green depending on the switch status, also enable operating in dark environments.

For assignment of the measuring unit to the scale labelling, 24 transparent adhesive labels are supplied. They can be glued between the adjusting wheels on the front panel.

Safety and monitoring

Measurement inputs

Switchable via DIP switch	
Unit signals	: 0/2..10 V 0/4..20 mA
Potentiometer	: 500 Ω..20 kΩ
Pt100	: -50..50°C 0..50°C 0..100°C 0..150°C 0..200°C 0..300°C 0..500°C

Thermocouple	
FeCuNi, Type J	: 0..250°C 0..500°C
NiCrNi, Type K	: 0..500°C 0..750°C 0..1000°C
PtRhPt, Type S	: 0..1500°C

(Special measurement ranges available on request)

Technical data

Wide-range power supply

Voltage	: 20..125 V DC and 20..250 V AC, (47 - 63Hz), max. 1.5W
---------	--

24 V power supply

Voltage	: 24 V DC +/-15%, max. 1.5W
---------	-----------------------------

Combined data

Rated voltage	: 253 V AC
Test voltage	: 3kV AC between input/relay output/auxiliary voltage
Operating temperature	: -10..60 °C
Storage temperature	: -20..80 °C
Air humidity	: 10..90 % (non-condensing)

Measurement inputs

Voltage	: 0/2..10 V, Ri approx. 20 kΩ
Current	: 0/4..20 mA, Ri approx. 60 Ω
Pt100	: linearised, measurement current approx. 1.6 mA

Thermocouple

Relays become inactive if there is a sensor break or short-circuit	
: linearised with comparison position compensation	

Resistance	: (3-wire), nominal value 500 Ω..20 kΩ
	: Internal reference voltage approx. 1.5 V

Relay outputs

Switching voltage	: < 250 V AC <2 A <500 VA
	: < 125 V DC <0.2 A <25 W
	: < 30 V DC <2 A <60 W

Switching frequency	: max. 5 Hz
Switching hysteresis	: approx. 1%

Functional safety

	: SIL2 in accordance with EN61508 (specific data available on request)
--	--

Setpoint setting

	: Scale precision: 2 %
--	------------------------

Actual value output	: 4..20 mA, resistance max. 120 Ω, No galvanic isolation from the input signal
---------------------	--

Product information

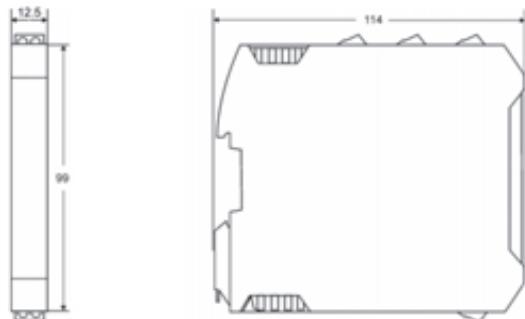
Input signal	Basic precision-actual value output	Temperature deviation *)
0/2..10V	0.2%	0.004%/K
0/4..20mA	0.2%	0.004%/K
Potentiometer	1%	0.007%/K
Pt100 -50.. 50°C	0.5%	0.03%/K
Pt100 0.. 50°C	0.9%	0.04%/K
Pt100 0..100°C	0.5%	0.03%/K
Pt100 0..150°C	0.2%	0.02%/K
Pt100 0..200°C	0.4%	0.02%/K
Pt100 0..300°C	0.3%	0.01%/K
Pt100 0..500°C	0.2%	0.007%/K
FeCuNi 0..250°C	1.0%	0.04%/K
FeCuNi 0..500°C	0.5%	0.03%/K
NiCrNi 0..500°C	0.5%	0.04%/K
NiCrNi 0..750°C	0.4%	0.03%/K
NiCrNi 0..1000°C	0.3%	0.02%/K
PtRhPt 0..1500°C	1.0%	0.04%/K

*) Measurement deviation depending on the environmental temperature in the switch cabinet (-10..+60°C)

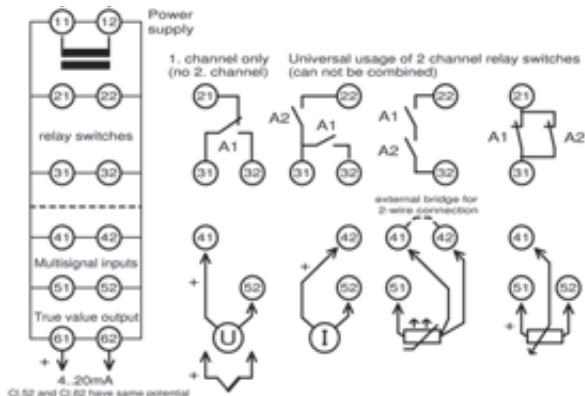
Housing

Dimensions (WxDxH)	: 12.5 x 115 x 108 mm
Material	: PA6.6, light grey, Flammability class V0 (UL94)
Weight	: 120 g
Protection class	: IP20
Screw terminals	: 0.2..2.5 mm ² , AWG 24..14,
Push-In-Terminals	: 0.5..1.5 mm ² , AWG 25..16, coded terminals

Dimensions

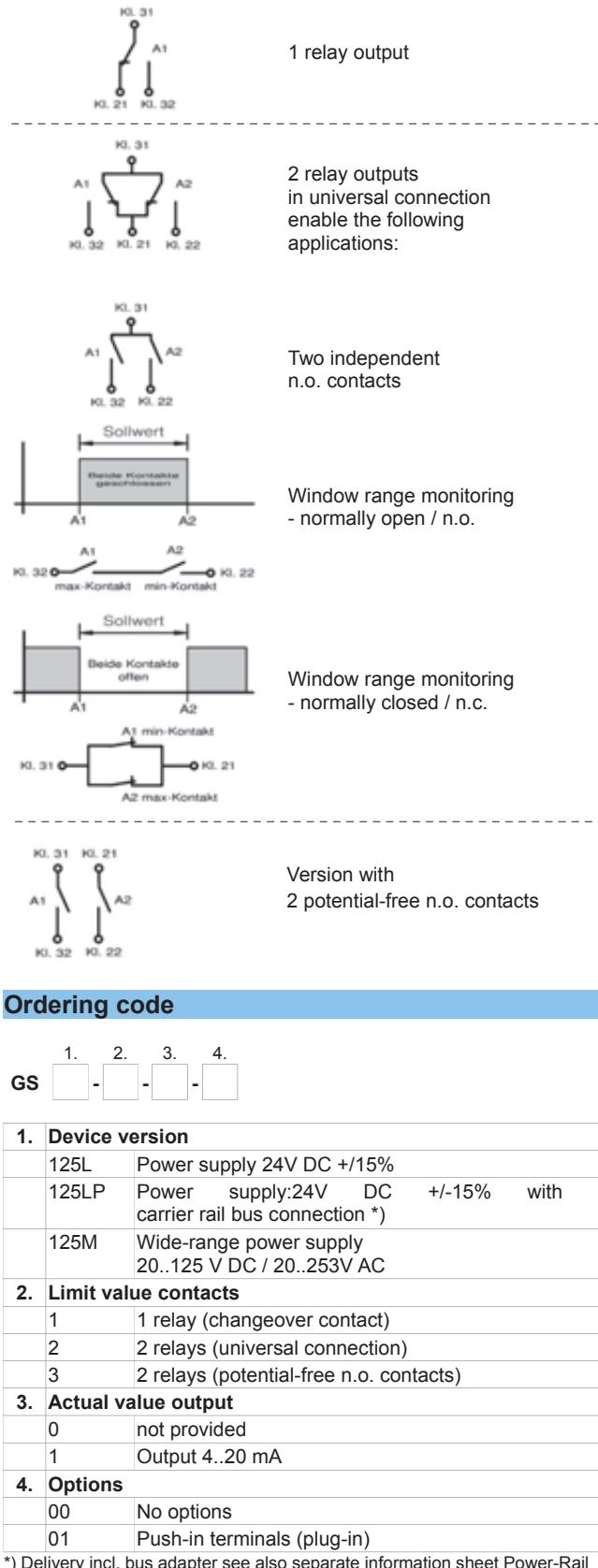


Connection diagram



Safety and monitoring

Limit value contacts



Ordering code

GS - - -

1. Device version

125L	Power supply 24V DC +/-15%
125LP	Power supply: 24V DC +/-15% with carrier rail bus connection *)
125M	Wide-range power supply 20..125 V DC / 20..253V AC

2. Limit value contacts

- 1 1 relay (changeover contact)
- 2 2 relays (universal connection)
- 3 2 relays (potential-free n.o. contacts)

3. Actual value output

- 0 not provided
- 1 Output 4..20 mA

4. Options

- 00 No options
- 01 Push-in terminals (plug-in)

*) Delivery incl. bus adapter see also separate information sheet Power-Rail

Product information

Temperature Guard TG50



Characteristics

The Temperature-Guard TG50 has inputs for temperature probes RTD (Pt100/Pt1000) and thermocouple J, K, N and S. Simple programming, up to 4 alarm outputs (SPDT) and an available fully isolated free programmable analog output 0/4..20 mA; 0/2..10 V DC offers a lot of solutions for temperature monitoring. Peak value indication for minimum and maximum measured temperature are stored in the background and can be read out from the display at any time.

Technical data

Power supply

Supply voltage : 230 V AC $\pm 10\%$
115 V AC $\pm 10\%$
24 V DC $\pm 15\%$
< 5 VA

Operating temperature : -10..+55 °C

CE-conformity : ATEX-directive 94/9/EG
(certificate PMT50ATEX.001)
EN 60079-0:2006 EN60079-11:2007
EN 61241-0:2006 EN61241-11:2006
IEC61326 05/2004, IEC 61000-4-2,
IEC 61000-4-3, IEC 61000-4-4,
IEC 61000-4-5, IEC 61000-4-6,
IEC 61000-4-8, IEC 61000-4-11,
CISPR16-1/16-2

Input

Fault function : break of wire (RTD Pt100/1000,
Thermocouple) and short-circuit
(only Pt100/1000)

RTD : Pt100 (3-wire) -100.0..+600.0 °C
Pt1000 (3-wire) -100.0..+300.0 °C
: Thermocouple (TC)
type J -100.0..+800.0 °C
type K -150..+1200 °C
type N -150..+1200 °C
type S -50..+1600 °C
cold junction compensation integrated

Accuracy : <0.1 %, ± 1 Digit

Display : Graphic LCD-Display, 128 x 64 Pixel,
with white back-lit

Safety and monitoring

Output

Alarm A1-A4 : relay SPDT
< 250 V AC < 250 VA < 2 A
 $\cos \Phi \geq 0.3$
< 300 V DC < 40 W < 2 A

Analog : 0/4..20 mA burden $\leq 500 \Omega$
0/2..10 V burden $> 500 \Omega$
isolated, automatic output changing
(burden dependent)

- Accuracy : 0.2 %; TK 0.01 %/K

Fault indication : for broken line or short circuit detection
→ analog output (programmable)
0 mA, < 3.6 mA or > 21.5 mA
→ Alarm relays
min. or max. function programmable

Case

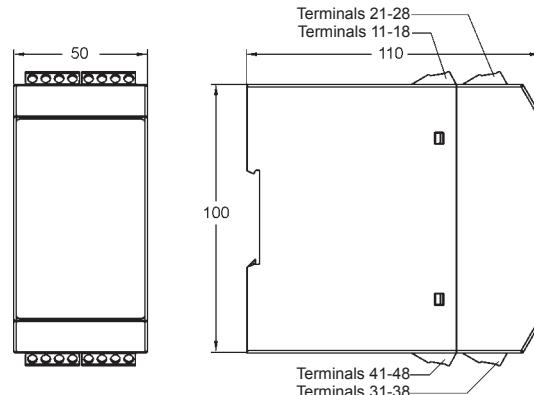
Weight : Polyamide (PA) 6.6 , UL94V-0
TS35 acc. to DIN EN 60715:2001-09

Connection : approx. 450 g

Protection class : screw terminals 0.14..2.5 mm²
AWG 26..AWG14

Protection class : case IP30, terminals IP20 acc. to
BGV A3

Dimensions

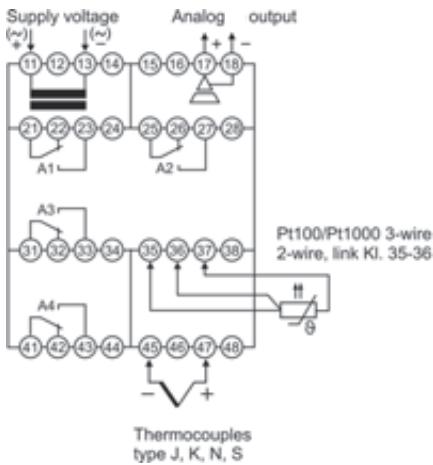


Continue next page.

Product information

Safety and monitoring

Connection diagram



Ordering code

1. 2. 3. 4. 5. 6.
TG50 - - - - - -

1. Device type/input

- 3 RTD Pt100, 3-wire, -100.0..+600.0 °C
 RTD Pt1000, 3-wire, -100.0..+300.0 °C
 Thermocouple
 J (Fe-CuNi), -100.0..+800.0 °C
 K (NiCr-Ni), -150..+1200 °C
 N (NiCrSi-NiSi), -150..+1200 °C
 S (Pt10Rh-Pt), -50..+1600 °C

2. Alarm output A1, A2

- 2R 2 relay SPDT

3. Alarm output A3, A4

- 00 not installed
2R 2 relay SPDT

4. Analog output

- 00 not installed
AO 0/4..20 mA, 0/2..10 V DC, isolated

5. Supply voltage

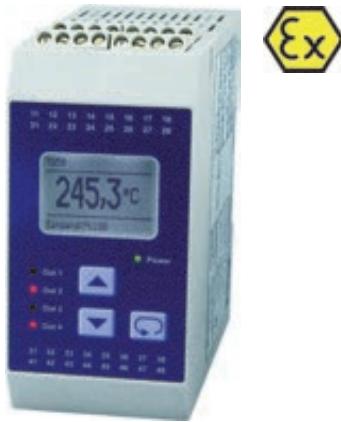
- 0 230 V AC, ± 10 % 50-60 Hz
1 115 V AC, ± 10 % 50-60 Hz
5 24 V DC, ± 15 %

6. Options

- 00 without option

Product information

Temperature Guard TG50Ex



Characteristics

The Temperature Guard TG50Ex offers intrinsically safe inputs for direct connection of temperature probes RTD (Pt100,Pt1000) and thermocouples type J, K, N or S, which are installed in the explosion endangered area.

Simple programming, 2 alarm outputs (SPDT) and an optional available fully free programmable isolated analog output 0/4..20 mA; 0/2..10 V DC offers a lot of solutions for temperature monitoring. The peak value indication for minimum and maximum measured temperature are stored in the background and can be read out from the display at any time.

Technical data

Power supply

Supply voltage	: 230 V AC ±10 % 115 V AC ±10 % 24 V DC ±15 % Um = 253 V AC or 125 V DC (terminals 11 and 13)
Power consumption	: max. 5 VA
Operating temperature	: -10..+55 °C
CE-conformity	: ATEX-directive 94/9/EG (certificate TG50ATEX.001) EN 60079-0:2006 EN 60079-11:2007 EN 61241-0:2006 EN 61241-11-0:2006 IEC61326 05/2004, IEC 61000-4-2 IEC 61000-4-3 IEC 61000-4-4 IEC 61000-4-5 IEC 61000-4-6 IEC 61000-4-8 IEC 61000-4-11 CISPR16-1/16-2

Safety and monitoring

Inputs

Explosions protection	: II (1) G [Ex ia] IIC/IIB or II (1) D [Ex iaD]
Approval	: TÜV 08 ATEX 554329
Fault detection	: broken line (Pt100/1000 and thermo-couple) and short circuit (only Pt100/1000)
Input RTD	: Pt100 (3-wire) -100.0..+600.0 °C Pt1000 (3-wire) -100.0..+300.0 °C (terminals 35, 36, 37)
Input TC	: Thermocouple type J -100.0..+800.0 °C type K -150..+1200 °C type N -150..+1200 °C type S -50..+1600 °C cold junction compensation integrated (terminals 45 and 47)

Accuracy

Temperature coefficient	: <0.1 %, ±1 Digit
	: 0.01 %/K

Safety data

Max. voltage no load U_0	: 1,4 V
Max. short circuit curr. I_0	: 2.5 mA
Max. output power P_0	: 3 mW
Resistance R	: 5600 Ω
Characteristic curve	: trapezoidal
Internal inductivity	: 4 µH
Internal capacity	: 135 nF
Explosion protection	Ex ia/IIC ia/IIB
Max. external inductivity	: 100 mH 100 mH
Max. external capacity	: 25 µF 120 µF

Outputs

Alarm outputs	: relay SPDT < 250 V AC < 250 VA < 2 A $\cos \Phi \geq 0.3$ < 300 V DC < 40 W < 2 A (terminals 21, 22, 23; 25, 26, 27)
Analog output	: 0/4..20 mA burden ≤ 500 Ω 0/2..10 V burden > 500 Ω, isolated output changes automatically (burden depending)
- Accuracy	: 0.2 %; TK 0.01 % / K (terminals 17 and 18)
Fault function	: for broken line or short circuit detection → analog output (programmable) 0 mA, < 3.6 mA or > 21.5 mA → alarm relays min. or max. function programmable

Display

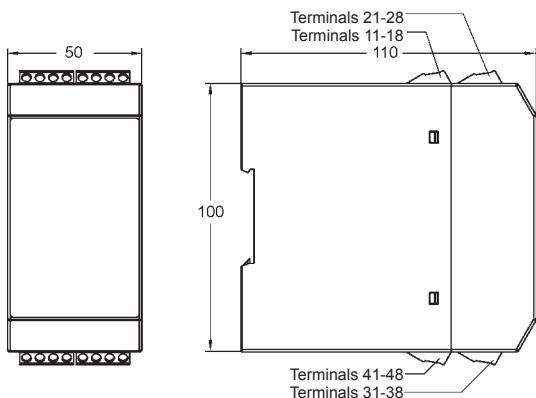
Case

Weight	: approx. 450 g
Connection	: screw terminals 0.14..2.5 mm ² AWG 26..AWG14
Protection class	: case IP30, terminals IP20 acc. to BGV A3

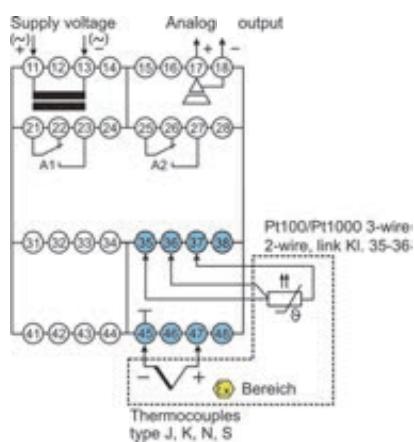
Continue next page

Product information

Dimensions



Connection diagram



Safety and monitoring

Ordering code

TG50Ex - - - - - -

1. Device type/input

3	RTD Pt100, 3-wire, -100.0..+600.0 °C RTD Pt1000, 3-wire, -100.0..+300.0 °C Thermocouple J (Fe-CuNi), -100.0..+800.0 °C K (NiCr-Ni), -150..+1200 °C N (NiCrSi-NiSi), -150..+1200 °C S (Pt10Rh-Pt), -50..+1600 °C
Inputs intrinsically safe	EX II (1) G [Ex ia] IIC/IIB EX II (1) D [Ex iaD]

2. Alarm outputs A1, A2

2R 2 relay SPDT

3. Alarm outputs A3, A4

00 not available

4. Analog output

00 not installed
AO 0/4..20 mA, 0/2..10 V DC, isolated

5. Supply voltage

0	230 V AC, ± 10 % 50-60 Hz
1	115 V AC, ± 10 % 50-60 Hz
5	24 V DC, ± 15 %

6. Options

00	without option
----	----------------

Product information

Thermal Limiter TB225 (in accordance with DIN EN 14597)



- Can be used as a temperature limiter and monitor
- Certified in accordance with DIN EN 14597
- Pt100 inputs, dual thermocouple, input signals
- 2 changeover relays
- Configuration via backlit graphic display
- 'White / Red' display colour change in the case of an alarm
- Safe galvanic isolation between input / output / auxiliary voltage
- Automatic recognition of the output signal
- Wide-range mains adapter
- Carrier rail mounting TS 35

Characteristics

The temperature limiter TB225 is used for applications where thermal processes must be monitored and the system must be switched to a safe operating state in the case of a fault. The device has universal inputs for the connection of dual thermocouples, Pt100 sensors, and input signals (0/4..20mA or 0/2..10V). The safety function is provided by means of the main relay with configurable threshold. An additional relay with an independently adjustable threshold is provided for additional signalling. The TB225 also offers an analog output which can be freely defined within the measuring range of the temperature input. The resetting of the device in the operating mode as a temperature limiter can take place via the buttons on the front, the integrated graphic display, or using an external switch or external voltage. The TB225 has safe 3-way electrical isolation between input, output, and auxiliary voltage.

Brief information

The connected temperature signal is evaluated and monitored. If the permissible threshold is reached or an error occurs within the permissible temperature range, the TB225 switches off immediately. The additional relay output of the TB225 enables the function of a preliminary alarm with an independent threshold. The following operating modes are possible through configuration:

Safety and monitoring

Temperature limiter:

Maximum or minimum monitoring with catch, manual resetting after fault elimination via the front keys or an external switch / voltage signal.

Operating methods in accordance with EN14597: 02/2015: Type 2B, 2H, 2V

Temperature monitor:

Maximum or minimum monitoring without catch, automatic resetting on return to the permissible range.

Operating methods in accordance with EN 14597: 02/2015: Type 2B

Technical data

Auxiliary power

Auxiliary voltage	: 18 – 230 V AC/DC
Power consumption	: < 5 VA
Rated voltage	: 250V AC in accordance with EN 60730-1: 10/2012, between input / relay output / auxiliary voltage, Degree of contamination 2, Overvoltage category III
CE Conformity	: Rated surge voltage 4kV EN 14597 02/2015 EN 61326: 07/2013

Environmental conditions

Operating temperature	: -10..+55 °C
storage temperature	: -20..+60 °C
Relative air humidity	: < 95 %
Condensation	: not permitted

Approvals

DIN EN 14597: 02/2015	: Temperature control devices and temperature limiters for heat generating systems
-----------------------	--

Input

Pt100	: -100.0..600.0°C
Accuracy	: 0,2%, ±1 Digit
Temperature coefficient	: 0,01%/K
Thermocouple	: Type J:Fe-CuNi-100..800°C Type K: NiCr-Ni -150..1200°C Type N:NiCrSi-NiSi -150..1200°C Type S:Pt10RH-PT 0..1600°C Reference junction compensation integrated
Accuracy:	: <0.3 %, ±1 digit
Temperature coefficient	: 0,01 %/K
Analog input	: 0/2..10 V DC, 0/4..20 mA 0..10 V und 0..20 mA not allowed for temperature limiter
Accuracy	: 0,2%, ±1 Digit
Temperature coefficient	: 0,01%/K
Display	: graphic LC display with 32 x 90 pixel, with white/red background lighting

Outputs

Switching outputs	: 2 x relay
Changeover relay	: < 250 V AC < 500 VA < 2 A ohmic load < 30 V DC < 60W < 2 A ohmic load Internal main relay secured with 2A fuse! Fuse is not interchangeable!
Analog output	: 0/4..20 mA load ≤ 500 Ω 0/2..10 V DC load > 500 Ω electrically isolated. Output switches automatically (load-dependent)

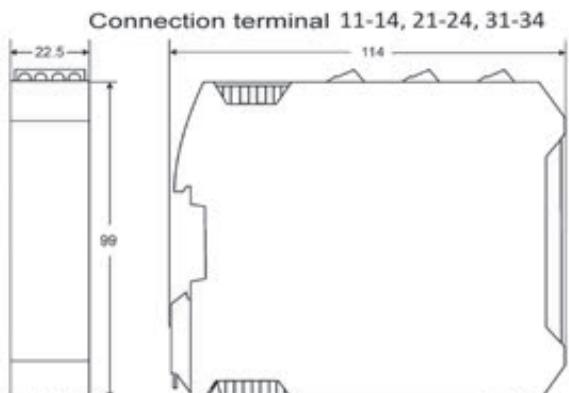
Housing

Weight	: approximately 180 g
Connection	: screw terminals 0.14..2.5 mm ² with wire protection 0.14 - 2.5 mm ² (AWG 26 - 14)
Protection rating	: IP20, BGV A3

Product information

Safety and monitoring

Dimensions



Connection terminal 41-44, 61-64

Ordering code

TB225 - - - -

1. Version/input

0	Universal input
---	-----------------

2. Output

0	2 relay / 1 analog output 0/4..20 mA
---	--------------------------------------

3. Auxiliary voltage

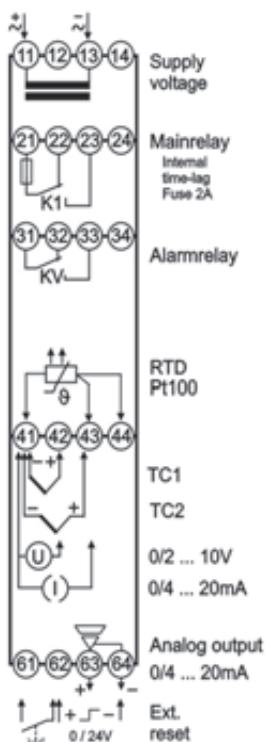
0	18 – 230 V AC/DC
---	------------------

4. Options

00	without option
----	----------------

01	Push-in terminal block
----	------------------------

Connection diagram



Product information

Safety Temperature Limiter STL50 (acc. to DIN EN 14597, SIL 2)



- Useful as Temperature Limiter/-Guard and Exhaust gas Temperature Limiter
- Certified according to DIN EN 14597 SIL 2
- Inputs RTD Pt100 or double-thermocouple
- Alarm output 1 relay SPDT
- Programming via backlit LCD-graphic-Display

Characteristics

The STL50 safety temperature limiter is used where ever thermal processes must be monitored and the system must be transferred into a safe operational state in case of fault. If the permissible temperature limit value is reached, or if a fault occurs within the permissible temperature range on the monitoring equipment (sensor open, sensor short-circuit, failure of a component part in the device, fault in the software, failure or inadmissible value of the supply voltage etc.), the STL50 switches off without delay.

The alarm contact is activated, the LED ALARM on the front panel and the back-lighting of the display light up, and the error cause is indicated as plain text on the display. In addition, there is a 24 V DC signal present on the terminals 17-18 for an external alarm signal.

Description

Programming

The device is programmable via front side buttons in connection with the graphic display.

Operating modes

The device can be used as:

STB → Maximum- or minimum-monitoring with hold. Reset possible after omission of the fault with the external or internal button.

ASTB → as before, but monitoring the exhaust gas temperature

STW → Maximum- or minimum-monitoring without hold. Automatic reset after leaving the dangerous range

Switching hysteresis always acts in the direction of safe range. The last fault is stored as plain text and can be called up in the working level and deleted.

Temperature sensor

The device may operate only with temperature probes which are certified according to DIN EN 14597!

Safety and monitoring

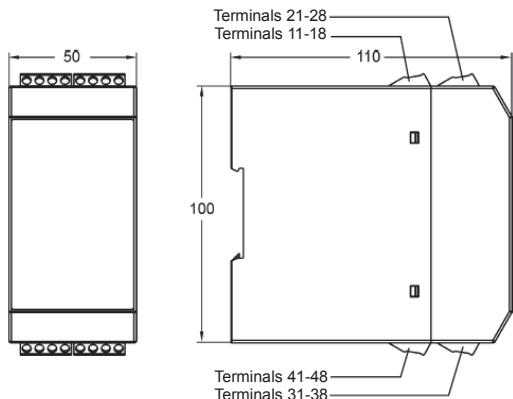
Technical data

Power supply	
Supply voltage	: 230 V AC ±10 % 115 V AC ±10 % 24 V DC ±15 %
Power consumption	: < 4 VA
CE-conformity	: EN 55022, EN 60555 IEC 61000-4-2/3/4/5/6/11/13
Ambient conditions	
Operating temperature	: -10..+55 °C
Storage temperature	: -30..+60 °C
Relative humidity	: < 95 %
Condensation	: not permitted operation only in vibration less ambient
Approvals	
EN 14597:2005	: temperature control devices and temperature limiters for heat-generating systems
EN 61508:2001 SIL2	: functional security safety-related electrical/electronic/programmable electronic systems
Input	
Pt100	: in the range -100.0..+600.0 °C 3-wire, max. line resistance 4 Ω each line sensor current<1 mA (non self heating)
Thermocouple	
Type J	: Fe-CuNi, -100.0..+800.0 °C
Type K	: NiCr-Ni, -150..+1200 °C
Type N	: NiCrSi-NiSi , -150..+1200 °C
Type S	: Pt10Rh-Pt, 0..+1600 °C cold junction compensation integrated
Accuracy	: <0.5 %, ±2 Digit
Temperature coefficient	: 0.01 %/K
Display	: graphic-LCD-display 28 x 64 Pixel, with white LCD-backlight
Output	
Relay	: SPDT <250 V AC <200 VA <2 A cos Phi ≥0.7 <250 VDC <80 W <2 A, internal fused 2 A (slow-blow)
Case	: Polyamide (PA) 6.6 , UL94V-0, TS35 acc. to DIN EN 60715:2001-09
Weight	: approx. 450 g
Connection	: screw terminals 0.14..2.5 mm ² (AWG 26 .. 14)
Protection class	: IP20, DIN EN 60529, BGV A3

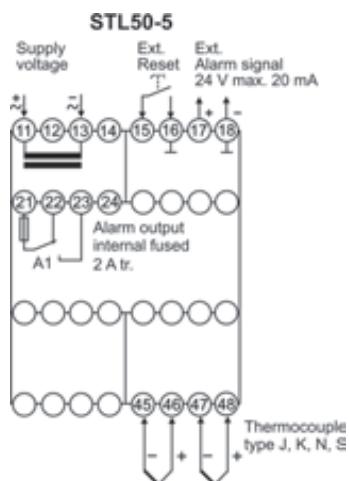
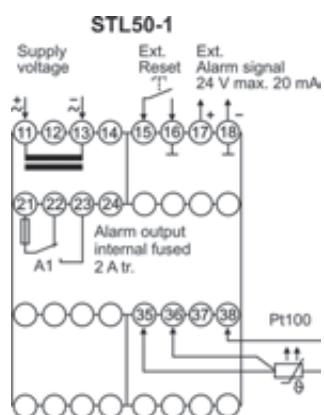
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Product information

Dimensions



Connection diagrams



Safety and monitoring

Ordering code

STL50 - - - -

1. Device type/input

1	Pt100, 3-wire, -100.0..+600.0 °C
5	Thermocouple J (Fe-CuNi), -100.0..+800.0 °C K (NiCr-Ni), -150..+1200 °C N (NiCrSi-NiSi), -150..+1200 °C S (Pt10Rh-Pt), 0..1600 °C

2. Output

1R	1 alarm output, relay SPDT
----	----------------------------

3. Supply voltage

0	230 V AC, ± 10 % 50-60 Hz
1	115 V AC, ± 10 % 50-60 Hz
5	24 V DC, ± 15 %

4. Options

00	without option
----	----------------

Product information

Safety Temperature Limiter STL50Ex (acc. to DIN EN 14597, SIL 2)



- Useful as Temperature Limiter-/Guard and Exhaust gas Temperature Limiter
- Certified according to DIN EN 14597 SIL 2
- Inputs RTD Pt100 or double-thermocouple
- Alarm output 1 relay SPDT
- Programming via backlit LCD-graphic-Display

Characteristics

The STL50Ex safety temperature limiter is used where ever thermal processes must be monitored and the system must be transferred into a safe operational state in case of fault. If the permissible temperature limit value is reached, or if a fault occurs within the permissible temperature range on the monitoring equipment (sensor open, sensor short-circuit, failure of a component part in the device, fault in the software, failure or inadmissible value of the supply voltage etc.), the STL50Ex switches off without delay.

The alarm contact is activated, the LED ALARM on the front panel and the back-lighting of the display light up, and the error cause is indicated as plain text on the display. In addition, there is a 24 V DC signal present on the terminals 17-18 for an external alarm signal.

Description

Programming

The device is programmable via front side buttons in connection with the graphic display.

Operating modes

The device can be used as:

STB → Maximum- or minimum-monitoring with hold. Reset possible after omission of the fault with the external or internal button.

ASTB → as before, but monitoring the exhaust gas temperature

STW → Maximum- or minimum-monitoring without hold. Automatic reset after leaving the dangerous range.

Switching hysteresis always acts in the direction of safe range.

The last fault is stored as plain text and can be called up in the working level and deleted.

Temperature sensor

The device may operate only with temperature probes which are certified according to DIN EN 14597!

Safety and monitoring

Technical data

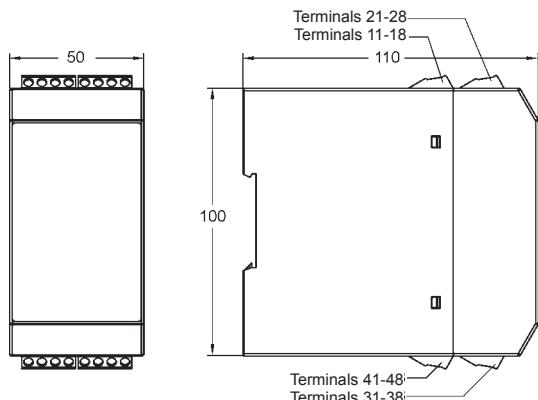
Power supply	: 230 V AC ±10 %
Supply voltage	: 115 V AC ±10 %
	: 24 V DC ±15 %
Power consumption	: < 4 VA
CE-conformity	: EN 55022, EN 60555 IEC 61000-4-2/3/4/5/6/11/13
Ambient conditions	
Operating temperature	: -10..+55 °C
Storage temperature	: -30..+60 °C
Relative humidity	: < 95 %
Condensation	: not permitted, operation only in vibration less ambient
Approvals	
EN 14597:2005	: temperature control devices and temperature limiters for heat-generating systems
EN 61508:2001 SIL2	: Functional security safety-related electrical/electronic/programmable electronic systems
Input	
Explosion protection	: II (1) G [Ex ia] IIC/IIB or II (1) D [Ex iaD]
Approval	: TÜV 07 ATEX 554295
Pt100	: -100.0..+600.0 °C, 3-wire, 3-wire, max. line resistance 4 Ω each line, sensor current<1 mA (non self heating)
Data in case of an error	
Max. voltage no load U_0	: 1.4 V
Max. short circuit current I_0	: 6 mA
Max. power loss P_0	: 7 mW
Min. internal resistor R	: 1.6 kΩ (curve trapezoidal)
Explosion protection	Ex ia/IIC ia/IIB
Max. external inductivity	: 100mH 20mH
Max. external capacity	: 110µF 28 µF
Internal capacity	: negligible
Internal inductivity	: negligible
Thermocouple	
Type J	: Fe-CuNi, -100.0..+800.0 °C
Type K	: NiCr-Ni, -150..+1200 °C
Type N	: NiCrSi-NiSi, -150..+1200°C
Type S	: Pt10Rh-Pt, 0..1600 °C cold junction compensation integrated
Data in case of an error	
Max. voltage no load U_0	: 0.7 V
Max. short circuit current I_0	: 2 mA
Max. power loss P_0	: 1.5 mW
Min. internal resistor R	: 5 kΩ (curve trapezoidal)
Explosion protection	Ex ia/IIC ia/IIB
Max. external inductivity	: 100mH 50mH
Max. external capacity	: 240µF 54 µF
Internal capacity	: negligible
Internal inductivity	: negligible
Accuracy	: <0.5 %, ±2 Digit
Temperature coefficient	: 0.01 %/K
Display	: graphic LCD-display 28 x 64 Pixel, with white LCD-backlight
Output	
Relay	: SPDT <250 V AC <200 VA <2 A $\cos \Phi \geq 0.7$ <250 VDC <80 W <2 A, internal fused 2 A (slow-blow)

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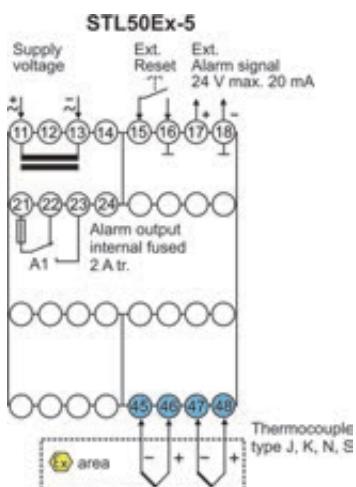
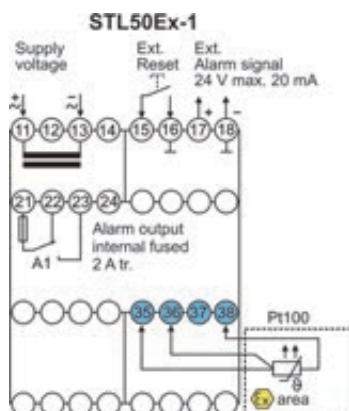
Product information

Case	: Polyamide (PA) 6.6 , UL94V-0, TS35 acc. to DIN EN 60715:2001-09
Weight	: approx. 450 g
Connection	: screw terminals 0.14..2.5 mm ² (AWG 26 .. 14)
Protection class	: IP20, DIN EN 60529, BGV A3

Dimensions



Connection diagrams



Safety and monitoring

Ordering code

1. 2. 3. 4.
STL50Ex - - - -

1. Device type/input

1	Pt100, 3-wire, -100.0..+600.0 °C
5	Thermocouple J (Fe-CuNi), -100.0..+800.0 °C K (NiCr-Ni), -150..+1200 °C N (NiCrSi-NiSi), -150..+1200 °C S (Pt10Rh-Pt), 0..1600 °C

2. Output

1R	1 alarm output relay
----	----------------------

3. Supply voltage

0	230 V AC, ± 10 % 50-60 Hz
1	115 V AC, ± 10 % 50-60 Hz
5	24 V DC, ± 15 %

4. Options

00	without option
----	----------------

Product information

Alarm-Display SD9648



Characteristics

The Alarm-Display SD9648 will be used for indicating and evaluations of alarm signals as well as analog measured values. Activation with voltage free contacts, 0/24 V signals or 0/4..20 mA for monitoring of analog measuring values.

Technical data

Power supply

Supply voltage : 230 V AC $\pm 10\%$, 115 V AC $\pm 10\%$,
24 V AC $\pm 10\%$, 24 V DC $\pm 15\%$

Frequency AC : 50 / 60 Hz

Power consumption : max. 3.5 VA

Operating temperature : 0..50 °C

CE- conformity : EN55022, EN60555,
IEC61000-4-3/4/5/11/13

Inputs

Digital : 0 / 24 V DC, $R_i = 10 \text{ k}\Omega$,
switching threshold

low < 4 V, high >11 V max. 35 V

: min. 10 ms

Impulse/pause : 0 / 4..20 mA, $R_i = 100 \Omega$
voltage drop max. 2.2 V at 20 mA

over-load limit approx. 23 mA (max. voltage
35 V). With powerless device the inputs be-
came a high resistance

Accuracy : 0.1 %, ± 1 Digit

Transmitter supply : $U_o = 24$ V, $R_i 150 \Omega$, max. 50 mA

Display : LCD-dot matrix display white / blue,
character height 6.5 mm, with back-lite
2 lines 16 characters each

Display interval : 0.5 s (refresh time)

Output

Relay SPDT : < 250 V AC < 250 VA < 2 A,
< 300 V DC < 50 W < 2 A

Case : panel case DIN 96x48,
Material PA6-GF; UL94V-0

Dimensions : front 96x48 mm, mounting depth 100mm

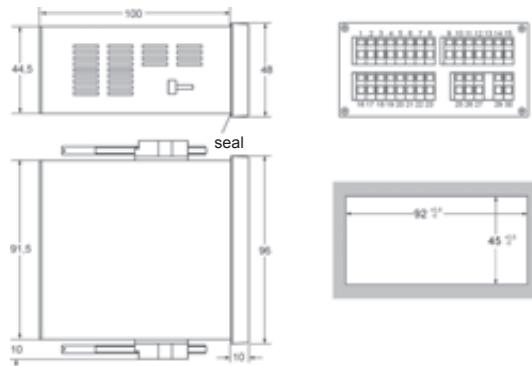
Weight : max. 390 g

Connection : clamp terminals, 0.08..1.5 mm²,
AWG28..AWG14

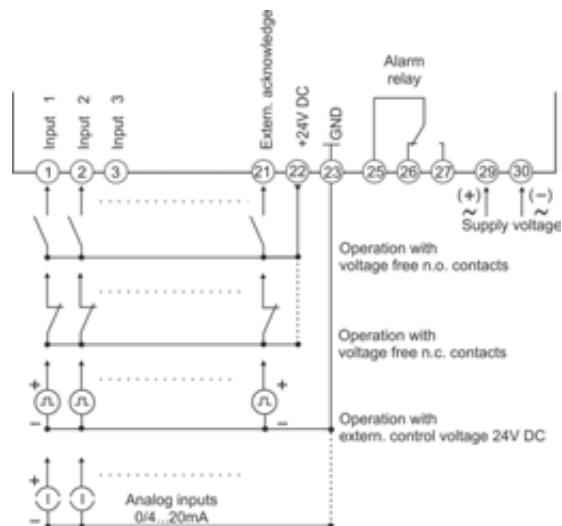
Protection class : front IP65, terminals IP20 acc. to BGV A3

Safety and monitoring

Dimensions



Connection diagram



Ordering code

SD9648 - - - - -

1. Inputs

1	20 digital inputs
2	12 digital + 8 analog inputs

2. Real time clock

0	without clock
1	with clock

3. Supply voltage

0	230 V AC $\pm 10\%$ 50-60Hz
1	115 V AC $\pm 10\%$ 50-60Hz
4	24 V AC $\pm 10\%$ 50-60Hz
5	24 V DC $\pm 15\%$

4. Options

00	without option
----	----------------

5. Additional text above the display (3x90mm HxW)

Product information

Insulation Guard IW1000



- Time optimized pulse measuring method
- 2 alarm outputs relay, 1 analogue output
- Automatic and manual self test
- Acoustic alarm in case of malfunction
- Devices for railway vehicles and healthcare facilities available

Characteristics

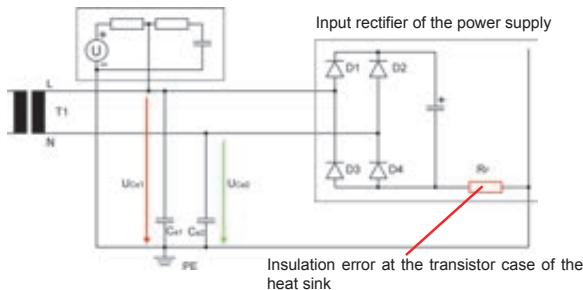
The isolation-guard IW1000 will be used for insulation-monitoring in machines and systems with ungrounded voltage systems. The universal design allows the monitoring of all AC - and DC -Systems.

Common informations

In well-insulated IT-systems (new installations) with a lot of connected devices a high leakage capacity may occur due grounded input filters, cable capacities etc. Common insulation guards, working with pulse measuring mode, are running with fixed pulse widths. For well operation, they must be adapted manually to the actual leakage capacity of the system. There are also insulation guards available, working with self adapting pulse width. However these devices need a long measuring time because the result will be at least available, when loading voltage will find its maximum (no more change in load voltage). With the time optimized measuring method of the IW1000, insulation resistance and leakage capacity will be calculated after 2-time constants. Therefor the reaction time of the IW1000 is very short. By applications of modern signal processing-algorithms in the software and over sampling-mode in connection with high signal-dissolution of the AD-converter, the IW1000 runs with high stability and reliable measurement.

Comparison of the DC-measuring procedure with the time optimized pulse measuring procedure of the IW1000

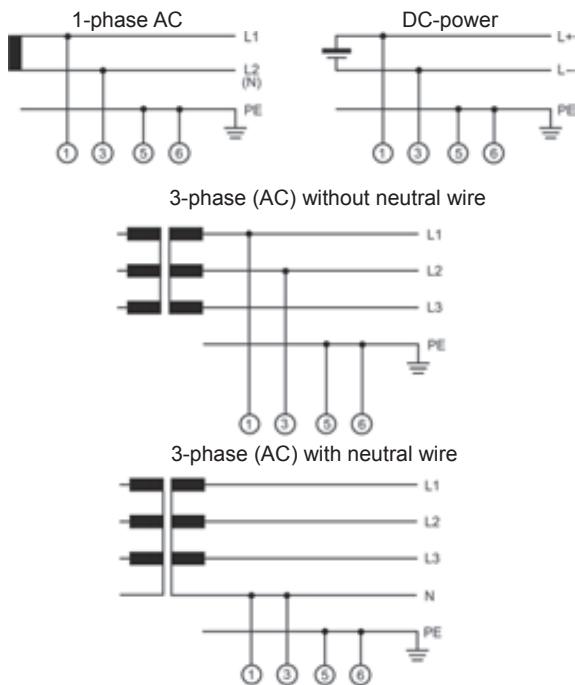
Simple circuit of an insulation guard with the DC-measurement method



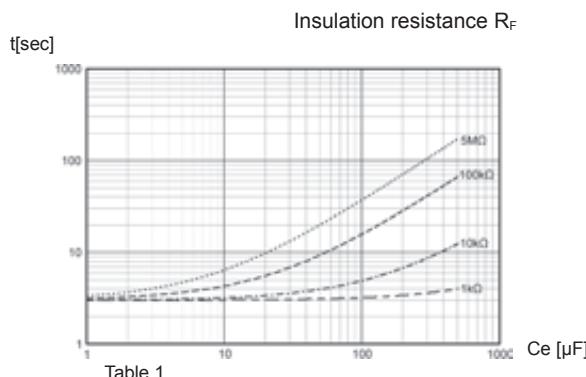
Safety and monitoring

DC-components of the leakage currents could appear without insulation error in case of an asymmetric load during positive and negatives half-waves. For example: Power controlled devices which are operating in phase-angle control or as zero-crossing switch (SSR- relays). Even frequency converters produce high DC-leakage currents. With time optimized pulse measuring method of the IW1000, DC-voltage-shares at the leakage capacities measured during positive and negative voltage pulses will be eliminated automatically by calculation. Therefor the measuring method is qualified for AC-AC/DC and true DC-systems.

Connection examples



Characteristic curve 1, measuring time



Product information

Technical data

Power supply

Supply voltage : 230 V AC, 115 V AC, 24 V AC $\pm 10\%$; 16.8..33.6 V DC, 10.8..15.6 V DC

Power consumption: max. 4 VA

Operating temp. : -10..+55 °C;

Option 01 : -25..+70 °C

Relative humidity : 75 % for annual mean in accordance with DIN EN50155, 95 % for 30 days all year continuously, seldom or low humidity doesn't lead to malfunctions or cancellations.

CE-conformity : EN 55022, EN 60555, IEC 61000-4-2/3/4/5/11/13

Option 01 additional

: EN 50155 in following parts: EN 61373, EN 61326-A1, IEC 68-2-6/27/29

Fire protection

: fulfill of fire protection of railway vehicles acc. to NFF16-101 in following parts (IEC) EN60695-2-12 (glow wire flammability test method, temperature 850 °C) and NFF16-102 in parts 6.2; 6.4; 6.5

Input

U_{nom} : 0..690 V AC/DC; ab UN >400 V operation only with cover clamp permitted

Frequency range : 16 $\frac{2}{3}$..400 Hz

Measurement **(standard)** **(health care)**

$U_{\text{meas}} \text{ max.}$: $\pm 40 \text{ V}$ $\pm 20 \text{ V}$

$I_{\text{meas}} \text{ max.}$: $\pm 220 \mu\text{A}$ $\pm 110 \mu\text{A}$

$R_i \text{ DC}$

: 180 kΩ (2 x 360 kΩ parallel)

Impedance Z_i : 180 kΩ (2 x 360 kΩ parallel) at 50 Hz

Operating values

AL1/AL2

: 1 kΩ..5 MΩ x 1,1 (1,1 kΩ..5,5 MΩ) programmable

Accuracy

: $\pm 5\%$, $\pm 1 \text{ k}\Omega$ in the range 1 kΩ..5 MΩ

Hysteresis

: 10..100 % of the setpoint programmable

Measuring time

: see table 1

System leakage capacity

: max. 500 µF

Display

: LCD Dot-Matrix, 2 lines 8 characters each, character height 5 mm, with back light

Indicating range

: 1 kΩ..9.9 MΩ

Solution

: 0.1 MΩ

1 MΩ..9.9 MΩ

: 1 kΩ..999 kΩ

Output

Relay SPDT : < 250 V AC < 250 VA < 5 A;

< 300 V DC < 50 W < 2 A

Analogue Case

: 0..1 mA, R_f (Insulation resistance)

: Polyamide (PA) 6.6 , UL94V-0,

acc. to DIN EN 60715:2001-09

Weight

: approx. 390 g

Connection

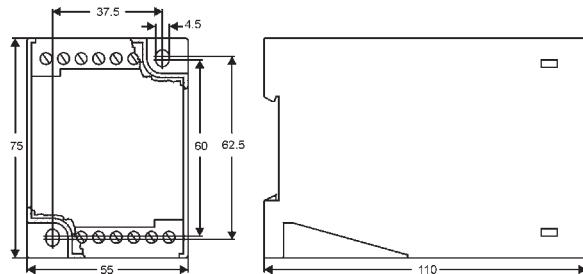
: screw terminals 4 mm²

Protection class

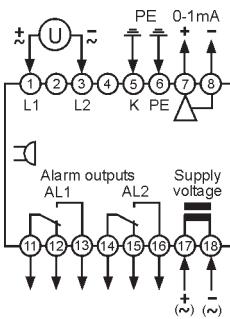
: case IP40, terminals IP20, BGV A3

Safety and monitoring

Dimensions



Connection diagram



Ordering code

1. 2. 3. 4.
IW1000 - - - -

1. Model

1	2 inputs L1 + L2 , output 0..1 mA for ext. pointer instruments
3	as 1, for health care facilities

2. Supply voltage

0	230 V AC	$\pm 10\%$ 50-60Hz
1	115 V AC	$\pm 10\%$ 50-60Hz
4	24 V AC	$\pm 10\%$ 50-60Hz
5	24 V DC	16.6..33.6 V DC
6	12 V DC	10.8..15.6 V DC

3. Options

00	without option
01	device for rail vehicles
02	measuring time 1 s $C_E \text{ max} < 200 \mu\text{F}$

4. Additional text above the display (3x50 mm HxW)

Accessories	
KA-IW1000-1	terminal cover for $U_{\text{meas}} > 400 \text{ V}$
IS96-DS-01	pointer instrument DIN 96x96 mm, mounting depth 63mm

Pointer instrument IS96



E Industrial electronics

E5

Power electronic

	Page
▪ Power supplies	180
▪ Power modules	186
▪ Relay coupler	194
▪ Current transformer	196

SSR - Supplies - Relays



Characteristics

System

- Solid State Relays from 25 up to 125 A
- Relay coupler up to 8 A
- Power supply 5-24 V DC max. 10 A
- DC/DC converter max. 2 A
- Power modules up to 80 A
- Heating current monitoring modules
- SSR control module
- Current transformer for primary current from 1 A up to 1000 A

Applications

- Power supplies for sensors and control cabinets
- Controlling and monitoring of injection molding machines
- Signal coupling
- Electronic power switches

Product information

General information

Inputs

- 0/4..20 mA
- 0/2..10 V DC
- Voltage AC/DC
- Current AC
- Resistance/Potentiometer
- Supply voltages from 24V DC..230 V AC
- Bistable 0/24 V DC

Outputs

- Impulse output 0/18 V DC
- Relay output SPDT
- Transistor output PNP
- Electronic output 24V DC up to 230V AC
- Power outputs for heating current control up to 125 A
- Controlled DC power supplies

Contact termination

- Plug-in terminals
- Screw terminals
- Bushing connection

Device Overview

Device	Function	Input	Output	Page
Power supplies				
NG1000	Supply voltage	24..230 V AC/DC	5..24V max. 2 A	183
DR	Supply voltage	115/230 V AC	24 V DC, max. 10A	184
DPP15	Supply Voltage	100..240 VAC	22,5..28,5 V DC	185
Module				
LM	Electronic power module	Control circuit 3..28 V DC	Load circuit 48..530 V AC	186
CKRD2340	Electronic power module	Control circuit 4.5..32 V DC	Load circuit 24..280 V AC	187
CMRD	Electronic power module	Control circuit 4.5..32 V DC	Load circuit 48..660 V AC	188
D2425	SSR	Control circuit 3..32 V DC	Load circuit 1 ~ 24..280 V AC	189
D2450	SSR	Control circuit 3..32 V DC	Load circuit 1 ~ 24..280 V AC	189
HD4850	SSR	Control circuit 3..32 V DC	Load circuit 1 ~ 48..530 V AC	189
SC869110	SSR	Control circuit 3..32 V DC	Load circuit 1 ~ 48..530 V AC	189
D53TP50D	SSR	Control circuit 3..32 V DC	Load circuit 3 ~ 48..530 V AC	189
H2CM	Heating-current monitoring module	Control circuit 3..28 V DC	Depends to the control input	190
STM40	Control module for SSR	Control circuit 0/4..20 mA, 0..10 V Potentiometer	0/8 V DC bistable	191
STU500	Control module for SSR DIN rail case TS35	Control circuit 0/4..20 mA, 0..10 V Potentiometer	0/12 V DC bistable	192
DC30-D3	SSR for inductive loads	Control circuit 3..24 V DC	Load circuit max. 30 V DC , 3A	193
K20, K40	Heat sink for SSR			189

Product information

Power electronic

Device	Function	Input	Output	Page
Switching relay				
RT424	Relay coupler	24V DC, 24V..230V AC	2 contacts SPDT max. 8 A	194
PT570	Relay coupler	24V DC, 24V..230V AC	4 contacts SPDT max. 6 A	195
Current transformer				
ASW	Slip-over current transformer	50..1000 AAC	1/5 AAC	196
WSW	Wounded primary current transformer	1..40 AAC	1/5 AAC	196

Mistakes reserved, technical specifications subject to change without notice.

Product information

Power electronic

DC Power Supply NG1000



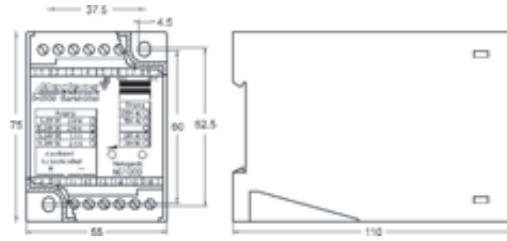
Characteristics

- Full 2-port isolation
- Adjustable output voltage
- Current up to 2 A
- Stabilized, short circuit proof
- Power limiting with positive characteristics

Technical data

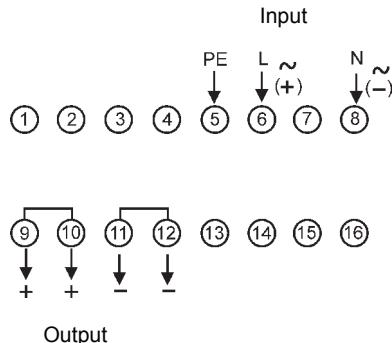
Input	: see ordering code
Frequency	: 47..63 Hz
Operating temperature	
NG1000-1/2-X	: -10..+50 °C
NG1000-3/4-X	: -10..+40 °C
CE-conformity	: acc. to EN 55022, EN 60555-2, IEC 61000-4-4/5/11
Output	
Voltage	: 5..12 / 24 V DC, adjustable via trimpot
Max. current	: see ordering code
Overload	: output voltage will be reduced
Load control	
NG1000-1/2-X	: <50 mV
NG1000-3/4-X	: <70mV
Residual ripple	
NG1000-1/2-X	: <20 mV
NG1000-3/4-X	: <40 mV
Short circuit current approx.	
NG1000-1-X	: 290 mA
NG1000-2-X	: 220 mA
NG1000-3-X	: 2 A
NG1000-4-X	: 4 A
Case	: standard case of polycarbonate 8020 UL94V-1
Weight	: max. 380 g
Connection	: screw terminals with pressure plate, max. 2.5 mm ²
Protection class	
NG1000-1/2	: case IP40,
NG1000-3/4	: case IP30 terminals IP20 acc. to BGV A3

Dimensions



DIN rail mounting TS35 or 2 screws M4

Connection diagram



Ordering code

AC/DC Power supplies input 230 V AC ±10 %

Type	Output*
NG1000-1-0	5..12 V DC; max. 250 mA
NG1000-2-0	12..24 V DC; max. 150 mA
NG1000-3-0	5..24 V DC; max. 1 A
NG1000-4-0	5..24 V DC; max. 2 A

DC/DC converter output 5..24V DC max. 1 A*

Type	Input
NG1000-3-5	24 V DC ±20 %
NG1000-3-6	48 V DC ±20 %
NG1000-3-7	60 V DC ±20 %
NG1000-3-8	80 V DC ±20 %
NG1000-3-9	110 V DC ±20 %
NG1000-3-10	220 V DC ±20 %

DC/DC converter output 5..24V DC max. 2 A*

Type	Input
NG1000-4-5	24 V DC ±20 %
NG1000-4-6	48 V DC ±20 %
NG1000-4-7	60 V DC ±20 %
NG1000-4-8	80 V DC ±20 %
NG1000-4-9	110 V DC ±20 %
NG1000-4-10	220 V DC ±20 %

* The output voltage is adjusted to the minimum at delivery.

Product information

DC Power Supplies Series DR



Characteristics

- 2-port isolation
- Output voltage 24 V DC
- Output current 3A up to 10 A
- Stabilized and short circuit protected
- Power limiting with positive characteristic curve

Technical data

Input	: 115 / 230 V AC
Frequency	: 47..63 Hz
Power consumption	
DR- 75-24	: 77 W
DR-120-24	: 120 W
DR-240-24	: 240 W
Operating temperature	: -10..+60 °C
CE-conformity	: EN 55011, EN 55022 (CISPR22) Class B EN 61000-3-2/3, EN 61000-4-2,3,4,5,6,8,11, EN V50204, EN 55024, EN 61000-6-2 (EN 50082-2)
Humidity	: 20..90 % RH, non condensation

Output

Voltage	: 24..28 V DC, adjustable via trim pot
Max. current	: see ordering code
Overload performance	: voltage reducing, positive curve
Load regulation	: ±1 %
Residual ripple	: <150 mV

Case	: aluminum case DIN rail mounting TS35 acc. to DIN EN 60715:2001-09
-------------	---

Weight

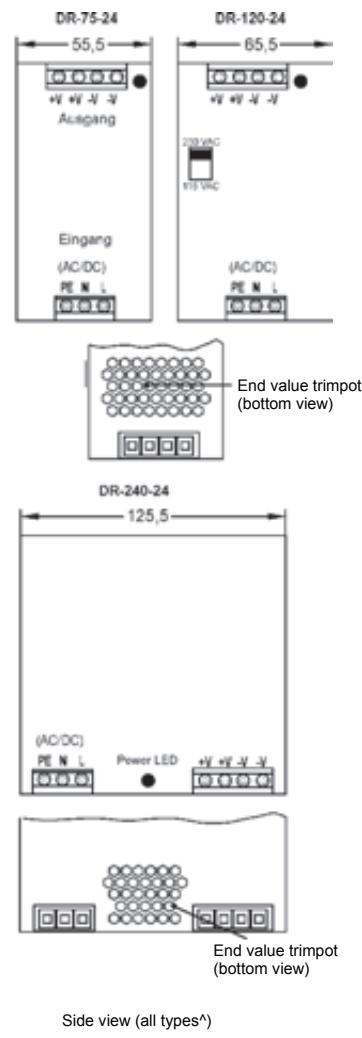
DR- 75-24	: approx. 600 g
DR-120-24	: approx. 800 g
DR-240-24	: approx. 1200 g

Connection	: screw clamps with pressure plate, max. 2.5 mm ²
-------------------	---

Protection class	: IP20 acc. to BGV A3
-------------------------	-----------------------

Power electronic

Dimensions and connection diagram



Ordering code

AC/DC Supplies input 115 / 230 V AC

Type	Output
DR- 75-24	24 V DC max. 3.2 A
DR-120-24	24 V DC max. 5.0 A
DR-240-24	24 V DC max. 10.0 A

Product information

Power electronic

DC Power Supply DPP15



Characteristics

- Full 2-port isolation
- Adjustable output voltage 22,5..28,5 V DC
- Current up to 0,6 A
- Stabilized, short circuit proof
- Power limiting with positive characteristics

Technical Data

Input

Supply voltage	: 85..264 V AC, 50..60 Hz or 90..375 V DC
Efficiency factor	: 80 %
Power factor	: acc to EN6100-3-2 class A
Operating temperature	: -10..+70 °C
CE-conformity	: acc to EN 61000-6-3, EN 55011, EN 55022, EN 61000-6-2, EN 61000-4-2/3/4/5/6/8/11, EN60950-1
Approvals	: UL 508 listed, UL 60950-1, NEC Class 2

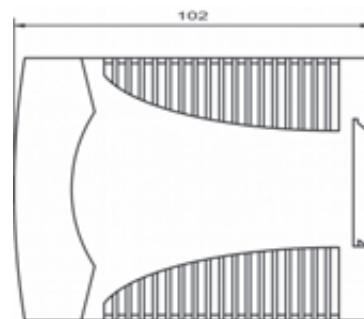
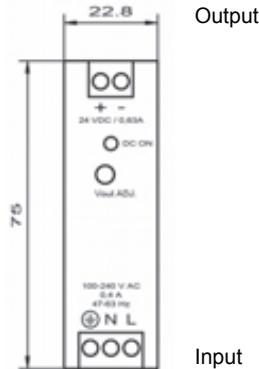
Output

Voltage	: 22,5..28,5 V DC, adjustable with trimpot
max. output current	: 0,6 A
Overload	: current increases, output voltage will be reduced, so that power can remains constant
max. overload current	: 150% of output current
Residual ripple	: < 50 mV
Load control	: < 0,5 %
Temperature coeff.	: < 1 %

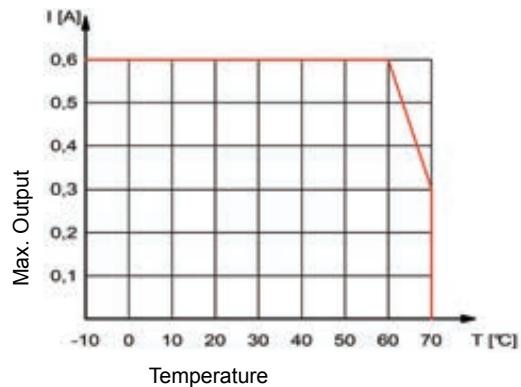
Case

Weight	: approx. 0,13 kg
Electrical connection	: screw terminal with pressure plate, max. 2,5 mm ²
Protection class	: IP20

Dimensions and Connection diagram



Output diagram



Ordering Code

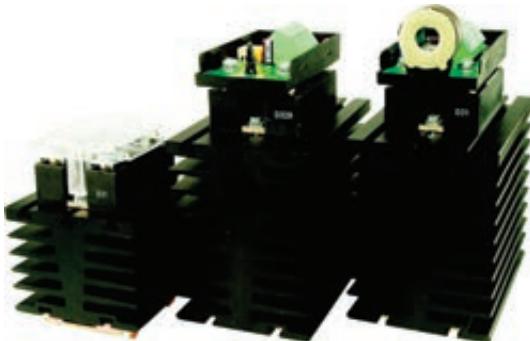
1.
DPP15 -

1.	Output	
	24	24 V DC

Product information

Power electronic

Power Module Series LM



Characteristics

- Load current 20, 40, and 80 A
- Full 2-port isolation
- Additional mounted modules:
Current-Alarm module H2CM
and continuous drive module STM40
- DIN rail mounting TS35

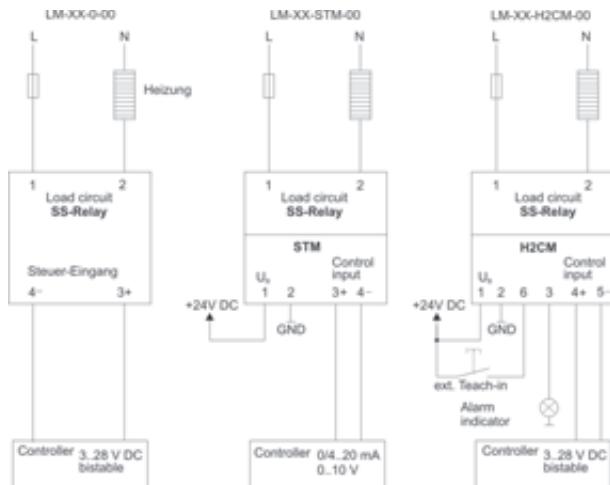
Technical data

Look at the data sheets solid state relay (SSR) and heat sinks (K20/K40).

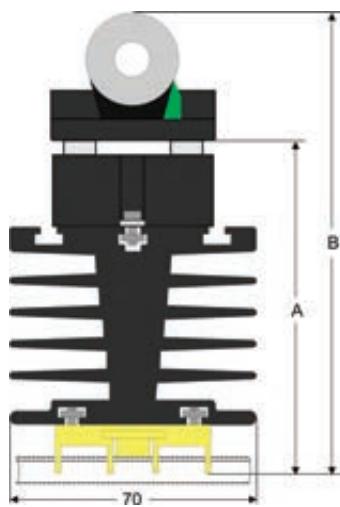
Module dimensions [mm]

Type	A	B	depth
LM-20-0-00	93		75
LM-20-STM-00		116	75
LM-20-H2CM-00		129	75
LM-40/80-0-00	130		100
LM-40/80-STM-00		153	100
LM-40/80-H2CM-00		165	100

Connection diagrams



Dimensions



Ordering code

1. - 2. - 3.

LM - - -

1. Load current at 45 °C and 100 % duty cycle	
20	Max. 20 A AC
40	Max. 40 A AC
80	Max. 80 A AC
2. Additional accessories	
0	without (terminal cover included)
H2CM	with current alarm module
STM	with continuous control module
3. Options	
00	without option

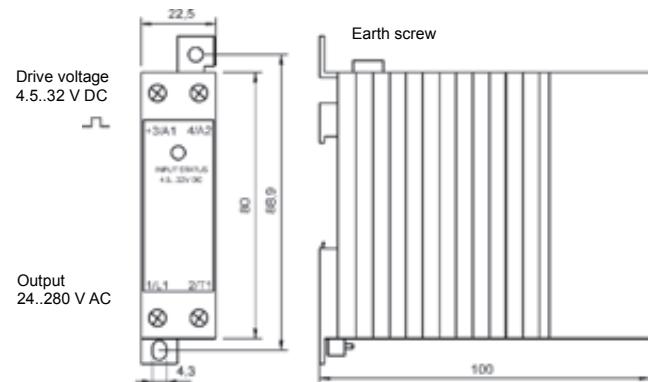
Product information

Solid State Relay CKRD2430



Power electronic

Dimensions / connection diagram



Technical data

- SSR relay with integrated heat-sink
- Power circuit 1 ~ 24..280 V AC / max. 30A*
- Zero voltage switch
- Voltage drop at max. load 1.6 V
- Leak current without drive 10 mA
- Full 2-port isolation
- Test voltage 4 kV ~
- Drive circuit 4.5..32 V DC with LED green
- Input current 15 mA/12 V DC or 20 mA/24 V DC with internal short circuit proof
- Screw terminals for input and output max. AWG 6 (10 mm²)
- Dedicated for loads with cosφ = 0.5
- DIN rail mounting TS35
- International approvals UL, CSA, VDE, CE

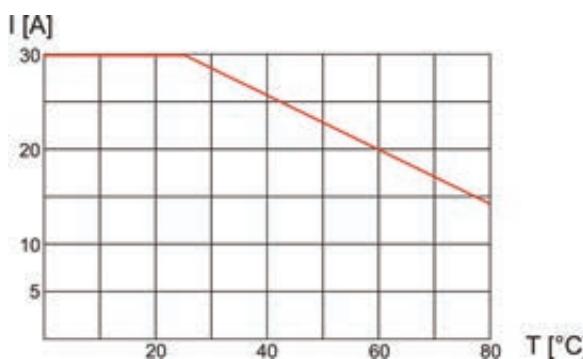
Note:

Mounting space between multiple devices, minimum 20mm.

Ordering code

CKRD2430

*Derating



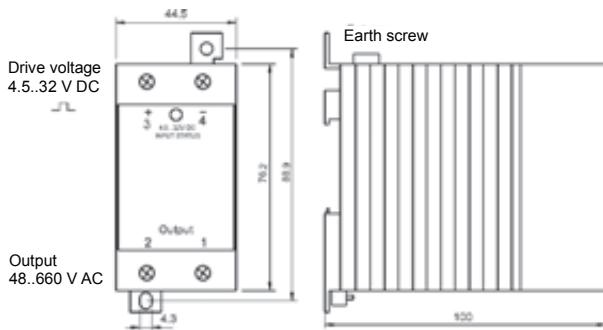
Product information

Power electronic

Solid State Relay CMRD



Dimensions / connection diagram



Note:

Mounting space between multiple devices, minimum 20mm.

Technical data

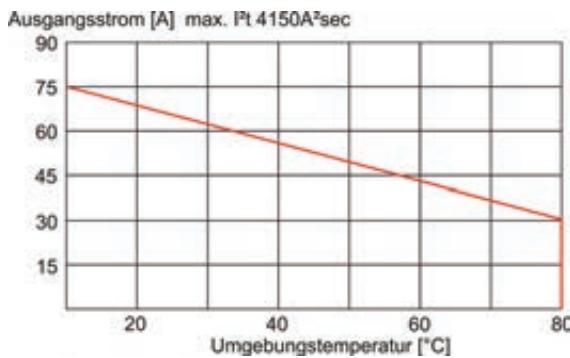
- SSR relay with integrated heat-sink
- Power circuit 1 ~ 48..660 V AC, max. 65A*
- Zero voltage switch
- Voltage drop at max. load 1.7 V
- Leak current without drive 10 mA
- Full 2-port isolation
- Test voltage 4 kV ~
- Drive circuit 4.5..32 V DC with LED green
- Input current 30 mA max. with internal short circuit proof
- Screw terminals for input AWG12 (2,5mm²) and output AWG 6 (10 mm²) max.
- Dedicated for loads with cosφ = 0.5
- DIN rail mounting TS35
- International approvals UL, CSA, VDE, CE

Ordering code

CMRD6065 48..660 V AC, max. 65A

*Derating

CMRD6065



Product information

1 ~ and 3 ~ Solid State Relay



1 ~ SSR



3 ~ SSR

Characteristics

- Load circuit from 24V AC up to 530 V AC
Current from 25 A up to 125 A
- Zero voltage switch
- 2-port isolation
- Dedicated for loads up to $\cos\phi$ 0.5
- Case isolated
- Test voltage 4 kVeff
- Voltage drop at I_{max} 1.6 V
- UL and CSA certification

Ordering code / technical data

Type 1 ~	Drive circuit [V]	Load circuit [V AC]	Current [A]	Terminal cover
D2425	3-32 DC	24-280	25	KS100
D2450	3-32 DC	24-280	45	KS100
HD4850	3-32 DC	48-530	50	KS100
SC869110	3-32 DC	48-530	125	KS100
3 ~				
D53TP50D	3-32 DC	48-530	50	KS300
Accessories				
KS100	Terminal cover acc. to German BGV A3			
KS300	Terminal cover acc. to German BGV A3			

Power electronic

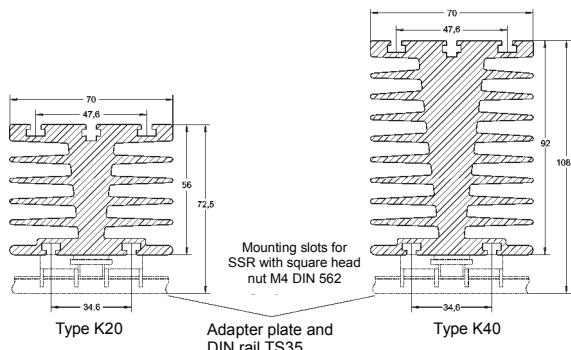
Heat sink K20, K40



Characteristics

- Aluminum heat sink
- DIN rail mounting TS35
- Mounting of the SSR without mechanical processing

Dimensions



Ordering code / technical data

Type	Length [mm]	Thermal resistance [kW]	Weight [kg]
K20-75	75	1.5	0.42
K20-100	100	1.2	0.55
K40-75	75	1	0.72
K40-100	100	0.8	0.93
Accessories			
K-MSSR1P	Mounting set for 1 ~SSR		
K-MSSR3P	Mounting set for 3 ~SSR		
WLP35	Thermal compound 35 gr. box		

Product information

Power electronic

Current Alarm Module H2CM



Characteristics

- Load circuit 1~ 48..530 V AC
- Load current 1..80 A max.
- 2-port isolation
- Drive circuit 3..28 V DC, bistable
- DIN rail mounting TS35

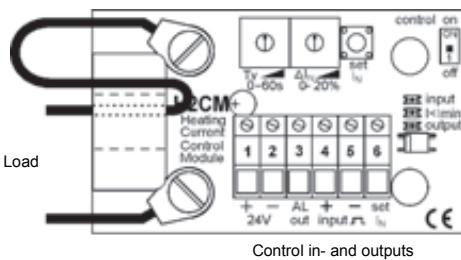
Applications

H2CM-modules are used for quality supervision in production of plastic parts in injection molding machines, thermoform-machines and even in the production of rubber parts. In temperature control circuits operating with solid state relays (SSR), the H2CM modules monitors the correct function of the installed heating elements in a molding tool by measuring the total heating current. Even the correct function of the SSR will be checked continuously.

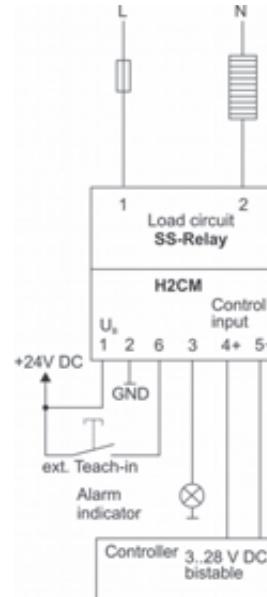
Technical data

Supply voltage	: 10..30 V DC, max. 5 % ripple voltage
Current consumption	: < 20 mA (output with no load)
Operating temperature	: -10..+60 °C
CE-conformity	: EN 55022; IEC 61000-4-2/3/4/5/11
Measuring range	: 1..80 A, 50/60 Hz
Alarm delay	: 0..60 s adjustable
Control input	: via opto coupler, $R_i > 3.3 \text{ k}\Omega$; off $\leq 1 \text{ V DC}$, on 3 ... 28 V DC
Teach-in input	: $R_i > 20 \text{ k}\Omega$; off $\leq 2 \text{ V DC}$, on 6..30 V DC
Alarm output	: PNP-transistor open collector, 50 mA max.(short circuit proof) via dip switch on/off selectable (including)
Terminal cover (Load)	: finger safe acc. to BGV A3
Connection (Control circuit)	: Screw terminal 1.5 mm ² flexible or 2.5 mm ² single wire
Mounting	: fits for SS-Relay, D-type
Dimensions	: 46 x 75 x 32 mm (W x L x H)

Connection diagram



Example



Ordering code

1. 2.
H2CM - -

1. Terminal connection (part of delivery) fitting for SS-Relay	
US	US-thread 6-32 / 8-32
M3 / M4	DIN thread M3 / M4
M3 / M5	DIN thread M3 / M5
2. Options	
00	without options

Accessories:
SSRelay and Heat-sinks see page 14

Product information

Continuous Input Drive Module STM40



- Direct mounting on the SSR
- Multi purpose input for 0/4..20 mA, 0..10 V DC
- Supply isolated
- Driving max. 3 SSR in parallel mode

Characteristics

STM40 modules are used in temperature control systems in connection with solid-state-relays (SSR). It converts continuous input-signals from SPS or other controllers into a pulse-width-controlled signal, suitable to operate with SSR. Input-signal may be 0/4..20 mA or 0..10 V or an external potentiometer. One STM40 module can drive additional 2 external SSR, except when operating in potentiometer mode.

Technical data

Power supply

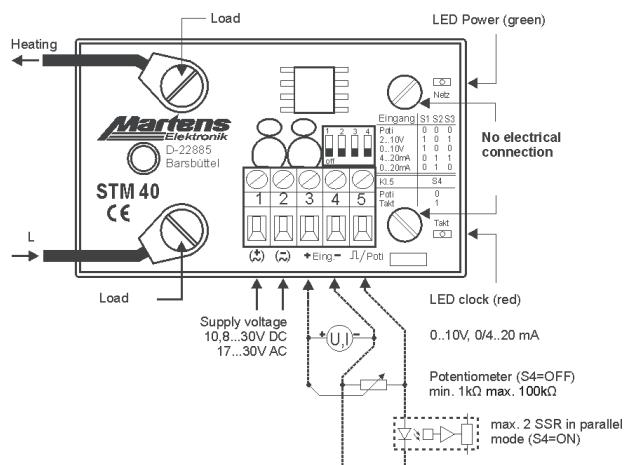
Supply voltage : 10.8..30 V DC, 17..30 V AC
Power consumption : appr. 1.3 VA
Operating temperature : -10..+60 °C
CE-conformity : EN 55022; EN 60555 IEC 61000-4-4/5/11/13

Control input

Voltage : 0..10 V DC, $R_i = 40 \text{ k}\Omega$, 3-times overload
Current : 0/4..20 mA, $R_i = 125 \Omega$, 3-times overload
Resistance : or potentiometer 1 k Ω ..100 k Ω
Output
Output clock : bistable 0/8 V DC, max. 20 mA
additional output for 2 SSR in parallel mode
Clock cycle : 1 s
Terminal cover (Load) : acc. to German BGV A3 (included)
Connection (Control circuit) : screw terminal 1.5 mm 2 flexible wire
or 2.5 mm 2 single wire
Mounting : on SSR, D-type
Dimensions : 46x75x32 mm (WxLxH)

Power electronic

Connection diagram

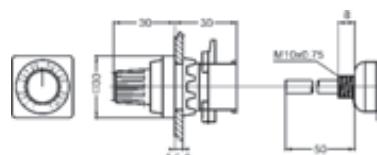


Ordering code

1. 2.
STM40 - -

1. Terminal connection (including) fitting for SSR	
US	US-thread 6-32 / 8-32
M3 / M4	DIN thread M3 / M4
M3 / M5	DIN thread M3 / M5
2. Options	
00	without option
Accessories	
PES30-10k	Potentiometer installation set, complete with 10 k Poti, mounting hole 22,5mm

Potentiometer installation set



Product information

Power electronic

Analog Pulse Converter STU500



- Switch selectable input signal 0/..20 mA, 0/2..10 V DC and Potentiometer
- Bistable output voltage 0/12 V DC
- Indicators for power and output

Characteristics

STU500 converts an analogue input signal into a bistable output signal 0/12V DC. The duty cycle of the output signal is proportional to the input signal level. It can be used for power control in heating circuits in combination with solid state relays (SSR).

Technical data

Power supply

Supply voltage	: 85..265 V AC or 10.8..30 V AC/DC
Frequency AC	: 47..63 Hz
Power consumption	: <1.5 VA
Operating temp.	: -10..+60 °C
Rated voltage	: 500 V acc to VDE 0110 group 2, full 3-port isolation
CE-conformity	: EN 50022, IEC 61000-4-4/5/11/13, EN 60555

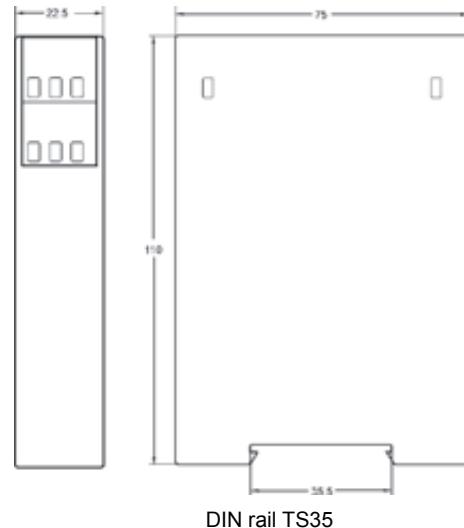
Inputs

Voltage	: 0/2..10 V, $R_i = 40 \text{ k}\Omega$, 3-times overload
Current	: 0/4..20 mA, $R_i = 125 \Omega$, 3-times overload
Resistance	: and Potentiometer from 1 kΩ..100 kΩ

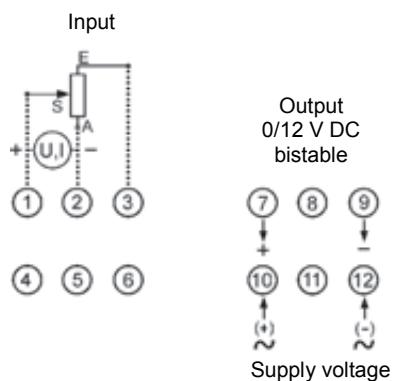
Output

Output clock	: bistable 0/12 V DC, max. 20 mA, short-circuit-proof
Clock cycle	: approx. 1 pulse/s
Case	: standard case polycarbonate 8020 UL 94 V-1 acc. to DIN EN 60715:2001-09
Weight	: approx. 140 g
Protection class	: case IP30, terminals IP20, (BGV A3)
Electrical connection	: screw terminals with pressure plate max. 2.5 mm²

Dimensions



Connection diagram



Ordering code

1.
STU500 - 10 -

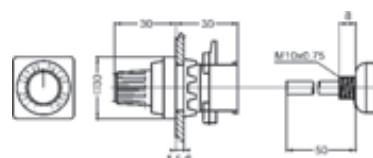
1. Supply voltage

0	85..265V AC
5	10.8..30 V AC/DC

Accessories

PES30-10k	Potentiometer installation set incl. 10 k poti for mounting hole 22.5mm, IP65
-----------	---

Potentiometer installation set



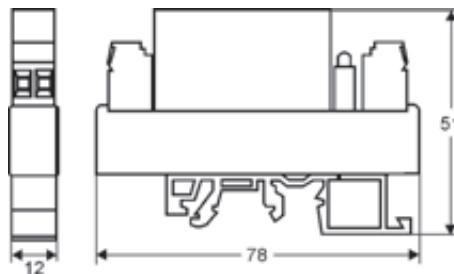
Product information

Power electronic

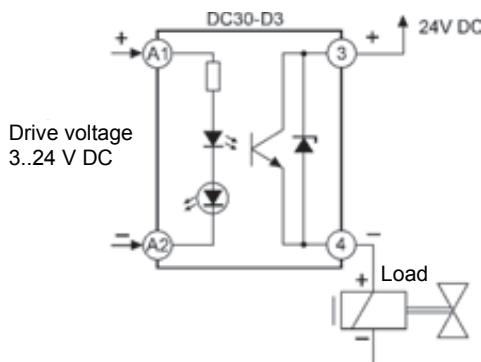
Solid State Relay DC30-D3



Dimensions



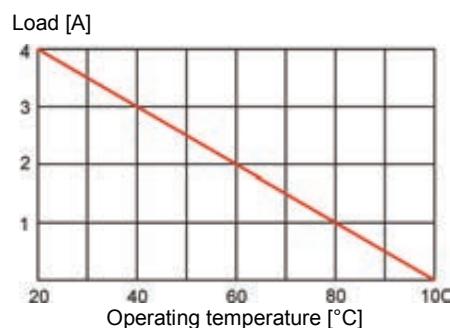
Connection diagram



Technical data

- DC-switching module for **inductive load**
- Load circuit max. 30 V DC / 3 A*
- Peak current 1 sec 5A
- Voltage drop at max. load 1.5 V
- Leak current at off-mode 1 mA
- Fully 2-port isolation
- Drive circuit 3..24 V DC with LED indicator green
- Input resistance 1 k Ω
- DIN rail mounting TS35

* Derating



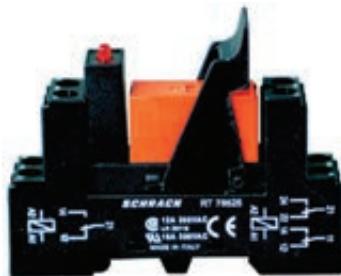
Ordering code

DC30-D3 max. 30V DC , 3 A

Product information

Power electronic

Relay Coupler RT424



depth 60 mm

Technical data

- Plug-in relay
- Switching current 8 A / 250 V AC
- Contact material AgNi 90/10
- Safety protection acc. VDE 0106
- Protection class III acc. to VDE 0700
- Test voltage 5 kV
- DIN rail mounting TS35
- International certifications



Ordering code

Storage program

Description	Supply voltage	Ordering number
Relay	24V DC (1440Ω)	RT424024
Relay	24V AC (350Ω)	RT424524
Relay	230 V AC (32500Ω)	RT424730
Socket		RT78625
Retaining clip		RT 16016
Labeling shield		RY 16040
LED-module red*	24 V DC	RPML 0024
LED-module red	24 V AC	RPML0524
LED-module red	230 V AC	RPML 0730

*including inverse diode

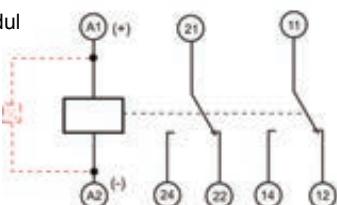
Package program

(contains 1 relay, socket, LED-module, retaining clip and labeling shield)

Package 24 V DC		RT4P4L24
Package 24 V AC		RT4P4R24
Package 230 V AC		RT4P4T30

Dimensions / connection diagram

LED-Modul



Product information

Power electronic

Relay Coupler PT570



depth 73 mm

Technical data

- Plug-in relay
- Switching current 6 A / 250 V AC
- Contact material AgNi 90/10
- Safety protection acc. to IEC664 / VDE 0106
- Protection class III acc. to VDE 0110b
- Test voltage 2 kV
- Finger safe test button, lock or unlock possible
- DIN rail mounting TS35
- International certifications



Ordering code

Storage program

Description	Supply voltage	Ordering number
Relay	24 V DC (1780 Ω)	PT570024
Relay	24 V AC (190 Ω)	PT570524
Relay	230 V AC (19470 Ω)	PT570730
Socket		PT78704
Retaining clip		PT16016
Labeling shield		PT16040
LED-module red*	24 V DC	RPML0024
LED-module red	24 V AC	RPML0524
LED-module red	230 V AC	RPML0730

*including inverse diode

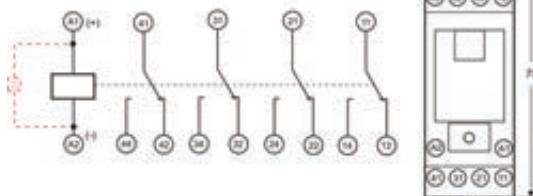
Package program

(contains 1 relay, socket, LED-module, retaining clip and labeling shield)

Package 24 V DC		PT4P4L24
Package 24 V AC		PT4P4R24
Package 230 V AC		PT4P4T30

Dimensions / connection diagram

LED-module



Product information

Power electronic

Slip-Over Current Transformer ASW



Model A

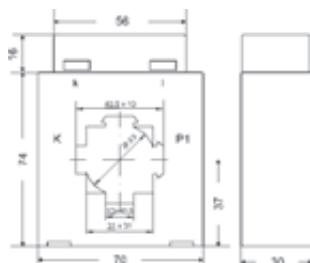
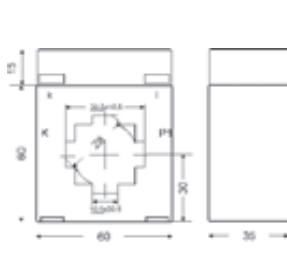


Model B

Characteristics

- Primary current from 50 A up to 1000 A
- Slip whole for different squares
- Easy handling
- Extended secondary terminal cover
- Innovative secondary clamp technology
- Break check plastic case
- Casting compound
- Isolation class E
- Accuracy class 3, > 75 A class 1
- Frequency 50-60 Hz

Dimensions



Ordering code

1. 2.
ASW - -

1.	Primary current [A] (please state in clear text)
50/ 60/ 75/ 80/ (power consumption 1.25 VA; model A)	
100/ 125/ 150/ 200/ 250/ 300/ 400/ 500/ 600/ 750/ 800/ 1000 (power consumption 2.5 VA; model B)	
2.	Secondary current [A]
1	max. burden [Ω]
5	max. burden [Ω]
Accessories incl. by delivery:	
1 primary rail clamp,	
2 secondary terminal covers yellow	
2 wall mounting clips	
Accessories	
Snap clamps for DIN rail mounting TS35	

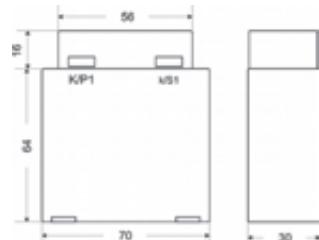
Wounded Current Transformer WSW



Characteristics

- Primary current from 1 A up to 40 A
- Easy handling
- Extended secondary terminal cover
- Innovative secondary clamp technology
- Break check plastic case
- Casting compound
- Isolation class E
- Accuracy class 1
- Frequency 50-60 Hz

Dimensions

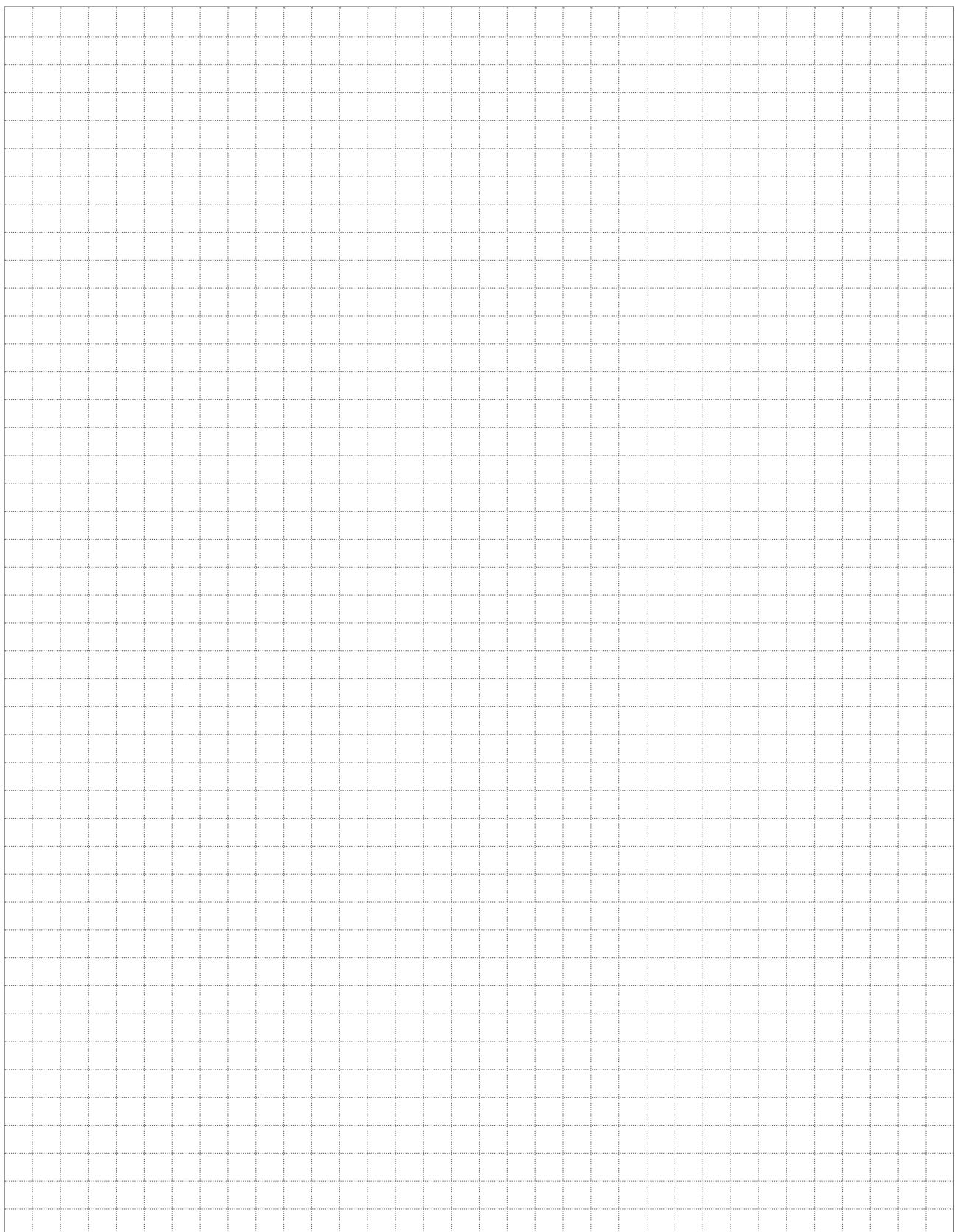


Ordering code

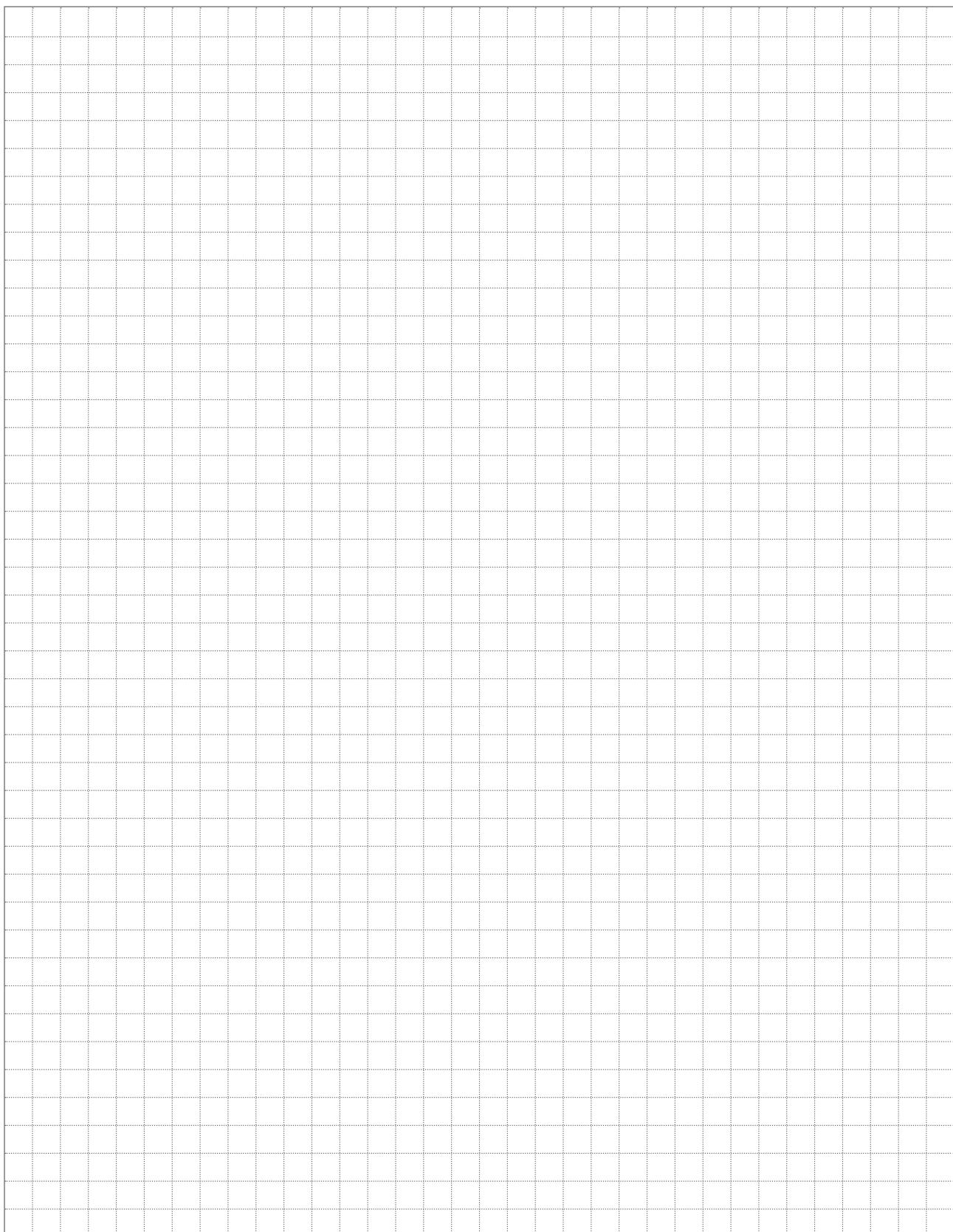
1. 2.
WSW - -

1.	Primary current [A] (please state in clear text)
1/ 2/ 2.5/ 5/ 6/ 7.5/ 10/ 12.5/ 15/ 20/ 25/ 30/ 40	
2.	Secondary current [A]
1	
5	
Accessories incl. by delivery:	
2 secondary terminal covers yellow	
2 wall mounting clips	
Accessories	
Snap clamps for DIN rail mounting TS35	

Notizen



Notizen



GHM GROUP - general terms and conditions of business

This document has been translated from German into English. In case of doubt, the German version shall always take precedence.

§ 1 Field of Application and Definitions

1. For legal relationships between the GHM Group (hereinafter GHM) and customers, these General Terms and Conditions of Business shall apply exclusively. Any conditions in deviation, contradiction or addition to these Terms, are hereby excluded even if known, unless there is express written agreement to the customer's contradicting Conditions of Business.
2. For the purposes of these Terms, a customer is an entrepreneur who places an order with GHM or who concludes a contract with GHM.
3. For the purposes of this contract, according to § 14 of the German Civil Code, an entrepreneur is a natural or legal entity who makes contracts while practising their business or professional freelance activity. We do not supply to consumers as defined in § 13 of the German Civil Code.
4. GHM reserves the right to change their Terms at any time. The customer is to be informed immediately about this in writing or via email. If the customer does not object within 2 weeks of the written notice or sending of the email, the imparted amendments to the Terms will be considered accepted by that customer. The message will inform the customer of the consequences of missing this deadline.

§ 2 Concluding Contracts

1. The product catalogues issued by GHM, as well as other brochures and technical documentation, are intended only for business customers and do not represent an offer to conclude a contract, but only an invitation to the customer to submit a written offer for a contract to GHM.
2. Offers from GHM are non-binding. Contracts can only be concluded via delivery or written confirmation of an assignment. Verbal orders only become effective when they are confirmed by GHM in writing. Changes to signed contracts must be confirmed by GHM in writing in order to be effective.
3. GHM reserves the right to change the technical data, shape and colour, and/or weight within reasonable bounds.
4. If GHM is not supplied correctly or promptly due to a circumstance beyond its control and therefore does not have the object of the contract available, GHM shall have the contractual right to withdraw from the contract. If this withdrawal right is used, the contract must be completely reversed and any received payments are to be returned.

§ 3 Prices, Payments, Discounts, Interest on Late Payments, Offset

1. All prices specified in the product catalogues, brochures and technical documentation issued by GHM are to be understood as without VAT unless we have indicated that they include VAT. Packaging, freight, postage and any other shipping costs are additionally to be paid by the customer unless otherwise agreed.
2. Insofar as expressly fixed prices are agreed upon, the given prices are based on GHM's acquisition costs at the time the order was confirmed. In case of unforeseen increases in acquisition costs beyond GHM's control, GHM reserves the right to raise the prices correspondingly if the delivery or service was not required within four months of signing the contract.
3. If not otherwise agreed in writing, all payments must be made in full, without deduction, to the given payment recipient, within 30 days of the date of invoicing. A discount of 2% is given for payments made within 10 days. This discount is excluded if the customer is late with other payment obligations due to us.
4. If payments are deferred or if the customer is in arrears with payments, the legal interest fees for lateness between companies will become due (currently 8% above the baseline interest according to § 288(2) of the German Civil Code). According to § 286 of the German Civil Code, lateness with payments occurs – even without a reminder – no later than 30 days after receiving the goods or services and the invoice.
5. The customer may only offset costs towards GHM with recognised or legally effective claims.

§ 4 Delivery and Transfer of Risk

1. The location of service and fulfilment is the applicable GHM branch.
2. If the customer requests the contractual object to be sent to another location, the danger of its becoming mislaid transfers to the customer when the goods are given to the freight carrier. In the absence of other agreements, GHM is free to select any type of shipping. The packaging material required for shipping will be invoiced separately and is to be recycled or properly disposed of by the customers at their own cost.
3. Delivery dates and deadlines are only considered binding if the contract parties have expressly made an agreement in this regard. In case of doubt, delivery periods begin on the date of job confirmation. If there is a temporary hindrance to service which is beyond GHM's control, the delivery dates and periods will extend correspondingly. This applies particularly in cases of force majeure, and strikes.
4. GHM has the right to make partial deliveries.

§ 5 Retention of Ownership

1. GHM reserves the right of ownership over contractual objects for itself until all GHM's claims towards the customer from the business relationship have been fulfilled. The customer is therefore obligated to handle the contractual objects with care. If there is an open account relationship, the reserved ownership covers the recognised balance. Violation of this instruction shall give GHM the right to withdraw from the relevant contract.
2. The customer is permitted to process the purchased object or combine it with other objects. Processing or combining is done for GHM. The new object resulting from this process (new goods) is to be carefully kept and used for us by the customer. In case of processing with other objects not belonging to the customer, we are owed an ownership share of the new goods, at a proportion determined by the relation of the value of the item we delivered which has been processed or combined, to the value of the other processed goods at the time of processing. If the customer purchases sole ownership of the new goods, the customer shall agree to assign to GHM partial ownership of the new goods in proportion to the value of the processed item we delivered and the other processed goods at the time of processing.
3. While ownership retention is applicable, the customer is not permitted to pawn

the goods or use them as security. Onselling is only permitted to resellers in the usual course of business and only on condition that the reseller receives full payment from his customers or reserves the right that ownership only transfers to the customer when the customer has fulfilled his payment obligations.

4. In case of pawning, seizure or other control or intervention of third parties regarding the contractual objects, the customer must inform GHM immediately.

§ 6 Guarantee

1. In case of faults in the contractual objects, guarantee claims are limited to replacement. If the fault is still present after two replacements, then the replacement is considered to have failed. The customer can then request an appropriate reduction in the price or withdraw from the contract.
2. All guarantee claims expire in 12 months as of the legal start date of expiration. This period is not applicable if the law according to the German Civil Code §438(1) no. 2 (Buildings and Items for Buildings) and §634a(1) no. 2 (Building Faults) prescribes longer deadlines, or in case of deliberate action, fraudulent concealment of the fault, or if a guarantee of quality has not been fulfilled.
3. Damage compensation to the client due to material fault is excluded. This does not apply in case of fraudulent concealment of the fault, if a guaranteed quality has not been fulfilled, if there is injury to life, body or health, or if GHM deliberately or grossly negligently violated its obligation. These stipulations do not change the burden of proof to the customer's disadvantage. Further or other claims than those in this § 6 due to material fault from the entity making the order are excluded.

§ 7 Exchanges and Repairs

1. GHM is not obligated to replace or take back goods without fault, and in case of special orders, replacement or return is excluded per se.
2. If GHM states it is willing to take back a standard item without being obligated to do so according to guarantee laws or their own given guarantee, then 15% of the purchase price will be retained if the goods are undamaged. If the goods are damaged, additional necessary repair costs will also be deducted. The buyer is permitted to prove that damage or reduction in value has not occurred at all or is significantly lower than the sum specified.
3. If GHM is to carry out repairs for the customer which do not fall within guarantee laws or their own guarantee, the item for repair will be sent back to the client by default at the client's own cost. If the customer requests a price quote for the repair, GHM has the right to invoice for this additional work to the amount of the actual costs incurred.
4. Special devices and modified standard versions cannot be exchanged or returned. A return subject to a return fee of 30% of the purchase price can be agreed upon in special cases.

§ 8 Limitation of Liability

GHM is only liable in cases where it, its legal representative or a subcontractor/fulfilment agent is guilty of deliberate or gross negligence. This does not apply if the damages are for injury to life, the body or health, or in case of violation of contractual obligations.

§ 9 Disposal of electronic devices

If the contractual items delivered include such, their disposal is governed by the following paragraphs regarding old devices (§ 3(3), German Electronics Law) which are used outside of private households (§ 3(4), German Electronics Law).

1. The customer will dispose of the delivered electronic devices at the end of their useful lives at his own cost and according to relevant legal regulations. The customer releases GHM from the manufacturer's obligations according to § 10(2) and (3) of the German Electronics Law and therefore also from any connected claims from third parties.
2. If the delivered goods are passed on to industrial third parties, the customer must also obligate these parties in writing to dispose of the devices properly after the end of their lives, to bear the related costs for this, and to impose a similar obligation if they pass the devices on again.
3. If the customer neglects to contractually obligate third parties to proper disposal and to obligate further recipients according to Para. 2 above, then the customer is obligated to take back the items after the end of their useful lives and dispose of them properly according to legal regulations. This shall also apply if the onwards obligation to the third party was not in writing and the third party disputes their responsibility for disposal.
4. GHM's right to have the customer take over and release GHM will not expire before two years have passed after the final use of the device. This two-year expiry restriction begins no earlier than the date of the manufacturer receiving a written notice from the customer about the end of the device's use. However, the claim on takeover and release will expire no later than 30 years after it comes into existence.
5. Conformity with WEEE for all electronic devices from GHM is ensured, based on the existing registration at the Foundation for Registering Old Electronic Devices. Our WEEE registration number is DE 93889386.

§ 10 Other

1. The exclusive application of the law of the Federal Republic of Germany is agreed upon. The stipulations of the United Nations Convention on Contracts for the International Sale of Goods are not applicable.
2. If the customer is a businessperson, a legal entity under public law or a special fund under public law, the agreed exclusive court of jurisdiction for any disputes from this contract is Regensburg. GHM shall also have the right to bring a case at the customer's location.
3. Should individual terms of this contract be ineffective, this will not affect the effectiveness of the remainder. In such a case, the ineffective term is to be changed or extended so that the economic goal it targets is fulfilled. § 139 of the German Civil Code [Partial Invalidity] is hereby waived.

Version dated: 31.12.2016

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Sales Germany



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20450 – 20458 21509 – 21513 27000 – 27729
20459 – 21040 21514 – 21999 27778 – 27793
21041 – 21450 22000 – 22999 28000 – 28999



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Sales area 10

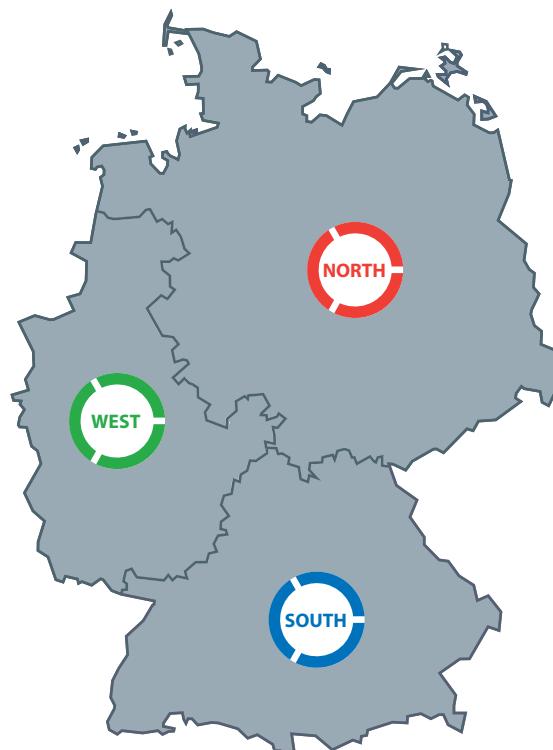
26000 – 26999
27730 – 27777
27794 – 27999



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Sales area 4

35000 – 36999 57000 – 59999
42000 – 42999 61000 – 61999
44000 – 44999
51000 – 51999
53000 – 53999



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Sales area 5

29000 – 9999
30000 – 34999
37000 – 39999



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Sales area 7

54000 – 56999
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Cust. support Sales area 9

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Sales area 8

80000 – 87999
90000 – 97999

Sales international

Our International Area Sales Management Team



Anita Renc
Direction sales international



Parimal Sharma
Sales Export



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Sales Export



Mina Kamal
Sales Export



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Language:
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Bulgaria

Language:
English, Hindi, German

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Language:
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Area:
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Language:
English

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Language:
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Director

GHM MĚŘICÍ TECHNIKA
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Member of GHM GROUP



Jan Grobler
Managing Director

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Denmark

South Africa

Italy

GHM Foreign Sales



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Worldwide Sales

Europe:

Austria	France
Belgium	Greece
Bulgaria	United Kingdom
Denmark	Ireland
Finland	Italy
Estonia	Croatia
Finland	Lithuania

Moldova	Russia
Netherlands	Sweden
Norway	Switzerland
Austria	Serbia
Poland	Slovakia
Portugal	Slovenia
Romania	Spain

Czech Republic
Turkey
Hungary
Serbia
Ukraine
Belarus

Worldwide:

Egypt	Japan
Australia	Malaysia
Brazil	Taiwan
Chile	Thailand
China	USA
India	United Arab Emirates
Israel	Vietnam