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JUMO DICON touch
Two/four-channel process and program controller with paperless recorder and touchscreen

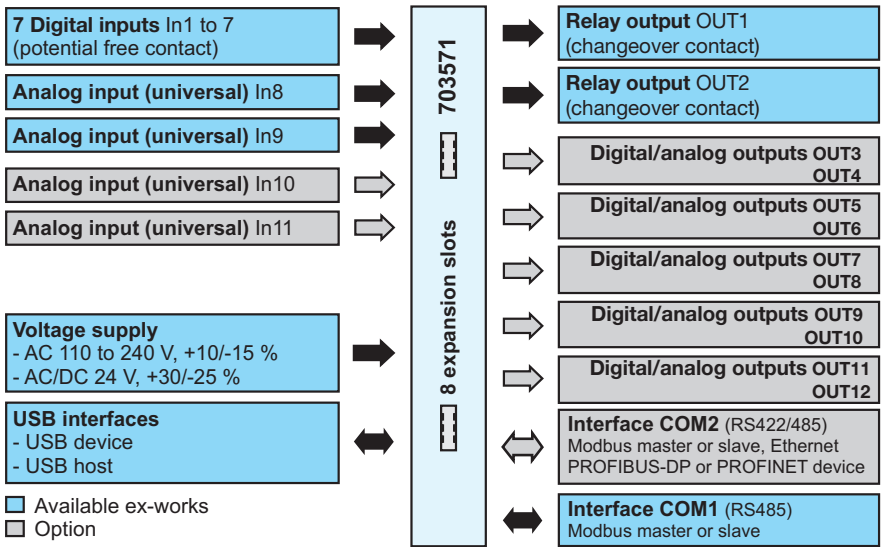
Brief description

The DICON touch is a universal process and program controller with 4 control channels, which displays information on a vibrant display and is operated intuitively with touchscreen.
Up to 4 control channels are available via the tried-and-tested JUMO control algorithm with two possible optimization variants. These enable a simple and highly-accurate startup. Even multiple-zone control, cascade control, or other complex control tasks are therefore possible.
In the following block diagram, the various hardware options of the modular hardware concept are depicted. 4 analog universal inputs and up to 8 external inputs can acquire a variety of physical measured values with high precision. Thanks to different output variants, the actuators can be controlled directly in the device, either in an analog manner or digitally. These can be expanded further through external digital outputs. To communicate with higher-level systems, interfaces such as Modbus (master/slave), PROFIBUS, PROFINET-RT, or Ethernet with web server, can be used.
To ensure secure process operation, the device has password-protected user administration with individual assignment of rights for different levels or control commands. Screen masks for controllers, program generators, recording, and for overview screens are ready-made and available. Four individual process screens can be created as desired using the configuration software. Important analog and digital process values can be saved in a tamper-proof manner with the recording extra code, visualized graphically, and exported to PC in a tamper-proof manner via interface or USB flash drive.
The configuration software allows for the process controller to be programmed with ease, for math and logic coherences to be described, and for customer-specific linearizations to be created. Additionally, tools are included for simulating external signals or the control process, or to record for the duration of the startup.
A comprehensive alarm and limit value concept as well as flexible digital signal management complete the "all-in-one device".



Type 703571/...

Block diagram



Special features

- Vibrant 3.5-inch color screen, with 320 × 240 pixels and 256 colors
- 32 programs with easy-to-use program entry and program control
- Interfaces as a standard feature: USB host, USB device, RS485 (COM1)
- Available as an interface (COM2): RS422/485 Modbus master/slave, PROFIBUS-DP, Ethernet, PROFINET-RT
- Integrated paperless recorder with tamper-proof data storage
- 4 individual process screens with user configurable input fields
- 16 math and logic functions
- Flexible through modular hardware
- Password-protected user administration5-digit analog value display
- Individual operating level
- Control loop and output level monitoring
- Integrated timer and time switch Service and operating hours counter
- Web server for online visualization via a web browser
- Alarm by email
- Protection type on the front, IP66
- AMS2750/CQI-9 calibration certificate
- cULus, DNV GL, DIN EN14597 approval

Approvals/approval marks (see "Technical data")

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Description

Controller types

The controller can be configured as a two-state controller, three-state controller, modulating controller, continuous controller, or continuous controller with integrated position controller. The cycle time of 150 ms depends on the configuration and can increase to a maximum of 250 ms.

Parameter blocks

4 parameter blocks can be assigned to each controller. Each parameter block has 15 parameters. The controller structures P, I, PD, PI, and PID can be adjusted.

Autotuning

Autotuning also makes it possible for the controller to be matched to the control process by a user who is not a control technology expert. The way the control process reacts to changes in the actuating variable is evaluated in the process. Two different optimization processes are available. The oscillation method is preset as the standard method in the controller.

User level

Up to 25 parameters of any type from the configuration or parameter level can be put compiled in this level. These parameters, for example, often need to be changed or made available to operating personnel (see "User administration").

User administration

Password-protected user administration guarantees safe process operation. This function allows for individual assignment of rights for 4 users, for access to different levels and control commands.

Setpoint values

Up to 4 setpoint values can be entered for each control channel. Toggling these setpoint values is controlled by 2 binary-coded digital signals. However, the setpoint values for both controllers can also be specified as an external setpoint specification via an additional analog input or an interface.

Program controller (extra code)

32 programs with 50 sections and 16 operating contacts can be programmed in the program controller. Each program can be assigned a program name and an icon.
4 setpoint values, section run times, operating contacts, tolerance bands, cycles, and parameter blocks can be assigned in each program section.

The tolerance band monitoring function monitors the actual value in an adjustable band around the setpoint value. The output signal of the tolerance band monitoring function can, for example, also be used to stop the program.

Ramp function

The ramp function allows a continuous change of the setpoint value up to the ramp end value (setpoint specification) for each control channel. After power ON, the ramp starts at the current actual value. The slope of the ramp is determined via different gradients for a rising and falling ramp. The ramp starts at the time the setpoint value is changed or at the same time as a digital signal. The ramp function can be controlled by digital signals or via the functional level.

Limit value monitoring function

There are 16 limit value monitoring functions, each with 8 selectable alarm functions AF1 to AF8 available. The limit value can be fixed or dependant on another measurand (setpoint value).
Using additional parameters such as the location and value of the switching differential, switch-on/switch-off delay, pulse function, type of acknowledgement, and startup alarm suppression, extensive functions can be realized. The startup alarm suppression, for example, can prevent the limit value monitoring function from being triggered during the start-up phase of a process.

A maximum of 16 math or logic functions (extra code)

The math and logic module allows analog and/or digital signals to be linked. The following math formulas are available to the operators: +, -, *, /, SQRT(), MIN(), MAX(), SIN(), COS(), TAN(), **, EXP(), ABS(), INT(), FRC(), LOG(), LN(), humidity and floating average, as well as !, &, |, ^, and (and).

Difference, ratio, and humidity can be configured on the device without extra code.

Analog inputs

The maximum of 4 analog inputs are universally user configurable for RTD temperature probes, thermocouples, resistors (resistance transmitters, potentiometers), and standard signals (current, voltage). The linearizations for over 20 common measuring probes are saved. A measured value offset or a fine adjustment can be carried out to compensate for machine-specific deviations.
Due to the measuring circuit monitoring function, out of range measurements, probe/cable break, and probe/cable short circuit are detected depending on the type of measuring probe. This way, in the event of a malfunction, the system is set to a safe operating status which is also configurable.

Customer-specific linearization

Customer-specific linearization is additionally possible. Programming is carried out with the aid of the setup program, using a value table with 40 value pairs or a 4th-order polynomial as a formula.

Analog outputs

Up to 5 analog outputs can be realized in the device. They can be used, for example, as controller outputs, setpoint value outputs, to output results of the math formulas, or as actual value outputs. The signals are freely scalable.

Digital inputs

The signals of the 7 standard digital inputs (potential-free contacts) can be used to trigger different internal functions (e.g. toggling the parameter block, starting autotuning, or acknowledging a limit value monitoring function).

Digital outputs

Up to twelve digital outputs can be realized in the device (see block diagram). They can be used for example, as controller outputs, limit value monitoring function signals, results of logic linkages, or for programmer signals, etc.

External inputs

8 external analog inputs and 8 external digital inputs each, can be loaded via an interface. The unit, range limits, and alarms can be adjusted for the external analog inputs.

Timer

4 timer functions are provided as standard. These can be used as relative timers or as weekly time switches (linked to the real-time clock).

Digital control signals

There are 8 digital control signals with different functions (OR connection, BCD connection, delay, inversion). The results are also available for controlling internal functions or they can be output to digital outputs.

Web server (online visualization)

This function is available with the installation of the Ethernet interface on expansion slot COM2. All information shown in the operating loop of the device can be accessed automatically without configuration.

Alarm by email

An email alarm can be sent to up to three addresses simultaneously via a mail server.
Up to 5 alarm texts can be configured; the sending process is controlled by digital signals. There are 5 different alarm texts for this. These are linked to specific digital signals from the device.

PROFINET-RT class B

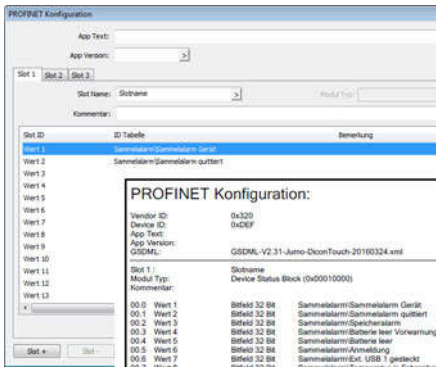
With the interface (code 63), it is possible to operate the device as a PROFINET-RT device according to IEEE 802.1, in a PROFINET-RT network. The GSDML which is provided is also available as a download on our website.
Connection is via 2 RJ-45 ports on the rear of the device.

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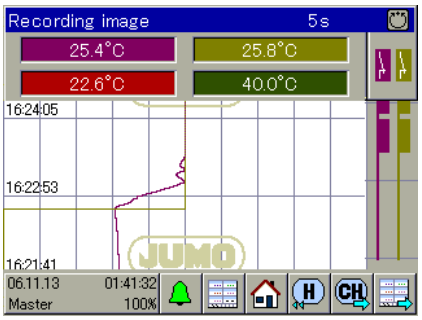
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Slot configuration can be carried out via the setup program and this can be printed as a PDF file. All standard Ethernet applications such as setup, PCC/PCA, and web server are also available here.
Integration of acyclic services is also possible, and will be explained in the interface description provided.



2 recording views (extra code)

4 analog channels and three digital channels can be recorded per recording view. They appear as line recorders with a time stamp. The line recorder image is always available. It is only possible to use the "history" function and to extract the recording data via PCC, PCA by means of the extra code 213 recording function.



Setup program

The setup program makes the controller easy to configure and parameterize using a PC. Data records can thus be created, edited, and transferred to the controller, and extracted from there. The data can be saved and printed. The setup program supports multiple languages, including German, English, and French.

External relay or logic module ER8 (accessories)

By connecting two ER8 external relay or logic modules, eight relay or digital outputs (12 V/20 mA) each can be added to the device. The control takes place via interface RS422/RS485. The setup program is essential for the configuration of the ER8 module that is mountable on the DIN-rail. Two ER8 modules can be connected.

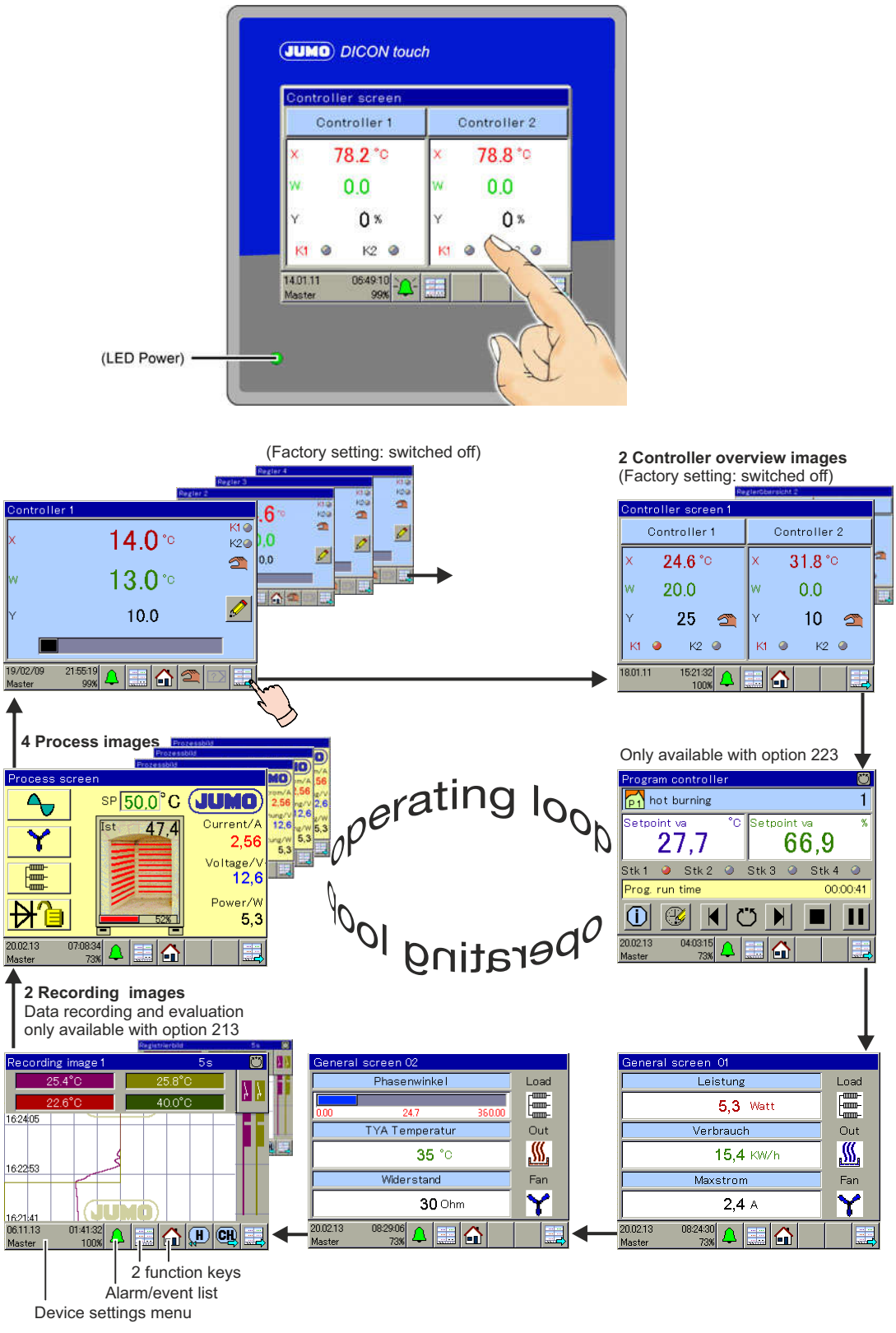
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Display and operating concept

The DICON touch is operated via a resistive touchscreen and also reacts to finger pressure. Commercially available pens with plastic tips can also be used.



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Controller parameters

The parameters and their meanings are listed in the table. Depending on the controller type, some parameters are omitted or are meaningless. Three-state controllers have 2 controller structures that can be parameterized differently for "heating" and "cooling". 4 parameter blocks can be managed for each of the 4 control channels.

Parameter	Value range	Default setting	Meaning
Proportional band Xp1	0 to 9999 digits	0 digits	Size of the proportional area The controller structure has no effect at 0! In the case of a continuous controller, Xp1 and Xp2 must be > 0.
Proportional band Xp2	0 to 9999 digits	0 digits	
Derivative time Tv1	0 to 9999 s	80 s	Influences the differential component of the controller output signal
Derivative time Tv2	0 to 9999 s	80 s	
Reset time Tn1	0 to 9999 s	350 s	Influences the integral component of the controller output signal
Reset time Tn2	0 to 9999 s	350 s	
Cycle time Cy1	0 to 999.9 s	20.0 s	When using a switched output, the cycle time should be chosen so that the energy supply to the process is as continuous as possible, and the switching elements are not overloaded.
Cycle time Cy2	0 to 999.9 s	20.0 s	
Contact spacing Xsh	0 to 999.9 digits	0.0 digits	Spacing between the two control contacts for three-state controllers, modulating controllers, and continuous controllers with integrated position controller
Switching differential Xd1	0 to 999.9 digits	1.0 digit	Hysteresis for switching controllers with proportional area = 0
Switching differential Xd2	0 to 999.9 digits	1.0 digit	
Actuator time TT	5 to 3000 s	60 s	Used run time range of the control valve for modulating controllers
Working point Y0	-100 to +100 %	0 %	Output level for P and PD controllers (if x = w then y = Y0)
Output value limit Y1	0 to 100 %	100 %	Maximum output level
Output value limit Y2	-100 to +100 %	-100 %	Minimum output level
Minimum relay switch-on duration Tk1	0.000 to 60.00 s	0.000 s	Limits the switching frequencies for switched outputs
Minimum relay switch-on duration Tk2	0.000 to 60.00 s	0.000 s	

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Technical data

Analog inputs

General information

Standard number	2 universal analog inputs
Optional number	2 additional universal analog inputs via optional boards
A/D converter	Dynamic resolution up to 16-bit (for all input types)
Galvanic isolation	See chapter "Galvanic isolation"

Thermocouples

Designation	**Standard**	**Measuring range**	**Measuring accuracy**[a]	**Ambient temperature influence**
Fe-CuNi “L”	DIN 43 710	-200 to +900 °C	≤ 0.25 %	≤ 100 ppm/K
Fe-CuNi “J”	DIN EN 60584	-200 to +1200 °C	≤ 0.25 %	≤ 100 ppm/K
Cu-CuNi “U”	DIN 43 710	-200 to +600 °C	≤ 0.25 %	≤ 100 ppm/K
Cu-CuNi “T”	DIN EN 60584	-200 to +400 °C	≤ 0.25 %	≤ 100 ppm/K
NiCr-Ni “K”	DIN EN 60584	-200 to +1372 °C	≤ 0.25 %[b]	≤ 100 ppm/K
NiCr-CuNi “E”	DIN EN 60584	-200 to +1000 °C	≤ 0.25 %	≤ 100 ppm/K
NiCrSi-NiSi “N”	DIN EN 60584	-100 to +1300 °C	≤ 0.25 %	≤ 100 ppm/K
Pt10Rh-Pt “S”	DIN EN 60584	-50 to 1768 °C	≤ 0.25 %[c]	≤ 100 ppm/K
Pt13Rh-Pt “R”	DIN EN 60584			
Pt30Rh-Pt6Rh “B”	DIN EN 60584	0 to 1820 °C	≤ 0.25 %[d]	≤ 100 ppm/K
Pt40Rh-Pt20Rh	ASTM E1751M-09	0 to 1888 °C	≤ 0.25 %[e]	≤ 100 ppm/K
Ir40Rh-Ir	ASTM E1751M-09	0 to 2110 °C	≤ 0.25 %	≤ 100 ppm/K
W5Re-W26Re “C”	ASTM E230M-11	0 to 2315 °C	≤ 0.25 %	≤ 100 ppm/K
W3Re-W25Re “D”	ASTM E1751M-09	0 to 2315 °C	≤ 0.25 %	≤ 100 ppm/K
Chromel®-Copel®	GOST R 8.585-2001	-200 to +800 °C	≤ 0.25 %	≤ 100 ppm/K
Chromel®-Alumel® (like NiCr-Ni "K")	GOST R 8.585-2001	-200 to +1372 °C	≤ 0.25 %	≤ 100 ppm/K
Fe-CuNi "L"	GOST R 8.585-2001	-200 to +800 °C	≤ 0.25 %	≤ 100 ppm/K
Smallest measuring span		Type L, J, U, T, K, E, N, Chromel®-Alumel®; 100 K Type S, R, B, D, C, W3Re/W26Re, Chromel®-Copel®: 500 K		
Measuring range start/end		Freely programmable within the limits in increments of 0.1 K		
Cold junction	GOST R	Pt100 internal, thermostat constant or external temperature probe		
Cold junction accuracy (internal)		± 1 K		
Cold junction temperature (external)		0 to +100 °C adjustable		
Sampling rate		Controller 1(2): 150 ms in total		
Input filter		Digital filter, 2nd order; filter constant can be set from 0 to 100 s		
Special features		Can also be programmed in °F		

[a] The accuracy specifications refer to the maximum measuring range. Smaller measuring spans lead to reduced linearization accuracy.
[b] The accuracy specifications are only guaranteed from -150°
[c] The accuracy specifications are only guaranteed from 0°C
[d] The accuracy specifications are only guaranteed from 300°C
[e] The accuracy specifications are only guaranteed from 600°C

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RTD temperature probe

Designation	Standard	Measuring range	Measuring accuracy[a]	Ambient temperature influence
Pt50 Two-wire circuit Three-wire circuit	DIN EN 60751	-200 to +850 °C	≤ 0.05 %	≤ 50 ppm/K
Cu50 Two-wire circuit Three-wire circuit	IEC 60 317	-50 to +200 °C	≤ 0.15 %	≤ 50 ppm/K
Pt100 Two-wire circuit Three-wire circuit	DIN EN 60751	-200 to +850 °C	≤ 0.05 %	≤ 50 ppm/K
Pt500 Two-wire circuit Three-wire circuit	DIN EN 60751	-200 to +850 °C	≤ 0.1 %	≤ 50 ppm/K
Pt1000 Two-wire circuit Three-wire circuit	DIN EN 60751	-200 to +850 °C	≤ 0.1 %	≤ 50 ppm/K
Ni100 Two-wire circuit Three-wire circuit	DIN 43760	-60 to +250 °C	≤ 0.15 %	≤ 50 ppm/K
Ni1000 Two-wire circuit Three-wire circuit	DIN 43760	-60 to +250 °C	≤ 0.1 %	≤ 50 ppm/K
KTY11-6 Two-wire circuit		-50 to +150 °C	≤ 1 %	≤ 50 ppm/K
Pt50 Two-wire circuit Three-wire circuit	GOST 6651-99	-200 to +850 °C	≤ 0.05 %	≤ 50 ppm/K
Pt100 Two-wire circuit Three-wire circuit	GOST 6651-94	-200 to +850 °C	≤ 0.05 %	≤ 50 ppm/K
Cu50 Two-wire circuit Three-wire circuit	GOST 6651-94	-50 to +200 °C	≤ 0.15 %	≤ 50 ppm/K
Cu100 Two-wire circuit Three-wire circuit	GOST 6651-94	-50 to +200 °C	≤ 0.15 %	≤ 50 ppm/K
Smallest measuring span		15 K		
Measuring current		Pt100 approx. 250 µA, Pt1000 approx. 100 µA		
Sensor line resistance		Max. 10 Ω per line for two-wire and three-wire circuits		
Lead compensation		Not required for three-wire circuit. For a two-wire circuit, lead compensation can be carried out in the software by correcting the actual value.		
Measuring range start/end		Freely programmable within the limits in increments of 0.1 K		
Sampling rate		Controller 1(2): 150 ms in total		
Input filter		Digital filter, 2nd order; filter time constant can be adjusted from 0 to 100 s		
Special features		Can also be programmed in °F		

[a] The accuracy specifications refer to the maximum measuring range. Smaller measuring spans lead to reduced linearization accuracy.

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Standard signals

Designation	**Measuring range**	**Measuring accuracy**[a]	**Ambient temperature influence**
Voltage freely scalable Input resistance R_E > 500 kΩ Input resistance R_E > 100 kΩ	 DC 0(2) to 10 V DC 0 to 1 V 0 to 100 mV	≤ 0.1 %	≤ 100 ppm/K
Smallest measuring span	5 mV		
Measuring range start/end	Freely programmable within the limits in increments of 0.01 mV		
Current **(voltage drop ≤ 2 V)**, freely scalable	DC 0(4) to 20 mA	≤ 0.1 %	≤ 100 ppm/K
Smallest measuring span	0.5 mA		
Measuring range start/end	Freely programmable within the limits in increments of 0.01 mA		
Limits in accordance with NAMUR recommendation NE 43 in case of deviation under/above measuring range		**Signal type 2 to 10 V**	**Signal type 4 to 20 mA**
Measurement information M		1.9 to 10.25 V	3.8 to 20.5 mA
Failure information A for deviation below measured value/short circuit ("NAMUR Low")		≤ 1.8 V	≤ 3.6 mA
Failure information A for deviation above measured value/probe break ("NAMUR High")		≥ 10.5 V	≥ 21 mA
Sampling rate	Controller 1(2): 150 ms in total		
Input filter	Digital filter, 2nd order; filter constant can be set from 0 to 10.0 s		
Galvanic isolation	See Chapter "Electrical data", Page 10 and Chapter "Galvanic isolation", Page 12		
Resistance transmitter	Min. 100 Ω, max. 4 kΩ	≤ 0.5 %[b]	≤ 100 ppm/K
Connection type	Resistance transmitter: three-wire circuit		
Smallest measuring span	60 Ω		
Sensor line resistance	Max. 10 Ω per line for two-wire and three-wire circuits		
Resistance values	Freely programmable within the limits in increments of 0.1 Ω		
Sampling rate	Controller 1(2): 150 ms in total		
Input filter	Digital filter, 2nd order; filter constant can be set from 0 to 100 s		

[a] The accuracy specifications refer to the maximum measuring range. Smaller measuring spans lead to reduced linearization accuracy.
[b] The accuracy specifications refer to the total resistance (initial resistance Ra + loop resistance RS + end resistance Re).

Measuring circuit monitoring

In the event of a malfunction, the outputs take on defined (configurable) statuses.

Measuring probe	**Out of range**	**Probe/cable short circuit**	**Probe/cable break**
Thermocouple	Is detected	Is not detected	Is detected
RTD temperature probe	Is detected	Is detected	Is detected
Voltage 2 to 10 V 0 to 10 V 0 to 1 V	 is detected is detected is detected	 is detected is not detected is not detected	 is detected is not detected is not detected
Current 4 to 20 mA 0 to 20 mA	 is detected is detected	 is detected is not detected	 is detected is not detected
Resistance transmitter	Is not detected	Is not detected	Is detected

Digital inputs

Standard number	7
Control	Potential-free contact

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Analog outputs

Per optional board (OUT3, 5, 7, 9 and OUT11 are possible)

1 analog output (configurable) A/D converter, 12 bit resolution	Load resistance RL_{oad}	Accuracy	Ambient temperature influence
Voltage DC 0(2) to 10 V	≥ 500 Ω	±0.25 %	±100 ppm/K
Current DC 0(4) to 20 mA	≤ 500 Ω	±0.25 %	±100 ppm/K

Digital outputs

Standard

Two relay outputs (changeover contact)	
Switching capacity AC	AC 230V/24V; 3(0,5) A; cosφ=1(≥ 0,6); D300
Switching capacity DC	DC 24V; 3(0,5; τ =7ms) A
Contact life	250,000 operations at nominal load

Per optional board

One relay output (changeover contact)	
Switching capacity AC	AC 230V/24V; 3(0,5) A; cosφ=1(≥ 0,6); D300
Switching capacity DC	DC 24V; 3(0,5; τ =7ms) A
Contact life	250,000 operations at nominal load
Two relay outputs (N/O contact)[a]	
Switching capacity AC	AC 230V/24V; 3(0,5) A; cosφ=1(≥ 0,6); D300
Switching capacity DC	DC 24V; 3(0,5; τ =7ms) A
Contact life	250,000 operations at nominal load
One solid state relay	
Switching capacity	1 A at AC 230 V, resistive load
Protection circuitry	Varistor
Two solid state relay for motor actuators	
Switching capacity	1 A at AC 230 V,
Protection circuitry	RC combination
One logic output (voltage supply for transmitter)	DC 0/22 V, max. 30 mA (short-circuit proof)
Two logic outputs	DC 0/12 V max. 20 mA (short-circuit proof, not galvanically isolated)
Two PhotoMOS® relays[b]	DC 45 V, max. 200 mA, (galvanically isolated from each other, not short-circuit proof) AC 30 V, max. 200 mA, (galvanically isolated from each other, not short-circuit proof)

[a] Combining a mains voltage circuit with a protective low-voltage circuit on the "dual normally open contact" option is not admissible.

[b] PhotoMOS is a registered trademark of Panasonic Corporation.

Controllers

Controller types	Inverse/direct two-state controller, three-state controller, three-state modulating controller, inverse/direct continuous controller, continuous controller with integrated position controller
Controller structures	P, PD, PI, PID
Sampling rate	150 ms
Parameter blocks	Four parameter blocks per controller

Screen

Resolution, size	320 × 240 pixels, 3.5 "
Type, number of colors	TFT color screen, 256 colors
Brightness setting	Adjustable on the device
Device operation	Via resistive touchscreen
Screensaver	Via waiting period or control signal
Display operating life	50 000 h

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Electrical data

Voltage supply Connection Voltage	At the back via screw terminals AC/DC 24 V +30/-25%, 48 to 63 Hz or AC 110 to 240 V +10/-15 %, 48 to 63 Hz	
Power consumption	At voltage supply 230 V: max. 15 VA / 7 W At voltage supply 24 V: max. 12 VA / 9 W	
Inputs and outputs Connection Conductor cross section	At the back via screw terminals Max. 2.5 mm ^{2}, wire or strand with end sleeve	
Electrical safety	According to DIN EN 61010-1 Overvoltage category III, pollution degree 2	
Electromagnetic compatibility Interference emission Interference immunity	According to DIN EN 61326-1 Class A - For industrial applications only Industrial requirements	
Memory data recorder (1 recording image)	Memory cycle	Recording interval
When recording: 4 analog signals 3 digital signals	1 s	approx. 44 days
	5 s	approx. 220 days
	10 s	approx. 441 days
	60 s	approx. 2646 days (7 years, 91 days)
Note: In case of recording 2 recording images, the recording intervals are cut in an half		

Environmental influences

Ambient/storage temperature range	-5 to +55 °C/-30 to +70 °C
Resistance to climatic conditions	Humidity 3K3 (DIN EN 60721-3-3) with extended temperature range, rel. humidity ≤ 95 % mid-year without condensation

Housing

Site altitude	Maximum 2000 m above sea level
Case type	Plastic front frame with metal case barrel (for indoor use)
Front frame dimensions	96 mm × 96 mm
Panel cut-out	$92^{+0.8}$ mm × $92^{+0.8}$ mm according to DIN IEC 61554
Close mounting	Spacing between the panel cut-outs, min. 35 mm horizontally and min. 80 mm vertically
Panel thickness	Max. 5 mm
Mounting depth	Max. 130 mm
Fastening	4 mounting elements
Operating position (including the viewing angle of the TFT color screen)	Any Horizontal ±65°, vertical +40 to -65°
Protection type	Front IP66, rear IP20, according to DIN EN 60529
Weight (fully fitted)	Approx. 1000 g

Approvals/approval marks

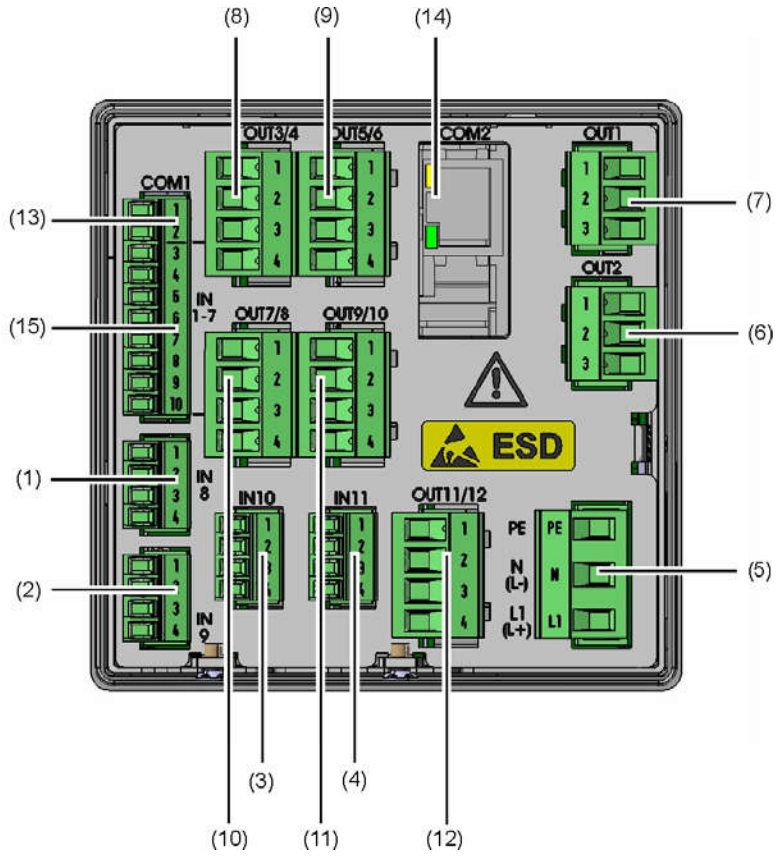
Approval mark	Testing agency	**Certificate/certification number**	**Inspection basis**	**Valid for**
DNV·GL	DNV·GL	TAA000014K	Class Guideline DNVGL-CG0339	All modules
c UL us	Underwriters Laboratories	20150622-E201387	UL 61010-1	All modules
DIN	DIN CERTCO	TR1238	DIN EN 14597	All modules

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Connection elements



(1) Analog input IN8

(2) Analog input IN9

(3) Expansion slot for analog input IN10

(4) Expansion slot for analog input IN11

(5) Voltage supply
AC 240 V +10/-15 %, 48 to 63 Hz, max. 38.1 VA
AC/DC 24 V +30/-25 %, 48 to 63 Hz,
Max. 21.9 VA / 11.5 W

(6) Relay output OUT2

(7) Relay output OUT1

(8) Expansion slot for outputs OUT3/4

(9) Expansion slot for outputs OUT5/6

(10) Expansion slot for outputs OUT7/8

(11) Expansion slot for outputs OUT9/10

(12) Expansion slot for outputs OUT11/12

(13) COM1 interface RS485

(14) Expansion slot for COM2 interface

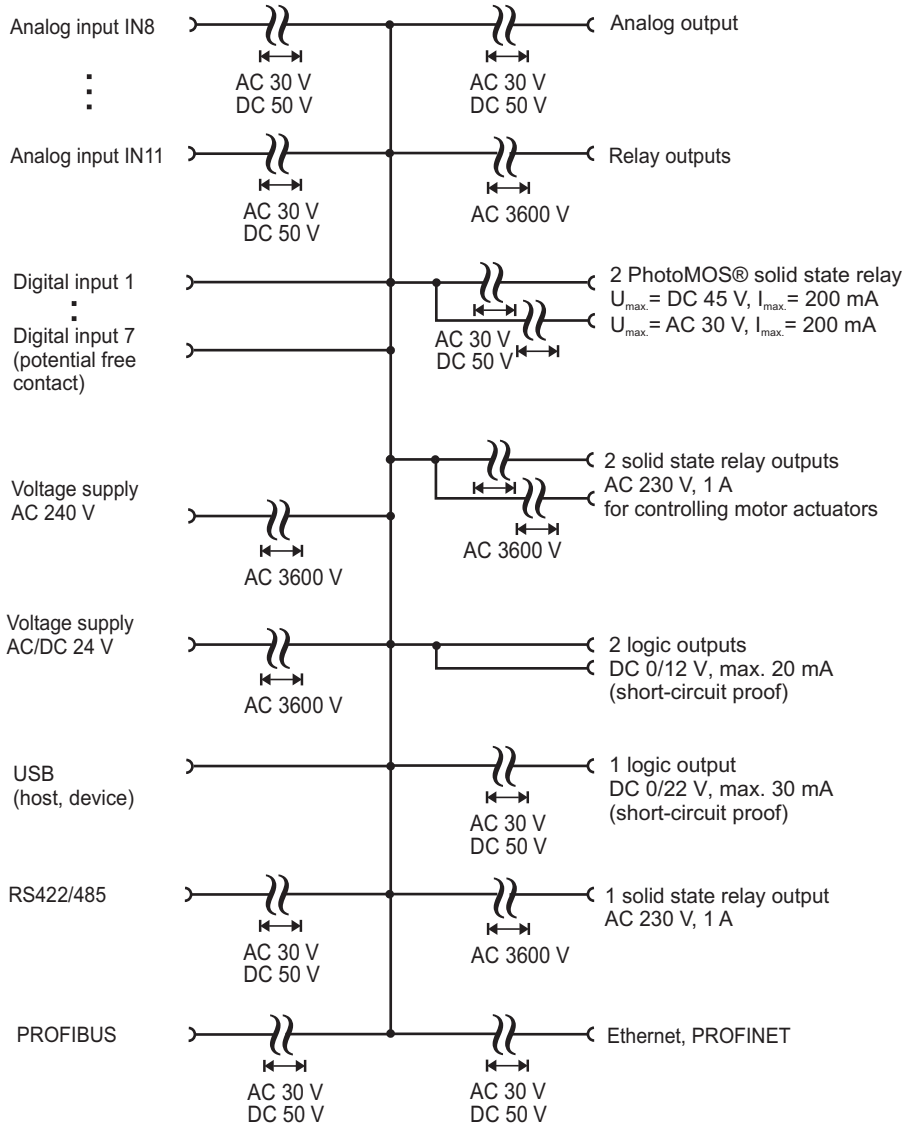
(15) Digital inputs IN1 to 7

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Galvanic isolation



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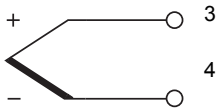
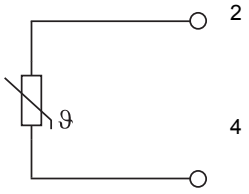
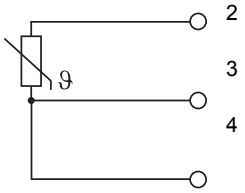
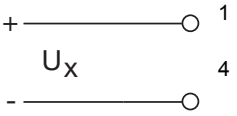
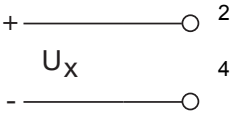
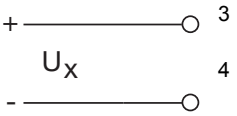
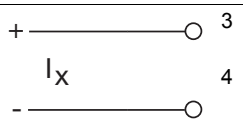
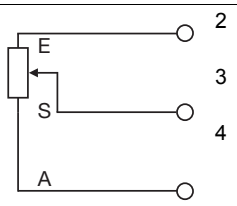
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Connection diagram

The connection diagram included in the data sheet provides initial information about the connection options. Only use the installation instructions or the operating manual for the electrical connection. The know-how and the correct technical implementation of the safety warnings/instructions contained in these documents are the prerequisite for the installation, electrical connection, and initial start as well as for the safety during operation.

Analog inputs

Input IN8, IN9 as a standard feature
2 analog inputs can be added to input (IN10), (IN11) via optional boards

Connection	**(Connection element) Input**	**Symbol and terminal designation**
Thermocouple	(1) IN8 (2) IN9 (3) IN10 (4) IN11	
RTD temperature probe Two-wire circuit		
RTD temperature probe Three-wire circuit		
Voltage DC 0(2) to 10 V		
Voltage DC 0 to 1 V		
Voltage DC 0 to 100 mV		
Current DC 0(4) to 20 mA		
Resistance transmitter A = Start E = End S = Slider		

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TIP!
Approval according to DIN EN 14597 is only valid if the correct probe with DIN approval is set in the configuration level, and also connected to the analog input. The measured value acquired in this way must lie in the approved temperature range of the DIN probe in the following tables, and can, for example, continue to be used as the actual value for the two controllers or for the limit value monitoring function.

Probes for air

Note: Because of the high response accuracy, the use of **thermowells** (pockets) is **not admissible**.

Actual type designation	Old type designation	Probe type	Temperature range	Nom. length mm	Process connection
RTD temperature probe Data Sheet 90.2006					
902006/65-228-1003-1-15-500-668/000	-	1 x Pt100	-170 ... +700°C	500	
902006/65-228-1003-1-15-710-668/000	-			710	
902006/65-228-1003-1-15-1000-668/000	-			1000	
902006/55-228-1003-1-15-500-254/000	-	1 x Pt100	-170 ... +700°C	500	
902006/55-228-1003-1-15-710-254/000	-			710	
902006/55-228-1003-1-15-1000-254/000	-			1000	
902006/65-228-2003-1-15-500-668/000	90.271-F01	2 x Pt100	-170 ... +700°C	500	Stop flange, movable
902006/65-228-2003-1-15-710-668/000	90.272-F01			710	
902006/65-228-2003-1-15-1000-668/000	90.273-F01			1000	
902006/55-228-2003-1-15-500-254/000	-	2 x Pt100	-170 ... +700°C	500	movable G1/2 compression clamp
902006/55-228-2003-1-15-710-254/000	-			710	
902006/55-228-2003-1-15-1000-254/000	-			1000	
Thermocouples Data Sheet 90.1006					
901006/65-547-2043-15-500-668/000	90.019-F01	2 x NiCr-Ni, Type „K“	-35 ... +800°C	500	Stop flange, movable
901006/65-547-2043-15-710-668/000	90.020-F01			710	
901006/65-547-2043-15-1000-668/000	90.021-F01			1000	
901006/65-546-2042-15-500-668/000	90.019-F11	2 x Fe-CuNi, Type „L“	-35 ... +700°C	500	
901006/65-546-2042-15-710-668/000	90.020-F11			710	
901006/65-546-2042-15-1000-668/000	90.021-F11			1000	
901006/66-550-2043-6-500-668/000	90.023-F01	2 x NiCr-Ni, Type „K“	-35 ... +1000°C	500	
901006/66-550-2043-6-355-668/000	90.023-F02			355	
901006/66-550-2043-6-250-668/000	90.023-F03			250	
901006/66-880-1044-6-250-668/000	90.021	1 x PT10Rh-PT, Type „S“	0 ... 1300°C	250	
901006/66-880-1044-6-355-668/000	90.022			355	
901006/66-880-1044-6-500-668/000	90.023			500	
901006/66-880-2044-6-250-668/000	90-D-021	2 x PT10Rh-PT, Type „S“	0 ... 1300°C	250	Stop flange, movable
901006/66-880-2044-6-355-668/000	90-D-022			355	
901006/66-880-2044-6-500-668/000	90-D-023			500	
901006/66-953-1046-6-250-668/000	90.027	1 x PT30Rh-PT6Rh, Type „B“	600 ... 1500°C	250	
901006/66-953-1046-6-355-668/000	90.028			355	
901006/66-953-1046-6-500-668/000	90.029			500	
901006/66-953-2046-6-250-668/000	90-D-027	2 x PT30Rh-PT6Rh, Type „B“	600 ... 1500°C	250	
901006/66-953-2046-6-355-668/000	90-D-028			355	
901006/66-953-2046-6-500-668/000	90-D-029			500	

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Probes for water and oil

Note: Because of the high response accuracy, the use of **thermowells** (pockets) is **not admissible**.

Actual type designation	Old type designation	Probe type	Temperature range	Nom. length mm	Process connection
RTD temperature probe Data Sheet 90.2006					
90.2006/10-402-1003-1-9-100-104/000		1 x Pt100	-40 ... +400°C	100	G1/2 screw connection
90.2006/10-402-2003-1-9-100-104/000		2 x Pt100		100	
902006/54-227-2003-1-15-710-254/000	90.272-F02	2 x Pt100	-170 ... 550°C	65...670	movable G1/2 compression clamp
902006/54-227-1003-1-15-710-254/000	90.272-F03	1 x Pt100		65...670	
902006/10-226-1003-1-9-250-104/000	90.239	1 x Pt100	-170 ... 480°C	250	G1/2 screw connection
902006/10-226-2003-1-9-250-104/000	90-D-239	2 x Pt100		250	
Thermocouples Data Sheet 90.1006					
901006/54-544-2043-15-710-254/000	90.020-F02	2 x NiCr-Ni, Type „K“	-35 ... 550°C	65...670	movable G1/2 compression clamp
901006/54-544-1043-15-710-254/000	90.020-F03	1 x NiCr-Ni, Type „K“		65...670	
901006/54-544-2042-15-710-254/000	90.020-F12	2 x FeCuNi, Type „L“		65...670	
901006/54-544-1042-15-710-254/000	90.020-F13	1 x FeCuNi, Type „L“		65...670	

Note: Because of the high response accuracy, **only use thermowells** (pockets) that are **included in the scope of delivery**.

Actual type designation	Old type designation	Probe type	Temperature range	Nom. length mm	Process connection
RTD temperature probe Data Sheet 90.2006					
902006/53-505-2003-1-12-190-815/000	90D239-F03	2 x Pt100	-40 ... +400 °C	190	
902006/53-507-2003-1-12-100-815/000	90.239-F02	2 x Pt100 (arranged one below the other in protection tube)	-40 ... +480 °C	100	
902006/53-507-2003-1-12-160-815/000	90.239-F12			160	
902006/53-507-2003-1-12-190-815/000				190	
902006/53-507-2003-1-12-220-815/000	90.239-F22			220	
902006/53-507-1003-1-12-100-815/000	90.239-F01	1 x Pt100	-40 ... +480 °C	100	weld-in sleeve
902006/53-507-1003-1-12-160-815/000	90.239-F11			160	
902006/53-507-1003-1-12-220-815/000	90.239-F21			220	
902006/53-505-1003-1-12-190-815/000	90.239-F03	1 x Pt100	-40 ... +400 °C	190	
902006/53-505-3003-1-12-100-815/000	90.239-F07	3 x Pt100	-40 ... +400 °C	100	
902006/53-505-3003-1-12-160-815/000	90.239-F17			160	
902006/53-505-3003-1-12-220-815/000	90.239-F27			220	
902006/40-226-1003-1-12-220-815/000	90.280-F30	1 x Pt100	-170 ... +480°C	220	weld-in sleeve
902006/40-226-1003-1-12-160-815/000	90.280-F31			160	
902006/40-226-1003-1-12-100-815/000	90.280-F32			100	
Thermocouples Data Sheet 90.1006					
901006/53-543-1042-12-220-815/000	90.111-F01	1 x Fe-CuNi Type „L“	-35 ... 480°C	220	weld-in sleeve
901006/53-543-2042-12-220-815/000	90.111-F02	2 x Fe-CuNi Type „L“		220	

Probes for water, oil and air

Note: Because of the high response accuracy, the use of **thermowells** (pockets) is **not admissible**.

Actual type designation	Old type designation	Probe type	Temperature range	Install. length mm	Process connection
RTD temperature probe Data Sheet 90.2006					
90.2006/10-390-1003-1-8-250-104/000	90.210-F95	1 x Pt100	max. 300°C	250	
Thermocouples Data Sheet 90.1006					
901006/45-551-2043-2-xxxx-11-xxxx		2 x NiCr-Ni, Type „K“	max. 1150°C	50...2000	

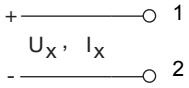
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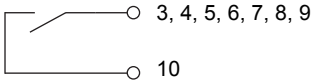
Analog outputs

Output OUT 3/4 to 11/12 can be extended by 1 analog output using optional boards

Connection	(Connection element) Input	Symbol and terminal designation
1 analog output DC 0/2 to 10 V or DC 0/4 to 20 mA (configurable)	(8) OUT3/4 (9) OUT5/6 (10) OUT7/8 (11) OUT9/10 (12) OUT11/12	

Digital inputs

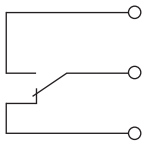
Input IN1 to 7 as a standard feature (cannot be extended)

Connection	(Connection element) Input	Symbol and terminal designation
Digital input, potential-free contact as a standard feature	(15) IN1 to 7	

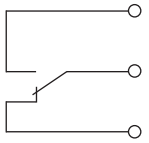
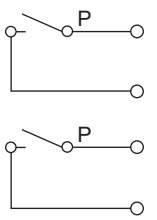
Digital outputs

OUT1 and OUT2 as a standard feature

The controller is equipped with 2 relay outputs (changeover contacts) as a standard feature.

Connection	(Connection element) Output	Symbol and terminal designation
Relay output (changeover contact)	(6) OUT2 (7) OUT1	

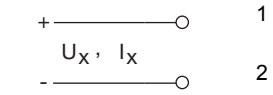
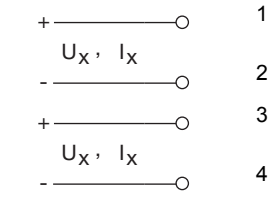
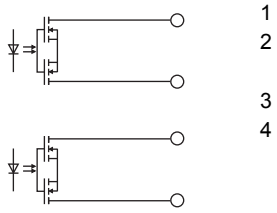
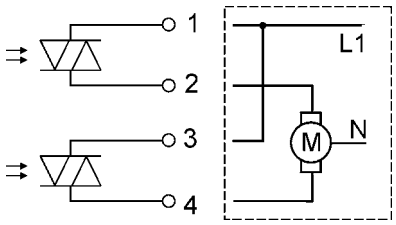
Outputs OUT 3/4 to 11/12 can be expanded via the following optional boards

Connection	(Connection element) Output	Symbol and terminal designation
1 relay output (changeover contact)	(8) OUT3/4 (9) OUT5/6 (10) OUT7/8 (11) OUT9/10 (12) OUT11/12	
2 relay outputs (N/O contact)[a]		
1 solid state relay AC 230 V, 1 A		

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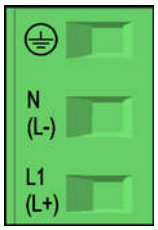
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Email: info.us@jumo.net
Internet: www.jumousa.com

Connection	**(Connection element) Output**	**Symbol and terminal designation**
1 logic output DC 0/22 V, max. 30 mA (short-circuit proof)		
2 logic outputs DC 0/12 V max. 20 mA (short-circuit proof, not galvanically isolated from each other)		
2 PhotoMOS® relays[b] max. DC 45 V, 200 mA max. AC 30 V, 200 mA (galvanically isolated)		
2 solid state relays AC 230 V, 1 A (for controlling the left and right-hand motor actuators, galvanically isolated)		

[a] Combining mains voltage and protective low-voltage circuits on a 2-way N/O contact option is not admissible.
[b] PhotoMOS is a registered trademark of the Panasonic Corporation.

Voltage supply (according to nameplate)

AC 230V (DC 24V)

Connection	**(Connection element)**	**Symbol and terminal designation**
Protection conductor	PE	
Neutral conductor	N (L-)	
Line conductor	L1(L+)	

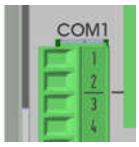
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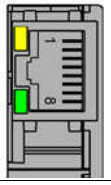
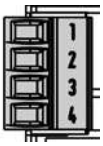
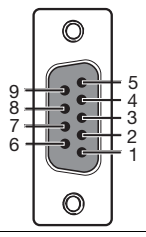
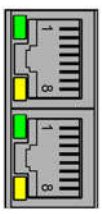
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Interfaces

USB device, USB host and COM1 interfaces as a standard feature

Connection	(Connection element)	Symbol and terminal designation		
USB device interface	(21)			
USB host	(20)			
COM1 serial interface RS485 (galvanically isolated)	(13)		1 TxD+/RxD+ 2 TxD-/RxD-	Transmission/received data + Transmission/received data -

COM2 interface can be expanded using optional boards

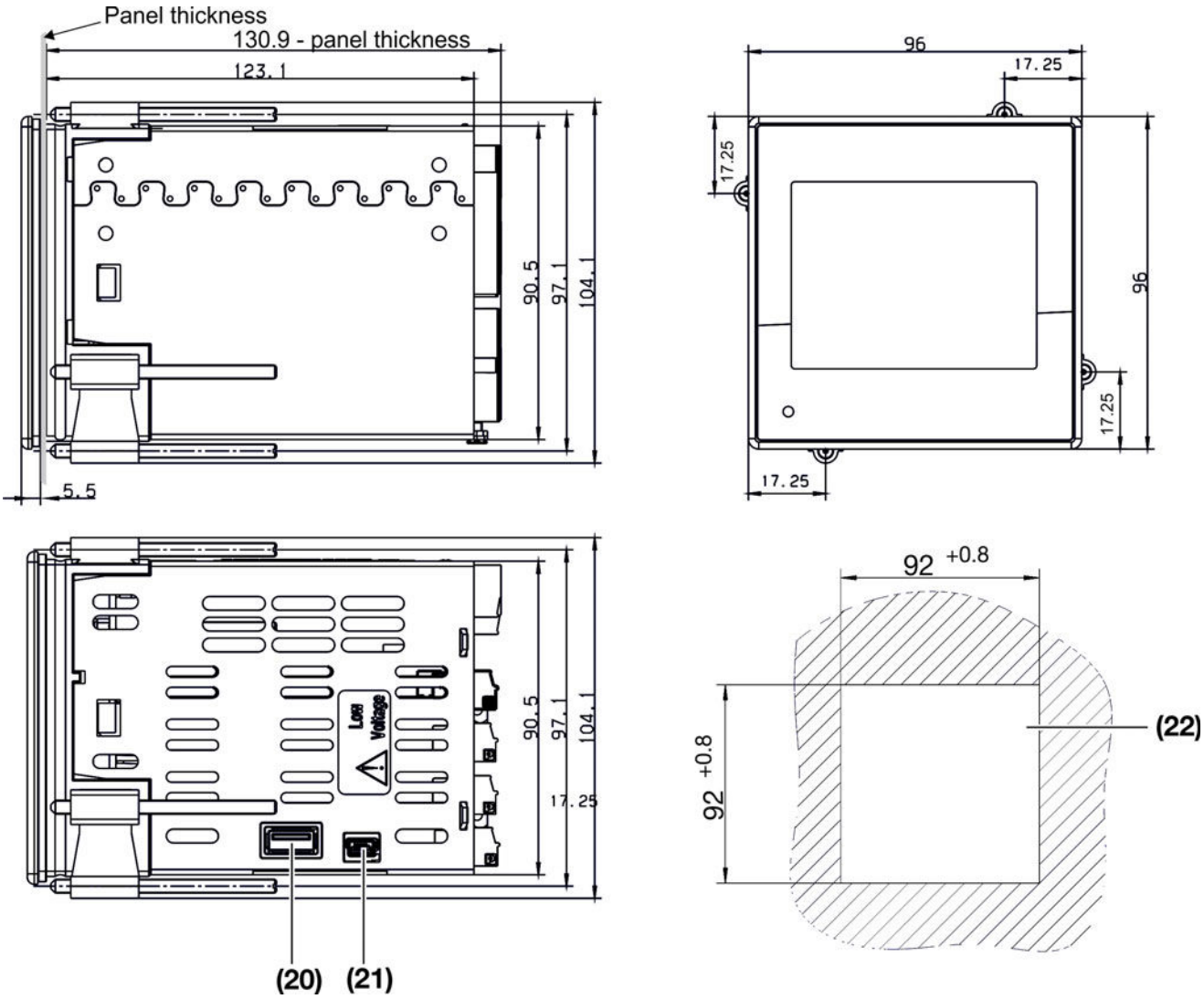
Connection	(Connection element)	Symbol and terminal designation		
Ethernet	(14)		1 TX+ 2 TX- 3 RX+ 6 RX-	Transmission data + Transmission data - Received data + Received data -
Serial interface RS422 (galvanically isolated)			1 RxD+ 2 RxD- 3 TxD+ 4 TxD-	Received data + Received data - Transmission data + Transmission data -
Serial interface RS485 (galvanically isolated)			3 TxD+/RxD+ 4 TxD-/RxD-	Transmission/received data + Transmission/received data -
PROFIBUS-DP			3 RxD/TxD-P (B) 5 DGND 6 VP (+5 V) 8 RxD/TxD-N (A)	Data wire B+ Ground Voltage supply Data wire (A) -
PROFINET-RT			1 TX+ 2 TX- 3 RX+ 6 RX-	Transmission data + Transmission data - Received data + Received data -

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Dimensions



(20) USB host interface

(21) USB device interface for setup

(22) Panel cut-out

Scope of delivery

- 1 controller in the ordered version
- 1 Operating Manual
- 1 panel seal 4 retaining elements for panel installation

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Order Details

	(1)	**Basic type**
703571		JUMO DICON touch - two-channel process and program controller with RS485 interface
	(2)	**Version**
8		Standard with default settings
9		Customer-specific configuration (specifications in plain text)
	(3)	**National language of display texts**
01		German
02		English
03		French
	(4)	**Input IN10**
00		Not used
10		Analog input (universal)
	(5)	**Input IN11**
00		Not used
10		Analog input (universal)
	(6)	**Outputs OUT3/4**
00		None
11		1 relay (changeover contact)
12		2 relays (make contact)
13		1 solid-state relay 230 V, 1 A
14		1 logic output 0/22 V, max. 30 mA
15		2 logic outputs 0/12 V, 20 mA
16		1 analog output
17		Two PhotoMOS® relays[a]
20		2 solid state relay 230 V, 1 A for motor actuator drives (double slot:OUT3/4 and OUT7/8)
	(7)	**Outputs OUT5/6**
00		None
11		1 relay (changeover contact)
12		2 relays (make contact)
13		1 solid-state relay 230 V, 1 A
14		1 logic output 0/22 V, max. 30 mA
15		2 logic outputs 0/12 V, 20 mA
16		1 analog output
17		2 PhotoMOS® relays
20		2 solid state relay 230 V, 1 A for motor actuator drives (double slot:OUT5/6 and OUT9/10)
	(8)	**Outputs OUT7/8** (not available for assignment with module 20 on OUT3/4)
00		None
11		1 relay (changeover contact)
12		2 relays (make contact)
13		1 solid-state relay 230 V, 1 A
14		1 logic output 0/22 V, max. 30 mA
15		2 logic outputs 0/12 V, 20 mA
16		1 analog output
17		2 PhotoMOS® relays
	(9)	**Outputs OUT9/10** (not available for assignment with module 20 on OUT5/6)
00		None
11		1 relay (changeover contact)
12		2 relays (make contact)
13		1 solid-state relay 230 V, 1 A
14		1 logic output 0/22 V, max. 30 mA

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15		2 logic outputs 0/12 V, 20 mA
16		1 analog output
17		2 PhotoMOS® relays
	(10)	**Outputs OUT11/12**
00		None
11		1 relay (changeover contact)
12		2 relays (make contact)
13		1 solid-state relay 230 V, 1 A
14		1 logic output 0/22 V, max. 30 mA
15		2 logic outputs 0/12 V, 20 mA
16		1 analog output
17		2 PhotoMOS® relays
	(11)	**Voltage supply**
23		AC 110 ... 240 V +10/-15 %, 48 ... 63 Hz
39		AC/DC 24 V +30/-25 %, 48 ... 63 Hz
	(12)	**COM2 interface**
00		Not used
08		Ethernet
54		RS422/485 Modbus RTU
63		PROFINET
64		PROFIBUS-DP
	(13)	**DIN-tested**
000		Without approval
056		With DIN approval
	(14)	**GL-tested**
000		Without approval
062		With GL approval
	(15)	**Extra code**
000		None
209		Controller 3 and 4
213		Recording function
214		Math and logic module 1 to 8
215		Math and logic module 9 to 16
223		Program controller
879		AMS2750/CQI-9[b]

[a] PhotoMOS is a registered trademark of Panasonic Corporation

[b] For the calibration certificate the channels to be checked are to be defined with the thermocouple type and the desired measuring points.

	(1)	/	**(2)**	-	**(3)**	-	**(4)**	**(5)**	-	**(6)**	**(7)**	**(8)**	**(9)**	**(10)**	-	**(11)**	-	**(12)**	/	**(13)**	,	**(14)**	,	**(15)**	, ...[a]
Order code		/		-		-			-						-		-		/		,		,		,
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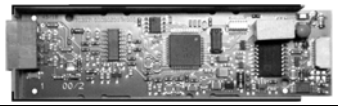
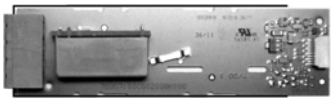
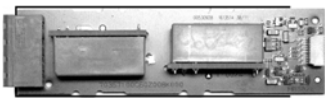
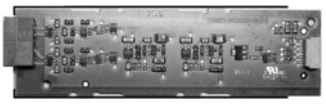
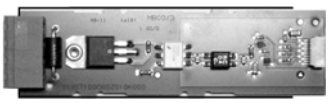
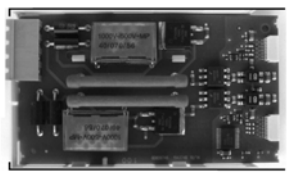
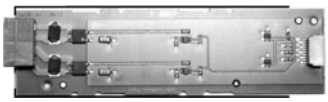
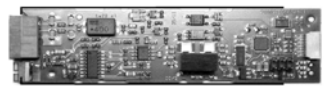
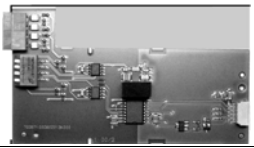
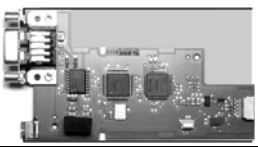
[a] List extra codes in sequence and separate using commas.

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Accessories

Item	Parts no.
Modules for expansion slots:	
One analog input (universal) 	00581159
One relay output (changeover contact) 	00581160
Two relay outputs (N/O contact) 	00581162
One logic output DC 0/22 V, max. 30 mA 	00581165
Two logic outputs DC 0/12 V max. 20 mA 	00581168
One solid state relay AC 230 V, 1 A 	00581164
Two solid state relays AC 230 V, 1 A for motor actuator 	00621574
Two PhotoMOS® relays[a] DC 45 V, max. 200 mA, AC 30 V, max. 200 mA 	00581171
One analog output (universal) 	00581169
Ethernet interface 	00581174
Serial interface RS422/RS485 	00581172
PROFIBUS-DP interface 	00581173

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General accessories

Article	**Part no.**
Program editor/startup	00607139
Setup/program editor	00606496
PCA3000/PCC JUMO software package 709701/709702	00431884
USB cable A-connector mini B-connector 3 m	00506252