



Brief Instructions

70151000T97Z001K000
V8.00/EN/0068850/2014-10-30

1 Introduction

1.1 Safety information

General

This manual contains information that must be observed in the interest of your own safety and to avoid material damage. This information is supported by symbols which are used in this manual as indicated. Please read this manual before starting up the device. Store this manual in a place that is accessible to all users at all times.

If difficulties occur during startup, please do not intervene in any way that could jeopardize your warranty rights!

Warning symbols

WARNING!
This symbol in connection with the signal word indicates that **personal injury** may occur if the respective precautionary measures are not carried out.

CAUTION!
This symbol in connection with the signal word indicates that **material damage or data loss** will occur if the respective precautionary measures are not taken.

CAUTION!
This symbol indicates that **components could be destroyed** by electrostatic discharge (ESD = Electro Static Discharge) if the respective precautionary measures are not taken. Only use the ESD packages intended for this purpose to return device inserts, assembly groups, or assembly components.

READ THE DOCUMENTATION!
This symbol, which is attached to the device, indicates that the associated **documentation for the device must be observed**. This is necessary to identify the nature of the potential hazard, and to take measures to prevent it.

Note symbols

NOTE!
This symbol refers to **important information** about the product, its handling, or additional benefits.

REFERENCE!
This symbol refers to **additional information** in other sections, chapters, or other manuals.

FURTHER INFORMATION!
This symbol is used in tables and indicates that **further information** is provided after the table.

DISPOSAL!
At the end of its service life, the device and any batteries present do not belong in the trash! Please ensure that they are **disposed of properly** and in an **environmentally friendly** manner.

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1.2 Intended use

The device is designed for use in an industrial environment as specified in the technical data. Other uses beyond those defined are not viewed as intended uses.

The device has been manufactured in compliance with applicable standards and directives as well as the applicable safety regulations. Nevertheless, improper use may lead to personal injury or material damage.

To avoid danger, only use the device:

- For the intended use
- When in good order and condition
- When taking the technical documentation provided into account

Risks resulting from the application may arise, e.g. as the result of missing safety provisions or wrong settings, even when the device is used properly and as intended.

1.3 Qualification of personnel

This document contains the necessary information for the intended use of the device to which it relates. It is intended for staff with technical qualifications who have been specially trained and have the appropriate knowledge in the field of automation technology.

The appropriate level of knowledge and the technically fault-free implementation of the safety information and warnings contained in the technical documentation provided are prerequisites for risk-free mounting, installation, and startup as well as for ensuring safety when operating the described modules. Only qualified personnel have the required specialist knowledge to correctly interpret and implement the safety information and warnings contained in this document in specific situations.

1.4 Acceptance of goods, storage, and transport

1.4.1 Checking the delivery

- Ensure that the packaging and its contents are undamaged.
- Check the delivery for completeness against the packing slip and order details.
- Inform the supplier immediately if there is any damage.
- Store damaged parts until clarification is received from the supplier.

1.4.2 Important information about storage and transport

- Store the device in a dry, clean environment. Observe the admissible ambient conditions (see "Technical data").
- Protect the device from shock during transport
- The original packaging provides optimum protection for storage and transport

1.4.3 Returning goods

If repairs are needed, return the complete device in clean condition. Use the original packaging to return goods.

Accompanying letter for repair

Please include the completed accompanying letter for repair when returning goods. Do not forget to state the following:

- Description of the application and
- Description of the error that has occurred

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The accompanying letter for repair (supplementary sheet for product returns) can be downloaded online from the manufacturer's website: <http://productreturn.jumo.info>

Protection against electrostatic discharge (ESD)

(ESD = electrostatic discharge)
To prevent damage due to ESD, electronic modules or components must be handled, packaged, and stored in an ESD-protected environment. Measures that protect against electrostatic discharge and electric fields are described in DIN EN 61340-1 and DIN EN 61340-2 "Protection of electronic devices from electrostatic phenomena".

- When sending back electronic modules or components, please note the following:
 - Pack sensitive components only in an environment providing protection against ESD. Workspaces such as this divert electrostatic charges to ground in a controlled manner and prevent static charges due to friction.
 - Use only packaging intended specifically for ESD-sensitive modules/components. These must consist of conductive plastics.

No liability can be assumed for damage caused by ESD.



CAUTION!
Electrostatic discharges occur in non-ESD-protected environments. Electrostatic discharges can damage modules or components. For transport purposes, use only the ESD packaging provided.

1.4.4 Disposal

Disposing of the device

DISPOSAL!
Devices and/or replaced parts should not be placed in the refuse bin at the end of their service life as they consist of materials that can be recycled by specialist recycling plants. Dispose of the device and the packaging material in a proper and environmentally friendly manner. For this purpose, observe the country-specific laws and regulations for waste treatment and disposal.

Disposing of the packaging material

The entire packaging material (cardboard packaging, inserts, plastic film, and plastic bags) is fully recyclable.

1 Introduction

1.5 Identifying the device version

1.5.1 Nameplate

The nameplate is affixed to the housing.

The nameplate contains important information. This includes:

Description	Designation on the nameplate	Example
Device type	Typ	701514B1-4356-25/214
Part no.	TN	00123456
Serial number	F-Nr.	0070033801217480006
Voltage supply	-	AC/DC 20 to 30 V, 48 to 63 Hz

Device type (Typ)
Compare the specifications on the nameplate with the order. Identify the supplied device version using the order details (order code).

Part no. (TN)
The part no. uniquely identifies an article in the catalog. It is important for communication between the customer and the sales department.

Serial number (F-Nr.)
The serial number indicates, among other things, the date of manufacture (year/week). Example: F-no. = 0070033801217480006
The characters in question are digits 12, 13, 14, and 15 (from the left). Thus the device was produced in calendar week 48 of 2017.

MAC address
For a device with Ethernet interface, the MAC address is indicated on the nameplate.

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1.5.2 Order details

(1) Basic type
701510 Type 701510 (format 132: 48 x 24 mm) 1 analog input, 2 digital inputs (digital input 1, alternative to logic output), 1 relay (N/O contact), 1 logic output 0/14 V (alternative to digital input 1) incl. timer, min/max value display, hold function, taring function
701511 Type 701511 (format 116: 48 x 48 mm) 1 analog input, 2 digital inputs (digital input 1, alternative to logic output), 2 relays (N/O contact), 1 logic output 0/14 V (alternative to digital input 1) incl. timer, min/max value display, hold function, taring function
701512 Type 701512 (format 108H: 48 x 96 mm) 1 analog input, 2 digital inputs (digital input 1, alternative to logic output), 2 relays (N/O contact), 1 logic output 0/14 V (alternative to digital input 1) incl. timer, min/max value display, hold function, taring function
701513 Type 701513 (format 108Q: 96 x 48 mm) 1 analog input, 2 digital inputs (digital input 1, alternative to logic output), 2 relays (N/O contact), 1 logic output 0/14 V (alternative to digital input 1) incl. timer, min/max value display, hold function, taring function
701514 Type 701514 (format 104: 96 x 96 mm) 1 analog input, 2 digital inputs (digital input 1, alternative to logic output), 2 relays (N/O contact), 1 logic output 0/14 V (alternative to digital input 1) incl. timer, min/max value display, hold function, taring function
(2) Version
8 Standard with default settings ^a
9 Customer-specific configuration (specifications in plain text)
(3) Option 1 ^b
0 Not used
1 1 relay (N/O contact) (only for type 701511)
2 1 logic output 0/14 V (only for types 701511, 701512, 701513, 701514)
4 1 RS485 interface (Modbus-RTU)
(4) Option 2 ^c
0 Not used
1 1 relay (N/O contact)
2 1 logic output 0/14 V
3 1 analog output
7 1 Ethernet interface (Modbus-TCP, Modbus-RTU/ASCII via TCP/IP; only for types 701512, 701513, 701514); option 1 does not apply
(5) Option 3 ^d (only for types 701512, 701513, 701514)
0 Not used
1 1 relay (N/O contact)
2 1 logic output 0/14 V
5 1 PhotoMOS [®] relay ^e

Order code
List extra codes in sequence, separated by commas.

1.5.3 Scope of delivery

- 1 device in the ordered version
- 1 quick start guide
- 1 mounting frame (only for types 701510 and 701511)
- 2 mounting elements (only for types 701512, 701513, and 701514)

1.5.4 Accessories

Description	Part no.
Setup program	00678822
USB cable, A connector to Micro-B connector, length 3 m	00616250
Activation for math and logic module (setup program required)	00689708
Activation for structured text (setup program required)	00689709
Mounting for DIN rail, for type 701510	00688236
Mounting for DIN rail, for type 701511	00688237

1 Introduction

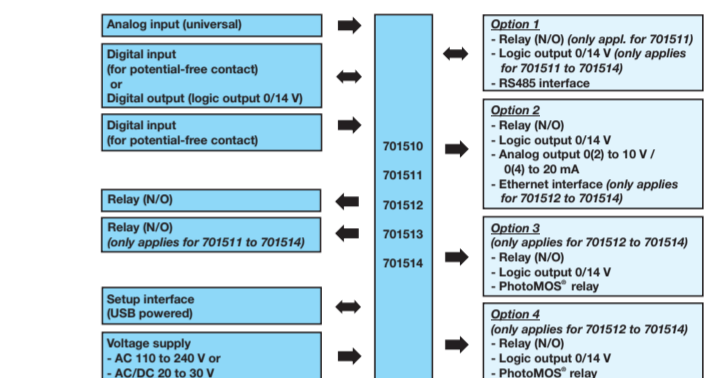
1.6 Brief description

The digital indicator series comprises five freely configurable, universally usable devices in various DIN formats to display temperature, pressure, and other process variables. The devices are characterized by a simple, clearly structured operation supported with texts. Process values and parameters are represented by two 18-segment LCD displays. The types 701512, 701513, and 701514 are additionally equipped with a pixel matrix LCD display for displaying text. In addition, all devices have individual display elements for the switch positions of the outputs as well as for the timer. The devices are operated using a membrane keyboard with four buttons and can be used under harsh environmental influences thanks to the high IP65 protection type.

The basic type includes a min/max value display function, a hold function, a taring function, limit value monitoring functions, digital control signals, extensive timer functions, and a service counter. A math and logic function is also available as an option. Furthermore, the user has the option to create his/her own application using structured text (ST code).

The devices can be conveniently configured using a PC with the help of the setup program (incl. ST editor). No separate voltage supply is required when configuring via the USB interface (USB-powered).

1.7 Block diagram



Option 1 (only appl. for 701511)
- Relay (N/O)
- Logic output 0/14 V only applies for 701511 to 701514
- RS485 interface

Option 2
- Relay (N/O)
- Logic output 0/14 V
- Analog output 0/2 to 10 V / 0/4 to 20 mA
- Ethernet interface (only applies for 701512 to 701514)

Option 3 (only applies for 701512 to 701514)
- Relay (N/O)
- Logic output 0/14 V
- PhotoMOS[®] relay

Option 4 (only applies for 701512 to 701514)
- Relay (N/O)
- Logic output 0/14 V
- PhotoMOS[®] relay

1 Introduction

1.8 Device types



1.9 Available technical documentation

NOTE!
In addition to this quick start guide, the following documents are available as PDF files and can be downloaded from the manufacturer's website:
Operating manual
Interface description (Modbus)
ST editor manual

2 Mounting

2.1 Installation instructions

WARNING!
The device is not designed for use in potentially explosive areas. Explosion hazard.
► Only deploy the device outside of potentially explosive areas.

Mounting site
The device is designed for installation in a panel cut-out within a closed switch cabinet. The front of the device and housing have different protection types (see technical data).

Climatic conditions
The ambient temperature and the relative humidity at the mounting site must correspond to the technical data. Aggressive gases and vapors have a negative effect on the operating life of the device. The mounting site must be free from dust, powder, and other suspended solids.

Installation position
The device can be installed in any position. The maximum admissible ambient temperature only applies for the installation with the display in a vertical position.

Technical data
⇒ chapter 5 "Technical data", Page 25

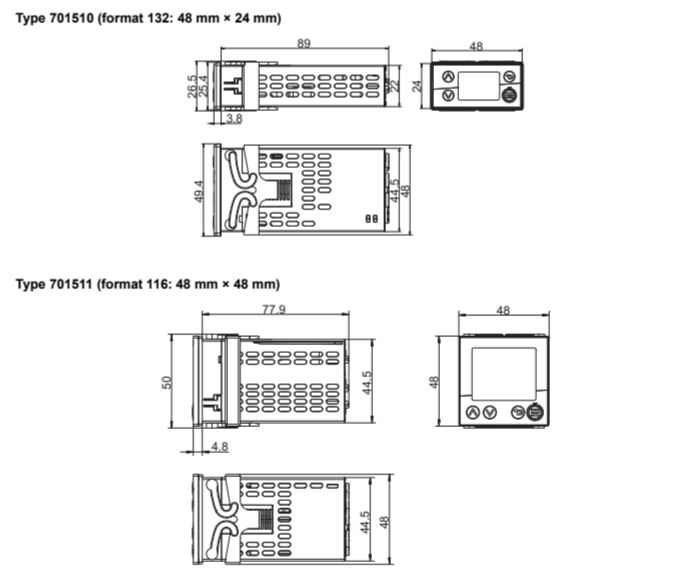
2.2 Cleaning

The front of the device (front foil) can be cleaned with standard detergents, rinsing and cleaning agents.

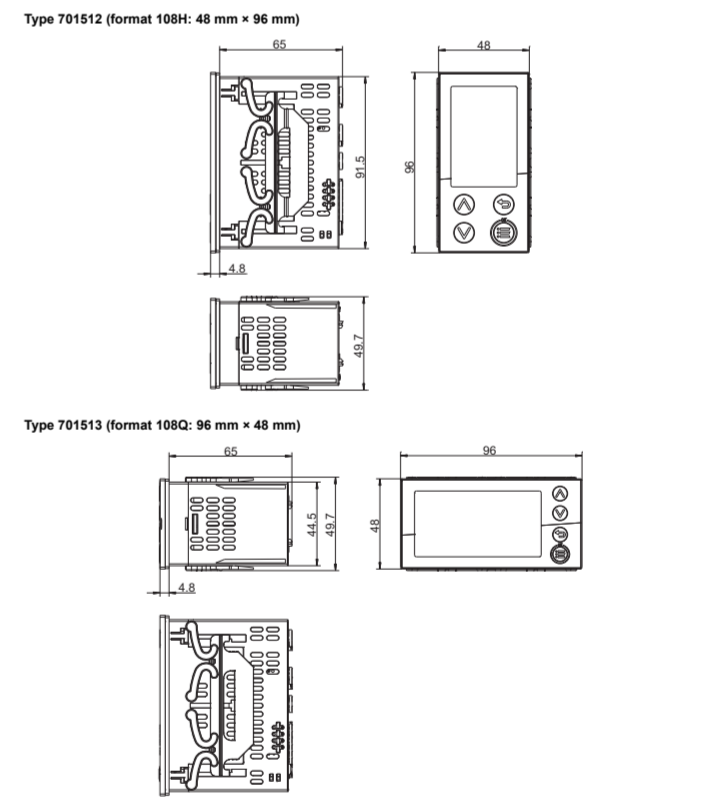
CAUTION!
The front of the device is not resistant to aggressive acids and lyes, scouring agents, and cleaning with a pressure cleaner.
Use of these media can cause damage.
► Only clean the front of the device with suitable agents.

2 Mounting

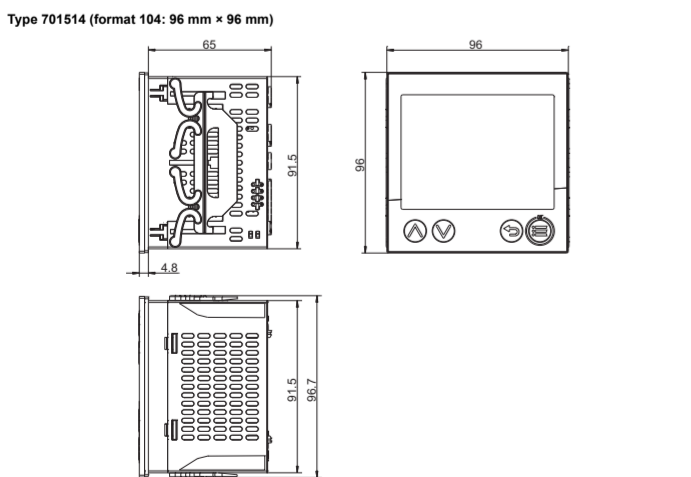
2.3 Dimensions



2 Mounting

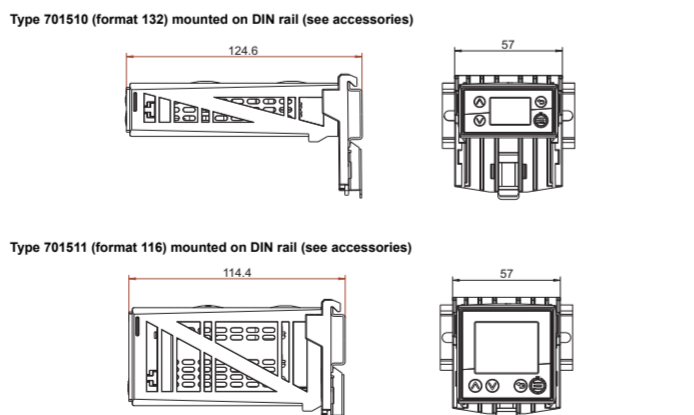


2 Mounting



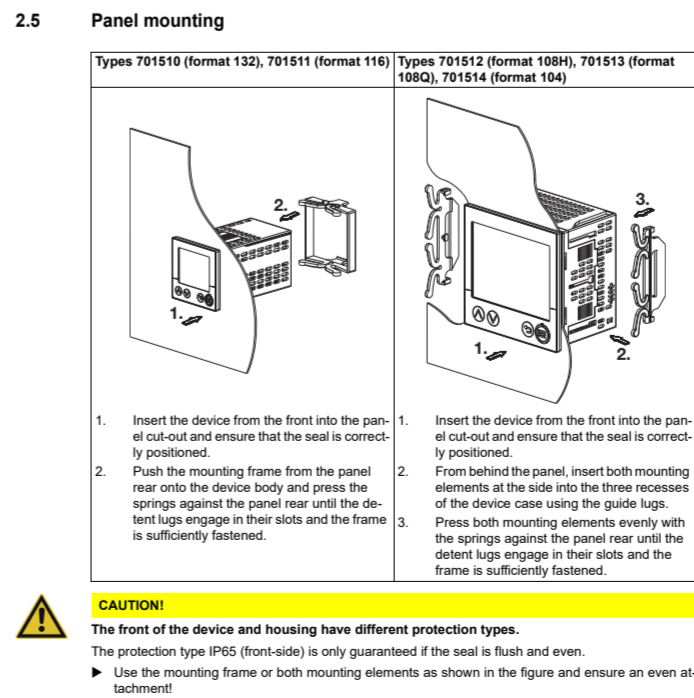
Type 701514 (format 104: 96 mm x 96 mm)	Panel cut-out (width x height)	Minimum spacing of panel cut-outs (for tightly packed installations)
701510 (132: 48 mm x 24 mm)	45 ^{+0.8} mm x 22 ^{+0.3} mm	Horizontal: 15 mm Vertical: 30 mm
701511 (116: 48 mm x 48 mm)	45 ^{+0.8} mm x 45 ^{+0.8} mm	Horizontal: 15 mm Vertical: 30 mm
701512 (108H: 48 mm x 96 mm)	45 ^{+0.8} mm x 92 ^{+0.8} mm	Horizontal: 20 mm Vertical: 30 mm
701513 (108Q: 96 mm x 48 mm)	92 ^{+0.8} mm x 45 ^{+0.8} mm	Horizontal: 20 mm Vertical: 30 mm
701514 (104: 96 mm x 96 mm)	92 ^{+0.8} mm x 92 ^{+0.8} mm	Horizontal: 20 mm Vertical: 30 mm

2 Mounting



2.4 DIN rail installation
For devices in the formats 132 and 116, special mounting elements for mounting on a DIN rail (35 mm, according to DIN EN 60715) are available as accessories. This involves a base plate attached to the DIN rail and a device holder (see depictions in the section "Dimensions").
Process:
1) Mount the base plate on the DIN rail from above and press down until it engages.
2) Insert the mounting frame (included in the scope of delivery of the device, see Panel mounting) into the device holder from above (front).
3) Insert the device (without panel seal) into the device holder from the front and secure using the mounting frame. In doing so, ensure sufficient attachment (see Panel mounting).
4) Carry out electrical connection.
To facilitate the connection, the device holder can be mounted in the base plate from above with its underside positioned vertically (top connection terminals). It is also possible to mount the device holder with its front positioned horizontally so that the connection terminals can be accessed from the front. After connection, the device holder must be removed from the position!
5) Insert the device holder into the side recesses of the base plate with its rear detent lugs (format 132: top and center recesses) and press down until it engages.

2 Mounting



CAUTION!
The front of the device and housing have different protection types. The protection type IP65 (front-side) is only guaranteed if the seal is flush and even.
► Use the mounting frame and both mounting elements as shown in the figure and ensure an even attachment!

3 Electrical connection

3.1 Installation notes

- Work on the device must only be carried out to the extent described and, like the electrical connection, only by qualified personnel.
 - Before plugging and unplugging connecting cables, it must be ensured that the acting person is electrostatically discharged (by touching grounded metallic parts, for example).
- Cables, shielding, and grounding**
- When selecting the electrical wiring material as well as when installing and connecting the device electrically, comply with the requirements of DIN VDE 0100 "Low-voltage electrical installations" and the applicable country-specific regulations (for example, based on IEC 60364).
 - It may be necessary to adhere to special notes relating to the heat resistance of cables (see connection diagram).
 - Route input, output, and supply lines separately and not parallel to one another.
 - Only use shielded and twisted probe and interface cables. Do not route the lines close to current-carrying components or cables.
 - For temperature probes, ground the shielding on one side in the control cabinet.
 - Do not perform loopthroughs on the grounding cables, but instead route the cables individually to a shared grounding point in the control cabinet; in doing so, ensure that the cables are as short as possible. Ensure that the potential equalization is correct.
- Electrical safety**
- The device is intended to be installed in control cabinets or plants. Ensure that the customer's fuse protection does not exceed 20 A.
 - Disconnect the device from the mains voltage on all poles prior to starting service or repair work.
 - The relay's load circuit can be operated with a hazardous electrical voltage (e.g. 230 V). De-energize the load circuit during mounting/dismounting and electrical connection.
 - To prevent the relay contacts being destroyed in the case of an external short-circuit in the load circuit, the latter must be fuse-protected as per the maximum admissible relay current (see technical data).
 - The device is not suitable for installation in potentially explosive areas.
 - In addition to a faulty installation, incorrectly set values on the device can also impair the correct function of the downstream process. Therefore, ensure that safety devices independent of the device, e.g. a pressure valve or temperature limiters/sensors, are present and that it is only possible for qualified personnel to define settings. Please observe the corresponding safety regulations in this context.
- References to other information**
- The electromagnetic compatibility conforms to the standards and regulations cited in the technical data.
 - In general, please observe the specifications regarding electrical isolation.
- Setup interface**
- The setup interface (USB) is not intended for a permanent connection. Always disconnect the USB cable from the device as soon as you have finished working with the setup program.

3 Electrical connection

3.2 Connection elements

Type 701510 (format 132)
Type 701510 (48 mm × 24 mm)

Terminals	Connection	Terminals	Connection	Terminals	Connection
1, 2	Output 1 (relay)	8, 10	Input 2 (for potential-free contact)	13, 14	Voltage supply
3, 4	(2) = option 2: output 2 (relay, logic or analog output)	9, 10	Input 1 (for potential-free contact) or output 3 (logic output)		PC (setup program)
5-8	Analog input	11, 12	(1) = option 1: RS485 interface		

Type 701511 (format 116)
Type 701511 (48 mm × 48 mm)

Terminals	Connection	Terminals	Connection	Terminals	Connection
1, 2	Output 1 (relay)	8, 10	Input 1 (for potential-free contact)	13, 14	(2) = option 2: output 5 (relay, logic or analog output)
3, 4	Output 2 (relay)	9, 10	Input 1 (for potential-free contact) or output 3 (logic output)		Voltage supply
5-8	Analog input	11, 12	(1) = option 1: output 4 (relay, logic output) or RS485 interface		PC (setup program)

Types 701512 (format 108H), 701513 (format 108Q), 701514 (format 104)
If the device is equipped with the Ethernet interface (option 2: RJ45 socket), terminals 11 to 14 are not available.

3 Electrical connection

3.3.5 RS485 interface

Version for type 701510 (format 132)	Symbol and terminal designation	Version for types 701511 to 701514	Symbol and terminal designation
Option 1: RS485 interface	RD/TD → 11	Option 1 (alternative to digital output 4): RS485 interface	RD/TD → 11
	RD/TD → 12		RD/TD → 12

3.3.6 Voltage supply

Version (see nameplate)	Symbol and terminal designation	Version (see nameplate)	Symbol and terminal designation
AC 110 to 240 V	L1 → L1/L+	AC/DC 20 to 30 V	L+ → L1/L+
	N → N/L-		L- → N/L-

NOTE!
No separate voltage supply is required for configuring using the setup program as the device is supplied via the USB interface (USB-powered). For a device in format 108H, 108Q, or 104, in this case the standard digital outputs are activated and the digital outputs of the options are deactivated.

3.4 Galvanic isolation

- The voltage specifications correspond to the test voltages (alternating voltage, rms values) according to EN 61010-1:2011-07 for the type test. Type 701510 (format 132): 3000 V instead of 3510 V.
- Functional galvanic isolation for the connection of SELV or PELV circuits.

5 Technical data

5.1 Analog input

Thermocouples

Designation	Type	Standard	ITS	Measuring range	Accuracy ^a
Fe-CuNi	"L"	DIN 43710 (1985)	ITS-68	-200 to +900 °C	± 0.25 %
Fe-CuNi	"J"	DIN EN 60584-1:2014 IEC 60584-1:2013	ITS-90	-210 to +1200 °C	± 0.25 % from -100 °C
Cu-CuNi	"U"	DIN 43710 (1985)	ITS-68	-200 to +600 °C	± 0.25 % from -100 °C
Cu-CuNi	"T"	DIN EN 60584-1:2014 IEC 60584-1:2013	ITS-90	-270 to +400 °C	± 0.25 % from -150 °C
Ni-Cr-Ni	"K"	DIN EN 60584-1:2014 IEC 60584-1:2013	ITS-90	-270 to +1300 °C	± 0.25 % from -80 °C
Ni-Cr-CuNi	"E"	DIN EN 60584-1:2014 IEC 60584-1:2013	ITS-90	-270 to +1000 °C	± 0.25 % from -80 °C
Ni-Cr-NiSi	"N"	DIN EN 60584-1:2014 IEC 60584-1:2013	ITS-90	-270 to +1300 °C	± 0.25 % from -80 °C
Pl10Rh-Pt	"S"	DIN EN 60584-1:2014 IEC 60584-1:2013	ITS-90	-50 to +1768 °C	± 0.4 % from 20 °C
Pl13Rh-Pt	"R"	DIN EN 60584-1:2014 IEC 60584-1:2013	ITS-90	-50 to +1768 °C	± 0.25 % from 50 °C
Pl30Rh-PtRh	"B"	DIN EN 60584-1:2014 IEC 60584-1:2013	ITS-90	-50 to +1820 °C	± 0.25 % from 400 °C
W5Re-W26Re	"C"	DIN EN 60584-1:2014 IEC 60584-1:2013	ITS-90	0 to 2315 °C	± 0.25 % from 500 °C
W3Re-W25Re	"D"	ASTM E175184-15	ITS-90	0 to 2315 °C	± 0.25 % from 500 °C
W5Re-W26Re	"A1"	GOST R 8.585-2001	ITS-90	0 to 2500 °C	± 0.25 % from 500 °C
Chromel-Copel	"L"	GOST R 8.585-2001	ITS-90	-200 to +800 °C	± 0.25 % from -80 °C
Chromel-AlumelB	"K"	GOST R 8.585-2001	ITS-90	-270 to +1300 °C	± 0.25 % from -80 °C

^a The accuracy value refers to the measuring range.

RTD temperature probe

Designation	Standard	ITS	Connection type	Measuring range	Accuracy ^a	Measuring current
PH100	DIN EN 60751:2009 IEC 60751:2008	ITS-90	Two-wire	-200 to +850 °C	± 0.2 %	500 µA
PH1000	DIN EN 60751:2009 IEC 60751:2008	ITS-90	Three-wire	-200 to +850 °C	± 0.1 %	500 µA
PH100	GOST 6651-2009 A.2	ITS-90	Two-wire	-200 to +850 °C	± 0.2 %	500 µA
KTY			Two-wire	-53 to +153 °C	± 2.0 %	50 µA

5 Technical data

5.7 Electrical data

Pixel matrix LCD display (only for types 701512, 701513, and 701514)

Pixel fields
Type 701512 (format 108H): 2 rows each with 9 pixel fields
Type 701513 (format 108Q): 2 rows each with 9 pixel fields
Type 701514 (format 104): 2 rows each with 11 pixel fields

Number of pixels per field: 8 × 5
Color: White

5.8 Environmental influences

Storage	Operation
Ambient temperature range	-30 to +70 °C
Storage	-10 to +55 °C
Site altitude	Max. 2000 m above sea level
Climatic environmental influences	According to class 3K3 with extended temperature range
Resistance to climatic conditions	± 90 % rel. humidity without condensation
Storage	According to class 1K2
Operation	According to class 3K3
Mechanical environmental influences	According to DIN EN 60721-3
Storage	According to class 1M2
Transport	According to class 2M2
Operation	According to class 3M3

3 Electrical connection

Type 701513 (96 mm × 48 mm)

Type 701512 (48 mm × 96 mm) Type 701514 (96 mm × 96 mm)

Terminals	Connection	Terminals	Connection	Terminals	Connection
1, 2	Output 1 (relay)	9, 10	Input 1 (for potential-free contact) or output 3 (logic output) or RS485 interface	17, 18	(4) = option 4: output 7 (relay, logic output or PhotoMOS [®] relay)
3, 4	Output 2 (relay)	11, 12	(1) = option 1: output 4 (logic output) or RS485 interface		Voltage supply
5-8	Analog input	13, 14	(2) = option 2: output 5 (relay, logic or analog output)		PC (setup program)
8, 10	Input 2 (for potential-free contact)	15, 16	(3) = option 3: output 6 (relay, logic output or PhotoMOS [®] relay)		

4 Operation

The device is configured, parameterized, and operated using the four buttons on the front. A setup program is also available for convenient configuration of the device using a PC. Some functions can only be configured with the setup program.

The individual parameters for device settings are organized in different levels that can be inhibited. The level inhibit helps to prevent accidental or unauthorized operation.

4.1 Display and control elements

- 18-segment LCD display (e.g. measured value), 4-digit, white; for types 701510 (132) and 701511 (116) also for displaying menu items, parameters and text
- 18-segment LCD display (e.g. timer remaining running time), 4-digit (701510 (132); 5-digit, 701511 (116); 8-digit, green; for types 701510 (132) and 701511 (116) also for displaying menu items, parameters, values and text; display "OK" when exiting editing mode (with change)
- Activity display for timer
- For types 701512 (108H), 701513 (108Q), and 701514 (104): pixel matrix LCD display for displaying menu items, parameters and values as well as customer-specific text
- Switching of the digital outputs (yellow = active)
- Up (in the menu: increase value, select previous menu item or parameter)
- Down (in menu: reduce value, select next menu item or parameter)
- Back (in menu: back to previous menu level, exit editing mode without change; in basic status: configuration function)
- Menu/OK (call up main menu, switch to submenu/level, switch to editing mode, exit editing mode with change)

Symbol (activity display)

Symbol	Off	On	Light up	Flashes
Timer	Timer is not active and also not configured	Timer is configured but not active	Timer is active (running)	

5 Technical data

^a The accuracy value refers to the measuring range.

Resistance transmitter and resistor/potentiometer

Designation	Measuring range	Accuracy ^a	Measuring current
Resistance transmitter	0 to 4000 Ω	± 0.1 %	50 µA
Resistance/potentiometer	0 to 400 Ω	± 0.15 %	500 µA
	0 to 4000 Ω	± 0.1 %	50 µA

^a The accuracy value refers to the maximum measuring range. Small measuring spans lead to reduced linearization accuracy.

Measuring circuit monitoring

The device behavior in the event of a fault is configurable.

Measuring probe	Measuring range underflow	Measuring range overflow	Short-circuit (probe/line)	Break (probe/line)	Polarity
RTD temperature probe	++	++	++	++	---
Resistance/potentiometer	---	---	---	---	---
Resistance transmitter	---	++	(+) ^b	(+) ^b	---
Thermocouple	++	++	---	++	(+) ^c

5 Technical data

5.9 Case

Case type	Case front	Panel thickness	Case fastening	Operating position	Protection type	Weight
Plastic housing for panel mounting according to DIN IEC 61554 (indoor use)	Made of plastic with membrane keyboard	1 to 10 mm	In panel using the supplied mounting frame or both mounting elements	Any ^a	Any ^a	Type 701510 (format 132): Max. 85 g Type 701511 (format 116): Max. 120 g Type 701512 (format 108H): Max. 160 g Type 701513 (format 108Q): Max. 160 g Type 701514 (format 104): Max. 220 g

^a The maximum admissible ambient temperature only applies for the installation with the display in a vertical position.

5.10 Approvals and approval marks

Approval mark	Test facility	Certificate/certification numbers	Inspection basis	Valid for
cULus	Underwriters Laboratories	E201387	UL 61010-1 (3. Ed.), CAN/CSA-22.2 No. 61010-1 (3. Ed.)	All types
DNV GL	DNV GL	TAA0000183	Class Guideline DNVGL-CG-0339	Type 701511 (DC 20 to 30 V) and type 701514 (AC 110 to 240 V), without Ethernet interface, panel mounting
BUREAU VERITAS	Bureau Veritas	53627/AV B0	Bureau Veritas Rules for the Classification of Steel Ships	

The device is approved if the relevant approval mark is shown on the device.

3 Electrical connection

3.3 Connection diagram

CAUTION!
In unfavorable conditions, the temperature may exceed 60 °C at the terminals. As a result, the insulation of the cables connected at the terminals may be damaged. The affected cables must be heat-resistant up to at least 80 °C.

NOTE!
There is an individual connection diagram on the housing that corresponds to the ordered device version.

3.3.1 Analog input

The analog input version is identical for all types.

Measuring probe/standard signal	Symbol and terminal designation	Measuring probe/standard signal	Symbol and terminal designation
Thermocouple	→ 6	Current DC 0(4) ... 20 mA	→ 6
RTD temperature probe two-wire circuit	→ 5	Resistance/potentiometer two-wire circuit	→ 5
RTD temperature probe three-wire circuit	→ 5	Resistance/potentiometer three-wire circuit	→ 5
Voltage DC 0(2) ... 10 V (usable as alternative to digital input 2)	U _x → 7	Resistance transmitter	→ 5

3.3.2 Digital inputs

The digital input version is identical for all types.

Input	Version	Symbol and terminal designation	Input	Version	Symbol and terminal designation
1	Digital input for potential-free contact (usable as alternative to digital output 3)	→ 9	2	Digital input for potential-free contact (only usable if the analog input is not configured as DC 0(2) ... 10 V)	→ 8
		→ 10			→ 10

4 Operation

Button functions

Button or button combination (permanent)	In basic status	When navigating	When editing
Up	---	Select previous menu item or parameter	Increase value or go up in picklist
Down	---	Select next menu item or parameter	Decrease value or go down in picklist
Back short (< 2 s)	Function configurable (default setting: without function)	Move to menu level above	Leave editing mode without changes
Back long (> 2 s)	Function configurable (default setting: without function)	---	---
Menu/OK short (< 2 s)	Call up main menu	Call up sub-menu or switch to editing mode	Leave editing mode with changes
Down + Menu/OK very long (> 5 s)	Call up menu for level inhibit	---	---

4.2 Language selection

After switching on the device for the first time, the user can either confirm the flashing displayed language with "OK" or select another language using the "Up/Down" buttons and then confirm this with "OK".

If, at a later point, another user is to also have the option of selecting a language, the configuration parameter "Language selection active" must be set to "Yes" (Configuration > System data). After applying the language, this parameter is automatically set to "No", so that language selection is not necessary the next time the device is switched on.

The language of the device texts can be changed at any time in the configuration settings (regardless of language selection after switch-on).

5 Technical data

Measuring probe	Measuring range underflow	Measuring range overflow	Short-circuit (probe/line)	Break (probe/line)	Polarity
Current 0 to 20 mA	---	++	---	---	---
Current 4 to 20 mA	++	++	++	++	++
Voltage 0 to 10 V	---	++	---	---	++
Voltage 2 to 10 V	++	++	++	++	++

++ = is detected, --- = is not detected, (+) = is detected in certain conditions

^a Is not detected in all combinations

^b Break in measuring current path is not detected

^c Depend on the set characteristic line

5.2 Digital inputs

Input for potential-free contact	Function
Contact closed: input is active (R _{ON} < 1 kΩ)	Contact open: input is inactive (R _{OFF} > 50 kΩ)
Sampling rate	150 ms

5.3 Analog output

Voltage	Output signal	Load resistance
DC 0(2) to 10 V	> 500 Ω	

Current	Output signal	Load resistance
DC 0(4) to 20 mA	< 450 Ω	

Accuracy: ± 0.5 %
Ambient temperature influence: ≤ 150 ppm/K

3 Electrical connection

3.3.3 Analog output

Version for type 701510 (format 132)	Symbol and terminal designation	Version for types 701511 to 701514	Symbol and terminal designation
Option 2 (alternative to digital output 2): DC 0(2) ... 10 V or DC 0(4) ... 20 mA (configurable)	U _x → 3	Option 2 (alternative to digital output 5): DC 0(2) ... 10 V or DC 0(4) ... 20 mA (configurable)	U _x → 14

3.3.4 Digital outputs

Output	Version	Symbol and terminal designation	Output	Version	Symbol and terminal designation
1	Relay (N/O contact)	→ 1	5	Option 2 for types 701511 (116), 701512 (108H), and 701514 (104) (alternative to analog output): Relay (N/O contact) or logic output 0/14 V	→ 13
2	Relay (N/O contact), (for type 701510 as option 2, see below)	→ 2	6	Option 3 for types 701512 (108H), 701513 (108Q), and 701514 (104) (alternative to analog output): Relay (N/O contact) or logic output 0/14 V (usable as alternative to digital input 1)	→ 13
		→ 3			→ 14
		→ 4			→ 14
		→ 5			→ 15
		→ 6			→ 15
		→ 7			→ 16
		→ 8			→ 16
		→ 9			→ 17
		→ 10			→ 17
4	Option 1 for types 701511 (116), 701512 (108H), 701513 (108Q), and 701514 (104) (alternative to RS485 interface): Relay (N/O contact), only for type 701511 (116) or logic output 0/14 V	→ 11	7	Option 4 for types 701512 (108H), 701513 (108Q), and 701514 (104): Relay (N/O contact; only with longer contact life) or logic output 0/14 V or PhotoMOS [®] relay	→ 17
		→ 12			→ 18
		→ 13			→ 18
		→ 14			→ 19

4 Operation

4.3 Error messages

Display	Possible cause ^a	Measures
<<<<	Measuring range underflow	Check sensor and line (break, short-circuit, polarity)
Short-circuit (probe/line)	Break (probe/line)	Check connection terminals
Polarity	Measuring range overflow	Check configuration (signal type, linearization, resistance measuring range, scaling)
>>>>	Break (probe/line)	---
---	Polarity	---

^a Depends on the signal type (measuring probe), see chapter "Technical data".

4.4 Further information

For further information regarding the operation and configuration of the device, see the operating manual, as well as the interface description (Modbus) and the ST editor manual, if necessary.

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Ethernet interface (option)

The settings of the Ethernet interface must be made with the Lantroxin CPM Manager PC software from the manufacturer Lantroxin, Inc. Configuration on the device or with the setup program is not necessary. Further information can be found in the interface description (Modbus).

5 Technical data

5.4 Digital outputs

Relay (N/O contact)	Switching capacity	Contact life
Max. 3 A at AC 230 V or DC 30 V, resistive load	150,000 operations at rated load	350,000 operations at 1 A

Relay (N/O contact) with longer contact life	Switching capacity	Contact life
Max. 3 A at AC 230 V, resistive load	300,000 operations at rated load	1,500,000 operations at 1 A

Logic output	Output signal	Current
DC 0/14 V	± 15 %	Max. 20 mA per output (at nominal voltage 14 V)

PhotoMOS [®] relay ^a	Switching capacity
Max. 200 mA at AC 30 V or DC 45 V, not short-circuit proof	

^a PhotoMOS is a registered trademark of Panasonic Corporation.

5.5 Interfaces

USB device	Connector type	Standard	Max. cable length
Micro-B (socket)	Low-Speed, Full-Speed	5 m	

RS485	Baud rate	Data format	Protocol
9600, 19200, 38400, 115200	8/1n, 8/1e, 8/1o, 8/2n	Modbus-RTU as slave	

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