

Controllers, Power Units, System / Recording Technology

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Process controls and programmers

Process controls**Nr.****JUMO IMAGO F3000****Process controllers for the meat processing industry**

70.0101

Programmers**Nr.****JUMO LKR-96****Controller for boilers, cooking chambers and baking installations**

70.0201

JUMO LMD-96 / LMD-400**Channel indicator and monitoring unit**

70.0202

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JUMO IMAGO F3000

Process controllers for the meat processing industry

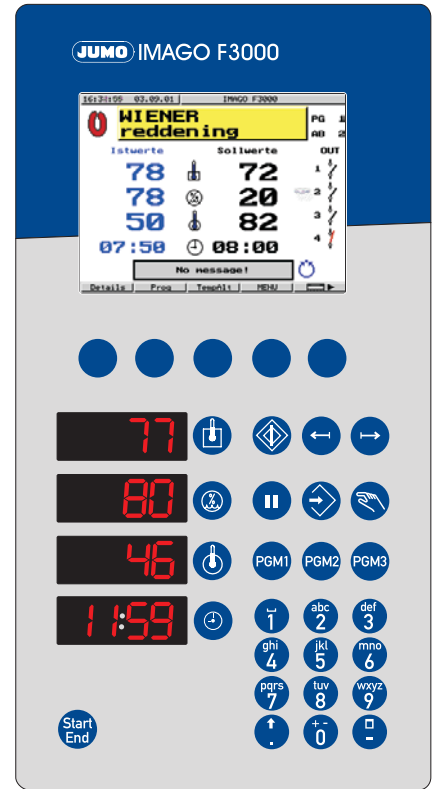
Brief description

These process controllers are built to a modular design, and are suitable for the control and regulation of cooking, smoking and climate-control installations, and all associated equipment such as smoke generators, catalyzers etc. They are available in both upright (portrait) and horizontal (landscape) formats.

The unit has a 5" color display capable of showing 27 colors. Templates for the user interface can be individually adjusted and laid out by the users themselves. Texts, process values, background diagrams and icons can be arranged as required. A status line indicates the last alarm that occurred. LED displays have also been included, so that the most important process variables are visible from a distance. Individual keys can be assigned to special functions and labelled accordingly.

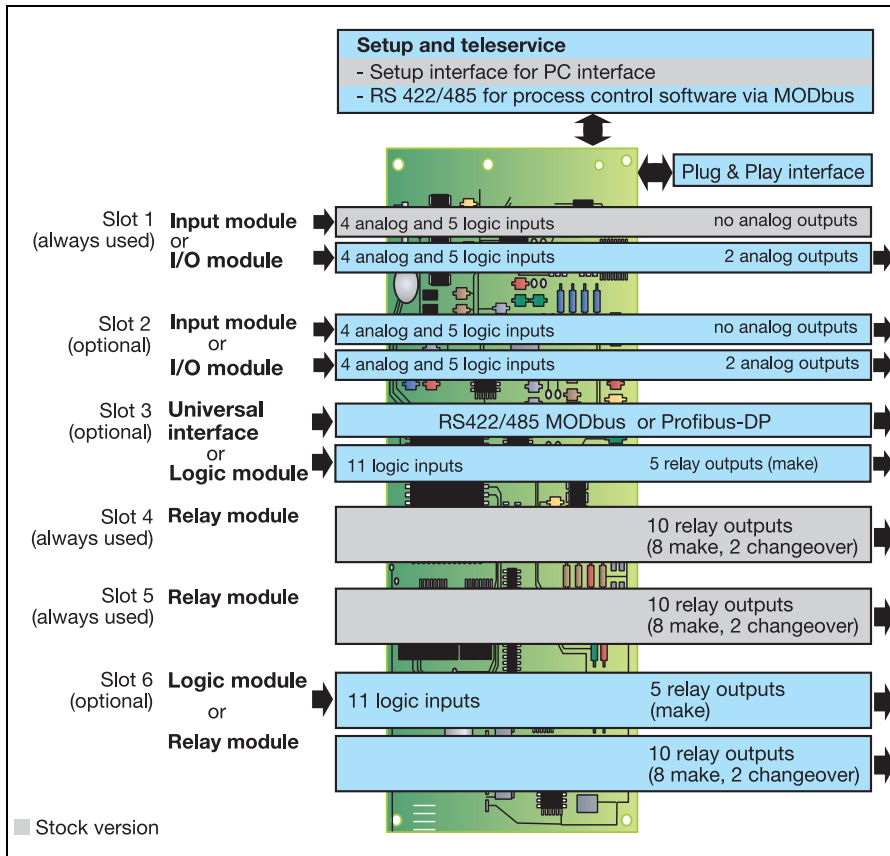
The instrument can store up to 99 named profile programs of up to 99 segments. All the processes required in the system are defined in 99 process steps and then simply called up sequentially for the program entry. An optional Plug & Play memory is available that can store all the data from the instrument, thus enabling easy exchange of hardware without any problems caused by lost data. The "Teleservice" software makes it possible to carry out configuration from a remote location, via a modem and the telephone network, thus saving on-site service costs.

A communication interface for MODbus or Profibus-DP facilitates integrating the instrument into a network.



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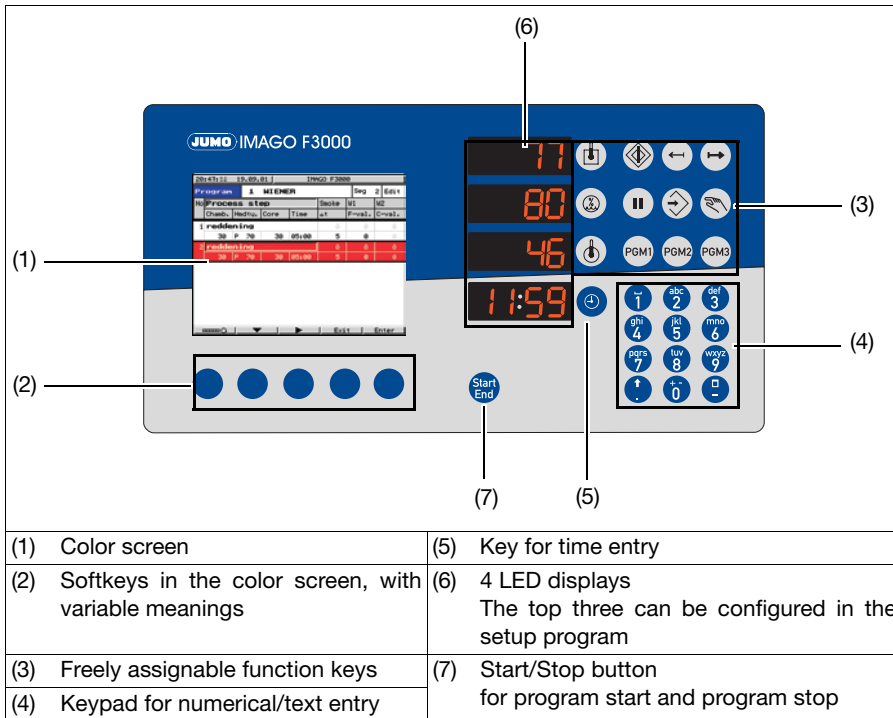
Block structure



Key features

- Two screen layout templates (masks) for automatic operation and one for the basic status, all freely editable
- 5" color display, 12mm LED displays for process values
- Plug & Play memory, to back up configuration data, transfer programs from one instrument to another, and to read in instrument software
- Configuration and parameter levels in English, German, French
- Math and logic functions
- Teleservice via modem
- Setup program for Windows 95/98/NT4.0/2000/ME
- Program editor

Display and control elements



(1) Color screen	(5) Key for time entry
(2) Softkeys in the color screen, with variable meanings	(6) 4 LED displays The top three can be configured in the setup program
(3) Freely assignable function keys	(7) Start/Stop button for program start and program stop
(4) Keypad for numerical/text entry	

Programs

99 profile programs can be entered, stored, and changed at any time. They are made up of various process steps with the associated setpoint values. A program can have a maximum of 99 segments. A total of 3000 segments can be stored for all programs together. The programs are chosen from a list or selected by meaningful icons.



Segments

A segment consists of a process step, up to 9 setpoint values, and the segment time. Various conditions for moving to the next step control the segment sequence.

Process steps

A process step contains various pre-defined systems states for smoking, reddening etc., which are usually specified by the system manufacturer.

The user only has to select the process and enter the appropriate setpoints. Up to 99 process steps can be stored.

Step-on conditions

The system steps on to the next segments when...

- ... the segment time has elapsed
- ... the programmed core temperature has been reached
- ... the segment time has elapsed and/or the programmed core temperature has been reached.
- ... the programmed final F value has been reached.
- ... the programmed final C value has been reached.
- ... a logic input that was configured as a condition for stepping on has been activated.
- ... the programmed final F value and the programmed core temperature have been reached.

Cooking process

The process can be controlled by the delta cooking or F-value cooking methods.

Signal for end of program

This is provided by a relay output.

Operating functions

18 of the total of 36 operating outputs can have a switching response assigned. They can be configured for ON-advance, OFF-advance, ON-delay or OFF-delay with respect to the changeover point from one segment to another. A pulse/pause ratio can also be selected. All times can be set individually.

2 timers

After entering an operating time for the system, a counter runs and the system has to be enabled by a password. A second counter can, for instance, be used to monitor and signal cleaning intervals.

Math and logic functions

The math module makes it possible to include setpoints, output levels, analog input measurements and the like in a mathematical formula.

The logic module can be used to create a logical combination of such variables as logic inputs, limit comparators and operating outputs.

A maximum of 4 math functions and 8 logic combinations can be entered via the setup program, and the results of these functions can be delivered at the outputs or used internally.

All logic formulae are processed and become effective within 100ms.

Self-optimization

Standard features include self-optimization, making it possible for a user to adapt the controller to match the control loop without any knowledge of control systems engineering.

This feature tests and evaluates the response of the control loop to specific changes in the control input parameters. The control parameters Xp, Tn, Tv and Cy are calculated.

PC programs

■ Setup program

The setup program for configuring the instrument can be installed in English, German or French. A PC can be used to create sets of data, edit them, transfer them to the process controls, or read them out from the instrument. The sets of data are stored and managed. 3 process layouts can be freely configured.

■ Teleservice

- Remote configuration and diagnosis of the system via modem
- Establish a connection through the setup program, dialling by:
 - a) direct-dialling through the setup, or
 - b) callback
- Display system status, such as operating modes, logic inputs and outputs, alarms and system information.

■ Process steps

Process steps are defined through the setup program and transferred to the instrument. The program editor is used to compile the programs.

RS422/RS485 interface (option)

The serial interface is used for communication with higher-level (supervisory) systems, and includes electrical isolation. The transmission protocols used are MODbus and Profibus.

Plug & Play memory (option)



This is plugged into the back of the instrument, and can store all the instrument data, or a selection:

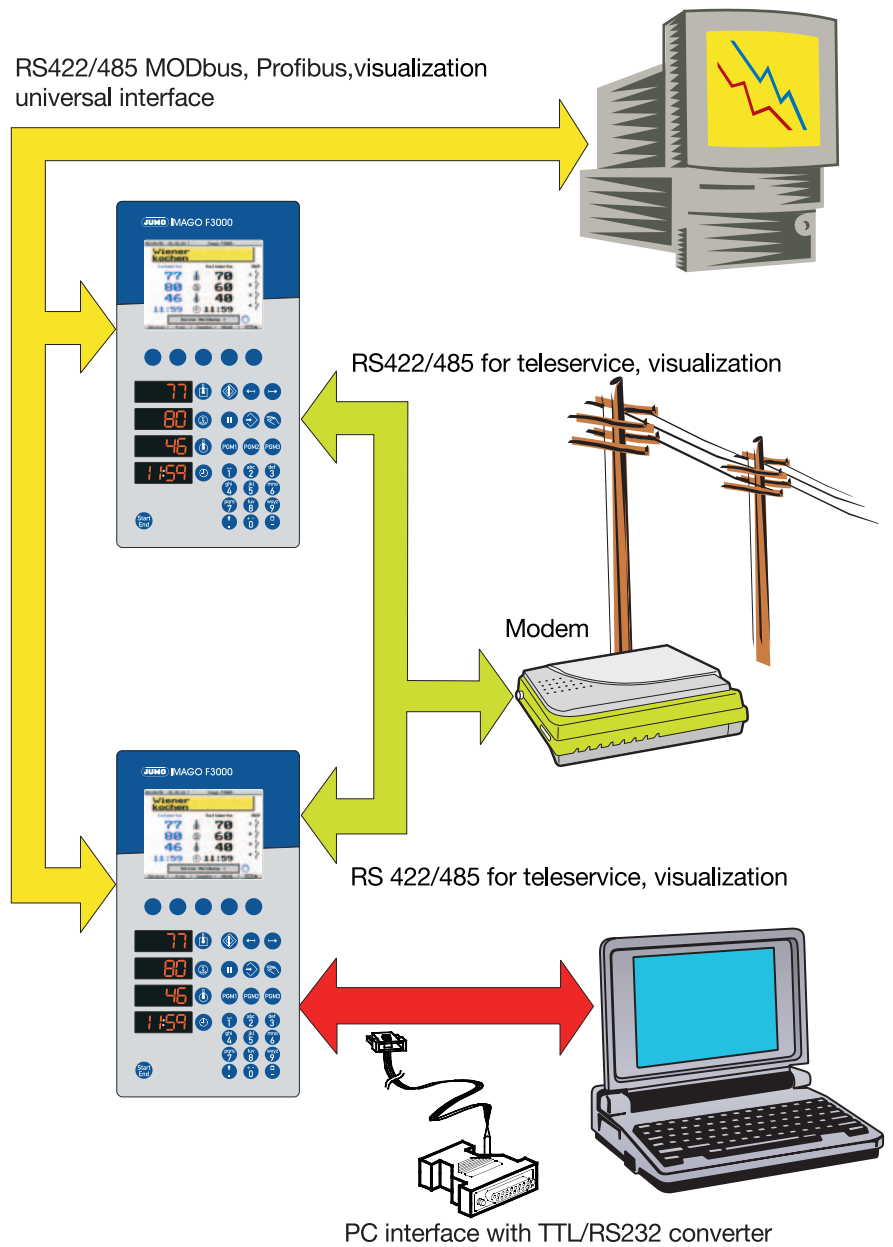
- parameter and configuration data
- process steps
- user programs
- instrument software version

Practical applications are for:

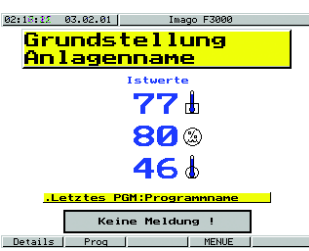
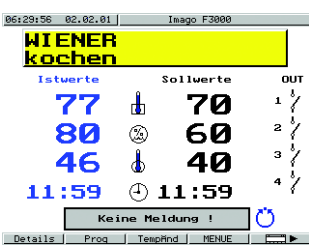
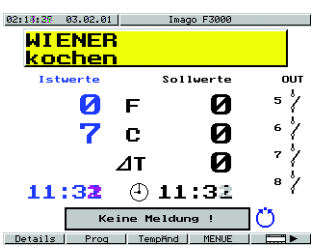
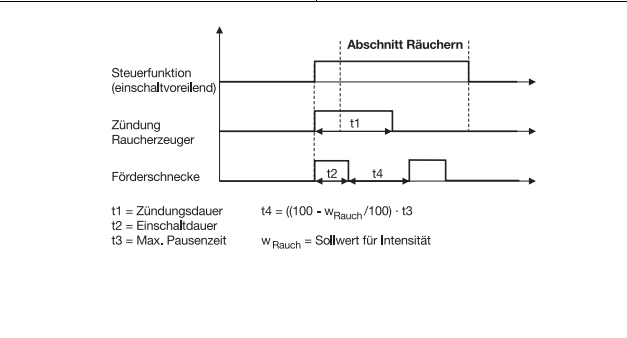

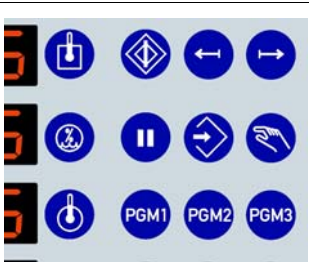
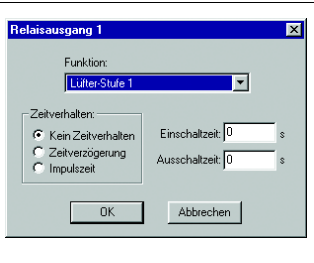
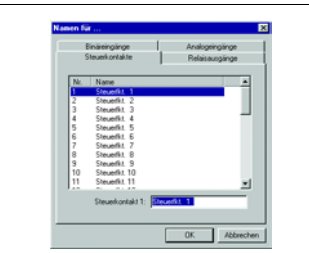
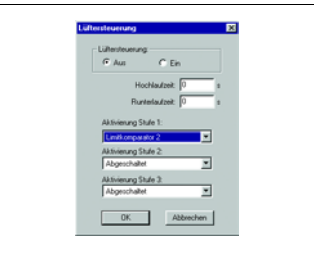
- simple configuration after a hardware replacement
- reading in new setup data from the system manufacturer
- copying user programs
- reading in new applications programs from the manufacturer
- reading in new instrument software

Interfaces for teleservice, setup and visualization

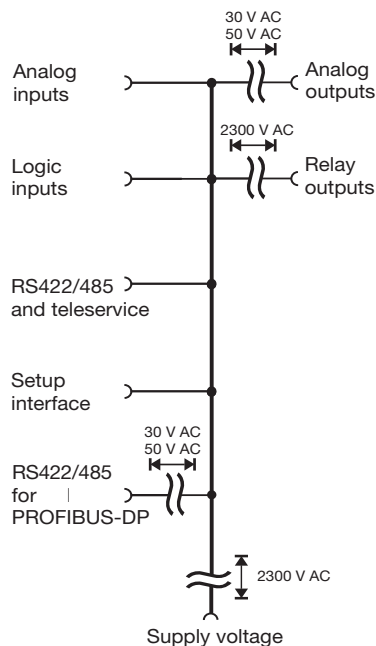
RS422/485 MODbus, Profibus, visualization universal interface



Extract from the parameter level

<p>Screen layout Three freely editable screens (for basic status, Automatic 1 and Automatic 2) are created in the setup program and then transferred to the instrument.</p>			
<p>Smoke generator The smoke generator is activated by an operating function. The smoke intensity can be altered while the profile program is running.</p>	 <p> t_1 = Zündungsdauer t_2 = Einschaltdauer t_3 = Max. Pausenzeit $t_4 = ((100 - w_{\text{Rauch}}/100) \cdot t_3)$ w_{Rauch} = Sollwert für Intensität </p>		
<p>Function keys The instrument is supplied as standard with the function keys printed as shown on the right. Replaceable inserted strips can be used to provide other legends and functions.</p>		<p>Assignment of the relay outputs</p> <p>Each relay output can be assigned to an instrument function, a time event or an input/output switching action.</p>	
<p>Texts and names can be defined for: analog and logic inputs, operating contacts, relay outputs, process steps, programs, other languages.</p>		<p>Fan control</p> <p>The fan power stages can be switched on by various logic signals within the instrument, such as a limit comparator.</p>	

Electrical isolation



Technical data

Analog inputs (max. two I/O modules, each with 4 inputs)

Thermocouples	Range	Meas. accuracy	Ambient temperature error
Fe-Con L	-200 to + 900°C	≤0.4%	100 ppm/°C
Fe-Con J EN 60584	-200 to +1200°C	≤0.4%	100 ppm/°C
NiCr-Ni K EN 60584	-200 to +1372°C	≤0.4%	100 ppm/°C
Cold junction	internal Pt100		

Resistance thermometer	Connection type	Range	Meas. accuracy	Ambient temperature error
Pt100 EN 60751	3-wire	-200 to +850°C	≤0.1%	100 ppm/°C
Sensor lead resistance	max. 30Ω per conductor in 2-wire/3-wire circuit			
Measuring current	250μA			
Lead compensation	Not required for 3-wire circuit. For a 2-wire circuit, lead compensation can be provided in the software by a process value correction.			

Standard signals	Range	Meas. accuracy	Ambient temperature error
Voltage	0 – 1V, input resistance $R_E > 100k\Omega$ 0 – 10V, input resistance $R_E > 100k\Omega$	≤0.1% ≤0.1%	100 ppm/°C 100 ppm/°C
Current	0 – 20mA, voltage drop ≤ 1V 4 – 20mA, voltage drop ≤ 1V	≤0.1% ≤0.1%	100 ppm/°C 100 ppm/°C
Scaling	through software		

Measurement circuit monitoring ¹	Over/underrange	Probe/lead short-circuit ¹	Probe/lead break
Thermocouple	•	-	•
Resistance thermometer	•	•	•
Voltage 0 – 1V	•	-	-
0 – 10V	•	-	-
Current 0 – 20mA	•	-	-
4 – 20mA	•	•	•

• = recognized - = not recognized

1. In the event of an error, the outputs move to defined levels (configurable as: 0%, 100%, -100%).

Logic inputs (max. 2 I/O modules, each with 5 inputs, and max. 2 logic modules, each with 11 inputs)

Floating contacts	with common reference potential, configurable for PLC level through internal solder links
PLC level	low = 0 to 6V, high = 13 to 30V

Relay outputs (max. 3 relay modules, each with 10 outputs, and max. 2 logic modules, each with 5 outputs)

Relay (relay module) Relay (logic modules) – contact rating – contact life – contact protection circuit	2 changeover contacts, 8 make contacts 5 make contacts 3A at 250VAC, resistive load 10 ⁶ operations at rated load between pole and make/break contact Varistor S14K300
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Analog outputs (max. 1 I/O module with two outputs)

Voltage – output signals – load resistance	0 – 10V / 2 – 10V, can be changed over in software $R_{load} \geq 500 \Omega$
Current – outputs signals – load resistance	0 – 20mA / 4 – 20mA, can be changed over in software $R_{load} \leq 450 \Omega$

Controller

Number	four
Controller type	single-setpoint controller, double-setpoint controller, modulating controller, proportional controller, proportional controller with integrated actuator driver
Controller structures	P/PD/PI/PID/I
A/D converter	resolution better than 14 bit
D/A converter	13 bit
Sampling time	500ms
Sampling time for logic formulae, with read-in and output of the signals	100ms

Color display

Resolution	320 x 240 pixels
Size	5"
Number of colors	27 colors

Electrical data

Supply voltage (switchmode power supply)	110 – 240V AC -15/+10%, 48 – 63Hz 20 – 30V AC/DC, 48 – 63Hz
Test voltage (type test)	as per EN 61 010, Part 1 overvoltage category II, pollution degree 2
Power consumption	max. 44VA, p.f. ≤ 0.7
Data backup	EEPROM
Electrical connection	at rear by screw terminals, conductor cross-section up to 2.5mm ² and ferrules (length: 10mm)
Electromagnetic compatibility - interference emission - interference immunity	to EN 61 326 Class B to industrial requirements
Safety standards	to EN 61 730-1 or EN 61 010-1

Housing

Housing type	plastic housing for panel mounting to DIN 43 700	
Dimensions in mm (for type ...)	700101/1, ...	700101/2, ...
Bezel	307 x 165 (portrait)	165 x 307 (landscape)
Mounting depth	107.6	107.6
Panel cut-out	138 ₀ ⁺¹ x 282 ₀ ^{+1.3}	282 ₀ ⁺¹ x 138 ₀ ^{+1.3}
Ambient/storage temperature range	-5 to +55°C / -40 to +70°C	
Climatic conditions	rel. humidity not exceeding 95% annual mean, no condensation	
Operating position	any	
Protection	to EN 60 529, front IP 67, rear IP 20	
Weight of minimal version (fully fitted)	approx. 1900 g (2300 g)	
Membrane keypad	Polyester membrane, protection: IP 67 resistant to normal cleaning agents and detergents	
Keys	Short-stroke keys with tactile feedback (click effect)	

Setup interface (electrically isolated)

Interface type	RS422/RS485
Protocol	always MODbus
Baud rate	9600 , 19200, 38400
Device address	1 – 255
Minimum response time	0 – 500ms

Universal interface**MODbus**

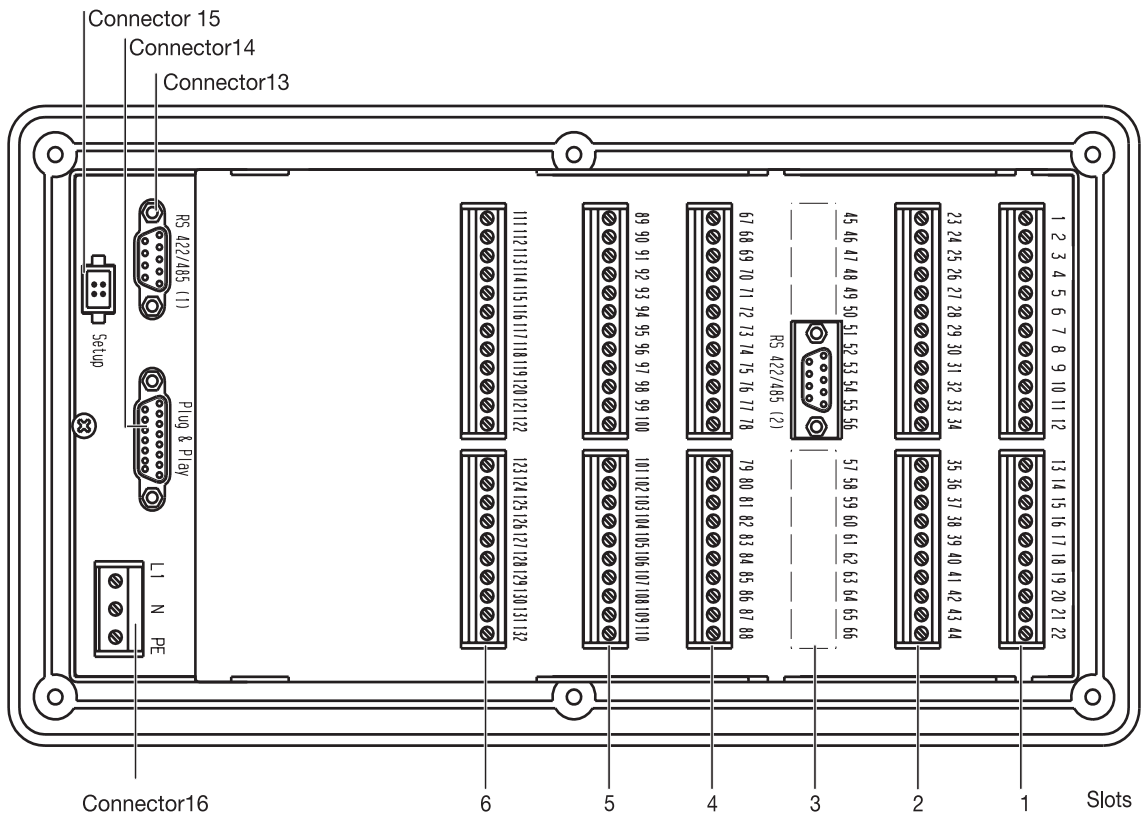
Interface type	RS422/RS485
Protocol	MODbus
Baud rate	9600 , 19200, 38400
Device address	1 – 255
Minimum response time	0 – 500ms

Profibus

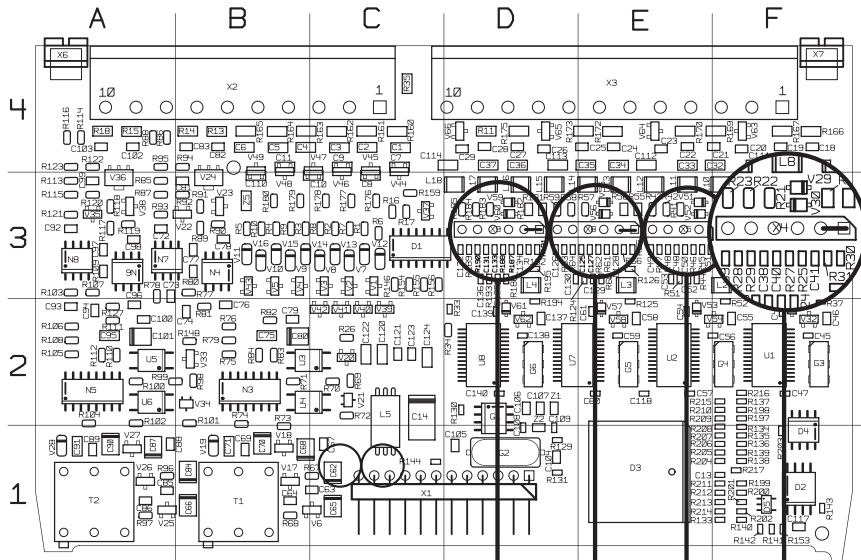
Device address	1 – 255
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bold print = factory setting

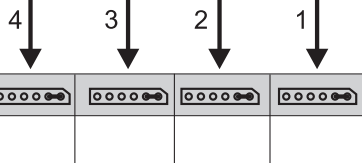
Connection diagram



Note: the link positions must be altered for voltage or thermocouple inputs!



Analog input No.



Pt100 (factory setting)

Your setting:





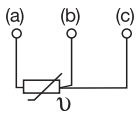



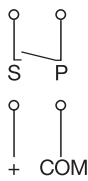


Setting options:

Only **one** link to be plugged in for each anaog input !

	Pt100
	0 — 10V
	0 — 1V and thermocouple

The current signal measurement does not depend on the position of the link !

I/O module (in slot 1)

		1		2		3		4		Symbol	
	Analog input No.										
	Thermocouple	1 + 3 -	4 + 6 -	7 + 9 -	10 + 12 -						
	Resistance thermometer	1 (a) 2 (b) 3 (c)	4 (a) 5 (b) 6 (c)	7 (a) 8 (b) 9 (c)	10(a) 11(b) 12(c)						
	Current input 0(4) – 20mA	2 + 3 -	5 + 6 -	8 + 9 -	11 + 12 -						
Voltage 0(2) – 10V	1 + 3 -	4 + 6 -	7 + 9 -	10 + 12 -							
The analog inputs 1 and 2, 3 and 4, must be electrically isolated from one another!											
	Logic input No.	1		2		3		4		5	Symbol
	floating contact or PLC input: 24V DC LO level: 0 to 6V HI level: 13 to 30V	13 S (n.o. make) 18 P (common)	14 S 18 P	15 S 18 P	16 S 18 P	17 S 18 P					
If PLC inputs are used, then the supply voltage for the logic inputs must be electrically isolated from the analog inputs!											
	Analog output No.	1		2						Symbol	
	0(4) – 20mA 0(2) – 10V configurable	19 + 20 -	21 + 22 -								

I/O module (in slot 2)

	Analog input No.	5	6	7	8	Symbol
	Thermocouple	23 + 25 -	26 + 28 -	29 + 31 -	32 + 34 -	
	Resistance thermometer	23(a) 24(b) 25(c)	26(a) 27(b) 28(c)	29(a) 30(b) 31(c)	32(a) 33(b) 34(c)	
	Current input 0(4) – 20mA	24 + 25-	27 + 28 -	30 + 31 -	33 + 34 -	
	Voltage 0(2) – 10V	23 + 25 -	26 + 28 -	29 + 31 -	32 + 34 -	

The analog inputs 5 and 6, 7 and 8, must be electrically isolated from one another!

	Logic input No.	6	7	8	9	10	Symbol
	floating contact or PLC input: 24V DC LO level: 0 to 6V HI level: 13 to 30V	35 S 40 P	36 S 40 P	37 S 40 P	38 S 40 P	39 S 40 P	
		35 + 40 COM	36 + 40 COM	37 + 40 COM	38 + 40 COM	39 + 40 COM	

If PLC inputs are used, then the supply voltage for the logic inputs must be electrically isolated from the analog inputs!

	Analog output No.	3	4	Symbol
	0(4) – 20mA 0(2) – 10V (configurable)	41 + 42 -	43 + 44 -	

Logic module (in slot 3)

	Logic input No.	22	23	24	25	26	27	28	29	30	31	32	Symbol
	floating contact or PLC input: 24V DC LO level: 0 to 6V HI level: 13 to 30V	45 S 56 P	46 S 56 P	47 S 56 P	48 S 56 P	49 S 56 P	50 S 56 P	51 S 56 P	52 S 56 P	53 S 56 P	54 S 56 P	55 S 56 P	
		45 + 56 COM	46 + 56 COM	47 + 56 COM	48 + 56 COM	49 + 56 COM	50 + 56 COM	51 + 56 COM	52 + 56 COM	53 + 56 COM	54 + 56 COM	55 + 56 COM	


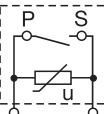
If PLC inputs are used, then the supply voltage for the logic inputs must be electrically isolated from the analog inputs!

	Relay output No.	31	32	33	34	35	Symbol
	3A 230V	57 P 58 S	59 P 60 S	61 P 62 S	63 P 64 S	65 P 66 S	


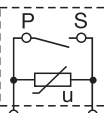
Universal interface (in slot 3)

	Connection for	Assignment	PROFIBUS-DP	Symbol
	RS422 interface, electrically isolated	4 RxD (+) 9 RxD (-) 3 TxD (+) 8 TxD (-) 5 GND	8 A(+) 3 B(-) 6 VCC 5 GND 9 GND	
	RS485 interface, electrically isolated	3 RxD/TxD A(+) 8 RxD/TxD B(-) 5 GND		


Relay module (in slot 4)

	Relay output No.	1	2	3	4	5	Symbol
		3A 230V	67 P 68 O 69 S	70 P 71 O 72 S	73 P 74 S	75 P 76 S	77 P 78 S
Relay output No.		6	7	8	9	10	Symbol
	3A 230V	79 P 80 S	81 P 82 S	83 P 84 S	85 P 86 S	87 P 88 S	


Relay module (in slot 5)

	Relay output No.	11	12	13	14	15	Symbol
		3A 230VA	89 P 90 O 91 S	92 P 93 O 94 S	95 P 96 S	97 P 98 S	99 P 100 S
Relay output No.		16	17	18	19	20	Symbol
	3A 230V	101 P 102 S	103 P 104 S	105 P 106 S	107 P 108 S	109 P 110 S	

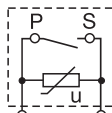
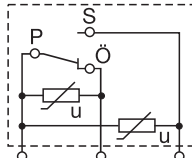
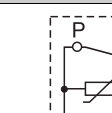
Logic module (in slot 6)

	Logic input No.	11	12	13	14	15	16	17	18	19	20	21	Symbol
		floating contact or PLC input: 24V DC LO level: 0 to 6V HI level: 13 to 30V	111 S 122 P	112 S 122 P	113 S 122 P	114 S 122 P	115 S 122 P	116 S 122 P	117 S 122 P	118 S 122 P	119 S 122 P	120 S 122 P	121 S 122 P
		111+ 122 COM	112+ 122 COM	113+ 122 COM	114+ 122 COM	115+ 122 COM	116+ 122 COM	117+ 122 COM	118+ 122 COM	119+ 122 COM	120+ 122 COM	121+ 122 COM	

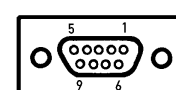
If PLC inputs are used, then the supply voltage for the logic inputs must be electrically isolated from the analog inputs!

	Relay output No.	26	27	28	29	30	Symbol
		3A 230V	123 P 124 S	125 P 126 S	127 P 128 S	129 P 130 S	131 P 132 S

Relay module (in slot 6)

Relay output No.	21	22	23	24	25	Symbol
3A 230VA	111 P 112 O 113 S	114 P 115 O 116 S	117 P 118 S	119 P 120 S	121 P 122 S	 
Relay output No.	26	27	28	29	30	Symbol
3A 230V	123 P 124 S	125 P 126 S	127 P 128 S	129 P 130 S	131 P 132 S	

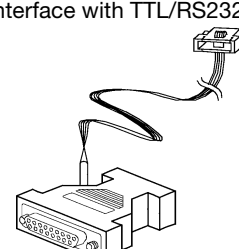

Connector 13

Teleservice, visualization	RS422	RS485	Symbol
RS422/485 interface	4 RxD (+) 9 RxD (-) 3 TxD (+) 8 TxD (-) 5 GND	8 RxD/TxD B(-) 3 RxD/TxD A(+) 5 GND	

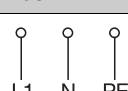
Connector 14

Connection for	Assignment	Symbol
Plug & Play interface		

Connector 15

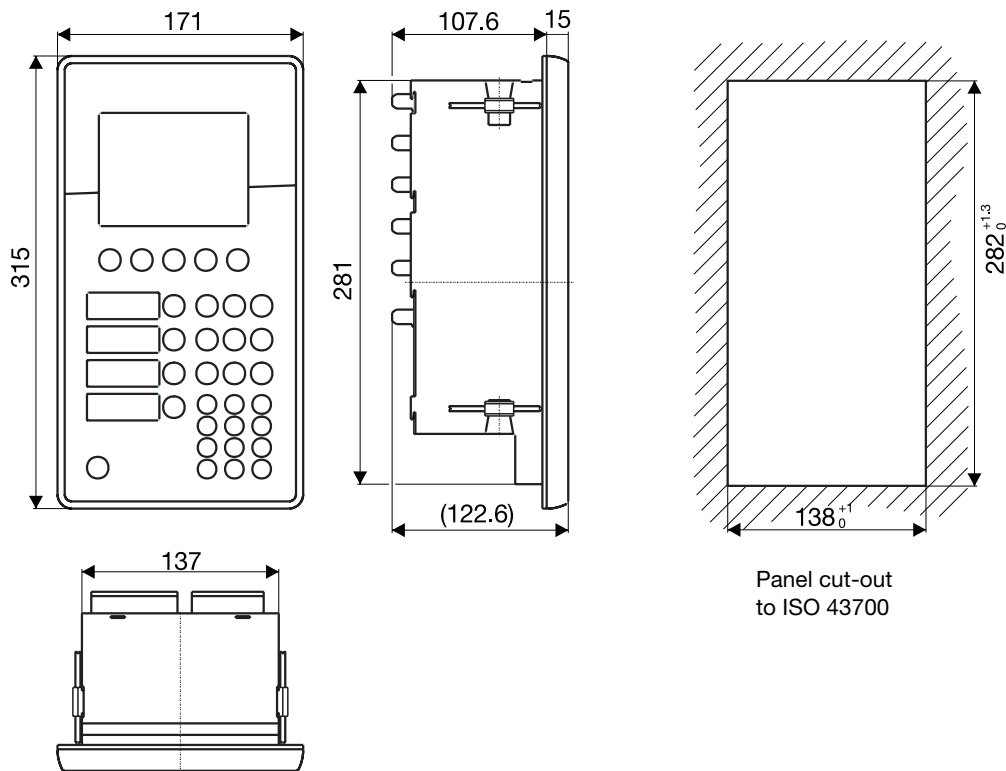
Connection for	Assignment	Symbol
Setup connector	 <p>(This is not electrically isolated from the analog inputs, logic inputs, and the teleservice interface.)</p>	

Connector 16

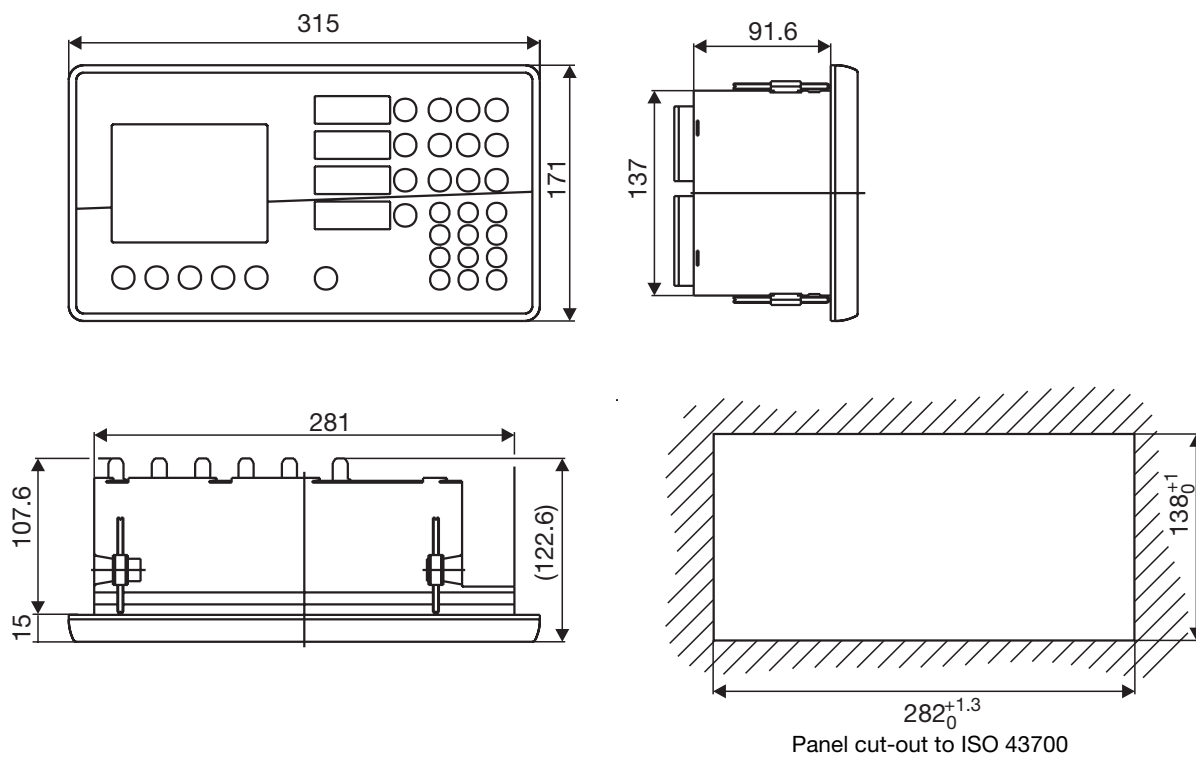
Connection for	Assignment	Symbol
Supply voltage, as per nameplate	L1 phase/line N neutral PE protective earth	

Dimensions

Type 700101/1, ... portrait format



Type 700101/2, ... landscape format



Order details: JUMO IMAGO F3000 process controlles for the meat processing industry

(1) Basic type

700101 JUMO IMAGO F3000

(2) Basic type extensions

Format

- x 1 332mm x 165mm, portrait format
- x 2 165mm x 332mm, landscape format

Version

- x 8 standard, with factory settings
- x 9 customized programming according to specification

Language for the configuration level

- x 1 German
- x 2 English
- x 3 French
- x 5 Russian

(3) Slot assignments

Code	Plug-in cards for inputs, outputs and interfaces	Slot Number					
		1	2	3	4	5	6
0	not used	-	0	0	-	0	0
1	relay module: 10 relay outputs (8 make, 2 changeover)	-	-	-	1	X	X
2	input module: 4 analog inputs, 5 logic inputs for floating contacts	2	X	-	-	-	-
3	I/O module: 4 analog inputs, 5 logic inputs for floating contacts, 2 analog outputs	X	X	-	-	-	-
4	logic module: 11 logic inputs for floating contacts, 5 relay outputs (make)	-	-	X	-	-	X
5	universal interface MODbus (electrically isolated)	-	-	X	-	-	-
6	universal interface PROFIBUS-DP (electrically isolated)	-	-	X	-	-	-
7	I/O module: 4 analog inputs, 5 logic inputs for PLC level	X	X	-	-	-	-
8	I/O module: 4 analog inputs, 5 logic inputs for PLC level, 2 analog outputs	X	X	-	-	-	-
9	Logic module: 11 logic inputs for PLC level, 5 relay outputs (make)	-	-	X	-	-	-

- assignment not possible
 X assignment possible
 ■ factory-set

(4) Supply voltage

- x 23 110 – 240V AC, -15/+10%, 48 – 63Hz
- x 25 20 – 53V AC/DC, 48 – 63Hz

(5) Interface for teleservice and visualization

- x 00 no interface
- x 54 RS422/485 interface (MODbus slave, connector 13)

(6) Extra code

- x 000 no extra code
- x 211 Plug & Play memory
- x 213 recording function

(7) Approvals

- x 000 none
- x 061 Underwriters Laboratories Inc. (UL)

Order code (1) (2) (3) (4) (5) (6) (7)
 Order example 700101 / 181 - 200110 - 23 - 00 / 000 - 000

Plug-in cards for retrofitting/converting

Sales No.

Available from stock:	
Relay module: 10 relay outputs (8 make, 2 changeover)	70/00398349
Input module: 4 analog inputs, 5 logic inputs	70/00398351
I/O module: 4 analog inputs, 5 logic inputs, 2 analog outputs	70/00398352
Logic module: 11 logic inputs, 5 relay outputs (make)	70/00398350
Interface for teleservice and visualization, RS422/485 (connector 13, MODbus slave, Code 54)	70/00398353
Delivery time approx. 2 weeks:	
Universal interface MODbus (slot 3)	70/00411250
Universal interface for PROFIBUS-DP (slot 3)	70/00411248
Input module for PLC level	70/00433065
Logic module for PLC level	70/00433064

Accessories - Price Sheet 70.9770

Sales No.

Program editor, multilingual	70/00398294
Setup program and program editor, multilingual	70/00398296
Setup program, program editor and teleservice, multilingual	70/00398297
PC interface with TTL / RS232 converter (socket)	70/00301315
Interface converter RS232 to RS422	70/00376969
Plug-in power supply for interface converter	70/00365933

Accessories

Sales No.

Plug & Play memory	70/00398298
Enable recording function	70/00433789
Mounting brackets for installation in LPF-200 / MPF-88 front panel cut-out	70/00413524



JUMO LKR96

Controller for boilers, cooking chambers and baking installations

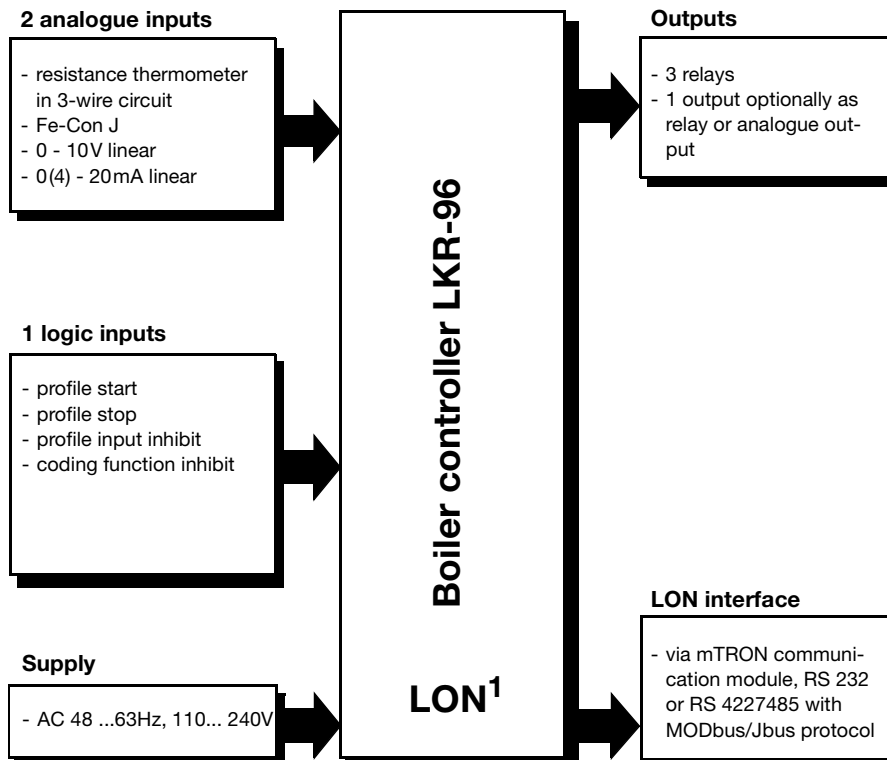
Brief description

The LKR-96 is a 1-channel controller which is available with 1 or 10 process steps. One process step consists of the boiler/core temperature, delta value F-value and running time. Two analogue inputs measure the boiler and core temperature. The integral real-time clock permits the start of a process step via day and time. On instruments of type 70.0201/2 or 70.0201/4, process step 10 can be used to operate an interval spray with adjustable duty cycle (permanently assigned to relay 4). External start and stop conditions or the configuration level inhibit can be set from the logic input through a floating contact. 4 relay outputs are available for controller, limit comparators, operating status and combination alarm. One output can be used as an analogue output (type 70.0201/X-XXX-01-05 ...). The communication module (Data Sheet 70.4040) provides a link to the supervisory level via a Jbus or MODbus protocol. The keys and the LED display of the controller have IP65 protection to DIN 42 115 at the front, are splash-proof and resistant to normal detergents.



Type 700201/...

Block structure



Features

- Compact dimensions 96mm x 96mm
- Easy operation
- Integral real-time clock for starting at any specific time
- Delta cooking and F-value cooking
- 2 limit comparators
- Combination alarm
- Analogue inputs Pt 100 in 3-wire circuit, thermocouple Fe-Con J, 0(4) - 20mA or 0 - 10V
- 1 analogue output
- Logic outputs in the form of relays with 2 n. o. (make) and 2 changeover contacts
- LON interface
- PID single-setpoint or double-setpoint controller
- Display of operating status
- Interval spray
- Protection IP65 at the front

Standard accessories

- 1 Operating Manual B 70.0201
- 2 mounting brackets
- Combicon push-on connectors with screw terminals
- 1 rubber seal for flush panel mounting

1. LON = Local Operating Network.
 Registered trademark of the ECHELON Corporation.

Type designation

Basic type (1) (2) (3) (4) (5) (6) (7)
 7002 01 / . - ... - 01 - .. - 23 - ...

(1) Basic type

type	Code
LKR-96	01

(2) Basic type extensions

Process steps	Code
1 process step	1
10 process steps	2
1 process step with LON interface FTT10A 78kBaud	3
10 process steps with LON interface FTT10A 78kBaud	4

(3) Analogue inputs

Analogue inputs 1, 2	Code
Pt 100 resistance thermometer in 3-wire circuit	888
Configuration to customer specification ¹	999

(4) Logic input

Floating contact	Code
profile program start/stop, inhibit of programming and parameter setting	01

(5) Outputs

Relays and analogue output	Code
3 relays	03
4 relays	04
3 relays and 1 analogue output	05

(6) Supply

At rear	Code
110 - 240V +10/-15% AC 48 - 63Hz	23

(7) Controller type/limit comparators

Output/number	Function	Code
Relay 1	single-setpoint controller	888
Relay 2	combination alarm	
Relay 3	limit comparator 1 (changeover contact)	
Configuration to customer specification ¹		999
Relay 4	limit comparator 2 (changeover contact)	
Analogue output	output of boiler/core temperature process values/set-points, controller output or actual F-value as standard signals	

■ factory setting

1. Check via the settings of the coding functions.

Connection diagram

Rear view			
Inputs 1,2	Terminal field 1		Diagram
Analogue	Input 1	Input 2	
Resistance thermometer in 3-wire circuit	1.1 1.2 1.3	1.4 1.5 1.6	
Thermocouple	1.1 + 1.2 -	1.4 + 1.5 -	
Standard signal 0 - 10V 0 - 20mA 4 - 20mA	1.1 + 1.2 -	1.4 + 1.5 -	
Logic			
Logic input 1	1.7 1.8	floating contact	
Outputs 1 - 4	Terminal field 2		
Output 4 (relay or analogue output)	2.1 n. o. (make) 2.2 common 2.3 n. c. (break)	changeover contact	
	2.2 + 2.3 -	standard signal	
	Terminal field 4		
Output 1 (relay)	4.1 n. o. (make) 4.2 common	Contact protection circuit: Varistor S14K300 Contact life: 10 ⁶ operations at rated load Rating: 230V 3A (resistive load)	
Output 2 (relay)	4.3 n. o. (make) 4.4 common		
Output 3 (relay)	4.5 n. o. (make) 4.6 common 4.7 n. c. (break)		
Supply	Terminal field 5		
110 - 240V +10/-15% AC 48 - 63 Hz	L1 N PE	line neutral protective earth	
LON interface			
78kBaud DC	1.9 1.10 1.11	twisted, screened cable technical earth	
FFT10A 78kBaud	3.1 3.2 3.3	technical earth twisted, screened cable	

Technical Data

	Resistance thermometer	Thermocouples	Standard signals
Analogue inputs			
Signal input	Pt 100 resistance thermometer in 2- or 3-wire circuit -199 to +850°C	Fe-Con J -199 to +1200°C defined range to EN 60 584: -50 to +750°C (Class 1 and 2)	0 - 10V 0 - 20mA 4 - 20mA
Measurement accuracy	0.05 %	0.25 %	0.05 %
Temperature drift	0.025 % max. per 10°C	0.1 % max. per 10°C	0.1 % max. per 10°C
Class accuracy	0.1 %	0.5 %	0.1 %
Resolution	better than 15bit	better than 15bit	better than 15bit
Signal circuit monitoring			
Probe break	recognised	recognised	is recognised at 4 - 20mA
Probe short-circuit	recognised	not recognised	is recognised at 4 - 20mA

Logic input

for connection to a floating contact for profile program start/stop, inhibit of programming and parameter setting

Outputs	Relay	Analogue output
Number 1, 2 and 3	Relay with contact protection Rating 230V 3A resistive load Contact life: 10 ⁶ operations at rated load	-
Number 4 (can be set via Cd functions)		0 - 20mA 4 - 20mA 0 - 10V 2 - 10V

Limit comparators

Functions	Comparator, window, comparator reversed, window reversed with adjustable limit values (switching edges)
Switching differential	adjustable in 0.1°C steps
Replacement value	Switching state adjustable on overrange/underrange

Controller structures	P	I	PI	PD	PID
Single-setpoint controller	X	X	X	X	X
Double-setpoint controller	X		X	X	X

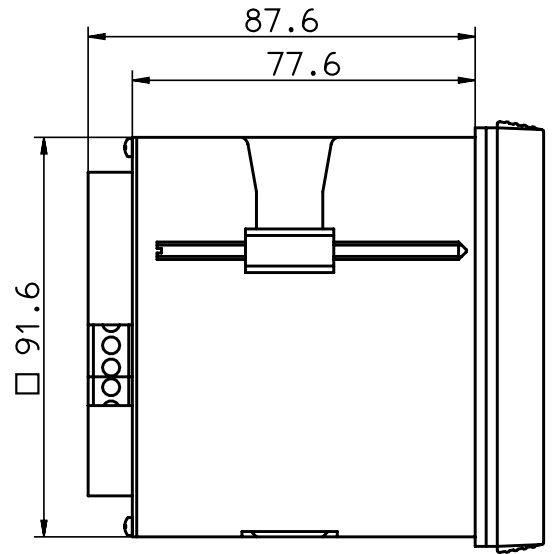
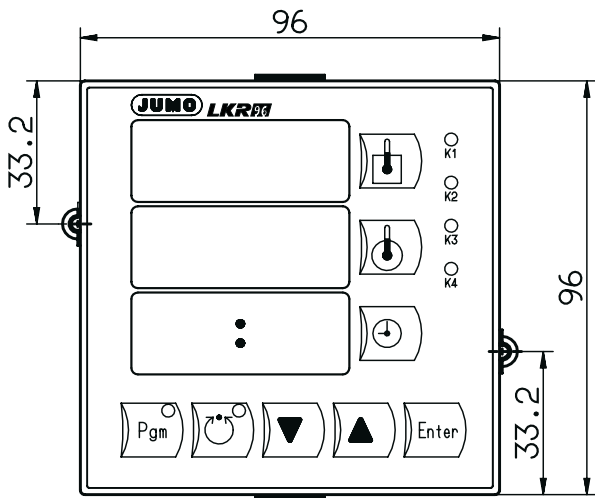
Case

Material	Faradex conductive (ABS)
Flammability class	UL 94 V0 self-extinguishing
Protection at front/rear	IP65/IP20 to DIN 42 115 Part 2
Membrane keypads	splash-proof, can be washed off with unpressurised water up to 70°C, 24 hour resistance at 50°C to mustard, grape juice, milk, as well as to normal disinfectants, e. g. toilet cleansers and detergents

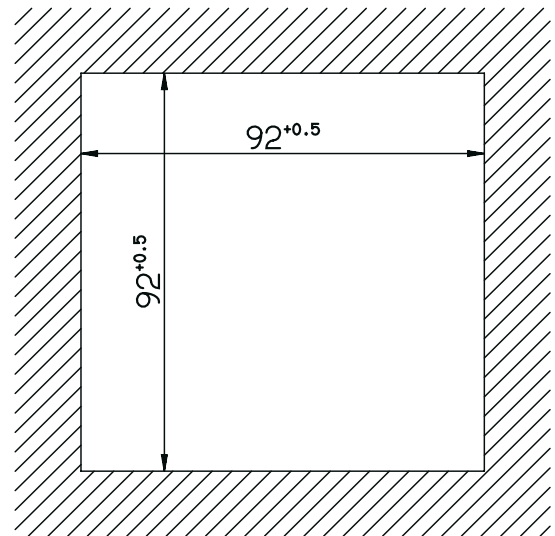
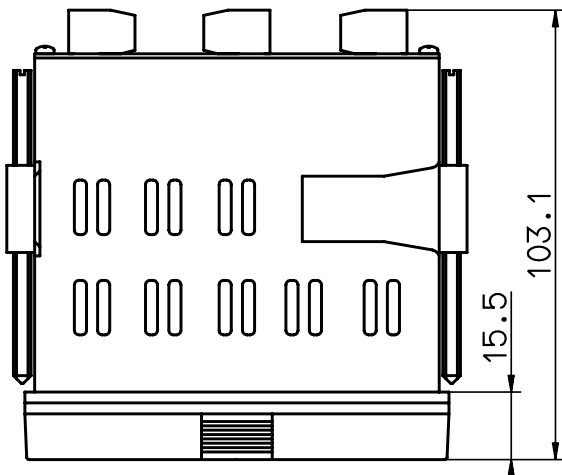
Environmental conditions, characteristic electrical data

Operating and ambient temperature	0 - 50°C with air circulation
Permitted storage temperature	-40 to +70°C
Contamination	Degree 2 to EN 61 010
Overvoltage	Category II to EN 61 010
Relative humidity	not exceeding 80%, no condensation
Supply	110 - 240V +10/-15% AC 48 - 63Hz
Power consumption	10V A max.
Response on power failure	Continue, hold, abort can be configured
Data buffer	Configuration and parameter data are stored in an EEPROM
Weight	460g

Dimensions



panel cut-out to DIN 43 700



JUMO LMD96 and LMD400

Channel indicator and monitoring unit

Brief description

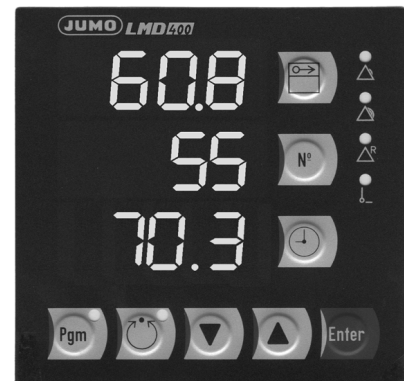
LMD 96 and LMD 400 are compact channel indicators for mTRON analogue input modules. An LMD monitoring system consists of an LMD as display/control unit and mTRON analogue input modules. It is possible to cover up to 400 channels and monitor them against limit values.

The measurements are shown in three red 4-digit, seven-segment displays, 13 mm high. In normal display, the corresponding channel number is indicated next to the measured value of a channel. The 3 or 4 relays and 4 LEDs available in the LMD serve to initiate alarms and signal various system conditions. The cyclic display can be held on any channel. The measurements can then be manually scrolled by operating the up or down keys. The assignment of the analogue input modules to the channel numbers takes place at the installation stage.

The keys and the LED display on the front have IP65 protection to DIN 42 115, are splash proof and resistant to normal household cleaners.

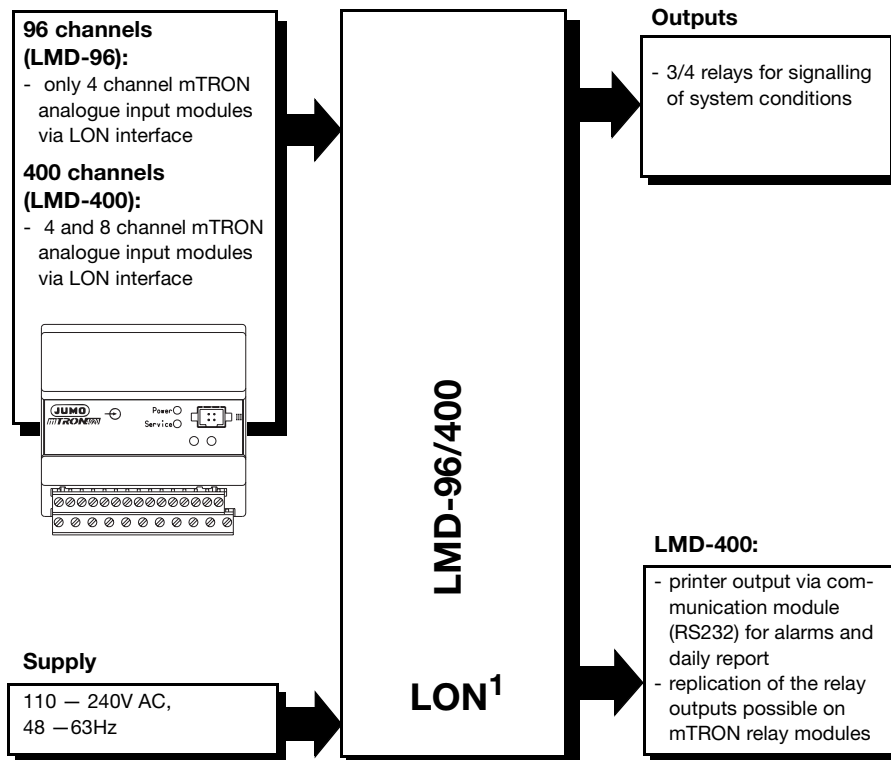


Type 700202/1...



Type 700202/2...

Block structure



1. LON = Local Operating Network.
Registered trademark of the ECHELON Corporation.

Features

- compact dimensions 96 x 96 cm
- simple operation
- integral real-time clock
- digital outputs in the form of relays with up to 2 normally open and 2 change-over contacts
- LON interface
- simple installation
- IP65 front protection

Standard accessories

- 1 Operating Instructions B 70.0202
- 2 mounting elements
- Combicon plug connectors with screw terminals
- 1 rubber seal for flush panel mounting

Ordering details

Basic type (1) (2) (3) (4)
 7002 02 / . - ... - 23

(1) Basic type

Type	Code
LMD 96/400	02

(2) Basic type extensions

Channels	Code
96 channels	1
400 channels	2

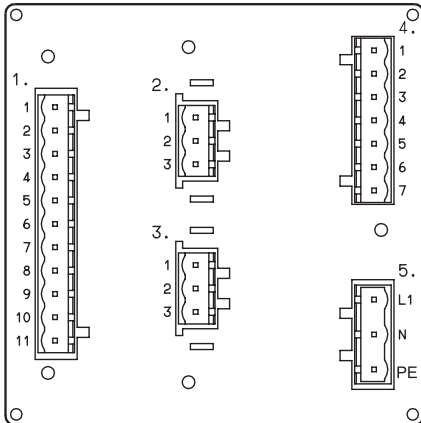
(3) Outputs

Relays	Code
3 relays	03
4 relays	04

(4) Supply

Rear	Code
110 – 240V AC +10/-15%, 48 – 63Hz	23

Rear view



Connection diagram

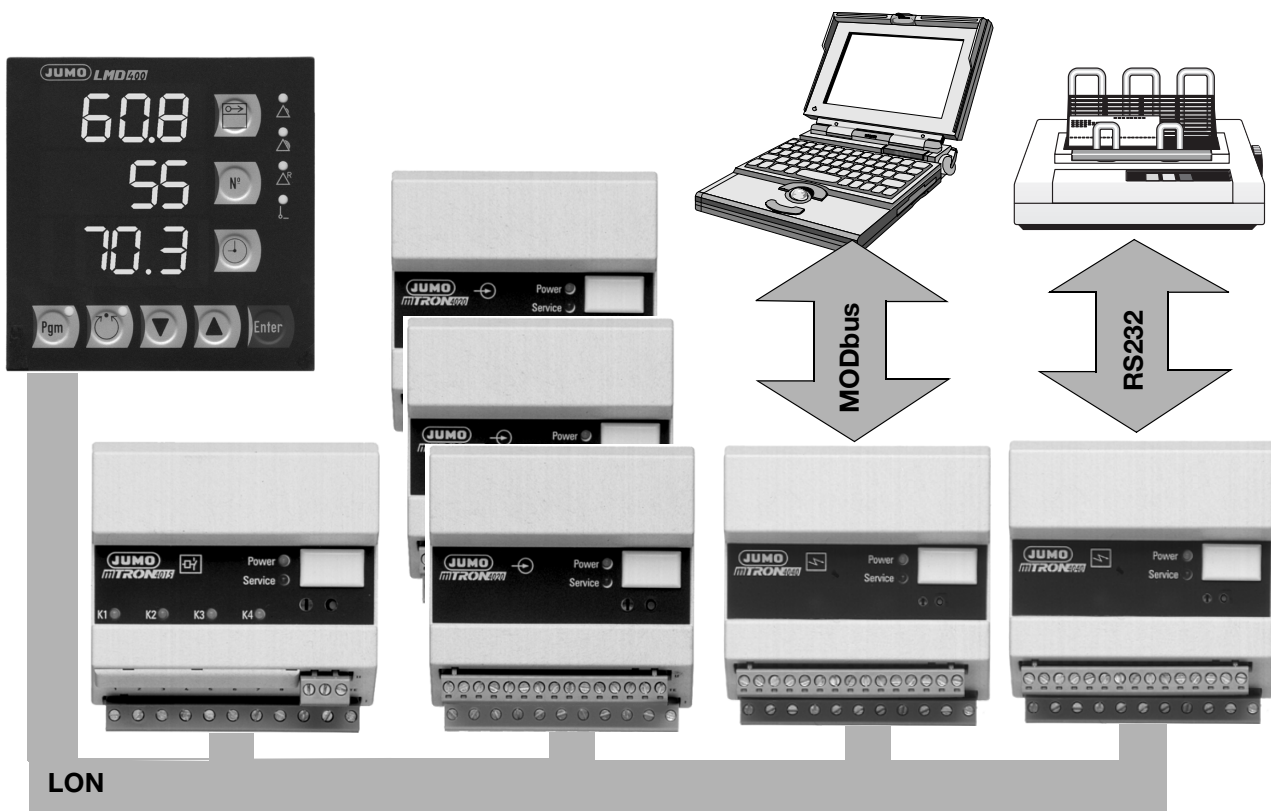
Relay outputs 1 – 4	Terminals, connector 2	Diagram
Output 4	2.1 n.o. (make) 2.2 common 2.3 n.c. (break)	changeover contact
LON interface	Terminals, connector 3	
FTT 10A 78kbaud	3.1 3.2 3.3	technical earth screened twisted pair
	Terminals, connector 4	
Output 1	4.1 n.o. (make) 4.2 common	Contact protection: varistor S14K300
Output 2	4.3 n.o. (make) 4.4 common	Contact life: 10 ⁶ operations at rated load contact rating: 230V 3A (resistive load)
Output 3	4.5 n.o. (make) 4.6 common 4.7 n.c. (break)	
Supply	Terminals, connector 5	
110 – 240V AC, +10/-15%, 48 – 63Hz	L1 N PE	line neutral protective earth

Technical data

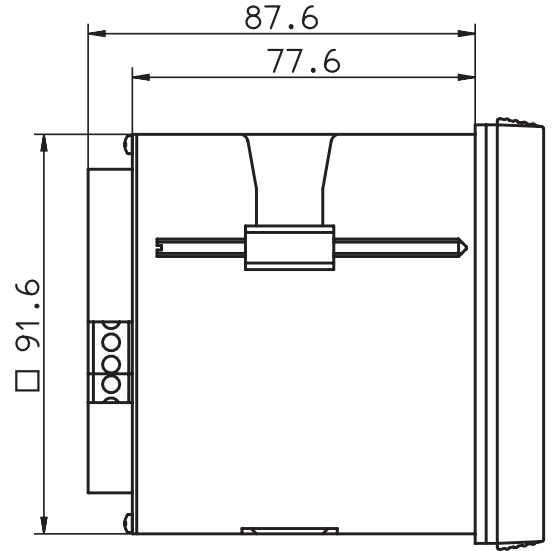
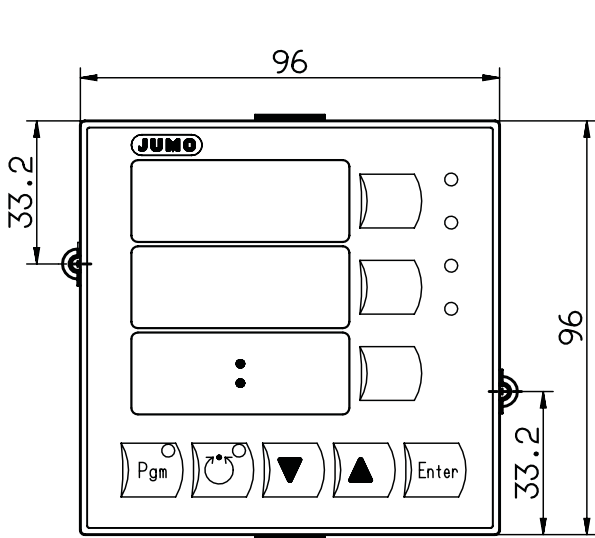
Outputs	relays
Relays 1 — 4	relays with contact protection, contact rating 230V 3A resistive load contact life 10^6 operations at rated load

Housing	
Material	Faradex conductive (ABS)
Flammability class	UL 94 V0 self-extinguishing
Protection front/rear	IP65/ IP20 to DIN 42 115 Part 2
Membrane keypad	splash proof and washable with water up to 70°C without pressure, resistant to normal disinfectants, such as toilet cleaners and detergents

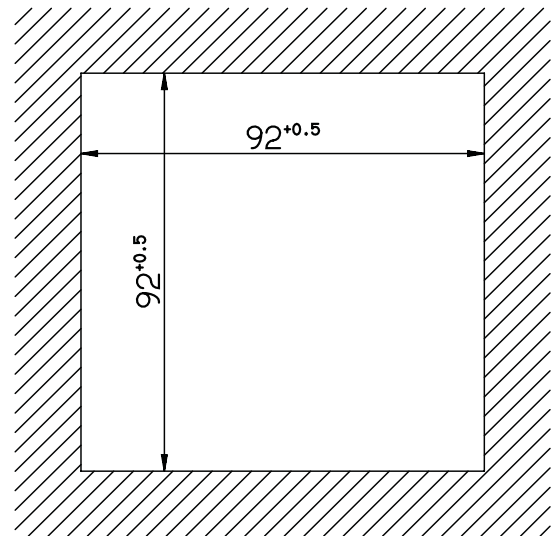
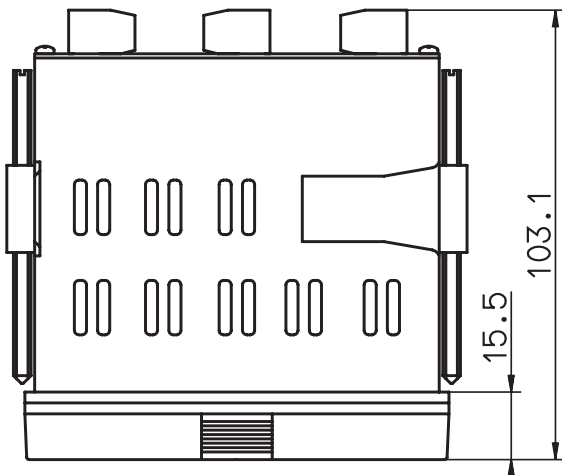
Environmental conditions, electrical data	
Operating and ambient temperature	0 — 50°C with air circulation
Permitted storage temperature	-40 to +70°C
Pollution	Degree 2 to EN 61 010
Overvoltage	Category 2 to EN 61 010
Relative humidity	≤ 80%, no condensation
Supply	110 — 240V AC +10/-15%, 48 — 63Hz
Power consumption	10VA max.
Response after supply failure	continue
Data backup	configuration and parameter data are stored in an EEPROM
Weight	460g



Dimensions



panel cut-out to DIN 43 700



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Internet: www.jumo.us



Electronic thermostats/microstats

	Nr.
JUMO eTRON T Digital thermostat with LC display for mounting on DIN rail	70.1050
JUMO eTRON M Electronic Microstat 76 x 36 mm format	70.1060
JUMO eTRON M100 Electronic Refrigeration Controller 76 x 36 mm format	70.1061



JUMO eTRON T Digital Thermostat

with LC display for mounting on a 35mm DIN rail

Brief description

The JUMO eTRON T is a compact digital thermostat in 90mm x 22.5mm format for simple temperature control (heating or cooling). The measurement input permits the connection of resistance thermometers or thermocouples, or standard current or voltage signals. The measured value is shown on a 3-digit LC display.

The switching status of the relay K1 is indicated by an LED.

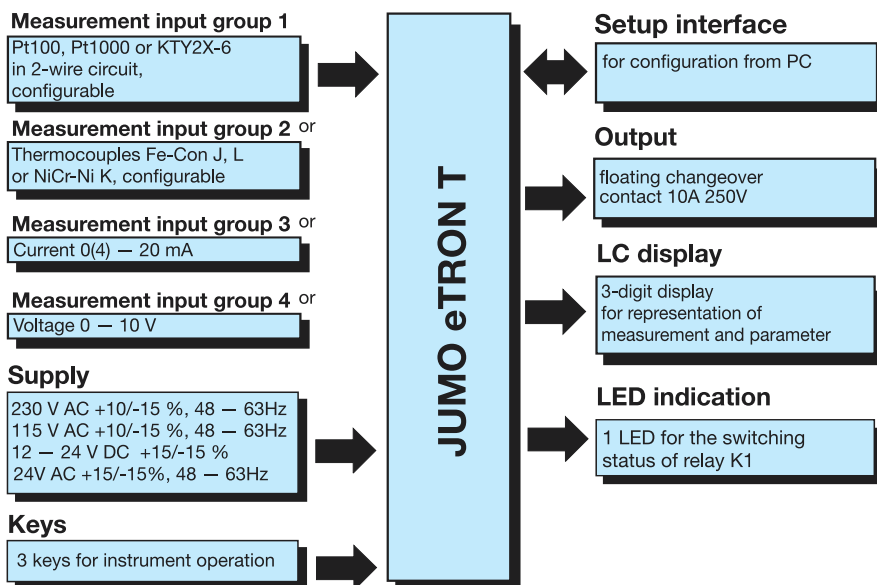
The instrument is operated from 3 keys on the front panel. The electrical connection is made via screw terminals.

A setup program and a PC interface are available as accessories, for easy configuration and parameterization from a PC.



Type 701050/ ...

Block structure



Key features

- Heating or cooling is configurable
- Limit monitoring
- Available for resistance thermometer, thermocouple, standard current or voltage signals, according to choice
- 10A relay (changeover contact)
- Adjustable switching hysteresis
- Simple, space-saving installation
- Time-delayed switch-on after power-on is selectable, e.g. for staggered starting of several equipment units
- 3-digit LC display with special characters for °C and °F
- Parameter level protected by code
- Setup program for configuration and archiving via PC
- Customized linearization via tabular function in the setup program
- UL approval

Displays and controls

LC display	3-digit segment display with symbols for the temperature unit, 6mm high	
Status indication	LED K1 lights up when the output relay is energized.	
Keys	<p>(P) programming</p> <p>(▲) increase setpoint or parameter value (dynamically)</p> <p>(▼) decrease setpoint or parameter value (dynamically)</p>	
Setup interface	The instrument is linked to a PC via a PC interface with TTL/RS232 converter and adapter (3-pin).	

Technical data

Measurement input	Designation	Measuring range	Meas. accuracy ¹ / ambient temperature error	Recognition of ...	
				Probe short-circuit	Probe break
Resistance thermometer	Pt100 EN 60 751	-200 to +600 °C	0.1%/ ≤100ppm/°C	is recognized	is recognized
	Pt1000 EN 60 751	-200 to +600 °C	0.1%/ ≤100ppm/°C	is recognized	is recognized
	KTY2X-6 (PTC)	-50 to +150 °C	1%/ ≤100ppm/°C	is recognized	is recognized
	Resistance 0 – 3000 Ω	customer table ³	0.1%/ ≤100ppm/°C ³	= 0Ω	is recognized
Measuring current for Pt100: 0.2 mA, for Pt1000, KTY2X-6 or resistance: 0.02 mA					
Lead compensation is adjustable via the parameter Lead compensation resistance ΔF_r The total resistance (sensor+lead) must not exceed 320Ω for Pt100 and 3200Ω for Pt1000, KTY2X-6 or resistance.					
Thermocouple	Fe-Con J EN 60 584	-200 to +999 °C	0.4%/ ≤100ppm/°C ²	-	is recognized
	Fe-Con L DIN 43 710	-200 to +900 °C	0.4%/ ≤100ppm/°C ²	-	is recognized
	NiCr-Ni K EN 60 584	-200 to +999 °C	0.4%/ ≤100ppm/°C ²	-	is recognized
	-10 to 60 mV	customer table ³	0.1%/ ≤100ppm/°C ³	-	is recognized
For the voltage input (-10 to 60 mV), terminal temperature compensation can be used for thermocouples. Internal terminal temperature compensation can be switched off via the setup program (0°C).					
Current	0 – 20 mA	-2 to 22 mA scalable with Δ_{cL} and Δ_{cH} or customer table	0.1%/ ≤100ppm/°C ³	-	-
	4 – 20 mA	2.4 to 21.6 mA scalable with Δ_{cL} and Δ_{cH}	0.1%/ ≤100ppm/°C ³	is recognized	is recognized
Input resistance $R_{IN} \leq 3\Omega$					
Voltage	0 – 10 V	-1 to 11 V scalable with Δ_{cL} and Δ_{cH} or customer table	0.1%/ ≤100ppm/°C	-	-
Input resistance $R_{IN} \geq 100k\Omega$					
1.) The accuracies refer to the measuring range span. 2.) valid from -50°C 3.) A valid customer table must be entered via the setup program and switched over to Δ_{Ab} in the instrument. This may reduce the measuring accuracy.					

Additional data

Sampling time	250 msec
Input filter	1st order digital filter; filter constant ΔF adjustable from 0.1 – 99.9sec
Measurement offset	adjustable from -99.9 to +99.9 via the parameter $\Delta F.t$
Special features	display of temperature unit: °C, °F (Fahrenheit) or switched-off
Customer table	The setup program acquires a maximum of 20 value pairs and uses them for the linear interpolation of 20 new calibration points.

Ambient conditions

Ambient temperature range	0 to +55°C, with side-by-side mounting 0 to +40°C
Storage temperature range	-40 to +70°C
Climatic conditions	≤75% rel. humidity annual mean, no condensation
Cleaning and care of front panel	The front panel can be cleaned with all the usual cleaning and rinsing agents. Do not use solvents such as methylated spirit, white spirit, P1 or xylene!

Relay output

Relay (changeover contact)	150,000 operations at 10A 250V AC resistive load
----------------------------	--

Supply

Supply voltage	230V AC +10/-15%, 48 – 63Hz or 115V AC +10/-15%, 48 – 63Hz (isolated from measurement input)
	12 – 24V DC +15/-15%, 24V AC +15/-15%, 48 – 63Hz (not isolated from measurement input)
Power consumption	< 2VA

Housing

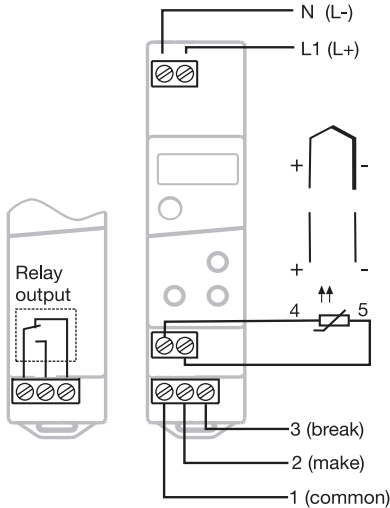
Material	polycarbonate
Mounting	35mm x 7.5mm DIN rail to EN 50 022
Operating position	unrestricted
Weight	approx. 110g
Protection	IP20
Flammability class	UL 94 V0

Electrical data

Data backup	EEPROM
Connection	via screw terminals for wire cross-sections up to 2.5 mm ²
Electromagnetic compatibility interference emission immunity to interference	EN 61 326 Class B to industrial requirements
Electrical safety	to EN 61 010, Part 1, overvoltage category III, pollution degree 2

Connection diagram

Type 701050/XX1-31: Measurement input and supply voltage are not isolated from each other!



Supply
230V AC +10/-15%
115V AC +10/-15%
12 – 24V DC +15/-15% /
24V AC +15/-15%, 48 – 63Hz

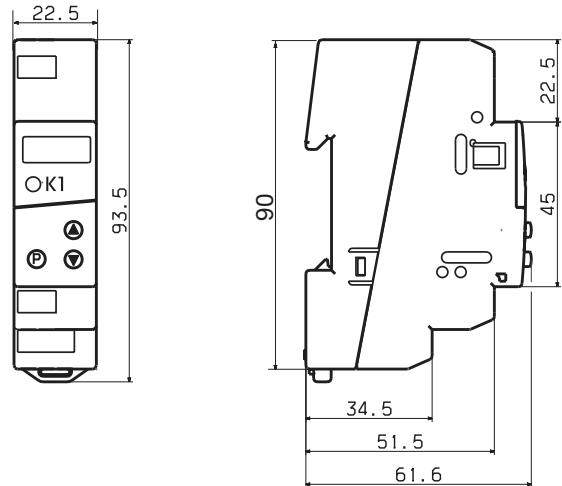
Measurement input
Thermocouples:
Fe-Con J, L and NiCr-Ni K

Standard signals:
current 0(4) – 20 mA
voltage 0 – 10 V

Resistance thermometers:
Pt100/ Pt1000/ KTY2X-6

Relay output
changeover contact (floating)
10A/250V AC

Dimensions



Order details

- 701050/
- (1) Basic version**
JUMO eTRON T
 - (2) Basic type extension Version**
 - 8 factory-set, configurable within the measurement input group
 - 9 configured to customer specifications
 - Measurement input group¹**
 - 1 Pt100 in 2-wire circuit
 - Pt1000 in 2-wire circuit
 - 2 KTY2X-6
 - Fe-Con J
 - Fe-Con L
 - NiCr-Ni K
 - 3 0 – 20 mA
 - 4 – 20 mA
 - 4 0 – 10 V
 - Number of relays**
 - 1 1 changeover contact 10A 250V
 - (3) Supply**
 - 02 230V AC +10/-15% 48 – 63Hz
 - 05 115V AC +10/-15% 48 – 63Hz
 - 31 12 – 24V DC +15/-15% /
24V AC +15/-15%, 48 – 63Hz
 - (4) Approvals**
 - 000 none
 - 061 Underwriters Laboratories Inc. (UL)

Order code (1) / (2) - (3) - (4)
Order example 701050 / 811 - 02 - 000

factory-set
1.) It is not possible to switch from one meas. input group to another.

Accessories

Setup program, multilingual
PC interface with TTL / RS232C converter and adapter (pins)

Suitable transducers can be found in these data sheets:

- 90.2005 Push-in resistance thermometers
- 90.2105 Screw-in resistance thermometers
- 90.1002 and subsequent ones for screw-in thermocouples
- 90.1101 and subsequent ones for push-in thermocouples
- 90.1221 Mineral-insulated thermocouples

Einsteck-Widerstandsthermometer mit Anschlussleitung

Technische Daten

Anschein: Leitzugende über abgedeckt mit Adernstrahlen, mit Steckkabel oder mehrpolige Steckverbindungskabel

Anscheinleistung: Pt100: Umgebungstemperatur $\pm 0,1^{\circ}\text{C}$ ($\pm 0,1^{\circ}\text{C}$)
Pt1000: Umgebungstemperatur $\pm 0,1^{\circ}\text{C}$ ($\pm 0,1^{\circ}\text{C}$)
KTY2X-6: Umgebungstemperatur $\pm 0,1^{\circ}\text{C}$ ($\pm 0,1^{\circ}\text{C}$)
Messbereich: Umgebungstemperatur -20°C bis $+100^{\circ}\text{C}$
Anschlussspannung: 0 – 10V
Messung: 0 bis 10V
Pt 100: Temperaturbereich: DIN EN 60751, K1 B, Zweidrahtschaltung
Pt 1000: Temperaturbereich: DIN EN 60751, K1 B, Zweidrahtschaltung
KTY2X-6: Temperaturbereich: DIN EN 60751, K1 B, Zweidrahtschaltung
Schutzklasse siehe Typenschild 90.1050 und 90.2005



JUMO eTRON M Electronic Microstat

76 x 36 mm format

Brief description

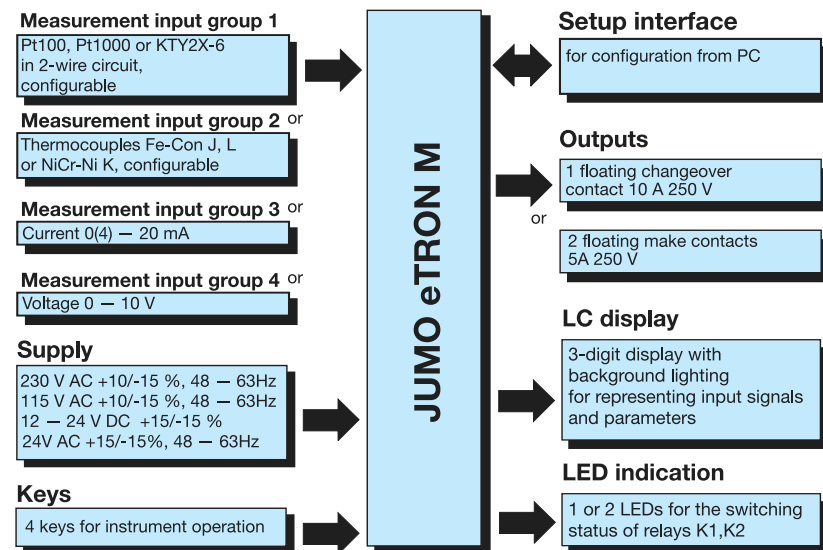
The JUMO eTRON M is a compact, digital electronic thermostat for simple temperature control (heating or cooling). The measurement input permits the connection of resistance thermometers or thermocouples, or standard current or voltage signals. The measured value is shown on a 3-digit backlit display. The switching states of relays K1 and K2 are indicated by two LEDs.

The instrument incorporates a simple defrosting function as well as an operating hours counter, which can, for instance, be used to record the operating time of a cooling compressor.

The instrument can be operated from 4 keys on the front panel. The electrical connection is made via screw terminals on the back of the instrument.

A setup program and a PC interface are available as accessories, for simple configuration and parameterization from a PC.

Block structure



Displays and controls

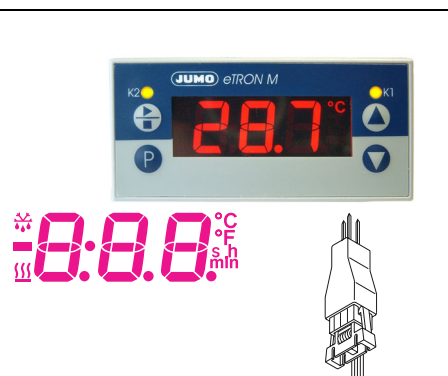
LC display	3-digit segment display, 13 mm high, and symbols for temperature unit, h, min, s, defrosting and heating, with red background lighting
Status indication	LED K1/K2 lights up when relay K1/K2 is energized. LED K1/K2 goes out when relay K1/K2 is de-energized.
Keys	<ul style="list-style-type: none"> for start-stop programming increase parameter value decrease parameter value
Setup interface	The instrument is linked to the PC via a PC interface with TTL/RS232 converter and adapter (3-pin).



Type 701060/XX2...

Key features

- Integrated defrosting function
- Heating or cooling is configurable
- Limit monitoring
- Available for resistance thermometer, thermocouple, standard current or voltage signals, according to choice
- Choice of a 10A relay or two 5 A relays
- Adjustable switching hysteresis
- Time-delayed switch-on after power-on is selectable, e. g. for staggered starting of several equipment units
- Operating hours counter
- Symbols for operating modes, °C, °F, hours, minutes and seconds in display
- Parameter level protected by code
- Setup program for configuration and archiving via PC
- Customized linearization via tabular function in the setup program
- UL approval



Technical data

Measurement input	Designation	Measuring range	Meas. accuracy ¹ / ambient temperature error	Recognition of ...	
				Probe short-circuit	Probe break
Resistance thermometer	Pt100 EN 60 751	-200 to +600 °C	0.1% / ≤100ppm/°C	is recognized	is recognized
	Pt1000 EN 60 751	-200 to +600 °C	0.1% / ≤100ppm/°C	is recognized	is recognized
	KTY2X-6 (PTC)	-50 to +150 °C	1% / ≤100ppm/°C	is recognized	is recognized
	Resistance 0 – 3000 Ω	customer table ³	0.1% / ≤100ppm/°C ³	= 0Ω	is recognized
Measuring current for Pt100: 0.2 mA, for Pt1000, KTY2X-6 and resistance: 0.02 mA					
Lead compensation is adjustable via the parameter Lead compensation resistance ΔF_r The total resistance (sensor+lead) must not exceed 320Ω for Pt100 and 3200Ω for Pt1000, KTY2X-6 or resistance.					
Thermocouple	Fe-Con J EN 60 584	-200 to +999 °C	0.4% / ≤100ppm/°C ²	-	is recognized
	Fe-Con L DIN 43 710	-200 to +900 °C	0.4% / ≤100ppm/°C ²	-	is recognized
	NiCr-Ni K EN 60 584	-200 to +999 °C	0.4% / ≤100ppm/°C ²	-	is recognized
	-10 to 60 mV	customer table ³	0.1% / ≤100ppm/°C ³	-	is recognized
For the voltage input (-10 to 60 mV), terminal temperature compensation can be used for thermocouples. Internal terminal temperature compensation can be switched off via the setup program (0°C).					
Current	0 – 20 mA	-2 to 22 mA scalable with S_{cL} and S_{cH} or customer table	0.1% / ≤100ppm/°C ³	-	-
	4 – 20 mA	2.4 to 21.6 mA scalable with S_{cL} and S_{cH}	0.1% / ≤100ppm/°C ³	is recognized	is recognized
Input resistance $R_{IN} \leq 3\Omega$					
Voltage	0 – 10 V	-1 to 11 V scalable with S_{cL} and S_{cH} or customer table	0.1% / ≤100ppm/°C	-	-
Input resistance $R_{IN} \geq 100k\Omega$					
1.) The accuracies refer to the measuring range span. 2.) valid from -50°C 3.) A valid customer table must be entered via the setup program and changed over to t_{RB} in the instrument. This may reduce the measuring accuracy.					

Additional data

Sampling time	250 msec
Input filter	1st order digital filter; filter constant ΔF adjustable from 0.1 – 99.9sec
Measurement offset	adjustable from -99.9 to +99.9 via the parameter ΔF_t
Special features	display of temperature unit: °C, °F (Fahrenheit) or switched-off
Customer table	The setup program acquires a maximum of 20 value pairs and uses them for the linear interpolation of 20 new calibration points.

Ambient conditions

Ambient temperature range	0 to +50 °C, with side-by-side mounting: 0 to +40 °C
Storage temperature range	-40 to +70 °C
Climatic conditions	≤ 75% rel. humidity, no condensation
Cleaning and care of front panel	The front panel can be cleaned with all the usual cleaning and rinsing agents. Do not use solvents such as methylated spirit, white spirit, P1 or xylene!

Output

1 relay (changeover contact) for Type 701060/XX1-XX	150,000 operations at 10A 250V AC 50Hz resistive load
2 relays (make contacts) for Type 701060/XX2-XX	100,000 operations at 5A 250V AC, 50Hz resistive load

Supply

Supply voltage	230V AC +10/-15%, 48 – 63Hz or 115V AC +10/-15%, 48 – 63Hz (isolated from measurement input) 12 – 24V DC +15/-15%, 24V AC +15/-15%, 48 – 63Hz (not isolated from measurement input)
Power consumption	<3VA

Housing

Material	polycarbonate
Mounting	in panel cut-out with bezel seal
Operating position	unrestricted
Weight	approx. 160g
Protection	front IP65, rear IP20
Flammability class	UL 94 V0

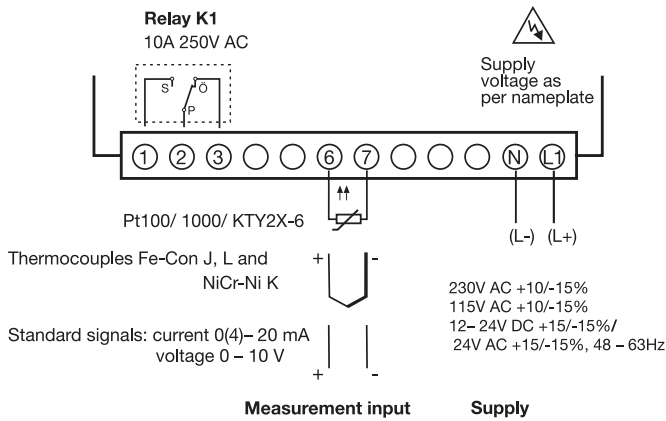
Electrical data

Data backup	EEPROM
Connection	via screw terminals for wire cross-section up to 4 mm ² solid wire and 2.5 mm ² stranded wire
Electromagnetic compatibility interference emission immunity to interference	product family standard: EN 61 326 Class B to industrial requirements
Operating conditions	The instrument is designed as a panel-mounting unit.
Electrical safety	to EN 61 010, Part 1 overvoltage category III, pollution degree 2

Connection diagram

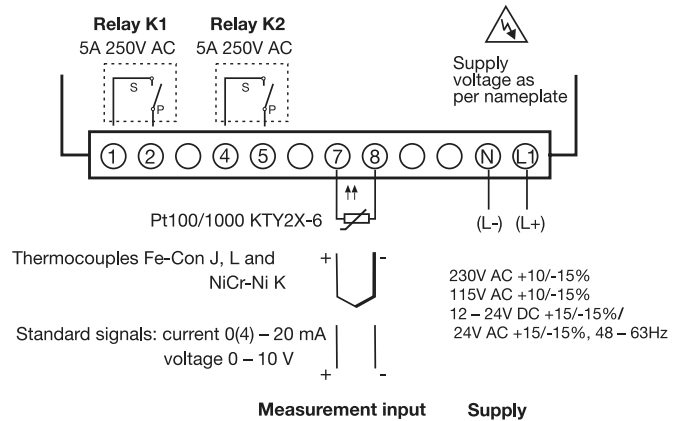
Type 701060/XX1-31: Measurement input and supply voltage are not isolated from each other!

Type 701060/XX1-XX



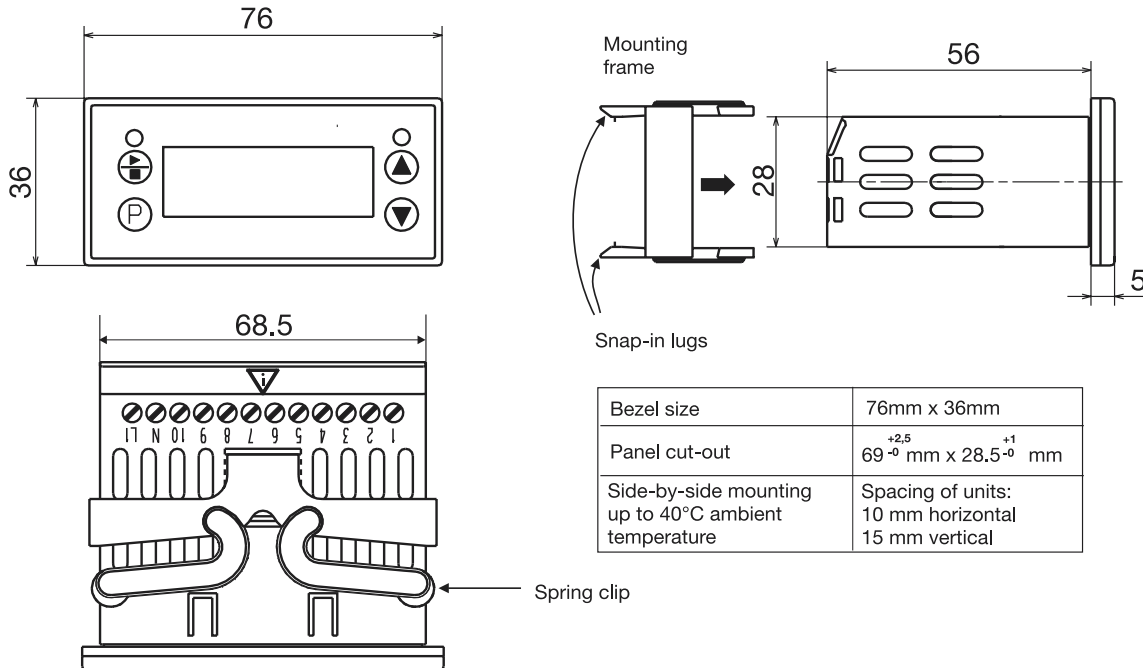
Type 701060/XX2-31: Measurement input and supply voltage are not isolated from each other!

Type 701060/XX2-XX



Dimensions

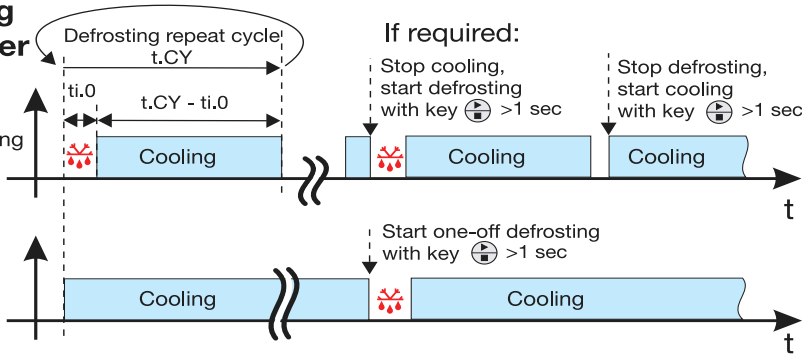
Type 701060/XX2-XX



Timing functions

Cooling controller

Cyclic cooling with defrosting
 $t_{i,0} \geq 1$
 $t_{CY} \geq 1$



Special case:

t_{CY} can only be set to 00.00 if $t_{i,0}$ has previously been set to 00.00. Afterwards, the defrosting duration is again set to the desired value.

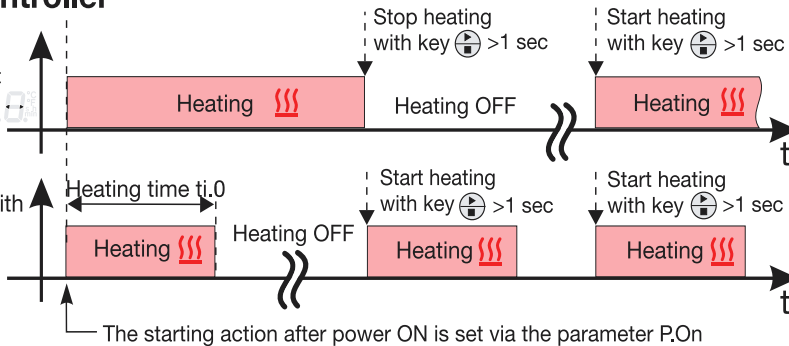
Keep to this sequence !

- * First set $t_{i,0}$ to 00.00
- * Then set t_{CY} to 00.00
- * Now set defrosting duration $t_{i,0}$ again

Heating controller

Heating, no time limit
 $t_{i,0} = 00.00$

Heating, with time limit
 $t_{i,0} \geq 1$



The starting action after power ON is set via the parameter P.On

Order details

701060/

- (1) Basic version
- JUMO eTRON M
- (2) Basic type extension
- Version
- 8 factory-set, configurable within the measurement input group
- 9 configured to customer specification
- Measurement input group¹
- 1 Pt100 in 2-wire circuit
- Pt1000 in 2-wire circuit
- 2 KTY2X-6
- Fe-Con J
- Fe-Con L
- NiCr-Ni K
- 3 0 – 20 mA
- 4 – 20 mA
- 4 0 – 10 V
- Number of relays
- 1 1 changeover contact 10A 250V
- 2 2 make contacts 5A 250V
- (3) Supply
- 02 230V AC +10/-15% 48 – 63Hz
- 05 115V AC +10/-15% 48 – 63Hz
- 31 12 – 24V DC +15/-15% / 24V AC +15/-15%, 48 – 63Hz
- (4) Approvals
- 000 none
- 061 Underwriters Laboratories Inc. (UL)

Order code

Order example

(1) / (2) - (3) - (4)
 701060 / 811 - 02 - 061

factory-set

1.) It is not possible to switch from one meas. input group to another

Suitable transducers can be found in these data sheets:

- 90.2005 Push-in resistance thermometers
- 90.2105 Screw-in resistance thermometers
- 90.1002 and subsequent ones for screw-in thermocouples
- 90.1101 and subsequent ones for push-in thermocouples
- 90.1221 Mineral-insulated thermocouples

Accessories

- Setup program, multilingual
- PC interface with TTL / RS232C converter and adapter (pins)

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 e-mail: mail@jumo.net
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 e-mail: sales@jumo.co.uk
 Internet: www.jumo.co.uk

JUMO Process Control, Inc.
 8 Technology Boulevard
 Canastota, NY 13031, USA
 Phone: 315-697-JUMO
 1-800-554-JUMO
 Fax: 315-697-5867
 e-mail: info@jumo.us
 Internet: www.jumo.us



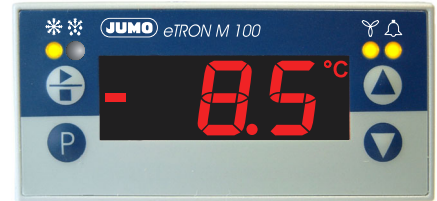
JUMO eTRON M100 Electronic Refrigeration Controller

76mm x 36mm format

Brief description

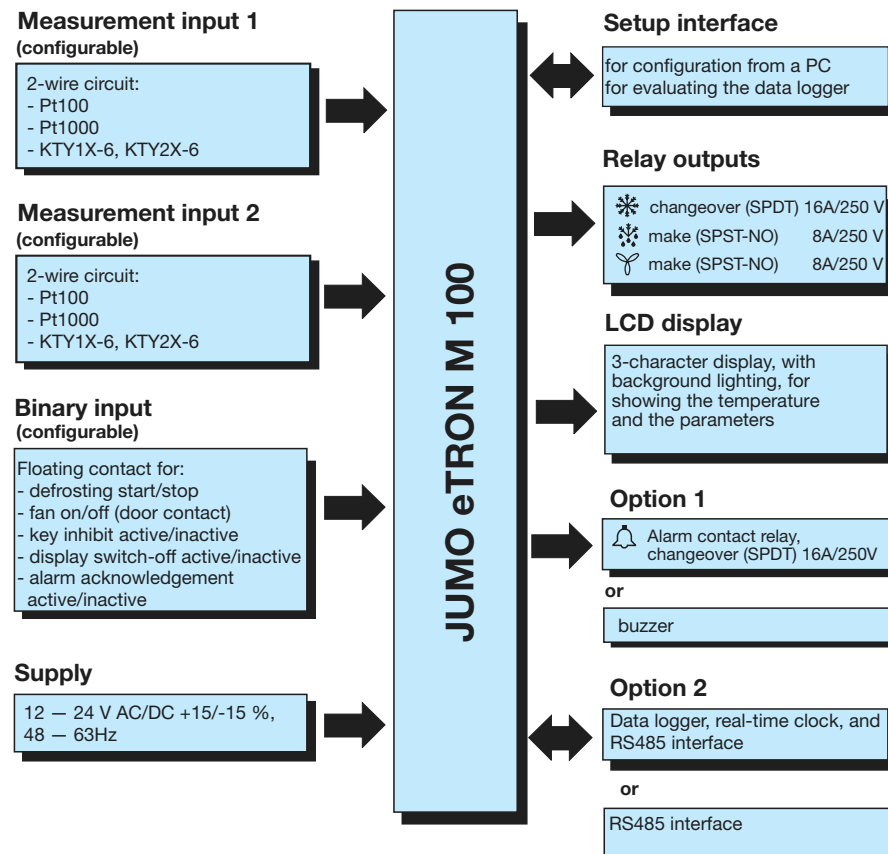
The JUMO eTRON M100 is an electronic refrigeration controller for application in cold stores, freezer cabinets or cold displays, for connection to RTD probes Pt100, Pt1000, KTY1X-6 or KTY2X-6.

The first measurement input is used to acquire the temperature of the cold store. The second measurement input acquires the evaporator temperature, and ends the defrosting process as soon as the limit for defrosting has been reached. The measurements and parameters are shown in a 3-character backlit display. Three relays are available for the cooling unit, the defrosting heating, and the fan. Alarms can optionally be generated via a relay or by means of the integrated buzzer. The switching states of the relays are indicated via yellow LEDs. Further options include a data logger with an adjustable recording interval for HACCP-compliant documentation¹, an RS485 interface, and a real-time clock. The electrical connection is made via screw terminals. Four keys serve for instrument operation and parameterization. A setup program and a PC interface are available as accessories, for easy parameterization from the PC, and for evaluating the data logger.



Type 701061/...

Block diagram








Key features

- Choice of “electrical” or “hot gas” defrosting process
- 16A relay for cooling unit and 8A relay for defrosting and fan functions
- 2 analog inputs for RTDs, KTY1X-6 or KTY2X-6 in 2-wire circuit
- Customized linearization is programmable through the setup program
- Operating hours counter with integrated service counter
- Alarm generation via relay or buzzer
- Available with real-time clock, data logger, and RS485 interface
- The data logger records the measurement inputs and switching states of all relays. This makes it possible to implement HACCP monitoring of the cold chain.
- Up to 8 parameters can be enabled individually for the operating level
- The parameter level is protected by a code, thus preventing any unauthorized access to the instrument data.
- Meets the requirements as per EN 12830 and EN 13485
- Setup program for instrument configuration and evaluation of the data logger

¹ HACCP : Hazard Analysis and Critical Control Point

Displays and controls

LCD display	3-character nine-segment display, 13 mm high, and symbols for the temperature unit, hr, min and sec, with red background lighting	
LED below the symbols	<p>The LEDs</p> <p>Cooling</p> <p>Defrosting</p> <p>Fan and Alarm come on when the corresponding relay is energized.</p> <p>The LEDs go out when the corresponding relay is de-energized.</p>	
Keys	<p> for Start/Stop of manual defrosting, acknowledge alarms</p> <p> Programming</p> <p> Increase parameter value</p> <p> Decrease parameter value</p>	
Setup interface	A PC interface and an adapter (4-pole socket) are used to connect the instrument to a PC.	



Technical data

Analog inputs

Analog input 1 and 2	Designation	Measuring range	Tolerance in % of measuring range span, temperature effect	Detection of ...	
				probe short-circuit	probe break
RTDs	Pt100 EN 60751	-200 to +600 °C	0.05% (±0.4°C), 100ppm/°C	yes	yes
	Pt1000 EN 60751	-200 to +600 °C	0.05% (±0.4°C), 100ppm/°C	yes	yes
PTC	KTY1X-6	-50 to +100 °C	0.5% (±0.75°C), 100ppm/°C	yes	yes
	KTY2X-6	-50 to +150 °C	0.5% (±1°C), < 100ppm/°C	yes	yes
	resistance 10 – 3500 Ω	customer table ¹	0.075% (±2.6Ω), 100ppm/°C	yes	yes

Measuring current for Pt100: 2 mA, for Pt1000, KTY2X-6, KTY1X-6 and resistor: 0.2 mA

Lead compensation is adjustable via the parameter Lead compensation resistance *or.1* and *or.2*.

The total resistance at the analog input (probe resistance + selected value for *or.1* or *or.2*) must not exceed the following values: 314Ω (with Pt100), 3140Ω (with Pt1000), 2235 Ω (with KTY2x-6), and 3400Ω (with KTY1x-6).

Input resistance	$R_{IN} \geq 100k\Omega$
Sampling time	250msec
Input filter	1st order digital filter; filter constant adjustable from 0.1 to 99.9sec
Measuring current	with Pt100: 0.2mA, with Pt1000, KTY2X-6, KTY1X-6 and resistor: 0.02mA
Lead compensation	adjustable via the parameters Lead compensation resistance <i>or.1</i> and <i>or.2</i>
Temperature offset	adjustable via the parameters <i>ot.1</i> and <i>ot.2</i>
Special features	temperature indication switchable to °F (Fahrenheit)

¹ A valid customer table must be entered through the setup program and switched over to *tAb* in the instrument.

Environmental influences

Ambient temperature range	0 to 55 °C
Storage temperature range	-40 to +70 °C
Climatic conditions	≤ 85 % rel. humidity, no condensation
Care of the front panel	The front panel can be cleaned with normal commercial washing, rinsing and cleaning agents. Do not use any solvents such as methylated spirits, white spirit, P1 or xylol !

Output

Relay for cooling, changeover (SPDT) Relay for alarm, changeover (SPDT)	70 000 operations at 16A, 250V AC, 50Hz resistive load
Relay for defrosting, make (SPST-NO) Relay for fan, make (SPST-NO)	100 000 operations at 8A, 250V AC, 50Hz resistive load

RS485 interface

Maximum baud rate	38.4 kbaud
Maximum transmission length	< 1200m
Maximum number of stations	32
Priority	The RS485 must not be used while the setup interface is in operation !

Supply voltage

Supply voltage	12 – 24V AC/DC +15/-15%, 48 – 63Hz (for operation with SELV circuits only !) (not electrically isolated from the analog inputs)
Power consumption	< 3W

Housing

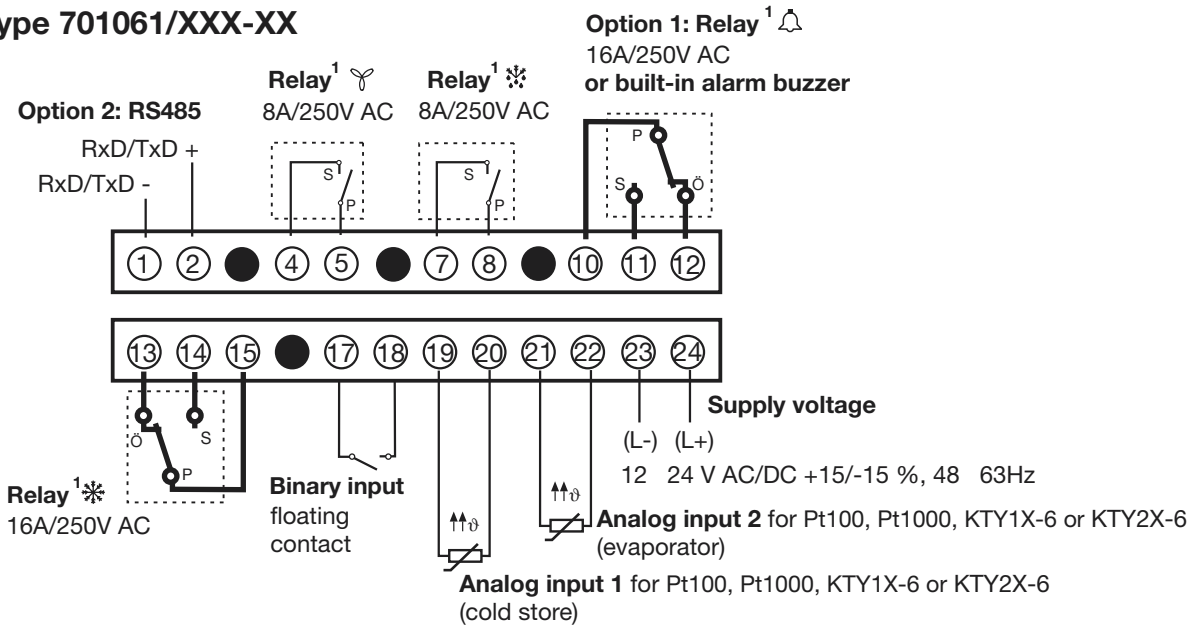
Material	polycarbonate, silver gray RAL 7001
Mounting	in panel cut-out, with bezel seal
Operating position	unrestricted
Weight	approx. 160g
Enclosure protection to EN 60 529, IEC 529	IP65 front, IP20 rear
Flammability class	UL 94 V0

Electrical data

Data backup	The data sets of the data logger are saved to a flash memory. The adjustable parameters are stored in EEPROM. Data are preserved after a power interruption.
Connection circuit	screw terminals for wire cross-sections up to 4 mm ² , solid wire, up to 2.5 mm ² , stranded wire
Electromagnetic compatibility interference emission interference immunity	Product family standard: EN 61326 Class B to industrial requirements
Operating conditions	The instrument is designed as a panel-mounting unit.
Electrical safety	EN 60 730, Part 1, overvoltage category III, pollution degree 2
Accuracy of the real-time clock, buffering	at 25°C: +15/- 15 sec per month, temperature effect: - 0.35 ppm/10°C within the ambient temperature range: +60/- 60 sec per month Gold Cap capacitor buffers the clock time unpowered for about 20 days.
Technical and functional characteristics of temperature recording devices or thermometers	as per EN 12830 and EN 13485

Connection diagram

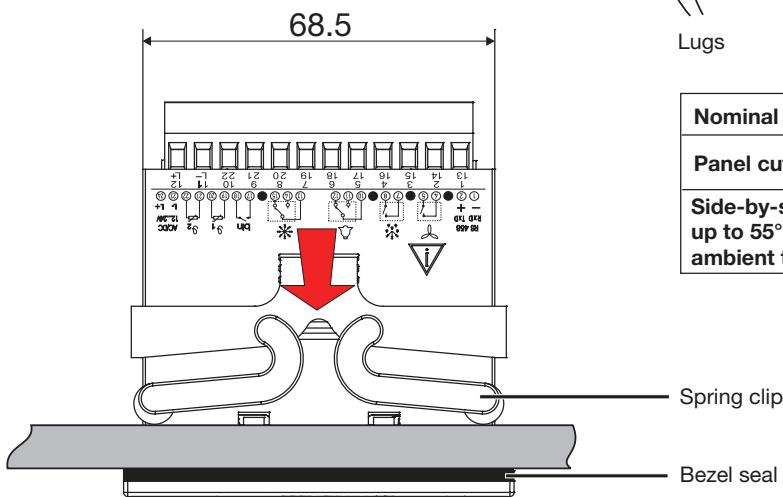
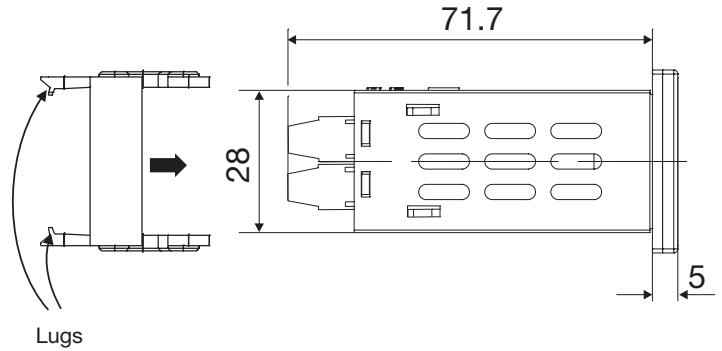
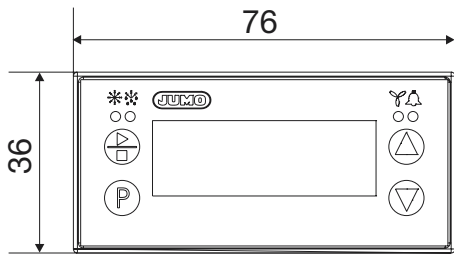
Type 701061/XXX-XX



1. The switching positions of the instrument relays shown here (dotted line) represent the relay de-energized condition.

Dimensions

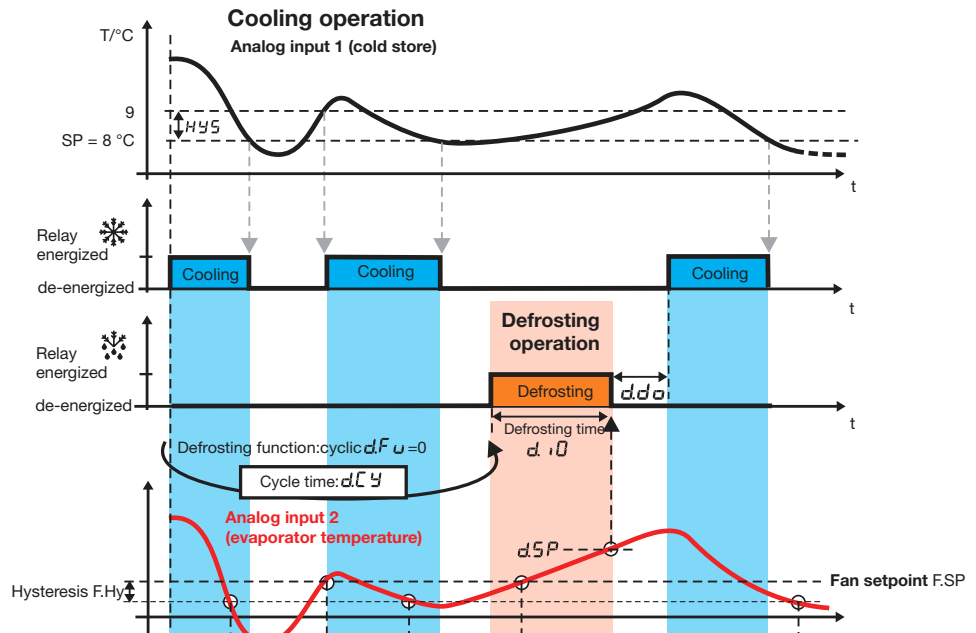
Type 701061/...



Nominal size	76mm x 36mm
Panel cut-out	69 ^{+2.5} ₋₀ mm x 28.5 ⁺¹ ₋₀ mm
Side-by-side mounting, up to 55°C ambient temperature:	spacing of instruments: 10 mm horizontal 15 mm vertical

Controller functions

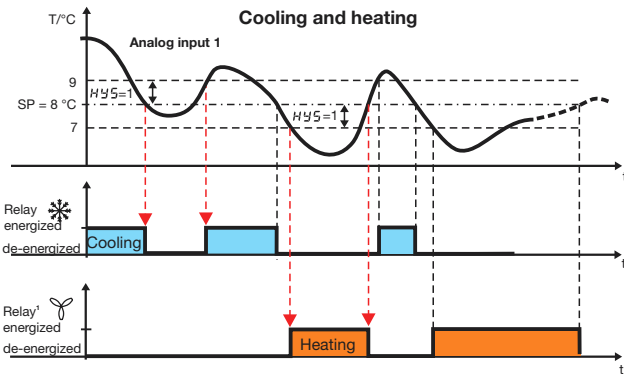
Cooling, defrosting and fan functions



Fan function <i>F.FU</i>	Run-up/ run-down behavior: <i>F.RU</i>	Relay energized/de-energized
0	off	Relay energized/de-energized
0	on	energized/de-energized
1	off	energized/de-energized
1	on	energized/de-energized
2	off	energized/de-energized
2	on	energized/de-energized

F.dL is neglected in this operating mode

Special function: cooling and heating with fan relay

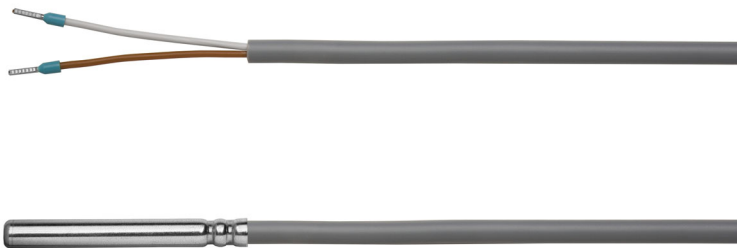


Order details

		(1) Basic version
	701061	JUMO eTRON M100 with 2 measurement inputs and 3 relay outputs
		(2) Basic type extensions
x	8	factory-set, configurable
x	9	configuration to customer specification
		Option 1
x	0	not available
x	1	buzzer
x	2	alarm contact, changeover (SPDT) contact 16A/250V
		Option 2
x	0	not available
x	1	RS485 interface
x	2	data logger, real-time clock, and RS485 interface
		(3) Supply voltage
x	32	12 – 24V AC/DC +15/-15 %, 48 – 63Hz
		(4) Extra codes
x	000	no Pt100 push-in probe
x	236	2 Pt100 push-in probes (diameter: 6mm, fitting length: 50mm, connecting cable: 1500mm)

	(1)		(2)		(3)		(4)
Order code	<input type="text"/>	/	<input type="text"/>	-	<input type="text"/>	/	<input type="text"/>
Order example	701061	/	8 0 0	-	32	/	000

2 Pt100 push-in probes (extra code 236)



Standard accessories

- 1 Operating Manual
- 1 spring clip and bezel seal

Accessories - Price Sheet 70.9770

- Setup program, multilingual
- PC interface with USB/TTL converter, adapter (socket) and adapter (plug)
- PC interface TTL / RS232 converter and adapter (socket)
- Adapter frame for mounting on DIN rail

Sales No.

- 70/00485306
- 70/00456352
- 70/00350260
- 70/00483019



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Fax: +44 1279 635262
e-mail: sales@jumo.co.uk
Internet: www.jumo.co.uk

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1-800-554-JUMO
Fax: 315-697-5867
e-mail: info@jumo.us
Internet: www.jumo.us



Temperature monitors/limiters

	Nr.
Electronic temperature monitor/limiter and safety temperature monitor/limiter to DIN 3440	70.1130
JUMO TB/TW Temperature limiter, temperature monitor with LC display for mounting on 35mm DIN rails, approvals to DIN 3440	70.1140

JUMO GmbH & Co. KG
 Delivery address: Mackenrodtstraße 14,
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Electronic Temperature Monitor/ Limiter and Safety Temperature Monitor/Limiter to DIN 3440

Brief description

The areas of application for (safety) temperature limiters or monitors ((S)TB or (S)TW) are to be found wherever thermal processes need to be monitored, and where the system must be set to a safe condition in the event of a fault. If the permitted temperature limit is reached or a fault occurs within the permitted temperature range (probe/cable break, short-circuit, component defect, power failure), then the instrument switches off without any delay. If the fault is no longer present, then limiters TB and STB must be reset manually. This can be done by means of a reset pushbutton on the instrument, or by an external pushbutton. The flow of energy is only enabled again when the temperature is lower (O-function) or higher (S-function) than the preset temperature limit by the amount of the switching differential. In the event of a short-term supply failure (not exceeding 1min) in the satisfactory range of the system, the instrument will be automatically enabled after the power has been restored. The size of the switching differential is 3°C, 10°C, 30°C or 100°C.

The analog setpoint knob for the limit temperature is mounted on the front panel. An unintentional or unauthorized adjustment of the limit setting is prevented by a clear cover which can be lead-sealed. The instruments are intended for use as built-in units for fixing onto standard rails to EN 50022-35. The screw terminals for the electrical connections (for a conductor cross-section of max. 2.5mm²) are on one wiring level.

The instruments function over defined temperature ranges between 0 and 1800 °C (with extra code "SIL" and "DIN": 0 to 1400 °C).

Temperature monitor TW*

Temperature monitors are devices which, after cutting out, are automatically reset when the probe temperature has fallen below the preset limit temperature by the amount of the switching differential.

Safety temperature monitor STW*

Safety temperature monitors are temperature monitors which, in addition, meet the requirements for enhanced safety according to DIN 3440.

Temperature limiter TB*

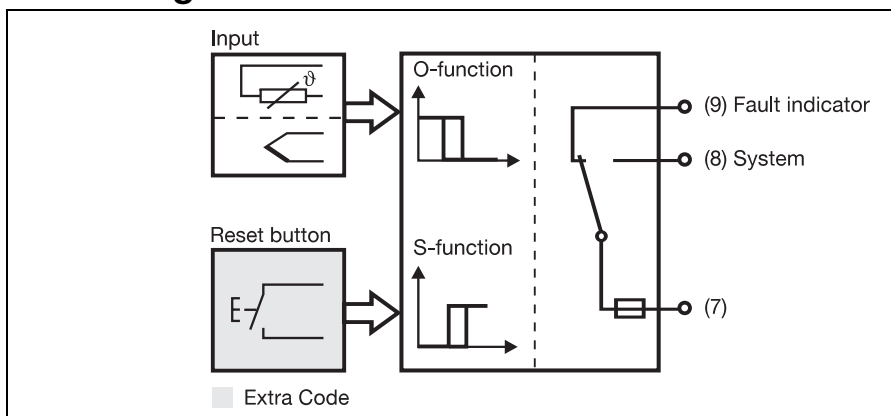
Temperature limiters are devices which are locked out after cutting out. They can be reset, either manually or by means of a tool, when the probe temperature has fallen below the limit temperature by the amount of the switching differential.

Safety temperature limiter STB*

Safety temperature limiters are temperature limiters which, in addition, meet the requirements for enhanced safety according to DIN 3440.

* Extract from DIN 3440

Block diagram

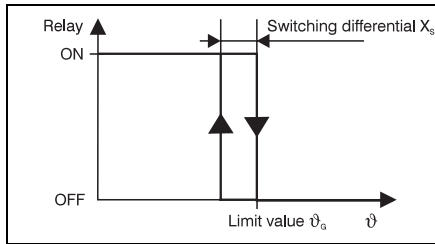


Type 701130/...

Key features

- Input for resistance thermometer or double thermocouple
- O- and S-function for rising and falling temperatures
- Connection for an external reset pushbutton (TB, STB)
- Approved to DIN 3440
- GL approval

O-function



Response in normal operation

- ϑ is less than ϑ_G
- temperature rises
- ⇒ the relay drops out at $\vartheta = \vartheta_G$.

Response after rising above the limit

- ϑ is greater than ϑ_G
- temperature falls
- ⇒ the relay pulls in automatically at $\vartheta = \vartheta_G - X_{sd}$ (STW and TW) or must be reset manually (STB and TB)

Response under fault conditions

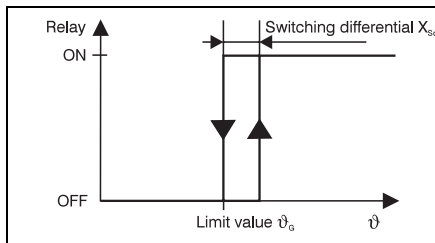
In the event of a fault (probe break or short-circuit, faulty electronics, supply failure) the relay drops out.

When

- the fault has been cleared
- ϑ is not greater than $\vartheta_G - X_{sd}$
- ⇒ for STW and TW: the relay pulls in automatically.

STB and TB must be reset manually. Only in the event of a short-term supply failure (not exceeding 1 min) in the satisfactory range of the system, the instrument will be enabled automatically after the power has been restored.

S-function



Response in normal operation

- ϑ is greater than ϑ_G
- temperature falls
- ⇒ the relay drops out at $\vartheta = \vartheta_G$.

Response after falling below the limit

- ϑ is less than ϑ_G
- temperature rises
- ⇒ the relay pulls in automatically at $\vartheta = \vartheta_G + X_{sd}$ (STW and TW) or must be reset manually (STB and TB)

Response under fault conditions

In the event of a fault (probe break or short-circuit, faulty electronics, supply failure) the relay drops out.

When

- the fault has been cleared
- ϑ is not less than $\vartheta_G + X_{sd}$
- ⇒ for STW and TW: the relay pulls in automatically.

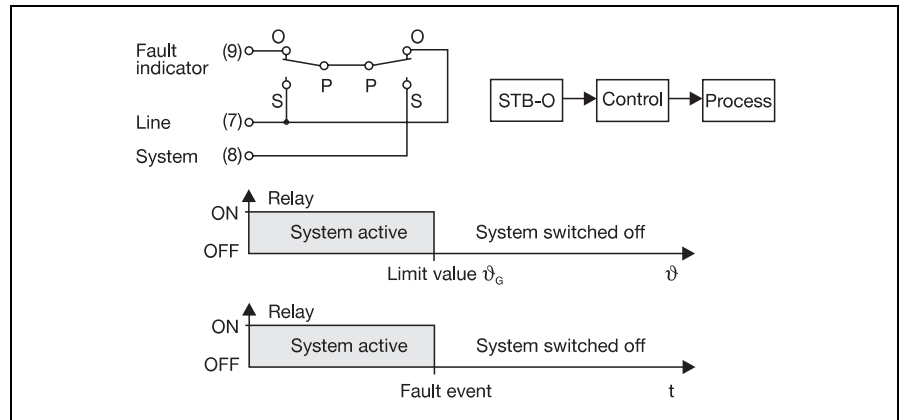
STB and TB must be reset manually. Only in the event of a short-term supply failure (not exceeding 1 min) in the satisfactory range of the system, the instrument will be enabled automatically after the power has been restored.

Example 1: Monitoring heating elements in a furnace

In the event of a fault, action must be taken to prevent overheating causing damage to the heating elements.

The energy flow must be switched off when the furnace temperature has risen above the maximum setpoint value.

In this case, a safety temperature limiter with an O-function is used.

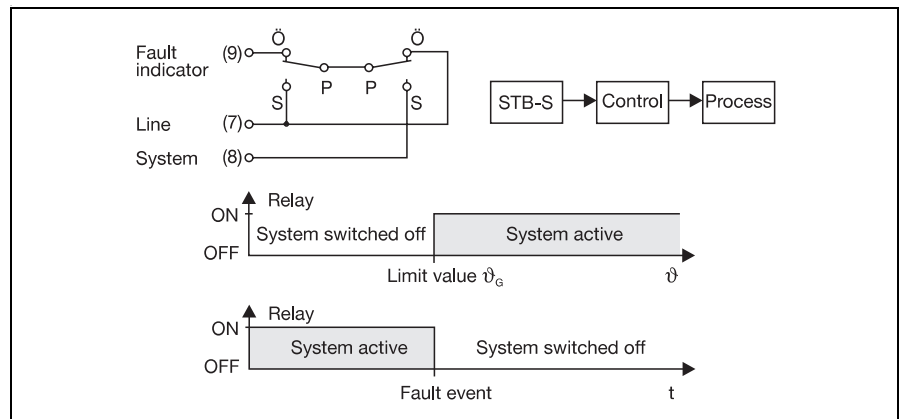


Example 2: Sawdust feed in a furnace

In the event of a fault, action must be taken to prevent a blowback.

The feed of the sawdust must be switched off when the furnace temperature has fallen below the minimum setpoint value.

In this case, a safety temperature limiter with an S-function is used.

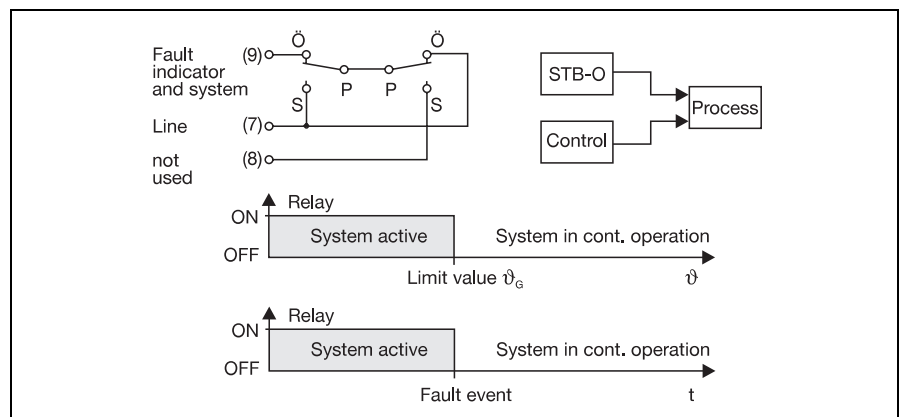


Example 3: Cooling foodstuffs

In the event of a fault, action must be taken to prevent the food becoming spoilt.

The system must be switched into continuous operation when the temperature of the cold-storage room is above the minimum setpoint.

In this case, a safety temperature limiter with an O-function is used.



Technical data

Inputs

For instruments with approval to DIN 3440 and SIL certification, the permissible measurement ranges must be observed. Available ranges and temperature probes are marked with “*”. If other probes are used than those specified in the JUMO data sheets 90.1006 and 90.2006, their registration and usability must be checked.

Resistance thermometer

Pt100

in 2-wire circuit:	0 to	120 °C*
permissible meas. range	0 to	300 °C*
for DIN and SIL:	0 to	400 °C*
0 to 600 °C	0 to	600 °C*
	200 to	500 °C*

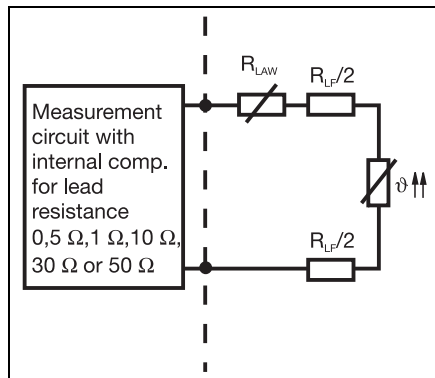
Ambient temperature error

0.8°C/10°C

Lead compensation

A lead resistance of 0.5Ω is internally allowed for as standard; 1Ω, 10Ω, 30Ω or 50Ω to special order (extra code).

A lead compensation resistor LAW is required for connection to Pt100 resistance thermometers with a max. operating temperature of 700 °C.



$$R_L = R_{LAW} + R_{LF}$$

R_L internally compensated lead resistance of the measuring circuit

R_{LAW} resistance of the lead compensation resistor

R_{LF} resistance of the probe leads

Double thermocouples

NiCr-Ni K:	200 to	600 °C*
permissible meas. range	400 to	800 °C*
for DIN and SIL:	600 to	1000 °C*
200 to 1000 °C	800 to	1200 °C

Pt10Rh-Pt S:	400 to	800 °C*
permissible meas. range	800 to	1200 °C*
for DIN and SIL:	1000 to	1400 °C
400 to 1300 °C	1200 to	1600 °C

Pt30Rh-Pt6Rh B:	800 to	1200 °C*
permissible meas. range	1000 to	1400 °C*
for DIN and SIL:	1200 to	1600 °C
800 to 1500 °C	1400 to	1800 °C

Fe-Con L:	50 to	450 °C*
permissible meas. range	200 to	600 °C*
for DIN and SIL:	500 to	900 °C
50 to 700 °C		

Ambient temperature error

2.0°C/10°C

Outputs

Relay

with floating changeover contact

Switching capacity

2A, 230V AC, resistive load protected by fuse 2A M

Contact life

100,000 switching operations at rated load

General data

Switching point accuracy

±2% of span

Switching differential X_{sd}

10°C, 30°C or 100°C

for Pt100 : also 3°C

Supply voltage

230V AC, +10% / -15% 48 – 63Hz

115V AC, +10% / -15% 48 – 63Hz

24V AC, +10% / -15% 48 – 63Hz

Power consumption

4 VA approx.

Permissible ambient temperature

0 to 55 °C

Permissible storage temperature

-40 to +80 °C

Climatic conditions

rel. humidity not exceeding 75%, no condensation

Protection

IP20 (to EN 60 529)

Electrical safety

to EN 60 730-1

creepage distances:

– mains to electronics 8 mm min.

– mains to relay 3 mm min.

– relay to electronics and probe 8 mm min.

Instrument can be connected to SELV circuits.

Test voltages

to EN 60 730-1 Table 13.2

Electromagnetic compatibility

to EN 61326

interference emission: Class B

immunity to interference: to industrial requirements

Ambient conditions

to EN 60 730-1 Para. 2.12.6

“normal”

Operating conditions

The instrument is designed as a built-in device according to:

EN 50178 5.5.1.3

Operating position

unrestricted

Weight

250 g approx.

Dimensions (W x H x D)

54 mm x 70 mm x 110 mm

Housing

Plastic

Combustibility class V0

With extra code GL:

The extra code GL means that the instrument complies with the regulations of Germanischer Lloyd for use on ships and maritime installations. The instrument meets application category C according to the GL guideline.

Temperature: 0 to 55 °C

Rel. humidity: not exceeding 100% rH

Vibration: not exceeding 0.7g

Standard accessories

– Operating Instructions B 70.1130

– 2 fixing elements (only for GL-version)

– Lead compensation resistor LAW (only with extra code 229, 231, 233, 235)

Accessory

Reset pushbutton RT



Testing

to EN 60947-5-1

Contact capability

max. 6A at 230V, 50Hz

Electrical connection

via screw terminals 2 x 2.5 mm²

Protection

IP50

Mounting

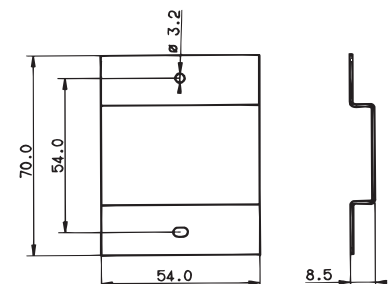
by threaded frontal ring in fixing hole 22mm dia.

Weight

50g approx.

Mounting plate BS

Mounting plate for wall fixing



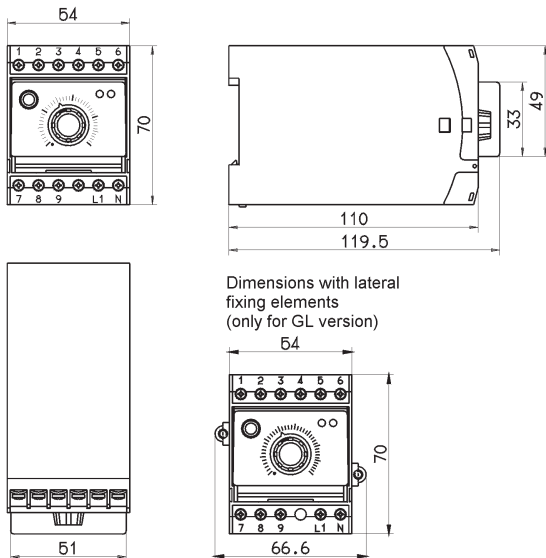
Frontal view

	(1)	Screw terminals, conductor cross-section max. 2.5mm ²
	(2)	Reset pushbutton (extra code with TB only)
	(3)	Limit setting knob
	(4)	Limit scale
	(5)	Fault indicator (S2 only for STB and STW)
	(6)	Lead-sealable clear cover
	(7)	Plastic housing

Connection diagram

Connection for	Terminals	
Relay output	7 common 8 (S) n.o. (make) 9 (O) n.c. (break)	
Supply voltage as on label	L1 line N neutral	
External reset pushbutton	5 6	
Resistance thermometer in 2-wire circuit	1 2 LAW = lead compensation resistor	
Thermocouple	1 - thermocouple 1 2 + 3 - thermocouple 2 4 +	

Dimensions



SIL Certification

When used in conjunction with the temperature probes listed in the JUMO data sheets 90.1006 and 90.2006, the instruments are certified as per SIL 2 or SIL 3.

If different probes are used, the SIL capability must be calculated using the specified FIT values ($\lambda_{du \text{ channel A}}$).

Instruments as per SIL 2



Type	Architecture	SFF	PFD avg	$\lambda_{du \text{ channel A}}$
701130/0253-001-XX/XXX STB-O, w	1oo2D	69.98%	1.19E-03	212.71
701130/0153-001-XX/XXX TB-O, w	1oo1	77.46%	6.72E-03	124.33
701130/0251-001-XX/XXX STW-O, w	1oo2D	69.09%	1.22E-03	221.71
701130/0151-001-XX/XXX TW-O, w	1oo1	75.87%	6.72E-03	133.33
701130/0153-0XX-XX/XXX TB-O, t	1oo1	74.38%	8.56E-03	158.21
701130/0151-0XX-XX/XXX TW-O, t	1oo1	72.97%	8.56E-03	167.21
701130/0254-001-XX/XXX STB-S, w	1oo2D	71.11%	2.12E-03	206.47
701130/0154-001-XX/XXX TB-S, w	1oo1	76.92%	8.43E-03	129.73
701130/0252-001-XX/XXX STW-S, w	1oo2D	70.21%	2.15E-03	215.47
701130/0152-001-XX/XXX TW-S, w	1oo1	75.37%	8.43E-03	138.73
701130/0154-0XX-XX/XXX TB-S, t	1oo1	76.20%	9.55E-03	153.48
701130/0152-0XX-XX/XXX TW-S, t	1oo1	74.84%	9.55E-03	162.48

Instruments as per SIL 3



Type	Architecture	SFF	PFD avg	$\lambda_{du \text{ channel A}}$
701130/0253-0XX-XX/XXX STB-O, t	1oo2D	72.23%	1.95E-04	213.71
701130/0251-0XX-XX/XXX STW-O, t	1oo2D	71.38%	2.04E-04	222.71
701130/0254-0XX-XX/XXX STB-S, t	1oo2D	73.12%	1.85E-04	203.46
701130/0252-0XX-XX/XXX STW-S, t	1oo2D	72.24%	1.94E-04	212.46

Type designation

If the standard version does not meet your requirements, then you can configure your own instruments by using the numerical codes.

(1) (2) (3) (4) (5)*
 701130 / **** - *** - ** / *** , ...

* List extra codes in sequence, separated by commas.

The measurement range must be given in plain text!

(1) Basic type	
701130	Electronic temperature monitor/limiter and safety temperature monitor/limiter to DIN 3440

(2) Basic type extensions	
0151	Temperature monitor with O-function (relay drops out at $\vartheta \geq \vartheta_G$)
0152	Temperature monitor with S function (relay drops out at $\vartheta \leq \vartheta_G$)
0153	Temperature limiter with O-function (relay drops out at $\vartheta \geq \vartheta_G$)
0154	Temperature limiter with S-function (relay drops out at $\vartheta \leq \vartheta_G$)
0251	Safety temperature monitor with O-function (relay drops out at $\vartheta \geq \vartheta_G$) ¹
0252	Safety temperature monitor with S-function (relay drops out at $\vartheta \leq \vartheta_G$) ¹
0253	Safety temperature limiter with O-function (relay drops out at $\vartheta \geq \vartheta_G$) ¹
0254	Safety temperature limiter with S-function (relay drops out at $\vartheta \leq \vartheta_G$) ¹

(3) Measurement inputs (see Technical data for ranges)	
001	Pt100 resistance thermometer in 2-wire circuit
042	Fe-Con L
043	NiCr-Ni K
044	Pt10Rh-Pt S
046	Pt30Rh-Pt6Rh B

(4) Supply voltage	
02	230V AC +10% / -15%, 48 – 63Hz
05	115V AC +10% / -15%, 48 – 63Hz
08	24V AC +10% / -15%, 48 – 63Hz

(5) Extra codes	
202	Switching differential 3°C (only for Pt100)
205	Switching differential 10°C
206	Switching differential 30°C
208	Switching differential 100°C
229	Lead resistance 1Ω internally compensated (incl. LAW 10Ω)
231	Lead resistance 10Ω internally compensated (incl. LAW 10Ω)
233	Lead resistance 30Ω internally compensated (incl. LAW 10Ω)
235	Lead resistance 50Ω internally compensated (incl. LAW 10Ω)
245	Internal reset button (extra code with TB)
056	DIN approval ²
057	SIL certification and DIN approval ²
062	GL approval (Germanischer Lloyd)

1. Internal reset button necessary for annual test (as standard)

2. Only possible if the permissible range values are observed.

Accessories
External reset button RT Sales-No. 70/97097865
Mounting plate BS Sales-No. 70/00059172
Lead compensation resistor LAW (10Ω) Sales-No. 70/00322800

DIN 3440

Instruments with approval to DIN 3440 must only be used in conjunction with the temperature probes specified in the JUMO data sheets 90.1006 and 90.2006.

If other temperature probes are used, their registration must be checked.

SIL

JUMO provides SIL-certified temperature probes that are suitable for the particular instrument.

They correspond to the temperature probes approved to DIN 3440, which are listed in the data sheets 90.1006 and 90.2006.

If other temperature probes are used, their usability must be checked.

Declarations of Conformity

The Declarations of Conformity can be found on our website at:
www.jumo.net → Products

Available from stock

Type	Setting range	Transducer	Sales No.
701130/0253-001-02/205, 245	0 to 120°C	1xPt100	70/00335259
701130/0253-001-02/205, 245	0 to 400°C	1xPt100	70/00335260
701130/0253-001-02/205, 245	200 to 500°C	1xPt100	70/00335261
701130/0253-043-02/206, 245	600 to 1000°C	2xNiCr-Ni K	70/00335262
701130/0254-001-02/205, 245	0 to 400°C	1xPt 100	70/00335263
701130/0151-001-02/205	0 to 300°C	1xPt100	70/00335264
External reset button RT	—	—	70/97097865
Mounting plate	—	—	70/00059172



JUMO TB/TW

Temperature limiter, temperature monitor

with LC display for mounting on 35mm DIN rails



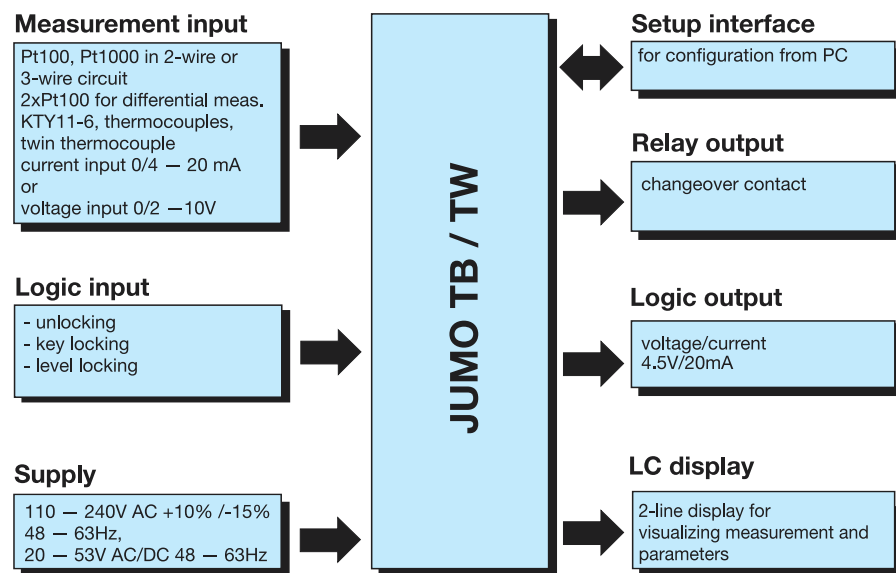
Brief description

The **JUMO** TB/TW is a freely programmable temperature limiting device. The measurement input is freely configurable for resistance thermometers and thermocouples, as well as for current and voltage signals. TB/TWs monitor thermal processes in systems for a set limit value. If this is exceeded, the built-in relay switches the system to a safe operational state and the LED K1 lights up. When the system returns to the o.k. region, the reset button (on the TB) has to be released manually using an appropriate tool. The TW, on the other hand, is reset automatically without any external action. The 4.5V/20mA logic output produces a pre-alarm signal at an adjustable temperature before reaching the limit value, which is additionally indicated via the LED K2. TB/TWs are mounted on DIN rails and wired up by means of screw terminals with 2.5mm² max. conductor cross-section. A PC setup program is available as an accessory, which can be used to set and store probe type, range, output action and inhibits.



Type 701140/ ...

Overview of function



Key features

- Setup program for configuring and archiving via PC
- Clear, easy-to-read alphanumerical display
- Digital input filter with adjustable filter time constant
- Short 90 msec sampling interval
- Pre-alarm adjustable as absolute value or relative to limit value
- Wide supply voltage range 110 – 240V AC +10% /-15%V
- Configurable as TB or TW
- 17 linearizations can be set
- Internal and external locking options
- 2xPt100 input for differential measurement

Technical data

Input for resistance thermometer

Designation	Range	Accuracy ¹
Pt100 EN 60 751	-200 to +850 °C	0.1%
KTY11-6 PTC	-50 to +150 °C	1%
Pt1000 DIN	-200 to +850 °C	0.1%
Connection circuit	2-, 3-wire	
Sampling interval	90 msec	
Input filter	2nd order digital filter; filter constant adjustable from 0 to 100sec	
Special features	2xPt100 for differential measurement, display can also be programmed in °F	

Input for thermocouple

Designation	Range	Accuracy ¹
Fe-Con L DIN 43 710	-200 to +900 °C	0.4%
Fe-Con J EN 60 584	-200 to +1200 °C	0.4%
Cu-Con U DIN 43 710	-200 to +600 °C	0.4%
Cu-Con T EN 60 584	-200 to +400 °C	0.4%
NiCr-Ni K EN 60 584	-200 to +1372 °C	0.4%
NiCrSi-NiSi N EN 60 584	-100 to +1300 °C	0.4%
Pt10Rh-Pt S EN 60 584	0 to +1768 °C	0.4%
Pt13Rh-Pt R EN 60 584	0 to +1768 °C	0.4%
Pt30Rh-Pt6Rh B EN 60 584	+300 to +1820 °C	0.4%
W3Re-W25Re D	0 to +2495 °C	0.4%
Cold junction	Pt100 internal	
Cold junction accuracy	± 1 °C	
Sampling interval	90 msec	
Input filter	2nd order digital filter; filter constant adjustable from 0 to 100sec	
Special features	can also be programmed in °F	

1. The accuracy refers to the maximum range span.
With smaller ranges and shorter spans, the linearization accuracy is reduced.

Analog input for DC voltage, DC current

Range	Accuracy	Input resistance
0 – 20mA 4 – 20mA	0.1%	R _E < 4 Ω
0 – 10V 2 – 10V	0.1%	R _E > 100 kΩ
Scaling	freely programmable within the limits	
Sampling interval	90 msec	
Input filter	2nd order digital filter; filter constant adjustable from 0 – 100sec	

Logic input

Connection	Function
Floating contact	Unlocking, key locking, level locking are configurable

Measuring circuit monitoring

	Resistance thermometer and KTY11-6	Thermocouple	Current / voltage
Over/underrange	is recognized	is recognized	is recognized
Probe/lead break	is recognized	is recognized	is recognized with 4 – 20mA and 2 – 10V
Probe short-circuit	is recognized	is recognized with twin thermocouples only	is recognized with 4 – 20mA and 2 – 10V

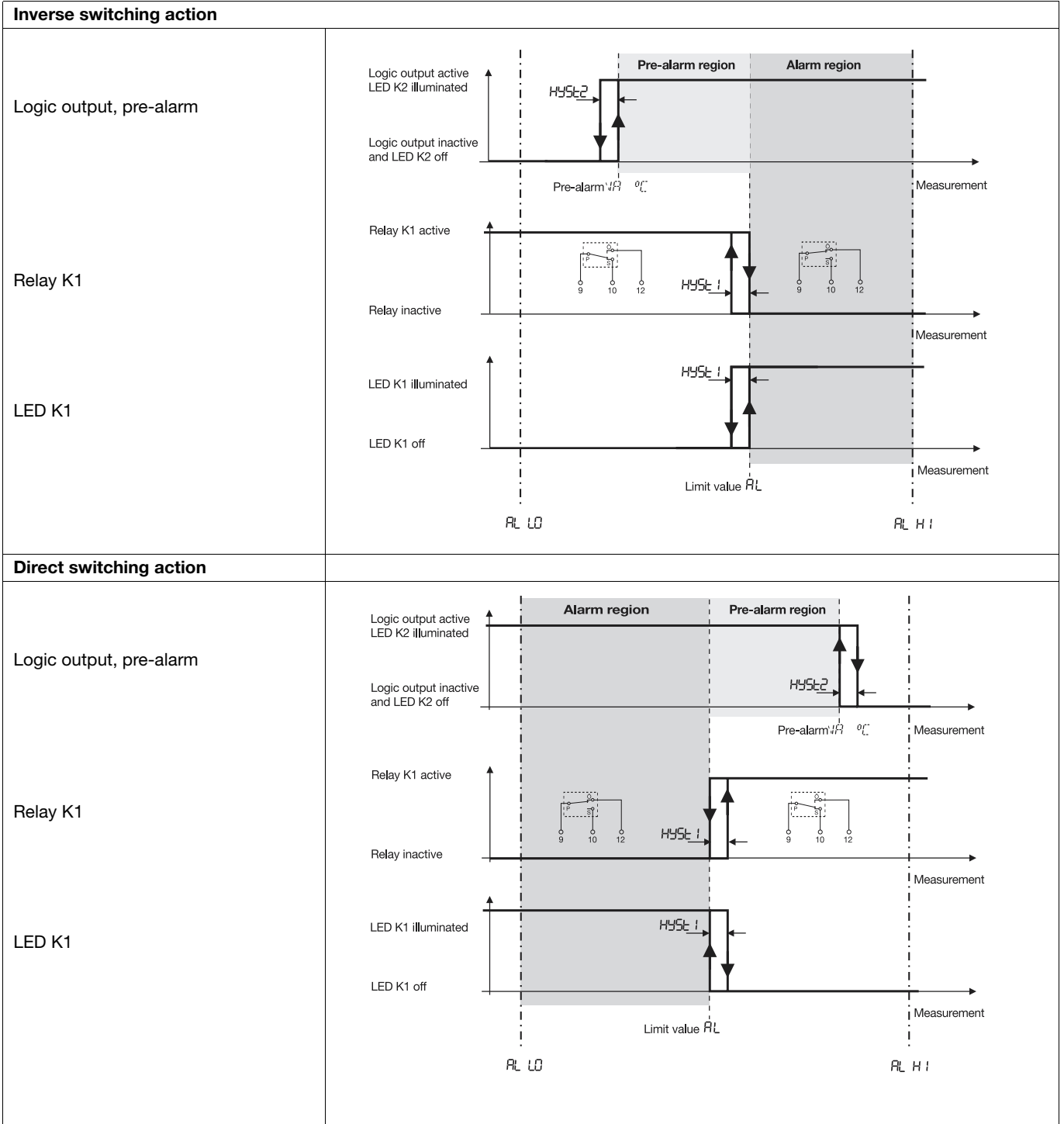
Supply

Supply voltage	20 – 53V AC/DC, 48 – 63 Hz 110 – 240V AC +10% /-15%
Power consumption	5 VA

Outputs

Relay, no contact protection circuit	150,000 operations at a contact rating of 3A/230V 50Hz resistive load
Logic output	4.5V/20mA logic signal, short-circuit proof

Switching action at limit value



Test voltages to EN 60730, Part 1

Between input or output and supply	
- with supply voltage 110 – 240V AC +10% /-15%	3.75kV/50Hz
- with supply voltage 20 – 53V AC/DC, 48 – 63 Hz	2.5kV/50Hz

Electrical safety

Clearance and creepage distances for normal environment to EN 60730-1, Table 20.1

Between mains supply and electronics and probe	≥ 8 mm
Between mains supply and relay	≥ 8 mm
Between relay and electronics and probe	≥ 8 mm

The instrument can be connected to SELV circuits.

Environmental influences

Ambient temperature range	0 to +55°C
Storage temperature range	-30 to +70°C
Temperature error	≤ ± 0.005 % per °C deviation from 23°C ¹ with resistance thermometers
	≤ ± 0.01 % per °C deviation from 23°C ¹ with thermocouples, current, voltage
Climatic conditions	75 % rel. humidity, no condensation
EMC	EN 61326
Interference emission	Class B
Noise immunity	industrial requirements

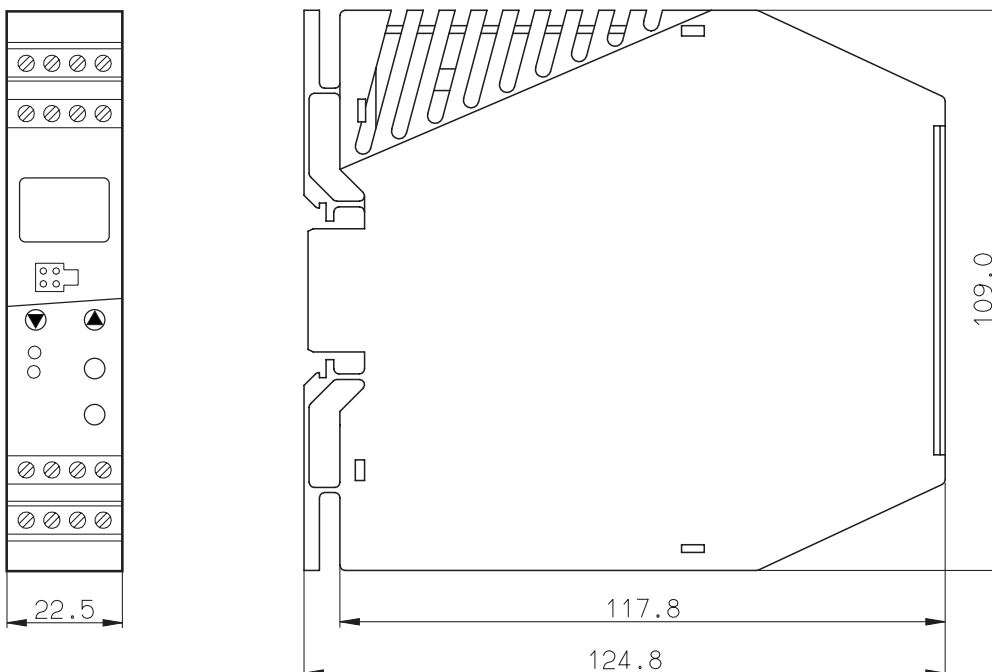
1. All data refer to the full scale value

Housing

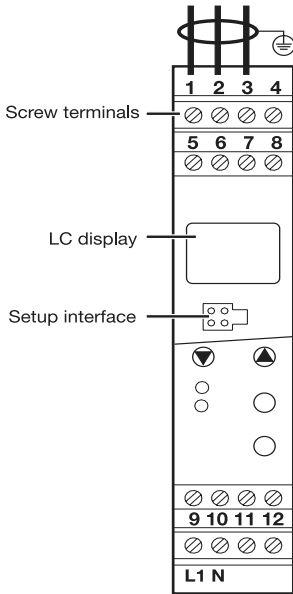
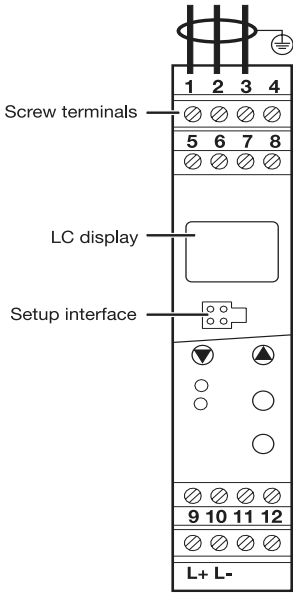

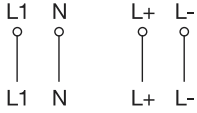

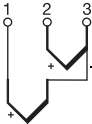
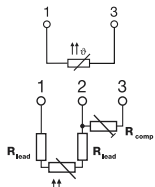


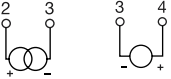



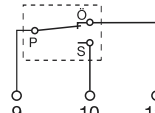
Material	polyamide (PA 6.6)
Screw terminals	0.2 – 2.5mm ² screw terminal
Mounting	on 35mm x 7.5mm DIN rail to EN 50 022
Operating position	vertical
Weight	160g approx.

Dimensions

Type 701140/...



Connection diagram

				
	Supply as on nameplate	AC L1 line N neutral	DC L+ L-	
	Analog inputs	Thermocouple		
		Twin thermocouple		
		KTY11-6 PTC in 2-wire circuit For longer leads, resistance thermometers in 2-wire circuit must be changed over to c111=001 (3-wire circuit) and compensated with a resistor. Compensation condition: $R_{lead} = R_{comp}$		
		Resistance thermometer in 3-wire circuit		
		Resistance thermometer 2 x Pt100 in 2-wire circuit for differential measurement (no lead compensation possible)		
0 – 20 mA, 0 – 10 V				
Logic input	for connection to floating contact			
	Logic output	4.5 V/ 20 mA (short-circuit proof)		
	Relay output	relay without contact protection circuit		

DIN approved probes for operation in air

RTDs to Data Sheet 90.2006	Probe type	Temperature range	Nom. length mm	Process connection
90.271-F01	2 x Pt100	-170 to +700°C	500	sliding stop flange
90.272-F01			710	
90.273-F01			1000	
90 2006/55...	2 x Pt100	-170 to +700°C	500	sliding clamping thread G1/2
90 2006/55...			700	
90 2006/55...			100	
Thermocouples to Data Sheet 90.1006	Probe type	Temperature range	Nom. length mm	sliding stop flange
90.019-F01	2 x NiCr-Ni, Type K	-35 to +800°C	500	
90.020-F01			710	
90.021-F01			1000	
90.019-F11	2 x Fe-Con, Type L	-35 to +700°C	500	
90.020-F11			710	
90.021-F11			1000	
90.023-F01	2 x NiCr-Ni, Type K	-35 to +1000°C	500	
90.023-F02			355	
90.023-F03			250	
90.021	1 x PT10Rh-PT, Type S	0 to 1300°C	250	
90.022			355	
90.023			500	
90-D-021	2 x PT10Rh-PT, Type S	0 to 1300°C	250	
90-D-022			355	
90-D-023			500	
90.027	1 x PT30Rh-PT6Rh, Type B	600 to 1500°C	250	
90.028			355	
90.029			500	
90-D-027	2 x PT30Rh-PT6Rh, Type B	600 to 1500°C	250	
90-D-028			355	
90-D-029			500	

DIN approved probes for operation in water and oil

RTDs to Data Sheet 90.2006	Probe type	Temperature range	Fitting length mm	Process connection
90.2006/10...	1 x Pt100	-40 to +400°C	100	G1/2 thread
90.2006/10...	2 x Pt100		100	
90.272-F02	2 x Pt100	-170 to +550°C	65 – 670	sliding clamping thread G1/2
90.272-F03	1 x Pt100		65 – 670	
90.239	1 x Pt100	-170 to +480°C	250	G1/2 thread
90-D-239	2 x Pt100		250	
90.239-F01	1 x Pt100	-40 to +480 °C	100	weld-in pocket
90.239-F11			160	
90.239-F21			220	
90.239-F03	1 x Pt100	-40 to +400 °C	190	
90D239-F03	2 x Pt100	-40 to +400 °C	190	
90.239-F02	2 x Pt100	-40 to +480 °C	100	
90.239-F12			160	
90.239-F22			220	
90.239-F07			3 x Pt100	
90.239-F17			160	
90.239-F27			220	
90.280-F30	1 x Pt100	-170 to +480°C	220	
90.280-F31			160	
90.280-F32			100	
Thermocouples to Data Sheet 90.1006	Probe type	Temperature range	Fitting length mm	Process connection
90.020-F02	2 x NiCr-Ni, Type K	-35 to +550°C	65 – 670	sliding clamping thread G1/2
90.020-F03	1 x NiCr-Ni, Type K		65 – 670	
90.020-F12	2 x Fe-Con, Type L		65 – 670	
90.020-F13	1 x Fe-Con, Type L		65 – 670	
90.111-F01	1 x Fe-Con Type L	-35 to +480°C	220	weld-in pocket
90.111-F02	2 x Fe-Con Type L		220	

Order details

	(1)	Basic version	
	701140	JUMO temperature limiter (TB) / temperature monitor (TW)	
	(2)	Basic type extension (programmable)	
		0151 Temperature monitor, inverse	
		0152 Temperature monitor, direct	
		0153 Temperature limiter, inverse	
		0154 Temperature limiter, direct	
X	888	programmable, factory-set	
X	999	programmable, configuration to customer specification ¹	
	(3)	Measurement input	
		001 Pt100 in 3-wire circuit	
		003 Pt100 in 2-wire circuit	
		005 Pt1000 in 2-wire circuit	
		006 Pt1000 in 3-wire circuit	
		024 2xPt100 for differential measurement	
		037 W3Re-W25Re	D
		039 Cu-Con	T
		040 Fe-Con	J
		041 Cu-Con	U
		042 Fe-Con	L
		043 Ni-CrNi	K
		044 Pt10Rh-Pt	S
		045 Pt13Rh-Pt	R
		046 Pt30Rh-Pt6Rh	B
		048 NiCrSi-NiSi	N
		052 0 – 20 mA	
		053 4 – 20 mA	
		063 0 – 10 V	
		071 2 – 10 V	
		601 KTY11-6	
X	888	programmable, factory-set	
X	999	programmable, configuration to customer specification ¹	
	(4)	Supply	
X	23	110 – 240V AC +10% /-15%, 48 – 63Hz	
X	22	20 – 53V AC/DC, 48 – 63Hz	
	(5)	Approvals	
X	000	no approval	
X	061	UL approval	

factory-set 1. For configuration to customer specification, please specify in plain text

	(1)	(2)	(3)	(4)	(5)
Order code	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>
Order example	701140	- 888	- 888	- 22	- 000

Standard accessory

- 1 Operating Manual

Accessories

- Setup program
- **PC interface with TTL/RS232C converter and adapter (4-pole socket)**
for connecting the TB/TW to a PC
- External reset button, Sales No. 70/97097865

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Internet: www.jumo.us



Digital indicators

	Nr.
JUMO di 32/di 08 Digital microprocessor indicators with 1 measurement input and a maximum of 3 signal outputs case for flush-panel mounting to DIN 43 700	70.1530
JUMO di eco Digital Temperature indicator microprocessor-controlled with a 10A changeover relay in 76mm x 36mm format	70.1540
JUMO di 308 Digital Indicator, microprocessor-controlled with max. 2 inputs, wide range of expansion options, panel mounting DIN housing, bezel 96mm x 48mm	70.1550
JUMO TDA-300/TDA-3000 Handheld Thermometer with data logger	70.2540

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JUMO di 32 / di 08

**Digital microprocessor indicators
 with 1 measurement input
 and a maximum of 3 signal outputs,
 case for flush-panel mounting to DIN 43 700**



Brief description

The single-channel digital indicators with the bezel sizes 48mm x 24mm and 96mm x 48mm are available for displaying measurements and monitoring limit values in industrial applications.

The configurable analog input permits the direct connection of thermocouples, resistance thermometers, resistance transmitters, potentiometers or transducers with a standard signal. The sampling rate for the measurement input is 4 measurements per second.

The indicators have a clearly legible 4-digit LED display which, depending on the version, is 10mm (JUMO di 32) or 20mm (JUMO di 08) high, and serves to display the measurements, as well as being available for dialogs. Only three buttons are used for configuration. The parameter setting is arranged dynamically, and after two seconds without any operation the value is accepted automatically.

The front protection is to IP66, at the rear IP20. The electrical connection is by plug-in screw terminals. The possible input and output configurations are shown in the following block structure.

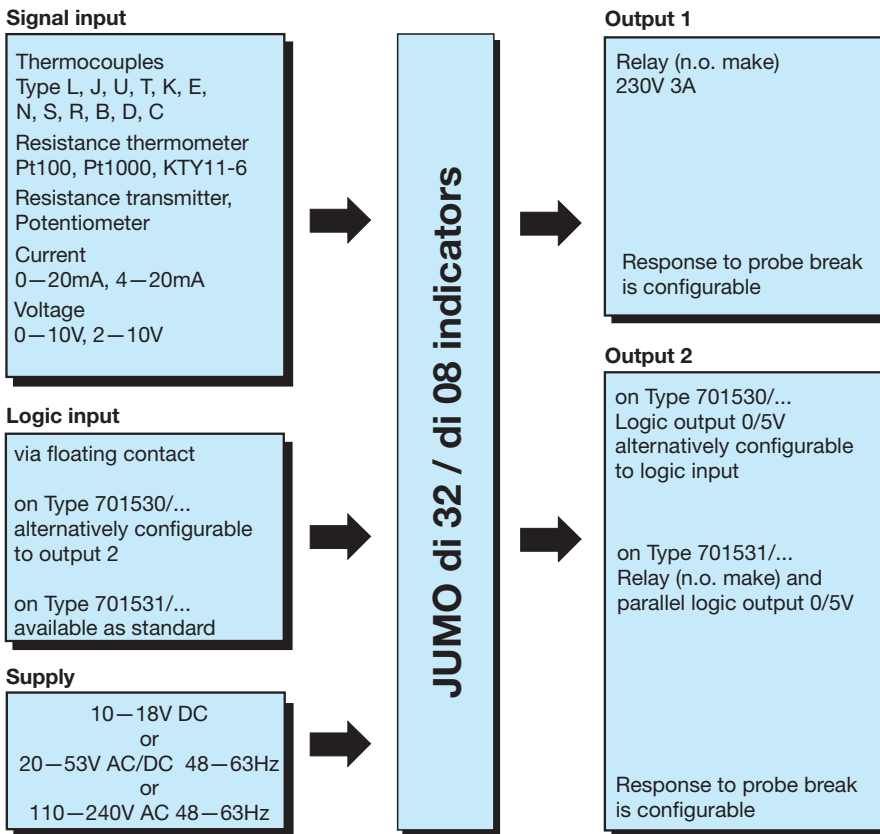


Type 701530/...



Type 701531/...

Block structure



Features

- structured operating and programming layout
- customer-specific linearization correction
- 2 limit comparators for limit monitoring
- digital input filter with programmable filter time constant
- time-delayed switching, programmable per relay
- switch-on delay after power-on is programmable

Technical data

Input for thermocouple

Designation	Range limits	Range	Measurement accuracy in range	Ambient temperature error
Fe-Con L	-200 + 900°C	-200 + 900°C	≤0.4%	100 ppm/°C
Fe-Con J EN 60 584	-210 +1200°C	-200 +1200°C	≤0.4%	100 ppm/°C
Cu-Con U	-200 + 600°C	-200 + 600°C	≤0.4%	100 ppm/°C
Cu-Con T EN 60 584	-270 + 400°C	-200 + 400°C	≤0.4%	100 ppm/°C
NiCr-Ni K EN 60 584	-270 +1372°C	-200 +1372°C	≤0.4%	100 ppm/°C
NiCr-Con E EN 60 584	-270 +1000°C	-150 +1000°C	≤0.4%	100 ppm/°C
NiCrSi-NiSi N EN 60 584	-270 +1300°C	-100 +1300°C	≤0.4%	100 ppm/°C
Pt10Rh-Pt S EN 60 584	-50 +1768°C	0 – 1768°C	≤0.4%	100 ppm/°C
Pt13Rh-Pt R EN 60 584	-50 +1768°C	0 – 1768°C	≤0.4%	100 ppm/°C
Pt30Rh-Pt6Rh B EN 60 584	0 – 1820°C	+300 +1820°C	≤0.4%	100 ppm/°C
W3Re-W25Re D	0 – 2495°C	0 – 2495°C	≤0.4%	100 ppm/°C
W5Re-W26Re C	0 – 2320°C	0 – 2320°C	≤0.4%	100 ppm/°C
Sampling rate	4 measurements per second			
Cold junction	Pt100 internal or external constant (CJT)			
Decimal place	configurable			

Input for resistance thermometer

Designation	Connection circuit	Range	Measurement accuracy	Ambient temperature error
Pt100 EN 60 751	2-wire	-200 +850°C	≤0.1%	50 ppm/°C
Pt100 EN 60 751	3-wire	-200 +850°C	≤0.1%	50 ppm/°C
Pt1000 EN 60 751	2-wire	-200 +850°C	≤0.1%	50 ppm/°C
Pt1000 EN 60 751	3-wire	-200 +850°C	≤0.1%	50 ppm/°C
KTY11-6	2-wire	-50 +150°C	≤1.0%	50 ppm/°C
Sensor lead resistance	20Ω max. per lead in 2-wire and 3-wire circuit			
Measuring current	250µA			
Lead compensation	not required for 3-wire circuit. For 2-wire circuit, lead compensation can be implemented in software through actual-value correction.			
Decimal place	configurable			

■ = factory setting

Input for resistance transmitter

Designation	Range	Measurement accuracy	Ambient temperature error
0 – 4kΩ	0 – 4kΩ	≤0.5%	50 ppm/°C
Sensor lead resistance	20Ω max. per lead		
Measuring current	25µA or 250µA (depending on size of resistance)		
Decimal place	configurable		

Input for potentiometer

Designation	Connection circuit	Range	Measurement accuracy	Ambient temperature error
0 – 4kΩ	2-wire	0 – 4kΩ	≤0.4%	50 ppm/°C
0 – 4kΩ	3-wire	0 – 4kΩ	≤0.4%	50 ppm/°C
Sensor lead resistance	20Ω max. per lead in 2-wire and 3-wire circuit			
Measuring current	250µA			
Lead compensation	not required for 3-wire circuit. For 2-wire circuit, lead compensation can be implemented in software through actual-value correction.			
Decimal place	configurable			

Input for standard signals

Designation	Range	Measurement accuracy	Ambient temperature error
Voltage	0 – 10V, input resistance $R_E > 100k\Omega$ 2 – 10V, input resistance $R_E > 100k\Omega$	$\leq 0.1\%$ $\leq 0.1\%$	100 ppm/°C 100 ppm/°C
Current	4 – 20mA, voltage drop $\leq 1V$ 0 – 20mA, voltage drop $\leq 1V$	$\leq 0.15\%$ $\leq 0.15\%$	100 ppm/°C 100 ppm/°C
Decimal place	configurable		

Measurement circuit monitoring¹

Transducer	Overrange	Underrange	Probe or lead short-circuit ¹	Probe or lead break
Thermocouple	•	•	-	•
Resistance thermometer	•	•	•	•
Resistance transmitter	•	•	•	•
Potentiometer	•	•	-	•
Voltage 2 – 10V	•	•	•	•
0 – 10V	•	-	-	-
Current 4 – 20mA	•	•	•	•
0 – 20mA	•	-	-	-

¹ In fault condition, the outputs move to a defined state (configurable: active or inactive).

- recognized
- not recognized

Logic input

Assignment	Type 701530/...	Type 701531/...
Number	1 (instead of the logic output only)	1 (standard)
Function (configurable)	Hold, Min/Max reset, level inhibit	
Operation	through floating contact	

Outputs

Assignment	Type 701530/...	Type 701531/...
Output 1	relay	relay
Output 2	logic output or logic input	relay and parallel logic output
Relay contact rating contact life	make contact (n.o.) 3A at 230VAC resistive load 150,000 operations at rated load	
Logic output current limiting load resistance	0/5V 20mA $R_{load} \geq 250\Omega$	
Feature	time-delayed switching of relays separately programmable per relay within the range 0 – 9999sec	

■ = factory setting

Switch-on delay

Switch-on delay after power ON	programmable within the range 4 – 9999sec
Feature	display and relays will only be activated after the programmed time has elapsed

Electrical data

Supply (switch-mode power supply)	10 – 18V DC ±0% or 110 – 240V AC -15/+10% 48 – 63Hz, or 20 – 53V AC/DC 48 – 63Hz
Test voltages (type test)	to EN 61 010, Part 1, March 1994, overvoltage category II, pollution degree 2, for Type 701530/... overvoltage category III, pollution degree 2, for Type 701531/...
Power drawn	7VA max.
Data backup	EEPROM
Electrical connection	at the rear, via plug-in screw terminals, conductor cross-section ≤ 1.5mm ² (1.0mm ² for Type 701530/...) or 2x 1.5mm ² (1.0mm ² for Type 701530/...), with core end sleeves
EMC - interference emission - immunity to interference	EN 61 326 Class B to industrial requirements
Safety regulation	to EN 61 010-1

Case

Case type	plastic case for panel mounting to DIN 43 700	
Size in mm (for Type)	Type 701530/...	Type 701531/...
Bezel	48 x 24	96 x 48
Depth behind panel	100	70
Panel cutout	45 ^{+0.6} x 22.2 ^{+0.3}	92 ^{+0.8} x 45 ^{+0.6}
Ambient/storage temperature range	0 – 55°C / -40 to +70°C	
Climatic conditions	≤ 75% rel. humidity, no condensation	
Operating position	any	
Protection	to EN 60 529, front IP66, rear IP20	
Weight	75g approx.	160g approx.

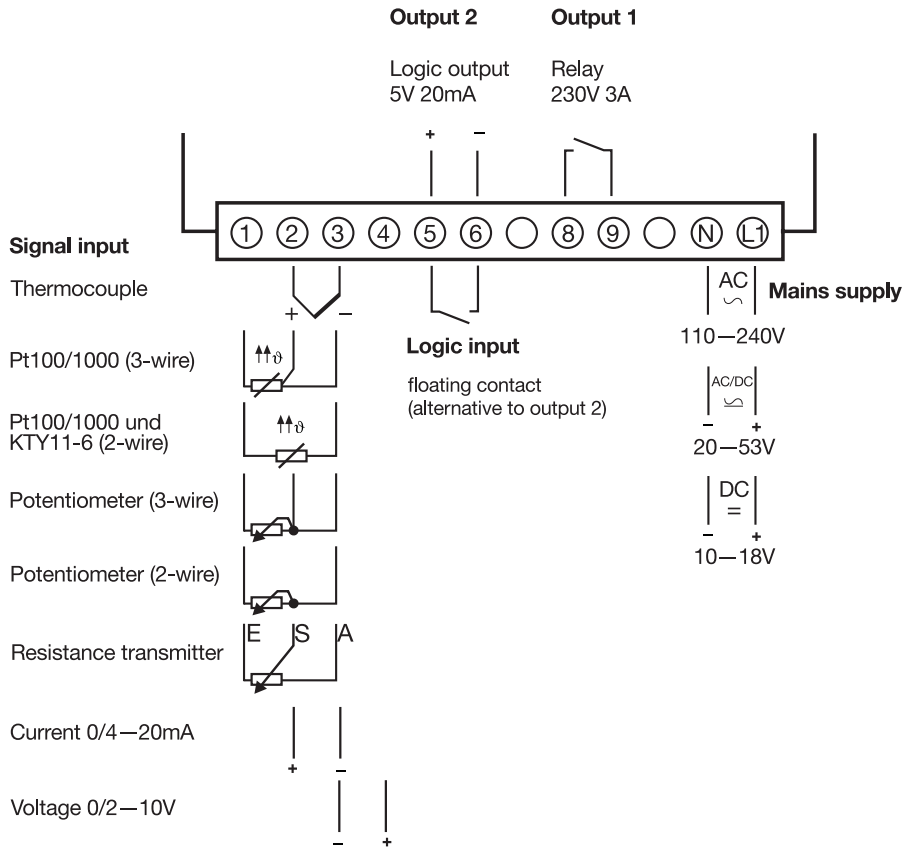
Displays and controls

(1) Display	7-segment display, 4 digits, red	
Height of digits	Type 701530/...: 10mm, Type 701531/...: 20mm	
Display range/unit	-1999 to +9999 digit / °C/°F	
Decimal places	none, one, two	
(2) Status indicators	two LEDs for the outputs 1 and 2, yellow	
(3) Buttons	select next parameter, select parameter and configuration level (> 2sec)	
	increase ¹ , decrease ¹ parameter value	
	instant return to basic status	
	display firmware version	

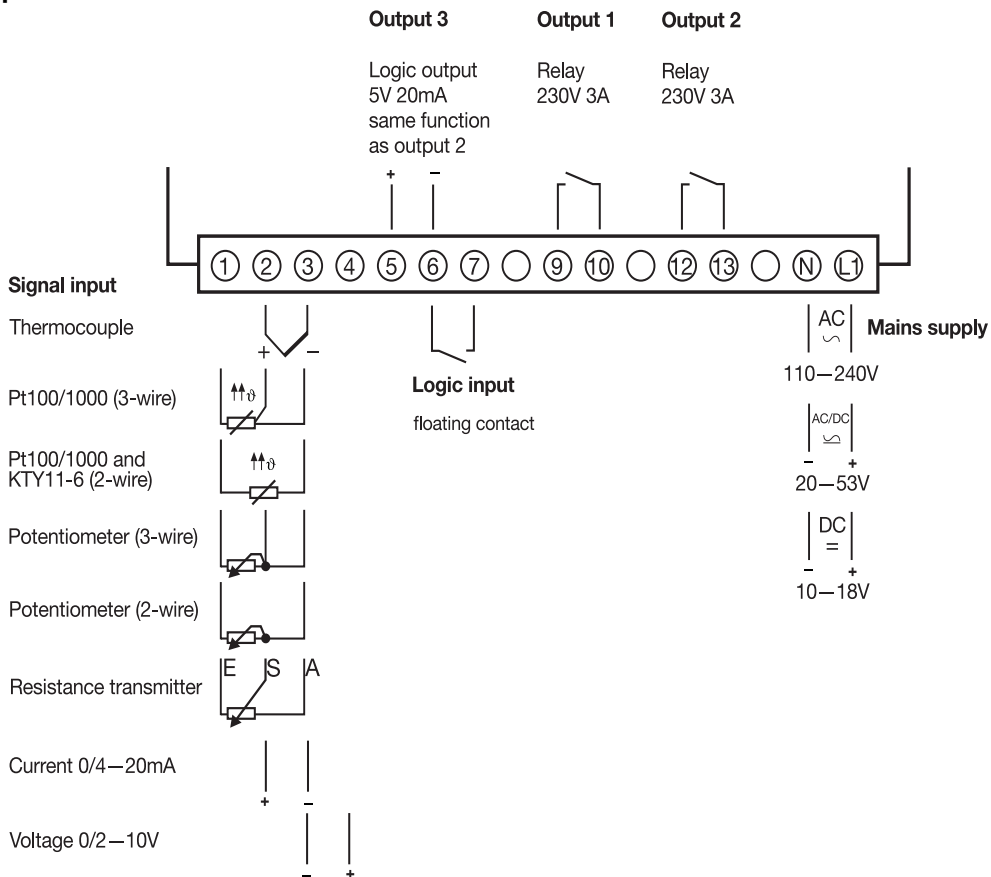
¹ Dynamic value setting; automatic acceptance of value after two seconds without pressing a button (also configuration codes)

Connection diagrams

JUMO di 32, Type 701530/...

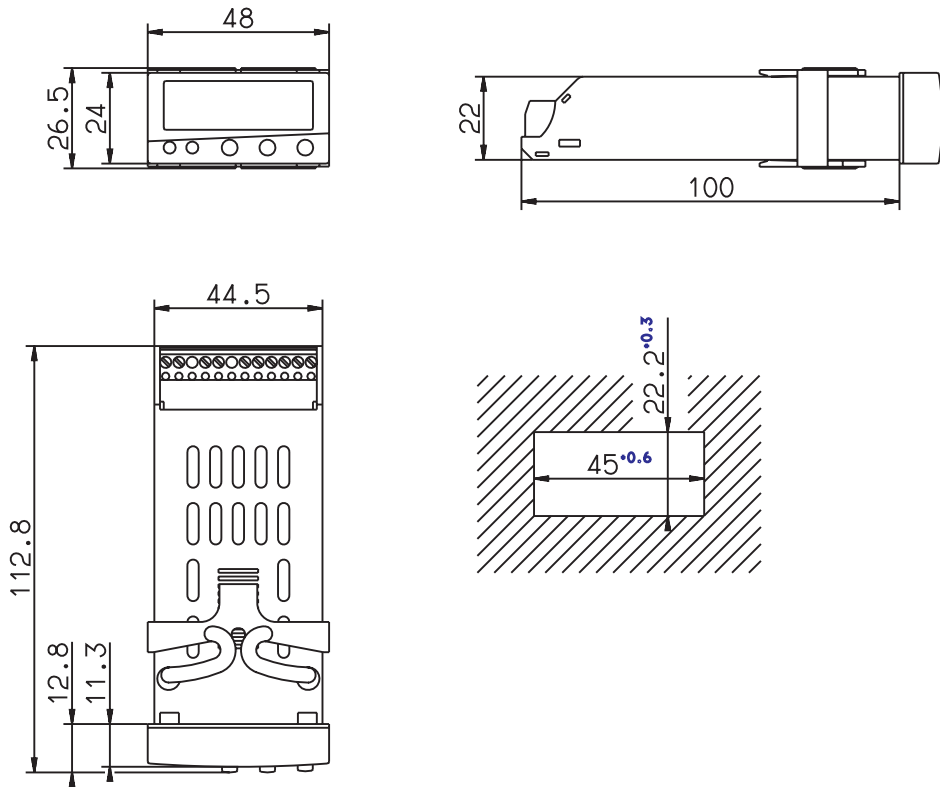


JUMO di 08, Type 701531/...

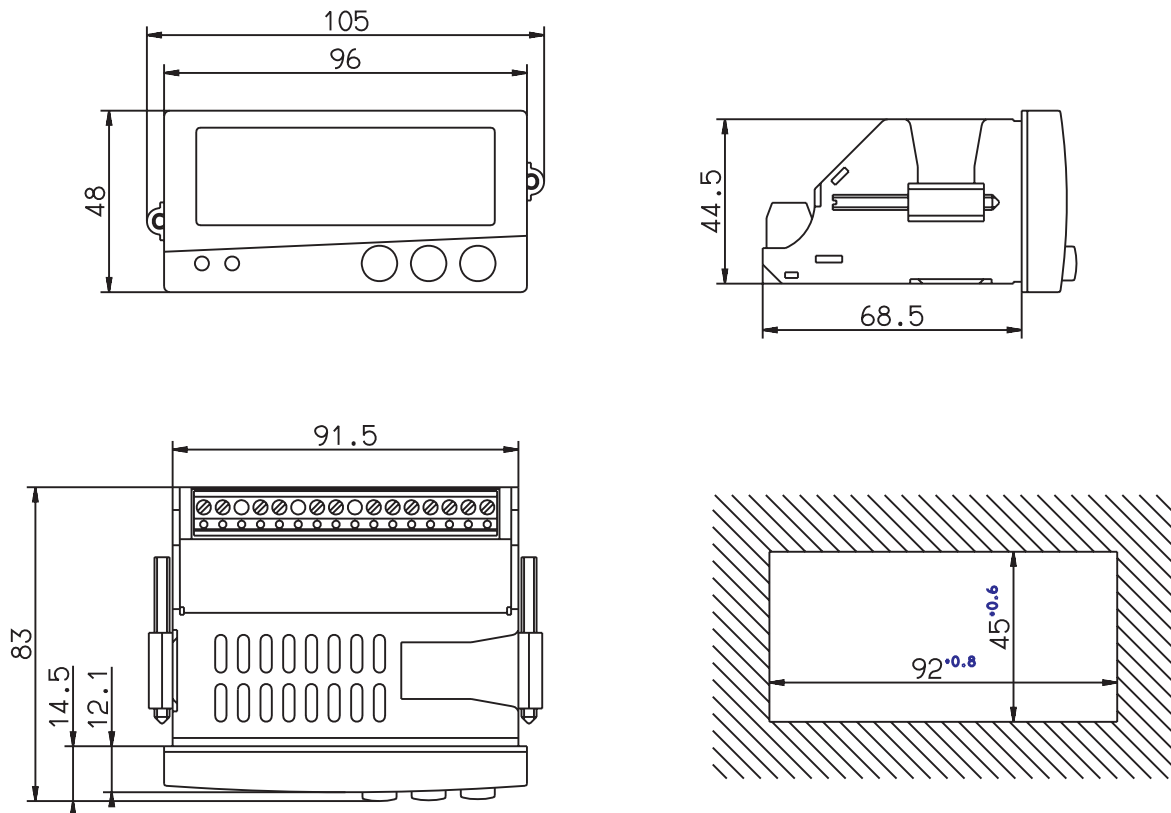


Dimensions

Type 701530/...



Type 701531/...



Side-by-side mounting (minimum spacing of panel cutouts)

Type	horizontal	vertical
701530/...	> 8mm	> 8mm
701531/...	> 10mm	> 10mm

Order details: Digital microprocessor indicators
with 1 measurement input and a maximum of 3 signal outputs,
case for flush-panel mounting to DIN 43 700

(1) Basic version

701530/ di 32 - size 48mm x 24mm

701531/ di 08 - size 96mm x 48mm

(2) Input (programmable)

x	x	888	factory-set
x	x	999	configuration to customer specification ¹

(3) Supply

x	x	16	10 – 18V DC ±0%
x	x	22	20 – 53V AC/DC 48 – 63Hz
x	x	23	110 – 240V AC +10/-15% 48 – 63Hz

Order code		(1)	/	(2)	-	(3)
Order example		701530	/	888	-	23

¹ For configuration to customer specification, please specify the probe type and the required settings in plain text.

Standard accessories

- 1 Operating Instructions B 70.1530.0
- 1 set of mounting brackets
- 1 seal



JUMO di eco Digital Indicator

76mm x 36mm format

Brief description

The JUMO di eco compact digital indicator is used for the simple visualization of temperatures or standard signals. The measurement input permits the connection of resistance thermometers or thermocouples, or standard current or voltage signals. The measured value is shown on a 3-digit backlit display.

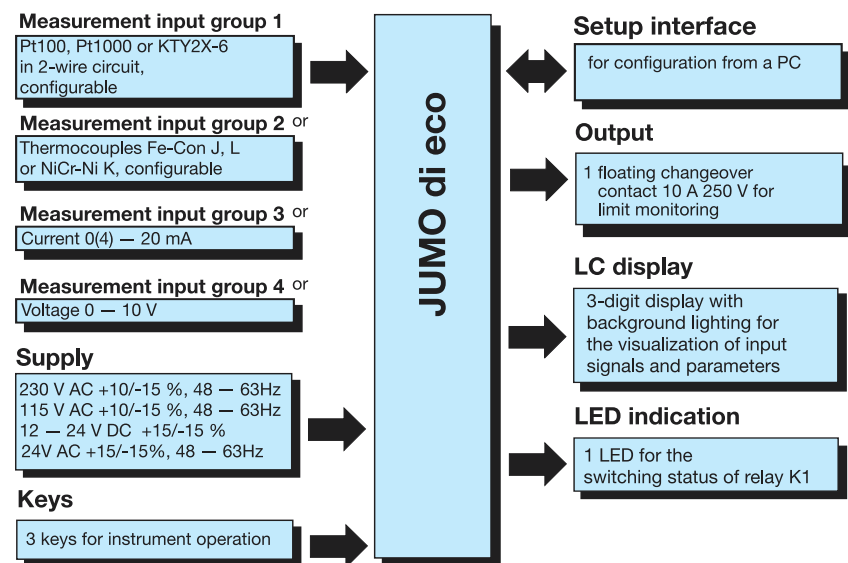
Limit infringements are monitored by means of a 10A relay (changeover contact) and indicated by an LED.

The 3 keys on the front panel can be used to configure, among others, the switching hysteresis and alarm suppression.

The electrical connection is made via screw terminals on the back of the instrument.

A setup program and a PC interface are available as accessories, for simple configuration and parameterization from a PC.

Block structure



Displays and controls

LC display	3-digit segment display, 13 mm high, and symbols for temperature unit, h, min and s, with red background lighting
Status indication	LED K1 flashes during alarm suppression LED K1 lights up when limits are infringed, or on a probe error
Keys	<p>Ⓟ programming</p> <p>▲ increase parameter value</p> <p>▼ decrease parameter value</p> <p>Ⓟ + ▲ version display</p> <p>Ⓟ + ▼ exit, jump to basic status (temperature indication)</p>
Setup interface	The instrument is linked to the PC via a PC interface with TTL/RS232 converter and adapter (3-pin).



Type 701540/...

Key features

- Limit monitoring
- Available for resistance thermometer, thermocouple, standard current or voltage signals, according to choice
- 10A relay (changeover contact)
- Adjustable switching hysteresis
- Programmable switch-on delay after power-on
- Configurable alarm suppression
- Symbols in display for temperature unit, minutes and seconds
- Parameter level protected by code
- Setup program for configuration and archiving via PC
- Customized linearization via tabular function in the setup program
- UL approval



Technical data

Measurement input	Designation	Measuring range	Meas. accuracy ¹ / ambient temperature error	Recognition of ...	
				Probe short-circuit	Probe break
Resistance thermometer	Pt100 EN 60 751	-200 to +600 °C	0.1%/ ≤100ppm/°C	is recognized	is recognized
	Pt1000 EN 60 751	-200 to +600 °C	0.1%/ ≤100ppm/°C	is recognized	is recognized
	KTY2X-6 (PTC)	-50 to +150 °C	1%/ ≤100ppm/°C	is recognized	is recognized
	Resistance 0 — 3000 Ω	customer table ³	0.1%/ ≤100ppm/°C ³	= 0Ω	is recognized
Measuring current for Pt100: 0.2 mA, for Pt1000, KTY2X-6 and resistance: 0.02 mA					
Lead compensation is adjustable via the parameter Lead compensation resistance ΔF_r The total resistance (sensor+lead) must not exceed 320Ω for Pt100 and 3200Ω for Pt1000, KTY2X-6 or resistance.					
Thermocouple	Fe-Con J EN 60 584	-200 to +999 °C	0.4%/ ≤100ppm/°C ²	-	is recognized
	Fe-Con L DIN 43 710	-200 to +900 °C	0.4%/ ≤100ppm/°C ²	-	is recognized
	NiCr-Ni K EN 60 584	-200 to +999 °C	0.4%/ ≤100ppm/°C ²	-	is recognized
	-10 to 60 mV	customer table ³	0.1%/ ≤100ppm/°C ³	-	is recognized
For the voltage input (-10 to 60 mV), terminal temperature compensation can be used for thermocouples. Internal terminal temperature compensation can be switched off via the setup program (0°C).					
Current	0 — 20 mA	-2 to 22 mA scalable with Δ_{cL} and Δ_{cH} or customer table	0.1%/ ≤100ppm/°C ³	-	-
	4 — 20 mA	2.4 to 21.6 mA scalable with Δ_{cL} and Δ_{cH}	0.1%/ ≤100ppm/°C ³	is recognized	is recognized
Input resistance $R_{IN} \leq 3\Omega$					
Voltage	0 — 10 V	-1 to 11 V scalable with Δ_{cL} and Δ_{cH} or customer table	0.1%/ ≤100ppm/°C	-	-
Input resistance $R_{IN} \geq 100k\Omega$					
1.) The accuracies refer to the measuring range span. 2.) valid from -50°C 3.) A valid customer table must be entered via the setup program and switched over to Δ_{Ab} in the instrument. This may reduce the measuring accuracy.					

Additional data

Sampling time	250 msec
Input filter	1st order digital filter; filter constant ΔF adjustable from 0.1 — 99.9sec
Measurement offset	adjustable from -99.9 to +99.9 via the parameter ΔF_L
Special features	display of temperature unit: °C, °F (Fahrenheit) or switched off
Customer table	The setup program acquires a maximum of 20 value pairs and uses them for the linear interpolation of 20 new calibration points.

Ambient conditions

Ambient temperature range	0 to +55 °C
Ambient temperature range with side-by-side mounting	0 to +40 °C
Storage temperature range	-40 to +70 °C
Temperature drift	≤100ppm/°C of measuring range
Climatic conditions	≤75 % rel. humidity, no condensation
Cleaning and care of front panel	The front panel can be cleaned with all the usual cleaning and rinsing agents. Do not use solvents such as methylated spirit, white spirit, P1 or xylene!

Output

Relay	150,000 operations at 10A 250V AC 50Hz resistive load
-------	---

Supply

Supply voltage	230V AC +10/-15 %, 48 — 63Hz or 115V AC +10/-15 %, 48 — 63Hz (isolated from measurement input)
	12 — 24V DC +15/-15 %, 24V AC +15/-15 %, 48 — 63Hz (not isolated from measurement input)
Power consumption	<3VA

Housing

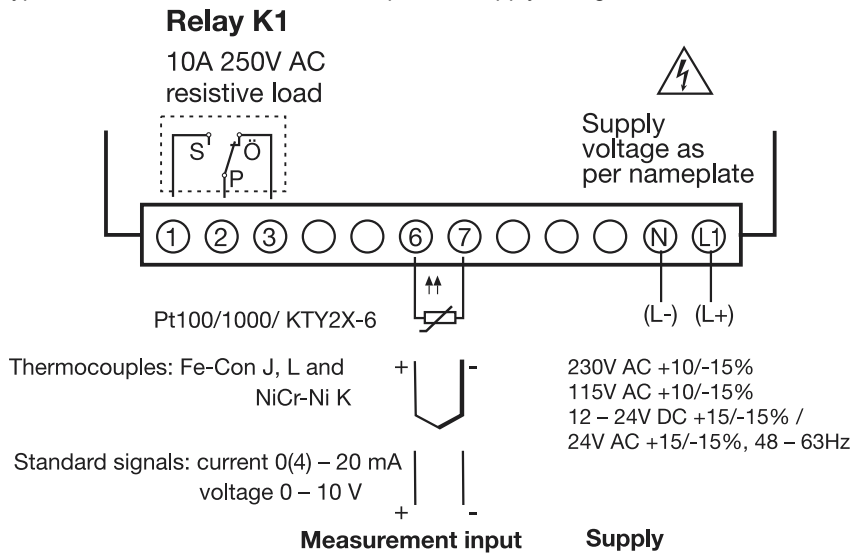
Material	polycarbonate
Mounting	in panel cut-out with bezel seal
Operating position	unrestricted
Weight	approx. 160g
Protection	front IP65, rear IP20
Flammability class	UL 94 V0

Electrical data

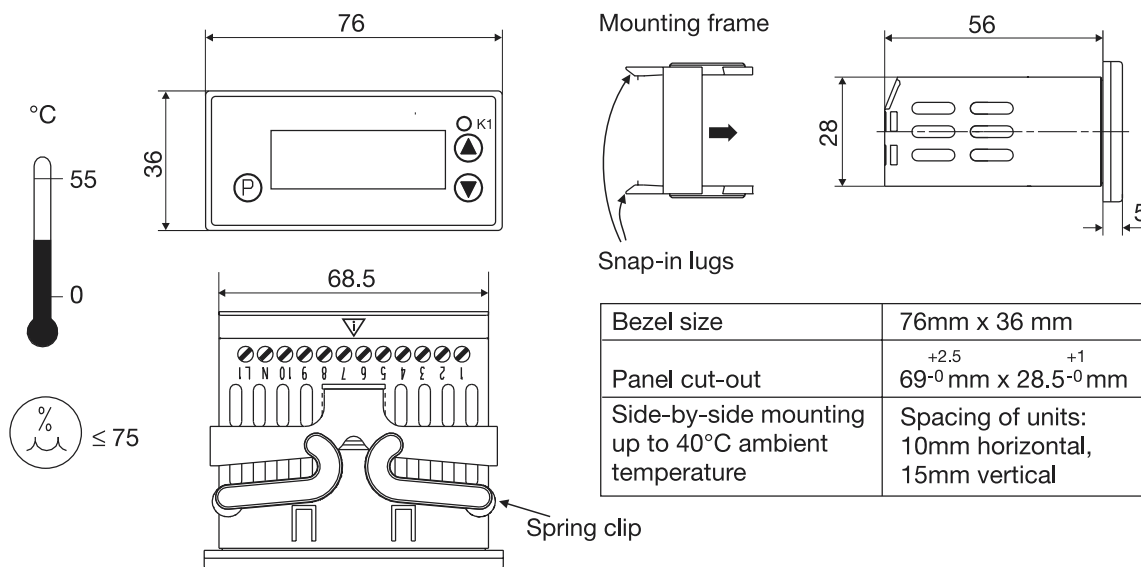
Data backup	EEPROM
Connection	via screw terminals for wire cross-sections up to 4 mm ² solid wire and 2.5 mm ² stranded wire
EMC - interference emission - immunity to interference	EN 61 326 Class B to industrial requirements
Operating conditions	The instrument is designed as a panel-mounting unit.
Electrical safety	to EN 61 010, Part 1 overvoltage category III, pollution degree 2

Connection diagram

Type 701540/XX1-31: Measurement input and supply voltage are not isolated from each other!



Dimensions



Order details

- 701540/ (1) **Basic version**
JUMO di eco
- (2) **Basic type extension Version**
- 8 factory-set, configurable within the measurement input group
- 9 configured to customer specifications **Measurement input group¹**
- 1 Pt100 in 2-wire circuit
Pt1000 in 2-wire circuit
- 2 KTY2X-6
Fe-Con J
Fe-Con L
NiCr-Ni K
- 3 0 – 20 mA
4 – 20 mA
- 4 0 – 10 V
- 1 1 relay (changeover contact 10A 250V)
- (3) **Supply**
- 02 230V AC +10/-15% 48 – 63Hz
- 05 115V AC +10/-15% 48 – 63Hz
- 31 12 – 24V DC +15/-15% /
24V AC +15/-15% 48 – 63Hz
- (4) **Approvals**
- 000 none
- 061 Underwriters Laboratories Inc. (UL)

(1)	(2)	(3)	(4)
Order code	701540	/	811 - 02 - 000
Order example			

factory-set

1.) It is not possible to switch from one meas. input group to another

Suitable transducers can be found in these data sheets:

- 90.2005 Push-in resistance thermometers
- 90.2105 Screw-in resistance thermometers
- 90.1002 and subsequent ones for screw-in thermocouples
- 90.1101 and subsequent ones for push-in thermocouples
- 90.1221 Mineral-insulated thermocouples



Standard accessories

- 1 Operating Manual B 70.1540.0
- 1 mounting frame
- 1 bezel seal

Accessories

Setup program, multilingual
PC interface with TTL / RS232C converter and adapter (pins)

JUMO GmbH & Co. KG
 Delivery address: Mackenrodtstraße 14,
 36039 Fulda, Germany
 Postal address: 36035 Fulda, Germany
 Phone: +49 661 6003-0
 Fax: +49 661 6003-607
 e-mail: mail@jumo.net
 Internet: www.jumo.net

JUMO Instrument Co. Ltd.
 JUMO House
 Temple Bank, Riverway
 Harlow, Essex CM 20 2TT, UK
 Phone: +44 1279 635533
 Fax: +44 1279 635262
 e-mail: sales@jumo.co.uk
 Internet: www.jumo.co.uk

JUMO Process Control, Inc.
 8 Technology Boulevard
 Canastota, NY 13031, USA
 Phone: 315-697-JUMO
 1-800-554-JUMO
 Fax: 315-697-5867
 e-mail: info@jumo.us
 Internet: www.jumo.us



JUMO di 308

Digital Indicator, microprocessor-controlled, with max. 2 inputs, wide range of expansion options, panel-mounting DIN housing, bezel 96mm x 48mm



JUMO di 308
 Type 701550/...

Brief description

The JUMO di 308 indicator shows temperatures in °C or °F, and standard signals in plain text. Even the basic instrument is provided with one analog input, two binary inputs, two relay outputs, two logic outputs, and a supply voltage for a 2-wire transmitter. Three expansion slots can be filled with additional inputs, outputs and interfaces.

The high-contrast, multicolor LCD for showing measurements and for operator prompting consists of a 5-digit 7-segment display (for the measurement or for setting parameters), an 8-character 16-segment display with color changeover (for the value, parameter name, channel name, process/alarm text as a running text of max. 24 characters, or a pseudo bar graph), and 4 switch status indicators for the binary outputs.

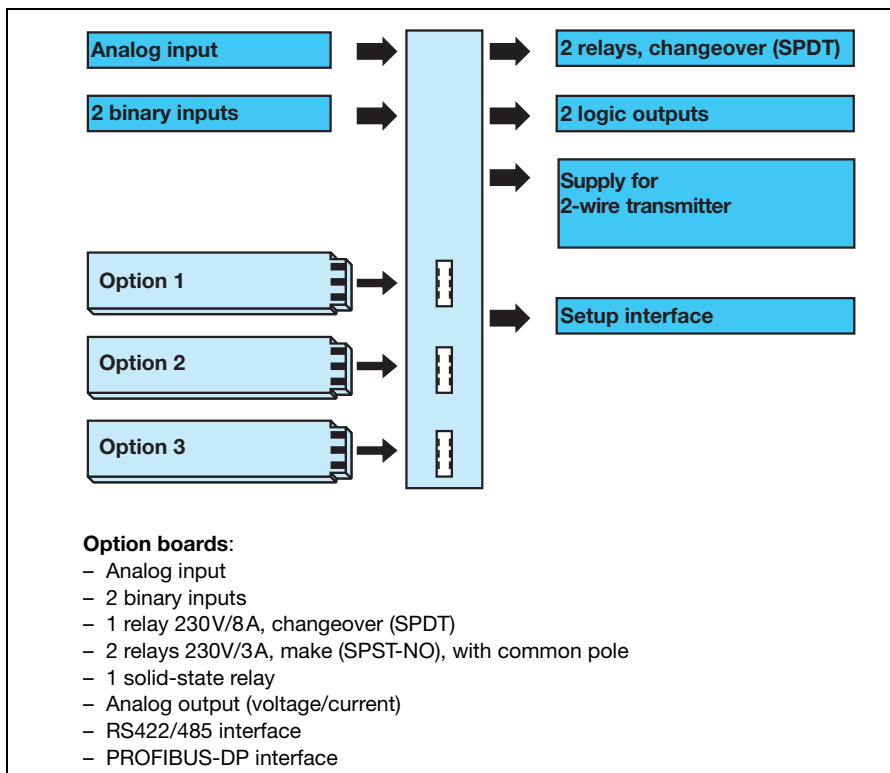
Four keys are provided on the instrument for operation and configuration, and a setup program for PC use is available as an option (e.g. for configuring the math and logic functions, and the input of display texts).

Linearizations for the usual transducers are stored, a customer-specific linearization table can be programmed through 10 interpolation points or by entering the coefficients of the polynomial.

An RS422/485 or a PROFIBUS-DP interface can be used to integrate the instrument into a data network. The electrical connection is made at the back, via screw terminals.

The possible input and output configurations are shown in the following block diagram.

Block structure



Key features

- Configurable process display text (max. 24-character running text)
- Alarm signal text with color changeover green-red (also as running text)
- Up to two configurable analog inputs
- Three option slots
- Math and logic module (option)
- 4 limit comparators
- Fast and convenient configuration through setup program
- RS422/485 interface (option)
- PROFIBUS-DP interface (option)
- cUL/UL approval applied for

Technical data

Thermocouple input

Designation	Measuring range	Meas. accuracy ¹ (incl. cold junction)	Ambient temperature error
Fe-Con L	-200 to +900°C	≤ 0.25%	100ppm/°C
Fe-Con J EN 60584	-200 to +1200°C	≤ 0.25%	100ppm/°C
Cu-Con U	-200 to +600°C	≤ 0.25%	100ppm/°C
Cu-Con T EN 60584	-200 to +400°C	≤ 0.25%	100ppm/°C
NiCr-Ni K EN 60584	-200 to +1372°C	≤ 0.25%	100ppm/°C
NiCr-Con E EN 60584	-200 to +1000°C	≤ 0.25%	100ppm/°C
NiCrSi-NiSi N EN 60584	-100 to +1300°C	≤ 0.25%	100ppm/°C
Pt10Rh-Pt S EN 60584	0 to +1768°C	≤ 0.25%	100ppm/°C
Pt13Rh-Pt R EN 60584	0 to +1768°C	≤ 0.25%	100ppm/°C
Pt30Rh-Pt6Rh B EN 60584	0 to +1820°C	≤ 0.25% (from 300°C)	100ppm/°C
W5Re-W26Re C	0 to +2320°C	≤ 0.25%	100ppm/°C
W3Re-W25Re D	0 to +2495°C	≤ 0.25%	100ppm/°C
W3Re-W26Re	0 to +2400°C	≤ 0.25%	100ppm/°C
Chromel-copel GOST 8.585-2001	-200 to +800°C	≤ 0.25%	100ppm/°C
Cold junction	Pt100, internal		

RTD input

Designation	Connection circuit	Measuring range	Meas. accuracy ¹		Ambient temperature error
			3-/4-wire	2-wire	
Pt100 EN 60751	2-wire / 3-wire / 4-wire	-200 to +850°C	≤ 0.05%	≤ 0.4%	50ppm/°C
Pt500 EN 60751	2-wire / 3-wire / 4-wire	-200 to +850°C	≤ 0.2%	≤ 0.4%	100ppm/°C
Pt1000 EN 60751	2-wire / 3-wire / 4-wire	-200 to +850°C	≤ 0.1%	≤ 0.2%	50ppm/°C
Pt50 GOST 6651-94	2-wire / 3-wire / 4-wire	-200 to +850°C	≤ 0.1%	≤ 0.8%	50ppm/°C
Pt100 GOST 6651-94	2-wire / 3-wire / 4-wire	-200 to +850°C	≤ 0.05%	≤ 0.4%	50ppm/°C
Cu50 GOST 6651-94	2-wire / 3-wire / 4-wire	-50 to +200°C	≤ 0.2%	≤ 1.6%	50ppm/°C
Cu100 GOST 6651-94	2-wire / 3-wire / 4-wire	-50 to +200°C	≤ 0.1%	≤ 0.8%	50ppm/°C
KTY11-6	2-wire	-50 to +150°C	–	≤ 2.0%	50ppm/°C
Sensor lead resistance	30Ω max. per lead for 3-wire/4-wire circuit				
Measuring current	approx. 250µA				
Lead compensation	Not required for 3-wire or 4-wire circuit. With a 2-wire circuit, the lead resistance can be compensated in software by a correction of the process value.				

Input for standard signals

Designation	Measuring range	Meas. accuracy ¹	Ambient temperature error
Voltage	0(2)–10V 0–1V Input resistance R _{IN} > 100kΩ	≤ 0.05% ≤ 0.05%	100ppm/°C 100ppm/°C
Current	0(4)–20mA, voltage drop ≤ 1.5V	≤ 0.05%	100ppm/°C
Resistance transmitter	min. 100Ω, max. 4kΩ	±4Ω	100ppm/°C

Binary inputs

Floating contacts	open = not active; short-circuit to GND = active
-------------------	--

Measuring circuit monitoring

Transducer	Detection of overrange/underrange	Detection of probe/lead short-circuit	Detection of probe/lead break
Thermocouple	yes	no	yes
RTD	yes	yes	yes
Voltage 2 – 10V 0 – 10V 0 – 1V	yes	yes	yes
	yes	no	no
	yes	no	no
Current 4 – 20mA 0 – 20mA	yes	yes	yes
	yes	no	no
Resistance transmitter	no	no	yes

In the event of a fault, the outputs move to a defined (configurable) status.

¹ The accuracy refers to the max. measurement range span. The linearization accuracy is reduced with short spans.

Outputs

Relay, changeover (SPDT) - contact rating - contact life	3A at 230V AC resistive load 350 000 operations at rated load/750 000 operations at 1A
Logic outputs	0/12V / 25mA max. (sum of all output currents)
Supply voltage for 2-wire transmitter	electrically isolated, not stabilized 15.8 – 15.2V / 30 – 50mA
Relay, changeover (SPDT), option - contact rating - contact life	8A at 230VAC resistive load 100 000 operations at rated load / 350 000 operations at 3A
Relay, make (SPST-NO), option - contact rating - contact life	3A at 230VAC resistive load 350 000 operations at rated load / 900 000 operations at 1A
Solid-state relay (option) - contact rating - protection circuitry	1A at 230V varistor
Voltage (option) - output signals - load resistance - accuracy	0 – 10V / 2 – 10V $R_{load} \geq 500\Omega$ $\leq 0.5\%$
Current (option) - output signals - load resistance - accuracy	0 – 20mA / 4 – 20mA $R_{load} \leq 500\Omega$ $\leq 0.5\%$

Display

Type	LCD with background lighting
Display 1	7-segment display, 18mm high, 5 digits, color: red
Function of display 1	measurement display and parameter setting
Display 2	16-segment display, 7mm high, 8 digits, color: red/green (switchable)
Function of display 2	24-character running text display (alarms), display of measurements or parameter names
Display 3	4 switching status indicators (K1 to K4), 3mm high

Electrical data

Supply voltage (switch-mode PSU)	110 – 240V AC -15/+10%, 48 – 63Hz or 20 – 30V AC/DC, 48 – 63Hz
Electrical safety	to EN 61 010, Part 1 overvoltage category III, pollution degree 2
Power consumption	13VA max.
Data backup	EEPROM
Electrical connection	at the back, via screw terminals, conductor cross-section up to 2.5mm ² (see table on page 5)
Electromagnetic compatibility (EMC) - interference emission - interference immunity	EN 61 326 Class B to industrial requirements

Housing

Housing type	plastic housing for panel mounting to IEC 61544
Depth behind panel	90 mm
Ambient/storage temperature range	0 to 55°C / -30 to +70°C
Climatic conditions	rel. humidity $\leq 90\%$ annual mean, no condensation
Operating position	horizontal
Enclosure protection	to EN 60 529, front IP65 / back IP20
Weight (fully fitted)	approx. 380g

Interface

Modbus

Interface type	RS422/RS485
Protocol	Modbus
Baud rate	9600, 19200, 38400
Device address	0 – 255
Max. number of nodes	32

PROFIBUS-DP

Device address	0 – 255
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Customized linearization

In addition to the linearizations for the usual transducers, a customer-specific linearization can be created. The programming is carried out in the setup program, in the form of a table of values (10 value pairs) or a formula (coefficient entry of polynomial).

User data

Parameters which frequently have to be changed by the user can be combined at the user level, under "User data" (only through the setup program).

Math and logic module (extra code)

The math module makes it possible to integrate measurements from the analog inputs into a mathematical formula, so that the calculated process variable is displayed. The logic module can be used, for instance, to make a logical combination of binary inputs and limit comparator states.

Up to two math or logic formulae can be entered through the setup program, and the results of the calculations can be presented at the outputs or via the display.

Binary functions

- key/level inhibit
- display off
- text display
- color changeover
- resetting MIN/MAX values
- "hold" function
- acknowledge limit comparators
- taring function
- resetting the taring function
- jump to next scroll parameter

The logic functions can be combined with one another (only through the setup program).

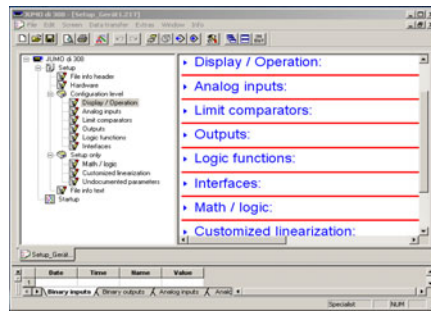
Functions of the outputs

- analog input variables
- math
- limit comparators
- binary inputs
- logic formula

Setup program for PC (accessory)

The PC setup program for configuring the instrument is available in English, French, German, Russian and other languages. It can be used to create and edit data sets, transfer them to the instrument or read them out from it. The data can be saved and printed.

The program includes a startup function for recording and visualizing measurement data.



Interfaces

Setup interface

The setup interface is integrated as standard in the indicator. It can be used to configure the instrument, in conjunction with the setup program (accessory) and setup interface (accessory).

RS422/RS485 interface

The serial interface serves for communication with supervisory systems, using the Modbus protocol.

PROFIBUS-DP

The indicator can be integrated into a field bus system according to the PROFIBUS-DP standard via the PROFIBUS-DP interface. This PROFIBUS version is especially designed for communication between automation systems and decentralized peripheral devices at the field level, and optimized for speed.

Data transmission is made serially, using the RS485 standard.

GSD generator, the project-planning tool that is supplied with the package (GSD =

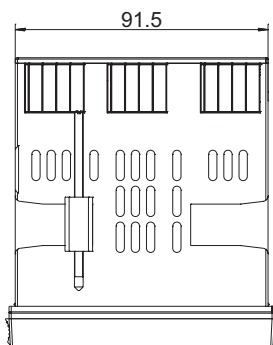
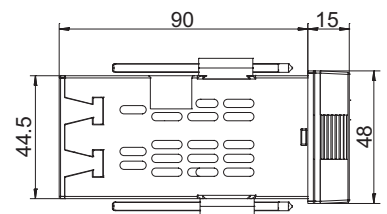
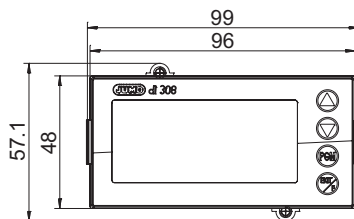
Gerätestammdaten, i.e. device data), is used to make a selection of device characteristics for the indicator, to create a standardized GSD file that is used to integrate the indicator into the field bus system.

Displays and controls



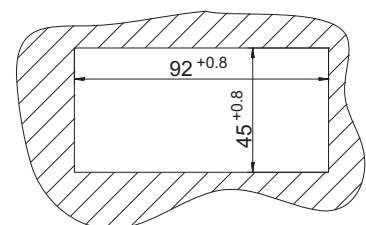
(1)	7-segment display (measurement display) 5-digit, red; configurable decimal place (automatic adjustment on display overflow)
(2)	16-segment display (24-character running text, parameter name, level symbols) 8-character, green or red; configurable decimal place
(3)	Indicator yellow; for four switching states of max. four outputs (indicator lit up = on)
(4)	Keys

Dimensions



PC interface adapter

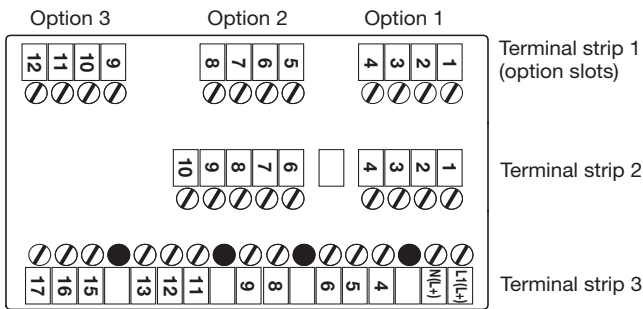
Panel cut-out



Side-by-side mounting

Minimum spacing of panel cut-outs		
	horizontal	vertical
without setup plug:	30mm	11mm
with setup plug (see arrow):	65mm	11mm

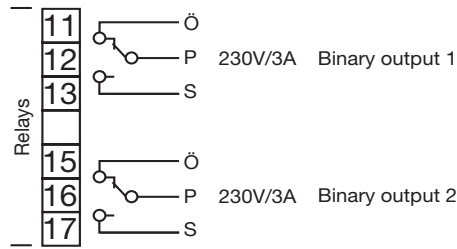
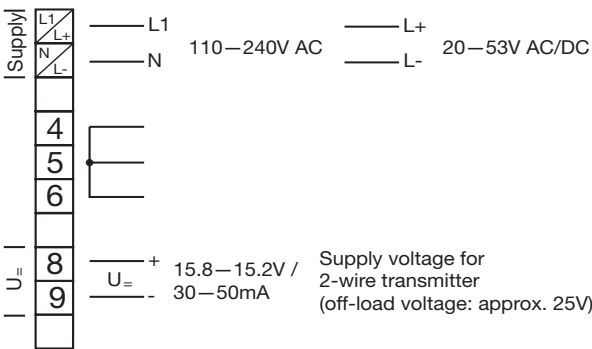
Connection diagram



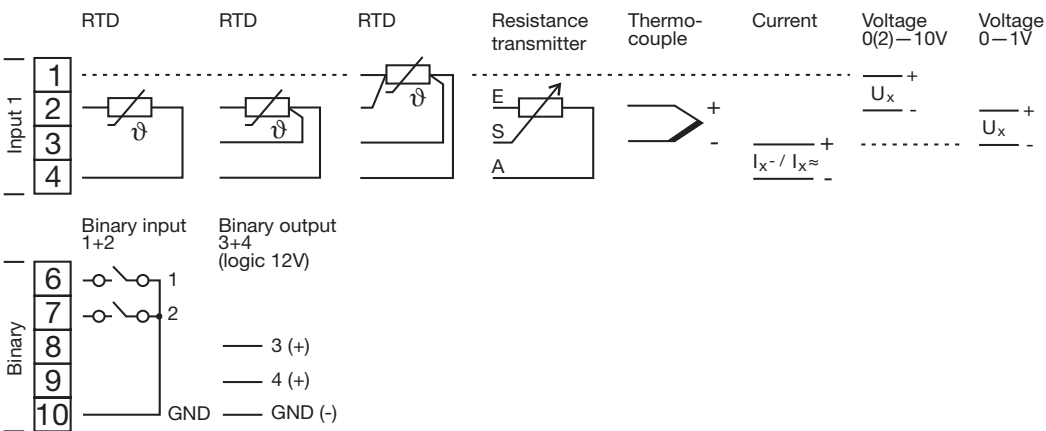
Conductor cross-sections and core-end ferrules for installation

Core-end ferrule	Conductor cross-section		Min. length of core-end ferrule or stripped
	min.	max.	
without ferrule	0.34mm ²	2.5mm ²	10mm (stripped)
without lip	0.25mm	2.5mm ²	10mm
with lip up to 1.5mm ²	0.25mm ²	1.5mm ²	10mm
with lip from 1.5mm ²	1.5mm ²	2.5mm ²	12mm
twin, with lip	0.25mm ²	1.5mm ²	12mm

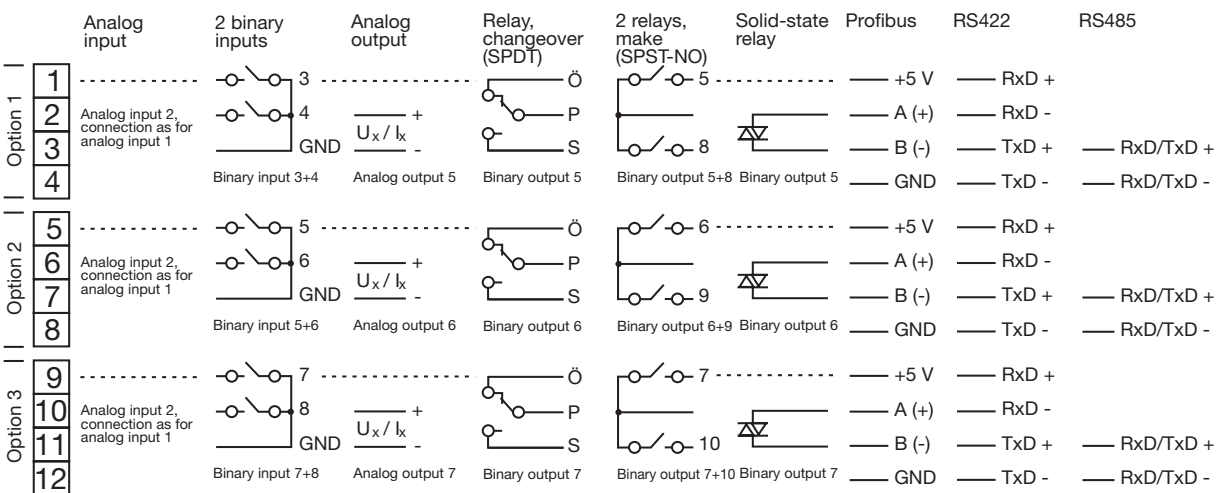
Terminal strip 3



Terminal strip 2



Terminal strip 1



Order details

Basic type

701550	JUMO di 308 including 1 analog input, 2 binary inputs, 2 relay outputs, 2 logic outputs, 96mm x 48mm bezel
--------	--

Basic type extensions

1		Basic type
		Version
8		standard, with factory settings
9		programming to customer specification
		logic outputs (2 are available)
	1	0/12V

Option slots

1.	2.	3.	Option slot	Max. number
0	0	0	not used	
1	1	1	analog input 2 (universal)	1
2	2	2	relay output, 1 changeover (SPDT)	2
3	3	3	relay output, 2 make (SPST-NO)	2
4	4	4	analog output	2
5	5	5	2 binary inputs	2
6	6	6	solid-state relay 1A	2
7	7	7	RS422/485 interface	1
8	8	8	PROFIBUS-DP interface	1

Caution:
Any assignment of the options to the slots (slots 1, 2 or 3) is possible. Their max. number, however, must not be exceeded.

Supply voltage

23	110 – 240V AC, 48 – 63Hz
25	20 – 30V AC/DC, 48 – 63Hz

Extra codes

000	none
214	math and logic module

Order code: 701550 / 1 8 1 - 4 0 0 - 23 / 000
 Order example: 701550 / 1 8 1 - 4 0 0 - 23 / 000

Standard accessories

- indicator
- seal
- mounting brackets
- Operating Instructions B70.1550.0 in DIN A6 format

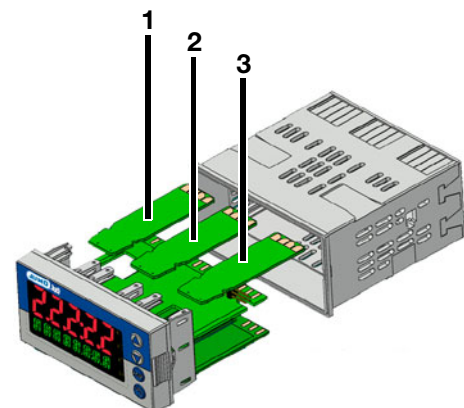
Accessories

- PC setup program
Sales No. 70/00493223
- PC interface with TTL/RS232 converter and adapter
Sales No. 70/00350260
- PC interface with USB/TTL converter, adapter (socket) and adapter (plug)
Sales No. 70/00456352

Further accessories

- A CD with the demo setup program and PDF documents (operating instructions and further documentation) can be ordered separately.

View of the three option slots



Delivery address: Mackenrodtstraße 14,
36039 Fulda, Germany
Postal address: 36035 Fulda, Germany
Phone: +49 661 6003-0
Fax: +49 661 6003-607
e-mail: mail@jumo.net
Internet: www.jumo.net

JUMO House
Temple Bank, Riverway
Harlow, Essex CM 20 2TT, UK
Phone: +44 1279 635533
Fax: +44 1279 635262
e-mail: sales@jumo.co.uk
Internet: www.jumo.co.uk

885 Fox Chase, Suite 103
Coatesville PA 19320, USA
Phone: 610-380-8002
1-800-554-JUMO
Fax: 610-380-8009
e-mail: info@JumoUSA.com
Internet: www.JumoUSA.com



JUMO TDA-300 and JUMO TDA-3000 Handheld Thermometer with data logger

Brief description

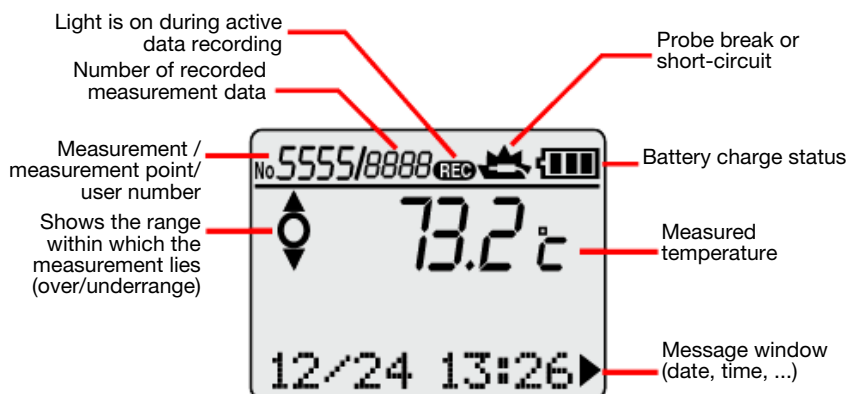
TDA-300 and TDA-3000 are handheld digital temperature indicators. They are used together with precision thermocouples or RTDs to measure temperatures on surfaces, in liquids, in melts, and in soft materials.

Interchangeable temperature probes allow rapid adaptation to different applications.

Both instruments feature a data logging function. On Type TDA-3000, the recorded measurement data can be read out via an USB interface. No special PC program is necessary for visualization, since the measurement data are available as ASCII files in CSV format (evaluation via spreadsheet programs).

The plastic housing is proof against shock and breakage and resistant to corrosive substances. Thermometers, temperature probes and accessories are all available for delivery from stock.

Displays



TDA-300 (Type 702540/...)
TDA-3000 (Type 702541/...)

Comparison of models

	TDA-300	TDA-3000
Data logger	99 measurements	9999 measurements
TAG numbers (meas. point designation)	5 (11 characters each)	99 (11 characters each)
User	1	99 (11 characters each)
Interfaces	-	USB, type Mini-B
Enclosure protection	IP67	IP54

Key features

- Measurement input for Pt100, NiCr-Ni K, Fe-Con J and Cu-Con T
- DKD calibration certificate
- Data logger for 9999 measurements
- Simple readout via USB and evaluation of data from a PC (TDA-3000 only)
- Limit monitoring
- Peak/bottom value acquisition
- Battery AA, Mignon LR6, with a long service life

Technical data

Input

Measurement input	RTD Pt100 to EN 60 751	Thermocouple NiCr-Ni K to EN 60 584	Thermocouple Fe-Con J to EN 60 584	Thermocouple Cu-Con T to EN 60 584
Range limits - resolution 1 °C - resolution 0.1 °C	-200 to +850 °C -199.9 to +850.0 °C	-200 to +1372 °C -199.9 to +999.9 °C	-200 to +1200 °C -199.9 to +999.9 °C	-50 to +400 °C -50.0 to +400.0 °C
Measurement offset	-99.9 to +99.9 °C			
Sampling rate	0.5 seconds			
Input filter	1st order digital filter; filter constant adjustable from 0 – 100 seconds			
Unit	°C or °F			

Accuracy

Measurement accuracy of display at 23 °C ambient temperature	±(0.1 % + 1 digit) or ±0.3 °C; the larger value applies			
Accuracy of cold junction (thermocouple only)	-	±0.5 °C for 5 to 40 °C ±1 °C for -20 to +5 °C and for 40 to 50 °C	±0.5 °C for 5 to 40 °C ±1 °C for -20 to +5 °C and for 40 to 50 °C	±0.5 °C for 5 to 40 °C ±1 °C for -20 to +5 °C and for 40 to 50 °C
Accuracy class of temperature probes	Class A	Class 2	Class 2	Class 2

Measuring circuit monitoring

Probe short-circuit, probe/cable break, wrong connection	Symbol in display 
--	--

Electrical data

Supply	1 alkaline battery, type LR6 AA
Battery service life	400 hrs continuous operation at 23 °C ambient temperature
Power consumption	10mW (average value)

Environmental influences

Device type	TDA-300	TDA-3000
Operating temperature range	-20 to +50 °C	
Temperature error	± 0.01 % of measuring span for 5 to 40 °C ambient temperature ± 0.02 % of measuring span for -20 to +5 °C and 40 to 50 °C ambient temperature	
Climatic conditions	rel. humidity ≤ 95 % annual average, no condensation	
EMC - interference emission - immunity to interference	EN 61 326 Class B to general requirements	
IP enclosure protection	IP67	IP54

Housing

Dimensions (W x H x D)	57 x 152 x 46mm
Weight	approx. 150g including battery

Display screen




Screen type	FSTN LCD
Display of measured temperature	through 4 digits
Display of memory number	through 4 digits
Display of total number of measured temperatures	through 4 digits
Messages (date, time, ...)	11 characters (68 x 8 pixels)
Data logging info	through symbol; light is on during data recording, flashes when ready for automatic data recording
Probe break/short-circuit	through symbol; light is on when the sensor is not connected or in the event of a break or short-circuit.

Battery charge status	3-stage display
Temperature unit	°C or °F (12 x 8 pixels)

Data logging function

Device type	TDA-300	TDA-3000
Recording type	manual or automatic	
Recording interval	any (manually), 1 — 3600 seconds (automatically)	
Contents of data record	temperature, TAG No. (meas. point designation), user, limits, and date/time	
Recording capacity	99 measurements	9999 measurements
Data storage	in SRAM (volatile memory)	in EEPROM (non-volatile memory)
	Loss of data when battery is discharged or has to be replaced	Data are retained for about 10 years, memory can be rewritten about 100,000 times.

Limit monitoring

Limit monitoring	upper and lower limit can be set for each measurement point
Temperature within the limits	
Temperature above or below the limit	 

Measurement points

Device type	TDA-300	TDA-3000
Number of measurement points	5	99
TAG number (meas. point designation)	consisting of up to 11 characters (digits, letters, and symbols)	

User

Device type	TDA-300	TDA-3000
Number of users	1	99
User names	-	consisting of up to 11 characters (digits, letters, and symbols)

USB interface (Universal Serial Bus) - only for TDA-3000

Speed	USB 2.0 (theoretically 12 Mbps max.)
Connection	Mini-B connector
Connecting cable	included in delivery
Supply	via PC
PC operating system	for Windows XP (Home/Prof.), Me and 2000 (Prof.)

Additional functions

Functions	Peak/bottom value storage, real-time clock (date and time), function locking and self-diagnostics
-----------	---

Temperature probes and adapters

RTD Pt100 with handle and attached connecting cable

Type	Construction	Description
Immersion probe 702546/01-100		<p>The immersion probe with handle is particularly suitable for measuring temperatures in liquids.</p> <p>The temperature sensor is located in the probe tip, embedded in a heat transfer compound. The handle, which is provided with an anti-kink spring, is made from temperature-resistant plastic.</p> <p>Max. measurement temperature: 250°C Max. temperature of handle: 100°C Max. temperature of cable: 180°C</p>
Insertion probe 702546/02-100		<p>Thanks to its measurement tip, this probe is particularly suitable for measuring the core temperature in food and other soft materials.</p> <p>The silicone handle is covered by a protective sleeve and is resistant to corrosive media such as oil and fatty acids.</p> <p>Max. measurement temperature: 250°C Max. temperature of handle: 180°C Max. temperature of cable: 180°C</p>

Thermocouples NiCr-Ni K with handle and attached compensating cable

Type	Construction	Description
Flexible immersion probe (mineral-insulated thermocouple) 702545/01-...		<p>The immersion probe tip is suitable for measuring temperatures in liquids.</p> <p>Max. measurement temperature: 1150°C Max. temperature of handle: 100°C Max. temperature of cable: 180°C</p>
Insertion probe 702545/02-...		<p>Thanks to its measurement tip, this probe is particularly suitable for measuring the core temperature in food and other soft materials.</p> <p>The silicone handle is covered by a protective sleeve and is resistant to corrosive media such as oil and fatty acids.</p> <p>Max. measurement temperature: 250°C Max. temperature of handle: 180°C Max. temperature of cable: 180°C</p>
Surface probe 702545/03-004		<p>The surface probe is particularly suitable for measurement on very small and uneven objects with poor heat conduction, for instance electronic components, glass, ceramic.</p> <p>The thermocouple is mounted on a spring plate so that the probe can also be applied obliquely to the surface.</p> <p>Max. measurement temperature: 400°C Max. temperature of handle: 100°C Max. temperature of cable: 180°C</p>
Surface probe 702545/03-015		<p>This surface probe enables highly accurate and easily reproducible measurements on flat surfaces.</p> <p>Since the spring bands of the probe are transversely linked, the measurements are largely independent of the applied pressure and the contact angle.</p> <p>Max. measurement temperature: 500°C Max. temperature of handle: 110°C Max. temperature of cable: 180°C</p>

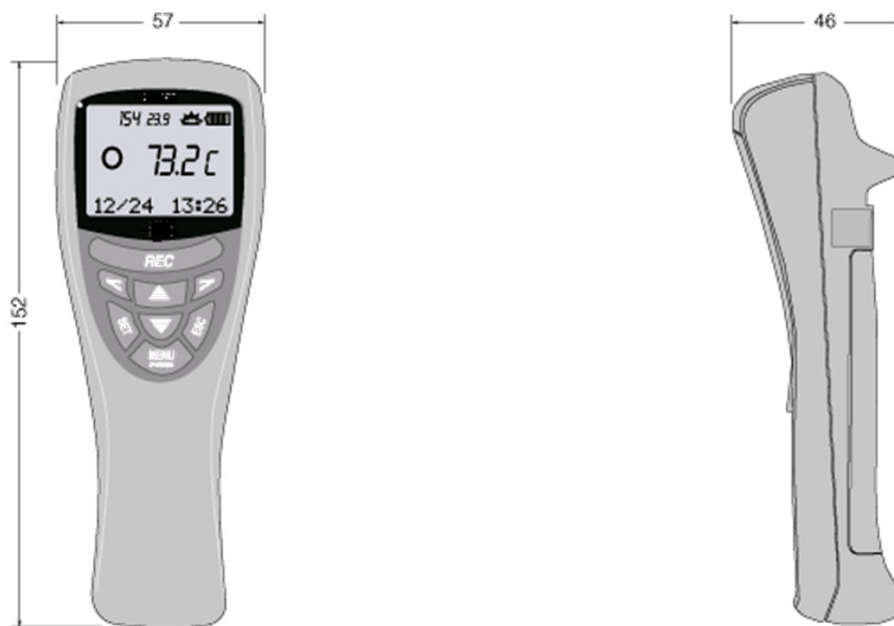
The cable length for all probes is about 1500mm. The insertion probes are protected to IP67.

Probes with type J and T thermocouples on request.

Adapters for existing probes

Type	Diagram	Description
Adapter for RTD Pt100 702546/04-000		The adapter is 1700mm long and can be used in ambient temperatures up to 100°C. Existing RTDs can be connected up via a connector-coupling combination (type Mini-Flach) in copper.
Adapter for thermocouple type K 702545/04-000		The adapter is 1700mm long and can be used in ambient temperatures up to 100°C. Existing thermocouples can be connected up via a thermal connector-coupling (type Mini-Flach).

Dimensions



Carrying case



Order details: Handheld thermometer with data logger

(1) Basic version

		702540/	TDA-300
		702541/	TDA-3000
		(2) DKD certificate	
x	x	88	without certificate
x	x	99	with certificate
		(3) DKD test	
x	x	000	without test
x	x	774	test at 0, 100 and 200°C
x	x	775	test to customer specification (please specify test points in plain text)

Order code (1) / (2) - (3)

Order example 702541 / 88 - 000

Order details: Temperature probe and adapter

(1) Basic version

		702545/	Thermocouple K
		702546/	Pt100 RTD
		(2) Probe type	
x	x	01	immersion probe
x	x	02	insertion probe
x		03	surface probe
x	x	04	adapter with 1500mm cable, for existing probes
		(3) probe diameter/length	
x	x	000	with probe type 04 only
x		004	4 mm dia. (probe type 03 only)
x		015	15 mm dia. (probe type 03 only)
x	x	100	length: 100 mm (probe types 01 and 02 only)
x		150	length: 150 mm (probe type 02 only)
x		200	length: 200 mm (probe type 01 only)

Order code (1) / (2) - (3)

Order example 702545 / 01 - 200

Standard accessories

- 1 Operating Manual
- 1 battery
- 1 carrying hook
- 1 USB connecting cable (TDA-3000 only)

Accessories

- Silicone heat transfer compound (30g tube, for temperature measurements up to 200°C, Sales No. 70/94091460
- Carrying case for thermometer, two probes, heat transfer compound and accessories, Sales No. 70/00453912

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Compact and process controllers

Series JUMO iTRON

Nr.

JUMO iTRON 04/08/16/32

Compact microprocessor controllers

Housing for flush-panel mounting to DIN 43 700

70.2040

JUMO iTRON 04B

Compact microprocessor controller with timer

Panel-mounting housing to DIN 43 700

70.2050

JUMO iTRON DR 100

Compact microprocessor controller with 2-line LC display

Mounting on a 35mm DIN rail

70.2060

Series JUMO dTRON

Nr.

JUMO dTRON 304/308/316

Compact Controller with program function

70.3041

JUMO dTRON 304 plast/308 plast

Compact Controller with program function

70.3046

Series JUMO DICON / IMAGO

Nr.

JUMO DICON 400/500

Universal process controllers

70.3570

JUMO DICON 401/501

Universal profile controllers/Universal profile generators

70.3580

JUMO IMAGO 500

Multi-channel Process and Program Controller

70.3590

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Automation system JUMO mTRON**Nr.****JUMO mTRON-Controller module**

with clip-on mounting to DIN rail

70.4010

JUMO mTRON-Relay module

with clip-on mounting to DIN rail

70.4015

JUMO mTRON-Analog input module

with clip-on mounting to DIN rail

70.4020

JUMO mTRON-Analog output module

with clip-on mounting to DIN rail

70.4025

JUMO mTRON-Logic module

with clip-on mounting to DIN rail

70.4030

JUMO mTRON-Operating unit

Panel-mounting housing, bezel size 151.6mm x 80.3mm

70.4035

JUMO mTRON-Communication module

with clip-on mounting to DIN rail

70.4040

JUMO mTRON-iTOOL

Project design software

70.4090

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JUMO iTRON 04/08/16/32

Compact microprocessor controllers

Housing for flush-panel mounting to DIN 43 700

Brief description

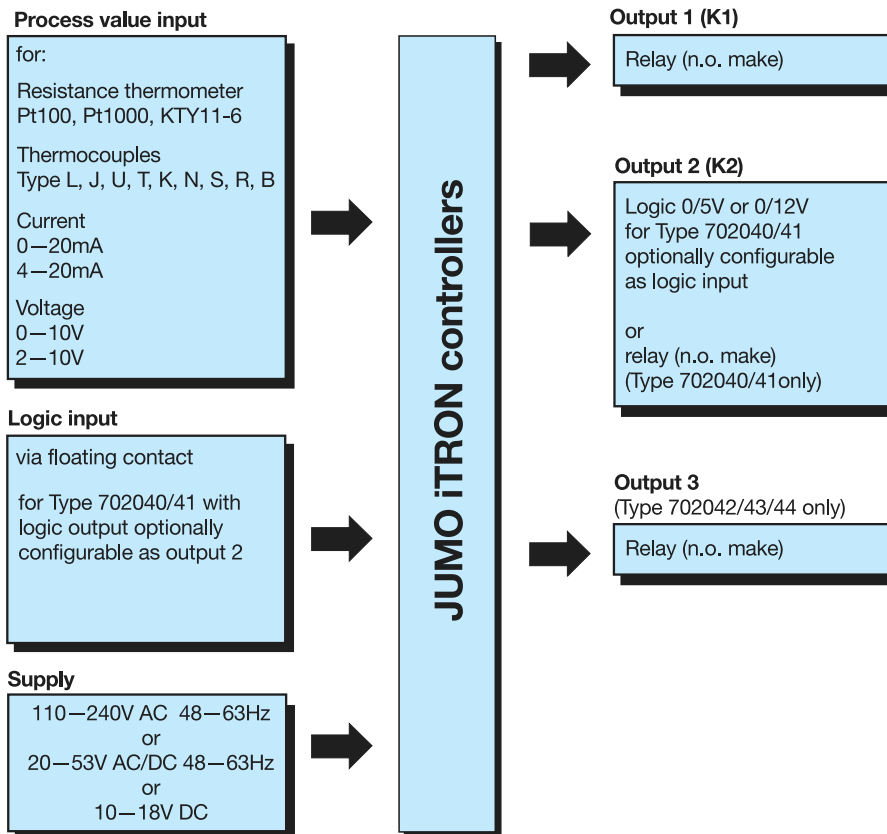
The JUMO iTRON controller series comprises universal and freely programmable compact instruments for a variety of control tasks. It consists of five models, with the bezel sizes 96mm x 96mm, 96mm x 48mm in portrait and landscape format, 48mm x 48mm and 48mm x 24mm.

The controllers feature a clearly readable 7-segment display which, depending on the version, is 10 or 20 mm high, for process value and setpoint indication or for dialogs. Only three keys are needed for configuration. Parameter setting is arranged dynamically, and after two operation-free seconds the value is accepted automatically. Self-optimisation, which is provided as standard, establishes the optimum controller parameters by a key stroke. The basic version also includes a ramp function with adjustable gradients. A timer function has been integrated as an extra.

All controllers can be employed as single-setpoint controllers with a limit comparator, or as double-setpoint controllers. The linearisations of the usual transducers are stored. Protection is IP65 at the front and IP20 at the back. The electrical connection is by a plug-in connector with screw terminals.

The inputs and outputs are shown in the block structure below.

Block structure



JUMO iTRON 32
Type 702040



JUMO iTRON 16
Type 702041



JUMO iTRON 08
Type 702042



JUMO iTRON 08
Type 702043



JUMO iTRON 04
Type 702044

Features

- Structured operating and programming layout
- Self-optimisation
- Ramp function
- Timer function
- Digital input filter with programmable filter time constant
- 1 limit comparator
- limit switch

Technical data

Thermocouple input

Designation	Range	Measurement accuracy	Ambient temperature error
Fe-Con L	-200 to + 900 °C	≤0.4%	100 ppm/°C
Fe-Con J EN 60 584	-200 to +1200 °C	≤0.4%	100 ppm/°C
Cu-Con U	-200 to + 600 °C	≤0.4%	100 ppm/°C
Cu-Con T EN 60 584	-200 to + 400 °C	≤0.4%	100 ppm/°C
NiCr-Ni K EN 60 584	-200 to +1372 °C	≤0.4%	100 ppm/°C
NiCrSi-NiSi N EN 60 584	-200 to +1300 °C	≤0.4%	100 ppm/°C
Pt10Rh-Pt S EN 60 584	0 – 1768 °C	≤0.4%	100 ppm/°C
Pt13Rh-Pt R EN 60 584	0 – 1768 °C	≤0.4%	100 ppm/°C
Pt30Rh-Pt6Rh B EN 60 584	0 – 1820 °C	≤0.4%	100 ppm/°C
Cold junction	Pt 100 internal		

Resistance thermometer input

Designation	Connection type	Range	Measurement accuracy	Ambient temperature error
Pt 100 EN 60 751	2-/3-wire	-200 to +850 °C	≤0.1%	50 ppm/°C
Pt 1000 EN 60 751	2-/3-wire	-200 to +850 °C	≤0.1%	50 ppm/°C
KTY11-6	2-wire	-50 to +150 °C	≤1.0%	50 ppm/°C
Sensor lead resistance	20 Ω max. per lead for 2- and 3-wire circuit			
Measurement current	250 μA			
Lead compensation	Not required for 3-wire circuit. For 2-wire circuit, lead compensation can be implemented in software through process value correction.			

Standard signal input

Designation	Range	Measurement accuracy	Ambient temperature error
Voltage	0 – 10V, input resistance $R_E > 100k\Omega$	≤0.1%	100 ppm/°C
	2 – 10V, input resistance $R_E > 100k\Omega$	≤0.1%	100 ppm/°C
	0 – 1V, input resistance $R_E > 10M\Omega^1$	≤0.1%	100 ppm/°C
	0,2 – 1V, input resistance $R_E > 10M\Omega^1$	≤0.1%	100 ppm/°C
Current	4 – 20mA, voltage drop 1V max.	≤0.1%	100 ppm/°C
	0 – 20mA, voltage drop 1V max.	≤0.1%	100 ppm/°C

1. for Type 702040/41 with 2 relay outputs (option)

Measurement circuit monitoring¹

Transducer	Overrange/underrange	Probe /lead short-circuit ¹	Probe/lead break
Thermocouple	•	-	•
Resistance thermometer	•	•	•
Voltage 2–10V / 0.2–1V 0–10V/ 0–1V	•	•	•
	•	-	-
Current 4–20mA 0–20mA	•	•	•
	•	-	-

1. In the event of a fault, the outputs move to a defined status (configurable).

■ = factory setting • recognised - not recognised

Outputs

Assignment	Type 702040/41	Type 702042/43/44
Output 1	relay	relay
Output 2	logic 0/5V or logic input	logic 0/5V
Output 2 (option)	logic 0/12V or logic input	logic 0/12V
Output 2 (option)	relay	not possible
Output 3	not available	relay
Technical data		
Relay rating contact life	n.o. (make) contact 3A at 250VAC resistive load 150 000 operations at rated load	
Logic current limiting load resistance	0/5V 20mA $R_{load} \geq 250\Omega$ min.	
Logic current limiting load resistance	0/12V 20mA $R_{load} \geq 600\Omega$ min.	

■ = factory setting

Controller

Controller type	single-setpoint controller with limit comparator, double-setpoint controller
Controller structures	P/PD/PI/PID
A/D converter	resolution better than 15 bit
Sampling time	210msec/250msec with activated timer function

Timer

Accuracy	0.7% ± 10ppm/°C
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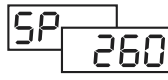
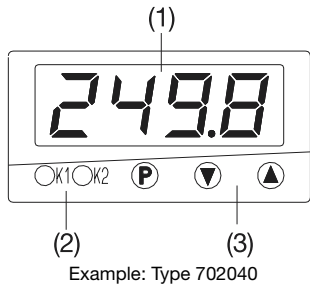
Electrical data

Supply (switch-mode power supply)	110 – 240V -15/+10% AC 48 – 63Hz, or 20 – 53V AC/DC 48 – 63Hz, or 10 – 18V DC (Connection to SELV or PELV)
Test voltages (type test)	to EN 61 010, Part 1, March 1994, overvoltage category II, pollution degree 2, for Type 702040/41 overvoltage category III, pollution degree 2, for Type 702042/43/44
Power consumption	max. 5VA
Data backup	EEPROM
Electrical connection	at the rear, via plug-in screw terminals, conductor cross-section up to 1.5mm ² (1.0mm ² for Type 702040/41) or 2x 1.5mm ² (1.0mm ² for Type 702040/41) with ferrules
Electromagnetic compatibility interference emission interference immunity	EN 61 326 Class B to industrial requirements
Safety regulation	to EN 61 010-1

Housing

Housing type	plastic housing for flush-panel mounting to DIN 43 700				
Dimensions in mm (for Type)	702040	702041	702042	702043	702044
Bezel size	48 x 24	48 x 48	48 x 96 (portrait)	96 x 48 (landscape)	96 x 96
Depth behind panel	100	100	70	70	70
Panel cut-out	45 ^{+0.6} x 22.2 ^{+0.3}	45 ^{+0.6} x 45 ^{+0.6}	45 ^{+0.6} x 92 ^{+0.8}	92 ^{+0.8} x 45 ^{+0.6}	92 ^{+0.8} x 92 ^{+0.8}
Ambient/storage temperature range	0 – 55°C / -40 to +70°C				
Climatic conditions	not exceeding 75% rel. humidity, no condensation				
Operating position	unrestricted				
Protection	to EN 60 529, IP65 at the front, IP20 at the back				
Weight	75g approx.	95g approx.	145g approx.	160g approx.	200g approx.

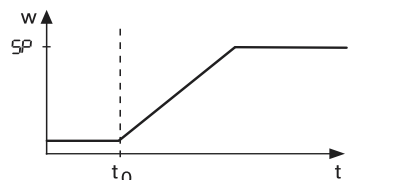
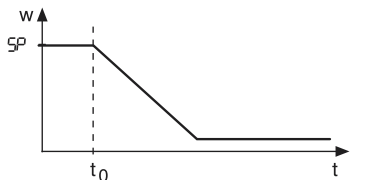
Display and controls

<p>(1) Display</p>	<p>7-segment display, 4 places, green Display alternates when setpoints, parameters and codes are indicated and entered.</p> 	 <p>Example: Type 702040</p>
<p>Character height</p>	<p>Type 702040/41/42: 10mm, Type 702043/44: 20mm</p>	
<p>Display range/unit</p>	<p>-1999 to +9999 digit / °C/°F</p>	
<p>Decimal places</p>	<p>none, one, two</p>	
<p>(2) Status indication</p>	<p>two LEDs for the outputs 1 and 2, yellow</p>	
<p>(3) Keys</p>	<p>for operating and programming the instrument. Dynamic modification of settings and parameters via the ▲ and ▼ keys. Automatic value acceptance after 2 seconds.</p>	

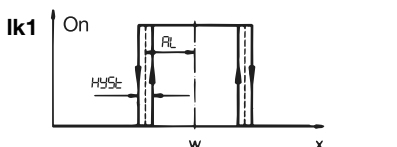
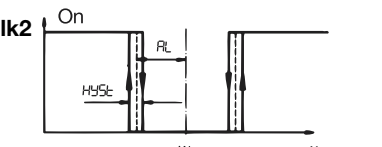
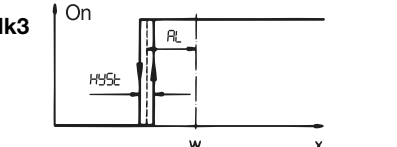
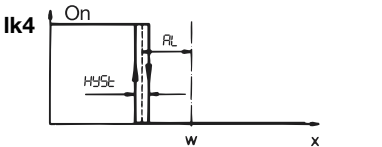
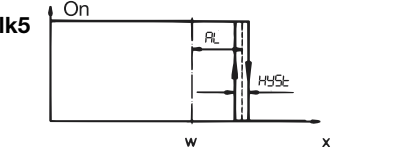
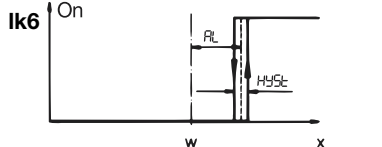
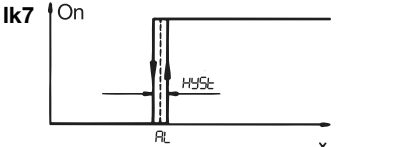
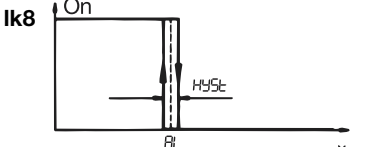
Self-optimisation (SO)

The standard self-optimisation facility produces an automatic adjustment of the controller to the process. Self-optimisation determines the controller parameters for PI and PID controllers (proportional band, reset time, derivative time), as well as the cycle time and the filter time constant of the digital input filter.

Ramp function

<p>The ramp function enables a defined approach of the process value from t_0 to the preset setpoint SP. The slope is set via a gradient (°C/min or °C/h) at the parameter level. On a change of setpoint, it will be active either as a falling or rising ramp.</p>		
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Limit comparator

<p>Function Ik1 Window function: Output is active (On) when the process value is within a certain range (window) about the setpoint. Function Ik2 as Ik1, but signal function reversed.</p>	<p>Ik1</p> 	<p>Ik2</p> 
<p>Function Ik3 low alarm Function: output is inactive, when the process value is below (setpoint - limit value) Function Ik4 as Ik3, but reversed signal function</p>	<p>Ik3</p> 	<p>Ik4</p> 
<p>Function Ik5 high alarm Function: output is inactive when the process value is above (setpoint + limit value) Function Ik6 as Ik5, but reversed signal function.</p>	<p>Ik5</p> 	<p>Ik6</p> 
<p>Function Ik7 Switching point is independent of the controller setpoint; only AL determines the switching point. Function: Output is active when the process value is above the limit value. Function Ik8 as Ik7, but reversed signal function.</p>	<p>Ik7</p> 	<p>Ik8</p> 

Limit switch (extra code)

If the limit comparator function is active, then the switched state will have to be reset by hand.
Precondition: the condition that caused the alarm is no longer present (for Ik8: process value < AL). The display shows the alarm status. The alarm status will be retained after a power failure.

Timer function (extra code)

Using the timer function, the control action can be influenced by means of the adjustable time $t, 0$. After the timer has been started by power ON, by pressing the key or via the logic input, the timer start value $t, 0$ is counted down to 0, either instantly or after the process value has gone above or below a programmable tolerance limit. When the timer has run down, several events are triggered, such as control switch-off (output 0%) and setpoint switching. Furthermore, it is possible to implement timer signalling during or after the timer count, via an output.

The timer function can be used in conjunction with the ramp function and setpoint switching.

Table: Timer functions (using the example of a reversed single-setpoint controller)

Function	Start condition		
	Power ON	Keypad/logic input	Tolerance limit
Time-limited control The control action is switched off after the timer has run down (output 0%)			
Time-dependent setpoint switching After the timer has been started, the process is controlled to setpoint $SP2$. After the timer has run down, the controller automatically switches over to $SP1$			
Time-delayed control The control action starts after the timer has run down.			
Timer with signalling After the timer has been started, $t, 0$ is counted down to 0. The control action is independent of the timer. With this timer function, too, the end of the timer count-down can also be signalled via an output.	Signalling after timer count-down (e.g. C122=3) 	Signalling from start to end of timing 	

Tolerance limit

The position of the tolerance limit depends on the controller type:

- Single-setpoint controller (reversed, heating): Tolerance limit is below the setpoint
- Single-setpoint controller (direct, cooling): Tolerance limit is above the setpoint
- Double-setpoint controller: Tolerance limit is below the setpoint

If, during the control process, the process value goes above/below the tolerance limit, then the timer will be stopped for the duration of the infringement.

Display and operation

The timer value is displayed at the operating level and remains so permanently (no time-out).

Operation is from the keypad, when the timer value is visible in the display, or via the logic input. The operating options comprise start, stop, continue and cancel timer function, and are shown differently in the display.

The current timer value and the timer start value are accessible and adjustable at any time at a separate timer level.

Parameter and configuration

Operating level

Designation	Display	Factory setting	Value range
Setpoint	SP/SP 1/SP2	0	SPL—SPH
Ramp setpoint	SPr	0	SPL—SPH
Timer value/timer start value	t, /t, 0	0	0—999.9h

Parameter level

Designation	Display	Factory setting	Value range
Setpoint 1	SP 1	0	SPL—SPH
Setpoint 2	SP 2	0	SPL—SPH
Limit value for limit comparator	AL	0	-1999 to +9999 digit
Proportional band 1	Pb .1	0	0—9999 digit
Proportional band 2	Pb .2	0	0—9999 digit
Derivative time	dt	80sec	0—9999 sec
Reset time	rt	350sec	0—9999 sec
Cycle time 1	CY 1	20.0sec	1.0—999.9 sec
Cycle time 2	CY 2	20.0sec	1.0—999.9 sec
Contact spacing	db	0	0—1000 digit
Differential (hysteresis) 1	HYS.1	1	0—9999 digit
Differential (hysteresis) 2	HYS.2	1	0—9999 digit
Working point	Y 0	0%	-100 to +100 %
Maximum output	Y .1	100%	0 to 100 %
Minimum output	Y .2	-100%	-100 to +100 %
Filter time constant	dF	0.6sec	0.0—100.0 sec
Ramp slope	rASd	0	0—999 digit

Configuration level

Designation	Display	Factory setting	Value range/selection
Transducer	CT 111	Pt100	Pt100, Pt1000, KTY11-6, T, J, U, L, K, S, R, B, N, 0 (4)—20 mA, 0 (2)—10V
Decimal place/unit	CT 112	none/°C	none, one, two/°C, F
Controller type/outputs	CT 113	see table on next page	
Limit comparator function	CT 114	no function	no function, lk1—8
Ramp function	CT 115	no function	no function, °C/min, °C/h
Output signal on overrange/ underrange	CT 116	0% output limit comparator off	0%, 100%, -100% limit comparator on/off
Logic input	CT 117	no function	key / level inhibit, ramp stop, setpoint switching
Outputs 1, 2 and 3 (only Type 702042/43/44)	CT 118	functions as defined under CT 113	freely configurable (see table on next page)
Timer function	CT 120	no function	see description "Timer function"
Start condition for timer	CT 121	from keypad/ logic input	- power ON - keypad/logic input - tolerance limit
Timer signalling	CT 122	no function	- timer start to timer run-down - after run-down for 10sec - after run-down for 1 min. - after run-down until acknowledgement
Unit of time (timer)	CT 123	mm.ss	- mm.ss - hh.mm - hhh.h
Start value of value range	SCL	0	-1999 to +9999 digit
End value of value range	SCH	100	-1999 to +9999 digit
Lower setpoint limit	SPL	-200	-1999 to +9999 digit
Upper setpoint limit	SPH	850	-1999 to +9999 digit
Process value correction	OFFS	0	-1999 to +9999 digit
Differential (hysteresis)	HYSct	1	0—9999 digit

Controller type/outputs (C 113)

Controller type	Output 1	Output 2 + 3
Single setpoint reversed	controller	limit comparator/timer signalling
Single setpoint direct	controller	limit comparator/timer signalling
Double setpoint	controller reversed	controller direct
Single setpoint reversed	limit comparator/timer signalling	controller
Single setpoint direct	limit comparator/timer signalling	controller
Double setpoint	controller direct	controller reversed

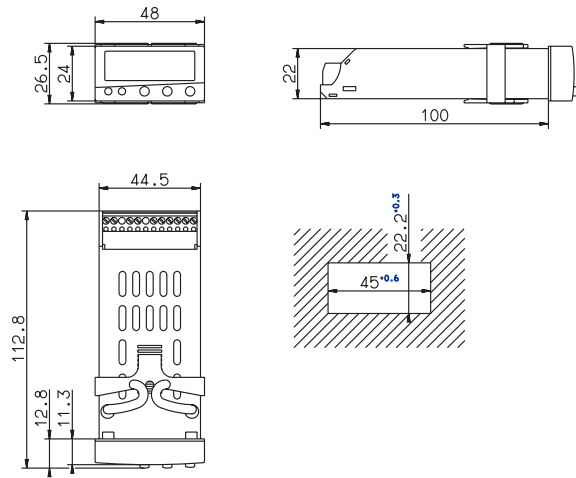
■ = factory setting

Expanded configuration options for the outputs on Type 702043/44 (C118)

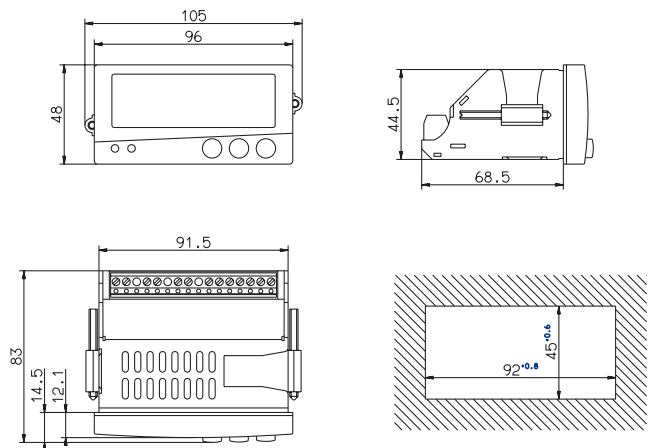
	Output 1: Relay (K1)	Output 2: Logic (K2)	Output 3: Relay
1-setpoint controller	Functions of the outputs as defined under C 113		
	controller output	limit comparator	timer signalling
	controller output	timer signalling	limit comparator
	limit comparator	controller output	timer signalling
	limit comparator	timer signalling	controller output
	timer signalling	controller output	limit comparator
	timer signalling	limit comparator	controller output
2-setpt. controller	controller output 1	controller output 2	limit comparator/timer
	controller output 1	limit comparator/timer	controller output 2
	controller output 2	controller output 1	limit comparator/timer
	controller output 2	limit comparator/timer	controller output 1
	limit comparator/timer	controller output 1	controller output 2
	limit comparator/timer	controller output 2	controller output 1

Dimensions

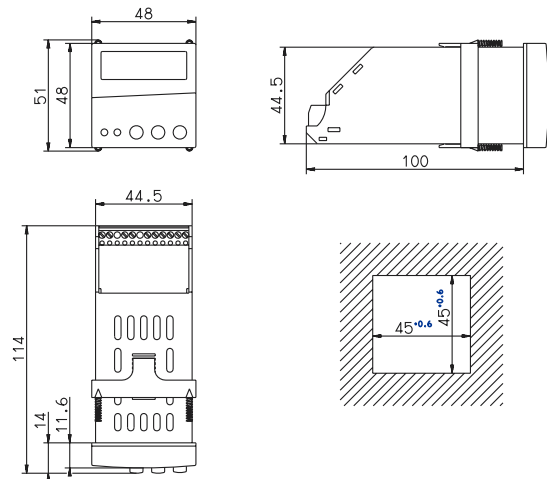
Type 702040 / ...



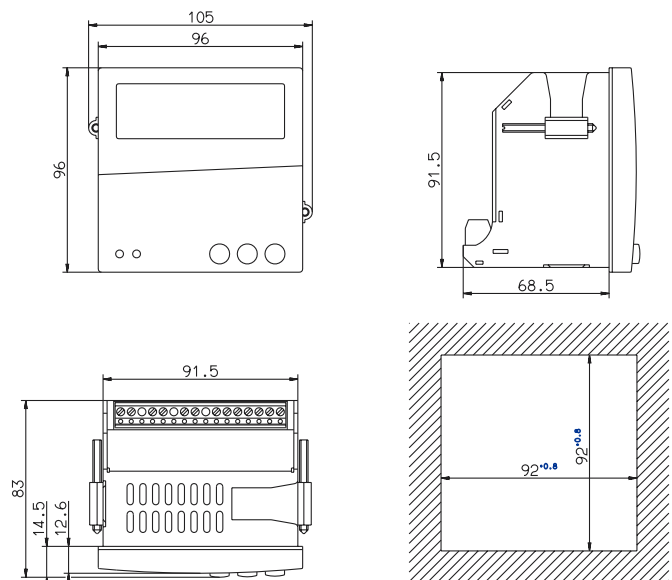
Type 702043/...



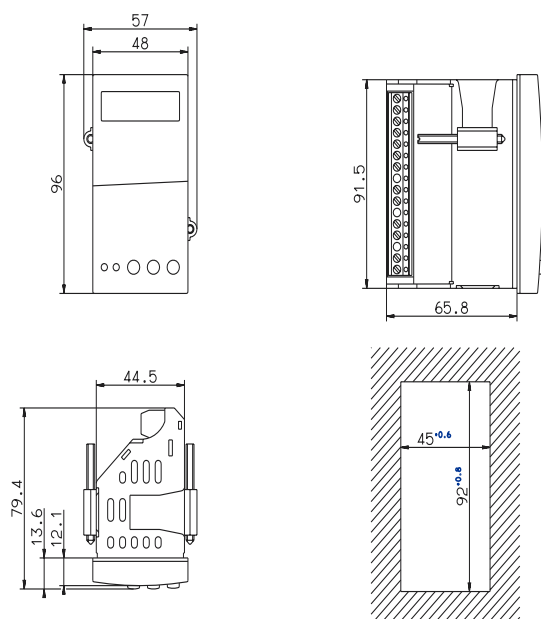
Type 702041 / ...



Type 702044/...



Type 702042 / ...



**Edge-to-edge mounting
(minimum spacings of the panel cut-outs)**

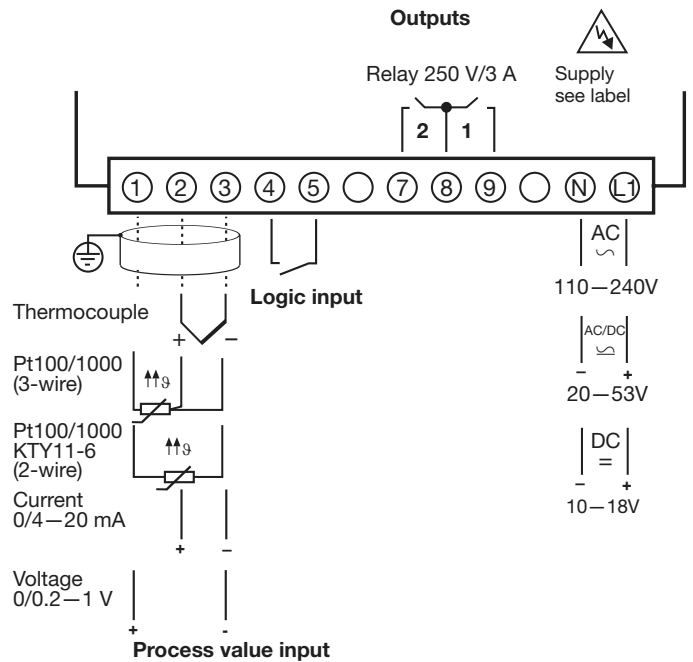
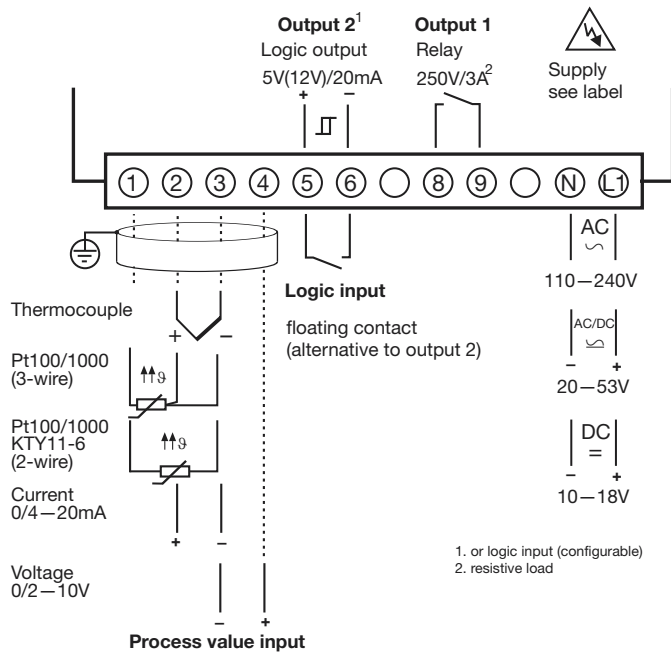
Type	horizontal	vertical
70.2040/41	8mm min.	8mm min.
70.2042/43/44	10mm min.	10mm min.

Connection diagrams

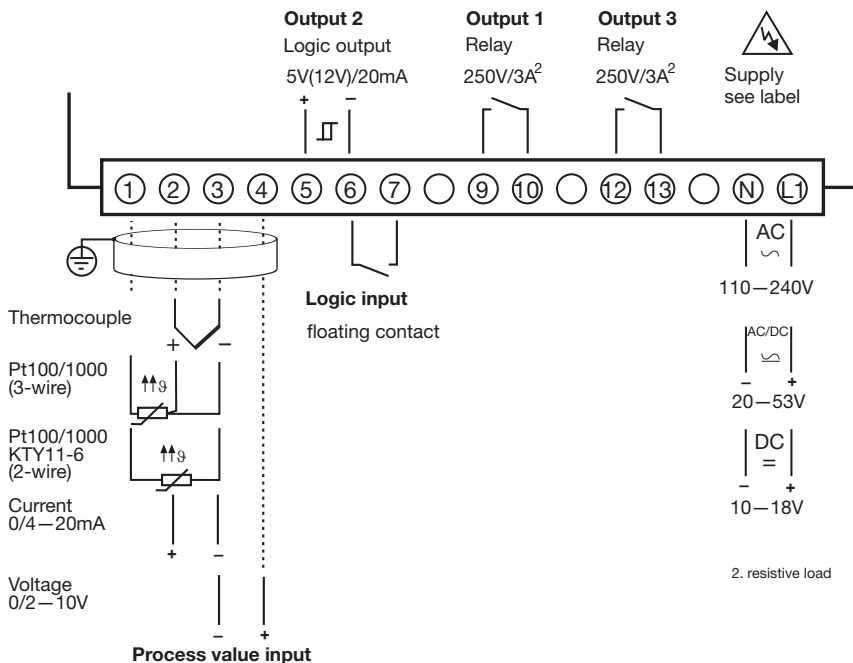
JUMO iTRON 32, Type 702040, 48 mm x 24 mm format
JUMO iTRON 16, Type 702041, 48 mm x 48 mm format

Standard version / Version with 12V logic output

Version with 2 relay outputs



JUMO iTRON 08, Type 702042, 48 mm x 96 mm format (portrait)
JUMO iTRON 08, Type 702043. 96 mm x 48 mm format (landscape)
JUMO iTRON 04, Type 702044, 96 mm x 96 mm format



Order details

Type designation

7020 (1) / (2) - (3) - (4) - (5) / (6) , ...*

* List extra codes in sequence, separated by commas

(1) Basic type (bezel size in mm)	40 = 48 x 24, 41 = 48 x 48, 42 = 48 x 96 (portrait), 43 = 96 x 48 (landscape), 44 = 96 x 96		
(2) Basic type extension	88 = controller type configurable ¹ 99 = controller type configured to customer specification ²		
(3) Inputs	888 = inputs configurable ¹ 999 = inputs configured to customer specification ²		
(4) Outputs	000 = Standard	Type 702040/41	Type 702042/43/44
	Output 1	relay (n.o. make)	relay (n.o. make)
	Output 2	logic 0/5V, optionally configurable as logic input	logic 0/5V
	Output 3	not available	relay (n.o. make)
	Options	Type 702040/41	Type 702042/43/44
113 = Output 2 (outputs 1+3 as for Standard)	logic 0/12V, optionally configurable as logic input	logic 0/12V	
101 = Output 2 (output 1 as for Standard)	relay (n.o. make) (logic input is always available)	not possible	
(5) Supply	16 = 10–18V DC 22 = 20–53V AC/DC 48–63Hz 23 = 110–240V AC -15/+10% 48–63Hz		
(6) Extra code	069 = UL and CSA approval 210 = Timer function 220 = Timer function + limit switch ³		
Delivery package	ex-factory for	Type 702040/41	Type 702042/43/44
		1 mounting frame	2 mounting brackets
		1 seal, 1 Operating Instructions 70.2040	

1. single-setpoint with limit comparator, see factory settings under configuration and parameter level

2. see extra order codes (below) or factory settings under configuration and parameter level

3. The linearizations for KTY11-6 and thermocouple B have been deleted

Extra order codes for customized configuration

(2) Basic type extension

Controller type	Output 1	Output 2 and 3
10 = single setpoint reversed ¹	controller	limit comparator/timer signalling
11 = single setpoint direct ²	controller	limit comparator/timer signalling
30 = double setpoint	controller reversed	controller direct
20 = single setpoint reversed ¹	limit comparator/timer signalling	controller
21 = single setpoint direct ²	limit comparator/timer signalling	controller
33 = double setpoint	controller direct	controller reversed

1. controller output is active when process value is below setpoint, e. g. heating

2. controller output is active when process value is above setpoint, e. g. cooling

(3) Inputs

001 = Pt100 3-wire	040 = Fe-Con J	045 = Pt13 Rh-Pt R	063 = 0–10V
003 = Pt100 2-wire	041 = Cu-Con U	046 = Pt30 Rh-PtRh B	071 = 2–10V
005 = Pt1000 2-wire	042 = Fe-Con L	048 = NiCrSi-NiSi N	601 = KTY11-6 (PTC)
006 = Pt1000 3-wire	043 = NiCr-Ni K	052 = 0–20mA	
039 = Cu-Con T	044 = Pt10Rh-Pt S	053 = 4–20mA	

■ = factory-set

Stock versions

⇒ Price Sheet



JUMO iTRON 04 B Compact Microprocessor Controller

Panel-mounting housing to DIN 43 700

Brief description

The JUMO iTRON 04 B is a compact, microprocessor-based 2-state controller with 96mm x 96mm bezel size.

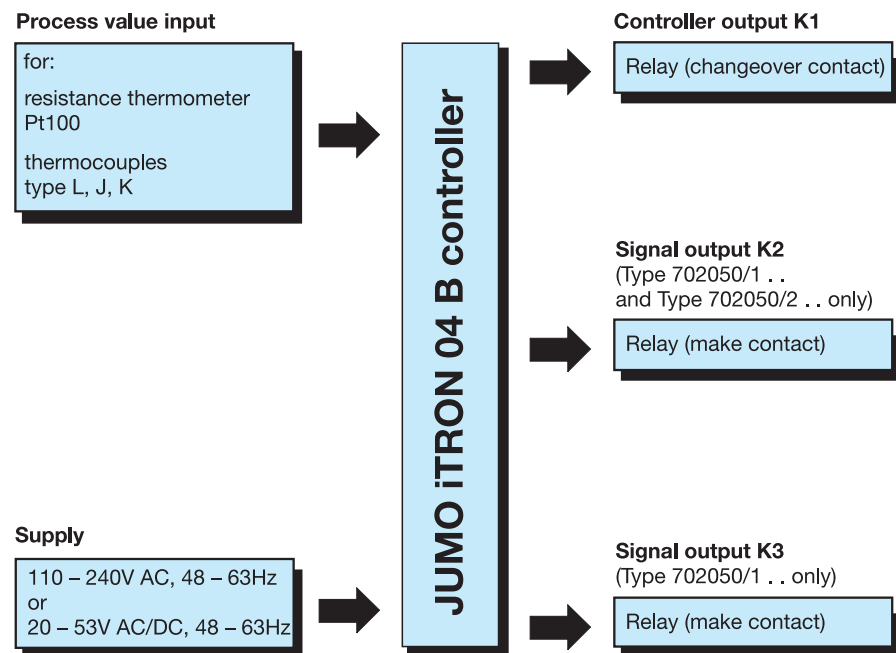
Common to all three controller versions is the clearly legible 7-segment display, 20mm high, for indicating the process value and setpoint, or for running dialogs. On the version with setpoint indication, the setpoint is permanently made visible in a separate display. Just two keys are needed for setpoint adjustment and configuration. Parameters are entered dynamically, and the value is accepted automatically after two seconds. The version with a timer features additional displays and controls for the timer function. Two relays have been assigned to the timer function (e.g. process control and program end). A limit comparator is available for the versions with setpoint indication and timer.

Thanks to the membrane keypad, the controller is protected at the front against splashing water and is easy to clean. This makes the instrument particularly suitable for the hygienic requirements of the food industry (for example, time-controlled processes for baking ovens). Individual parameters can be switched out of display on the instrument by means of the distinctly user-friendly setup program.

The electrical connection is made via pluggable screw terminals.

The possible input and output configurations are shown in the block diagram below.

Block structure



JUMO iTRON 04 B
Type 702050/0... ..



JUMO iTRON 04 B
Type 702050/1... ..
with timer



JUMO iTRON 04 B
Type 702050/2 . .
with setpoint indication

Key features

- Simple operation
- Timer function (Type 702050/1 . . only)
- Digital input filter with programmable filter time constant
- Limit comparator (Types 702050/1 . . and 702050/2 . . only)
- Easy-to-clean membrane keypad
- Suitable for ambient temperatures up to 60°C
- Three relays with 5A contact rating at 230V (Type 702050/1 . . only)
- Trilingual setup program (German, English, French)
- UL approval (in preparation)

Displays and controls

(1)	Upper LED display	3-digit 7-segment display, 20mm high, for the process value (temperature); red The setpoint can be indicated here through the setup program, and a key combination can be used to switch between setpoint and process value display.	
(2)	Lower LED display	3-digit 7-segment display, 14mm high On Type 702050/1.. : for timer indication; green display format: h.mm (last minute: ss) On Type 702050/2.. : for setpoint; green	
(3)	LED	controller output K1, yellow signal output K2, green (on Types 702050/1.. and 702050/2.. only) signal output K3, red (Type 702050/1.. only) LED comes on when relay is energized. LED goes out when relay is de-energized.	
(4)	Keys	timer control (Type 702050/1.. only) increase value, select parameter decrease value, select parameter	

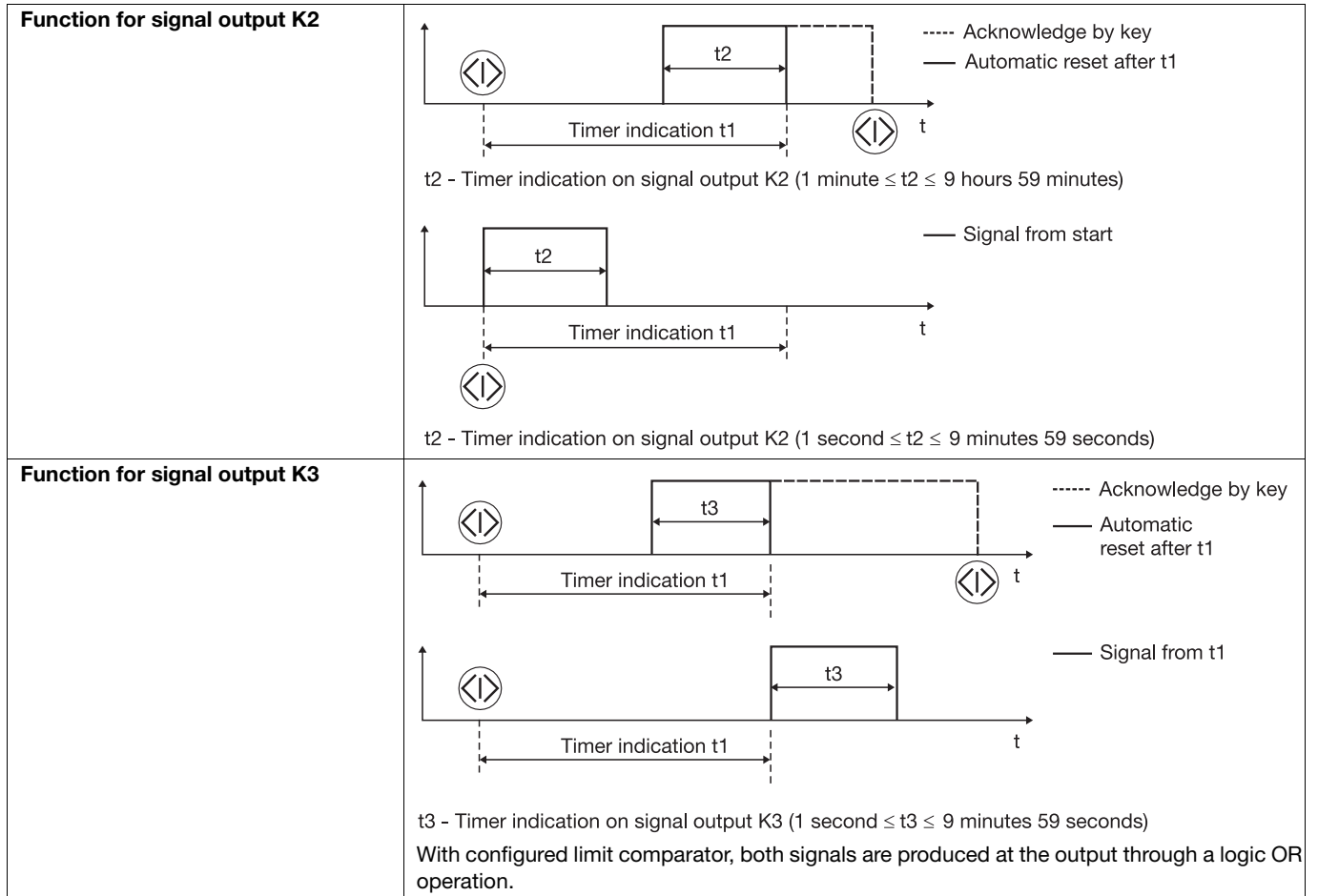
Limit comparator (Type 702050/1 .. and 702050/2 .. only)

<p>Function Ik1 Window function: output is active (On) when the measured value is within a certain range (window) around the setpoint.</p> <p>Function Ik2 as Ik1, but inverted signal function.</p>	<p>Ik1</p>	<p>Ik2</p>
<p>Function Ik3 low limit signaling Function: output is inactive when the measured value is below (setpoint - limit value)</p> <p>Function Ik4 as Ik3, but inverted signal function.</p>	<p>Ik3</p>	<p>Ik4</p>
<p>Function Ik5 high limit signaling Function: output is inactive when the measured value is above (setpoint + limit value)</p> <p>Function Ik6 as Ik5, but inverted signal function.</p>	<p>Ik5</p>	<p>Ik6</p>
<p>Function Ik7 Switching point is independent of the controller setpoint; only AL determines the switching point. Function: output is active when the measured value is above the limit value.</p> <p>Function Ik8 as Ik7, but inverted signal function.</p>	<p>Ik7</p>	<p>Ik8</p>

On Type 702050/2.. with setpoint indication, the signal is output via signal output K2, on Type 702050/1.. with timer via signal output K3.

Timer function (Type 702050/1 . . only)

The controller has a timer function that is independent of the control action, with a selectable timer indication $t_1 \leq 9$ hrs and 59 min. Different signal functions are implemented via two outputs.



Technical data

Input for thermocouple

Designation	Range	Meas. accuracy	Ambient temperature error
Fe-Con L	0 to 725°C (32 to 999°F)	$\leq 0.5\%$	100 ppm/°C
Fe-Con J EN 60 584	0 to 725°C (32 to 999°F)	$\leq 0.5\%$	100 ppm/°C
NiCr-Ni K EN 60 584	0 to 999°C (32 to 999°F)	$\leq 0.5\%$	100 ppm/°C
Cold junction	Pt100 internal		

Input for resistance thermometer

Designation	Connection circuit	Range	Meas. accuracy	Ambient temperature error
Pt100 EN 60 751	3-wire	-99 to +600°C -99 to +999°F	$\leq 0.1\%$	50 ppm/°C
Sensor lead resistance	max. 20Ω per lead for 2-wire and 3-wire circuit			
Measuring current	250μA			
Lead compensation	Not required for 3-wire circuit. For 2-wire circuit, lead compensation can be provided in the software by process value correction.			

Measuring circuit monitoring¹

Transducer	Overrange/underrange	Probe/lead short-circuit ¹	Probe/lead break
Thermocouple	•	-	•
Resistance thermometer	•	•	•

1. In the event of an error, the outputs move to defined states (configurable).

■ = ex-factory • = recognized - = not recognized

Outputs

Assignment	Type 702050/0	Type 702050/1	Type 702050/2
Output K1	relay (changeover contact) 5A at 250VAC resistive load 250,000 operations at rated load	relay (changeover contact) 5A at 250VAC resistive load 250,000 operations at rated load	relay (changeover contact) 5A at 250VAC resistive load 250,000 operations at rated load
Output K2	not available	relay (make contact) 5A at 250VAC resistive load 100,000 operations at rated load	relay (make contact) 5A at 250VAC resistive load 100,000 operations at rated load
Output K3	not available	relay (make contact) 5A at 250VAC resistive load 100,000 operations at rated load	not available

Controller

Controller type	2-state controller
Controller action	P/PD/PI/PID
A/D converter	resolution >15 bit
Sampling time	210msec

Timer

Accuracy	2.5sec/10h ±50ppm within ambient temperature range
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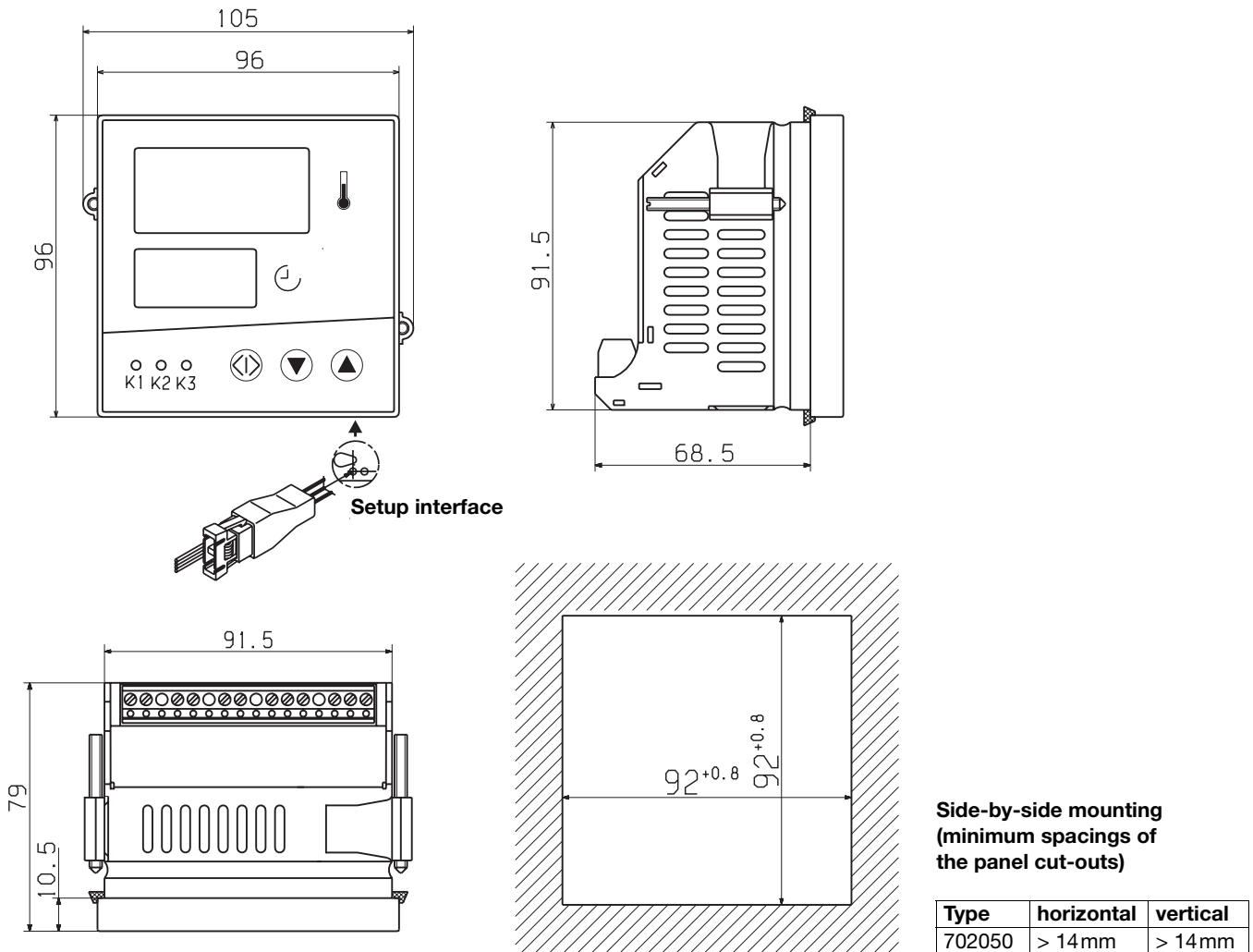
Electrical data

Supply (switch-mode PSU)	110 – 240V AC -15/+10%, 48 – 63Hz or 20 – 53V AC/DC, 48 – 63Hz
Test voltages (type test)	to EN 61 010, Part 1 08.02, overvoltage category III, pollution degree 2
Power consumption	max. 6VA
Data backup	EEPROM
Electrical connection	at the rear by plug-in screw terminals, conductor cross-section ≤ 2.5 mm ² solid wire or 1.5 mm ² stranded wire with ferrules
Electromagnetic compatibility interference emission immunity to interference	EN 61 326 03.02 Class B to industrial requirements
Safety regulation	to EN 61 010-1

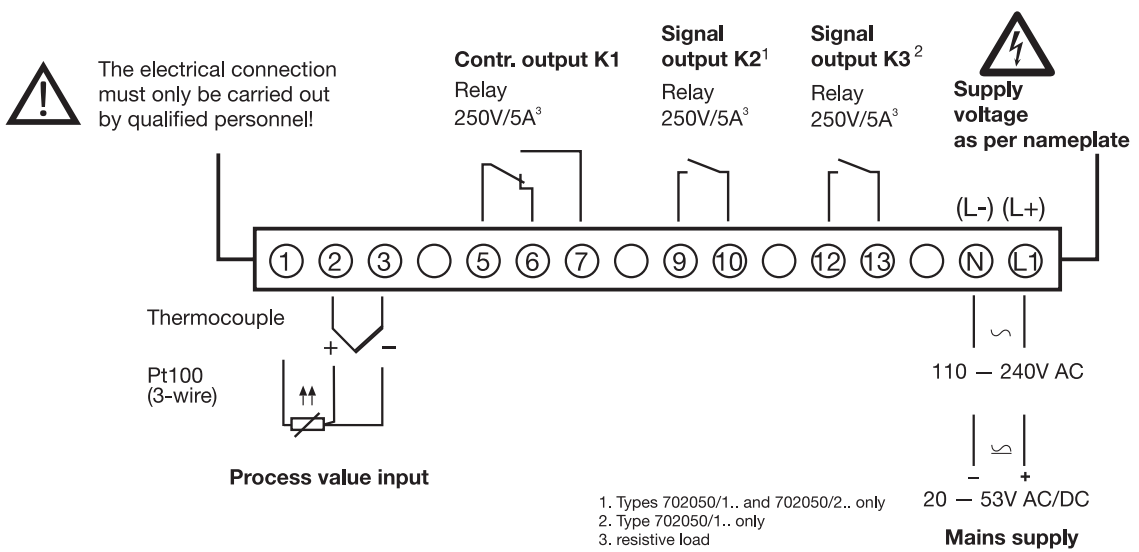
Housing

Housing type	plastic housing for flush-panel mounting to DIN 43 700
Ambient/storage temperature range	-5 to 60°C / -40 to +70°C
Climatic conditions	≤ 90% rel. humidity, no condensation
Operating position	unrestricted
Protection	to EN 60 529, front IP65, rear IP20
Weight	approx. 190g

Dimensions



Connection diagram



Order details

Basic version	
	702050/0.. JUMO iTRON 04 B without timer
	702050/1.. JUMO iTRON 04 B with timer
	702050/2.. JUMO iTRON 04 B with setpoint indication
	(1) Basic type extension
x x x	.88 factory-set, configurable
x x x	.99 configured to customer specification
	(2) Process value input
x x x	888 configurable (ex-factory: Pt100)
x x x	999 configured to customer specification
	Pt100
	Fe-Con Type J
	Fe-Con Type L
	NiCr-Ni Type K
	(3) Outputs
x	311 1 changeover (K1)
	341 1 changeover (K1), 1 make (K2)
x	344 1 changeover (K1), 2 make (K2, K3)
	(4) Supply
x x x	22 20 – 53V AC/DC, 48 – 63Hz
x x x	23 110 – 240V AC +10/-15%, 48 – 63Hz
	(5) Extra codes
x x x	000 none
x x x	061 UL approval (in preparation)

	(1)	(2)	(3)	(4)	(5)						
Order code	702050	/	[...]	-	[...]	-	[...]	-	[..]	/	[...]
Order example	702050	/	088	-	888	-	311	-	23	/	061

■ = stock items
 x = choice is possible for this basic type

Accessories

Sales No.

Setup program for Windows 98/ME/NT4.0/2000/XP
 PC interface for setup program, with adapter

70/00420495
 70/00400821

➔ Operating Instructions B 70.2050.0 ➔ www.jumo.net



JUMO iTRON DR 100 Microprocessor Controller

with a 2-line LC display
for mounting on a 35mm DIN rail

Brief description

The JUMO iTRON DR 100 is a universal, freely programmable microprocessor controller which lends itself to a wide range of control applications.

According to choice, the controller is available with one relay (changeover contact) or 2 relays (make contacts).

Resistance thermometers, thermocouples as well as current and voltage signals can be connected to the freely configurable measurement input. Linearizations are stored for the usual transducers.

The controller features a 2-line, alphanumeric LC display for indicating the process value and setpoint, or for running dialogs.

Parameter setting is arranged dynamically, and the value is accepted automatically after two seconds.

Self-optimization, which comes as standard, establishes the optimum control parameters at the touch of a button. The basic version also includes a ramp function with an adjustable gradient as well as a timer function.

The iTRON DR 100 can be used as a 2-state controller with a limit comparator, or as a 3-state controller.

The controller is mounted on DIN rails and connected up via screw terminals with a max. conductor cross-section of 2.5mm².

A setup program and a PC interface are available as accessories, for easy configuration and parameterization from a PC.



Type 702060/ ...

Overview of functions

Measurement input

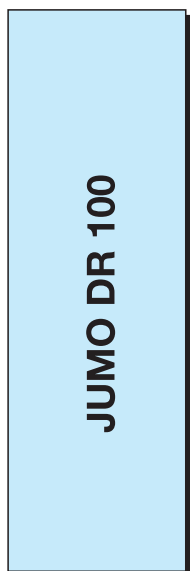
Pt100, Pt1000 in 2-wire or 3-wire circuit, KTY11-6, thermocouples type L, J, U, T, K, N, S, R, B
current input 0/4 — 20 mA or voltage input 0/2 — 10V

Logic input

for connection to floating contact

Supply

110 — 240V AC +10% /-15%
48 — 63Hz,
20 — 53V AC/DC 48 — 63Hz



Setup program

for configuration from a PC

Relay output

1 changeover contact or 2 make contacts

Logic output

voltage/current 0/5V, 0/20mA or 0/12V, 0/20mA short-circuit proof

LC display

2-line display for visualizing measurement and parameters

Key features

- Freely configurable measurement input
- Ramp function
- Timer function
- Self-optimization
- Clear, easy-to-read alphanumeric display
- Sampling time 210 msec
- Setup program for configuration and archiving from a PC

Technical data

Input for resistance thermometer

Designation	Range	Accuracy ¹
Pt 100 EN 60751	-200 to +850 °C	0.1%
KTY11-6 PTC	-50 to +150 °C	1%
Pt1000 DIN	-200 to +850 °C	0.1%
Connection circuit	2-, 3-wire	
Sampling rate	210 msec (250 msec with active timer)	
Input filter	2nd order digital filter; filter constant adjustable from 0 – 100sec	

Input for thermocouple

Designation	Range	Accuracy ¹
Fe-Con L DIN 43710	-200 to +900 °C	0.4%
Fe-Con J EN 60584	-200 to +1200 °C	0.4%
Cu-Con U DIN 43710	-200 to +600 °C	0.4%
Cu-Con T EN 60584	-200 to +400 °C	0.4%
NiCr-Ni K EN 60584	-200 to +1372 °C	0.4%
NiCrSi-NiSi N EN 60584	-100 to +1300 °C	0.4%
Pt10Rh-Pt S EN 60584	0 to +1768 °C	0.4%
Pt13Rh-Pt R EN 60584	0 to +1768 °C	0.4%
Pt30Rh-Pt6Rh B EN 60584	300 to 1820 °C	0.4%
Cold junction	Pt100 internal	
Cold junction accuracy	± 1 °C	
Sampling rate	210 msec (250 msec with active timer)	
Input filter	2nd order digital filter; filter constant adjustable from 0 – 100sec	

1. The accuracy refers to the maximum range span.
Reduced linearization accuracy with small ranges and short spans.

Analog input for DC voltage, DC current

Range	Accuracy	Input resistance
0 – 20mA 4 – 20mA	0.1%	R _{IN} < 4 Ω
0 – 10V 2 – 10V	0.1%	R _{IN} > 100 kΩ
Scaling	freely programmable within the limits	
Input filter	2nd order digital; filter constant adjustable from 0 – 100sec	

Logic input

Connection	Function
Floating contact	configurable for key inhibit, level inhibit, ramp stop, setpoint switching, and for timer control

Measuring circuit monitoring

Transducer	Overrange/ underrange	Probe/ lead short-circuit	Probe/lead break
Thermocouple	is recognized	-	is recognized
Resistance thermometer	is recognized	is recognized	is recognized
Voltage 2 – 10V 0 – 10V	is recognized is recognized	is recognized -	is recognized -
Current 4 – 20mA 0 – 20mA	is recognized is recognized	is recognized -	is recognized -

Supply

Supply voltage	20 – 53V AC/DC, 48 – 63 Hz 110 – 240V AC +10% /-15%, 48 – 63 Hz
----------------	--

Power consumption	5 VA
Electrical safety	test voltages to EN 61 010 overvoltage category III, pollution degree 2

Outputs

Type	Relay output K1	Relay output K2	Logic output
70.2060/1XX, XXX, 000..	changeover contact, 3A at 250V AC resistive load; 100, 000 operations at nominal load	-	logic output 0/5V, 0/20mA (short-circuit proof)
70.2060/2XX, XXX, 113..	make contact, 3A at 250V AC resistive load; 100, 000 operations at nominal load	make contact, 3A at 250V AC resistive load; 100, 000 operations at nominal load	logic output 0/12V, 0/20mA (short-circuit proof)

Environmental conditions

Ambient temperature range	0 to +55°C
Storage temperature range	-30 to +70°C
Climatic conditions	75% rel. humidity, no condensation
EMC	EN 61 326
Interference emission, immunity to interference	Class B, industrial requirements

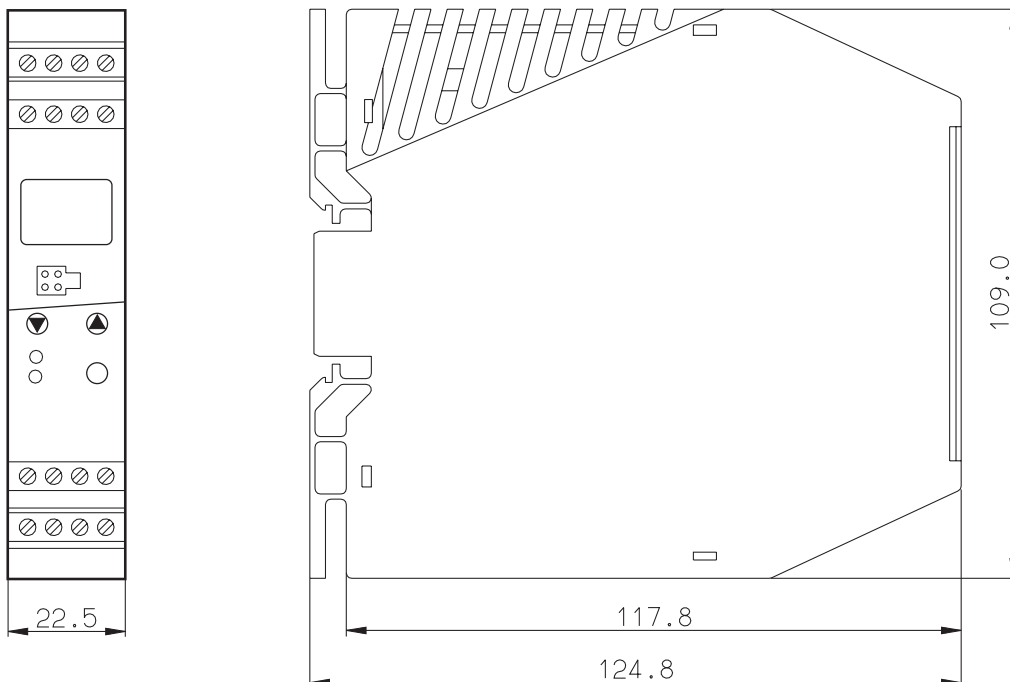
1. All data refer to the full-scale value

Housing

Material	polyamide (PA 6.6)
Mounting	on 35mm x 7.5mm DIN rail to EN 50 022
Operating position	vertical
Weight	approx. 160g
Data backup	EEPROM
Electrical connection	via screw terminals, conductor cross-section: 0.2 – 2.5mm ²

Dimensions

Type 702060/...



Ramp function

<p>The ramp function enables a defined approach of the PV from t_0 to the selected setpoint SP. The slope is set via a gradient ($^{\circ}\text{C}/\text{min}$ or $^{\circ}\text{C}/\text{h}$) at the parameter level. On a change of setpoint, it will be active either as a falling or rising ramp.</p>		
--	--	--

Self-optimization (SO)

<p>The standard self-optimization facility enables the controller to automatically adapt to the process. Self-optimization determines the controller parameters for PI and PID controllers (proportional band, reset time, derivative time) as well as the cycle time and filter time constant of the digital input filter.</p>	<p>SO in the approach phase</p>	<p>SO at the setpoint</p>
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Limit comparator

<p>Function Ik1 Window function: output is active (On) when the measured value is within a certain range (window) about the setpoint.</p> <p>Function Ik2 as Ik1, but inverted signal function.</p>	<p>Ik1</p>	<p>Ik2</p>
<p>Function Ik3 lower limit signal Function: output is inactive when the measured value is below (setpoint - limit value)</p> <p>Function Ik4 as Ik3, but inverted signal function.</p>	<p>Ik3</p>	<p>Ik4</p>
<p>Function Ik5 upper limit signal Function: output is inactive when the measured value is above (setpoint + limit value)</p> <p>Function Ik6 as Ik5, but inverted signal function.</p>	<p>Ik5</p>	<p>Ik6</p>
<p>Function Ik7 Switching point does not depend on the controller setpoint; only AL determines the switching point. Function: output is active when the measurement is above the limit value.</p> <p>Function Ik8 as Ik7, but inverted signal function.</p>	<p>Ik7</p>	<p>Ik8</p>

Timer function

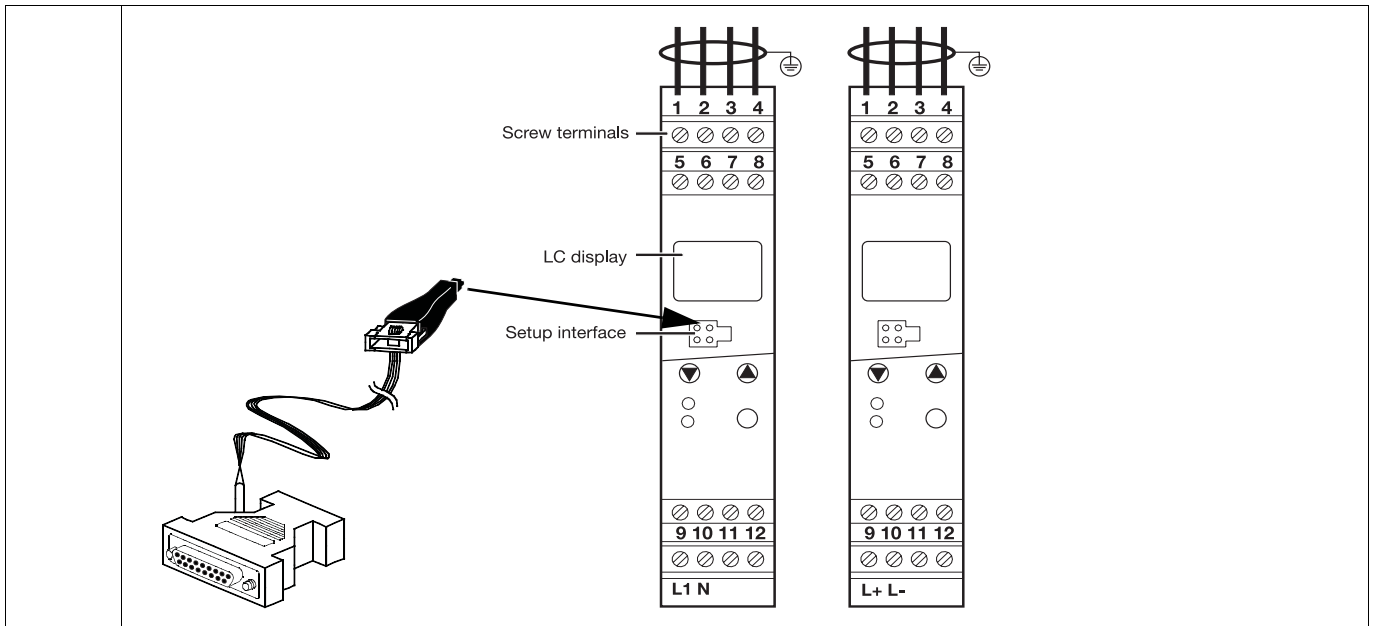
Using the timer function, the control action can be influenced by means of an adjustable time $t, \bar{0}$. After the timer has been started (by power ON, pressing the key or through the logic input), the timer start value $t, \bar{0}$ is counted down to 0, either immediately or after the process value has gone above or below a programmable tolerance limit. When the timer has run down, different events can be triggered, such as control switch-off (output 0%) or setpoint switching. In addition, it is possible to implement timer signaling during or after the timer count, via an output.

The timer function can be used in conjunction with the ramp function and setpoint switching.

Table: timer function (using the example of an inverse 2-state controller)

Function	Start condition		
	Power ON	Keys/logic input	Tolerance limit
Time-limited control The control action is switched off after the timer has run down (output 0%)			
Time-dependent setpoint switching After the timer has been started, the process is controlled to setpoint $SP2$. When the timer has run down, the controller automatically switches to $SP1$.			
Time-delayed control The control action starts after the timer has run down.			
Timer with signaling After the timer has started, $t, \bar{0}$ is counted down to 0. The control action is independent of the timer. With this timer function, too, the end of the timer count-down can also be signaled via an output.	Signaling after timer count-down (e.g. C122=3) 	Signaling from start to end of timing 	

Connection diagram



	Supply as per nameplate	AC L1 line N neutral	AC/DC L+ L-	
	Analog inputs	Thermocouple		
		KTY11-6 PTC in 2-wire circuit For longer leads, resistance thermometers in 2-wire circuit must be changed over to c111=001 (3-wire circuit) and compensated with a resistor. Compensation condition: $R_{lead} = R_{comp}$		
		Resistance thermometer in 3-wire circuit		
		Standard signals: 0(4) – 20 mA 0(2) – 10 V		
Logic input	for connection to floating contact			
	Logic output	0/5 V, 0/20 mA oder 0/12V, 0/20mA (short-circuit proof)		
	Relay output It is impermissible to combine supply circuits with SELV circuits!	changeover contact K1 without contact protection circuit Type 702060/1XX...		
		make contact K1 Type 702060/2XX...	make contact K2 Type 702060/2XX...	

Order details				
(1)	Basic type	Output 1	Output 2	Note
	188 =	1 relay (changeover contact)	-	programmable, with factory setting ¹
	199 =	1 relay (changeover contact)	-	programmable, customized configuration ²
	288 =	1 relay (make contact)	1 relay (make contact)	programmable, with factory setting ¹
	299 =	1 relay (make contact)	1 relay (make contact)	programmable, customized configuration ²
(2)	Measurement input			
		888 =	programmable, with factory setting ¹	
		999 =	programmable, customized configuration ²	
(3)	Output 3			
		000 =	logic output: 0/5V, 0/20mA	
		113 =	logic output: 0/12V, 0/20mA	
(4)	Supply			
		23 =	110 – 240V AC +10/-15%, 48 – 63Hz	
		22 =	20 – 53V AC/DC, 48 – 63Hz	
(5)	Extra code			
		061 =	UL approval (Underwriters Laboratories)	
<small>1. see ex-factory settings at the configuration and parameter levels 2. see customer order text or settings at the configuration and parameter levels</small>				

702060/ (1) (2) (3) (4) (5)
 ... - ... - ... - .. / ...

Standard accessory

- 1 Operating Manual

Accessories

- Setup program
- **PC interface with TTL/RS232C converter and adapter, 4-pole**
 for connecting the instrument to a PC
 Sales No. 70/00350260

JUMO GmbH & Co. KG
 Delivery address: Mackenrodtstraße 14,
 36039 Fulda, Germany
 Postal address: 36035 Fulda, Germany
 Phone: +49 661 6003-0
 Fax: +49 661 6003-607
 e-mail: mail@jumo.net
 Internet: www.jumo.net

JUMO Instrument Co. Ltd.
 JUMO House
 Temple Bank, Riverway
 Harlow, Essex CM 20 2TT, UK
 Phone: +44 1279 635533
 Fax: +44 1279 635262
 e-mail: sales@jumo.co.uk
 Internet: www.jumo.co.uk

JUMO Process Control, Inc.
 8 Technology Boulevard
 Canastota, NY 13031, USA
 Phone: 315-697-JUMO
 1-800-554-JUMO
 Fax: 315-697-5867
 e-mail: info@jumo.us
 Internet: www.jumo.us



JUMO dTRON 304/308/316 Compact Controller with program function

Brief description

The **JUMO** dTRON 300 series of controllers includes four freely programmable instruments in different DIN formats for controlling temperature, pressure and other process variables. The high-contrast, multicolor LC display for process value, setpoint and operator prompting contains two four-digit 7-segment displays, two single-character 16-segment displays, display of the active setpoints, six switch position indicators, and displays for the dimensional unit, ramp function and manual operation.

Simple operation through 4 keys. The instruments can be used as 2-state, 3-state, modulating or continuous controllers. The controller software includes a program or ramp function, parameter set changeover, two autotuning (self-optimization) procedures, a math and logic module, as well as 4 limit comparators.

Linearizations for the usual transducers are stored, and a customer-specific linearization table can be programmed.

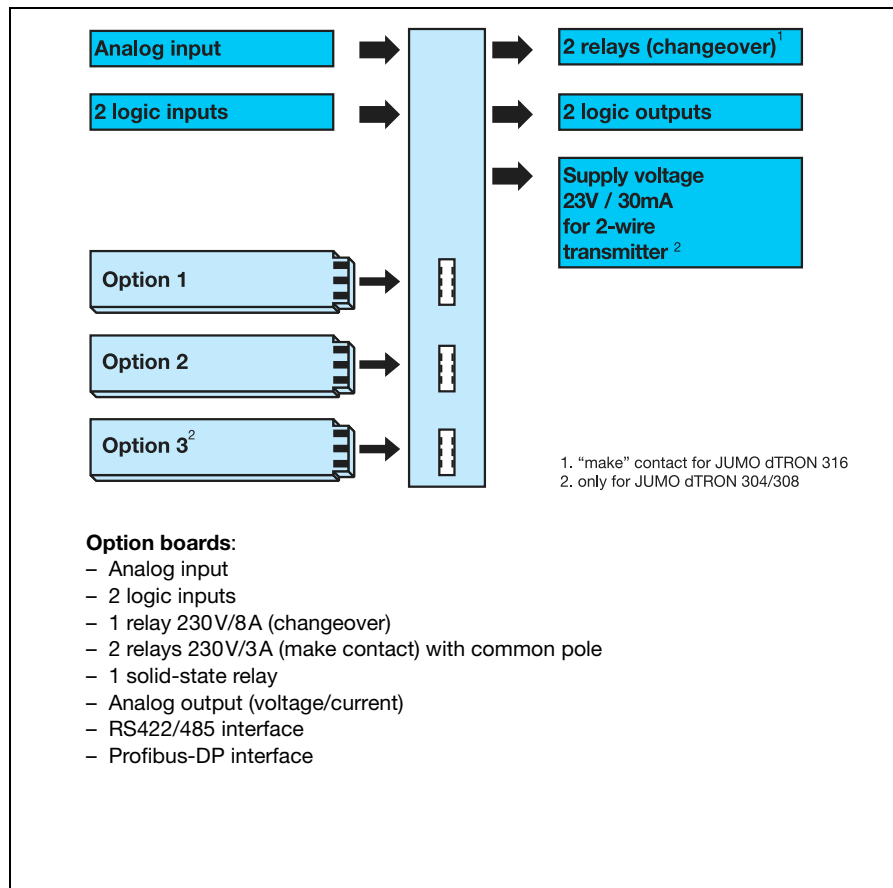
A setup program is available for user-friendly configuration from a PC.

A serial interface for RS422/485 or Profibus-DP can be used to integrate the instruments into a data network.

The electrical connection is made at the back, via screw terminals.

The possible input and output configurations are shown in the following block diagram. The option boards are universally applicable for all instruments in the series.

Block structure



JUMO dTRON 316
 Type 703041/ ...



JUMO dTRON 308H
 Type 703042/ ...



JUMO dTRON 308Q
 Type 703043/ ...



JUMO dTRON 304
 Type 703044/ ...

Key features

- + Max. two programmable analog inputs
- + Four programmable setpoints, two parameter sets
- + Program function with 8 segments, or ramp function
- + Math and logic module
- + 4 limit comparators
- + Two timer functions
- + Two self-optimization procedures
- + Fast, user-friendly configuration through the setup program with program editor
- + RS422/485 interface
- + Profibus-DP interface
- + cUL/UL approval applied for

Self-optimization

Standard features include the tried and tested self-optimization, which makes it possible for the controller to be matched to the control loop by a user who is not a control technology expert.

This functions by evaluating the response of the control loop to specific changes in the manipulating variable. Either an oscillatory method or a step-response test can be selected. The step-response test is used, for example, in the plastics industry or in processes where the oscillatory method cannot be employed. The controller parameters that are calculated are: proportional band, reset time, derivative time, cycle time and filter time constant.

Customer-specific linearization

In addition to the linearizations for the usual transducers, a customer-specific linearization can also be created. The programming is carried out in the setup program, in the form of a table of values or a formula.

User data

Parameters which are frequently changed by the user can be combined at the operating level under "User data" (only through the setup program).

Math and logic module¹

The math module makes it possible to combine values such as the setpoints, output levels and measurements from the analog inputs into a mathematical formula.

The logic module can be used, for instance, to make a logical combination of logic inputs and limit comparator states.

Up to two math or logic formulae can be entered through the setup program, and the results of the calculations can be presented at the outputs or used for internal purposes.

Special types of controller¹

The instrument can be operated as a differential, humidity or ratio controller.

Logic functions

- Start/cancel self-optimization
- Change to manual mode
- Hold/cancel ramp
- Controller off
- Setpoint changeover
- Parameter set switching
- Key/level inhibit
- Text display
- Display off
- Acknowledge limit comparators
- Program start/hold/cancel
- Timer start/stop

The logic functions can be combined with one another (only through the setup program).

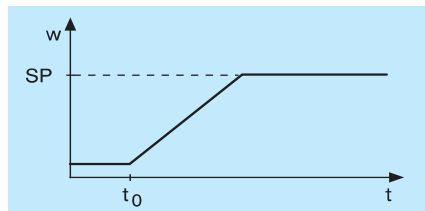
1. Extra code

Functions of the outputs

- Analog input variables
- Math
- Process value
- Setpoint
- Ramp end value
- Control deviation
- Output level
- Controller outputs
- Limit comparators
- Control contacts
- Logic inputs
- Logic formula
- Program end
- Timer signals
- Program/automatic signal

Ramp function

Either a rising or a falling ramp function can be used (increase or decrease in the setpoint). The change in setpoint value SP at t_0 is the final value for the ramp. The ramp starts with the setpoint at time t_0 . The slope of the ramp can be programmed; the sign (direction) of the slope is given by the relationship between the setpoint at time t_0 and the SP value. When the supply voltage is switched on, the ramp function starts with the momentary process value.



Timers

Two timers are available for time-dependent control. The status of the timers can be switched through to the logic outputs or internally processed for the activation or de-activation of time-dependent processes.

Setup program (accessory)

The setup program for configuring the instrument is available in English, French and German. Using a PC, you can create and edit sets of data, and transfer them to the controller or read them out from the instrument. The data sets are stored and managed.

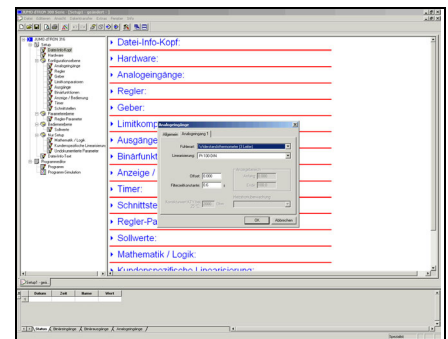
The setup program can be expanded through additional program modules.

Program editor

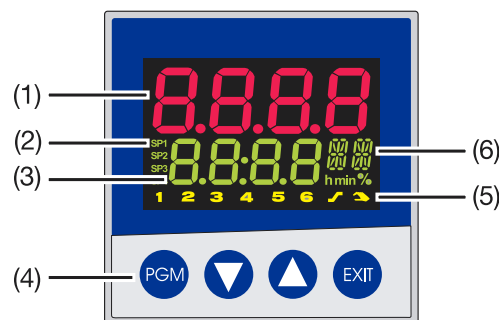
For the easy creation of programs.

Startup

To check the control-loop behavior.

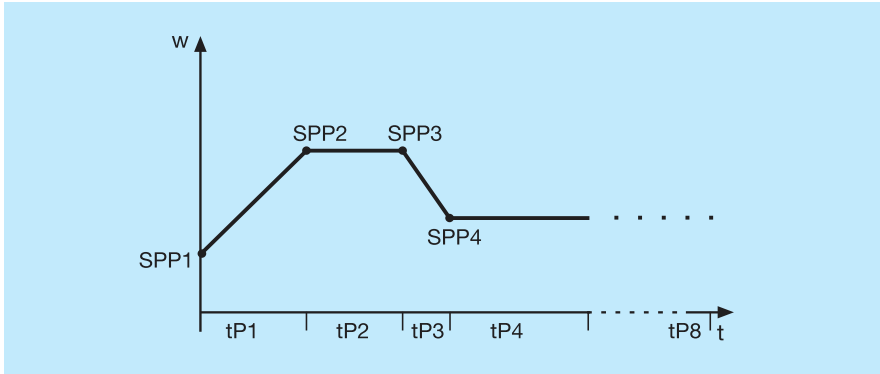


Displays and controls



(1)	7-segment display (factory setting: process value) four-digit, red; decimal place is configurable (automatic adjustment on display overflow)
(2)	Active setpoint (factory setting: SP1) SP1, SP2, SP3, SP4 (SP=setpoint); green;
(3)	7-segment display (factory setting: setpoint) four-digit, green; decimal place is configurable, also used for operator prompting (display of parameter and level symbols)
(4)	Keys
(5)	Indication yellow, for - switch status of logic outputs 1 – 6 (display lights up = ON) - ramp/program function is active - active manual operation
(6)	16-segment display for the unit °C/°F and text two-digit, green; with symbols for h, min, % additional display options through the setup program

Program function



A setpoint profile can be implemented with a maximum of 8 program segments. The settings for the segment setpoints (SPP1 — SPP8) and segment times (tP1 — tP8) are carried out at the user level. The time scale can be configured as mm:ss or hh:mm (s = seconds, h = hours). A program-end signal can be generated, and the program can be halted or canceled. Further functions can be defined through the setup program (start at process value, cyclical program handling, segment-by-segment assignment of parameter sets and four control contacts). The program profile can also be visualized.

Warm-up ramp for hot-channel controller

The warm-up ramp for hot-channel equipment is used, for example, for the gentle operation of ceramic heater elements. Damage can be avoided by allowing moisture to evaporate slowly from the hygroscopic heater elements during the warm-up phase.

Interfaces

RS422/RS485 interface

The serial interface is used for communication with higher-level (supervisory) systems. The Modbus protocol is used for transmission.

PROFIBUS-DP

The Profibus-DP interface can be used to integrate the controller into a fieldbus system operating according to the Profibus-DP standard. This Profibus version is especially designed for communication between automation systems and decentralized peripheral devices at the field level, and optimized for speed. Data transmission is made serially, using the RS485 standard. GSD generator, the project-planning tool that is supplied with the package (GSD = Gerätestammdaten, i.e. device data), is used to make a selection of device characteristics for the controller to create a standardized GSD file that is used to integrate the controller into the fieldbus system.

Parameter level

All the parameters and their meanings are included in the table. Some parameters may be missing or meaningless for a particular type of controller. Two parameter sets can be stored, to handle special applications.

Parameter	Value range	Factory setting	Meaning
Proportional band	0 — 9999 digits	0 digits	Size of the proportional band 0 means that the controller structure is out of action!
Derivative time	0 to 9999 sec	80 sec	Influences the differential component of the controller output signal
Reset time	0 to 9999 sec	350 sec	Influences the integral component of the controller output signal
Cycle time	0 to 999.9 sec	20.0 sec	When using a switched output, the cycle time should be chosen so that the energy flow to the process is as continuous as is practicable without overloading the switching elements.
Contact spacing	0 to 999.9 sec	0.0 digits	The spacing between the two control contacts for 3-state or modulating controllers
Switching differential	0 — 999.9 digits	1.0 digits	Hysteresis for switching controllers with proportional band = 0
Actuator time	5 to 3000 sec	60 sec	Actuator time range used by the control valve for modulating controllers
Working point	-100 to +100%	0%	The output level for P and PD controllers (if $x = w$ then $y = Y0$)
Output level limiting	0 — 100%	100%	The maximum limit for the output level
	-100 to +100 %	-100%	The minimum limit for the output level

Technical data

Thermocouple input

Designation	Measuring range	Measuring accuracy	Ambient temperature error
Fe-Con L	-200 to + 900°C	≤0.25%	100 ppm / °C
Fe-Con J EN 60 584	-200 to +1200°C	≤0.25%	100 ppm / °C
Fe-Con U	-200 to + 600°C	≤0.25%	100 ppm / °C
Cu-Con T EN 60 584	-200 to + 400°C	≤0.25%	100 ppm / °C
NiCr-Ni K EN 60 584	-200 to +1372°C	≤0.25%	100 ppm / °C
NiCr-Con E EN 60 584	-200 to +1000°C	≤0.25%	100 ppm / °C
NiCrSi-NiSi N EN 60 584	-100 to +1300°C	≤0.25%	100 ppm / °C
Pt10Rh-Pt S EN 60 584	0 to 1768°C	≤0.25%	100 ppm / °C
Pt13Rh-Pt R EN 60 584	0 to 1768°C	≤0.25%	100 ppm / °C
Pt30Rh-Pt6Rh B EN 60 584	0 to 1820°C	≤0.25% ¹	100 ppm / °C
W5Re-W26Re C	0 to 2320 °C	≤0.25%	100 ppm / °C
W3Re-W25Re D	0 to 2495 °C	≤0.25%	100 ppm / °C
W3Re-W26Re	0 to 2400 °C	≤0.25%	100 ppm / °C
Cold junction	Pt100, internal		

1. in the range 300 to 1820 °C

Input for resistance thermometer

Designation	Connection	Measuring range	Measuring accuracy		Ambient temperature error
			3-/4-wire	2-wire	
Pt100 EN 60 751	2-wire / 3-wire / 4-wire	-200 to +850°C	≤0.05%	≤0.4%	50 ppm / °C
Pt500 EN 60 751	2-wire / 3-wire / 4-wire	-200 to +850°C	≤0.2%	≤0.4%	100 ppm / °C
Pt1000 EN 60 751	2-wire / 3-wire / 4-wire	-200 to +850°C	≤0.1%	≤0.2%	50 ppm / °C
KTY11-6	2-wire	-50 to +150°C	≤1.0%	≤2.0%	50 ppm / °C
Sensor lead resistance	max. 30Ω per lead for 3-wire or 4-wire circuit				
Measuring current	approx. 250µA				
Lead compensation	Not required for 3-wire or 4-wire circuit. With a 2-wire circuit, the lead resistance can be compensated in software by a correction of the process value.				

Input for standard signals

Designation	Measuring range	Measuring accuracy	Ambient temperature error
Voltage	0(2) — 10V 0 — 1V Input resistance $R_{IN} > 100k\Omega$	≤0.05% ≤0.05%	100 ppm / °C 100 ppm / °C
Current	0(4) — 20mA, voltage drop ≤ 1.5V	≤0.05%	100 ppm / °C
Heating current	0 — 50mA AC	≤1%	100 ppm / °C
Resistance transmitter	min. 100Ω, max. 4kΩ	≤0.5%	100 ppm / °C

Logic inputs

Floating contacts	
-------------------	--

■ Standard version

Measuring circuit monitoring

In the event of a fault, the outputs move to a defined (configurable) status.

Sensor	Overrange / underrange	Probe or lead short-circuit	Probe or lead break
Thermocouple	•	-	•
Resistance thermometer	•	•	•
Voltage 2 — 10V 0 — 10V	• •	• -	• -
Current 4 — 20mA 0 — 20mA	• •	• -	• -

• = recognized - = not recognized

Outputs

Relay (changeover) for type 703042/43/44 contact rating contact life	3A at 230VAC resistive load 350,000 operations at rated load / 750,000 operations at 1A
Relay (changeover) (option) contact rating contact life	8A at 230V AC resistive load 100,000 operations at rated load / 350,000 operations at 3A
Relay (make) for type 703041 contact rating contact life	3A at 230VAC resistive load 150,000 operations at rated load / 350,000 at 1A
Relay (changeover) (option) contact rating contact life	3A at 230VAC resistive load 350,000 operations at rated load / 900,000 operations at 1A
Logic output	0/12V / 30mA max. (sum of all output currents) or 0/18V / 25mA max. (sum of all output currents)
Solid-state relay (option) contact rating protection circuitry	1A at 230V varistor
Voltage (option) output signals load resistance	0 – 10V / 2 – 10V $R_{load} \geq 500\Omega$
Current (option) output signals load resistance	0 – 20mA / 4 – 20mA $R_{load} \leq 500\Omega$
Supply voltage for 2-wire transmitter voltage	electrically isolated, not stabilized 30V DC with no load 23V at 30mA load

Controller

Controller type	2-state controller, 3-state controller, modulating controller, continuous controller
Controller structures	P, PD, PI, PID
A/D converter	dynamic resolution up to 16-bit
Sampling time	250msec
	50msec, 90msec, 150msec, 250msec

Electrical data

Supply voltage (switchmode PSU)	110 – 240V AC -15/+10%, 48 – 63Hz 20 – 53V AC/DC, 48 – 63Hz
Electrical safety	to EN 61 010, Part 1 overvoltage category II, pollution degree 2 for type 703041 with power supply AC/DC connect to SELV and PELV only
Power consumption	max. 13VA
Data backup	EEPROM
Electrical connection	at the back, via screw terminals, conductor cross-section up to 1.5mm ² with core ferrules (length: 10mm)
Electromagnetic compatibility Interference emission Interference immunity	EN 61 326 Class B to industrial requirements

■ Stock version

Housing

Housing type	plastic housing for panel mounting to DIN 43 700
Depth behind panel	90 mm
Ambient/storage temperature range	0 to 55 °C / -40 to +70 °C
Climatic conditions	rel. humidity ≤90% annual mean, no condensation
Operating position	horizontal
Protection	to EN 60 529, front IP65 / back IP20
Weight (fully fitted)	JUMO dTRON316: approx. 220g JUMO dTRON308: approx. 380g JUMO dTRON304: approx. 490g

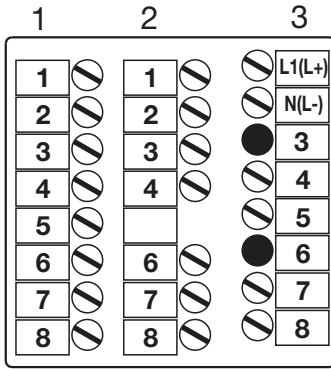
Interface**MODbus**

Interface type	RS422/485
Protocol	Modbus, Modbus-integer
Baud rate	9600, 19200, 38400
Device address	0 – 255
Max. number of nodes	32

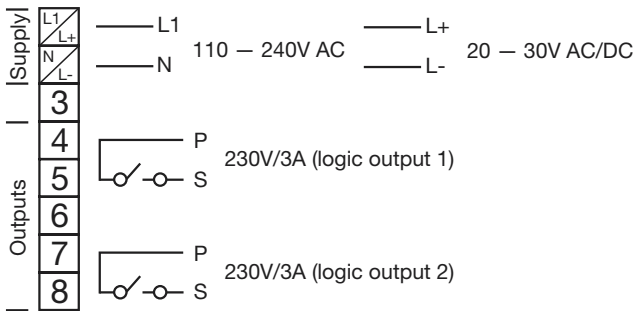
Profibus

Device address	0 – 255
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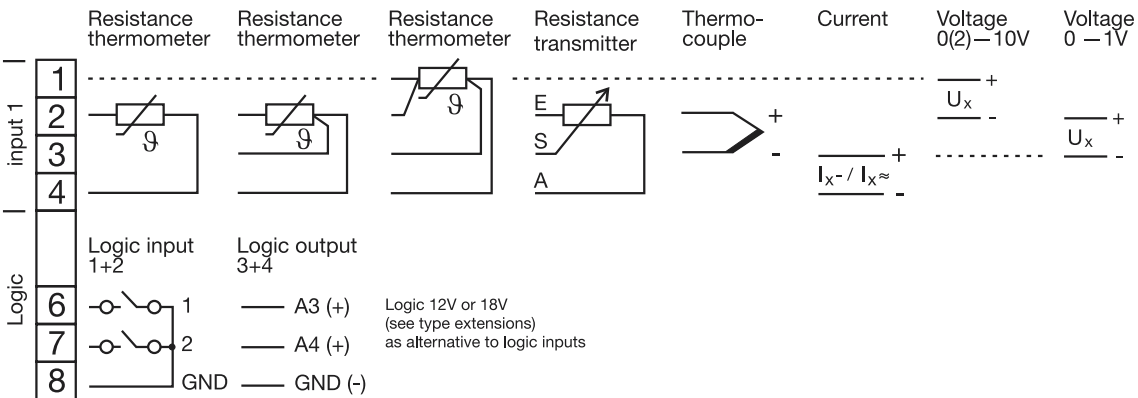
Connection diagram, type 703041



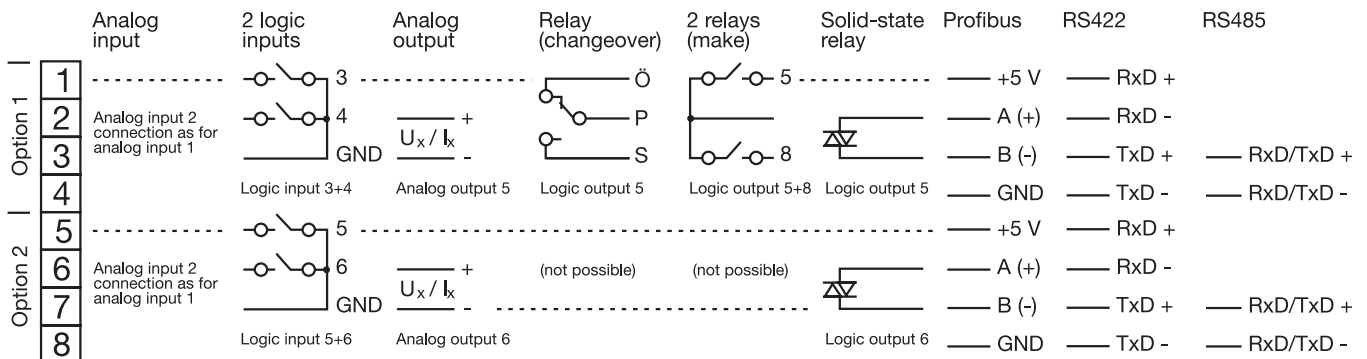
Terminal strip 3



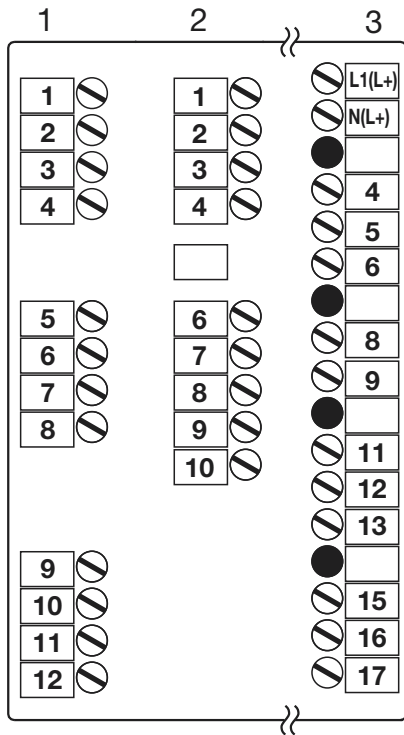
Terminal strip 2



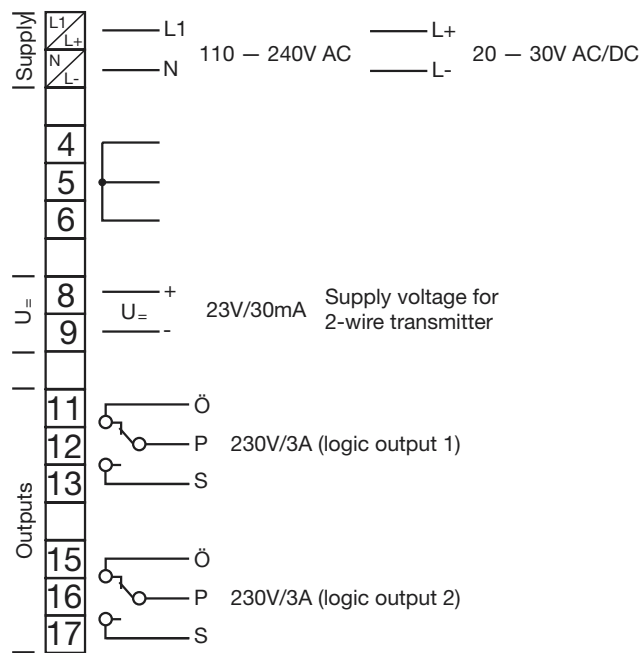
Terminal strip 1



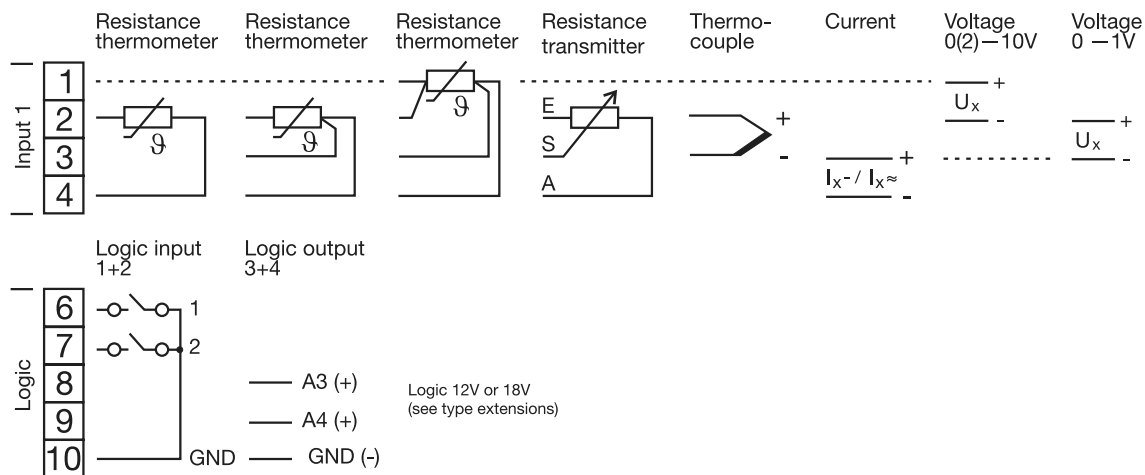
Connection diagram, type 703042/43/44



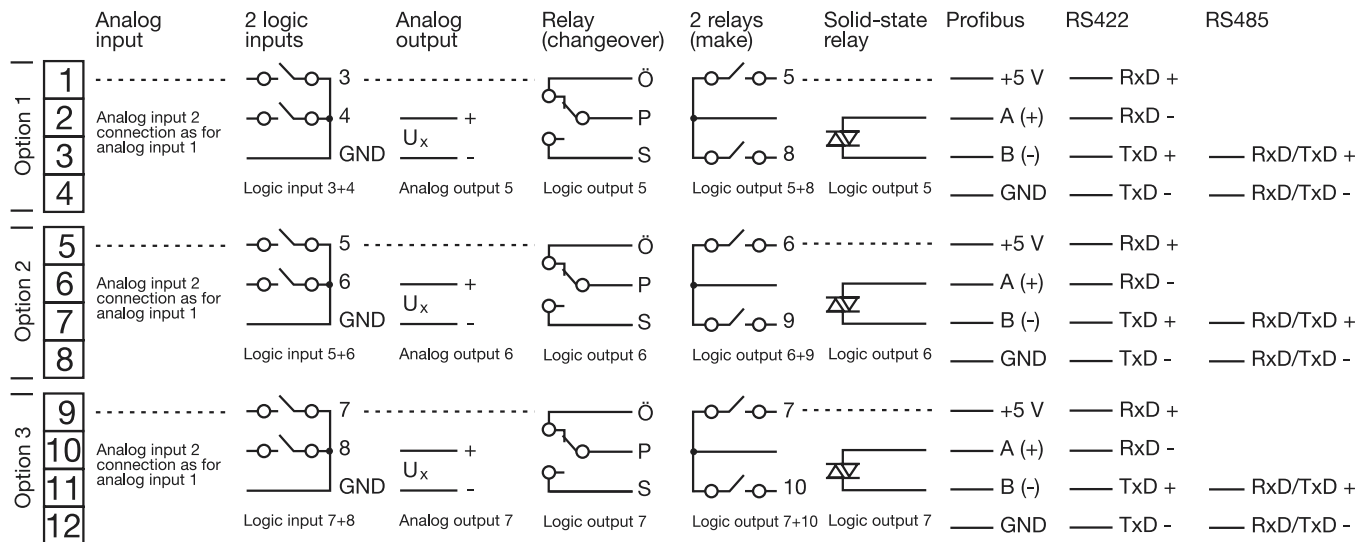
Terminal strip 3



Terminal strip 2

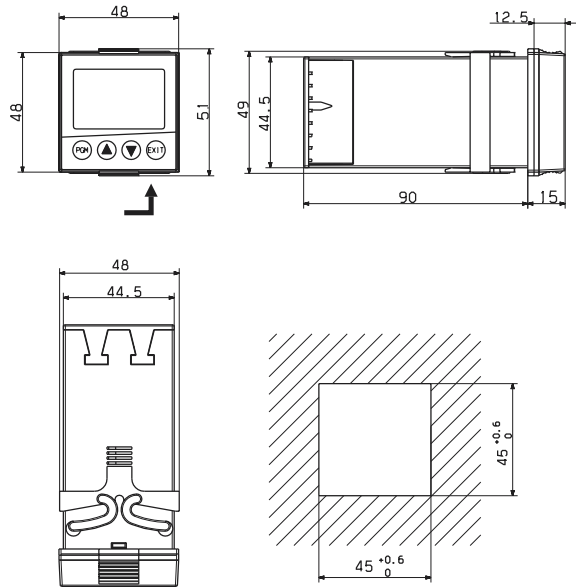


Terminal strip 1

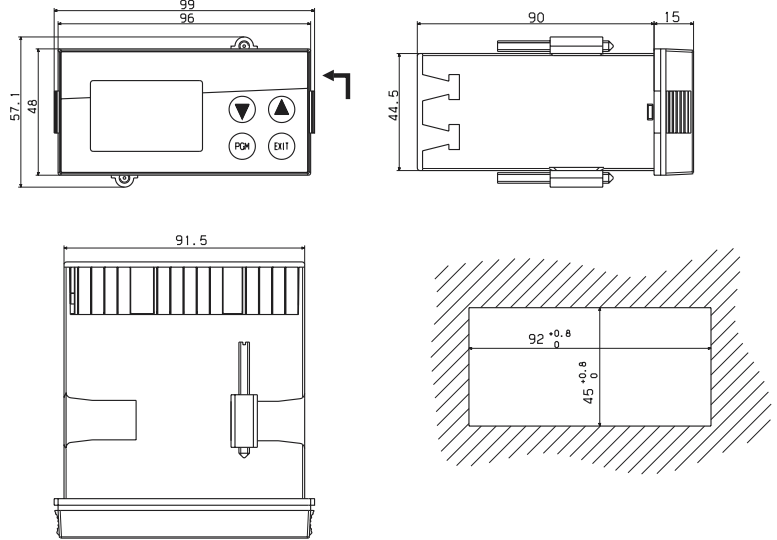


Dimensions

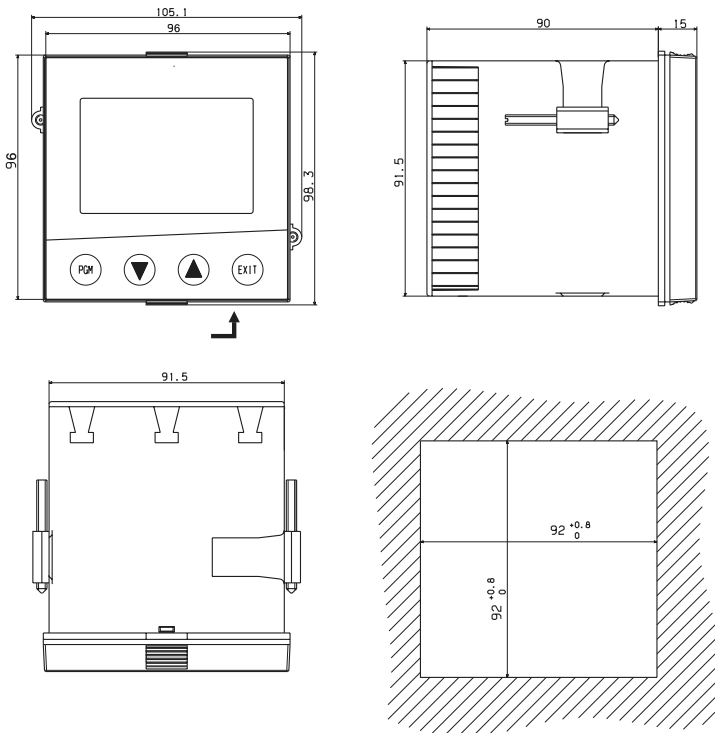
Type 703041



Type 703042/43



Type 703044



Close mounting		
Minimum spacing of panel cut-outs		
Type	horizontal	vertical
without setup connector:		
703041	11 mm	30 mm
703042 (portrait format)	11 mm	30 mm
703043 (landscape fmt.)	30 mm	11 mm
703044	11 mm	30 mm
with setup connector (see arrow):		
703041	11 mm	65 mm
703042 (portrait format)	11 mm	65 mm
703043 (landscape fmt.)	65 mm	11 mm
703044	11 mm	65 mm

Order details

Basic type	
703041	JUMO dTRON316, format 48mm x 48mm incl. 1 analog input, 2 relay outputs and 2 logic inputs or 2 logic outputs
703042	JUMO dTRON308, format 48mm x 96mm (portrait format) incl. 1 analog and 2 logic inputs, 2 relays and 2 logic outputs
703043	JUMO dTRON308, format 96mm x 48mm (landscape format) incl. 1 analog and 2 logic inputs, 2 relays and 2 logic outputs
703044	JUMO dTRON304, format 96mm x 96mm incl. 1 analog and 2 logic inputs, 2 relays and 2 logic outputs

Basic type extensions	
1	Basic type 1
Version	
8	Standard, with factory settings
9	Programming to customer specification
Logic outputs (2 available as standard)	
1	0 / 12V
2	0 / 18V

				Type 703042/43/44	Type 703041 (no option 3)		
1	2	3	Option slots	Max. number	Max. number	Option 1	Option 2
0	0	0	not used			X	X
1	1	1	Analog input 2 (universal)	1	1	X	X
2	2	2	Relay (changeover)	2	1	X	-
3	3	3	2 relays (make contact)	2	1	X	-
4	4	4	Analog output	2	2	X	X
5	5	5	2 logic inputs	2	1	X	X
6	6	6	Solid-state relay 1 A	2	2	X	X
7	7	7	RS422/485 interface	1	1	X	X
8	8	8	Profibus-DP interface	1	1	X	X

X = available in this option slot, - = not available in this option slot

Supply voltage	
2	3 110 – 240V AC -15/+10%, 48 – 63Hz
2	5 AC/DC 20...30V, 48...63Hz

Extra codes			
0	0	0	none
2	1	4	Math and logic module
2	1	7	Ratio controller (requirement: 2 analog inputs)
2	1	8	Differential controller (requirement: 2 analog inputs)
2	1	9	Humidity controller (requirement: 2 analog inputs)

Approvals			
0	0	0	none
0	6	1	Underwriters Laboratories Inc. (UL)
0	5	6	DIN EN 14597

 / 1 - - / ,

703041 / 1 8 1 - 1 4 0 - 2 3 / 0 0 0 , 0 6 1

■ = stock versions

- Scope of delivery:
- 1 controller
 - 1 seal
 - mounting brackets
 - 1 Operating Instructions B70.3041.1
 - 1 Installation Instructions B70.3041.4
 - 1 mini-CD with demo setup software, comprehensive operating manual and additional documentation (software can be enabled for a charge; also for download at www.JUMO.net)

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 Fax: +49 661 6003-607
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 1-800-554-JUMO
 Fax: 315-697-5867
 e-mail: info@jumo.us
 Internet: www.jumo.us



JUMO dTRON 304 plast/ 308 plast Compact Controller for the plastics industry

Brief description

The JUMO dTRON 300 plast series of controllers consists of two freely programmable instruments in different DIN formats for controlling temperature and other process variables, to suit the special applications of the plastics industry. Such applications include extruders, injection-molding machinery, tempering equipment and hot-channel systems.

The high-contrast, multicolor LC display for process value, setpoint and operator prompting contains two four-digit 7-segment displays, two single-character 16-segment displays, display of the active setpoints, six status indicators, and displays for the unit, ramp function and manual operation.

Simple operation through 4 keys. The instruments can be used as 2-state, 3-state, modulating or continuous controllers. The controller software includes a hot-channel warm-up ramp function, control loop and output level monitoring, two autotuning (self-optimization) procedures, a math and logic module, as well as 4 limit comparators.

Linearizations for the usual transducers are stored, and a customer-specific linearization table can be programmed.

A setup program is available for user-friendly configuration from a PC.

An RS422/485, a PROFIBUS-DP or current interface can be used to integrate the instruments into a data network.

The electrical connection is made at the back, via screw terminals.

The possible input and output configurations are shown in the following block diagram. The option boards are universally applicable for all instruments in the series.

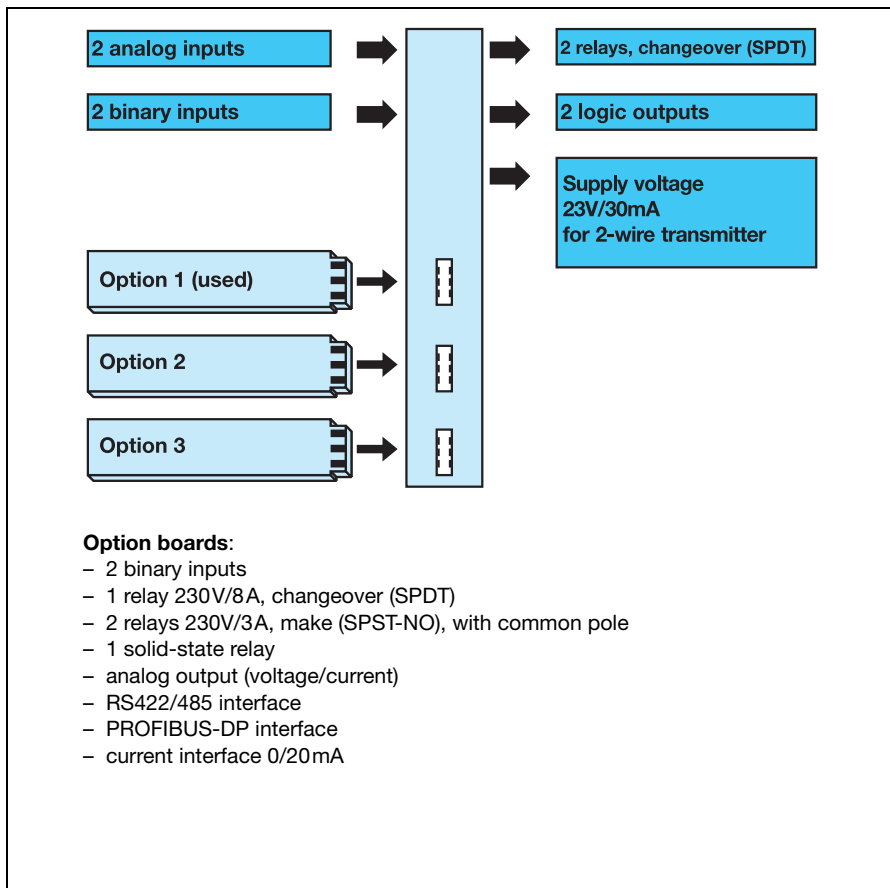


JUMO dTRON 308 plast
 Type 703046/ ...



JUMO dTRON 304 plast
 Type 703048/ ...

Block structure



Key features

- Control loop monitoring
- Output level monitoring
- Hot-channel warm-up ramp
- Heater current monitoring
- MODbus master function
- Boost function
- Four programmable setpoints, two parameter sets
- Math and logic module
- Two autotuning procedures
- Fast, user-friendly configuration through the setup program with program editor
- RS422/485 interface
- PROFIBUS-DP interface
- Current interface 0/20mA (as per Euromap)
- cUL/UL approval applied for

Autotuning

Standard features include the tried and tested autotuning facility, which makes it possible for the controller to be matched to the control loop by a user who is not a control-technology expert.

This functions by evaluating the response of the control loop to specific changes in the output level. Either an oscillatory method or a step-response test can be selected. The step-response test is used, for example, in the plastics industry or in processes where the oscillatory method cannot be employed. The controller parameters that are calculated are: proportional band, reset time, derivative time, cycle time and filter time constant.

Customer-specific linearization

In addition to the linearizations for the usual transmitter outputs, a customer-specific linearization can be created. The programming is carried out in the setup program, in the form of a table of values or a formula.

User data

Parameters which frequently have to be changed by the user can be combined at the user level, under "User data" (only through the setup program).

Math and logic module¹

The math module makes it possible to combine values such as setpoints, output levels and measurements from the analog inputs into a mathematical formula.

The logic module can, for instance, be used to logically combine binary inputs and limit comparators with one another.

Up to two math or logic formulae can be entered through the setup program, and the results of the calculations can be presented at the outputs or used for internal purposes.

Special types of controller¹

The instrument can be operated as a difference, humidity or ratio controller.

Binary functions

- Start boost function
- Start/cancel autotuning
- Change to manual mode
- Hold/cancel ramp
- Controller off
- Setpoint switching
- Parameter set switching
- Key/level inhibit
- Text display
- Display off
- Acknowledge limit comparators
- Program start/hold/cancel
- Timer start/stop

Several binary functions can be combined with one another (only through the setup program).

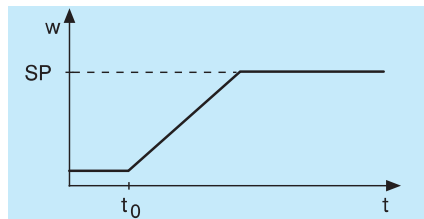
1. Extra code

Functions of the outputs

- Analog input variables
- Math
- Process value
- Setpoint
- Ramp end value
- Control deviation
- Output level
- Controller outputs
- Limit comparators
- Control contacts
- Binary inputs
- Logic formula
- Program end
- Timer signals
- Program/automatic signal

Ramp function

Either a rising or a falling ramp function can be used (increase or decrease in the setpoint). The setpoint value SP changed at time t_0 is the final value for the ramp. The ramp starts with the setpoint at time t_0 . The slope of the ramp can be programmed; the sign of the slope is given by the relationship between the setpoint at time t_0 and the SP value. When the supply voltage is switched on, the ramp function starts with the momentary process value.



Timer

A timer is available for time-dependent control. The status of the timer can be switched through to the binary outputs or internally processed for the activation or de-activation of time-dependent processes.

Setup program (accessory)

The setup program for configuring the instrument is available in English, French, German, and other languages. Using a PC, you can create and edit sets of data, and transfer them to the controller or read them out from the instrument. The data sets are stored and managed.

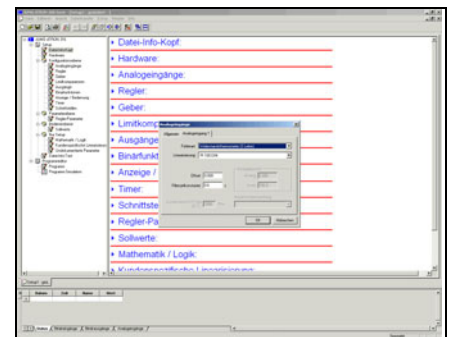
The setup program can be expanded through additional program modules.

Program editor

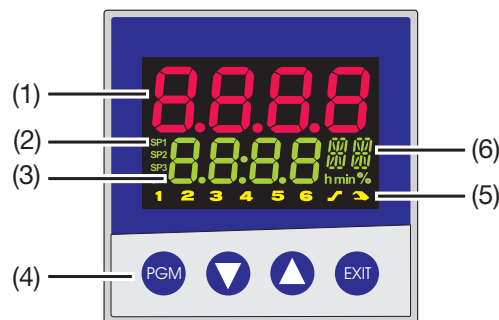
For the easy creation of programs.

Start-up

To check the control behavior.



Displays and controls



(1)	7-segment display (factory setting: process value) four-digit, red; decimal place is configurable (automatic adjustment on display overflow)
(2)	Active setpoint (factory setting: SP1) SP1, SP2, SP3, SP4 (SP=setpoint); green;
(3)	7-segment display (factory setting: setpoint) four-digit, green; decimal place is configurable; also used for operator prompting (display of parameter and level symbols)
(4)	Keys
(5)	Indication yellow, for - switch status of binary outputs 1 – 6 (display lights up = on) - ramp/program function is active - manual operation is active
(6)	16-segment display for the unit °C/°F and text two-digit, green; symbols for h, min and % additional display options through the setup program

Program function

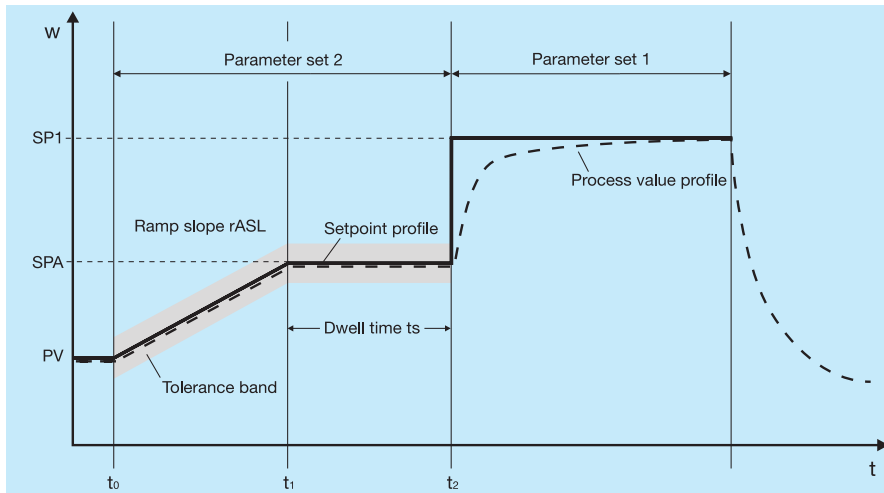
A setpoint profile can be implemented with a maximum of 8 program segments. The settings for the segment setpoints and segment times are carried out at the user level. The time scale can be configured as mm:ss or hh:mm (s = seconds, h = hours).

A program-end signal can be generated, and the program can be halted or canceled.

Further functions can be defined through the setup program (start at process value, cyclical program handling, segment-by-segment assignment of parameter sets and four control contacts). The program profile can also be visualized.

Warm-up ramp for hot channel

The warm-up ramp for hot-channel equipment is used, for example, for the gentle operation of ceramic heater elements. Damage can be avoided by allowing moisture to evaporate slowly from the hygroscopic heater elements during the warm-up phase.



Boost function

Time- or event-controlled setpoint boost, for example for tool nozzle retraction during the production process. The temperature of the zones is raised by an adjustable value for an adjustable time period, via the binary function (factory setting: binary input 1 (pushbutton)).

Reduction function

The temperature of the zones can be lowered to a quiescent-state setpoint during the production process, for cleaning or changing tools. Ex-factory, this is carried out via binary input 2, but can also be activated through a different signal.

Control loop monitoring

Control loop monitoring is used to check whether the process reacts as expected during commissioning and the approach phase. What is checked is how the process value changes with respect to changes in the output level.

In addition, control loop monitoring also detects any polarity reversal of the operating sense (heating ON, process value falls).

If the (adjustable) conditions are not fulfilled, an alarm will be triggered.

Output level monitoring

This functions serves to monitor the control loop during operation. Output level monitoring is available for checking whether the output level (in a stabilized condition) moves within definable limits (monitoring band) about an average output level. The average output level is calculated by the instrument by means of an adjustable determination time t_y . If the output level goes outside the monitoring band, an alarm signal is initialized. This serves to indicate a heating failure or changes to the sensor, for instance.

Interfaces

RS422/RS485 interface

The serial interface is used for communication with higher-level (supervisory) systems.

The MODbus protocol is used for transmission.

PROFIBUS-DP

The PROFIBUS-DP interface can be used to integrate the controller into a fieldbus system operating according to the PROFIBUS-DP standard. This PROFIBUS variant is especially designed for communication between automation systems and decentralized peripheral devices at the field level, and optimized for speed.

Data transmission is made serially, using the RS485 standard.

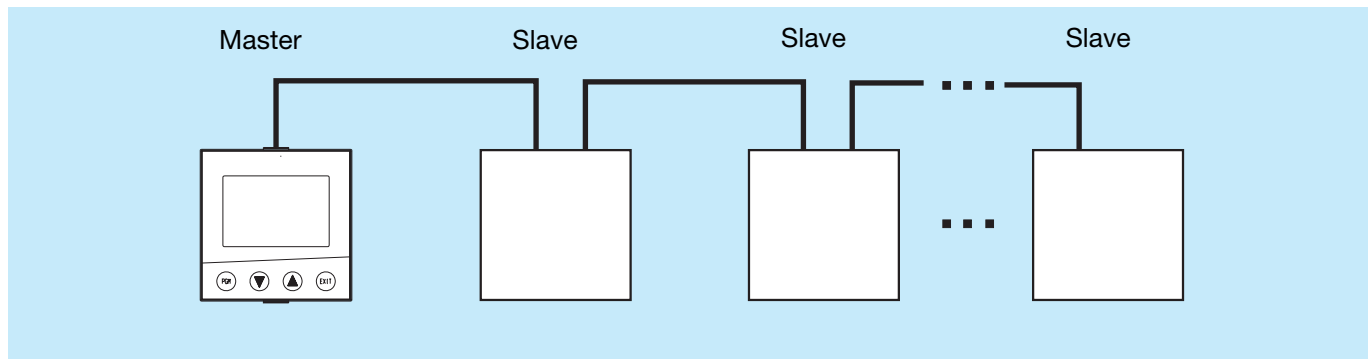
GSD generator, the project-planning tool that is supplied with the package (GSD = Gerätestammdaten, i.e. device data), is used to make a selection of device characteristics for the controller, to create a standardized GSD file that is used to integrate the controller into the fieldbus system.

Current interface

Serial interface with 0/20mA as per Euromap. Communication takes place through the MODbus or Arburg protocol.

MODbus master

The instrument can be used as an independent master within a MODbus network. This enables the transmission of data to all the devices (slaves (max. 32)) in the MODbus network, either by a key stroke or through the binary function. The slaves must all be devices of the same type. The configuration is performed through the Setup program.



Parameter level

All parameters and their meanings are listed in the table below. Some parameters may be missing or meaningless for a particular type of controller. Two parameters sets can be stored, to handle special applications.

Parameter	Value range	Factory setting	Meaning
Proportional band	0 to 9999 digits	0 digits	Size of the proportional band 0 means that the controller structure is out of action!
Derivative time	0 to 9999 sec	80 sec	Influences the differential component of the controller output signal
Reset time	0 to 9999 sec	350 sec	Influences the integral component of the controller output signal
Cycle time	0 to 999.9 sec	20.0 sec	When using a switched output, the cycle time should be chosen so that the energy flow to the process is as continuous as is practicable without overloading the switching elements.
Contact spacing	0 to 999.9 sec	0.0 digits	The spacing between the two control contacts for 3-state or modulating controllers
Switching differential	0 to 999.9 digits	1.0 digits	Hysteresis for switching controllers with proportional band = 0
Actuator time	5 to 3000 sec	60 sec	Actuator time range used by the control valve for modulating controllers
Working point	-100 to +100%	0%	The output level for P and PD controllers (if $x = w$ then $y = Y0$).
Output level limiting	0 to 100%	100%	Maximum output level
	-100 to +100 %	-100%	Minimum output level

Technical data

Input for thermocouple

Designation	Measuring range	Measuring accuracy	Ambient temperature error
Fe-Con L	-200 to + 900 °C	≤0.25%	100 ppm / °C
Fe-Con J EN 60 584	-200 to +1200 °C	≤0.25%	100 ppm / °C
Cu-Con U	-200 to + 600 °C	≤0.25%	100 ppm / °C
Cu-Con T EN 60 584	-200 to + 400 °C	≤0.25%	100 ppm / °C
NiCr-Ni K EN 60 584	-200 to +1372 °C	≤0.25%	100 ppm / °C
NiCr-Con E EN 60 584	-200 to +1000 °C	≤0.25%	100 ppm / °C
NiCrSi-NiSi N EN 60 584	-100 to +1300 °C	≤0.25%	100 ppm / °C
Pt10Rh-Pt S EN 60 584	0 to 1768 °C	≤0.25%	100 ppm / °C
Pt13Rh-Pt R EN 60 584	0 to 1768 °C	≤0.25%	100 ppm / °C
Pt30Rh-Pt6Rh B EN 60 584	0 to 1820 °C	≤0.25% ¹	100 ppm / °C
W5Re-W26Re C	0 to 2320 °C	≤0.25%	100 ppm / °C
W3Re-W25Re D	0 to 2495 °C	≤0.25%	100 ppm / °C
W3Re-W26Re	0 to 2400 °C	≤0.25%	100 ppm / °C
Cold junction	Pt100, internal		

1. within the range 300 to 1820 °C

Input for resistance thermometer

Designation	Connection circuit	Measuring range	Measuring accuracy		Ambient temperature error
			3-/4-wire	2-wire	
Pt100 EN 60 751	2-wire / 3-wire / 4-wire	-200 to +850 °C	≤0.05%	≤0.4%	50 ppm / °C
Pt500 EN 60 751	2-wire / 3-wire / 4-wire	-200 to +850 °C	≤0.2%	≤0.4%	100 ppm / °C
Pt1000 EN 60 751	2-wire / 3-wire / 4-wire	-200 to +850 °C	≤0.1%	≤0.2%	50 ppm / °C
KTY11-6	2-wire	-50 to +150 °C	≤1.0%	≤2.0%	50 ppm / °C
Sensor lead resistance	30 Ω max. per lead for 3-wire/4-wire circuit				
Measuring current	approx. 250 μA				
Lead compensation	Not required for 3-wire or 4-wire circuit. With a 2-wire circuit, the lead resistance can be compensated in software by a correction of the process value.				

Input for standard signals

Designation	Measuring range	Measuring accuracy	Ambient temperature error
Voltage	0(2) — 10V 0 — 1V input resistance $R_{IN} > 100k\Omega$	≤0.05% ≤0.05%	100 ppm / °C 100 ppm / °C
Current	0(4) — 20 mA, voltage drop ≤ 1.5V	≤0.05%	100 ppm / °C
Heating current	0 — 50 mA AC	≤1%	100 ppm / °C
Resistance transmitter	min. 100 Ω, max. 4 kΩ	≤0.5%	100 ppm / °C

Binary inputs

Floating contacts	
-------------------	--

■ Standard version

Measuring circuit monitoring

In the event of a fault, the outputs move to a defined (configurable) status.

Sensor	Overrange / underrange	Probe or lead short-circuit	Probe or lead break
Thermocouple	●	-	●
Resistance thermometer	●	●	●
Voltage 2 — 10V	●	●	●
0 — 10V	●	-	-
Current 4 — 20mA	●	●	●
0 — 20mA	●	-	-

● = recognized - = not recognized

Outputs

Relay, changeover (SPDT) contact rating contact life	3A at 230V AC resistive load 350,000 operations at rated load / 750,000 operations at 1 A
Relay, changeover (SPDT), option contact rating contact life	8A at 230VAC resistive load 100,000 operations at rated load / 350,000 operations at 3A
Relay, make (SPST-NO) contact rating contact life	3A at 230VAC resistive load 350,000 operations at rated load / 900,000 operations at 1 A
Logic output	0/12V / 24mA max. (sum of all output currents) or 0/18V / 24mA max. (sum of all output currents)
Solid-state relay (option) contact rating protection circuitry	1A at 230V varistor
Voltage (option) output signals load resistance	0 – 10V / 2 – 10V $R_{load} \geq 500\Omega$
Current (option) output signals load resistance	0 – 20mA / 4 – 20mA $R_{load} \leq 500\Omega$
Supply voltage for 2-wire transmitter voltage	electrically isolated, not stabilized 30V with no load 23V at 30mA

Controller

Controller type	2-state controller, 3-state controller, modulating controller, continuous controller
Controller action	P/PD/PI/PID
A/D converter	dynamic resolution up to 16-bit
Sampling cycle time	250msec 50msec, 90msec, 150msec, 250msec

Electrical data

Supply voltage (switch-mode PSU)	110 – 240V AC -15/+10%, 48 – 63Hz 20 – 30V AC/DC, 48 – 63Hz
Electrical safety	to EN 61 010, Part 1 overvoltage category II, pollution degree 2
Power consumption	13VA max.
Data backup	EEPROM
Electrical connection	at the back, via screw terminals, conductor cross-section up to 2.5mm ² with core ferrules (length: 10mm)
Electromagnetic compatibility interference emission interference immunity	EN 61 326 Class B to industrial requirements

■ Stock version

Housing

Housing type	plastic housing for panel mounting to DIN 43 700
Depth behind panel	90 mm
Ambient/storage temperature range	0 to 55°C / -40 to +70°C
Climatic conditions	rel. humidity ≤ 90% annual mean, no condensation
Operating position	horizontal
Enclosure protection	to EN 60 529, front IP65 / back IP20
Weight (fully fitted)	Type 703046: approx. 380g Type 703048: approx. 490g

Interface**MODbus**

Interface type	RS422/485
Protocol	MODbus, MODbus-integer
Baud rate	9600, 19200, 38400
Device address	0 – 255
Max. number of stations	32

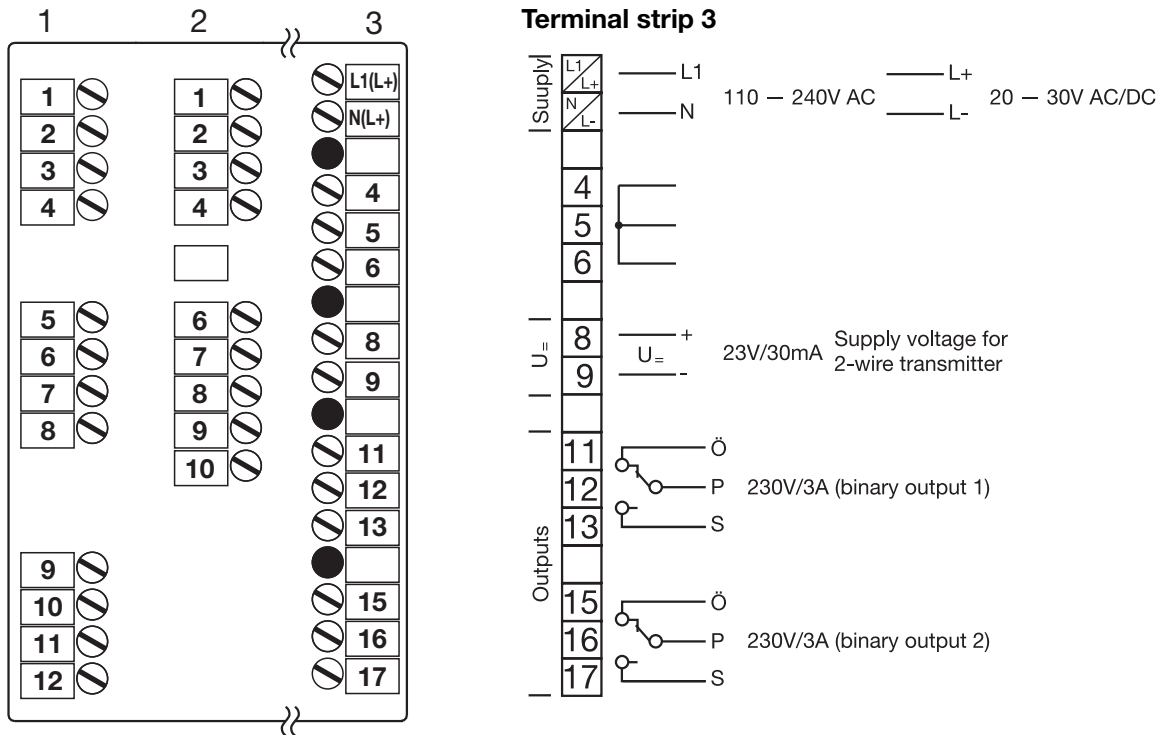
Profibus-DP

Device address	0 – 255
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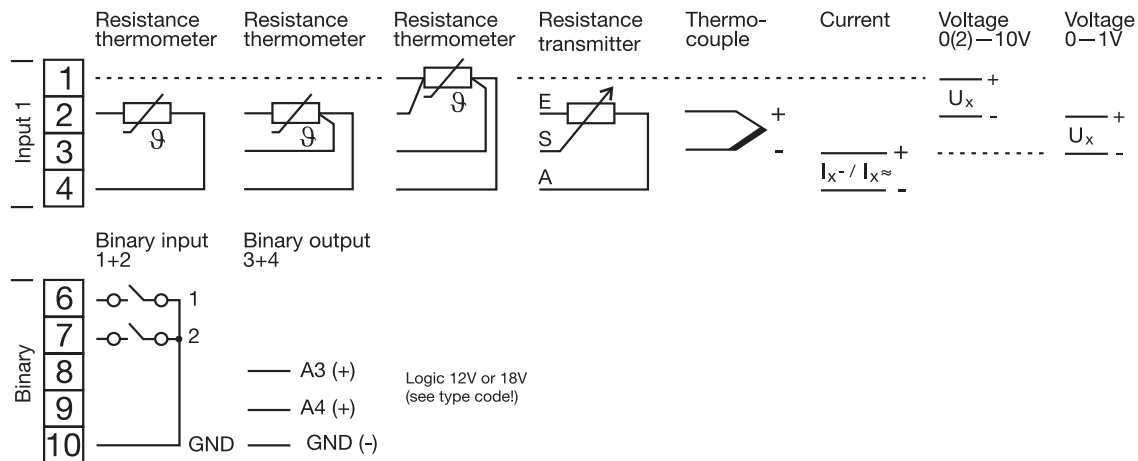
Current interface

Interface type	current 0/20mA
Protocol	MODbus, MODbus-integer, MODbus master
Baud rate	4800, 9600, 19200, 38400
Device address	0 – 255
Max. number of stations	32

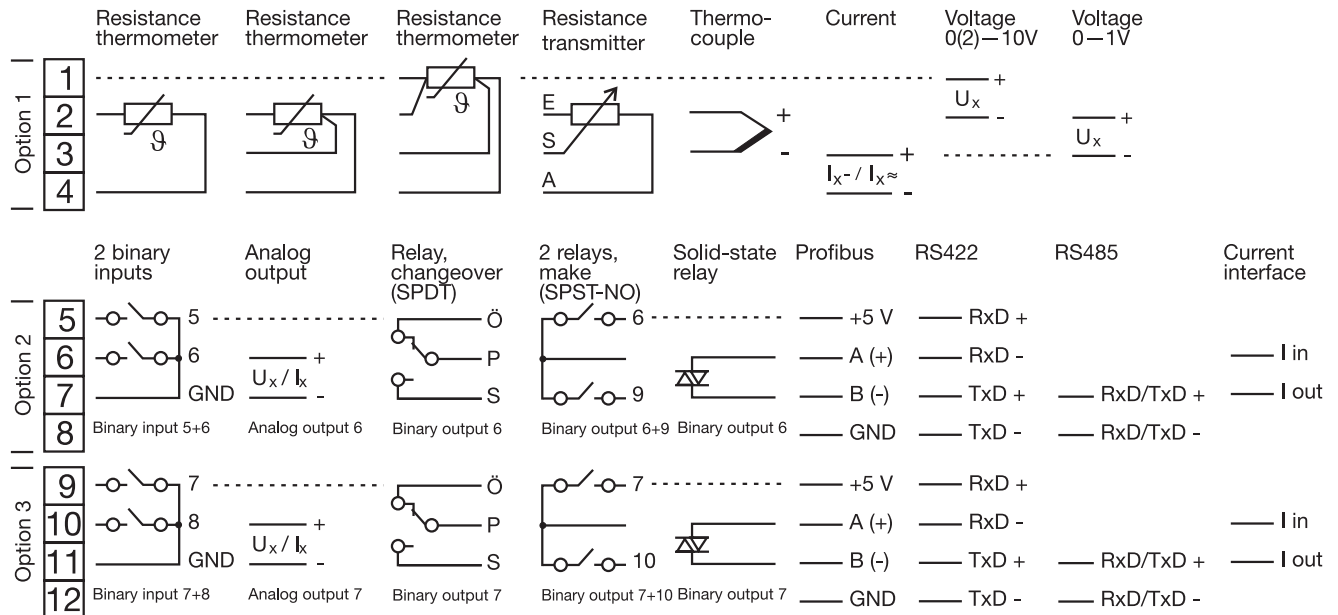
Connection diagram, type 703046/48



Terminal strip 2

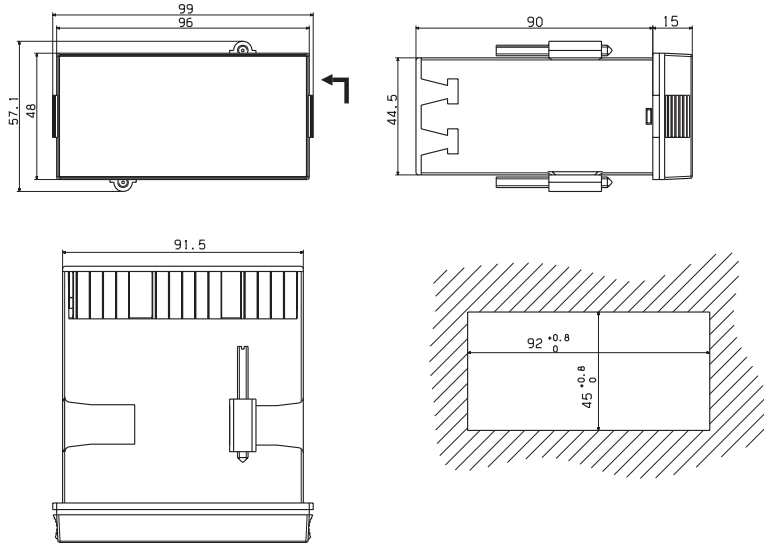


Terminal strip 1

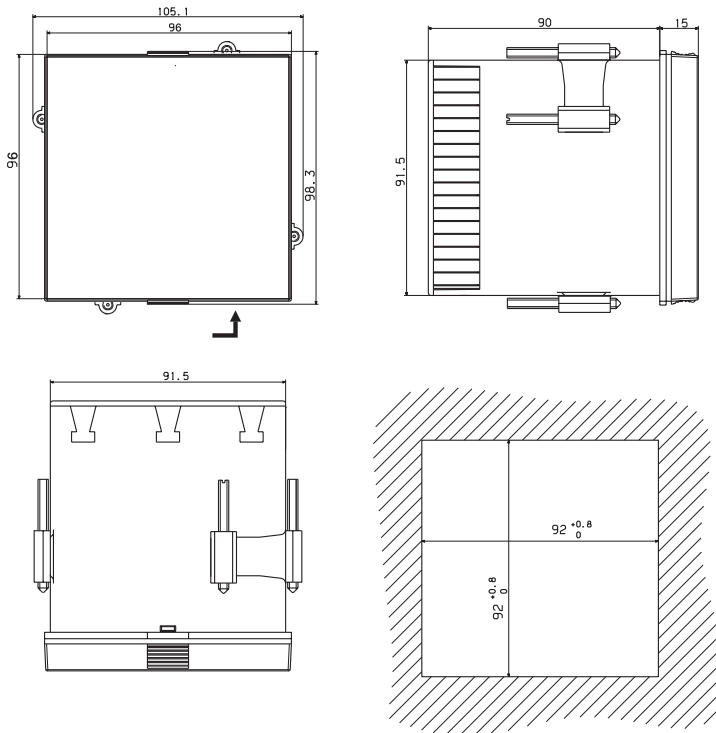


Dimensions

Type 703046



Type 703048



Side-by-side mounting			
Minimum spacing of panel cut-outs			
Type	horizontal	vertical	
without setup plug:			
703046	11 mm	30 mm	
703048	11 mm	30 mm	
with setup plug (see arrow):			
703046	11 mm	65 mm	
703048	11 mm	65 mm	

Order details

Basic type	
703046	JUMO dTRON308, 48mm x 96mm format (portrait format) incl. 2 analog and 2 binary inputs, 2 relays and 2 logic outputs
703048	JUMO dTRON304, 96mm x 96mm format incl. 2 analog and 2 binary inputs, 2 relays and 2 logic outputs

Basic type extensions	
2	Basic type 2
Version	
8	Standard, with factory settings
9	Programming to customer specification
Logic outputs (2 are available as standard)	
1	0 / 12V
2	0 / 18V

1.	2.	3.	Option slot	Maximum number of options
-	0	0	not used	
1	-	-	Analog input 2 (universal)	1
-	2	2	Relay, changeover (SPDT)	2
-	3	3	2 relays, make (SPST-NO)	2
-	4	4	Analog output	2
-	5	5	2 binary inputs	2
-	6	6	Solid-state relay 1A	2
-	7	7	RS422/485 interface	1
-	8	8	PROFIBUS-DP interface	1
-	9	9	Current interface 0/20mA	1

- = not allowed in this option slot

Supply	
2	3 110 – 240V AC -15/+10%, 48 – 63Hz
2	5 20 – 30V AC/DC, 48 – 63Hz

Extra codes			
0	0	0	none
2	1	4	Math and logic module
2	1	7	Ratio controller
2	1	8	Difference controller
2	1	9	Humidity controller

Approvals			
0	0	0	none
0	6	1	Underwriters Laboratories Inc. (UL)

 / 2 - 1 - / ,

703046 / 2 8 1 - 1 4 0 - 2 3 / 0 0 0 , 0 6 1

■ = stock versions

- Scope of delivery:
- controller
 - seal
 - mounting brackets
 - Operating Manual B70.3046.0 in DIN A6 format

1 mini-CD with the demo setup software and pdf documents in DIN A4 format (operating manual and additional documentation) can be ordered separately. The individual documents and programs are downloadable from www.jumo.net (the software can be enabled for a charge).

Delivery address: Mackenrodtstraße 14,
36039 Fulda, Germany
Postal address: 36035 Fulda, Germany
Phone: +49 661 60 03-0
Fax: +49 661 60 03-6 07
E-mail: mail@jumo.net
Internet: www.jumo.de

JUMO House
Temple Bank, Riverway
Harlow, Essex CM20 2TT, UK
Phone: +44 12 79 63 55 33
Fax: +44 12 79 63 52 62
E-mail: sales@jumo.co.uk

885 Fox Chase, Suite 103
Coatesville PA 19320, USA
Phone: 610-380-8002
1-800-554-JUMO
Fax: 610-380-8009
E-mail: info@JumoUSA.com
Internet: www.JumoUSA.com



JUMO DICON 400/500

Universal process controllers



Brief description

This series of universal, freely configurable process controllers is available in the formats 96mm x 96mm and 96mm x 48mm (portrait and landscape format).

The instruments feature two 4-digit 7-segment displays, five or eight LEDs for indication of the switching status and operating modes, an 8-digit matrix display, as well as six keys for operation and configuration.

The user has flexibility in assigning the slots of the controller according to the block structure. Additional functions include self-optimisation, parameter set switching, and up to eight limit comparators.

Linearisations for conventional transducers are held in the memory; a customized linearisation table can be programmed.

The process controller can be adapted to a variety of tasks with the aid of a maths module. The instruments can be integrated into a data network via a serial interface, or can be expanded through an external relay module.

A setup program is available for easy configuration from a PC.

The electrical connection is at the rear by screw terminals.



JUMO DICON 500
Type 703570/0...

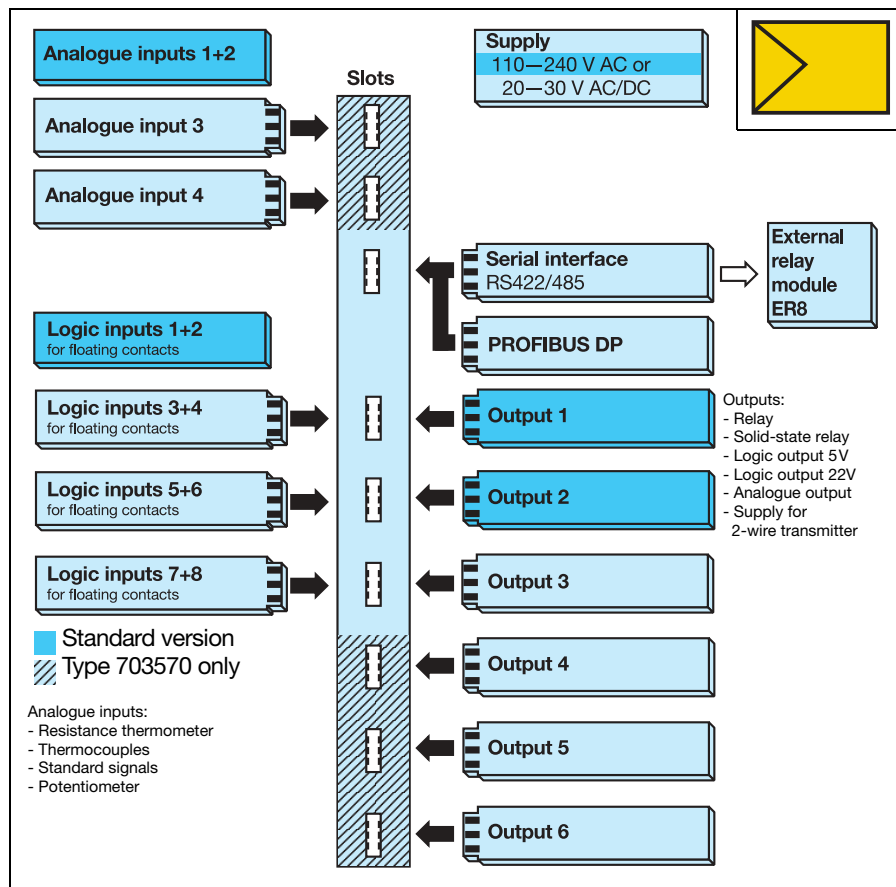


JUMO DICON 400
Type 703575/1...



JUMO DICON 400
Type 703575/2...

Block structure



Features

- Switchable displays
- Text or bar graph display
- 8 limit comparators
- 4 setpoints
- 2 parameter sets
- Maths and logic module
- Ramp and profile program function
- Setup program with JUMOstart-up software for Windows® 95/98/NT4.0
- Approved to DIN 3440 (for Type 703570)
- UL approval
- GL approval

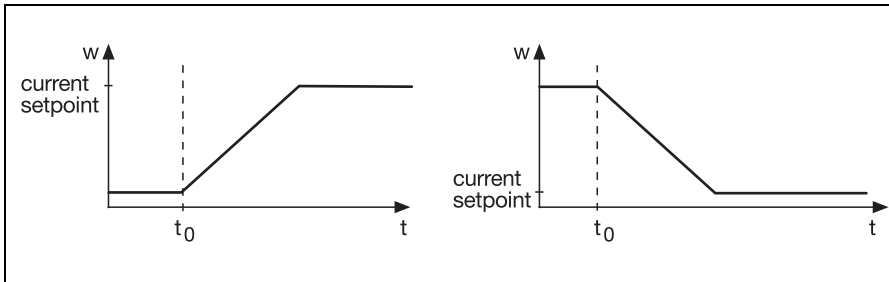
Self-optimisation

The standard specification includes an auto-tuning facility which permits the user to adjust the controller to the process without any control engineering know-how. Auto-tuning evaluates the reaction of the process to certain changes of the output variables. The controller parameters X_p , T_n , T_v and C_y are calculated.

Ramp function

This function enables a defined approach of the process value from t_0 to the current setpoint.

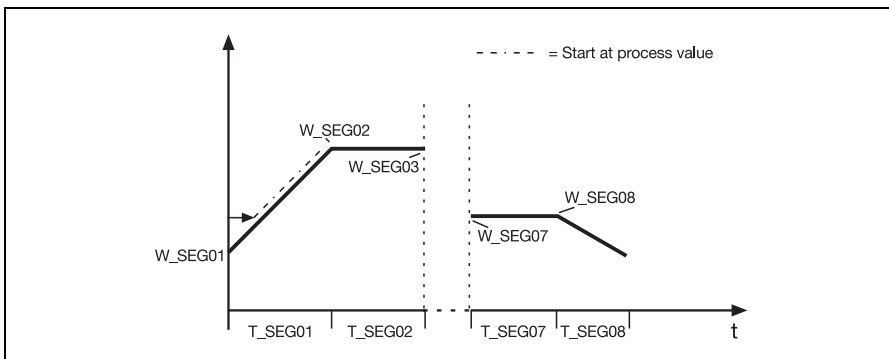
The slope is adjusted via a gradient ($^{\circ}\text{C}/\text{min}$, $^{\circ}\text{C}/\text{h}$ or $^{\circ}\text{C}/\text{day}$) at configuration level 1. On a setpoint change, it is active either as a rising or a falling ramp.



Profile program function

It is possible to produce a profile program with up to eight segments. The segment setpoints ($W_SEG01 - W_SEG08$) and segment times ($T_SEG01 - T_SEG08$) are defined at an additional level. The segment times can be programmed from 00:00:00 to 99:59:59 (format: hh:mm:ss).

The program starts at the program start or the process value. When starting at the process value, the profile is searched to find a setpoint which corresponds to the process value at the instant of the start. The profile then continues from this point. If the process value is outside the profile, a start is made at the first program segment. The program can either be run through once, or it can be repeated cyclically. Furthermore, it is possible to hold the program.



Fuzzy logic

In addition to the standard parameters, the controller software also contains a fuzzy logic software module. This can be used to improve both the control and the disturbance action via two parameters.

Customized linearisation

As well as the linearisations for conventional transducers, a customer-specific linearisation can be created.

Programming is performed via the setup program, in the form of a table of values.

Maths and logic module (option)

The maths module can be used to integrate, for instance, setpoints, outputs and the measured values of the analogue inputs into a mathematical formula.

Through the logic module it is possible to logically link logic inputs and limit comparators, for example.

Two formulae can be entered via the setup program for each of the two modules. The results of the calculations can then be produced via the outputs or can be used for internal purposes.

There is the additional possibility of implementing controls for difference, ratio and humidify through standard formulae.

Configurable displays

Any process variable can be visualised on the 7-segment displays and the dot-matrix display.

It is possible to switch between two displays either from the keys, or automatically after an adjustable interval.

Text display

The functions of the logic inputs, the limit comparators and the logic outputs of the logic module can have customer texts assigned to them.

Depending on the status of the function or the configuration of the displays, a programmed text (8 characters max.) is shown on the matrix display.

The customer texts can only be created using the setup program.

Setup program (accessory)

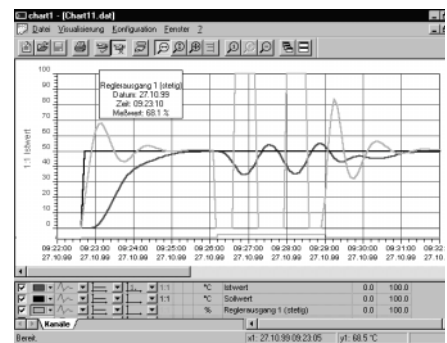
The setup program for configuration is available in English, German and French. A PC can be used to create and edit data sets, transfer them to the controller or read them out of the instrument. The data sets are stored and managed.



JUMO Start-up software

The JUMO start-up software is an integral part of the setup program and is available for conveniently adapting the controller to the process.

Different process variables (e. g. setpoint, process value, control deviation, signals from the controller outputs) can be displayed graphically. The controller parameters can be altered and transferred to the controller via the setup or RS422/485 interfaces.



RS422/RS485 interface (option)

The serial interface is available for communication with higher-level systems. MODbus/Jbus are used as transmission protocols.

PROFIBUS-DP (option)

The controller can be integrated into a fieldbus system to the PROFIBUS-DP standard, via the PROFIBUS-DP interface. This PROFIBUS variant has been designed specifically for the communication between automation systems and decentralised peripheral instruments at the field level, and is speed-optimised. The data are transmitted serially in accordance with the RS485 standard. Using the project design tool included in the delivery (GSD-generator; GSD = instrument master data), a standardised GSD file is created that serves to integrate the controller into the fieldbus system, through selection of characteristic controller data.

External relay module ER8 (accessory)

The controller can be expanded by eight relay outputs through the external relay module ER8. Operation is by the RS422/RS485 interface. The setup program is necessary for configuring the ER8, which can be mounted on a standard DIN rail.

Functions of the logic inputs

- Start/cancel self-optimisation
- Changeover to manual mode
- Manual mode inhibit
- Ramp stop
- Ramp off
- Setpoint switching
- Process value switching
- Parameter set switching
- Key/level inhibit
- Text display
- All displays off
- Profile program start/stop

Functions of the outputs

- Analogue input variables
- Mathematics
- Process value
- Setpoint
- Control deviation
- Output
- Controller outputs
- Limit comparators
- Logic inputs
- Logic
- Manual mode signal

Operation, parameterization, configuration

Operation, setting of the controller parameters and configuration are arranged at different levels.

Operating level

Setpoints, measurements of the analogue inputs, maths as well as the controller output can be indicated here.

Profile program function

The eight segments of the profile program function are programmed here. This level only appears when the profile program function has been activated.

Parameter level

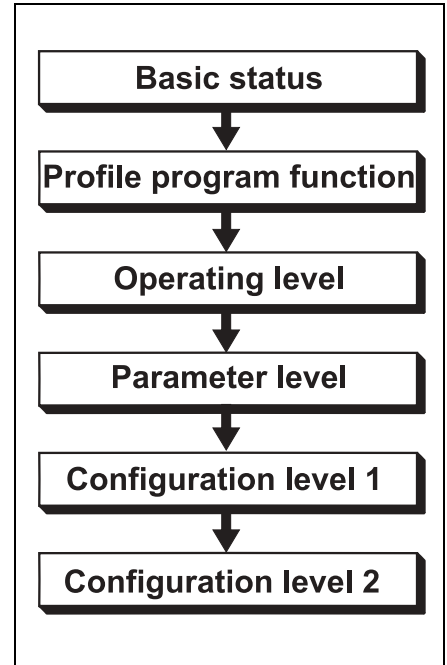
The controller parameters are set here.

Configuration level 1

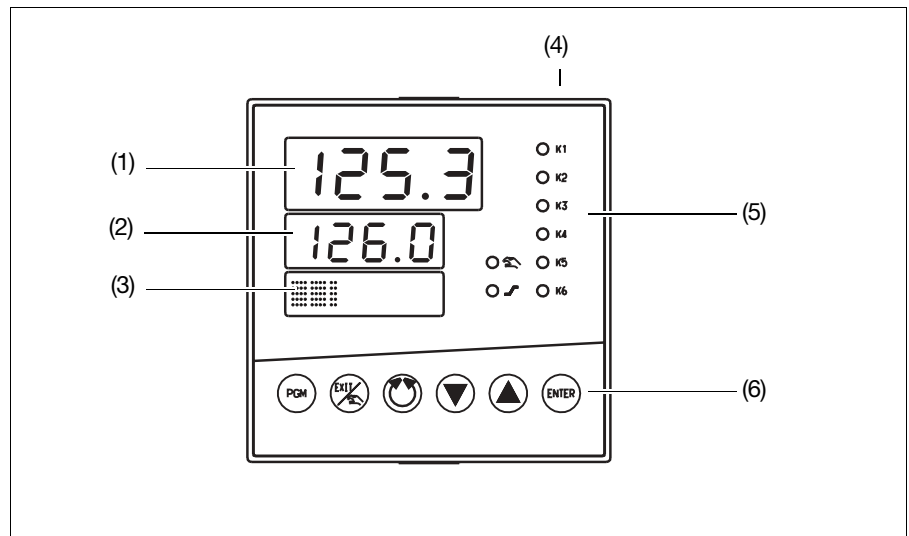
Here the basic functions of the instrument, such as controller function and setpoint switching, are set.

Configuration level 2

The hardware and software codes that correspond to the controller version, are shown here.



Displays and controls



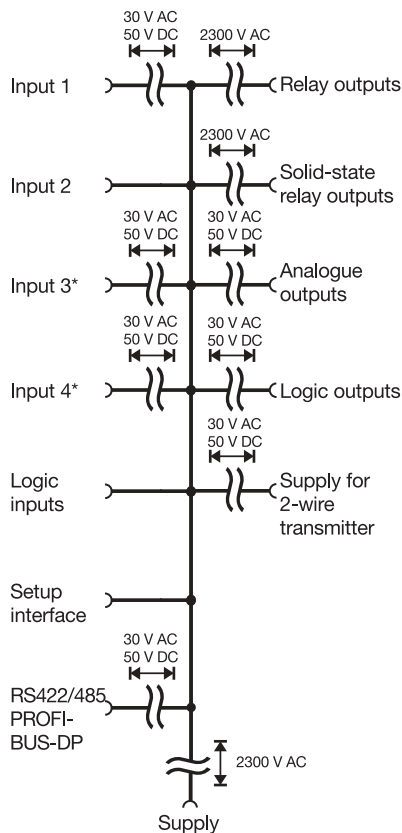
<p>(1) configurable 7-segment display 4 digits, red</p> <table border="1"> <thead> <tr> <th>Type</th> <th>Height</th> </tr> </thead> <tbody> <tr> <td>703570</td> <td>13mm</td> </tr> <tr> <td>703575</td> <td>10mm</td> </tr> </tbody> </table> <p>factory-set: process value</p>	Type	Height	703570	13mm	703575	10mm	<p>(4) Setup interface (for position, see dimensional drawings)</p>
Type	Height						
703570	13mm						
703575	10mm						
<p>(2) configurable 7-segment display 4 digits, green</p> <table border="1"> <thead> <tr> <th>Type</th> <th>Height</th> </tr> </thead> <tbody> <tr> <td>703570</td> <td>10mm</td> </tr> <tr> <td>703575</td> <td>7mm</td> </tr> </tbody> </table> <p>factory-set: setpoint</p>	Type	Height	703570	10mm	703575	7mm	<p>(5) Status indication 6 (3) yellow LEDs for status indication of the outputs 2 green LEDs to display manual mode and the ramp/profile program function</p>
Type	Height						
703570	10mm						
703575	7mm						
<p>(3) configurable dot-matrix display 8 digits, green factory-set: output (bar graph)</p>	<p>(6) Keys</p>						

Parameter level

The table below lists all the parameters, as well as their meaning. Depending on the controller type, certain parameters are irrelevant or not applicable. Two parameter sets can be stored for specific applications.

Parameters	Display	Value range	factory-set	Meaning
Controller structure	Structure 1	P, I, PD, PI, PID	PID	Structure 2 refers to the second output in the case of a double-setpoint controller
	Structure 2	P, I, PD, PI, PID	PID	
Proportional band	Xp1	0—9999 digit	0 digit	Size of the proportional band At Xp =0 the controller structure is not effective!
	Xp2	0 — 9999 digit	0 digit	
Derivative time	Tv1	0—9999 sec	80 sec	Influences the differential component of the controller output signal
	Tv2	0—9999 sec	80 sec	
Reset time	Tn1	0—9999 sec	350 sec	Influences the integral component of the controller output signal
	Tn2	0—9999 sec	350 sec	
Switching cycle time	Cy1	0—9999 sec	20 sec	For a switching output, the cycle time should be selected so that the energy supply to the process is virtually continuous while the switching devices are not overloaded.
	Cy2	0—9999 sec	20 sec	
Contact spacing	Xsh	0—9999 sec	0 digit	Spacing between the two control contacts for double-setpoint controllers, modulating controllers and proportional controllers with integral actuator driver.
Switching differential	Xd1	0—999 digit	1 digit	Differential of switching controllers for Xp = 0.
	Xd2	0—999 digit	1 digit	
Stroke time	TT	5—3000 sec	60 sec	Utilised stroke time of the control valve on modulating controllers and proportional controllers with integral actuator driver.
Working point	Y0	-100 to +100%	0%	Output on P and PD controllers (y = Y0 at x = w).
Output limiting	Y1	0—100%	100%	Maximum output limit
	Y2	-100 to +100 %	-100%	Minimum output limit
Minimum relay ON time	Tk1	0—60 sec	0 sec	Limitation of the switching rate on switching outputs
	Tk2	0—60 sec	0 sec	

Isolation



*Type 703570 only

Technical data

Thermocouple input

Designation	Range	Meas. accuracy	Ambient temperature error
Fe-Con L	-200 +900°C	≤0.25%	100 ppm per °C
Fe-Con J EN 60 584	-200 +1200°C	≤0.25%	100 ppm per °C
Cu-Con U	-200 +600°C	≤0.25%	100 ppm per °C
Cu-Con T EN 60 584	-200 +400°C	≤0.25%	100 ppm per °C
NiCr-Ni K EN 60 584	-200 +1372°C	≤0.25%	100 ppm per °C
NiCr-Con E EN 60 584	-200 +1000°C	≤0.25%	100 ppm per °C
NiCrSi-NiSi N EN 60 584	-200 +1300°C	≤0.25%	100 ppm per °C
Pt10Rh-Pt S EN 60 584	0 – 1768°C	≤0.25%	100 ppm per °C
Pt13Rh-Pt R EN 60 584	0 – 1768°C	≤0.25%	100 ppm per °C
Pt30Rh-Pt6Rh B EN 60 584	0 – 1820°C	≤0.25%	100 ppm per °C
W5Re-W26Re	0 – 2320°C	≤0.25%	100 ppm per °C
W3Re-W25Re	0 – 2400°C	≤0.25%	100 ppm per °C
Cold junction	Pt100 internal, external or constant		

Resistance thermometer input

Designation	Type of connection	Range	Meas. accuracy	Ambient temperature error
Pt100 EN 60 751	2-wire/3-wire	-200 +850°C	≤0.05%	50 ppm per °C
Pt 50, 500, 1000 EN 60 751	2-wire/3-wire	-200 +850°C	≤0.1%	50 ppm per °C
Cu50	2-wire/3-wire	-50 +200°C	≤0.1%	50 ppm per °C
Ni100 DIN 43 760	2-wire/3-wire	-60 +250°C	≤0.05%	50 ppm per °C
KTY11-6	2-wire	-50 +150°C	≤1.0%	50 ppm per °C
PTK9	2-wire	Lithium-chloride sensor		
Sensor lead resistance	max. 30Ω per conductor in 2-/3-wire circuit			
Measuring current	250μA			
Lead compensation	nor required for 3-wire circuit. For 2-wire circuit, lead compensation can be provided in the software by a process value correction.			

Input for standard signals

Designation	Range	Meas. accuracy	Ambient temperature error
Voltage	0 – 10V, input resistance $R_E > 100k\Omega$	≤0.05%	100 ppm per °C
	-10 to +10V, input resistance $R_E > 100k\Omega$	≤0.05%	100 ppm per °C
	1 to + 1V, input resistance $R_E > 100k\Omega$	≤0.05%	100 ppm per °C
	0 to + 1V, input resistance $R_E > 100k\Omega$	≤0.05%	100 ppm per °C
	0 – 100mV, input resistance $R_E > 100k\Omega$	≤0.05%	100 ppm per °C
	-100 to +100mV, input resistance $R_E > 100k\Omega$	≤0.05%	100 ppm per °C
Current	4 – 20mA, voltage drop ≤ 1V	≤0.1%	100 ppm per °C
	0 – 20mA, voltage drop ≤ 1V	≤0.1%	100 ppm per °C
Heater current	0 – 50mA AC	≤1%	100 ppm per °C
Potentiometer	100Ω min., 10kΩ max.		

Measurement circuit monitoring¹

Transducer	Over/underrange	Probe/lead short-circuit ¹	Probe/lead break
Thermocouple	•	-	•
Resistance thermometer	•	•	•
Voltage 2 – 10V 0 – 10V	•	•	•
	•	-	-
Current 4 – 20mA 0 – 20mA	•	•	•
	•	-	-

• = recognised - = not recognised

1. In the event of an error, the outputs move to defined states (configurable).

■ Standard version

Outputs

Relay contact rating contact life contact protection circuit	changeover contact 3A at 250VAC resistive load 150 000 operations at rated load 56Ω/15nF between common-make/common-break		
Logic current limiting	0/5V 20mA	or	0/22V 30mA
Solid-state relay contact rating protection circuit	1A at 230V Varistor		
Voltage output signals load resistance	-10 to +10V/0 – 10V / 2 – 10V R _{load} 500Ω min.		
Current output signals load resistance	-20 to +20mA/0 – 20mA / 4 – 20mA R _{load} 450Ω max.		
Supply for 2-wire transmitter voltage current	22V 30mA		

Controller

Controller type	single-setpoint controller, double-setpoint controller, modulating controller, proportional controller, proportional controller with integral actuator driver
Controller structures	P/PD/PI/PID/I
A/D converter	resolution better than 15 bit
Sampling time	210msec

Electrical data

Supply (Switched mode power supply)	110 – 240V AC -15/+10%, 48 – 63Hz 20 – 30V AC/DC, 48 – 63Hz
Test voltages (type test)	to EN 61 010, Part 1 overvoltage category II, pollution degree 2
Power consumption	10VA max. for Type 703570 7VA max. for Type 703575
Data backup	EEPROM
Electrical connection	At rear by screw terminals, conductor cross-section up to 2.5mm ² and core-end sleeve (length: 10mm)
Electromagnetic compatibility interference emission interference immunity	EN 61 326 Class B to industrial requirements
Safety standards	to EN 61 730-1 for Type 703570 to EN 61 010-1 for Type 703575

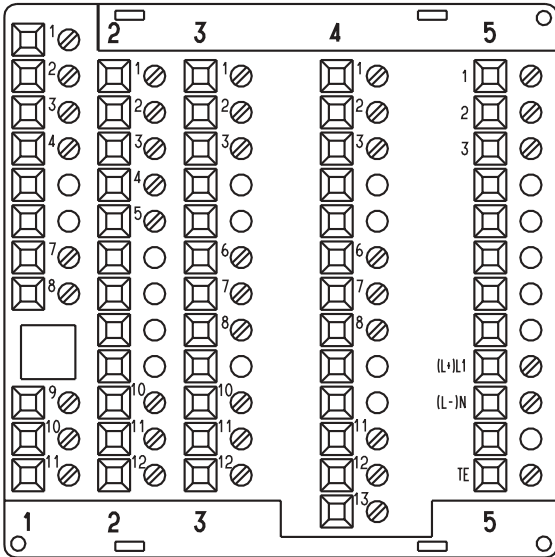
Housing

Housing type	plastic housing for panel mounting to DIN 43 700		
Dimensions in mm (for Type)	703575/1...	703575/2...	703570/0
Bezel	48 x 96 (portrait)	96 x 48 (landscape)	96 x 96
Depth behind panel	130	130	130
Panel cut-out	45 ^{+0.6} x 92 ^{+0.8}	92 ^{+0.8} x 45 ^{+0.6}	92 ^{+0.8} x 92 ^{+0.8}
Ambient/storage temperature range	-5 to 55°C / -40 to +70°C		
Climatic conditions	rel. humidity not exceeding 95% annual mean, no condensation		
Operating position	any		
Protection	to EN 60 529, front IP65, rear IP20		
Weight (fully fitted)	approx. 420g	approx. 420g	approx. 730g

■ Standard version

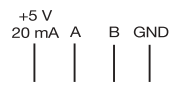
Connection diagrams

Type 703570/0...



Interface

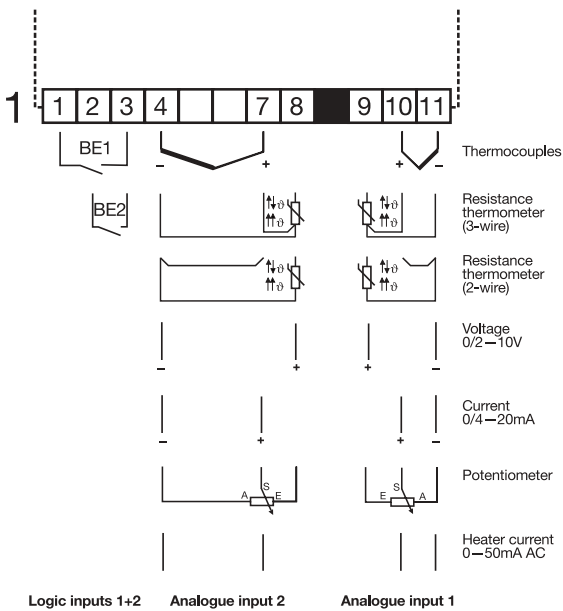
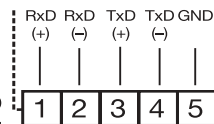
PROFIBUS DP



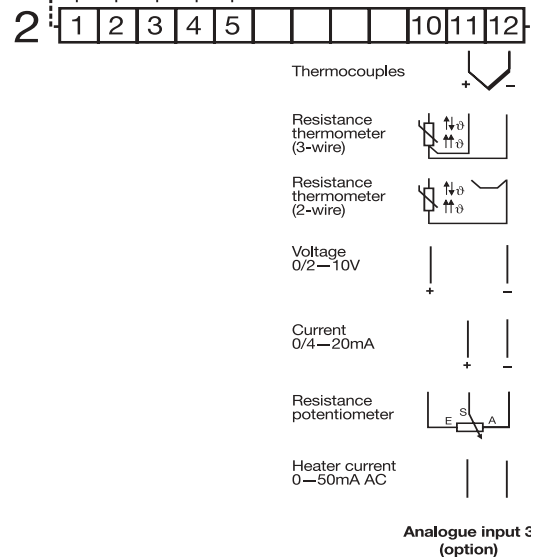
RS485/ER8



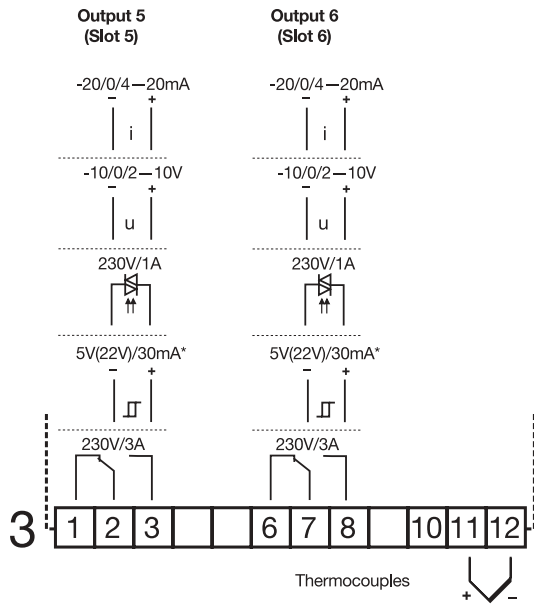
RS422



Logic inputs 1+2 Analogue input 2 Analogue input 1



Analogue input 3 (option)



* Supply for 2-wire transmitter (22V)

Resistance thermometer (3-wire)

Resistance thermometer (2-wire)

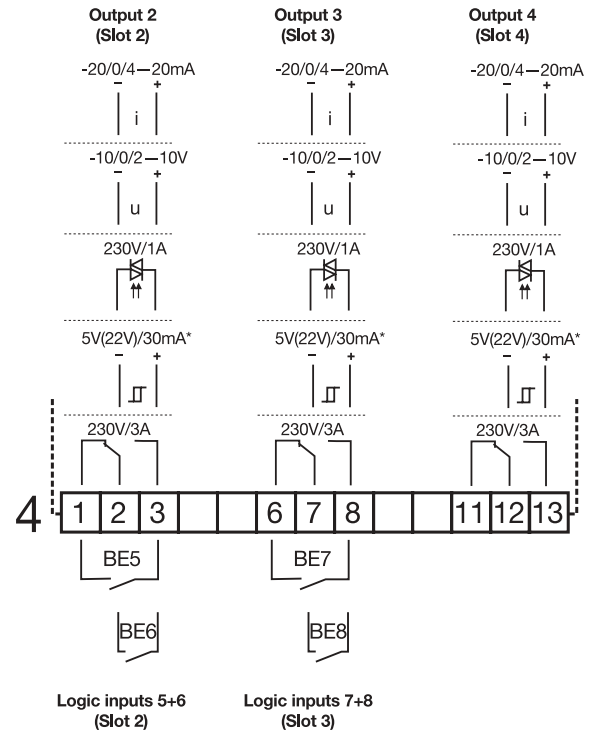
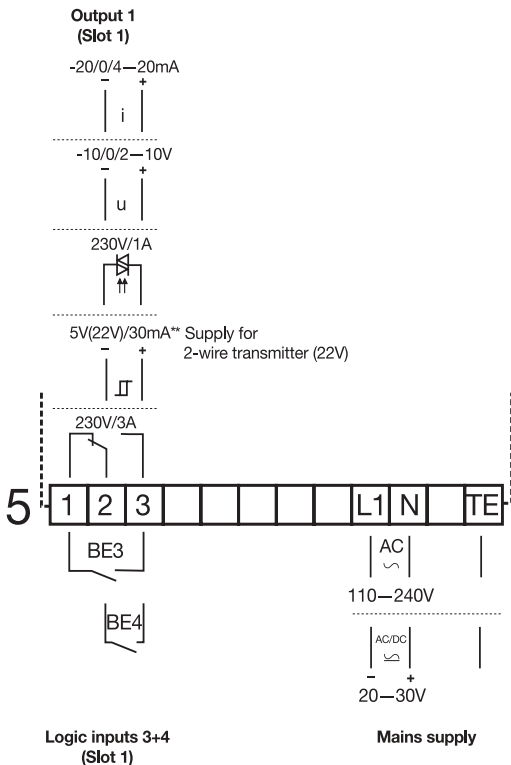
Voltage 0/2—10V

Current 0/4—20mA

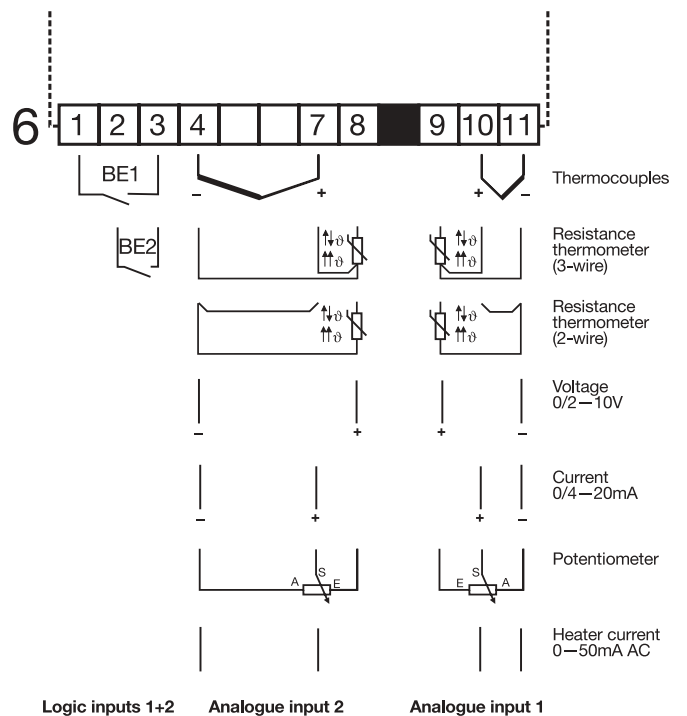
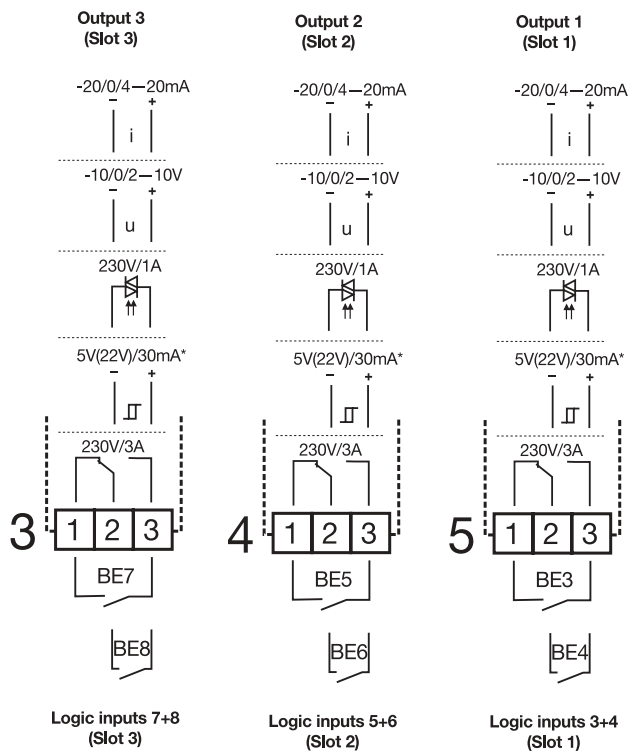
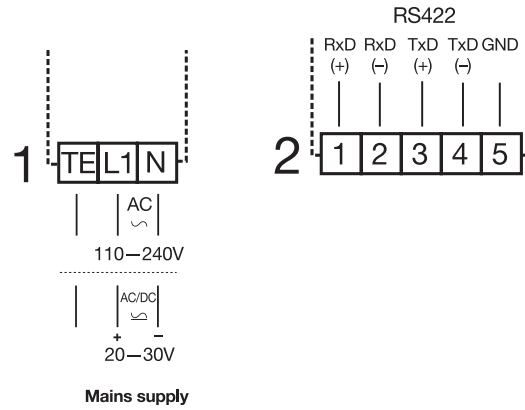
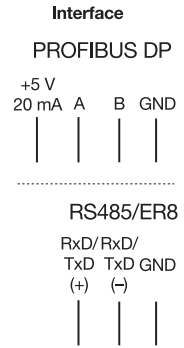
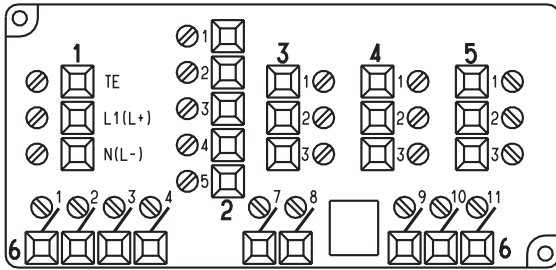
Potentiometer

Heater current 0—50mA AC

Analogue input 4 (option)



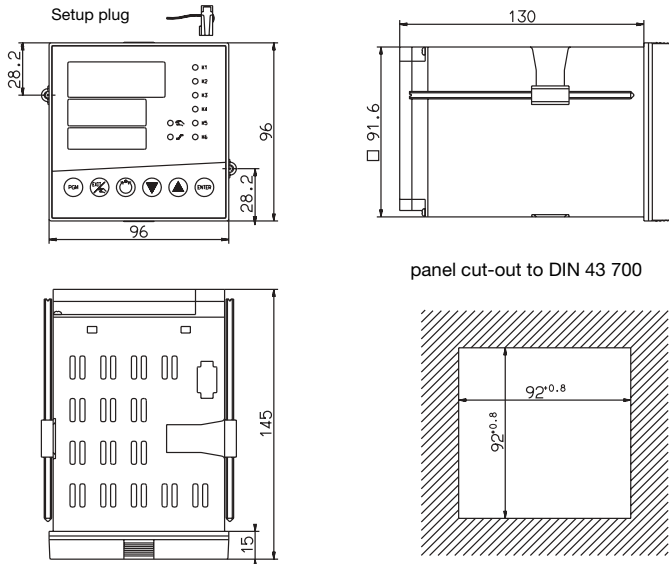
Type 703575/1... (portrait format) and Type 703575/2... (landscape format)



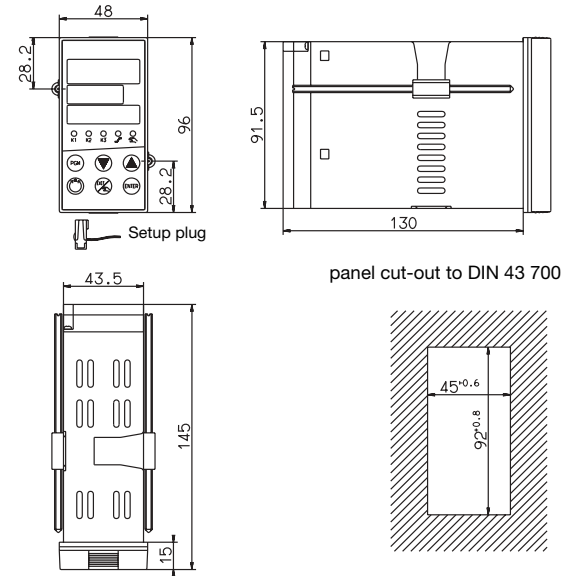
* supply for 2-wire transmitter (22V)

Dimensions

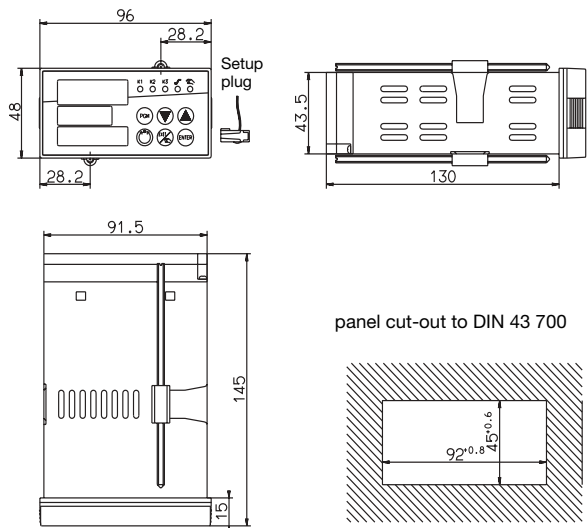
Type 703570/0...



Type 703575/1... (portrait format)

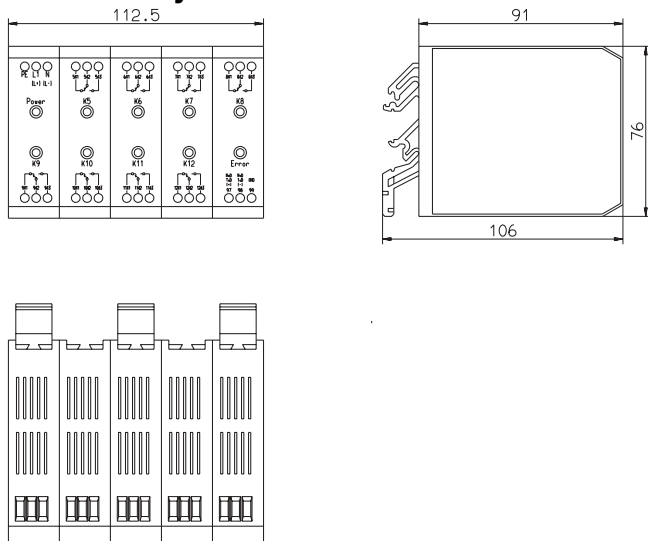


Type 703575/2... (landscape format)



Edge-to-edge mounting		
Minimum distances of the panel cut-outs		
Type	horizontal	vertical
without setup plug:		
703570/0...	11mm	30mm
703575/1... (portrait)	11mm	30mm
703575/2... (landscape)	30mm	11mm
with setup plug:		
703570/0...	11mm	65mm
703575/1... (portrait)	11mm	65mm
703575/2... (landscape)	65mm	11mm

External relay module ER8



Accessories

External relay module ER8* Supply 93 — 263V AC Sales No. 70/00325805
External relay module ER8* Supply 20 — 53V DC/AC Sales No. 70/00325806
PC interface for setup program Sales No. 70/00301315
Setup program including start-up software for Windows® 95/98 and NT4.0 Hardware requirements: - PC-486DX-2-100 - 16 Mbyte RAM - 15 Mbyte available on hard disk - CD-ROM - 1 free serial interface

* The RS422/485 interface is required for operating the external relay module!

Ordering details

Basic type	
703570	JUMO DICON 500: Universal process controller in 96mm x 96mm format
703575	JUMO DICON 400: Universal process controller in 96mm x 48mm and 48mm x 96mm formats

Basic type extensions	
Format	
0	96mm x 96mm
1	48mm x 96mm portrait format
2	96mm x 48mm landscape format
Version	
8	Standard with factory settings
9	Customized programming according to specification
Language of instrument texts	
1	German
2	English
3	French

1.	2.	3.	4.	Analogue input
	0	0		not assigned (analogue inputs 1 + 2 available as standard)
1	1	1	1	Universal input (all listed transducers, except voltage -10 to +10V / 0 – 10V / 2 – 10V)
2	2	2	2	Voltage -10 to +10V / 0 – 10V / 2 – 10V

1.	2.	3.	4.	5.	6.	Slot for output/two logic inputs (two logic inputs available as standard)
0	0	0	0	0	0	not assigned
1	1	1	1	1	1	Relay (changeover contact)
2	2	2	2	2	2	Solid-state relay 230V 1A
3	3	3	3	3	3	Logic 0/5V
4	4	4	4	4	4	Logic 0/22V
5	5	5	5	5	5	Analogue output
6	6	6	6	6	6	Supply for 2-wire transmitter
7	7	7				Two logic inputs (logic inputs 3+4, 5+6, 7+8; only possible on slots 1, 2 and 3)

Supply		
2	3	110 – 240V AC -15/+10% 48 – 63Hz
2	5	20 – 30V AC/DC, 48 – 63Hz

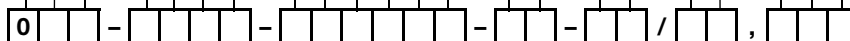
Interface		
0	0	not assigned
5	4	RS422/RS485 with MODbus/Jbus protocol
6	4	PROFIBUS-DP

Maths and logic module		
0	0	not available
0	3	available

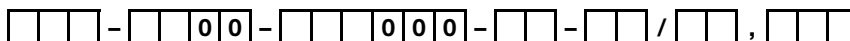
Approvals			
0	0	0	none
0	5	6	DIN 3440*
0	6	1	Underwriters Laboratories Inc. (UL)
0	6	2	Germanischer Lloyd (GL)*
0	6	3	DIN 3440 and GL*
0	6	4	DIN 3440 and UL*
0	6	5	GL and UL*
0	6	6	DIN 3440, GL and UL*

* for Type 703570 only

703570/



703575/



■ Stock versions

Accessories ⇒ page 10

Delivery address: Mackenrodtstraße 14,
36039 Fulda, Germany
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Fax: +49 (0) 661 60 03-6 81
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Fax: 610-380-8009
E-Mail: info@JumoUSA.com
Internet: www.JumoUSA.com



JUMO DICON 401/501

Universal profile controllers

Universal profile generators

Brief description

The series of universal, freely configurable profile controllers/generators is available in the formats 96mm x 96mm and 96mm x 48mm (portrait and landscape format).

The instruments feature two 4-digit 7-segment displays, five or eight LEDs for indicating the switching status and operating modes, an 8-digit matrix display, as well as six keys for operation and configuration.

The user has flexibility in assigning the slots of the profile controller according to the block structure.

10 profile programs with up to 100 segments can be programmed; a total of 100 segments is available.

Additional functions include self-optimisation, parameter set switching, a real-time clock, up to 8 limit comparators and a maximum of eight operating contacts.

Linearisations for conventional transducers are stored in the memory; furthermore, a customized linearisation table can be programmed.

The profile controllers can be adapted to a variety of tasks with the aid of a maths module.

The instruments can be integrated into a data network via a serial interface, or they can be expanded through an external relay module.

A setup program with a program editor is available for easy configuration from a PC.

The electrical connection is at the rear by screw terminals.



JUMO DICON 501
Type 703580/0...

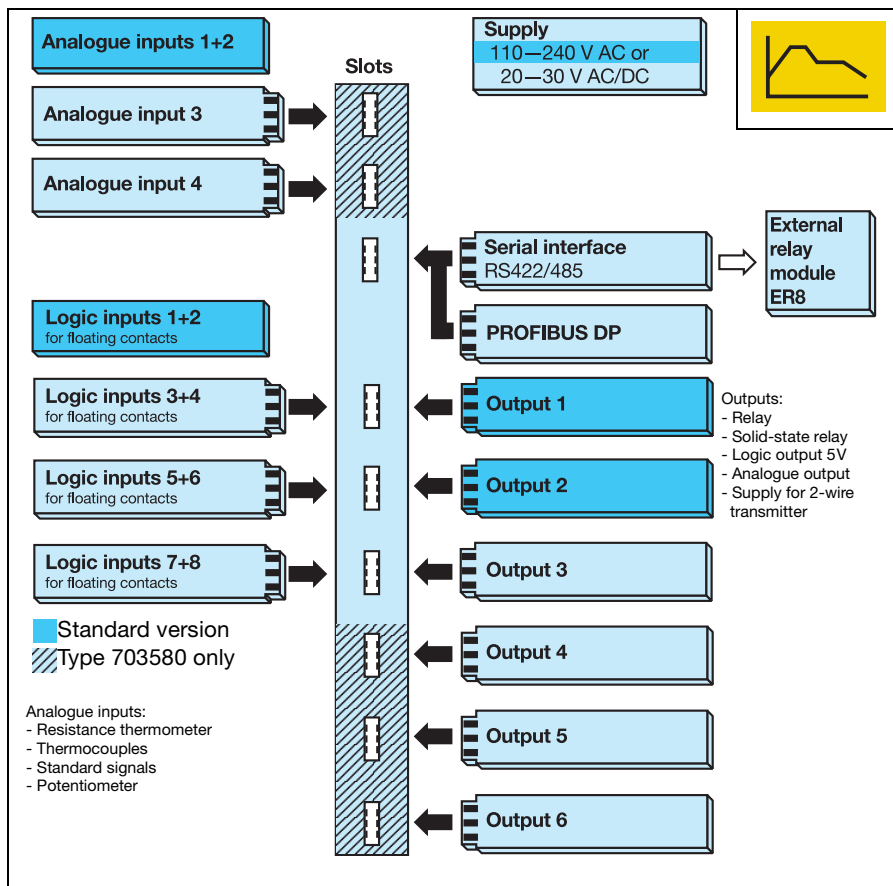


JUMO DICON 401
Type 703585/1...



JUMO DICON 401
Type 703585/2...

Block structure



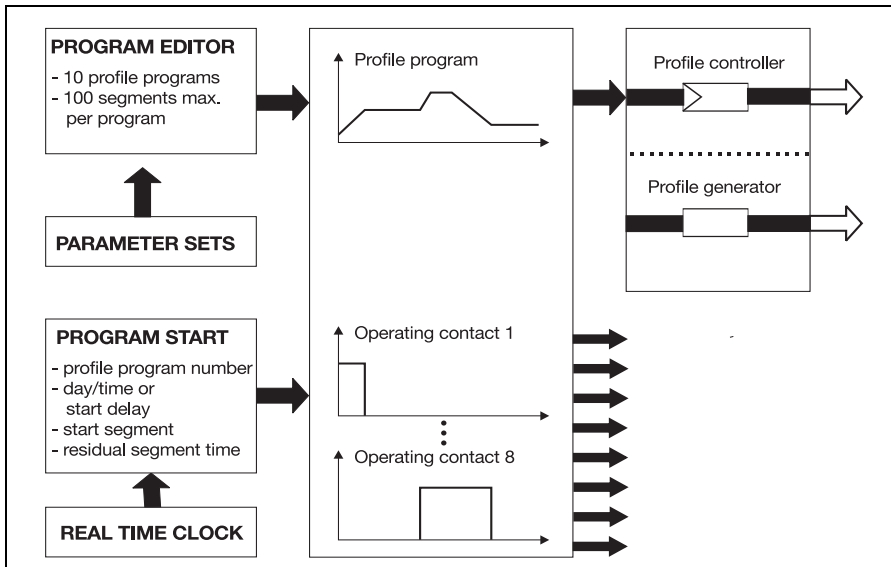
Features

- Switchable displays
- Text or bar graph display
- 8 limit comparators
- 2 parameter sets
- Maths and logic module
- 8 operating contacts
- Real-time clock
- Setup program with program editor and JUMO start-up software for Windows® 95/98/NT4.0
- Approved to DIN 3440 (for Type 703580)
- UL approval
- GL approval applied for

Profile controller

10 profile programs with up to 100 segments can be programmed. A total of 100 segments is programmable. In addition, eight operating contacts can be assigned to the corresponding program segments.

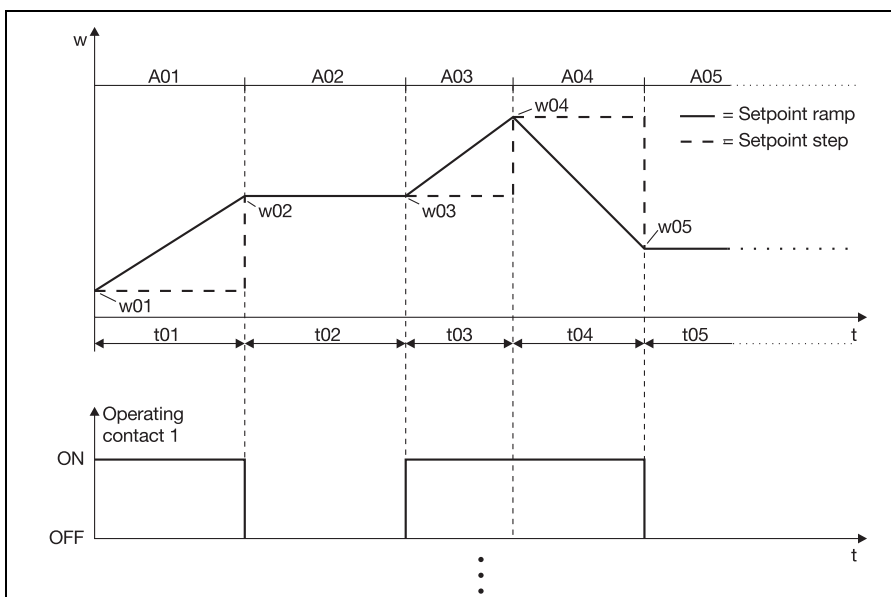
A profile program can be started manually from the keys (on the instrument or externally), or by programming the start conditions. When programming the start conditions, the time can be set either by selecting a start delay, or by programming a weekday and time. Furthermore, it is possible to program a weekly profile with 10 entries via the setup program.



Profile programs consist of a series of segments with definable segment setpoints. The individual segment setpoints are connected either by ramps or by step functions. At each segment, the status of the eight operating contacts can be modified.

In addition, each segment can have assigned to it one of the two programmable parameter sets, as well as an upper and a lower limit (tolerance band) for monitoring the process value.

Continuous loops can be set up through programmable repeat cycles. Segments are defined by the segment setpoint and segment time, or the ramp slope (gradient). Through the integral program editor it is possible to create segments from the keys, as well as to edit, copy or delete them.



Self-optimisation

The standard specification includes an auto-tuning facility which permits the user to adjust the controller to the process without any knowledge of control engineering.

Customized linearisation

In addition to the linearisation for the usual transducers, a customer-specific linearisation can be created.

Programming is carried out via the setup program, in the form of a table of values.

Maths and logic module (option)

The maths module permits integrating e. g. setpoints, control outputs and the measured values of the analogue inputs into a mathematical formula.

The logic module can be used to create logic links between logic inputs, limit comparators and operating contacts, for example.

Two formulae can be entered via the setup program for each of the two modules. The results of the calculation can then be produced via the outputs or used for internal purposes.

There is an additional possibility of implementing difference, ratio and humidity control through established standard formulae.

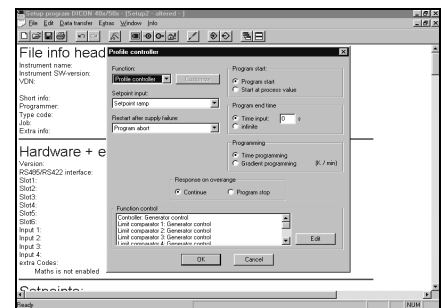
Configurable displays

Any process variable can be visualised on the 7-segment displays and the dot-matrix display.

It is possible to switch between two displays either from the keys, or automatically after an adjustable interval.

Setup program (accessory)

The setup program for instrument configuration is available in English, German and French. A PC can be used to create and edit data sets, transfer them to the controller, or read them out of the instrument. The data sets are stored and managed.

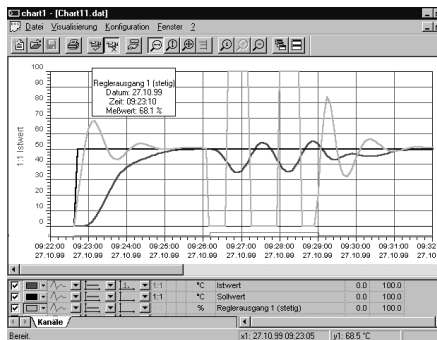


With the aid of the program editor, which is integrated into the setup program, profile programs can easily be created, edited and transferred.

JUMO Start-up software

The **JUMO** start-up software is an integral part of the setup program and is available for conveniently adapting the controller to the process.

Different process variables (e. g. setpoint, process value, control deviation, signals from the controller outputs) can be displayed graphically. The controller parameters can be altered and transferred to the controller via the setup or RS422/485 interfaces.



Text display

Customer texts can be assigned to the functions of the logic inputs, the limit comparators, the logic outputs of the logic module and the operating contacts. It is also possible to designate profile program names.

Depending on the status of the function or the configuration of the displays, a programmed text (8 characters max.) is shown on the matrix display.

The customer texts and the program names can only be set up with the aid of the setup program.

PROFIBUS-DP (option)

The controller can be integrated into a fieldbus system to the PROFIBUS-DP standard, via the PROFIBUS-DP interface. This PROFIBUS variant has been designed specifically for the communication between automation systems and decentralised peripheral instruments at the field level, and is speed-optimised.

The data are transmitted serially in accordance with the RS485 standard.

Using the project design tool included in the delivery (GSD-generator; GSD = instrument master data), a standardised GSD file is created that serves to integrate the controller into the fieldbus system, through selection of the controller data.

RS422/RS485 interface (option)

The serial interface is available for communication with higher-level systems. MODbus/Jbus are used as transmission protocols.

External relay module ER8 (accessory)

The controller can be expanded by eight relay outputs through the external relay module ER8. Operation is via the RS422/RS485 interface.

The setup program is necessary for configuring the ER8, which can be mounted on a standard DIN rail.

Functions of the logic inputs

- Programming inhibit
- Profile program start/stop/cancel
- Profile program selection
- Fast forward
- Segment change
- Start/cancel self-optimisation
- Setpoint switching
- Process value switching
- Parameter set switching
- Key/level inhibit
- Text display
- All displays off
- Auto/manual changeover

Functions of the outputs

- Analogue input variables
- Mathematics
- Process value
- Setpoint
- Control deviation
- Control output
- Controller outputs
- Limit comparators
- Operating contacts
- Logic inputs
- Logic
- Profile-program end signal
- Tolerance band signal
- Manual mode signal

Operation, parameterization, configuration

Operation, as well as setting the controller parameters and configuration, are arranged at different levels.

Operating level

Different process variables (measurements of the analogue inputs, program times...) can be indicated here.

Profile program start

The conditions for the start of the program are defined here.

Profile program editor

Here, the programs are set up from the keys and edited.

Parameter level

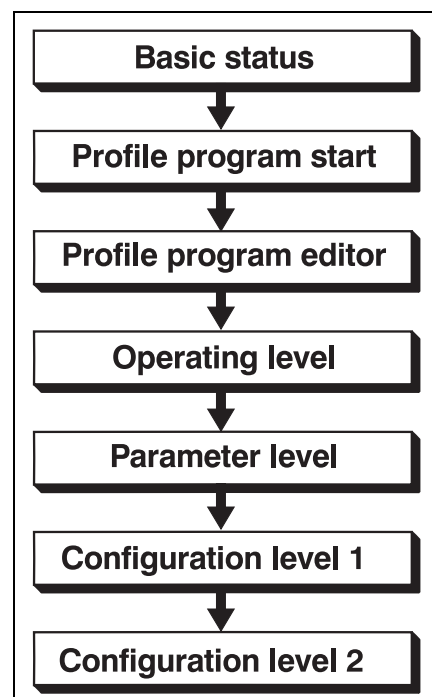
The controller parameters are set here.

Configuration level 1

The basic functions of the instrument, such as restart, profile program end time, are set at this level.

Configuration level 2

The hardware and software codes which correspond to the controller version are indicated here.

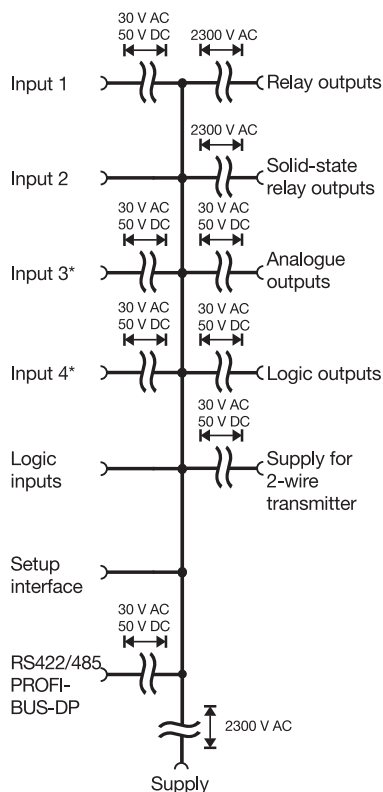


Displays and controls

(1) points to the top red 4-digit display showing '125.3'.
 (2) points to the middle green 4-digit display showing '126.0'.
 (3) points to the bottom green 8-digit dot-matrix display showing 'P01/003'.
 (4) points to the top right corner of the panel.
 (5) points to the six yellow LEDs (K1-K6) and two green LEDs (K5, K6).
 (6) points to the row of control buttons: PGM, EXIT, a circular arrow, a downward arrow, an upward arrow, and ENTER.

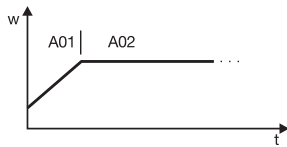
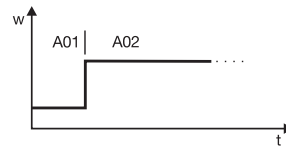
(1) configurable 7-segment display 4 digits, red	(4) Setup interface (for position, see dimensional drawings)						
<table border="1"> <thead> <tr> <th>Type</th> <th>Height</th> </tr> </thead> <tbody> <tr> <td>703580</td> <td>13 mm</td> </tr> <tr> <td>703585</td> <td>10 mm</td> </tr> </tbody> </table> <p>factory-set: process value</p>	Type	Height	703580	13 mm	703585	10 mm	
Type	Height						
703580	13 mm						
703585	10 mm						
(2) configurable 7-segment display 4 digits, green	(5) Status indication 6 (3) yellow LEDs for the switching status indication of the outputs 2 green LEDs to display the "Manual" and "Automatic" operating modes.						
<table border="1"> <thead> <tr> <th>Type</th> <th>Height</th> </tr> </thead> <tbody> <tr> <td>703580</td> <td>10 mm</td> </tr> <tr> <td>703585</td> <td>7 mm</td> </tr> </tbody> </table> <p>factory-set: setpoint</p>	Type	Height	703580	10 mm	703585	7 mm	
Type	Height						
703580	10 mm						
703585	7 mm						
(3) configurable dot-matrix display 8 digits, green factory-set: program status	(6) Keys						

Isolation



*Type 703580 only

Profile controller (extract from configuration level 1)

Parameters	Selection/Value range	Description
Function	Profile controller Profile generator	The instrument can be operated as profile controller or profile generator.
Restart	Profile program stop Continue Hold Continue at deviation <x% Continue at process value	Response of the controller on a supply failure.
Profile program start	Start at profile program start Start at process value	Start conditions for the start of profile programs. Program start: Program starts with the programmed setpoint of the first segment (A01) Start at PV: The present process value is accepted as the first setpoint; the program starts at the corresponding segment
Setpoint input	Setpoint ramp Setpoint step	Setpoint ramp:  Setpoint step: 
Time/gradient	Time Gradient	Types of program entry. Time: segment setpoint/segment time Gradient: segment setpoint/gradient
Function control	Generator control Operating contact 1 ... Operating contact 8	Controller and limit comparators 1 – 8 can be switched off individually during the program run. Generator control: Controller or limit comparators are active during the program run Operating contact 1 – 8: Controller or limit comparators are only active, when the corresponding operating contact is in the "ON" status
Process value deviation	0 – 100 digit	Parameter for "Continue at deviation < x%"
Profile program end time	-1 – 9999 sec	Duration of the program end signal (for outputs); -1= infinite

Parameter level

The table lists all the parameters and their meaning. Depending on the controller type, certain parameters are irrelevant or not applicable. Two parameter sets can be stored for specific applications.

Parameters	Display	Value range	factory-set	Meaning
Controller structure	Structure 1	P, I, PD, PI, PID	PID	Structure 2 refers to the second output in the case of a double-setpoint controller
	Structure 2	P, I, PD, PI, PID	PID	
Proportional band	Xp1	0 – 9999 digit	0 digit	Size of the proportional band At Xp = 0 the controller structure is not effective!
	Xp2	0 – 9999 digit	0 digit	
Derivative time	Tv1	0 – 9999 sec	80 sec	Influences the differential component of the controller output signal
	Tv2	0 – 9999 sec	80 sec	
Reset time	Tn1	0 – 9999 sec	350 sec	Influences the integral component of the controller output signal
	Tn2	0 – 9999 sec	350 sec	
Switching cycle time	Cy1	0 – 9999 sec	20 sec	For a switching output, the cycle time should be selected so that the energy supply to the process is virtually continuous while, at the same time, not overloading the switching devices.
	Cy2	0 – 9999 sec	20 sec	
Contact spacing	Xsh	0 – 9999 sec	0 digit	Spacing between the two control contacts for double-setpoint controllers, modulating controllers and proportional controllers with integral actuator driver
Switching differential	Xd1	0 – 999 digit	1 digit	Differential for switching controllers for Xp = 0
	Xd2	0 – 999 digit	1 digit	
Stroke time	TT	5 – 3000 sec	60 sec	Utilised stroke time of the control valve on modulating controllers and proportional controllers with integral actuator driver
Working point	Y0	-100 to +100%	0%	Output on P and PD controllers (y = Y0 at x = w).
Output limiting	Y1	0 – 100%	100%	Maximum output limit
	Y2	-100 to +100 %	-100%	Minimum output limit
Minimum relay ON time	Tk1	0 – 60 sec	0 sec	Limitation of the switching frequency on switching outputs
	Tk2	0 – 60 sec	0 sec	

Technical data

Thermocouple input

Designation	Range	Meas. accuracy	Ambient temperature error
Fe-Con L	-200 +900°C	≤0.25%	100 ppm per °C
Fe-Con J EN 60 584	-210 +1200°C	≤0.25%	100 ppm per °C
Cu-Con U	-200 +600°C	≤0.25%	100 ppm per °C
Cu-Con T EN 60 584	-270 +400°C	≤0.25%	100 ppm per °C
NiCr-Ni K EN 60 584	-270 +1372°C	≤0.25%	100 ppm per °C
NiCr-Con E EN 60 584	-270 +1000°C	≤0.25%	100 ppm per °C
NiCrSi-NiSi N EN 60 584	-270 +1300°C	≤0.25%	100 ppm per °C
Pt10Rh-Pt S EN 60 584	-50 +1768°C	≤0.25%	100 ppm per °C
Pt13Rh-Pt R EN 60 584	-50 +1768°C	≤0.25%	100 ppm per °C
Pt30Rh-Pt6Rh B EN 60 584	0 – 1820°C	≤0.25%	100 ppm per °C
W5Re-W26Re	0 – 2320°C	≤0.25%	100 ppm per °C
W3Re-W25Re	0 – 2400°C	≤0.25%	100 ppm per °C
Cold junction	Pt100 internal, external or constant		

Resistance thermometer input

Designation	Connection type	Range	Meas. accuracy	Ambient temperature error
Pt100 EN 60 751	2-wire/3-wire	-200 +850°C	≤0.05%	50 ppm per °C
Pt 50,500, 1000 EN 60 751	2-wire/3-wire	-200 +850°C	≤0.1%	50 ppm per °C
KTY11-6	2-wire	-50 +150°C	≤1.0%	50 ppm per °C
Cu50	2-wire/3-wire	-50 +200°C	≤0.1%	50 ppm per °C
Ni100 DIN 43 760	2-wire/3-wire	-60 +250°C	≤0.05%	50 ppm per °C
PTK9	2-wire	lithium-chloride sensor		
Sensor lead resistance	max. 30Ω per conductor in 2-/3-wire circuit			
Measuring current	250μA			
Lead compensation	not required for 3-wire circuit. For 2-wire circuit, lead compensation can be provided in the software by a process value correction.			

Standard signal input

Designation	Range	Meas. accuracy	Ambient temperature error
Voltage	0 – 10V, input resistance $R_E > 100k\Omega$	≤0.05%	100 ppm per °C
	-10 to +10V, input resistance $R_E > 100k\Omega$	≤0.05%	100 ppm per °C
	1 to + 1V, input resistance $R_E > 100k\Omega$	≤0.05%	100 ppm per °C
	0 to + 1V, input resistance $R_E > 100k\Omega$	≤0.05%	100 ppm per °C
	0 – 100mV, input resistance $R_E > 100k\Omega$	≤0.05%	100 ppm per °C
	-100 to +100mV, input resistance $R_E > 100k\Omega$	≤0.05%	100 ppm per °C
Current	4 – 20mA, voltage drop ≤ 1V	≤0.05%	100 ppm per °C
	0 – 20mA, voltage drop ≤ 1V	≤0.05%	100 ppm per °C
Heater current	0 – 50mA AC	≤1%	100 ppm per °C
Potentiometer	100Ω min., 10kΩ max.		

Measurement circuit monitoring¹

Transducer	Over/underrange	Probe/lead short-circuit ¹	Probe/lead break
Thermocouple	•	-	•
Resistance thermometer	•	•	•
Voltage	2 – 10V	•	•
	0 – 10V	•	-
Current	4 – 20mA	•	•
	0 – 20mA	•	-

• = recognised - = not recognised

1. In the event of an error, the outputs move to defined states (0%, 100%, -100% configurable).

■ Standard version

Outputs

Relay contact rating contact life	changeover contact 3A at 250VAC resistive load 150 000 operations at rated load		
Logic current limiting	0/5V 20mA	or	0/22V 30mA
Solid-state relay contact rating	1A at 230V		
Voltage output signals load resistance	-10 to +10V/0 – 10V/2 – 10V $R_{load} 500\Omega$ min.		
Current output signals load resistance	-20 to +20mA/0 – 20mA/4 – 20mA $R_{load} 450\Omega$ max.		
Supply for 2-wire transmitter voltage current	22V 30mA		

Controller

Controller type	single setpoint-controller, double setpoint-controller, modulating controller, proportional controller, proportional controller with integral actuator driver
Controller structures	P/PD/PI/PID
A/D converter	resolution better than 15 bit
Sampling time	210msec

Electrical data

Supply (switched mode power supply)	110 – 240V AC -15/+10% 48 – 63Hz 20 – 30V AC/DC, 48 – 63Hz
Test voltages (type test)	to EN 61 010, Part 1 overvoltage category II, pollution degree 2
Power consumption	10 VA max. for Type 703580 7 VA max. for Type 703585
Data backup	EEPROM
Electrical connection	At the rear via screw terminals, conductor cross-section up to 2.5mm ² and core-end sleeve (length: 10mm)
Electromagnetic compatibility	EN 50 081-1, EN 50 082-2, NAMUR recommendation NE21
Safety standards	to EN 61 730-1 for Type 703580 to EN 61 010-1 for Type 703585

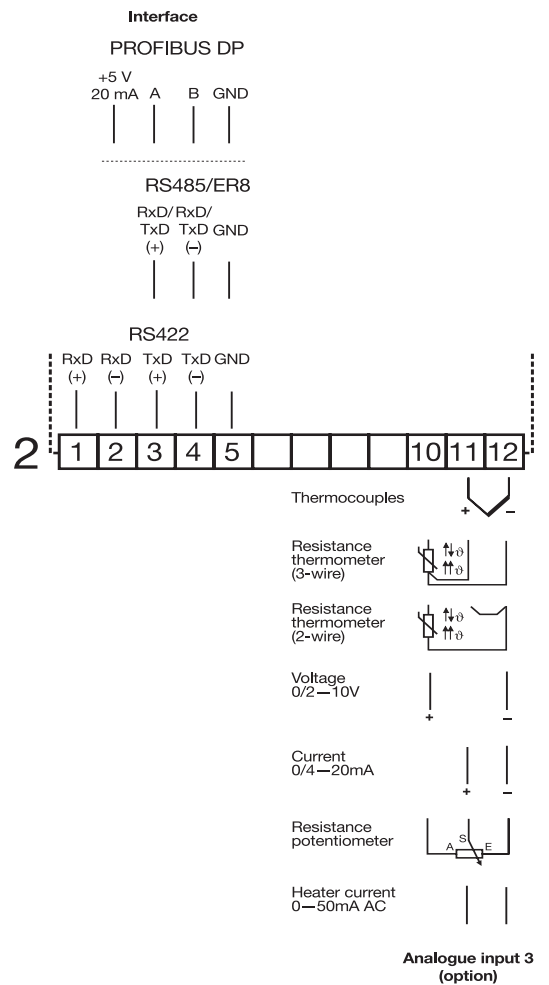
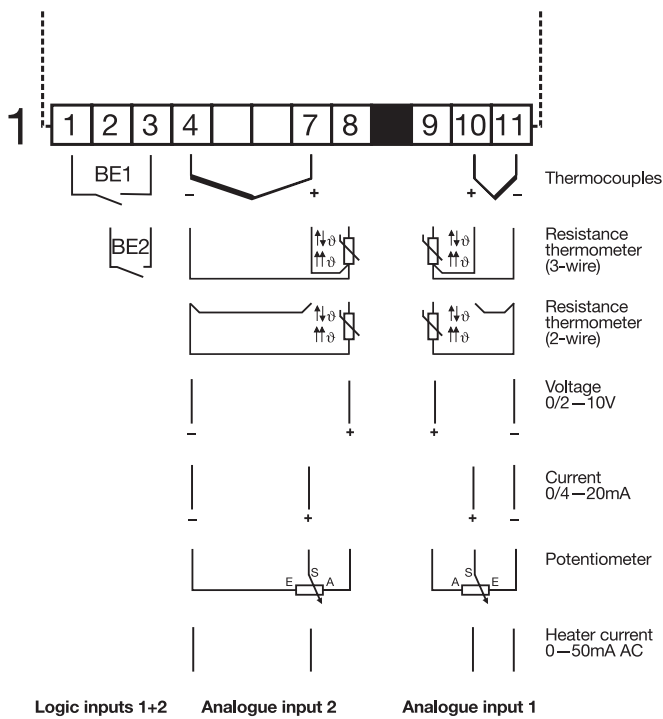
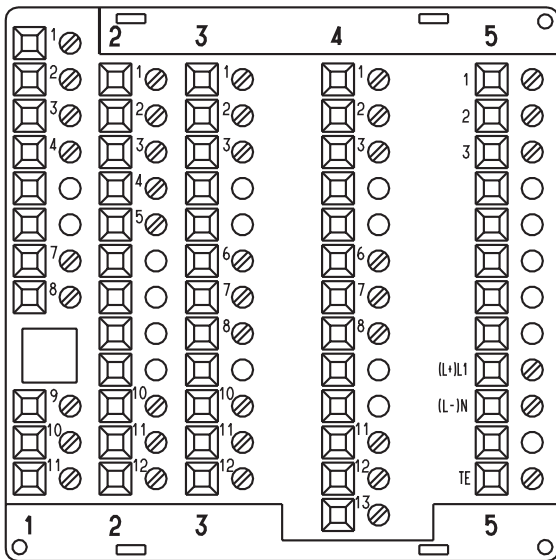
Housing

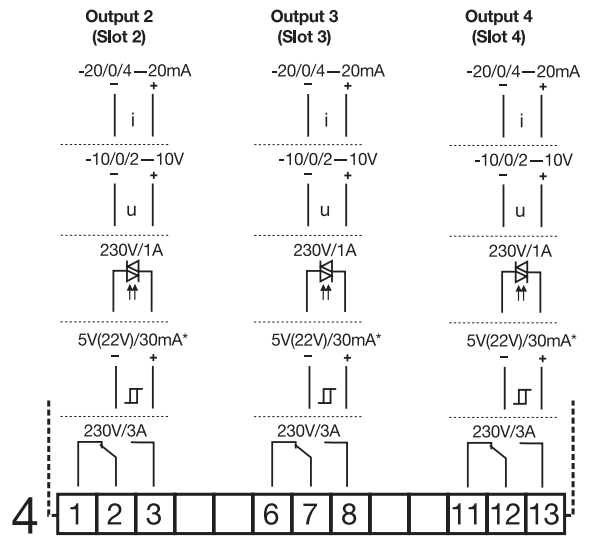
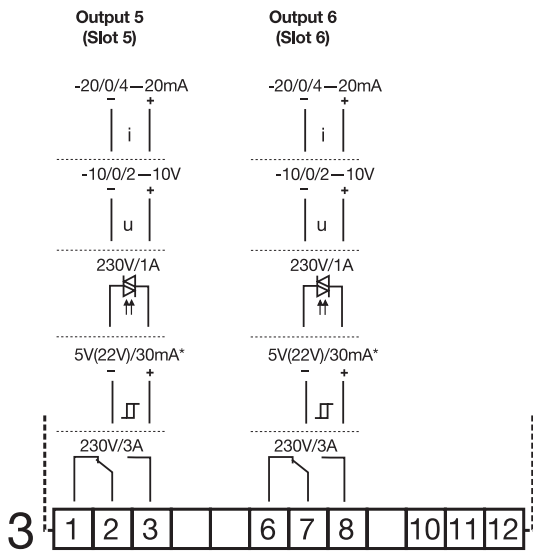
Housing type	plastic housing for panel mounting to DIN 43 700		
Dimensions in mm (for Type)	703585/1...	703585/2...	703580/0...
Bezel	48 x 96 (portrait)	96 x 48 (landscape)	96 x 96
Depth behind panel	130	130	130
Panel cut-out	45 ^{+0.6} x 92 ^{+0.8}	92 ^{+0.8} x 45 ^{+0.6}	92 ^{+0.8} x 92 ^{+0.8}
Ambient/storage temperature range	-5 to 50°C / -40 to +70°C		
Climatic conditions	rel. humidity, not exceeding 90% annual mean, no condensation		
Operating position	any		
Protection	to EN 60 529, front IP65, rear IP20		
Weight (fully fitted)	approx. 420g	approx. 420g	approx. 730g

■ Standard version

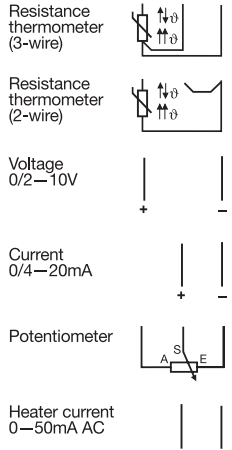
Connection diagrams

Type 703580

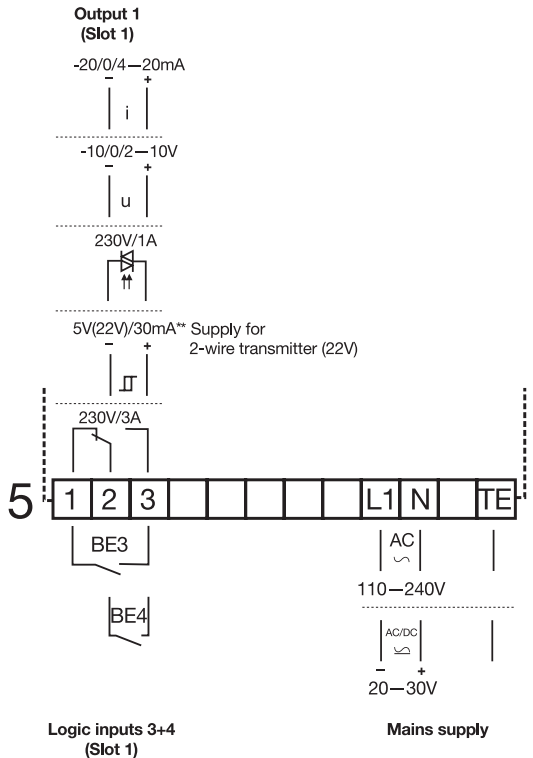




* Supply for 2-wire transmitter (22V)



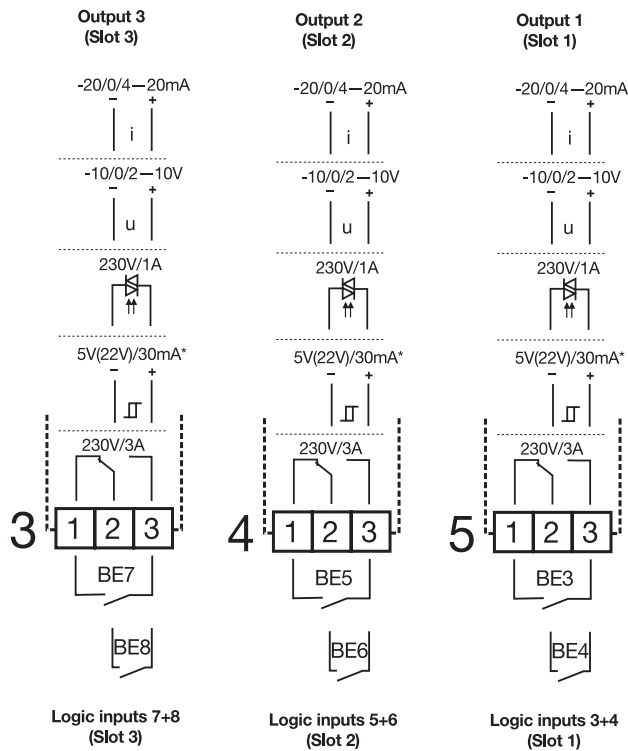
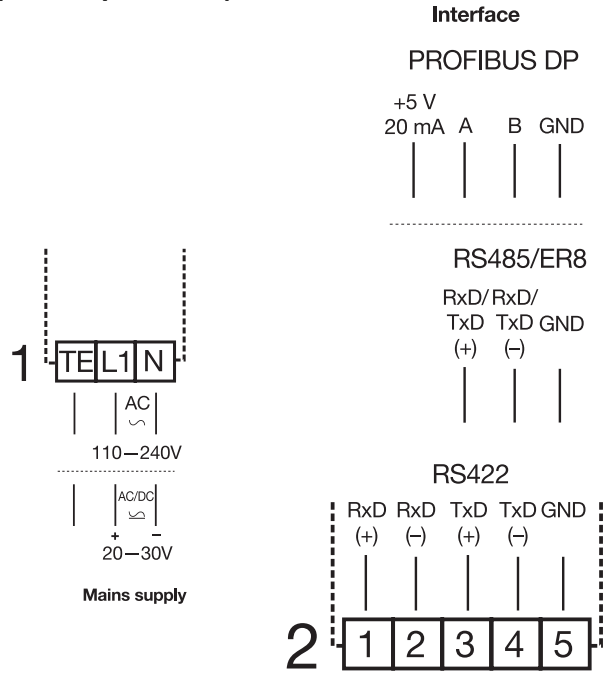
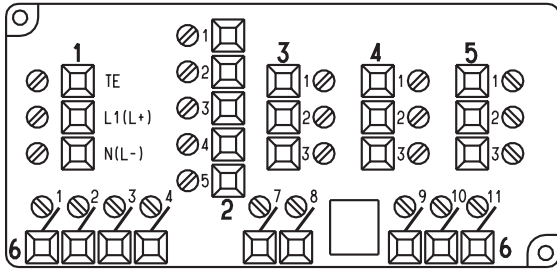
Analogue input 4 (option)



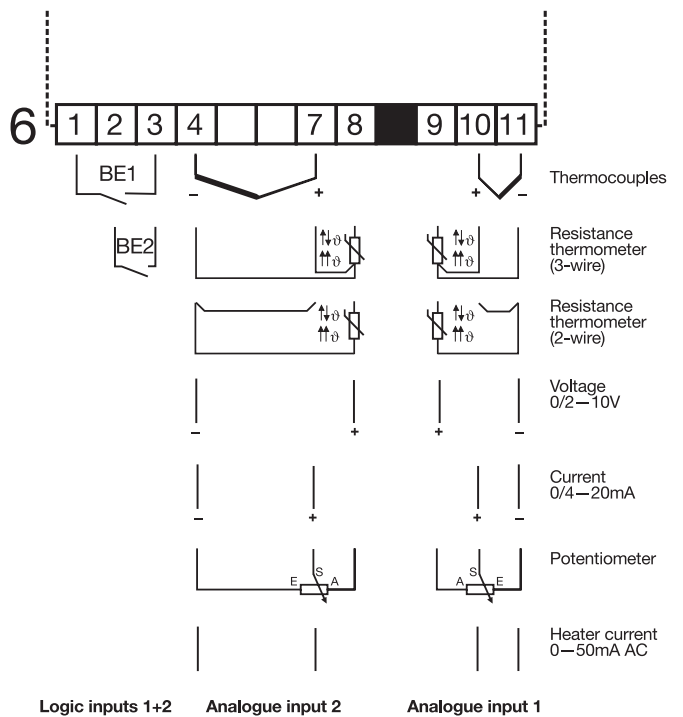
Logic inputs 3+4 (Slot 1)

Mains supply

Type 703585/1... (portrait format) and Type 703585/2... (landscape format)

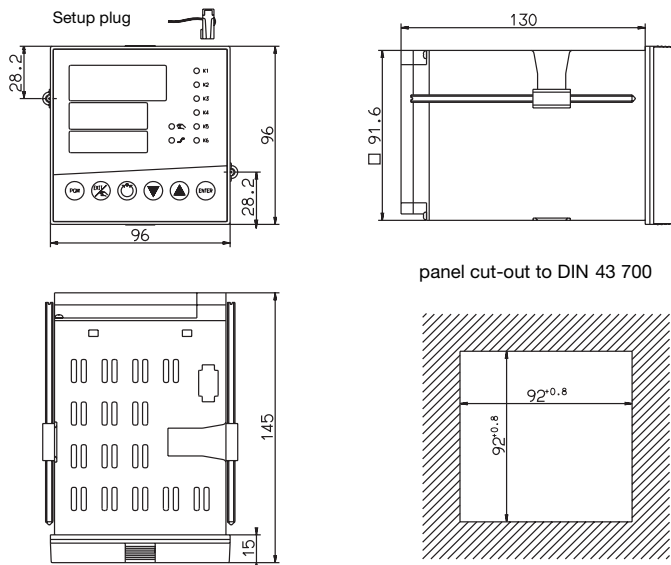


* Supply for 2-wire transmitter (22V)

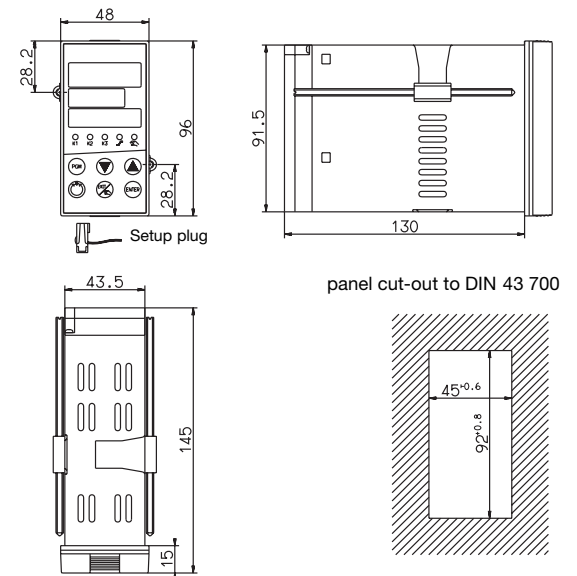


Dimensions

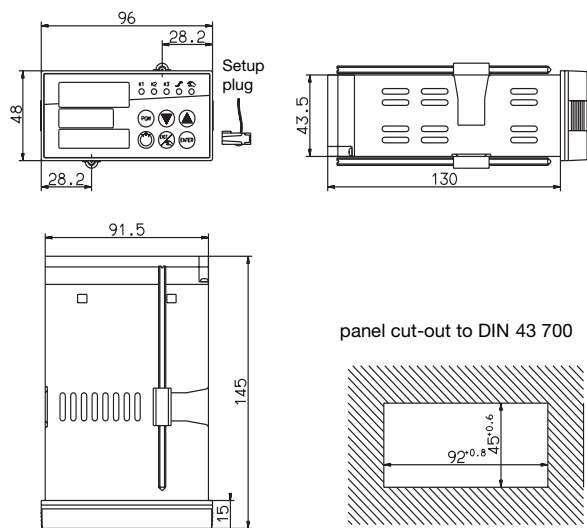
Type 703580/0...



Type 703585/1... (portrait format)

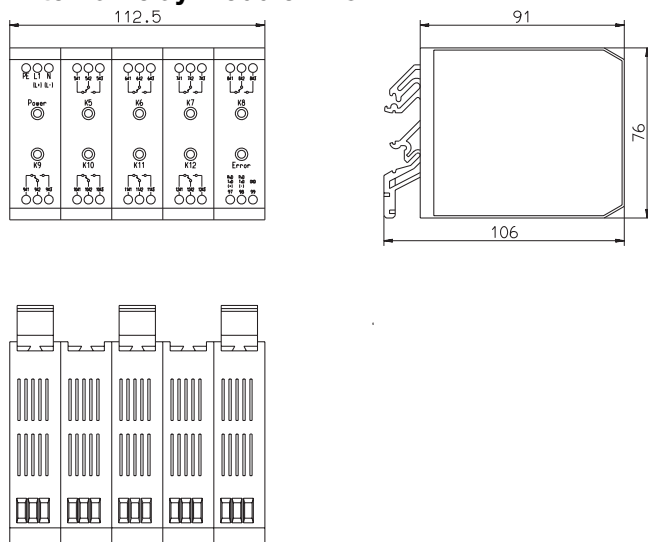


Type 703585/2... (landscape format)



Edge-to-edge mounting		
Minimum distances of panel cut-outs		
Type	horizontal	vertical
without setup plug:		
703580/0...	11 mm	30 mm
703585/1... (portrait)	11 mm	30 mm
703585/2... (landscape)	30 mm	11 mm
with setup plug:		
703580/0...	11 mm	65 mm
703585/1... (portrait)	11 mm	65 mm
703585/2... (landscape)	65 mm	11 mm

External relay module ER8



Accessories

External relay module ER8* Supply 93 — 263V AC Sales No. 70/00325805
External relay module ER8* Supply 20 — 53V DC/AC Sales No. 70/00325806
PC interface for setup program Sales No. 70/00301315
Setup program with program editor for Windows® 95/98 and NT4.0 Hardware requirements: - PC-486DX-2-100 - 16 Mbyte RAM - 15 Mbyte available on hard disk - CD-ROM - 1 free serial interface

* The RS422/485 interface is required for operating the external relay module!

Ordering details

Basic type	
703580	JUMO DICON 501: Universal profile controller/profile generator in 96mm x 96mm format
703585	JUMO DICON 401: Universal profile controller/profile generator in 96mm x 48mm and 48mm x 96mm formats

Basic type extensions	
Format	
0	96mm x 96mm
1	48mm x 96mm portrait format
2	96mm x 48mm landscape format
Version	
8	Standard with factory settings
9	Customized programming according to specification
Language of instrument texts	
1	German
2	English
3	French

1.	2.	3.	4.	Analogue input
	0	0		not assigned (analogue inputs 1 + 2 available as standard)
1	1	1	1	Universal input (all listed transducers except voltage ranges -10 to +10V / 0 – 10V / 2 – 10V)
2	2	2	2	Voltage ranges -10 to +10V / 0 – 10V / 2 – 10V

1.	2.	3.	4.	5.	6.	Slot for output/two logic inputs (two logic inputs available as standard)
0	0	0	0	0	0	not assigned
1	1	1	1	1	1	Relay (changeover contact)
2	2	2	2	2	2	Solid-state relay 230V 1A
3	3	3	3	3	3	Logic 0/5V
4	4	4	4	4	4	Logic 0/22V
5	5	5	5	5	5	Analogue output
6	6	6	6	6	6	Supply for 2-wire transmitter
7	7	7				Two logic inputs (logic inputs 3+4, 5+6, 7+8; only possible on slots 1, 2 and 3)

Supply		
2	3	110 – 240V -15/+10% AC 48 – 63Hz
2	5	20 – 30V AC/DC, 48 – 63Hz

Interface		
0	0	not assigned
5	4	RS422/RS485 with MOD/Jbus protocol
6	4	PROFIBUS-DP

Maths and logic module		
0	0	not available
0	3	available

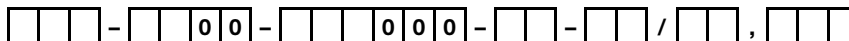
Approvals			
0	0	0	none
0	5	6	DIN 3440*
0	6	1	Underwriters Laboratories Inc. (UL)
0	6	2	Germanischer Lloyd (GL)*
0	6	3	DIN 3440 and GL*
0	6	4	DIN 3440 and UL*
0	6	5	GL and UL*
0	6	6	DIN 3440, GL and UL*

* for Type 703580 only

703580/



703585/



■ Stock versions

Accessories ⇒ page 11

Delivery address: Mackenrodtstraße 14,
36039 Fulda, Germany
Postal address: 36035 Fulda, Germany
Phone: +49 661 6003-0
Fax: +49 661 6003-607
e-mail: mail@jumo.net
Internet: www.jumo.net

JUMO House
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Fax: +44 1279 635262
e-mail: sales@jumo.co.uk
Internet: www.jumo.co.uk

885 Fox Chase, Suite 103
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Phone: 610-380-8002
1-800-554-JUMO
Fax: 610-380-8009
e-mail: info@JumoUSA.com
Internet: www.JumoUSA.com



JUMO IMAGO 500

Multi-channel Process and Program Controller



Brief description

The JUMO IMAGO 500 is a process and program controller with up to 8 controller channels or 4 program channels. The instrument is built to the format 144 mm x 130 mm for a standard 92 mm x 92 mm panel cut-out and a mounting depth of 170 mm.

The display is a 5" color graphics display (27 colors). The layout of the screen templates can be individually adapted and adjusted. Two freely configurable screen templates make it possible to customize the placing of texts, process values, background pictures and icons.

The controller features up to 8 analog inputs and 6 logic inputs, as well as six expansion slots for switched or analog outputs. Four of these slots can be used alternatively for analog inputs or outputs.

A setup program is available for conveniently configuring the instrument from a PC. Linearizations for the usual transducers are stored within the controller, four customer-specific linearization tables can be programmed.

A math and logic module can be used to adapt the instrument to a very wide range of control tasks.

Two serial interfaces, RS422/485 or Profibus-DP, serve to integrate the controller into a data network.

Modules can be retrofitted quite simply by the user (see block structure).

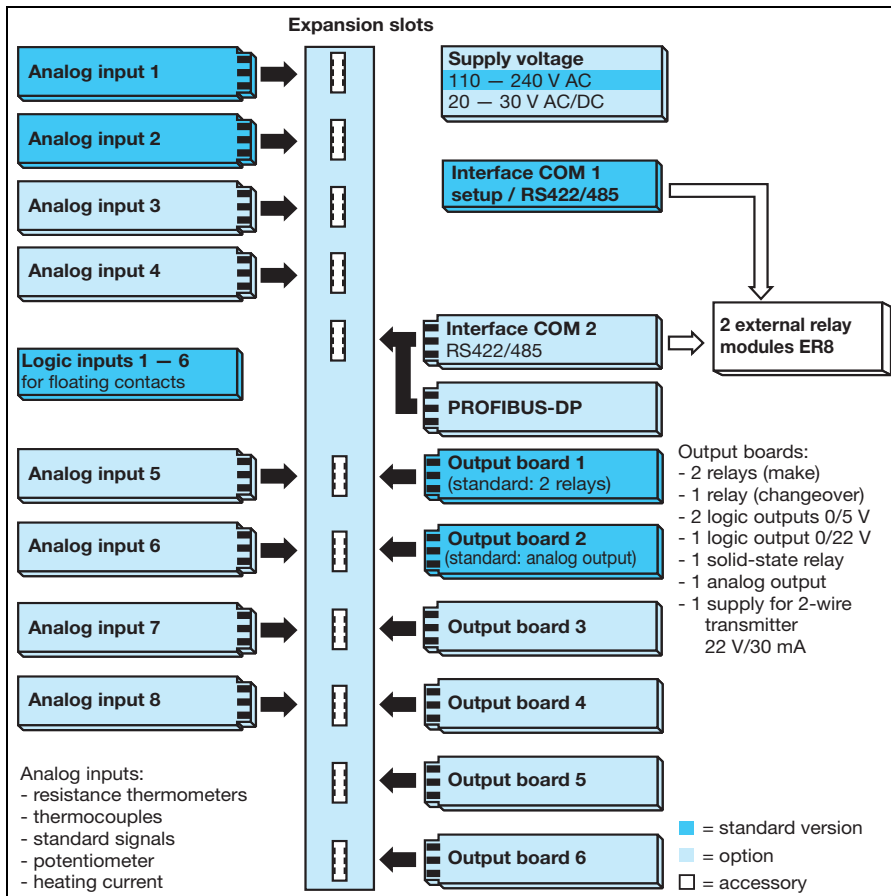
The electrical connection is made at the rear of the instrument, via plug-in screw terminals.

JUMO IMAGO 500
Type 703590/ ...

Approvals



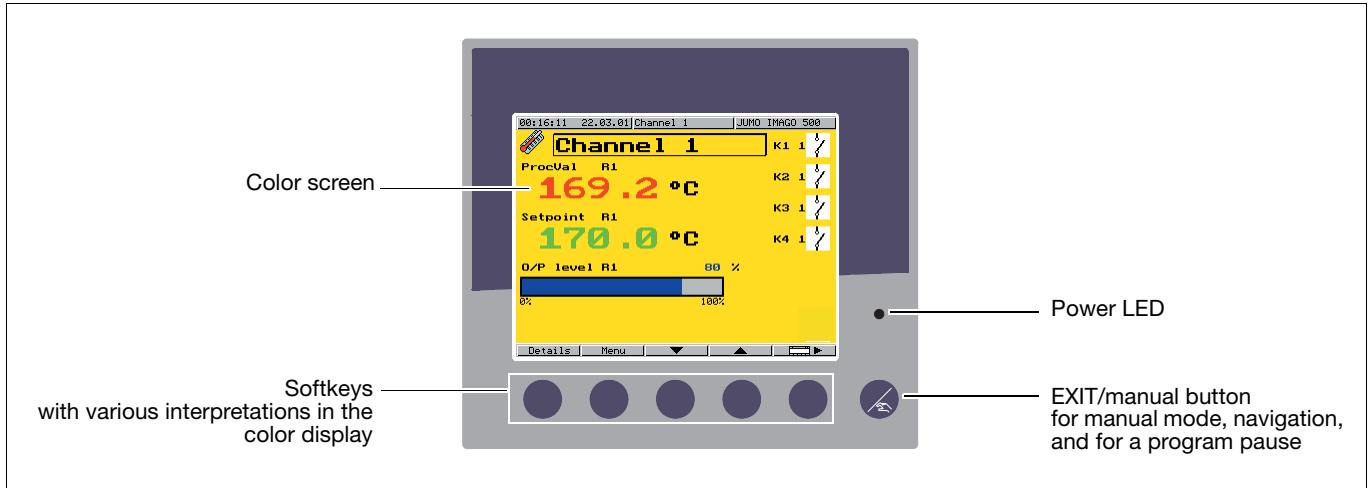
Block structure



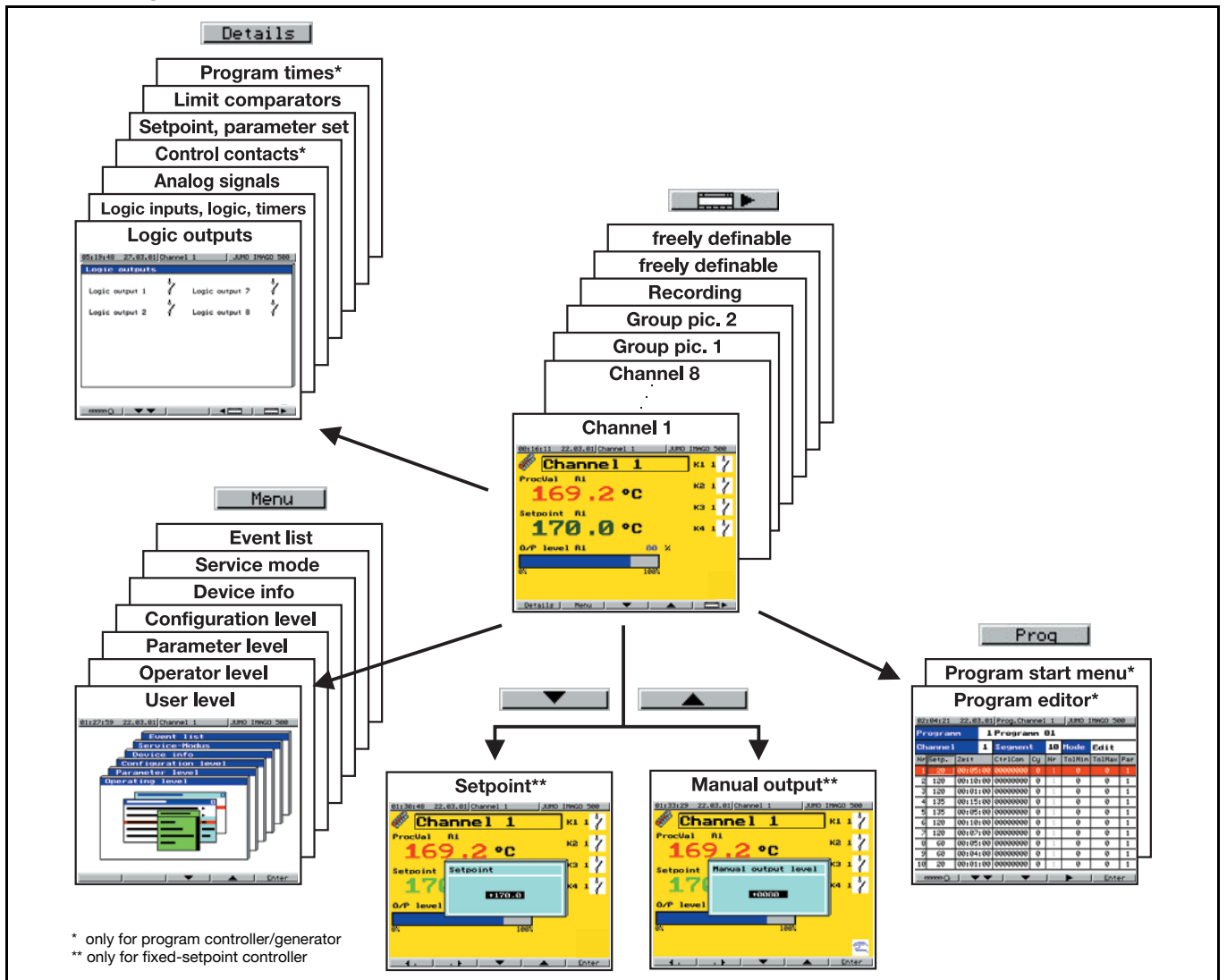
Key features

- Brilliant 5" color graphics display, with 27 colors
- Freely configurable screen templates
- Up to 8 controller channels
- 50 programs, with 1000 segments under dynamic management
- 16 limit comparators
- Modular hardware design
- Recording function
- Up to 4 cascade controllers
- Profibus-DP interface
- Math and logic functions
- Teleservice via external modem
- Setup program and program editor for Windows 95/98/NT4.0/2000/ME

Displays and controls

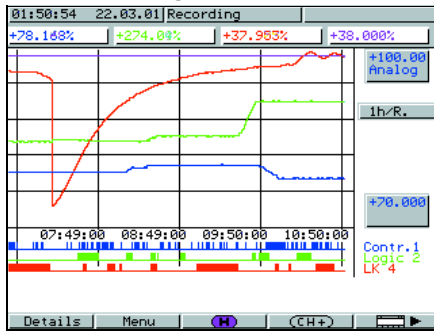


Operating concept



The operation, configuration and displays are organized into a structural arrangement in the screen templates. The insertion of the (variable) softkey functions in the lower section of the screen keeps the user continually informed about the operating options. The instrument is configured through the well-established level structure (operating, parameter and configuration levels). A customer-specific arrangement of those parameters that frequently have to be altered (user level) can also be implemented by using the setup program. A wide variety of process values and status displays (e.g. switching states of the limit comparators) are visualized clearly and in detail. Operating states and alarms are indicated by definable texts and icons in a reserved area of the screen. Unused screen templates can be switched out of the display.

Recording



The recording function is used to create a graphical representation of the development of process values. This can be used to monitor and check control processes.

Features:

- free choice of signals for 4 analog channels and 3 logic channels
- memory storage cycle 60 – 3600 measurements per hour
- ring memory for 43,200 measurements
- readout of data via the interface

Self-optimization

Standard features include self-optimization, making it possible for the controller to be matched to the control loop by a user who is not a control-technology expert.

This functions by evaluating the response of the control loop to specific changes in the manipulating variable. Either an oscillatory method or a step response test can be selected. The controller parameters that are calculated are: proportional band, reset time, derivative time, filter time constant, and cycle time.

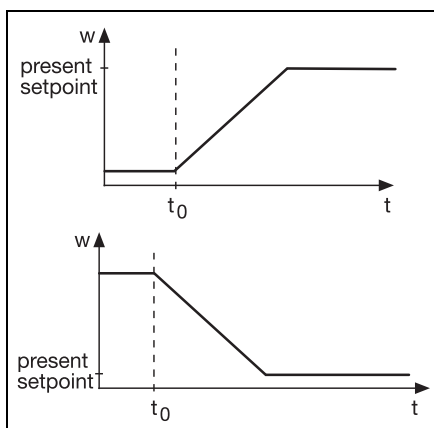
Ramp function

In a fixed-setpoint controller, the ramp function enables a defined run-up of the process value from t_0 until it reaches the given setpoint value.

The rate of change is defined as a gradient (°C/min, °C/hour or °C/day).

When the setpoint changes, this function is activated in the rising or falling direction.

The ramp function can be activated individually for each channel.



Customer-specific linearization

In addition to the linearizations for the usual transducers, up to four customer-specific linearizations can be created. The programming is carried out in the setup program, in the form of a table of values or a formula.

Configurable screen templates

Two freely configurable screen templates are available for arrangement into user-specific layouts.

Using the accessory setup program, representations of process values and graphics are selected from a library and assembled into the screen template within a graphics editor.

Some graphical elements can also be incorporated.

Configurable texts

The accessory setup program can be used to define up to 100 texts for use as messages and representations in the screen templates. Furthermore, all instrument texts can be changed or translated into other languages.

Event list

Important events, such as alarm messages, external texts or system messages, are collected together in an event list.

User level

Parameters which frequently have to be changed by the user can be collected together and displayed in the screen template "User level" (only through the setup program).

Math and logic module¹

The math module makes it possible to combine values such as setpoints, output levels and measurements into a mathematical formula.

The logic module can be used to make a logical combination of such elements as logic inputs and limit comparator states.

Up to 16 math or logic formulae can be entered through the setup program, and the results of the calculations can be presented at the outputs or used for internal purposes.

Difference, ratio, and humidity control

Controllers for difference, ratio, and humidity can be achieved through standard formulae that have been included.

Cascade controller

Demanding control tasks can be handled by configuring the instrument as a cascade or trimmer cascade controller. Four cascade controllers can be implemented by using eight controller channels.

C-level controller (option)

The instrument can be used as a C-level controller, to regulate the level of carbon in the atmosphere of a gas coking furnace. The sensing device in this case is a zircon dioxide probe.

Logic functions

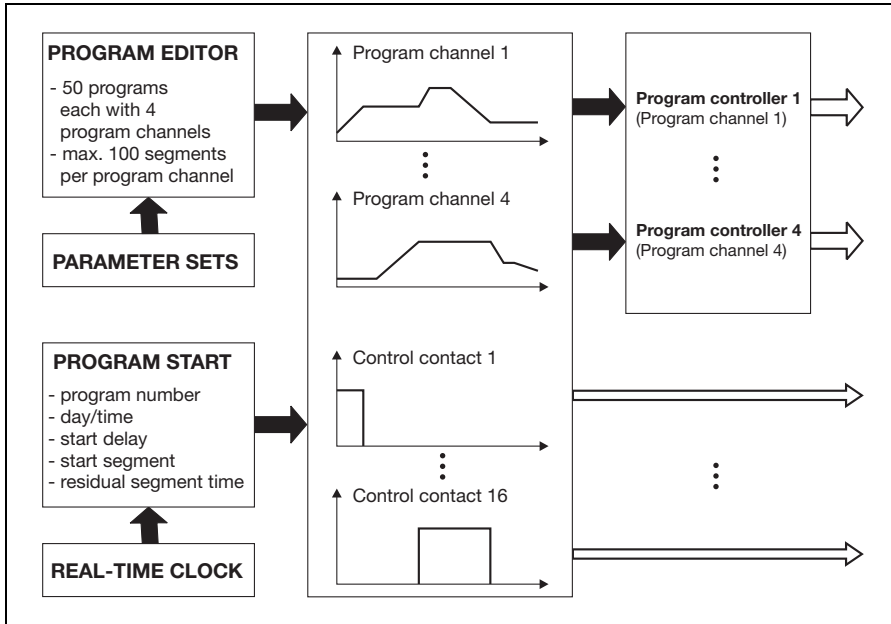
- Start/cancel of self-optimization
- Change to manual mode
- Inhibit manual mode
- Ramp stop/OFF
- Setpoint changeover
- Process value changeover
- Parameter set switching
- Key/level inhibit
- Text display
- Screen saving
- Screen switching
- Acknowledge limit comparators
- Program start/stop/cancel
- Inhibit program start
- Program selection
- Fast forwards
- Segment change
- Time synchronization
- Timer start/stop

The logic functions can be combined with one another.

Functions of the Outputs

- Analog input variables
- Math
- Process value
- Setpoint
- Ramp end value
- Control deviation
- Output level
- Cascade output level
- Program end value
- Controller outputs
- Limit comparators
- Control contacts
- Logic inputs
- Logic
- Program end
- Ramp end
- Manual mode signal
- Timer signals
- Program/automatic signals

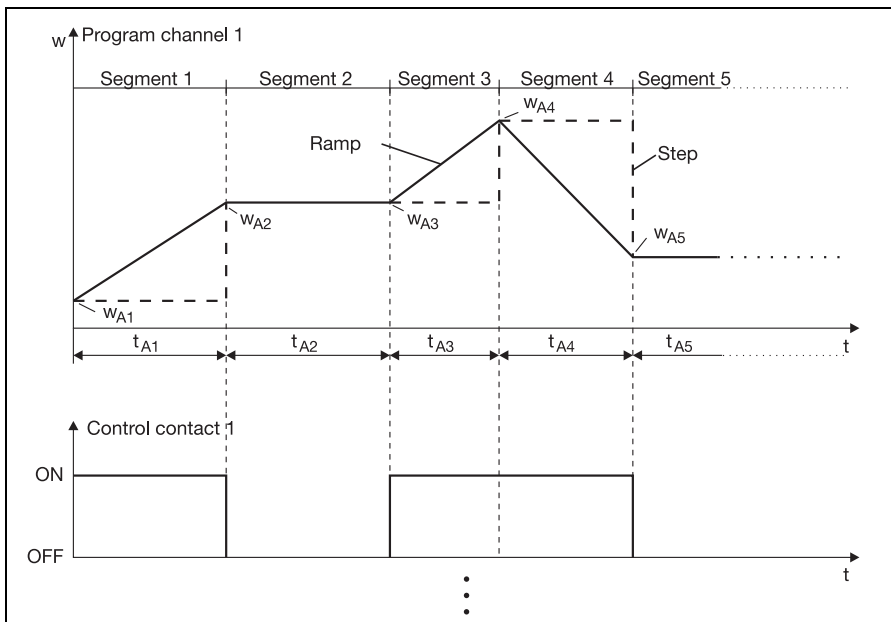
Program controller



50 programs can be created, with a maximum of 4 program channels. The program channels run synchronously, and can each contain up to 100 segments. A total of 1000 segments can thus be programmed.

Furthermore, 16 control contacts can be programmed and assigned to the program channels. These are also run synchronously.

The start of a program can be initiated manually, by pressing a key on the instrument (or an external button), or through the programming of the start conditions. The start time can be determined either by defining a start delay or by programming a date and time. A weekly program can also be entered into the instrument, through the setup program.



Program channels are made up from a sequence of segments containing defined segment setpoints. The individual segment setpoints can optionally be linked to ramp or step functions.

The state of the 16 control contacts can be influenced in each segment. In addition, one of two programmable parameter sets and an upper and lower limit (tolerance band) for monitoring the process value can be assigned to each segment.

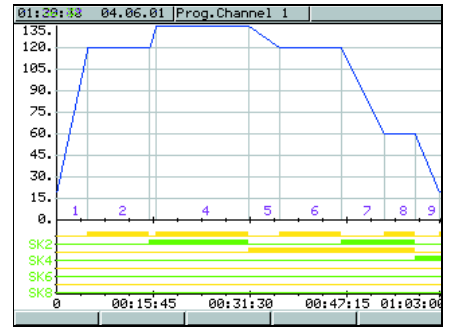
Endless loops can be implemented by programming repeated cycles.

Segments are defined by the segment setpoint and the segment time.

The control contacts 9 – 16 can only be set in the program editor of the setup program.

Program editor

02:04:21 22.03.01 Prog.Channel 1 JUMO IMAGO 500									
Program 1 Programm 01									
Channel	1	Segment	10	Mode	Edit				
Nr	Setp.	Zeit	CtrlCon	Cy	Nr	To1Min	To1Max	Par	
1	20	00:05:00	00000000	0	1	0	0	1	
2	120	00:10:00	00000000	0	1	0	0	1	
3	120	00:01:00	00000000	0	1	0	0	1	
4	135	00:15:00	00000000	0	1	0	0	1	
5	135	00:05:00	00000000	0	1	0	0	1	
6	120	00:10:00	00000000	0	1	0	0	1	
7	120	00:07:00	00000000	0	1	0	0	1	
8	60	00:05:00	00000000	0	1	0	0	1	
9	60	00:04:00	00000000	0	1	0	0	1	
10	20	00:01:00	00000000	0	1	0	0	1	



The integrated program editor can be used for the comfortable creation and alteration of programs.

The program profiles and the states of the control contacts can be graphically displayed as a function of the time.

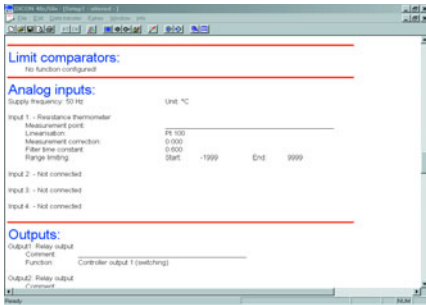
The setup program can be used to program a second setpoint sequence per program channel.

Timers

Four timers are provided, for time-dependent control. The states of the timers can be used for further internal processing or to set logic outputs.

Setup program (accessory)

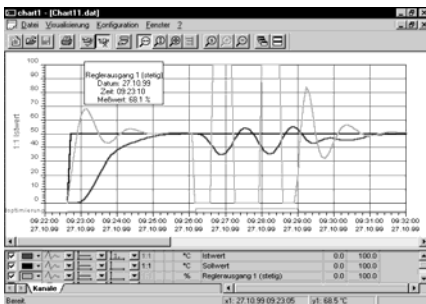
The setup program for configuring the instrument is available in German, English and French. Using a PC, you can create and edit sets of data, and transfer them to the controller or read them out from the instrument. The data sets are stored and managed.



Commissioning software (JUMO) Startup

The commissioning software (JUMO) Startup is provided for optimum and comfortable adaptation of the controller to the control loop.

Various process variables (e.g setpoint, process value, control deviation, controller output signals) can be graphically visualized. The controller parameters can be altered and transferred to the controller via the setup or the RS422/485 interface on the controller.



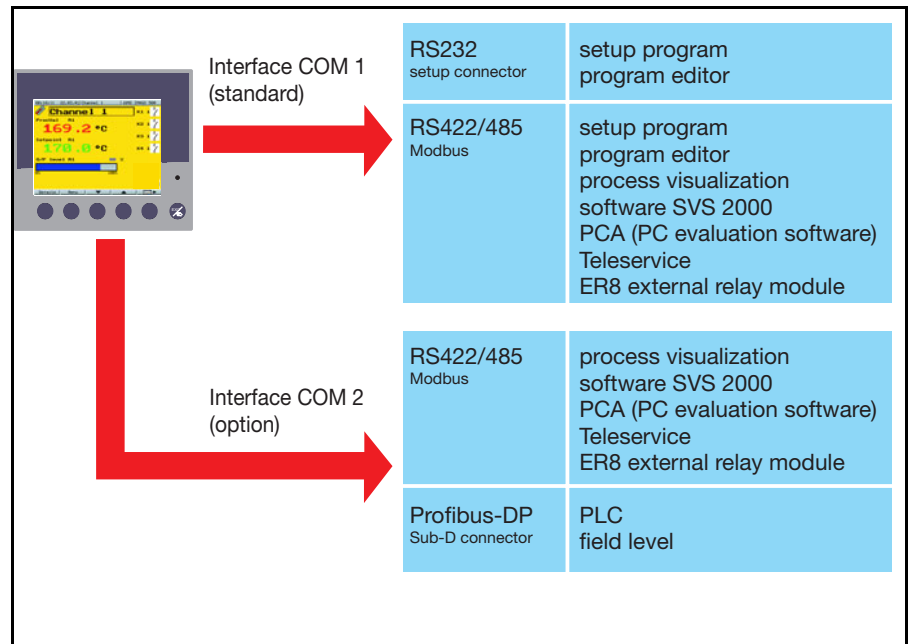
External relay module ER8 (accessory)

Up to 2 ER8 external relay modules can be used. Each module expands the controller by 8 relay or logic outputs.

They can be operated via an RS422/RS485 interface.

The setup program is required to configure ER8 modules, which are mounted on DIN rails.

Interfaces



RS422/RS485 interface

The serial interface is used for communication with higher-level (supervisory) systems. The transmission protocol that is used is the Modbus protocol.

Profibus-DP¹

The Profibus-DP interface can be used to integrate the controller into a fieldbus system operating according to the Profibus-DP standard. This Profibus version is especially designed for communication between automation systems and decentralized peripheral devices at the field level, and optimized for speed. The data transmission is made serially, using the RS485 standard.

GSD generator, the project-planning tool that is supplied with the package (GSD = Gerätestammdaten, i.e. basic device data), is used to make a selection of device characteristics for the controller to create a standardized GSD file that is used to integrate the controller into the fieldbus system.

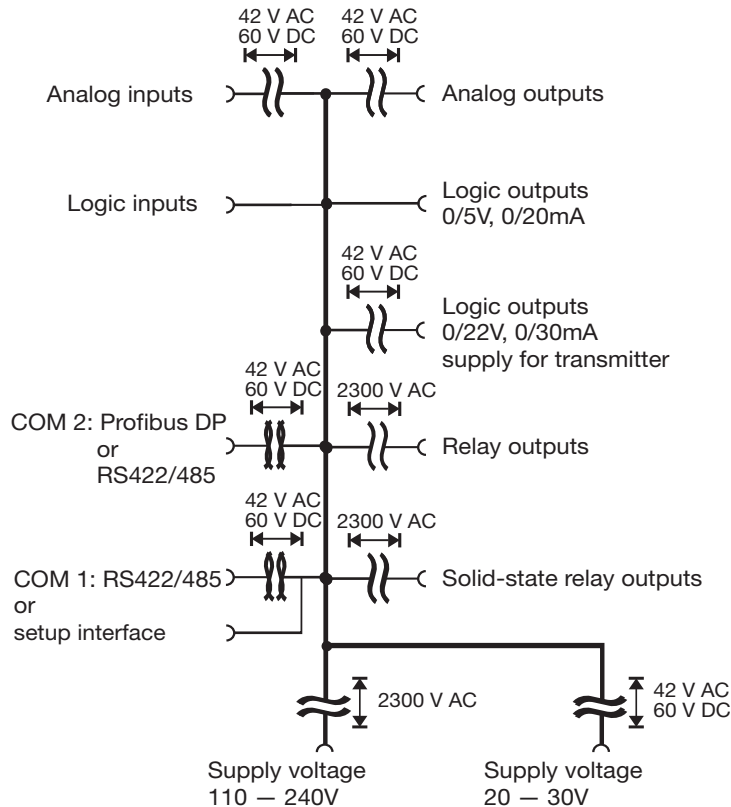
¹ Option

Parameter level

All the parameters and their meanings are included in the table. Some parameters may be omitted or meaningless for a particular type of controller. Two parameter sets can be stored, to handle special applications.

Parameter	Value range	Factory setting	Meaning
Controller structure	P, I, PD, PI, PID	PID	Control loop feedback
Proportional band	0 to 9999 digits	0 digits	Size of the proportional band 0 means that the controller structure is out of action!
Derivative time	0 to 9999 sec	80 sec	Determines the differential component of the controller output signal
Reset time	0 to 9999 sec	350 sec	Determines the integral component of the controller output signal.
Cycle time	0 to 9999 sec	20 sec	When using a switched output, the cycle time should be chosen so that the energy flow to the process is quasi-continuous, i.e. as continuous as is practicable without overloading the switching elements.
Contact spacing	0 to 999 sec	0 digits	The spacing between the two controller contacts for 3-state or modulating controllers, or continuous controllers with an integrated actuator driver.
Switching differential	0 to 999 digits	1 digit	Hysteresis for switching controllers with proportional band = 0
Actuator time	5 to 3000 sec	60 sec	The actually utilized stroke time of the regulator valve with modulating controllers or continuous controllers with an integrated actuator driver.
Working point	-100 to +100%	0%	The output level for P and PD controllers (if $x = w$ then $y = Y_0$).
Output level limiting	0 to 100%	100%	The maximum limit for the output level.
	-100 to +100 %	-100%	The minimum limit for the output level.
Minimum relay ON time	0 to 60 sec	0 sec	Limits the frequency of switching for switched outputs.

Electrical isolation



Technical data

Thermocouple input

Designation	Measurement range	Meas. accuracy ¹	Ambient temperature error
Fe-Con L	-200 to +900°C	≤ 0.25%	100 ppm / °C
Fe-Con J EN 60 584	-200 to +1200°C	≤ 0.25%	100 ppm / °C
Fe-Con U	-200 to +600°C	≤ 0.25%	100 ppm / °C
Cu-Con T EN 60 584	-200 to +400°C	≤ 0.25%	100 ppm / °C
NiCr-Ni K EN 60 584	-200 to +1372°C	≤ 0.25%	100 ppm / °C
NiCr-Con E EN 60 584	-200 to +915°C	≤ 0.25%	100 ppm / °C
NiCrSi-NiSi N EN 60 584	-100 to +1300°C	≤ 0.25%	100 ppm / °C
Pt10Rh-Pt S EN 60 584	0 to 1768°C	≤ 0.25%	100 ppm / °C
Pt13Rh-Pt R EN 60 584	0 to 1768°C	≤ 0.25%	100 ppm / °C
Pt30Rh-Pt6Rh B EN 60 584	0 to 1820°C	≤ 0.25% ²	100 ppm / °C
W5Re-W26Re C	0 to 2320 °C	≤ 0.25%	100 ppm / °C
W3Re-W25Re D	0 to 2495 °C	≤ 0.25%	100 ppm / °C
W3Re-W26Re	0 to 2400 °C	≤ 0.25%	100 ppm / °C
Cold junction	Pt100 internal, external, or constant		

¹ with 250msec sampling time

² within the range 300 to 1820°C

Input for resistance thermometer

Designation	Connection circuit	Measurement range	Meas. accuracy ¹	Ambient temperature error
Pt100 EN 60 751	2-wire / 3-wire	-200 to +850°C	≤ 0.05%	50 ppm / °C
Pt50, Pt500, Pt1000 EN 60 751	3-wire	-200 to +850°C	≤ 0.1%	50 ppm / °C
Cu50	3-wire	-50 to +200°C	≤ 0.1%	50 ppm / °C
Ni100 DIN 43 760	2-wire / 3-wire	-60 to +250°C	≤ 0.05%	50 ppm / °C
KTY11-6	3-wire	-50 to +150°C	≤ 1.0%	50 ppm / °C
PtK9	3-wire	Lithium-chloride sensor		
Sensor lead resistance	max. 30Ω per lead for 2-wire or 3-wire circuit			
Meas. current	250μA			
Lead compensation	Not required for 3-wire circuit. With a 2-wire circuit, the lead resistance can be compensated in software by a correction of the process value.			

Input for standard signals

Designation	Measurement range	Meas. accuracy ¹	Ambient temperature error
Voltage	0 to 10V	≤ 0.2%	100 ppm / °C
	-10 to +10V	≤ 0.2%	100 ppm / °C
	-1 to +1V	≤ 0.1%	100 ppm / °C
	0 to +1V	≤ 0.1%	100 ppm / °C
	0 to 100mV	≤ 0.1%	100 ppm / °C
	-100 to +100mV	≤ 0.1%	100 ppm / °C
	Input resistance $R_{IN} > 100 \text{ k}\Omega$		
Current	4 – 20mA, voltage drop ≤ 1 V	≤ 0.1%	100 ppm / °C
	0 – 20mA, voltage drop ≤ 1 V	≤ 0.1%	100 ppm / °C
Heating current	0 – 50mA AC	≤ 1%	100 ppm / °C
Potentiometer	min. 100Ω, max. 10kΩ		

¹ with 250msec sampling time

Logic inputs

Floating contacts	
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■ Standard version

Measurement circuit monitoring

In the event of a fault, the outputs move to a defined (configurable) status.

Sensor	Overrange / underrange	Probe or lead short-circuit	Probe or lead break
Thermocouple	•	-	•
Resistance thermometer	•	•	•
Voltage 2 – 10V 0 – 10V	• •	• -	• -
Current 4 – 20mA 0 – 20mA	• •	• -	• -

• = recognized - = not recognized

Outputs

Relay contact rating contact life	changeover contact, or 2 x make 3A at 250V AC resistive load 150,000 operations at rated load (with 2 x make, the supply circuits ≥48V AC cannot be combined on one board with SELV circuitry!)		
Logic current limiting	0/5V 20mA	or	0/22V 30mA
Solid-state relay contact rating protection circuitry	1A at 230V varistor		
Voltage output signals load resistance	0 – 10V / 2 – 10V $R_{load} \geq 500\Omega$		
Current output signals load resistance	0 – 20mA / 4 – 20mA $R_{load} \leq 450\Omega$		
Supply voltage for 2-wire transmitter voltage current	22V 30mA		

Controller

Controller type	2-state controller, 3-state controller, modulating controller, continuous controller, continuous controller with integrated actuator driver
Controller structures	P / PD / PI / PID / I
A/D converter	dynamic resolution up to 16 bit
Sampling time	250 msec 50 msec, 150 msec, 250 msec (configurable)

Color screen

Resolution	320 x 240 pixels
Size (screen diagonal)	5" (12.7 cm)
No. of colors	27 colors

Electrical data

Supply voltage (switchmode PSU)	110 – 240V AC -15/+10%, 48 – 63Hz 20 – 30V AC/DC, 48 – 63Hz
Electrical safety	to EN 61 010, Part 1 overvoltage category III, pollution degree 2
Power consumption	max. 30 VA
Data backup	Flash memory
Data buffer	battery (for restart data / initial conditions for the program controller / time)
Electrical connection	at rear, via plug-in screw terminals conductor cross-section max. 2.5mm ² with core ferrules (length: 10mm)
Electromagnetic compatibility interference emission interference immunity	EN 61 326 Class A to industrial requirements

■ Standard version

Approvals

UL approval	
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Housing

Housing type	housing and rear panel: metal for panel mounting as per DIN ISO 43 700
Front bezel	plastic to UL94 V0 144 mm x 130mm
Mounting depth	170 mm
Panel cut-out	$92^{+0.8} \times 92^{+0.8}$ mm
Ambient/storage temperature range	-5 to 50°C / -40 to +70°C
Climatic conditions	rel. humidity $\leq 75\%$ annual mean, no condensation
Operating position	horizontal
Enclosure protection	to EN 60 529 front IP65 / rear IP20
Weight (fully fitted)	approx. 1400 g
Membrane keypad	polyester film, resistant to normal washing and cleaning agents

Interface (COM1)

Interface type	PC interface or RS422/485
Protocol	Modbus
Baud rate	9600, 19200, 38400
Device address	1 – 255
Minimum response time	0 – 500msec

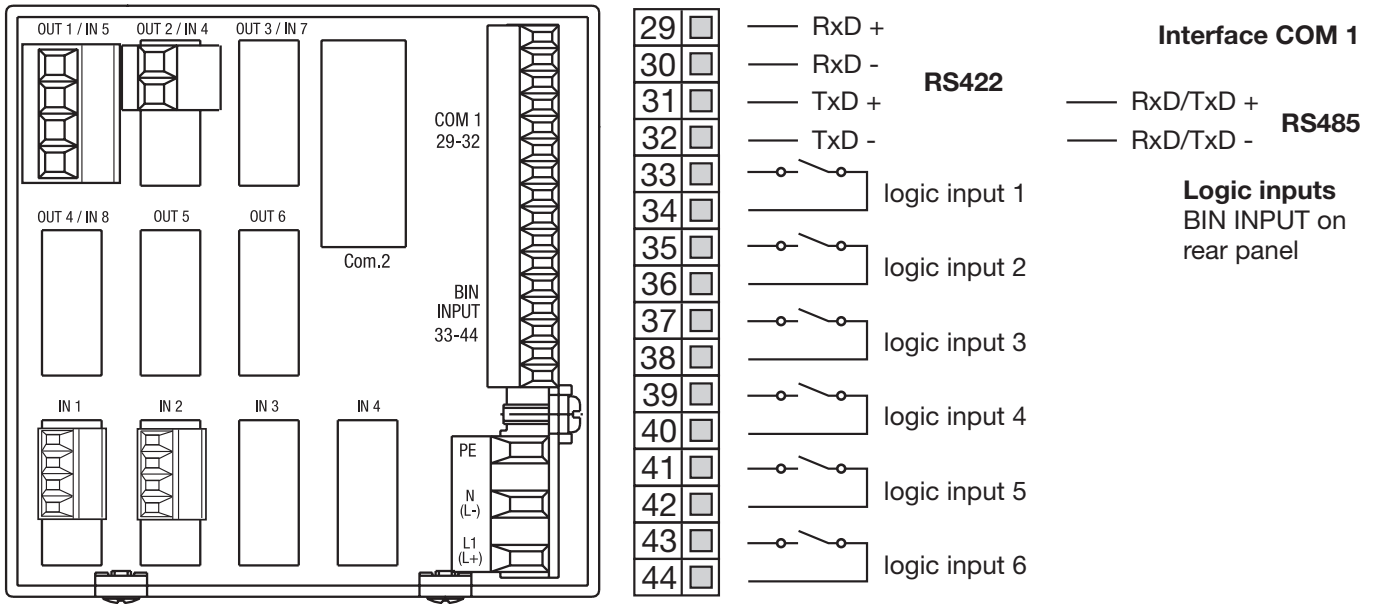
Interface (COM2)**Modbus**

Interface type	RS 422/485
Protocol	Modbus
Baud rate	9600, 19200, 38400
Device address	1 – 254

Profibus

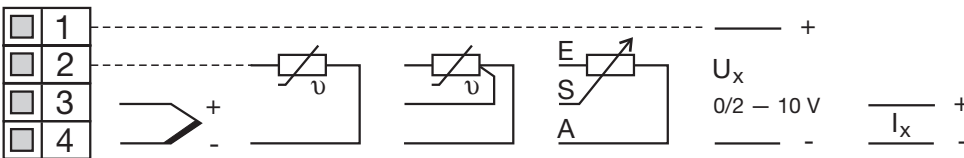
Device address	1 – 128
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Connection diagram



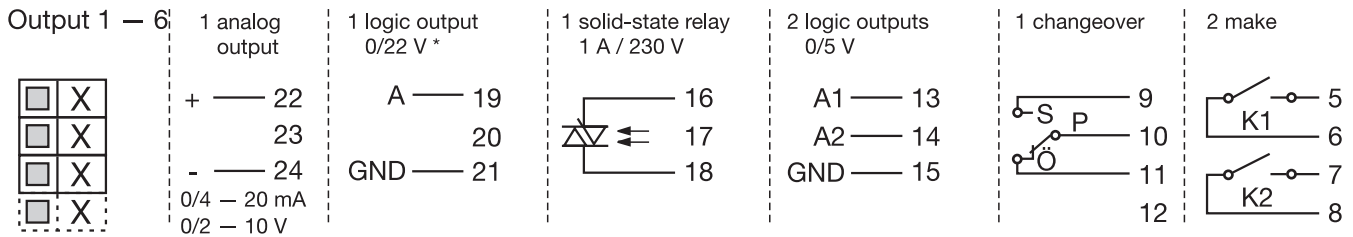
Analog inputs

Expansion slots: IN1 – 8



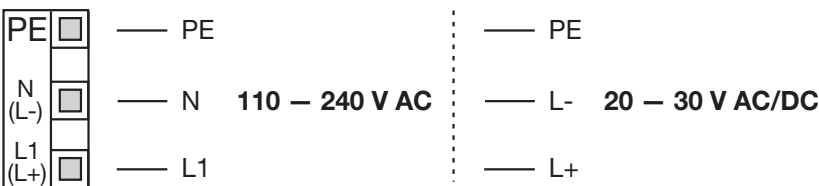
Outputs

Expansion slots: OUT1 – 6



* or supply for 2-wire transmitter

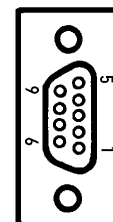
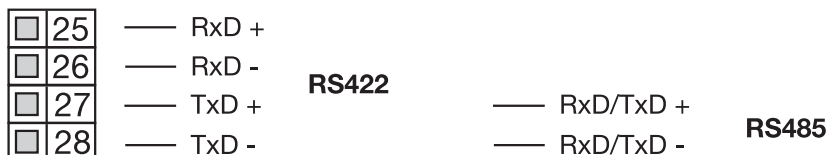
Supply voltage



Slot	Expansion card with 1 output	Expansion card with 2 outputs
OUT1	Output 1	Output 1+7
OUT2	Output 2	Output 2+8
OUT3	Output 3	Output 3+9
OUT4	Output 4	Output 4+10
OUT5	Output 5	Output 5+11
OUT6	Output 6	Output 6+12

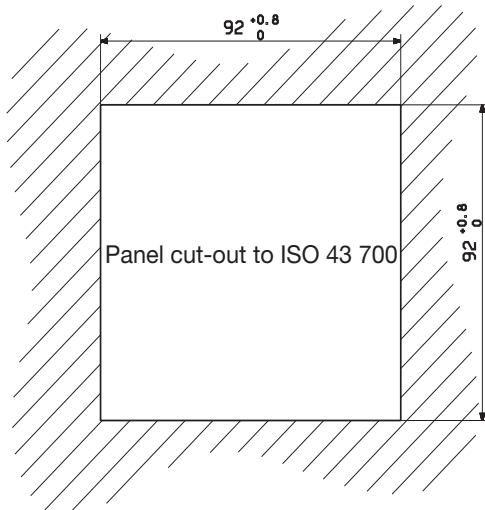
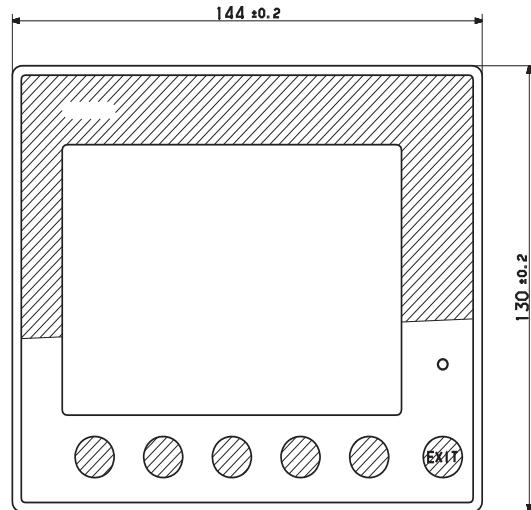
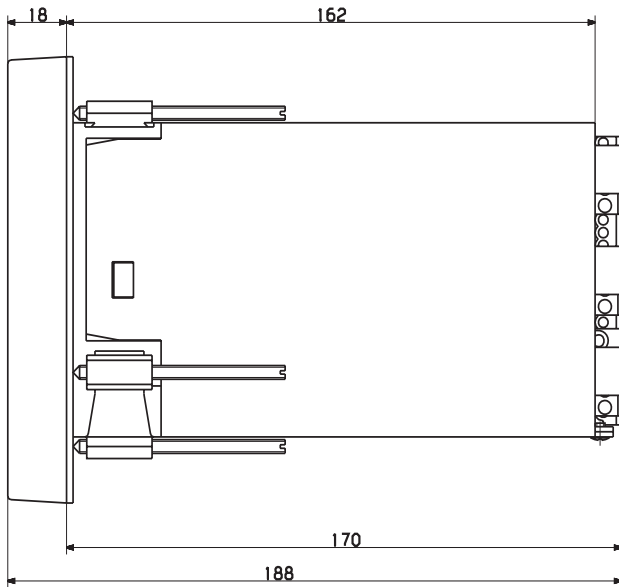
Interfaces

COM 2

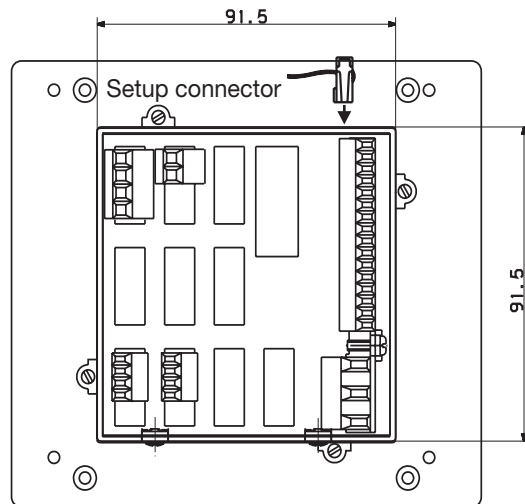


Pin	Assignment
3	RxD/TxD-P
4	RTS
5	DGND
6	VP
8	RxD/TxD-N

Dimensions

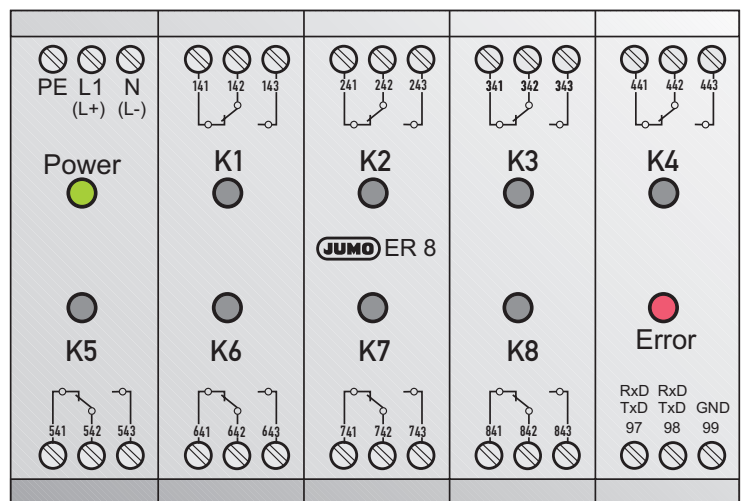


Rear view



Accessories

External relay module ER8 ¹ , 110 — 240V AC Sales No. 70/00405292 (relay outputs) Sales No. 70/00439131 (logic outputs)
External relay module ER8 ¹ , 20 — 53V AC/DC Sales No. 70/00405297 (relay outputs) Sales No. 70/00471459 (relay outputs)
PC interface for setup program Sales No. 70/00301315 (TTL/RS232) Sales No. 70/00456352 (USB/TTL)
Setup program and program editor ² Sales No. 70/00399795
Setup program with program editor and Startup ² Sales No. 70/00403094
Setup program with program editor, Startup and Teleservice ² Sales No. 70/00400012
Program editor (software) ² Sales No. 70/00400460



¹ If the two external relay modules are used, an RS422/485 interface is required!
² Requirements: Windows[®] 95/98/NT4.0/ME/2000, PC Pentium100, 16 MByte RAM, 15 MByte free on HD, CD-ROM, 1 free serial interface

Order details

Basic type	
703590	JUMO IMAGO 500; multi-channel process and program controller

Basic type extensions	
No. of controller channels	
2	2 controller channels
4	4 controller channels
8	8 controller channels
Version	
8	standard, with factory settings
9	customized programming, as specified
Language for instrument texts	
1	German
2	English
3	French
9	Customer-specific language (Czech, Dutch, Hungarian, Italian, Russian, Swedish)

1	2	3	4	Analog inputs
0	0	0	0	not used
8	8	8	8	universal input (configurable)
3	3	3	3	input for zirconium dioxide sensor 0 – 2V

1	2	3	4	5	6	Outputs and analog inputs
0	0	0	0	0	0	none
1	1	1	1	1	1	1 relay (changeover)
2	2	2	2	2	2	1 solid-state relay 1 A / 230 V
3	3	3	3	3	3	2 relays (make contacts)
4	4	4	4	4	4	1 logic output 0/22 V
5	5	5	5	5	5	1 analog output
6	6	6	6	6	6	1 supply for 2-wire transmitter 22V/30mA
7	7	7	7	7	7	2 logic outputs 0/5 V
8	8	8	8	-	-	1 universal input

Supply voltage		
2	3	110 – 240V AC -15/+10% 48 – 63Hz
2	5	20 – 30V AC/DC 48 – 63Hz

Interface COM2		
0	0	not used
5	4	RS422/485 with Modbus/Jbus protocol
6	4	Profibus-DP

Extra codes			
0	0	0	no extra codes
2	1	2	C-level control
2	1	3	recording function
2	1	4	math and logic module 1 – 8
2	1	5	math and logic module 9 – 16 (requires extra code 214)

703590/



■ Standard version

¹ List extra codes in sequence, separated by commas.



Controller module

Brief description

The unit is a module of the JUMO mTRON control and automation system. The plastic housing measures 91 mm x 85.5 mm x 73.5 mm (W x H x D) and is mounted on a standard rail.

Using the function blocks ramp, maths, controller and limit comparator, it is possible to build up a great variety of automation structures. Each of the analogue inputs is monitored against adjustable limit values. In addition to four definable setpoints the memory stores two controller parameter sets. A fully developed auto-tuning function automatically adapts the controller to the characteristics of the process.

In addition to two logic inputs there are 2 analogue inputs for standard signals, Pt100 and thermocouples. There are 2 switching outputs and one analogue output. The analogue inputs and the analogue output can be configured without hardware changes. The controller module incorporates a network connection for data interchange.

A screened twisted pair is used as transmission line. There is a setup interface for module parameter setting and configuration from a PC under the JUMO mTRON-iTOOL project design software. The electrical connections are made through plug-in connectors with screw terminals.



Type 704010/0-...

Block structure

2 analogue inputs

for Pt 100, thermocouples, standard signals, potentiometer, resistance or AC current.
Functions:
- control variable
- external setpoint
- input variable for maths functions
- input variable for the limit comparator
- output of measurements to the network
- stroke retransmission
- heater current monitoring

2 logic inputs

for floating contacts, TTL or CMOS level
Functions:
- setpoint changeover
- ramp reset
- ramp stop
- ramp inactive
- changeover to manual operation
- start of self-optimisation
- parameter set switching

Input

network variables

Analogue network variables
Logic network variables



Setup interface

for configuration and parameter setting

JUMO mTRON-iTOOL

Functions:
- linking to other JUMO mTRON modules
- configuration and parameter setting
- project archiving
- online process diagnostics

3 outputs

2 switching outputs (e. g. relays) and 1 analogue output
Functions:
- controller output 1
- controller output 2
- limit comparator output
- operation via a network variable
- measurement 1 + 2
- maths function

Output

network variables

Analogue network variables
Logic network variables

**JUMO mTRON
Operating unit**

1. LON¹ = Local Operating Network
Registered trademark of the
ECHELON Corporation

Features

■ Maths functions

Difference, humidity, ratio, square root, square, minimum, maximum, absolute value, sum, product, mean value

■ Ramp function

Setpoint ramp for a time-defined approach of the process to the setpoint

■ Limit comparator

Comparator and window functions, direct or reversed

■ Switching setpoint/parameter set

Facility for switching between 4 setpoints and 2 controller parameter sets through logic inputs and network variables.

■ Range monitor

The analogue inputs are monitored against defined limit values

■ Cascade output

Conversion of the setpoint input for an external slave controller

■ Setup interface

For configuration and setting of parameters, the module is linked to a PC via a PC interface

■ Plug & Play function

Problem-free replacement of modules without re-configuration

Technical data

Hardware inputs

Analogue inputs

Measurement input

- resistance thermometer
- thermocouples
- standard signals (current/voltage)
- AC current (50/60Hz sinusoidal)
- resistance
- potentiometer

Sampling time

420msec for all inputs

Functions

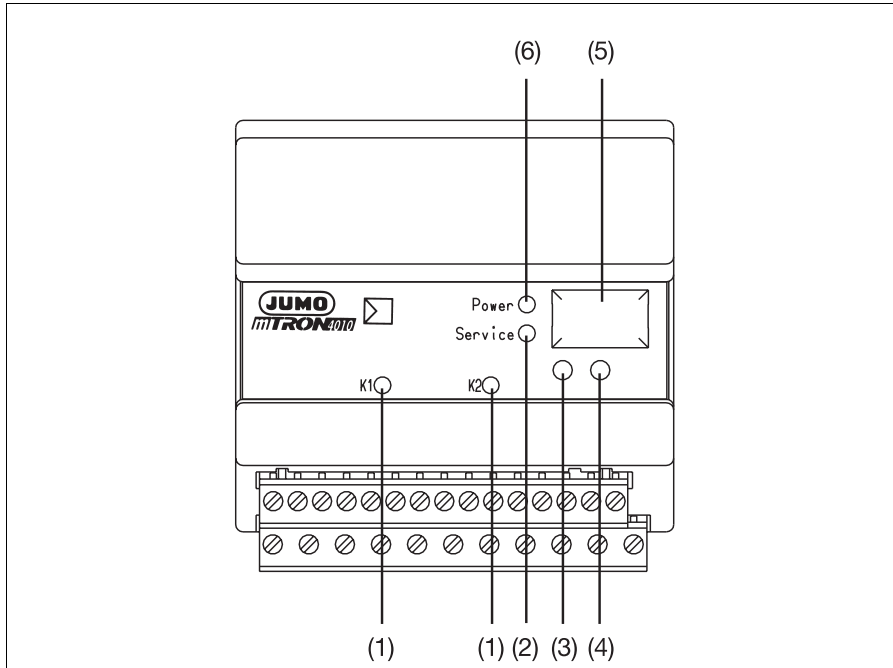
- control variable
- limit comparator
- maths function
- network output
- external setpoint
- heater current monitoring
- stroke retransmission
- analogue output

Sensor	Measurement range ¹	Internal resistance/voltage drop	Measurement circuit monitoring		Resolution	Measurement accuracy	
			Recognition of sensor break	Recognition of sensor short-circuit		Maximum measurement error ¹ at 23°C	Ambient temperature drift per 10°C
Pt 100	-200 to +850°C (-200 to +850°C)		X	X	0.025°C	± 0.4°C	± 0.21°C
Fe-Con L	-200 to +900°C (-200 to +900°C)	47MΩ	X	-	0.05°C	± 1.8°C	± 0.9°C
Fe-Con J	-200 to +1200°C (-100 to +1200°C)	47MΩ	X	-	0.05°C	± 1.8°C	± 1.2°C
NiCr-Ni K	-200 to +1372°C (-100 to +1372°C)	47MΩ	X	-	0.07°C	± 1.9°C	± 1.4°C
Cu-Con U	-200 to +600°C (-100 to +600°C)	47MΩ	X	-	0.07°C	± 1.7°C	± 0.6°C
Cu-Con T	-200 to +400°C (-200 to +400°C)	47MΩ	X	-	0.07°C	± 1.6°C	± 0.4°C
NiCrSi-NiSi N	-100 to +1300°C (-100 to +1300°C)	47MΩ	X	-	0.07°C	± 2.3°C	± 1.3°C
Pt10Rh-Pt S	0 – 1768°C (100 – 1768°C)	47MΩ	X	-	0.3°C	± 3.4°C	± 1.7°C
Pt13Rh-Pt R	0 – 1768°C (100 – 1768°C)	47MΩ	X	-	0.25°C	± 3.4°C	± 1.7°C
Pt30Rh-Pt6Rh B	0 – 1820°C (400 – 1820°C)	47MΩ	X	-	0.3°C	± 4.4°C	± 1.4°C
Standard signals	-50 to +50mV	47MΩ	X	-	2.5µV	± 0.04mV	± 0.05mV
Standard signals	0 – 50mV	47MΩ	X	-	2.5µV	± 0.04mV	± 0.05mV
Standard signals	10 – 50mV	47MΩ	X	X	2.5µV	± 0.04mV	± 0.05mV
Standard signals	-10 to +10V	2MΩ	-	-	500µV	± 8mV	± 15mV
Standard signals	0 – 10V	2MΩ	-	-	500µV	± 8mV	± 15mV
Standard signals	2 – 10V	2MΩ	X	X	500µV	± 8mV	± 15mV
Standard signals	-1 to +1V	2MΩ	-	-	50µV	± 0.8mV	± 1.5mV
Standard signals	0 – 1V	2MΩ	-	-	50µV	± 0.8mV	± 1.5mV
Standard signals	0.2 – 1V	2MΩ	X	X	50µV	± 0.8 mV	± 1.5mV
Standard signals	0 – 20mA	less than 1V	-	-	1µA	± 15µA	± 30µA
Standard signals	4 – 20mA	less than 1V	X	X	1µA	± 15µA	± 30µA
AC current	0 – 50mA	less than 1V	-	-	5µA	1mA	± 100µA
Resistance	0 – 400Ω		X	X	0.01Ω	± 0.15Ω	± 0.1Ω
Potentiometer	0.1 – 10KΩ		X (slider)	-	0.01 %	0.25 %	0.1 %

X: recognized -: not recognized

1. The accuracy given refers to the ranges given in brackets. With thermocouples, the accuracy is obtained only in the specified operating position and after an operating time of at least 1 hour.

Displays and controls



(1)	Status LED, yellow for the logic outputs K1 and K2; lights up when relay is energised or logic output is activated	(4)	Installation key the module reports to the JUMO mTRON-iTOOL project design software or the operating unit
(2)	Service LED, red - lights up on operating fault - flashes when the mechanical con- nection to the module from JUMO mTRON-iTOOL or the operat- ing unit is being checked by a test signal ("wink"). - long flashing pulses (3 sec on, 1 sec off) when a Plug & Play fault occurs	(5)	Setup interface for the PC interface line which links the module to the PC
(3)	Switch for the termination resistance of the LON network	(6)	Power LED, green lights up when the supply is switched on

Logic inputs

activation: floating contacts,
TTL or CMOS level

Functions:

- setpoint selection
- ramp reset
- ramp stop
- ramp inactive
- changeover to manual operation
- start autotuning
- parameter set switching

Hardware outputs

Analogue output

Signal	Burden
0 – 10V	500Ω min.
2 – 10V	500Ω min.
0 – 20mA	500Ω max.
4 – 20mA	500Ω max.

Accuracy: 0.25 %
Resolution: 16 bit

Functions:

- controller output 1 or 2
- output of a maths function
- output of a network variable
- output of a measurement value of
the analogue inputs

Switching outputs

Functions:

- controller output 1 or 2
- limit comparator output
- output of a network variable

Relay outputs

Type: changeover contact
Nominal voltage: 250V
Nominal current: 3A
Contact rating: 3A, 250V AC
resistive load
Life: 5·10⁵ operations
on resistive load
Contact material: AgCdO (hard gold plated)
Contact protection circuit:
Varistor (make contact only)
Minimum load: 10mA 5V DC

Solid-state relay output

Type: 1A 250V AC
Overvoltage protection: varistor

Logic output

Type: 0/12V
internal resistance: 600Ω

Input

network variables

Analogue network variables

Functions:

- external setpoint
- maths function
- ramp start
- external control variable
- stroke retransmission
- manual control output
- additive disturbance
- multiplying disturbance
- analogue output

Logic network variables

Functions:

- setpoint selection
- ramp reset
- ramp stop
- ramp inactive
- changeover to manual operation
- start of self-optimisation
- parameter set switching
- direct operation of the relays

Output

network variables

Analogue network variables

Output cycle:

420msec – 8.4sec, adjustable

Functions:

- measurement analogue input 1
- measurement analogue input 2
- process variable
- setpoint
- setpoint output for slave controller
(cascade control)
- controller analogue output 1
- controller analogue output 2

Logic network variables

Output cycle: controlled by event,
but at least every 6sec

Functions:

- limit comparator output
- monitoring the analogue inputs
- monitoring function for the
network inputs (combined alarm)

Controller structures

Controller type	Controller structure
1-setpoint controller	P, I, PI, PD, PID
2-setpoint controller	P, I, PI, PD, PID
Proportional controller.	P, I, PI, PD, PID
Modulating controller	PI, PID
Proportional control- ler with integral actuator driver	P, I, PI, PD, PID

General data

Environmental conditions to EN 61 010

Operating and ambient temperature:

0 – 55 °C

Permitted storage temperature:

–40 to +70 °C

Relative humidity: rH 80 % max.

Pollution degree 2

Overvoltage category 2

Housing

Material: plastic,
self-extinguishing

Flammability Class: UL 94 VO

Protection: IP20 (to EN 60 529)

Mounting: on standard rail

Supply

110 – 240 V AC, +10/–15%, 48 – 63 Hz,

or 20 – 53 V AC/DC, 48 – 63 Hz

Power consumption: 5 VA max.

Network (LON interface)

Transceiver: free topology FTT-10A

Topology: ring, star, line or
mixed structure

Baud rate: 78 kbaud

Max. lead length (depending on lead type):

line: 2700m

star: 500m

ring: 500m

mixed: 500m

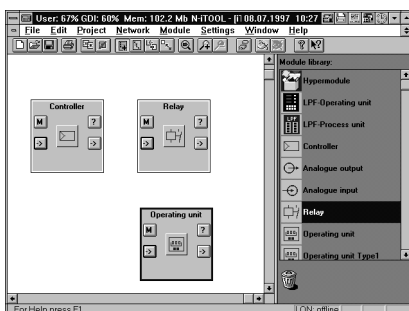
Max. number of modules: 64

Operation and project design

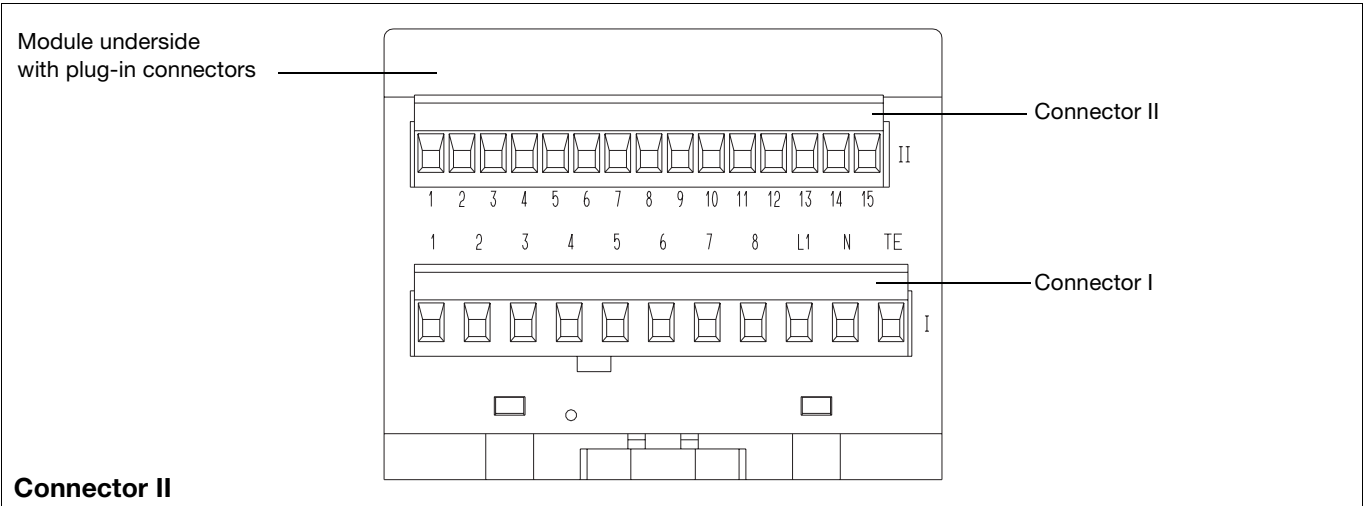
Operation, parameter setting and configuration of JUMO mTRON modules can be carried out from the JUMO mTRON operating unit.

The JUMO mTRON-iTOOL project design software permits convenient design and start-up of a JUMO mTRON system.

The projects can be archived and documented. Individual modules are linked via LON by assigning network variable (NV) names.



Connection diagram

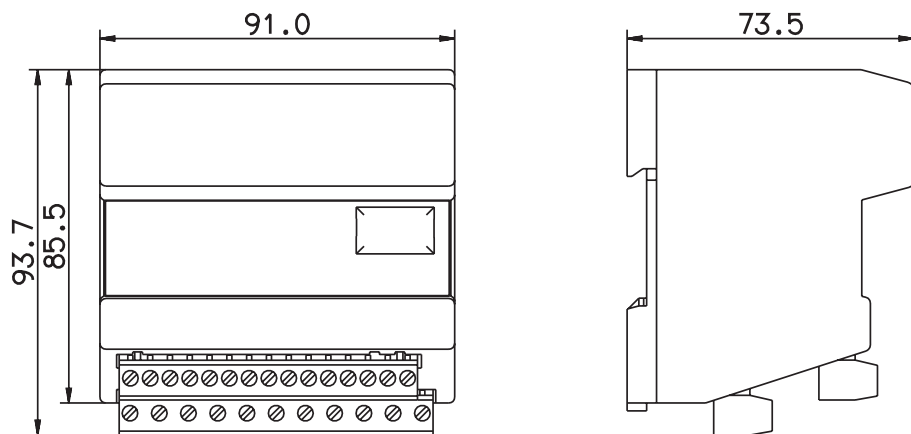


Connection for	Terminals		Notes	Diagram
Analogue inputs	Input 1	Input 2		
Thermocouple	II_8+ II_7-	II_12+ II_11-		
Resistance thermometer in 3-wire circuit	II_8 II_6 II_7	II_12 II_10 II_11		
Resistance thermometer in 2-wire circuit	II_6 II_8 II_7	II_10 II_12 II_11	$R_A = R_{lead}$	
Potentiometer	II_6 II_8 II_7	II_10 II_12 II_11	E=end S=slider A=start	
Voltage input -50 to +50mV	II_8+ II_7-	II_12+ II_11-		
Voltage input -1 to + 1V -10 to +10V	II_5+ II_7-	II_9+ II_11-		
Current input 0 — 20mA	II_8+ II_7-	II_12+ II_11-		
AC current input 0 — 50mA	II_8 II_7	II_12 II_11		
Logic inputs floating contact	II_1 II_2	II_1 II_3		
LON interface	II_13 = TE		screen	
	II_14 = Net_A II_15 = Net_B		any polarity	
Technical earth	II_4			

Connector I

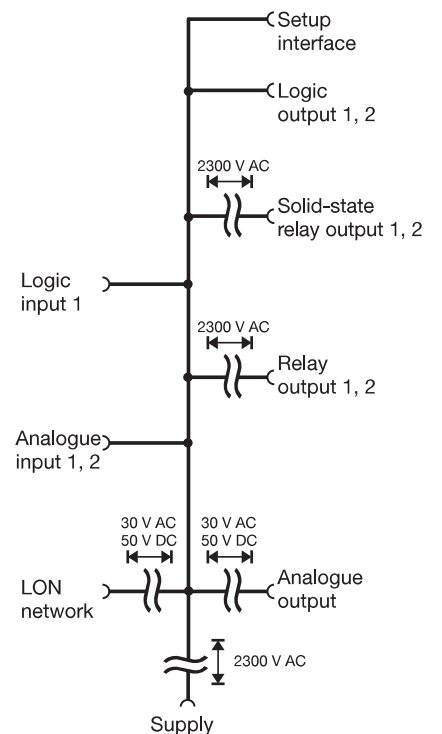
Connection for	Terminals			Notes	Diagram
	Output 1	Output 2	Output 3		
Relay output 3A 250VAC, resistive load	I_3 I_4 I_5	I_6 I_7 I_8		O=n.c.(break) P=common S=n.o. (make)	
Logic output 12V 20mA	I_5+ I_4-	I_8+ I_7-			
Solid-state relay output 250V 1A	I_4 I_5	I_7 I_8			
Analogue output 0 – 10V/ 2 – 10V 0 – 20mA/ 4 – 20mA			I_1 – I_2 +		
Supply as label	AC	DC			
	I_L1 line I_N neutral I_TE technical earth	I_L1 } any I_N } polarity I_TE technical earth			

Dimensions



mm	inch
73.5	2.89
85.5	3.37
91.0	3.58
93.7	3.69

Isolation



Ordering details

704010/0- **(1)** - **(2)** - **(3)**

(1) Inputs

Standard version **888**

Measurement input	Inputs	
	1	2
Pt 100 resistance thermometer	X	X
Thermocouples Fe-Con L Fe-Con J NiCr-Ni K Cu-Con U Cu-Con T NiCrSi-NiSi N Pt10Rh-Pt S Pt13Rh-Pt R Pt30Rh-Pt6Rh B		
Standard signals 0 – 50 mV 10 – 50 mV -50 to +50 mV 0 – 1 V 0.2 – 1 V -1 to +1 V 0 – 10 V 2 – 10 V -10 to +10 V 0 – 20 mA 4 – 20 mA -20 to +20 mA		
AC current 0 – 50mA		
Resistance 0 – 400Ω		
Potentiometer 0.1 – 10KΩ		

Special version **999**

Factory configured to customer specification.
Please specify inputs in plain language.

(2) Outputs

Outputs	Code
2 relays (changeover) and 1 analogue output ¹ (selectable)	302
2 logic outputs 12V 20mA and 1 analogue output ¹ (selectable)	304
2 solid-state relay outputs 250V 1A and 1 analogue output ¹	305

1. analogue outputs:

0 – 10V

2 – 10V

0 – 20mA

X

4 – 20mA

Special version **999**

Factory configured to customer specification.
Please specify outputs in plain language.

X = factory-set, freely programmable

(3) Supply

Type	Code
110 – 240V AC +10/-15%, 48 – 63Hz	23
20 – 53V AC/DC, 48 – 63Hz	22

Standard accessory

1 Installation Instructions M 70.4010

Accessories

PC interface

with TTL/RS232C converter

for connecting the module to a PC;
length 2m.

Sales No. 70/00301315

Project design software

JUMO mTRON-iTOOL

Using the JUMO mTRON- iTOOL project design software the modules can be designed graphically on the PC. The user is able to link modules of the JUMO mTRON family and to configure the application-specific parameters.

System Manual JUMO mTRON

Documentation of configuration, parameter setting and installation of the modules.

Sales No. 70/00334336

JUMO mTRON modules

Controller module

Data Sheet 70.4010

Relay module

Data Sheet 70.4015

Analogue input module

Data Sheet 70.4020

Analogue output module

Data Sheet 70.4025

Logic module

Data Sheet 70.4030

Operating unit

Data Sheet 70.4035

Communication module

Data Sheet 70.4040

Project design software

JUMO mTRON-iTOOL

Data Sheet 70.4090

JUMO
mTRON
Relay module



Brief description

The unit is a module of the JUMO mTRON control and automation system. The plastic housing measures 91 mm x 85.5 mm x 73.5 mm (W x H x D) and is mounted on a standard rail.

In addition to direct operation through logic network variables there is a facility for limit comparator functions with delays and latching. The module can also convert analogue operating signals into quasi-analogue pulse trains for operating output devices. Functions such as pulse width modulation, pulse frequency modulation and actuator driver are provided.

The module has a total of 4 switching outputs (relay, logic or solid-state relay output) which can be operated via the LON¹ bus.

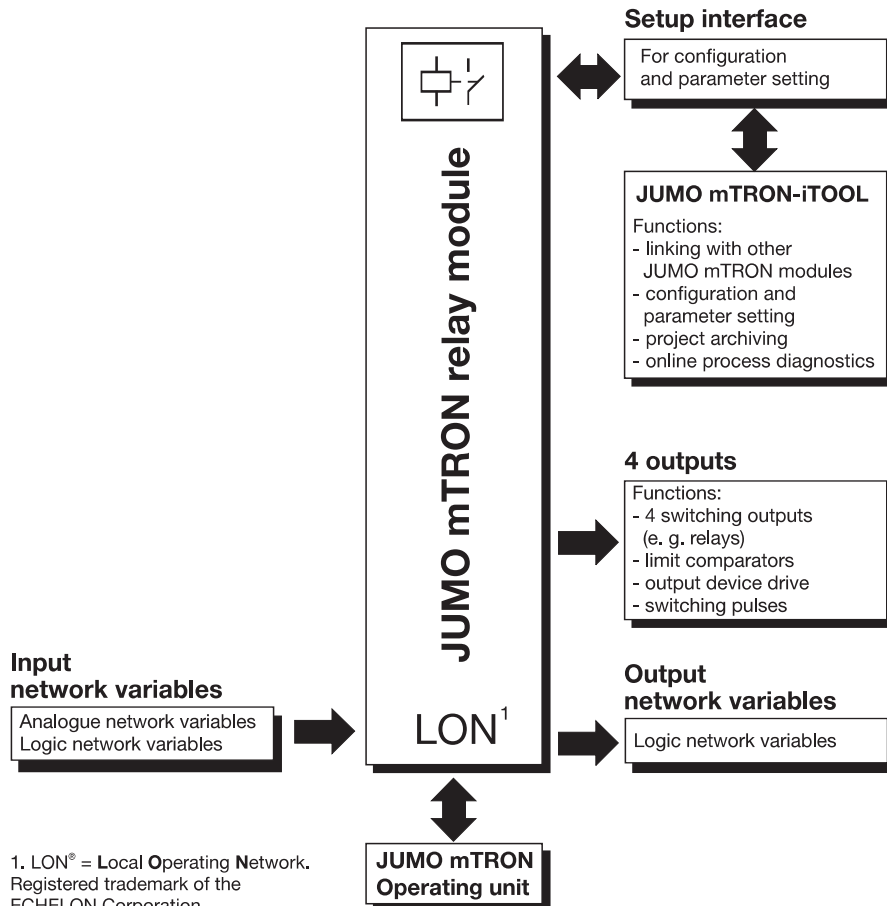
The module incorporates a network connection for communication and data interchange between the modules. A screened twisted pair is used as transmission line.

There is a setup interface for module parameter setting and configuration from a PC under the JUMO mTRON-iTOOL project design software. The electrical connections are made through plug-in connectors with screw terminals.



Type 704015/0-...

Block structure

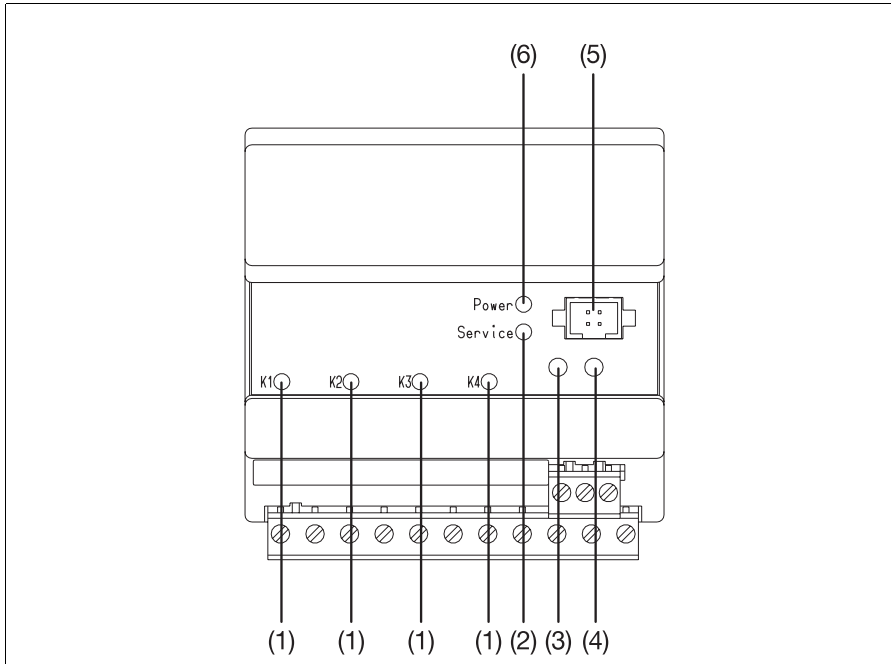


1. LON[®] = Local Operating Network. Registered trademark of the ECHELON Corporation.

Features

- **Limit comparators**
Comparator and window functions, direct or reversed, with switch-on and switch-off delay, also latching and gate circuit
- **Pulse width modulation**
PD controller converting the analogue control signals into switching pulses for operating contactors and solenoid valves
- **Pulse frequency modulation**
This function converts analogue control signals into switching pulses for operating dosing pumps, for example
- **Actuator driver**
Controller for operating actuating motors with position retransmission
- **Setup interface**
For configuration and setting of parameters the module is linked to a PC via a PC interface
- **Plug & Play function**
Problem-free replacement of modules without re-configuration

Displays and controls



(1)	Status LED, yellow for the logic outputs K1 to K4; lights up when relay is energised or logic output is activated	(4)	Installation key the module reports to the JUMO mTRON-iTOOL project design software or operating unit
(2)	Service LED, red – lights up on operating fault – flashes when the mechanical connection to the module from JUMO mTRON-iTOOL or the operating unit is being checked by a test signal (“wink”) – long flashing pulses (3 sec on/1sec off) when a Plug & Play fault occurs	(5)	Setup interface for the PC interface line which links the module to the PC
(3)	Switch for the termination resistance of the LON network	(6)	Power LED, green lights up when the supply is switched on

Technical data

Hardware outputs

Functions:

- direct relay outputs
- limit comparator output
- actuator driver outputs
- pulse width outputs
- pulse frequency outputs

Relay outputs

Type: n.o. (make) contact

Nominal voltage: 250V

Nominal current: 3A

Rating: 3A, 250V AC, resistive load

Life: $5 \cdot 10^5$ operations

on resistive load

Contact material: AgCdO

(hard gold plated)

Minimum load: 10mA 5V DC

Solid-state relay output

Type: 1A 250V AC

Logic output

Type: 0/12V

Internal resistance: 600Ω

Input network variables

Analogue network variables

Functions:

- input variables
for the limit comparators,
pulse width modulation,
pulse frequency modulation and
actuator driver

Sampling time

210msec

Logic network variables

Functions:

- direct relay operation
- gate circuit for the limit comparators
- latch reset
- actuator driver switch-off

Output network variables

Logic network variables

Output cycle: controlled by event,
but at least every 6.3sec

Functions:

- monitoring function for the
network inputs (combined alarm)
- output of the relay states

General data

Environmental conditions to EN 61 010

Operating and ambient temperature:

0 – 55 °C

Permitted storage temperature:

–40 to+70 °C

Relative humidity: rH 80 % max.

Pollution degree 2

Overvoltage category 2

Housing

Material: plastic, self-extinguishing

Flammability Class: UL 94 VO

Protection: IP20 (to EN 60 529)

Mounting: on standard rail

Supply

110 – 240V AC +10/–15%, 48 – 63Hz,

or 20 – 53V AC/DC, 48 – 63Hz

Power consumption: 5 VA max.

Network (LON interface)

Transceiver: free topology FTT-10A

Topology: ring, star, line or mixed
structure

Baud rate: 78 kbaud

Max. lead length (depending on lead type):

line: 2700 m

star: 500 m

ring: 500 m

mixed: 500m

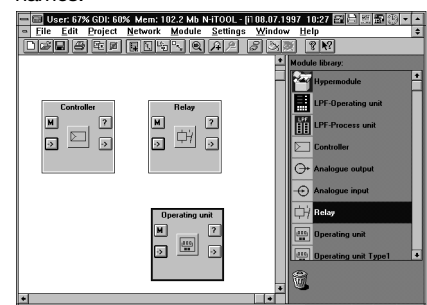
Max. number of modules: 64

Operation and project design

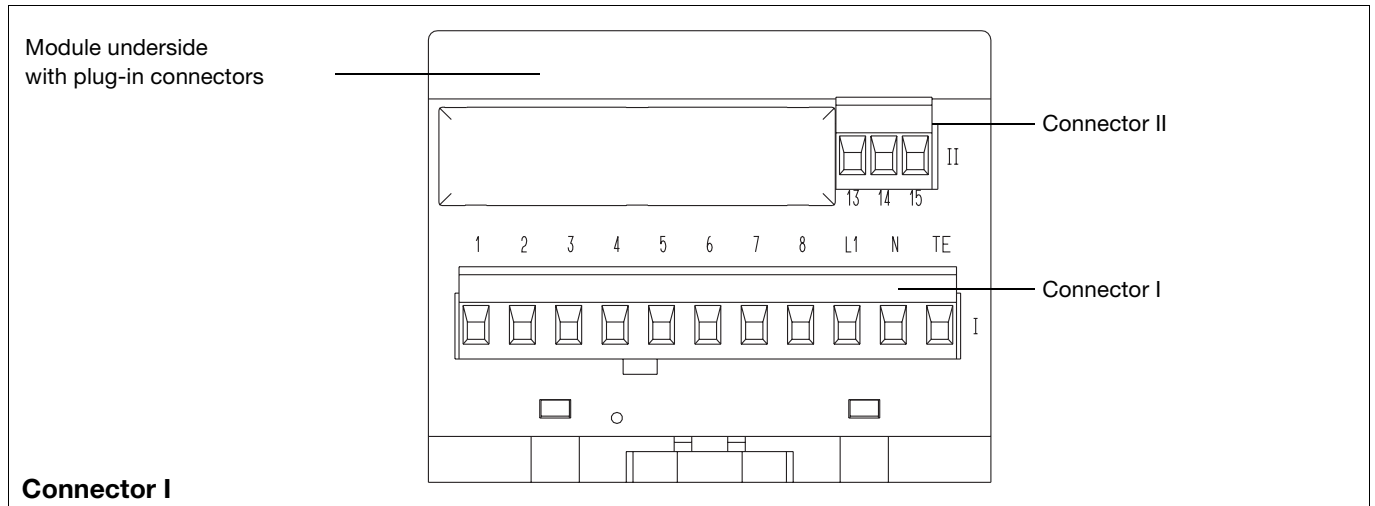
Operation, parameter setting and configuration of JUMO mTRON modules can be carried out from the JUMO mTRON operating unit.

The JUMO mTRON-iTOOL project design software permits convenient design and start-up of a JUMO mTRON system.

The projects can be archived and documented. Individual modules are linked via LON by assigning network variable (NV) names.



Connection diagram



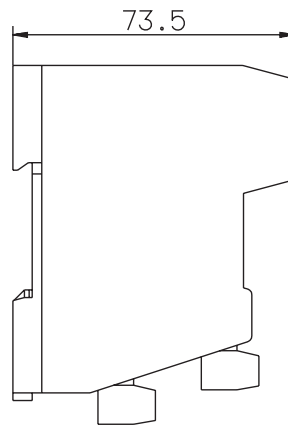
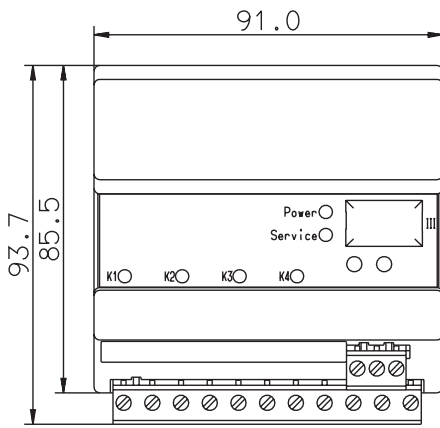
Connector I

Connection for	Terminals				Notes	Diagram
Outputs	Output 1	Output 2	Output 3	Output 4		
Relay 3A, 250V AC, resistive load	I_1 I_2	I_3 I_4	I_5 I_6	I_7 I_8	P = common S = n.o. (make)	
Logic output 12V 20mA	I_1 I_2	I_3 I_4	I_5 I_6	I_7 I_8	- +	
Solid-state relay output 250V 1A	I_1 I_2	I_3 I_4	I_5 I_6	I_7 I_8		
Supply as label	AC		DC			
	I_L1 line I_N neutral		I_L1 } any I_N } polarity			
	I_TE technical earth		I_TE technical earth			

Connector II

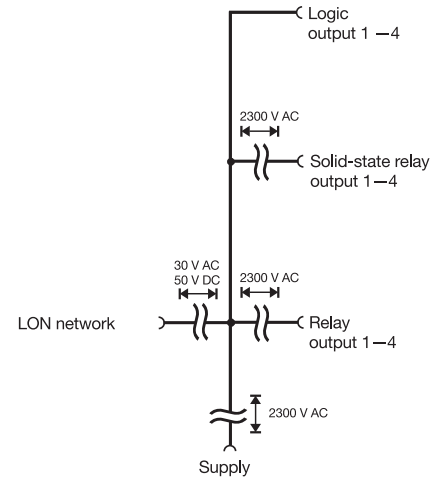
Connection for	Terminals	Notes	Diagram
LON interface	II_13 = TE	screen	
	II_14 = Net_A II_15 = Net_B	any polarity	

Dimensions



mm	inch
73.5	2.89
85.5	3.37
91.0	3.58
93.7	3.69

Isolation



Ordering details

704015/0- (1) (2) ... - ..

(1) Outputs

Standard version

Outputs	Code
4 relays (n.o.make)	154
4 logic outputs 12V 20mA	165
4 solid-state relay outputs 250V 1A	170

Special version 999

Factory-configured to customer specification. Please specify type of outputs in plain language.

(2) Supply

Type	Code
110 – 240V AC +10/-15%, 48 – 63Hz	23
20 – 53V AC/DC, 48 – 63Hz	22

Standard accessory

1 Installation Instructions M 70.4015

Accessories

PC interface with TTL/RS232C converter

for connecting the module to a PC, length 2m.

Sales No. 70/00301315

Project design software

JUMO mTRON-iTOOL

Using the JUMO mTRON-iTOOL project design software the modules can be designed graphically on the PC. The user is able to link modules of the JUMO mTRON family and to configure the application-specific parameters.

System Manual JUMO mTRON

Documentation of configuration, parameter setting and installation of the modules.

Sales No. 70/00334336

JUMO mTRON modules

Controller module

Data Sheet 70.4010

Relay module

Data Sheet 70.4015

Analogue input module

Data Sheet 70.4020

Analogue output module

Data Sheet 70.4025

Logic module

Data Sheet 70.4030

Operating unit

Data Sheet 70.4035

Communication module

Data Sheet 70.4040

Project design software

JUMO mTRON-iTOOL

Data Sheet 70.4090

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Analog input module

Brief description

The unit is a module of the JUMO mTRON control and automation system. The plastic housing measures 91 mm x 85.5 mm x 73.5 mm (W x H x D) and is mounted on a standard rail.

The module has four universal analog measurement inputs which can be monitored against adjustable limit values, one logic input, one counter input, one math function and a customized linearization which can be used for capturing and processing the measurement. There is also a selectable comparator function with switch-on and switch-off delay, as well as latching and gate circuit.

The analog input module incorporates a network connection for communication and data interchange between the modules. Numerous process and status signals can be exchanged with other units via the network.

A screened twisted pair is used as transmission line.

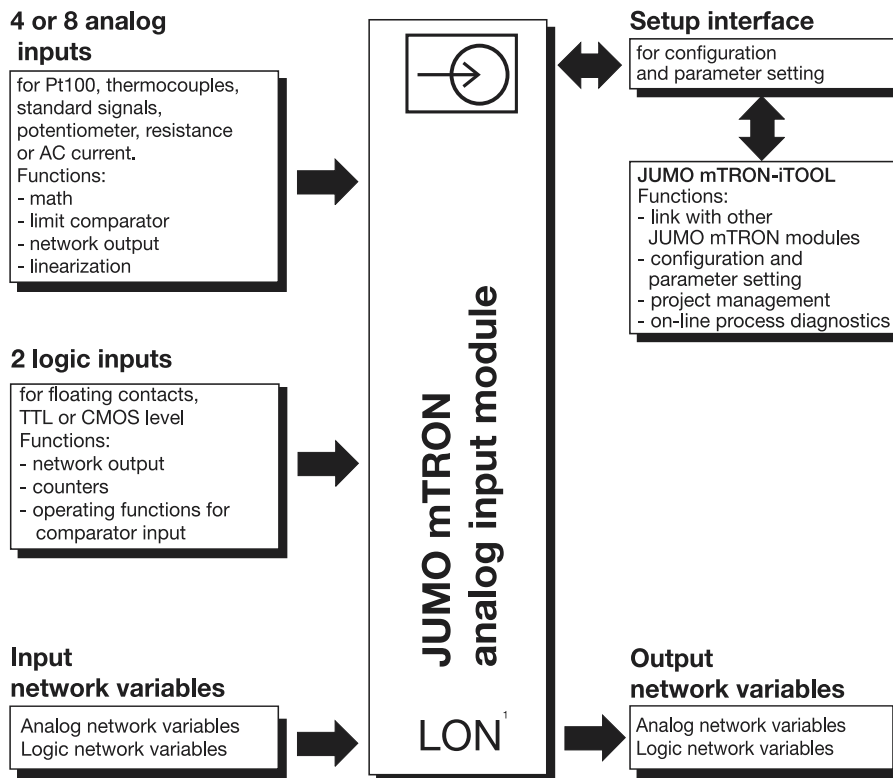
There is a setup interface for module parameter setting and configuration from a PC under the JUMO mTRON-iTOOL project design software.

The electrical connections are made through plug-in connectors with screw terminals.



Type 704020/...

Block structure



1. LON¹ = Local Operating Network.
 Registered trademark of the
 ECHELON Corporation.

Features

- **Math functions**
 Difference, humidity, ratio, square root, square, minimum, maximum, absolute value, sum, product, mean value
- **Limit comparator**
 Comparator and window functions, direct or reversed, with switch-on and switch-off delay, also latching and gate circuit
- **Customized linearization**
 Linearization function with up to 21 calibration points
- **Range monitoring**
 The analog inputs are monitored against definable limit values
- **Setup interface**
 For configuration and parameter setting the module is linked to a PC via a PC interface
- **Plug-&-Play-Function**
 Problem-free replacement of modules without re-configuration

Technical data

Hardware inputs

Analog inputs

Measurement input

- resistance thermometer
- thermocouples
- standard signals (current/voltage)
- AC current (50/60Hz sinusoidal)
- resistance
- potentiometer

Sampling time

420 msec for all inputs

Functions

- network output
- math function
- customized linearization
- limit comparator

Logic input

activation: floating contact, TTL or CMOS level

Functions:

- network output
- operating input for the comparator function

Frequency input

activation: floating contact, TTL or CMOS level
 maximum counting rate: 15kHz

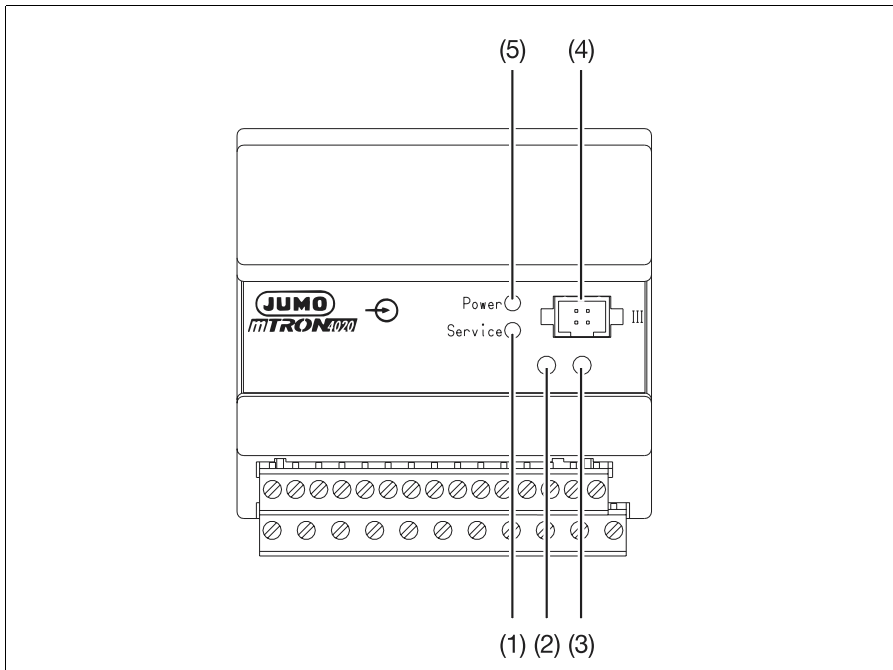
Note: The quoted measurement accuracy is only valid if all analog inputs have sensors connected. Unused analog inputs must be shorted by a wire jumper.

Sensor	Measurement range ¹	Internal resistance/voltage drop	Meas. circuit monitoring		Resolution	Measurement accuracy	
			Recognition of sensor break	Recognition of sensor short-circuit		Maximum measurement error ¹ at 23°C	Ambient temperature drift per 10°C
Pt100	-200 to +850°C (-200 to +850°C)		X	X	0.025°C	± 0.4°C	± 0.21°C
Fe-Con L	-200 to +900°C (-200 to +900°C)	47MΩ	X	-	0.05°C	± 1.8°C	± 0.9°C
Fe-Con J	-200 to +1200°C (-100 to +1200°C)	47MΩ	X	-	0.05°C	± 1.8°C	± 1.2°C
NiCr-Ni K	-200 to +1372°C (-100 to +1372°C)	47MΩ	X	-	0.07°C	± 1.9°C	± 1.4°C
Cu-Con U	-200 to +600°C (-100 to +600°C)	47MΩ	X	-	0.07°C	± 1.7°C	± 0.6°C
Cu-Con T	-200 to +400°C (-200 to +400°C)	47MΩ	X	-	0.07°C	± 1.6°C	± 0.4°C
NiCrSi-NiSi N	-100 to +1300°C (-100 to +1300°C)	47MΩ	X	-	0.07°C	± 2.3°C	± 1.3°C
Pt10Rh-Pt S	0 – 1768°C (100 – 1768°C)	47MΩ	X	-	0.3°C	± 3.4°C	± 1.7°C
Pt13Rh-Pt R	0 – 1768°C (100 – 1768°C)	47MΩ	X	-	0.25°C	± 3.4°C	± 1.7°C
Pt30Rh-Pt6Rh B	0 – 1820°C (400 – 1820°C)	47MΩ	X	-	0.3°C	± 4.4°C	± 1.4°C
Standard signals	-50 to +50mV	47MΩ	X	-	2.5µV	± 0.04mV	± 0.05mV
Standard signals	0 – 50mV	47MΩ	X	-	2.5µV	± 0.04mV	± 0.05mV
Standard signals	10 – 50mV	47MΩ	X	X	2.5µV	± 0.04mV	± 0.05mV
Standard signals	-10 to +10V	2MΩ	-	-	500µV	± 8mV	± 15mV
Standard signals	0 – 10V	2MΩ	-	-	500µV	± 8mV	± 15mV
Standard signals	2 – 10V	2MΩ	X	X	500µV	± 8mV	± 15mV
Standard signals	-1 to +1V	2MΩ	-	-	50µV	± 0.8mV	± 1.5mV
Standard signals	0 – 1V	2MΩ	-	-	50µV	± 0.8mV	± 1.5mV
Standard signals	0.2 – 1V	2MΩ	X	X	50µV	± 0.8 mV	± 1.5mV
Standard signals	-20 to +20mA	less than 1 V	-	-	1µA	± 15µA	± 30µA
Standard signals	0 – 20mA	less than 1V	-	-	1µA	± 15µA	± 30µA
Standard signals	4 – 20mA	less than 1V	X	X	1µA	± 16µA	± 30µA
AC current	0 – 50mA	less than 1V	-	-	5µA	1mA	± 100µA
Resistance	0 – 400Ω		X	X	0.01 Ω	± 0.15Ω	±0.1Ω
Potentiometer	0.1 – 10KΩ		X (slider)	-	0.01 %	0.25 %	0.1 %

X: recognized - : not recognized

1. The accuracy given refers to the ranges given in brackets. With thermocouples, the accuracy is obtained only in the specified operating position and after an operating time of at least 1 hour.

Displays and controls



(1)	Service LED, red - lights up on operating fault - flashes when the mechanical connection to the module from JUMO mTRON- iTOOL or the operating unit is being checked by a test signal ("wink")	(4)	Setup interface for the PC interface line which links the module to the PC
(2)	Switch for the termination resistance of the LON network	(5)	Power LED, green lights up when the supply is switched on
(3)	Installation key the module reports to the JUMO mTRON-iTOOL project design software or the operating unit		

Input network variables

Analog network variables

Functions:

- math function
- customized linearization
- limit comparator

Logic network variable

Function:

- operating input for the comparator function

Output network variables

Analog network variables

Output cycle: 420 msec – 8.4sec, adjustable

Functions:

- measurement analog input 1 – 4 (8)
- output for math
- output for linearization 1 – 4 (8)

Frequency input

Output cycle: 0.8388608sec

Function:

- output of the pulses counted at fixed intervals

Logic network variables

Output cycle: event-controlled but at least every 14sec

Functions:

- limit comparator output
- output of the logic input
- monitoring of the analog inputs
- monitoring of the network inputs (combined alarm)

General data

Environmental conditions to EN 61 010

Operating and ambient temperature: 0 – 55°C

Permitted storage temperature: –40 to +70°C

Relative humidity: rH 80 % max.

Pollution degree 2

Oversvoltage category 2

Housing

Material: plastic, self-extinguishing

Flammability Class: UL 94 VO

Protection: IP20 (to EN 60 529)

Mounting: on standard rail

Supply

110 – 240V AC +10/–15%, 48 – 63Hz, or 20 – 53V AC/DC, 48 – 63Hz

Power consumption: 5 VA max.

Network (LON interface)

Topology: free topology FTT-10A (ring, star, line or mixed structure)

Baud rate: 78 kbaud

Max. lead length (depending on lead type):

line: 2700m

star: 500m

ring: 500m

mixed: 500m

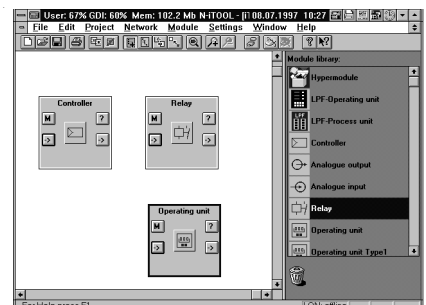
Max. number of modules: 64

Operation and project design

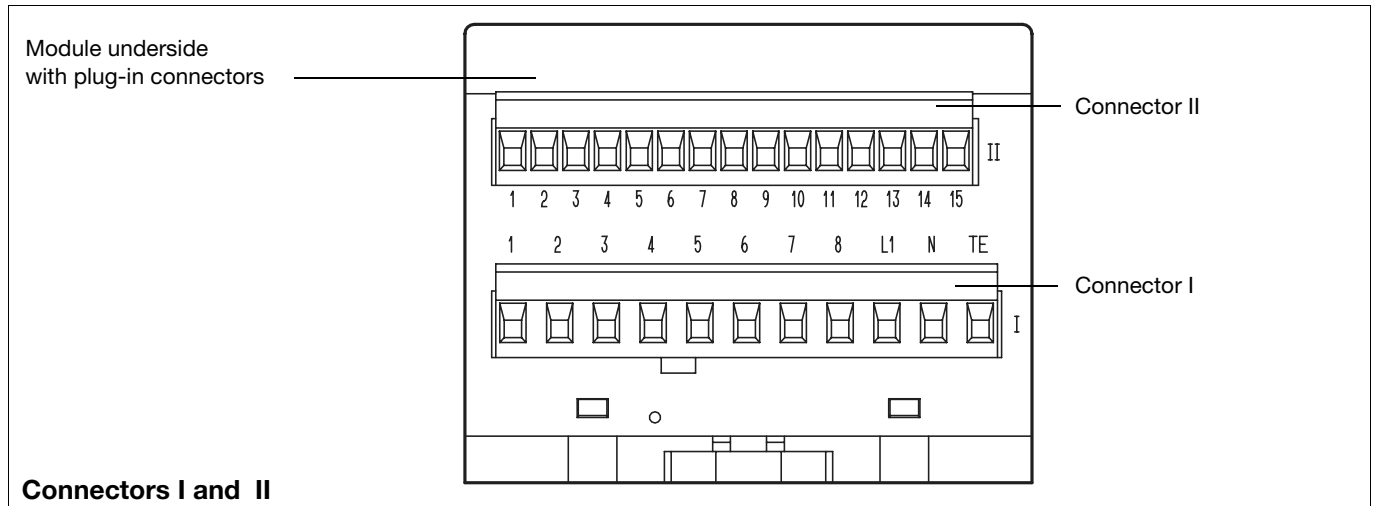
Operation, parameter setting and configuration of JUMO mTRON modules can be carried out from the JUMO mTRON operating unit.

The JUMO mTRON-iTOOL project design software permits convenient design and start-up of a JUMO mTRON system.

The projects can be archived and documented. Individual modules are linked via LON by assigning network variable (NV) names.



Connection diagram for Type 704020/0-

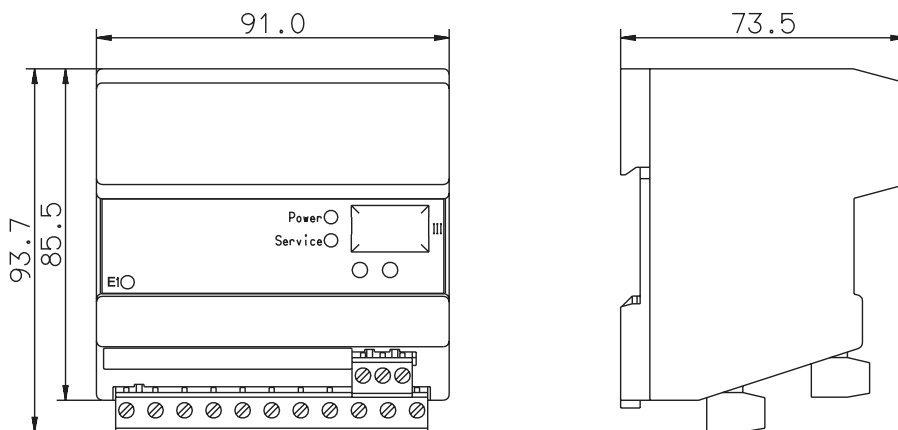


Connectors I and II

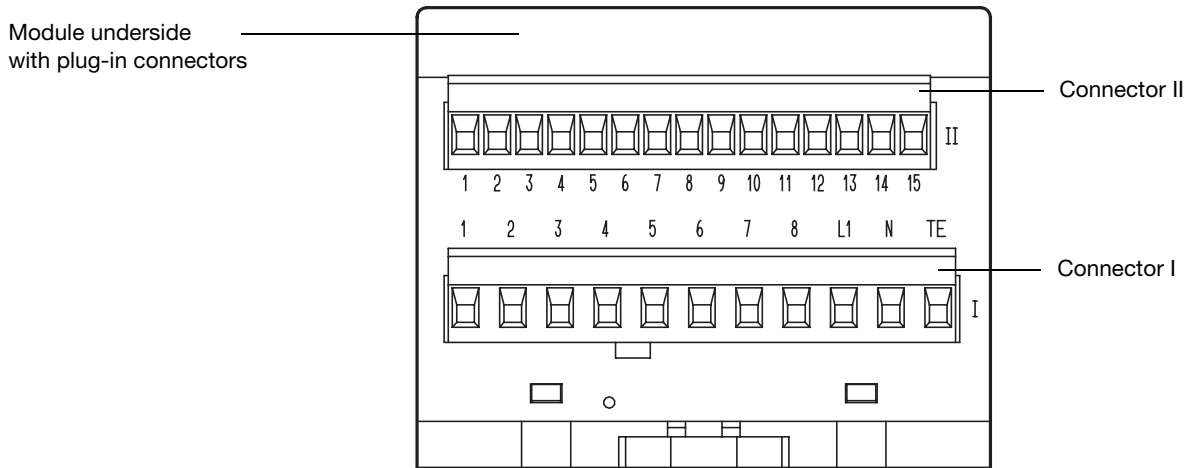
Connection for	Terminals				Notes	Diagram
	Input 1	Input 2	Input 3	Input 4		
Thermocouple	I_4+ I_3-	I_8+ I_7-	II_8 + II_7 -	II_12 + II_11 -		
Resistance thermometer in 3-wire circuit resistance 0 – 400Ω with 3-wire connection	I_4 I_2 I_3	I_8 I_6 I_7	II_8 II_6 II_7	II_12 II_10 II_11		
Resistance thermometer in 2-wire circuit resistance 0 – 400Ω with 3-wire connection	I_2 I_4 I_3	I_6 I_8 I_7	II_6 II_8 II_7	II_10 II_12 II_11	$R_A = R_{lead}$	
Potentiometer	I_2 I_4 I_3	I_6 I_8 I_7	II_6 II_8 II_7	II_10 II_12 II_11	E = end S = slider A = start	
Voltage 0 – 10mV 10 – 50mV -50 to +50mV	I_4+ I_3-	I_8+ I_7-	II_8 + II_7 -	II_12 + II_11 -		
Voltage input 0 – 1V / 0.2 – 1V -1 to +1V 0 – 10V / 2 – 10V -10 to +10V	I_1+ I_3-	I_5+ I_7-	II_5 + II_7 -	II_9 + II_11 -		
Current 0 – 20mA 4 – 20mA	I_4+ I_3-	I_8+ I_7-	II_8 + II_7 -	II_12 + II_11 -		

Connection for	Terminals				Notes	Diagram
	Input 1	Input 2	Input 3	Input 4		
Analog inputs AC current 0 – 50mA			II_7 II_8	II_11 II_12		
Logic input floating contact TTL or CMOS level	II_1 II_2					
Frequency input floating contact TTL or CMOS level	II_1 II_3					
LON interface	II_13 = TE				screen	
	II_14 = Net_A II_15 = Net_B				any polarity	
Technical earth	II_13					
Supply as label	AC		DC			
	I_L1 line I_N neutral I_TE technical earth		I_L1 } any I_N } polarity I_TE technical earth			


Dimensions



Connection diagram for Type 704020/1-



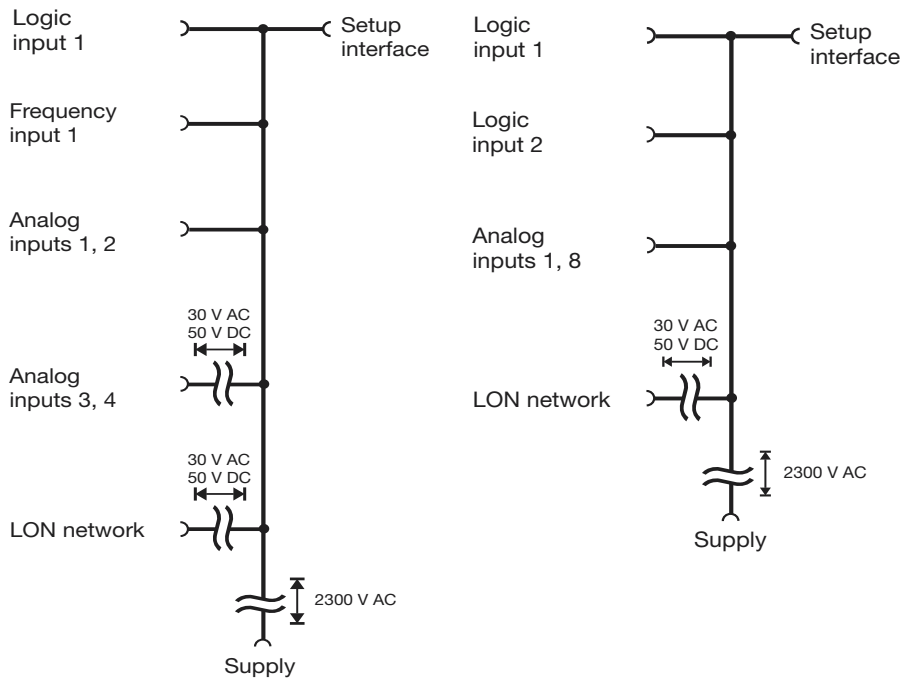
Connection for	Terminals								Diagram																
Analog inputs	1	2	3	4	5	6	7	8																	
Resistance thermometer Pt100 and Pt1000 in 2-wire circuit	I_1 I_2	I_3 I_4	I_5 I_6	I_7 I_8	II_5 II_6	II_7 II_8	II_9 II_10	II_11 II_12	<table border="0"> <tr><td>I_1</td><td>I_2</td></tr> <tr><td>I_3</td><td>I_4</td></tr> <tr><td>I_5</td><td>I_6</td></tr> <tr><td>I_7</td><td>I_8</td></tr> <tr><td>II_5</td><td>II_6</td></tr> <tr><td>II_7</td><td>II_8</td></tr> <tr><td>II_9</td><td>II_10</td></tr> <tr><td>II_11</td><td>II_12</td></tr> </table>	I_1	I_2	I_3	I_4	I_5	I_6	I_7	I_8	II_5	II_6	II_7	II_8	II_9	II_10	II_11	II_12
I_1	I_2																								
I_3	I_4																								
I_5	I_6																								
I_7	I_8																								
II_5	II_6																								
II_7	II_8																								
II_9	II_10																								
II_11	II_12																								
Voltage 0 – 10V 2 – 10V Current 0 – 20mA 4 – 20mA	I_1+ I_2-	I_3+ I_4-	I_5+ I_6-	I_7+ I_8-	II_5+ II_6-	II_7+ II_8-	II_9+ II_10-	II_11+ II_12-	<table border="0"> <tr><td>I_1</td><td>I_2</td></tr> <tr><td>I_3</td><td>I_4</td></tr> <tr><td>I_5</td><td>I_6</td></tr> <tr><td>I_7</td><td>I_8</td></tr> <tr><td>II_5</td><td>II_6</td></tr> <tr><td>II_7</td><td>II_8</td></tr> <tr><td>II_9</td><td>II_10</td></tr> <tr><td>II_11</td><td>II_12</td></tr> </table>	I_1	I_2	I_3	I_4	I_5	I_6	I_7	I_8	II_5	II_6	II_7	II_8	II_9	II_10	II_11	II_12
I_1	I_2																								
I_3	I_4																								
I_5	I_6																								
I_7	I_8																								
II_5	II_6																								
II_7	II_8																								
II_9	II_10																								
II_11	II_12																								
Logic input 1 floating contact TTL or CMOS level	II_1 II_2																								
Logic input 2 floating contact TTL or CMOS level	II_1 II_3																								

LON interface	II_13 = TE	screen	II 15 II 14 II 13 ○ ○ ○ TE
	II_14 = Net_A II_15 = Net_B	any polarity	
Technical earth	II_13		
Supply as label	AC	DC	
	I_L1 line I_N neutral I_TE technical earth	I_L1 any polarity I_N any polarity I_TE technical earth	I_L1 I_N I_TE ○ ○ ○

Isolation

Type 704020-0

Type 704020-1



Ordering details

704020/0- **(1)** - **(2)**

(1) Analog inputs

Standard version 888

Measurement input	Inputs			
	1	2	3	4
Pt100 resistance thermometer	X	X	X	X
Thermocouples Fe-Con L Fe-Con J NiCr-Ni K Cu-Con U Cu-Con T NiCrSi-NiSi N Pt10Rh-Pt S Pt13Rh-Pt R Pt30Rh-Pt6Rh B				
Standard signals 0 – 50 mV 10 – 50 mV -50 to +50 mV 0 – 1 V 0.2 – 1 V -1 to +1 V 0 – 10 V 2 – 10 V -10 to +10 V 0 – 20 mA 4 – 20 mA				
AC current 0 – 50mA				
Resistance 0 – 400Ω				
Potentiometer 0.1 – 10KΩ				

Special version 999

Factory-configured to customer specification. Please specify inputs in plain language, see table.

(2) Supply

Type	Code
110 – 240V AC +10/-15%, 48 – 63Hz	23
20 – 53V AC/DC, 48 – 63Hz	22

X = factory-set, freely programmable

Ordering details

704020/1- **(1)** - **(2)**

(1) Analog inputs

Standard version 888

Measurement input	Inputs 1 – 8
Pt100 resistance thermometer in 2-wire circuit	179
Pt1000 resistance thermometer in 2-wire circuit	180
Standard voltage signals: (switchable via JUMO mTRON-iTOOL) 0 – 10 V 2 – 10 V	181
Standard current signals: (switchable via JUMO mTRON-iTOOL) 0 – 20 mA 4 – 20 mA	182

Special version 999

(2) Supply

Type	Code
110 – 240V AC +10/-15%, 48 – 63Hz	23
20 – 53V AC/DC, 48 – 63Hz	22

Standard accessory

1 Installation instructions B 70.4020.4

Accessories

PC interface

with TTL/RS232C converter

for connecting the module to a PC; length 2m.

Sales No. 70/00301315

Project design software

JUMO mTRON-iTOOL

Using the JUMO mTRON-iTOOL project design software, the modules can be designed graphically on the PC. The user is able to link modules of the JUMO mTRON family and to configure the application-specific parameters.

System Manual JUMO mTRON

Documentation of configuration, parameter setting and installation of the modules.

Sales No. 70/00334336

JUMO mTRON modules

Controller module

Data Sheet 70.4010

Relay module

Data Sheet 70.4015

Analog input module

Data Sheet 70.4020

Analog output module

Data Sheet 70.4025

Logic module

Data Sheet 70.4030

Operating unit

Data Sheet 70.4035

Communication module

Data Sheet 70.4040

Project design software

JUMO mTRON-iTOOL

Data Sheet 70.4090

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36039 Fulda, Germany
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E-Mail: info@jumoinstruments.fsnet.co.uk

735 Fox Chase
Coatesville PA 19320, USA
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1-800-554-JUMO
Fax: 610-380-8009
E-Mail: info@JumoUSA.com
Internet: www.JumoUSA.com



Analogue output module



Brief description

The unit is a module of the JUMO mTRON control and automation system. The plastic housing measures 91 mm x 85.5 mm x 73.5 mm (W x H x D) and is mounted on a standard rail.

A logic input captures an external process status and passes it on to the LON network. The module has two isolated analogue outputs which are operated via the LON bus and whose output signals are adjustable.

The module is linked to other modules via the LON¹ interface.

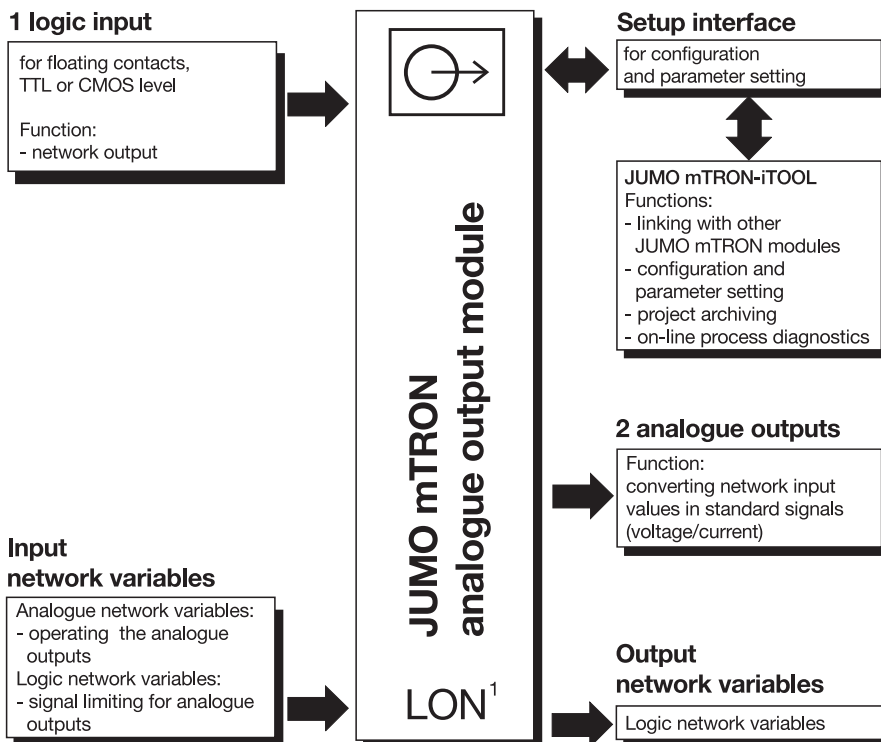
The module incorporates a network connection for communication and data interchange between the modules. A screened twisted pair is used as transmission line. There is a set-up interface for module parameter setting and configuration from a PC under the JUMO mTRON-iTOOL project design software.

The electrical connections are made through plug connectors with screw terminals.



Type 704025/0-..

Block structure

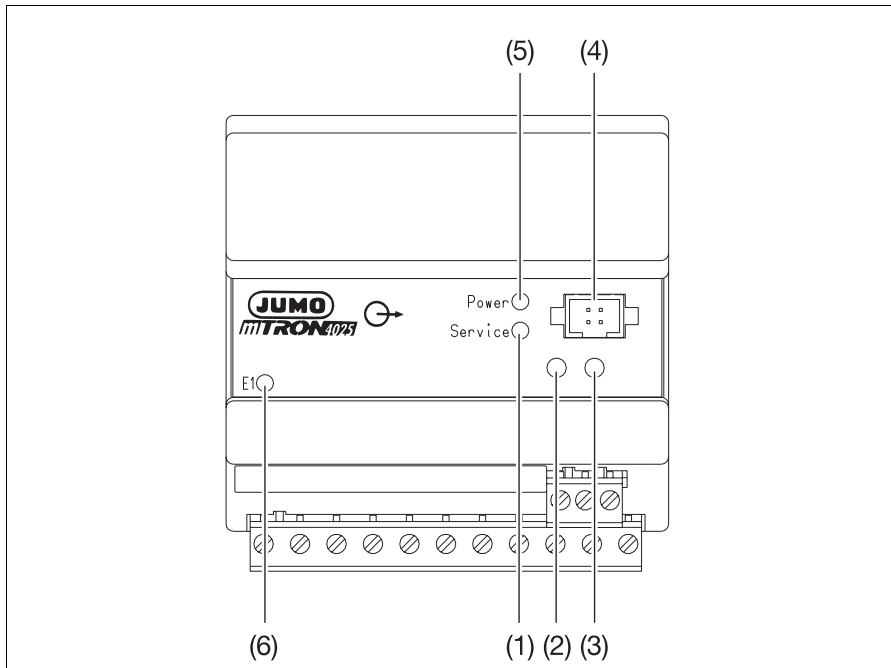


Features

- **Isolated outputs**
The analogue output module has two isolated analogue outputs (current 0 – 20mA or 4 – 20mA / voltage 0 – 10V or 2 – 10V)
- **Scaling**
The analogue network inputs can be freely scaled using two parameters
- **Limiting**
The analogue outputs can be limited through two parameters.
- **Setup interface**
For configuration and setting of parameters, the module is linked to a PC via a PC interface
- **Plug & Play function**
Problem-free replacement of modules without re-configuration

1. LON¹ = Local Operating Network.
Registered trademark of the ECHELON Corporation.

Displays and controls



(1)	Service LED, red - lights up on operating fault - flashes when the mechanical connection to the module from JUMO mTRON-iTOOL or the operating unit is being checked by a test signal ("wink")	(4)	Setup interface for the PC interface line which links the module to the PC
(2)	Switch for the termination resistance of the LON network	(5)	Power LED, green lights up when the supply is switched on
(3)	Installation key the module reports to the JUMO mTRON-iTOOL project design software or the operating unit	(6)	Logic input, yellow lights up when the floating contact at logic input E1 is closed

General data

Environmental conditions to EN 61 010
 Operating and ambient temperature: 0 – 55°C
 Permitted storage temperature: –40 to +70°C
 Relative humidity: rH 80 % max.
 Pollution degree 2
 Overvoltage category 2

Housing

Material: plastic, self-extinguishing
 Flammability Class: UL 94 VO
 Protection: IP20 (to EN 60 529)
 Mounting: on standard rail

Supply

110 – 240V AC +10/–15%, 48 – 63Hz,
 or 20 – 53V AC/DC, 48 – 63Hz
 Power consumption: 5 VA max.

Network (LON interface)

Transceiver: free topology FTT-10A
 Topology: ring, star, line or mixed structure
 Baud rate: 78 kbaud
 Max. lead length (depending on lead type):
 line: 2700 m
 star: 500 m
 ring: 500 m
 mixed: 500 m
 Max. number of modules: 64

Technical data

Hardware inputs

Sampling time:
 210msec for all inputs

Logic input

activation: floating contact
 Function:
 - capturing a process status

Hardware outputs

Analogue outputs

Signal	Load/Burden
0 – 10 V	> 500Ω
2 – 10 V	> 500Ω
0 – 20mA	< 500Ω
4 – 20mA	< 500Ω

Accuracy: 0.25 %
 Resolution: 16 bit

Function:
 - converting network input values into standard signals

Input network variables

Analogue network variables

Function:
 - operating the analogue outputs

Logic network variables

Function:
 - activating the signal limit of the analogue outputs

Output network variables

Logic network variables

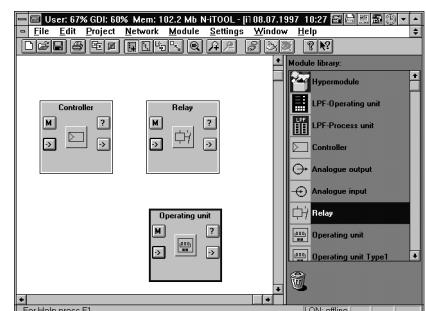
Output cycle: controlled by event, but at least every 14sec
 Function:
 - monitoring the network inputs and the range limit (combined alarm)

Operation and project design

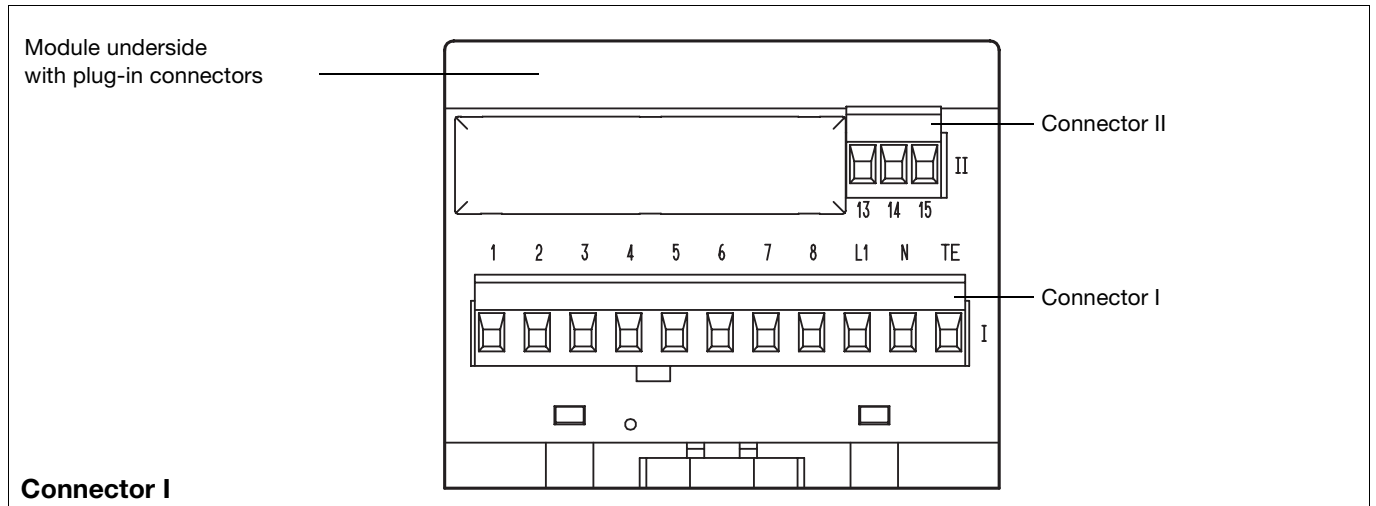
Operation, parameter setting and configuration of JUMO mTRON modules can be carried out from the JUMO mTRON operating unit.

The JUMO mTRON-iTOOL project design software permits convenient design and start-up of a JUMO mTRON system.

The projects can be archived and documented. Individual modules are linked via LON by assigning network variable (NV) names



Connection diagram



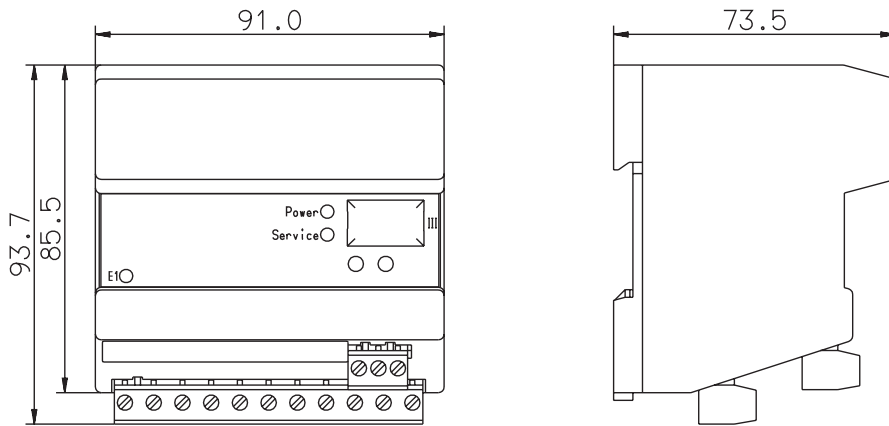
Connector I

Connection for	Terminals		Notes	Diagram
Analogue outputs	Output 1	Output 2		
0 – 10V, 2 – 10V 0 – 20mA, 4 – 20mA	I_2+ I_1-	I_4+ I_3-		
Logic input floating contact	I_5 I_6			
Supply as label	AC	DC		
	I_L1line I_Nneutral I_TEtechnical earth	I_L1ajy I_Npolarity I_TEtechnical earth		

Connector II

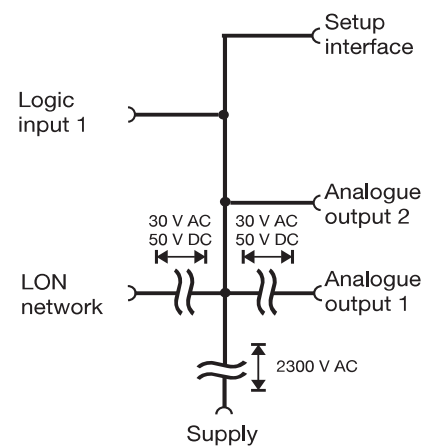
Connection for	Terminals	Notes	Diagram
LON interface	II_13 = TE	screen	
	II_14 = Net_A II_15 = Net_B	any polarity	

Dimensions



mm	inch
73.5	2.89
85.5	3.37
91.0	3.58
93.7	3.69

Isolation



Ordering details

(1)
704025/0-..

(1) Supply . .

Type	Code
110 – 240V AC +10/–15%, 48 – 63Hz	23
20 – 53V AC/DC, 48 – 63Hz	22

Standard accessory

1 Installation Instructions M 70.4025.4

Accessories

PC interface with TTL/RS232C converter

for connecting the module to a PC,
length 2m.

Sales No. 70/00301315

Project design software JUMO mTRON-iTOOL

Using the JUMO mTRON-iTOOL project design software, the modules can be designed graphically on the PC. The user is able to link modules of the JUMO mTRON family and to configure the application-specific parameters.

System Manual JUMO mTRON
Documentation of configuration, parameter setting and installation of the modules.
Sales No. 70/00334336

JUMO mTRON modules

Controller module
Data Sheet 70.4010

Relay module
Data Sheet 70.4015

Analogue input module
Data Sheet 70.4020

Analogue output module
Data Sheet 70.4025

Logic module
Data Sheet 70.4030

Operating unit
Data Sheet 70.4035

Communication module
Data Sheet 70.4040

**Project design software
JUMO mTRON-iTOOL**
Data Sheet 70.4090

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Phone (01279) 63 55 33
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USA
Jumo Process Control Inc.
735 Fox Chase
Coatesville, PA 19320
Phone 610 - 380 - 8002
800 - 554 JUMO
Fax 610 - 380 - 8009



JUMO mTRON Logic module



Brief description

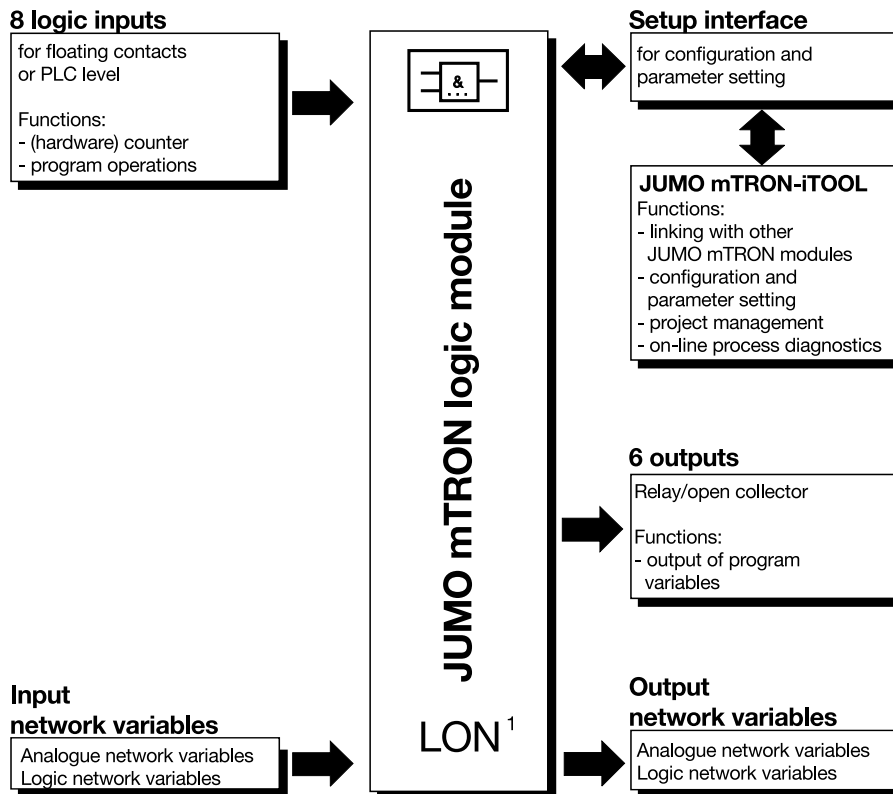
The unit is a module of the JUMO mTRON control and automation system. The plastic housing measures 91 mm x 85.5 mm x 73.5 mm (W x H x D) and is mounted on a standard rail.

The logic module processes programs which are created according to IEC 1131 Part 3 "Structured text". It permits logic, arithmetic, bit sequence, comparison and selection operations. A library contains standardised function blocks for timed operations, up/down counters, edge recognition and bistable functions. The module features eight logic inputs (floating contact or PLC level) and six relay or open-collector outputs. A network connection is available for the exchange of data. A screened twisted pair is used as a transmission line. There is a setup interface for module parameter setting and configuration from a PC under the JUMO mTRON-iTOOL project design software. The electrical connections are made through plug-in connectors with screw terminals.



Type 704030/0-...

Block structure

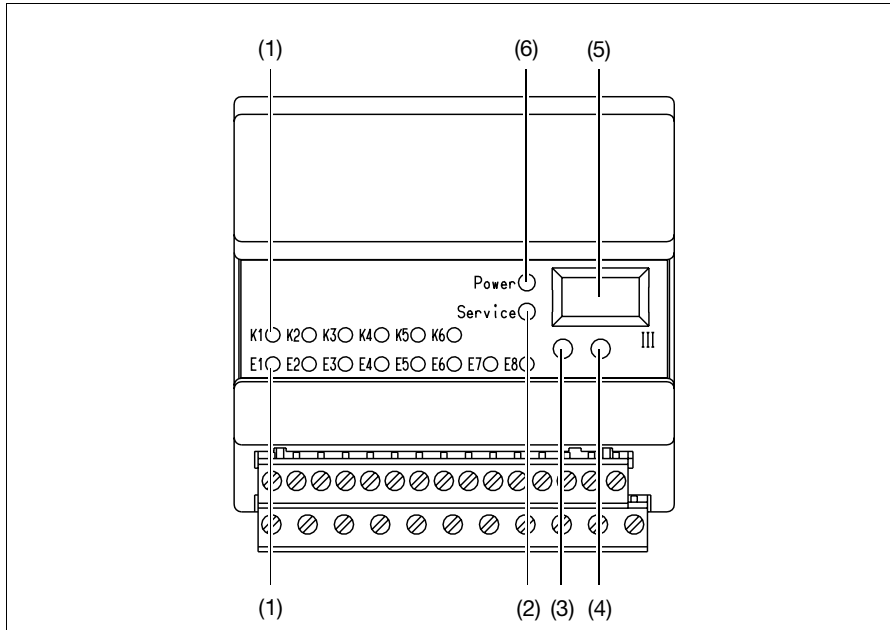


Features

- 8 logic inputs
- 6 switching outputs
- Real-time clock
- Network inputs
8 logic, 4 long, 8 real
- Network outputs
8 logic, 4 long, 8 real
combined alarm
switching status of inputs/outputs
date/time
- 2 hardware counters
for counting pulses and time
measurements via the logic inputs
- Programming through
"Structured text" to DIN 1131
- Function blocks to DIN 1131
- Debugger
for program testing
(via JUMO mTRON iTOOL)
- Setup interface
For configuration and parameter
setting, the module is linked to a PC via
a PC interface
- Plug & Play function
Problem-free replacement of modules
without re-configuration

1. LON¹ = Local Operating Network
Registered trademark of the
ECHELON Corporation

Displays and controls



(1) Status LED, yellow for the outputs K1 to K6 and the logic inputs E1 to E8, lights up if the output is active /contact is closed or voltage on the logic input	(4) Installation key the module reports to the JUMO mTRON-iTOOL project design software or the operating unit
(2) Service LED, red - lights up on operating fault - blinks when the mechanical connection to the module from the JUMO mTRON-iTOOL or the operating unit is checked by a test signal ("wink")	(5) Setup interface for the PC interface line which connects the module to the PC
(3) Switch for the termination resistance of the LON network	(6) Power LED, green lights up when the supply is switched on

Technical data

Hardware inputs

Logic inputs

Activation:

- floating contacts
- PLC level

Functions:

- (hardware) counters
- program operations

Hardware outputs

Switching outputs

Function:

- output of program variables

Relay outputs

Type: (n.o.) make

Nominal voltage: 250V

Nominal current: 3A

Rating: 3A, 250V AC, resistive load

Life: 5·10⁵ operations with resistive load

Contact material: AgCdO (hard gold plated)

Minimum load: 5V 10mA DC

8.99/00336365

Open-collector outputs

Rating: 50V 0.5A max.

short-circuit proof

Input

network variables

Analogue network variables

- 8 variables "real" type
- 4 variables "long" type

Logic network variables

- 8 variables "bool" type

Output

network variables

Analogue network variables

Output cycle: 420msec

- 8 variables "real" type

Logic network variables

Output cycle: event-controlled every 105 msec, but at least every 6sec

- 8 variables "bool" type

Further network variables

Output cycle: 420 msec

- 4 variables "long" type
- date and time
- combined alarm
- switching status of the inputs
- switching status of the outputs

General data

Environmental conditions to EN 61 010

Operating and ambient temperature:

0 – 55°C

Permitted storage temperature:

-40 to +70°C

Relative humidity: rH 80% max.

Pollution degree 2

Overvoltage category 2

Housing

Material: plastic, self-extinguishing

Flammability Class: UL 94 V0

Protection: IP20 (to EN 60 529)

Mounting: on a standard rail

Supply

110 – 240V AC +10/-15%, 48 – 63Hz,

or 20 – 53V AC/DC, 48 – 63Hz

Power consumption: 5VA max.

Network

(LON interface)

Transceiver: free topology FTT-10A

Topology: ring, star, line or

mixed structure

Baud rate: 78 kbaud

Max. lead length

(depending on lead type):

line: 2700m

star: 500m

ring: 500m

mixed: 500m

Max. number of modules: 64

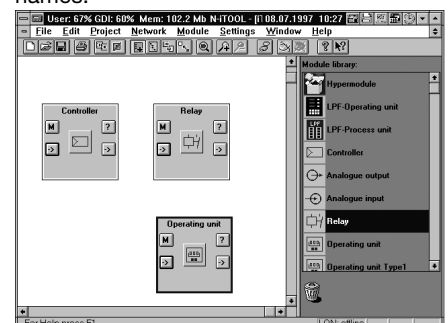
Operation

and project design

Operation, parameter setting and configuration of JUMO mTRON modules can be carried out from the JUMO mTRON operating unit.

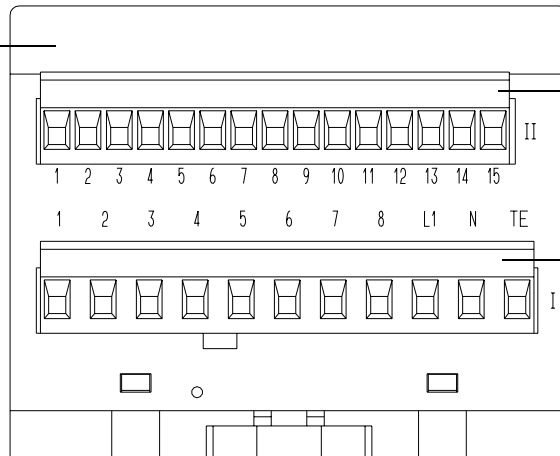
The JUMO mTRON-iTOOL project design software permits convenient design and start-up of a JUMO mTRON system.

The projects can be archived and documented. Individual modules are linked via LON by assigning network-variable (NV) names.



Connection diagram

Module underside
with plug-in connectors



Connector II

Connector I

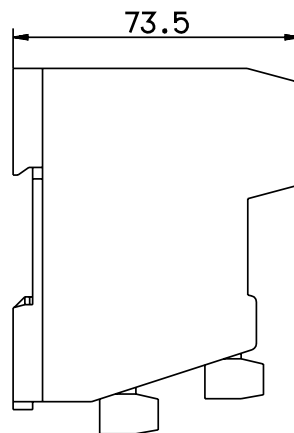
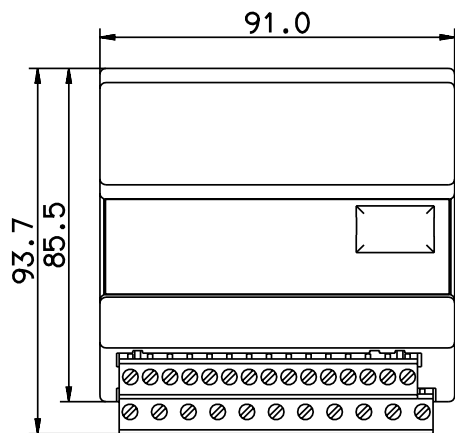
Connector II

Connection for	Terminals								Diagram
Logic inputs	E1	E2	E3	E4	E5	E6	E7	E8	
Floating contact	II_1 II_9	II_2 II_9	II_3 II_9	II_4 II_9	II_5 II_9	II_6 II_9	II_7 II_9	II_8 II_9	
Voltage -35V to 4.5V -> low 13V to 35V -> high	II_1 + II_9 -	II_2 + II_9 -	II_3 + II_9 -	II_4 + II_9 -	II_5 + II_9 -	II_6 + II_9 -	II_7 + II_9 -	II_8 + II_9 -	
The terminals II_9, II_10 and II_11 are linked internally.									
LON interface	II_13 = TE				screen				
	II_14 = Net_A				any polarity				
II_15 = Net_B									
Technical earth	II_13 II_TE								

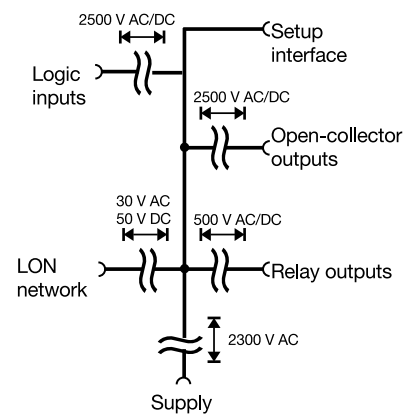
Connector I

Connection for	Terminals						Notes	Diagram
Outputs	K1	K2	K3	K4	K5	K6		
Relay output 3A, 250VAC, resistive load	I_1 I_2	I_1 I_3	I_1 I_4	I_5 I_6	I_5 I_7	I_5 I_8	P = common S = n.o. (make)	
Open-collector output 50V 0.5A max.	I_1 I_2 +	I_1 I_3 +	I_1 I_4 +	I_5 I_6 +	I_5 I_7 +	I_5 I_8 +		
	I_1 and I_5 are not linked internally!							
Supply as label	AC			DC				
	I_L1 line	I_N neutral	I_TE technical earth	I_L1 } any	I_N } polarity	I_TE technical earth		

Dimensions



Isolation



Ordering details

(1) (2) (3)
704030/0---

(1) Inputs

Inputs	Code
8 logic inputs, volt-free from the system	178
8 voltage inputs 0/24V	188

(2) Outputs

Outputs	Code
6 logic outputs (relay, n.o. make)	156
6 open-collector outputs (transistor) (available from October '98)	176

(3) Supply

Type	Code
110 — 240V AC +10/–15%, 48 — 63Hz	23
20 — 53V AC/DC, 48 — 63Hz	22

Standard accessory

1 Installation Instructions 70.4030

Accessories

**PC interface
with TTL/RS232C converter**
for connecting the module to a PC;
length 2m.
Sales No. 70/00301315

Project design software JUMO mTRON-iTOOL

Using the JUMO mTRON- iTOOL project design software, the modules can be designed graphically on the PC. The user is able to link modules of the JUMO mTRON family and to configure the application-specific parameters.

JUMO mTRON System Manual

Documentation of configuration,
parameter setting and installation of the
modules.
Sales No. 70/00334336

JUMO mTRON modules

Controller module

Data Sheet 70.4010

Relay module

Data Sheet 70.4015

Analogue input module

Data Sheet 70.4020

Analogue output module

Data Sheet 70.4025

Logic module

Data Sheet 70.4030

Operating unit

Data Sheet 70.4035

Communication module

Data Sheet 70.4040

JUMO mTRON-iTOOL project design software

Data Sheet 70.4090

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Internet: www.JumoUSA.com



Operating unit

Brief description

The operating unit is a module of the JUMO mTRON control and automation system. The housing measures 151.6 mm x 80.3 mm x 43.2 mm (W x H x D) and is suitable for flush panel mounting.

As man-machine interface the operating unit provides optimum and orderly insight into the process states and the system parameters of the JUMO mTRON automation system. It has a back-lit LC display of 2 x 20 places. Only six keys are required for operating the modules and setting their parameters. The process information to be shown on the LC display is configured graphically on a PC as process window, using the setup editor of the JUMO mTRON-iTOOL project design software. Up to 16 process windows and 16 alarm windows can be created. The arrangement of the process window and the combination of the process variables in a process window can be freely determined by the user.

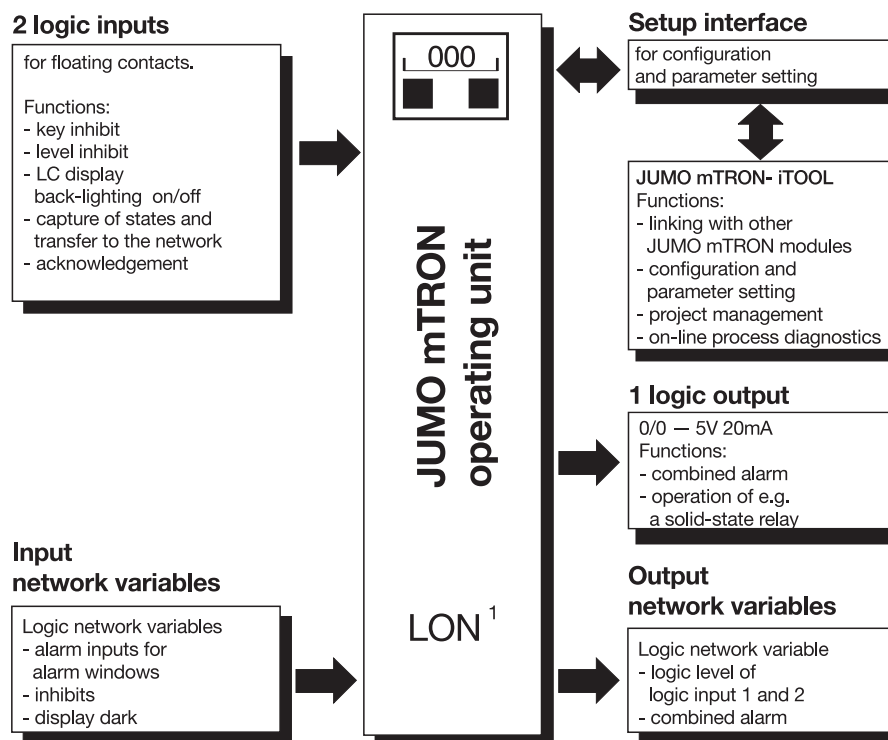
After downloading the process windows from the PC to the operating unit they appear on the LC display after pressing the key. This method of freely configuring the LC display offers process-oriented insight into the system states.

When configuring or setting parameters of a JUMO mTRON module, the appropriate instrument is selected through the operating unit. A pre-defined menu structure on the operating unit provides clear access to the functions of the module for configuration or parameter setting.



Type 704035/0-..

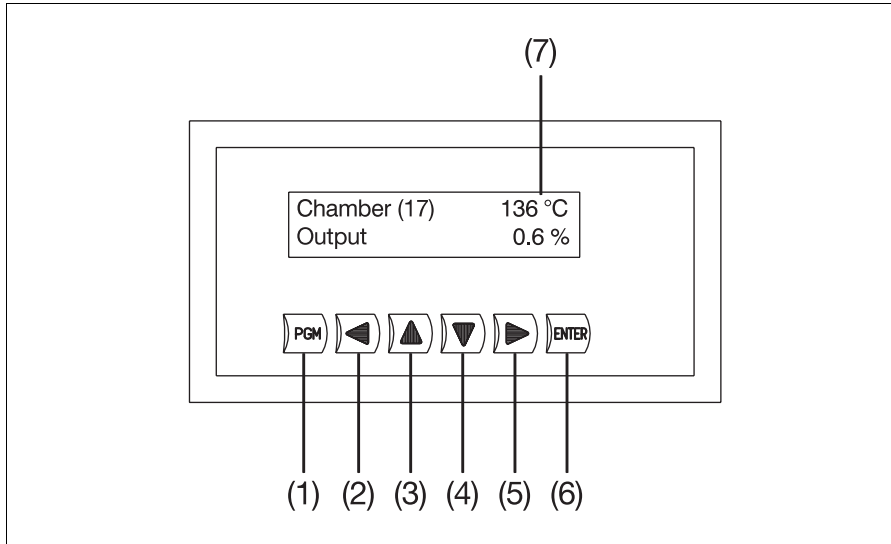
Block structure



Features

- **Operation and display** of the entire JUMO mTRON automation system through process windows
- **Configuration and parameter setting** on all modules of a JUMO mTRON automation system
- **Display** of up to 16 process-operated alarms
- **Setup interface** For configuration and parameter setting the module is linked to a PC via a PC interface
- **Plug & Play function** Problem-free replacement of modules without re-configuration

Displays and controls



(1)	PGM - key for changing from operating level to parameter level	(4)	Selection key selects backwards between different items in the ring list (decrementing)
(2)	Backwards - moves one step backwards without storing	(5)	Forwards moves one step forwards without storing
(3)	Selection key selects forwards between different items in the ring list (incrementing)	(6)	ENTER acknowledges edited values and alarms
		(7)	LC display 2 x 20 places

General data

Environmental conditions to EN 61 010

Operating and ambient temperature: 0 – 55°C
 Permitted storage temperature: –40 to +70°C
 Relative humidity: rH 80 % max.
 Pollution degree 2
 Overvoltage category 2

Housing

Front: aluminium, with front membrane
 Flammability Class: UL 94 VO
 Protection: IP65 (front), IP20 (rear)
 Installation: flush panel mounting using two brackets inserted at the sides

Supply

110 – 263V AC +10/-15%, 48 – 63Hz, or 20 – 53V AC/DC, 48 – 63Hz
 Power consumption: 10 VA max.

Network (LON interface)

Transceiver: free topology FTT-10A (ring, star, line or mixed structure)
 Baud rate: 78 kbaud
 Max. lead length (depending on lead type):
 line: 2700 m
 star: 500 m
 ring: 500 m
 mixed: 500 m
 Max. number of modules: 64

Technical data

Hardware inputs

Logic inputs

activation: floating contacts
 sampling time: 500msec for all inputs

Functions:

- key inhibit
- level inhibit
- LCD back lighting on/off
- capturing states and transferring them to the network

Hardware outputs

Logic output

logic signal: 5 V 40 mA, short-circuit proof

Function:

- operating e.g. an external solid-state relay when conditions set in software are fulfilled (e.g. alarm states)

Input network variables

Logic network variables

Functions:

- inhibiting operating levels (2)
- acknowledging alarms (1)
- setting the logic output (1) (combined alarm function, linked as logical OR)
- activating the alarm windows (16)

Output network variables

Logic network variables

Output cycle: event-controlled, but at least every 6sec

Functions:

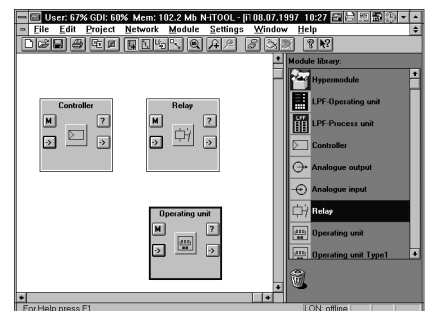
- status of the two logic inputs
- status of the combined alarm

Operation and project design

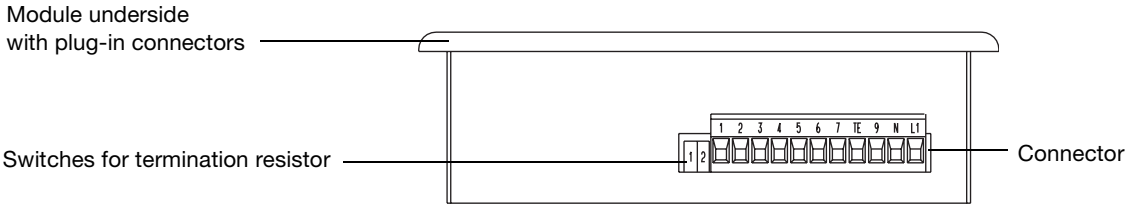
The JUMO mTRON operating unit can be used for operating, parameter setting and configuring of JUMO mTRON modules.

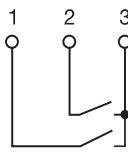
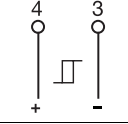
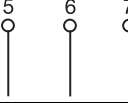
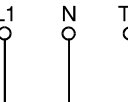
The JUMO mTRON-ITool project design software permits convenient design and start-up of a JUMO mTRON system.

The projects can be archived and documented. Individual modules are linked via LON by assigning network variable (NV) names.

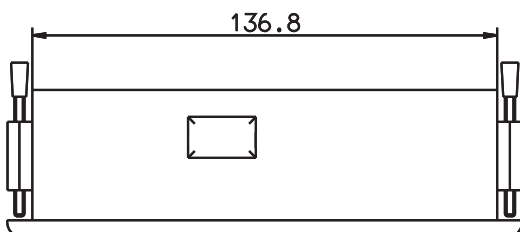
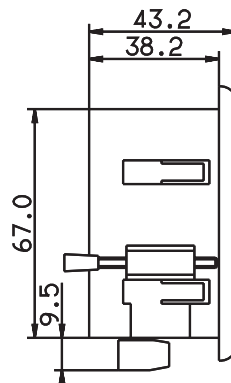
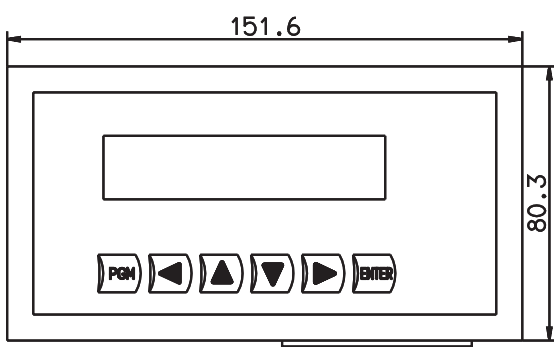


Connection diagram

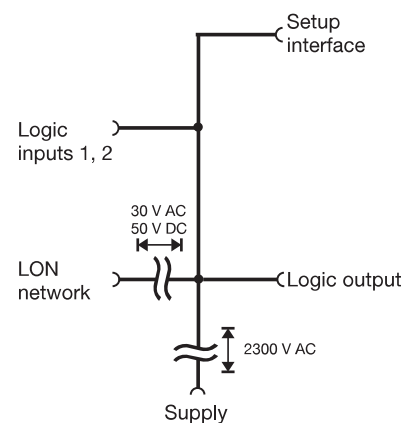


Connection for	Terminals		Notes	Diagram
Logic inputs	Input 1	Input 2		
Floating contacts	1 3	2 3		
Logic output 5V 40mA	4 + 3 -			
LON interface	7 = TE		screen	
	6 = Net_A 5 = Net_B		any polarity	
	9 = not used			
Supply as label	AC		DC	
	L1 line N neutral TE technical earth	L1 } any N } polarity TE } technical earth		

Dimensions



Isolation



Panel cut-out to DIN 43 700

138^{+1.0} mm x 68^{+0.7} mm

Ordering details

(1)
704035/0- ..

(1) Supply

Type	Code
110 – 240V AC, +10/-15%, 48 – 63Hz	23
20 – 53V AC/DC, 48 – 63Hz	22

Standard accessories

2 mounting brackets
1 Installation Instructions M 70.4035.4

Accessories

PC interface with TTL/RS232C converter

for connecting the module to a PC;
length 2m.
Sales No. 70/00301315

Project design software

JUMO mTRON-iTOOL
Using the JUMO mTRON-iTOOL project design software, the modules can be designed graphically on the PC. The user is able to link modules of the JUMO mTRON family and to configure the application-specific parameters.

System Manual JUMO mTRON

Documentation of configuration, parameter setting and installation of the modules.
Sales No. 70/00334336

JUMO mTRON modules

Controller module
Data Sheet 70.4010

Relay module
Data Sheet 70.4015

Analogue input module
Data Sheet 70.4020

Analogue output module
Data Sheet 70.4025

Logic module
Data Sheet 70.4030

Operating unit
Data Sheet 70.4035

Communication module
Data Sheet 70.4040

Project design software
JUMO mTRON-iTOOL
Data Sheet 70.4090

mm	inch
9.5	0.37
38.2	1.19
43.2	1.70
67.0	2.64
68 ^{+0.7}	2.68 ^{+0.03}
80.3	3.16
136.8	5.39
138 ^{+1.0}	5.43 ^{+0.04}
151.6	5.97

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Communication module

Brief description

This unit is a module of the JUMO mTRON control and automation system. The plastic housing measures 91 mm x 85.5 mm x 73.5 mm (W x H x D) and is mounted on a standard rail.

The module is used for communication between the JUMO mTRON modules and higher-level units with MODbus or Jbus interface. The communication module has a LON interface with FTT-10A transceiver for linking to the JUMO mTRON installation and either an RS232, RS422 or RS485 interface for data transmission under the MODbus protocol. A setup interface is provided for parameter setting and configuration of the module via a PC under the JUMO mTRON-iTOOL project design software. The electrical connection is made through plug-in screw terminals.



Type 704040/0-...

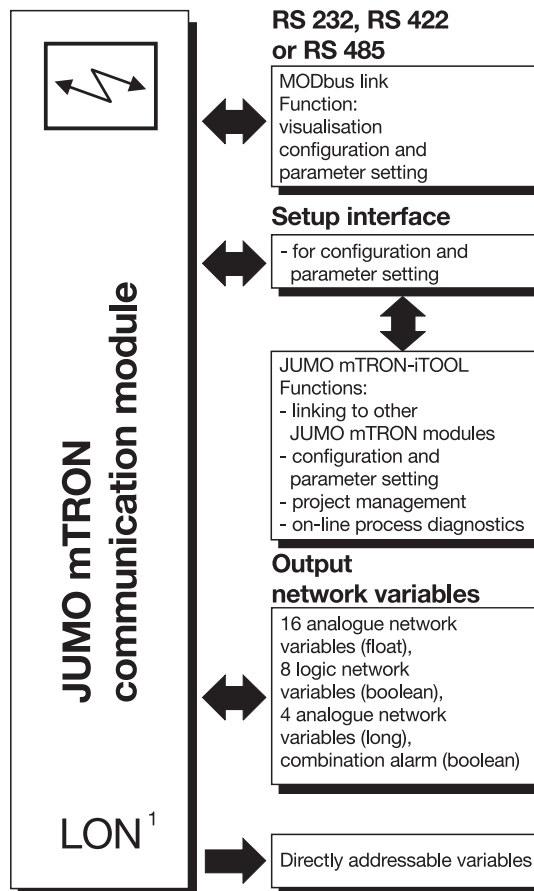
Block structure

Direct addressing

The variables of all the JUMO mTRON modules connected to the LON-bus can be addressed directly.

Input network variables

16 analogue network variables (float),
 8 logic network variables (boolean),
 4 analogue network variables (long),
 1 modem alarm (boolean)

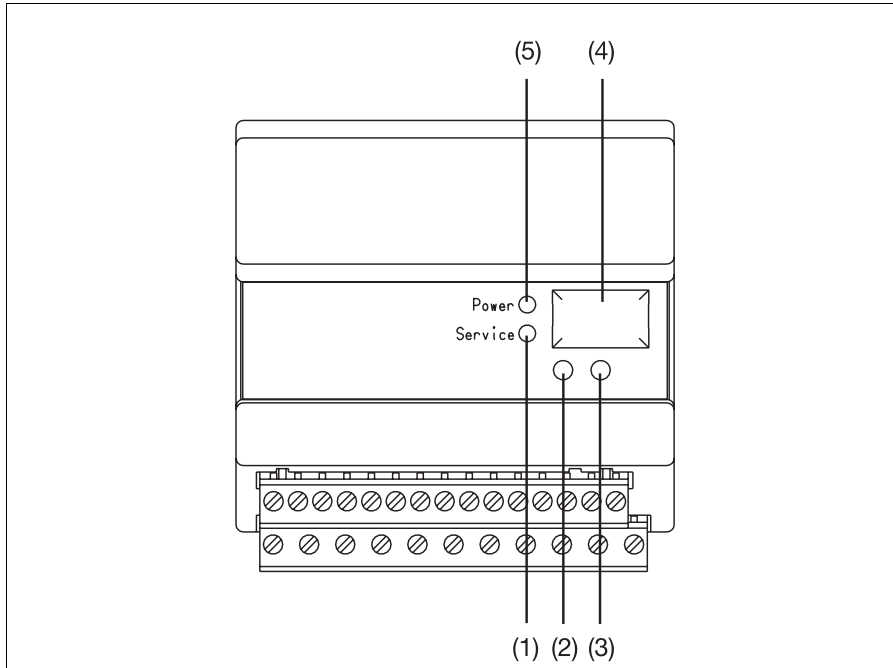


Features

- Visualisation via MODbus
- Connection to PLC via MODbus
- Configuration and parameter setting via JUMO mTRON-iTOOL project design software
- Modem operation for configuration and setting parameters of a JUMO mTRON automation system over any distance
- Several communication modules can operate in a network
- Automatic dialling of a telephone number via modem on alarm in the LON network
- Integral RS232, RS422 or RS485 interface

1. LON[®] = Local Operating Network
 Registered trademark of the
 ECHELON Corporation

Displays and controls



(1)	Service LED, red - lights up on operating fault - flashes when the mechanical connection to the module from JUMO mTRON-iTOOL or the operating unit is being checked by a test handshake signal ("wink")	(3)	Installation key the module reports to the JUMO mTRON-iTOOL project design software or the operating unit
(2)	Switch for the termination resistance of the LON network	(4)	Setup interface for the PC interface line which links the module to the PC
		(5)	Power LED, green lights up when the supply is switched on

General data

Environmental conditions to EN 61 010

- Operating and ambient temperature: 0 – 55°C
- Permitted storage temperature: -40 to +70°C
- Relative humidity: rH 80 % max.
- Pollution degree 2
- Overvoltage category 2
- Electromagnetic compatibility: EN 61 326
- interference emission: Class B
- interference immunity: to industrial requirements

Housing

- Material: plastic, self-extinguishing
- Flammability Class: UL 94 V0
- Protection: IP20 (to EN 60 529)
- Mounting: on standard rail

Supply

- 110 – 240V AC +10/-15 %, 48 – 63Hz, or 20 – 53V AC/DC, 48 – 63Hz
- Power consumption: 5VA max.

Network (LON interface)

- Transceiver: free topology FTT-10A
- Topology: ring, star, line or mixed structure
- Baud rate: 78 kbaud
- Max. lead length (depending on lead structure):
 line: 2700m
 star: 500m
 ring: 500m
 mixed: 500m
- Max. number of modules: 64

Input network variables

Analogue network variables

- 16 variables "real" type
- 4 variables "long" type

Logic network variables

- 8 variables "bool" type
- 1 modem alarm "bool" type

Function:

They are linked to any network variable of other mTRON modules

Output network variables

Analogue network variables

- 16 variables "real" type
- 4 variables "long" type

Logic network variables

- 8 variables "bool" type

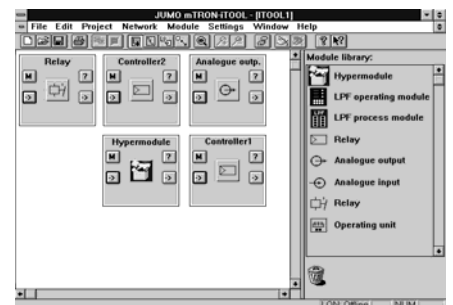
Function:

They can be written as output network variables of the communication module via MODbus.

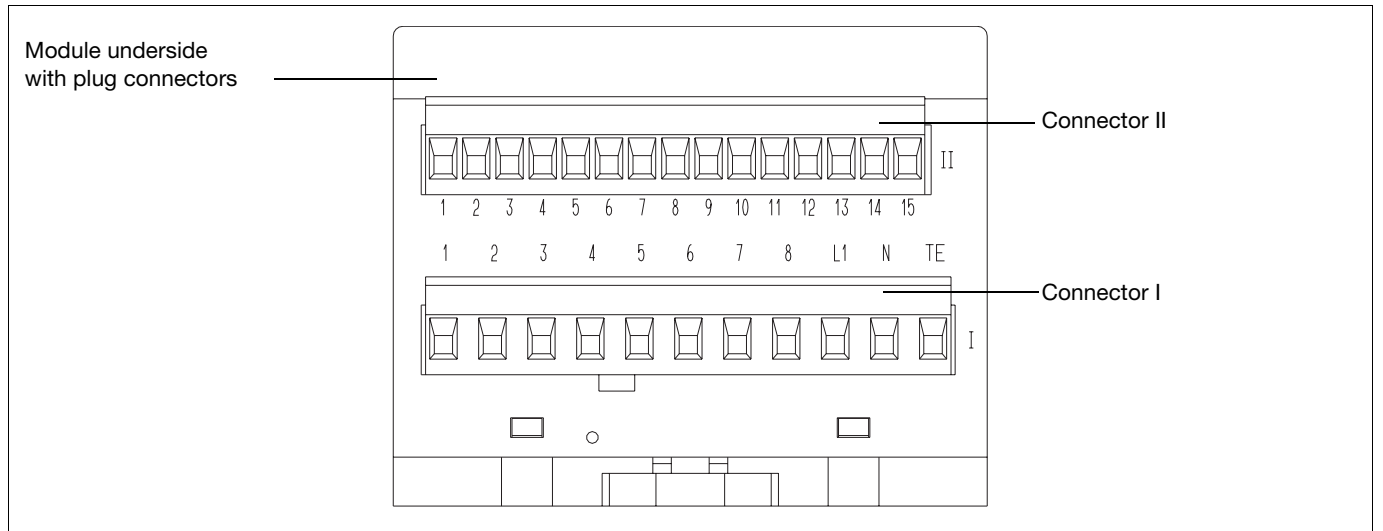
Operation and project design

Operation, parameter setting and configuration of JUMO mTRON modules can be carried out from the JUMO mTRON operating unit.

The JUMO mTRON-iTOOL project design software permits convenient design and start-up of a JUMO mTRON system. The projects can be archived and documented. Individual modules are linked via LON by assigning network variable (NV) names.



Connection diagram



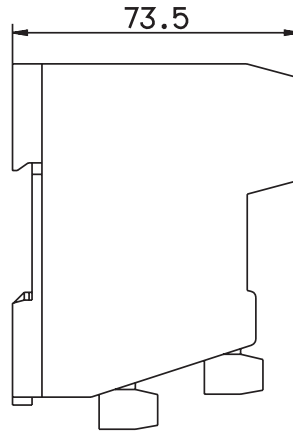
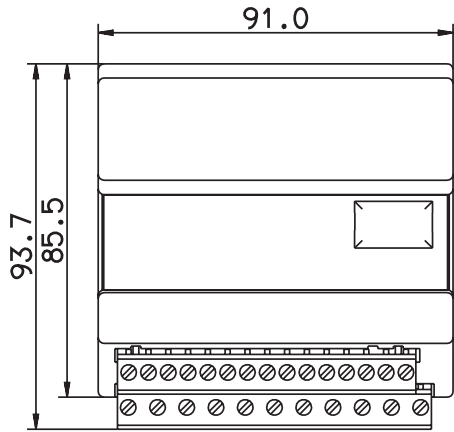
Connector II

Connection for	Terminals	Notes	Diagram
RS232	II_1 II_2 II_3 II_4 II_5	GND RxD TxD CTS RTS	
RS422	II_1 II_2 II_3 II_4 II_5	GND TxD A TxD B RxD A RxD B	
RS485	II_1 II_2 II_3	GND RxD/TxD A RxD/TxD B	
LON interface	II_13 = TE	screen	
	II_14 = Net_A II_15 = Net_B	any polarity	

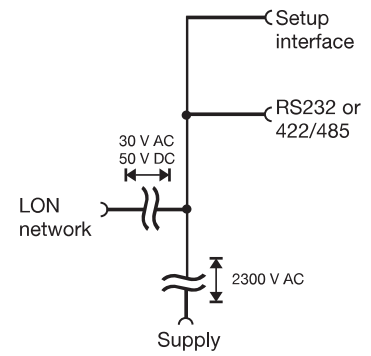
Connector I

Connection for	Terminals	Notes	Diagram
Supply as label	I_L1 AC I_N I_TE	line neutral technical earth	
	I_L1 DC I_N I_TE	} any polarity technical earth	

Dimensions



Isolation



Ordering details

704040/0- (1) (2) - .. - ..

(1) Outputs

Outputs	Code
Interface RS232	51
Interface RS422	52
Interface RS485	53

(2) Supply

Type	Code
110 – 240 V AC +10/-15%, 48 – 63Hz	23
20 – 53 V AC/DC, 48 – 63Hz	22

Standard accessory

1 Installation Instructions B 70.4040.4

Accessories

PC interface with TTL/RS232C converter
for connecting the module to a PC; length 2m.
Sales No. 70/00301315

Project design software JUMO mTRON-iTOOL
Using the JUMO mTRON- iTOOL project design software the modules can be designed graphically on the PC. The user is able to link modules of the JUMO mTRON family and to configure the application-specific parameters.

System Manual JUMO mTRON
Documentation of configuration, parameter setting and installation of the modules.
Sales No. 70/00334336

JUMO mTRON modules

- Controller module**
Data Sheet 70.4010
- Relay module**
Data Sheet 70.4015
- Analogue input module**
Data Sheet 70.4020
- Analogue output module**
Data Sheet 70.4025
- Logic module**
Data Sheet 70.4030
- Operating unit**
Data Sheet 70.4035
- Communication module**
Data Sheet 70.4040
- Project design software JUMO mTRON-iTOOL**
Data Sheet 70.4090

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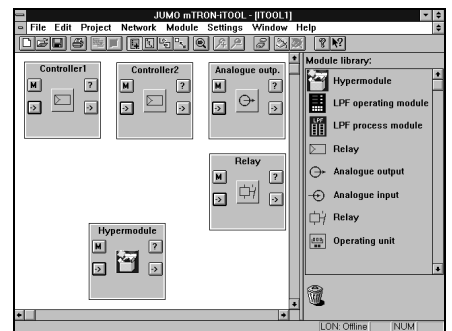
Project design software iTOOL



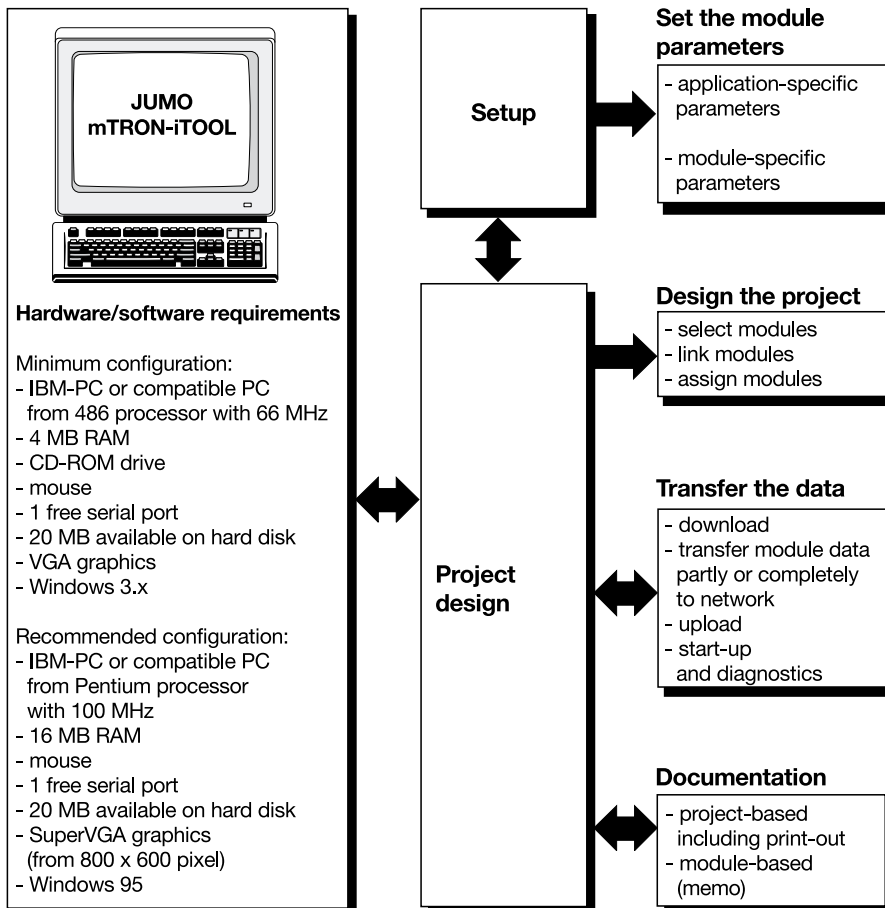
Brief description

JUMO mTRON automation systems can be designed graphically on the PC using the JUMO mTRON-iTOOL project design software. The menu and window arrangement of the program follows the usual Windows format. A module library containing the individual modules as graphic symbols can be called up at any time during project design. The modules required for the system project are taken from this library using Drag & Drop and can be placed freely on the working area. Any 16-character names can be assigned to the modules to provide a direct relationship with the real installation. The module carries a type-dependent symbol for quick visual recognition.

With this program the user is able to link instruments of the JUMO mTRON family, to set application-specific parameters with the aid of an embedded instrument-specific setup program, to load the completed project in the JUMO mTRON automation system, and to produce the documentation for the project. There is a choice of whether download or upload is to operate on all modules or only on selected ones. When the project design has been completed and the project is operating, values of network variables can be indicated online. This provides a direct check on the design of the real installation.



Block structure



Features

- **Project design**
The modules are selected, links between them are defined through network variables and assigned to the modules in the system.
- **Download (upload)**
The data can be loaded into the system, either individually or for the entire project.
- **Modem**
Download/upload via modem for remote servicing is available.
- **NV monitor**
Any network variables can be monitored on-line.
- **Drag & Drop**
Quick and intuitive working through Drag & Drop.
- **Off-line operation**
A project can be edited without any connection to the network. The assignment between the modules in JUMO mTRON-iTOOL and the modules in the system can be made later, either manually or automatically in on-line operation
- **Project documentation**
The entire project as well as each individual module (memo) can be documented.

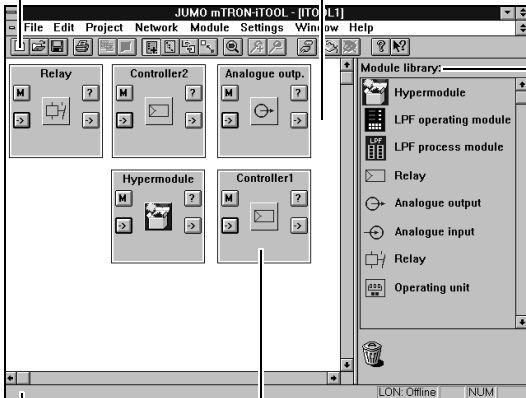
The JUMO mTRON-iTOOL project design software

Tool bar

Important functions can be called up directly by mouse click using the icons in this bar

Project window

In the project window the modules are shown on the working area as individual graphic objects (module windows).



View mode

The project is managed through different view modes. Module selection, for example, takes place through Drag & Drop from the *module library* to the working area.

Module window

The elements of the module window are used to call up the lists of input/output network variables, the setup program, the module-specific online help, and the memo (documentation). There is a free choice of module name (up to 16 characters).

Status bar

Brief reference texts are shown in the status bar. JUMO mTRON-iTOOL and the setup program have additional extensive online help functions.

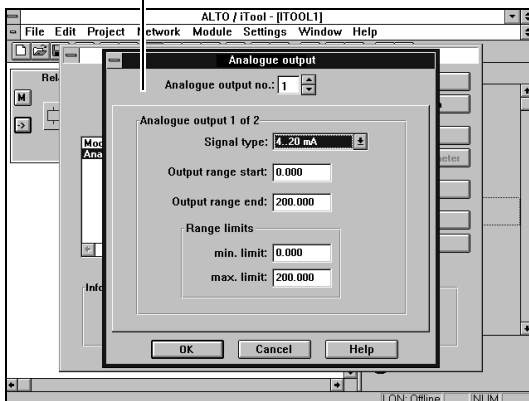
The setup programs

They are bound directly into the JUMO mTRON-iTOOL and are called up by a double click on the module icon in the module window.

There is a separate setup program for each module to ensure clear setting of the module parameters.

Setup dialogue (Analogue output)

The parameters of the individual module functions are set clearly through module-specific dialogues (windows).



Training/seminars

Special training sessions and seminars on JUMO mTRON-iTOOL are provided at our Training Centre.

Details concerning available training sessions and dates are available from local JUMO offices and subsidiaries. The addresses of our head office in Fulda and of our offices in the UK and the USA are given in the heading of this Data Sheet.

Standard accessory

System Manual JUMO mTRON; useful tool for configuration, parameter setting and operation of the modules

Accessory

PC interface

with TTL/RS232C converter

for connecting the module to a PC, length 2m.

Sales No. 70/00301315

JUMO mTRON modules summary

Controller module

Data Sheet 70.4010

Relay module

Data Sheet 70.4015

Analogue input module

Data Sheet 70.4020

Analogue output module

Data Sheet 70.4025

Logic module

Data Sheet 70.4030

Operating unit

Data Sheet 70.4035

Communication module

Data Sheet 70.4040

Project design software

JUMO mTRON-iTOOL

Data Sheet 70.4090

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Recording instruments

Pen recorders

Nr.

JUMO LOGOLINE 500/500 junior/500d
Pen recorder with text printing and
LED dot-matrix display

for 1 - 3 channels, panel-mounting DIN housing, bezel size 144mm x 144mm

70.6000

JUMO LOGOPRINT 500/500 junior
Printing recorder with text printing and
24 character LED dot-matrix display

for 3 or 6 channels, panel-mounting DIN housing, bezel size 144mm x 144mm

70.6030

Paperless recorder

Nr.

JUMO LOGOSCREEN 500 cf
Entry-level Paperless Recorder with CompactFlash card and life-cycle data management

for 3 or 6 channels, isolated

70.6510

JUMO LOGOSCREEN es
Paperless recorder for secure acquisition of FDA-compliant measurement data

for 6 or 12 channels, isolated (can be expanded to 36 channels)

70.6560

JUMO LOGOSCREEN cf
Paperless recorder with CompactFlash card as storage medium

for 6 or 12 channels, isolated (can be expanded to 36 channels)

70.6570

JUMO LOGOSCREEN nt
Paperless recorder with TFT display and CompactFlash card

for 3 to 18 channels, isolated (can be expanded to 42 channels)

70.6580

Consumables

Nr.

Charts, ribbons, print heads, fiber pen, ink and accessories

70.9800

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Logoline 500



Pen recorder with text printing and LED dot-matrix display

Brief description

The LOGOLINE 500 recorder family comprises three pen recorders:

Type LL.v-44u, Type LL.v-44uj and Type LL.v-44ud.

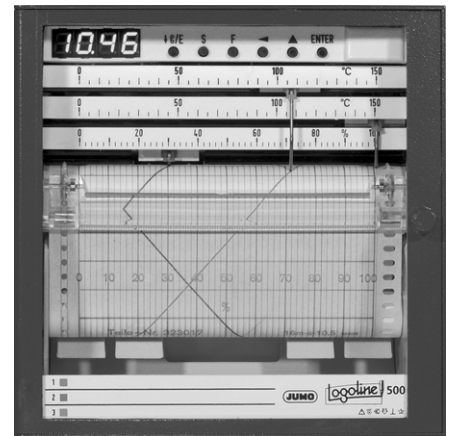
Each pen recorder offers up to three measurement inputs for recording the measurements, which are isolated from each other by optocouplers. The measurements can be read by pointers against scales, or are shown on the display. Channel 1 can be used to output text in addition to the measurement trace.

All channels are zeroed using Hall sensors.

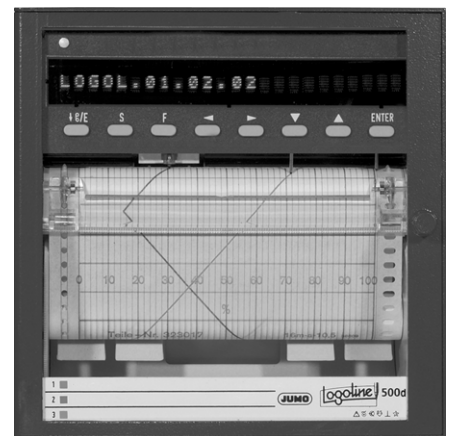
The watchdog monitors the pen recorder function and triggers a restart in the event of a fault. The configuration data are stored permanently in EEPROM. On a power failure, the real-time clock is buffered by the recorders.

The standard current and voltage signals can be connected on all recorders. On types LL.v-44u and LL.v-44uj, input signals can additionally be from thermocouples, resistance thermometers, resistance transmitters and potentiometers. The necessary linearization is performed automatically.

Optional expansions are available for the types LL.v-44u and LL.v-44ud. Eight logic inputs are available for additional operating functions. In most cases, a math and logic module permits the recorder to be individually adapted to complex measurement tasks. An external relay module ER8 for rail mounting supplements the pen recorders by eight switching outputs. A 2-wire transmitter can be operated from an isolated supply.



Type LL3v-44u/ ...
 Type LL3v-44uj/ ...



Type LL3v-44ud/ ...

Overview of functions

	LL.v-44u	LL.v-44uj	LL.v-44ud
1/2/3 analog inputs (configurable and electrically isolated)	Thermocouples Resistance thermometer Resistance transmitter Potentiometer Voltage Current	Voltage Current	Thermocouples Resistance thermometer Resistance transmitter Potentiometer Voltage Current
8 logic inputs ¹	for floating contacts or PLC level Functions: - External texts - Binary-linked text - External stop - External speed - Event counter - External scaling - External report		for floating contacts or PLC level Functions: - External texts - Binary-linked text - External stop - External speed - Event counter - External scaling - External report
Outputs ¹	- Interface for 8 relay outputs - Supply for 2-wire transmitter		- Interface for 8 relay outputs - Supply for 2-wire transmitter
Recording	- Measurement traces - Text printing	- Meas. traces - Text printing (restricted)	- Measurement traces - Text printing
Setup interface	for configuration and parameter setting		for configuration and parameter setting
RS422/RS485 interface ¹	Data transfer from and to the recorder		Data transfer from and to the recorder

1. available as an option

Applications

- Failure and fault analysis
- Compliance with official regulations
- Reports for users and customers
- Monitoring of processes
- Optimization of procedures

Technical data

Thermocouple input (LL.v-44u and LL.v-44ud)

Designation	Range	Linearization accuracy ¹
Fe-Con L DIN 43 710	-200 to +900°C	±0.1%
Fe-Con J EN 60 584	-210 to +1200°C	±0.1% above -200°C
Cu-Con U DIN 43 710	-200 to +600°C	±0.1% above -150°C
Cu-Con T EN 60 584	-270 to +400°C	±0.1% above -150°C
NiCr-Ni K EN 60 584	-270 to +1372°C	±0.1% above -80°C
NiCr-Con E EN 60 584	-270 to +1000°C	±0.1% above -100°C
NiCrSi-NiSi N EN 60 584	-270 to +1300°C	±0.1% above -100°C
Pt10Rh-Pt S EN 60 584	-50 to +1768°C	±0.15% above 0°C
Pt13Rh-Pt R EN 60 584	-50 to +1768°C	±0.15% above 0°C
Pt30Rh-Pt6Rh B EN 60 584	0 – 1820°C	±0.15% above 400°C
Shortest span	Types L, J, U, T, K, E, N: Types S, R, B:	100°C 500°C
Range start/end	within the range limits, freely programmable in 0.1°C steps	
Cold junction	Pt 100 internal, external Pt 100 in 3-wire circuit or external cold junction thermostat	
Cold junction accuracy (internal)	± 1°C	
Cold junction temperature (external)	-20 to +100°C can be set via the setup software	
Measurement time	240msec for all three channels	
Input filter	second-order digital filter; filter constant adjustable from 0 – 10.0sec	
Special features	programmable also in °F; customer-specific linearization	

1. The linearization accuracy refers to the maximum measurement span.

Resistance thermometer input (LL.v-44u and LL.v-44ud)

Designation	Connection	Range	Linearization accuracy	Meas. current
Pt 100 DIN	2/3-wire	-200 to +100°C	±0.4°C	400µA
	2/3-wire	-200 to +850°C	±0.8°C	400µA
	4-wire	-200 to +100°C	±0.4°C	400µA
	4-wire	-200 to +850°C	±0.5°C	400µA
Pt 100 JIS	2/3-wire	-200 to +100°C	±0.4°C	400µA
	2/3-wire	-200 to +649°C	±0.8°C	400µA
	4-wire	-200 to +100°C	±0.4°C	400µA
	4-wire	-200 to +649°C	±0.5°C	400µA
Pt 500 DIN	2/3-wire	-200 to +100°C	±0.4°C	50µA
	2/3-wire	-200 to +850°C	±0.8°C	50µA
	4-wire	-200 to +100°C	±0.4°C	50µA
	4-wire	-200 to +850°C	±0.5°C	50µA
Pt 1000 DIN	2/3-wire	-200 to +100°C	±0.4°C	50µA
	2/3-wire	-200 to +850°C	±0.8°C	50µA
	4-wire	-200 to +100°C	±0.4°C	50µA
	4-wire	-200 to +850°C	±0.5°C	50µA
Ni 100	2/3-wire	-60 to +100°C	±0.4°C	400µA
	2/3-wire	-60 to +180°C	±0.8°C	400µA
	4-wire	-60 to +100°C	±0.4°C	400µA
	4-wire	-60 to +180°C	±0.5°C	400µA
Connection type	2-, 3- or 4-wire circuit			
Shortest span	15°C			
Sensor lead resistance	max. 30Ω per core in 3-wire circuit max. 15Ω per core in 2-wire circuit			
Range start/end	within the limits, freely programmable in 0.1°C steps			
Measurement time	240msec for all three channels			
Input filter	second-order digital filter; filter constant adjustable from 0 – 10sec			
Special features	programmable also in °F; customer-specific linearization			

Resistance transmitter and potentiometer input (LL.v-44u and LL.v-44ud)

Range	Accuracy	Measurement current
up to 130Ω	±150mΩ	400μA
up to 390Ω	±300mΩ	400μA
up to 1600Ω	±1.6Ω	50μA
up to 3900Ω	±2 Ω	50μA
Connection type	resistance transmitter: 3-wire circuit potentiometer: 2-, 3- or 4-wire circuit	
Shortest span	6Ω	
Sensor lead resistance	max. 30Ω per core in 3-wire circuit max. 15Ω per core in 2-wire circuit	
Resistance values	within the limits, freely programmable in 0.1Ω steps	
Measurement time	240msec for all three channels	
Input filter	second-order digital filter; filter constant adjustable from 0 to 10.0sec	

DC voltage or current input

Basic range	Accuracy	Input resistance
-15 to +77mV	±80μV	>1MΩ
0 – 170mV	±120μV	>1MΩ
-76 to + 76mV	±120μV	>1MΩ
-162 to +880mV	±1 mV	>500kΩ
0 – 1930mV	±1 mV	>500kΩ
-880 to +880mV	±1 mV	>500kΩ
-1.84 to +10V	±6mV	>500kΩ
0 – 22V	±12mV	>500kΩ
-10 to +10V	±12mV	>500kΩ
Shortest span	5mV	
Range start/end	freely programmable within the limits (up to 999mV in 0.01mV steps, above 1V in 1mV steps)	
-4 to +21mA	±20μA	
0 – 45mA	±40μA	
-20.5 to +20.5mA	±40μA	
Shortest span	0.5mA	
Range start/end	within the limits, freely programmable in 0.01mA steps	
Measurement time	240msec for all three channels	
Input filter	second-order digital filter; filter constant adjustable from 0 – 10.0sec	
Special features	adjustable linearization for thermocouples and resistance thermometers (for connecting transmitters without linearization)	

Response on transducer short-circuit/break

	Short-circuit ¹	Break ¹
Thermocouple ²	recognized	recognized
Resistance thermometer ²	recognized	recognized
Resistance transmitter ²	not recognized	not recognized
Potentiometer ²	recognized	recognized
Voltage up to 170mV	recognized	recognized
Voltage above 170mV	not recognized	not recognized
Current	0mA is recognized	0mA is recognized

1. On the LL.v-44u and the LL.v-44uj, the fiber pens are positioned to 0%. No message is shown on the 7-segment display.
On the LL.v-44ud, the fiber pens are positioned to 0%. ">>>>>>" appears in the LED dot matrix display.

2. LL.v-44u and LL.v-44ud

Recording system

Zero adjustment	self-compensating system using Hall sensors
Drive	stepping motor
Sensitivity	0.2% or better referred to 100mm recording width
Reproducibility	0.25% or better referred to 100mm recording width
Response time	1 sec referred to 100mm recording width
Indication and recording accuracy	Class 0.5 referred to range limits and basic ranges
Ink capacity	sufficient for approx. 1000m trace; on channel 1 depending on text printing
Color sequence	channel 1: blue, channel 2: red, channel 3: green
Pen offset	2mm; LL.v-44u and LL.v-44ud: can be corrected by pen offset compensation
Overrun/underrun	electronically limited to 0 – 100mm writing width
Chart speed	programmable in the steps: 0, 5, 10, 20, 60, 120, 240, 300, 360, 600, 720, 1800, 3600, 7200mm/h; LL.v-44u and LL.v-44ud: freely programmable in 1mm/h steps
Chart drive	by stepping motor and gearbox
Chart cassette	cassette for roll chart and fanfold chart (tear-off edge, chart-end switch)
Chart overall width / writing width pin spacing visible chart length overall length	roll or fanfold chart to DIN 16 320 120mm / 100mm 110mm roll chart: 60mm; fanfold chart: 30 – 60mm roll chart: 16m or 32m; fanfold chart: 16m
Scale	on LL.v-44u und LL.v-44uj, max. 3 scales, white, black figuring
Standard scale graduation	0 – 100%, for other scale graduations see code "sk"

Electrical data

Supply	93 – 263V AC 48 – 63Hz (standard) or 20 – 53V AC/DC 48 – 63Hz (optional)
Electrical safety	to EN 61 010, Part 1 of March 1994 overvoltage category II, pollution degree 2
Test voltages (type test) - Mains supply to measurement circuit - Mains supply to housing - Between measurement circuits - Measurement circuits to housing - Electrical isolation between the analog inputs	AC: 3.7kV 50Hz, 1 min; AC/DC: 510V 50Hz, 1 min AC: 2.3kV 50Hz, 1 min; AC/DC: 510V 50Hz, 1 min 510V 50Hz, 1 min 510V 50 Hz, 1 min up to 30V AC and 50V DC
Supply voltage error	less than 0.1% of range span
Power consumption	35VA max.
Data back-up	more than 4 years by lithium battery in RAM, or 2 days by storage capacitor at 15 – 25°C ambient temperature. Additional back-up in EEPROM.
Electrical connection	at the back through screw-clamp connectors, max. conductor cross-section 2.5mm ² or 2x 1.5mm ² with cable ferrules, setup connector with Type LL.v-44ud at the front behind the flip-up dot-matrix display, with Type LL.v-44u, at the right above the measurement channels
EMC - Interference emission - Immunity to interference	EN 61 326 Class B to industrial requirements

Housing

Housing type Housing door	Housing for flush-panel mounting to DIN 43 700, galvanized steel zinc die-casting
Transport mechanism	in corrosion-resistant chrome-nickel steel
Chart cassette	in plastic (polycarbonate)
Bezel size	144mm x 144mm
Mounting depth	227mm
Panel cut-out	138 ^{+1.0} mm x 138 ^{+1.0} mm
Housing mounting	in a control panel to DIN 43 834
Ambient temperature range	-10 to +50°C
Ambient temperature error	0.3% per 10°C
Storage temperature range	-20 to +70°C
Climatic conditions	75% max. rel. humidity, no condensation
Operating position	NL 90 ± 30, DIN 16 257 (vertical)
Protection	to EN 60 529 Category 2, front IP54 (IP65 with extra code IP65); rear IP20
Weight	3.2kg max.

Operating modes

LL.v-44u and LL.v-44ud

Chart speeds

The LL.v-44u and LL.v-44ud recorders can be programmed with four different operating modes for the chart speed.

1. Normal operation

2. Limit operation

If the measurement goes above/below the programmed limits, the recorder switches to the speed which has been programmed under "limit operation".

3. External operation

A signal on one of the logic inputs at the back of the recorder switches to the speed programmed under "external speed".

4. Timed operation

Chart speed which is operative within a programmable time span.

Zoom (plot area)

In zoom operation, an enlarged recording is made of a section of the full range.

Presentation range (offset)

This parameter is used to define the presentation range of a trace on the chart.

This assists the evaluation of traces which are close together or overlapping.

LL.v-44uj

This recorder only features the operating mode "normal operation". Zoom and offset functions are not applicable.

Text printing

LL.v-44u and LL.v-44ud

Text printing is used for comments on the recorded trace and for event recording.

Priorities can be assigned to the texts to serve as abort criteria during simultaneous text printing requests.

Text printing can be separately configured for each text, either time-optimized or during printing of the recording traces.

Text printing facilities:

- Time, date
- Scaling of the channels
- Change of chart speed
- Recording start/end text
- Eight external texts¹
- 16 binary-linked external texts¹
- Eight relay texts¹
- Event counter¹
- Report
- Print test
- Service print

1. extra code zf is required.

LL.v-44uj

For LOGOLINE 500 junior, text printing is limited to

- Time, date
- Change of chart speed
- Text at recording start and end
- Print test
- Service print.

Printing priorities and the printing mode can not be set.

Extra codes

LL.v-44u and LL.v-44ud

Logic inputs (zf)

Both types can be equipped with eight logic inputs.

The inputs can be operated through floating contacts or by the following voltage levels:

inactive 0 — 5V

active 20 — 35V

The voltages must be applied for 0.5sec.

Functions available:

- External start/stop
- Chart speed change to "external speed"
- Text printing
- Start/stop external report
- Start scaling print
- Event counter

Supply for 2-wire transmitter (zf)

An isolated supply for a 2-wire transmitter is available.

24V ± 5% DC 45mA

Serial interface for ER8 (zf)

The external relay module ER8 can be operated using the serial interface.

RS422/RS485 interface

This interface is intended for communication with higher-level systems (e. g. bus system or PC).

It can be used to

- read out the measurements,
- monitor operating states, and
- transmit text and values to the recorders.

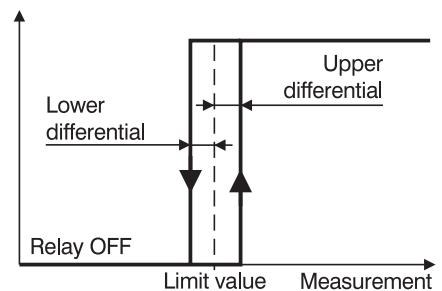
Accessories

LL.v-44u and LL.v-44ud

External relay module ER8

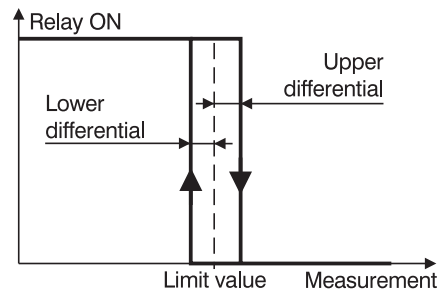
The Types LL. v-44u and LL.v-44ud can be equipped with an external relay module ER8 (eight relay outputs) to monitor the infringement of upper or lower limits. The assignment of the relay outputs to the measurement channels is freely programmable. The limits are set at the parameter level.

Relay function within the measurement range: Ik7, Ik8



Ik7:

Function: relay is energized when: Measurement > limit + upper differential.



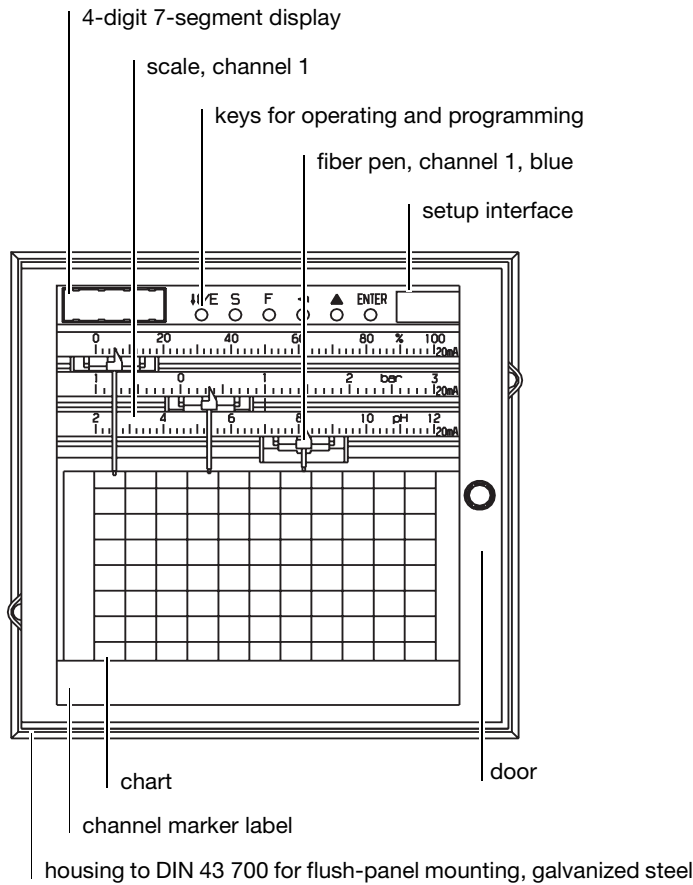
Ik8:

As Ik7, but relay function is reversed.

Position and width of the switching differential can be selected via the setup program.

Contact rating:
3A, 250V AC 50Hz
3A, 30V DC
resistive load

Indications and controls LL.v-44u and LL.v-44uj



Operation and configuration

On the recorder

LL.v-44uj and LL.v-44ud

All parameters can be programmed from the instrument keys. A 7-segment or an LED dot-matrix display are available to monitor the parameters.

LL.v-44u

The following parameters can be altered from the keys:

- Language
- Date and time
- Summer time
- Relay limit settings
- Chart speed
- Print test
- Service print

Via setup program for PC

LL.v-44u and LL.v-44ud

More conveniently than by the instrument keys, all parameters can be configured via the PC setup program.

Additional functions are:

- Customer-specific linearization
- Setting the printing mode of texts ("Overwrite trace" or "Interrupt trace")
- Different settings (also for several instruments) can be managed.
- Reading out and altering the setting of a configured instrument
- Archiving and printing the setting

Customer-specific linearization

In the setup program there is a choice between linear, square law and cube law linearization. There can be up to 41 calibration points for linear and square law linearization, and up to 61 calibration points for cube law linearization. These calibration points are used to determine the coefficients for polynomials which are defined for each section, so that even a few calibration points produce a smooth graph.

Accuracy: depends on the shape of the graph and the selected linearization.

Language

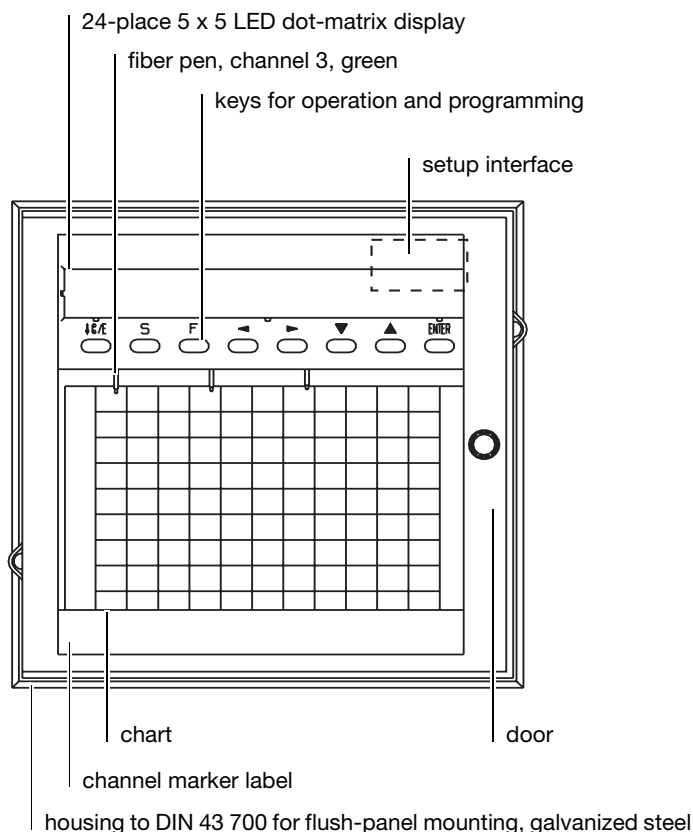
LL.v-44u and LL.v-44uj

The language setting (English, German, French) appears in the print-out only.

LL.v-44ud

The language which was set (English, German, French) appears in the print-out and in the LED dot-matrix display.

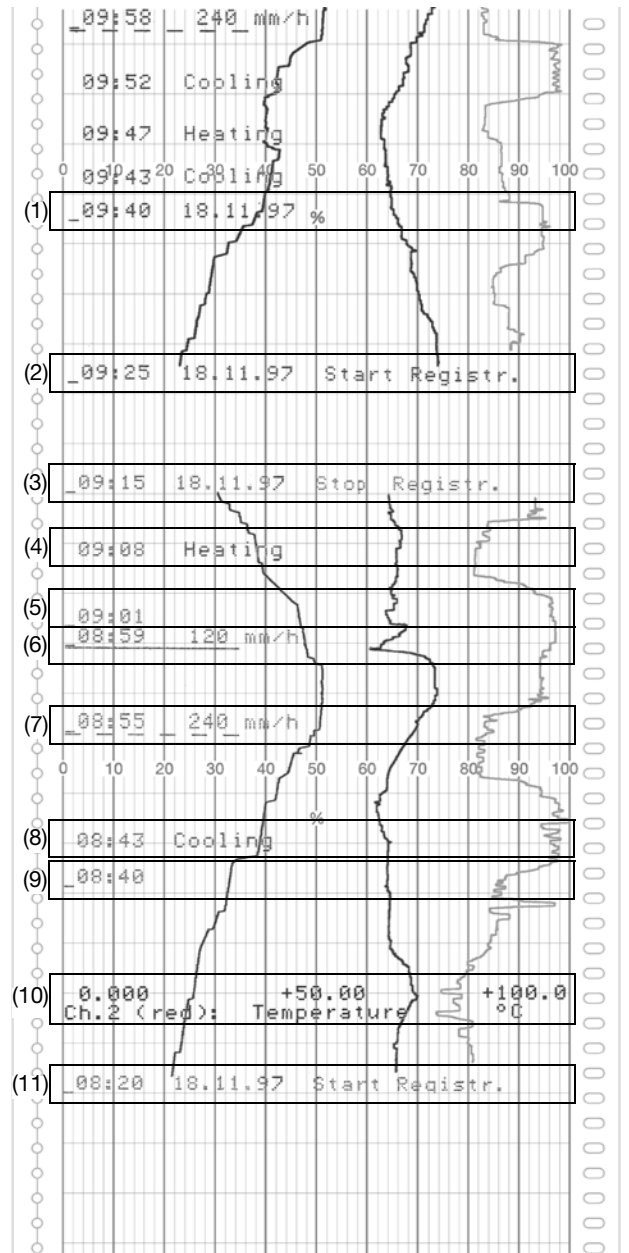
Indications and controls LL.v-44ud



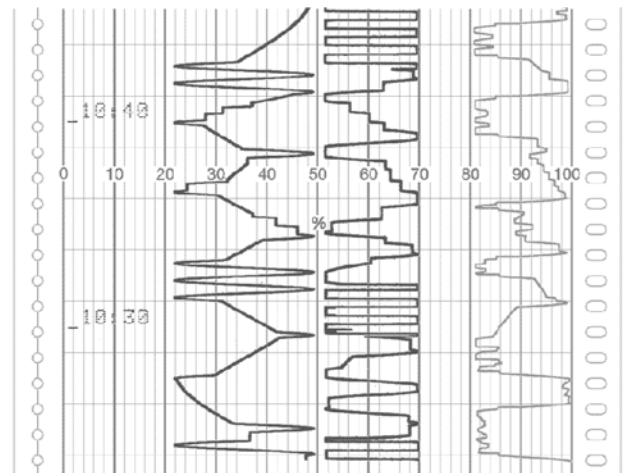
Example of a recording with text print-out for Type LLv-44u (ud)

The factory-setting provides for all the measurement traces to be printed in the range 0–100%, i.e. across the entire chart width.

- (1) Print the time (with every fourth print-out, the current chart speed, the programmed instrument name or the date are printed alternately)
- (2) Print-out at the start of the recording (begin text)
- (3) Print-out at the end of the recording (end text)
- (4) Relay text
- (5) Current time
- (6) Speed change to normal operation
- (7) Speed change to limit operation
- (8) Relay text on exceeding the limit
- (9) Current time
- (10) Print-out of scaling with channel number, pen color, channel name and unit.
- (11) Begin text

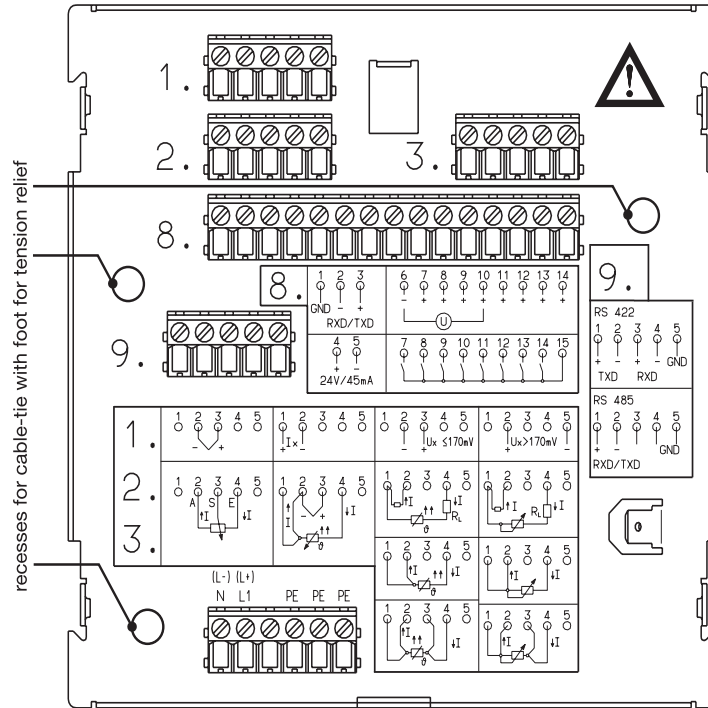


In the example above, the measurement traces are printed out in normal mode, i.e. all traces share the entire width of the chart (0 – 100mm). The presentation range can be selected freely on the chart for each trace. This assists the evaluation, in particular of traces which are close to each other or which overlap. The traces in the example on the right have thus been arranged over three sections of the chart.



Connection diagram

Rear view with screw-clamp connectors



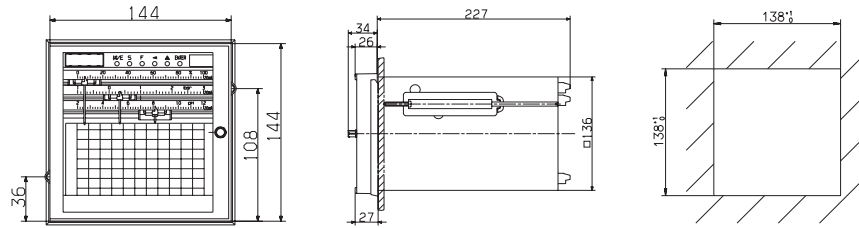
Connection				Diagram
Supply as on label	N neutral L1 line PE protective earth		N (L-) L1 (L+) PE	(L-) (L+) N L1 PE PE PE 1 2 3 4 5 6
Analog inputs	Input 1	Input 2	Input 3	
	Connector	Connector	Connector	
Thermocouple				
Thermocouple with external Pt 100 cold junction				
Resistance thermometer/potentiometer in 2-wire circuit	1.	2.	3.	
Resistance thermometer/potentiometer in 3-wire circuit				
Resistance thermometer/potentiometer in 4-wire circuit				

Analog inputs	Input 1	Input 2	Input 3	
	Connector	Connector	Connector	
Resistance transmitter with 3-wire connection	1.	2.	3.	<p>A = start S = slider E = end</p>
Voltage input up to 170mV				
Voltage input above 170mV				
Current input				

		Connector	
External relay module ER8	Communication with external relay module	8.	
Supply for external 2-wire transmitter	24V ± 5% 45mA		
Digital operating inputs	Contact operation LOW = R _{OFF} 100kΩ min. HIGH = R _{ON} 50kΩ max.		
Min. pulse duration: HIGH 500msec LOW 500msec	Voltage operation LOW = 0 – 5V DC (inactive) HIGH = 20 – 35V DC (active)		
Serial interface RS422/RS485	Communication with higher-level systems	9.	RS 422 RS 485

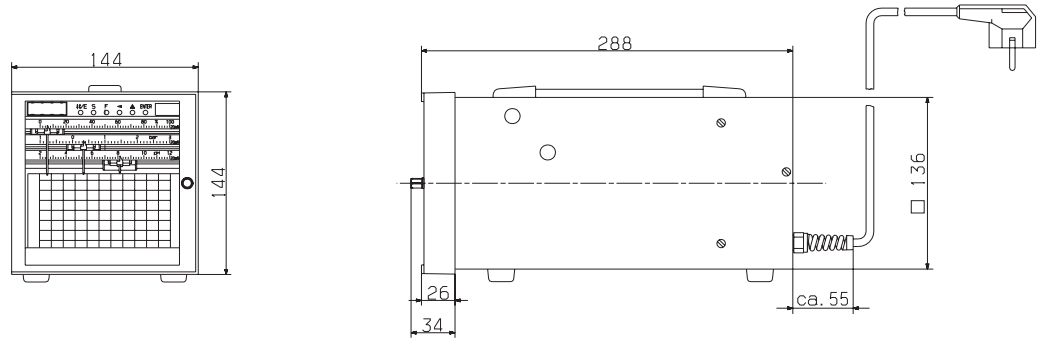
Dimensions

Housing for flush-panel mounting



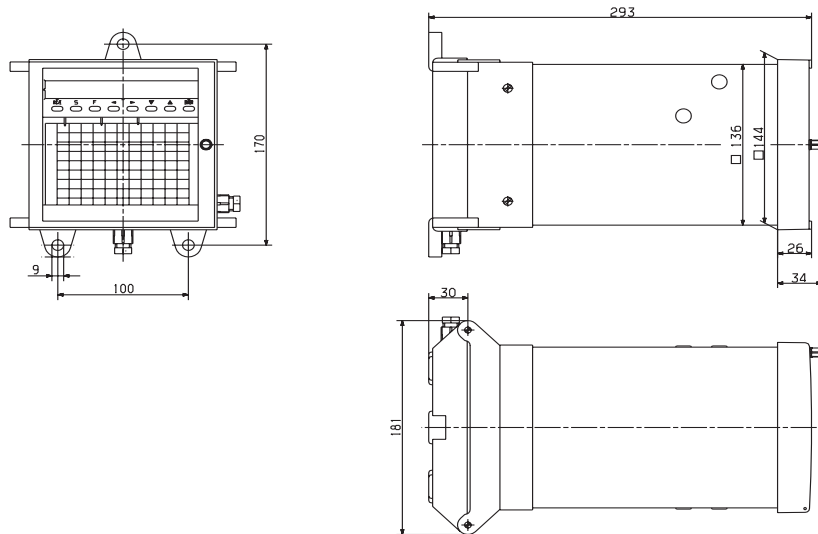
Code tm

Housing with carrying handle, rubber feet and terminal cover, also 3m mains supply cable with SCHUKO plug



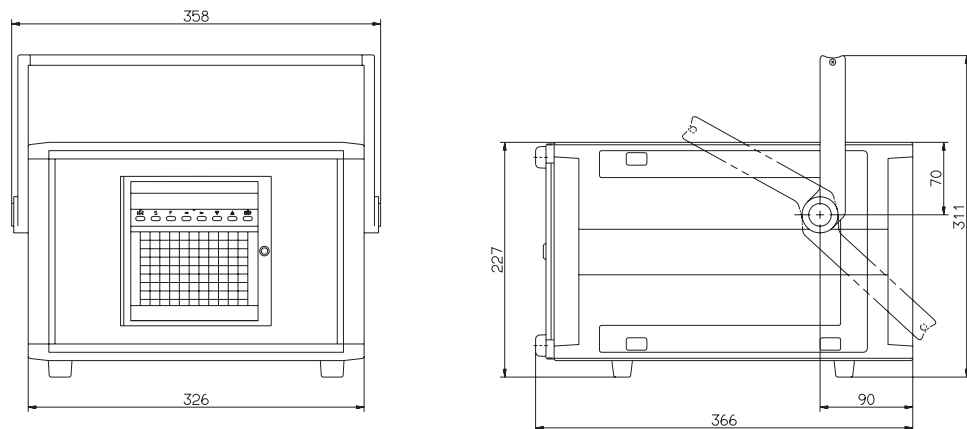
Code ab

Housing for wall mounting. The panel-mounting housing is fitted in a carrier and can be swung out through 90°.



Code TG-35

Portable recorder housing for varying applications in mobile use



Order details

(1) Basic version LOGOLINE 500

LL . v-44u/ ...	pen recorder with scales and universal inputs
1	Input 1 input with text output factory-set configuration to customer specification ¹
2	2 inputs (input 1 with text output) factory-set configuration to customer specification ¹
3	3 inputs (input 1 with text output) factory-set configuration to customer specification ¹

(1) Basic version LOGOLINE 500junior

LL . v-44uj/ ...	pen recorder with scales and inputs for standard signals
1	Input 1 input with text output factory-set
2	2 inputs (input 1 with text output) factory-set
3	3 inputs (input 1 with text output) factory-set

(1) Basic version LOGOLINE 500d

LL . v-44ud/ ...	pen recorder with display and universal inputs
1	Input 1 input with text output factory-set configuration to customer specification ¹
2	2 inputs (input 1 with text output) factory-set configuration to customer specification ¹
3	3 inputs (input 1 with text output) factory-set configuration to customer specification ¹

(2) Interface

x	x	RS422	for communication with higher-level systems
x	x	RS485	for communication with higher-level systems

(3) Extra codes

x	x	sk	special scales, e. g. m ³ /h, bar etc.	
x	x	zf	extra functions: 8 logic inputs, serial interface for external relay module ER8, electrically isolated 24 V/50 mA DC supply for 2-wire transmitter	
x	x	c	storage capacitor (ex-factory: lithium battery)	
x	x	x	fp	cassette for fanfold chart 16m long
x	x	x	r32	roll chart 32m long
x	x	x	ab	housing for wall mounting (the panel-mounting housing can be swung out through 90° in the carrier).
x	x	x	tm	housing with carrying handle, rubber feet and terminal cover, also 3m mains supply cable with SCHUKO plug
x	x	x	TG-35	portable case for recorder
x	x	x	ts	door with lock (IP54)
x	x	x	IP65	IP65 seal, wide mounting brackets

Order code

Order example

(1) / (2) / (3) , ...² ...
 LL3v-44ud / RS422 / sk ,

1. Please specify probe type and range in plain text.
 2. List extra codes in sequence, separated by commas.

Standard accessories

	LOGOLINE		
	500	500junior	500d
1 Operating Instructions	B 70.6001	B 70.6011	B 70.6021
2 mounting brackets	X	X	X
cable-tie with foot (can be released), for strain relief of the connected sensor leads	X	X	X
1 disposable fiber pen per channel	X	X	X
2 chart rolls 16m long or 1 chart roll 32m long (with code r32) or 1 fanfold chart pack 16m long (with code fp)	X	X	X

Accessories

	LOGOLINE		
	500	500junior	500d
PC interface with TTL/RS232 converter	X	—	X
Setup program on 3.5" diskette (2 items)	X	—	X
External relay module ER8 (code zf is required)	X	—	X

X = possible

— = not possible

Order examples

Order details	Description	LOGOLINE		
		500	500junior	500d
LL3v-44u/ts,fp,tm LL 3 v-44 u ts fp tm	pen recorder 3 channels amplifier and bezel size 144mm x 144mm version with scales and universal measurement inputs door with lock (IP54) cassette for fanfold chart house with carrying handle, rubber feet and mains supply cable	X		
LL1v-44uj/TG-35 LL 1 v-44 uj/ TG-35	pen recorder 1 channel amplifier and bezel size 144mm x 144mm version with scales and standard signal input (current/voltage) portable case		X	
LL2v-44ud/zf,RS485 LL 2 v-44 ud zf RS485	pen recorder 2 channels amplifier and bezel size 144mm x 144mm display version with universal measurement inputs 8 logic inputs, supply for 2-wire transmitter and interface for ER8 serial interface for communication with higher-level systems, such as bus system or PC			X

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LOGOPRINT® 500 / 500 junior



Printing recorder with text printing and 24-character LED dot-matrix display

Brief description

The LOGOPRINT recorder family consists of two printing recorders, the LOGOPRINT 500 and the LOGOPRINT 500 junior.

LOGOPRINT 500 (Type 706030)

The printing recorder is equipped with 3 or (optionally) 6 measurement inputs, which are electrically isolated from one another. The evaluation of the measurement traces of the printing recorder can be assisted by extensive text printing. The recorder can be programmed either by using the 8 keys on the front of the instrument or through a PC setup program.

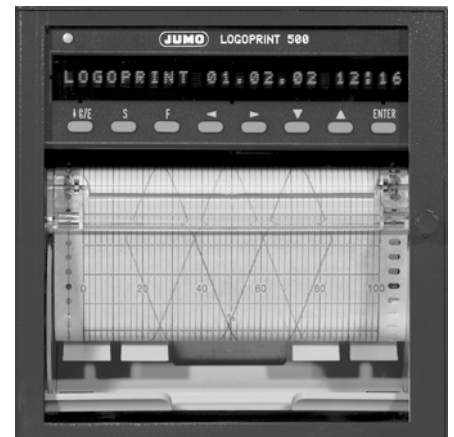
Thermocouples, resistance thermometers, resistance transmitters, potentiometers, voltages or currents (standard signals) are possible as input signals. The appropriate linearizations are carried out automatically, but can also be adapted to customer-specific linearizations with the help of the PC setup program.

Further outstanding features of the LOGOPRINT 500, which are already included in the basic version, are four open-collector outputs for signaling infringements of limits and faults, eight event traces, as well as peak value recording.

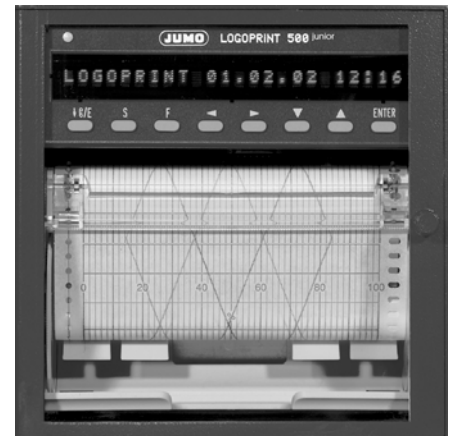
The color assignments (measurement traces and texts) are freely programmable via the PC setup program, which is available as an accessory.

LOGOPRINT 500 junior (Type 706031)

This recorder is equipped with 6 measurement inputs, which are electrically isolated from one another. It can also support the evaluation of the measurement traces with printed text (limited). Programming is only possible via the keys. Voltages and currents (standard signals) are possible as input signals. There are no open-collector outputs, no event traces, no peak value recording and no extra codes.



Type 706030



Type 706031

Overview of functions

	Type 706030	Type 706031
Analog inputs (configurable and isolated)	3 or 6 inputs for: - thermocouples - resistance thermometers - resistance transmitters - potentiometers - voltage and current	6 inputs for: - voltage - current
8 logic inputs	available as extra code	not available
Outputs	- 4 open-collector outputs available as extra code: - interface for 8 relay outputs - supply for 2-wire transmitter	not available
Recording	- measurement traces - text printing - event traces	- measurement traces - text printing (limited)
Setup interface	for configuration and parameter setting via PC	not available
RS422/RS485 interface	extra code for the data transfer from and to the recorder	not available
Supply voltage	110 – 240V AC +10/-15% 48 – 63Hz 20 – 53V AC/DC ±0% 48 – 63Hz	110 – 240V AC +10/-15% 48 – 63Hz 20 – 53V AC/DC ±0% 48 – 63Hz

Features of the Type 706030

- Limit monitoring
- Event traces
- Four open-collector outputs
- Peak value recording
- Extensive text printing
- Statistics (report) with minimum, maximum and mean values
- Event- and time-controlled chart speed
- Math and logic module (PC setup program is required)
- Universal chart cassette

Technical data

Thermocouple input (Type 706030)

Designation	Range	Linearisation accuracy ¹
Fe-Con L DIN 43 710 ²	-200 to + 900°C	±0.2%
Fe-Con J EN 60 584	-210 to +1200°C	±0.2% above -200°C
Cu-Con U DIN 43 710 ²	-200 to + 600°C	±0.3%
Cu-Con T EN 60 584	-270 to + 400°C	±0.5% above -200°C
NiCr-Ni K EN 60 584	-270 to +1372°C	±0.2% above -150°C
NiCr-Con E EN 60 584	-270 to +1000°C	±0.2% above -200°C
NiCrSi-NiSi N EN 60 584	-270 to +1300°C	±0.2% above -150°C
Pt10Rh-Pt S EN 60 584	-50 to +1768°C	±0.5% above 0°C
Pt13Rh-Pt R EN 60 584	-50 to +1768°C	±0.5% above 0°C
Pt30Rh-Pt6Rh B EN 60 584	0 — 1820°C	±0.5% above 500°C
Shortest span	Types L, J, U, T, K, E, N: Types S, R, B:	100°C 500°C
Range start/end	freely programmable within the limits in 0.1°C steps	
Cold junction	Pt 100 internal or thermostat as external constant	
Cold junction accuracy (internal)	± 1°C	
Cold junction temperature (external)	-50 to +100°C, adjustable through setup software	
Measurement time	for 3 channels < 2sec; for 6 channels < 4sec	
Input filter	2nd order digital filter; filter constant adjustable from 0 — 50.0sec	
Features	also programmable in °F; customer-specific linearizations	

1. The linearization accuracy refers to the maximum span.
The linearization accuracy is reduced for shorter spans.

2.) invalid DIN since 1995

Resistance thermometer input (Type 706030)

	Connection	Range	Linearisation accuracy	Meas. current
Pt 100 EN 60 751	2/3-wire	-200 to +250°C	±0.6°C	500µA
	2/3-wire	-200 to +850°C	±1.0°C	250µA
	4-wire	-200 to +250°C	±0.5°C	500µA
	4-wire	-200 to +850°C	±0.8°C	250µA
Pt 100 JIS	2/3-wire	-200 to +260°C	±0.6°C	500µA
	2/3-wire	-200 to +649°C	±1.0°C	250µA
	4-wire	-200 to +260°C	±0.5°C	500µA
	4-wire	-200 to +649°C	±0.8°C	250µA
Pt 500 DIN	2/3-wire	-200 to +150°C	±0.6°C	250µA
	2/3-wire	-200 to +850°C	±1.0°C	250µA
	4-wire	-200 to +150°C	±0.5°C	250µA
	4-wire	-200 to +850°C	±0.8°C	250µA
Pt 1000 DIN	2/3-wire	-200 to +250°C	±0.6°C	500µA
	2/3-wire	-200 to +850°C	±1.0°C	250µA
	4-wire	-200 to +250°C	±0.5°C	500µA
	4-wire	-200 to +850°C	±0.8°C	250µA
Ni 100	2/3-wire	-60 to +125°C	±0.6°C	500µA
	2/3-wire	-60 to +180°C	±1.0°C	250µA
	4-wire	-60 to +125°C	±0.5°C	500µA
	4-wire	-60 to +180°C	±0.8°C	250µA
Connection type	2-, 3- or 4-wire circuit			
Shortest span	15°C			
Probe lead resistance	max. 30Ω per core for 4-wire circuit max. 20Ω per core for 2- and 3-wire circuit for Pt 100 up to 260°C max. 10Ω per core in 2-wire and 3-wire circuit			
Range start/end	freely programmable within the limits in 0.1°C steps			
Measurement time	for 3 channels < 2sec; for 6 channels < 4sec			
Input filter	2nd order digital filter; filter constant adjustable from 0 — 50sec			
Features	also programmable in °F; customer-specific linearizations			

Resistance transmitter and potentiometer input (Type 706030)

Range	Accuracy	Measuring current
up to 200Ω	±300mΩ	500μA
up to 400Ω	±600mΩ	250μA
up to 800Ω	±1Ω	250μA
up to 2000Ω	±2Ω	500μA
up to 4000Ω	±3Ω	250μA
Connection type	resistance transmitter: 3-wire circuit potentiometer: 2-, 3- or 4-wire circuit	
Shortest span	6Ω	
Probe lead resistance	max. 30Ω per core in 4-wire circuit max. 20Ω per core in 2- and 3-wire circuit up to 200Ω range: max. 10Ω per core in 2- and 3-wire circuit	
Resistance values	freely programmable within the limits in 0.1Ω steps	
Measurement time	for 3 channels < 2sec; for 6 channels < 4sec	
Input filter	2nd order digital filter; filter constant adjustable from 0 – 50.0sec	

Input for DC voltage or DC current (Type 706030 and Type 706031)

Basic range	Accuracy	Input resistance
-25 to +75mV	±100μV	R _E > 10 MΩ
0 – 100mV	±100μV	R _E > 10 MΩ
-100 to +100mV	±150μV	R _E > 10 MΩ
0 – 200mV	±150μV	R _E > 10 MΩ
-500 to +500mV	±1mV	R _E > 10 MΩ
0 – 1V	±1mV	R _E > 10 MΩ
-1 to +1V	±2mV	R _E > 10 MΩ
-5 to +5V	±10mV	R _E > 0.5 MΩ
0 – 10V	±10mV	R _E > 0.5 MΩ
-10 to +10V	±15mV	R _E > 0.5 MΩ
Shortest span	5mV	
Range start/end	freely programmable within the limits (up to 999mV in 0.01 mV steps, from 1V in 1 mV steps)	
4 – 20mA	±20μA	burden voltage 2.6V max. burden voltage 2.6V max. burden voltage 2.6V max.
0 – 20mA	±20μA	
-20 to +20mA	±40μA	
Shortest span	0.5mA	
Range start/end	freely programmable within the limits in 0.1 mA steps	
Measurement time	for 3 channels < 2sec; for 6 channels < 4sec	
Input filter	2nd order digital filter; filter constant adjustable from 0 – 50.0sec	
Features	for Type 706030: adjustable linearizations for thermocouples and resistance thermometers (for connection to transmitters without linearization)	

Transducer short-circuit/break

	Short-circuit ¹	Break ¹
Thermocouple	not recognized	recognized
Resistance thermometer	recognized	recognized ²
Resistance transmitter	recognized	recognized
Potentiometer	not recognized	recognized ²
Voltage up to ± 1V	not recognized	recognized
Voltage above ± 1V	not recognized	not recognized
Current	not recognized	not recognized

1. The print head is positioned to 0%, ">>>>>>" appears in the LED dot-matrix display.
2. In 4-wire circuit: only recognized at terminals 1 and 2.

Outputs (Type 706030)

Three open-collector outputs	to signal over/underlimit
One open-collector output	to signal faults (e. g. end of chart)

Printing system (Type 706030 and Type 706031)

Drive	stepper motor
Sensitivity	0.2% or better referred to 100mm writing width
Reproducibility	0.25% or better referred to 100mm writing width
Display and recording accuracy	Class 0.5 referred to range limits and basic ranges
Print head	print head with penlift function - sufficient for approx. 1 million dots (depending on the ambient temperature)
Print colors	Violet, red, black for 3-channel printing recorder and violet, red, black, green, blue, brown for 6-channel printing recorder. For Type 706030 the color assignment can be changed at will, through the setup program.
Over/underrun	electronically limited to 0 – 100mm writing width
Chart speed	programmable in the steps 0, 5, 10, 20, 60, 120, 240, 300, 360, 600, 720mm/h
Paper feed	by stepper motor and gearing
Chart cassette	cassette for roll chart and fanfold chart (with tear-off edge and paper-end switch)
Chart overall width / writing width sprocket roller spacing visible diagram length overall length	roll or fanfold chart to DIN 16 320 120mm / 100mm 110mm roll chart: 60mm; fanfold chart: 30 – 60mm roll chart: 16m or 32m; fanfold chart: 16m

Electrical data (Type 706030 and Type 706031)

Supply (SMPS)	110 – 240V AC +10/-15% AC 48 – 63Hz, or 20 – 53V ±0% AC/DC 48 – 63Hz
Electrical safety	to EN 61 010, Part 1, March 1994 overvoltage Category II, contamination Grade 2
Test voltages (type test) mains supply to measurement circuit mains supply to housing between measurement circuits measurement circuits to housing electrical isolation between the analog inputs	with AC supply 2.3kV 50Hz, 1 min; with AC/DC 510V 50Hz, 1 min with AC supply 1.5kV 50Hz, 1 min; with AC/DC 510V 50Hz, 1 min 200V 50Hz, 1 min 500V 50Hz, 1 min up to 30V AC and 50V DC
Supply voltage sensitivity	less than 0.1 % of range span
Power consumption	35VA max.
Data buffering	More than 4 years through lithium battery in RAM or 2 days with storage capacitor at 5 – 25°C ambient temperature. Additional backup in EEPROM.
Electrical connection	At rear through plug-in screw terminals, max. conductor cross-section 2.5mm ² or 2x 1.5mm ² with core end sleeves. For Type 706030: Setup connector at the front behind flip-up dot-matrix display
EMC interference emission immunity to interference	EN 61 326 Class B to industrial requirements

Housing (Type 706030 and Type 706031)

Housing type housing door	Housing for front-panel mounting to DIN 43 700, galvanized sheet steel cast zinc
Transport mechanism	in corrosion-resistant chrome-nickel steel
Chart cassette	in plastic (polycarbonate)
Bezel size	144mm x 144mm
Depth behind panel	212mm without screw terminals; 227mm with screw terminals plugged in
Panel cut-out	138 ^{+1.0} mm x 138 ^{+1.0} mm
Housing mounting	in control panel to DIN 43 834
Ambient temperature range	0 to +50°C
Ambient temperature error	0.2%/10°C
Storage temperature range	-20 to +70°C (without print head), -20 to +55°C (with print head)
Climatic conditions	20 – 70% relative humidity, no condensation
Operating position	normal position: vertical ± 30° (NL 90 ± 30, to DIN 16 257)
Protection	to EN 60 529 Category 2, front IP54 (IP65 with extra code 266), rear IP20
Weight	3.5 kg max.

Operating modes

Type 706030

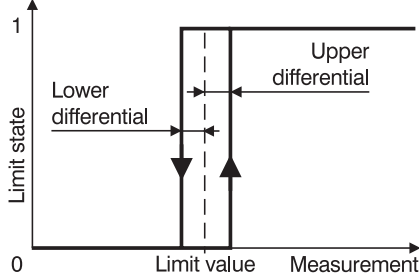
Limit monitoring

Eight limit comparators are available to monitor the limits.

Limits, differential values (hysteresis), limit comparator functions (lk), texts and the channels to be monitored can be programmed. The result of the monitoring is fed to the open-collector outputs (1 – 3) and the optional relay module (1 – 8) as limit state (logic 0 or 1).

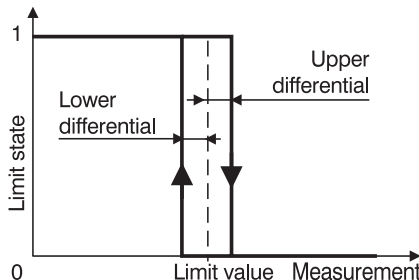
The different lk functions are:

lk 7:



The limit state is set to 1 when: measurement > limit + upper differential.

lk8:



as lk7, but function is reversed.

Chart speeds

The LOGOPRINT 500 can be programmed with four different operating modes for the chart speed:

1. Normal operation
2. Limit operation

If the measurement goes above/below the programmed limits, the recorder switches to the speed which has been programmed under "limit operation".

3. External operation

A signal on one of the logic inputs at the back of the recorder switches to the speed which has been programmed under "external speed".

4. Timed operation

The chart speed which is operative within a programmable time span.

Type 706031

The LOGOPRINT 500 junior has no limit monitoring. Only normal operation is possible as chart speed.

Graphic print-out

Type 706030

Measurement traces

Zoom (plot area)

In zoom operation, an enlarged recording is made of a section of the full range of a trace.

Presentation range (offset)

This parameter is used to define the presentation range of a trace on the chart.

This assists the evaluation, in particular of traces which are close to each other or which overlap.

Peak value recording

The peak value recording can be switched on or off for each channel.

In the switched-off state, the present value of a channel is printed.

Since more values can be measured than can be printed, the minimum and maximum values measured between two lines to be printed are stored when the peak value recording is switched on. These minimum and maximum values are printed when peak value recording is activated.

Event traces

Eight event traces can be printed. Limit monitoring (limit comparators) or the state of the optional logic inputs can thus be documented on the chart.

Type 706031

The entire chart width for each measurement trace is available here. The functions zoom, presentation range, peak value recording and event traces are not applicable.

Text printing

Text printing is used for comments on the recorded trace and for event recording.

Type 706030

Printing priorities can be assigned to texts, to serve as abort criteria during simultaneous text printing requests.

Text printing can be separately configured for each text, either time-optimized or during continued recording of traces.

Type 706031

The priorities and the printing mode are strictly defined here.

Text printing facilities for

Type 706030 and Type 706031:

- Time, date
- Scaling of the channels
- Channel numbers
- Change of chart speed
- Recording start/end text
- "Power on" and "power off" text
- Print text to check the printing system and the service print

Additional text printing facilities for

Type 706030:

- 16 limit comparator texts¹ (eight for underlimit and eight for overlimit)
- 2 reports (calculate and print minimum, maximum and mean values)
- Eight external texts¹ (extra code)
- 16 binary-linked external texts¹ (extra code)
- Event counter¹ (extra code)

1. These texts are buffered through a queue. As long as the queue is not full, complete documentation is assured.

Extra codes

Type 706030

RS422/RS485 interface

This interface is intended for communication with higher-level systems (e. g. bus system or PC). It can be used to read out measurements, to monitor operating states and to transmit texts and values to the recorder.

Logic inputs

Eight logic inputs can be operated either through floating contacts or by the following voltage levels:

inactive: 0 – 5V / active: 20 – 35V

The voltage levels must be applied for 0.4sec.

Functions available include:

- External start/stop
- Activate external chart speed
- Text printing
- Start/stop external report
- Start scaling print
- Increment two event counters
- Key inhibit
- Event traces

Supply for 2-wire transmitter

An electrically isolated supply for a 2-wire transmitter is available.

24V DC 45mA ± 5%

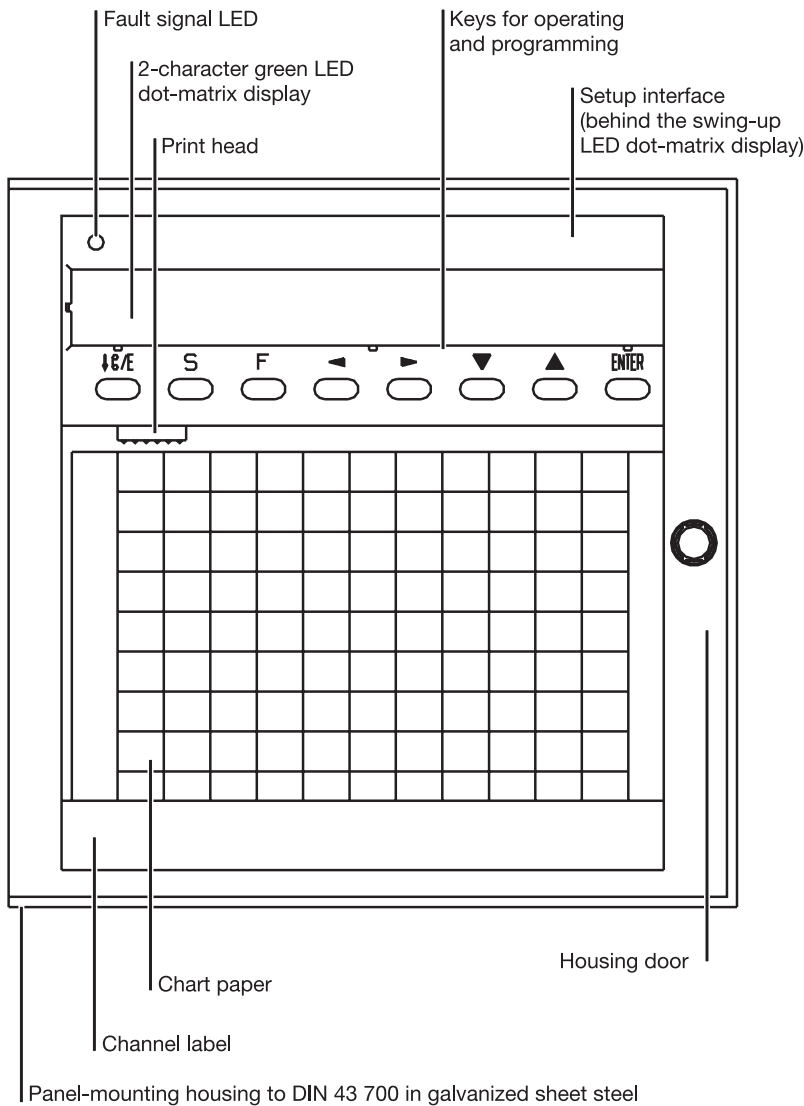
ER8 external relay module

The LOGOPRINT 500 can be equipped with an ER8 external relay module (eight relay outputs) to monitor infringements of upper and lower limits. The relay outputs are permanently assigned to the limit comparators. The assignment to the measurement channels can be made freely through the limit comparator parameter.

Contact rating:

3 A 250V AC 50Hz , or 3 A 30V DC resistive load

Display and controls



Panel-mounting housing to DIN 43 700 in galvanized sheet steel

Operation and configuration

Type 706030 and Type 706031

At the recorder

The eight keys on the instrument are used for operating the instrument, and to configure all the parameters essential to the operation.

The 24-character dot-matrix display is available for indicating and monitoring the measurements and parameters.

Type 706030

Via the setup program for PC (accessory)

The recorder can be configured using the setup program for PC (see diagram, bottom left) more conveniently than by using the instrument keys.

The configuration data of a configured instrument can be read out and altered using the setup program.

For a further instrument with the same configuration, the data can be copied through the setup program. The configuration data can be archived on data media and printed out.

In addition to the programming possibilities from the keys of the recorder, the setup program offers the following extra functions:

- Setting different print colors
- Customer-specific linearizations
- Setting the printing mode for the texts (printing mode: "Overwrite measurement trace" or "Interrupt measurement trace")
- Printing priorities
- Math and logic module editor
- Various settings can be managed

Customer-specific linearizations

The setup program offers a choice between linear, square law and cube law linearization. There can be up to 41 calibration points for linear and square law linearization, and up to 61 calibration points for cube law linearization. These calibration points are used to determine the coefficients for polynomials which are defined for each section, so that even a few calibration points produce a smooth graph.

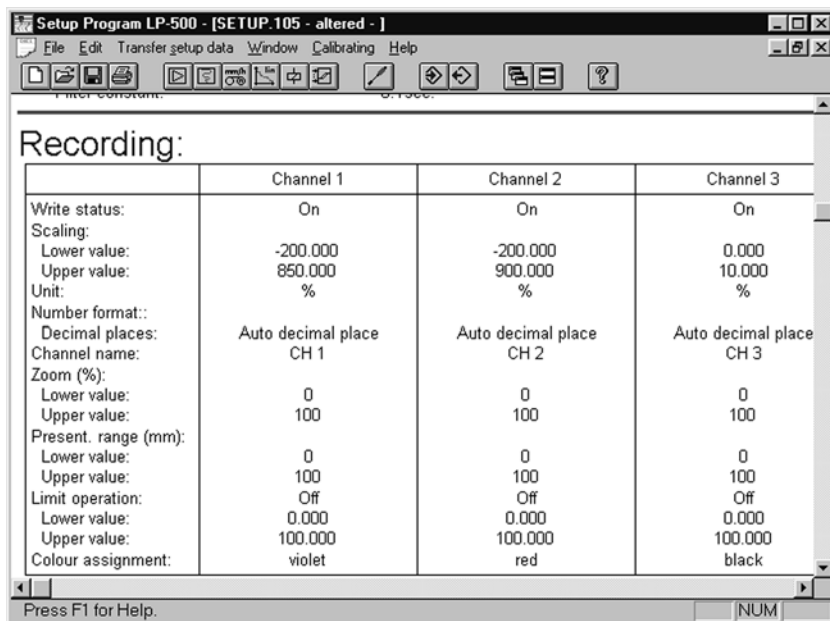
Accuracy: depends on the shape of the graph and the selected linearization.

Language

Type 706030 and Type 706031

The language setting (English, German, French) appears in the print-out and on the LED dot-matrix display.

Setup program (Type 706030)

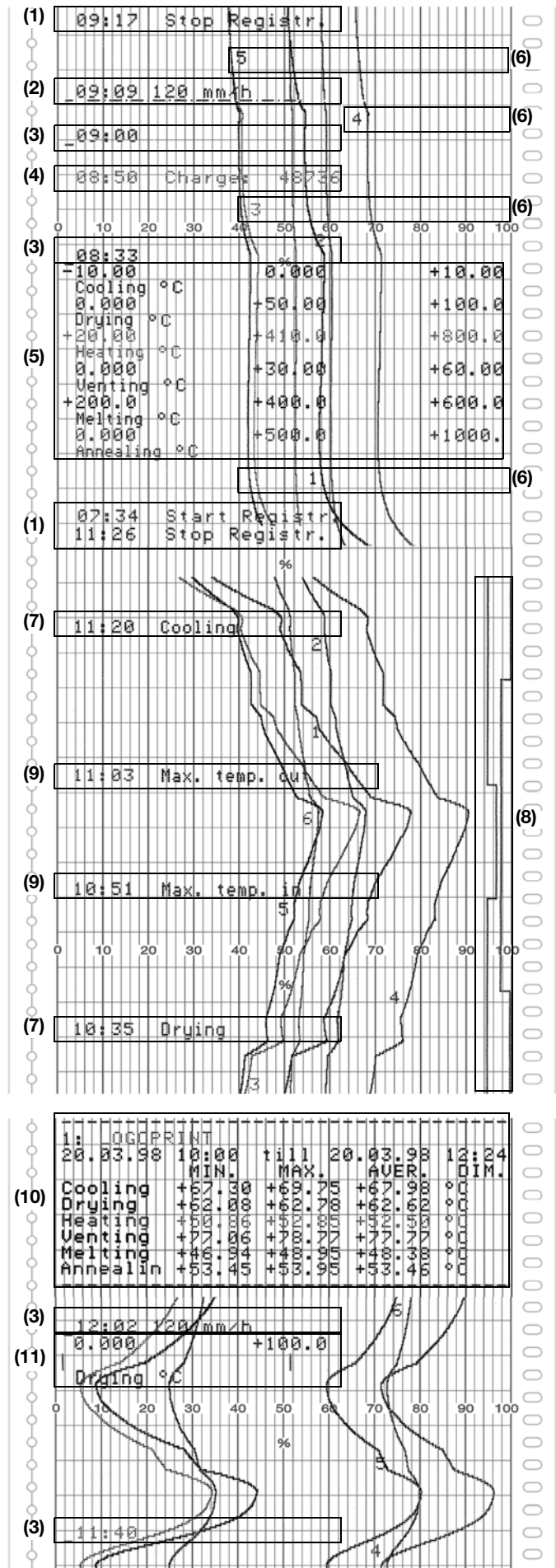


Example of a recording with text print-out for Type 706030

- (1) Recording start/end text
- (2) Speed change to 120 mm/h through a logic input
- (3) Printing the time (with every fourth print-out, the current chart speed, the programmed instrument name, or the date are printed alternately).
- (4) If a selectable logic input is closed, the count of an event counter is incremented and documented together with the programmed text. Altogether, two event counters are available.
- (5) The scaling of all active channels can be printed, either by pressing the **F** key (hold down for at least 4 sec), or through a logic input.
- (6) The channel number can be printed in the selected channel color so that individual traces can be more easily differentiated.
- (7) Documentation of over/underlimit conditions in the limit comparators.
- (8) A total of eight event traces can be printed out. They can be used either to document the state of the limit comparators, or that of the logic inputs. The position of the event traces on the chart can also be programmed.
- (9) Additional texts (external texts) can be printed if one logic input, or a combination of up to four logic inputs, is switched.
- (10) Print-out of a report. The print-out shows the period of time in which the measurements were acquired and calculated, as well as the minimum, maximum and mean values of all active channels (including channel name and unit).
- (11) As opposed to (5), the scaling of the channels can be performed alternately in a programmable spacing.

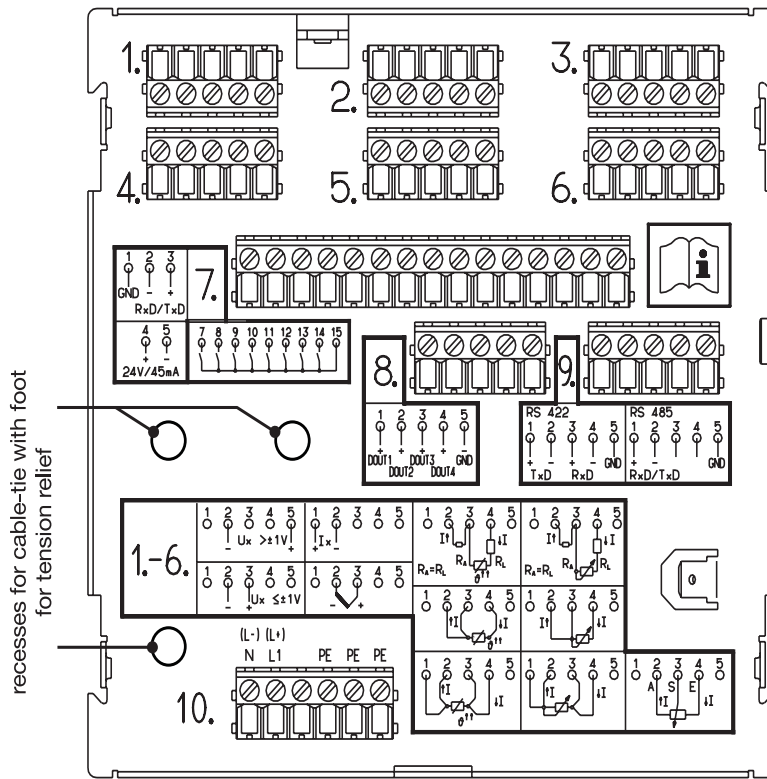
All texts which relate to a logic input can only be printed if the extra code "8 logic inputs" (code 259) has been implemented in the recorder.

In the example, the traces which were printed above the report (10), are printed out in the normal mode, i.e. all traces share the entire chart width (0 – 100mm). The presentation range can be selected freely on the chart for each trace. This assists the evaluation, in particular of traces which are close to one another or which overlap. The traces below the report have thus been arranged over two sections of the chart (0 – 50mm and 50 – 100mm).



Connection diagram for maximum terminal assignment

Rear view of 3/6-channel version with plug-in screw-clamp connectors



Connection for 3/6-channel version

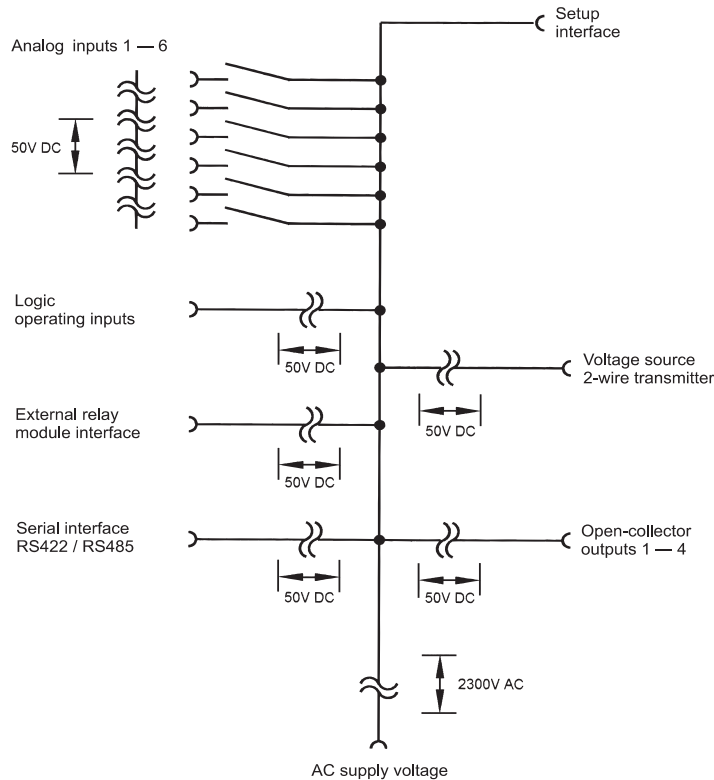
Diagram

Supply as on label	N neutral L1 line PE protective earth	Connector 10.	(L-) N 1 (L+) L1 2 PE 3 PE 4 PE 5 PE 6						
Analog inputs Type 706030	<p style="text-align: center;">Inputs</p> <table border="1" style="width: 100%; text-align: center;"> <tr> <td>1</td> <td>2</td> <td>3</td> <td>4</td> <td>5</td> <td>6</td> </tr> </table> <p style="text-align: center;">Connector</p>		1	2	3	4	5	6	
1	2	3	4	5	6				
Thermocouple									
Resistance thermometer in 2-wire circuit									
Resistance thermometer in 3-wire circuit									
Resistance thermometer in 4-wire circuit									

Analog inputs Type 706030	Inputs						Diagram
	1	2	3	4	5	6	
	Connector						
Resistance transmitter in 3-wire circuit							<p>A = start S = slider E = end</p>
Potentiometer in 2-wire circuit	1.	2.	3.	4.	5.	6.	<p>$R_A = R_L$</p>
Potentiometer in 3-wire circuit							
Potentiometer in 4-wire circuit							
Analog inputs Type 706030 and Type 706031	Inputs						Diagram
	1	2	3	4	5	6	
	Connector						
Voltage input up to $\pm 1V$							<p>$U_x \leq \pm 1V$</p>
Voltage input above $\pm 1V$	1.	2.	3.	4.	5.	6.	<p>$U_x > \pm 1V$</p>
Current input $\pm 20mA$							<p>I_x</p>
Current input (shunt) $\leq \pm 20mA$ (when using transducers with changeable internal resistance; extra code "terminal with shunt" is required)							<p>I_x</p>

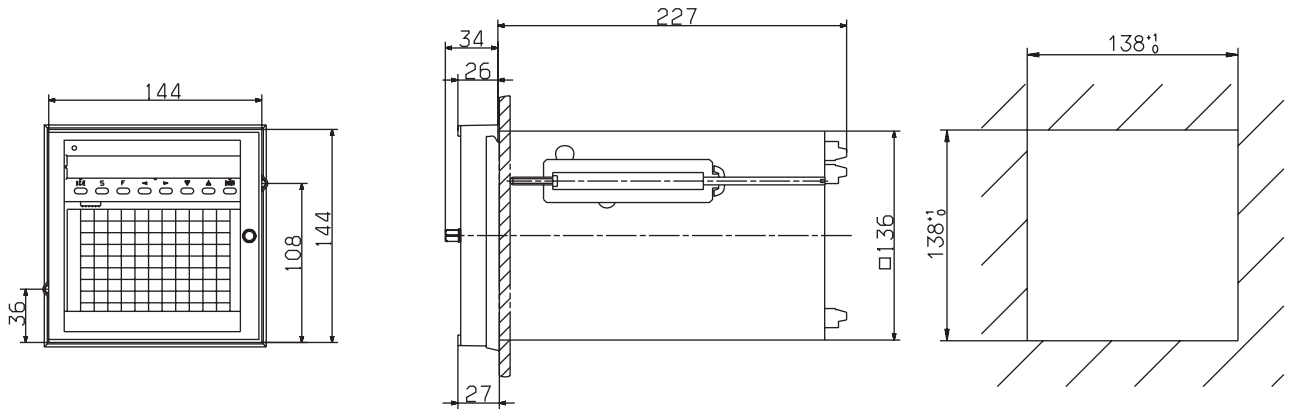
Inputs/outputs Type 706030		Connector	Diagram
ER8 external relay module	Communication with external relay module	7.	
Voltage source for external 2-wire transmitter	24V 45mA ± 5%		
Logic operating inputs	Contact operation LOW = $R_{OFF} \geq 100k\Omega$ HIGH = $R_{ON} \leq 50k\Omega$ Voltage operation LOW = 0 – 5V DC (inactive) HIGH = 20 – 35V DC (active)		
Open-collector outputs	DOUT1 – DOUT4 $U_{max} = 32V DC$ $I_{max} = 100mA$ Residual voltage DOUT active $U_{DOUTactive} = 0.4 – 1.2V$		
RS422/RS485 serial interface	Communication with higher-level systems		9.

Overview of the electrical isolation



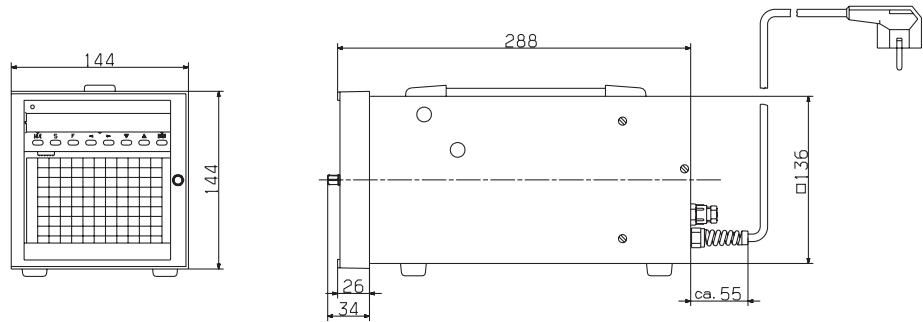
Dimensions

Panel-mounting housing



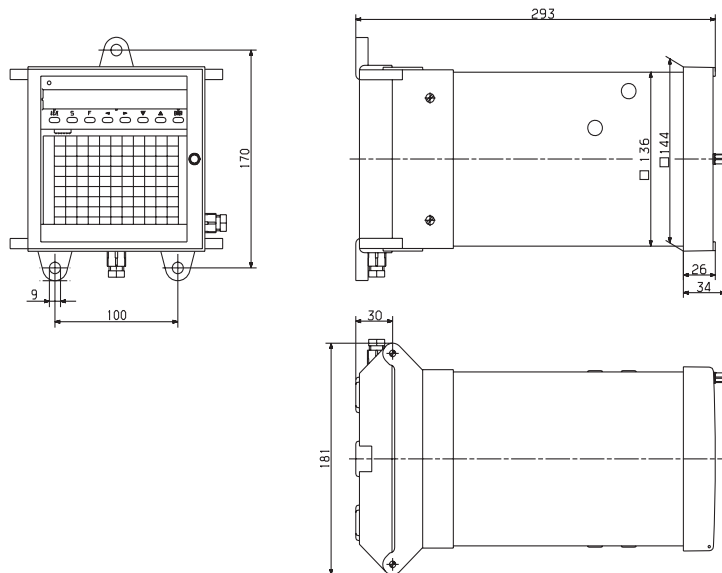
Extra code

Housing with carrying handle, rubber feet and terminal cover, also 3m mains cable with earthed plug



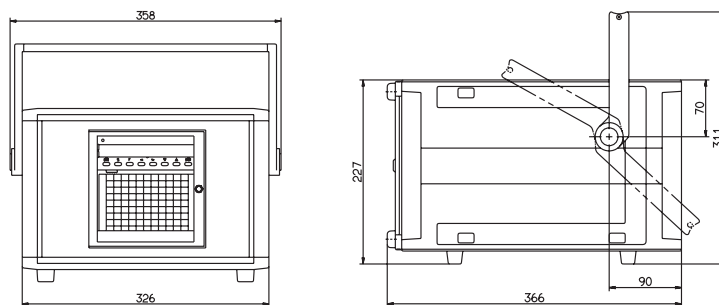
Extra code

Housing for wall mounting. The panel-mounting housing is fitted in a carrier and can be swung out through 90°.



Extra code "TG-35"

Portable recorder housing for varying applications in mobile use



Ordering details

Basic type (1) (2) (3) (4) (5) (6)
 706030 / .. - ... , ... - .. - .. / ... , ...¹

Basic type (1) (2) (3) (4) (5) (6)
 706031 / 15 - ... , ... - 00 - .. / ... , ...¹

(1) Basic type extensions

Connectors	Code
I: 3 analog inputs ²	14
I/II: 3/3 analog inputs	15

(2) Inputs (programmable) with 3 channels

Inputs on connector I	Code
factory-set	888
configuration to customer specification	999

(3) Inputs (programmable) with 6 channels

Inputs on connector II	Code
not assigned ²	000
factory-set	888
configuration to customer specification	999

(4) RS422/RS485 interface

At rear	Code
not assigned	00
RS422, Jbus, MODbus ²	52
RS485, Jbus, MODbus ²	53

(5) Supply

At rear	Code
110 – 240V AC +10/-15% 48 – 63Hz	23
20 – 53V AC/DC +0/-0% 48 – 63Hz	22

(6) Extra codes

	Code
lithium battery for RAM buffer (ex-factory)	020
storage capacitor for RAM buffer (on request)	021
8 logic inputs ² , interface ² for external relay module (ER8), voltage output ² 24V 50mA DC	259
terminal with shunt (6 items)	030
door with lock (IP54)	265
IP65 seal, wide fixing brackets	266
universal portable housing TG-35	350
housing with carrying handle	351
housing for wall mounting (can be swung through 90°)	247

Accessories for programming²

setup program on two 3.5" diskettes, multi-lingual
PC interface cable with TTL/RS232 converter

Accessory²

ER8 external relay module (extra code 259 is required)
--

1. extra codes are listed in sequence and separated by a comma
 2. only for Type 706030

Standard accessories

- 1 Operating Instructions
- 2 mounting brackets
- cable-tie with foot (can be released), for tension relief of the sensor leads connected
- 1 print head, 3 colors (each color is available twice) or 1 print head, 6 colors
- 1 roll chart 32m long, and 1 fanfold chart pack 16m long

Consumables

Print head (2 items)

- 3 colors
Part No. 00355244
- 6 colors
Part No. 00355255

Roll chart (5 rolls)

- no name, % graduation, linear overall length: 16m overall width: 120mm Part No. 00331497
- no name, % graduation, linear overall length: 32m overall width: 120mm Part No. 00331499
- no name, special graduation, linear (marked as specified)

Fanfold chart (5 packs)

- no name % graduation, linear overall length: 16m overall width: 120mm Part No. 00331490
- no name, special graduation, linear (marked as specified)

Ordering examples

- 706030/15-888,888-00-23/020,259
- 706030 Logoprint 500
 - 15 6 analog channels
 - 888,888 all channels factory-set
 - 00 no RS422 or RS485 interface
 - 23 AC supply
 - 020 lithium battery (ex-factory)
 - 259 8 logic inputs, interface for ER8, voltage output 24V 50mA DC for 2-wire transmitter
- 706031/15-888,888-00-23/021
- 706031 Logoprint 500 junior
 - 15 6 analog channels
 - 888,888 factory-set
 - 00 no interface
 - 23 AC supply
 - 021 storage capacitor

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JUMO LOGOSCREEN 500 cf



Entry-level Paperless Recorder with CompactFlash card and life-cycle data management

Brief description

The appearance of the LOGOSCREEN 500 cf is dominated by a 5-inch color display, in which the measurement data can be displayed in a vertical direction, similar to ordinary chart recorders. But unlike ordinary recorders, the LOGOSCREEN 500 cf does not need any chart paper for recording. Measurement data are stored electronically, and are available for evaluation on the spot as well as in the PC.

The integrated life-cycle data management ensures fast traceability of process data referred to specific installations.

According to choice, the LOGOSCREEN 500 cf can be fitted with 3 or 6 electrically isolated measurement inputs. The recorder can be programmed from eight keys, or by using a PC via a CompactFlash card or one of the interfaces.

The bezel size is 144mm x 144mm, depth behind panel 214mm.



Type 706510/...

Block structure

3/6 analog inputs

- Thermocouple
 - RTD
 - Voltage
 - Current
- (inputs are electrically isolated from one another)

Power supply

- 110 - 240V AC
- or
- 20 - 53V AC/DC

Features

- 5" STN color screen**
320 x 240 pixels, 27 colors
- CompactFlash card**
≤ 2GB for transfer of measurements and configuration of paperless recorder
- CPU card**
with main memory and measurement data memory (FLASH memory) for approx. 350 000 measurements



Extra codes

- 4 binary inputs**
their states can be graphically displayed
- 3 relays**
changeover (SPDT) 3A, 230V
- RS232/RS485 or Ethernet interface**
for process and configuration data
- Math and logic module**
- Counters and integrators**

Software (accessory)

- Setup program**
for configuration
- Evaluation software**
for representation and evaluation of measurement data
- Communication software**
for automatic data readout (also via modem)

Approvals



Key features

- Measurement data presented numerically as vertical diagrams (with scaling, numerical display, or as a bar graph)
- Presentation of event traces such as "Binary inputs"
- On-site availability of measurements in the FLASH memory
- Measurement data are retained, even after a power interruption
- Saving of data sets on the CompactFlash card
- Instrument configuration through the keys or the setup program (CompactFlash card or interface)
- Evaluation of archived data with PC evaluation program
- Search function for history analysis
- Adaptation of the memory cycles to the specific process, using normal, time-of-day and event operation
- Freely configurable inputs
- Internal sampling rate 250msec for 3 or 6 analog inputs, minimum storage cycle 1sec
- Counters and integrators (6 channels)
- Math and logic module (6 channels)
- integrated web server

Technical data

Analog inputs

Input for DC voltage, DC current

Basic range	Accuracy	Input resistance
-20 to +70mV	$\pm 80\mu\text{V}$	$R_{\text{IN}} \geq 1\text{ M}\Omega$
-3 to +105mV	$\pm 100\mu\text{V}$	$R_{\text{IN}} \geq 1\text{ M}\Omega$
-10 to +210mV	$\pm 240\mu\text{V}$	$R_{\text{IN}} \geq 1\text{ M}\Omega$
-0.5 to +12V	$\pm 6\text{mV}$	$R_{\text{IN}} \geq 470\text{ k}\Omega$
-0.05 to +1.2V	$\pm 1\text{mV}$	$R_{\text{IN}} \geq 470\text{ k}\Omega$
-1.2 to +1.2V	$\pm 2\text{mV}$	$R_{\text{IN}} \geq 470\text{ k}\Omega$
-10 to +12V	$\pm 12\text{mV}$	$R_{\text{IN}} \geq 470\text{ k}\Omega$
Shortest span	5mV	
Range start/end	freely programmable within the limits in 0.01 mV steps	
-2 to +22mA	$\pm 20\mu\text{A}$	burden voltage $\leq 1\text{ V}$
-22 to +22mA	$\pm 44\mu\text{A}$	burden voltage $\leq 1\text{ V}$
Shortest span	0.5mA	
Range start/end	freely programmable within the limits in 0.01 mA steps	
Overrange / underrange	according to NAMUR NE 43	
Sampling cycle	3 or 6 channels 250msec	
Input filter	2nd order digital filter; filter constant adjustable from 0 to 10.0sec	
Test voltage for electrical isolation	350V (via optocoupler)	
Resolution	> 14 bit	

Thermocouple

Designation	Type	Standard	Meas. range	Accuracy ¹
Fe-Con	L	DIN 43 710	-200 to +900°C	$\pm 0.1\%$
Fe-Con	J	EN 60 584	-210 to +1200°C	$\pm 0.1\%$ from -100°C
Cu-Con	U	DIN 43 710	-200 to +600°C	$\pm 0.1\%$ from -150°C
Cu-Con	T	EN 60 584	-270 to +400°C	$\pm 0.15\%$ from -150°C
NiCr-Ni	K	EN 60 584	-270 to +1372°C	$\pm 0.1\%$ from -80°C
NiCr-Con	E	EN 60 584	-270 to +1000°C	$\pm 0.1\%$ from -80°C
NiCrSi-NiSi	N	EN 60 584	-270 to +1300°C	$\pm 0.1\%$ from -80°C
Pt10Rh-Pt	S	EN 60 584	-50 to +1768°C	$\pm 0.15\%$ from 0°C
Pt13Rh-Pt	R	EN 60 584	-50 to +1768°C	$\pm 0.15\%$ from 0°C
Pt30Rh-Pt6Rh	B	EN 60 584	0 to 1820°C	$\pm 0.15\%$ from 400°C
W3Re/W25Re	D		0 to 2400°C	$\pm 0.15\%$ from 500°C
W5Re/W26Re	C		0 to 2320°C	$\pm 0.15\%$ from 500°C
Chromel-Copel		GOST R 8.585-2001	-200 to +800°C	$\pm 0.1\%$
Shortest span	Type L, J, U, T, K, E, N, chromel-copel: Type S, R, B, D, C:			100°C 500°C
Range start/end	freely programmable within the limits, in 0.1°C steps			
Cold junction	Pt100 internal or thermostat external constant			
Cold junction accuracy (internal)	$\pm 1\text{ }^\circ\text{C}$			
Cold junction temperature (external)	-50 to +150°C, adjustable			
Sampling cycle	3 or 6 channels, 250msec			
Input filter	2nd order digital filter; filter constant adjustable from 0 to 10.0sec			
Test voltage for electrical isolation	350V (via optocoupler)			
Resolution	> 14 bit			
Special features	also programmable in °F			

¹ The accuracy refers to the maximum measuring range. The accuracy is reduced with short spans.

RTD

Designation	Standard	Connection circuit	Meas. range	Accuracy	Measuring current
Pt100	EN 60 751 (TC = 3.85*10 ⁻³ 1/°C)	2/3-wire	-200 to +100°C	±0.5°C	500µA
		2/3-wire	-200 to +850°C	±0.8°C	250µA
		4-wire	-200 to +100°C	±0.5°C	500µA
		4-wire	-200 to +850°C	±0.5°C	250µA
Pt100	JIS 1604 (TC = 3.917*10 ⁻³ 1/°C)	2/3-wire	-200 to +100°C	±0.5°C	500µA
		2/3-wire	-200 to +650°C	±0.8°C	250µA
		4-wire	-200 to +100°C	±0.5°C	500µA
		4-wire	-200 to +650°C	±0.5°C	250µA
Pt100	GOST 6651-94 A.1 (TC = 3.91 *10 ⁻³ 1/°C)	2/3-wire	-200 to +100°C	±0.5°C	500µA
		2/3-wire	-200 to +850°C	±0.8°C	250µA
		4-wire	-200 to +100°C	±0.5°C	500µA
		4-wire	-200 to +850°C	±0.5°C	250µA
Pt500	EN 60 751 (TC = 3.85*10 ⁻³ 1/°C)	2/3-wire	-200 to +100°C	±0.5°C	250µA
		2/3-wire	-200 to +850°C	±0.8°C	250µA
		4-wire	-200 to +100°C	±0.5°C	250µA
		4-wire	-200 to +850°C	±0.5°C	250µA
Pt1000	EN 60 751 (TC = 3.85*10 ⁻³ 1/°C)	2/3-wire	-200 to +100°C	±0.5°C	500µA
		2/3-wire	-200 to +850°C	±0.8°C	250µA
		4-wire	-200 to +100°C	±0.5°C	500µA
		4-wire	-200 to +850°C	±0.5°C	250µA
Ni100	DIN 43 760 (TC = 6.18*10 ⁻³ 1/°C)	2/3-wire	-60 to +180°C	±0.4°C	500µA
		4-wire	-60 to +180°C	±0.4°C	500µA
Pt50	ST RGW 1057 1985 (TC = 3.91*10 ⁻³ 1/°C)	2/3-wire	-200 to +100°C	±0.5°C	500µA
		2/3-wire	-200 to +1100°C	±0.9°C	250µA
		4-wire	-200 to +100°C	±0.5°C	500µA
		4-wire	-200 to +1100°C	±0.6°C	250µA
Cu 50	GOST 6651-94 A.3 (TC = 4.28*10 ⁻³ 1/°C)	2/3-wire	-50 to +100°C	±0.5°C	500µA
		2/3-wire	-50 to +200°C	±0.9°C	250µA
		4-wire	-50 to +100°C	±0.5°C	500µA
		4-wire	-50 to +200°C	±0.6°C	250µA
Cu100	GOST 6651-94 A.4 (TC = 4.26*10 ⁻³ 1/°C)	2/3-wire	-50 to +200°C	±0.5°C	500µA
		4-wire	-50 to +200°C	±0.5°C	500µA
Connection circuit	2-, 3-, or 4-wire circuit				
Shortest span	15°C				
Sensor lead resistance	max. 30 Ω per conductor for 3-wire/4-wire circuit max. 10Ω per conductor for 2-wire circuit				
Range start/end	freely programmable within the limits in 0.1°C steps				
Sampling cycle	3 or 6 channels, 250msec				
Input filter	2nd order digital filter; filter constant adjustable from 0 to 10sec				
Test voltage for electrical isolation	350V (via optocoupler)				
Resolution	> 14bit				

Transducer short circuit/break

	Short circuit ¹	Break ¹
Thermocouple	not detected	detected
RTD	detected	detected
Voltage ≤ 210mV	not detected	detected
Voltage > 210mV	not detected	not detected
Current	not detected	not detected

¹ Programmable reaction of device, e.g. trigger an alarm

Binary inputs (extra code)

Quantity	4, to DIN 19 240; 1Hz max., 32V max.
Level	logic "0": -3 to +5V, logic "1": 12 – 30V
Sampling cycle (binary inputs, without counter function)	1 sec
Count frequency (binary inputs, with counter function)	30Hz max.
Auxiliary voltage (output)	24V ±10%, 50mA (short-circuit proof)

Outputs (extra code)

3 relays	changeover (SPDT) (3A, 230V)
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Interfaces

Setup interface (standard)	to read and write measurement, instrument, and configuration data (Modbus protocol)
RS232 / RS485 (extra code)	to read and write measurement, instrument, and configuration data (Modbus protocol)
Ethernet (extra code)	to read and write measurement, instrument and configuration data (Modbus-TCP protocol)

Screen

Resolution	320 x 240 pixels
Size	5"
Number of colors	27 colors
Screen refresh rate	≥150Hz
Contrast setting	adjustable on instrument
Screen saver (switch-off)	through waiting time or control signal

Electrical data

Supply (switch-mode PSU)	110 – 240 V AC +10/-15%, 48 – 63Hz or 20 – 53V AC/DC, 48 – 63Hz
Test voltages (type test)	to EN 61 010, Part 1, March 1994 overvoltage category II, pollution degree 2 for supply voltage: AC 2.3kV/50Hz, 1 min, for supply voltage: AC/DC 510V/50Hz, 1 min for supply voltage: AC 2.3kV/50Hz, 1 min, for supply voltage: AC/DC 510V/50Hz, 1 min
- electrical supply to measuring circuit	350V/50Hz, 1 min
- electrical supply to housing (protective earth)	up to 30V AC and 50V DC
- measuring circuits to other measuring circuits and housing	
- electrical isolation between the analog inputs	
Supply voltage error	< 0.1 % of range span
Power consumption	approx. 25VA
Data backup	see page 6
Electrical connection	At the back, via pluggable screw terminals, conductor cross-section ≤ 2.5mm ² or 2 x 1.5mm ² with core end ferrules.
Electromagnetic compatibility (EMC)	EN 61 326 Class A to industrial requirements
- interference emission	
- interference immunity	
Safety regulations	to EN 61 010
Enclosure protection	to EN 60 529 category 2, front IP54, back IP20
Ambient temperature range	0 to +50°C
Ambient temperature error	0.03 %/°C
Storage temperature range	-20 to +60°C

Approvals

UL approval	
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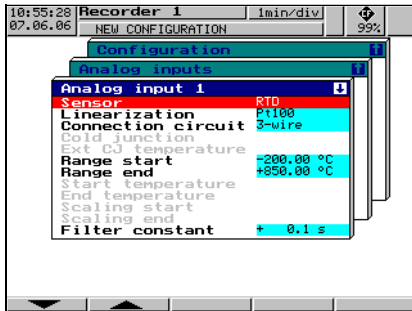
Housing

Housing type - housing door	housing for flush panel mounting to DIN 43 700, galvanized steel sheet zinc die-casting
Bezel size	144 mm x 144 mm
Depth behind panel	214 mm, including connectors
Panel cut-out	138 ^{+1.0} mm x 138 ^{+1.0} mm
Panel thickness	2 – 40 mm
Housing mounting	in panel to DIN 43 834
Climatic conditions	≤ 75% relative humidity, no condensation
Operating position	unrestricted, but taking into account the viewing angle of the screen, horizontally ±50°, vertically ±30°
Enclosure protection	to EN 60 529 Category 2, IP54 front (IP65 with extra code 266), IP20 back
Weight	approx. 3.5 kg

Operation and configuration

On the recorder

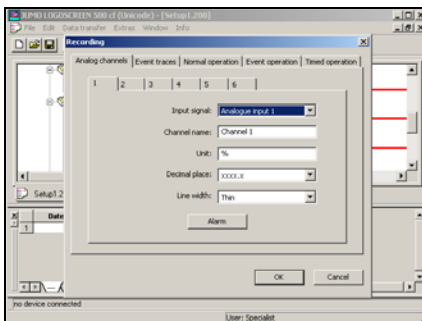
Configuration is menu-led, using 8 keys. Three of these have fixed functions assigned (Enter, Menu, Exit), and five alter their function and visual representation according to the menu. The currently active functions are shown on the bottom edge of the screen, so that key functions are always unambiguous during use.



The configuration on the recorder is protected from unauthorized access by a code number.

Via setup program for PC (accessory)

Instrument configuration via the setup program for the PC is more convenient than using the keys on the instrument itself.



The configuration data can be created on a data medium (CompactFlash card) and read into the recorder, or transferred to the instrument via one of the interfaces. The PC can be used to output the settings to a printer.

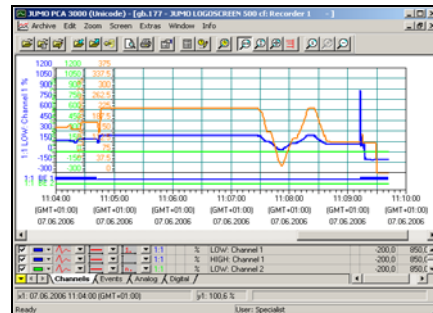
Operating language

The operating language for the instrument can be configured in various languages. English, German, French, Dutch, Spanish, Italian, Hungarian, Czech, Swedish, Polish, Danish, Finnish, Portuguese and Russian have been implemented.

Others on request.

Evaluation program

The PC evaluation program (PCA3000) is a program that runs under Windows NT/2000/XP, and is used to manage, archive, visualize and evaluate the recorder data that have been stored on a CompactFlash card.



- The data from the LOGOSCREEN 500 cf are read in by the evaluation program and saved in an archive file. The lifecycle data management ensures that, if needed, all the data throughout the lifetime of a system can be saved in an archive file. Changes to the configuration are shown separately, together with the corresponding measurement data.
- The user can gain access at any time to certain data sets (configuration), which can be distinguished by supplementary information. In addition, it is possible to restrict the time periods to be evaluated.
- Any analog channels or event traces of a paperless recorder can subsequently be combined into PCA groups in PCA3000.
- Since each group is displayed in a separate window, several groups can be shown simultaneously on the screen and compared.
- Operation by mouse or keys.
- The export filter makes it possible to export the stored data for processing in another program (e.g. Excel).
- The PCA3000 evaluation program supports network capability, i. e. several users can obtain data from the same database in the network, independently of one another.

PCA communication software (PCC)

- The data can be read out from the paperless recorder via the serial interface (RS232/RS485) on the back, via the Ethernet interface, or via the setup interface on the front. The data can be read out manually or automatically (e.g. daily at 23.00 hrs).
- Data can also be retrieved via remote control, through a modem.

Interface

The current process data, configuration data and special instrument data can be read out via the RS232/RS485 interface (extra code), via the Ethernet interface, or through the setup interface that is fitted as standard. The archive data (FLASH memory) can also be read out, in conjunction with the PCC software.

Serial interfaces

When using the RS232 interface, a maximum cable length of 15m is permitted. A cable length of 1.2km is allowed for the RS485 interface.

Connection is by a 9-pole SUB-D connector (for RS232/RS485) on the back of the instrument, or on the front (via the setup interface). Modbus and Jbus protocols are available, and the transmission mode used is RTU (Remote Terminal Unit).

The changeover between the RS232 and the RS485 interface is made through the program (configuration).

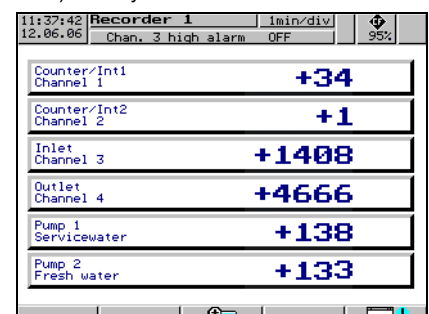
Ethernet interface

Connection is by a RJ45 socket on the back of the instrument. Modbus/TCP is used as a protocol. The maximum transmission rate is 10Mbit/sec.

Extra codes

Counters/integrators/operating time counters

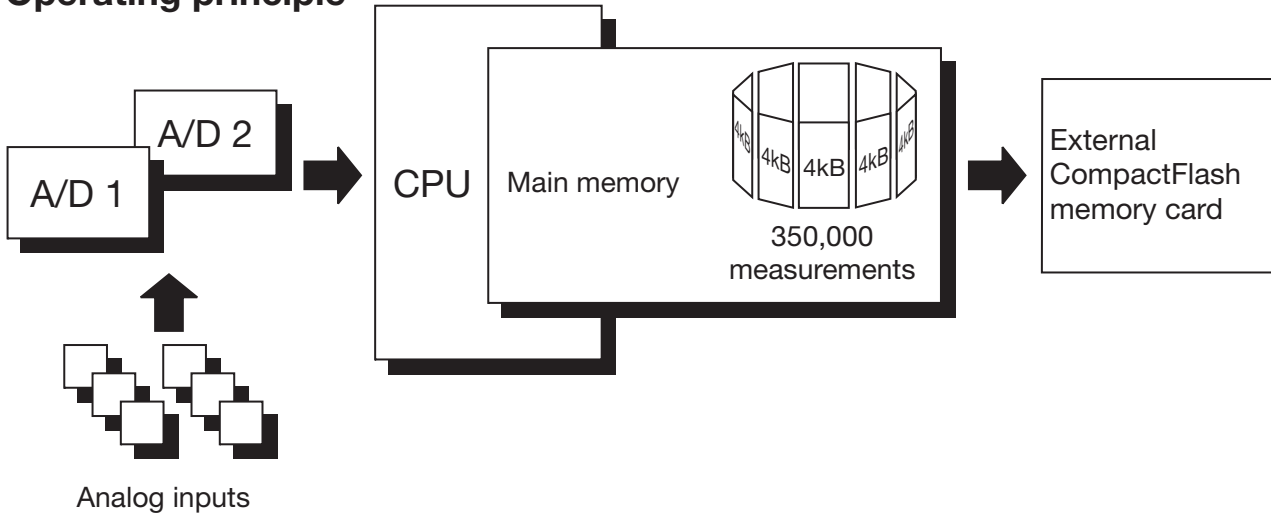
6 additional internal channels are available for use as counters, integrators or operating time counters. These counters are controlled through the binary inputs, the alarms, or via the logic channels. The numerical indication is shown in a separate window, with a maximum of 9 figures. The acquisition period can be selected as: periodic, daily, weekly, monthly, yearly as well as externally, total (overall count) or daily from ... to.



Math/logic module

The module for math and logic (only configurable via the setup software) enables, for instance, the combination of analog channels with one another, with counters and/or with the binary inputs. The operators available for formulae are: +, -, *, /, (,), SQRT(), MIN(), MAX(), SIN(), COS(), TAN(), **, EXP(), ABS(), INT(), FRC(), LOG(), LN(), humidity, moving average or !, &, |, ^, as well as (and).

Operating principle



Data processing

The measurements from the analog inputs are acquired continuously in a 250msec sampling cycle. These measurements also serve as the basis for limit monitoring. The measurements are transferred to the main memory of the instrument, according to the configurable storage cycle and stored value (average, momentary value, maximum, minimum, or peak value).

Main memory (FLASH memory)

The data stored in the main memory are regularly copied to the Compact Flash card in 4 kbyte blocks. The main memory is written to as a ring memory, i.e. when it is full, the oldest data will automatically be overwritten by new data. The memory capacity is sufficient for approx. 350,000 measurements.

The instrument monitors the capacity of the main memory and activates the "Memory alarm (internal)" signal if the level falls below a configurable residual capacity.

CompactFlash card

For saving the data, CompactFlash cards (industrial grade) can be used with the following storage capacities: ≤ 2GB. The instrument monitors the capacity of the CompactFlash card, and activates the "Memory alarm (CF card)" signal if the level falls below a configurable residual capacity. This signals can be used, for instance, to operate a relay (warning signal "Swap CF card").

Data security

The data are stored in coded form in a proprietary format. If the CompactFlash card is removed from the instrument, no data will be lost immediately, as these data are still stored in the FLASH memory. A loss of data will only occur if, after the CompactFlash card has been removed, the FLASH memory is completely rewritten as well.

Response to disconnection of the instrument from the electrical supply

- Configuration and measurement data will be retained, even after the paperless recorder has been disconnected from the electrical supply.
- When the lithium battery, supplied ex-factory, is exhausted (≥ 10years) or the storage capacitor (available on request) is discharged (typically 2 weeks), all measurements that have not yet been saved on a CompactFlash card, as well as the time, will be lost.

Recording duration

Depending on the configuration of the instrument, the duration of the recording can vary over a considerable range (from a few days up to several months).

Limit monitoring/ operating mode changeover

An over/underlimit condition will trigger an alarm. The alarm can be output through a relay or used as a control signal for changing over the operating mode from normal/timed operation to event operation. The storage cycle and stored value can be configured separately for all three operating modes. With the help of the alarm delay function, brief occurrences of over/underlimit conditions can be filtered out, with the result that no alarm is generated.

Normal operation

If the instrument is **not** in event operation and **not** in timed operation, then normal operation is active by default.

Timed operation

Timed operation is active on a daily basis, within a programmable time period.

Event operation

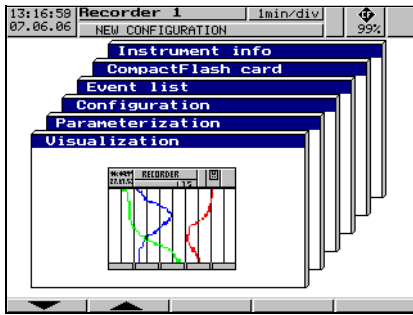
Event operation is activated/terminated by a control signal (binary input, combination alarm). As long as this control signal is active, the instrument is in event operation.

The operating modes have different priorities

Operating mode	Priority
Event operation	1 (higher)
Timed operation	2
Normal operation	3 (lower)

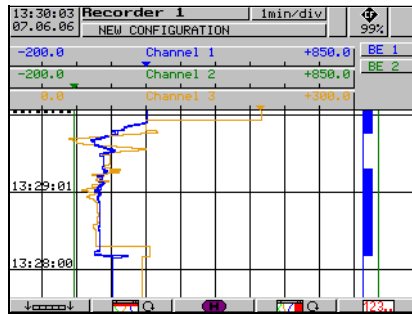
Presentation modes on the instrument

Main menu



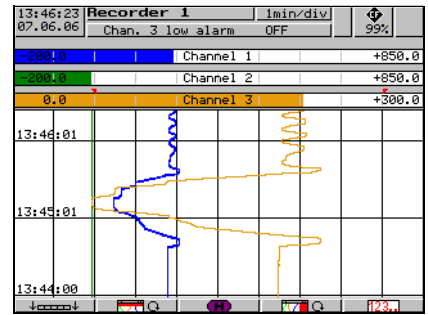
- Branching into the menus (levels)
 - visualization
 - parameterization
 - configuration
 - event list
 - CF card manager
 - device info

Visualization



- Analog channels and event traces
- In addition to the curves, measurements can be made visible in numerical form, with scaling or as a bar graphs.
- Softkeys can be made visible or hidden.

Visualization

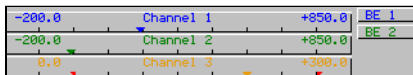


- Graphical presentation of the analog channels (without event traces)
- Display of scaling and limit markers for the channels

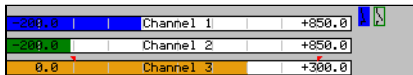
Visualization



- Display mode "Measurements" (numerical display)

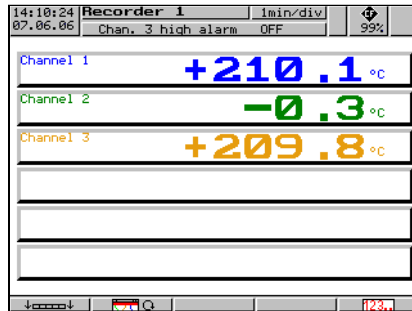


- Display mode "Scaling" including limit markers



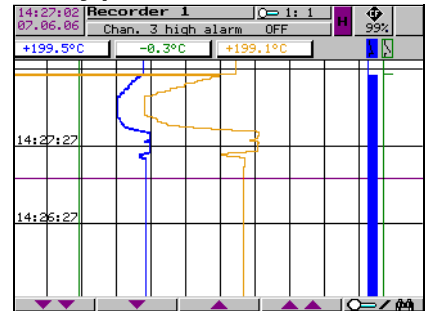
- Display mode "Bar graph" including limit markers

Visualization



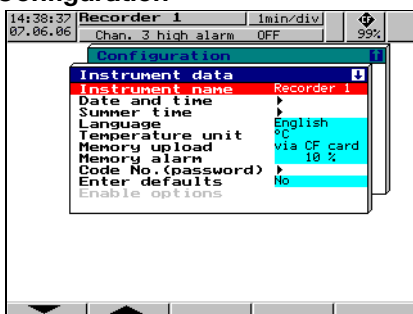
- The graphical presentation can be switched off in favor of a larger numerical display.

History presentation



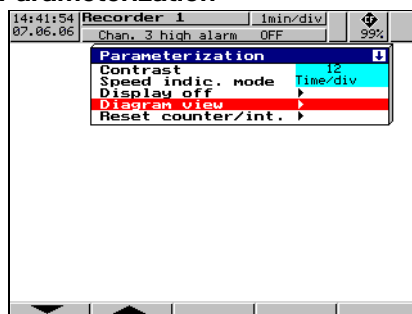
- All stored measurement data are shown as curves at different zoom levels.
- Numerical display of the measurements for the analog channels at the cursor position.
- Shifting of the visible section within the stored measurement data.
- When recorded as an envelope: the maximum or minimum value display can be changed within the channel line.

Configuration



- Configuration from instrument keys
- Password-protected
- Configuration can be transferred to CF card
- Configuration data can be read/alterd through the setup program

Parameterization



- General settings without password
- Selection of the presentation mode, such as: analog data and/or event traces with/without channel line

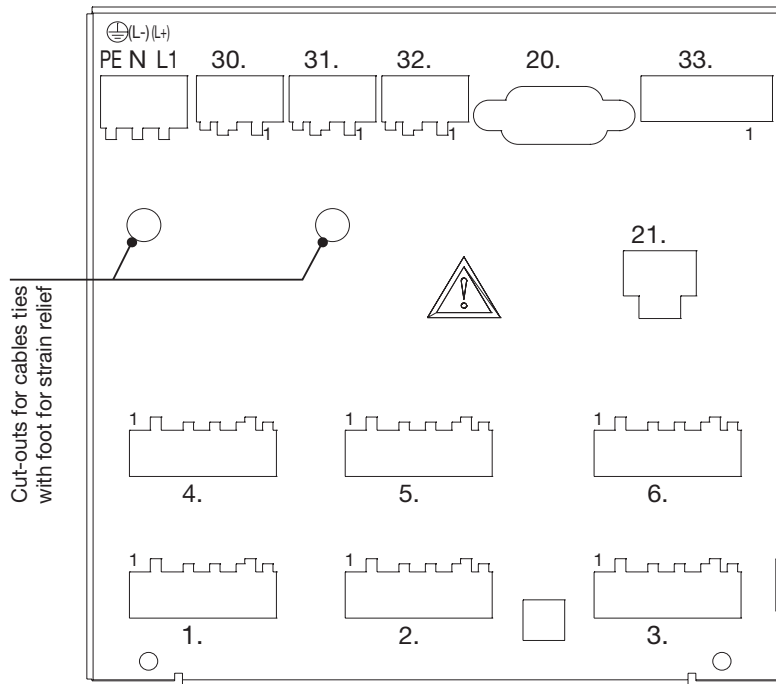
Event list

Event list				
07.06.06	14:37:33	Chan. 3 high alarm	OFF	
07.06.06	14:37:38	Chan. 3 low alarm	OFF	
07.06.06	14:37:37	Chan. 3 high alarm	ON	
07.06.06	14:37:37	Chan. 3 low alarm	ON	
07.06.06	14:37:31	POWER ON		
07.06.06	14:37:25	POWER OFF		
07.06.06	14:28:57	Chan. 3 high alarm	OFF	
07.06.06	14:28:57	Chan. 3 low alarm	OFF	
07.06.06	14:28:56	Chan. 3 high alarm	ON	
07.06.06	14:28:56	Chan. 3 low alarm	ON	
07.06.06	14:28:51	POWER ON		
07.06.06	14:28:23	POWER OFF		
07.06.06	14:23:56	Chan. 3 high alarm	OFF	
07.06.06	14:23:56	Chan. 3 low alarm	OFF	
07.06.06	14:23:55	Chan. 3 high alarm	ON	
07.06.06	14:23:55	Chan. 3 low alarm	ON	

- Important events in plain text (alarm messages, external texts or system messages)

Connection diagram

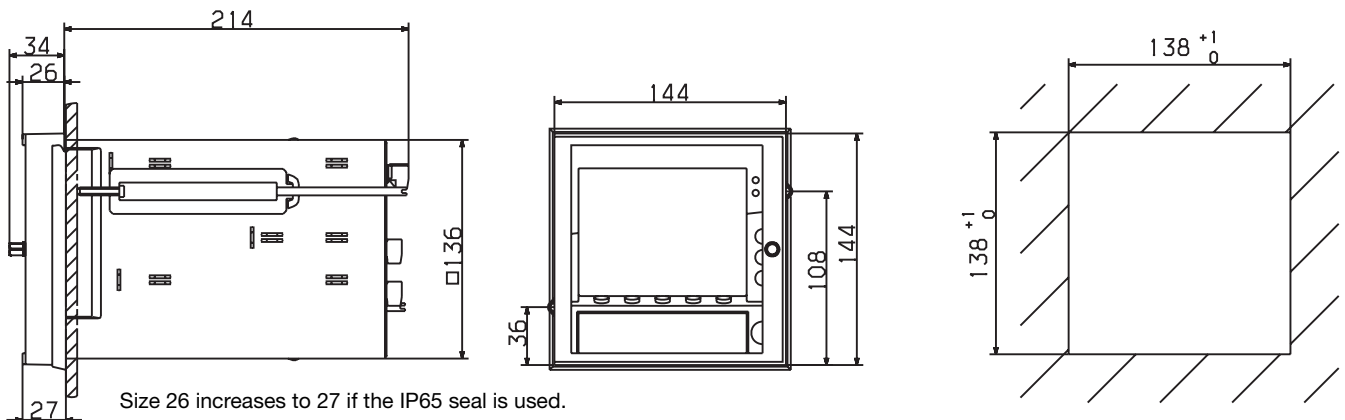
Rear view of a 3/6-channel paperless recorder with pluggable screw terminals



Terminal assignments for 3/6-channel paperless recorder		Diagram
Analog inputs	Connector	
Thermocouple	1 to 6	
RTD in 2-wire circuit	1 to 6	
RTD in 3-wire circuit	1 to 6	
RTD in 4-wire circuit	1 to 6	
Voltage input ≤ 210mV	1 to 6	
Voltage input > 210mV	1 to 6	
Current input	1 to 6	

Supply		
Supply	PE N (L-) L1 (L+)	
Relay outputs (extra code)		
Relays K1, K2, K3 changeover (SPDT)	30, 31, 32	
Setup interface (included in delivery)		
The setup interface can be found behind a protective flap on the front of the instrument.		
Interfaces (extra code)		
RS232 9-pole SUB-D socket (switchable to RS485)	20	2 RxD Received Data 3 TxD Transmitted Data 5 GND Ground
RS485 9-pole SUB-D socket (switchable to RS232)	20	3 TxD+/RxD+ Transmitted/Received Data + 5 GND Ground 8 TxD-/RxD- Transmitted/Received Data -
Ethernet RJ45 socket	21	1 TX+ Transmitted Data + 2 TX- Transmitted Data - 3 RX+ Received Data + 6 RX- Received Data -
Binary inputs (extra code)		
Supply voltage 24V/50mA Binary inputs voltage-controlled LOW = -3 to +5V DC HIGH = 12 to 30V DC	33 6 +24V auxiliary supply 5 GND 4 binary input 1 3 binary input 2 2 binary input 3 1 binary input 4	 Example: binary input 4, operated from the internal supply voltage

Dimensions



Order details

Entry-level Paperless Recorder with CompactFlash card as storage medium and life-cycle data management

(1) Basic version	
706510/14	Paperless recorder with 3 analog inputs
706510/24	Paperless recorder with 3 analog inputs incl. setup and PC evaluation program (PCA3000)
706510/15	Paperless recorder with 6 analog inputs
706510/25	Paperless recorder with 6 analog inputs incl. setup and PC evaluation program (PCA3000)
(2) Supply voltage	
x x x x 22	20 – 53V AC/DC, 48 – 63Hz
x x x x 23	110 – 240V AC +10/-15%, 48 – 63Hz
(3) Extra codes	
x x x x 008	Ethernet interface
x x x x 020	Lithium battery for memory buffering (ex-factory)
x x x x 021	Storage capacitor (instead of extra code 020)
x x x x 260	Integrators and counters, as well as math and logic module (the math and logic module can only be configured through the setup program).
x x x x 261	4 binary inputs, 3 relay outputs, serial interface RS232/RS485 (Modbus, Jbus)
x x x x 265	Door with lock (IP54)
x x x x 266	IP65 seal, wide mounting brackets
x x x x 350	Universal carrying case TG-35

Order code	(1)	-	(2)	/	(3)	, ... ¹
Order example	706510/14	-	23	/	020	

¹ List extra codes in sequence, separated by commas.

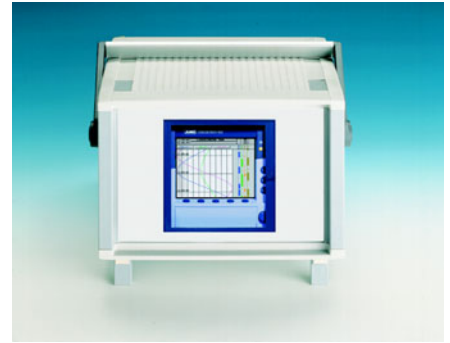
Standard accessories

- 1 Operating Manual B 70.6510.0
- 2 mounting brackets
- Cable tie with foot (can be released), for strain relief of the connecting cables to the sensors

Accessories (Data Sheet 70.9700)

	Sales No.
- Setup program, multilingual	70/00467262
- PC evaluation software (PCA3000), multilingual	70/00431882
- PCA communications software (PCC), multilingual	70/00431879
- PC interface with TTL/RS232 converter and adapter (socket)	70/00350260
- PC interface with USB/TTL converter, adapter (socket) and adapter (pins)	70/00456352
- Enabling extra code 260 (configuration of the math and logic module only through the setup program)	70/00393217
- CompactFlash memory cards in various sizes. The CF cards specified by JUMO are tested and designed for industrial applications. We do not accept any responsibility for other CF cards.	

Universal carrying case TG-35



- for the installation of a paperless recorder with bezel size 144mm x 144mm
- 326mm x 227mm x 366mm (W x H x D)
Cut-out: 138mm x 138mm
- The paperless recorder is accessible from the back

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 Internet: www.jumo.us



LOGOSCREEN es



Paperless Recorder for secure acquisition of FDA-compliant measurement data

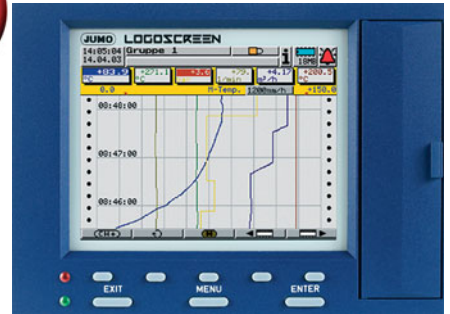
Brief description

Together with its PC software components, this paperless recorder provides a closed system for the electronic acquisition, storage and archiving of process data that fulfills the requirements of FDA 21 CFR Part 11.

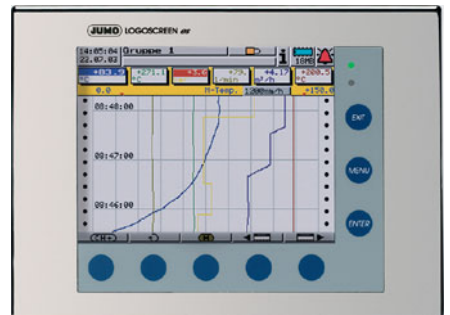
The presentation is mainly determined by a 5.7" color screen, on which the measurement data are displayed in different formats (numbers, diagrams, bar graph...).

The integrated Security Manager ensures that only authorized persons can operate the instrument, and the integrated Audit-Trail Manager ensures seamless documentation of all operative actions.

Measurement data are electronically stored and available for evaluation both locally and on a PC. Front bezel size is 144 mm x 200 mm, maximum mounting depth is 228 mm.

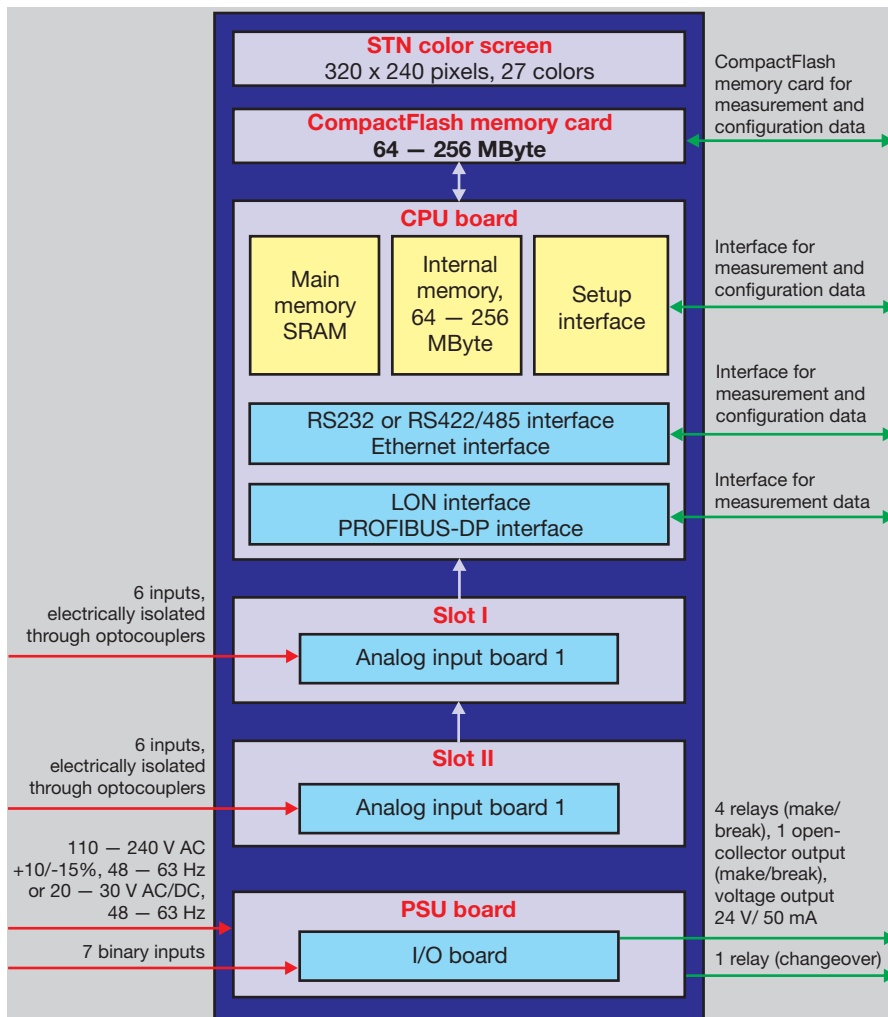


Type 706560/...



Type 706560/..., stainless steel front

Block structure



Key features

- conforms to FDA CFR Part 11
- monitored back-panel cover
- no chart/pens
- presentation of the measurement data in vertical/horizontal diagrams, bar graph, numerical, ...
- batch reporting
- local availability of the measurement data stored in RAM
- data records can be saved to a CompactFlash memory card
- instrument can be configured from the keypad, via the CompactFlash memory card or serial interface
- evaluation of the archived data through the PC evaluation software
- adaptation of the storage cycles to the individual process through
 - normal operation
 - event operation
 - day-time operation
- report with minimum/maximum/average values and integrator
- freely programmable inputs for resistance thermometers, thermocouples, DC current and DC voltage
- sampling cycle minimum 125msec with 12 analog inputs
- PROFIBUS-DP and Ethernet connection

Technical data

Internal analog inputs (channels 1 to 12)

Thermocouple

Designation	Type	Standard	Range	Linearization accuracy ¹
Fe-Con	L	DIN 43 710	-200 to + 900°C	±0.1%
Fe-Con	J	EN 60 584	-210 to +1200°C	±0.1% above -100°C
Cu-Con	U	DIN 43 710	-200 to + 600°C	±0.1% above -150°C
Cu-Con	T	EN 60 584	-270 to + 400°C	±0.15% above -150°C
NiCr-Ni	K	EN 60 584	-270 to +1372°C	±0.1% above -80°C
NiCr-Con	E	EN 60 584	-270 to +1000°C	±0.1% above -80°C
NiCrSi-NiSi	N	EN 60 584	-270 to +1300°C	±0.1% above -80°C
Pt10Rh-Pt	S	EN 60 584	-50 to +1768°C	±0.15% above 0°C
Pt13Rh-Pt	R	EN 60 584	-50 to +1768°C	±0.15% above 0°C
Pt30Rh-Pt6Rh	B	EN 60 584	0 to 1820°C	±0.15% above 400°C
Shortest span			Types L, J, U, T, K, E, N: Types S, R, B:	100°C 500°C
Range start/end	freely programmable within the limits in 0.1 °C steps			
Cold junction	Pt100 internal or thermostat external constant			
Cold junction accuracy (internal)	± 1°C			
Cold junction temperature (external)	-50 to +100°C, adjustable through setup software			
Sampling cycle	6 or 12 channels 125msec			
Input filter	2nd order digital filter; filter constant adjustable from 0 – 10.0sec			
Test voltage	500V (across optocoupler)			
Resolution	better than 14 bit			
Features	also programmable in °F			

¹ The linearization accuracy refers to the maximum range span.
The linearization accuracy is reduced for shorter spans.

Resistance thermometers

Designation	Standard	Connection	Range	Linearization accuracy	Measuring current
Pt 100	EN 60 751	2/3-wire	-200 to +500°C	±0.4°C	500µA
		2/3-wire	-200 to +850°C	±0.8°C	250µA
		4-wire	-200 to +500°C	±0.4°C	500µA
		4-wire	-200 to +850°C	±0.5°C	250µA
Pt 100 JIS		2/3-wire	-200 to +500°C	±0.4°C	500µA
		2/3-wire	-200 to +650°C	±0.8°C	250µA
		4-wire	-200 to +500°C	±0.4°C	500µA
		4-wire	-200 to +650°C	±0.5°C	250µA
Pt 500	EN 60 751	2/3-wire	-200 to +500°C	±0.4°C	250µA
		2/3-wire	-200 to +850°C	±0.8°C	250µA
		4-wire	-200 to +500°C	±0.4°C	250µA
		4-wire	-200 to +850°C	±0.5°C	250µA
Pt 1000	EN 60 751	2/3-wire	-200 to +500°C	±0.4°C	500µA
		2/3-wire	-200 to +850°C	±0.8°C	250µA
		4-wire	-200 to +500°C	±0.4°C	500µA
		4-wire	-200 to +850°C	±0.5°C	250µA
Ni 100	EN 60 751	2/3-wire	-60 to +180°C	±0.4°C	500µA
		4-wire	-60 to +180°C	±0.4°C	500µA
Connection type	2-, 3- or 4-wire circuit				
Shortest span	15°C				
Probe lead resistance	max. 30Ω per core for 3- and 4-wire circuit max. 10Ω per core for 2-wire circuit				
Range start/end	freely programmable within the limits in 0.1°C steps				
Sampling cycle	6 or 12 channels 125msec				
Input filter	2nd order digital filter; filter constant adjustable from 0 – 10sec				
Test voltage	500V (across optocoupler)				
Resolution	better than 14 bit				
Features	also programmable in °F				

Resistance transmitter and potentiometer

Range	Accuracy	Measuring current
up to 180Ω	±150mΩ	500μA
up to 390Ω	±300mΩ	250μA
up to 2000Ω	±2Ω	500μA
up to 4000Ω	±4Ω	250μA
Connection type	resistance transmitter: 3-wire circuit potentiometer: 2-/3-wire circuit	
Shortest span	6Ω	
Probe lead resistance	max. 30Ω per core in 4-wire circuit max. 20Ω per core in 2- and 3-wire circuit up to 200Ω range: max. 10Ω per core in 2-and 3-wire circuit	
Resistance values	freely programmable within the limits in 0.1Ω steps	
Sampling cycle	6 or 12 channels 125msec	
Input filter	2nd order digital filter; filter constant adjustable from 0 – 10.0sec	

Input for DC voltage or DC current

Basic range	Accuracy	Input resistance
-20 to +70mV	±80μV	R _{IN} ≥ 1 MΩ
-5 to +105mV	±100μV	R _{IN} ≥ 1 MΩ
-10 to +210mV	±240μV	R _{IN} ≥ 1 MΩ
-0.5 to +12 V	±6mV	R _{IN} ≥ 470 kΩ
-0.05 to + 1.2V	±1 mV	R _{IN} ≥ 470 kΩ
-1.2 to + 1.2V	±2mV	R _{IN} ≥ 470 kΩ
-12 to +12 V	±12mV	R _{IN} ≥ 470 kΩ
Shortest span	5mV	
Range start/end	freely programmable within the limits (up to 999mV in 0.01mV steps, above 1V in 1mV steps)	
-2 to +22mA	±20μA	burden voltage 1V max. burden voltage 1V max.
-22 to +22mA	±44μA	
Shortest span	0.5mA	
Range start/end	freely programmable within the limits in 0.1mA steps	
Sampling cycle	6 or 12 channels 125msec	
Input filter	2nd order digital filter; filter constant adjustable from 0 – 10.0sec	
Features	adjustable linearizations for thermocouples and resistance thermometers (for connection to transmitters without linearization)	

Transducer short-circuit/break

	Short-circuit ¹	Break ¹
Thermocouple	not detected	detected
Resistance thermometer	detected	detected
Resistance transmitter	detected	detected
Potentiometer	not detected	detected
Voltage up to ± 1V	not detected	detected
Voltage above ± 1V	not detected	not detected
Current	not detected	not detected

¹ Programmable reaction of instrument, e.g. triggering alarm

Binary inputs (extra code)

Number	7 to DIN VDE 0411, Part 500; 25Hz max., 32V max.
Level	logic "0": -3 to +5V, logic "1": 12 to 30V
Sampling cycle	minimum 1 sec

Outputs

1 relay (ex-factory)	changeover (SPDT), 3A, 230V AC ¹
4 relays (extra code)	make/break (SPST-NO/SPST-NC), 3A, 230V AC ¹
1 open-collector output (extra code)	25V max., 100mA max.

¹ with resistive load. It is not permissible to mix SELV circuits and supply circuits.

Screen

Resolution	320 x 240 pixels
Size	5.7"
Number of colors	27 colors

Electrical data

Supply (switch-mode power supply)	110 – 240V AC +10/-15%, 48 – 63Hz or 20 – 30V AC/DC 48 – 63Hz
Electrical safety	to EN 61 010, Part 1, August 2002 overvoltage category II, pollution degree 2
Test voltages (type test)	
- mains supply circuit to measurement circuit	with AC supply: 3.7kV 50Hz, 1 min, with AC/DC supply: 510V 50Hz, 1 min
- mains supply circuit to housing (protective earth)	with AC supply: 2.3kV 50Hz, 1 min, with AC/DC supply: 510V 50Hz, 1 min
- measurement circuits to measurement circuit and housing	510V 50Hz, 1 min
- electrical isolation between the analog inputs	up to 30V AC and 50V DC
Supply voltage error	less than 0.1 % of span
Power consumption	25VA approx.
Data backup	see page 7
Electrical connection	at rear through plug-in screw terminals, max. conductor cross-section 2.5mm ² or 2x 1.5mm ² with ferrules

Environmental influences

Ambient temperature range	0 to +45°C
Ambient temperature error	0.03 % per °C
Storage temperature range	-20 to +60°C
Climatic conditions	not exceeding 75% relative humidity, no condensation
EMC	EN 61 326
- interference emission	Class A
- immunity to interference	to industrial requirements

Housing

Housing front	zinc die-casting
Housing type	housing for flush-panel mounting to DIN 43 700, galvanized steel
Bezel size	200mm x 144mm
Depth behind panel	233mm
Panel cut-out	138 ^{+1.0} mm x 138 ^{+1.0} mm
Housing fixing	in panel to DIN 43 834
Operating position	unrestricted, taking into account the viewing angle of the screen, horizontal ±50°, vertical ±30°
Protection	to EN 60 529 Category 2, front IP54 (IP65 with extra code stainless steel front), rear IP20
Weight	3.5kg approx.

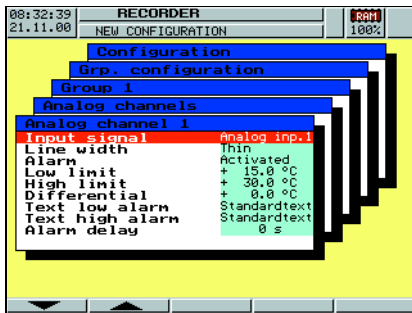
External analog measurement inputs / binary inputs / binary outputs

Type	JUMO mTRON automation system
Sampling cycle	1 sec
Technical data	see Data Sheet: 70.4015 Relay module 70.4020 Analog input module 70.4030 Logic module
Configuration	iTOOL Project design software (70.4090)

Operation and configuration

On the recorder

The instrument is configured from eight keys under menu guidance. Functions of 5 keys (softkeys) on the instrument alter according to the context so that there are always unique key functions during operation. Softkey functions are indicated on the screen in plain text or through symbols.



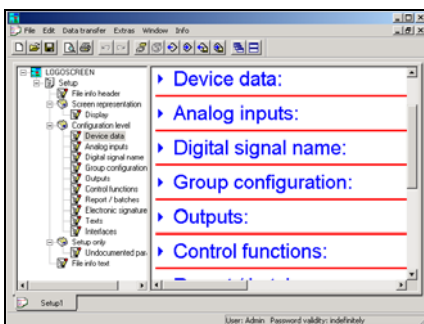
Integrated user lists (for various users with different access rights) protect the recorder from unauthorized access.

Via setup program for PC (extra code)

More conveniently than from the instrument keys, the recorder can be configured via the setup program for PC.

Communication between the PC setup program and the paperless recorder can be made through:

- the setup interface
- the serial interface
- the Ethernet interface, or
- the CompactFlash memory card.



The configuration data can be archived on a data storage medium and can be output to a printer.

Via CompactFlash memory card

The configuration can be saved to a CompactFlash memory card, and read into the instrument from this card.

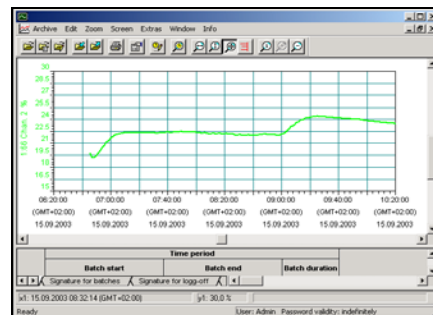
Operating language

The operating language for the instrument can be configured for different languages. English, German, French, Dutch, Italian, Spanish, Hungarian, Czech, Swedish, Polish, Danish, Finnish, Portuguese and Russian have already been implemented.

PC programs (accessories)

PC evaluation program (PCA 3000)

The PC evaluation program (PCA 3000) is a program which runs under Windows NT4.0/2000/XP, and is used to manage, archive, visualize and evaluate the recorder data.



- The data of instruments with different configurations are recognized by the evaluation program and stored in an archive database. The complete management is performed automatically. The user only has to enter an identifier (supplementary description) manually.
- The user can at any time access specific sets of data which can be distinguished by the identifier. In addition, the time ranges to be evaluated can be limited.
- Any analog and digital channels of a paperless recorder can be subsequently combined into PCA groups in the PCA3000 software.
- Since each group is displayed in a separate window, several groups can be shown simultaneously on the screen and compared.
- Operation by mouse and keys.
- It is possible to export the stored data via the export filter, so that they can be processed in other programs, such as Excel.
- The PCA 3000 evaluation program has network capability, i.e. several users can obtain data from the same database in the network independently of each other.

PCA communications software (PCC)

- The data can be read out from the paperless recorder via the serial interface (RS232/RS422/RS485). The data can be read out either manually or automatically (e.g. daily at 23 hrs).
- Data can also be retrieved via remote control, through a modem.

PC Security Manager (PCS)

- Software for the administration of access control. This software is only accessible for administrators.

PC Audit-Trail Manager

- Software for the documentation of operational actions that could lead to alterations in the data records.

Interfaces

- Setup interface (fitted as standard)
- RS232 interface (fitted as standard)
- RS422/485 interface (extra code)
- Ethernet interface (extra code)
- LON interface (extra code)
- PROFIBUS-DP interface (extra code)

Setup interface

The setup interface is used together with the PC interface cable (including the TTL/RS232 converter and adapter) for operation of the PC setup program (see Page 5). The paperless recorder has setup interfaces (connected in parallel) on both the front and back panels. They cannot both be used at the same time.

RS232 interface

RS422/485 interface

The current process data, as well as specific instrument data, can be read out via the RS232 or RS422/RS485 interfaces. The data that are stored in the internal memory can also be read out in conjunction with the PC evaluation software PCA3000 and the PCA communications software (PCC).

Normally, the instrument is supplied with a RS232 interface which allows for a lead length of maximum 15 meters. The RS422/RS485 interface permits a lead length of 1.2 km.

Connection is by a 9-pin SUB-D connector at the back of the instrument. Modbus and Jbus protocols are available, and the transmission mode used is RTU (Remote Terminal Unit).

Ethernet interface

The Ethernet interface can be used in local networks for communication between the paperless recorder and the PC setup program or the PCA communications software. The IP address is given a fixed setting through configuration on the instrument or in the PC setup program.

When using the Ethernet interface, care must be taken to ensure that only one client at a time is permitted to access the instrument (server).

Transmission protocol: TCP/IP

Network type: 10BaseT

	Setup interface	RS232 RS422 RS485	Ethernet	PROFI-BUS-DP	LON	External CF card
Read/write measurements (present data)	yes	yes	yes	yes	yes	no
Read measurements (stored data)	yes	yes	yes	no	no	yes
Read/write configuration	yes	yes	yes	no	no	yes
Write user list	yes	yes	yes	no	no	yes
Read screen memory	yes	yes	yes	no	no	no

PROFIBUS-DP interface

The paperless recorder can be integrated into a fieldbus system according to the PROFIBUS-DP standard, via the PROFIBUS-DP interface. This PROFIBUS variant is particularly suitable for the communication between automation systems and distributed peripheral devices at the field level.

Data transmission takes place serially according to the RS485 standard, at a maximum of 12Mbit/sec.

Using the project design tool that is included in the delivery (GSD generator; GSD = Device Base Data), an application-specific GSD file is created, which is used to integrate the paperless recorder into the fieldbus system.

Up to 36 channels can be read in via the PROFIBUS.

LON interface

The LON interface is used to expand the measurement channels (channels 13 – 36) through modules from the JUMO mTRON automation system.

External CompactFlash memory card (CF)

The external CompactFlash memory card is used to transfer the data from the internal memory to the PC. Configuration data can be created on the PC and then transferred to the paperless recorder by means of the memory card.

On the PC side, data on the card is accessed with the help of a CompactFlash reader/writer.

Data processing

Data recording

The measurements of the analog inputs are acquired continuously in a 125msec sampling cycle. Based on these measurements, reports are compiled and limits monitored.

Depending on the programmable storage cycle and stored value (maximum/minimum/average or instantaneous value), the measurements are transferred to the main memory of the instrument.

Main memory (RAM)

The data which are stored in the RAM are regularly copied to the internal memory in 10 kByte blocks. This is written to as a ring memory, i.e. when the RAM is full, the oldest data will automatically be overwritten by new data. The storage capacity is sufficient for 350,000 measurements.

The data from the main memory can be shown as a history presentation on the paperless recorder.

Internal memory

When a block of the main memory has been filled it is copied to the internal memory. The internal memory has a capacity of 64 – 256 MByte.

Every write action is monitored, so that any errors in saving data can be immediately identified.

The instrument monitors the capacity of the internal memory and activates one of the "memory alarm" signals when the capacity has fallen below the configurable residual capacity level. These signals can be used, for instance, to operate a relay.

CompactFlash memory card (external)

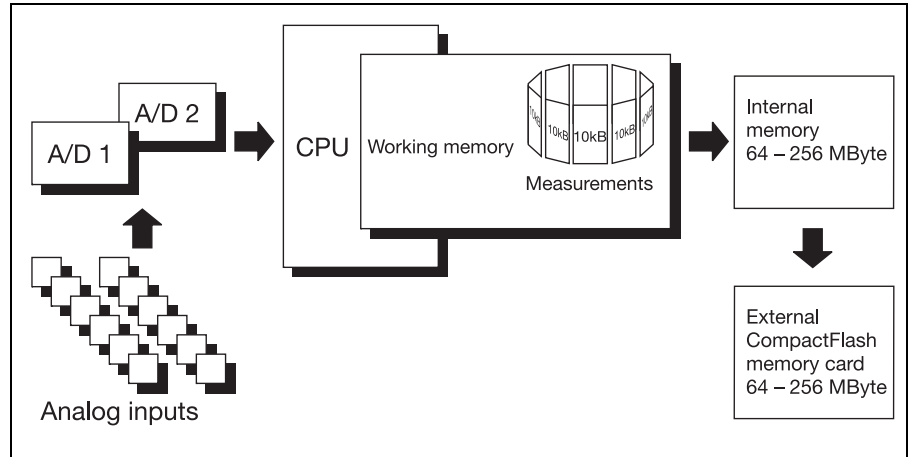
The external (replaceable) CompactFlash memory card can be used to transfer the data to a PC.

Data security

The data are stored in coded form in a proprietary format. This ensures a high level of data security.

If the paperless recorder is disconnected from the supply, then:

- RAM and clock time are buffered by a lithium battery (ex-factory) for more than 4 years, or more than 2 days with a storage capacitor (at 15 to 25°C ambient temperature)
- measurement data in the internal memory will not be lost
- configuration data are saved in the non-volatile Flash memory



Recording duration

Depending on the configuration of the instrument, the duration of the recording can vary over a considerable range (from a few days up to several months).

Data transfer

Data transfer from the paperless recorder to a PC is made by means of the external CompactFlash memory card, via the serial interface, or via the Ethernet interface.

Reports

For each input, a report (maximum/minimum/average and integrator) can be run over a pre-defined period.

Batch reports

Batch reporting can be performed in conjunction with an external report. Start, end and duration of a batch are recorded. Together with a batch counter and freely definable texts, these times can be displayed on the paperless recorder and within the PC evaluation software PCA3000.

Batch reporting can, for instance, be started by

- binary inputs 1 – 7 (extra code)
- Modbus flag (serial interface)
- external binary inputs 1 – 6 (JUMO mTRON system)

Limit monitoring/ change of operating mode

Over/underlimit conditions trigger an alarm. The alarm can be used, for instance, as a control signal to switch the operating mode from normal/timed operation to event operation.

The storage cycle and stored value can be configured separately for all three operating modes.

With the help of the alarm delay function, brief occurrences of over/underlimit conditions can be filtered out, with the result that no alarm is produced.

Normal operation

If no alarm is present and the instrument is not in timed operation, normal operation is active.

Event operation

Event operation is activated/deactivated by a control signal (log. input, group/com-bination alarm, ...). As long as the control signal is active, the recorder is in event operation.

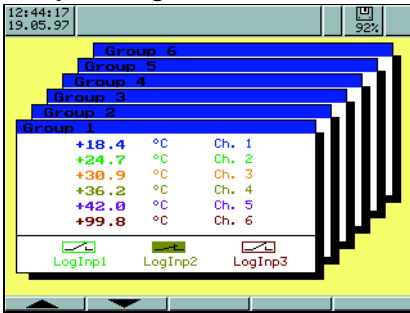
Timed operation

Timed operation is active on a daily basis for a programmable period of time. The operating modes have different priorities:

Operating mode	Priority
Event operation	1 (higher)
Timed operation	2
Normal operation	3 (lower)

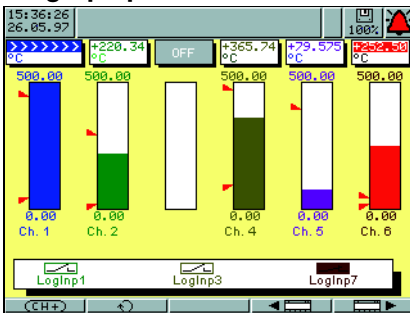
Presentation modes on the recorder

Group manager



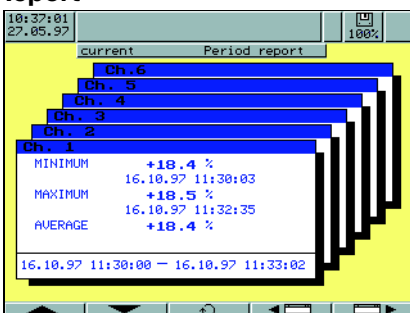
- 6 groups, each with any 6 analog and 3 binary inputs
- one input can be assigned to several groups
- display of present measurements or states of inputs
- groups can be active/inactive

Bar graph presentation



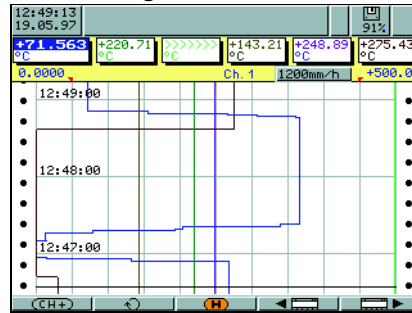
- bar graph presentation of the analog channels
- on/off presentation of the digital channels
- display of the present analog channels with scaling and limit markers
- color change of bar graph to red on overlimit condition

Report



- report of one analog channel in its own window
- indication of minimum, maximum, average/integral value and time period
- display of previous report

Vertical diagram



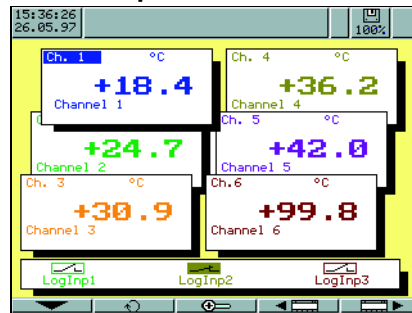
- recorder chart presentation of the analog channels
- scaling and limit marker indication on one channel
- numerical display of the present analog channels

Horizontal diagram



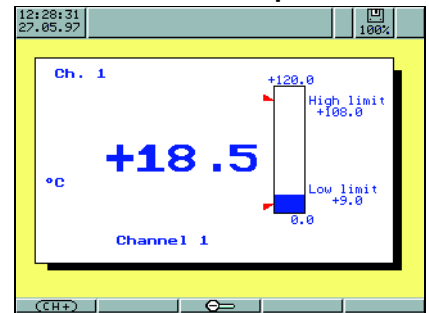
- graphical presentation of the analog and digital channels
- scaling and limit marker indication on one channel
- numerical display of the present measurements of the analog channels

Numerical presentation



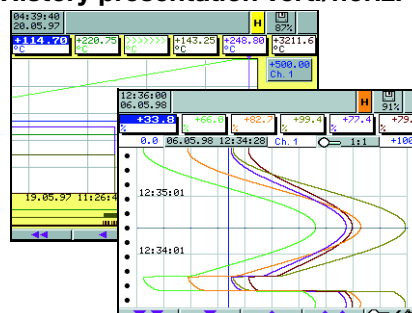
- large numerical presentation of the analog channels, including the 2-line channel description
- each analog channel can be switched to the foreground
- on/off presentation of the digital channels

Numerical 1-channel presentation



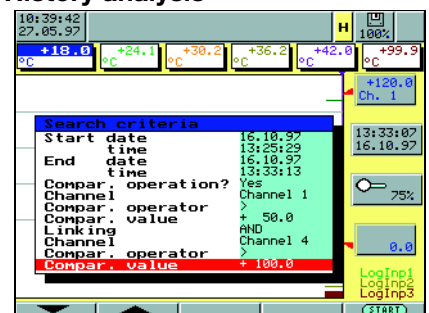
- clear presentation of one analog channel
- one analog channel is presented simultaneously as bar graph and number
- display of the 2-line channel designation
- indication of scaling and limit markers

History presentation vert./horiz.



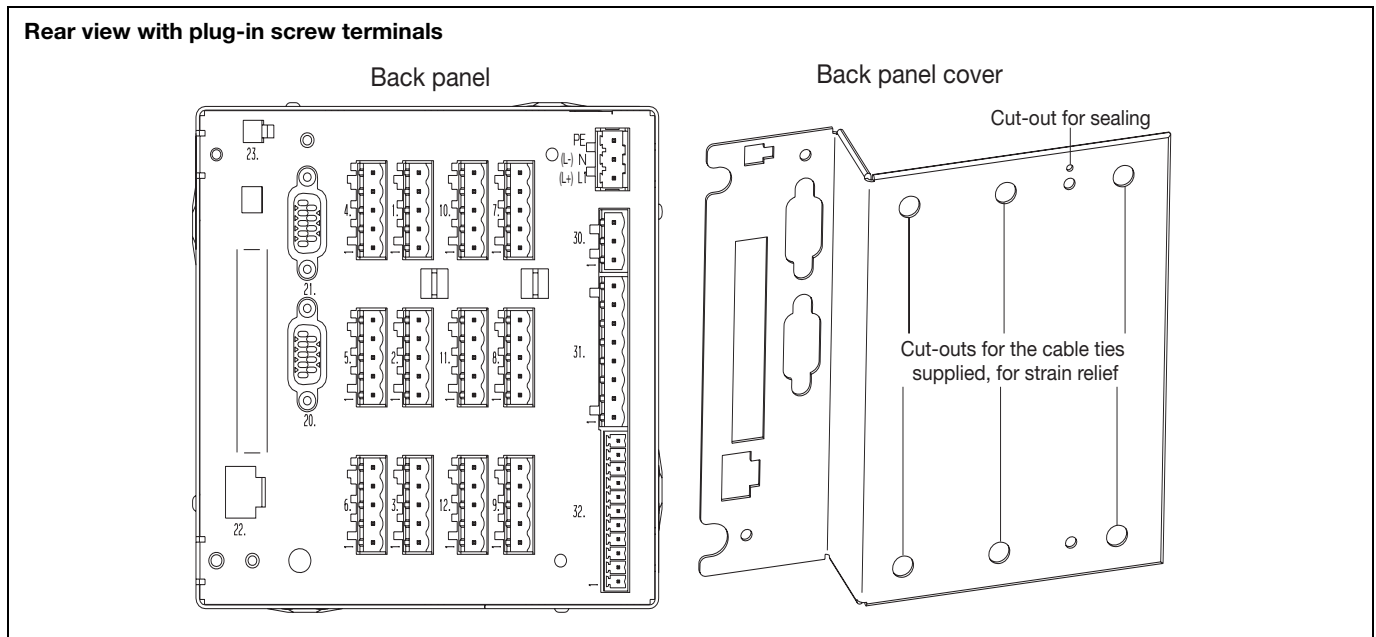
- graphical presentation of all stored measurement data at different zoom levels
- indication of scaling and limit markers for one channel
- numerical display of the measurements of the analog channels at the cursor position
- shifting of the visible window within the stored measurement data

History analysis



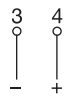
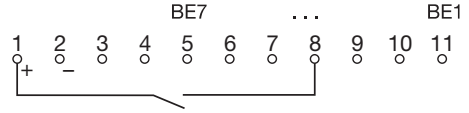
- restriction to a specific time period

Connection diagram

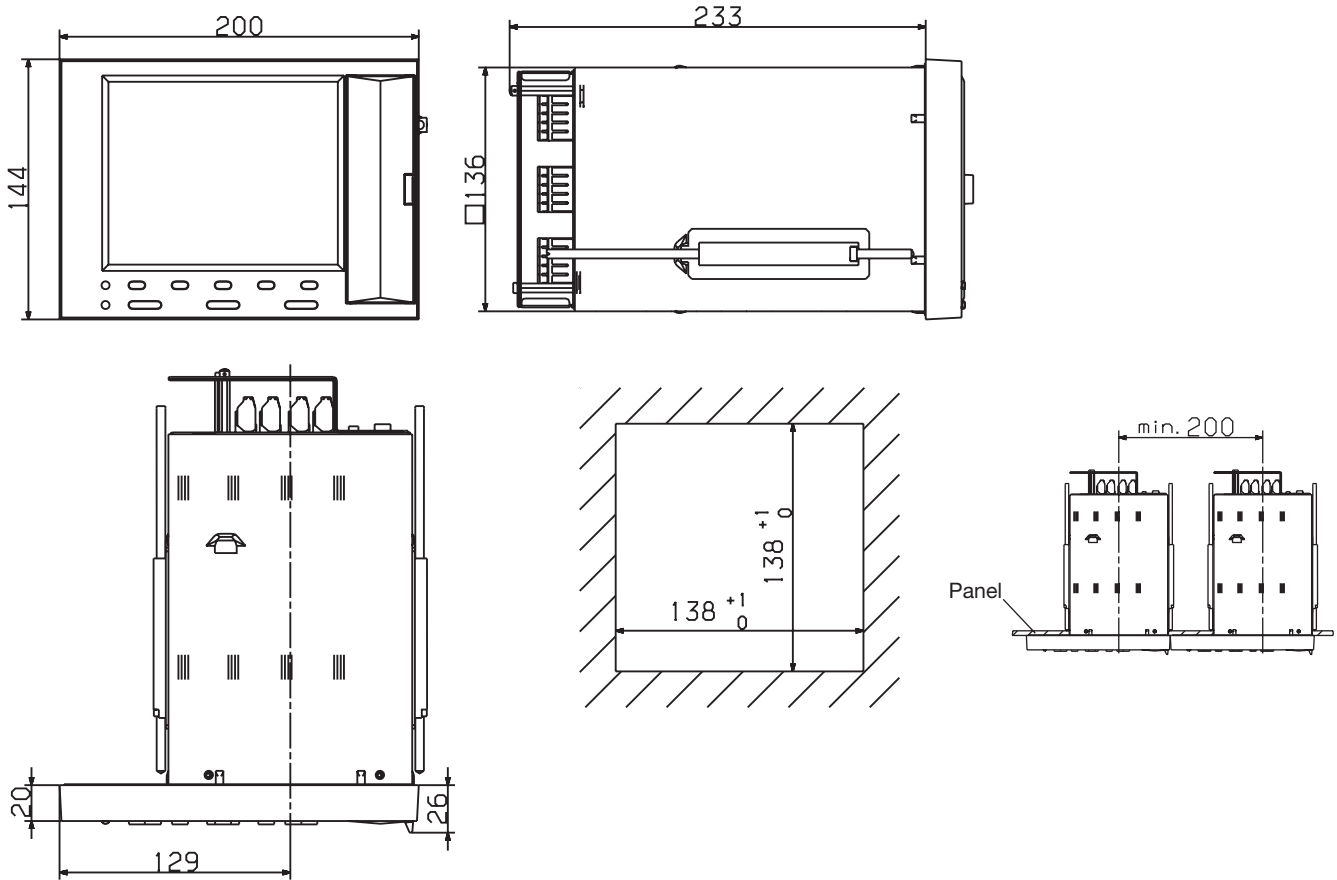


Terminal assignment	Connector	Diagram
Supply voltage		
Supply voltage as per nameplate	L1 (L+) N (L-) PE	
Analog inputs		
Thermocouple	1 to 12	
Resistance thermometer in 2-wire circuit	1 to 12	
Resistance thermometer in 3-wire circuit	1 to 12	
Resistance thermometer in 4-wire circuit	1 to 12	
Resistance transmitter	1 to 12	
Potentiometer in 2-wire circuit	1 to 12	
Potentiometer in 3-wire circuit	1 to 12	

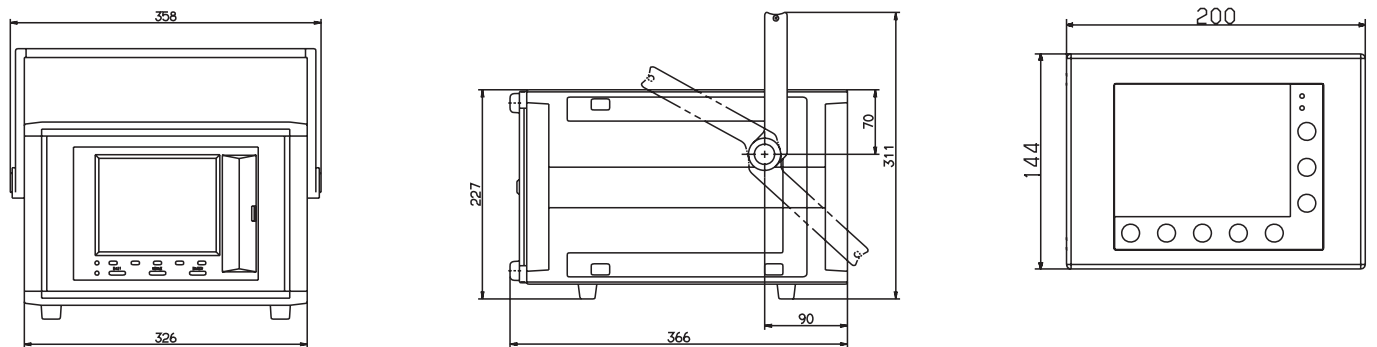
Potentiometer in 4-wire circuit	1 to 12	
Voltage input up to 200mV	1 to 12	
Voltage input above 200mV	1 to 12	
Current input	1 to 12	
Digital interfaces		
RS232 9-pin SUB-D socket	20	2 RxD receive data 3 TxD transmit data 5 GND ground
RS422 9-pin SUB-D socket (extra code)	20	3 TxD+ transmit data + 4 RxD+ receive data + 5 GND ground 8 TxD- transmit data - 9 RxD- receive data -
RS485 9-pin SUB-D socket (extra code)	20	3 TxD+/RxD+ transmit/receive data + 5 GND ground 8 TxD-/RxD- transmit/receive data -
LON interface 9-pin SUB-D socket (extra code)	21	3 Net_A 9 Net_B
PROFIBUS-DP 9-pin SUB-D socket (extra code)	21	3 RxD/TxD-P receive/transmit data-Plus B-cable 5 DGND data transmission potential 6 VP supply voltage-Plus 8 RxD/TxD-N receive/transmit data-N A-cable
Ethernet RJ45 socket (extra code)	22	1 TX+ transmit data + 2 TX- transmit data - 3 RX+ receive data + 6 RX- receive data -
Setup interface	23	The paperless recorder also has a setup interface on the front panel (wired in parallel). It is not possible to use both at the same time.
Relay outputs		
Relay K1 changeover (SPDT)	30	
Relay K2 to K5 make/break (SPST-NO/SPST-NC) (extra code)	31	

Digital I/O		
Open-collector output (extra code)	32 3 ground 4 collector	
Binary inputs (extra code) voltage-operated LOW = -3 to +5V DC HIGH = 12 to 30V DC Supply 24V/50mA	32 1 +24V auxiliary supply not stabilized 2 GND 5 binary input 7 ... 11 binary input 1	 <p>Example: Binary input 4 (BE4) operated from the internal supply voltage</p>

Dimensions (also for stainless steel front)



Extra code: universal carrying case TG-35 and stainless steel front



Order details

LOGOSCREEN es

Paperless Recorder for secure acquisition of FDA-compliant measurement data

(1) Basic version	
706560/00	paperless recorder without analog inputs
706560/01	paperless recorder without analog inputs incl. PC software package and interface cable/adaptor
706560/10	paperless recorder with 6 analog inputs
706560/20	paperless recorder with 6 analog inputs incl. PC software package and interface cable/adaptor
706560/11	paperless recorder with 12 analog inputs
706560/21	paperless recorder with 12 analog inputs incl. PC software package and interface cable/adaptor
(2) Inputs 1 – 6 (programmable)	
x x 000	not assigned
x x x x x 888	factory-set
(3) Inputs 7 – 12 (programmable)	
x x 000	not assigned
x x x x x 888	factory-set
(4) Interface	
x x x x x 51	RS232 (standard)
x x x x x 54	RS422/485
x x x x x 66	RS232 and LON
x x x x x 67	RS422/485 and LON
x x x x x 68	RS232 and PROFIBUS-DP
x x x x x 69	RS422/485 and PROFIBUS-DP
(5) Internal memory	
x x x x x 0064	64 MB memory
x x x x x 0128	128 MB memory
x x x x x 0256	256MB memory
(6) External memory ¹	
x x x x x 0000	without external memory
x x x x x 0064	64 MB CompactFlash memory card
x x x x x 0128	128 MB CompactFlash memory card
x x x x x 0256	256MB CompactFlash memory card
(7) Supply	
x x x x x 23	110 – 240V AC +10/-15 %, 48 – 63Hz
x x x x x 25	20 – 30V AC/DC 48 – 63Hz
(8) Extra codes	
x x x x x 008	Ethernet connection
x x x x x 020	lithium battery for memory buffer (ex-factory)
x x x x x 061	UL approval
x x x x x 021	storage capacitor (instead of extra code 020)
x x x x x 258	7 binary inputs, 1 open-collector output, 4 relay outputs, voltage output 24V DC 50mA
x x x x x 350	universal carrying case TG-35 ²
x x x x x 444	stainless steel front with membrane keypad

Order code

Order example

(1) (2) (3) (4) (5) (6) (7) (8)
 - , - - - - / , ...³
 706560/10 - 888 , 000 - 51 - 0064 - 0064 - 23 / 020

Standard accessories

- instrument documentation
- 2 fixing brackets
- 4 cable-ties with foot (can be released) for strain relief of the attached sensor cables

Accessories, data sheet 70.9700

- PC software package consisting of: setup program, PC evaluation software (PCA3000), PCA communications software (PCC), PC Security Manager (PCS) and PC Audit-Trail Manager (PCAT) Please specify all version numbers when placing repeat orders.
- PC interface with TTL/RS232 converter and adapter Sales No. 70/00350260
- PC interface with USB/TTL converter, adapter (socket) and adapter (pins) Sales No. 70/00456352
- Documentation IQ / OQ German-English Sales No. 70/00436829
- Documentation IQ / OQ French-English Sales No. 70/00441797

Supplementary accessory: Universal carrying case TG-35



Approvals

- UL approval (extra code)



¹ The CompactFlash memory cards specified by JUMO have been tested and are suitable for industrial applications.

No guarantee is given for other CF cards.

² The UL approval (061) applies to the panel-mounting instrument only.

³ List extra codes in sequence, separated by commas.

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 Phone: +49 661 6003-0
 Fax: +49 661 6003-607
 e-mail: mail@jumo.net
 Internet: www.jumo.net

JUMO Instrument Co. Ltd.
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 Internet: www.jumo.us



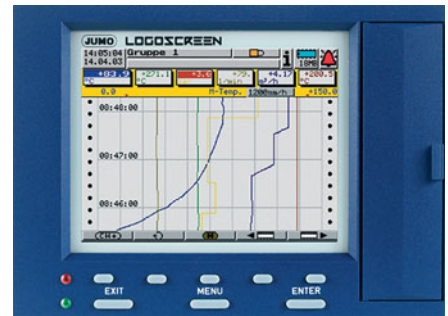
LOGOSCREEN cf

Paperless Recorder with CompactFlash card as storage medium

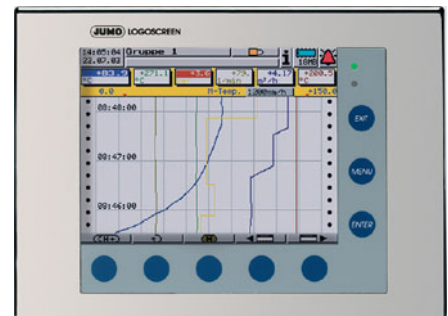


Brief description

Together with its PC software components, this recorder constitutes a system for the electronic acquisition, storage, archiving and analysis of a substantial amount of data. The recorder is internally equipped with 6 or 12 universal measurement inputs and can be expanded to a maximum of 36 inputs through the JUMO mTRON automation system. The acquired process data are saved to the internal backup memory (32 to 128 MByte) and transferred via the CompactFlash memory card, which is plugged in at the front. An optional Ethernet interface provides integration into PC networks in order to allow data to be accessed via networked PC stations. The recorder can be configured from 8 keys or from a PC. Front bezel size is 144 mm x 200 mm, max. depth behind panel is 228 mm.

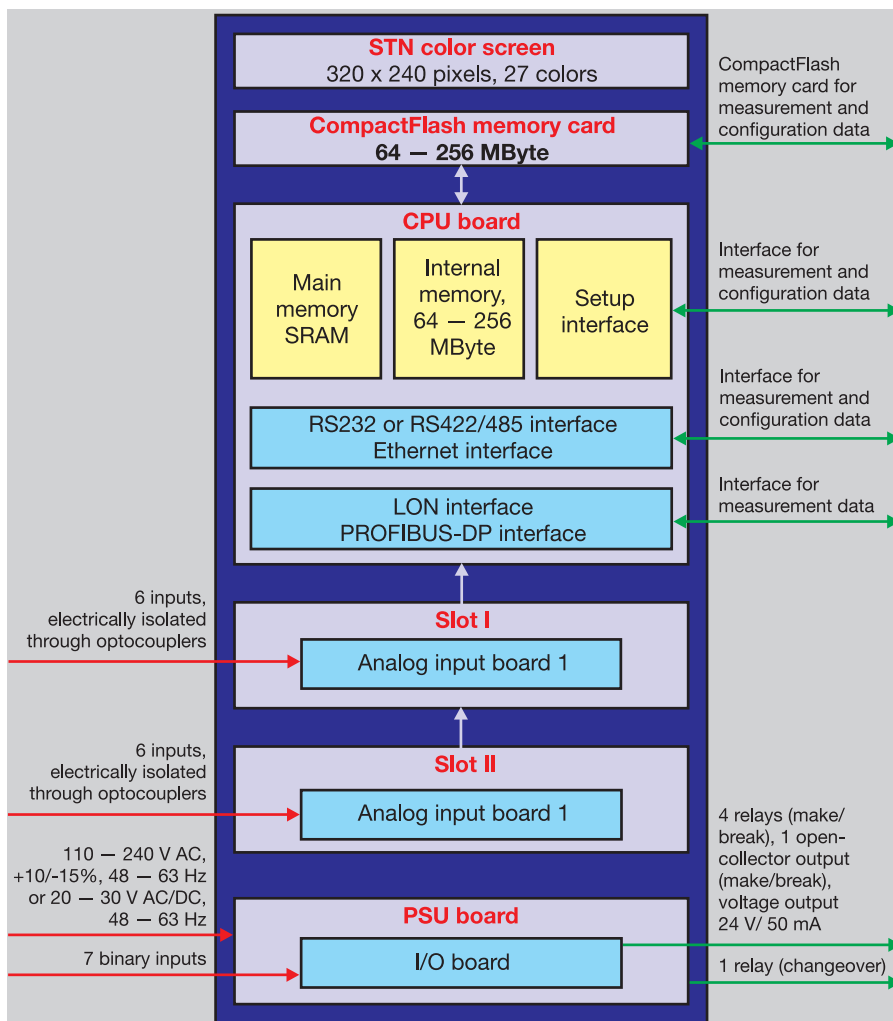


Type 706570/...



Type 706570/..., stainless steel front

Block structure



Key features

- No chart/pens
- Presentation of the measurement data in vertical/horizontal diagrams, bar graph, numerical, ...
- Batch documentation
- Local availability of the measurement data stored in RAM
- Data records can be saved to a CompactFlash memory card
- Instrument can be configured from the keys, via the CompactFlash memory card or serial interface
- Evaluation of the archived data through the PC evaluation software
- Adaptation of the storage cycles to the individual process through
 - normal operation
 - event operation
 - day-time operation
- Report with minimum/maximum/average values and integrator
- Freely programmable inputs for resistance thermometers, thermocouples, DC current and DC voltage
- Sampling cycle minimum 125msec with 12 analog inputs
- PROFIBUS-DP and Ethernet connection

Technical data

Internal analog inputs (channels 1 to 12)

Thermocouple

Designation	Type	Standard	Range	Linearization accuracy ¹
Fe-Con	L	DIN 43 710	-200 to + 900°C	±0.1%
Fe-Con	J	EN 60 584	-210 to +1200°C	±0.1% above -100°C
Cu-Con	U	DIN 43 710	-200 to + 600°C	±0.1% above -150°C
Cu-Con	T	EN 60 584	-270 to + 400°C	±0.15% above -150°C
NiCr-Ni	K	EN 60 584	-270 to +1372°C	±0.1% above -80°C
NiCr-Con	E	EN 60 584	-270 to +1000°C	±0.1% above -80°C
NiCrSi-NiSi	N	EN 60 584	-270 to +1300°C	±0.1% above -80°C
Pt10Rh-Pt	S	EN 60 584	-50 to +1768°C	±0.15% above 0°C
Pt13Rh-Pt	R	EN 60 584	-50 to +1768°C	±0.15% above 0°C
Pt30Rh-Pt6Rh	B	EN 60 584	0 to 1820°C	±0.15% above 400°C
Shortest span			Types L, J, U, T, K, E, N: Types S, R, B:	100°C 500°C
Range start/end	freely programmable within the limits in 0.1 °C steps			
Cold junction	Pt100 internal or thermostat external constant			
Cold junction accuracy (internal)	± 1°C			
Cold junction temperature (external)	-50 to +100°C, adjustable through setup software			
Sampling cycle	6 or 12 channels 125msec			
Input filter	2nd order digital filter; filter constant adjustable from 0 – 10.0sec			
Test voltage	500V (across optocoupler)			
Resolution	better than 14 bit			
Special features	also programmable in °F			

¹ The linearization accuracy refers to the maximum range span.
The linearization accuracy is reduced for shorter spans.

Resistance thermometers

Designation	Standard	Connection	Range	Linearization accuracy	Measuring current
Pt 100	EN 60 751	2/3-wire	-200 to +500°C	±0.4°C	500µA
		2/3-wire	-200 to +850°C	±0.8°C	250µA
		4-wire	-200 to +500°C	±0.4°C	500µA
		4-wire	-200 to +850°C	±0.5°C	250µA
Pt 100 JIS		2/3-wire	-200 to +500°C	±0.4°C	500µA
		2/3-wire	-200 to +650°C	±0.8°C	250µA
		4-wire	-200 to +500°C	±0.4°C	500µA
		4-wire	-200 to +650°C	±0.5°C	250µA
Pt 500	EN 60 751	2/3-wire	-200 to +500°C	±0.4°C	250µA
		2/3-wire	-200 to +850°C	±0.8°C	250µA
		4-wire	-200 to +500°C	±0.4°C	250µA
		4-wire	-200 to +850°C	±0.5°C	250µA
Pt 1000	EN 60 751	2/3-wire	-200 to +500°C	±0.4°C	500µA
		2/3-wire	-200 to +850°C	±0.8°C	250µA
		4-wire	-200 to +500°C	±0.4°C	500µA
		4-wire	-200 to +850°C	±0.5°C	250µA
Ni 100	EN 60 751	2/3-wire	-60 to +180°C	±0.4°C	500µA
		4-wire	-60 to +180°C	±0.4°C	500µA
Connection type	2-, 3- or 4-wire circuit				
Shortest span	15°C				
Probe lead resistance	max. 30Ω per core for 3- and 4-wire circuit max. 10Ω per core for 2-wire circuit				
Range start/end	freely programmable within the limits in 0.1°C steps				
Sampling cycle	6 or 12 channels 125msec				
Input filter	2nd order digital filter; filter constant adjustable from 0 – 10sec				
Test voltage	500V (across optocoupler)				
Resolution	better than 14 bit				
Special features	also programmable in °F				

Resistance transmitter and potentiometer

Range	Accuracy	Measuring current
up to 180Ω	±150mΩ	500μA
up to 390Ω	±300mΩ	250μA
up to 2000Ω	±2Ω	500μA
up to 4000Ω	±4Ω	250μA
Connection type	resistance transmitter: 3-wire circuit potentiometer: 2-/3-wire circuit	
Shortest span	6Ω	
Probe lead resistance	max. 30Ω per core in 4-wire circuit max. 20Ω per core in 2- and 3-wire circuit up to 200Ω range: max. 10Ω per core in 2-and 3-wire circuit	
Resistance values	freely programmable within the limits in 0.1Ω steps	
Sampling cycle	6 or 12 channels 125msec	
Input filter	2nd order digital filter; filter constant adjustable from 0 – 10.0sec	

Input for DC voltage or DC current

Basic range	Accuracy	Input resistance
-20 to +70mV	±80μV	$R_{IN} \geq 1\text{ M}\Omega$
-5 to +105mV	±100μV	$R_{IN} \geq 1\text{ M}\Omega$
-10 to +210mV	±240μV	$R_{IN} \geq 1\text{ M}\Omega$
-0.5 to +12 V	±6mV	$R_{IN} \geq 470\text{ k}\Omega$
-0.05 to + 1.2V	±1mV	$R_{IN} \geq 470\text{ k}\Omega$
-1.2 to + 1.2V	±2mV	$R_{IN} \geq 470\text{ k}\Omega$
-12 to +12 V	±12mV	$R_{IN} \geq 470\text{ k}\Omega$
Shortest span	5mV	
Range start/end	freely programmable within the limits (up to 999mV in 0.01mV steps, above 1V in 1mV steps)	
-2 to +22mA	±20μA	burden voltage 1V max.
-22 to +22mA	±44μA	burden voltage 1V max.
Shortest span	0.5mA	
Range start/end	freely programmable within the limits in 0.1mA steps	
Sampling cycle	6 or 12 channels 125msec	
Input filter	2nd order digital filter; filter constant adjustable from 0 – 10.0sec	
Special features	adjustable linearizations for thermocouples and resistance thermometers (for connection to transmitters without linearization)	

Transducer short-circuit/break

	Short-circuit ¹	Break ¹
Thermocouple	not detected	detected
Resistance thermometer	detected	detected
Resistance transmitter	detected	detected
Potentiometer	not detected	detected
Voltage up to ± 1V	not detected	detected
Voltage above ± 1V	not detected	not detected
Current	not detected	not detected

¹ Programmable reaction of instrument, e.g. triggering alarm

Binary inputs (extra code)

Number	7 to DIN VDE 0411, Part 500; 25Hz max., 32V max.
Level	logic "0": -3 to +5V, logic "1": 12 to 30V
Sampling cycle	minimum 1 sec

Outputs

1 relay (ex-factory)	changeover (SPDT), 3A, 230V AC ¹
4 relays (extra code)	make/break (SPST-NO/SPST-NC), 3A, 230V AC ¹
1 open-collector output (extra code)	25V max., 100mA max.

¹ with resistive load. It is not permissible to mix SELV circuits and supply circuits.

Screen

Resolution	320 x 240 pixels
Size	5.7"
Number of colors	27 colors

Electrical data

Supply (switch-mode power supply)	110 – 240V AC +10/-15%, 48 – 63Hz or 20 – 30V AC/DC 48 – 63Hz
Electrical safety	to EN 61 010, Part 1, August 2002 overvoltage category II, pollution degree 2
Test voltages (type test)	
- mains supply circuit to measurement circuit	with AC supply: 3.7kV 50Hz, 1 min, with AC/DC supply: 510V 50Hz, 1 min
- mains supply circuit to housing (protective earth)	with AC supply: 2.3kV 50Hz, 1 min, with AC/DC supply: 510V 50Hz, 1 min
- measurement circuits to measurement circuit and housing	510V 50Hz, 1 min
- electrical isolation between the analog inputs	up to 30V AC and 50V DC
Supply voltage error	less than 0.1 % of span
Power consumption	25VA approx.
Data backup	see page 7
Electrical connection	at rear through plug-in screw terminals, max. conductor cross-section 2.5mm ² or 2x 1.5mm ² with ferrules

Environmental influences

Ambient temperature range	0 to +45°C
Ambient temperature error	0.03 % per °C
Storage temperature range	-20 to +60°C
Climatic conditions	not exceeding 75% relative humidity, no condensation
EMC	EN 61 326
- interference emission	Class A
- immunity to interference	to industrial requirements

Housing

Housing front	zinc die-casting
Housing type	housing for flush-panel mounting to DIN 43 700, galvanized steel
Bezel size	200mm x 144mm
Depth behind panel	225mm
Panel cut-out	138 ^{+1.0} mm x 138 ^{+1.0} mm
Housing fixing	in panel to DIN 43 834
Operating position	unrestricted, taking into account the viewing angle of the screen, horizontal ±50°, vertical ±30°
Protection	to EN 60 529 Category 2, front IP54 (IP65 with extra code stainless steel front), rear IP20
Weight	3.5kg approx.

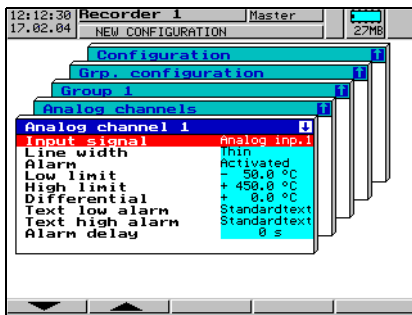
External analog measurement inputs / binary inputs / binary outputs

Type	JUMO mTRON automation system
Sampling cycle	1 sec
Technical data	see Data Sheet: 70.4015 Relay module 70.4020 Analog input module 70.4030 Logic module
Configuration	iTOOL Project design software (70.4090)

Operation and configuration

On the recorder

The recorder is configured from eight keys under menu guidance. Functions of 5 keys (softkeys) on the instrument alter according to the context so that there are always unique key functions during operation. Softkey functions are indicated on the screen in plain text or through symbols.



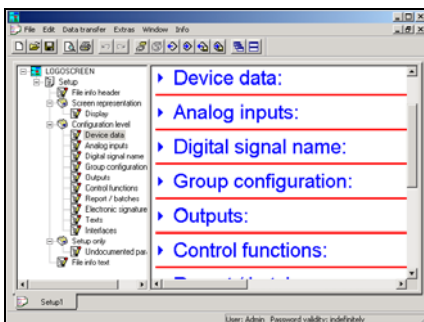
Integrated user lists (for various users with different access rights) protect the recorder from unauthorized access.

Via setup program for PC (extra code)

More conveniently than from the instrument keys, the recorder can be configured via the setup program for PC.

Communication between the PC setup program and the paperless recorder can be made through:

- the setup interface
- the serial interface
- the Ethernet interface, or
- the CompactFlash memory card.



The configuration data can be archived on a data storage medium and can be output to a printer.

Via CompactFlash memory card

The configuration can be saved to a CompactFlash memory card, and read into the instrument from this card.

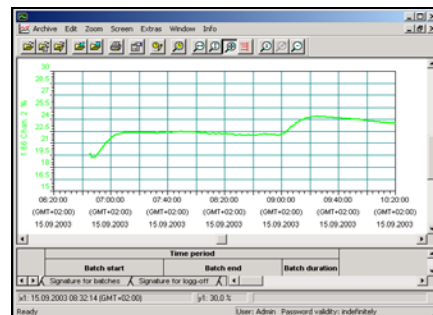
Operating language

The operating language for the instrument can be configured for different languages. English, German, French, Dutch, Italian, Spanish, Hungarian, Czech, Swedish, Polish, Danish, Finnish, Portuguese and Russian have already been implemented.

PC programs (accessories)

PC evaluation software (PCA 3000)

The PC evaluation software (PCA 3000) is a program which runs under Windows NT4.0/2000/XP, and is used to manage, archive, visualize and evaluate the recorder data.



- The data of instruments with different configurations are recognized by the evaluation software and stored in an archive database. The complete management is performed automatically. The user only has to enter an identifier (supplementary description) manually.
- The user can at any time access specific sets of data which can be distinguished by the identifier. In addition, the time ranges to be evaluated can be limited.
- Any analog and digital channels of a paperless recorder can be subsequently combined into PCA groups in the PCA3000 software.
- Since each group is displayed in a separate window, several groups can be shown simultaneously on the screen and compared.
- Operation by mouse and keys.
- It is possible to export the stored data via the export filter, so that they can be processed in other programs, such as Excel.
- The PCA 3000 evaluation software has network capability, i.e. several users can obtain data from the same database in the network independently of each other.

PCA communications software (PCC)

- The data can be read out from the recorder via the serial interface (RS232/RS422/RS485) or the Ethernet interface. The data can be read out either manually or automatically (e.g. daily at 23 hrs).
- Data can also be retrieved via remote control, through a modem.

Interfaces

- Setup interface (fitted as standard)
- RS232 interface (fitted as standard)
- RS422/485 interface (extra code)
- Ethernet interface (extra code)
- LON interface (extra code)
- PROFIBUS-DP interface (extra code)

Setup interface

The setup interface is used together with the PC interface cable (including the TTL/RS232 converter and adapter) for operation of the PC setup program (see Page 5). The paperless recorder has setup interfaces (connected in parallel) on both the front and back panels. They cannot both be used at the same time.

RS232 interface

RS422/485 interface

The current process data, as well as specific instrument data, can be read out via the RS232 or RS422/RS485 interfaces.

The data that are stored in the internal memory can also be read out in conjunction with the PC evaluation software PCA3000 and the PCA communications software (PCC).

Normally, the instrument is supplied with a RS232 interface which allows for a lead length of maximum 15 meters. The RS422/RS485 interface permits a lead length of 1.2 km.

Connection is by a 9-pin SUB-D connector at the back of the instrument. Modbus and Jbus protocols are available, and the transmission mode used is RTU (Remote Terminal Unit).

Ethernet interface

The Ethernet interface can be used in local networks for communication between the paperless recorder and the PC setup program or the PCA communications software. The IP address is given a fixed setting through configuration on the instrument or in the PC setup program.

When using the Ethernet interface, care must be taken to ensure that only one client at a time is permitted to access the instrument (server).

Transmission protocol: TCP/IP

Network type: 10BaseT

	Setup interface	RS232 RS422 RS485	Ethernet	PROFI-BUS-DP	LON	External CF card
Read/write measurements (present data)	yes	yes	yes	yes	yes	no
Read measurements (stored data)	yes	yes	yes	no	no	yes
Read/write configuration	yes	yes	yes	no	no	yes
Write user list	yes	yes	yes	no	no	yes
Read screen memory	yes	yes	yes	no	no	no

PROFIBUS-DP interface

The paperless recorder can be integrated into a fieldbus system according to the PROFIBUS-DP standard, via the PROFIBUS-DP interface. This PROFIBUS variant is particularly suitable for the communication between automation systems and distributed peripheral devices at the field level.

Data transmission takes place serially according to the RS485 standard, at a maximum of 12Mbit/sec.

Using the project design tool that is included in the delivery (GSD generator; GSD = Device Base Data), an application-specific GSD file is created, which is used to integrate the paperless recorder into the fieldbus system.

Up to 36 channels can be read in via the PROFIBUS.

LON interface

The LON interface is used to expand the measurement channels (channels 13 – 36) through modules from the JUMO mTRON automation system.

External CompactFlash memory card (CF)

The external CompactFlash memory card is used to transfer the data from the internal memory to the PC. Configuration data can be created on the PC and then transferred to the paperless recorder by means of the memory card.

On the PC side, data on the card is accessed with the help of a CompactFlash reader/writer.

Data processing

Data recording

The measurements of the analog inputs are acquired continuously in a 125msec sampling cycle. Based on these measurements, reports are compiled and limits monitored.

Depending on the programmable storage cycle and stored value (maximum/minimum/average or instantaneous value), the measurements are transferred to the main memory of the instrument.

Main memory (RAM)

The data which are stored in the RAM are regularly copied to the internal memory in 10 kByte blocks. This is written to as a ring memory, i.e. when the RAM is full, the oldest data will automatically be overwritten by new data. The storage capacity is sufficient for 350,000 measurements.

The data from the main memory can be shown as a history presentation on the paperless recorder.

Internal memory

When a block of the main memory has been filled it is copied to the internal memory. The internal memory has a capacity of 64 – 256 MByte.

Every write action is monitored, so that any errors in saving data can be immediately identified.

The instrument monitors the capacity of the internal memory and activates one of the "memory alarm" signals when the capacity has fallen below the configurable residual capacity level. These signals can be used, for instance, to operate a relay.

CompactFlash memory card (external)

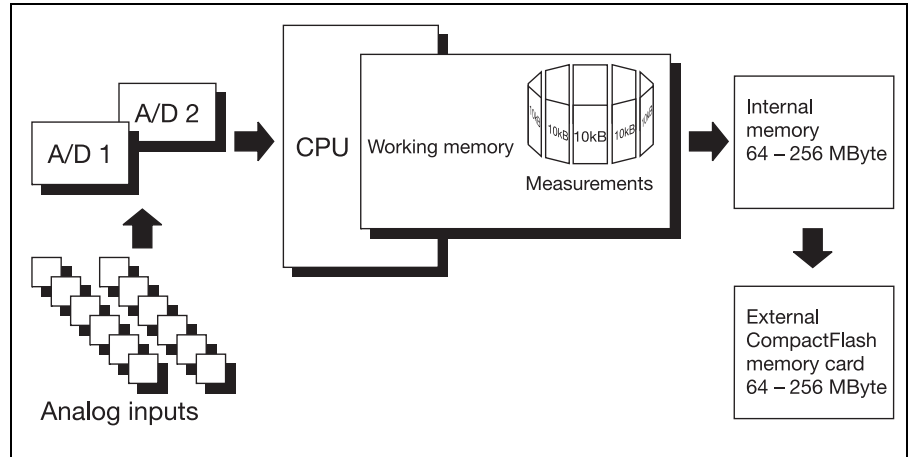
The external (replaceable) CompactFlash memory card can be used to transfer the data to a PC.

Data security

The data are stored in coded form in a proprietary format. This ensures a high level of data security.

If the recorder is disconnected from the supply, then:

- RAM and clock time are buffered by a lithium battery (ex-factory) for more than 4 years, or more than 2 days with a storage capacitor (at 15 to 25°C ambient temperature)
- measurement data in the internal memory will not be lost
- configuration data are saved in the non-volatile Flash memory



Recording duration

Depending on the configuration of the instrument, the duration of the recording can vary over a considerable range (from a few days up to several months).

Data transfer

Data transfer from the paperless recorder to a PC is made by means of the external CompactFlash memory card, via the serial interface, or via the Ethernet interface.

Reports

For each input, a report (maximum/minimum/average and integrator) can be run over a pre-defined period.

Batch reports

Batch reporting can be performed in conjunction with an external report. Start, end and duration of a batch are recorded. Together with a batch counter and freely definable texts, these times can be displayed on the recorder and within the PC evaluation software PCA3000.

Batch reporting can, for instance, be started by

- binary inputs 1 – 7 (extra code)
- Modbus flag (serial interface)
- external binary inputs 1 – 6 (JUMO mTRON system)

Limit monitoring/ change of operating mode

Over/underlimit conditions trigger an alarm. The alarm can be used, for instance, as a control signal to switch the operating mode from normal/timed operation to event operation.

The storage cycle and stored value can be configured separately for all three operating modes.

With the help of the alarm delay function, brief occurrences of over/underlimit conditions can be filtered out, with the result that no alarm is produced.

Normal operation

If no alarm is present and the instrument is not in timed operation, normal operation is active.

Event operation

Event operation is activated/deactivated by a control signal (log. input, group/com-bination alarm, ...). As long as the control signal is active, the recorder is in event operation.

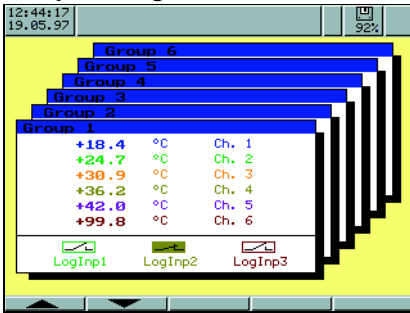
Timed operation

Timed operation is active on a daily basis for a programmable period of time. The operating modes have different priorities:

Operating mode	Priority
Event operation	1 (higher)
Timed operation	2
Normal operation	3 (lower)

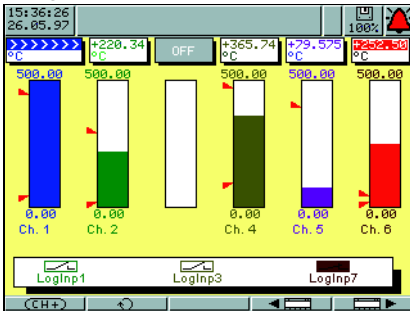
Presentation modes on the recorder

Group manager



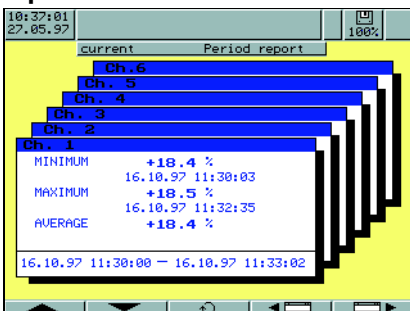
- 6 groups, each with any 6 analog and 3 binary inputs
- one input can be assigned to several groups
- display of present measurements or states of inputs
- groups can be active/inactive

Bar graph presentation



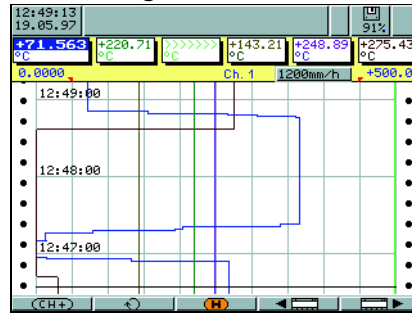
- bar graph presentation of the analog channels
- on/off presentation of the digital channels
- display of the present analog channels with scaling and limit markers
- color change of bar graph to red on overlimit condition

Report



- report of one analog channel in its own window
- indication of minimum, maximum, average/integral value and time period
- display of previous report

Vertical diagram



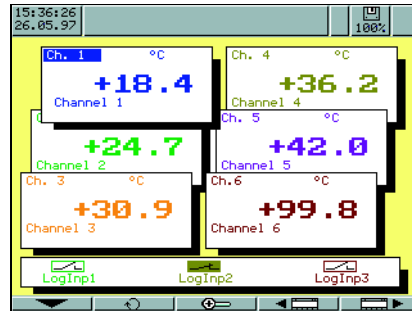
- recorder chart presentation of the analog channels
- scaling and limit marker indication on one channel
- numerical display of the present analog channels

Horizontal diagram



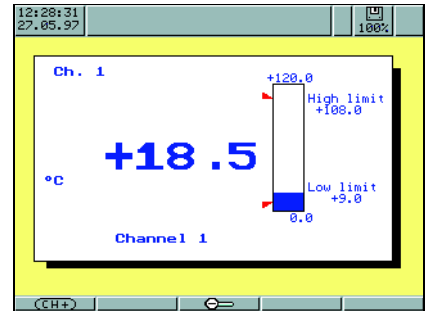
- graphical presentation of the analog and digital channels
- scaling and limit marker indication on one channel
- numerical display of the present measurements of the analog channels

Numerical presentation



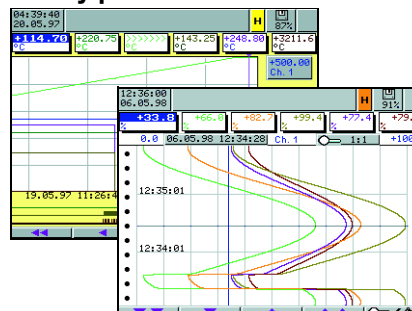
- large numerical presentation of the analog channels, including the 2-line channel description
- each analog channel can be switched to the foreground
- on/off presentation of the digital channels

Numerical 1-channel presentation



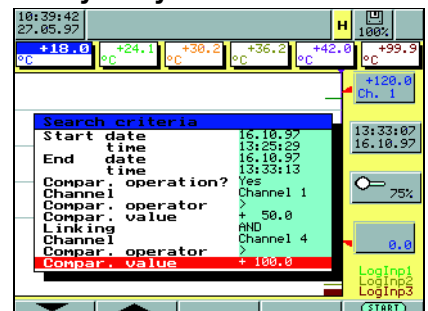
- clear presentation of one analog channel
- one analog channel is presented simultaneously as bar graph and number
- display of the 2-line channel designation
- indication of scaling and limit markers

History presentation vert./horiz.



- graphical presentation of all stored measurement data at different zoom levels
- indication of scaling and limit markers for one channel
- numerical display of the measurements of the analog channels at the cursor position
- shifting of the visible window within the stored measurement data

History analysis



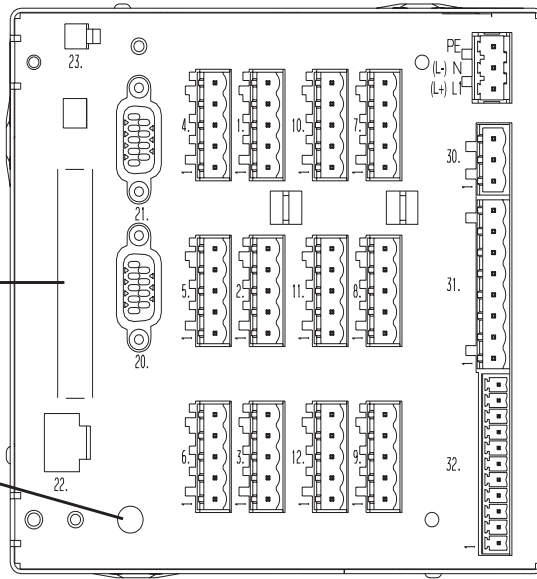
- restriction to a specific time period

Connection diagram

Rear view with plug-in screw terminals

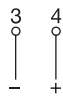
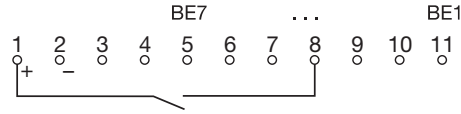
Slot for CompactFlash card including ejector (with stainless steel front only)

Cut-out for the cable-ties supplied, for strain relief of connecting cables

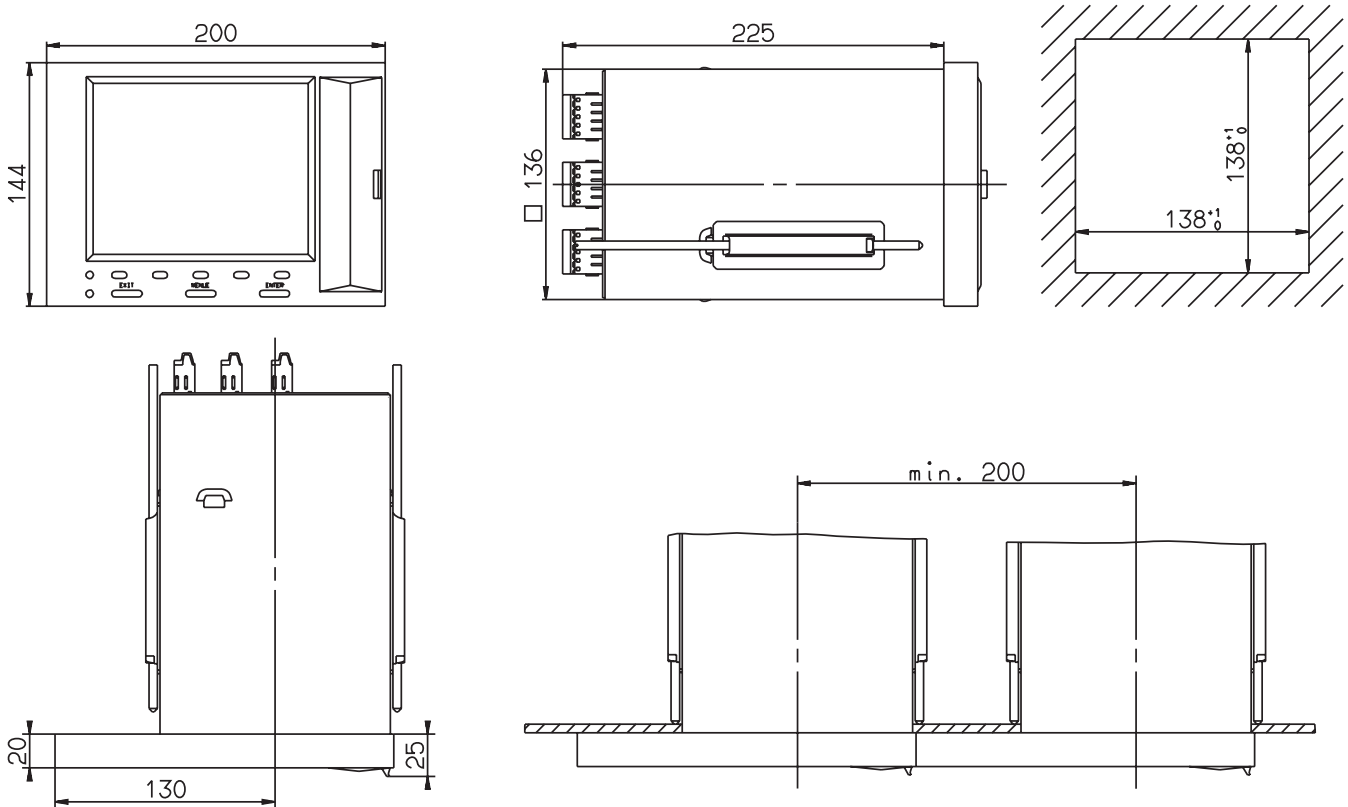


Terminal assignment	Connector	Diagram
Supply voltage		
Supply voltage as per nameplate	L1 (L+) N (L-) PE	
Analog inputs		
Thermocouple	1 to 12	
Resistance thermometer in 2-wire circuit	1 to 12	
Resistance thermometer in 3-wire circuit	1 to 12	
Resistance thermometer in 4-wire circuit	1 to 12	
Resistance transmitter	1 to 12	
Potentiometer in 2-wire circuit	1 to 12	
Potentiometer in 3-wire circuit	1 to 12	

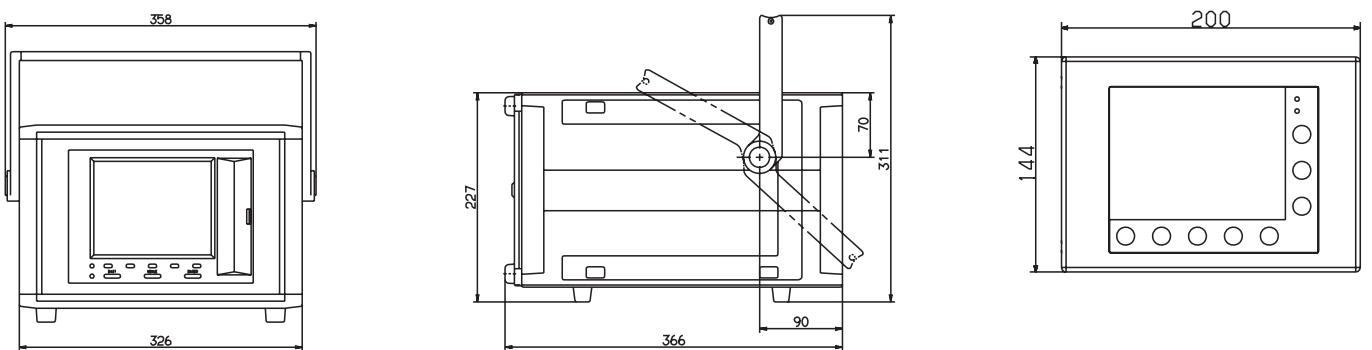
Potentiometer in 4-wire circuit	1 to 12	
Voltage input up to 200mV	1 to 12	
Voltage input above 200mV	1 to 12	
Current input	1 to 12	
Digital interfaces		
RS232 9-pin SUB-D socket	20	2 RxD receive data 3 TxD transmit data 5 GND ground
RS422 9-pin SUB-D socket (extra code)	20	3 TxD+ transmit data + 4 RxD+ receive data + 5 GND ground 8 TxD- transmit data - 9 RxD- receive data -
RS485 9-pin SUB-D socket (extra code)	20	3 TxD+/RxD+ transmit/receive data + 5 GND ground 8 TxD-/RxD- transmit/receive data -
LON interface 9-pin SUB-D socket (extra code)	21	3 Net_A 9 Net_B
PROFIBUS-DP 9-pin SUB-D socket (extra code)	21	3 RxD/TxD-P receive/transmit data-Plus B-cable 5 DGND data transmission potential 6 VP supply voltage-Plus 8 RxD/TxD-N receive/transmit data-N A-cable
Ethernet RJ45 socket (extra code)	22	1 TX+ transmit data + 2 TX- transmit data - 3 RX+ receive data + 6 RX- receive data -
Setup interface	23	The paperless recorder also has a setup interface on the front panel (wired in parallel). It is not possible to use both at the same time.
Relay outputs		
Relay K1 changeover (SPDT)	30	
Relay K2 to K5 make/break (SPST-NO/SPST-NC) (extra code)	31	

Digital I/O		
Open-collector output (extra code)	32 3 ground 4 collector	
Binary inputs (extra code) voltage-operated LOW = -3 to +5V DC HIGH = 12 to 30V DC Supply 24V/50mA	32 1 +24V auxiliary supply not stabilized 2 GND 5 binary input 7 ... 11 binary input 1	 <p>Example: Binary input 4 (BE4) operated from the internal supply voltage</p>

Dimensions (also for stainless steel front)



Extra code: universal carrying case TG-35 and stainless steel front



Order details

LOGOSCREEN cf Paperless Recorder with CompactFlash card as storage medium

		(1) Basic version
	706570/00	paperless recorder without analog inputs
	706570/01	paperless recorder without analog inputs incl. Setup and PC evaluation software and interface cable/adapter
	706570/10	paperless recorder with 6 analog inputs
	706570/20	paperless recorder with 6 analog inputs incl. Setup and PC evaluation software and interface cable/adapter
	706570/11	paperless recorder with 12 analog inputs
	706570/21	paperless recorder with 12 analog inputs incl. Setup and PC evaluation software and interface cable/adapter
		(2) Inputs 1 – 6 (programmable)
	000	not assigned
	888	factory-set
		(3) Inputs 7 – 12 (programmable)
	000	not assigned
	888	factory-set
		(4) Interface
	51	RS232 (standard)
	54	RS422/485
	66	RS232 and LON
	67	RS422/485 and LON
	68	RS232 and PROFIBUS-DP
	69	RS422/485 and PROFIBUS-DP
		(5) Internal memory
	0064	64 MB backup memory
	0128	128 MB backup memory
	0256	256MB memory
		(6) External memory¹
	0000	without external memory
	0064	64 MB CompactFlash memory card
	0128	128 MB CompactFlash memory card
	0256	256MB CompactFlash memory card
		(7) Supply
	23	110 – 240V AC +10/-15%, 48 – 63Hz
	25	20 – 30V AC/DC 48 – 63Hz
		(8) Extra codes
	008	Ethernet connection
	020	lithium battery for memory buffer (ex-factory)
	061	UL approval
	021	storage capacitor (instead of extra code 020)
	258	7 binary inputs, 1 open-collector output, 4 relay outputs, voltage output 24V DC 50mA
	350	universal carrying case TG-35 ²
	444	stainless steel front with membrane keys

Order code

(1) (2) (3) (4) (5) (6) (7) (8)
 - , - - - - / ,...³

Order example

706570/10 - 888 , 000 - 51 - 0064 - 0064 - 23 / 020

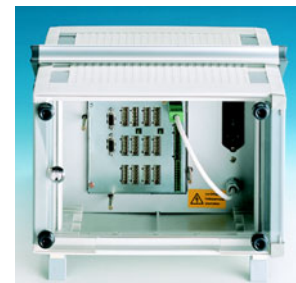
Standard accessories

- instrument documentation
- 2 fixing brackets
- 4 cable-ties with foot (can be released) for strain relief of the attached sensor cables

Accessories, data sheet 70.9700

- Setup program
- PC evaluation software (PCA3000)
- PCA communications software (PCC)
- PC interface with TTL/RS232 converter and adapter Sales No. 70/00350260
- PC interface with USB/TTL converter, adapter (socket) and adapter (pins) Sales No. 70/00456352

Supplementary accessory: Universal carrying case TG-35



Approvals

- UL approval (extra code)



¹ The CompactFlash memory cards specified by JUMO have been tested and are suitable for industrial applications.

No guarantee is given for other CF cards.

² The UL approval (061) applies to the panel-mounting instrument only.

³ List extra codes in sequence, separated by commas.

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 Postal address: 36035 Fulda, Germany
 Phone: +49 661 6003-0
 Fax: +49 661 6003-607
 e-mail: mail@jumo.net
 Internet: www.jumo.net

JUMO Instrument Co. Ltd.
 JUMO House
 Temple Bank, Riverway
 Harlow, Essex CM 20 2TT, UK
 Phone: +44 1279 635533
 Fax: +44 1279 635262
 e-mail: sales@jumo.co.uk
 Internet: www.jumo.co.uk

JUMO Process Control, Inc.
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 Phone: 315-697-JUMO
 1-800-554-JUMO
 Fax: 315-697-5867
 e-mail: info@jumo.us
 Internet: www.jumo.us



LOGOSCREEN nt



Paperless recorder with TFT display and CompactFlash card

Brief description

The LOGOSCREEN nt represents a new generation of paperless recorders from JUMO that stand out through their modular design for the acquisition of measurement data (3 to 18 measurement inputs can be implemented internally), their innovative operating concept and high standards of security to prevent unauthorized access and manipulation of the stored data.

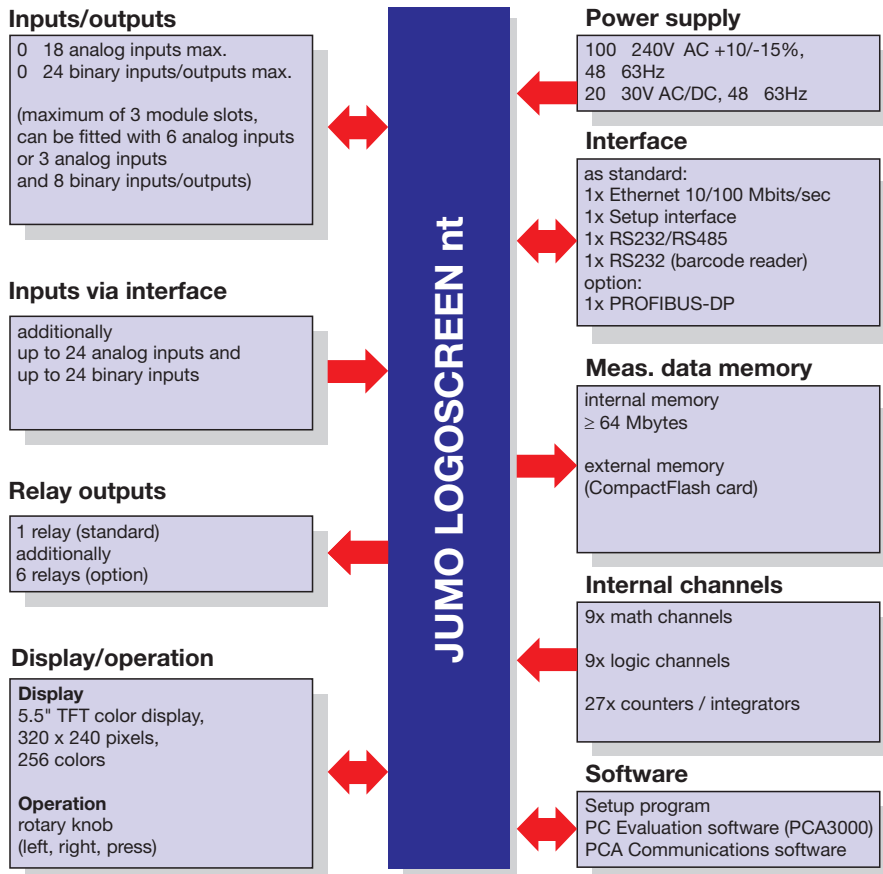
In the LOGOSCREEN nt, data can be visualized in process images as measurement curves, as a bar graph or in alphanumerical form.

Powerful PC programs are available for analyzing and evaluating the archived data, and for configuring the LOGOSCREEN nt.



Type 706580/...

Block structure



Key features

- Easy operation by control knob and through menu guidance
- Presentation of the measurements in various diagrams and process diagrams
- Visualization of alarms and events
- Measurement data storage on CompactFlash memory card
- Automatic read-out of data through the PCA Communications Software (PCC)
- Interface to SCADA systems, to PLC controls and PC systems
- Integrated web server
- Measurement display via web browser
- Simultaneous recording of up to 3 batch reports
- Batch control (start, stop, texts) through barcode reader
- MODbus master function
- Operator languages: English, German, French and Russian. Others on request.

Technical data

Analog inputs

Thermocouple

Designation	Type	Standard	Meas. range	Accuracy ¹
Fe-Con	L	DIN 43 710	-200 to +900°C	±0.1%
Fe-Con	J	EN 60 584	-200 to +1200°C	±0.1% from -100°C
Cu-Con	U	DIN 43 710	-200 to +600°C	±0.1% from -150°C
Cu-Con	T	EN 60 584	-270 to +400°C	±0.1% from -150°C
NiCr-Ni	K	EN 60 584	-200 to +1372°C	±0.1% from -80°C
NiCr-Con	E	EN 60 584	-200 to +1000°C	±0.1% from -80°C
NiCrSi-NiSi	N	EN 60 584	-100 to +1300°C	±0.1% from -80°C
Pt10Rh-Pt	S	EN 60 584	0 to 1768°C	±0.15%
Pt13Rh-Pt	R	EN 60 584	0 to 1768°C	±0.15%
Pt30Rh-Pt6Rh	B	EN 60 584	0 to 1820°C	±0.15% from 400°C
W3Re/W25Re	D		0 to 2495°C	±0.15% from 500°C
W5Re/W26Re	C		0 to 2320°C	±0.15% from 500°C
W3Re/W26Re			0 to 2400°C	±0.15% from 500°C
Chromel-alumel	GOST R 8.585-2001		-200 to +1372°C	±0.1% from -80°C
Chromel-copel	GOST R 8.585-2001		-200 to +800°C	±0.15% from -80°C
PLII (Platinel II)			0 to 1395°C	±0.15%
Shortest span	Type L, J, U, T, K, E, N, chromel-alumel, PLII: 100°C Type S, R, B, D, C, W3Re/W26Re, chromel-copel: 500°C			
Range start/end	freely programmable within the limits, in 0.1°C steps			
Cold junction	Pt100 internal or thermostat external constant			
Cold junction accuracy (internal)	± 1°C			
Cold junction temperature (external)	-50 to +150°C adjustable			
Sampling cycle	channel 1 – 18: 125msec in total			
Input filter	2nd order digital filter; filter constant adjustable from 0 to 10.0sec			
Electrical isolation	see "Electrical data" on page 5 and "Overview of the electrical isolation" on page 15			
Resolution	> 14 bit			
Features	also programmable in °F			

1. The linearization accuracy refers to the maximum measuring range. The linearization accuracy is reduced with short spans.

Resistance thermometers

Designation	Standard	Connection circuit	Meas. range	Accuracy ¹	Meas. curr.
Pt100	EN 60 751 (TC = $3.85 \cdot 10^{-3}$ 1/°C)	2/3-wire	-200 to +100°C	±0.5°C	≈ 250µA
		2/3-wire	-200 to +850°C	±0.8°C	≈ 250µA
		4-wire	-200 to +850°C	±0.5°C	≈ 250µA
Pt100	JIS 1604 (TC = $3.917 \cdot 10^{-3}$ 1/°C)	2/3-wire	-200 to +100°C	±0.5°C	≈ 250µA
		2/3-wire	-200 to +650°C	±0.8°C	≈ 250µA
		4-wire	-200 to +650°C	±0.5°C	≈ 250µA
Pt100	GOST 6651-94 A.1 (TC = $3.91 \cdot 10^{-3}$ 1/°C)	2/3-wire, 4-wire	-200 to +100°C	±0.5°C	≈ 250µA
		2/3-wire, 4-wire	-200 to +850°C	±0.8°C	≈ 250µA
Pt500	EN 60 751 (TC = $3.85 \cdot 10^{-3}$ 1/°C)	2/3-wire, 4-wire	-200 to +100°C	±0.5°C	≈ 100µA
		2/3-wire, 4-wire	-200 to +850°C	±0.9°C	≈ 100µA
Pt1000	EN 60 751 (TC = $3.85 \cdot 10^{-3}$ 1/°C)	2/3-wire	-200 to +100°C	±0.5°C	≈ 100µA
		2/3-wire	-200 to +850°C	±0.8°C	≈ 100µA
		4-wire	-200 to +850°C	±0.5°C	≈ 100µA
Ni 100	DIN 43 760 (TC = $6.18 \cdot 10^{-3}$ 1/°C)	2/3-wire, 4-wire	-60 to +180°C	±0.4°C	≈ 250µA
Pt50	ST RGW 1057 1985 (TC = $3.91 \cdot 10^{-3}$ 1/°C)	2/3-wire	-200 to +100°C	±0.5°C	≈ 250µA
		2/3-wire	-200 to +1100°C	±0.9°C	≈ 250µA
		4-wire	-200 to +100°C	±0.5°C	≈ 250µA
		4-wire	-200 to +1100°C	±0.6°C	≈ 250µA
Cu 50	(TC = $4.26 \cdot 10^{-3}$ 1/°C)	2/3-wire	-50 to +100°C	±0.5°C	≈ 250µA
		2/3-wire	-50 to +200°C	±0.9°C	≈ 250µA
		4-wire	-50 to +100°C	±0.5°C	≈ 250µA
		4-wire	-50 to +200°C	±0.7°C	≈ 250µA

Designation	Standard	Connection circuit	Meas. range	Accuracy ¹	Meas. curr.
Cu 100	GOST 6651-94 A.1 (TC = 4.26·10 ⁻³ 1/°C)	2/3-wire	-50 to +100°C	±0.5°C	≈ 250µA
		2/3-wire	-50 to +200°C	±0.9°C	≈ 250µA
		4-wire	-50 to +100°C	±0.5°C	≈ 250µA
		4-wire	-50 to +200°C	±0.6°C	≈ 250µA
Connection circuit		2-, 3-, or 4-wire circuit			
Shortest span		15°C			
Sensor lead resistance		max. 30 Ω per conductor for 3-wire/4-wire circuit max. 10Ω per conductor for 2-wire circuit			
Range start/end		freely programmable within the limits in 0.1 °C steps			
Sampling cycle		channel 1 – 18: 125msec in total			
Input filter		2nd order digital filter; filter constant adjustable from 0 to 10sec			
Electrical isolation		see “Electrical data” on page 5 and “Overview of the electrical isolation” on page 15			
Resolution		> 14bit			
Features		also programmable in °F			

1. The linearization accuracy refers to the maximum measuring range. The linearization accuracy is reduced with short spans.

Resistance transmitter and potentiometer

Designation	Meas. range	Accuracy ¹	Measuring current
Resistance transmitter	up to 4000Ω	±4 Ω	≈ 100µA
Potentiometer	< 400Ω	±400 mΩ	≈ 100µA
	≥ 400Ω to 4000Ω	±4 Ω	≈ 250µA
Connection circuit		resistance transmitter: 3-wire circuit potentiometer: 2-/3-/4-wire circuit	
Shortest span		60Ω	
Sensor lead resistance		max. 30Ω per conductor for 4-wire circuit max. 10 Ω per conductor for 2-/3-wire circuit	
Resistance values		freely programmable within the limits, in 0.1Ω steps	
Sampling cycle		channel 1 – 18: 125msec in total	
Input filter		2nd order digital filter; filter constant adjustable from 0 to 10.0sec	
Electrical isolation		see “Electrical data” on page 5 and “Overview of the electrical isolation” on page 15	
Resolution		> 14bit	

1. The linearization accuracy refers to the maximum measuring range. The linearization accuracy is reduced with short spans.

Input for DC voltage, DC current

Basic range	Accuracy ¹	Input resistance
-12 to +112mV	±100µV	R _{IN} ≥ 1 MΩ
-10 to +210mV	±240µV	R _{IN} ≥ 470 kΩ
-1.5 to +11.5V	±6mV	R _{IN} ≥ 470 kΩ
-0.12 to +1.12V	±1mV	R _{IN} ≥ 470 kΩ
-1.2 to +1.2V	±2mV	R _{IN} ≥ 470 kΩ
-11 to +12V	±12mV	R _{IN} ≥ 470 kΩ
Shortest span		5mV
Range start/end		freely programmable within the limits in 0.01 mV steps
-1.3 to +22mA	±20µA	burden voltage ≤ 3V
-22 to +22mA	±44µA	burden voltage ≤ 3V
Shortest span		0.5mA
Range start/end		freely programmable within the limits in 0.01 mA steps
Overrange/underrange		according to NAMUR NE 43
Sampling cycle		channel 1 – 18: 125msec in total
Input filter		2nd order digital filter; filter constant adjustable from 0 to 10.0sec
Electrical isolation		see “Electrical data” on page 5 and “Overview of the electrical isolation” on page 15
Resolution		> 14bit

1. The linearization accuracy refers to the maximum measuring range. The linearization accuracy is reduced with short spans.

Transducer short circuit/break

	Short-circuit ¹	Break ¹
Thermocouple	not detected	detected
Resistance thermometer	detected	detected
Resistance transmitter	not detected	detected
Potentiometer	not detected	detected
Voltage ≤ ± 210mV	not detected	detected
Voltage > ± 210mV	not detected	not detected
Current	not detected	not detected

1. Programmable reaction of device, e.g. triggering alarm

Binary inputs/outputs (option)

Input or output	configurable as input or output
Number	8, 16 or 24, depending on the device version, to DIN VDE 0411, Part 500; max. 25Hz, max. 32V
Input - level - pulse width - sampling cycle (for recording)	logic "0": -3 to +5V (input current max. ±1 mA), logic "1": 12 – 30V (2.5mA ≤ input current ≤ 5mA) min. 300msec 1 Hz
High-speed input - task - pulse width - sampling cycle	the first two binary inputs of each module (B1, B2, B9, B10, B17, B18), if the module is not fitted with relays or 6 analog inputs count function, e.g. for flow measurement min. 300µs 10kHz
Output - type - level - sampling cycle	open-collector output, switches relative to positive voltage logic "0": transistor is inhibited (max. permissible voltage across switching transistor ≤ 30V, max. leakage current 0.1 mA) logic "1": transistor is switched on (max. voltage across switching transistor ≤ 1.6V, max. current 50mA) at least 1 sec (1 Hz)

Outputs

1 relay (ex-factory)	changeover (SPDT), 3A, 230V AC ¹
6 relays (option)	changeover (SPDT), 3A, 230V AC ^{1,2}

1. with resistive load. 2. It is not permissible to mix SELV circuits and supply circuits.

Interfaces

RS232/RS485 (connector 7) - protocol - baud rate - modem - connector - external inputs	Qty. 1, switchable between RS232 and RS485 MODbus master, MODbus slave and barcode reader 9600, 19200, 38400 can be connected SUB-D via the MODbus master/salve function, 24 analog and 24 binary
RS232 for barcode reader (connector 2) - protocol - baud rate - connector - external inputs	Qty. 1 MODbus master, MODbus slave and barcode reader 9600, 19200, 38400 SUB-D via the MODbus master/salve function, 24 analog and 24 binary
Ethernet (connector 6) - quantity - protocols - baud rate - connector - data format	max. 1 TCP, IP, HTTP, DHCP, SMTP, MODbusTCP 10Mbits/sec, 100Mbits/sec RJ45 HTML

Screen

Resolution / size	320 x 240 pixels / 5.5"
Type / number of colors	TFT color screen / 256 colors
Screen refresh rate	> 150Hz
Brightness setting	adjustable on instrument
Screen saver (switch-off)	through waiting time or control signal

Electrical data

Supply voltage (switch-mode PSU)	100 – 240V AC +10/-15%, 48 – 63Hz or 20 – 30V AC/DC, 48 – 63Hz
Electrical safety	to EN 61 010, Part 1, August 2002 overvoltage category II, pollution degree 2 terminal for PE conductor
Protection class I	
Test voltages (type test)	
- mains supply circuit to measuring circuit	with AC supply: 2.3kV/50Hz, 1 min, with AC/DC supply: 510V/50Hz, 1 min
- mains supply circuit to housing (protective conductor)	with AC supply: 2.3kV/50Hz, 1 min, with AC/DC supply: 510V/50Hz, 1 min
- measuring current circuits to meas. current circuit and housing	500V/50Hz, 1 min
- electrical isolation between analog inputs	up to 30V AC and 50V DC
Supply voltage error	< 0.1% of range span
Power consumption	approx. 30VA
Data backup	CompactFlash memory card
Electrical connection	
- mains supply and relays	at rear through pluggable screw terminals, 5.08mm raster, max. conductor cross-section $\leq 2.5\text{mm}^2$ or $2 \times 1.5\text{mm}^2$ with ferrules or at rear through pluggable and screwable terminal blocks (on request)
- analog and binary inputs	at rear through pluggable screw terminals, 3.81 mm raster, max. conductor cross-section $\leq 1.5\text{mm}^2$ or at rear through pluggable and screwable terminal blocks (on request)

Environmental influences

Ambient temperature range	0 to +50°C
Ambient temperature effect	0.03%/°C
Storage temperature range	-20 to +60°C
Climatic conditions	$\leq 75\%$ relative humidity, no condensation
EMC	EN 61 326
- interference emission	Class A
- immunity to interference	to industrial requirements

Housing

Housing front	zinc die-casting, optionally in stainless steel
Housing type	housing for flush-panel mounting to DIN 43 700, in stainless steel
Bezel size	144 mm x 144 mm
Depth behind panel	192 mm (incl. terminals)
Panel cut-out	$138^{+1.0}$ mm x $138^{+1.0}$ mm
Panel thickness	2 – 40 mm
Housing mounting	in panel to DIN 43 834
Operating position	unrestricted, but taking into account the viewing angle of the screen, horizontally $\pm 65^\circ$, vertically $+40^\circ$ to -65°
Enclosure protection	to EN 60 529 Category 2, front IP65, rear IP20
Weight	approx. 4 kg



Control knob, to rotate and press.

CompactFlash memory card and setup interface behind housing door.

Instrument description

Hardware

The paperless recorder is built to a modular design. The basic type consists of a PSU board (incl. relays) and a CPU board (incl. Ethernet and RS232/RS485 interfaces and a RS232 interface to connect a barcode reader).

The module slots 1, 2 and 3 can be fitted with input modules, each with 6 analog inputs or 3 analog inputs and 8 binary inputs/outputs. Alternatively, module slot 3 can be fitted with a relay module that has 6 relays.

Optionally, the PSU board can be equipped with a PROFIBUS-DP interface.

Data recording

The measurements are acquired continuously in a 125msec sampling cycle. Based on these measurements, reports are compiled and limits checked.

The measurements are transferred to the main memory of the instrument, according to the programmable storage cycle and stored value (maximum, minimum, average, min&max, instantaneous value or economy mode).

The paperless recorder saves the data according to the groups, and an input can be assigned to several groups (maximum 9).

Main memory (RAM)

The data stored in the RAM are regularly copied to the internal memory in 20 kbyte blocks. This is written to as a ring memory, i.e. when the memory is full, the oldest data will automatically be overwritten by new data.

The data from the main memory can be shown as a history presentation on the recorder. The size of the history memory can be configured.

Internal memory

When a block in the main memory has been filled, it is copied to the internal memory. The internal memory has a capacity of ≥ 64 Mbytes.

Every write action is monitored, so that any errors in saving data can be immediately identified.

The instrument monitors the capacity of the internal memory and activates one of the "memory alarm" signals when the capacity has fallen below the configurable residual capacity level. These signals can be used, for instance, to operate the alarm relay.

CompactFlash memory card (external)

The external (replaceable) CompactFlash memory card can be used to transfer the data to a PC.

Data security

The data are stored in coded form in a proprietary format. This ensures a high level of data security.

If the paperless recorder is disconnected from the supply, then:

- RAM and clock time are buffered by a lithium battery (ex-factory) for at least 10 years, with storage capacitor for at least 2 days (ambient temperature -40 to $+45^{\circ}\text{C}$),
- Measurement and configuration data in the internal memory will not be lost.

Recording duration

Depending on the configuration of the instrument, the duration of the recording can vary over a considerable range (from a few days up to several months).

Data transfer

Data transfer from the paperless recorder to a PC is made by means of the external CompactFlash memory card, via the serial interface, or via the Ethernet interface.

Report

For each channel of a group, a report (maximum/minimum/average or integrator) can be run over defined periods.

Batch reports

Up to three batch reports can be created simultaneously in the recorder. The measurement data, start, end and duration of each batch can be displayed together with a batch counter and freely definable texts, both on the recorder and within the PC Evaluation Software PCA3000.

On request, a barcode reader can be used to start batches and read in batch texts.

Limit check/

changeover of operating mode

Over/underlimit conditions trigger alarms. An alarm can be used, for instance, as a control signal for changing over the operating mode.

The storage cycle and stored value can be configured separately for all three operating modes.

With the help of the alarm delay function, brief occurrences of over/underlimit conditions can be filtered out, with the result that no alarm is generated.

Normal operation

If the instrument is **not** in timed or event operation, normal operation is active.

Event operation

Event operation is activated/deactivated by a control signal (binary input, group/combo combination alarm...). As long as the control signal is active, the instrument is in event operation.

Timed operation

Timed operation is active on a daily basis within a programmable time period. The operating modes have different priorities.

Counters/integrators/ operating time counters/ high-speed counters

27 additional internal channels are available for use as counters, integrators or operating time counters.

These counters are controlled through the binary inputs, the alarms, or via the logic channels. The analog channels can be used for the integrators. The numerical indication is shown in a separate window, with a maximum of 9 digits. The acquisition period can be selected as: periodic, daily, weekly, monthly, yearly as well as external, total (overall count) or daily from ... to. A maximum of 6 binary inputs are available as high-speed counters with a 10kHz sampling cycle rate.

Math/logic module (extra code)




The module for math and logic (9 channels each) enables, for instance, the combination of analog channels with one another, and also the combination of analog channels with counters and binary inputs. The operators available for formulae are: +, -, *, /, (,), SQRT(), MIN(), MAX(), SIN(), COS(), TAN(), **, EXP(), ABS(), INT(), FRC(), LOG(), LN(), humidity, moving average or !, &, |, ^, as well as (and).

The math and logic module can only be configured through the setup program.

Operation and configuration


On the recorder

The instrument is configured from the control knob on the front panel under menu guidance.


-  Shift current menu position (cursor) to the left or upwards.
-  Shift current menu position (cursor) to the right or downwards.
-  When the control knob is pressed, the current function is executed.

Example:

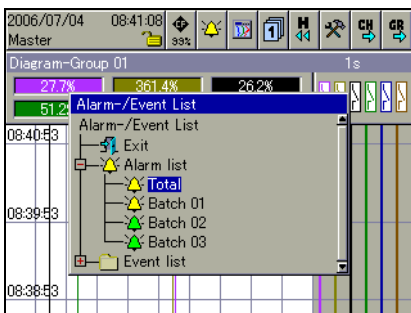


 Rotate control knob to the left.

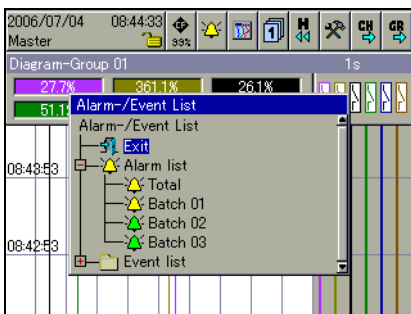



 Press control knob.

Result: The menu for the alarm and event list is called up.




 Rotate control knob to the left.



 Press control knob.

Result: The menu for the alarm and event list is closed again.



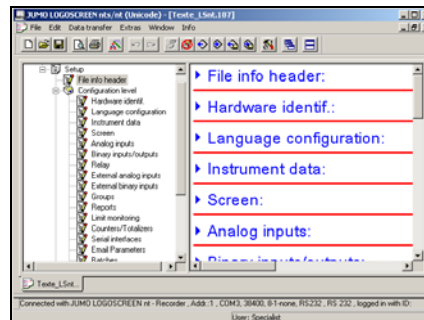
 Integrated user lists (different users with different authorizations) protect the recorder against unauthorized access.

Through setup program

As an alternative to the configuration from the control knob on the recorder, the instrument can also be configured through the setup program.

The communication between the setup program and the paperless recorder is made through the:

- setup interface,
- serial interface,
- Ethernet interface or
- CompactFlash memory card



The configuration data can be archived on a data storage medium and output to the printer.

Via the CompactFlash memory card

The configuration can be saved to the CompactFlash memory card and read into the recorder.

Operating language

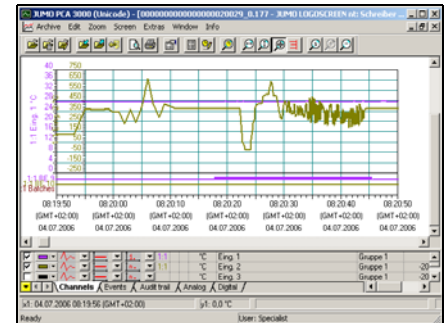
Two languages (see order details) are integrated in the instrument ex-factory. The setup program is used to exchange the operator language.

The languages available at the moment are: English, French, German and Russian. Other language versions (with Unicode capability) can be created.

PC programs

PC Evaluation Software (PCA3000)

The PC Evaluation Software (PCA3000) is a program which runs under Windows NT4.0/2000/XP, and is used to manage, archive, visualize and evaluate the recorder data.



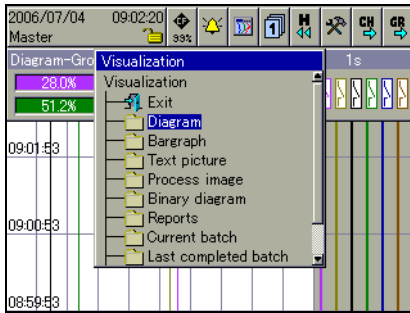
- The data from differently configured instruments are recognized by the PC Evaluation Software and stored in an archive database. The entire management is performed automatically. The user only has to manually allocate an identifier (supplementary description).
- The user can at any time gain access to certain data sets which can be distinguished by the identifier. In addition, it is possible to restrict the time periods to be evaluated.
- Any analog or binary channels of a paperless recorder (even from different groups) can subsequently be combined into PCA groups in PCA3000.
- Since each group is displayed in a separate window, several groups can be shown simultaneously on the screen and compared.
- Operation by mouse or keys.
- Using the export filter, it is possible to export the stored data, so that they can be processed in other programs, such as Excel.
- The PC Evaluation Software PCA3000 has network capability, i.e. several users can obtain data from the same database in the network independently of each other.

PCA Communications software (PCC)

- The data can be read out from the recorder via the serial interface (RS232/RS485) or via the Ethernet interface. The data can be read manually or automatically (e.g. daily at 23.00 hrs).
- Data can also be retrieved via remote control, through a modem.

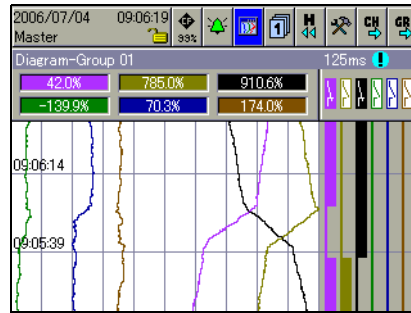
Visualization on the instrument

Operator level



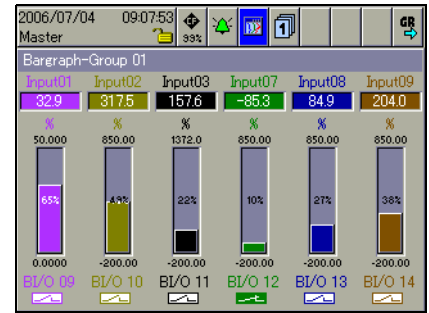
- Selection of visualization

Vertical diagram



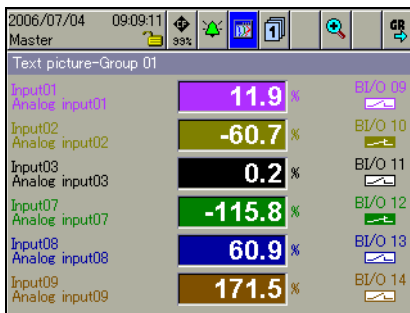
- Recorder chart presentation of the analog and binary channels
- Display of scaling and limit markers of a channel (can be switched on/off)
- Numerical display of the current analog channels

Bar graph presentation



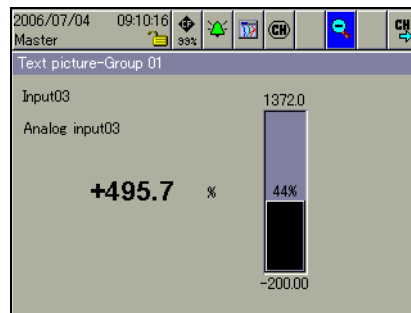
- Bar graph presentation of the analog channels
- On/Off presentation of the binary channels
- Display of the current analog channels with scaling and limit markers
- Color change of bar graph to red when limits are infringed

Numerical presentation



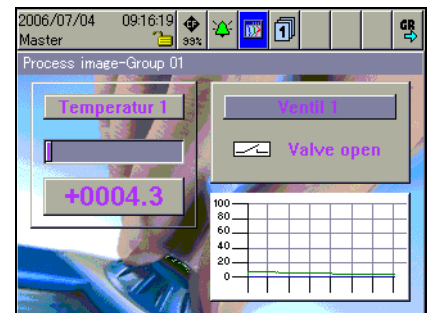
- Large numerical presentation of the analog channels, including the channel name and description
- Each analog channel can be switched to the foreground
- On/Off presentation of the binary channels

Numerical 1-channel presentation



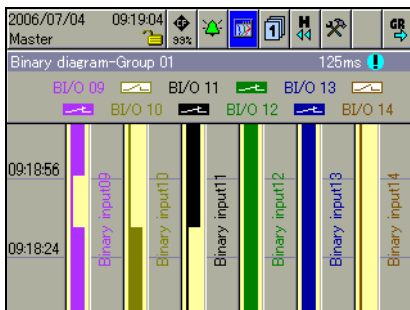
- Clear presentation of an analog channel
- An analog input is shown as a bar graph and a number simultaneously
- Display of the channel name and description
- Display of scaling and limit markers

Process image



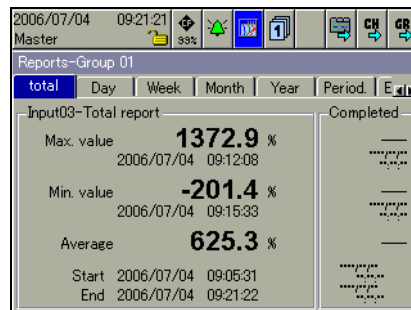
- Freely configurable presentation (through the setup program) of analog and binary signals with background pictures
- One process image for each group

Binary presentation



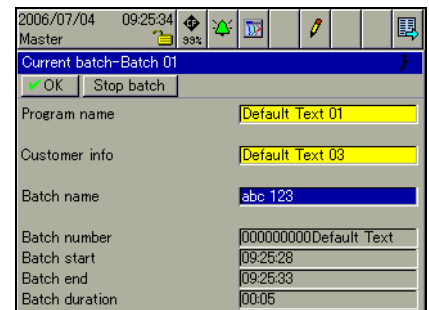
- On/Off presentation of the binary channels

Report



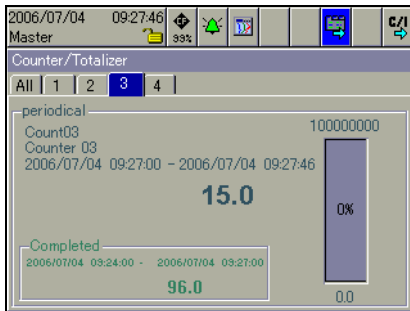
- Display of different reports for the analog channels of a group
- Details of minimum/maximum/average/integral values and time period
- Display of the previous report

Batch reports



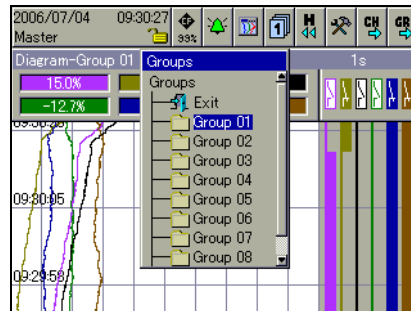
- 3 batches documented simultaneously
- Changeover between current and completed batch reports
- Electronic signature is possible
- Batch texts via interface and barcode reader, among others

Counter/integrator presentation



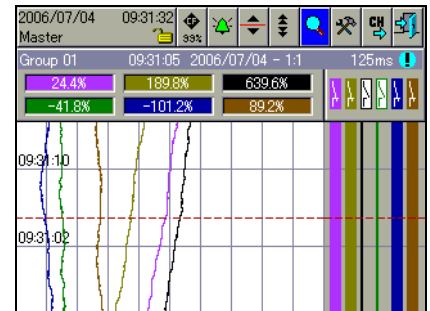
- Presentation of up to 27 counters or integrators
- Changeover between individual or overall display
- Display of the current and the most recently completed count

Group selection



- Up to 9 groups are configurable
- Up to 6 analog and 6 binary channels can be shown for each group
- Measurement signals can be used in several groups

History presentation



- All stored measurement data are shown as curves at different zoom levels
- Display of scaling and limit markers of a channel
- Numerical display of the measurements of the analog channels at the cursor position
- Shifting of the visible section within the stored measurement data

Presentation of alarm lists

Date	Time	Description
2006/07/04	09:47:22	Alarm Lim02
2006/07/04	09:47:15	Alarm Lim01
2006/07/04	09:47:15	I/O 9 not calibrated
2006/07/04	09:47:15	High Alarm AI08
2006/07/04	09:47:15	I/O 8 not calibrated
2006/07/04	09:47:15	I/O 7 not calibrated
2006/07/04	09:47:15	High Alarm AI02

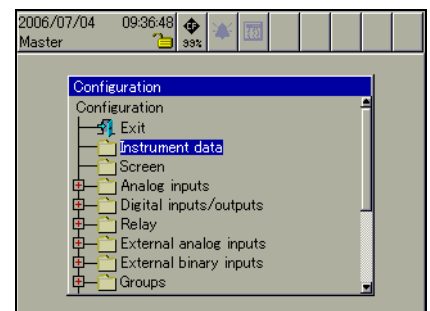
- Display of current alarms
- For the instrument as a whole or batch-related
- Up to 150 entries visible on the recorder

Presentation of event lists

Date	Time	Description
2006/07/04	09:35:19	CF card removed
2006/07/04	09:35:19	CF card in place
2006/07/04	09:35:16	CF card removed
2006/07/04	09:34:16	POWER ON
2006/07/04	09:33:42	POWER OFF
2006/07/04	09:26:29	Batch 01 end
2006/07/04	09:25:28	Batch 01 start
2006/07/04	09:05:31	NEW CONFIGURATION

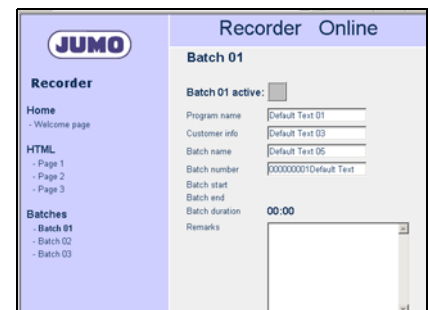
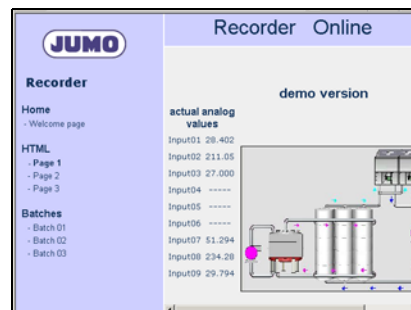
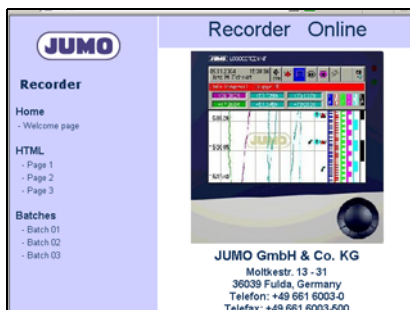
- Display and storage of events and alarms
- For the instrument as a whole or batch-related
- Up to 150 entries visible on the recorder

Configuration



- Configuration on the recorder itself, by rotating and pressing the control knob
- Configuration through setup program

Visualization through the web browser



- Freely configurable HTML pages

Interfaces

- Setup interface (standard)
- RS232/RS485 interface (standard)
- Ethernet interface (standard)
- RS232 interface for barcode reader (standard)
- PROFIBUS-DP interface (extra code - in preparation)

	Setup interface	RS232 RS485	Ethernet	PROFIBUS-DP	External CF card
Read / write current measurement data	yes	yes	yes	yes	no
Read stored measurement data	yes	yes	yes	no	yes
Read / write configuration	yes	yes	yes	no	yes
Write user list	yes	yes	yes	no	yes

Setup interface

The setup interface is used together with a PC interface for operating the setup program.

The recorder has one setup interface on the front panel and one on the back panel (connected in parallel). The two interfaces cannot both be operated at the same time. The available PC interfaces are:

- PC interface with TTL/RS232 converter and adapter (socket)
Sales No. 70/00350260
- PC interface as USB/TTL converter, with adapter (socket) and adapter (plug)
Sales No. 70/00456352

Further information on the PC interface can be found in data sheet 70.9700.

RS232/RS485 interface

The current process data as well as specific device data can be read out via the RS232 or RS485 interface.

The data saved to the internal memory can also be read out in conjunction with the PC Evaluation Software PCA3000 and the PCA Communications Software (PCC).

The RS232 interface permits a maximum lead length of 15m, the RS485 interface 1.2km.

Connection is by a 9-pin SUB-D connector at the back of the instrument. The MODbus (master and slave) protocols are available, and the transmission mode used is RTU (Remote Terminal Unit).

RS232 for barcode reader

A barcode reader can be attached to the interface. The barcode reader can be used to start or stop the batch reporting, and to set batch texts (customer information, batch number...).

The barcode reader can also be operated via the RS232/RS485 interface, and the RS232 interface for the barcode reader can also be used as a Modbus master or slave.

Ethernet interface

The Ethernet interface can be used in local networks for the communication between the recorder and the setup program and the PCA Communications Software. The IP address is set permanently through the configuration on the instrument or in the setup program, or can be automatically received from a DHCP server.

The integrated web server allows simultaneous access by several PCs to 3 HTML and 3 batch pages.

Transmission protocol: TCP/IP
Network type: 10BaseT, 100BaseT

PROFIBUS-DP interface

The recorder can be integrated into a fieldbus system according to the PROFIBUS-DP standard via the PROFIBUS-DP interface. This PROFIBUS version is especially designed for the communication between automation systems and distributed peripheral devices at the field level.

Data are transmitted serially according to the RS485 standard, with a maximum of 12 Mbits/sec.

Using the project design tool that is included in the delivery (GSD generator; GSD = device master file), an application-specific GSD file is created, which is used to integrate the recorder into the fieldbus system.

External CompactFlash memory card (CF)

The external CompactFlash memory card (CF) is used to transfer the data from the internal memory to the PC. Configuration data can be created on the PC and then transferred to the recorder by means of the memory card.

On the PC side, data on the card is accessed using a read/write device (CompactFlash reader/writer).

External inputs via interface

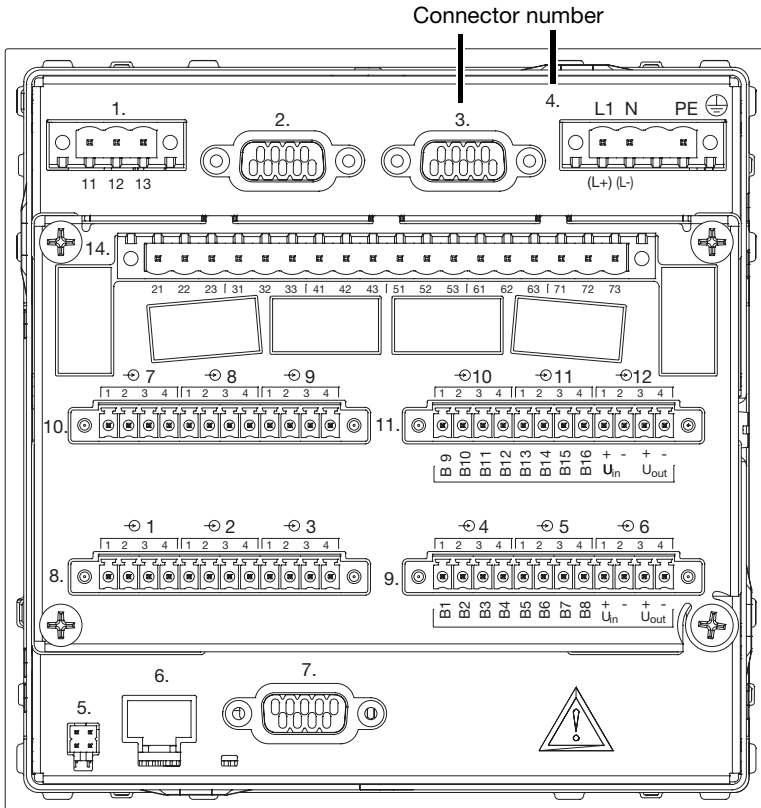
The paperless recorder can acquire and store up to 24 analog inputs and 24 binary inputs.

Furthermore, the interfaces can be used to enter comments in the event list of the recorder.

Connection diagram

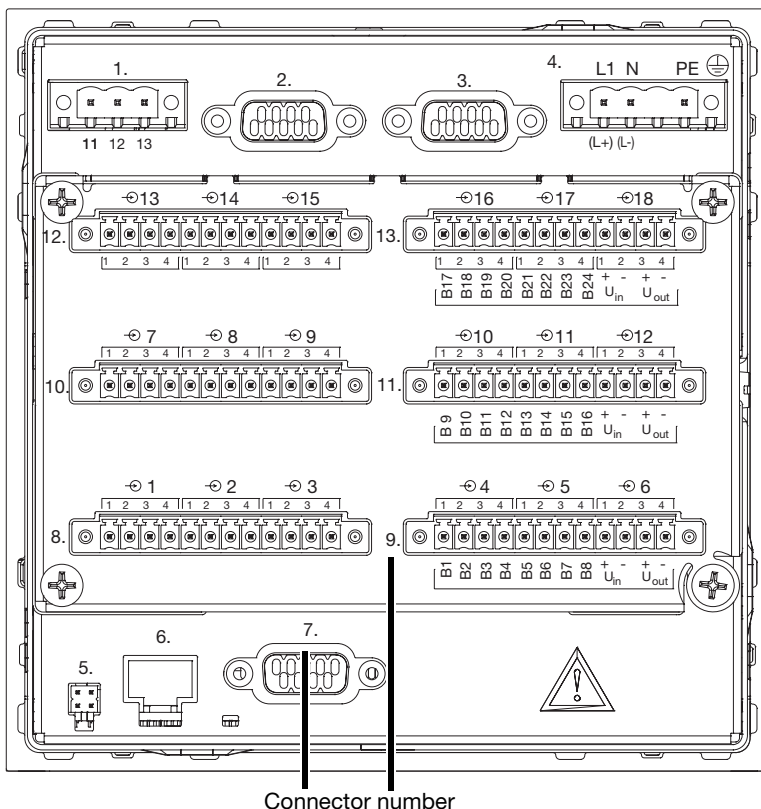
Rear view with pluggable screw terminals

Instrument variant 1




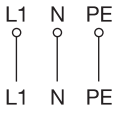
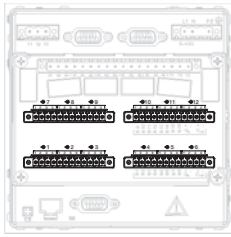
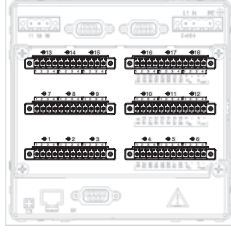
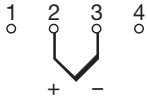
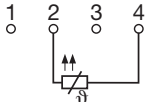
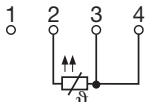
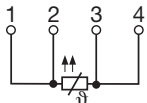
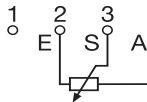
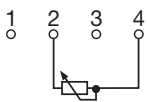
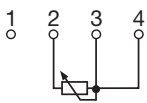
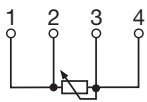
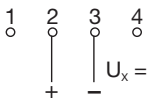
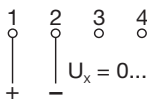
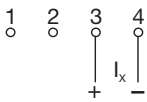
- Module slot 3 (top)**
fitted with one relay card.
- Module slot 2 (middle)**
fitted with 6 analog channels or
3 analog channels and
8 binary inputs/outputs.
- Module slot 1 (bottom)**
fitted with 6 analog channels or
3 analog channels and
8 binary inputs/outputs.


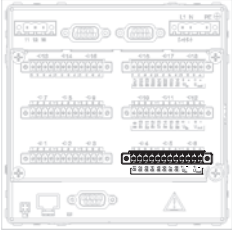
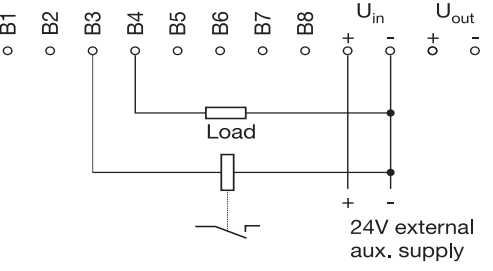
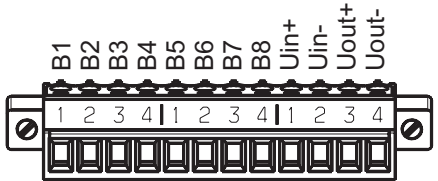
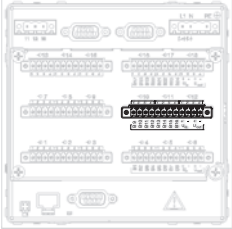

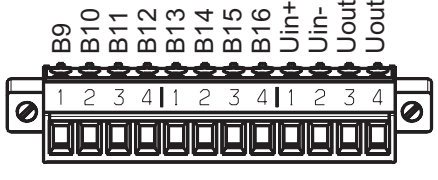
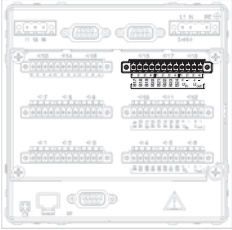
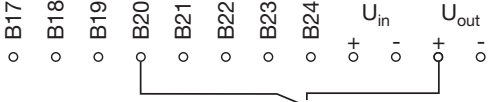
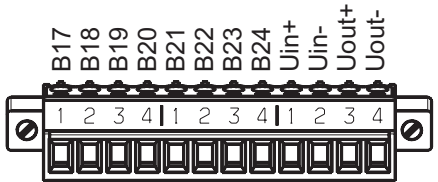
Instrument variant 2


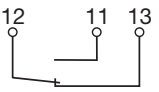
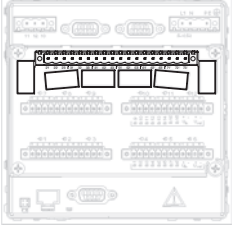
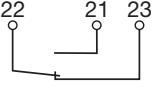
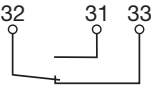
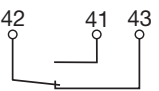
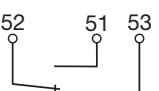
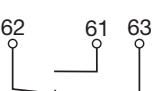
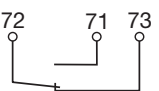








- Module slot 3 (top)**
fitted with 6 analog channels or
3 analog channels and
8 binary inputs/outputs.
- Module slot 2 (middle)**
fitted with 6 analog channels or
3 analog channels and
8 binary inputs/outputs.
- Module slot 1 (bottom)**
fitted with 6 analog channels or
3 analog channels and
8 binary inputs/outputs.

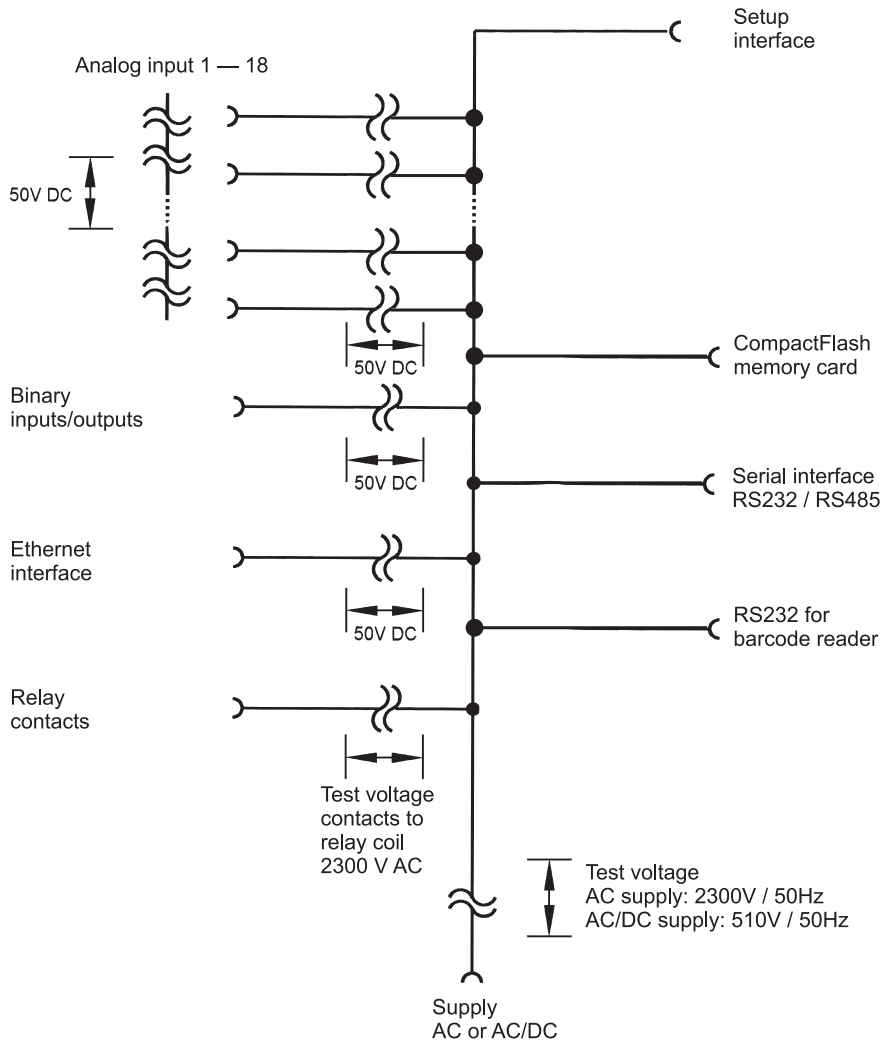
Connector number

Terminal assignment	Connector	Diagram
Supply		
Supply as on nameplate	Connector 4 L1 (L+) N (L-) PE 	
Analog inputs		
Thermocouple	Connectors 8 to 11 (input 1 to 12) for instrument variant 1  or connectors 8 to 13 (input 1 to 18) for instrument variant 2 	
RTD in 2-wire circuit		
RTD in 3-wire circuit		
RTD in 4-wire circuit		
Resistance transmitter		 <p>E = End S = Slider A = Start</p>
Potentiometer in 2-wire circuit		
Potentiometer in 3-wire circuit		
Potentiometer in 4-wire circuit		
Voltage input 0 – 1V		 <p>$U_x = 0 \dots 1V$</p>
Voltage input 0 – 10V		 <p>$U_x = 0 \dots 10V$</p>
Current input	 <p>I_x</p>	

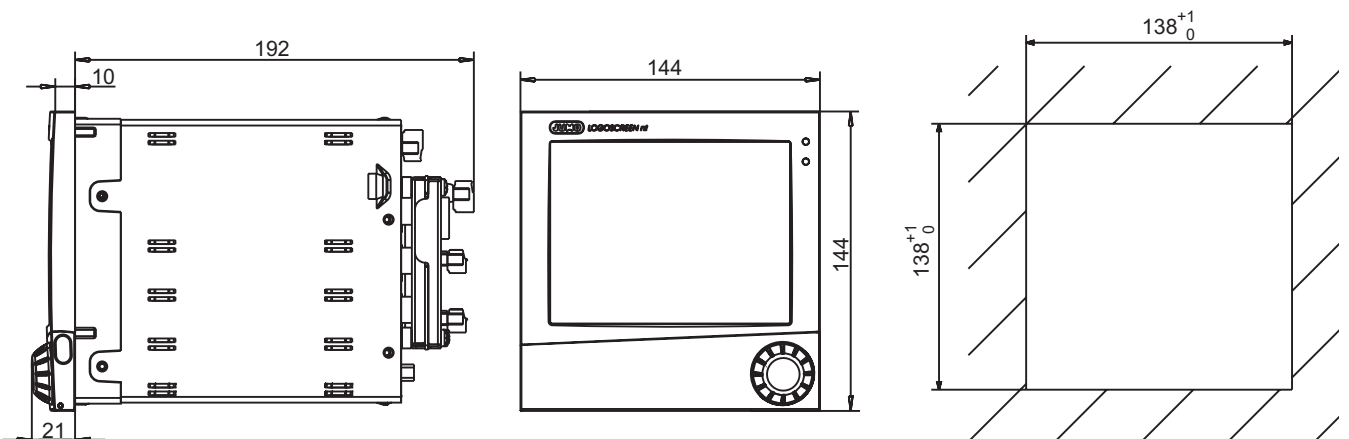
Terminal assignment	Connector	Diagram
<p>Binary inputs/outputs</p> <p> Configuration (through the setup program or on the instrument) defines which are binary inputs and which are outputs.</p>		
<p>B1 ... B8</p> <p>voltage-controlled LOW = -3 to +5V DC HIGH = 12 to 30V DC</p> <p>Supply voltage 24V/60mA</p> 	<p>Connector 9 only on modules with 3 analog inputs</p> <p>B1 binary input/ output 1</p> <p>...</p> <p>B8 binary input/ output 8</p> <p>U_{in+} external aux. supply</p> <p>U_{in-} ground for ext. auxiliary supply</p> <p>U_{out+} +24V aux. supply</p> <p>U_{out-} ground aux. supply</p>	 <p>Example: Connecting a load to binary output 4 (B4) and a solid-state relay to binary output 3 (B3) requires an external auxiliary supply.</p> <p>Diagram of the connector:</p> 
<p>B9 ... B16</p> <p>voltage-controlled LOW = -3 to +5V DC HIGH = 12 to 30V DC</p> <p>Supply voltage 24V/60mA</p> 	<p>Connector 11 only on modules with 3 analog inputs</p> <p>B9 binary input/ output 9</p> <p>...</p> <p>B16 binary input/ output 16</p> <p>U_{in+} external aux. supply</p> <p>U_{in-} ground for ext. auxiliary supply</p> <p>U_{out+} +24V aux. supply</p> <p>U_{out-} ground aux. supply</p>	 <p>Example: Binary input 12 (B12) is operated from the internal power supply.</p> <p>Diagram of the connector:</p> 
<p>B17 ... B24</p> <p>voltage-controlled LOW = -3 to +5V DC HIGH = 12 to 30V DC</p> <p>Supply voltage 24V/60mA</p> 	<p>Connector 13 only for instr. variant 2 and on modules with 3 analog inputs</p> <p>B17 binary input/ output 17</p> <p>...</p> <p>B24 binary input/ output 24</p> <p>U_{in+} external aux. supply</p> <p>U_{in-} ground for ext. auxiliary supply</p> <p>U_{out+} +24V aux. supply</p> <p>U_{out-} ground aux. supply</p>	 <p>Example: Binary input 20 (B20) is operated from the internal power supply.</p> <p>Diagram of the connector:</p> 

Connector assignments	Connector	Diagram	
Relay outputs			
Relay 1 changeover (SPDT)	Connector 1 		
Relay 2 changeover (SPDT)	Connector 14 only for instr. variant 1 		
Relay 3 changeover (SPDT)			
Relay 4 changeover (SPDT)			
Relay 5 changeover (SPDT)			
Relay 6 changeover (SPDT)			
Relay 7 changeover (SPDT)			
Interfaces			
RS232C for barcode reader 9-pin SUB-D socket connector	Connector 2 	2 RxD 3 TxD 5 GND	Receive Data Transmit Data Ground
PROFIBUS-DP 9-pin SUB-D socket connector (extra code)	Connector 3 	3 RxD/TxD-P 5 DGND 6 VP 8 RxD/TxD-N	Receive/Transmit Data-Pos. B conductor Ground for data transmission Supply voltage-Pos. Receive/Transmit Data-Neg. A conductor
Setup interface	Connector 5 	The recorder also has a setup interface on the front panel, connected in parallel. The two interfaces cannot both be operated at the same time.	
Ethernet RJ45 socket connector	Connector 6 	1 TX+ 2 TX- 3 RX+ 6 RX-	Transmit Data + Transmit Data - Receive Data + Receive Data -
RS232C 9-pin SUB-D socket connector (switchable to RS485)	Connector 7 	2 RxD 3 TxD 5 GND	Receive Data Transmit Data Ground
RS485 9-pin SUB-D socket connector (switchable to RS232)	Connector 7 	3 TxD+/RxD+ 5 GND 8 TxD-/RxD-	Transmit/Receive Data + Ground Transmit/Receive Data -

Overview of the electrical isolation



Dimensions



Order details

	Basic type
706580/	Paperless recorder with Ethernet, Setup and RS232/RS485 interface and RS232 interface (to connect a barcode reader) and one relay

	Basic type extensions
	Software
0	No software package
1	With software package (setup program, PC Evaluation software PCA3000, PCA Communications software PCC)
	Language for instrument texts
8	Factory setting (English/German)
9	Set to customer specification

1	2	3	Module slots
			Slot 1 (bottom)
0			not used
2			3 analog inputs and 8 binary inputs/outputs
3			6 analog inputs
			Slot 2 (middle)
0			not used
2			3 analog inputs and 8 binary inputs/outputs
3			6 analog inputs
			Slot 3 (top)
		0	not used
		1	6 relay outputs
		2	3 analog inputs and 8 binary inputs/outputs
		3	6 analog inputs

	Supply
33	100 – 240V AC +10/-15%, 48 – 63Hz
25	20 – 30V AC/DC, 48 – 63Hz (under development)

	Extra codes
020	Lithium battery for memory buffering
021	Storage capacitor (instead of extra code 020)
260	Math and logic module
267	Profibus-DP interface (under development)
350	Universal carrying case TG-35

706580/ [] - [] - [] / []¹ (Order code)
 706580/ 1 8 - 3 2 1 - 33 / 020 (Order example)

¹. List extra codes in sequence, separated by commas.

Standard accessories

- 1 Installation instructions B 70.6580.4
- 1 Operating instructions B 70.6580.1
- 4 mounting brackets
- 1 control panel seal
- 1 CD with detailed operating instructions and additional documentation

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 1-800-554-JUMO
 Fax: 610-380-8009
 e-mail: info@JumoUSA.com
 Internet: www.JumoUSA.com



Charts

Printing recorders					
					PS1(2, 3, 6)d(v)-44u/2 (4, 4.2)
					PS1(2, 3, 6)d(v)-88/2 (4, 4.2)
					PS1d-96/4
					PD.v-44(96)
					706030(31)/. . . Logoprint 500 (junior)
Pen recorders					
					LS1(2, 3)k-44m(mg)/2(4)
					LS1k-44ms/2(4)
					LL1(2, 3)v-44(jr)/4 Logoline 340
					LL1(2, 3)v-44u(ud, uj) Logoline 500 (junior)
Process recorders					
					LP6v-44/2.0(4.4) Logoprint 100 (140)
					LD6v-44/2(4) Logoprint C 200 (240)
					DP32v-10/2
					LM.v-44/4 Logoprint 084
Roll chart					
	Overall length	Overall width	Print	No. of rolls per package	Sales No.
x	16m	110mm	%	1	70/00033511
x	16m	140mm	%	1	70/00033513
	16m	110mm	%	1	70/00033515
	16m	70mm	%	1	70/00040782
	35m	308mm	lines	1	70/00081474
x	16m	120mm	%	5	70/00331395
	16m	120mm	%	5	70/00331398
	32m	120mm	%	5	70/00331410
	16m	120mm	none	5	70/00331413
	16m	120mm	none	5	70/00331474
	16m	120mm	lines	5	70/00331475
	25m	90mm	none	5	70/00331476
	16m	120mm	%, no hrs	5	70/00331497
	32m	120mm	%, no hrs	5	70/00331499
	16m	120mm	as specified ¹	1	
Fanfold chart					
	Overall length	Overall width	Print	No. of packs per package	Sales No.
	35m	308mm	lines	1	70/00081475
	15.6m	120mm	none	5	70/00331490
	15.6m	120mm	lines	1	70/00319743
	15.6m	120mm	%	5	70/00331401
	15.6m	120mm	%	5	70/00331407
	15.6m	120mm	none	5	70/00331480
	15.6m	120mm	as specified ¹	1	

1. 1 graduation, minimum order: 30 items

There is a handling charge of 25 euros on orders below 100 euros.

instruments from current product range

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Ribbons, print heads

Printing recorders

PS1(2, 3, 6)d(v)-44u/2 (4, 4.2)

PS1(2, 3, 6)d(v)-88/2 (4, 4.2)

PD.v-44(96)

706030(31)/. . .

Logoprint 500 (junior)

Process recorders

LD6v-44/2(4)

Logoprint C 200 (240)

DP32v-10/2

		No. of items per package	Sales No.		
x	Print head	6x violet	1	00040564	
x	Print head	3x violet, 3x red	1	00040561	
x	Print head	2x violet, 2x red, 2x black	1	00040562	
x	Print head	violet, red, black, green, blue, brown	1	00040563	
	x	Print head	violet, red, black, green, blue, brown	1	00081473
	x	Print head	violet, red, black, green, blue, brown	2	00331501
	x	Print head	2x violet, 2x red, 2x black	2	00355244
	x	Print head	violet, red, black, green, blue, brown	2	00355255
x	Set of ribbons	6x red	1	00060229	
x	Set of ribbons	6x black	1	00060230	
x	Set of ribbons	6x green	1	00060231	
x	Set of ribbons	6x blue	1	00060232	
x	Set of ribbons	6x brown	1	00060233	
x	Set of ribbons	violet, red, black, green, blue, brown	1	00030520	
x	Set of ribbons	6x violet	1	00033098	
x	Set of ribbons	3x violet, 3x red	1	00033100	
x	Set of ribbons	2x violet, 2x red, 2x black	1	00033101	
	x	Set of ribbons	violet, red, black, green, blue, brown	1	00020741
	x	Set of ribbons	6x black	1	00030522
	x	Set of ribbons	6x violet	1	00033106
	x	Set of ribbons	3x violet, 3x red	1	00033107
	x	Set of ribbons	2x violet, 2x red, 2x black	1	00033108
	x	Set of ribbons	6x red	1	00060224
	x	Set of ribbons	6x green	1	00060226
	x	Set of ribbons	6x blue	1	00060227
	x	Set of ribbons	6x brown	1	00060228

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**Fiber pen, ink and accessories****Pen recorders**

LS1(2, 3)k-44/fs

LS1(2, 3)k-44m(mg)/2(4)

LS1k-44ms/2(4)

LL1(2, 3)v-44(jr)/4

Logoline 340

LL1(2, 3)v-44u(ud, uj)

Logoline 500(junior)

Flatbed recorder

FS1(2)v-250

LIN 250

				No. of items per package	Sales No.	
x			Disposable fiber pens (channel 1)	blue	1	00046722
x			Disposable fiber pens (channel 2)	red	1	00046723
x			Disposable fiber pens (channel 3)	green	1	00046724
	x	x	Disposable fiber pens (channel 1)	blue	2	00331505
	x	x	Disposable fiber pens (channel 2)	red	2	00331507
	x	x	Disposable fiber pens (channel 3)	green	2	00331508
	x	x	Refillable fiber pens (channel 1)	blue	1	00053708
	x	x	Refillable fiber pens (channel 2)	red	1	00053709
	x	x	Refillable fiber pens (channel 3)	green	1	00053710
	x	x	Bottle of ink, contents 10ml	blue	1	00053711
	x	x	Bottle of ink, contents 10ml	red	1	00053712
	x	x	Bottle of ink, contents 10ml	green	1	00053713
	x	x	Filler	blue	1	00053714
	x	x	Filler	red	1	00053715
	x	x	Filler	green	1	00053716
	x	x	Fiber tip set (10 tips)		1	00053717
		x	Disposable fiber pen (channel 1)	blue	2	00331664
		x	Disposable fiber pen (channel 2)	red	2	00331666
		x	Disposable fiber pen (channel 3)	green	2	00331667
		x	Disposable fiber pen (channel 1)	red	1	00059590
		x	Disposable fiber pen (channel 2)	blue	1	00059591

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Temperature transmitters

Nr.

JUMO dTRANS T01

Programmable 2-wire transmitter

for connection to resistance thermometers and thermocouples
for installation in terminal head Form B to DIN 43 729
for mounting on rail

70.7010

JUMO dTRANS T02

Programmable 4-wire transmitter (Smart Transmitter)

with isolation of the standard signal
for mounting on DIN rail 35 x 7,5mm to EN 50 022

70.7020

JUMO dTRANS T03 J/B/T

Analog 2-wire transmitter with digital adjustment

for connection to Pt 100 resistance thermometers
for installation in terminal head Form B to DIN 43 729, terminal head Form J
for mounting on rail

JUMO dTRANS T03 BU/TU

Analog 3-wire transmitter with digital adjustment

for connection to Pt 100 resistance thermometers
for installation in terminal head Form B to DIN 43 729, terminal head Form J
for mounting on rail

70.7030

JUMO dTRANS T04

Four-wire Transmitter, settable via DIP switch / PC setup program

for connection to Pt 100/Pt 1000 resistance thermometer or potentiometer;
rail-mounted for building into control cabinets

70.7040

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JUMO dTRANS T01 / T01T

Programmable 2-wire transmitter

for connection to resistance thermometers and thermocouples
 for installation in: terminal head Form B to DIN 43 729
 for mounting on: rail



Brief description

The 2-wire transmitter uses resistance thermometers or thermocouples to acquire the temperature. With resistance thermometers, the probe can be connected in 2-/3- or 4-wire circuit. The versions 707015/... and 707016/... are intended for installation inside the hazardous area.

Probe type, connection circuit and range can be configured using the setup program. The 4 – 20mA output signal (or reversed 20 – 4mA) is available in linearized form (linear with temperature).

The instrument is designed for industrial application and conforms to the corresponding European Standards, to ensure electromagnetic compatibility (EMC).

The versions 707015/... and 707016/... conform to the Directives of EN 50 014, and to EN 50 020 "Electrical apparatus for use in hazardous areas" according to the Certificate of Conformity.

The transmitters JUMO dTRANS T01 (Types 707011/..., 707013/... and 707016/...) can also be programmed using a HART® communicator or a HART® modem in conjunction with a PC setup program.



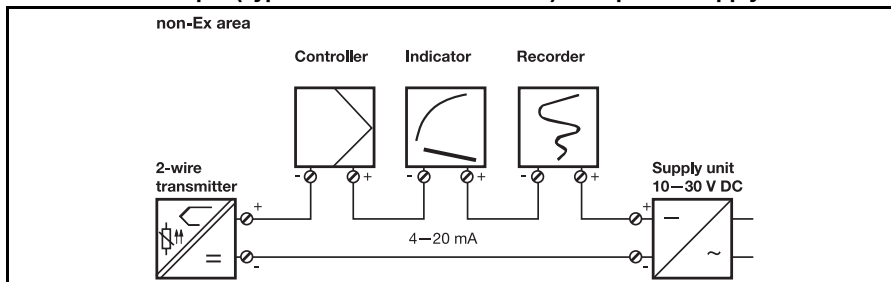
Type 707010/..., Type 707011/... (HART®)
 Type 707015/... (Ex), Type 707016/... (HART® / Ex)



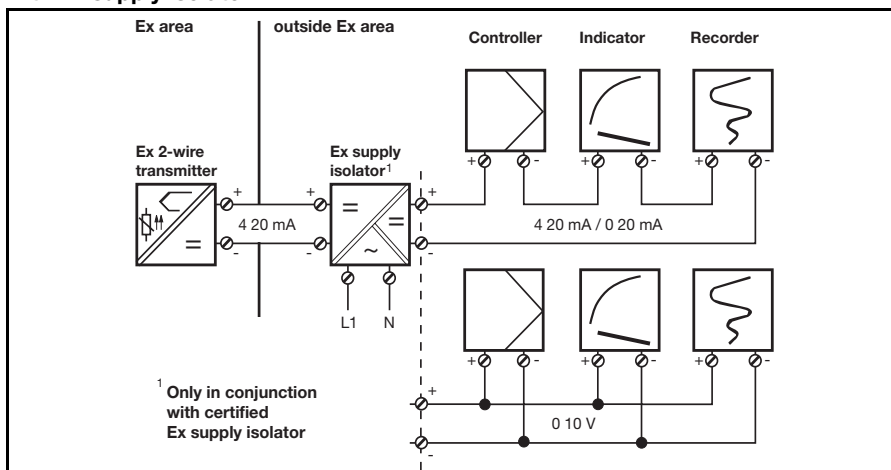
Type 707012/..., Type 707013/... (HART®)

System diagrams

Connection example (Types 707010/... to 707013/...) with power supply unit



Connection example (Types 707015/... and 707016/...) for Ex application with Ex supply isolator



Features

- Types 707011/..., 707013/... and 707016/... with HART® interface
- Type 707015/... Ex version
 CE Ex II 1 G EEx ia IIC T6/T5/T4
- Type 707016/... with HART® interface and as Ex version
 CE Ex II 1 G EEx ia IIC T6/T5/T4
 II 2 G EEx ia IIC T6/T5/T4
- Types 707012/... and 707013/... in rail-mounting housing
- input and output electrically isolated
- freely configurable ranges
- customized linearization for resistance thermometer and thermocouple
- configuration via Windows setup program



Technical data

Input for thermocouple

Designation	Range limits	Accuracy ¹ (typical)
Fe-Con L DIN 43 710 ³	-200 to +900°C	0.5°C
Fe-Con J EN 60 584	-210 to +1200°C	0.5°C above -150°C
Cu-Con U DIN 43 710 ³	-200 to +600°C	0.5°C
Cu-Con T EN 60 584 ³	-270 to +400°C	0.5°C above -200°C
NiCr-Ni K EN 60 584	-270 to +1372°C	0.5°C above -140°C
NiCr-Con E EN 60 584 ³	-270 to +1000°C	0.5°C above -150°C
NiCrSi-NiSi N EN 60 584 ³	-270 to +1300°C	1°C above -100°C
Pt10Rh-Pt S EN 60 584 ³	-50 to +1768°C	2°C above 20°C
Pt13Rh-Pt R EN 60 584 ³	-50 to +1768°C	2°C above 50°C
Pt30Rh-Pt6Rh B EN 60 584 ³	0 to 1820°C	2°C above 400°C
MoRe5-MoRe41 ²	0 to 2000°C	2°C above 500°C
W3Re-W25Re D ³	0 to 2495°C	1°C above 500°C
W5Re-W26Re C ³	0 to 2320°C	1°C above 500°C
Shortest span	Type L, J, U, T, K, E, N: 50°C Type S, R, B: 500°C Type MoRe5-MoRe41, D, C: 500°C	
Cold junction	Pt100 internal or external cold junction (adjustable from 0 to 80°C)	
Cold junction accuracy	± 1°C	
Sampling rate	> 1 measurement per second	
Sensor current	350nA	
Input filter	1st order digital filter; filter constant adjustable: - on Types 707010/..., 707012/... and 707015/... within the range 0 – 125sec - on Types 707011/..., 707013/... and 707016/... within the range 0 – 100sec	
Features	also programmable in °F; freely programmable range limits; input isolated from output	

¹ The accuracy refers to the maximum range span.

² Not available on Types 707011/..., 707013/... and 707016/...

³ For types 707012/... and 707013/... on request only.

Input for resistance thermometer

Designation	Range limits	Range	Accuracy ¹
Pt 100 EN 60 751	-200 to +850°C	-100 to +200°C -200 to +850°C	±0.2°C ±0.4°C
Pt 100 JIS	-200 to +649°C	-100 to +200°C -200 to +649°C	±0.2°C ±0.4°C
Pt 500 DIN	-200 to +250°C	-100 to +200°C -200 to +250°C	±0.2°C ±0.4°C
Pt 1000 DIN	-200 to +250°C	-100 to +200°C -200 to +250°C	±0.2°C ±0.4°C
Ni 100	-60 to +250°C	-60 to +250°C	±0.2°C
Ni 500	-60 to +150°C	-60 to +150°C	±0.2°C
Ni 1000	-60 to +150°C	-60 to +150°C	±0.2°C
Connection circuit	2-, 3- or 4-wire circuit		
Shortest span	10°C		
Sensor lead resistance - for 3-, 4-wire connection - for 2-wire connection	≤ 11Ω per conductor measuring resistance + ≤22Ω internal lead resistance		
Sensor current	< 0.6mA		
Sampling rate	> 1 measurement per second		
Input filter	1st order digital filter; filter constant adjustable: - on Types 707010/..., 707012/... and 707015/... within the range 0 – 125sec - on Types 707011/..., 707013/... and 707016/... within the range 0 – 100sec		
Features	also programmable in °F; freely programmable range limits; input isolated from output		

¹ The accuracy refers to the maximum range span.

Measurement circuit monitoring

Underrange	linear drop to 3.8mA (as per NAMUR recommendation 43)
Overrange	linear rise to 20.5mA (as per NAMUR recommendation 43)
Probe short circuit / probe and lead break	resistance thermometer: $\leq 3.5\text{mA}$ or $\geq 21.0\text{mA}$ (configurable) thermocouple: $\leq 3.5\text{mA}$ or $\geq 21.0\text{mA}$ (configurable) ¹
Current limiting on probe short circuit or probe break	$\leq 23\text{mA}$

¹ Probe short-circuit recognition is not possible for thermocouple.

Output

	Types 707010/..., 707012/..., 707015/...	Types 707011/..., 707013/..., 707016/...
Output signal	proportional DC current 4 – 20 mA, 20 – 4 mA	
Electrical isolation	between input and output	between input and output
Test voltage	$U_{\text{peak}} = 3.75\text{kV}/50\text{Hz}$	$U = 2.0\text{kV}/50\text{Hz}$
Transfer characteristic	linear with temperature	
	customized linearization	
	reversion of output signal	
Burden (Rb)	$Rb = (Ub - 8V) / 0.022A$	$Rb = (Ub - 10V) / 0.022A$
Burden error	$\leq \pm 0.02\% / 100\Omega^1$	
Calibration conditions / accuracy	24V DC at approx. 22°C / $\leq \pm 0.05\%$ ¹	
1st order digital filter	0 – 125sec configurable	0 – 100sec configurable
Step response 0 – 100 %	< 2sec (with filter constant 0sec)	
Switch-on delay (correct measurement after connecting the supply voltage only after ...)	5sec	4sec

¹ All specified values refer to 20mA full scale.

Custom linearization¹

Number of calibration points	maximum: 40
Interpolation	linear

¹ On Types 707011/..., 707013/... and 707016/... through 4th order polynomial.

Supply

Supply voltage (Ub) with reverse polarity protection	Type 707010/...: 8 – 35V DC Type 707012/...: 8 – 35V DC Type 707015/...: 8 – 30V DC	Type 707011/...: 10 – 35V DC Type 707013/...: 10 – 35V DC Type 707016/...: 10 – 30V DC
Supply voltage error	$\leq \pm 0.01\%$ per V deviation from 24V ¹	

¹ All specified values refer to 20mA full scale.

Environmental influences

Operating temperature range	-40 to +85°C	
Storage temperature range	-40 to +100°C	
Temperature error	resistance thermometer: $\leq \pm 0.005\%$ per °C deviation from 22°C ¹ thermocouple: $\leq \pm 0.005\%$ per °C deviation from 22°C ¹ plus accuracy of cold junction	
Long-term stability	$\leq 0.1\text{°C}$ per year ² or $\leq 0.05\%$ per year ^{2,3}	
Climatic conditions	rel. humidity $\leq 95\%$, with condensation	
Vibration strength	according to GL characteristic 2	
EMC	EN 61 326 Class B to industrial requirements	
IP protection	Types 707010/... and 707015/...: IP54 Types 707010/... and 707015/...: IP00 Type 707012/...: IP20	Types 707011/... and 707016/...: IP66 Types 707011/... and 707016/...: IP00 Type 707013/...: IP20

¹ All specified values refer to 20mA full scale

² under calibration conditions

³ % refer to the selected span. The larger value applies.

Housing

	Types 707010/..., 707011/..., 707015/..., 707016/...	Types 707012/..., 707013/...
Material	polycarbonate (encapsulated)	polycarbonate
Screw terminal	≤ 1.75mm ² ; max. tightening torque 0.6Nm	≤ 2.5mm ² ; max. tightening torque 0.6Nm
Mounting	in terminal head Form B DIN 43 729; in surface-mounting case (on request); in switchgear cabinet (mounting bracket is required)	on DIN rail 35mm x 7.5mm (EN 50 022); on DIN rail 15mm (EN 50 045); on G rail (EN 50 035)
Operating position	unrestricted	
Weight	approx. 40g	approx. 90g



Version 707015/... (Ex) - Extract from the EC Type-Examination Certificate ZELM 99 ATEX 0018X

Marking	CE ₀₀₃₂ Ex II 1 G EEx ia IIC T6/T5/T4
Temp. range in "II 2 G" and "II 3 G"	T6 = -40 to +55°C / T5 = -40 to +70°C / T4 = -40 to +85°C
Temp. range in "II 1 G"	T6 = -40 to +40°C / T5 = -40 to +50°C / T4 = -40 to +60°C
Supply circuit Max. values at the terminals 1(+) and 2(-)	U _i = 30V DC I _i = 100mA P _i = 750mW
Internal inductance and capacitance	L _i = negligible C _i = negligible
Sensor circuit Max. values at the terminals 3, 4, 5 and 6	U _o = 9.6V DC I _o = 4.5mA P _o = 11mW linear output characteristic
Max. permissible external inductance and capacitance EEx ia IIC EEx ia IIB	L _o = 4.5mH / C _o = 709nF L _o = 8.5mH / C _o = 1300nF



Version 707016/... (Ex) - Extract from the EC Type-Examination Certificate PTB 01 ATEX 2124

Marking	CE ₀₀₃₂ Ex II 1 G EEx ia IIC T6/T5/T4 II 2 G EEx ia IIC T6/T5/T4
Temp. range in "II 2 G" and "II 3 G"	T6 = -40 to +55°C / T5 = -40 to +70°C / T4 = -40 to +85°C
Temp. range in "II 1 G"	T6 = -20 to +40°C / T5 = -20 to +50°C / T4 = -20 to +60°C
Supply circuit Max. value at the terminals 1(+) and 2(-)	U _i = 30VDC I _i = 100mA P _i = 750mW
Internal inductance and capacitance	L _i = negligible C _i = negligible
Sensor circuit Max. values at the terminals 3, 4, 5 and 6	U _o = 5V DC I _o = 5.4mA P _o = 6.6mW linear characteristic
Internal inductance and capacitance	L _i = negligible C _i = negligible
Connected circuit without lumped external inductance or capacitance	L _o = 1000mH C _o = 100µF
Connected circuit with lumped external inductance or capacitance	
EEx ia IIC EEx ia IIB, EEx ia IIA	L _o = 100mH / C _o = 2µF L _o = 100mH / C _o = 9.9µF

Connection diagram

	Connection for		Terminals	
		Supply voltage for Type 707010/... 8 – 35V DC Supply voltage for Type 707011/... 10 – 35V DC Supply voltage for Type 707015/... 8 – 30V DC (Ex) ¹ Supply voltage for Type 707016/... 10 – 30V DC (Ex) ¹ Current output 4 – 20mA	+1 $R_B = \frac{U_b - 8V}{22mA}$ -2 $R_B = \frac{U_b - 10V}{22mA}$ $R_B = \frac{U_b - 8V}{22mA}$ $R_B = \frac{U_b - 10V}{22mA}$ R _B = burden resistance U _b = supply voltage	
Ex version only in conjunction with certified Ex transmitter supply unit				
	Analog inputs			
	Thermocouple	+4 -6		
	Resistance thermometer in 2-wire circuit	3 6	$R_L \leq 11\Omega$ R _L = lead resistance per conductor	
	Resistance thermometer in 3-wire circuit	3 5 6	$R_L \leq 11\Omega$ R _L = lead resistance per conductor	
	Resistance thermometer in 4-wire circuit	3 4 5 6	$R_L \leq 11\Omega$ R _L = lead resistance per conductor	
Ex version: please note connection data of the Ex input circuit!				

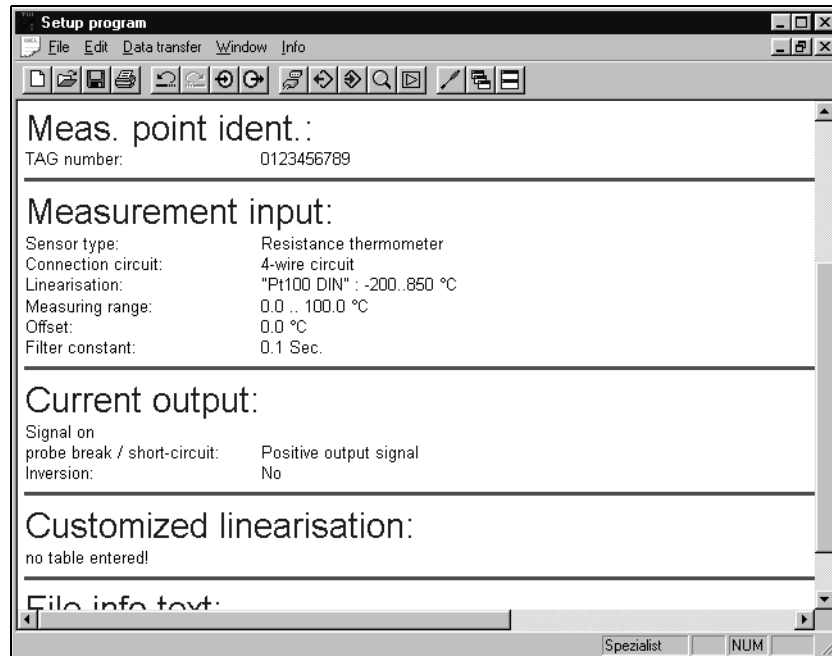
¹ On Types 707015/... and 707016/... only up to 30V. The connection must only be made to an intrinsically safe circuit.

	Connection for		Terminals	
		Supply voltage for Type 707012/... 8 – 35V DC Supply voltage for Type 707013/... 10 – 35V DC Current output 4 – 20mA	+81 $R_B = \frac{U_b - 8V}{22mA}$ -82 $R_B = \frac{U_b - 10V}{22mA}$ R _B = burden resistance U _b = supply voltage	
	Analog inputs			
	Thermocouple (special feature: see order details)	+11 -12		
	Resistance thermometer in 2-wire circuit	11 13	$R_L \leq 11\Omega$ R _L = lead resistance per conductor	
	Resistance thermometer in 3-wire circuit	11 12 13	$R_L \leq 11\Omega$ R _L = lead resistance per conductor	
Resistance thermometer in 4-wire circuit	11 12 13 14	$R_L \leq 11\Omega$ R _L = lead resistance per conductor		

Caution: the order details on P. 8 must be observed

Setup program

The setup program is available for configuring the transmitter from a PC. With Types 707010/..., 707012/... and 707015/..., the connection is via the PC interface with a TTL/RS232 converter (or an USB/RS232 converter) and the setup interface of the transmitter, in the case of Types 707011/..., 707013/... and 707016/..., via a HART® modem. The connection for the setup circuit must only be used outside the hazardous area. It is not permissible to configure the transmitter inside the Ex area. The protective cover must be closed after programming (Types 707010/... and 707015/...).



Configurable parameters

TAG number (10 characters) on Types 707011/..., 707013/... and 707016/..., 8 characters only, but with additional 16-character description	Sensor type
Connection circuit (2-/3-/4-wire)	External and internal cold junction
Customized linearization	Range limits
Output signal rising/falling (reversion)	Digital filter
Response to probe break/short circuit	Recalibration/fine calibration (not on Types 707011/..., 707013/... and 707016/...)
Lead resistance with 2-wire circuit	

If no power supply (supply isolator) is available, the 2-wire transmitter Type 707010/..., 707012/... or 707015/... has to be configured using a 9V block battery as a power source.

Fine calibration (not on Types 707011/..., 707013/... and 707016/...)

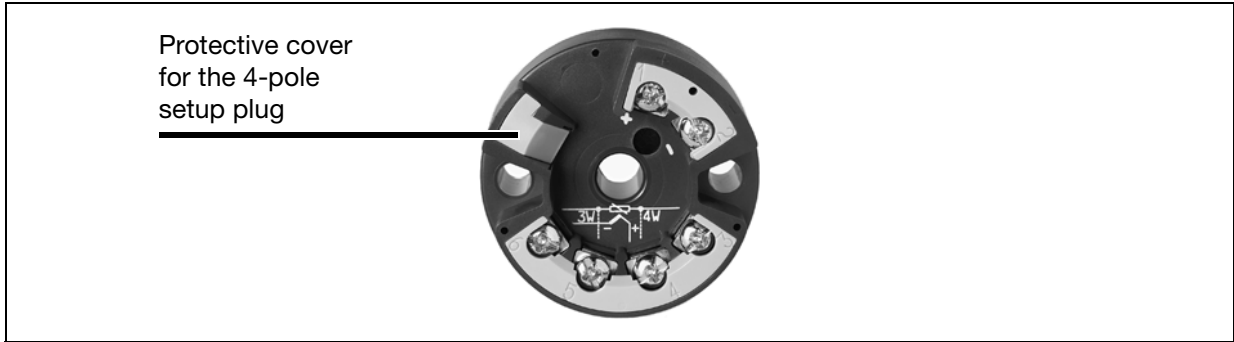
Fine calibration means correction of the output signal. The signal can be adjusted within $\pm 5\%$ of the 20 mA full-scale value. Fine calibration is performed through the setup program. Values for 4 mA (zero), 20 mA (full scale) and offset can be calibrated separately, via the setup program.

Hardware and software requirements

The following hardware and software requirements must be met when installing and operating the setup program:

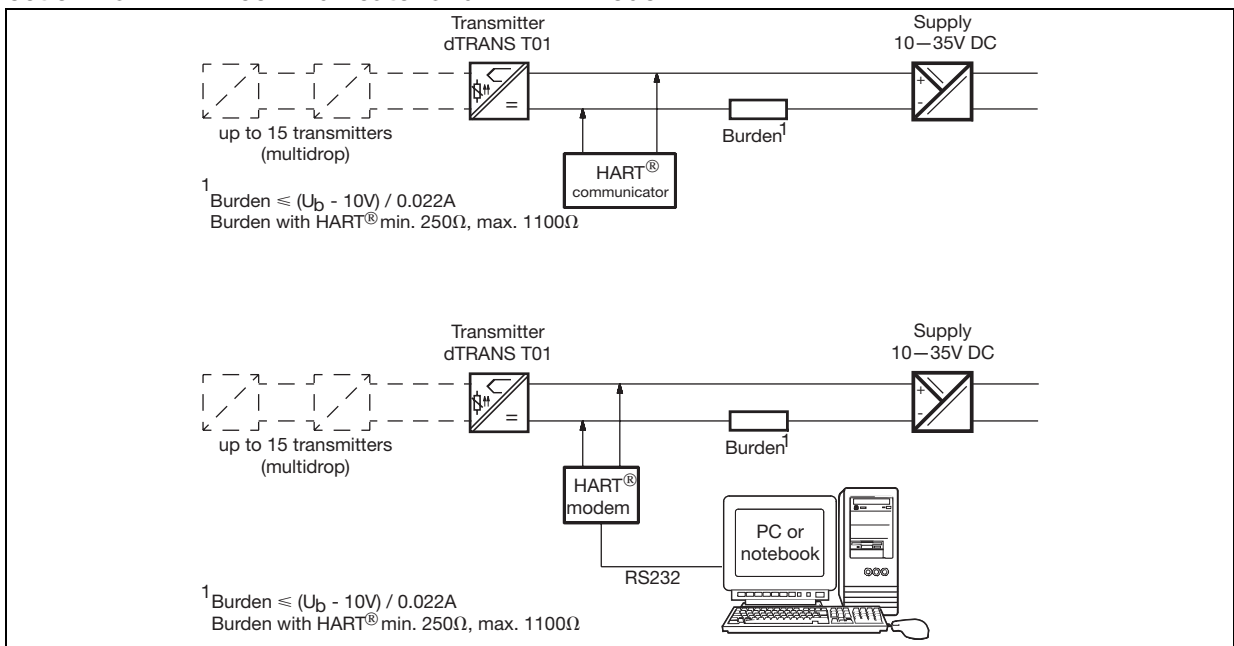
IBM-PC or compatible PC from 486DX-2-100	16 MB main memory
15MB free space on hard disk	CD-ROM drive
1 free serial interface	Windows 95 or above, Windows NT4.0 or Windows 2000

Setup interface (Types 707010/... and 707015/...)



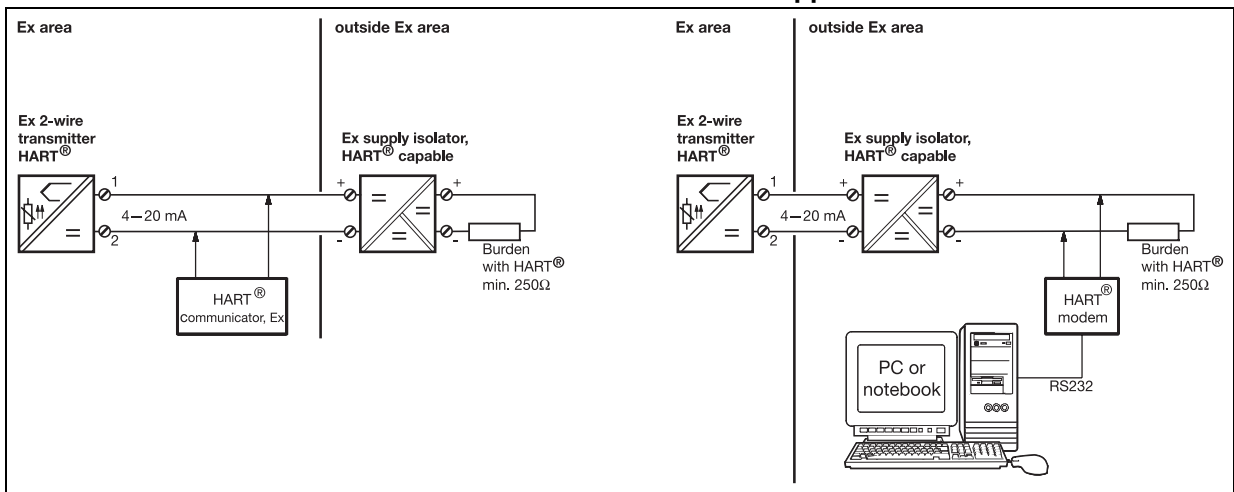
HART[®] interface (Types 707011/... and 707013/...)

Connection via HART[®] communicator and HART[®] modem



HART[®] interface (Type 707016/...)



Connection via HART[®] communicator and HART[®] modem for Ex application



Order details: JUMO dTRANS T01 / T01T

Programmable 2-wire transmitter

(1) Basic version

707010	programmable 2-wire transmitter	
707011	programmable 2-wire transmitter with HART® interface	
707012	programmable 2-wire transmitter installed in rail-mounting housing ¹ (Caution: observe the footnotes)	
707013	programmable 2-wire transmitter with HART® interface installed in rail-mounting housing ¹ (Caution: observe the footnotes)	
707015	programmable 2-wire transmitter with Ex protection EEx ia IIC T6	
707016	programmable 2-wire transmitter with HART® interface and Ex protection	

(2) Input (programmable)	
x x x x x x	888 factory-set (Pt100 DIN 4w / 0 – 100°C)
x x x x x x	999 configuration to customer specification ²
(3) Output (proportional DC current)	
x x x x x x	888 factory-set (4 – 20mA)
x x x x x x	999 configuration to customer specification (20 – 4mA)
(4) Probe break/ short circuit	
x x x x x x	888 factory-set (positive protection)
x x x x x x	999 configuration to customer specification (negative protection)

Order code	(1)	(2)	(3)	(4)
	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>
Order example	707010	/ 888	- 888	- 888

¹ When ordering, please specify the type of sensor required (thermocouple or resistance thermometer). For thermocouple inputs, the sensor input cannot be changed retrospectively, because of the internal compensating cable. For resistance thermometer inputs, all types of resistance thermometers listed on P. 2 can be connected, but no thermocouples. Thermocouple inputs are available on request.
² Probe type and range have to be specified in plain text for configuration to customer specification.

Standard accessories

- 1 Operating Instructions
- Fixing items: 2 screws, 2 compression springs (not for Types 707012/... and 707013/...)

Accessories

- PC setup program, multilingual
- PC interface cable with TTL/RS232 converter and adapter (socket) for Types 707010/..., 707012/... and 707015/...
- PC interface cable with USB/RS232 converter and adapter (socket) for Types 707010/..., 707012/... and 707015/...
- HART® modem (for Types 707011/..., 707013/... and 707016/...), Sales No. 40/00345666
- HART® communicator (for Types 707011/..., 707013/... and 707016/...) Sales No. 40/00345668 (German) and 40/00384998 (English)
- Power supply units 1- and 4-way (Data Sheet 70.7500)
- Isolating amplifier and supply isolator (Data Sheet 70.7510)
- Ex transmitter supply unit (Data Sheet 70.7520)
- Ex supply unit with isolating transformer, HART® capable for Type 707016/... (Data Sheet 40.4757)
- Bracket for mounting on DIN rail, Sales No. 70/00352463

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JUMO dTRANS T02 Programmable 4-wire Transmitter (Smart Transmitter)



with isolation of the standard signal
 for mounting on DIN rail 35mm x 7.5mm to EN 50 022

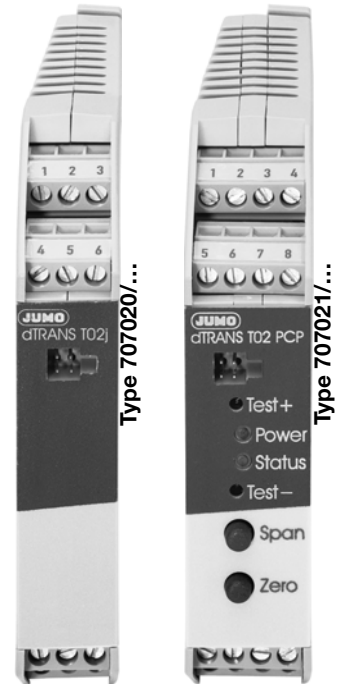
Brief description

The JUMO dTRANS T02 transmitters incorporate a microprocessor for digital signal processing. Input and output are electrically isolated. They can be mounted on a DIN rail, the electrical connection is by screw terminals for stranded or solid wire up to 2.5mm² conductor cross-section.

Depending on the type, the 0/4 — 20mA or 0/2 — 10V output signal is available either linearized (linear with temperature) or inverted (option). The transmitters can be programmed via the PC setup program, which is supplied as an accessory (sensor type, range, output action, fine calibration, custom linearization).

On types 707021/... and 707022/... it is possible to additionally program the limits of the limit comparators, and the frequency output.

Current and voltage outputs are available directly on terminals. No hardware alterations are required.



Overview of function

	dTRANS T02j (junior) Type 707020/...	dTRANS T02 PCP Type 707021/...	dTRANS T02 LCD Type 707022/...	dTRANS T02 EX Type 707025/...
Housing width	17.5mm	22.5mm	22.5mm	22.5mm
Display	none	2 LEDs	2 LEDs and LCD display	2 LEDs
Keys	none	2 keys	3 keys	2 keys
Supply	24V DC	20 — 53V AC/DC 110 — 240V AC	20 — 53V AC/DC 110 — 240V AC	230V AC 20 — 53V AC/DC
Inputs	thermocouple, resistance thermometer (restricted), potentiometer, voltage (≤100mV), current with ext. shunt	thermocouple, resistance thermometer, resistance transmitter, potentiometer, voltage (up to ±10V), current (up to ±20mA)	thermocouple, resistance thermometer, resistance transmitter, potentiometer, voltage (up to ±10V), current (up to ±20mA)	thermocouple, resistance thermometer, resistance transmitter, potentiometer, voltage (up to ±10V), current (up to ±20mA)
Outputs	0/4 — 20mA, 0 — 10V	0/4 — 20mA, 0/2 — 10V, 2 open-collector	0/4 — 20mA, 0/2 — 10V, 2 open-collector	0/4 — 20mA, 0/2 — 10V
Internal	linearization, customized linearization	linearization, customized linearization, 2 limit comparators or 1 limit comparator and 1 frequency output	linearization, customized linearization, 2 limit comparators or 1 limit comparator and 1 frequency output	linearization, customized linearization 2 limit comparators (indication only via the power and status LEDs)
Operation	fine calibration via setup program	fine calibration and limits via instrument keys and setup program	fine calibration and limits via instrument keys and setup program	fine calibration via instrument keys and setup program



Technical data for type 707020

Input for thermocouple

Designation	Range limits	Range	Accuracy ¹
Fe-Con L DIN 43 710	-200 to +900°C	-200 to +900°C	0.25%
Fe-Con J EN 60 584	-210 to +1200°C	-200 to +1200°C	0.25%
Cu-Con U DIN 43 710	-200 to +600°C	-200 to +600°C	0.25%
Cu-Con T EN 60 584	-270 to +400°C	-200 to +400°C	0.25%
NiCr-Ni K EN 60 584	-270 to +1372°C	-150 to +1372°C	0.25%
NiCr-Con E EN 60 584	-270 to +1000°C	-200 to +1000°C	0.25%
NiCrSi-NiSi N EN 60 584	-270 to +1300°C	-100 to +1300°C	0.25%
Pt10Rh-Pt S EN 60 584	-50 to +1768°C	-50 to +1768°C	0.25%
Pt13Rh-Pt R EN 60 584	-50 to +1768°C	-50 to +1768°C	0.25%
Pt30Rh-Pt6Rh B EN 60 584	0 — 1820°C	400 — 1820°C	0.25%
MoRe5-MoRe41	0 — 2000°C	500 — 2000°C	0.25%
W3Re-W25Re D	0 — 2495°C	500 — 2495°C	0.25%
W5Re-W26Re C	0 — 2320°C	500 — 2320°C	0.25%
Shortest span	Type L, J, U, T, K, E, N: 50°C Type S, R, B: 500°C Type MoRe5-MoRe41: 500°C Type D, C: 500°C		
Range start/end	freely programmable range limits		
Cold junction	Pt100 internal or external cold junction (0 — 80°C is adjustable)		
Cold junction accuracy	± 1°C		
Sampling rate	> 1 measurement per second		
Input filter	1st order digital filter; filter constant adjustable from 0 to 125sec		
Special features	also programmable in °F; input isolated from output		

¹ The accuracy refers to the maximum range span.

For small ranges, as well as for short spans, the linearization accuracy is reduced.

Input for resistance thermometer

Designation	Range limits	Range	Accuracy
Pt 100 EN 60 751	-200 to +850°C	-100 to +200°C -200 to +850°C	±0.4°C ±0.8°C
Pt 100 JIS	-200 to +649°C	-100 to +200°C -200 to +649°C	±0.4°C ±0.8°C
Pt 500 DIN	-200 to +250°C	-100 to +200°C -200 to +250°C	±0.4°C ±0.8°C
Pt 1000 DIN	-200 to +250°C	-100 to +200°C -200 to +250°C	±0.4°C ±0.8°C
Ni 100	-60 to +180°C	-60 to +180°C	±0.8°C
Ni 500, Ni 1000	-60 to +150°C	-60 to +150°C	±0.8°C
Connection circuit	2-, 3- or 4-wire		
Shortest span	20°C		
Range start/end	freely programmable range limits		
Sensor lead resistance - for 3-, 4-wire connection - for 2-wire connection	≤ 11Ω per conductor meas. resistance + ≤ 22Ω internal lead resistance		
Sensor current	< 0.6mA		
Sampling rate	> 1 measurement per second		
Input filter	1st order digital filter; filter constant adjustable from 0 to 125sec		
Special features	also programmable in °F; input isolated from output		

Input for potentiometer

Range	Accuracy
up to 400Ω up to 2000Ω	±500mΩ ±1Ω
Connection circuit	2-, 3- or 4-wire circuit
Shortest span	6Ω
Resistance values	freely programmable within the limits in 0.1Ω steps
Sensor lead resistance - for 3-, 4-wire connection - for 2-wire connection	≤ 11Ω per conductor meas. resistance + ≤22Ω internal lead resistance
Sampling rate	> 1 measurement per second
Input filter	1st order digital filter; filter constant adjustable from 0 to 125sec
Special features	also programmable in °F; input isolated from output

Input for DC voltage, DC current

Range	Accuracy	Input resistance
0 – 100mV	±150μV	R _{IN} > 10 MΩ
Shortest span	5mV	
Range start/end	freely programmable within the limits (up to 999mV in 0.1mV steps, above 1V in 1mV steps)	
Sampling rate	> 1 measurement per second	
Input filter	1st order digital filter; filter constant adjustable from 0 to 125sec	
Current input	The current input can only be implemented in conjunction with an external shunt (not included in delivery). Example: a 5Ω shunt results in 0 – 20mA current input, with a programmed voltage range of 0 – 100mV. The accuracy corresponds to the voltage input plus the inaccuracy of the shunt.	

Measurement circuit monitoring

	Resistance thermometer	Thermocouple
Underrange	linear drop to 3.8mA or 0mA (as per NAMUR recommendation 43)	
Ovrange	linear rise to 20.5mA (as per NAMUR recommendation 43)	
Probe short-circuit / Probe/lead break	0mA or ≥ 21.0mA (configurable)	0mA or ≥ 21.0mA (configurable) ¹
¹ Probe short-circuit recognition is not possible for thermocouple		

Analog outputs

	Current output
Output signal	proportional DC current 0 – 20mA or 4 – 20mA programmable
Transfer characteristic	linear with temperature inversion of the output signal
Max. burden	750Ω
Burden error	≤ ± 0.02% / 100Ω
1st order digital filter	0 – 125sec configurable
Step response 0 – 100 %	< 2sec (with filter constant 0sec)
Switch-on delay	5sec (correct measurement after connecting the supply voltage)
	Voltage output
Output range	0 – 10V
Accuracy	± 5mV
Linearity error	± 2mV
Load resistance	≥ 2kΩ
Load error	± 15mV
Ripple	± 1% referred to 10V, 0 – 90kHz

Custom linearization

Number of calibration points	40 max.
Interpolation	linear

Electrical data

Supply voltage	24V DC +10%/-15%
Power consumption	1W
Supply voltage error	$\leq \pm 0.01\%$ per V deviation from 24V
Test voltage	to DIN 61 010, Part 1 510V/50Hz, 1min
Isolation - between input and output - between input and mains supply - between output and mains supply - between input and setup plug	50V 50V 50V no isolation between input and setup plug

Technical data type 707021/..., type 707022/... and type 707025/...**Input for thermocouple**

Designation	Range limits	Range	Accuracy ¹
Fe-Con L DIN 43 710	-200 to +900°C	-200 to +900°C	0.1% above -150°C
Fe-Con J EN 60 584	-210 to +1200°C	-200 to +1200°C	0.1% above -100°C
Cu-Con U DIN 43 710	-200 to +600°C	-200 to +600°C	0.1% above -100°C
Cu-Con T EN 60 584	-270 to +400°C	-200 to +400°C	0.1% above -100°C
NiCr-Ni K EN 60 584	-270 to +1372°C	-200 to +1372°C	0.1% above -60°C
NiCr-Con E EN 60 584	-270 to +1000°C	-200 to +1000°C	0.1% above -60°C
NiCrSi-NiSi N EN 60 584	-270 to +1300°C	-100 to +1300°C	0.1% above -80°C
Pt10Rh-Pt S EN 60 584	-50 to +1768°C	-50 to +1768°C	0.15% above 0°C
Pt13Rh-Pt R EN 60 584	-50 to +1768°C	-50 to +1768°C	0.15% above 0°C
Pt30Rh-Pt6Rh B EN 60 584	0 – 1820°C	400 – 1820°C	0.15% above 400°C
W3Re-W25Re D	0 – 2495°C	500 – 2495°C	0.15% above 500°C
W5Re-W26Re C	0 – 2320°C	500 – 2320°C	0.15% above 500°C
Shortest span	Type L, J, U, T, K, E, N: 100°C; type S, R, B, D, C: 500°C		
Range start/end	freely programmable within the limits in 0.1°C steps		
Cold junction	Pt100 internal or external cold junction (adjustable from 0 to 100°C)		
Cold junction accuracy	$\pm 1^\circ\text{C}$		
Sampling rate	$\leq 100\text{msec}$		
Special features	also programmable in °F; input isolated from output		

¹ The accuracy refers to the maximum range span.

For small ranges, as well as for short spans, the linearization accuracy is reduced.

Input for resistance thermometer

Designation	Connection circuit	Range limits	Range	Accuracy
Pt 100 EN 60 751	2/3-wire	-200 to +850°C	-100 to +200°C	$\pm 0.4^\circ\text{C}$
	2/3-wire		-200 to +850°C	$\pm 0.8^\circ\text{C}$
	4-wire		-100 to +200°C	$\pm 0.4^\circ\text{C}$
	4-wire		-200 to +850°C	$\pm 0.5^\circ\text{C}$
Pt 100 JIS	2/3-wire	-200 to +649°C	-100 to +200°C	$\pm 0.4^\circ\text{C}$
	2/3-wire		-200 to +649°C	$\pm 0.8^\circ\text{C}$
	4-wire		-100 to +200°C	$\pm 0.4^\circ\text{C}$
	4-wire		-200 to +649°C	$\pm 0.5^\circ\text{C}$
Pt 500 DIN	2/3-wire	-200 to +850°C	-100 to +200°C	$\pm 0.4^\circ\text{C}$
	2/3-wire		-200 to +850°C	$\pm 0.8^\circ\text{C}$
	4-wire		-100 to +200°C	$\pm 0.4^\circ\text{C}$
	4-wire		-200 to +850°C	$\pm 0.5^\circ\text{C}$
Pt 1000 DIN	2/3-wire	-200 to +850°C	-100 to +200°C	$\pm 0.4^\circ\text{C}$
	2/3-wire		-200 to +850°C	$\pm 0.8^\circ\text{C}$
	4-wire		-100 to +200°C	$\pm 0.4^\circ\text{C}$
	4-wire		-200 to +850°C	$\pm 0.5^\circ\text{C}$
Ni 100	2/3-wire	-60 to +180°C	-60 to +180°C	$\pm 0.8^\circ\text{C}$
	4-wire		-60 to +180°C	$\pm 0.5^\circ\text{C}$

Designation	Connection circuit	Range limits	Range	Accuracy
Ni 500, Ni 1000	2/3-wire 4-wire	-60 to +150°C	-60 to +150°C -60 to +150°C	±0.8°C ±0.5°C
Connection circuit	2-, 3- or 4-wire circuit			
Shortest span	15°C			
Range start/end	freely programmable within the limits in 0.1°C steps			
Sensor lead resistance	≤ 30Ω per conductor (for 3- and 4-wire circuit) ≤ 15Ω per conductor (for 2-wire circuit)			
Sensor current	< 0.6mA			
Sampling rate	≤ 100msec			
Input filter	2nd order digital filter; filter constant adjustable from 0 to 20.0sec			

Input for resistance transmitter and potentiometer

Range	Accuracy
up to 200Ω	±300mΩ
up to 400Ω	±600mΩ
up to 800Ω	±1Ω
up to 2000Ω	±2Ω
up to 3900Ω	±3Ω
Connection circuit	resistance transmitter: 3-wire potentiometer: 2-, 3- or 4-wire
Shortest span	6Ω
Resistance values	freely programmable within the limits in 0.1Ω steps
Sensor lead resistance	≤ 30Ω per conductor for 4-wire circuit ≤ 15Ω per conductor for 2- and 3-wire circuit up to 200Ω range: ≤ 10Ω per conductor for 2- and 3-wire circuit
Sampling rate	≤ 100msec
Input filter	2nd order digital filter; filter constant adjustable from 0 to 20.0sec

Input for DC voltage, DC current

Range	Accuracy	Input resistance
-25 to +75mV 0 to 100mV	±100μV ±100μV	R _{IN} > 10 MΩ R _{IN} > 10 MΩ
-100 to +100mV 0 to 200mV	±150μV ±150μV	R _{IN} > 10 MΩ R _{IN} > 10 MΩ
-500 to +500mV 0 to 1V	±1mV ±1mV	R _{IN} > 10 MΩ R _{IN} > 10 MΩ
-1 to +1V -5 to +5V	±2mV ±10mV	R _{IN} > 10 MΩ R _{IN} > 0.5 MΩ
0 to 10V -10 to +10V	±10mV ±15mV	R _{IN} > 0.5 MΩ R _{IN} > 0.5 MΩ
Shortest span	5mV	
Range start/end	freely programmable within the limits (up to 999mV in 0.1mV steps, above 1V in 1mV steps)	
4 to 20mA 0 to 20mA -20 to +20mA	±20μA ±20μA ±40μA	burden voltage ≤ 2.6V burden voltage ≤ 2.6V burden voltage ≤ 2.6V
Shortest span	0.5mA	
Range start/end	freely programmable within the limits in 0.1mA steps	
Sampling rate	≤ 100msec	
Input filter	2nd order digital filter; filter constant adjustable from 0 to 20.0sec	

Analog outputs

Current output	
Output range	proportional DC current 0 – 20mA or 4 – 20mA programmable
Accuracy	± 0.015mA
Linearity error	± 0.005mA
Max. burden	750Ω
Burden error	± 0.01 mA
Ripple	± 1% referred to 20mA, 0 – 90kHz; above 90kHz: tested to EN 50 081
Output current on probe break, over/underrange	0mA or 22mA (programmable)
Voltage output	
Output range	0 – 10V or 2 – 10V
Accuracy	± 5mV
Linearity error	± 2mV
Load resistance	≥ 2kΩ
Burden error	± 15mV
Ripple	± 1% referred to 10V, 0 – 90kHz
Output voltage on probe break, over/underrange	0V or 11V (programmable)

Digital outputs (only for types 707021/... and 707022/...)

2 open-collector outputs	
Output 1	Ik7 or Ik8 programmable
Output 2	Ik7 or Ik8 or frequency output
Function Ik7	
Function Ik8	
Switching capacity of open-collector	35V, 100mA
Voltage drop	in switched condition ≤ 1.2V
Short-circuit strength	not available
Frequency output	
Function	the frequency output produces the latest measurement as a frequency; the frequency at range start/end is programmable
Smallest / highest frequency	10Hz / 1000Hz
Error output	
Activation	due to probe break, over/underrange and internal errors (Pt100 of cold junction faulty, EEPROM does not respond)

Customized linearization

Interpolation: linear	max. 41 calibration points
Interpolation: square-law	max. 53 calibration points
Interpolation: cube-law	max. 61 calibration points
Input of calibration points	through setup program (accessory)

Electrical data

Supply voltage - types 707021/... and 707022/... - type 707025/...	20 – 53V AC/DC, 48 – 63Hz or 110 – 240V AC +10/-15%, 48 – 63Hz 230V AC ±10%, 48 – 63Hz or 20 – 53V AC/DC, 48 – 63Hz
Power consumption	max. 5VA
Test voltage - between input or output and supply - with AC supply - with AC/DC supply - between input and output	to DIN 61 010, Part 1 2.3kV/50Hz, 1 min 510V/50Hz, 1 min 510V/50Hz, 1 min
Isolation - between input and output - between input and mains supply - between output and mains supply - between output and setup plug	50V 250V 250V no isolation between output and setup plug



Version 707025/... (Ex)

Marking	II (1) G D [EEx ia] IIC
Max. permissible ambient temperature	+60°C
Supply circuit (terminals L1 (L+), N (L-) and PE) max. safe voltage	230V AC ±10%, 48 – 63Hz or 20 – 53V AC/DC, 48 – 63Hz $U_m = 253V$
Output circuit (terminals 9(+) and 10(-)) max. safe voltage	0 – 20mA or 4 – 20mA $U_m = 253V$
Output circuit (terminals 11(-) and 12(+)) max. safe voltage	0 – 10V $U_m = 253V$
Setup circuit max. safe voltage	5V TTL level $U_m = 253V$
Sensor circuit (terminals 1 to 5) intrinsically safe protection EEx ia IIB/IIC or EEx ib IIB/IIC	$U_0 = 6.0V$ $I_0 = 18.9mA$ $P_0 = 28.4mW$ characteristic: linear $C_i \approx 0$ $L_i \approx 0$
Max. permissible external inductance/capacitance EEX ia IIB / EEX ib IIB EEX ia IIC / EEX ib IIC	$L_0 = 400mH / C_0 = 1000\mu F$ $L_0 = 100mH / C_0 = 40\mu F$
In the presence of lumped capacitance and / or inductance in the intrinsically safe sensor circuit:	
Max. permissible external inductance/capacitance EEX ia IIB / EEX ib IIB EEX ia IIC / EEX ib IIC	$L_0 = 20mH / C_0 = 8\mu F$ $L_0 = 10mH / C_0 = 1.7\mu F$

For all types

Electrical data

Electrical safety	to EN 61 010
EMC - interference emission - immunity to interference	EN 61 326 Class B to industrial requirements

Environmental influences

Ambient/storage temperature range	-10 to +60°C / -10 to +70°C
Temperature error	$\leq \pm 0.005\%$ per °C deviation from 22°C ¹
Climatic conditions	< 75 % rel. humidity, no condensation

¹ All specifications refer to the range-end value 20 mA

Housing

Material	polyamide (PA 6.6)
IP protection	IP20 (EN 60 529)
Screw connection	screw terminal 0.2 – 2.5mm ²
Mounting	on 35mm x 7.5mm DIN rail to EN 50 022
Operating position	upright
Weight	approx. 50g

Setup interface

The setup interface is used for configuring the transmitter from a PC. Connection is via the PC interface with TTL/RS232 converter and adapter.

Configurable parameters		
TAG number (6 characters on type 707020/..., for all the others: 10 characters)	Sensor type	Connection circuit (2-/3-/4-wire)
External and internal cold junction	Customized linearization	Range limits
Selection of type lk7 or lk8 (not on type 707020/...)	Input of limit (not on type 707020/...)	Input of differential (upper and lower) (not on type 707020/...)
Output signal rising/falling (inversion)	Digital filter	Response to probe break/short-circuit
Recalibration (fine calibration)	Lead resistance for 2-wire circuit	

Fine calibration

Fine correction means correction of the output signal. The signal can be corrected in the range $\pm 5\%$ of the 20 mA end value.

Fine calibration is performed using the setup program.

On type 707021/..., type 707022/... and 707025/... fine calibration can also be carried out from the instrument keys.

Connection diagram


	Type 707020/...	Type 707021/..., Type 707022/... and Type 707025/...
Connection for		
Supply see nameplate		
Analog inputs		
Thermocouple		
Resistance thermometer in 2-wire circuit		
Resistance thermometer in 3-wire circuit		
Resistance thermometer in 4-wire circuit		
Potentiometer in 2-wire circuit		
Potentiometer in 3-wire circuit		
Potentiometer in 4-wire circuit		

	Type 707020/...	Type 707021/..., Type 707022/... and Type 707025/...
Resistance transmitter in 3-wire circuit	not possible	
Voltage input < 1V		
Voltage input ≥ 1V	not possible	
Current input		
Analog outputs		
Voltage output		
Current output		
Digital outputs		
Open-collector output 1	not possible	
Open-collector output 2	not possible	
¹ When using a shunt resistor, the signal leads and the shunt must be provided with a crimp connector. ² On type 707025/... the limits are indicated only via the status and power LEDs.		

Order details: JUMO dTRANS T02

Programmable 4-wire Transmitter
(Smart Transmitter)

(1) Basic version

	707020	dTRANS T02j programmable transmitter	
	707021	dTRANS T02 PCP programmable transmitter	
	707022	dTRANS T02 LCD programmable transmitter with LCD display	
	707025	dTRANS T02 Ex programmable transmitter Ex protection II (1) G D [EEx ia] IIC	
x	x	(2) Input (programmable)	
x	x	888 factory-set (Pt100 DIN vI / 0 to 100°C)	
x	x	999 configuration to customer specification ¹	
x	x	(3) Output (proportional DC current - programmable)	
x	x	888 factory-set (0 – 20mA)	
x	x	999 configuration to customer specification (4 – 20mA or 0 – 10V or 2 – 10V)	
		(4) Supply	
	03	230V AC ±10%, 48 – 63Hz	x
	22	20 – 53V AC/DC, 48 – 63Hz	x
	23	110 – 240V AC +10/-15%, 48 – 63Hz	x
x	29	24V DC +10/-15%	

Order code	(1)	(2)	(3)	(4)
Order example	707021	/ 888	- 888	- 22

¹ For configuration to customer specification, probe type and range have to be specified in plain text

Standard accessories

- 1 Operating Instructions

Accessory

- PC setup program, multilingual
- PC interface cable with TTL/RS232 converter and adapter

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 Fax: 610-380-8009
 e-mail: info@JumoUSA.com
 Internet: www.JumoUSA.com



JUMO dTRANS T03 J, B, T Analog 2-wire transmitter with digital adjustment



JUMO dTRANS T03 BU, TU Analog 3-wire transmitter with digital adjustment

for connection to Pt100 resistance thermometers
 for installation in: - terminal head Form B to DIN 43 729
 - terminal head Form J

for mounting on: - rail



dTRANS T03 J
 Type 707030/...



dTRANS T03 B
 Type 707031/...



dTRANS T03 BU
 Type 707033/...

Brief description

These transmitters are designed for industrial applications and are used to measure the temperature through Pt100 resistance thermometers in 2-/3-wire circuit connections (Pt1000 linearization on request).

The 4 – 20 mA or 0 – 10 V output signal is linear with temperature.

The continuous analog signal path enables an extremely fast reaction time of the output to a change in temperature (continuous analog measurement instead of digital sampling rate), resulting in a low-noise output signal that is insensitive to interference. A very high degree of precision - even with small ranges - is ensured thanks to the range-specific gain adjustment.

Digital communication allows the transmitter to be adapted to the measurement task (range, probe break and fine calibration).

Two versions are available to suit specific requirements:

Instruments with basic type extension 880/990 (adjustable)

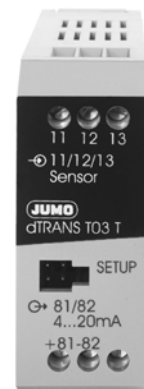
The transmitters are calibrated for a fixed range but can, at any time, be calibrated for a different range through the PC setup program.

Instruments with basic type extension 881/991 (configurable)

The required range can be configured through the PC setup program, without sensor simulation and measurement.

Overview of function

	dTRANS T03 J Type 707030/...	dTRANS T03 B Type 707031/...	dTRANS T03 T Type 707032/...	dTRANS T03 BU Type 707033/...	dTRANS T03 TU Type 707034/...
Input	Pt100	Pt100	Pt100	Pt100	Pt100
Connection circuit	2-wire	2-/ 3-wire	2-/ 3-wire	2-/ 3-wire	2-/ 3-wire
Mounting	terminal head Form J	terminal head Form B	rail	terminal head Form B	rail
Output	4 – 20mA	4 – 20mA	4 – 20mA	0 – 10V	0 – 10V



dTRANS T03 T
 Type 707032/...



dTRANS T03 TU
 Type 707034/...

Technical data for 2-wire transmitter (Types 707030/..., 707031/... and 707032/...)

Input for resistance thermometer

	dTRANS T03 J Type 707030/...	dTRANS T03 B Type 707031/...	dTRANS T03 T Type 707032/...
Measurement input	Pt100 (EN 60 751)		
Range limits	-200 to +850°C		
Connection circuit	2-wire circuit	2-/3-wire circuit	2-/3-wire circuit
Smallest span	25°C		
Largest span	1050°C		
Unit	°C or °F		
Zero shift	for spans < 75°C fixed zero: -40°C, -20°C, 0°C, 20°C, 40°C		
	for span 75°C: ±50°C		
	for spans > 75°C: see "Range organization" on page 7		
Sensor lead resistance for 3-wire connection	≤ 11Ω per conductor		
Sensor lead resistance for 2-wire connection	factory-set: 0 Ω lead resistance settable through PC setup program		
Sensor current	≤ 0.5mA		
Sampling rate	continuous measurement because of analog signal path		

Measurement circuit monitoring to NAMUR recommendation NE43

Underrange	falling to ≤ 3.6mA
Overrange	rising to ≥ 22mA to < 28mA (typically 24mA)
Probe short-circuit	≤ 3.6mA
Probe and lead break	positive: ≥ 22mA to < 28mA (typically 24mA) negative: ≤ 3.6mA

Output

Output signal	proportional DC current 4 – 20mA
Transfer characteristic	linear with temperature
Transfer accuracy	≤ ± 0.1% ¹
Damping of ripple on supply voltage	> 40dB
Burden (Rb)	$R_b = (U_b - 7.5V) / 22mA$
Burden error	≤ ± 0.02% / 100Ω ¹
Settling time on a temperature change	≤ 10msec
Calibration conditions	24V DC / approx. 22°C
Calibration/configuration accuracy	≤ ± 0.2% ^{1,2} or ≤ ± 0.2°C ²

Supply voltage

Supply voltage (Ub)	7.5 – 30V DC
Reverse polarity protection	yes
Supply voltage error	≤ ± 0.01% per V deviation from 24V ¹

¹ All details refer to the range-end value 20mA

² The larger value applies

Ambient conditions

	dTRANS T03 J Type 707030/...	dTRANS T03 B Type 707031/...	dTRANS T03 T Type 707032/...
Operating temperature range	-40 to +85 °C	-40 to +85 °C	-25 to +70 °C
Storage temperature range	-40 to +100 °C		
Temperature error	$\leq \pm 0.01\%$ per °C deviation from 22 °C ¹		
Climatic conditions	rel. humidity $\leq 95\%$ annual mean, no condensation		
Vibration strength	to GL Characteristic 2	to GL Characteristic 2	-
EMC - interference emission - immunity to interference	EN 61 326 Class B to industrial requirements		
IP enclosure protection - in terminal head / open mounting - on C-rail	IP54 / IP00 -	IP54 / IP00 -	- IP20

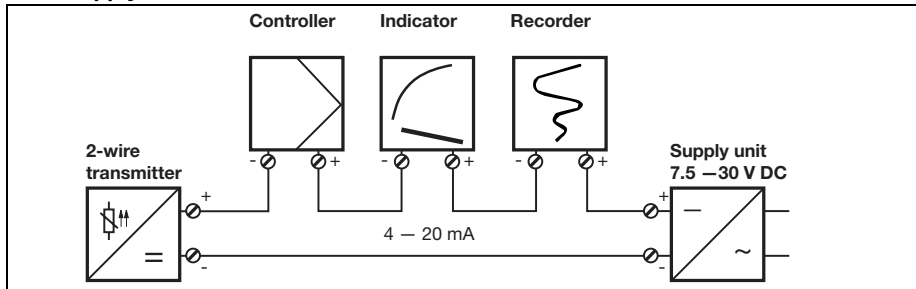
¹ All details refer to the range-end value 20 mA

Housing

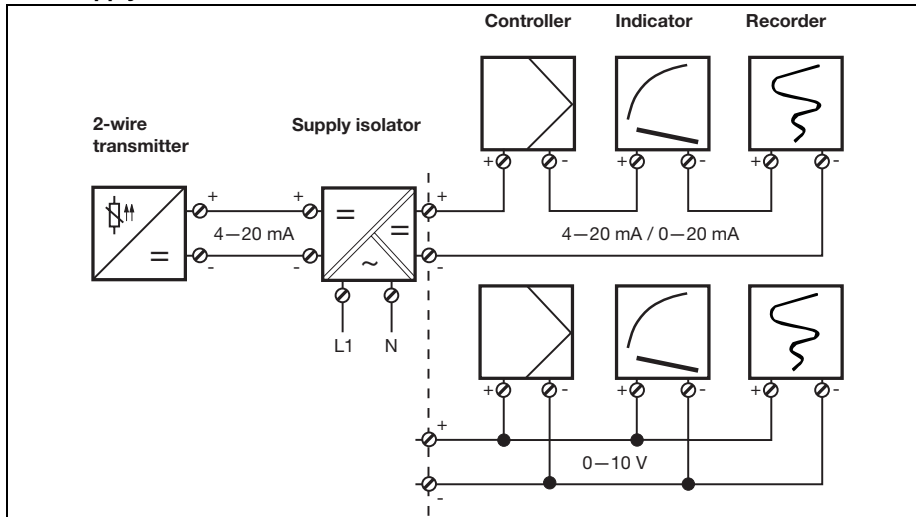
	Type 707030/...	Type 707031/...	Type 707032/...
Material	polycarbonate (encapsulated)	polycarbonate (encapsulated)	polycarbonate
Screw terminal	$\leq 1.5\text{mm}^2$; max. torque 0.15Nm	$\leq 1.75\text{mm}^2$; max. torque 0.6Nm	$\leq 2.5\text{mm}^2$; max. torque 0.6Nm
Mounting	inside terminal head Form J	inside terminal head Form B DIN 43 729; in surface-mounting case (on request); in switch cabinet (fixing bracket is required)	on C-rail 35mm x 7.5mm (EN 50 022); on C-rail 15mm (EN 50 045); on G-rail (EN 50 035)
	use only original accessories for mounting!		
Operating position	unrestricted		
Weight	approx. 12g	approx. 45g	approx. 70g

System diagrams for 2-wire transmitter

Connection example with supply unit



Connection example with supply isolator



Technical data for 3-wire transmitter (Types 707033/..., and 707034/...)

Input for resistance thermometer

	dTRANS T03 BU Type 707033/...	dTRANS T03 TU Type 707034/...
Measurement input	Pt100 (EN 60 751)	
Range limits	-200 to +850°C	
Connection circuit	2-/3-wire circuit	
Smallest span	25°C	
Largest span	1050°C	
Unit	°C or °F	
Zero shift	for spans < 75°C fixed zero: -40°C, -20°C, 0°C, 20°C, 40°C	
	for span 75°C: ±50°C	
	for spans > 75°C: see "Range organization" on page 7	
Sensor lead resistance for 3-wire connection	≤ 11Ω per conductor	
Sensor lead resistance for 2-wire connection	factory-set: 0 Ω lead resistance, settable through PC setup program	
Sensor current	≤ 0.5mA	
Sampling rate	continuous measurement because of analog signal path	

Measurement circuit monitoring to NAMUR recommendation NE43

Underrange	0V
Ovrange	rising to > 11V to < 14V (typically 12V)
Probe short-circuit	0V
Probe and lead break	positive: rising to > 11V to < 14V (typically 12V) negative: 0V

Output

Output signal	DC voltage 0 – 10V
Transfer characteristic	linear with temperature
Transfer accuracy	≤ ± 0.2% ¹
Damping of ripple on supply voltage	> 40dB
Load	≥ 10kΩ
Load error	≤ ± 0.1%
Settling time on a temperature change	≤ 10msec
Calibration conditions	24V DC / approx. 22°C
Calibration/configuration accuracy	≤ ± 0.2% ^{1,2} or ≤ ± 0.2°C ²

Supply voltage

Supply voltage (U _b)	15 – 30V DC
Reverse polarity protection	yes
Supply voltage error	≤ ± 0.01 % per V deviation from 24V ¹

¹ All details refer to the range-end value 10V

² The larger value applies

Ambient conditions

	dTRANS T03 BU Type 707033/...	dTRANS T03 TU Type 707034/...
Operating temperature range	-40 to +85°C	-25 to +70°C
Storage temperature range	-40 to +100°C	
Temperature error	$\leq \pm 0.01\%$ per °C deviation from 22°C ¹	
Climatic conditions	rel. humidity $\leq 95\%$ annual mean, no condensation	
Vibration strength	to GL Characteristic 2	-
EMC - interference emission - immunity to interference	EN 61 326 Class B to industrial requirements	
IP enclosure protection - in terminal head / open mounting - on C-rail	IP54 / IP00 -	- IP20

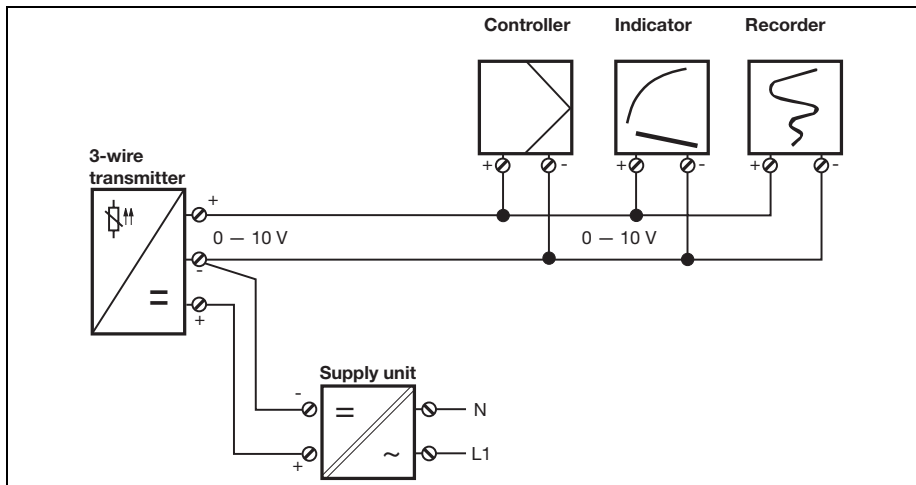
¹ All details refer to the range-end value 10V

Housing

	Type 707033/...	Type 707034/...
Material	polycarbonate (encapsulated)	polycarbonate
Screw terminal	$\leq 1.75\text{mm}^2$; max. torque 0.6Nm	$\leq 2.5\text{mm}^2$; max. torque 0.6Nm
Mounting	inside terminal head Form B DIN 43 729; in surface-mounting case (on request); in switch cabinet (fixing bracket is required)	on C-rail 35mm x 7.5mm (EN 50 022); on C-rail 15mm (EN 50 045); on G-rail (EN 50 035)
	use only original accessories for mounting!	
Operating position	unrestricted	
Weight	approx. 45g	approx. 70g

System diagram for 3-wire transmitter

Connection example



Setup program (for all types)

The setup program is available for calibrating/configuring the transmitter from a PC.

Connection is through a PC interface (including power supply and adapter) and the setup interface of the transmitter. In order to calibrate/configure the transmitter, it has to be connected to the supply voltage. If no power supply or supply isolator is available, Types 707030/..., 707031/... and 707032/... can be supplied from a 9V block battery.

Adjustable/configurable parameters

- TAG number (8 characters)
- response to probe and cable break
- range start, range end
- lead resistance for 2-wire circuit

Fine calibration

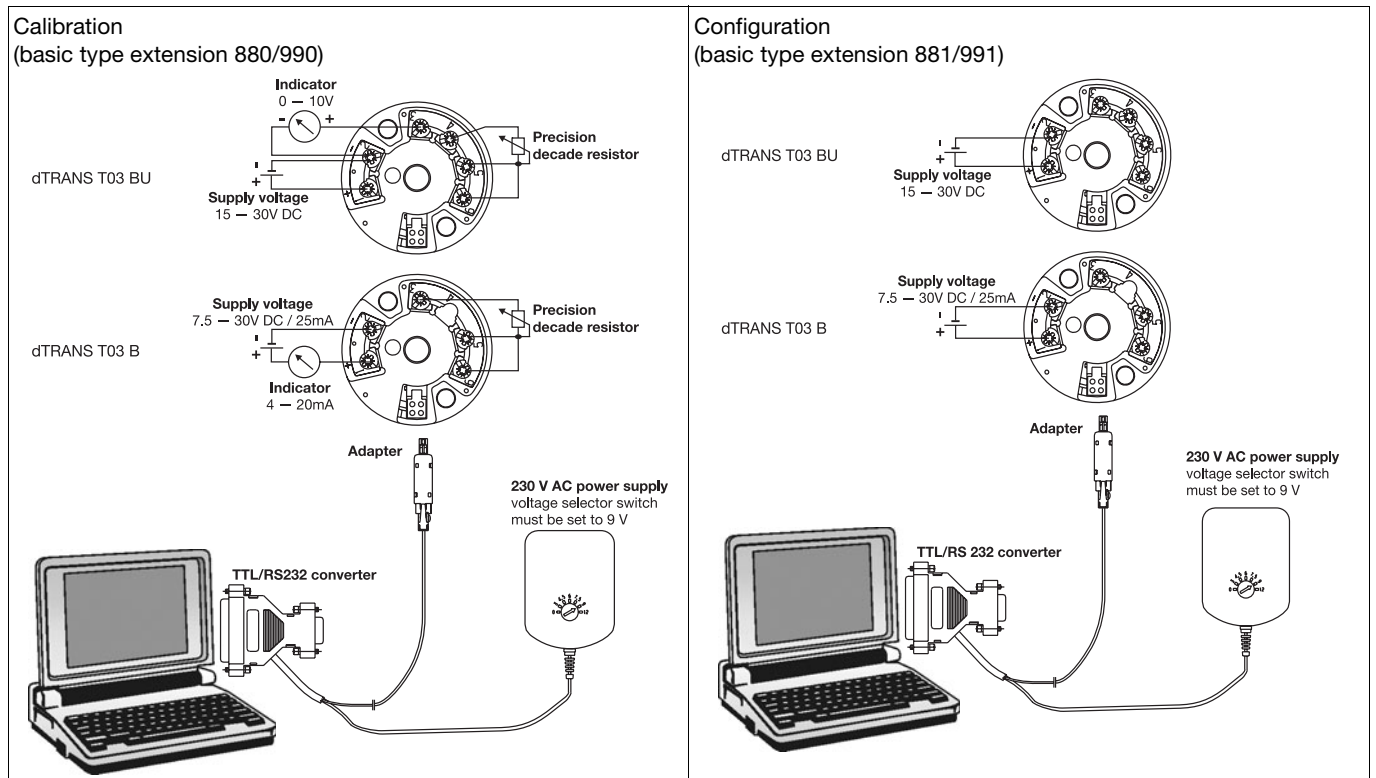
Fine calibration means adjustment of the output signal of a calibrated/configured transmitter. Errors due to the system (such as an unfavorable probe installation) can be compensated. The signal can be adjusted in the range $\pm 0.2\text{mA}$ for current output and $\pm 0.1\text{V}$ for voltage output. Negative output voltages are not possible with voltage output. Fine calibration can only be carried out through the setup program.

Hardware and software requirements

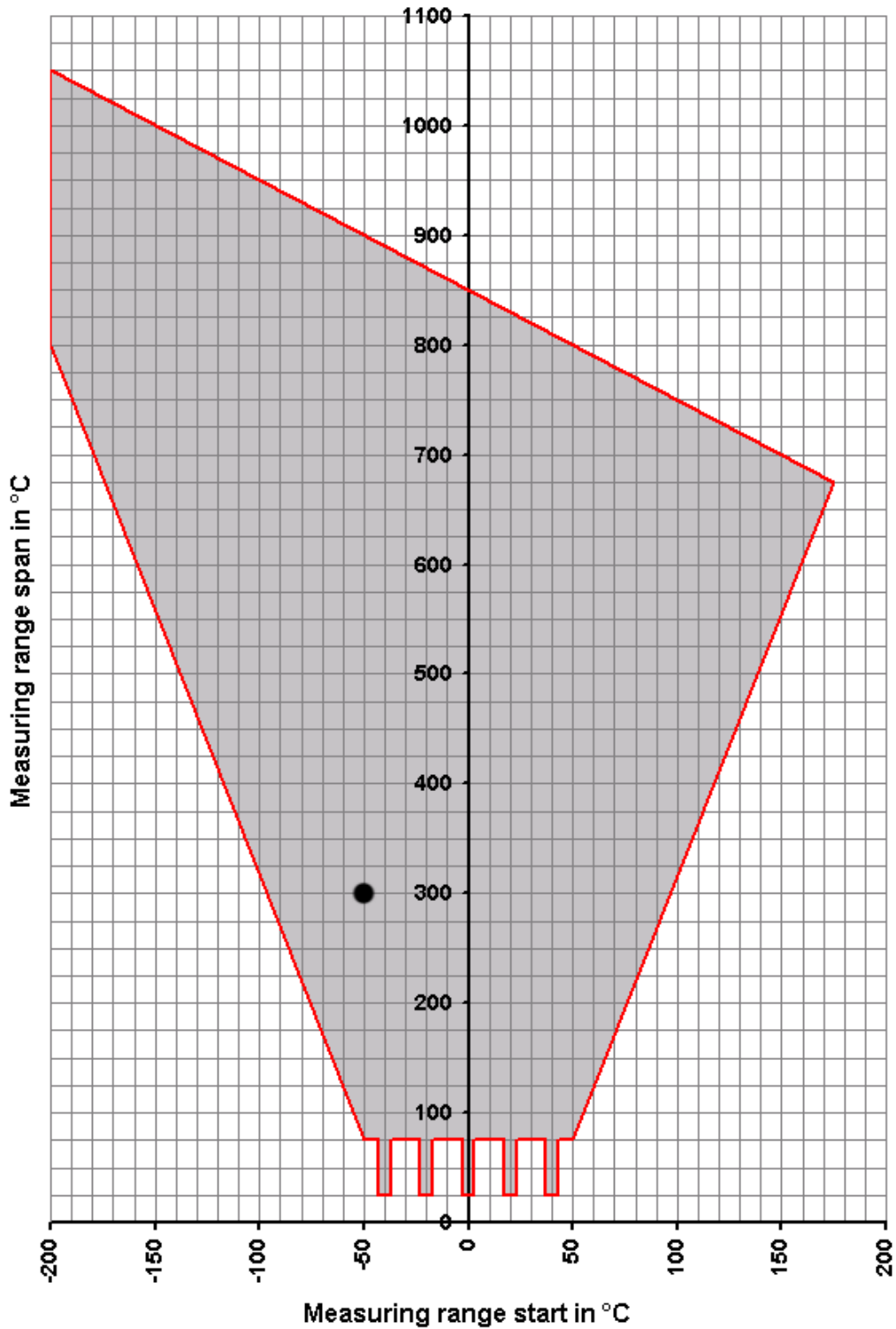
The following hardware and software requirements have to be met for installing and operating the setup program:

- IBM-PC or compatible PC from 486DX-2-100
- 64 MB main memory
- 10MB available on hard disk
- CD-ROM drive
- 1 free serial interface
- Win 98, ME or Win NT4.0, 2000, XP

Connection layout for calibrating/configuring the dTRANS T03 B and BU



Range organization



All the possible range-start values in relation to the range span are contained within the gray area.

$$\text{range span} = \text{range end} - \text{range start}$$

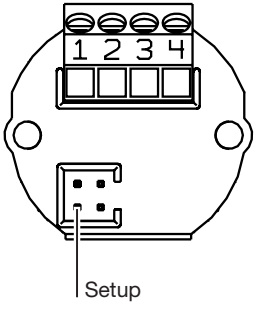

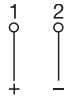


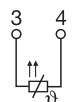
Example: range start = -50°C, range end = 250°C
 range span = range end - range start = 250°C - (-50°C) = 300°C

Caution: When selecting the range start, make sure it lies within the gray area.

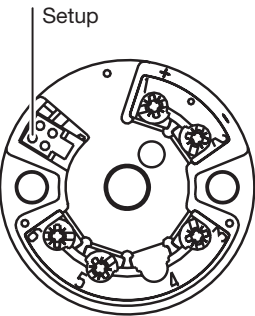

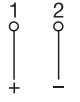


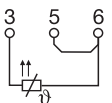

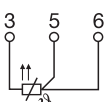
Please note: for spans smaller than 75°C, the only permissible start values are: -40°C, -20°C, 0°C, +20°C and +40°C.

Connection diagram for 2-wire transmitter

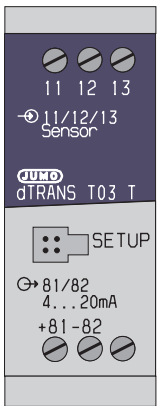

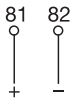


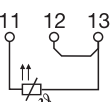

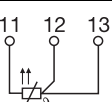
dTRANS T03 J - Type 707030/...

	Connection for		Terminal assignments		
		Supply voltage 7.5 – 30V DC	+1 -2	$R_B = \frac{U_b - 7.5V}{22mA}$ $R_B = \text{burden resistance}$ $U_b = \text{supply voltage}$	
		Current output 4 – 20mA			
Analog inputs					
	Resistance thermometer in 2-wire circuit	3 4	standard is $R_L = 0\Omega$		

dTRANS T03 B - Type 707031/...

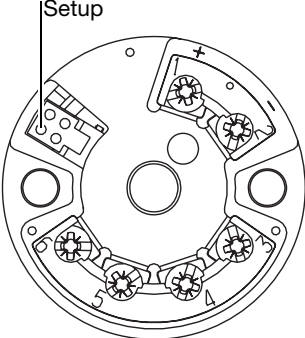

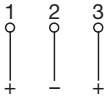


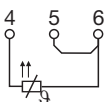

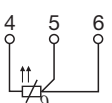
	Connection for		Terminal assignments		
		Supply voltage 7.5 – 30V DC	+1 -2	$R_B = \frac{U_b - 7.5V}{22mA}$ $R_B = \text{burden resistance}$ $U_b = \text{supply voltage}$	
		Current output 4 – 20mA			
Analog inputs					
	Resistance thermometer in 2-wire circuit	3 5 6	standard is $R_L = 0\Omega$		
	Resistance thermometer in 3-wire circuit	3 5 6	$R_L \leq 11\Omega$ $R_L = \text{lead resistance per conductor}$		

dTRANS T03 T - Type 707032/...

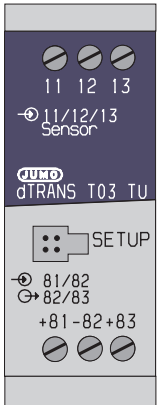

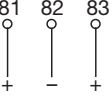


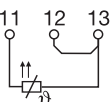

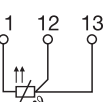
	Connection for		Terminal assignments		
		Supply voltage 7.5 – 30V DC	+81 -82	$R_B = \frac{U_b - 7.5V}{22mA}$ $R_B = \text{burden resistance}$ $U_b = \text{supply voltage}$	
		Current output 4 – 20mA			
Analog inputs					
	Resistance thermometer in 2-wire circuit	11 12 13	standard is $R_L = 0\Omega$		
	Resistance thermometer in 3-wire circuit	11 12 13	$R_L \leq 11\Omega$ $R_L = \text{lead resistance per conductor}$		

Connection diagram for 3-wire transmitter

dTRANS T03 BU - Type 707033/...

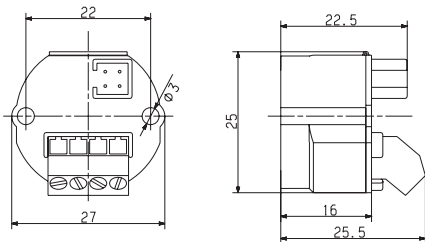
	Connection for		Terminal assignments	
		Supply voltage 15 – 30V DC	+1 -2	
		Voltage output 0 – 10V	-2 +3	
	Analog inputs			
	Resistance thermometer in 2-wire circuit	4 5 6	standard is $R_L = 0\Omega$	
	Resistance thermometer in 3-wire circuit	4 5 6	$R_L \leq 11\Omega$ $R_L =$ lead resistance per conductor	

dTRANS T03 TU - Type 707034/...

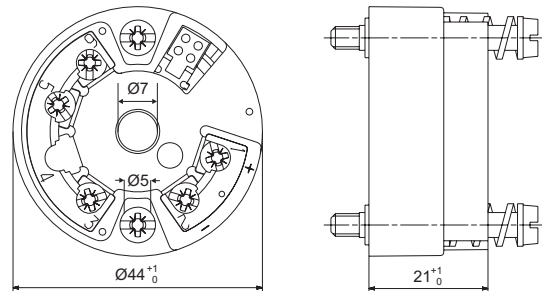
	Connection for		Terminal assignments	
		Supply voltage 15 – 30V DC	+81 -82	
		Voltage output 0 – 10V	-82 +83	
	Analog inputs			
	Resistance thermometer in 2-wire circuit	11 12 13	standard is $R_L = 0\Omega$	
	Resistance thermometer in 3-wire circuit	11 12 13	$R_L \leq 11\Omega$ $R_L =$ lead resistance per conductor	

Dimensions

dTRANS T03 J

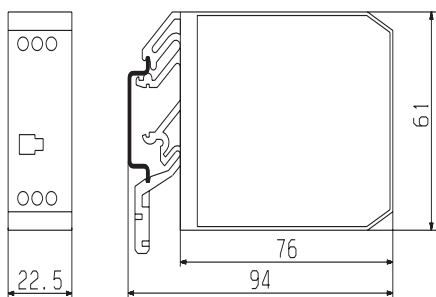


dTRANS T03 B and dTRANS T03 BU

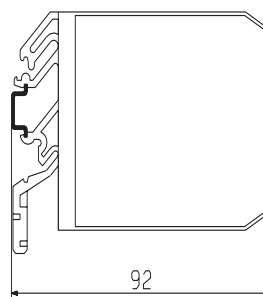


dTRANS T03 T and dTRANS T03 TU

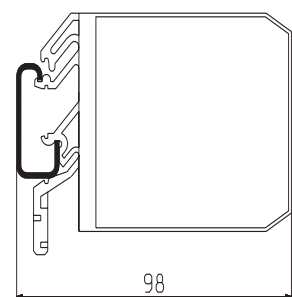
C-rail 35mm x 7.5mm EN 50 022



C-rail 15mm EN 50 045



G-rail EN 50 035



Order details: JUMO dTRANS T03

Analog transmitter with digital adjustment

(1) Basic version

707030	dTRANS T03 J analog 2-wire transmitter for installation in terminal head Form J (2-wire circuit only)
707031	dTRANS T03 B analog 2-wire transmitter for installation in terminal head Form B
707032	dTRANS T03 T analog 2-wire transmitter for rail mounting
707033	dTRANS T03 BU analog 3-wire transmitter for installation in terminal head Form B
707034	dTRANS T03 TU analog 3-wire transmitter for rail mounting

(2) Basic type extensions

x	x	x	x	x	880	adjustable, factory-set (probe break: positive; lead resistance: 0Ω)
x	x	x	x	x	990	adjustable, setting to customer specification (please specify in plain text)
x	x	x	x	x	881	configurable, factory-set (probe break: positive; lead resistance: 0Ω)
x	x	x	x	x	991	configurable, setting to customer specification (please specify in plain text)

(3) Input

x	x	x	x	x	001	Pt100 in 3-wire circuit ¹
x	x	x	x	x	003	Pt100 in 2-wire circuit ¹

(4) Output

x	x	x	005	4 – 20mA
		x	040	0 – 10V

Order code (1) (2) (3) (4)
 / - -

Order example 707031 / 880 - 001 - 005

¹ Pt1000 on request

Standard accessories

- Operating Instructions
- Fixing items

Accessories

- PC setup program, multilingual
- PC interface (isolated) with TTL/RS232 converter, power supply (230V AC) and adapter (socket)
- PC interface (isolated) with TTL/RS232 converter, power supply (115V AC) and adapter (socket)
- Supply units 1- way and 4-way (Data Sheet 70.7500)
- Isolating amplifier and supply isolator (Data Sheet 70.7510)
- Supply unit for transmitters (Data Sheet 70.7520)
- Fixing bracket for mounting Type 707031/... and Type 707033/... on rail, Sales No. 70/00352463



JUMO dTRANS T04

Four-wire Transmitter, settable via DIP switch/PC setup program

for connection to Pt100/Pt1000 resistance thermometer or potentiometer; rail-mounted for building into control cabinets

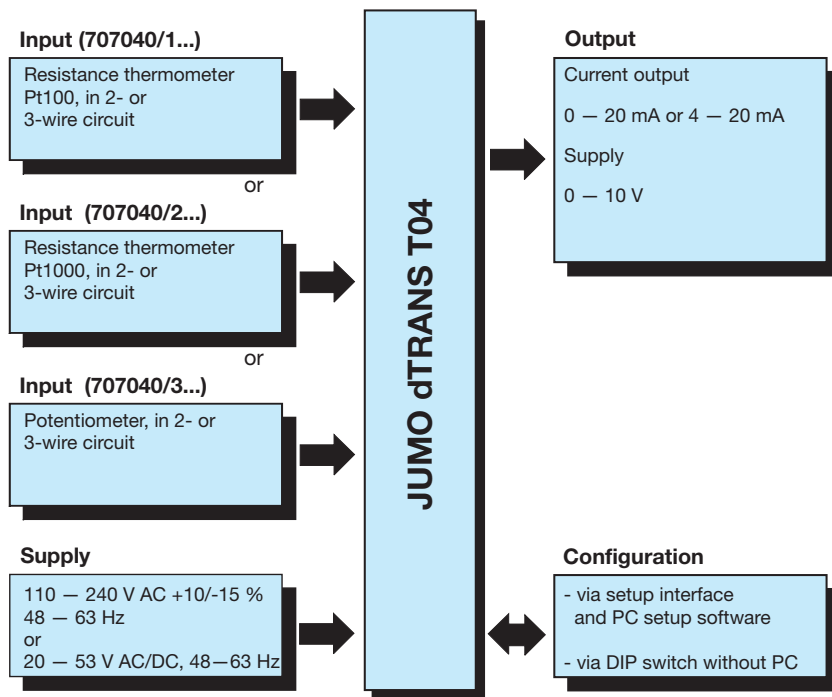
Brief description

These transmitters are designed for industrial applications and are used to measure the temperature or resistance through a Pt100 or Pt1000 resistance sensor or potentiometer in 2-wire or 3-wire circuit connection. The 0 – 20 mA, 4 – 20 mA or 0 – 10 V output signal is available linear with temperature/resistance. The continuous analog signal path enables a fast reaction of the output to a temperature change (analog continuous measurement instead of digital sampling rate). This results in a low-noise output signal that is immune to interference. High precision, even with small ranges, is ensured by the range-specific gain adjustment. The transmitter can be set either on the instrument itself, via DIP switch, or through the PC setup program.



dTRANS T04
Type 707040/...

Block structure



Key features

- Measuring range selectable via DIP switch or through the PC setup program
- Choice of signal output: 0 – 10V, 0 – 20mA or 4 – 20mA
- Fast response, thanks to continuous analog measurement
- Low-noise current signal, immune to interference
- Electrical isolation between input, output / mains supply
- Current/voltage output

Controls

	<p>The chosen measuring range and output response can be set via DIP switch. Using the PC setup program, additional ranges and parameters are configurable.</p>
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Technical data

Input

Measurement input	Pt100 EN 60 751	Pt1000 EN 60 751	Potentiometer
Range limits	-200 to +850°C	-200 to +850°C	0 – 11000Ω
Connection circuit	2- and 3-wire circuit		
Configuration	through DIP switch or using the PC setup program		
Shortest span	25°C	25°C	250Ω
Largest span	1050°C	1050°C	11000Ω
Range start for shortest span	-50°C to +20°C	-50°C to +20°C	0 – 500Ω
Range start for other spans	see range organization on Page 5 and Page 6		
Unit	°C (°F settable through the PC setup program)	°C (°F settable through the PC setup program)	Ω
Sensor lead resistance for 3-wire connection	≤ 11Ω per conductor		
Sensor lead resistance for 2-wire connection	factory-set: 0Ω lead resistance, adjustable through the PC setup program		
Sensor current	≤ 0.5mA	≤ 0.1mA	≤ 0.1mA
Sampling rate	continuous measurement (analog signal path)		

Output

Measurement input	Pt100 EN 60 751	Pt1000 EN 60 751	Potentiometer
Output signal - current: - voltage:	selectable through DIP switch or PC setup program proportional DC current 0 – 20mA or 4 – 20mA DC voltage 0 – 10V		
Transfer characteristic - for resistance thermometer: - for potentiometer:	linear with temperature linear with resistance		
Transfer accuracy	≤ ± 0.1 % ¹		
Residual ripple	≤ ± 0.2 % ¹		
Burden (with current output)	≤ 750Ω		
Burden error	≤ ± 0.01 % / 100Ω ¹		
Current limiting	> 21.6mA – < 28mA (24mA typical)		
Load (with voltage output)	≥ 10kΩ		
Load error	≤ ± 0.1 % ¹		
Voltage limiting	> 11V – < 14V (12V typical)		
Settling time on a temperature change	≤ 40msec		
Settling time after switch-on or reset	≤ 200msec		
Calibration conditions	230V AC / 23°C (± 5°C)		
Calibration accuracy	≤ ± 0.3 % ^{1,2} or ≤ ± 0.3°C ²	≤ ± 0.3 % ^{1,2} or ≤ ± 0.3°C ²	≤ ± 0.3 % ¹
Supply voltage error	≤ ± 0.05 % ¹		

1. All data refer to the range end value 10V or 20mA

2. The larger value applies

Measuring circuit monitoring

Underrange: - current output 4 – 20mA - current output 0 – 20mA - voltage output 0 – 10V	falling to ≤ 3.6mA < 0mA (-0.05mA typical) < 0V -0.6V typical)
Overrange - current output 4 – 20mA - current output 0 – 20mA - voltage output 0 – 10V	rising to > 21.6mA – < 28mA (24mA typical) rising to > 21.6mA – < 28mA (24mA typical) rising to > 11V – < 14V (12V typical)
Probe short-circuit: - current output 4 – 20mA - current output 0 – 20mA - voltage output 0 – 10V	≥ 1.5mA – ≤ 3.6mA (2mA typical) < 0mA (-0.05mA typical) < 0V (-0.6V typical)

Probe and lead break: - current output 4 — 20mA - current output 0 — 20mA - voltage output 0 — 10V	Signal is configurable. positive signal: > 21.6mA — < 28mA (24mA typical) negative signal: ≥ 1.5mA — ≤ 3.6mA (2mA typical) positive signal: > 21.6mA — < 28mA (24mA typical) negative signal: < 0mA (-0.05mA typical) positive signal: > 11V — < 14V (12V typical) negative signal: < 0V (-0.6V typical)
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Electrical data

Supply voltage	110 — 240V AC +10/-15%, 48 — 63Hz	20 — 53V AC/DC, 48 — 63Hz
Power consumption	4VA	3VA
Electrical safety	to EN 61 010, Part 1 overvoltage category II, pollution degree 2, protection class I	to EN 61 010, Part 1 protection class III, for operation with SELV/PELV circuits
Test voltage	3700V	500V
Electrical isolation	The supply is electrically isolated from the input and the output. There is no electrical isolation between input, output and setup connector.	The supply is electrically isolated from the input and the output. There is no electrical isolation between input, output and setup connector.

Environmental influences

Operating temperature range	-25 to +55°C
Storage temperature range	-40 to +90°C
Storage temperature humidity	rel. humidity ≤ 85 %, no condensation
Temperature error	≤ ± 0.01 % / °C ¹
Climatic conditions	EN 60721-3-3 3K3 rel. humidity ≤ 85 % annual average, no condensation
Vibration strength	according to GL Characteristic 2
EMC - interference emission - immunity to interference	EN 61 326 Class B to industrial requirements
IP enclosure protection	IP20 to EN 60 529

1. All data refer to the range end value 10V or 20mA

Housing

Material	polycarbonate
Flammability class	UL 94 V0
Dimensions (W x H x D)	22.5 x 93.5 x 60mm
Screw terminal	2,5mm ² wire cross-section / 2.5mm wire dia.
Mounting	on 35mm x 7.5mm DIN rail to EN 60 715 A.1, for installation in control cabinets
Operating position	unrestricted
Weight	approx. 100g

PC setup program

The PC setup program is used for configuration and fine adjustment of the transmitter from a PC (e.g. when the sensor drifts). Connection is through the PC interface with TTL/RS232 converter and adapter and the setup interface of the transmitter. In order to configure the transmitter, it must be connected to the supply.

Configurable parameters

- TAG number (14 characters)
- response to probe and cable break
- range start, range end
- output signal 0(4) – 20mA or 0 – 10V
- lead resistance for 2-wire circuit

Fine adjustment

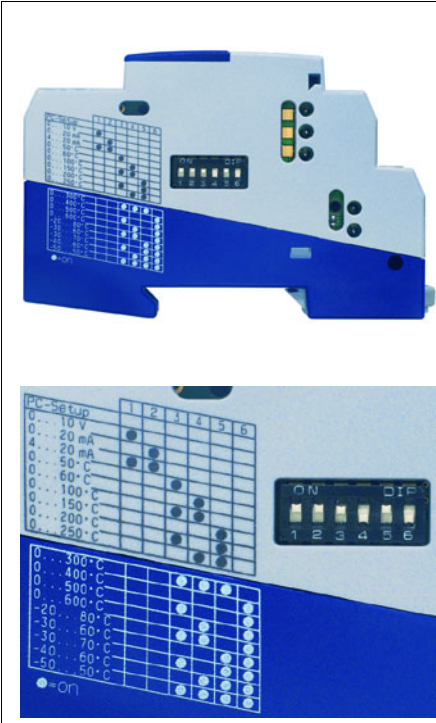
Fine adjustment means correction of the output signal of a configured transmitter; systematic errors such as those caused by an unsuitable probe mounting can be compensated. The signal can be adjusted in the range $\pm 0.2\text{mA}$ for current output and $\pm 0.1\text{V}$ for voltage output. Fine adjustment can only be carried out through the setup program.

Hardware and software requirements

The following hardware and software requirements must be met for installing and operating the PC setup program:

- IBM-PC or compatible PC with Pentium processor or higher
- 64 MB main memory
- 15MB available on hard disk
- CD-ROM drive
- 1 free serial interface
- Win 98, ME or Win NT4.0, 2000, XP

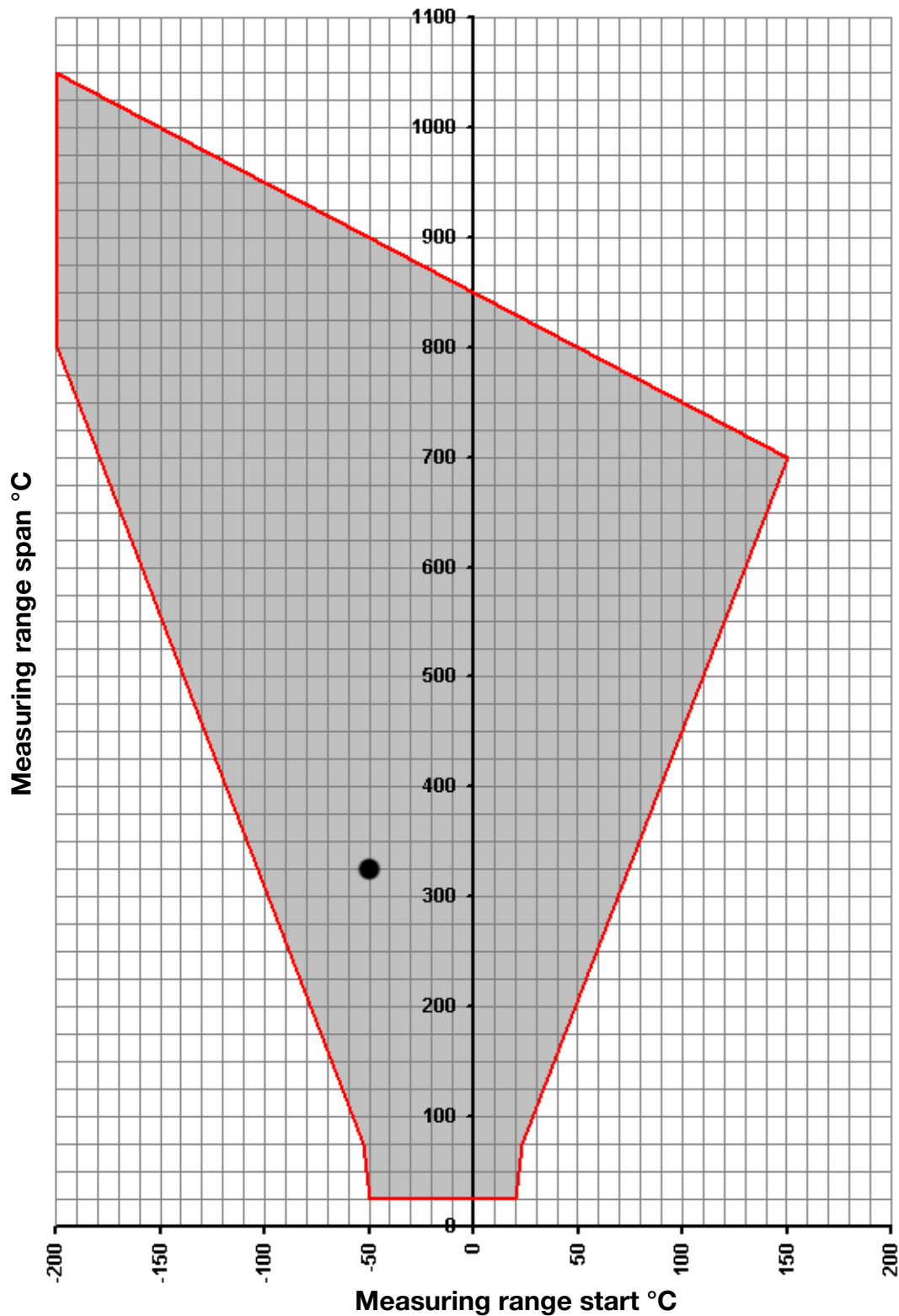
DIP switch configuration

	Function or measuring range for Pt100 and Pt1000	Function or measuring range for potentiometer	DIP switch					
			1	2	3	4	5	6
	PC setup ¹	PC setup ¹						
	Output 0 – 10V	Output 0 – 10V	•					
	Output 0 – 20mA	Output 0 – 20mA		•				
	Output 4 – 20mA	Output 4 – 20mA	•	•				
	Range 0 to 50°C	Range 0 – 500Ω			•			
	Range 0 to 60°C	Range 0 – 1 kΩ				•		
	Range 0 to 100°C	Range 0 – 2kΩ			•	•		
	Range 0 to 150°C	Range 0 – 3kΩ					•	
	Range 0 to 200°C	Range 0 – 4kΩ			•		•	
	Range 0 to 250°C	Range 0 – 5kΩ				•	•	
	Range 0 to 300°C	Range 0 – 6kΩ			•	•	•	
	Range 0 to 400°C	Range 0 – 7kΩ						•
	Range 0 to 500°C	Range 0 – 8kΩ			•			•
	Range 0 to 600°C	Range 0 – 9kΩ				•		•
	Range -20 to +80°C	Range 0 – 10kΩ			•	•		•
	Range -30 to +60°C	Range 0 – 11kΩ					•	•
	Range -30 to +70°C				•		•	•
	Range -40 to +60°C					•	•	•
	Range -50 to +50°C				•	•	•	•

• = ON

1. When configuring through the PC setup program, the input **and** output must be configured from the PC.

Measuring range organization (resistance thermometer)



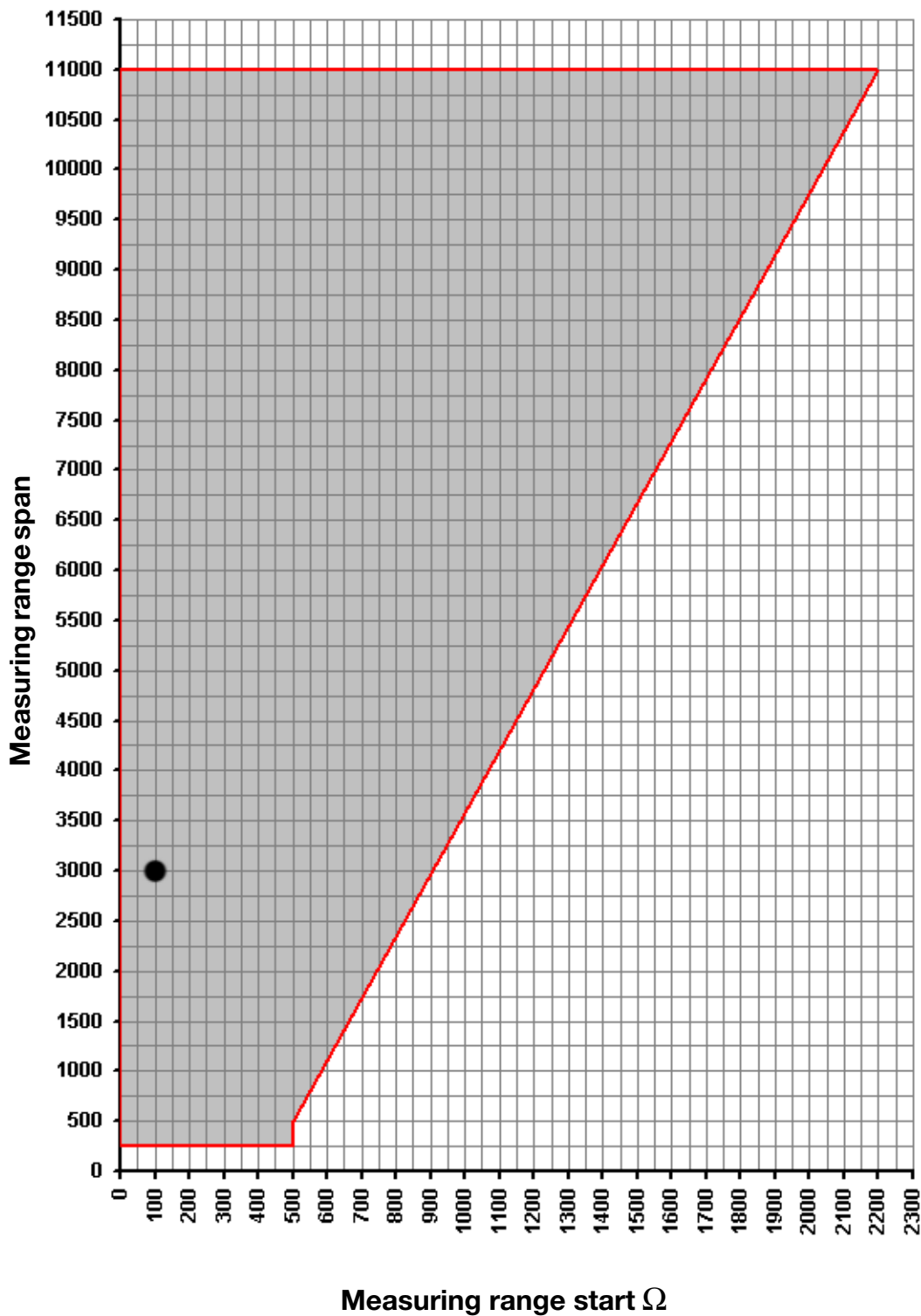
All the possible range-start values in relation to the range span are contained within the gray area.

$$\text{range span} = \text{range end} - \text{range start}$$

Example: range start = -50°C, range end = 275°C
 range span = range end - range start = 275°C - (-50°C) = 325°C

Please note: When selecting the range start, make sure it lies within the gray area.

Measuring range organization (potentiometer)



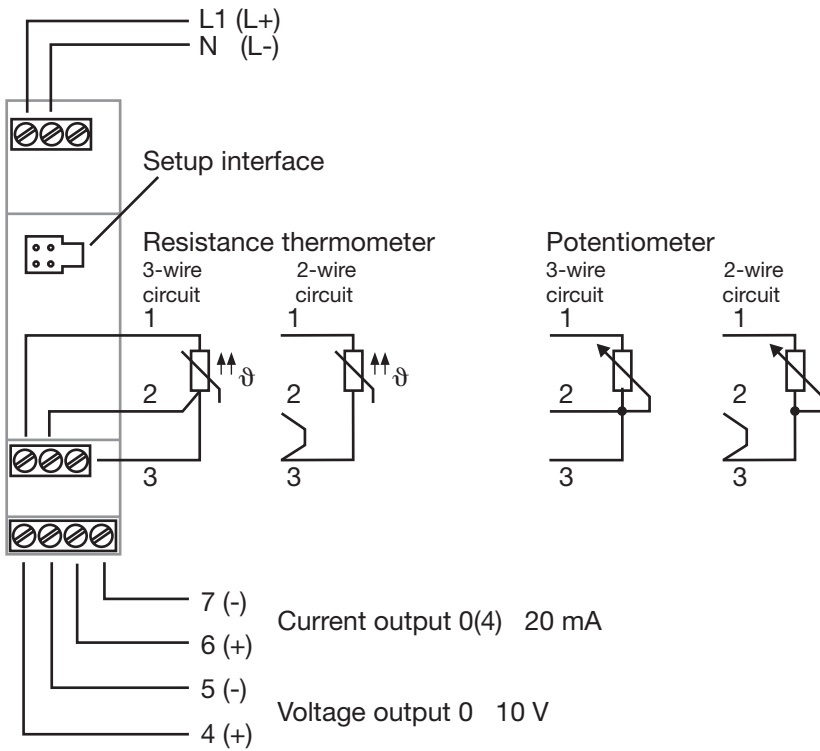
All the possible range-start values in relation to the range span are contained within the gray area.

$$\text{range span} = \text{range end} - \text{range start}$$

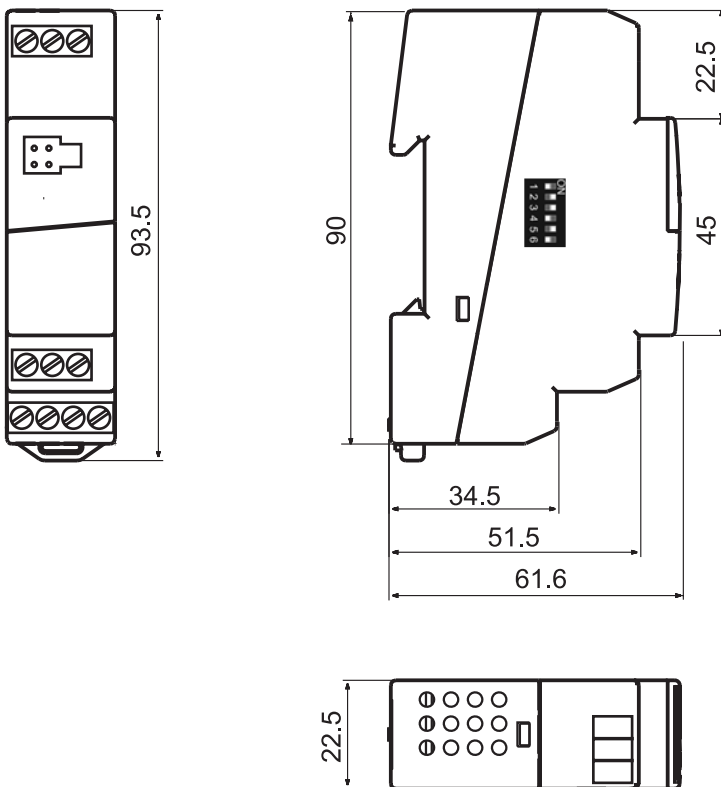
Example: range start = 100 Ω , range end = 3100 Ω
 range span = range end - range start = 3100 Ω - 100 Ω = 3000 Ω

Please note: When selecting the range start, make sure it lies within the gray area.

Connection diagram



Dimensions



Order details: JUMO dTRANS T04

Four-wire transmitter, settable via DIP switch/PC setup program

(1) Basic version¹

	707040/1	dTRANS T04 for Pt100 resistance thermometer
	707040/2	dTRANS T04 for Pt1000 resistance thermometer
	707040/3	dTRANS T04 for potentiometer
	(2) Input	
x	888	factory-set ² (3-wire circuit, 0 to 100°C)
x	888	factory-set ² (3-wire circuit, 0 — 1 kΩ)
x	999	configuration to customer specification (please specify in plain text) ³
	(3) Output	
x	888	factory-set (0 — 20mA)
x	999	setting to customer specification (please specify in plain text) ³
	(4) Supply	
x	22	20 — 53V AC/DC, 48 — 63Hz
x	23	110 — 240V AC +10/-15%, 48 — 63Hz

Order code

(1) - (2) - (3) - (4)

Order example

707040/1 - 888 - 888 - 23

1. It is not possible to switch between the sensor types.
2. Additional measuring ranges are selectable via DIP switch or PC setup program (see Page 4).
3. Please check whether the required measuring range and output can be set via DIP switch. In such a case, "factory-set" can be ordered.

Standard accessory

- Operating Manual

Accessories

- PC setup program, multilingual
- PC interface cable with TTL/RS232 converter and adapter

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Internet: www.jumo.net

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Internet: www.jumo.co.uk

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Canastota, NY 13032, USA
Phone: 315-697-JUMO
1-800-554-JUMO
Fax: 315-697-5867
e-mail: info@jumo.us
Internet: www.jumo.us



Power supplies, Isolating amplifiers, Supply isolators

Nr.

Supply units for transmitters

for rail mounting

C rail 35mm x 7,5mm	EN 50 022	
C rail 15mm	EN 50 045	
G rail	EN 50 035	70.7500

Isolating amplifier and supply isolator

Isolating unit for standard signals and power supply unit for 2-wire transmitters

for mounting on

C rail 35mm x 7,5mm	EN 50 022	
C rail 15mm	EN 50 045	
G rail	EN 50 035	70.7510

Supply unit for transmitters

Supply unit for 2-wire transmitters with isolated standard signal

for mounting on

C rail 35mm x 7,5mm	EN 50 022	
C rail 15mm	EN 50 045	
G rail	EN 50 035	70.7520

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 e-mail: info@JumoUSA.com
 Internet: www.JumoUSA.com



Supply units for transmitters

for rail mounting

- C rail 35mm x 7.5mm EN 50022
- C rail 15mm EN 50045
- G rail EN 50035

Brief description

The supply units are used for the stabilised supply of transmitters. They provide a 24V DC supply which is electrically isolated from the mains supply.

Type designation

TN-22

supply unit for one 2-wire transmitter
 dimensions: 22.5mm x 61 mm x 76mm
 1 x 24V DC 10%, 22mA (stabilised)
 power consumption: 1.5VA approx.
 short-circuit proof

(1) (2) (3)

TN-22/ 02, 022

TN-22/ 04, 022

TN-22

supply unit for one analog transmitter
 dimensions: 30mm x 76mm x 91mm
 1 x 24V DC ±10%, 55mA (stabilised)
 power consumption: 3VA approx.
 conditionally short-circuit proof

(1) (2) (3)

TN-22/ 02, 055

TN-22/ 04, 055

TN-45

supply unit for up to four 2-wire transmitters
 dimensions: 45mm x 76mm x 91mm
 4 x 24V DC ±10%, 25mA (stabilised)
 power consumption: 8VA approx.
 short-circuit proof

(1) (2) (3)

TN-45/ 02, 025

TN-45/ 04, 025

TN-67

supply unit for up to four analog transmitters
 dimensions: 75mm x 76mm x 91mm
 4 x 24V DC ±10%, 55mA (stabilised)
 power consumption: 15VA approx.
 conditionally short-circuit proof

(1) (2) (3)

TN-67/ 02, 055

TN-67/ 04, 055

Codes for numbers (1) ... (3)

(1) Basic type

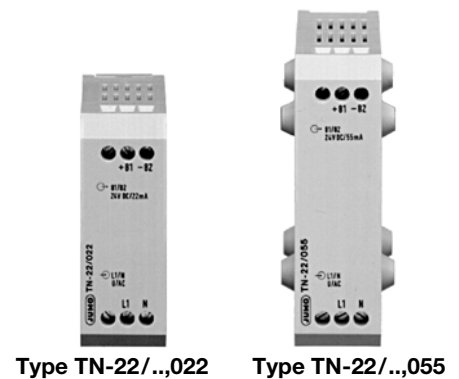
case width 22.5mm or 30mm	22
case width 45mm	45
case width 75mm	67

(2) Supply

230V AC 48 ... 63Hz +10% ... -15%	02
115V AC 48 ... 63Hz +10% ... -15%	04

(3) Maximum current of supply units

22 mA	022
25 mA	025
55 mA	055



Type TN-22/...022

Type TN-22/...055

Technical data

General data

Operating temperature range

-10 ... +50°C

Storage temperature range

-20 ... +70°C

Climatic conditions

rel. humidity 75% max. annual mean
 no condensation

Operating position

vertical

Electrical connection

screw terminals for solid or stranded wire
 up to 2.5mm² conductor cross-section

Protection

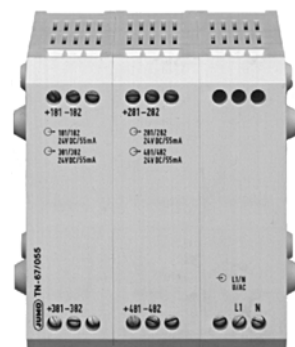
IP20 to DIN 40050

Weight

TN-22/...022	125g
TN-22/...055	210g
TN-45/...025	450g
TN-67/...055	600g

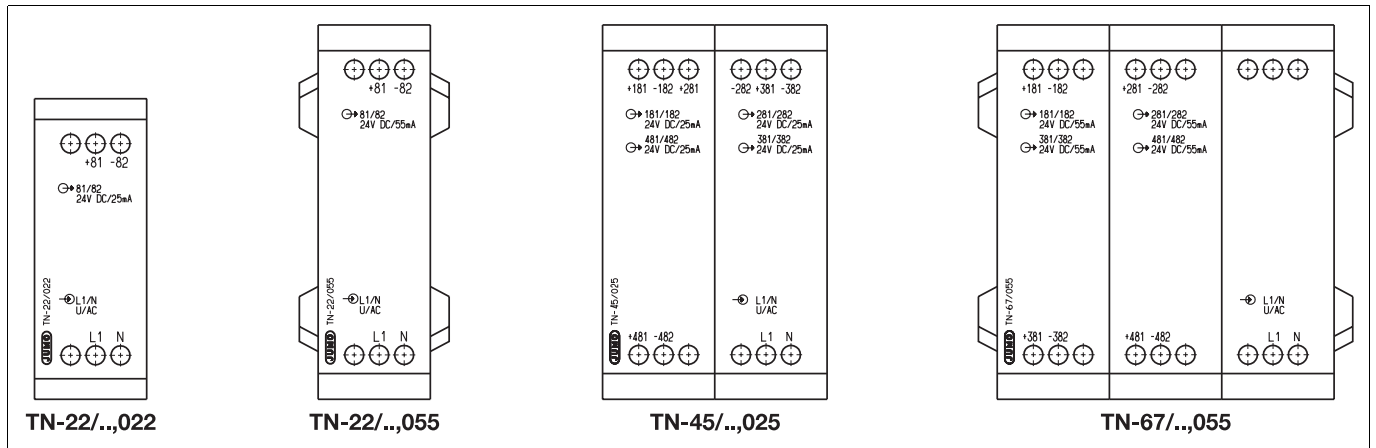


Type TN-45/...025



Type TN-67/...055

Connection diagram



TN-22/...,022 and TN-22/...,055

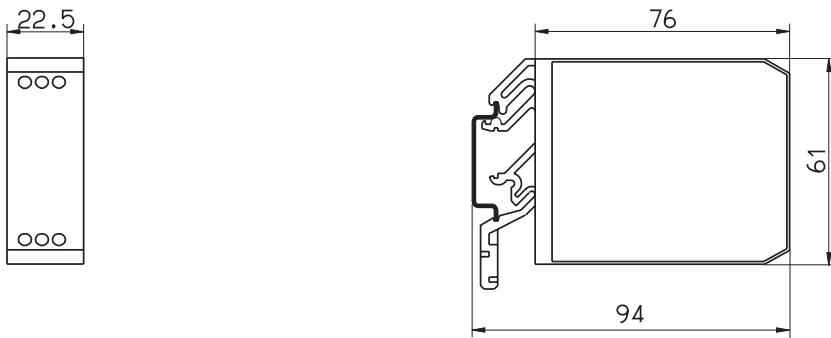
Connection for		Terminals	
Supply	AC	L1 N	line neutral
Output	DC	81+ 82-	24V DC TN-22/...,022: 22mA TN-22/...,055: 55mA

TN-45/...,025 and TN-67/...,055

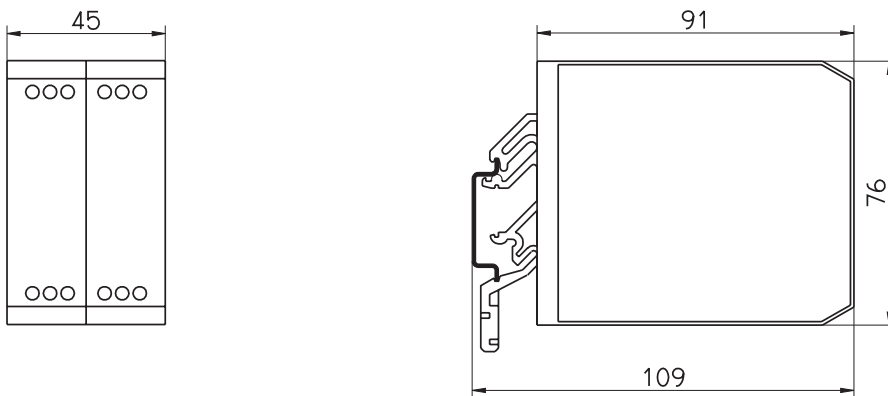
Connection for		Terminals	
Supply	AC	L1 N	line neutral
Output	DC	181+ 182-	24V DC TN-45/...,025: 25mA TN-67/...,055: 55mA
		281+ 282-	24V DC TN-45/...,025: 25mA TN-67/...,055: 55mA
		381+ 382-	24V DC TN-45/...,025: 25mA TN-67/...,055: 55mA
		481+ 482-	24V DC TN-45/...,025: 25mA TN-67/...,055: 55mA

Dimensions

TN-22/...,022

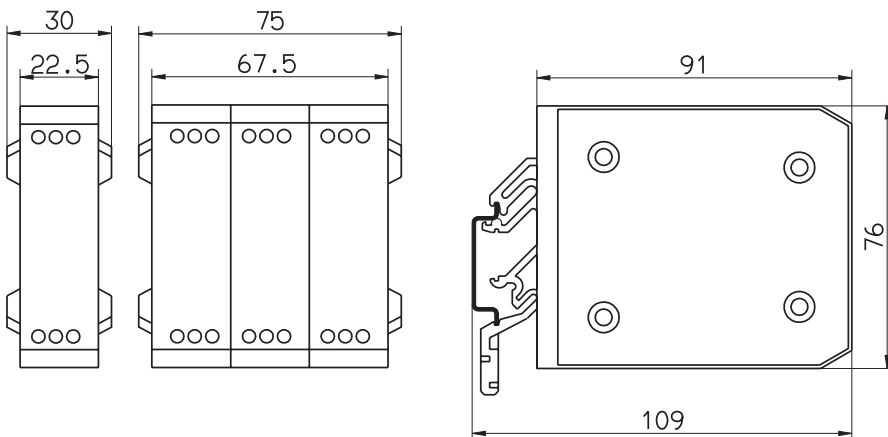


TN-45/...,025



TN-22/...,055

TN-67/...,055



mm	inch
22.5	0.89
30	1.18
45	1.77
61	2.40
67.5	2.66
75	2.95
76	2.99
91	3.58
94	3.70
109	4.29

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Isolating amplifier and supply isolator

Isolating unit for standard signals
 and power supply unit for 2-wire transmitters

for mounting on: **C rail 35mm x 7.5mm** **EN 50 022**
C rail 15mm **EN 50 045**
G rail **EN 50 035**



Brief description

The isolating amplifier/supply isolator TT-45/4 ... is used for isolating standard signals and as a power supply for 2-wire transmitters. It provides the supply for the transmitter, isolates the signal and passes it on to the output. The TT-45/4 ... provides a high degree of isolation between input and output and between input and supply.

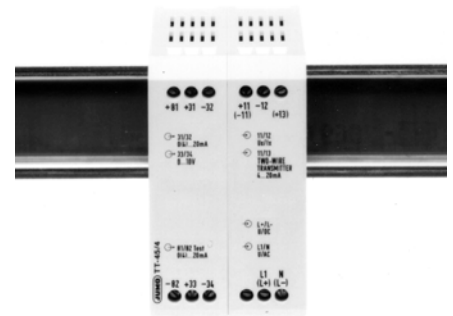
A working voltage up to 600V DC or AC rms is permissible on the input side (test voltage 3700V) in accordance with EN 61 010 Part 1, pollution degree 2 and overvoltage category II. The measurement input is factory-calibrated; there is a choice of the standard signals 0 – 10V and 0(4) – 20mA.

The TT-45/4 ... is built into a polycarbonate housing that can be readily clipped onto three different types of rail.

The isolating amplifiers permit close-up mounting, to save installation space.

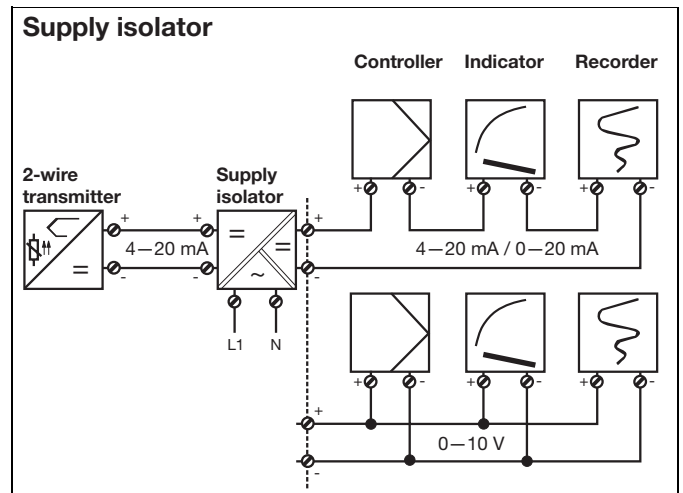
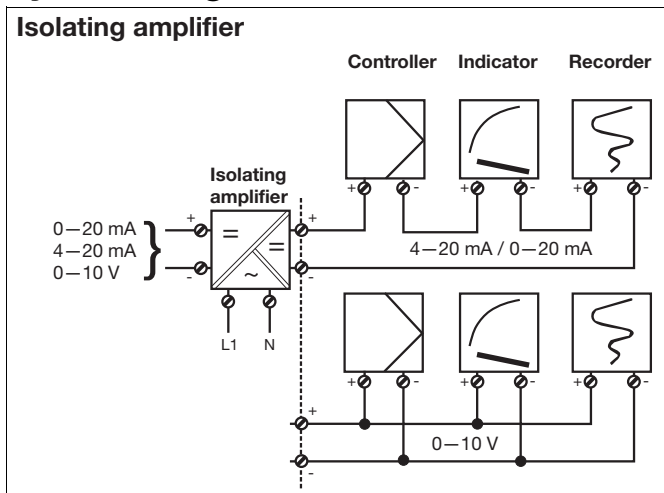
Applications of the isolating amplifier/supply isolator are:

- power supply for 2-wire transmitters and for isolating standard signals
- protection of connected electronic equipment from impermissibly high working voltages
- provision of floating output signals
- avoidance of ground loops
- conversion of standard signals, e. g. 0 – 10V input to 4 – 20mA output



TT-45/4 ...

System diagrams



Technical data

Input (isolating amplifier)

Input signal	DC current	DC voltage
Shortest span	1 mA, $R_i = 300\Omega$	100 mV, $R_i > 500k\Omega$
Longest span	100 mA, $R_i = 3\Omega$	50 V, $R_i = 10k\Omega/V$
Ranges	0 – 20 mA, $R_i = 15\Omega$ 4 – 20 mA, $R_i = 15\Omega$	0 – 10 V/ $R_i = 100k\Omega$

Input (supply isolator for 2-wire transmitter)

Voltage at transmitter	$\geq 15V$ DC at 20 mA
Lead resistance	$R_{lead} = \frac{15V - U_B}{20mA}$ $U_B =$ operating voltage of the 2-wire transmitter connected
Current limiting	$22mA \leq I \leq 25mA$
Range	4 – 20 mA, $R_i = 15\Omega$
Transfer characteristic	linear
Transfer error	$\leq 0.1\%^{1}$

Output

	DC current	DC voltage
Output signal	proportional DC current: 0(4) – 20 mA convertible	proportional DC voltage: 0 – 10 V
Load resistance		$\geq 2k\Omega$
Current limiting	$22mA \leq I \leq 24mA$	
Burden	$\leq 750\Omega$	
Burden error	$\leq 0.1\% / 750\Omega^{1}$	
Note	Voltage and current output can be used simultaneously. In this case, the burden is $\leq 400\Omega$ and the load resistance $\geq 4k\Omega$.	
Monitoring of output current	Through built-in interlock diode, without interrupting the output circuit. The internal resistance of the meter must not exceed 20 Ω .	
Calibration accuracy	$\leq 0.2\%^{1}$	
Ripple	$\leq 0.2\%^{1}$	
Response time	$\leq 300msec^{1}$	
Supply voltage error	$\leq 0.05\%^{1}$	

Electrical data

Supply voltage (auxiliary power)	230V/115V AC +10/-15%, 48 – 63Hz (selected by solder links)	24V DC +/-15%
Power consumption at rated conditions: - as isolating amplifier - as supply isolator	2.5VA 3.2VA	2.7VA 3.4VA
Electrical isolation	EN 61 010 Part 1, with pollution degree 2 and overvoltage category II, up to a working voltage of 600V DC or AC rms between input and output and between input and supply test voltage: 3700V working voltage to EN 61 010 Part 1, between output and supply up to 300V DC or AC voltage rms (only with 230/115V AC).	
Electrical connection	by screw terminals for solid or stranded wire, 2.5 mm ² max. conductor cross-section	
EMC - interference emission - noise immunity	EN 61 326 Class B general requirements	

¹ All errors in % refer to the full-scale value

Housing

Material	polycarbonate
Protection	IP20 to DIN 40 050
Mounting	on C rail or G rail
Operating position	vertical
Weight	
- with 230/115V AC	350g
- with 24V DC	210g

Ambient conditions

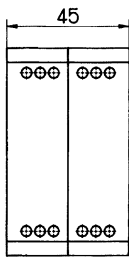
Ambient temperature range	-10 to +55°C
Ambient temperature error	≤ 0.2% per 10°C
Storage temperature range	-20 to +70°C
Climatic conditions	rel. humidity < 75% annual mean, no condensation

Connection diagram

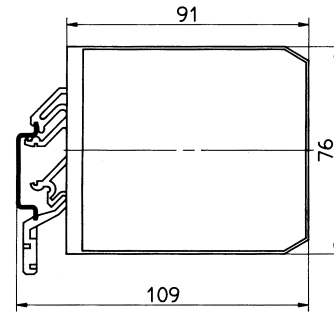
<p>TT-45/4 ...</p>	Connection for	Terminals		
	Supply as per nameplate	L1 line N neutral	AC	
		L + L -	DC	
	Analog inputs			
	Voltage	11+ 12-	U_x	
	Current	11+ 12-	I_x	
	2-wire transmitter 4 – 20mA 15V DC at 20mA	11- 13+	$\text{lead resistance} \leq \frac{15V - U_B}{20\text{mA}}$ U_B : minimum operating voltage of the 2-wire transmitter connected	
	Analog outputs			
	Voltage 0 – 10V	33+ 34-	$R_{\text{load}} \geq 2\text{k}\Omega$	
	Current 0(4) – 20mA	31+ 32-	$R_{\text{burden}} \leq 750\Omega$	
Service meter (current output only)	81+ 82-	$R_i \leq 20\Omega$		

Dimensions

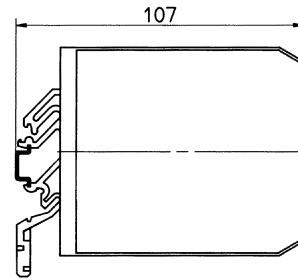
TT-45/4 ...



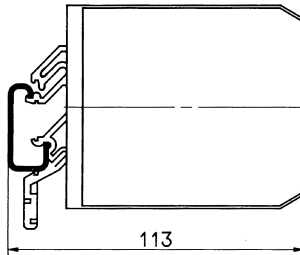
C rail 35mm x 7.5mm EN 50 022



C rail 15mm EN 50 045



G rail 35mm EN 50 035



Order details:

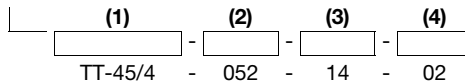
(1) Basic version

TT-45/4 Isolating amplifier and supply isolator
size: 45mm x 76mm x 91mm (W x H x D)

	(2) Input
x	052 0 – 20mA
x	053 4 – 20mA
x	063 0 – 10V
x	999 configuration to customer specification (please specify in plain text)
	(3) Output
x	14 0 – 20mA/0 – 10V
x	15 4 – 20mA/0 – 10V
x	99 configuration to customer specification (please specify in plain text)
	(4) Supply
x	02 230V AC +10/-15%, 48 – 63Hz
x	04 115V AC +10/-15%, 48 – 63Hz
x	07 24V DC ±15%

Order code

Order example



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Supply unit for transmitters

Supply unit for 2-wire transmitters
 with isolated standard signal
 for mounting on: **DIN rail 35mm x 7.5mm**
DIN rail 15mm
G rail

EN 50 022
EN 50 045
EN 50 035

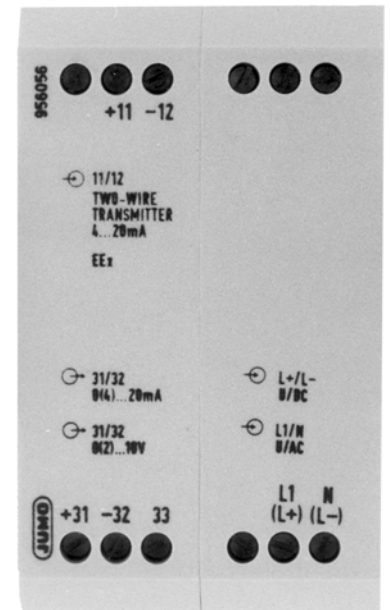


Brief description

The 707520/... supply unit for transmitters is used to supply 2-wire transmitters. It provides the power for the transmitter, isolates the signal and passes it on to the output. The electrical isolation is provided between supply and intrinsically safe input, between supply and output, and between intrinsically safe input and output.

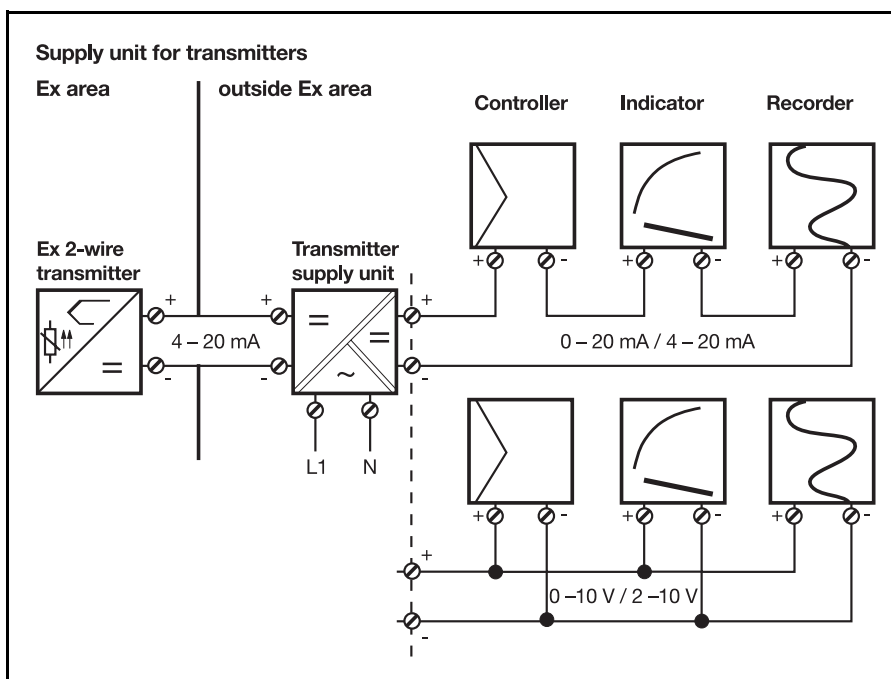
The unit is intended for industrial application and complies with the corresponding European Standards for ensuring electromagnetic compatibility (EMC). In addition, the transmitter supply unit conforms to the Directives of EN 50 014 and EN 50 020 "Electrical apparatus for use in hazardous areas".

The input is factory-calibrated to 4 – 20mA, at the output there is a choice between the standard signals 0(2) – 10V and 0(4) – 20mA. The transmitter supply unit is built into a polycarbonate housing which can be readily clipped onto three different types of rail. Several units can be mounted close together, to save installation space.



Type 707520/... (with Ex protection)

System diagrams



Features

- Ex version
 - ⊕ II (1) G D [Ex ia] IIC or [Ex ia] IIB
 - II (2) G D [Ex ib] IIC or [Ex ib] IIB
- Supply unit to provide power for 2-wire transmitters, electrically isolated

Technical data

Input

Input signal	current 4 – 20mA intrinsically safe
Voltage at transmitter	14V approx. at 20mA

Output

	Current	Voltage
Output signal	0 – 20mA or 4 – 20mA (see order details)	0 – 10V or 2 – 10V (see order details)
Current/voltage changeover	changeover from current to voltage is made through a wire link at terminals 32 and 33 in conjunction with an internal burden resistance of 500Ω.	
Permitted output burden	750Ω max.	250kΩ min. (voltage error through R _{load} 0.2% max.)
Characteristic	linear	
Response to short-circuit at input	I _A > 22 mA	
Response on open input	I _A approx. 0 mA	
Current /voltage limitation	< 30mA	< 20V

Accuracy (referred to the maximum output signal)

Deviation from characteristic	< 0.15%
Time constant	< 50msec
Ripple of output signal	< 1%
Ambient temperature error	< 0.2% per 10°C
Burden error	< 0.1% per 100% change
Supply error per 10%	< 0.05%

Electrical data

Supply AC voltage AC voltage DC voltage	230V AC +10/-15% 48 – 63Hz, 24V AC +10/-15% 48 – 63Hz, 18 – 32V DC +0/-0%
Power consumption at rated voltage	AC: 3VA approx. DC: 2.2W approx.
Permitted ripple within the specified voltage limits	< 2.5V _{p-p}
Isolation between	supply and intrinsically safe input supply and output intrinsically safe input and output
Insulation voltage	The intrinsically safe supply circuit has a safe isolation up to a summed peak value of 375V for the nominal voltages from those circuits which are not intrinsically safe.
Electrical safety	overvoltage category II, pollution degree 2 to EN 61 010
EMC - interference emission - immunity to interference	EN 61 326 Class B to industrial requirements

Ambient conditions

Permissible ambient temperature	-20 to +65°C
Storage temperature	-40 to +85°C

Housing

Material	polycarbonate
Protection	IP20 to DIN 40 050
Mounting	on DIN rail (EN 50 022 or EN 50 045) and G rail (EN 50 035) inside the non-hazardous area
Weight	350g



Ex protection

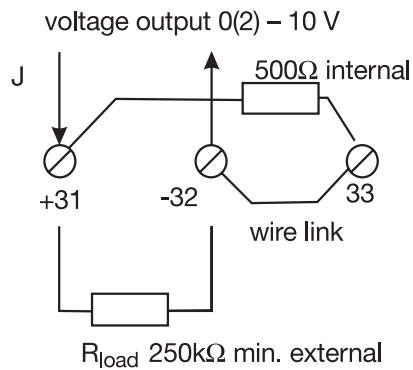
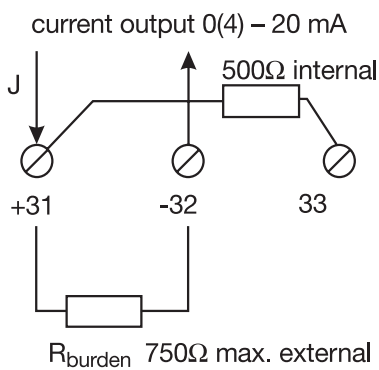
Extract from the EC Type-Examination Certificate DTM 01 ATEX E 137

Marking	<p>⊕ Ex II (1) G D [EEx ia] IIC or [EEx ia] IIB</p> <p>II (2) G D [EEx ib] IIC or [EEx ib] IIB</p>
Ambient temperature range	-20 °C ≤ Ta ≤ +65 °C
Non-intrinsically safe circuits	
Supply circuit (auxiliary supply)	
Operating voltage	<p>U_n = 230V AC +10/-15%, 48 – 63Hz or</p> <p>U_n = 24V AC +10/-15%, 48 – 63Hz or</p> <p>U_n = 18 – 32V DC ±0%</p> <p>U_m = 250V AC</p>
Signal circuit	
Voltage	<p>15V DC</p> <p>U_m = 250V AC</p>
Intrinsically safe supply and signal circuit	
Maximum safe values - voltage - current - power - characteristic	<p>U_o = 25V DC</p> <p>I_o = 87.4mA</p> <p>P_o = 547mW</p> <p>linear</p>
Max. permissible external inductance/capacitance	
EEx ia IIC / EEx ib IIC	L _o = 4mH / C _o = 105nF
EEx ia IIB / EEx ib IIB	L _o = 15mH / C _o = 620nF
for combined operation:	
EEx ia IIC	<p>L_o = 1mH / C_o = 30nF</p> <p>L_o = 2mH / C_o = 18nF</p>
EEx ia IIB	<p>L_o = 3.3mH / C_o = 152nF</p> <p>L_o = 5mH / C_o = 130nF</p>
Maximum external inductance-resistance ratio	
- supply circuit Group IIC	L _o /R _o = 0.065mH/Ω
- supply circuit Group IIB	L _o /R _o = 0.26mH/Ω

Connection diagram

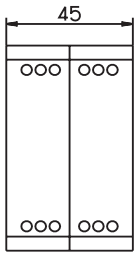
<p>707520/...</p> <p>956056</p> <p>+11 -12</p> <p>11/12 TWO-WIRE TRANSMITTER 4...20mA EE_x</p> <p>31/32 0(4)...20mA</p> <p>31/32 0(2)...10V</p> <p>JUMO</p> <p>+31 -32 33</p> <p>L+ L- (L+) (L-)</p> <p>L1 N (L+) (L-)</p>	Connection for		Terminals		
	<p>Supply as on nameplate</p>	L1 line	AC	L1	N
		N neutral		L+	L-
	Analog inputs		<p>2-wire transmitter 4 – 20mA EEx ia IIC</p>		<p>+11 intrinsically safe circuit</p> <p>-12</p> <p>lead resistance</p> $R = \frac{14V - U_B}{20mA}$ <p>U_B = min. operating voltage of the 2-wire transmitter that is connected</p>
	Analog outputs		<p>voltage 0(2) – 10V</p>		<p>+31 R_{load} 250kΩ min.</p> <p>-32</p> <p>33 wire link to terminal -32</p>
<p>current 0(4) – 20mA</p>		<p>+31 R_{burden} 750Ω max.</p> <p>-32</p>		<p>+31</p> <p>-32</p>	

Current/voltage output

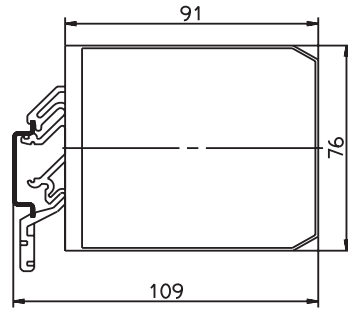


Dimensions

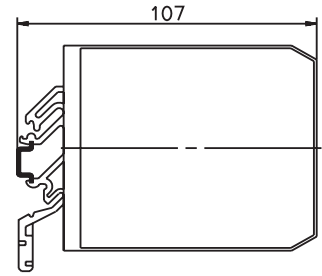
707520/...



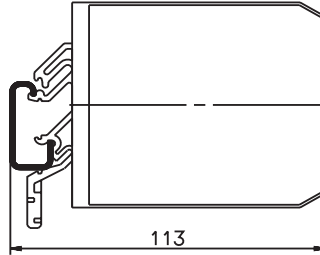
DIN rail 35 mm x 7.5 mm EN 50 022



DIN rail 15 mm EN 50 045



G rail 35 mm EN 50 035



Order details: Supply unit for transmitters

(1) Basic version

	707520	Supply unit for 2-wire transmitters Dimensions: 45 mm x 76 mm x 91 mm (W x H x D)
x	091	(2) Input 4 – 20 mA
x	030	(3) Output (proportional DC current - configurable) 0 – 20 mA / 0 – 10 V
x	032	4 – 20 mA / 2 – 10 V
x	02	(4) Supply 230 V AC +10/-15%, 48 – 63 Hz
x	08	24 V AC +10/-15%, 48 – 63 Hz
x	24	18 – 32 V DC ±0%

Order code (1) (2) (3) (4)
 707520 / 091 - - - -
 Order example 707520 / 091 - 030 - 02

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Thyristor power switches/power units

	Nr.
JUMO TYA-432 Thyristor and TRIAC power switches for wall mounting	70.9010
JUMO TYA-432 Thyristor power switch with integrated heat sink for DIN rail or screw mounting	70.9020
JUMO TYA-110 Thyristor power unit for analogue control mounted on rail to EN 50 022 or wall-mounted	70.9040
JUMO IPC IGBT Power Converters with amplitude control	70.9050

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Thyristor power switches

- load currents 25A and 50A (max.)
- load voltages 265V and 530V (max.)
- control voltage 4 – 32V DC
- UL approval

Brief description

Thyristor power switches are used for the contact-free switching of a.c. loads. A typical application is the switching of resistive-inductive loads at high switching rates, especially in the industrial sector, such as in the plastics packaging industry, in HVAC engineering and in the construction of industrial furnaces.

The control and power sections are electrically isolated by optocouplers.

The control signal range is compatible with the logic outputs of JUMO controllers.

The power section operates as a zero-voltage switch, which means that it always switches when the voltage passes through zero, irrespective of the instant of the signal change.

This prevents the generation of interference voltages. A varistor is integrated on the output side as a protection against voltage spikes.

The input status is indicated by an LED.



TYA 432-45/50 (25), 530 (265)

Technical data

Load circuit

Type	TYA 432-45/25, 265	TYA 432-45/50, 530
Load voltage	24 – 265V _{rms}	42 – 530V _{rms}
Load current (maximum)	25A _{rms}	50A _{rms}
Load current (minimum)	150mA _{rms}	
Fuse load integral limit I ² · t (t = 10msec)	≤310A ² · sec	≤1800A ² · sec
Frequency	45 – 65Hz	
Peak off-state voltage	≥650V _{pk}	≥1200V _{pk}
Leakage current	≤3mA	
cos φ (p.f.)	>0.5 at 230V _{rms}	>0.5 at 230V _{rms}

Control

Control signal range	4 – 32V DC
Switch-on voltage	≤2.75V DC for TYA 432-45/25,265 ≤3.75V DC for TYA 432-45/50,530
Switch-off voltage	≥2V DC
Input current	≤10mA at 32V DC
Response delay	≤0.5 · cycle length

General data

Operating mode	zero-crossing switching
Electrical isolation	by optocoupler between control and power section; insulation voltage ≥ 4 kV
Thermal resistance junction-case	0.8 °C/W for TYA 432-45/25, 265 0.5 °C/W for TYA 432-45/50, 530
Permissible ambient temperature	-20 to +70°C
Storage temperature	-40 to +100°C
Electrical connection	via screw terminals (load: \square 16mm ² max. / control: \square 2.5mm ² max.)
Electromagnetic compatibility	EN 61000 - 6 - 4 EN 61000 - 6 - 2
Electrical safety	overvoltage category III pollution degree 3 (external)
Housing	Noryl 6FN 1
Enclosure protection	IP20
Weight	60g

Derating tables

The maximum thermal resistance between the baseplate of the thyristor power switch and the environment $R_{(thSA)}$ is determined as a function of the load currents and the different ambient temperatures. The matrix below has been provided for this purpose. The power loss at a given nominal current can also be taken from this matrix.

Example:

Current I = 15A resistive load

$T_A = 40^\circ\text{C}$ (measured during operation, with the power switch built into a switchgear cabinet)

Selected thyristor power switch: TYA 432-45/25, 265

The maximum thermal resistance of the heat sink can be seen from the matrix to be 3.8 °C/W.

Important note:

Use a silicone-based heat transfer compound between the heat sink and the thyristor power switch. If you use a heat transfer compound that does not contain silicone, then you have to make sure that the chemical silicone substitute does not attack the Noryl SE 1 GFN 1 of the plastic housing. We recommend the use of silicone-based heat transfer compounds, e.g. Dow Corning.

To ensure safe operation at maximum performance, it is essential to strictly observe the thermal requirements according to the derating tables.

TYA 432-45/25, 265

Load current [A]	Thermal resistance [°C/W]						Power loss [W]
	20	30	40	50	60	70	
25.0	2.70	2.34	1.98	1.61	1.25	0.89	28
22.5	3.10	2.69	2.28	1.86	1.45	1.04	24
20.0	3.61	3.13	2.65	2.18	1.70	1.23	21
17.5	4.26	3.70	3.14	2.59	2.03	1.47	18
15.0	5.14	4.47	3.80	3.14	2.47	1.80	15
12.5	6.38	5.56	4.73	3.91	3.09	2.27	12
10.0	8.25	7.19	6.14	5.08	4.02	2.97	9
7.5	11.4	9.94	8.49	7.04	5.59	4.14	7
5.0	17.7	15.4	13.2	11.0	8.74	6.51	4
2.5	-	-	-	-	18.2	13.6	2

T_A
Ambient temperature [°C]

TYA 432-45/50, 530

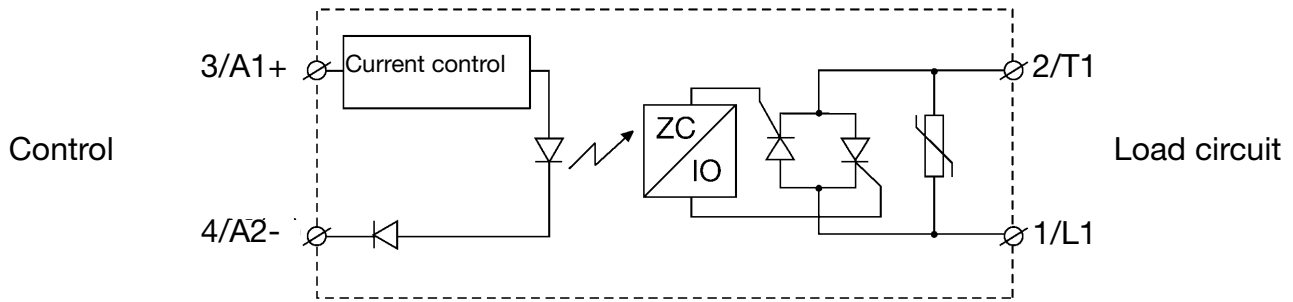
Load current [A]	Thermal resistance [°C/W]						Power loss [W]
	20	30	40	50	60	70	
50.0	1.03	0.86	0.70	0.53	0.37	0.20	61
45.0	1.27	1.09	0.90	0.71	0.52	0.33	53
40.0	1.54	1.32	1.10	0.89	0.67	0.45	46
35.0	1.85	1.59	1.34	1.08	0.82	0.57	39
30.0	2.26	1.95	1.65	1.34	1.03	0.72	33
25.0	2.85	2.47	2.08	1.70	1.32	0.94	26
20.0	3.73	3.24	2.75	2.26	1.77	1.27	20
15.0	5.22	4.54	3.86	3.19	2.51	1.83	15
10.0	8.21	7.16	6.11	5.05	4.00	2.95	10
5.0	17.2	15.0	12.9	10.7	8.51	6.33	5

T_A
Ambient temperature [°C]

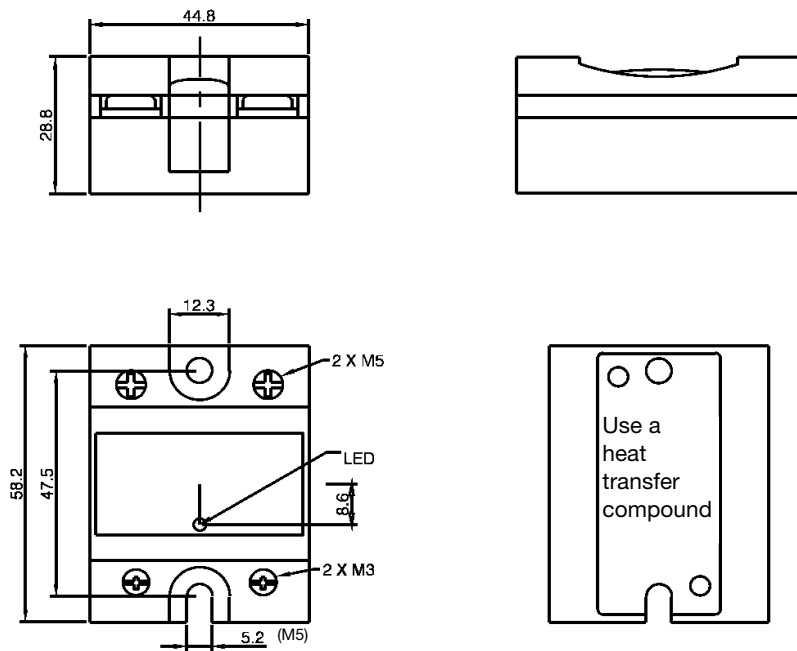
Thermal resistance junction-environment, R_{thja}	< 20.0	°C/W
Thermal resistance junction-baseplate, R_{thjc}	< 0.80	°C/W
Thermal resistance baseplate-heat sink, R_{thcs}	< 0.20	°C/W
Max. permissible baseplate temperature	100	°C
Max. permissible junction temperature	125	°C

Thermal resistance junction-environment, R_{thja}	< 20.0	°C/W
Thermal resistance junction-baseplate, R_{thjc}	< 0.50	°C/W
Thermal resistance baseplate-heat sink, R_{thcs}	< 0.20	°C/W
Max. permissible baseplate temperature	100	°C
Max. permissible junction temperature	125	°C

Connection



Dimensions



Order details

Type	Load voltage	Load current	Sales No.
TYA 432-45/25, 265	24 – 265V _{rms}	25A _{rms}	70/00408536
TYA 432-45/50, 530	42 – 530V _{rms}	50A _{rms}	70/00408537

In order to ensure fault-free operation as well as higher reliability when using thyristor power switches, we recommend the use of fuses with a superior breaking capacity (e. g. from Ferraz).

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 Internet: www.jumo.us



Thyristor Power Switches

with integrated heat sink
 for DIN rail or screw mounting

- load currents 3x20A, 30A and 45A (max.)
- load voltages 265V and 660V (max.)
- control voltage 4 – 32V DC
- UL approval

Brief description

Thyristor power switches are used for contact-free switching of a.c. loads. A typical application is the switching of resistive-inductive loads at high switching rates, especially in the industrial sector, such as in the plastics packing industry, in HVAC engineering and in the construction of industrial furnaces.

Control and power section are electrically isolated by optocouplers.

The control signal range is compatible with the logic outputs of JUMO controllers.

The power section operates as a zero-voltage switch, which means that it always switches when the voltage passes through zero, irrespective of the instant of the signal change.

This reduces the generation of interference in the electrical supply.

The input status is indicated by an LED.



TYA 432-100/
30, 265 (660)



TYA 432-100/
45, 660



TYA 432-100/3,
20, 660

Technical data

Load circuit

Type	TYA 432-100/30, 265	TYA 432-100/30, 660	TYA 432-100/45, 660	TYA 432-100/3, 20, 660
Load voltage	24 – 265V _{rms}		42 – 660V _{rms}	
Load current (maximum)	30A _{rms} (T _a = 25 °C)		45A _{rms} (T _a = 25 °C)	20A _{rms} (T _a = 25 °C)
Load current (minimum)	150mA _{rms}			
Fuse load integral limit I ² · t (t=10msec)	1800A ² · sec		6600A ² · sec	1800A ² · sec
Frequency	45 – 65Hz			
Peak off-state voltage	650V _{pk}		1200V _{pk}	
Leakage current	<3mA _{rms}			
cos φ (p.f.)	>0.5 at 230V AC		>0.5 at 600V AC	

Control

Type	TYA 432-100/30, 265	TYA 432-100/30, 660	TYA 432-100/45, 660	TYA 432-100/3, 20, 660
Control signal range	4 – 32V DC			5 – 32V DC
Switch-on voltage	3.8V DC			4.7V DC
Switch-off voltage	1.2V DC			
Input current	12mA at 32V DC			24mA at 32V DC
Response delay	1 · cycle length			<1 · cycle length

General data

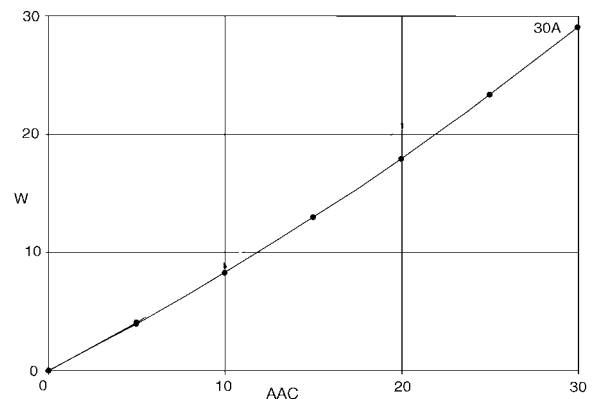
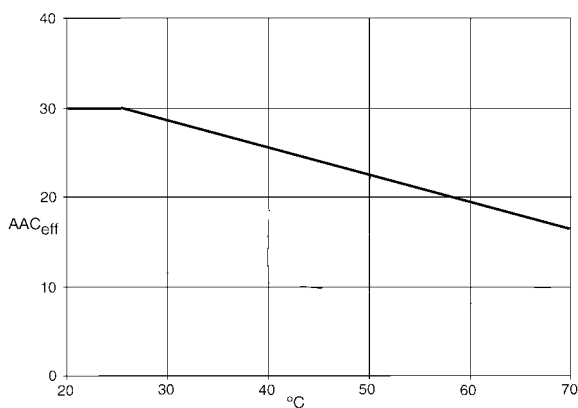
Type	TYA 432-100/30, 265	TYA 432-100/30, 660	TYA 432-100/45, 660	TYA 432-100/3, 20, 660
Operating mode	zero-crossing switching			
Electrical isolation	by optocoupler between control and load section; insulation voltage 4kV _{rms}			
Permissible ambient temperature	-30 to +70°C			
Electrical connection	by screw terminals; load / control (max. cross-section) □ 2x2.5mm ² / 2x2.5mm ² □ 25mm ² / 4.0mm ² □ 2x2.5mm ² / 2x2.5mm ²			
Housing	PBT FR		Crustan SK641-FR, PBT	PBT
Protection	IP20			
Weight	200g		360g	380g

Derating curves

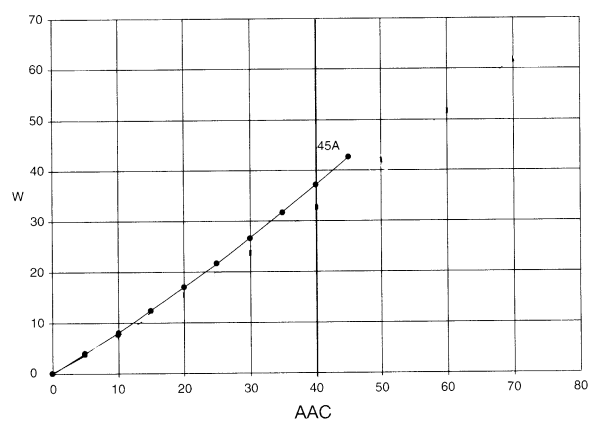
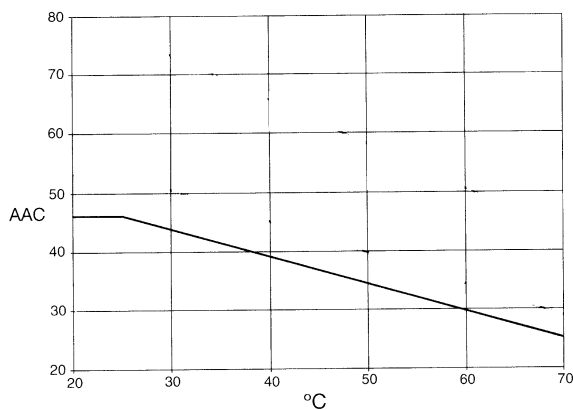
Permissible load current as a function of ambient temperature

Power loss as a function of the load current

TYPE 432-100/30, 265 (660)



TYPE 432-100/45, 660

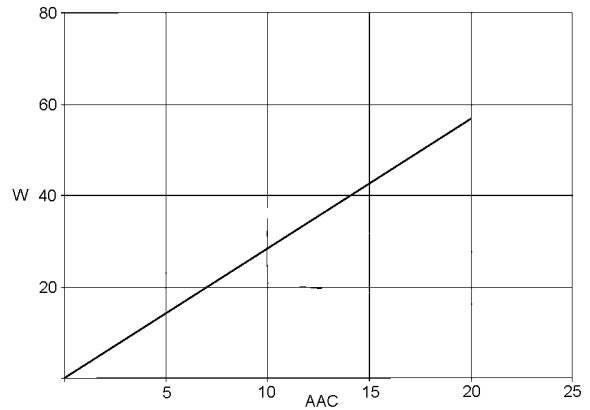
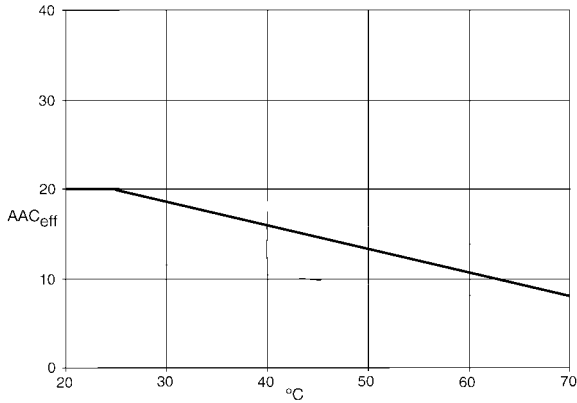


Note

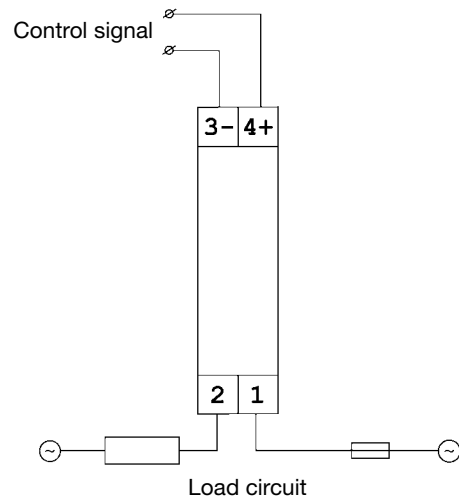
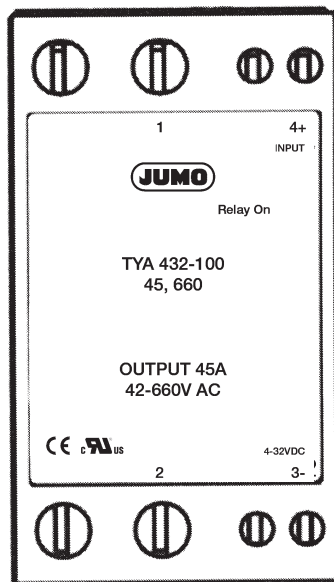
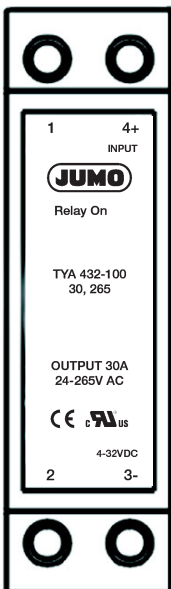
The fins of the heat sink must be oriented vertically, to allow the heat to dissipate by natural convection. Do not install any heat-sensitive components or devices in the vicinity of the power switch.

Derating curves

TYPE 432-100/3, 20, 660

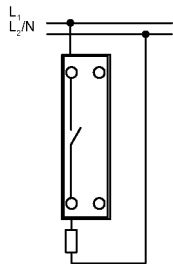


Connection

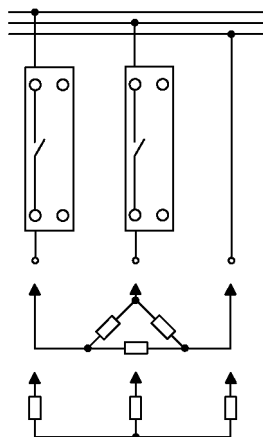


TYA 432-100/30, 265 (660) TYA 432-100/45, 660

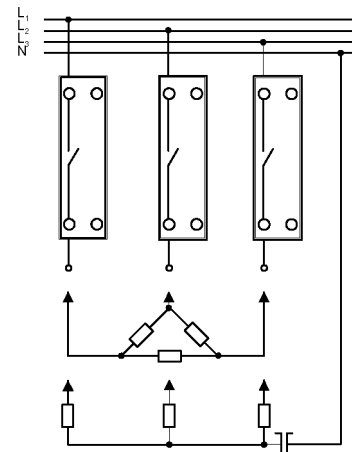
1-pole solid-state relay in a 1-phase application phase-neutral, phase-phase



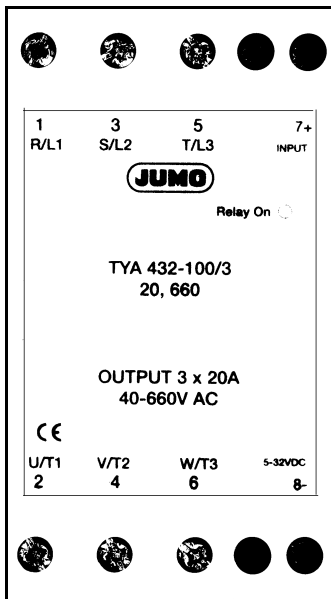
Two 1-pole solid-state relays in a 3-phase application delta and star (economy circuit)



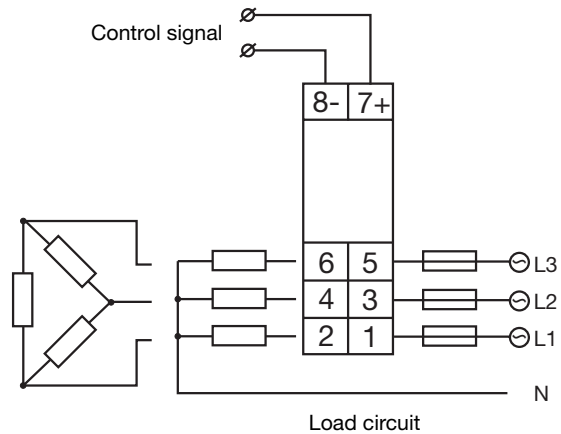
Three 1-pole solid-state relays in a 3-phase application delta, star, star with neutral



Connection

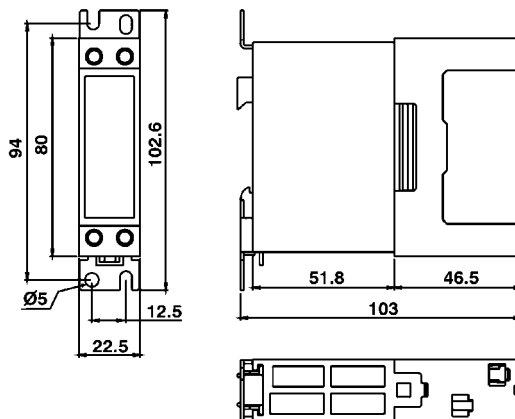


TYA 432-100/3, 20, 660

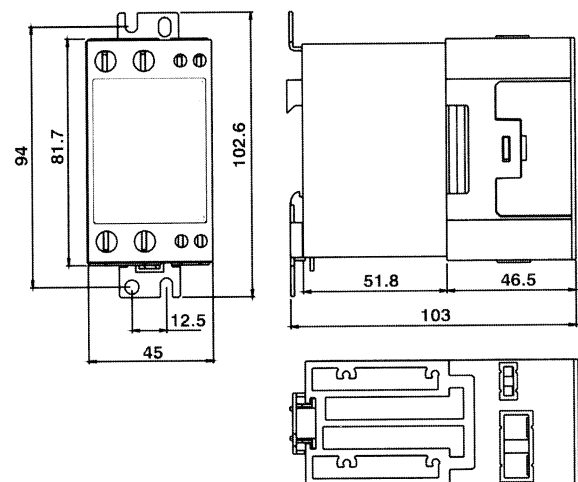


Dimensions

TYPE 432-100/30, 265 (660)



TYPE 432-100/45, 660 and TYA 432-100/3 20, 660



Minimum spacing for side-by-side mounting:

horizontal: 22.5mm

vertical: 120mm

Order details

Type	Load voltage	Load current	Sales No.
TYA 432-100/30, 265	24 – 265V _{rms}	30A _{rms}	70/00408538
TYA 432-100/30, 660	42 – 660V _{rms}	30A _{rms}	70/00418274
TYA 432-100/45, 660	42 – 660V _{rms}	45A _{rms}	70/00408540
TYA 432-100/3, 20, 660	42 – 660V _{rms}	20A _{rms}	70/00427435

In order to ensure fault-free operation as well as a higher reliability when using thyristor power switches, we recommend the use of fuses with a superior breaking capacity (e. g. from Ferraz).

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Internet: www.JumoUSA.com



Thyristor unit for analogue control

mounted on rail to EN 50 022 or wall-mounted



Brief description

Thyristor units are used in all applications where larger resistive and inductive loads have to be switched, for example in industrial furnaces and in plastics processing. The thyristor unit consists of two thyristors connected in inverse parallel, the isolated heat sink and the control electronics. Thyristor units up to 50A load current can either be snapped onto a 35 mm rail or wall-mounted using a mounting plate. Units from 75A load current can only be wall-mounted. Depending on the settings of the internal switches, the thyristor units operate either in phase-angle mode with adjustable current limiting, or in burst-firing mode. In burst-firing operation, the start of the first half-wave can be partly cut back to permit operation on transformer loads. A subsidiary control, which can be selected as U^2 , P or I^2 , ensures that fluctuations in the supply voltage do not affect the control loop during the process. The control range can be restricted by attenuating the input signal, and a base load can be set using an external potentiometer. An economy circuit can be used on multi-phase loads in burst-firing operation. In phase-angle operation, the phase angle set by the controller is approached slowly, starting from 180 degrees, in order to avoid high inrush currents (soft start). The thyristor units conform to VDE 0160 5.5.1.3 (5/88) and VDE 0106 Part 100 (3/83). The unit has to be grounded in accordance with the requirements of the local power supply authority.

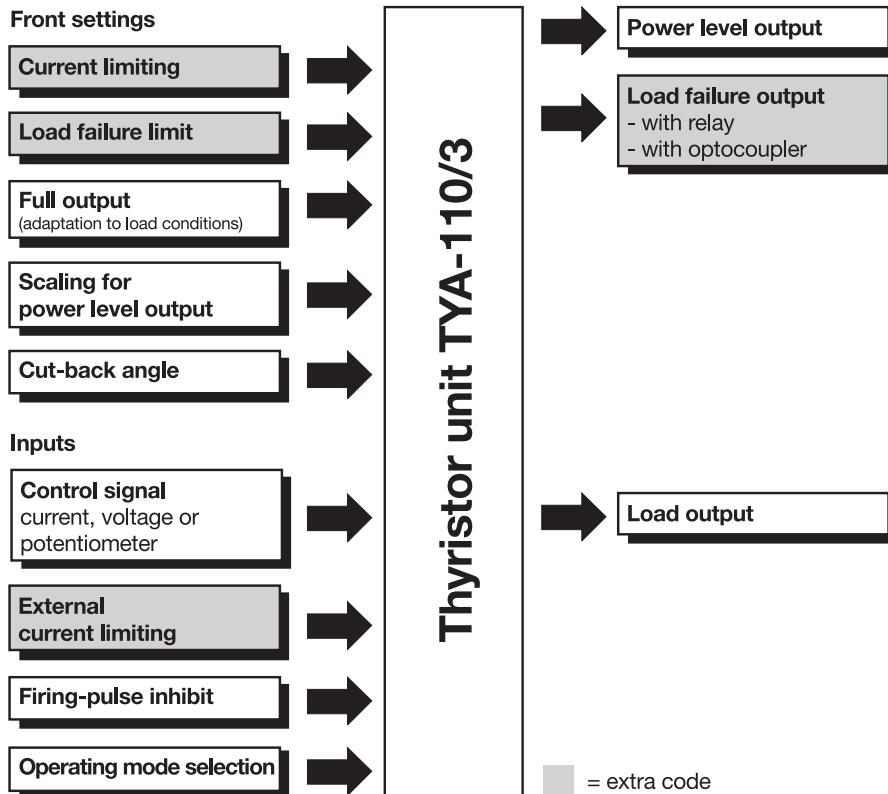


Type TYA-110/3,



Type TYA-110/3, 150...250, ...

Block structure



- input for voltage, current and potentiometer
- input signal can be freely selected
- freely selectable operating mode (phase-angle/burst-firing operation)
- adjustable cut-back of first half-wave in burst-firing operation
- supply voltage monitoring
- input signal attenuation
- soft start in phase-angle operation
- U^2 control with adjustable process value output
- master-slave economy circuit
- firing-pulse inhibit
- recognition of part-load failure for economy circuit

Technical data

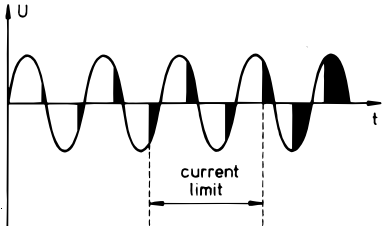
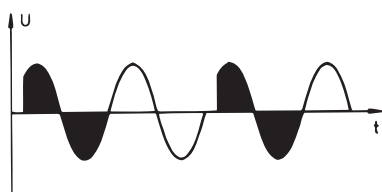
Load circuit

Nominal load voltage	24V -20%/+15% AC 45 – 63Hz 42V -20%/+15% AC 45 – 63Hz 115V -20%/+15% AC 45 – 63Hz 230V -20%/+15% AC 45 – 63Hz 265V -20%/+15% AC 45 – 63Hz 400V -20%/+15% AC 45 – 63Hz 460V -20%/+15% AC 45 – 63Hz 500V -20%/+15% AC 45 – 63Hz (control voltage = nominal load voltage)
Continuous load current I_L	25A, 50A, 75A, 100A, 150A, 250A
Load types	resistive and resistive-inductive loads (B 1.2Tesla max.)
Current limiting	in phase-angle operation, the load current can be set by a trimmer at the front within the range 10 – 100% I_N . The limitation is based on the rms value of the load current.
Fuse	super-fast semiconductor fuse
TSE circuit	RC network as standard
Power loss	$1.3V \times I_{load}$ (A) approx.
Control accuracy	supply voltage fluctuations within the tolerance range (-20%/+15%) are accurately compensated. Fluctuations 0.5% max.

Control

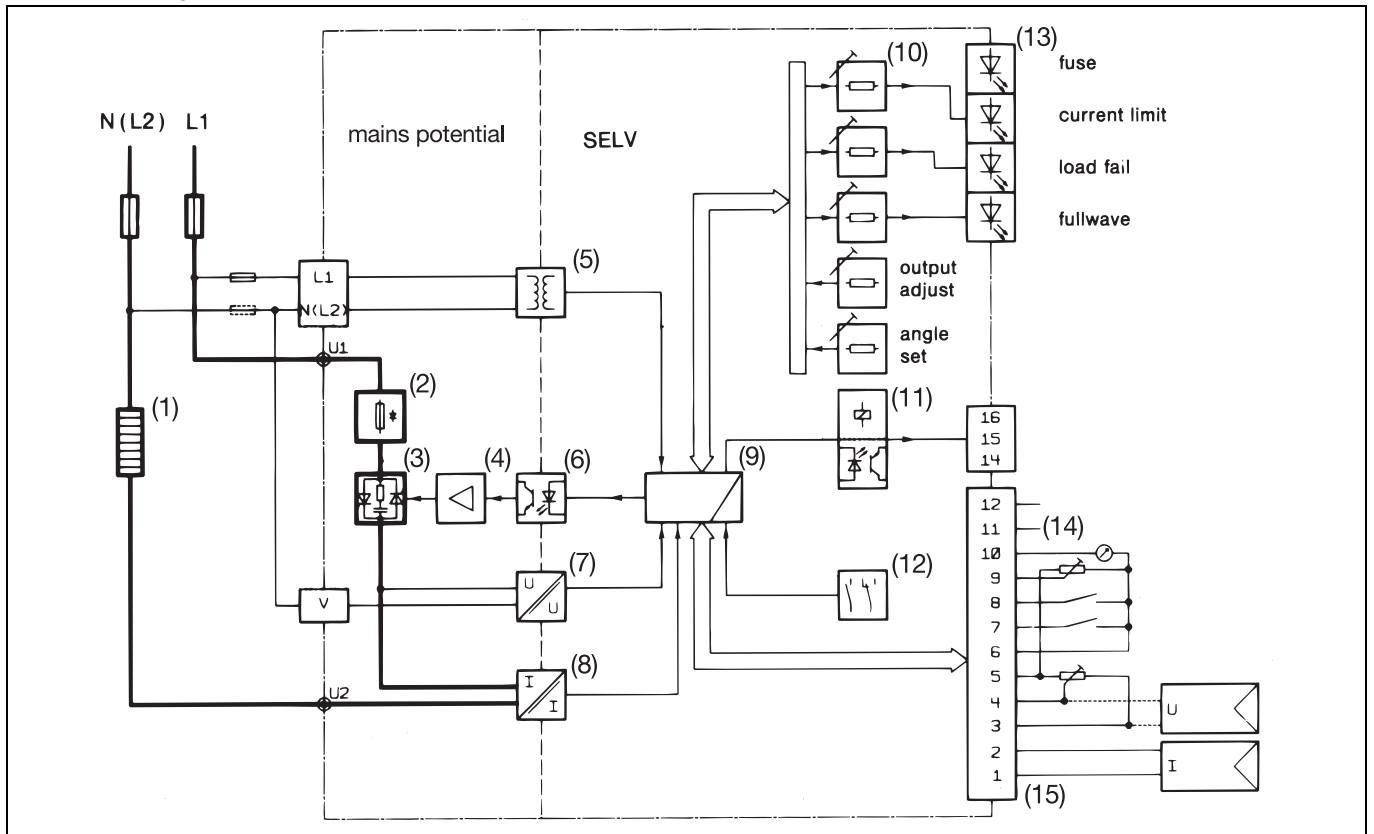
Control signal	0 (4) – 20mA $R_1 = 50 \Omega$ 0 (2) – 10V $R_1 = 25k\Omega$ 0 (1) – 5V $R_1 = 12k\Omega$ 0/10V (0/5V) $R_1 = 12k\Omega$ 0/20mA $R_1 = 50\Omega$ floating contact or manual control from an external 5 k Ω potentiometer
Input signal attenuation	adjustment range 100 – 20%

General data

Circuit variants	<ul style="list-style-type: none"> - single-phase operation - star circuit with accessible star point - open delta circuit - economy circuit with master-slave principle and subsidiary U^2 control in burst-firing operation - free-running economy circuit (star or delta), only with subsidiary P control in burst-firing operation
Operating modes	<ul style="list-style-type: none"> - phase-angle operation for resistive and transformer loads with soft start (with extra code TR, TO with current limiting) <div style="text-align: center;">  <p style="text-align: center;">current limit</p> </div> <ul style="list-style-type: none"> - burst-firing operation for resistive or transformer load. <div style="text-align: center;">  </div>

Features	Two single-phase units can be linked into an economy circuit in burst-firing operation - free-running economy circuit for resistive loads - master-slave economy circuit for resistive and transformer loads
Subsidiary controls	U^2 control as standard. With extra code TR or TO: free choice between U^2 , P, I^2 control via internal switches.
Power level output	U^2 signal as standard. With extra code TR or TO: free choice between U^2 , P, or I^2 signal via internal switches, adjustable 0 – 5V to 0 – 10V. $I_{max} \approx 2\text{mA}$.
Electrical connection	Control wiring by screw terminals for conductor cross-sections 0.2 – 2.5mm ² . Load connections by cable lugs to DIN 46 212.
Protection	IP00 to EN 60 529, grounded heatsink
Permitted ambient temperature range	0 – 45°C Permitted current reduced by 2% for each °C increase in ambient temperature; the maximum permissible ambient temperature must not exceed 60°C.
Permitted storage temperature range	-10 to +70°C
Climatic conditions	rel. humidity 75% max. annual mean, no condensation
Cooling	by natural convection
Operating position	vertical
Operating conditions	The thyristor unit is designed as a built-in unit to: VDE 0160 5.5.1.3 (5/88) VDE 0106 Part 100 (3/83) pollution degree 2 to VDE 0110 Part 1 4.2 (1/89) overvoltage category U III to VDE 0160 5.7 (5/88)
Test voltage	to VDE 0160 Table 4 (5/88)
Creepage distance	control electronics to load circuit 10mm min. control electronics to housing 10mm min. Unit can be connected to SELV circuits. SELV = Separate Extra Low Voltage
Housing	TYA110/3, 25 (50) 110 x 195 x 152mm TYA110/3, 75 (100) 125 x 195 x 170mm TYA110/3, 150 (250) 150 x 220 x 280mm
Weight	TYA110/3, 25 (50) 2.8 kg TYA110/3, 75 (100) 3.7 kg TYA110/3, 150 8.6 kg TYA110/3, 250 9.0 kg
Standard accessories	1 mounting plate for wall-mounting 1 Operating Instructions B 70.9040

Block diagram



Description of the blocks

- (1) load
- (2) super-fast semiconductor fuse
- (3) thyristor module with RC protection circuit
- (4) driver stage for thyristor module
- (5) supply voltage for control electronics
- (6) optocoupler
- (7) voltage transformer
- (8) current transformer
- (9) control electronics
- (10) front trimmers
- (11) fault-report output via relay or optocoupler
- (12) configuration switches
- (13) message LED
- (14) master-slave links
- (15) output control, control inputs, power level output

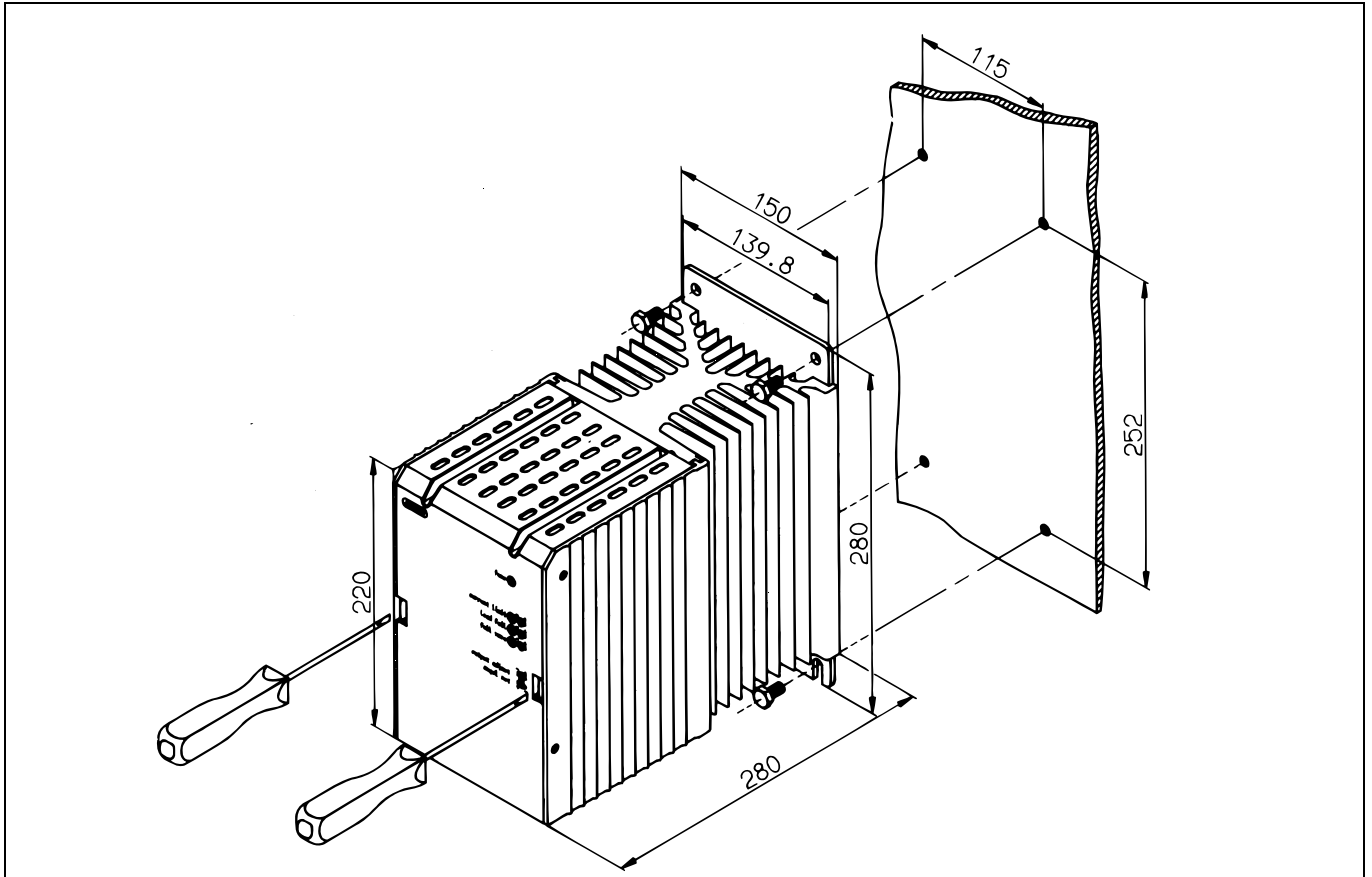
Description of function

From the control electronics (9), the firing pulses for the thyristors (3) pass through an optocoupler (6). The different operating and load types can be set by internal switches (12). Load current and voltage are sensed by the transformers (7) and (8), to provide subsidiary U^2 , I^2 or P control.

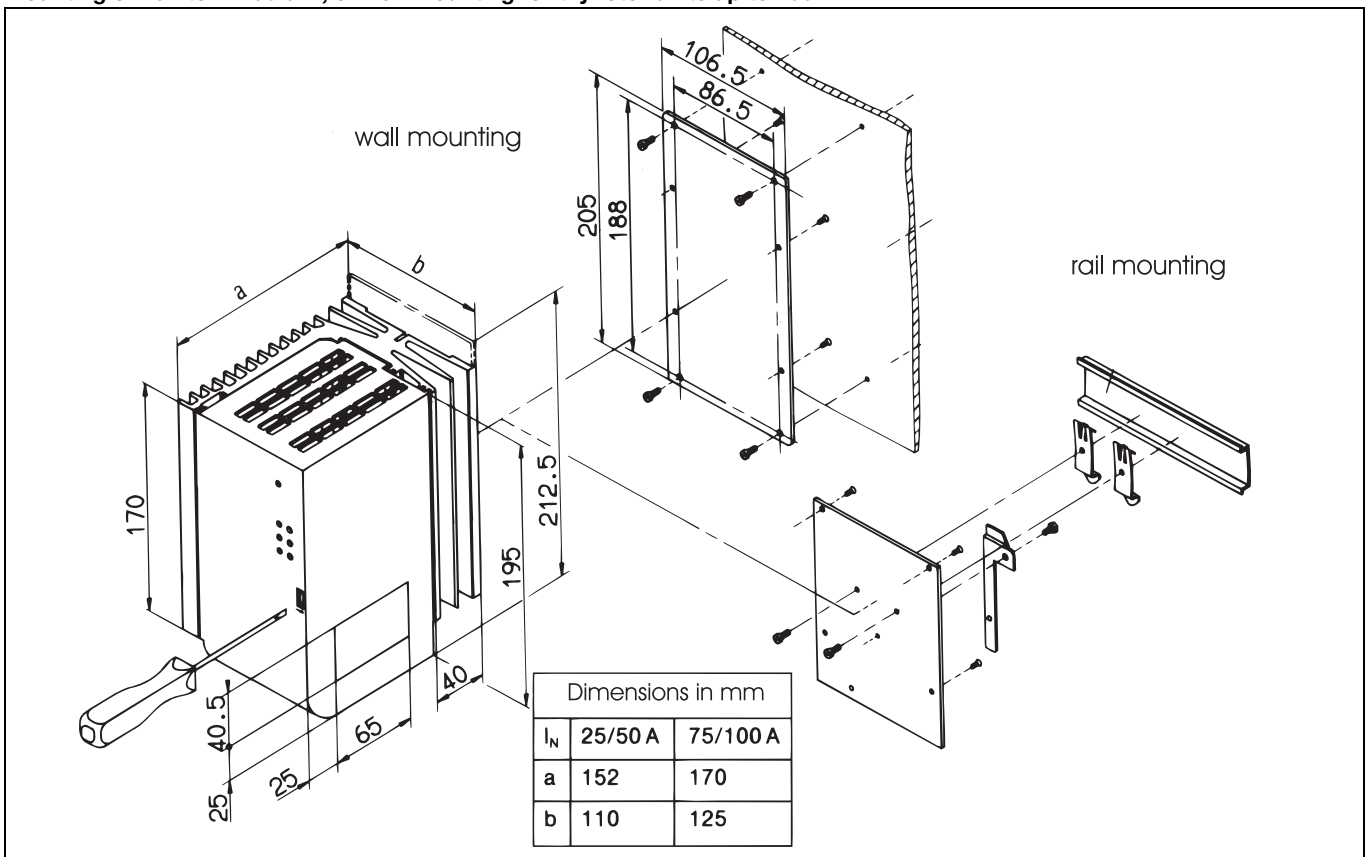
Numerous monitoring functions (10) or (13) and a fault-report output (11) via relay or optocoupler are available. The fault-report output indicates load and part-load failure, as well as a blown fuse. The transformer (5) provides the supply for the control electronics.

Dimensions/mounting

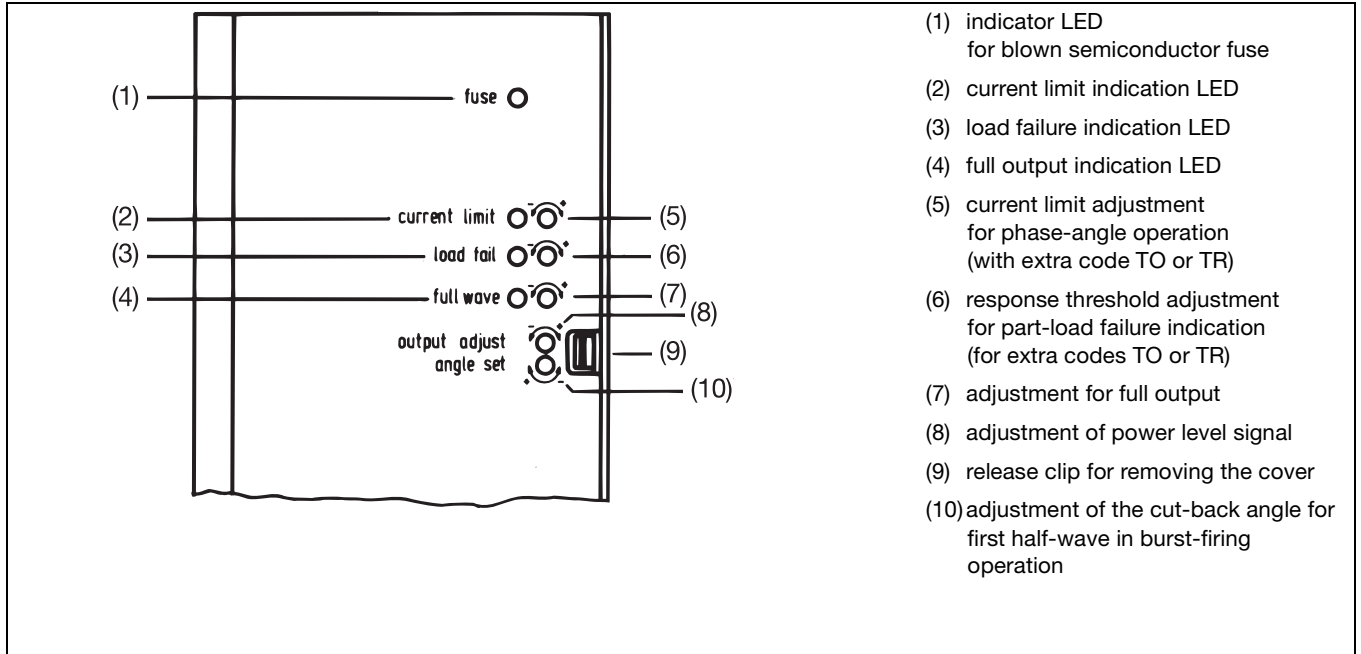
Wall mounting for 150/250-A thyristor unit



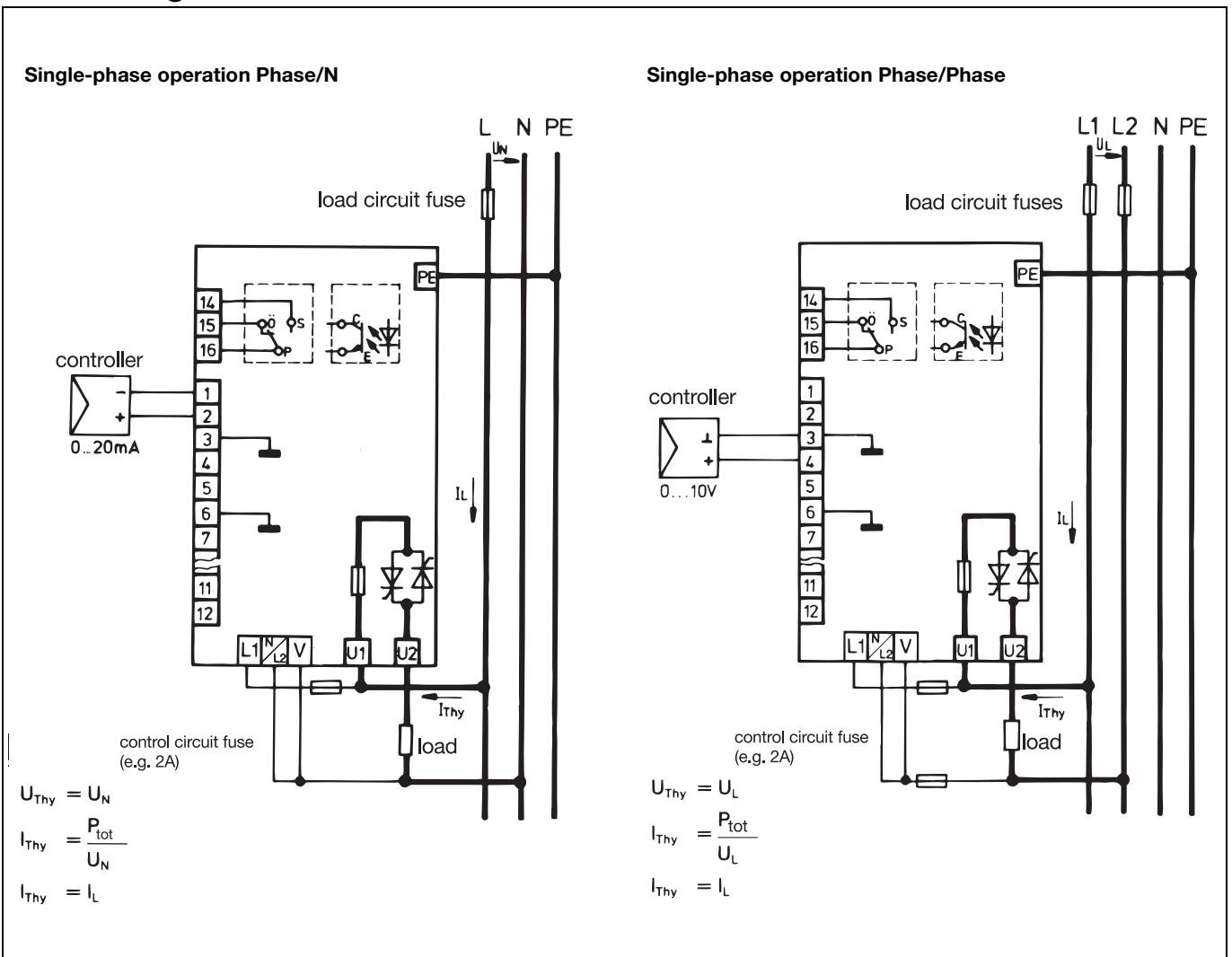
Mounting on rail to EN 50 022, or wall mounting for thyristor units up to 100 A



Front view

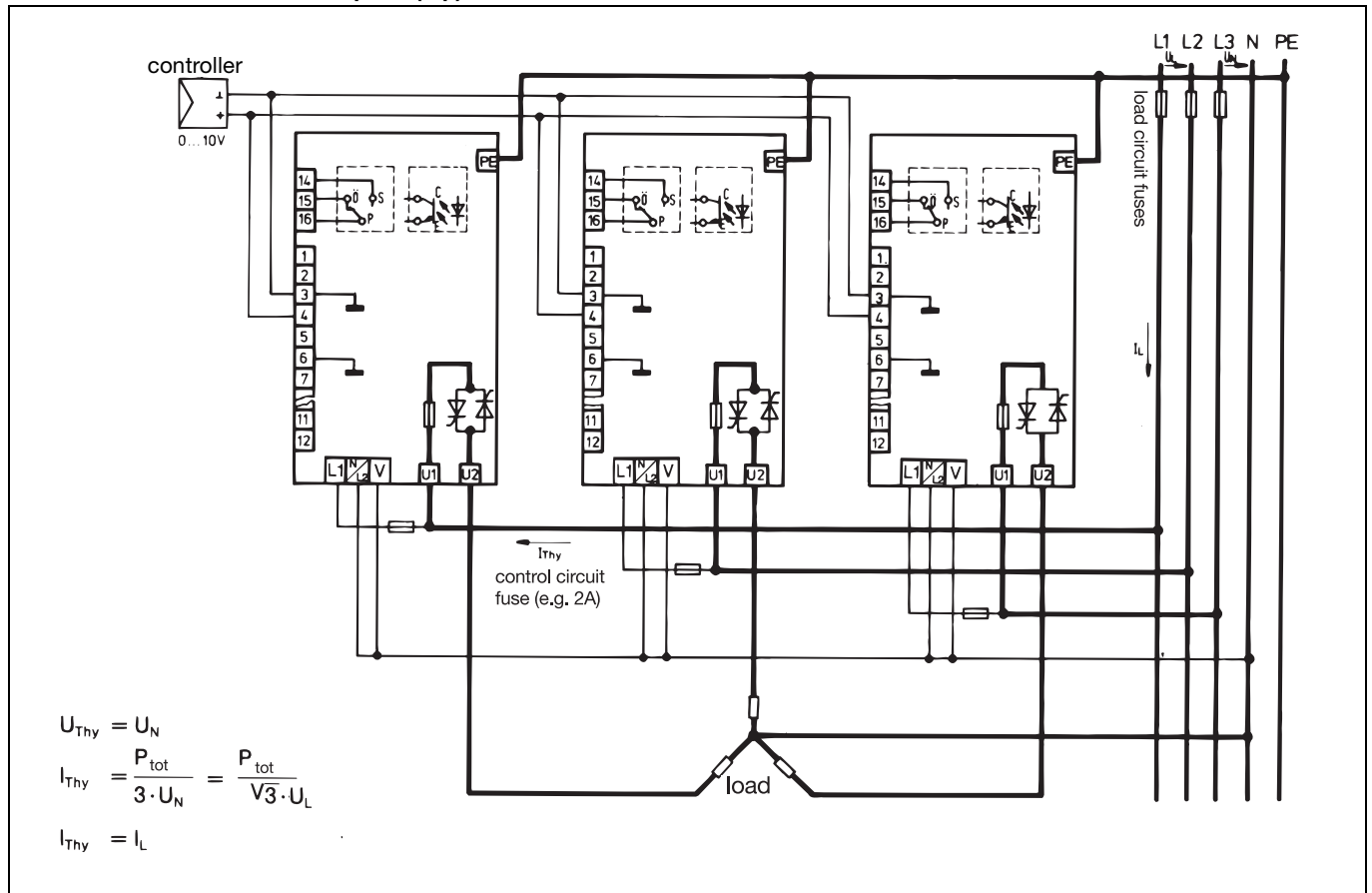


Circuit diagrams

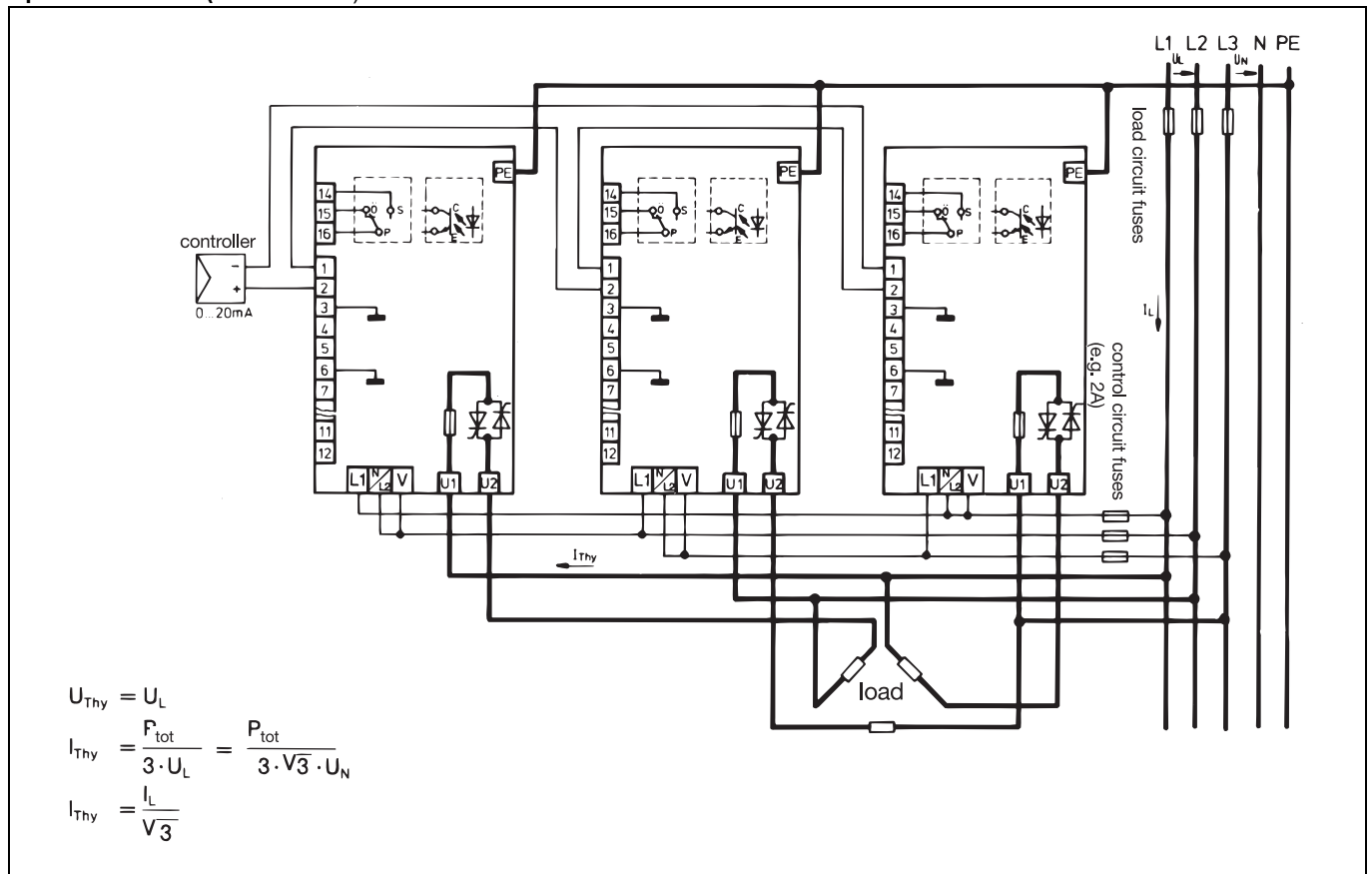


Circuit diagrams

Star circuit with accessible star point (Mp)

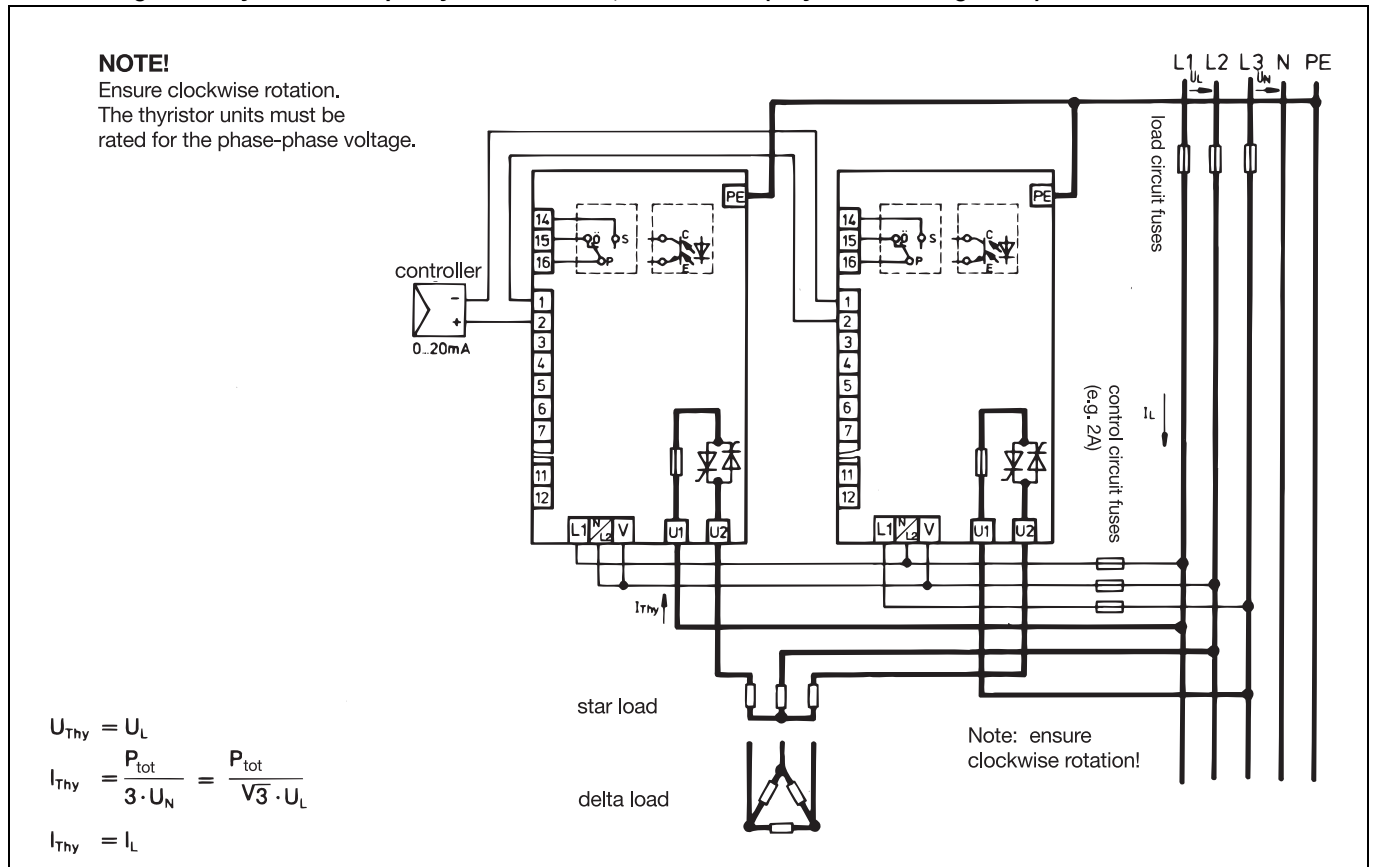


Open delta circuit (6-wire circuit)

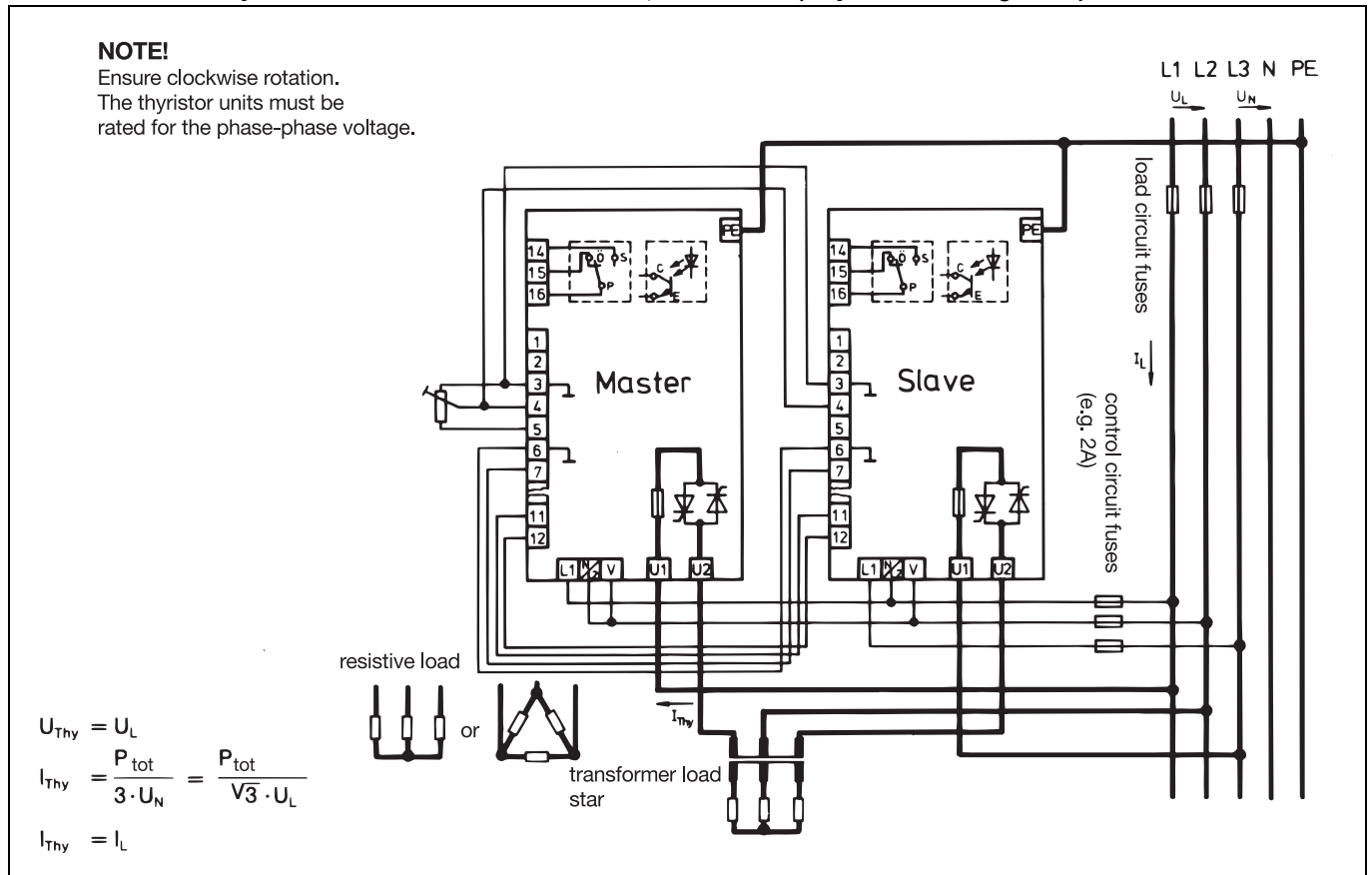


Circuit diagrams

Free-running economy circuit with purely resistive loads, star or delta (only in burst-firing mode)

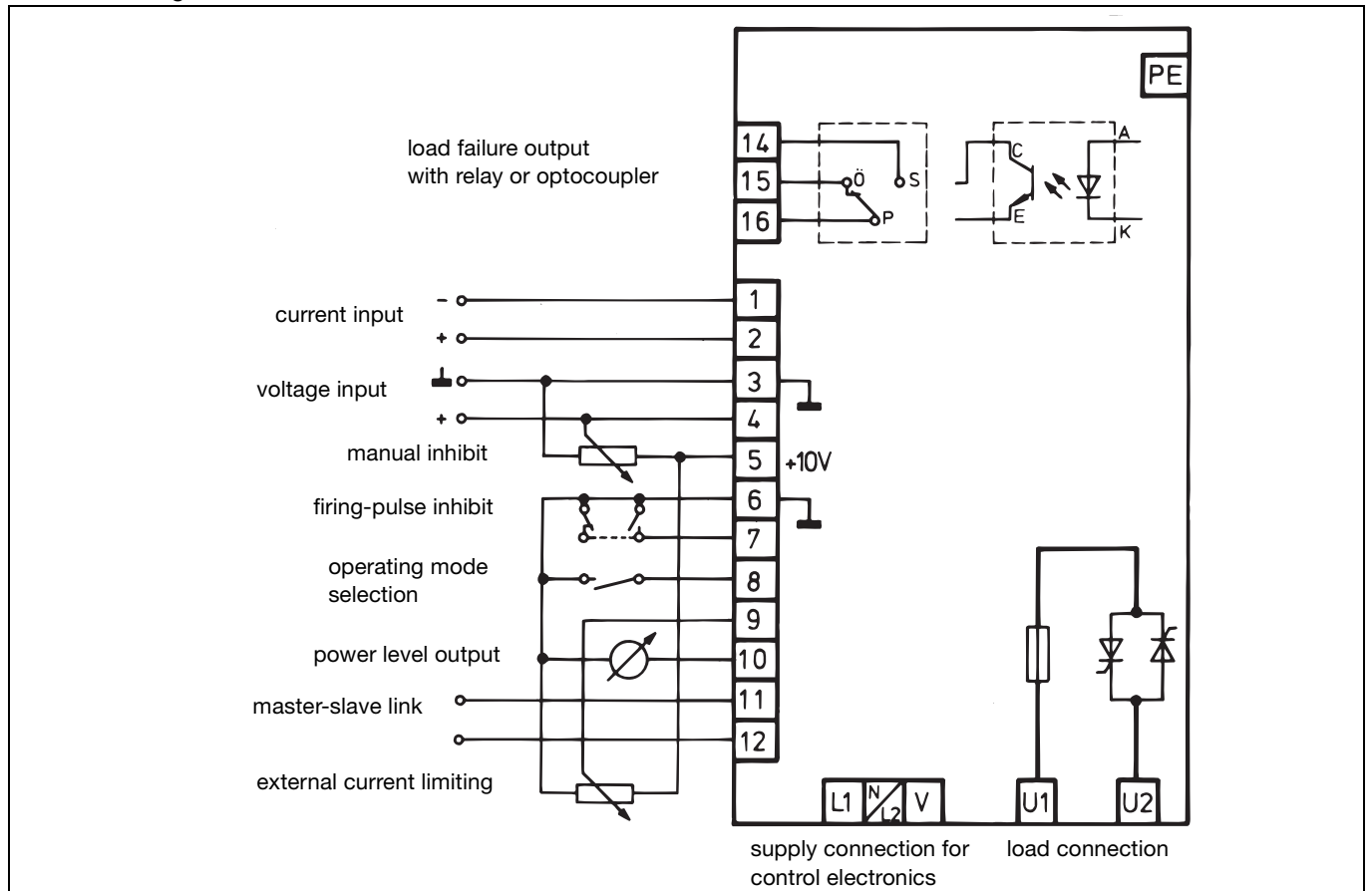


Master-slave economy circuit with resistive-inductive loads, star or delta (only for burst-firing mode)



Circuit diagrams

Connection diagram

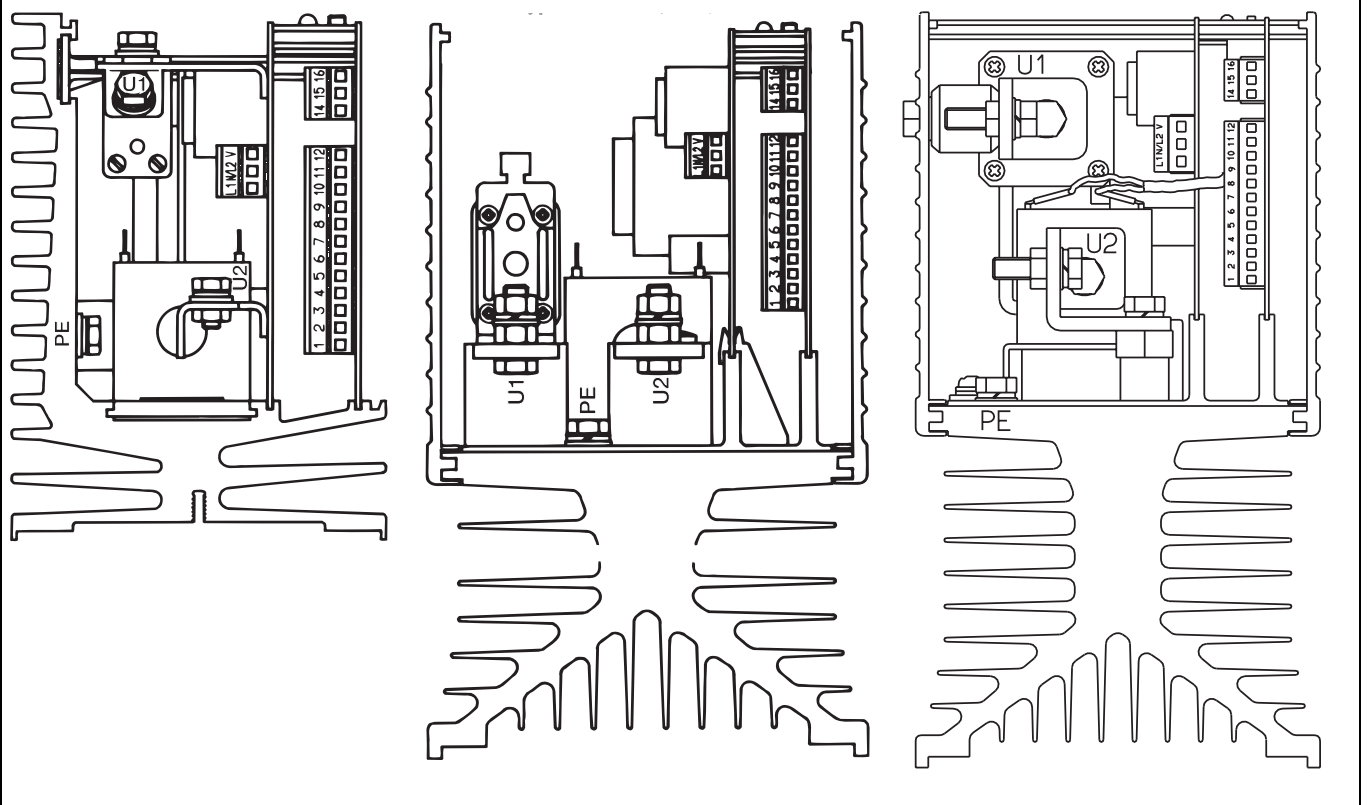


Connection diagrams

Type TYA-110/3, 025 ... 100, ...

Type TYA-110/3, 150, ...

Type TYA-110/3, 250, ...



Connection diagram

Connection for	Terminals	Symbol
Supply for control electronics; link terminal V with N/L2 (except for economy circuit)	L1 N/L2 V	
Load connection	U1 U2	
Current input (differential input)	1- 2+	
Logic input	current signal	
	voltage signal	
	floating contact	
Voltage input (referred to ground)	3⊥ 4+	
External manual adjustment with 5 kΩ potentiometer (via voltage input)	3 start (⊥) 4 slider 5 end (+10V, 2mA)	
Firing-pulse inhibit (inhibit input) $I_K \approx 1 \text{ mA}$ (n.c. or n.o.)	6⊥ 7+	
Load failure output with relay rating 5A 230V AC resistive load relay de-energised on fault	14 n.o. (make) 15 n.c. (break) 16 common	
Load failure output with optocoupler $I_{Cmax.} = 2 \text{ mA}$ $U_{CEO max.} = 32 \text{ V}$	15 collector 16 emitter	
External changeover of operating mode (phase-angle or burst-firing mode)	6⊥ 8+	
Power level output 0 – 10V $I_{max} \approx 2 \text{ mA}$	6⊥ 10+	
Master-slave link for master-slave economy circuit	6⊥ 11 12	
External current limiting with 5 kΩ potentiometer	5 start (+10V, 2mA) 6 end (⊥) 9 slider	

Suitable operating and control modes for different loads

Extra code TR, TO required	Operating mode	Load type			
		constant $R_{warm} = R_{cold}$	positive $R_{warm} > R_{cold}$	negative $R_{warm} < R_{cold}$	long-term ageing
non	phase-angle operation	X	-	-	-
yes	phase-angle operation with current limiting	-	X	X	X
no	burst-firing operation	X	-	-	-
no	burst-firing operation with initial phase-angle cut-back	X	-	-	-
yes	burst-firing operation with initial phase-angle cut-back and current limiting	-	X	X	X
	Control mode				
no	subsidiary U^2 control	X	X	-	-
yes	subsidiary I^2 control	-	-	X	-
yes	subsidiary P control	-	-	-	X

X = suitable - = not suitable

Extra code MS (master-slave circuit)

Type TYA-110/3, 025...100, ..., MS...

Mounting plate thickness: 5mm
Units are wired up.

Type TYA-110/3, 150...250, ..., MS...

Mounting plate thickness: 10mm
Units are wired up.

Ordering details

Type code

TYA-110/3, (1)
..., (2)
... - (3)
.., ...*

* list extra codes in sequence, separated by commas.

(1) Load current	025	= load current	25A
	050	= load current	50A
	075	= load current	75A
	100	= load current	100A
	150	= load current	150A
	250	= load current	250A
(2) Rated load voltage	024	= rated load voltage	24V
	042	= rated load voltage	42V
	115	= rated load voltage	115V
	230	= rated load voltage	230V
	265	= rated load voltage	265V
	400	= rated load voltage	400V
	460	= rated load voltage	460V
(3) Extra codes	TR	= expanded version with indication of part-load break (adjustable by trimmers) and blown fuse via a common relay contact and LED. This version also includes:	
		- current limiting (internal, external)	
		- rated current adjustment at $I \leq I_N/2$	
	- free selection of subsidiary control (U^2 , P or I^2); permits free-running economy circuit with P control		
	- power level output can be switched to U^2 , P or I^2 signal		
	TO	= as TR, but message via optocoupler	
	MS	= master-slave circuit on mounting plate, prepared and ready for connection	

Accessories

Assembly kit for rail mounting at 25A and 50A load current Order No. 70/00067312

Super-fast semiconductor fuses for protecting thyristors against short-circuits (no line fuses)

32A for $I_N = 25A$ Order No. 70/00068009

160A for $I_N = 100A$ Order No. 70/00081801

80A for $I_N = 50A$ Order No. 70/00068011

350A for $I_N = 150A$ Order No. 70/00083318

125A for $I_N = 75A$ Order No. 70/00081800

550A for $I_N = 250A$ Order No. 70/00371964

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JUMO IPC IGBT Power Converter with amplitude control

Brief description

The JUMO IPC is a power converter for controlling heater loads that previously required a transformer (either a variable transformer or the combination of a transformer with a thyristor power converter).

It functions in such a way that it can be considered to be an electronic transformer with a pulsed DC output.

It combines the advantages of conventional variable transformers, such as amplitude control and sinusoidal supply current loading, with the advantages of a thyristor power switch, such as current limiting, load monitoring, subordinate control action and so on. There is no electrical isolation between the supply voltage and the load voltage. These power converters are employed wherever substantial resistive loads need to be switched.

A choke and a mains/line filter, in addition to the IPC power converter itself, are mandatory for operating the IPC. Only chokes or filters specified by JUMO may be used for this purpose. Thanks to the amplitude control (the current drawn from the supply is always sinusoidal), synchronous clock controls (as for burst-firing operation) and power-factor compensation networks (for the reactive power resulting from phase-control) are not needed.



Type 709050/X3 ...

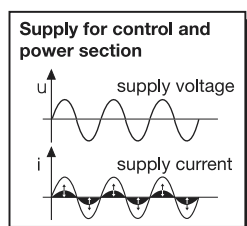
Functional overview

Front-panel settings

- Current limiting (current limit adjust)
- Load fault limit (load fail adjust)
- Resistance limiting¹ (R-control adjust)
- SIC voltage reserve¹ (SIC-reserve)
- Full output level (max. Power adjust)
- Base load setting (min. Power adjust)
- Adjust power level output (output adjust U^2, P, I^2)

Inputs

- Control inputs for:
 - current
 - voltage
 - potentiometer 5 kΩ
- Firing pulse inhibit floating contact



1. Only for Type 709050/X2...and 709050/X3...



LED indicators

- Semiconductor fuse¹ (fuse)
- Overtemperature (overheat)
- Electronic safety switch-off¹ (IGBT)
- Current limiting (current limit)
- Load/partial load failure (load fail)
- Resistance limiting¹ (R-control)
- SIC voltage reserve¹ (SIC reserve)
- Standby (Power)

Outputs

- Power level output 0 – 10V (U^2, P, I^2)
- Resistance output 0 – 5V (R)
- Load fault output via relay or optocoupler
- Load current

Key features

- Low-interference on the supply with high-power resistive loads (flicker)
- Operation of low-voltage heater elements directly from the electrical supply, without a step-down transformer
- Minimum harmonics in the plant supply, and low weight (no power transformer required)
- Short-circuit proof during power-on
- Supply current proportional to the power required (amplitude control)
- Control is independent of the resistance characteristic of the heater elements
- Minimum control reactive power
- Compact size
- Free choice of subordinate control loop U^2, P, I^2
- Compensation of the ageing process in SIC heater elements
- Indication if the voltage reserve is no longer able to compensate for ageing¹
- Resistance limiting, protection for Molybdenum Disilicid-Super heater elements from overheating in the upper temperature range¹
- Integrated semiconductor fuses to protect the IPC from a short to ground¹

1. Only for Type 709050/X2 and ... /X3

Technical data

Control

Control signal	0(4) – 20mA 0(2) – 10V 0(1) – 5V	$R_i = 50 \Omega$ $R_i = 25 k\Omega$ $R_i = 12 k\Omega$	Manual control through an external 5 k Ω potentiometer
Input signal attenuation	Adjustment range 100 – 20 %		
Base load setting	0 – 100 %		

Supply voltage

	Type 709050/X1...	Type 709050/X2....	Type 709050/X3...
Supply voltage	115V AC +15%/-20%, 48 – 63Hz (only with 115V AC in the power section)		
Control section	230V AC +15%/-20%, 48 – 63Hz		
Supply voltage	115V AC +15%/-20%, 48 – 63Hz, 230V AC +15%/-20%, 48 – 63Hz		
Power section	400V AC +15%/-20%, 48 – 63Hz		
Load voltage $U_{L_{rms}}$	20V, 60V, 90V, 120V DC	20V, 60V, 90V, 120V, 150V, 210V, 270V, 380V DC	20V, 60V, 90V, 120V, 150V, 210V DC
Load current $I_{L_{rms}}$	70A DC	70A / 100A DC	200A DC
Load type	resistive loads		

General characteristics

Circuit configuration	Single-phase operation		
Operating modes	Amplitude control		
Subordinate control loop	As standard: free choice between U^2 , P, I^2 control, selected by internal switches		
Current limiting	In operation, the load current can be set by a trimmer on the front panel in the range 10 – 100 % I_N . This limits the rms value of the load current.		
Partial load failure	20 – 100 % of nominal current		
R-control	-	Adjustment range from R_{Nom} to $10 \times R_{Nom}$ $R_{Nom} = \text{nominal voltage} / \text{nominal current}$	
SIC reserve	-	Message is generated as soon as the voltage reserve in SIC heater elements is used up	
Power level output	As standard: free choice between U^2 , P or I^2 signal, selected by internal switches, adjustable 0 – 5V to 0 – 10V, $I_{max} \approx 2 \text{ mA}$, offset deviation $\leq \pm 5\%$		
Control accuracy	The regulation will eliminate supply voltage variations within the tolerance range (+15%/-20%), with an accuracy of $\pm 0.5\%$.		
Electrical connection	Control leads via plug-in screw terminals, for conductor cross-section 0.5 – 2.5mm ²		
	in the power section: via cable lugs to DIN 46212	in the power section: via screw terminals 10mm ² – 50mm ²	in the power section: via screw terminals 10mm ² – 95mm ²
Semiconductor fuse	-	integrated into the unit	
Enclosure protection	IP00 as per EN 60 529	IP20 as per EN 60 529	
Protection class	Protection Class I, with isolated control circuitry for connection to SELV circuits.		
Permissible ambient temperature range	5 to 40°C (3K3 as per EN 60 721-3-3)		
Permissible storage temperature range	-10 to +70°C (1K3 as per EN 60 721-3-1)		
Cooling	Forced convection, maximum inlet air temperature 35°C.		
Climatic conditions	Rel. humidity $\leq 5 - 85\%$ annual average, no condensation, 3K3 as per EN 60 721		
Operating position	vertical		
Operating conditions	The converter is designed as a built-in device as per EN 50 178, pollution degree 2, overvoltage category \ddot{U} III		
Test voltage	as per EN 50 178		
Creepage distances	Control section – load circuit: $\geq 5.5 \text{ mm}$, control section – housing: $\geq 5.5 \text{ mm}$, device can be connected to SELV circuits. SELV = Separate Extra Low Voltage (safety low voltage)		
Earth leakage current	The earth leakage current of the IPC power converter with an EMC filter wired into the supply lead (excluding any leakage current in the load) is less than 3 mA.		
Housing	Metal housing		
Power consumption of control section	approx. 50 VA	approx. 75 VA	
Standard accessory	1 Operating Manual B 70.9050.0...		

Power loss (W)

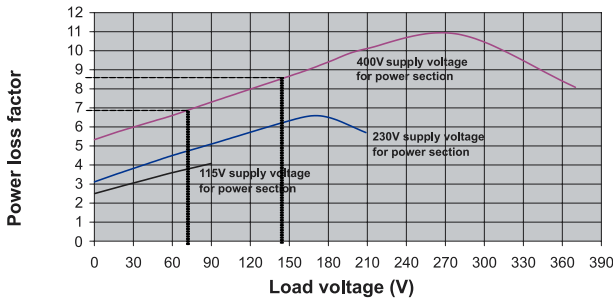
Note: The power losses appear as heat dissipated in the heat sinks of the power converter.

This heat must be removed by the on-site arrangements (e. g. switchgear cabinet) according to the climatic conditions !

Type 709050/X1... and Type 709050/X2...

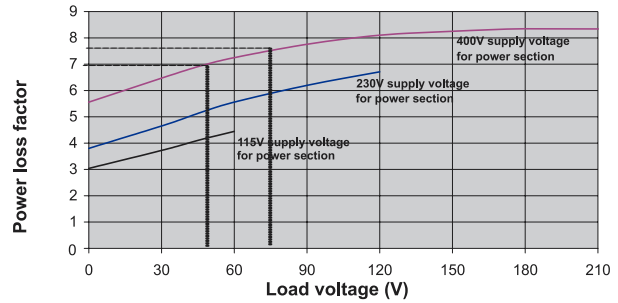
Power loss for IPC 70/100A, incl. choke and supply filter

$P_{tot} (W) = I_{Load}(A) \times \text{power loss factor}$



Power loss for IPC 200A, incl. choke and supply filter

$P_{tot} (W) = I_{Load}(A) \times \text{power loss factor}$



Type 709050/82-12-400-150-100/252

Converter ratings: load voltage = 150V; load current = 100A;
Supply voltage for power section = 400V

Resistive loads and Molybdenum Disilizid Super heater elements

Data for heater element: load voltage = 140V; load current = 90A

Measure the maximum load voltage that is actually produced (e.g. 140V) and find the intercept point of this value with the supply voltage curve for the power section. The value on the Y axis is the corresponding power loss factor (e.g. 8.5).

Multiply the load current (e.g. 90A) that flows through the load resistor by the power loss factor that applies for the maximum load voltage (e.g. 140V) and the result is the power loss (in W).

Power loss = 90(A) x power loss factor

Power loss = 90(A) x 8.5 = **765W**

Type 709050/92-12-400-150-100/252

Converter ratings: Load voltage = 150V; Load current = 100A;
Supply voltage for power section = 400V; P-control, P = 6300W

SIC heater element

Data for SIC heater element: new: 70V/90A, old 140V/45A; P = 6300W

Measure the maximum load voltage that is actually produced for the **new** SIC heater element (e.g. 70V) and find the intercept point of this value with the supply voltage curve for the power section. The value on the Y axis is the corresponding power loss factor (e.g. 6.8).

Multiply the load current (e.g. 90A) that flows through the **new** SIC heater element by the power loss factor that applies for the maximum load voltage (e.g. 70V) and the result is the power loss (in W).

Power loss = 90(A) x power loss factor

Power loss = 90(A) x 6.8 = **612W**

Type 709050/83-12-400-90-200/252

Converter ratings: load voltage = 90V; load current = 200A;
Supply voltage for power section = 400V

Resistive loads and Molybdenum Disilizid Super heater elements

Data for heater element: load voltage = 75V; load current = 130A

Measure the maximum load voltage that is actually produced (e.g. 75V) and find the intercept point of this value with the supply voltage curve for the power section. The value on the Y axis is the corresponding power loss factor (e.g. 7.5).

Multiply the load current (e.g. 130A) that flows through the load resistor by the power loss factor that applies for the maximum load voltage (e.g. 75V) and the result is the power loss (in W).

Power loss = 130 (A) x power loss factor

Power loss = 130(A) x 7.5 = **975W**

Type 709050/93-12-400-90-200/252

Converter ratings: Load voltage = 90V; Load current = 200A;
Supply voltage for power section = 400V; P-control, P = 9000W

SIC heater element

Data for SIC heater element: new: 45V/200A, old 90V/100A; P = 9000W

Measure the maximum load voltage that is actually produced for the **new** SIC heater element (e.g. 45V) and find the intercept point of this value with the supply voltage curve for the power section. The value on the Y axis is the corresponding power loss factor (e.g. 6.8).

Multiply the load current (e.g. 200A) that flows through the **new** SIC heater element by the power loss factor that applies for the maximum load voltage (e.g. 45V) and the result is the power loss (in W).

Power loss = 200 (A) x power loss factor

Power loss = 200(A) x 6.8 = **1360W**

General data

Fault signal output	Type 709050/X1...	Type 709050/X2...	Type 709050/X3...
Relay (SPDT-changeover contact) without contact suppression	150,000 switching actions at switched power level of 3A/230V 50Hz (resistive load)		
Optocoupler output	$I_{Cmax} = 2\text{mA}$, $U_{CE0max} = 32\text{V}$		
Power converter dimensions			
(length x width x height)	(272 x 260 x 175) mm	(348.6 x 300 x 217) mm	(403.5 x 300 x 257.5) mm
Weight	approx. 9 kg	approx. 17 kg	approx. 22.5 kg

Chokes

Type	Dimensions	Connection cross-section	Tightening torque	Weight	Sales No.
L = 0.6 mH / $I_N = 75\text{A}$ IP20 enclosure protection as per EN 60 529	Choke diameter: 155 mm Height: 135 mm Diameter of fixing hole: 10.4 mm	4 – 25 mm ²	screw terminals max. 4 – 4.5 Nm	approx. 7.5kg	70/00392474
L = 0.6 mH / $I_N = 100\text{A}$ IP20 enclosure protection as per EN 60 529	Height: 208 mm, Width: 200 x 200 mm	10 – 50 mm ²	screw terminals max. 6 – 8 Nm	approx. 20 kg	70/00415759
L = 0.6 mH / $I_N = 200\text{A}$ IP20 enclosure protection as per EN 60 529	Height: 190 mm, Width: 200 x 385 mm	35 – 95mm ²	screw terminals max. 15 – 20 Nm	approx. 37 kg	70/00436848

EMC filter

For the supply to the power section						
Nominal voltage, nominal current	Dimensions (length x width x height) in mm	Connection cross-section	Tightening torque	Weight	Permissible ambient temperature	Sales No.
115V/250V/440V AC, $I_{Nom} = 16\text{A}$	(255 x 50 x 126)	0.25 – 4 mm ²	0.6 – 0.8 Nm	approx. 4 kg	40°C	70/00399527
115V/250V/440V AC, $I_{Nom} = 20\text{A}$	(289 x 70 x 140)	0.5 – 10 mm ²	1.5 – 1.8 Nm	approx. 5.5 kg	40°C	70/00438775
115V/250V/440V AC, $I_{Nom} = 32\text{A}$	(324 x 90 x 160)	0.5 – 10 mm ²	1.5 – 1.8 Nm	approx. 9.5 kg	40°C	70/00409831
115V/250V/440V AC, $I_{Nom} = 63\text{A}$	(380 x 117 x 190)	0.5 – 16 mm ²	2 – 2.3 Nm	approx. 17 kg	40°C	70/00409990
115V/250V/440V AC, $I_{Nom} = 100\text{A}$	(445 x 150 x 220)	10 – 50 mm ²	6 – 8 Nm	approx. 26 kg	40°C	70/00431997
For the supply to the control section (only required if the power section is operated from 400 V AC)						
115V/250V AC, $I_{Nom} = 1\text{A}$	(80 x 45 x 30)	through faston connectors 6.3 x 0.8mm	–	approx. 120 g	40°C	70/00413620

Dimensions for Type 709050/X1...

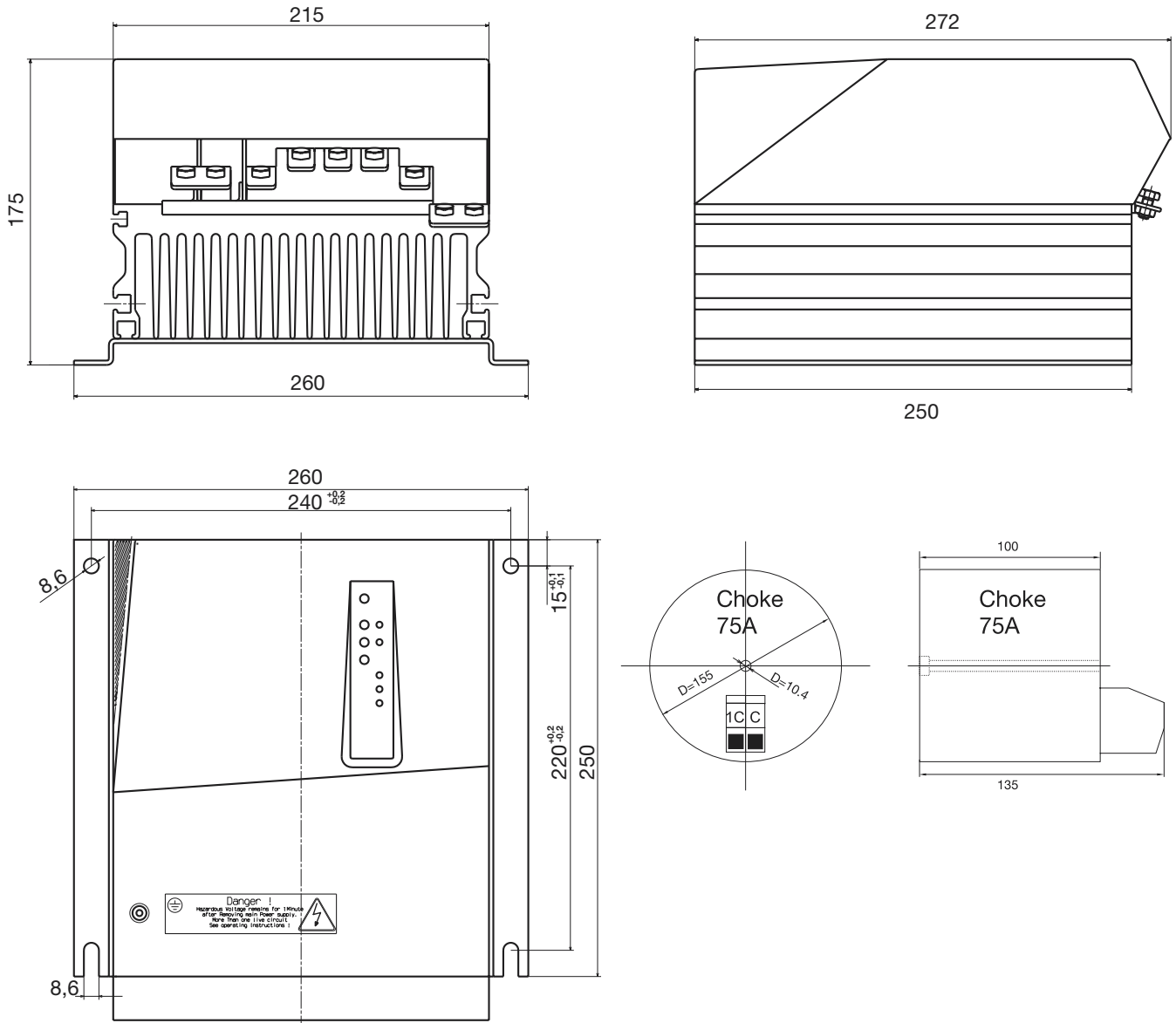
Type 709050/X1...

Note:

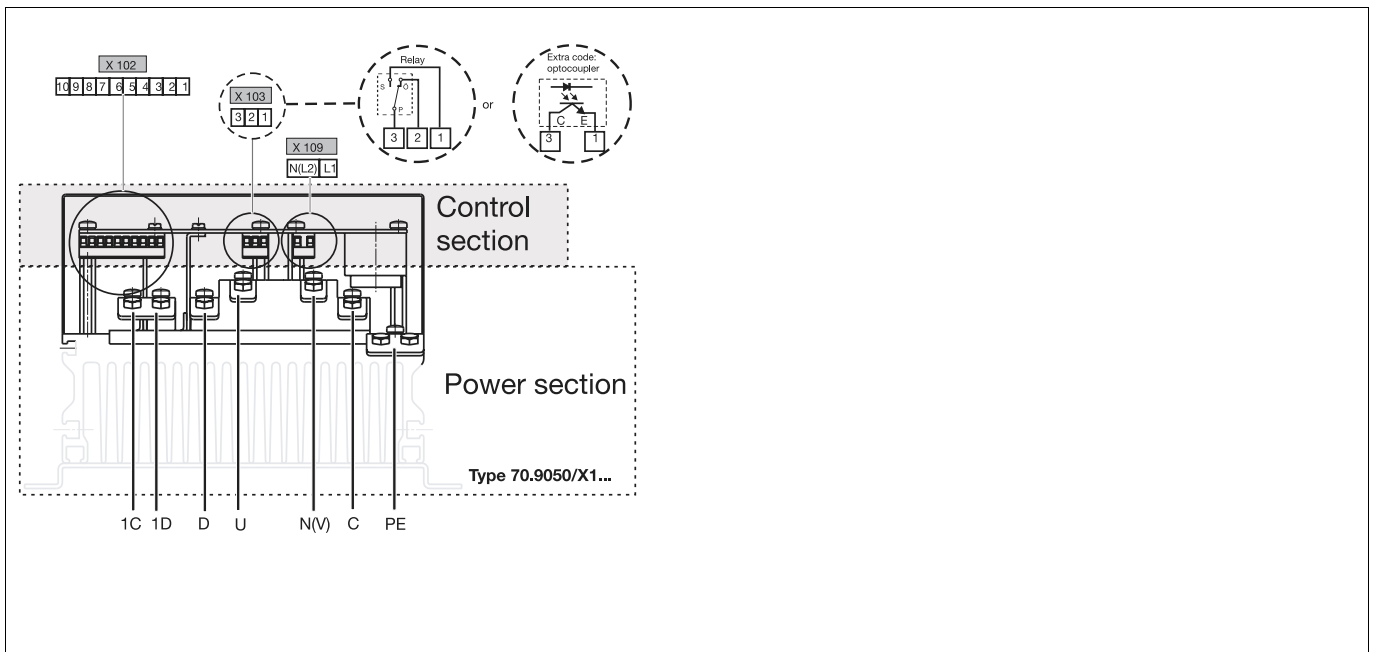
Tightening torque for screws in power section (wrench size 10mm a/f): max. 15 Nm.

Tightening torque for screw terminals, for 75A choke: 4 – 4.5 Nm

Tightening torque for green screw terminals in control section: 0.5 – 0.6 Nm




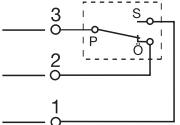
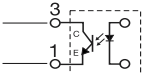
Connection diagram for Type 709050/X1...



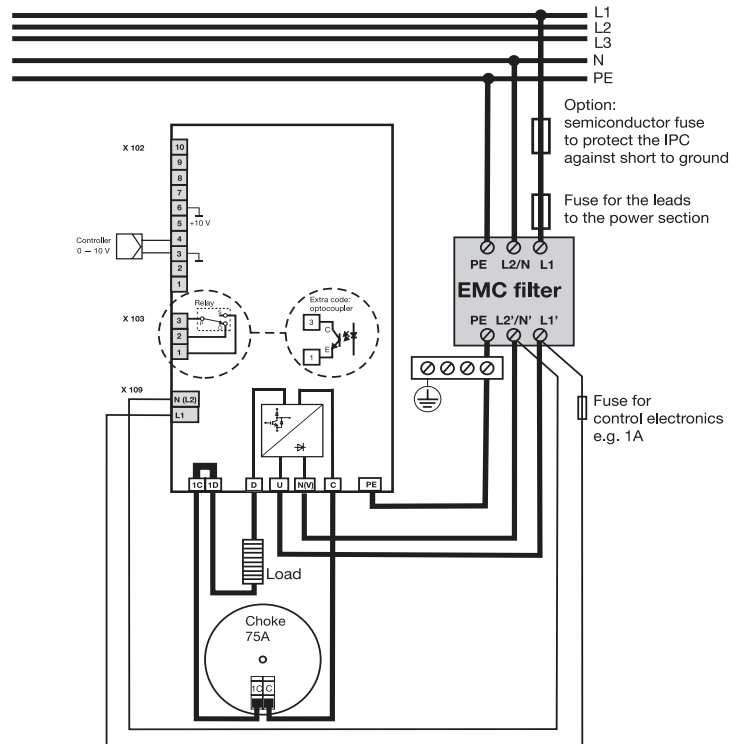
	Connection for	Screw terminal X109	Diagram
	Supply for control section	L1 N (L2)	L1 — o L1 N (L2) — o N (L2)

	Connection for	Screw connections in power section	Diagram
	Protective earth conductor	PE	PE — o PE
	Supply for power section	U N(V)	L1 — o U N (L2) — o N (V)
	Choke connection	1C C	
	Load connection	1D + D -	

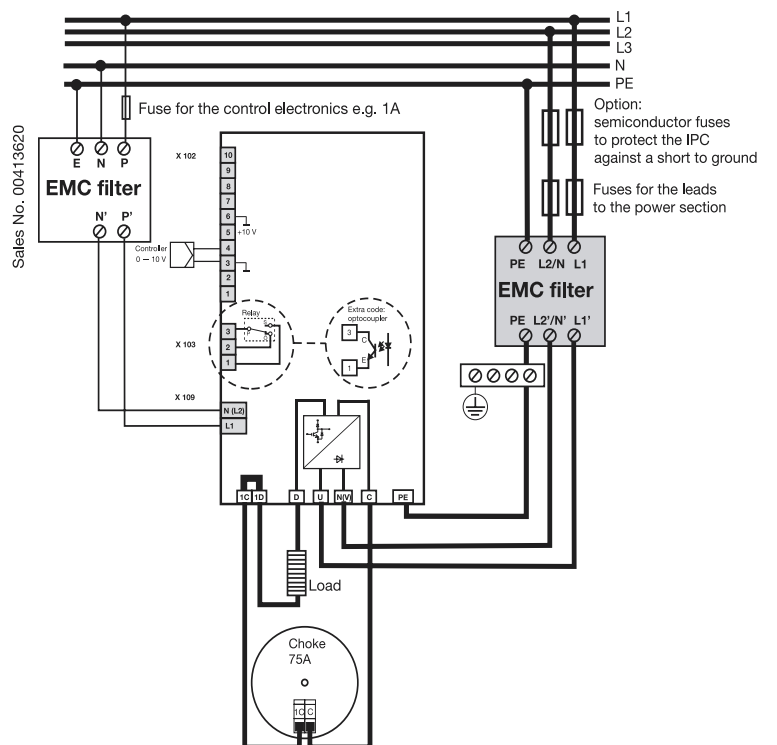
	Connection for	Screw terminal X102	Diagram
	Current input (differential input)	1- 2+	
	Voltage input (referred to ground)	3 ground 4+	
	External manual adjustment Potentiometer 5 kΩ	3 start (ground) 4 slider 5 end (+10V)	
	Firing pulse inhibit (inhibit input) I_K approx. 1 mA (SPST-NC) break or (SPST-NO) make contact	6 ground 7+	
	Power level output 0 – 10V (U^2 , P, I^2) I_{max} approx. 2 mA	10 + 6 ground	
	Resistance output 0 – 5V (R) I_{max} approx. 2 mA	8 + 6 ground	

	Connection for	Screw terminal X103	Diagram
	Load fault output, with relay Contact rating 230V/3A AC resistive load Relay drops out on fault	1 (SPST-NO) make contact 2 (SPST-NC) break contact 3 common	
	Load fault output, with optocoupler $I_{c\ max} = 2\text{mA}$ $U_{CEO\ max} = 32\text{V}$	3 collector 1 emitter	

**Wiring for single-phase operation Phase / N
for Type 709050/X1...**



**Wiring for single-phase operation Phase / Phase
for Type 709050/X1...**

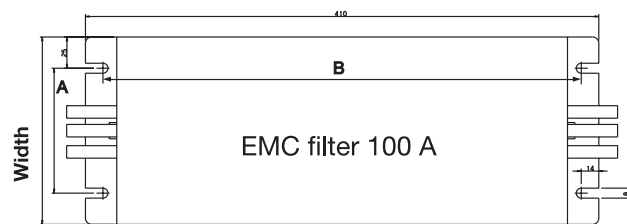
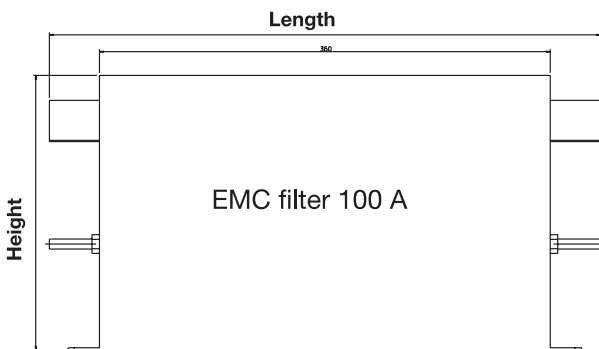
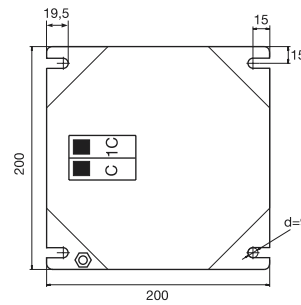
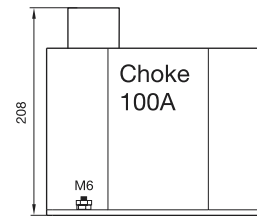
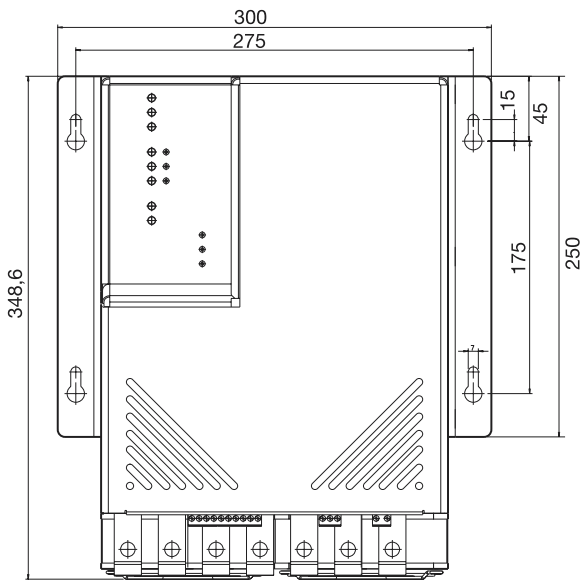
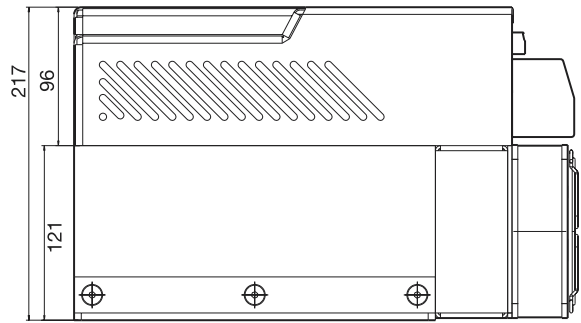
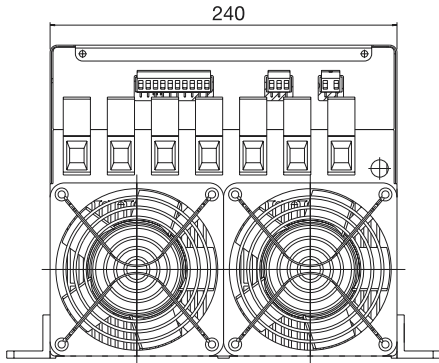


Dimensions

Note:

Tightening torque for the screws in the power section (socket wrench, 5 mm a/f) is 6 – 8 Nm.
 Tightening torque for screw terminals, for 100A choke: 6 – 8 Nm
 Tightening torque for green screw terminals in control section: 0.5 – 0.6 Nm

Type 709050/X2...

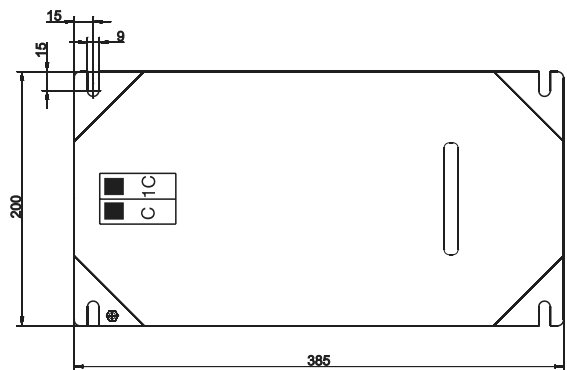
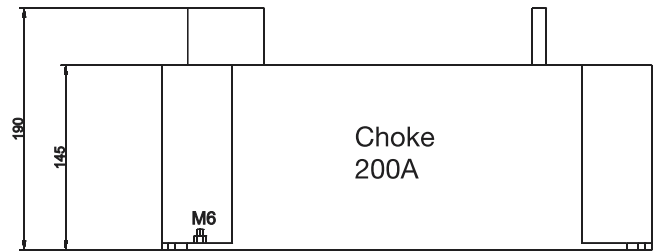
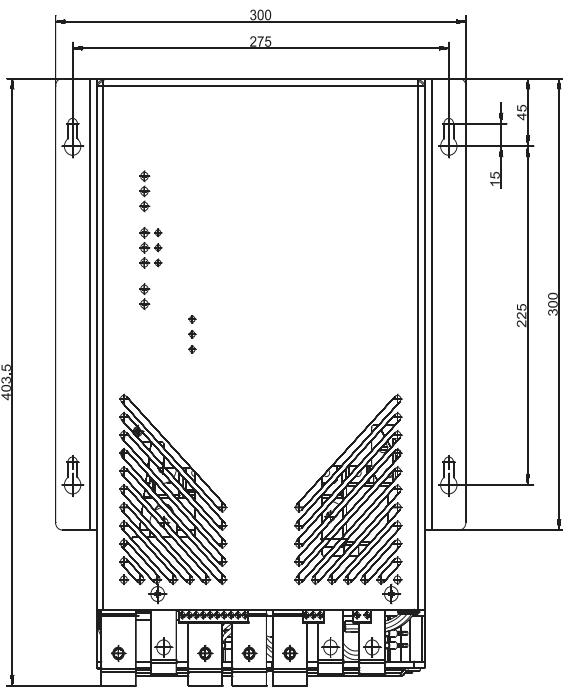
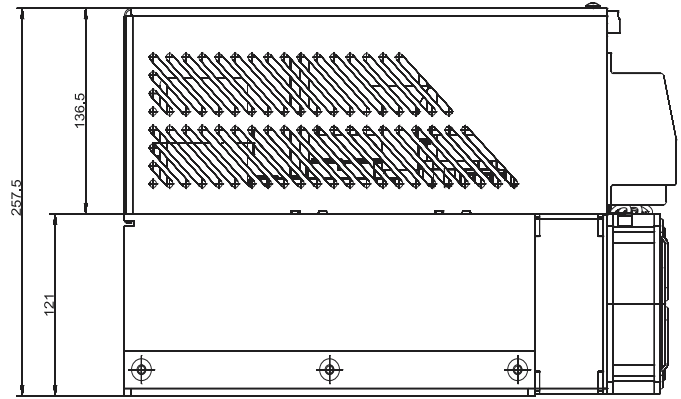
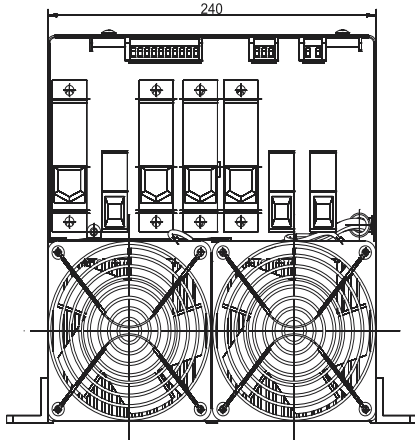


EMC filter current	Length (mm)	Width (mm)	Height (mm)	Fixing hole spacing (mm)		Tightening torque	Connection cross-section (mm ²)
				A	B		
for power section							
16A	255	50	126	25	240	0.6 – 0.8 Nm	0.2–4
20A	289	70	140	50	295	1.5 – 1.8 Nm	0.5–10
32A	324	90	160	50	295	1.5 – 1.8 Nm	0.5–10
63A	380	117	190	65	330	2 – 2.3 Nm	0.5–16
100A	445	150	220	100	385	6 – 8 Nm	10–50
for control section							
1A	80	46	30	-	61		via faston connectors 6.3 x 0.8mm

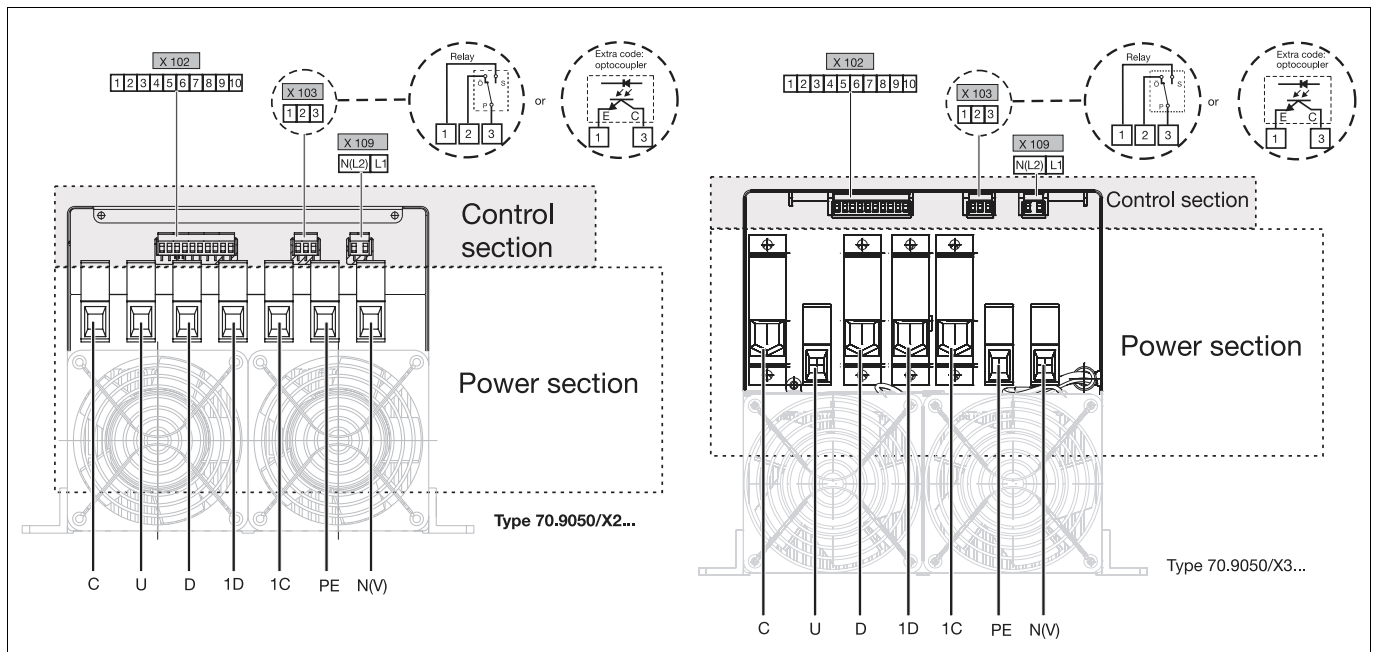
Type 709050/X3...

Note:

Tightening torque for the screws in the power section (socket wrench, 5 mm a/f) is 6 – 8 Nm
 Tightening torque for the screws in the power section (socket wrench, 6 mm a/f) is 15 – 20 Nm
 Tightening torque for screw terminals, for 200A choke: 15 – 20 Nm
 Tightening torque for green screw terminals in control section: 0.5 – 0.6 Nm




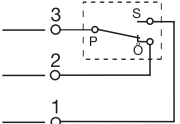
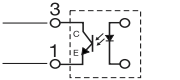
Connection diagram for Type 709050/X2... and 709050/X3...



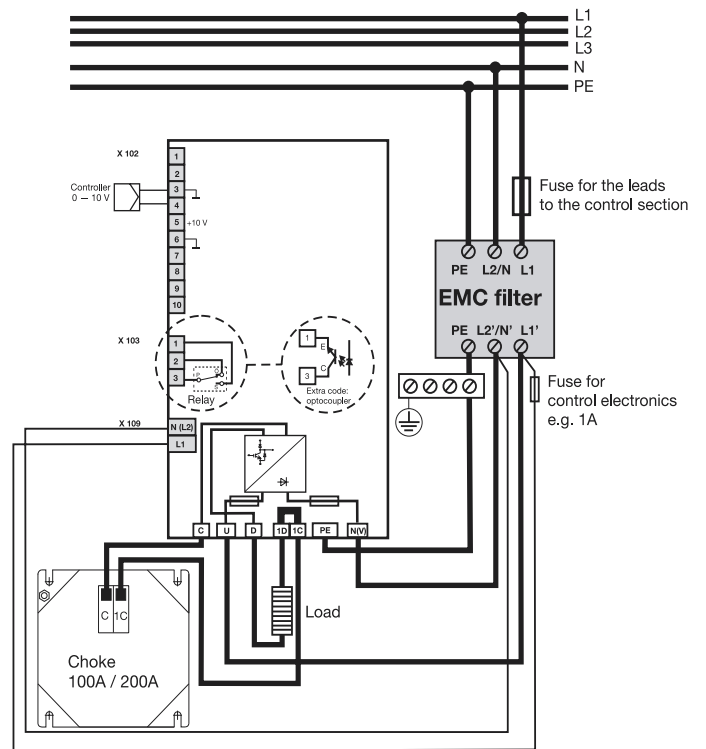
	Connection for	Screw terminal X109	Diagram
	Supply for control section	L1 N (L2)	L1 — o L1 N (L2) — o N (L2)

	Connection for	Screw connections in power section	Diagram
	Protective earth conductor	PE	PE — o PE
	Supply for power section	U N(V)	L1 — o U N (L2) — o N (V)
	Choke connection	1C C	
	Load connection	1D - D +	

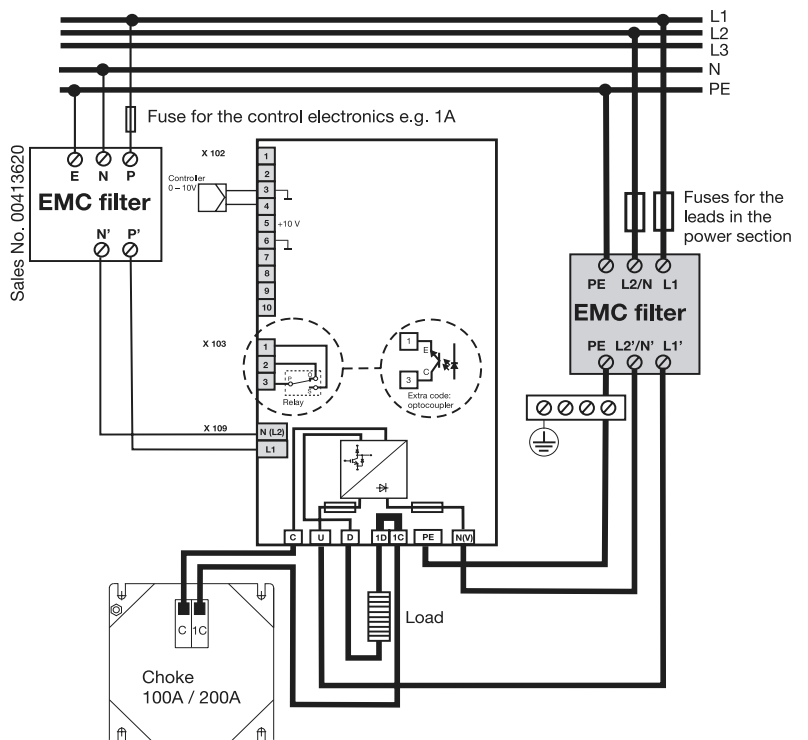
	Connection for	Screw terminal X102	Diagram
	Current input (differential input)	1- 2+	
	Voltage input (referred to ground)	3 ground 4+	
	External manual adjustment Potentiometer 5 kΩ	3 start (ground) 4 slider 5 end (+10V)	
	Firing pulse inhibit (inhibit input) I_K approx. 1mA (SPST-NC) break or (SPST-NO) make contact	6 ground 7+	
	Power level output 0 — 10V (U^2 , P, I^2) I_{max} approx. 2mA	10 + 6 ground	
	Resistance output 0 — 5V (R) I_{max} approx. 2mA	8 + 6 ground	

	Connection for	Screw terminal X103	Diagram
	Load fault output, with relay Contact rating 230V/3A AC resistive load Relay drops out on fault	1 (SPST-NO) make contact 2 (SPST-NC) break contact 3 common	
	Load fault output, with optocoupler $I_{c\ max} = 2\text{mA}$ $U_{CEO\ max} = 32\text{V}$	3 collector 1 emitter	

**Wiring for single-phase operation Phase / N
for Type 709050/X2... and 709050/X3...**



**Wiring for single-phase operation Phase / Phase
for Type 709050/X2 and 709050/X3...**



Order details

		(1) Basic version	
	709050/81	IGBT power converter 70A (max. load voltage: 120V) standard version	
	709050/91	customized version	
		(2) Supply for control section	
	709050/82	IGBT power converter 70A or 100A (max. load voltage: 380V) standard version	
	709050/92	customized version	
		(3) Supply for power section	
	709050/83	IGBT power converter 200A (max. load voltage: 210V) standard version	
	709050/93	customized version	
x		11	115V AC +15/-20%, 48 – 63Hz (only with 115V AC in the power section)
x	x	12	230V AC +15/-20%, 48 – 63Hz
		(4) Load voltage	
x		115	115V AC +15/-20%, 48 – 63Hz
x	x	230	230V AC +15/-20%, 48 – 63Hz
	x	400	400V AC +15/-20%, 48 – 63Hz
		(5) Load current	
x	x	020	20V DC
x	x	060	60V DC
x	x	090	90V DC
	x	120	120V DC
	x	150	150V DC
	x	210	210V DC
	x	270	270V DC
	x	380	380V DC
		(6) Extra code: fault signal output	
x	x	252	Relay (SPDT-changeover contact) 3A
x	x	257	Optocoupler

Order code (1) (2) (3) (4) (5) (6)

- - - - -

Order example 709050/81 - 12 - 230 - 060 - 070 / 252

Standard accessory

1 Operating Manual

Accessories

Chokes

L = 0.6 mH / I_{Nom} = 75A, 100A or 200A

EMC filter (for supply to power section)

115V/250V/440V AC I_{Nom}=16A, 20A, 32A, 63A or 100A

EMC filter (for supply to control section)

(only necessary for 400V AC supply voltage in power section)

115V/250V AC I_{Nom}=1A

Semiconductor fuse (2 are necessary)

extra-fast 200A for I_{Nom} = 100A

The I²t value of the Semiconductor fuse must be smaller than 20000 A²s !

(use only for Type 709050/X2... and 709050/X3. !)

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	Nr.
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Software and Accessories for Programmers, Thermostats, Microstats und Controllers	70.9770
Accessories for panel-mounting instruments to DIN bezel sizes 96 mm x 96 mm, 96 mm x 48 mm und 48 mm x 48 mm	70.9710

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Software for Indicators, Recorders and Temperature Transmitters

Downloadable from: http://www2.jumo.de/index_www2.html

Device designation										Device software version			
										di-48	Data Sheet 70.1520 (95.1520)	102.xx..	
										di-08 / 32	Data Sheet 70.1530 (95.1530)	149.xx..	
										di eco	Data Sheet 70.1540 (95.1540)	168.xx...	
										LOGOLINE 500 (d)	Data Sheet 70.6000 (95.3530)	078.xx.xx.	
										LOGOPRINT 500	Data Sheet 70.6030 (95.4012)	105.xx.xx.	
										LOGOSCREEN 500cf	Data Sheet 70.6510	208.01.xx	
										LOGOSCREEN es	Data Sheet 70.6560 (95.5011)	172.xx.xx.	
										LOGOSCREEN cf	Data Sheet 70.6570 (95.5012)	172.xx.xx.	
										LOGOSCREEN nt	Data Shett 70.6580	187.xx.xx	
										dTRANS T01	Data Sheet 70.7010 (95.6550)	114/153.xx.xx.	
										dTRANS T02	Data Sheet 70.7020 (95.6520)	135/151.xx.xx.	
										dTRANS T03	Data Sheet 70.7030 (95.6530)	194.xx.xx.	
										dTRANS T04	Data Sheet 70.7040	199.xx.xx.	
										Software programs¹ (multilingual)			Sales No.
								x		PC software package, consisting of: Setup software, PC Evaluation software (PCA3000), PCA Communications software (PCC), PC Security Manager (PCS) and PC Audit Trail Manager (PCAT)			70/00417278
								x		IQ / OQ documentation (German / English)			70/00436829
								x		IQ / OQ documentation (French / English)			70/00441797
								x	x x	PC Evaluation program (PCA3000)		177.xx.xx	70/00431882
								x	x x	PCA Communications server (PCC)		178.xx.xx	70/00431879
								x		Setup program			70/00361535
								x		Setup program			70/00355073
									x	Setup program			70/00378730
									x	Setup program			70/00397093
									x	Setup program			70/00378733
x										Setup program			70/00363042
									x	Setup program			70/00432408
	x									Setup program			70/00438980
		x								Setup program			70/00419998
									x	Setup program			70/00448774
								x		Setup program			70/00467262
									x	Setup program			70/00468991

1. Delivery time for software: about 3 working days

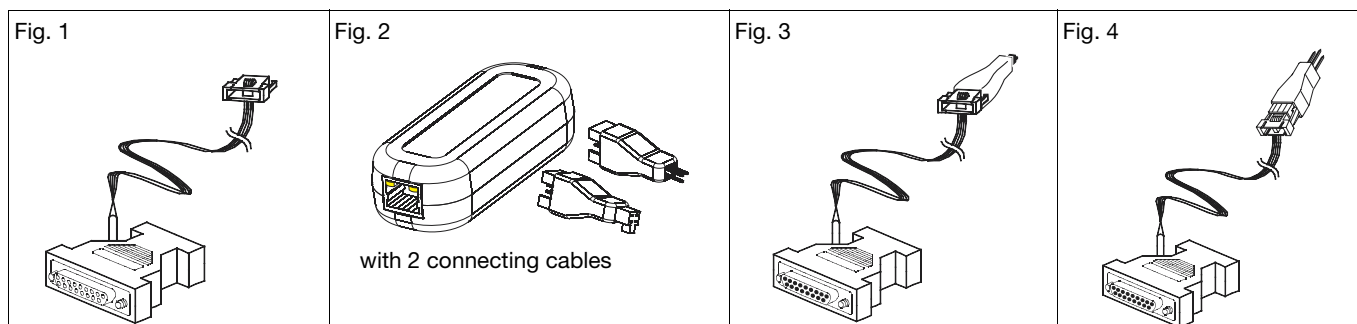


Accessories for Indicators, Recorders and Temperature Transmitters

Device designation														
													di-48	Data Sheet 70.1520 (95.1520)
													di-08 / 32	Data Sheet 70.1530 (95.1530)
													di eco	Data Sheet 70.1540 (95.1540)
													LOGOLINE 500 (d)	Data Sheet 70.6000 (95.3530)
													LOGOPRINT 500	Data Sheet 70.6030 (95.4012)
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													dTRANS T03	Data Sheet 70.7030 (95.6530)
													dTRANS T04	Data Sheet 70.7040
Accessories													Sales No.	
x	x	x	x	x	x	x	x	x	x	x	x	x	Converter cable, USB-serial	70/00408077
													Enable math / logic module	70/00393217
													4-way relay module for open-collector outputs	70/00404537
													ER8 relay module, 110 – 240V AC ²	70/00405292
													ER8 relay module, 20 – 53V AC ²	70/00405297
x													PC interface with TTL / RS232 converter	70/00301315
x	x	x	x	x	x	x	x	x	x	x	x	x	PC interface with USB / TTL converter, adapter (socket) and adapter (pins)	70/00456352
													PC interface with TTL / RS232 converter and adapter (socket)	70/00350260
													PC interface with TTL / RS232 converter and adapter (pins)	70/00400821
													PC interface with TTL / RS232 converter, PSU (230V AC) and adapter (socket)	70/00394201
													PC interface with TTL / RS232 converter, PSU (115V AC) and adapter (socket)	70/00403384
													RS232 interface cable (9/9-pole)	70/00367735
													RS232 interface cable (9/25-pole)	70/00367736
													CF-card reader (USB2.0)	70/00423136
													CF-card adapter, type II	70/00424310
													CompactFlash 64MB	70/00419404
													CompactFlash 128MB	70/00419398
													CompactFlash 256MB	70/00463462
													Modem cable 5m (2x 9-pole pin)	70/00427093
													Modem cable 5m (25/9-pole pin)	70/00431871
													Fixing bracket, for mounting the B head transmitter on DIN rail	70/00352463
													Barcode-reader with RS232 interface	70/00407798
													Analog DIN rail modem, configured, with accessories	70/00416612
													ISDN DIN rail modem, configured, with accessories	70/00416611
													GSM modem, configured, with accessories	70/00440255

Fig. 1
Fig. 2
Fig. 3
Fig. 4

2. extra code is necessary



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Software for Programmiers, Thermostats, Microstats and Controllers

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Device designation						Device software version
					DICON 400/500	Data Sheet 70.3570 050.xx.xx
					DICON 401/501	Data Sheet 70.3580
					dTRON 16.1	Data Sheet 70.3011 099.xx.xx
					dTRON 316/308/304	Data Sheet 70.3041 192.xx.xxx
					iTRON	Data Sheet 70.2040 109.xx.xx
					TB/TW	Data Sheet 70.1140 148.xx.xx
					IMAGO F3000	Data Sheet 70.0101 152.xx.xx
					IMAGO 500	Data Sheet 70.3590 162.xx.xx
					eTRON T	Data Sheet 70.1050 168.xx.xx
					eTRON M	Data Sheet 70.1060
					eTRON M100	Data Sheet 70.1061 231.xx.xx
					iTRON 04 B	Data Sheet 70.2050 181.xx.xx
					DR 100	Data Sheet 70.2060 195.xx.xx
					Software programs¹ (multilingual)	Sales No.
x					Setup program, program editor and Startup	70/00379085
	x				Setup program	70/00400027
		x			Setup program	70/00400025
			x		Setup program	70/00387913
				x	Program editor	70/00398294
				x	Setup program and program editor	70/00398296
				x	Setup program, program editor and Teleservice	70/00398297
x					Program editor	70/00379547
				x	Program editor	70/00400460
				x	Setup program and program editor	70/00399795
				x	Setup program, program editor and Startup	70/00403094
				x	Setup program, program editor, Startup and Teleservice	70/00400012
				x	Software package for recording function: PCA 3000 - evaluation program PCC - communications software	177.xx.xx 178.xx.xx 70/00431884
				x	Setup program	70/00419998
				x	Setup program	70/00485306
				x	Setup program	70/00420495
				x	Setup program	70/00435732
	x				Setup program, program editor and Startup	70/00445443

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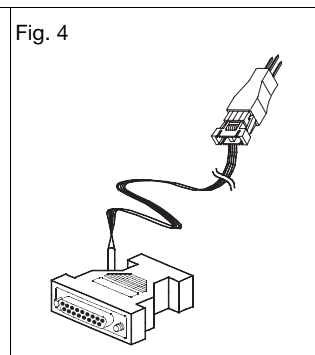
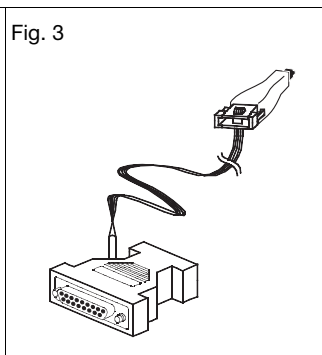
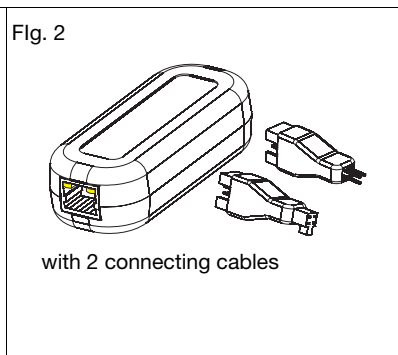
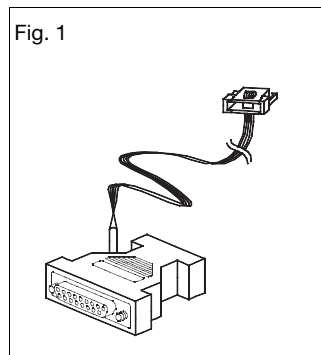
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Accessories for Programmiers, Thermostats, Microstats and Controllers

Device designation															
													DICON 400/500	Data Sheet 70.3570	
													DICON 401/501	Data Sheet 70.3580	
													dTRON 16.1	Data Sheet 70.3011	
													dTRON 316/308/304	Data Sheet 70.3041	
													iTRON	Data Sheet 70.2040	
													TB/TW	Data Sheet 70.1140	
													IMAGO F3000	Data Sheet 70.0101	
													IMAGO 500	Data Sheet 70.3590	
													eTRON T	Data Sheet 70.1050	
													eTRON M	Data Sheet 70.1060	
													eTRON M100	Data Sheet 70.1061	
													iTRON 04 B	Data Sheet 70.2050	
													mTRON	Data Sheet 70.4010 ... 45	
													DR 100	Data Sheet 70.2060	
													Accessories		Sales No.
x	x	x	x	x	x	x	x	x	x	x	x	x	Converter cable USB-serial	70/00408077	
x													PC interface with TTL/RS232 converter	70/00301315	Fig. 1
x	x	x	x	x	x	x	x	x	x	x	x	x	PC interface with USB/TTL converter, adapter (socket) and adapter (pins)	70/00456352	Fig. 2
													PC interface with TTL/RS232 converter and adapter (socket)	70/00350260	Fig. 3
x													PC interface with TTL/RS232 converter and adapter (pins)	70/00400821	Fig. 4
													ER8 relay module 110 – 240V AC	70/00405292	
													ER8 relay module 20 – 53V AC	70/00405297	
x	x												Plug-in power supply unit for interface converter (serial)	70/00365933	
x	x												Interface converter RS232 to RS422/485 (serial)	70/00376969	
x	x												Interface converter USB to RS232/422/485	70/00410030	



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Accessories for flush-panel mounting instruments to DIN



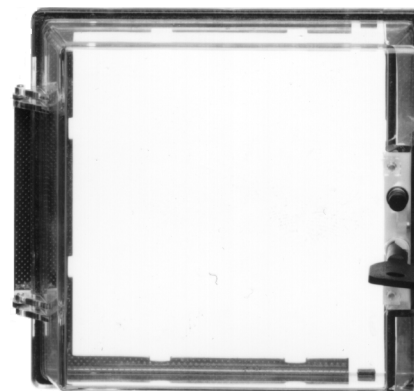
Protection cover AK-96

Lockable clear protection covers are available for protection against mechanical damage and unintentional or unauthorised manipulation, as well as protecting against dust and splashing water.

The panel mounting instrument is passed through the cover frame and pushed into the panel cut-out, where it is secured from behind.

Technical data

- lockable (plastic lock)
- high-impact clear plastic (polycarbonate)
- heat-resistant up to 130°C
- suitable for flush-panel mounting instruments with 96mm x 96mm bezel (DIN 43 700)
- Protection IP65



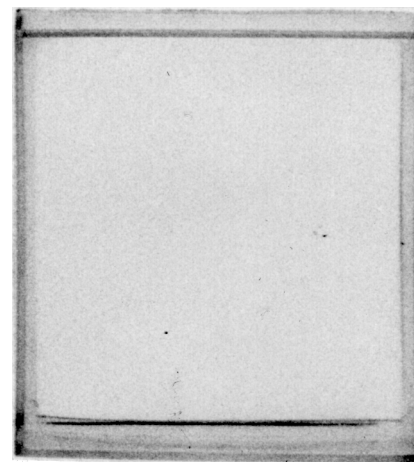
AK-96

Protection cover AK-48/f

The flexible cover protects against dust and splashing water while still allowing continued operation. The protection cover is slipped over the bezel, the instrument is pushed into the panel cut-out and secured from the back.

Technical data

- flexible clear plastic (soft PVC)
- size 48mm x 48mm
- Protection IP65



AK-48/f

Type	Controller
AK-48/f	to Data Sheet 70.1030

Blanking covers for panel cut-out

The blanking covers made of black plastic are secured from the back with plastic clips.

Type	Panel cut-out for flush-panel mounting instruments with bezel (DIN 43 700)
3-445/177	96mm x 96mm
3-445/317	48mm x 96mm



3-445/177

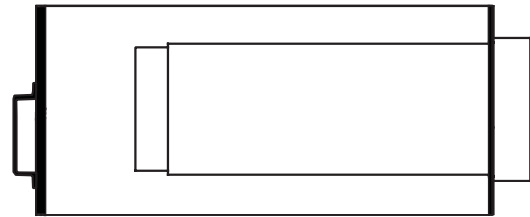
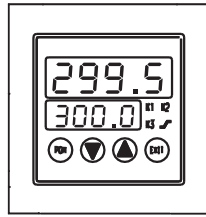


3-445/317

Mounting brackets for DIN rail

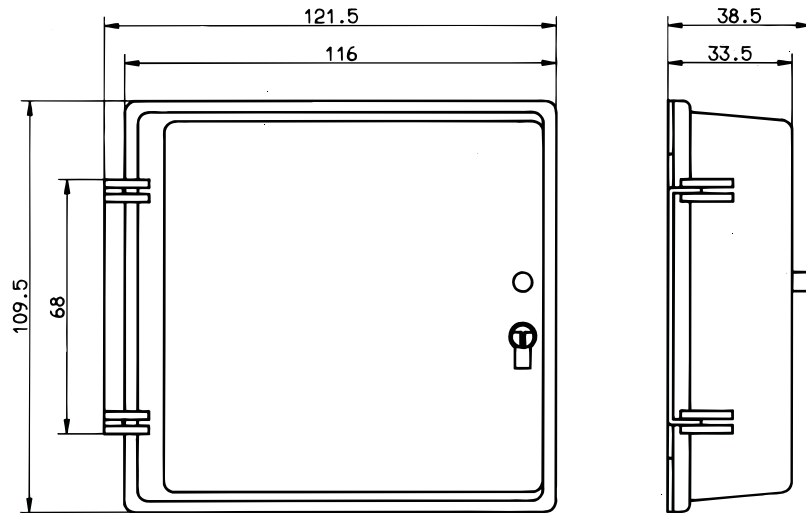
The mounting brackets for DIN rail enable flush-panel mounting units to be mounted according to DIN, also in switchgear cabinets, for example.

Mounting brackets for units with bezel	Dimensions (W x H x D)
48mm x 48mm	68mm x 70mm x 153mm
48mm x 96mm (portrait format)	68mm x 108mm x 153mm
96mm x 48mm (landscape format)	108mm x 70mm x 153mm



Dimensions

AK-96



AK-48/f

