



C **JUMO**® US

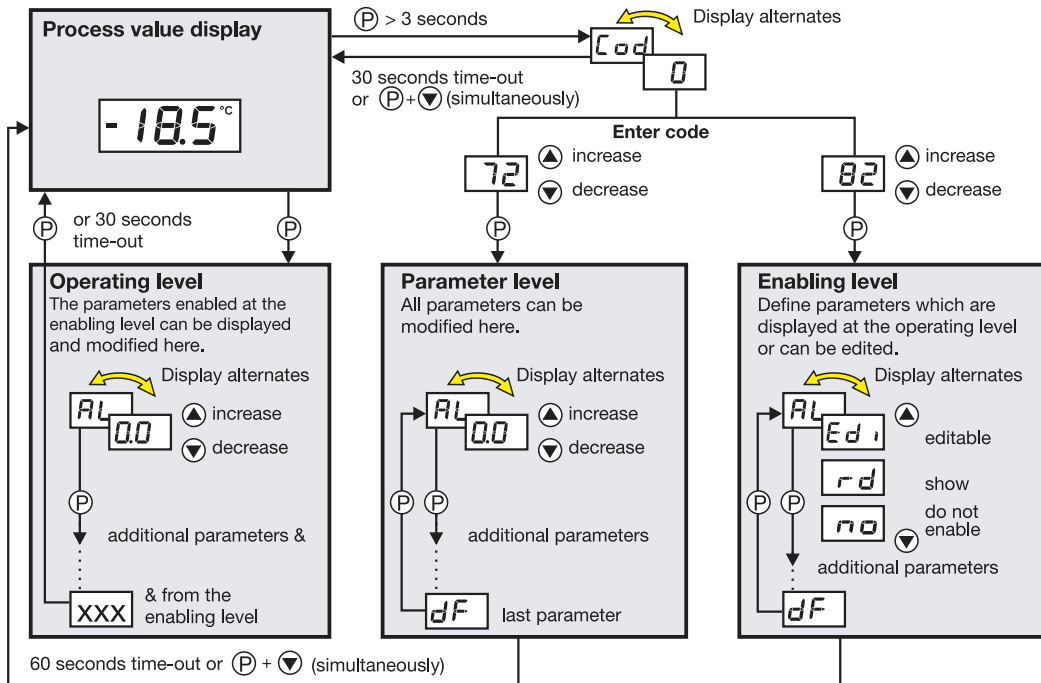


JUMO di eco
Digital Indicator

B 70.1540.0
Operating Instructions

02.10

Overview of operation



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1 Instrument identification

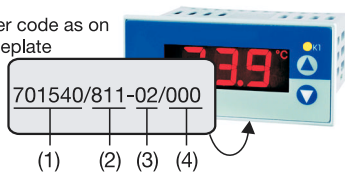
The nameplate is glued to the bottom of the instrument. The supply voltage that is connected must correspond to the voltage specified on the nameplate.



All necessary settings are described in these Operating Instructions. If any difficulties should still arise during start-up, you are asked not to carry out any unauthorized manipulations on the unit. You could endanger your rights under the instrument warranty! Please contact the nearest subsidiary or the head office.

Please read these operating instructions carefully before commissioning the instrument. Keep the manual in a place that is accessible to all users at all times. Please assist us to improve these operating instructions, where necessary.

Order code as on nameplate



Delivery package

- 1 seal
- 1 mounting frame
- 1 Operating Instructions 70.1540.0

701540/

(1) Basic version

JUMO di eco

(2) Basic type extension**Version**

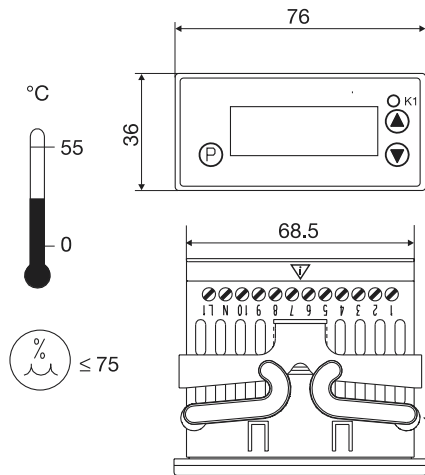
8	factory-set, configurable within the measurement input group
9	configured to customer specification
	Measurement input group¹
1	Pt100 in 2-wire circuit Pt 1000 in 2-wire circuit KTY2X-6
2	Fe-Con J Fe-Con L NiCr-Ni K
3	0 – 20 mA 4 – 20 mA
4	0 – 10 V
1	1 changeover 10A/250V
	(3) Supply
02	230V AC +10/-15% 48 – 63Hz
05	115V AC +10/-15% 48 – 63Hz
31	12 – 24V DC +15/-15% or 24V AC +15/-15% 48 – 63Hz
	(4) Approvals
000	none

_____	(1)	(2)	(3)	(4)
	<input type="text"/>	/ <input type="text"/>	- <input type="text"/>	/ <input type="text"/>
	701540	/ 811	- 02	/ 000

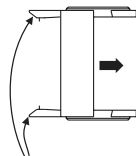
Order code**Order example** factory-set

1.) t is not possible to switch from one measurement input group to another

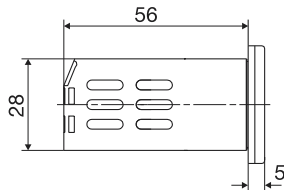
2 Mounting



Mounting frame



Snap-in lugs



Bezel size	76mm x 36 mm
Panel cut-out	$69^{+2.5}_{-0}$ mm x 28.5^{+1}_{-0} mm
Side-by-side mounting up to 40°C ambient temperature	Spacing of units: 10mm horizontal, 15mm vertical

- * Pull off mounting frame from instrument.
- * Insert the instrument from the front into the panel cut-out and make sure that the bezel seal is seated correctly.
- * From the back, push mounting frame onto the housing until the spring clips are under tension and the snap-in lugs have engaged at top and bottom.

3 Electrical connection

3.1 Installation notes

- The choice of cable, the installation, the fusing and the electrical connection of the instrument must conform to the requirements of VDE 0100 "Regulations on the Installation of Power Circuits with nominal voltages below 1000 V" or the appropriate local regulations.
- The electrical connection must only be carried out by qualified personnel.
- The electromagnetic compatibility conforms to the standards and regulations listed under Technical data.
- The instrument is not suitable for installation in areas with an explosion hazard and must be built into a housing that provides protection against fire /electrical hazards.
- The load circuit must be fused for the maximum relay current in order to prevent welding of the output relay contacts in the event of a short circuit.
- Do not connect any additional loads to the supply terminals of the instrument.
- The external fuse of the supply should not be rated below 1A, depending on the conductor cross-section. If contact with live components is possible while working on the instrument, it must be disconnected on all poles from the supply (e.g. via a separate mains supply switch).

<input type="checkbox"/> Supply		Measurement input and supply
230V AC and 115V AC	short-circuit-proof	electrically isolated from each other
12 – 24V DC and 24V AC	not short-circuit-proof	not electrically isolated from each other

3.2 Connection diagram

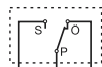


The electrical connection must only be carried out by qualified personnel!

Type 701540/XX1-XX

Relay K1

AC 250V/10A resistive load

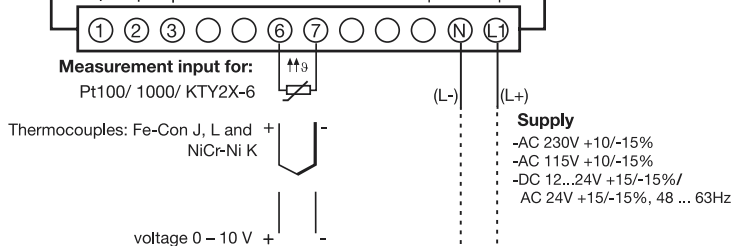


Type 701540/XX1-31:

Measurement input and supply voltage are not isolated from each other!



Supply voltage as per nameplate



Standard signals: current 0(4) – 20 mA

Connection of a 2-wire-transmitter at Type 701540/X31-31

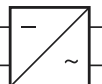
Notice technical data of the 2-wire-transmitter!



Do not connect screw 7 with (L-)!

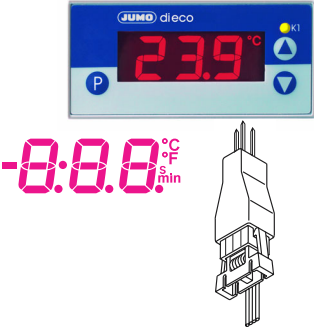
4...20 mA

Supply DC 12...24 V



4 Commissioning the instrument

4.1 Displays and controls

LC display	3-digit segment display, 13 mm high, with symbols for °C, °F, min and s, with red background lighting	
Status display	LED K1 lights up when present value is larger than AL. LED K1 goes out when present value is smaller than AL.	
Keys	<p>(P) programming</p> <p>▲ increase parameter value select operational status in enabling level</p> <p>▼ decrease parameter value select operational status in enabling level</p> <p>(P) + ▲ version display</p> <p>(P) + ▼ exit, jump to basic status</p>	
Setup interface	The instrument is linked to the PC via a PC interface with TTL/RS232 converter and adapter (3 pins).	

When everything is connected up correctly on the instrument, the present temperature is displayed. If an alarm message appears, see Chapter 6 “Alarm messages”. The relay operates according to the selected relay type (OUT), see Chapter 4.3 “Setting the instrument functions (parameter level)”.


4.2 Operating level



Time-out:

If no key is pressed for 30 seconds, then the instrument automatically switches back to the temperature display, see **Overview of operation on the front inside page**.

The parameters that have been enabled at the enabling level can be displayed and modified at the operating level.

- * Press **P** (only briefly). The first parameter that can be modified appears, e.g.  . **Parameter name** and present **value** are displayed alternately.
- * Use the **▲** and **▼** keys to set the value within the specified value range.
- * Acknowledge settings with **P**.
- * Set the next parameter, see *Overview of operation* on the front inside page.







4.3 Setting the instrument functions (parameter level)



Time-out:

If no key is pressed for 60 seconds, the instrument automatically switches back to temperature display, see **Overview of operation on the front inside page**.

The instrument functions and values are set at the parameter level.

- * Press **P** for 3 seconds and  will appear in alternation.
- * Set code 72 for accessing the parameter level using the  and  keys. The longer the key is pressed, the faster the value will change.
- * Acknowledge with **P**, **parameter name** and **value** appear alternately, e.g. .
- * Use the  and  keys to set the value within the specified value range.
- * Acknowledge settings with **P**.
- * Set the next parameter, see *Overview of operation* on the front inside page.

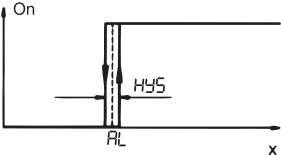


Switching parameters out of display:

The table below lists all the parameters for each instrument type.



Depending on the type designation on the nameplate, parameters that are not required are hidden.

Indicator parameters

Parameter	Meaning	Value range from...factory-set...to
AL	<p>Alarm value (limit for relay and LED)</p> <p>A measured value is considered to be an alarm if</p> <ul style="list-style-type: none"> - present value is larger than alarm value $AL + \frac{1}{2}$ hysteresis HYS and - has been continuously present for longer than configured under the alarm suppression time ALd. <p>An alarm is reset if</p> <ul style="list-style-type: none"> - present value is smaller than the alarm value - $\frac{1}{2}$ hysteresis. 	$ALL \dots 0 \dots ALH$
HYS	<p>Hysteresis</p> <p>It is used to determine an alarm. The hysteresis lies symmetrically about the limit value AL.</p> 	0.4 ... 1.0 ... 99.9°C/°F
ALL	<p>Low alarm limit</p> <p>ALL, together with ALH, is used to limit the value range for the alarm value AL.</p>	-350 ... -200 ... 999°C/°F
ALH	<p>High alarm limit</p> <p>ALH, together with ALL, is used to limit the value range for the alarm value AL.</p>	-350 ... 500 ... 999°C/°F

Parameter	Meaning	Value range from...factory-set...to
<i>AL.d</i>	Alarm suppression time An alarm is not considered to be an alarm for this period. The LED K1 flashes in the display. If an alarm is present for longer than <i>AL.d</i> , then it is considered to be an alarm, the LED K1 lights up and the relay is switched in accordance with the parameter <i>out</i> (see parameter <i>AL</i>).	0 ... 60min
<i>dLY</i>	Switch-on delay after power-on For the time-delayed switch-on of the alarm monitoring. No alarms are evaluated during this time, only probe errors.	0 ... 60min
<i>out</i>	Relay type 0: relay operates as a break contact in the event of an alarm 1: relay operates as a make contact in the event of an alarm	0 ... 1
<i>S.Er</i>	Response to over/underrange 0: relay drops out at once 1: relay pulls in at once	0 ... 1

Parameter	Meaning	Value range from...factory-set...to
Input		
SEn	Sensor connected in 2-wire circuit Measurement input group 1 on Type: 701540/X11-XX	Pt100: P, Ih Pt1000: P, It KTY2X-6: P, tC or tAb
	Measurement input group 2 on Type: 701540/X21-XX	Fe-Con J: t, c, J Fe-Con L: t, c, L NiCr-Ni K: t, c, H or tAb
	Measurement input group 3 on Type: 701540/X31-XX	0(4)... 20 mA: L in / tAb
	Measurement input group 4 on Type: 701540/X41-XX	0 ... 10 V: L in / tAb
S.cL	Start value for indication range with measurement input voltage or current Example: input signal 4 – 20mA is to be represented in the display from -10 to 50. Set S.cL= -10 and S.cH=50.	-999 ... 0 ... +999
S.cH	End value for indication range with measurement input voltage or current	-999 ... 100 ... +999
i. 0	Signal for measurement input current: 0 = 0 to 20mA 1 = 4 to 20mA	0, 1
OF.t	Process value offset PV offset in °C, °F or digit (no unit)	-99.9 ... 0.0 ... 99.9

Parameter	Meaning	Value range from...factory-set...to
OF.r	<p>Lead compensation resistance This value is used to compensate the resistance of the probe lead and is dependent on the lead length. For best temperature measurement results, the resistance value of the probe lead has to be entered here (with short-circuited probe).</p> <p> If the total resistance at the measurement input (sensor resistance + selected value for OF.r) exceeds 320 Ω with Pt100 and 3200 Ω with Pt1000/KTY2x-6, a measurement error will occur !</p>	0.0 ... 99.9 in Ω
Un i	<p>Unit for the process value displayed</p> <p> Only the process value at the measurement input will be correspondingly converted when changing over to $^{\circ}\text{F}$. All other variables will retain their values.</p>	$^{\circ}\text{C}$ or $^{\circ}\text{F}$ no (= no unit)
dF	<p>Filter time constant for adapting the digital input filter. At a signal step, 63% of the changes are registered after the filter time constant has elapsed. Values between 0.1 and 0.7 are interpreted as 0.8 (sampling time). If the filter time constant is long:</p> <ul style="list-style-type: none"> - high damping of interference signals - slow reaction of the process value display to process value changes. 	0.1 ... 0.8 ... 99.9s



Return to the first parameter AL of the parameter level with $\text{P} > 3$ seconds.







4.4 Allocating user rights (enabling level)



Time-out:

If no key is pressed for 60 seconds, the instrument automatically switches back to the process value display, see **Overview of operation on the front inside page**.

The setting at the enabling level defines **user rights** which determine whether a parameter is shown at the operating level, can be edited or is not shown at all.

- * Press **P** for 3 seconds and  appears.
- * Set code 82 for accessing the enabling level using the  and  keys.
- * Acknowledge with **P**
Parameter and **user right** blink in alternation, e.g. .
- * Use the  and  keys to set user right to *Ed*, *rd* or *no*.

User right	Display	Factory setting
Parameter is shown and editable	<i>Ed</i>	<i>AL</i>
Parameter is shown only	<i>rd</i>	-
Parameter is not shown	<i>no</i>	all other parameters

- * Acknowledge settings with **P**.
- * Set next parameter, see *Overview of operation* on the front inside page.

5 Technical data

Meas. input	Designation	Meas. 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	recognized	recognized
	Pt1000 EN 60 751	-200 to +600 °C	0.1%/ ≤100ppm/°C	recognized	recognized
	KTY2X-6 (PTC)	-50 to +150 °C	1%/ ≤100ppm/°C	recognized	recognized
	resistance 0 – 3000 Ω	customer table ³	0.1%/ ≤100ppm/°C ³	= 0Ω	recognized
Measuring current with Pt100: 0.2 mA, with Pt1000, KTY2X-6 or resistance: 0.02 mA					
Lead compensation is adjustable via the parameter Lead compensation resistance $D F_r$ The total resistance (sensor+lead) must not exceed 320Ω with Pt100 and 3200Ω with Pt1000, KTY2X-6 or resistance.					
Thermo-couple	Fe-Con J EN 60 584	-200 to +999 °C	0.4%/ ≤100ppm/°C ²	-	recognized
	Fe-Con L DIN 43710	-200 to +900 °C	0.4%/ ≤100ppm/°C ²	-	recognized
	NiCr-Ni K EN 60 584	-200 to +999 °C	0.4%/ ≤100ppm/°C ²	-	recognized
	-10 to 60 mV	customer table ³	0.1%/ ≤100ppm/°C ³	-	recognized
For the voltage input (-10 to 60 mV), terminal temperature compensation for thermocouples can be used. Internal terminal temperature compensation can be switched off through the setup program (0°C).					

Meas. input	Designation	Meas. range	Meas. accuracy ^{1)/} ambient temperature error	Recognition of ...	
				Probe short- circuit	Probe break
Current	0 to 20 mA	-2 to 22 mA scalable with S_{cL} and S_{cH} or customer table	0.1%/ $\leq 100 \text{ ppm}/^{\circ}\text{C}^3$	-	-
	4 to 20 mA	2.4 to 21.6 mA scalable with S_{cL} and S_{cH}	0.1%/ $\leq 100 \text{ ppm}/^{\circ}\text{C}^3$	recognized	recognized
Input resistance $R_{IN} \leq 3\Omega$					
Voltage	0 to 10 V	-1 to 11 V scalable with S_{cL} and S_{cH} or customer table	0.1%/ $\leq 100 \text{ ppm}/^{\circ}\text{C}$	-	-
Input resistance $R_{IN} \geq 100\text{k}\Omega$					
1.) The accuracy refers to the measuring range span. 2.) valid from -50°C 3.) A valid customer table must be entered through the setup program and switched over to tAb in the instrument. This may reduce the measuring accuracy.					

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, no condensation
Cleaning and care of the 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 (changeover contact)	150,000 operations at 10A 250V AC resistive load
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Supply

Supply voltage	230V AC +10/-15%, 48 – 63Hz or 115V AC +10/-15%, 48 – 63Hz (electrically isolated from measurement input)
	12 – 24V DC +15/-15%, 24V AC +15/-15%, 48 – 63Hz (not electrically isolated from measurement input)
Power consumption	< 4VA

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 VO

Electrical data

Data backup	EEPROM
Connection	screw terminals for wire cross-sections up to 4 mm ² solid wire and up to 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

5.1 Setup program

The program and the interface with adapter are available as accessories and offer the following advantages:

- simple and convenient parameterization and archiving via PC
- simple duplicating of parameters on instruments of the same type
- possibility of entering a linearization table


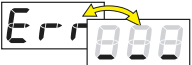
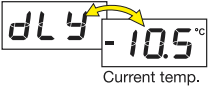


Minimum hardware and software requirements

- PC Pentium 100 or compatible
- 128 MB RAM, 16 MB free on hard disk
- CD-ROM drive
- free COM interface
- Microsoft Windows 98/ME/NT4.0/2000/XP
- * Link PC interface to the RS232 interface on the PC
- * Insert black adapter (3 pins) into instrument from below



6 Alarm messages

The following alarm messages may appear in the temperature display:

Error message	Cause	Elimination
	Display overrun The value is too large and is outside the range.	<ul style="list-style-type: none">- Check sensor and connecting cable for damage or short-circuit- Check whether the correct sensor has been set or connected ⇒ Chapter 4 “Commissioning the instrument”
	Display underrun The value is too small and is outside the range.	
 Current temp.	Time for switch-on delay after power-on has elapsed. With display over/underrun, switch-on delay becomes ineffective.	* Cancel switch-on delay with  + 



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