

JUMO iTRON 04/08/16/32

Compact microprocessor controllers

Housing for flush-panel mounting to DIN 43 700

Brief description

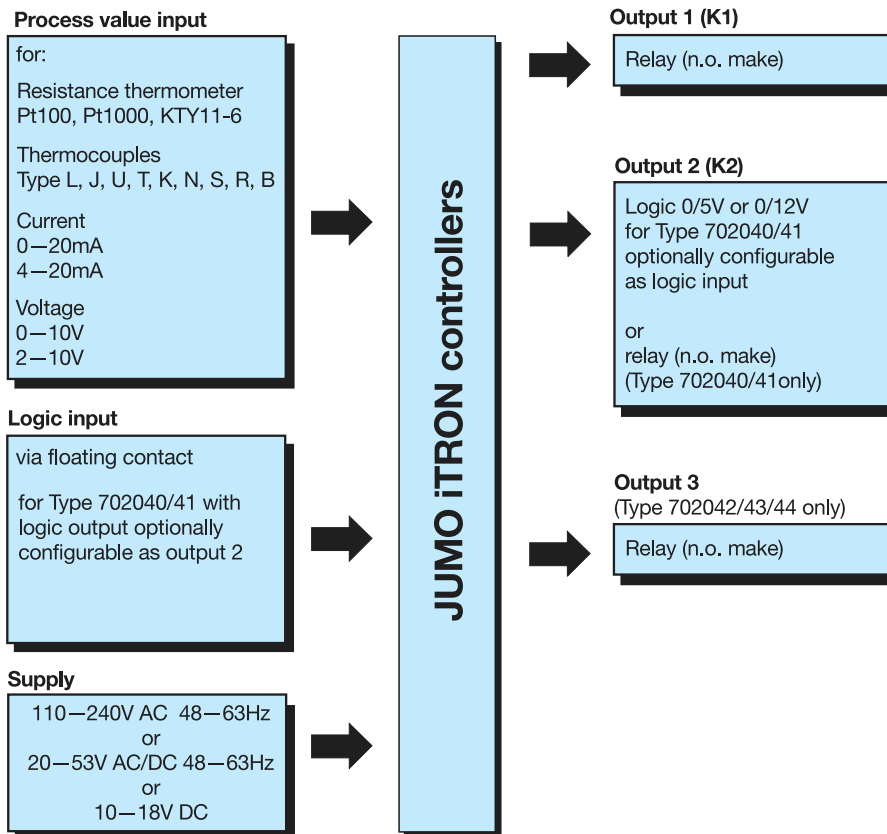
The JUMO iTRON controller series comprises universal and freely programmable compact instruments for a variety of control tasks. It consists of five models, with the bezel sizes 96mm x 96mm, 96mm x 48mm in portrait and landscape format, 48mm x 48mm and 48mm x 24mm.

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 ¹ | 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 | | |

1. These ranges refer to the ambient temperature of 20°C

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 | 20Ω max. per lead for 2- and 3-wire circuit | | | |
| Measurement current | 250μA | | | |
| 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 > 100kΩ | ≤0.1% | 100 ppm/°C |
| | 2 – 10V, input resistance R _E > 100kΩ | ≤0.1% | 100 ppm/°C |
| | 0 – 1V, input resistance R _E > 10MΩ ¹ | ≤0.1% | 100 ppm/°C |
| | 0,2 – 1V, input resistance R _E > 10MΩ ¹ | ≤0.1% | 100 ppm/°C |
| Current | 4 – 20mA, voltage drop 3V max. | ≤0.1% | 100 ppm/°C |
| | 0 – 20mA, voltage drop 3V 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 |
|----------|-----------------|

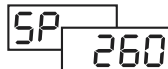
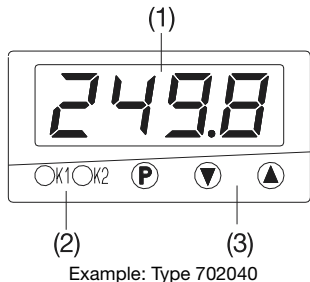
Electrical data

| | |
|---|---|
| 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. 7VA |
| 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

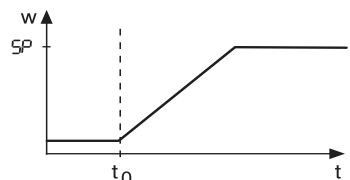
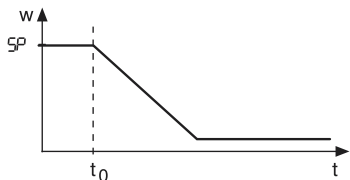
| | | |
|-------------------------------------|---|---|
| <p>(1) Display</p> | <p>7-segment display, 4 places, green Display alternates when setpoints, parameters and codes are indicated and entered.</p>  |  <p>Example: Type 702040</p> |
| <p>Character height</p> | <p>Type 702040/41/42: 10mm, Type 702043/44: 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)

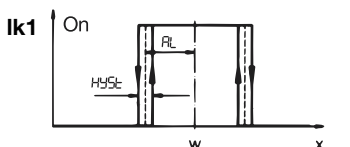
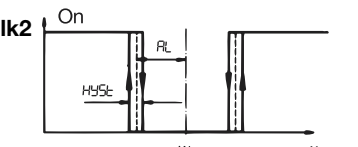
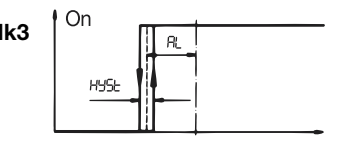
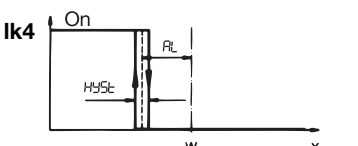
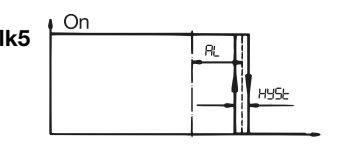
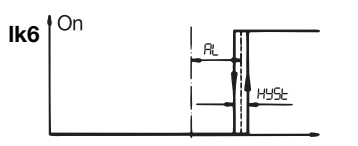
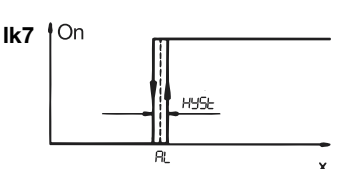
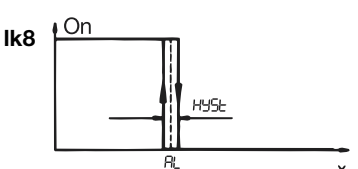
The standard self-optimisation facility produces an automatic adjustment of the controller to the process.

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> |  |  |
|---|---|--|

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 | € 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 | € 112 | none/°C | none, one, two/°C, F |
| Controller type/outputs | € 113 | see table on next page | |
| Limit comparator function | € 114 | no function | no function, lk1—8 |
| Ramp function | € 115 | no function | no function, °C/min, °C/h |
| Output signal on overrange/ underrange | € 116 | 0% output limit comparator off | 0%, 100%, -100% limit comparator on/off |
| Logic input | € 117 | no function | key / level inhibit, ramp stop, setpoint switching |
| Outputs 1, 2 and 3 (only Type 702042/43/44) | € 118 | functions as defined under € 113 | freely configurable (see table on next page) |
| Timer function | € 120 | no function | see description "Timer function" |
| Start condition for timer | € 121 | from keypad/ logic input | - power ON - keypad/logic input - tolerance limit |
| Timer signalling | € 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) | € 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) | HYS€ | 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 |

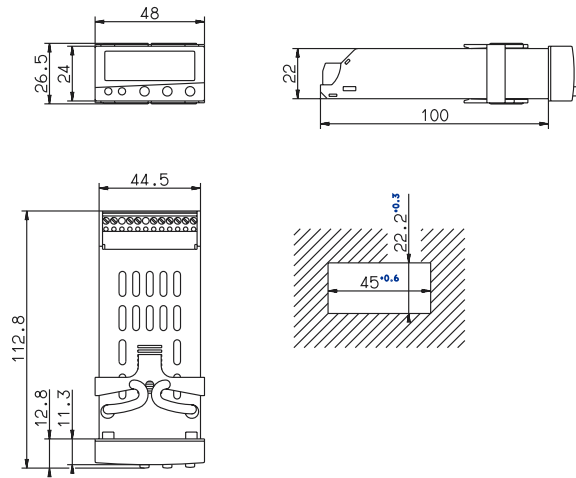
■ = factory setting

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

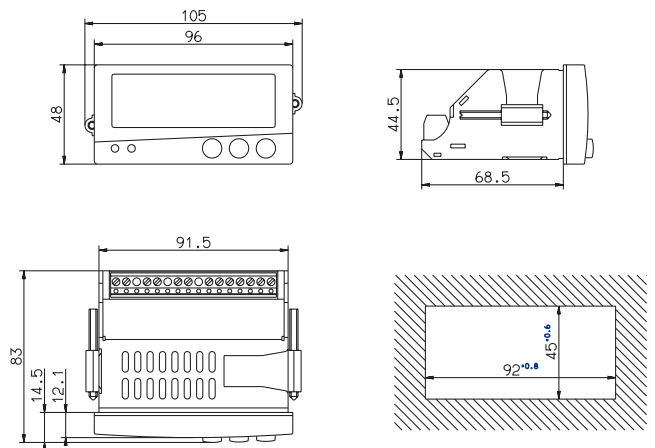
| | Output 1: Relay (K1) | Output 2: Logic (K2) | Output 3: Relay |
|-----------------------|---|------------------------|------------------------|
| 1-setpoint controller | Functions of the outputs as defined under C 113 | | |
| | controller output | limit comparator | timer signalling |
| | controller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

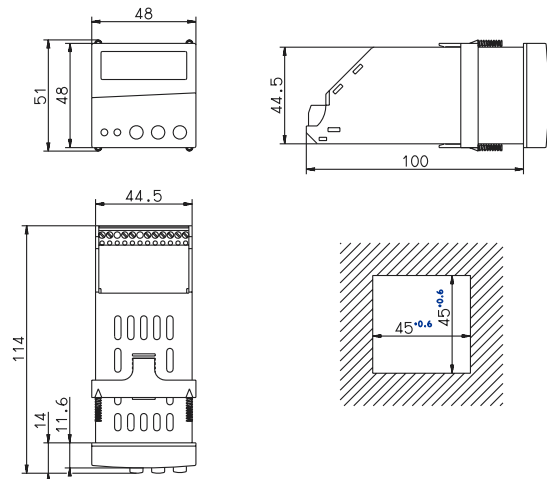
Type 702040 / ...



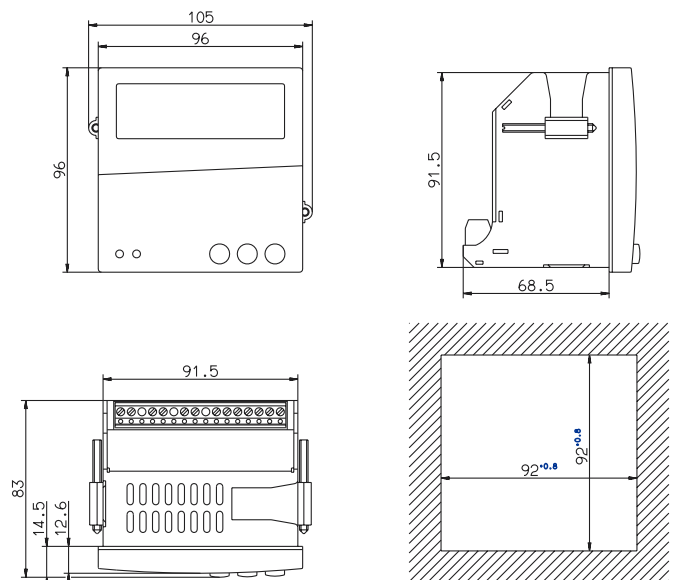
Type 702043/...



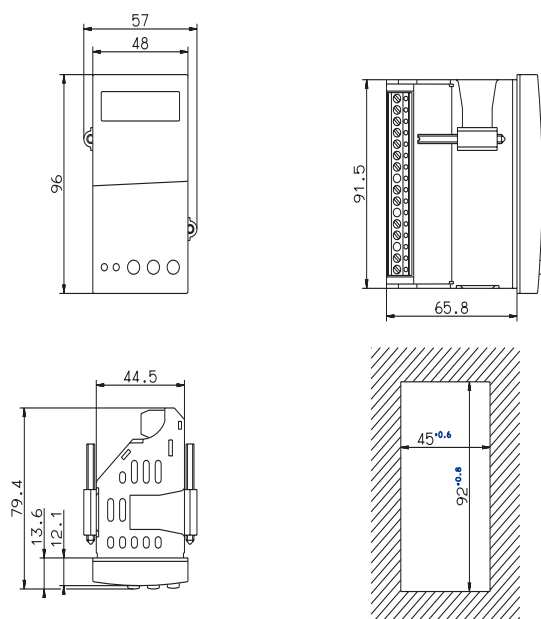
Type 702041 / ...



Type 702044/...



Type 702042 / ...



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

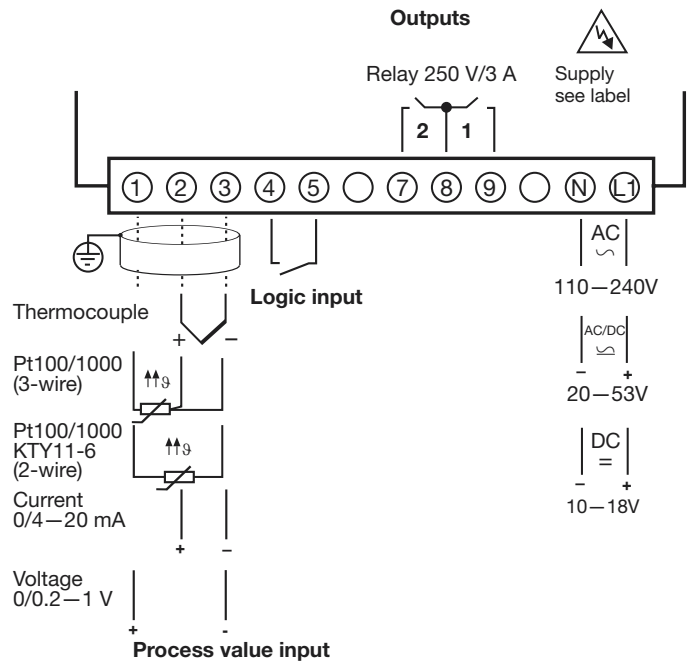
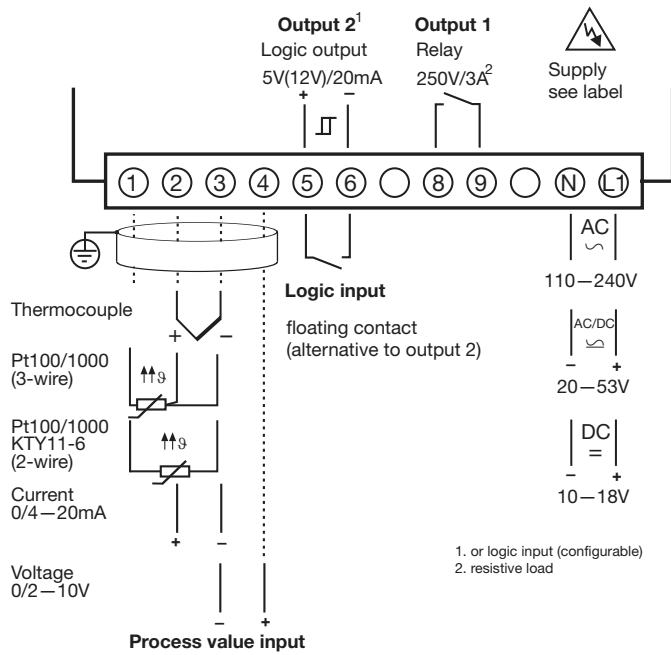
| Type | horizontal | vertical |
|---------------|------------|-----------|
| 70.2040/41 | 8mm min. | 8mm min. |
| 70.2042/43/44 | 10mm min. | 10mm min. |

Connection diagrams

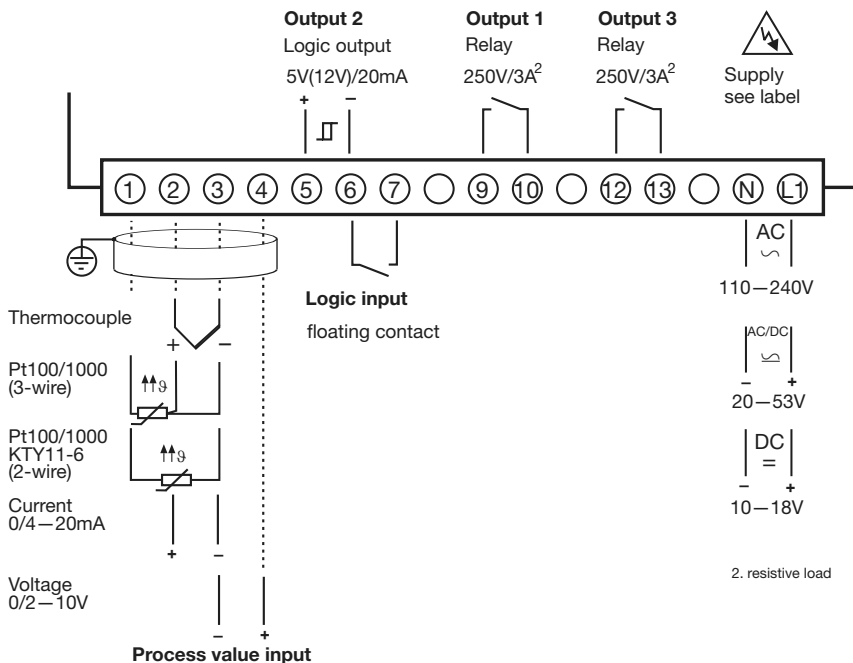
JUMO iTRON 32, Type 702040, 48mm x 24mm format
JUMO iTRON 16, Type 702041, 48mm x 48mm format

Standard version / Version with 12V logic output

Version with 2 relay outputs



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