



# 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 2.5mm<sup>2</sup>.

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

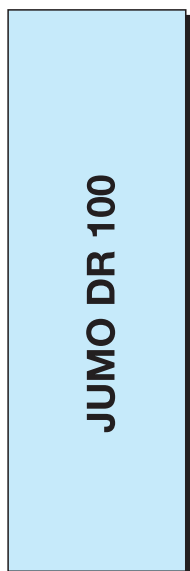
Pt100, Pt1000 in 2-wire or 3-wire circuit, KTY11-6, thermocouples type L, J, U, T, K, N, S, R, B  
current input 0/4 — 20 mA or voltage input 0/2 — 10V

### 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 <sup>1</sup>
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 <sup>1</sup>
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%	$R_{IN} < 4 \Omega$
0 – 10V 2 – 10V	0.1%	$R_{IN} > 100 \text{ k}\Omega$
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
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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

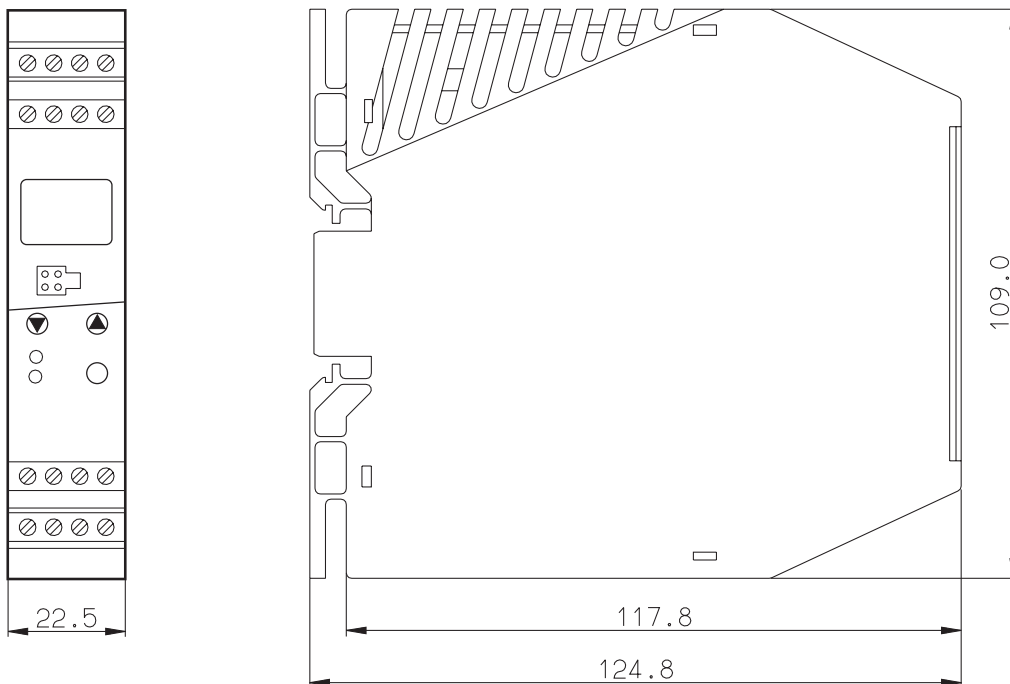
1. All data refer to the full-scale value

**Housing**

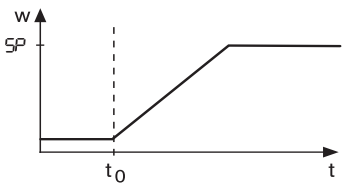
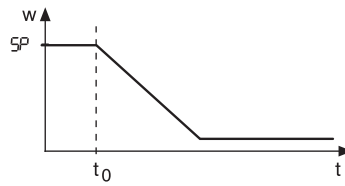
Material	polyamide (PA 6.6)
Mounting	on 35mm x 7.5mm DIN rail to EN 50 022
Operating position	vertical
Weight	approx. 160g
Data backup	EEPROM
Electrical connection	via screw terminals, conductor cross-section: 0.2 – 2.5mm <sup>2</sup>

**Dimensions**

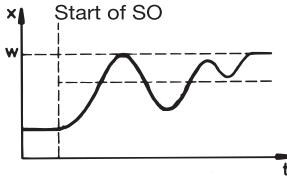
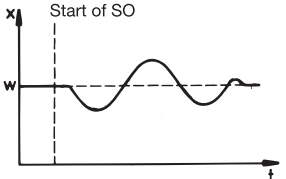
**Type 702060/...**



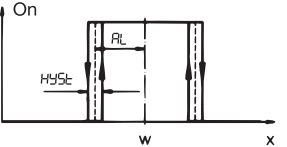
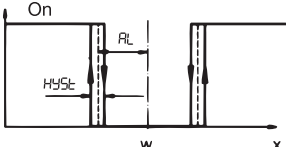
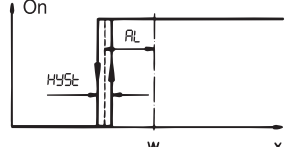
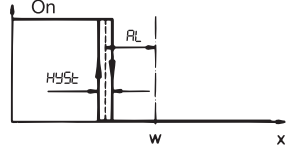
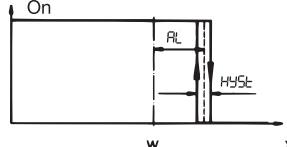
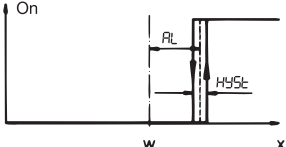
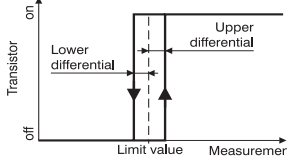
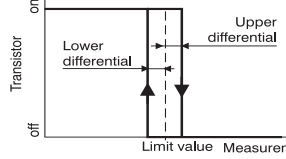
## Ramp function

<p>The ramp function enables a defined approach of the PV from <math>t_0</math> to the selected setpoint SP. The slope is set via a gradient (<math>^{\circ}\text{C}/\text{min}</math> or <math>^{\circ}\text{C}/\text{h}</math>) 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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## 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><b>SO in the approach phase</b></p> 	<p><b>SO at the setpoint</b></p> 
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## Limit comparator

<p><b>Function Ik1</b> Window function: output is active (On) when the measured value is within a certain range (window) about the setpoint.</p> <p><b>Function Ik2</b> as Ik1, but inverted signal function.</p>	<p><b>Ik1</b></p> 	<p><b>Ik2</b></p> 
<p><b>Function Ik3</b> lower limit signal Function: output is inactive when the measured value is below (setpoint - limit value)</p> <p><b>Function Ik4</b> as Ik3, but inverted signal function.</p>	<p><b>Ik3</b></p> 	<p><b>Ik4</b></p> 
<p><b>Function Ik5</b> upper limit signal Function: output is inactive when the measured value is above (setpoint + limit value)</p> <p><b>Function Ik6</b> as Ik5, but inverted signal function.</p>	<p><b>Ik5</b></p> 	<p><b>Ik6</b></p> 
<p><b>Function Ik7</b> 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><b>Function Ik8</b> as Ik7, but inverted signal function.</p>	<p><b>Ik7</b></p> 	<p><b>Ik8</b></p> 

## Timer function

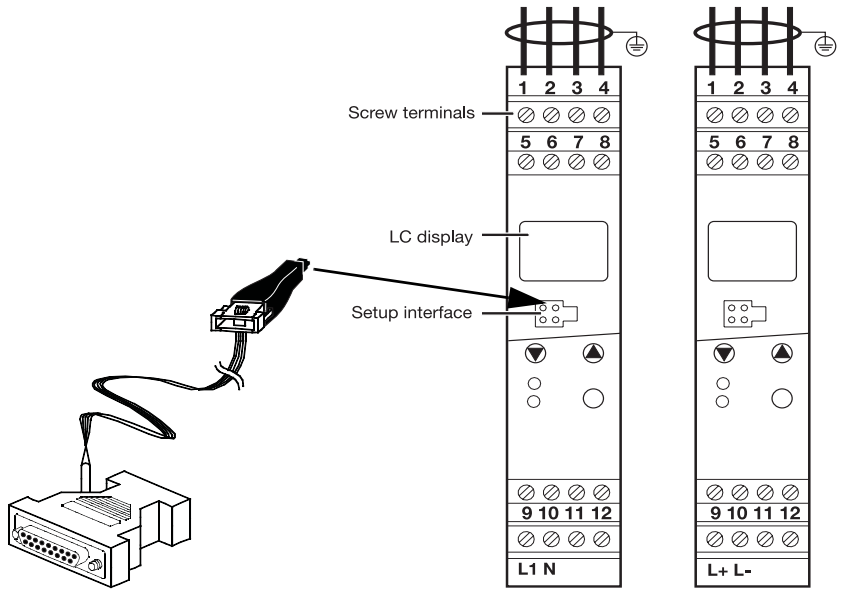
Using the timer function, the control action can be influenced by means of an adjustable time  $t, \bar{0}$ . After the timer has been started (by power ON, pressing the key or through the logic input), the timer start value  $t, \bar{0}$  is counted down to 0, either immediately or after the process 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
<b>Time-limited control</b> The control action is switched off after the timer has run down (output 0%)			
<b>Time-dependent setpoint switching</b> After the timer has been started, the process is controlled to setpoint $SP2$ . When the timer has run down, the controller automatically switches to $SP1$ .			
<b>Time-delayed control</b> The control action starts after the timer has run down.			
<b>Timer with signaling</b> 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



	<b>Supply</b> as per nameplate	<b>AC</b> L1 line N neutral	<b>AC/DC</b> L+ L-	
	<b>Analog inputs</b>	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		
<b>Logic input</b>	for connection to floating contact			
	<b>Logic output</b>	0/5 V, 0/20 mA oder 0/12V, 0/20mA (short-circuit proof)		
	<b>Relay output</b>  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 <sup>1</sup>
	199 =	1 relay (changeover contact)	-	programmable, customized configuration <sup>2</sup>
	288 =	1 relay (make contact)	1 relay (make contact)	programmable, with factory setting <sup>1</sup>
	299 =	1 relay (make contact)	1 relay (make contact)	programmable, customized configuration <sup>2</sup>
(2)	<b>Measurement input</b>			
		888 =	programmable, with factory setting <sup>1</sup>	
		999 =	programmable, customized configuration <sup>2</sup>	
(3)	<b>Output 3</b>			
		000 =	logic output: 0/5V, 0/20mA	
		113 =	logic output: 0/12V, 0/20mA	
(4)	<b>Supply</b>			
		23 =	110 – 240V AC +10/-15%, 48 – 63Hz	
		22 =	20 – 53V AC/DC, 48 – 63Hz	
(5)	<b>Extra code</b>			
		061 =	UL approval (Underwriters Laboratories)	
1. see ex-factory settings at the configuration and parameter levels				
2. see customer order text or settings at the configuration and parameter levels				

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