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JUMO iTRON DR 100 Microprocessor Controller

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



Type 702060/ ...

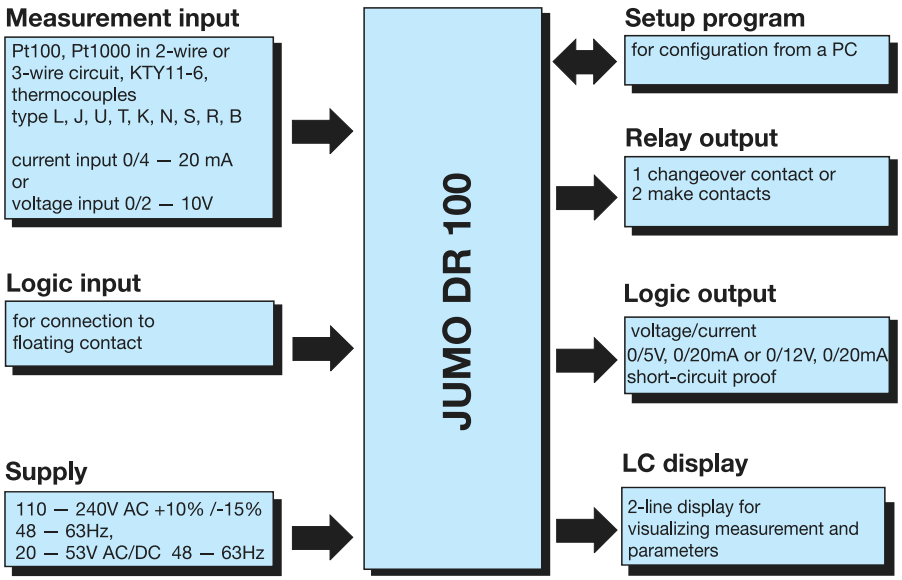
Brief description

The JUMO iTRON DR 100 is a universal, freely programmable microprocessor controller which lends itself to a wide range of control applications.
The controller is available with one SPDT or 2 SPST relays.
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.

Approvals

cULus

Overview of functions



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 — 100 sec	

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 — 100 sec	

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 — 20 mA 4 — 20 mA	0.1%	fall of potential < 2V
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 — 100 sec	

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 — 20 mA 0 — 20 mA	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
UL	valid for UL 61010-1 and CSA C22.2 No 61010-1

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

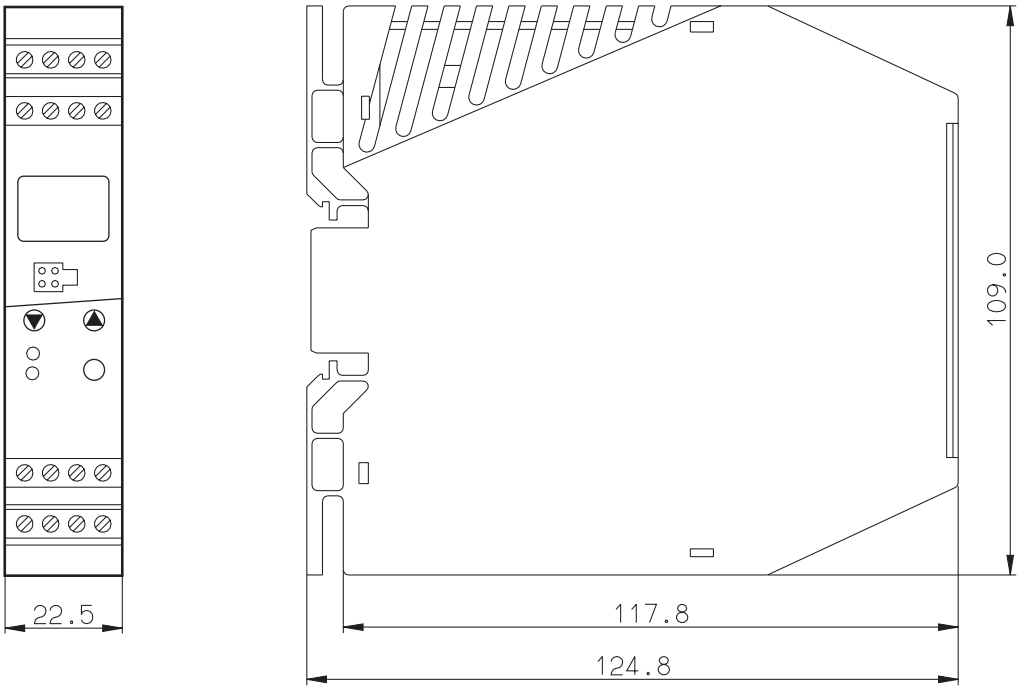
1. All data refer to the full-scale value

Housing

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

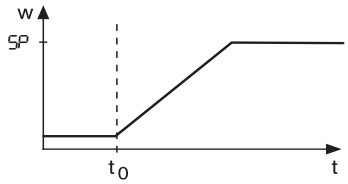
Dimensions

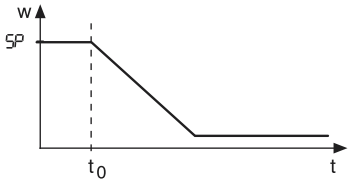
Type 702060/...



Ramp function

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 (°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.

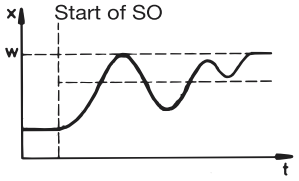




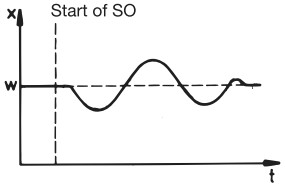
Self-optimization (SO)

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.

SO in the approach phase



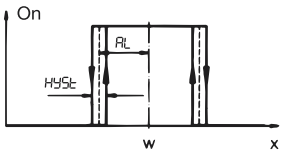
SO at the setpoint



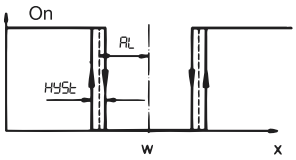
Limit comparator

Function lk1
Window function: output is active (On) when the measured value is within a certain range (window) about the setpoint.
Function lk2
as lk1, but inverted signal function.

lk1

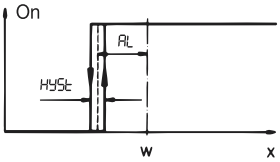


lk2

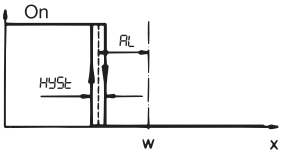


Function lk3
lower limit signal
Function: output is inactive when the measured value is below (setpoint - limit value)
Function lk4
as lk3, but inverted signal function.

lk3

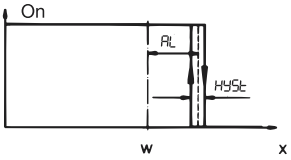


lk4

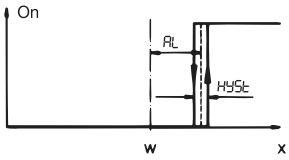


Function lk5
upper limit signal
Function: output is inactive when the measured value is above (setpoint + limit value)
Function lk6
as lk5, but inverted signal function.

lk5

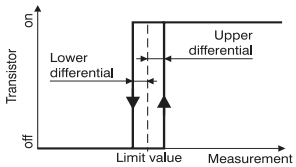


lk6

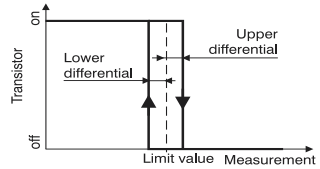


Function lk7
Switching point does not depend on the controller setpoint; only AL determines the switching point.
Function: output is active when the measurement is above the limit value.
Function lk8
as lk7, but inverted signal function.

lk7



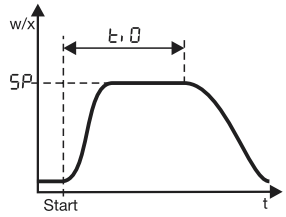
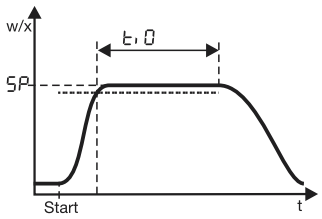
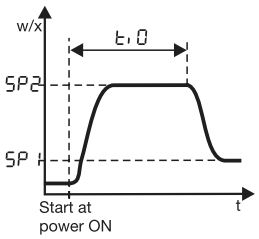
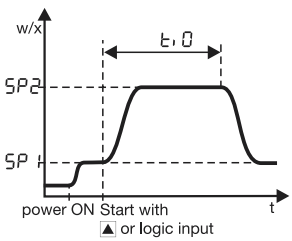
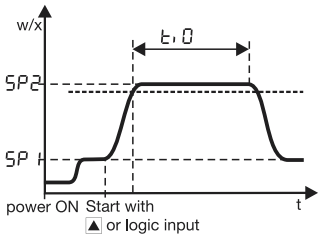
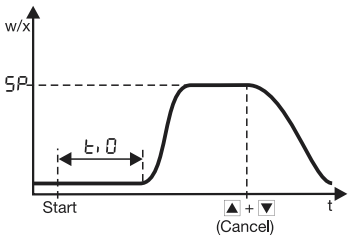
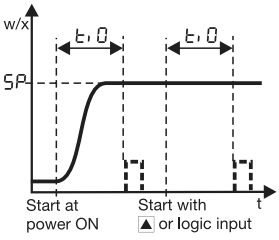
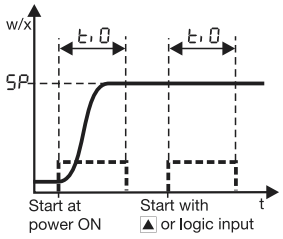
lk8



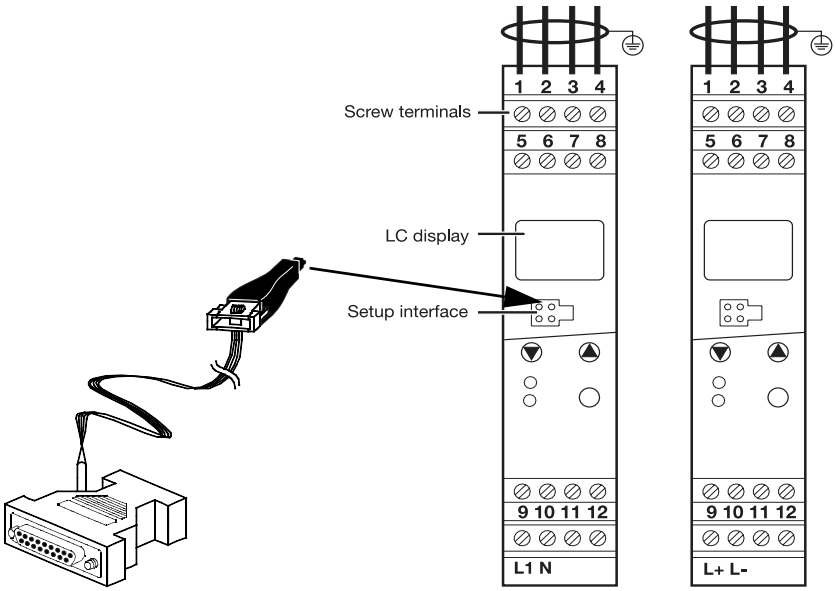
Timer function

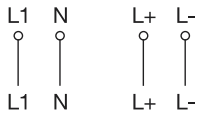
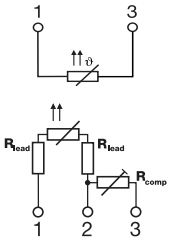
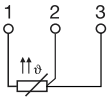
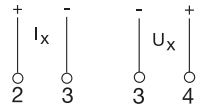
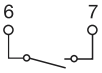
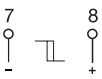
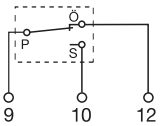
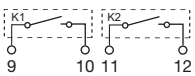
Using the timer function, the control action can be influenced by means of an adjustable time t1.0. After the timer has been started (by power ON, pressing the key or through the logic input), the timer start value t1.0 is counted down to 0, either immediately or after the process value has gone above 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	Start condition: Keys/logic input	Start condition: 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, t1.0 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!	SPDT (changeover contact) K1 without contact protection circuit Type 702060/1XX...		
		SPST (make contact) K1 Type 702060/2XX...	SPST (make contact) K2 Type 702060/2XX...	

Order details

(1)	**Basic type**	**Output 1**	**Output 2**	**Note**
	188 =	1 relay SPDT (changeover contact)	-	programmable, with factory setting[1]
	199 =	1 relay SPDT (changeover contact)	-	programmable, customized configuration[2]
	288 =	1 relay SPST (make contact)	1 relay SPST (make contact)	programmable, with factory setting[1]
	299 =	1 relay SPST (make contact)	1 relay SPST (make contact)	programmable, customized configuration[2]
(2)	**Measurement input**			
	888 =	programmable, with factory setting[1]		
	999 =	programmable, customized configuration[3]		
(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)	

1. see ex-factory settings at the configuration and parameter levels

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

2. Possible settings for Basic type extension

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

1a. controller output is active when process value is below setpoint, e. g. heating
2a. controller output is active when process value is above setpoint, e. g. cooling

3. Possible settings for 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

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