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JUMO eTRON M100
Electronic Refrigeration Controller

76mm x 36mm format

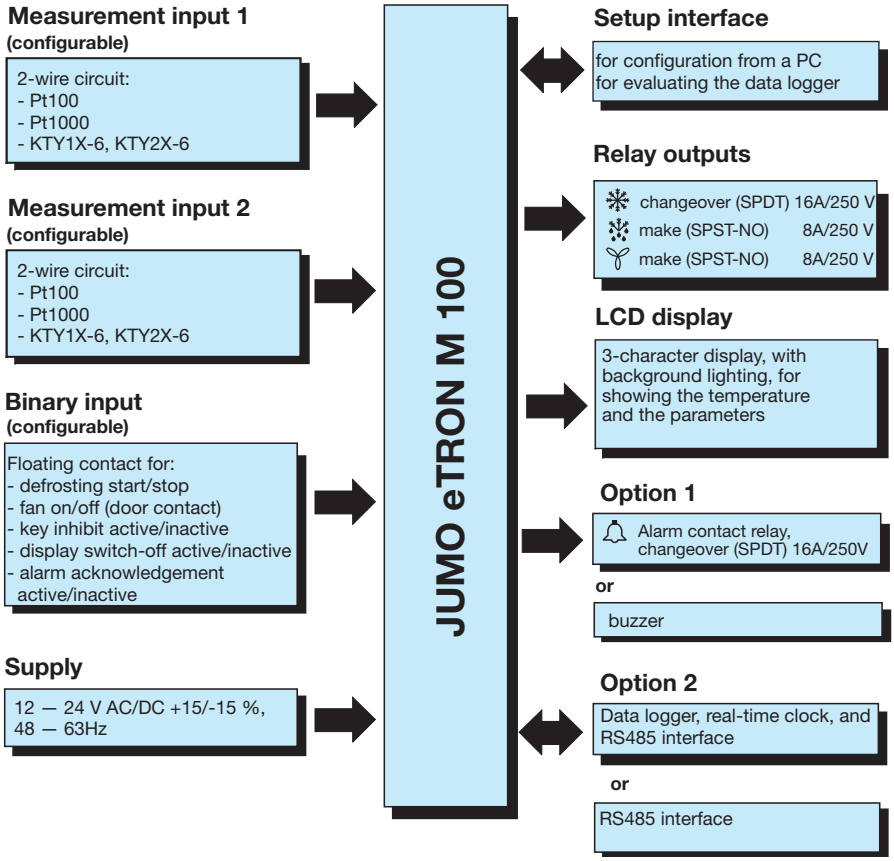


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Brief description

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 documentation[1], 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.

Block diagram



[1] **HACCP** : **H**azard **A**nalysis and **C**ritical **C**ontrol **P**oint

Special 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

Approvals

c UL us

2009-04-01/00488089

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 	The LEDs **Cooling** **Defrosting** **Fan** and **Alarm** come on when the corresponding relay is energized. The LEDs go out when the corresponding relay is de-energized.
Keys	for Start/Stop of manual defrosting, acknowledge alarms Programming Increase parameter value Decrease parameter value
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	250 msec
Input filter	1st order digital filter; filter constant adjustable from 0.1 to 99.9 sec
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 or.1 and or.2
Temperature offset	adjustable via the parameters ot.1 and ot.2
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
Shock und vibration	DIN EN 60068-2-6 schedule C.2, Frequency-Range: 10 to 55 Hz Acceleration: 20 m/s^2 (2g)
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 60.000 operations at 16A, 250V AC, 50Hz cos phi > 0,6
Relay for defrosting, make (SPST-NO) Relay for fan, make (SPST-NO)	100 000 operations at 8A, 250V AC, 50Hz resistive load 85.000 operations at 8A, 250V AC, 50Hz cos phi > 0,6

RS485 interface

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

Supply voltage

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

Housing

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

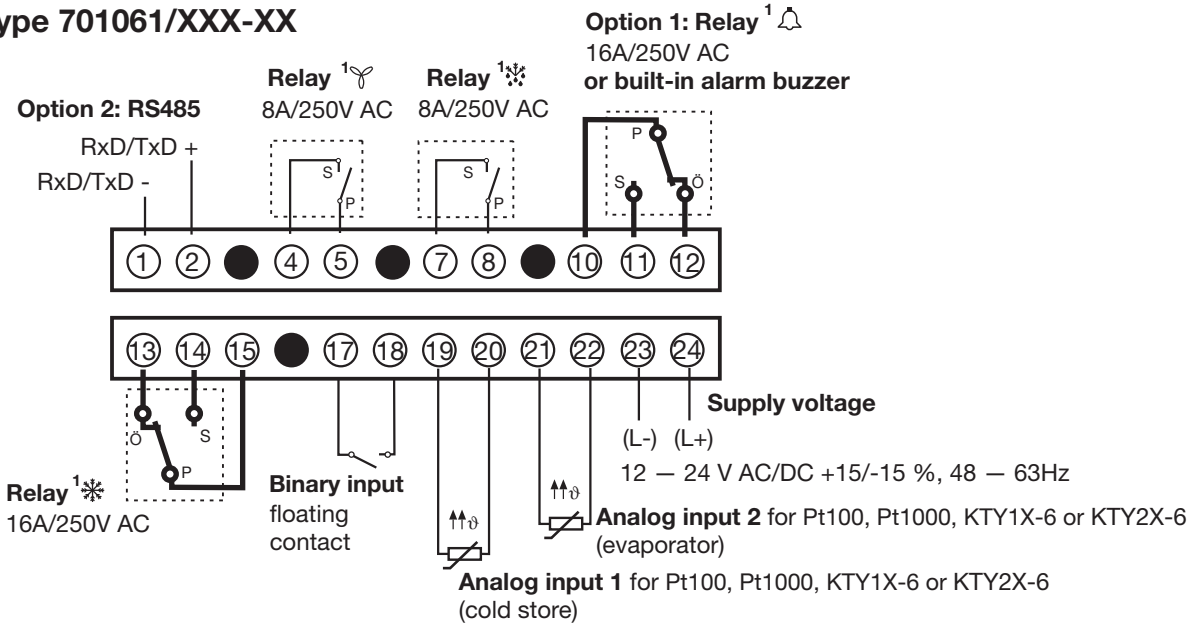
Electrical data

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.
Data logger: Recording duration depending from Recording interval (Parameter rEC)	<table><tr><th>rEC</th><th>Recording duration</th></tr><tr><td>1 min</td><td>7 days 19 hours</td></tr><tr><td>5 min</td><td>39 days (1 month, 9 days)</td></tr><tr><td>15 min</td><td>117 days (4 month)</td></tr><tr><td>60 min</td><td>469 days (1year 3 months)</td></tr><tr><td>120 min</td><td>938 days (2 years 6 months)</td></tr></table>
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

Approval/Marks

Abbreviation	Inspection authority	valid for
UL	Underwriters Laboratories	only valid for mass-production units with the JUMO symbol

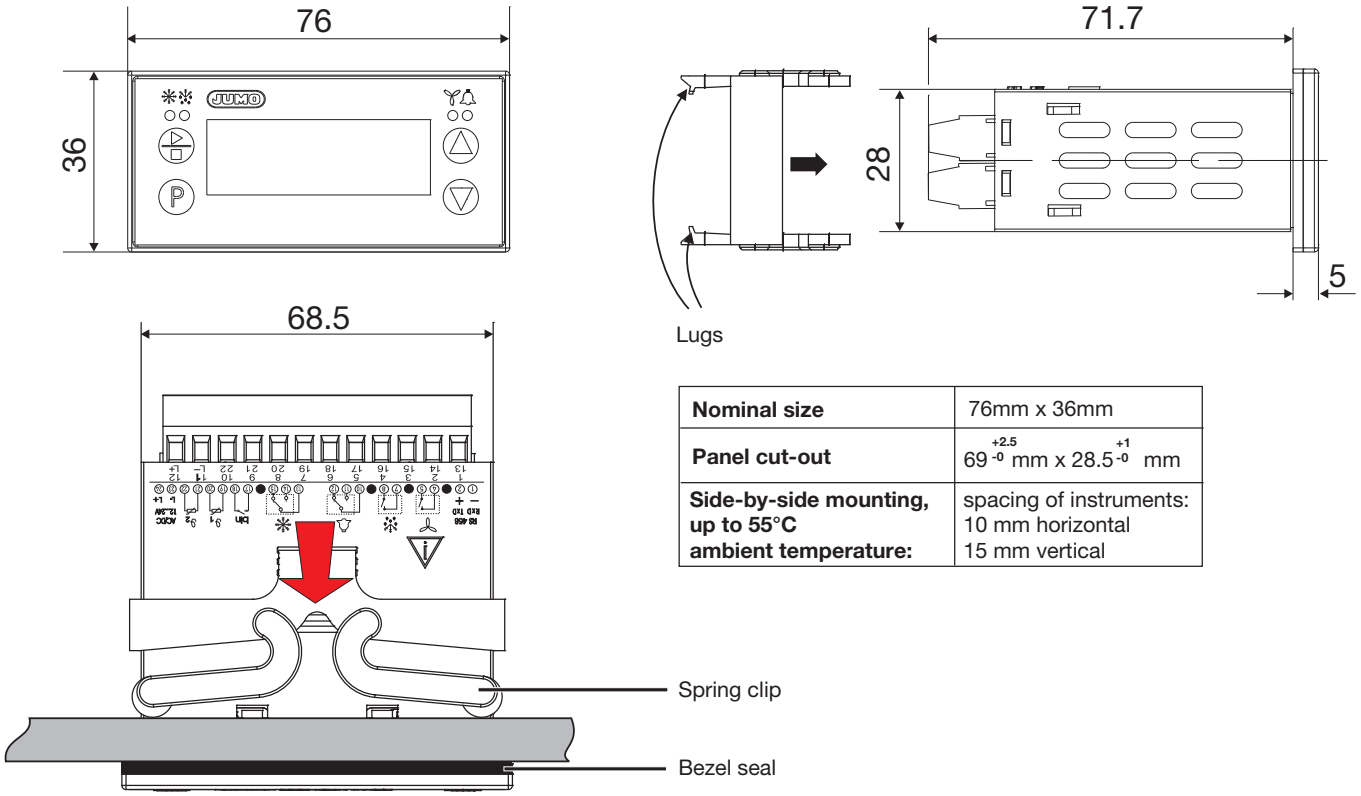
Connection diagram



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

Dimensions

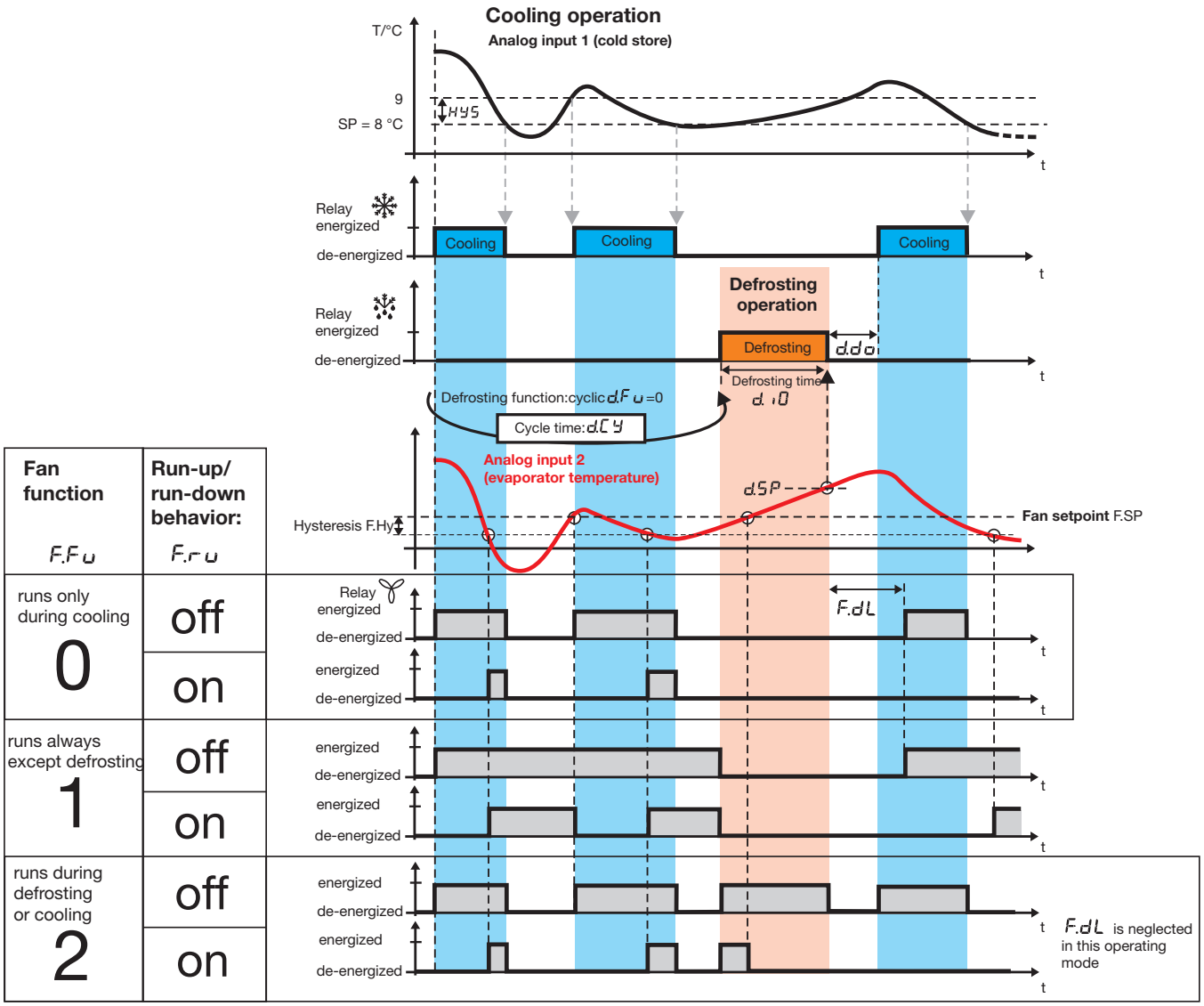
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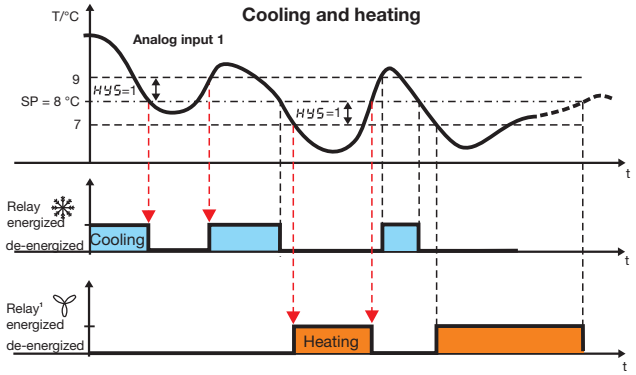
Nominal size	76mm x 36mm
Panel cut-out	$69^{+2.5}_{-0}$ mm x 28.5^{+1}_{-0} mm
Side-by-side mounting, up to 55°C ambient temperature:	spacing of instruments: 10 mm horizontal 15 mm vertical

Controller functions

Cooling, defrosting and fan functions



Special function: cooling and heating with fan relay

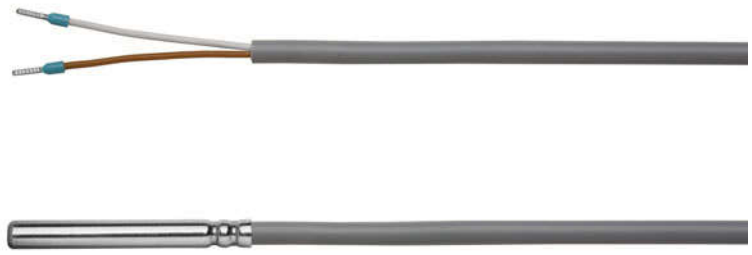


Order details

			(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		/		-		/	
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

	Sales No.
Setup program, multilingual	70/00485306
PC interface with USB/TTL converter, adapter (socket) and adapter (plug)	70/00456352
PC interface TTL / RS232 converter and adapter (socket)	70/00350260

Accessories - Price Sheet 70.9710

	Sales No.
Adapter frame for mounting on DIN rail	70/00483019

