



# R1-120A-V

## Multiloop controller with 6 0-5 V input channels

Multiloop temperature controller for DIN rail mounting; 6 analog inputs for 0-5 V; accurate readings without need of calibration; up to 6 PID loops; heat, cool or heat/cool control with various output types: on/off, time proportional, analog (with addition of C1-10 external module) or for motorized valve control (open/close); PID autotuning algorithm; programmable activation sequence to limit the energy consumption during start-up; dedicated interface for connection with a local operator panel (F1-10); RS422/485 serial interface with Modbus (ASCII or RTU) protocol; a common supervision of many controllers can be provided by the SCADA software WINLOG-A or by the F1-100 and the F1-500 (touch screen) operator panels.

### GENERAL SPECIFICATIONS

Power supply	From 9 to 36 Vdc, 100 mA @ 24 Vdc (without F1-10), 170 mA (with)
Power supply protections	Against surge, voltage peaks and polarity inversion
Operating environment	Temperature: from 0 to 70 °C, relative humidity: from 25 to 85 % (non condensing)
Operating atmosphere	Without corrosive gas
Storage temperature	From -20 to 80 °C (without ice)
Electromagnetic compatibility <b>CE</b>	<ul style="list-style-type: none"> <li>• Radio frequency emissions: EN55011 Group 1 Class A</li> <li>• Conducted emissions: EN55011 Group 1 Class A</li> <li>• Radio frequency immunity: ENV50140 10 V/m AM from 80 to 1000 MHz</li> <li>• Conducted immunity: ENV50141 10V/m AM from 0.15 to 80 MHz</li> </ul>
IP grade	Connectors: IP20, enclosure: IP20
Insulation	<ul style="list-style-type: none"> <li>• Between analog inputs and digital inputs/outputs: 500 V</li> <li>• Between analog inputs and power supply section: 500 V</li> <li>• Between analog inputs and 485/422 section: 1000 V</li> <li>• Between digital inputs/outputs and 485/422 section: 1500 V</li> <li>• Between power supply and 485/422 sections: 1500 V</li> </ul>
Signalling leds	Power on, self-test, digital inputs and outputs status, serial tx, serial rx
Mounting mode	DIN EN50022 rail
Dimensions	175L x 120H x 65P mm
Weight	450 g
Ordering code	R1-120A-V

### ANALOG INPUTS SPECIFICATIONS

Sensor type	6 voltage sensors (from 0 to 5 V)
Analog/digital conversion	Double ramp, 16 bit resolution
Voltage allowed	From -1 to 6 V
Input impedance	20 k $\Omega$
Overall accuracy	$\pm 5$ mV
Acquisition rate	1 s (all the six channels)

### DIGITAL INPUTS SPECIFICATIONS

Input type	2 inputs, optoisolated, common positive (power supply voltage)
Voltage levels	Active state: from 15 to 36 V, non active state: from 0 to 4 V
Current sinked	10 mA @ 24 V
Detectable pulse duration	Not less than 500 ms

**DIGITAL OUTPUTS SPECIFICATIONS**

Output type	12 outputs PNP transistor open collector, pull-down resistor: 22 k $\Omega$ to ground
Output voltage when active	The voltage supply
Maximum load current	100 mA each output
Protections	Suppression diode, overvoltages and short circuit

**COMMUNICATION INTERFACE SPECIFICATIONS**

Communication interface	EIA RS485 or RS422 (selectable by dip-switches)
Communication speed	9600 or 19200 baud (selectable by dip-switches)
Communication protocol	Modbus ASCII or Modbus RTU (selectable by dip-switches)
Device address	From 1 to 63 (selectable by dip-switches)
485/422 lines protections	Against surge, short circuits and voltage peaks
Pull-up and pull-down resistors	10 k $\Omega$

**FUNCTIONAL SPECIFICATIONS**

Watch-dog	Hardware
RAM data retention	One hour maximum
Read software filter	Moving average, 8 samples depth (individually selectable for each channel)
Set-points	Two, runtime selectable by using one of the digital inputs
Set-point options	<ul style="list-style-type: none"> <li>• Can be the temperature read from one of other channels</li> <li>• Hold-back and soft start</li> <li>• Set-point ramp, user configurable</li> </ul>
Regulation strategies	Heat, cool, heat/cool, with start order
Regulation algorithm	Advanced PID, with cycle time selectable from 1 to 240 s
Autotuning	Yes (one channel at time)
Outputs	<ul style="list-style-type: none"> <li>• For SSR, with ramp and outputs limits user configurable</li> <li>• For relays, with working cycle user configurable</li> <li>• For motorized valves without potentiometric feedback</li> </ul>
Alarms	Band type and minimum/maximum type alarms, with time activation filter (individually selectable for each channel)