

RFS

COMPACT DIN RAIL MOUNTING TEMPERATURE CONTROLLER



- SMART TUNE- PID CONTROL
- UNIVERSAL INPUT, TC, 3 WIRE RTD AND LINEAR mA, mV, V
- PROCESS, BAND, DEVIATION AND CONTROL FAULT ALARMS
- SOFT START POWER LIMITER
- 3 RELAY/ SSR OUTPUTS
- 1 ISOLATED LOGIC INPUT
- CT INPUT - LOAD CURRENT MONITORING
- RS 485 MODBUS SERIAL COMMUNICATION
- MODULAR BUSSED INTERCONNECTION
- OPC BASED GRAPHICAL CONFIGURATION SOFTWARE

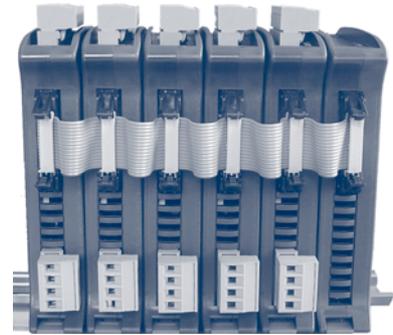
OVERVIEW

Designed to offer outstanding control performance and provide a comprehensive solution for a wide variety of applications such as; food processing, plastic manufacturing, and process applications requiring heat/cool control and process protection alarms in a compact DIN rail mounting package.

Universal-thermocouple or RTD input coupled with a responsive SMART¹ auto-tuning PID control algorithm that is equipped with special functions including soft start and non linear cooling. A complete set of process protection alarm function; high and low limit, band and deviation are included.

Modular bussed interconnection allows simultaneous connection of all common instrument elements:(power supply, serial interface, logic input and open collector output for common alarms).

The alarm-logic input expansion unit RFS-AL makes use of the modular bussed interconnection to provide additional I/O capacity.

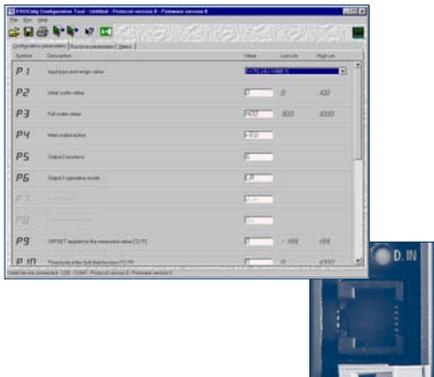


SYNCHRONISED PRE-HEATING

This function eliminates differential heating during machine start up due to differing heating rates of individual heaters in applications such as extruders and injection tool hot runner control.

It operates by synchronising the set-point ramp rate of all heating zones within a controlled group by "holding back" the ramping set-point of these instruments using the individual loop band alarm functions. The common alarm output and isolated logic input functions are used to achieve this.

PC INTERFACE PORT + OPC BASED CONFIGURATION SOFTWARE



The integrated configuration port uses special software and an adaptor allowing:

1. Easy configuration of the instrument, with descriptions of the parameters and of the relative limits.
2. Computer storage of the complete configuration enabling the same configuration to be copied to other RFS units.
3. Copying and cloning of configuration to a new instrument.
4. The configuration interface port may be used in both configuration and operating modes to monitor the process during set up.

PROCESS PROTECTION ALARMS

Process (high or low limit), Band and Deviation alarm outputs are available with the additional flexibility of latching and masking functions until the process variable reaches the alarm threshold. Band and Deviation alarms are also masked after a set point change until the process variable reaches the alarm threshold. The alarm latching function holds the alarm on until it is acknowledged.

SMART TUNING

Automatically adjusts the PID parameters according to the process dynamics.

An important characteristic of the ERO Electronic continuous self tuning algorithm is its ability to optimise control parameters without injecting any artificial disturbances into the system.

SEQUENTIAL ADDRESSES (MODBUS) FOR COMMONLY ACCESSED PARAMETERS

To maximise the data transfer rates between the RFS and the host supervisory system important operating parameters are grouped. Digital status information is transferred as data words to increase efficiency.

The RFS is able to communicate relevant parameter information with a single data request, not a series of separate address operations.

START UP ENERGY MANAGEMENT

To reduce the maximum electrical loading at machine start-up, during full power conditions, the sequence of the RFS control outputs are scheduled according to the selected instrument ModBus address.

This facility significantly reduces maximum machine start-up current requirements and offers potential savings in electrical installation capacity and cabling specification requirements.

COMMUNICATION AVAILABILITY OF I/O

All RFS I/O may be read directly over the ModBus communication interface by the host supervisory system. Additionally, the communication host may write to RFS outputs that are not assigned as alarm or status functions.

This facility expands available PLC and host supervisory system I/O, simplifies machine troubleshooting and provides the possibility to perform remote diagnostics.

OFD FUNCTION - OUTPUT FAILURE DETECTION [optional]

Using the CT input, the output failure detection function monitors the current in the load driven by the output 1. Load and actuator protection is provided in the following way:

- During the ON period of the output, the instrument measures the current through the load and it generates an alarm condition if this current is lower than a pre-programmed threshold. A low current shows a partial or total break down of the load or actuator SSR.
- During the OFF period of the output, the instrument measures the leakage current through the load and it generates an alarm condition when this current is higher than a pre-programmed threshold value. A high leakage current shows a short circuit of the actuator.

PRODUCT SPECIFICATION

Case:	PC/ABS grey colour
Self-extinguishing degree:	V0 according to UL 746C.
Front protection:	IP 20
Dimensions:	131 x 117 x 22.5mm
Weight:	250g max
Power supply:	switching 24V AC/DC ($\pm 10\%$ of the nominal value)
Power consumption:	6VA
Insulation:	reinforced insulation is guaranteed between the supply input and the instrument inputs and outputs
Common mode rejection:	120dB @ 50/60Hz.
Normal mode rejection:	60dB @ 50/60Hz.
EMC/Safety:	this instrument is certified CE. It complies with regulations 89/336/EEC (harmonized reference standard EN-50081-2 and EN-50082-2) and 73/23/EEC e 93/68/EEC (harmonized reference standard EN 61010-1).
Installation:	DIN rail mounting.
Installation category:	II.
Sampling time:	- 250mSec for linear inputs - 500mSec for TC or RTD inputs
Accuracy:	$\pm 0.2\%$ f.s.v. @ 25°C with nominal supply.
Operative temperature:	0 to +50°C.
Storage temperature:	-20 to +70°C.
Humidity:	20% to 85% non condensing RH

MEASUREMENT INPUTS

All inputs are configurable and calibrated in the factory.

Thermocouple input

<i>Sensor break:</i>	open circuit sensor break detection.
<i>Cold joint compensation:</i>	automatic compensation for temperature between 0 and 50 °C.
<i>Error of cold joint compensation:</i>	0.1°C/°C.
<i>Input Impedance:</i>	> 1M Ω .
<i>Calibration:</i>	- according to IEC 584-1 - DIN 43710-1977 for TC type L

Standard scale table

TC type	°C	°F
L	0/400.0	0/1650
L	0/900	
J	-100.0/400.0	-150/1830
J	-100/1000	
K	-100.0/400.0	-150/2500
K	-100/1370	
N	-100/1400	-150/2550
R	0/1760	0/3200
S	0/1760	0/3200
T	-200.0/400.0	-330/750

RTD Input

<i>Type:</i>	3 wire Pt 100
<i>Calibration:</i>	according to DIN 43760
<i>Measure current:</i>	130 μ A.
<i>Line resistance:</i>	automatic compensation up to 20 Ω /wire with non measurable error
<i>Engineering units:</i>	programmable $^{\circ}$ C or $^{\circ}$ F
<i>Sensor break:</i>	indication of the breaking of the sensor or of one or more wires. Indication of a short-circuit when sensor resistance is less than 15 Ω .

Standard scale table

RTD	$^{\circ}$ C	$^{\circ}$ F
PT 100	-200.0/400.0	-200.0/400.0
3 wire	-200/800	-330/1470

Linear inputs (mA - V)

<i>Scale field:</i>	programmable from keyboard -1999 to 4000.
<i>Decimal point:</i>	programmable in any position.

Standard scale table

Input	Impedance
0 - 20 mA	< 5 Ω
4 - 20 mA	< 5 Ω
0 - 60 mV	> 1 M Ω
12 - 60 mV	> 1 M Ω

LOGIC INPUT**Logic Input**

<i>Function:</i>	selection of the operative set point (SP or SP2) or of the temporary block of the execution of the ramp on the set point
<i>Type:</i>	dry contact excitation 8V, 8mA
<i>Insulation:</i>	functional insulation
<i>Insulation voltage:</i>	50Vrms.

CURRENT TRANSFORMER INPUT

Input current:	50mA - 50/60Hz
Full scale measurement range:	0-10 A, 0- 100A (configurable)
Resolution:	0-20A: 0.1A. 21-100A: 1A.
Programmable output state:	NO or NC- relay control output. 1 or 0 logic level - SSR control output.
Minimum period length:	On and Off: 400mSec..

OUTPUTS**Output 1 and 2 - SSR**

<i>Function:</i>	regulating output
<i>Type:</i>	non insulated
Logic level 1:	- max.27V DC @ 1mA - min.14V DC @ 20mA
Logic level 0:	< 0.5V

Relay Type

Output 1

Function: regulating output
Type: SPST
Contact load: 3A @ 250V AC max. on resistive load

Output 2

Function: regulating output or alarm
Type: relay with SPST contact
Contact load: 3A @ 250V AC max. on resistive load

Output 3

Function: alarm output
Type: relay with SPDT contact.
Contact load: 3A @ 250V AC max. on resistive load

Output 4

Function: group alarm output (common output)
Type: open collector
Contact load: max 20mA @ 48V.

CONTROL ACTION

Type: one (heating) or two (heating/cooling) control outputs.
Output action: proportional time.
Control actions: PI + PID + SMART + ON/OFF.
Proportional band: - 1.0% to 100.0% of the input range width for processes with one regulating element.
 - 1.5% to 100.0% of the input range width for processes with two regulating elements.
 Selecting PB = 0 the regulation becomes ON/OFF kind.

Hysteresis (for control action of ON/OFF): programmable from 0.1% to 10.0% of the input field width.
Integral time: programmable from 1 second to 20 minutes or excluded.
Time of derivative action: programmable from 1 second to 10 minutes or excluded.
Offset of the integral action: - for one regulating element (heating), the offset is programmable from 0 to 100% of the output range.
 - for two regulating elements (heating/cooling) the offset is programmable from -100% to +100% of the main output range.

Cycle time of the output 1: 1 second to 200 seconds.
Commutation from Manual to Automatic mode: BUMPLESS.
Relative gain of output 2: Programmable from the keyboard from 0.20 to 1.00 referred to the proportional band.
Cycle time of output 2: 1 second to 200 seconds
Overlapping/dead band: programmable from -20% (dead band) to +50% (overlapping) of the proportional band.

DUAL SET POINT SELECTION

- Function:** Two user configurable operating set points are selectable through logic input or the communication interface.
This facility provides a method for fast and convenient run-hold switching either from an external switch contact or a host supervisory system.

ALARMS

- Alarm action:** programmable direct or inverse.
Alarm functions: individually configurable as process, band or deviation alarms.
Alarm reset: individually programmable as automatic or manual reset.
Alarm masking: individually configurable as masked or unmasked alarms.
Hysteresis: 0.1 to 10.0% of the input field.

SERIAL INTERFACE

- Type:** isolated RS-485.
Protocol: ModBus (2 wire).
Baud rate: programmable from 600 to 19200 BAUD.
Byte format: 8 bit.
Parity: programmable even, odd or none.
Stop bit: one.
Address: 1 to 254.
Voltage levels: according to EIA communications standard.
Line loading: 1/4 unit load

HOW TO ORDER

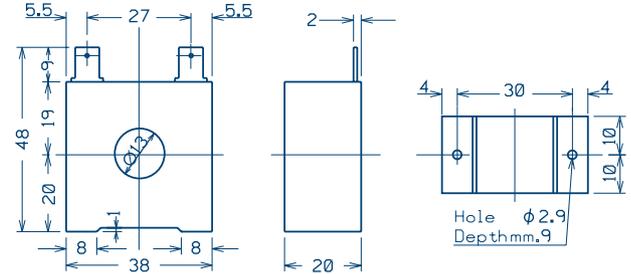
MODEL	INPUT	CONTROL ACTION	OUTPUT 1	OUTPUT 2	OPTION	POWER SUPPLY	CUSTOMER CONFIGUR.
RFS din rail mounting controller	5 TC, RTD, 20mA, 60mV, 5V and 10V (*)	3 PID + SMART	1 Relay 6 SSR	0 not provided 1 Relay 6 SSR	0 not provided 4 OFD + log.input 5 two alarms + OFD + log.input	5 24V AC or DC	000 Std ERO Labels 0XX Customisation
RFS	5	3				5	

(*) Special version, contact the sales office for details.

HOW TO ORDER - CURRENT TRANSFORMER

MODEL	PRIMARY CURRENT
CTR current transformer	1 10A
	2 25A
	4 50A
	5 100A
	CTR

DIMENSIONS



HOW TO ORDER - ACCESSORIES

INTERCONNECTING KIT FOR COMPLETE RFS Phoenix connectors screw terminal type/part number

[MSTB2,5/2-ST-5,08](#)
[MSTB2,5/3-ST-5,08](#)
[MSTB2,5/4-ST-5,08](#)
[MSTB2,5/5-ST-5,08](#)
[MSTB2,5/8-ST-5,08](#)

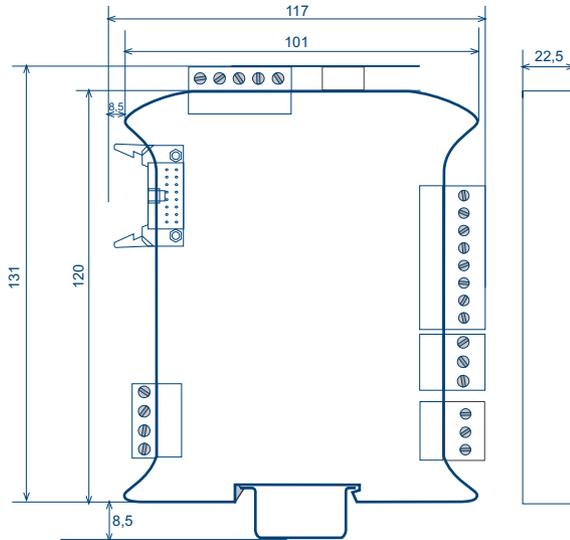
ARFSKITCON00

INTERCONNECTING BUS CABLE X 13 CONNECTIONS Molex europe type/part number

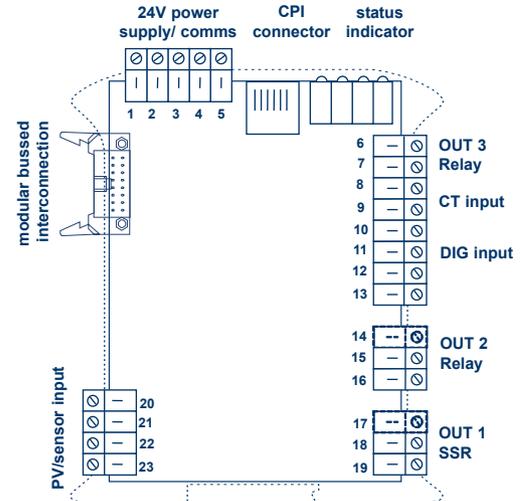
[39512163](#)

ARFSFLAT13000

DIMENSIONS



CONNECTIONS



ERO ELECTRONIC

VIA XXIV MAGGIO 22070 GUANZATE (CO) ITALY

TEL. + 39 031 975 111 FAX. + 39 031 977 512

SALES@EROELECTRONIC.COM - WWW.EROELECTRONIC.COM

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