

# MICROPROCESSOR PROGRAMMER- CONTROLLER RE15 TYPE



## APPLICATION

The RE15 is a versatile temperature or process programmer/controller. It is destined to monitor and control temperature, pressure, flow, level, humidity and others, in a wide range of applications in industries such as food, glass, plastics, ceramics, etc.

## FEATURES

### General:

- dual displays (4 digits with 7-segments each),
  - the upper red, for display the process value,
  - the lower green, configurable for display the setpoint, control power, measured value at auxiliary input, state of digital input or program parameters,
- two bargraphs (red and green) 21 points each, configurable for display control power, setpoint or process value,
- four indicators for outputs state,
- four buttons to configure the controller,

### Inputs:

- up to 2 analog inputs, each sampled twice a second,
- universal configurable main input: The input will accept all standard thermocouples, the Pt100 resistance thermometers, milliamps or volts,
- auxiliary linear input configurable for remote setpoint or for an additional process value for control (sum or difference or average to main input) or for extra measurement (for example a position feedback potentiometer at motorized valve control),
- digital input (non-voltage contact) for remote program control-stop/run, hold, reset Input is active when closed.

### Outputs:

- four outputs (see ordering code),
- up to 2 analogue outputs - configurable 0-10 V, 0-5 V, 0-20 mA, 4-20 mA,
- each output can be configured as control output or alarm or retransmission (analogue only), or event output,

### Digital communications: RS485; MODBUS ASCII and RTU protocol

### Setpoint:

- local with soft start
- remote from auxiliary input
- ramp/soak: 15 programs

### Control:

- The RE15 can be configured for heating, cooling, heating/cooling, cooling/cooling or for motorised valve control. The valve control algorithm does not require a position feedback potentiometer.

### Programmer parameters:

- 15 programs,
- 15 segments per program,
- ramp segments 0.1...999.9 units/min.,
- soak segments 00:01...99:59 minutes,
- event outputs at segments,
- start at process value,
- holdback function,
- number of cycles 1...99,

### Alarms:

- number: 0...4,
- deviation: high, low or band,
- full scale: high or low,
- full scale: main or auxiliary input,
- sensor break alarm,
- latched: on or off
- hysteresis: 0...99.9 units

### Extra functions:

- two selectable autotuning algorithms are available: with the load cool and at the setpoint. They calculate PID settings for accuracy control,
- retransmission of the setpoint or PV; configurable span,
- two security codes protect all (except setpoint) parameters,
- hand or automatic mode with bumpless switching,
- reset to factory settings,

**A setup program LUMEL-CONTROL is available for easy configuration from a PC.**

## TECHNICAL DATA

### Input signals

The controller has a universal input with the possibility to connect any input signal as resistance, thermoelectric power, voltage or current. The kind and the range of the input signal are chosen by the program from the table 1.

### Basic accuracy

0.2% (0.3% for B,R and S thermocouples)

### Sampling period

0.5 s

### Control algorithm

ON/OFF with hysteresis, PID, with auto-adaptation

### Action way of outputs:

- reverse (for heating) (r n u)
- direct (for cooling) (d i r)
- analogous, linear voltage or current linear output
- logic, with a proportional cycle time
- heating-cooling or cooling-cooling
- three-state heating-cooling or cooling-cooling
- three-state step-by- step for closing/opening the valve

### Kinds of setpoint:

- constant (standard) (c o n)
- ramp/soak programmed (P r o g)
- from the auxiliary input (i n P 2)

**Number of programs** 15

**Number of segments in the program** 1...15

**Duration time of a segment** 1...999 min

**Set point change rate** 0.0...999.9 units/min

**Number of program repetitions** 1...99

### Kinds of outputs:

- relay
  - electromagnetic relays contact load: 220 V, 2 A
  - cosφ = 0.4, S = 440 VA
- logic non-voltage
  - OC type, U<sub>max</sub> = 24 V, I<sub>max</sub> = 10 mA
- logic voltage
  - 0/19 V, I<sub>max</sub> = 20 mA
- analog voltage
  - 0...5 V, 0...10 V, R<sub>load</sub> ≥ 500 Ω
- analog current
  - R<sub>load</sub> ≤ 500 Ω

**Accuracy of analog outputs** 0.2%

### RS-485 serial interface:

- baud rate 9600, 4800, 2400 bit/s
- transmission protocol MODBUS
- Modes ASCII: 8N1, 7E1, 7O1
- RTU: 8N2, 8E1, 8O1

#### Reference and rated service conditions:

- supply voltage: 90...230...254 V a.c./d.c.  
or 20...24...40 V a.c./d.c
- supply voltage frequency 48...50...68 Hz
- ambient temperature 5...23...40 °C
- relative humidity 25...85 %
- external magnetic field < 400 A/m.
- work position any
- resistance of leads connecting the RTD to the controller < 10 Ω/lead

#### Protection level ensuring by the housing:

- from the faceplate IP65
- from terminals IP20

#### Additional errors caused in rated service conditions caused by:

- lead resistance change in a three-wire line < 0.2%
- compensation of the thermocouple cold junction temperature changes < 2°C
- ambient temperature change < 0.2%/ 10 K

#### Safety requirements acc. EN 61010-1

- isolation basic
- installation category III
- pollution level 2

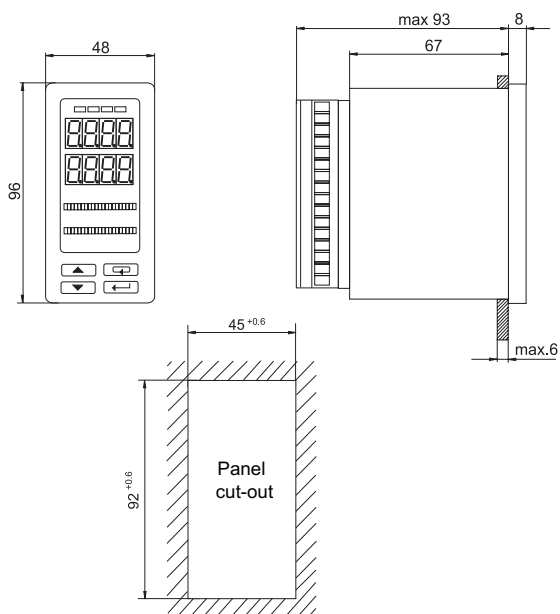
#### Electromagnetic compatibility:

- immunity EN 61000-6-2
- emission EN 61000-6-4

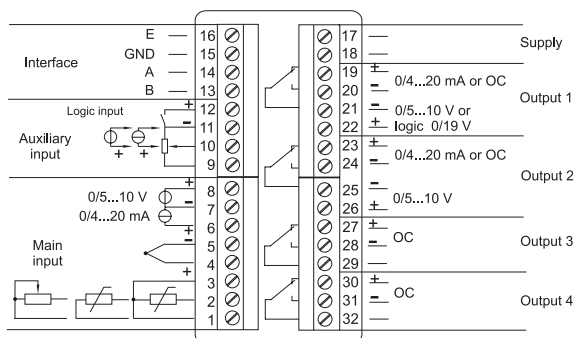
**Overall dimensions** 48 x 96 x 93 mm

**Weight** 300 g

#### EXTERNAL AND ASSEMBLY DIMENSIONS



#### CONNECTION DIAGRAM



#### Input signals, measuring range

Table 1

Sensor types	Designation	Range	Symbol on the display
<b>Universal input</b>			
Pt100 acc. EN 60751+A2:1997	Pt100	-200...850°C	Pt
Pt1000 acc. EN 60751+A2:1997	Pt1000	-200...850°C	Pt .0
Ni100/1.617	Ni100	-60...180°C	ni
Cu100/1.426	Cu100	-50...180°C	cu
Fe-CuNi	J	-100...1200°C	t
Cu-CuNi	T	-100...400°C	t - t
NiCr-NiAl	K	-100...1370°C	t - K
PtRh10-Pt	S	-50...1760°C	t - S
PtRh13-Pt	R	-50...1760°C	t - r
PtRh30-PtRh6	B	300...1800°C	t - b
NiCr-CuNi	E	-100...1000°C	t - E
NiCrSi-NiSi	N	-100...1300°C	t - n
Chromel-kopel		0...800°C	t - c h
Resistance		0...400 Ω	r - r r
Linear current	I	0...20, 4...20 mA	0-20, 4-20
Linear voltage	U	0...5 V, 0...10 V	0-05, 0-10
<b>Auxiliary input</b>			
Linear current	I	0...20 mA, 4...20 mA	0-20, 4-20
Linear voltage	U	0...5 V, 0...10 V	0-05, 0-10
Linear potentiometric	r	0...100 Ω, 0...1000 Ω	100, 1000
<b>Logic input</b>			
voltageless	b	shorted, opened contacts	on off

#### ORDERING CODES

RE15 CONTROLLER	X	X	X	X	X	XX	X
<b>Main input:</b>							
- universal input for thermocouples, resistance thermometers, linear current 0/4...20 mA, linear voltage 0...5/10 V, logic input .....	1						
- as ordered .....	9						
<b>Auxiliary input:</b>							
- without input .....	0						
- current 0/4...20 mA .....	1						
- voltage 0...5/10 V .....	2						
- potentiometric transmitter 0...100 Ω .....	3						
- potentiometric transmitter 0...1000 Ω .....	4						
- as ordered .....	9						
<b>Outputs:</b>							
- 4 relays, change-over contact .....	1						
- 4 OC logic non-voltage .....	2						
- 1 logic 0/19 V + 3 relays .....	3						
- 1 analog output + 3 relays .....	4						
- 1 analog output + 3 OC .....	5						
- 2 analog outputs + 2 relays .....	6						
- 2 analog outputs + 2 OC .....	7						
- as ordered .....	9						
<b>RS-485 interface:</b>							
- without interface .....	0						
- with the MODBUS protocol .....	1						
<b>Supply voltage:</b>							
90...230...254 V a.c./d.c. ....	1						
20...24...40 V a.c./d.c. ....	2						
<b>Option:</b>							
- standard .....	00						
- custom-made* .....	99						
<b>Additional requirements:</b>							
- without additional requirements .....	0						
- with a quality certificate .....	1						
- acc. user's agreements** .....	X						

\* The code symbol will be settled by the manufacturer

\*\* After agreeing by the producer

#### EXAMPLE OF ORDER

The code symbol: **RE15-1-1-4-1-1-00-0** means: a RE15 controller with a universal input, auxiliary input: 0/4...20 mA, with one analog output 0/4...20 mA or 0...5/10 V and 3 relays, with a RS-485 serial interface and MODBUS protocol, supply voltage 90...230...254 V a.c./d.c., standard code, without additional requirements.