

## Specifications

Input	<input type="checkbox"/> RTD, <input type="checkbox"/> thermocouple,
Output	<input type="checkbox"/> current, <input type="checkbox"/> voltage
Power Supply	the power supply voltage, 5 A
Consumption	<input type="checkbox"/> 230 VAC, <input type="checkbox"/> 115 VAC, <input type="checkbox"/> 12...24 VAC/DC
Measurement Error	less than 1.5 VA
Temperature Drift	≤ ± 0.3% from span
Operating Temperature / Humidity	≤ 0.02% from span for 1 °C
Protection Class	-10...65 °C / 0...85% RH
	IP66

## Warranty and Support

..... serial number	<b>Warranty</b> COMECO warrants this product to be free from defects in materials and workmanship for 2 years. If your unit is found to be defective within that time, we will promptly repair or replace it. This warranty does not cover accidental damage, wear or tear, or consequential or incidental loss. This warranty does not cover any defects caused by wrong transportation, storage, installation, or operating (see 'Specifications').
..... manufacturing date	
QC check mark .....(passed) (stamp)	
88 Slavyanska Str. P.O.Box 378 Plovdiv 4000, BULGARIA tel: +359 32 646523, 646524 fax: +359 32 634089, 646517 e-mail: support@comeco.org	<b>Technical support</b> In the unlikely event that you encounter a problem with your COMECO device, please call your local dealer or contact directly our support team.

QD-8.2.4-WC

## PROGRAMMABLE CONTROLLER

# RT38-Y

## OPERATION MANUAL



Please read this Operation Manual before mounting and operating!  
Save the Manual for future references!

Table 1

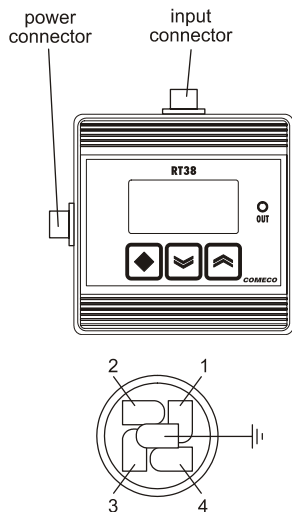
Parameter	Symbol	Description
<b>Configuration Parameters</b> (These parameters are part of Configuration level)		
Input Type	$INP$	The type of the signal that can be connected to the device input
Display Offset	$OFF$	Specifies a constant to be added to the measured input value
Point Position	$POINT$	The display decimal point position
Filter Time	$FT$	Specifies the relative time constant of the input filter
Filter Band	$FB$	Specifies a zone around the measured value, within which the filter is active
Unit	$UNIT$	Temperature measurement unit
Input Low	$IL$	Display low range, corresponding to the low signal range of a linear input
Input High	$IH$	Display high range, corresponding to the high signal range of a linear input
<b>Parameters of the control algorithm</b> (These parameters are part of Parametric level)		
Hysteresis	$HYS$	Relay switching differential
Direction	$DIR$	Relay action direction
Hold	$HLD$	Holds the output reaction
<b>Parameter of Basic (operating) level</b>		
Set Point	$SP$	Control set-point value
<b>Keyboard locking Parameter</b> (This parameter is part of Hidden level)		
Lock Keyboard	$LOC$	Keyboard locking mode

Value	Unit	Notes
RTD	-	$Pt\ 1$ (Pt100), $Pt\ 2$ (Pt100), $Pt\ 3$ (Pt500), $Pt\ 4$ (Pt1000), $Pt\ 5$ (Pt100-GOST), $Pt\ 6$ (Pt50-GOST), $Pt\ 7$ (Pt100-GOST), $Cu\ 1$ (Cu50, 1.426), $Cu\ 2$ (Cu100, 1.426), $Cu\ 3$ (Cu50, 1.428), $Cu\ 4$ (Cu100, 1.428)
T/C	-	$ECJ$ (T/C "J"), $ECK$ (T/C "K"), $ECE$ (T/C "E")
current	-	$420$ (4...20 mA), $020$ (0...20 mA)
voltage	-	$010$ (0...10 V)
-199 ... 999	ISU	OFFSET
x1, x0.1	-	when indicating values with the input-signal measurement unit (ISU); $_.$ (tens not shown), $._.$ (tens shown within the -19.9...99.9 range)
0 ... 100	-	
0 ... 100	-	
$OFF$ , $OFF$	-	This parameter makes sense ONLY in case of a temperature sensor!
-199 ... 999	ISU	This parameter makes sense ONLY in case of a linear input signal!
-199 ... 999	ISU	This parameter makes sense ONLY in case of a linear input signal!
0 ... 100	ISU	
$7_.$ , $7_.$	-	$7_.$ (relay ON under set point), $7_.$ (relay ON over set point)
0 ... 999	sec.	
-199 ... 999	ISU	For temperature input, the set point is limited for different sensor types!
$OFF$ , $con$ , $SP$ , $ALL$	-	$OFF$ (totally unlocked), $con$ (Configuration level locked), $SP$ (only set-point adjustment enabled), $ALL$ (totally locked)

## Overview

RT38-Y is a cheap programmable ON/OFF controller, designed for direct control over temperature or other processes when coupled with a temperature or other sensor. The device is equipped with a 3-digit LED display and a control relay transferring the power supply voltage to an external actuator. RT38-Y is available in 2 universal-input versions – RTD (for 7 selectable Ptx and 4 Cux sensor types) and T/C (for 3 selectable thermocouples) – as well as in versions for linear current and voltage signals.

## Wiring



### Important note:

Power supply must be turned off during the wiring!

### Power wiring

- ◆ Connect the right power supply voltage for your device (see '**Specifications**') via pins #3 (line) and #4 (neutral) of the power connector.
- ◆ Use pins #2 (line) and #1 (neutral) of the power connector to wire the output.

### Input wiring

- ◆ In case of an RT38-Y with linear input, connect the input signal through the device input connector as follows:  
pin #1 - common;  
pin #2 - input;  
pin #3 - Vaux (+).
- ◆ To connect sensor to a RT38-Y with RTD or T/C input, use the pins of the input connector in the following way:  
pin #1 - common;  
pin #2 - RTD or T/C (-);  
pin #3 - RTD or T/C (+).
- ◆ In either case, leave pin #4 unconnected.

## Electro-Magnetic Interference (EMI) Issues

- ◆ All signal wires must be shielded. They must not be packaged together with power cables!
- ◆ Never lay the signal wires close to inductive or capacitive noise sources, such as relays, contactors, motors, etc.!
- ◆ All shields have to be grounded **ONLY** at one end, as closer as possible to the controller terminals!
- ◆ Avoid sharing supply lines with powerful consumers, especially with inductive loads, switched on and off.
- ◆ To stop unwelcome interference signals entering through the power supply lines, use shielded 1:1 isolation transformer!
- ◆ Shunt all switched (not only those switched by the controller) inductive consumers with special suppression networks: RC group and varistor - for AC loads, or diode - for DC loads.
- ◆ If the controller operates in a very powerful EMI area, it has to be mounted inside a grounded metal shielding box!

## Input Filtration

### Low-pass filter

This first-order filter acts **ONLY** within a certain band around filter output value. This has been designed to cut periodic noises outside the communication signal spectrum.

- ◆ Filter operation is defined by two parameters:  
**Filter Time** (defines filter time constant) and **Filter Band** (defines filter active band around filter output value).
- ◆ If the newly measured value differs from the filter output by more than **Filter Band**, the filter resets with a new initial output value (newly measured value).

## Parameter Programming

### Controller parameters

RT38-Y is a programmable device whose service behavior is determined by a set of parameters. All the parameters, along with their names, symbols, and value ranges, are given in Table 1.

### Setting numerical parameter value

- ◆ Enter parameter value adjustment mode (see '**Program Levels**').
- ◆ The whole part of the value together with the left zeroes appears on the display, and the rightmost digit blinks.
- ◆ To increase or decrease the blinking digit value, use respectively or .
- ◆ The 2 rightmost digits can accept values from **0** to **9**, and the leftmost digit can also accept the values **-** and **+**.
- ◆ To select another digit, press .
- ◆ Confirm the adjusted value by pressing simultaneously + .
- ◆ If the new value has not been confirmed and no key has been pressed for a certain period of time, value adjustment automatically ceases, and the parameter retains its initial value.

### Setting symbolic parameter value

- ◆ Enter parameter value adjustment mode (see '**Program Levels**').
- ◆ Read the blinking parameter value.
- ◆ To change the value, use and , and to confirm, press + .
- ◆ If the new value has not been confirmed and no key has been pressed for a certain period of time, value adjustment automatically ceases, and the parameter retains its initial value.

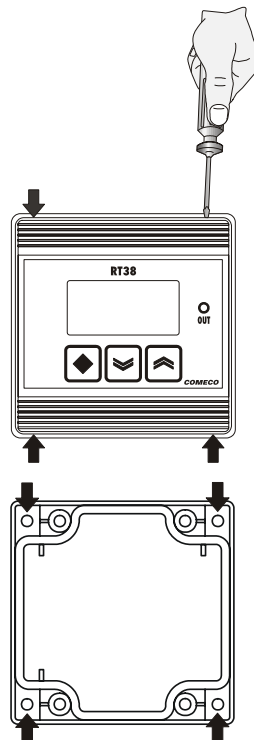
✱ - Changing Point Position value reflects the real value of all parameters with ISU!

E.g.: changing Point Position value from (x1) to (x0.1) would change a Set-point value of 100 to 10.0!!!

## Error Messaging

- ◆ **□ □ □** (over range) - display value over 999 or sensor damaged (broken).
- ◆ **□ □ □** (under range) - display value under -199 or sensor damaged (shorted out).
- ◆ **FAL** (fail) - device memory error; if error still exists after restart, the unit must be returned for repair.
- ◆ **E.N.C** (not calibrated) - all factory calibrations are set to default and the accuracy can not be guaranteed!
- ◆ **E.S.P** (error in **Set Point**) - incorrect **Set Point** value; check and readjust.
- ◆ **E.H.S** (error in **Hysteresis**) - incorrect **Hysteresis** value; check and readjust.
- ◆ **- - -** (noise / initial check) - too noisy input signal; also shows the initial device check at power-on.

## Mounting



### Direct in-process mounting

Fit RT38-Y to the object of control through the mounting accessory of the built-in sensor.

### Wall mounting

- ◆ Insert the tip of a suitable screwdriver into one of the openings between the lower and the upper cap on the front panel. Use the screwdriver as a lever to open the caps.
- ◆ Unscrew the four screws and remove the part of the box containing the electronic module and the front panel.



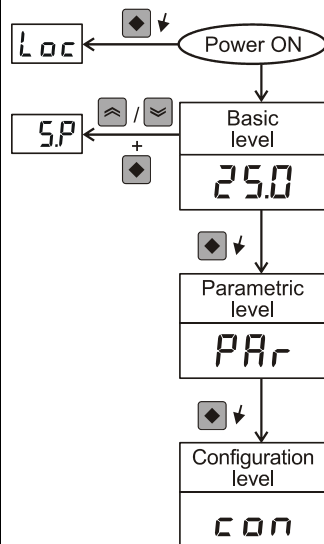
*For subsequent installations, skip this step because the mounting screws are already accessible through the four corner holes under the front panel caps.*

- ◆ Fix the box to the wall with proper mounting screws through the four back holes on the terminal box.
- ◆ Put the electronic module and the front panel caps back.

### DIN-rail mounting

Your RT38-Y can also be easily mounted on every 35 mm rail conforming to EN50022 by the means of a special DIN-rail clamp, which has to be ordered separately.

## Program Levels



### Basic level

- At power-on, RT38-Y enters Basic level. At this level, the device indicates the measured input value (PV) with a resolution, according to the **Point Position** parameter.
- To enter **Set Point** value adjustment mode, press  $\leftarrow + \blacklozenge$  or  $\rightarrow + \blacklozenge$ .

### Parametric level

This level contains the control algorithm parameters.

- Enter from Basic level by pressing and holding  $\blacklozenge$  until **PAR** appears on the display. Release the key.
- Choose a parameter with  $\leftarrow$  and  $\rightarrow$ .
- To enter parameter value adjustment mode, press  $\blacklozenge + \leftarrow$ .
- If no key has been pressed for a while, the device automatically returns to Basic level, storing all confirmed changes.
- For quick exiting and saving, use key combination  $\leftarrow + \rightarrow$ . Message **Set** confirms the adjustments.

### Configuration level

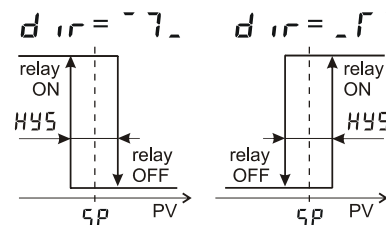
This level contains the configuration parameters of the device.

- Enter from Basic level by pressing and holding  $\blacklozenge$  until **CON** appears.
- To access and adjust the configuration parameters, follow the algorithm described in '**Parametric level**'.

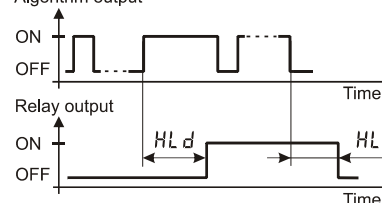
### Hidden level

- Hold  $\blacklozenge$  depressed while turning the power on and until **LOC** appears.
- Set keyboard locking mode.

## Output Control



Algorithm output



### Output control operation

- The control output operates according to the control algorithm parameters.
- The output deactivates when an error has been detected (see '**Error messaging**').

### ON/OFF control algorithm

The static characteristic of a relay controlled by an ON/OFF algorithm is shown on the left drawing.

### Output hold

For eliminating undesirable switches of the alarm output, additional parameter (**Hold**) is assigned to hold the output reaction for certain period of time.