v13-12.12

COMECO
CONTROL & MEASUREMENT

COMECO Inc., P.O.Box 378, Plovdiv 4000, BULGARIA, tel: +359 32 646523, 646524, fax: 634089
e-mail: info@comeco.org, WWW.COMECOGROUP.COM

PROGRAMMABLE CONTROLLER

RT38

OPERATION MANUAL

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

Overview

RT38 is an ultra-economical ON/OFF programmable controller for temperature and other technological parameters, available in 2 universal-input versions – RTD (for 7 selectable Pt and 4 Cu sensor types) and T/C (for 3 selectable thermocouples) – as well as in versions for linear current and voltage signals. The device is equipped with a 3-digit LED display and 1 programmable relay control/alarm output, and can be ordered in various cases including the smallest 1/32 DIN case or enclosed in a standard 11-pin box for DIN-rail mounting and for mains or low-voltage supply.

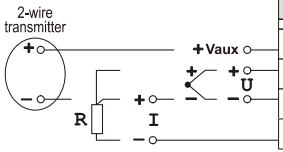
Mounting

Panel mounting ('B' / 'H' / 'V' / 'S' / 'L' / 'M')

- Place RT38 into an appropriate panel cut-out.
- Tighten it into place using the enclosed mounting bracket(s).

DIN-rail mounting ('R')

RT38-R can be easily mounted on every 35 mm rail conforming to EN50022 by the means of a standard UNDECAL socket base.



B/H/V	S	L/M	R
A10	2		7
A11	3	3	4
A12	4	4	5
A13	5	5	6

Input signal wiring
Connect the input with regard to its type through the respective and depending on the case type (see '**Specifications**') terminals on the device back.

Voltage transmitters should be powered ONLY by external source!

B/H/V	S	L	M	R
A9	8	10		9
A8	9	9	6	11
A7	10	8	7	8

Output wiring
Connect the output with regard to its type (see '**Specifications**') via the respective terminals.

B/H/V	S	L/M	R
A1	6	1	2
A2			
A3	7	2	10

Power supply wiring
Connect the right power supply voltage for your device (see '**Specifications**') through the respective terminals.

Important notes:

- *Power supply must be turned off during mounting and wiring!*
- *In case of 90...250 VAC/DC power supply, grounding the device via separate wire is mandatory for covering safety standards.*
- *With DC power supply, the polarity does not matter.*

More detailed wiring schematics are available at comecogroup.com under 'Support' tab.

Important note:

A built-in RC noise suppression circuit may be connected in parallel with relay contacts. Full AC voltage isolation may NOT be provided when relay contacts are open. Small AC current (≈ 1.5 mA at 230 VAC) may still flow through the RC circuit!

- 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!

Some parameters are accessible only when the respective functionality is installed. (see '**Specifications**'*).*

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

E.g.: changing **Point Position** *value from (0) to (0.0) would change a Set-point value of 100 to 10.0!!!*

Device parameters

RT38 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 select another digit, press [◆].
- The 2 rightmost digits can accept values from 0 to 9, and the leftmost digit can also accept the values - and 1.
- To increase or decrease the blinking digit value, use respectively [≪] or [≫].
- 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.

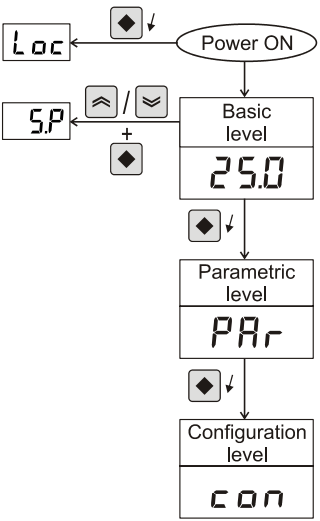
Setting symbolic parameter value

- Enter parameter value adjustment mode (see '**Program Levels**').
- Read the blinking parameter value.
- To change the value, use [≪] or [≫], 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.

Parameter	Symbol	Description
Parameters of Configuration level		
Input Type	inP	Type of signal that can be connected to the device input
Display Offset	oFS	Constant to be added to the measured input value
Point Position	Pnt	Display decimal point position
Filter Time	F.t	Relative time constant of the input filter
Filter Band	F.b	Zone around the measured value, within which the filter is active
Unit	Unt	Temperature measurement unit
Input Low	i.Lo	Display value at low limit of the linear input range
Input High	i.hi	Display value at high limit of the linear input range
Parameters of Parametric level		
Hysteresis	HYS	Relay switching differential
Direction	dir	Relay action direction
Hold	HLd	Holds the output reaction
Parameter of Basic (operating) level		
Set Point	SP	Control set-point value
Access-Control Parameter (parameter of Hidden level)		
Lock Keyboard	Loc	Keyboard locking mode

Table 1

Value	Unit	Notes
RTD	-	Pt.1 (Pt50), Pt.2 (Pt100), Pt.3 (Pt500), Pt.4 (Pt1000), Pt.5 (Pt46-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	-	t.c.J (T/C "J"), t.c.K (T/C "K"), t.c.t (T/C "T")
current	-	4.20 (4…20 mA), 0.20 (0…20 mA)
voltage	-	0.10 (0…10 V)
-199 ... 999	ISU	display offset value
0, 0.0	-	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	-	
oC, oF	-	This parameter makes sense ONLY in case of a temperature sensor!
-199 ... 999	ISU	These parameters make sense ONLY in case of a linear input signal!
-199 ... 999	ISU	Set **Input Low** < **Input High**!
0 ... 100	ISU	0...25% from span in case of a linear input signal
¯7_, _r¯	-	¯7_ - activates under set point, _r¯ - activates over set point
0 ... 999	sec.	
-199 ... 999	ISU	For temperature input, the set point is limited for different sensor types!
oFF, con, S.P.E, ALL	-	oFF (unlocked), con (Configuration level locked), S.P.E (only set-point adjustment enabled), ALL (locked)



Access control (Hidden level)

- Hold ◆ pressed while turning the power supply on and until Loc appears.
- Set keyboard locking mode by assigning a corresponding value to the **Lock Keyboard** parameter.

Basic level

At power-on, RT38 enters Basic level. At this level, the device indicates the measured input value (PV) with a resolution, according to the **Point Position** parameter.

Set-point adjustment

- To view the current **Set Point** value, press and hold either ⩓ or ⩔.
- Press ◆ while holding ⩓ / ⩔ to enter **Set Point** adjustment mode.

Parametric level

This level contains the control algorithm parameters.

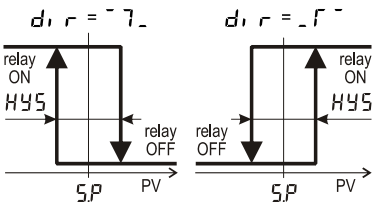
- Enter from Basic level by pressing and holding ◆ until PAr appears on the display. Release the key.
- Choose a parameter using ⩓ or ⩔.
- To enter parameter value adjustment mode, press ◆ + ⩓.
- If no key has been pressed for a while, the device automatically returns to Basic level, storing all confirmed changes.
- For quick exiting and saving, use key combination ⩓ + ⩔ or hold down ◆ (for case 'M'). Message Sto confirms the adjustments.

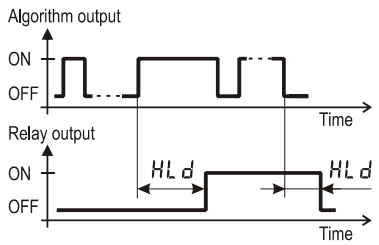
Configuration level

This level contains the configuration parameters of the device.

- Enter from Basic level by pressing and holding ◆ until con appears.
- To access and adjust the configuration parameters, follow the algorithm described in 'Parametric level'.

Output Control





Control output operation

- The control output operates according to the control algorithm parameters.
- When an error is detected (see '**Error messaging**'), the output deactivates.

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

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).

Error Messaging

- ⌐ - ¬ (over range) -
  display value over 999
  or sensor damaged (broken).
- L _ J (under range) -
  display value under -199
  or sensor damaged (shorted out).
- FAIL (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.HS (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.

Declaration of Conformity

CE

The undersigned hereby declares,
on behalf of COMECO Inc.,
that this device has been manufactured
in compliance with standards
EN 61000, EN 61010, and EN 61326,
and meets the requirements of Directives
2004/108/EC, 2006/95/EC, and 2011/65/EC.

Vladimir Sakaliyski, CEO
COMECO Inc.

Waste Disposal

Do not dispose of electronic devices together with household waste material!

If disposed of within European Union,
this product should be treated
and recycled in accordance with the laws
of your jurisdiction implementing
the WEEE Directive 2002/96
on the Waste Electrical and Electronic
Equipment.

Specifications

Case	☐ 'B', ☐ 'H', ☐ 'V', ☐ 'S', ☐ 'L', ☐ 'M', ☐ 'R'
Input	☐ RTD, ☐ thermocouple, ☐ current, ☐ voltage
Output	☐ relay 5A/250VAC with NO/NC or NO contact, ☐ SSR 1A/250VAC, ☐ SSR 0.2A/250VAC, ☐ MOS gate 0.1A/60V, optically isolated, ☐ 5...24 VDC, 30 mA for external SSR
Power Supply	☐ 230 VAC, ☐ 90…250 VAC/DC, ☐ 24 VDC, ☐ 12...24 VAC/DC, ☐ 9 VAC, ☐ .....
Excitation Voltage	☐ ≤ U_p (DC); ≤1.2*U_p (AC), ☐ 24 VDC, 30 mA, ☐ .....
Consumption	less than 1.5 VA
Measurement Error	≤ ± 0.3% from span
Temperature Drift	≤ ± 0.02% from span for 1 °C
Ambient Temperature / Humidity	-10…65 °C / 0…85% RH, non-condensing
Protection Class: front / terminals	☐ IP65, ☐ IP54, ☐ IP44 / IP20

Warranty and Support

…….
serial number

…….
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

Warranty

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**').

Technical support

In the unlikely event that you encounter a problem with your COMECO device, please call your local dealer or contact directly our support team.