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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

PROCESS INDICATOR (TRIP ALARM UNIT)

TI08-R

OPERATION MANUAL

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

Overview

TI08-R is an economical 3-digit programmable process indicator / trip alarm unit, enclosed in a standard 11-pin box, with an input for linear current, voltage, or resistive signals. The device can be ordered with up to 2 relay outputs and for mains or low-voltage AC/DC supply.

Mounting

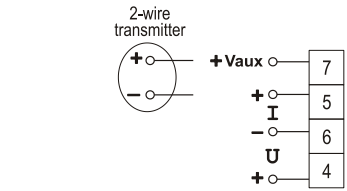
TI08-R can be easily mounted on every 35 mm rail conforming to EN50022 by the means of a standard UNDECAL socket base.

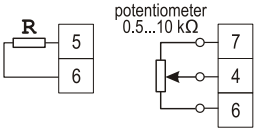
Electro-Magnetic Interference (EMI) Issues

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 indicator 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 indicator) inductive consumers with special suppression networks: RC group and varistor - for AC loads, or diode - for DC loads.
- If the indicator operates in a very powerful EMI area, it has to be mounted inside a grounded metal shielding box.

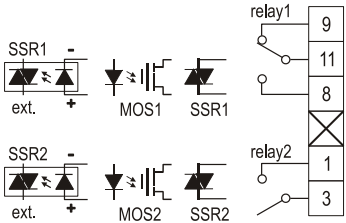




Input signal wiring

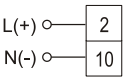
Connect the input with regard to its type (see '**Specifications**') through the respective socket-base terminals.

Voltage transmitters should be powered ONLY by external source.



Output wiring

Connect the outputs with regard to their types (see '**Specifications**') via the respective terminals.



Power supply wiring

Connect the right power supply voltage for your device (see '**Specifications**') through terminals 2 and 10.

Important notes:

- *Power supply must be turned off during mounting and wiring.*
- *Connecting a potentiometer requires excitation voltage of 5 V, 10 mA (see '**Specifications**').*

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

Parameter	Symbol	Description
Parameters of Level L3		
Input Type	inP	Type of the input signal in case of programmable input
Point Position	Pnt	Display decimal point position
Input Low	i.Lo	Display value at low limit of the input range
Input High	i.hi	Display value at high limit of the input range
Input Correction	i.cr	Constant to be added to the measured input value
Gradient	Grd	Maximum admissible input change for 120 ms sampling period
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
SP Limit Low	S.P.L	Set-point low limit
SP Limit High	S.P.h	Set-point high limit
Parameters of Level L2		
Direction 1	dr.1	Control action direction of output **K1**
+Differential 1	P.d.1	Relay switching differential over set point for output **K1**
-Differential 1	n.d.1	Relay switching differential under set point for output **K1**
Time On 1	t.n.1	ON duration of pulsed output **K1**
Time Off 1	t.F.1	OFF duration of pulsed output **K1**
Hold On 1	h.n.1	Holds the output **K1** reaction when being activated
Hold Off 1	h.F.1	Holds the output **K1** reaction when being deactivated
The same 7 parameters, but with index 2 – for output **K2**		
Parameters of Level L1		
Set Point 1	S.P.1	Set-point value of output **K1**
Set Point 2	S.P.2	Set-point value of output **K2**
Access-Control Parameter (parameter of Hidden level)		
Access Control Level	A.c.L.	Controls the access to device parameters

* *With potentiometric input, after wiring the device and setting desired values to* **Input Low** *and* **Input High**, **Input High** *value differ, to adjust the device to display PV correctly,set new* **Input High** *value as calculated*

Input High$_{new}$ = **Input Low** + *(***Input High** - **Input Low***)*^{2} */ (PV(100%)* - **Input Low***)*

Table 1

Value	Unit	Notes
u.10, u.5, i.0., i.4.	-	u.10 (0…10 V), u.5 (0...5 V; potentiometer 0.5...10 kΩ), i.0. (0…20 mA), i.4. (4…20 mA)
0, 0.0, 0.00	-	when indicating values with the input-signal measurement unit (**ISU**)
-199 ... 999	ISU	
-199 ... 999	ISU	*
-199 ... 999	ISU	display offset value
0 … 999	ISU	used for input peak filtration; value '0' cancels the filtration
0 … 999	-	This parameter and the following one define a low-pass input filter.
0 … **M**	ISU	**M** = 25% of input range
-199 ... 999	ISU	These parameters keep the set points in safe limits, preserving them from random changes.
coo,hEA	-	'**coo**ling' - activates over set point, '**hea**ting' - activates under set point
0 ... 999	ISU	less than (high range limit - **Set Point 1**)
0 ... 999	ISU	less than (**Set Point 1** - low range limit)
0 ... 999	sec.	pulse duration; value '0' disables pulse mode
0 ... 999	sec.	pause duration; value '0' disables pulse mode
0 ... 999	sec.	Value '0' disables hold mode.
-199 ... 999	ISU	within operating range limits **Input Low** ... **Input High**, considering **SP Limit Low(High)**, **Input Correction**, and **+/-Differential 1(2)**
FuL,L1,no	-	FuL (full access), L1 (access only to parameters of level L1), no (no access)

check the PV(100%) value when potentiometer slide is positioned at 100%. If PV(100%) value and by the formula:

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

- Changing **Point Position** *value reflects on 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

TI08-R 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.

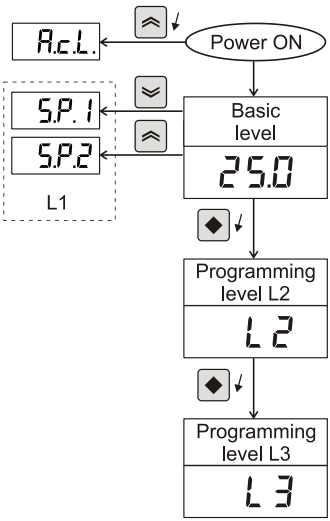
Setting numerical parameter value

- 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 ⊣.
- To increase or decrease the blinking digit value, use respectively ⌃ or ⌄.
- Confirm the adjusted value by pressing simultaneously ◆ + ⌃ or ◆ + ⌄.
- 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 ◆ + ⌃ or ◆ + ⌄.
- 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.

Program Levels



Programming order

- Set full access to device parameters.
- Adjust the parameters.
- If needed, restrict the access again by adjusting the **Access Control Level** parameter.

Access control (Hidden level)

- Hold [⌃] depressed while turning the power supply on and until A.c.L. appears.
- Set access level according to Table 1.

Basic level

At power-on, TI08-R enters Basic level. At this level, the device indicates the measured input value (PV) with a resolution, according to the **Point Position** parameter.

- If the whole part of PV cannot be entirely displayed, the unit generates a blinking 'overflow' message (oL or -oL, depending on PV sign).
- If PV is out of the device physical operating range, it displays blinking symbolic message: L_ _ ⌋ (under-range) or ⌈ ¯ ¬ (over-range).
- Upon entering Basic level, TI08-R may display the ini message, indicating that some time is necessary for filter initialization.
- The noi message may appear as a result of the peak filter operation (see '**Input filtration**').

Set-point adjustment (Level L1)

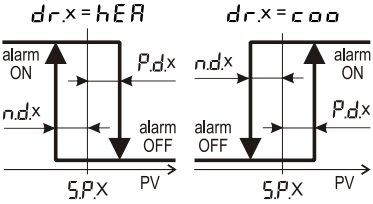
- To enter **Set Point 1** adjustment mode, press and hold [⌄] until S.P.1 appears on the display. Release the key to view the set-point value.
- To enter **Set Point 2** adjustment mode, follow the same procedure, but start with the [⌃] key.

Program Levels

Programming (Levels L2 and L3)

- Enter from Basic level by pressing and holding ◆.
- To access and adjust the parameters from level L2, release the key while L2 is displayed. To enter level L3, release the key when L3 appears on the display.
- 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 ⌃ + ⌄.

Output Control



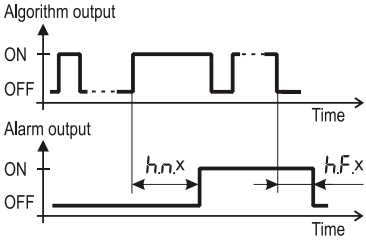
Alarm output operation

- The alarm outputs operate according to the control algorithm parameters.
- When an error is detected (see '**Error messaging**'), the outputs deactivate and restore after all discrepancies have been resolved and programming exited.

ON/OFF control algorithm

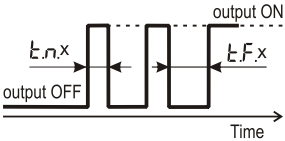
The static characteristic of an alarm relay controlled by an ON/OFF algorithm is shown on the left drawing.

Output Control



Output hold

For eliminating undesirable output switches, additional parameters (**Hold On** and **Hold Off**) are assigned to hold the output reaction for certain period of time.



Output pulse mode

When an output is activated by the control algorithm, it can either stay ON or pulse depending on **Time On** and **Time Off** parameter values.

Error Messaging

Message	Parameters	Error type
FAL	all	incorrect memory
E. 1	Grd	out of range
E. 2, E. 3	F.t, F.b	out of range
E. 4, E. 5	S.P.L, S.P.h	out of input range *
E. 6	S.P.L, S.P.h	S.P.L > S.P.h
E.11, E.21	t.n.1, t.n.2	out of range
E.12, E.22	t.F.1, t.F.2	out of range
E.13, E.23	h.n.1, h.n.2	out of range
E.14, E.24	h.F.1, h.F.2	out of range
E.15, E.25	P.d.1, P.d.2	out of range
E.16, E.26	n.d.1, n.d.2	out of range
E.17, E.27	S.P.1, S.P.2	outside S.P.L ...S.P.h
E.18, E.28	S.P.x - n.d.x	under input range *
E.19, E.29	S.P.x + P.d.x	over input range *

* device physical operating range considering **Input Correction**

- In some cases, TI08-R finds discrepancies in parameter values that must be resolved before operating at Basic level.
- The device indicates such kind of problems by displaying error messages as given on the left.
- If FAL appears on the display, try debugging by turning the power off/on.
- If the problem persists, press and hold ◆ to restore the default (factory) settings.

Peak filter

This filter is intended for eliminating pulse spikes (peaks), which can appear in the input signal, in the following way:

- TI08-R measures the input signal value every 120 ms (sample time).
- The measured values are compared subsequently. The filter checks the difference between the last 2 samples. If it does not exceed **Gradient** value, the device accepts the signal as *normal*.
- If the last measured value differs from the previous one by more than the **Gradient** value, the filter output is held until the device determines a presence of a *normal* signal. It is possible only if the input signal has not been changed with more than the **Gradient** value for 4 subsequent samples.
- If the device has not determined a *normal* signal for 20 subsequent samples, nOI appears on the display (see 'Basic level').

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).

Declaration of Conformity

The undersigned hereby declares, on behalf of COMECO Inc., that this process indicator (trip alarm unit) model TI08-R has been manufactured in compliance with standards EN 61010-1 and EN 61326-1, and meets the requirements of Directives 2004/108/EC, 2006/95/EC, and 2011/65/EU.

Krasimir Darakchiev, 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 Directive 2012/19/EU on waste electrical and electronic equipment (WEEE).

Specifications

Input	☐ programmable,
	☐ fixed, ...
Outputs:	up to 2
Electromechanical relay	5A/250VAC with NO/NC or NO contact
SSR	1A/250VAC
MOS gate	0.1A/60V, optically isolated
Output for external SSR	5...24 VDC, 30 mA
- K1	☐ relay, ☐ SSR, ☐ MOS gate, ☐ for ext. SSR
- K2	☐ relay, ☐ SSR, ☐ MOS gate, ☐ for ext. SSR
Power Supply	☐ 230 VAC, ☐ 90…250 V,
	☐ 24 VDC, ☐ 12...24 V,
	☐ .....
Excitation Voltage (Vaux)	☐ 10...30 V, 30 mA, ☐ 5 VDC, 10 mA, stabilized,
	☐ .....
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	IP44 / IP20

Warranty and Support

……
article number

……
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

QD-8.2.4-WC

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.