Specifications 12

Case	☐ 'B', ☐ 'H', ☐ 'Y', ☐ 'Z1', ☐ 'Z2'
Display	☐ LCD, ☐ LED, ☐ LCD + backlight
Input	loop supply DC current
Measurement Range	4...20 mA
Operating Range	3...22 mA
Absolute Range	2...50 mA
Built-in Transmitter	☐ .....
Alarm Outputs	☐ 2 relays 5A/250VAC w/ NO contact, ☐ 2 NPN 100mA/40V, non-isolated, ☐ 2 PNP 100mA/40V, non-isolated
Alarm Differential (Hysteresis)	± 1 rightmost display digit
Keyboard Location ('Z1' and 'Z2' only)	☐ on front panel, ☐ on rear panel
Loop Supply Voltage	4…36 VDC
Loop Voltage Drop	☐ < 3.5 V, ☐ < 6.5 V
Measurement Error	< ± 0.05% from span ± 1 digit
Temperature Drift	< 0.025% from span for 1 °C
Warm-up Time	up to 1 min
Operating Temperature / Humidity	-10…65 °C / ☐ 0…85% RH, ☐ 0…95% RH
Storage Temperature / Humidity	-20…65 °C / 0…95% RH
Protection Class: front / terminals	☐ IP68, ☐ IP65, ☐ IP54 / 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

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.

v12-04.11

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

LOOP-POWERED INDICATOR

TI200

OPERATION MANUAL

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

Table 1

Parameter	Symbol	Description	Value	Unit	Notes
Configuration Parameters (These parameters are part of Configuration level)					
Point Position	PnE	Display decimal point position	0 / 0.0 / 0.00 / 0.000	-	when indicating values with the input-signal measurement unit (**ISU**)
Display Low	,Lo	Display value at low limit of the input range	-1999 ... 9999	ISU	
Display High	,Hi	Display value at high limit of the input range	-1999 ... 9999	ISU	
Display Offset	oFFS	Constant to be added to the measured input value	-1999 ... 9999	ISU	OFFSET
Filter Time	F.t	Relative time constant of the input filter	0 … 255	-	higher value for better filtration
Filter Band	F.b	Zone around the measured value, within which the filter is active	0 … 3000	-	
Calibration	cALE	Enables / disables calibration mode	noYES	-	For authorized personnel ONLY!
Alarm Set Point 1	SP1	Set-point value of alarm output 1	-1999 ... 9999	ISU	
Direction 1	dir1	Control action direction of alarm output 1	--L_, _J--	-	--L_ (ON under set point), _J-- (ON over set point)
Alarm Set Point 2	SP2	Set-point value of alarm output 2	-1999 ... 9999	ISU	
Direction 2	dir2	Control action direction of alarm output 1	--L_, _J--	-	--L_ (ON under set point), _J-- (ON over set point)
Return	rtn	Forced return to Basic level	-	-	
Keyboard locking Parameter (This parameter is part of Hidden level)					
Lock Keyboard	LocK	Keyboard locking mode	dtEY, ESP, EtEY	-	dtEY (keyboard disabled), ESP (only set-point adjustment enabled), EtEY (keyboard enabled)
Return	rtn	Forced return to Basic level	-	-	

Overview 2

TI200 is a loop-powered process indicator, equipped with a fully programmable 4-digit LCD or LED display, a 2-button keyboard, and 2 programmable alarm limits controlling 2 alarm outputs. TI200-B and TI200-H are designed for panel mounting, TI200-Z1 and TI200-Z2 – for mounting inside windowed sensor-protective heads as temperature displays with or without in-head transmitter, and TI200-Y can be used as a stand-alone process transmitter with local display when a standard 4...20 mA in-head transmitter is also installed inside its protective box.

Electro-Magnetic Interference (EMI) Issues

⚠ **Important note:**

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

Parameter Programming 8

- *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!!!*

Indicator parameters

TI200 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.

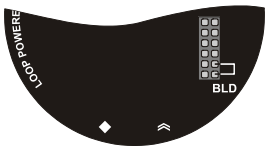
Setting numerical parameter value

- 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 **SET**.
- The 3 rightmost digits can accept values from 0 to 9, and the leftmost digit can also accept the values – and ⊣.
- To change the blinking digit value, use **UP**.
- Confirm the adjusted value by pressing simultaneously **SET + UP**.
- 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 **UP**, and to confirm, press **SET + UP**.
- 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.

Display Backlighting 15



- When installed (see '**Specifications**'), the display backlight may be turned off.
- To disable the backlighting of a TI200-B or TI200-H, short out terminals A13 and A14.
- In case of a TI200-Z1 or TI200-Z2, short out the 2 bottom-right pins of the service connector.

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 and EN 61010, and meets the requirements of Directives 73/23/EEC and 89/336/EEC.

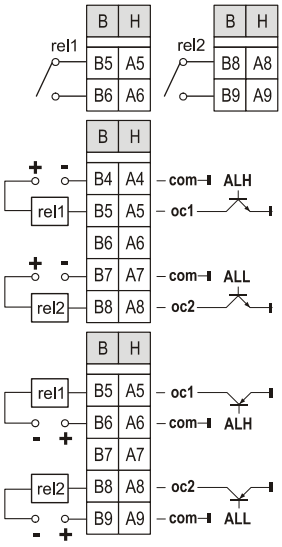
Vladimir Sakaliyski
CEO
COMECO Inc.

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.

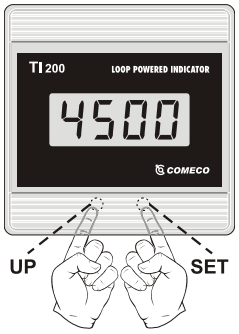
Wiring 5



Wiring TI200-B/H

- Wire the current loop through terminals B1(+) and B3(-) (for case 'B') or A1(+) and A3(-) (for case 'H').
- Connect the outputs with regard to their types (see '**Specifications**') via the respective terminals.

Keyboard



TI200-B/H keyboard

There are 2 programming keys – **UP** (⏫) and **SET** (◆) – on the device front panel.

TI200-Z keyboard

The keys **UP** (⏫) and **SET** (◆) are either on the front or the rear panel (see '**Specifications**').

TI200-Y keyboard

- The programming keys are hidden on the back of the electronic module.
- To reach the keys, open the box as described in '**Mounting**'.
- After finishing off adjustments, close the 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).

Error Messaging

- ⌐¯¯¬ (over range) - display value over **Input High** + 10 or sensor damaged.
- L__J (under range) - display value below **Input Low** - 10 or sensor damaged.

Calibrating

Important notes:

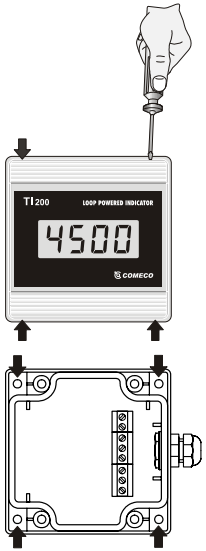
- *1-point calibration (only 4 mA or 20 mA) is enabled.*
- *After exiting calibration mode, the device automatically changes the value of the* **Calibration** *parameter to* no*!*

- Connect a milliampere simulator to the 'current loop' terminals and adjust simulated current to 4 mA or 20 mA.
- Set **Calibration** parameter to YES.
- From Basic level, press and hold **SET** until cAL appears. Release the key.
- Select the 1st calibration point – 4 or 20 – and confirm with **SET** + **UP**.
- During calibration, the unit displays cccc.
- After finishing calibration of the 1st point, the device automatically starts the calibration procedure for the 2nd point. To interrupt, press **UP** to display rtn and return to Basic level with **SET**.
- To calibrate the 2nd point, repeat the above steps.

Mounting

Important notes:

- *Cases 'Z1' and 'Z2' are designed to be incorporated inside protective heads with distance between centers of the female threaded openings respectively 55 mm and 68 mm.*
- *Never over-tighten the screws because this may damage the indicator case!*



Panel mounting ('B', 'H')

- Place TI200 into a 90x90 mm (for case 'B') or 90x42 mm (for 'H') panel cut-out.
- Tighten it into place using the enclosed mounting brackets.

In-head mounting ('Z1', 'Z2')

- Unscrew the protective head top cover.
- Dispose the wired indicator inside the head.
- Fix with the two attached screws.

Wall mounting ('Y')

- 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 liver to open the caps.
- Unscrew the four screws and remove the part of the box containing the electronic module and the front panel.

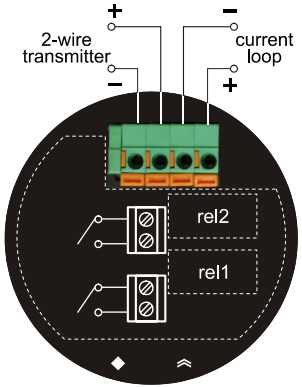
For subsequent installations, skip this step because the mounting screws are already accessible through the four corner holes under the front panel caps.

- 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 ('Y')

Your TI200 can also be mounted on a 35 mm DIN rail by the means of special DIN rail clamps, which have to be ordered separately.

Wiring

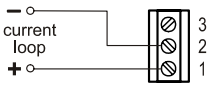


Important note:

See **'Specifications'** *for the current loop data and alarm outputs' load capabilities.*

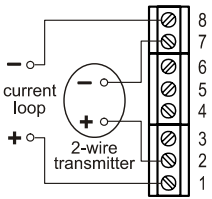
Wiring TI200-Z

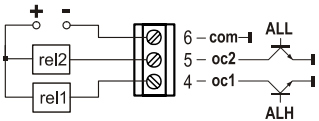
- Wire the indicator via its spring terminals as shown on the wiring diagram and on the unit back.
- When no transmitter is to be connected to the device, short out 'transmitter' terminals.
- Connect the outputs if such are installed (see **'Specifications'**) via the respective screw terminals on the external relay PCB.

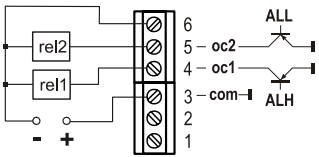


Wiring TI200-Y

- Open the box as described in **'Mounting'** to access the eight terminals on the main board.
- Wire the current loop through terminals 1(+) and 2(-) as shown on the left.
- In case of transmitter installed, wire as illustrated on the second diagram.
- To connect NPN or PNP outputs, follow respectively the third or the fourth wiring diagram.







Program Levels

Basic level

At power-on, TI200 enters Basic level. At this level, the device indicates the measured value (PV) with a resolution, according to the **Point Position** parameter.

Configuration level

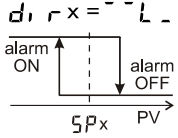
This level contains the configuration parameters of the device.

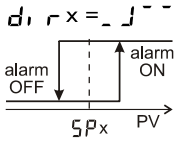
- Enter from Basic level by pressing and holding **SET** until `conF` appears.
- Scroll the parameters with **UP**.
- To enter parameter value adjustment mode, press **SET**.
- If no key has been pressed for a while, the device automatically returns to Basic level, storing all confirmed changes.
- For quick exiting and saving, use key combination **SET + UP**.
- For forced exit, select `rtn` and press **SET**.

Hidden level

- Hold **SET** depressed while turning the power on and until `LocU` appears.
- Set keyboard locking mode.

Output Control





Alarm output operation

- The alarm outputs operate according to the alarm parameters.
- The outputs deactivate when an error has been detected (see **'Error messaging'**).

Important note:

At power-off, the relays retain their state.

ON/OFF alarm algorithm

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