

Input	programmable
Measurement Error	0.3% from span
Non-linearity	within measurement error
Temperature Drift	0.01% from span for 1 °C
RTD Line Compensation	automatic software
Cold-junction Compensation	automatic software
Serial Interface	<input type="checkbox"/> RS485, isolated, <input type="checkbox"/> RS485 for "PolyMonitor", isolated
Interface Isolation	2500 VAC for 1 min
Number of Bus Nodes	max. 256
Power Supply	10...36 VDC or 8...25 VAC
Supply Isolation	> 1 kV DC
Consumption	max. 0.5 W
Operating Temperature / Humidity	-20...70 °C / 0...90% RH
Protection Class	IP20

Warranty and Support

.....
 serial number

.....
 manufacturing date

QC check mark(passed)
 (stamp)

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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.

QD-8.2.4-WC

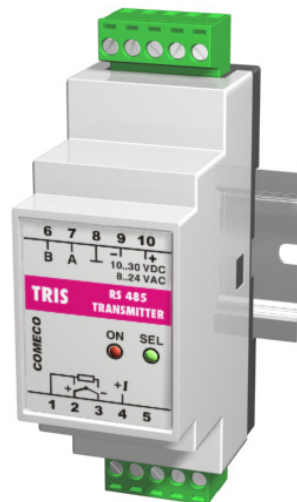
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SMART RS485 TRANSMITTER

TRIS

OPERATION MANUAL



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

Communication Protocol



Notes:

- ◆ TRIS adds 3 spaces in the beginning of the response.
- ◆ TRIS returns decimal point even when the value is integer.
- ◆ #13 (CR) is byte 0x0D; #10 (LF) is byte 0x0A.
- ◆ The U255 command should be used only in case just one slave is presented.

Protocol architecture

- ◆ The protocol is based on UART protocol with:
 - Baud Rate - as defined by parameter Baud Rate;
 - Data bits - 8;
 - Parity Control - Even;
 - Stop bit - 1.
- ◆ ASCII protocol is used for communicating, and the information is exchanged in frames.
- ◆ Each frame consists of 1, or 2 words separated by byte 32 (SPACE), and ends with bytes 13 (CR) and 10 (LF). The first word in the frame denotes a parameter 'Symbol' as taken from Table 1 and the second word (if needed) is the parameter 'Value', both spelled with only small Latin letters, digits, dots, and/or the '-' sign.

Device activating

- ◆ To respond to commands, the device should be active.
- ◆ For a device to be activated, it must receive a Ux command, where 'x' is the value of the parameter Address or the value '255' (if device address is unknown), and respond to it with ok..
- ◆ If a device does not respond even to U255, check the UART protocol settings, chiefly Baud Rate value.
- ◆ The device remains active until it receives another Ux command, but with different device address, an error -1 (see 'Errors'), or with reset.
- ◆ Any Baud Rate value change through the communication interface also deactivates the device.

Reading from a device

- ◆ If the frame consists of only one word, it is recognized as a command for reading.
- ◆ The device responds to it by returning the same word and its value, according to Table 1.

Input Filtration

Peak filter

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

- ◆ TRIS measures the input signal value every 120 ms (sample time).
- ◆ The measured values are compared subsequently. The filter checks the difference between the last two 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 four subsequent samples.
- ◆ If the device has not determined a normal signal for 20 subsequent samples, it considers the signal noisy.

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).

TRIS is an intelligent rail-mountable transmitter with isolated universal input and RS485 output, specially designed for multi-point process measurement and data acquisition in a network.

Mounting and Wiring

Mounting

TRIS can be easily mounted on every 35 mm rail conforming to EN50022.

Wiring

- ◆ Connect the input with regard to its type through the respective terminals as illustrated on the unit front panel.
- ◆ Wire the RS485 output as shown on the front panel.
- ◆ Connect the right supply voltage for your device (see 'Specifications') to the power supply terminals.



Important note:

Power supply must be turned off during the wiring!

Operating and Programming

Indication

- ◆ The 'ON' LED lights red at power-on.
- ◆ The 'SEL' LED illuminates when the device is active.
- ◆ During transmission via the communication interface, the 'SEL' LED darkens.

Device parameters

TRIS 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.

Parameter programming

TRIS is to be programmed through the RS485 port, via the communication interface.



Protocol examples:

PC or other device: TRIS response:

activating device number 10

U10#13#10 ok.#13#10

reading filter time

f.t#13#10 f.t 0015.#13#10

writing filter time of 30

f.t 30#13#10 f.t 0030.#13#10

reading input value of 27.5

p.v#13#10 p.v 027.5#13#10

invalid command.	command not recognized
parity error.	parity error detected
not a number.	attempt to write symbols for numerical parameter
point error.	value resolution greater than parameter's one
out of range.	value out of range
read only.	parameter is read-only
can't save.	problem with writing in non-volatile memory

Writing in a device

- ◆ If the frame consists of two words, it is recognized as a command for writing.
- ◆ With writing, transferred are the same two words that would have been received at the respective command for reading from the device.
- ◆ After successful writing, the device responds with the respective command for reading, except for the baud command.

Other device responses

- ◆ When Error Info value is -1, the device substitutes any command for error reading.
- ◆ TRIS responses in case of incorrect protocol use are given on the left.

Reset

To reset the device, send command `reset`.

Errors

Value	Parameters	Error type
-1	all	Incorrect memory
0	all	No error
1	Gradient	Out of range
2	Filter Time	Out of range
3	Filter Band	Out of range
29	Address	Out of range

- ◆ In some cases, TRIS finds non-conformities in parameter values that must be corrected before further operation.
- ◆ To read the error value, send command `error` via the communication interface.
- ◆ In case of value -1, try debugging by turning the power off/on.
- ◆ If the problem persists, send command `error 0` to restore the default (factory) settings.

Table 1

Parameter	Symbol	Description
Input Type	inp	Type of signal that can be connected to the device input
Unit	unit	Temperature measurement unit
Point Position	pnt	Decimal point position
Input Low	i.hi	Input value at low limit of the linear input range
Input High	i.lo	Input value at high limit of the linear input range
Input Correction	i.cor	Constant to be added to the measured input value
Address	addr	Device address
Baud Rate	baud	Serial interface rate
Gradient	grad	Maximum input signal change during the sampling period (120 ms)
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
Input Value	p.v	Measured input value (read-only)
Error Info	error	Error detected

◆ - Changing Point Position value reflects the real value of all parameters with the input-signal measurement unit (ISU)!

E.g.: changing Point Position value from (x1) to (x0.1) would change an Input Correction value of 100 to 10.0!!!

Value	Unit	Notes
pt100	-	Pt100: -100...850 °C
pt1000	-	Pt1000: -100...600 °C
ptc1 or ptc2	-	PTC 1k or 2k: -50...150 °C
t.c.b	-	T/C B: 200...1800 °C
t.c.j	-	T/C J: -20...1000 °C
t.c.k	-	T/C K: -20...1300 °C
t.c.r	-	T/C R: 0...1700 °C
t.c.s	-	T/C S: 0...1700 °C
t.c.t	-	T/C T: -40...400 °C
u	-	voltage linear: 0...100 mV
i.0.20 or i.4.20	-	current linear: 0...20 mA or 4...20 mA
c or f	-	°C or °F
0, 1, 2, 3	-	x1, x0.1, x0.01, x0.001
-1999...9999	ISU	These parameters make sense ONLY in case of a linear input signal!
-1999...9999	ISU	OFFSET
1...254	-	
1200, 2400, 4800, 9600	bps	factory set to 4800 bps
0...9999	ISU	used for input peak filtration; Value '0' cancels the filtration.
0...9999	-	This parameter and the following one define a low-pass input filter.
0...M	ISU	temperature: whole part of M ≤ 100; linear: M = 25% of input range
numerical value	ISU	measured input value
sat.lo	-	ADC under-range
sat.hi	-	ADC over-range
inp.br	-	sensor break
break	-	device failure
noise	-	noisy measurement
-1, 0, 1, 2, 3, 29	-	All errors, except 0, are read-only (see 'Errors').