

digital network transmitters

TRN



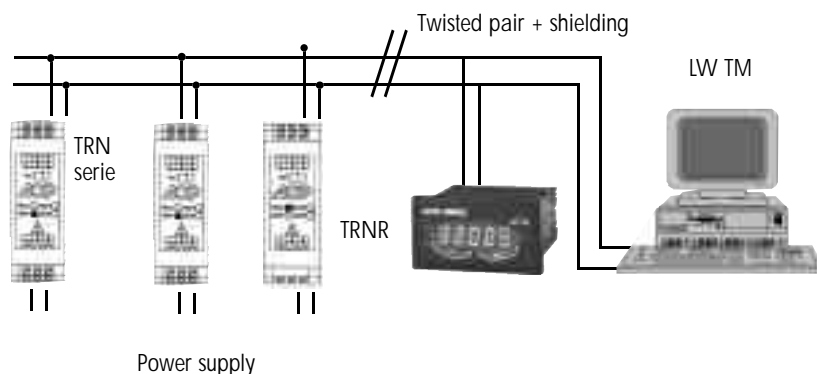
The TRN line of digital transmitters condition most signals generated by lab and industrial transducers. Their metrological performance, combined with their communications interface for transmitting data over a simple telephone pair, make the TRN series one of the choice solutions for any transducer centralization and acquisition problem that requires both good control of the measurement and low installation cost.

- RS485 2-wire Modbus
- High accuracy
- All signal types
- On-site readout repeater
- Relay outputs
- PC software

They come in the form of DIN-rail click-on boxes, so they can be mounted in cabinets, with many accessories for wall mounting too.

The basic version comes with a 230 Vac line power supply. 115 Vac, 48 Vac, and 24 Vdc options are available to meet most other requirements – especially for supplying all the TRN's by a simple pair.

The entire network can be configured from any PC that has the programming software. The data can be collected and processed on any commercially available supervisor using a Modbus RS485 two-wire interface or, easier still, on a PC using the AOIP supervision and storage software.



The Modbus transmitters described in greater detail below consist of five types of modules:

- Two-channel transmitters for platinum probe temperature measurements and process quantities (TRNP module)
- One-channel transmitters for thermocouple temperature measurements (TRNT)
- Two-channel transmitters for frequency measurements and pulse counts (TRNF)
- One-channel readout repeater transmitters with two relay outputs (TRNR)
- Threshold detectors with two relay outputs (TRNA).

common functions

Configuration.....
The units are configured using the LTCTM program (key protection), saved in permanent storage.

Thresholds.....
The user can program two thresholds on each transmitter. When the transmitter has two measurement channels (like the TRNP), these two thresholds can be assigned to a single specific channel, or each channel can be programmed with a single threshold.
These thresholds can be read by Modbus or controlled directly by the relay outputs on the corresponding TRNA. The two TRN's (measuring unit and alarm outputs) communicate by infrared link.

The supervisor also has the possibility of activating these thresholds through the network.

Linearization Tables.....
The operator can define up to ten value pairs, entered in tabular form, to scale or correct each of the inputs (transducer calibration).

Communications Interface.....
The link is of the two-wire RS 485 (half-duplex) type using the Modbus/Jbus protocol. All the read and write registers needed for using the TRN's are described in the LTCTM program, so the transmitters can be used in environments (programmable controllers, supervisors, and the like)

other than those proposed by AOIP, but it is strongly recommended that the LTCTM utility be used for the configuration phase.

Accuracy.....
Accuracy is expressed as $\pm (\% R + n)$, in which R is the instrument reading and n the number of units specified. For example, for the measurement of a 100 platinum probe at 50°C, the accuracy of the TRN over one year is $\pm(0.05\% R + 0.2^\circ\text{C})$.
The uncertainty will therefore be 0.05% of 50°C, or $0.025^\circ\text{C} + 0.2^\circ\text{C} = 0.225^\circ\text{C}$. It should be noted that this calculation does not account for the error introduced by the transducer, as this can be corrected using the linearization tables after calibration.

platinum probe + process -transmitter TRNP

This measures temperature by resistive probe in a three-wire circuit on one channel while measuring 0-10 V or 0-20 mA

process signals on the other channel. It is configured using the LTCTM program. The process channel can supply two-wire

transducers. The TRNP can be combined with the TRNA threshold detector with its two relay outputs.

Channel 1: Resistive temperature probe

Nominal rating: 200
Measurement range: 240 maximum.
Measurement current: 0.5 mA.
Possibility of averaging up to 32 measurements.
Pt100 linearized as per IEC 751 (DIN 43760).
Other transducers on request.

Sensor	Range	Resolution	Accuracy over 1 year
Pt 100 or JPt 100	- 210 to + 320°C	0.01°C	0.05% + 0.2°C
Pt 50	- 210 to + 320°C	0.01°C	0.05% + 0.5°C

Channel 2: DC voltage

This channel can be scaled depending on the physical quantity to be measured.
Measurement range: - 1.5 V to + 12 V.
Input resistance: 1.11 MΩ.
Response time < 0.5 s.

Serial mode rejection at 50/60 Hz > 60 dB.
Common mode rejection at 50/60 Hz > 110 dB.
Temperature coefficient < 10% of accuracy/°C.

Range	Resolution	Accuracy over 1 year
10 V	1 mV	0.1% + 2 mV

Channel 2: Process current (0-20 mA)

This channel can be scaled depending on the physical quantity to be measured using the linearization tables.
Current loop supply: 21 V \pm 10% at 20 mA.
No-load voltage < 40 V.

Maximum current: 25 mA.
Measurement range: - 3 mA to + 24 mA.
Input impedance: 5 \pm 2%.
Response time < 0.5 s.
Temperature coefficient < 10% of precision/°C

Range	Resolution	Accuracy over 1 year
20 mA	1 μ A	0.1% + 4 μ A

thermocouples transmitter - TRNT

This unit accepts most transducers available on the market. The type of thermocouple is defined by the LTCTM configuration program. For any that are not available in this program, consult us.
The transmitter contains a linearization table for correcting the transducer at ten points, after calibration.
The TRNT can be used in combination with the TRNA threshold detector, which includes two relay outputs
All types of thermocouples measured.
Linearization as per IEC 584-1.

Input position	Resolution	Accuracy
High level (K, T, J, etc ...)	0.1°C	0.1% + 0.3°C
Low level (R, S, etc ...)	1°C	0.1% + 1°C

Precision and resolution in the usual operating ranges.
Internal reference junction compensation: $\pm 0.5^\circ\text{C}$.

frequency-count transmitter - TRNF •

This transmitter has two inputs:

- Channel 1 is configurable as a pulse counter or ON/OFF measurements (dry contact can be supplied by the transmitter or voltage level).
- Channel 2 is configurable as pulse counter or frequencymeter. When defined

for ON/OFF detection, the state of channel 1 can be programmed to inhibit the count on channel 2. The measurement channels can be scaled by linearization tables in order to indicate the true physical quantity measured by the transducer.

The TRNF offers the possibility of supplying a Namur type transducer with a 5 V/1 k source.

The TRNF can be combined with the TRNA threshold detector including two relay outputs.

Channel 1: ON/OFF measurement or count

ON/OFF measurement

Pulse count

Maximum frequency: 1 kHz, capacity 4 x 10⁹

Measurement	0 status	1 status
Dry contact	Closed (R line < 10 k)	Open
Voltage level	< 1 V	> 2 V

Channel 2: Frequency measurement and pulse count

This input can be configured in levels and state change thresholds with internal switches.

Pulse count

Maximum frequency: 10 kHz, capacity: 4 x 10⁹

Frequency measurement: three programmable ratings.

Measurement time < 0.5 s.

Possibility of averaging up to 32 measurements.

In mode counter and frequencymeter modes, a low-pass filter can be programmed by internal switch with a cutoff frequency of 1 kHz to 10 kHz.

The dc component can also be suppressed by internal switch.

Range	Minimum frequency	Resolution	Accuracy
100 Hz	5 Hz	0.01 Hz	0.01 Hz
1 KHz	5 Hz	0.1 Hz	0.1 Hz
10 KHz	50 Hz	1 Hz	1 Hz

threshold detector with two relay outputs TRNA •

Communicating by infrared link to the TRN family of transmitters, this unit has two relay outputs.

The LTCTM configuration program is used to define two thresholds per transmitter. The associated TRNA is controlled when a

threshold is crossed. For reference, the thresholds can also be forced by the supervisor. The TRNA offers two relay outputs, RL1 and RL2. Each relay has a toggle (NO-NC) contact. The alarm status corresponds to the relays

NC status.

Cutoff power: 5 A, 250 Vac

Maximum switched power: 1250 VA, 150 W.

readout repeater TRNR •

This module is used for remote display of one of the channels (measured or computed) accepted by the AOIP supervisors (LW1 or LWTM) or other, at any point in the Modbus network.

It comes with standard two relay outputs that can be activated either by a threshold overshoot (programmable at the level of the TRNR by the LTCTM configuration software) or by an order from the supervisor.

Red led readout.

Readout capacity: - 19,999 to + 39,999
Same relay output as the TRNA.

general specifications •

Communications interface

The link is of the two-wire RS 485 half-duplex type using the Modbus RTU/Jbus protocol.

The bit rate is controlled by internal switches, from 2400 to 19,200 baud.

Format: 8 bits, 1 stop bit, no parity
Addresses are set by internal switches, from 1 to 63.

Operating conditions

Reference domain: 18 to 28°C, RH from 45 to 75%.

Nominal operating range: 0 to 50°C, RH

from 20 to 80% without condensation.

Operating limits: - 10 to + 50°C.

Storage/shipping limits: - 30 to + 70°C.

Mechanical specifications

•TRNP, TRNT, TRNF, TRNA: DIN rail click-on casing as per EN 50022-35.

Dimensions (h x w x d):

75 x 26 x 111 mm.

Screw connections

Seal: IP 40 casing, IP 20 terminal strips.

•TRNR: Flush-mount casing

Panel cutout: 48 x 96 mm.

Depth: 120 mm.

Screw connections.

Electrical characteristics

Galvanic insulation between power supply, measurement circuit, and RS 485 link
Standard supply: 230 V + 10%.

Optional supplies: 115 Vac, 48 Vac (except TRNR), 24 Vac.

Consumption: 2 VA for all models except TRNR.

Safety Standards

The instruments are constructed and tested in conformity with European standard EN 61010-1.

Category 2, pollution 2, measurement assignment voltage: 250 V.

Category 3, pollution 2, measurement assignment voltage: 120 V.

RS 485 output assignment voltage: 10 V.

Measurement or RS 485 supply test voltage: 4000 V rms/50 Hz.

RS 485/measurement test voltage: 1800 V rms/50 Hz.

Transmitters supplied by a voltage of more than 60 Vac must be mounted either in a wall box or cabinet.

software

The TRN series transmitter communications interfaces meet the Modbus RTU/Jbus standard, so they can be configured and used on any master system equipped with this protocol.

A PC program series (Windows 3.1 or higher) is proposed to make them easier to use.

LTCTM Configuration/Display Software

This program is used to configure all the transmitters from a PC equipped with an RS 485 two-wire interface.

The menu guides the operator through all the various choices, such as:

- Definition of the transducer (type of thermocouple, for example)
- Threshold programming
- Configuration of linearization tables for scaling or correcting the temperature transducers.

The parameters are saved on nonvolatile memory and can be read back at any time with the LTCTM software.

Once all the TRN's are configured, the program can also be used for real-time digital display of all the transmitters connected to the network.

LWTM Real-time Supervisor

This is used to acquire up to 100 TRN modules connected to the PC on an RS 485 link. All four ports, COM1 to COM4, can be declared in communication.

Four hundred additional channels can be defined as calculation channels, on and between channels.

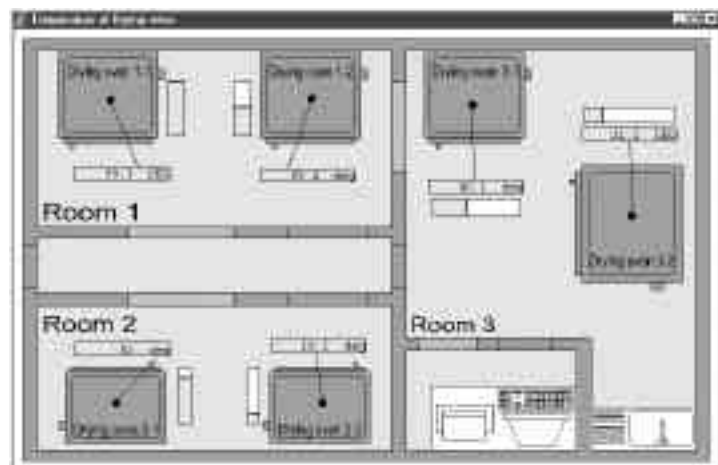
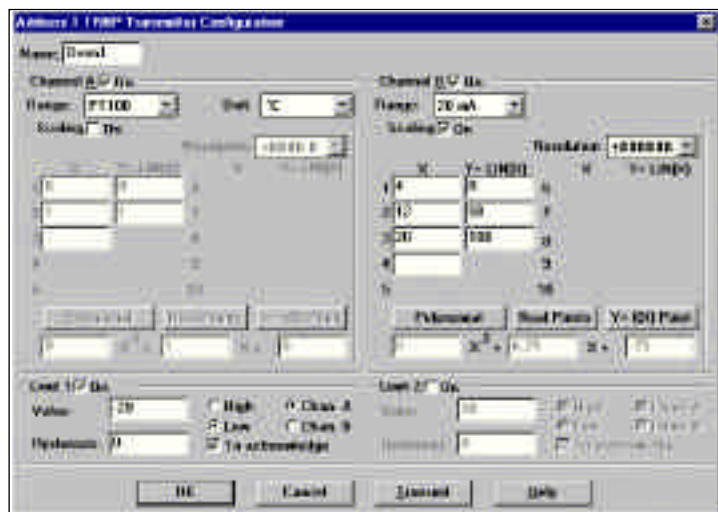
The 500 channels can then be declared for real time display in the form of a mimic diagram, curve, bargraph, digital table, alarm log, and other possibilities.

Certain channels can be declared as outputs, and the value is then displayed on the TRNR repeater at a defined address.

The user also has the possibility of declaring an unlimited number of result files, each of which can be interrogated in real time without interrupting the acquisition. The files are directly compatible with Excel, and can be exported in real time, using the dynamic DDE type links, or off line.

LW1 Real-time Supervisor

This offers the same possibilities as LWTM, with the added openness to all products using Modbus RTU/Jbus protocol, including especially the AOIP measurement stations (10 to 100 channels).



accessories

The transmitters are DIN rail click-on boxes, except for the TRNR, which is a wall flush mount.

Various accessories are available:

- Wall DIN rail for mounting one or two transmitters (AN 6006)
- Wall DIN rail for mounting ten transmitters (AN 6007)
- IP54 wall box for eight transmitters (AN 6009)
- IP54 wall box for one TRNR and five transmitters (ATC 021)
- RS232/RS485 converter for 25-pin PC interface (ATC 022)
- 9/25-pin adapter cord (AN 5894)
- 2 x 24 V supply output from 230 Vac line (AN 6008).

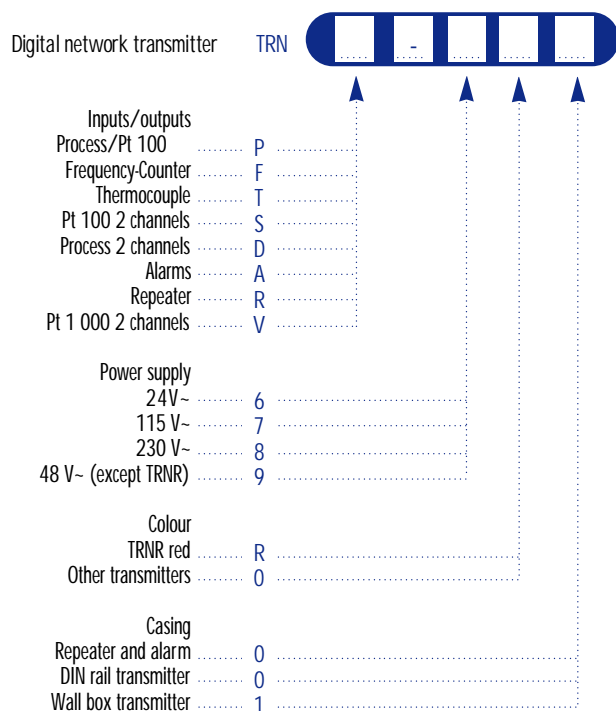


AN 6009



ATC 021

ordering instructions



Configuration software	LTCTM
Real-time supervisor program	LWTM
Real-time supervisor program	LW1

Accessories	
DIN rail for 2 transmitters	AN 6006
DIN rail for 10 transmitters	AN 6007
Wall box for 8 TRN	AN 6009
Wall box for 1 TRNR and 5 TRN	ATC 021
RS 232/RS 485 converter	ATC 022
9/25 pin adapter for PC	AN 5894
230/2 x 24 V~ power supply	AN 6008
DIN rail 24 V - 500 mA power supply	ATH001-00A
Case mounting of 2 TRN (1)	ATC040

(1) Indicate the transmitter

Specifications are subject to modification without prior notice



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