WIRELESS SENSORS TECHNOLOGY

THM602-I

THERMOCOUPLE AND MV MODBUS TEMPERATURE TRANSMITTER

Tekon Electronics In Head Temperature Transmitters are specifically designed to meet the most rigorous requirements of operation in the industrial process environments. Due to their reduced dimensions they can be installed in the the DIN Form B sensor connection head in place of traditional terminal blocks.

THM602-I is a temperature transmitter which accepts thermocouples sensors (C, J, K, N, R, S and T) and voltage sensors to make it available in a Modbus RTU slave register.

Dimensions	45ø x 23 mm
Weight:	Approx. 50g
Material:	Nylon 66
Protection Index:	IP40

KEY FEATURES

THERMOCOUPLES SENSOR INPUT
C, J, K, N, R, S AND T

VOLTAGE SENSOR INPUT

1,5KV AC GALVANIC ISOLATION

MODBUS RTU SLAVE PROTOCOL
RS-485

CONTINUOUS OPERATING STATUS MONITORING
AND SELF-DIAGNOSTIC

HIGH PRECISION AND ACCURACY

HIGH EMC PERFORMANCE

WIDE MEASUREMENT RANGE

DS_INHD_THM602-I_E01A

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TECHNICAL SPECIFICATIONS

INPUT THERMOCOUPLES (TC)	
Measured variable	Temperature
Sensor type	Thermocouples C, J, K, N, R, S, T
Units	ºC / ºF / K (configurable)
Connection	1 Thermocouple (TC)
Sensor current diagnostic	<11 nA
Open-circuit monitoring	Always active (cannot be disabled)
Cold junction compensation (CJC)	Integrated resistance thermometer
Measuring range	Not configurable (see "Measuring accuracy" table)
Characteristic curve	Temperature-linear

INPUT mV	
Measured variable	DC Voltage
Sensor type	DC Voltage source
Connection	2 wires
Units	mV
Open-circuit monitoring	Always active (cannot be disabled)
Measuring range	Not configurable (See "Measuring Accuracy" table)
Characteristic curve	Voltage-linear

MEASUREMENT ACCURACY	
Reference conditions	
Auxiliary power	24V DC ± 1%
Ambient temperature	23ºC
Warm-up time	2 min
Digital measuring errors	See table "Measuring accuracy" table
Internal temperature measure error	< ± 0,50 ºC
Influence of ambient temperature	
on thermocouples J, K, N and T	< ± 0,005 ºC / ºC
on thermocouples C and R	< ± 0,010 ºC / ºC
on thermocouple S	< ± 0,200 ºC / ºC
on linear mV	< ± 0,001 mV / ºC
EMC - immunity influence (IEC 61326-1)	< ± 0,0279% of span (thermocouple K)
Extended EMC immunity (NAMUR NE 21, A criterion, burst)	< ± 0,00465% of span (thermocouple K)

COMMON SPECIFICATIONS	
Isolation voltage (test | operation)	1,5 kV AC | 48 V AC
Internal power dissipation	40 mW to 0,5 W
Voltage drop	12 V DC
Effect of supply voltage variation	< 0,003% of span/ V DC
Response time 90%	< 1s

Power-up time (TC)	< 600ms

OUTPUT - MODBUS	
Physical layer	RS-485
Slave address range	From 1 to 100
Support baud rates	4800, 9600, 19200, 38400, 56000, 57600, 115200 (configurable)
Supported parity	Odd/Even/None (configurable)
Stop bits	1 or 2 (configurable)
Response time	<100ms
Comunication start up time (after power ON) [1]	5 s

OPERATING ENVIRONMENT	
Ambient temperature range	-20 to 80ºC
Storage temperature range	-20 to 80ºC
Relative humidity	≤95%, without condensation

FACTORY DEFAULT SETTINGS	
Sensor	Thermocouple K
Temperature format	Celsius (ºC)
Modbus settings	
Baudrate	9600 bps
Parity	None
Data bits	8
Stop bits	2
Slave address (Node Index)	1
Modbus register - Value	Register value
Acquisition mode configuration	6 (Thermocouple K)
Temperature format configuration	1 (ºC)

CERTIFICATIONS AND APPROVALS	
EN 61326	Electrical equipment for measurement, control and laboratory use. EMC requirements.
IEC 61000-4-2	Electrostatic discharge immunity test
IEC 61000-4-3	Radiated, radio-frequency, electromagnetic field immunity test
IEC 61000-4-4	Electrical fast transient/burst/immunity test
IEC061000-4-5	Surge immunity test

POWER SUPPLY	
Power supply	5 to 24 V DC ±10%
Power consumption (max.)	0,3 W

CASING	
Material	Nylon 66
Weight	Approx. 50g

Dimensions	See “Dimensional drawings”
Cross section	2,5 mm^2
Protection index	IP40

[1] Five seconds window, after power ON, to enter in configuration mode using Tekon Configurator Software. Check “Installation Guige” for more information.

MODBUS ADDRESSES

MODBUS TABLE (HOLDING REGISTERS)

Description	Address	Type	Values
Sensor status	13	UINT16	1 - Reading OK 2 - Open circuit 6 - Internal temperature below the minimum allowed limit 7 - Internal temperature above the minimum allowed limit
Acquisition mode configuration	15	UINT16	2 - Linear voltage 6 - Thermocouple K 7 - Thermocouple J 8 - Thermocouple N 9 - Thermocouple R 10 - Thermocouple S 11 - Thermocouple T 12 - Thermocouple C
Internal temperature (simple resolution)	16	UINT16	Temperature value from the internal sensor multipled by 10
External temperature (simple resolution)	17	UINT16	Temperature value from the internal sensor multipled by 10
Temperature format configuration	18	UINT16	1 - ºC 2 - ºF 3 - K
Acquired milivolts	19	FLOAT32	Format: CD AB (little endian byte swap)
Internal temperature (full resolution)	21	FLOAT32	Format: CD AB (little endian byte swap)
External temperature (full resolution)	23	FLOAT32	Format: CD AB (little endian byte swap)
Modbus slave address	42	UINT16	
Modbus baudrate	43	FLOAT32	Format: CD AB (little endian byte swap)
Modbus parity	45	UINT16	
Device model	54	UINT16	70 - THM602-I
FW version: Makor | Minor	56	UINT16	
FW revision	57	UINT16	
HW version: Major | Minor	58	UINT16	
System state	59	UINT16	1 - Normal running 2 - Configuration 3 - Tekon user configuration 5 - Load default settings 255 - Deadlock
Modbus stop bits	64	UINT16	

MEASURING ACCURACY

THERMOCOUPLES (TC)

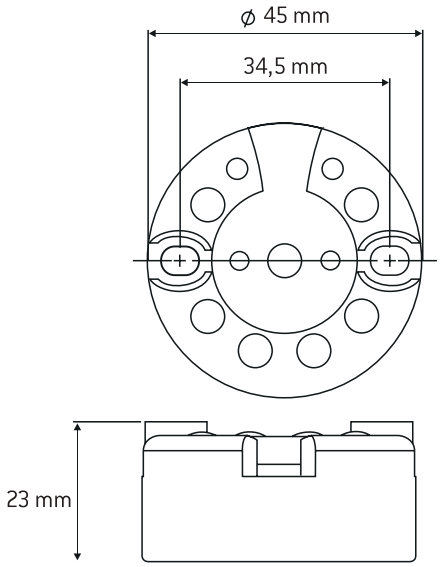
SENSOR	RANGE (°C)	DIGITAL ACCURACY (°C)	RESOLUTION (°C)
C	0 to 2300	< ± 1,0	0,400
J	-210 to 1200	< ± 1,0	0,077
K	-270 to 1372	< ± 1,0	0,098
N	-270 to 1270	< ± 1,0	0,151
R	-50 to 1760	< ± 1,2	0,189
S	-50 to 1760	< ± 2,0	0,185
T	-270 to 400	< ± 1,0	0,026

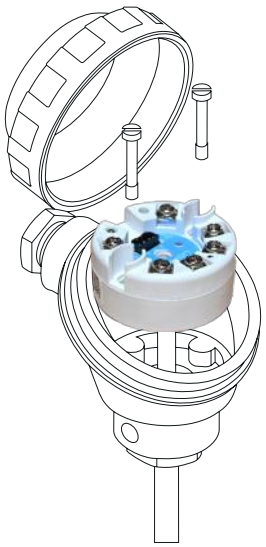
LINEAR SENSORS

SENSOR	RANGE (mV)	ACCURACY (mV)	RESOLUTION (mV)
mV	-2000 to 2000	< ± 5	1

TECHNICAL DRAWINGS AND INFORMATION

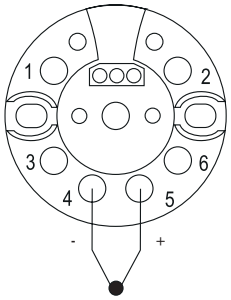
DIMENSIONAL DRAWINGS & INSTALLATION DIAGRAM



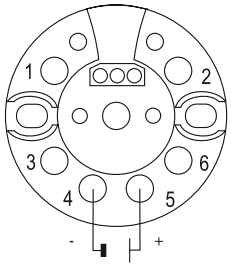


ELECTRICAL CONNECTIONS

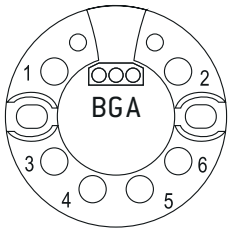
THERMOCOUPLES



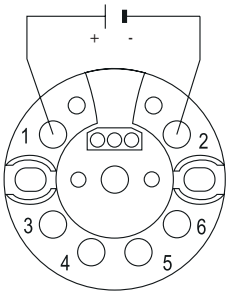
mV



RS485

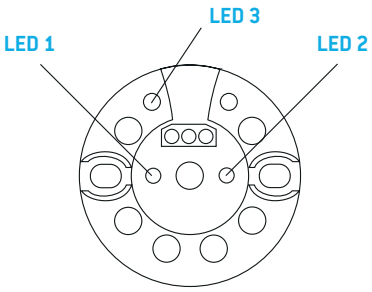


POWER SUPPLY



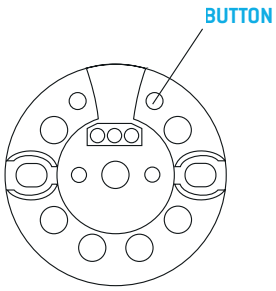
A: TxD-/RxD-
B: TxD +/RxD+
G: C common signal reference ground

STATUS LED



LED 1 (RED)	LED 2 (BLUE)	LED 3 (RED/ GREEN)	
OFF	BLINK	Rx Modbus Tx Modbus	No sensor error Configuration mode
FLASH	BLINK		Sensor error Configuration mode
OFF	ON		No sensor error Normal mode
FLASH	ON		Sensor error Normal mode

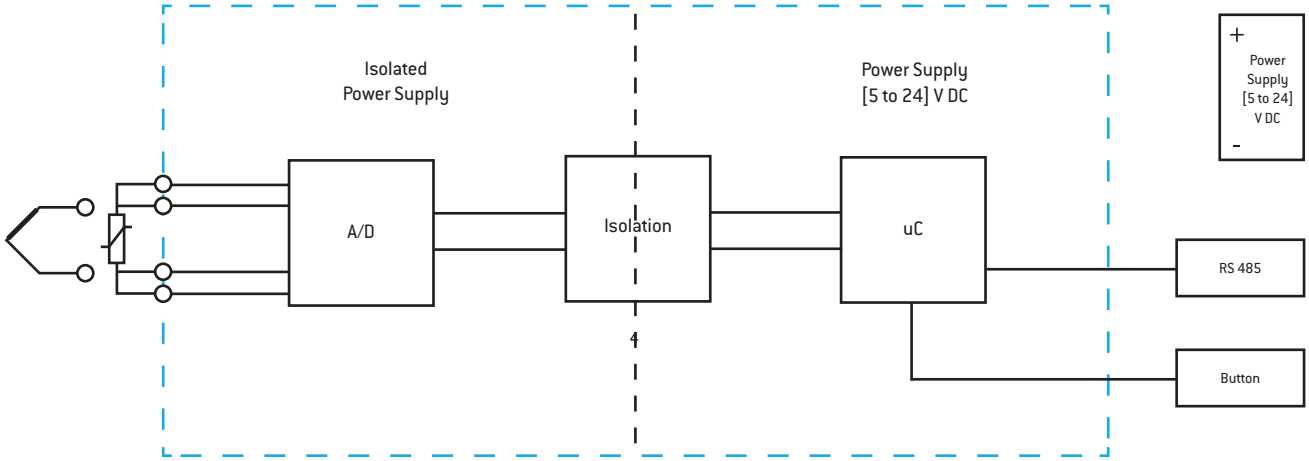
CONFIGURATION MODE



Enter and exit configuration mode

Press button for 5 seconds to enter configuration mode and press button for 5 seconds to exit configuration mode

BLOCK DIAGRAM



RELATED PRODUCTS

RS485 TO USB CONVERTER CABLE

REF.: PA123790400

Cable to connect THM602-I temperature head transmitter to USB port.

REVISION HISTORY

VERSION
E01A

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