SPARK
Drives & Automation

MODBUS THERMOCOUPLE TRANSMITTER

Reads temperature from multiple Thermocouple types & transmits over MODBUS

MODBUS Thermocouple Transmitter – MTT converts a thermocouple input to a standard industrial MODBUS data (Signed 16-bit data). It supports multiple thermocouple types (J, K, T, R, S Thermocouples) inputs and also provides auto reference junction compensation. Digital calibration of all thermocouple ranges is performed the factory, with calibration data stored in EEPROM on board. This allows thermocouple types to be changed in the field with no need for recalibration. Cold junction compensation automatically corrects for temperature variations at the thermocouple reference junction at the transmitter.

This module is designed with a high performance microcontroller, RS232 & RS485 for MODBUS. Our module functions as a MODBUS RTU Slave, which receives input read / output write command over MODBUS and perform the function accordingly. Module configuration (Slave ID, Baud Rate, etc.,) can be done using RS232 and IO Read/Write can be done via RS232/RS485.

Features

- ✓ Standard 24V operation.
- ✓ J, K, T, R, S Thermocouples and mV Inputs
- ✓ Programmable Burnout with Sensor Fail Indicator
- ✓ Inputs are not isolated- Only use ISOLATED thermocouple sensors
- ✓ Slave ID, Baud Rate, Configuration using MODBUS.
- ✓ Can be interfaced easily PLC or HMI using MODBUS.

Mechanical Characteristics

Operating temperature	:	0...+65 (°C)
Size (l*b*h)	:	100*45*50 mm
Housing	:	DIN Rail ABS Plastic Enclosure
Weight	:	70grams.

sales@sparkdna.in, +91 99428 66766
#44, Marvel Parambariam, Kalapatti Road, Saravanampatti,
Coimbatore, Tamilnadu, India 641035.

Connector Info – Control Card

Pin numbers mentioned are from left to right.

TOP SIDE CONNECTOR

PIN#	CONNECTION
SUPPLY CONNECTION	
24+	24V DC Supply
GND	Ground 0V
-	Reserve
-	Reserve
RS485 INTERFACE	
D+	RS485 D+
D-	RS485 D-
RS232 INTERFACE	
Tx	RS232 Tx
Rx	RS232 Rx
GND	Ground – 0V
-	Reserve

BOTTOM SIDE CONNECTOR

PIN#	CONNECTION
DIGITAL OUTPUT	
DOP	Fault Output
-	Reserve
THERMOCOUPLE INTERFACE	
T+	Thermocouple Interface T+
T-	Thermocouple Interface T-

Communication Parameters for RS-485 & RS-232:

Parameter	RS232	RS485	
		Default	Configurable
Protocol	MODBUS – RTU Slave (Hex)	MODBUS – RTU Slave (Hex)	No
Slave Number	1	1	Yes
Baud Rate	9600	9600	Yes
Data bits	8	8	No
Parity	None	None	No
Stop Bits	2	2	Yes
Retry Count	2	2	No
Time Out	1000ms	1000ms	No

NOTE: The Slave Number for RS232 is always "1", cannot be changed. To change Slave number for RS485 refer the Register Section below.

Register Set

Thermocouple Register:

Hex Address	Function	Type	Port
0001H	Temperature data	Read	RS232 & RS485
0019H	Unit Selection Register	Read / Write	
001AH	Thermocouple Type Selection	Read / Write	
0021H	Fault Indication Register	Read	

Configuration Registers:

Hex Address	Function	Type	Port
07D0H	Slave Address of RS485	Read / Write	RS232 only
07D1H	Baud Rate of RS485	Read / Write	
07D2H	Stop Bits of RS485	Read / Write	

sales@sparkdna.in, +91 99428 66766
#44, Marvel Parambariam, Kalapatti Road, Saravanampatti,
Coimbatore, Tamilnadu, India 641035.

Changing the Slave Address of Module:

This module has two communication ports RS232 and RS485. The Slave address for RS232 is fixed as 01 and cannot be changed. For updating the slave address for RS485, the New Slave address can be written to address (07D0H) via RS232 port. The last changed Slave address will be retained until next change.

Functions of Control Registers:

- 0001H – Temperature Data: This register has 16-bit signed value. When this address is read, the Temperature value will be transmitted either in °C (Default) or in °F depending on Unit Selection Register.

- 0019H - Unit Selection Register: This register has default '0'. The values written to this register will select the corresponding Unit as shown and this will retained until next change.
    - ➔ '0' - °C (Default)
    - ➔ '1' - °F
- 001AH – Thermocouple Type Selection: This register has default '0'. The values written to this register will select the corresponding Thermocouple type shown in below and this will retained until next change.
    - ➔ '0'- J type. (Default)
    - ➔ '1'- K type.
    - ➔ '2'- T type.
    - ➔ '3'- S type.
    - ➔ '4'- R type

- 0021H - Fault Indication Register: When this address is read, the Fault Code will be transmitted as shown in below. The Fault State indicated by the Digital NPN output. Fault will automatically cleared when it is recovered.
    - ➔ '0' – No Fault.
    - ➔ '1' – Thermocouple Disconnected.
    - ➔ '2' – Over / Under Voltage Fault.

Functions of RS485 Configuration Registers:

- 07D0H (42001) – Slave Address of RS485: This register has default '1'. The values written to this register will change the Slave Address of RS485 com-port and this will retained until next change. This register can read by either RS232 & RS485 and write by RS232 only.

- 07D1H (42002) – Baud Rate of RS485: This register has default '0'. The values written to this register with the corresponding Baud Rate of RS485 which is shown in below and this will retained until next change. This register can read by either RS232 & RS485 and write by RS232 only.
    - ➔ '0' – 9600 bps(Default)
    - ➔ '1' – 14400 bps
    - ➔ '2' – 19200 bps
    - ➔ '3' – 38400 bps
    - ➔ '4' – 56000 bps
    - ➔ '5' – 57600 bps

- 07D2H (42003) – Stop Bits of RS485: This register has default '0'. The values written to this register with the corresponding Stop Bits of RS485 which is shown in below and this will retained until next change. This register can read by either RS232 & RS485 and write by RS232 only.
  - ➔ '0' – 2 Stop Bits(Default)
  - ➔ '1' – 1 Stop Bits

Configurator Tool:

PC based Configurator tool is available for Module configuration (Salve ID, Baud rate, Stop bits etc.,).

Thermocouple selection along with unit of measurement can be done. Measured temperature data will be displayed.

This greatly reduces the initial testing efforts and time.