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NEXSENS TS210 Thermistor String User Guide

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NEXSENS TS210 Thermistor String

The TS210 Thermistor String is a temperature sensor that measures the temperature of water for environmental monitoring applications. It is designed to be connected to a data logger for data collection and analysis.

Wiring Connection Table

Table 1 shows the wiring table for the UW-FLxR Cable with the corresponding pin and wire colors for the TS210 signal.

Receptacle Pin	Wire Color	TS210 Signal
1	Green	RS485-A
2	Blue	RS485-B
3	Brown	PassThrough
4	Red	12VDC
5	White	—
6	Yellow	PassThrough
7	Black	GND
8	Orange	PassThrough

Sensor Information

The TS210 is equipped with Modbus-RTU Register Information, which allows for easy data retrieval and customization of the sensor settings. Table 2 shows the function and data type for reading temperature data. Table 3 shows the function and data type for changing the Modbus address of the first node on the TS210 string.

Specs

- **Dimensions**: 13.46 cm L x 3.56cm Dia. (5.3 "L x 1.4"Dia.)
- **Range**: 0 to 45°C (32 to 113°F)
- **Resolution**: 0.01°C
- **T90 Response Time**: 60 seconds
- **Maximum Depth**: 200m (656 ft.)
- **Maximum Length**: 1219m (4000 ft.)

General

- **Power**: 5-24 VDC
- **Protocol**: RS-485 (Modbus-RTU)
- **Baud Rate**: 19200
- **Parity**: N81
- **Default Starting Address**: 1*
- **Format**: Big Endian
- **Timeout**: 500 ms

On a T-Node FR string with multiple nodes, the nodes should be addressed in increasing numerical order.

Universal Modbus Address

The TS210 is programmed to respond to Modbus address 251, which is implemented in case the sensor's current address is unknown. Table 4 shows the function and data type for reading the current node address using the universal address. It is important to note that this address should only be queried with one sensor connected to the data line, as multiple sensors connected may result in a bad message.

Function 0x04 (Read Input Registers)			
Registers	Data Type	Data Size	Purpose
0x1000	16-bit integer	1 Register	Uses the universal address (251) to read the current node address.

Example Input: FB,04,10,00,00,01,21,50
Uses universal address (FB) to read current address.

Example Output: FB,04,02,00,07,20,E6
Current Modbus address is 7 (0x0007

NexSens Data Logger Connection

The TS210 can be easily connected to a NexSens data logger for data collection and analysis. Follow the steps below for setup:

1. Set up your data logger on WQData LIVE by following the included quick start guide or visiting the NexSens Knowledge Base.
    1. Following the included data logger quick start guide with your order.
    2. Visiting the NexSens Knowledge Base
2. Plug the string into an open sensor port on the data logger for autodetection.
3. After the next logger reading, confirm that all temperature nodes on the string have been recognized and ensure that each show valid temperature readings. Gather a few readings before deployment.
    1. Confirm that all temperature nodes on the string have been recognized.
    2. Ensure that each show valid temperature readings.
   3. Gather a few readings before deployment

Before field deployment, it is important to connect a UW-plug on the last node of the string to prevent water intrusion. For additional information, refer to the TS210 Resource Library on the NexSens Knowledge Base or contact NexSens customer support.

Overview

The NexSens TS210 Thermistor String features a series of connected sensors containing integral titanium thermistors secured in protective housings. Each sensor is accurate to +/- 0.075°C. Readings stabilize within 60

seconds due to the thermistors direct contact with water. Temperature data is transmitted on a RS-485 Modbus RTU string bus for integration with data loggers and SCADA systems. The sensors are connected via marine-grade cable with a braided Kevlar core and can be suspended vertically in a water column or horizontally along a stream or riverbed. The string is powered by 4-28 VDC for operation on a 12 or 24 VDC power supply.

UW-FLxR receptacle cable pinout
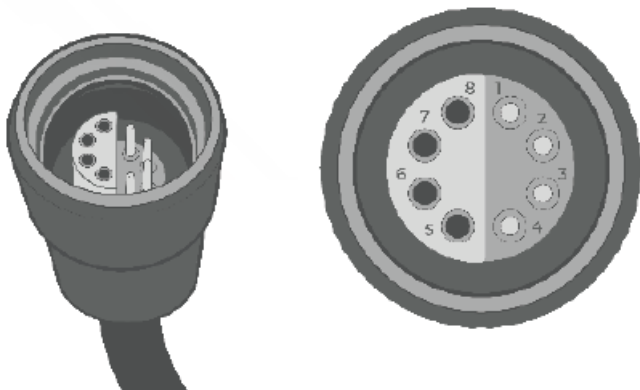
Modbus-RTU Register Information

Read temperature.

Function 0x04 (Read Input Registers)			
Registers	Data Type	Data Size	Purpose
0x0006,0x0007	32-bit Float Big-endian	2 Registers	Requests the temperature recorded in °C.

Example Input: 01,04,00,06,00,02,91,CA
Requests the temperature reading from address 1.

Example Output: 01,04,04,41,AF,38,1D,0C,50
Sensor responds with 0x41af381d (21.9024°C).

Change Modbus address

Function 0x10 (Write Multiple Registers)			
Registers	**Data Type**	**Data Size**	**Purpose**
0x1000	16-bit integer	1 Register	Changes the Modbus address of the first node on the TS210 string*.

Assuming the first node of the string begins with address 1

Example Input: 01,10,10,00,00,01,02,00,05,77,92
Changes Modbus address from 1 to 5.

Example Output: 01,10,10,00,00,01,05,09
Sensor responds acknowledging new address.

IMPORTANT – BEFORE FIELD DEPLOYMENT: Ensure to connect a UW-plug on the last node of the string to prevent water intrusion.

For additional information, please reference the TS210 Resource Library on the NexSens Knowledge Base.
nexsens.com/ts210kb

- 937-426-2703
- **www.nexsens.com**

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Documents / Resources

NEXSENS TS210 Thermistor String [pdf] User Guide
TS210, TS210 Thermistor String, Thermistor String, String

References

- **Knowledge Base - NexSens**
- **Knowledge Base - NexSens**
- **NexSens Technology Inc. - Better Data. It's what we do**