

SM500F

Field-mountable paperless recorder



Connecting the SM500F to a Panel 800 via Modbus TCP

Measurement made easy

Panel 800 and SM500F

Introduction

Recording and Control products can now be found via both the Measurement Products sales channels and the Control Systems essential automation product suite. This provides a whole new world of products that Recorders and Controllers can interact with.

For example, a plant using a DCS might have a requirement for local indication and recording at more remote areas of the plant, while still requiring that the information from those locations is bought into the wider system. A local recording system as back up for a wider system could also be required.

This document details how an SM500F can be connected to, and communicate with, a Panel 800 being used as a local HMI for a larger control system.

Communication method

Modbus TCP can be used in one of two ways to enable the SM500F and Panel 800 to communicate. The SM500F can be configured as either the Server (Slave) or the Client (Master) device with the Panel 800 as either the Client (Master) or the Server (Slave) device, respectively.

Modbus TCP functionality is available on the SM500F only if the optional Ethernet board is fitted to the recorder. The Ethernet settings must then be configured to assign the SM500F to a position on the same network as the Panel 800 and to enable the devices to communicate.

SM500F Ethernet configuration

Refer to Section 7.10.3 of the recorder's User Guide ([IM/SM500F](#)) to configure the SM500F's Ethernet functionality.

Configuring the SM500F as the Modbus TCP server (slave) device

Configuring the Panel 800

The Panel 800 can be configured only by using a PC-based application called **Panel Builder 800**. The first step when using Panel Builder 800 is the creation of a project.

Note. This document does not include instructions for creating a project. For details of how to create a project or any other questions regarding Panel Builder 800, refer to manual [3BSE069487-600](#).

Once a project has been created and the Panel 800 configured as a Modbus Client (Master) device (see Figure 1), the properties for the Modbus master driver must be set correctly.

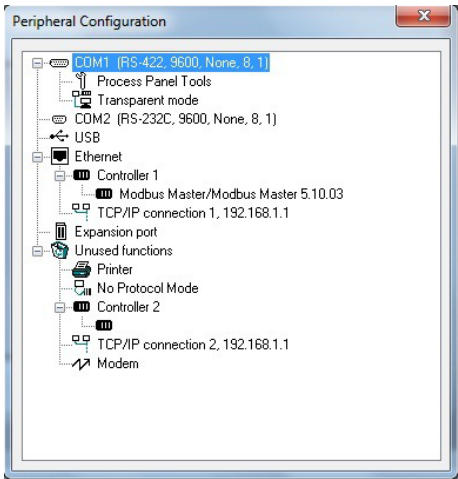


Figure 1 Panel 800 builder Modbus client (master) configuration

Referring to Figure 2, configure the following parameters:

Communication mode	Set to Ethernet TCP/IP.
Default station (station refers to the slave device)	This is a legacy parameter from the RS485 Modbus settings and is the Modbus address of the slave device. Because the devices are communicating via Ethernet, the IP address of the slave is used, but this parameter is part of the Modbus Master settings and cannot be turned off. Set to 255 – this informs the master device that it is not required.
32 bit word mapping	Set to Big-endian to enable correct communications to take place.
Addressing	Set to Decimal.
Start address	Set to 1-based to enable entry of the register numbers provided in the SM500F User Guide (IM/SM500F).
Max block size (words)	Set to 16 to enable correct display of all bytes that are transferred during Modbus Communications.

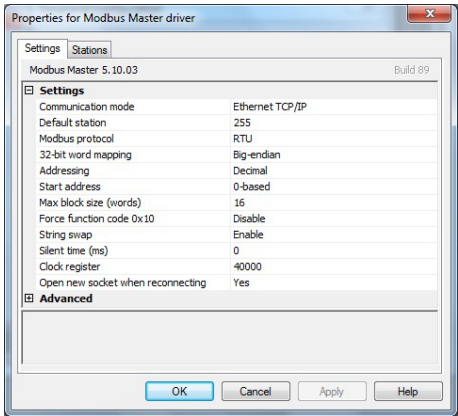


Figure 2 Modbus master driver settings tab

Figure 3 shows the Modbus driver's **Stations** tab where the following parameters for each instrument in the network are entered to enable the Panel 800 to communicate with them:

Station	Enter the number that identifies the instrument's location within the network. Note. This is not the instrument's address – it is an identification number that enables the operator to identify the instrument.
IP address	Enter the instrument's IP address.
Port	Enter the system port number through which communication will take place.
Node	Enter the node address 255.

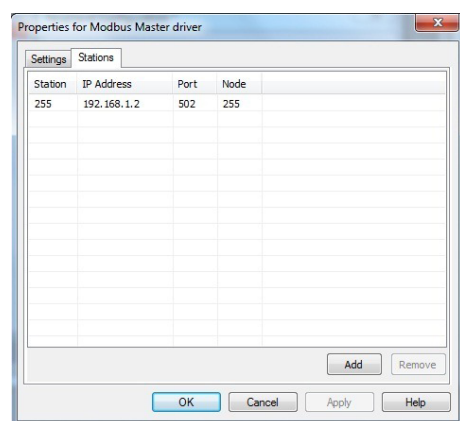


Figure 3 Modbus master driver stations tab

The next step configures the registers to read and display on the Panel 800 display. This is performed in the analog numeric configuration screen.

Referring to Figure 4, configure the following parameter:

- Analog signal**
- Enter the address of the register to read in the dialog entry box and use the adjacent drop-down menus to:
- 1 Select the function code of the register.
 - 2 Select the read format **Float without exp.**

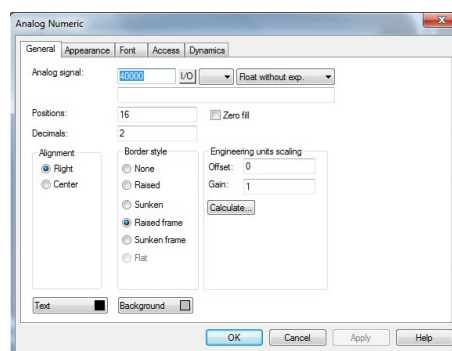


Figure 4 Analog numeric general tab

If there is a requirement to write a value to an SM500F register, select the **Access** tab and, referring to Figure 5, check the **Enable operator input** box.

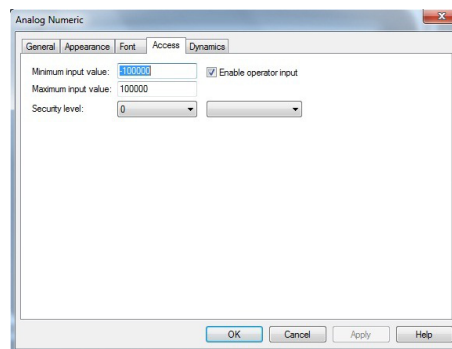


Figure 5 Analog numeric access tab

When all required registers have been configured, select the **Transfer** menu item from the toolbar at the top of the screen and transfer the program to the Panel 800 ready for connection to the SM500F.

...Configuring the SM500F as the Modbus TCP server (slave) device

Configuring the SM500F

To configure the SM500F as a server (slave) device, enter the configuration level and select the Modbus TCP parameter in the main menu to access the Modbus TCP configuration screen.

Referring to Figure 6, set the parameters on the **Modbus TCP** tab as follows:

- Implementation

Select Modbus TCP Server.
- Connections allowed

Enter the number of connections required.
- Modbus TCP Port

Enter the same port number assigned to the Panel 800 during the Modbus master driver configuration.
- Reverse IEEE Data

Select Yes or No as required.

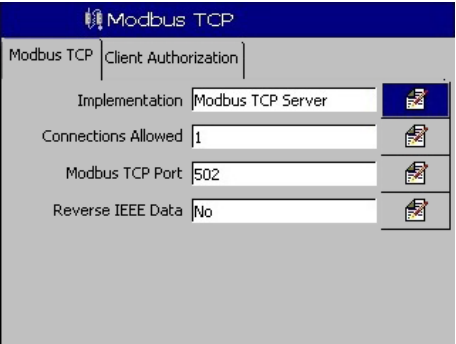


Figure 6 SM500F Modbus TCP tab

Figure 7 is an example of the SM500F’s chart display showing that the recorder can display and record values written to it by master or client programs or devices.

In this example, the Panel 800 has written a value of 20 to Comms analog input 1 of the SM500F. This input has been assigned to recording channel 1.2 by the SM500F’s configuration therefore the value is displayed against that channel and recorded in channel 1.2’s data file.

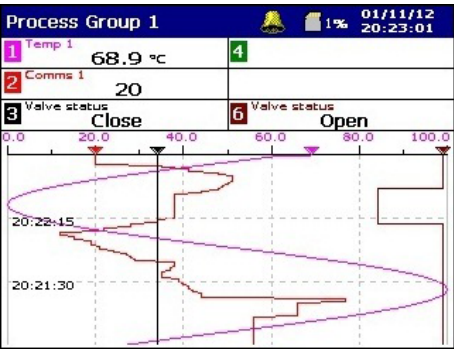


Figure 7 SM500F Chart display

Configuring the SM500F as the Modbus TCP master (client) device

Configuring the Panel 800

In this example, a new project is created configuring the Panel 800 as the Modbus server (slave) device (see Figure 8); the Modbus slave driver is then configured accordingly.

The next step assigns register numbers to the parameters to read – see Figure 10.

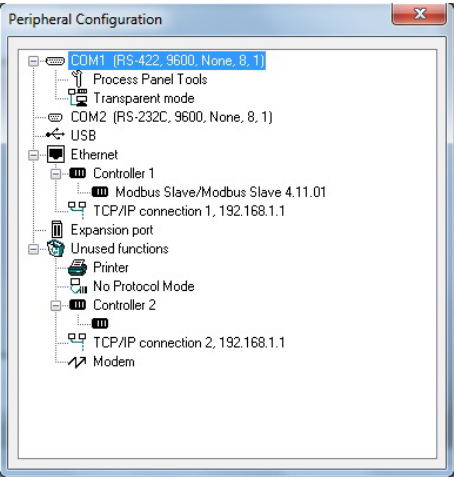


Figure 8 Panel 800 Builder Modbus Server (Slave) configuration

Referring to Figure 9, set the following parameters:

Communication method Select Ethernet.

Local port number Set as required.

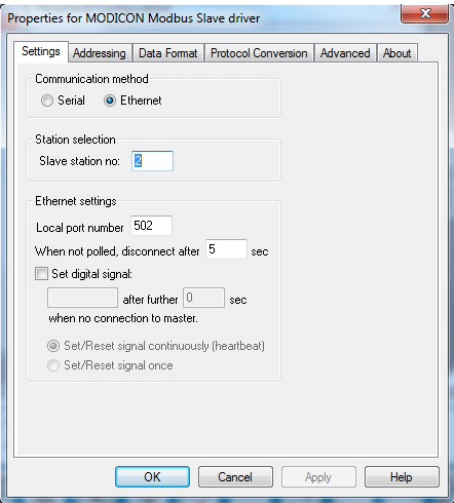


Figure 9 Modbus slave driver settings tab

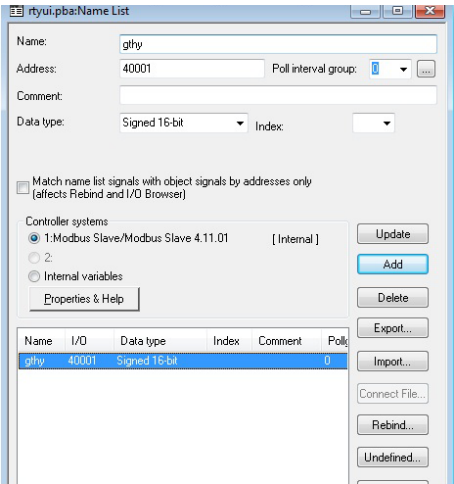


Figure 10 Assigning register numbers

Finally, when all required registers have been configured, select the 'Transfer' menu item from the toolbar at the top of the screen and transfer the program to the Panel 800 in order to display the required values on the SM500F.

Configuring the SM500F as the Modbus TCP Master (Client) device

Configuring the SM500F

To configure the SM500F as a client (master) device, enter the configuration level and select the **Modbus TCP** parameter in the main menu to access the Modbus TCP configuration screen.

Referring to Figure 11, set the parameters on the **Modbus TCP** tab as follows:

Implementation	Select Modbus TCP Client.
Connections Allowed	Enter the number of connections required.
Modbus TCP Port	Enter the same port number assigned to the Panel 800 during the Modbus slave driver configuration.

Figure 11 SM500F Modbus TCP tab

The next step is to configure the registers that are to be read and recorded on the SM500F. Holding registers and input registers are configured on the **Comms analog I/P** tab and coils on the **Comms digital I/P** tab.

Referring to Figure 12, set the parameters on the **Comms analog I/P** tab as follows:

Comms analog I/P	Select the input to use.
Protocol	Select the Modbus protocol to use, TCP or RTU.
IP-address	Enter the IP address of the Panel 800.
Register Number	Enter the register number to read.
Type	Select the register type.
Format	Select the format in which to read the data.

Figure 12 SM500F Comms analog I/P tab

The input must now be assigned to a recording channel to enable it to be recorded and displayed on the SM500F's front panel. Referring to Figure 13, select the required channel configuration screen **Setup** tab and select the configured input as the **Source ID**.

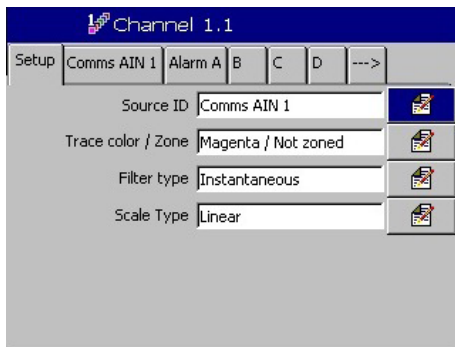


Figure 13 SM500F channel setup tab

Finally, exit the SM500F's configuration mode, ensuring **Save as current configuration** is selected. The configured channel's data is now displayed on the recorder's screen like any other input – see Figure 14.

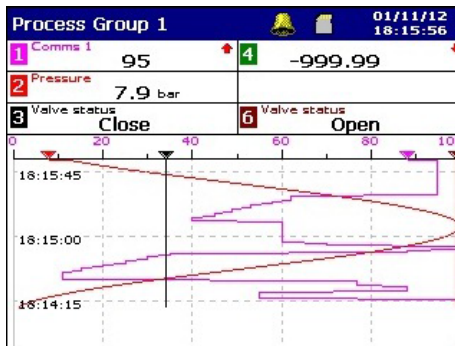


Figure 14 SM500F chart view

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