

SM500F

Field-mountable paperless recorder



Connecting the SM500F to an AC700F via Modbus RS485

Measurement made easy

AC700F 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 plant-wide distributed control system (DCS) might have a requirement for local indication and recording at remote areas of the plant.

This document details how an SM500F can be connected to, and communicate with, a Freelance AC700F controller.

Communication method

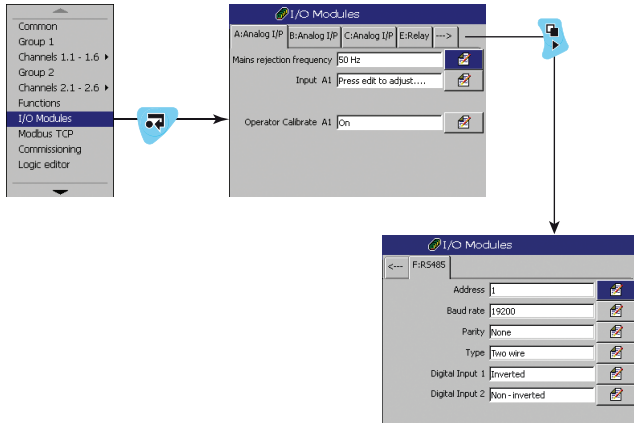
The AC700F can be equipped to communicate via Modbus RS485 and can be configured as either a server (slave) or client (master) device. However, the SM500F can be used only as a server (slave) device with Modbus RS485 and this is very easy to configure.

SM500F Modbus RS485 configuration

Note. Modbus RS485 communications are available on the SM500F only if the optional Modbus/digital input module is fitted.

To configure the SM500F:

- 1 Refer to Section 7 of the recorder's User Guide ([IM/SM500F](#)), and enter the configuration level, select the **I/O module** menu item to open the I/O Modules screen and select the RS485 tab.



- 2 Enter a unique Modbus Address (between 1 and 31) to enable the AC700F to identify the SM500F on the Modbus link.

Note. Maximum 31 slaves per loop.

- 3 Select the Baud rate (transmission speed) used by the AC700F: 1200, 2400, 4800, 9600, 19200, 38400, 115200.

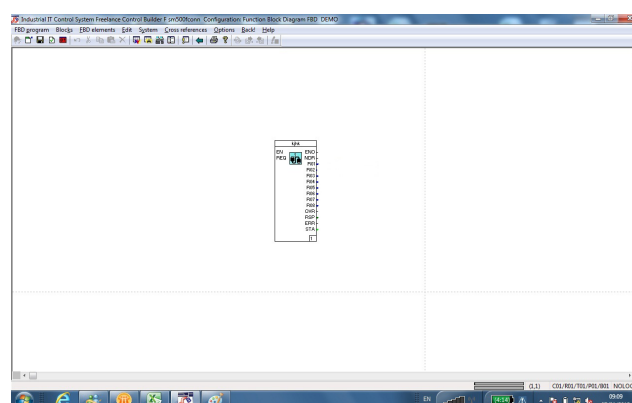
- 4 Select the Parity process used by the AC700F: None, Odd or Even.

Note. Parity is an error checking process used by a Modbus Master device to ensure that the received message is correct and without error. The choices of None, Odd and Even refers to what is added to the message in the form of an extra stop bit. This is double checked at the Master end to ensure that the message has been received correctly.

- 5 Referring to Section 7 of the recorder's User Guide ([IM/SM500F](#)), exit and save the configuration.

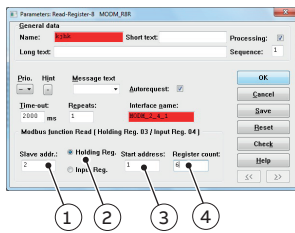
In this example, the SM500F has been configured as follows:

Address: 1
Baud Rate: 19200
Parity: None



...AC700F configuration

6 Configure the read parameters as follows:



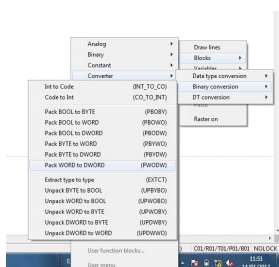
- ① Enter the device address programmed into the SM500F at step 2 on page 2 (1 in this example).
- ② Select **Holding Reg.** (The analog input values from the SM500F are required. These are values obtained directly from the process (for example, pressure and temperature) and are stored in the SM500F's holding registers).
- ③ Enter the start address 0000 (the holding register address to read first).
- ④ Enter the register count 6 (the number of registers to read).

In this example, the analog input registers start at Holding Register address 0000 and each value occupies 2 registers. Reading 6 registers obtains the values of the SM500F's Analog inputs 1, 2 and 3.

7 To read the values correctly on the AC700F, the 2 single register values (that are in WORD format) must be changed to a single Double word (DWORD) register by a converter block.

Right click anywhere on the white area of the function block screen and select:

Blocks>Converter>Binary conversion>Pack WORD to DWORD:

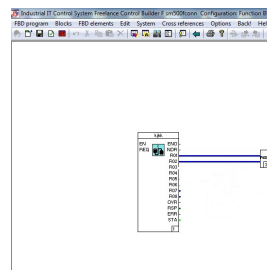


8 A new block is created that must be linked to the Modbus Master Function Block. Left click the new block and drag and drop it onto the Modbus Master Function Block to create the link.

9 Double click the new block and check that the input type is set correctly:



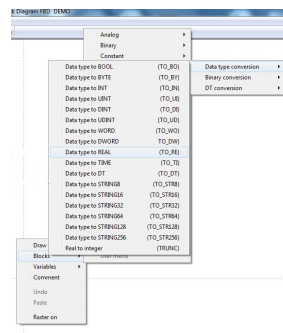
10 Link the new block to the Master block:



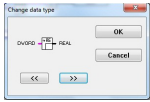
The Master block combines the 2 registers that make up the single value from the SM500F's analog input into a single block. This must then be converted to a 'real' number to view exactly the value displayed by the SM500F.

11 Right click on the white area of the function block screen and select:

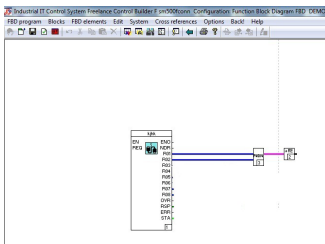
Blocks>Converter>Data type conversion>Data type to REAL:



- 12** Double click the new block and check that the input and output types are set correctly:



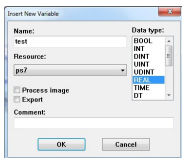
- 13** Link the new block to the other blocks to ensure that the data is displayed in a readable format:



- 14** Right click on the screen and select: Variables > Write:

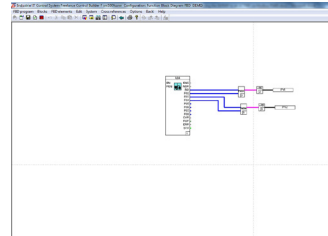



- 15** The 'Insert New Variable' dialog box is displayed:



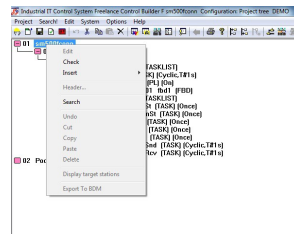
Enter a suitable ID in the **Name:** field and select the data type **REAL** from the **Data type:** list.

- 16** Join the variable block to the remainder of the function block diagram:



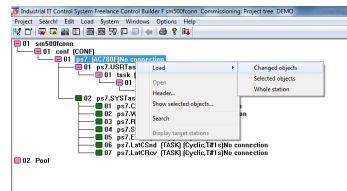
- 17** Click  to return to the project tree. Select Yes to save the project.

- 18** Once saved, right click the first line of the project tree and select Check:

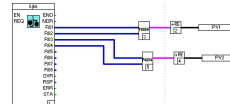


This checks the program and displays a message box to confirm the program is free of errors.

- 19** Load the changed objects into the AC700F:



- 20** Double click the fbd1 project tree arm to display the values from the SM500F slave device.



Acknowledgements

Modbus is a registered trademark of the Modbus-IDA organization.

Windows is a registered trademark of Microsoft Corporation in the United States and/or other countries.

Notes

ABB Limited**Measurement & Analytics**

Howard Road, St. Neots
Cambridgeshire, PE19 8EU
UK

Tel: +44 (0) 870 600 6122

Fax: +44 (0)1480 217 948

Email: enquiries.mp.uk@gb.abb.com

ABB Inc.**Measurement & Analytics**

125 E. County Line Road
Warminster, PA 18974
USA

Tel: +1 215 674 6000

Fax: +1 215 674 7183

abb.com/measurement



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