RS-485 MODBUS Interface for SDM 5700

The SDM with RS485 option uses serial communication allowing it to communicate over long distances with a computer or other types of instruments.
It uses a two-wire system and does not need additional communication lines.

When used with a computer, the maximum length of communication wire is 1.2km (4600 ft).
In addition, to increase communication reliability, the communication line of the system can be connected in a ring shape.

1) Communication method: HDX (half duplex) RS485
2) Maximum distance: 1.2km (4600ft)
3) Maximum number of connections: 31 / port
4) Communication data: 1 START, 8 DATA, 1 STOP Bit, NO PARITY
5) Speed: Selectable between 2400, 4800, 9600 BPS
6) Protocol: MODBUS® ASCII

Prior to using the RS485 feature, the address and communication speed need to be set up.

1) Apply power to the SDM and go to parameter group.
Refer to the SDM user manual for instructions on changing parameter groups.

2) Set up the address (AddS) and speed (SPEd) of the SDM communication.

NOTE 1: Set the speed parameter to 2400 for communication speed of 2400BPS

NOTE 2: Set the address parameter to give the SDM a communication number. Setting the AddS parameter to 0 disables communication.

NOTE 3: See the SDM user manual for details on how to use the controller.

WARNING: Every SDM controller connected to the communication line must have the same speed and each controller must have a different communication number to operate properly.

Connecting Communication Wire

When making the communication connection observe the correct polarity. When the distance between a computer and SDM is short (i.e. less than 10m or 33 feet) a twisted pair of wires can be used. Shielded wire should be used for longer distances.

For optimum performance the communication line must use matching resistance. To accomplish this there is a jumper on the inside of the controller. This jumper is set to the "M" position from the factory and should be left in this position if only one controller is being used. If more than one controller is used, only the final controller should have the jumper set to "M". All other controllers should have the jumper set to the other position.

Referring to the following figures, connect the matching resistor of the final controller by putting the jumper in "M" location on the PC board of SDM.
Make all other connections as outlined in the SDM user manual.

WARNING: The last SDM in the communication line must have the jumper set to "M". When SDMs are added or removed, the jumper position should be checked to ensure correct connection.

Reading internal variable data of the SDM (MODBUS® Function Code 03)

Function code 03 is a used to request variable data from the SDM via a computer or an external instrument. The procedure to receive data is as follows.

NOTE: Refer to general MODBUS® communication rules for detailed Check-Sum method, response time, and definitions of other function codes.

1. In the following example the data of the "Integral Time" variable is requested from the SDM with and AddS number of 01. When requesting data from the SDM using a computer the request is formatted as follows:

:	Address	F Code	Data Address	Amount of Data Requested	C1	C2	CR	LF
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)

(1) Start bit: (:)
(2) SDMaddress (Adds) number: (01 - 31)
(3) MODBUS® function code: (03)
(4) Four digit address of data: amount of data requested (See the Tables)
(5) Amount of data requested: 0001 (# of bytes in four digits)
(6) CHECK-SUM HIGH: (C1)
(7) CHECK-SUM LOW: (C2)
(8) Carriage return: (CR)
(9) Line feed: (LF)

2. The response of the SDM to the request is formatted as follows

:	Address Number	F Code	Number of Responding Bytes	Value of Data Requested	C1	C2	CR	LF
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)

(1) Start bit: (:)
(2) SDM address (AddS) number: (01 - 31)
(3) Repeat of the MODBUS® function Code: (03)
(4) Number of responding bytes: (0001)
(5) Value of data requested: 000A (2 bytes in HEX code)
(6) CHECK-SUM HIGH: (C1)
(7) CHECK-SUM LOW: (C2)
(8) Carriage return: (CR)
(9) Line feed: (LF)

Changing Data in the SDM (MODBUS® Function Code 06)

Function code 06 is used to change the data of variables in the SDM via a computer or external instrument. The procedure to change data is as follows.

NOTE: Refer to general MODBUS® communication rules for detailed Check-Sum method, response time, and definitions of other function codes.

1) In the following example the data contained in the SDU data address number 3 (integral time) will be changed to 15 seconds (HEX 000F).

:	Address	F Code	Data Address	Amount of Data Requested	C1	C2	CR	LF
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)

(1) Start bit: (:)
(2) SDM Address (AddS) Number: (01 - 31)
(3) MODBUS® Function Code: (06)
(4) Address of data to be changed: (0003)
(5) New data: (000F) (HEX for 15)
(6) CHECK-SUM HIGH: (C1)
(7) CHECK-SUM LOW: (C2)
(8) Carriage return: (CR)
(9) Line feed: (LF)

SDM response after data change

1) If the data change was completed properly the SDM will respond by sending back the original request.

2) If the data transfer was not completed properly the SDM will respond with the following message.

:	Address	F Code	Data Fail Code	C1	C2	CR	LF
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)

(1) Start bit: (:)
(2) SDM address (AddS) number: (1 - 31)
(3) MODBUS® function code: (86)
(4) Data failure code: (02)
(5) CHECK-SUM HIGH: (C1)
(6) CHECK-SUM LOW: (C2)
(7) Carriage return: (CR)
(8) Line feed: (LF)

SDM Parameter Addresses and Functions

The following tables contain all of the SDM parameters. The table lists their address numbers and functions.

The tables are set up as follows:

1) Parameter address: The addresses are in hexadecimal code but wrote decimal.
2) Symbol: The parameter symbol as shown on the SDM display.
3) Parameter adjustment range: The minimum and maximum allowable limits for the given parameter.
4) Parameter function: Description of the variable.
5) All parameters are in integer form only. All numbers after the decimal point will be removed.
6) Parameters are classified into groups by functions.

NOTE: Refer to the SDM manual for details on parameter functions and adjustment ranges.