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# Application Note

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## TSI MODEL 8610 EVERWATCH™ MODBUS™ COMMUNICATIONS

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Modbus communications are installed in all Model 8610 fume hood face velocity monitors. This document provides the technical information needed to communicate between the host DDC system and the Model 8610 units. This document assumes the programmer is familiar with Modbus protocol. Further technical assistance is available from TSI if your question is related to TSI interfacing to a DDC system. If you need further information regarding Modbus programming in general, please contact:

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One High Street  
North Andover, MA 01845  
Phone (508) 794-0800

The Modbus protocol utilizes the RTU format for data transfer and Error Checking. Check the Modicon Modbus Protocol Reference Guide (PI-Mbus-300) for more information on CRC generation and message structures.

The messages are sent at 9600 baud with 1 start bit, 8 data bits, and 2 stop bits. Do not use the parity bit. The system is set up as a master slave network. The TSI units act as slaves and respond to messages when their correct address is polled.

Blocks of data can be read from each device. Using a block format will speed up the time for the data transfer. The size of the blocks is limited to 15 bytes. This means the maximum message length that can be transferred is 15 bytes. The typical response time of the device is around 0.05 seconds with a maximum of 0.1 seconds.

### Unique to TSI

The list of variable addresses shown below skips some numbers in the sequence due to internal Model 8610 functions. This information is not useful to the DDC system and is therefore deleted. Skipping numbers in the sequence will not cause any communication problems.

### RAM Variables

RAM variables can be read using the Modbus command **04 Read Input Registers**. They can be written to using the Modbus command **06 Preset Single Register**. The RAM variables can be read in blocks but must be written one variable at a time.

**8610 Fume Hood Monitor**

<b>Variable Name</b>	<b>Variable Address</b>	<b>Information Provided to Master System</b>	<b>Integer DDC system receives</b>
Model Number	0	Model Number	8610
Face Velocity	1	Fume Hood Face Velocity	Displayed in ft/min.
Status Index	2	Status of EVERWATCH device	0 Normal    1 Low Alarm 2 High Alarm   3 Sensor Error 5 Data Error
Low Alarm	3	Low Alarm Setpoint	Displayed in ft/min.
High Alarm	4	High Alarm Setpoint	Displayed in ft/min.
Filter Index	5	Index for display averaging time	0 1 Second    1 2 Seconds 2 3 Seconds   3 5 Seconds 4 10 Seconds   5 20 Seconds
Alarm Mode	6	Alarm Reset Mode	0 Unlatched    1 Latched
Audible Disable	7	Permanent Mute Capability	0 Off    1 On
Output Mode	8	Analog Output Mode	0 Current    1 Voltage
Network Protocol	9	Communications Protocol	0 Modbus    1 Cimetrics
Network	10	Address of unit for communications.	0-247
Calibration Code Enable	17	Calibration pass code enable.	0 Off    1 On
Configuration Code Enable	18	Configuration pass code enable	0 Off    1 On
*Remote Low Alarm	21	Second low alarm setpoint for remote mode.	Displayed in ft/min.
*Remote High Alarm	22	Second high alarm setpoint for remote mode.	Displayed in ft/min.
*Setback Mode	23	Control mode of device.	Write only variable, reading will always give a value of 2. Initiates mode change. 1 put unit in setback or remote mode. 0 put unit in normal mode.

**\*Note: These items only available on 8610-AS version.**

EXAMPLE of **04 Read Input Registers** function format.

This example read variable addresses 1 and 2 (Face Velocity and Status Index).

<b>QUERY</b>		<b>RESPONSE</b>	
Field Name	(Hex)	Field Name	(Hex)
Slave Address	01	Slave Address	01
Function	04	Function	04
Starting Address Hi	00	Byte Count	04
Starting Address Lo	01	Data Hi Addr0	00
No. Of Points Hi	00	Data Lo Addr0	64 (100 ft/min)
No. Of Points Lo	02	Data Hi Addr1	00
Error Check (CRC)	--	Data Lo Addr1	00 (Normal- No Alarm)
		Error Check (CRC)	--

EXAMPLE of **06 Preset Single Register** function format.

This example changes the low alarm setpoint to 60 ft/min.

<b>QUERY</b>		<b>RESPONSE</b>	
Field Name	(Hex)	Field Name	(Hex)
Slave Address	01	Slave Address	01
Function	06	Function	06
Address Hi	00	Address Hi	00
Address Lo	03	Address Lo	03
Data Hi	00	Data Hi	00
Data Lo	3C	Data Lo	3C
Error Check (CRC)	--	Error Check (CRC)	--