# MODEL FHC50 FUME HOOD CONTROLLER
# MODEL FHM10 FUME HOOD MONITOR

Modbus® COMMUNICATIONS

Modbus® communications are installed in the TSI Model FHM10 fume hood monitor and Model FHC50 fume hood controller. This document provides the technical information needed to communicate between the host DDC system and the TSI 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:

Modicon Incorporated (a division of Schneider-Electric)
One High Street
North Andover, MA 01845
Phone (800) 468-5342

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 no start bit, 8 data bits, and 1 stop bit. 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 255 bytes. This means the maximum message length that can be transferred is 255 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 FHC50 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. If a variable is not used by the particular FHC50 configuration, it will be reported with a value of -1.

All variables are outputted in English units: ft/min, and CFM. If the DDC system is to display different units, the DDC system needs to make the conversion.

## Network Points

These variables can be read using Modbus® command **03 Read Holding Registers**. They can be written to using Modbus® command **06 Write Single Register**. Many of these variables are the same "menu items" that are configured from the controller keypad. The calibration and control items are not accessible from the DDC system. This is for safety reasons since each hood is individually setup for maximum performance.

---

Modbus is a registered trademark of Modicon Incorporated.

## FHC50 Variable List

| Feature | Holding Register (Decimal) | Unit | Read / Write |
|---|---|---|---|
| Face Velocity | 40001 | fpm | R |
| Current Face Velocity Setpoint* | 40002 | fpm | R |
| Flow Rate | 40003 | cfm | R |
| Current Flow Rate Setpoint* | 40004 | cfm | R |
| Damper or Valve Position* | 40005 | % | R |
| Sash Position Percent* | 40006 | % | R |
| Sash Open Area* | 40007 | ft^2 * 100 | R |
| Low Velocity Alarm Status | 40008 | 0: Inactive<br>1: Active | R |
| High Velocity Alarm Status | 40009 | 0: Inactive<br>1: Active | R |
| Low Flow Alarm Status | 40010 | 0: Inactive<br>1: Active | R |
| High Flow Alarm Status | 40011 | 0: Inactive<br>1: Active | R |
| High Sash Position Alarm Status | 40012 | 0: Inactive<br>1: Active | R |
| Velocity Sensor Error Status | 40013 | 0: Inactive<br>1: Active | R |
| Data Error Status | 40014 | 0: Inactive<br>1: Active | R |
| Setback Status | 40015 | 0: Inactive<br>1: Active | R |
| Emergency Status | 40016 | 0: Inactive<br>1: Active | R |
| Normal Face Velocity Setpoint* | 40021 | fpm | R/W |
| Setback Face Velocity Setpoint* | 40022 | fpm | R/W |
| Normal Low Face Velocity Alarm Setpoint | 40023 | fpm | R/W |
| Normal High Face Velocity Alarm Setpoint | 40024 | fpm | R/W |
| Setback Low Face Velocity Alarm Setpoint | 40025 | fpm | R/W |
| Setback High Face Velocity Alarm Setpoint | 40026 | fpm | R/W |
| Normal Flow Setpoint* | 40027 | cfm | R/W |
| Setback Flow Setpoint* | 40028 | cfm | R/W |
| Min Flow Setpoint* | 40029 | cfm | R/W |
| Max Flow Setpoint* | 40030 | cfm | R/W |

## FHC50 Variable List

| Feature | Holding Register (Decimal) | Unit | Read / Write |
|---|---|---|---|
| Normal Low Flow Alarm Setpoint | 40031 | cfm | R/W |
| Normal High Flow Alarm Setpoint | 40032 | cfm | R/W |
| Setback Low Flow Alarm Setpoint | 40033 | cfm | R/W |
| Setback High Flow Alarm Setpoint | 40034 | cfm | R/W |
| Min Damper Position* | 40035 | % | R/W |
| Max Damper Position* | 40036 | % | R/W |
| Setback Damper Position Setpoint* | 40037 | % | R/W |
| High Sash Position Alarm Setpoint* | 40038 | % | R/W |
| Units Value | 40041 | 0: FPM, CFM<br>1: m/s & m3/h<br>2: m/s & l/s | R/W |
| Display Averaging | 40042 | 0: 0.5 sec avg<br>1: 1 sec avg<br>2: 2 sec avg<br>3: 3 sec avg<br>4: 5 sec avg<br>5: 10 sec avg<br>6: 20 sec avg<br>7: 40 sec avg | R/W |
| Emergency Mode | 40043 | 0: Exit Emergency Mode<br>1: Enter Emergency Mode | W |
| Setback Mode | 40044 | 0: Exit Setback Mode<br>1: Enter Setback Mode | W |

*Feature only available on Model FHC50 fume hood controller.

*Specifications subject to change without notice.*

UNDERSTANDING, ACCELERATED

**TSI Incorporated** – Visit our website **www.tsi.com** for more information.

| | | | |
|---|---|---|---|
| **USA** | **Tel:** +1 800 874 2811 | **India** | **Tel:** +91 80 67877200 |
| **UK** | **Tel:** +44 149 4 459200 | **China** | **Tel:** +86 10 8219 7688 |
| **France** | **Tel:** +33 491 11 87 64 | **Singapore** | **Tel:** +65 6595 6388 |
| **Germany** | **Tel:** +49 241 523030 | | |

TSI-1060 Rev. B (6/13/2013)  Printed in U.S.A.