ec eyc-tech

Operation Manual eyc-tech FDM06-I

Venturi Thermal Mass Flow Meter





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1. Security Considerations

Please read this Specification carefully, prior to use of this, and keep the manual properly, for timely reference.

Solemn Statement :

This product can not be used for any explosion-proof area.

Do not use this product in a situation where human life may be affected.

eyc-tech will not bear any responsibility for the results produced by the operators !

Warning!

- Installation and wiring must be performed by qualified personnel in accordance with all applicable safety standards.
- This product must be operated under the operating conditions specified in manual to prevent equipment damages.
- Please using the product under the ordinary pressure, or it will influence safe problem.
- This product must be operated under the operating condition specified in this manual to prevent equipment damages.
- This product must be operated under the normally atmospheric condition to prevent equipment damages.
- To prevent products damage, always disconnect the power supply from the product before performing any wiring and installation.
- All wiring must comply with local codes of indoor wiring and electrical installation rules.
- Please use crimp type terminal.
- To prevent personal injury, do not touch the moving part of product in operation.
- It may cause high humidity atmosphere during the product was breakdown. Please take safety strategy.



Venturi Thermal Mass

2. Operation Form





Venturi Thermal Mass Flow Meter





UP

OK DOWN

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%Key Pad Operation Mode

Button Instruction	FDM06-I Operation Mode							
Button Instruction	Normal Mode	Menu Mode						
Press UP once	Reserved	increase number or option once						
Bross OK onco	Go Monu Modo	Submit the selection, go on next menu or complete the setting						
Press OK once	Go Wenu Wode	and then return to the normal mode						
Bross DOW/N onco	Percented	decrease number or option once, shift cursot if numerical						
Press DOWN Once	Reserveu	menu						
Hold UP	Reserved	increase number or option faster						
Hold OK 1.5 seconds	Reserved	Return to previous menu, or leave menu mode						
Hold OK 5 seconds	Flow Rate Auto Zero	Reserved						
Hold DOWN	Reserved	decrease number or option faster						
Press UP and DOWN	Report Counter	Not Available						
simultaneously	Reset Counter							



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3. Connection Diagram

*Please make sure the product and the device which connect with RS-485 are on common ground, avoid damaged product.

4. Installation

The following table specifies the required straight lengths of the pipe sections depending on pipe diameter in case of different disturbances.

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5. RS-485 and Modbus

FDM06-I integrate a RS-485 interface for digital communication as an option feature. Based on Modbus protocol makes the general convenience on PLC, HMI and PC connection. For Modbus protocol information please download the file from website. Besides the PLC, HMI application, the user software provide the device setting and data logging function, it also can free download from website.

Technical Data :

- (1) Max. network size : 32 transmitters
- (2) Communication : with COM-Port (serial interface) of PC
- (3) Max. network expansion : 1200m (3937ft) total length at 9600 baud
- (4) Transmission rate : 9600, 19200, 38400, 57600, 115200 Baud
- (5) Parity : None, Even, Odd
- (6) Data length : 8 bit
- (7) Stop bit : 1 or 2 bit
- (8) Factory default Station address = 1, Data format = 9600, N81

6. Autozero

The middle button allows user to set the current flow rate to zero point. It is required to press the button about 5 seconds, and user can see Auto Zero will be display. Then user can release this button and will see the prompt Auto Zero Done, and the new zero point has been set. Please make sure that the gas is completely still prior to execute this function.

This button also allows user to restore factory default setting. It is required to press the button about 10 seconds, user will first see Reset Zero will be display. Then user can release this button and will see the prompt Reset Zero Done, and the new zero point has been set.

7. Software and Configuration Step

User may download the configuration software on eyc web site. Please decompress the application prior to execute it. Operating System requirements : above Windows

- 7. Other application program requirements : above Microsoft Office 2003
- 1. Hardware connection : Connect the FDM06-I to PC through USB to RS-485 or RS-232 to RS-485 converter
- 2. Check the COM port number from Device Manager in Computer Management. e.g. COM1 in illustration

3. Open the FDM06-IC UI, go to function "Interface", click item "Config" and then setting COM port, BAUD rate, data format and Station ID, pressed "Apply" for connection

evc-tec	h UI FDI	M06-I V1.0	.1-202	40719)															ור	• ! I	nterface						
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4. Scan RS-485 connection

Open the FDM06-I UI, go to function "Interface ", click item "Config " and then setting COM port, pressed "Scan" bottom for scan devices and pressed "Close and Export " when the interested devices found.

P Interface	
PORT COM1 -	e ^{ud} Scan
BAUD RATE 9600 -	Baud 9600
DATA FRAME None-8Bit-1Stop	Data Tyne NR1
TIMEOUT 250 ms	
RETRY 2 times	Station ID 138
STATION ID 1	Progress 2%
STATION ID	Station ID Boud Rate Data Type Medal Name FW Vention
Station ID Baud Rate Data Type	▶ 1 9600 N81 FDM06-I 1.0.1
1 9600 N81	
د	· · · · · · · · · · · · · · · · · · ·
Scan Apply Cancel	STOP CLOSE AND EXPORT CANCEL

Pick up the device that you want to connect to and then press "Apply" to go.

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5. Setting on Analog Output

In the group of OUT1, Output tab. The output1 related setting could be found.

- (1) Quantity : Flow Rate in unit of L/min, Flow Rate in unit of m/h, Flow Rate in unit of m/min
- (2) Response rate : 1st order low pass filter inside, set 100 if filter disable and set 0 if the maximum response time. 100~0 possible. Lower value if lower fluctuation but longer response time, higher value if allow higher fluctuation but shorter response time.
- (3) Analog Type : Voltage or Current
- (4) Analog Range : 0 ... 20 mA / 4 ... 20 mA (if output current) / 0 ... 10 V (if output voltage)
- (5) Decimal Places : Up to 4 decimal places. Please note that the number of displayed digits is a fixed maximum of 5 digits, and the decimal digits need to occupy integer digits.
- (6) Range for Display Upper and Lower
- (7) Alarm Mode: Check the box if analog output pretend a alarm switch output
- (8) Alarm Trigger Point: Upper and Lower
- (9) Alarm Output Level: Upper and Lower

eyc-tech_UI_FDM06-I_V1.0.1-20240719 Station 1*									
<u>F</u> ile <u>I</u> nterface <u>A</u> bout									
Display Output Setting Interpolation Information	Totaliser								
OUT1 OUT2									
(1) Quantity m³/hour 🗸	Quantity •C •								
(2) Response Rate 98	Response Rate 98								
(3) 🔘 Voltage 🛛 💿 Current									
(4) Analog Range 4-20mA 🗸	Alarm Level High 🔹								
(5) Decimal Places 1111.1 🔹	Decimal Places 1111.1								
(6) Upper Range 1000.0 🛓	Upper Range 100.0								
Lower Range 0.0	Lower Range 0.0								
(7) 🔲 Alarm Mode	Totalizer Mode								
(8) Upper Point 800.0 👻	Set Point 80.0								
Lower Point 700.0	Hysteresis 10.0								
(9) Upper Level 20.0	Delay On O								
Lower level 4.0	Delay Off 0								
Apply									
Open Port, Read successful	Open Port, Read successful .::								

6. Setting on Relay Output

In the group of OUT2, Output tab. The relay related setting could be found.

- (1) Quantity : Flow Rate in unit of L/min, Flow Rate in unit of m/h, Flow Rate in unit of m/min,
- (2) Response rate : 1st order low pass filter inside, set 100 if filter disable and set 0 if the maximum response time. 100~0 possible. Lower value if lower fluctuation but longer response time, higher value if allow higher fluctuation but shorter response time.
- (3) Alarm Level : Relay activate mode, activate at increasing signal (High) or activate at decreasing signal (Low)
- (4) Decimal Places : Up to 4 decimal places. Please note that the number of displayed digits is a fixed maximum of 5 digits, and the decimal digits need to occupy integer digits.
- (5) Range for Display Upper and Lower
- (6) Totalizer Mode: Check the box if relay activate source from flow accumulation counter
- (7) Set Point : Activation Set Point
- (8) Hysteresis : Activation Hysteresis Gap
- (9) Delay On : Relay Activate Delay Time in second
- (10) Delay Off : Relay Deactivate Delay Time in second

evc-tech_UI_FDM06-I_V1.0.1-20240719 Station 1									
<u>F</u> ile <u>I</u> nterface <u>A</u> bout									
Display Output Setting Interpolation Information To	otaliser								
OUT1 OUT2									
Quantity m³/hour 🔹	(1) Quantity •C •								
Response Rate 98	(2) Response Rate 98								
Voltage © Current									
Analog Range 0-10V 🔹	(3) Alarm Level High 🔹								
Decimal Places 1.1111	(4) Decimal Places 1111.1 🔹								
Upper Range 1.0000	(5) Upper Range 100.0								
Lower Range 0.0000	Lower Range 0.0								
🔲 Alarm Mode	(6) 🔳 Totalizer Mode								
Upper Point 0.8000	(7) Set Point 80.0								
Lower Point 0.7000	(8) Hysteresis 10.0								
Upper Level 10.0 🛓	(9) Delay On O								
Lower level 4.0	(10)Delay Off 0								
Apply									
Open Port, Read successful .::									

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7. Offset adjustment and RS-485 Setup

There are 3 groups in setting tab. The description of each item as below.

- X Offset adjustment :
- (1) Flow Rate Offset
- (2) Temperature Offset
- (3) Flow Rate Low Cut Off Level

X Modbus Protocol :

- (4) Station ID
- (5) Baud Rate
- (6) Data Frame, the combination of parity check and stop bit
- X Menu Configuration :
- (7) Configuration brief
- (8) Read : Upload the settings of the currently connected device
- (9) Write : Download the setting of the currently connected device
- (10) Open : Open configuration file and load the settings
- (11) Save : Save configuration file

※ Modbus Protocol:

8. Linear Interpolation

Click the Interpolation tab to specify linear interpolation points.

- (1) interpolation table
- (2) interpolation curve
- (3) interpolation input column, device measures value (raw value)
- (4) interpolation output column, device output value (standard value or correction value)
- (5) read the interpolation table of connected device
- (6) Clear the interpolation table on configuration software. Note: this action will not modify the interpolation table of the device
- (7) apply, the interpolation would be written in device
- (8) enable, activate the interpolation calculation. When a green rectangle as shown below is displayed under the button, it means that interpolation is enabled, otherwise the interpolation function is turned off.

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9. Data display and logging

On the Display tab, display the measurement data and log the data. The settings are as follows.

*button function description

Clear clear chart

change chart drawing line style

out1 select the activate channel to be set color

Color set the activate channel line color

Snap capture drawing chart screen

Export export measurement data since the last "clear chart" or ui start up

Y Title (ON) Y-axis label On/Off

X Title (ON) X-axis label On/Off

AxisY2 (ON) secondary Y-axis On/Off

Legend (ON) chart legend On/Off

Log (OFF)

Auto Scale

data log function On/Off

.

1 Minute The X-axis scale adjustment

-30

The Y-axis scale mode

Set recording time interval

- a. File > Log Interval
- b. Select recording interval

Venturi Thermal Mass Flow Meter

%Export/recording measurement

1. export measurement data since the last "clear chart" or ui start up

1-1. clock Display > Export eyc-tech_UI_FDM06-I_V1.0.1-20240719 Station 1* - • • File Interface About Display Output Setting Interpolation Information Totaliser flow temperature 56.1 31.3 m³/hour °C 60 Y Title (ON) Axis2 (ON) Clear OUT1 Snap Log (OFF) X Title (ON) Legend (ON) 0 Chart Color Export 1 Minute Auto Scale

1-2. Specify the file path and file name > Save

Air Flow

<u>%</u>	eyc-tech_UI_FDM06-I_V1.0	.1-20240719 Station 1*							
<u>F</u> ile <u>I</u> nterface <u>A</u> bout									
Di	splay Output Setting Ir	terpolation Information Totaliser							
		56.1 ^{flow} 31.3	temperature °C						
	Clear OUT1 Snap	Y Title (ON) Axis2 (ON) Log	60						
	Chart Color Export	X Title (ON) Legend (ON) (OFF)							
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Note: If the specified file already exists, the data will be overwritten.

2. Record measurement data: record data since the Log function is turn on

2-1. Clock Display > Log(OFF)

€ eyc-tech_UI_FDM06-I_V1.0.1-20240719 Station 1*		- 0 ×
<u>F</u> ile <u>I</u> nterface <u>A</u> bout		
Display Output Setting Interpolation Information Totaliser		
56.1 flow m ³ /hour	31.3	temperature °C
Clear OUT1 Snap Y Title (ON) Axis2 (ON) Log		60 [^]
Chart Color Export X Title (ON) Legend (ON) (OFF) 1 Minute	Auto Scale	0

2-2. Specify the file path and file name > Save > Log(ON)

<u>%</u>	eyc-tech_UI_FDM06-I_V1.0.1-	-20240719 Station 1*		
E	ile <u>I</u> nterface <u>A</u> bout			
Dis	splay Output Setting Inte	rpolation Information Totaliser		
	Clear OUT1 Snap Clear Color Export	56.1 flow m ³ /hour Y Title (ON) Axis2 (ON) Log X Title (ON) Legend (ON) (OFF)	31.3	temperature °C 60 () 0 () e
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Note: If the specified file already exists, the data will be overwritten.

2-3. Finish recording measurement data: Click Log(ON) again. At this time, the button returns to displaying Log(OFF), and the recorded data file is stored in the specified file.

eyc-tech_UI_FDM06-I_V1.0.1-20240719 Station 1*	
<u>F</u> ile <u>I</u> nterface <u>A</u> bout	
Display Output Setting Interpolation Information Totaliser	
56.1 flow m ³ /hour	31.3 ^{temperature} °C
Clear OUT1 Snap Y Title (ON) Axis2 (ON) Log	60
Chart Color Export X Title (ON) Legend (ON) (ON) 1 Minute	Auto Scale

Air Flow

- 10. Device Information
 - (1) Serial Number of Device
 - (2) Model Name of Device
 - (3) Firmware Version of Device
 - (4) Factory Mode Status, default Disable
 - (5) Firmware Checksum
 - (6) Output equipment, supports analog output and relay functions
 - (7) Supported Unit Conversion
 - (8) Totalizer function, default enable
 - (9) Temperature Calibration Points
 - (10) Analog Output Calibration points
 - (11) Calibration Date

eyc-tech_UI_FDM06-I_V1.0.1	1-20240719 Station 1*									
<u>F</u> ile <u>I</u> nterface <u>A</u> bout	<u>File</u> Interface <u>A</u> bout									
Display Output Setting Interpolation Information Totaliser										
(1) Serial Number	RD240729_001	(4) Factory (MNF) Mode	Disable							
(2) Model Name	FDM06-I	(5) Firmware Checksum	C8FC							
(3) Firmware Version	1.0.1	(6) Output	Analog, Relay							
(7) Unit Conversion	L/min, m³/hour, m³/mi	in, °C, °F								
(8) Totalizer	Enable									
TS1 (°C)	0.00, 100.00									
⁽⁹⁾ TS2 (°C)	0.00, 100.00									
(10) DAC Calibration Points										
Voltage (V)	0.250, 1.250, 3.750, 6.00	00, 10.000								
Current (mA)	4.000, 8.000, 12.000, 16.	.000, 20.000								
(11) Calibration Date	2024-8-1									
Open Port, Read successful										

Air Flow

- 11. Totalizer
 - (1) Flow Velocity
 - (2) Flow Volume Rate
 - (3) Volume Accumulation Totalizer 1. Count positive flow only.
 - (4) Volume Accumulation Totalizer 2. Count total flow amount without direction if Bidirectional flow mode is enabled. Thus, the reverse flow amount = Totalizer 2 – Totalizer 1
 - (5) unit of counter 1
 - (6) unit of counter 2
 - (7) Main switch of totalizer
 - (8) Function switch of totalizer 1
 - (9) Function switch of totalizer 2
 - (10) Ser/Reset Totalizer 1
 - (11) Set/Reset Totalizer 2

eyc-tech_UI_FDM06-I_V1.0.1-20	240719 Station 1*			- • •
<u>F</u> ile <u>I</u> nterface <u>A</u> bout				
Display Output Setting Interpo	lation Information T	otaliser		
Totaliser				
(1) Instantaneous Flow	56.09167	m³/hour	(7) Totaliser 1 and 2	
(2) Instantaneous Flow	934.861	Liter/min		
(3) Accumulatve Flow 1	48	m ³	(8) Totaliser 1	Set (10)
⁽⁴⁾ Accumulatve Flow 2	48075	Liter	(9) Totaliser 2	Set (11)
(5) Unit of Flow 1	m³ →			
(6) Unit of Flow 2	Liter -			
Open Port, Read successful				.::

8. Inspection and Maintenance

1. Maintenance

Since this product is inspected and calibrated for high accuracy at the factory before shipment, no calibration on the installation site is necessary when this product is installed

For inspection and maintenance follow the instructions below :

(a) Periodic inspection

Periodically inspect this product for its sensing accuracy, and clean the bypass channel. Set the period between inspections based on atmospheric dust and other contaminants in the installation environment

(b) Sensor maintenance

Do not damage sensor surface during maintenance process

(c) Troubleshooting

If any problem occurs during operation, refer to the table below for appropriate solutions

2. Troubleshooting :

Problem	Cleck items	Soluations
●No output	 Disconnected wiring 	●Re-perform wiring
●Unstable output	●Loose wiring	Crew on terminal tightly or
	Power supply voltage	replace wires
	●Sensor damages	Clean up the bypass channel
		Replace the sensor
Slow response to	 Moisture / Condensation 	Remove the sensor cover and
output	on the product	filter. Let the sensor unit dry
● Error in output	• Execute Autozero before	naturally in a clean air
	measures	environment
	● Check installed location	● Refer to the section 6. Autozero
	Check bypass channel	ullet The straight length of pipe did
	● Check dust and	not satisfy design specifications.
	contamination on the	Refer to the section 4.
	sensor	Installation
		Cleanup the bypass channel
		● Calibrate
		 Replace the sensor

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Venturi Thermal Mass Flow Meter

eyc-tech Measuring Specialist

enhance your capability with sensor technology Air flow | Humidity | Dew point | Differential pressure | Liquid flow Temp. | Pressure | Level | Air quality | Signal meter

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