

TRACER[®] VM BASE FLOWMETERS

General Description

The Tracer_{VM} Flowmeter is a non-display sensor that provides a 0.5 to 3.5 Volt output for process flow rate and a 0.5 to 4.1 Volt output for process temperature.

Vortex sensor technology is highly accurate and repeatable without moving parts. Flow reading is direction specific. Refer to the arrow on the body for correct installation.

Connection to the process is made using standard pipe threads in NPT or BSP from 3/8" through 1-1/2". Flow body materials are corrosion-resistant brass, nylon, anodized aluminum and stainless steel. Options are based on thread size, see page 2 for details.

The flowmeter is designed for use in industrial water applications such as injection mold cooling or filter and pump monitoring.

Benefits

- No moving parts for reliable operation
- Flow and Temperature Sensors in one unit for compact installation
- Quick temperature response from direct media contact
- Economical and versatile construction with corrosion-resistant materials

Specifications

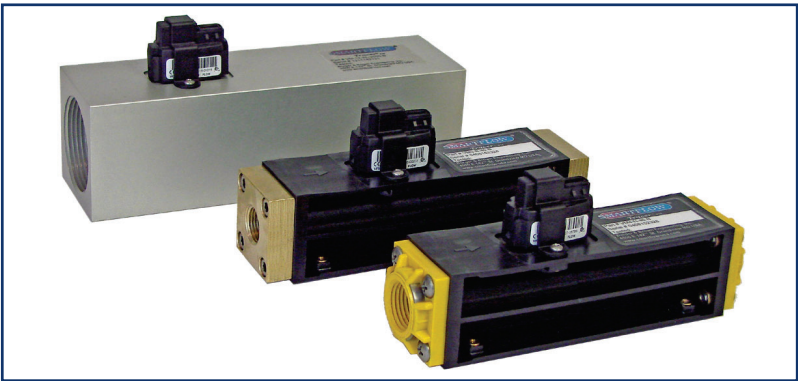
Flow Ranges and Connection Sizes

1 to 15 LPM	(.3 to 4 GPM)	3/8" or 1/2"
2 to 40 LPM	(.5 to 10.6 GPM)	3/8" or 1/2"
5 to 100 LPM	(1.3 to 26.4 GPM)	3/4" or 1"
10 to 200 LPM	(2.6 to 52.8 GPM)	1" or 1-1/2"

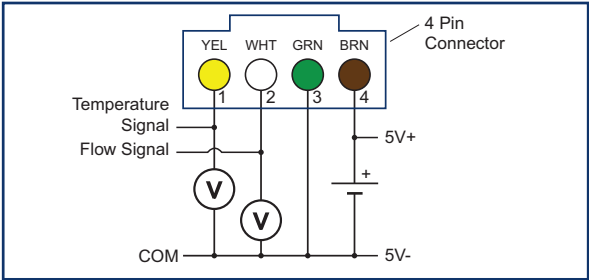
Flow Accuracy±1.5% of Full Scale
Temperature Range..... 0°C to 120°C (32°F to 248°F)
Temperature Accuracy ±0.5°C
Operating Pressure 10.3 bar max. (150 psi max.)

Power

Power Supply 5VDC ±5% (external)
Output Signals..... Ratiometric
Flow Signal.....0.5 - 3.5V (zero at .35V)
Temperature Signal 0.5 - 4.1V
Power Consumption<50mW
Load Impedance..... >10kW



Electrical Connections



Pin	Description	Color
1	Temperature Signal*	Yellow
2	Flow Signal*	White
3	Common (0V)	Green
4	Power Supply (+5VDC)	Brown

*relative to Pin 3

Materials

Sensing Element.. Silicone-Based MEMS Sensor
Seal (sensor to housing) EPDM
Insert PPA 40 GF
3/8" & 1/2" Body Size..... Glass-Filled Nylon Flow Body with Brass or Nylon End Caps
3/4" thru 1-1/2" Body Size Anodized Aluminum or Stainless Steel Flow Body
Cable 2.9M (9.5ft) 4-conductor for power and output, ends stripped

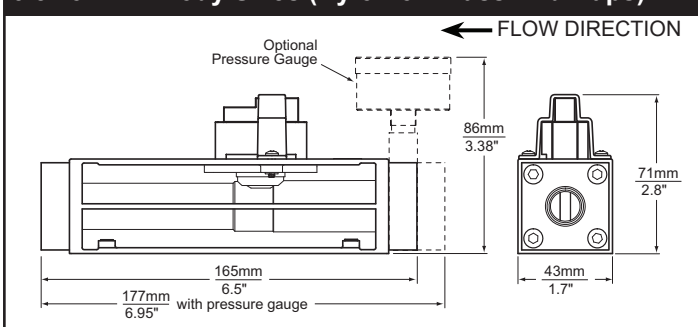
Power Supply Requirements

- 5VDC
- Separated from hazardous live circuitry by double or reinforced insulation
- Suggested current limit: 50-100mA

Model Number

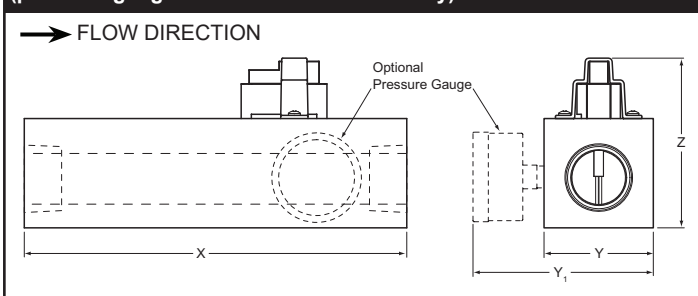
VM	3	-	B	-	15	-	B	-
Body Size								
3/8"NPT	3							
3/8"BSPP	3B							
1/2"NPT	4		B or N					
1/2"BSPP	4B							
3/4"NPT	6							
3/4"BSPP	6B		AL or SS					
1"NPT	8							
1"BSPP	8B		AL or SS					
1-1/2"NPT	12							
1-1/2"BSPP	12B		AL or SS					
Body Material								
Glass-Filled Nylon with Brass End Caps			B					
Nylon End Caps (3/8" and 1/2" only)			N					
Anodized Aluminum Body			AL					
Stainless Steel Body (3/4" and larger only)			SS					
Flow Range								
1 to 15 LPM (.3 to 4 GPM)								15H
2 to 40 LPM (.5 to 10.6 GPM)								40H
5 to 100 LPM (1.3 to 26.4 GPM)								100H
10 to 200 LPM (2.6 to 52.8 GPM)								200H

3/8" or 1/2" Body Sizes (Nylon or Brass End Caps)



3/4" thru 1-1/2" Body Sizes

Aluminum or Stainless Steel
(pressure gauge not available with AL body)



Dimensions (mm/inches)

Body Size	X	Y	Y ₁	Z
3/4", 5 to 100 LPM	178/7.0	45.7/1.8	77/3.1	74/2.9
1", 5 to 100 LPM	178/7.0	45.7/1.8	77/3.1	74/2.9
1", 10 to 200 LPM	178/7.0	51/2.0	84/3.3	79/3.1
1-1/2", 10 to 200 LPM	198/7.8	58/2.3	90/3.6	86/3.4

When using with RJG eDart IA-2 module

Add line item:

Part no. CONN-LBG-4-F

Description: 4-pin Connector added to cable

Directives

Flow sensors are in conformity with these Council directives on the approximation of the laws of the EC member states:

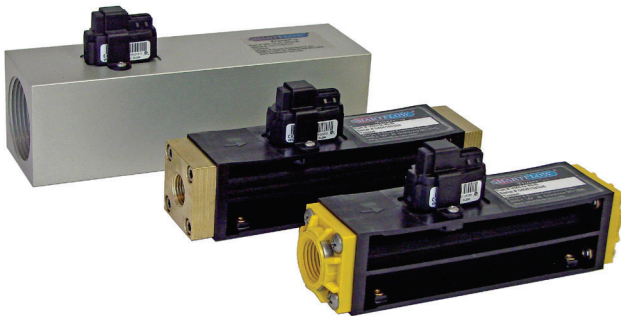
- Low Voltage Directive (2006/95/ED)
Standards used: EN 61010-1:2001
- EMC Directive (2004/108/EC)

Standards used: EN 61326-1:2006 and 61326-2-3:2006

Smartflow flow sensors fall under Article 3, 3 of PED Directive 97/23/EEC and are not required to be CE-marked according to this directive.

*BSPP - Available upon request

Tracer[®]_{VM} Flowmeter - Base



The Tracer_{VM} Flowmeter is a non-display sensor that provides a 0.5 to 3.5 Volt output for process flow rate and a 0.5 to 4.1 Volt output for process temperature.

Vortex sensor technology is highly accurate and repeatable without moving parts. Flow reading is direction specific. Refer to the arrow on the body for correct installation.

Connection to the process is made using standard pipe threads in NPT or BSP from 3/8" through 1-1/2". Flow body materials are corrosion-resistant brass, nylon, anodized aluminum and stainless steel. Options are based on thread size, see page E85 for details.

The flowmeter is designed for use in industrial water applications such as injection mold cooling or filter and pump monitoring.

Benefits

- No moving parts for reliable operation
- Flow and Temperature Sensors in one unit for compact installation
- Quick temperature response from direct media contact
- Economical and versatile construction with corrosion-resistant materials

Flow Ranges		
Body Size	Range (GPM)	Range (LPM)
3/8" & 1/2"	.3 to 4	1 to 15
3/8" & 1/2"	.5 to 10.6	2 to 40
3/4" & 1"	1.3 to 26.4	5 to 100
1" & 1-1/2"	2.6 to 52.8	10 to 200

	CATALOG NO.	DESCRIPTION
Base Flowmeters	VM3-B-15H-B	3/8" molded body brass ends max. Flow Rate 4 GPM
	VM3-B-40H-B	3/8" molded body brass ends max. Flow Rate 10.6 GPM
	VM4-B-15H-B	1/2" molded body brass ends max. Flow Rate 4 GPM
	VM4-B-40H-B	1/2" molded body brass ends max. Flow Rate 10.6 GPM
	VM3-N-15H-B	3/8" molded body nylon ends max. Flow Rate 4 GPM
	VM3-N-40H-B	3/8" molded body nylon ends max. Flow Rate 10.6 GPM
	VM4-N-15H-B	1/2" molded body nylon ends max. Flow Rate 4 GPM
	VM4-N-40H-B	1/2" molded body nylon ends max. Flow Rate 10.6 GPM
	VM6-AL-100H-B	3/4" aluminum flow body max. Flow Rate 26.4 GPM
	VM8-AL-100H-B	1" aluminum flow body max. Flow Rate 26.4 GPM
	VM8-AL-200H-B	1" aluminum flow body max. Flow Rate 52.8 GPM
	VM12-AL-200H-B	1-1/2" aluminum flow body max. Flow Rate 52.8 GPM
	VM6-SS-100H-B	3/4" ss flow body max. Flow Rate 26.4 GPM
	VM8-SS-100H-B	1" ss flow body max. Flow Rate 26.4 GPM
	VM8-SS-200H-B	1" ss flow body max. Flow Rate 52.8 GPM
	VM12-SS-200H-B	1-1/2" ss flow body max. Flow Rate 52.8 GPM

TRACER[®]_{VM} FLOWMETER with USER INTERFACE

General Description

Tracer_{VM} Flowmeter with User Interface measures liquid flow rate and temperature while providing a selectable analog voltage and programmable switch. Tracer_{VM} Flowmeter with User Interface calculates BTU's per minute and incorporates FCI (Flow Characteristic Indicator) in support of Scientific CoolingSM principles.

Vortex sensor technology is highly accurate and repeatable without moving parts. Flow reading is direction specific. Refer to the arrow on the body for correct flow direction for installation.

8 to 28VDC power source is required to supply the flowmeter. Sealed push-buttons configure the flowmeter and switching operations through user-friendly menus.

Separate analog outputs facilitate data collection of temperature and flow rates. The voltage outputs are user-selectable using on-screen menus: 0 to 3.5/4.1 Volts, 0 to 5 Volts or 0 to 10 Volts.

FCI helps optimize systemic water usage. "TF" on the digital display signifies the presence of Turbulent Flow, or optimum cooling water efficiency. 0, 10, 20 or 30% glycol mix is supported in Turbulent Flow calculations.

SPDT switch is programmable for one to four set points: low flow, high flow, low temperature, high temperature or turbulent flow condition. Set points may be turned on or off in any combination to signify an alarm state.

New Reynolds Number Display provides instant Turbulent Flow information based on water temperature, flow rate, cooling line diameter and glycol content. See page E90 for Turbulent Flow and Value Curve information.

Totalizer function provides volume display from a user-selected start point. (Maximum value is approximately 42,949,000 liters or 11,338,000 gallons.)

English or Metric units for flow and temperature can be changed at any time.



Applications

Tracer_{VM} Flowmeter is suitable for use in industrial water applications such as: injection mold cooling, die cast cooling, filter condition indication and more.

Tracer_{VM} Flowmeter with User Interface is ideally suited for connection to data acquisition systems. These systems give plastics injection molders real-time statistical process control.

Annual calibration is recommended for best results. Flow sensor and user interface electronics are paired and must be used together once calibration is complete.

Remote User Interface

User Interface may be mounted up to 2.9M (9.5ft) away from the Tracer_{VM} Base Model (sensor and flow body without display). Use the "R" designator in the model number for a completely new unit or order a stand-alone Remote User Interface to use with an existing Base Model.

Add User Interface to Existing Base Model

Tracer_{VM} Base model without User Interface can be upgraded. User interface electronics installation, initial setup and calibration are performed at the factory. See page E90 for ordering information.

Model Number

VM	3	-	B	-	15	-	L
Body Size							
3/8"NPT	3						
3/8"BSPP	3B		B or N		15H		
1/2"NPT	4				40H		
1/2"BSPP	4B						
3/4"NPT	6		AL or SS		100H		
3/4"BSPP	6B						
1"NPT	8		AL or SS		100H		
1"BSPP	8B				200H		
1-1/2"NPT	12		AL or SS		200H		
1-1/2"BSPP	12B						

User Interface

- L** Local (display housing attached to flow body, standard)
R Remote (display housing on mounting plate with 2.9(M) cable connection to flow body)

Body Material		Flow Range
Glass-Filled Nylon with Brass End Caps	B	15H 1 to 15 LPM (.3 to 4 GPM)
Nylon End Caps (3/8" and 1/2" only)	N	40H 2 to 40 LPM (.5 to 10.6 GPM)
Anodized Aluminum	AL	100H 5 to 100 LPM (1.3 to 26.4 GPM)
Stainless Steel (3/4" and larger only)	SS	200H 10 to 200 LPM (2.6 to 52.8 GPM)

How To Order

Two part numbers are required to order.

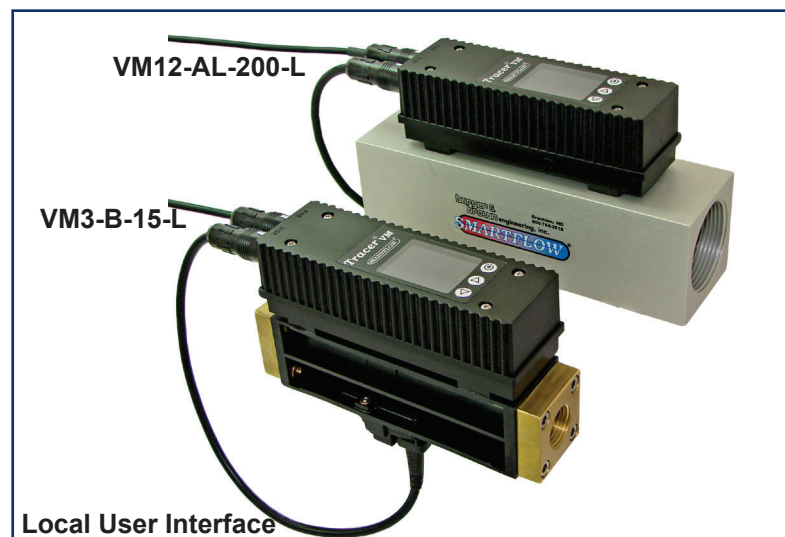
1. Choose the model number from this page.

2. Choose cable per below:

EFM-CBL-OPC.....Loose leads (standard, ends stripped)

CBL-VMI-WWA 120VAC power supply wall adapter

EFM-CBL-OPC-O..... Cylindrical connectors for use with RJG IA1 module



*BSPP - Available upon request

Add User Interface to Existing Tracer_{VM} Base Model

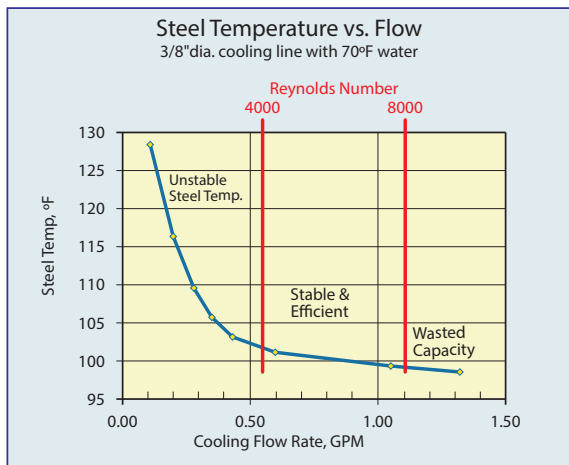
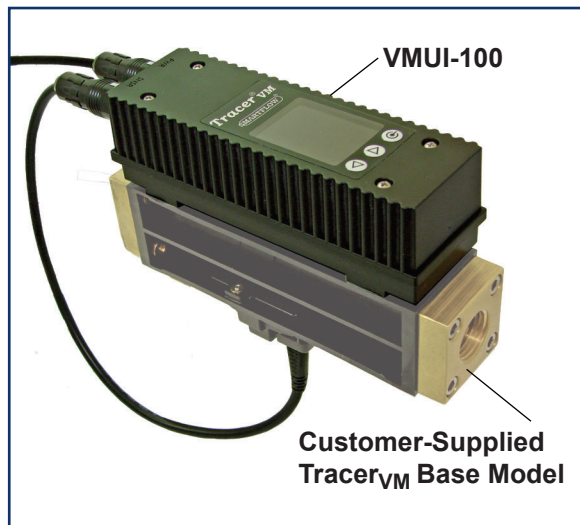
User Interface can be added at the factory to customer-supplied Tracer_{VM} without local display. Two part numbers are required.

1. Contact the factory for RMA number.
2. Local Interface, order part number: **VMUI-100**
-or-
Remote Interface, order part number: **VMUI-100-R**
3. Choose cable per below:

EFM-CBL-OPC..... Loose leads
(standard, ends stripped)

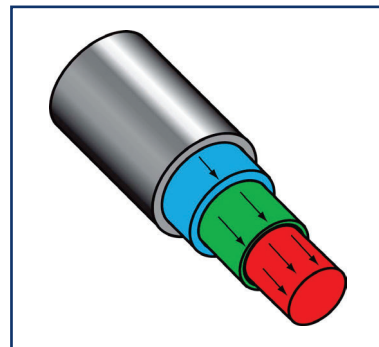
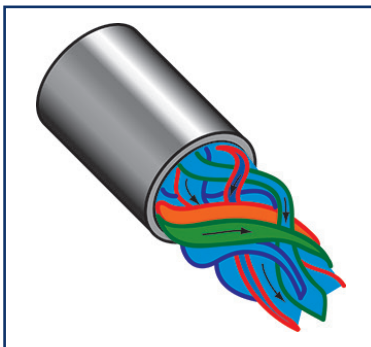
CBL-VMI-WWA 120VAC power
supply wall adapter

EFM-CBL-OPC-O.....Cylindrical
connectors for use with
RJG IA1 module



Turbulent Flow Basics

Turbulent water flow is much more efficient at removing heat in a cooling system than water flowing under laminar conditions. Once turbulent flow is achieved, increasing the flow rate does not significantly improve the cooling rate of the system. In molding applications, many mold operators try to maximize the flow of water through their cooling systems to ensure turbulent flow. Doing so increases energy costs for pumping more water than necessary through the system. This practice may also limit the amount of cooling water available for cooling additional molds on the same cooling system circuit. By insuring turbulent flow using FCI Technology, less water can be used in the molding process, saving precious resources.



Tracer[®]_{VM} Flowmeter - Electronic with User Interface

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Benefits

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Flow Ranges		
Body Size	Range (GPM)	Range (LPM)
3/8" & 1/2"	.3 to 4	1 to 15
3/8" & 1/2"	.5 to 10.6	2 to 40
3/4" & 1"	1.3 to 26.4	5 to 100
1" & 1-1/2"	2.6 to 52.8	10 to 200

	CATALOG NO.	DESCRIPTION
Electronic Flowmeters Local Display	VM3-B-15H-L	3/8" molded body brass ends max. Flow Rate 4 GPM
	VM3-B-40H-L	3/8" molded body brass ends max. Flow Rate 10.6 GPM
	VM4-B-15H-L	1/2" molded body brass ends max. Flow Rate 4 GPM
	VM4-B-40H-L	1/2" molded body brass ends max. Flow Rate 10.6 GPM
	VM3-N-15H-L	3/8" molded body nylon ends max. Flow Rate 4 GPM
	VM3-N-40H-L	3/8" molded body nylon ends max. Flow Rate 10.6 GPM
	VM4-N-15H-L	1/2" molded body nylon ends max. Flow Rate 4 GPM
	VM4-N-40H-L	1/2" molded body nylon ends max. Flow Rate 10.6 GPM
	VM6-AL-100H-L	3/4" aluminum flow body max. Flow Rate 26.4 GPM
	VM8-AL-100H-L	1" aluminum flow body max. Flow Rate 26.4 GPM
	VM8-AL-200H-L	1" aluminum flow body max. Flow Rate 52.8 GPM
	VM12-AL-200H-L	1-1/2" aluminum flow body max. Flow Rate 52.8 GPM
	VM6-SS-100H-L	3/4" ss flow body max. Flow Rate 26.4 GPM
	VM8-SS-100H-L	1" ss flow body max. Flow Rate 26.4 GPM
	VM8-SS-200H-L	1" ss flow body max. Flow Rate 52.8 GPM
	VM12-SS-200H-L	1-1/2" ss flow body max. Flow Rate 52.8 GPM

Tracer[®]_{VM} Flowmeter - Electronic with User Interface



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Body Size	Range (GPM)	Range (LPM)
3/8" & 1/2"	.3 to 4	1 to 15
3/8" & 1/2"	.5 to 10.6	2 to 40
3/4" & 1"	1.3 to 26.4	5 to 100
1" & 1-1/2"	2.6 to 52.8	10 to 200

	CATALOG NO.	DESCRIPTION
Electronic Flowmeters Remote Display	VM3-B-15H-R	3/8" molded body brass ends max. Flow Rate 4 GPM
	VM3-B-40H-R	3/8" molded body brass ends max. Flow Rate 10.6 GPM
	VM4-B-15H-R	1/2" molded body brass ends max. Flow Rate 4 GPM
	VM4-B-40H-R	1/2" molded body brass ends max. Flow Rate 10.6 GPM
	VM3-N-15H-R	3/8" molded body nylon ends max. Flow Rate 4 GPM
	VM3-N-40H-R	3/8"molded body nylon ends max. Flow Rate 10.6 GPM
	VM4-N-15H-R	1/2" molded body nylon ends max. Flow Rate 4 GPM
	VM4-N-40H-R	1/2" molded body nylon ends max. Flow Rate 10.6 GPM
	VM6-AL-100H-R	3/4" aluminum flow body max. Flow Rate 26.4 GPM
	VM8-AL-100H-R	1" aluminum flow body max. Flow Rate 26.4 GPM
	VM8-AL-200H-R	1" aluminum flow body max. Flow Rate 52.8 GPM
	VM12-AL-200H-R	1-1/2" aluminum flow body max. Flow Rate 52.8 GPM
	VM6-SS-100H-R	3/4" ss flow body max. Flow Rate 26.4 GPM
	VM8-SS-100H-R	1" ss flow body max. Flow Rate 26.4 GPM
	VM8-SS-200H-R	1" ss flow body max. Flow Rate 52.8 GPM
	VM12-SS-200H-R	1-1/2" ss flow body max. Flow Rate 52.8 GPM

Tracer[®] VM Bluetooth Interface

Tracer_{VM} Bluetooth Interface collects, transmits and saves data from Tracer_{VM} Base Flowmeters installed in injection mold cooling circuits.

Flowmeters purchased separately are connected via cable to the Tracer_{VM} Bluetooth Interface. The Interface provides power to each flowmeter and receives voltage signals for temperature and flow.

The Bluetooth Interface wirelessly transmits flow and temperature to display on a mobile device. Flow condition data log files can be created via app and saved on USB flash drive documenting the mold cooling water conditions.

The Interface also communicates over Ethernet connection to PC software for network file storage and alerts. The files are easily read into database software for reference or analysis.

Scientific Molders can use data to confirm processing parameters and optimize cycle times and cooling water efficiency.

VMBTI-100

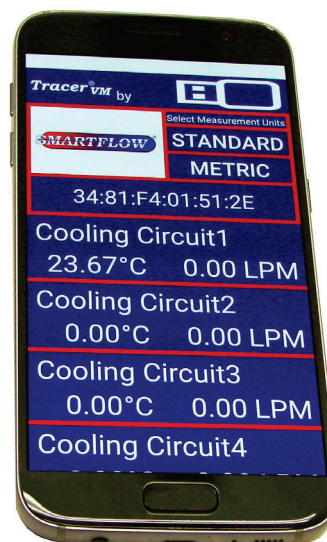
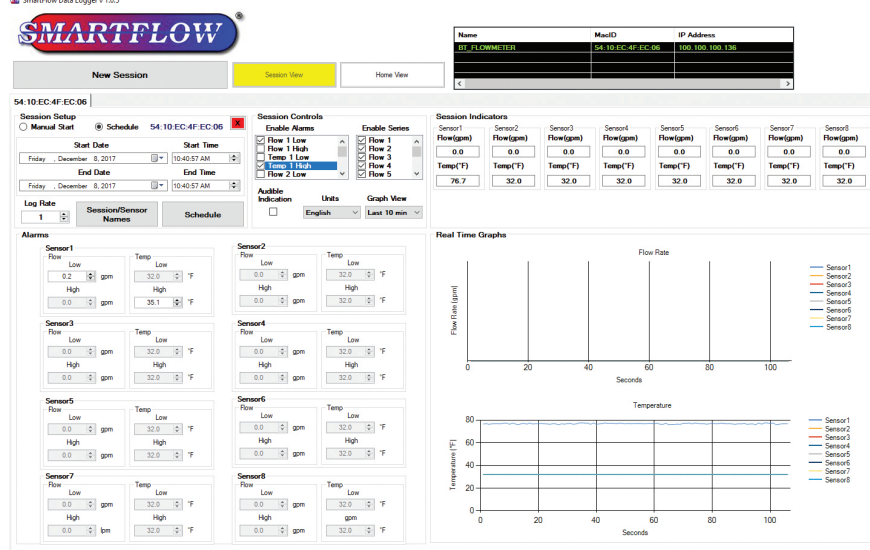


CATALOG NO.	DESCRIPTION
VMBTI-100	The Bluetooth Interface wirelessly transmits flow and temperature to display on a mobile device or network PC.

Data Logger Software

(PC based for network file storage and process alerts)

SmartFlow Data Logger v1.0.5



Tracer_{VM} App

(smartphone or tablet required, user provided, USB file storage)



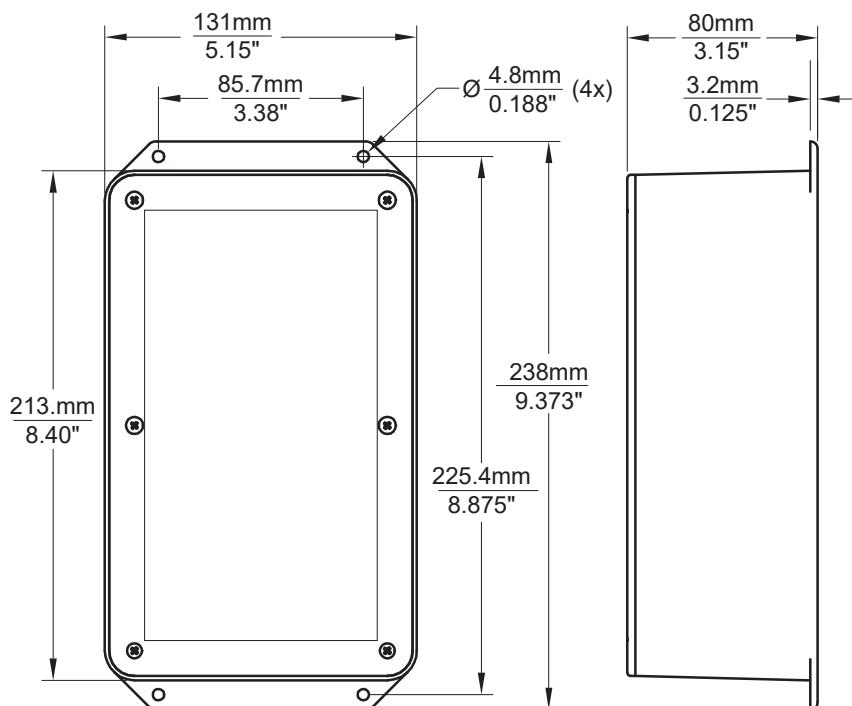
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Tracer[®]_{VM} Bluetooth Interface

Model Number: VMBTI-100

Enclosure Dimensions

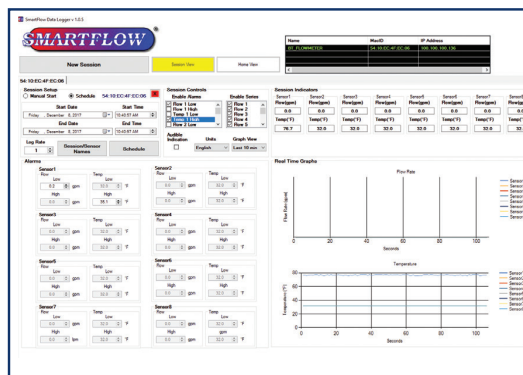


Data Logger (PC Based Software)

The Data Logger Software is provided to you free of charge as a .zip file via USB flash drive or internet download. The Data Logger displays temperature and flow rate data from up to 10 Tracer_{VM} Interface Modules with each module on a separate tab.

Functions:

- Saves .csv file to specified location for archiving and analysis.
- Display and data logging options include:
 - * Name Interfaces
 - * Name individual cooling circuits in the session (display only)
 - * Name .csv file
 - * Manual or Scheduled duration
 - * Selectable log rate between 1 and 3600 seconds
 - * Metric or English units
 - * Set alerts for low or high temperature and flow rates
 - * View real-time graph for each Tracer_{VM} Base unit. View data from each Tracer_{VM} Interface module in individual tabs.



Tracer[®] VM Bluetooth Interface

PC-Based **Smartflow Data Logger Software** provides temperature and flow process data that can be used in database software for reference and analysis. These data records are useful to injection molders maintaining compliance to regulatory requirements and quality control.

Two screen views are available: Home View and Session View.

Home View

The Home View displays graphs of temperature and flow cooling water conditions for all Tracer_{VM} Base flowmeters connected to TracerVM Bluetooth Interfaces.

Up to 10 Interfaces can be displayed graphically on one screen. The maximum number of Tracer_{VM} Bluetooth Interface Units visible for selection is 30. The Home View can show overall health of cooling water lines across the shop floor. An unexpected value for flow or temperature can be seen quickly and may be an indication of a blocked cooling line or out-of-tolerance processing conditions resulting in poor molded part quality.

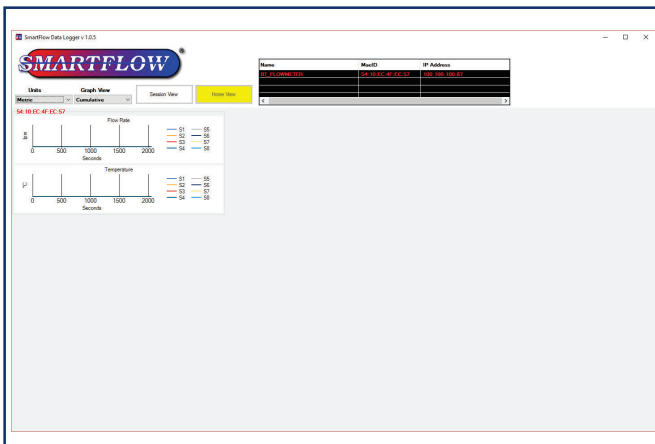
Session View

Session view displays one Tracer_{VM} Bluetooth Interface with temperature and flow values for each connected Tracer_{VM} Base flowmeter. A maximum of eight flowmeters can be viewed on the screen in Session View. A maximum of 10 Interfaces can be accessed as tabs in the session view at one time.

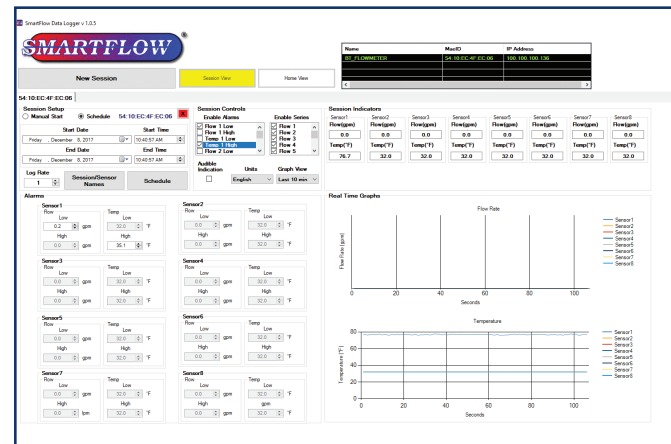
Log files are created in Session View. These can be started manually or scheduled as needed. Maximum recorded log length is 72 hours.

Session Controls box allow users to set alerts for low or high temperature and flow conditions. When data is being recorded, an alert will pop up on screen to notify the user when a parameter has been breached. The indicator will disappear as soon as the condition that caused the alert has cleared. Alerts are disabled when recording is not active.

Session Indicators at the top of the screen display current temperature and flow values from Tracer_{VM} Base Flowmeters that are connected to the selected Interface. Real Time Graphs are also displayed for each flowmeter connected to the Interface. Unused flowmeter locations may be disabled as needed. Active Interface units are selected via tabs located near the top of the screen.



Home View



Session View