

SMARTFLOW® TRACER®_{VM}



Base Flowmeters

This is not your standard flowmeter! The TRACER_{VM} raises the bar by reporting Temperature and Flow rates electronically to aid in cooling and process efficiency.

The Tracer_{VM} Flowmeter is a non-display meter that reports flow rates and temperature via voltage signals for connection to data acquisition system or Bluetooth Interface. The TRACER_{VM} is designed for use in industrial water applications such as injection mold cooling and pump monitoring. The flowmeter uses Vortex sensor technology that is highly accurate and repeatable without any moving parts. Connection to the process is made using standard pipe threads in NPT or BSP from 3/8" through 1-1/2". The flowmeter body materials are corrosion-resistant and can be ordered in brass, nylon, anodized aluminum or stainless steel. These options are based on inlet/thread size, see next page for the complete details.



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

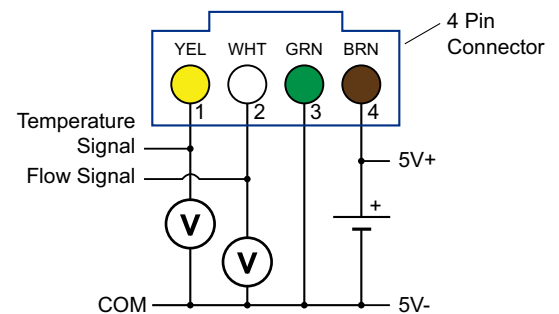
1 to 15 LPM	(.3 to 4 GPM)	3/8" or 1/2"
2 to 40 LPM	(.5 to 10.6 GPM)	3/8" or 1/2"
5 to 100 LPM	(1.3 to 26.4 GPM)	3/4" or 1"
10 to 200 LPM	(2.6 to 52.8 GPM)	1" or 1-1/2"

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

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
 Brass or Nylon End Caps
 3/4" thru 1-1/2" Body Size..... Anodized Aluminum
 or Stainless Steel Flow Body
 Cable2.9M (9.5ft) 4-conductor for power
 and output,ends stripped

Power Supply

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



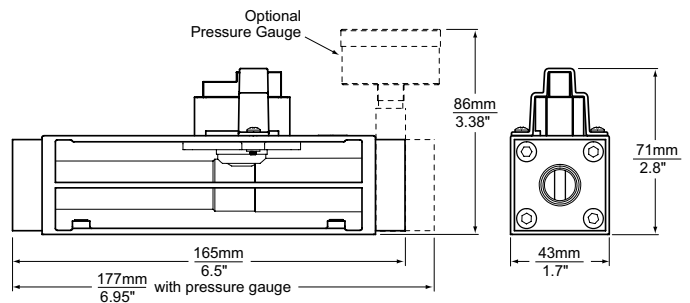
VM 3 - B - 15 - B - P1Q

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		
Body Material			
Glass-Filled Nylon with Brass End Caps		B	
Nylon End Caps (3/8" and 1/2" only)		N	
Anodized Aluminum		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

Special Order Options

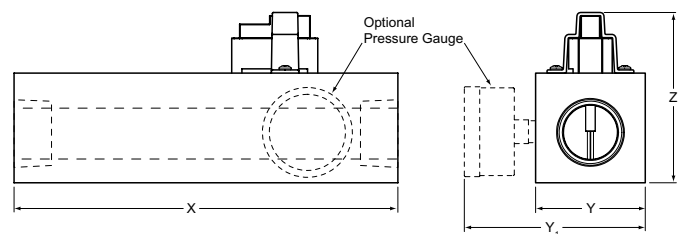
- P1 30 psi Pressure Gauge
- P2 60 psi Pressure Gauge
- P3 100 psi Pressure Gauge
- P4 160 psi Pressure Gauge
(Pressure gauges not available with AL body material)
- Q Delta-Q® Precision Flow Regulator
(use with VM3 or VM4 only)

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



3/4" or 1-1/2" Body Sizes (Nylon or Brass End Caps)

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	74.2/2.9
1", 5 to 100 LPM	178/7.0	45.7/1.8	77/3.1	74.2/2.9
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

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

When using with RJG eDart IA-2 module

Add line item:

Part no. CONN-LBG-4-F

Description: 4-pin CConnector added to cable

SMARTFLOW® TRACER®_{VM} with Local or Remote USER INTERFACE



No more guessing or misreading confusing manual flow meters. The TRACE_{VM} USER INTERFACE provides flow rates, temperature, and Turbulent Flow in an easy to read digital display.

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 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.

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.

New Reynolds Number Display provides instant turbulent flow information based on water temperature, flow rate, cooling line diameter and glycol content. See page 4 for turbulent flow and value curve information

Applications Tracer 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.





Specifications

Flow Ranges and Accuracy

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

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)

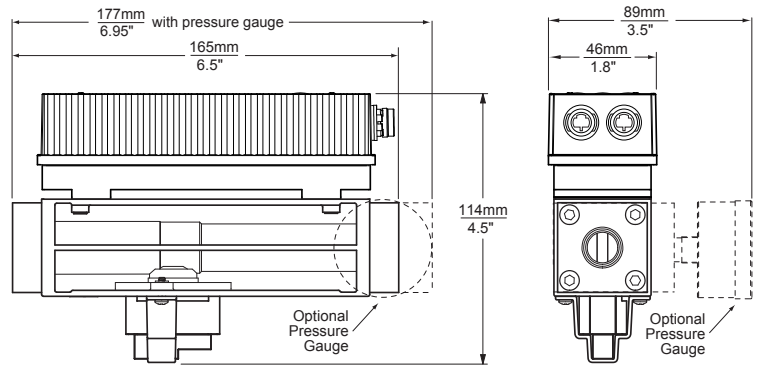
Power

Power Supply..... 8 to 28 VDC (external)
 Switch Rating..... 30 VDC/30VAC
 Flow and Temp Signals 0 to 5 or 0 to 10 VDC

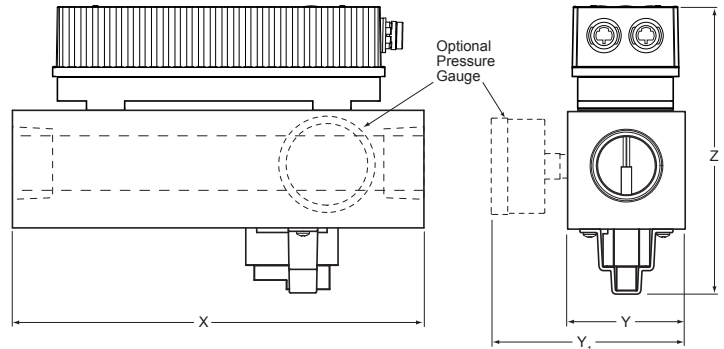
Materials

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
 Brass or Nylon End Caps
 3/4" thru 1-1/2" Body Size..... Anodized Aluminum
 or Stainless Steel Flow Body

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



3/4" or 1-1/2" Body Sizes (Nylon or Brass End Caps) 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	117/4.6
1", 5 TO 100 LPM	178/7.0	45.7/1.8	77/3.1	117/4.6
1" 10 TO 200 LPM	178/7.0	51/2.0	84/3.3	122/4.8
1-1/2", 10 TO 200 LPM	198/7.8	58/2.3	90/3.6	130/5.1

Directives

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

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VM 3 - B - 15 - L - P1Q

Body Size				Special Order Options
3/8" NPT	3	B or N	15H 40H	P1 30 psi Pressure Gauge
3/8" BSPP	3B			P2 60 psi Pressure Gauge
1/2" NPT	4			P3 100 psi Pressure Gauge
1/2" BSPP	4B			P4 160 psi Pressure Gauge (Pressure gauges not available with AL body material)
3/4" NPT	6	AL or SS	100H	Q Delta-Q® Precision Flow Regulator (use with VM3 or VM4 only)
3/4" BSPP	6B			
1" NPT	8	AL or SS	100H 200H	
1" BSPP	8B			
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	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-OPCA - 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



Local User Interface



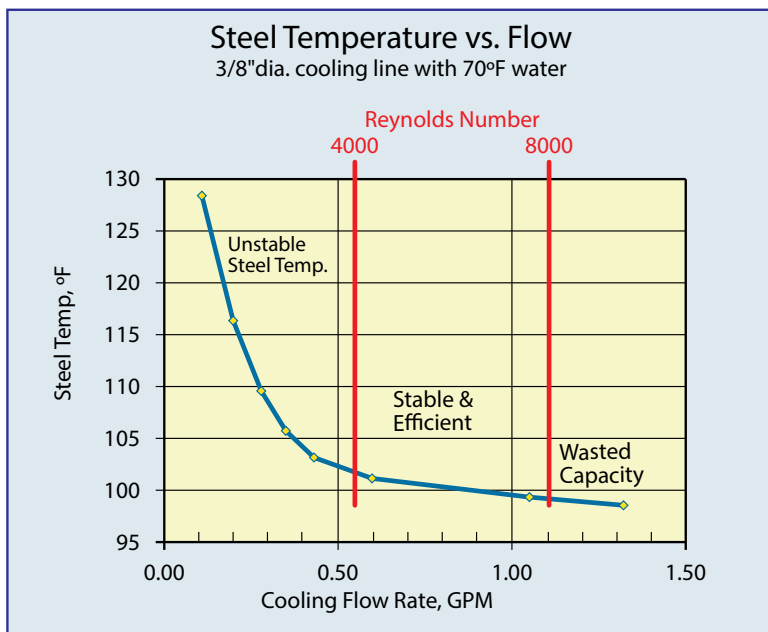
Remote User Interface



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 an RMA number
- 2- Local Interface, order part number VMUI-100
- 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

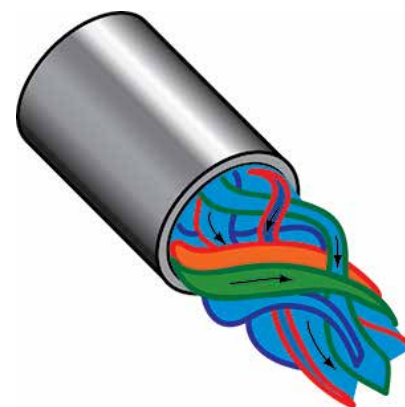
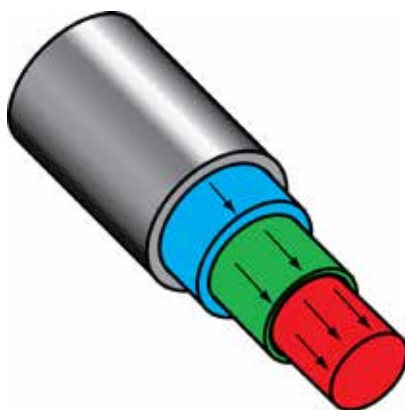


Turbulent Flow Basics

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.



SMARTFLOW® TRACER®_{VM} BLUETOOTH INTERFACE



Step into the 21st century with the TRACER_{VM} Bluetooth interface. Operators are able to view real time cooling data via Bluetooth compatible devices.

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 the data logger software for reference or analysis. Scientific Molders can use this data to confirm processing parameters and optimize cycle times and cooling water efficiency.



ITEM NUMBER
VMBTI-100



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Data Logger Software
(PC based for network file storage and alarm capabilities)



Tracer_{VM} Bluetooth Interface includes the Interface module and all software necessary to create cooling line log files.

Mobile app allows for creation of log files to be saved on Interface connected USB. The Ethernet port on the Interface connects to local network enabling log file creation, storage and process alerts.

Peripheral equipment such as PC, Mobile Device or flash drives are user provided. Input comes from Tracer_{VM} Base models.

Please refer to Smartflow_{VM} base model data sheet for details.

Features and Benefits

- Transmits temperature and flow conditions in real time to mobile devices for process monitoring up to 20 meters away.
- Simplifies multiple Tracer_{VM} Base installations by providing power, ground and signal termination near the process.
- Gasketed, water-resistant plastic enclosure provides secure mounting in locations where occasional water spray is present.
- Housing mounting holes are integral for easy installation.
- Ethernet port connects the Interface to a local network for communication with Data Logger software.
- USB port provides mobile device charging plus flash drive connection.
- Smartflow Data Logger PC software included.

Specifications:

Housing.....	NEMA4X compliant
Operating Temperature.....	0°C to 52°C (32°F to 125°F)
Maximum Wireless Range.....	20 meters (65.5 ft)
Maximum Tracer _{VM} Base Flowmeter	
Distance to Bluetooth I/F.....	3 meters (10ft)
Power required.....	8 to 28VDC with earth ground (external)
Cord grips.....	9 pieces liquid-tight (included)
Data logging software.....	included



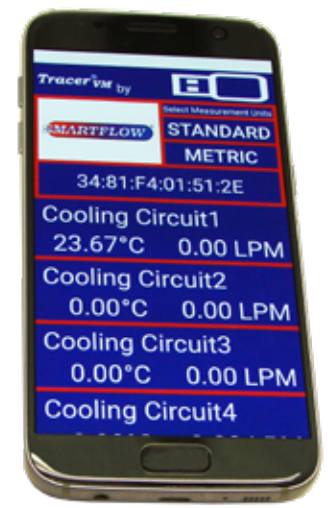
TracerVM Base

Mobile App

Tracer_{VM} Mobile app is available for free download from iTunes or the Google Play store. Search for "Tracer_{VM}". The mobile app displays temperature and flow rate data from one Interface module with up to 8 flowmeters at one time.

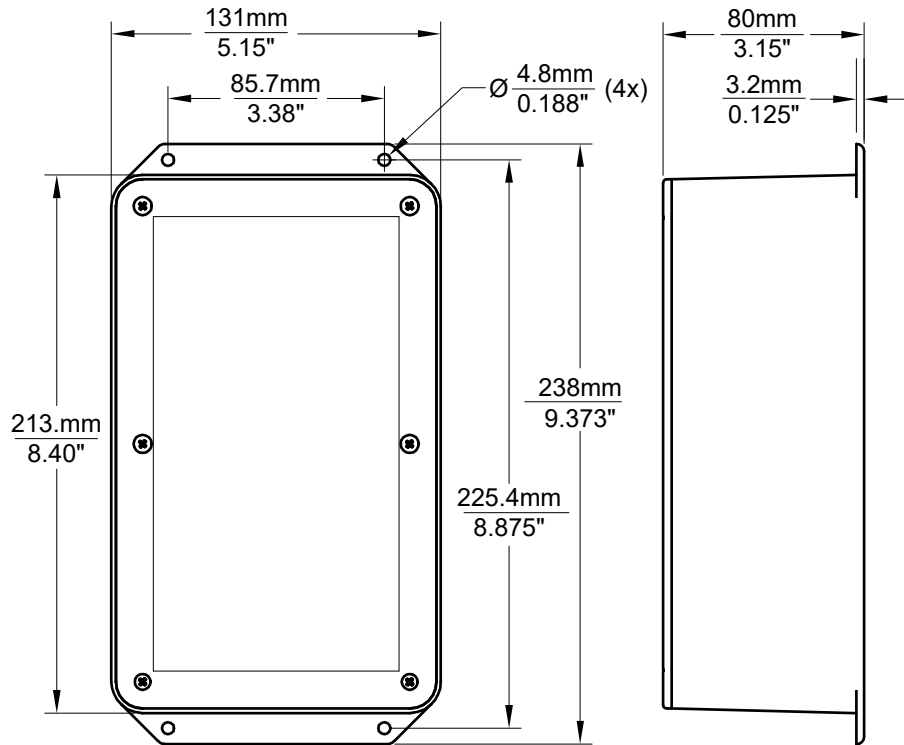
Functions:

- Saves .csv file to USB data storage device connected to the Bluetooth Interface Module for archiving and analysis.
- Display and data logging options include:
 - * Name Interfaces
 - * Name individual cooling circuits on the device
 - * Name .csv file
 - * Manual or Scheduled duration
 - * Selectable log rate between 1 and 3600 seconds
 - * Metric or English units





VMBTI-100 Enclosure Dimensions

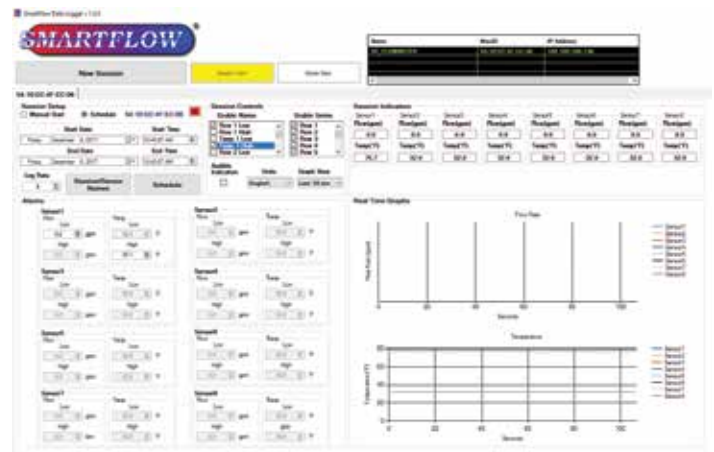


Data Logger (PC Based Software)

The Data Logger Software is provided to you free of charge as an 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:

- Dry Contact Switch for Alarm Notification
- 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.





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 Tracer_{VM} 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_{VM} 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_{VM}. 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