SMARTFLOW®

TRACER® ELECTRONIC FLOWMETERS

DD-3B

U.S. Patent No. 7,729,869

Model DD
Digital Display

- Battery Powered
- LCD Display
  - FCI (Flow Characteristic Indicator)
  - Flow
  - Temperature
  - BTU's per minute

See page 3 for model numbers and dimensions.

General Description

Tracer Electronic Flowmeter with Liquid Crystal Display (LCD) measures water flow rate, temperature, calculates BTU's per minute and incorporates a Flow Characteristic Indicator (FCI). The highly-visible display is configured via the sealed push buttons and user-friendly menus.

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

Bi-directional flow reading makes installation simple and convenient.

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

Corrosion-resistant wetted parts assure long-lasting durability.

Polysulfone viewing window provides visual flow indication (3/8" models only)

Automatic display shut-off prolongs battery life.

RoHS compliant

As a diagnostic tool, engineers and maintenance personnel can quickly spot-check temperature and flow in water lines using the LCD Tracer flowmeter. This portable LCD unit is unmatched as a troubleshooting tool.

As a process control tool, the Tracer can be left in place to closely monitor more critical applications. Annual calibration is recommended for best results. 3/8" Tracer flowmeters are not recommended for use in liquids containing ferrous particles. Larger units equipped with inductive sensors are not sensitive to metal particles in process liquid.

Specifications

Flow Accuracy ..... ±5%*
Flow Repeatability ..... ±3%*

Wetted Parts

3/8" Body ..... Nickel-Plated Brass
2" Body ..... Clear-Anodized Aluminum
or 303 Stainless Steel (-SS model suffix)
Sight Window (3/8" only)..... Polysulfone
Impeller .....Nylon
Impeller Shaft..... Stainless Steel
Magnet (3/8" only).....Neodymium

Power

Battery.....3.6V 1.0A Lithium
(included, shipped uninstalled)
Battery Life..... 500 hrs actual use

Process Temperature

Range ..... 32°F to 180°F (0°C to 82°C)
Accuracy .....±2% of display value
Repeatability .....±1% of display value

Environmental

Pressure
3/8" Body ..... 150 psi max. (10.3 bar max.)
2" Body ..... 100 psi max.(6.9 bar max.)

*Accuracy and Repeatability figures are based on the full scale of the range.

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Design and specifications are subject to change without notice.

SMARTFLOW® Switching Tracer® Electronic Flowmeters

DDS-16B

U.S. Patent No. 7,729,869

General Description

Tracer Electronic Switching Flowmeter measures liquid flow rate and temperature while providing a selectable analog voltage and programmable switch. Tracer Switching Flowmeter calculates BTU's per minute and incorporates FCI (Flow Characteristic Indicator) in support of Scientific Cooling℠ principles.

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. “TFLOW” on the digital display signifies the presence of Turbulent Flow, or optimum cooling water efficiency. 10, 20 or 30% glycol mix is supported in Turbulent Flow calculations.

SPDT switch is programmable for one to five set points: low flow, high flow, low temperature, high temperature and/or turbulent flow condition. Set points may be turned on or off in any combination.

Bi-directional flow reading makes installation simple and convenient.

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

Applications

Tracer flowmeter is suitable for use in injection molding machine cooling water loops, lube oil systems, blending systems, filter condition indicators, and varied applications requiring flow measurement of clean, non-viscous, chemically compatible process liquids.

Annual calibration is recommended for best results. 3/8" Tracer flowmeters are not recommended for use in liquids containing ferrous particles. Larger units equipped with inductive sensors are not sensitive to metal particles in process liquid.

Model DDS
Digital Display Switching

- Remotely Powered 8 to 28VDC
- 0-5 or 0-10 Volts Analog Outputs
- Programmable SPDT Switch
- LCD Display
  - FCI (Flow Characteristic Indicator)
  - Flow
  - Temperature
  - BTU's per minute

See page 3 for model numbers and dimensions.

Specifications

Flow Accuracy ..... ±5%*

Flow Repeatability ..... ±3%*

Wetted Parts

2" Body ..... Clear-Anodized Aluminum or 303 Stainless Steel (-SS model suffix)

Impeller .....Nylon

Impeller Shaft..... Stainless Steel

Power..... 8 to 28VDC

Cable..... 16ft (4.8M)

Switching..... SPDT, 1A, 30VAC, 42VDC

Process Temperature

Range ..... 32°F to 180°F (0°C to 82°C)

Accuracy .....±2% of display value

Repeatability .....±1% of display value

Environmental

Pressure

2" Body ..... 100 psi max.(6.9 bar max.)

*Accuracy and Repeatability figures are based on the full scale of the range.

FCI (Flow Characteristic Indicator)

Turbulent Flow is the point at which cooling efficiency is optimized. Increasing flow rates above the point of Turbulent Flow provides diminishing cooling rate improvement. Using FCI, systemic cooling water flow can be optimized, conserving water and maximizing cooling plant-wide without plumbing changes. “TFLOW” displays when Turbulent Flow is present within the Tracer flowmeter.

Model Number

DD - 3 B - B

Electronics Function

Digital Display Battery-Powered	**DD**
Switching Tracer Analog Output plus Programmable Switch (2" only)	**DDS**

Flow Range and Connection Size

0.5 - 8 gpm (2-30 lpm) All 3/8" Tracer flow bodies are Nickel-Plated Brass	3/8"	**3**
10 - 110 gpm (38 - 418 lpm) Standard 2" Tracer flow bodies are Anodized Aluminum (Stainless Steel is optional)	2"	**16**

Body Material & Thread Options

	Leave Blank for NPT Threaded Connection
-B	Parallel British Threaded Connection
-SS	Stainless Steel Body with NPT Threaded Connection (2" only)
-B-SS	Stainless Steel Body with Parallel British Threaded Connection (2" only)

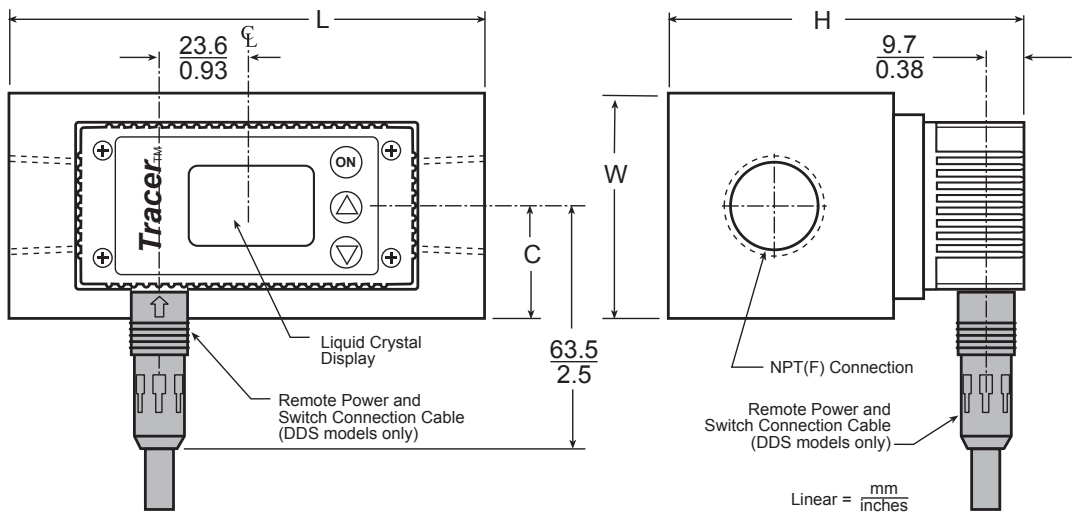
Pressure Gauges & Quick-Disconnect Options

B	Standard (without pressure gauge, applies to all 3/8" and any 2" aluminum flow bodies)
E	with quick-disconnect fittings (3/8" only)
	For use only with 2" SS Body
C1	30 psi Pressure Gauge
C2	60 psi Pressure Gauge
C3	100 psi Pressure Gauge
CL	Liquid-filled Pressure Gauge (100 psi)

Stainless Steel Application Note:

Stainless Steel flowmeter bodies are strongly recommended when copper is present in water lines This includes water treatments such as organic biocides containing copper. Aluminum is susceptible to galvanic action in the presence of copper. Contact your factory representative for more information.

Dimensions (mm/inches)				
Body Size	L	H	W	C
3/8"	87/3.42	58/2.27	42/1.67	21/0.83
2"	140/5.50	118/4.65	76/3.00	38/1.50



Precision Flow Regulator with 3/8" Tracer® Electronic Flowmeters

Model Number

DD - 3B - Q

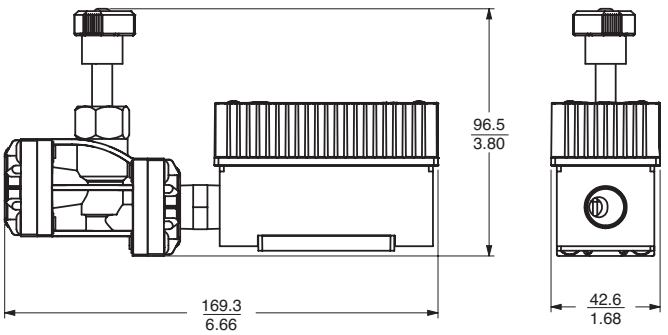
Thread Size		Delta-Q End Cap Material	
3/8"NPT(F)	**3B**	**Q**	Brass
3/8"BSPP(F)	**3B-B**	**QP**	Nylon

Delta-Q Flow Regulator can be used with 3/8" Tracer electronic flowmeters.

DD- **3.6V Battery-Powered**

- Flow Rate Display
- Temperature Display
- BTU's/Minute Display
- Turbulent Flow Condition (with optional glycol % input)

DD-3B-QP



RECOMMENDED FLOW DIRECTION

Wetted Parts and Materials

Flowmeter Body	Nickel-Plated Brass
Impeller	Nylon
Impeller Shaft	Stainless Steel
Magnet	Neodymium
Back Cover	Polysulfone
Flow Regulator Body	Glass-Filled Nylon
Stem & Valve Seat	Stainless Steel
O-Ring	EPDM
End Cap	Brass or Glass-Filled Nylon

Specifications

Flow Accuracy	±5% of full scale
Flow Repeatability	±3% of full scale
Temperature Accuracy	±2% of display
Temperature Repeatability	±1% of display
Operating Temperature	180°F max. (82°C max.)
Operating Pressure	150 psi max. (10.3 bar max.)
Power	3.6VDC Battery (included)

SMARTFLOW®

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 displays Reynolds Number, calculates BTU's per minute and incorporates FCI (Fluid Characteristic Indicator) in support of Scientific Cooling^{SM} 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.

Separate analog outputs facilitate data collection of temperature and flow rates. The voltage outputs are user-selectable using on-screen menus: 0.5 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.

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

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.

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

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.

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 4 for ordering information.

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Tracer®VM Flowmeter with User Interface

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" & 1"	5 to 100	1.3 to 26.4
1" & 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.)

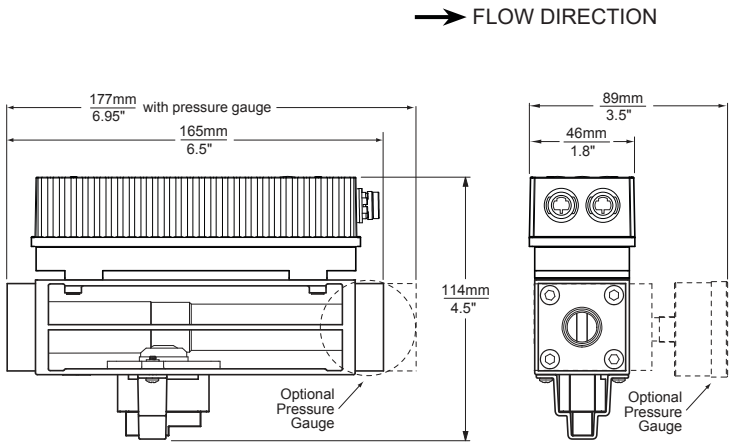
Power

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

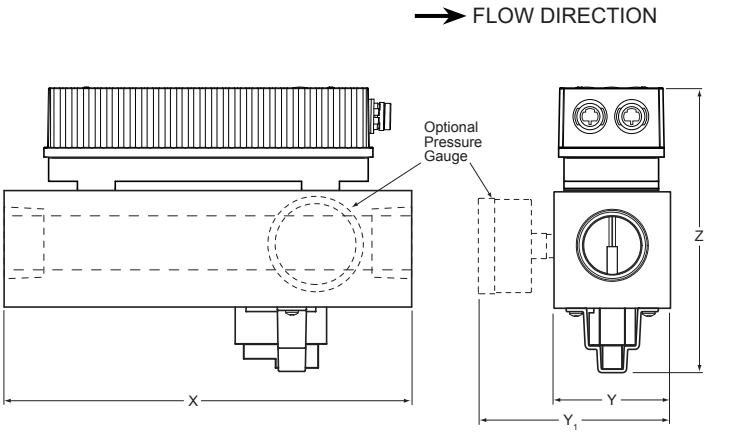
Materials

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 with 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" 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	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:

- 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.

SMARTFLOW® Tracer®VM Flowmeter with User Interface

Model Number

VM	3	-	B	-	15H	-	L	-	P1Q

Body Size

3/8"NPT	3	B or N
3/8"BSPP	3B	
1/2"NPT	4	
1/2"BSPP	4B	
3/4"NPT	6	AL or SS
3/4"BSPP	6B	
1"NPT	8	AL or SS
1"BSPP	8B	
1-1/2"NPT	12	AL or SS
1-1/2"BSPP	12B	

Body Material

Glass-Filled Nylon with Brass End Caps Nylon End Caps (3/8" and 1/2" only)	B N
Anodized Aluminum Stainless Steel (3/4" and larger only)	AL SS

Flow Range

15H	1 to 15 LPM (.3 to 4 GPM)
40H	2 to 40 LPM (.5 to 10.6 GPM)
100H	5 to 100 LPM (1.3 to 26.4 GPM)
200H	10 to 200 LPM (2.6 to 52.8 GPM)

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)

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)

How To Order

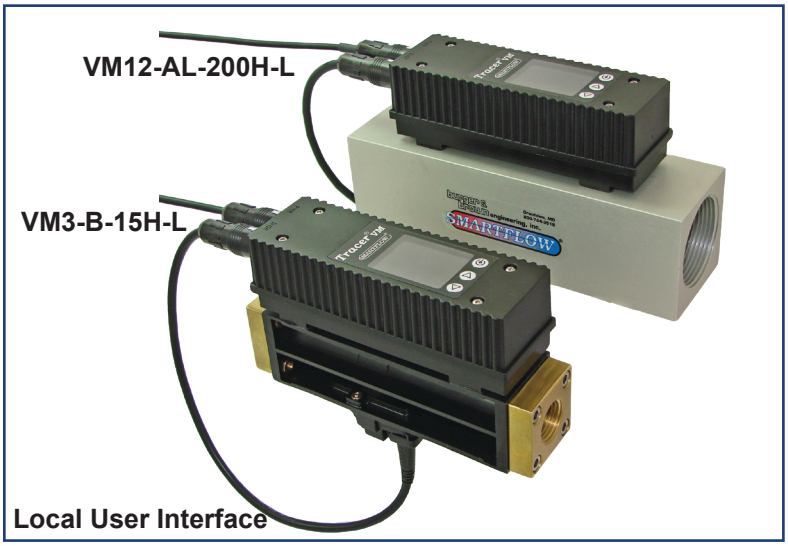
Two part numbers are required to order.

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



Local User Interface

Remote User Interface

Add User Interface to Existing Tracer$_{VM}$ Base Model

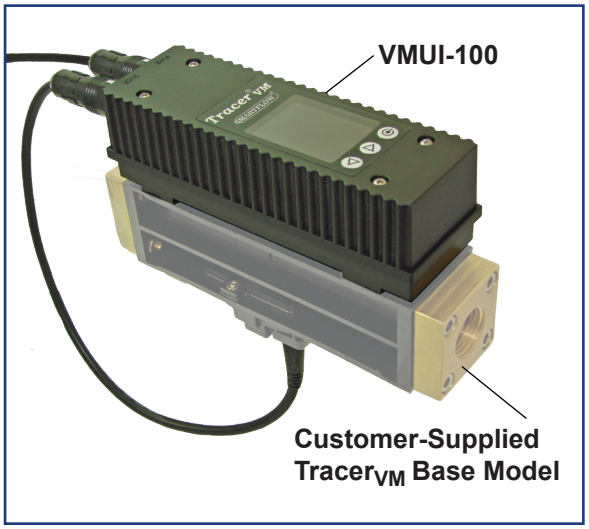
User Interface can be added at the factory to customer-supplied Tracer$_{VM}$ without local display. Two part numbers are required.

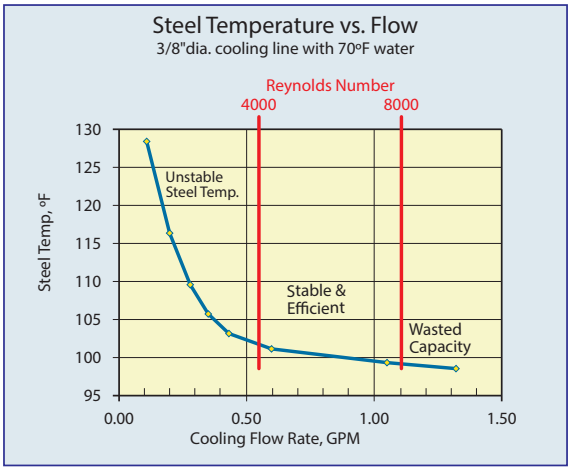
1. Contact the factory for RMA number.
2. Local Interface, order part number: **VMUI-100**
   -or-
   Remote Interface, order part number: **VMUI-100-R**
3. Choose cable per below:

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

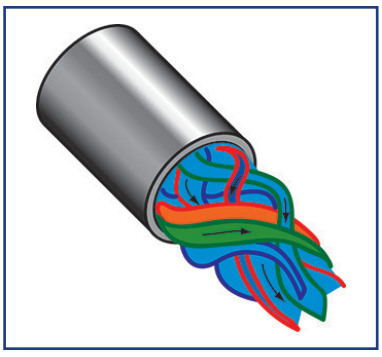


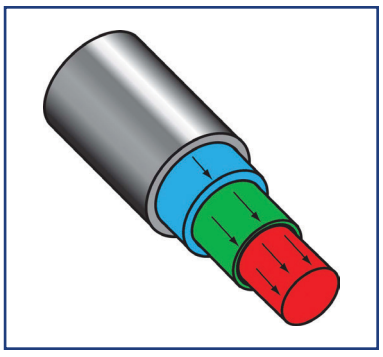


Turbulent Flow Basics

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.

Try our on-line Turbulent Flow Calculator:
www.SMARTFLOW-USA.com/turbulent-flow-rate-calculator





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TRACER® VM Bluetooth Interface

General Description

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.

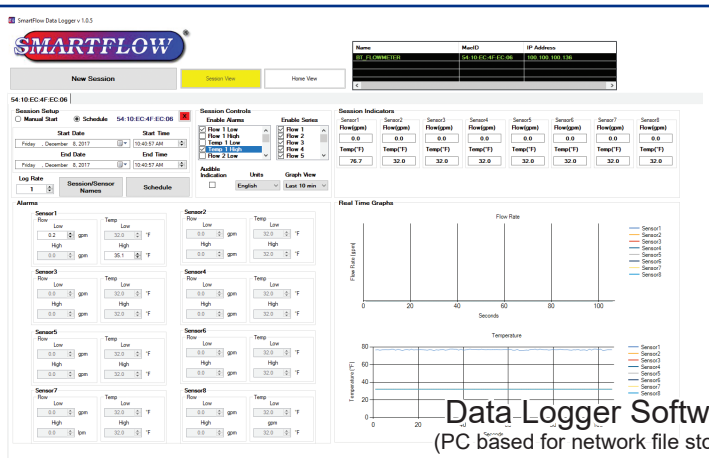
The Bluetooth Interface wirelessly transmits flow and temperature to display on a mobile device. Flow condition data log files can be created via app and saved on USB flash drive documenting the mold cooling water conditions.

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.

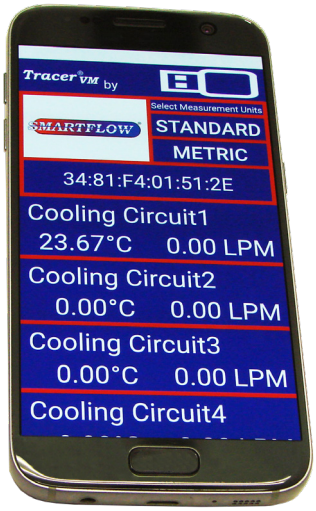
VMBTI-102

When used with PC software, a dry contact switch is available for connection to a peripheral or machine control to signal an alarm for out of limit cooling water conditions.

Model VMBTI-102



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



Tracer$_{VM}$ App
(smartphone or tablet required, user provided, USB file storage)

Get it on iTunes

GET IT ON Google Play

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SMARTFLOW® TRACER®VM Bluetooth Interface

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. Dry contact switch is available on model VMBTI-102.

Peripheral equipment such as PC, Mobile Device or flash drives are user provided. Input comes from Tracer$_{VM}$ Base models. Please refer to Smartflow catalog 186 for details.

VMBTI-100


Tracer$_{VM}$ Base

Tracer$_{VM}$ Bluetooth Interface must be used with at least one Tracer$_{VM}$ Base Flowmeter for flow and temperature input. Up to eight flowmeters can be connected to one Bluetooth Interface. See Smartflow Catalog 186 for Tracer$_{VM}$ Base 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.
- Ethernet port connects the Interface to a local network for communication with Data Logger PC Software.
- USB port provides mobile device charging plus flash drive connection.
- Smartflow Data Logger PC Software is available for download from the Smartflow-usa.com web site.
- With Model VMBTI-102 dry contact switch is available to signal out of limit temperature and flow rate conditions when using the Data Logger PC Software.

Specifications

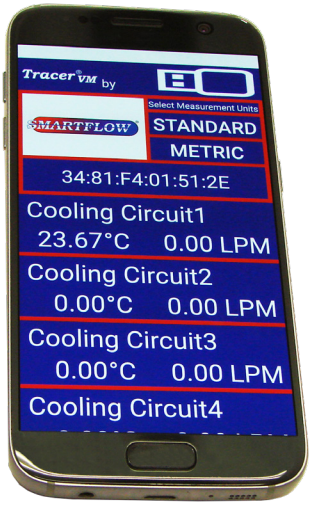
Housing ..... NEMA4X compliant
Operating Temperature ..... 0°C to 52°C (32°F to 125°F)
Maximum Wireless Range ..... 20 meters (65.6ft)
Maximum Tracer$_{VM}$ Base Flowmeter
Distance to Bluetooth I/F ..... 3 meters (10ft)
Power Required ..... 8 to 28VDC with earth ground (external) required to maintain signal integrity
Relay Switch Rating
(Model VMBTI-102 only) 2A, 250VAC/220VDC

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.

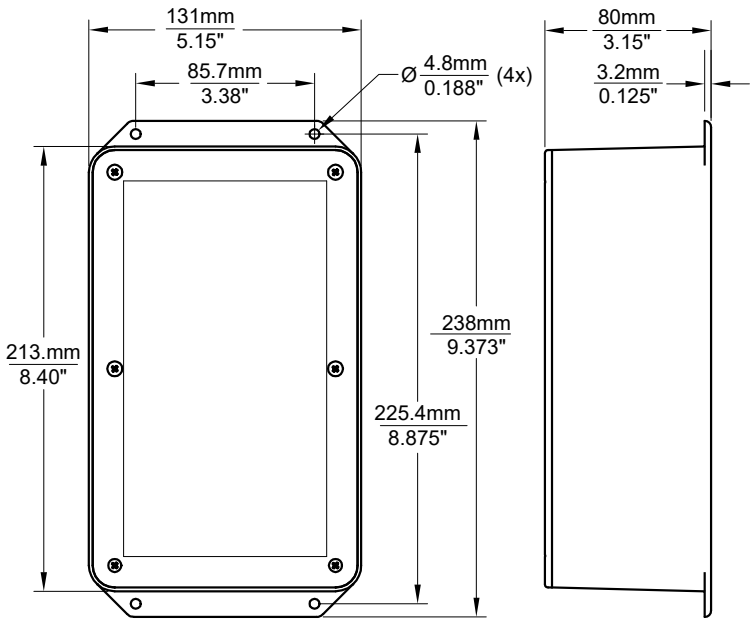
Functions:

- Save .csv file to USB data storage device connected to the Bluetooth Interface Module for archiving and analysis.
- Name Interfaces
- Name individual cooling circuits on the device
- Name .csv file
- Select Manual or Scheduled duration
- Select log rate between 1 and 3600 seconds



SMARTFLOW® TRACER®$_{VM}$ Bluetooth Interface

Enclosure Dimensions All Models



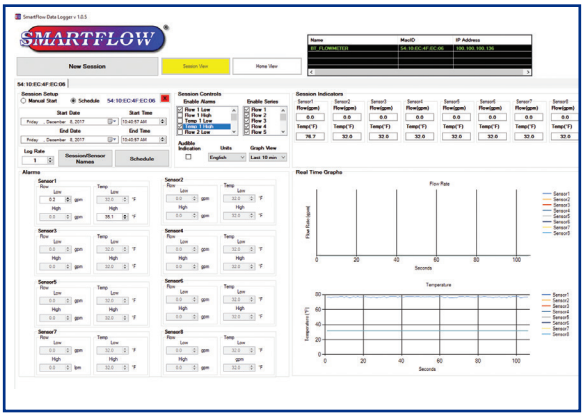
Feature	Model Number	
	VMBTI-100	VMBTI-102
Transmit Temperature and Flow via Bluetooth to Mobile Device	✓	✓
Send Temperature and Flow to PC Software via Ethernet Connection	✓	✓
USB mobile device charging or data port	✓	✓
Dry Contact Switch	✗	✓

Data Logger (PC Based Software)

The Data Logger Software is provided to you free of charge as a download from the product web page. 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.
- Name Interface Units
- Name individual cooling circuits in the session (display only)
- Name .csv file
- Set Manual or Scheduled duration
- Select log rate between 1 and 3600 seconds
- Select Metric or English units
- Set alerts for low or high temperature and flow rates. **Alerts are disabled when recording is not active.**
- View real-time graph for each Tracer$_{VM}$ Base unit.
- View data from each Tracer$_{VM}$ Interface module in individual tabs.



Model VMBTI-102 only - Dry contact switch changes state while alerts are active. Switch can be connected to external device such as low voltage stack light or machine control.

SMARTFLOW® Tracer®$_{VM}$ Bluetooth Interface

Data Logger Screens

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 Interface Units 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.

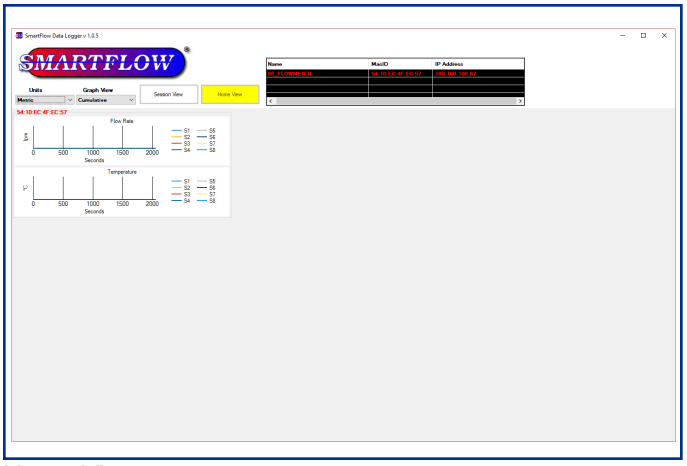
Log files are created in Session View. These can be started manually or scheduled as needed. Maximum recorded log length is 72 hours.

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.

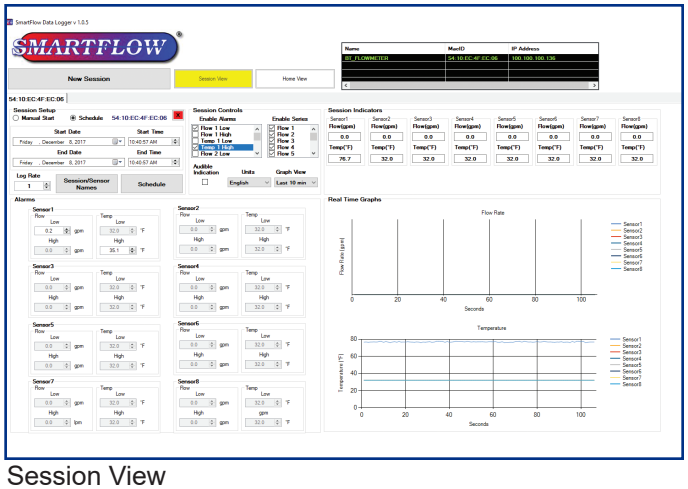
Model VMBTI-102 only: Dry contact switch changes state to indicate the out of limit condition when alert is active.

Alerts and dry contact switch are disabled when session 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

For *An Inside Look at Turbulent Flow* and other helpful processing articles, visit the Technical Documents section of the Smartflow-usa.com web site.

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SMARTFLOW®

TRACER®$_{VMA}$ with AutoReg™ Flow Regulator

(patent pending)

General Description

Tracer$_{VMA}$ with AutoReg Flow Regulator automatically adjusts flow rate to the required user-selected volume regardless of changes in line pressure. This results in a more consistent flow rate with more control over cooling water conditions in critical molding situations.

The User Interface communicates with the valve actuator that automatically adjusts the opening of the internal needle valve of the Delta-Q® or brass flow regulator to maintain the correct flow rate or Reynolds Number.

Local or Remote User Interface control allows for convenient installation. User Interface may be mounted up to 2.9M (9.5ft) away from the flow sensor and regulator assembly.

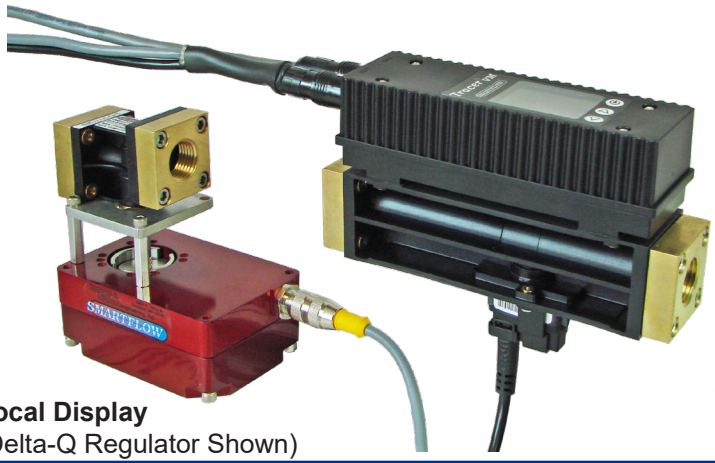
Separate Analog Outputs facilitate data collection of temperature and flow rates. The voltage outputs are user-selectable using on-screen menus: 0 to 3.5/4.1 Volts, 0 to 5 Volts or 0 to 10 Volts.

FCI (Fluid Characteristic Indicator) Technology 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.

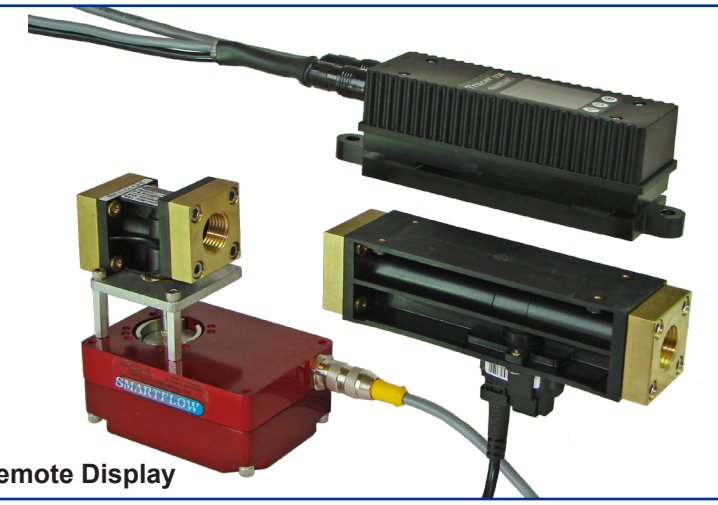
SPDT Switch is programmable for one to four set points: low flow, high flow, low temperature, high temperature or turbulent flow condition. Set points may be turned on or off in any combination to signify an alarm state. The switch may be connected to machine controls or a visual indicator such as a low voltage stack light.

Actuator Alarm notifies the user if the Tracer$_{VMA}$ with AutoReg is unable to maintain minimum required flow rate or Reynolds Number. The time interval is programmable.

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



Local Display
(Delta-Q Regulator Shown)



Remote Display

Totalizer Function provides volume display from a user-selected start point which is re-settable at any time. (Maximum value is approximately 42,949,000 liters or 11,338,000 gallons.)

24VDC, 1.5A Power Source with earth ground is required to supply the Tracer$_{VMA}$ AutoReg Flow Regulator.

Actuator may be rotated as a unit in relation to the regulator for ease of installation and accessibility.

Corrosion Resistant Materials are standard. 3/8" and 1/2" options include Delta-Q flow regulator. 3/4" and 1" flow regulator sizes are brass only.

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Design and specifications are subject to change without notice.

SMARTFLOW® Tracer®$_{VMA}$ Flowmeter with AutoReg™

Specification

Flow Ranges				
Body Size	Range (LPM)	Range (GPM)	Reynolds Number Deadband	Flow Rate Deadband
3/8" & 1/2"	1 to 15	.3 to 4	300	0.1LPM
3/8" & 1/2"	2 to 40	.5 to 10.6	300	0.1LPM
3/4" & 1"	5 to 100	1.3 to 26.4	1000	1.0LPM
1"	10 to 200	2.6 to 52.8	1000	2.0LPM

Flow Accuracy .....±1.5% of Full Scale
Temperature Range..... 0°C to 120°C (32°F to 248°F)
Temperature Accuracy .....±2°C
Operating Pressure ..... 10.3 bar max. (150 psi max.)

Power
Power Supply ..... 24 VDC (external)
Switch Rating 1A, 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
Flowmeter Insert.....PPA 40 GF

Flow Body
3/8" & 1/2" Body Size ..... Glass-Filled Nylon Flow Body with Brass or Nylon End Caps
3/4" & 1" Body Size .....Anodized Aluminum or Stainless Steel Flow Body

Flow Regulator
3/8" & 1/2" Delta-Q..... Brass or Glass-Filled Nylon End Caps
Glass-Filled Nylon
Stainless Steel Stem and Valve Seat
EPDM O-Rings
3/8" Brass.....Brass Body
Brass Stem and Valve Seat
EPDM O-Rings
3/4" & 1".....Brass Body
Brass Stem and Valve Seat
EPDM O-Rings

Applications

Tracer$_{VMA}$ with AutoReg Flow Regulator is designed to maintain steady flow rate where pressure fluctuations may adversely impact cooling water conditions. Upstream changes in cooling water pressure can cause unexpected increase or decrease in system pressure, changing the volume of flow. The Tracer$_{VMA}$ AutoReg compensates for these changes by adjusting the flow rate automatically according to user settings.

Menu selections on the User Interface allow input of a target Reynolds Number to maintain Turbulent Flow. The flow rate is automatically adjusted by the controller based on water temperature, flow rate, glycol content and the size of the flow path.

The Tracer$_{VMA}$ AutoReg is ideally suited for use in "lights out" injection molding or where cooling water conditions must be monitored for quality control and process validation.

Tracer$_{VMA}$ AutoReg Flow Regulator can be connected to data acquisition systems providing manufacturers real-time statistical process temperature and flow data.

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

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.

Tracer®VMA Flowmeter with AutoReg™

Model Number

VMA	3	-	B	-	15H	-	L	-	QA3	-	P1

Body Size

3/8"NPT	**3**
3/8"BSPP	**3B**
1/2"NPT	**4**
1/2"BSPP	**4B**
3/4"NPT	**6**
3/4"BSPP	**6B**
1"NPT	**8**
1"BSPP	**8B**

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 (3/4" and larger only)	**SS**

B or **N**	**B** or **N**
AL or **SS**	**AL** or **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**

15H	**15H**
40H	**40H**
100H	**100H**
200H	**200H**

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)

Flow Regulator with Actuator

(match to User Interface size)

QA3	3/8"NPT Delta-Q Precision Flow Regulator
QA3B	3/8"BSPP Delta-Q Precision Flow Regulator
QA4	1/2"NPT Delta-Q Precision Flow Regulator
QA4B	1/2"BSPP Delta-Q Precision Flow Regulator
FR3	3/8"NPT Brass Flow Regulator
FR3B	3/8"BSPP Brass Flow Regulator
FR6	3/4"NPT Brass Flow Regulator
FR6B	3/4"BSPP Brass Flow Regulator
FR8	1"NPT Brass Flow Regulator
FR8B	1"BSPP Brass Flow Regulator

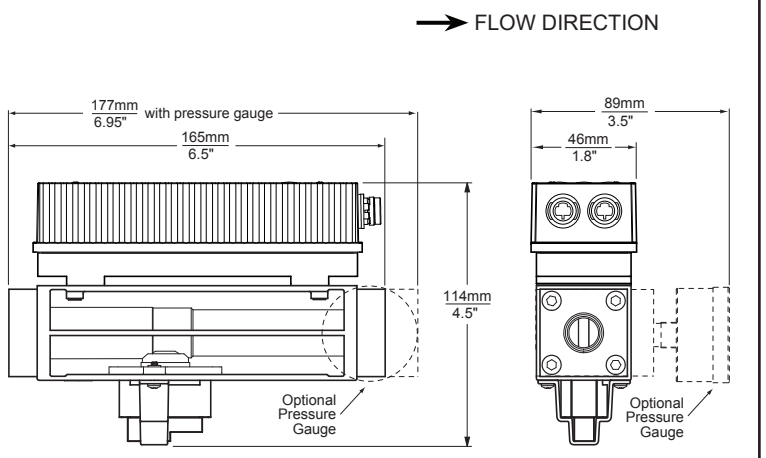
Optional Pressure Gauges

(Located on User Interface)

P1	30 psi Pressure Gauge
P2	60 psi Pressure Gauge
P3	100 psi Pressure Gauge
P4	160 psi Pressure Gauge

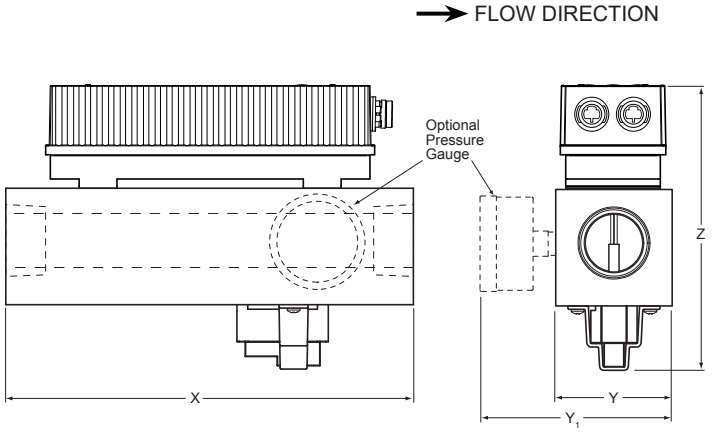
(Pressure gauges not available with AL body material)

3/8" or 1/2" User Interface & Flow Body



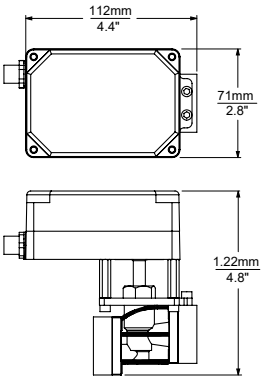
3/4" & 1" User Interface & Flow Body

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

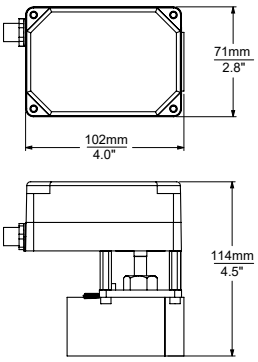


Dimensions (mm/inches)				
Body Size	**X**	**Y**	**Y_1**	**Z**
3/4", 5 to 100 LPM	178/7.0	45.7/1.8	77/3.1	117/4.6
1", 5 to 100 LPM	178/7.0	45.7/1.8	77/3.1	117/4.6
1", 10 to 200 LPM	178/7.0	51/2.0	84/3.3	122/4.8

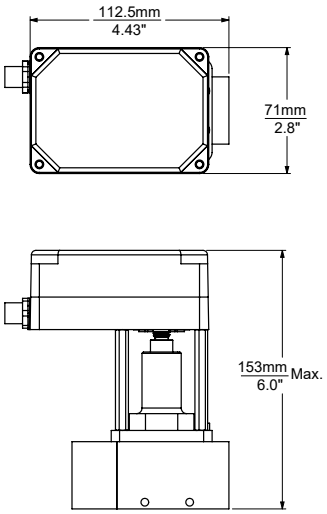
Regulator with Actuator (3/8" & 1/2" Delta-Q®)



Regulator with Actuator (3/8" Brass)



Regulator with Actuator (3/4" & 1" Brass)



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