

Tracer[®]_{VM} Bluetooth Interface

Model number VMBTI-102

Operating Instructions

General

The 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 Tracer_{VM} Bluetooth Interface wirelessly transmits flow and temperature for display on a tablet or smartphone. Files can be created using the free app and saved on USB flash drive connected to the Interface.

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

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.

App software is available for download at no cost from Google[™]Play or iTunes[™] stores and is required to view data. Search for “Tracervm” to locate.

PC Based software is provided free of charge from Burger & Brown Engineering, Inc. It is available for download at this web address: www.smartflow-usa.com/tracer-vm-bluetooth.htm.

Power

Attach the power cable to the P1 connector according to the chart below. Individual wires are 24AWG stranded copper. Attach 8 to 28VDC power to the unit for correct operation. Do not energize the circuit without Tracer_{VM} Base units connected.

Power supply other than 8 to 28VDC may damage the electronics! Ensure that power supply provides Earth Ground (0V) and not a reference. Earth Ground is required for reliable flow and temperature output display.

Power Cable Color Chart

Wire Color	Function
Black	DC Ground (Earth)
Red	+DC Input (8 to 28VDC)

Network Connection Requirement

When used with PC Software, the Tracer_{VM} Bluetooth Interface must be connected through a DHCP Client such as a wireless router or Local Area Network that will automatically assign an IP address. The Interface will not communicate if plugged directly into a computer.



Specifications

Operating Temp. Range..... 32 to 248°F (0 to 120°C)
 Housing..... ABS, NEMA4X
 Seals..... Buna
 Maximum Wireless Range 20 meters
 Bluetooth Version 1.1 4.0+LE 5
 Power Required..... 8 to 28VDC with Earth Ground
 Dry Contact Switch Rating 2A, 250VAC, 220VDC
 USB Port Output..... 5VDC
 Power Cable 2-Conductor, 6 meters (20ft) long
 Cord Grips 10 pieces liquid-tight (included)

EMI/RFI Interference

Care should be taken to route power and signal cable away from motors and pumps. Signal integrity may be adversely affected by close proximity of the wiring to machinery producing high frequency emissions.

Cables to Tracer_{VM}

Maximum effective signal cable length is 2.9m (10ft) as supplied. Splicing extra length to the cable is not recommended. Sensor cables are supplied with the Tracer_{VM} Base units.

Flow and Mounting Direction

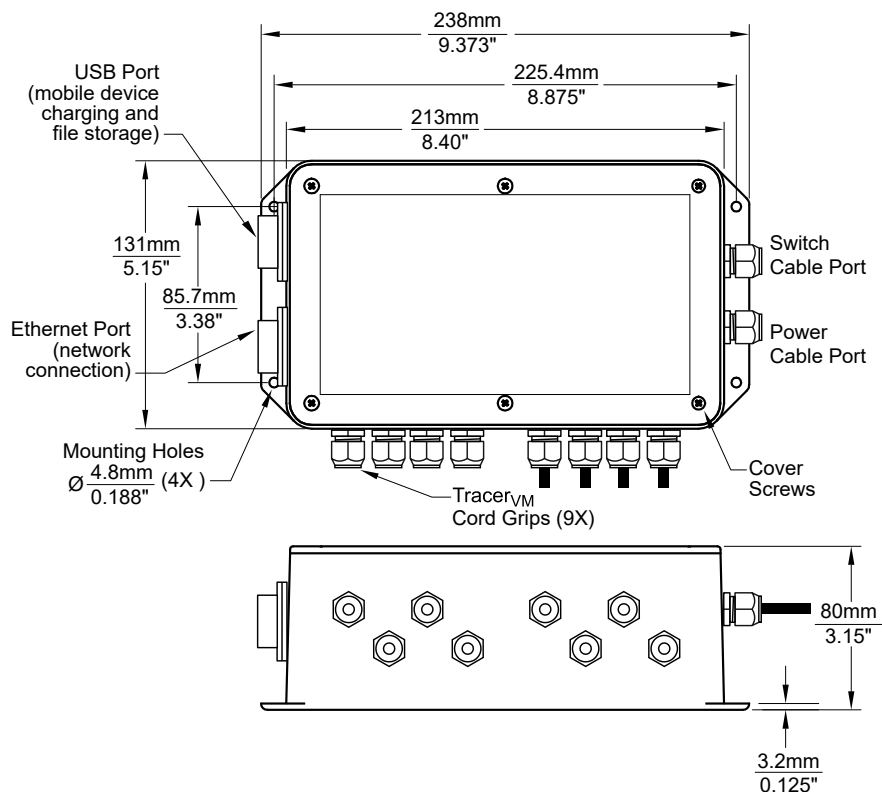
Orient the Tracer_{VM} Base units so the flow direction of the process fluid matches the directional arrow on the body of each meter. Flow in the opposite direction of the arrow will yield inaccurate voltage output. The presence of air bubbles in the process fluid will also create an inaccurate voltage output. Refer to Tracer_{VM} Base Instructions (Form 187) for details.



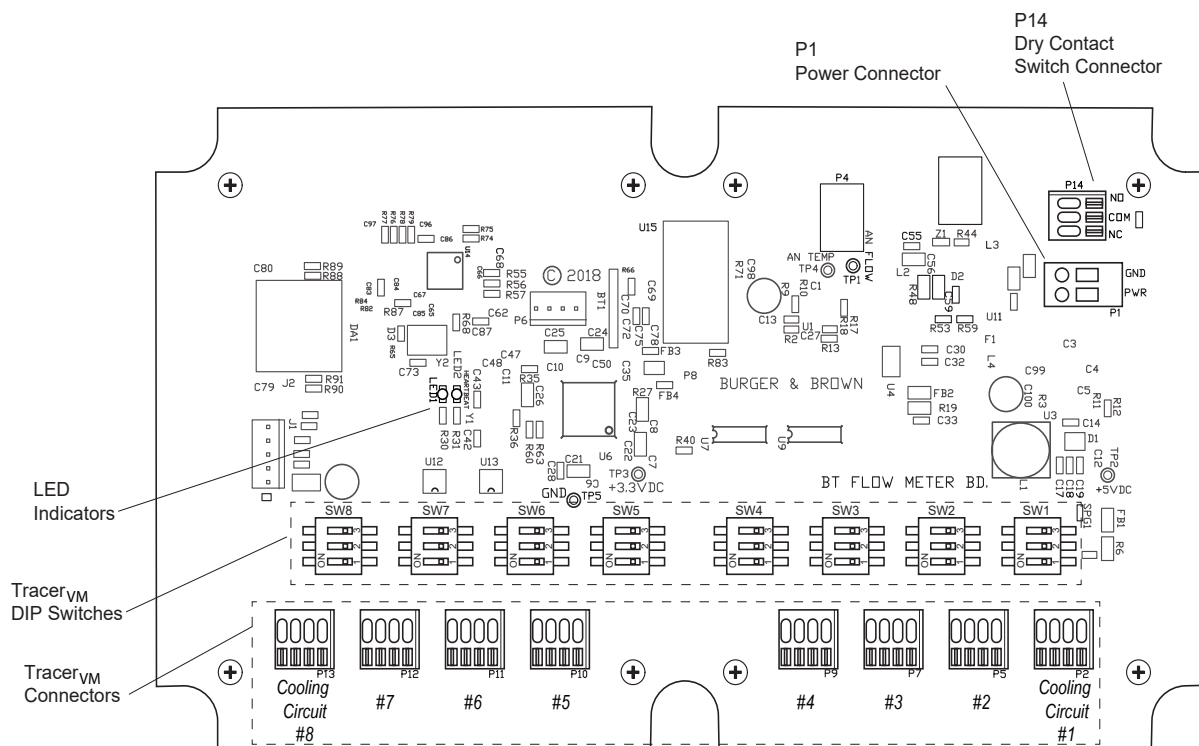
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burger & brown engineering, inc.

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Housing
Dimensions
Figure 1



Installation

Tracer_{VM} Bluetooth Interface must be wired to Tracer_{VM} Base units to transmit flow and temperature values from the process. Begin by installing Tracer_{VM} Base units into the flow path (see Form 187 for installation details) except for wire terminations.

Mount the Bluetooth Interface box in a dry location. Occasional water spray will not permeate the electronics housing if correct installation practices are used. See Figure 1 for mounting hole locations. Use #8 screws to mount the housing.

Remove 6 cover screws and the interface cover to expose the circuit board inside the box.

Connect Power Cable

Loosen the Power Cable nut on the side of the box. Insert the cable through the cord grip with approximately 8cm (3") of loose cable on the inside of the box. Tighten the cord grip nut on the outside of the box hand-tight. Locate P1 connector on the left side of the circuit board (See Figure 2). Hold down the small button on the top of the connector and insert the red and black wires of the power cord according to Figure 3: PWR = Red Wire, GND = Black Wire.

Connect Dry Contact Switch (optional)

Connect switch leads from external device for alarm state notification to Dry Contact Switch Connector on the circuit board. Loosen the Dry Contact nut on the side of the box. Insert the cable through the cord grip with approximately 8cm (3") of loose cable on the inside of the box. Tighten the cord grip nut on the outside of the box hand-tight. Locate P14 connector on the left side of the circuit board (See Figure 2). Strip and insert the wires (20 - 26 AWG) into the connector according to Figure 4: Normally Closed, Common, Normally Open.

Connect the Tracer_{VM} Base Units

Eight connectors on the circuit board accommodate external Tracer_{VM} Base units. Each Tracer_{VM} Base unit must be wired to a connector on the Bluetooth Interface circuit board. See chart at right for Cooling Circuit Number and Corresponding Connector Number. See also Figure 2 on page 2.

Prepare wire ends. Cut cylindrical connector end off of Tracer_{VM} Base cable if present. Cut away 25mm (1") of external cable jacket. Use caution not to damage wire insulation. Strip inside wire ends to expose approx. 6mm (1/4") of copper wire. Twist copper wire together so it will insert easily into the connectors on the circuit board.

Loosen the nut on a Tracer_{VM} cord grip in the top of the box. Insert the Tracer_{VM} Base cable through the cord grip with approximately 5 cm (2") of loose cable on the inside of the box. Tighten the cord grip nut on the outside of the box hand-tight. Locate the appropriate connector along the edge of the circuit board. Hold down the small button on the top of the connector and insert the color-coded wires of the cable according to Figure 5 (left to right: brown, white, yellow, green).

Ensure that any unused cord grips have a short length of unattached wire installed in them to maintain the liquid-resistant properties of the enclosure. Secure each cord grip hand-tight.

Set the Corresponding DIP Switches

Each connector is associated with a DIP (Dual In-Line Package) Switch below it. Flow range must be matched to the sensor on the Tracer_{VM} in order for values to be correctly displayed on the mobile app and PC. Set the switches according to the chart below. See Figure 6. Position 3 should always be set to "OFF".

DIP Switch Settings			
Flow Range	Pos. 1	Pos. 2	Pos. 3
1 - 15LPM	Off	Off	Future Use Do not adjust. Off
2 - 40LPM	On	Off	
5 - 100LPM	Off	On	
10 - 200LPM	On	On	

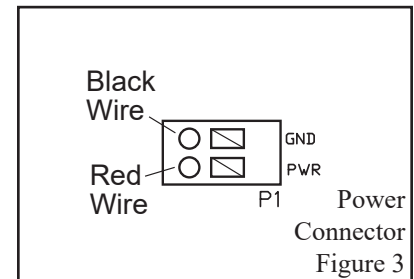


Figure 3

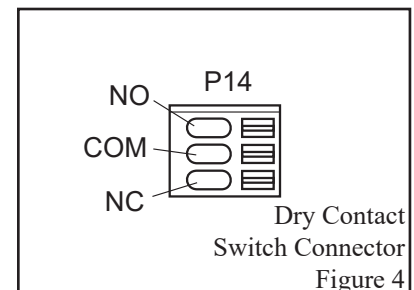
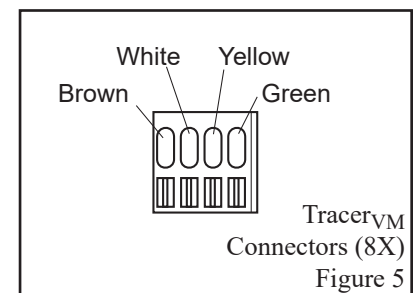
Dry Contact
Switch Connector
Figure 4

Figure 5

Cooling Circuit	Connector No.
1	P2
2	P5
3	P7
4	P9
5	P10
6	P11
7	P12
8	P13

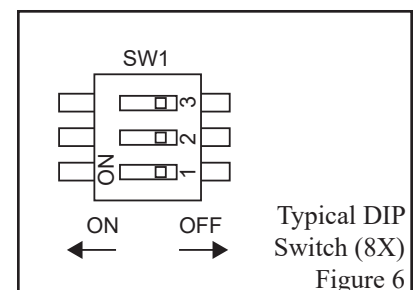


Figure 6

Tracer_{VM} Bluetooth Interface Operation

When unit is powered, green LED Indicator blinks.

If the red LED Indicator is on, check cable connections.

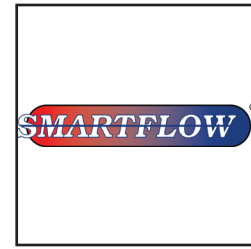
When green LED is blinking and all cables are connected, re-install cover, evenly torque 6 cover screws hand-tight. Do not over-tighten.

Download the Mobile App

From your mobile device, download the Tracer_{VM} Application from Google Play or iTunes stores. See Figure 7 for icon.

The application includes the following features:

- Toggle display in Metric or Standard Units by touching the applicable label.
- Rename Cooling Circuits and Bluetooth Interface Units if desired. Cooling Circuit and Bluetooth Interface names are saved on the local device only.
- Display temperature and flow rate from any Tracer_{VM} Bluetooth Interface device within 20 meters.
- Display all Tracer_{VM} Bluetooth Interface Units within 20 meters. Only one mobile device may be connected at one time to any Tracer_{VM} Bluetooth Interface Unit.



App Icon
Figure 7

App Operation

1. Power on the Tracer_{VM} Bluetooth Interface and start the Tracer_{VM} app on the mobile device.
2. Select the Interface to view from the list of available Interfaces. The app automatically searches for Bluetooth signals. If Interface devices are not listed:
 - Verify that other users are logged off
 - Bluetooth Interface is attached to appropriate power with earth ground
 - Mobile device is less than 20 meters from the Interface
3. The Interface and the cooling circuits are renamed by pressing and holding the name on the mobile screen. These names are specific to the mobile device and will display as defaults when using a different mobile device.
4. To begin a data logging session, go to the logging screen by selecting the USB icon in the upper right hand corner of the app.
5. Ensure that a USB flash drive is connected to the USB port on the Interface. See Figure 1.
6. Select the name box to enter a name for the file.
7. Set the frequency. This is the time in seconds between data points.
8. To start a manual session, select the "START USB LOGGING" button. To stop a manual session select "STOP USB LOGGING".
9. To start a scheduled session, first select the date, start time and duration. Then select "START USB LOGGING" button. The session will start and end automatically.

To exit the app, select the "back" function on your device until your home screen reappears.

Recommendations

- When more than one Tracer_{VM} Bluetooth Interface is in use, place a physical label on each housing and follow a consistent naming convention.
- When running more than one shift, consider using a single tablet instead of individual smartphones to monitor all circuits.
- Make sure there is enough storage space on the USB flash drive for your files before starting the logging session. Files generated are usually less than 1MB.

Data Logger Software

General Description

The Smartflow Data Logger collects and displays temperature and flow rate information from Tracer_{VM} Bluetooth Interface Modules. The information is saved to a .csv file that can be imported into a database or spreadsheet for future analysis or process reference. Medical molding applications or other critical molded parts that require process verification or traceability will benefit from this technology.

The Data Logger can collect from up to 10 Bluetooth Interfaces at once. Each Bluetooth Interface connects up to 8 flowmeters for a maximum of 80 cooling water lines. One .csv file is created for each Interface. Files are only comma delimited.

The software is provided as a .zip file. Extract the installation program and install onto a computer in the default location or select a folder according to your preference. Executable file name is "SmartFlow Data Logger.msi".

There are two viewing screens: "Home View" and "Session View".

Home View: Metric or English Units and Interface Modules are selected. A graph of the flow rate and temperature is available for each Interface. The user selects the area on the screen for each Interface from the list of those available.

Session View: Session options and file output are configured. Selectable options are:

- Manual or Scheduled Duration
- Session Name
- Sensor Names
- Log Rate in seconds
- Enable or Disable Alarms and Audible Indication
- Metric or English Units
- Graph View
- Output File Name (.csv)

Start the Smartflow Data Logger Application. Check that each Tracer_{VM} Bluetooth Interface is connected to **8 to 28 Volts DC power supply with earth ground** and connected to the local network.

1. Highlight the "Home View" box. Select your preferred units (English or Metric). *Changing units after a session is started will clear all data without saving.*
2. Select the name of a Tracer_{VM} Bluetooth Interface from the list at the top of the screen. Select the area of the home view screen for individual interface display. Once an interface is assigned to the home view, the name in the list will change from yellow to green. *Note: There are up to 10 possible graph locations on the "Home View" screen. The number of locations you can select is determined by the number of Interfaces connected to the local network. If one Interface is connected, there will only be one available graph location.*
3. To start a logging session, the Interface must be assigned in the "Home View" with visible graph (steps 1 & 2). Select the "Session View" box. Select the Interface from the list of available modules in the top window. Then select "New Tab".
4. Once a session has been started, you can start either a Manual Session or a Scheduled Session.
5. Once a session has been opened, the software begins recording data that can be saved by starting a "Manual Session". This rolling history is gathered for up to 72 hours without a session being actively recorded. This is available as long as a session is open and the program is running. Note: If units are changed on a session view, the rolling history will be cleared.
6. The session name, as well as the names of each sensor can be changed by clicking the Session/Sensor names button.
7. Log Rate is the rate at which data is collected in terms of seconds between data points. The value can be set from 1 second up to 3600 seconds (1 hour).
8. The session controls section allows you to turn alarms on/off as well as turn the graph on/off for individual sensors. The audible indication selection turns the audible alarm on/off. Units must be set to either English or Metric before a session is started. Once a session is started you will not be able to change units. The Graph View provides available time ranges (30 seconds through 8 hours or cumulative) for Real Time Graphs visible in the Session View.
9. Once alarms have been enabled they can be adjusted in the "Alarms" region. If an alarm is triggered, a pop up warning will display as well as an icon underneath any sensor with an active alarm. In addition, the session tab will turn red to indicate which Bluetooth Interface is experiencing an alarm. Alarm indicators are visible only during a logging session.
10. For a manual session, once the desired data has been recorded, select the end session button to save the data. For a scheduled session the data will save automatically. Once a session is started, data is recorded to a .csv file. This file is updated after every data point is recorded. *Do not open the file while the current session is in progress.* To close out of a session simply select the red "X" in the session setup area.

Troubleshooting

Display	Resolution
Flow and Temperature readings are 0.00	Check cable between sensor and Bluetooth Interface circuit is plugged in both places. Re-seat connections.
Flow and Temperature readings are erratic	Check flow sensor value matches the DIP Switch settings on the circuit board. See page 3.
	Check power supply for voltage between 8 & 28VDC with Earth Ground.
No display on app	Check for connection to power supply.
	Confirm distance of mobile device to Bluetooth Interface is less than 20 meters.
No Tracer _{VM} Bluetooth Interfaces are listed	Check for other users connected to the Interface. Only one mobile device will connect wirelessly at one time.

Limited Warranty

Seller warrants that this product supplied will conform to the description herein stated and that the product will be of standard quality. This is the sole warranty made by Seller with respect to this product. Seller expressly disclaims any other express or implied warranties, including, but not limited to, the implied warranty of merchantability and the implied warranty of fitness for a particular purpose. Seller shall not be liable for any cost or damages, whether direct, incidental or consequential, including, but not limited to, any injury, loss or damage resulting from the use of this product, regardless of whether any claim for such cost or damages is based on warranty, contract, negligence, tort or strict liability. The sole liability of Seller is limited to repairing or replacing this product. This warranty shall not apply to any products that have been repaired or altered by anyone other than Seller. The warranty shall not apply to any products subject to misuse due to common negligence or accident, nor to any products manufactured by Seller which are not installed or operated in accordance with the printed instructions of Seller or which have been operated beyond the rated capacity of the goods. Seller states that the product's useful safe life is 5 years. Actual life may vary widely depending on operating environment such as temperature, pressure, and chemical exposure. Users are cautioned to refer to instructions for operating limits and a partial list of incompatible chemicals.