

Smartflow® Quick Reference Product Finder and Training Notes

Produced By Invotec Solutions Limited (Master Distributor)

This training document contains the following information:

- ✓ **About Smartflow**
- ✓ **A summary of all available products**
- ✓ **Key Technical details for each product range**
- ✓ **Important notes for product selection**

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About Smartflow®

SMARTFLOW® is an international brand known for its proprietary products for the moulding industry, Smartflow products are produced by Burger & Brown Engineering.

Burger & Brown Engineering was formed in 1978 and are located in Grandview, Missouri USA and also offer special machines for industrial automation, precision contract micro machining, custom injection moulding, plastic part design and consulting.

Smartflow products comprises a line of multi-port manifolds for water and non-aggressive liquid applications, flowmeters for monitoring flow, temperature, and pressure, and limit switches for ejector plate, slide retention, and core pull applications.

Recent product introductions include cooling efficiency aids such as the Delta-Q® precision flow regulator, Tracer®vm electronic flowmeters, low flow indicators in addition to Scientific CoolingSM classes.

ManifoldBuilder.com was launched in 2013 to allow customers access to 3D CAD information on Smartflow manifolds and custom assemblies.

All Smartflow products are designed to help injection moulders save time and money through increased efficiency and moulded part quality.

The majority of Smartflow products are based on the SMED (Single-Minute Exchange of Dies) principle all our products ensure fast tool change times and mould flow control.

www.Manifoldbuilder.com

ManifoldBuilder.com was launched in 2013 to allow customers access to 3D CAD information on Smartflow manifolds and custom assemblies.

A website designed for distributors and customer where you can build assemblies, download pdf and CAD files and obtain build numbers for custom quotations.

Available in English, Spanish and German.

800-764-3518



Montaje A Medida De Caudalímetros A Partir De Componentes Estándares

¡Bienvenido al Nuevo ManifoldBuilder.com! Para mejorar la seguridad de su información personal, la plataforma CAD y el registro han sido actualizadas. Al descargar datos de CAD por primera vez, se le pedirá que cree una nueva cuenta de usuario. Póngase en contacto con jmckee@burgereng.com para obtener ayuda si es necesario.

Productos disponibles: 6

Número de parte	F3-A-Q	
Tamaño de la entrada	3/8 Inch NPT(F)	
Selección del tipo de regulador	con latón casquillos de extremo	
accesorios	Regulador Sólo	
L	67.82 (2.67)	mm (INCH)
H	38.1 (1.50)	mm (INCH)
W	38.1 (1.50)	mm (INCH)
A	96.5 (3.80)	mm (INCH)
B	-	mm (INCH)

Generar CAD
Generar hoja de datos PDF
Solicitud de cotización

3D
Dimensión





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Aluminium manifolds



Features

- Stock sizes are BSPP thread
- Inlet/Outlet sizes: 3/4", 1", 1-1/2" and 2"
- Port sizes: 1/4", 3/8", 1/2", 3/4" and 1"
- Manifolds are also produced with BSPT or NPT threads
- Manifolds can also be supplied with flat sealing surface to take flat seals such as Dowty washers.
- Ports can be in many positions along the sides and top of manifolds (not 2" manifolds as different profile only allows for top port locations.)
- Manifolds can be manufactured to any length and configuration subject to manufacturing limitations.
- Stock and standard manifolds are produced in Red and Blue but are also available in other colours such as Black, Gold, Green, Clear (a colour change surcharge will apply)
- **All manifolds we assemble with ball valves, flow meters, quick release fittings etc. are sealed with Loctite 565 – we never use tape.**
- Not all aluminium manifolds are the same, our base material is a high 6000 series specification with Military Specification Type II Class 2 anodization. Why does this matter? Galvanic Corrosion

Important notes

- See attached additional information: **galvanic_corrosion.pdf**
- All aluminium manifolds may at some point suffer from Galvanic corrosion normally due to dissimilar metals being used in cooling circuits or chemicals in the water supply. The better the coating, the better the life cycle of an aluminium manifold.
- Cheaper competitors – yes cheaper manifolds exist but generally they only offer a limited number of sizes and inferior levels of anodization, some even just paint manifolds for identification.
- Industry standards state BLUE is cool water OUT to the cooling circuit and Red is the warm water return FLOW IN.
- Any flow/pressure/temperature measuring device should be fitted on the return FLOW IN to the red return manifolds.

Key Specifications:

- Material: Aluminium (6000 Series)
- Max. Pressure: 150 psi (10 bar)
- Max. Temperature: 149°C)
- Anodizing: Military Specification Type II Class 2
- Standard Colours: Red, Blue
- Optional Colours: Black, Green, Gold, Clear

Duoflo® Aluminium manifolds



Features

The Duoflow design manifolds are robust extruded aluminium joined together by a stainless-steel centre plug which provides a shorter footprint specifically for mounting a manifold directly to an injection mould, or where space is limited.

Perfect for Faster Tool Change times, they significantly reduce setting times by mounting manifolds directly to moulds in storage. Water connection is simplified to "Supply" and "Return" lines versus individual water lines for every circuit.

No end plugs are required.

Popular sizes are available with faster delivery.

- Manifolds are produced with BSPP, BSPT or NPT threads
- Manifolds can also be supplied with flat sealing surfaced to take flat seals such as Dowty washers.
- Ports can be in many positions along the sides and top of manifolds (2" size not available.)
- Manifolds can be manufactured at any length and configuration subject to manufacturing limitations.
- Stock and standard manifolds are produced in Red and Blue but are also available in other colours such as Black, Gold, Green, Clear (a colour change surcharge will apply)
- **All manifolds we assemble with ball valves, flow meters, quick release fittings etc. are sealed with Loctite 565 – we never use tape.**
- Not all aluminium manifolds are the same, our base material is a high 6000 series specification with Military Specification Type II Class 2 anodization. Why does it matter? Galvanic Corrosion

Important notes

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- All aluminium manifolds may at some point suffer from Galvanic corrosion normally due to dissimilar metals being used in cooling circuits or chemicals in the water supply. The better the coating, the better the life cycle of an aluminium manifold.
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- Industry standards state BLUE is cool water OUT to the cooling circuit and Red is the warm water return FLOW IN.
- Any flow/pressure/temperature measuring device should be fitted on the return FLOW IN to the red return manifolds.

Key Specifications:

- Material: Aluminium (6000 Series)
- Max. Pressure: 150 psi (10 bar)
- Max. Temperature: 99°C
- Anodizing: Military Specification Type II Class 2
- Standard Colours: Red, Blue
- Optional Colours: Black, Green, Gold, Clear

304 Stainless Steel Manifolds



Features

- Requested for clean room and medical environments or for high-flow applications where chemical compatibility and corrosion-resistance are important.
- Smartflow 304 Stainless Steel manifolds are produced using 1-1/2" or 2" heavy gauge stainless steel.
- All bodies and ports are fully welded - they are heavy duty and built to last.
- All manifolds are 100% leaked tested before leaving the factory.
- Competitors sell cheap versions, some very cheap versions but in our experience, these are thin wall drawn tubing with folded and riveted port entrees. These can have a very short life span.
- Stock sizes are BSPP thread
- Inlet/Outlet sizes: 3/4", 1" and 1-1/2"
- Port sizes: 1/4", 3/8", 1/2" and 3/4"
- Manifolds are also produced with BSPT or NPT threads
- Ports can be in many positions along the sides and top of manifolds
- Manifolds can be manufactured at any length and configuration subject to manufacturing limitations.
- **Not all stainless-steel manifolds are the same, many are thin wall drawn tubing with folded and riveted port entrees. These can have a very short life span.**

Important notes

- Not effected by Galvanic corrosion.
- Any flow/pressure/temperature measuring device should be fitted on the return FLOW IN return manifolds.

Key Specifications:

- Material: 304 Stainless Steel
- Temperature Rating: up to 121°C
- Maximum Working Pressure Ratings: Liquid (oil, water, benign fluids): 250 psi

High Pressure/Temperature Stainless Steel Manifolds



Features

- Used in with high temperature pressurized water and hot oil applications.
- Available with high temperature pressurized water and hot oil flow meters and regulators.
- Available in body sizes 1" and 1-1/2"
- Fully welded with only one open inlet.
- **Rated to 450°F (232°C) at 450psi (31bar) or 600°F (315°C) at 100psi (6.9bar)**
- Manifolds are also produced with BSPP or NPT threads
- Ports can be in many positions along the sides and top of manifolds
- Manifolds can be manufactured at any length and configuration subject to manufacturing limitations.

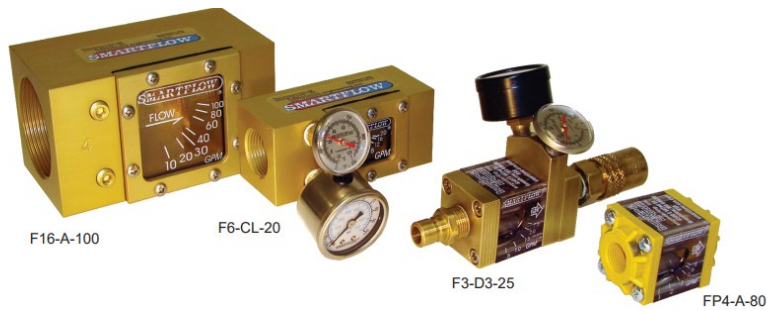
Important notes

Made to order only

Key Specifications

- Material: Stainless Steel
- Operating Limits: 232°C at 450psi (31bar)
- Operating Limits: 315°C at 100psi (6.9bar)

Mechanical Flow Meters



Features

Smartflow offer a range of flow meters to measure flows from 2-375 lpm

Also available in US Gallons GPM – 1.5-150 GPM

Threads sizes are offered in BSP and NPT

Thread connections range from 1/4", 3/8", 1/2", 3/4", 1", 1-1/2", 2" and 3" (3" only in NPT Threads)

Construction includes Nylon (with reinforced stainless-steel threads), Brass and Anodized Aluminium
- all viewing windows are Polysulfone.

All flow meters can be supplied with optional temperature gauges and pressure gauges (Liquid and standard)

Galvanic corrosion may occur in anodized aluminium components when installed in electrical connection with more noble metals such as copper. Use appropriate installation practices.

Key Specification

- Flow Accuracy: $\pm 10\%$ full scale
- Operating Temperature max: 99°C
- Operating Pressure max: 100 psi (6.9 bar)
- Optional Thermometer: -20° to 120°C $\pm 2\%$ accuracy (full scale)
- Optional Pressure Gauge: $\pm 3\%$ accuracy (full scale)

The IceCube™ Flow meter



Features

Why is it called the IceCube™ flow meter? Because it looks like an ice cube.

This is the most popular size because:

- They are designed to fit our manifolds on ports spacing of 3/8" threads and over
- They can be mounted to our Delta-Q precision control valves
- They work with simple ball valve set-up
- They can be fitted in-line with existing hoses

Nylon body sizes

- Nylon body flow rates are 10 lpm, 20 lpm and 30 lpm
- Thread connections are 1/4", 3/8" and 1/2"

Brass body sizes

- Brass body flow rates are 10 lpm, 20 lpm and 30 lpm
- Thread connections are 1/4", 3/8", 1/2" and 3/4"

Important notes

- All flow meters should be mounted vertically to ensure a full chamber of water for accurate readings.
- When stepping up or down a pipe size you should fit a new pipe to the inlet and outlet of the flow meter 5 x the diameter of the flow meter thread size.
- For example: You want to attach a 1" flow meter to read the water flow in a 3/4" pipe. You would first fit an extension pipe of 1" x 5 = 5" (125mm) to the inlet and outlet of the flow meter. This is to ensure you are not disturbing the water flow into the flow meter.
- Flow meters should always be fitted to the return manifold, FLOW IN.

Key Specification

- Flow Accuracy: $\pm 10\%$ full scale
- Operating Temperature max: 99°C
- Operating Pressure max: 100 psi (6.9 bar)
- Optional Thermometer: -20° to 120°C $\pm 2\%$ accuracy (full scale)
- Optional Pressure Gauge: $\pm 3\%$ accuracy (full scale)

Medium and Large Body Flow Meters



Image shows: Flowmeter With Temperature & Pressure Gauge



Image shows: Flowmeter With Temperature & Liquid Filled Pressure Gauge

- Smartflow Medium and Large Body Flow Meters offer a range of flow meters to measure flows from 75-375 lpm
- Also available in US Gallons GPM – 20-150 GPM
- Threads sizes are offered in BSP and NPT
- Thread connections range from 3/4", 1", 1-1/2", 2" and 3" (3" only in NPT Threads)
- Construction: Anodized Aluminium, all viewing windows are Polysulfone.
- All flow meters have optional temperature gauges and pressure gauges (Liquid and standard)
- They work with simple ball valve set-up
- They can be fitted in-line with existing pipework

Galvanic corrosion may occur in anodized aluminium components when installed in electrical connection with more noble metals such as copper. Use appropriate installation practices.

Important notes

- All flow meters should be mounted vertically to ensure a full chamber of water for accurate readings.
- When stepping up or down a pipe size you should fit a new pipe to the inlet and outlet of the flow meter 5 x the diameter of the flow meter thread size.
- For example: You want to attach a 1" flow meter to read the water flow in a 3/4" pipe. You would first fit an extension pipe of 1" x 5 = 5" (125mm) to the inlet and outlet of the flow meter. This is to ensure you are not disturbing the water flow into the flow meter.
- Flow meters should always be fitted to the return manifold, FLOW IN.

Key Specification

- Flow Accuracy: $\pm 10\%$ full scale
- Operating Temperature max: 99°C
- Operating Pressure max: 100 psi (6.9 bar)
- Optional Thermometer: 0 to 250°F (-20° to 120°C) $\pm 2\%$ accuracy (full scale)
- Optional Pressure Gauge: $\pm 3\%$ accuracy (full scale)

High Pressurized Hot WATER Flowmeter – 204°C



Designed specifically for high temperature pressurized water circulating loops.

The Hot Water Flowmeter is a durable, vane-operated device that provide visual indication of flow rate in gallons or litres per minute.

The indicator ball is separated from the process by a high-pressure silicone gasket and stainless-steel plate. High temperature glass retains the indicator ball.

- 1/2" BSP or NPT Threads
- Temperature max: 204°C
- Pressure max: 250 psi (17.2 bar)
- Flow Rate: 5-22Lpm
- Stainless Steel Body
- Indicator ball is separated from the process
- Optional Temperature Gauge provides added function.

Important notes

- All flow meters should be mounted vertically to ensure a full chamber of water for accurate readings.
- When stepping up or down a pipe size you should fit a new pipe to the inlet and outlet of the flow meter 5 x the diameter of the flow meter thread size.
- For example: You want to attach a 1" flow meter to read the water flow in a 3/4" pipe. You would first fit an extension pipe of 1" x 5 = 5" (125mm) to the inlet and outlet if the flow meter. This is to ensure you are not disturbing the water flow into the flow meter.
- Flow meters should always be fitted to the return manifold/process, FLOW IN.

Key Specification

- Threaded Connections: 1/2"NPT or BSPP
- Operating Temperature max: 204°C
- Operating Pressure max: 250 psi (17.2 bar)
- Flow Range: 2-6 gpm or 5-22 lpm
- Flow Accuracy: ±10%

High Pressurized Hot OIL Flowmeter – 288°C



Designed specifically for high temperature oil circulating loops.

The Hot Oil Flowmeter is a durable, vane-operated device that provide visual indication of flow rate in gallons or litres per minute.

The indicator ball is separated from the process by a high-pressure gasket and stainless-steel plate.

High temperature glass retains the indicator ball.

- 1/2" BSP or NPT Threads
- Temperature max: 288°C
- Pressure max: 150 psi (10.3 bar)
- Flow Rate: 5-22Lpm
- Stainless Steel Body
- Indicator ball is separated from the process
- Optional Temperature Gauge provides added function.

Important notes

- All flow meters should be mounted vertically to ensure a full chamber of water for accurate readings.
- When stepping up or down a pipe size you should fit a new pipe to the inlet and outlet of the flow meter 5 x the diameter of the flow meter thread size.
- For example: You want to attach a 1" flow meter to read the water flow in a 3/4" pipe. You would first fit an extension pipe of 1" x 5 = 5" (125mm) to the inlet and outlet if the flow meter. This is to ensure you are not disturbing the water flow into the flow meter.
- Flow meters should always be fitted to the return manifold/process, FLOW IN.

Key Specification

- Threaded Connections: 1/2"NPT or BSPP
- Operating Temperature max: 288°C
- Operating Pressure max: 150 psi (10.3 bar)
- Flow Range: 2-6 gpm or 5-22 lpm

Hot Oil Flowmeters – 150 Lpm – 288°C



Designed specifically for high temperature circulating loops,

The Hot Oil Flowmeter is a durable, vane-operated device that provide visual indication of flow rate in gallons or litres per minute.

The indicator ball is separated from the process by a high-pressure silicone gasket and stainless-steel plate. High temperature glass retains the indicator ball.

- **1" NPT Threads ONLY**
- Temperature max: 288°C
- Pressure max: 150 psi (10.3 bar)
- Flow Rate: 20-150Lpm or 5-40 GPM
- Carbon steel body (black oxide finish)
- Indicator ball is separated from the process
- Optional Temperature Gauge provides added function.

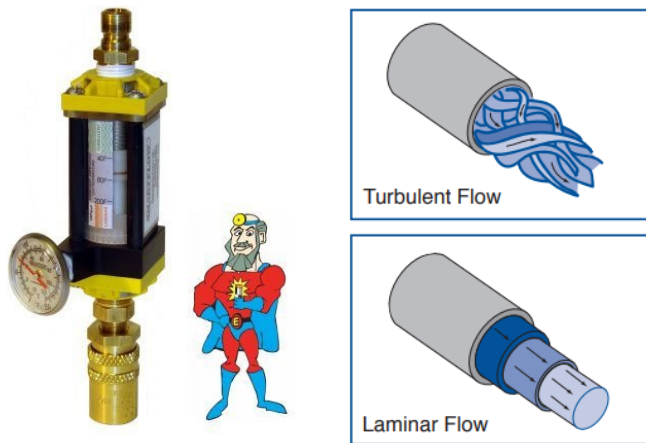
Important notes

- All flow meters should be mounted vertically to ensure a full chamber of water for accurate readings.
- When stepping up or down a pipe size you should fit a new pipe to the inlet and outlet of the flow meter 5 x the diameter of the flow meter thread size.
- For example: You want to attach a 1" flow meter to read the water flow in a 3/4" pipe. You would first fit an extension pipe of 1" x 5 = 5" (125mm) to the inlet and outlet if the flow meter. This is to ensure you are not disturbing the water flow into the flow meter.
- Flow meters should always be fitted to the return manifold/process, FLOW IN.

Key Specification

- Threaded Connections: 1"NPT
- Operating Temperature max: 288°C
- Operating Pressure max: 150 psi (10.3 bar)
- Flow Range: 5-40 gpm or 20-150 lpm
- Flow Accuracy: ±10%

Dr. Eddy® Turbulent Flow Indicators



Turbulent Flow - **Why is it important?**

In simple terms our turbulent flow meters including Dr. Eddy® Turbulent Flow Indicators using Fluid Characteristic Indication (FCI) technology displays the condition of the water as it relates to cooling efficiency: laminar flow, transitional flow, or turbulent flow.

In any cooling circuit at the point the water is 'turbulent' then water is touching all available surfaces of the cooling circuit and absorbing as much energy (heat) as it is possible, therefore any further increase in flow is wasted water and energy costs.

- Dr. Eddy applies the science of heat transfer, diagnosing the condition of cooling water lines at a glance.
- Cooling water capacity can be conserved plant-wide by using the minimum amount of flow that will produce turbulence on all presses.
- It may be possible to delay costly water system upgrades by optimizing the flow effectivity.
- Water viscosity effects turbulent flow calculations therefore optional measuring scales are available to include 10% Glycol
- Dr. Eddy has four scales built into the meter: three scales for FCI and one scale for flow rate. FCI Scales are selectable and correspond to cooling line inside diameter: 1/4", 3/8", or 1/2".
- **Example: Using a 6mm channel with cooling water at 4°C, typically you only need 3.3 lpm to achieve turbulent flow.** Please see the Turbulent_Flow_Chart_web.pdf attached.

Nylon body sizes

- Nylon body flow rates are 1-8 lpm or 0.25-2 GPM
- Thread connections are 1/4" and 3/8"

Brass body sizes

- Brass body flow rates are 1-8 lpm or 0.25-2 GPM
- Thread connections are 1/4" and 3/8"

Some Turbulent Flow Facts

- Flow is likely to be turbulent for Reynolds numbers above 4000.
- Reynolds Number (Re) is a dimensionless quantity used to predict fluid flow patterns.
- $Re = (\text{Velocity} \times \text{Diameter}) \div \text{Kinematic Viscosity}$
- Kinematic Viscosity of water at 20°C (68°F) = 1cSt.
- Geometry and roughness inside flow passages will affect Turbulent Flow.

Key Specification

- Flow Accuracy: $\pm 10\%$ full scale
- Operating Temperature max: 99°C
- Operating Pressure max: 100 psi (6.9 bar)
- Optional Thermometer: -20° to 120°C $\pm 2\%$ accuracy (full scale)

**Reasonable Flow Rates of 60°F (15°C)
Water through Schedule 40 Pipe**

Pipe Size (nominal)	Flow Rate	
	Gallons per Minute	Liters per Minute
1/4"	3	11
3/8"	6	23
1/2"	10	38
3/4"	15	57
1"	25	95
1-1/4"	45	171
1-1/2"	60	228
2"	100	380
3"	230	870

This information is provided solely as a service to our customers, and in no way infers any liability on the part of Burger & Brown Engineering, Inc., its representatives, or distributors.



Turbulent Flow Rates



Turbulent Flow Reference Chart

Approximate Minimum Flow required for turbulence in drilled water passages based on Reynolds Number of 4000

Passage Diameter	Nominal Pipe Size	Minimum Flow in GPM by Temperature		
		40°F	120°F	200°F
.44"	1/4"	0.88	0.31	0.18
.59"	3/8"	1.16	0.42	0.24
.72"	1/2"	1.41	0.51	0.29

Passage Diameter	Nominal Pipe Size	Minimum Flow in LPM by Temperature		
		4°C	49°C	93°C
11mm	1/4"	3.3	1.2	0.7
15mm	3/8"	4.4	1.6	0.9
18mm	1/2"	5.3	1.9	1.1

Try the on-line calculator

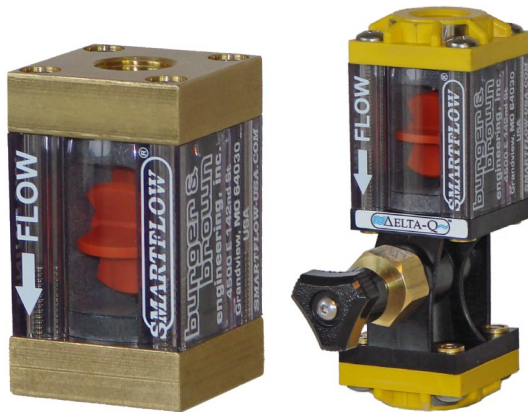
www.smartflow-usa.com/turbulent-flow-rate-calculator

**burrer &
brown**
engineering, inc.

4500 E 142nd Street
Grandview, MO 64030 USA
tel: 800-764-3518
www.smartflow-usa.com

Flow Indicators

Low Flow Indicators



Smartflow **Low Flow Indicator** is an in-line device using a high visibility impeller to show water movement inside a cooling line with flow between 0.3 and 4 Litres per Minute.

Low Flow Indicators are ideal for use in **critical injection mould cooling circuits** using bubblers or baffles where flow is restricted, and effective cooling is essential.

They measure 0.3 to 4 lpm (0.08 to 1 GPM) for critical cooling circuits

- The Design based on our most popular IceCube™ flow meter
- They are designed to fit our manifolds on ports spacing of 3/8" threads and over
- They can be mounted to our Delta-Q precision control valves
- They work with simple ball valve set-up
- They can be fitted in-line with existing hoses
- Available with optional temperature and pressure gauges.

Nylon body sizes

- Thread connections are 1/4", 3/8" and 1/2" BSPP (or NPT)

Brass body sizes

- Thread connections are 1/4", 3/8" and 1/2" BSPP or (NPT)

Important notes

- All flow meters should be mounted vertically to ensure a full chamber of water for accurate readings.
- When stepping up or down a pipe size you should fit a new pipe to the inlet and outlet of the flow meter 5 x the diameter of the flow meter thread size.
- For example: You want to attach a 1" flow meter to read the water flow in a 3/4" pipe. You would first fit an extension pipe of 1" x 5 = 5" (125mm) to the inlet and outlet of the flow meter. This is to ensure you are not disturbing the water flow into the flow meter.
- Flow meters should always be fitted to the return manifold, FLOW IN.

Key Specification

- Flow Range: 0.3 to 4 lpm (0.08 to 1 GPM)
- Operating Temperature max: 99°C
- Operating Pressure max: 100 psi (6.9 bar)
- Optional Thermometer: -20° to 120°C $\pm 2\%$ accuracy (full scale)
- Optional Pressure Gauge: $\pm 3\%$ accuracy (full scale)

High Temperature Low Flow Indicator



Smartflow High Temperature Flow Indicators are designed to show the presence of flow in very low flow applications.

- This high temperature indicator comprises high-visibility impeller and robust flow body designed for industrial applications.
- High Temperature, Low Flow Indicators are ideal for use in critical cooling circuits such as bubblers or baffles where flow is restricted, and effective cooling is essential.
- Designed for use in low flow applications 0.3 - 4 LPM
- Bi-Directional - flow indicator works with flow from either direction. (Observe one-way flow direction when using optional flow regulators.)
- 17.2bar pressure rating satisfies most pressurized water system requirements.
- 204°C temperature rating allows installation into difficult mould cooling applications.

Important notes

- **We recommend using only extremely clean cooling water through the attached channels to reduce the build-up of deposits that build up easily in high temperature applications.**
- Scale deposits can coat the inside of cooling water channels effectively creating barrier insulation in water lines preventing efficient heat transfer.
- All flow meters should be mounted vertically to ensure a full chamber of water for accurate readings.
- When stepping up or down a pipe size you should fit a new pipe to the inlet and outlet of the flow meter 5 x the diameter of the flow meter thread size.
- For example: You want to attach a 1" flow meter to read the water flow in a 3/4" pipe. You would first fit an extension pipe of 1" x 5" (125mm) to the inlet and outlet of the flow meter. This is to ensure you are not disturbing the water flow into the flow meter.

Key Specification

- Threaded Connections: 3/8"BSPP or NPT
- Operating Temperature max: 204°C
- Operating Pressure max: 17.2bar (250psi)
- Flow Range: 0.3 - 4 LPM (0.08 to 1 GPM)

Flow Regulators

Smartflow Delta-Q® Precision Flow Regulator



Delta-Q Body with Brass End Caps



Delta-Q Body with Nylon End Caps



Delta-Q Body with Nylon End Caps & Pressure Gauge

Unlike offering standard ball valves the Smartflow Delta-Q flow regulators allows the customer to create repeatable and balanced Processes

- They are a durable and economical precision flow regulator allowing full adjustability of flow volume from an unrestricted flow to complete shut off using the manual flow control knob.
- The modular design allows users to customize models meeting Scientific Cooling requirements for each application.
- The Delta-Q is available with Brass or Nylon end caps
- Available thread sizes include: 1/4", 3/8" and 1/2" BSP or NPT

They are designed to fit on any Smartflow manifold with 3/8" port spacing and over and can be used with other Smartflow products such as:

20 Lpm



Delta-Q Body with Brass Flowmeter & Temp. Gauge.



Delta-Q Body with Dr. Eddy & Nylon End Caps
(Brass End Caps Available)



- IceCube™ Flowmeters
- Temperature and Pressure Gauges
- Dr. Eddy® Flowmeter/Turbulent Flow Indicators
- Tracer® Electronic Flowmeters
- Cooling Water Manifolds

Key Specifications

- Operating Temperature max.: 99°C
- Operating Pressure max: 100 psi (6.9 bar)
- Optional - Dial Thermometer: -20° to 120°C ±2% accuracy (full scale)
- Optional - Pressure Gauge: 0 to 100 psi (0 to 700 Kpa) ±3% accuracy (full scale)

Brass Flow Regulators



Smartflow® flow regulators provide a unique, leak-free, single point manual flow control.

- This regulator incorporates the proven mechanical flowmeter and integral needle valve in a compact design.
- Very few moving parts improve reliability and leak-free operation.
- Used singly or in combination with a water manifold, the flow regulator allows manual control of individual cooling water lines.

Features

- Inlet thread sizes: 1/4", 3/8" and 1/2" BSP or NPT
- Outlet thread size: 3/8" Only
- Compact size works well in restricted-space locations.
- Rugged construction gives years of dependable service.
- 99°C (210°F) Temperature Rating allows installation into a wide range of applications.
- Optional Temperature Gauge displays additional process information.
- No Mounting Restrictions ease installation in any position without extra brackets or hardware.

Key Specifications

- Operating Temperature max.: 99°C
- Operating Pressure max: 100 psi (6.9 bar)
- Optional - Dial Thermometer: -20° to 120°C ±2% accuracy (full scale)

Smartflow 3/4" Brass flow regulators NPT ONLY



Optional: 30lpm flow window
*0-10lpm shown

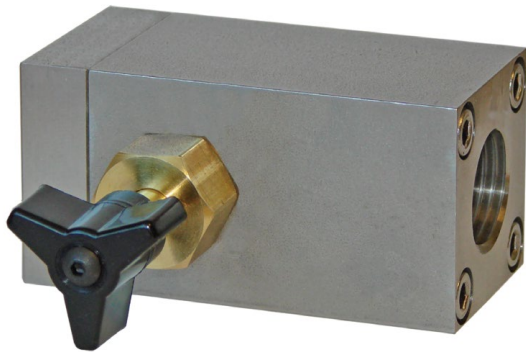
The large size of this Smartflow 3/4" Brass flow regulator is unique in the industry for precise control of 3/4" cooling water lines.

- The flow regulator can be used in combination with an IceCube™ 3/4" mechanical flow meter (NPT ONLY) to add flow, temperature or pressure indication.
- Mounting Brackets are included for mechanical support.
- Brass body, valve stem and seat with EPDM O-rings are compatible with most process liquids.

Key Specifications

- Thread Size: 3/4"NPT(F)
- Operating Temperature max: 115°C
- Operating Pressure max: 150 psi (10.3 bar)

High temperature Flow Regulator 204°C



Smartflow High Temperature Flow Regulator is a manual needle valve specifically designed for high temperature cooling applications.

- Maximum pressure rating of 17.2bar (250psi) allows installation into many different cooling applications.
- Fine manual control regulates the flow opening from wide open to fully closed.
- Flow body is comprised of corrosion-resistant stainless steel and brass components in addition to high temperature O-ring seals.

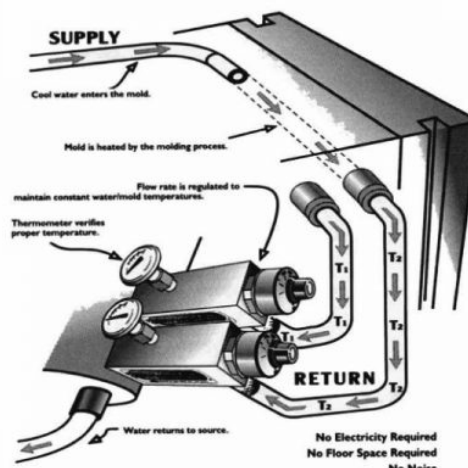
Important notes

- **We recommend using only extremely clean cooling water through the attached channels to reduce the build-up of deposits that build up easily in high temperature applications.**
- **Caution! Always use pipe thread sealant that is rated for use in high temperature applications when joining these components. We recommend Loctite #567 or equivalent.**
- Scale deposits can coat the inside of cooling water channels effectively creating barrier insulation in water lines preventing efficient heat transfer.
- When stepping up or down a pipe size you should fit a new pipe to the inlet and outlet of the flow meter 5 x the diameter of the flow meter thread size.
- For example: You want to attach a 1" flow meter to read the water flow in a 3/4" pipe. You would first fit an extension pipe of 1" x 5 = 5" (125mm) to the inlet and outlet if the flow meter. This is to ensure you are not disturbing the water flow into the flow meter.

Key Specifications

- Thread Size: 1/2"BSPP or NPT(F)
- Operating Temperature max: 204°C
- Operating Pressure max: 250 psi (17.2 bar)

Smartflow Mould Temperature Regulator



The Smartflow Mould Temperature Regulator effectively controls mould cooling water temperature between 27°C and 49°C to maintain a steady mould temperature.

- Traditionally, high turbulent flow rates are used in cooling water loops to achieve acceptable heat transfer rates from the mould. High turbulent flow rates are irrelevant when using the Smartflow Mould Temperature Regulator.
- Designed to control the temperature of a critical zone of a mould tool.
- The unit is also unaffected by supply cooling water pressure and temperature. For example, it automatically compensates for temperature changes of cooling tower water between night and day.

Features

- Multiple zone control – using several regulators or an optional inlet manifold facilitates effective zone control
- Unaffected by pressure changes – the Mould Temperature Regulator uses the thermal expansion principle for operation
- Handles tower water temperature changes – modulates flow to control cooling water temperature
- In-Line mounting – installs easily without additional hardware
- Cost of ownership – typically 1/6 the cost of a conventional electric mould heater
- Maintenance free – few internal parts for trouble-free operation
- Energy saving – it uses no electricity, conserving precious energy costs
- Small size – cleans up shop floor clutter: no hoses or power cords to trip over
- Integral dial thermometer – verifies Set Point temperature
- Optional inlet manifold – provides temperature control for multiple zones with one regulator

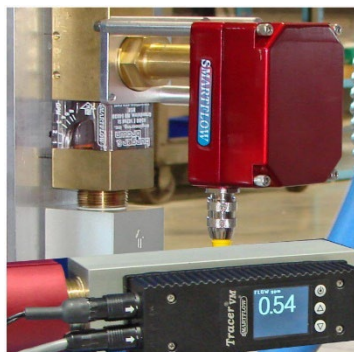
Key Specifications**Regulator**

- Cooling water set point range: 27° to 49°C
- Accuracy: $\pm 1^{\circ}\text{F}$ Full Scale
- Flow capacity: 19 to 95 lpm per hour

Dial Thermometer

- Range: -18 to 121°C
- Accuracy: $\pm 1^{\circ}\text{F}$ Mid-Scale $\pm 2^{\circ}\text{F}$ Full Scale

Smartflow TRACER® VMA with AutoReg Flow Regulator



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 moulding 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.
- TracerVMA with Automatic 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 TracerVMA with Automatic Flow Regulation compensates for these changes by adjusting the flow rate automatically according to user settings.

Features

- Automatic Flow Regulator
- Set by Flow or Reynolds Number
- Unaffected by Changes in Water Pressure
- Local or Remote Interface
- Alarm Outputs

Key Specifications

- Flow Accuracy: $\pm 1.5\%$ of Full Scale
- Temperature Range: 0°C to 120°C
- Temperature Accuracy: $\pm 2^\circ\text{C}$
- 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

Digital Flow Meters



Features

Why use Smartflow digital flow meters?

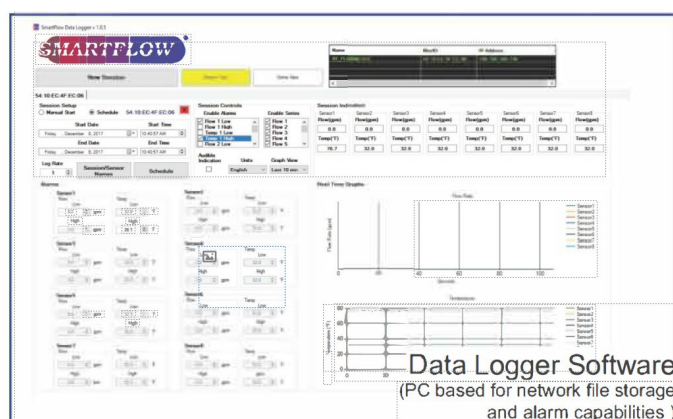
Like most Smartflow products our flow meters allow you to build a modular solution.


There are some competitor systems such as Huracan, Mouldflo, Flowesense , but all these are compact usually offering only one port size, they have limited flow meter positions and you must buy a complete system or nothing.

The Smartflow solutions allows you to choose the level of integration and offers the following possibilities:

- Smartflow digital flow meters offer a large range of connections size: 3/8", 1/2", 3/4", 1", 1-1/2" and 2" (model dependent) Note* Legacy Flow Meters are only available with 3/8" and 2" connections, 2" connections are not yet available for VM flow meters.
- Construction can be a moulded body, aluminium body, or stainless-steel body (model dependent)
- Flow rates range from 1 – 418 lpm
- The ability to have flow meters on all ports or maybe just on one or two critical circuits.
- The ability to have different size flow meters on the same manifold if fitted to our bespoke manifolds.
- The customer may want to just monitor the main inlet or outlets of manifolds system as an early warning of changes in flow.
- We offer just the VM base units which are much more economical where many circuits are been monitored, the base units will give the customer an analogue signal our for temperature and flow, the customer can then use these signals with their own monitoring equipment or connect to our Bluetooth and LAN network solutions.
- The VM flowmeters can have built in display/control on the flow meter body or a remote display to locate to another part of the machine - all models will also output analogue signals for external applications.
- Smartflow offer a free desktop software package for circuit monitoring and data logging.


- All digital flowmeters display turbulent flow and have settings for glycol percentages.
- VM models also have totalizer functions.
- All have local alarm display and passive contact for external alarm switch (audible or light warnings)
- Legacy DD models have impeller flow monitoring with smaller 3/8" models extremely popular with machine setter and maintenance personal.
- All new VM models use Vortex sensor technology for flow measurement meaning greater accuracy, longer life due to No Moving Parts.






Body Only

+



Customers System

+

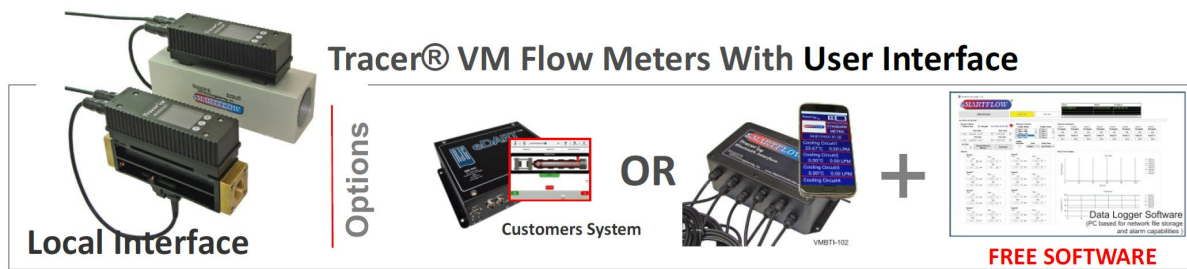


FREE SOFTWARE

Tracer VM – Body Only- No Display

Cost effective solution for customers to use the analogue outputs for flow and temperature to connect to their own factory monitoring system such as RGJ, Mattec etc. or connect to our Bluetooth interface for use with a mobile phone and connect to our FREE PC software with a LAN connection.

- Analogue Outputs for Flow and Temperature
- Option: Connect to Bluetooth Interface + FREE PC Software
- Option: Connect to customers own factory monitoring system



Tracer® VM Flow Meters With User Interface

Options

Local Interface

Customers System

OR

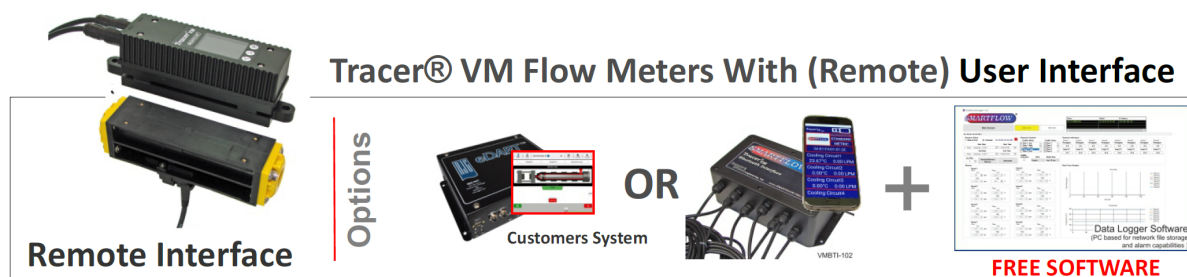
VMBT-102

FREE SOFTWARE

Tracer VM with Local User Interface.

With local colour screen or use the analogue outputs for flow and temperature to connect to their own factory monitoring system such as RGJ, Mattec etc. or connect to our Bluetooth interface for use with a mobile phone and connect to our FREE PC software with a LAN connection.

- Local Temperature and Flow Display
- Local high and Low Alarms
- Passive built in contact (for alarms etc.)
- Turbulent Flow Indication
- Glycol/Antifreeze adjustments
- Totalizer Function
- Can be charged for use away from the machine.
- Option: Connect to Bluetooth Interface + FREE PC Software
- Option: Connect to customers own factory monitoring system



Tracer® VM Flow Meters With (Remote) User Interface

Options

Remote Interface

Customers System

OR

VMBT-102

FREE SOFTWARE

Tracer VM with Remote User Interface.


With a remote colour screen (supplied with 2.9m Cable) or use the analogue outputs for flow and temperature to connect to their own factory monitoring system such as RGJ, Mattec etc. or connect to our Bluetooth interface for use with a mobile phone and connect to our FREE PC software with a LAN connection.

- Remote Temperature and Flow Display
- Remote high and Low Alarms
- Passive built in contact (for alarms etc.)
- Turbulent Flow Indication
- Glycol/Antifreeze adjustments
- Totalizer Function
- Can be charged for use away from the machine.
- Option: Connect to Bluetooth Interface + FREE PC Software
- Option: Connect to customers own factory monitoring system



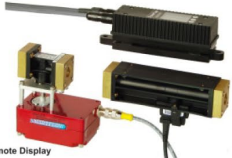
Tracer® VMA Flow Meters With AutoReg

Options



Customers System

Programmable Flow Control




Remote Display

NEW

Tracer VMA with Local or Remote User Interface – Flow Regulator

Controls flow in LPM, GPM or Reynolds Number - With a local or remote colour screen (supplied with 2.9m Cable) or use the analogue outputs for flow and temperature to connect to their own factory monitoring system such as RGJ, Mattec etc.


- Controls flow in LPM, GPM or Reynolds Number
- Local or Remote Temperature and Flow Display
- Local or Remote high and Low Alarms
- Passive built in contact (for alarms etc.)
- Turbulent Flow Indication
- Glycol/Antifreeze adjustments
- Totalizer Function
- Option: Connect to customers own factory monitoring system



Tracer Legacy® Flow Meters


3/8" DD
2" DD & DDS Models

Customers System



DDS Only

Options

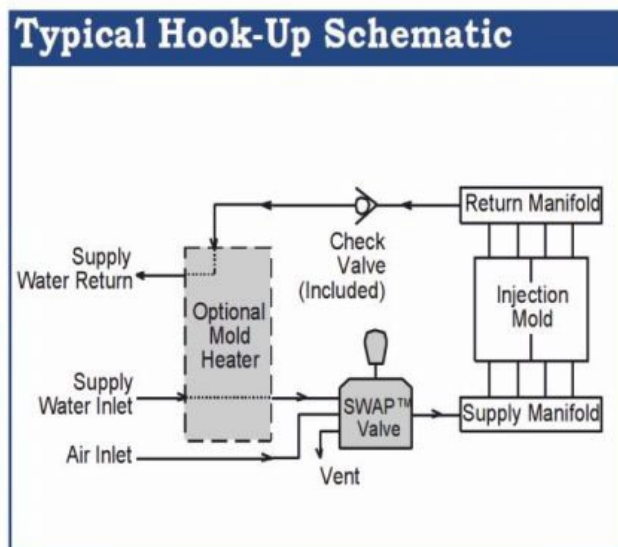


Tracer Legacy Flow Meters

With local LCD screen (DD Models) or use the analogue outputs for flow and temperature to connect to their own factory monitoring system such as RGJ, Mattec etc. (DDS Models)

- Local Temperature and Flow Display
- Local high and Low Alarms
- Passive built in contact (for alarms etc.)
- Turbulent Flow Indication
- Glycol/Antifreeze adjustments
- Can be charged for use away from the machine. (DD Models Only)
- Option: Connect to customers own factory monitoring system (DDS Models Only)

The SWAP® Valve



Features

Designed to empty mould tools in seconds for faster, cleaner mould changes.

As with many Smartflow products this product forms part of the SMED process.

Based on the SMED (Single-Minute Exchange of Dies) principle all our products ensure fast tool change times and mould flow control.

Model Choice

- Glass-Filled nylon body with stainless steel valve disk
- Solid brass body with stainless steel valve disk
- Both types eliminate Galvanic corrosion
- Available in 1" & 2" inlet/outlet (moulded body 1" only)
- Threads BSP or NPT
- Built in manual pressure relief valve for any residual pressure locked in system after purging.
- Comes with check valve to install in the return line to stop expelled water returning to the tool.
- Optional: Locking pin to stop accidental movement of purging handle.

Important notes

- The SWAP valve eliminates the need for bins, buckets or barrels to collect existing water in the tool.
- The SWAP valve eliminates the difficult and costly process of disposing of water that many contain chemicals.

- For cooling systems that use an open vented system (cooling towers etc.), no further equipment is required.
- CLOSED LOOP cooling systems
- As the mould emptying is carried out with compressed, air many customers do not want additional air bubbles potentially contaminating the water supply.

Key Specification

- Maximum Pressure: 150psi (10.3bar)
- Maximum Operating Temperature: 121°C
- Normal Working Air Pressure: 80 to 100psi
- Pressure Drop across Purge Valve: 1psi at 50gpm

Important

As the mould emptying is carried out with compressed, air many customers do not want additional air bubbles potentially contaminating the water supply.

The air ingress is minimal, but it is advised in this case to fit the **TACO®** air separator



- ❖ Available with 1" and 2" NPT threads only (adaptor may be required)
- ❖ The TACO valve should be fitted approximately 5m away from the return line. After a few circuits of water flow the additional air will be eliminated.
- ❖ One TACO valve can handle the return flow of several machines.
- ❖ There are also further benefits in that air from other processes (such as pump seals) in the production environment will also be removed.

Key Specification

- Operating Pressure Max: 150psi (10bar)
- Operating Temperature Max.: 115°C
- Operating Temperature Min.: -4°C
- Media: Water or Water/Glycol
- Max. Velocity: 5ft/sec (1.5m)

The Fastie®



Features

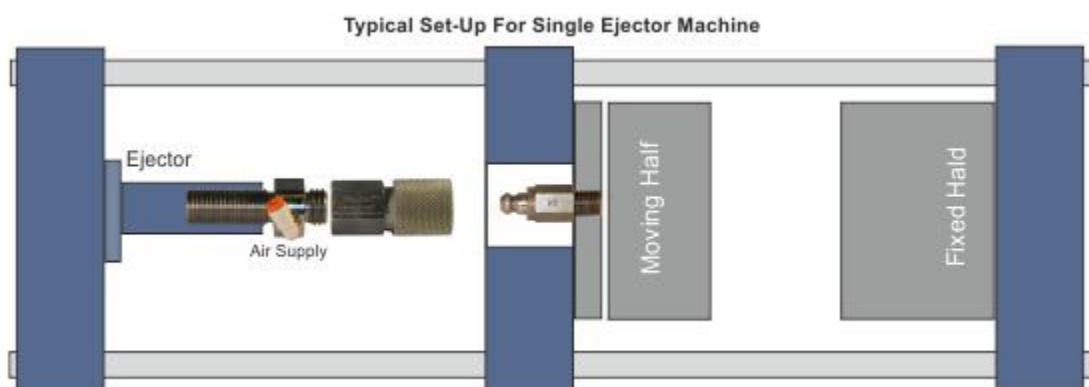
The Fastie connects the ejector piston or ejector plate to mould tool.

Mechanical locking

Pneumatic opening

As many Smartflow products this product forms part of the SMED process.

Based on the SMED (Single-Minute Exchange of Dies) principle all our products ensure fast tool change times and mould flow control.



Model choice

- 3 Standard sizes, 1", 1-3/8" and 2" body size
- 2.5 to 15 Tonne Ejector Force depending on model selected.
- Typical threads: M12, M16, M20. Other sizes on request
- Centre air adaptors (to put the air on the back of the coupler) standard for single central piston set-up.
- 90% of all set-ups are single piston types in Europe
- For larger machines with ejector plates, an air distribution manifold is available where up to 4 x Fastie systems are required for example one in each corner.

Important notes

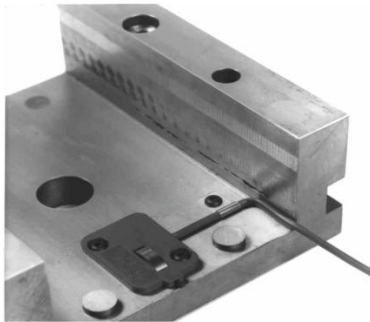
- Customer must supply compressed air supply - 80 - 100psi
- Customer must fit manual air switch to activate open the Fastie coupler.
- The Fastie coupler MUST be open (air on) to disconnect the coupler otherwise damage can occur.
- The Fastie has a good misalignment tolerance $\pm 3.5\text{mm}$ to $\pm 6\text{mm}$ (depending on model) but this should not be relied on, so good initial alignment is recommended.
- Additional connection/extension bars can be quoted on request.

Key Specification

- Maximum Operating Temperature: 149°C
- Air Pressure Range: 80 - 100psi
- Pull Stud Material: Hardened Steel (58-62Rc)
- Knockout Bar and Coupler Material: High Strength Steel
- Threaded Studs: B7 Alloy or Comparable
- Air Manifold Material: Aluminium
- Air Tubing Material: 1/8"OD Nylon

Mould Safety Switches

The THINSWITCH®



Features

- Used worldwide to prevent costly damage to mould tooling
- The switch ensures the ejector plate is 'physically' back before mould closes.

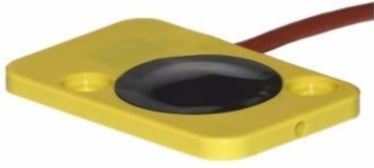
Important notes

- The switch is normally fitted by milling/cutting a 3/16" pocket in the tool at the time of the mould tool production or during maintenance.
- Many will have seen this switch as a DME BLUE switch (Smartflow is RED) – THE DME switch is the Smartflow THINSWITCH so can be sold as a replacement to DME switches.

Temperature rating

- 79.4°C max. or 121°C max.

The THINSWITCH® (Liquid Resistant)



Features

- Used worldwide to prevent costly damage to mould tooling
- The switch ensures the ejector plate is 'physically' back before mould closes.
- A polyurethane dome covers the actuator spring, protecting internal gold switch contacts from environmental contamination.

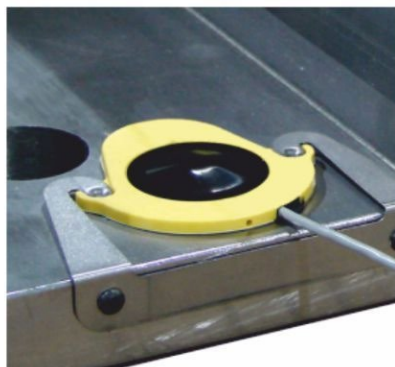
Important notes

- The switch is normally fitted by milling/cutting a 3/16" pocket in the tool at the time of the mould tool production or during maintenance.
- Many will have seen this switch as a DME BLUE switch (Smartflow is RED) – THE DME switch is the Smartflow THINSWITCH so can be sold as a replacement to DME switches.
- No official IP rating.

Temperature rating

- 79.4°C max. or 121°C max.

The GLOBAL THINSWITCH® (Liquid Resistant)



Features

- Used worldwide to prevent costly damage to mould tooling
- **This switch can be retrofitted to any mould tool with 3mm, 4mm or 3/16" elector plate gap.**
- **This switch can be fitted with the tool remaining in the machine.**
- The switch ensures the ejector plate is 'physically' back before mould closes.
- A polyurethane dome covers the actuator spring, protecting internal gold switch contacts from environmental contamination.

Important notes

- This switch can be fitted with the tool remaining in the machine.
- **The Switch can be replaced with no tools required as it is held in place with our patented sprung bracket.**
- No official IP rating.

Temperature rating

- 80°C max

The SMARTLOCK®



Features

- **Used to ensure tool cores/slides are in the correct position before mould closing/opening.**
- Smartflow Smartlock Slide Retainer and Limit Switch provides a switch and slide detent in one unique package.
- The locking function prevents premature slide movement during moulded part ejection while the SPDT switch is simultaneously actuated.

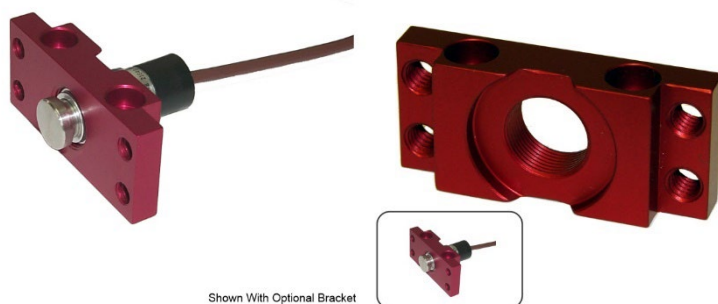
Important notes

- Two sizes of switch are available 11mm standard plunger or 14.2mm captive plunger (the C Range)
- A capture screw holds the plunger in the slide to prevent loss when using the “C” version of the switch.

Temperature rating

- 79.4°C max. or 121°C max.

The VERSASWITCH™



Features

- **Used to ensure tool cores are in the correct position before mould closing/opening.**
- Versaswitch is easily installed into a 5/8"-24 female thread.
- The switch actuates when 3.5 lbs of force is applied to the plunger.
- Actuation height is adjusted by threading the switch to the correct position in the installation.
- Optional mounting bracket

Temperature rating

- 82°C max

Galvanic Corrosion

Cause and Prevention of Galvanic Corrosion in Aluminum

Cause

Four conditions must be present for galvanic corrosion to occur:

- **Cathode** - the more noble or least active metal. This metal has current discharge properties and will be protected from corrosion by the presence of the anode metal. Cathode examples: copper, gold, silver, nickel
- **Anode** - the least noble or active metal. This metal has current acceptance properties and will corrode. Anode examples: magnesium, zinc, aluminum
- **Electrolyte** - the capacity to conduct electrical current through the flow of ions. Electrolyte example: water
- **Metallic path** - metallic connection conducting electrical current.

Other factors affecting the corrosiveness of water are pH, temperature, and oxygen content. Water pH should remain between 6 and 8 to minimize corrosion. Increased temperature and oxygen in water also accelerate corrosion.

Prevention

Five ways to inhibit galvanic corrosion in water systems:

- **Cathodic Protection** - A sacrificial anode (usually a zinc or magnesium rod) is installed in the system. The material is more anodic in nature than the aluminum and draws the corrosion away from the aluminum. This is a higher maintenance solution as the anode must be replaced periodically.
- **Water Condition** - Change the water treatment system. Eliminate any chlorine or floating ions and monitor the pH level of the water. Add corrosion inhibitors.
- **Material Selection** - Change the ratio of dissimilar metals so it is more evenly balanced, or remove the dissimilar metals completely. Use stainless steel components.
- **Coatings** - Insulate the metals with a protective coating. This is often temporary. The anodizing on our aluminum manifolds usually provides adequate protection, except in severe environments.
- **Metal Isolation** - Install an insulative fitting, such as a PVC bushing or pipe connection to break the electrical connection of the metallic path.

**bunger &
brown engineering, inc.**