

MONITORING OF PRODUCTION

# FLOW MONITORING SYSTEM



Optimise production value and energy efficiency



Monitor flow, pressure and temperature in the cooling circuits



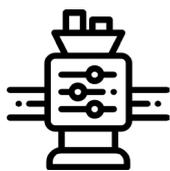
Protect your moulds and plan preventive maintenance



Set up automated alarm functions



Get the complete overview in one screen



Mount directly on any injection moulding machine



Integrate with your central data system



Agile solution, tailored to your specific needs



## Advanced monitoring system for injection moulding machines



### Optimise your production and energy-efficiency

Monitor and control your mould's cooling circuits with The Flow Monitoring System. The system protects your moulds and improves the quality of your production, by quickly identifying and alerting you about cooling complications.

#### Make data-driven decisions

The Mouldflo System monitors temperature, pressure and flow in the cooling circuits within the mould, using intelligent manifolds, mounted directly on the machine.

This gives you vital information about how your production is performing as well as the knowledge you need to improve your production value, optimise your energy efficiency and protect your moulds.

The system is easy to install and it is compatible with almost any type of injection moulding machine.

#### Automated quality assurance

By using the system's alarm functionality, you will be automatically alerted, whenever an issue arises and when parameters differ from your preferred machine settings.

The system works as a watchdog of various common cooling circuit problems, such as:

- Blocked waterways
- Scale or rust build up
- Incorrect piping
- Lack of water flow from the mould heater

#### Agile and customised solution

The monitoring system is very agile and can be adjusted and expanded over time, as your production grows or changes.

Multiple manifolds can be electronically 'daisy-chained' together to accommodate the necessary number of cooling channels. The system will automatically identify new manifolds and display them on the screen.

The intelligent manifolds comes in a variety of sizes and installations. This means, that we can provide you with a solution tailored specifically for your requirements.

# System Overview



Touch Panel or VNC

## Touch Panel or VNC

The integrated VNC (Virtual Network Computing) feature allows for easy integration on the machine control, laptop or smartphone via Ethernet cable or WiFi router.

The Mouldflo Touch panel is industrial style and equipped with VESA standard mounts.



MF-Server Network ready

## Server

The Server is a compact computer with Mouldflo software installed. The design makes the unit fit directly inside the electrical cabinet on the injection moulding machine and it is equipped with a standard DIN-rail mount.



MFI0 interface (connects up to 8 manifolds)

## Interface module

The Mouldflo system is equipped with a DIN-Rail mounted interface module – this is the hub of the system. It can be connected to alarm beacons and marker signals coming from the injection mould and via Ethernet to any network available on the factory floor.



Stainless steel manifold



Aluminium manifold

## Manifolds (Stainless Steel and Aluminium)

We have developed a diverse range of manifolds, in order to accommodate any type of injection moulding production.

## Software Interface



### Mouldflo software

Using a remote mounted touch screen the system will monitor and display the flow and temperature for every circuit. The information can be displayed in either a graphical or text format. The data is stored in the internal memory, time and date stamped for ultimate traceability.

### Data overview

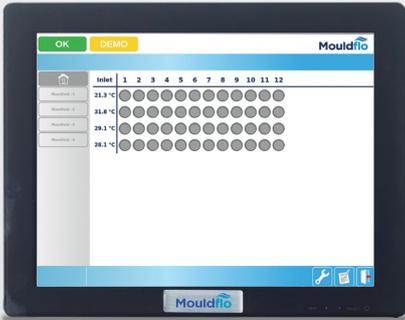
The interface gives a quick overview of the data, making it easy for the operator to spot any trend in deteriorating performance for any particular flow circuit. The data can be read over an Ethernet connection or downloaded onto a USB stick.

### Warnings and alarms

Warning and alarm limits can be set for flow and temperature to all monitored zones individually. Should a zone deviate from those settings, then both an onscreen warning and a potential free alarm signal can be fed directly to an ancillary device – such as an alarm tower, hot runner controller or the injection moulding machine to warn that the flow has deviated outside of tolerance.

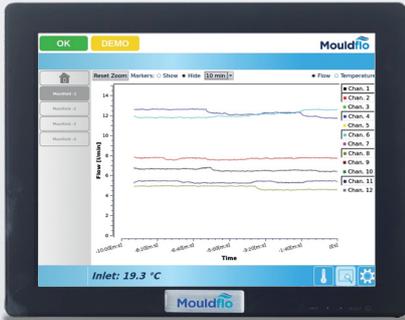
### Store and load mould settings

The system is capable of storing multiple mould set-ups on the internal memory which can be quickly loaded when a mould is changed with all the correct set-points saved for any given mould.



**Simple overview**

Get an immediate overview of cooling circuit status 'at a glance' on a single screen with instant display status and alarms if the flow / temperature goes outside of tolerance



**Historical data**

A performance log for each circuit and manifold is stored on the internal memory allowing the user to track the performance and easily identify problems



**Event log**

Alarm errors, warnings and operator changes are all stored with a time and date stamp and can be reviewed at any time



**Connect to your preferred device**

The VNC feature will allow you to monitor the flow and temperature remotely from any location directly from your preferred device.

You can integrate with the machine control or use the Mouldflo Touch Panel. This 15" Capacitive sensing touch panel will ensure a quick response and trouble free user interface.

## Hardware

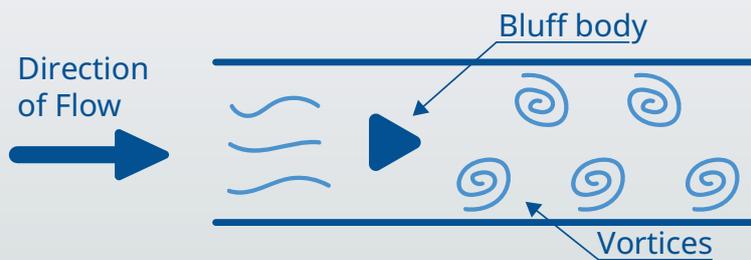
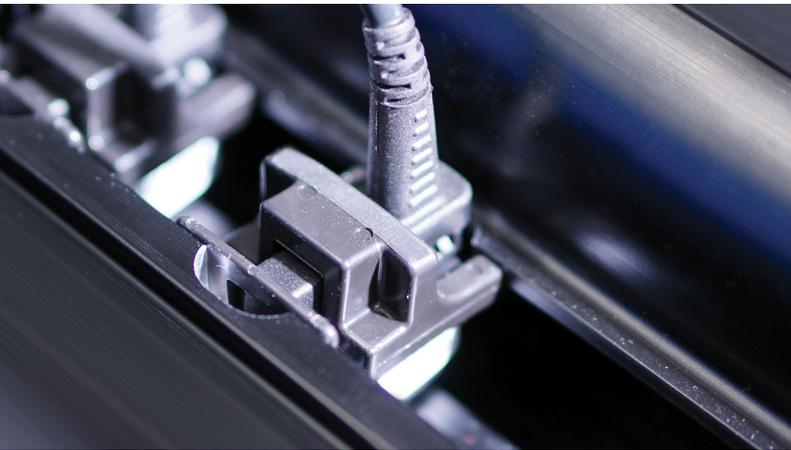


Figure 1: Vortex Flow Measurement



### Sensors

Each manifold is equipped with compact sensors that are capable of reading both flow and temperature. The sensors are based upon the vortex flow measurement principle which uses a bluff body in the middle of the flow path to create small eddy currents or vortices (see Figure 1). The pressure of this current is measured to determine the flow through a given cross sectional area.

The sensors have no moving parts. This, combined with a large flow path, makes it ideally suited for mould cooling - even when using heavily contaminated water. The sensors are integrated directly into the manifold, keeping size to an absolute minimum.

### Interface module

The interface module facilitates true plug and play, allowing multiple manifolds to be monitored and also enabling convenient and simple connection to the touch screen, power supply, alarm signals in/out and machine communications. The module is equipped with USB and Ethernet.

The data generated by the system can be fed into production monitoring systems or other ancillary devices such as hot runner controllers or the moulding machine control system using the onboard communication ports.



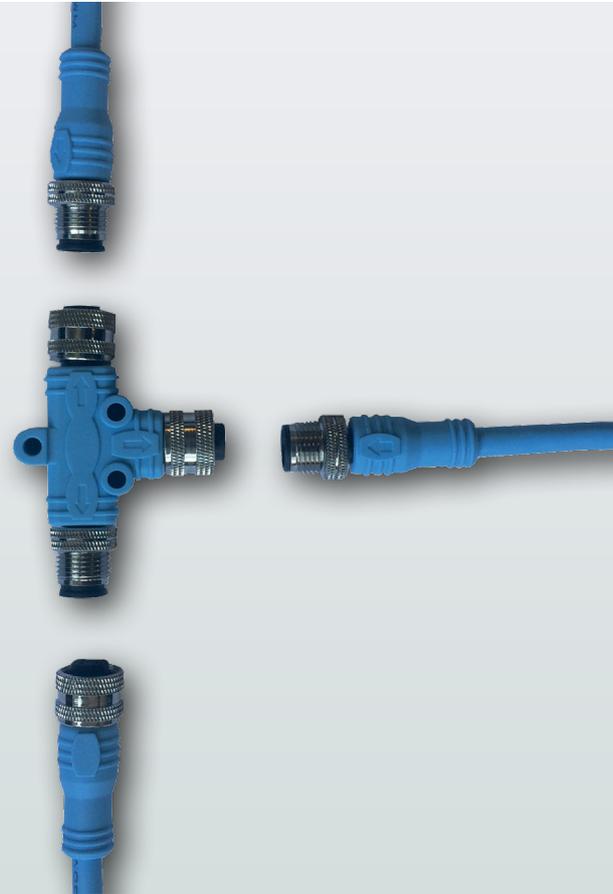
## Optional Pressure Sensors

The correct pressure is critical in all flow circuits and with pressure sensors installed in the manifolds you will be able to monitor both the inlet and outlet pressure.

This feature allows the user to ensure that there is sufficient flow capacity and also identifies any deviation in the water supply.

The difference between inlet and outlet pressure illustrates the total pressure loss through the mould which is often caused by incorrect dimensioning of fittings and hoses.

The optional pressure sensors complete the installation and will ensure full knowledge of your flow circuit.



## M12 connectors and cables

Mouldflo manifolds and the interfaces are equipped with M12 connectors and inputs.

Multiple manifolds can be electronically daisy chained together and connected to the interface, thereby ensuring perfect connections and trouble free operation.

This 'plug and play'-functionality of the connectors makes the system very agile and it is easy to expand the installation over time, to accommodate the necessary number of flow channels.

## Manifolds



### Customise your installation

We have developed a diverse range of manifolds, in order to accommodate any type of injection moulding production. The manifolds are available in aluminium or stainless steel and with a variety of specifications. We recommend that you use aluminium manifolds for aluminium moulds, and stainless steel manifolds for steel moulds.

#### Stainless Steel Manifolds

The stainless steel manifold is constructed from AISI 304 stainless steel with easily accessible mounting holes on two faces for simple installation. The compact and robust manifold resist corrosion well thanks to the property of stainless steel.

It is available with 4, 8 or 12 zones with 50 mm between each. It has two 1" BSPP flow inlets and outlets, which offers maximum flexibility when mounting and connecting to the water supply.

To match your specific requirements the stainless steel manifold is available in several different versions. You can customise your own manifold with a variety of different specifications to choose from:

- Flow range (1-20 L/min or 2-40 L/min)
- Number of zones (4, 8, 12)
- Thread standard (BSP or NPT)

#### Aluminium Manifolds

The aluminium manifold is extruded with integrated T-slots on two faces for flexible mounting. The manifold is robust and has a black anodised aluminium exterior to resist corrosion. The design is compact and integrated as it consists of very few separate parts.

It is available with 4, 8 or 12 zones with standard 50 mm between each. It has two 1,5" flow inlets and outlets, which offers maximum flexibility when mounting and connecting to the water supply. It is also available in a short pitch version with 35 mm between each cooling circuit port, resulting in a more compact design, that can fit into very small spaces.

You can customise your own manifold with a variety of different specifications to choose from:

- Flow range (1-15 L/min or 2-40 L/min)
- Number of zones (4, 8, 12)
- Pitch length (standard: 50mm or short pitch: 35mm)

NEW

## Specifications

Stainless Steel Manifold	
Manifold feed	1" BSPP
Manifold ports	3/8" BSPP female or 3/8" NPT male or 1/2" BSPT male or 1/2" NPT male
Number of zones	4/8/12 Standard
Flow sensor type	Vortex Flowsensor (VFS)
Pressure sensor type (add-on)	Relative Pressuresensor (RPS)
Range (Flow)	1-20 litres/min or 2-40 litres/min
Power supply	12 or 24 VDC
Operating temperature (max)	Standard: 0 - 95°C / High Temp: 0 - 120 °C
Operating pressure (max)	10 bar
Temperature sensing	Per circuit (return)
Flow sensing	Per circuit (return)
Temperature sensor - main inlet	Yes
Accuracy (Flow)	1% fs
Accuracy (Temperature)	15 - 90°C: +/- 0,5 °C 0 - 120°C: +/- 1 °C
Resolution (Temperature)	0,5°C

No. of zones	Total length	Depth	Height	Distance between ports	Ports (flow range 1-20 l/min)	Ports (flow range 2-40 l/min)
4	240 mm	165 mm	115 mm	50 mm	3/8" BSPP female or 3/8" NPT male	1/2" BSPT male or 1/2" NPT male
8	440 mm	165 mm	115 mm	50 mm	3/8" BSPP female or 3/8" NPT male	1/2" BSPT male or 1/2" NPT male
12	640 mm	165 mm	115 mm	50 mm	3/8" BSPP female or 3/8" NPT male	1/2" BSPT male or 1/2" NPT male

Aluminium Manifold	
Manifold feed	1½" BSPP
Manifold ports	1/2" BSPP female
Number of zones	4/8/12 Standard or 8/12 Short pitch
Flow sensor type	Vortex Flowsensor (VFS)
Pressure sensor type (add-on)	Relative Pressuresensor (RPS)
Range (Flow)	1-15 litres/min or 2-40 litres/min
Power supply	12 or 24 VDC
Operating temperature (max)	Standard: 0 - 95°C / High Temp: 0 - 120 °C
Operating pressure (max)	10 bar
Temperature sensing	Per circuit (return)
Flow sensing	Per circuit (return)
Temperature sensor - main inlet	Yes
Accuracy (Flow)	1% fs
Accuracy (Temperature)	15 - 90°C: +/- 0,5 °C 0 - 120°C: +/- 1 °C
Resolution (Temperature)	0,5°C

No. of zones	Total length	Depth	Height	Distance between ports	Ports (flow range 1-15 and 2-40 l/min)
4	210 mm	180 mm	124 mm	50 mm	1/2" BSPP female
8	410 mm	180 mm	124 mm	50 mm	1/2" BSPP female
12	610 mm	180 mm	124 mm	50 mm	1/2" BSPP female
8 (Short pitch)	305 mm	180 mm	124 mm	35 mm	1/2" BSPP female
12 (Short pitch)	445 mm	180 mm	124 mm	35 mm	1/2" BSPP female

Introducing MouldLive:

## IIoT Mould Monitoring & Cloud Solution

The new MouldLive solution allows you to take monitoring to the next level with complete remote surveillance and cloud storage.

As an add-on to the existing Mouldflo product line it is easy to implement into installations already in place.

Ready for Plastic Industry 4.0?  
Get started with MouldLive!

Learn more at [mouldflo.com/en/products/mouldlive](http://mouldflo.com/en/products/mouldlive)



NEW

**MouldLive**  
by Mouldflo

# Take it from our customers...



We are happy to have implemented the Mouldflo functionalities into our work processes. It's easy to use the products and it helps a lot to maintain the quality during production.

*Eagle Industry*

Mouldflo helps us start our production faster, making the time it takes to change a mould more efficient by nearly 10 minutes. It saves us important time and it has improved our work flow considerably.

*Varroc Lighting Systems*



Just having the flow monitoring has been a huge troubleshooting advantage, as we have been able to compare flow through the three different molds that we have been sampling. We immediately found that one of the new tools had a blocked circuit and were able to fix it right away.

*T E Connectivity*

The Test-rig gives us the reports and technical data required to optimise a tool's cooling efficiency.

*Aalbers Tool and Mould Inc.*

