

FlowHUB Series

Flow, Temperature, Measure,
display, switch, transmit

Up to

- 360 lpm, 100 US gpm
- 420 bar, 6,000 psi

The FlowHUB is ideal for condition monitoring, test stands and closed loop control applications both for fluid power and lubrication systems. The FlowHUB can measure and display flow and temperature readings as well as switch and transmit flow values. This enables a system designer to trigger alarms, shutoffs and transmit real-time values to a PLC using just one component, instead of up to six which might have been required conventionally. This represents a significant cost saving in terms of reduced complexity of wiring and far fewer components.

It is available in five flow ranges from 1 to 360 lpm (0.25 to 100 US gpm) and in two pressure ranges 210 and 420 bar (3,000 and 6,000 psi). The FlowHUB is available in three versions - 'Switch', 'Transmitter' and 'Ultimate', all three versions have built in temperature measurement and a large bright digital display.

The 'Switch' version provides two configurable switched outputs; the trigger flow rate, time delay, sense (above/below) and normal mode (normally closed / normally open) can all be freely configured. Each switch is independent and can switch up to 500 mA. The 'Transmitter' version provides a conditioned output either 0 to 5 Volts or 4 to 20 mA - full scale is configurable to any maximum flow. The 'Ultimate' version has both the switches and transmitter and the highest pressure rating of 420 bar (6,000 psi) as well as an enhanced response time of 50 ms.

Other configurations are available on request.



Hydraulic measurement and control

WEBTEC
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Features

- **FLOW:** 1 - 360 lpm, 0.25 - 100 US gpm
- **PRESSURE:** Up to 420 bar, 6,000 psi
- **DESIGNED** for permanent installation (few wearing parts)
- **EASY** to operate
4 digit LED display
3 large keys
- **ACCURACY** better than 3% FSD
- **REPEATABILITY** better than 1%
- **TEMPERATURE** measurement built-in
- **WIDE RANGE OF OPTIONS:** Choice of outputs V or mA. Two programmable switches. Complete with adaptors fitted (BSP or JIC Male). Engineering units lpm or US gpm (°C or °F)
- **EASY INSTALLATION**
Mount in any orientation
Install straight after a bend. Allows reverse flow
- **TRACEABLE** calibration on request
- **PATENT** Pending Design



Certificate No.8242

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(Issue 3)

Specification

Protection: Designed to meet IP64 (NEMA Type 5)

Functional

Flow range: see model configuration

Pressure range: see model configuration

Ambient temperature: 5 to 40 °C
(41 - 104°F)

Fluid type: hydraulic oil

Fluid temperature: 5 to 90 °C (41 - 194 °F)

Accuracy: ± 3% of full scale at 21 cSt
(higher accuracy on request)

Repeatability: Better than ± 1%

Response time: 150 ms (**Switch and Transmitter**),
50 ms (**Ultimate**)

Electrical specification

Supply voltage: 15 to 30 VDC class 2 supply only

Typical current: 35 mA

Maximum current excluding switch current: 60 mA

Switch current: 500 mA per switch max.

Switch Voltage: Supply voltage - 0.5 V

Connector type: M12 - 5 pin male

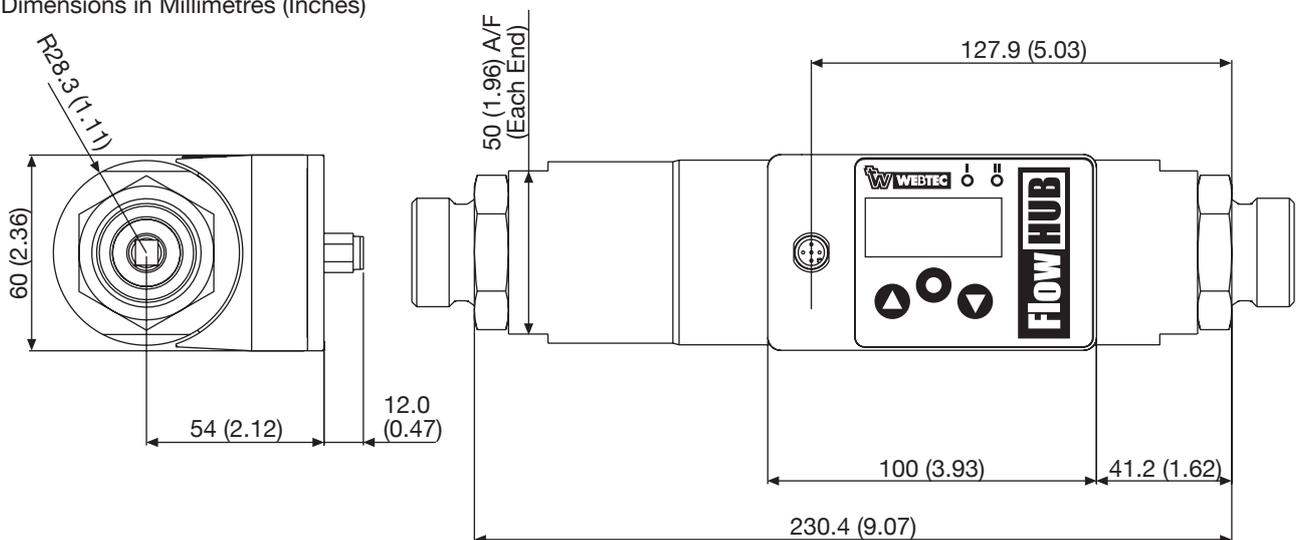
Voltage output: minimum load = 10K Ohms

Current output: maximum load = (supply voltage x
46) - 200 ohms

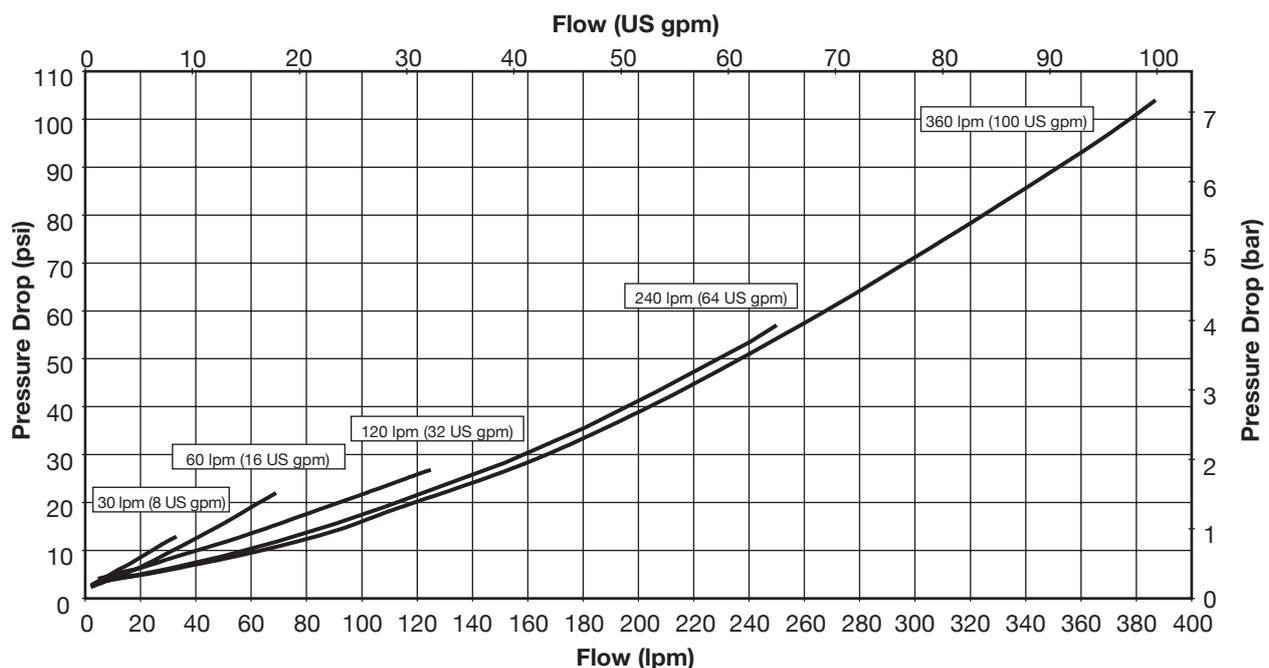
Weight: 2 Kg (4.4 lbs)

Installation

Dimensions in Millimetres (Inches)



Flow versus Pressure Drop (at 21 cSt in forward direction)



Model configuration

Examples

EU **HF360** - **TRNMA-3** - **B100V**
Code 1 Code 2 Code 3

Above model number is a FlowHUB Transmitter: Flow range: 8 - 360 lpm, Maximum pressure: 210 bar (3,000 psi), Temperature: °C, output: 4 - 20 mA, no switches, 1" BSPP adaptors.

US **HF100** - **TRNMA-3** - **S100V**
Code 1 Code 2 Code 3

Above model number is a FlowHUB Transmitter: Flow range: 2 - 100 US gpm, Maximum pressure: 3000 psi (210 bar), Temperature: °F, output: 4 - 20 mA, no switches, 1 5/16" JIC Male adaptors.

Step 1 - Choose flow range and engineering units

| EU flow range (lpm & °C) | | | US flow range (US gpm and °F) | | |
|--------------------------|------------|-------------------|-------------------------------|------------|--|
| Code 1 | Flow range | Standard adaptors | Code 1 | Flow Range | Standard adaptors |
| HF030 | 1 - 30 | 1/2" or 3/4" BSPP | HF008 | 0.3 - 8 | 1-1/16" -12UN JIC Male or 3/4" -16UN JIC Male |
| HF060 | 2 - 60 | 1/2" or 3/4" BSPP | HF016 | 0.5 - 16 | 1-1/16" -12UN JIC Male or 3/4" -16UN JIC Male |
| HF120 | 4 - 120 | 3/4" or 1" BSPP | HF032 | 1 - 32 | 1-1/16" -12UN JIC Male or 1-5/16" -12UN JIC Male |
| HF240 | 8 - 240 | 1" BSPP | HF064 | 2 - 64 | 1-5/16" -12UN JIC Male |
| HF360 | 8 - 360 | 1" BSPP | HF100 | 2 - 100 | 1-5/16" -12UN JIC Male |

Step 2 - Choose electronics and maximum pressure

| Electronic control and maximum pressure options | | |
|---|--------------------------|--|
| Code 2 | Maximum working pressure | Function description |
| SWTNA-3 | 210 bar (3,000 psi) | Two programmable switches |
| TRN5V-3 | 210 bar (3,000 psi) | Output 0 - 5 Volt |
| TRNMA-3 | 210 bar (3,000 psi) | Output 4 - 20 mA |
| ULT5V-6 | 420 bar (6,000 psi) | Two programmable switches, output 0 - 5 Volt |
| ULTMA-6 | 420 bar (6,000 psi) | Two programmable switches, output 4 - 20 mA |

Step 3 - Choose adaptors

| Adaptors | | | |
|--------------|-------------|-------------|------------------------|
| BSPP options | | SAE options | |
| Code 3 | Description | Code 3 | Description |
| B050V | 1/2" BSPP | S050V | 3/4" -16UN JIC Male |
| B075V | 3/4" BSPP | S075V | 1-1/16" -12UN JIC Male |
| B100V | 1" BSPP | S100V | 1-5/16" -12UN JIC Male |

Custom configurations are available, please contact sales.

Build your own FlowHUB

- -
Code 1 Code 2 Code 3

Filtration

It is recommended that a 25-micron filter is installed in the hydraulic circuit prior to the FlowHUB.

Calibration

The above specification is met without 'wet' calibration - if full traceable calibration is required then please state at the time of ordering - this is an option and will incur an additional charge. As standard it is completed at 21 cSt (ISO 32 oil at 50 °C / 122 °F)

Construction material

Flow body: High tensile aluminium 2014 T6

Internal parts: Brass CZ121, Stainless steel 316, Steel 212A42

Adaptors: High pressure - Steel 212A42 zinc plated and clear trivalent passivate.
Standard - Steel 230M07 zinc plated.

Electronics enclosure: Die cast aluminium

Operation

All FlowHUBs work on the same theory - the fluid flow is used to move a magnet which is mounted within a piston, the distance moved is proportional to the flow rate. This movement is measured by a sensitive magnetic device. The piston is designed to minimise the effects of variations in temperature and viscosity and built-in flow conditioning eliminates flow swirl and allow any connection to be made at the input without the normal 10 diameters of straight pipe. The on-board electronics condition the signal and convert the linear movement to fluid flow. The FlowHUB also allows unmeasured flow in the reverse direction.

Installation

The FlowHUB can be installed in any orientation and since the unit has built-in flow conditioning, no lengths of straight tube are needed. As the unit contains a sensitive magnetic device it is recommended to mount away from strong magnetic fields and large ferrous objects, a distance of 80 mm is recommended. For this reason it is also recommended to use only the adaptors supplied as different shaped adaptors can effect the readings.

Reverse flow operation

The FlowHUB will allow reverse flow but it will not measure the flow rate. The pressure drop in reverse flow is considerably higher than that for forward flow. Please see chart below for details.

Reverse flow pressure drop

| Flow range | Pressure drop at 1/2 full flow | Pressure drop at full flow |
|----------------------|--------------------------------|----------------------------|
| 360 lpm (100 US gpm) | 70 psi @ 180 lpm | 260 psi @ 360 lpm |
| 240 lpm (64 US gpm) | 40 psi @ 120 lpm | 130 psi @ 240 lpm |
| 120 lpm (32 US gpm) | 110 psi @ 60 lpm | 400 psi @ 120 lpm |
| 60 lpm (16 US gpm) | 30 psi @ 30 lpm | 90 psi @ 60 lpm |
| 30 lpm (8 US gpm) | 9 psi @ 15 lpm | 28 psi @ 30 lpm |

(1 bar = 14.5 psi, 10 lpm = 2.64 USgpm)

Fluid viscosity

The performance of the FlowHUB can be affected by the viscosity of the fluid measured. All units are designed to meet the specification at a viscosity of 21 cSt, which is a typical kinematic viscosity for a hydraulic fluid operating at 50°C. The shaded area of the table shows the expected range of viscosities that can be used by the FlowHUB (models 30, 60, 120, 240 lpm & 8, 16, 32, 64 US gpm) with minimal effect on the accuracy (less than ± 3% FS). FlowHUBs can be specially calibrated at a different viscosity or we can advise on the expected error when it is used at other viscosities. For more detailed information about viscosity changes and information on the 360 lpm or 100 US gpm models please contact Webtec.

Table showing kinematic viscosity (cSt) of different mineral oils at specific temperatures

| Temp °C | Fluid type | | | | | |
|---------|------------|-------|-------|-------|-------|-------|
| | ISO15 | ISO22 | ISO32 | ISO37 | ISO46 | ISO68 |
| 0 | 85.9 | 165.6 | 309.3 | 449.9 | 527.6 | 894.3 |
| 10 | 49.0 | 87.0 | 150.8 | 204.7 | 244.9 | 393.3 |
| 20 | 30.4 | 50.5 | 82.2 | 105.5 | 127.9 | 196.1 |
| 30 | 20.1 | 31.6 | 48.8 | 59.8 | 73.1 | 107.7 |
| 40 | 14.0 | 21.0 | 31.0 | 36.6 | 44.9 | 63.9 |
| 50 | 10.2 | 14.7 | 20.8 | 23.9 | 29.4 | 40.5 |
| 60 | 7.7 | 10.7 | 14.7 | 16.5 | 20.2 | 27.2 |
| 70 | 6.0 | 8.1 | 10.9 | 12.0 | 14.6 | 19.2 |
| 80 | 4.8 | 6.4 | 8.4 | 9.1 | 11.1 | 14.3 |
| 90 | 4.0 | 5.2 | 6.6 | 7.2 | 8.7 | 11.1 |
| 100 | 3.3 | 4.3 | 5.5 | 6.0 | 7.1 | 8.9 |

Grey area denotes operation with standard calibration will give flow accuracy of better than 3% FS.



APPROVED