



Pico Technology
Diagnostic Flow Meters



www.webtec.com

Introduction

These flow meters are designed for intermittent or continuous testing of hydraulic systems on vehicles, mobile machinery, test stands and many other hydraulic circuits.

This manual covers the Pico Technology range of products. These flow meters are designed for, and should only be used with, the Pico Technology test kits.

There are six models, each supplied with connection leads as a kit in a case.

Read the following safety instructions before you operate the equipment for the first time. Safety may be impaired if they are not followed.

Four of the models have an integral loading valve, which can provide progressive pressure loading in either flow direction. All of the models have a magnetic reluctance transducer that measures the speed of a turbine. Each time a blade passes the reluctance transducer, an electric pulse is generated. This reluctance transducer does not require an external power supply and the unit also incorporates a thermistor to measure fluid temperature.

All models are as standard designed to work with, and are calibrated with, oil at 21 cSt.

The flow meters can be used to measure flow in either direction (lower accuracy is achieved in the reverse direction).

Do not use with water

The flow meters are designed for use with mineral oil having reasonable lubrication properties. They are not suitable for use with water or fluids with a high water content. If a flow meter is used with water it should be flushed immediately after use with white or methylated spirit or similar and then flushed with mineral oil to minimise any internal corrosion. This may avoid an expensive repair. Damage to a flow meter from the use of a non-approved fluid invalidates our normal warranty.

Functional specification

Flow Range: see model configuration

Pressure Range: see model configuration

Operating temperature: Ambient -10 to +50

Fluid type: Hydraulic oil

Fluid temperature: 0 to 90 °C (continuous)

90 to 110 °C (intermittent)

Accuracy: CT300/600 - 15 to 100% of range - 1% of indicated reading

Below 15% fixed accuracy of 1% of 15% of full scale.

CT25 - 1% of full scale.

Repeatability: Better than 1%

Pin connections: Two BNC connectors

Q = Flow

T = Temperature

Construction material

Flow body: CT600R High tensile Aluminium 2014A T6

Flow body: CT300R High tensile Aluminium 2014A T6

Flow Body: CT25 High tensile Aluminium 2011 T6

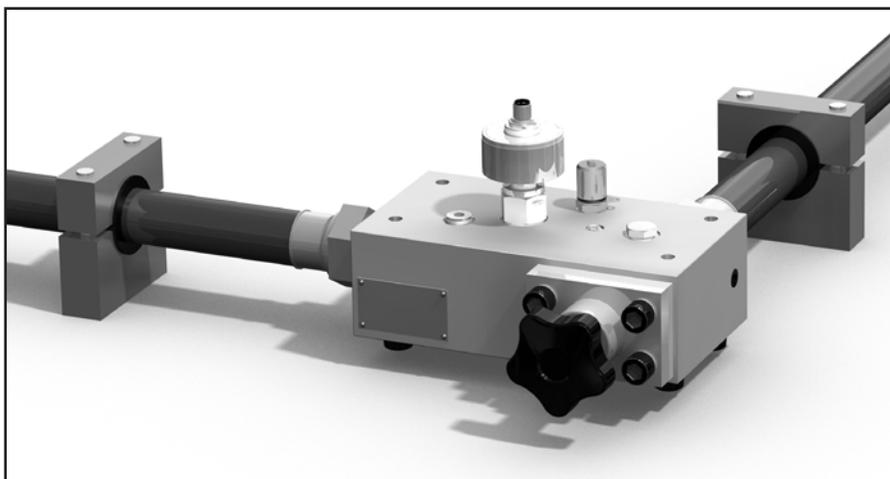
Internal parts: Aluminium, Steel, Stainless Steel.

Transducer body: Steel 212A42 electroless Nickel plated, anodised aluminium lid

Seals: FKM seals as standard

Installation guidance

All hydraulic connections should be made by suitably qualified personnel. Inlet and outlet connections should always have a similar bore size to that of the flow meter to prevent venturi or constriction effects.



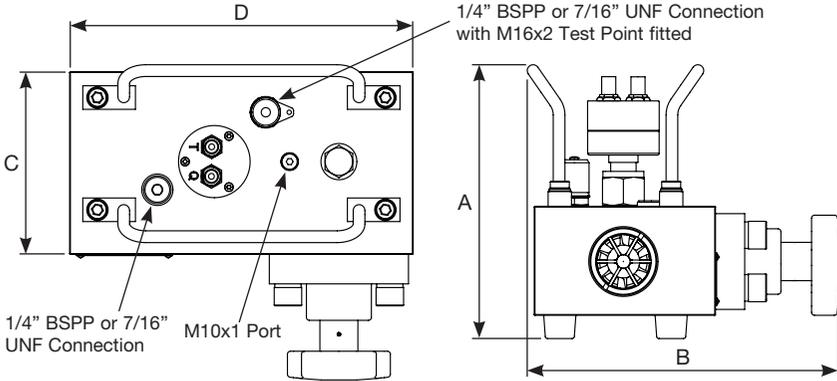
CTR flow meter shown in typical mounting.

- The flow block can be mounted in any orientation.
- The flow meter should be connected by flexible hose. The flexible hoses should be 'strain relieved' (clamped). Ensure the clamps are at least one pipe diameter wide and position close to the fittings.
- It is recommended that a 25 micron (10 micron for CT25) filter is installed in the hydraulic circuit prior to the flow meter.
- Consideration should be given to the effects of cavitation erosion as this could damage the unit.
- Although the units are bi-directional greater accuracy is achieved by ensuring the flow is passed in the preferred direction, as indicated on the serial plate.
- When using this type of flow meter to measure low pressure systems, such as case drain leakage, it is recommended that a relief valve or check valve is fitted to protect against excessive pressure caused by surge flows.
- Care should be taken to ensure that the flow block is installed in a position which is not subjected to excessive pulsation as this can cause incorrect readings.
- Check IP rating before installing in wet areas. If installed in wet areas use BNC caps to protect the connectors when no cable is present. IP rating only applies if unit is fully connected.
- All turbines have built-in flow straighteners so the normal recommended length of 10 Ø of straight tube can be reduced to 8 Ø at the input and output, where space is limited.
- Before starting a test or running flow through the circuit ensure the load valve is fully open (fully anticlockwise) and increase the pressure slowly
- The meters have additional ports in the top face to enable the user to connect additional sensors. These are 1/4" BSP or #4 SAE O ring ports and one M10x1 port. As standard one 1/4" BSP or #4 SAE is fitted with a test point (M16x2) and other ports are blanked. See model table for more details and port configuration.
- For heavy-duty applications, for example installation close to a piston pump or advice on installation please contact Webtec.
- The internal burst discs are to protect the flow meter not the hydraulic installation. Always ensure the appropriate relief devices are fitted to protect the installation.

Dimensions

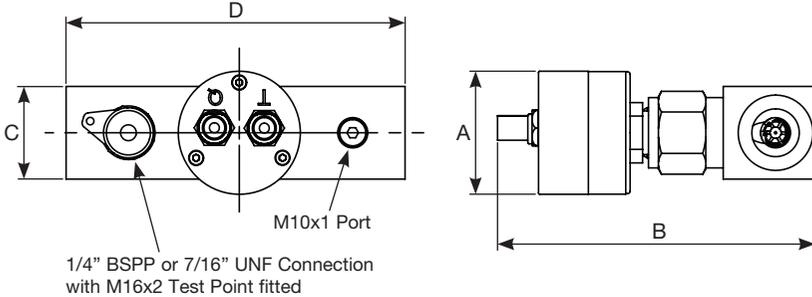
Kit No.	Webtec Model No.	A	B	C	D	Weight kg (lbs)
PICO 300 EU	CT300R-FB-B-B-6	161	193	100	222	3.7 (8.1)
PICO 600 EU	CT600R-FB-S-B-7	186	214	125	235	8.0 (17.6)
PICO 300 NA	CT300R-FB-S-S-6	161	193	100	222	3.7 (8.1)
PICO 600 NA	CT600R-FB-S-S-7	186	214	125	235	8.0 (17.6)

Dimensions in Millimetres



Kit No.	Webtec Model No.	A	B	C	D	Weight kg (lbs)
PICO 25 EU	CT25-FB-B-B-6	49	127.5	37	136	0.7 (1.5)
PICO 25 NA	CT25-FB-S-S-6	49	127.5	37	136	0.7 (1.5)

Dimensions in Millimetres



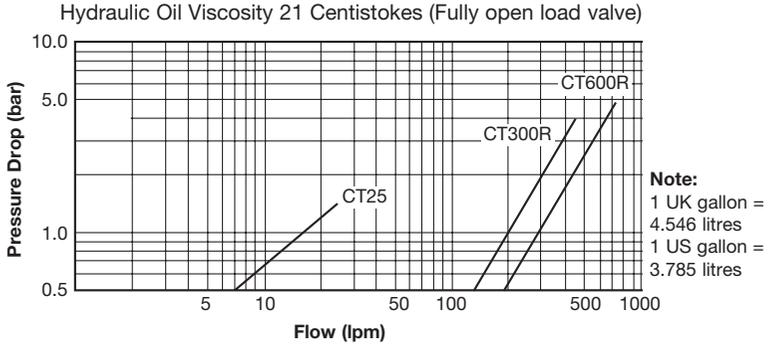
Model configuration

Webtec Model No.	Flow range	Main ports	Top ports	Max. pressure
CT25-FB-B-B-6	1 - 25 lpm	1/2" BSPP	1/4" BSPP	420 bar
CT25-FB-S-S-6	0.5 - 7 US gpm	3/4" -16UN #8 SAE ORB	7/16" -20UN #4 SAE ORB	6000 psi
CT300R-FB-B-B-6	8 - 300 lpm	1" BSPP	1/4" BSPP	420 bar
CT600R-FB-S-B-7	20 - 600 lpm	1-7/8" -12UN #24 SAE ORB	1/4" BSPP	480 bar
CT300R-FB-S-S-6	2 - 80 USgpm	1-5/16" -12UN #16 SAE ORB	7/16" -20UN #4 SAE ORB	6000 psi
CT600R-F-B-S-S-7	5 - 160 USgpm	1-7/8" -12UN #24 SAE ORB	7/16" -20UN #4 SAE ORB	7000 psi

Technical information

All flow meters are calibrated at a mean viscosity of 21 cSt using ISO32 hydraulic mineral oil to ISO11158 category HM. Special calibration is available over a custom flow range or at a different viscosity, please contact sales to discuss your application.

Pressure Drop Chart



Fluid viscosity

The performance of a turbine flow meter can be affected by the viscosity of the fluid measured. Our turbine flow meters are calibrated at between 18 and 26 cSt as standard (a mean viscosity of 21 cSt), which is the typical kinematic viscosity for a hydraulic fluid operating at 50 °C. The kinematic viscosity of all hydraulic fluids is related to the fluid temperature and the table below shows the affect of temperature on the kinematic viscosity of a range of typical grades of hydraulic oil.

The shaded area of the table shows the range of viscosities that can be measured by a flow meter with standard calibration with minimal effect on the accuracy (less than $\pm 1\%$ FS).

Flow meters can be specially calibrated at a different viscosity to the standard or we can advise on the expected error when the flow meter is used at other viscosities. Please contact sales for further information.

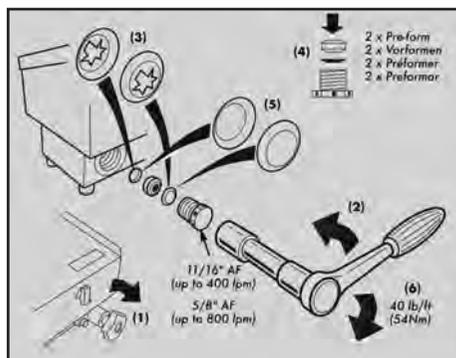
Table showing kinematic viscosity (cSt) of different mineral oils at specific temperatures

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

ISO 15, 22, 32, 46 and 68 based on typical figures for the Esso Nuto range of HM oils. ISO 37 based on Shell Tellus HM oil.

Maintenance and service

Replacement of burst discs. This procedure should only be completed by suitably trained personnel.



The loading valve contains replaceable safety discs. These discs relieve the pressure at approximately 7 bar (100 psi) over the maximum pressure by-passing the oil internally.

Replacing Safety Discs

- Disconnect the unit from the hydraulic circuit and remove any fittings from the exit port
 - Locate the new discs - the unit is shipped with spare discs located in the block
 - Screw the load valve fully shut - (clockwise)
 - Unscrew the safety disc holder from the valve.
 - Remove the disc spacer and ruptured discs from the valve and disc holder
 - Carefully shape the two discs by pressing them by hand between the disc holder and spacer
- Place the first disc inside the valve
 - Replace the spacer
 - Place the second disc on top of the spacer
 - Screw in the disc holder, tighten to 54 Nm (40 lb.ft)
 - Unscrew the load valve fully.

Calibration

Recommended period between calibrations is 12 months.

Maximum period between calibrations is 36 months.

Unit accuracy may be affected by operating cycle, fluid condition or extended periods between recalibrations.

Spares Table

Webtec Model Number	Webtec Burst Disc Part Number	Pressure Rating
CT300R-FB-B-B-6 CT300R-FB-S-S-6	FT10791-6	6000 psi (420 bar)
CT600R-FB-S-B-7 CT600R-FB-S-S-7	FT10792-7	7000 psi (480 bar)

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Favor de no devolver mercancías sin autorización por escrito

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