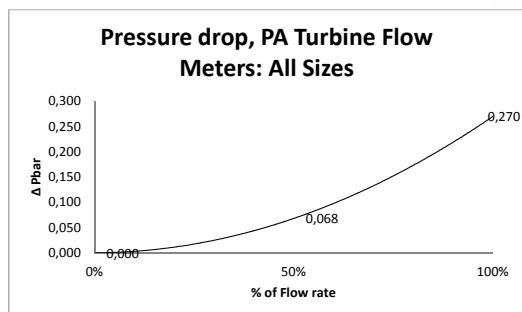


# Turbine Flow Meter Range



# Turbine Flow Meter Range

Our Turbine Flow Meters have a unique open bearing design which allows the measured media to flow freely thru the bearings and therefore provides continuous lubrication. This prolongs the life time of the flow meter and allows for free flow of cleaning agents during CIP. This is why we can provide a full 5-year warranty on our whole turbine flow meter series.



## Turbine flow meter range

Type	Nominal Bore (mm)	(Inches)	Bore (mm)	Flow Range - Liters / Minute	M3/Hr
-12/1	12	1/2	9,6	2,3 - 14	0,138 - 0,840
-15/2	15	5/8	11,8	4,5 - 34	0,270 - 2,040
-15/4	15	5/8	11,8	9,0 - 68	0,540 - 4,080
-18/8	18	3/4	15,5	18 - 140	1,080 - 8,400
-25/16	25	1	21,5	27 - 270	1,620 - 16,200
-31/24	31	1 1/4	27,3	41 - 410	2,460 - 24,600
-37/42	37	1 1/2	33,5	70 - 700	4,200 - 42,000
-50/66	50	2"	45,2	110 - 1100	6,600 - 66,000

Type - Series	Connection	Pressure Rating	Description
PATC	Triclover (ISO2852) fittings	10 Bar Max	Hygienic applications i.e. breweries, pharmaceutical, dairy, drinking water
PAT	BSPT (Tapered thread) or BSPP (Parallel thread)	250 Bar Max	Industrial and Hydraulic applications, i.e. automotive, oil
PAH	BSM/RJT	10 Bar Max	Hygienic applications; i.e. wine
PAF	Flanged series incl. DIN, ANSI & JIS	Refer to flange data.	General Industry

## Technical specifications

**Accuracy:** +/- 0,5%

**Repeatability:** 0,1%

**Output pulse:** Sine wave, >25mV peak to peak.

**Output Frequency:** Approximately 100-1000Hz

**Temperature Range:** -50 - 125°C

Pressure drop 4 PSI (0,27 Bar) @ max flow rate (water).

**IP Rating:** IP66 & IP68

**Pickup thread connection:** 9/16 x 26 TPI (or) 5/8-18 UNF

**Maximum Flow Range:** 150% of specified Max flow for short periods.

**Calibration:** 5-point Calibration Certificate included in all deliveries.

## Materials:

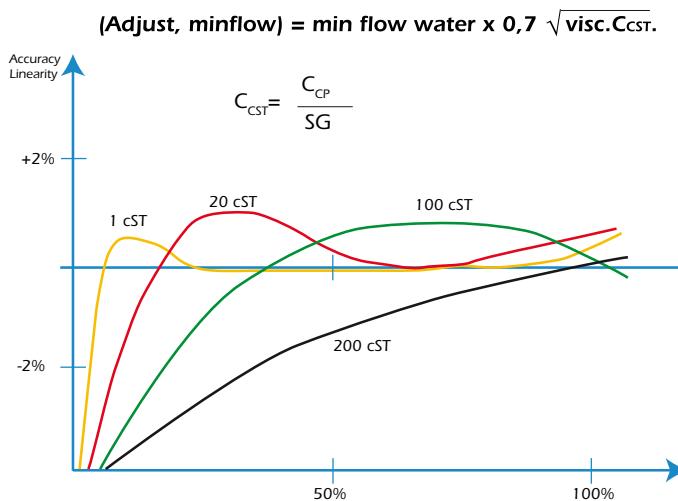
**Body** = Stainless Steel / EN 1.4401

**End supports** = Stainless Steel / EN 1.4401

**Rotor** = Fv 520

**Bearings** = (Shaft = Stellite 100) (Bushes = Stellite 6) Bearing balls = Al2O3

# The below diagram illustrates the effect of viscosity on the performance of the Turbine flow meter



**NOTE:** Each flow meter size is represented by a minimum and a maximum flow range. These flow ranges are based on calibration with water - which has a viscosity of 1.

The minimum flow range value will increase with increasing viscosity. Next is a formula that shows how to calculate the new minimum flow range value for a new viscosity.

$$N = n \times 0,7 \sqrt{C_{\text{CST}}}$$

## Where:

N = The new minimum flow range value  
 n = The listed minimum flow range of the Turbine flow meter for water  
 C<sub>CST</sub> = Viscosity in Centistokes.

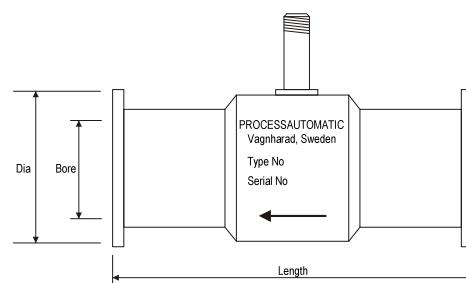
If you only have the viscosity value in CP (Centipoise) - then please use the following conversion formula:

$$C_{\text{CST}} = C_{\text{CP}} / \text{SG}$$

## Where:

C<sub>CST</sub> = Viscosity in Centistokes.  
 C<sub>CP</sub> = Viscosity in Centipoise.  
 SG = Specific Gravity.

## DIMENSIONS (Common dimensions)



### Flowmeter dimensions:

The table below covers the PAT and PATC range. Dimensions for other types are available on request.

PATC Dimensions:	Model	Length (mm)	Bore (mm)	Dia (mm)
	PATC/12/1	62	9.6	50
	PATC/15/2	62	11.8	50
	PATC/15/4	62	11.8	50
	PATC/18/8	90.5	15.5	50
	PATC/25/16	90.5	21.5	50
	PATC/31/24	117	27.3	50
	PATC/37/42	108	33.5	50
	PATC/50/66	132	45.2	64

PAT Dimensions:	Model	Length (mm)	Bore (mm)	Dia R"
	PAT/12/1	62	9.6	1/2
	PAT/15/2	62	11.8	5/8
	PAT/15/4	62	11.8	5/8
	PAT/18/8	82	15.5	3/4
	PAT/25/16	89	21.5	1
	PAT/31/24	98	27.3	1 1/4
	PAT/37/42	110	33.5	1 1/2
	PAT/50/66	132	45.2	2

# Turbine Flow Meter Series

Following are the 4 main Turbine flow meter series available from Process Automatic. Custom solutions are also available upon request; including optional end fittings, lengths and material selections. Please also note that we supply fully custom made reducers and straight lengths with optional end connections upon request .

## Hygienic & Sanitary Turbine Flow Meter

## Hygienic Turbine Flow Meter

### PATC



This “Sanitary” Turbine Flow Meter is suitable for clean environments such as dairies, breweries and pharmaceutical applications.

<b>Type:</b>	PATC - Sanitary Turbine Flow Meter
<b>Connection:</b>	Triclover end connections (ISO2852)
<b>Pressure Rating:</b>	10 Bar - Max.

### PAH



This “Hygienic” Turbine Flow Meter has the BSM or RJT fittings; also referred to as wine fittings.

<b>Type:</b>	PAH - Hygienic Turbine Flow Meter
<b>Connection:</b>	BSM & RJT hygienic fittings.
<b>Pressure Rating:</b>	10 Bar - Max.

### PAT



The PAT series has the classic BSP industrial fittings. Available as BSPP with the parallel threads or as BSPT with the tapered threads. These fittings suite hydraulic and other general industrial applications.

<b>Type:</b>	PAT - Industrial Turbine Flow Meter
<b>Connection:</b>	BSPP or BSPT
<b>Pressure Rating:</b>	250 Bar - Max.

### PAF



The Flanged series is available in most standards; including DIN and ANSI, up to 250Bar. The PAF Series is suitable for most general industry applications.

<b>Type:</b>	PAF - Industrial Turbine Flow Meter
<b>Connection:</b>	Flanged connections: DIN/ANSI
<b>Pressure Rating:</b>	250 Bar - Max.

# Accessories

## Turbine Flow Meter Repair Kit (Internals):

Despite the durability of our Turbine Flow Meters, the internal assembly will eventually need to be replaced. We provide the repair kits (Internals) with a full 5 point calibration certificate and a full 1 year warranty. Replacing the internals, reduces line maintenance costs and fully restores the functionality of the flow meter.



## PA 95 Magnetic Pickup Sensor

We can provide our Turbine Flow Meters with the option of our standard 2-pin Pick-up sensor. This is our standard 2-pin Pick-up sensor and a real work horse; with over 30 years of proven service. It is highly durable and extremely reliable. Depending on the input sensitivity of the receiving instrument, the PA95 Pickup sensor can be delivered together with one of our Pick-up preamplifiers PA105 or PA106.

<b>Type:</b>	Self generating Magnetic Inductive Pick-up Sensor.
<b>Electrical connection:</b>	Female Connector - Cannon / Amphenol connector type MS 3106-10SL-4S
	Male (Pickup) - Cannon / Amphenol connector type MS 3102-10SL-4P
<b>Sensor connection:</b>	9/16-26 TPI Thread.
<b>Nominal coil resistance:</b>	430 Ohm
<b>Nominal coil inductance:</b>	260 mH
<b>Dimensions:</b>	Length = 59,5mm, Ø = 15,8mm
<b>Material:</b>	Stainless steel (EN1.4401)



## PA 97 Magnetic Pickup Sensor

We also provide our flow meters with the option of a pickup sensor with built in pre-amplifier. This model is available as magnetic Inductive or as a Hall effect sensor.



<b>Type:</b>	Magnetic Inductive or Hall effect with built in Pre-Amplifier.
<b>Electrical connection:</b>	Female Connector - Cannon / Amphenol connector type MS 3106-10SL-3S
	Male (Pickup) - Cannon / Amphenol connector type MS 3102-10SL-3P
<b>Sensor connection:</b>	5/8-18
<b>Dimensions:</b>	Length = 70 & 76mm, Ø = 16mm
<b>Material:</b>	Stainless steel (300 series)

## PA 99 Magnetic Pickup Sensor

We also provide our flow meters with the option of an ATEX approved pickup sensor with built in pre-amplifier. This model is available as magnetic Inductive or as a Hall effect sensor.

<b>Type:</b>	Magnetic Inductive or Hall effect with built in Pre-Amplifier.
<b>Electrical connection:</b>	Female Connector - Cannon / Amphenol connector type MS 3106-10SL-3S
	Male (Pickup) - Cannon / Amphenol connector type MS 3102-10SL-3P
<b>Sensor connection:</b>	5/8-18
<b>Dimensions:</b>	Length = 356mm, Ø = 16mm
<b>Rating:</b>	II 1 G Ex ia IIC
<b>Material:</b>	Stainless steel (300 series)

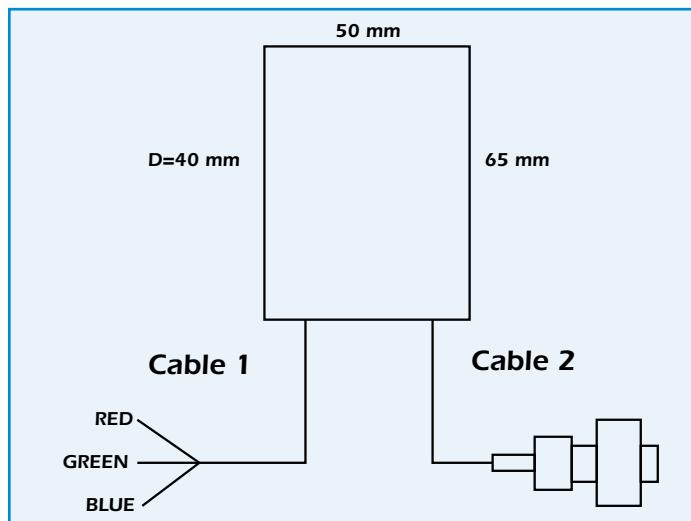


# Accessories Continued

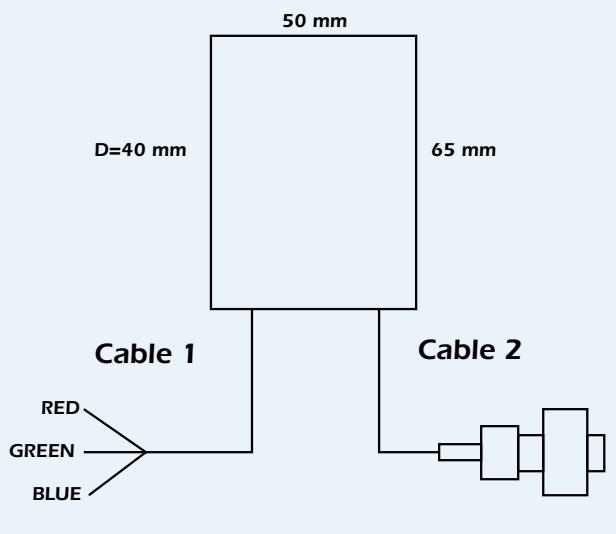
## PA 105 Pre-Amplifier



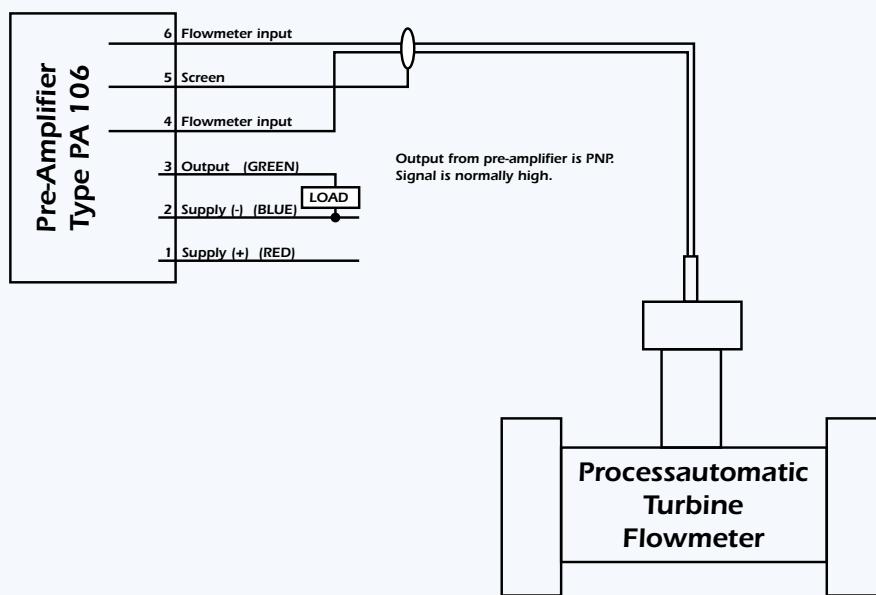
- **Red cable:** Supply voltage, V+ = 5-30V
- **Green cable:** Output open collector, max load 500mA
- **Blue Cable:** 0V, Supply and signal.
- **Temperature Range:** - 40 to +70C
- **Enclosure Protection:** IP65 standard
- **Enclosure Protection:** IP66 & IP68 Potted.



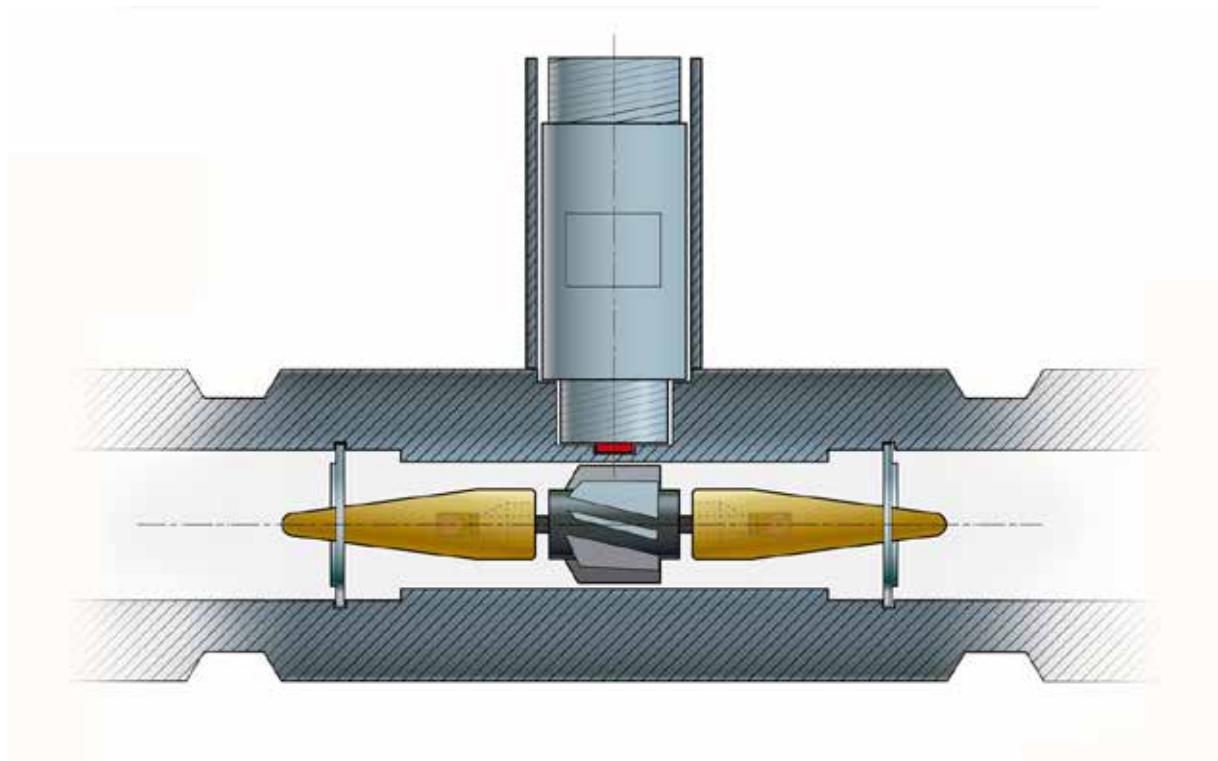
## PA 106 Pre-Amplifier



- **Red cable:** Supply voltage, V+ = 5-30V
- **Green cable:** Output source, amplitude = V+, max load 20mA
- **Blue Cable:** 0V, Supply and signal.
- **Temperature Range:** - 40 to +70C
- **Enclosure Protection:** IP65 standard
- **Enclosure Protection (optional):** IP66 & IP68 Potted.



# Functional principal & description of the Turbine Flow Meter



The Turbine flow meter (axial turbine) was invented by Reinhard Woltman and is an accurate and reliable flow meter for liquids and gases. It consists of a flow tube with end connections and a magnetic multi bladed free spinning rotor (impeller) mounted inside; in line with the flow. The rotor is supported by a shaft that rests on internally mounted supports.

The Supports in Process Automatics Turbine Flow Meters are designed to also act as flow straighteners, stabilizing the flow and minimizing negative effects of turbulence. The Supports also house the unique open bearings; allowing for the measured media to lubricate the bushes - prolonging the flow meters life span. The Supports are fastened by locking rings (circlips) on each end.

The rotor sits on a shaft, which in turn is suspended in the flow by the two supports. As the media flows, a force is applied on the rotor wings. The angle and shape of the wings transform the horizontal force to

a perpendicular force, creating rotation. Therefore, the rotation of the rotor is proportional to the applied force of the flow. Because of this, the rotor will immediately rotate as soon as the media induces a forward force. As the rotor cannot turn thru the media on its own, it will stop as soon as the media stops. This ensures an extremely fast response time, making the Turbine Flow Meter ideal for batching applications.

A pick-up sensor is mounted above the rotor. When the magnetic blades pass by the pickup sensor, a signal is generated for each passing blade. This provides a pulsed signal proportional to the speed of the rotor and represents pulses per volumetric unit.; and as such the flow rate too.

Our Turbine flow meters have a stainless steel body, rotor and end supports. The bearings are of Stellite and Al2O3. In combination with the overall design - The Process Automatic Turbine Flow Meters are unmatched on quality and durability.



*Superior & Unique*



*Open bearing design*

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