

Technical specifications Exchangeable PVDF Turbine Flowmeter 0045 and 0085

Description:

The Flowmeter has low flow capabilities in a wide range of flow processes. The exchangeable turbine flowmeters are designed to perform a simple and fast exchange of the Turbine flowtube in single use applications, especially for the Pharmaceutical and Biotech industries. Together with the IR- opto electronics, the flowmeter produces an accurate pulse signal, proportional to the flow which can easily be transmitted and processed. Electronics available for 5 Vdc or 5-30 Vdc. The PVDF Turbine Flowmeter is available in two versions, Clipmounted and Tubeholder.

Sterilization of the Turbine tube is possible with :

- Gamma Irradiation up to 50 kGy
- CIP / SIP
- Autoclave
- ETO



Model Clipmounted



Model Tubeholder

General Process specifications with water at 20 °C / 68 °F		
model >	0045	0085
Flowrange L/min	0.03 - 2.0	0.3 - 20.0
Accuracy +/- in % of reading	1,5	1.5
Repeatability in %	0.15%	0.15%
Wetted Parts	PVDF with ruby bearing	PVDF with ruby bearing
Proces connections	8 mm hose barb	12 mm hose barb
Max Liquid temperature °C / F	80/176	80 / 176
Max pressure Bar	25	20
Average Impuls /ltr @ linear range	95000	4800
Average linear flowrange	100 - 1500 ml/min	1 - 18 L/min
Recommend Pre Filter µm	100	100
Std Connection cabel	1 mtr / 3.2 Ft	1 mtr / 3.2 Ft

Availability:

Two models are available

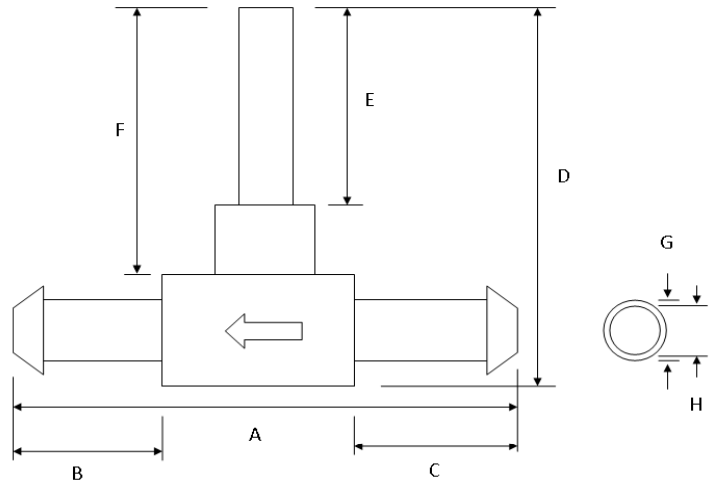
- Clipmounted, if exchanging the tube occurs in low frequency
- With a Tubeholder, if a more solid device is desired and exchanging the tube occurs more frequent

Table 1:

Connecting Electrical Wiring	Electrical data			
	Power supply version:	5 Vdc	24 Vdc	Tubeholder 24 Vdc
	Current consump.	11.5 mA	9.2mA	9.2 mA
	Reversed polarity of DC	yes	no	yes
	Voltage peak 1 sec max	12 Vdc	36 Vdc	36Vdc
	Output Short to ground	4.9 mA	2.4 mA	4.9 mA
Output signal	NPN square wave	Same	Same	
<p>Caution: If connecting sensor to different electronics like PLC's, external resistor is required. See left draw [RX]</p>				

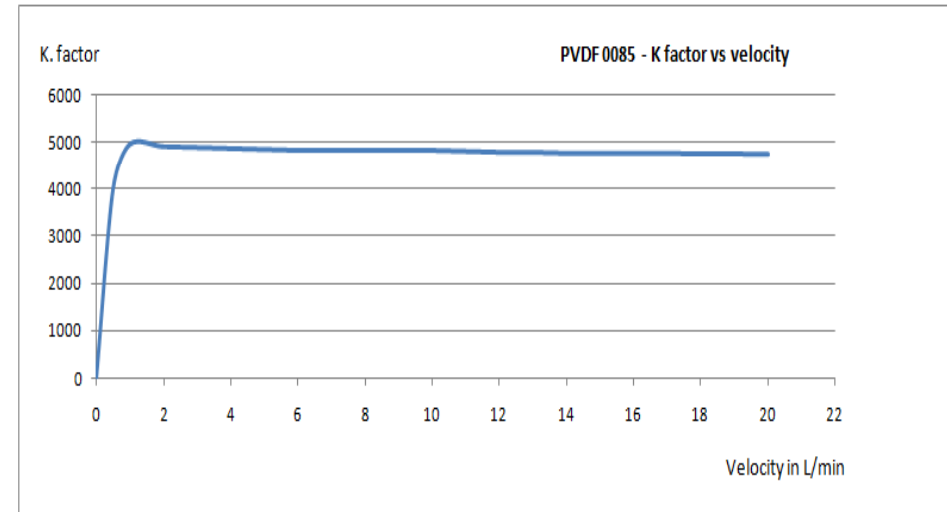
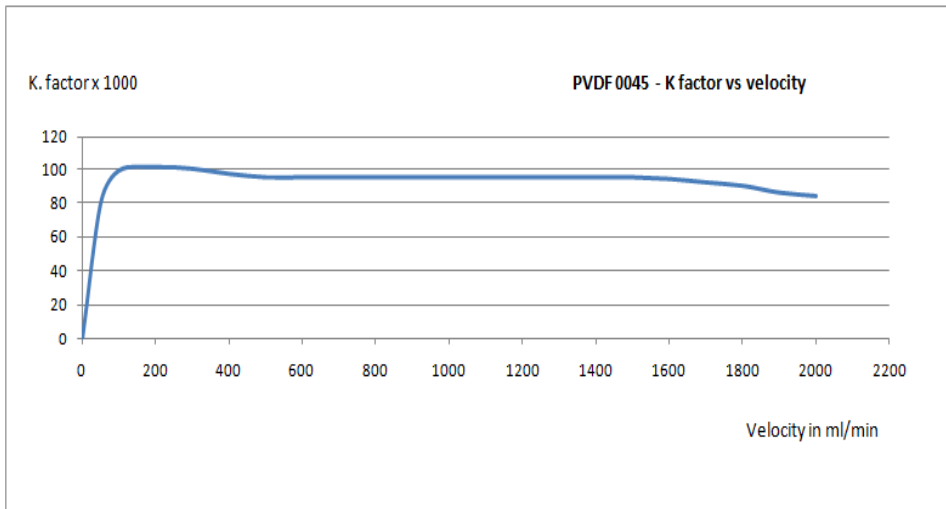
- Recommendations before use:**
- Check flow direction (arrow on sensor)
 - Install a suitable filter in front of the sensor (see table 1)
 - De-aerate the system with gentle pressure before starting the system
 - Check for leakage after system start
 - Never clean the sensor with compressed Air
 - Check chemical resistance of wetted parts
 - Avoid influence by direct sunlight on the flowmeter

Dimensions in mm	0045 Hose Barbs	0085 Hose Barbs
A	52	62
B	15	20
C	17	20
D	60	67
E	36	36
F	46	46
G	7	12
H	4.5	9



K-factor - with water 20 °C / 68 ° F

The K-factor is the amount of impulses per volume, measured with water at 20 °C / 68 ° F



Effects on K factor at higher viscosities:

A higher liquid viscosity effects the measuring performance of the Flowmeter significant. Depending of the vsicosity, the turbine needs a higher flow to start spinning, while the K factor will be lower.

Tests with a water / Glycerine solution shows following average effects:

Glycerine concentration (Viscosity	Density g/cm ³
65%	15 mPas	1.16

	model PVDF 0045	model PVDF 0085
Turbine rotor starts spinning at	250 ml/min	400 ml/min
lineair signal from	900 ml/min	7 l/min
Average K factor deviation vs water	-11%	-17%

Recommendation:

Every deviant liquid other then water should be tested first in behalf on K factor calibration.

Mounting direction of the Turbine tube:

The flowmeter can only be used in 1 direction.
On the flowtube with black middle part, an arrow shows the right flow direction.

The exchangeable flowtube for use with the Tubeholder, does not show an arrow, but you can indentify the right direction in 3 ways:

1. The tube only fits in 1 direction in the Tubeholder
2. If you look into the tube, the white rotor shows the outlet
3. Looking at the tube, the biggest ringprofile shows the outlet side.

Effects caused by temperature influence on the electronics:

Recommended max temperature of 80 °C / 176 °F is to protect the electronic IR sensor.

A short (max 30 minutes) higher temperature (max 120 °C / 248 °F) however will not cause any damage.

Effects caused by temperature on max pressure:

The PVDF flowtube is resistant against a continuous medium temperature of 150 °C / 302 °F

At higher temperatures, a lower max pressure is recommended according to the table 'Pressure rating according DIN 2401'

Pressure rating according DIN 2401	
Temperature in °C / °F	Tensile strenght at 23 °C/73 °F
	PN10
-40 / -40	100%
0 / 32	100%
10 / 50	100%
20 / 68	100%
30 / 86	80%
40 / 104	70%
50 / 122	60%
60 / 140	50%
70 / 158	45%
80 / 176	40%
90 / 194	35%
100 / 212	35%
110 / 230	30%
120 / 248	30%
130 / 266	25%

Example pressure rating: At 20 °C PVDF 0085 is 20 bar (table 1)

At 80 °C PVDF 40% = max 8 bar

Effects caused by temperature influence on the K-Factor

At higher medium temperature, the K factor will heighten due to a lower viscosity of the material. Depending of the kind of material and viscosity, we recommend to re-calibrate the K factor at all time.

For more extensive information about material properties, visit our website www.equflow.com or send an email to sales@equflow.com

Regulations and Certifications:

Material specifications:

Name of Material PVDF Solef 1008 /0001 Homopolymer
Chemical name Polyvinylidene Fluoride
Density 1.78 g/m3
Water absorbsion (24 < 0.04% - ISO 62 (method 1)
Composition of Ruby bearing is Synthetic AL203 monocrystal.

EU regulations:

Directive 2002/95/EC
RoHS - restriction of Hazardous substances in Electrical equipment
Wherein Hg - Pb - Cr(VI) and PBB - PBDPE are below 0,1%
and Cd is below 0,01%
WEEE and CE
KTW recommend Plastics for drinking water applications

US Regulations:

US CONEG Wherein the sum of Pb - Cd - Cr - Hg shall not exceed 100 ppm
FDA 21 CFR 177.2510(a)
NSF Standard 61 Drinking water system components
NSF Standard 51 Food equipment materials
USP Class VI
UL Standard 94 Flammability of palstic materials Class V-0

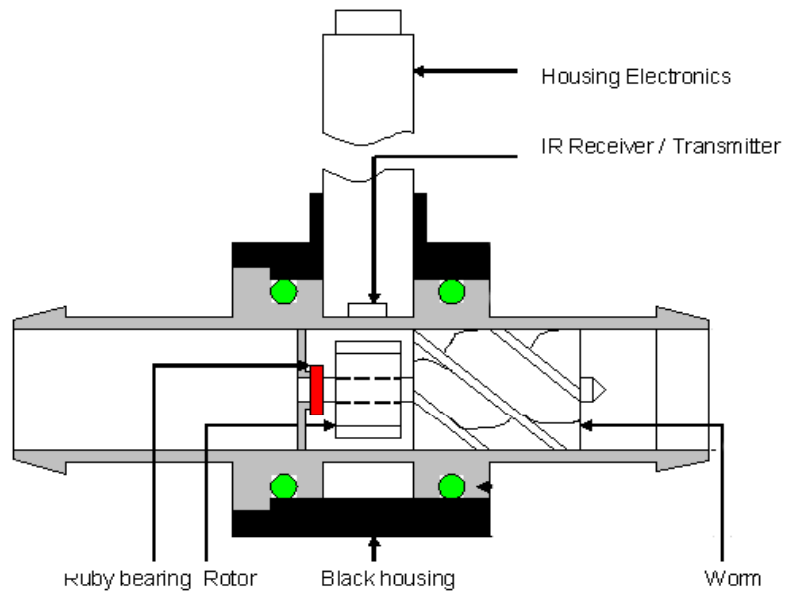
Other International Regulations

GADSL Does not contains prohibited of Declarable substances.

TSE/BSE Statement:

This product is manufactured according to a chemical polymerization process that does not involve any substance of animal or biological origin.
Source: Solvay.

Turbine tube slice and innerparts.



Compatibility:

The output signal of the PVDF Flowmeters can be connected to

1. Equflow 6100 DA converter, to obtain analogue signals 4 - 20 mA and 0-10 V.
2. Equflow 601 Dose Controller for flowmonitoring, Totalizing, datalogging and Dosecontrol
3. A laptop or PC for Configuration functions.

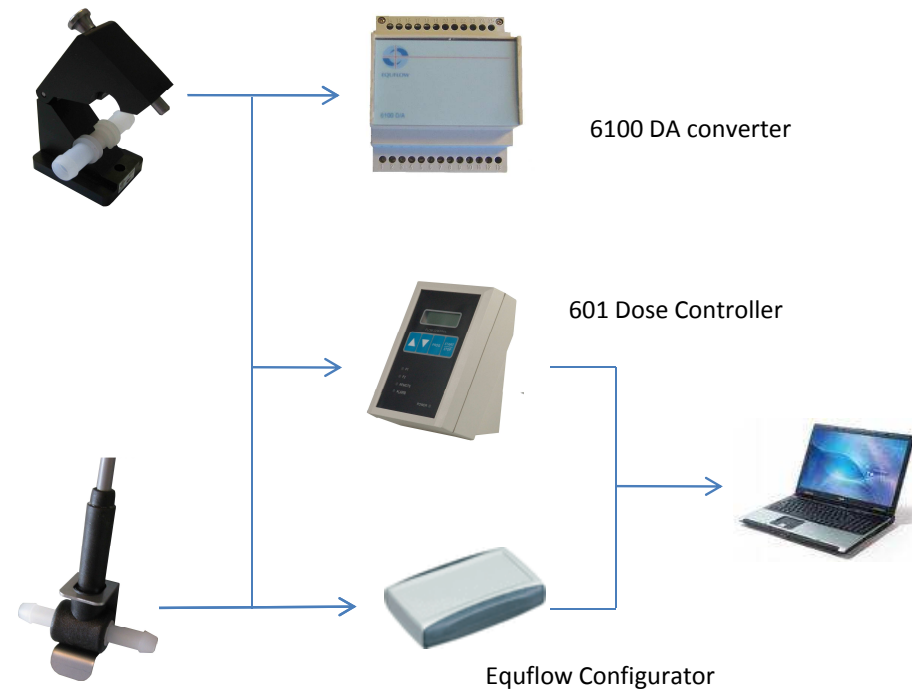
Optional Configurator set up functions of the 5-30 Vdc - M version:

- Flow switch mode , set switch level at certain flow
 - Set Batch mode; frequently dosing the same amount of volume.
- (Equflow Configurator required)

Working principle:

A static worm forces the passing fluid into a spin
 The spinning fluid brings the rotor into a frictionless rotation proportional to the flow.
 The reflectors on the rotor reflects an IR beam. The electronics convert the optical signal into an electrical square wave pulse.
 This setup even allows measuring opaque liquids.
 The frictionless rotation of the rotor, allows no wear out takes place.

Patent: US5388466



Ordercodes:

PVDF flowmeters clipmounted 5 - 30 Vdc:

0045.P.H.P.01.CX PVDF Disposable Turbine flowmeter 4.5; Hose Barb ; 5 - 30 Vdc; Clip
 0085.P.H.P.01.CX PVDF Disposable Turbine flowmeter 8.5; Hose Barb ; 5 - 30 Vdc; Clip

PVDF flowmeters clipmounted 5 Vdc:

0045.P.H.P.01.CL PVDF Disposable Turbine flowmeter 4.5; Hose Barb ; 5 - 30 Vdc; Clip
 0085.P.H.P.01.CL PVDF Disposable Turbine flowmeter 8.5; Hose Barb ; 5 - 30 Vdc; Clip

Tubeholder for PVDF turbine tubes 5 - 30 Vdc:

0045.C.X.P.01.TX Tubeholder for PVDF 4.5 turbine tube; includes 5-30 Vdc electronics
 0085.C.X.P.01.TX Tubeholder for PVDF 8.5 turbine tube; includes 5-30 Vdc electronics

Exchangeable PVDF turbine tubes:

0045.P.H.0.00.CX PVDF Disposable Rotor Tube 4.5; Hose Barb;Clipmounting 10-pack
 0045.P.H.0.00.TX PVDF Disposable Rotor Tube 4.5; Hose Barb;for Tubeholder 10-pack
 0085.P.H.0.00.TX PVDF Disposable Rotor Tube 8.5; Hose Barb;for Tubeholder 10-pack
 0085.P.H.0.00.CX PVDF Disposable Rotor Tube 8.5; Hose Barb; Clipmounting 10-pack

Spareparts Electronics and clips

0000.P.X.P.01.CX Electronic pick-up ; 5-30 Vdc ; Clipmounting
 0000.P.X.P.01.CL Electronic pick-up ; 5 Vdc ; Clipmounting
 0045.X.X.X.00.CX Mounting Clip for the 0045 flowmeters
 0085.X.X.X.00.CX Mounting Clip for the 0085 flowmeters

Optional Controllers and converters:

6100.DA.CON.DC.XX Digital impulse to Analogue 4-20 mA / 0-10 V Converter model 6100
 6300.BA.CON.DC.XX Converter Batch or Flowswich applications
 601.BF.K.010 601 Batch - Flow - Totalizer Controller
 CONF.0010.X01 Flowmeter Configuration Module
 CONF.0601X.X01 Configuration Program for the 601 controller, including datalogging software module.



6100 DA converter



601 controller



Flowmeter configurator

All flowmeter electronics standard with 1 meter / 3.2 feet PVC cable.
 Other specifications and modifications on request.

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