biotech access point...

High Purity

North America

PRESENTS

EQUFLOW®
Sensors

EQUFLOW®
Sensors

Disposable PVDF Turbine Flowmeter

Outstanding performance in Pharmaceutical-, Medical-, and Bio-technological 'single-use' applications

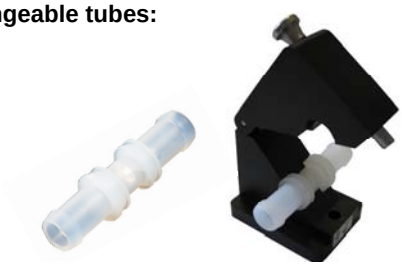
This flowmeter has low flow capabilities in a wide range of flow processes and has been developed to perform a fast exchange of the flow tube in single-use applications (or have them built in to disposable assemblies).
In spite of the name 'Single-use', these devices are also suitable for long-term measurement.

Characteristics:
Performs a fast exchange of the flowtubes
High resolution square wave output
Flow Measuring by revolutionary Infra Red turbine rotor reflection
PVDF for high chemical and corrosive resistance
High accuracy (< 1%) and repeatability (< 0.15%)
Also suitable for opaque liquids
Programmable pulse output
PVDF meets all the requirements of the US Pharmacopeia Class VI
The flow tube can be sterilized up to 140º C.
Gamma radiation resistant up to 50 kGy

Patent US5388466

Available in 2 designs, both with exchangeable tubes:

1. Clip mounted



2. With Tube holder

Model	0045	0085
Inner diameter in mm	4,7	9,3
Flow range	0.03 – 2 L/min	0.3 – 20 L/min
Accuracy	1% of reading	1% of reading
Repeatability	< 0.15 %	< 0.15 %
Wetted parts	PVDF / Ruby bearing	PVDF / Ruby bearing
Tube connection	7 mm hose barb	12 mm hose barb
Tube length in mm	53	62
Liquid temperature in °C	-20 tot +80	-20 tot +80
Max. pressure at 20°C in MPa	2.5 (25 Bar)	2 (20 Bar)
Viscosity in cSt.	0.8 - 10	0.8 – 10
K factor (water) in pulse/Litre	100.000	4.500
Power supply	5 - 30 Vdc	5 - 30 VDC
Output signal	5 - 30 V square wave	5 - 30 V square wave
Power consumption	34 mA at 5 V	34 mA at 5 V
Electrical cable length	PVC 1 meter	PVC 1 meter
Options: Programmable K-factor – Flow alarm level – Batch function with preset Other Specs on request.		

High Purity North America, LLC • P.O. Box 6438, Providence, RI 02940
Shipping Address: Unit #4, 25 Thurber Blvd, Smithfield, RI 02917 • Telephone (401) 349-0685 • Fax (401) 349-0931
E-mail: info@hp-na.com • Website: www.hp-na.com

Technical Specifications:
Exchangeable PVDF 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.

Clipmounted Model

The PVDF Turbine Flowmeter is available in two versions, **Clipmounted** and **Tubeholder**.

Availability:
Two models are available:

- Clipmounted, if exchanging the tube occurs infrequently
- Use the Tubeholder if a more solid device is desired and exchanging the tube occurs infrequently

Tubeholder Model

Sterilization of the Turbine tube is possible with:

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

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
Process connections	8 mm hose barb	12 mm hose barb
Max Liquid temperature ˚C / F	80/176	80 / 176
Max pressure Bar	25	20
Average Impulse /ltr @ linear range	95000	4800
Average linear flowrange	100 - 1500 ml/min	1 - 18 L/min
Recommend Pre Filter µm	100	100
Std Connection cable	1 mtr / 3.2 Ft	1 mtr / 3.2 Ft

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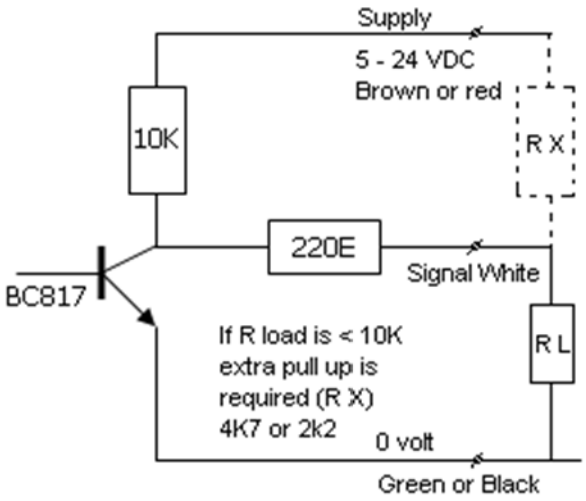
Connecting Electrical Wiring



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

Caution:

If connecting sensor to different electronics like PLCs, an external resistor is required.
See image above [RX]

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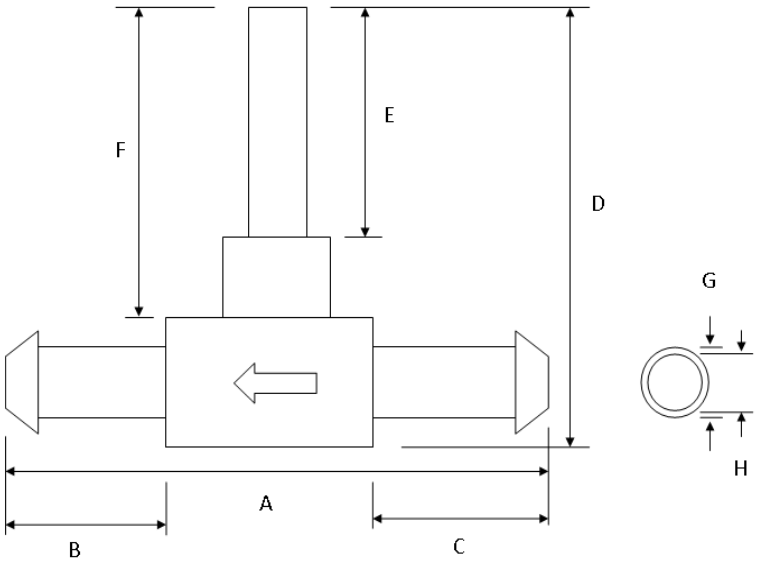
Recommendations before use:
- Check flow direction (arrow on sensor)
- De-aerate the system with gentle pressure before starting the system
- Check for leakage after system start
- Never clean the sensor with compressed Air
- Check chemical resistance of wetted parts
- Avoid influence by direct sunlight 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

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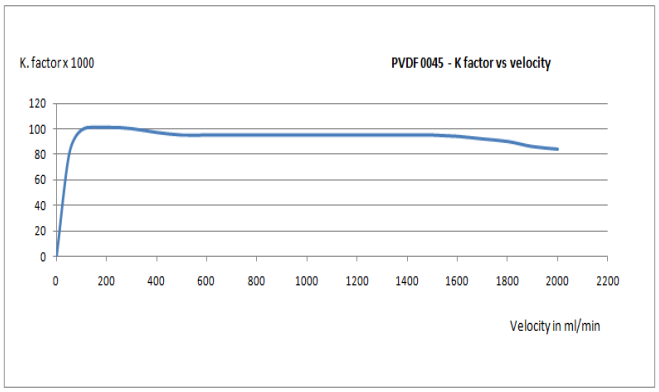
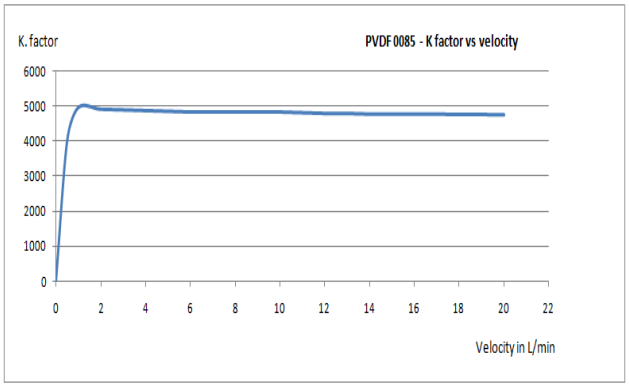
K-factor - with water 20˚C / 68˚ F
The K-factor is the amount of impulses per volume, measured with water at 20 ˚C / 68 ˚F





Effects on K factor at higher viscosities:
A higher liquid viscosity affects the measuring performance of the Flowmeter significantly. Depending on the viscosity, the turbine needs a higher flow to start spinning, while the K factor will be lower (this is easily adjustable).

Tests with a water / Glycerin solution show following average effects:

Glycerin concentration (weight)	Viscosity	Density g/cm³
65%	15 mPas	1.16
	model PVDF 0045	model PVDF 0085
Turbine rotor starts spinning at	250 ml/min	400 ml/min
linear signal from	900 ml/min	7 l/min
Average K factor deviation vs. water	-11%	-17%

Recommendation:
Any liquid other then water should be tested first to determine the effect on K factor calibration.

Mounting direction of the turbine tube:
The flowmeter can only be used in 1 direction.
On the flowtube, the middle section shows an arrow with the right flow direction.

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

1. The Tube only fits in one direction in the tube holder
2. If you look into the tube, the white rotor shows the outlet.
3. Looking at the tube, the biggest ring profile shows the outlet side.

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Technical Specifications:
Exchangeable PVDF Flowmeter 0045 and 0085

Effects caused by temperature influence on the electronics:
Recommended max temperature of 80 ˚ C / 176 ˚ F 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 maintains its resistance at 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'

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 on the kind of material and viscosity, we recommend re-calibrating the K factor every time. For more extensive information about material properties, visit our website at www.hp-na.com, or email info@hp-na.com.

Pressure rating according DIN 2401	
Temperature in ˚C / ˚F	Tensile strength 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	

Regulations and Certifications:

Material specifications:

Name of Material	PVDF Solef 1008 /0001 Homopolymer
Chemical name	Polyvinylidene Fluoride
Density	1.78 g/m3
Water absorption (24 h at 23 ˚C/73 ˚F)	< 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)
USP	Class VI
UL Standard 94	Flammability of plastic 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.

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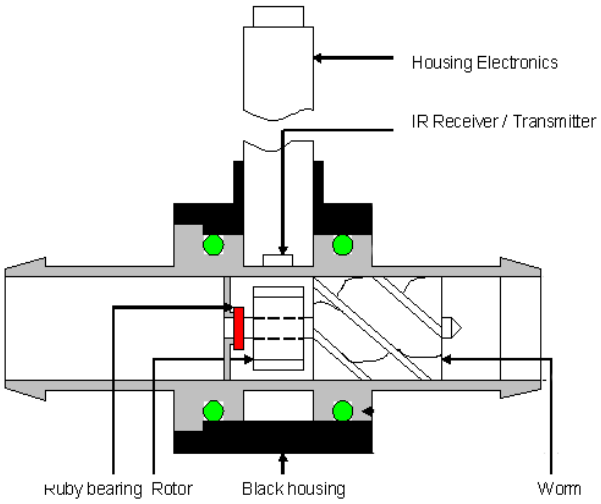
Technical Specifications:
Exchangeable PVDF Flowmeter 0045 and 0085

Turbine Tube Splice and Inner Parts



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 reflect an IR beam.

The electronics convert the optical signal into an electrical square wave pulse.

This setup even allows measuring opaque liquids.

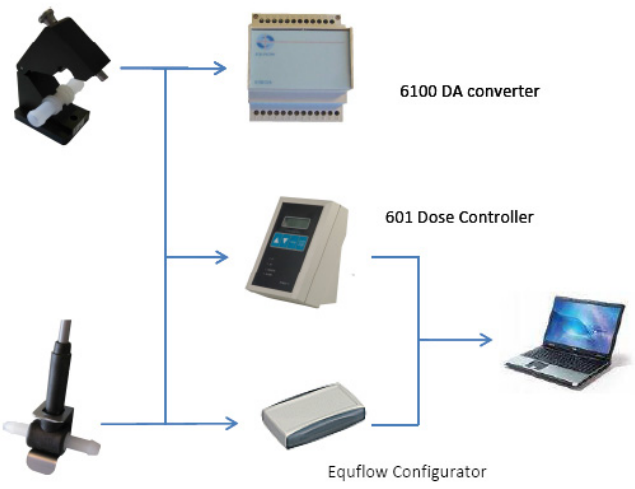
The frictionless rotation of the rotor ensures that no wear out takes place.
Patent: US5388466

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 Dose control
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)



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PVDF Order Codes
Exchangeable PVDF Flowmeter 0045 & 0085

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)

Spare parts 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 Flowswitch 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.

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

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Fixed PFA Turbine Flowmeter
Non-Gamma Model

The PFA flow sensor of Equflow has low flow sensing capabilities in a wide range of applications, and is suitable for clear, opaque, neutral, corrosive and aggressive liquids. An ultra light-weight turbine rotor follows the fluctuation of flow very accurately and generates a high-resolution IR reflected signal. In either flow-controlled or monitoring applications, the PFA flowsensor can measure flow rates and totalize.

Characteristics:
Turbine flowsensor with high resolution output
Flow Measuring by revolutionary IR turbine rotor reflection
PFA / Teflon for high chemical and corrosive resistance
High accuracy and repeatability (“Swiss made”)
Suitable for opaque liquids
PFA meet all the requirements of the US Pharmacopeia Class VI
BSE/TSE certificate available
All wetted parts are made of Teflon® PFA with a ruby bearing
Autoclave / ETO

Patent US5388466

Options:

Programmable K-factor
Flow Alarm level
Batch function with preset

Model	0045	0085	0125
Inner diameter in mm	4.5	8.5	12.5
Flow range	0.06 - 2 L/min	0.5 - 20 L/min	1.5 - 40 L/min
Accuracy	1% of reading	1% of reading	1% of reading
Repeatability	< 0.15 %	< 0.15 %	< 0.15 %
Wetted parts	PFA / Ruby	PFA / Ruby	PFA / Ruby
Tube connection thread/hose barb	⅛ “ NPT / 7 mm	¼ “ NPT / 12 mm	½ “ NPT-BSP / -
Tube length in mm	52	60	72
Liquid temperature in °C	-20 tot +80	-20 tot +80	-20 tot +80
Max. pressure at 20° C in MPa	2 (20 Bar)	1.5 (15 Bar)	1 (10 Bar)
Viscosity in cSt.	0.8 - 10	0.8 - 10	0.8 - 10
Resolution in microL/puls	9	164	500
K factor (water) in pulse/Litre	110.000	6.100	2.000
Power supply	5 - 30 Vdc	5 - 30 Vdc	5 - 30 Vdc
Output signal	5 - 30 V sq. wave	5 - 30 V sq. wave	5 - 30 V sq. wave
Power consumption	34 mA at 5 V	34 mA at 5 V	34 mA at 5 V
Electrical cable length	PVC 1 meter	PVC 1 meter	PVC 1 meter
Other Specs on request			

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Disposable PFA Turbine Flowmeter

This model is developed to perform a fast exchange of the flow tube (hygienic reason e.g. in pharmaceutical industry). The flowmeter is suitable for clear and opaque, neutral, corrosive and aggressive liquids, and for periodic monitoring.
The flow tube is assembled in the flow system.
For measurement and calibration, the easy-to-remove housing is placed around the tube for measuring.

Characteristics:
Turbine flowsensor with high resolution output
Flow Measuring by revolutionary IR turbine rotor reflection
PFA / Teflon for high chemical and corrosive resistance
High accuracy and repeatability ("Swiss made")
Suitable for opaque liquids
Programmable pulse output
PFA meets all the requirements of the US Pharmacopeia Class VI
BSE/TSE certificate available

All wetted parts are made of Teflon®/PFA with a ruby bearing.
The flow tube can be sterilized up to 160º C.

Patent US5388466

Options:

Programmable K-factor
Flow Alarm level
Batch function with preset

Model	0045	0085
Inner diameter in mm	4.5	8.5
Flow range	0.06 – 2 L/min	0.5 – 20 L/min
Accuracy	1% of reading	1% of reading
Repeatability	< 0.15 %	< 0.15 %
Wetted parts	PFA / Ruby	PFA / Ruby
Tube connection	⅛" NPT or 7 mm hosebarb	¼" NPT or 12 mm hosebarb
Tube length in mm	L. 51	L. 60
Liquid temperature in °C	-20 tot +80	-20 tot +80
Max. pressure at 20°C in MPa	2 (20 Bar)	1.5 (15 Bar)
Viscosity in cSt.	0.8 - 10	0.8 – 10
K factor (water) in pulse/Litre	110.000	6.100
Power supply	5 - 30 Vdc	5 - 30 VDC
Output signal	5 - 30 V square wave	5 - 30 V square wave
Power consumption	34 mA at 5 V	34 mA at 5 V
Electrical cable length	PVC 1 meter	PVC 1 meter

Other Specs on request.

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Batch- and Flow Controller
Model S/601

Very 'easy to use' controller for Batching, Dosing, Filling,
Mixing and Totalizing.
Multi-functional and simple to program with 4 keys (see Quick Start Guide).
Equipped with clear 2x16 LCD display and audible Buzzer.
Automatic Power-down Data safe mode.
On/Off Switch

Application examples:

- Batch to feed stream
- Batch in time
- Filling 2 liquids simultaneously
- Filling 2 liquids sequentially
- Proportional mixing
- Flow monitoring and totalizing
- Pump control

The controller is assembled in a solid synthetic box with
IP65 enclosure. Several indicators on the PCB make it easy to
analyse process failures. The controller has an automatic power-down data safe mode.

Programmable:
K-factor to adjust for viscosity
Volume flow 1 and 2
Dose interval
Leakage alarm
No flow alarm
Read out in different units
Adjustable lag- correction
Login codes
and many more
Communication: USB, Ethernet

Modification and Customizing:

We modify software and
program on customer request
to optimize your process.

More products:

PFA or SS Turbine Flowmeters
SDM Metering Barrelpumps
Dose Computers

Inputs	Outputs
Flowmeter 1 puls max 5 kHz	Valve 1
Flowmeter 2 puls max 5 kHz	Valve 2
Extern Start / Stop	Alarm
Analog1 0 - 10 V	Reject
Analog2 0 - 10 V	Spare 1
Analog3 0 - 10 V	Spare 2
Analog4 4 - 20 mA	Spare 3
Power supply 24 Vdc	Analog1 4 - 20 mA
One-wire digital input	Analog2 0 - 10 V

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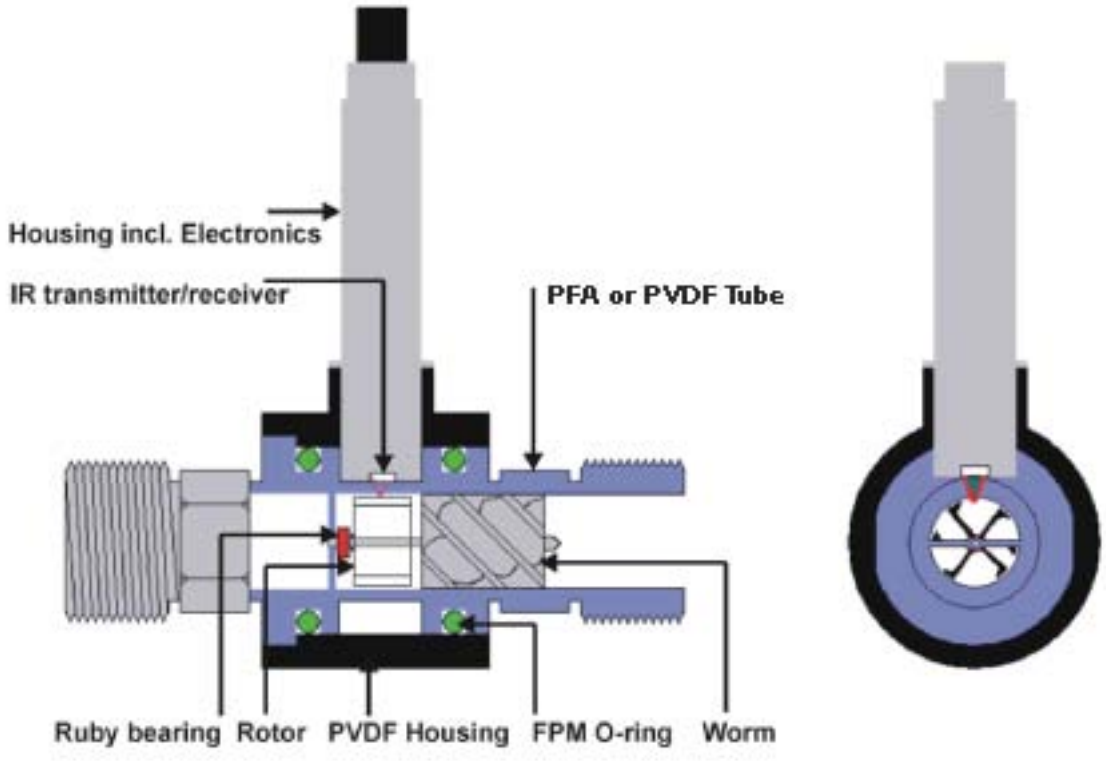
The Working Principle



Working principal:

1. a static worm forces the passing fluid to spin
2. the spinning fluid drives a rotor with reflectors into a frictionless rotation
3. a high resolution infrared sensor determines the rate of flow by counting the passing reflections
4. the set up even allows the flow of opaque liquids to be determined accurately
5. the ultra low mass of the rotor guarantees a quick response to changes in the rate of flow

Fixed

Disposable

Stainless Steel

Electronics

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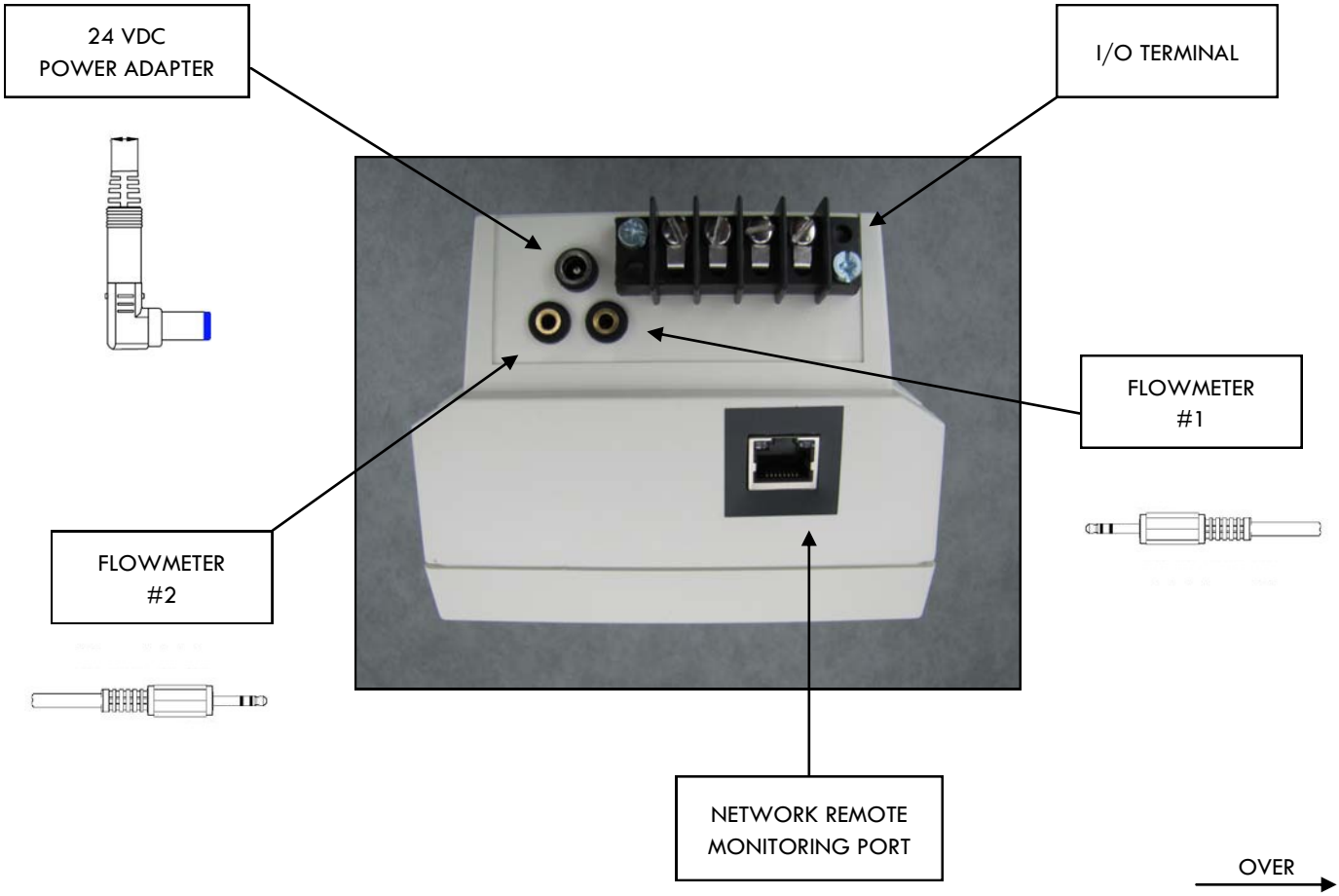
EquFlow S601 Flow Monitor
Quick Setup Guide

3 Easy Steps:

1 Make Connections 2 Set Parameters 3 Calibrate Flow Meters

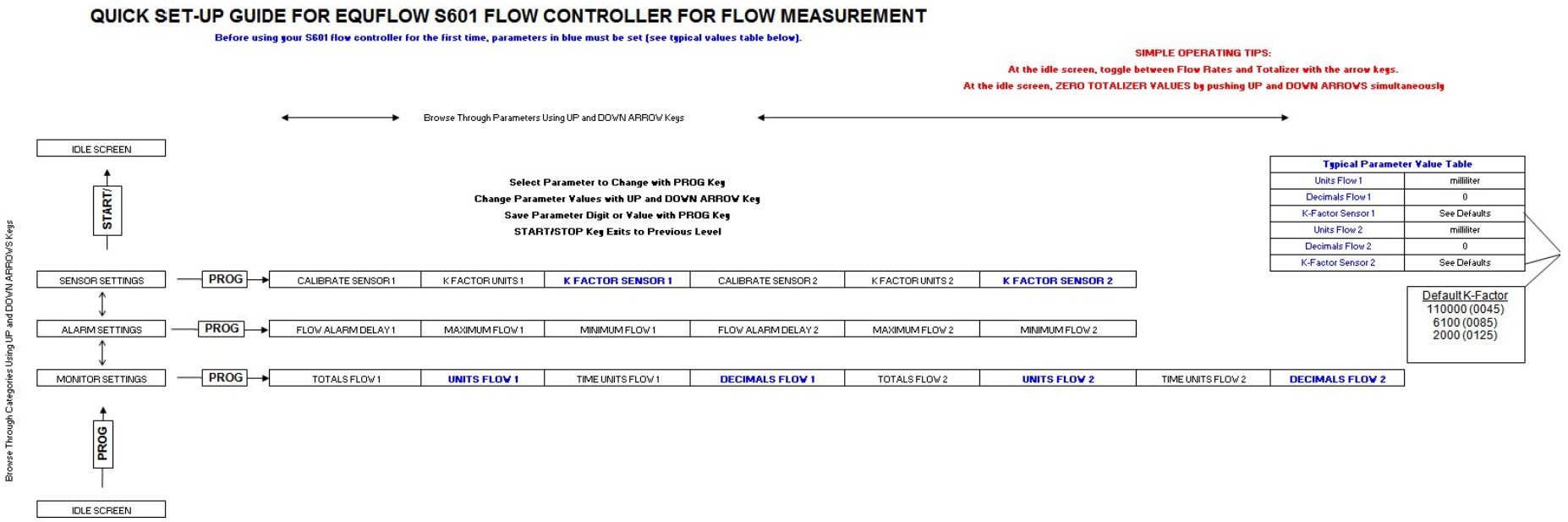
1 Make Connections:



OVER

EquFlow S601 Flow Monitor Quick Setup Guide (Continued)

2 Set Parameters:

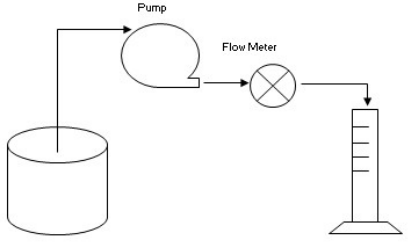


3 Calibrate:

Procedure for Automatic K-Factor Calibration

Complete parameter set-up before calibration. Calibration should be done on liquid to be measured (or similar viscosity/temperature solution).
More details of calibration on page 12 of S601 Manual.

1. Set up Flow meter as shown in figure to right
2. Zero totalizer (see Tips above)
3. Press START on S601 flow controller
4. Start pump at calibration flow rate
5. Collect liquid in graduated cylinder for ≥ 1 minute
6. Stop pump
7. Press STOP on S601 Flow controller
8. Enter programming mode, browse to CALIBRATE SENSOR 1 or CALIBRATE SENSOR 2 and push PROG
9. Change volume shown to actual volume measured and push PROG
10. Push STOP until back at idle screen



biotech access point...

High Purity North America

PRESENTS:

EQUFLOW®
Sensors









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