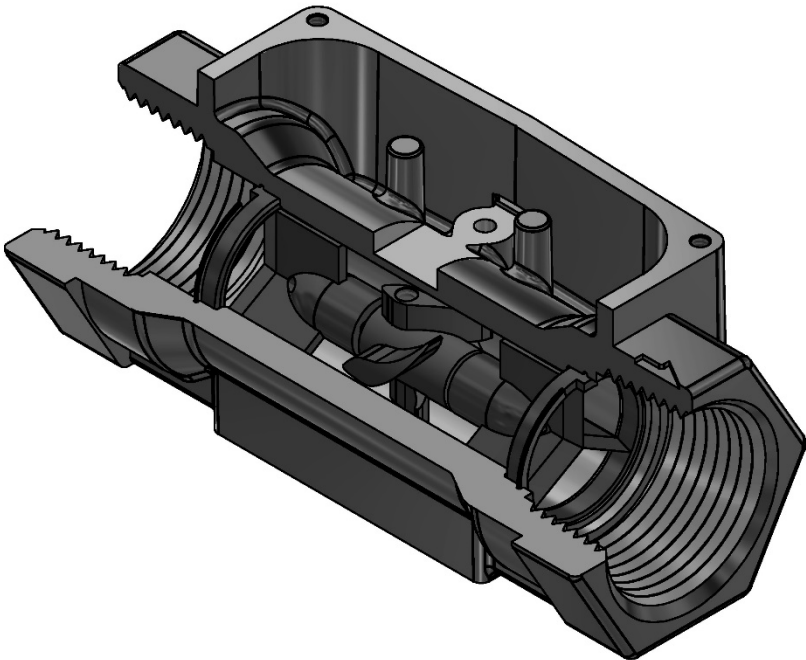


FLOMEC[®]

Owner's Manual



G2 Industrial Grade Turbine Housing

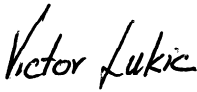
Includes Aluminum and Stainless Steel Housings
ANSI Flange Fittings and Tri-Clover[®] Flange Fittings

To the owner...

Congratulations on receiving your FLOMEC® Industrial Grade Turbine. We are pleased to provide you with a product designed to give you maximum reliability and efficiency.

Our business is the design, manufacture, and marketing of liquid handling, agricultural, and recreational products. We succeed because we provide customers with innovative, reliable, safe, timely, and competitively priced products. We pride ourselves in conducting our business with integrity and professionalism.

We are proud to provide you with a quality product and the support you need to obtain years of safe, dependable service.



Victor Lukic, President
Great Plains Industries, Inc.

GENERAL INFORMATION

This manual will assist you in installing and maintaining your FLOMEC® Industrial Grade turbine housing (See Figure 1). Information on electronics are contained in their respective manuals. Please reference those as necessary.

Figure 1

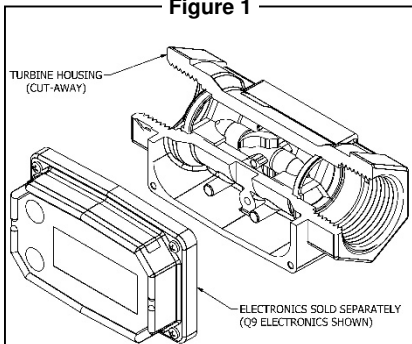


TABLE OF CONTENTS

General Information.....	2
Installation.....	4
Operation.....	6
Maintenance.....	6
Troubleshooting.....	8
Model Number Chart.....	9
Specifications.....	10
Aluminum.....	10
Stainless Steel.....	12
ANSI Flange Fittings.....	14
Tri-Clover® Flange Fittings.....	16
Illustrated Parts Drawings.....	18
Service.....	21
Agency Approvals Table.....	22

For best results, take the time to fully acquaint yourself with all information about all components of your FLOMEC® Electronic Digital Metering System prior to installation and use. If you need assistance, contact the distributor from whom you purchased your turbine.



This symbol is used throughout the manual to call your attention to safety messages.



Warnings alert you to the potential for personal injury.



Cautions call your attention to practices or procedures which may damage your equipment.

Notes give information that can improve efficiency of operations.

It is your responsibility to make sure that all operators have access to adequate instructions about safe operating and maintenance procedures.

Read Me!

For your safety, review the major warnings and cautions below before operating your equipment.

▲ WARNING

The apparatus enclosure may contain aluminum and is considered to constitute a potential risk of ignition by impact or friction. Care must be taken into account during installation and use to prevent impact or friction.

▲ WARNING

Part of the enclosure is constructed from plastic. To prevent the risk of electrostatic sparking the plastic surface should only be cleaned with a damp cloth.

1. Use **only fluids** that are compatible with the housing material and wetted components of your turbine.
2. When measuring flammable liquids, observe precautions against fire or explosion.
3. When handling hazardous liquids, always follow the liquid manufacturer's safety precautions.
4. When working in hazardous environments, always exercise appropriate safety precautions.
5. Always dispose of used cleaning solvents in a safe manner according to the solvent manufacturer's instructions.
6. During turbine removal, liquid may spill. Follow the liquid manufacturer's safety precautions for cleanup of minor spills.
7. Do not blow compressed air through the turbine.
8. Do not allow liquids to dry inside the turbine.
9. Handle the rotor carefully. Even small scratches or nicks can affect accuracy.
10. When tightening the turbine, use a wrench only on the wrench flats.

11. For best results, always verify accuracy before use.

Product Description

FLOMEC® Industrial Meter Turbines are identified by the internal diameter of the inlet and outlet.

- Model 05 – 1/2 inch
- Model 07 – 3/4 inch
- Model 10 – 1 inch
- Model 15 – 1-1/2 inch
- Model 20 – 2 inch

Each turbine is designed to work with onboard computer electronics and/or with one of several accessory output modules.

Liquid flows through the turbine housing causing an internal rotor to spin. As the rotor spins, an electrical signal is generated in the pickup coil. This signal is converted into engineering units (gallons, litres, etc.) on the local display. Accessory modules can be used to export the signal to other equipment.

Upon receipt, examine your meter for visible damage. The turbine is a precision measuring instrument and should be handled as such. Remove the protective plugs and caps for a thorough inspection. If any items are damaged or missing, contact your distributor.

Make sure the turbine model meets your specific needs. Refer to the Specifications Section and confirm the following:

1. The flowrate is within the limits of your model.
2. The liquid is compatible with the turbine's wetted components.
3. The system's pressure does not exceed the turbine's maximum pressure rating.

Information specific to your particular turbine, including serial number, model number, manufacturing date, and K-factor is etched on the meter. Be prepared to provide this information if you call customer service.

SN = Serial Number, a 6-digit number that identifies this particular turbine.

MODEL = Model Number, G2 followed with a letter indicating the housing material.

- A** for Aluminum
- S** for Stainless Steel

Two digits follow the material code indicating the size.

- 05** – 1/2 inch
- 07** – 3/4 inch
- 10** – 1 inch
- 15** – 1-1/2 inch
- 20** – 2 inch

The final letter indicates the type of thread.

- F** for Flange
- N** for NPT
- I** for ISO
- T** for Tri-Clover® Flange

MFG DATE = Manufacturing Date indicating the week and year of manufacture.

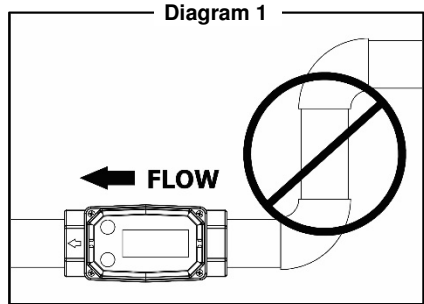
KF = K-Factor given in pulses per gallon (PPG).

INSTALLATION

For your future reference, it might be useful to record this information in the manual in case it becomes unreadable on the turbine.

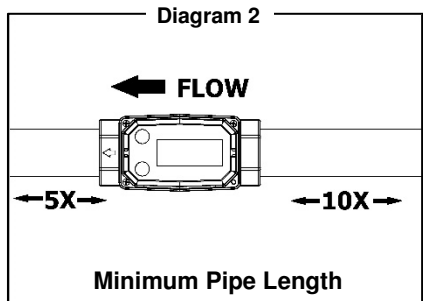
All FLOMEC® turbines are designed to measure flow in only one direction. The direction is indicated by the arrow, cast-molded in the turbine.

Flow altering devices such as elbows, valves, and reducers can affect accuracy. See Diagram 1. The following recommended guidelines are given to enhance accuracy and maximize performance. Distances given here are minimum requirements; double them for desired straight pipe lengths.



Upstream from the turbine, allow a minimum straight pipe length at least 10 times the internal diameter of the turbine. For example, with the 1-inch turbine, there should be 10 inches (25.4 cm) of straight pipe immediately upstream. The desired upstream straight pipe length is 20 inches (50.8 cm).

Downstream from the turbine, allow a minimum straight pipe length at least 5 times the internal diameter of your turbine. For example, with the 1-inch turbine, there should be 5 inches (12.7 cm) of straight pipe immediately downstream. The desired downstream distance is 10 inches (25.4 cm). See Diagram 2.



A typical backpressure of 5 to 50 PSI (0.34 to 3.4 bar) will prevent cavitation. Create backpressure by installing a control valve on the downstream side of the meter at the proper distance detailed above.

Foreign material in the liquid being measured can clog the turbine's rotor and adversely affect accuracy. If this problem is anticipated or experienced, install screens to filter impurities from incoming liquids.

Models 1/2 in., 3/4 in. and 1 in.:

Maximum Particulate Size	
Inches:	0.005
Microns:	125
Mesh:	120
Standard Sieve:	125 µm
Alternative Sieve:	No. 120

Models 1-1/2 in. and 2 in.:

Maximum Particulate Size	
Inches:	0.018
Microns:	500
Mesh:	35
Standard Sieve:	500 µm
Alternative Sieve:	No. 35

To ensure accurate measurement, remove all air from the system before use.

Threaded Connections

1. To protect against leakage, seal all threads with an appropriate sealing compound. Make sure the sealing compound does not intrude into the flow path.
2. Make sure the arrow on the outlet is pointed in the direction of the flow.
3. Tighten the turbine onto the fittings. Use a wrench only on wrench flats.

Note: If connecting to new male threads, burrs and curls can adversely affect accuracy. Correct the problem prior to turbine installation.

Verify accuracy after connections are complete. See Operation section.

ANSI Flange Connection

Use a gasket between the meter flange and mating flange. Determine the material of the gasket based on the operating conditions and type of fluid.

Note: Do not over tighten the flange bolts. This may cause the gasket to be compressed into the flow stream and may decrease the accuracy of the meter. See ANSI flange specification section for flange installation diagram.

Verify accuracy after connections are complete. See Operation section.

Tri-Clover® Flange Connection

1. Make sure the arrow on the outlet is pointed in the direction of the flow.
2. Insert a gasket between the meter fitting and the mating fitting. Determine the gasket material based on the operating conditions and the type of fluid used.
3. Fasten with the appropriate clamp. Tighten clamp to manufacturer's specifications.

Verify accuracy after connections are complete. See Operation section.

OPERATION

Verify Accuracy

Before use, check the turbine's accuracy and verify calibration.

1. Make sure there is no air in the system.
2. Measure an exact known volume into an accurate container.
3. Verify the volume against the readout or recording equipment.

Note: If necessary, use a correction factor to figure final volume.

For best results, accuracy should be verified periodically as part of a routine maintenance schedule.

MAINTENANCE

Removing the Turbine

⚠ WARNING

During turbine removal, liquid may spill. Follow the liquid manufacturer's safety precautions for cleanup of minor spills.

1. Drain all liquid from the turbine. Wear protective clothing as necessary.
2. Disconnect both ends of the turbine. For threaded connections, loosen both ends of the turbine using a wrench only on the turbine's wrench flats.
3. If the turbine is not immediately installed again, cap lines as necessary.

Cleaning the Turbine

During use, the turbine should be kept full of liquid to ensure that drying does not occur inside the turbine. If drying or caking should occur, the rotor will stick or drag, affecting accuracy. To determine if the rotor is stuck or dragging, gently blow air through the meter and listen for the quiet whir of the rotor.

⚠ CAUTION

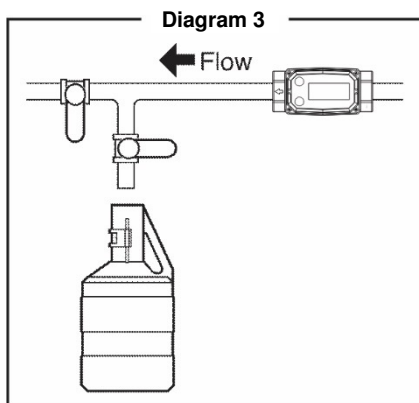
Never blow compressed air through the meter. It could damage the rotor.

1. Remove the turbine from the system following the directions below.
2. Carefully clean residue off all parts. Remove internal parts as detailed above. Note orientation carefully for correct assembly. Internal parts can be soaked for 10 to 15 minutes in compatible cleaning solutions.
3. Use a soft brush or small probe to *carefully* remove residue from the rotor.

⚠ WARNING

Follow the liquid manufacturer's instructions for the disposal of contaminated cleaning solvents.

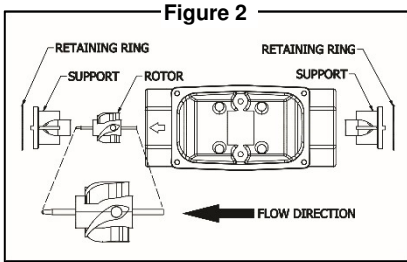
3. When the rotor turns freely, assemble and install it again following the instructions above.
4. Check accuracy after cleaning. See Diagram 3 for example of bucket test method.



Replacing Internal Parts

1. Remove the turbine from the system as detailed above.

Note: Carefully notice the orientation of all internal parts as they are removed, especially the orientation of the rotor to the flow direction arrow. See Figure 2.



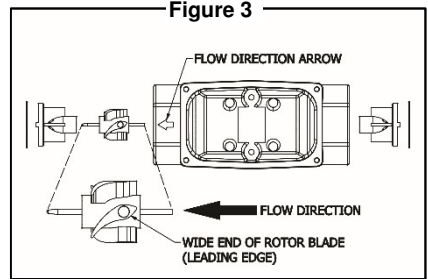
2. Using a small tool such as a screwdriver or awl, gently pry one retaining ring from its groove. Remove the support. If necessary, use needle nose pliers. Little or no force should be required.
3. Carefully remove the rotor.

CAUTION

Handle the rotor carefully. Even small scratches or nicks can affect accuracy.

4. Turn the turbine over and remove the other retaining ring. Remove the other support.
5. Clean, as detailed below, or discard as necessary.
6. Replace one support and retaining ring. Parts should drop easily into place with little or no force.

7. Install the rotor. Make sure the wide end of the rotor's blades faces the flow direction. See Figure 3.



8. Turn the turbine over and drop the second support into place. Put the final retaining ring into position.
9. Reinstall the turbine, purge the system of air, and verify accuracy before use.

TROUBLESHOOTING

Symptom	Probable Cause	Solution
Measurement is not accurate	1. Turbine operated below minimum rate	Increase flowrate. See Specifications.
	2. Turbine partially clogged with dried liquid.	Remove turbine. Clean carefully. Make sure rotor spins freely.
	3. Turbine bearings partially clogged with dried liquid.	Remove turbine. Clean carefully. Make sure rotor spins freely.
	4. Sealant wrapped around rotor.	Remove turbine. Clear material from rotor. Make sure rotor spins freely.
	5. Installed too close to fittings.	Install Correctly. See Installation section
	6. Improper connections to recording device.	Check all electrical connections. Reference appropriate installation instructions.
	7. Accuracy needs verification.	Complete normal accuracy verification procedures. Repeat periodically.

MODEL NUMBER CHART – THREADED HOUSINGS

Normal Range GPM Water	Normal Range LPM Water	Inlet/Outlet Size NPT	Aluminum Model No.	Stainless Steel Model No.
1-10	3.8-37.9	1/2 in.	A05	S05
2-20	7.6-75.7	3/4 in.	A07	S07
5-50	18.9-190	1 in.	A10	S10
10-100	38-380	1-1/2 in.	A15	S15
20-200	76-760	2 in.	A20	S20

MODEL NUMBER CHART – FLANGED HOUSINGS

Normal Range GPM Water	Normal Range LPM Water	Inlet/Outlet Size	Stainless Steel ANSI Flange Model No.	Stainless Steel Tri-Clover Model No.
1-10	3.8-37.9	1/2 in.	---	S05T
2-20	7.6-75.7	3/4 in.	---	S07T
5-50	18.9-190	1 in.	S10F	S10T
10-100	38-380	1-1/2 in.	S15F	S15T
20-200	76-760	2 in.	S20F	S20T

SPECIFICATIONS – ALUMINUM

All data on Models 1/2 inch, 3/4 inch, and 1 inch determined with 1 centipoise solvent test fluid at 70° F (21° C). Data on Models 1-1/2 inch and 2 inch is determined with water at 70° F (21° C).

Model Size	A05 1/2 in.	A07 3/4 in.	A10 1 in.	A15 1-1/2 in.	A20 2 in.
Linear Flow Range					
Gallons/minute (GPM)	1-10	2-20	5-50	10-100	20-200
Litres/minute (LPM)	3.8-37.9	7.6-75.7	18.9-190	38-380	76-760
Maximum Flow ¹					
Gallons/minute (GPM)	15	30	75	150	300
Litres/minute (LPM)	56.8	113.6	284	568	1,136
Maximum Pressure Drop					
in 10:1 Range					
PSIG	8	7.5	5	4	7
bar	0.55	0.52	0.34	0.28	0.48
Frequency Range in Linear Flow Range	42-420 Hz	37-370 Hz	47-470 Hz	36-360 Hz	33-330 Hz
Connections					
NPT or ISO Threads	Yes	Yes	Yes	Yes	Yes
Female	Yes	Yes	Yes	Yes	Yes
Inlet/Outlet Size	1/2 in.	3/4 in.	1 in.	1-1/2 in.	2 in.
Wrench Size:					
Inch	1-1/16 in.	1-5/16 in.	1-5/8 in.	2-3/8 in.	3 in.
Millimeter	27 mm	33 mm	41 mm	60 mm	75 mm
Weight*					
Pounds	0.9 lbs.	0.9 lbs.	1.0 lbs.	2.1 lbs.	3.4 lbs.
Kilograms	0.4 kg	0.4 kg	0.5 kg	1.0 kg	1.5 kg

* Computer electronics add 0.2 lbs. (0.1kg) to total weight.

¹ The meter can operate up to this flowrate without damage. Continuous operation will severely degrade meter life and performance.

Performance

Linear Range for 1/2 in.:	10:1 @ ±2.0% of reading
Linear Range for 3/4 in. and 1 in.:	10:1 @ ±1.5% of reading
Linear Range for 1-1/2 in. and 2 in.:	10:1 @ ±1.0% of reading
Repeatability:	±0.1%

Pressure Rating

300 PSIG (21 bar)

Wetted Components

Housing:	Aluminum
Journal Bearings:	Ceramic (96% Alumina)
Shaft:	Tungsten Carbide
Rotor and Supports:	PVDF
Retaining Rings:	316 Stainless Steel

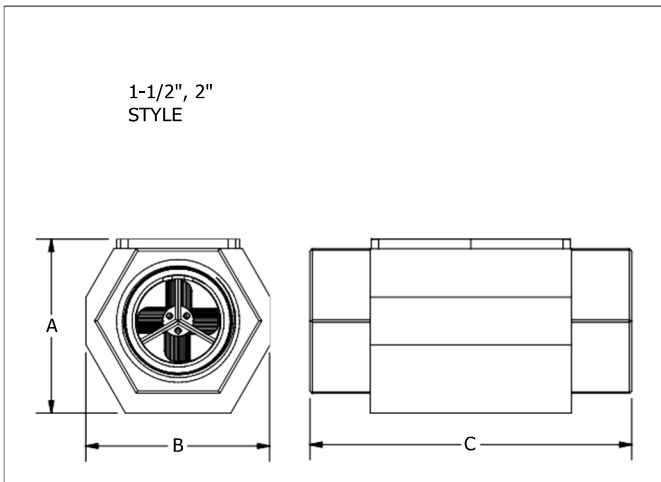
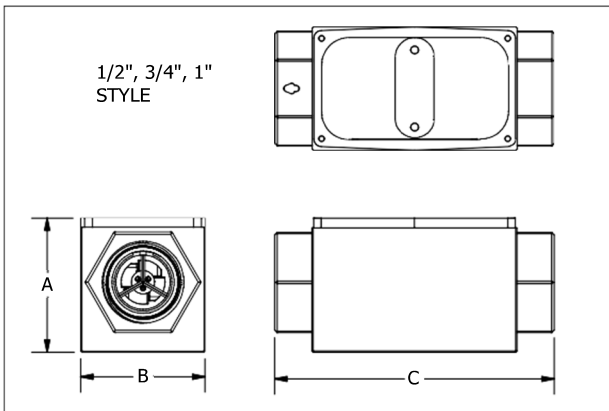
Temperature Range

-40° F to +250° F (-40° C to +121° C)

These temperatures apply to operations and storage. They are only for the turbine without computer electronics. Final operational temperature range is determined by computer electronics or accessory modules.

Dimensions

Model Size	A05 1/2 in.	A07 3/4 in.	A10 1 in.	A15 1-1/2 in.	A20 in.
A = Height:					
Inches	1.8 in.	2.0 in.	2.2 in.	2.8 in.	3.2 in.
Centimeters	4.6 cm	5.1 cm	5.6 cm	7.1 cm	8.2 cm
B = Width					
Inches	2.0 in.	2.0 in.	2.0 in.	2.7 in.	3.3 in.
Centimeters	5.1 cm	5.1 cm	5.1 cm	6.9 cm	8.4 cm
C = Length					
Inches	4.2 in.	4.3 in.	4.5 in.	5.3 in.	6.3 in.
Centimeters	10.7 cm	10.9 cm	11.4 cm	13.5 cm	16.0 cm
Computer electronics add 0.7 in. (1.8 cm) to height of turbine					



SPECIFICATIONS – STAINLESS STEEL

All data on Models 1/2 inch, 3/4 inch, and 1 inch determined with 1 centipoise solvent test fluid at 70° F (21° C). Data on Models 1-1/2 inch and 2 inch is determined with water at 70° F (21° C).

Model-Size	S05 1/2 in.	S07 3/4 in.	S10 1 in.	S15 1-1/2 in.	S20 2 in.
Linear Flow Range					
Gallons/minute (GPM)	1-10	2-20	5-50	10-100	20-200
Litres/minute (LPM)	3.8-37.9	7.6-75.7	18.9-190	38-380	76-760
Maximum Flow ¹					
Gallons/minute (GPM)	15	30	75	150	300
Litres/minute (LPM)	56.8	113.6	284	568	1,136
Maximum Pressure Drop					
in 10:1 Range					
PSIG	8	6	10	4	7
bar	0.55	0.41	0.69	0.28	0.48
Frequency Range in Linear Flow Range	42-420 Hz	37-370 Hz	47-470 Hz	36-360 Hz	33-330 Hz
Connections					
NPT or ISO Threads	Yes	Yes	Yes	Yes	Yes
Female	Yes	Yes	Yes	Yes	Yes
Inlet/Outlet Size	1/2 in.	3/4 in.	1 in.	1-1/2 in.	2 in.
Wrench Size:					
Inch	1-1/16 in.	1-5/16 in.	1-5/8 in.	2-3/8 in.	3 in.
Millimeter	27 mm	33 mm	41 mm	60 mm	75 mm
Weight*					
Pounds	1.0 lbs.	1.2 lbs.	1.7 lbs.	3.3 lbs.	6.1 lbs.
Kilograms	0.5 kg	0.5 kg	0.8 kg	1.5 kg	2.8 kg

* Computer electronics add 0.2 lbs. (0.1kg) to total weight.

¹ The meter can operate up to this flowrate without damage. Continuous operation will severely degrade meter life and performance.

Performance

Linear Range for 1/2 in.:	10:1 @ ±2.0% of reading
Linear Range for 3/4 in. and 1 in.:	10:1 @ ±1.5% of reading
Linear Range for 1-1/2 in. and 2 in.:	10:1 @ ±1.0% of reading
Repeatability:	±0.1%

Pressure Rating

Standard Stainless Steel Meter 1,500 PSIG (103 bar)

Wetted Components

Housing:	316 Stainless Steel
Journal Bearings:	Ceramic (96% Alumina)
Shaft:	Tungsten Carbide
Rotor and Supports:	PVDF
Retaining Rings:	316 Stainless Steel

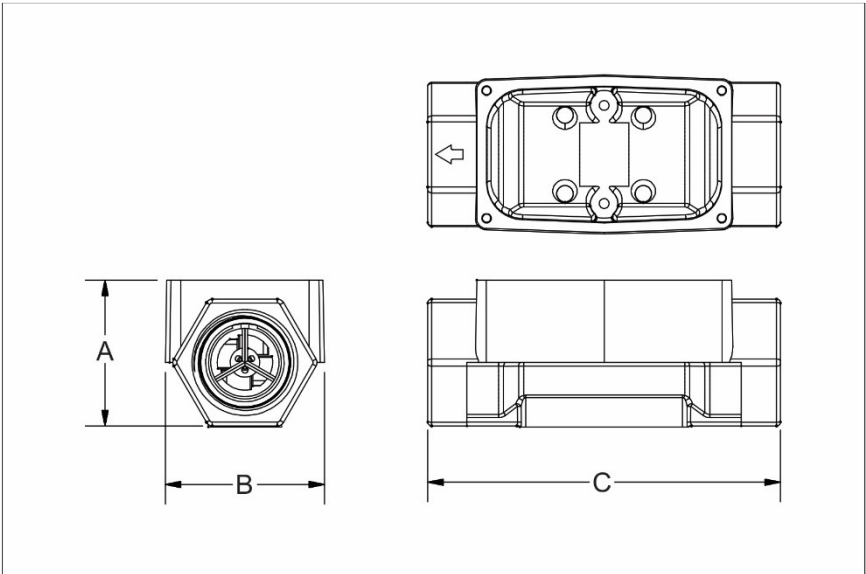
Temperature Range

-40° F to +250° F (-40° C to +121° C)

These temperatures apply to operations and storage. They are only for the turbine without computer electronics. Final operational temperature range is determined by computer electronics or accessory modules.

Dimensions

Model Size	S05 1/2 in.	S07 3/4 in.	S10 1 in.	S15 1-1/2 in.	S20 2 in.
A = Height:					
Inches	1.4 in.	1.6 in.	1.9 in.	2.6 in.	3.1 in.
Centimeters	3.6 cm	4.1 cm	4.8 cm	6.6 cm	7.9 cm
B = Width					
Inches	2.0 in.	2.0 in.	2.0 in.	2.7 in.	3.4 in.
Centimeters	5.1 cm	5.1 cm	5.1 cm	6.9 cm	8.6 cm
C = Length					
Inches	4.2 in.	4.3 in.	4.5 in.	5.3 in.	6.3 in.
Centimeters	10.7 cm	10.9 cm	11.4 cm	13.5 cm	16.0 cm
Computer electronics add 0.7 in. (1.8 cm) to height of turbine					



SPECIFICATIONS – ANSI FLANGE FITTINGS

All data on Model 1 inch determined with 1 centipoise solvent test fluid at 70° F (21° C). Data on Models 1-1/2 inch and 2 inch is determined with water at 70° F (21° C).

Model Size	S10F 1 in.	S15F 1-1/2 in.	S20F 2 in.
Linear Flow Range			
Gallons/minute (GPM)	5-50	10-100	20-200
Litres/minute (LPM)	18.9-190	38-380	76-760
Maximum Flow ¹			
Gallons/minute (GPM)	75	150	300
Litres/minute (LPM)	284	568	1,136
Maximum Pressure Drop			
in 10:1 Range			
PSIG	10	4	7
bar	0.69	0.28	0.48
Frequency Range in Linear Flow Range	47-470 Hz	36-360 Hz	33-330 Hz
Connections			
ANSI 150 lb. Flange	Yes	Yes	Yes
Bolt Size	1/2 in.	1/2 in.	5/8 in.
Weight*			
Pounds	5.7 lbs.	10.2 lbs.	16.7 lbs.
Kilograms	2.6 kg	4.6 kg	7.6 kg

* Computer electronics add 0.2 lbs. (0.1kg) to total weight.

¹ The meter can operate up to this flowrate without damage. Continuous operation will severely degrade meter life and performance.

Performance

Linear Range for 1 in.: 10:1 @ ±1.5% of reading

Linear Range for 1-1/2 in. and 2 in.: 10:1 @ ±1.0% of reading

Repeatability: ±0.1%

Pressure Rating

Flange Rule

Wetted Components

Housing: 316 Stainless Steel

Journal Bearings: Ceramic (96% Alumina)

Shaft: Tungsten Carbide

Rotor and Supports: PVDF

Retaining Rings: 316 Stainless Steel

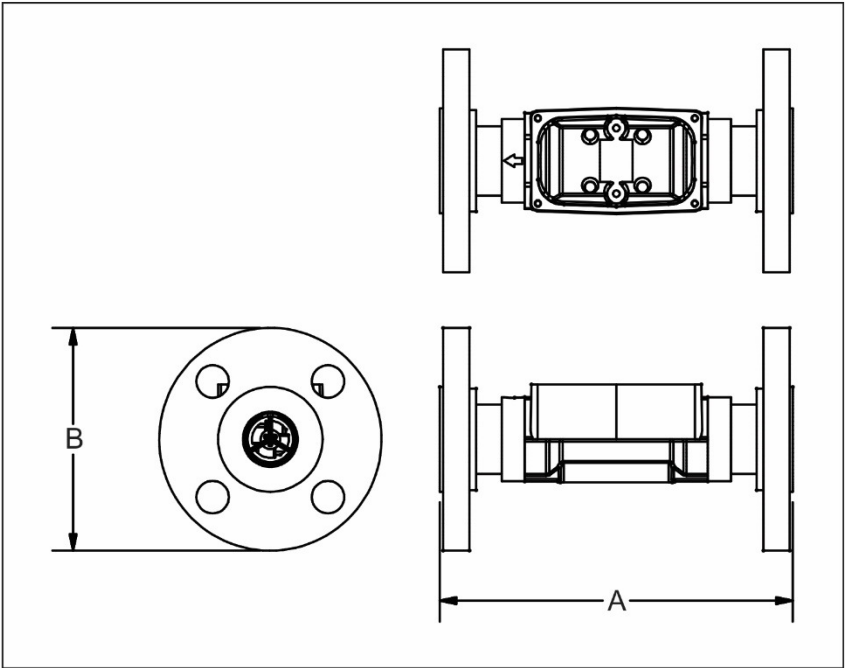
Temperature Range

-40° F to +250° F (-40° C to +121° C)

These temperatures apply to operations and storage. They are only for the turbine without computer electronics. Final operational temperature range is determined by computer electronics or accessory modules.

Dimensions

Model Size	S10F 1 in.	S15F 1-1/2 in.	S20F 2 in.
A = Height:			
Inches	6.75 in.	8.00 in.	9.50 in.
Centimeters	17.14 cm	20.32 cm	24.13 cm
B = Width			
Inches	4.25 in.	5.00 in.	6.00 in.
Centimeters	10.80 cm	12.71 cm	15.24 cm



SPECIFICATIONS – TRI-CLOVER® FLANGE FITTINGS

All data on Models 1/2 inch, 3/4 inch and 1 inch determined with 1 centipoise solvent test fluid at 70° F (21° C). Data on Models 1-1/2 inch and 2 inch is determined with water at 70° F (21° C). Size refers to the size of the turbine, not the body ferrule. Refer to dimension chart for detail sizes.

Model Size	S05T 1/2 in.	S07T 3/4 in.	S10T 1 in.	S15T 1-1/2 in.	S20T 2 in.
Linear Flow Range					
Gallons/minute (GPM)	1-10	2-20	5-50	10-100	20-200
Litres/minute (LPM)	3.8-37.9	7.6-75.7	18.9-190	38-380	76-760
Maximum Flow ¹					
Gallons/minute (GPM)	15	30	75	150	300
Litres/minute (LPM)	56.8	113.6	284	568	1,136
Maximum Pressure Drop					
in 10:1 Range					
PSIG	8	7.5	5	4	4
bar	0.55	0.52	0.34	0.28	0.28
Frequency Range in Linear Flow Range	45-450 Hz	37-370 Hz	45-475 Hz	35-350 Hz	33-330 Hz
Connections					
Inlet/Outlet Size	1/2 in.	3/4 in.	1 in.	1-1/2 in.	2 in.
Fitting Clamp Size	3/4 in.	1 in.	1-1/2 in.	2 in.	2-1/2 in.
Weight*					
Pounds	1.1 lbs.	1.6 lbs.	2.1 lbs.	3.9 lbs.	5.7 lbs.
Kilograms	0.5 kg	0.7 kg	1.0 kg	1.8 kg	2.6 kg

* Computer electronics add 0.2 lbs. (0.1kg) to total weight.

¹ The meter can operate up to this flowrate without damage. Continuous operation will severely degrade meter life and performance.

Performance

Linear Range for 1/2 in.:	10:1 @ ±2.0% of reading
Linear Range for 3/4 in. and 1 in.:	10:1 @ ±1.5% of reading
Linear Range for 1-1/2 in. and 2 in.:	10:1 @ ±1.0% of reading
Repeatability:	±0.1%

Pressure Rating

450 PSIG (31 bar) @ 70° F
with Type 1 Buna-N Gasket

Wetted Components

Housing:	316 Stainless Steel
Journal Bearings:	Ceramic (96% Alumina)
Shaft:	Tungsten Carbide
Rotor and Supports:	PVDF
Retaining Rings:	316 Stainless Steel

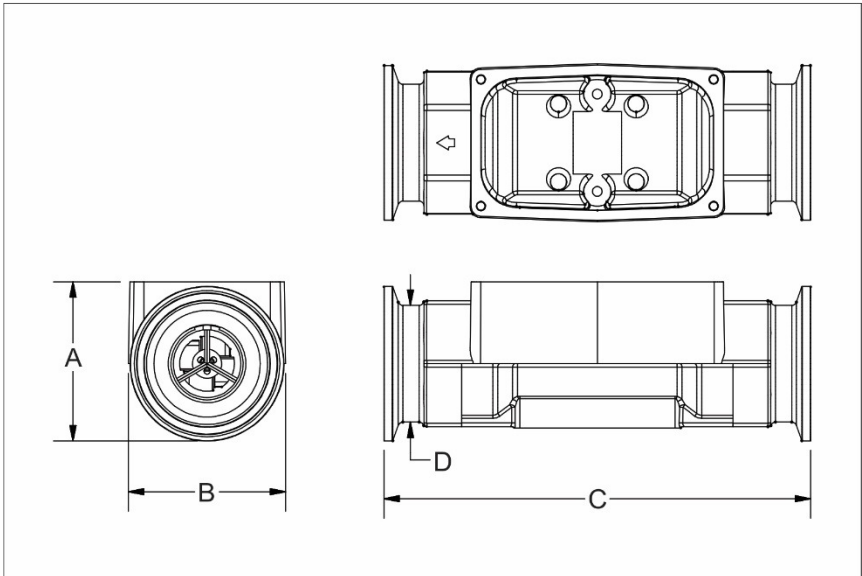
Temperature Range

-40° F to +250° F (-40° C to +121° C)

These temperatures apply to operations and storage. They are only for the turbine without computer electronics. Final operational temperature range is determined by computer electronics or accessory modules.

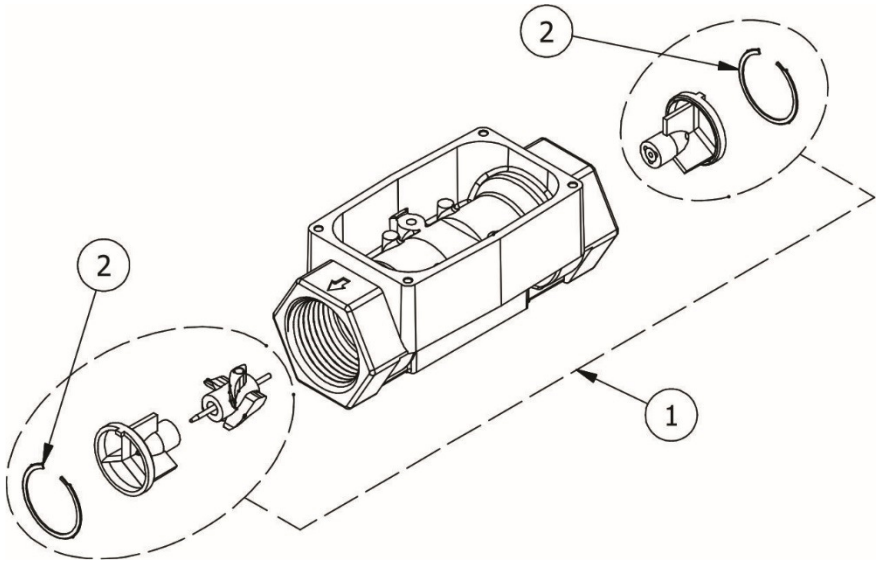
Dimensions

Model Size	S05T 1/2 in.	S07T 3/4 in.	S10T 1 in.	S15T 1-1/2 in.	S20T 2 in.
A = Height:					
Inches	1.4 in.	2.0 in.	2.0 in.	2.6 in.	3.1 in.
Centimeters	3.6 cm	5.1 cm	5.1 cm	6.6 cm	7.9 cm
B = Width					
Inches	2.0 in.	2.0 in.	2.0 in.	2.7 in.	3.4 in.
Centimeters	5.1 cm	5.1 cm	5.1 cm	6.9 cm	8.6 cm
C = Length					
Inches	5.0 in.	5.0 in.	5.5 in.	6.5 in.	7.0 in.
Centimeters	12.71 cm	12.71 cm	13.97 cm	16.51 cm	17.78 cm
D = Outside Dia. - Ferrule					
Inches	.75 in.	1.00 in.	1.50 in.	2.00 in.	2.50 in.
Centimeters	1.90 cm	2.54 cm	3.81 cm	5.08 cm	6.35 cm
Fitting/ Clamp Size	3/4 in.	1 in.	1-1/2 in.	2 in.	2-1/2 in.
Computer electronics add 0.7 in. (1.8 cm) to height of turbine					



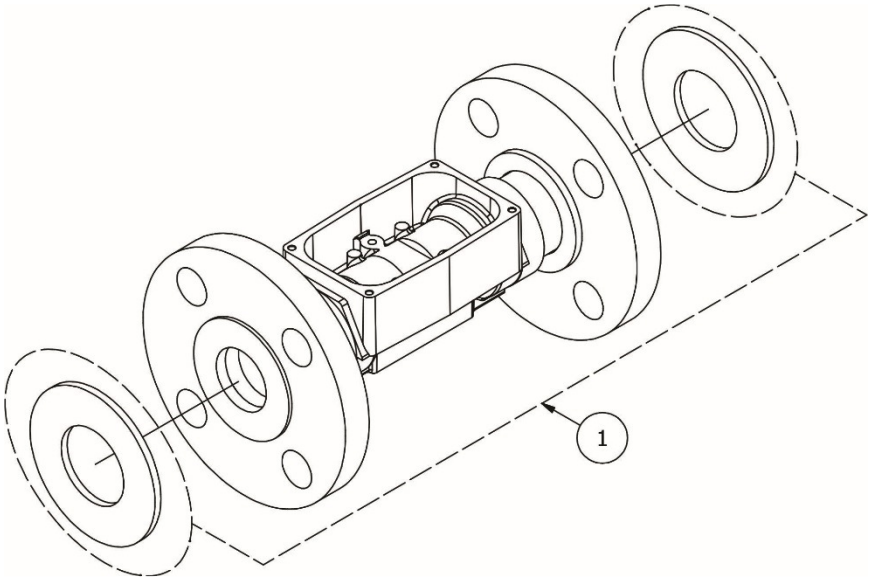
ILLUSTRATED INTERNAL PARTS DRAWING

Internal parts shown below are used in all G2 Industrial Grade turbine housings covered by this manual. (Threaded housing shown.)



Item No.	Part No.	Description	No. Reqd.
1	125500-1	"05" 1/2-inch Rotor/Support Replacement Kit (includes rotor assembly, support assembly & retaining rings)	1
	125500-2	"07" 3/4-inch Rotor/Support Replacement Kit (includes rotor assembly, support assembly & retaining rings)	1
	125500-3	"10" 1-inch Rotor/Support Replacement Kit (includes rotor assembly, support assembly & retaining rings)	1
	125500-4	"15" 1-1/2-inch Rotor/Support Replacement Kit (includes rotor assembly, support assembly & retaining rings)	1
	125500-5	"20" 2-inch Rotor/Support Replacement Kit (includes rotor assembly, support assembly & retaining rings)	1
2	904005-20	"05" 1/2-inch Retaining Ring	2
	904005-20	"07" 3/4-inch Retaining Ring	2
	904005-20	"10" 1-inch Retaining Ring	2
	904005-20	"15" 1-1/2-inch Retaining Ring	2
	904005-20	"20" 2-inch Retaining Ring	2

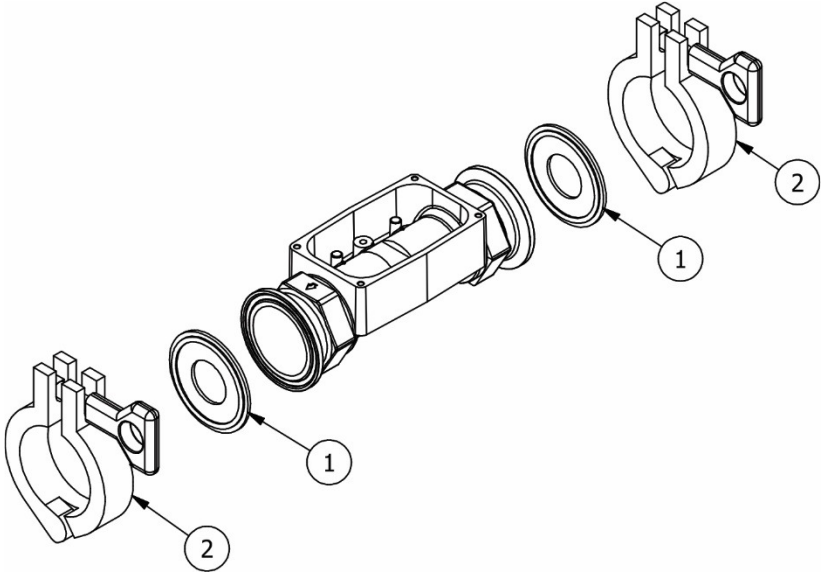
ILLUSTRATED PARTS DRAWING (ANSI FLANGE)



Item No.	Part No.	Description	No. Reqd.
1	125505-01	Flange Gasket Kit - 2 Gaskets (1 in. Neoprene)	1
	125504-01	Flange Gasket Kit - 2 Gaskets (1 in. FKM)	1
	125505-02	Flange Gasket Kit - 2 Gaskets (1-1/2 in. Neoprene)	1
	125504-02	Flange Gasket Kit - 2 Gaskets (1-1/2 in. FKM)	1
	125505-03	Flange Gasket Kit - 2 Gaskets (2 in. Neoprene)	1
	125504-03	Flange Gasket Kit - 2 Gaskets (2 in. FKM)	1

ILLUSTRATED PARTS DRAWING (TRI-CLOVER® FLANGE)

See illustrated internal parts drawing for internal wetted parts.



Item No.	Part No.	Description	No. Reqd.
1	901003-35	Gasket - 3/4 inch Fluoroelastomer	2
	901003-36	Gasket - 1 inch Fluoroelastomer	2
	901003-37	Gasket - 1-1/2 inch Fluoroelastomer	2
	901003-38	Gasket - 2 inch Fluoroelastomer	2
	901003-39	Gasket - 2-1/2 inch Fluoroelastomer	2
	901003-40	Gasket - 3/4 inch Nitrile	2
	901003-41	Gasket - 1 inch Nitrile	2
	901003-42	Gasket - 1-1/2 inch Nitrile	2
	901003-43	Gasket - 2 inch Nitrile	2
	901003-44	Gasket - 2-1/2 inch Nitrile	2
2	906005-49	Clamp - 3/4 inch	2
	906005-50	Clamp - 1 inch	2
	906005-50	Clamp - 1-1/2 inch	2
	906005-51	Clamp - 2 inch	2
	906005-52	Clamp - 2-1/2 inch	2

SERVICE

For warranty consideration, parts, or other service information, please contact your local distributor. If you need further assistance, call the GPI Customer Service Department in Wichita, Kansas, during normal business hours.

1-888-996-3837

To obtain prompt, efficient service, always be prepared with the following information:

1. The model number of your turbine.
2. The serial number or manufacturing date code of your turbine.
3. Specific information about part numbers and descriptions.

For warranty work always be prepared with your original sales slip or other evidence of purchase date.

Returning Parts

Please contact the factory before returning any parts. It may be possible to diagnose the trouble and identify needed parts in a telephone call. GPI can also inform you of any special handling requirements you will need to follow covering the transportation and handling of equipment which has been used to transfer hazardous or flammable liquids.

⚠ CAUTION

Do not return turbines without specific authority from the GPI Customer Service Department. Due to strict regulations governing transportation, handling, and disposal of hazardous or flammable liquids, GPI will not accept turbines for rework unless they are completely free of liquid residue.

⚠ CAUTION

Turbines not flushed before shipment can be refused and returned to the sender.

AGENCY APPROVALS TABLE

Turbine Body Only:

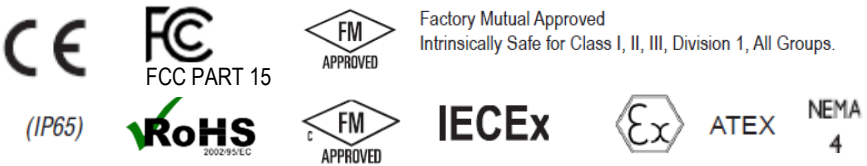
Aluminum, Stainless Steel, Stainless Steel ANSI Flange,
Stainless Steel Tri-Clover® Flange



Turbine Body with:

Q9 - Mounted Industrial Grade Computer Electronics.

Q1 - Mounted Industrial Grade Computer Electronics, Vertical Mount.



Factory Mutual Approved
Intrinsically Safe for Class I, II, III, Division 1, All Groups.

Note: When a component with Approval Agency ratings is mated to another component with the same Approval Agency ratings, the combination may gain environmental approvals.

When one of the components has lessor or no Approval Agency ratings, the resultant combination assumes the ratings of the lessor rated component.

If one component has no ratings, the resultant combination has no ratings.

Limited Warranty Policy

Great Plains Industries, Inc. 5252 E. 36th Street North, Wichita, KS USA 67220-3205, hereby provides a limited warranty against defects in material and workmanship on all products manufactured by Great Plains Industries, Inc. This product includes a 1-year warranty. Manufacturer's sole obligation under the foregoing warranties will be limited to either, at Manufacturer's option, replacing or repairing defective Goods (subject to limitations hereinafter provided) or refunding the purchase price for such Goods theretofore paid by the Buyer, and Buyer's exclusive remedy for breach of any such warranties will be enforcement of such obligations of Manufacturer. The warranty shall extend to the purchaser of this product and to any person to whom such product is transferred during the warranty period.

The warranty period shall begin on the date of manufacture or on the date of purchase with an original sales receipt. This warranty shall not apply if:

- A. the product has been altered or modified outside the warrantor's duly appointed representative;
- B. the product has been subjected to neglect, misuse, abuse or damage or has been installed or operated other than in accordance with the manufacturer's operating instructions.

To make a claim against this warranty, contact the GPI Customer Service Department at 316-686-7361 or 888-996-3837. Or by mail at:

Great Plains Industries, Inc.
5252 E. 36th St. North
Wichita, KS, USA 67220-3205

If you are outside North or South America contact:

Great Plains Industries – Australia
1/16 Atkinson Road,
Taren Point NSW 2229, Sydney, Australia

The company shall, notify the customer to either send the product, transportation prepaid, to the company at its office in Wichita, Kansas, or to a duly authorized service center. The company shall perform all obligations imposed on it by the terms of this warranty within 60 days of receipt of the defective product.

GREAT PLAINS INDUSTRIES, INC. EXCLUDES LIABILITY UNDER THIS WARRANTY FOR DIRECT, INDIRECT, INCIDENTAL AND CONSEQUENTIAL DAMAGES INCURRED IN THE USE OR LOSS OF USE OF THE PRODUCT WARRANTED HEREUNDER.

The company herewith expressly disclaims any warranty of merchantability or fitness for any particular purpose other than for which it was designed.

This warranty gives you specific rights and you may also have other rights which vary from U.S. state to U.S. state.

Note: In compliance with MAGNUSON MOSS CONSUMER WARRANTY ACT – Part 702 (governs the resale availability of the warranty terms).

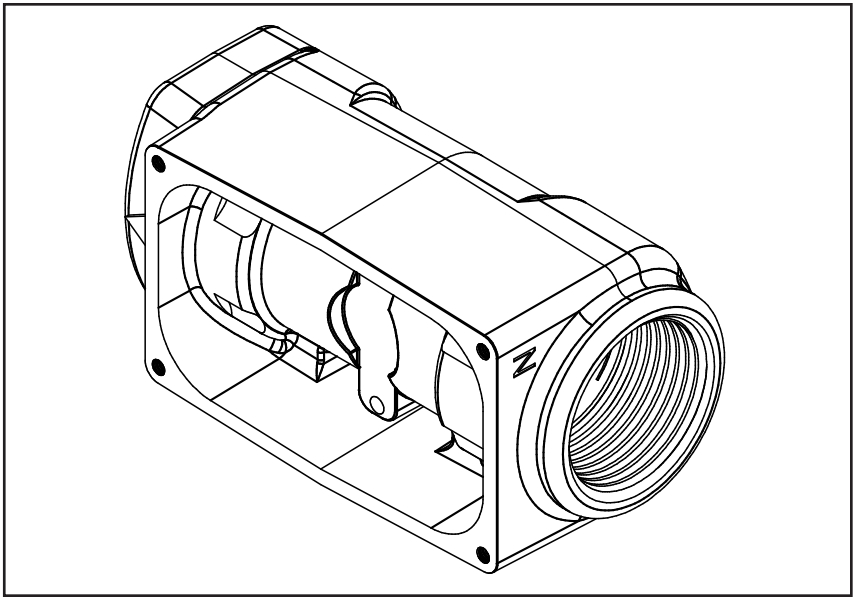


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Commercial Grade **TURBINE HOUSING** Owner's Manual

Includes Aluminum and Nylon



To the owner...

Congratulations on receiving your GPI® Commercial Grade Turbine. We are pleased to provide you with a product designed to give you maximum reliability and efficiency.

Our business is the design, manufacture, and marketing of liquid handling, agricultural, and recreational products. We succeed because we provide customers with innovative, reliable, safe, timely, and competitively-priced products. We pride ourselves in conducting our business with integrity and professionalism.

We are proud to provide you with a quality product and the support you need to obtain years of safe, dependable service.

Victor Lukic

Victor Lukic, President
Great Plains Industries, Inc.

GENERAL INFORMATION

This manual will assist you in installing and maintaining your GPI Commercial Grade turbine housing. (See Figure 1) Information on computer electronics and accessory modules are contained in other manuals. Please reference those as necessary.

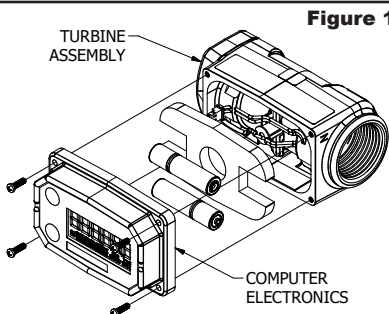


TABLE OF CONTENTS

General Information.....	2
Installation	4
Maintenance	5
Troubleshooting.....	6
Specifications	7
Aluminum	7
Nylon.....	9
Parts	11
Service.....	11

For best results, take the time to fully acquaint yourself with all information about all components of your GPI Electronic Digital Metering System prior to installation and use. If you need assistance, contact the distributor from whom you purchased your turbine.



This symbol is used throughout the manual to call your attention to safety messages.



WARNING

Warnings alert you to the potential for personal injury.



CAUTION

Cautions call your attention to practices or procedures which may damage your equipment.

Notes give information that can improve efficiency of operations.

It is your responsibility to make sure that all operators have access to adequate instructions about safe operating and maintenance procedures.

Read Me!

For your safety, review the major warnings and cautions below before operating your equipment.

1. This equipment is approved to handle only fluids that are compatible with the housing material. Use only fluids that are compatible with the wetted components of your turbine.

WARNING

The apparatus enclosure may contain aluminum and is considered to constitute a potential risk of ignition by impact or friction. Care must be taken into account during installation and use to prevent impact or friction.

WARNING

Part of the enclosure is constructed from plastic. To prevent the risk of electrostatic sparking the plastic surface should only be cleaned with a damp cloth.

2. When measuring flammable liquids, observe precautions against fire or explosion.
3. When handling hazardous liquids, always follow the liquid manufacturer's safety precautions.
4. When working in hazardous environments, always exercise appropriate safety precautions.
5. Always dispose of used cleaning solvents in a safe manner according to the solvent manufacturer's instructions.
6. During turbine removal, liquid may spill. Follow the liquid manufacturer's safety precautions for clean up of minor spills.
7. Do not blow compressed air through the turbine.

8. Do not allow liquids to dry inside the turbine.
9. Handle the rotor carefully. Even small scratches or nicks can affect accuracy.
10. When tightening the turbine, use a wrench only on the wrench flats.
11. For best results, always verify accuracy before use.

Product Description

GPI Commercial Meter Turbines are identified by the internal diameter and the inlet and outlet.

- Model 025 – 1 inch (Low Flow)
- Model 100 – 1 inch (Mid Flow)
- Model 200 – 2 inch (High Flow)

Each of these turbines is designed to work with on-board computer electronics and/or with one of several accessory modules that can interface to a wide variety of reporting and collecting devices.

Liquids flow through the turbine housing causing an internal rotor to spin. As the rotor spins, an electrical signal is generated in the pickup coil. The electrical signal provides the output necessary to operate the on-board computer electronics for local indication directly on the turbine or one of several accessory modules that transmit the signal to external equipment.

Upon receipt, examine your meter for visible damage. The turbine is a precision measuring instrument and should be handled as such. Remove the protective plugs and caps for a thorough inspection. If any items are damaged or missing, contact your distributor.

Make sure the turbine model meets your specific needs. Refer to the Specifications Section and confirm the following:

1. The flowrate is within the limits of your model.
2. The liquid is compatible with the turbine's wetted components.
3. The system's pressure does not exceed the turbine's maximum pressure rating.

Information specific to your particular turbine, including serial number and manufacturing date is printed on the bottom of the turbine.

For your future reference, it might be useful to record this information in the manual in case it becomes unreadable on the turbine.

INSTALLATION

All GPI® turbines are designed to measure flow in only one direction. The direction is indicated by the arrow cast-molded in the turbine outlet. If the opposite direction is desired, and you are using on-board computer electronics, rotate the computer electronics 180 degrees prior to installation.

Flow altering devices such as elbows, valves, and reducers can affect accuracy. The following recommended guidelines are given to enhance accuracy and maximize performance. Distances given here are minimum requirements; double them for desired straight pipe lengths.

Upstream from the turbine, allow a minimum straight pipe length at least 20 times the internal diameter of the turbine. For example, with the 1-inch turbine, there should be 20 inches (51 cm) of straight pipe immediately upstream.

Downstream from the turbine, allow a minimum straight pipe length at least 5 times the internal diameter of your turbine. For example, with the 1-inch turbine, there should be 5 inches (12.7 cm) of straight pipe immediately downstream. The desired downstream distance is 10 inches (25.4 cm).

A typical back pressure of 5 to 50 PSI (0.34 to 3.4 bar) will prevent cavitation. Create back pressure by installing a control valve on the downstream side of the meter at the proper distance detailed above.

Foreign material in the liquid being measured can clog the turbine's rotor and adversely affect accuracy. If this problem is anticipated or experienced, install screens to filter impurities from incoming liquids.

Model 025:

Maximum Particulate Size	
Inches:	0.005
Microns:	125
Mesh:	120

Models 100 and 200:

Maximum Particulate Size	
Inches:	0.018
Microns:	500
Mesh:	35

All GPI turbines are tested and calibrated at the factory using state-of-the-art calibration procedures and test equipment.

To ensure accurate measurement, remove all air from the system before use. To purge the system of air:

1. Ensure some back pressure exists on the turbine in the line.
2. Open the discharge valve or nozzle and allow fluid to completely fill the system. Make sure the stream is full and steady.
3. Close the discharge valve or nozzle.
4. Start normal operations.

Connections

1. To protect against leakage, seal all threads with an appropriate sealing compound. Make sure the sealing compound does not intrude into the flow path.
2. Make sure the arrow on the outlet is pointed in the direction of the flow.

⚠ CAUTION

Using a wrench on plastic meters could damage the meter.

3. Tighten the turbine onto the fittings. Use a wrench only on wrench flats.

NOTE: If connecting to new male threads, burrs and curls can adversely effect accuracy. Correct the problem prior to turbine installation.

It is strongly recommended that accuracy be verified prior to use.

MAINTENANCE

Verify Accuracy

Before use, check the turbine's accuracy and verify calibration.

1. Make sure there is no air in the system.
2. Measure an exact known volume into an accurate container.
3. Verify the volume against the readout or recording equipment.

NOTE: If necessary, use a correction factor to figure final volume.

For best results, accuracy should be verified periodically as part of a routine maintenance schedule.

Remove the Turbine

⚠ WARNING

During turbine removal, liquid may spill. Follow the liquid manufacturer's safety precautions for clean up of minor spills.

1. Drain all liquid from the turbine. Wear protective clothing as necessary.
2. Loosen both ends of the turbine. Use a wrench only on the turbine's wrench flats.
3. If the turbine is not immediately installed again, cap lines as necessary.

Clean the Turbine

During use, the turbine should be kept full of liquid to ensure that drying does not occur inside the turbine. If drying or caking should occur, the rotor will stick or drag, affecting accuracy. To determine if the rotor is stuck or dragging, gently blow air through the meter and listen for the quiet whir of the rotor.

⚠ CAUTION

Never blow compressed air through the meter. It could damage the rotor.

1. Remove the turbine from the system following the directions above.
2. Apply a penetrating lubricant such as WD-40® or a recommended cleaning solvent on the turbine's rotor, shaft, and bearings. Allow it to soak for 10 to 15 minutes.

⚠ CAUTION

Do not submerge the meter.

3. Carefully remove residue from the rotor using a soft brush or small probe such as a screwdriver. Be careful not to damage the rotor and support.
4. When the rotor turns freely, install it again following the installation instructions given earlier in this manual.

⚠ WARNING

Follow the liquid manufacturer's instructions for the disposal of contaminated cleaning solvents.

TROUBLESHOOTING

Symptom	Probable Cause	Solution
A. MEASUREMENT IS NOT ACCURATE	1. Turbine operated below minimum rate	Increase flowrate. See Specifications.
	2. Turbine partially clogged with dried liquid	Remove turbine. Clean carefully. Make sure rotor spins freely.
	3. Turbine bearings partially clogged with dried liquid	Remove turbine. Clean carefully. Make sure rotor spins freely.
	4. Sealant wrapped around rotor	Remove turbine. Clear material from rotor. Make sure rotor spins freely.
	5. Installed too close to fittings	Install correctly. See Installation Section.
	6. Improper connections to recording device	Check all electrical connections. Reference appropriate installation instructions.
	7. Accuracy needs verification	Complete normal accuracy verification procedures. Repeat periodically.

SPECIFICATIONS

Aluminum

All data on Models A025 and A100 determined with 1 centipoise Kermac solvent test fluid at 70° F (21° C). Data on Model A200 is determined with water at 70° F (21° C).

Models Size	A025 1 inch Low Flow	A100 1 inch	A200 2 inch
Linear Flow Range Gallons/minute (GPM) Litres/minute (L/min)	0.3-3 1-11	3-50 11-190	30-300 114-1,135
Maximum Flow Gallons/minute (GPM) Litres/minute (L/min)	3 11	50 190	300 1,135
Maximum Pressure Drop in 10:1 Range PSIG bar	8 0.55	5 0.34	4 0.28
Frequency Range in Flow Range	11-110 Hz @ 0.3-3 GPM	36.5-608.3 Hz @ 3-50 GPM	36-360 Hz @ 30-300 GPM
Connections NPT or ISO Threads Female Inlet/Outlet Size	Yes Yes 1 in.	Yes Yes 1 in.	Yes Yes 2 in.
Weight with Computer Electronics Pounds Kilograms	1.35 lbs. .61 kg	1.35 lbs. .61 kg	3.0 lbs. 1.36 kg

Performance

Linear Range for 1 in. Low Flow: N/A*
 Linear Range for 1 in.: ± 1.5% of reading
 Linear Range for 2 in.: ± 1.5% of reading
 Repeatability for 1 in. Low Flow: ± 1%
 Repeatability for 1 in.: ± 0.2%
 Repeatability for 2 in.: ± 0.2%

Pressure Rating

300 PSIG (21 bar)

Wetted Components

Housing: Aluminum
 Journal Bearings: Ceramic (96% Alumina)
 Shaft: Tungsten Carbide
 Rotor and Supports: Nylon
 Retaining Rings: 316 Stainless Steel

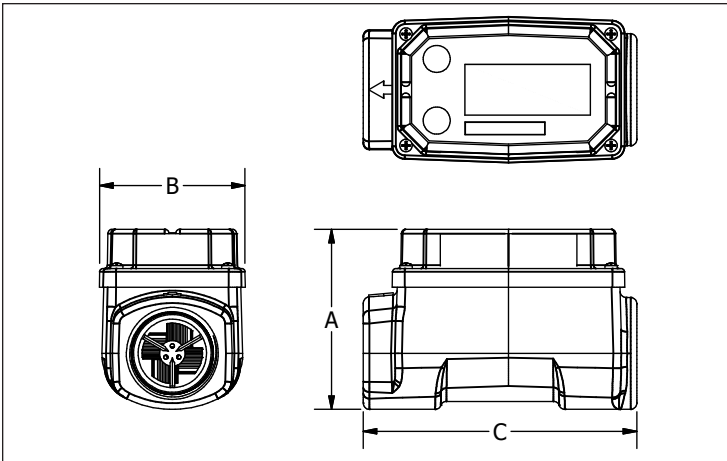
Temperature Range

-40° F to +250°F (-40° C to +121° C)

These temperatures apply to operations and storage. They are only for the turbine without computer electronics. Final operational temperature range is determined by computer electronics or accessory modules.

* Accuracy can vary up to ±5% depending on installation and fluid type. Field calibration is recommended for best accuracy.

Aluminum cont'd.



Dimensions

Models Size	A025 1 inch Low Flow	A100 1 inch	A200 2 inch
A = Height†: Inches Centimeters	2.5 in. 6.3 cm	2.5 in. 6.3 cm	4.25 in. 11.4 cm
B = Width Inches Centimeters	2.0 in. 5.1 cm	2.0 in. 5.1 cm	3.0 in. 7.6 cm
C = Length Inches Centimeters	4.0 in. 10.1 cm	4.0 in. 10.1 cm	6.0 in. 15.2 cm

† Height includes 0.7 inch (1.8 cm) for the computer electronics.

SPECIFICATIONS

Nylon

All data on Models N025 and N100 determined with 1 centipoise Kermac solvent test fluid at 70° F (21° C).

Models Size	N025 1 inch Low Flow	N100 1 inch
Linear Flow Range Gallons/minute (GPM) Litres/minute (L/min)	0.3 - 3 1 - 11	3 - 50 11 - 190
Maximum Flow Gallons/minute (GPM) Litres/minute (L/min)	3 11	50 190
Maximum Pressure Drop in 10:1 Range PSIG bar	8 0.55	5 0.34
Frequency Range in Flow Range	11 - 110 Hz @ 0.3 - 3 GPM	36.5 - 608.3 Hz @ 3 - 50 GPM
Connections NPT or ISO Threads Female Inlet/Outlet Size	Yes Yes 1 in.	Yes Yes 1 in.
Weight with Computer Electronics Pounds Kilograms	1.0 lbs. 0.5 kg	1.0 lbs. 0.5 kg

Performance

Linear Range for 1 in. Low Flow:	N/A*
Linear Range for 1 in.:	± 1.5% of reading
Repeatability for 1 in. Low Flow:	± 1%
Repeatability for 1 in.:	± 0.2%

Pressure Rating

150 PSIG (10.3 bar)

Wetted Components

Housing:	Nylon
Journal Bearings:	Ceramic
Shaft:	Tungsten Carbide
Rotor and Supports:	Nylon
Retaining Rings:	316 Stainless Steel

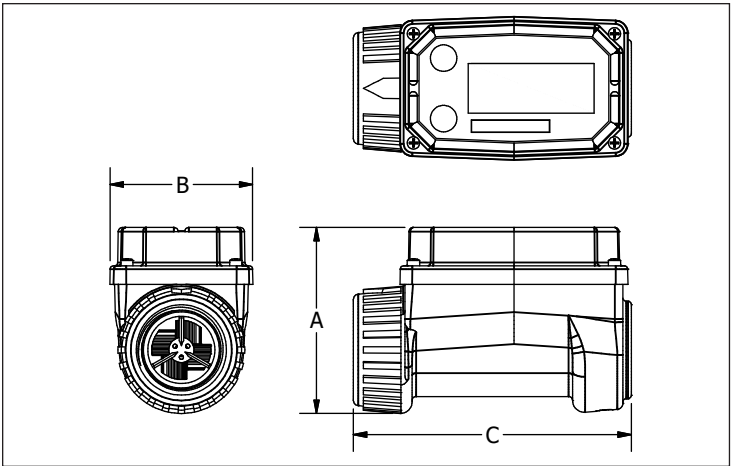
Temperature Range

+14° F to +250° F (-40° C to +121° C)

These temperatures apply to operations and storage. They are only for the turbine without computer electronics. Final operational temperature range is determined by computer electronics or accessory modules.

* Accuracy can vary up to ±5% depending on installation and fluid type. Field calibration is recommended for best accuracy.

Nylon cont'd.



Dimensions

Models Size	N025 1 inch Low Flow	N100 1 inch
A = Height*: Inches Centimeters	2.5 in. 6.3 cm	2.5 in. 6.3 cm
B = Width Inches Centimeters	2.0 in. 5.1 cm	2.0 in. 5.1 cm
C = Length Inches Centimeters	4.0 in. 10.1 cm	4.0 in. 10.1 cm

* Height includes 0.7 inch (1.8 cm) for the computer electronics.

PARTS

Order Replacement Kits with the part numbers given here.

Part No.	Description
904009-66	Screw, Aluminum Meter
904003-21	Screw, Nylon Meter
901002-52	Seal, Computer

SERVICE

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1-888-996-3837

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The warranty period shall begin on the date of manufacture or on the date of purchase with an original sales receipt. This warranty shall not apply if:

- A. the product has been altered or modified outside the warrantor's duly appointed representative;
- B. the product has been subjected to neglect, misuse, abuse or damage or has been installed or operated other than in accordance with the manufacturer's operating instructions.

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Wichita, KS, USA 67220-3205

If you are outside North or South America contact:

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1/16 Atkinson Road,
Taren Point NSW 2229, Sydney, Australia

The company shall, notify the customer to either send the product, transportation prepaid, to the company at its office in Wichita, Kansas, or to a duly authorized service center. The company shall perform all obligations imposed on it by the terms of this warranty within 60 days of receipt of the defective product.

GREAT PLAINS INDUSTRIES, INC., EXCLUDES LIABILITY UNDER THIS WARRANTY FOR DIRECT, INDIRECT, INCIDENTAL AND CONSEQUENTIAL DAMAGES INCURRED IN THE USE OR LOSS OF USE OF THE PRODUCT WARRANTED HEREUNDER.

The company herewith expressly disclaims any warranty of merchantability or fitness for any particular purpose other than for which it was designed.

This warranty gives you specific rights and you may also have other rights which vary from U.S. state to U.S. state.

Note: In compliance with MAGNUSON MOSS CONSUMER WARRANTY ACT – Part 702 (governs the resale availability of the warranty terms).



IECEX



ATEX

NEMA
4

(IP65)

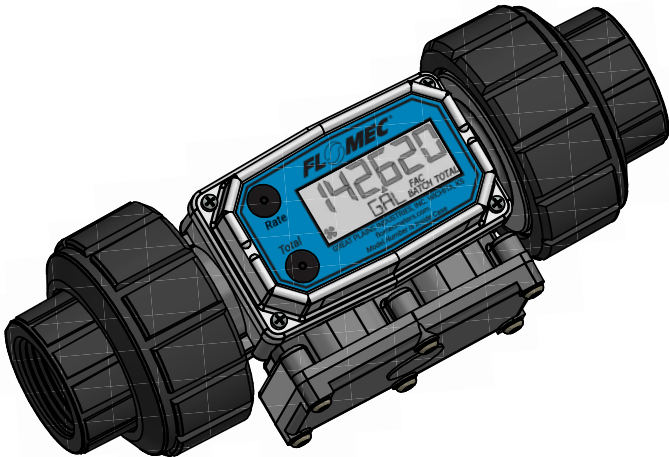
Wichita · Sydney

GREAT PLAINS INDUSTRIES



Great Plains Industries, Inc. / 888-996-3837 / GPI.net

Industrial Grade **PVDF** **TURBINE HOUSING** Owner's Manual



Turbine shown here with Computer Electronics which are sold separately.

To the owner . . .

Congratulations on receiving your FLOMEC® Industrial Grade Turbine. We are pleased to provide you with a product designed to give you maximum reliability and efficiency.

Our business is the design, manufacture, and marketing of liquid handling, agricultural, and recreational products. We succeed because we provide customers with innovative, reliable, safe, timely, and competitively-priced products. We pride ourselves in conducting our business with integrity and professionalism.

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Victor Lukic, President
Great Plains Industries, Inc.

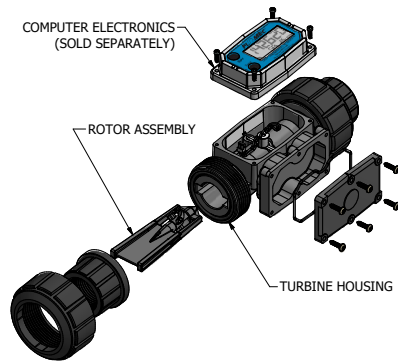
TABLE OF CONTENTS

General Information.....	2
Installation	4
Operation.....	5
Maintenance.....	5
Troubleshooting.....	7
Model Number Chart.....	7
Specifications	8
Parts	9
Service.....	10
Agency Approvals Table	11

GENERAL INFORMATION

This manual will assist you in installing and maintaining your PVDF turbine housing. (See Figure 1) Information on computer electronics and accessory modules are contained in other manuals. Please reference those as necessary.

Figure 1



For best results, take the time to fully acquaint yourself with all information about all components of your FLOMEC Electronic Digital Metering System prior to installation and use. If you need assistance, contact the distributor from whom you purchased your turbine.

SAFETY INSTRUCTIONS



This symbol is used throughout the manual to call your attention to safety messages.

WARNING

WARNINGS alert you to the potential for personal injury.

CAUTION


CAUTIONS call your attention to practices or procedures which may damage your equipment.


NOTES give information that can improve efficiency of operations.

It is your responsibility to make sure that all operators have access to adequate instructions about safe operating and maintenance procedures.

Read Me!

For your safety, review the major warnings and cautions below before operating your equipment.

 WARNING
The apparatus enclosure may contain aluminum and is considered to constitute a potential risk of ignition by impact or friction. Care must be taken into account during installation and use to prevent impact or friction.

 WARNING
Part of the enclosure is constructed from plastic. To prevent the risk of electrostatic sparking the plastic surface should only be cleaned with a damp cloth.

1. This equipment is approved to handle only fluids that are compatible with all materials of construction.
2. When measuring flammable liquids, observe precautions against fire or explosion.
3. When handling hazardous liquids, always follow the liquid manufacturer's safety precautions.
4. When working in hazardous environments, always exercise appropriate safety precautions.
5. Always dispose of used cleaning solvents in a safe manner according to the solvent manufacturer's instructions.
6. During turbine removal, liquid may spill. Follow the liquid manufacturer's safety precautions for clean up of minor spills.
7. Do not blow compressed air through the turbine.

8. Do not allow liquids to dry inside the turbine.
9. Handle the rotor carefully. Even small scratches or nicks can affect accuracy.
10. When tightening the turbine, do not use a wrench or pliers to tighten the turbine. Hand tighten only.
11. For best results, always verify accuracy before use.

Product Description

FLOMEC Industrial Meter Turbines are identified by the internal diameter of the inlet and outlet.

Model 05 - 1/2 inch
Model 10 - 1 inch

Each turbine is designed to work with on-board computer electronics and/or with one of several accessory modules that can interface to a wide variety of reporting and collecting devices.

Liquid flows through the turbine housing causing an internal rotor to spin. As the rotor spins, an electrical signal is generated in the pickup coil. The electrical signal provides the output necessary to operate the on-board computer electronics for local indication directly on the turbine or one of several accessory modules that transmit the signal to external equipment.

Upon receipt, examine your meter for visible damage. The turbine is a precision measuring instrument and should be handled as such. Remove the protective plugs and caps for a thorough inspection. If any items are damaged or missing, contact your distributor.

Make sure the turbine model meets your specific needs. Refer to the Specifications Section and confirm the following:

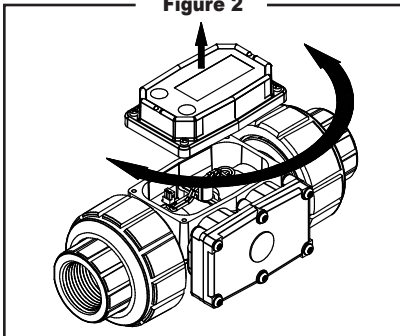
1. The flowrate is within the limits of your model.
2. The liquid is compatible with the turbine's wetted components.
3. The system's pressure does not exceed the turbine's maximum pressure rating.

Each FLOMEC® Turbine has a unique identification number that includes the Serial Number, K-Factor and Manufacturing Date. This identification number is etched into the surface of the turbine. Record this identification number in the back of the Owner's Manual in the space provided.

INSTALLATION

All FLOMEC turbines are designed to measure flow in only one direction. The direction is indicated by the arrow cast-molded in the turbine outlet. If the opposite direction is desired, and you are using on-board computer electronics, rotate the computer electronics 180 degrees prior to installation.

Figure 2



Flow altering devices such as elbows, valves, and reducers can affect accuracy. The following recommended guidelines are given to enhance accuracy and maximize performance. Distances given here are minimum requirements; double them for desired straight pipe lengths.

Upstream from the turbine, allow a minimum straight pipe length at

least 10 times the internal diameter of the turbine. For example, with the 1 inch turbine, there should be 10 inches (25.4 cm) of straight pipe immediately upstream. The desired upstream straight pipe length is 20 inches (50.8 cm).

Downstream from the turbine, allow a minimum straight pipe length at least 5 times the internal diameter of your turbine. For example, with the 1 inch turbine, there should be 5 inches (12.7 cm) of straight pipe immediately downstream. The desired downstream distance is 10 inches (25.4 cm).

A typical back pressure of 5 to 50 PSI (0.34 to 3.4 bar) will prevent cavitation. Create back pressure by installing a control valve on the downstream side of the meter at the proper distance detailed above.

Foreign material in the liquid being measured can clog the turbine's rotor and adversely affect accuracy. If this problem is anticipated or experienced, install screens to filter impurities from incoming liquids.

Model 05

Maximum Particulate Size	
Inches:	0.005
Microns:	125
Mesh:	120
Standard Sieve:	125 µm
Alternative Sieve:	No. 120

Model 10

Maximum Particulate Size	
Inches:	0.018
Microns:	500
Mesh:	35
Standard Sieve:	500 µm
Alternative Sieve:	No. 35

To ensure accurate measurement, remove all air from the system before use. To purge the system of air:

1. Ensure some back pressure exists on the turbine in the line.
2. Open the discharge valve or

nozzle and allow fluid to completely fill the system. Make sure the stream is full and steady.

3. Close the discharge valve or nozzle.
4. Start normal operations.

Each turbine contains a removable back coverplate. Leave the coverplate installed unless accessory modules specify removal.

Connections

1. To protect against leakage, seal all threads with an appropriate sealing compound. Make sure the sealing compound does not intrude into the flow path.
2. Make sure the flow direction arrow on housing back is pointed in the direction of the flow.
3. Install union ring over pipe end prior to installing pipe fitting.
4. Install pipe fittings on pipe ends, and tighten.
5. Tighten union ring to the turbine. Make sure O-ring is positioned in housing ends. Do not use a wrench or pliers. Hand tighten only.

NOTE: If connecting to new male threads, burrs and curls can adversely affect accuracy. Correct the problem prior to turbine installation.

Verify accuracy using the procedure found in the Operation Section.

OPERATION

Verify Accuracy

Before use, check the turbine's accuracy and verify calibration.

1. Make sure there is no air in the system.

2. Measure an exact known volume into an accurate container.
3. Verify the volume against the readout or recording equipment.

NOTE: If necessary, use a correction factor to figure final volume.

For best results, accuracy should be verified periodically as part of a routine maintenance schedule.

MAINTENANCE

Remove the Turbine

⚠ WARNING

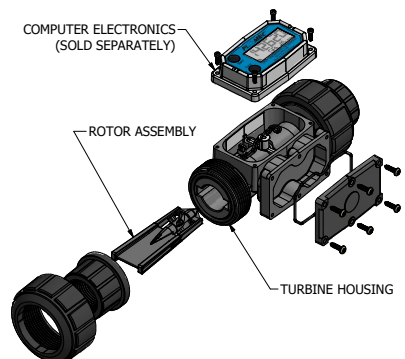
During turbine removal, liquid may spill. Follow the liquid manufacturer's safety precautions for clean up of minor spills.

1. Drain all liquid from the turbine. Wear protective clothing as necessary.
2. Loosen both union rings at the ends of the turbine.
3. If the turbine is not immediately installed again, cap lines as necessary.

Replace Internal Parts

1. Remove the turbine from the system. See Figure 3.

Figure 3



2. Use your fingers to gently remove the rotor assembly from the groove. Do not use force to remove the rotor assembly.

⚠ CAUTION

Handle the rotor assembly carefully. Even small scratches or nicks can affect accuracy.

3. Use the procedure below to clean the turbine.
4. Install the rotor assembly into the turbine housing. Make sure the pointed end of the rotor assembly is inserted first. (see Figure 3) Guide the assembly into place using a smooth motion, little or no force is required.
5. Reinstall the turbine, purge the system of air, and verify accuracy before use.

Clean the Turbine

During use, the turbine should be kept full of liquid to ensure that drying does not occur inside the turbine. If drying or caking should occur, the rotor will stick or drag, affecting accuracy. To determine if the rotor is stuck or dragging, remove rotor from housing and physically turn rotor.

⚠ CAUTION

Never blow compressed air through the meter. It could damage the rotor.

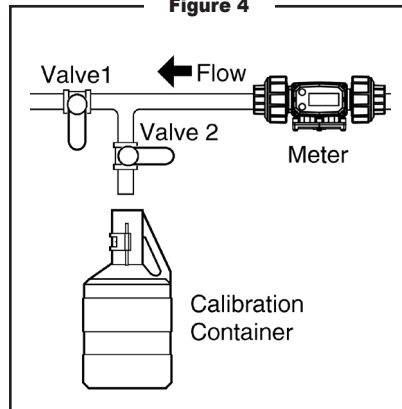
1. Remove the turbine from the system following the directions above.
2. Carefully clean residue off all parts. Remove internal parts as detailed above. Note orientation carefully for correct assembly. Internal parts can be soaked for 10 to 15 minutes in compatible cleaning solutions. Use a soft brush or small probe to *carefully* remove residue from the rotor.

⚠ WARNING

Follow the liquid manufacturer's instructions for the disposal of contaminated cleaning solvents.

3. When the rotor turns freely, assemble and install it again following the instructions above.
4. Check accuracy after cleaning. See Figure 4 for bucket test method.

Figure 4



TROUBLESHOOTING

SYMPTOM	PROBABLE CAUSE	CORRECTIVE ACTION
MEASUREMENT IS NOT ACCURATE	1. Turbine operated below minimum rate.	Increase flow rate. See Specifications.
	2. Turbine partially clogged with dried liquid.	Remove turbine. Clean carefully. Make sure rotor spins freely.
	3. Turbine bearings partially clogged with dried liquid.	Remove turbine. Clean carefully. Make sure rotor spins freely.
	4. Sealant wrapped around rotor.	Remove turbine. Clear material from rotor. Make sure rotor spins freely.
	5. Installed too close to fittings.	Install correctly. See Installation Section.
	6. Improper connections to recording device.	Check all electrical connections. Reference appropriate installation instructions.
	7. Accuracy needs verification.	Complete normal accuracy verification procedures. Repeat periodically.

MODEL NUMBER CHART

Model	Normal Range GPM Water	Normal Range LPM Water	Fitting Size NPT
P05	1.2 - 12	4.54 - 45.42	1/2 inch
P10	5 - 50	18.9 - 190	1 inch

SPECIFICATIONS

All data on Models 05 and 10 determined with 1 centipoise stoddard solvent test fluid at 70° F (21° C).

Models Size	Model 05 1/2 inch	Model 10 1 inch
Linear Flow Range Gallons/minute (GPM) Litres/minute (LPM)	1.2 - 12 4.5 - 45.4	5 - 50 18.9 - 190
Maximum Flow Gallons/minute (GPM) Liters/minute (LPM)	15 56.8	75 284
Maximum Pressure Drop in 10:1 Range: PSIG bar	10.0 0.68	6.0 0.40
Frequency Range in Linear Flow Range	45 - 450 Hz	45 - 475 Hz
Fitting Type	NPT (Female) ISO (Female)	NPT (Female) ISO (Female)
Weight* Pounds Kilograms	.75 lbs. .340 kg	1.28 lbs. .580 kg
Ship Weight* Pounds Kilograms	1.13 lbs. .535 kg	1.70 lbs. .770 kg

* Computer electronics add 0.2 lbs. (0.1 kg) to total weight.

Performance	Model 05	Model 10
Linear Range:	10:1 @ ± 2% of reading	10:1 @ ± 1.5% of reading
Repeatability:	± 0.3%	± 0.3%

Pressure Rating 100 PSIG (6.9 bar)

Wetted Components

Housing:	PVDF
Journal Bearings:	Ceramic (98% Alumina)
Shaft:	Ceramic (98% Alumina)
Rotor & Supports:	PVDF
O-Ring:	FKM (Standard) PTFE (Optional - Sold Separately)

Temperature Range

These temperatures are for the turbine without computer electronics. Final operational temperature range is determined by computer electronics or accessory modules.

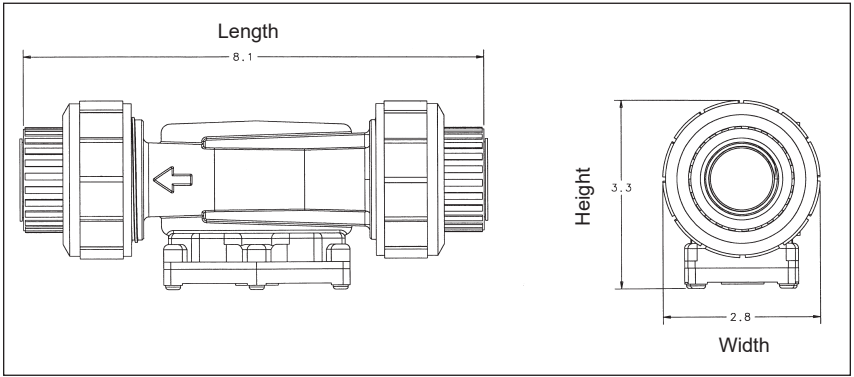
Operating Temperature

-20° F to +180° F (-28° C to 82° C)

Storage Temperature

-40° F to 250° F (-40° C to 121° C)

Sample Dimensions (Model 10 Shown)



Dimensions

Models Size	Model 05 1/2 inch	Model 10 1 inch
A = Height:		
Inches	3.2 in.	3.3 in.
Centimeters	8.1 cm	8.3 cm
B = Width:		
Inches	2.1 in.	2.8 in.
Centimeters	5.3 cm	7.1 cm
C = Length:		
Inches	7.3 in.	8.1 in.
Centimeters	18.5 cm	20.5 cm

Computer electronics add 0.7 in. (1.8 cm) to height of turbine.

PARTS

Order Replacement Kits with the part numbers given here.

Part No.	Description
901002-52	Seal (Computer)
125500-7	Model 05 (1/2 inch) Rotor Assembly Replacement Kit
125500-6	Model 10 (1 inch) Rotor Assembly Replacement Kit
901003-12	O-Ring Viton Union Fitting (1/2 inch)
901003-17	O-Ring Viton Union Fitting (1 inch)
125206-1	Model 10 O-Ring Kit (two O-Rings) - Teflon
125206-2	Model 05 O-Ring Kit (two O-Rings) - Teflon

SERVICE

For warranty consideration, parts, or other service information, please contact your local distributor. If you need further assistance, call the GPI Customer Service Department C.S.T.

1-888-996-3837

To obtain prompt, efficient service, always be prepared with the following information:

1. The model number of your turbine.
2. The serial number or manufacturing date code of your turbine.
3. Specific information about part numbers and descriptions.

For warranty work always be prepared with your original sales slip or other evidence of purchase date.

Returning Parts

Please contact the factory before returning any parts. It may be possible to diagnose the trouble and identify needed parts in a telephone call. GPI can also inform you of any special handling requirements you will need to follow covering the transportation and handling of equipment which has been used to transfer hazardous or flammable liquids.

CAUTION

Do not return turbines without specific authority from the GPI Customer Service Department. Due to strict regulations governing transportation, handling, and disposal of hazardous or flammable liquids, GPI will not accept turbines for rework unless they are completely free of liquid residue.

CAUTION

Turbines not flushed before shipment can be refused and returned to the sender.

Customer Service will ask for the following at the time of service.

Model No: _____

Serial Number: _____

K-Factor: _____

Manufacturing Date: _____

Distributor Name: _____

Distributor Phone Number: _____

Note: The Manufacturing Date, K-Factor and Serial Number are etched into the Turbine Housing.

AGENCY APPROVALS TABLE

TURBINE BODY ONLY:

PVDF



TURBINE BODY WITH MOUNTED INDUSTRIAL GRADE 09 COMPUTER ELECTRONICS:



Factory Mutual Approved
Intrinsically Safe for Class I, II, III, Division 1,
All Groups



IECEEx



ATEX

NEMA
4

TURBINE BODY WITH QSB PULSE-OUT:



TURBINE BODY WITH QSB PULSE-OUT WITH Q09 DISPLAY:



**TURBINE BODY WITH QSB PULSE-OUT (OR) QSB PULSE-OUT WITH Q09 DISPLAY,
COUPLED WITH ANY QSI COMMUNICATIONS SUITE (VERSION 1, 2, OR 3):**



NOTE: When a component with Agency Approval ratings is mated to another component with the same Approval Agency ratings, the combination may gain environmental approvals. When one of the components has lesser or no Approval Agency ratings, the resultant combination assumes the ratings of the lesser rated component. If one component has no ratings, the resultant combination has no ratings.

Limited Warranty Policy

Great Plains Industries, Inc. 5252 E. 36th Street North, Wichita, KS USA 67220-3205, hereby provides a limited warranty against defects in material and workmanship on all products manufactured by Great Plains Industries, Inc. This product includes a 1 year warranty. Manufacturer's sole obligation under the foregoing warranties will be limited to either, at Manufacturer's option, replacing or repairing defective Goods (subject to limitations hereinafter provided) or refunding the purchase price for such Goods theretofore paid by the Buyer, and Buyer's exclusive remedy for breach of any such warranties will be enforcement of such obligations of Manufacturer. The warranty shall extend to the purchaser of this product and to any person to whom such product is transferred during the warranty period.

The warranty period shall begin on the date of manufacture or on the date of purchase with an original sales receipt. This warranty shall not apply if:

- A. the product has been altered or modified outside the warrantor's duly appointed representative;
- B. the product has been subjected to neglect, misuse, abuse or damage or has been installed or operated other than in accordance with the manufacturer's operating instructions.

To make a claim against this warranty, contact the GPI Customer Service Department at 316-686-7361 or 888-996-3837. Or by mail at:

Great Plains Industries, Inc.
5252 E. 36th St. North
Wichita, KS, USA 67220-3205

If you are outside North or South America contact:

Great Plains Industries – Australia
1/16 Atkinson Road,
Taren Point NSW 2229, Sydney, Australia

The company shall, notify the customer to either send the product, transportation prepaid, to the company at its office in Wichita, Kansas, or to a duly authorized service center. The company shall perform all obligations imposed on it by the terms of this warranty within 60 days of receipt of the defective product.

GREAT PLAINS INDUSTRIES, INC., EXCLUDES LIABILITY UNDER THIS WARRANTY FOR DIRECT, INDIRECT, INCIDENTAL AND CONSEQUENTIAL DAMAGES INCURRED IN THE USE OR LOSS OF USE OF THE PRODUCT WARRANTED HEREUNDER.

The company herewith expressly disclaims any warranty of merchantability or fitness for any particular purpose other than for which it was designed.

This warranty gives you specific rights and you may also have other rights which vary from U.S. state to U.S. state.

Note: In compliance with MAGNUSON MOSS CONSUMER WARRANTY ACT – Part 702 (governs the resale availability of the warranty terms).

Wichita · Sydney

GREAT PLAINS INDUSTRIES



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