



**MODEL 1100 TURBINE FLOW METER
INSTALLATION & OPERATION MANUAL**



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OPERATING PRINCIPLE:

Fluid entering the meter passes through the inlet flow straightener which reduces its turbulent flow pattern and improves the fluid's velocity profile. Fluid then passes through the turbine blades causing it to rotate at a speed proportional to the fluid velocity. As each blade passes through the magnetic field, created at the base of the pickoff transducer, AC voltage (pulse) is generated in the pickup coil (see Figure 1). These impulses produce an output frequency proportional to the volumetric flow through the meter. The output frequency is used to represent flow rate and/or totalization of fluid passing through the turbine flow meter.

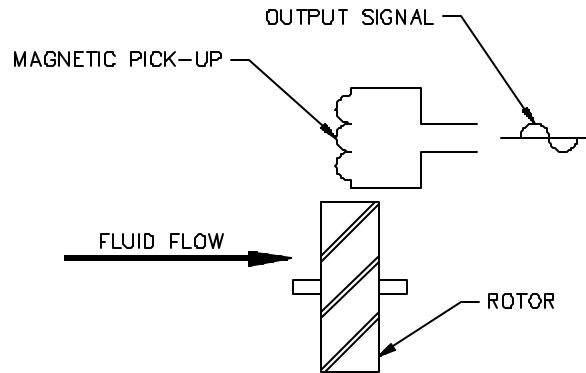
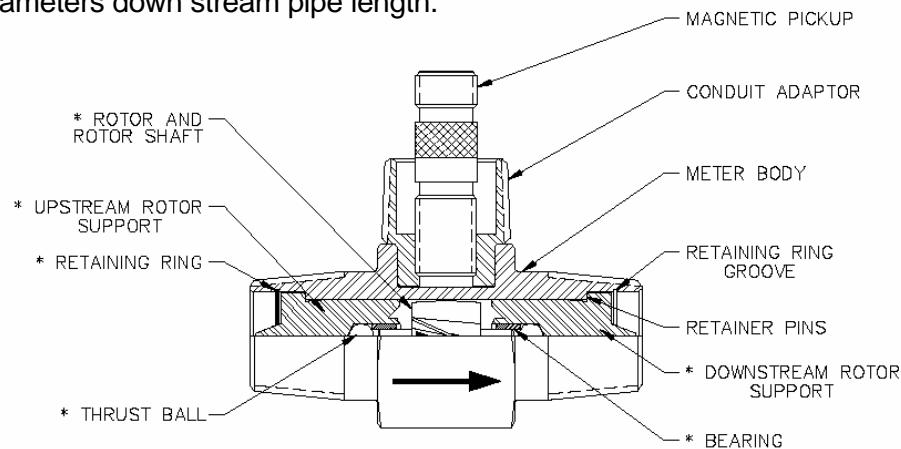


Fig. 1 Schematic illustration of electric signal generated by rotor movement.

MODEL 1100 TURBINE METER and REPAIR KIT:

TURBINE METER:

The Model 1100 turbine flow meter is designed withstand the rigorous demands of the most remote flow measurement applications. The Model 1100 Flowmeter maintains measurement accuracy and mechanical integrity in the corrosive and abrasive fluids commonly found in oil field waterflood projects pipelines, in-situ mining operations, offshore facilities and plant locations. Simple to install and service, it can operate in any orientation (horizontal to vertical) as long as the "flow direction" arrow is aligned in the same direction as the actual line flow. For optimum performance, the flow meter should be installed with a minimum of 10 diameters upstream pipe length and 5 diameters down stream pipe length.



NOTE: * INDICATES PARTS
CONTAINED IN REPAIR KITS

Fig. 2 Typical cross-section of B110-375 through B111-121 turbine flow meter.

MATERIAL of CONSTRUCTION:

Body: 316 Stainless Steel

Rotor: CD4MCU Stainless Steel

Rotor Support and Bearings: 316 Stainless Steel

Rotor Shaft: Tungsten Carbide

OPERATING LIMITATIONS:

Temperature: -150° F to +350° F (-101° C to +177° C)

The meter should not be subjected to temperatures above +350° F (177° C), or below -150° F (-101° C) or the freezing point of the metered liquid. High temperatures will damage the magnetic pick-up while lower temperatures will limit the rotation of the rotor.

Pressure: The following meters have a maximum pressure rating of:

5,000 psi		800 psi	
B110-375	B111-110	B111-130	B111-180
B110-500	B111-115	B111-140	B111-200
B110-750	B111-121	B111-160	
B110-875	B111-120		

Note: Consult factory for pressure ratings for flanged meters.

WARNING: **Pressure in excess of allowable rating may cause the housing to burst and cause serious personal injury.**

Accuracy: +/- 1.0% of reading.

Repeatability: +/- 0.1%

Calibration: Water (NIST Traceable Calibration)

Corrosion: All Blancett Model 1100 turbine meters are constructed of stainless steel and tungsten carbide. The operator must ensure that the operating fluid is compatible with these materials. Incompatible fluids can cause deterioration of internal components and cause a reduction in meter accuracy.

Pulsation and

Vibration: Severe pulsation and mechanical vibration will affect accuracy, and shorten the life of the meter

Filtration: If small particles are present in the fluid Blancett recommends that a strainer be installed upstream of the meter (see Table 1 for filtration recommendations).

REPAIR KIT:

The Model 1100 Turbine Meter Repair Kit is designed for easy field service of a damaged flow meter, rather than replacing the entire flow meter (see Appendix B for repair kit information). Repair parts are constructed of stainless steel alloy and tungsten carbide and is factory calibrated to ensure accuracy throughout the entire flow range. Each kit is complete and includes the calibrated K-factor which used to recalibrate the flow monitor or, other electronics, to provide accurate output data.

INSTALLATION INSTRUCTIONS:

Prior to installation, the flow meter should be checked internally for foreign material and to ensure the turbine rotor spins freely. Fluid lines should also be checked and cleared of all debris.

The flow meter must be installed with the flow arrow, etched on the exterior of the meter body, pointing in the direction of fluid flow. Though the meter is designed to function in any position it is recommended, where possible, to install horizontally with the magnetic pick-up facing upward.

The liquid being measured should be free of any large particles that may obstruct rotation of the rotor. If particles are present, a mesh strainer should be installed upstream before operation of the flow meter. (See Table 1)

TABLE 1

PART NUMBER	STRAINER MESH	CLEARANCE	FILTER SIZE
B110-375	60 X 60	.0092	260 Micron
B110-500	60 X 60	.0092	260 Micron
B110-750	60 X 60	.0092	260 Micron
B110-875	60 X60	.0092	260 Micron
B111-110	60 X 60	.0092	260 Micron
B111-115	20 X 20	.0340	.86mm
B111-120	10 X10	.0650	1.6mm
B111-121	20 X 20	.0340	.86mm
B111-130	8 X 8	.0900	2.3mm
B111-140	10 X 10	.0650	1.6mm
B111-160	4 X 4	.1875	4.8mm
B111-180	8 X 8	.0900	2.3mm
B111-200	4 X 4	.1875	4.8mm

The preferred plumbing setup is one containing a by-pass line (Fig. 3) that allows meter inspection and repair without interrupting flow. If a by-pass line is not utilized, it is important that all control valves be located down-stream of the flow meter (Fig. 4).

CAUTION: Damage can be caused by striking an empty meter with a high velocity flow stream.

This is true with any restriction in the flow line that may cause the liquid to flash. If necessary, air eliminators should be installed to ensure that the meter is not incorrectly measuring entrained air or gas.

It is recommended that a minimum length, equal to ten (10) pipe diameters of straight pipe, be installed on the up-stream side and five (5) diameters on the down-stream side of the flow meter. Otherwise meter accuracy may be affected. Piping should be the same size as the meter bore or threaded port size.

Do not locate the flow meter or connection cable close to electric motors, transformers, sparking devices, high voltage lines, or place connecting cable in conduit with wires furnishing power for such devices. These devices can induce false signals in the flow meter coil or cable, causing the meter to read inaccurately.

If problems arise with the flow meter and monitor consult Appendix A (Trouble Shooting Guide). If further problems arise, consult the factory. Turbine Meter Repair Kits are also available, see Appendix B. If the internal components of the turbine flow meter are damaged beyond repair, these repair kits are available. Information pertaining the turbine meter repair kits are referenced in Appendix B.

OPERATIONAL START UP: TURBINE FLOW METER

The following steps should be followed when installing and starting the meter.

WARNING: Make sure that fluid flow has been shut off and pressure in the line released before attempting to install the meter in an existing system.

1. After meter installation, close the isolation valves, and open the by-pass valve. Flow liquid through the by-pass valve for sufficient time to eliminate any air or gas in the flow line.

CAUTION: High velocity air or gas may damage the internal components of the meter.

2. Open up-stream isolating valve slowly to eliminate hydraulic shock while charging the meter with the liquid. Open the valve to full open.
3. Open down-stream isolating valve to permit meter to operate.
4. Close the bypass valve to a full closed position.
5. Adjust the downstream valve to provide the required flow rate through the meter. Note: The downstream valve may be used as a control valve.

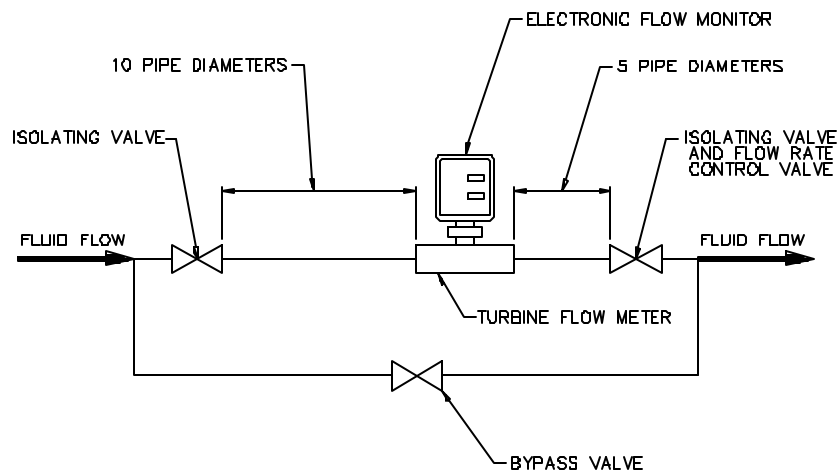


Fig. 3 Meter installation utilizing a bypass line

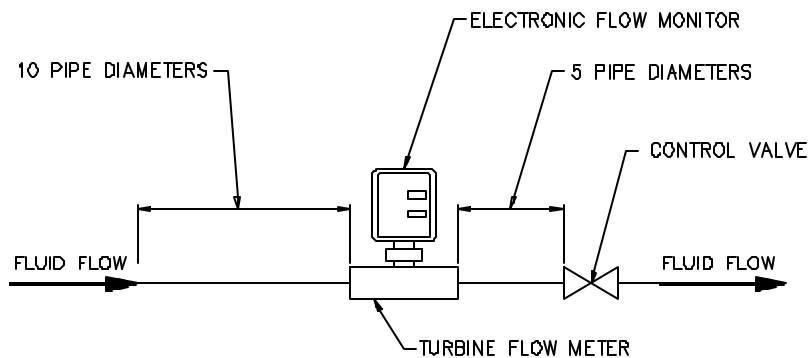


Fig. 4 Meter installation without utilizing a bypass line

APPENDIX A TROUBLE SHOOTING GUIDE

TROUBLE	POSSIBLE CAUSE	REMEDY
Meter indicates higher than actual flow rate	Cavitation Debris on rotor support Build up of foreign material on meter bore. Gas in liquid	Increase back pressure Clean meter Clean meter Install gas eliminator ahead of meter
Meter indicates lower than actual flow rate	Debris on rotor Worn bearing Viscosity higher than calibrated	Clean meter and add filter Clean meter and add filter Recalibrate monitor (Appendix A)
Erratic system indication, meter alone works well (remote monitor application only)	Ground loop in shielding	Ground shield one place only. Look for internal electronic instrument ground. Reroute cables away from electrical noise.
Indicator shows flow when shut off.	Mechanical vibration causes rotor to oscillate without turning	Isolate meter
No flow indication. Full or partial open position	Fluid shock, full flow into dry meter or impact caused bearing separation or broken rotor shaft.	Rebuild meter with repair kit and recalibrate monitor. Move to location where meter is full on start-up or add downstream flow control valve.
Erratic indication at low flow, good indication at high flow	Rotor has foreign material wrapped around it.	Clean meter and add filter
No flow indication	Faulty pick-up	Replace pick-up.
System works perfect, except indicates lower flow over entire range	Bypass flow, leak	Repair or replace bypass valves, or faulty solenoid valves.
Meter indicating high flow, upstream piping at meter smaller than meter bore	Fluid jet impingement on rotor.	Change piping.
Opposite effects of above	Viscosity lower than calibrated	Change temperature, change fluid or recalibrate meter.

APPENDIX B REPAIR KIT INFORMATION

Flow Meter Size	Repair Kit Fits Meter Part No.	Repair Kit Part Number
3/8"	B110-375	B251-103
1/2"	B110-500	B251-105
3/4"	B110-750	B251-108
7/8"	B110-875	B251-109
1"	B111-110	B251-112
1-1/2"	B111-115	B251-116
2" Low	B111-121	B251-116
2"	B111-120	B251-120
3"	B111-130	B251-131
4"	B111-140	B251-141
6"	B111-160	B251-161
8"	B111-180	B251-181
10"	B111-200	B251-200
Standard Magnetic Pick-up	All Meter Sizes	B111109

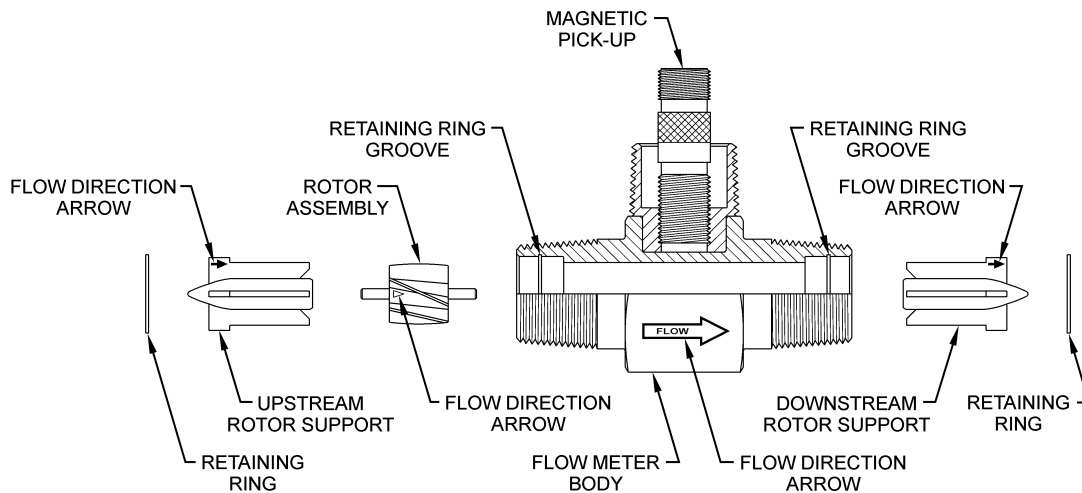


Fig. 5 Typical turbine meter component directory

CAUTION: Always reassemble rotor supports, rotor, and meter body are all marked with flow arrows, which must all point in the same direction.



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