



Installation and Instruction Manual



All Stainless Steel Turbine Flowmeter
Type : TDSS.

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Warning

When the Flowmeter is installed at explosion hazard field, DON'T remove the COVERPLATE when the meter is powered. Please make parameter setting at safe filed prior to installation.

For TDSS-B (Battery Powered Type) and TDSS-C (24V DC Power), it's optional to use one special magnet for totalizer reset without opening the coverplate. Please request this function when totalizer reset is frequently used at hazard field.



Special Notice

Pictures & Descriptions are for your information only, please refer to the actual product. Parameters are subjected to changes without notice.

1.0 GENERAL INFORMATION

This manual will assist you in installing, using and maintaining your BASS turbine flow meter. It is your responsibility to make sure that all operators have access to adequate instructions about safe operating and maintenance procedure.



Warning

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

1. Use only fluids that are compatible with the housing material and wetted components for 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. During turbine removal, liquid may spill. Follow the liquid manufacturer's safety precautions for clean up of minor spills.
6. Do not blow compressed air through the turbine.
7. Handle the rotor carefully. Even small scratches or nicks can affect accuracy.
8. When tightening the turbine, use a wrench only on the wrench flats.
9. For best results, calibrate the meter at least 1 time per year.

Product Description

TDSS series turbine flow meters have the features: high accuracy, good repeatability, convenient installation/maintenance, simple structure etc.

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 (liters, cubic meters, gallons etc.) on the local display where is applicable. Optional 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 carefully. Remove the protective plugs and caps for a thorough inspection. If any items are damaged or missing, contact BASS.

Make sure the turbine flow model meets your specific needs. For your future reference, it might be useful to record this information on nameplate in the manual in case it becomes unreadable on the turbine.

2.0 SPECIFICATIONS

Materials of Construction

Body	AISI 304 Stainless steel
Rotor	CD4MCU Stainless steel
Rotor Support	AISI 316 Stainless steel
Rotor Shaft	Tungsten carbide
Turndown Ratio	10 : 1 standart , 20 : 1 on request
Accuracy	±1% of reading, ±0,5 and ±0,2% on request
Repeatability	±0,1%
Calibration	Standart Manufacturer Calibration Certificate
Pressure Rating	63 bar max. (100 bar max. ops.)
Temperature	-40°C...120°C (-40°C...150°C ops.)
End Connection	Thread G,NPT or Flange DIN,ANSI,JIS
Power Supply	12...24 VDC for pulse 24VDC for analog and LCD 3 VDC lithium battery for battery powered LCD
Protection	IP65
Hazardous Area	Ex d II B T6 on request

3.0 OPERATION CONDITIONS

Type and Flow Rate Tables

Type	Bore Size [mm]	End Connection	Flow Range[l/min]	Extended Flow Range[l/min]	Recommended Strainer [Mesh]
TDSS.004...	4	G 1/2" or DN15	0,6...4,5	0,6...6	60
TDSS.006...	6	G 1/2" or DN15	1,5...10	1...10	60
TDSS.010...	10	G 1/2" or DN15	3...20	2,5...25	60
TDSS.015...	15	G 1" or DN25	10...100	6...133	60
TDSS.020...	20	G 1" or DN25	13...133	7,5...150	60
TDSS.025...	25	G 1 1/2" or DN40	16...165	8...165	40
TDSS.032...	32	G 2" or DN40	25...250	13...250	20
TDSS.040...	40	G 2" or DN50	33...335	16...335	20
			Flow Range[m3/h]	Extended Flow Range[m3/h]	
TDSS.050...	50	DN50	4...40	2...40	20
TDSS.065...	65	DN65	7...70	4...70	20
TDSS.080...	80	DN80	10...100	5...100	10
TDSS.100...	100	DN100	20...200	10...200	10
TDSS.125...	125	DN125	25...250	13...250	4
TDSS.150...	150	DN150	30...300	15...300	4
TDSS.200...	200	DN200	80...800	40...800	4

4.0 MODEL AND SELECTION

TDSS.								Description
Bore Sizes	XXX							Please see "Type and Flow Rate Tables"
Line Size		015						DN15
		025						DN25
		040						DN40
		050						DN50
		065						DN65
		080						DN80
		100						DN100
		125						DN125
		150						DN150
		200						DN200
Connection		D					Thread (please specify NPT,G or BSP)	
		F					Flanged (please specify DIN,ANSI,JIS)	
Converter Type		P					Pulse output	
		A					4-20 mA output	
		B					Lithium battery powered,with display,without output	
		L					4-20 mA output,with display	
		C					RS-485 communication,with display,24V DC	
		H					4...20 mA+HART protocol, with display,24V DC display	
Accuracy Level			10				±1% of reading	
			05				±0,5% of reading	
			02				±0,2% of reading	
Range Type				S			Standart Flow Range	
				E			Extended Flow Range	
Body Material					S		AISI 304 SS	
					L		AISI 316 L	
Enclosure						N	IP65	
						E	Ex d II B T6 flameproof	
Temperature Range						N	-40°C...120°C	
						H	-40°C...150°C	



TDSS.XXX.XX.D.P....
Basic Type



TDSS.XXX.XX.F.A....
Ex-proof or Analog output



TDSS.XXX.XX.F.B or C or H....
with LCD Display

5.0 CAUTIONS FOR INSTALLATION

Mounting Positions

Turbine flow meters should be installed at the place in compliance with the requirements below:

- ◆ Easy maintenance
- ◆ No vibration
- ◆ No electromagnetic interface
- ◆ Away from heat source

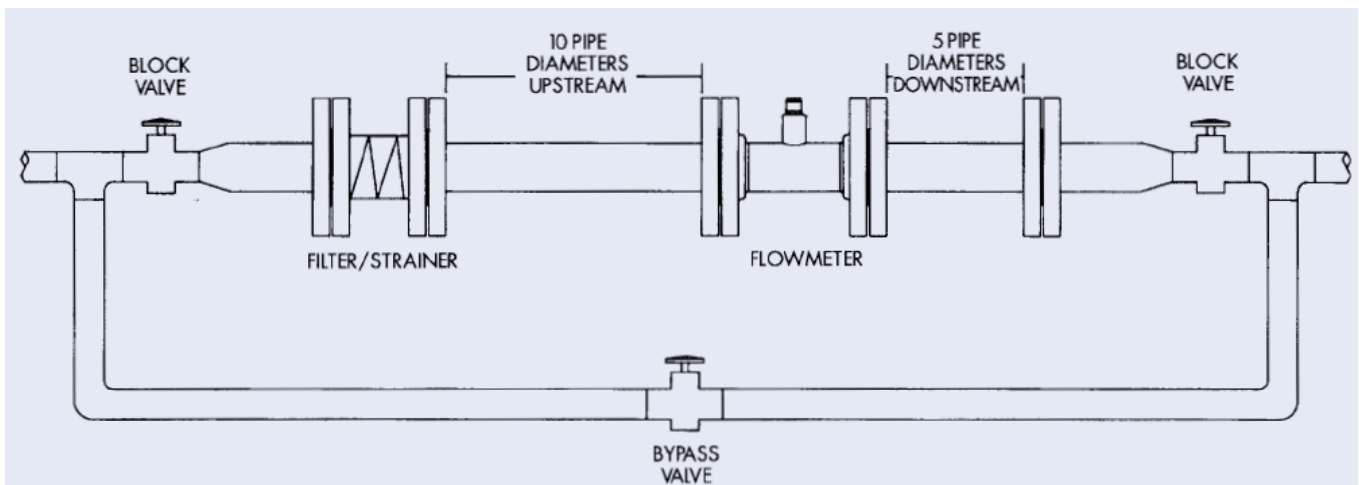
Mounting Orientation

All BASS turbine flow meters are designed to measure flow in only one direction. The direction is indicated by the arrow on the body.

Required Lengths of Straight Runs

Flow altering device such as elbows, valves and reducers can affect accuracy. See diagram 1 for typical flow meter system installation.

Diagram 1. Typical Flow Meter System Installation

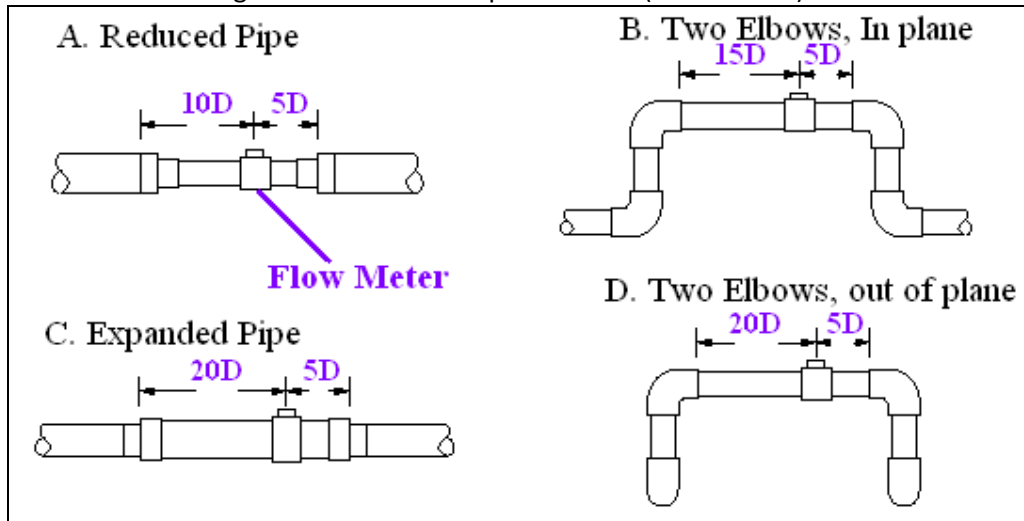


The recommended guidelines are given to enhance accuracy and maximize performance. Distance given here are minimum requirements; double them for desired straight pipe lengths.

- Upstream: allow a minimum straight pipe length at least 10 times the internal diameter of the pipe. For example, with the 50mm pipe, there should be 500mm of straight pipe immediately upstream. Desired upstream straight pipe length is 1000mm.
- Downstream: allow a minimum straight pipe length at least 5 times the internal diameter of the pipe. For example, with the 50mm pipe, there should be 250mm of straight pipe immediately upstream. Desired upstream straight pipe length is 500mm.

See diagram 2 for straight pipe length requirement when there is altering device.

Diagram 2. Number of Pipe Diameter (D=Diameter)



Warning:

Precaution for direct sunshine and rain when the meter is installed outside.

Anti-Cavitation

Cavitation can be caused by entrained air, and it can seriously damage the rotor on a turbine flow meter. An amount higher than about 100 mg/l of entrained air or gas can produce error. In addition, cavitation can be caused by too little backpressure on the flow meter. For BASS turbine flow meters, you should provide a backpressure (downstream pressure) of at least 1.25 times the vapor pressure, plus 2 times the pressure drop through the flow meter. See formula 1.

$$\text{Formula 1} \quad : P_b \geq 1.25 \times P_v + 2 \times (P_{in} - P_{out})$$

In formula 1: (P_b : Back pressure; P_v : Vapor Pressure; P_{in} : Inlet Pressure; P_{out} : Outlet Pressure)

Create backpressure by installing a control valve on the downstream side of the meter at the proper distance detailed above.



Special Notice

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

- ◆ To ensure accurate measurement, drain all air from the system before use.
- ◆ When the meter contains removable coverplates. Leave the coverplate installed unless accessory modules specify removal. Don't remove the coverplates when the meter is powered, or electrical shock and explosion hazard can be caused.

Thread 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.

Flange Connections

The flange follows GB/T 9119-2000 (ISO 7005-1) RF (Raised Face).

Note: flange can be customized following other criterias.

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.

Installation Dimensions

Thread or flange connection is used according to different flow models. See Figure 1, 2, 3 and Table 3 for detailed dimensions.

Figure 1: DN4-DN10 sensor structure

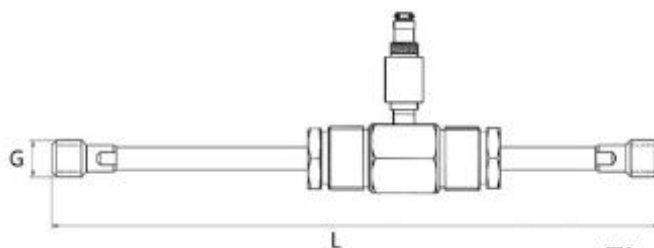


Figure 1

Figure 2: DN15-DN40 sensor Structure

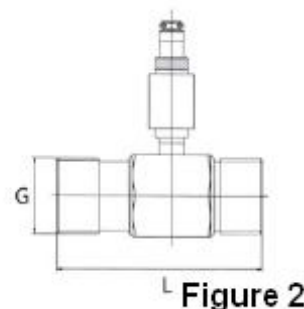


Figure 2

Figure 3: DN50-DN200 sensor structure

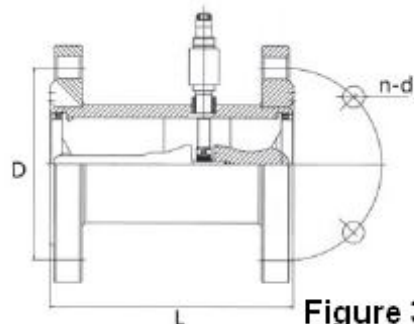


Figure 3

Table 3. Dimensions

Diameter (mm)	L (mm)	G	D (mm)	d (mm)	n (Bolts)
3.1 Flange: ISO7005-1 RF					
4	295	G ½	Threaded Connection		
6	330	G ½			
10	450	G ½			
15	75	G 1	Φ65	Φ14	4
20	80	G 1	Φ75	Φ14	4
25	100	G 1 ¼	Φ85	Φ14	4
32	140	G 2	Φ100	Φ14	4
40	140	G 2	Φ110	Φ18	4
50	150	Flange Connection	Φ125	Φ18	4
65	170		Φ145	Φ18	4
80	200		Φ160	Φ18	8
100	220		Φ180	Φ18	8
125	250		Φ210	Φ22	8
150	300		Φ240	Φ22	8
200	360		Φ295	Φ28	12
3.2 Flange: ASNI Class 600					
15	90		Φ66.5	Φ16	4
25	115		Φ89	Φ20	4

6.0 ELECTRICAL WIRING






Warning:

Electrical Hazard Disconnect power before beginning installation.

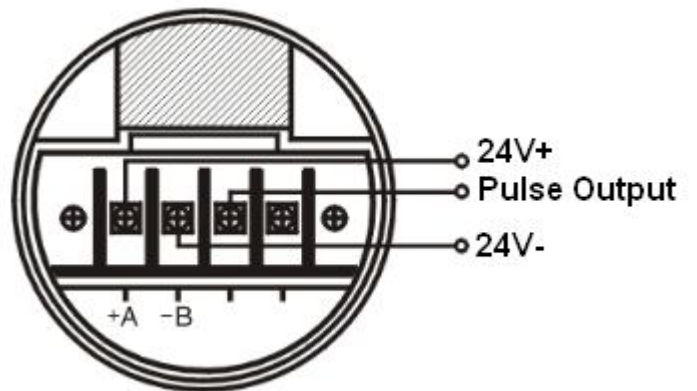
- ◆ Basic Type: TDSS-P (See Table 4)

Terminal wiring for TDSS-P,IP65

Terminal Symbols	Description
Red Wire 	Power Supply: "24V+"
White Wire 	Power Supply: "24V-"
Yellow Wire 	Pulse Output

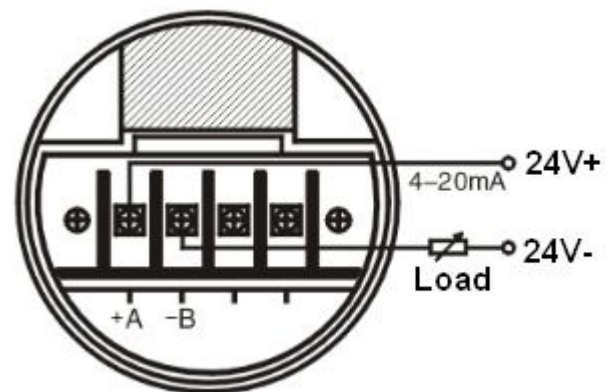
- ◆ Explosion Proof Type: TDSS-P (See Figure 4)

Figure 4. Terminal configuration and terminal wiring for TDSS-P Explosion Proof Type



- ◆ Explosion Proof Type: TDSS-A (See Figure 5)

Figure 5. Terminal configuration and terminal wiring for TDSS-A Explosion Proof Type



Intelligent integrated Turbine Flow Meter (Type: TDSS-L or C)

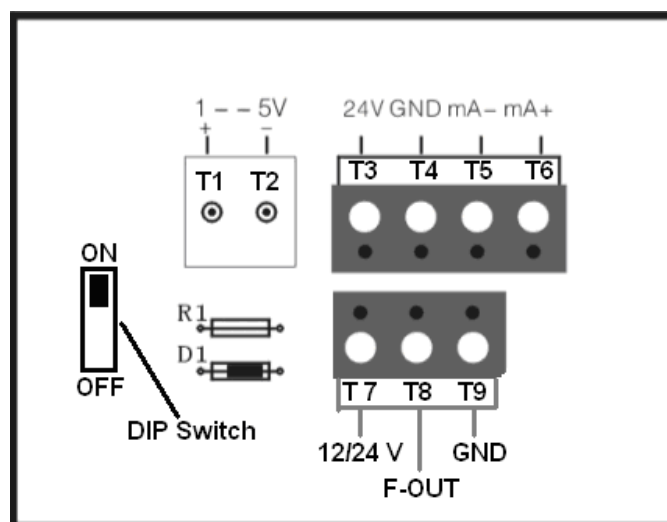


Figure 6. Terminal Wiring for TDSS-L or C

Table 5. Terminal wiring for TDSS-L or C

Function (Optional)	Terminal Symbols	Description
(2 wires) 4 to 20 mA Output	T3: 24V	24V (+)
	T4: GND	4-20 mA + output
(3 wires) 4 to 20 mA Output	T3: 24V	24V+ DC Power Supply
	T4: GND	24V- DC Power Supply
	T6: mA+	Current Output 4 to 20 mA DC (+)
(4 wires) 4 to 20 mA Output	T3: 24V	24V+ DC Power Supply
	T4: GND	24V- DC Power Supply
	T5: mA-	Current Output 4 to 20 mA DC (-)
	T6: mA+	Current Output 4 to 20 mA DC (+)
Pulse Output	T7: 12/24 V	12/24V: 12V+ to 24V+ DC Power Supply
	T8: F-OUT	F-OUT: Pulse output
	T9: GND	GND: 24V- DC Power Supply
1 to 5V DC Output	T1: +	1 to 5V DC output (+)
	T2: -	1 to 5V DC output (-)
	T3: 24V	24V+ DC Power Supply
	T4: GND	24V- DC Power Supply

DIP Switch Function: (Default position: OFF)

ON: Terminal T4 (GND) connects to Housing, solving 50Hz interference.

OFF: Disconnect the connection between Terminal T4 (GND) and Housing.

Note: When multi flow meters are powered with same power supply, only one meter's DIP switch can be set at "ON" and others should be at "OFF" position.

7.0 OPERATION AND SETUP

Basic Type: TDSS-P Turbine Flow Sensor

The sensor has been calibrated and qualified prior to leave the plant.

Connections between this sensor and secondary instrument: At first check whether the sensor's output characters (pulse's frequency, amplitude and width) can match secondary instrument's input characters. Set secondary instrument's parameter according to sensor's K-Factor.

A Type: TDSS-A Turbine Flow Transmitter

According to customer's requirement, the current output for zero and full-scale flow has been adjusted prior to leave the plant.

B Type: TDSS-L,B,C,H Intelligent Turbine Flow Meter

Parameter Setup: (Authorized Engineer only)



Warning: Don't change the parameter unless get the approval from distributor or BASS company. Even minor change on parameter can affect accuracy.

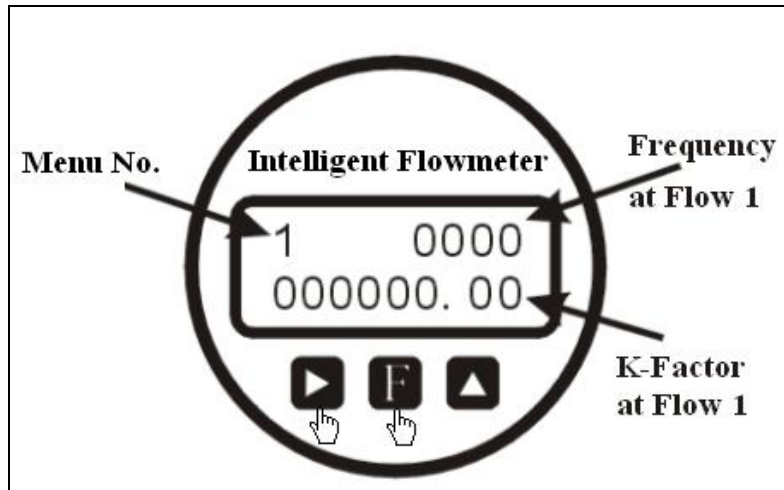




Figure 7. Enter Parameter Setup



To enter parameter setup, press and hold the and   buttons until the display changes.

Press  to change cursor position: cursor-right

Press  to change value

Press  to advance to next menu.

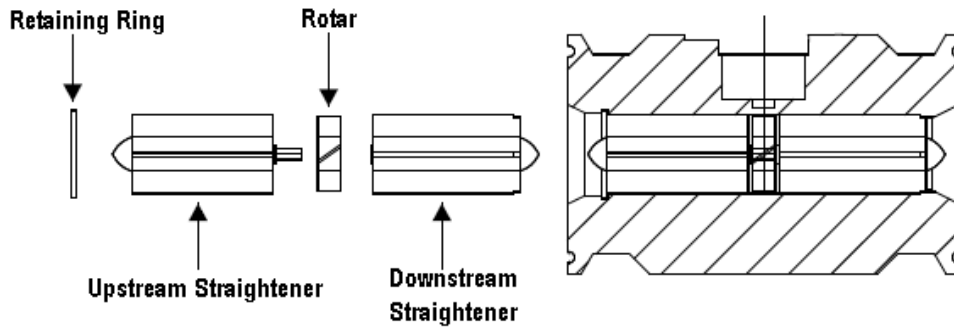
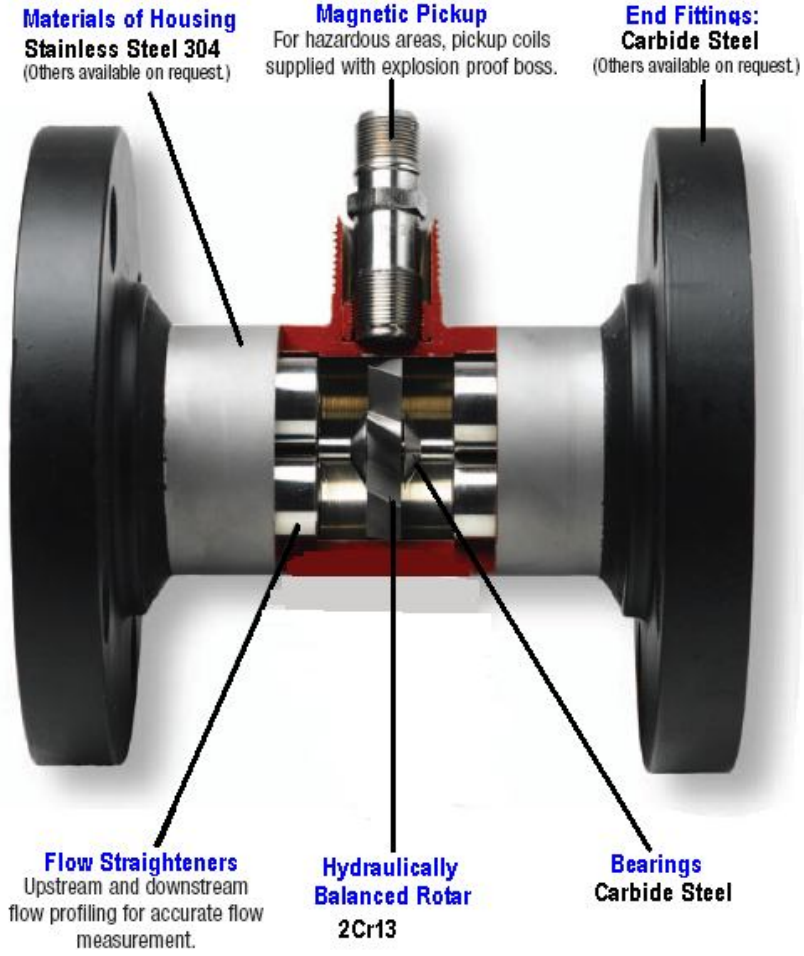
Press and hold   to exit and save setting.

To reset totalizator flow, under working state press and hold  

8.0 TROUBLESHOOTING

Symptom	Probable Cause	Solution
Measurement is not accurate	1. Turbine operated below minimum rate. 2. Turbine partially clogged with dried liquid 3. Installed too close to fittings.	Increase flowrate. Refer to Section 3.0 Operation Conditions Remove turbine. Clean carefully. Make sure rotor spins freely. Install correctly. Refer to Section 5.0 Cautions for Installation
LCD Display Abnormity	1. Battery Power Type: Bad contact on the connector between battery and PCB 2. DC Power Type: supply voltage is abnormal	Open back cover and repower the flow meter Check and ensure power supply is 24V DC

9.0 METER CONSTRUCTION



Exploded View of Internals

Assembled Internals



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