

# Liquid Turbine Flow Meter



Subject to change without notice.

# 1. General Information

This manual will assist you in installing, using and maintaining your Dawin 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 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. 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.

## 1.1 Product Description

Operating Principle:

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 Dawin.

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. Refer to the nameplate for your customized product's specification.

## 2. Technical Data

### Measuring system

Application range	Liquid: water; diesel; gasoline (1) Without Impurity (2) Low viscosity
<b>Measured Value</b>	
Primary measured value	Flow Rate
Secondary measured value	Volume flow

### Design

<b>Features</b>	
Modular construction	The measurement system consists of a flow sensor and a signal converter. It is available as compact and as separate version.
Compact version converter	N Type: Pulse output without local display
	A Type: 4-20mA Output without local display
	B Type: Local Display; Lithium Battery Power; No Output
	C Type: Local Display; 24V DC Power; 4-20mA Output; Optional Function: (1) Backup Power Supply: Lithium Battery (2) Modbus RS485 (3) Pulse Output
Connection	Thread: DN4-DN50
	Flange: DN15-DN200 (DIN, ANSI, JIS)
	Wafer: DN15-DN100
Measurement Ratio	Standard – 10:1; Optional: 20:1

### Measuring accuracy

Reference conditions	Flow conditions similar to EN 29104
	Medium: Water
	Electrical conductivity: $\geq 300 \mu\text{S}/\text{cm}$
	Temperature: +10...+30°C / +50...+86°F
	Inlet section: $\geq 10 \text{ DN}$
	Operating pressure: 1 bar / 14.5 psig
Flow Meter Accuracy	Standard: 1.0% of rate
	<b>Optional:</b> 0.5% of rate

## Operating conditions

<b>Temperature</b>	
Process temperature	T1 Level: -20...+80°C
	T2 Level: -20...+120°C
	T3 Level: -20...+150°C
Ambient temperature (all versions)	<b>Standard</b> (with aluminum converter housing):
	-10...+55°C
Storage temperature	-20...+70°
<b>Pressure</b>	
EN 1092-1	DN100...DN200: PN 16
	DN15...DN80: PN 25
	Other pressures on request
ASME B16.5	1/2" ...8": 150 lb RF
	Other pressures on request
JIS	1/2" ...8": 10 K
	Other pressures on request

## Installation conditions

Installation	Take care that flow sensor is always fully filled
	For detailed information see chapter "Cautions for Installation"
Flow direction	Forward
	Arrow on flow sensor indicates flow direction.
Inlet run	≥ 10 DN
Outlet run	≥ 5 DN

## Materials

<b>Sensor housing</b>	SS304
	Other materials on request
<b>Flanges</b>	SS304
	Other materials on request
<b>Rotor</b>	
Standard: 2Cr13	EN10088-3      1.4021      X20Cr13
	AISI              420
	BS                420S37
	JIS                SUS410J1
Optional: CD4MCu	DN15...DN80
<b>Bearings and Shaft</b>	Tungsten Carbide
<b>Converter Housing</b>	Standard: polyurethane coated die-cast aluminum

## Process connections

<b>Flange</b>	
EN 1092-1	DN15...200 in PN 6...40
ASME	1/2" ...8" in 150 lb RF
JIS	1/2" ...8" in 10...20K
Design of gasket surface	RF
	Other sizes or pressure ratings on request
<b>Thread</b>	DN4...DN50 in PN63

## Measurable Flow Rate Range:

*Note: The flow range as blow is for reference only. Consult the factory if you have special requirement. Refer to the nameplate or certificate for actual flow range.*

Nominal Diameter		Standard Flow Range	Extended Flow Range
(mm)	(in.)	(m3/h)	(m3/h)
4	0.15	0.04 to 0.25	0.04 to 0.4
6	0.25	0.1 to 0.6	0.06 to 0.6
10	0.4	0.2 to 1.2	0.15 to 1.5
15	0.5	0.6 to 6	0.4 to 8
20	0.75	0.8 to 8	0.45 to 9
25	1	1 to 10	0.5 to 10
32	1.25	1.5 to 15	0.8 to 15
40	1.5	2 to 20	1 to 20
50	2	4 to 40	2 to 40
65	2.5	7 to 70	4 to 70
80	3	10 to 100	5 to 100
100	4	20 to 200	10 to 200
125	5	25 to 250	13 to 250
150	6	30 to 300	15 to 300
200	8	80 to 800	40 to 800

### 3. Model and Selection

Model Selection (See Table 1)

Table 1: Model Selection Guidance for Liquid Turbine Flowmeter

Model Suffix Code										Description		
TBF	-											
Diameter											Three Digitals; for example: 010: 10 mm;      015: 15 mm; 080: 80 mm;      100: 100 mm	
Converter		N									No display; 24V DC; Pulse Output	
		A									No display; 24V DC; 4-20mA Output	
		B										Local display; Lithium Battery Power; No output
		C										Local display; 24V DC Power; 4-20mA Output; Optional backup power: Lithium Battery
		C1										Local display; 24V DC Power; 4-20mA Output; Modbus RS485 Communication Optional backup power: Lithium Battery
		H										Local display; 24V DC Power; 4-wire 4-20mA Output & HART Communication
Accuracy			10								1.0% of Rate	
			05								0.5% of Rate	
Flow Range				S							Standard Range: refer to flow range table	
				W							Wide Range: refer to flow range table	
Body Material					S						SS304	
					L						SS316	
Explosion Rating						N					Safety Field without Explosion	
						E					ExdIIBT6	
Pressuring Rating							N				Per Standard	
							H(x)				Customized Pressure Rating	
Connection									-DXX		DXX: D06, D10, D16, D25, D40 D06: DIN PN6; D10: DIN PN10 D16: DIN PN16; D25: DIN PN25 D40: DIN PN40	
									-AX		AX: A1, A3, A6 A1: ANSI 150#; A3: ANSI 300# A6: ANSI 600#	
										-JX		JX: J1, J2, J4 J1: JIS 10K; J2: JIS 20K; J4: JIS 40K
										-TH		Thread; DN4...DN50
Fluid Temperature										-T1	-20...+80°C	
										-T2	-20...+120°C	
										-T3	-20...+150°C	

Model Code:TBF-050C10SSNN-A1-T1

Explanation - Diameter: 50mm; Converter: 24V DC Power Supply, 4-20mA Output, Local Display  
Accuracy: 1.0%; Flow range: 4-40 m3/h; Body Material: SS304; No Explosion;  
Connection: ANSI 150# Flange; Fluid Temperature: -20...+80°C