

*Class I, Group A, B, C, D, Division I.
Complies with ASME Standard B31.3*



NuFlo
Measurement Systems

*EZ-IN[®] Series
BF Turbine
Flowmeter*

Installation Manual



® CERTIFIED NRTL/C

Table of Contents

Introduction	1
Installation	4
Precautions	4
Installation Procedure	5
Calibration	6
Maintenance and Repairs	6
Removing and Inspecting the Meter	6
Reassembling the Meter	9
Specifications and Parts Lists	11
Warranty—Limitation of Liability	15

EZ-IN® Series BF Turbine Flowmeter Manual

Introduction

The EZ-IN® Series BF (between-flange) Turbine Flowmeter measures flowstream volume in flanged pipelines by transmitting electrical pulses to readout instruments.

The flowmeter's precision turbine has a speed directly proportional to the liquid velocity flowing through the meter. As the turbine rotates, the blades break magnetic lines of force set up by a pickup screwed into the meter body. This penetration of the magnetic field creates electrical pulses. The flowmeter consists of the meter body, two bearing supports, a rotor, and the magnetic pickup (Fig. 1, Page 2).

For installation, ANSI RF flanges and gaskets are recommended as well as all-thread studs, bolts, nuts and washers. Body centering rings and flow straighteners can also be used. An installation handle (Fig. 2, Page 3) is available to allow easier installation and removal (Part No. 100079570). An optional $\frac{3}{4}$ -in. thin-wall pickup locking-nut socket is also available (Part No. 100013146).

EZ-IN® Series BF Turbine Flowmeter Manual

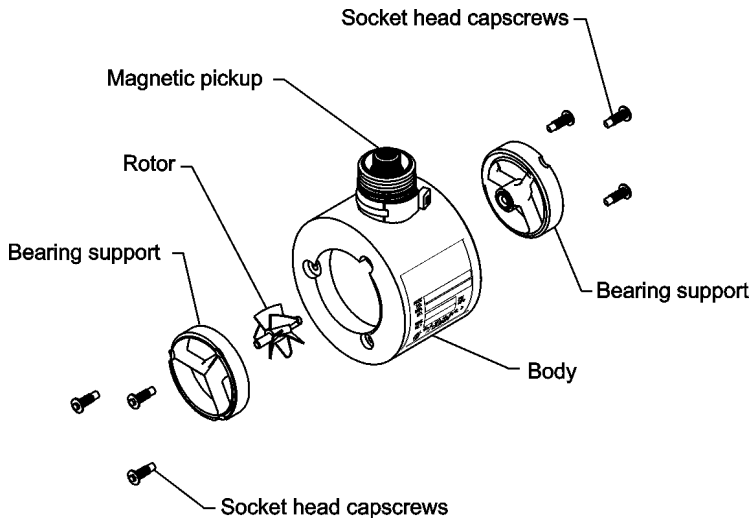


Fig. 1—Flowmeter components

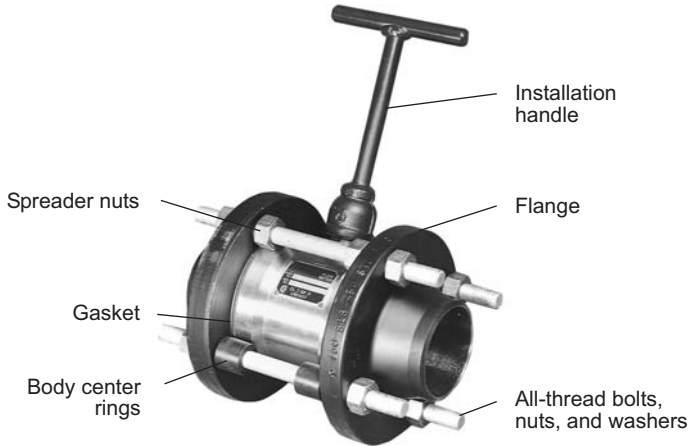


Fig. 2—Assembled flowmeter with optional installation handle

Installation

Precautions

The EZ-IN® Series BF Turbine Flowmeter can be installed vertically or horizontally as long as the flow direction appearing on the meter body is the same as the direction of flow in the line.

- Before installing the meter, clean all upstream lines.
- Do not blow out lines with compressed air or gas once the meter has been installed.
- Do not slug the meter with fluid. Carefully fill the line after installing the meter. After startup, keep the meter full of fluid.
- Never exceed the maximum recommended flow rate or temperature for the meter.
- Avoid hammer blows or other sharp impacts to the meter that could damage internal parts.

Installation Procedure

1. Install a straight section of pipe on either side of the meter. This pipe must be the same size as the meter with a length of at least 10 pipe diameters upstream and 5 pipe diameters downstream. For example, a 6-in. pipe requires a 6-in. flowmeter. The section of straight pipe upstream must be 60 in.; the section downstream must be 30 in.
2. Align the meter bore with the ID of the pipe flange. Lower the meter between the flanges until it rests firmly on the body centering rings. Install all threaded bolts, nuts, and washers to connect the upstream and downstream flanges.
3. Install the gaskets, bolts, washers, and nuts. Tighten the nuts for a leak-proof seal. If necessary, use additional nuts as spreaders.
4. Insert the magnetic pickup assembly into the pickup adapter and turn it until it is hand-tight, then back it out $\frac{1}{4}$ turn. Install and tighten the locking nut to prevent the pickup from vibrating.

Calibration

The EZ-IN® Series BF Turbine Flowmeter is precalibrated with water at the factory and tagged with the calibration factor in pulses/gal. For maximum accuracy with fluids other than water, calibrate the meter with the actual fluid being measured in the flowline. This meter can be proved by any of the conventional methods used to prove other turbine meters.

Maintenance and Repairs

If the flowmeter is exposed to abrasive fluids or long periods of over-range flow rates, periodically check it for possible wear.

Removing and Inspecting the Meter

1. Remove the magnetic pickup (Fig. 3, Page 7) to avoid damaging it.
2. Remove one or more of the flange bolts (Fig. 3, Page 7). Loosen the remaining flange bolt nuts to allow clearance for the meter. Free the meter by turning the spreader nuts.

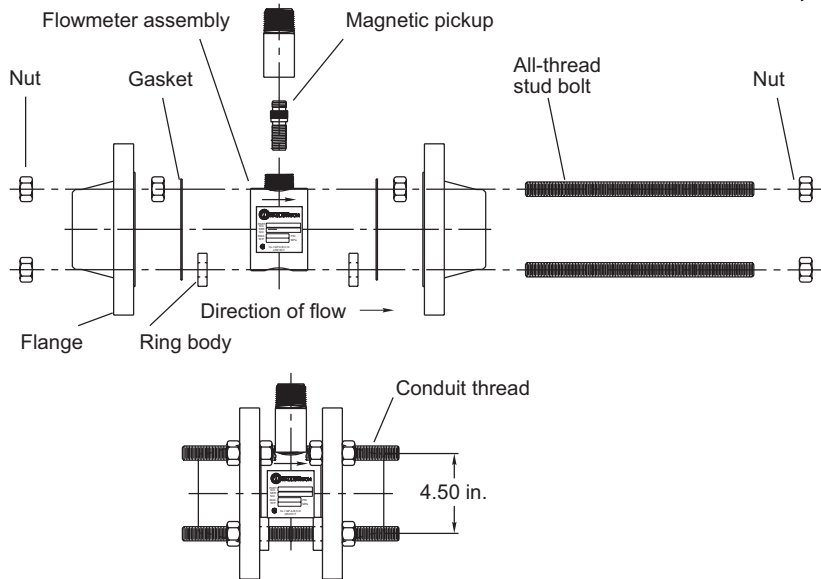


Fig. 3—Removing and inspecting the meter.

3. Lift the meter between the pipeline flanges, using an installation handle if necessary (Fig. 2, Page 3).
4. Remove one of the flowmeter bearing supports (Fig. 1, Page 2).
 - *For meters $\frac{3}{8} \times 1$ in. through 1×1 in.,* remove the snap rings.
 - *For larger sizes,* remove the three socket head cap screws with a standard Allen wrench.

Pull the bearing support straight. You may need to rotate the support while pulling. If necessary, insert a wooden dowel or brass rod from the other end of the meter and gently tap on the support to free it.

Caution—Do not pry on the bearing supports. Internal parts could break or shatter. If a bearing support is stuck, soak the meter in solvent.

5. Remove the rotor and examine the other bearing support.
6. Examine the carbide bearing and rotor shaft. If either part is worn or damaged, replace all internal parts with a precalibrated internal parts kit (Page 12).

Reassembling the Meter

1. Coat the OD of the bearing support with the grease provided in the kit to make subsequent disassembly easier.

Caution—Do not lubricate the rotor shaft or bearing.

2. Insert a bearing support in the meter body, making certain its flow arrow and the arrow on the meter are pointing in the same direction.
3. Align the index marks (punch marks) on the bearing support and the edge of the meter body.
 - *For meters $3/8 \times 1$ in. through 1×1 in.,* install the snap rings.
 - *For larger sizes,* replace the retaining screws and tighten them with a standard Allen wrench.
4. Insert the rotor, making sure the arrow on it points in the same direction as the arrow on the meter body.
5. Repeat Steps 2 and 3 to install the second bearing support.
6. Verify that the rotor spins freely.

7. Return the meter to the line, using the body centering rings to align the meter properly with the interior diameter of the flanges. Carefully align the flange gaskets to help prevent gasket damage. Use the spreader nuts, if necessary, to provide room to lower the meter into the position between the flange gaskets.
8. Reinstall the bolts that were removed from the flanges when the meter was taken out of the line.
9. Loosen the flange spreader nuts until they no longer are engaged.
10. Tighten the nuts on the flange bolts until they form a seal on the flange gasket.
11. Fill the meter with fluid, following the precautions on Page 4.

Specifications and Parts Lists

EZ-IN® Series BF Flowmeter Specifications

Flowmeter Size in.	Linear Flow Ranges (based on water)			Nom. Calib. Factor pulses/gal (pulses x 1000/m ³)	Max. Output Frequency pulses/sec	Δp at Max. Flow psi (kPa)
	gal/min	m ³ /h	B/D			
3/8	0.3 to 3	0.068 to 0.68	10 to 100	22,000 (5812)	1,100	4 (28)
1/2	0.75 to 7.5	0.17 to 1.70	25 to 250	14,500 (3830)	1,815	12 (83)
3/4	2 to 15	0.45 to 3.41	68 to 515	2,950 (780)	740	18 (124)
7/8	3 to 30	0.68 to 6.81	100 to 1,000	2,350 (621)	1,175	20 (138)
1	5 to 50	1.14 to 11.36	170 to 1,700	900 (238)	750	20 (138)
1 1/2 x 2	15 to 180	3.41 to 40.88	515 to 6,000	325 (86)	975	16 (110)
2	40 to 400	9.09 to 90.85	1,300 to 13,000	55 (14.5)	365	22 (152)
3	80 to 800	18.17 to 181.7	2,742 to 27,428	57 (15.2)	760	16 (110.4)
4	100 to 1,200	22.71 to 272.55	3,400 to 41,000	30 (7.9)	600	10 (69)
6	250 to 2,500	56.78 to 567.82	8,600 to 86,000	7 (1.8)	290	10 (69)
8	350 to 3,500	79.49 to 794.94	12,000 to 120,000	3 (0.8)	175	6 (41)

Note—The linear flow range of liquids with nonlubricating characteristics is limited to the upper 60% of the A16 rating. If using the flowmeter with liquids having viscosities more than 5 centistokes, consult the factory for engineering assistance.

Replacement Rotor and Bearing Support Kits (Precalibrated)

Meter Size in.	Standard-Grade Linearity $\pm 1.0\%$	Industrial-Grade Linearity $\pm 0.5\%$
3/8 x 1	100003521 ^a	100003378 ^b
3/8 x 2	100079691	101209535
1/2 x 1	100003531	100003379
1/2 x 2	100005122	100062982
3/4 x 1	100003449	100003380
3/4 x 2	100079674	100062983
7/8 x 1	100005124	100061059
7/8 x 2	100079811	101209539
1 x 1	100003527	100003381
1 x 2	100005123	100062984
1 1/2 x 2	100005099	100062985
2 x 2	100003553	100003549
3	100003540	100012104
4	100003554	100062986
6	100012091	100062987
8	100063004	100062988

^a 3/8 x 1 Standard Grade $\pm 2.0\%$ Linearity.

^b 3/8 x 1 Industrial Grade $\pm 1.0\%$ Linearity.

Hardware Kits and Centering Rings (Raised-Face Flanges)

Hardware Kits—Price Ref. 800-690 ^a					
Size (in.)	150 lb	300 lb	600 lb	900 lb	1,500 lb
1	100014135	100009578	100009578	100079754	100079754
1 1/2 and 2	100003555	100003556	100003556	100003557	100003557
3	100003558	100007860	100007860	100003559	100012105
4	100003560	100003561	100003562	100063005	100063006
6	100063007	100063008	100012106	100063009	100063010
8	100063011	100063012	100063013	101209537	101209536

^aIncludes bolts, nuts, gaskets, spreader nuts, and centering rings.
(Kit does not include flanges.)

Centering Rings Only—Price Ref. 800-690 ^b					
Size (in.)	150 lb	300 lb	600 lb	900 lb	1,500 lb
1	100079753	100079752	100079752	100079751	100079751
1 1/2 and 2	100007974	100007973	100007973	100014124	100014124
3	100079569	100014122	100014122	100079568	100014120
4	100014123	100014122	100014121	100014120	100079567
6	100079566	100079565	100079564	100079563	100079562
8	100079561	100079560	100079559	101209538	100079558

^bFour centering rings are required for installation.

Hardware Kits (Ring Joint Flanges)

Price Ref. No. 800-690^a			
Size (in.)	900 lb	1,500 lb	2,500 lb
1 1/2 and 2	N/A	100014145	100080024
3	N/A	100079971	101203294
4	100079986	100079960	101209541
6	100080034	100080023	N/A
8	N/A	N/A	N/A

^aHardware kit includes bolts, nuts, seal rings, and spreader nuts. (Does not include flanges).

Magnetic Pickup Part Numbers

Size	Temperature Range (°F)	Part No.
3/8 through 3/4 in.	-67 to 225	100002337
7/8 through 8 in.	-67 to 250	100002077
3/8 through 8 in.	-67 to 450	100002076

Warranty—Limitation of Liability

WARRANTY - LIMITATION OF LIABILITY: Seller warrants only title to the products, software, supplies and materials and that, except as to software, the same are free from defects in workmanship and materials for a period of one (1) year from the date of delivery. Seller does not warranty that software is free from error or that software will run in an uninterrupted fashion. Seller provides all software “as is”. THERE ARE NO WARRANTIES, EXPRESS OR IMPLIED, OF MERCHANTABILITY, FITNESS FOR A PARTICULAR PURPOSE, OR OTHERWISE WHICH EXTEND BEYOND THOSE STATED IN THE IMMEDIATELY PRECEDING SENTENCE. Seller’s liability and Buyer’s exclusive remedy in any case of action (whether in contract, tort, breach of warranty or otherwise) arising out of the sale or use of any products, software, supplies, or materials is expressly limited to the replacement of such products, software, supplies, or materials on their return to Seller or, at Seller’s option, to the allowance to the customer of credit for the cost of such items. In no event shall Seller be liable for special, incidental, indirect, punitive or consequential damages. Seller does not warrant in any way products, software, supplies and materials not manufactured by Seller, and such will be sold only with the warranties that are given by the manufacturer thereof. Seller will pass only through to its purchaser of such items the warranty granted to it by the manufacturer.



NuFlo Measurement Systems
14450 John F. Kennedy Blvd.
Houston, TX 77032
Phone (800) 654-3760
www.nuflotech.com