



**INSTRUCTION MANUAL FOR FLOWMETERS  
OF THE FD SERIES**

**1. INSTRUMENT DESCRIPTION**

Variable area glass-pipe flowmeter for small and large fluid and gas flow rates.

Suitable for vertical mounting with ascending flow.

It can be equipped with an alarm contact for minimum and/or maximum flow rate.

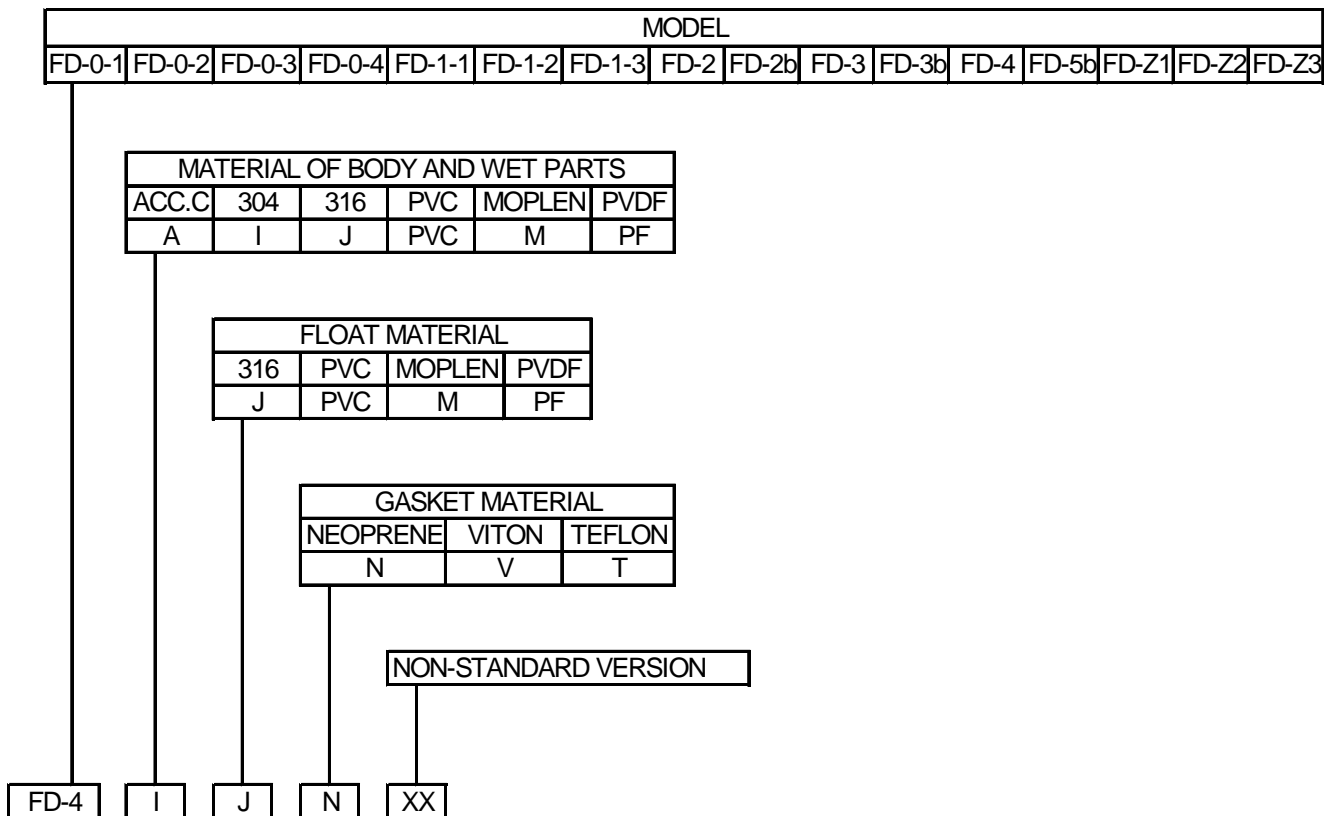
The flowmeters FD are manufactured with a very strong frame with 4 steel columns. Process connections can be made in several variants in order to meet individual needs.

The seal on the glass pipe is of stuffing box type and can be adjusted even when the device is running.

**2. MODEL IDENTIFICATION**

The instrument can be identified through a model code.

For details on the codes, see catalogue bulletin.

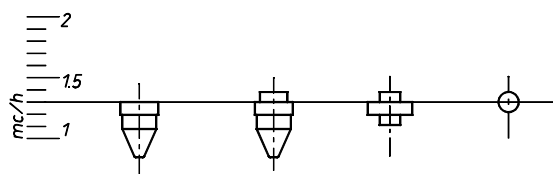


The instruments can be accompanied by various accessories such as:

- Control valves
- MIN/MAX alarm sensors
- Amplifier for sensor
- Plastic protection for glass

### 3. OPERATING PRINCIPLE

The flowmeter exploits the variable area principle. It is composed of a conical tube inside which a float is free to run. Outside the tube is a graduated scale, the flow rate of the fluid is read directly on the scale, next to the line indicated in the figure.



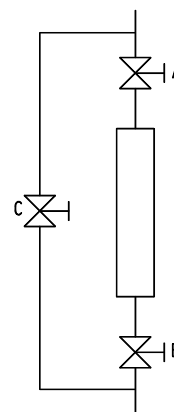
### 4. INSTALLATION

#### INSTALLATION ON THE SYSTEM

Before starting installation, check line connections and the instrument ones for compatibility. The instrument must be installed perfectly upright, between well aligned piping and at controlled distances to avoid mechanical stress on the instruments. In flowmeters of the threaded type, make sure that the threaded part is not under excessive strain, even by using a sealant (e.g.: a PTFE tape). Remove the rod that blocks the float, it was mounted as a protection during shipment.

### 5. START-UP

In a new system we suggest you abundantly wash the piping and adopt by-pass valves as in the figure beside. Moreover, we suggest you adopt a straight piping length upstream of the instrument (2-3D), to avoid turbulence that might jeopardize the stability of the float.



#### FIRST START-UP

- All of the valves shall be closed;
- Slowly open the valve (C) to balance the pressure values between the upstream and downstream points of the instrument;
- Slowly open the valve (A) until it is fully open;
- Slowly open the valve (B) until it is fully open;
- Fully close the valve (C);

In cases when valves (A) and (B) are also used to control flow rate, remember that valve (A) is used for liquids whereas valve (B) is used with gases.

### 6. CALIBRATION

The instrument is factory-set and does not require any calibration to be performed on site. In cases when alarm contacts are adopted, these shall be set to the value needed upon installing the instrument.

## 7. MAINTENANCE

As regards all instruments meant to measure fluids which can leave deposits, we suggest periodically cleaning the measuring pipe and the float.

- Make sure the instrument has been shut off and emptied of the liquid it holds inside;
- Remove the screws (3) that fasten the instrument to the system and pull out the flow meter body;
- Loosen the screws (5) to release the stuffing box (7);
- Remove the float (9) **ALWAYS FROM ABOVE**. In models with driven float, first remove the screws (12), and then remove the guide rod (10);
- Loosen the screws (4) and remove the upper head (2);
- Pull out the measuring pipe (15) and the float (9) **ALWAYS FROM ABOVE**;
- Check the seals for integrity (14), their wear may cause a leak of fluid from the flowmeter;
- Clean the pipe and the float with rags or soft brushes.
- Perform a visual check of the float and the inside of the pipe, make sure that the fluid has not caused corrosion or erosions, as they lead to errors in instrument accuracy and, in the long run, are likely to damage it.

In cases when there are damaged parts, immediately replace them, and contact our customer service for the related spare parts.

We suggest you always replace the seals of the glass pipe (14) when the stuffing boxes are loosened to pull out the glass pipe (15).

At the end of the cleaning and replacement of any damaged part, you can reassemble the flowmeter by going through the steps listed above in reversed order.

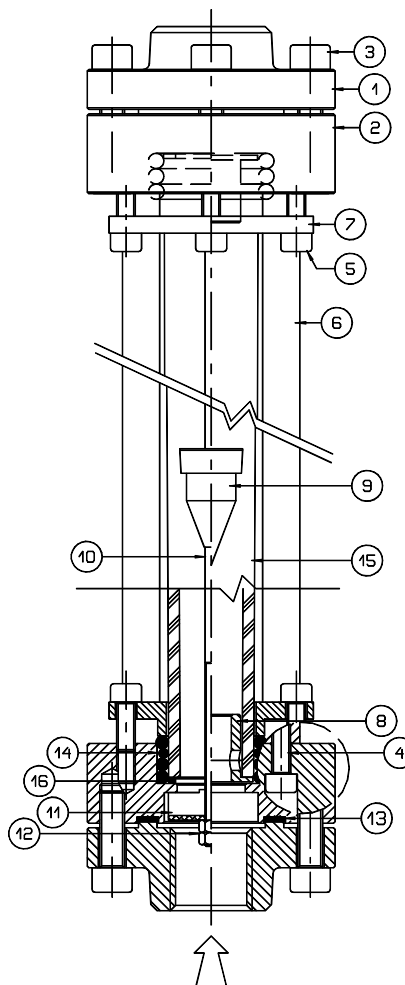
To start-up the unit, please follow the instruction listed in paragraph (5) START-UP.

## 8. RECOMMENDED SPARE PARTS (\*)

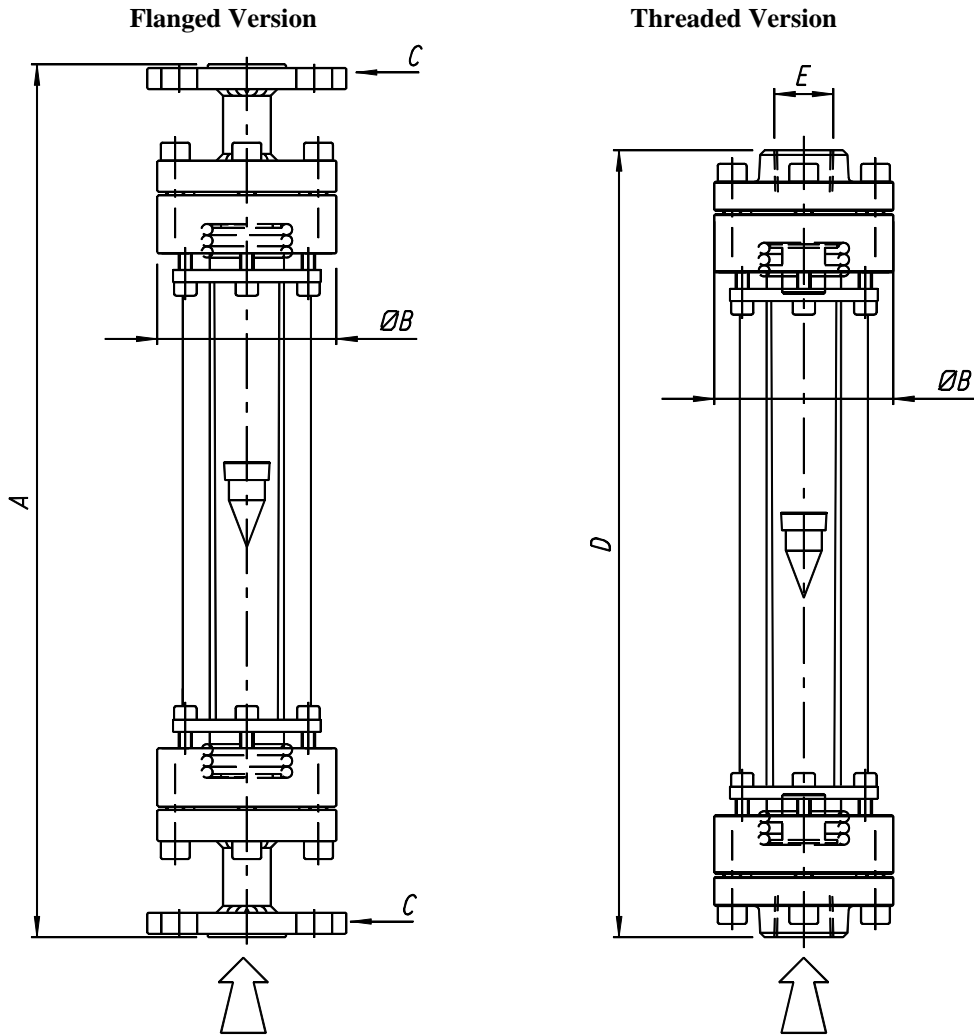
POS.	DESCRIPTION
1	Connection
2	Head piece
3	Screw
4	Screw
5	Screw
6	Columns
7	Stuffing Box
8	Float Retainer
9(*)	Float
10	Flot Guide Rod
11	Thread tensioner
12	Nut
13	Coupling seal
14(*)	Glass pipe seal
15(*)	Glass pipe
16	Glass protection

**N.B.** In your request for spare parts, always mention the instrument serial number.

This number is provided on the instrument rating plate that is fastened to the bottom of the unit and is a five-digit number preceded by the letter "F"(e.g.:F45678).



**9. DIMENSIONAL DRAWINGS OF THE BODY**



MOD.	Metal Version			Plastic Version			Possible connections											P(1) mm H2O
	A	D	B	A	D	B	Standard Threading UNI-ISO/228.1			Standard flanging								
							1/4"	1/2"	-	UNI 2223/29 PN10				ANSI 150 R.F				
FD-0-1	506	378	55	542	412	82	1/4"	1/2"	-	15	-	-	-	-	1/2"	-	-	50
FD-0-2	506	378	55	542	412	82	1/4"	1/2"	-	15	-	-	-	-	1/2"	-	-	50
FD-0-3	506	378	55	542	412	82	1/4"	1/2"	-	15	-	-	-	-	1/2"	-	-	50
FD-0-4	506	378	55	542	412	82	1/4"	1/2"	-	15	-	-	-	-	1/2"	-	-	50
FD-1-1	506	378	55	542	412	82	1/4"	1/2"	-	15	-	-	-	-	1/2"	-	-	50
FD-1-2	506	378	55	542	412	82	1/4"	1/2"	-	15	-	-	-	-	1/2"	-	-	50
FD-1-3	506	378	55	542	412	82	1/4"	1/2"	-	15	-	-	-	-	1/2"	-	-	50
FD-2	506	380	65	542	412	82	1/4"	1/2"	-	15	20	-	-	-	1/2"	3/4"	-	50
FD-2b	506	380	65	556	432	95	1/4"	1/2"	3/4"	15	20	25	-	-	1/2"	3/4"	1"	100
FD-3	510	390	80	556	432	95	1/2"	3/4"	1"	15	20	25	32	1/2"	3/4"	1"	1 1/4"	150
FD-3b	510	390	80	556	434	100	1/2"	3/4"	1"	15	20	25	32	1/2"	3/4"	1"	1 1/4"	300
FD-4	510	395	92	556	444	116	1"	1 1/4"	1 1/2"	20	25	32	40	3/4"	1"	1 1/4"	1 1/2"	500
FD-5b	522	430	112	556	452	140	1"	1 1/4"	1 1/2"	25	32	40	50	1"	1 1/4"	1 1/2"	2"	550
FD-Z1	625	535	112	677	573	140	1"	1 1/4"	1 1/2"	25	32	40	50	1"	1 1/4"	1 1/2"	2"	600
FD-Z2	629	535	138	707	573	164	1 1/2"	2"	-	32	40	50	65	1 1/4"	1 1/2"	2"	2 1/2"	400
FD-Z3	653	580	167	707	593	182	2"	2 1/2"	3"	50	65	80	-	2"	2 1/2"	3"	-	500

(1) Load loss next to the maximum flow rates



**10. TROUBLESHOOTING**

The flowmeters of the FD series are not normally exposed to faults.

- If the flow meter does not take a correct measurement; inspect the pipe and the float.
- If some fluid leaks out of the head pieces; tighten the screws (5) acting on the stuffing box. If the leak persists, check the seals for damages.

All these checks shall be performed by following the instructions provided in paragraph 7. MAINTENANCE.

If the problem persists or for other inconveniences whatsoever, please contact our customer service.

**11. DISPOSAL**

When the instruments have come to the end of their service life, they need to undergo disposal. Always comply with the applicable regulations in force.

During the disposal stages, specially mind the polymers, resins and rubbers used in the manufacture.

All metal parts, after the removal of seals and gaskets, special protective coatings requested by the customer and all other plastic parts, can be recycled.

**12. GUARANTEE**

All flow meters of the FD series are guaranteed to be free from manufacturing faults over a period of 12 months from the date of shipment.

In the event of failures, implying return of goods within the limit specified above, OFFICINE OROBICHE will replace (shipment fees not included) all damaged parts free, provided that the failure does not ensue from incorrect use.

OFFICINE OROBICHE shall never be held responsible for any incorrect use of their products when these are used for purposes other than those mentioned in the specifications approved at the order stage.

In these cases, no complaints will ever be taken into consideration.

No damage and/or fee, whether direct or indirect, ensuing from an incorrect installation or use shall ever be debited to OFFICINE OROBICHE

The instrument can be used for a maximum life period of 10 years dating from delivery.

When this period is over, there are two alternative options:

- 1) Replace it with a new instrument.
- 2) Have the old instrument overhauled by OFFICINE OROBICHE or, at all events, by a qualified technician who undertakes to guarantee any further use of the unit.

**INSTRUMENT RETURN PROCEDURE**

The instrument returning to the factory shall bear, in attachment, the following data:

- 1) Buyer's name.
- 2) Description of the material.
- 3) Detected fault.
- 4) Process data.
- 5) Specification of the fluids that have been used with the instrument.

The instrument shall be returned perfectly clean and free from dust or deposits. Otherwise, OFFICINE OROBICHE reserves the right not to carry out the servicing and return the instrument to the sender.

**FINAL REMARKS**

Each instrument is supplied fully assembled and equipped with all the needed accessories.

Some parts are sold separately under special circumstances only.

Accessories such as on/off valves and/or control valves are supplied with the instrument but are not assembled.

Therefore, we warn you to carefully inspect the supply and notify us at once if discrepancies are found.

**NB: IN CASES WHEN THE INSTRUMENTS ARE MEANT TO BE USED IN AREAS FEATURING POTENTIALLY EXPLOSIVE ATMOSPHERES, THE USER SHALL COMPLY WITH THE SUPPLEMENTARY SAFETY INSTRUCTIONS ATTACHED TO THE STANDARD ONES.**