



ELC Oval gear flowmeter

User Manual

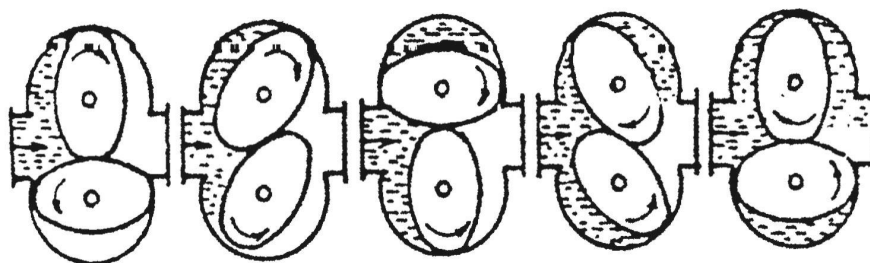
1. Application

Oval gear flow meter is a pointer display .It is a kind of light volume flow meter of which the print wheel has cumulative count and zero. This flow meter is widely used in various industrial areas to control the liquid flow. It is applicable to all types of liquid measuring, such as crude oil, diesel, gasoline and so on, with great range and high precision, convenient use and maintenance. Different materials selected can meet the petroleum, chemical, pharmaceutical, food, metallurgy, electricity, transportation and other fields of liquid flow measurement.

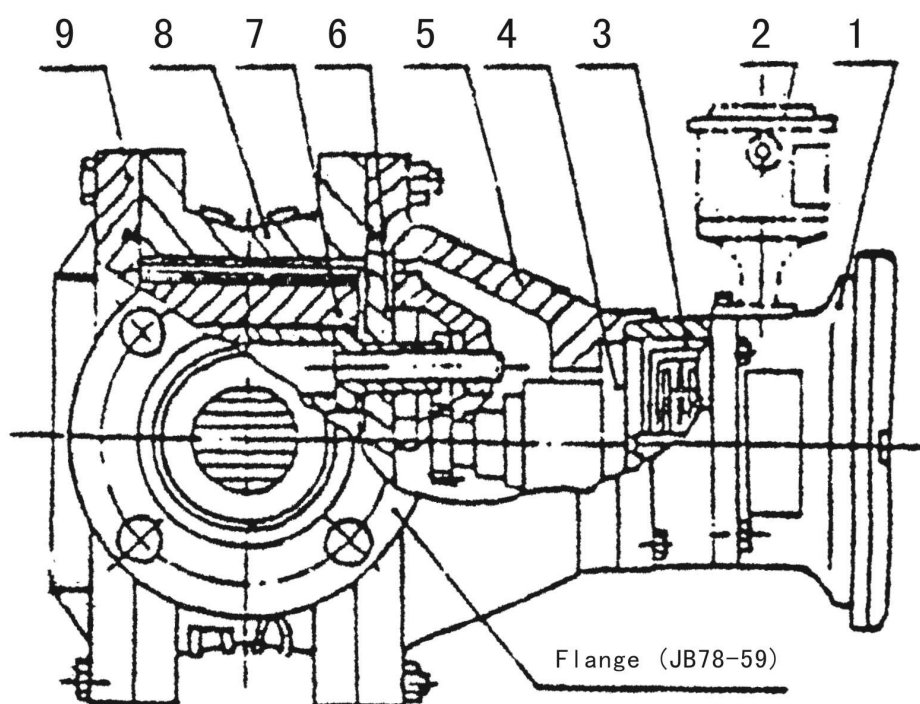
2. The working principle and structure

Flow meter is installed in the metering tank and the measurement of a pair of oval box gear, with the upper and lower cover an early Lunar sealed cavity (due to rotation of the gear, so sealing is not an absolute) as a unit of emissions. When measured by the pipe into the liquid flow meter, due to pressure generated by the inlet and outlet to promote a pair of differential gears for rotation, the constant measurement by cavity after the beginning of the Lunar liquid delivery to the outlet, elliptical gear with each rotation is the product of four times the measured volume of liquid flow (the principle of Figure 1).

The flow meter is composed by the shell, counter, oval gear and coupling (magnetic coupling and sub-axial coupling). (Reference to picture 2).



Picture 1 Oval gear operation schematic



Picture 2 Structure

- | | | |
|-------------------------|------------------|--|
| 1. COUNTER | 2. Signal output | 3. Precision regulator (DN50 and above only) |
| 4. Sealing the coupling | 5. Front cover | 6. Flat |
| 7. Oval gear | 8. Shell | 9. Rear cover |

3. Technical Data

(1) Ordinary cast iron type (A) , Steel type (E) , Stainless steel type (B)

<div>Model</div> <div>Item</div>	ELC-A cast iron		ELC-E steel			ELC-B stainless steel	
Pressure (Mpa)	1.0	1.6	2.5	4.0	6.4	1.0	1.6
Measured liquid viscosity	2-200 mPa.s						
Measured liquid temperature	-20℃ ~+100℃						
Flow range m³/h							
<div>Model</div> <div>Accuracy</div> <div>Diameter DNmm</div>	ELC-A cast iron		ELC-E steel		ELC-B stainless steel		
	0.5	0.2	0.5	0.2	0.5	0.2	
10	0.08~0.4	0.1~0.4	0.08~0.4	0.1~0.4	0.1~0.5	0.1~0.5	
15	0.25~1.5	0.3~1.5	0.25~1.5	0.3~1.5	0.3~1.5	0.3~1.5	
20	0.5~3	0.6~3	0.5~3	0.6~3	0.6~3	0.6~3	
25	1~6	1.2~6	1~6	1.2~6	1.2~6	1.2~6	
40	2.5~15	3~15	2.5~15	3~15	3~15	3~15	
50	4~24	4.8~24	4~24	4.8~24	4.8~24	4.8~24	
80	10~60	12~60	10~60	12~60	12~60	12~60	
100	16~100	20~100	16~100	20~100	20~100	20~100	
150	32~190	38~190	32~190	38~190	38~190	38~190	
200	34~340	68~340	34~340	68~340	68~340	68~340	

(2) High temperature cast iron type (TA) , Steel type (TE) , Stainless steel type (TB)

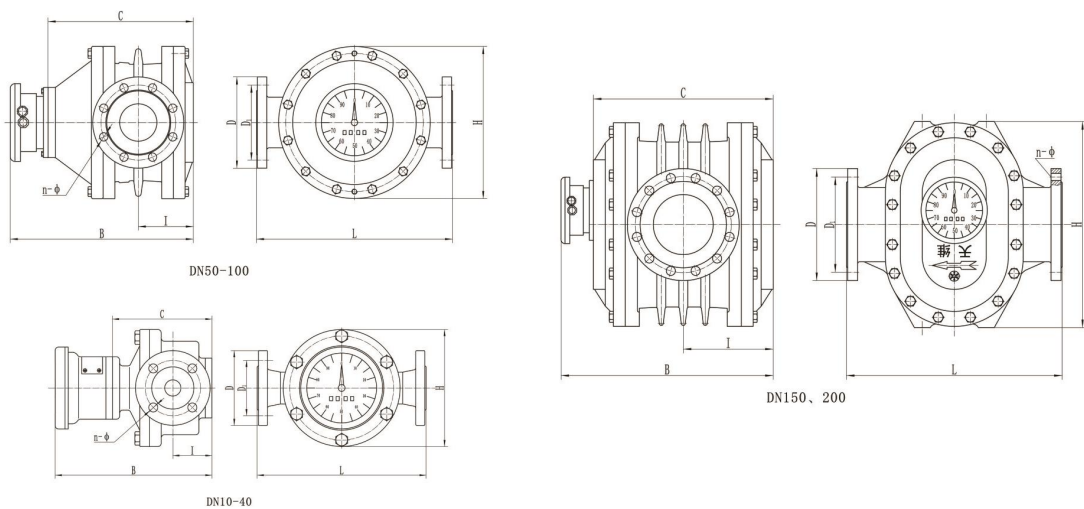
<div>Model</div> <div>Item</div>	ELC-TA cast iron		E LC-TE steel			E LC-TB stainless steel	
Pressure (Mpa)	1.0	1.6	2.5	4.0	6.4	1.0	1.6
Measured liquid viscosity	2-200 mPa.s						
Measured liquid temperature	+100℃ ~+280℃						
Flow range m³/h							
<div>Model</div> <div>Accuracy</div> <div>Diameter DNmm</div>	E LC-TA cast iron		E LC-TE steel		E LC-TB stainless steel		
	0.5	0.2	0.5	0.2	0.5	0.2	
10	0.08~0.4	0.1~0.4	0.08~0.4	0.1~0.4	0.1~0.5	0.1~0.5	
15	0.24~1.35	0.35~1.35	0.24~1.35	0.35~1.35	0.36~1.35	0.36~1.35	
20	0.54~2.7	0.72~2.7	0.54~2.7	0.72~2.7	0.72~2.7	0.72~2.7	
25	1.2~5.4	1.4~5.4	1.2~5.4	1.4~5.4	1.4~5.4	1.4~5.4	
40	2.7~13.5	3.6~13.5	2.7~13.5	3.6~13.5	3.6~13.5	3.6~13.5	
50	4.4~21.6	5.75~21.6	4.4~21.6	5.75~21.6	5.75~21.6	5.75~21.6	
80	10.8~54	14.4~54	10.8~54	14.4~54	14.4~54	14.4~54	
100	18~90	24~90	18~90	24~90	24~90	24~90	
150	38~170	45.6~170	38~170	45.6~170	45.6~170	45.6~170	
200	34~340	68~340	34~340	68~340	68~340	68~340	

(3)High viscosity cast (NA), steel (NE),stainless steel(NB),

Model Item	ELC-NA cast iron		ELC-NE steel		ELC-NB stainless steel					
Pressure(Mpa)	1.6				2.5		4.0		6.4	
Measured liquid viscosity	200~3000 mPa.s									
Measured liquid temperature	-10℃~+100℃									
Accuracy	0.5级									
Flow range m³/h										
Diameter DN mm	10	15	20	25	40	50	80	100	150	200
Flow range	0.04~0.2	0.15~0.75	0.3~1.5	0.6~3	1.5~7.5	2.4~12	6~30	10~50	38~100	34~300

4、Dimensions

(A) The dimensions of the cast iron type, high viscosity cast iron type, high temperature cast iron.



Unit: mm

DN(mm)	L	H	A	B	D	D ₁	n (No.)	Φ
10	150	100	165	209	90	60	4	14
15	170	118	172	226	95	65	4	14
20	200	150	225	228	105	75	4	14
25	260	180	232	246	115	85	4	14
40	245	182	249	268	145	110	4	18
50	340	250	230	372	160	125	4	18
65	420	325	270	392	180	145	4	18
80	420	325	315	433	195	160	8	18
100	515	418	370	458	215	180	8	18
150	540	515	347	557	280	240	8	23
200	650	650	476	720	335	295	12	23

B) The dimensions of steel type, high viscosity steel type, high temperature steel.

Unit: mm

DN(mm)	L	H	B	A	D	D ₁	n(No.)	Φ
15	200	138	232	180	105	75	4	14
20	250	164	220	160	125	90	4	18
25	300	202	252	185	135	100	4	18
40	300	202	293	208	165	125	4	23
50	384	262	394	312	175	135	4	23
80	450	335	452	332	210	170	8	23
100	556	440	478	310	250	200	8	25
150	540	510	557	347	300	250	8	26
200	650	650	624	476	360	310	12	26

The size of cast iron type and high-temperature steel type is: According to the table, DN15 ~ DN25, part A and part B, should plus 160mm extension tube heat; DN40 ~ DN80, part A and part B should increase by thermal extension of 300mm pipe. Other size is just like the table.

(C) Size of stainless steel type

Unit: mm

DN(mm)	L	H	B	A	D	D ₁	n (No.)	Φ
15	200	120	226	172	95	65	4	14
20	236	150	238	225	105	75	4	14
25	287	195	249	232	115	85	4	14
40	265	180	370	265	145	110	4	18
50	265	180	370	265	160	125	4	18
65	365	260	460	319	174	145	4	18
80	420	305	459	324	200	160	8	18
100	515	400	554	373	220	180	8	18
150	540	515	607	397	280	240	8	23

5、Flow meter installation

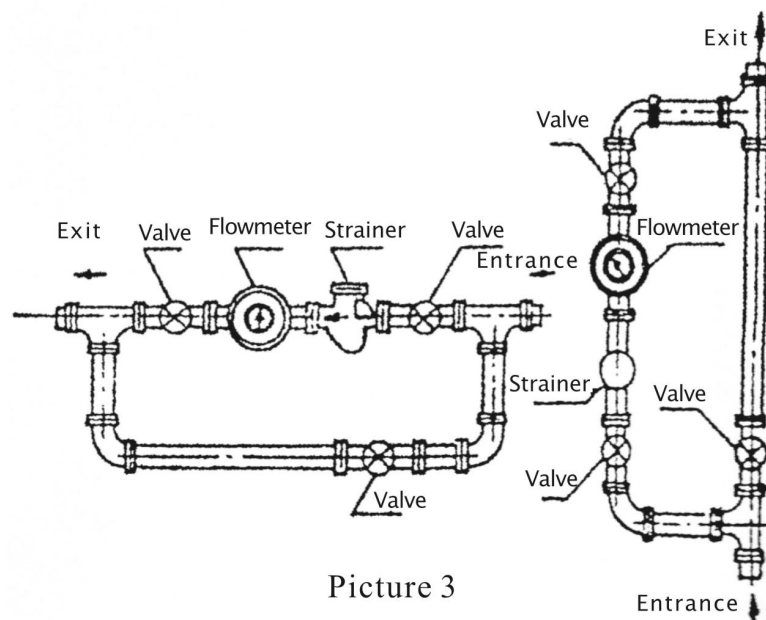
1、Pipes should be thoroughly cleaned before installing, and strainer is before of the flow meter to prevent debris entering the flow meter. The air separator should be installed if the measured liquid containing gas.

2、Attention the gear axis of the flow meter installed must be horizontal position, that is, the counter vertical dial. Regulation valve 、 starting valve and closing valve should installed on the meter side of the Import and Export.

3、The direction of arrows on the shell should be installed with the liquid pipe flow direction.

4、 Continuous flow of the pipeline which is horizontal can installed a bypass in order to clean and maintenance. If the flow meter is installed on the vertical pipe, we can install it in the bypass pipe to prevent debris from falling into the instrument.

5、 Under the right conditions, according to the needs of the custom, the counter of flow meter can rotating 180° or 90° .



Picture 3

6. Cautions:

1. Do not check flow meter with water.
2. Starting or stopping, the gate valve should be slow to prevent a sudden shock, and should prevent backflow.
3. When the flow meter repairing, there shall be no demolition of the rear cover so as to avoid re-generated when the impact of changes to the precision accuracy.

7. Calculation and adjustment of the deviation

(A) The deviation of flow meter, flow test points measured every time were determined using the following equation: (volume method)

$$E = \frac{V_m - V}{V} \times 100\%$$

E—meter deviation (generally refers to the cumulative deviation) get two Significant figures.

V_m —meter measured number (that is, display number)

V—as amended, the flow meter measured the value of the standard device (that is, the actual number) from the basic formula for calculating the error.

When $V_m > V$, the basic error of flow meter is "+" value, means pointer is go faster.

$V_m < V$, the basic error of flow meter is "-" value that take the slow flow meter.

In order to make the basic error in the limit of flow meter error, we often need to adjust the error. That is we can replace adjustment gears (adjusted teeth) which are installed in the counter to change the mechanical transmission ratio, so that the flow meter to adjust the show deserves. Error adjustment can not change the flow meter characteristics, but it curves in artificially in the new coordinate system.

In general, the provisions of (or actual use) the flow range of the maximum and minimum flow test point margin of error of not more than the basic provisions of the basic error of precision limit can be adjusted through the error so that the basic error of flow meter qualified .

Flow meter has been used, the general regulation of first gear with the original error test group, and then the error in accordance with the specific error to adjust the situation further.

8. Common reasons for failure and solution

Fault phenomenon	Reasons	Measures	Remarks
Oval gear does not turn	1. Pipeline in debris. 2. Measured liquid containing more than debris, damaged filter. Debris to enter the meter, the gear stuck.	Clean up meter and pipeline, repairing filter.	
Axial seal leakage coupling	Seal packing seal wear a or lack of oil	Pressed screw cap or replacement fill, seal oil loading	
Pointer rotation instability, or when the stop-and-go	Indicators, such as pad volumes or loose pieces of rotating non-rotating flexible	Re-fastening, eliminate the phenomenon of non-flexible	
Negative bias in small-flow error is too large	Oval gear encounter with the metering box walls, the reasons for bearing wear, or deformation measurement box	Replacement of bearings, repair of varying tooth Department and gear metering box wall, so that rotational flexibility to ensure that the necessary clearance.	
Error variation is too large	Contains a large pulse of fluid or gas.	Pulse or retrofitted to reduce gas separator	
Error is too large, but the biggest error between them does not exceed $\pm 1\%$	More than the use of, or maintenance, such as changes in space	Re-adjustment	
Output device is no signal	1、The device installed in the wrong place	Re-adjust the position	
	2, then the anti-polarity	Into the re - : 1.“+” Then the red line 2.“—” Then the black line 。	

9. Other

1. Stainless steel flow meter is for 98% sulfuric acid, 60% nitric acid, 50% liquid caustic soda and other chemical measurement.
2. The instrument before delivery is test with light diesel oil, do not use water, the specific testing in accordance with the national metrological verification <<JJG235-90 oval gear flow meter standards>>.

10. Ordering Information

1. Name, model, Specifications, materials.
2. Medium temperature, working pressure, flow range.
3. Medium or medium viscosity .
4. Any special requirements (such as explosion-proof, etc.).
5. The name of order and delivery name.
6. Detailed mailing address, telephone, telegraph, postal code,
7. Clearing units, the depositary bank, the account number.
8. Reaching station, contact.
9. If you need to learn more about the product, please call for information.
10. Warranty services of factory products, follow-up maintenance in the period.

