Oval Gear Flowmeter LC Series









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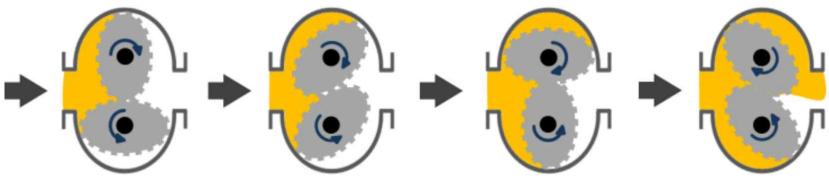
General Description

Oval meters are instruments used for the continuous and intermittent measurement and control of the pipe liquid flow, which are typical of positive displacement meter, feature large flow range, low pressure loss, large viscosity range, easy installation, high accuracy and can measure high temperature, high viscosity liquids with easy calibration.
Type LC oval meters are fitted with on-site pointer indication and roller integration device which can indicate the liquid flow and intermittent flow passing through the pipeline.
For the different liquids (acid, alkali, salt, organic solution etc.), the meters can be made of different materials (cast iron, cast steel, stainless steel etc.).
The meters are widely used for the flow measurement in the field of petroleum, chemical, chemical fiber, traffic, food industries and commerce, medical and sanitary departments.

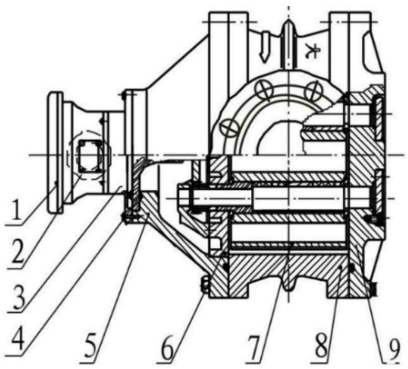
Structure and Operation Principle

Oval meter is generally comprised of a flow transducer and a counter mechanism.
The main part of the transducer is a measuring chamber which consists of a pair of oval wheels and a sealing coupling.
The counter mechanism contains speed reduction gears, adjusting device, counter, and pulse transmitter etc.



In the measuring chamber, a pair of oval wheels and cover plate make a crescent shape cavity which is used as a measuring unit.
The oval wheels are rotated by the pressure difference in the inlet and outlet of the meter and drive the inlet liquid through the cavity to the outlet, each revolution of the oval wheels displaces fluid four time the volume of the cavity, the total revolutions of the oval wheels and the revolution rate will be transferred to the mechanical counter, and the total liquid volume and instantaneous flow will be known by the pointer display and the roller integration.

The attached signal generator converts the rotary axial angular shift to the pulse signal and then transmits it to the customer's electrical indicator for remote integrated flow and instantaneous flow indication and control.



1. Counter
2. Pulse Transmitter
3. Accuracy Adjustor
4. Sealing Coupling
5. Front Cover
6. Cover Plate
7. Oval Gears
8. Shell
9. Back Cover

General Technical Specification

1. Materials of main parts and the nominal operating pressure

Model	Shell and cover	Cover plate	Oval wheel	Rotary shaft	Bushing	Nominal Pressure (MPa)
LC-A	Cast iron	Cast iron	Cast iron. Stainless steel. Alloy aluminum, engineering material	Stainless steel	Bronze (with oil) or rolling bearing	1.6
LC-E	Cast steel	Cast iron				<DN50: 6.3 DN80~100: 4.0 6.3 DN150~200: 2.5
LC-Q	Cast iron	Cast iron			Graphite	1.6
LC-B, C	Stainless steel	Stainless steel	Stainless steel		Graphite, rolling bearing	1.6 2.5

Notes:
1. 022Cr17Ni12Mo2 for type LC-C; 06Cr19Ni10 for type LC-B.
2. Flanges below 2.5MPa are protruded; 6.3MPa flanges are concave and convex; and both of the above at 4.0 MPa.

2. Accuracy class: Class 0.5, Class 0.2

3. Operating temperature:

LC-A: -20°C ~+60°C

LC-B, E, L: -41°C ~+60°C

LC-Q, L: -20°C~+60°C;

Under high temperature adjustment, the heat sink can reach 60°C~+200°C

4. Explosion-proof mark: Exd IIC T6 Gb

5. Flow range:

unit: m^3/h

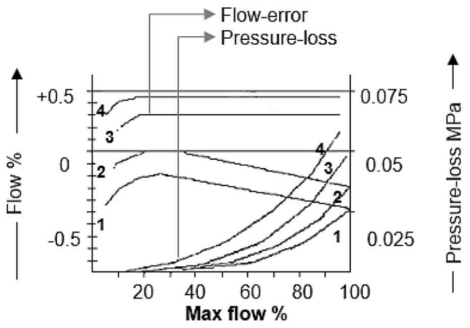
e	DN	Viscosity (mPa. s)							
		0.3~0.8	0.8~2		2~200		200~1000		1000
0II	10	0.08~0.25	0.1~0.25	0.05~0.25	0.08~0.25	0.05~0.25	0.03~0.05	0.02~0.05	
10	10	0.2~0.5	0.15~0.5	0.1~0.5	0.1~0.5	0.05~0.5	0.06~0.3	0.03~0.3	0.0
15	15	0.75~1.5	0.5~1.5	0.3~1.5	0.3~1.5	0.15~1.5	0.2~1.0	0.1~1.0	0.0
20	20	1.5~3	1~3	0.5~3	0.5~3	0.3~3	0.4~2.1	0.2~2.1	0.1
25	25	3~6	2~6	1~6	1~6	0.6~6	0.8~4.2	0.4~4.2	0.
40	40	7.5~15	5~15	2.5~15	2.5~15	1.5~15	2.1~10.5	1.0~10.5	0.7
50	50	8~24	8~24	4.8~24	4.8~24	2.4~24	2.4~16.8	1.6~16.8	1.2
40 50	40 50	6~20	6~20	4~20	4~20	2~20	2.8~14	1.4~14	1.0
65	65	20~40	15~40	8~40	8~40	4~40	5.6~28	2.8~28	2
80	80	30~60	20~60	12~60	12~60	6~60	8.4~42	4.2~42	3
00	100	50~100	34~100	20~100	20~100	10~100	14~70	6~70	5
50	150	95~190	64~190	38~190	38~190	19~190	26.6~133	13.3~133	9.5
00	200	170~340	114~340	56~340	56~340	34~340	47.6~238	23.8~238	17
acy		0.5	0.2	0.5	0.2	0.5	0.2	0.5	

Note: If the temperature of the metered liquid is higher than 80°C.
the maximum flow fate will be 90% of the primary flow, and the minimum will be 120%.

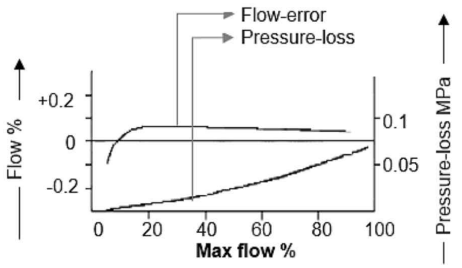
6. Performance (curves of flow error and pressure loss)

Class **0.5 flowmeter**

1. Aerial petrol; 0.7MPa·s
2. Light diesel oil; 5MPa·s
3. Water; 1MPa·s
4. Transformer oil; 20MPa·s



Class **0.2 flowmeter**



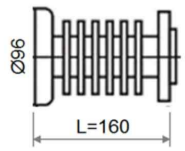
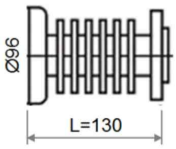
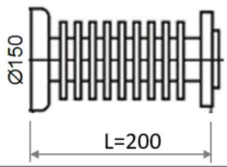
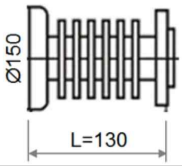
Notes:

1. The above accuracy curve shows the meter error when the metered liquids have different viscosities, and the meter error can be adjusted up and down the Axis 0 by the accuracy adjustor to optimize the error.
2. For any liquid when the flow range rate is reduced, the meter accuracy can be improved by means of accuracy adjustor.

Other Special Oval Meters of Type LC series

1. Flowmeter of high temperature

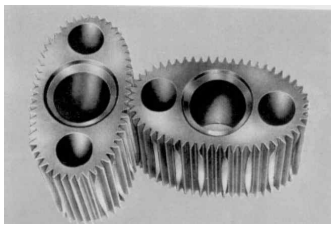
Flowmeter of high temperature is matched radiator, the which's specifications are as followings:

Cooling tube for DN10~40mm		Cooling tube for DN50~200mm	
			
T1	**T2**	**T1**	**T2**

Note: 'T' for flowmeter of high temperature without radiator, 60°C~120°C
'T1' for the meter with long radiator, 120°C~200°C
'T2' for the meter with short radiator, 60°C~120°C

2. Flowmeter of large viscosity

Type: **LC-NR, LC-NA** for cast iron, **LC-NE** for cast steel
Nominal pressure (MPa):1.6 for cast iron; 6.3 for cast steel
under DN100; 2.5 for cast steel above DN100
Measured liquid viscosity (MPa.s): 300~2000.
2,000~20,000 (specially manufactured)
Measured liquid temp.: -20°C ~+200°C
Accuracy class: 0.5



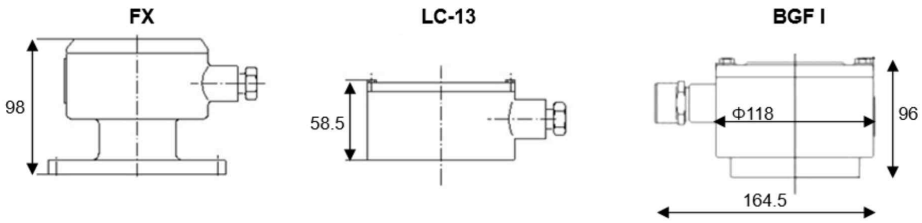
3. Remote oval transmitter

General description

Remote transmitter meter is comprised of flowmeter reality and a signal transmitter, which can convert the pipe liquid flow to pulse signals or analog signals directly.
Matched the EL series indicators or other indicators
and systems, the meter can realize remote displaying, control and record.

Technical specification

a. Accuracy; Class 0.5, Class 0.2
b. Measured media temp.: Normal operated temperature -20°C ~+60°C
c. Types of pulse transmitter: GF, MF
d. Structure type of transmitter: BGF, FX, LC-13
e. Explosion-proof mark: ExiaIICT5 (intrinsically safety)-FX, LC13
ExdIICT6Gb (explosion-proof type)-BGF
f. Dimensions (see the following figures):



g. Specification and parameter

DN (mm)	Flow Range	Output signal		Output signal		Output signal
	Viscosity	GF		FX (GF)		MF-1
	2~200MPa.s	L/P	P/S	L/P	P/S	
10	0.05~0.5	0.00171	81.2	0.000425	327.0	4~20mA
15	0.15~1.5	0.00598	69.6	0.001500	277.7	4~20mA
20	0.3~3	0.01218	68.4	0.001500	555.5	4~20mA
25	0.6~6	0.011936	139.6	0.003000	555.5	4~20mA
40	1.5~15	0.03306	126.0	0.007800	534.2	4~20mA
50	2.4~24	0.02400	277.7			4~20mA
65	4~40	0.05470	203.1			4~20mA
80	6~60	0.1224	136.2			4~20mA
100	10~100	0.26178	106.3			4~20mA
150	19~190	0.31476	167.7			4~20mA
200	34~340	0.31538	299.5			4~20mA

h. Dimensions calculation
For different types of signal transmitters, add dimension C with the shape dimension of transmitters, thus get the total dimension.
** For instance: LC-HB25.2/ FX-GF-I, Height C=171. Height of type FX=98, Total height=171+98=269

4. Light-type oval flowmeter

Light-Type Oval Meters are developed according to the market, for light weight and low cost, which feature light weight, unique appearance, easily assembled, good repetition and high accuracy.

Technical specification

a. Accuracy; Class 0.5, Class 0.2
b. Nominal pressure: 1.6 MPa
c. Other specifications are same with the those of series LC-A
d. Materials of main parts

LC-AxxII

LC-L

Type	DN	Shell, front and back cover	Cover plate	Oval gear	Shaft	bushing
LC-AxxII	Above DN80	Cast iron	Cast iron	Alloy aluminum, Cast iron	Stainless steel	Bronze (with oil), Graphite

5. Type LC-U oval flowmeter

To transmit and detect the medias, which are easily frozen at a normal temperature or concreting at a certain temperature, it needs to preheat and melt the media in the pipe. But for it is forbidden to pass through steam directly (to prevent the meter from being damaged), we develop the meter with thermal insulation sleeve outside of the meter shell. It can fill hot water, hot oil or steam under 200°C into the thermal insulation sleeve, then melt the frozen media in the meter or strainer and keep the temp. thus ensure the meter operating normally.

The strainer before the meter can be also matched thermal insulation sleeve.
The inlet flange is normally type of DN15 flange, and also could be designed according to the customer's requirement.

Nominal operating pressure of thermal insulation sleeve is 0.5MPa, and also could be designed according to the customer's requirement.

References for Components and Structures of the Meters

1. Counters: A, A1, J1, A5, A6, BELZ, BXZ

Counter	Performance	Matched devices
A	Pointer indication, Roller total calculation with 6numbers, Unit: L	Pointer indication: DN10 1L/per loop;
A1	Same with the above, matched pulse transmitter	
J1	Pointer indication, Roller total calculation with 6 numbers, Unit: L, matched pulse transmitter	Under DN65 100L/per loop; above
A5	Pointer indication, Roller total calculation with 6 numbers, matched pulse transmitter	DN10 1L/per loop; under DN25 10L/per loop; under DN65 100L/per loop; above DN80 1000L/per loop.
A6	Dual-pointers indication, Roller total calculation with 6 numbers, single-shift with 4 numbers, return-to-zero, matched pulse transmitter	
BELZ	Direct-read indicator for integrated value, single-shift value, instantaneous flow and return-to-zero of the single shift	Used for every type of flowmeters
BXZ	Direct-read indicator for integrated value, single-shift	Used for every type of flowmeters

2. Scheme of counter with reducer (JT1, GT/ F)

Scheme	Total height	Notes
A without reducer	78	Used for Type LC meters under DN40
A1 without reducer	105	Used for Type LC meters under DN40, matched BGF, BMF.
J1+JT1	94+35=129	Used for Type LC meters above DN50, matched BGF, BMF.
A5+GT/F	64+67.5	Used for Type LC meters, matched BGF, BMF.
A6+GT/F	64+67.5	Used for Type LC meters, matched BGF, BMF, return-to-zero
BELZ	≯160	Used for Type LC meters
BXZ	≯146	Used for Type LC meters

Notes:

1. Operation of counter BELZ shall be referred to the corresponding manual.
2. Return-to-zero operation should be conducted only after the flow stops operation from damaging the meter.

3. Scheme for pulse transmitter

3.1 General description for pulse transmitter GF

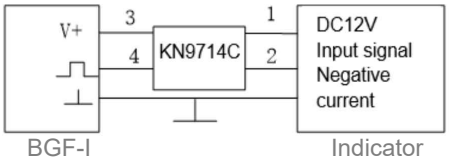
Pulse transmitter GF is a sensor of the rotary angular shift matched to cubage flowmeters, which can convert the measured flow to the pulse signal for remote flow indication, and work at both intrinsically safety explosion and separation explosion.

Normal performances of transmitter GF

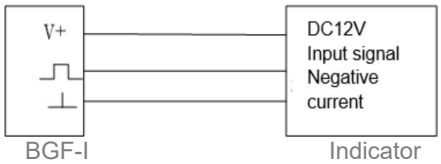
1. No contact, reliable transmitting, square wave output,
2. Operating frequency is direct proportion with matched meter's flow.
3. Environment temp.: -10~+60°C
4. Explosion-proofmark: ExiaIICT6, ExdIICT6Gb
5. Dimensions of output pipeline interface: Internal screw thread G1/2''
6. Dimensions of thehole in the cable: flame-proof type Φ11
7. High accuracy, resisting vibration, specially used for effused flow.

BGF-I technical characteristics

1. Nominal operating voltage: DC12V±10%
2. Output signal: low level <0.5V; high level >9V
3. Matched safety grid: KN9714C
4. Three-cable system (12V, signal, 0V)
5. Intrinsically safety connection

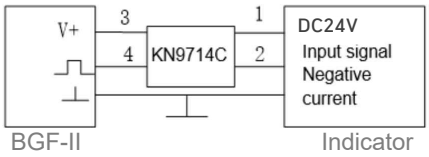


6. General and flameproof interface circuit diagram



BGF- II technical characteristics

1. Nominal operating voltage: DC24V±10%
2. Output signal: low level <1V; high level >20V
3. Matched safety grid: KN9714C
4. Three-cable system (12V, signal, 0V)
5. Intrinsically safety connection



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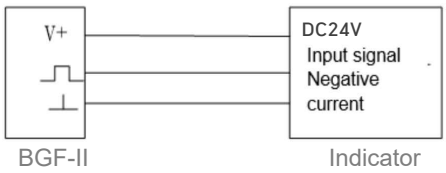
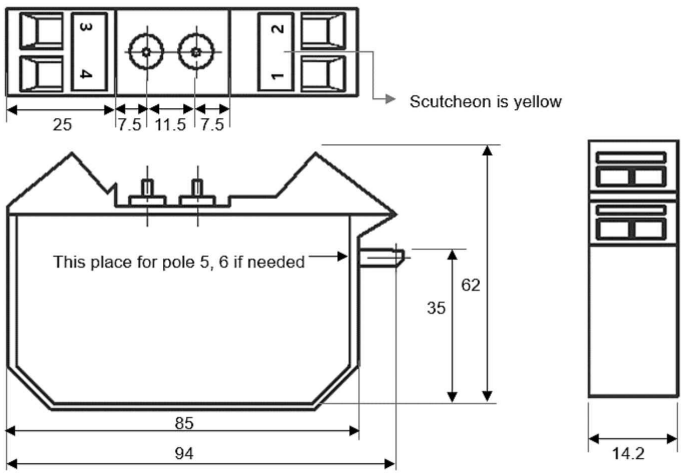


3.2 Shape and dimensions of safety grid



3.3 Table of matched transmitter parameters:

Unit: **L**-liter, **P**-pulse number, **S**-second

Counter A_5, A_6, A_1		
	Pulse transmitter GF	
DN	**L/P**	**P/S**
10	0.001	138.1
15	0.01	41.6
20	0.01	83.3
25	0.01	166.6
40	0.1	41.7
B40II	0.1	55.56

Counter A_5, A_6, J_1		
	Pulse transmitter GF	
DN	**L/P**	**P/S**
50	0.1	66.7
B50II	0.1	55.56
65	0.1	111.1
80	0.1	166.7
100	0.1	277.8
150	1	52.78
200	1	94.44

4. 4-20mA analog pulse transmitter BMF

4.1 Pulse transmitter BMF matched to cubage flowmeter can convert the instantaneous flow to 4-20mA analog signals for remote flow indication, regulation and control, and export pulse signals for integration.

4.2 Design feature:

(1) 4-cable system (positive electricity, 4-20mA current, signal, negative current)

Note: 3-cable system for 4-20mA output only, signal cable doesn't fetch out at the time of supplied. If need, please show when being ordered for goods.

(2) 4-20mA output directly, high performance, reliable transmitting

(3) Nomenclature

BMF – X X/2: two-cable: 4: four-cable
1: 12V supplied
2: 24V supplied
1: Series LC meter
2: Type LC meter (Ex-proof)

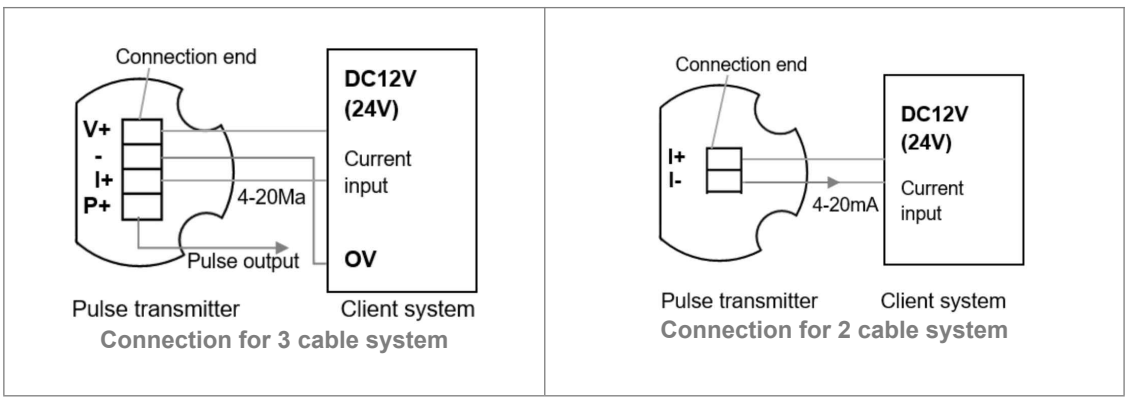
4.3 Technical specification

1. Output signal:
   a: Analog signals: 4-20mA
   b: Voltage: Low level < 0.5 V; High level >9V (12V supplied)
   Low level < 1 V; High level >20V (24V supplied)
2. Allowable errors
   Analog signals: ±0.5%F.S.
   Pulse signals: ±1 pulse
3. Environment temp.: -25°C ~+50°C
4. Analog signals load resistance (client end) <400Ω 12V supplied
   <800Ω 24V supplied
5. Power supply:
   DC12V ±10% 60mA, 4-cable system DC12V or DC24V ±10% 60mA
   DC24V ±10% 60mA, 2-cable system DC24V or DC24V ±10% 20mA
6. Explosion-proof mark: Exd II CT6 Gb

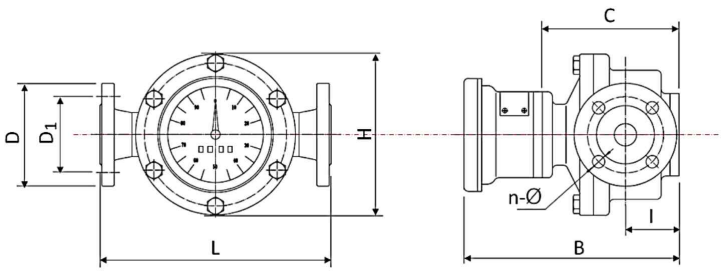
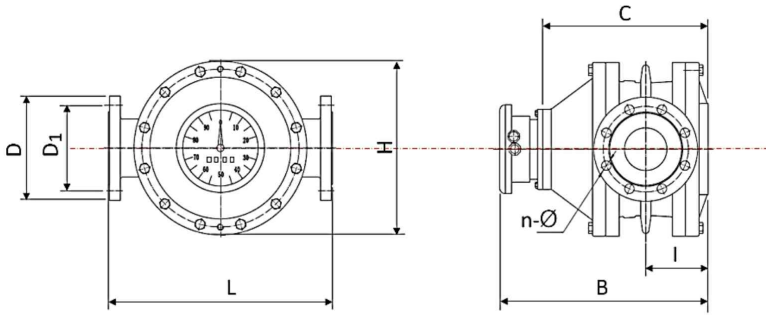
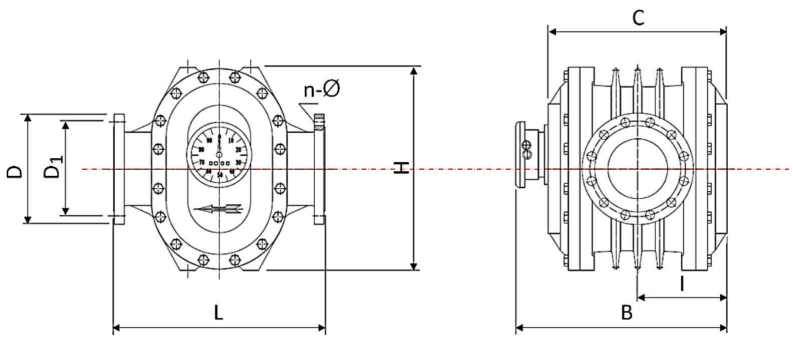
4.4 Note for clients

24V DC or 12V DC shall be indicated when being ordered for goods, and remember making connection with power off.

Electric joint:

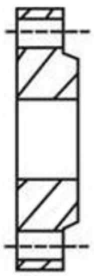


Shape and Installation Dimension

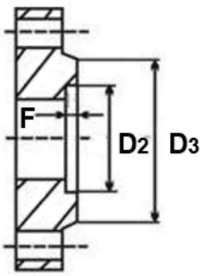
DN10~40	
DN50~100	
DN150, DN200	

Form of flange

Unit: mm



PN ≤2.5MPa



PN=6.3MPa

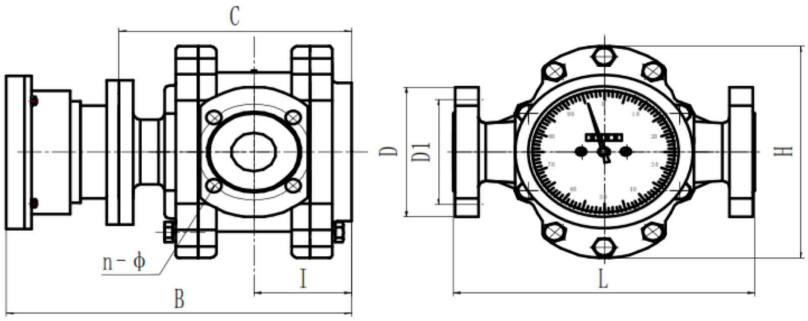
DN	D_3	D_2	f
10	50	35	4
15	55	40	4
20	68	51	4
25	78	58	4
40	95	76	4
50	105	88	4
80	140	112	4
100	168	150	4.5

● **Cast iron type (Dimension B for meter matched counter A or J1)** (Unit: mm)

DN	L	H	I	B	C	D	D_1	n	Φ	Weight
10	150	100	45	213	135	90	60	4	14	6 kg
15	170	118	48	226	147	95	65	4	14	8 kg
20	200	150	53	238	155	105	75	4	14	11 kg
25	260	180	60	246	164	115	85	4	14	18 kg
40	245	180	77	271	199	145	110	4	18	20 kg
50	340	250	88	379	249	160	125	4	18	46 kg
S50	287	218	103	310	232	165	125	4	18	28 kg
65	420	325	118	443	311	185	142	4	18	87 kg
S65	265	248	120	378	284	185	145	4	18	40 kg
80	420	325	118	441	311	195	160	8	18	87 kg
S80	265	248	120	387	284	200	160	8	18	67 kg
100	515	418	131	467	337	220	180	8	18	160 kg
150	540	510	210	565	435	280	240	8	23	245 kg
200	650	650	247	624	494	335	295	12	23	400 kg

● Dimensions for type LC-A××II

(Unit: mm)



DN	L	H	B	C	I	D	D_1	n	Φ	Weight
A50Ⅱ	265	201	370	237	87	165	125	4	18	28 kg
A65Ⅱ	265	235	410	280	118	185	145	4	18	40 kg
A80Ⅱ	265	237	450	320	136	200	160	8	18	67 kg
A100Ⅱ	350	392	450	317	123	220	180	8	18	115 kg

● Cast steel type (Dimension B for meter matched counter A or J1) (Unit: mm)

DN	L	H	I	B	C	D	D_1	n	Φ	Weight
15	200	138	53	220	142	105	75	4	14	12 kg
20	250	164	63	244	166	125	90	4	18	18 kg
25	300	202	68	252	173	135	100	4	18	22 kg
40	300	202	83	283	205	165	125	4	23	27 kg
50	384	262	88	398	268	175	135	4	23	66 kg
80	450	337	118	460	330	210	170	8	23	118 kg
100	555	442	131	484	354	250	200	8	25	210 kg
150	540	510	210	565	435	300	250	8	26	260 kg
200	650	650	247	624	494	360	310	12	26	430 kg

● Stainless steel type (Dimensions for type B and type C)

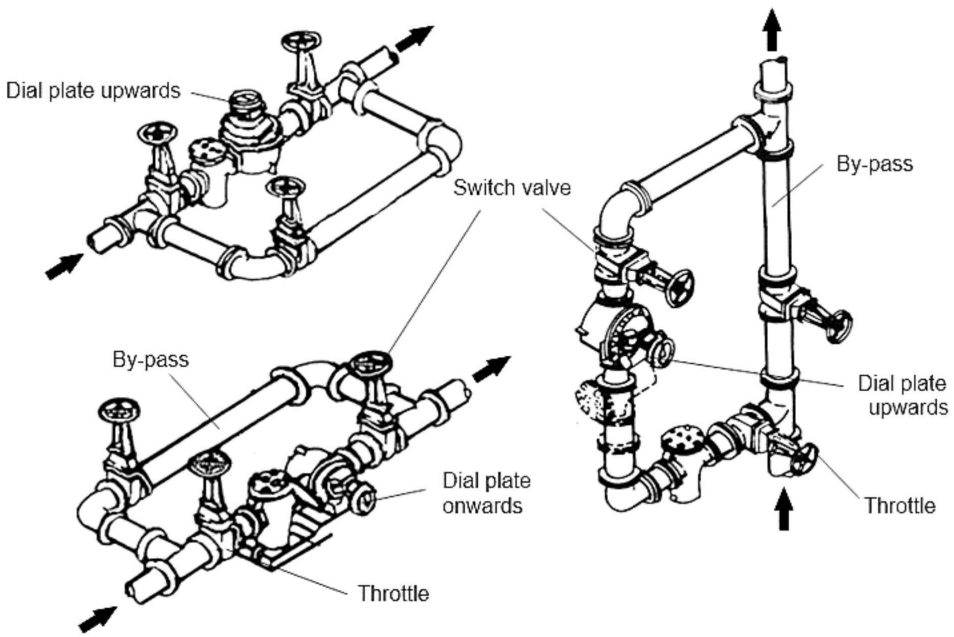
Flange standard: GB/T9112-2000, this table for convex type. **(Unit: mm)**

DN	L	H	I	B	C	D	D_1	n	Φ	Weight
B, C10	170	100	45	216	133	90	60	4	14	7 kg
B, C15	200	120	48	226	142	95	65	4	14	11 kg
B, C20	230	150	58	238	159	105	75	4	14	17 kg
B, C25	280	195	64	249	171	115	85	4	14	21 kg
B, C40	265	178	92	350	183	150	110	4	18	24 kg
B, C50	265	178	92	350	183	165	125	4	18	24 kg
B, C65S	365	260	125	400	259	165	125	4	18	59 kg
A50Ⅱ	265	201	87	370	237	165	125	4	18	28 kg
A65Ⅱ	265	235	118	410	280	185	145	4	18	40 kg
A80Ⅱ	265	237	136	450	320	200	160	8	18	67 kg
A100Ⅱ	350	392	123	450	317	220	180	8	18	115 kg
B, C65	365	260	125	400	259	180	145	4	18	59 kg
B, C65K	365	260	125	400	259	200	160	8	18	60 kg
B80	420	305	133	459	311	200	160	8	18	82 kg
B100Ⅱ	515	400	181	554	405	220	180	8	18	127 kg
B150	540	515	210	607	455	280	240	8	23	280 kg
B200	650	650	247	646	494	340	295	12	23	435 kg

Flow meter installation

1. A strainer should be installed in front of the meter, and be sure that the arrows on the casting of the meter and the strainer pointing the same direction of the liquid flow.
2. If the metered media contains gas, a gas separator should be installed in front of the meter.
3. Whether the pipe line is vertically or horizontally installed, the wheel's shaft of the meter must be fixed horizontal, that is, the dial is vertical to the surface.
4. While the meter is installed properly, the counter may be turned 180°C or 90°C for easy reading.
5. Prior to the installation of the new meter, first push the oval wheels from the outlet for several times with a bamboo rod, if the wheels don't move, they can be immersed in the petrol to prevent from deposits in the meter after the factory's inspection.
6. A throttle valve must be fixed at the inlet of the meter, an on-off valve at the outlet, which must be slowly activated to prevent from a sudden impact, reverse flow, and water hammer.
7. It is forbidden to clean the meter with steam.
8. For the continuous operated departments, a by-pass should be mounted.
9. Prior to the installation of the meter, the pipe line must be thoroughly cleaned, and at the time of cleaning use a straight pipeline instead of the meter, to prevent impurity, welding residue from entering the meter.
10. It is forbidden to inspect the meter made of cast iron and cast steel using water.
11. During the operated of the meter the flow rate can't exceed the flow marked on the name on plate.
    It is preferable to operate the meter at 50~80% of the max. flow.
12. If the metered media is causticity, stainless steel shall be selected.
13. Following is the installation figure.

Stand installation



Horizontal Installation Vertical Installation

Error Calculation and Adjustment Error

1. Flowmeter's basic error is calculated by every measuring value of each tested flow dot, as formulas followed: (Cubage method)

E = (Vm-V)/ V×100%
E : Flowmeter error (generally total error), two effective numbers.
Vm : Flowmeter's measuring value (displaying value).
V : After adjusted, flowmeter standard set measuring value (actual value).

It is known by basic error calculation that when Vm is larger than V, meter basic error is "+" value, which means that meter is fast, when Vm is smaller than V, meter basic error is "—" value, which means that meter is slow.
Flowmeter error may need to be adjusted and stay in basic error by replacing a standard gear set of the counter. That is to change mechanic transmitting ratio, which can make displaying value adjusted. Adjusting error can't change flowmeter's flow characters, but it can make the error curve stay in the new coordinates system.
Generally, in actual flow range, basic error of Max. and Min. tested dots is not able to surpass definitive basic error. Flowmeter used generally is tested by adjusting intrinsic gear wheel set and then adjust error again according to idiographic condition.

2. Error adjustment steps (Guide for the error adjustment table)

a. When designed, the standard gear set is 38/35.
If the tested meter is found to be running faster, and causes a plus (+) error, for instance,
if the error is +1.02~+0.3, replace the gear set by set 41/38 (see table 1), so the error curve stays in the new coordinate system, then the error is adjusted within the error range of +0.39~-0.33.

b. During the operation of the flowmeter, the error range will be changed or over ranged due to the wearing of the gear set etc.
If the error range doesn't exceed 1%, it can be adjusted within the error range, for instance,
the meter error drops to -0.7 +0.2, when the gear set is needed to be replaced, first check the tooth number of it, if it is 41/38, error +0.63 corresponding to it will be regarded as zero pointer (coordinate origin),
then the set 41/38 will be replaced by the set 40/37. the coordinate origin of the curve shifts from zero pointer
for the set 41/38 down to the +0.43 pointer for the set 40/37, so the error curve stays in the new coordinate system.

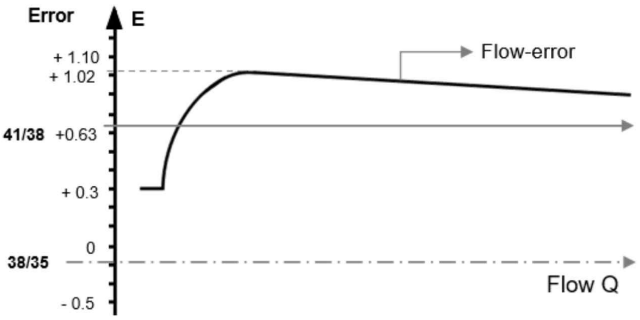


Figure 1

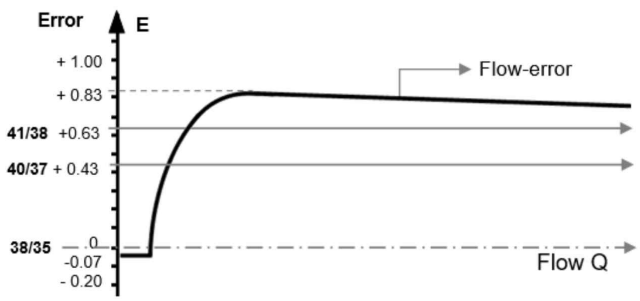
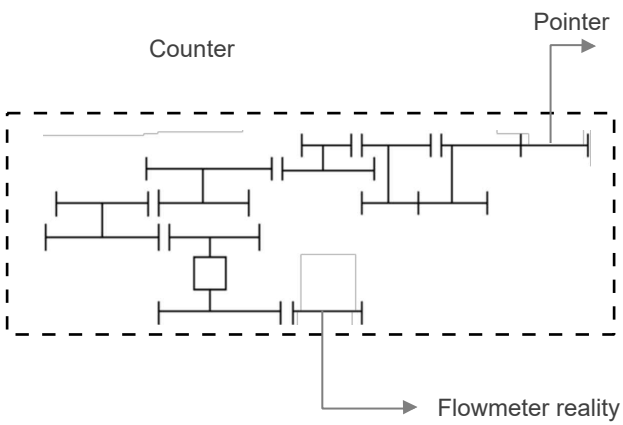


Figure 2

Adjustment Table

Error adjustment % under DN40		Adjustment gear set Z1	Adjustment gear set Z2
When the indicated flow rate is smaller than the actual value, Z1, Z2 can be selected from bottom to top. → ←When the indicated value is larger than the actual value, Z1, Z2 can be selected from top to bottom.	3.27	37	33
	2.94	38	34
	2.63	39	35
	2.34	40	36
	2.06	41	37
	1.80	42	38
	1.55	43	39
	1.32	44	40
	1.09	45	41
	0.88	46	42
	0.74	35	32
	0.48	36	33
	0.23	37	34
	0.00	38	35
	0.22	39	36
	0.43	40	37
	0.63	41	38
	0.81	42	39
	0.99	43	40
	1.16	44	41
	1.32	45	42
	1.47	46	43
	1.54	31	29
	1.75	32	30
	1.95	33	31
	2.14	34	32
	2.31	35	33
	2.489	36	34
	2.63	37	35
	2.78	38	36
	2.92	39	37
	3.05	40	38

Error adjustment % DN50 ~ 200		Adjustment gear set Z1	Adjustment gear set Z2
When the indicated flow rate is smaller than the actual value, Z1, Z2 can be selected from bottom to top→. ←When the indicated value is larger than the actual value, Z1, Z2 can be selected from top to bottom.	4.21	33	30
	3.90	34	31
	3.62	35	32
	3.35	36	33
	3.10	37	34
	2.86	38	35
	2.63	39	36
	2.42	40	37
	2.22	41	38
	2.02	42	39
	1.84	43	40
	1.75	29	27
	1.67	44	41
	1.50	30	28
	1.35	46	43
	1.27	31	29
	1.05	32	30
	0.85	33	31
	0.66	34	32
	0.48	35	33
	0.31	36	34
	0.15	37	35
	0.00	38	36
	0.14	39	37
	0.28	40	38
	0.40	41	39
	0.53	42	40
	0.64	43	41
	0.75	44	42
	0.86	45	43
	0.96	46	44
	1.14	24	23
	1.32	25	24
	1.47	26	25
	1.62	27	26
	1.75	28	27
	1.88	29	28
	2.00	30	29
	2.11	31	30
	2.21	32	31
	2.30	33	32
	2.39	34	33
	2.48	35	34
	2.63	37	38
	2.77	39	38



	2.89	41	40
	3.01	43	42
	3.16	46	45

Trouble Shooting

Trouble	Cause	Measures
Roots wheels don't rotate	Foreign matters drop into meter, blocking the oval wheels during installation.	Disassemble and clean, then refit the meter and the strainer.
	The strainer is damaged	
	There is impurity in the pipe	
Pulse transmitters don't work	The transmitter has wrong place	Replace the transmitter
	Connected to wrong poles	Reconnect the cables, red for +pole, black for -pole
Axial sealing coupling leakage	The sealing stuffing wears or the sealing oil is in short.	Tighten the gland or replace the stuffing, fill the sealing oil.
Pointer moves unstably	The counter is not well assembled, the pointer fixed loose.	Reassemble the pointer.
	Accuracy adjusting gears loose	Tighten the screw again.
Error range is larger	Ripple is larger	Decrease the ripple
	The liquid contains gas	Fix a gas separator before meter and strainer
Error is larger, but the difference between the max. and the min. doesn't exceed 1% (0.4% for class 0.2)	Exceed the terminal time of the meter	Readjust and verify the meter.
	Clearances change after examination.	
Error of small meter is larger	Oval wheels touch the shell because the bearings are damaged, or the shell is distorted	Replace the bearings, fix the shell and the wheels to ensure the clearance, recalibrate the meter

Others

1. The stainless steel flowmeters are specially made for the chemical liquid measurement 98% sulphidic acid, 60% nitric acid, 50% caustic acid.
2. Hefei Jingda Instrument General Factory also produces Series OI, OM, OK Oval meters with the technology transferred from Bopp & Renther GmbH, Germany.
3. Prior to the delivery of the meter, it has been calibrated with the light diesel oil in the factory, and water calibration is not allowable in order to prevent the oval wheels from rusting. For the detail, see the national inspecting procedures standard JJG 235-99 [Verification Regulation of Oval Wheel Flowmeters]
4. The strainer is separate product with separate price (complete sets are also provided).

Notice for Order

1. Name, type, specification, material;
2. Media temperature, operating pressure, flow range;
3. Media Viscosity or the name of the media;
4. Special requirement (for instance explosion-proof mark, etc);
5. Name of work units of ordering and receiving products;
6. Detailed address, telephone number and post code;
7. Work unit for settling accounts, bank and the account code;
8. The arriving station and the linkman;
9. Means for transportation;

10. Please contact us if you need more details about the related products;
11. We promise return goods, change and repair for our product and followed service during the product's service time of use.

Model selection

Model: LC_Oval gear flowmeter			
Type		LC	
		LC-U	Matched thermal insulation sleeve
		LC-G	Tube thread
		LC-H	Flowmeter of welded steel
		LC- Q	Flowmeter of metering gasoline flowmeter
		LC-N	Flowmeter of large viscosity
		LC-SP	Flowmeter for foodstuff
		LC-T_1, T_2	Radiator (1 for long, 2 for short)
Material	Shell	A	Cast iron meter
		B/C	Stainless steel meter **B:** SUS304/ **C:** SUS316
		E	Cast steel meter
	Rotor	A	Material is cast iron
		B/C	Material is stainless steel **B:** SUS304/ **C:** SUS316
		L	Material is alloy aluminum
Nominal diameter		XX	DN10……..DN200
Special requirement		S (K)	Flange shrunk (widened)
		II	Improved type
Allowable pressure		.2/	1.6MPa
		.3/	2.5MPa
		.4/	4.0MPa
		.6/	6.3MPa
Counter		A, A1	Used for counter under DN40
		A5, J1	Single pointer counter
		BELZ, BXZ	Counter with electric indicator
		A6	Return-to-zero counter
		BXZ	Small flow digital display counter
Pulse transmitter		FX	Used for remote transmitter
		BGF-I	12V: 3-cable pho-electric transmitter
		BGF-II	24V: 3-cable pho-electric transmitter
		BMF	4-20mA analog signal output
Accuracy		J	High precision flowmeter

Note:

1. When the oval wheel's material is same with the shell's, it can be not indicated
2. '**B**'-06Cr19Ni10, '**C**'-022Cr17Ni12Mo2
3. '**B**' before generator means separation generator
4. If without radiator the meter could be only marked T
5. At past LC11 was used as on-site indicator and LC12 with transmitter.
   New clients are proposed to use this new marker and old customers may use the old ones.