LC OVAL GEAR FLOWMETER

Wide Range of fluids & Viscosity solutions
Heavy duty meter construction
No flow condition needed
Different material options


DN10-DN25


DN50-DN100


Digital Register


DN65 High Temp.

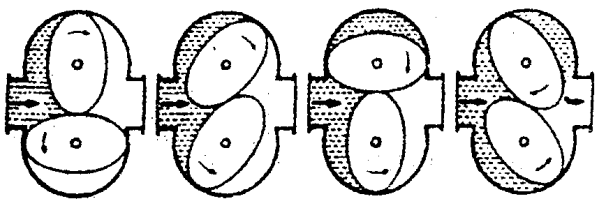

DN150, DN200


DN50-DN100

General Description

Oval gear flowmeters 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. LC oval gear flowmeters are fitted with mechanical pointer and register which can indicate the liquid flow and totalized 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.

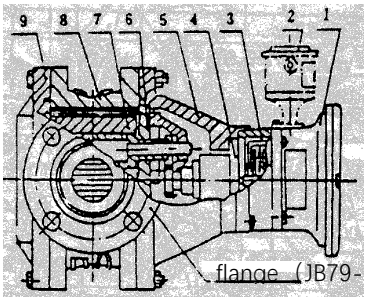
Structure and Principle



Oval gear flowmeter is generally comprised of a flow transducer and a register mechanism. The main part of the transducer is a measuring chamber which consists of a pair of oval wheels and a sealing coupling. The register mechanism contains speed reduction gears, adjusting device, register, 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 Register, 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 electrical indicator for remote integrated flow and instantaneous flow indication and control.

Register

1) Pulse transmitter
2) Accuracy adjustor (above DN50)
3) Sealing coupling
4) Front cover
5) Cover plate
6) Oval gears
7) Shell
8) Back cover



Technical Specification

a) General Specifications

Accuracy:	0.5%, 0.2%
Protection Level:	IP66
Working Temp:	LC-A: -20˚C~+60˚C; LC-B, E: -41˚C~60˚C, LC-Q: -20˚C~+60˚C, With high temp. Radiator: 60˚C-200˚C
Explosion Proof:	Exia IICT6, ExdIICT6
Medium Viscosity:	Max 2000mPa.s
Flowmeter Size:	DN10-DN200

b) Main Types and Materials

LC-A: Cast-iron Oval Gear Flow meter, applied widely in various oil or other medium which is not corrosive to cast iron material;
LC-E: Cast-steel Oval Gear Flow meter, applied in the low-corrosive fluids with high pressure.
LC-B,C: Stainless steel Oval Gear Flow meter, applied to strong corrosive fluids such as acid, alkali, salty or organic chemicals.

Table 1 Main parts material and Nominal operation pressure

	Shell & Cover	Cover Plate	Oval Gear	Shaft	Nominal Pressure (1.6Mpa)
LC-A	Cast iron	Cast iron	Cast iron/ Stainless steel/ Aluminium alloy	Bronze(with oil) or rolling bearing	1.6Mpa
LC-E	Cast steel	Cast iron			≤DN50: 6.3Mpa DN80-100:4.0, 6.3Mpa DN150-200:2.5Mpa
LC-B/C	Stainless steel	Stainless steel	Stainless steel	Graphite or rolling bearing	≤DN50:2.5Mpa ≥DN80:1.6Mpa

Note:
LC-C Material: 316 Stainless steel, LC-B Material: 304 stainless steel
Flange below 2.5Mpa is RF, 6.3Mpa flange is MFM, 4.0Mpa flange can be RF or MFM.

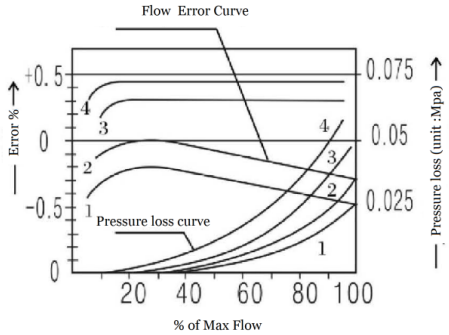
Table 2 Flow range and Viscosity (Flow unit: m^3/h)

Model	Size (mm)	Medium Viscosity (mPa. s)							
		0.3-0.6	0.6-2		2-200		200-1000		1000-2000
LC-10II	10	0.08-0.2	0.1-0.25	0.05-0.25	0.08-0.25	0.05-0.25	0.03-0.05	0.02-0.05	
LC-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	0.03-0.2
LC-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	0.07-0.7
LC-20	20	1.5-3	1-3	0.5-3	0.5-3	0.3-3	0.4-2.1	0.2-2.1	0.15-1.5
LC-25	25	3-6	2-6	1-6	1-6	0.6-6	0.8-4.2	0.4-4.2	0.3-3
LC-40	40	7.5-15	5-15	2.5-15	2.5-15	1.5-15	2.1-10.5	1.0-10.5	0.7-7.5
LC-50	50	8-24	8-24	4.8-24	4.8-24	2.4-24	2.4-16.8	1.6-16.8	1.2-12
LC-B40(50)	40, 50	6-20	6-20	4-20	4-20	2-20	2.8-14	1.4-14	1.0-10
LC-65	65	20-40	15-40	8-40	8-40	4-40	5.6-28	2.8-28	2-20
LC-80	80	30-60	20-60	12-60	12-60	6-60	8.4-42	4.2-42	3-30
LC-100	100	50-100	34-100	20-100	20-100	10-100	14-70	6-70	5-50
LC-150	150	95-190	64-190	38-190	38-190	19-190	26.6-133	13.3-133	9.5-95
LC-200	200	170-340	114-340	56-340	56-340	34-340	47.6-238	23.8-238	17-170
Accuracy		0.5	0.2	0.5	0.2	0.5	0.2	0.5	0.5

Note: when the viscosity is over 200Mpa. S, it belongs to high viscosity medium.

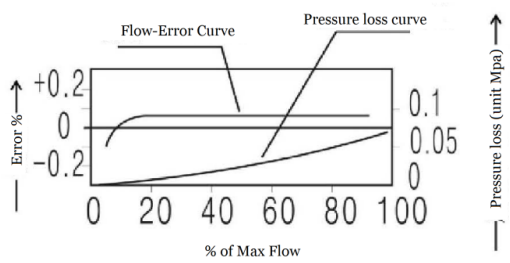
c) Flow meter Error and Pressure loss

0.5% Accuracy Error and Pressure Loss Curve



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

0.2% Accuracy Error and Pressure Loss Curve



Notes:

1.The 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.

Dimensions

The dimensions are only for mechanical Register A

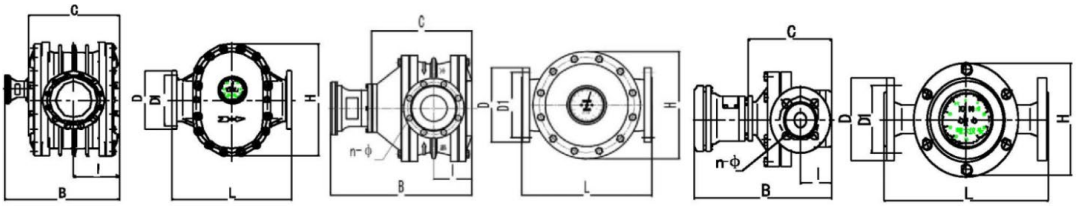


Table 3 LC-A Cast Iron Oval Gear Flow meter Dimensions (B=Register A dimensions) Unit: mm

Nominal Diameter	L	H	B	C	I	D	D1	n	Φ	Weight（kg)
10	150	100	213	135	45	90	60	4	14	6
15	170	118	226	147	48	95	65	4	14	8
20	200	150	238	155	53	105	75	4	14	11
25	260	180	246	164	60	115	85	4	14	18
40	245	180	271	199	77	145	110	4	18	20
50	340	250	379	249	88	160	125	4	18	46
80	420	325	441	311	118	195	160	8	18	87
100	515	418	467	337	131	220	180	8	18	160
150	540	510	565	435	210	280	240	8	23	245
200	650	650	624	494	247	335	295	12	23	400

Table 4 LC-E Cast Steel Oval Gear Flow meter Dimensions (B=Register A dimensions) Unit: mm

Nominal Diameter	L	H	B	C	I	D	D1	n	Φ	Pressure (Mpa)	Weight (kg)
15	200	138	220	142	53	105	75	4	14		12
20	250	164	244	166	63	125	90	4	18		18
25	300	202	252	173	68	135	100	4	18		22
40	300	202	283	205	83	165	125	4	23	Example:	27
50	384	262	398	268	88	175	135	4	23	Flange pressure 6.3Mpa	66
80	450	337	460	330	118	210	170	8	23		118
100	555	442	484	354	131	250	200	8	25		210
150	540	510	565	435	210	300	250	8	26	Example:	260
200	650	650	624	494	247	360	310	12	26	Flange .5Mpa	430

Table 5 LC-B,C Stainless steel Oval Gear Flow meter Dimensions Unit: mm

Nominal Diameter	L	H	B	C	I	D	D1	n	Φ	Weight (kg)
B,C10	170	100	216	133	45	90	60	4	14	7
B,C15	200	120	226	142	48	95	65	4	14	11
B,C20	230	150	238	159	58	105	75	4	14	17
B,C25	280	195	249	171	64	115	85	4	14	21
B,C40Ⅱ	265	178	310	183	92	150	110	4	18	24
B,C50Ⅱ	265	178	310	183	92	165	125	4	18	24
B,C65S	365	260	400	259	125	165	125	4	18	59
B,C65Ⅱ	365	260	400	259	125	185	145	4	18	59
B,C65K	365	260	400	259	125	200	160	8	18	60
B80II	420	305	500	370	133	200	160	8	18	82
B100Ⅱ	515	400	554	405	181	220	180	8	18	127
B150	540	515	607	455	210	285	240	8	23	280
B200	650	650	646	494	247	340	295	12	23	435

Model Selection

Table 6

Item	Code	Description
Factory mark	LC	Oval Gear Flow meter
Special Marking	U	With heating jacket
	G	Pipe Thread type
	H	Welded type steel flow meter
	P	Nuclear purpose
	P1	Nuclear purpose with anti-shock
Functions	N	High viscosity ⩾ 200Mpa. s
	SP	For Food industry
	$T/T_1/T_2$	*High temperature*1*
Material	A	Cast iron
	B/C	B= Stainless steel 304, C=Stainless steel 316
	E	Cast steel
	Q	Others
Size	10-200	Flow meter sizes from 10mm to 200mm
Special Structure	S	Flanges shrinking
	K	Flanges Expanding
	II	Others
Pressure Rating	.2/	1.6Mpa
	.3/	2.5Mpa
	.4/	4.0Mpa
	.6/	6.3Mpa
Register	A	Mechanical pointer, 6 digits totalizer, no return to zero
	A6	Mechanical pointer, 6 digits totalizer, return to zero
	BELZ-0	Digital indicator, instant and totalized flow, battery power, no output, Explosion proof.
	BELZ-1	Digital indicator, instant and totalized flow, 24V DC, Pulse output, 3-wire, Explosion proof.
	BELZ-2	Digital indicator, instant and totalized flow, 24V DC, 4-20mA output, 2-wire, Explosion proof.
	BELZ-3	Digital indicator, instant and totalized flow, 24V DC, 4-20mA output, 4-wire, Explosion proof.
	BELZ-4	Digital indicator, instant and totalized flow, 24V DC, 4-20mA output, Hart, Explosion proof.
	X	Other functions
Output	BGF-I	Only for A or A6 register, Pulse output, 3-wire, Explosion proof.12V DC power supply
	BGF-II	Only for A or A6 register, Pulse output, 3-wire, Explosion proof.24 V DC power supply
	BMF	Only for A or A6 register, 4-20mA output, Explosion proof.24 V DC power supply
Accuracy	J	High accuracy: 1.0%

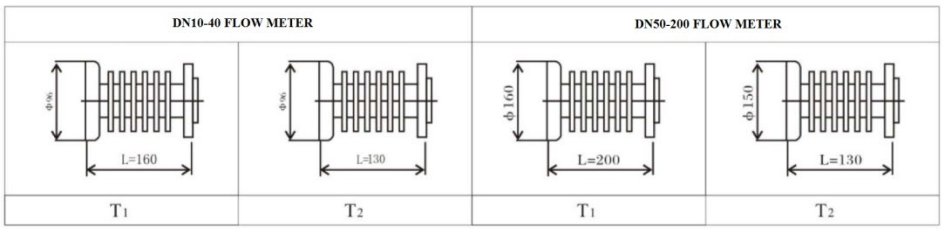
**1: $T/T_1/T_2$: High temperature.*

T: High temp 60-120°, only for mechanical register without output, with radiator.

T_1: High temp 120-200°, with long radiator.

T_2: High temp 60-120°C, with short radiator, for flow meter with output.

a) Radiator Dimensions



b) Models Selection Sample:

LC-T$_1$E80.3/A6BGF-II
LC-Oval Gear Flow meter
T$_1$- High temp 120-200˚, with long radiator
E-Cast Iron Material
80-Flow metrer size 80mm
.3/-Pressure rating: 2.5Mpa
A6- Mechanical pointer, 6 digits totalizer, return to zero
BGF-II- Only for A or A6 register, Pulse output, 3-wire, Explosion proof.24 V DC power supply