LL
Roots Flow Meter

Model LL Roots flow meter is a kind of volumetric instrument used to measure the volume flow of the fluid in enclosed pipes.

It can provide on-site display of accumulated flow; when being coupled with photoelectron pulse converter and flow totalizer through transmission output interface, it can carry out remote measurement、display、and control.

Its unique features are high accuracy、good repeatability、wide range ability、and not so high demand for straight pipes on upstream or downstream side of flow meter.

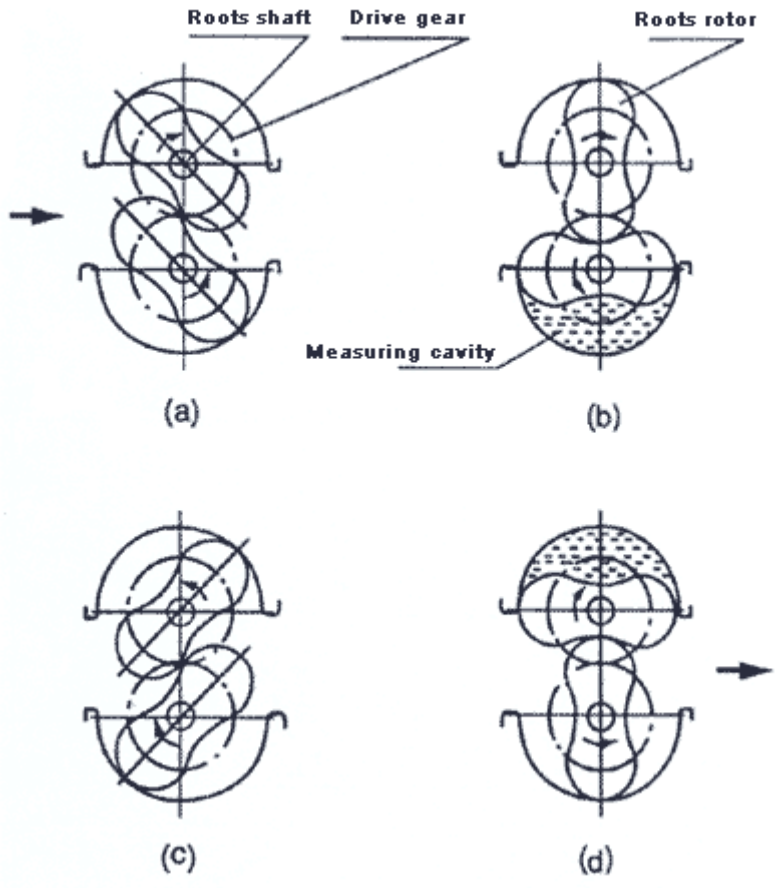
It might be especially suitable for the fluids of high viscosity, and any change of viscosity should not cause obvious influence on the measured value.

This flow meter should be usable for non-corrosive fluids, such as crude oil and petroleum products (diesel fuel、lubricating oil etc.)

Standard for this flow meter is Q/YXBM 368-2000; while the inspecting regulation thereof is JJG 667-97.

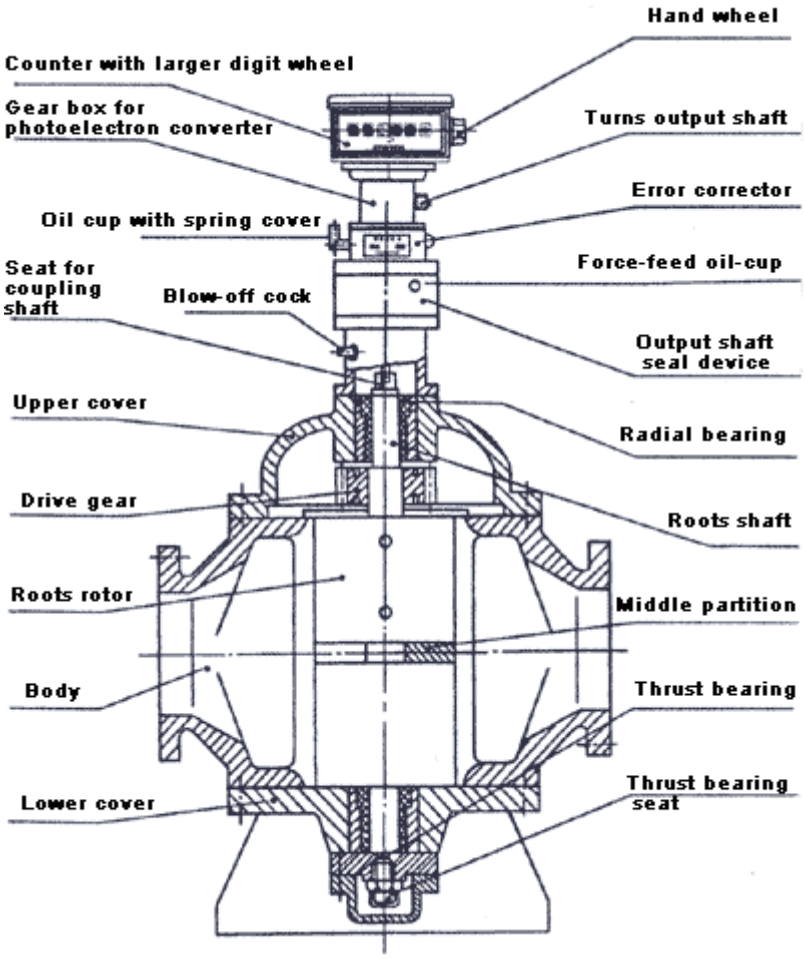
☐Operating Principle

When measured liquid flows through the measuring cavity, a differential pressure will take place between the inlet and outlet of flow meter. This pressure will force the roots rotors to rotate (see figures a、b、c、d), while a pair of drive gears fixed on the shafts will enable both roots rotors to drive each other alternatively. As the volume of measuring cavity is a constant value, thus the total flow of measured liquid will be proportional to the turns of rotors rotation, and the latter will be simultaneously transferred to the counter through variable speed device with a certain drive ratio. Therefore the accumulative reading of counter should be considered as volume flow within a certain period.



☐Structure Diagram

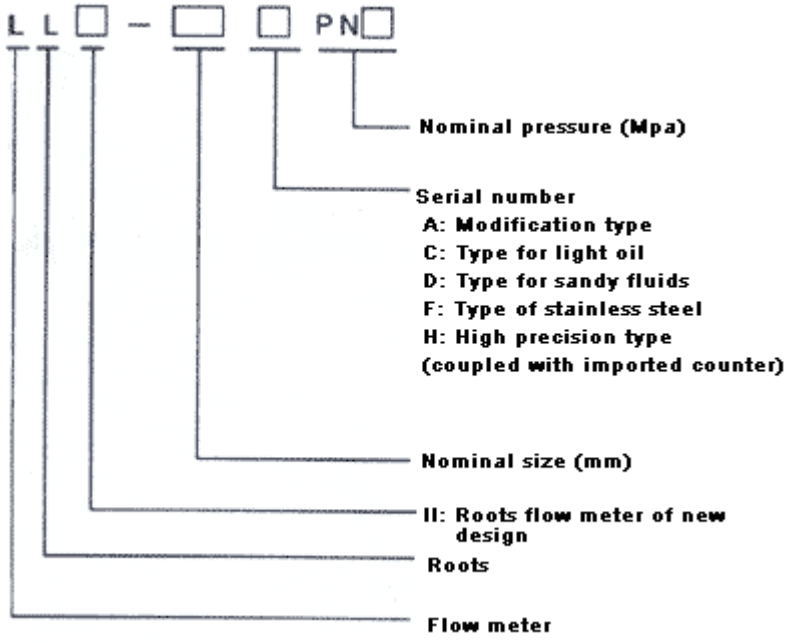
This flow meter is composed of body、roots rotors、drive gears、output shaft seal device、error corrector、and counter etc.



☐Principal Specifications

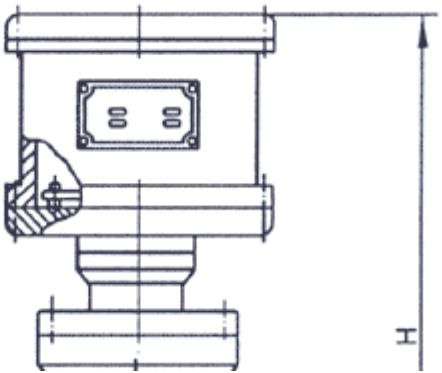
Nominal sizes DN (mm)	Maximum flow rate m3/h	Elementaryerror limit %		Temperature of medium 0C	Speed of transmission output shaft m3/r	Nominal Pressure MPa	Maximum pressure loss MPa	Viscosity range mPa · s
		Range ability 5:1	Range ability 10：1					
15	2.5	±0.2	±0.5	0～120	0.001	6.3	＜0.12	3～500
25	6							
40	16							
50	25				0.01	1.6 2.5		
80	60							
100	100							
150	250				0.1	4.0 6.3		
200	400							
250	600							
300	1000							

☐Model Designation

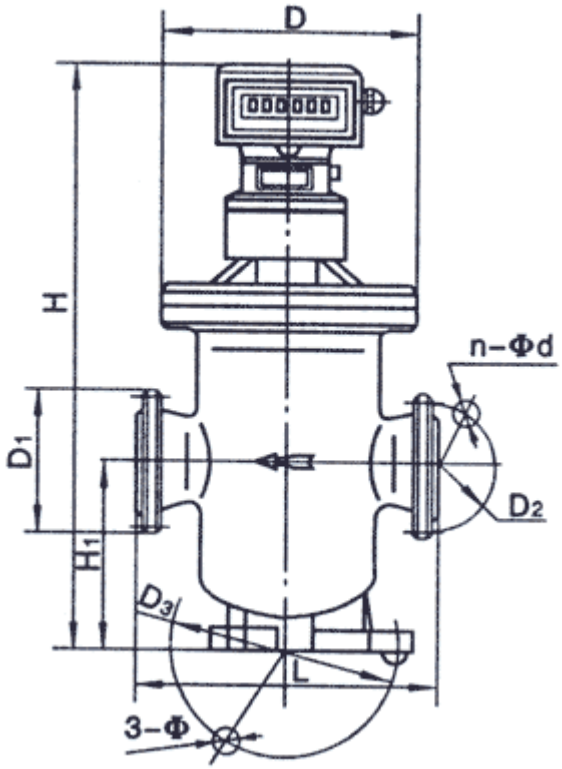


☐Overall dimensions for mounting

• Nominal sizes DN 15～100 mm

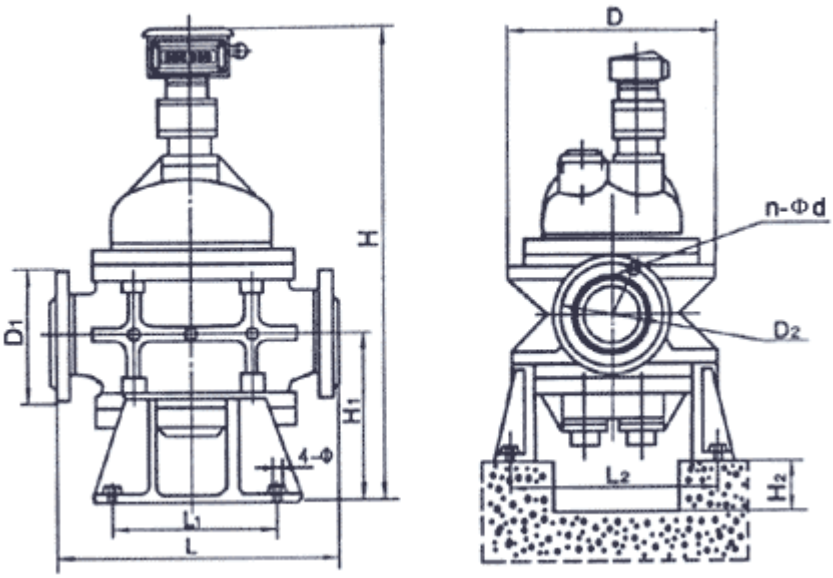


• Nominal sizes DN 50～100mm, PN 2.5、PN4.0、PN6.3



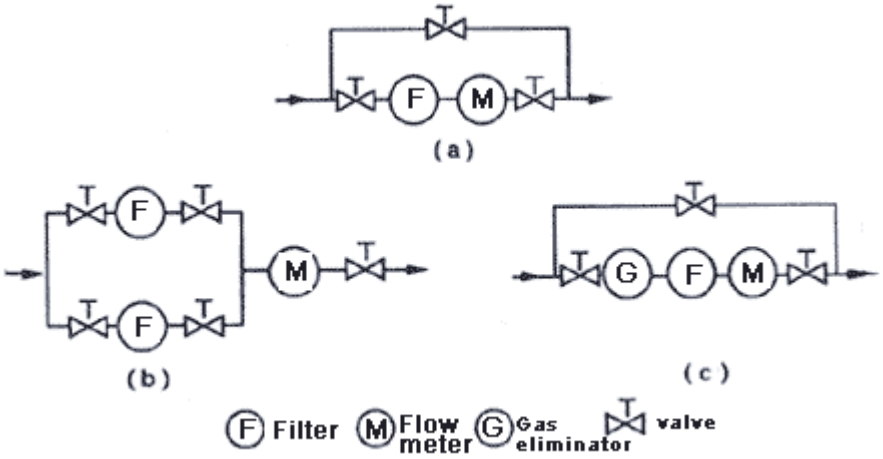
Dimensions / Model	Overall height H	Height of center H1	Outside diameter of large plane D	location of base bolts D3	Base bolt apertures 3-Φ	Distance between two flanges L	Outside diameter of flanges D1	Circle of bolt hole Centers D2	Apertures of boltholes n-Φd	Connecting bolts n-Md1	Weight (kg)
LL-50A，PN2.5	940	237	Φ300	Φ240	3-Φ18	360	Φ160	Φ125	4-Φ18	4-M16	128
PN4.0							Φ160	Φ125	4-Φ18	4-M16	129
PN6.3							Φ175	Φ135	4-Φ23	4-M20	130
LL-80，PN2.5	1037	289	Φ400	Φ370	3-Φ23	460	Φ195	Φ160	8-Φ18	8-M16	228
PN4.0							Φ195	Φ160	8-Φ18	8-M16	229
PN6.3							Φ210	Φ170	8-Φ23	8-M20	231
LL-100，PN2.5	1100	318	Φ425	Φ370	3-Φ23	500	Φ230	Φ190	8-Φ23	8-M20	280
PN4.0							Φ230	Φ190	8-Φ23	8-M20	282
PN6.3							Φ250	Φ200	8-Φ25	8-M22	286

• Nominal sizes DN150～300mm



Dimensions / Model	Overall height H	Height of center H1	Outside diameter of large plane D	Location of base bolts L1×L2	Base bolt apertures 4-Φ	Distance between two flanges L	Outside diameter of flanges D1	Circle of bolt hole centers D2	Apertures of bolt holes n-Φd	Connecting bolts n-Md1	Maintenance notch depthof foundation H2＞	Weight (kg)
LL-150A，PN1.6	1467	462	Φ470	355×360	4-Φ25	650	Φ280	Φ240	8-Φ23	8-M20	60	460
PN2.5							Φ300	Φ250	8-Φ25	8-M22		470
PN4.0							Φ300	Φ250	8-Φ25	8-M22		470
PN6.3							Φ340	Φ280	8-Φ34	8-M30		490
LL-200,PN1.6	1528	488	Φ500	570×440	4-Φ27	700	Φ335	Φ295	12-Φ23	12-M20		625
PN2.5							Φ360	Φ310	12-Φ25	12-M22		640
PN4.0	1540	500	Φ520				Φ375	Φ320	12-Φ30	12-M27		650
PN6.3							Φ405	Φ345	12-Φ34	12-M30		670
LL-250,PN1.6	1731	576	Φ670	580×840		1000	Φ405	Φ355	12-Φ25	12-M22	100	1562
PN2.5							Φ425	Φ370	12-Φ30	12-M27		1578
PN4.0			Φ720				Φ445	Φ385	12-Φ34	12-M30		1595
PN6.3							Φ470	Φ400	12-Φ41	12-M36		1620
LL-300,PN1.6	1936	680	Φ670				Φ460	Φ410	12-Φ25	12-M22		1780
PN2.5							Φ485	Φ430	16-Φ30	16-M27		1800
PN4.0			Φ720				Φ510	Φ450	16-Φ34	16-M30		1825
PN6.3							Φ530	Φ460	16-Φ41	16-M36		1860

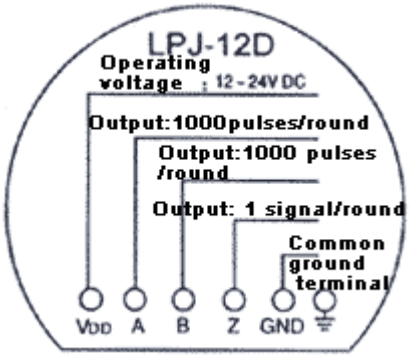
☐Mode of pipe installation (sketch)



Notes: Requirements for mounting:
• Select mounting location with less vibration and free from high temperature and moisture.
• Mount the flow meter upright on a horizontal pipe.
• Before mounting flow meter, it is necessary to clear away all impurities as sludge and welding dregs out of the pipe.
• The flow meter should be located at a lower place so as to separate gas from the measured fluid at other higher places. If necessary, a gas eliminator should be mounted ahead of the flow meter.
• Filter and gas eliminator should be mounted on the upstream side of flow meter, while adjusting valve should be mounted on the downstream side.

☐Wiring terminal diagram of photoelectron pulse converter

• LPJ-12D (explosion-proof type)



• LPJ-12D/FI (explosion-proof type)