Model LLQ
Roots Flow meter for Gas

LLQ Roots flow meter for gas (hereafter for short called flow meter) is a kind of volumetric flow meter used to measure volume flow of gas continuously passing through the pipe. In consideration of high velocity of gas flow, roots rotor is made of aluminum alloy with its resisting ability to abrasion and corrosion strengthened by special surface disposal. Both rotor shaft and bearing are made of stainless steel and the shaft journal is rather small in diameter with the result that the rotor can be rotated flexibly and lightly. Thus this flow meter has the features of high measuring accuracy, wide measuring range, and minor starting differential pressure and pressure loss. It can be used to measure most gases with stable flow velocity and normal gas with flow velocity greatly changed. This flow meter has found wide application in measurements of wellhead natural gas, industrial coal gas, common gas and gas out of its generating station.

This flow meter can display accumulated flow on the site. As desired, customer can allocate LPZ pulse converter and relevant SXP-3113 intelligent flow totalizer together with other related instruments so as to carry out long distance transmission and display accumulated volume flow and instantaneous volume flow rate of gas under the conditions of reference pressure (101.32 kPa) and reference temperature (20℃).

This flow meter is suitable for occasion with explosion-proof requirements and its classification is dIIBT4.

Standard for this product is Q/YXBM 370-95 and the inspecting regulation thereof is JJG 633-90

□Principal Specifications

Nominal size DN mm	Upper limit of flow rate(m3/h)	Limit of elemental error(%)	
		Range-ability10：1	Range-ability5:1
25	25	±1.5	±1.0
40	50		
50	80		
80	250		
100	400		
150*	1000		
200*	2500		

Note: Those with signs * denote the products under development.

•Basic type (model designation: LLQ-□)

Medium temperature： 0～80℃

Nominal pressure： 1.6MPa

Maximum pressure loss： ＜0.5kpa

Providing accumulated gas flow on-site display

•Special type (model designation: LLQ-□/LPZ)

On the base of basic type, following items are added:

Electric signal output: Pulse signal of three-wire system

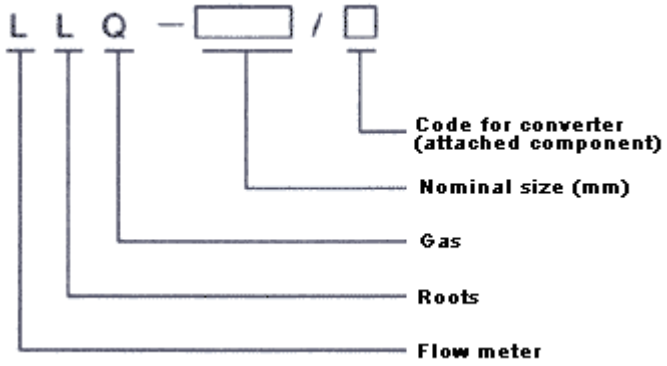
Operating voltage： 24±1.5V DC

Maximum input current： 25mA

Frequency response： ＞200(times/min)

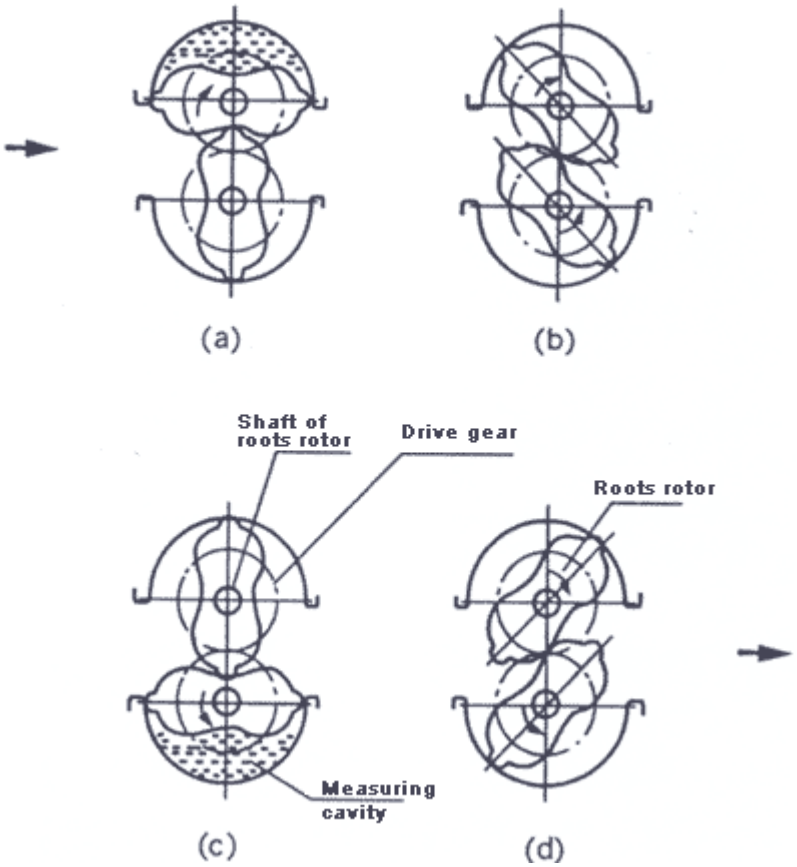
Output mode： Collector open circuit (electrode)

□Model Designation



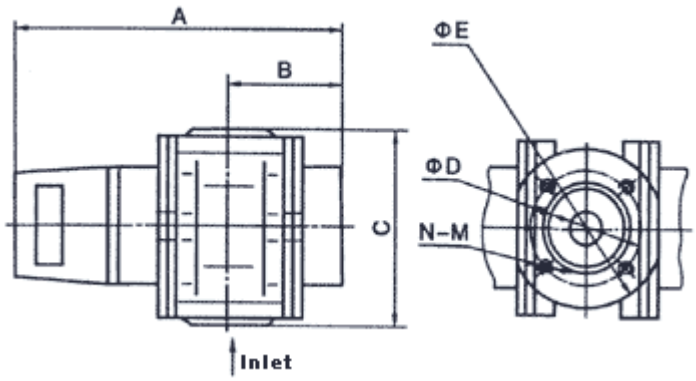
☐Operating Principle

When measured gas 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 gas will be proportional to the turns of rotor 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.

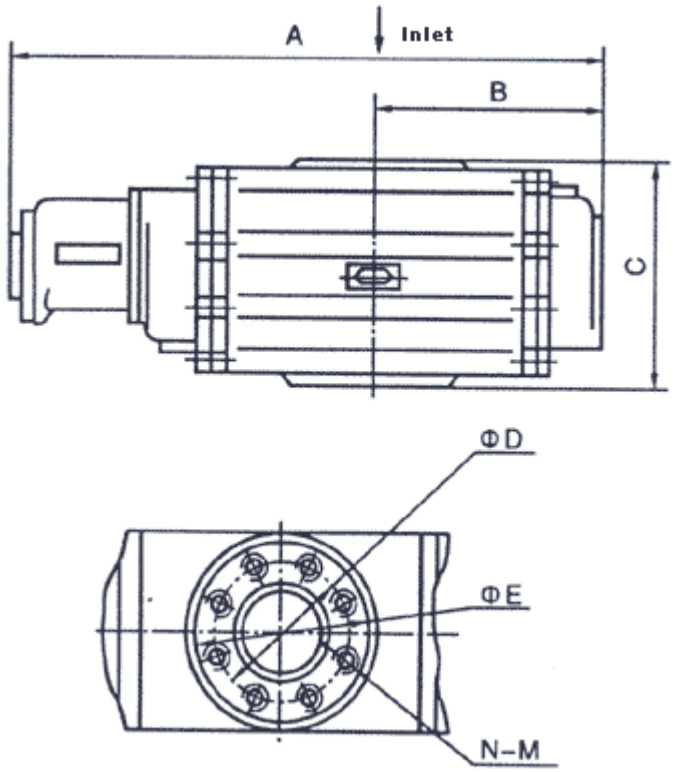


☐Overall dimensions for mounting (Unit: mm)

• Nominal size DN 25 mm

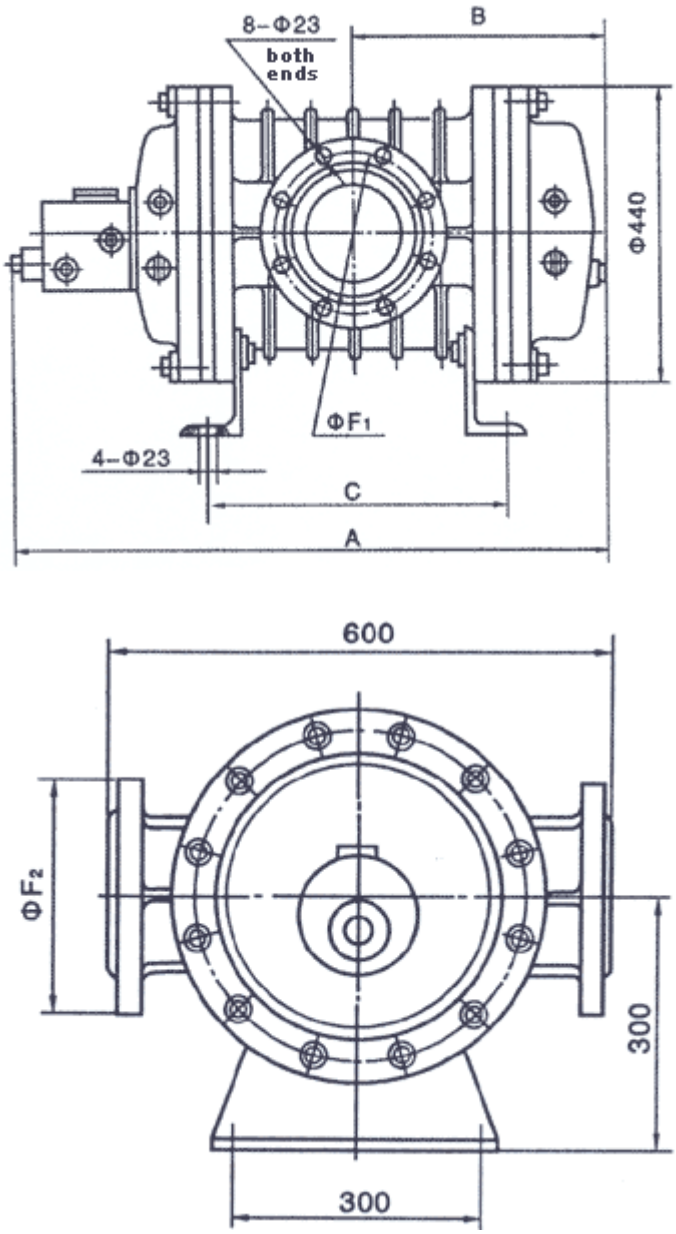


• Nominal size DN 40～100 mm



Nominal size DNmm	A	B	C	ΦD	ΦE	N-M	Weight kg
25	355	95	135	85	115	4-M12×20	12
40	498	145	172	110	145	4-M16×20	14
50	532	162	172	125	160	4-M16×25	15
80	659	232	245	160	195	8-M16×25	35
100	759	282	245	180	215	8-M16×25	46

• Nominal size DN 150～200 mm



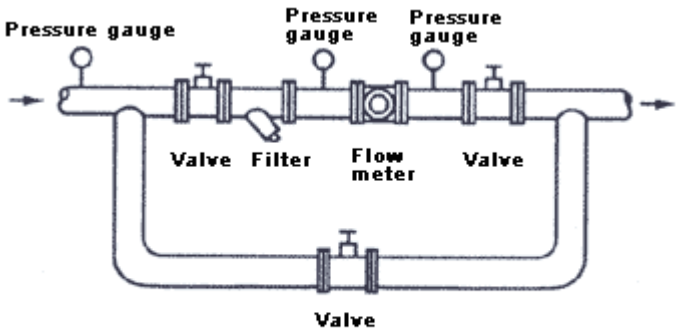
Nominal size DNmm	A	B	C	ΦF1	ΦF2	Weight kg
150*	922	370	460	240	280	220
200*	1102	460	640	295	335	280

Note: Those with sign * denote the products under development

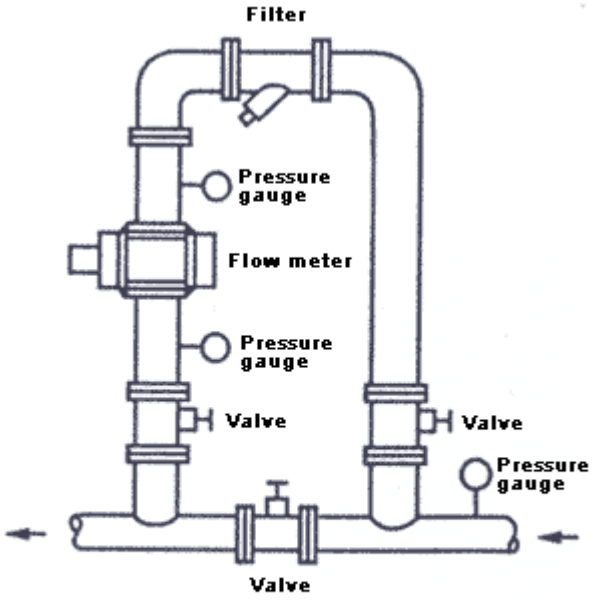
Allocation of pipe flanges should accord with standards JB/T81-94 (PN 1.6, PN 2.5) or JB/T82.2-94 (PN 4.0, PN 6.3)

☐Pipe Connection (sketch for mounting)

• Recommended mounting mode



Horizontal mode for mounting

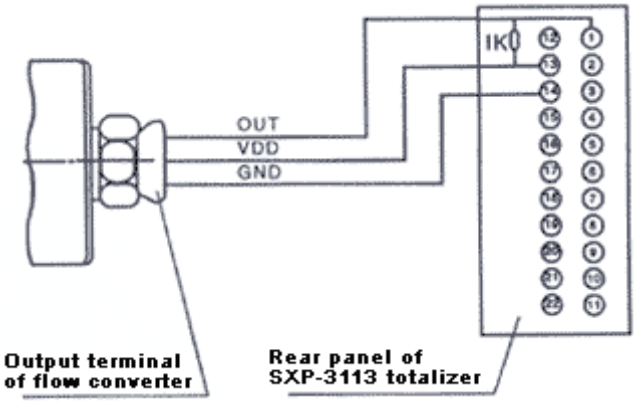


Vertical mode for mounting

□Requirements for Mounting

·The body of flow meter should be horizontally mounted (i.e. two roots rotors lie in a horizontal state), while the pipe line could be mounted in either horizontal or vertical mode.
·By-pass line should be lower than the main line where the flow meter is located.
·Before mounting flow meter, all impurities as rusted particles and iron filings should be cleared out of the pipes. If necessary, suitable gas filter could be mounted ahead of the flow meter.
·When mounting flow meter, special care must be taken to prevent flow meter from deformation as a result of external force influence.
·Before mounting flow meter, a straight pipe with flanges could be used as a temporary substitute for flow meter and the latter should not be mounted until a certain amount of gas has passed for cleaning.
·It is required to select the place with vibration as less as possible for the flow meter to mount in.

□Wiring Terminal Diagram



Note:
The converter of this flow meter is designed to adopt three-wire system as transmission mode with its operating voltage being 24±1.5V DC and its pulse output connected to Model 3113 intelligent flow totalizer.
• Wire connection marks: OUT-blue (yellow), V DD-red (brown), GND-black (white)
• Between signal output wire (OUT) and power supply wire (V DD), a resistance of 1kΩ should be connected in parallel with them.
• If customers require to allocate other related instruments such as pressure transmitters and temperature transmitters, refer to the manual of SXP-3113 intelligent flow totalizer for details about their wiring requirements.

□Attachable Instrument

Model		Functions
SXP-3113 Intelligent Flow Totalizer	1.	Suitable for all flow transmitters generating pulse signals and analog signals
	2.	Under the conditions that pressure and temperature are rather stable and allocation of related transmitters in these fields might be not required, compensations for predetermined parameters could be carried out by manual setting of pressure and temperature values.
	3.	With pressure 、temperature transmitters allocated by customer, this instrument can simultaneously receive signals from both of them and make on-line automatic compensations, thus carrying out precision integration on the flow of fluid
	4.	It can display total amount、instantaneous flow rate、and its percentage of mass or volume flow. With allocation of pressure and temperature transmitters, it can display the measured values of pressure and temperature.
	5.	It can provide 0～10mA or 4～20mA direct current signal output.
	6.	It can provide standard print signals of Centronics style.
	7.	About other functions, customers could refer to its manual for details.

□Ordering Information

- please submit the model of products and their specifications;
- please point out name of fluid medium, with its viscosity、normal pressure、nominal pressure and range of operating temperature.
- Please submit normal flow rate、flow range of medium and required measuring accuracy.
- If allocations of this company's filter、and flow totalizer are required, they could be ordered and specified at the same time.
- For special requirements, please consult with our sales department.