

Glass tube flow meter

Self-operation pressure regulator(Galvanostat)

■ Summary

This purge sets are composed of metal tube rotameters or glass tube rotameters with constant flow valves, which can be used for the measurement and keep flow rate of gases or liquids constantly output.

Float flowmeter featured with safety and reliable, measuring precise and steady, so that this series purge sets keep flow rates output constantly even when the supply or load pressure changes, which can be widely used for the transmitters cleaning among the industries of petroleum processing, chemical, ethylene, fertilizer, steel, chemical fiber and textile and so on., also can be used among the processing control of differential pressure level measurement.

The design of this series products can be fulfill of the industrial control requirements, installation applicable condition also can be fulfill of the requirements of instrument measuring technology.



■ Features

- ☆ single-path, two-path, multipath (optional);
- ☆ single meter installation, panel mounting, cabinet installation (optional);
- ☆ 1/4" NPT, swagelok, screw, flange connection (optional);
- ☆ 6mm, 8mm, 10mm, 15mm, 25mm pipeline;
- ☆ Switch signal output, 4-20mA signal output (optional);
- ☆ Metal structure, simpleness, hardness, beauty;
- ☆ Can test processing temperature below 200°C;
- ☆ Can test processing pressure below 6.4MPa;
- ☆ Flowrate, pressure (optional) indicate on-site;
- ☆ Adopts to our company LZ series float flowmeter;
- ☆ Precision micro needle valves are optional, convenient, flexible, applicable for flowrate field adjustment.

■ Working Principle

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Learn from the measuring structure diagram(eg:constant inlet pressure) can know that:

The force upward elastic membrane is:
 $P_2A + P_1a$ _____ (1)

The force upward elastic membrane is:
 $P_3A + P_2a + F$ _____ (2)

When the pressure is in balance, means that (1)=(2)

$P_2A + P_1a = P_3A + P_2a + F$ _____ (3)

As the differential pressure of pressure regulator membrane $P_2 - P_3$, we can get the equation as following:

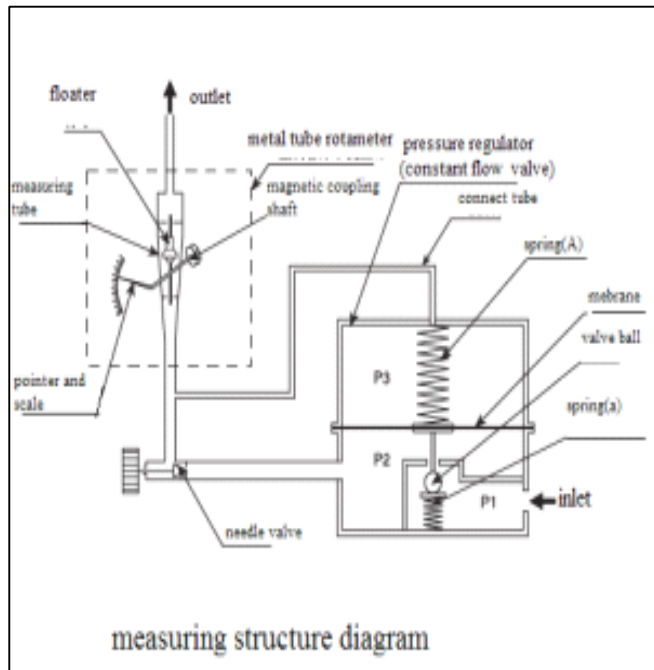
$P_2 - P_3 = F/A - a/A(P_1 - P_2)$ _____ (4)

Because of $a < A$, the $a/A(P_1 - P_2)$ can be negligible, as F and A are constant value, so:

$C(\text{constant value}) = P_2 - P_3$

When the measuring media is not compressed liquid, RE pressure regulator can be applicable for the outlet pressure changes. Said for (4), as P_1 is constant, P_3 is variational, when P_3 change to: $P_3 + \Delta P$, P_2 change to: $P_2 + \Delta P$, so that:

$C(\text{constant value}) = P_2 - P_3$



■ Technical Parameter

Meter Type	LZB(equip with glass tube float flowmeter)	LZZ(equip with metal tube float flowmeter)
Measuring range(100%valve)		
Water:20℃	3-100l/h	25-4000l/h
Air:0.1MPa,20℃	50-3400l/h	0.7-80m ³ /h
Measuring range ratio	10:1	10:1
Accuracy grade	4	1.5
Flow scale	Actual flow scale	Actual flow scale
Medium pressure	Max. 1.0MPa	Max.6.4MPa(special demand can order)
Medium temperature	-20℃~100℃	-20℃~200℃
Ambient temperature	-20℃~60℃	-20℃~60℃
Contact medium pressure	304,316	304,316
Body	Plastic,PVC	Cast aluminium,epoxy resin coating
Process connection		
Swagelok	Φ 6mm, Φ 8mm, Φ 10mm	Φ 6mm, Φ 8mm, Φ 10mm
Screw	1/4"NPT,1/2"NPT	1/4"NPT,1/2"NPT
Flange	1/2"ANSI 150lb,DIN2501,HG,GB	1/2"ANSI 150lb,DIN2501,HG,GB
Special	According to users' demand	According to users' demand

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■ Flowrate table

Calibration Conditions: Water: 20°C; Air: 20°C 0.1013MPa(abs), actual medium measuring range will change according to conditions.

◆ Equip with glass tube float flowmeter

Table 1

No.	Diameter of valve central spindle	Water l/h(100%)	Air l/h(100%)	Pressure loss(kPa)
QF005	1.0	—	50	1.2
QF010	1.0	3	100	1.4
QF015	1.0	5	150	1.5
QF040	2.5	10	400	1.8
QF080	2.5	25	800	3.5
QF125	2.5	40	1250	6.5
QF200	2.5	60	2000	13.0
QF300	2.5	80	2500	23.5
QF340	4.5	100	3400	40.0

◆ Equip with metal tube float flowmeter

Table 2

DN	No.	Water l/h(100%)	Air l/h(100%)	Pressure loss (kPa)
15	QF15.1	25	0.7	1.5
	QF15.2	40	1.0	1.5
	QF15.3	60	1.5	1.5
	QF15.4	100	2.2	1.5
	QF15.5	160	3.6	1.5
	QF15.6	250	5.5	3.0
	QF15.7	400	10	3.0
	QF15.8	630	14	3.5
25	QF25.0	630	14	1.5
	QF25.1	1000	22	1.5
	QF25.2	1600	35	1.5
	QF25.3	2500	50	3.0
	QF25.4	4000	80	3.5

◆ Equip with micro flowrate metal tube float flowmeter table same

as table1

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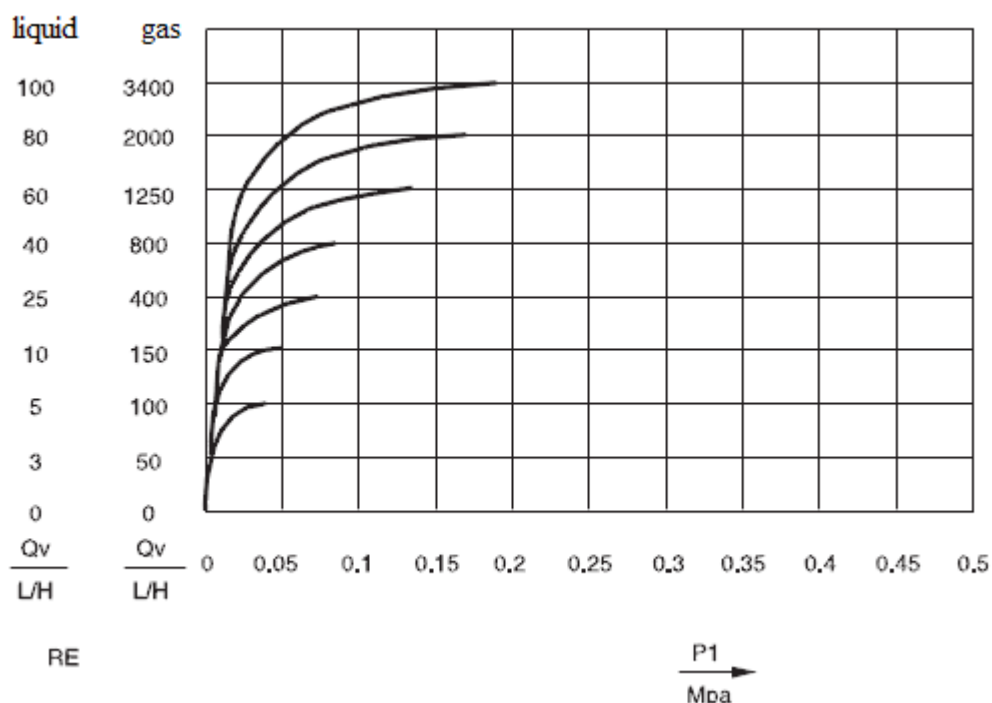
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◆ Equip with RE and RA constant flow valve

Constant flow valve model	RE	RA
Applicable condition	Constant inlet pressure change P1	Constant outlet pressure change P2
Medium state	Liquid or gas	Liquid or gas
Medium temperature		
Standard	80℃	80℃
Special	150℃	150℃
Medium pressure		
Standard	1.0MPa	1.0MPa
Special	6.4MPa(changeable according to demand)	6.4MPa(changeable according to demand)
Controllable pressure range	0.02-0.5MPa	
Differential pressure	0.02-0.045MPa	
Control accuracy	4.0%(equip with glass tube float flowmeter) 1.5%(equip with metal tube float flowmeter)	4.0%(equip with glass tube float flowmeter) 1.5%(equip with metal tube float flowmeter)
Min. working pressure	0.005MPa(see curve table)	0.005MPa(see curve table)
Differential pressure under min.working pressure	0.002-0.004MPa(see curve table)	0.003-0.005MPa(see curve table)

RE inlet pressure change constant flow valve characteristic curve



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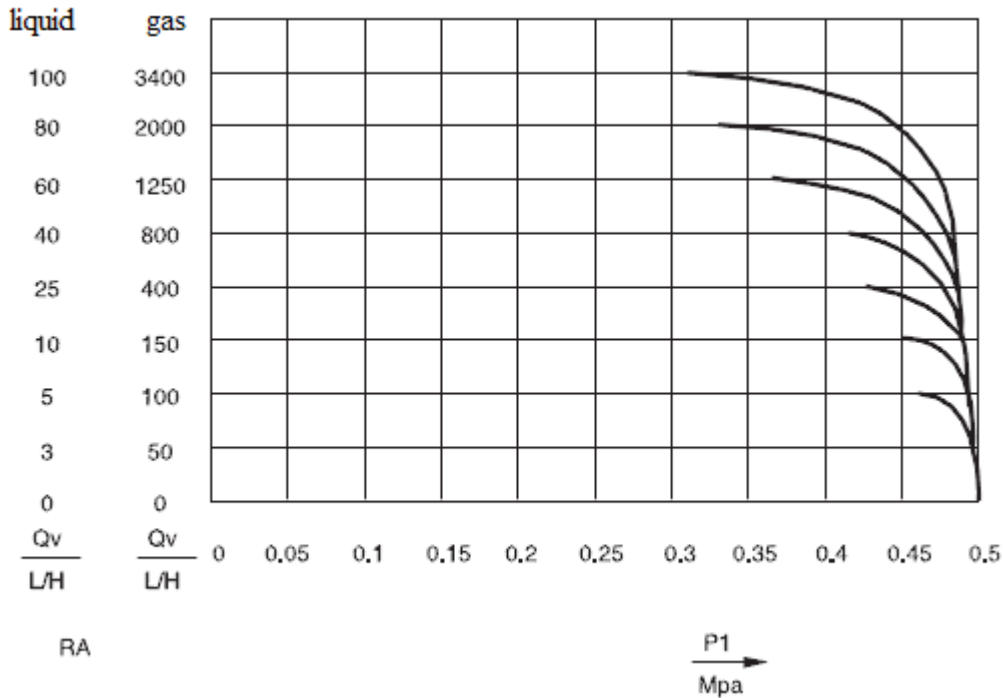
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RA outlet pressure change constant flow valve characteristic curve



Typical Application

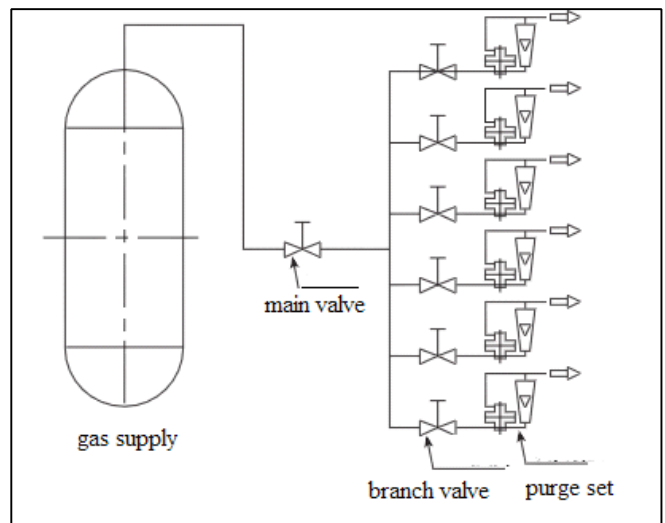
Typical applications on the conditions of gas supply pressure change

As shown to the right: According to needs separate the main pipeline supplied gas into many branches. When close or adjust some of branches gas flow can cause the change of supply gas pressure in main pipeline. The single-path purge set fixed in branch can measure flow precisely and keep the output flow constantly.

Recommended products model:

LZB-()DK/RE ... Equip with glass tube flowmeter purge set

LZZ-()/RE ... Equip with metal tube flowmeter purge set



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◆ **Typical applications on the conditions of outlet pressure change**

liquid level measurement

As shown to the right: when A with constant flow gas, the gas will discharge the medium insert in liquid pipeline and form into steady bubble, meanwhile the pressure between pipe A and B will be equal with liquid pressure on port B.

If the pressure of B is P_1 , air pressure is P_0 ,

So: $P_1 - P_0 = \Delta P$, meanwhile

$P_1 = \gamma h + P_0$, so

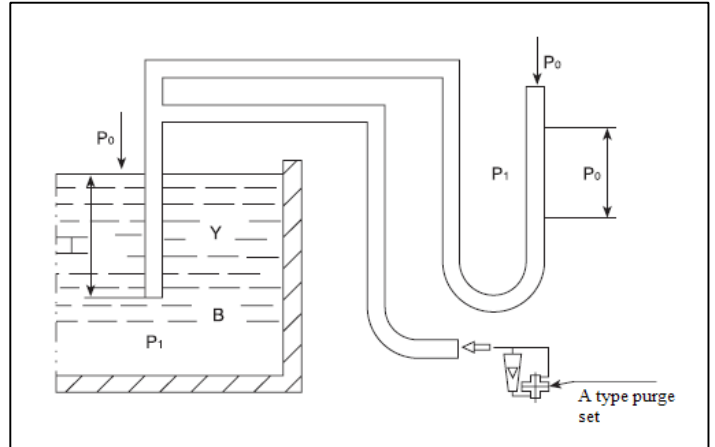
$P_1 - P_0 = \gamma h = \Delta P$

So on the condition of knowing medium density measure ΔP with differential pressure transmitter or pressure meter, then can measure the liquid level h .

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◆ **Typical applications on the conditions of outlet pressure change**

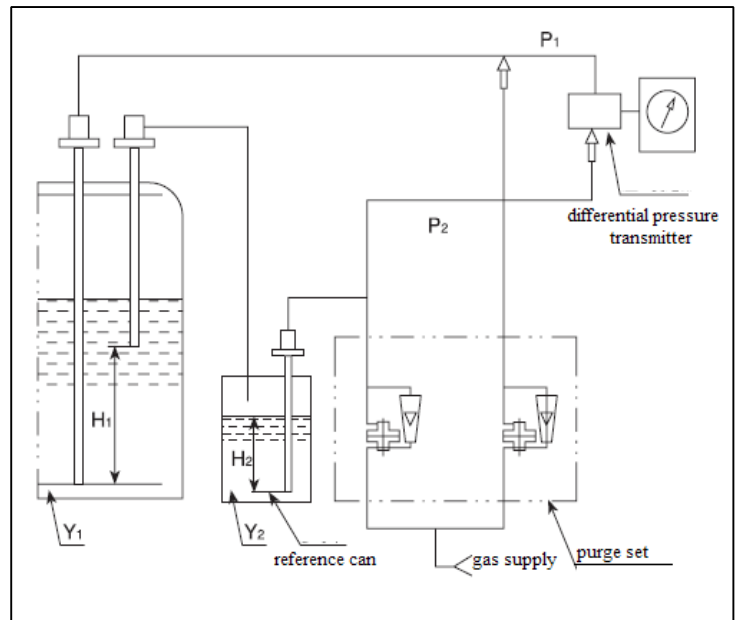
density measurement

As show to the right: If have known the measuring medium liquid level H_1 and reference medium liquid level H_2 , also know reference medium density γ_2 , measure differential pressure with differential pressure transmitter, then can measure the medium density γ_1 .

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◆ Typical application when measure flow with differential pressure

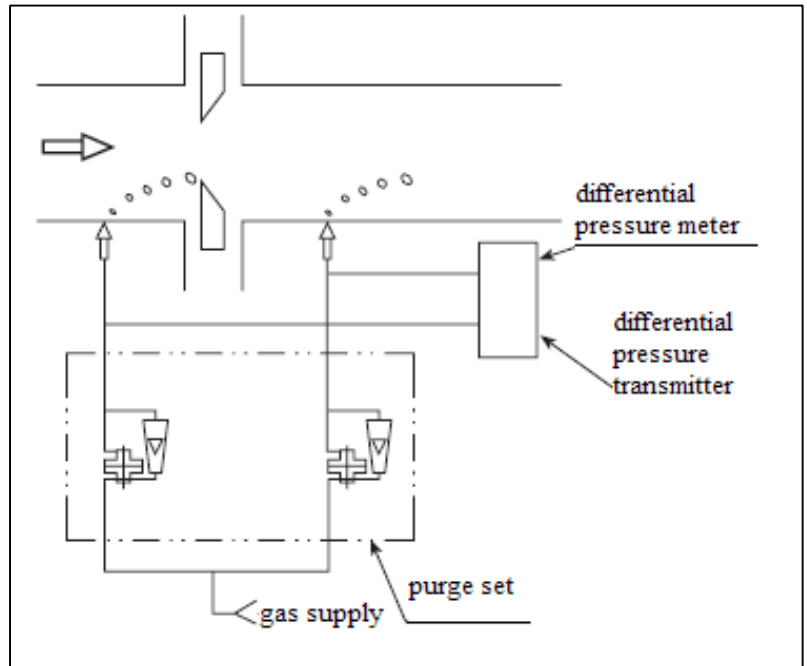
transmitter

When measure corrosive liquid or liquid with solid particle or gas flow with dust, the lead pressure capillary may be clogged. Adopt with dual-circuits purge set to wash the two pressure ports, which can make sure the solid particle or dust will not clog the pressure port or lead pressure tube.

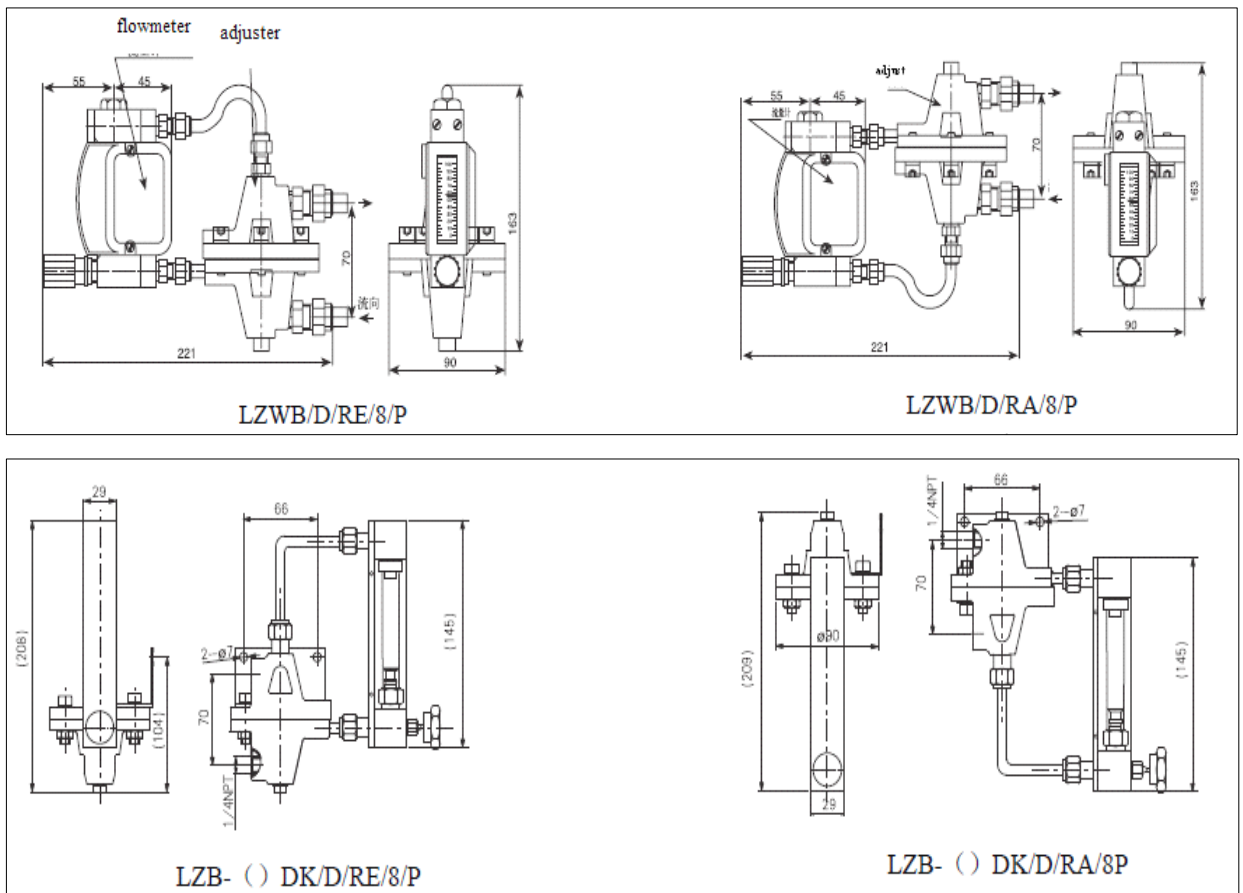
Recommended products model:

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LZZ-()/RE ... Equip with metal tube flowmeter purge set

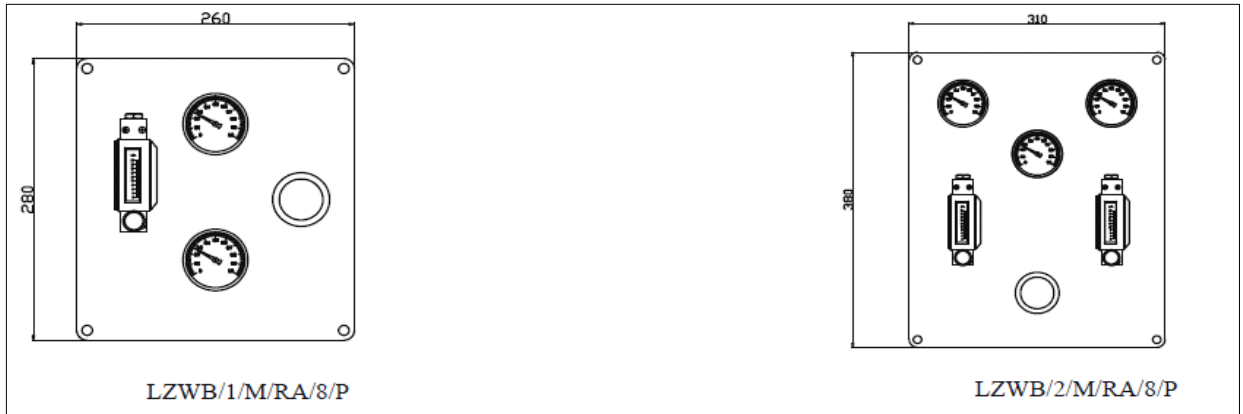
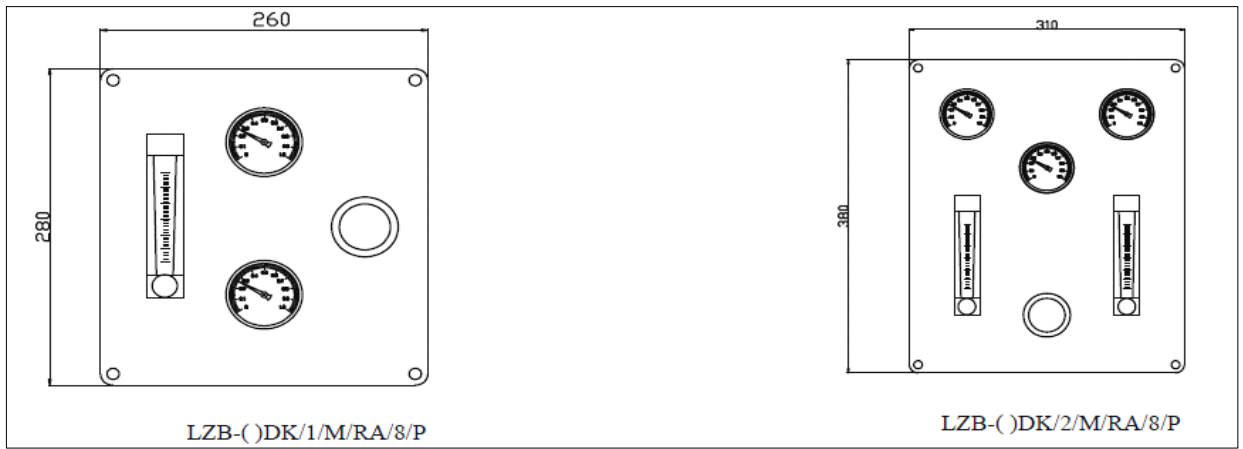
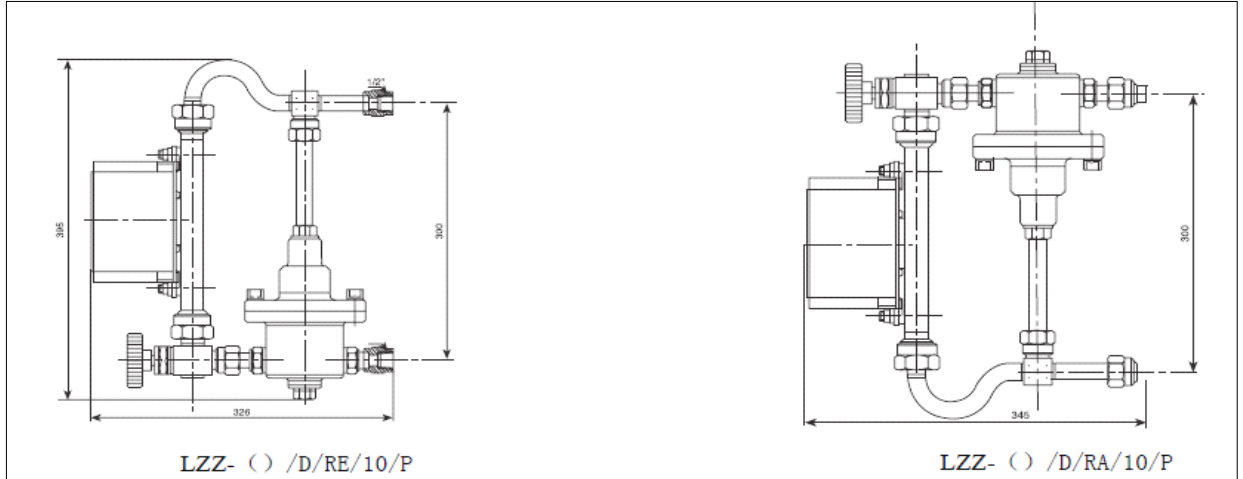


■ Overall Size





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■ Installation Precautions

- Please instal purge set in proper position,to make sure that debug,clean and repair conveniently.
- Because of instal magnetic coupling transfer system in purge set floater,to make sure that the disturbing magnetic field from other equipment during operation will not influence the flowmeter measuring result.
- When instal,please add fixed support in proper position in order to keep the purge set steady.
- Install size shall not exceed the given size more or less,to avoid the pressure from stretch or



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compress work in purge set.

- When there are iron magnetic particles in liquid medium,must filter the magnetic particles before installing purge set.
- Must make sure the flow direction of medium same as the requirement of flow purge set,when instal flowmeter please close all of the fine-tune needle valves.
- Before operation,please empty and clean pipeline to avoid impact force,shall open valve slowly adjust to working pressure,shall change flowrate from adjust open of valves,avoid impact force to floater which can cause measuring parts damage.

■ Type Selection

LZ series purge set	
1.Flowmeter model:LZ	
2.Class model	
B	Equip with glass tube flowmeter(select DK series in general)
Z	Equip with metal tube flowmeter
WB	Equip with micro flow metal tube flowmeter
3.Purging form(If one meter,this code shall not select)	
1	Single-way purge
2	Double-way purge
3	Multi-way purge(Special demand can order)
4.Instal type	
D	Single meter type
M	Faceplate type
5.Pressure adjustment	
RE	Inlet pressure adjustment
RA	Outlet pressure adjustment
6.Procedure connection	
F	Flange connction
S	Screw connection
6	Φ 6mm sleeve chuck
8	Φ 8mm sleeve chuck
10	Φ 10mm sleeve chuck
Others	According to customers' demand
7.Materials	
P	304
R	316
others	According to buyers' demand
8.Others	
L	With pressure indicator
G	With magnetic filter

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