

Water Meter Test Bench

Model LBJ 50-200

1. General:

Water Meter Test Bench Model LBJ 50-200 is class 2 water meter test equipment, adopting principle of volumetric method. It is designed and manufactured according to China standard number ZBY303-85, "Horizontal woltman cold water meter DN 50-400" and JJG258-88, "Verification rules for horizontal woltman water meter". This equipment is to test water meter DN 50, 65, 80, 100, 150 and 200 according to International standard ISO 4064.

2. Main technical data:

1. Water meter to be tested: DN 50, 65, 80, 100, 150, and 200
2. Equipment accuracy: Grade 0.2, i.e., permitted accumulating error $\leq \pm 0.2\%$
3. Testing mode: Volumetric method
4. Volume tank: Necking frame, shaped into two cucurbits, can be 0.2m³, 0.5 m³, 2 m³ and 5 m³.
5. Instant flow indicator:
Glass rotor flow meter rang: 700-30000L/h
By-pass flow meter range: 32-500 m³/h
6. Switch (of two flow meters):
Driving power and working pressure: Compressed air 0.4-0.6MPa
Switch time: <400ms
Switch time difference: <100ms
7. Water pressure when the water meter was tested: (0.35-0.45) MPa
8. Electric power: 220V 50HZ
9. Overall dimensions: Length X Width X Height (mm) 9125×3200×4300

3. Components and working principle

This equipment is mainly consist of water inlet pneumatic butterfly valve, straight pipeline, clamp, bench, flow regulating valve, instant flow meter, switch, volume tank, water release valve, water level meter, and electrical operating box.

This equipment is using volumetric method to testing water meter. It makes the water flow across the pipe in a certain time, and then infuse the standard volume meter by water meter. When the water is stillness, it can get the error curve in that instantaneous flow point by comparing the reading of water meter counter and standard volume meter staff guage.

$$\text{Error} = (V-v)/v \times 100\%$$

V: Volume shown by the water meter(s)

v: Volume shown by the volume tank

It can get out the flow error curve of water meters in different instantaneous flow point after changing width of flow regulating valve.

Water meter testing flow, water supply volume and error list

Water meter testing flow, water supply volume and error in using and after mending

DN (MM)	Normal flow-rate		Dividing line flow-rate				Minimum flow-rate					
	Dry		Wet		Dry		Wet		Dry		Wet	
	(m ³ /h)	(≥L)	(m ³ /h)	(≥L)	(m ³ /h)	(≥L)	(m ³ /h)	(≥L)	(m ³ /h)	(≥L)	(m ³ /h)	(≥L)
50	15	300	15	1000	4.5	100	4.5	1000	1.2	100	1.2	1000
80	40	500	40	1000	12	200	12	1000	3.2	100	3.2	1000
100	60	500	60	1000	18	200	18	1000	4.8	100	4.8	1000
150	150	2000	150	2000	45	1000	45	1000	12	200	12	1000
200	250	3000	250	10000	75	1000	75	10000	20	200	20	1000
250	400	5000	400	10000	120	2000	120	10000	32	400	32	1000
300	600	5000	600	10000	180	2000	180	10000	48	400	48	1000

400	1000	10000	1000	10000	300	3000	300	10000	80	1000	80	1000
Permissible error	$\pm 2\%$		$\pm 3\%$				$\pm 5\%$					

4. Fixing requirement

1. It should be fixed in the place which has enough sunshine and excellent ventilation.
2. The inlet pipe is no smaller than the main pipe. The pipe should have no leak, and should be washed before using.
3. The water pressure should be steady, and the quality of the water should be good.
4. The location of the equipment should not be disturbed, especially should not be near the equipment which is shaking fiercely.
5. The test bench should be fixed in horizontal way. Glass rotor flowmeter group should not be slanted clearly. The maximum degree of gradient is 5 degree.
6. Fixing the operation bench in a suitable place which should connect with power and gas supplier.
7. Rated voltage of power: 220V.

5. Working process

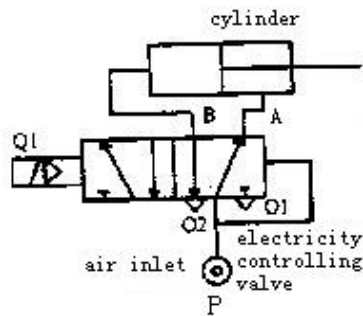
1. Open the compressor to make the air pressure in the pipe reach the working standard.
2. Turn on the external power of the operating box. The indicator light will be on when switch on the operating box.
3. The water meter's DN should be same to the pipe.
4. Press the fasten button to clamp the water meter which is to be tested.
5. First, open 2" ball valve beside the main water entering valve to full fill the pipe; second, open the main water entering valve to exhaust air.
6. Choose the right turnoff and water release button on the operating bench according to kinds of water meter's flow point and water quantity.
7. If there is any accident in working, press the emergency stop switch at once.
8. The information above is just for reference. It can be operated according to the practical situation.

6. Attention

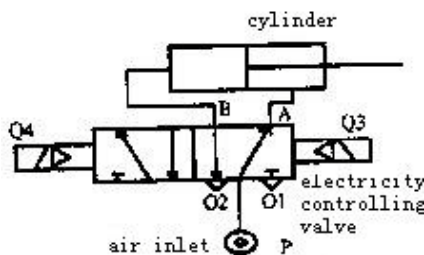
1. If there is any accident in working, press the emergency stop switch at once.
2. When regulate the glass rotor flowmeter, turn off the ball valve slowly to prevent from breaking the glass pipe.
3. When using in winter, the water in the glass rotor flowmeter should be released to make the pipe escape from frost cracking.
4. Regulating bench should be maintained and repaired periodically to make sure that all the components are working normally.

LBJ80-200mm water meter test bench machine specification**1. Working principle: see drawings****2. Principle specification:**

- 1.) Power: input power rated voltage alternating current 220V50HZ. After transformation, the commute will make out a 24V direct current. The anode of the power passes through 2RD to supply the electricity to the whole loop of the equipment.



Main water entering valve
pneumatically actuated principle



- 2.) The control of main water entering valve and working indicate

Press SB3 bottom (Main water entering valve opens). Under the circumstance of KB(7-9) closed, the winding of the relay KA closes after getting the electricity. After pass through the assistant contact point KA(5-7) which is self-protecting, KA(1-11) shuts up, and winding of the relay Q1 gets the power to control the commutator to change the direction, and then the water entering valve opens.

Assistant contact point KB(7-9) is to prevent people press the release button of the fasten equipment when the water entering valve is open.

1HD: water entering valve turns on the indicate light. SB2 is the emergency stop button to shut up the main water entering valve emergently.

Pneumatically actuated principle: Control valve uses the single electric winding to control commutate valve. Electromagnetism winding Q1

3. Fasten equipment working and stop control and working indication

A: Press SB4 button to fasten.

Commutate valve's electromagnetism winding (I₈-I₉) gets the electricity to do the order to fasten, at the same time SB4 (19-21) contact point makes the winding

of the relay KB shut up. 2HD gets the working indication, KB's assistant contact point KB(7-9) shuts up which allows KA closed. And then the water gets into main water entering valve. It could prevent the working bench open the main water entering valve when the water meters are not fastened.

B: Press SB5 button to relax.

When the relay winding's power is failure (main water entering valve shut up), KA(15-17)'s electrocircuit has the electricity, commutate valve's electromagnetism winding Q3 get the electricity, winding Q3 does the operation of relaxing.

4. Container 1" and 2" release the water, shut up control and working indication

Press SB7, relay winding K1 gets the electricity and self-protecting. K1(1-27) shuts up. Q4 get the power to close the water release valve.

Pneumatically actuated principle: same as main water entering valve

5. Commutate valve changes the direction and working indication

Commutate valve is controlled by the button directly. Press SB10, Q6 gets the power to change the direction to 2M³. Press SB10, Q7 gets the power the change the direction to 0.5M³. (I₂₃-I₂₄), (I₂₅-I₂₆) is external commutate button.

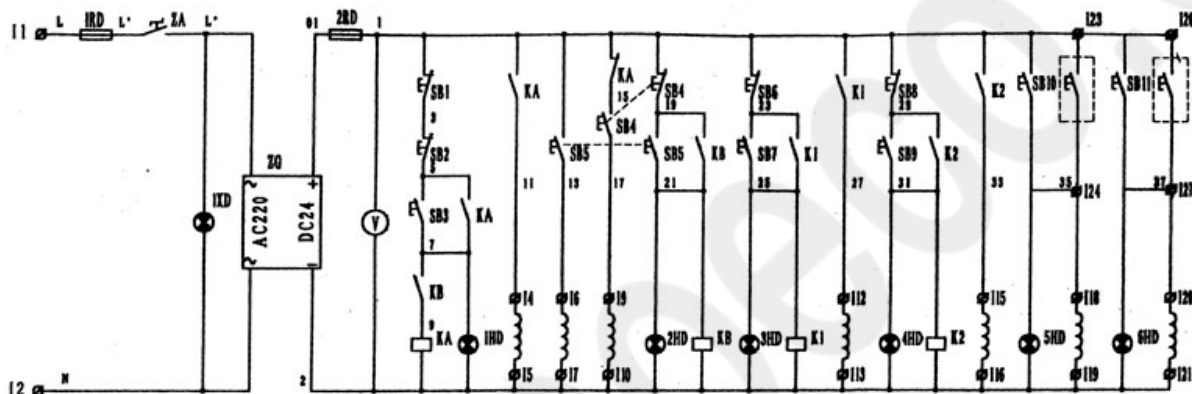
Pneumatically actuated principle: same as fasten equipment

6. Using the commutate valve list

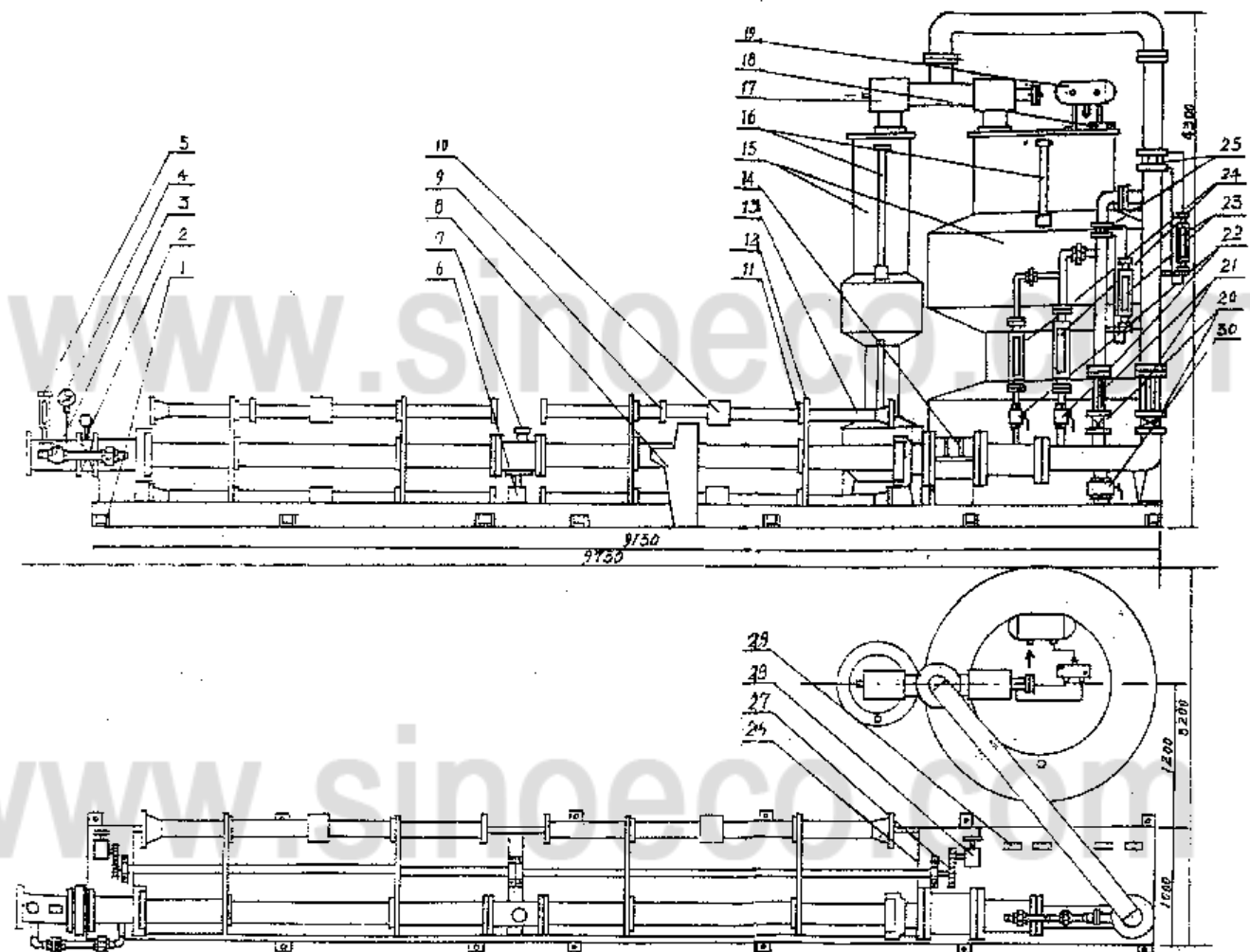
Controlling part	Main water entering valve	Fasten equipment	Container 1#	Container 2#	Commutator
Using commutate valve	Single winding	Double winding	Single winding	Single winding	Double winding
Working winding	Q1	Q2 Q3	Q4	Q5	Q6 Q7

Working process

- 1) Open the compressor. When the air pressure is over 0.4MPa, turn around the power key on the control table, and switch on the power.
- 2) Put the water meter on the test bench whose DN is same with the pipe, and then press the fasten button SB4 to ensure that water meter has been fastened and put in horizontal way and the interface has been sealed.
- 3) When water meter has been fastened firmly, open the flow regulating valve, press button SB3 (main water entering valve opens) to let the water in and exclude all the air.
- 4) Press the commutate button, change the direction to 5M3. Commutate 0.5M3 to make the commutate working in releasing container.
- 5) When all water in the working container is out, shut up the water releasing valve. Watching the water meter counter, when the reading is in a certain integer, press the commutate button to change the direction of water to the working container to exclude out the water. When the reading is in integer again, press commutate button at once to make the water flow to releasing container.
- 6) Compare cubage of water in container with cubage of water meter in working time to get out the percentage of error.
- 7) When the measure is finished, shut up the flow valve at first, and then shut up the main water entering valve.
- 8) Open the manual pressure release valve to exclude the pressure in the pipe.
- 9) When there is no pressure in pipe, press the fastening and relaxing button SB5 to get off the water meter.
- 10) After working, release the water in container. Turn off the power of control table at first, and then turn off compressor.



Power and power indication	24V volts d.c.	Working voltage	Main valve start and stop control and working indication	Fasten equipment start and stop control and working indication	1# water box water release control and working indication	2# water box water release control and working indication	Commutate valve start and stop control and working indication
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1	Working bench	11	Active axletree	21	Rectifier
2	Main water entering valve	12	Turntable	22	Flow regulating valve
3	External regulating valve	13	Straight pipe	23	Distributary flowmeter
4	Pressure meter	14	Fasten equipment	24	Rotor flowmeter
5	Water	15	Standard container	25	Pore plate
6	Water meter supporting equipment	16	Number showing glass pipe	26	Axletree
7	Water meter	17	Commutator	27	Gear
8	Operating bench	18	Electromagnetism valve	28	Reducer
9	Pressure room	19	Gas storing canister	29	Electromagnetism valve
10	Balance block	20	Large flow regulating valve	30	Water release valve

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