

Operation Manual
FOR
SKT140 Series of Pneumatic
Hydraulic Test-Bed

Preface

The pneumatic hydraulic test-bed is a modern test equipment that our company designs and manufactures by combining the working principles of the pneumatic test-beds imported from abroad and the actual conditions in our country.

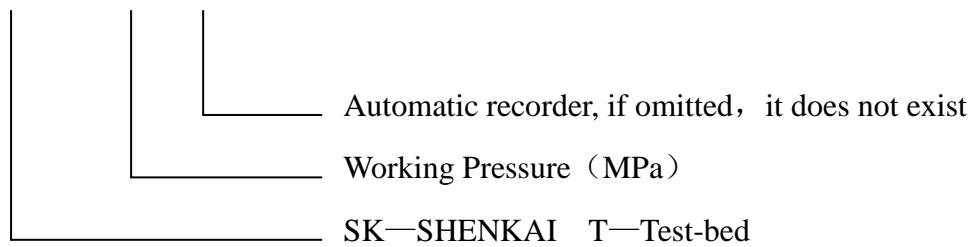
I Features

The pneumatic hydraulic test-bed uses compressed air as power source and uses pneumatic pump as pressure supply. Air source pressure is proportional to output hydraulic pressure. Corresponding hydraulic pressure to be tested can be obtained by adjusting air source pressure. When air source pressure and hydraulic pressure are in a state of balance, the pneumatic pump will discontinue to apply pressure and output hydraulic pressure equal to preset pressure will be reached and become steady so that the rate of pressure rise can be controlled by controlling air input. Therefore, the test-bed is characterized by explosion-proof performance, adjustable output pressure, controllable rate of pressure rise, small size, light weight, easy operation, reliable properties and extensive purposes. It is specially suitable to the high pressure tests and ultra-high pressure tests for the pressure-containing equipments used in drilling and production projects in oilfields, such as blowout equipments, valves, pipelines, connectors, pressure vessels, and so on, and also it is designed for use as test facilities in scientific research departments and inspection departments.

Through our company's continue research and innovating, the new SKT140J type of pneumatic hydraulic test-bed has a a printing & record equipment. So it not only has the function of printing and recording, but also the features of electric control, all close down type, splendid and neat appearance, facilitated operation and so on. Use properly and maintenance is very important to test-bed.

II Product Type and Name

SKT 140 J The Pneumatic Hydraulic Test-bed



III Conventional Product Parameter Table

Type	Compressed Proportion	Air supply Pressure (accommodate) MPa	Working Pressure (Maximum) MPa	Automatic Printing Recorder	Weight (kg)
SKT140J	1:51 1pc	0.7	32	1 pc.	231
	1:236 1pc	0.7	140	1pc	

IV Working Principles of Products

SKT140J Test-bed

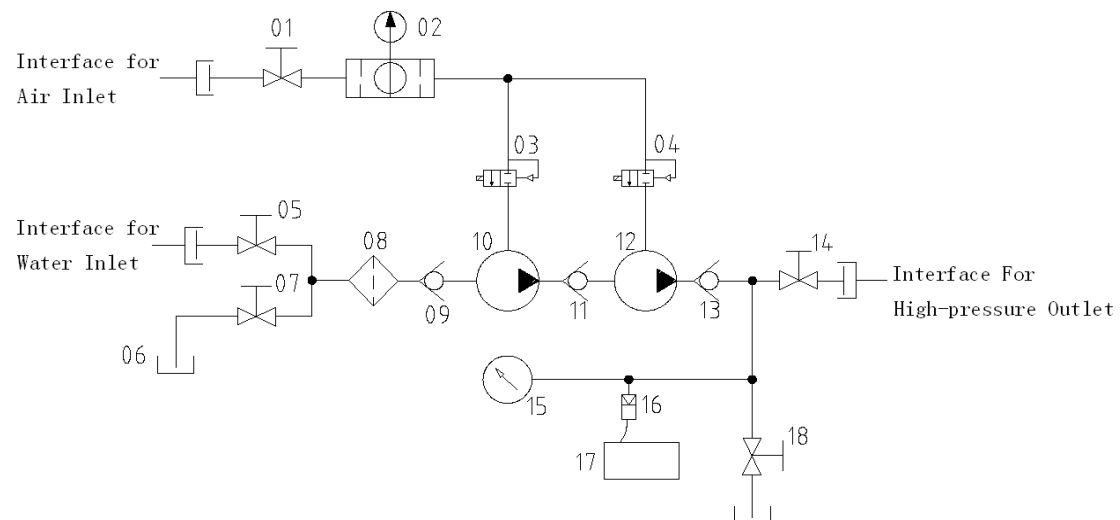


图 1 system working principle

NO.	Name	NO.	Name
01	Ball valve	10	Low -pressure pump
02	Gas disposal three joint piece	11	Non-return valve
03	Servo precursor 2-position and 2-way electromagnetic valve	12	High-pressure pump

04	Servo precursor 2-position and 2-way electromagnetic valve	13	Non-return valve
05	Globe valve	14	High pressure cut-off valve
06	Reservoir	15	High-pressure gauge
07	Globe valve	16	Pressure transducer
08	Oil filter	17	Printing recorder
09	Non-return valve	18	High pressure cut-off valve

Points of Attention:

- 1、 The power used for the printing recorder and electromagnetic valve is 220VAC/50Hz. It is necessary to ground wire in order to ensure personal safety during using this recorder.
- 2、 The printing recorder only can be used in non-explosion proof environment or during non-explosion proof period.
- 3、 High-pressure cut-off valve is a cone valve and its closing torque shall not be more than 18N m. The correct method of operation is to release pressure first and then close the valve if its leakage occurs during pressure rising. Excessive torque will damage the valve core to shorten the valve’s service life.

V Operating Procedures (See Illustrative Diagram)

1. Add lubricating oil into the oil atomizer of Gas disposal three joint piece [02]. Use 10# or 20# machine oil in southern parts of china and use anti-freezing machine oil or low-freezing hydraulic oil in winter in the northern parts of China.
2. Fill the reservoir [06] with hydraulic oil or emulsified oil.
3. Close Servo precursor 2-position and 2-way electromagnetic valve [03] [04] for air source (4 pcs. or 2 pcs.) and connect this set to air source whose pressure is not more than 1MPa (10kgf/cm²).
4. If hydraulic oil is used as test fluid, close the globe valve [05] (upper) and open the globe valve [07] (lower) to permit free flow of hydraulic oil from the reservoir to the filter [08]. If clean water is used as test fluid, close the globe valve [07] (lower) and open the globe valve [05](upper) to permit free flow of clean water from the suction port to the filter[08].

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5. If hydraulic oil is used as test fluid, blank off the outlet for pressure test and relief port, open the cut-off valve [14] and the cut-off valve [18], and connect the outlet of the pump(s) to the reservoir so as to take back the hydraulic oil. If clean water is used as test fluid, drain away the water through the relief outlet.
 6. To close the air regulator of Gas disposal three joint piece [02], rotate its hand wheel counterclockwise to enable the spring inside this valve to be in a free state.
 7. Close the relief valve [18], open the 2-position and 2-way electromagnetic valve [03] [04] for air source (2 pcs. of A/B group or all) , and rotate the hand wheel of the air regulator [10] clockwise until the low-pressure air cylinder [15] can only run a little. Continue to slowly rotate the hand wheel of the air regulator [15] clockwise and observe the change of the high pressure gauge [15] readings. When the value shown on the high pressure gauge [15] is equal to preset pressure of the vessel being tested and become steady (At this moment this air-powered pump stops running because air source pressure and hydraulic pressure are in a state of balance), lock the nut of the hand wheel of the air regulator [02], close the 2-position and 2-way electromagnetic valve [03] of the low-pressure air cylinder [10].
 8. Open the relief valve [18] to release pressure, and remove the bull plug from the outlet [14] for pressure test.
 9. Connect the vessel to the interface for high pressure outlet through the pipelines for pressure test, close the cut-off valve [18] for relief(high-pressure), and open the electromagnetic valve [03] for air source of the air cylinder [10] for low-pressure pump to charge the vessel being tested with test fluids. After air in both the vessel being tested and pipelines is drained up, close the electromagnetic valve [03] for air source and blank off the exhaust port of the vessel being tested.
 10. Open the electromagnetic valve [03] of the low-pressure air cylinder [10] slowly to allow this air cylinder to run. Charge the vessel being tested with test fluid to make pressure inside it rise, and check all connecting positions for sealing. Close the electromagnetic valve [03] of the low-pressure air cylinder and release pressure if leakage occurs. Reopen the electromagnetic valve [03] of the

low-pressure air cylinder [10] to raise pressure after leakage is eliminated. When pressure rises to the extent that the low-pressure air cylinder stops running (It results from the balance between air source pressure and hydraulic pressure, but the electromagnetic valve [03] of the low-pressure air cylinder [10] shall not be closed.),open the electromagnetic valve [04] of the high-pressure air cylinder [12] slowly to make pressure rise to preset value, hold pressure and observe the vessel being tested.

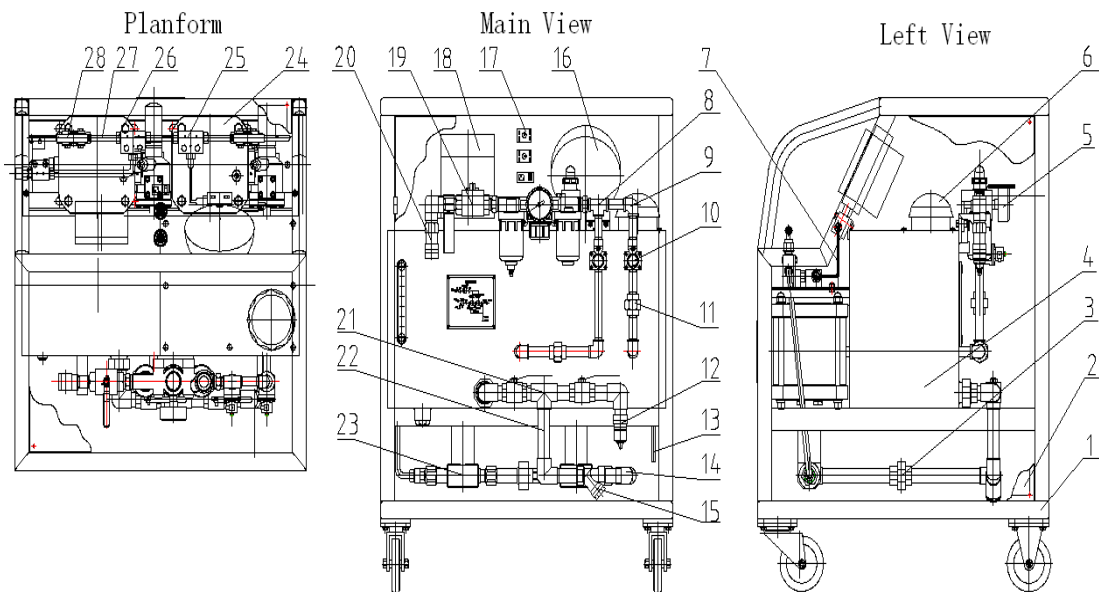
11. After the pressure test is complete, close the electromagnetic valve [03] and open the relief valve [18] to release pressure.

Note:①All above operations are under the situation that it has electronic power, the open & close of electromagnetic valves are controlled by the buttons on the operational panel. When the electric power is not permitted or it doesn't exist, the electromagnetic valves has manual operation.

②The printing recorder refers to operation manual of recorder.

VI Operating Procedures (See Illustrative Diagram)

- 1、 Prior to hydrostatic test for the vessel, drain away air in the vessel and in the necessary to perform high pressure test and ultra-high pressure test for the vessel, as to do so will make pressure rise steadily as well as safely.



Assembly Drawing

Note: The above illustration is based on double-pump, details to see the follow table

NO.	Name	Qty.	Remark
1	Framework	1pc.	Assembly
2	Cover board	1set.	Assembly
3	Union for water	1pc.	Assembly
4	Oil vessel	1pc.	Assembly
5	Air filter/Oil Mist lubricator/Air regulator	1set	Assembly
6	Oil vessel casing	1pc.	Include filter for oil
7	Pipeline for pressure gauge	1pc.	Steel pipeline
8	Tee for air	1pc.	1/2"Rc male screw end
9	Elbow for air	4pcs.	1/2"Rc male screw end
10	Servo precursor 2-position and 2-way electromagnetic valve	2pcs.	1/2"NPT female Screw
11	Union for air	2pcs.	1/2"Rc female screw end
12	Quick connecting for water inlet	1pc.	Inlet for water
13	Relief pipeline	1pc.	Seamless steel pipeline
14	Elbow for water	5pcs.	1"Rc male screw end
15	Filter for water	1pc.	Screw end, stainless steel filter
16	High pressure gauge	1pc.	
17	Buttons to start pumps	1pc respectively	
18	Printer & recorder	1set	Including pressure transducer
19	Ball valve	3pcs.	Screw end, copper ball valve
20	Quick connection for air inlet	1pc.	Inlet for air
21	Tee for water	1pc.	
22	Double pin for water	10pcs.	1/2R male screw end
23	High/low pressure liquid cylinder	Respectively 1 set	Liquid cylinder assembly
24	High/low pressure pump	Respectively 1 set	Pump Assembly

25	Stainless steel tee	3pcs.	Female screw end, M20×1.5
26	Lock nut for high pressure pipeline	11pcs.	
27	High pressure pipeline	4pcs.	
28	High pressure cut-off valve for opening/relief	2pcs.	Female screw end, M20×1.5 stainless steel

- 2、 The smaller the volume of the vessel being tested is, the slower the rate of the pressure rise shall be, which means that the opening of the electromagnetic valve[10] for air source of the air cylinder[23] for low-pressure pump or the electromagnetic valve [10] for air source of the air cylinder[23] for high-pressure pump shall be smaller, as rapid pressure rise will damage the vessel being tested.
- 3、 During testing, the operator must observe the change of the high-pressure gauge[16] readings and check whether the leakage occurs on all connecting positions .if problems are detected, immediately stop the pump and release pressure to solve them.
- 4、 The high pressure air-powered pump, which is not used for increasing the pump discharge, only acts as the pressurizer. therefore, while the vessel being tested is being charged with test fluids, this pump shall stop running so as to avoid damage to its hydraulic cylinder packing.
- 5、 When clean water is used as the test fluid, blank of the outlet for pressure test according to both item 4 and item 5 of the operating procedures after the pressure test is complete or before you get off work to avoid corrosion resulting from a long-period water stay in this set, run the air-powered pump for one minute and then cycle hydraulic oil or emulsified oil in the reservoir to clear away water.
- 6、 To prolong the service life of the air regulator, rotate its hand wheel anticlockwise to enable the spring inside this valve to be in a free state.
- 7、 There must be lubricating oil in the oil atomizer in order to lubricate air-powered pumps.the adjusted oil value shall be 15~20 drops/per minute. Oil can be injected into the oil cup only on condition that there is no pressure in the oil cup.
- 8、 Drain away water remaining in the water & air filter in time. Drain and clean the

filter flask with mineral oil, and then dry the filter flask with low-pressure air. Be careful not to clean the filter flask with acetone, acetaldehyde, acetate and toluene, as these solutions will damage the filter flask.

9、 Be sure to keep test fluids used in this set clean, frequently clean the oil reservoir and the filter screen, and also frequently clean the filter screen of the liquid filter[15]. If test fluids are contaminated, damage to valve seals of this set will occur so as to affect their service performances.

10、 Being a low pressure valve, the three-way clock valve[25] shall be checked whether it is in the proper position(see item 4 and item 5 specified in the operating procedures) before the relief valve is opened, as danger will occur if high pressure liquid enter the three-way clock valve when it is closed.

VII Accessories and spare parts

No.	Name	Size	Qty.	Remark
1	Electrical source computer line		1	One end is 90 female plug, the other end is male plug
2	Paper for recorder		5pcs.	1 pc. In printer
3	Hose for air	ID19X10m	1pc.	One end with a 3/4" quick adapt, and another end prepared by customer.
4	Hose for water	ID25.4X10m	1pc.	One end with a 1" quick adapt, and another end prepared by customer.
5	High pressure hose assembly	ID6X10m	1pc.	Both end with $\Phi 6/10$ hose adapt and M27X2nut Head end connecting with M20X1.5/M27X2 outlet adapt of pressure test stand, terminal end connected with 1/2NPT/M27X2 adapt of pressure test port.
6	Adapt for	M20X1.5/M27	1pc.	Connected with M27X2 nut in high

	outlet of pump	X2		pressure hose assembly, and 1pc.Φ15X2.5 O ring installed in the middle (installed in the outlet tee of pressure test stand)
7	Adapt for pressure test port	1/2NPT/M27X2	1pc.	M27X2 male screw connected with M27X2 nut in high pressure hose assembly, 1pc. φ15X3 gasket installed in the middle, and 1/2NPT male screw connected with 1/2NPT female screw in pressure test flange of customer.
8	Double pin for high pressure assembly	M27X2/M27X2 (provided only in case The customer needs more Than 2 high-pressure hose assemblies)	2pcs.	Installed between two high pressure hose assemblies, 1pc. φ15X2.5 O-ring installed in each end, and connected to M27X2 nut on hose assembly end. It's only working under the pressure of low pressure hose assembly.

Spare Parts List

No.	Name	Size	Qty.	Remark
1	Stainless steel high pressure globe valve	DN 5mm / PN 140MPa	1pc.	Female screw end, M20×1.5
2	Stainless steel low pressure non-return	DN 5mm / PN 32MPa	1pc.	Screw end
3	O Ring	Φ15×2.4	10 pcs	Install between adapt of pump outlet or adapt of pressure test port and adapt of high pressure hose assembly
4	O Ring	Φ20×1.5	10 pcs	Used in non-return valve
5	O Ring	Φ20×3.1	4 pcs	Used in non-return valve
6	O Ring	Φ25×3.1	4 pcs	Used in non-return valve
7	O Ring	Φ30×3.1	4 pcs	Installed between adapt connected with high pump and adapt connected with low pump
8	Lip-type packing	Φ13×Φ23×7	4 pcs	Used in high pressure pump
9	Lip-type packing	Φ28×Φ42×10	4 pcs	Used in high pressure pump
10	Squareness packing	Φ18×Φ8×3	4 pcs	Used in stainless steel high pressure globe valve

VIII Order Note

1. The user shall state the type and specification of the product he will order.
2. The number of pipelines for the pressure test may fluctuate on user's Request, but the price for them will be required separately in the event of the fluctuation.
3. Our company can design and manufacture products in accordance with special specifications required by the user or in accordance with drawings offered by the

user.

IX Product Documents

1. One set of Instruction Manuals in Chinese and English.
2. One set of Certificates of Compliance in Chinese and English.
3. One set of Packing List (Accessories and Spare Parts List included) in Chinese and English.