



REVALVE

BY PKTBA SINCE 1962

TECHNICAL SPECIFICATION
TEST UNIT FOR SHUT-OFF VALVES
DN 50 – 800 (NPS 2 - 32)

PKTBA-S-5-600/500M

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TEST UNIT FOR SHUT-OFF VALVES

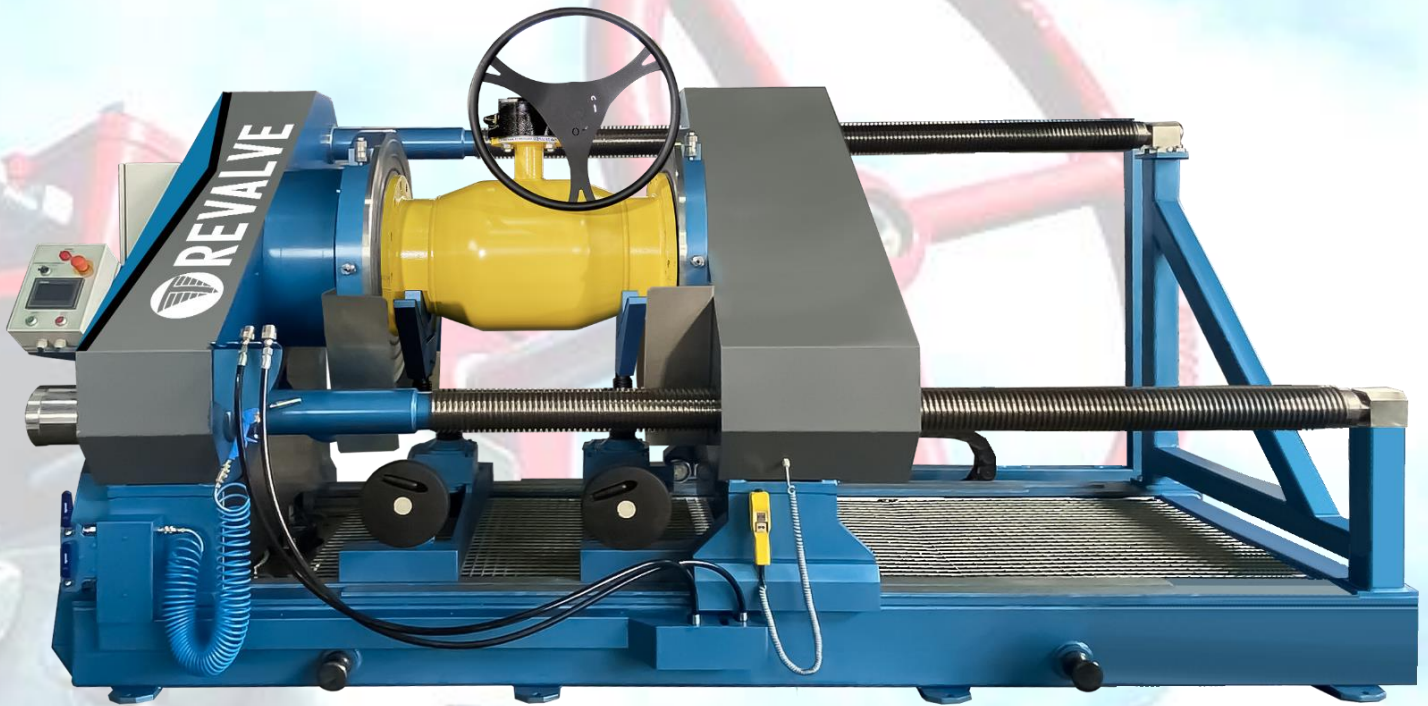
Test unit is designed for liquid and gas testing of pipeline valves DN 50 – 800 (NPS 2 – 32) according to common international standards as **API 6D, API 598, ISO 5208**:

- Shell test
- Seat leakage test
- Backseat test
- DBB test

Item	Name	Qty
1	<p>Clamping system PKTBA-S-5-600/500M Designed for testing of pipeline valves with DN 50 – 800 (NPS 2 – 32) in horizontal position with clamping force 500 tones</p> <p style="background-color: #0056b3; color: white; padding: 2px;">Optional features, available upon request:</p> <p>1.1 DBB test set</p>	1 ea.
2	<p>Control station PKTBA-PGS-120PZ-B Provides control of clamping system, LP & HP test medium supply and accurate parameters readings. Basic scope includes oil station for proportional clamping control.</p> <p style="background-color: #0056b3; color: white; padding: 2px;">Optional features, available upon request:</p> <p>2.1 HP gas testing line 2.2 Liquid test line upgrade up to 650 bar 2.3 Safety screen</p>	1 ea.
3	<p>Computer registration system PKTBA-CRS-M Designed for on-line recording of the testing parameters and test reports creating</p> <p style="background-color: #0056b3; color: white; padding: 2px;">Optional features, available upon request:</p> <p>3.1 Video monitoring system</p>	1 ea.
4	<p>Water recycling station PKTBA-SOV-1,5 Designed for liquid test medium storage and supply</p>	1 ea.
Optional equipment		
5	<p>HP compressor PKTBA-UK-3 Provides a constant supply of high pressure air up to 300 bar for feeding of HP test systems of control station</p>	1 ea.
6	<p>Safety fence PKTBA-B-6-5 Rigid carbon steel safety fence for high pressure gas & liquid tests with 1 bullet-proof glass for visual control and swing gates</p>	1 ea.

TEST UNIT FOR SHUT-OFF VALVES

Clamping system PKTBA-S-5-600/500M



Clamping system general view

1

Description & special features

Clamping system is designed for liquid and gas testing of pipeline valves in horizontal position (stem vertical) in accordance with common international standards.

It ensures quick and safe valve installation and hydraulic clamping while testing.

The system is equipped with:

- Valve in-test support devices
- Stainless steel multi-tables
- Remote control of the movable test table travel
- Vacuum system
- Quick filling system
- Stainless steel tank with drainage pump
- Emergency shut-down system
- Leakage measuring module
- Bi-directional pressure supply system
- Quick release pressure connections
- Spare parts for 2 years of decent operation
- Quick release sockets for master/control gauges

2

Types of tested valves

RF, RTJ and FF flanged (as per ASME B16.5, B16.47) shut-off valves DN 50 – 800 (NPS 2 – 32)

- Wedge gate valves DN 50 – 800 (NPS 2 – 32)
- Ball valves DN 100 – 600 (NPS 4 – 24)
- Slab gate valves DN 100 – 500 (NPS 4 – 20)

TEST UNIT FOR SHUT-OFF VALVES

3

Valve in-test support devices

Manual operated

2 ea. (total lifting capacity up to 10 t)

Test bench is equipped with adjustable support devices to hold the valve between test tables during testing improving safety and increasing testing capacity for valves of one type and DN.



4

Control panel

Vacuating, water filling and draining is performed automatically from control operator panel on the fixed (left) cross-head.

Panel is completed with Emergency shut-down system to protect operating and surrounding personnel in contingency circumstances.



5

Remote control

Control of mobile crosshead travel is performed from a portable and handy wired remote control device. This device provides unrestricted mobility around the test bench for operator. Remote control is fitted with attachment system that allows to place the device on any metallic surface.



6

Cross-head travel

Electromechanical from wired remote control.

The electric motor is provided with **torque limiter** which stops the motor after the crosshead touches the valve. Thus, valve is totally protected from any damage during the crosshead moving.

7

Stainless steel test tables

A unique design of the multi-table adapters with groove installed rubber O-rings allow to test most of the ASME flanged valves (RF and RTJ) with all specified diameters from NPS 6" up to 32" resulting in

TEST UNIT FOR SHUT-OFF VALVES

saved time, money and storage. Separate adapters for small NPS 2-5 valves shall be installed on the multi-tables for testing.

Rubber O-rings are used as consumables, service life of the rings depending on the tests quantity and pressure.

To increase total service life of the test unit, **spare O-rings** for NPS 2-32 are included to the scope of supply.

To improve service life and test quality, tables are finished with **stainless steel face surface**. It ensures stable rust and corrosion protection with no risk of rust materials appearing inside the tested valve during opening and closing, which can damage the sealing surfaces.



8

High-performance vacuum system

Clamping system is equipped with integrated vacuum system with final depth of up to 90% that serves for removing of air trap in the valve body providing test process safety and precise testing parameters.

9

Quick filling system

The clamping system equipped with a built-in pump of high capacity up to **160 l/min** for valve filling. Water with corrosion inhibitor could be supplied from the water recycling station SOV-1,5 with volume up to 1500 L (see *optional items*)

10

Stainless steel tray

For water collecting after testing the clamping system is provided with the tray. It is made completely of stainless steel to ensure long service life and perfect look.

Top part of the tray is covered by the stainless steel grille to ensure that operator will not loose any valve part to the tray. It is also protects the draining lines/pump from damage.

Operator is able to step on the grille for valve servicing and mounting, comfortably moving on the test bench keeping the workwear and shoes clean.



11

Drainage system

To collect water after the liquid testing clamping system is provided with **stainless steel** water collection tray equipped with a powerful draining pump with capacity up to **170 l/min**.

Draining pump is switch on and off automatically by the level sensor signal.

The drainage system pump stop automatically when reaching a certain level of water in the tank protecting equipment from idling and dry operation.

TEST UNIT FOR SHUT-OFF VALVES

12 Bi-directional pressure supply system

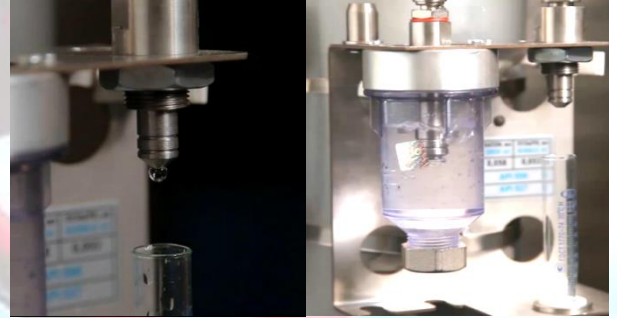
Connection of the test medium supply lines is provided by the quick couplers. System provides supply of test medium to both test tables allowing bi-directional testing (A → B, B → A) of installed valve cavities without re-installation.

13 Leakage detection module

To measure **small seat leakages** of tested valve the clamping system is provided with **bubble and drop counters**. Bubble and drop counters both are provided with spare nozzles:

- Ø3 – universally applicable nozzle to measure in accordance with API 6D, API 598 and ISO 5208
- Ø6,1 – to measure in accordance with other standards.

Calculations for standards shall be based on visually counted amount of bubbles/drops.



14 Covers for main inner components

Right and left crossheads and basement of the clamping system are finished with painted steel panels protecting the inner parts from dust and damage and improving the unit overall look.



TECHNICAL PARAMETERS

15	Maximum test pressure	Maximum test pressure available at the test system depending on the tested valve size:			
		Valve inlet size		Maximum pressure, bar	
		DN, mm	NPS, inch	With water	With air
		50 - 200	2 - 8	400	7
		250	10		
		300	12		
		350	14		
		400	16	330	
		500	20	220	
		600	24	155	
700	28	115			
800	32	90			
16	Maximum clamping force, tons	500			

TEST UNIT FOR SHUT-OFF VALVES

17	Distance between test tables (min-max), mm	170 – 2125
18	Clear distance between screw rods, mm	1400
19	Horizontal distance between screw rods, mm	1120
20	Built-in tank volume, l	400
21	Power supply, V/Hz/kW	400 / 50 / 7
22	Dimensions (LxWxH), mm, not exceeding	4015 x 1865 x 2000
23	Weight, kg, not exceeding	8000

Options available upon request

1.1 DBB test set

DBB valves requires some special test to prove the sealing surfaces tightness. To perform it, the testing medium should be supplied from left and right valve cavities simultaneously.

This option allows to supply the medium from both sides of the valve, including HP hoses, shut-off devices, quick couplings and pressure gauges.

TEST UNIT FOR SHUT-OFF VALVES

Control station PKTBBA-PGS-120PZ-B



Control station general view with CRS

1

Purpose

The control station designed for test process operation, pressurizing of supplied test mediums, automated proportional clamping control during clamping system operation to exclude axial loads at the tested valve body during HP testing.

Test control circuit built at the LP actuated Camozzi components, what makes process safe and simple as system automatically distribute pressure and test mediums, themselves eliminate faults from wrong operation and improve HSE in the test area from hazardous conditions.

State of the art system professionally designed for safe and precise high-pressure testing of the shut-off valves.

2

Design and special features

The station is equipped with the following systems:

Proportional clamping control system

The system provides smart and quick operation of the clamping system. Clamping with pressure up to 230 bar provided by oil station included in the basic scope of supply. Clamping force control is provided by automated PLC system, proportionally supplied test pressure to the valve cavity installed at the clamping system.

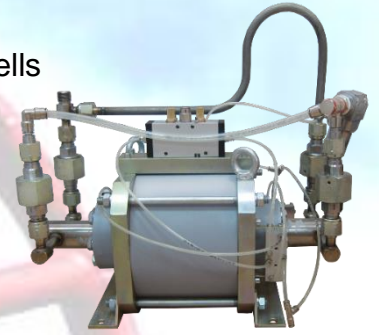
TEST UNIT FOR SHUT-OFF VALVES

Liquid test system for shut-off valves up to 400 bar

This system is specially designed for safe and quick testing of valve's shells and seats. This system is completely air-free and based on high-performance HP liquid pump. The controls units are placed on the front panel of the station.

Important note:

The minimal pressure for this line is **16 bar** due to HP liquid pump and check valves parameters installed in this line.



LP gas test system up to 7 bar

System is equipped with precise LP regulator.

All supplied test medium come through filtration units installed at the station for long term and safe operation of test system and its control elements.

Test medium undergoes through fine filters, all water wetted parts are made of corrosion proof materials improving long service life of the test system



3

System of proportional clamping control

Unique design of proportional clamping control system allows significantly reduce axial load on the tested valve body during tests excluding welds and body damage and get precise results according to API standard terms.

One of the most important features of the REVALVE proportional clamping is the air damper. It's allowing to extend the clamping force range and to create a low pre-clamping force, which is very important for small valves testing.

When the valve is mounted on the clamping system and pre-clamped, air shall be removed from the valve by vacuum system, then filled with water in case of liquid testing. During operations, the operator shall select sealing type and valve nominal diameter, the system calculates and adjusting the required clamping force at test pressure increase.

Safety features of the proportional clamping system:

- Includes electric system with **light indicator**, pressure sensors and buzzer. Yellow warning lamp indicates the test medium in the clamped valve with pressure more than **5 bar**.
- The **oil station** with hydraulic lock provides safety gas testing – in case when electric supply is shut down the valve remains clamped.
- **Overpressure protection system** that stops pressure raising if test pressure allowed for the given nominal bore is more than 5% exceeded.
- **Emergency stop button**. When pressing “Emergency stop” button testing pressure is released to allowable minimal value.



4

Safety interlock system

Prevents the valve unclamping if the test pressure is above **5 bar**. All the “clamp release” switches are blocked to ensure that operator will not accidentally push them. Included in the proportional system.

TEST UNIT FOR SHUT-OFF VALVES

5

Test process control

Manual – using the control units, such as switches pressure regulators at the main panel of the station



6

Quick release couplings for additional (master) gauges or pressure sensors

For quick switching of additional pressure gauges or pressure sensors sockets are provided with quick connectors and NPT 1/2" adapters. Especially required during the calibration procedure if master-gauges are need to be attached quickly.

Additional (master) gauges **are not included** in this option.



TECHNICAL PARAMETERS

7	Pressure ranges	<p>Hydraulic clamping: up to 230 bar, automatic adjusting</p> <p>Liquid testing HP: 16 – 400 bar</p> <p>Gas testing LP: up to 7 bar</p>
8	Measuring devices and features	<p>Liquid testing: 1x600 bar Ø 160 (150) mm, accuracy class 1, double scale bar/psi;</p> <p>1x160 bar Ø 160 (150) mm (overpressure protected), accuracy class 1, double scale bar/psi;</p> <p>LP gas testing: 1x10 bar Ø 160 mm, accuracy class 1, double scale bar/psi</p>
9	Test medium	<p>Air / Nitrogen</p> <p>Water / Water with corrosion inhibitor</p>
10	Filling pump capacity	Up to 57 nl/min
11	Air supply	7-10 bar from low-pressure air source or workshop network
12	Water supply	Water or water with corrosion inhibitor from the external tank
13	Power supply, V/Hz/kW	400 / 50 / 5,5
14	Dimensions (LxWxH), mm, not exceeding	1200 x 980 x 2000

TEST UNIT FOR SHUT-OFF VALVES

15	Weight, kg, not exceeding	500
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Options available upon request

2.1	HP gas testing line
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HP gas testing line up to 300 bar allows shell and seat testing of valves according to international standards. Option includes measuring and control devices. Require external high pressure source – up to 300 bar.

2.2	Liquid test line upgrade up to 650 bar
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For safe and quick testing of valves shells and seats liquid test line can be upgraded up to 650 bar. Minimal pressure for this line is 25 bar. Option includes measuring and control devices.

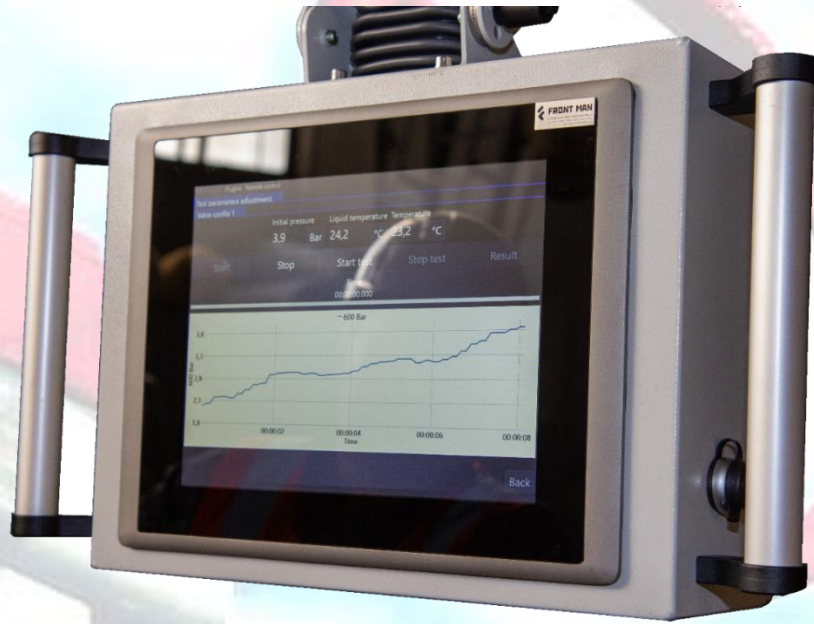
2.3	Safety screen
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To increase safety and comfort level the station can be equipped with rigid **safety screen** made of protective transparent material. Especially required if the clamping system is located near the control station and the operator can be affected by splashes during the pressure testing.



TEST UNIT FOR SHUT-OFF VALVES

Computer registration system PKTBA-CRS-M



General view of computer registration system

1 Purpose

The unit allows:

- to record and store the results of pipeline valve testing, to store the results in the form of protocols at internal memory or company server
- to measure leakages through the valve gate
- to control test medium pressure during gas and liquid tests
- to register shell test pressure and seat test pressure during pipeline valves testing

2 Description

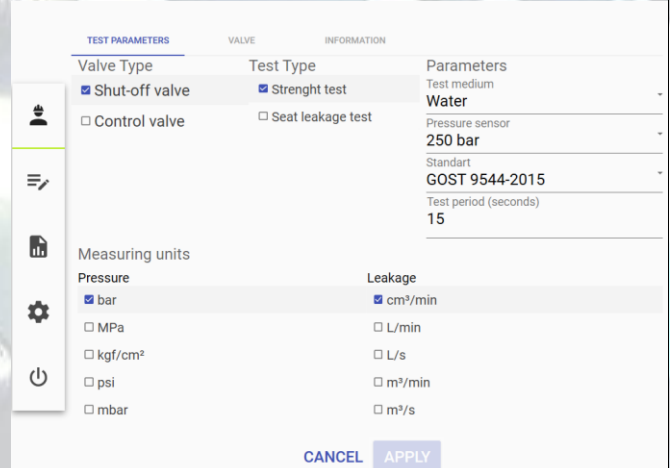
Integrated Computer Registration System designed for continuous test process monitoring and receiving of measurement parameters from ADC connected transducers and laser leakage sensors, resulting data in the test protocol by software package designed for valve test process allow immediate test protocol review and print out from workshop printing device via Wi-Fi quick connection.

CRS serves as automatic data processing unit, displaying test process key parameters as **pressure, leakage rate and temperature** on real-time bases through data and graphics being displayed on a not less than 15" **screen** with edge to edge design.

Software is provided by integrated **industrial monoblock PC** running on **Microsoft Windows 10** operating system that doesn't require special skills to launch and operate the system. The package can be translated into the required language upon request.

The test report fields and protocol letterhead can be customized and easily accompanied by Company logo.

The system can be updated and serviced from Revalve IT Department remotely when required.



TEST UNIT FOR SHUT-OFF VALVES

3

Composition

The unit consists of:

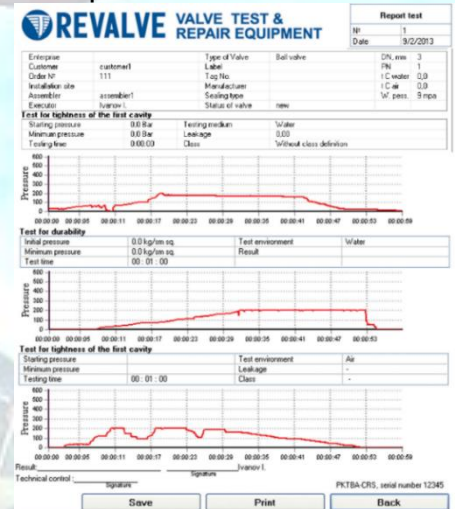
- mobile metal frame
- industrial fanless monoblock PC with not less than 15 inch screen
- pressure sensors
- temperature sensors
- analog/digital converter
- optical bubble counter
- optical drop counter
- communication cables

4

Test protocol

Automatically generated final report with immediate printing feature includes the following lines and can be customized complying with required international codes and internal procedures:

- Manufacturer
- Company name
- Report No
- Testing Date (time, date, test medium and ambient temperature, test pressure, seat leakage)
- Installation site/location
- Valve type
- DN / PN
- Test medium, time
- Leakage
- Result, and others



TECHNICAL PARAMETERS

5	Test pressure measurement range	Pressure sensors:	
		Sensor # 1	0 ... 10 bar
		Sensor # 2	0 ... 160 bar
		Sensor # 3	0 ... 600 bar
		± 0,25 F.S.	
6	Optical bubble and drop counters	<ul style="list-style-type: none"> • Air optical counter (1 pcs.): 0-15,0 cm³/min • Water optical counter (1 pcs.): 0-12 cm³/min 	
7	Power supply, V/Hz/kW	230 / 50 / 0,6	



TEST UNIT FOR SHUT-OFF VALVES

Options for computer registration system available upon request

3.1

Video monitoring system

Video control system is designed for remote monitoring of test process and focusing on the potential leaking or bleeding parts of a valve, where the direct presence of personnel is dangerous or not recommended.

The system is a part of CRS and allows to record testing process and to attach the video to specific protocol. The option includes 2 cameras.

TEST UNIT FOR SHUT-OFF VALVES

Water recycling station PKTBA-SOV-1,5



General view of the water recycling station

1	Description	
	Station consists of: <ul style="list-style-type: none"> • A plastic tank with volume of 1500 liters. The plastic tank includes breather valve • 4 drain lines, consisting of fitting, filter and check valve • Hoses and fittings for connecting the tank to the other test units • Ball valves for water draining to sewage or for filling with clean water 	
2	Volume of plastic tank, l	1500
3	Medium	Water, water with corrosion inhibitor
4	Dimensions (LxWxH), mm, not exceeding	1700 x 955 x 1875
5	Weight, kg	75

TEST UNIT FOR SHUT-OFF VALVES

OPTIONAL EQUIPMENT

High-pressure compressor PKTBA-UK-3



High-pressure compressor general view

1 Short description

Compressor unit is designed to create and provide a constant supply of HP gas up to 300 bar for its consumers. Compressor unit can work in manual and automatic mode. 300 bar gas pressure is required for proper operation of the high-pressure test systems.

2 Composition

The compressor unit consists of the compressor, placed in the low noise cabinet and mounted on the rigid frame. The receiver is placed on the separate frame allowing to divide the compressor with receivers.

3 Description

Electric driven high pressure 3-stage piston-type gas compressor provides high pressure gas up to 300 bar. The compressor charges 2 cylinders with high pressure air, which are mounted on a frame. Each cylinder neck is provided with ball valve for condensate draining. A condensate collection unit is installed at the bottom of the cylinder. Cylinders are combined and filled with compressed air up to 300 Bar.

The set of supply includes high pressure hoses for connection to consumers.

4	Initial air pressure	Atmospheric
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5	Final air pressure, bar	300
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TEST UNIT FOR SHUT-OFF VALVES

6	Compressor capacity, normalized to standard conditions, nl/min	Up to 290
7	Compressor unit cooling	air
8	Receivers volume, l, at least	2 x 50
9	Unit supply voltage, V/Hz	400 / 50
10	Unit power consumption, not more than, kW	7.5
11	Overall dimensions (LxWxH), mm, not exceeding	Compressor – 1350 x 930 x 1300 Cylinders – 1300 x 355 x 1985
12	Weight, kg, not exceeding	745

TEST UNIT FOR SHUT-OFF VALVES

Safety fence PKTBA-B-6-5



Safety fence general view

1

Purpose

Rigid safety fence is designed to provide protection of the operating personnel involved in the test process from the risk of serious injury or even death during pneumatic and hydraulic high-pressure testing.

Important note: since API and ISO standards are not undertaking to meet third parties' safety precaution measures, Revalve strongly recommends to perform high pressure hydraulic and pneumatic tests within enclosed safety area (fence) with operating personnel being protected from potential hazard.

2

Description

Safety fence is made of carbon steel tough panels made of welded bent 3 mm thick metal plates. Window panel has one 36 mm thick armored glass and could be equipped with more **upon request**. Safety fence is designed from sections in order to provide an easy, quick transportation and assembly.

3

Safety features

When closing the fence doors with the safety gate latch the Information plate "CAUTION! TESTING IN PROCESS!" starts to light up indicating the start of the test.

TEST UNIT FOR SHUT-OFF VALVES

The fence is supplied with 3 color process light column including the pressure sensors and gate latch position indicator.

- Green color indicates the closed gates.
- Yellow – the unit is under pressure.
- Red – the safety fence is open.

In case of unauthorized gates opening the red and yellow lights will light up with sound alarm.

To add even more safety to the process environment the safety fence is equipped with gates interlock system designed to block the doors when the valve is under pressure avoiding unauthorized access.

If the gates are not closed when the valve is under pressure the sound alarm is actuated. If the gates are closed the safety interlock system is activated keeping doors blocked till the end of the testing and pressure release.



4	Safety fence gate	Swing gates
5	Gateway, not less, mm	1640
6	Armored glass	Safety fence is provided with one window with 36 mm thick armored glass with dimensions of 500 x 500.
7	Power supply, V/Hz/kW	230 / 50 / 1
8	Dimensions (LxWxH), mm, not exceeding	6373 x 5375 x 2500
9	Weight, kg, not exceeding	4300

TEST UNIT FOR SHUT-OFF VALVES

GENERAL REQUIREMENTS

1	Requirements for ergonomics	<p>The design of the equipment should ensure free access to equipment for maintenance and repair.</p> <p>Where necessary, the design of the equipment must be capable of performing the convenience of the labor action with means of individual protection.</p> <p>The design of the equipment should provide the optimum distribution of functions between man and production equipment to ensure the safety and to limit severity and intensity of labor.</p>
2	Reliability requirements	<p>The warranty period of equipment - 12 months from the date of commissioning or 18 months from the date of dispatch whatever is earlier.</p> <p>The total period of operation, taking into account proper service and the replacement of worn units - at least 8 years.</p>
3	Information plate language	Russian / English
4	Operating conditions	<p>Temperature: +5-50 °C Humidity (at + 25°C): 30-90% (non condensing). Indoor use under the following conditions:</p> <ul style="list-style-type: none"> • work site should be equipped with a ventilation system; • height above the mean sea level – not exceeding 1000 m; • no shock allowed. <p>The use in conditions of the explosive and electric current conducting mediums or mediums, containing caustic vapors and gases is not allowed.</p> <p>The scope of supply includes power stabilizer required for safe and stable work of provided equipment.</p>

DOCUMENTATION

1	Each unit	<p>Passport / Technical certificate (including test and calibration certificates for all installed test pressure gauges and sensors) Operation / Maintenance Manuals</p>
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Attention! Dimensions and images are provided for the reference and could be a subject for amendment during the design phase without changes in the complex performance parameters.

Attention! This is a preliminary version. The set of equipment or it's specification can be altered upon request to meet customer's requirements.

TEST UNIT FOR SHUT-OFF VALVES

Spare parts, consumables, additional services:

1. Set of spare parts and consumables for 2 years of operation.

Set of spare parts includes all necessary consumables for two years of normal operation of the equipment. Spare parts kit is included to the scope of supply and will be supplied along with equipment.

2. Factory acceptance, testing and supervision during installation and start-up. Training on customer site. Warranty and after sales service.

In accordance with internal QMS system (certified and based on ISO 9001-2015 requirements), our Quality Department will provide FAT program and corresponding agenda upon customer's request for participation in factory acceptance testing of the manufactured equipment before it's dispatch.

Upon request, qualified and experienced engineers of REVALVE can perform control over the installation and commissioning of the equipment.

Installation period should begin only after receiving the following confirmation:

- All the equipment is received at the installation site;
- All the installation requirements (procedures, equipment, accessories, qualified personnel etc.) are fulfilled (the list of requirements will be prepared in advance by REVALVE service team).

Under request, our qualified engineers can:

- Supervise the installation of the equipment and its launch;
- Perform the final preparation of the equipment assisting customer personnel.

Personnel training on customer's site:

We assign the utmost value to appropriate customer personnel user-training to ensure safe and efficient running and maintenance of the equipment. We consider that personnel user-training is sufficiently required, especially in cases where the personnel have no experience operating our precise equipment.

The proper study of equipment design features, safe operation requirements and maintenance methods increases the performance of the equipment, and prolongs its service life.

Training can be conducted both in Russian and in English languages.

The expected time period required for start-up supervision, commissioning and training will be determined in a due time upon request.

Warranty and after sales service.

REVALVE provides 18-month warranty after the equipment dispatch and 12-month warranty after the launch date of the equipment at customer site or 18 months since the date of dispatch. The assumed service life of our equipment is 8 years, at least.

REVALVE is a customer-centric company and our assistance policy is based on a long-term partnership with our customers.

We have a full-cycle in-house manufacturing:

- Designing.
- Raw materials preparation treatment;
- All types of machining procedures using high-duty CNC centers (our production facilities; account more than 200 machining units);
- Spare parts supplied by the approved world-famous manufacturers;
- Full-cycle paint coating;
- Assembling and testing of manufactured equipment with load 1,5 times exceeding nominal;
- Installation and start-up supervision;
- Comprehensive user-training.

Our customer-centric approach to the support policy ensures a due time spare parts supply and support through all service life of the products.