

A 110 E

Operation and Maintenance Manual for Instrumentation Valves PHOENIX Modular Design System

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1 Generals

1.1 Range

This operation and maintenance instruction applies to the valves mentioned in table 1, which represent the PHOENIX standard assortment in sizes DN 3,5 to 8 mm and nominal pressure ratings between PN 250 to 630. This instruction is valid for type-test approved (acc. to VdTÜV-Ordinance 35) options with design data acc. to table A1, too.

Design	PHOENIX Type	Stem sealing
Thru-way globe valves	506, 525, 661	Stuffing box
	570, 535, 662	Bellows
Pressure gauge valve with test connection	587	Stuffing box
	597	Bellows
Pressure gauge valve with blocking test connection	589	Stuffing box
	599, 664	Bellows
Manifold (3 valves)	626	Stuffing box
	659	Bellows
Manifold combination (5 valves)	630	Stuffing box
	631	Bellows

Table 1: PHOENIX type numbers covered by this instruction

All types of the several design (as mentioned in table 1) can be equipped with interchangeable valve inserts as shown in fig. 1 or fig. 3. Therefore, in the following statements the different types of valves are without importance and can be neglected.

1.2 Connections

The selection of the connections is made by the customer. Weld and threaded connections are preferred. Flanged options and combinations of different types of connections can be realised.

1.3 Applications

Instrumentation valves are used as shut-off devices in measuring circuits and are installed in all industrial areas.

The pertinent pressure-temperature ratings are shown in the individual data-sheets and must be strictly observed.

2 Transport and Storage

The inlet and outlet orifices of the valves are protected by plastic caps which shall be removed only before their immediate installation in the system. Storage shall be granted in clean, well tempered and dry rooms.

Valves with stuffing box seal : In case of longer storage periods gland packed valves should be operated (from fully opened to fully closed position) at least once a year. When a packing of pure graphite are used, this procedure should take place every 6 months latest as the packing is fitted with a pretension of 1,3 x NP. Without an interim operation there is a risk that the valves becomes difficult to operate. In case a valve cannot be operated at all the pretension of the packing shall be released. For doing so, loosen the counter nut (fig.1, item 25) and move the pressure nut (fig. 1, item 20) by a quarter turn to the left. Then retighten the counter nut (fig. 1, item 25) strongly (approx. 60 Nm).

Lubrication of the thread of the operating stem shall be made in open position.

Attention! Packings in dry and preloaded state are subject to an ageing process. Therefore, the efficiency of the packing of stored valves must be checked before installation.

3 Installation

3.1 Installation position

When not otherwise specified, thruway isolating valves and pressure gauge valves with test connection shall be installed in flow direction as indicated by the arrow stamped on the body (Fig. 1 and 3, item 1) if not otherwise recommended.

The valves can be installed in each desired position, however, preference is given to vertical stem and horizontal hand wheel.

Before installation a visual check on possible damages must be performed. In case of doubt such valves shall not be installed into the system. After the removal of the protecting caps a check must be performed to ensure that no foreign particles or impurities will be inside the valve.

Tensions of the piping system itself shall not be transmitted on the valves. The user has to provide adequate fixation possibilities and supports.

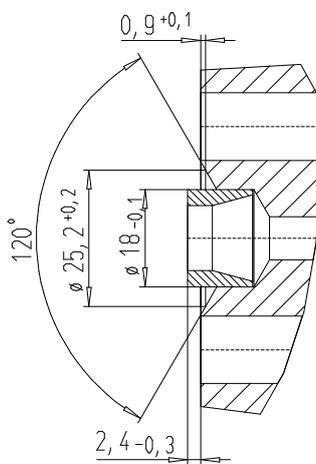
3.2 Connections

Valves with weld connections : Before their installation these valves must be opened by anticlockwise turn of the stem (fig. 1 and 3, item 9, 9.1). During the weld process no impurities shall enter inside the valves.

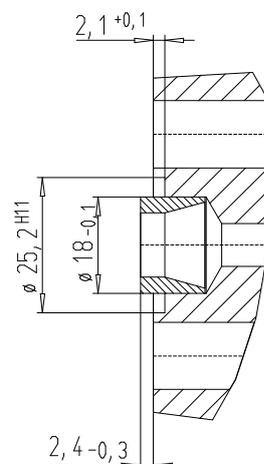
The welding procedure must be executed in conformity with the standards valid for the steel quality stamped on the body (fig. 1 and 3, item 1). In case that during this process the sealing areas of the valves (stuffing box or bellows) are exposed to higher temperatures than allowed by the design data the sealing set (stuffing box insert or bellows insert) must be previously removed.

Valves with threaded or flanged connections : These valves can be fitted directly into the piping system. Make sure that no impurities enter into the valves.

Transmitter connection of manifolds (3 valves - types 626 and 659) and manifold combinations (5 valves - types 630 and 631). Caused by the revision of standard DIN 19213 dated 1991 there are two variants of transmitter connection. Depending on the present variant, O-Rings $\text{Ø}18 \times 3$ respectively $\text{Ø}20 \times 2,65$ have to be used.



DIN 19213-B3 up to 1991 for O-Ring $\text{Ø}18 \times 3$



DIN 19213-B3 since 1991 for O-Ring $\text{Ø}20 \times 2,65$

Attention! Before connecting the transmitter pay attention to the present variant of connection!

4 Pressure and leak tests

For the pressure and leak tests the valves must be brought in open position. Following they shall be tested with the relevant testing pressure on the fixed leak rates.

In case of eventual leakage of gland packed valves, the packing must be re-tightened (see "§ 6.1. Gland packed valves").

The test liquid shall be applied in conformity with the valid rules for the prevention of accidents.

5 Operation

Before commissioning of a plant or after repair works very often deposits or foreign particles or residues of the repair works (e.g. weld pearls, chips, burrs and similar) are accumulated in the system. These components must be carefully removed by cleansing procedures taking great care not to damage the sensitive sealing areas or the bellows.

The valve opens in anticlockwise direction and closes by clockwise operation of the handwheel, handwheel wrench or t-handle.

5.1 Gland packed valves

To avoid faulty gripping of the stem against packing and lower wiper ring due to high temperatures valves with stuffing box seal should never be opened under service conditions until the final stop. PHOENIX recommends to open to valve totally and then proceed with a quarter turn in closing direction.

In case of leakage the packing shall be either re-tightened (see "§ 6.1. Gland packed valves") or replaced (see "§ 7.2.1 Gland packed valves").

Max. operating moment: 5 Nm

5.2 Bellows sealed valves

Leakage can only happen in case of faulty bellows. In such a case the valve can still stay in the line for a short period using the emergency stuffing box (fig. 3, item 22) as secondary sealing element. For doing so the pressure nut (fig. 3, item 17) must be tightened. The bellows must be replaced immediately.

Max. operating moment: 5 Nm

6 Maintenance

6.1 Gland packed valves

Packings are subject to wear and tear. Therefore, a regular check is recommended.

Packing shall be re-tightened only when leakage happens. For doing so, the counter nut (fig. 1, item 25) shall be loosened and the stem will be put with the hand-operating mechanism in „half-open position“. After this procedure tighten the pressure nut (fig. 1, item 20) by turning it clockwise until the leakage stops. Do not exceed the max. torque of 5 Nm. In case higher torque should be necessary, the packing must be replaced immediately (see “§ 7.2.1. Gland packed valves”). After the tightening or replacement of the packing the counter nut (fig. 1, item 25) shall be tightened with a torque of approx. 60 Nm.

6.2 Bellows sealed valves

Bellows sealed valves are maintenance free.

7 Replacement of components / Spare parts

Attention! Before each intervention the valves and the system must be depressurised and, if necessary, cleaned with a liquid which is harmless for personnel and environment!

RISK OF ACCIDENTS !

7.1 Change of sealing elements

In most cases bodies for gland packed and bellows sealed valves are identical. Thus a possible change from a gland packed type to a bellows sealed option can be realised very easily. However, PHOENIX recommends that the user shall contact PHOENIX before starting such a procedure to be sure that the right elements are available due to eventual modifications of design that might have proved necessary in the meantime and which right PHOENIX reserves for themselves. A replacement can be performed by the relevant disassembling and refitting of the different valve inserts in the right sequence.

In case a change for gland packed option to bellows sealed type shall be performed check carefully whether the sealing area for the metallic gasket (fig. 3, item 27) and for the packing (fig. 1, item 1, 21, 22) respectively will meet the requirements to fulfil its function.

7.2 Disassembling and change of valve sealing inserts

7.2.1 Gland packed valves

Remove handwheel, if necessary. Unscrew counter nut (fig. 1, item 25) and lift pressure nut (fig. 1, item 20) from the body by turning it anticlockwise. Be careful not to remove the pressure nut (fig. 1, item 20) from the stem (fig. 1, item 9, 9.1). In case the valve sealing insert cannot be pulled out without difficulties an auxiliary bushing of plastic (PTFE, PVC or similar) acc. to PHOENIX drawing N° 5713.0265 shall be hooded over the pressure nut (fig. 1, item 20) as shown in fig. 2. Afterwards the counter nut (fig. 1, item 25) shall be screwed again onto the pressure nut (fig. 1, item 20). The pressure nut (fig. 1, item 20) must be blocked on the hexagon square. By clockwise rotation of the counter nut (fig. 1, item 25) now the complete insert incl. stem (fig. 1, item 9, 9.1) will be unscrewed from the body (fig. 1, item 1) and can be removed.

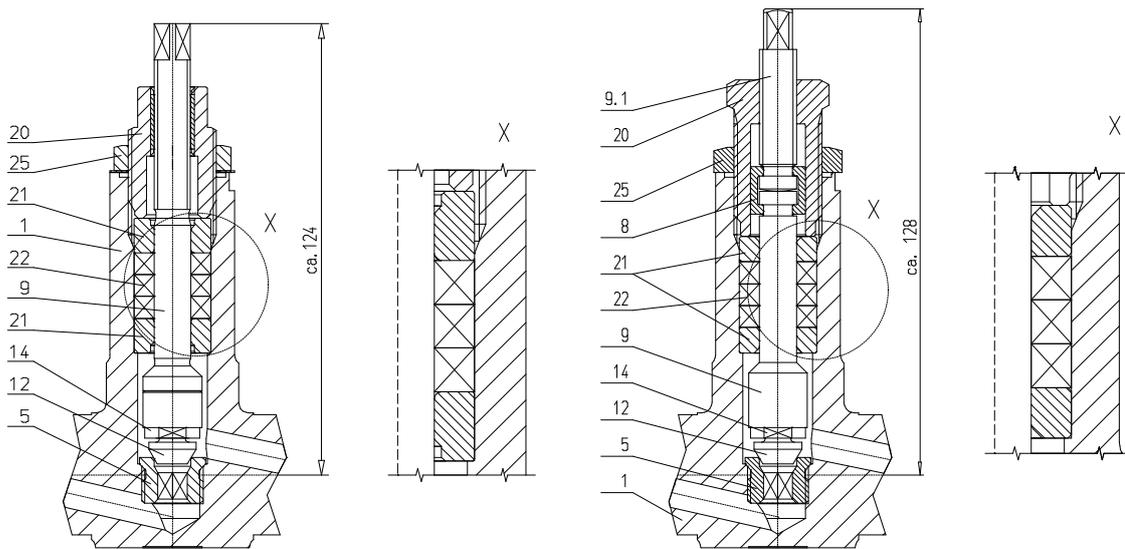


Fig. 1: Valve with stuffing box seal

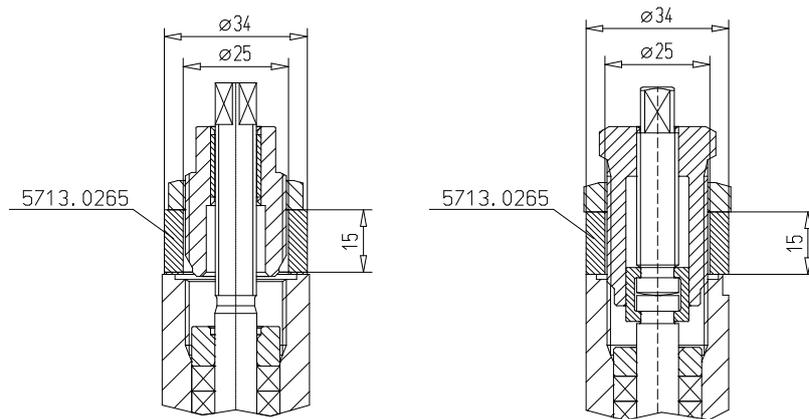


Fig. 2: Auxiliary tool to PAW 5713.0265

After having finished this procedure the packing can be replaced. Unscrew the pressure nut (fig. 1, item 20) from the stem (fig. 1, item 9, 9.1). Remove old packing (fig. 1, item 22) and insert carefully the new packing rings (fig. 1, item 22) between the base rings (fig. 1, item 21). The insertion of the base rings (fig. 1, item 21) shall be made as shown in fig. 1 „detail X“. Screw the pressure nut (fig. 1, item 20) onto the stem (fig. 1, item 9, 9.1) without tightening the packing (fig. 1, item 22).

7.2.2 Bellows sealed valves

Attention! Before its disassembling the valve it must be brought in fully open position. Clockwise turning of the stem during the assembling and in disassembled respectively state is not allowed.

The guide of the stem (fig. 3, item 10) shall be unscrewed by anticlockwise rotation. Then the bellows insert can be removed. In case of a damaged bellows (fig. 3, item 7) the whole insert set must be replaced.

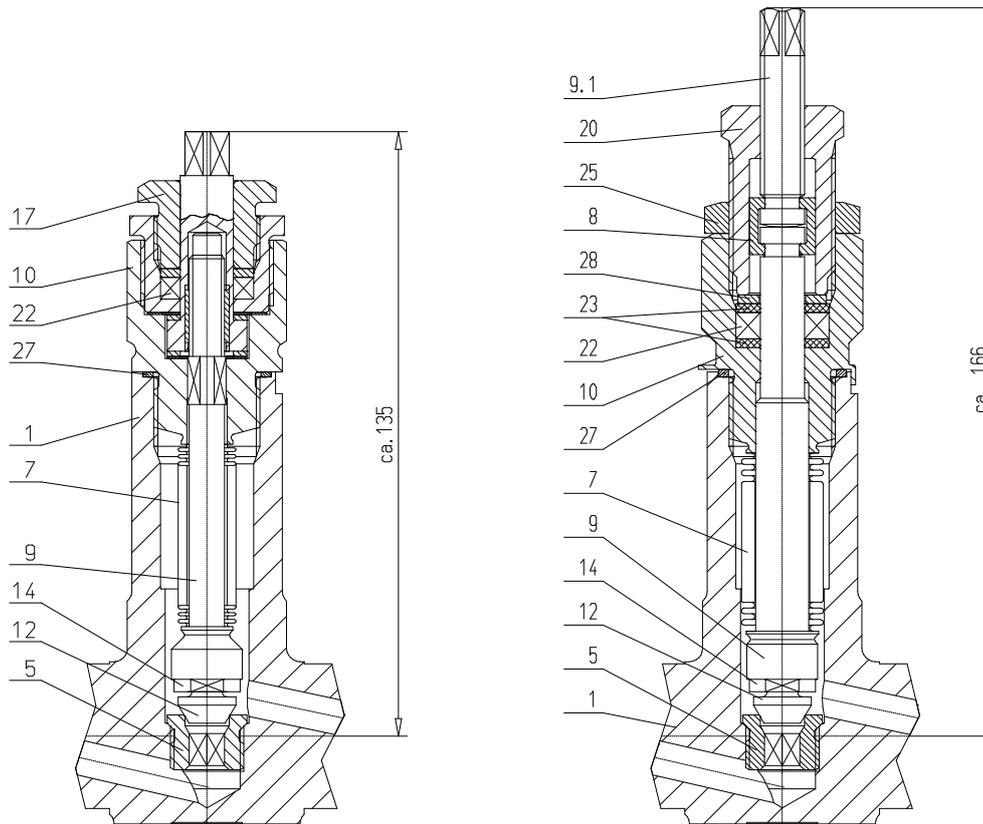


Fig. 3: Valve with bellows seal

7.3 Replacement of disc

Unscrew the union nut SW 13 (fig. 1 and 3, item 14) from the stem (fig. 1 and 3, item 9) by turning it anticlockwise. Remove the old disc (fig. 1 and 3, item 12). Screw-in the new disc (fig. 7, seat \varnothing 5 mm) or the complete new disc unit (fig. 5, seat \varnothing 8 mm) and tighten with a torque of approx. 20 Nm.

Check:

The disc (fig. 1 and 3, item 12) must move free on the stem (fig. 1 and 3, item 9).

7.4 Replacement of seat

Unscrew the seat (fig. 1 and 3, item 5) with the corresponding key or an auxiliary tool (see table 2) by turning it anticlockwise. Lubricate the thread of the new seat (fig. 1 and 3, item 5) with a suitable grease. Screw-in the new seat (fig. 1 and 3, item 5) and tighten with the torque mentioned in table 2.

	Seat \varnothing 5 mm	Seat \varnothing 8 mm
Disc Order N°	PAW 5610.0001 (Fig. 7)	PAW 6610.8051 (Fig. 5)
Disc Torque	20 Nm	20 Nm
Seat Key	T-handle SW 10	PAW 5695.0802 (Fig. 10)
Seat Order N°	PAW 5604.1105 (Fig. 6)	PAW 5604.1205 (Fig. 4) ¹⁾
Seat Torque	60 Nm	80 Nm

Table 2: Instructions for fitting of seat and disc

¹⁾ Note: Seats type PAW 5604.1203 will be mounted at PAW site. In exchange for these, seats type PAW 5604.1205 have to be used. This might lead to a decrease of valve stroke of max. 1.2mm.

7.5 Fitting of complete sealing inserts

7.5.1 Gland packed valves

Before assembly the new sealing inserts, check whether all components are correctly fitted as shown in fig. 1 „detail X” and that the stem is screwed into the pressure nut (fig. 1, item 20) until the lift stop. Then first tighten the pressure nut (fig. 1, item 20) with a torque of 50 Nm and then the counter nut (fig. 1, item 25) with a torque of 60 Nm.

7.5.2 Bellows sealed valves

Before assembly of the complete sealing insert the thread and the surfaces for the gasket must be properly cleaned. Then put in the gasket¹⁾ (fig. 3, item 27) and grease the thread with a suitable lubricant. Make sure that the bellows seal insert is in the fully opened position. Otherwise risk of bending of the stem.

The bellows seal insert of new valves is tightened with torque values acc. to table A1. For revised/repared valves about 25% higher torque values might be used. Should these torques do not guarantee satisfactory tightness, the valve body should be replaced.

¹⁾ Note: Valves of older design are equipped with a metal o-ring. Principally also for this design only crowned gaskets are allowed.

8 Safety notes

During commissioning and also during normal operation due to temperature differences leakage might happen in the packing and gasket area. To avoid these inconveniences the nuts shall be checked if required, but at the regular shutdown latest. They must be re-tightened if necessary.

Each kind of intervention which exceeds normal maintenance routine shall be performed at depressurised system only

Attention! In case of toxic or corrosive agents the piping system must be neutralised before each intervention. It may also be that the packing will still contain residues of the handled media.

9 Ordering spare parts

PHOENIX asks his clients to order possible spare parts with the indication of the relevant PHOENIX reference numbers (see fig. 4 to fig. 11). In case customer should need more spares than those mentioned in the following figures PHOENIX requests to indicate in the inquiry / order the PHOENIX order number that is stamped on the valve's body.

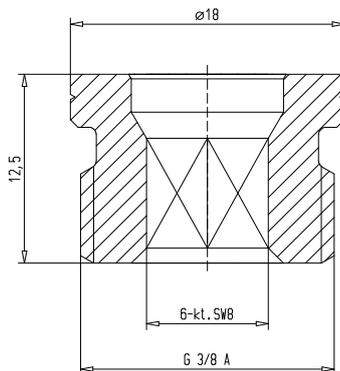


Fig. 4: Seat-Ø 8mm PAW 5604.1205

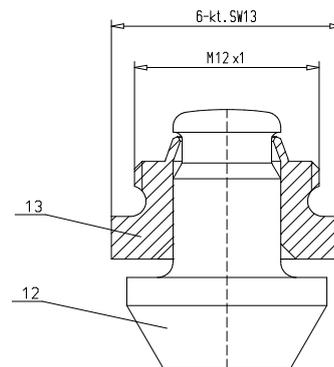


Fig. 5: Disc-Ø 8mm PAW 6610.8051

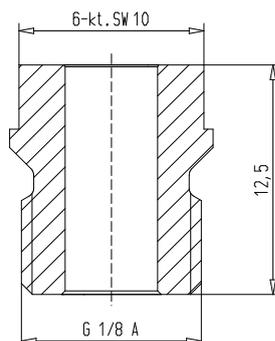


Fig. 6: Seat-Ø 5mm PAW 5604.1105

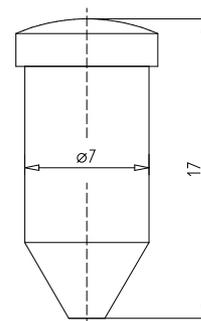


Fig. 7: Disc-Ø 5mm PAW 5610.0001

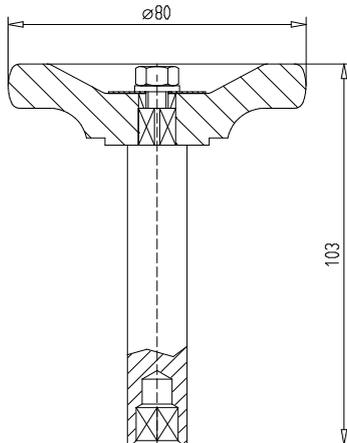


Fig. 8: Handwheel wrench PAW 6695.0808

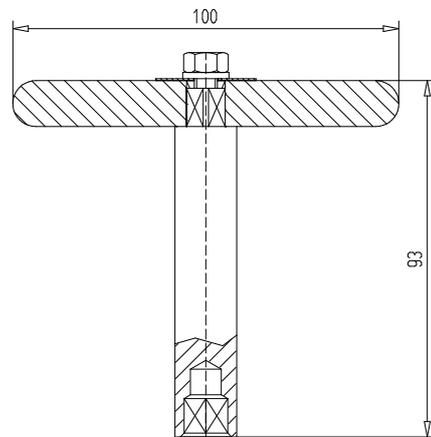


Fig. 9: T-handle PAW 6695.0800

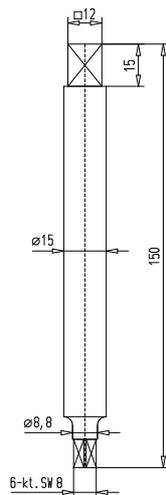


Fig. 10: Assembling key PAW 5695.0802

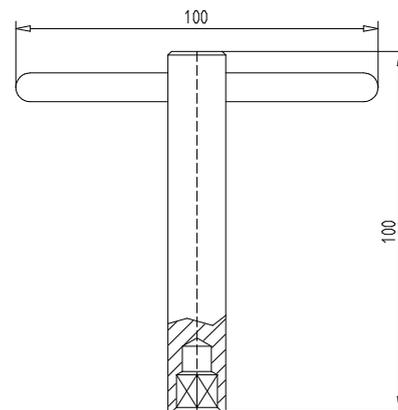


Fig. 11: T-handle PAW 3309.0000

Design	Type-No	Body-material	Stem-sealing	type-testing-No	Design-pressure [bar]	Design-temperature [°C]	Tightening torque stem-guiding (Item 10) [Nm]
506		1.4571	stuffing box	T 07-86-01	250 / 200	180 / 360	-
		1.0460		T 07-86-01	250 / 150	180 / 360	-
		1.4529		T 07-86-01	250 / 230	180 / 360	-
		1.5415		T 07-86-01	250 / 200	180 / 360	-

Table A1: type-test approved instrumentation valves acc. to VdTÜV-Ordinance 35