

JIS

JAPANESE INDUSTRIAL STANDARD

**Pneumatic system—3-Port
solenoid operated valves**

JIS B 8374—1993

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In the event of any doubt arising,
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Pneumatic system —
3-Port solenoid operated valves

B 8374-1993

1. Scope This Japanese Industrial Standard specifies the 3-port solenoid operated valves for pneumatic use to be used in the pneumatic systems for the mechanical equipments (hereafter referred to as "valves").

Further, the working conditions for the valves shall be as given in the following:

- (1) Maximum working pressure 0.7 MPa {7.14 kgf/cm²} or under
- (2) Ambient temperature and working air temperature -5°C to 50°C (however, the inside of the valve shall not be that freezes).
- (3) Vibration and impact The valves shall not generally be subjected to harmful vibration and impact.
- (4) Actuation frequency The maximum actuation frequency shall be one time per second, and the minimum actuation frequency shall be one time per 30 days.
- (5) Quality of air The quality of the air to be supplied to the valves shall be allowed to conform to the service object, functions and performances, and ambient environment of the valves, as well as be treated with the control of the quality of the air for enhancing the reliability, endurance and safety of the valves.

Remarks 1. The pressure to be used in this Standard shall indicate the gauge pressure.

2. The standards cited in this Standard are as follows:

JIS B 0142 Glossary of terms for oil hydraulics and pneumatics

JIS B 0203 Taper pipe threads

JIS B 8370 General rule for pneumatic systems

JIS C 0704 Insulation test for control gear

JIS C 1302 Insulation resistance testers (battery operated)

JIS C 4003 Classification of materials for insulation of electrical machinery and apparatus

3. The units, numerical values and numerical formulae given in { } in this Standard are based on the traditional units, and are appended for informative reference.

4. As regards the quality of the air, it shall be in accordance with 7. (Energy transmission and cleaning equipment) of JIS B 8370.

2. Definitions For the purposes of this Standard, the definitions given in JIS B 0142 apply.

3. Types of valves and marking symbols

3.1 Types of valves The types of the valves shall be classified as given in the following according to the type symbols of valves, nominal bores of ports, conditions of valve passages, working pressures, rated voltages, rated frequencies and characteristics.

- (1) Type symbols of valves and nominal bores of ports The type symbols of valves, nominal bores of ports and designations of screw joints shall be in accordance with Table 1.

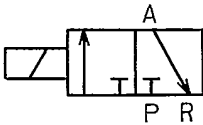
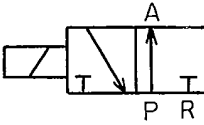
Table 1. Type symbols of valves, nominal bores of ports and designations of screw joints

Type symbol of valve	Nominal bore of port	Designation of screw joint
DV3	6	Rc 1/8
	8	Rc 1/4
	10	Rc 3/8
	15	Rc 1/2
	20	Rc 3/4
	25	Rc 1
PV3	6	Rc 1/8
	8	Rc 1/4
	10	Rc 3/8
	15	Rc 1/2
	20	Rc 3/4
	25	Rc 1

- Remarks
1. The type symbol DV3 indicates that of direct action type 3-port, and the type symbol PV3 that of pilot operated type 3-port.
 2. The screw threads of the screw joints shall generally be of the taper internal pipe threads specified in JIS B 0203.

- (2) Conditions of valve passages As to the conditions of the valve passages, under the condition where the voltage is not applied to the solenoid, that valve passage in which the air does not flow from the inlet of valve to the outlet of valve shall be designated as the normally closed, and that flows as the normally open. The symbols thereof shall be NC for the normally closed, NO for the normally open and CO for the combination of both, and the connecting conditions of the ports shall be in accordance with Table 2.

Table 2. Conditions of valve passages

Marking symbol	NC	NO	CO
Passage symbol			—

Remarks: The port P expresses the inlet, the port A the outlet and port R the exhaust opening.

- (3) Working pressures The working pressures of the valves shall be 0 MPa {0 kgf/cm²} to 0.7 MPa {7.14 kgf/cm²} for the direct action type, and 0.2 MPa {2.04 kgf/cm²} to 0.7 MPa {7.14 kgf/cm²} for the pilot type.
- (4) Rated voltage and rated frequency The rated voltage of the solenoids shall be a.c. 100 V or 200 V, and d.c. 12 V or 24 V. The rated frequency of a.c. shall be 50 Hz, 60 Hz or 50/60 Hz for common use.

Further, the voltage variation at the time of service shall be within the range of 90 % to 110 % the rated voltage.

- (5) Characteristics The flow rate characteristics (effective cross-sectional areas), air leakage, endurance (number of times of actuation) and response time shall be in accordance with Table 3.

Table 3. Characteristics of valves

Nominal bore of port	Characteristics				Number of times of actuation 10 ⁴ times	Response time s
	Effective cross- sectional area mm ²		Air leakage cm ² /min (ANR)			
	Characteristic symbols					
	A	B	C	D		
6	1.2 min.	10 min.	10 max.	500 max.	500	0.04 max.
8	3 min.	20 min.	10 max.	500 max.		0.04 max.
10	—	40 min.	25 max.	1000 max.		0.04 max.
15	—	60 min.	25 max.	1000 max.		0.06 max.
20	—	100 min.	50 max.	1500 max.		0.1 max.
25	—	190 min.	50 max.	1500 max.		0.1 max.

Further, C shall be those which have used synthetic rubber or the like for sealing mechanism, and D shall be those which have used metal for sealing mechanism as the main object.

3.2 Marking symbols The expressing method of the marking symbols of the valves shall be in accordance with the following:

□ V3 - □ □ - □ □ - □ □

Characteristics: It shall be expressed by the combination of characteristic symbols in accordance with Table 3.

Condition of valve passage: It shall be expressed by the marking symbol in accordance with Table 2.

Nominal bore of port: It shall be expressed by digits in accordance with Table 1.

Type of valve: It shall be expressed by the type symbol in accordance with Table 1.

Example 1. DV3 - 06 - CO - AC

Example 2. PV3 - 25 - NC - BD

4. Performances

4.1 Actuation When tested in accordance with the provisions of 10.1, the switching actuation shall be smooth and be free from abnormal sound.