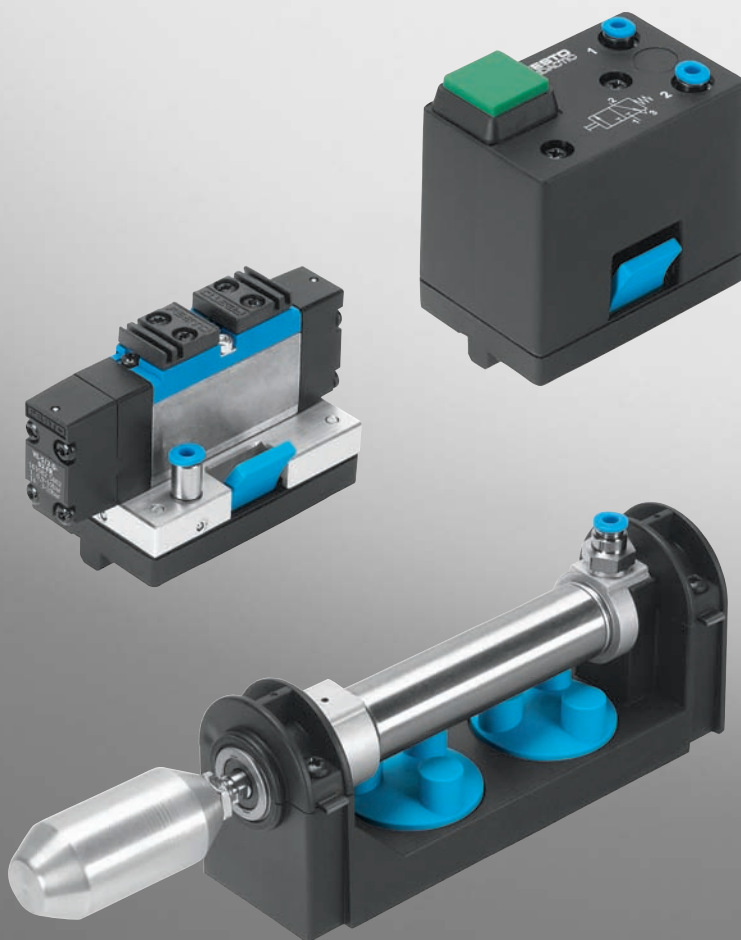


Pneumatics Basic Level

FESTO

Set of Overhead
Transparencies
TP 101



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Foreword

The Collection of Transparencies is conceived for the basic material of the TP100 Pneumatic Technology Package. The transparency collection and technology package form part of the Learning System for Automation from Festo Didactic GmbH & Co.

The transparencies are designed from a didactical and methodological point of view. For each transparency, there is a short accompanying text that provides the speaker with a quick overview of the contents. More information you will find in the textbook Pneumatics.

Syllabus

- Physical fundamentals of pneumatics
- Function and application of pneumatic components
- Designation and drawing of pneumatic symbols
- Drawing of pneumatic circuit diagrams in accordance with standards
- Representation of motion sequences and operating statuses
- Direct and indirect stroke-dependent controls
- AND/OR logic functions of the input signals
- Time-dependent control system with time-delay valve
- Pressure-dependent control system with pressure sequence valve
- Troubleshooting with simple pneumatic control systems

The text pages contain a complete picture of the transparency with additional explanations and designations which the speaker can enter on the transparency during instruction.

The advantages of this concept are:

- The speaker can add to the transparencies step by step during the presentation
- Instruction is livelier
- The text pages supplied reduce preparation time

New!

Electronic presentation

The enclosed CD-ROM contains all the overhead transparencies and accompanying text of this edition in an electronically presentable form in the files „Pneumatics_transparencies.pdf“ and „Pneumatics_text.pdf“. In addition to the screen presentation, which can be made in any order, the contents can be printed out and text and graphics can be used for your own training preparations, insofar as the functionality of the required Adobe® Acrobat® Reader permits this. This freely distributable software is available on the CD-ROM in the currently valid English version for Windows 95/98/NT for installation in the directory „Acrobat_Reader“. Please start the file „rs405eng.exe“ and follow the subsequent dialogue.

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Combinational elements

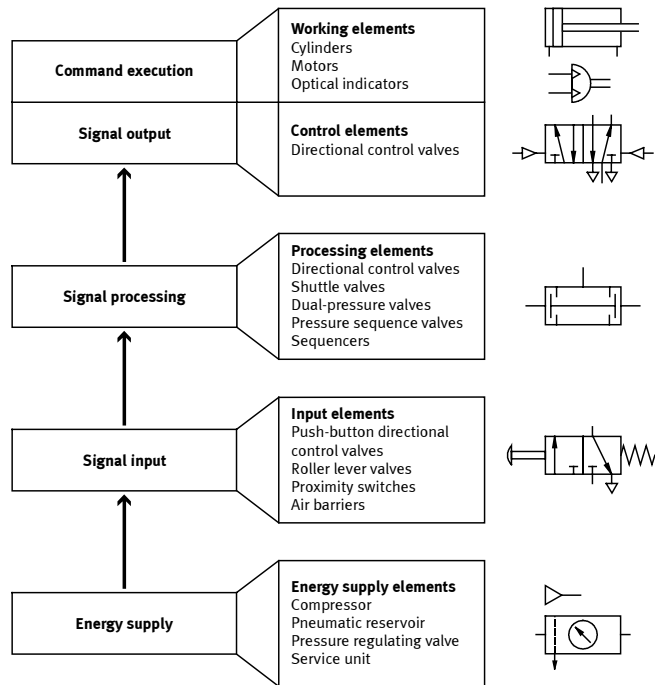
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Actuators

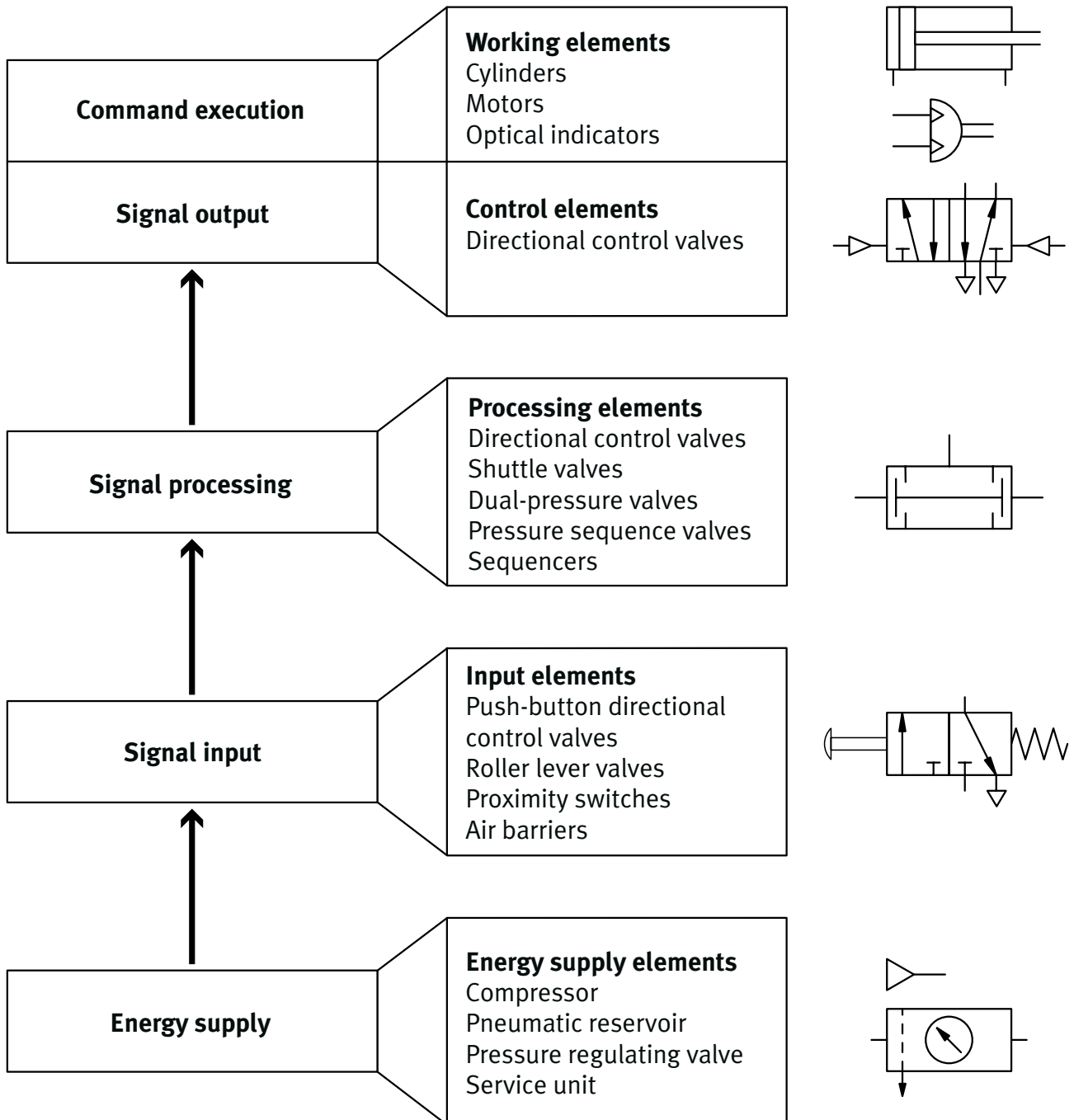
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The Structure of Pneumatic Systems

- Signal flow
 - From bottom to top
- Control chain
 - S P A principle: Sensor, processor, actuator
 - I P A principle: Input, processing, output
- Energy supply
 - Through tubing or piping



The Structure of Pneumatic Systems



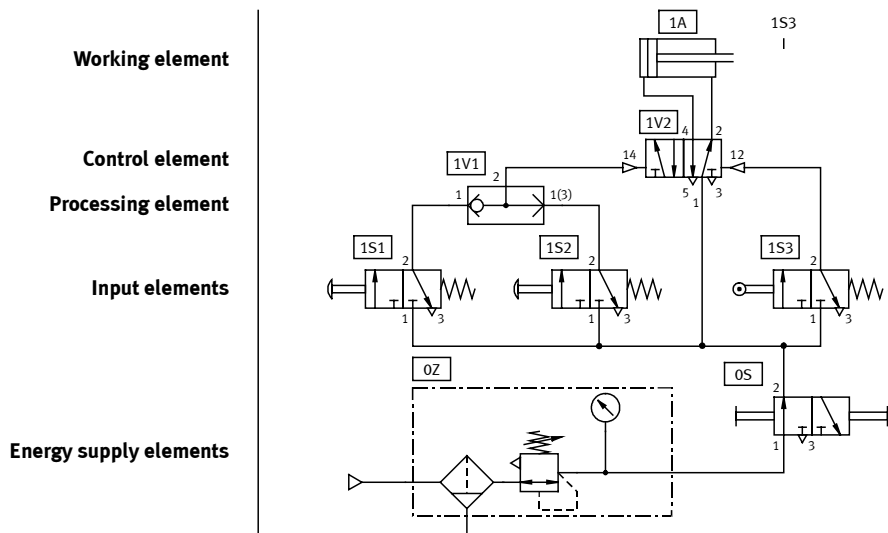
System Circuit Diagram

Identification code for components

- System number beginning with 1; used only when the entire circuit consists of more than one system
- Circuit number beginning with 1; all accessories with 0
- Component identification by letter
- Component number beginning with 1

Circuit Diagram

- From top to bottom
- Working element 1A marking line of input element 1S3
- Control element 1V2
- Processing element 1V1
- Input elements 1S1, 1S2, 1S3
- Energy supply elements 0Z, 0S



System Circuit Diagram

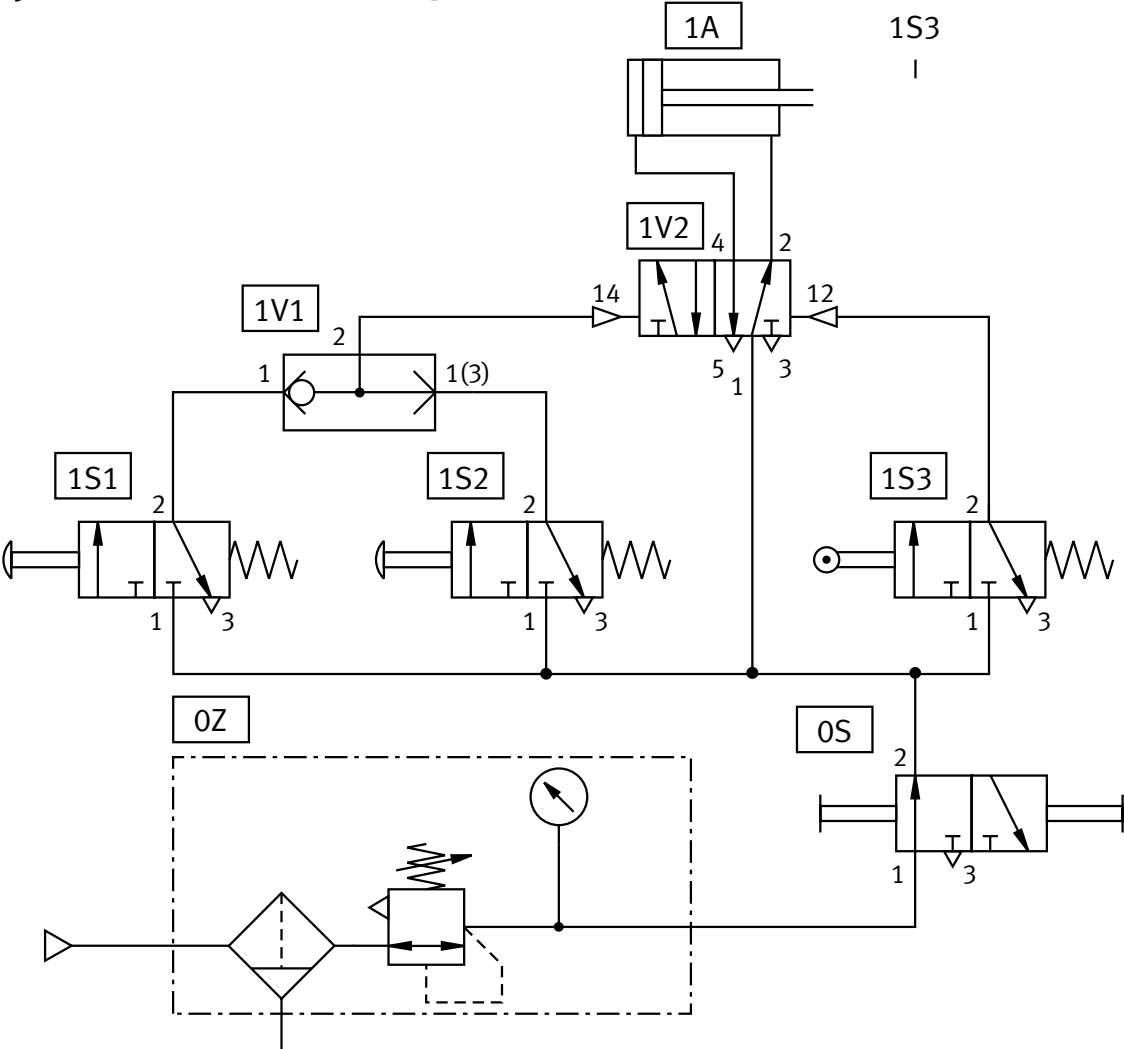
Working element

Control element

Processing element

Input elements

Energy supply elements



Direct Actuation of Cylinders

Single-acting cylinders

- Perform work in only one direction
- Return position via spring
- Air supply port, vent hole

3/2-Way valve

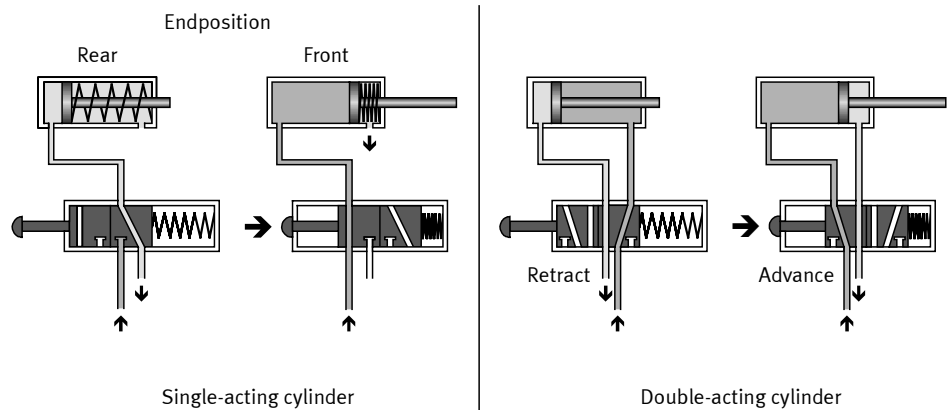
- 3 Working ports, 2 switching positions
- Manually actuated, spring return

Double-acting cylinder

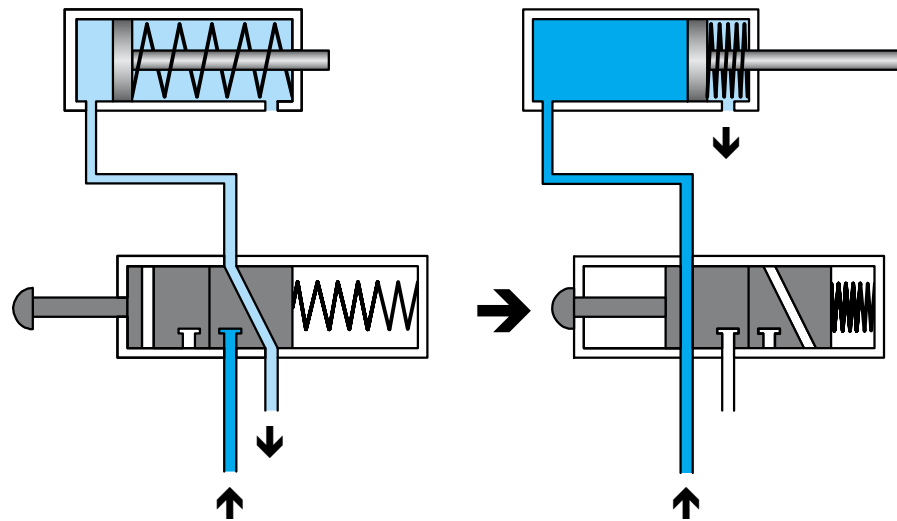
- Performs work in both directions
- 2 air supply ports

5/2-Way valve

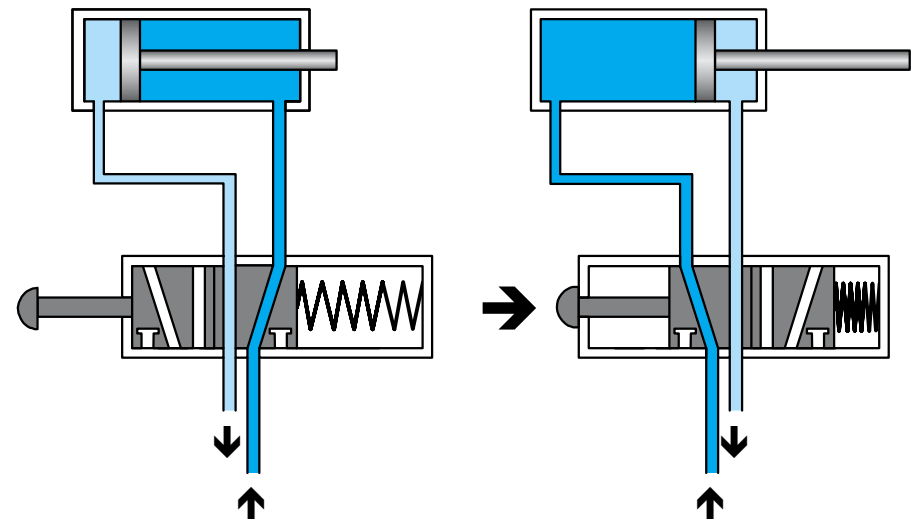
- 5 Working ports, 2 switching positions
- Manually actuated, spring return



Direct Actuation of Cylinders



Single-acting cylinder



Double-acting cylinder

Symbols for the Power Supply Section

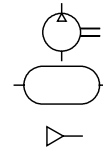
Symbols in accordance with DIN ISO 1219 "Fluid Technique – Graphical Symbols and Circuit Diagrams"

The triangle indicates the flow direction.

In general, the symbols for pneumatics and hydraulics are the same.

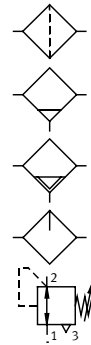
Energy Supply

- Compressor with constant displacement volume
- Pneumatic reservoir
- Pressure source



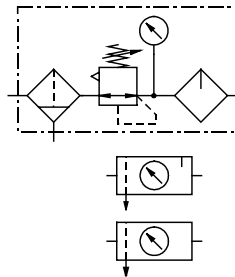
Maintenance

- Filter
- Water separator with manual actuation
- Water separator with automatic condensate drain
- Lubricator
- Pressure regulating valve with relief port, adjustable



Combined Symbols

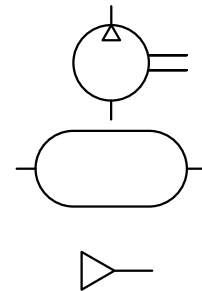
- Air service unit
Consisting of Compressed air filter, Pressure regulating valve, Pressure gauge and compressed air lubricator
- Simplified representation of a service unit
- Simplified representation of a service unit without compressed air lubricator



Symbols for the Power Supply Section

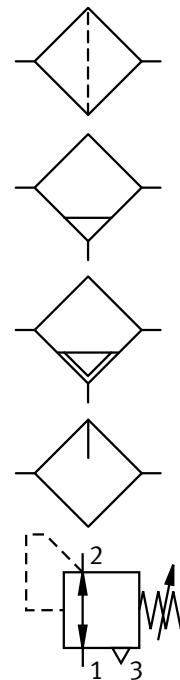
Energy Supply

- Compressor with constant displacement volume
- Pneumatic reservoir
- Pressure source



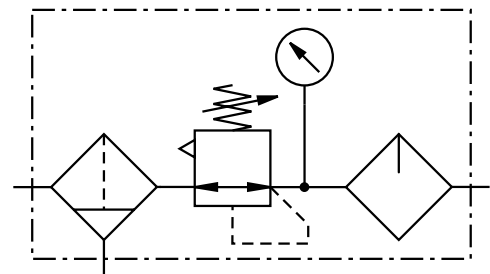
Maintenance

- Filter
- Water separator with manual actuation
- Water separator with automatic condensate drain
- Lubricator
- Pressure regulating valve with relief port, adjustable

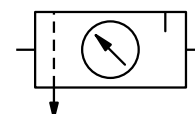


Combined Symbols

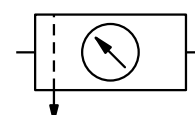
- Air service unit
Consisting of Compressed air filter, Pressure regulating valve, Pressure gauge and compressed air lubricator



Simplified representation of a service unit



Simplified representation of a service unit without compressed air lubricator



Directional Control Valves: Ports and Switching Positions

Directional control valves are used as

- Control elements
- Processing elements or
- Input elements

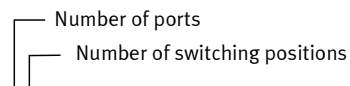
Written title: 2/2-Way valve

Spoken title: Two-slash-two way valve

Port identification: By numbers

Open position/Normally open position

Closed position/Normally closed position



2/2-way valve, normally open position



3/2-way valve, normally closed position



3/2-way valve, normally open position



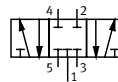
4/2-way valve
flow from 1 → 2 and from 4 → 3



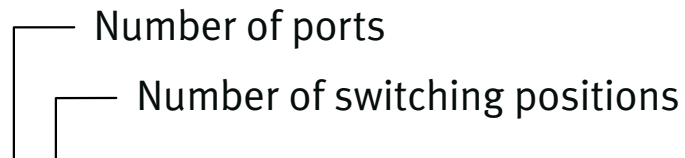
5/2-way valve
flow from 1 → 2 and from 4 → 5



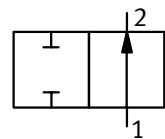
5/3-way valve, mid-position closed



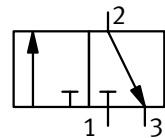
Directional Control Valves: Ports and Switching Positions



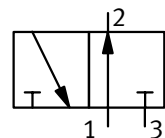
2/2-way valve, normally open position



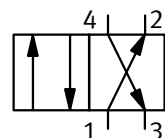
3/2-way valve, normally closed position



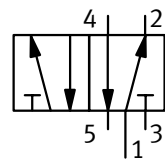
3/2-way valve, normally open position



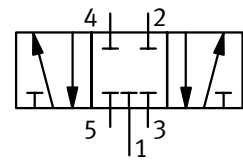
4/2-way valve
flow from 1 → 2 and from 4 → 3



5/2-way valve
flow from 1 → 2 and from 4 → 5



5/3-way valve, mid-position closed



Port designations

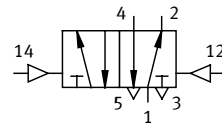
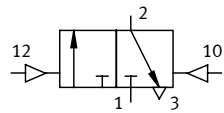
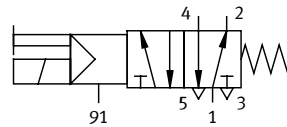
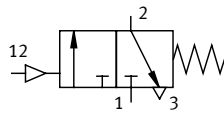
Port designation in accordance with DIN ISO 5599-3 "Fluid Technology – Pneumatics, 5-Way Valves"

Working ports

- 1 Supply port
- 2, 4 Working ports
- 3,5 Exhaust ports

Pilot ports

- 10 Signal applied blocks flow from 1 to 2
- 12 Signal applied opens flow from 1 to 2
- 14 Signal applied opens flow from 1 to 4
- 81, 91 Auxiliary pilot air



Port designations

