

Pneumatic Symbols

**For system diagrams and component
identification**



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- **Three position valves**
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- **Symbol Library**



Click the section to advance directly to it

Graphic Symbols Standards

- **Pneumatic symbols conform to and are devised from the International Standard ISO 1219-1 1991**
- **This covers graphical symbols for Fluid Power Systems and Components**
- **Port markings for fluid power valves are not covered by the ISO standard. These are taken from the recommendations of CETOP RP 68 P**



CETOP

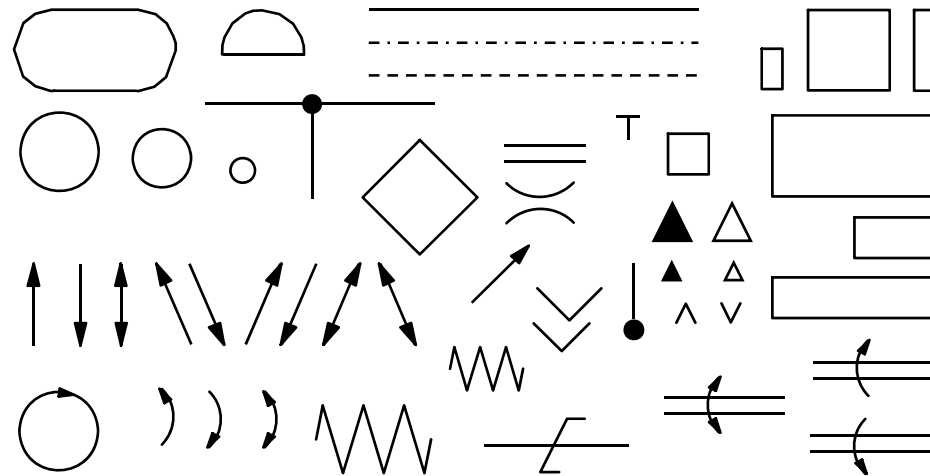
- **Who is CETOP? CETOP is the abbreviation of Comité Européen des Transmissions Oléohydrauliques et Pneumatiques. CETOP is the European Fluid Power Committee.
Thus, it is:**
 - **· The communication platform for fluid power in Europe.**
 - **· The international umbrella organisation for national fluid power associations in Europe.**
- **Through the 18 national associations which are member of CETOP, all well known companies in Europe belong to the European Committee. Many of these companies are leading fluid power manufacturers and major players in the international markets.**
- **CETOP represents more than 1,000 companies - mainly manufacturers, but also some dealers - with almost 70,000 employees and a market value of about 13 billion EURO. These account for a very high proportion of companies active in these fields - 80-90% in most countries.**

Basic Symbols



Shapes

- These shapes and lines in the relative proportions shown, make up a set of basic symbols from which fluid power symbols and circuits are constructed



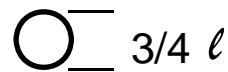
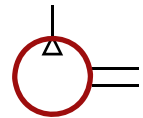
Basic Symbols (shapes)

- Symbol sets can be drawn to any size but their scale and relative proportions are determined by a basic dimension of your choice " ℓ "

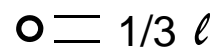
Circles



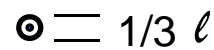
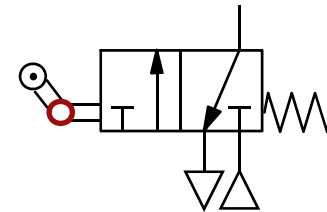
energy conversion units



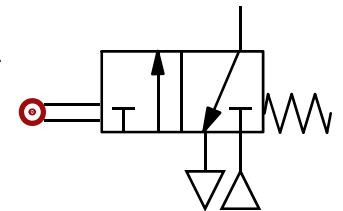
measuring instrument



mechanical link



roller

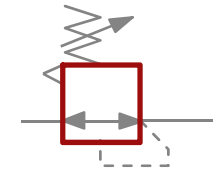


Basic Symbols (shapes)

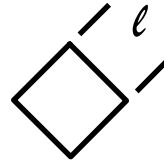
Square



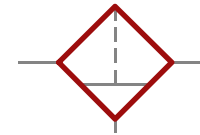
**control component
connections
perpendicular to sides**



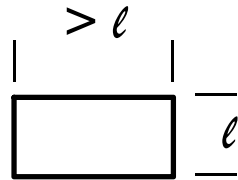
**Square at
45°**



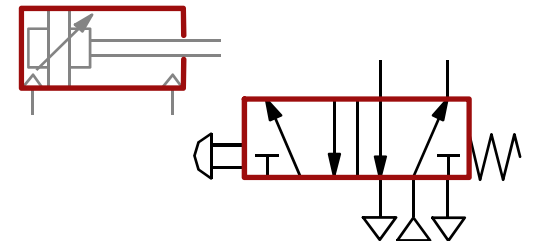
**conditioning apparatus
connections to corners**



Rectangle

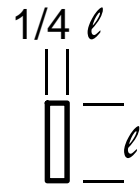


cylinders and valves

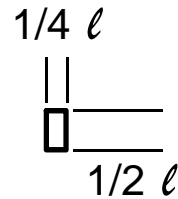
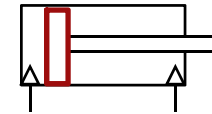


Basic Symbols (shapes)

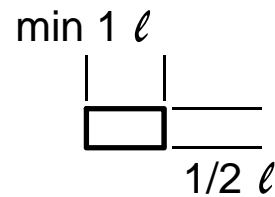
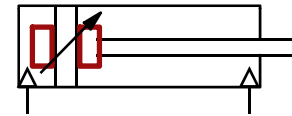
Rectangles
continued



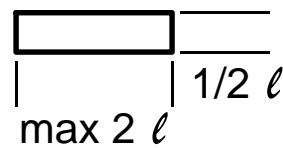
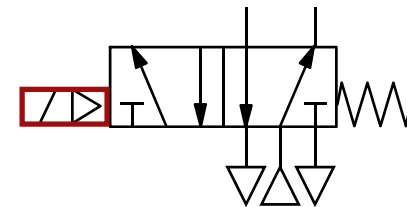
piston




cushion



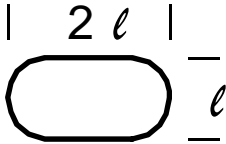
**certain control
methods, length
between limits to
suit**



Basic Symbols

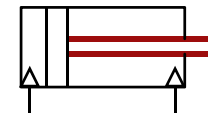
Semi-circle  rotary actuator, motor or pump with limited angle of rotation



Capsule  pressurised reservoir, air receiver, auxiliary gas bottle



Double line  mechanical connection, piston rod, lever, shaft

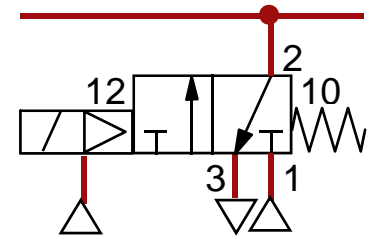


Basic Symbols

Line



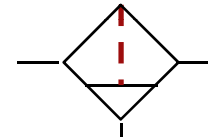
**Working line, pilot supply,
return, electrical**



Dashed



Pilot control, bleed, filter



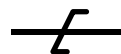
Chain



**Enclosure of two or more
functions in one unit**



Line





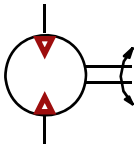


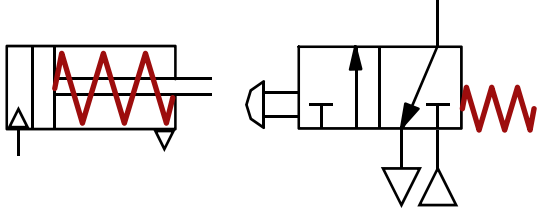


Electrical line



Functional Elements




Functional Elements

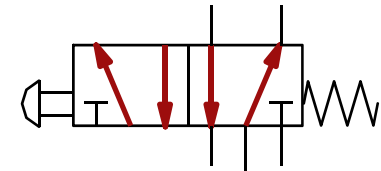
Triangle	$\frac{1}{2} \ell$  $\frac{1}{4} \ell$ 	Direction and nature of fluid, open pneumatic or filled hydraulic	
Spring	 	size to suit	
Arrow	 $\frac{1}{3} \ell$	Long sloping indicates adjustability	



Functional Elements

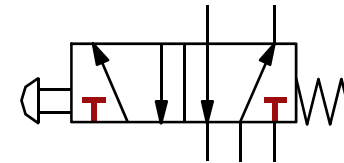
Arrows 

Straight or sloping path and flow direction, or motion



Tee 

Closed path or port





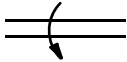

Restriction 

Size to suit

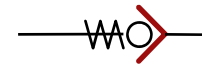


Functional Elements

Curved arrows  rotary motion

Shaft rotation  clockwise from right hand end
 anti-clockwise from right hand end
 both

Seating  90° angle



Functional Elements

Temperature



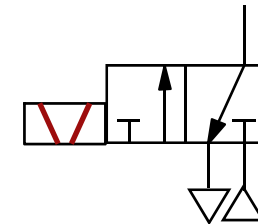
**Indication or control
size to suit**



Operator



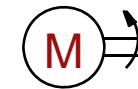
**Opposed solenoid
windings**



Prime mover

M


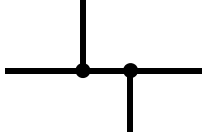
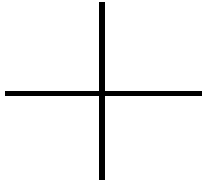

Electric motor



Flowlines and Connections



Flowlines

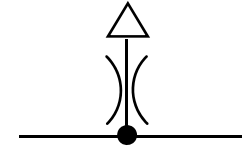
Junction		Single
Junction		Four way junction
Crossing		not connected
Flexible line		Hose usually connecting parts with relative movement



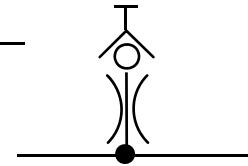
Connections

Air bleed

Continuous



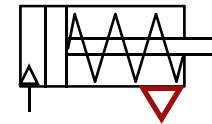
Temporary by probe



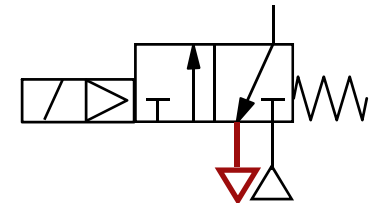
Air exhaust



No means of connection

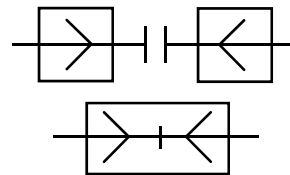


With means of connection



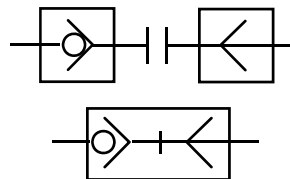
Connections

**Coupling quick
release**



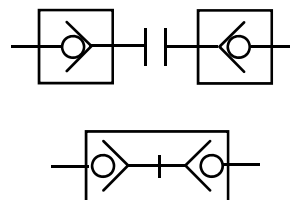
Both to exhaust

**Coupling quick
release self sealing**



Source sealed

**Coupling quick
release self sealing**

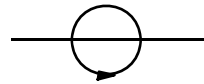


Both sealed

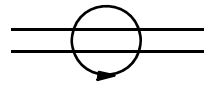


Connections

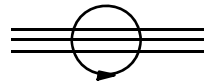
Rotary connection one line



Rotary connection two lines



Rotary connection three lines

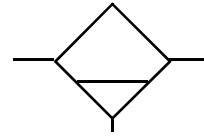


Conditioners and Pressure Producing Plant

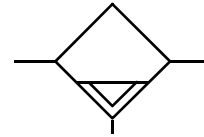


Conditioners

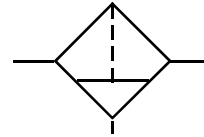
- **Water separator with manual drain**



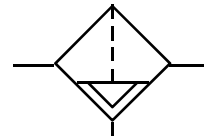
- **Water separator with automatic drain**



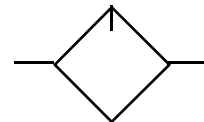
- **Filter with manual drain**



- **Filter with automatic drain**

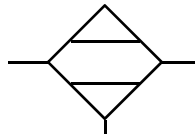


- **Lubricator**

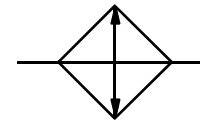
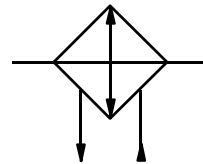


Conditioners

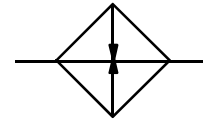
- **Dryer**



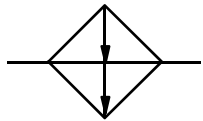
- **Cooler with and without coolant flow lines**



- **Heater**

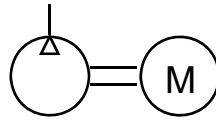


- **Combined heater / cooler**



Plant

- **Compressor and electric motor**



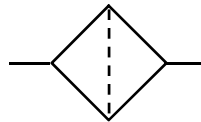
- **Air receiver**



- **Isolating valve**



- **Air inlet filter**



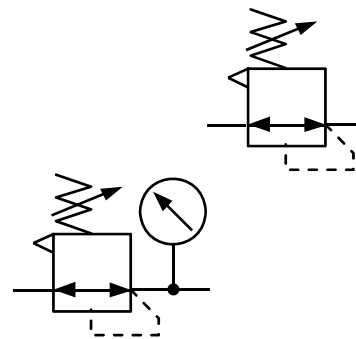
Pressure Control



Pressure regulators

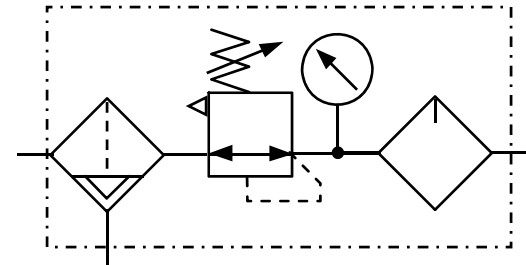
- A pressure regulator symbol represents a normal state with the spring holding the regulator valve open to connect the supply to the outlet.
- The dotted line represents the feedback, this opposes the spring and can vary the flow through the valve from full flow, through shut off, to exhaust. The symbol is usually drawn in only this one state. The flow path can be imagined to hinge at the right hand end to first shut off the supply then connect to the exhaust.

- Adjustable Regulator simplified
- Adjustable Regulator with pressure gauge simplified

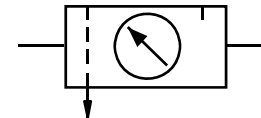


Filter Regulator Lubricator

- **FRL Combined unit**



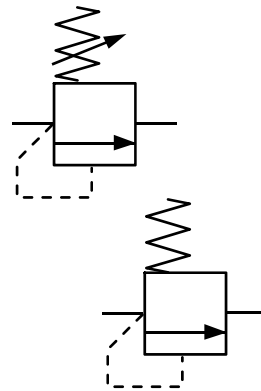
- **FRL Simplified symbol**



Pressure relief valves

- A pressure relief valve symbol represents a normal state with the spring holding the valve closed.
- The dotted line represents feed-forward, this opposes the spring and can be imagined to lift the flow path. When the pressure reaches an excess value the flow path will line up with the ports and flow air to relief.

- Adjustable relief valve simplified



- Preset relief valve simplified

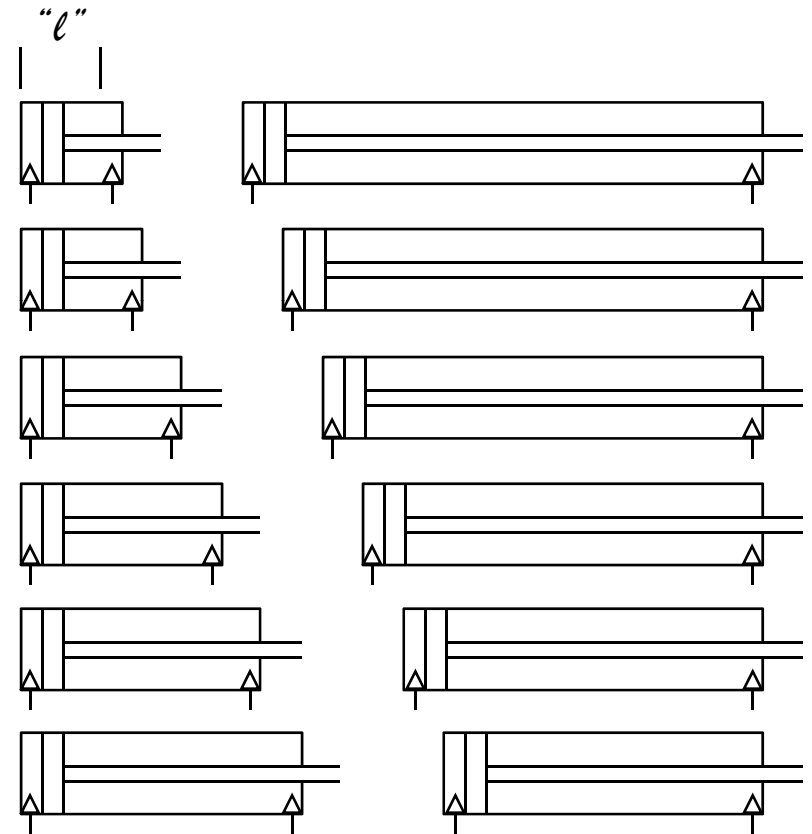
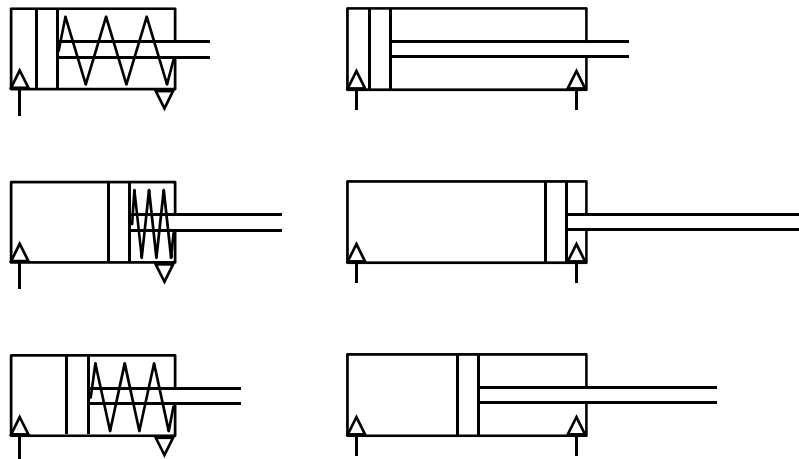


Actuators



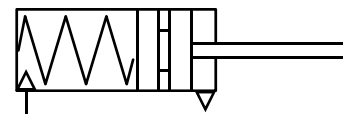
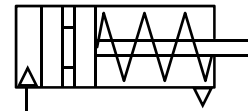
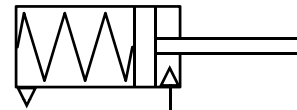
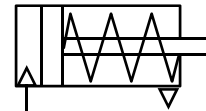
Actuators

- Cylinders symbols can be any length over "l"
- The piston and rod can be shown in the retracted, extended or any intermediate position



Single acting

- **Single acting sprung instroked**
- **Single acting sprung outstroked**
- **Single acting sprung instroked magnetic ***
- **Single acting sprung outstroked magnetic ***

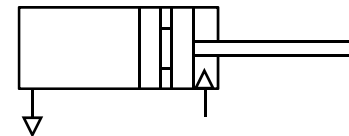
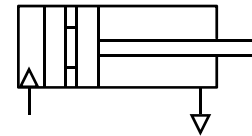
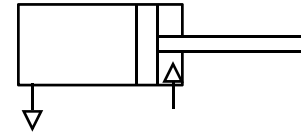
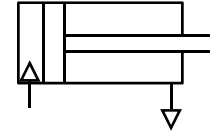


* ISO 1219-1 provides no example for magnetic cylinders



Single acting without spring

- **Single acting normally instroked external force returns**
- **Single acting normally outstroked external force returns**
- **Single acting normally instroked magnetic external force returns**
- **Single acting normally outstroked magnetic external force returns**

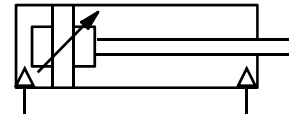


Note: the hardware is usually double acting cylinders applied as single acting

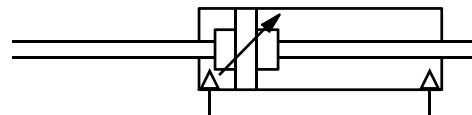


Double acting

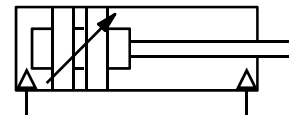
- Double acting adjustable cushions



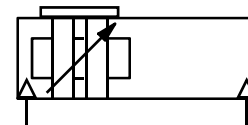
- Double acting through rod



- Double acting magnetic *



- Double acting rodless *

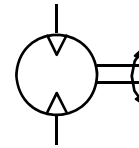
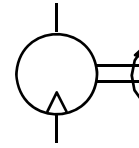


* ISO 1219-1 provides no example for magnetic or rodless cylinders



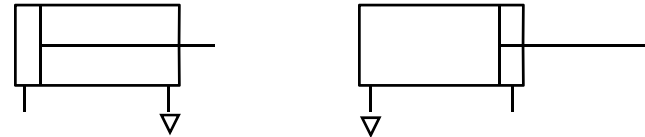
Rotary actuators

- **Semi rotary double acting**
- **Rotary motor single direction of rotation**
- **Rotary motor bi-directional**

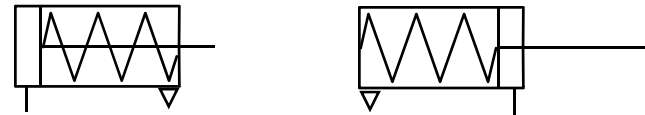


Simplified cylinder symbols

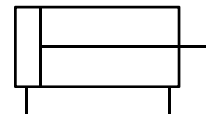
- **Single acting load returns**



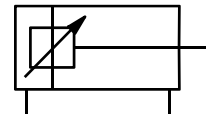
- **Single acting spring returns**



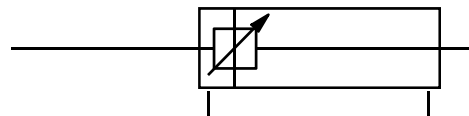
- **Double acting non cushioned**



- **Double acting adjustable cushions**



- **Double acting through rod**



Valve symbol structure



Valve symbol structure

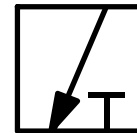
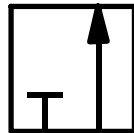
- The function of a valve is given by a pair of numerals separated by a stroke, e.g. 3/2..
- The first numeral indicates the number of main ports. These are inlets, outlets and exhausts but excludes signal ports and external pilot feeds.
- The second numeral indicates the number of states the valve can achieve.



Valve symbol structure

- A 3/2 valve therefore has 3 ports (normally these are inlet, outlet and exhaust) and 2 states (the normal state and the operated state)
- The boxes are two pictures of the same valve

operated



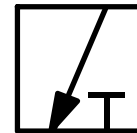
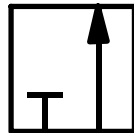
normal



Valve symbol structure

- A valve symbol shows the pictures for each of the valve states joined end to end

operated



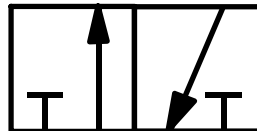
normal



Valve symbol structure

- A valve symbol shows the pictures for each of the valve states joined end to end

operated

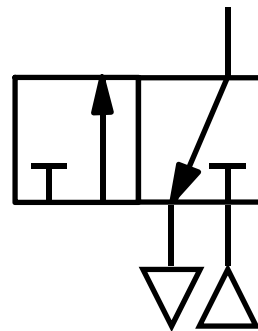


normal



Valve symbol structure

- The port connections are shown to only one of the diagrams to indicate the prevailing state



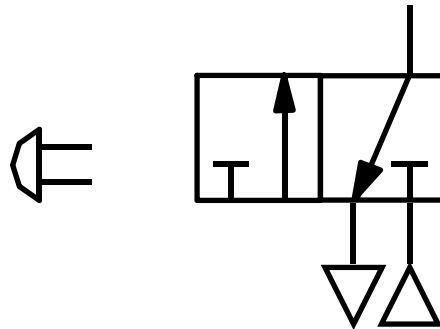
normal



Valve symbol structure

- The operator for a particular state is illustrated against that state

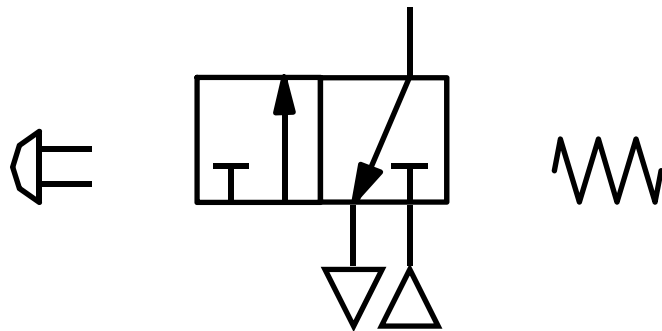
Operated state
produced by
pushing a button



Valve symbol structure

- The operator for a particular state is illustrated against that state

Operated state
produced by
pushing a button



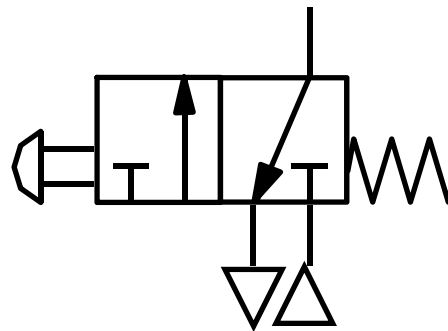
Normal state
produced by
a spring



Valve symbol structure

- The operator for a particular state is illustrated against that state

Operated state
produced by
pushing a button

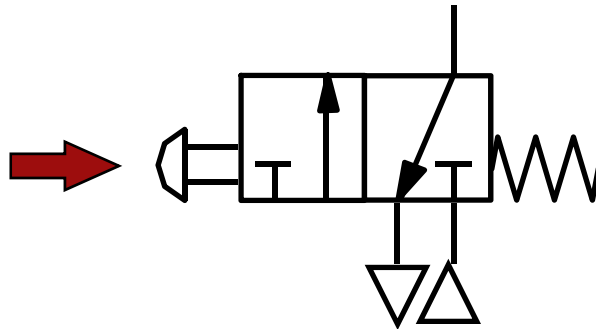


Normal state
produced by
a spring



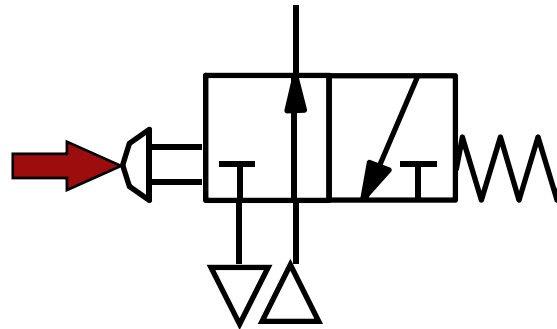
Valve symbol structure

- The valve symbol can be visualised as moving to align one state or another with the port connections



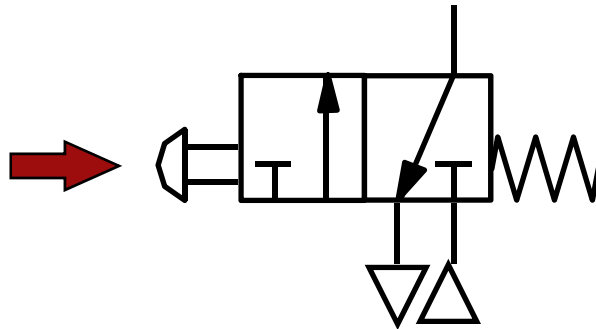
Valve symbol structure

- The valve symbol can be visualised as moving to align one state or another with the port connections



Valve symbol structure

- The valve symbol can be visualised as moving to align one state or another with the port connections



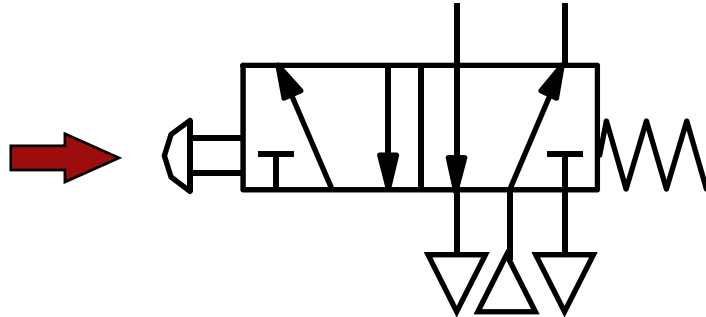
Valve symbol structure

- A 5/2 valve symbol is constructed in a similar way. A picture of the valve flow paths for each of the two states is shown by the two boxes. The 5 ports are normally an inlet, 2 outlets and 2 exhausts



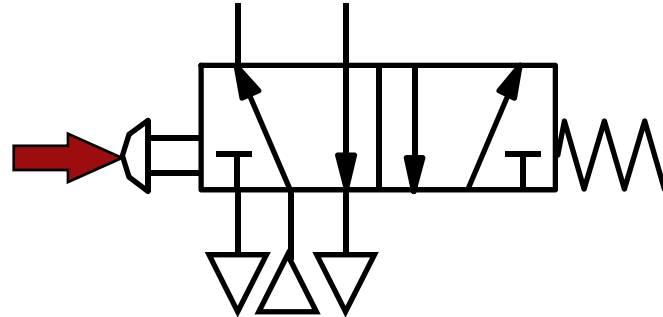
Valve symbol structure

- The full symbol is then made by joining the two boxes and adding operators. The connections are shown against only the prevailing state



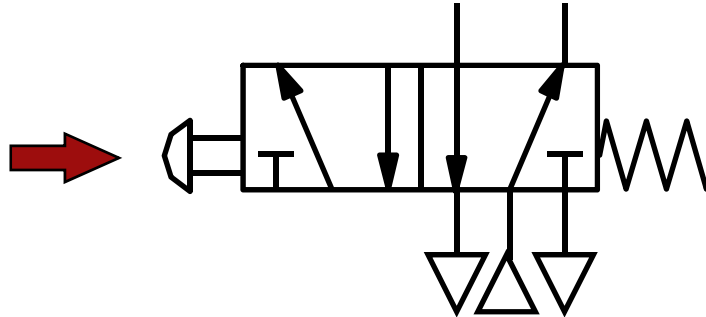
Valve symbol structure

- The full symbol is then made by joining the two boxes and adding operators. The connections are shown against only the prevailing state



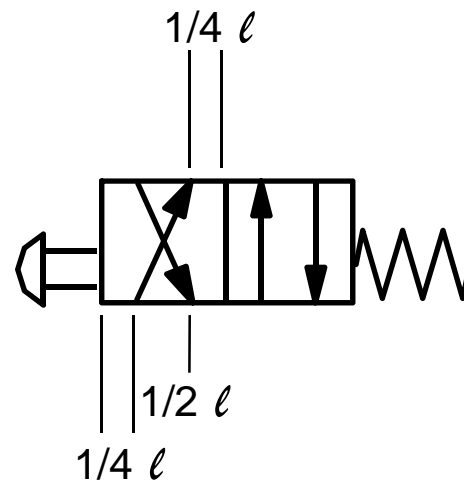
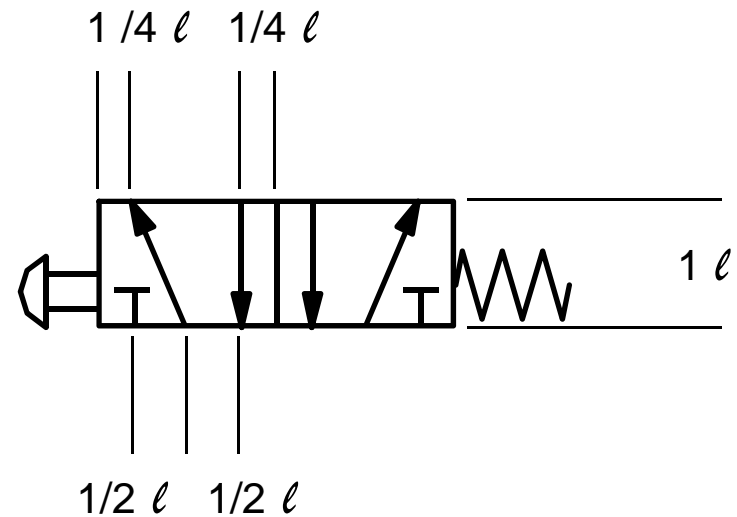
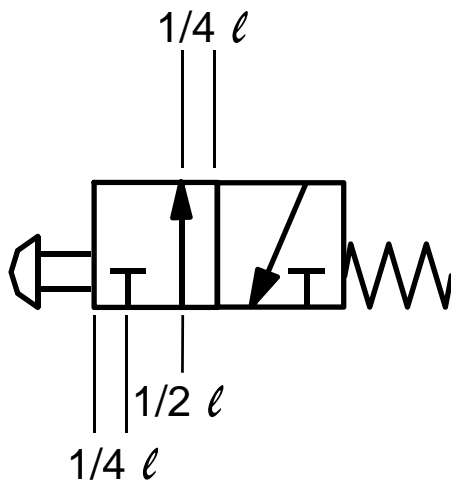
Valve symbol structure

- The full symbol is then made by joining the two boxes and adding operators. The connections are shown against only the prevailing state



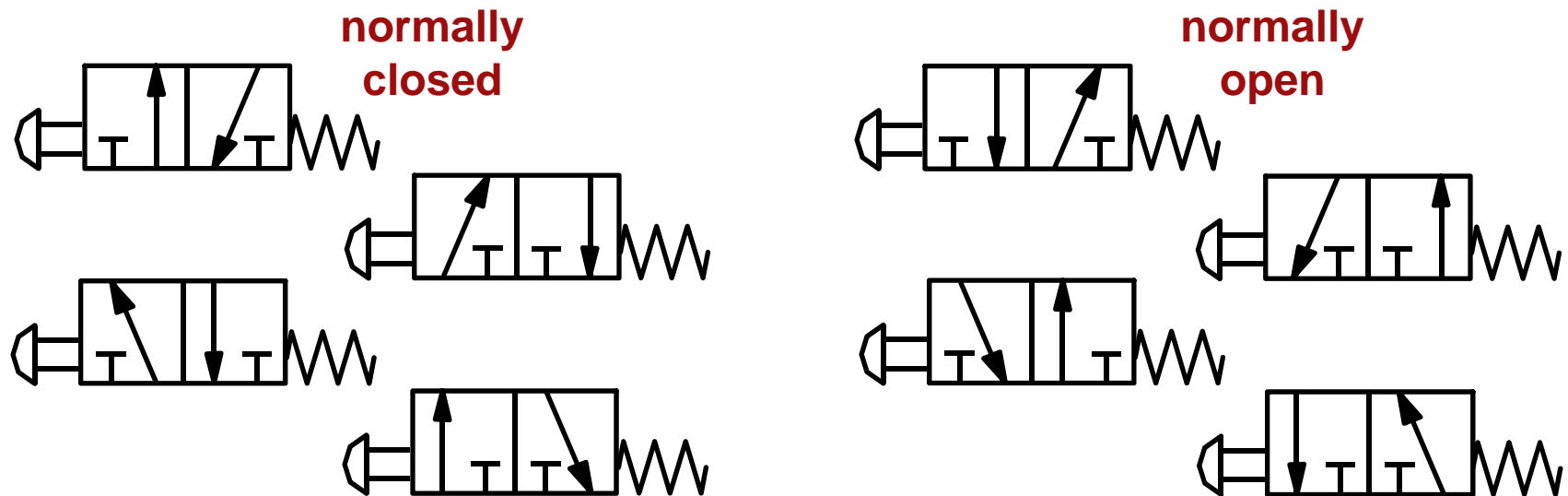
Valve symbol structure

- The recommended spacing of the connections



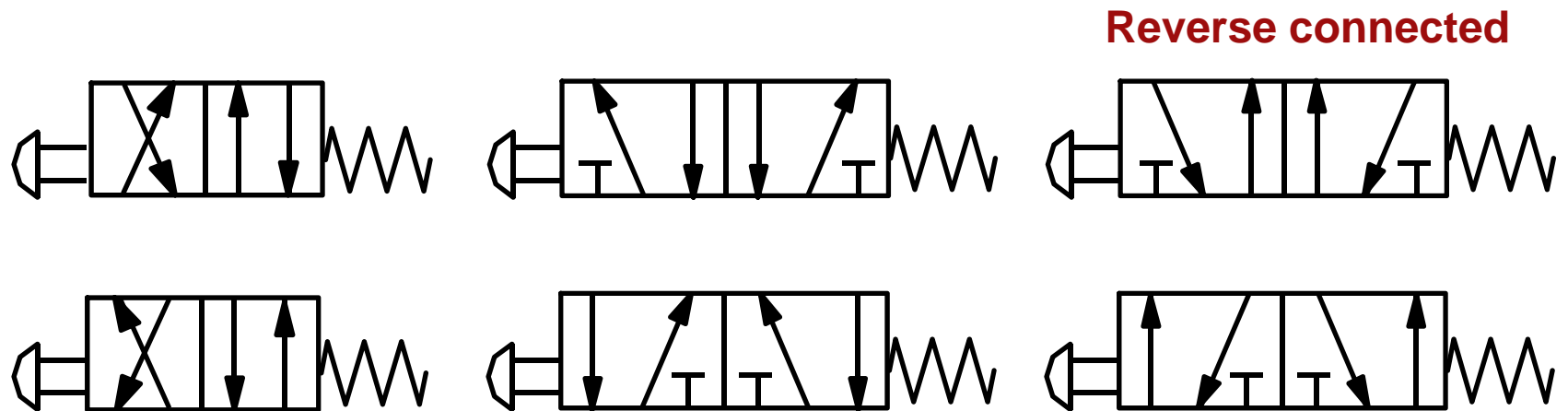
Valve symbol structure

- The boxes can be joined at either end but the operator must be drawn against the state that it produces. The boxes can also be flipped
- A variety of symbol patterns are possible



Valve symbol structure

- The boxes can be joined at either end but the operator must be drawn against the state that it produces. The boxes can also be flipped
- A variety of symbol patterns can be produced



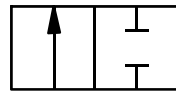
Valve functions



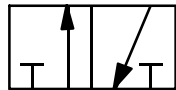
Valve functions

Basic valves before operators are added

Function 2/2

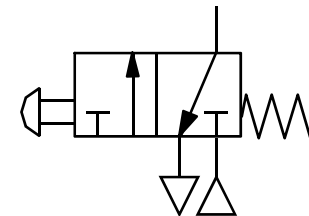
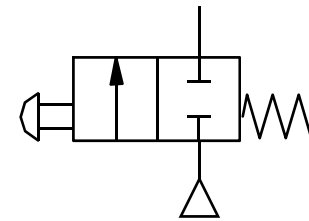


Function 3/2



Examples, push button operated with spring return

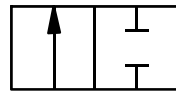
Normal position



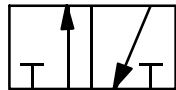
Valve functions

Basic valves before operators are added

Function 2/2

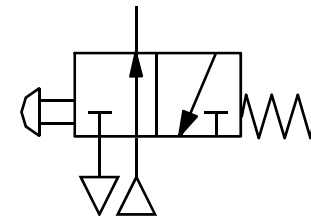
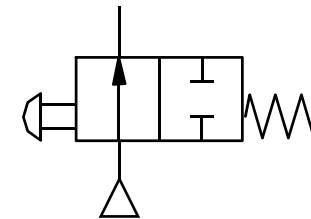


Function 3/2



Examples, push button operated with spring return

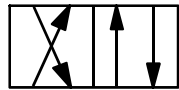
Operated position



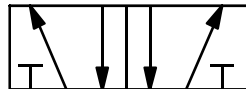
Valve functions

Basic valves before operators are added

Function 4/2

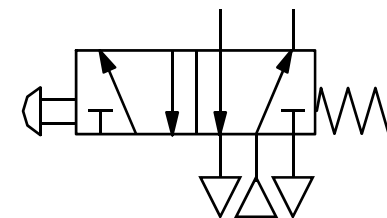
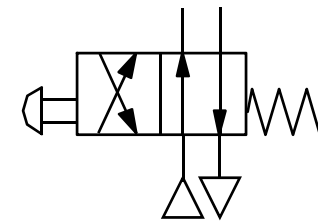


Function 5/2



Examples, push button operated with spring return

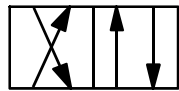
Normal position



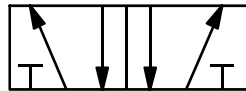
Valve functions

Basic valves before operators are added

Function 4/2

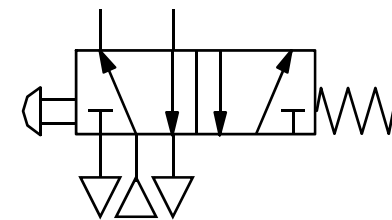
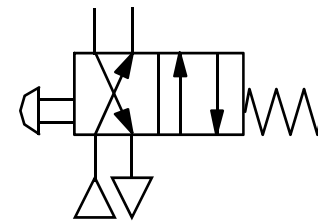


Function 5/2



Examples, push button operated with spring return

Operated position



Valve functions 5/3

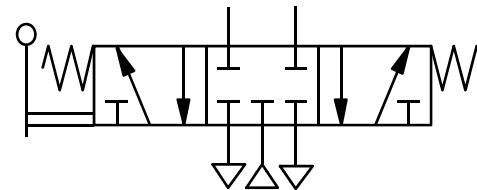
- **Three position valves have a normal central position that is set by springs or with a manual control such as a lever**
- **The flow pattern in the centre position varies with the type. Three types will be considered**
 - **1, All ports sealed**
 - **2, Outlets to exhaust, supply sealed**
 - **3, Supply to both outlets, exhausts sealed**



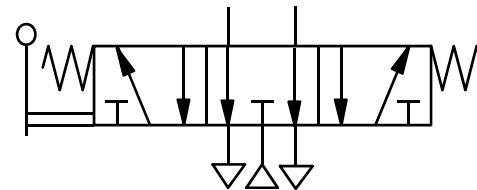
Valves 5/3

- All valves types shown in the **normal position**

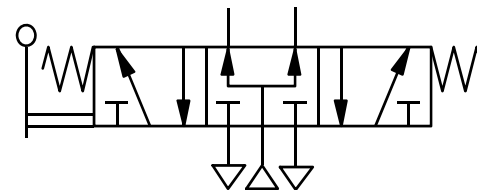
- **Type 1. All ports sealed**



- **Type 2. Outlets to exhaust**



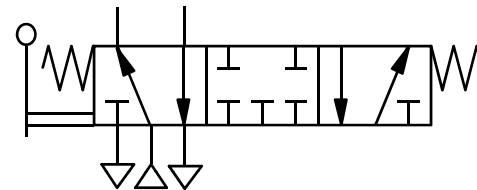
- **Type 3. Supply to outlets**



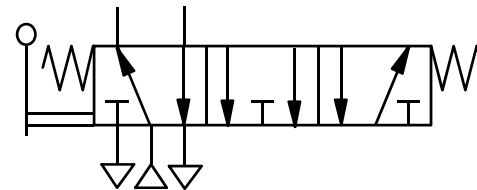
Valves 5/3

- All valves types shown in the **first operated position**

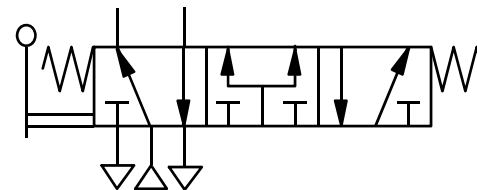
- **Type 1. All ports sealed**



- **Type 2. Outlets to exhaust**



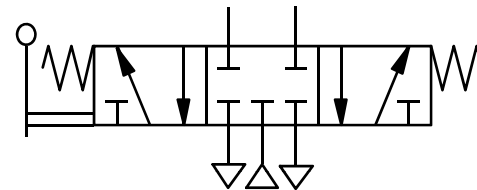
- **Type 3. Supply to outlets**



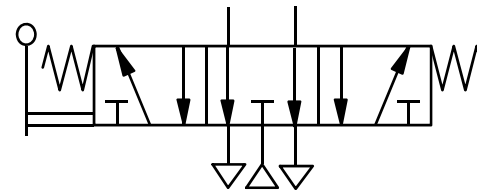
Valves 5/3

- All valves types shown in the **normal position**

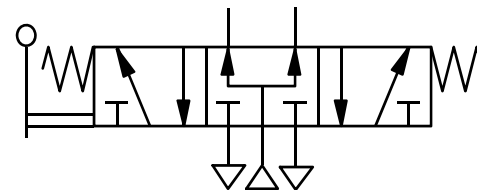
- **Type 1. All ports sealed**



- **Type 2. Outlets to exhaust**



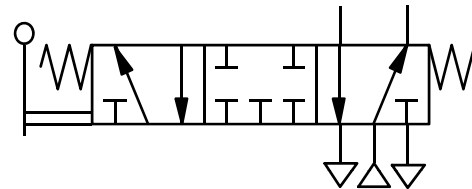
- **Type 3. Supply to outlets**



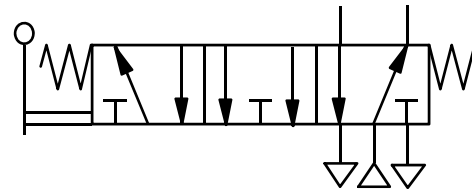
Valves 5/3

- All valves types shown in the **second operated position**

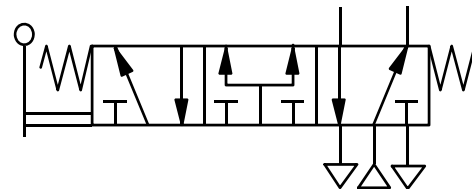
- **Type 1. All ports sealed**



- **Type 2. Outlets to exhaust**



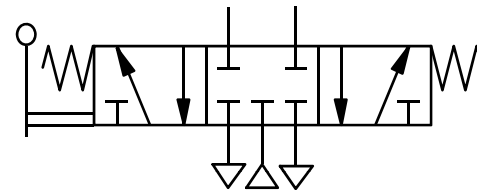
- **Type 3. Supply to outlets**



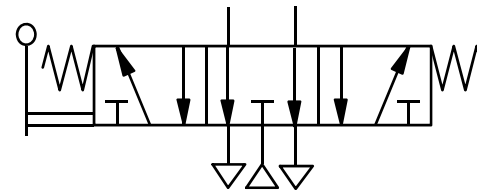
Valves 5/3

- All valves types shown in the **normal position**

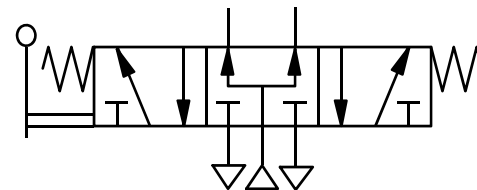
- **Type 1. All ports sealed**



- **Type 2. Outlets to exhaust**



- **Type 3. Supply to outlets**



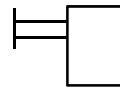
Operators



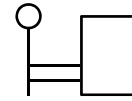
Operators

Manual

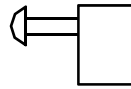
General manual



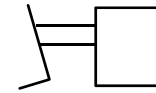
Lever



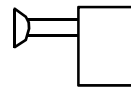
Push button



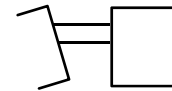
Pedal



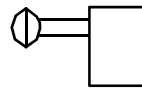
Pull button



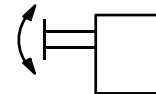
Treadle



Push/pull button



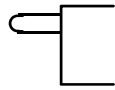
Rotary knob



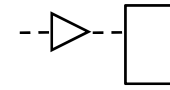
Operators

Mechanical

Plunger



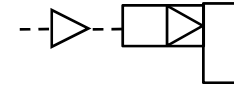
Pressure



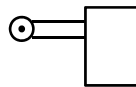
**Spring normally
as a return**



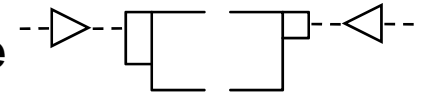
Pilot pressure



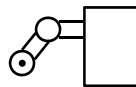
Roller



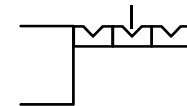
Differential pressure



**Uni-direction
or one way trip**



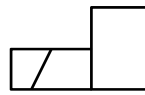
Detent in 3 positions



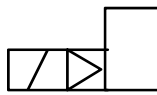
Operators

Electrical

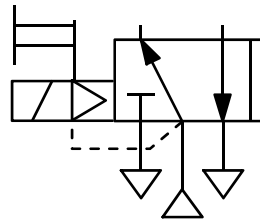
Solenoid direct



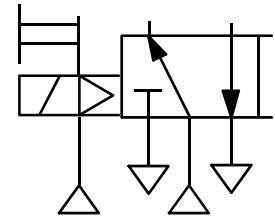
Solenoid pilot



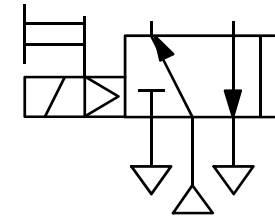
Solenoid pilot with manual override and integral pilot supply



Solenoid pilot with manual override and external pilot supply



When no integral or external pilot supply is shown it is assumed to be integral

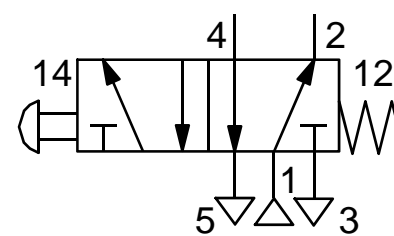
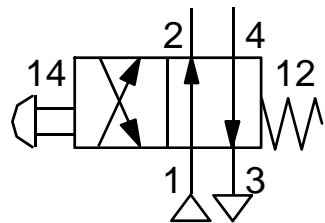
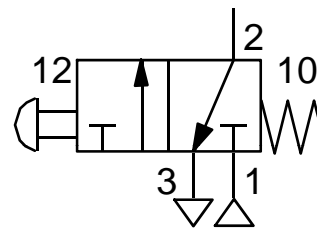
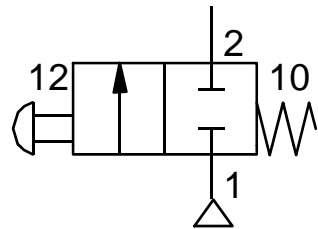


Port markings



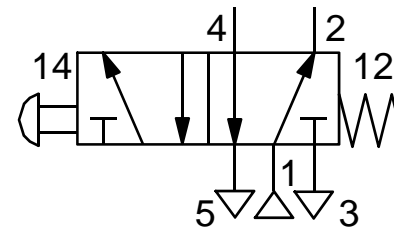
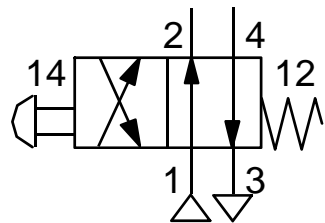
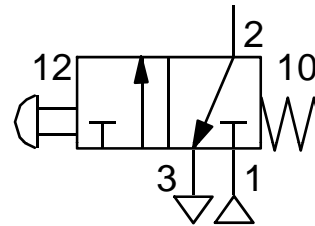
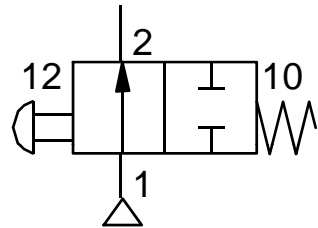
Port Markings

To CETOP RP68P



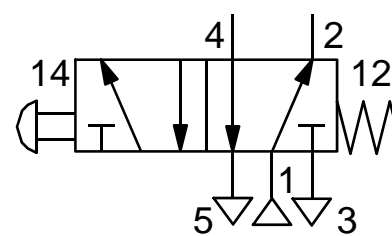
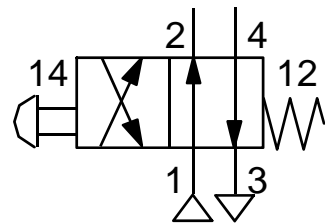
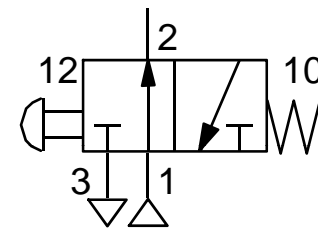
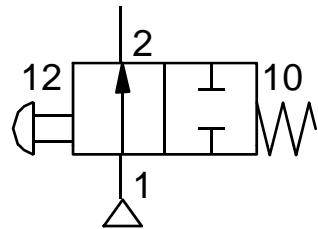
Port Markings

To CETOP RP68P



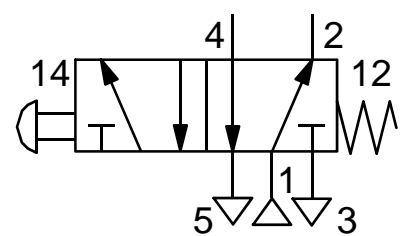
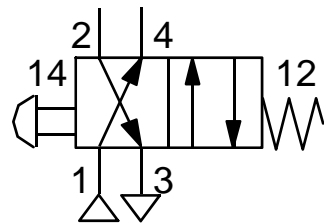
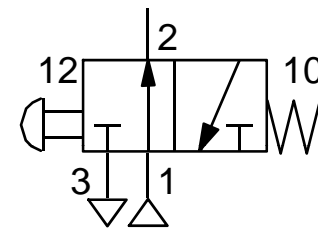
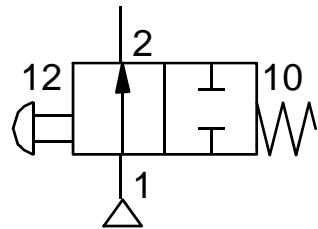
Port Markings

To CETOP RP68P



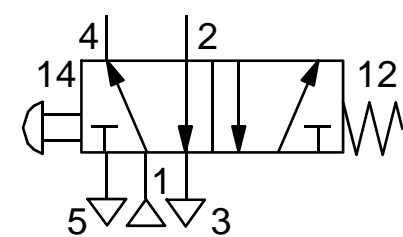
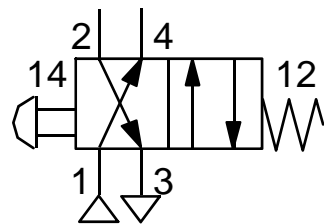
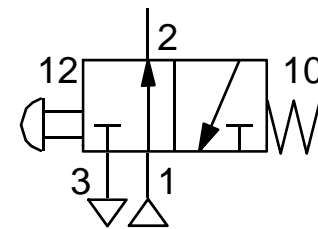
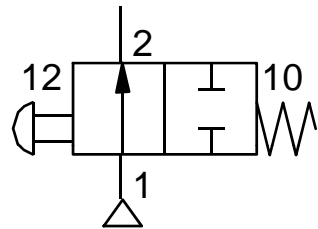
Port Markings

To CETOP RP68P



Port Markings

To CETOP RP68P

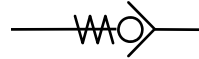


Function components



Function components

- Non-return valve simplified



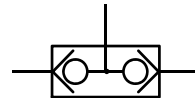
- Flow regulator uni-directional



- Flow regulator bi-directional simplified

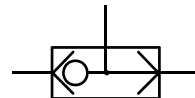


- Two pressure 'AND' simplified



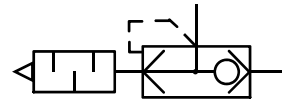
Note: The output can exhaust back and is not trapped

- Shuttle valve 'OR' simplified

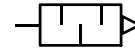


Function components

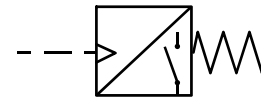
- Quick exhaust valve with silencer simplified



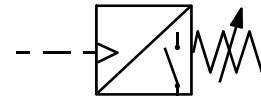
- Silencer










- Pressure to electric switch preset



- Pressure to electric switch adjustable



Symbol Library

- **Actuators** 
- **Solenoid Valves** 
- **Valves** 
- **Air Line** 
- **Function Components** 
- **Vacuum** 
- **Electrical and electronic** 



Click the section arrow to go to it

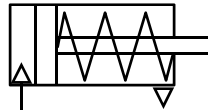
Symbol Library

Actuators

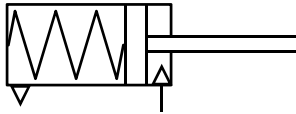


Single acting cylinders

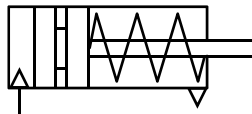
- Sprung in



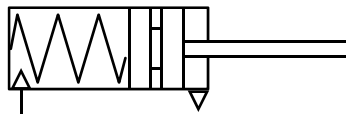
- Sprung out



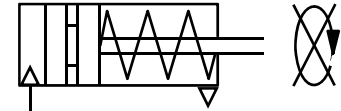
- Magnetic sprung in



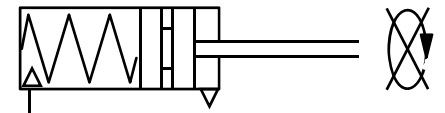
- Magnetic sprung out



- Magnetic sprung in non-rotating rod

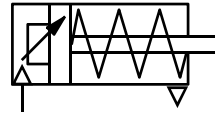


- Magnetic sprung out non-rotating rod

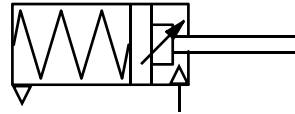


Single acting cylinders

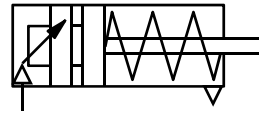
- Sprung in adjustable cushion



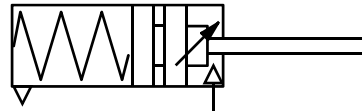
- Sprung out adjustable cushion



- Magnetic sprung in adjustable cushion

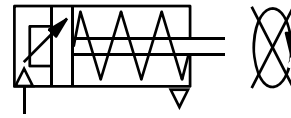


- Magnetic sprung out adjustable cushion

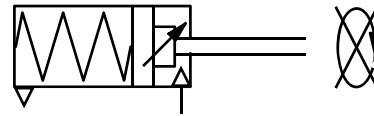


Single acting cylinders

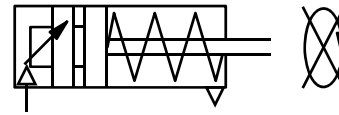
- Sprung in adjustable cushion non-rotating rod



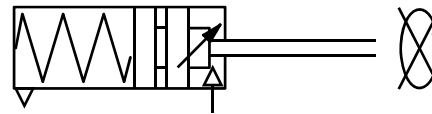
- Sprung out adjustable cushion non-rotating rod



- Magnetic sprung in adjustable cushion non-rotating rod

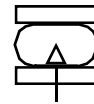


- Magnetic sprung out adjustable cushion non-rotating rod

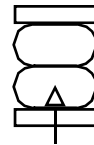


Single acting bellows

- **Bellows single convolution**



- **Bellows double convolution**

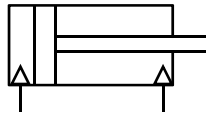


- **Bellows triple convolution**

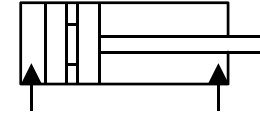


Double acting cylinders

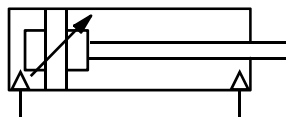
- **Non-magnetic**



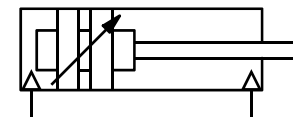
- **Magnetic hydraulic**



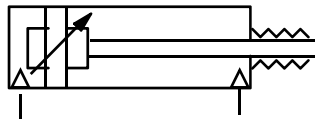
- **Non-magnetic adjustable cushioned**



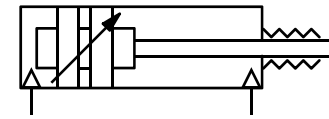
- **Magnetic adjustable cushioned**



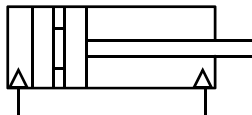
- **Non-magnetic rod bellows**



- **Magnetic adjustable cushioned rod bellows**

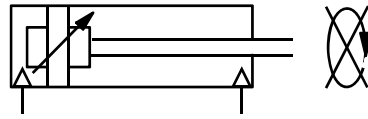


- **Magnetic**

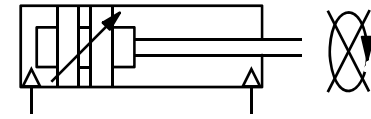


Double acting cylinders

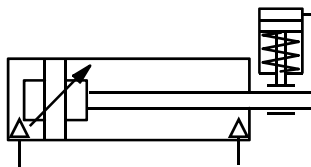
- **Non-rotating rod**



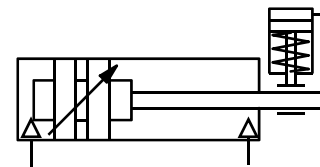
- **Magnetic non-rotating rod**



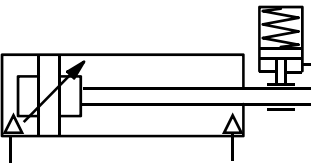
- **Active brake**



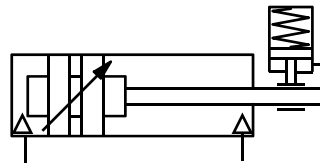
- **Magnetic active brake**



- **Passive brake**



- **Magnetic passive brake**

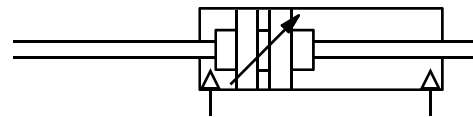
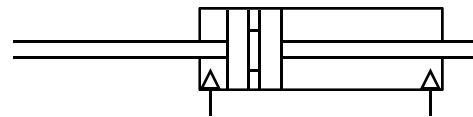
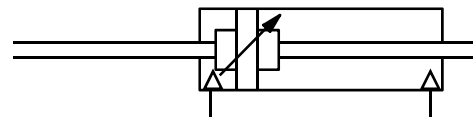
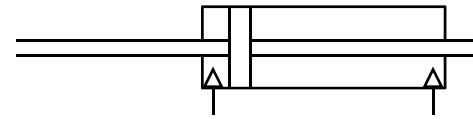


- **Guided rod magnetic**



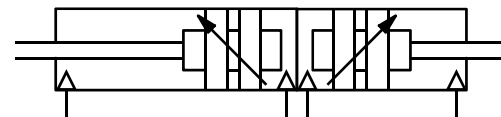
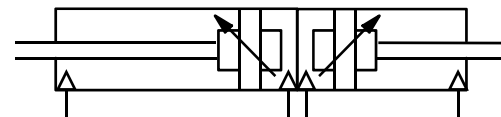
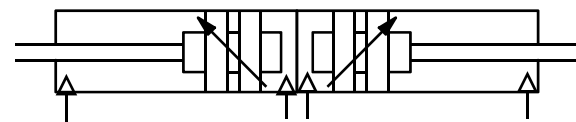
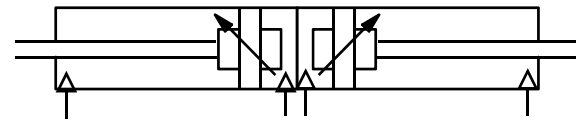
Double acting cylinders

- **Non-magnetic through rod**
- **Non-magnetic adjustable cushioned through rod**
- **Magnetic through rod**
- **Magnetic adjustable cushioned through rod**



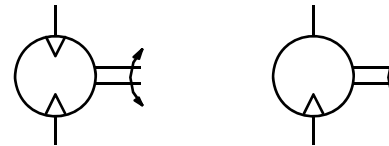
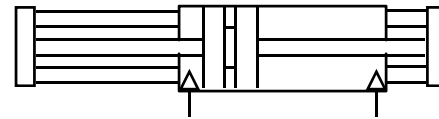
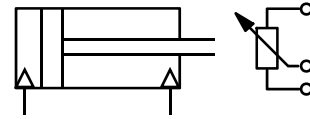
Double acting cylinders

- Three position adjustable cushions (equal strokes)
- Three position adjustable cushions magnetic (equal strokes)
- Four position adjustable cushions (unequal strokes)
- Four position adjustable cushions magnetic (unequal strokes)



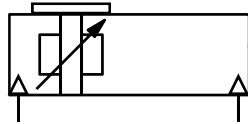
Other actuators

- **With electronic analogue output of piston position**
- **Slide unit**
- **Semi-rotary actuator**
- **Rotary motor bi-directional and non-reversible**

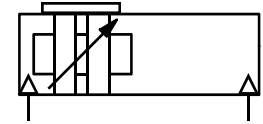


Rodless cylinders

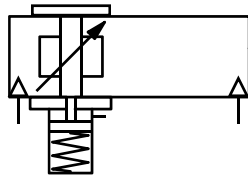
- Cushioned



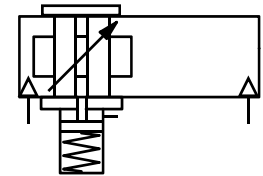
- Cushioned magnetic



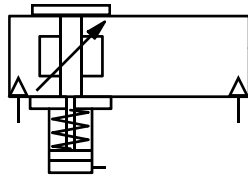
- Cushioned passive brake



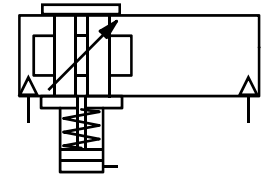
- Cushioned magnetic passive brake



- Cushioned active brake

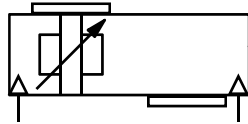


- Cushioned magnetic active brake

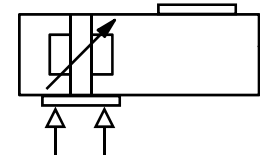


Rodless cylinders

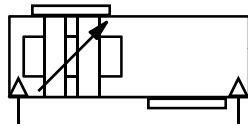
- **Twin stroke cushioned**



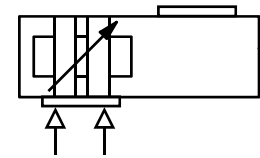
- **Twin stroke air through carriage**



- **Twin stroke cushioned magnetic**

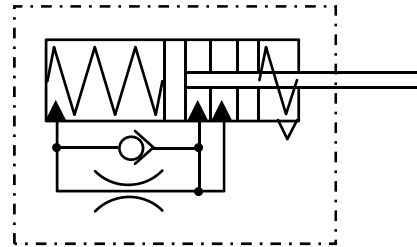


- **Twin stroke air through carriage magnetic**

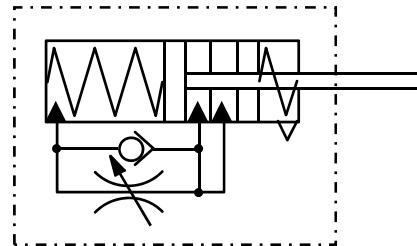


Shock absorbers

- **Self adjusting**



- **Adjustable**



End



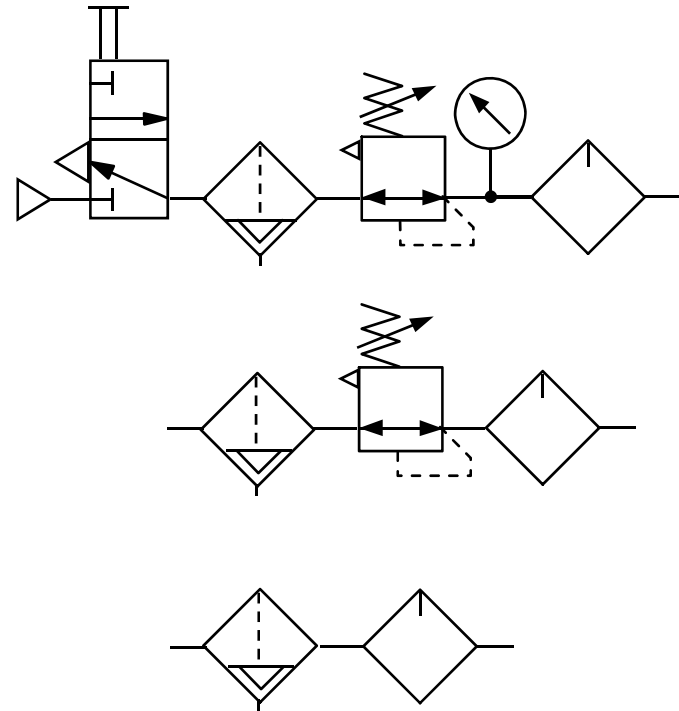
Symbol Library

Air Line Equipment



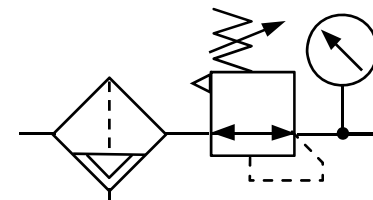
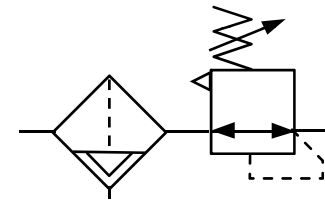
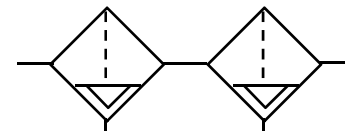
Combination units

- **FRL with shut off valve and pressure gauge**
- **Lubro-control unit**
- **Filter and lubricator**



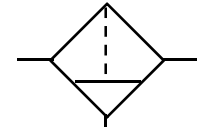
Combination units

- **Breathing air set**
- **Filter regulator**
- **Filter regulator with gauge**

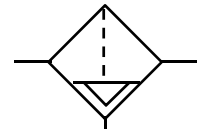


Filters

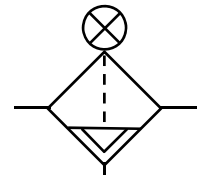
- **Filter with manual drain**



- **Filter with automatic drain**

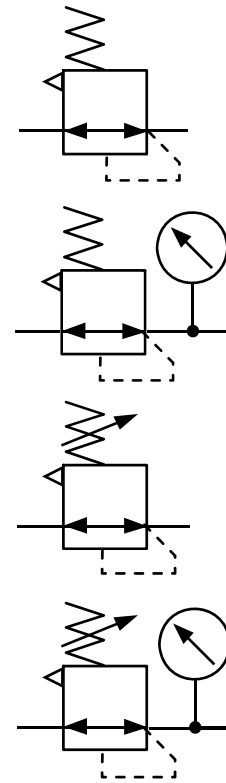


- **Filter with automatic drain and pressure drop indicator**



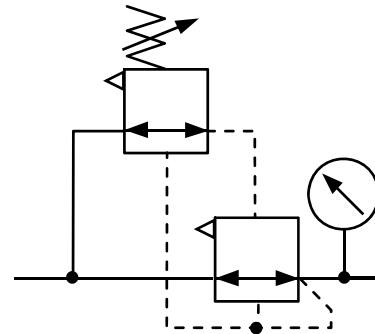
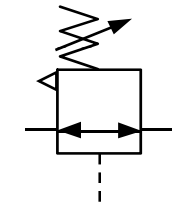
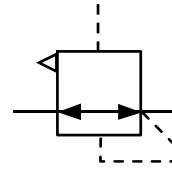
Pressure regulators

- **Pre-set relieving**
- **Pre-set relieving with pressure gauge**
- **Adjustable relieving**
- **Adjustable relieving with pressure gauge**



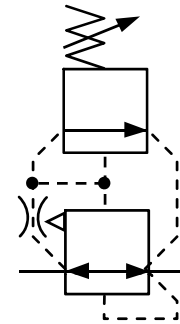
Pressure regulators

- **Pilot operated**
- **Pilot regulator with independent feedback**
- **Pilot operated regulator controlled from pilot regulator**

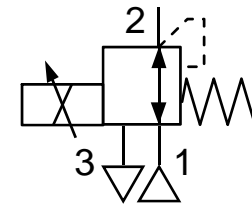


Pressure regulators

- Precision dual stage (11-818)

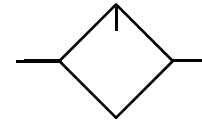


- Proportional pressure valve



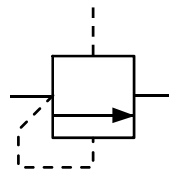
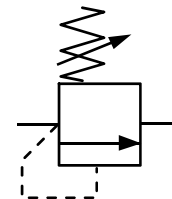
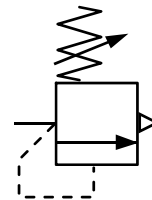
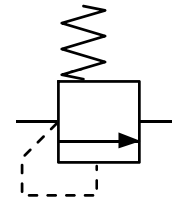
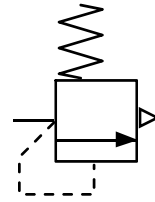
Lubricator

- Lubricator



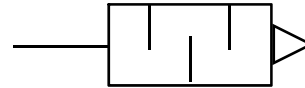
Pressure relief valves

- **Preset, no means of connection to exhaust**
- **Preset, tapped exhaust port**
- **Adjustable, no means of connection to exhaust**
- **Adjustable, tapped exhaust port**
- **Pilot operated**

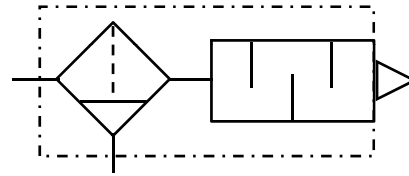


Other components

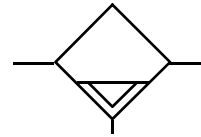
- **Silencer**



- **Filter silencer**



- **Water separator automatic drain**



End



Symbol Library

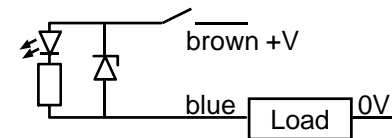
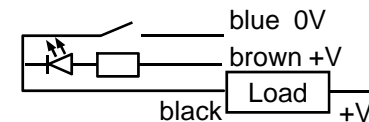
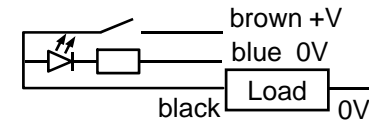
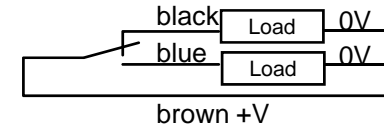
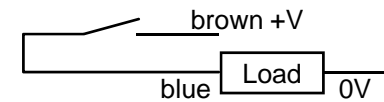
Electrical and Electronic



Sensors

Loads must be additionally suppressed

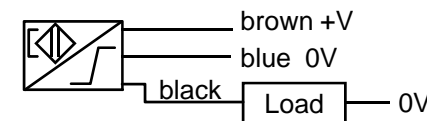
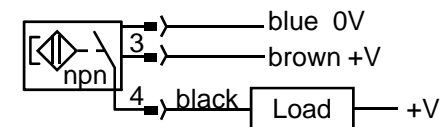
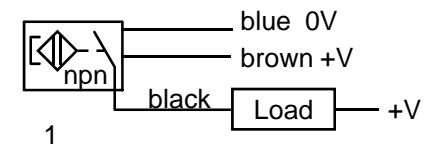
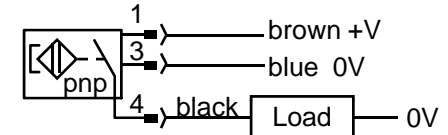
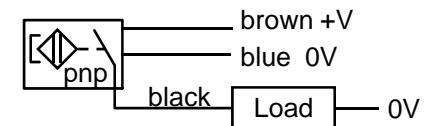
- Reed switch 2 wire
- Reed switch changeover
- Reed switch 3 wire with led indicator (emulating current sourcing pnp device)
- Reed switch 3 wire with led indicator (emulating current sinking npn device)
- Reed switch 2 wire with led indicator



Sensors

Loads must be additionally suppressed

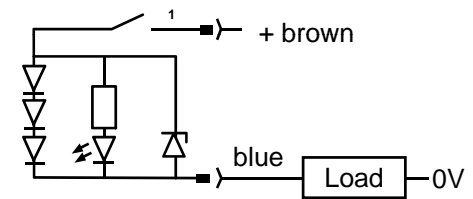
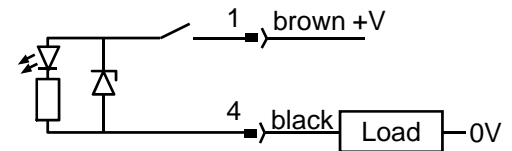
- **Solid state magnetic sensor pnp (current sourcing)**
- **Solid state magnetic sensor plug in cable pnp (current sourcing)**
- **Solid state magnetic sensor npn (current sinking)**
- **Solid state magnetic sensor plug in cable npn (current sinking)**
- **Solid state magnetic sensor with pulse extension**



Sensors

- Reed switch 2 wire with led indicator and plug in cable
- Reed switch 2 wire with led indicator and plug in cable





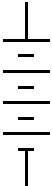
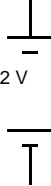
Loads must be additionally suppressed



Electrical Symbols



Electrical symbols

- | | | | |
|----------------------------------|---|-------------------|--|
| ● Direct current (DC) | — | ● Line to earth |  |
| ● Alternating current (AC) | ~ | ● Line to chassis |  |
| ● AC or DC |  | ● Cell |  |
| ● Positive and negative polarity | +
—
— | ● Battery |  or ^{12 V}  |



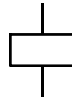
Electrical Components

	Normally open	Normally closed		Normally open	Normally closed
● Relay contact			● General manual switch contact		
● Push button contact			● Roller switch contact		
● Pull button contact			● Delay to operate		
● Twist switch contact			● Delay to reset		

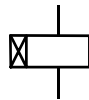


Electrical Components

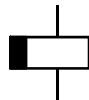
- **Relay coil**



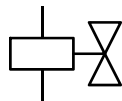
- **Relay coil delay to operate contacts**



- **Relay coil delay to reset contacts**

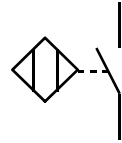


- **Solenoid valve coil**

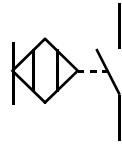


Electrical Components

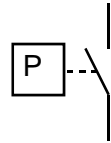
- Proximity switch



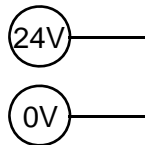
- Touch sensitive switch



- Pressure switch



- Supply and return



- Bell



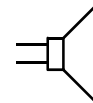
- Buzzer



- Microphone



- Loudspeaker

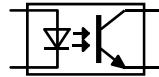


Electronic Component Symbols



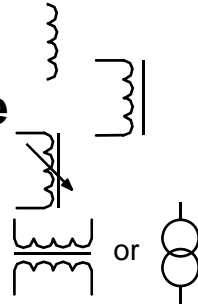
Electronic Components

- **Opto-isolator**



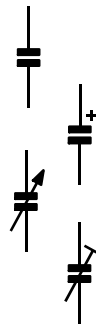
- **Windings**

- inductor
- inductor with core
- variable inductor
- transformer



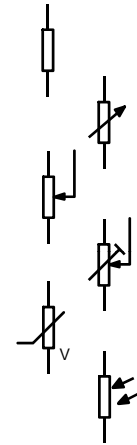
- **Capacitors**

- capacitor
- polarised capacitor
- variable capacitor
- pre-set capacitor



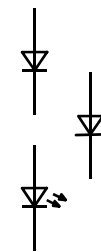
- **Resistors**

- Resistor
- Variable
- Potentiometer
- Pre-set pot
- Voltage dependent
- Light dependent



- **Diodes**

- diode
- zener diode
- light emitting diode



Electronic Components

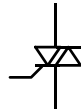
- **Thyristor**



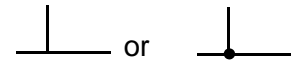
- **Fuse**



- **Triac**



- **Wires connected**



- **NPN Transistor**



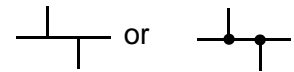
- **Wires crossing**



- **PNP Transistor**



- **Double junction**

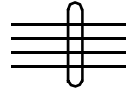


- **Photo-transistor**



Electronic Components

- **Conductors in a cable**



- **Conductors twisted**



- **Plug and socket**



- **Coaxial plug and socket**



- **Meters for amps, volts, ohms & watts**



- **Motors dc & ac**



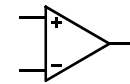
- **Generator**



- **Lamp steady & flashing**



- **Operational amplifier**



End



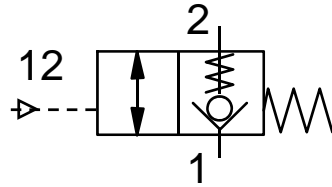
Symbol Library

Function Fittings and Components

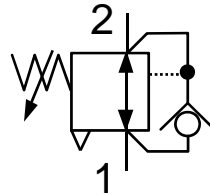


Function fittings

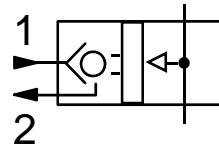
- **Blocking fitting**




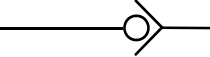
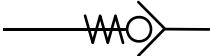
- **Pressure reducing fitting**



- **Pneumatic sensor fitting**



Function components

- **Air fuse** 
- **Non return valve** 
- **Non return valve** 

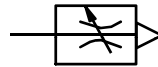


Function components

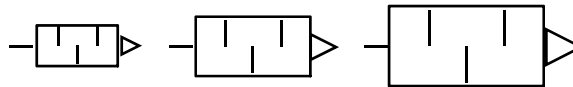
- **bi-directional flow regulator**



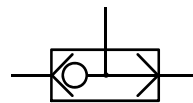
- **Exhaust flow regulator with and without silencer**



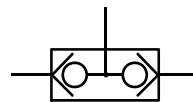
- **Silencers**



- **Shuttle valve 'OR'**

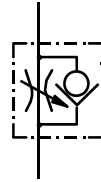


- **Two pressure valve 'AND' (will exhaust either signal back)**

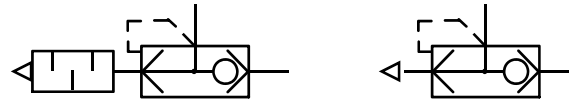


Function components

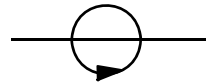
- **Uni-directional flow regulator**



- **Quick exhaust valve with and without silencer**



- **Rotating joint**



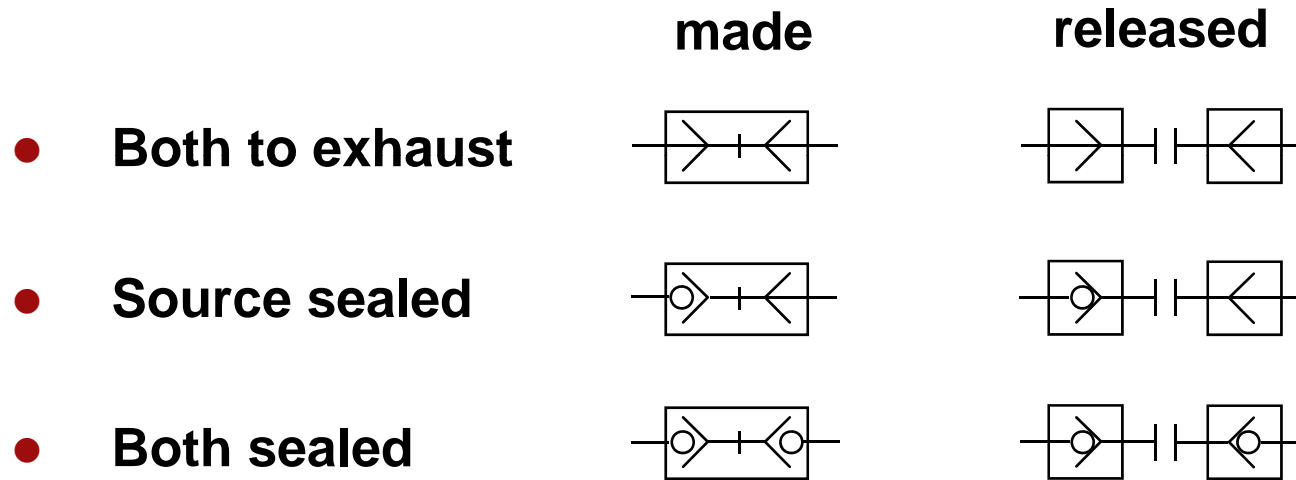
- **Pressure indicator**



- **Pressure drop indicator**



Quick release couplings



End



Symbol Library

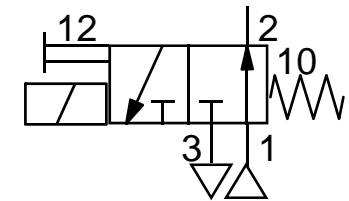
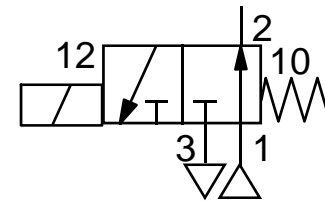
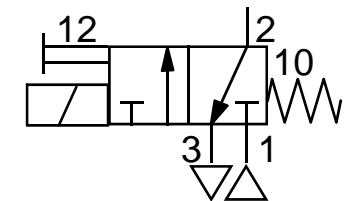
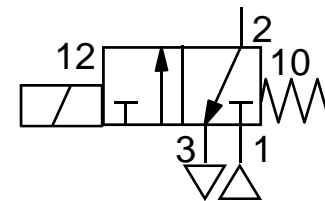
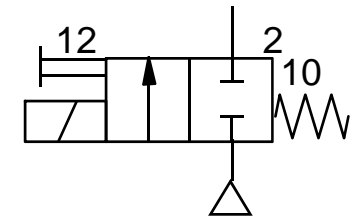
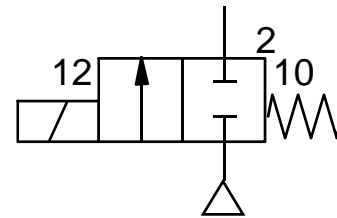
Solenoid Valves



Solenoid valves

- Direct solenoid actuated spring return 2/2 NC
- Direct solenoid actuated spring return 3/2 NC
- Direct solenoid actuated spring return 3/2 NO

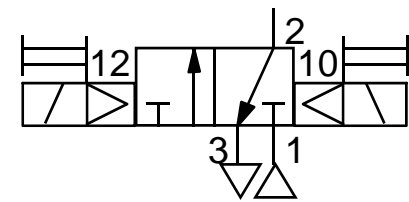
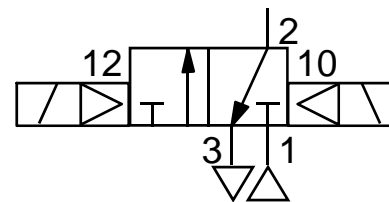
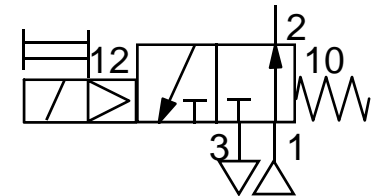
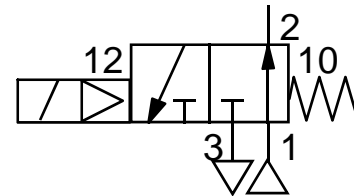
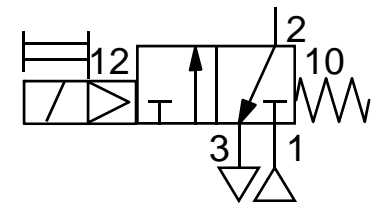
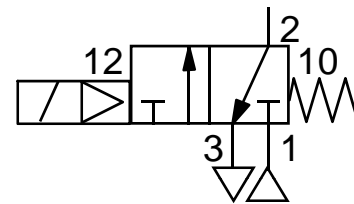
with man override on the solenoid



Solenoid valves

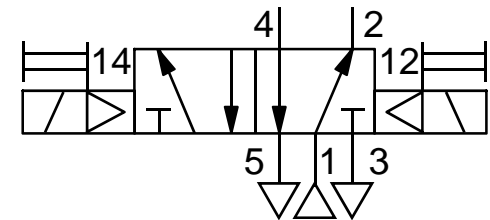
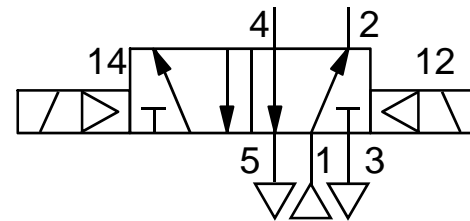
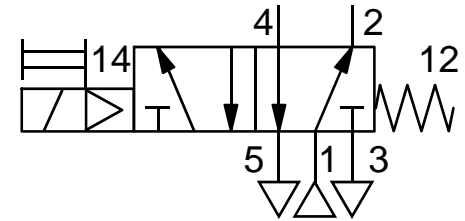
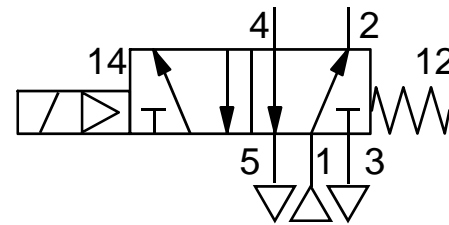
- **Pilot solenoid actuated
spring return 3/2 NC**
- **Pilot solenoid actuated
spring return 3/2 NO**
- **Pilot solenoid actuated
pilot solenoid return**

**with man override
on the solenoid**



Solenoid valves

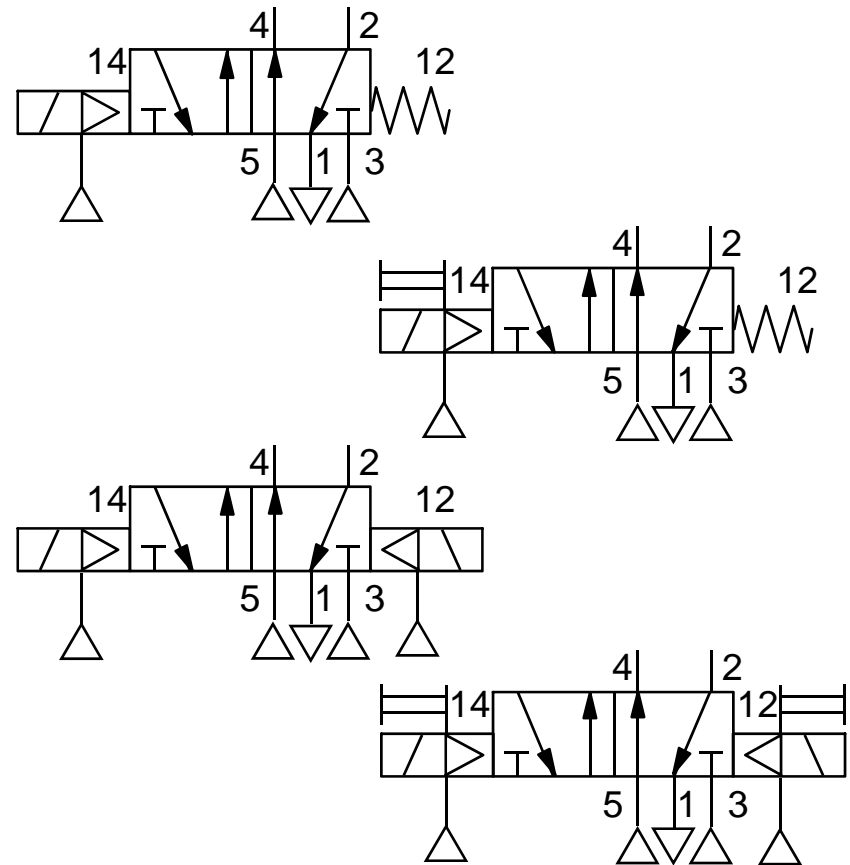
- **Pilot solenoid actuated spring return, 5/2**
- **Pilot solenoid actuated spring return and manual override, 5/2**
- **Pilot solenoid actuated pilot solenoid return, 5/2**
- **Pilot solenoid actuated pilot solenoid return and manual override, 5/2**



Solenoid valves

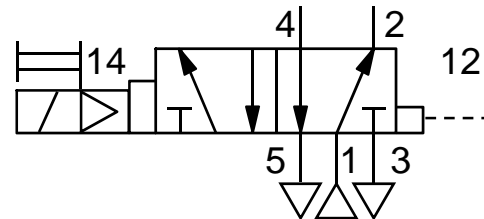
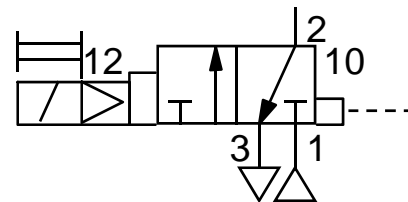
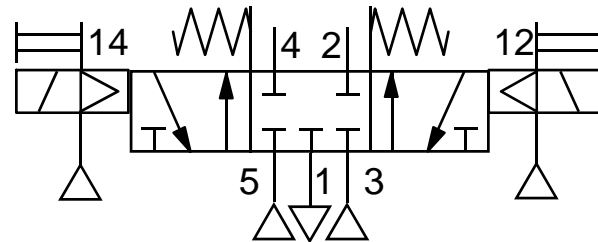
- Pilot solenoid actuated spring return, 5/2
- Pilot solenoid actuated spring return and manual override, 5/2
- Pilot solenoid actuated and returned, 5/2
- Pilot solenoid actuated and returned with manual overrides, 5/2

Reverse piped



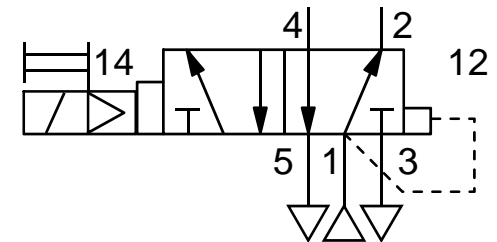
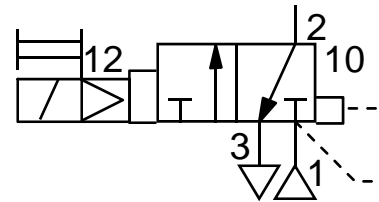
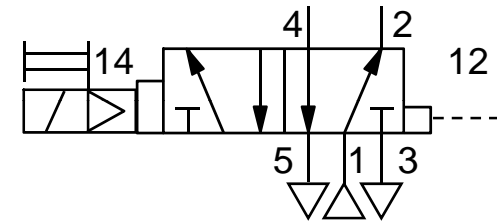
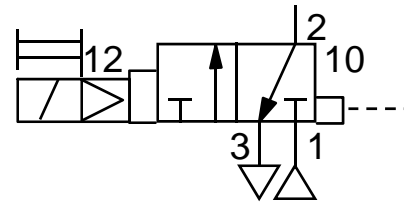
Solenoid valves

- **Double pilot solenoid actuated spring to centre all ports sealed reverse piped**
- **Priority pilot solenoid actuated differential air return, 3/2**
- **Priority pilot solenoid actuated differential air return, 5/2**



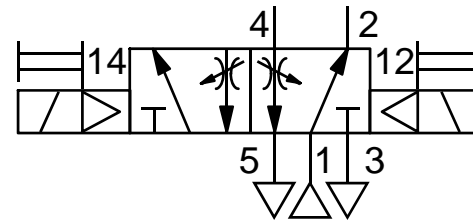
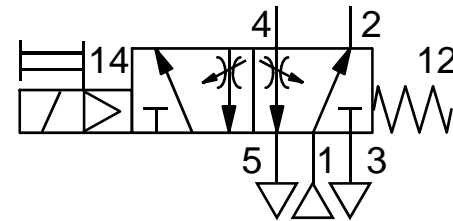
Solenoid valves

- Priority pilot solenoid actuated differential air return, 3/2
- Priority pilot solenoid actuated differential air return, 5/2
- Priority pilot solenoid actuated air spring return, 3/2
- Priority pilot solenoid actuated air spring return, 5/2



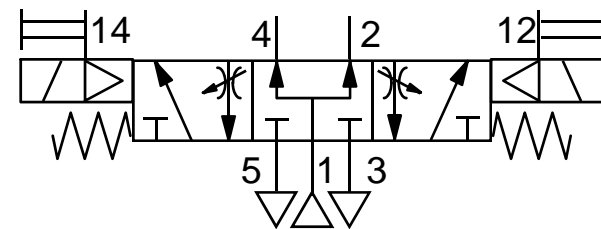
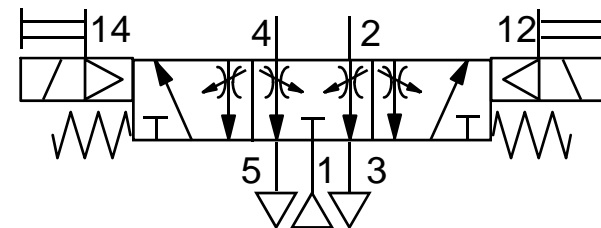
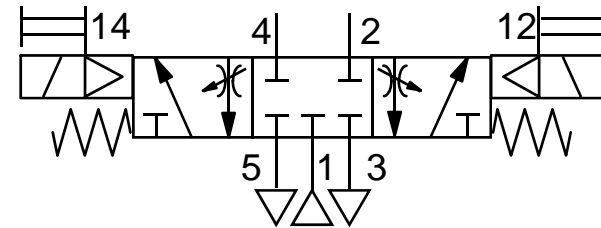
Solenoid valves

- **Pilot solenoid actuated spring return, manual override, 5/2 with integral flow regulators**
- **Double pilot solenoid actuated, manual override, 5/2 with integral flow regulators**



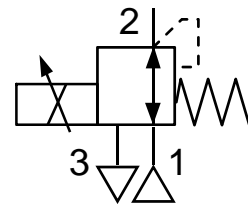
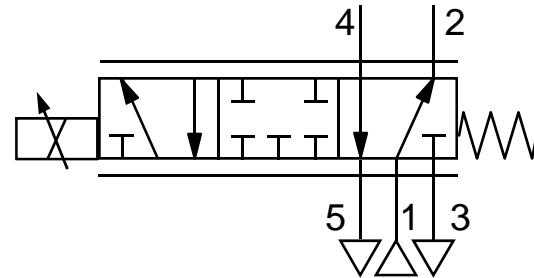
Solenoid valves

- **Double pilot solenoid actuated, spring to centre all ports sealed, 5/3 with integral flow regulators**
- **Double pilot solenoid actuated, spring to centre supply port sealed, 5/3 with integral flow regulators**
- **Double pilot solenoid actuated, spring to centre supply to outlets, 5/3 with integral flow regulators**



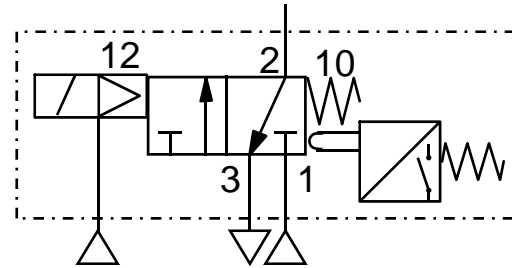
Proportional solenoid valves

- **Proportional flow to electrical signal**
- **Proportional pressure to electrical signal**

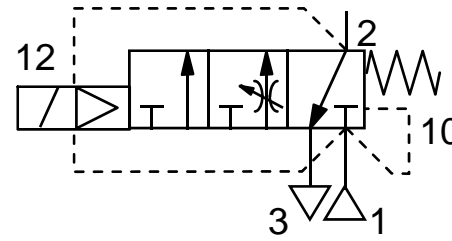


Safety related valves

- **Monitored dump valve**



- **Soft start valve**



End



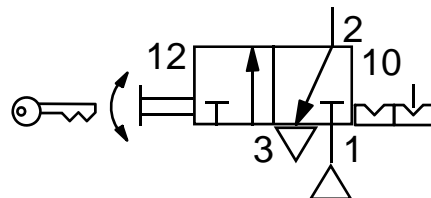
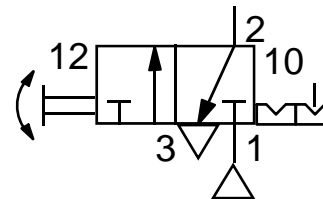
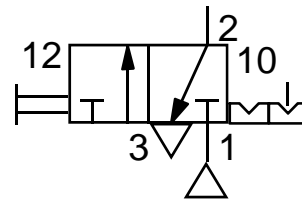
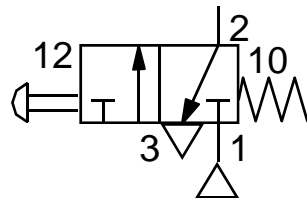
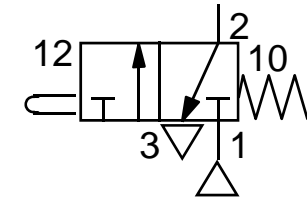
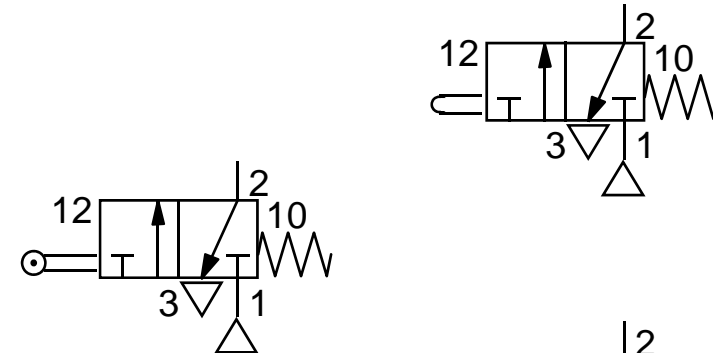
Symbol Library

Valves



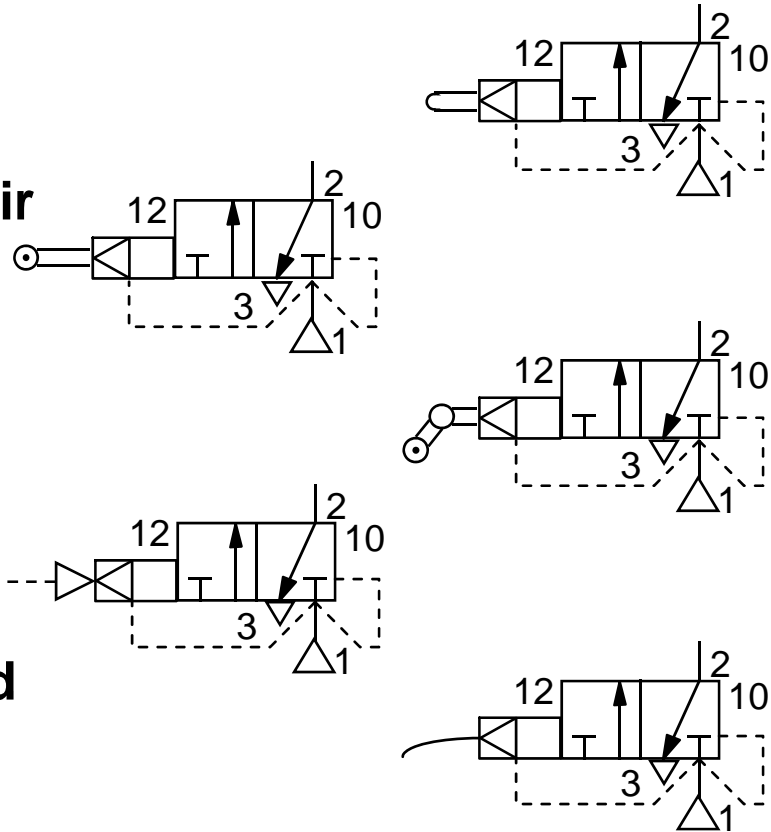
Valves un-tapped exhaust

- Plunger actuated spring return 3/2
- Roller actuated spring return 3/2
- Push button actuated spring return 3/2
- Toggle actuated detented 3/2
- Rotary knob actuated detented 3/2
- Key actuated detented 3/2



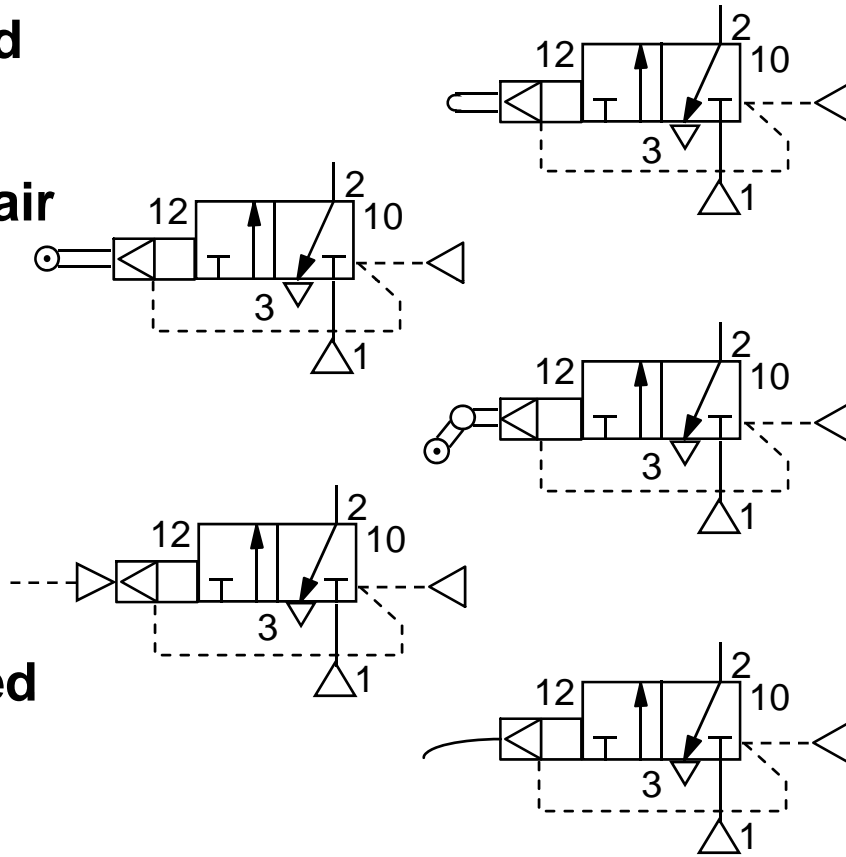
Valves integral bleed supply

- **Plunger / bleed actuated air return 3/2**
- **Roller / bleed actuated air return 3/2**
- **One way trip / bleed actuated air return 3/2**
- **Low pressure / bleed actuated air return 3/2**
- **Antenna / bleed actuated air return 3/2**



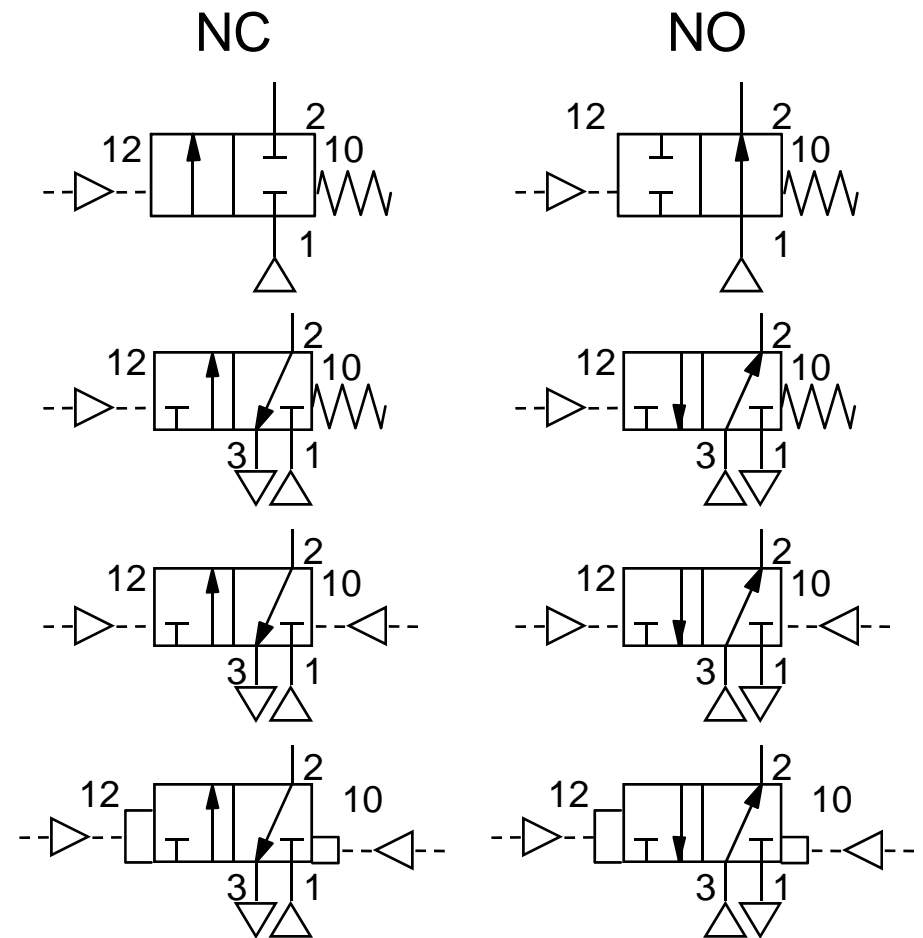
Valves external bleed supply

- **Plunger / bleed actuated air return 3/2**
- **Roller / bleed actuated air return 3/2**
- **One way trip / bleed actuated air return 3/2**
- **Low pressure / bleed actuated air return 3/2**
- **Antenna / bleed actuated air return 3/2**



Pilot actuated valves

- **Pilot actuated spring return 2/2**
- **Pilot actuated spring return 3/2**
- **Double pilot actuated 3/2**
- **Differential pilot actuated 3/2**

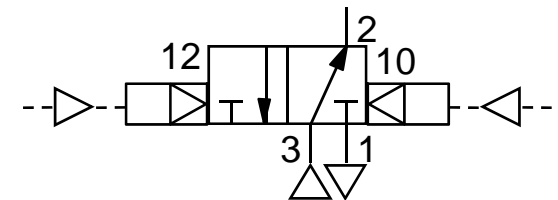
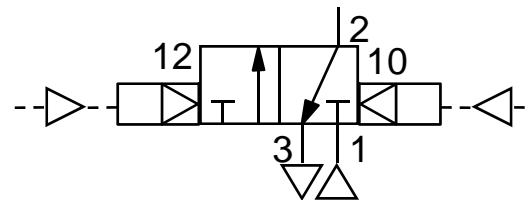
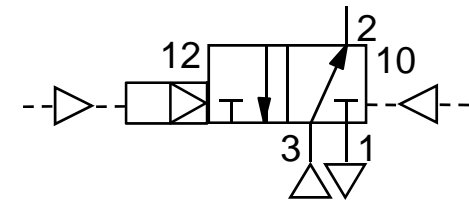
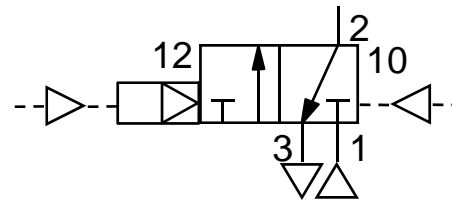
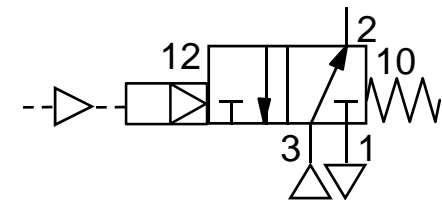
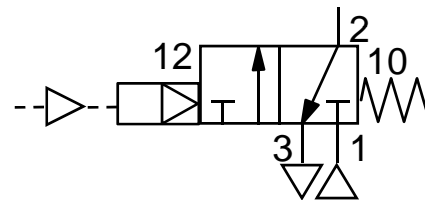
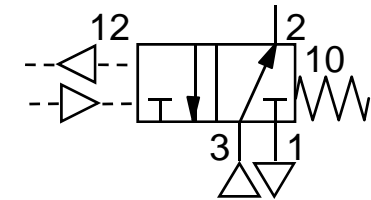
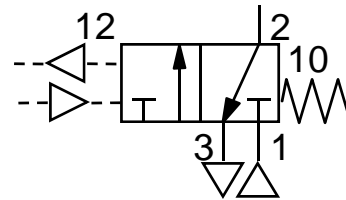


Pilot actuated valves

- Pressure or vacuum actuated spring return 2/2 (diaphragm valve)
- Low pressure pilot actuated spring return 3/2
- Low pressure pilot actuated pilot return, 3/2
- Low pressure pilot actuated and returned, 3/2

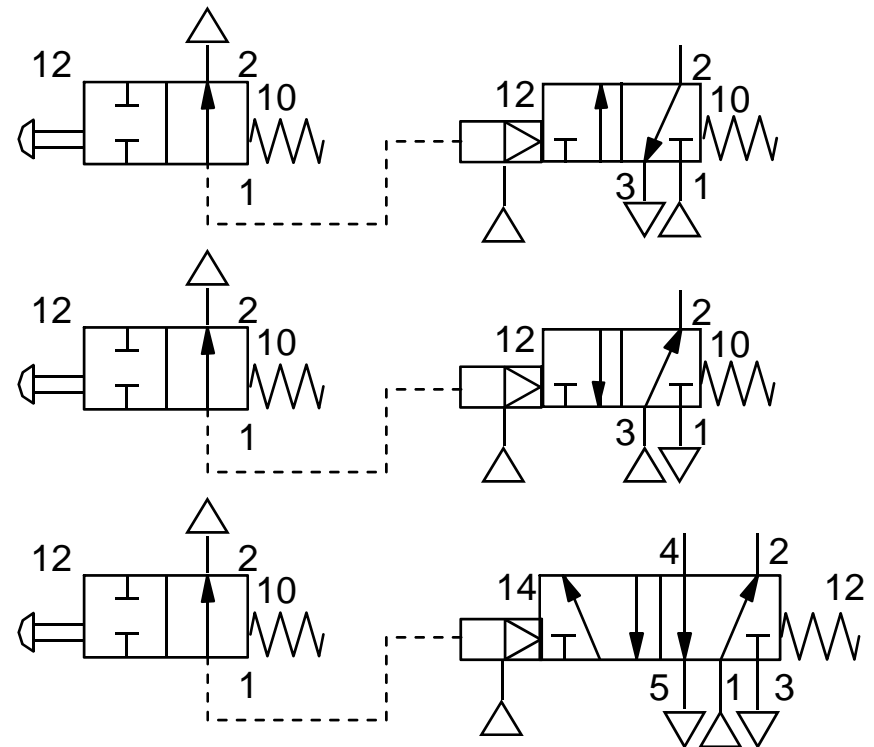
NC

NO



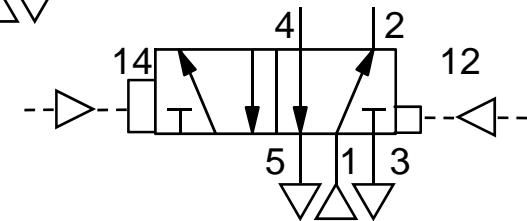
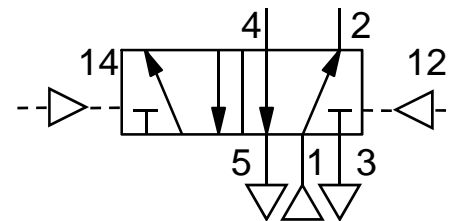
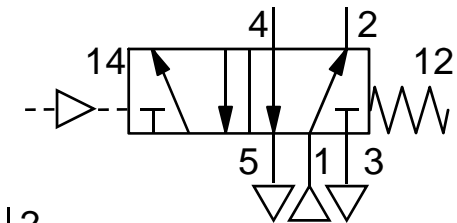
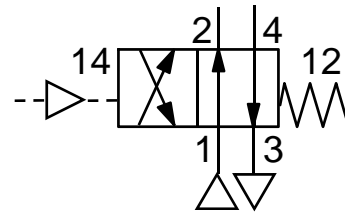
Pilot actuated valves

- Remote pressure bleed actuated spring return, NC, 3/2
- Remote pressure bleed actuated spring return, NO, 3/2
- Remote pressure bleed actuated spring return, 5/2



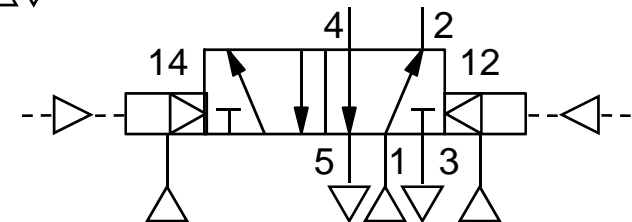
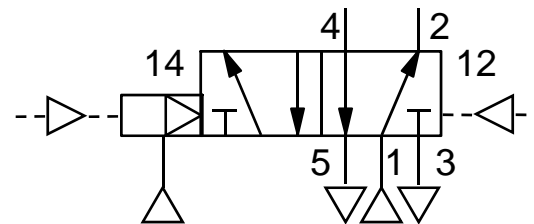
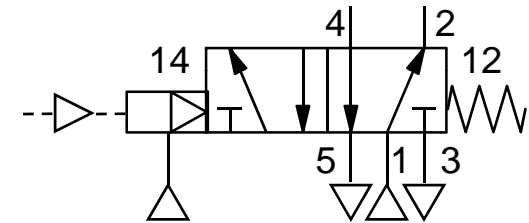
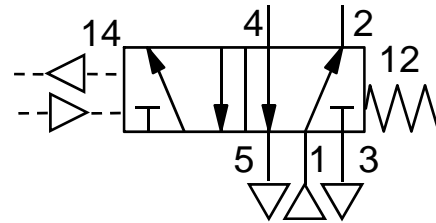
Pilot actuated valves

- **Pilot actuated spring return, 4/2**
- **Pilot actuated spring return, 5/2**
- **Double pilot actuated 5/2**
- **Differential pilot actuated 5/2**



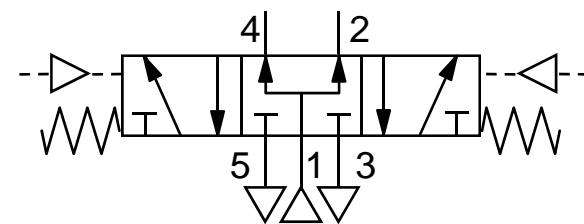
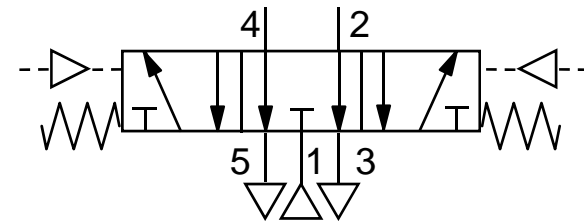
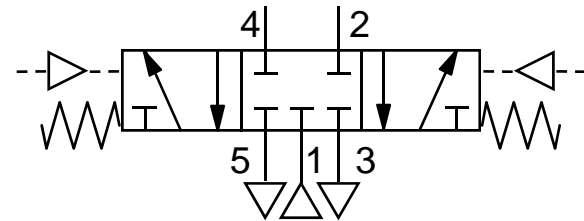
Pilot actuated valves

- Pressure or vacuum actuated spring return, 5/2 (diaphragm valve)
- Low pressure pilot actuated spring return, 5/2
- Low pressure pilot actuated pilot return, 5/2
- Low pressure pilot actuated and returned, 5/2



Pilot actuated valves

- **Double pilot actuated spring to centre all ports sealed**
- **Double pilot actuated spring to centre supply port sealed**
- **Double pilot actuated spring to centre supply to outlets**

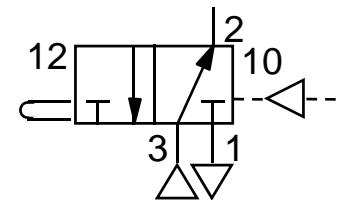
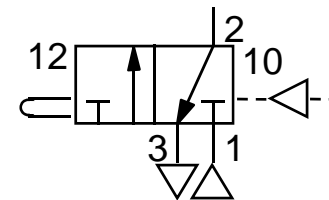
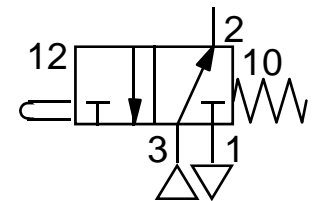
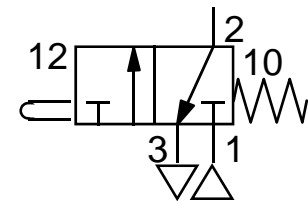
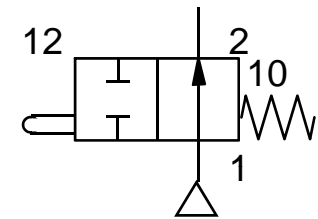
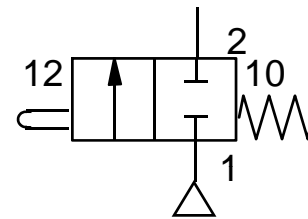


Mechanically actuated valves

- **Plunger actuated spring return 2/2**
- **Plunger actuated spring return 3/2**
- **Plunger actuated air reset 3/2**

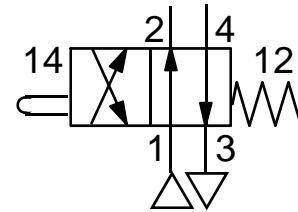
NC

NO

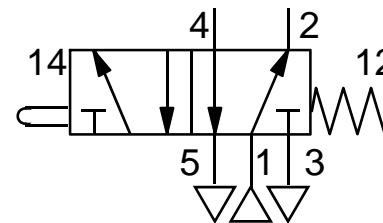


Mechanically actuated valves

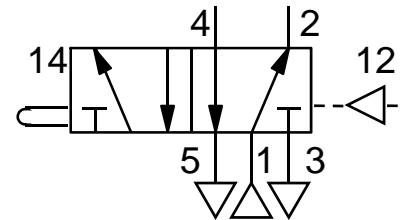
- **Plunger actuated spring return, 4/2**



- **Plunger actuated spring return, 5/2**



- **Plunger actuated air reset 5/2**

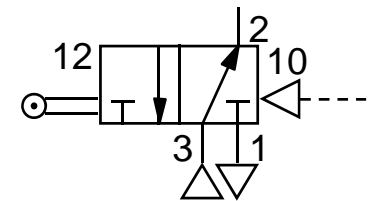
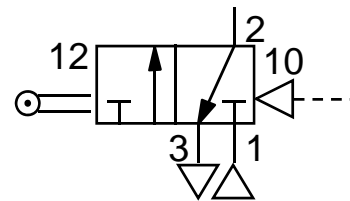
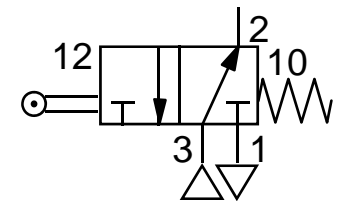
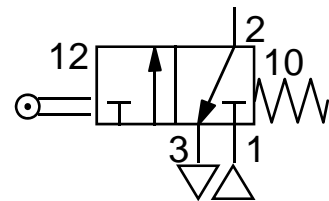
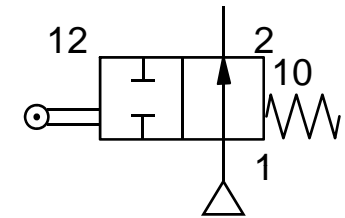
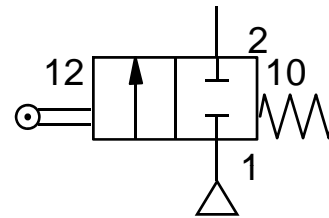


Mechanically actuated valves

- **Roller actuated spring return 2/2**
- **Roller actuated spring return 3/2**
- **Roller actuated air reset 3/2**

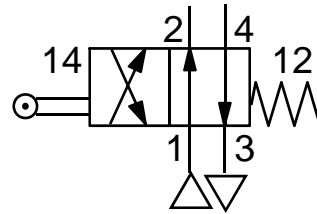
NC

NO

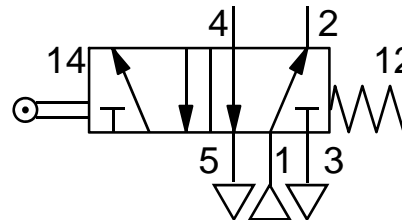


Mechanically actuated valves

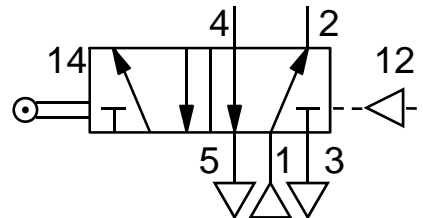
- Roller actuated spring return, 4/2



- Roller actuated spring return, 5/2



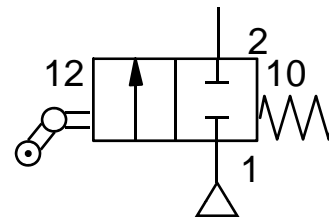
- Roller actuated air reset 5/2



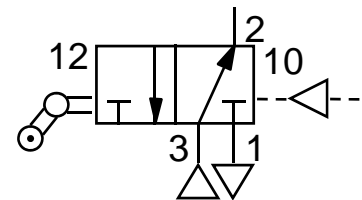
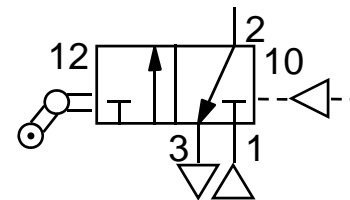
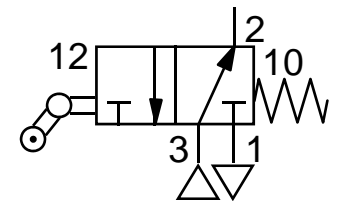
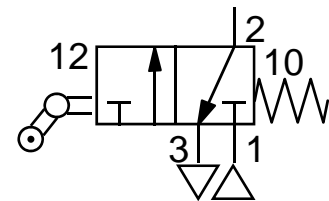
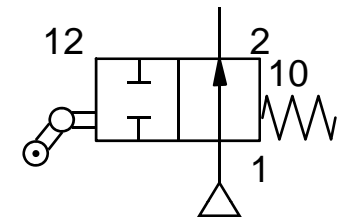
Mechanically actuated valves

- One way trip actuated spring return 2/2
- One way trip actuated spring return 3/2
- One way trip actuated air reset 3/2

NC

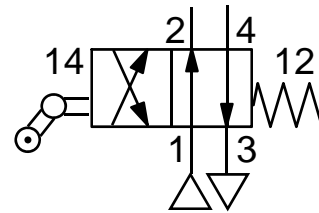


NO

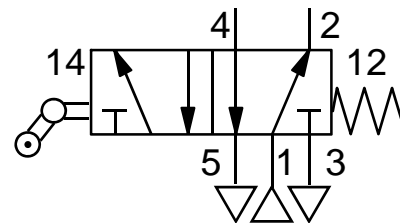


Mechanically actuated valves

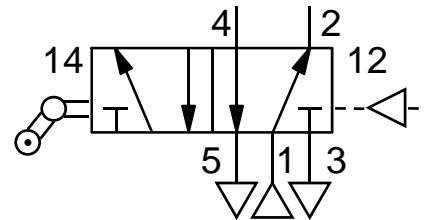
- One way trip actuated spring return, 4/2



- One way trip actuated spring return, 5/2



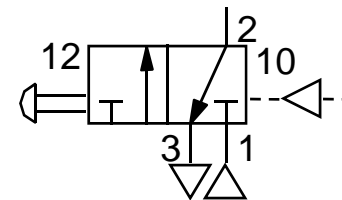
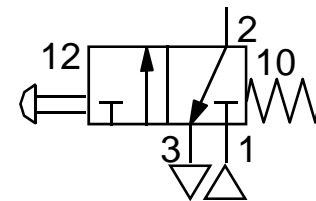
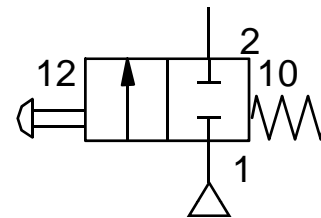
- One way trip actuated air reset 5/2



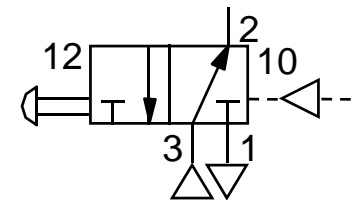
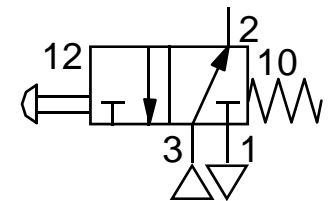
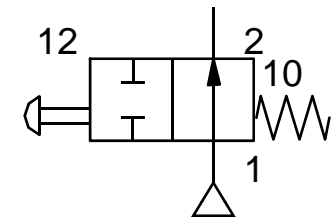
Manually actuated valves

- **Push button actuated spring return 2/2**
- **Push button actuated spring return 3/2**
- **Push button actuated air reset 3/2**

NC

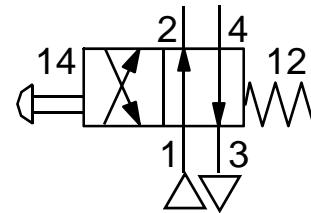


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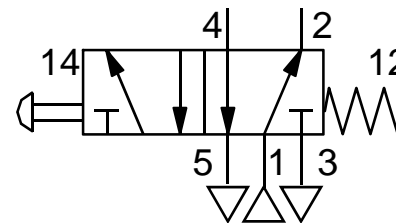


Manually actuated valves

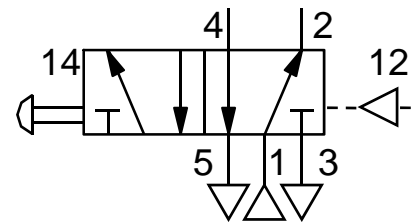
- Push button actuated spring return, 4/2



- Push button actuated spring return, 5/2



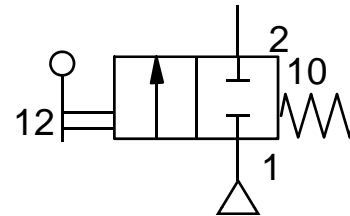
- Push button actuated air reset 5/2



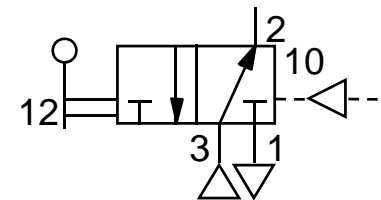
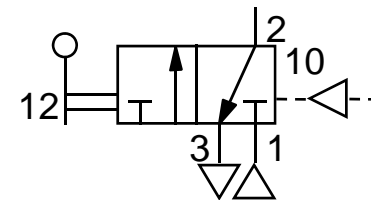
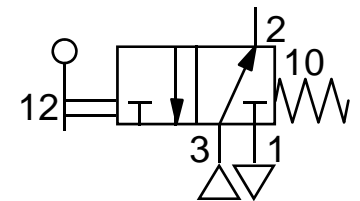
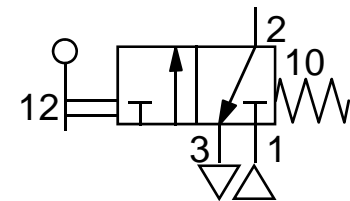
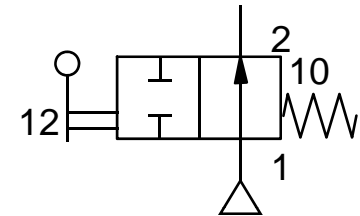
Manually actuated valves

- Lever actuated spring return 2/2
- Lever actuated spring return 3/2
- Lever actuated air reset 3/2

NC

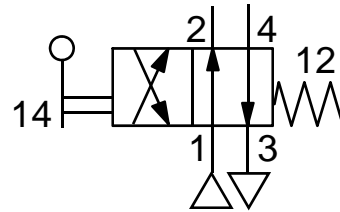


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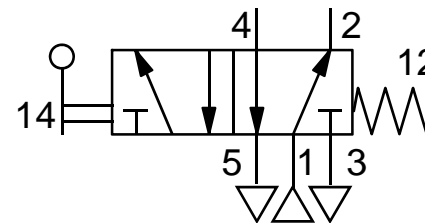


Manually actuated valves

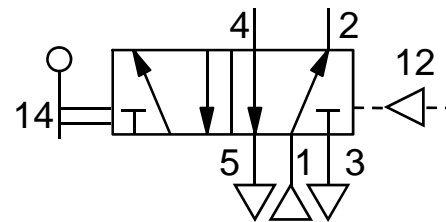
- Lever actuated spring return, 4/2



- Lever actuated spring return, 5/2

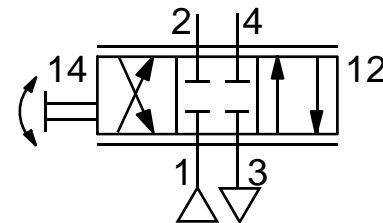
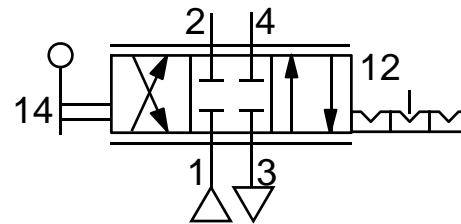
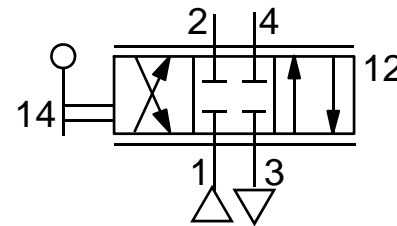


- Lever actuated air reset 5/2



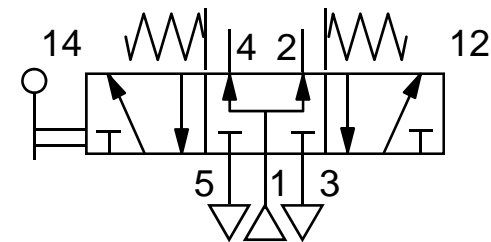
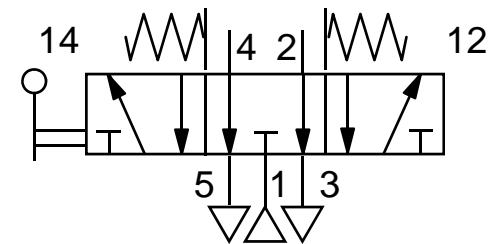
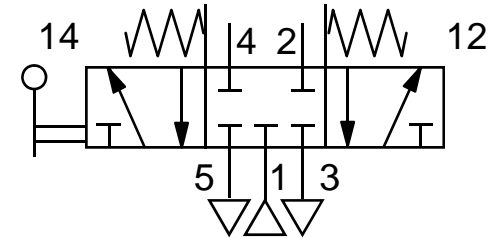
Manually actuated valves

- Lever actuated lever return, variable throttling, 4/2
- Lever actuated lever return, variable throttling, detented, 4/2
- Rotary knob actuated and returned, variable throttling, 4/2



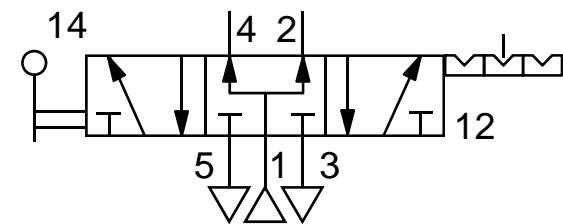
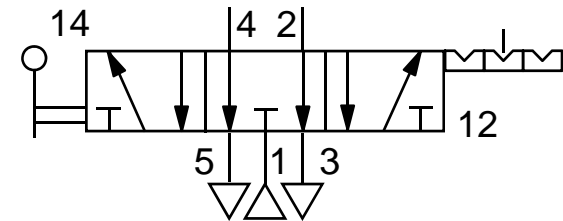
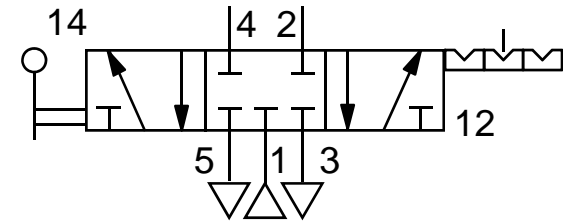
Manually actuated valves

- Lever actuated spring to centre all ports sealed
- Lever actuated spring to centre supply port sealed
- Lever actuated spring to centre supply to outlets



Manually actuated valves

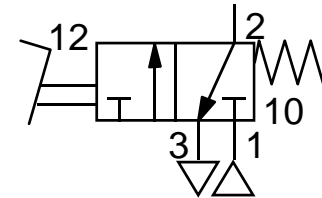
- **Lever actuated, detented, all ports sealed centre**
- **Lever actuated, detented, supply port sealed centre**
- **Lever actuated, detented, supply to outlets centre**



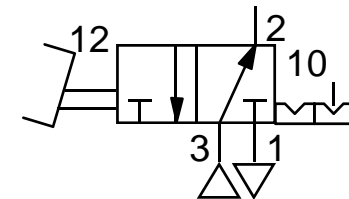
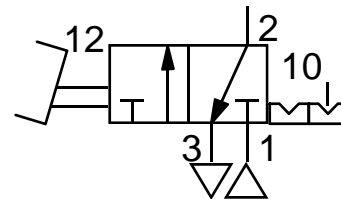
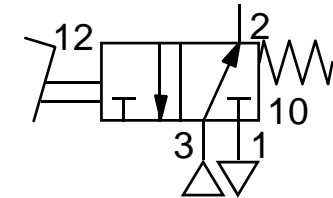
Manually actuated valves

- Pedal actuated spring return 3/2
- Treadle actuated detented 3/2

NC

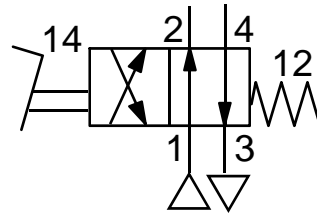


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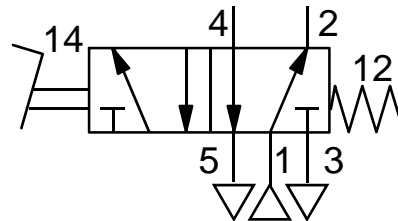


Manually actuated valves

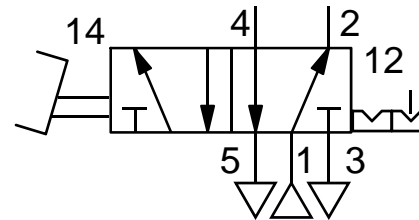
- Pedal actuated spring return, 4/2



- Pedal actuated spring return, 5/2

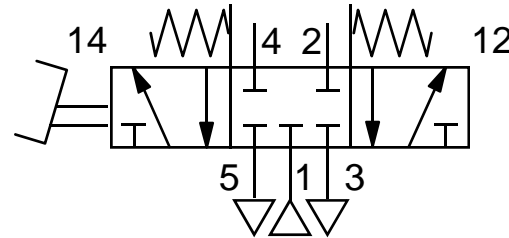


- Treadle actuated detented 5/2

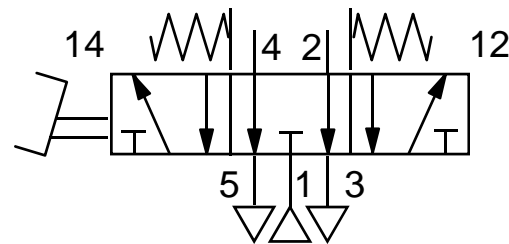


Manually actuated valves

- Treadle actuated spring to centre all ports sealed

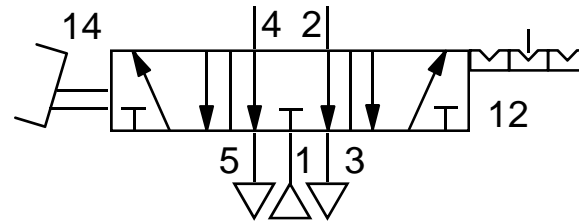
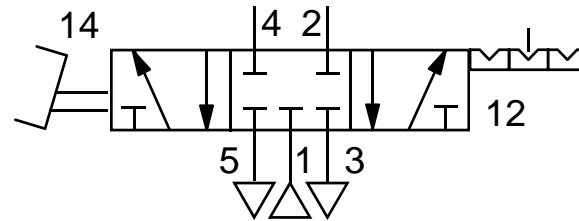


- Treadle actuated spring to centre supply port sealed



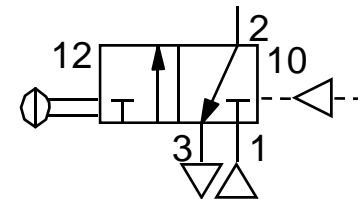
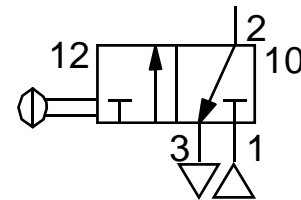
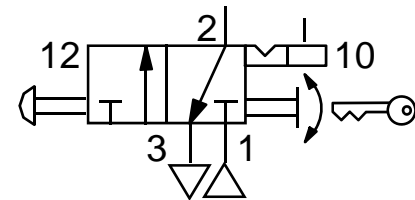
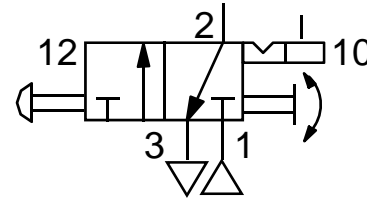
Manually actuated valves

- **Treadle actuated, detented, all ports sealed centre**
- **Treadle actuated, detented, supply port sealed centre**



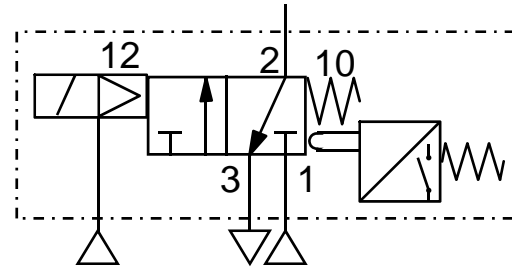
Manually actuated valves

- **Push button actuated rotary manual return 3/2**
- **Push button actuated key return 3/2**
- **Push actuated pull returned 3/2**
- **Push actuated pull or air returned 3/2**

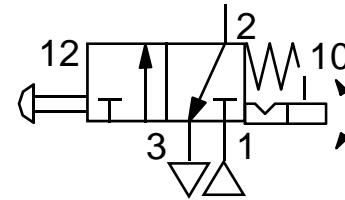


Safety related valves

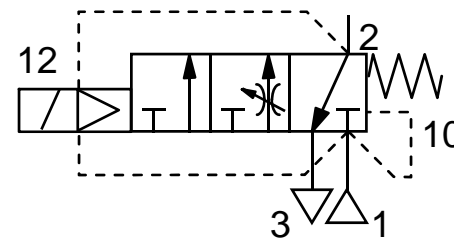
- **Monitored dump valve**



- **Emergency stop valve**

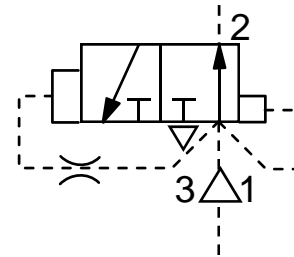


- **Soft start valve**



Special purpose valves

- **Impulse generator**



End



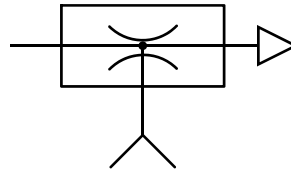
Symbol Library

Vacuum Equipment

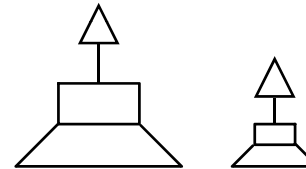


Vacuum equipment

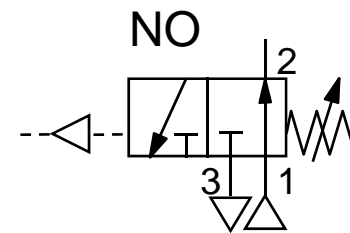
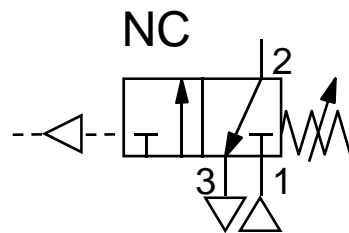
- Vacuum generator



- Vacuum cups

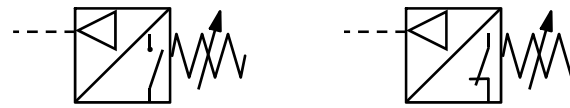


- Vacuum switch pneumatic

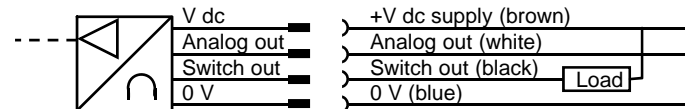


Vacuum equipment

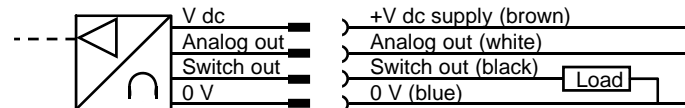
- Vacuum switch electric, normally open and normally closed



- Vacuum transducer with analog and switched outputs npn

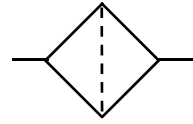


- Vacuum transducer with analog and switched outputs pnp

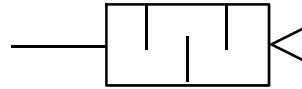


Vacuum equipment

- **Vacuum filter**



- **Vacuum silencer**



- **Vacuum gauge**



End

