

# **DIESEL MECHANIC**



**MINING QUALIFICATIONS AUTHORITY**

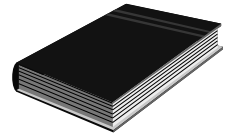
## **CODE: PN - 8**

# **SET PRESSURE SEQUENCE VALVES**

## INDEX

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## SOURCE REFERENCES

Demonstration by a competent person, e.g. a Training Officer.

FESTO – Pneumatics Basic Level Textbook

## OBJECTIVE

You will be learning towards the outcome “Set pressure sequence valves”. Whilst learning towards the outcome you will be required to achieve the following:

- Know the function of a pressure sequence valve.
- Know the function of a pneumatic 4/2 way directional control valve with spring return.
- Set the one-way flow control valve so that the piston of cylinder no 1 will take 9 seconds to extend.
- Set the sequence valve so that the cylinder no 2 starts to move when cylinder no 1 is fully extended.

On completion of this module, the learner must be able to:

- State the function of a pressure sequence valve.
- State the function of a pneumatic 4/2 way directional control valve with spring return.
- Set the one-way flow control valve so that the piston of cylinder no 1 will take 9 seconds ( $\pm 1$  second) to extend.
- The pressure sequence valve must be correctly set that cylinder no 2 starts to move if cylinder 1 is fully extended.

During this process you must adhere to certain specified requirements as listed in the Module.

## ASSESSMENT AND EVALUATION CRITERIA

You will be assessed, when you are confident that you may achieve the outcomes as listed, to determine your competence as measured against the required criteria. This assessment will be in line with accepted best practices regarding assessment.

- Theoretical and practical assessments will be set during the module and must be completed without using reference.
- The learner will be required to answer all the questions without any reference.

**HAZARD IDENTIFICATION AND CONTROL (HIAC) FORM****PN - 8****SET PRESSURE SEQUENCE VALVES**

<b>STEPS IN OPERATION / PROCESS</b>	<b>POTENTIAL ACCIDENT / INCIDENT</b>	<b>CONTROLS (BY RESPONSIBLE PERSON)</b>
1. Construct a pneumatic circuit.	<ul style="list-style-type: none"> <li>Improper or careless handling of pneumatic components and pipes can lead to damage of equipment.</li> </ul>	<ul style="list-style-type: none"> <li>Always handle components and pipes correctly, and with great care.</li> </ul>
2. Use of compressed air in a pressurised circuit.	<ul style="list-style-type: none"> <li>Circuit under pressure.</li> </ul>	<ul style="list-style-type: none"> <li>Wipe components and panel clean after use and store components.</li> <li>Ensure circuit is depressurised before removing components or pipes</li> </ul>
3. Insure work area is safe.	<ul style="list-style-type: none"> <li>Dirt particles in eyes and laceration of skin.</li> </ul>	<ul style="list-style-type: none"> <li>Wear correct PPE.</li> </ul>

**NOTE:** Before doing the practical work contained in this module, the learner must study the content of the above HIAC form again and then sign the statement below.

The above risks, which will be encountered in this module, are fully understood and will be controlled during the practical work.

Signature of learner:

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Signature of Training Officer:

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Date:

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# 1. PRESSURE SEQUENCE VALVE

**ITEM / TASK:** Introduction.

**DESCRIPTION:**

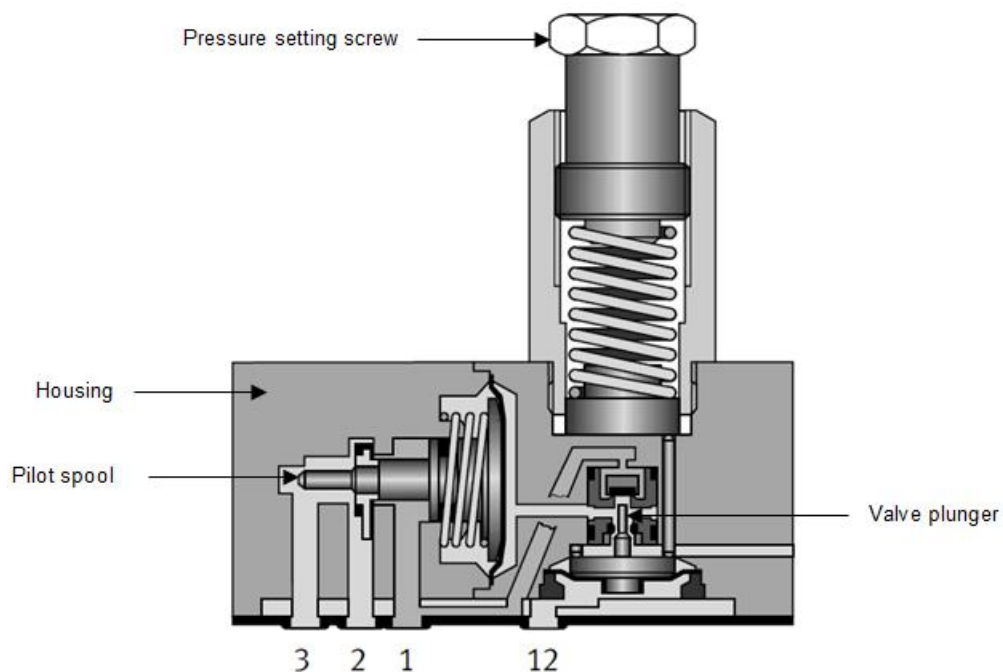
When two or more cylinders must operate in a specific sequence in a circuit, a pressure sequence valve may be used. A 3/2-way directional control valve with adjustable control pressure setting will operate when a specific pressure has been reached in the circuit. The pressure at which the valve operates is adjustable.

**ITEM / TASK:** Components of a pressure sequence valve.

**DESCRIPTION:**

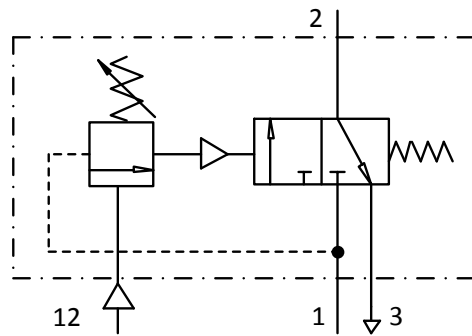
A. The pressure sequence valve consist of the following components: (Fig 1)

- a. Housing
- b. Valve plunger
- c. Pressure setting screw
- d. Pilot spool



**FIG 1.**

B. The symbol for a pressure sequence valve is shown in Fig 2.



**FIG 2.**

**ITEM / TASK:** Function of a pressure sequence valve.

**DESCRIPTION:**

A. Pressure sequence valves are installed in pneumatic controls where a specific pressure is required for a switching operation (pressure dependent controls).

**ITEM / TASK:** Operation of a pressure sequence valve.

**DESCRIPTION:**

- A. When the applied control signal from port 12 reaches the set pressure, the 3/2-way valve is actuated and switches the 3/2 way valve into the open position. This allows air to flow from port 1 to port 2. (Refer to fig 1 & 2)
- B. Conversely, the 3/2 way valve reverses, if the control signal at port 12 falls below the set pressure. The air is then exhaust through port 3 to the atmosphere.

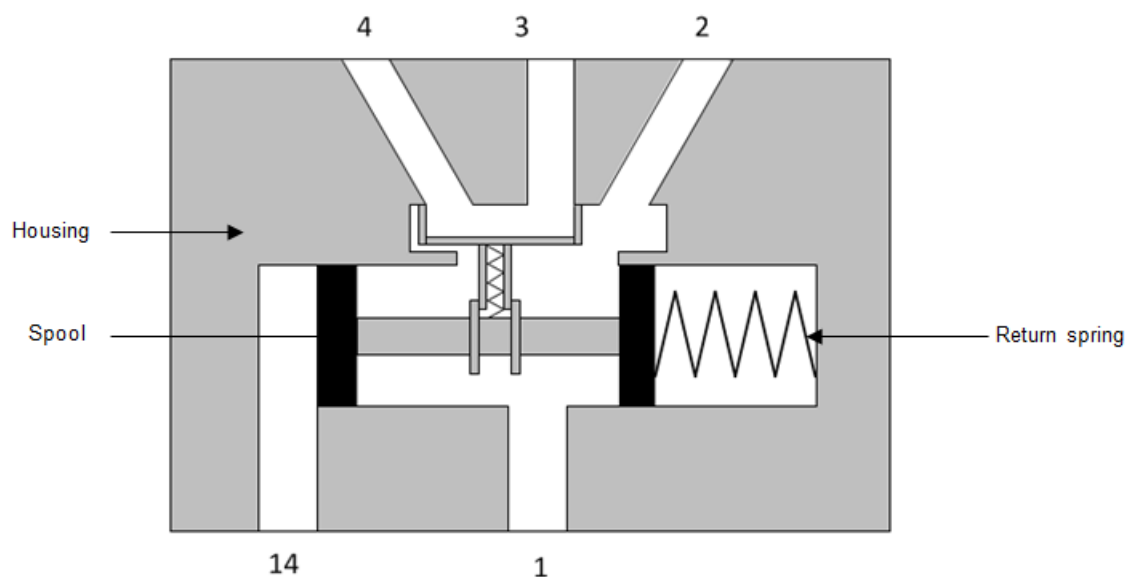
## 2. 4/2 WAY DIRECTIONAL CONTROL VALVE, SINGLE PILOT OPERATED

### **ITEM / TASK:** Introduction.

- A. Pneumatic directional control valves may also be used in a circuit where two or more cylinders must operate in a specific sequence.
- B. The pneumatic 4/2-way spring return directional control valve will operate when a specific pressure has been reached in the circuit. The pressure at which this valve will operate is not adjustable.

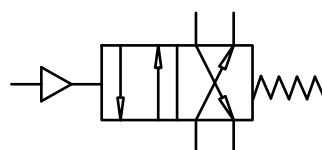
### **ITEM / TASK:** Components of a 4/2 way directional control valve, single pilot operated.

- A. The 4/2 way directional control valve, single pilot operated consist of the following components: (Fig 3)
  - a. Housing
  - b. Spool
  - c. Return spring



**FIG 3.**

- B. The symbol for a 4/2 way directional control valve, single pilot operated is shown in Fig 4.



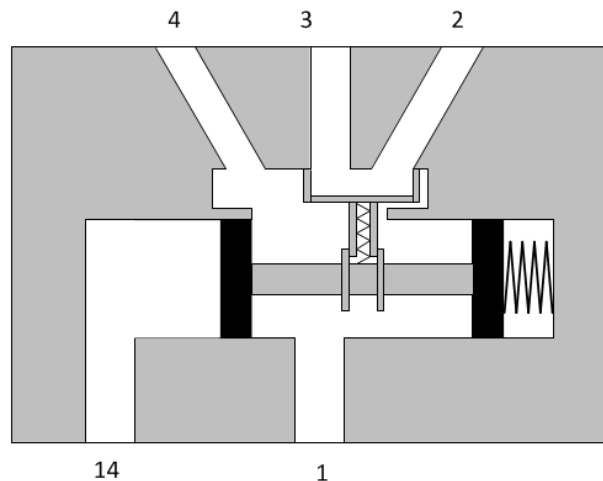
**FIG 4.**



**ITEM / TASK:** Operation of a 4/2 way directional control valve, single pilot operated.

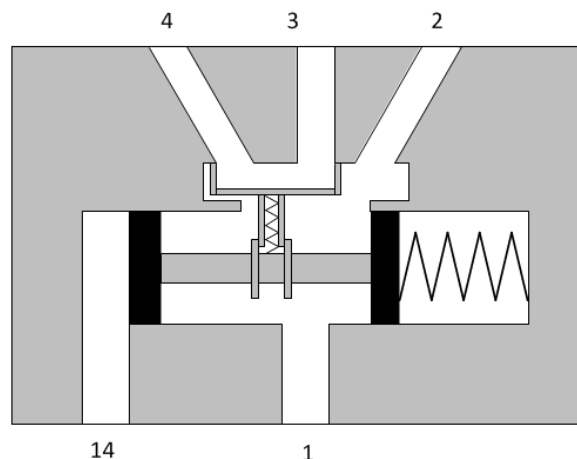
**DESCRIPTION:**

- A. If compressed air is supplied to control port 14 (Y), the flat slide is moved to the right by the spool. In this position, the supply air will flow from port 1 (P), through port 4 (B), to the cylinder. The return air from the cylinder will flow from port 2 (A), to port 3 (R), and into the atmosphere. (Fig 5)



**FIG 5.**

- B. The valve is reversed by means of direct pneumatic actuation. When the compressed air is removed from the control 14 (Y), the control piston return to the original position by means of a spring. (Fig 6)



**FIG 6.**

**DO THE SELF TEST AND PRACTICE ON THE NEXT PAGES  
BEFORE ATTEMPTING THE ASSESSMENT.**



## SELF TEST 1

1. What is the function of a pressure sequence valve?

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2. What is the function of a 4/2 way directional control valve, single pilot operated?

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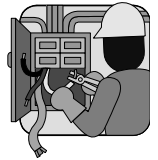


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Refer to your notes to check your answers.

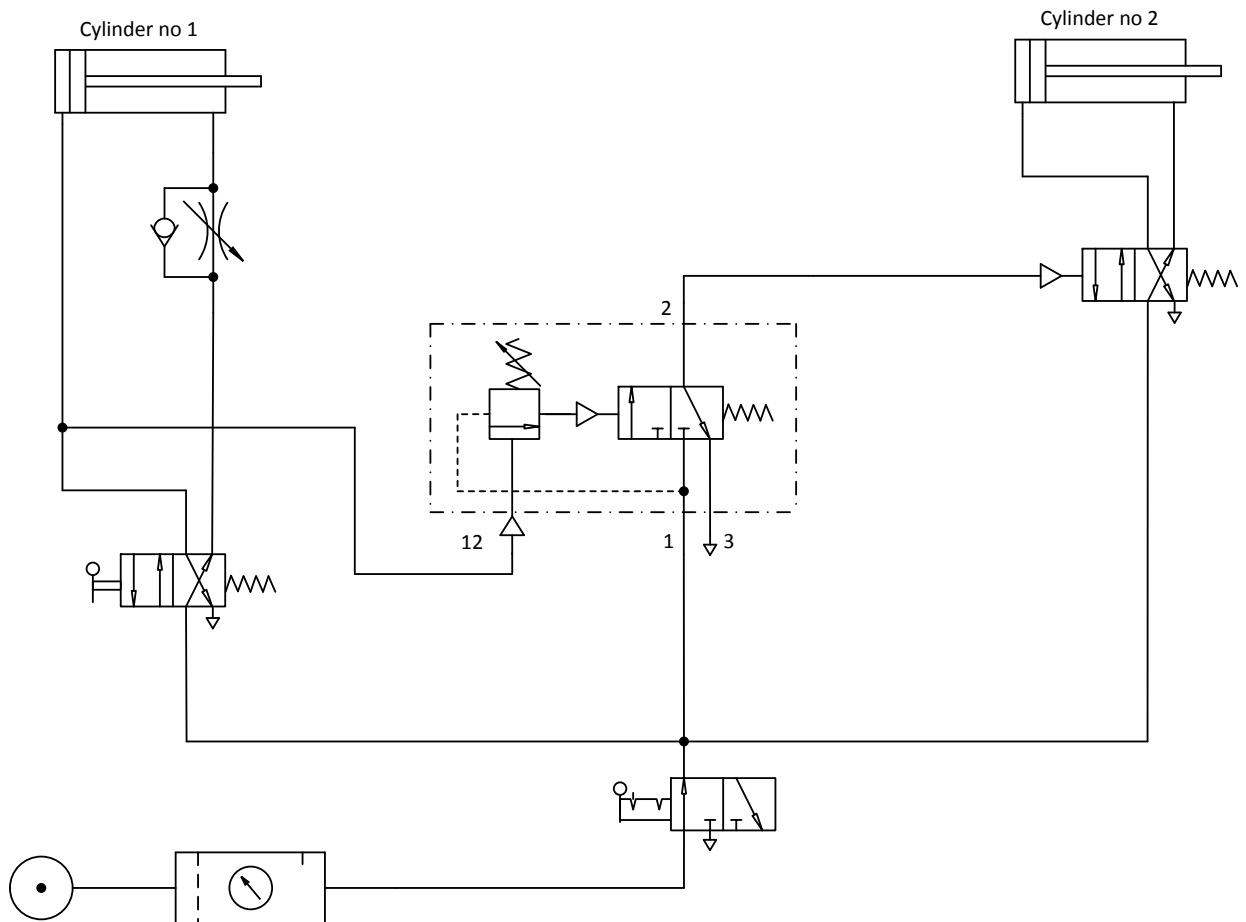
Ask your Training Officer to check your work and if it is correct, to sign below.

LEARNER	TRAINING OFFICER
DATE :	DATE :
SIGNATURE :	SIGNATURE :



## PRACTICE

1. Practice drawing the symbol for a pressure sequence valve.
2. Practice drawing the symbol for a 4/2 way directional control valve, single pilot operated.
3. Identify the above mentioned valves from the training panel / equipment.
4. Construct the circuit (shown on the next page) on the training panel.
  - Adjust the one-way flow control valve so that cylinder no 1 will take 9 seconds to extend.
  - Adjust the pressure sequence valve so that cylinder no 2 will not start to move before cylinder no 1 has been fully extended.
5. Indicate the flow of air for each position of the directional control valves on the above schematic drawing.



Ask your Training Officer to check your work and if it is correct, to sign below.

LEARNER	TRAINING OFFICER
DATE :	DATE :
SIGNATURE :	SIGNATURE :



## **REMEMBER ALWAYS WORK SAFE**

**Once you have passed the entire practices, you are now at liberty to request a Formative Assessment from your Assessor.**