

Applications of Hydraulics

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&

Pneumatics

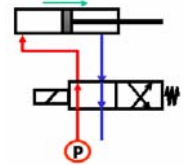
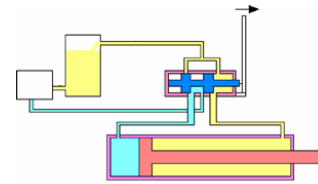
By: Alireza Safikhani



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Fluid Power Symbols

- The four types of hydraulic-circuit diagrams are **block, cutaway, pictorial, and graphical**. These diagrams show
- Components and how they will interact.
- Manufacturing engineer and assembler how to connect the components.
- Field technician how the system works, what each component should be doing, and where the oil should be going so that the technician can diagnose and repair the system.



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Standards

- The standards organizations in "Fluid Power" field are
- **BS** (British Standards).
- **ISO** (International Standards Organization).
- **CETOP** (Comite Des Transmissions Oleohydrauliques et Pneumatiques or European Hydraulic and Pneumatics Committee).
- You will find a complete list of fluid power standards on the following websites.
- <http://www.fimop.be/en/norm>
- <http://www.iso.ch/iso/en/ISOOnline.openerpage>
- <http://www.cetop.org/presentation.htm>

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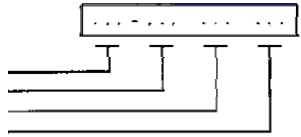
Drawing circuit diagrams

- The main standards for circuit drawings are as follows.
- Symbols must be created to standards **BS2917/ISO 1219-1**.
- The layout of the drawing should conform to **ISO 1219 - 2**.
- The standards for connections to the hardware are covered by **ISO 9461**
- **ISO 1219-1**

5 Numbering System

- The number should consist of four parts.
- Consider the identification tag 2 – 3V5
- The first number is the installation number. If there is only one, it may be omitted.
- The second number is the circuit number and again if there is only one, it may be omitted. The number 0 is used for the drawing of the power pack and accessories.
- The letter identifies the type of component as follows.
 - P Pump
 - A Actuator
 - M Prime Mover
 - S Sensor
 - V Valve
 - Z or any other appropriate letter is used for any other component.
- The last number is the sequence number of the component so V5 means valve number 5.

Installation No.
Circuit No.
Component Code
Component No.

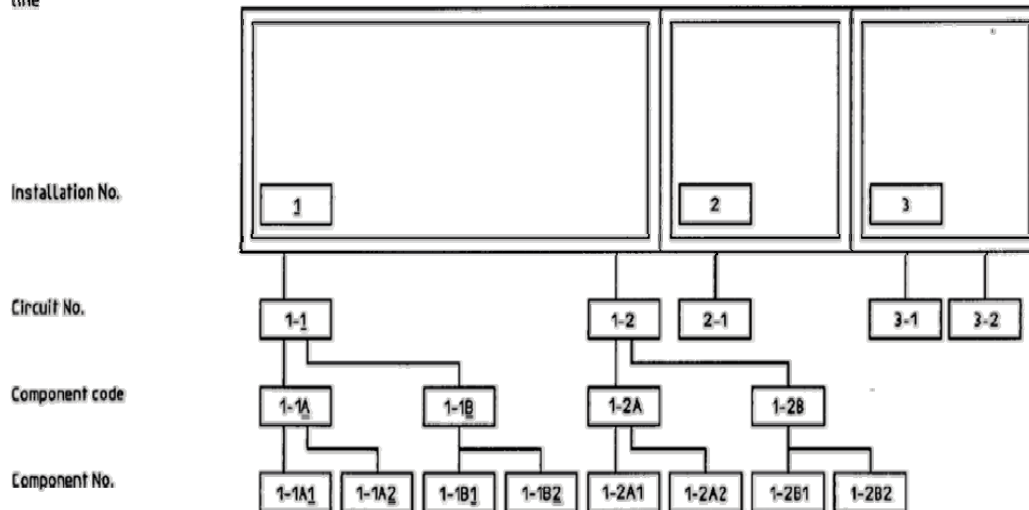


6 PJPES

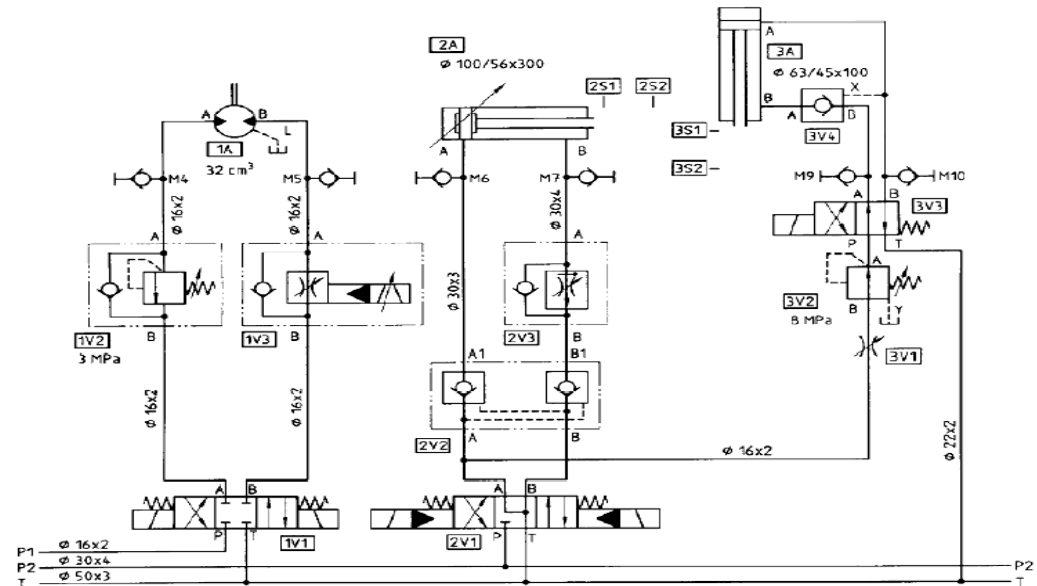
- Pipes are identified on drawings with the following letters.
- P Pressure lines
- T Tank or return lines
- L Leakage or drainage lines
- Each should be numbered starting with 1 and a different number used for pipes at different operating pressures.
- The hydraulic and pneumatic examples attached show these features.
- The use of Computer Aided Design packages such as "PneSim pro" or "Automation Studio" automatically produce drawings to the correct standards.

7 Example

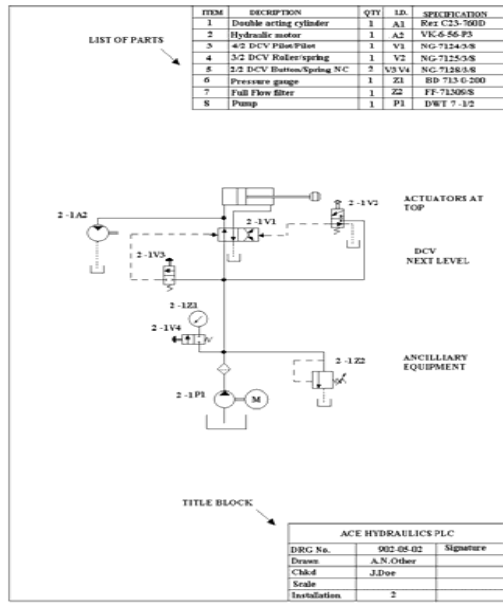
For example, plant, production line



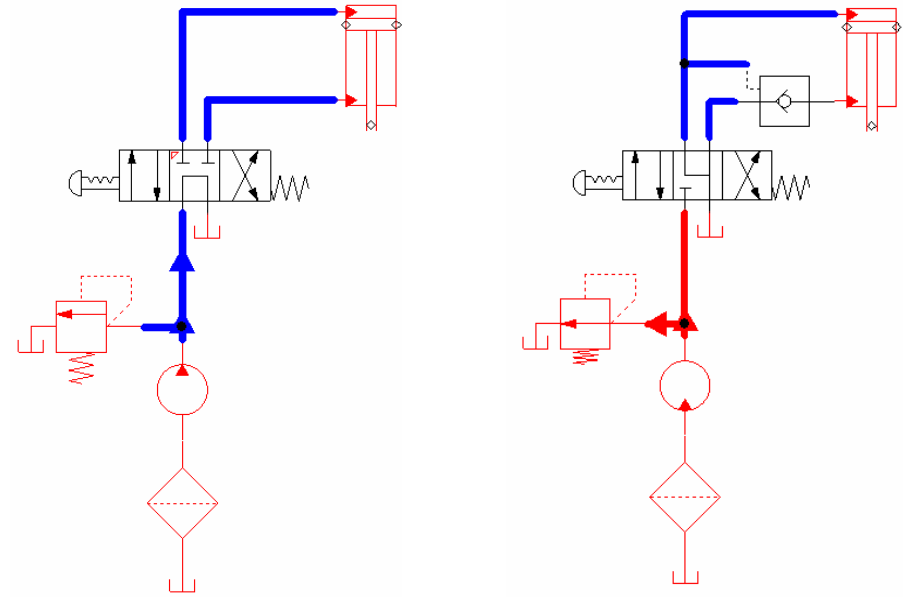
8 Example



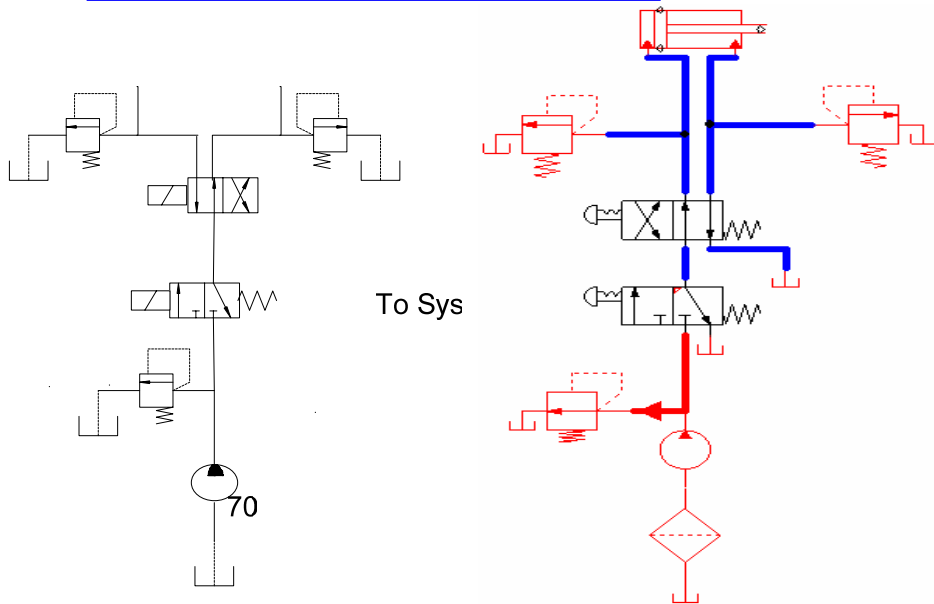
Example



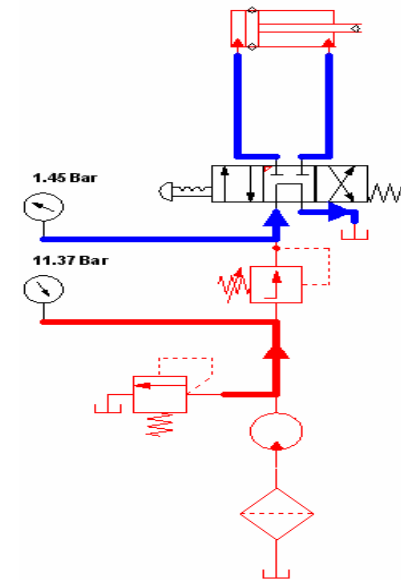
Applied Circuits (Press Circuits)



Multi Pressure Circuits



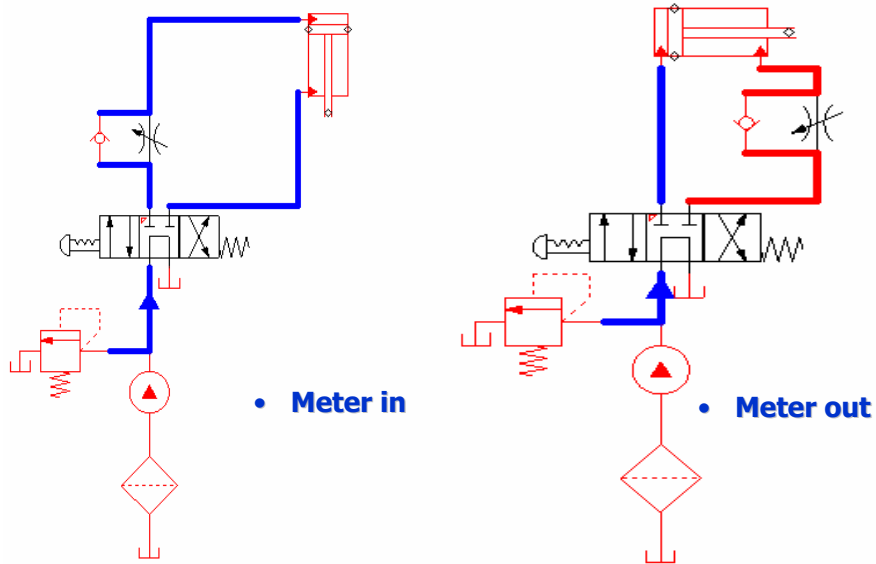
Pressure Reducing



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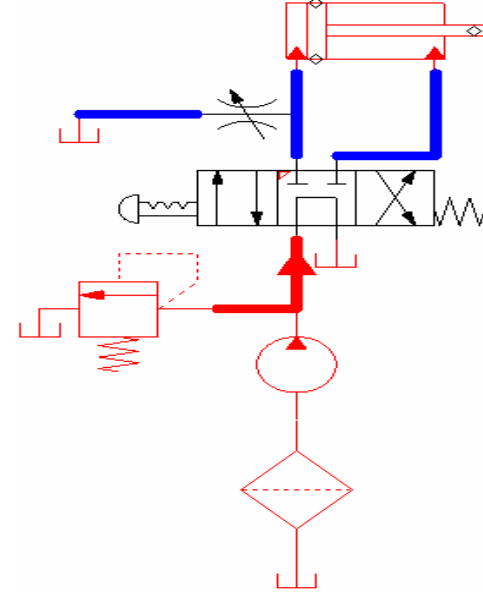
Speed Control



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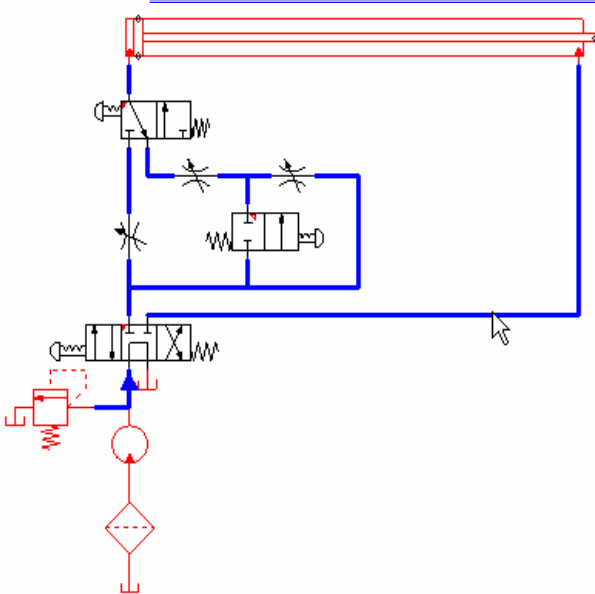
Bleed off



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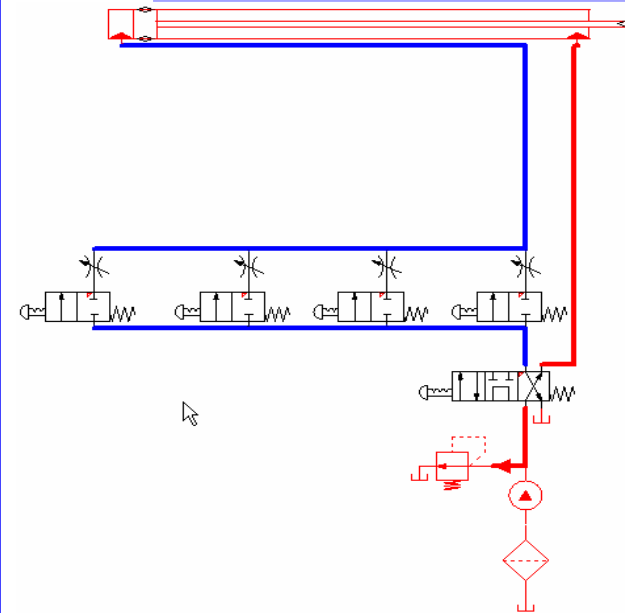
Series Flow



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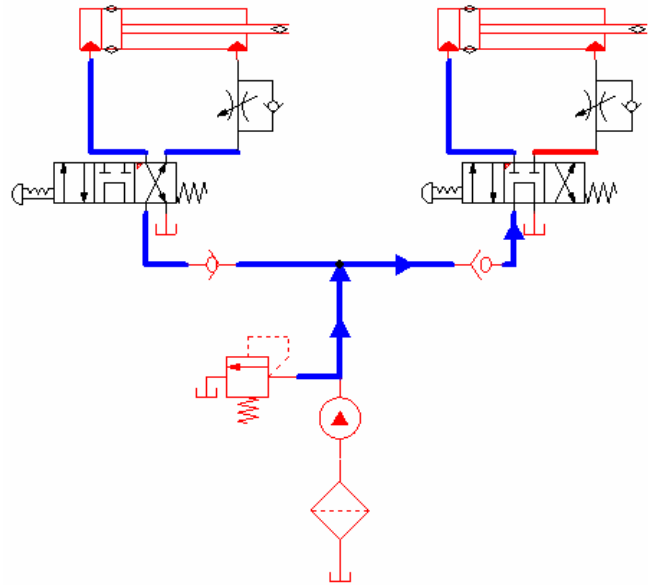
Parallel Flow



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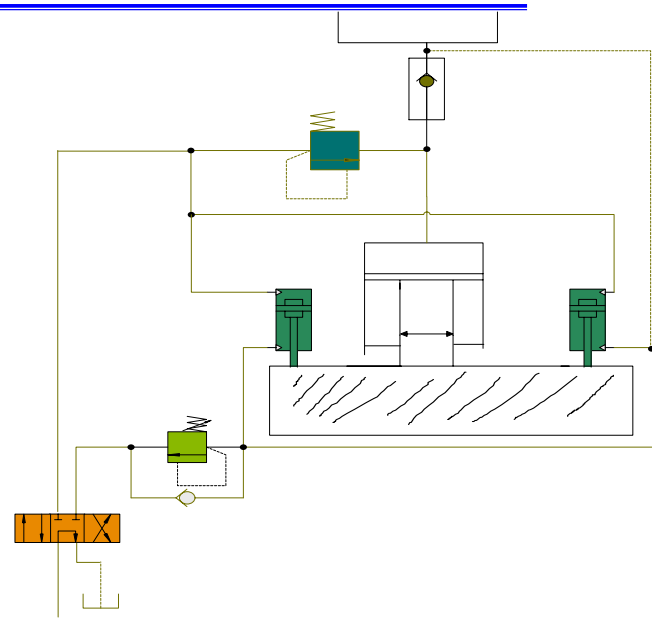
Isolation



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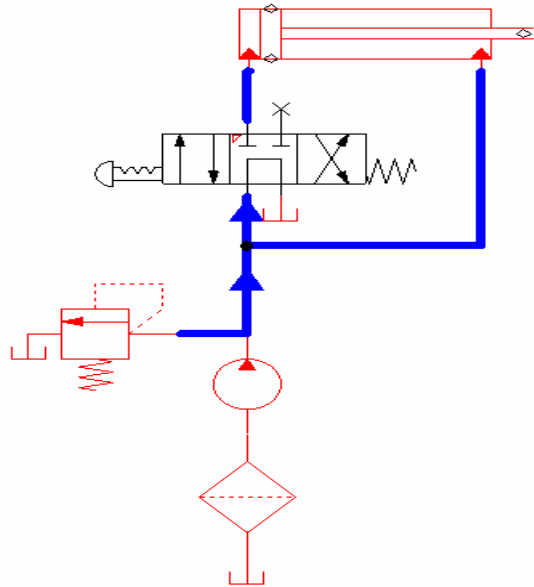
Press Circuit



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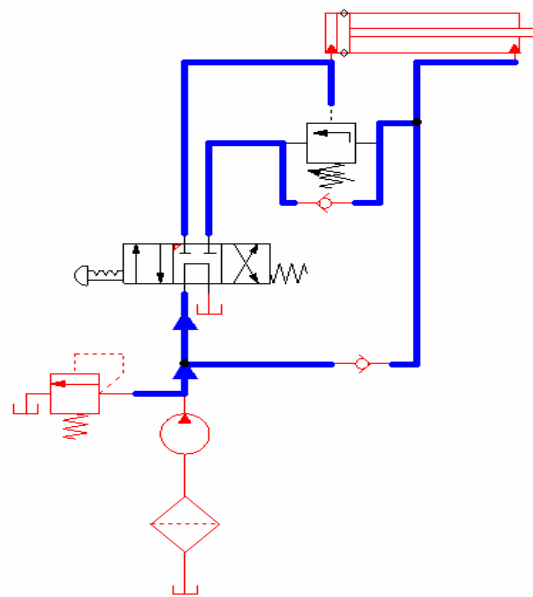
Regenerative Circuit



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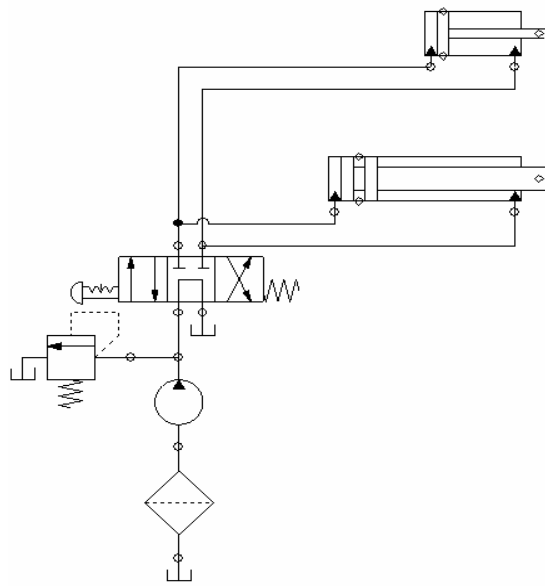
Corrected Regenerative Circuit



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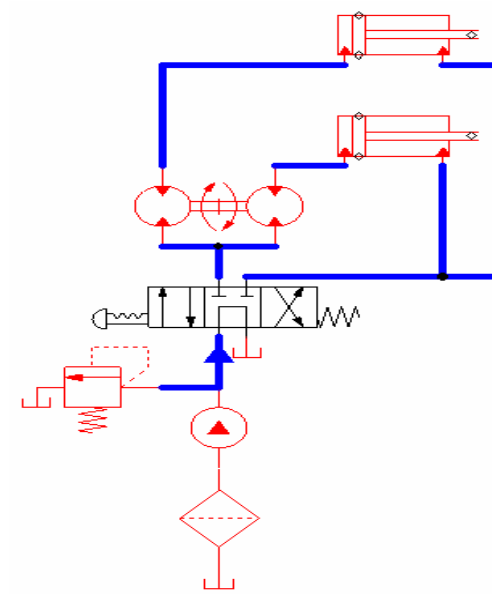
Synchronization



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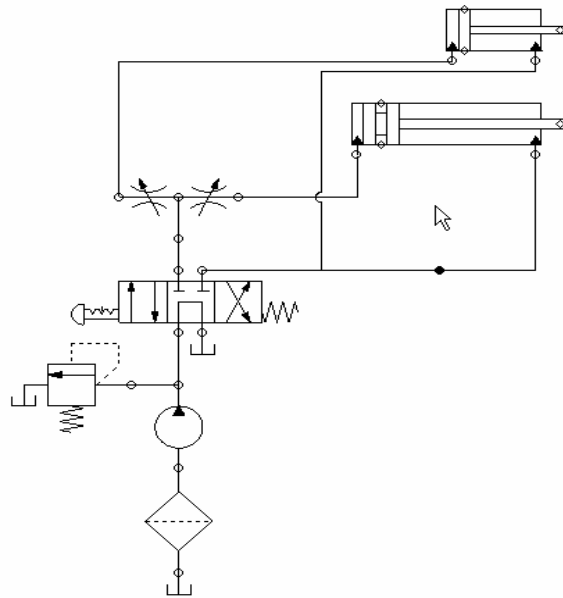
Synchronization



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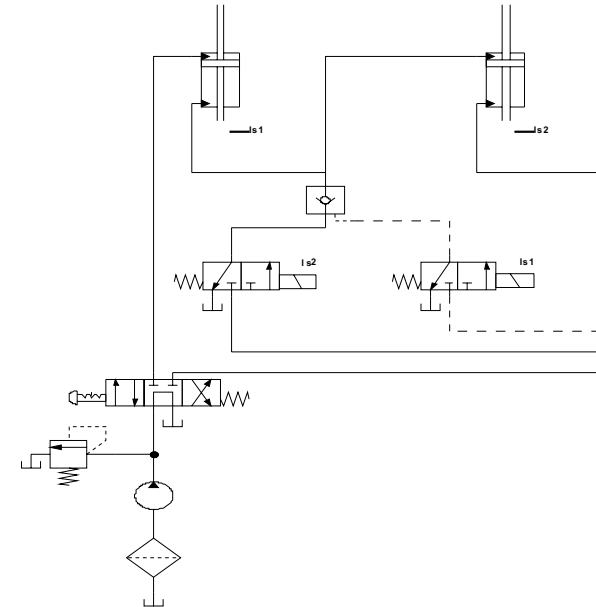
Synchronization



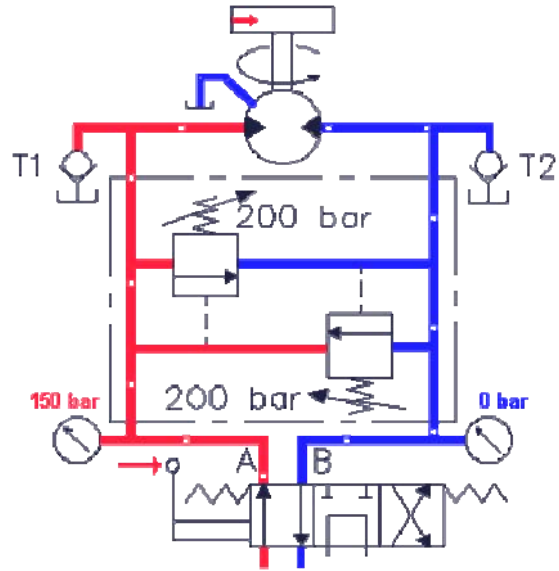
24



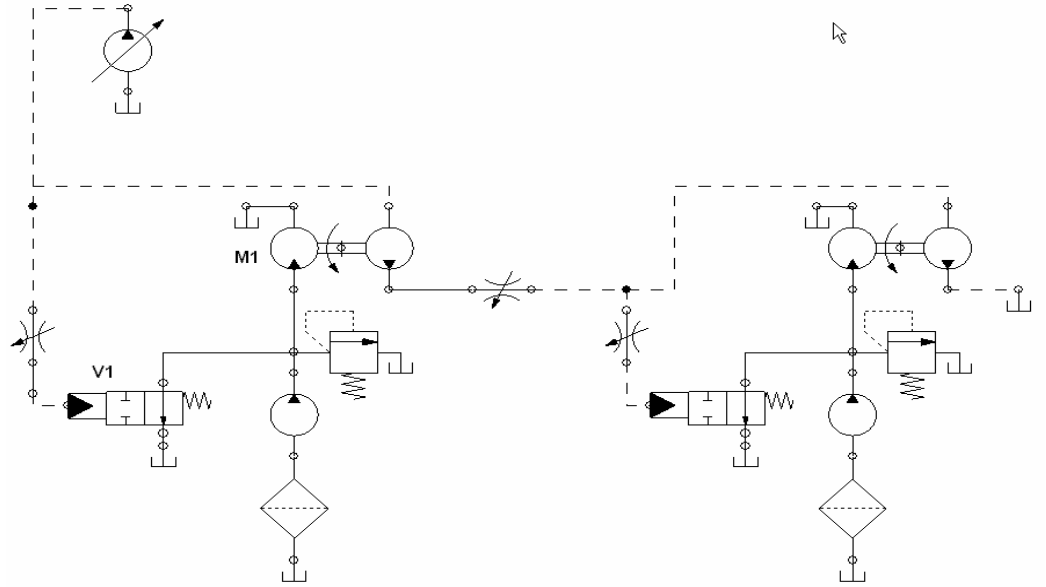
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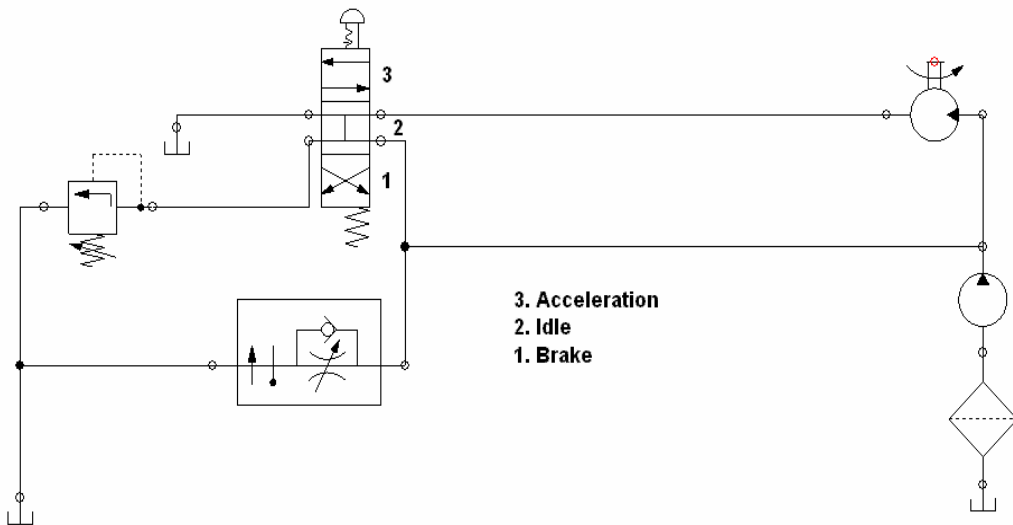
Pump Protection



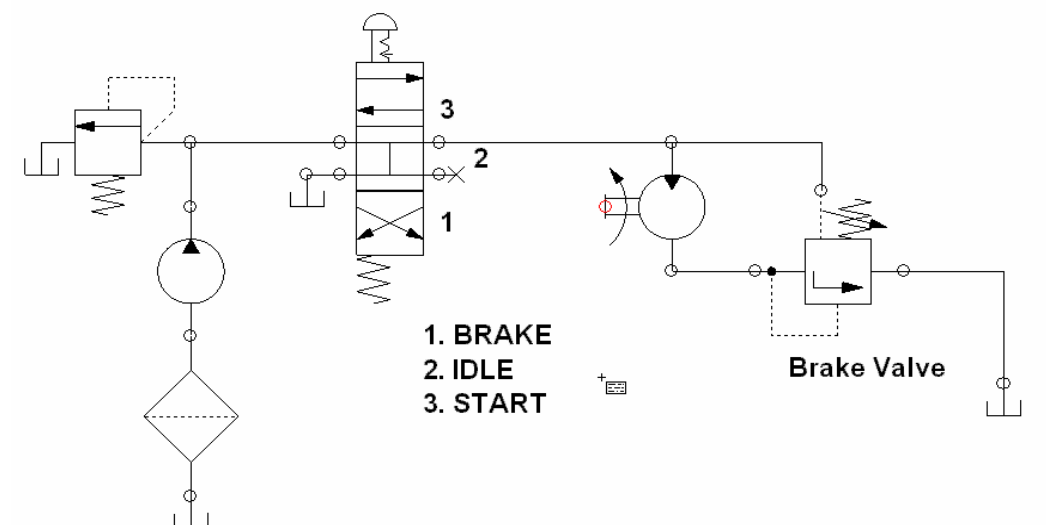
Hydro motor Synchronization



Motor Drive

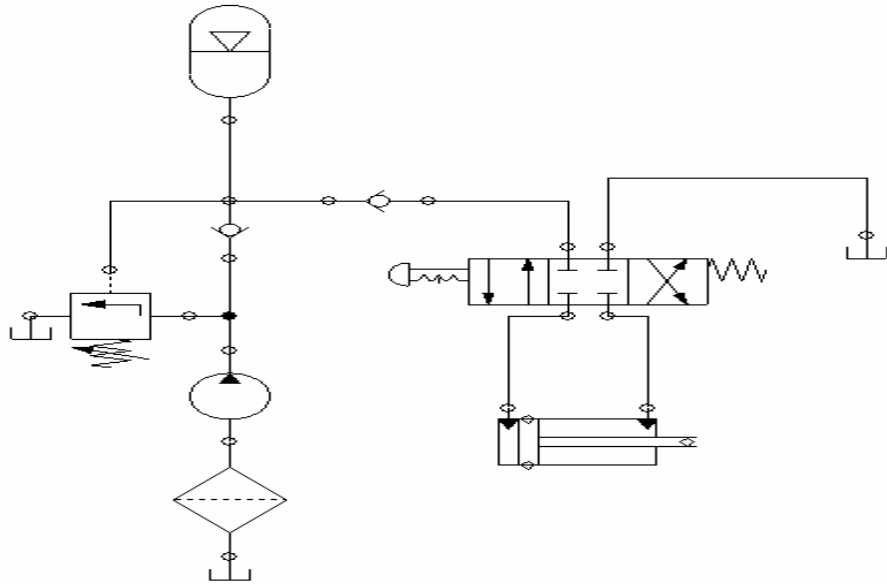


Motor Drive

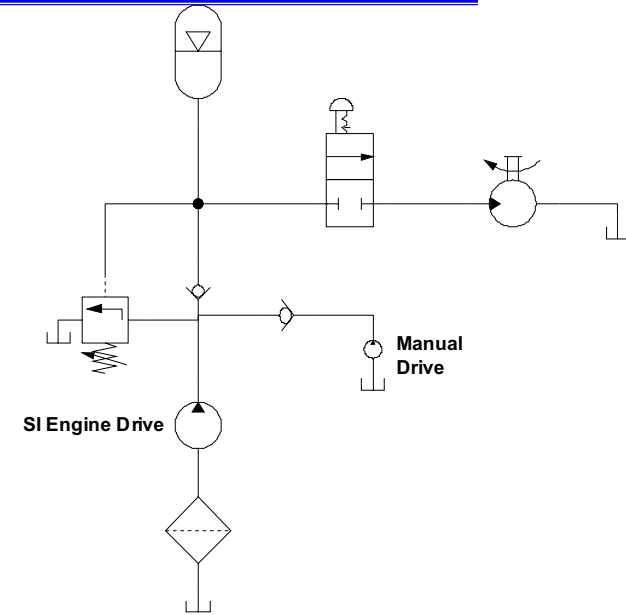




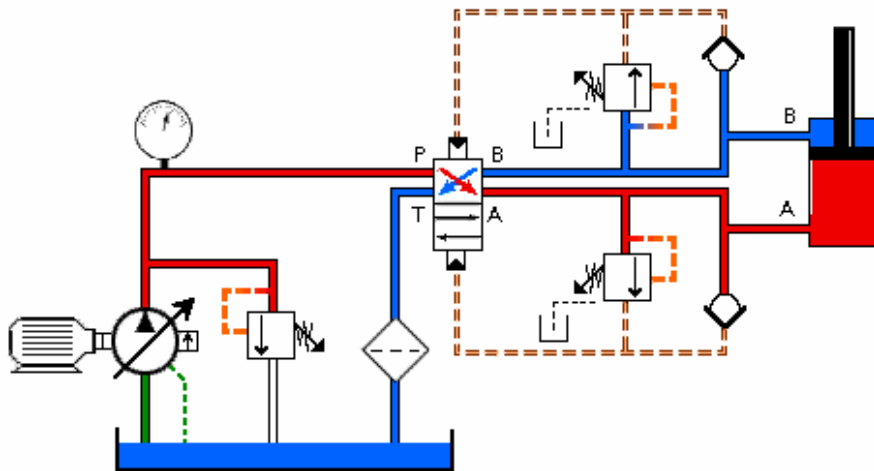
Accumulator Circuit



Heavy Engines Start



Reciprocating Cylinder



Counterbalancing

