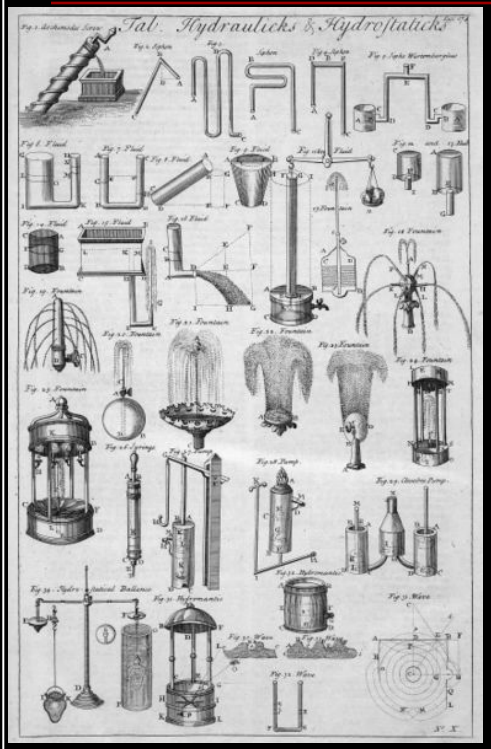
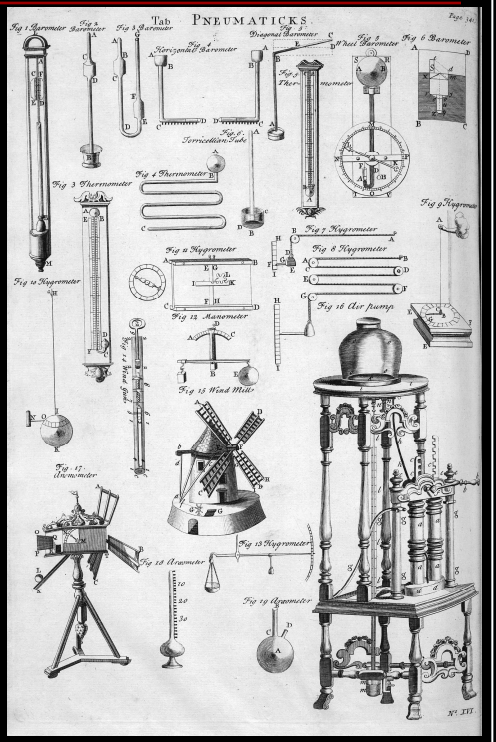
Pneumatic and Hydraulic Drawing Information





Justin Ovson

MECH 4250: Comprehensive Design 2

Professor: Dr. David Beale

Background of Pneumatics and Hydraulics

- Pneumatics:
  - Definition: the use of pressurized gas, especially air, to do work
- Hydraulics:
  - Definition: Of, the use of a pressurized fluid, especially water, to do work

Industrial Applications

- Construction
- Entertainment
- Agricultural
- Marine & Offshore
- Mining
- Plastics & Injection Molding
- Food Processing
- Forestry & Lumber
- Material Handling Packaging
- Recycling / Waste Management
- Rail & Trucking

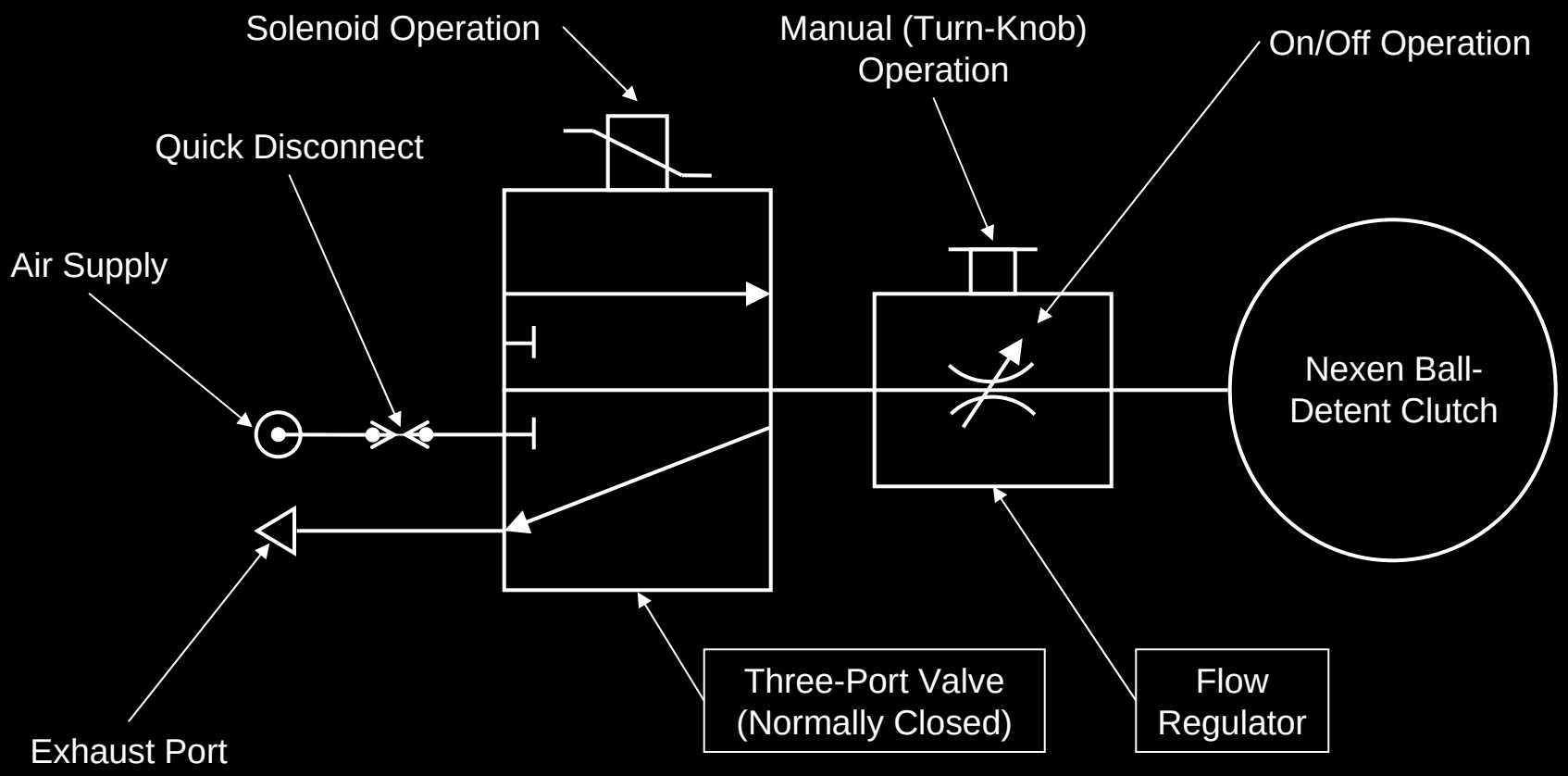
Pneumatic Schematic Generation Methods

- Computer Aided Method
  - HyPneu Fluid Power Software
  - Company: BarDyne, Inc.
  - Pros:
    - Comprehensive Symbol Library that Meets ISO Standards
    - Capable of Running Complex Simulations
    - Automatically Generates a Bill of Materials
    - Technical Support Staff
  - Cons:
    - Expensive Software
    - Steep Learning Curve
- Manual/Non-C.A.D. Method
  - PowerPoint AutoShape Editor
  - Company: Microsoft
  - Pros:
    - Readily Available Software
    - Easy to Learn User Interface
  - Cons:
    - Draftsman Must Look Up all Symbols
    - Extremely Tedious and Time Consuming
    - No Automatic Symbol Library

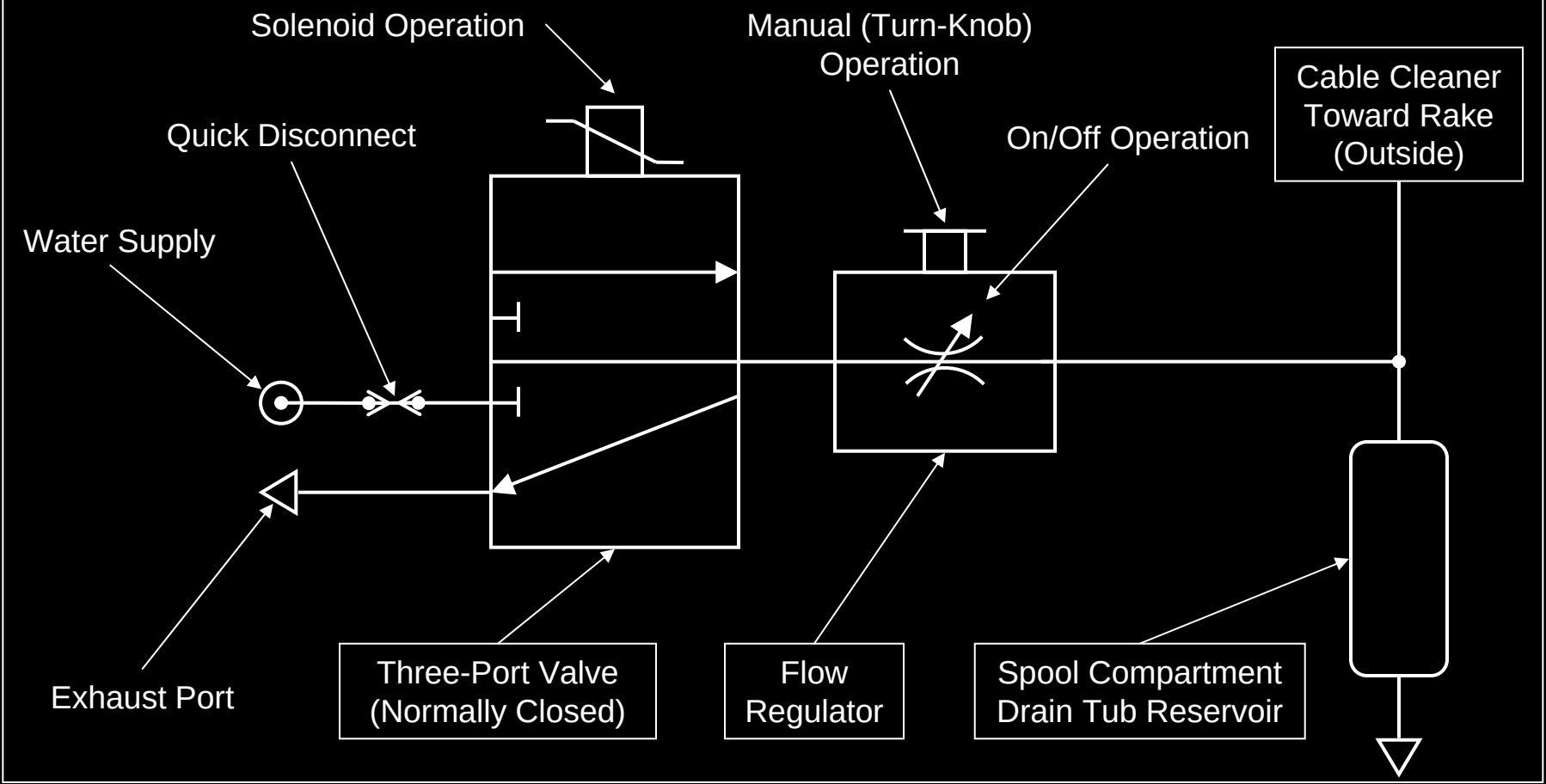
Budweiser Project Specific Schematics

- Generated Manually Via the PowerPoint Method
- Comply with the ISO 1219-1 Standard
  - ISO 1219-1:2006 establishes basic elements for symbols. It lays down rules for devising fluid power symbols for use on components and in circuit diagrams.
- Budweiser Air and Water System Schematics are on the Next Two Slides

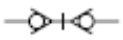
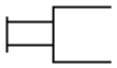
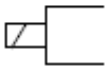
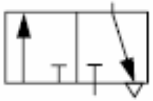
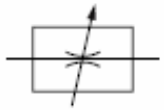
2-D Air Pneumatic Schematic



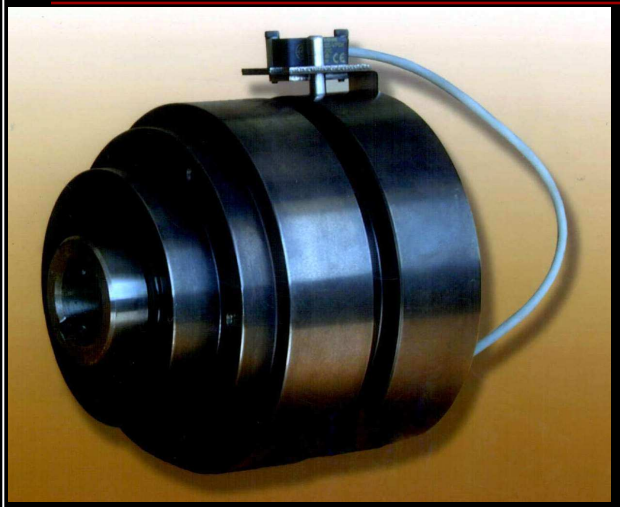
2-D Water Hydraulic Flow Schematic



Overview of Symbols Used in Preceding Budweiser Schematics

Symbol	Designation	Explanation
		Connected, with mechanically opening check valves
	Pressure source	
	Manual operation	General (without specifying type of control)
	Electrical actuation	By solenoid with one winding
	3/2-way valve	In 1st switch position inlet is closed (e. g. single acting cylinder is exhausted or connected to return flow line)
	Flow control valve	With adjustable flow control

Pictorial Representation of Devices



Nexen Ball-
Detent Clutch

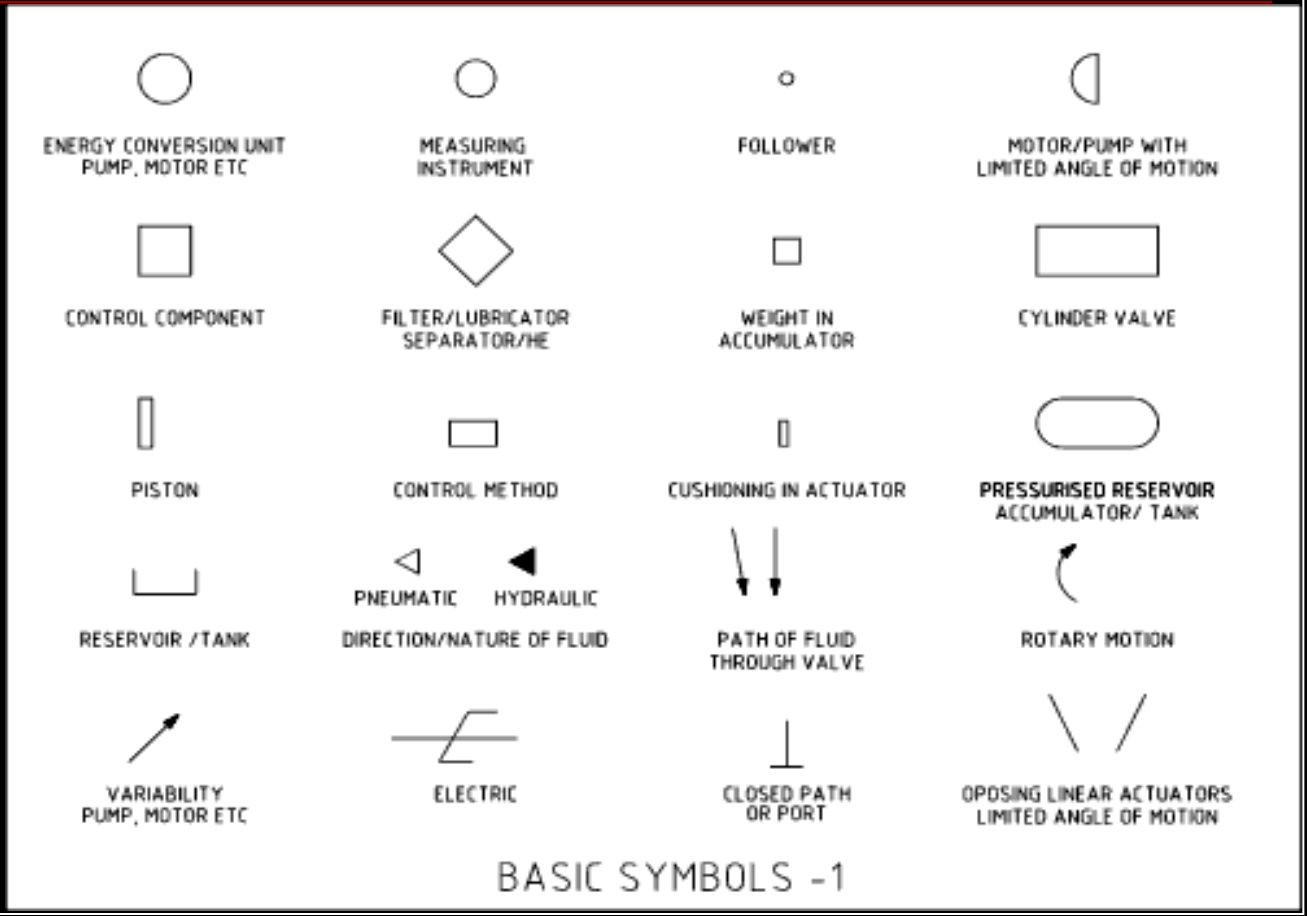
Asco 3-Way
Solenoid

Quick
Disconnect
Fitting

Regulator
Valve

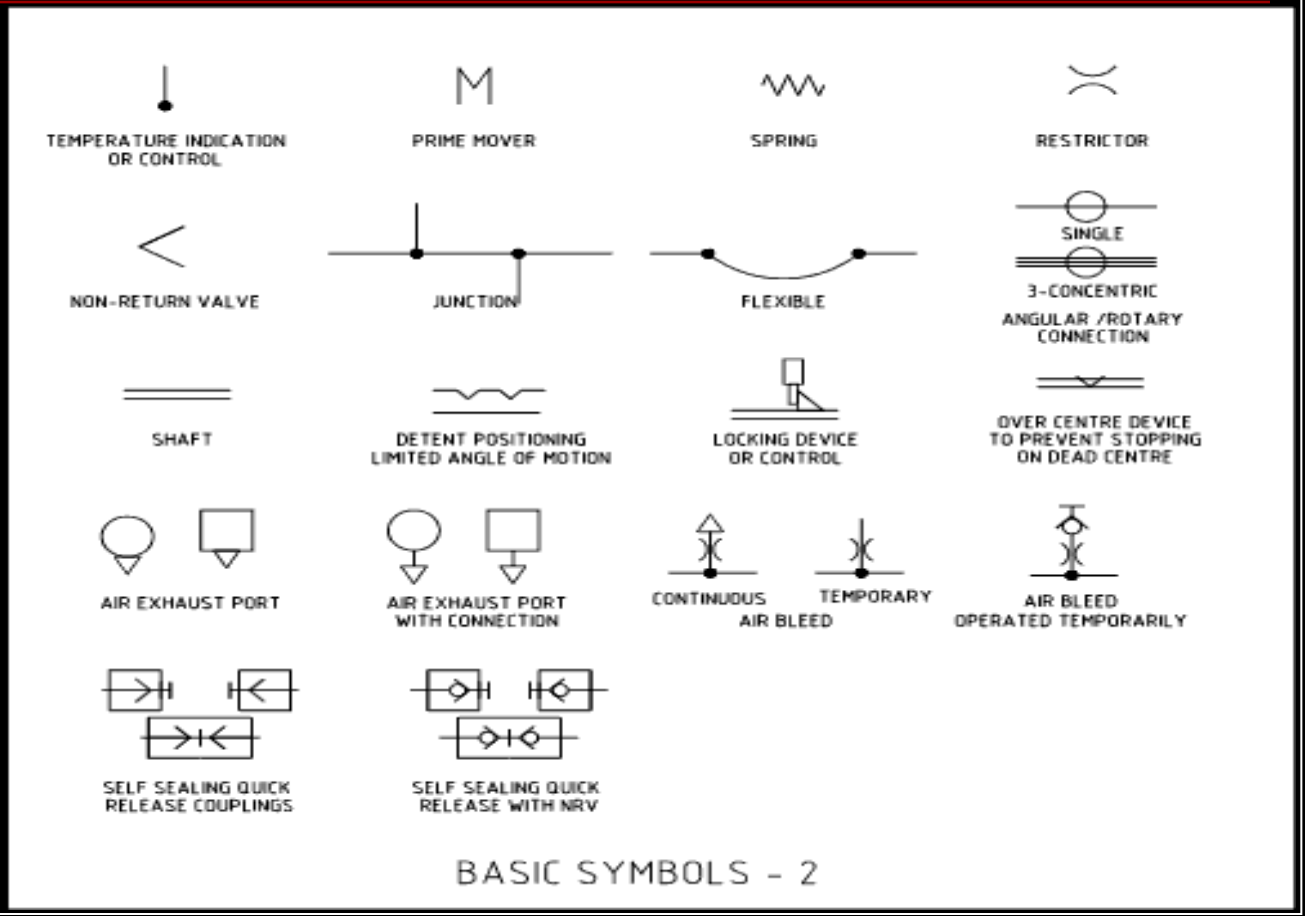
Symbol Library: Basic Symbols

- Basic Symbols # 1:
- ISO 1219



Symbol Library: Basic Symbols

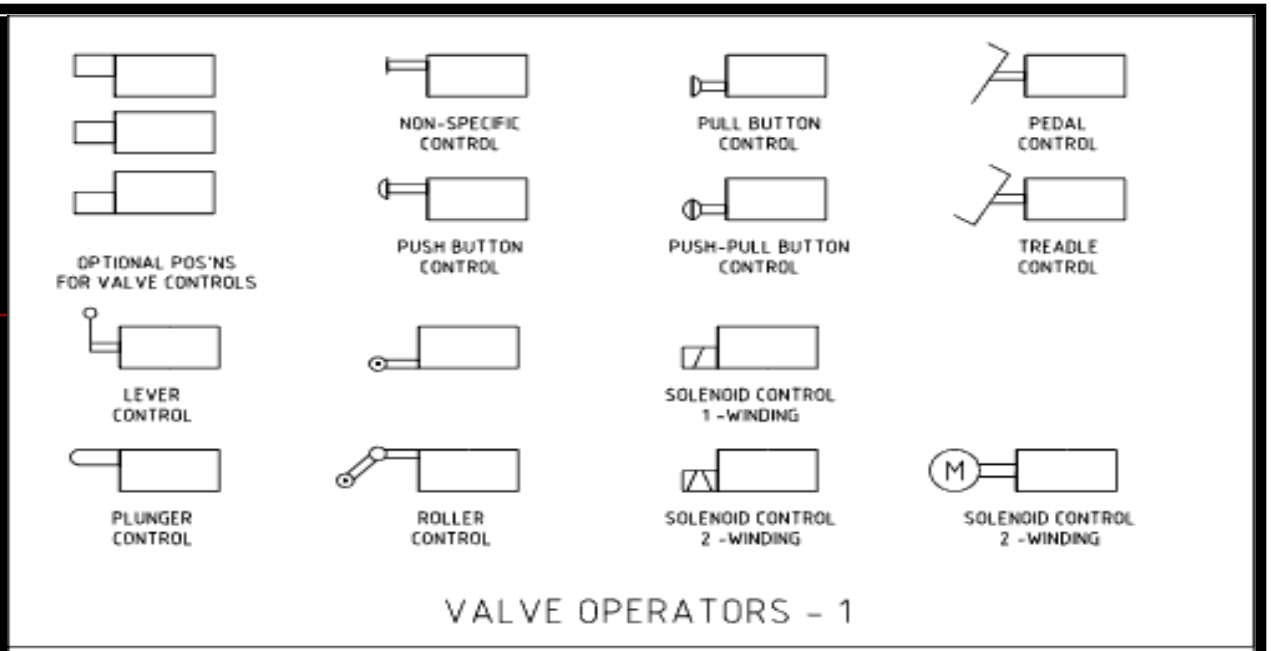
- Basic Symbols # 2:
- ISO 1219

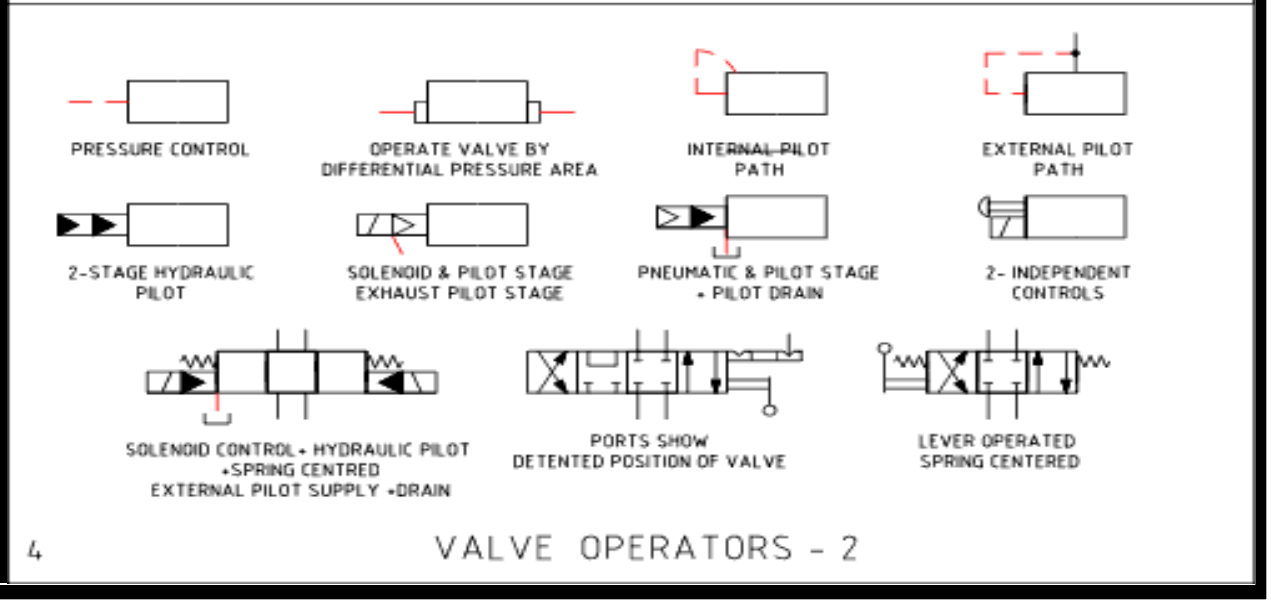


Symbol Library:

ISO 1219

Valve Operators



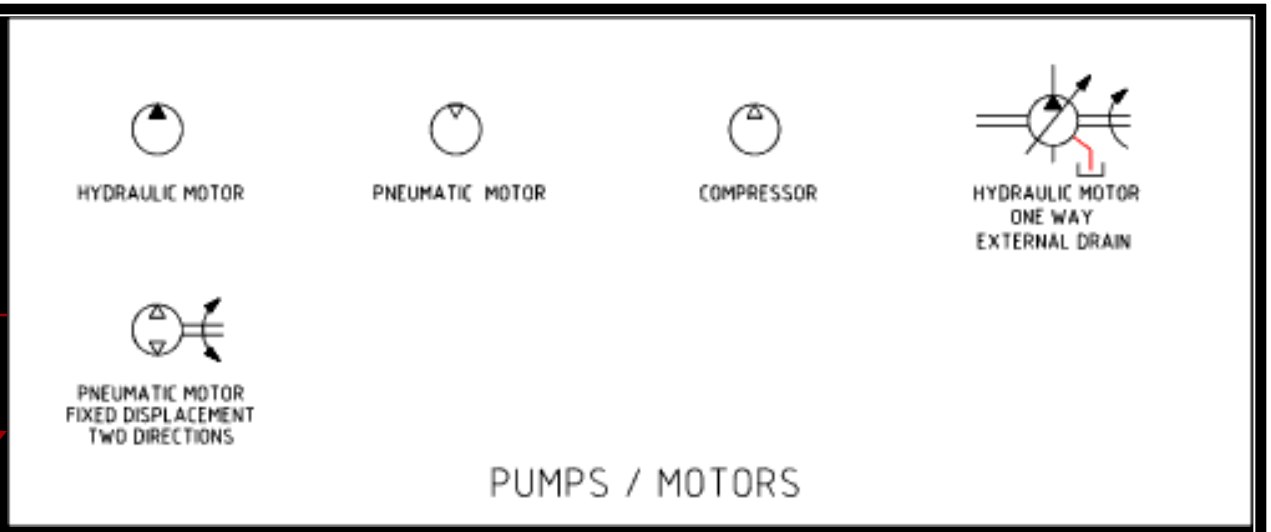


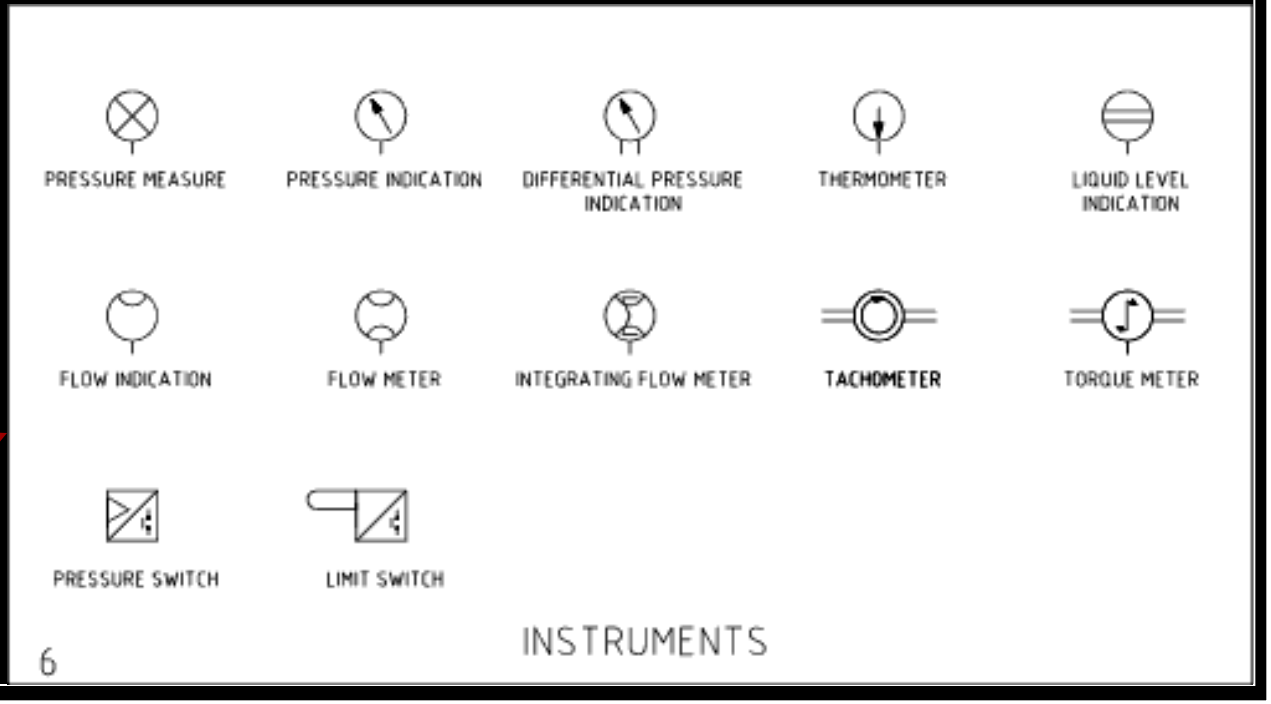
Symbol Library:

ISO 1219

Energy Conversion Devices

Instruments



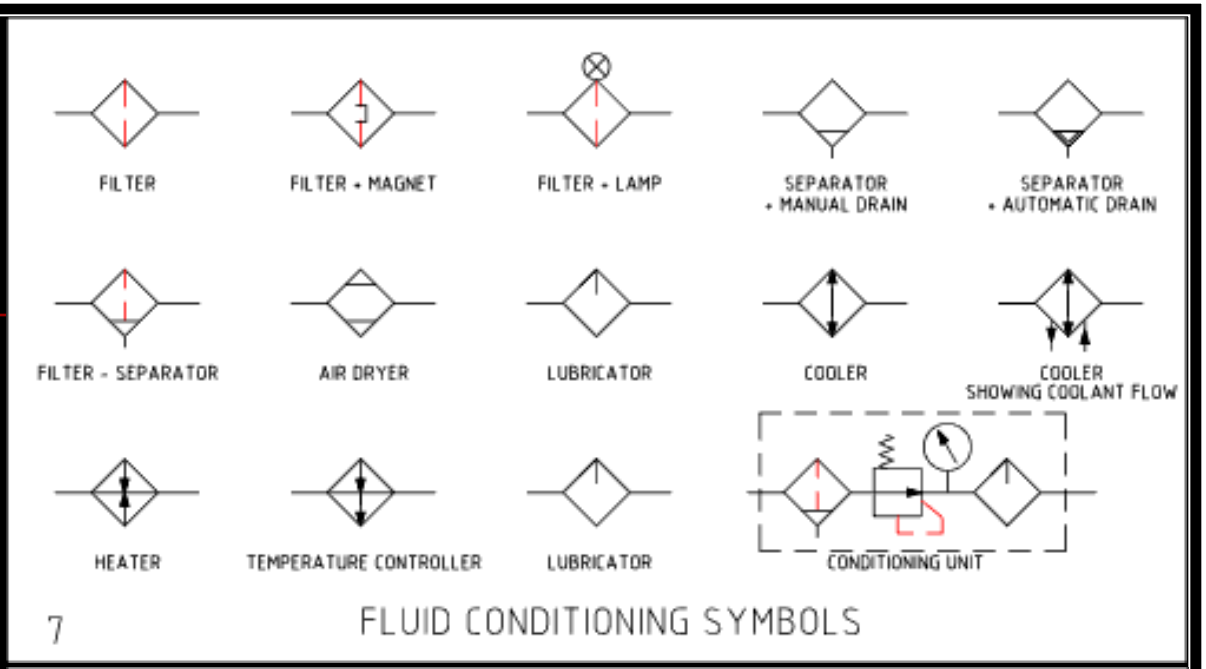


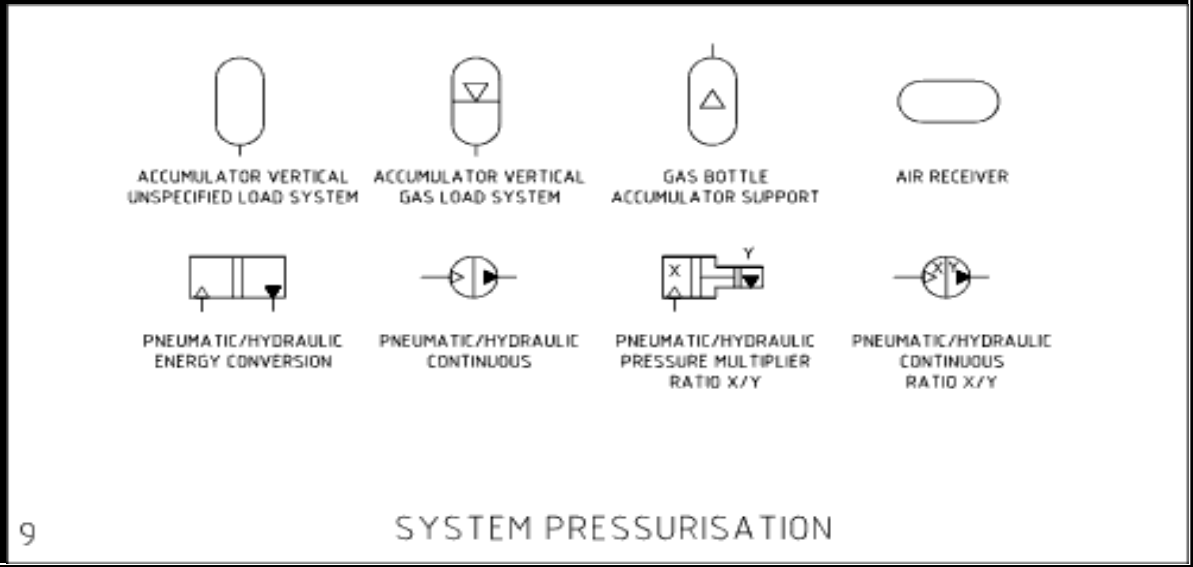
Symbol Library:

ISO 1219

Fluid Conditioning

Pressurization Method





Helpful Reference Web Pages

- For Additional Information on Pneumatic and Hydraulic Schematics Click on the Following Links:
- Common Symbols:
  - http://www.rosscontrols.com/symbols2.htm
  - http://www.kuhnkeusa.com/pdf/pneumatics/symbols.pdf
  - http://www.roymech.co.uk/Useful_Tables/Drawing/Hyd_Pnue_symbols.html
- General Information:
  - http://www.hydraulicspneumatics.com/
- Software Options:
  - http://www.pneumatic-source.com/search2/manuf/Software/