

MOLECULE—A small natural particle of matter composed of two or more atoms.

MOTOR—A device that converts fluid power into mechanical force and motion. It usually provides rotary mechanical motion.

MOTOR, FIXED-DISPLACEMENT—A motor in which the displacement per unit of output motion cannot be varied.

MOTOR, LINEAR—(See Cylinder.)

MOTOR, ROTARY—A motor capable of continuous rotary motion.

MOTOR, ROTARY LIMITED—A rotary motor having limited motion.

MOTOR, VARIABLE-DISPLACEMENT—A motor in which the displacement per unit of output motion can be varied.

NEOPRENE—A synthetic rubber highly resistant to oil, light, heat, and oxidation.

NEUTRALIZATION NUMBER—A measure of the total acidity or basicity of an oil; this includes organic or inorganic acids or bases or a combination of them.

OXIDATION—The process by which oxygen unites with some other substance, causing rust or corrosion.

PACKING—A class of seal that is used to provide a seal between two parts of a unit which move in relation to each other.

PASCAL'S LAW—A pressure applied to a confined fluid at rest is transmitted with equal intensity throughout the fluid.

PERIPHERY—The outside surface, especially that of a rounded object or body.

PIPE—A type of fluid line whose dimensions are designated by nominal (approximate) inside diameter and wall thickness.

PNEUMATICS—Engineering science pertaining to gaseous pressure and flow.

PORT—An internal or external terminus of a passage in a component.

POTENTIAL ENERGY—The energy a substance has because of its position, its condition, or its chemical composition.

POUR POINT—The lowest temperature at which a liquid will flow under specified conditions.

POWER UNIT—A combination of pump, pump drive, reservoir, controls, and conditioning components which may be required for its application.

POWER—The rate of doing work or the rate of expanding energy.

PRESSURE—The amount of force distributed over each unit of area, usually expressed in pounds per square inch.

PRESSURE, ABSOLUTE—The sum of atmospheric and gauge pressures.

PRESSURE, ATMOSPHERIC—Pressure exerted by the atmosphere at any specific location.

PRESSURE, BACK—The pressure encountered on the return side of a system.

PRESSURE, DIFFERENTIAL—The difference in pressure between any two points of a system or a component.

PRESSURE, HEAD—The pressure due to the height of a column or body of fluid. It is usually expressed in feet.

PRESSURE, OPERATING—The pressure at which a system operates.

PRESSURE, PRECHARGE—The pressure of compressed gas in an accumulator prior to the admission of a liquid.

PRESSURE, PROOF—The nondestructive test pressure in excess of the maximum rated operating pressure.

PRESSURE, STATIC—The pressure in a fluid at rest.

PRESSURE SWITCH—An electrical switch operated by the increase or decrease of fluid pressure.

PRIME MOVER—The source of mechanical power used to drive the pump or compressor.

PUMP—A device that converts mechanical force and motion into hydraulic fluid power.

PUMP, AXIAL PISTON—A pump having multiple pistons disposed with their axes parallel.

PUMP, CENTRIFUGAL—A pump that produces fluid velocity and converts it to pressure head.

PUMP, FIXED-DISPLACEMENT—A pump in which the displacement per cycle cannot be varied.

PUMP, RADIAL PISTON—A pump having multiple pistons disposed radially actuated by an eccentric element.

PUMP, VARIABLE-DISPLACEMENT—A pump in which the volume of fluid per cycle can be varied.

RANKINE SCALE—A thermometer scale based on absolute zero of the Fahrenheit scale, in which the freezing point of water is approximately 492°R.

RATIO—The value obtained by dividing one number by another, indicating their relative proportions.

RECEIVER—A container in which gas is stored under pressure as a supply source for pneumatic power.

RECIPROCATING—Moving back and forth, as a piston reciprocating in a cylinder.

RESERVOIR—A container for storage of liquid in a fluid power system.

RESPONSE TIME—The time lag between a signal input and the resulting change of output.

RESTRICTOR—A device that reduces the cross-sectional flow area.

RESTRICTOR, ORIFICE—A restrictor, the length of which is relatively small with respect to its cross-sectional area. The orifice may be fixed or variable. Variable types are noncompensated, pressure compensated, or pressure and temperature compensated.

RETURN LINE—A line used for returning fluid back into the reservoir or atmosphere.

SEPARATOR—A device whose primary function is to isolate undesirable fluids and or contaminants by physical properties other than size.

SERVO—A device used to convert a small movement into a greater movement of force.

SOLID—The form of matter that has a definite shape and a definite volume.

SPECIFIC GRAVITY—The ratio of the weight of a given volume of a substance to the weight of an equal volume of some standard substance.

STEADY FLOW—A flow in which the velocity, pressure, and temperature at any point in the fluid do not vary with time.

STRAINER—A coarse filter.

STOKE—The standard unit of kinematic viscosity in the cgs system. It is expressed in square centimeters per second; 1 centistoke equals 0.01 stoke.

STUFFING BOX—A cavity and closure with manual adjustment for a sealing device.

SUPPLY LINE—A line that conveys fluid from the reservoir to the pump.

SURGE—A momentary rise of pressure in a circuit.

SYNCHRONIZE—To make two or more events or operations occur at the proper time with respect to each other.

SYNTHETIC MATERIAL—A complex chemical compound that is artificially formed by the combining of two or more simpler compounds or elements.

TANK—A container for the storage of fluid in a fluid power system.

THEORY—A scientific explanation, tested by observations and experiments.

THERMAL EXPANSION—The increase in volume of a substance due to temperature change.

TORQUE—A force or combination of forces that produces or tends to produce a twisting or rotary motion.

TUBING—A type of fluid line whose dimensions are designated by actual measured outside diameter and by actual measured wall thickness.

TURBINE—A rotary motor actuated by the reaction, impulse, or both, of a flow of pressurized fluid.

VALVE—A device that controls fluid flow direction, pressure, or flow rate.

VALVE, CHECK—A directional control valve that permits flow of fluid in only one direction.

VALVE, COUNTERBALANCE—A pressure control valve that maintains back pressure to prevent a load from falling.

VALVE, DIRECTIONAL CONTROL—A valve whose primary function is to direct or prevent flow through selected passages.

VALVE, FLOW CONTROL—A valve whose primary function is to control flow rate.

VALVE, HYDRAULIC—A valve for controlling liquid.

VALVE, PILOT—A valve used to operate another valve or control.

VALVE, PNEUMATIC—A valve for controlling gas.

VALVE, PRESSURE REDUCING—A pressure control valve whose primary function is to limit outlet pressure.

VALVE, PRIORITY—A valve that directs flow to one operating circuit at a fixed rate and directs excess flow to another operating circuit.

VALVE, RELIEF—A pressure control valve whose primary function is to limit system pressure.

VALVE, SELECTOR—A directional control valve whose primary function is to selectively interconnect two or more ports.

VALVE, SEQUENCE—A valve whose primary function is to direct flow in a predetermined sequence.

VALVE, SERVO—A directional control valve that modulates flow or pressure as a function of its input signal.

VALVE, SHUTOFF—A valve that operates fully open or fully closed.

VALVE, UNLOADING—A pressure control valve whose primary function is to permit a pump or compressor to operate at minimum load.

VELOCITY—The rate of motion in a particular direction. The velocity of fluids is usually expressed in feet per second.

VENTURI—A tube having a narrowing throat or constriction to increase the velocity of fluid flowing through it. The flow through the venturi causes a pressure drop in the smallest section, the amount being a function of the velocity of flow.

VISCOSITY—A measure of the internal friction or resistance of a fluid to flow.

VISCOSITY INDEX—A measure of the viscosity-temperature characteristics of a fluid as referred to that of two arbitrary reference fluids.

VISCOSITY, SAYBOLT UNIVERSAL SECONDS (SUS)—The time in seconds for 60 milliliters of oil to flow through a standard orifice at a given temperature.

VISCOSITY, KINEMATIC—The absolute viscosity divided by the density of the fluid. It is usually expressed in centistokes.

VOLUME OF FLOW—The quantity of fluid that passes a certain point in a unit of time. The volume of flow is usually expressed in gallons per minute for liquids and cubic feet per minute for gases.

WORK—The transference of energy from one body or system to another. That which is accomplished by a force acting through a distance.

APPENDIX II

MECHANICAL SYMBOLS OTHER THAN AERONAUTICAL FOR FLUID POWER DIAGRAMS

LINES

LINES, WORKING



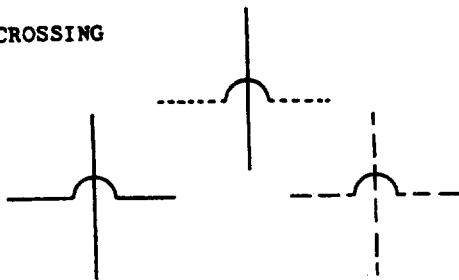
LINES, PILOT



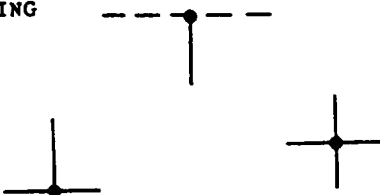
LINES, LIQUID DRAIN OR AIR EXHAUST



LINES, CROSSING



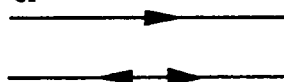
LINES, JOINING



LINES, FLEXIBLE



FLOW, DIRECTION OF



LINES TO RESERVOIR
BELOW FLUID LEVEL



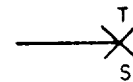
ABOVE FLUID
LEVEL



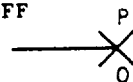
PLUG OR PLUGGED CONNECTION



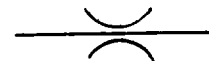
TESTING STATION



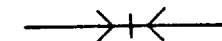
FLUID POWER TAKE-OFF
STATION



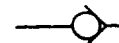
RESTRICTION, FIXED



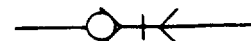
QUICK DISCONNECT
WITHOUT CHECKS



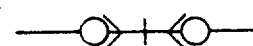
WITH CHECKS
DISCONNECTED



WITH ONE CHECK



WITH TWO CHECKS



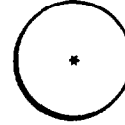
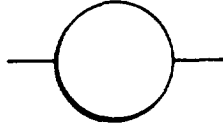
PUMPS, COMPRESSORS & ROTARY MOTORS

BASIC SYMBOL
ENVELOPE



COMPRESSORS, AIR

PORTS

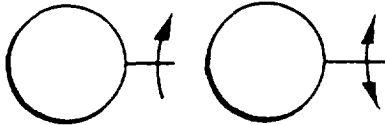


LINES OUTSIDE ENVELOPE ARE NOT PART OF SYMBOL, BUT REPRESENT FLOW LINES CONNECTED THERETO.

APPROPRIATE SYMBOLS SHALL BE ADDED TO INDICATE SHAFTS, CONNECTING LINES, AND METHOD OF CONTROL.

* TYPE OF COMPRESSOR SHALL BE INDICATED WITHIN BASIC SYMBOL BY APPROPRIATE LETTERS LISTED BELOW.

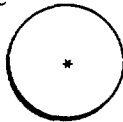
SHAFTS, ROTATING



ARROW INDICATES DIRECTION OF ROTATION BY ASSUMING IT IS ON NEAR SIDE OF SHAFT.

CF FIXED DISPLACEMENT
CK KINETIC

PUMPS, HYDRAULIC

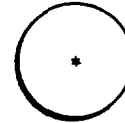


APPROPRIATE SYMBOLS SHALL BE ADDED TO INDICATE SHAFTS, CONNECTING LINES, AND METHOD OF CONTROL.

* TYPE OF PUMP SHALL BE INDICATED WITHIN BASIC SYMBOL BY APPROPRIATE LETTERS LISTED BELOW.

PF FIXED DISPLACEMENT
PK KINETIC - CENTRIFUGAL
PV VARIABLE DISPLACEMENT

FLUID MOTORS, ROTARY



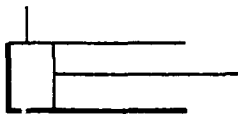
APPROPRIATE SYMBOLS SHALL BE ADDED TO INDICATE SHAFTS, CONNECTING LINES, AND METHOD OF CONTROL.

* TYPE OF MOTOR SHALL BE INDICATED WITHIN BASIC SYMBOL BY APPROPRIATE LETTERS LISTED BELOW.

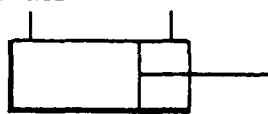
MF FIXED DISPLACEMENT
MO OSCILLATING
MV VARIABLE DISPLACEMENT

CYLINDERS

SINGLE ACTING



DOUBLE ACTING
SINGLE END ROD



DOUBLE END ROD



RESERVOIRS

VENTED



PRESSURIZED

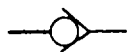


RECEIVER FOR AIR OR OTHER GASES



VALVE

VALVE, CHECK



VALVE, RESTRICTION, CHOKE
VARIABLE VISCOUS



VALVE, RESTRICTION, ORIFICE
VARIABLE NON-VISCOUS



VALVE, BASIC SYMBOL
(INSERT MODEL NO. FOR
SPECIAL VALVES)



METHOD OF INDICATING
INTERNAL FLOW



VALVE EXAMPLES

VALVE, MANUAL SHUT OFF



VALVE, RELIEF
MAXIMUM PRESSURE



VALVE, RELIEF
REMOTELY OPERATED



VALVE, SEQUENCE
DIRECTLY OPERATED



VALVE, PRESSURE REDUCING



VALVE, SHUT OFF
2 POSITION-2 CONNECTION



VALVE, DIRECTIONAL 2
POSITION-3 CONNECTION



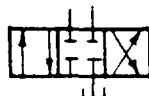
VALVE, DIRECTIONAL
2 POSITION-4 CONNECTION



VALVE, DIRECTIONAL
3 POSITION-4 CONNECTION
OPEN CENTER



VALVE, DIRECTIONAL
3 POSITION-4 CONNECTION
CLOSED CENTER

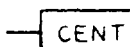


TYPE OF CONTROL

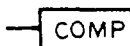
CONTROL, BASIC SYMBOL



CONTROL, CENTRIFUGAL



CONTROL, COMPENSATOR



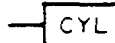
CONTROL, COMPENSATOR
PRESSURE



CONTROL, COMPENSATOR
TEMPERATURE



CONTROL, CYLINDER



CONTROL, DETENT



CONTROL, MANUAL



CONTROL, MECHANICAL



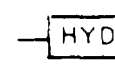
CONTROL, MOTOR
ELECTRIC



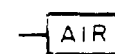
CONTROL, MOTOR
HYDRAULIC



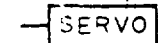
CONTROL, PILOT
HYDRAULIC



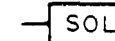
CONTROL, PILOT
AIR



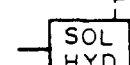
CONTROL, SERVO



CONTROL, SOLENOID



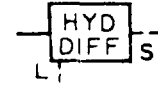
CONTROL, SOLENOID
HYD. PILOT OPERATED



CONTROL, THERMAL



CONTROL, PILOT HYD.
DIFFERENTIAL AREA



MISCELLANEOUS UNITS

MOTOR, ELECTRIC



STRAINER



HEAT EXCHANGER



PRESSURE SWITCH



INTENSIFIER



PRESSURE GAGE



ACCUMULATOR



SPRING



FILTER



COMPONENT ENCLOSURE

