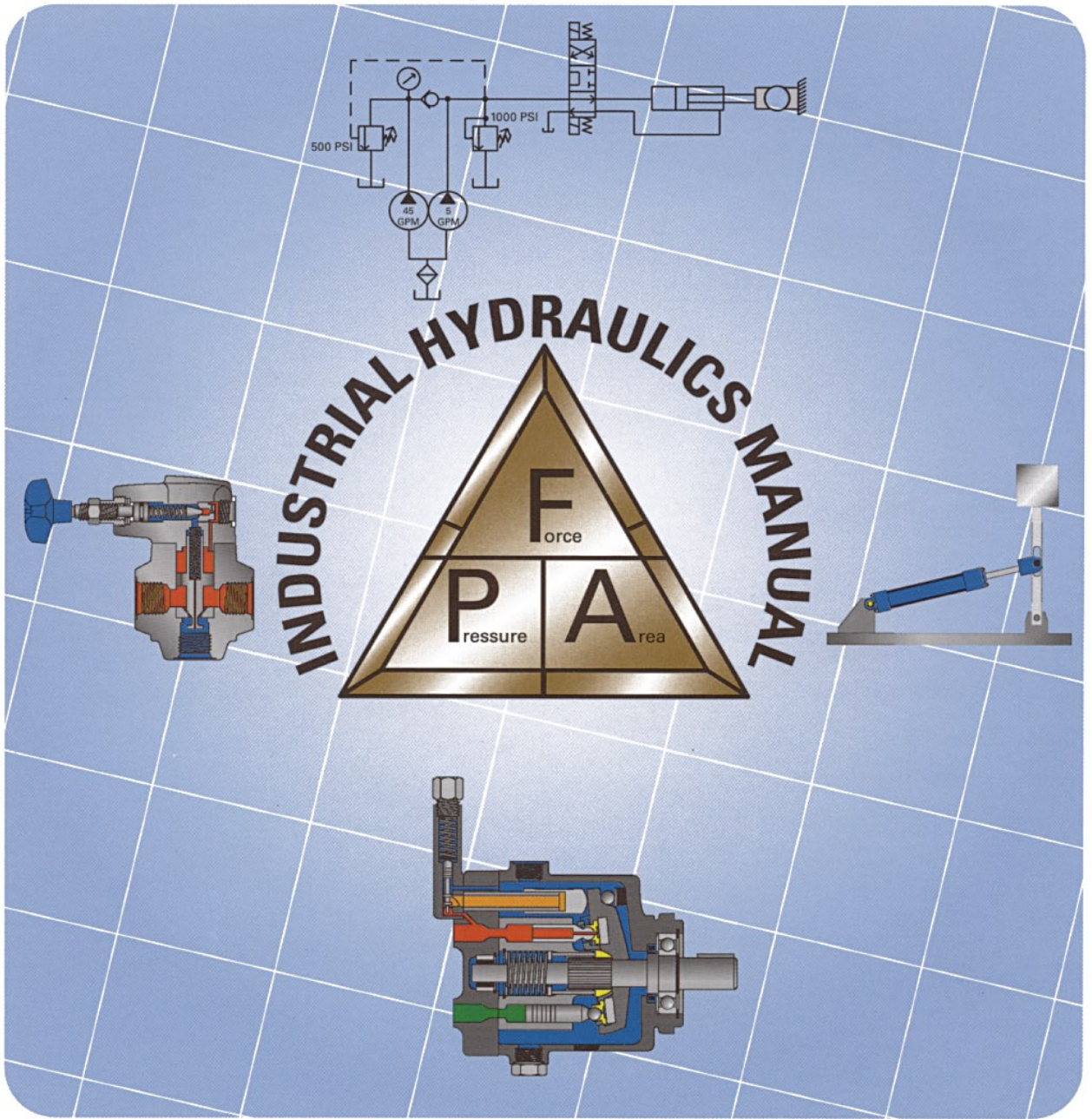




Fluid Power

Industrial Hydraulics Manual



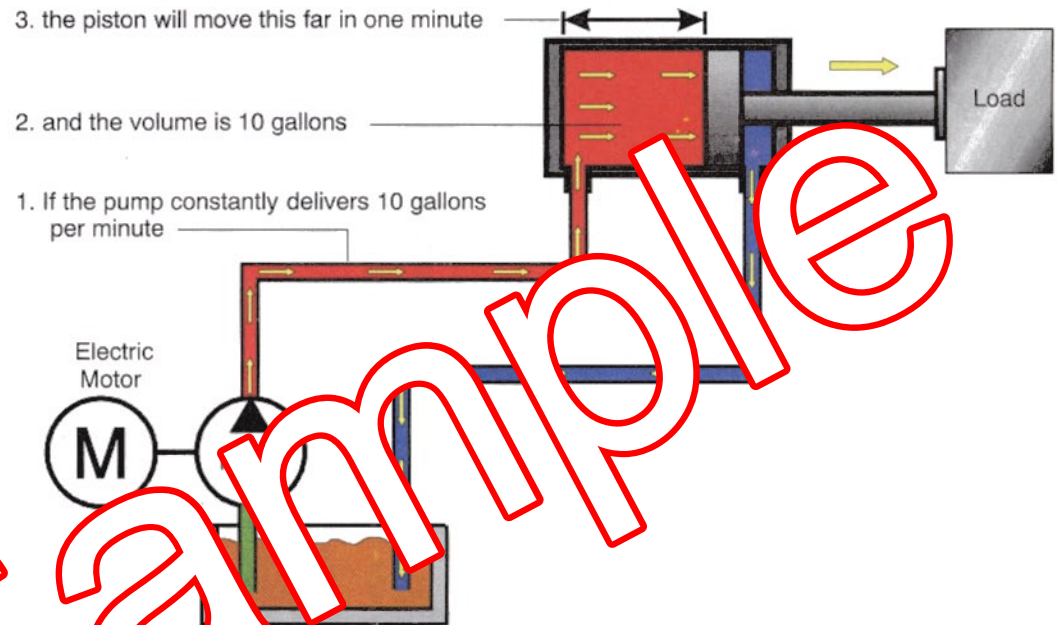
Advantages of Hydraulics

As described below, there are several important advantages of hydraulic systems.

Variable Speed

Most electric motors run at a constant speed. It is also desirable to operate an engine at a constant speed. The actuator (linear or rotary) of a hydraulic system, however, can be driven from maximum speeds (A) to reduced speeds (B) by varying the pump delivery using a flow control valve. A more complete description of various valves mentioned in this introduction section will appear later in this manual.

A. Maximum Speed



B. Reduced Speed

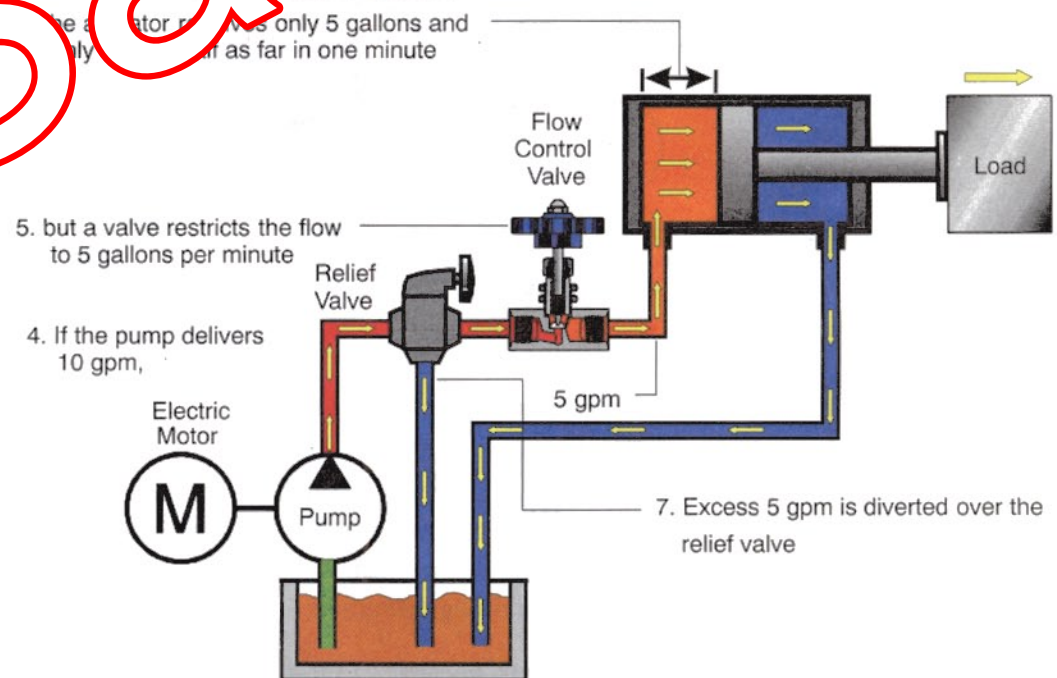


Figure 1-5 Hydraulic speed is variable

To convert	into	Multiply by	To convert	into	Multiply by
Pounds/sq.in.	Kgs./sq. meter	703.1	Seconds (angle)	Radians	4.848×10^{-6}
Pounds/sq.in.	Kilopascal	6.895	Slug	Kilograms	14.59
Pounds/sq.in.	Pounds/sq.ft	144.0	Slug	Pounds	32.17
Pounds/hr.	Kilograms/hr.	0.454	Square Centimeters	Circular mils.	1.973×10^5
Pounds/sec.	Kilograms/hr.	1,633.0	Square Centimeters	Sq. feet	1.076×10^{-3}
Pounds-sec./sq.ft.	Pound mass/ft. sec.	32.2	Square Centimeters	Sq. inches	0.1550
Quadrants (angle)	Degrees	90.0	Square Centimeters	Sq. meters	0.0001
Quadrants (angle)	Minutes	5,400.0	Square Centimeters	Sq. miles	3.861×10^{-11}
Quadrants (angle)	Radians	1.571	Square Centimeters	Sq. millimeters	100.0
Quadrants (angle)	Seconds	3.24×10^5	Square Centimeters	Sq. yards	1.196×10^{-4}
Quarts (liq.)	Cu. cms.	946.4	Square Feet	Acres	2.296×10^{-5}
Quarts (liq.)	Cu. feet	0.03342	Square Feet	Circular mils.	1.833×10^8
Quarts (liq.)	Cu. inches	57.75	Square Feet	Sq. cms.	929.0
Quarts (liq.)	Cu. meters	9.464×10^{-4}	Square Feet	Sq. inches	144.0
Quarts (liq.)	Cu. yards	1.238×10^{-3}	Square Feet	Sq. meters	0.09290
Quarts (liq.)	Gallons	0.25	Square Feet	Sq. miles	3.587×10^{-8}
Quarts (liq.)	Liters	0.9463	Square Feet	Sq. millimeters	9.290×10^4
Radians	Degrees	57.30	Square Feet	Sq. yards	1.111
Radians	Minutes	3,438.0	Square Feet/sec.	Centistokes	903.0
Radians	Quadrants	0.6366	Square Inches	Circular mils	1.273×10^6
Radians	Seconds	2.063×10^5	Square inches	Sq. cms	6.452
Radians/sec.	Degrees/sec.	57.30	Square inches	Sq. feet	1.4×10^{-3}
Radians/sec.	Revolutions/min.	9.549	Square inches	Sq. meters	0.452
Radians/sec.	Revolutions/sec.	0.1592	Square inches	Sq. miles	10^6
Radians/sec./sec.	Revs./min./min.	573.0	Square inches	Sq. yards	7.716×10^{-4}
Radians/sec./sec.	Revs./min./sec.	9.549	Square kilometers	Acres	247.1
Radians/sec./sec.	Revs./sec./sec.	0.1592	Square kilometers	Sq. cms	10^{10}
Revolutions	Degrees	360.0	Square kilometers	Sq. ft.	10.76×10^4
Revolutions	Quadrants	4.0	Square kilometers	Sq. inches	1.550×10^9
Mils	Feet	333×10^{-5}	Square kilometers	Sq. meters	10^6
Mils	Inches	0.01	Square kilometers	Sq. miles	0.3861
Mils	Kilometers	3.28×10^{-5}	Square kilometers	Sq. yards	1.196×10^4
Mils	Meters	3.28×10^{-5}	Square meters	Acres	2.471×10^{-4}
Minutes (angle)	Degrees	0.01667	Square meters	Sq. cms.	10^4
Minutes (angles)	Quadrants	1.852×10^{-4}	Square meters	Sq. feet	10.76
Minutes (angle)	Radians	2.909×10^{-4}	Square meters	Sq. inches	1,550.0
Minutes (angles)	Seconds	60.0	Square meters	Sq. miles	3.861×10^{-7}
Myriagrams	Kilograms	10.0	Square meters	Sq. millimeters	10^6
Myriameters	Kilometers	10.0	Square meters	Sq. yards	1.196
Myriawatts	Kilowatts	10.0	Square miles	Acres	640.0
Revolutions	Radians	6.283	Square miles	Sq. feet	27.88×10^6
Revolutions/min.	Degrees/sec.	6.0	Square miles	Sq. kms.	2.590
Revolutions/min.	Radians/sec.	0.1047	Square miles	Sq. meters	2.590×10^6
Revolutions/min.	Revs./sec.	0.01667	Square miles	Sq. yards	3.098×10^6
Revolutions/min./min.	Radians/sec./sec.	1.745×10^{-3}	Square millimeters	Circular mils	1,753.0
Revolutions/min./min.	Revs./min./sec.	0.01667	Square millimeters	Sq. cms	0.01
Revolutions/min./min.	Revs./sec./sec.	2.778×10^{-4}	Square miles	Sq. feet	1.076×10^{-5}
Revolutions/sec.	Degrees/sec.	360.0	Square miles	Sq. inches	1.550×10^{-3}
Revolutions/sec.	Radians/sec.	6.283	Square mils	Circular mils.	1.273
Revolutions/sec.	Revs./min.	60.0	Square mils	Sq. cms	6.452×10^{-6}
Revolutions/sec./sec.	Radians/sec./sec.	6.283	Square mils	Sq. inches	10^6
Revolutions/sec./sec.	Revs./min./min.	3,600.0	Square yards	Acres	2.066×10^{-4}
Revolutions/sec./sec.	Revs./min./sec.	60.0	Square yards	Sq. cms	8,361.0
Seconds (angle)	Degrees	2.778×10^{-4}	Square yards	Sq. feet	9.0
Seconds (angle)	Minutes	0.01667	Square yards	Sq. inches	1,296.0
Seconds (angle)	Quadrants	3.087×10^{-6}	Square yards	Sq. meters	0.8361