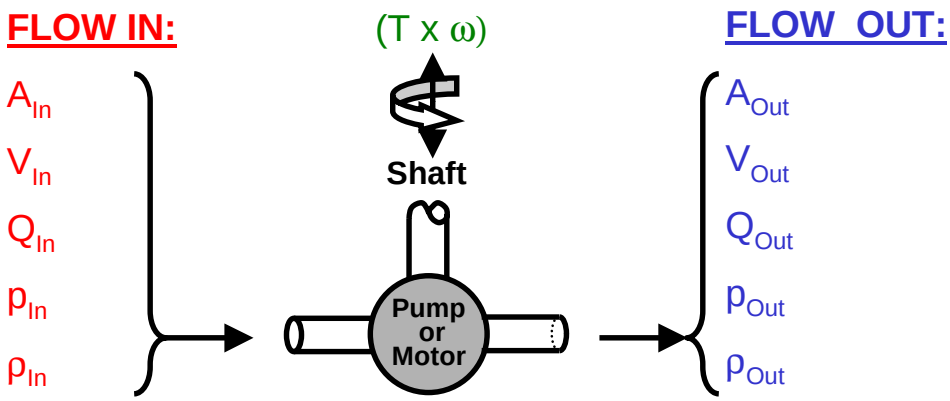
2.000 Hydraulic Pump & Motor Equations:

POWER IN OR OUT:



Important Flow Variables In Hydraulic Pumps and Motors

Quantity		Pumps	Motors
Power Input	P_{In}	$T_{Pump} \bullet \omega_{Pump}$	$\Delta p_{Motor} \bullet Q_{Motor}$
Power Output	P_{Out}	$\Delta p_{Pump} \bullet Q_{Pump}$	$T_{Motor} \bullet \omega_{Motor}$
Volume Flow Rate	Q	$D_{Pump} \bullet \omega_{Pump}$ Or $A_{In} \bullet V_{In}$ D_{Pump} =Displacement of Pump	$D_{Motor} \bullet \omega_{Motor}$ Or $A_{Out} \bullet V_{Out}$ D_{Motor} =Displacement of Motor
Power Equation	P	$\eta_m \bullet P_{In} = P_{Out}$; so $\eta_m \bullet T_{Pump} \bullet \omega_{Pump} = \Delta p_{Pump} \bullet Q_{Pump}$	$\eta_m \bullet P_{In} = P_{Out}$; so $\eta_m \bullet \Delta p_{Motor} \bullet Q_{Motor} = T_{Motor} \bullet \omega_{Motor}$
Mass Flow Rate	$\dot{m}_i$	$\dot{m}_{In} = \rho_{In} \bullet A_{In} \bullet V_{In}$	$\dot{m}_{In} = \rho_{In} \bullet A_{In} \bullet V_{In}$
		$\dot{m}_{Out} = \rho_{Out} \bullet A_{Out} \bullet V_{Out}$	$\dot{m}_{Out} = \rho_{Out} \bullet A_{Out} \bullet V_{Out}$
Power Equation:		$P_{In} = P_{Out} + \dot{E}_{Stored} + P_{Loss}$	

Note: $\dot{E}_{Stored} \sim 0$ For Steady State

$P_{Loss} = P_{In} \bullet (1 - \eta_m)$