

# YC Series Pumps & Motors

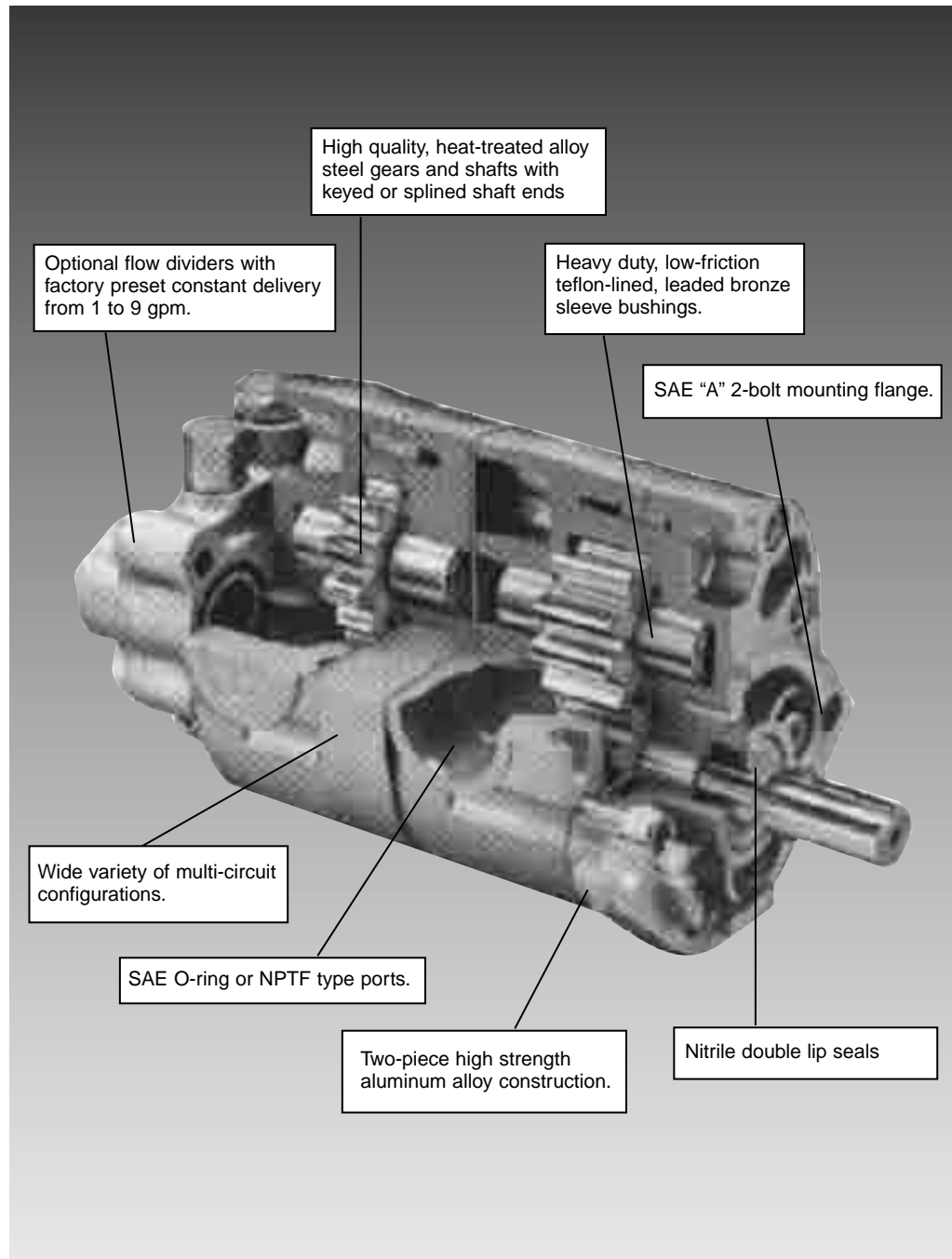


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## YC Series Hydraulic Pumps and Motors

QCC YC Series is a flexible and powerful family of hydraulic gear pumps and motors. They are ideal for applications where light weight and compact size are major considerations.

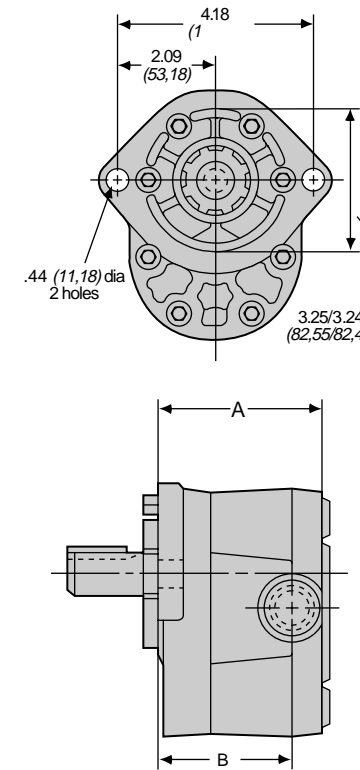
YC Series pumps and MYC motors are available in six basic displacements from .58 to 1.94 cubic inches per revolution (9.5 to 31.8 ml/rev). Complete information can be found by referring to specific sections of this catalog.



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## YC Series Hydraulic Pumps and Motors



Pump or Motor Displacement Code	058YC	077YC	116YC	125YC	155YC	194YC
Theoretical displacement in <sup>3</sup> /rev (cm <sup>3</sup> /rev)	.58 (9,5)	.77 (12,6)	1.16 (19,0)	1.25 (20,5)	1.55 (25,4)	1.94 (31,8)
Maximum <b>continuous</b> pressure psi (bar)	2500 (172)	2500 (172)	2500 (172)	2500 (172)	2500 (172)	2000 (138)
Pump-maximum speed (rpm)	3000	3000	3000	3000	3000	3000
Motor-maximum speed (rpm)	5000	5000	4000	4000	4000	3000

Model Number	058YC M058YC	077YC M077YC	116YC M116YC	125YC M125YC	155YC M155YC	194YC M194YC
"A" inches (mm)	2.69 (68,33)	2.81 (71,37)	3.06 (77,72)	3.15 (80,01)	3.31 (84,07)	3.56 (90,42)
"B" inches (mm)	1.88 (47,75)	2.03 (51,56)	2.28 (57,91)	2.32 (58,93)	2.53 (64,26)	2.78 (70,61)

YC Pumps		gpm (l/min)					
rpm	psi (bar)	058YC	077YC	116YC	125YC	155YC	194YC
1800	500 (34)	4.7 (17,8)	5.9 (22,3)	9.0 (34,1)	9.8 (37,1)	12.0 (45,4)	15.0 (56,8)
	1000 (69)	4.6 (17,4)	5.8 (22,0)	8.9 (33,9)	9.6 (36,3)	11.9 (45,0)	14.9 (56,4)
	2000 (138)	4.5 (17,0)	5.7 (21,6)	8.8 (33,3)	9.2 (34,8)	11.8 (44,7)	14.8 (56,0)
	2500 (172)	4.4 (16,7)	5.6 (21,2)	8.7 (32,9)	9.0 (34,1)	11.8 (44,7)	—
3000	500 (34)	7.9 (29,9)	9.9 (37,5)	14.9 (56,4)	15.8 (59,8)	20.0 (75,7)	25.0 (94,6)
	1000 (69)	7.8 (29,5)	9.8 (37,1)	14.8 (56,0)	15.6 (59,0)	19.9 (75,3)	24.9 (94,2)
	2000 (138)	7.7 (29,1)	9.7 (36,7)	14.7 (55,6)	15.2 (57,5)	19.8 (74,9)	24.8 (93,9)
	2500 (172)	7.6 (28,8)	9.6 (36,3)	14.6 (55,3)	15.0 (56,8)	19.8 (74,9)	—

Input Horsepower hp (kW)							
rpm	psi (bar)	058YC	077YC	116YC	125YC	155YC	194YC
1800	500 (34)	1.7 (1,3)	2.2 (1,6)	3.5 (2,6)	4.3 (3,2)	4.9 (3,7)	5.5 (4,1)
	1000 (69)	3.6 (2,7)	4.5 (3,4)	6.2 (4,6)	7.6 (5,7)	8.8 (6,6)	10.0 (7,5)
	2000 (138)	6.5 (4,8)	8.2 (6,1)	8.9 (6,6)	15.0 (11,2)	16.2 (12,1)	19.0 (14,2)
	2500 (172)	9.0 (6,7)	11.3 (8,4)	15.0 (11,2)	19.8 (14,8)	21.0 (15,7)	—
3000	500 (34)	3.2 (2,4)	4.0 (3,0)	5.8 (4,3)	7.0 (5,2)	8.0 (6,0)	9.3 (6,9)
	1000 (69)	6.0 (4,5)	7.5 (5,6)	10.5 (7,8)	12.5 (9,3)	14.2 (10,6)	16.0 (11,9)
	2000 (138)	10.8 (8,1)	13.5 (10,1)	20.0 (14,9)	24.7 (18,4)	27.5 (20,5)	31.0 (23,1)
	2500 (172)	15.2 (11,3)	19.0 (14,2)	25.0 (18,7)	32.0 (23,9)	34.0 (25,4)	—

MYC Motors		Input Flow gpm (l/min)					
rpm	psi (bar)	M058YC	M077YC	M116YC	M125YC	M155YC	M194YC
2000	500 (34)	5.7 (21,6)	7.2 (27,3)	10.5 (39,7)	11.2 (42,4)	14.0 (53,0)	17.2 (65,1)
	1000 (69)	5.8 (22,0)	7.3 (27,6)	10.8 (40,9)	11.5 (43,5)	14.2 (53,7)	17.8 (67,4)
	2000 (138)	6.2 (23,5)	7.8 (29,5)	11.4 (43,1)	12.2 (46,2)	15.1 (57,2)	19.0 (71,6)
	2500 (172)	6.4 (24,2)	8.0 (30,3)	11.7 (44,3)	12.5 (47,3)	16.0 (60,6)	—
4000	500 (34)	10.9 (41,3)	13.7 (51,9)	20.2 (76,5)	21.6 (81,8)	27.2 (103,0)	25.6* (96,9)
	1000 (69)	11.2 (42,4)	14.0 (53,0)	20.8 (78,7)	22.2 (84,0)	27.8 (105,2)	26.2* (99,2)
	2000 (138)	11.6 (43,9)	14.5 (54,9)	21.0 (79,5)	23.0 (87,1)	29.0 (109,8)	28.0* (106,0)
	2500 (172)	11.7 (44,3)	14.7 (55,6)	22.0 (83,3)	23.5 (88,9)	29.5 (111,7)	—

Torque lb-in (daNm)							
rpm	psi (bar)	M058YC	M077YC	M116YC	M125YC	M155YC	M194YC
2000	500 (34)	32.8 (0,4)	41.0 (0,5)	75.0 (0,8)	80.4 (0,9)	98.0 (1,1)	110.0 (1,2)
	1000 (69)	79.2 (0,9)	99.0 (1,1)	160.0 (1,8)	171.5 (1,9)	210.0 (2,4)	250.0 (2,8)
	2000 (138)	172.0 (1,9)	215.0 (2,4)	328.0 (3,7)	351.6 (4,0)	442.0 (5,0)	560.0 (6,3)
	2500 (172)	216.0 (2,4)	270.0 (3,1)	390.0 (4,4)	418.0 (4,7)	548.0 (6,2)	—
4000	500 (34)	22.4 (0,2)	28.0 (0,3)	42.0 (0,5)	45.0 (0,5)	50.0 (0,6)	76.0* (0,9)
	1000 (69)	68.0 (0,8)	85.0 (1,0)	132.0 (1,5)	141.5 (1,6)	163.0 (1,8)	221.0* (2,5)
	2000 (138)	168.0 (1,9)	210.0 (2,4)	308.0 (3,5)	330.1 (3,7)	29.0 (0,3)	520.0* (5,9)
	2500 (172)	208.8 (2,4)	261.0 (2,9)	370.0 (4,2)	396.6 (4,5)	29.5 (0,3)	—

Test data at 175 SUS Hydraulic Oil @ 120° F (49° C).  
For higher speeds consult QCC.

\* Performance data available to 3000 rpm.  
\* Performance data rated at 3000 rpm.

## YC Series Pumps and Motors

QCC YC Series hydraulic gear pumps are ideally suited for applications where a lightweight, compact, and efficient pump is needed. Operating at continuous pressures to 2500 psi (172 bar) and speeds to 3000 rpm, YC Series pumps are available in six displacements from .58 to 1.94 in<sup>3</sup>/rev (9,5 to 31,8 cm<sup>3</sup>/rev).

Model	Displacement in <sup>3</sup> /rev (cm <sup>3</sup> /rev)	Gear Width in. (mm)
058YC	.58 (9,5)	.375 (9,52)
077YC	.77 (12,6)	.50 (12,70)
116YC	1.16 (19,0)	.75 (19,05)
125YC	1.25 (20,5)	.81 (20,57)
155YC	1.55 (25,4)	1.00 (25,40)
194YC	1.94 (31,8)	1.25 (31,75)

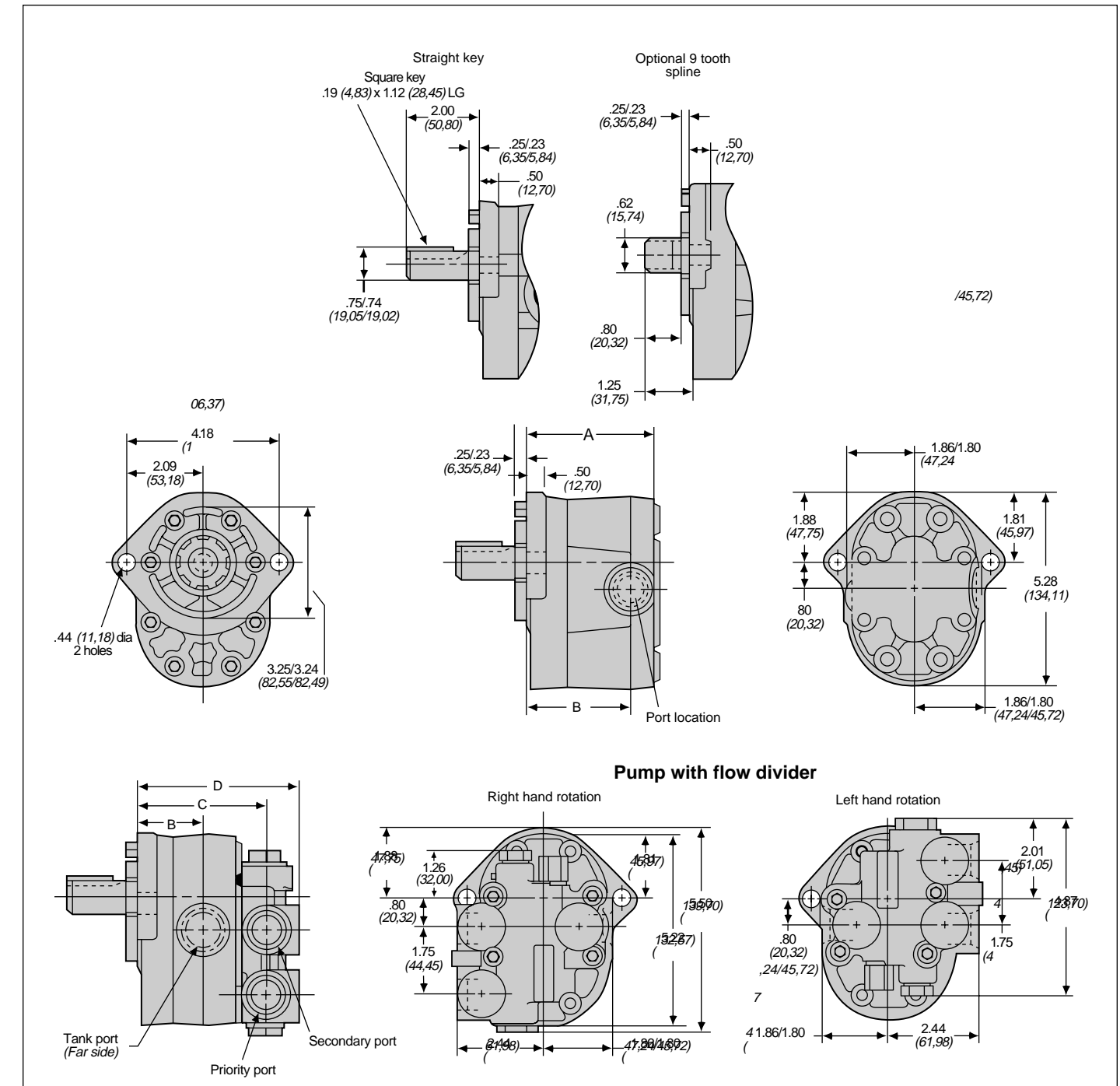
Note: Theoretical pump delivery in gpm (l/min) is determined by multiplying displacement in<sup>3</sup>/rev (cm<sup>3</sup>/rev) by desired pump rpm and dividing by 231 (1000).

YC pumps have a pressure balanced design for high volumetric and mechanical efficiencies. They feature two-piece, high-strength aluminum alloy construction with heat-treated alloy steel gears and shafts. Standard features include straight, keyed shaft; heavy-duty sleeve bearings; double lip, nitrile rubber seal; and side SAE O-ring or NPTF type ports. Optional flow dividers are available with factory preset constant delivery from 1 to 9 gpm (3,7 to 34 l/min) at the regulated flow port.

<b>Operating Pressures</b>	<b>058YC</b> to 2500 psi (172 bar) continuous <b>077YC</b> to 2500 psi (172 bar) continuous <b>116YC</b> to 2500 psi (172 bar) continuous <b>125YC</b> to 2500 psi (172 bar) continuous <b>155YC</b> to 2500 psi (172 bar) continuous <b>194YC</b> to 2000 psi (138 bar) continuous See performance curves.
<b>Recommended Operating Speeds</b>	To 3000 rpm. See performance curves.
<b>Mounting</b>	SAE 2-bolt Type A.
<b>Shafts</b>	.750" (19 mm) diameter straight keyed shaft, standard. .625" (16 mm) diameter, 9-tooth, and .750" (19 mm) diameter, 11-tooth splined shafts, optional. Other shafts available upon request.
<b>Shaft Rotation</b>	Clockwise. Counterclockwise. (When viewed from shaft end)
<b>Seals</b>	Double lip, nitrile rubber, standard. Mechanical, high pressure double lip, fluoroelastomer, and Silicone T seals, optional.
<b>Bearings</b>	Heavy-duty, low friction teflon lined, leaded bronze sleeve bushings.
<b>Porting</b>	SAE O-ring and NPTF side location, standard. End or combination location, optional.
<b>Optional Flow Dividers</b>	Pre-set at factory to deliver a constant flow – 1 to 9 gpm (3,7 to 34 l/min) – at the regulated flow port. Flow divider incorporates relief valve in the priority section only.
<b>Weight</b>	To 6.25 pounds. (2,84 kg.)

## Dimensions

Model	"A"		"B"		"C"		"D"	
	in.	(mm)	in.	(mm)	in.	(mm)	in.	(mm)
058YC	2.69	(68,33)	1.86	(47,24)	3.53	(89,66)	4.53	(115,06)
077YC	2.81	(71,37)	2.03	(51,56)	3.51	(89,15)	4.50	(114,30)
116YC	3.06	(77,72)	2.28	(57,91)	3.76	(95,50)	4.75	(120,65)
125YC	3.15	(80,01)	2.32	(58,93)	3.99	(101,35)	4.99	(126,75)
155YC	3.31	(84,07)	2.53	(64,26)	4.01	(101,85)	5.00	(127,00)
194YC	3.56	(90,42)	2.78	(70,61)	4.26	(108,20)	5.25	(133,35)





**Filtration**

Recommended filtration is 10 micron nominal, 25 micron absolute, for maximum service life. Make sure that the filter is properly sized for your system and cleaned on a regular basis. If practical, the hydraulic system should include a warning device which signals when the filter is dirty, preventing the filter from going into a bypass condition. This will help ensure maximum component life and efficiency.

**Reservoir**

The reservoir provides hydraulic system oil storage, oil deaeration, and some heat dissipation. Reservoir construction should include at least one internal baffle, creating separate chambers for system return oil and pump inlet oil. This allows return oil to deaerate and contaminants to settle out. Surplus oil would then flow over baffle to pump inlet side. Oil cleanliness is especially important at startup.

Reservoirs are ideally sized so the volume of reservoir oil is not replaced more than twice per minute. Practical considerations of space and weight, however, sometimes make this difficult on mobile equipment. A heat exchanger may be required, depending on maximum system load and duty cycle.

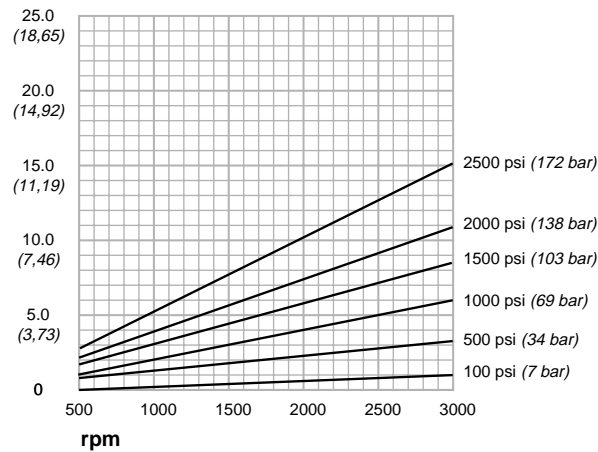
**Operating Temperatures**

Pumps with Nitrile rubber seals should operate at system temperatures of 180° F (82,2 °C) maximum. Nitrile seals can tolerate intermittent pump operation periods to 200° F (93,3 °C) without damage to the pump seals. However, system temperatures exceeding 225° F (107,2 °C) will cause premature seal failure and result in external leakage.

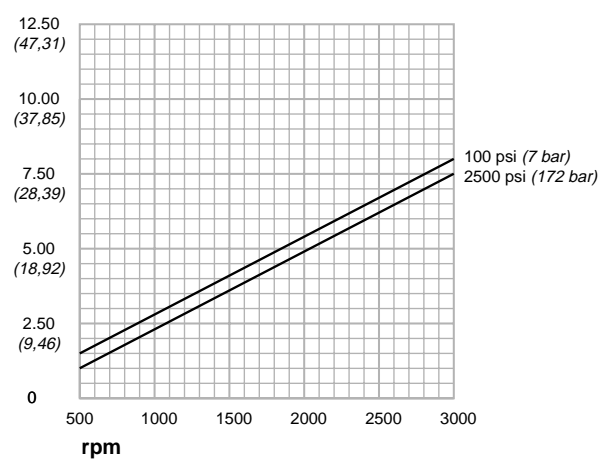
**Model 058YC — Typical Performance Data**

Pressure	gpm		l/min		hp		kW		Flow Input	
	1.4	5.3	3.2	12.1	4.8	18.2	6.4	24.2	8.0	30.2
100 psi (7 bar)	0.1	0.75	0.4	0.3	0.6	0.45	0.8	0.6	0.9	0.67
	1.3	4.9	3.1	11.7	4.7	17.8	6.2	23.5	7.9	29.9
500 psi (34 bar)	0.4	0.3	1.2	0.9	1.7	1.27	2.4	1.79	3.2	2.39
	1.2	4.5	3.0	11.4	4.6	17.4	6.2	23.5	7.8	29.5
1000 psi (69 bar)	0.8	0.6	2.4	1.79	3.6	2.69	4.8	3.58	6.0	4.48
	1.2	4.5	3.0	11.4	4.6	17.4	6.2	23.5	7.8	29.5
1500 psi (103 bar)	1.2	2.9	3.2	2.39	4.9	3.66	6.5	4.45	8.4	6.27
	1.6	4.5	2.9	11.0	4.5	17.0	6.1	23.0	7.7	29.1
2000 psi (138 bar)	1.6	1.19	4.1	3.06	6.5	4.85	8.7	6.49	10.8	8.06
	1.1	4.2	2.8	10.6	4.4	16.7	6.0	22.7	7.6	28.8
2500 psi (172 bar)	2.4	1.79	5.8	4.33	9.0	6.71	12.0	8.95	15.2	11.34
rpm	500	1200	1800	2400	3000					

**Input Horsepower (kW)**



**Flow gpm (l/min)**



**Operating Temperatures (continued)**

Oil in a hydraulic system that is consistently overheated will break down, forming varnish on system components, and destroying system sealing materials. Poor and erratic system operation is the usual result of an overheated system. If system temperatures are expected to consistently exceed 180° F (82,2 °C), it will be necessary to place a heat exchanger in the system.

**Drives**

YC Series hydraulic pumps can be mounted in either direct or indirect drive configurations. The pump mount and drive should be designed to minimize axial and radial loads on the pump shaft. The preferred method is direct mounting using a flex coupler. The coupler may be omitted if .004" (0,10 mm) total indicator reading is maintained between the pilot mounting diameter and the drive shaft powering the pump. For indirect drives, consult factory.

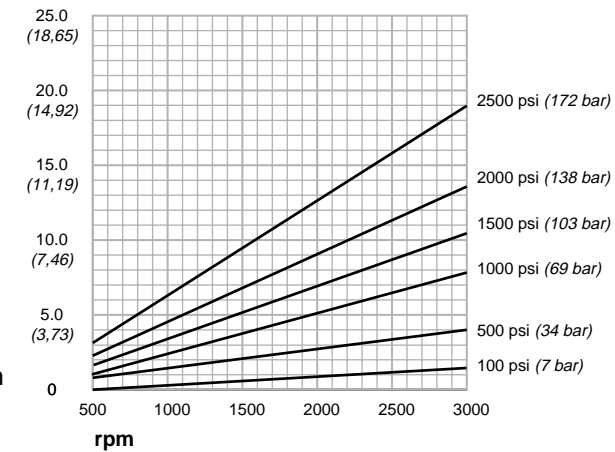
**System Plumbing**

The major objective in the specification of tubing and hose sizes is to limit maximum oil velocity. This results in quieter system operation, consistent temperature operation, and a reduction of heat through the elimination of pressure drops. To avoid pump cavitation, maximum inlet line flow should not exceed 10 ft/sec. (3,04 m/sec). Inlet vacuum should not exceed 5" (127mm) Hg at the normal operating temperature. Continuous operation at vacuums in excess of 5" (127mm) Hg will cause premature unit failure.

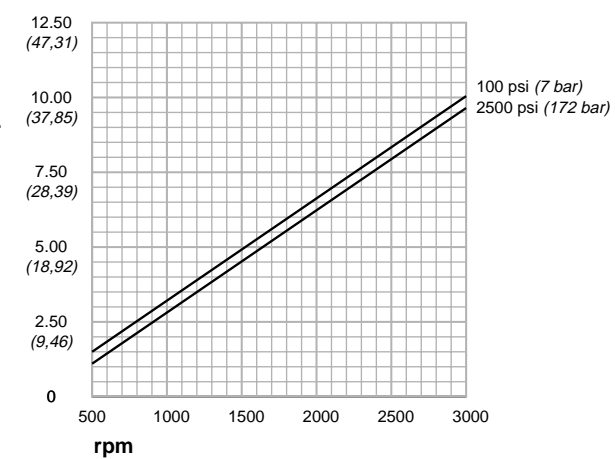
**Model 077C — Typical Performance Data**

Pressure	gpm		l/min		hp		kW		Flow Input	
	1.8	6.8	4.0	15.1	6.0	22.7	8.0	30.2	10.0	37.9
100 psi (7 bar)	0.2	0.15	0.5	0.37	0.8	0.6	1.0	0.75	1.2	0.9
	1.7	6.4	3.9	14.8	5.9	22.3	7.9	29.9	9.9	37.5
500 psi (34 bar)	0.5	0.37	1.5	1.12	2.2	1.64	3.1	2.31	4.0	2.98
	1.6	6.1	3.8	14.4	5.8	21.9	7.8	29.5	9.8	37.1
1000 psi (69 bar)	1.0	.75	3.0	2.24	4.5	3.36	6.0	4.48	7.5	5.60
	1.6	6.1	3.8	14.4	5.8	21.9	7.8	29.5	9.8	37.1
1500 psi (103 bar)	1.5	1.12	4.0	2.98	6.2	4.63	8.2	6.12	10.5	7.83
	2.0	5.7	3.7	14.0	5.7	21.6	7.7	29.1	9.7	36.7
2000 psi (138 bar)	2.0	1.49	5.2	3.88	8.2	6.12	10.9	8.13	13.5	10.07
	1.4	5.3	3.6	13.6	5.6	21.2	7.6	28.8	9.6	36.3
2500 psi (172 bar)	3.0	2.24	7.3	5.45	11.3	8.43	15.0	11.19	19.0	14.17
rpm	500	1200	1800	2400	3000					

**Input Horsepower (kW)**



**Flow gpm (l/min)**



**System Plumbing (continued)**

On cold starts a vacuum of 10" Hg (460mm) can be tolerated for short durations. Higher inlet vacuums than 10" Hg (460mm) shorten pump life by creating heat and excessive pressure in the pump. Pump discharge lines should have flow velocities under 20 ft/sec. (6,10 m/sec).

**Cavitation**

Cavitation problems can be the result of excessive air in the oil, high inlet vacuum, improper reservoir construction and placement, or operation exceeding rated operation speed. Hydraulic oil normally has some dissolved air. Air leaks on the pump inlet side, however, will raise the air content substantially. Since air is more compressible than oil, air bubbles will collapse (or implode) when pressurized, causing severe stress on hydraulic system components. As the air content increases, resultant damage to the system also increases. High inlet vacuum, often caused by restrictions or improper reservoir configuration, are another source of cavitation. Operation of a pump at higher than rated speeds increases inlet vacuum and can result in cavitation as well.

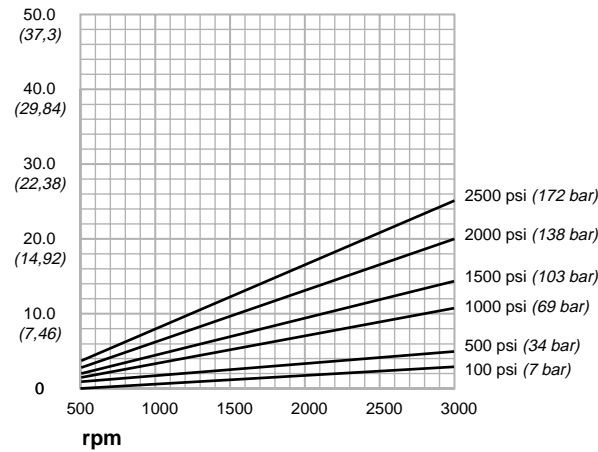
**Operating Speeds**

A hydraulic pump's speed rating is determined by the ability of the pump to fill with oil without cavitating, at a given inlet pressure and oil viscosity. Maximum speed for YC Series pumps is 3000 rpm, based on operation at sea level using SAE oil with a viscosity of 175 SUS at 120° F (49° C).

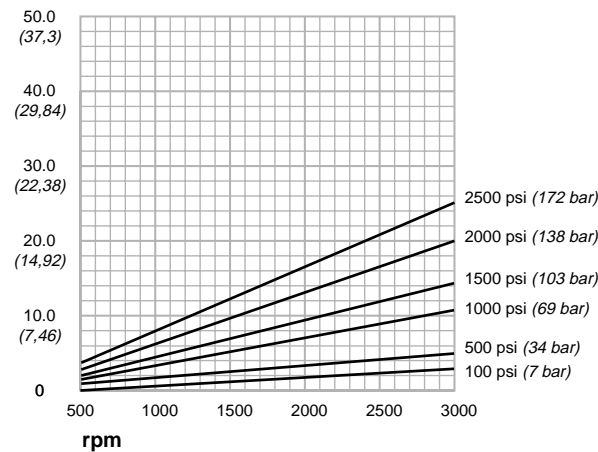
Model 116YC — Typical Performance Data

Pressure	500 rpm		1200 rpm		1800 rpm		2400 rpm		3000 rpm	
	gpm hp	l/min kW	gpm hp	l/min kW	gpm hp	l/min kW	gpm hp	l/min kW	gpm hp	l/min kW
100 psi (7 bar)	2.6	9,8	6.0	22,7	9.1	34,4	12.0	45,4	15.0	56,8
	0.2	0,15	0.8	0,6	1.3	0,97	2.0	1,49	2.5	1,87
500 psi (34 bar)	2.5	9,5	5.9	22,3	9.0	34,0	11.9	45,0	14.9	56,4
	1.2	0,9	2.5	1,87	3.5	2,61	4.7	3,51	5.8	4,33
1000 psi (69 bar)	2.4	9,1	5.8	21,9	8.9	34,5	11.8	44,7	14.8	56,0
	1.8	1,34	4.0	2,98	6.2	4,63	8.4	6,27	10.5	7,83
1500 psi (103 bar)	2.4	9,1	5.8	21,9	8.9	34,5	11.8	44,7	14.8	56,0
	2.0	1,5	5.8	4,33	8.9	6,64	11.8	8,8	14.8	11,04
2000 psi (138 bar)	2.3	8,7	5.7	21,6	8.8	34,1	11.7	44,3	14.7	55,6
	3.0	2,24	7.8	5,82	11.8	8,8	15.9	11,86	20.0	14,92
2500 psi (172 bar)	2.2	8,3	5.6	21,2	8.7	33,7	11.6	43,9	14.6	55,2
	4.0	2,98	10.0	7,46	15.0	11,19	20.0	14,92	25.0	18,65

Input Horsepower (kW)



Input Horsepower (kW)



**Operating Speeds (continued)**

Minimum speed for the YC Series is 500 rpm. This is the normal minimum speed at which the pump will operate continuously at rated pressure. Consult QCC for operation outside these limits.

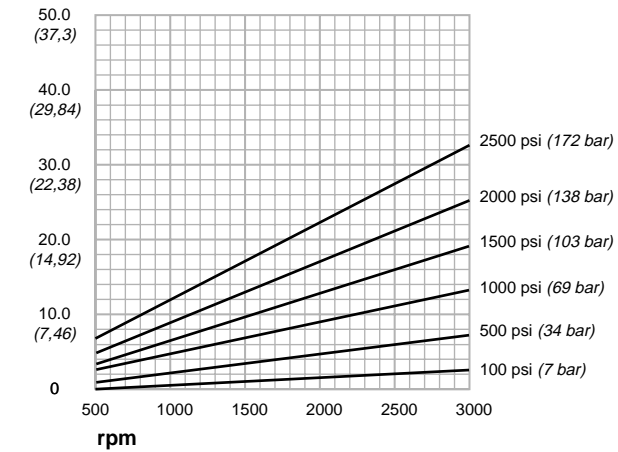
**Operating Pressure Ratings**

YC Series pumps are designed to operate continuously at the rated pressures shown on page 4. In most applications this maximum pressure should be considered the maximum relief valve setting. Lower operating pressures will extend the life of the unit. Maximum operating pressures decrease in the higher displacement pumps.

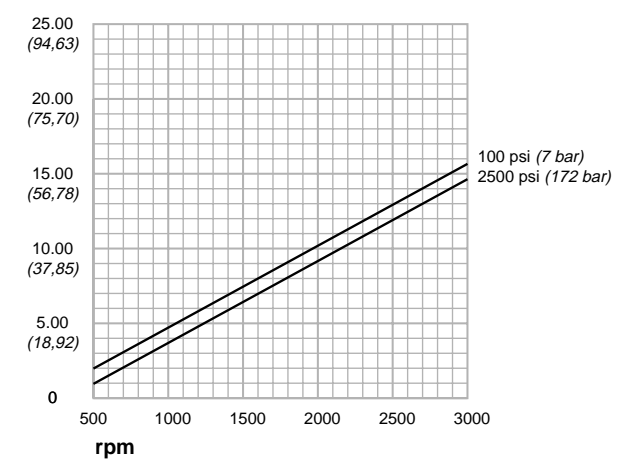
Model 125YC — Typical Performance Data

Pressure	500 rpm		1200 rpm		1800 rpm		2400 rpm		3000 rpm	
	gpm hp	l/min kW	gpm hp	l/min kW	gpm hp	l/min kW	gpm hp	l/min kW	gpm hp	l/min kW
100 psi (7 bar)	3.0	11,4	6.5	24,6	9.9	37,5	13.0	49,2	16.0	60,5
	0.5	0,37	1.0	0,75	1.2	0,9	1.8	1,34	2.0	1,49
500 psi (34 bar)	2.8	10,6	6.4	24,2	9.8	37,1	12.8	48,4	15.8	59,8
	1.3	0,97	3.0	2,24	4.3	3,21	5.8	4,33	7.0	5,22
1000 psi (69 bar)	2.6	9,8	6.3	24,0	9.6	36,3	12.6	47,7	15.6	59,0
	2.2	1,64	5.0	3,73	7.6	5,67	10.0	7,46	12.5	9,33
1500 psi (103 bar)	2.4	9,1	6.2	23,5	9.4	35,6	12.4	46,9	15.4	58,3
	3.8	2,83	7.8	5,82	11.2	8,36	14.8	11,04	18.0	13,43
2000 psi (138 bar)	2.2	8,3	6.0	22,7	9.2	34,8	12.2	46,2	15.2	57,5
	4.8	3,58	10.3	7,68	15.0	11,19	20.0	14,92	24.7	18,43
2500 psi (172 bar)	2.0	7,6	5.8	21,9	9.0	34,0	12.0	45,4	15.0	56,8
	6.2	4,63	13.5	10,07	19.8	14,77	25.9	19,32	32.0	23,87

Input Horsepower (kW)



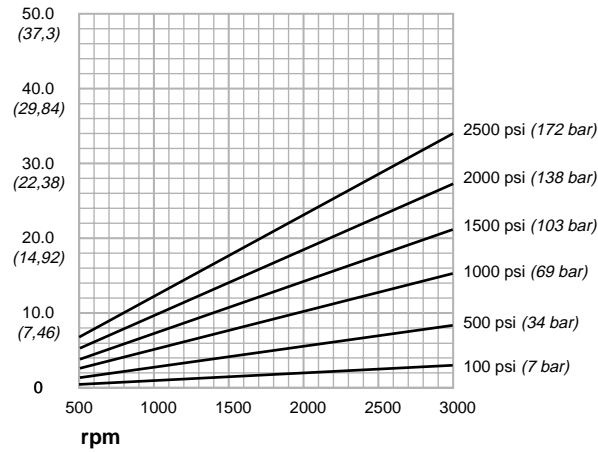
Flow gpm (l/min)



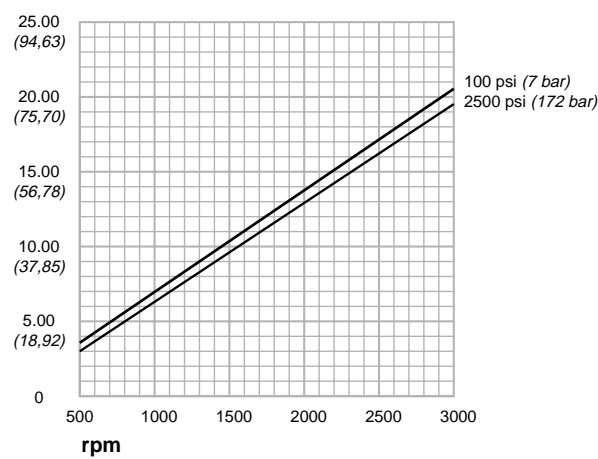
Model 155YC — Typical Performance Data

Pressure	Flow Input									
	gpm		l/min		hp		kW		Input	
100 psi (7 bar)	3.2	12.1	8.1	30.7	12.1	45.8	16.1	61.0	20.1	76.1
	0.2	0.15	1.0	0.75	1.7	1.27	2.1	1.57	2.8	2.09
500 psi (34 bar)	3.1	11.7	8.0	30.2	12.0	45.4	16.0	60.5	20.0	75.7
	1.5	1.12	3.2	2.39	4.9	3.66	6.3	4.70	8.0	5.97
1000 psi (69 bar)	3.0	11.4	7.9	29.9	11.9	45.0	15.9	60.1	19.9	75.3
	2.2	1.64	5.8	4.33	8.8	6.56	11.6	8.65	14.2	10.59
1500 psi (103 bar)	3.0	11.4	7.9	29.9	11.9	45.0	15.9	60.1	19.9	75.3
	2.8	2.09	8.0	5.97	12.4	9.25	17.0	12.68	21.2	15.82
2000 psi (138 bar)	2.9	11.0	7.8	29.5	11.8	44.7	15.8	59.8	19.8	74.9
	4.2	3.13	10.9	8.13	16.2	12.09	21.8	16.26	27.5	20.52
2500 psi (172 bar)	2.9	11.0	7.8	29.5	11.8	44.7	15.8	59.8	19.8	74.9
	6.1	4.55	14.1	10.52	21.0	15.67	27.5	20.52	34.0	25.36
rpm	500		1200		1800		2400		3000	

Input Horsepower (kW)



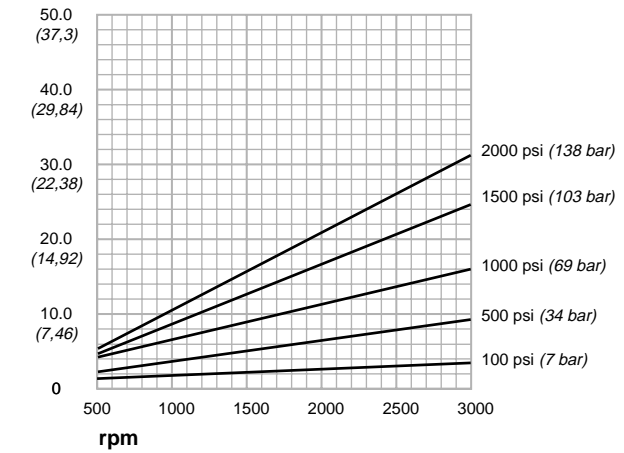
Flow gpm (l/min)



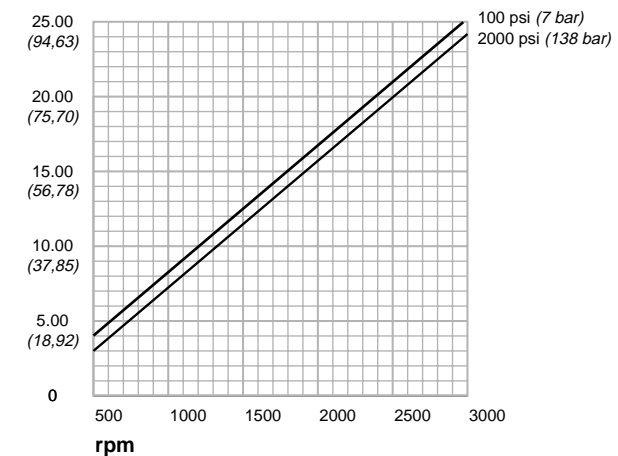
Model 194YC — Typical Performance Data

Pressure	Flow Input									
	gpm		l/min		hp		kW		Input	
100 psi (7 bar)	4.1	15.5	10.1	38.2	15.1	57.2	20.1	76.1	25.1	95.0
	1.0	0.75	1.8	1.34	2.0	1.49	2.8	2.09	3.0	2.24
500 psi (34 bar)	4.0	15.1	10.0	37.9	15.0	56.8	20.0	75.7	25.0	94.6
	1.8	1.34	3.8	2.83	5.5	4.1	7.3	5.44	9.3	6.94
1000 psi (69 bar)	3.9	14.8	9.9	37.5	14.9	56.4	19.9	75.3	24.9	94.2
	3.0	2.24	6.3	4.7	10.0	7.46	13.0	9.7	16.0	11.9
1500 psi (103 bar)	3.9	14.8	9.9	37.5	14.9	56.4	19.9	75.3	24.9	94.2
	3.8	2.83	9.5	35.9	14.2	10.59	19.3	14.4	24.0	17.9
2000 psi (138 bar)	3.8	14.4	9.8	37.1	14.8	56.0	19.8	74.9	24.8	93.8
	5.0	3.73	12.4	9.25	19.0	14.17	25.0	18.65	31.0	23.13
rpm	500		1200		1800		2400		3000	

Input Horsepower (kW)



Flow gpm (l/min)





## YC Series Multi-Circuit Pumps

Available YC Multi-Circuit Configurations							in.	(mm)				
YC-YC Duals	Approximate Overall Lengths "A" Dimensions						058YC	077YC	116YC	125YC	155YC	194YC
	058YC	077YC	116YC	125YC	155YC	194YC						
058YC (.58 in <sup>3</sup> /rev)	5.36 (136)	5.49 (139)	5.74 (146)	5.86 (149)	5.99 (152)	6.24 (158)						
077YC (.77 in <sup>3</sup> /rev)	5.49 (139)	5.62 (143)	5.87 (149)	5.99 (152)	6.12 (155)	6.37 (162)						
116YC (1.16 in <sup>3</sup> /rev)	5.74 (146)	5.87 (149)	8.80 (224)	6.24 (158)	6.37 (162)	6.62 (168)						
125YC (1.25 in <sup>3</sup> /rev)	5.86 (149)	5.99 (152)	6.24 (158)	6.36 (162)	6.49 (165)	6.74 (171)						
155YC (1.55 in <sup>3</sup> /rev)	5.99 (152)	6.12 (155)	6.37 (162)	6.49 (165)	6.62 (168)	6.87 (174)						
194YC (1.94 in <sup>3</sup> /rev)	6.24 (158)	6.37 (162)	6.62 (168)	6.74 (171)	6.87 (174)	7.12 (181)						
YC-YB Tandem	058YC	077YC	116YC	125YC	155YC	194YC						
15YB (.15 in <sup>3</sup> /rev)	5.93 (151)	6.06 (154)	6.31 (160)	6.43 (163)	6.56 (167)	6.81 (173)						
22YB (.22 in <sup>3</sup> /rev)	6.18 (157)	6.31 (160)	6.56 (167)	6.68 (170)	6.81 (173)	7.06 (179)						
29YB (.29 in <sup>3</sup> /rev)	6.18 (157)	6.31 (160)	6.56 (167)	6.68 (170)	6.81 (173)	7.06 (179)						
43YB (.43 in <sup>3</sup> /rev)	6.43 (163)	6.56 (167)	6.81 (173)	6.93 (176)	7.06 (179)	7.31 (186)						
58YB (.58 in <sup>3</sup> /rev)	6.68 (170)	6.81 (173)	7.06 (179)	7.18 (182)	7.31 (186)	7.56 (192)						
73YB (.73 in <sup>3</sup> /rev)	6.93 (176)	7.06 (179)	7.31 (186)	7.43 (189)	7.56 (192)	7.81 (198)						
YC-B Tandem	058YC	077YC	116YC	125YC	155YC	194YC						
06B (.06 in <sup>3</sup> /rev)	6.20 (157)	6.33 (161)	6.58 (167)	6.70 (170)	6.83 (173)	7.08 (180)						
11B (.11 in <sup>3</sup> /rev)	6.33 (161)	6.46 (164)	6.71 (170)	6.83 (173)	6.96 (177)	7.21 (183)						
15B (.15 in <sup>3</sup> /rev)	6.27 (159)	6.40 (163)	6.65 (169)	6.77 (172)	6.90 (175)	7.15 (182)						
18B (.18 in <sup>3</sup> /rev)	6.33 (161)	6.46 (164)	6.71 (170)	6.83 (173)	6.96 (177)	7.21 (183)						
22B (.22 in <sup>3</sup> /rev)	6.39 (162)	6.52 (166)	6.77 (172)	6.89 (175)	7.02 (178)	7.27 (185)						
30B (.30 in <sup>3</sup> /rev)	6.52 (166)	6.65 (169)	6.90 (175)	7.02 (178)	7.15 (182)	7.40 (188)						
37B (.37 in <sup>3</sup> /rev)	6.64 (169)	6.77 (172)	7.02 (178)	7.14 (181)	7.27 (185)	7.52 (191)						
47B (.47 in <sup>3</sup> /rev)	6.82 (173)	6.95 (177)	7.20 (183)	7.32 (186)	7.45 (189)	7.70 (196)						
59B (.59 in <sup>3</sup> /rev)	7.02 (178)	7.15 (182)	7.40 (188)	7.52 (191)	7.65 (194)	7.90 (201)						
74B (.74 in <sup>3</sup> /rev)	7.27 (185)	7.40 (188)	7.65 (194)	7.77 (197)	7.90 (201)	8.15 (207)						

YC Series hydraulic pumps can readily be adapted for use in multi-circuit pump arrangements. Multi-circuit pumps, combine the capability of several pumps into one, reducing the number of components, hoses and fittings, operating and maintenance costs. As shown in the table at right, three configurations are available to provide a wide range of displacement options: 1) YC-YC dual pumps; 2) YC-YB tandem pumps; and, YC-B tandem pumps. For multi-circuit pumps minimum order quantities apply.

### YC-YC Dual Pumps

YC pumps can be combined to create dual pumps with 1) one common inlet and two outlets, 2) two separate inlets and outlets or 3) sealed sections for dissimilar fluids. By adding an optional flow divider manifold, it is possible to get three separate circuits from one drive point.

## Dimensions

When sizing dual pumps, Maximum Pressure Units (MPU) cannot exceed a total of 5000 units. Total MPU's are calculated by adding together the in<sup>3</sup>/rev displacement times the maximum pressure (psi) of each pump section.

### Example: 077/194 YC Dual

If the front section were to run at 2500 psi, the rear section should be limited to 1585 psi, computed as follows:

- 1st Section:  
.77 in<sup>3</sup>/rev x 2500 psi = 1925 MPUs
- 5000 MPUs - 1925 = 3075 remaining MPUs for second section
- 2nd Section:  
3075 MPUs / 1.94 in<sup>3</sup>/rev = 1585 psi maximum

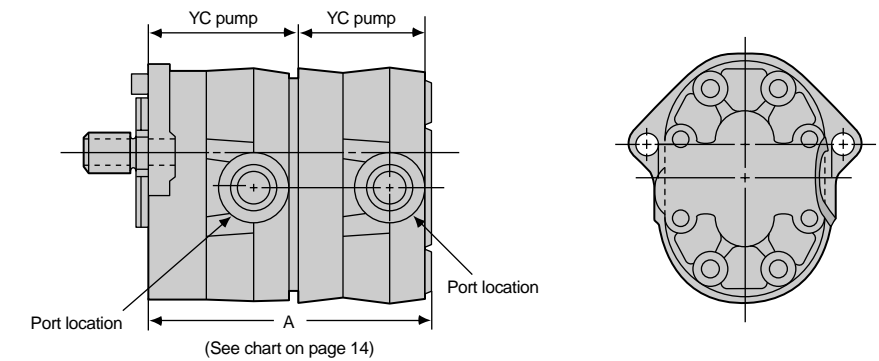
### YC-YB Tandem Pumps

YC pumps can be combined with YB Series pumps in tandem to produce a dual pump with a wide range of displacements and pressures with two separate inlets and outlets. Lightweight YB pumps are available in six displacements from .15 to .73 in<sup>3</sup>/rev (2 to 12 cm<sup>3</sup>/rev) as shown in the chart at left. Consult factory for specific needs.

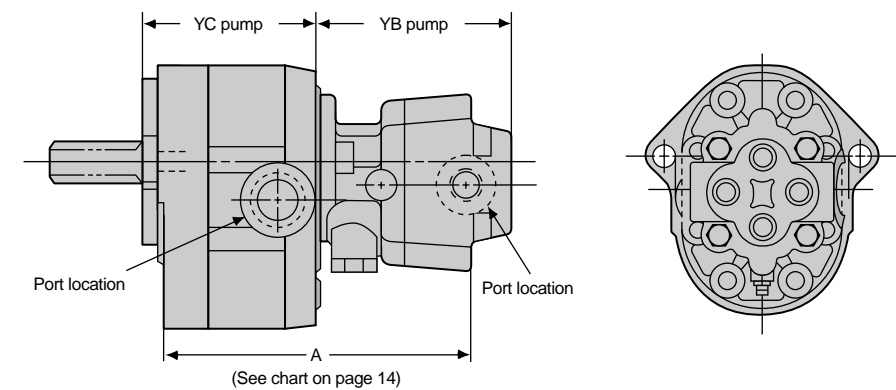
### YC-B Tandem Pumps

YC pumps and Champion B pumps (Bulletin #FP20-19) can be combined to make tandem dual pumps with a common inlet and two outlets. Cast iron B pumps are available in ten sizes from .06 to .74 in<sup>3</sup>/rev (1 to 12 cm<sup>3</sup>/rev) as shown in the chart below. Consult the factory for your specific needs.

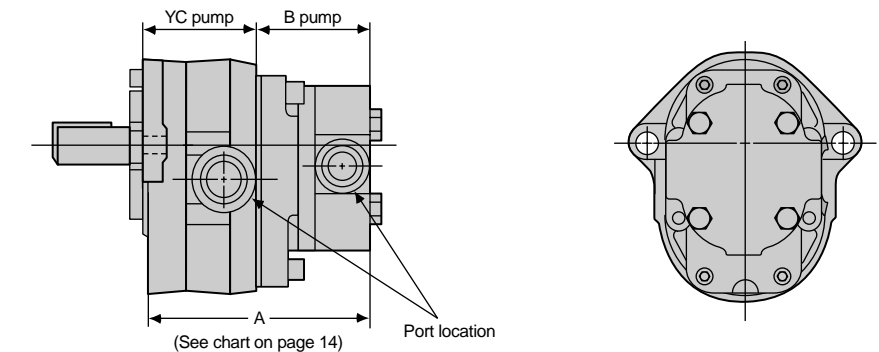
### Dual YC Pump



### YC/YB Tandem Pump



### YC/B Tandem Pump



### MYC Series Hydraulic Motors – Specifications

Model	Displacement	in <sup>3</sup> /rev (cm <sup>3</sup> /rev)	Gear Width	in. (mm)
M058YC	.58	(9,5)	.375	(9,52)
M077YC	.77	(12,6)	.50	(12,70)
M116YC	1.16	(19,0)	.75	(19,05)
M125YC	1.25	(20,5)	.81	(20,57)
M155YC	1.55	(25,4)	1.00	(25,40)
M194YC	1.94	(31,8)	1.25	(31,75)

Note: Theoretical pump delivery in gpm (*l/min*) is determined by multiplying displacement in<sup>3</sup>/rev (cm<sup>3</sup>/rev) by desired pump rpm and dividing by 231 (1000).

QCC MYC gear motors offer economy and performance at speeds to 5000 rpm and supply pressures to 2500 psi (172 bar). They are available in six displacements from .58 to 1.94 in<sup>3</sup>/rev (9,5 to 31,8 cm<sup>3</sup>/rev).

MYC motors have a pressure-balanced design for high volumetric and mechanical efficiencies. They feature two-piece, high strength aluminum alloy construction with heat-treated alloy steel gears and shafts. Standard features include straight, keyed shaft; heavy-duty sleeve bearings; high pressure, double lip, nitrile rubber seals; and side SAE O-ring or NPTF type ports.

Operating Pressures	
<b>M058YC</b>	to 2500 psi (172 bar) continuous
<b>M077YC</b>	to 2500 psi (172 bar) continuous
<b>M116YC</b>	to 2500 psi (172 bar) continuous
<b>M125YC</b>	to 2500 psi (172 bar) continuous
<b>M155YC</b>	to 2500 psi (172 bar) continuous
<b>M194YC</b>	to 2000 psi (138 bar) continuous
	See performance curves.

Recommended Operating Speeds	
	To 5000 rpm. See performance curves.

Maximum Back Pressure	
	With standard high pressure seal – 100 psi max (7 bar), continuous. 150 psi max (10 bar), intermittent.
	With optional high pressure mechanical seals – 200 psi (14 bar), continuous. 300 psi (21 bar), intermittent.

Mounting	
	SAE 2-bolt Type A.

Shafts	
	.750" (19 mm) diameter straight keyed shaft, standard. .625" (16 mm), 9-tooth, and .750" (19 mm), 11-tooth splined shafts, optional. Other shafts available upon request.

Shaft Rotation	
	Clockwise. Counterclockwise. (When viewed from shaft end)

Seals	
	Double lip, nitrile rubber, standard. Mechanical, high pressure double lip or fluoroelastomer seals, optional.

Bearings	
	Heavy-duty, low friction teflon lined, leaded bronze sleeve bushings.

Porting	
	SAE O-ring and NPTF side location, standard. End or combination location, optional.

Weight	
	To 6.25 pounds. (2,84 kg.)

### Dimensions

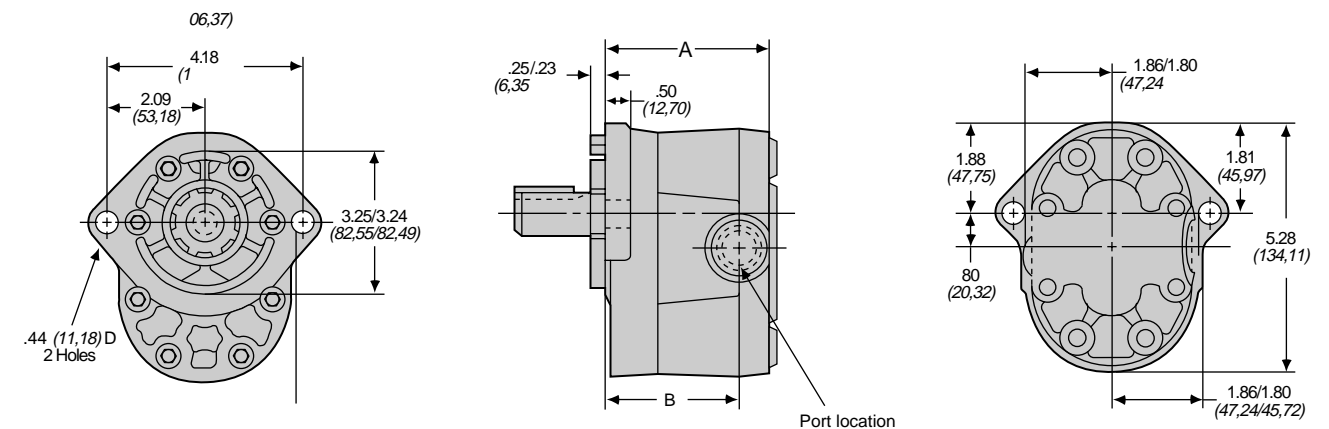
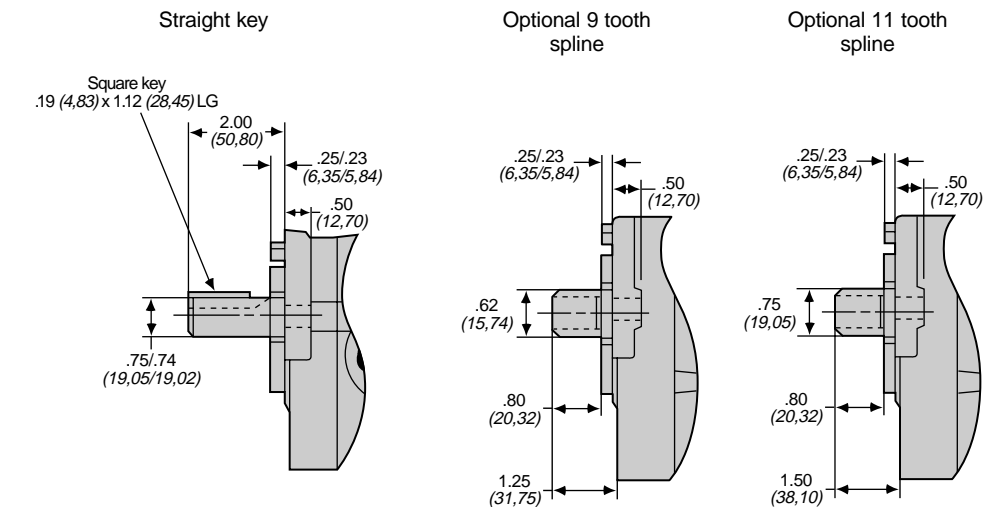
Model	"A"		"B"	
	in.	(mm)	in.	(mm)
058YC	2.69	(68,33)	1.86	(47,24)
077YC	2.81	(71,37)	2.03	(51,56)
116YC	3.06	(77,72)	2.28	(57,91)
125YC	3.15	(80,01)	2.32	(58,93)
155YC	3.31	(84,07)	2.53	(64,26)
194YC	3.56	(90,42)	2.78	(70,61)

#### 9-Tooth Spline Data

Number of teeth	9
Pitch	16/32
Pressure angle	30°
Major diameter	.625/.620 (15,875/15,748)
Minor diameter	.4835/.4725 (12,280/12,002)
Pitch diameter (ref.)	.5625 (14,287)

#### 11-Tooth Spline Data

Number of teeth	11
Pitch	16/32
Pressure angle	30°
Major diameter	.748/.747 (18,999/18,974)
Minor diameter	.6085/.5975 (15,46/15,18)





**Filtration**

Recommended filtration is 10 micron nominal, 25 micron absolute, for maximum service life. Make sure that the filter is properly sized for your system and cleaned on a regular basis. If practical, the hydraulic system should include a warning device which signals when the filter element is dirty, preventing the filter from going into a bypass condition. This will help ensure maximum component life and efficiency.

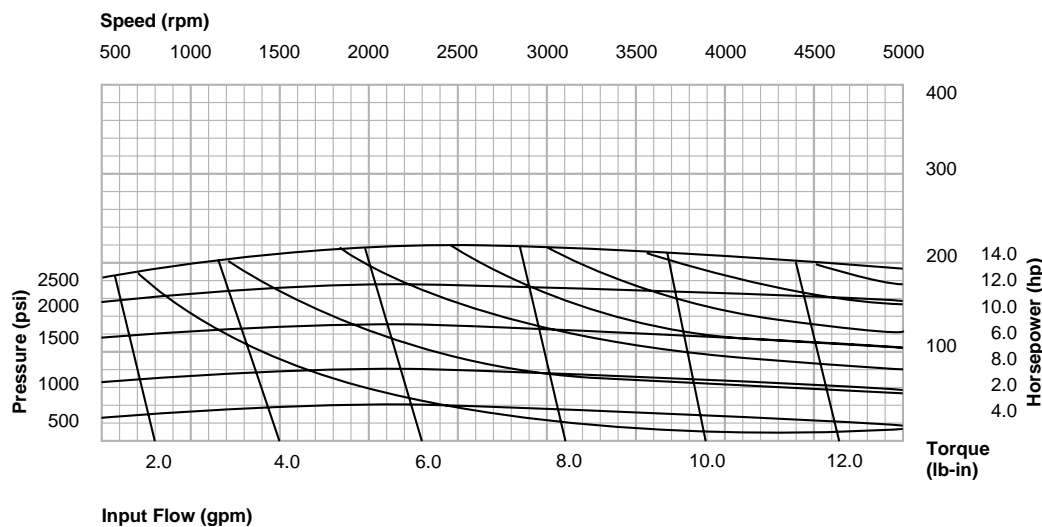
**Operating Temperatures**

MYC motors with the standard nitrile rubber high pressure shaft seal should normally operate at system temperatures of 180°F (82,2°C) maximum. Nitrile rubber seals can tolerate intermittent motor operation periods to 200°F (93,3°C) without damage to the seal material. However, system temperatures exceeding 225°F (107,2°C) will cause premature seal failure and result in external leakage.

Oil in a hydraulic system that is consistently overheated will break down, forming varnish on system components, and destroying system sealing materials. Poor and erratic system operation is the usual result of an overheated system. If system temperatures are expected to consistently exceed 180°F (82,2°C), a heat exchanger placed in the return line may be necessary. An optional seal, the double lip high pressure fluoroelastomer shaft seal provides higher temperature operation. These are also suitable for use with fluids not compatible with nitrile rubber seals.

**Model M058YC — Typical Performance Data**

Pressure	Speed (rpm)					Input Flow	
	1000	2000	3000	4000	5000	gpm Lb-in	l/min N-m
500 psi (34 bar)	3.2	5.7	8.4	10.9	13.6	41,3	51,5
	34.4	32.8	28.0	22.4	9.6	2,53	1,08
1000 psi (69 bar)	3.2	5.8	8.6	11.2	13.9	42,4	52,6
	79.7	79.2	75.2	68.0	57.6	7,68	6,51
1500 psi (103 bar)	3.3	6.0	8.8	11.3	14.0	42,8	53,0
	126.4	128.0	126.4	116.8	105.6	13,2	11,93
2000 psi (138 bar)	3.6	6.2	8.9	11.6	14.4	00,0	54,5
	166.4	172.0	172.0	168.0	158.4	18,98	17,90
2500 psi (172 bar)	3.6	6.4	9.1	11.7	14.4	44,3	54,5
	200.0	216.0	214.4	208.8	200.0	23,59	22,6
rpm	1000	2000	3000	4000	5000		



**Operating Temperatures (continued)**

Another optional seal, the mechanical or rotary shaft seal is used in high pressure, high speed applications. Mechanical seals also tolerate higher back pressures. Consult the factory for your special needs.

**Operating Speeds**

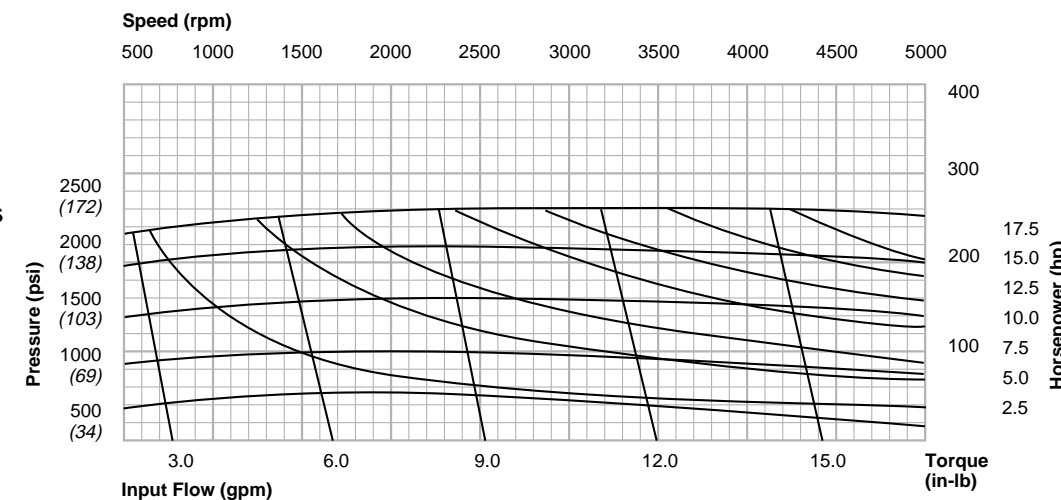
MYC motors have a maximum operating speed range up to 5000 rpm, based on operation at sea level using SAE oil with a viscosity of 130 SUS at 120°F (49°C). Actual limits for each displacement can be found in the motor performance curves. Minimum speed is 500 rpm. This is the normal minimum speed at which the motor will operate continuously at rated pressure. Consult factory for operation outside these limits.

**Operating Pressure Ratings**

MYC motors are designed to operate continuously at the rated pressures shown on page 16. Maximum operating pressures decrease in higher displacement motors.

**Model M077YC — Typical Performance Data**

Pressure	Speed (rpm)					Input Flow	
	1000	2000	3000	4000	5000	gpm Lb-in	l/min N-m
500 psi (34 bar)	4.0	7.2	10.5	13.7	17.0	51,9	64,3
	43.0	41.0	35.0	28.0	12.0	3,16	1,36
1000 psi (69 bar)	4.0	7.3	10.8	14.0	17.4	53,0	65,9
	99.0	99.0	94.0	85.0	72.0	9,6	8,14
1500 psi (103 bar)	4.2	7.5	11.0	14.2	17.6	53,7	66,6
	158.0	160.0	158.0	146.0	132.0	16,5	14,92
2000 psi (138 bar)	4.5	7.8	11.2	14.5	18.0	54,9	68,1
	208.0	215.0	215.0	210.0	198.0	23,73	22,37
2500 psi (172 bar)	4.6	8.0	11.4	14.7	18.1	55,6	68,5
	250.0	270.0	268.0	261.0	250.0	29,49	28,25
rpm	1000	2000	3000	4000	5000		



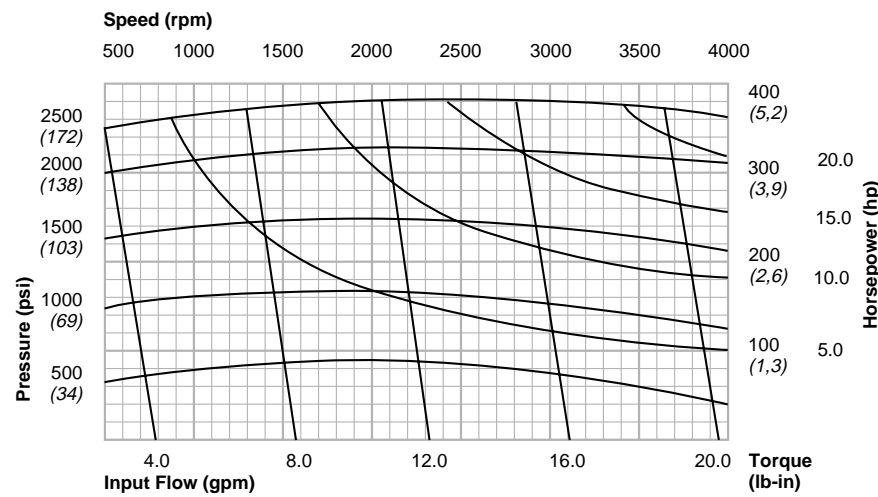
**System Plumbing**

Undersized or restricted return lines can cause excessive back pressure on the motor shaft seal. Excessively high back pressures can shorten seal life and cause efficiency loss through heat buildup. To avoid excessive back pressure, the return line should be sized such that flow does not exceed 100 psi (7 bar), (150 psi [10 bar] intermittent) for a motor with the standard high pressure seal. A motor with the optional high pressure mechanical seal can tolerate back pressure to 200 psi (14 bar) and 300 psi (20 bar) intermittent.

All MYC motors are equipped with an internal drain, eliminating the need for an external drain line. If more than one motor is used on the same circuit, they should be connected in parallel.

**Model M116YC — Typical Performance Data**

Pressure	5.2		10.5		15.8		20.2			
	gpm	l/min	gpm	l/min	gpm	l/min	gpm	l/min		
	lb-in	N-m	lb-in	N-m	lb-in	N-m	lb-in	N-m		
500 psi (34 bar)	19,7	39,7	59,8	76,5	80,0	9,04	8,47	7,01	4,75	
	21,9	40,9	60,5	78,7	5,8	18,31	160,0	150,0	132,0	14,92
1000 psi (69 bar)	22,7	41,6	61,3	79,5	246,0	27,8	245,0	240,0	220,0	24,86
	23,5	43,1	62,5	81,4	6,2	36,16	328,0	320,0	308,0	34,8
1500 psi (103 bar)	21,9	44,3	63,6	83,3	5,8	41,81	390,0	387,0	370,0	41,81
	23,5	47,3	68,1	88,9	370,0	44,07	387,0	370,0	370,0	41,81
rpm	1000	2000	3000	4000						

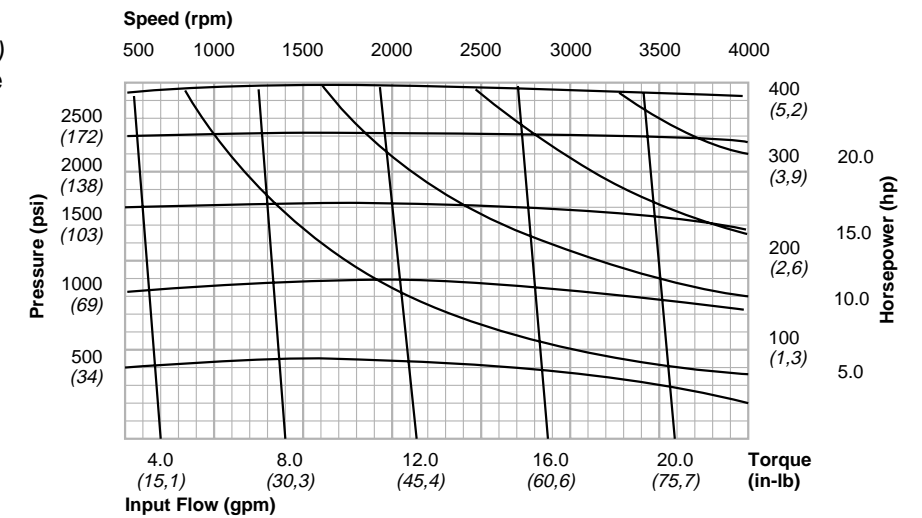


**How to Use Performance Curves**

Performance curves shown for MYC motors combine 5 related variables: pressure, speed, input flow, output torque, and horsepower output. If any two variables are known or assumed, the others can be determined. Compare the curves for all models and select the one which provides the best performance at desired speed and torque. Example: the application requires a motor producing 350 lb-inches (3,4 daNm) of torque at 1250 rpm. To discover the values for psi (bar), gpm (l/min), and hp, find and mark the intersection of 1250 rpm and 350 lb-inches (3,4 daNm) on the curve. The value of the remaining variables can be found by interpolation. In this case they would be 1250 psi (86 bar), 12 gpm (45,4 l/min) and 8 hp. Examine the motor curves for each displacement and choose the motor most suitable for the desired application.

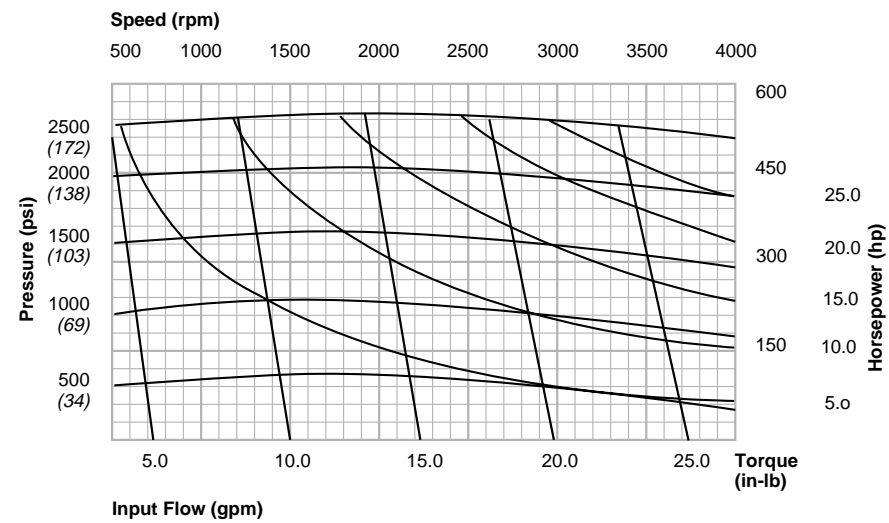
**Model M125YC — Typical Performance Data**

Pressure	5.5		11.2		16.9		21.6			
	gpm	l/min	gpm	l/min	gpm	l/min	gpm	l/min		
	lb-in	N-m	lb-in	N-m	lb-in	N-m	lb-in	N-m		
500 psi (34 bar)	20,8	42,4	64,0	81,7	85,7	9,68	9,08	7,5	5,08	
	23,5	43,5	64,7	84,0	6,2	19,62	171,5	160,8	141,5	15,99
1000 psi (69 bar)	24,2	44,3	65,5	85,2	263,7	29,8	262,6	257,2	235,8	26,64
	25,0	46,2	66,6	87,1	6,6	38,76	351,6	343,0	330,1	37,3
1500 psi (103 bar)	23,5	47,3	68,1	88,9	6,2	44,81	418,0	414,8	396,6	44,81
	23,5	47,3	68,1	88,9	396,6	44,81	418,0	414,8	396,6	44,81
rpm	1000	2000	3000	4000						



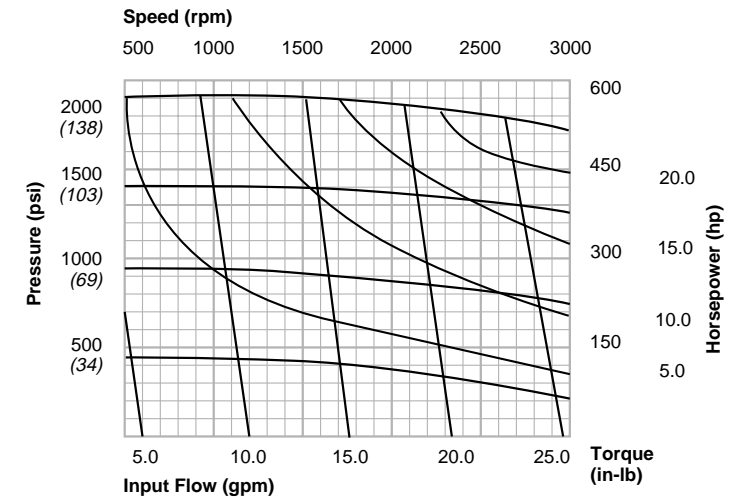
Model M155YC — Typical Performance Data

Pressure	Input Flow				Torque			
	gpm	l/min	gpm	l/min	lb-in	N-m	lb-in	N-m
500 psi (34 bar)	7.2	27.3	14.0	53.0	20.5	77.6	27.2	102.9
	108.0	12.2	98.0	11.07	80.0	9.04	50.0	5.65
1000 psi (69 bar)	7.5	28.4	14.2	53.7	21.0	79.5	27.8	105.2
	220.0	24.86	210.0	23.73	198.0	22.37	163.0	18.42
1500 psi (103 bar)	7.8	29.5	14.8	56.0	21.8	82.5	28.0	106.0
	341.0	38.53	330.0	37.29	310.0	35.03	280.0	31.64
2000 psi (138 bar)	8.0	30.2	15.1	57.2	22.3	84.4	29.0	109.8
	450.0	50.85	442.0	49.94	430.0	48.59	408.0	46.1
2500 psi (172 bar)	8.5	32.0	16.0	60.1	23.0	87.1	29.5	111.7
	552.0	62.37	548.0	61.92	533.0	60.23	515.0	58.19
rpm	1000		2000		3000		4000	



Model M194YC — Typical Performance Data

Pressure	Input Flow		Torque	
	gpm	l/min	lb-in	N-m
500 psi (34 bar)	8.8	33,8	17.2	65,1
	130.0	14,69	110.0	12,43
1000 psi (69 bar)	9.5	36,0	17.8	67,4
	278.0	31,41	250.0	28,25
1500 psi (103 bar)	10.0	37,9	18.4	69,6
	422.0	47,68	330.0	46,33
2000 psi (138 bar)	10.5	39,7	19.0	72,0
	570.0	64,41	560.0	63,28
rpm	1000		2000	
	3000		4000	





### Order Code

#### Hydraulic Fluids

Hydraulic fluid performs three basic functions. First, it provides efficient transfer of power from the pump to the actuators. Second, the fluid provides lubrication and surface protection to the working parts. The use of petroleum-based fluids with rust and oxidation inhibitors remains the main choice for most hydraulic systems. Third, the fluid acts to transfer heat to maintain a consistent system temperature operation range.

Viscosity is the most important property of a hydraulic fluid. It measures how the fluid resists flow. Thick, dense oil has high viscosity; thin oil has low viscosity. Ideally, the fluid should have a viscosity of 100 to 180 SUS at operating temperature, with 7500 SUS maximum viscosity for low temperature startup condition.

Viscosity index measures how the viscosity of the hydraulic fluid changes with temperature. A high viscosity index indicates that the hydraulic fluid will have almost the same viscosity at high and low temperatures. Fluids with viscosities that vary widely with temperature changes have a low viscosity index. Because of the wide range of operating temperatures encountered, hydraulic pumps should use fluids with a high viscosity index.

#### Order Code Analysis

##### For Multi-Circuit Pumps

	077	YC	00	17	01	/	194	YC	01	11	00	-		L	M
1	2	3	4	5	6		2	3	4	5	6		7	8	9

##### For Single Pumps and Motors

	077	YC	01	01	01	-	5	L	F	14
1	2	3	4	5	6		7	8	9	10

1 Application	
Omit	No letter indicates pump
M	Motor

2 Displacement			
Displacement Code	Displacement in <sup>3</sup> /rev (cm <sup>3</sup> /rev)	Gear Width in. (mm)	
058	.58 (9,5)	0.40	(10,16)
077	.77 (12,6)	0.500	(12,70)
116	1.16 (19,0)	0.750	(19,05)
125	1.25 (20,5)	0.810	(20,57)
155	1.55 (25,4)	1.000	(25,40)
194	1.94 (31,8)	1.250	(31,75)

##### 3 Series (SAE "A" 2-Bolt Mount)

4 Flow Divider	
00	Standard cover (No flow divider)
01	Priority flow 3.0 gpm (11 l/min)
06	Priority flow 6.0 gpm (22 l/min)
10	Priority flow 2.0 gpm (7 l/min)
11	Priority flow 4.0 gpm (15 l/min)

**Note:** Some single pumps and motors have only three numbers following the series designation (i.e. 077YC111-LF), if none of the codes exceeds a single digit call out (0 through 9).

### Order Code

#### Hydraulic Fluids (continued)

Pour point is the lowest rated temperature at which a hydraulic fluid will flow. Because hydraulic pumps are often used on mobile equipment that may be exposed to very low outside temperatures, a low pour point is very important. Ideally, the fluid pour point should be at least 20° F (6,6° C) below the lowest expected outside temperature.

Hydraulic fluid in everyday use is constantly stressed by temperature changes, high pressures, oxidation, and contamination. Hydraulic fluid with *good stability characteristics* resists premature breakdown. At the same time, keeping the hydraulic fluid clean is probably the most essential aspect for ensuring the reliable performance of the system. Contamination is the leading cause of hydraulic system breakdowns. The system should always be filtered and the element should be regularly cleaned or replaced. When the fluid needs replacement, be sure to use a good grade of new, clean fluid.

The hydraulic fluid must be **compatible** with nitrile rubber sealing components. In addition, a good grade of hydraulic fluid will **contain additives** to help control wear, oxidation and foaming.

Please consult QCC before using any non-petroleum base or fire-resistant fluids which may require special seal materials.

5 Porting	
Without Flow Divider Unless Specified, Porting is in Cover	
01	3/4" NPTF (inlet) tank, 1/2" NPTF (outlet) pressure – (side)
02	1" NPTF (inlet) tank, 1/2" NPTF (outlet) pressure – (side)
17	1 1/16 - 12 SAE straight thread (inlet) tank, 7/8 - 14 SAE straight thread (outlet) pressure – (side)
21	1 3/16 - 12 SAE straight thread (inlet) tank, 7/8 - 14 SAE straight thread (outlet) pressure – (side)
23	1 1/16 - 12 SAE straight thread (inlet) tank, 7/8 - 14 SAE straight thread (outlet) pressure, both end ported
Without Flow Divider Unless Specified, Porting is in Cover	
35	1 1/16 - 12 SAE straight thread (inlet) tank, 1 1/16 - 12 SAE straight thread (outlet) pressure — (side)
41	1 5/16 - 12 SAE straight thread (inlet) tank, 1 1/16 SAE straight thread (outlet) pressure, both end ported
With Flow Divider Manifold	
11	1 3/16 - 12 SAE straight thread (inlet) tank, 7/8 - 14 SAE straight thread (outlets) priority and secondary – (side)

For code analysis and ordering of YC-YB and YC-B tandem pumps, consult QCC.

6 Shaft Extension	
00	No shaft extension (rear section dual)
01	.75" (19 mm) diameter straight keyed shaft, (2" [51 mm] extension) with .19" (4,82 mm) x 1.12 lg keyway
02	.62" (16 mm) diameter 9-tooth spline – (1.25" [32 mm] extension)
03	.75" (19 mm) diameter 11-tooth spline – (1.50" [38mm] extension)

7 Customer Variations	
Omit	Standard shaft seal
5	High pressure shaft seal with internal snap ring

8 Shaft Rotation (viewed from shaft end)	
L	Left hand
R	Right hand

9 Design Modification	
F	New body style incorporating retaining plate and "E" ring groove in body casting; also pressed in shaft seal and seal retainer in body. (Replaces D modification)
H	"E" ring loading plate incorporating retaining plate and "E" ring groove in casting (Standard dual assembly replaces "F" assemblies)
M	Same as "H" modification except using split driveshaft with serrated coupling

10 Relief Valve Setting	
Standard models with integral relief valve will be set at 1500 psi (103 bar). The code numbers represent valve settings multiplied by 1/100. Consult factory for other settings and availability.	

