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## PTO

### 210 Series

- Standard smart start drive line output
- Intermittent torque rating
- Standard SAE output flange and shafts
- Used with Ford 10R140 transmissions



Model Number	Description	Model Number	Description
210FMMFP-B4AD	2WD or 4WD, Diesel, SAE A 2-Bolt Flange, 3/4"-11T Shaft	210GMMFP-B487	2WD or 4WD, Gas, AD Output with 2.01 in <sup>3</sup> /rev PGP511 Gear Pump
210FMMFP-B450	2WD or 4WD, Diesel, AD Output with 1.16 in <sup>3</sup> /rev PGP511 Gear Pump	210FMMFP-B2SD	2WD Only, Diesel, Smart Start 1-1/4" - 5/16" key Driveshaft
210FMMFP-B455	2WD or 4WD, Diesel, AD Output with 1.28 in <sup>3</sup> /rev PGP511 Gear Pump	210FMMFP-B415	2WD or 4WD, Diesel, AD Output with 2.93 in <sup>3</sup> /rev P16 Gear Pump
210GMMFP-B21	2WD Only, Gas, XP Output with 3.51 in <sup>3</sup> /rev P16 Gear Pump	210FMMFP-K4XP	2WD or 4WD, Diesel, EOC shift, SAE A 2-Bolt Flange, 7/8"-13T Shaft
210GMMFP-B409	2WD or 4WD, Gas, AD Output with 2.17 in <sup>3</sup> /rev PGP-315 Gear Pump	210GMMFP-B4XP	2WD or 4WD, Gas, SAE A 2-Bolt Flange, 7/8"-13T Shaft



Image provided by TDH Manufacturing





## 210 SERIES POWER TAKE-OFF SPECIFICATIONS AND TECHNICAL DATA

**210** **F** **M** **MF** **P** **-** **B** **4** **21**

**Basic Model**  
210

**Mounting Option**  
F = F250-F600 Diesel MY2020 & Later  
63 G = F250-F600 Gas MY2020 & Later  
X = F250-F600 Gas or Diesel (Use for No Harness)

**Gear Ratio**  
M = 46/36 (144% Output Speed)

**Input Option**  
MF = 46 Tooth, Spur  
**NOTE:** For more details, see Application Catalog

**Lube Option**  
P = Internal Lubrication

**Shift Option**  
B = Diesel - 12V Elec/Hyd  
B = Gas - 12V Elec/Hyd (w/ High Temp Loom)  
K = 12V Elec/Hyd w/ EOC (Electronic Overspeed Control)  
E = Reduced Harness (PTO Connections Only)  
X = No Wiring Harness

**Output Option**  
**Driveline Output**  
38 SD = Smart Start - Rd Standard Shaft (1-1/4" - 5/16" Key)  
**Pump Mount**  
AD = SAE A 2-Bolt Flange (3/4" - 11T)  
XP = Special SAE A Pilot 2-Bolt Flange, SAE B Shaft (7/8" - 13T)  
21 = CGP-P11A21-5AC (0.49 in<sup>3</sup>/rev, .0021 GPR)  
26 = CGP-P11A26-5AC (0.61 in<sup>3</sup>/rev, .0026 GPR)  
32 = CGP-P11A32-5AC (0.73 in<sup>3</sup>/rev, .0032 GPR)  
37 = CGP-P11A37-5AC (0.85 in<sup>3</sup>/rev, .0037 GPR)  
42 = CGP-P11A42-5AC (0.98 in<sup>3</sup>/rev, .0042 GPR)  
50 = CGP-P11A50-5AC (1.16 in<sup>3</sup>/rev, .0050 GPR)  
55 = CGP-P11A55-5AP (1.28 in<sup>3</sup>/rev, .0055 GPR)  
61 = CGP-P11A61-5AP (1.40 in<sup>3</sup>/rev, .0061 GPR)  
71 = CGP-P11A71-5AP (1.65 in<sup>3</sup>/rev, .0071 GPR)  
82 = CGP-P11A82-5AP (1.89 in<sup>3</sup>/rev, .0082 GPR)  
87 = CGP-P11A87-5AP (2.01 in<sup>3</sup>/rev, .0087 GPR)  
08 = CGP-P31B081-5AG (1.86 in<sup>3</sup>/rev, .0081 GPR)  
09 = CGP-P31B094-5AG (2.17 in<sup>3</sup>/rev, .0094 GPR)  
11 = CGP-P31B107-5AG (2.48 in<sup>3</sup>/rev, .0107 GPR)  
15 = CGP16-150A-2D1 (2.93 in<sup>3</sup>/rev, .0127 GPR)  
38 18 = CGP16-180A-2D1 (3.51 in<sup>3</sup>/rev, .0152 GPR)  
38 20 = CGP16-200A-2D1 (3.90 in<sup>3</sup>/rev, .0169 GPR)

**Assembly Arrangement**  
2 = 4 x 2 Vehicles Only  
4 = 4 x 4 and 4 x 2 Vehicles

38 4 x 2 Vehicles only  
63 Includes wiring harness with high temperature loom and heat shield

## Chelsea CGP-P11 Series Pump Specs for 4 x 2 and 4 x 4 Vehicles (3/4" - 11 Tooth Pump Spline - AD Output)

Order Code w/ PTO (C)	Chelsea Pump Model	Displacement in <sup>3</sup> /rev	GPM (A)	Pump (A) HP	Torque (A) ft-lbs	Pressure PSI		Max Speed RPM		Max Pump Flow GPM	Rear Pump Ports	
						Intermittent	Continuous	Pump	Engine (B)		Inlet	Outlet
21	CGP-P11A021-5AC	0.49	3.30	7.0	24.6	3988	3625	4000	1736	4.8	SAE 12	SAE 10
26	CGP-P11A026-5AC	0.61	4.11	8.7	30.7	3988	3625	3600	1736	5.9	SAE 12	SAE 10
32	CGP-P11A032-5AC	0.73	4.91	10.4	36.7	3988	3625	3500	1736	7.1	SAE 12	SAE 10
37	CGP-P11A037-5AC	0.85	5.72	12.1	42.7	3988	3625	3300	1736	8.3	SAE 12	SAE 10
42	CGP-P11A042-5AC	0.98	6.60	14.0	49.3	3988	3625	3000	1736	9.5	SAE 12	SAE 10
50	CGP-P11A050-5AC	1.16	7.81	16.5	58.3	3770	3625	3000	1736	11.3	SAE 12	SAE 10
55	CGP-P11A055-5AP	1.28	8.62	17.1	60.5	3480	3410	2800	1736	12.5	SAE 16	SAE 12
61	CGP-P11A061-5AP	1.40	9.43	18.0	63.4	3408	3265	2800	1736	13.6	SAE 16	SAE 12
71	CGP-P11A071-5AP	1.65	11.11	17.9	63.0	2900	2755	2300	1597	14.8	SAE 16	SAE 12
82	CGP-P11A082-5AP	1.89	12.72	17.8	62.8	2465	2395	2300	1597	16.9	SAE 16	SAE 12
87	CGP-P11A087-5AP	2.01	13.53	17.8	62.7	2320	2250	2000	1389	15.7	SAE 16	SAE 12

## Chelsea GPG-P315 Series Pump Specs for 4 x 2 and 4 x 4 Vehicles (3/4" - 11 Tooth Pump Spline - AD Output)

Order Code w/ PTO	Chelsea Pump Model	Displacement in <sup>3</sup> /rev	GPM (A)	Pump (A) HP	Torque (A) ft-lbs	Pressure PSI		Max Speed RPM		Max Pump Flow GPM	Rear Pump Ports	
						Intermittent	Continuous	Pump	Engine (B)		Inlet	Outlet
8	CGP-P31B081-5AG	1.86	12.52	24.1	85.1	3300	3300	3000	1736	18.1	SAE 16	SAE 16
9	CGP-P31B094-5AG	2.17	14.61	24.7	87.2	2900	2900	3000	1736	21.1	SAE 16	SAE 16
11	CGP-P31B107-5AG	2.48	16.70	24.4	86.0	2500	2500	3000	1736	24.2	SAE 16	SAE 16

## Chelsea P16 Series Pump Specs for 4 x 2 and 4 x 4 Vehicles (7/8" - 13 Tooth Pump Spline - XP Output)

Order Code w/ PTO	Chelsea Pump Model	Displacement in <sup>3</sup> /rev	GPM (A)	Pump (A) HP	Torque (A) ft-lbs	Pressure PSI		Max Speed RPM		Max Pump Flow GPM	Rear Pump Ports	
						Intermittent	Continuous	Pump	Engine (B)		Inlet	Outlet
15	CGP16-150A-2D1	2.93	19.73	34.5	121.9	3000	3000	2800	1736	28.5	SAE 20	SAE 16
18 38	CGP16-180A-2D1	3.51	23.63	30.3	107.1	2200	2200	2500	1736	34.2	SAE 20	SAE 16
20 38	CGP16-200A-2D1	3.90	26.26	30.6	108.1	2000	2000	2200	1528	33.4	SAE 20	SAE 16

(A) GPM &amp; Pump Input HP @ 1200 Engine RPM (1736 PTO Output RPM - 144% Ratio) &amp; Continuous Pressure Rating with 90% efficiency rating considered.

(B) Max Engine Speed = Minimum of (1) (Max Pump Speed) / 1.44 PTO Ratio and (2) 2500 RPM maximum PTO output speed. PTO output speeds above 2500 RPM requires application approval from Parker Chelsea.

**NOTE:** Minimum ideal engine speed for Ford Super Duty in stationary mode is 900 RPM (Diesel) and 700 RPM (Gas). Consult fordbbas.com**NOTE:** Ford's 10R140 transmission delivers up to 300 ft-lbs to PTO. Consult fordbbas.com for power and torque limitations based on vehicle configuration.**FORMULAS:**

GPM = Cu. In. x .004329 = G/Rev x 1736 RPMs x .90 efficiency

HP = (GPM x Max PSI) / 1714

Torque = (HP x 5252) / 1736 RPMs

**WARNING:** This product can expose you to chemicals including Lead and Lead Compounds, and Di(2-ethylhexyl)phthalate (DEHP) which are known to the State of California to cause cancer and birth defects or other reproductive harm. For more information go to [www.P65Warnings.ca.gov](http://www.P65Warnings.ca.gov)

## 249 SERIES POWER TAKE-OFF SPECIFICATIONS AND TECHNICAL DATA

**2 4 9** **F** **M** **LL** **X** **-** **B** **4** **5 5**

**Basic Model**  
\*249 Ford TorqShift® 6 Transmission

**Mounting Option**  
**F** = 6.7L Diesel w/ Ford TorqShift 6 (6R140)  
**H** = 6.8L Gas 2016 & Later w/ Ford TorqShift 6 (6R140)  
**X** = 6.7L Diesel or 6.8L Gas (Use for No Harness)

**Gear Ratio**  
**M** = 124% Engine Speed

**Input Option**  
**LL** = 35 Tooth, Spur  
**NOTE:** For more details, see Application Catalog (Transmission model number required)

**Lube Option**  
**X** = Internal Pressure Lube

**Shift Option**  
**B** = 12V Hydraulic  
**K** = 12V Hydraulic w/ EOC (Electronic Overspeed Control)  
**E** = Less Wiring Harness

**Output Option**  
**Driveline Output**  
**SD** = Smart Start - Rd Standard Shaft (1-1/4" - 5/16" Key)  
**XD** = Rd Standard Shaft (1-1/4" - 5/16" Key)  
**Pump Mount**  
**08** = Hyd. Pump 1.86 In³/rev - 0.0081 GPR  
**09** = Hyd. Pump 2.17 In³/rev - 0.0094 GPR  
**11** = Hyd. Pump 2.48 In³/rev - 0.0107 GPR  
**15** = Hyd. Pump 2.93 In³/rev - 0.0127 GPR  
**16** = Hyd. Pump 0.37 In³/rev - 0.0016 GPR  
**26** = Hyd. Pump 0.61 In³/rev - 0.0026 GPR  
**32** = Hyd. Pump 0.73 In³/rev - 0.0032 GPR  
**37** = Hyd. Pump 0.85 In³/rev - 0.0037 GPR  
**42** = Hyd. Pump 0.98 In³/rev - 0.0042 GPR  
**55** = Hyd. Pump 1.28 In³/rev - 0.0055 GPR  
**61** = Hyd. Pump 1.40 In³/rev - 0.0061 GPR  
**71** = Hyd. Pump 1.65 In³/rev - 0.0071 GPR  
**82** = Hyd. Pump 1.89 In³/rev - 0.0082 GPR  
**87** = Hyd. Pump 2.01 In³/rev - 0.0087 GPR  
**AD** = SAE A 2-Bolt Flange (3/4" - 11T)  
**XP** = Special SAE A Pilot 2-Bolt Flange, SAE B Shaft (7/8" - 13T)

**Assembly Arrangement**  
**2** = 4 x 2 Vehicles  
**4** = 4 x 4 Vehicles

<sup>5</sup> Automatically pressure lubed

<sup>5</sup> Automatically pressure lubed

<sup>38</sup> 4 x 2 Vehicles Only

<sup>63</sup> Includes wiring harness with high temperature loom and heat shield

Chelsea CGP-P11 Series Pump Specs for 4 x 2 and 4 x 4 Vehicles (3/4" - 11 Tooth Pump Spline – AD Output)										
Order Code w/ PTO (C)	Chelsea Pump Model	Displacement in³/rev	GPM (A)	Pump (A) HP	Torque (A) ft-lbs	Pressure PSI		Max Speed RPM		Max Pump Flow GPM
						Intermittent	Continuous	Pump	Engine (B)	
16	CGP-P11A016-5GC	0.37	2.15	4.5	16.0	3990	3625	4000	2016	3.6
26	CGP-P11A026-5GC	0.61	3.54	7.5	26.4	3990	3625	3600	2016	5.9
32	CGP-P11A032-5GC	0.73	4.23	9.0	31.6	3990	3625	3500	2016	7.1
37	CGP-P11A037-5GC	0.85	4.93	10.4	36.8	3990	3625	3300	2016	8.3
42	CGP-P11A042-5GC	0.98	5.68	12.0	42.4	3990	3625	3000	2016	9.5
55	CGP-P11A055-5GC	1.28	7.42	14.8	52.1	3480	3410	2800	2016	12.5
61	CGP-P11A061-5GE	1.40	8.12	15.5	54.6	3410	3265	2800	2016	13.6
71	CGP-P11A071-5GE	1.65	9.57	15.4	54.3	2900	2755	2400	1935	15.4
82	CGP-P11A082-5GE	1.89	10.96	15.3	54.0	2465	2395	2300	1855	16.9
87	CGP-P11A087-5GE	2.01	11.65	15.3	54.0	2320	2250	2000	1613	15.7

Chelsea PGP-315 Series Pump Specs for 4 x 2 Vehicles Only (3/4" - 11 Tooth Pump Spline – AD Output)										
Order Code w/ PTO	Chelsea Pump Model	Displacement in <sup>3</sup> /rev	GPM (A)	Pump (A) HP	Torque (A) ft-lbs	Pressure PSI		Max Speed RPM		Max Pump Flow GPM
						Intermittent	Continuous	Pump	Engine (B)	
08	CGP-P31B081-5AG	1.86	10.78	20.8	73.3	3300	3300	3000	2016	18.1
09	CGP-P31B094-5AG	2.17	12.58	21.3	75.1	2900	2900	3000	2016	21.1
11	CGP-P31B107-5AG	2.48	14.38	21.0	74.0	2500	2500	3000	2016	24.2

Chelsea P16 Series Pump Specs for 4 x 2 Vehicles Only (7/8" - 13 Tooth Pump Spline – XP Output)										
Order Code w/ PTO	Chelsea Pump Model	Displacement in³/rev	GPM (A)	Pump (A) HP	Torque (A) ft-lbs	Pressure PSI		Max Speed RPM		Max Pump Flow GPM
						Intermittent	Continuous	Pump	Engine (B)	
15	P16-150A-2D1	2.93	16.99	29.7	104.9	3000	3000	2800	2016	28.5

(A) GPM & Pump Input HP @ 1200 Engine RPM (1488 PTO Output RPM - 124% Ratio) & Continuous Pressure Rating with 90% efficiency rating considered.

**(B) Max Engine Speed = (Max Pump Speed) / (1.24) for PTO Ratio Increase. Max Speed determined by Max PTO output speed of 2500.**

(C) For Pump Codes 61, 71, 82 & 87 - 45 degree fittings are required to connect hydraulic hoses for clearance. Order Kit number 329667X

**CAUTION:** 249 Gear Pump Options: The PTO drive gear delivers up to 250 Lbs. ft. torque to the aftermarket PTO, and can manage the heat of 60 HP continuously. Higher horsepower can be delivered, but for shorter durations depending on the amount of power required. Ref: Ford Body Builders Manual; TorqShift Automatic Transmission.

**FORMULAS:**  $GPM = Cu. In. \times .004329 = G/Rev \times 1488 \text{ RPMs} \times .90 \text{ efficiency}$  •  $HP = (GPM \times \text{Max PSI}) / 1714$  •  $Torque = (HP \times 5252) / 1488 \text{ RPMs}$



# 249V SERIES POWER TAKE-OFF SPECIFICATIONS AND TECHNICAL DATA

**Basic Model** — 249 F M LL X — B V 17

<sup>5</sup> **249**

**Mounting Option** — F = 6.7L Diesel w/ Ford TorqShift 6 (6R140)  
<sup>63</sup> H = 6.8L Gas 2016 & Later Ford TorqShift 6 (6R140)  
X = 6.7L Diesel or 6.8L Gas (Use for No Harness)

**Gear Ratio** — M = 124% Engine Speed

**Input Option** — LL = 35 Tooth, Spur  
**NOTE:** For more details, see Application Catalog  
 (Transmission model number required)

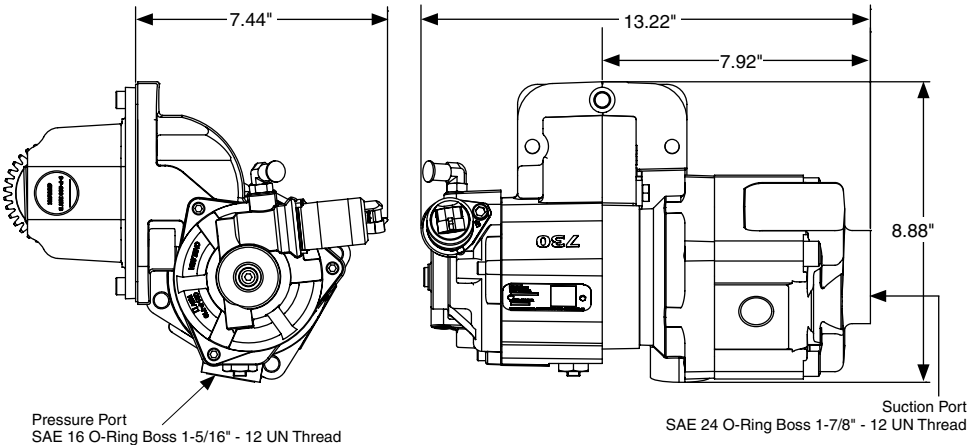
**Lube Option** — X = External Pressure Lube

<sup>5</sup> Automatically pressure lubed  
<sup>63</sup> Includes Wiring harness with high temperature loom and heat

**Output Option**  
**Pump Mount**  
08 = B08 Cartridge 1.61 in<sup>3</sup>/rev - 0.0438 GPR  
10 = B10 Cartridge 2.08 in<sup>3</sup>/rev - 0.0566 GPR  
12 = B12 Cartridge 2.26 in<sup>3</sup>/rev - 0.0615 GPR  
14 = B14 Cartridge 2.81 in<sup>3</sup>/rev - 0.0764 GPR  
17 = B17 Cartridge 3.56 in<sup>3</sup>/rev - 0.0968 GPR  
20 = B20 Cartridge 3.89 in<sup>3</sup>/rev - 0.1058 GPR  
22 = B22 Cartridge 4.29 in<sup>3</sup>/rev - 0.1167 GPR  
25 = B25 Cartridge 4.84 in<sup>3</sup>/rev - 0.1316 GPR  
IT = Less Cartridge

**Assembly Arrangement**  
V = Integral Denison T6C Vane Pump

**Shift Option**  
B = 12V Hydraulic  
K = 12V Hydraulic w/ EOC  
 (Electronic Overspeed Control)  
E = No Harness



Chelsea 249V Integral Vane Pump Data for 4 x 2 or 4 x 4 Vehicles										
Option Code w/ PTO	Chelsea Pump Cartridge Number	Displacement in <sup>3</sup> /rev	GPM (D)	Pump (D) HP	Torque (D) Ft. Lbs.	Pressure PSI		Pump Speed RPM		Max Speed RPM
						Intermittent	Continuous	Min.	Max	Engine (B)
08	380418-08	1.61	9.33	19	67	4000	3500	400	2800	2015
10	380418-10	2.08	12.06	25	87	4000	3500	400	2800	2015
12	380418-12	2.26	13.10	27	94	4000	3500	400	2800	2015
14	380418-14	2.81	16.29	33	117	4000	3500	400	2800	2015
17	380418-17	3.56	20.64	42	149	4000	3500	400	2800	2015
20	380418-20	3.89	22.55	46	163	4000	3500	400	2800	2015
22	380418-22	4.29	24.87	51	179	4000	3500	400	2800	2015
25	380418-25	4.84	28.06	57	202	4000	3500	400	2800	2015
157	380418-157					4000	3500	400	2800	2015

(A) GPM & Pump Input HP @ 1200 Engine RPM (1488 PTO Output RPM - 124% Ratio) & Continuous Pressure Rating with 90% efficiency rating considered.  
 (B) Max Engine Speed = (Max Pump Speed) / (1.24) for PTO Ratio Increase. Max Speed determined by Max PTO output speed of 2500.  
 (D) GPM & Pump Input HP @ 1200 Engine RPM (1488 PTO Output RPM - 124% Ratio) & 2000 PSI Continuous Pressure Rating.  
 See leakage chart for additional flow losses at other pressures.  
**CAUTION:** 249V Pump Options: The PTO drive gear delivers up to 250 Lbs. ft. torque to the aftermarket PTO, and can manage the heat of 40 HP continuously. Higher horsepower can be delivered, but for shorter durations depending on the amount of power required. Ref: Ford Body Builders Manual; TorqShift Automatic Transmission.  
**NOTE:** Refer to Chelsea Owner's Manual HY25-1FRD-M1/US for complete vane pump information.

**FORMULAS:** GPM = Cu. In. x .004329 = G/Rev x 1488 RPMs x .90 efficiency • HP = (GPM x Max PSI) / 1714 • Torque = (HP x 5252) / 1488 RPMs

# PTO

## 252 Series

- Controlled compression interface gasket eliminates the setting of gear backlash
- Lightweight housing design allows for maximum heat dissipation
- Excellent gear contact ratio quiet operation
- Integrated cartridge valve reduces installation time



Model Number	Description	Model Number	Description
252GDHVP-B51449	Allison, XE Output with 1.24 in <sup>3</sup> /rev PGP511 Gear Pump	252RDKUX-B5XE	Ram/Aisin MY2011+, SAE A 2 or 4-Bolt Flange, 5/8"-9T Shaft
252RDKUX-B5P71	Ram/Aisin MY2011+, AD Output with 1.65 in <sup>3</sup> /rev PGP511 Gear Pump	252RDKUX-B5AD	Ram/Aisin MY2011+, SAE A 2-Bolt Flange, 3/4"-11T Shaft
252RDKUX-B5P42	Ram/Aisin MY2011+, AD Output with 0.98 in <sup>3</sup> /rev PGP511 Gear Pump	252GDHVP-B5XE	Allison, Pressure Lube, SAE A 2 or 4-Bolt Flange, 5/8"-9T Shaft
252GDHVP-B51462	Allison, Pressure Lube, XE Output with 1.40 in <sup>3</sup> /rev PGP511 Gear Pump	252GDHVX-B5AD	Allison, SAE A 2-Bolt Flange, 3/4"-11T Shaft
252GDHVX-B5XE	Allison, SAE A 2 or 4-Bolt Flange, 5/8"-9T Shaft	252RDKUX-B5P82	Ram/Aisin MY2011+, AD Output with 1.98 in <sup>3</sup> /rev PGP511 Gear Pump





## 252 SERIES POWER TAKE-OFF SPECIFICATIONS AND TECHNICAL DATA

**252 R D K U P - B 5 A D**

**Basic Model** 252

**Mounting Option**  
 G = Metric Mount  
 D = Dodge/Aisin (MY2010 & Prior)  
 R = RAM/Aisin (MY2011 and Later)

**Gear Ratio**  
**Internal**  
 D = 19/37  
 M = 24/32

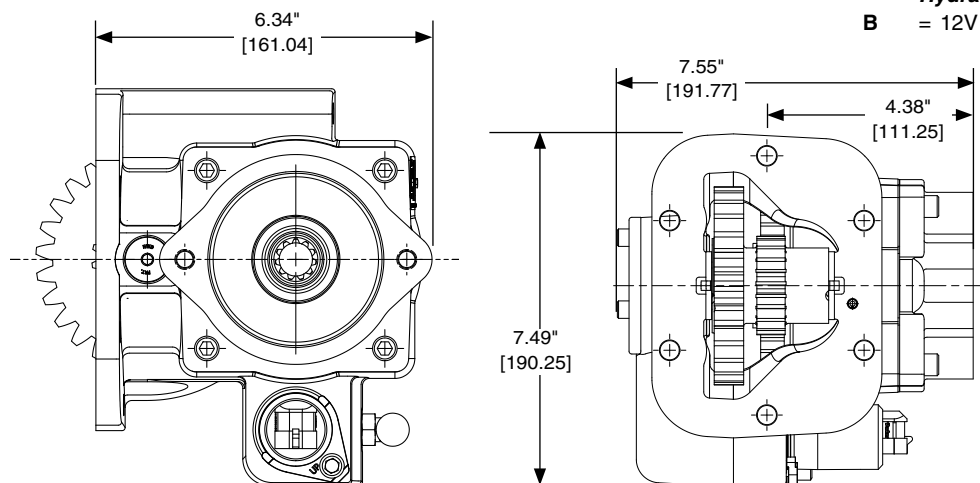
**Input Option**  
 HV = Allison  
 KU = Dodge/RAM  
**NOTE:** For more details, see Application Catalog (Transmission model number required)

**Lube Option**  
 X = No Pressure Lube  
**Pressure**  
 P = Pressure Lube Only

**Output Option**  
**Driveline Output**  
 XB = 1" Round Keyed Shaft, 1/4" Key  
**Pump Mount**  
 1121 = Hyd Pump 2.1 GPM @ 1000 RPM  
 1126 = Hyd Pump 2.6 GPM @ 1000 RPM  
 1137 = Hyd Pump 3.7 GPM @ 1000 RPM  
 1449 = Hyd Pump 4.9 GPM @ 1000 RPM  
 1462 = Hyd Pump 6.2 GPM @ 1000 RPM  
 P37 = Hyd Pump 3.7 GPM @ 1000 RPM  
 P42 = Hyd Pump 4.2 GPM @ 1000 RPM  
 P71 = Hyd Pump 7.1 GPM @ 1000 RPM  
 P82 = Hyd Pump 8.2 GPM @ 1000 RPM  
 AD = SAE A 2-Bolt Flange, SAE AH Shaft (3/4" - 11T)  
 XE = SAE A 2 or 4-Bolt Flange, SAE A Shaft (5/8" - 9T)

**Assembly Arrangement**  
 5 = Left side - bulge down  
 Right side - bulge up

**Shift Option**  
**Hydraulic**  
 B = 12V Elec/Hyd



252 Pumps offered in the PGP511 with 5/8" - 9T / SAE A Flange

Option Order Code	Chelsea Pump Model	Displacement in3/rev	Displacement Gal/rev	Max Pressure PSI	Max Speed RPM	Shaft Size
1121	CGP-P11C021-1AC	0.49	0.002	3988	4000	5/8" - 9T
1126	CGP-P11C026-1AC	0.61	0.003	3988	3600	5/8" - 9T
1129	CGP-P11C029-1AC	0.67	0.003	3988	3600	5/8" - 9T
1137	CGP-P11C037-1AC	0.85	0.004	3988	3300	5/8" - 9T
1449	CGP-P31C054-1AE	1.24	0.005	3500	3000	5/8" - 9T
1462	CGP-P31C061-1AE	1.40	0.006	3500	3000	5/8" - 9T

252 Pumps offered in the PGP511 with 3/4" - 11T / SAE A Flange

Option Order Code	Chelsea Pump Model	Displacement in3/rev	Displacement Gal/rev	Max Pressure PSI	Max Speed RPM	Shaft Size
P37	CGP-P11C037-5AC	0.85	0.004	3988	3300	3/4" - 11T
P42	CGP-P11C042-5AC	0.98	0.004	3988	3000	3/4" - 11T
P71	CGP-P11C071-5AC	1.65	0.007	2900	2400	3/4" - 11T

**WARNING:** This product can expose you to chemicals including Lead and Lead Compounds, and Di(2-ethylhexyl)phthalate (DEHP) which are known to the State of California to cause cancer and birth defects or other reproductive harm. For more information go to [www.P65Warnings.ca.gov](http://www.P65Warnings.ca.gov)

# PTO

## 272 Series

- SAE 6-Bolt housing
- Integrated air valve – no remote valve (patent pending)
- Internal self-adjusting shaft brake (patent 7159701)
- Wet Spline option – extends PTO
- Smart Start option – reduces high inertia startup
- Two year warranty



Model Number	Description	Model Number	Description
272NDHVP-B3BD	6-Bolt Shaft Brake - Rd Standard Shaft	272FPLLP-B8XD	6-Bolt Rd Standard Shaft 1-1/4" - 5/16" Key
272RDKUP-B3RK	6-Bolt Direct Mount SAE B 7/8" - 13T	272RCKUP-B3RK	6-Bolt Direct Mount SAE B 7/8" - 13T
272NBHVP-B3RK	6-Bolt Direct Mount SAE B 7/8" - 13T	272GBHVP-B5RK	6-Bolt Direct Mount SAE B 7/8" - 13T
272GCHVP-B3RK	6-Bolt Direct Mount SAE B 7/8" - 13T	272FPLLP-B8RK	6-Bolt Direct Mount SAE B 7/8" - 13T
272GBHVP-B3RK	6-Bolt Direct Mount SAE B 7/8" - 13T	272GCHVP-B3XD	6-Bolt Rd Standard Shaft 1-1/4" - 5/16" Key



## 272 SERIES POWER TAKE-OFF SPECIFICATIONS AND TECHNICAL DATA

**272** **X** **B** **FN** **P** **-** **B** **5** **X D**

**Basic Model**  
272

**Mounting Option**  
**X** = Standard Mount  
**Z** = Deep Mount  
**G** = Metric Stud Kit  
**K** = Standard Mount w/o Stud Kit  
**L** = Deep Mount w/o Stud Kit  
**M** = Low-Profile w/ Standard Stud Kit  
**N** = Low-Profile w/ Metric Stud Kit  
**A** = Aisin Only (Non-Dodge/Ram)  
**D** = Dodge/Aisin  
**R** = RAM/Aisin

**Gear Ratio**  
**A** = 19/53  
**B** = 22/50  
**C** = 25/47  
**D** = 28/44  
**G** = 31/41  
**K** = 33/39  
**M** = 35/37  
**P** = 37/35  
**S** = 39/33

**Input Gear Designator**  
 Aisin, Allison, EATON Fuller, Mack  
**NOTE:** For more details, see Application Catalog (Transmission Model Number required)

**Lube Option**  
**X** = No Pressure Lube  
**Pressure**  
**P** = Pressure Lube  
<sup>5</sup> **R** = Valve Cap Rotated 120°  
<sup>5</sup> **S** = Valve Cap Rotated 240°  
**Wet Spline**  
<sup>5</sup> **W** = Wet Spline  
<sup>5</sup> **V** = Valve Cap Rotated 120° w/ Wet Spline  
<sup>5</sup> **Y** = Valve Cap Rotated 240° w/ Wet Spline

**Output Option**  
**Driveline Output**  
**XD** = Rd Standard Shaft (1-1/4" - 5/16" Key)  
**XV** = 1410 Series Companion Flange  
**BD** = Drag Brake - Rd Standard Shaft (1-1/4" - 5/16" Key)  
**BV** = Drag Brake - 1410 Series Companion Flange  
<sup>64</sup> **SD** = Smart Start - Rd Standard Shaft (1-1/4" - 5/16" Key)  
**SV** = Smart Start - 1410 Series Companion Flange  
**AB** = DIN 120 Flange  
**AC** = DIN 100 Flange  
**Pump Mount**  
**RE** = Rotatable SAE "A" 2-Bolt Flange, SAE "A" Shaft (5/8" - 9T)  
<sup>68</sup> **RB** = Rotatable SAE "B" 4-Bolt Flange, SAE "B" Shaft (7/8" - 13T)  
<sup>68</sup> **RK** = Rotatable SAE "B" 2 or 4-Bolt Flange, SAE "B" Shaft (7/8" - 13T)  
<sup>68</sup> **RF** = Rotatable SAE "B" 2 or 4-Bolt Flange, SAE "BB" Shaft (1" - 15T)  
<sup>68</sup> **RZ** = Rotatable SAE "B" 2 or 4-Bolt Flange, SAE "C" Shaft (1-1/4" - 14T)  
<sup>68</sup> **RS** = Rotatable SAE "C" 2 or 4-Bolt Flange, SAE "C" Shaft (1-1/4" - 14T)  
<sup>68</sup> **RY** = Rotatable ISO 7653 Flange, DIN 5462 Shaft  
**XR** = Chelsea Special (Cloverleaf), SAE "B" Shaft (7/8" - 13T)

**Assembly Arrangement**  
**3** = Right side - bulge down, Left side - bulge up  
**5** = Left side - bulge down, Right side - bulge up

**Shift Option**  
**Hydraulic**  
**B** = 12V Elec/Hyd - Integral  
**D** = 24V Elec/Hyd - Integral  
**E** = 12V Elec/Hyd w/o Installation Kit - Integral  
**N** = 24V Elec/Hyd w/o Installation Kit - Integral  
**K** = 12V Elec/Hyd w/ EOC  
**L** = 24V Elec/Hyd w/ EOC  
**G** = 12V Elec/Hyd Remote Valve w/o EOC  
**H** = 24V Elec/Hyd Remote Valve w/o EOC  
**Air**  
**A** = Manual Air Shift  
**V** = Manual Air Shift w/o Installation Kit  
**1** = 12V Elec/Air - Integral  
**2** = 24V Elec/Air - Integral  
**J** = 12V Elec/Air w/ EOC - Integral  
**3** = 24V Elec/Air w/ EOC - Integral  
**P** = 12V Elec/Air Remote  
**Q** = 24V Elec/Air Remote  
**R** = 12V Elec/Air Remote w/ EOC  
**4** = 24V Elec/Air Remote w/ EOC

<sup>5</sup> Automatically pressure lubed  
<sup>64</sup> Hyd shift PTOs only  
<sup>68</sup> Check for Wet Spline Availability

Specifications Chart	Approximate Weight: 49 lbs. [22 kg]								
	272*A	272*B	272*C	272*D	272*G	272*K	272*M	272*P	272*S
Intermittent & <b>Continuous</b> Torque Rating lbs-ft [Nm]	300 [407]	300 [407]	300 [407]	300 [407]	300 [407]	300 [407]	300 [407]	300 [407]	300 [407]
HP Rating for Intermittent & <b>Continuous</b> Service									
At 500 RPM of Output Shaft HP [Kw]	29 [21]	29 [21]	29 [21]	29 [21]	29 [21]	29 [21]	29 [21]	29 [21]	29 [21]
At 1000 RPM of Output Shaft HP [Kw]	57 [43]	57 [43]	57 [43]	57 [43]	57 [43]	57 [43]	57 [43]	57 [43]	57 [43]

**WARNING:** This product can expose you to chemicals including Lead and Lead Compounds, and Di(2-ethylhexyl)phthalate (DEHP) which are known to the State of California to cause cancer and birth defects or other reproductive harm. For more information go to [www.P65Warnings.ca.gov](http://www.P65Warnings.ca.gov)



# PTO

## 280 Series

- Torque up to 390 lbs-ft for 10-Bolt applications
- Combo valve shift option available for PTO/dump pump systems
- Industry first rotatable wet spline
- Replaces the 277/278 Series
- For constant mesh option use 287 Series PTO



Model Number	Description
280GCFJP-B5RK	10-Bolt Mount SAE B 7/8" - 13T
280GCFJP-B5XD	10-Bolt Mount Rd Standard Shaft 1-1/4" - 5/16" Key
280GDFJP-B5RK	10-Bolt Mount SAE B 7/8" - 13T
280GDFJP-B5XD	10-Bolt Mount Rd Standard Shaft 1-1/4" - 5/16" Key

Model Number	Description
280GGFJP-B5RK	10-Bolt Mount SAE B 7/8" - 13T
280GGFJP-B5XD	10-Bolt Mount Rd Standard Shaft 1-1/4" - 5/16" Key
280GMFJP-B5RK	10-Bolt Mount SAE B 7/8" - 13T
280GMFJP-B5XD	10-Bolt Mount Rd Standard Shaft 1-1/4" - 5/16" Key





## 280 SERIES POWER TAKE-OFF SPECIFICATIONS AND TECHNICAL DATA

**Basic Model** — **280**

**Mounting Option** — **G** = Standard Mount 10-Bolt w/ Metric Studs

**Gear Ratio** —

3 & 5 Arr.	8 Arr.
<b>B</b> = 22/50	<b>B</b> = 22/53
<b>C</b> = 25/47	<b>C</b> = 25/50
<b>D</b> = 28/44	<b>D</b> = 28/47
<b>G</b> = 31/41	<b>G</b> = 31/44
<b>K</b> = 33/39	<b>K</b> = N/A
<b>M</b> = 35/37	<b>M</b> = 35/40
<b>P</b> = 37/35	<b>P</b> = 37/38
<b>S</b> = 39/33	<b>S</b> = 39/36
<b>T</b> = 41/31	<b>T</b> = 42/33

**Input Option** — **FJ** = Allison  
**KV** = CAT

**NOTE:** For more details, see Application Catalog (Transmission Model Number required)

**Lube Option** —

**Pressure**

**P** = Pressure Lube  
**R** = Valve Cap Rotated 120°  
**S** = Valve Cap Rotated 240°

**Wet Spline**

<sup>5</sup> **W** = Wet Spline  
<sup>5, 45</sup> **V** = Valve Cap Rotated 120° w/ Wet Spline  
<sup>5</sup> **Y** = Valve Cap Rotated 240° w/ Wet Spline

- <sup>15</sup> The remote mount solenoid option can not utilize the EOC option.
- <sup>21</sup> Includes Installation Kit, Console Sold Separately.
- <sup>45</sup> Available on Shift Option B, D, K, L, M, N, S & T.
- <sup>46</sup> Available with Rotated Valve.
- <sup>47</sup> Available with Wet Spline.
- <sup>68</sup> Check for Wet Spline availability

**Output Option****Driveline Output**

- XD** = Rd Standard Shaft (1-1/4" - 5/16" Key)  
**XV** = 1410 Series Companion Flange  
**BV** = Drag Brake - 1410 Series Companion Flange  
**BD** = Drag Brake - Rd Standard Shaft (1-1/4" - 5/16" Key)  
**SD** = Smart Start - Rd Standard Shaft (1-1/4" - 5/16" Key)  
**SV** = Smart Start - 1410 Series Companion Flange  
**AB** = DIN 120 Flange  
**AC** = DIN 100 Flange  
**SB** = Smart Start - DIN 120 Flange  
**SC** = Smart Start - DIN 100 Flange

**Pump Mount**

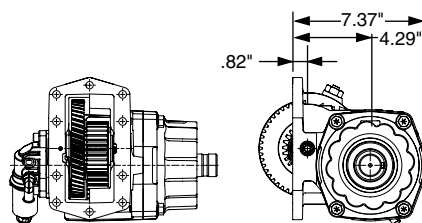
- <sup>68</sup> **RB** = Rotatable SAE B 4-Bolt Flange, SAE B Shaft (7/8" - 13T)  
<sup>47</sup> **RK** = Rotatable SAE B 2 or 4-Bolt Flange, SAE B Shaft (7/8" - 13T)  
<sup>47</sup> **RF** = Rotatable SAE B 2 or 4-Bolt Flange, SAE BB Shaft (1" - 15T)  
<sup>47</sup> **RZ** = Rotatable SAE B 2 or 4-Bolt Flange, SAE C Shaft (1-1/4" - 14T)  
<sup>47</sup> **RS** = Rotatable SAE C 2 or 4-Bolt Flange, SAE C Shaft (1-1/4" - 14T)  
<sup>47</sup> **RY** = Rotatable ISO 7653 Pump Mount DIN 5462 Shaft  
**XR** = Chelsea Special (Cloverleaf), SAE B Shaft (7/8" - 13T)

**Assembly Arrangement**

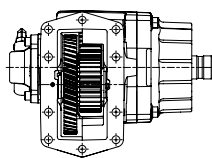
- 3** = Right side - bulge down, Left side - bulge up  
**5** = Left side - bulge down, Right side - bulge up  
**8** = Both sides - no offset

**Shift Option**

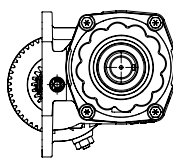
- <sup>46</sup> **B** = 12V Elec/Hyd  
<sup>46</sup> **D** = 24V Elec/Hyd  
<sup>46</sup> **E** = 12V Elec/Hyd w/o Installation Kit  
<sup>46</sup> **N** = 24V Elec/Hyd w/o Installation Kit  
<sup>46</sup> **K** = 12V Elec/Hyd w/ EOC  
<sup>46</sup> **L** = 24V Elec/Hyd w/ EOC  
<sup>15</sup> **G** = 12V Elec/Hyd Remote Valve w/o EOC  
<sup>15</sup> **H** = 24V Elec/Hyd Remote Valve w/o EOC  
<sup>21, 46</sup> **S** = 12V Elec/Hyd w/ Air Shift PTO/Dump Pump Combo Valve, w/ Kick Out, w/ Neutral Spring Return  
<sup>21, 46</sup> **T** = 12V Elec/Hyd w/ Air Shift PTO/Dump Pump Combo Valve, w/o Kick Out, w/ Neutral Spring Return



Assembly 3



Assembly 5



Assembly 8

**Specifications Chart**

Approximate Weight: 49 lbs. [22 kg]

	280*B	280*C	280*D	280*G	280*K	280*M	280*P	280*S	280*T
Continuous Torque Rating (lbs-ft) [Nm]	300 [407]	390 [529]	390 [529]	360 [488]	340 [461]	318 [431]	290 [393]	265 [359]	240 [325]
HP Rating for Continuous Duty									
At 500 RPM of Output Shaft (HP) [Kw]	29 [21]	37 [28]	37 [28]	34 [26]	32 [24]	30 [23]	28 [21]	25 [19]	23 [17]
At 1000 RPM of Output Shaft (HP) [Kw]	57 [43]	74 [56]	74 [56]	69 [51]	65 [48]	61 [45]	55 [41]	50 [38]	46 [34]

**WARNING:** This product can expose you to chemicals including Lead and Lead Compounds, and Di(2-ethylhexyl)phthalate (DEHP) which are known to the State of California to cause cancer and birth defects or other reproductive harm. For more information go to [www.P65Warnings.ca.gov](http://www.P65Warnings.ca.gov)

# PTO

## 282 Series

- SAE 8-Bolt housing
- Integrated air valve – no remote valve (patent pending)
- Internal self-adjusting shaft brake (patent 7159701)
- Wet Spline option – extends PTO
- Smart Start option – reduces high inertia startup
- Two year warranty
- Used on Eaton UltraShift®



Model Number	Description	Model Number	Description
282XGAJX-P3RK	8-Bolt Direct Mount SAE B 7/8" - 13T	282XDAJX-A3RK	8-Bolt Direct Mount SAE B 7/8" - 13T
282XKAJX-A3RK	8-Bolt Direct Mount SAE B 7/8" - 13T	282GCAJX-A3BD	8-Bolt Shaft Brake - Rd Standard Shaft
282XMAJX-A3RK	8-Bolt Direct Mount SAE B 7/8" - 13T	282XBAJX-A3XD	8-Bolt Rd Standard Shaft 1-1/4" - 5/16" Key
282GBAJX-V3BD	8-Bolt Shaft Brake - Rd Standard Shaft	282XMAJX-V3RY	8-Bolt Pump Mount DIN 5462
282XGAJX-A3RK	8-Bolt Direct Mount SAE B 7/8" - 13T	282XDAJX-P3RK	8-Bolt Direct Mount SAE B 7/8" - 13T



## 282 SERIES POWER TAKE-OFF SPECIFICATIONS AND TECHNICAL DATA

<b>282</b>	<b>X</b>	<b>K</b>	<b>AJ</b>	<b>X</b>	<b>-</b>	<b>A</b>	<b>3</b>	<b>RK</b>
<b>Basic Model</b> 282								
<b>Mounting Option</b> <b>X</b> = Standard Mount <b>Z</b> = Deep Mount <b>G</b> = Metric Stud Kit <b>K</b> = Standard Mount w/o Stud Kit <b>E</b> = EATON Fuller Mount (Brazil)								
<b>Gear Ratio</b> <b>B</b> = 22/50 <b>C</b> = 25/47 <b>D</b> = 28/44 <b>G</b> = 31/41 <b>K</b> = 33/39 <b>M</b> = 35/37 <b>P</b> = 37/35 <b>S</b> = 39/33 <b>T</b> = 41/31								
<b>Input Gear Designator</b> Aisin, Allison, EATON Fuller, Mack <b>NOTE:</b> For more details, see Application Catalog (Transmission Model Number required)								
<b>Lube Option</b> <b>X</b> = No Pressure Lube <b>Pressure</b> <b>P</b> = Pressure Lube <sup>5</sup> <b>R</b> = Valve Cap Rotated 120° <sup>5</sup> <b>S</b> = Valve Cap Rotated 240° <b>Wet Spline</b> <sup>5</sup> <b>W</b> = Wet Spline <sup>5</sup> <b>V</b> = Valve Cap Rotated 120° w/ Wet Spline <sup>5</sup> <b>Y</b> = Valve Cap Rotated 240° w/ Wet Spline								
<b>Output Option</b> <b>Driveline Output</b> <b>XD</b> = Rd Standard Shaft (1-1/4" - 5/16" Key) <b>XV</b> = 1410 Series Companion Flange <b>BD</b> = Drag Brake - Rd Standard Shaft (1-1/4" - 5/16" Key) <b>BV</b> = Drag Brake - 1410 Series Companion Flange <sup>64</sup> <b>SD</b> = Smart Start - Rd Standard Shaft (1-1/4" - 5/16" Key) <b>SV</b> = Smart Start - 1410 Series Companion Flange <b>AB</b> = DIN 120 Flange <b>AC</b> = DIN 100 Flange <b>Pump Mount</b> <b>RE</b> = Rotatable SAE "A" 2-Bolt Flange, SAE "A" Shaft (5/8" - 9T) <sup>68</sup> <b>RB</b> = Rotatable SAE "B" 4-Bolt Flange, SAE "B" Shaft (7/8" - 13T) <sup>68</sup> <b>RK</b> = Rotatable SAE "B" 2 or 4-Bolt Flange, SAE "B" Shaft (7/8" - 13T) <sup>68</sup> <b>RF</b> = Rotatable SAE "B" 2 or 4-Bolt Flange, SAE "BB" Shaft (1" - 15T) <sup>68</sup> <b>RZ</b> = Rotatable SAE "B" 2 or 4-Bolt Flange, SAE "C" Shaft (1-1/4" - 14T) <sup>68</sup> <b>RS</b> = Rotatable SAE "C" 2 or 4-Bolt Flange, SAE "C" Shaft (1-1/4" - 14T) <sup>68</sup> <b>RY</b> = Rotatable ISO 7653 Flange, DIN 5462 Shaft <b>XR</b> = Chelsea Special (Cloverleaf), SAE "B" Shaft (7/8" - 13T)								
<b>Assembly Arrangement</b> <b>3</b> = Right side - bulge down, Left side - bulge up <b>5</b> = Left side - bulge down, Right side - bulge up								
<b>Shift Option</b> <b>Hydraulic</b> <b>B</b> = 12V Elec/Hyd - Integral <b>D</b> = 24V Elec/Hyd - Integral <b>E</b> = 12V Elec/Hyd w/o Installation Kit - Integral <b>N</b> = 24V Elec/Hyd w/o Installation Kit - Integral <b>K</b> = 12V Elec/Hyd w/ EOC <b>L</b> = 24V Elec/Hyd w/ EOC <b>G</b> = 12V Elec/Hyd Remote Valve w/o EOC <b>H</b> = 24V Elec/Hyd Remote Valve w/o EOC <b>Air</b> <b>A</b> = Manual Air Shift <b>V</b> = Manual Air Shift w/o Installation Kit <b>1</b> = 12V Elec/Air - Integral <b>2</b> = 24V Elec/Air - Integral <b>J</b> = 12V Elec/Air w/ EOC - Integral <b>3</b> = 24V Elec/Air w/ EOC - Integral <b>P</b> = 12V Elec/Air Remote <b>Q</b> = 24V Elec/Air Remote <b>R</b> = 12V Elec/Air Remote w/ EOC <b>4</b> = 24V Elec/Air Remote w/ EOC								

Specifications Chart	Approximate Weight: 49 lbs. [22 kg]								
	282*B	282*C	282*D	282*G	282*K	282*M	282*P	282*S	282*T
Intermittent & <b>Continuous</b> Torque Rating lbs-ft [Nm]	300 [407]	300 [407]	300 [407]	300 [407]	300 [407]	300 [407]	300 [407]	300 [407]	300 [407]
HP Rating for Intermittent & <b>Continuous</b> Service									
At 500 RPM of Output Shaft HP [Kw]	29 [21]	29 [21]	29 [21]	29 [21]	29 [21]	29 [21]	29 [21]	29 [21]	29 [21]
At 1000 RPM of Output Shaft HP [Kw]	57 [43]	57 [43]	57 [43]	57 [43]	57 [43]	57 [43]	57 [43]	57 [43]	57 [43]

**WARNING:** This product can expose you to chemicals including Lead and Lead Compounds, and Di(2-ethylhexyl)phthalate (DEHP) which are known to the State of California to cause cancer and birth defects or other reproductive harm. For more information go to [www.P65Warnings.ca.gov](http://www.P65Warnings.ca.gov)



# PTO

## 442/489 Series

- Easy to set backlash
- Slip fit idler pin for easy interchange from one transmission to another
- Economical workhorse features a cast iron housing



Model Number	Description	Model Number	Description
442XHAHX-A3XD	Air Shift 1-1/4" Round Key	442XLAHX-A3XK	Air Shift 7/8" - 13T Direct Mount
442XHAHX-A3XK	Air Shift 7/8" - 13T Direct Mount	442XRAHX-A3XD	Air Shift 1-1/4" Round Key
442XLAHX-A3XD	Air Shift 1-1/4" Round Key	442XRAHX-A3XK	Air Shift 7/8" - 13T Direct Mount

Model Number	Description	Model Number	Description
489XLAHX-A3XK	L Ratio, Air Shift, SAE B 2 or 4-Bolt Flange, 7/8"-13T Shaft	489XRAHX-A3XD	R Ratio, Air Shift, 1-1/4" - 5/16" key Driveshaft
489XFAHX-A3XK	F Ratio, Air Shift, SAE B 2 or 4-Bolt Flange, 7/8"-13T Shaft	489GLAHX-A3XK	Metric Stud, L Ratio, Air Shift, SAE B 2 or 4-Bolt Flange, 7/8"-13T Shaft
489XQAHX-A3XK	Q Ratio, Air Shift, SAE B 2 or 4-Bolt Flange, 7/8"-13T Shaft	489GSAHX-A3XD	Metric Stud, S Ratio, Air Shift, 1-1/4" - 5/16" key Driveshaft
489XHAHX-A3XK	X Ratio, Air Shift, SAE B 2 or 4-Bolt Flange, 7/8"-13T Shaft	489QHLZX-D3XK	H Ratio, 12V Elec/Air Shift Eaton Endurant, SAE B 2 or 4-Bolt Flange, 7/8"-13T Shaft
489XSAHX-A3XD	S Ratio, Air Shift, 1-1/4" - 5/16" key Driveshaft	489XQAHX-V3XQ	Q Ratio, Air Shift w/o Installation Kit, SAE B 2 or 4-Bolt Flange, 7/8"-13T Shaft
489XHAHX-V3XK	H Ratio, Air Shift w/o Installation Kit, SAE B 2 or 4-Bolt Flange, 7/8"-13T Shaft	489QFLZX-D3XK	F Ratio, 12V Elec/Air Shift Eaton Endurant, SAE B 2 or 4-Bolt Flange, 7/8"-13T Shaft
489XQAHX-V3XK	Q Ratio, Air Shift w/o Installation Kit, SAE B 2 or 4-Bolt Flange, 7/8"-13T Shaft	489XLAHX-A3RK	L Ratio, Air Shift, Rotatable SAE B 2 or 4-Bolt Flange, 7/8"-13T Shaft
489XLAHX-A5XK	L Ratio, Air Shift, SAE B 2 or 4-Bolt Flange, 7/8"-13T Shaft	489QCLZX-D3XD	C Ratio, 12V Elec/Air Shift Eaton Endurant, 1-1/4" - 5/16" key Driveshaft
489XFAHX-V5XK	F Ratio, Air Shift w/o Installation Kit, SAE B 2 or 4-Bolt Flange, 7/8"-13T Shaft	489XFAHX-V3RB	F Ratio, Air Shift w/o Installation Kit, Rotatable SAE B 4-Bolt Flange, 7/8"-13T Shaft
489XQAHX-A5XK	Q Ratio, Air Shift, SAE B 2 or 4-Bolt Flange, 7/8"-13T Shaft	489XQAHX-V3RK	Q Ratio, Air Shift w/o Installation Kit, Rotatable SAE B 2 or 4-Bolt Flange, 7/8"-13T Shaft





## 442/489 SERIES POWER TAKE-OFF SPECIFICATIONS AND TECHNICAL DATA

442

489

Basic Model

X

Q

A H

X

-

A

3

X D

Mounting Option

X = Standard Mount

K = Standard Mount w/o Stud Kit

G = Standard Mount w/ Metric Studs

Z = Deep Mount

Q = Eaton Procision™  
(442 Only)

L = Deep Mount w/o Stud Kit

Gear Ratio

A = 14/39

B = 14/39 (442 Only)

C = 17/37

F = 21/37

H = 23/35

L = 25/34

Q = 19/24

R = 22/24

S = 24/22

U = 26/20

W = 26/17

X = 38/21

Input Option

Eaton, Mack, Tremac, Allison, Chelsea, Mercedes, Rockwell Transmissions

NOTE: For more details, see Application Catalog  
(Transmission Model Number required)

Lube Option

X = No Pressure Lube

P = Pressure Lube

Shift Option

<sup>1</sup> A = Air Shift

V = Air Shift w/o Installation Kit

<sup>1</sup> P = 12V Elec/Air Shift

D = 24V Elec/Air Shift (489 Only)

<sup>21</sup> S = Air Shift w/ PTO/Dump Pump Combo  
Valve w/ Kick Out w/ Neutral Spring Return

<sup>21</sup> T = Air Shift w/ PTO/Dump Pump Combo  
Valve w/o Kick Out w/ Neutral Spring Return

<sup>21</sup> U = Air Shift w/ PTO/Dump Pump Combo  
Valve w/ Kick Out w/o Neutral Spring Return

<sup>1</sup> W = Wire Shift

X = Wire Shift w/o Cable & Knob

M = Constant Mesh

H = No Shift Assembly

C = Special Shift Control & Bracket Kit

D = Eaton Procision 12V Elec/Air

<sup>1</sup> E = Hydraulic Shift Eaton Procision (442 Only)

Q = 24V Elec/Air Shift (489 Only)

Output Option

Driveline Output

XD = Rd Standard Shaft (1-1/4" - 5/16" Key)

XX = 1-1/4" Tapered Output Shaft w/ Keyway

Pump Mount

XE = SAE A 2 or 4-Bolt Flange, SAE A Shaft (5/8" - 9T)

AK = SAE B 2-Bolt Flange, SAE B Shaft (7/8" - 13T)

SQ = SAE B 4-Bolt Flange, SAE B Shaft (7/8" - 13T)

XK = SAE B 2 or 4-Bolt Flange, SAE B Shaft (7/8" - 13T)

<sup>59</sup> XQ = SAE B 2 or 4-Bolt Flange, SAE B Shaft (7/8" - 13T)

AF = SAE B 2 or 4-Bolt Flange, SAE BB Shaft (1" - 15T)

AZ = SAE B 2 or 4-Bolt Flange, SAE C Shaft (1-1/4" - 14T)

GA = Greaseable SAE B 2-Bolt Rotatable Flange,  
SAE B Shaft (7/8" - 13T)

GB = Greaseable SAE B 4-Bolt Rotatable Flange,  
SAE B Shaft (7/8" - 13T)

GK = Greaseable SAE B 2 or 4-Bolt Flange,  
SAE B Shaft (7/8" - 13T)

<sup>59</sup> GQ = Greaseable SAE B 2 or 4-Bolt Flange,  
SAE B Shaft (7/8" - 13T)

GF = Greaseable SAE B 2 or 4-Bolt Flange,  
SAE BB Shaft (1" - 15T)

GR = Greaseable Chelsea Special (Cloverleaf),  
SAE B Shaft (7/8" - 13T)

RC = Rotatable SAE A 2-Bolt Flange,  
SAE A Shaft (5/8" - 9T)

RD = Rotatable SAE A 2-Bolt Flange,  
SAE B Shaft (7/8" - 13T)

RA = Rotatable SAE B 2-Bolt Flange,  
SAE B Shaft (7/8" - 13T)

RB = Rotatable SAE B 4-Bolt Flange,  
SAE B Shaft (7/8" - 13T)

RF = Rotatable SAE B 2-Bolt Flange,  
SAE BB Shaft (1" - 15T)

RK = Rotatable SAE B 2 or 4-Bolt Flange,  
SAE B Shaft (7/8" - 13T)

RJ = Rotatable SAE B 4-Bolt Flange,  
SAE BB Shaft (1" - 15T) (489 Only)

RE = Rotatable SAE B 4-Bolt Flange,  
SAE BB Shaft (1" - 15T)

RY = Rotatable ISO 7653 Pump Mount DIN 5462 Shaft

XR = Chelsea Special (Cloverleaf), SAE B Shaft (7/8" - 13T)

XY = ISO 7653 Pump Mount DIN 5462 Shaft

Assembly Arrangement

3, 4, 5, 6

<sup>1</sup> Includes mounting parts

<sup>21</sup> Includes installation kit, console sold separately

<sup>59</sup> Same as XK except rotated 90°

Specifications Chart	Approximate Weight: 30 lbs. [13.6 kg]											
	442*A 489*A	442*B	442*C 489*C	442*F 489*F	442*H 489*H	442*L 489*L	442*Q 489*Q	442*R 489*R	442*S 489*S	442*U 489*U	442*W 489*W	442*X 489*X
Torque Rating (lbs-ft) [Nm]	250 [339]	250 [339]	250 [339]	250 [339]	250 [339]	250 [339]	225 [305]	225 [305]	200 [271]	195 [264]	175 [237]	140 [190]
HP Rating for Duty												
At 500 RPM of Output Shaft (HP) [Kw]	24 [18]	24 [18]	24 [18]	24 [18]	24 [18]	24 [18]	21 [16]	21 [16]	19 [14]	19 [14]	17 [12]	13 [10]
At 1000 RPM of Output Shaft (HP) [Kw]	48 [36]	48 [36]	48 [36]	48 [36]	48 [36]	48 [36]	43 [32]	43 [32]	38 [28]	37 [28]	33 [25]	27 [20]

# PTO

## 524 Series

- Continuous torque rating of 260 lbs-ft [350 Nm]
- Rear mount design requires less mounting space and simplifies installation
- No gear backlash to set, simplifying installation
- Used with Volvo I-Shift and Mack mDrive transmissions
- Daimler Detroit™ DT12™



Model Number	Description	Model Number	Description
524XTASW-V-XK	2/4-Bolt I-Shift Mack mDrive 7/8" - 13T	524XTASW-V-XY	I-Shift Mack mDrive 1-3/8" - 8T DIN
524XVASW-V-XK	2/4-Bolt I-Shift Mack mDrive 7/8" - 13T	524XVASW-V-XY	I-Shift Mack mDrive 1-3/8" - 8T DIN
524XTASX-V-XK	2/4-Bolt I-Shift Mack mDrive 7/8" - 13T	524XTASX-V-XY	I-Shift Mack mDrive 1-3/8" - 8T DIN
524XVASX-V-XK	2/4-Bolt I-Shift Mack mDrive 7/8" - 13T	524XVASX-V-XY	I-Shift Mack mDrive 1-3/8" - 8T DIN



# 524 SERIES POWER TAKE-OFF SPECIFICATIONS AND TECHNICAL DATA

**Basic Model**  
524

**Mounting Option**  
X = ISO 7653 80mm x 80mm Mount

**Gear Ratio**  
<sup>77</sup>M = 1:1.00  
<sup>77</sup>T = 1:1.33  
<sup>77</sup>U = 1:1.44  
V = 1:1.80

**Input Option**  
AC = ZF-AS Tronic Meritor Freedomline™  
AH = ZF S6-65/66/70/75/80/90, 6S-800  
6S-1000, 6S-1200  
AQ = ZF 9S-1110TO / TD  
AS = Volvo I-Shift and Mack mDrive  
DA = Daimler DT12™ (-OA and -DA)  
DB = Daimler DT12™ (-OB and -DB)  
DD = Daimler DT12™ (-OC, -DC and -OD)  
LZ = Eaton Endurant™

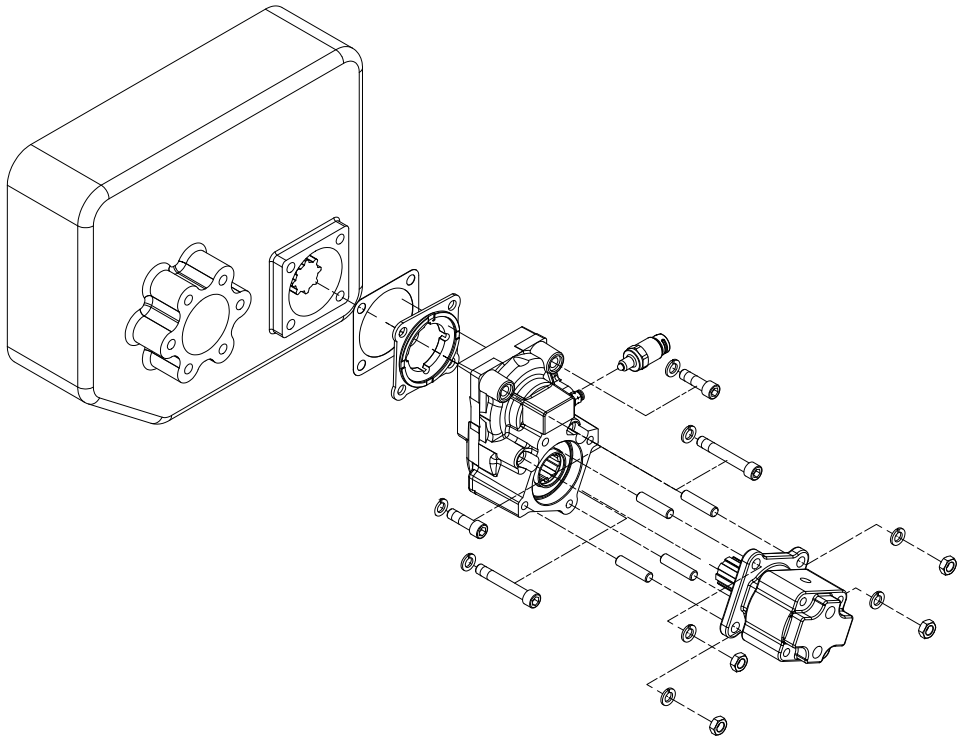
**NOTE:** For more details, see Application Catalog  
(Transmission Model Number required)

**Output Option**  
XK = SAE B 2 or 4-Bolt Flange,  
SAE B Shaft (7/8" - 13T)  
XV = 1410 Series Companion Flange  
XY = ISO 7653 Pump Mount  
DIN 5462 Shaft (8x32x36)

**Shift Option**  
A = Air  
D = Eaton Endurant™  
V = Volvo I-Shift & Mack mDrive Kit  
P = 12V Elec/Air Shift  
Q = 24V Elec/Air Shift  
F = 12V Elec/Air ZF-As Tronic Meritor Freedomline™  
H = No Shift Kit (Indicator/Connector Included)

**Lube Option**  
X = Dry Spline

<sup>77</sup> Ships with sculpted housing for DT12 applications (DA and DB Input Kits)



Specifications Chart	Approximate Weight: 22.3 lbs. [10.1 kg]			
	524*M	524*T	524*U	524*V
Intermittent & Continuous Torque Rating (lbs-ft) [Nm]	300 [407]	300 [407]	295 [400]	258 [350]
HP Rating for Intermittent & Continuous Duty				
At 500 RPM of Output Shaft (HP) [Kw]	29 [22]	29 [22]	28 [21]	25 [19]
At 1000 RPM of Output Shaft (HP) [Kw]	57 [43]	57 [43]	56 [42]	49 [37]



## PTO

### 823 Series

- Intermittent torque rating of 750 lbs-ft
- Six popular pump mount options
- Four shift options available
- Available in Wet Spline and greasable shaft
- High speed for pneumatic blower applications



Model Number	Description
823XJAKP-A6XS	8-Bolt Manual Air Shift, 2/4-Bolt SAE C 1-1/4" - 14T

Model Number	Description
823XJAHF-A3XS	8-Bolt Manual Air Shift, 2/4-Bolt SAE C 1-1/4" - 14T





# 823 SERIES POWER TAKE-OFF SPECIFICATIONS AND TECHNICAL DATA

**Basic Model**  
823

**Mounting Option**  
**G** = Standard Mount w/ Metric Studs  
**X** = Standard Mount  
**D** = Daimler DT12 w/ Adapter

**Gear Ratio**  
**B** = 18/32  
**D** = 20/30  
**G** = 21/29  
**J** = 23/27  
**M** = 25/25  
**R** = 29/21  
**T** = 32/18

**Input Option**  
Eaton, Mack, Chelsea 912, Daimler Transmissions  
**NOTE:** For more details, see Application Catalog  
(Transmission Model Number required)

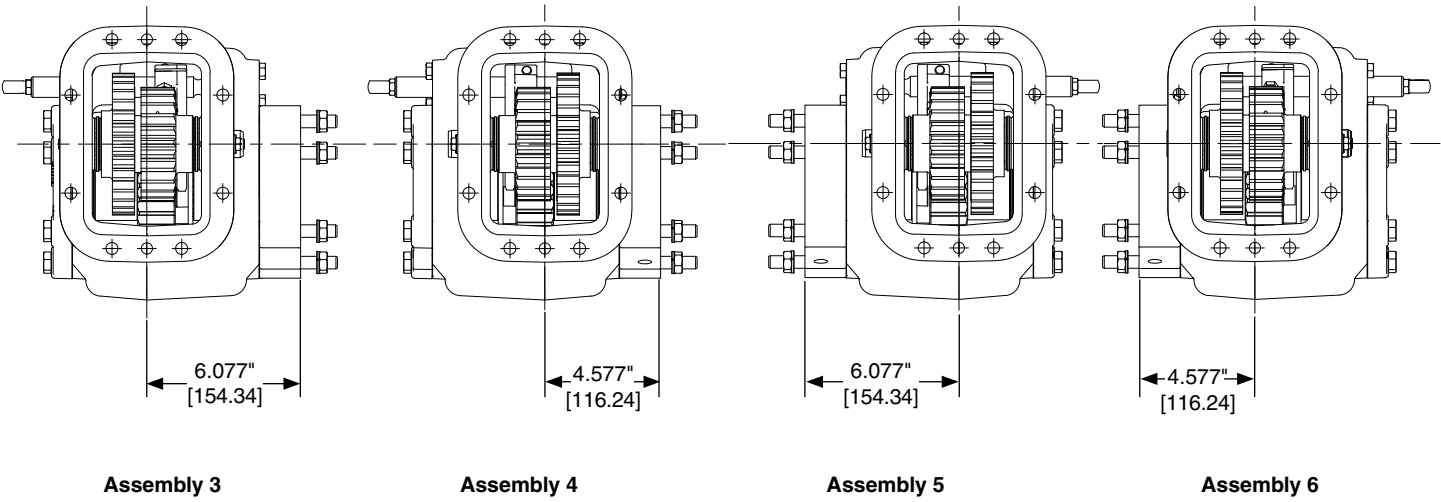
**Lube Option**  
**Pressure**  
**X** = No Pressure Lube  
**P** = Pressure Lube  
**Wet Spline**  
**W** = Wet Spline

**Output Option**  
**Driveline Output**  
**AB** = DIN 120  
**AC** = DIN 100  
**XV** = 1410 Series Companion Flange  
**Pump Mount**  
<sup>47</sup> **XS** = SAE C 4-Bolt Flange,  
SAE C Shaft (1-1/4" - 14T)  
<sup>47</sup> **XU** = SAE C 2-Bolt Flange,  
SAE C Shaft (1-1/4" - 14T)  
**GS** = Greaseable SAE C 2 or 4-Bolt Flange,  
SAE C Shaft (1-1/4" - 14T)  
**GU** = Greaseable SAE C 2-Bolt Flange  
SAE C Shaft (1-1/4" - 14T)

**Assembly Arrangement**  
3, 4, 5, 6

**Shift Option**  
<sup>1</sup> **A** = Air Shift  
**M** = Constant Mesh  
**V** = Air Shift w/o Installation Kit  
**Y** = Lever Shift

<sup>1</sup> Includes mounting parts.  
<sup>47</sup> Available with Wet Spline



Specifications Chart	Approximate Weight: 76 lbs. [34.5 kg]						
	823*B	823*D	823*G	823*J	823*M	823*R	823*T
Intermittent Torque Rating (lbs-ft) [Nm]	750 [1017]	750 [1017]	750 [1017]	750 [1017]	750 [1017]	550 [746]	500 [678]
HP Rating for Intermittent Service							
At 500 RPM of Output Shaft (HP) [Kw]	71 [53]	71 [53]	71 [53]	71 [53]	71 [53]	52 [39]	47 [35]
At 1000 RPM of Output Shaft (HP) [Kw]	143 [107]	143 [107]	143 [107]	143 [107]	143 [107]	104 [78]	95 [71]

**WARNING:** This product can expose you to chemicals including Lead and Lead Compounds, and Di(2-ethylhexyl)phthalate (DEHP) which are known to the State of California to cause cancer and birth defects or other reproductive harm. For more information go to [www.P65Warnings.ca.gov](http://www.P65Warnings.ca.gov)

## PTO

### 870 Series

- Compact housing height reduces clearance issues.
- Quiet Gear™ input option available.
- Smart Start option available to reduce shock load at start-up for certain applications.
- Wet Spline pump flange extends PTO and pump shaft life
- For constant mesh option use 877XL Series PTO



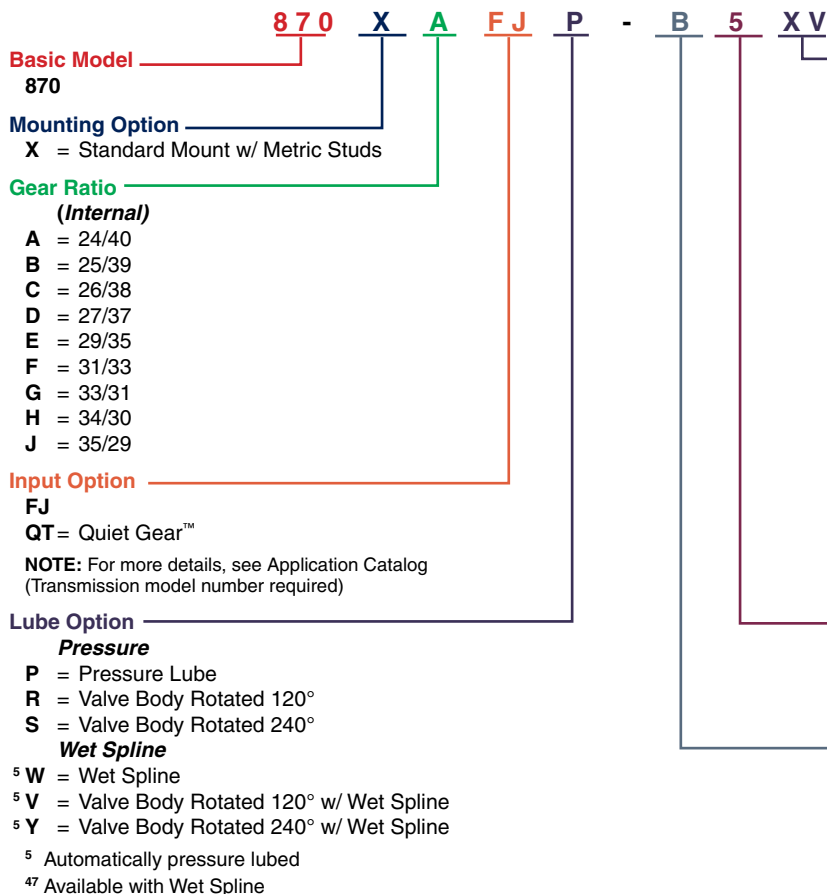
Model Number	Description
870XDFJP-B5XV	D Ratio, Elec/Hyd Shift, 1410 Series Companion Flange
870XAFJP-B5AB	A Ratio, Elec/Hyd Shift, DIN 120 Flange
870XAFJP-B5RS	A Ratio, Elec/Hyd Shift, SAE C 2- or 4-Bolt Flange, 1-1/4"-14T Shaft
870XGFJP-B5SV	G Ratio, Elec/Hyd Shift, Smart Start - 1410 Series Companion Flange
870XAFJP-G5XV	A Ratio, Remote Elec/Hyd Shift, 1410 Series Companion Flange
870XFFJP-B3XV	F Ratio, Elec/Hyd Shift, 1410 Series Companion Flange

Model Number	Description
870XDFJP-B5SV	D Ratio, Elec/Hyd Shift, Smart Start - 1410 Series Companion Flange
870XEFJP-G5RY	E Ratio, Remote Elec/Hyd Shift, ISO 7653 Pump Mount, DIN 5462 Shaft
870XAFJP-B5AC	A Ratio, Elec/Hyd Shift, DIN 100 Flange
870XEQTW-B3RS	E Ratio, Quiet Gear Input, Wet Spline, Elec/Hyd Shift, SAE C 2- or 4-Bolt Flange, 1-1/4"-14T Shaft



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## 870 SERIES POWER TAKE-OFF SPECIFICATIONS AND TECHNICAL DATA

**Output Option****Driveline Output**

- AB** = DIN 120 Flange  
**AC** = DIN 100 Flange  
**BB** = Shaft Brake - DIN 120 Flange  
**BC** = Shaft Brake - DIN 100 Flange  
**BV** = Shaft Brake - 1410 Series Companion Flange  
**SB** = Smart Start - DIN 120 Flange  
**SC** = Smart Start - DIN 100 Flange  
**SV** = Smart Start - 1410 Series Companion Flange  
**XV** = 1410 Series Companion Flange

**Pump Mount**

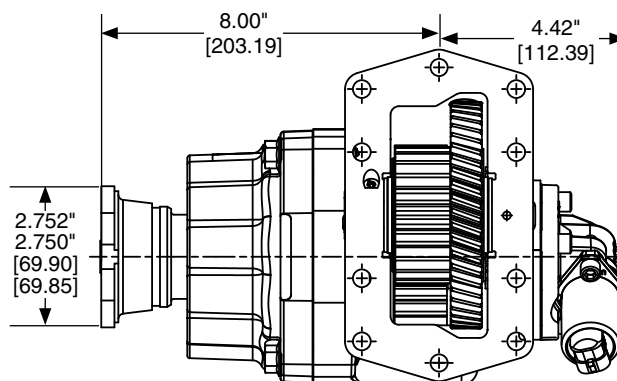
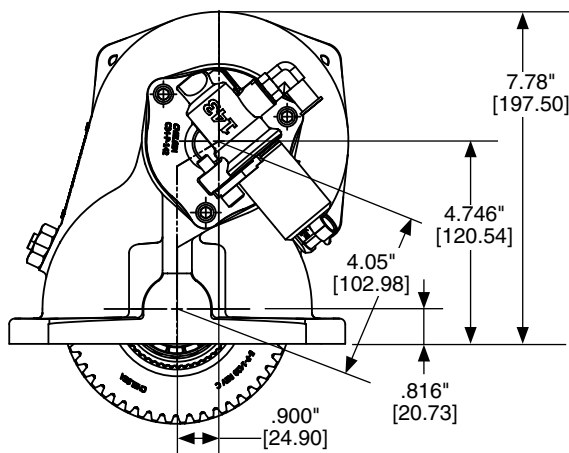
- <sup>47</sup> **RF** = Rotatable SAE B 2 or 4-Bolt Flange, SAE BB Shaft (1" - 15T)  
<sup>47</sup> **RK** = Rotatable SAE B 2 or 4-Bolt Flange, SAE B Shaft (7/8" - 13T)  
<sup>47</sup> **RZ** = Rotatable SAE B 2 or 4-Bolt Flange, SAE C Shaft (1-1/4" - 14T)  
<sup>47</sup> **RS** = Rotatable SAE C 2 or 4-Bolt Flange, SAE C Shaft (1-1/4" - 14T)  
<sup>47</sup> **RY** = Rotatable ISO 7653 Pump Mount DIN 5462 Shaft

**Assembly Arrangement**

- 3** = Right side - bulge down  
Left side - bulge up  
**5** = Left side - bulge down  
Right side - bulge up

**Shift Option**

- B** = 12V Elec/Hyd  
**D** = 24V Elec/Hyd  
**E** = 12V Elec/Hyd w/o Installation Kit  
**N** = 24V Elec/Hyd w/o Installation Kit  
**K** = 12V Elec/Hyd w/ EOC  
**L** = 24V Elec/Hyd w/ EOC  
**G** = 12V Elec/Hyd Valve w/o EOC - Remote  
**H** = 24V Elec/Hyd Valve w/o EOC - Remote

**Specifications Chart**

Approximate Weight: 56 lbs. [25 kg]

	870*A	870*B	870*C	870*D	870*E	870*F	870*G	870*H	870*J
Continuous Torque Rating (lbs-ft) [Nm]	670 [908]	630 [854]	590 [800]	550 [746]	485 [658]	430 [583]	380 [515]	355 [481]	335 [454]
HP Rating for Continuous Duty									
At 500 RPM of Output Shaft (HP) [Kw]	64 [48]	60 [45]	56 [42]	52 [39]	46 [35]	41 [31]	36 [27]	34 [25]	32 [24]
At 1000 RPM of Output Shaft (HP) [Kw]	128 [95]	120 [90]	112 [84]	105 [78]	92 [69]	82 [61]	72 [54]	68 [51]	64 [48]

**WARNING:** This product can expose you to chemicals including Lead and Lead Compounds, and Di(2-ethylhexyl)phthalate (DEHP) which are known to the State of California to cause cancer and birth defects or other reproductive harm. For more information go to [www.P65Warnings.ca.gov](http://www.P65Warnings.ca.gov)



# PTO

## 880 Series

- Intermittent torque rating of 500 lbs-ft
- Speed ratios for high and low speed applications
- High speed for pneumatic blower applications



Model Number	Description
880XBAKP-M6XS	8-Bolt Manual Constant Mesh, SAE C 1-1/4" - 14T

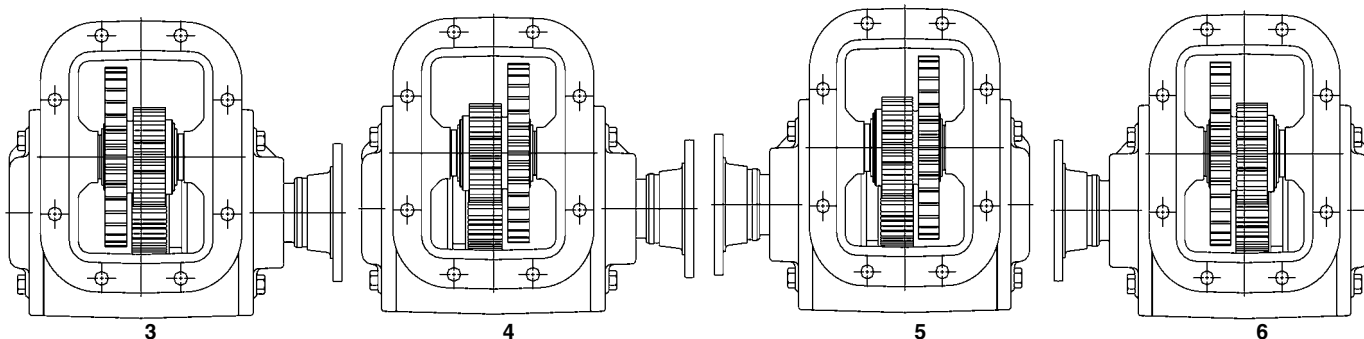
Model Number	Description
880XMAHX-A3GS	8-Bolt Manual Air Shift Greaseable, 2/4-Bolt SAE C 1-1/4" - 14T



## 880 SERIES POWER TAKE-OFF SPECIFICATIONS AND TECHNICAL DATA

<b>Basic Model</b> 880	<b>880</b>	<b>X</b>	<b>B</b>	<b>AH</b>	<b>X</b>	<b>-</b>	<b>Y</b>	<b>3</b>	<b>XV</b>	<b>Output Option</b> <b>Driveline Output</b> <b>Pump Mount</b> <b>XV</b> = 1410 Series Companion Flange <b>XK</b> = SAE B 2 or 4-Bolt Flange, SAE B Shaft (7/8" - 13T) <b>AF</b> = SAE B 2 or 4-Bolt Flange, SAE BB Shaft (1" - 15T) <b>AZ</b> = SAE B 2 or 4-Bolt Flange, SAE C Shaft (1-1/4" - 14T) <b>XS</b> = SAE C 2 or 4-Bolt Flange, SAE C Shaft (1-1/4" - 14T) <b>XY</b> = ISO 7653 Pump Mount DIN 5462 Shaft <b>GS</b> = Greasable SAE C 2 or 4-Bolt Flange, SAE C Shaft (1-1/4" - 14T)
<b>Mounting Option</b> <b>G</b> = Standard Mount Metric Studs <b>K</b> = Standard Mount w/o Stud Kit <b>L</b> = Deep Mount w/o Stud Kit <b>Q</b> = Eaton Endurant™ <b>X</b> = Standard Mount <b>Z</b> = Deep Mount <b>D</b> = Daimler DT12 w/ Adapter										<b>Assembly Arrangement</b> 3, 4, 5, 6
<b>Gear Ratio</b> <b>B</b> = 18/32 <b>M</b> = 25/25 <b>D</b> = 20/30 <b>Q</b> = 27/23 <b>G</b> = 21/29 <b>R</b> = 29/21 <b>J</b> = 23/27 <b>T</b> = 32/18										<b>Shift Option</b> <b>A</b> = Air Shift <b>V</b> = Air Shift w/o Installation Kit <b>P</b> = 12V Elec/Air Shift <b>D</b> = 12V Elec/Air Shift - Eaton Endurant <b>M</b> = Constant Mesh <b>Y</b> = Lever Shift <b>H</b> = No Shift Assembly
<b>Input Option</b> Eaton, Tremac, Meritor, Chelsea, Daimler Transmissions See Current Price Book for Options <b>NOTE:</b> For more details, see Application Catalog (Transmission model number required)										
<b>Lube Option</b> <b>X</b> = No Pressure Lube <b>P</b> = Pressure Lube										

<sup>1</sup> Includes mounting parts



Specifications Chart	Approximate Weight: 63 lbs. [28.6 kg]							
	880*B	880*D	880*G	880*J	880*M	880*Q	880*R	880*T
Intermittent Torque Rating (lbs-ft) [Nm]	500 [678]	500 [678]	500 [678]	500 [678]	500 [678]	450 [610]	400 [542]	350 [475]
HP Rating for Intermittent Duty								
At 500 RPM of Output Shaft (HP) [Kw]	48 [36]	48 [36]	48 [36]	48 [36]	48 [36]	43 [32]	38 [28]	33 [25]
At 1000 RPM of Output Shaft (HP) [Kw]	95 [71]	95 [71]	95 [71]	95 [71]	95 [71]	86 [64]	76 [57]	67 [50]

**WARNING:** This product can expose you to chemicals including Lead and Lead Compounds, and Di(2-ethylhexyl)phthalate (DEHP) which are known to the State of California to cause cancer and birth defects or other reproductive harm. For more information go to [www.P65Warnings.ca.gov](http://www.P65Warnings.ca.gov)

## PTO

### 890 Series

- Power torque ratings of 670 lbs-ft
- Pump clearance – moves the PTO output flange to the rear of the transmission
- Multiple output ratios available
- Wet Spline standard
- For constant mesh option use 897 Series PTO



Model Number	Description	Model Number	Description
890LEFJW-B5XS	Left Side, Extended Shaft, SAE C Output Shaft and Flange	890REFJW-B3XS	Left Side, Extended Shaft, SAE C Output Shaft and Flange





## 890 SERIES POWER TAKE-OFF SPECIFICATIONS AND TECHNICAL DATA

890 H A FJ W - B 5 XS

**Basic Model**  
890**Mounting Option**

- X = Less Bracket & Hose Kit  
**3000 Family (Side/Side Openings)**  
 L = MD Left Side (5 Arr.)  
 N = MD Left Side w/ Cooler (3 Arr.)  
 M = MD Left Side w/ Retarder (5 Arr.)  
 R = MD Right Side w/ or w/o Cooler (5 Arr.)  
 Y = MD Right Rotated CW (5 Arr.)  
**3000 Family (Side/Top Openings)**  
 E = MD Left Side (5 Arr.)  
 F = MD Left Side w/ Retarder (5 Arr.)  
 T = MD Top Side w/ or w/o Cooler, w/o Retarder (5 Arr.)  
**4000 Family**  
 H = HD Left Side (5 Arr.)  
 C = HD Left Side w/ Cooler (3 Arr.)  
 P = HD Left Side w/ Retarder (5 Arr.)  
 J = HD Left Side w/ Retarder (3 Arr.)  
 U = HD Top Side (5 Arr.)  
 K = HD Top Side w/ Retarder (5 Arr.)

**Gear Ratio**

- A = 24/40      E = 29/35  
 B = 25/39      F = 31/33  
 C = 26/38      G = 33/31  
 D = 27/37      H = 34/30

**Input Option**

- FJ = Allison

**NOTE:** For more details, see Application Catalog (Transmission Model Number required)

**Lube Option****Wet Spline**

- <sup>37</sup> W = Wet Spline

<sup>33</sup> G & H ratio for Allison MD only

<sup>34</sup> DA output is not available for transmission with a retarder or cooler

<sup>35</sup> XS, XK, AF, AZ outputs only available with 5 ass'y arrangement

<sup>36</sup> CS, CK, CF, CZ outputs only available with 3 ass'y arrangement

<sup>37</sup> Automatically Pressure lubed with wet spline

<sup>61</sup> For HD requires Engineering Approval

**Output Option****3 Assembly Arrangement**

- AC = DIN 100 Flange  
 AB = DIN 120 Flange  
<sup>36</sup> CK = SAE B 2 or 4-Bolt Flange, SAE B Shaft (7/8" - 13T)  
<sup>36</sup> CF = SAE B 2 or 4-Bolt Flange, SAE BB Shaft (1" - 15T)  
<sup>36</sup> CZ = SAE B 2 or 4-Bolt Flange, SAE C Shaft (1-1/4" - 14T)  
<sup>36</sup> CS = SAE C 4-Bolt Flange, SAE C Shaft (1-1/4" - 14T)  
 ZS = SAE C 4-Bolt Flange, SAE C Shaft (1-1/4" - 14T) (Modified XS)  
 XV = 1410 Series Companion Flange  
 XY = ISO 7653 Pump Mounting DIN 5462 Shaft

**5 Assembly Arrangement**

- AC = DIN 100 Flange  
 AB = DIN 120 Flange  
<sup>35</sup> XK = SAE B 2 or 4-Bolt Flange, SAE B Shaft (7/8" - 13T)  
<sup>35</sup> AF = SAE B 2 or 4-Bolt Flange, SAE BB Shaft (1" - 15T)  
<sup>35</sup> AZ = SAE B 2 or 4-Bolt Flange, SAE C Shaft (1-1/4" - 14T)  
<sup>35</sup> XS = SAE C 2 or 4-Bolt Flange, SAE C Shaft (1-1/4" - 14T)  
 ZS = SAE C 4-Bolt Flange, SAE C Shaft (1-1/4" - 14T) (Modified XS)  
<sup>34</sup> DA = SAE D 4-Bolt Flange, SAE D Shaft (1-3/4" - 13T)  
 XV = 1410 Series Companion Flange  
 XY = ISO 7653 Pump Mounting DIN 5462 Shaft

**Assembly Arrangement**

- <sup>36</sup> 3 = Right side - bulge down  
 Left side - bulge up  
<sup>35</sup> 5 = Left side - bulge down  
 Right side - bulge up

**Shift Option**

- B = 12V Elec/Hyd  
 D = 24V Elec/Hyd  
 K = 12V Elec/Hyd w/ EOC  
 L = 24V Elec/Hyd w/ EOC  
 G = 12V Elec/Hyd w/o EOC - Remote Valve  
 H = 24V Elec/Hyd w/o EOC - Remote Valve

**Specifications Chart**

Approximate Weight: 97 lbs. [44 kg]

	890*A	890*B	890*C	890*D	890*E	890*F	890*G	890*H
Intermittent & Continuous Torque Rating (lbs-ft) [Nm]	670 [908]	630 [854]	590 [800]	550 [746]	485 [658]	430 [583]	379 [513]	356 [482]
HP Rating for Intermittent & Continuous Duty								
At 500 RPM of Output Shaft (HP) [Kw]	64 [48]	60 [45]	56 [42]	52 [39]	46 [35]	41 [31]	36 [27]	34 [25]
At 1000 RPM of Output Shaft (HP) [Kw]	128 [95]	120 [90]	112 [84]	105 [78]	92 [69]	82 [61]	72 [53]	68 [50]

**WARNING:** This product can expose you to chemicals including Lead and Lead Compounds, and Di(2-ethylhexyl)phthalate (DEHP) which are known to the State of California to cause cancer and birth defects or other reproductive harm. For more information go to [www.P65Warnings.ca.gov](http://www.P65Warnings.ca.gov)

# Dump Pumps

## C101/102 - G101/102 - SG102

- Maximum pressure to 2500 PSI
- Maximum speed 2400 RPM
- Relief value setting 2000 PSI
- Genuine commercial quality
- Shaft sizes
  - G102 Series 4S SAE B 7/8"-13T
  - G102 Series 4D DIN 1-3/8"-8T
  - SG102 Series SAE B 7/8"-13T
  - C101 - G101 Series 1" Round Keyed Shaft
  - C102 Series SAE B 7/8"-13T

**NOTE:** Looking for a Muncie or Permco interchange?  
Use our reference interchange tool at [crossref.parker.com](http://crossref.parker.com)



Allison Transmission shown

Part Number	Descriptions	Rotation	Gear	CID
3089310047	G101-1-2.0 (Remote Mount)	BI	2.0"	3.94
3089310416	G102-1-2.0-R-4S (Direct Mount)	CW	2.0"	3.94
3089310418	G102-1-2.0-L-4S (Direct Mount)	CCW	2.0"	3.94
3089310903	G102-1-2.0-R-4S-AS (Direct Mount w/ Air Shift Installed)	CW	2.0"	3.94
3089310905	G102-1-2.0-L-4S-AS (Direct Mount w/ Air Shift Installed)	CCW	2.0"	3.94
3089310913	G102-1-2.0-R-4D-AS (Direct Mount w/ Air Shift Installed, DIN 8 Tooth)	CW	2.0"	3.94
3149310226	C101D-2.5 (Remote Mount)	BI	2.5"	6.38
3149325227	C102D-2.5-1-AS (Direct Mount w/ Air Shift Installed)	CCW	2.5"	6.38
3149325229	C102D-2.5-1 (Direct Mount)	CCW	2.5"	6.38
3149325234	C102D-2.5 (Direct Mount)	CW	2.5"	6.38
3189111001	SG102-1-2.5R-4S (Direct Mount)	CW	2.5"	4.93
3189112001	SG102-1-2.5L-4S (Direct Mount)	CCW	2.5"	4.93
3189111002	SG102-1-2.5R-4S-AS (Direct Mount w/ Air Shift Installed)	CW	2.5"	4.93
3189112002	SG102-1-2.5L-4S-AS (Direct Mount w/ Air Shift Installed)	CCW	2.5"	4.93

## Accessories

Part Number	Descriptions
3089414016	ASK-16, (Air Shift Cylinder w/ Hoses and Fittings G Series)
3089414049	ASK-49, (Air Shift Cylinder w/o Hoses and Fittings G Series)
3149414006	ASK-6, (Air Shift Cylinder w/ Hoses and Fittings C Series)
3149414017	ASK-17, (Air Shift Cylinder w/o Hoses and Fittings C Series)
DBSP-3	Direct Mount Bracket C102
3140100005	Remote Mount Bracket C101
329972-1X	SG Pump Bracket for left side of the Allison 3000 Series transmission
329972-2X	SG Pump Bracket for left and top sides of the Allison 4000 Series transmission.

### P16 Pumps

- SAE B 2-Bolt Flange
- Maximum pressure up to 3000 PSI
- Maximum speed 3000 RPM
- SAE B 7/8"-13T Shaft
- Recommended for 210 Series PTO



Part Number	Model Number	Rotation	Port	Inlet	Outlet	CID
0120321	P16-85A-2N1	CCW	O-Ring	1-1/4"	1"	1.66
0120440	P16-100C-2N1	CW	O-Ring	1-1/4"	1"	1.96
0120446	P16-100A-2N1	CCW	O-Ring	1-1/4"	1"	1.96
0120748	P16-150A-2N1	CCW	O-Ring	1-1/4"	1"	2.93
0120749	P16-150C-2N1	CW	O-Ring	1-1/4"	1"	2.93
0120900	P16-180A-2N2	CCW	NPT	1"	3/4"	3.51
0121057	P16-200A-2N1	CCW	O-Ring	1-1/4"	1"	3.90
0121751	P16-150C-2N2	CW	NPT	1"	3/4"	2.93
0121750	P16-150A-2N2	CCW	NPT	1"	3/4"	2.93
0120606	P16-115C-2N2	CW	NPT	1"	3/4"	2.24
0120605	P16-115A-2N2	CCW	NPT	1"	3/4"	2.24
0120301	P16-85A-2N2	CCW	NPT	1"	3/4"	1.66
0120056	P16-200C-2N1	CW	O-Ring	1-1/4"	1"	3.90



# Gear Pumps

## PGP020 Pumps

- Bi-Rotational
- SAE B 2/4-Bolt Flange
- SAE B 7/8"-13T Shaft
- SAE BB 1"-15T Shaft
- All pumps are side and rear ported
- Pressure to 3000 PSI
- Speeds to 2400 RPM

**NOTE:** Looking for a Muncie or Permco interchange?  
Use our reference interchange tool at [crossref.parker.com](http://crossref.parker.com)



Part Number	Description	Shaft	Rotation	Port	Rear	Side	Gear	CID
3089110274	PGP020	7/8" - 13T	BI	O-Ring	1"	1"	1"	1.97
3089110271	PGP020	7/8" - 13T	BI	NPT	1"	1"	1"	1.97
3089110272	PGP020	7/8" - 13T	BI	NPT	1"	1"	1-1/4"	2.46
3089110278	PGP020	7/8" - 13T	BI	O-Ring	1"	1"	1-1/4"	2.46
3089110275	PGP020	7/8" - 13T	BI	O-Ring	1"	1-1/4"	1-1/2"	2.96
3089110264	PGP020	7/8" - 13T	BI	NPT	1"	1-1/4"	1-1/2"	2.96
3089110265	PGP020	7/8" - 13T	BI	NPT	1"	1-1/4"	1-3/4"	3.45
3089110276	PGP020	7/8" - 13T	BI	O-Ring	1"	1-1/4"	1-3/4"	3.45
3089110266	PGP020	7/8" - 13T	BI	NPT	1"	1-1/4"	2"	3.94
3089110277	PGP020	7/8" - 13T	BI	O-Ring	1"	1-1/4"	2"	3.94
3089110295	PGP020	1" - 15T	BI	NPT	1"	1-1/4"	2"	3.94
3089110296	PGP020	1" - 15T	BI	O-Ring	1"	1-1/4"	2"	3.94

## GP1 DIN Mount Pumps

- Bi-Rotational
- DIN 1-3/8"-8T Shaft
- All pumps are rear ported 1" o-ring boss
- Speeds to 2400 RPM
- Pressures to 250 bar or 3600 PSI



Part Number	Description	Shaft	Rotation	Port	Rear	Gear Size	Max Pressure	CID
3249110552	P330-24CC	1-3/8" - 8T DIN	BI	O-Ring	1"	3/4"	3500 psi	1.48
3249110553	P330-42CC	1-3/8" - 8T DIN	BI	O-Ring	1"	1-1/4"	3500 psi	2.46
3239110573	P350-63CC	1-3/8" - 8T DIN	BI	O-Ring	1"	1-1/2"	3500 psi	3.83
3239110574	P350-83CC	1-3/8" - 8T DIN	BI	O-Ring	1"	2"	3000 psi	5.10

## PGP051 Pumps

- SAE B 2 or 4-Bolt Flange
- SAE B 7/8"-13T or 1"-15T Shaft
- Pressure to 2500 PSI or 3000 PSI
- Speeds to 2400 RPM

**NOTE:** Looking for a Muncie or Permco interchange?  
Use our reference interchange tool at [crossref.parker.com](http://crossref.parker.com)



Part Number	Descriptions	Shaft	Rotation	Port	Rear	Side	Gear	CID
3139610664	PGP051 2/4B NPT SRP 17	7/8" - 13T	BI	NPT	1-1/2"	1-1/4"	1-3/4"	4.46
3139610769	PGP051 2/4B ODT SRP 17	7/8" - 13T	BI	O-Ring	1-1/4"	1-1/4"	1-3/4"	4.46
3139610727	PGP051 4B ODT SRP 20	7/8" - 13T	BI	O-Ring	1-1/4"	1-1/4"	2"	5.10
3139610663	PGP051 2/4B NPT SRP 20	7/8" - 13T	BI	NPT	1-1/2"	1-1/4"	2"	5.10
3139610768	PGP051 2/4B ODT SRP 20	7/8" - 13T	BI	O-Ring	1-1/4"	1-1/4"	2"	5.10
3139610659	PGP051 2/4B NPT SRP 22	7/8" - 13T	BI	NPT	1-1/2"	1-1/2"	2-1/4"	5.74
3139610767	PGP051 2/4B ODT SRP 22	7/8" - 13T	BI	O-Ring	1-1/4"	1-1/2"	2-1/4"	5.74
3139610442	PGP051 4B NPT RP 25	7/8" - 13T	BI	NPT	1-1/4"	Blank	2-1/2"	6.38
3139610367	PGP051 4B NPT SRP 25	7/8" - 13T	BI	NPT	1-1/4"	1-1/4"	2-1/2"	6.38
3139610450	PGP051 4B NPT SP 25	7/8" - 13T	BI	NPT	Blank	1-1/4"	2-1/2"	6.38
3139610526	PGP051 4B ODT SRP 25	7/8" - 13T	BI	O-Ring	1-1/4"	1-1/4"	2-1/2"	6.38
3139610527	PGP051 4B MIX SF-ODT 25	7/8" - 13T	CCW	Mixed	2" SF	1" ODT	2-1/2"	6.38
3139610658	PGP051 2/4B NPT SRP 25	7/8" - 13T	BI	NPT	1-1/2"	1-1/2"	2-1/2"	6.38
3139610800	PGP051 2/4B NPT SRP 25	1" - 15T	BI	NPT	1-1/4"	1-1/4"	2-1/2"	6.38
3139610766	PGP051 2/4B ODT SRP 25	7/8" - 13T	BI	O-Ring	1-1/4"	1-1/2"	2-1/2"	6.38
3139610801	PGP051 2/4B ODT SRP 25	1" - 15T	BI	O-Ring	1-1/4"	1-1/2"	2-1/2"	6.38

# Gear Pumps

## PGP051 Pumps (Cont.)

- SAE B 2/4-Bolt Flange
- 13T Shafts
- Pressure to 2500 PSI
- Speeds to 2400 RPM

**NOTE:** Looking for a Muncie or Permco interchange?  
Use our reference interchange tool at [crossref.parker.com](http://crossref.parker.com)



## PGP051 Pumps with Built in Relief

Part Number	Descriptions	Shaft	Rotation	Port	Rear	Side	Gear	CID
3139610678	PGP051 2/4B NPT SP 17	7/8" - 13T	CCW	NPT	RV	1-1/4"	1-3/4"	4.46
3139610699	PGP051 2/4B NPT SP 25	7/8" - 13T	CCW	NPT	RV	1-1/2"	2-1/2"	6.38



Actual Product Has Extended Studs

## PGP051 Pumps SAE "C" 4-Bolt Flanges or SAE "B" 4-Bolt Flanges

Part Number	Descriptions	Shaft	Rotation	Port	Rear	Side	Gear	CID
3139610529	PGP051 4B MIXSF ODT 25	1-1/4" - 14T	CCW	Mixed	2" SF	1" ODT	2-1/2"	6.38
3139610814	PGP051 4C ODT SRP 20	1-1/4" - 14T	BI	O-Ring	1-1/4"	1-1/4"	2"	5.10
3139610815	PGP051 4C ODT SRP 20	1-1/4" K	BI	O-Ring	1-1/4"	1-1/4"	2"	5.10
3139610816	PGP051 4C NPT SRP 20	1-1/4" - 14T	BI	NPT	1-1/4"	1-1/4"	2"	5.10
3139610817	PGP051 4C NPT SRP 20	1-1/4" K	BI	NPT	1-1/4"	1-1/4"	2"	5.10
3139610818	PGP051 4C ODT SRP 25	1-1/4" - 14T	BI	O-Ring	1-1/2"	1-1/2"	2-1/2"	6.38
3139610819	PGP051 4C ODT SRP 25	1-1/4" K	BI	O-Ring	1-1/2"	1-1/2"	2-1/2"	6.38
3139610820	PGP051 4C NPT SRP 25	1-1/4" - 14T	BI	NPT	1-1/2"	1-1/2"	2-1/2"	6.38
3139610821	PGP051 4C NPT SRP 25	1-1/4" K	BI	NPT	1-1/2"	1-1/2"	2-1/2"	6.38
3139710338	PGP051 4B ODT SRP 22	1-1/4" K	BI	O-Ring	1-1/2"	1-1/2"	2-1/4"	5.74
3139710339	PGP051 4B NPT SRP 22	1-1/4" K	BI	NPT	1-1/2"	1-1/2"	2-1/4"	5.74



## PGP130 Pumps

- SAE 2-Bolt A and B
- SAE Splined 9T, 11T, 13T and 7/8" Keyed
- Maximum speeds up to 3000 RPM
- Maximum pressure up to 4350 PSI
- For continuous pressure, reference pump catalog.



Part Number	Description	Rotation	Shaft/Mount	Port	Inlet	Outlet	CID
3259110057	PGP130A0320AC2H2NB1B1D6D5	CCW	11T SAE A 2B	O-Ring	SAE 16 ORB 1" ODT 1-5/16-12	SAE 12 ORB 3/4" ODT 1-1/16 -12	1.96
3259110058	PGP130A0070AC2H2NB1B1D4D3	CCW	11T SAE A 2B	O-Ring	SAE 10 ORB 5/8" ODT 7/8-14	SAE 8 ORB 1/2" ODT 3/4 -16	0.43
3259110059	PGP130A0130AC2H2NB1B1D6D4	CCW	11T - SAE A 2B	O-Ring	SAE 16 ORB 1" ODT 1-5/16-12	SAE 10 ORB 5/8" ODT 7/8-14	0.77
3259110067	PGP130A0380CD1H3NB1B1D7D6	CW	13T - SAE B 2B	O-Ring	SAE 20 ORB 1-1/4" ODT 1-5/8-12	SAE 16 ORB 1" ODT 1-5/16-12	2.32
3259110068	PGP130A0320CD1H3NB1B1D7D6	CW	13T - SAE B 2B	O-Ring	SAE 20 ORB 1-1/4" ODT 1-5/8-12	SAE 16 ORB 1" ODT 1-5/16-12	1.95
3259110069	PGP130A0230CD1H3NB1B1D6D5	CW	13T - SAE B 2B	O-Ring	SAE 16 ORB 1" ODT 1-5/16-12	SAE 12 ORB 3/4" ODT 1-1/16 -12	1.37

## Gear Pumps

### PGP350 Pumps

- SAE 2-Bolt or 4-Bolt, including ZF style
- SAE splined or keyed
- Maximum speed up to 3000 RPM
- Maximum pressure up to 3500 PSI



**NOTE:** Looking for a Muncie or Permco interchange?  
Use our reference interchange tool at [crossref.parker.com](http://crossref.parker.com)

### PGP350 Easy Fit Bushing Pumps

Part Number	Description	Rotation	Port	Inlet	Outlet	Gear	CID
3239110548	PGP350 DIN ODT RP 8T DIN 20	CCW	O-Ring	1-1/4"	1"	2"	5.10
3239110550	PGP350 DIN ODT RP 8T DIN 20	CW	O-Ring	1-1/4"	1"	2"	5.10
3239110522	PGP350 4B ODT RP CW 7/8" - 13T 20 W	CW	O-Ring	1-1/4"	1"	2"	5.10
3239110523	PGP350 4B ODT RP CCW 7/8" - 13T 20 W	CCW	O-Ring	1-1/4"	1"	2"	5.10
3239110549	PGP350 DIN ODT RP 8T DIN 25	CCW	O-Ring	1-1/4"	1"	2.5"	6.38
3239110551	PGP350 DIN ODT RP 8T DIN 25	CW	O-Ring	1-1/4"	1"	2.5"	6.38
3239110524	PGP350 4B ODT RP CW 7/8" - 13T 25 W	CW	O-Ring	1-1/4"	1"	2.5"	6.38
3239110525	PGP350 4B ODT RP CCW 7/8" - 13T 25 W	CCW	O-Ring	1-1/4"	1"	2.5"	6.38

### Accessories

Part Number	Description
3169414001	Commercial Dry Valve 2" Inlet
ER200	2" Inlet Port Size
ER150	1-1/2" Inlet Port Size
ER125	1-1/4" Inlet Port Size
93839-02	Bleed Valve

### Vane Pumps

- Fixed displacement vane
- Silent technology
- Wide range of displacements
- Wide number of shift options
- Double shaft seal option possible
- Shaft options  
(SAE - "B" / "BB" / "C")
- Available in three frame sizes



Part Number	Model Number	Shaft	GPM @1200 RPM
024-44117-0/01	T6CMB253R01C1	7/8" - 13T	25
024-51647-0/01	T6CMB313L01C1	7/8" - 13T	31
024-63027-0/01	T6CMB314R01C1	1" - 15T	31
024-44411-0	T6CCMB17B175R00D100	7/8" - 13T	18-18
024-45200-0	T6CCMB17B175L00D100	7/8" - 13T	18-18
054-47247-0	T6CCMWB31B25WL00D100	1-1/4" Keyed	31-25
024-94368-0	T7DSWB42XL00A1W1	1-1/4" Keyed	42

Additional parts are available, contact Customer Service.

# Piston Pumps

## F1 Pumps

- Compact housing
- High efficiencies at low RPM
- Multiple displacements
- Easy to change rotation
- Robust shafts
- Easy fitment
- Multiple suction fittings



### ISO Mount, DIN 5462 Shaft

Part Number	Model Number	Self Priming Speed	Displacement cm <sup>3</sup> /Rev	Rotation	GPM @ 1000 RPM	Max Pressure (Continuous)
3781024	F01-025-R	2,600	26	Right/CW	7	5,000
3781025	F01-025-L	2,600	26	Left/CCW	7	5,000
3781040	F01-041-R	2,400	41	Right/CW	11	5,000
3781041	F01-041-L	2,400	41	Left/CCW	11	5,000
3781050	F01-051-R	2,200	51	Right/CW	13	5,000
3781051	F01-051-L	2,200	51	Left/CCW	13	5,000
3781060	F01-061-R	2,200	60	Right/CW	16	5,000
3781061	F01-061-L	2,200	60	Left/CCW	16	5,000
3781080	F01-081-R	2,000	82	Right/CW	21	5,000
3781081	F01-081-L	2,000	82	Left/CCW	21	5,000
3781100	F01-101-R	1,800	103	Right/CW	27	5,000
3781101	F01-101-L	1,800	103	Left/CCW	27	5,000

### Standard SAE versions

Part Number	Model Number	Self Priming Speed	Displacement cm <sup>3</sup> /Rev	Rotation	GPM @ 1000 RPM	Max Pressure (Continuous)
3781424	F1-25-R	2,600	26	Right/CW	7	5,000
3781425	F1-25-L	2,600	26	Left/CCW	7	5,000
3781440	F1-41-R	2,400	41	Right/CW	11	5,000
3781441	F1-41-L	2,400	41	Left/CCW	11	5,000
3781450	F1-51-R	2,200	51	Right/CW	13	5,000
3781451	F1-51-L	2,200	51	Left/CCW	13	5,000
3781460	F1-61-R	2,200	60	Right/CW	16	5,000
3781461	F1-61-L	2,200	60	Left/CCW	16	5,000



## F1 Pumps (Cont.)

### F1-25 to -101, ISO

Frame Size F1-	25	41	51	61	81	101	Frame Size F1-	25	41	51	61	81	101
<b>Displacement</b> [cm <sup>3</sup> /rev]	25.6	40.9	51.1	59.5	81.6	102.9	<b>Shaft speed</b> [rpm]						
<b>Max flow</b> <sup>(1)</sup> [l/min]							short circuited pump (low press)	2700	2700	2700	2700	2300	2300
at 350 bar	67	98	112	131	163 <sup>(3)</sup>	185 <sup>(3)</sup>	max speed at 350 bar <sup>(2)</sup>	2600	2400	2200	2200	2000 <sup>(3)</sup>	1800 <sup>(3)</sup>
at 400 bar	56	86	97	113	143	160	at 400 bar <sup>(2)</sup>	2200	2100	1900	1900	1750	1550 <sup>(3)</sup>
<b>Max operating pressure</b> [bar]							<b>Torque</b> <sup>(1)</sup> [Nm]						
continuous	350	350	350	350	350	350	at 350 bar	142	227	284	331	453	572
intermittent	400	400	400	400	400	400	at 400 bar	163	260	324	378	518	653
							<b>Input power</b> [kW]						
							continuous	31	46	52	61	76	86
							intermittent <sup>(4)</sup>	39	57	66	76	95	108
							<b>Weight</b> [kg]	8.5	8.5	8.5	8.5	12.5	12.5

<sup>(1)</sup> Theoretical Values

<sup>(2)</sup> Valid at an inlet pressure of 1.0 bar (abs.) when operating on mineral oil at a viscosity of 30 mm<sup>2</sup>/s (cSt).

<sup>(3)</sup> Valid with 2-1/2" inlet (suction) line.

Valid with 2-1/2" inlet (suction) line.

With 2" suction line: F1-81 – max 1400 rpm (Q ≈ 120 l/min);

F1-101 – max 1000 rpm (Q ≈ l/min).

<sup>(4)</sup> Max 6 seconds in any one minute.

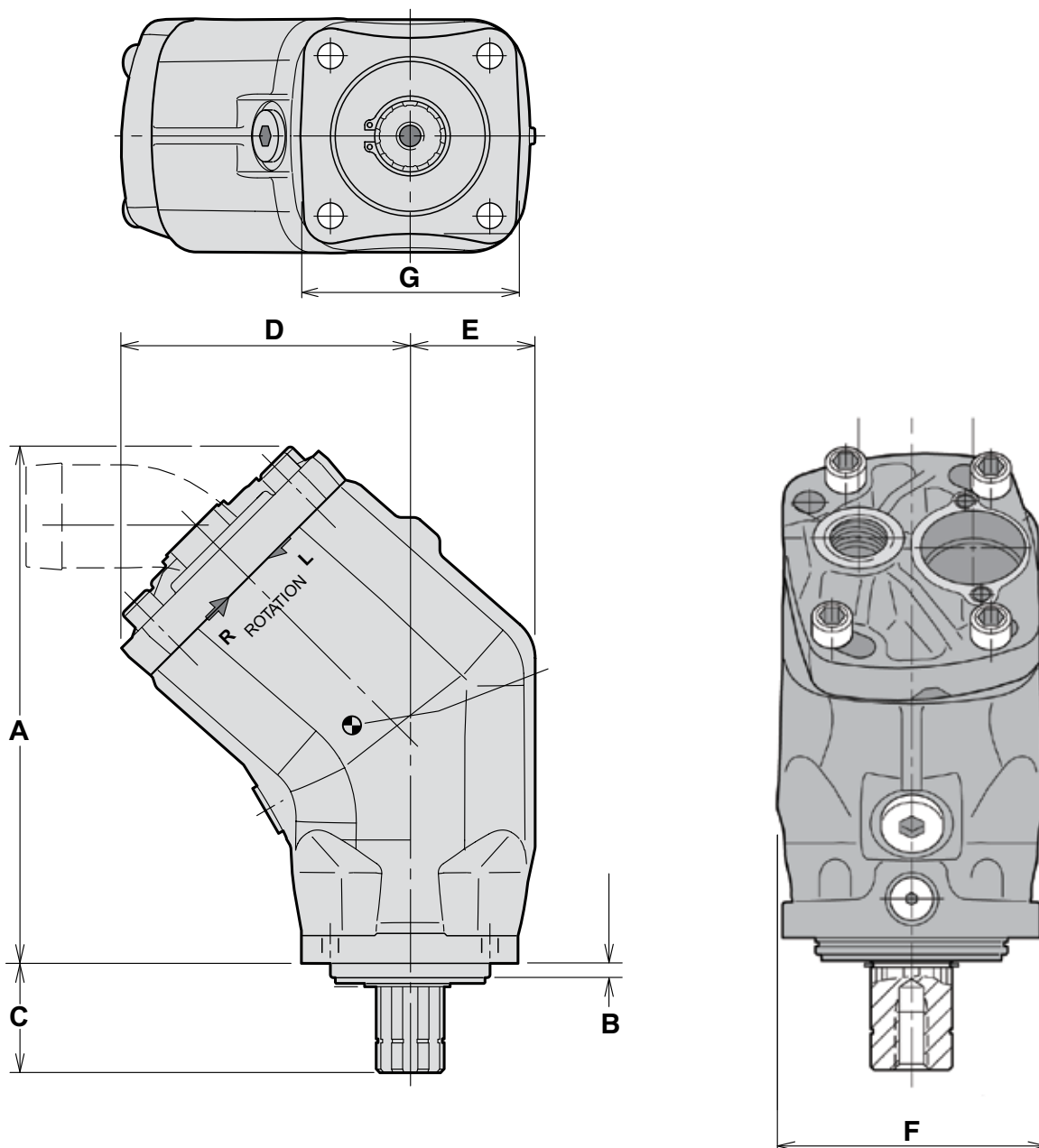
**NOTE:** For noise level information, contact Parker Hannifin.



**WARNING:** This product can expose you to chemicals including Lead, Nickel (metallic), or Titanium Dioxide which are known to the State of California to cause cancer, or Lead which is known to the State of California to cause birth defects and other reproductive harm. [www.p65warnings.ca.gov](http://www.p65warnings.ca.gov)

# Piston Pumps

## Installation Drawing



Dimensions, inch (mm)

Series	A	B	C	D	E	F	G
F1-25							
F1-41	8.07 (205)	0.27 (7)	2.17 (55)	5.10 (129.5)	2.22 (56.5)	4.25 (108)	4.29 (109)
F1-51							
F1-61							
F1-81	10.20 (259)	0.27 (7)	2.17 (55)	5.67 (144)	2.48 (63)	4.65 (118)	4.33 (110)
F1-101							

### Easy to Change Rotation For F1 Piston Pumps

Pumps in this program come standard with right hand rotation. Please note the completed arrow to indicate direction.



Take out 3 bolts and loosen the 4th but do not remove the final bolt. Firmly hold the end cap against the housing and remove the 4th bolt making certain the end cap does not lift allowing the center pin to come out of position.



Rotate Pump shaft end cover 180° and make sure the L arrow is complete. Install the bolts and torque to service specifications 66 Lbs. ft. of Torque or 90 Nm.



Arrow should now have a completed full arrow pointing to the left.



# Piston Pumps

## F2 Pumps

F2 fixed displacement piston pumps are widely used on truck applications with operating pressure up to 5000 PSI (350 BAR). These twin flow pumps provide two independent output flows with a single inlet in a compact package. These lightweight, efficient pumps were designed specifically for truck applications including cargo cranes, hook loaders, forest cranes and concrete mixer trucks.



Part Number	Description	Max. Displacement in <sup>3</sup> /rev (cc/rev)	Outlet Pressure PSI (Bar)	Drive Speed RPM	Max. Shaft Speed	Flow** @ 1800 RPM		Max. Input Power HP (KW)
						Port A GPM (LPM)	Port B GPM (LPM)	
3784042	F2 42/42 - R	2.62/2.50 (43/41)*	5000 (350)	1800 <sup>(1)(2)</sup>	2550 <sup>(3)</sup>	20.4 (77.2)	19.5 (73.8)	118 (88.0)
3784043	F2 42/42 - L	2.62/2.50 (43/41)*	5000 (350)	1800 <sup>(1)(2)</sup>	2550 <sup>(3)</sup>	20.4 (77.2)	19.5 (73.8)	118 (88.0)
3781453	F2 53/53 - R	3.30/3.17 (54/52)*	5000 (350)	1800 <sup>(1)(2)</sup>	2550 <sup>(3)</sup>	25.5 (96.5)	24.8 (93.9)	147 (110.0)
3781454	F2 53/53 - L	3.30/3.17 (54/52)*	5000 (350)	1800 <sup>(1)(2)</sup>	2550 <sup>(3)</sup>	25.5 (96.5)	24.8 (93.9)	147 (110.0)
3781470	F2 70/35 - R	4.27/2.13 (70/35)*	5000 (350)	1800 <sup>(1)(2)</sup>	2550 <sup>(3)</sup>	32.3 (122.3)	16.1 (61.1)	150 (110.0)
3781471	F2 70/35 - L	4.27/2.13 (70/35)*	5000 (350)	1800 <sup>(1)(2)</sup>	2550 <sup>(3)</sup>	32.3 (122.3)	16.1 (61.1)	150 (110.0)
3784070	F2 70/70 - R	4.27/4.27 (68/68)*	4350 (300)	1650 <sup>(1)(2)</sup>	2550 <sup>(3)</sup>	32.3 (122.3)	32.3 (122.3)	150 (112.0)
3784071	F2 70/70 - L	4.27/4.27 (68/68)*	4350 (300)	1650 <sup>(1)(2)</sup>	2550 <sup>(3)</sup>	32.3 (122.3)	32.3 (122.3)	150 (112.0)

\* Port A / Port B \*\* Port A and Port B

<sup>(1)</sup> Valid with 2-1/2" inlet (suction) line; with 2" inlet line: 53/53 and 70/35 max 1,100 rpm 42/42 and 55/28 max 1400 rpm. (q=120 l/min)

<sup>(2)</sup> Measured at 1.0 bar abs. inlet pressure. **Please Note:** A lower inlet pressure affects pump performance.

<sup>(3)</sup> Max. shaft speed is only available unloaded.

Additional Parts are Available

### Flow vs. Shaft Speed (theoretical)

Pump Speed [rpm]	800	1000	1200	1400	1600	1800	1900	2000	2100
<b>F2-53/53 flow [l/min]</b>									
Port A	43	54	65	76	86	97	-	-	-
Port B	42	52	62	73	83	94	99	104	109
Total (ports A + B)	85	106	127	149	169	191	-	-	-
<b>NOTE: 42/42 values is 80% of 53/53 values &amp; 70/70 values is 130% of 53/53 values</b>									
<b>F2-70/35 flow [l/min]</b>									
Port A	55	69	83	97	110	124	-	-	-
Port B	29	36	43	50	58	65	68	72	76
Total (ports A + B)	84	105	126	147	168	189	-	-	-
<b>NOTE: 55/28 values is 80% of 70/35 values</b>									

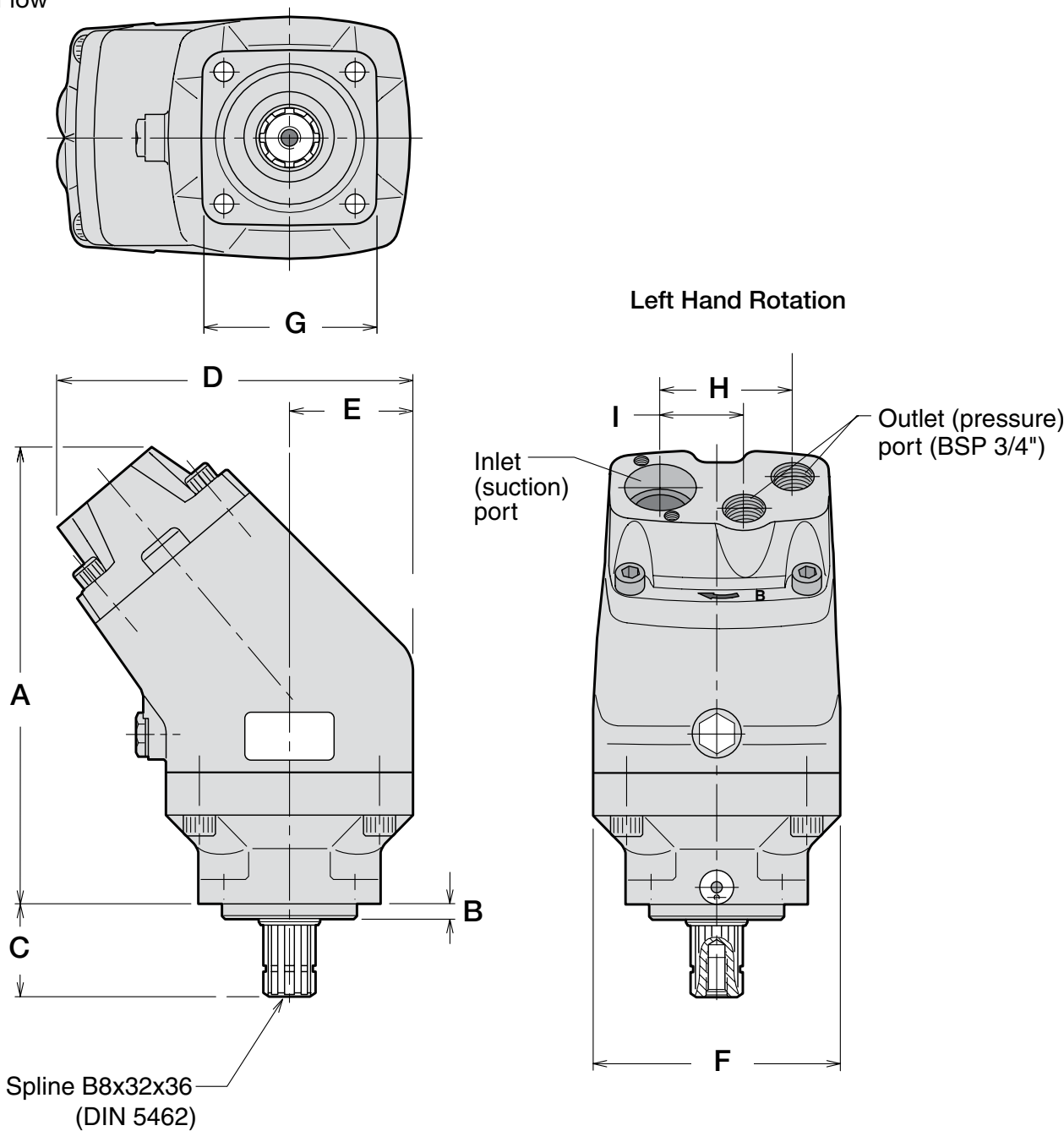
### Shaft Torque vs. Pressure (theoretical)

Pressure [bar]	150	200	250	300	350	Pressure [bar]	150	200	250	300	350
<b>F2-53/53 torque [Nm]</b>						<b>F2-70/35 torque [Nm]</b>					
Port A	129	171	214	257	300	Port A	164	219	274	329	383
Port B	124	165	206	248	289	Port B	86	114	143	171	200
Total (ports A + B)	253	336	420	505	589	Total (ports A + B)	250	333	417	500	583
<b>NOTE: 42/42 values is 80% of 53/53 values 70/70 values is 130% of 53/53 values</b>						<b>NOTE: 55/28 values is 80% of 70/35 values</b>					



F2 Pumps (Cont.)

- Twin Flow



Dimensions, inch (mm)

Series	A	B	C	D	E	F	G	H	I
F2	10.9 (277)	0.33 (8.5)	2.2 (55)	8.4 (213)	2.9 (74)	5.8 (148)	4.3 (109)	3.2 (81)	2.0 (51)

# Piston Pumps

## F3 Pumps

- Disengageable and engageable
- Air operated
- High selfpriming speeds
- Operating pressures up to 400 bar
- High overall efficiency
- Low noise level
- Small installation dimensions
- Low weight



Part Number	Model Number	Self Priming Speed	Displacement cm <sup>3</sup> /Rev	Rotation	GPM @ 1000 RPM	Max Pressure (Continuous)
<b>12V</b>						
3720383	F3-81-L	2,000	82	Left/CCW	21	5,000
3720382	F3-81-R	2,000	82	Right/CW	21	5,000
3720385	F3-101-L	1,800	103	Left/CCW	27	5,000
3720384	F3-101-R	1,800	103	Right/CW	27	5,000
<b>24V</b>						
3720092	F3-81-L	2,000	82	Left/CCW	21	5,000
3720091	F3-81-R	2,000	82	Right/CW	21	5,000
3720094	F3-101-L	1,800	103	Left/CCW	27	5,000
3720093	F3-101-R	1,800	103	Right/CW	27	5,000

## F3-81 and -101, ISO

Frame Size F3-	81	101	Frame Size F3-	81	101
<b>Displacement</b> [cm <sup>3</sup> /rev]	81.6	102.9	<b>Torque</b> <sup>(1)</sup> [Nm]		
<b>Max flow</b> <sup>(1)</sup> [l/min]			at 350 bar	453	572
at 350 bar	163 <sup>(3)</sup>	185 <sup>(3)</sup>	at 400 bar	518	653
at 400 bar	143	400	<b>Input power</b> [kW]		
<b>Max operating pressure</b> [bar]			continuous	76	85
continuous	350	350	intermittent <sup>(4)</sup>	95	123
intermittent	400	400	<b>Weight</b> [kg]	16.7	16.7
<b>Shaft speed</b> [rpm]					
short circuited pump (low press)	2300 <sup>(3)</sup>	2300 <sup>(3)</sup>			
max speed at 350 bar <sup>(2)</sup>	2000 <sup>(3)</sup>	1800 <sup>(3)</sup>			
at 400 bar <sup>(2)</sup>	1750	1550 <sup>(3)</sup>			

<sup>(1)</sup> Theoretical Values

<sup>(2)</sup> Valid at an inlet pressure of 1.0 bar (abs.) when operating on mineral oil at a viscosity of 30 mm<sup>2</sup>/s (cSt).

<sup>(3)</sup> Valid with 2-1/2" inlet (suction) line.

Valid with 2-1/2" inlet (suction) line.

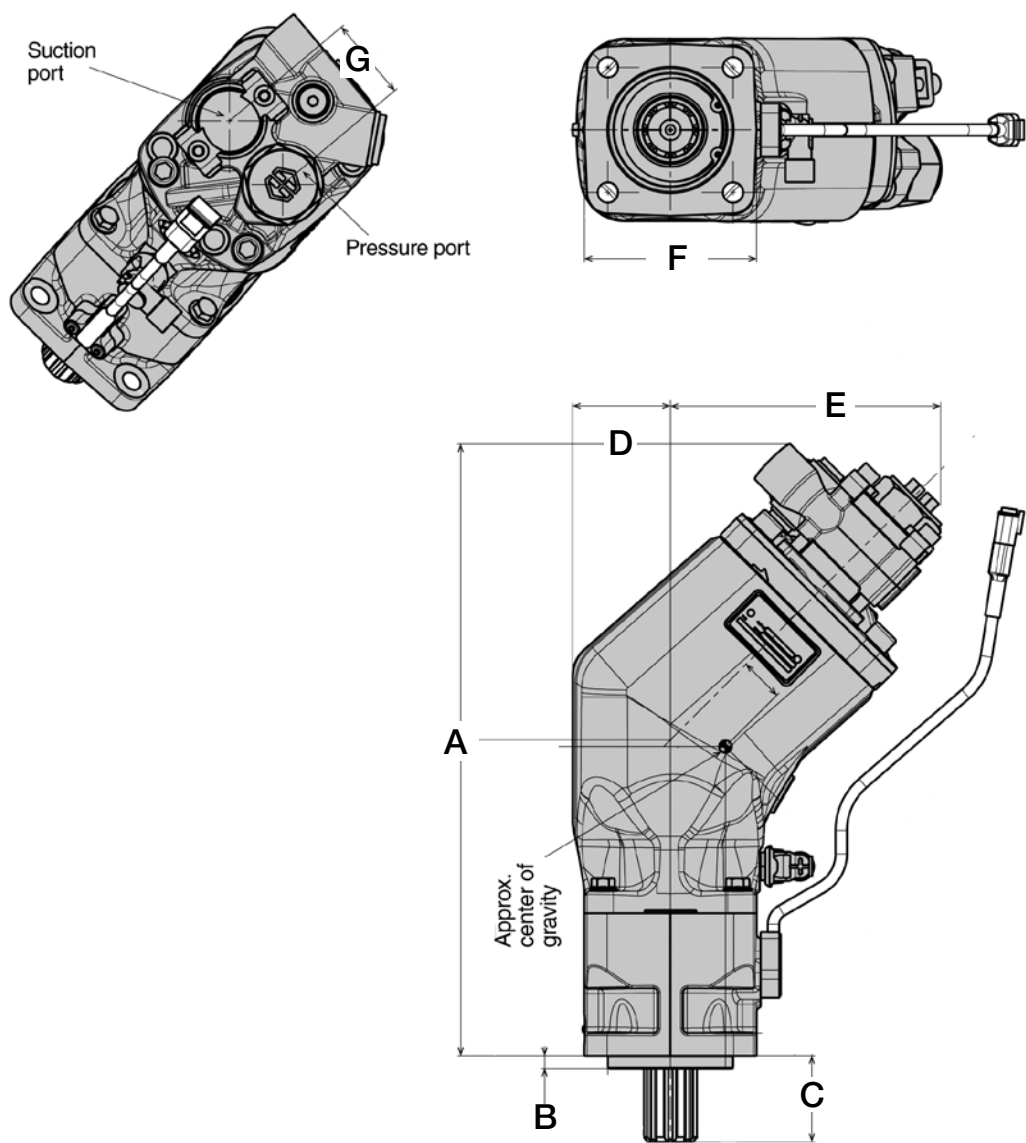
With 2" suction line: F1-81 – max 1400 rpm (Q ≈ 120 l/min);

F1-101 – max 1000 rpm (Q ≈ l/min).

<sup>(4)</sup> Max 6 seconds in any one minute.

**NOTE:** For noise level information, contact Parker Hannifin

F3 Pumps (Cont.)



Dimensions, inch (mm)

Series	A	B	C	D	E	F	G
F3	15.43 (392)	0.33 (8.5)	2.2 (55)	2.49 (63)	6.81 (173)	4.33 (110)	2.09 (53)

BPV-F3 Bypass Valve 12 or 24 VDC without manual override

Bypass Valve, type	BPV-F3
Max pressure, continuous	350 bar
Intermittent	400 bar
Solenoid voltage	12 or 24 VDC
Power requirement	14 W
Operating mode	Activated solenoid; Check valve closed

Accessories / Spare Parts

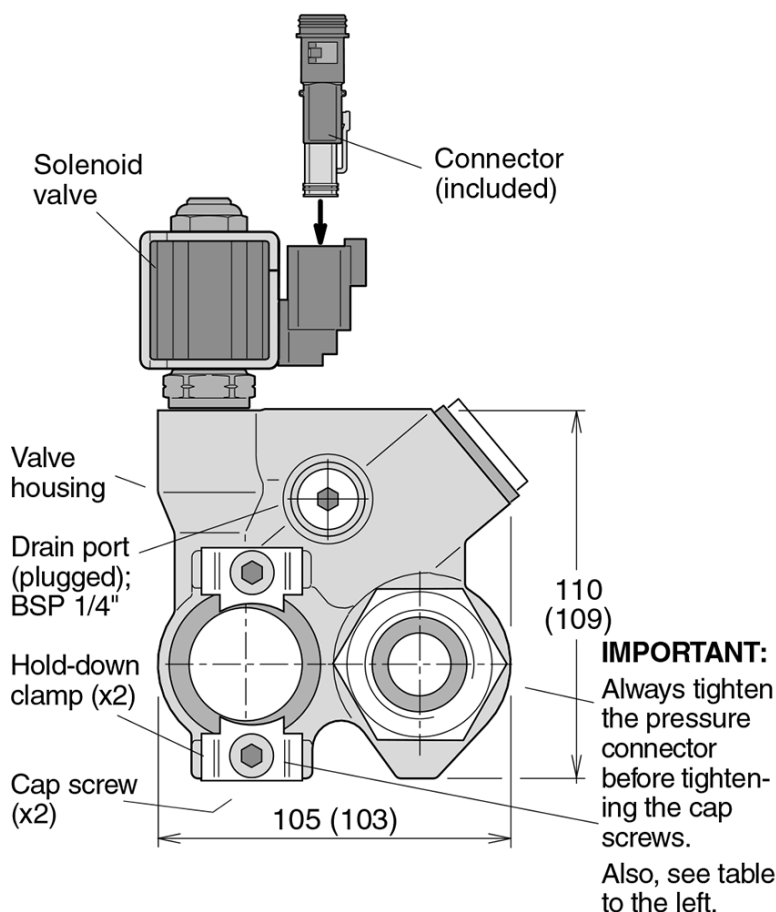
- As the BPV valve is symmetrical, it can be turned 180° to prevent interference with chassis components; it can be utilized for either left hand or right hand pumps.
- The valve function must only be activated or released (by means of the 24 VDC solenoid) at no load (below 20 bar) system pressure.

# Piston Pumps

## BPV-F1 and BPV-T1 Bypass Valve Without manual override

Bypass Valve, Type	BPV-F1-25 to -101 and BPV-T1-81 and -121	Bypass Valve Kits	Voltage	Ordering Number	For F1 an T1 Size	Torque <sup>1)</sup>
Max pressure, continuous	350 bar	BPV-F1-25	24 VDC	<b>378 8803</b>	F1-25	50 Nm
intermittent	400 bar	BPV-F1-41 BPV-F1-81	24 VDC 12 VDC	<b>378 7201</b> <b>378 7202</b>	F1-41, -51, -61 and T1-81	50 Nm
Solenoid voltage (option)	24 VDC, (12 VDC)	BPV-F1-81 BPV-F1-121	24 VDC 12 VDC	<b>378 7203</b> <b>378 7204</b>	F1-81, -101, and T1-121	100 Nm
Power requirement	17 W	Drain fitting kit F1-025		<b>378 1640</b>	Contains a drain line fitting a bonded seal and nozzle.	
Operating mode	Activated solenoid: Check valve closed	Drain fitting kit other F1, F2 and T1		<b>378 3039</b>	Contains a drain line fitting and a bonded seal.	

1) Torque pressure connector to:



**NOTE:** Dimensions are shown for BPV-F1-81  
(those for BPV-F1-25 are in parenthesis)

*BPV-F1 and -T1 installation and cross section without  
manual override*

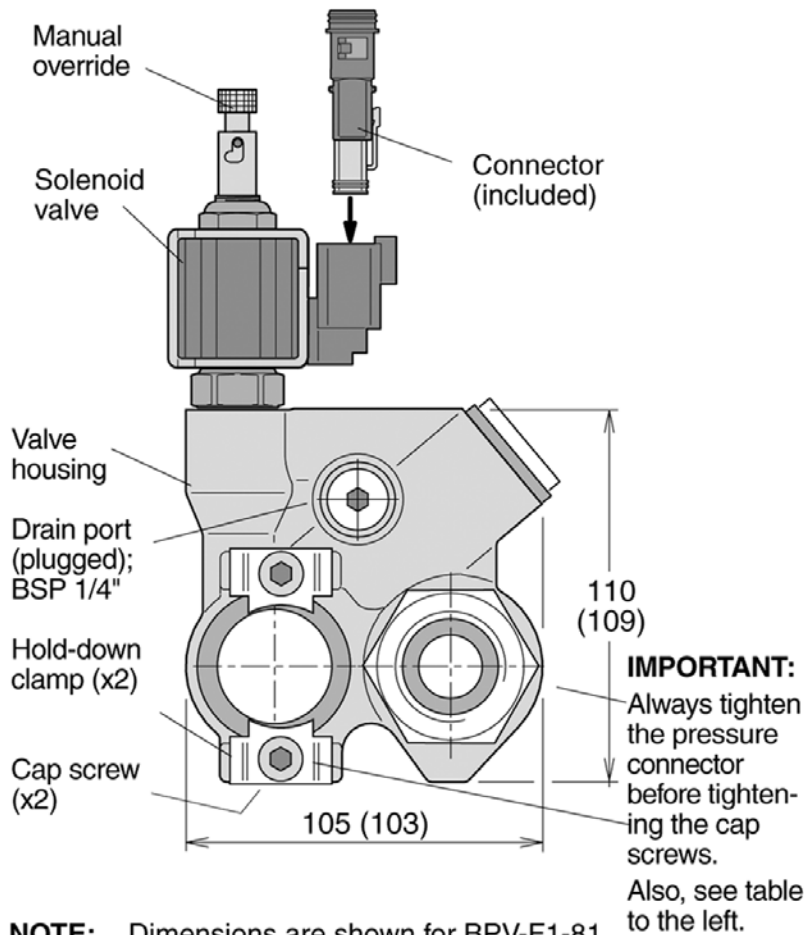


BPV-F1 Bypass Valve  
With manual override

Bypass Valve, Type	BPV-F1-25 and -81
Max pressure, continuous	350 bar
intermittent	400 bar
Solenoid voltage	24 VDC
Power requirement	17 W
Operating mode	Activated solenoid: Check valve closed

Bypass valve kits	Voltage	Ordering Number	For F1 an T1 sSize	Torque <sup>1)</sup>
BPV-F1-25	24 VDC	378 7461	F1-25, -41, -51 and -61	50 Nm
BPV-F1-81	24 VDC	378 7462	F1-81 and -101	100 Nm
Drain fitting kit F1-025		378 1640	Contains a drain line fitting a bonded seal and nozzle.	
Drain fitting kit other F1, F2		378 3039	Contains a drain line fitting and a bonded seal.	

1) Torque pressure connector to:



**NOTE:** Dimensions are shown for BPV-F1-81 (those for BPV-F1-25 are in parenthesis)

*BPV-F1 installation and cross section with manual override*

# Piston Pumps

## BPV-F2 Bypass Valve With manual override

Bypass Valve, Type	BPV-F2
Max pressure, continuous	350 bar
intermittent	400 bar
Solenoid voltage (option)	24 VDC
Power requirement	17 W (each solenoid)
Operating mode	Activated solenoid: Check valve closed

Bypass Valve Kits <sup>1)</sup>	Voltage	Ordering number	For F2 size	Torque <sup>3)</sup>
BPV-F2	24 VDC	<b>378 7463</b>	42/42, 53/53, 55/28, 70/35, 70/70	50 Nm

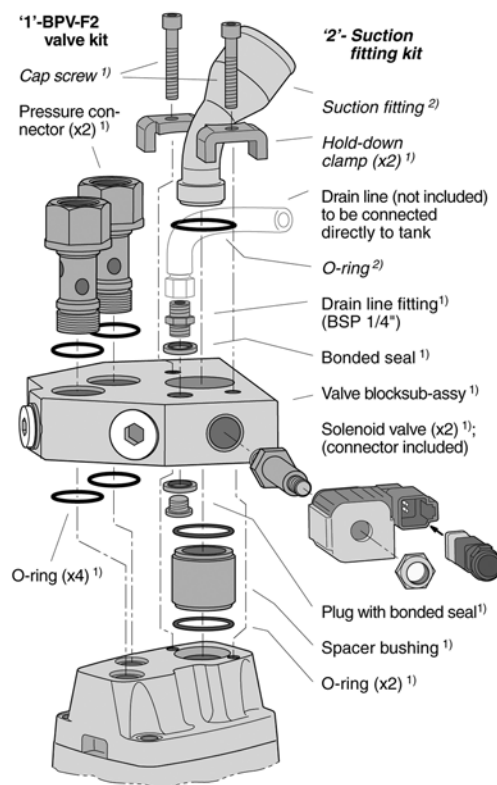
- 1) The BPV-F2 valve kit contains parts designated '1' in the split view to the right.
- 2) A suction fitting kit (parts designated '2' in the split view) is not included with the F2 pump; it must be ordered separately.
- 3) Torque pressure connector to:

## BPV-F2 Bypass Valve Without manual override

Bypass Valve, Type	BPV-F2
Max pressure, continuous	350 bar
intermittent	400 bar
Solenoid voltage (option)	24 VDC, (12 VDC)
Power requirement	17 W
Operating mode	Activated solenoid: Check valve closed

Bypass Valve Kits <sup>1)</sup>	Voltage	Ordering number	For F2 size	Torque <sup>3)</sup>
BPV-F2	24 VDC	<b>378 7424</b>	42/42, 53/53,	50 Nm
	12 VDC	<b>378 7425</b>	55/28, 70/35, 70/70	

- 1) The BPV-F2 valve kit contains parts designated '1' in the split view to the right.
- 2) A suction fitting kit (parts designated '2' in the split view) is not included with the F2 pump; it must be ordered separately.
- 3) Torque pressure connector to:



Bypass valve split view without manual override (with F2 end cap).

**NOTE:** A suction fitting kit (parts designated '2' in the split view) is **not** included with the F2 pump; it must be ordered separately (refer to chapter10).

## F1, F2, F3, VP1 Pumps

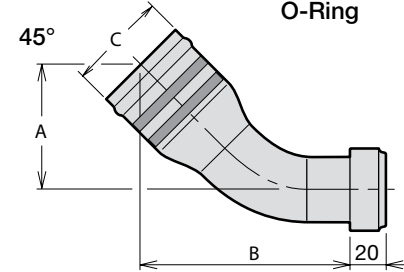
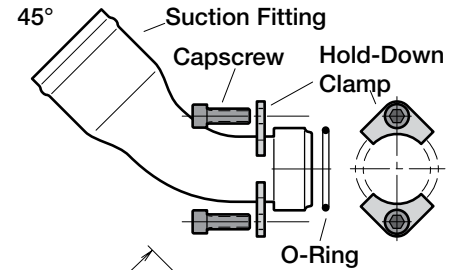
### Suction and Pressure Fittings

Additional hold-down-clamp kit consists of:  
hold-down-clamp cap screw and o-ring  
ordering no. 3781321

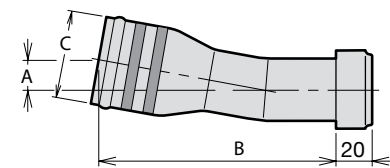
Additional hold-down-clamp kit for mounting on BPV  
ordering no. 3782439

**NOTE:** A suction fitting must be ordered separately  
(not included with the pump).

**NOTE:** 90 Degree Fittings Available Go to  
<http://www.phtruck.com/HPS.html>



### Straight Fitting



Part Number	Description	A mm	B mm	C Dia. mm	Size
3783523 <sup>(3)</sup>	Straight	32	174	75	3.00"
3780633 <sup>(1)</sup>	45 degree	60	104	38	1.50"
3780364 <sup>(2)</sup>	45 degree	67	110	50	2.00"
3780634 <sup>(3)</sup>	45 degree	75	117	63	2.50"
3780635 <sup>(1)</sup>	Straight	0	85	38	1.50"
3780636 <sup>(2)</sup>	Straight	17	136	50	2.00"
3780637 <sup>(3)</sup>	Straight	25	145	63	2.50"
3781234 <sup>(1)</sup>	45 degree	60	104	32	1.25"

<sup>(1)</sup> Recommended for frame size F1-25

<sup>(2)</sup> Recommended for frame size F1-41, -51, -61, -81, -101

<sup>(3)</sup> 3 clamps and 3 screws

# Piston Pumps

## VP1 Pumps

- Pressures up to 5800 PSI
- Will fit between Allison transmission and truck frame rail
- Suitable for all load sensing systems
- Splined Shaft (DIN 5462)
- Light and compact for PTO mounting



Part Number	Model Number	Rotation	(Up To) Self Priming Speed <sup>(2)</sup>	Weight [lbs]	Max Pressure RPM <sup>(1)</sup> (Continuous)	Displacement [cm <sup>3</sup> /rev]
3780334	VP1-45R	Right	2,400	60	5,000	45
3780335	VP1-45L	Left	2,400	60	5,000	45
3780336	VP1-75R	Right	2,100	60	5,000	75
3780337	VP1-75L	Left	2,100	60	5,000	75
3786000	VP1-95R	Right	2,200	60	5,800	95
3786001	VP1-95L	Left	2,200	60	5,800	95
3784110	VP1-110-R	Right	2,100	60	5,800	110
3784111	VP1-110-L	Left	2,100	60	5,800	110
3784500	VP1-130R	Right	1,900	60	5,800	130
3784501	VP1-130L	Left	1,900	60	5,800	130

### Standard SAE versions

Part Number	Model Number	Rotation	(Up To) Self Priming Speed <sup>(2)</sup>	Weight [lbs]	Max Pressure RPM <sup>(1)</sup> (Continuous)	Displacement [cm <sup>3</sup> /rev]
3784095	VP1-095-R	Right	2,200	60	5,800	95
3784096	VP1-095-L	Left	2,200	60	5,800	95
3784093	VP1-110-R	Right	2,100	60	5,800	110
3784094	VP1-110-L	Left	2,100	60	5,800	110
3784091	VP1-130-R	Right	1,900	60	5,800	128
3784092	VP1-130-L	Left	1,900	60	5,800	128

Frame Size VP1-	045	075	095	110	130
Displacement [cm <sup>3</sup> /rev]	45	75	95	110	128
Max operating pressure [bar]					
continuous	350	350	400	400	400
intermittent	400	400	420	420	420
Mass moment of inertia J [kgm <sup>2</sup> ]	.00606	.00606	.00681	.00690	.00690
Selfpriming speed [rpm]					
2" suction line, max	2200	1700	1250	1100	900
2-1/2" suction line, max	2400	2100	1750	1500	1300
3" suction line, max	—	—	2200	2100	1900
Max Speed unloaded [rpm]					
(in bypass mode, no flow)	3000	3000	3000	3000	3000
Control type	LS				
Shaft end spline	DIN 5462				
Mounting flange	ISO 7653-1985				
Weight (with control) [kg]	27				

Additional parts are available, contact Customer Service.

<sup>(1)</sup> Max 6 seconds in any one minute.

<sup>(2)</sup> Valid at an inlet pressure of 1.0 bar (abs.) when operating on mineral oil at a viscosity of 30 mm<sup>2</sup>/s (cSt).



Mount Kit w/ Straight Fittings for VP1 045 & 075 Only (Part Number 3785286)

VP1 095-110-130, use standard suction fittings



### PAVC Piston Pumps Variable Displacement

- Maximum speeds to 3000
- Maximum pressure to 3000 PSI
- Load sensing
- Pressure and flow controls



**NOTE:** All pumps listed below are Load Sensing with pressure compensation.

Part Number	Pump Size	Suction Port	Pressure Port	Shaft Size	Rotation
PAVC33BR4AP26	33 CC 2.01 CID	1-1/4" O-Ring	3/4" O-Ring	7/8" 13 Tooth	CW
PAVC33BL4AP26	33 CC 2.01 CID	1-1/4" O-Ring	3/4" O-Ring	7/8" 13 Tooth	CCW
PAVC38BR4AP16	38 CC 2.32 CID	1-1/4" O-Ring	3/4" O-Ring	7/8" 13 Tooth	CW
PAVC38BL4AP16	38 CC 2.32 CID	1-1/4" O-Ring	3/4" O-Ring	7/8" 13 Tooth	CCW
PAVC6592L4AP13X3770	65 CC 3.96 CID	1-1/2" S/F	1" O-Ring	1-1/4" Keyed	CCW
PAVC10092L4AP22X3654	100 CC 6.10 CID	2" S/F	1-1/4" O-Ring	1-1/4" Keyed	CCW

Small Displacements 33 & 38 CC can all be PTO Mounted 442/489 and 280 Chelsea® Series PTO's.

Larger Displacements 65 and 100 CC can be front mounted to the engine or be PTO shaft driven.

All Pumps listed above can be driven with a Constant Mesh or a PowerShift/Clutch Style PTO.

All 7/8"-13 Tooth Pumps have an SAE "B" Pilot Diameter 4".

All 1-1/4" Round Keyed shafts have an SAE "C" Pilot Diameter 5".

### P1 Piston Pump

- Variable displacement, axial piston pump for open-circuit applications
- Medium pressure, continuous operation at pressures up to 280 bar
- Quiet and efficient control capability
- Low ripple to further reduce noise
- Compact overall package size
- Elastomer seals that eliminate gaskets and external leakage
- High operating efficiency results in lower power consumption and reduced heat generation



Frame size P1	-018	-028	-045	-060	-075	-100	-140
Displacement (cm3/rev)	18	28	45	60	75	100	140
(in3/rev)	1.10	1.71	2.75	3.66	4.58	6.1	8.54
Max continuous pressure (bar)	280	280	280	280	280	280	280
(psi)	4000	4000	4000	4000	4000	4000	4000
Self priming speed @ 1 bar inlet pressure	3300	3200	2800	2500	2400	2250	2100

**WARNING:** This product can expose you to chemicals including Lead, Nickel (metallic), or Titanium Dioxide which are known to the State of California to cause cancer, or Lead which is known to the State of California to cause birth defects and other reproductive harm. [www.p65warnings.ca.gov](http://www.p65warnings.ca.gov)

# Hydraulic Motors

## TB Series

### Medium duty power

This medium duty small frame motor incorporates many features that are included in our heavy duty motors. Design features include a high pressure shaft seal so external drains are never required, roller vane technology for automatic wear compensation and full flow internal cooling and flushing. This is a very economical motor for most medium duty applications.



### TB Series – 2-Bolt

Part Number	Description	Eaton	CIR	GPM	Speed	Max Pressure Cont.	Max Pressure Int.	Max Torque	Max Supply Pressure
TB0100AP100AAAA	1/2" NPT 1" Key	101-1027	6.0	12	409	1800	2400	1411 Lbs. in.	2750
TB0195AP100AAAA	1/2" NPT 1" Key	101-1029	11.9	12-15	287	1800	2100	3011 Lbs. in.	2750
TB0365AP100AAAA	1/2" NPT 1" Key	101-1032	22.6	12-15	151	1250	1525	3897 Lbs. in.	2750
TB0100AS100AAAA	7/8" NPT 1" Key	101-1035	6.0	12	409	1800	2400	1411 Lbs. in.	2750
TB0195AS100AAAA	7/8" O-Ring 1" Key	101-1037	11.9	12-15	287	1800	2100	3011 Lbs. in.	2750
TB0365AS100AAAA	7/8" O-Ring 1" Key	101-1040	22.6	12-15	151	1250	1525	3897 Lbs. in.	2750
TB0195FP100AAAA	1/2" NPT 1" Key	101-1005	11.9	12-15	287	1800	2100	3011 Lbs. in.	2750
TB0230FP100AAAA	1/2" NPT 1" Key	101-1006	15.9	12-15	246	1500	2000	2797 Lbs. in.	2750
TB0295FP100AAAA	1/2" NPT 1" Key	101-1007	17.9	12-15	191	1400	1800	3096 Lbs. in.	2750
TB0365FP100AAAA	1/2" NPT 1" Key	101-1008	22.6	12-15	151	1250	1525	3897 Lbs. in.	2750
TB0390FP100AAAA	1/2" NPT 1" Key	101-1556	24.0	12-15	143	1200	1450	3792 Lbs. in.	2750
TB0036FS100AAAA	7/8" O-Ring 1" Key	101-1750	2.2	9	932	1800	2400	427 Lbs. in.	2750
TB0050FS100AAAA	7/8" O-Ring 1" Key	101-1749	3.0	9	678	1800	2400	693 Lbs. in.	2750
TB0065FS100AAAA	7/8" O-Ring 1" Key	101-1009	4.0	9	511	1800	2400	946 Lbs. in.	2750
TB0080FS100AAAA	7/8" O-Ring 1" Key	101-1010	5.0	9	409	1800	2400	1193 Lbs. in.	2750
TB0100FS100AAAA	7/8" O-Ring 1" Key	101-1011	6.0	12-15	454	1800	2400	1411 Lbs. in.	2750
TB0130FS100AAAA	7/8" O-Ring 1" Key	101-1751	8.0	12-15	430	1800	2400	1951 Lbs. in.	2750
TB0165FS100AAAA	7/8" O-Ring 1" Key	101-1012	10.0	12-15	343	1800	2250	2428 Lbs. in.	2750
TB0195FS100AAAA	7/8" O-Ring 1" Key	101-1013	11.9	12-15	287	1800	2100	3011 Lbs. in.	2750
TB0230FS100AAAA	7/8" O-Ring 1" Key	101-1014	15.9	12-15	246	1500	2000	2797 Lbs. in.	2750

Other sizes available contact customer service, a product manager or use the crossover tool at <https://divapps.parker.com/divapps/hpmd/parker-pcra-dist/>.



### TB Series (Cont.)

#### TB Series – 4-Bolt

Part Number	Description	Eaton	CIR	GPM	Speed	Max Pressure Cont.	Max Pressure Int.	Max Torque	Max Supply Pressure
TB0036FP100AAAA	1/2" NPT 1" Key	101-1753	2.2	9	932	1800	2400	427 Lbs. in.	2750
TB0050FP100AAAA	1/2" NPT 1" Key	101-1001	3.0	9	678	1800	2400	693 Lbs. in.	2750
TB0065FP100AAAA	1/2" NPT 1" Key	101-1754	4.0	9	511	1800	2400	946 Lbs. in.	2750
TB0080FP100AAAA	1/2" NPT 1" Key	101-1002	5.0	9	409	1800	2400	1193 Lbs. in.	2750
TB0100FP100AAAA	1/2" NPT 1" Key	101-1003	6.0	12-15	454	1800	2400	1411 Lbs. in.	2750
TB0130FP100AAAA	1/2" NPT 1" Key	101-1755	8.0	12-15	430	1800	2400	1951 Lbs. in.	2750
TB0165FP100AAAA	1/2" NPT 1" Key	101-1004	10.0	12-15	343	1800	2250	2428 Lbs. in.	2750
TB0195FP100AAAA	1/2" NPT 1" Key	101-1005	11.9	12-15	287	1800	2100	3011 Lbs. in.	2750
TB0230FP100AAAA	1/2" NPT 1" Key	101-1006	15.9	12-15	246	1500	2000	2797 Lbs. in.	2750
TB0295FP100AAAA	1/2" NPT 1" Key	101-1007	17.9	12-15	191	1400	1800	3096 Lbs. in.	2750
TB0365FP100AAAA	1/2" NPT 1" Key	101-10084	22.6	12-15	151	1250	1525	3897 Lbs. in.	2750
TB0390FP100AAAA	1/2" NPT 1" Key	101-1556	24.0	12-15	143	1200	1450	3792 Lbs. in.	2750
TB0036FS100AAAA	7/8" O-Ring 1" Key	101-1749	2.2	9	932	1800	2400	427 Lbs. in.	2750
TB0050FS100AAAA	7/8" O-Ring 1" Key	101-1009	3.0	9	678	1800	2400	693 Lbs. in.	2750
TB0065FS100AAAA	7/8" O-Ring 1" Key	101-1750	4.0	9	511	1800	2400	946 Lbs. in.	2750
TB0080FS100AAAA	7/8" O-Ring 1" Key	101-1010	5.0	9	409	1800	2400	1193 Lbs. in.	2750
TB0100FS100AAAA	7/8" O-Ring 1" Key	101-1011	6.0	12-15	454	1800	2400	1411 Lbs. in.	2750
TB0130FS100AAAA	7/8" O-Ring 1" Key	101-1751	8.0	12-15	430	1800	2400	1951 Lbs. in.	2750
TB0165FS100AAAA	7/8" O-Ring 1" Key	101-1012	10.0	12-15	343	1800	2250	2428 Lbs. in.	2750
TB0195FS100AAAA	7/8" O-Ring 1" Key	101-1013	11.9	12-15	287	1800	2100	3011 Lbs. in.	2750
TB0230FS100AAAA	7/8" O-Ring 1" Key	101-1014	15.9	12-15	246	1500	2000	2797 Lbs. in.	2750
TB0295FS100AAAA	7/8" O-Ring 1" Key	101-1015	17.9	12-15	191	1400	1800	3096 Lbs. in.	2750
TB0365FP100AAAA	7/8" O-Ring 1" Key	101-1016	22.6	12-15	151	1250	1525	3897 Lbs. in.	2750
TB0390FS100AAAA	7/8" O-Ring 1" Key	101-1564	24.0	12-15	143	1200	1450	3792 Lbs. in.	2750

Other sizes available contact customer service, a product manager or use the crossover tool at <https://divapps.parker.com/divapps/hpmd/parker-pcra-dist/>.

# Hydraulic Motors

## TE Series

### Heavy duty power in a small frame motor

The TE motor has higher pressure ratings than the TB motor, for applications requiring higher torque. This motor has robust roller bearings that can withstand higher side loads. The TE Series uses high pressure shaft seals and high flow shaft seal cooling to prevent premature wear and seal leaks.



### TE Series – 2-Bolt

Part Number	Description	Eaton	CIR	GPM	Speed	Max Pressure Cont.	Max Pressure Int.	Max Torque	Max Supply Pressure
TE0080AP100AAAA	1/2" NPT 1" Key	103-1026	5.0	12-15	695	2030	2750	1416 Lbs. in.	2900
TE0165AP100AAAA	1/2" NPT 1" Key	103-1028	10.0	12-15	348	2030	2750	2744 Lbs. in.	2900
TE0230AP100AAAA	1/2" NPT 1" Key	103-1030	13.9	15-20	328	1740	2400	3363 Lbs. in.	2900
TE0045AS100AAAA	7/8" O-Ring 1" Key	N/A	2.5	12-15	1024	2030	2750	624 Lbs. in.	2900
TE0080AS100AAAA	7/8" O-Ring 1" Key	103-1034	5.0	12-15	695	2030	2750	1416 Lbs. in.	2900
TE0165AS100AAAA	7/8" O-Ring 1" Key	103-1036	10.0	12-15	348	2030	2750	2744 Lbs. in.	2900
TE0230AS100AAAA	7/8" O-Ring 1" Key	103-1038	13.9	15-20	328	1740	2400	3363 Lbs. in.	2900
TE0390AS100AAAA	7/8" O-Ring 1" Key	103-1040	24.0	15-20	191	1233	1740	3935 Lbs. in.	2900

Other sizes available contact customer service, a product manager or use the crossover tool at <https://divapps.parker.com/divapps/hpmd/parker-pcra-dist/>.

### TE Series – 4-Bolt

Part Number	Description	Eaton	CIR	GPM	Speed	Max Pressure Cont.	Max Pressure Int.	Max Torque	Max Supply Pressure
TE0100FP100AAAA	1/2" NPT 1" Key	103-1003	6.0	12-15	582	2030	2750	1682 Lbs. in.	2900
TE0295FP100AAAA	1/2" NPT 1" Key	103-1007	17.9	15-20	256	1450	2100	3784 Lbs. in.	2900
TE0100FS100AAAA	7/8" O-Ring 1" Key	103-1011	6.0	12-15	582	2030	2750	1682 Lbs. in.	2900
TE0295FS100AAAA	7/8" O-Ring 1" Key	103-1015	17.9	15-20	256	1450	2100	3784 Lbs. in.	2900

Other sizes available contact customer service, a product manager or use the crossover tool at <https://divapps.parker.com/divapps/hpmd/parker-pcra-dist/>.



## TF Series

### Heavy duty tough applications

Sturdy tough construction makes Parker's TF Series large frame motors suitable for the most severe applications. The powertrain uses a unique 60:40 spline geometry for strength. All splines are constantly flushed with cool fluid for durability. Roller vanes and sealed commutation assure high volumetric efficiency, smooth low speed operation and extended life. Shaft seals can withstand full system pressure and are washed in cool fluid for long life.



## TF Series

Part Number	Description	Eaton	CIR	GPM	Speed	Max Pressure Cont.	Max Pressure Int.	Max Torque	Max Supply Pressure
TF0080AB020AAAA	7/8" O-Ring 1" Key	104-1001	4.9	12-15	693	3000	4000	1948 Lbs. in.	4350
TF0100AB020AAAA	7/8" O-Ring 1" Key	104-1002	6.1	15-20	749	2250	3500	1746 Lbs. in.	4350
TF0130AB020AAAA	7/8" O-Ring 1" Key	104-1003	7.8	15-20	583	2000	3000	2031 Lbs. in.	4350
TF0240AB020AAAA	7/8" O-Ring 1" Key	104-1006	14.5	20-25	394	2000	3000	3782 Lbs. in.	4350
TF0080AB030AAAA	7/8" O-Ring 1-1/4" Key	104-1022	4.9	12-15	693	3000	4000	1948 Lbs. in.	4350
TF0100AB030AAAA	7/8" O-Ring 1-1/4" Key	104-1023	6.1	15-20	749	2250	3500	1746 Lbs. in.	4350
TF0130AB030AAAA	7/8" O-Ring 1-1/4" Key	104-1024	7.8	15-20	583	2000	3000	2031 Lbs. in.	4350
TF0170AB030AAAA	7/8" O-Ring 1-1/4" Key	104-1025	10.3	15-20	444	2000	3000	2808 Lbs. in.	4350
TF0195AB030AAAA	7/8" O-Ring 1-1/4" Key	104-1026	12.0	15-20	381	2000	3000	3222 Lbs. in.	4350
TF0240AB030AAAA	7/8" O-Ring 1-1/4" Key	104-1027	14.5	20-25	394	2000	3000	3782 Lbs. in.	4350
TF0360AB030AAAA	7/8" O-Ring 1-1/4" Key	104-1028	22.2	20-25	258	1880	2750	5257 Lbs. in.	4350

Other sizes available contact customer service, a product manager or use the crossover tool at <https://divapps.parker.com/divapps/hpmd/parker-pcra-dist/>.



# Hydraulic Motors

## TG Series

### Exceptional strength high performance motor

The heart of Parker's TG Series large frame powertrain the torque link, is an extra heavy duty part that includes unique 60:40 spline geometry. Rugged construction throughout allows the transmission of over 12,600 Lbs. in. of torque. The entire powertrain is continually washed in cool, high flow fluid to assure long life. Roller vanes and sealed commutator maintain high efficiency and provide smooth low speed performance.



### TG Series

Part Number	Description	Eaton	CIR	GPM	Speed	Max Pressure Cont.	Max Pressure Int.	Max Torque	Max Supply Pressure
TG0140MS030AAAA	7/8" O-Ring 1-1/4" Keyed Shaft	N/A	8.6	20-25	660	3000	4000	3455 Lbs. in.	4350
TG0195MS030AAAA	7/8" O-Ring 1-1/4" Keyed Shaft	N/A	11.9	20-25	477	3000	4000	4919 Lbs. in.	4350
TG0280MS030AAAA	7/8" O-Ring 1-1/4" Keyed Shaft	N/A	17.1	20-25	334	3000	4000	7044 Lbs. in.	4350
TG0335MS030AAAA	7/8" O-Ring 1-1/4" Keyed Shaft	N/A	20.6	20-25	277	3000	4000	8533 Lbs. in.	4350
TG0475MS030AAAA	7/8" O-Ring 1-1/4" Keyed Shaft	N/A	29.1	20-30	237	2000	3000	7853 Lbs. in.	4350
TG0785MS030AAAA	7/8" O-Ring 1-1/4" Keyed Shaft	N/A	48.0	20-30	143	1500	2000	9239 Lbs. in.	4350

Other sizes available contact customer service, a product manager or use the crossover tool at <https://divapps.parker.com/divapps/hpmd/parker-pcra-dist/>.

## TGK Series

### Exceptional strength & durability high performance motor

The heart of Parker's TK Series powertrain, the torque link is an extra heavy duty part that includes unique 60:40 spline geometry. Rugged construction throughout allows the transmission of over 23,000 Lbs. in. of torque. The entire powertrain is continually washed in cool, high flow fluid to assure long life. Roller vanes and sealed commutator maintain high efficiency and provide smooth low speed performance.



### TGK Series

Part Number	Description	CIR	GPM	Speed	Max Pressure Cont.	Max Pressure Int.	Max Torque	Max Supply Pressure
TGK0170AS620AAAA	7/8-14 SAE, 1-1/4" 14 Tooth Spline SAE	10.3	20 – 25	554	3500	4000	4794	4350
TGK0240AS030AAAA	7/8-14 SAE, 1-1/4" Keyed	14.5	20 – 25	393	3500	4000	8031	4350
TGK0280US050AAAA	7/8-14 SAE, 1-1/4" 14 Tooth Spline	17.1	20 – 25	334	3500	4000	9470	4350
TGK0405MS200AAAA	7/8-14 SAE, 1-3/8" Keyed	24.7	20 – 25	232	3500	4000	13681	4350
TGK0530MS080AAAA	7/8-14 SAE, 1-1/4" Tapered	32.3	20 – 30	231	3250	3750	16774	4350

Other sizes available contact customer service, a product manager or use the crossover tool at <https://divapps.parker.com/divapps/hpmd/parker-pcra-dist/>.



### Wetline Kits

- Simple to use, online tools build complete Wet Line System
- Single part numbered kits for immediate installation
- Takes the guesswork out of kit selection
- Three year warranty available on approved applications



**Parker's eConfigurator can specify a kit for many applications.**

Dump Trailer

Dump Truck

Low Boy - Goose Neck

Moving Floor

Live Bottom

Premium Combo System - Moving Floor/Gooseneck or Low Boy

Auto Combo System - Dump Trailer/Moving Floor/Gooseneck or Low Boy

Combination - Side Dump/End Dump/Moving Floor/Gooseneck or Low Boy

Oil Transfer

Standard Combo Systems (2440 max)

Volvo Kits - I-Shift

Mack Kits - mDrive

Frack Truck

Side Dump

**Don't see your application - Go to [www.phtruck.com/WETLINEKITS](http://www.phtruck.com/WETLINEKITS)**

## Kits / Systems

### Snow & Ice System

#### Parker ICS-567

##### System Components:

- Integrated & versatile master controller  
IQAN XC23 input/output module  
IQAN G11 Bluetooth® technology  
IQAN LC6 & LST Joysticks
- Pre-programmed IQAN MC2 valve driver module
- Complete wiring harness
- Electro-proportional Pulsar® hydraulic sectional valve



The IQAN-G11 solution offers on-site, short range or remote diagnostic access to vehicles by wireless communication coupled together with IQAN software tools. System is plug-and-play with vehicle chassis for automatic ground speed.



Zinc-Plated Pulsar® Valve



#### Ordering Info:

Parker ICS-567: Part# MCE14751

There are two mounting options for this system:

PMC-PEDESTAL-FLOOR (Used on all truck cabs with bucket seats and no center console)

PMC-PEDESTAL-RAM (Mounts on the Ram Mount bracket, #RAM-VB-185 using the passenger seat hardware.

Ram Mount bracket, #RAM-VB-185 is sold separately thru Ram Mounts)

Below are images of the mounting systems. The bracket goes with the RAM option.



PMC-Pedestal-Floor



PMC-Pedestal-RAM

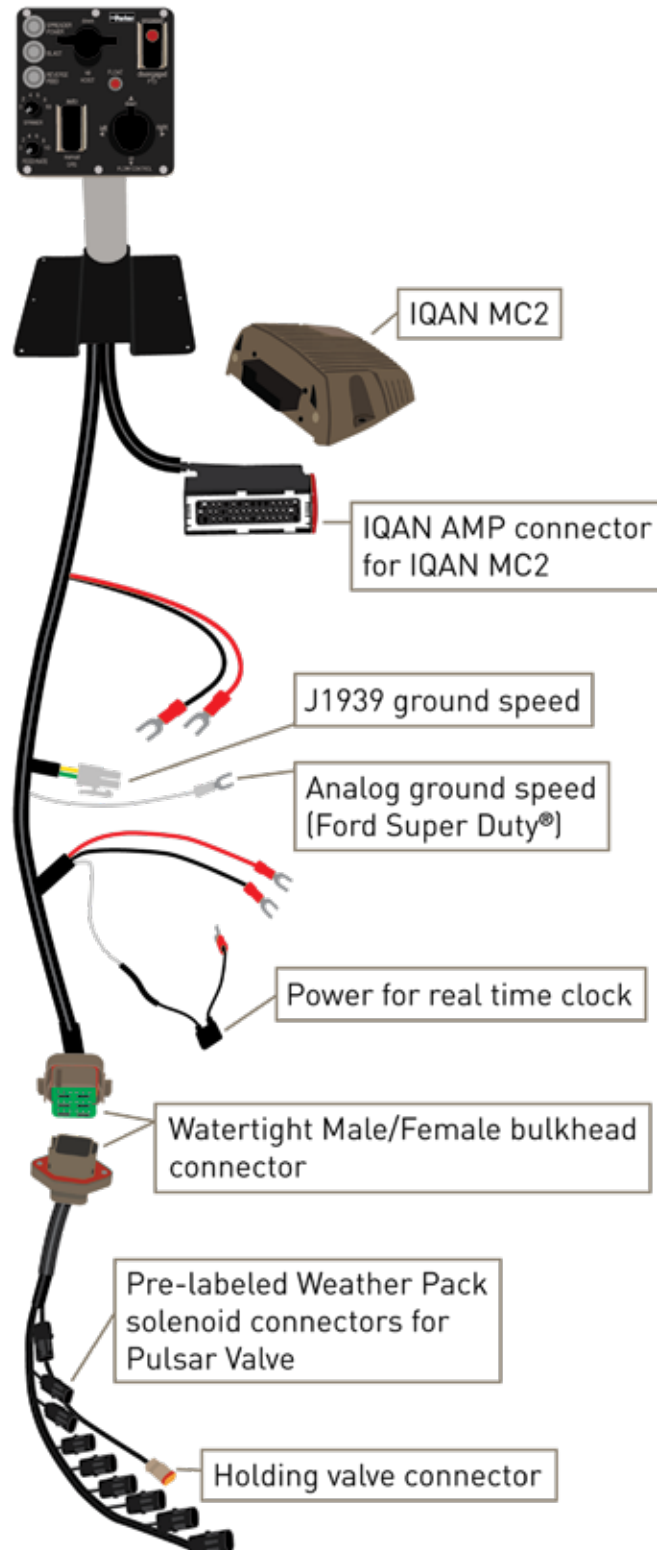


Bracket

## Snow & Ice System (Continued)

### Total System Reliability

Complete Parker system designed for quality, simplicity, and efficiency.



## Kits / Systems

### Parker Spread Master System

#### PSM1000

System includes:

- Electronic control module PSM1000C
- Control manifold assembly PSM1000M
- Wiring harness PSM1000H
- Application instructions PSM1000AI



#### PSM1500-1

Parker Spread Master System

A spinner control function for auxillary spreader



#### PSM1500-2

Parker Spread Master System

Precision feed rate and spinner control at the touch of your fingers.





## Valves

- Available in open-center and load-sense technologies
- Flows 10-70 GPM, 3500 PSI
- Work ports available in SAE 8, 10 and 12
- Many special metering spools available



Part Number	Description	Application
MCE14264	VA20 Single Acting Cylinder, Pneumatic O-Ring Ports	Dump Truck
MCE14265	VA20 Double Acting Cylinder, Pneumatic O-Ring Ports	Side Dump Truck / Trailer
MCE14260	VA20 One Single Acting / One Double Acting Cylinder, Pneumatic O-Ring Ports	Side Dump / End Dump – Plus multiple types of two line trailer connections – Combo System
MCE14341	VA20 One Double Acting Motor Handle Operated	Trailer Valve Oil Transfer
MCE14451	VA20 One Double Acting Motor / One Single Acting Cylinder	Combo Winch / LB / DT / OT
3489201754	VA35 Single Acting Cylinder, Pneumatic O-Ring Ports	Dump Trailer
3489302021	VA35 Two Single Acting Cylinder, Pneumatic O-Ring Ports	Premium / Combination System

**NOTE:** All assembled valves listed above are rated for 2500 PSI except for the premium combination that has one section set at 2000 PSI and one section set at 3000 PSI

# Valves

## V20 Valve

- Inlet
- Main relief
- Work sections
- Outlet
- Section seals
- Stud kit to hold the assembly in place



## V20 Inlets

Part Number	Model	Description	Porting
08650029	20-LC-12	Standard Inlet	SAE 12
08650004	20-12-SF	Split Flow Mid Inlet	SAE 12
08650003	20-12-CF	Combined Flow Mid Inlet	SAE 12

## V20 Work Sections

Part Number	Model	Description	Porting
08650016	20-10-03	Single-Acting Cylinder Spool	SAE 10
08650020	20-10-04	Double-Acting Cylinder Spool	SAE 10
08650018	20-10-F4	Double-Acting Motor Spool	SAE 10
13650963	20-10-03-PA1	Single-Acting Cylinder Spool Pneumatic	SAE 10
13650964	20-10-04-PA1	Double-Acting Cylinder Spool Pneumatic	SAE 10

## V20 Outlets

Part Number	Model	Description	Porting
13650146	20-RC-12-E	Standard Outlet	SAE 12
08650024	20-RC-12-E-MY	Power Beyond Outlet	SAE 12
08650103	K-20-10-Y	Power Beyond Sleeve	SAE 10
08650100	K-20-X	Conversion Plug	SAE 12

## V20 Main Relief Valves

Part Number	Description	Application
RP51A-3000	RP51A-3000	Main Relief Valve
08650419	WH-1950	Fixed Main Relief Valve 134 Bar (1950 PSI)
08650420	WH-2550	Fixed Main Relief Valve 176 Bar (2550 PSI)

## V20 Work Port Reliefs

Part Number	Description	Application
08650380	K-20-AC	Anti-Cavitation Check
08650387	CRA-1200	Combination PR/AC 83 Bar (1200 PSI)
08650388	CRA-1700	Combination PR/AC 117 Bar (1700 PSI)
08650389	CRA-1950	Combination PR/AC 134 Bar (1950 PSI)
08650390	CRA-2500	Combination PR/AC 176 Bar (2550 PSI)

## Actuator Kits

Part Number	Description	Application
08650105	K-20-D	3-Position Detent
08650630	K-20-PA1	Pneumatic Positioner

## Handles and Accessories

Part Number	Description	Application
08650151	K-20-VH-B	Vertical Handle Black
08650156	K-20-HH-B	Horizontal Handle Black
08650107	K-20-RET	Standard Seal Retainer Plate
08650097	Wiper	Spool Wiper
08650113	K-20-HBO-C1	Complete Bracket
08650112	K-20-Boot	Spool Boot Assembly

## Handles and Accessories

Part Number	Description	Application
391-1873-097	DV35-H4	Low Boy 6" Handle
391-1873-065	DV35-H8	High Boy 8" Handle

## Accessory Valves

- Flow dividers, pilot operated check valves, relief valves
- Manual or air operated
- Flows to 225 LPM (60 GPM)
- Pressures to 207 bar (3000 PSI)
- Cast iron bodies



Part Number	Description
RPL-100-A	Relief valve, 1" NPT ports, adjustable
RPL-16-A	Relief valve, 16 SAE NPT ports, adjustable
S-100	Selector valve 1" NPT ports, manual shift
AS-16	Selector valve 1" SAE ports, airshift, spring return
AS-100	Selector valve 1" NPT ports, no manual override
AS-100-SR	Selector valve 1" NPT ports, airshift, spring return

## Auto Combo Valves

- Dual pressure relief
- Complete with fittings



Part Number	Description	Application
ACVA10A	Auto Control Valve Assembly	Combination Systems*

\*No interaction for the driver required for the driver to change from one pressure to a different setting. System automatically recognizes the settings.

## Tipper Valves

- Flow is up to 65 GPM
- Pressure is up to 5800 PSI
- Relief valves set at 2100 PSI & 3000 PSI



Part Number	Description	Application
CVA16SP	Tipper Valve Air Actuated [Raise-Hold-Lower]	Dump Truck/Trailer
CVA16DP	Tipper Valve [Dual Pressure]	Combination Systems
CVM12SP	Tipper Valve Manual Shift [Raise-Hold-Lower]	Small Dump Truck

# Shifter Controls

## Consoles & Towers

- Control for dump pump consoles
- Safety interlock handle
- Rugged aluminum construction
- Easy to mount



Part Number	eConfigurator	Description	Main Applications
328388-98X	A	PTO Switch No-Hoist Control - Tubing & Fittings	Multiple
329024-12X	B	PTO Switch No-Hoist Control - Electric Hydraulic	Multiple
329106-153X	V	Air Shift Cover & Boot - Used with OEM In-Dash PTO Switch	Multiple
328388-65X	S	PTO Switch - Hoist Control - Tubing & Fittings Spring Return Auto PTO Kick Out	Dump / Truck
328388-72X	T	PTO Switch - Hoist Control - Tubing & Fittings 3 Position Detent No Auto PTO Kick Out	Dump / Truck Roads / Hwy
328388-79X	U	PTO Switch - Hoist Control - Tubing & Fittings 3 Position Detent PTO Kick Out	Dump Trailer
329219X	C	8" High Tower - Used with S-T-U Options	
3239-13	D	13" High Tower - Used with S-T-U Options	
AVCP-295-MTCK8	H	PTO Switch - MF/Hoist - Tower Tubing	Premium Combo
AVCP-695-M-T-8	W	No PTO Switch - MF/Hoist - Tower Tubing	Combination
AVCP-195-T-8	J	No PTO Switch - Hoist Control 3 Position Detent No Auto Kick Out	Dump Truck / Trailer
CONV-APS-18	Sold Separately	PTO Switch – MF/HOIST – Tarp & Tailgate switch plugged	

### Consoles with & with-out Controls

CONV- APS-8	w/ controls	PTO Switch – Hoist – Tailgate & Aux (PLUGGED)	Premium Combo Dump Truck
HCVC-VTS	w/o controls	PTO/HOIST Combo – Tailgate – Tarp – Aux	all blank holes for push -pull valves
	Lo profile	(used between door and driver seat)	Premium Combo
HCVC-VRN	w/o controls	PTO/HOIST Combo – Tailgate – Tarp – Aux	all blank holes for switches
	Lo profile	(used between door and driver seat)	Premium Combo

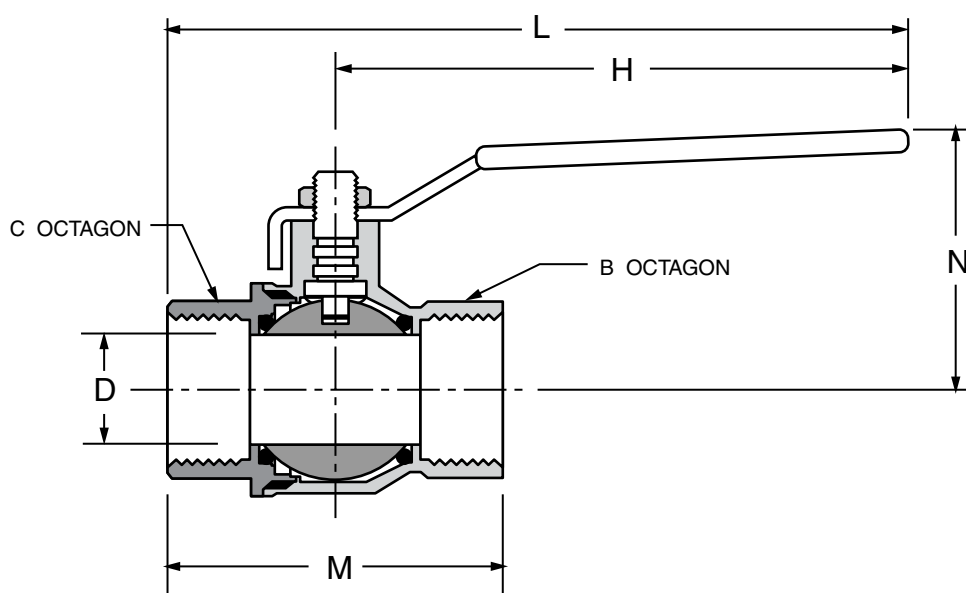
## Ball Valves

- Forged brass body
- Chrome plated brass ball
- PTFE seats/seals
- Fluorocarbon stem o-rings
- Steel handle



### Brass Ball Valve V520P - Female Pipe Ends

Part Number	Pipe Thread	B Octagon	C Octagon	H	L	M	N	Flow Dia. D
V520P-20	1-1/4"	1.93	1.93	6.22	8.05	3.66	2.82	1.180
V520P-24	1-1/2"	2.13	2.13	6.22	8.23	4.02	3.06	1.570
V520P-32	2"	2.69	2.69	6.22	8.58	4.76	3.33	2.000
V520P-40	2-1/2"	3.35	3.35	10.04	13.11	6.14	5.20	2.520
V520P-48	3"	3.89	3.89	10.04	13.52	6.97	5.51	3.000





# Filters

## Hydraulic Oil Filters

- Broader applications compared to 150 PSI rated spin-on cans
- Variety of mounting configurations
- Flange options for low profile, easy mounting

The Parker coreless filter will not only extend the service life of system components, but will last 3 times as long as the spin-on filters. By properly filtering your system with Parker coreless filtration, you can reduce your equipment downtime and hydraulic component replacements.

**Parker Kits** - Come complete with everything you need to mount and connect filter

**Mounting** - 6 hole pattern for flexibility

**Indicator Gauge** - Show at a glance when the filter needs changing

**Ports** - SAE ports standard

**25x thread engagement** - Filters will not blow off and provide 3 times the service life over spin-on canisters

## 12AS/50AS Coreless Series

- Maximum pressure 500 PSI
- 2.5 to 1 safety factor
- Operating temperatures:  
-40°F (-40°C) to 225°F (107°C)



### Filter Kits

Part Number	Description
SWKA-01	50 AS Filter Assembly - Gauge - Mounting Bracket
SWKA-10	50 AS Filter Assembly - Gauge - Mounting Bracket Qty 10

### Filter Assemblies

Part Number	Description
12AS210QEBPGS121	20 GPM 10 Micron SAE 12 3/4"
50AS110QEBPGS201	50 GPM 10 Micron SAE 20

### Filter Elements

Part Number	Description
940763Q	12AS 10 Micron
940818Q	50AS 10 Micron



## 12AT/50AT Spin-On Series

- Maximum pressure 150 PSI
- 2.5 to 1 safety factor
- Operating temperatures:  
-40°F (-40°C) to 225°F (107°C)



### Filter Assemblies

Part Number	Description
12AT110CBPGN12H	15 GPM 10 Micron NPT 3/4"
12AT110CBPGS12H	15 GPM 10 Micron SAE 12
50AT110CBPGN20H	45 GPM 10 Micron NPT 1-1/4"
50AT110CBPGS20H	45 GPM 10 Micron SAE 20
50AT210CN25DDH	50 GPM 10 Micron Double NPT 1-1/4"
50AT210CBPGS20H	50 GPM 10 Micron Double SAE 20
80AT110CBPGY32H	Dual Spin-On Filter

### Filter Elements

Part Number	Description
921999	12AT Cellulose 10 Micron
926169	50AT Cellulose 10 Micron
927736	50AT-2 Cellulose 10 Micron

## Accessories

### Fluid level / temperature gauges



Part Number	Thread	Length
FL.69121	M10	3
FL.69312	M10	10

### Breathers - non-pressurized



Part Number	Description
AB.1163.10	10 Micron, 3" hole size

### Gauge



Part Number	Description
936912	25 PSI Gauge
Fits all AT and AS filter head assemblies	

### Filter Brackets



Part Number	Description
FB10	For AT & AS Filters
FB20	Fits Dual Filter

## Hose - 387TC

- Hydraulic - tough cover
- ISO 18752, SAE J 1942-1 USCG, AGS, DNV
- Constant working pressure

**Application:** Petroleum based hydraulic fluids and lubricating oils

**Inner Tube:** Synthetic rubber

**Reinforcement:** Two braid steel wire (4-wire for size -20)

**Cover:** Synthetic rubber abrasion resistant, MSHA accepted

**Temperature Range:** -40°F to +257°F (-40° C to +125°C)

**Fittings:** 43 Series



Part Number	Hose ID		Hose OD		Working Pressure		Minimum Bend Radius	
	Inch	mm	Inch	mm	psi	MPa	Inch	mm
387TC-4	1/4"	6.3	0.53"	13.4	3000	21	2	50
387TC-6	3/8"	10	0.69"	17.4	3000	21	2-1/2	65
387TC-8	1/2"	12.5	0.82"	20.7	3000	21	3-1/2	90
387TC-10	5/8"	16	0.94"	23.9	3000	21	4	100
387TC-12	3/4"	19	1.10"	28	3000	21	4-3/4	120
387TC-16	1"	25	1.40"	35	3000	21	6	150
387TC-20	1-1/4"	31.5	1.82"	46	3000	21	8-1/4	210

Technical reference only

For information on the full line of GlobalCore hoses and details on 43 series fittings, go to [parker.com/globalcore](http://parker.com/globalcore)

# Hoses

## Hose - 811

- Suction and return line
- 1/2 SAE minimum bend radius
- SAE 100R4, J1942/USCG HF



**Application:** Petroleum based hydraulic fluids and lubricating oils

**Inner Tube:** Synthetic rubber

**Reinforcement:** Multiple layers of fiber spiral and one helical wire

**Cover:** Synthetic rubber

**Temperature Range:** -40°F to +212°F (-40° C to +100°C)

**Fittings:** 81 Series, 88 Series

Part Number	Hose ID		Hose OD		Working Pressure				Minimum Bend Radius	
	Inch	mm	Inch	mm	81/88DB psi	81/88DB MPa	88HC psi	88HC MPa	Inch	mm
811-16	1"	25.4	1.5"	38.0	250	1.7	50	0.3	3"	76
811-20	1-1/4"	31.8	1.77"	45.0	200	1.4	50	0.3	4"	102
811-24	1-1/2"	38.1	2.05"	52.0	150	1	50	0.3	5"	127
811-32	2"	50.8	2.50"	63.6	100	0.7	50	0.3	6"	152

Cut lengths are available, contact Customer Service.

811-16-72"

811-20-24"

811-20-72"

811-20-144"

811-24-72"

## Hose Kits

Part Number	Description
2L-TTD-C102	2 Line Dump Trailer - One Line Trailer Connection
2L-TTDE-C102	2 Line Dump Trailer Extended Cab - One Line Trailer Connection
3L-TTD-C102	3 Line Dump Trailer - One Line Trailer Connection
3L-TTDE-C102	3 Line Dump Trailer Extended Cab - One Line Trailer Connection
3L-CLP	3 Line Combination Low Pressure - One or Two Line Trailer Connection
3L-MF-PGP051A	3 Line Oil Transfer or Std. Moving Floor - Two Line Trailer Connection
3L-MF-PGP051AE	3 Line Oil Transfer or Std. Moving Floor - Extended Cab - Two Line Trailer Connection
3L-MF-HF-350	3 Line Moving Floor High Flow - Two Line Trailer Connection
3L-MF-HFE-PGP50	3 Line Moving Floor High Flow Extended Cab - Two Line Trailer Connection

Contact Customer Service for Bill of Materials.



# Thermoplastic Hose

## HLB/HLBD – Lubrication Line Hose, SAE 100R7



### Series HLB/HLBD – Nylon Core Tube

Part Number	Nominal I.D.		Maximum O.D.		Max. Working Pressure 73°F/ 23°C		Minimum Bend Radius		Weight		Permanent Fitting Series	Field Attachable Series
	inch	mm	inch	mm	psi	MPa	inch	mm	lbs./ft.	kg/mtr		
HLBD02	1/8	3.2	0.32	8.1	3,000	20.7	1/2	13.0	0.03	0.04	CY	BU
HLB03*	3/16	5	0.41	10.4	3,000	20.7	3/4	19.0	0.06	0.08	CY	BU

\*HLB03 – Copolyester core tube

## 518D – Non-Conductive Hose



### Series 518D – Nylon Core Tube, SAE 100R7

Part Number	Nominal I.D.		Maximum O.D.		ANSI A92.2 Max. Working Pressure 73°F/ 23°C		SAE 100R7 Max. Working Pressure 73°F/ 23°C		Minimum Bend Radius		Weight		Permanent Fitting Series	Field Attachable Series
	inch	mm	inch	mm	psi	MPa	psi	MPa	inch	mm	lbs./ft.	kg/mtr		
518D-2	1/8	3.2	0.34	8.6	3,150	21.7	3,000	21	1/2	13	0.03	0.05	56	-
518D-3	3/16	5	0.43	10.9	3,250	22.4	3,250	22.4	3/4	19.0	0.05	0.07	56	51R
518D-4	1/4	6.3	0.47	11.9	3,150	21.7	3,000	21.0	1-1/2	38.0	0.06	0.09	56	51R
518D-5	5/16	8	0.57	14.5	3,150	21.7	2,500	17.5	1-3/4	44.0	0.08	0.11	56	-
518D-6	3/8	10	0.64	16.3	3,000	21.0	2,250	15.8	2	51.0	0.10	0.14	56	51R
518D-8	1/2	12.5	0.81	20.6	3,000	21.0	2,250	15.8	3	76.0	0.15	0.22	56	51R
518D-10	5/8	16	0.98	24.9	3,000	21.0	2,750	19.2	6	152.0	0.21	0.31	56	-
518D-12	3/4	19	1.09	27.7	1,660	11.4	1,250	8.8	5	127.0	0.21	0.31	56	-
518D-16*	1	25	1.32	33.5	1,330	9.2	1,000	7.0	8	203.0	0.27	0.40	56	-

\*518D-16 – Copolyester core tube

**WARNING:** This product can expose you to chemicals including Antimony Oxide (Antimony Trioxide), which is known to the State of California to cause cancer, and 2-Imidazolidinethione, which is known to the State of California to cause birth defects or other reproductive harm. For more information go to [www.P65Warnings.ca.gov](http://www.P65Warnings.ca.gov).

## 563TJ – TOUGHJACKET™ SAE 100R17 Hydraulic Hose



### Series 563TJ – Copolyester Core Tube – 3,000 PSI constant pressure

Part Number	Nominal I.D.		Maximum O.D.		Max. Working Pressure 73°F/ 23°C		Minimum Bend Radius		Weight		Permanent Fitting Series
	inch	mm	inch	mm	psi	MPa	inch	mm	lbs./ft.	kg/mtr	
563TJ-4	1/4	6.3	0.47	11.9	3,045	21.0	1-1/2	38.1	0.09	0.14	56
563TJ-6	3/8	10	0.64	16.3	3,045	21.0	2	50.8	0.19	0.29	56
563TJ-8	1/2	12.5	0.77	19.5	3,045	21.0	2-3/4	69.9	0.24	0.36	56
563TJ-10*	5/8	16	0.97	24.6	3,045	21.0	3-1/2	88.9	0.40	0.60	43
563TJ-12*	3/4	19	1.12	28.3	3,045	21.0	4-1/4	108.0	0.55	0.82	43
563TJ-16*	1	25	1.45	36.9	3,045	21.0	6	150.0	0.88	1.31	43

\*Two wire braid

For information on hose ends, go to [parker.com/parflex](http://parker.com/parflex)

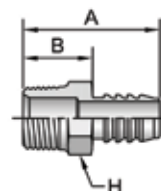
**WARNING:** This product can expose you to chemicals including Nickel compounds, which is known to the State of California to cause cancer, and Toluene, which is known to the State of California to cause birth defects or other reproductive harm. For more information go to [www.P65Warnings.ca.gov](http://www.P65Warnings.ca.gov).

# Fittings

## 88 Series Fittings for 811/881HT/881 Hose

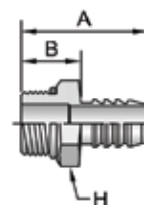
### 0188 - Male NPTF Pipe - Rigid

Part Number	Thread Inch	Hose I.D. Inch	A Inch	mm	H Inch	B Inch	mm
0188-12-12	3/4" x 14	3/4"	2.55"	57	1-1/8"	1.13"	29
0188-16-16	1" x 11-1/2	1"	2.75"	70	1-3/8"	1.37"	35
0188-20-20	1-1/4" x 11-1/2	1-1/4"	3.05"	77	1-3/4"	1.47"	37
0188-20-24	1-1/4" x 11-1/2	1-1/2"	3.21"	82	1-3/4"	1.47"	37
0188-24-24	1-1/2" x 11-1/2	1-1/2"	3.24"	82	2"	1.50"	38
0188-32-32	2" x 11-1/2	2"	3.49"	89	2-1/2"	1.66"	42
0188-40-40	2-1/2" x 8	2-1/2"	4.10"	104	3"	2.27"	58



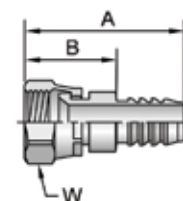
### 0588 - Male SAE Straight Thread with O-Ring - Rigid

Part Number	Thread Inch	Hose I.D. Inch	A Inch	mm	H Inch	B Inch	mm
0588-12-12	1-1/16" x 12	3/4"	2.13"	54	1-1/4"	1"	25
0588-16-16	1-5/16" x 12	1"	2.38"	60	1-1/2"	1"	25
0588-20-20	1-5/8" x 12	1-1/4"	2.59"	66	1-7/8"	1"	25



### 0688 - Female JIC 37° - Swivel

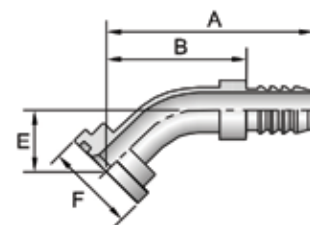
Part Number	Thread Inch	Hose I.D. Inch	A Inch	mm	W Inch	B Inch	mm
0688-12-12	3/4" 1-1/16" x 12	3/4"	2.66"	68	1-1/4"	1.53"	39
0688-16-12	1" 1-5/16" x 12	3/4"	2.47"	63	1-1/2"	1.34"	34
0688-16-16	1" 1-5/16" x 12	1"	2.72"	69	1-1/2"	1.34"	34
0688-20-20	1-1/4" 1-5/8" x 12	1-1/4"	3.34"	85	2"	1.75"	44
0688-24-24	1-1/2" 1-7/8" x 12	1-1/2"	3.67"	93	2-1/4"	1.93"	49
0688-32-32	2" 2-1/2" x 12	2"	4.14"	105	2-7/8"	2.31"	59



### 1788 - SAE Code 61 Flange Head - 45° Elbow

### ISO 12151-3 - E45S - L (1 Piece: ISO 12151-3 - E45M - L)

Part Number	Flange Inch	Hose I.D. Inch	A Inch	mm	E Inch	mm	F Inch	B Inch	mm
1788-16-16	1"	1"	3.55"	90	1.06"	27	1-3/4"	2.17"	55
1788-20-20	1-1/4"	1-1/4"	3.90"	99	1.13"	29	2"	2.31"	59
1788-24-24	1-1/2"	1-1/2"	4.15"	105	1.11"	28	2-3/8"	2.41"	61
1788-32-32	2"	2"	4.58"	116	1.25"	32	2-13/16"	2.75"	70

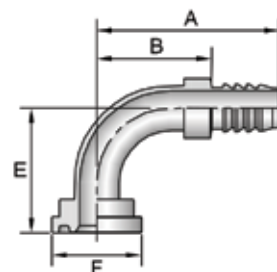


## 88 Series Fittings for 811/881 Hose

1988 - SAE Code 61 Flange Head - 90° Elbow

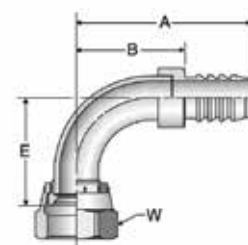
ISO 12151-3 - E90S - L (1 Piece: ISO 12151-3 - E90M - L)

Part Number	Flange Inch	Hose I.D. Inch	A Inch	A mm	E Inch	E mm	F Inch	B Inch	B mm
1988-16-16	1"	1"	3.55"	85	2.37"	60	1-3/4"	1.97"	50
1988-20-20	1-1/4"	1-1/4"	3.80"	97	2.50"	64	2"	2.21"	56
1988-24-24	1-1/2"	1-1/2"	4.20"	107	2.74"	70	2-3/8"	2.46"	62
1988-32-32	2"	2"	4.86"	123	3.19"	81	2-13/16"	3.03"	77



## 3988 - Female JIC 37° - Swivel

Part Number	Thread Inch	Hose I.D. Inch	A Inch	A mm	E Inch	E mm	W Inch	B Inch	B mm	
3988-12-12	3/4"	1-1/16" x 12	3/4"	2.98"	76	1.82"	46	1-1/4"	1.85"	47
3988-16-16	1"	1-5/16" x 12	1"	3.48"	88	2.14"	54	1-1/2"	2.10"	53
3988-20-20	1-1/4"	1-5/8" x 12	1-1/4"	3.81"	97	2.59"	66	2"	2.22"	56
3988-24-24	1-1/2"	1-7/8" x 12	1-1/2"	4.21"	107	2.81"	71	2-1/4"	2.47"	63



## 88HC - Hose Clamp (Worm Gear)

Part Number	Hose I.D. Inch
88HC-12	3/4"
88HC-16	1"
88HC-20	1-1/4"
88HC-24	1-1/2"
88HC-24	2"



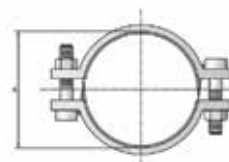
## 88HC-H - Hose Clamp (High Torque Worm Gear)

Part Number	Hose I.D. Inch
88HC-16C	3/4"
88HC-16H	1"
88HC-20H	1-1/4"
88HC-24H	1-1/2"
88HC-24H	2"



## 88HC - Heavy Hose Clamp (Double Bolt)

Part Number	Hose I.D. Inch
88DB-12	3/4"
88DB-16	1"
88DB-20	1-1/4"
88DB-24	1-1/2"
88DB-32	2"

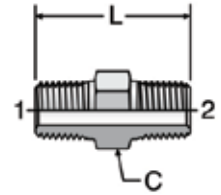


# Adapters

## Pipe Fittings and Port Adapters

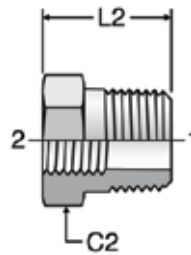
### FF - Pipe Nipple NPTF/NPT

Tube Fitting Part #	End Size		Tube Fitting Part #	End Size	
	1 NPTF	2 NPTF		1 NPTF	2 NPTF
1/2 x 1/8 FF-S	1/2" - 14"	1/8" - 27"	1 x 3/4 FF-S	1" - 11-1/2"	3/4" - 14"
1/2 x 3/8 FF-S	1/2" - 14"	3/8" - 18"	1 FF-S	1" - 11-1/2"	1" - 11-1/2"
1/2 x 1/4 FF-S	1/2" - 14"	1/4" - 18"	1-1/4 x 1 FF-S	1-1/4" - 11-1/2"	1" - 11-1/2"
1/2 FF-S	1/2" - 14"	1/2" - 14"	1-1/4 FF-S	1-1/4" - 11-1/2"	1-1/4" - 11-1/2"
3/4 x 1/4 FF-S	3/4" - 14"	1/4" - 18"	1-1/2 x 1 FF-S	1-1/2" - 11-1/2"	1" - 11-1/2"
3/4 x 3/8 FF-S	3/4" - 14"	3/8" - 18"	1-1/2 FF-S	1-1/2" - 11-1/2"	1-1/2" - 11-1/2"
3/4 x 1/2 FF-S	3/4" - 14"	1/2" - 14"	2 x 1-1/2 FF-S	2" - 11-1/2"	1-1/2" - 11-1/2"
3/4 FF-S	3/4" - 14"	3/4" - 14"	2 FF-S	2" - 11-1/2"	2" - 11-1/2"
1 x 1/4 FF-S	1" - 11-1/2"	1/4" - 18"			
1 x 3/8 FF-S	1" - 11-1/2"	3/8" - 18"			
1 x 1/2 FF-S	1" - 11-1/2"	1/2" - 14"			



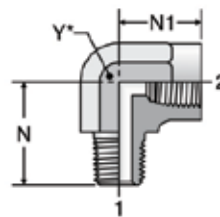
### PTR - Pipe Thread Reducer NPTF/NPT

Tube Fitting Part #	End Size	
	1 NPTF	2 NPTF
2 x 1 PTR-S	2" - 11-1/2"	1" - 11-1/2"
2 x 1-1/4 PTR-S	2" - 11-1/2"	1-1/4" - 11-1/2"
2 x 1-1/2 PTR-S	2" - 11-1/2"	1-1/2" - 11-1/2"



### CD - Street Elbow NPTF/NPT

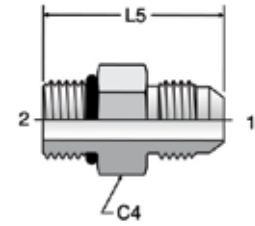
Tube Fitting Part #	End Size	
	1 NPTF	2 NPTF
1-1/4 CD-S	1-1/4" x 11-1/2"	1-1/4" x 11-1/2"
1-1/4 x 1-1/2 CD-S	1-1/4" x 11-1/2"	1-1/2" x 11-1/2"
1-1/2 CD-S	1-1/2" x 11-1/2"	1-1/2" x 11-1/2"



### F5OX - Straight Thread Connector 37° Flare / SAE-ORB SAE 070120

Tube Fitting Part #	End Size	
	1 JIC	2 SAE-ORB
8-4 F5OX-S	1/2"	1/4"
8-6 F5OX-S	1/2"	3/8"
8-10 F5OX-S	1/2"	5/8"
8-12 F5OX-S	1/2"	3/4"
8-16 F5OX-S	1/2"	1"
10 F5OX-S	5/8"	5/8"
10-6 F5OX-S	5/8"	3/8"
10-8 F5OX-S	5/8"	1/2"
10-12 F5OX-S	5/8"	3/4"
10-16 F5OX-S	5/8"	1"
12 F5OX-S	3/4"	3/4"
12-8 F5OX-S	3/4"	1/2"
12-10 F5OX-S	3/4"	5/8"
12-14 F5OX-S	3/4"	7/8"
12-16 F5OX-S	3/4"	1"
12-20 F5OX-S	3/4"	1-1/4"
14 F5OX-S	7/8"	7/8"
14-16 F5OX-S	7/8"	1"

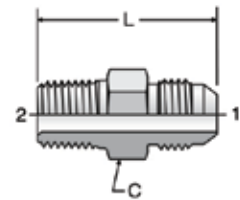
Tube Fitting Part #	End Size	
	1 JIC	2 SAE-ORB
16 F5OX-S	1"	1"
16-8 F5OX-S	1"	1/2"
16-10 F5OX-S	1"	5/8"
16-12 F5OX-S	1"	3/4"
16-14 F5OX-S	1"	7/8"
16-20 F5OX-S	1"	1-1/4"
16-24 F5OX-S	1"	1-1/2"
20 F5OX-S	1-1/4"	1-1/4"
20-12 F5OX-S	1-1/4"	3/4"
20-16 F5OX-S	1-1/4"	1"
20-24 F5OX-S	1-1/4"	1-1/2"
24 F5OX-S	1-1/2"	1-1/2"
24-20 F5OX-S	1-1/2"	1-1/4"



### FTX - Male Connector 37° Flare / NPTF SAE 070102

Tube Fitting Part #	End Size	
	1 JIC	2 NPTF
8-8 FTX-S	1/2"	1/2"
8-12 FTX-S	1/2"	3/4"
8-16 FTX-S	1/2"	1"
10 FTX-S	5/8"	5/8"
10-6 FTX-S	5/8"	3/8"
10-12 FTX-S	5/8"	3/4"
12 FTX-S	3/4"	3/4"
12-6 FTX-S	3/4"	3/8"
12-8 FTX-S	3/4"	1/2"
12-16 FTX-S	3/4"	1"
12-20 FTX-S	3/4"	1-1/4"
14 FTX-S	7/8"	7/8"

Tube Fitting Part #	End Size	
	1 JIC	2 NPTF
16 FTX-S	1"	1"
16-8 FTX-S	1"	1/2"
16-12 FTX-S	1"	3/4"
16-20 FTX-S	1"	1-1/4"
16-24 FTX-S	1"	1-1/2"
20 FTX-S	1-1/4"	1-1/4"
20-12 FTX-S	1-1/4"	3/4"
20-16 FTX-S	1-1/4"	1"
20-24 FTX-S	1-1/4"	1-1/2"
24 FTX-S	1-1/2"	1-1/2"
24-16 FTX-S	1-1/2"	1"
24-20 FTX-S	1-1/2"	1-1/4"





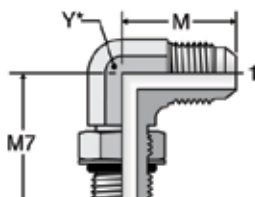
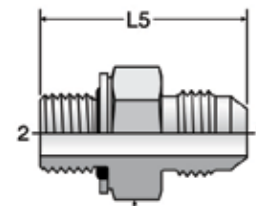
# Adapters

## F4OMX

Male Connector - BSPP  
37° Flare / BSPP-ORR

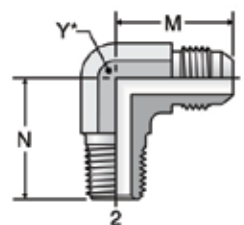
Tube Fitting Part #	End Size	
	1 JIC	2 BSPP
8-4 F4OMXS	1/2"	1/4"
8 F4OMXS	1/2"	3/8"
8-8 F4OMXS	1/2"	1/2"
8-12 F4OMXS	1/2"	3/4"
10-6 F4OMXS	5/8"	3/8"
10 F4OMXS	5/8"	5/8"
12-8 F4OMXS	3/4"	1/2"
12 F4OMXS	3/4"	3/4"

Tube Fitting Part #	End Size	
	1 JIC	2 BSPP
12-16 F4OMXS	3/4"	1"
16-12 F4OMXS	1"	3/4"
16 F4OMXS	1"	1"
16-20 F4OMXS	1"	1-1/4"
20 F4OMXS	1-1/4"	1-1/4"
24-20 F4OMXS	1-1/2"	1-1/4"
24 F4OMXS	1-1/2"	1-1/2"



**C5OX - Straight Thread Elbow**  
37° Flare / SAE - ORB  
SAE 070220

Tube Fitting Part #	End Size	
	1 JIC	2 SAE-ORB
16-12 C5OX-S	1"	3/4"
16-14 C5OX-S	1"	7/8"
16-20 C5OX-S	1"	1-1/4"
16-24 C5OX-S	1"	1-1/2"
20 C5OX-S	1-1/4"	1-1/4"
20-16 C5OX-S	1-1/4"	1"



**CTX - Male Elbow**  
37° Flare / NPTF  
SAE 070202

Tube Fitting Part #	End Size	
	1 JIC	2 SAE-ORB
16-12 CTX-S	1"	3/4"
16-20 CTX-S	1"	1-1/4"
20 CTX-S	1-1/4"	1-1/4"
20-16 CTX-S	1-1/4"	1"
20-24 CTX-S	1-1/4"	1-1/2"
24 CTX-S	1-1/2"	1-1/2"

For more adapters, go to [parker.com/TFD](http://parker.com/TFD)

## 6100 Series

### Coupling Set with WingNut

Part Number With Flange	Part Number Without Flange	Body Size	Thread Size
6100-16	6120-16	1"	1" – 11-1/2 NPTF
6100-20	6120-20	1-1/4"	1-1/4" – 11-1/2 NPTF
6100-24	6120-24	1-1/2"	1-1/2" – 11-1/2 NPTF



### Nipples

Part Number With Flange	Part Number Without Flange	Body Size	Thread Size
6105-16	6115-16	1"	1-11" – 1/2 NPTF
6105-20	6115-20	1-1/4"	1-1/4" – 11-1/2 NPTF
6105-24	6115-24	1-1/2"	1-1/2" – 11-1/2 NPTF



### Dust Caps for Nipples

Part Number With Flange	Body Size
6108-16	1"
6108-20	1-1/4"
6108-24	1-1/2"



### Couplers - Wingnut

Part Number Brass	Body Size	Thread Size
6125-16	1"	1" – 11-1/2 NPTF
6125-20	1-1/4"	1-1/4" – 11-1/2 NPTF
6125-24	1-1/2"	1-1/2" – 11-1/2 NPTF



### Couplers - Hex Nut

Part Number Brass	Body Size	Thread Size
6135-16	1"	1" – 11-1/2 NPTF
6135-20	1-1/4"	1-1/4" – 11-1/2 NPTF
6135-24	1-1/2"	1-1/2" – 11-1/2 NPTF



### Dust Plugs for Couplers

Part Number With Flange	Body Size
6109-16	1"
6109-20	1-1/4"
6109-24	1-1/2"



### Mounting Flanges

Part Number Steel	Body Size
6107-16 (1 piece)	1"
6107-20 (2 piece)	1-1/4"
6107-24 (2 piece)	1-1/2"



## Quick Couplers

### 60 Series

#### Couplers - Female Thread



Part Number Brass	Part Number Steel	Body Size	Thread Size
BH6-60	H6-62	3/4	3/4 — 14 NPTF
	H6-62-T12	3/4	1-1/16 — 12 ORB
BH8-60	H8-62	1	1 — 11-1/2 NPTF
	H8-62-T16	1	1-5/16 — 12 ORB

#### Nipples - Female Thread



Part Number Brass	Part Number Steel	Body Size	Thread Size
BH6-61	H6-63	3/4	3/4 — 14 NPTF
	H6-63-T12	3/4	1-1/16 — 12 ORB
BH8-61	H8-63	1	1 — 11-1/2 NPTF
	H8-63-T16	1	1-5/16 — 12 ORB

### 6600 Series

#### Couplers



Part Number	Body Size	Thread Size	Valve Type
6601-12-12	3/4	3/4 — 14 NPTF	Poppet
6608-12-12	3/4	1-1/16 — 12 ORB	Poppet
6601-16-16	1	1 — 11-1/2 NPTF	Poppet
6608-16-16	1	1-5/16 — 12 ORB	Poppet

#### Nipples



Part Number	Body Size	Port End Thread Size	Valve Type
6602-12-12	3/4	3/4 — 14 NPTF	Poppet
6610-12-12	3/4	1-1/16 — 12 ORB	Poppet
6602-16-16	1	1 — 11-1/2 NPTF	Poppet
6610-16-16	1	1-5/16 — 12 ORB	Poppet

### 4000 Series

#### Couplers



Part Number	Body Size	Port End Thread Size	Valve Type
4150-5	3/4	3/4 — 14 NPTF	Ball
4050-6P	1	1 — 11-1/2 NPTF	Poppet

For more couplers, go to [parker.com/QCD](http://parker.com/QCD)

#### Nipples



Part Number	Body Size	Port End Thread Size	Valve Type
4110-5	3/4	3/4 — 14 NPTF	Ball
4010-6P	1	1 — 11-1/2 NPTF	Poppet

### QuickFit Valve

- Oil change in under 30 minutes
- Single connection point
- Eliminates 100% of spills
- Works with QuickFit bracket, Parker check valve, adapters/fittings and hose



Part Number	Description
CVST-500-QF	Integrated FEM nipple and double check valve

## Push-To-Connect Advantages:

The design of the Parker PTC Composite Air Brake Fitting complies with the performance requirements of D.O.T. FMVSS 571.106, SAE J1131 and SAE J2494-3. No special tools are needed to assemble. Just bottom the tubing in the fitting for a positive seal. Tube support design assures maximum flow.



**Application:** Use with Parker Parflex SAE J844 type A & B nylon tubing. Designed for all D.O.T. truck and trailer applications. Prior to use, all applications should be carefully tested through the range of conditions which may be encountered.

**Temperature Ranges:** Variations from -40°F to +200°F.

**Working Pressure Ranges:** 250 psi.

### 32PTC - Union

Part Number	Tube Size
32PTC-6	3/8"
32PTC-8	1/2"
32PTC-10	5/8"
32PTC-12	3/4"

### 362PTC - Union Y

Part Number	Tube Size
362PTC-4	1/4"
362PTC-6	3/8"
362PTC-8	1/2"

### 364PTC - Union Tee

Part Number	Tube Size
364PTC-4	1/4"
364PTC-6	3/8"
364PTC-8	1/2"

### 365PTC - 90° Union Elbow

Part Number	Tube Size
365PTC-6	3/8"
365PTC-8	1/2"

### 368PTC

#### Union Y Male Connector

Part Number	Tube Size	Pipe Thread
368PTC-4-2	1/4"	1/8"
368PTC-4-4	1/4"	1/4"
368PTC-6-4	3/8"	1/4"
368PTC-8-6	1/2"	3/8"
368PTC-8-8	1/2"	1/2"

### 369PTC - 90° Male NPT Elbow

Part Number	Tube Size	Pipe Thread
369PTC-4-2	1/4"	1/8"
369PTC-4-4	1/4"	1/4"
369PTC-4-6	3/8"	1/4"
369PTC-6-2	3/8"	1/8"
369PTC-6-4	3/8"	1/4"
369PTC-6-6	3/8"	3/8"
369PTC-6-8	3/8"	1/2"
369PTC-8-4	1/4"	1/2"
369PTC-8-6	1/2"	3/8"
369PTC-8-8	1/2"	1/2"
369PTC-10-6	1/2"	1/2"
369PTC-10-8	5/8"	1/2"
369PTC-12-8	1/2"	3/8"
369PTC-12-12	3/4"	3/4"

### 370PTC

#### 90° Female NPT Elbow

Part Number	Tube Size	Pipe Thread
370PTC-4-2	1/4"	1/8"
370PTC-4-4	1/4"	1/4"
370PTC-6-2	1/8"	3/8"
370PTC-6-4	3/8"	1/4"
370PTC-6-6	3/8"	3/8"
370PTC-8-6	1/2"	3/8"
370PTC-8-8	1/2"	1/2"
370PTC-10-8	5/8"	1/2"

### 371PTC - Male Run Tee

Part Number	Tube Size	Pipe Thread
371PTC-4-2	1/4"	1/8"
371PTC-4-4	1/4"	1/4"
371PTC-4-6	1/4"	3/8"
371PTC-6-4	3/8"	1/4"
371PTC-6-6	3/8"	3/8"
371PTC-8-4	1/2"	1/4"
371PTC-8-6	1/2"	3/8"
371PTC-8-8	1/2"	1/2"
371PTC-10-8	5/8"	1/2"

### 372PTC - Male Branch Tee

Part Number	Tube Size	Pipe Thread
372PTC-4-2	1/4"	1/8"
372PTC-4-4	1/4"	1/4"
372PTC-4-6	1/4"	3/8"
372PTC-6-4	3/8"	1/4"
372PTC-6-6	3/8"	3/8"
372PTC-8-6	1/2"	3/8"
372PTC-8-8	1/2"	1/2"
372PTC-10-8	5/8"	1/2"

### 379PTC - 45° Male NPT Elbow

Part Number	Tube Size	Pipe Thread
379PTC-4-2	1/4"	1/8"
379PTC-4-4	1/4"	1/4"
379PTC-6-2	3/8"	1/8"
379PTC-6-4	3/8"	1/4"
379PTC-6-6	3/8"	3/8"
379PTC-6-8	3/8"	1/2"
379PTC-8-4	1/2"	1/4"
379PTC-8-6	1/2"	3/8"
379PTC-8-8	1/2"	1/2"
379PTC-10-6	1/2"	1/2"
379PTC-10-8	5/8"	1/2"
379PTC-12-8	1/2"	3/8"

For more brass fittings, go to [parker.com/FSC](http://parker.com/FSC)

# Tubing

## Tractor-to-Trailer Coils



### Series BrakCoil® - Air Brake Connection

Kit Part No.	Individual Coil Part No.	Tube O.D.		Valve Tail Length		Brass Male Ends (NPT)		Working Length		Number of Coils
		inch	mm	inch	mm	Valve inch	Gladhand inch	ft	mtr	
731516	731512-RED 731512-BLU	1/2	12.7	12	305	1/2	1/2	15	4.6	21-1/2
731522	731513-RED 731513-BLU	1/2	12.7	40	1016	1/2	1/2	15	4.6	21-1/2
741526	731612-RED 731612-BLU	1/2	12.7	40	1016	3/8	3/8	15	4.6	21-1/2
751641	741590-RED 741590-BLU	1/2	12.7	6	152	1/2	1/2	12	3.7	18-1/2

### Series Fifth Wheel Slider

Part Number	Fittings	Pigtail Length		Maximum Extended Length		Retracted Length	
		inch	mm	inch	mm	inch	mm
811537	(2) 68NTA-4-4	2	51	74	1880	10	254

**WARNING:** This product can expose you to chemicals including Lead, which is known to the State of California to cause cancer and birth defects or other reproductive harm. For more information go to [www.P65Warnings.ca.gov](http://www.P65Warnings.ca.gov)

## Air Brake Tubing - Series 1120, PFT



### Series 1120, PFT - Airbrake Tubing

Part Number	Tube O.D.		Tube I.D.		Nominal Wall Thickness		Minimum Burst Pressure		Minimum Bend Radius		Weight		Color
	inch	mm	inch	mm	inch	mm	psi	bar	inch	mm	lbs./ft.	kg/mtr	
PFT-2A-XXX-1000*	1/8	3.2	.079	2.0	.023	0.6	1000	68.9	3/8	9.5	.003	.005	●
PFT-2.5-XXX-250	5/32	4.0	.092	2.3	.032	0.8	1200	82.7	1/2	12.5	.006	.008	●
PFT-3A-XXX-1000*	3/16	4.8	.118	3.0	.035	0.9	1200	82.7	3/4	19.0	.008	.011	●
1120-4A-XXX-1000	1/4	6.4	.170	4.3	.040	1.0	1200	82.7	1	25.5	.012	.018	● ● ● ● ● ● ● ●
PFT-5A-BLK-500*	5/16	7.9	.232	5.9	.040	1.0	1000	68.9	1-1/4	32.0	.016	.023	●
1120-6B-XXX-100	3/8	9.5	.251	6.4	.062	1.6	1400	96.5	1-1/2	38.0	.027	.040	●
1120-6B-XXX-500	3/8	9.5	.251	6.4	.062	1.6	1400	96.5	1-1/2	38.0	.027	.040	● ● ● ● ● ● ● ●
1120-8B-XXX-500	1/2	12.7	.376	9.6	.062	1.6	950	65.5	2	51.0	.039	.058	● ● ● ● ● ● ● ●
1120-10B-XXX-250	5/8	15.9	.441	11.2	.092	2.3	900	62.1	2-1/2	63.5	.070	.104	● ● ● ● ● ● ● ●
1120-12B-XXX-250	3/4	19.1	.566	14.4	.092	2.3	800	55.2	3	76.0	.086	.128	● ● ● ● ● ● ● ●

Note: \*2A, 3A, and 5A are not DOT sizes

### Color Code Guide

●	BLK	Black
●	BLU	Blue
●	BRN	Brown
●	GRN	Green

●	ORG	Orange
●	PUR	Purple
●	RED	Red
●	SIL	Silver

●	TAN	Tan
●	YEL	Yellow
○	WHT	White

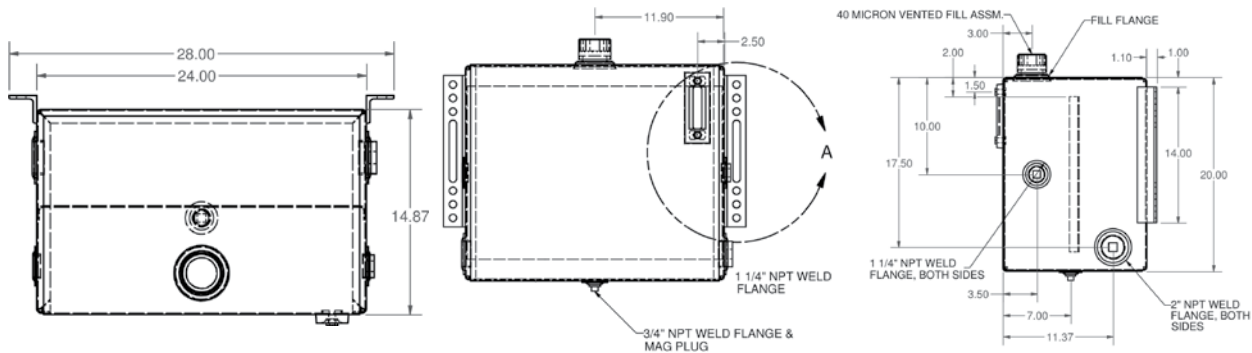
**WARNING:** The products listed can expose you to chemicals including Nickel, which is known to the State of California to cause cancer, and birth defects or other reproductive harm. For more information go to [www.P65Warnings.ca.gov](http://www.P65Warnings.ca.gov)



# Reservoirs - Side Frame Mount Tanks

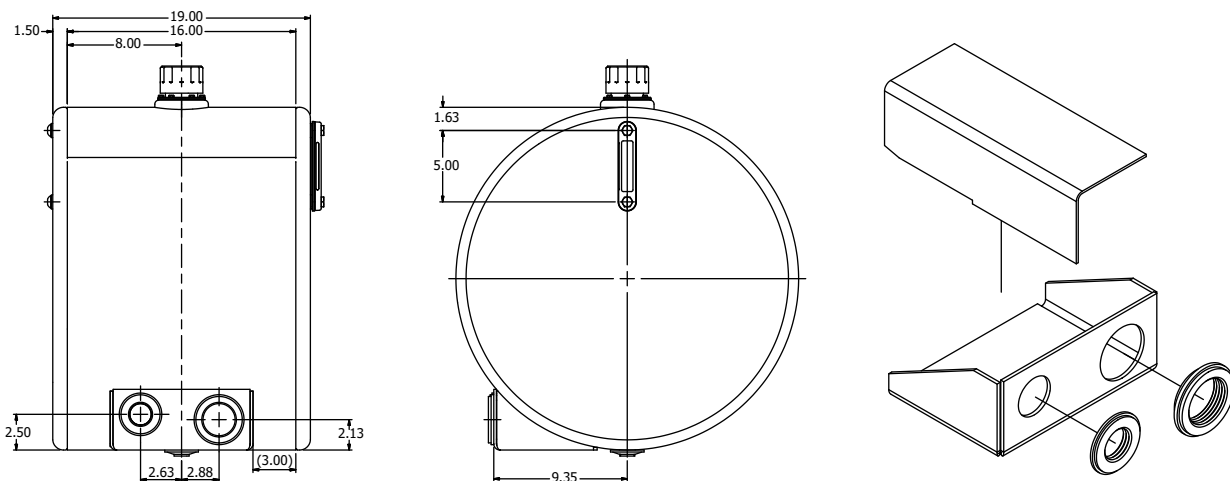
## Parker Part Number - SMS30

- 30 gallon reservoir
- Steel tank assembly, fully baffled, with pre-punched and slotted 2"x 2" mounting angles
- Two 2" NPT suction ports, (2) two 1-1/4" return line ports
- One 2" port plug and (1) one 1-1/4" port plug
- Magnetic drain plug, filler/breather assembly, including 40 micron filter w/chain
- 5" Oil level/temp sight gauge
- Unit packaged in a single carton



## Parker Part Number - SMA35, SMA35SS

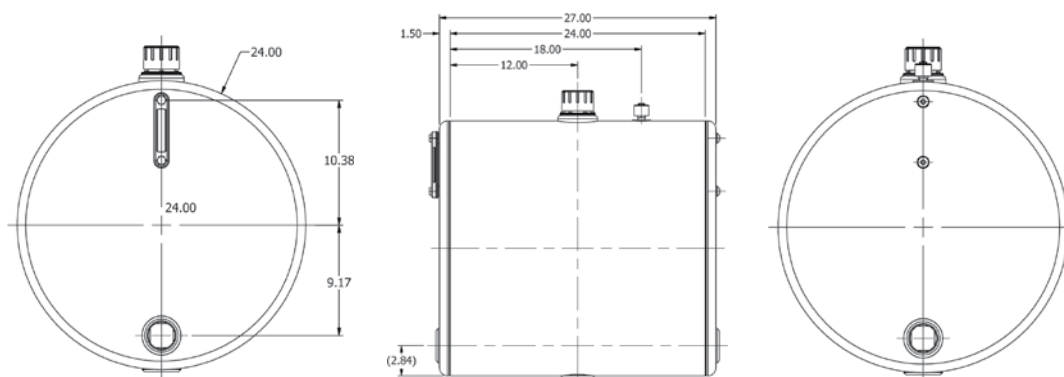
- 35 gallon reservoir
- Roll-formed cylindrical aluminum tank with domed ends that are die stamped
- Three heavy duty 1-1/4" NPT ports with built-in diffusers
- One 1-1/4" port plug
- Bright mill finish
- AMK-624-C Mounting Kit, which includes two frame mount powder coated J-brackets and two rubber shielded, power coated carbon steel strap assemblies



## Reservoirs - Side Frame Mount Tanks

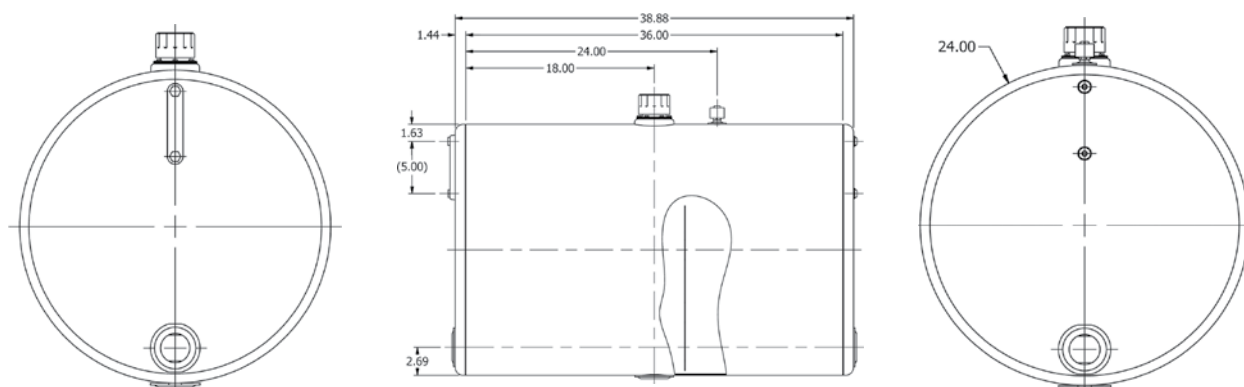
### Parker Part Number - SMS50, SMA50, SMA50SS

- 50 gallon reservoir
- Tank assembly ships in one carton with mounting kit shipped in separate carton
- SMA50SS comes with stainless steel straps
- Each tank assembly is provided with (3) three 2" NPT ports
- Auxiliary mushroom vent(s) in tank top to increase air exchange
- Filler/breather assembly includes 40 micron filler/breather cap (chain mounted) with nylon strainer basket and bayonet closure
- All ports in each unit are internally diffused, one port plug provided



### Parker Part Number - SMS75, SMA75, SMA75SS

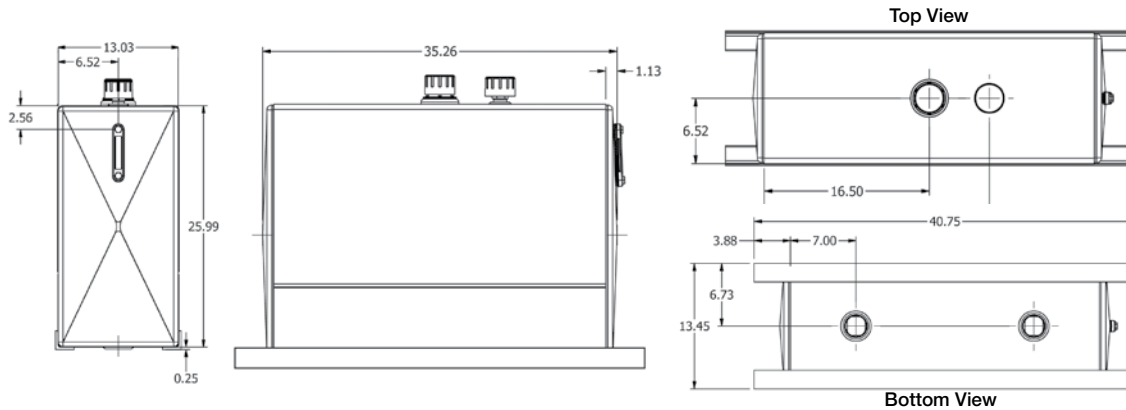
- 75 gallon reservoir
- Tank assembly ships in one carton with mounting kit shipped in separate carton
- Tank assembly is provided with (3) three 2" NPT ports
- Auxiliary mushroom vent(s) in tank top to increase air exchange
- Filler/breather assembly includes a 40 micron filler/breather cap (chain mounted) with nylon strainer basket and bayonet closure
- All ports in each unit are internally diffused, one port plug provided



## Reservoirs - Behind Cab Tanks

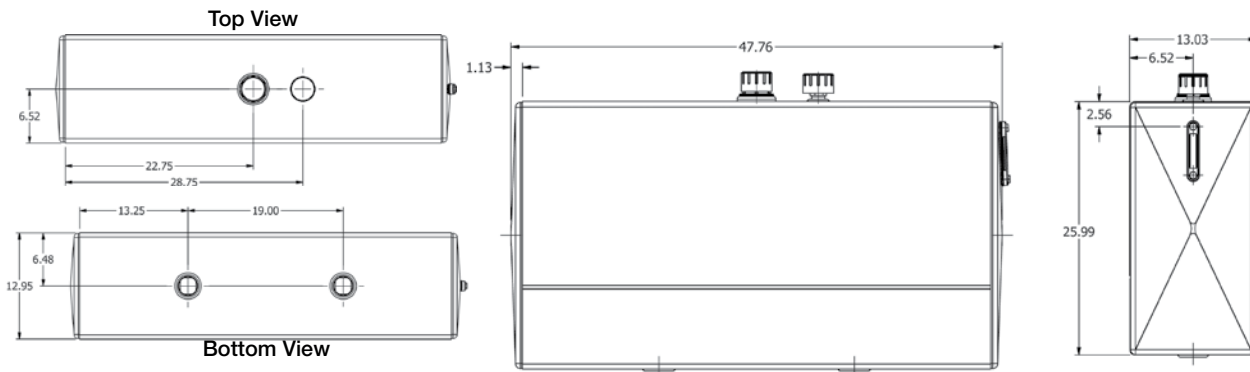
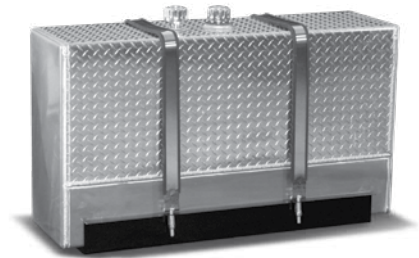
### Parker Part Number - URS50, URA50

- 50 gallon reservoir
- Steel tank assembly with (2) two 2" screw-in NPT bottom ports
- Aluminum tank assembly with (2) two 1-1/4" screw-in NPT bottom ports
- Filler/breather assembly including a 40 micron filler/breather cap (chain mounted)
- Strapless design
- Mounting kit included
- All ports in each unit are internally diffused, one port plug provided



### Parker Part Number - URA70, URS70

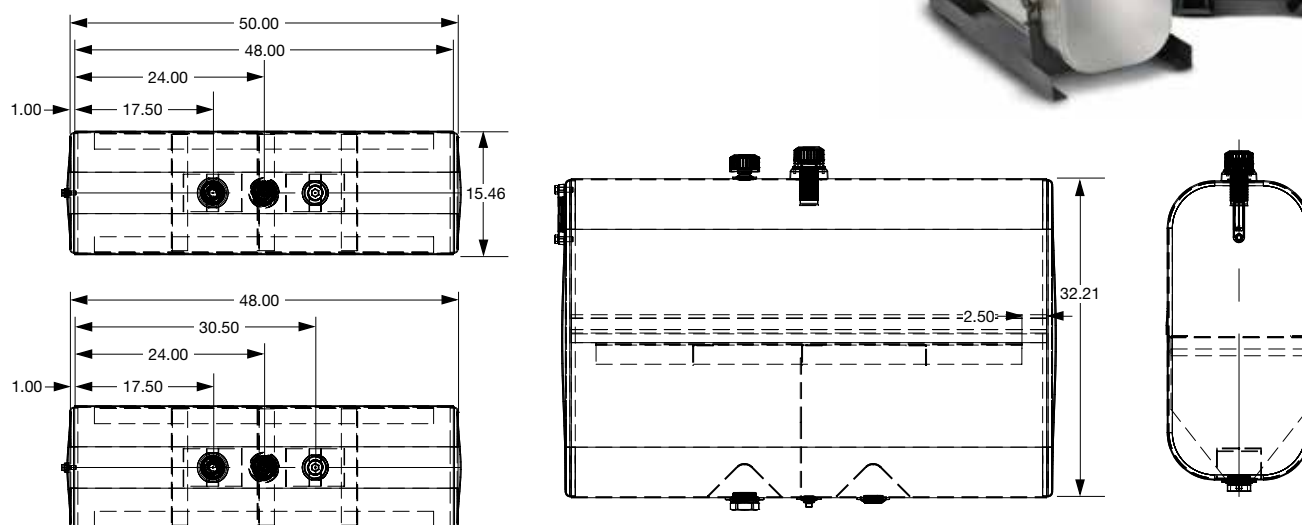
- 70 gallon reservoir
- Aluminum tank assembly with (2) two 2" screw-in NPT bottom ports
- Filler/breather assembly including a 40 micron filler/breather cap (chain mounted)
- Auxiliary vent
- Mounting kit included
- All ports in each unit are internally diffused, one port plug provided



## Reservoirs - Behind Cab Tanks

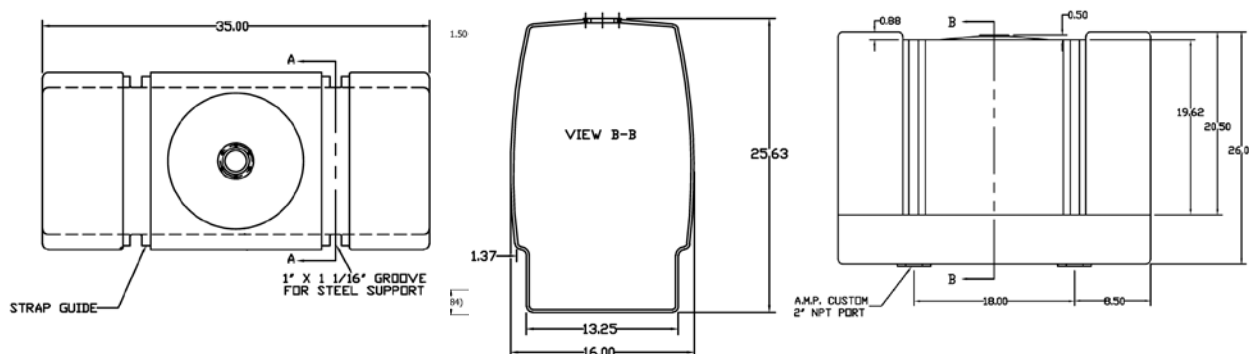
### Parker Part Number - BC100K, BCA100K, BCA100KS

- Steel tanks are constructed with baffles (vortex shield), and come with filler breathers, sight level gauges
- All mounting hardware is included
- All tanks are available in aluminum
- Stainless steel strap part number BCSS75



### Parker Part Number - URP50

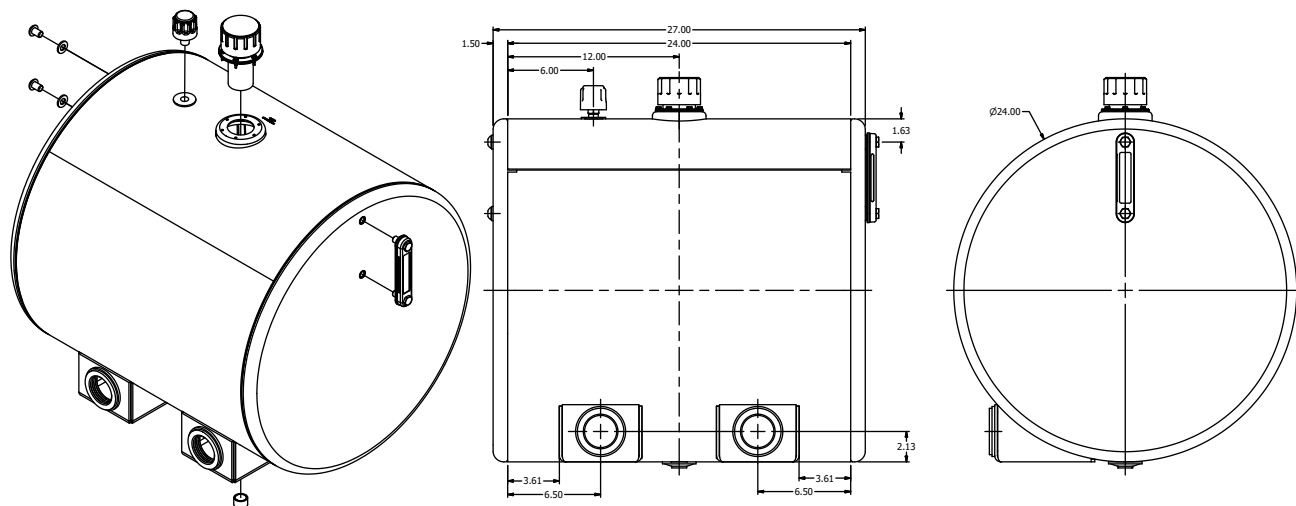
- Extra large 63 gallon capacity/50 gallon usable
- Rugged reinforced-polyethylene
- Dual 2" NPT ports - field serviceable if necessary
- Includes heavy duty strapless hold down system with powder coated steel saddle
- Pre-assembles for easy installation
- Screw-in diffuser - 2" to 1"
- Sight tempature gauge standard
- Heavy duty chain mounted filler/breather cap - 40 micron filtration standard



## Reservoirs - Side Frame Mount Tank; Rear Ports

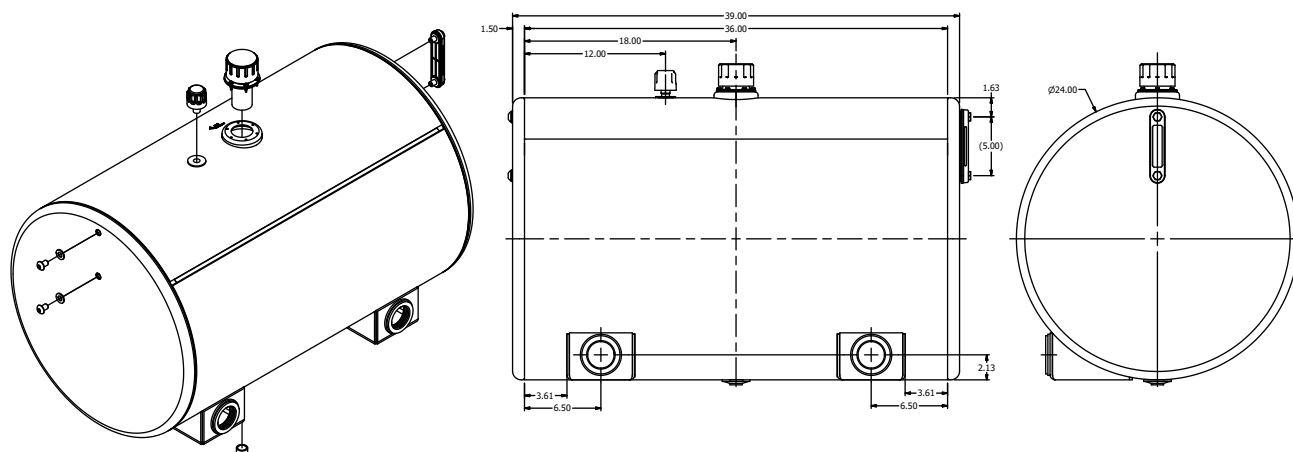
### Parker Part Number - SMA50-R & SMA50SS-R

- 50 gallon reservoir
- Tank assembly ships in one carton with mounting kit shipped in separate carton
- SMA50SS comes with stainless steel straps
- Each tank assembly is provided with (3) three 2" NPT ports
- Auxiliary mushroom vent(s) in tank top to increase air exchange
- Filler/breather assembly includes 40 micron filler/breather cap (chain mounted) with nylon strainer basket and bayonet closure
- All ports in each unit are internally diffused, one port plug provided



### Parker Part Number - SMA75-R & SMA75SS-R

- 75 gallon reservoir
- Tank assembly ships in one carton with mounting kit shipped in separate carton
- Tank assembly is provided with (3) three 2" NPT ports
- Auxiliary mushroom vent(s) in tank top to increase air exchange
- Filler/breather assembly includes a 40 micron filler/breather cap (chain mounted) with nylon strainer basket and bayonet closure
- All ports in each unit are internally diffused, one port plug provide

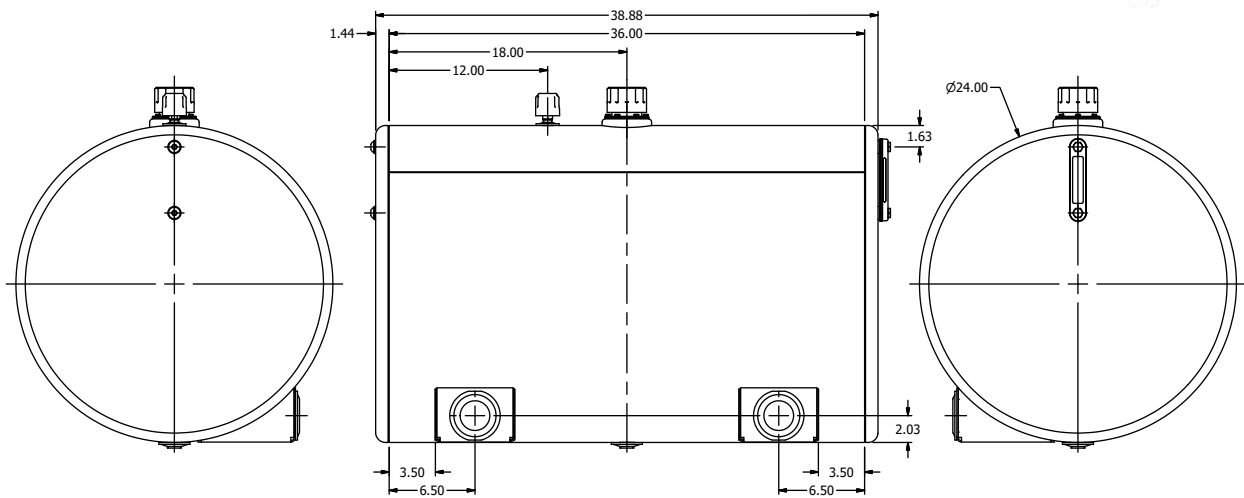




## Reservoirs - Side Frame Mount Tank; Rear Ports

### Parker Part Number - SMS75-R & SMS75SS-R

- Steel Saddlemount - 75 Gallon



## Oil Coolers

The ULDC oil cooler with 12 or 24V DC motor is optimized for use in the mobile industry. Together with a wide range of accessories, the ULDC cooler is suitable for installation in most applications and environments.

- Optimized design with the right choice of materials and components, ensures a reliable and long lasting cooler with low service and maintenance costs.
- Compact design resulting in a lighter weight unit, yet with higher cooling capacity and lower pressure drop.
- Easy to maintain and easy to retrofit into many applications.
- DC motor 12V/24V.
- Quiet fan and fan motor.



## Order Key for ULDC Oil Coolers

All positions must be filled in when ordering.

### Example:

ULDC -	007	-A	-000	SA
Series	Model	Motor Type	Thermoswitch	Core Bypass
1	2	3	4	5

#### 1. OIL COOLER SERIES WITH AC MOTOR; ULAC

#### 2. COOLER SIZE/MODEL

004, 007, 011, 016, 020, 023, 033

#### 3. MOTOR VOLTAGE

12V	= A
24V	= B

#### 4. THERMOSWITCH

No thermoswitch	= 000
100 °F	= 100
120 °F	= 120
140 °F	= 140
160 °F	= 160
175 °F	= 175

#### 5. CORE BYPASS\*

No Bypass	= SW
20 psi External Hose Bypass (standard option)	= SA
65 psi External Hose Bypass (standard option)	= SB

\*The standard cores are single pass. Two pass cores and other options available upon request, please consult Accumulator and Cooler Division.

### FLUID COMBINATIONS

Mineral oil  
Oil/water emulsion  
Water glycol  
Phosphate ester

### MATERIAL

Cooler core	Aluminum
Fan blades/guard	Glass fiber reinforced polypropylene
Fan housing	Steel
Other parts	Steel
Surface treatment	Electrostatically powder-coated

### COOLER CORE

Maximum static working pressure	300 psi
Dynamic working pressure	200 psi**
Heat transfer tolerance	± 6 %
Maximum oil inlet temperature	250°F

\*\*Tested in accordance with ISO/DIS 10771-1

### COOLING CAPACITY CURVES

The cooling capacity curves in this catalog are created using oil type ISO VG 46 at 250°F.

### CONTACT PARKER FOR ADVICE ON

Oil temperatures > 250°F  
Oil viscosity > 100 cSt/500 SSU  
Aggressive environments  
Environments with heavy airborne particulates  
High-altitude locations

## Oil Coolers

### Oil Coolers (Cont.)

Available Part Numbers	Available Part Numbers
ULDC 003 B 000SW	ULDC 016 B 000SW
ULDC 004 A 000SW	ULDC 020 A 000SW
ULDC 004 B 000SW	ULDC 020 B 000SW
ULDC 007 A 000SW	ULDC 023 A 000SW
ULDC 011 A 000SW	ULDC 023 B 000SW
ULDC 011 B 000SW	ULDC 033 A 000SW
ULDC 016 A 000SW	ULDC 033 B 000SW

### External Bypass Kits

#### Model SA (20 PSI)

Part Number	Cooler Size
BP-007-SA	007
BP-011-SA	011
BP-016-SA	016
BP-020-SA	020
BP-023-SA	023
BP-033-SA	033 & 044
BP-058-SA	058
BP-078-SA	078
BP-112-SA	112

#### Model SB (65 PSI)

Part Number	Cooler Size
BP-007-SB	007
BP-011-SB	011
BP-016-SB	016
BP-020-SB	020
BP-023-SB	023
BP-033-SB	033 & 044
BP-058-SB	058
BP-078-SB	078
BP-112-SB	112

### Thermo Switch

#### Fixed Temperature Setting

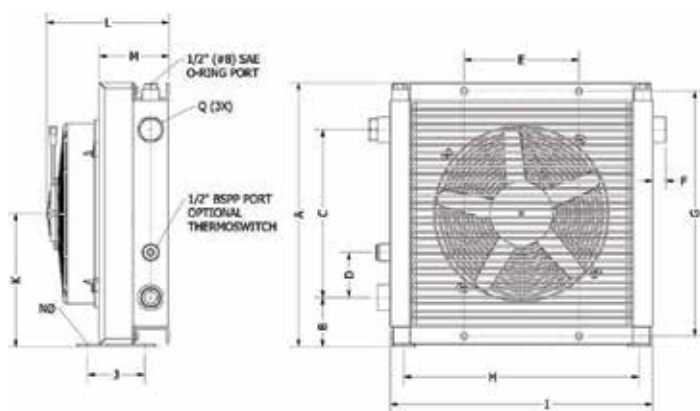
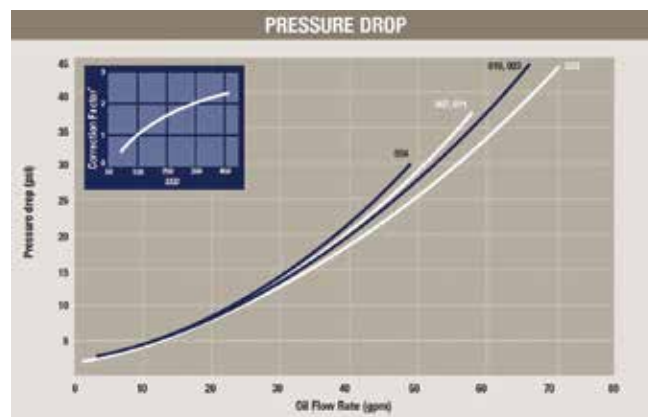
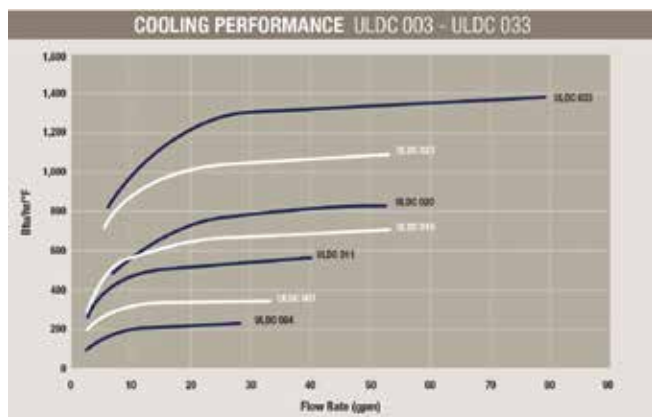
All of the following switches are offered in 1/2" BSP male connection.

Part Number	Temperature
ATS-GF-C100	104° F
ATS-GF-C120	122° F
ATS-GF-C140	140° F
ATS-GF-C160	160° F
ATS-GF-C175	175° F



## ULDC Cooling Performance

The cooling capacity curves are based on an ETD (Entering Temperature Difference) of 1°F. For example, oil temperature of 140°F and air temperature of 70°F yields a temperature difference of 70 °F. Multiply the number from the cooling graphs corresponding to the specific flow rate by the ETD for the particular application to get the total heat duty.



Type	Weight lbs (Approx.)	Acoustic Pressure LpA dB(A) 3 Ft.*	Max. Current (Amps.)**		Q SAE O-Ring Boss
ULDC 004	13	63	7	4	1" (#16)
ULDC 007	20	71	13	6	1" (#16)
ULDC 011	26	75	20	12	1" (#16)
ULDC 016	33	75	20	12	1" (#16)
ULDC 020	40	82	20	10	1" (#16)
ULDC 023	55	75	20	12	1" (#16)
ULDC 033	66	75	20	12	1-1/4" (#20)

\* Noise level tolerance  $\pm 3$  dB(A).

\*\* ULDC-023 & ULDC-033 Cooler assemblies come with two fans each. The indicated max. current is for one fan only.

Type	A	B	C	D	E	F	G	H	I	J	K	L	M	NO dia./oblong
ULDC 004	10.0	3.5	3.5	-	6.0	0.9	9.0	5.3	10.5	5.8	5.2	6.0	4.3	0.35 x 0.55
ULDC 007	13.3	3.7	6.3	3.2	8.0	0.9	11.7	8.0	13.0	10.5	6.8	6.8	4.3	0.35
ULDC 011	15.6	3.4	9.0	3.2	8.0	0.9	14.3	14.2	15.7	4.0	7.9	8.5	4.9	0.35 x 1.1
ULDC 016	18.3	3.4	11.7	3.2	8.0	0.9	17.0	16.4	18.3	4.0	9.3	8.3	4.8	0.35 x 1.1
ULDC 020	20.1	3.0	13.8	2.8	8.0	0.9	18.7	18.5	20.1	4.0	10.1	8.3	4.9	0.35 x 0.55
ULDC 023	25.0	5.4	14.9	3.2	14.0	-	20.2	-	24.2	11.4	7.9/18.0	8.6	4.9	0.51
ULDC 033	-	3.4	19.1	3.2	14.0	1.0	24.5	-	25.0	11.4	7.9/18.0	10.1	6.5	0.51

All dimensions listed above are in inches.

## Telescopic Cylinders

### Updated Design from the Industry Leader

Parker Cylinder Division has been manufacturing hydraulic cylinders for over 100 years and is a leading supplier to the truck, mining, material handling, and refuse markets. The SAT Series cylinder continues the company's dedication to providing industry leading products focused on reducing the long term costs of operating critical capital equipment. This updated design provides the following benefits over our existing product offering:



### Design Features

Increased Operating Pressure	Cylinder rated to handle 2500 psi operating pressure representing a 25% increase over previous product offering
Increased Lifting Force	Larger plunger size and increased operating pressure result in increased lifting force over current cylinder
Improved Sealing Technology	Polyurethane U-Cup seals and Umbrella style wipers provide a more robust sealing package than existing cylinder
Reduced Weight	New cylinder design is on average 4% lighter due to smaller gaps between stages requiring less hydraulic fluid to fill cylinder
Reduced Cycle Time	Decreased space between sleeves and less oil to fill cylinder results in 13% average reduction in cylinder cycle time
Increased Safety Factor	Thicker walls and wider bearings result in a 25% average improvement to cylinder column strength

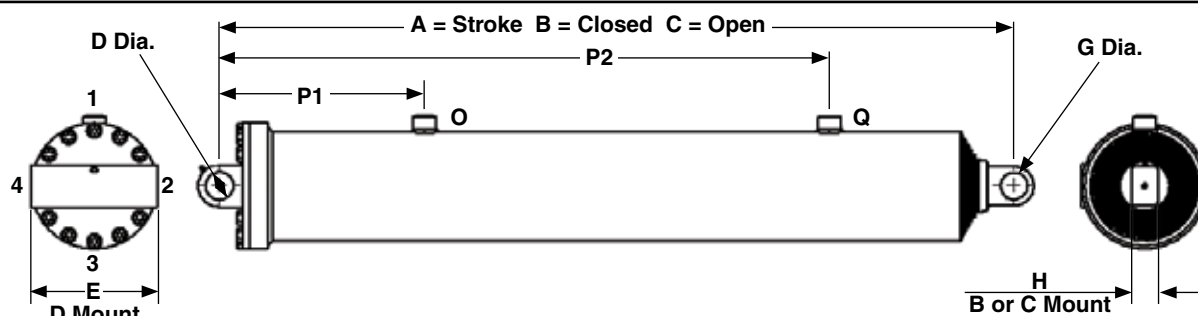


## S Series to SAT Series Model Code Conversion

S Series Part Number	Model Code	SAT Series Part Number	Model Code
3771513168	S53DC-65-104.00	1HSAT000250002	SAT53DC104.00-AAAB-47.69
3771513169	S53DC-65-107.56	1HSAT000250003	SAT53DC107.00-AAAB-48.50
3771513170	S53DC-65-126.62	1HSAT000250004	SAT53DC126.00-AAAB-54.81
3771513171	S53DC-66-84.00	1HSAT000250001	SAT53DC84.00-ABAA-41.19
3771513172	S53DC-66-72.00	1HSAT000250005	SAT53DC72.00-ABAA-37.19
3771513177	S53DC-68-120.00	1HSAT000250006	SAT53DC120.00-BCDB-52.81
3771513178	S53DC-68-123.00	1HSAT000250007	SAT53DC123.00-BCDB-54.50
3771413308	S63DC-96-130.19	1HSAT000250040	SAT63DC129.56-AACB-56.00
3771413309	S63DC-97-111.00	1HSAT000250017	SAT63DC111.00-AAAB-49.94
3771413310	S63DC-97-123.00	1HSAT000250008	SAT63DC123.00-AAAB-54.94
3771413319	S63DC-101-104.00	1HSAT000250010	SAT63DC104.00-AAAB-47.50
3771413320	S63DC-101-107.56	1HSAT000250011	SAT63DC107.00-AAAB-48.50
3771413321	S63DC-101-120.00	1HSAT000250012	SAT63DC120.00-AAAB-52.81
3771413322	S63DC-101-126.62	1HSAT000250013	SAT63DC126.00-AAAB-54.81
3771413324	S63DC-101-140.25	1HSAT000250009	SAT63DC140.25-AAAB-59.81
3771413326	S63DC-102-126.00	1HSAT000250014	SAT63DC126.00-CCDB-55.50
3771413327	S63DC-102-138.00	1HSAT000250018	SAT63DC138.00-CCDB-59.50
3771413328	S63DC-102-150.00	1HSAT000250015	SAT63DC150.00-CCDB-66.00
3771413329	S63DC-102-162.00	1HSAT000250016	SAT63DC162.00-CCDB-67.50
3771414058	S64DB-12-135.00	1HSAT000250019	SAT64DB135.00-DAAE-47.19
3771414056	S64DB-12-156.00	1HSAT000250020	SAT64DB156.00-DAAE-53.19
3771414059	S64DC-14-156.00	1HSAT000250021	SAT64DC156.00-EAAB-53.62
3772513128	S73DC-66-124.88	1HSAT000250022	SAT73DC124.62-AAAB-54.81
3772513129	S73DC-66-140.44	1HSAT000250023	SAT73DC140.18-AAAB-60.00
3772514125	S74DC-74-135.00	1HSAT000250024	SAT74DC135.00-AAAB-48.44
3772514122	S74DC-74-140.00	1HSAT000250027	SAT74DC140.00-AAAB-49.75
3772514123	S74DC-74-156.00	1HSAT000250029	SAT74DC156.00-AAAB-53.75
3772514120	S74DC-74-161.75	1HSAT000250025	SAT74DC161.75-AAAB-55.31
3772514130	S74DC-74-167.00	1HSAT000250028	SAT74DC167.00-AAAB-56.25
3772514126	S74DC-74-180.00	1HSAT000250026	SAT74DC180.00-AAAB-61.12
3772914082	S84DC-66-161.00	1HSAT000250032	SAT84DC161.00-AAAF-55.75
3772914084	S84DC-66-180.00	1HSAT000250030	SAT84DC180.00-AAAF-59.75
3772914085	S84DC-66-188.00	1HSAT000250031	SAT84DC188.00-AAAF-61.75
3772915166	S85DC-66-190.00	1HSAT000250034	SAT85DC189.00-AAAF-54.62
3772915167	S85DC-66-220.00	1HSAT000250033	SAT85DC220.00-AAAF-60.00
3772915161	S85DC-66-235.00	1HSAT000250037	SAT85DC234.00-AAAF-64.62
3772915160	S85DC-66-250.00	1HSAT000250035	SAT85DC249.00-AAAF-68.62
3772915165	S85DC-66-265.00	1HSAT000250036	SAT85DC265.00-AAAF-71.00



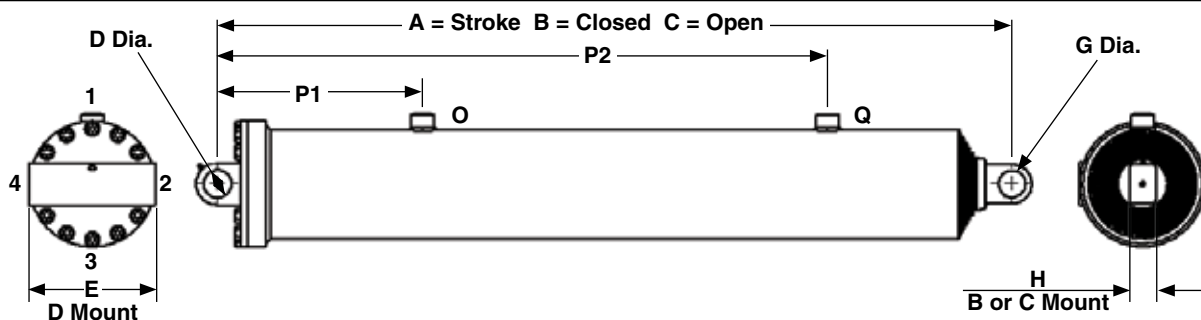
# Telescopic Cylinders



## SAT Cylinder List for Stock Cylinders

Cylinder Part Number	Model Code	Nomial Stage OD	Number Stages	A Stroke	B Closed	C Open	D Pin	E Width	G Pin
1HSAT000250001	SAT53DC084.00-ABAA-41.19	5	3	84	41.19	125.19	2	7	1.63
1HSAT000250002	SAT53DC104.00-AAAB-47.69	5	3	104	47.69	151.69	2	7	1.75
1HSAT000250003	SAT53DC107.00-AAAB-48.50	5	3	107	48.5	155.5	2	7	1.75
1HSAT000250004	SAT53DC126.00-AAAB-54.81	5	3	126	54.81	180.81	2	7	1.75
1HSAT000250005	SAT53DC72.00-ABAA-37.19	5	3	72	37.19	109.19	2	7	1.63
1HSAT000250006	SAT53DC120.00-BCDB-52.81	5	3	120	52.81	172.81	2	7.75	1.75
1HSAT000250007	SAT53DC123.00-BCDB-54.50	5	3	123	54.5	177.5	2	7.75	1.75
1HSAT000250008	SAT63DC123.00-AAAB-54.94	6	3	123	54.94	177.94	2	7	2
1HSAT000250009	SAT63DC140.25-AAAB-59.81	6	3	140.25	59.81	200.06	2	7	2
1HSAT000250010	SAT63DC104.00-AAAB-47.50	6	3	104	47.5	151.5	2	7	2
1HSAT000250011	SAT63DC107.00-AAAB-48.50	6	3	107	48.5	155.5	2	7	2
1HSAT000250012	SAT63DC120.00-AAAB-52.81	6	3	120	52.81	172.81	2	7	2
1HSAT000250013	SAT63DC126.00-AAAB-54.81	6	3	126	54.81	180.81	2	7	2
1HSAT000250014	SAT63DC126.00-CCDB-55.50	6	3	126	55.5	181.5	2.38	8	2.13
1HSAT000250015	SAT63DC150.00-CCDB-66.00	6	3	150	66	216	2.38	8	2.13
1HSAT000250016	SAT63DC162.00-CCDB-67.50	6	3	162	67.5	229.5	2.38	8	2.13
1HSAT000250017	SAT63DC111.00-AAAB-49.94	6	3	111	49.94	160.94	2	7	2
1HSAT000250018	SAT63DC138.00-CCDB-59.50	6	3	138	59.5	197.5	2.38	8	2.13
1HSAT000250019	SAT64DB135.00-DAAE-47.19	6	4	135	47.19	182.19	1.75	8	1.5

# Telescopic Cylinders

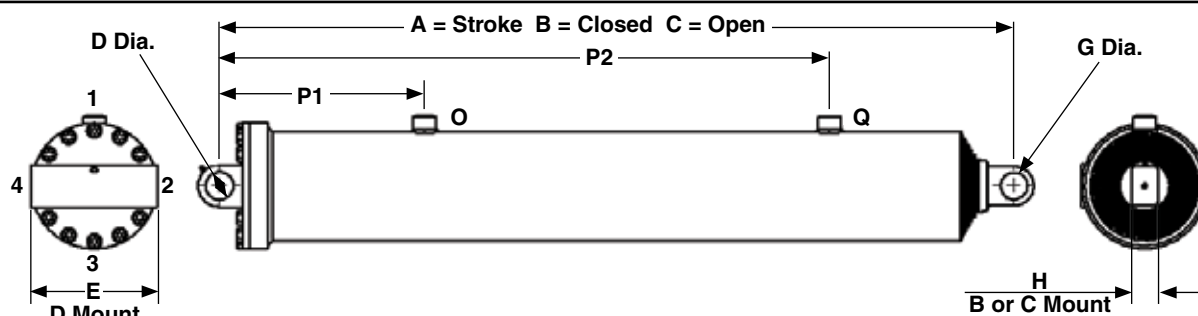


H Width	O Port Size	P1 Loc.	P1 Orientation 1,2,3, or 4	Q Port Size	P2 Loc.	P2 Orientation 1,2,3, or 4	Gallons To Fill	Gallons To Extend	Weight Lbs. (Dry)	Cylinder Part Number
1.5	3/4" NPT	13	1				0.44	4.66	173	1HSAT000250001
2	1" NPT	15.06	1				0.56	5.79	200	1HSAT000250002
2	1" NPT	37.06	1				0.58	5.95	203	1HSAT000250003
2	1" NPT	39.38	1				0.66	7	229	1HSAT000250004
1.5	3/4" NPT	23.06	1				0.38	4.38	157	1HSAT000250005
1.5	#16 SAE 90D	26.25	1				0.62	6.6	222	1HSAT000250006
1.5	#16 SAE 90D	26.25	1				0.65	6.85	229	1HSAT000250007
2	1" NPT	28.25	1				0.76	9.59	277	1HSAT000250008
2	1" NPT	29.75	1				0.87	10.96	301	1HSAT000250009
2	1" NPT	15.06	1				0.7	8.1	240	1HSAT000250010
2	1" NPT	15.06	1				0.72	8.34	245	1HSAT000250011
2	1" NPT	15.06	1				0.75	9.34	266	1HSAT000250012
2	1" NPT	15.06	1				0.79	9.81	276	1HSAT000250013
1.5	#16 SAE 90D	15.06	1				0.79	9.82	280	1HSAT000250014
1.5	#16 SAE 90D	15.06	1				0.94	11.69	332	1HSAT000250015
1.5	#16 SAE 90D	15.06	1				1.01	12.63	339	1HSAT000250016
2	1" NPT	34.5	1				0.87	10.96	252	1HSAT000250017
1.5	#16 SAE 90D	24.81	1				0.86	10.76	300	1HSAT000250018
2.69	3/4" NPT	23.25	1	3/4" NPT	23.25	2	0.77	9.1	286	1HSAT000250019



**WARNING:** This product can expose you to chemicals including Lead or DEHP, which is known in the state of California to cause cancer, birth defects or other reproductive harm. For more information go to [www.P65Warnings.ca.gov](http://www.P65Warnings.ca.gov)

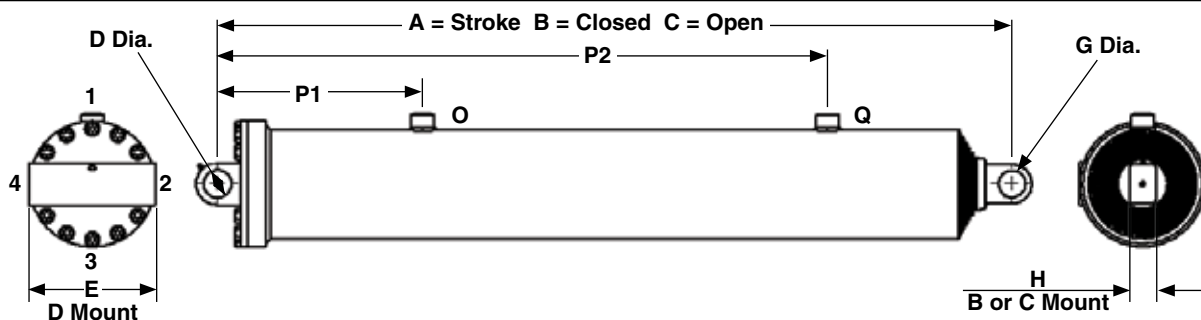
## Telescopic Cylinders



### SAT Cylinder List for Stock Cylinders (Continued)

Cylinder Part Number	Model Code	Nomial Stage OD	Number Stages	A Stroke	B Closed	C Open	D Pin	E Width	G Pin
1HSAT000250020	SAT64DB156.00-DAAE-53.19	6	4	156	53.19	209.19	1.75	8	1.5
1HSAT000250021	SAT64DC156.00-EAAB-53.62	6	4	156	53.62	209.62	2	7.25	2
1HSAT000250022	SAT73DC124.62-AAAB-54.81	7	3	124.62	54.81	179.43	2	8.25	2
1HSAT000250023	SAT73DC140.18-AAAB-60.00	7	3	140.18	60	200.18	2	8.25	2
1HSAT000250024	SAT74DC135.00-AAAB-48.44	7	4	135	48.44	183.44	2	8.25	2
1HSAT000250025	SAT74DC161.75-AAAB-55.31	7	4	161.75	55.31	217.06	2	8.25	2
1HSAT000250026	SAT74DC180.00-AAAB-61.12	7	4	180	61.12	241.12	2	8.25	2
1HSAT000250027	SAT74DC140.00-AAAB-49.75	7	4	140	49.75	189.75	2	8.25	2
1HSAT000250028	SAT74DC167.00-AAAB-56.25	7	4	167	56.25	223.25	2	8.25	2
1HSAT000250029	SAT74DC156.00-AAAB-53.75	7	4	156	53.75	209.75	2	8.25	2
1HSAT000250030	SAT84DC180.00-AAAF-59.75	8	4	180	59.75	239.75	2	9.5	2
1HSAT000250031	SAT84DC188.00-AAAF-61.75	8	4	188	61.75	249.75	2	9.5	2
1HSAT000250032	SAT84DC161.00-AAAF-55.75	8	4	161	55.75	216.75	2	9.5	2
1HSAT000250033	SAT85DC220.00-AAAF-60.00	8	5	220	60	280	2	9.5	2
1HSAT000250034	SAT85DC189.00-AAAF-54.62	8	5	189	54.62	243.62	2	9.5	2
1HSAT000250035	SAT85DC249.00-AAAF-68.62	8	5	249	68.62	317.62	2	9.5	2
1HSAT000250036	SAT85DC265.00-AAAF-71.00	8	5	265	71	336	2	9.5	2
1HSAT000250037	SAT85DC234.00-AAAF-64.62	8	5	234	64.62	298.62	2	9.5	2
1HSAT000250040	SAT63DC129.56-AACB-56.00	6	3	129.56	56	185.56	2	7	2

# Telescopic Cylinders



H Width	O Port Size	P1 Loc.	P1 Orientation 1, 2, 3, or 4	Q Port Size	P2 Loc.	P2 Orientation 1, 2, 3, or 4	Gallons To Fill	Gallons To Extend	Weight Lbs. (Dry)	Cylinder Part Number
2.69	3/4" NPT	26.25	1	3/4" NPT	26.25	2	0.86	10.62	302	1HSAT000250020
1.75	1" NPT	15.06	1				0.89	10.52	301	1HSAT000250021
2	1" NPT	39.38	1				0.89	13.07	358	1HSAT000250022
2	1" NPT	15.56	1				1	14.71	392	1HSAT000250023
2	1" NPT	24.13	1				0.9	12.49	348	1HSAT000250024
2	1" NPT	39.63	1				1.08	14.93	399	1HSAT000250025
2	1" NPT	45.44	1				1.2	16.6	442	1HSAT000250026
2	1" NPT	15.06	1				0.95	12.93	358	1HSAT000250027
2	1" NPT	15.06	1				1.13	15.42	405	1HSAT000250028
2	1" NPT	15.06	1				1.05	14.4	387	1HSAT000250029
2	1" NPT	15.5	1	1" NPT	46.06	1	1.41	22.25	550	1HSAT000250030
2	1" NPT	15.5	1	1" NPT	48.06	1	1.42	22.3	568	1HSAT000250031
2	1" NPT	15.5	1	1" NPT	42.06	1	1.26	19.87	514	1HSAT000250032
2	1" NPT	15.5	1	1" NPT	46.06	1	1.5	24.12	594	1HSAT000250033
2	1" NPT	15.5	1	1" NPT	40.69	1	1.38	20.72	540	1HSAT000250034
2	1" NPT	15.06	1	1" NPT	54.69	1	1.82	27.29	681	1HSAT000250035
2	1" NPT	15.5	1	1" NPT	57.06	1	1.94	29.06	705	1HSAT000250036
2	1" NPT	15.06	1	1" NPT	50.69	1	1.71	25.65	691	1HSAT000250037
2	1" NPT 90 Degree	18.75	1				0.87	10.96	284	1HSAT000250040



**WARNING:** This product can expose you to chemicals including Lead or DEHP, which is known in the state of California to cause cancer, birth defects or other reproductive harm. For more information go to [www.P65Warnings.ca.gov](http://www.P65Warnings.ca.gov)

## Miscellaneous

### Useful Formulas

Pump Output Horsepower:	$HP = GPM \times PSI \div 1714$
Pump Input Horsepower:	$HP = GPM \times PSI \div 1714 \div E$
Pump Input Torque (Lbs. ft.):	$T = CID \times PSI \div 75.36$
Gallons Per Minute:	$GPM = CID \times RPM \div 231$
Cubic Inches Displacement:	$CID = GPM \times 231 \div RPM$
Horse Power:	$HP = T \times RPM \div 5252$
Flow in GPM using PTO:	$GPM = \text{Engine RPM} \times \text{PTO}\% \times \text{CIR} \div 231 \times E$
CCM Conversion:	$CCM = CID \times 16.39$
CID Conversion:	$CID = CCM \times .06102$

### Abbreviations

HP = Horsepower  
 GPM = Gallons per Minute  
 CID = Cubic Inches Displacement  
 PSI = Pounds per Square Inch  
 RPM = Revolutions per Minute  
 E = Efficiency  
 T = Torque  
 CCM = Cubic Centimeter Displacement

## Notes





## Notes



# Parker Hannifin Corporation - Offer of Sale

1. **Definitions.** As used herein, the following terms have the meanings indicated.
  - Buyer: means any customer receiving a Quote for Products.
  - Goods: means any tangible part, system or component to be supplied by Seller.
  - Products: means the Goods, Services and/or Software as described in a Quote.
  - Quote: means the offer or proposal made by Seller to Buyer for the supply of Products.
  - Seller: means Parker-Hannifin Corporation, including all divisions and businesses thereof.
  - Services: means any services to be provided by Seller.
  - Software: means any software related to the Goods, whether embedded or separately downloaded.
  - Terms: means the terms and conditions of this Offer of Sale.
2. **Terms.** All sales of Products by Seller are expressly conditioned upon, and will be governed by the acceptance of, these Terms. These Terms are incorporated into any Quote provided by Seller to Buyer. Buyer's order for any Products whether communicated to Seller verbally, in writing, by electronic data interface or other electronic commerce, shall constitute acceptance of these Terms. Seller objects to any contrary or additional terms or conditions of Buyer. Reference in Seller's order acknowledgement to Buyer's purchase order or purchase order number shall in no way constitute an acceptance of any of Buyer's terms or conditions of purchase. No modification to these Terms will be binding on Seller unless agreed to in writing and signed by an authorized representative of Seller.
3. **Price; Payment.** The Products set forth in the Quote are offered for sale at the prices indicated in the Quote. Unless otherwise specifically stated in the Quote, prices are valid for thirty (30) days and do not include any sales, use, or other taxes or duties. Seller reserves the right to modify prices at any time to adjust for any raw material price fluctuations. Unless otherwise specified by Seller, all prices are F.C.A. Seller's facility (INCOTERMS 2020). All sales are contingent upon credit approval and full payment for all purchases is due thirty (30) days from the date of invoice (or such date as may be specified in the Quote). Unpaid invoices beyond the specified payment date incur interest at the rate of 1.5% per month or the maximum allowable rate under applicable law.
4. **Shipment; Delivery; Title and Risk of Loss.** All delivery dates are approximate, and Seller is not responsible for damages resulting from any delay. Regardless of the manner of shipment, delivery occurs and title and risk of loss or damage pass to Buyer, upon placement of the Products with the carrier at Seller's facility. Unless otherwise agreed prior to shipment and for domestic delivery locations only, Seller will select and arrange, at Buyer's sole expense, the carrier and means of delivery. When Seller selects and arranges the carrier and means of delivery, freight and insurance costs for shipment to the designated delivery location will be prepaid by Seller and added as a separate line item to the invoice. Buyer shall be responsible for any additional shipping charges incurred by Seller due to Buyer's acts or omissions. Buyer shall not return or repack any Products without the prior written authorization from Seller, and any return shall be at the sole cost and expense of Buyer.
5. **Warranty.** The warranty for the Products is as follows: (i) Goods are warranted against defects in material or workmanship for a period of twelve (12) months from the date of delivery or 2,000 hours of use, whichever occurs first; (ii) Services shall be performed in accordance with generally accepted practices and using the degree of care and skill that is ordinarily exercised and customary in the field to which the Services pertain and are warranted for a period of six (6) months from the date of completion of the Services; and (iii) Software is only warranted to perform in accordance with applicable specifications provided by Seller to Buyer for ninety (90) days from the date of delivery or, when downloaded by a Buyer or end-user, from the date of the initial download. All prices are based upon the exclusive limited warranty stated above, and upon the following disclaimer: **EXEMPTION CLAUSE; DISCLAIMER OF WARRANTY, CONDITIONS, REPRESENTATIONS: THIS WARRANTY IS THE SOLE AND ENTIRE WARRANTY, CONDITION, AND REPRESENTATION, PERTAINING TO PRODUCTS. SELLER DISCLAIMS ALL OTHER WARRANTIES, CONDITIONS, AND REPRESENTATIONS, WHETHER STATUTORY, EXPRESS OR IMPLIED, INCLUDING BUT NOT LIMITED TO THOSE RELATING TO DESIGN, NONINFRINGEMENT, MERCHANTABILITY, AND FITNESS FOR A PARTICULAR PURPOSE. SELLER DOES NOT**

**WARRANT THAT THE SOFTWARE IS ERROR-FREE OR FAULT-TOLERANT, OR THAT BUYER'S USE THEREOF WILL BE SECURE OR UNINTERRUPTED. UNLESS OTHERWISE AUTHORIZED IN WRITING BY SELLER, THE SOFTWARE SHALL NOT BE USED IN CONNECTION WITH HAZARDOUS OR HIGH RISK ACTIVITIES OR ENVIRONMENTS. EXCEPT AS EXPRESSLY STATED HEREIN, ALL PRODUCTS ARE PROVIDED "AS IS".**

6. **Claims; Commencement of Actions.** Buyer shall promptly inspect all Products upon receipt. No claims for shortages will be allowed unless reported to Seller within ten (10) days of delivery. Buyer shall notify Seller of any alleged breach of warranty within thirty (30) days after the date the non-conformance is or should have been discovered by Buyer. Any claim or action against Seller based upon breach of contract or any other theory, including tort, negligence, or otherwise must be commenced within twelve (12) months from the date of the alleged breach or other alleged event, without regard to the date of discovery.

7. **LIMITATION OF LIABILITY.** IN THE EVENT OF A BREACH OF WARRANTY, SELLER WILL, AT ITS OPTION, REPAIR OR REPLACE THE NON-CONFORMING PRODUCT, RE-PERFORM THE SERVICES, OR REFUND THE PURCHASE PRICE PAID WITHIN A REASONABLE PERIOD OF TIME. IN NO EVENT IS SELLER LIABLE FOR ANY SPECIAL, INDIRECT, INCIDENTAL OR CONSEQUENTIAL DAMAGES INCLUDING ANY LOSS OF REVENUE OR PROFITS, WHETHER BASED IN CONTRACT, TORT OR OTHER LEGAL THEORY. IN NO EVENT SHALL SELLER'S LIABILITY UNDER ANY CLAIM MADE BY BUYER EXCEED THE PURCHASE PRICE PAID FOR THE PRODUCTS.

8. **Confidential Information.** Buyer acknowledges and agrees that any technical, commercial, or other confidential information of Seller, including, without limitation, pricing, technical drawings or prints and/or part lists, which has been or will be disclosed, delivered or made available, whether directly or indirectly, to Buyer ("Confidential Information"), has been and will be received in confidence and will remain the property of Seller. Buyer further agrees that it will not use Seller's Confidential Information for any purpose other than for the benefit of Seller.

9. **Loss to Buyer's Property.** Any tools, patterns, materials, equipment or information furnished by Buyer or which are or become Buyer's property ("Buyer's Property"), will be considered obsolete and may be destroyed by Seller after two (2) consecutive years have elapsed without Buyer ordering the Products manufactured using Buyer's Property. Furthermore, Seller shall not be responsible for any loss or damage to Buyer's Property while it is in Seller's possession or control.

10. **Special Tooling.** "Special Tooling" includes but is not limited to tools, jigs, fixtures and associated manufacturing equipment acquired or necessary to manufacture Goods. Seller may impose a tooling charge for any Special Tooling. Such Special Tooling shall be and remain Seller's property notwithstanding payment of any charges by Buyer. In no event will Buyer acquire any interest in the Special Tooling, even if such Special Tooling has been specially converted or adapted for manufacture of Goods for Buyer and notwithstanding any charges paid by Buyer. Unless otherwise agreed, Seller has the right to alter, discard or otherwise dispose of any Special Tooling or other property owned by Seller in its sole discretion at any time.

11. **Security Interest.** To secure payment of all sums due from Buyer, Seller retains a security interest in all Products delivered to Buyer and, Buyer's acceptance of these Terms is deemed to be a Security Agreement under the Uniform Commercial Code. Buyer authorizes Seller as its attorney to execute and file on Buyer's behalf all documents Seller deems necessary to perfect Seller's security interest.

12. **User Responsibility.** Buyer, through its own analysis and testing, is solely responsible for making the final selection of the Products and assuring that all performance, endurance, maintenance, safety and warning requirements of the application of the Products are met. Buyer must analyze all aspects of the application and follow applicable industry standards, specifications, and any technical information provided with the Quote or the Products, such as Seller's instructions, guides and specifications. If Seller provides options of or for Products based upon data or specifications provided by Buyer, Buyer is responsible for determining that such data and specifications are suitable and sufficient for all applications and reasonably foreseeable uses of the Products. In the event Buyer is not the end-user of the Products, Buyer will ensure such end-user complies with this paragraph.

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**13. Use of Products, Indemnity by Buyer.** Buyer shall comply with all instructions, guides and specifications provided by Seller with the Quote or the Products. **Unauthorized Uses.** If Buyer uses or resells the Products in any way prohibited by Seller's instructions, guides or specifications, or Buyer otherwise fails to comply with Seller's instructions, guides and specifications, Buyer acknowledges that any such use, resale, or non-compliance is at Buyer's sole risk. Further, Buyer shall indemnify, defend, and hold Seller harmless from any losses, claims, liabilities, damages, lawsuits, judgments and costs (including attorney fees and defense costs), whether for personal injury, property damage, intellectual property infringement or any other claim, arising out of or in connection with: (a) improper selection, design, specification, application, or any misuse of Products; (b) any act or omission, negligent or otherwise, of Buyer; (c) Seller's use of patterns, tools, equipment, plans, drawings, designs, specifications or other information or things furnished by Buyer; (d) damage to the Products from an external cause, repair or attempted repair by anyone other than Seller, failure to follow instructions, guides and specifications provided by Seller, use with goods not provided by Seller, or opening, modifying, deconstructing, tampering with or repackaging the Products; or (e) Buyer's failure to comply with these Terms. Seller shall not indemnify Buyer under any circumstance except as otherwise provided in these Terms.

**14. Cancellations and Changes.** Buyer may not cancel or modify, including but not limited to movement of delivery dates for the Products, any order for any reason except with Seller's written consent and upon terms that will indemnify, defend and hold Seller harmless against all direct, incidental and consequential loss or damage and any additional expense. Seller, at any time, may change features, specifications, designs and availability of Products.

**15. Limitation on Assignment.** Buyer may not assign its rights or obligations without the prior written consent of Seller.

**16. Force Majeure.** Seller is not liable for delay or failure to perform any of its obligations by reason of events or circumstances beyond its reasonable control. Such circumstances include without limitation: accidents, labor disputes or stoppages, government acts or orders, acts of nature, pandemics, epidemics, other widespread illness, or public health emergency, delays or failures in delivery from carriers or suppliers, shortages of materials, war (whether declared or not) or the serious threat of same, riots, rebellions, acts of terrorism, fire or any reason whether similar to the foregoing or otherwise. Seller will resume performance as soon as practicable after the event of force majeure has been removed. All delivery dates affected by force majeure shall be tolled for the duration of such force majeure and rescheduled for mutually agreed dates as soon as practicable after the force majeure condition ceases to exist. Force majeure shall not include financial distress, insolvency, bankruptcy, or other similar conditions affecting one of the parties, affiliates and/or sub-contractors.

**17. Waiver and Severability.** Failure to enforce any provision of these Terms will not invalidate that provision; nor will any such failure prejudice either party's right to enforce that provision in the future. Invalidation of any provision of these Terms shall not invalidate any other provision herein and, the remaining provisions will remain in full force and effect.

**18. Termination.** Seller may terminate any agreement governed by or arising from these Terms for any reason and at any time by giving Buyer thirty (30) days prior written notice. Seller may immediately terminate, in writing, if Buyer: (a) breaches any provision of these Terms, (b) becomes or is deemed insolvent, (c) appoints or has appointed a trustee, receiver or custodian for all or any part of Buyer's property, (d) files a petition for relief in bankruptcy on its own behalf, or one is filed against Buyer by a third party, (e) makes an assignment for the benefit of creditors; or (f) dissolves its business or liquidates all or a majority of its assets.

**19. Ownership of Software.** Seller retains ownership of all Software supplied to Buyer hereunder. In no event shall Buyer obtain any greater right in and to the Software than a right in the nature of a license limited to the use thereof and subject to compliance with any other terms provided with the Software.

**20. Indemnity for Infringement of Intellectual Property Rights.** Seller is not liable for infringement of any patents, trademarks, copyrights, trade dress, trade secrets or similar rights ("Intellectual Property Rights") except as provided in this Section. Seller will defend at its expense and will pay the cost of any settlement or damages awarded in an action brought against Buyer based on a third party claim that one or more of the Products sold hereunder infringes the Intellectual Property Rights of a third party in the

country of delivery of the Products by Seller to Buyer. Seller's obligation to defend and indemnify Buyer is contingent on Buyer notifying Seller within ten (10) days after Buyer becomes aware of any such claim, and Seller having sole control over the defense of the claim including all negotiations for settlement or compromise. If one or more Products sold hereunder is subject to such a claim, Seller may, at its sole expense and option, procure for Buyer the right to continue using the Products, replace or modify the Products so as to render them non-infringing, or offer to accept return of the Products and refund the purchase price less a reasonable allowance for depreciation. Seller has no obligation or liability for any claim of infringement: (i) arising from information provided by Buyer; or (ii) directed to any Products provided hereunder for which the designs are specified in whole or part by Buyer; or (iii) resulting from the modification, combination or use in a system of any Products provided hereunder. The foregoing provisions of this Section constitute Seller's sole and exclusive liability and Buyer's sole and exclusive remedy for claims of infringement of Intellectual Property Rights.

**21. Governing Law.** These Terms and the sale and delivery of all Products are deemed to have taken place in, and shall be governed and construed in accordance with, the laws of the State of Ohio, as applicable to contracts executed and wholly performed therein and without regard to conflicts of laws principles. Buyer irrevocably agrees and consents to the exclusive jurisdiction and venue of the courts of Cuyahoga County, Ohio with respect to any dispute, controversy or claim arising out of or relating to the sale and delivery of the Products.

**22. Entire Agreement.** These Terms, along with the terms set forth in the main body of any Quote, forms the entire agreement between the Buyer and Seller and constitutes the final, complete and exclusive expression of the terms of sale and purchase. In the event of a conflict between any term set forth in the main body of a Quote and these Terms, the terms set forth in the main body of the Quote shall prevail. All prior or contemporaneous written or oral agreements or negotiations with respect to the subject matter shall have no effect. These Terms may not be modified unless in writing and signed by an authorized representative of Seller.

**23. Compliance with Laws.** Buyer agrees to comply with all applicable laws, regulations, and industry and professional standards, including those of the United States of America, and the country or countries in which Buyer may operate, including without limitation the U.S. Foreign Corrupt Practices Act ("FCPA"), the U.S. Anti-Kickback Act ("Anti-Kickback Act"), U.S. and E.U. export control and sanctions laws ("Export Laws"), the U.S. Food Drug and Cosmetic Act ("FDCA"), and the rules and regulations promulgated by the U.S. Food and Drug Administration ("FDA"), each as currently amended. Buyer agrees to indemnify, defend, and hold harmless Seller from the consequences of any violation of such laws, regulations and standards by Buyer, its employees or agents. Buyer acknowledges that it is familiar with all applicable provisions of the FCPA, the Anti-Kickback Act, Export Laws, the FDCA and the FDA and certifies that Buyer will adhere to the requirements thereof and not take any action that would make Seller violate such requirements. Buyer represents and agrees that Buyer will not make any payment or give anything of value, directly or indirectly, to any governmental official, foreign political party or official thereof, candidate for foreign political office, or commercial entity or person, for any improper purpose, including the purpose of influencing such person to purchase Products or otherwise benefit the business of Seller. Buyer further represents and agrees that it will not receive, use, service, transfer or ship any Products from Seller in a manner or for a purpose that violates Export Laws or would cause Seller to be in violation of Export Laws. Buyer agrees to promptly and reliably provide Seller all requested information or documents, including end-user statements and other written assurances, concerning Buyer's ongoing compliance with Export Laws.

08/20

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