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PTO

249 Series

- Noise suppression system
- Single hose connection and integrated actuation valve
- Pump flows up to 25.1 GPM at 1200 engine RPM



Model Number	Description
249FMLLX-B242	6-Bolt Auto 2 Wheel Drive AD 3/4" - 11T
249FMLLX-B471	6-Bolt Auto 4 Wheel Drive AD 3/4" - 11T

Model Number	Description
CGP-P11A042-5GC	Gear Pump 5.7 GPM's 3/4" - 11T
CGP-P11A071-5GE	Gear Pump 9.6 GPM's 3/4" - 11T



249 SERIES POWER TAKE-OFF SPECIFICATIONS AND TECHNICAL DATA

Basic Model ————— **2 4 9**

⁵249 = Ford TorqShift™ 6 Transmission

Mounting Option ————— **F M L L X**

F = F350-F550 Diesel MY2011 & Later
F650/F750 Diesel MY2016 & Later

⁶³**H** = F650/F750 Gas MY2016 & Later
F350-F550 Gas MY2017 & Later

X = F350-F750 Gas or Diesel
(Use for No Harness)

Gear Ratio ————— **M**

M = 124% Engine Speed

Input Option ————— **LL**

LL = 35 Tooth, Spur

NOTE: For more details, see Application Catalog

Lube Option ————— **X**

X = No Pressure Lube

Shift Option ————— **B 4**

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

Output Option

³⁸**08** = Hyd. Pump 12.0 GPM @ 1200 Eng. RPM
³⁸**09** = Hyd. Pump 14.0 GPM @ 1200 Eng. RPM
³⁸**11** = Hyd. Pump 16.0 GPM @ 1200 Eng. RPM
³⁸**15** = Hyd. Pump 18.9 GPM @ 1200 Eng. RPM
16 = Hyd. Pump 2.4 GPM @ 1200 Eng. RPM
26 = Hyd. Pump 3.9 GPM @ 1200 Eng. RPM
32 = Hyd. Pump 4.7 GPM @ 1200 Eng. RPM
37 = Hyd. Pump 5.5 GPM @ 1200 Eng. RPM
42 = Hyd. Pump 6.3 GPM @ 1200 Eng. RPM
55 = Hyd. Pump 8.2 GPM @ 1200 Eng. RPM
61 = Hyd. Pump 9.0 GPM @ 1200 Eng. RPM
71 = Hyd. Pump 10.6 GPM @ 1200 Eng. RPM
82 = Hyd. Pump 12.2 GPM @ 1200 Eng. RPM
87 = Hyd. Pump 12.9 GPM @ 1200 Eng. RPM
AD = SAE A 2-Bolt Flange (3/4" - 11T)
³⁸**SD** = Smart Start - Rd Standard Shaft
(1-1/4" - 5/16" Key)
³⁸**XD** = Rd Standard Shaft (1-1/4" - 5/16" Key)
XP = SAE A 2-Bolt Flange, SAE B Shaft
(7/8" - 13T)

Assembly Arrangement

2 = 2WD Chassis
4 = 4WD Chassis

⁵ Automatically pressure lubed
³⁸ 4 x 2 Vehicles Only
⁴⁴ Includes Heat Shield and Wiring Harness
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 ³ /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	3226	6.41
26	CGP-P11A026-5GC	0.61	3.54	7.5	26.4	3990	3625	3600	2903	9.51
32	CGP-P11A032-5GC	0.73	4.23	9.0	31.6	3990	3625	3500	2823	11.06
37	CGP-P11A037-5GC	0.85	4.93	10.4	36.8	3990	3625	3300	2661	12.14
42	CGP-P11A042-5GC	0.98	5.68	12.0	42.4	3990	3625	3000	2419	12.73
55	CGP-P11A055-5GC	1.28	7.42	14.8	52.1	3480	3410	2800	2258	15.52
61	CGP-P11A061-5GE	1.40	8.12	15.5	54.6	3410	3265	2800	2258	16.97
71	CGP-P11A071-5GE	1.65	9.57	15.4	54.3	2900	2755	2400	1935	17.14
82	CGP-P11A082-5GE	1.89	10.96	15.3	54.0	2465	2395	2300	1855	18.82
87	CGP-P11A087-5GE	2.01	11.65	15.3	54.0	2320	2250	2000	1613	17.40

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 ³ /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	2419	24.16
09	CGP-P31B094-5AG	2.17	12.58	21.3	75.1	2900	2900	3000	2419	28.18
11	CGP-P31B107-5AG	2.48	14.38	21.0	74.0	2500	2500	3000	2419	32.21

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 in ³ /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	2258	35.52

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

PTO

249V Series

- Fits both Super Duty 4x4 and 4x2 applications
- Provides quiet PTO applications on Ford Super Duty trucks
- Pump flows up to 35 GPM at 3500 engine RPM



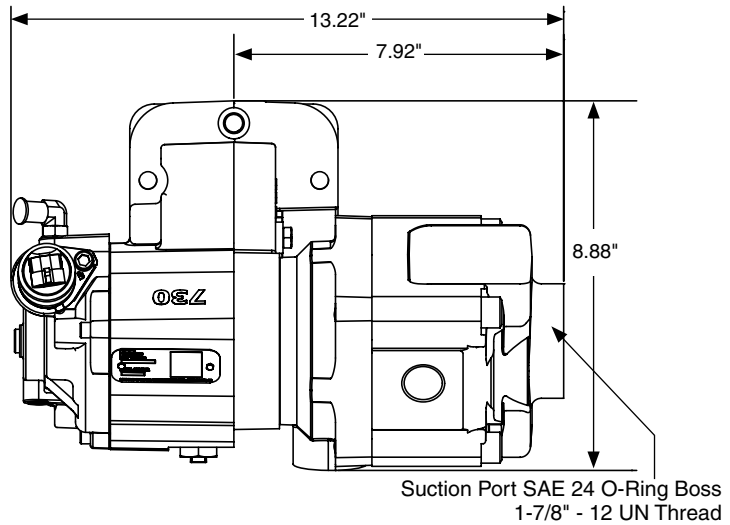
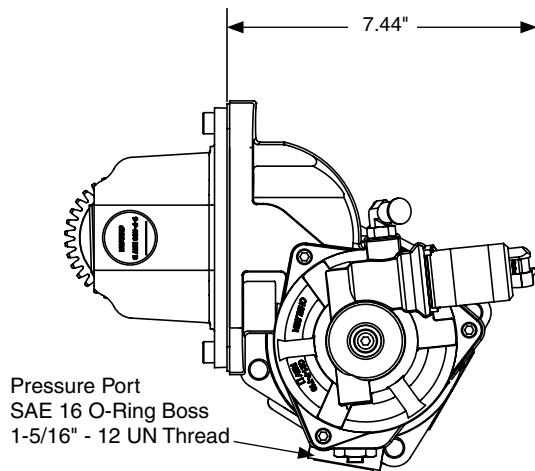
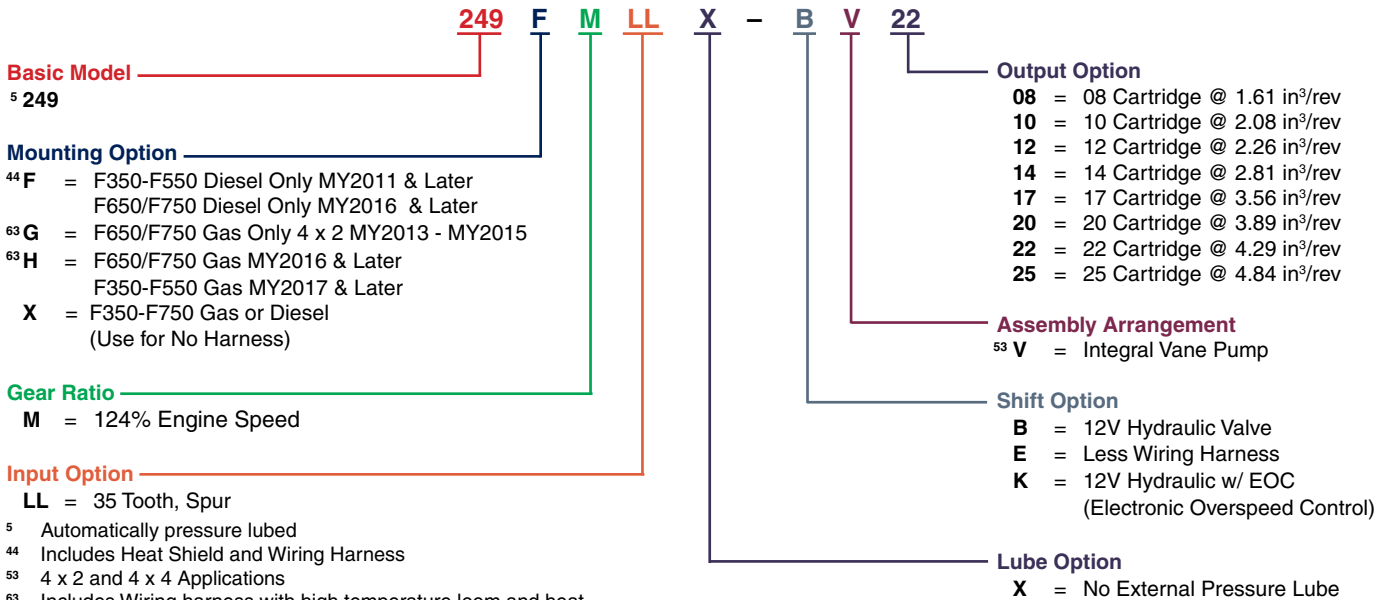
249 With Integral Vane Pumps

Model Number	Description
249FMLLX-BV12	6-Bolt Auto 2/4 Wheel + Pump 12 GPM
249FMLLX-BV14	6-Bolt Auto 2/4 Wheel + Pump 14 GPM
249FMLLX-BV17	6-Bolt Auto 2/4 Wheel + Pump 17 GPM

Model Number	Description
249FMLLX-BV20	6-Bolt Auto 2/4 Wheel + Pump 20 GPM
249FMLLX-BV22	6-Bolt Auto 2/4 Wheel + Pump 22 GPM
249FMLLX-BV25	6-Bolt Auto 2/4 Wheel + Pump 25 GPM



249V SERIES POWER TAKE-OFF SPECIFICATIONS AND TECHNICAL DATA



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 ³ /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

(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

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

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 3 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
- R = Valve Cap Rotated 120°
- S = Valve Cap Rotated 240°

Wet Spline

- ^{5, 64} W = Wet Spline
- ^{5, 64} V = Valve Cap Rotated 120° w/ Wet Spline
- ^{5, 64} Y = Valve Cap Rotated 240° w/ Wet Spline

⁵ Hyd shift PTOs only

⁶⁴ Hyd shift PTOs only

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
- ⁶⁴**SD** = Smart Start - Rd Standard Shaft (1-1/4" - 5/16" Key)
- ⁶⁴**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)
- RB** = Rotatable SAE "B" 4-Bolt Flange, SAE "B" Shaft (7/8" - 13T)
- RK** = Rotatable SAE "B" 2 or 4-Bolt Flange, SAE "B" Shaft (7/8" - 13T)
- RF** = Rotatable SAE "B" 2 or 4-Bolt Flange, SAE "BB" Shaft (1" - 15T)
- RZ** = Rotatable SAE "B" 2 or 4-Bolt Flange, SAE "C" Shaft (1-1/4" - 14T)
- RS** = Rotatable SAE "C" 2 or 4-Bolt Flange, SAE "C" Shaft (1-1/4" - 14T)
- 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

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 & Continuous 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 & Continuous 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

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



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



280 SERIES POWER TAKE-OFF SPECIFICATIONS AND TECHNICAL DATA

280 G B FJ P - B 5 XD

Basic Model
280

Mounting Option
G = Metric Studs

Gear Ratio

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

Input Option
FJ = Allison
KV = CAT

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

Lube Option
Pressure

P = Pressure Lube
⁴⁵R = Valve Cap Rotated 120°
S = Valve Cap Rotated 240°

Wet Spline

⁵W = Wet Spline
^{5, 45}V = Valve Cap Rotated 120° w/ Wet Spline
⁵Y = Valve Cap Rotated 240° w/ Wet Spline

⁵ Automatically pressure lubed

¹⁵ The remote mount solenoid option cannot utilize the EOC option

²¹ Includes installation kit, console sold separately

⁴⁵ Available on shift option B, D, K, L, M, N, S & T

⁴⁶ Available with rotated valve

⁴⁷ Available with Wet Spline

⁶⁸ 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

⁶⁸RB = Rotatable SAE B 4-Bolt Flange, SAE B Shaft (7/8" - 13T)
⁴⁷RK = Rotatable SAE B 2 or 4-Bolt Flange, SAE B Shaft (7/8" - 13T)
⁴⁷RF = Rotatable SAE B 2 or 4-Bolt Flange, SAE BB Shaft (1" - 15T)
⁴⁷RZ = Rotatable SAE B 2 or 4-Bolt Flange, SAE C Shaft (1-1/4" - 14T)
⁴⁷RS = Rotatable SAE C 2 or 4-Bolt Flange, SAE C Shaft (1-1/4" - 14T)
⁴⁷RY = 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

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

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

PTO

282 Series

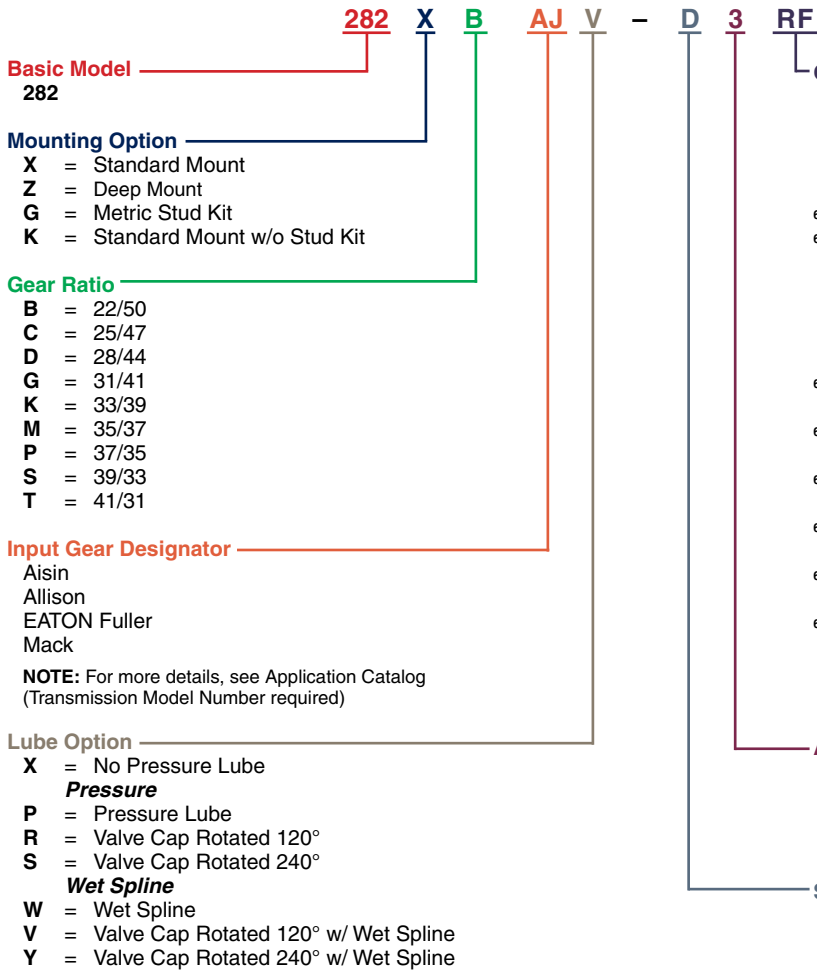
- SAE 8-Bolt housing
- Integrated air valve – no remote valve (patent pending)
- Internal self-adjusting shaft brake (patent 7159701)
- Wet Spline option – extends PTO
- Smart Start option – reduces high inertia startup
- Two year warranty



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



- 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
 - ⁶⁴**SD** = Smart Start - Rd Standard Shaft (1-1/4" - 5/16" Key)
 - ⁶⁴**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)
 - ⁶⁸**RB** = Rotatable SAE "B" 4-Bolt Flange, SAE "B" Shaft (7/8" - 13T)
 - ⁶⁸**RK** = Rotatable SAE "B" 2 or 4-Bolt Flange, SAE "B" Shaft (7/8" - 13T)
 - ⁶⁸**RF** = Rotatable SAE "B" 2 or 4-Bolt Flange, SAE "BB" Shaft (1" - 15T)
 - ⁶⁸**RZ** = Rotatable SAE "B" 2 or 4-Bolt Flange, SAE "C" Shaft (1-1/4" - 14T)
 - ⁶⁸**RS** = Rotatable SAE "C" 2 or 4-Bolt Flange, SAE "C" Shaft (1-1/4" - 14T)
 - ⁶⁸**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

⁶⁴ Hyd shift PTOs only
⁶⁸ Check for Wet Spline availability

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 & Continuous 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 & Continuous 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

PTO

442 Series

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

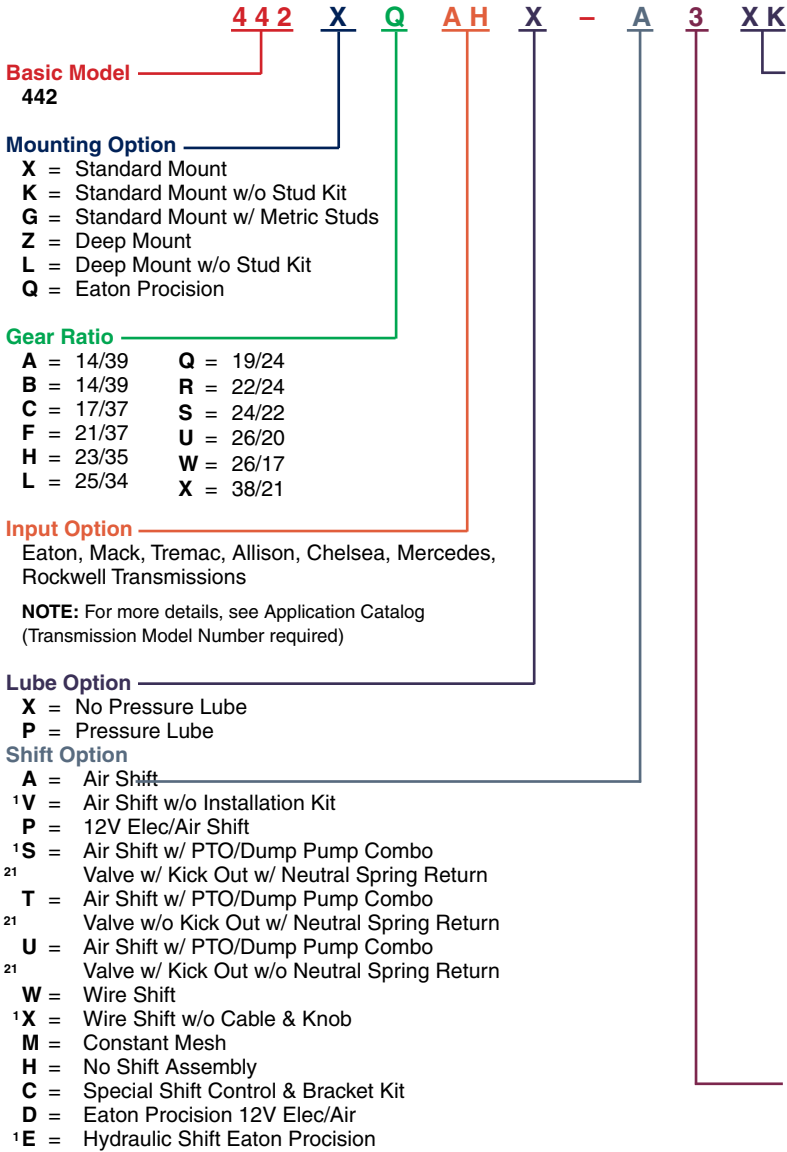


Model Number	Description
442XHAHX-A3XD	Air Shift 1-1/4" Round Key
442XHAHX-A3XK	Air Shift 7/8" - 13T Direct Mount
442XLAHX-A3XD	Air Shift 1-1/4" Round Key

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



442 SERIES POWER TAKE-OFF SPECIFICATIONS AND TECHNICAL DATA



Output Option

Driveline Output

- 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)
- ⁵⁹**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)
- XD** = Rd Standard Shaft (1-1/4" - 5/16" Key)

Pump Mount

- 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)
- ⁵⁹**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)
- 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)
- XX** = 1-1/4" Tapered Output Shaft w/ Keyway
- XY** = ISO 7653 Pump Mount DIN 5462 Shaft

Assembly Arrangement

- 3, 4, 5, 6

¹ Includes mounting parts

²¹ Includes installation kit, console sold separately

⁵⁹ Same as XK except rotated 90°

Specifications Chart	Approximate Weight: 30 lbs. [13.6 kg]											
	442*A	442*B	442*C	442*F	442*H	442*L	442*Q	442*R	442*S	442*U	442*W	442*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]

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

PTO

489 Series

- 442 Series family, but with an 8-Bolt mounting flange
- No adapter plate needed
- Less installation time, less expense, and reduced leak points



Model Number	Description	Model Number	Description
489XFAHX-A5XK	2/4-Bolt Std. Air Shift 7/8" - 13T Stud Kit	489GFAHX-A5XK	2/4-Bolt Air Shift 7/8" - 13T Metric Stud Kit
489XHAHX-A5XK	2/4-Bolt Std. Air Shift 7/8" - 13T Stud Kit	489GHAHX-A5XK	2/4-Bolt Air Shift 7/8" - 13T Metric Stud Kit
489XLAHX-A5XK	2/4-Bolt Std. Air Shift 7/8" - 13T Stud Kit	489GLAHX-A5XK	2/4-Bolt Air Shift 7/8" - 13T Metric Stud Kit
489XQAHX-A5XK	2/4-Bolt Std. Air Shift 7/8" - 13T Stud Kit	489GQAHX-A5XK	2/4-Bolt Air Shift 7/8" - 13T Metric Stud Kit
489XFAHX-S5XK	2/4-Bolt Combination Spring Return 7/8" - 13T	489GFAHX-S5XK	2/4-Bolt Spring Return 7/8" - 13T Metric Stud Kit
489XHAHX-S5XK	2/4-Bolt Combination Spring Return 7/8" - 13T	489GHAHX-S5XK	2/4-Bolt Spring Return 7/8" - 13T Metric Stud Kit
489XLAHX-S5XK	2/4-Bolt Combination Spring Return 7/8" - 13T	489GLAHX-S5XK	2/4-Bolt Spring Return 7/8" - 13T Metric Stud Kit
489XQAHX-S5XK	2/4-Bolt Combination Spring Return 7/8" - 13T	489GQAHX-S5XK	2/4-Bolt Spring Return 7/8" - 13T Metric Stud Kit
489XFAHX-T5XK	2/4-Bolt 3 Position Detent 7/8" - 13T	489GFAHX-T5XK	2/4-Bolt 3 Position Detent 7/8" - 13T Metric Stud Kit
489XHAHX-T5XK	2/4-Bolt 3 Position Detent 7/8" - 13T	489GHAHX-T5XK	2/4-Bolt 3 Position Detent 7/8" - 13T Metric Stud Kit
489XLAHX-T5XK	2/4-Bolt 3 Position Detent 7/8" - 13T	489GLAHX-T5XK	2/4-Bolt 3 Position Detent 7/8" - 13T Metric Stud Kit
489XQAHX-T5XK	2/4-Bolt 3 Position Detent 7/8" - 13T	489GQAHX-T5XK	2/4-Bolt 3 Position Detent 7/8" - 13T Metric Stud Kit
489XFAHX-U5XK	2/4-Bolt Auto Kick Out 7/8" - 13T	489GFAHX-U5XK	2/4-Bolt Auto Kick Out 7/8" - 13T Metric Stud Kit
489XHAHX-U5XK	2/4-Bolt Auto Kick Out 7/8" - 13T	489GHAHX-U5XK	2/4-Bolt Auto Kick Out 7/8" - 13T Metric Stud Kit
489XLAHX-U5XK	2/4-Bolt Auto Kick Out 7/8" - 13T	489GLAHX-U5XK	2/4-Bolt Auto Kick Out 7/8" - 13T Metric Stud Kit
489XQAHX-U5XK	2/4-Bolt Auto Kick Out 7/8" - 13T	489GQAHX-U5XK	2/4-Bolt Auto Kick Out 7/8" - 13T Metric Stud Kit
489XFAHX-U5XK	2/4-Bolt Auto Kick Out 7/8" - 13T	489GFAHX-V5XK	2/4-Bolt Air Shift Cover 7/8" - 13T Metric Stud Kit
489XHAHX-V5XK	2/4-Bolt Air Shift Cover 7/8" - 13T	489GHAHX-V5XK	2/4-Bolt Air Shift Cover 7/8" - 13T Metric Stud Kit
489XLAHX-V5XK	2/4-Bolt Air Shift Cover 7/8" - 13T	489GLAHX-V5XK	2/4-Bolt Air Shift Cover 7/8" - 13T Metric Stud Kit
489XQAHX-V5XK	2/4-Bolt Air Shift Cover 7/8" - 13T	489GQAHX-V5XK	2/4-Bolt Air Shift Cover 7/8" - 13T Metric Stud Kit



489 SERIES POWER TAKE-OFF SPECIFICATIONS AND TECHNICAL DATA

Basic Model 489 **X** **Q** **AH** **X** - **A** **3** **XK**

Mounting Option
X = Standard Mount
G = Standard Mount w/ Metric Stud Kit
K = Standard Mount w/o Stud Kit
Q = Eaton Endurant
Z = Deep Mount

Gear Ratio
A = 14/39 **R** = 22/24
C = 17/37 **S** = 24/22
F = 21/37 **U** = 26/20
H = 23/35 **W** = 26/17
L = 25/34 **X** = 38/21
Q = 19/24

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
¹ **A** = Air Shift
P = 12V Elec/Air Shift
Q = 24V Elec/Air Shift
D = 12V Elec/Air Shift Eaton Endurant
V = Air Shift w/o Installation Kit
²¹ **S** = Air Shift w/ PTO/Dump Pump Combo Valve w/ Kick Out w/ Neutral Spring Return
²¹ **T** = Air Shift w/ PTO/Dump Pump Combo Valve w/o Kick Out w/ Neutral Spring Return
²¹ **U** = Air Shift w/ PTO/Dump Pump Combo Valve w/ Kick Out w/o Neutral Spring Return
¹ **W** = Wire Shift
X = Wire Shift w/o Cable & Knob
M = Constant Mesh
H = No Shifter Kit
C = Special Shift Control & Bracket Kit

¹ Includes mounting parts
²¹ Includes installation kit, console sold separately
⁵⁹ Same as XK except rotated 90°

Output Option
Driveline Output
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)
⁵⁹ **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)
XD = Rd Standard Shaft (1-1/4" - 5/16" Key)
Pump Mount
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)
⁵⁹ **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)
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)
XX = 1-1/4" Tapered Output Shaft w/ Keyway
XY = ISO 7653 Pump Mount DIN 5462 Shaft

Assembly Arrangement
 3, 4, 5, 6

Specifications Chart	Approximate Weight: 30 lbs. [13.6 kg]										
	489*A	489*C	489*F	489*H	489*L	489*Q	489*R	489*S	489*U	489*W	489*X
Torque Rating (lbs-ft) [Nm]	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]	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]	43 [32]	43 [32]	38 [28]	37 [28]	33 [25]	27 [20]

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

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

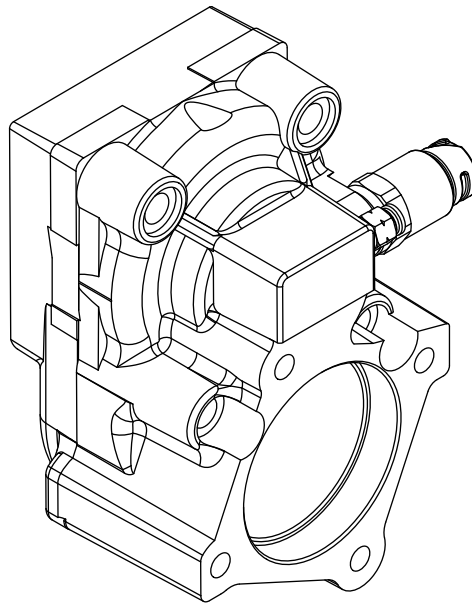
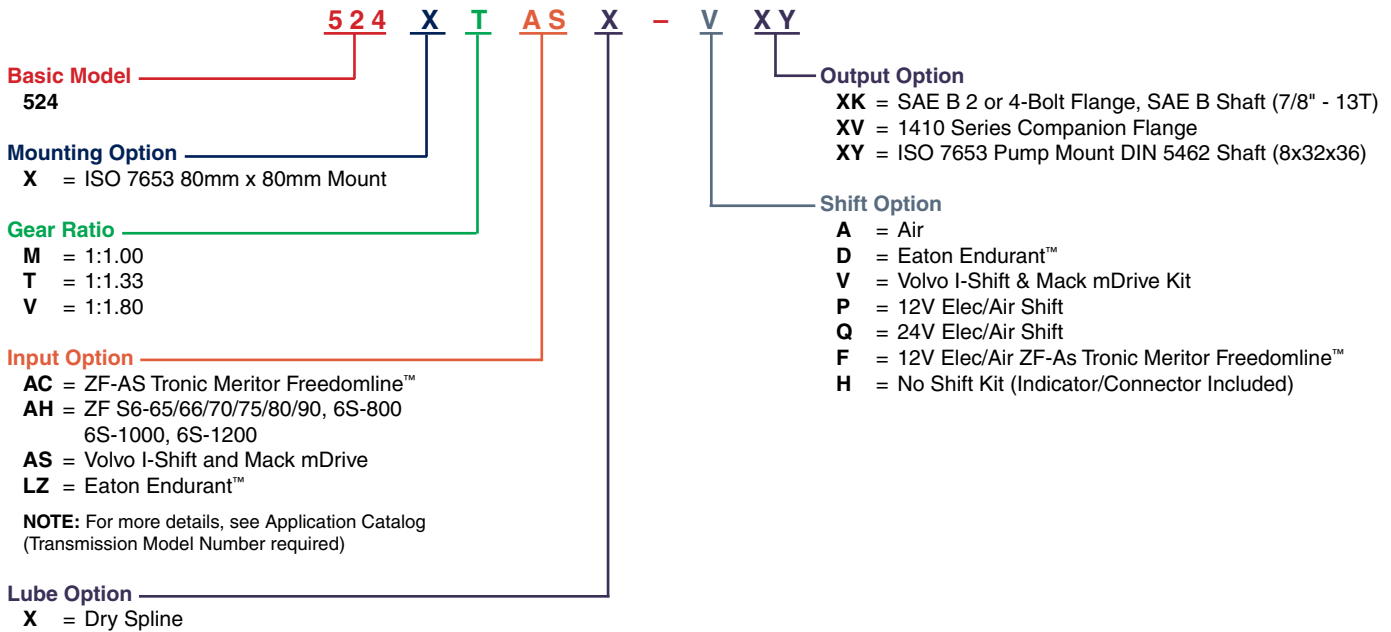


Model Number	Description
524XTASW-V-XK	2/4-Bolt I-Shift Mack mDrive 7/8" - 13T
524XVASW-V-XK	2/4-Bolt I-Shift Mack mDrive 7/8" - 13T
524XTASX-V-XK	2/4-Bolt I-Shift Mack mDrive 7/8" - 13T
524XVASX-V-XK	2/4-Bolt I-Shift Mack mDrive 7/8" - 13T

Model Number	Description
524XTASW-V-XY	I-Shift Mack mDrive 1-3/8" - 8T DIN
524XVASW-V-XY	I-Shift Mack mDrive 1-3/8" - 8T DIN
524XTASX-V-XY	I-Shift Mack mDrive 1-3/8" - 8T DIN
524XVASX-V-XY	I-Shift Mack mDrive 1-3/8" - 8T DIN



524 SERIES POWER TAKE-OFF SPECIFICATIONS AND TECHNICAL DATA



Specifications Chart	Approximate Weight: 22.3 lbs. [10.1 kg]		
	524*M	524*T	524*V
Intermittent & Continuous Torque Rating (lbs-ft) [Nm]	300 [407]	300 [407]	258 [350]
HP Rating for Intermittent & Continuous Duty			
At 500 RPM of Output Shaft (HP) [Kw]	29 [22]	29 [22]	25 [18]
At 1000 RPM of Output Shaft (HP) [Kw]	57 [43]	57 [43]	49 [37]

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

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
823XJAHP-A3XS	8-Bolt Manual Air Shift, 2/4-Bolt SAE "C" 1-1/4" - 14T



823 SERIES POWER TAKE-OFF SPECIFICATIONS AND TECHNICAL DATA

823 X M A H P - Y 3 X S

Basic Model
823

Mounting Option
G = Standard Mount w/ Metric Stud Kit
X = Standard Mount

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

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

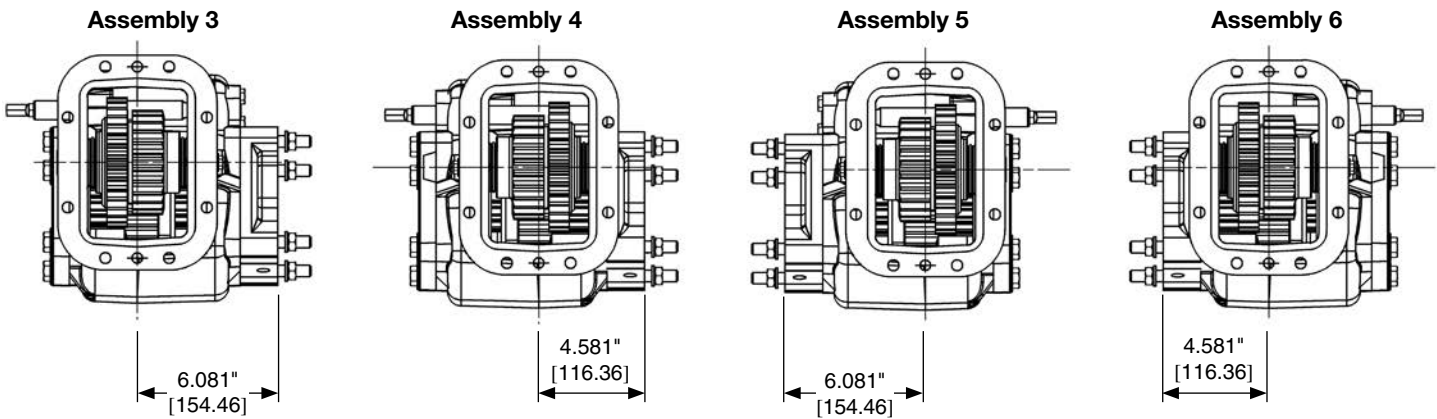
Output Option
Driveline Output
AB = DIN 120
AC = DIN 100
47 XU = SAE C 2-Bolt Flange, SAE C Shaft (1-1/4" - 14T)
47 XS = SAE C 2 or 4-Bolt Flange, SAE C Shaft (1-1/4" - 14T)
GU = Greaseable SAE C 2-Bolt Flange SAE C Shaft (1-1/4" - 14T)
GS = Greaseable SAE C 2 or 4-Bolt Flange, SAE C Shaft (1-1/4" -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

Assembly Arrangement
3, 4, 5, 6

Shift Option
1 A = Air Shift
M = Constant Mesh
V = Air Shift w/o Installation Kit
Y = Lever Control

1 Includes mounting parts
47 Available with Wet Spline

Assembly Arrangements



Specifications Chart	Approximate Weight: 76 lbs. [34.5 kg]						
	823*B	823*D	823*G	823*J	823*M	823*R	823*T
Intermittent & Continuous Torque Rating (lbs-ft) [Nm]	750 [919]	750 [919]	750 [919]	750 [919]	750 [919]	550 [734]	500 [644]
HP Rating for Intermittent & Continuous Service							
At 500 RPM of Output Shaft (HP) [Kw]	71 [53]	71 [53]	71 [53]	71 [53]	71 [53]	52 [38]	47 [35]
At 1000 RPM of Output Shaft (HP) [Kw]	143 [107]	143 [107]	143 [107]	143 [107]	143 [107]	104 [43]	95 [37]

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

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

880 X B AH X - Y 3 XV

Basic Model
880

Mounting Option
G = Standard Mount Metric Studs
K = Standard Mount Less Stud Kit
L = Deep Mount Less Stud Kit
X = Standard Mounting
Z = Deep Mount
Q = Eaton Endurant

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

Input Option
 Eaton, Tremec, Meritor, Chelsea Transmissions
 See Current Price Book for Options

Lube Option
P = Pressure Lube
X = No Pressure Lube

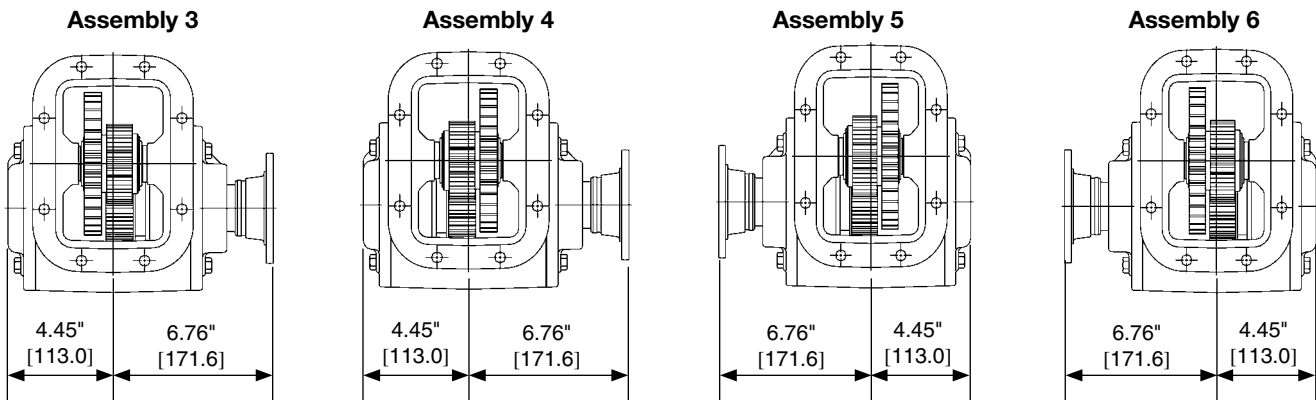
Output Option
AF = SAE B 2 or 4-Bolt Flange, SAE BB Shaft (1" - 15T)
AZ = SAE B 2 or 4-Bolt Flange, SAE C Shaft (1-1/4" - 14T)
XK = SAE B 2 or 4-Bolt Flange, SAE B Shaft (7/8" - 13T)
XS = SAE C 2 or 4-Bolt Flange, SAE C Shaft (1-1/4" - 14T)
XV = 1410 Series Companion Flange
XY = ISO 7653 Pump Mount
GS = Greaseable SAE C 2 or 4-Bolt, SAE C Shaft (1-1/4" - 14T)

Assembly Arrangement
3, 4, 5, 6

Shift Option
H = No Shift Kit
¹**P** = 12V Elec/Air Shift
M = Constant Mesh
¹**A** = Air Shift
V = Air Shift w/o Installation Kit
Y = Lever Shift
D = 12V Elec/Air Shift Eaton Endurant

¹ Includes mounting parts

Assembly Arrangements



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 & Continuous 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 & Continuous Service								
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

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

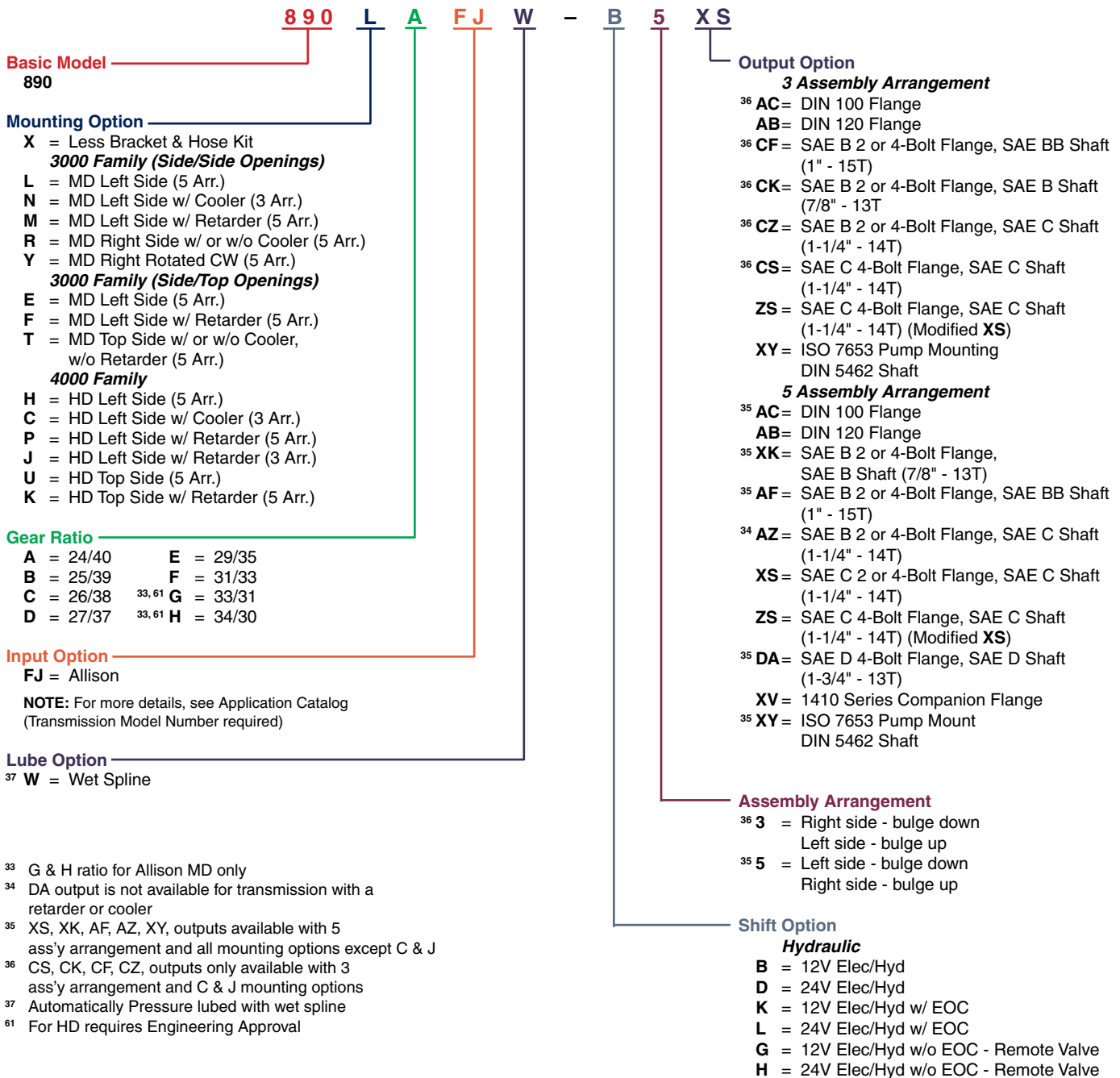


Model Number	Description
890LEFJW-B5XS	Left Side, Extended Shaft, SAE C Output Shaft and Flange

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



890 SERIES POWER TAKE-OFF SPECIFICATIONS AND TECHNICAL DATA



³³ G & H ratio for Allison MD only
³⁴ DA output is not available for transmission with a retarder or cooler
³⁵ XS, XK, AF, AZ, XY, outputs available with 5 ass'y arrangement and all mounting options except C & J
³⁶ CS, CK, CF, CZ, outputs only available with 3 ass'y arrangement and C & J mounting options
³⁷ Automatically Pressure lubed with wet spline
⁶¹ For HD requires Engineering Approval

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]

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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
 - C101 - G101 Series 1" Round Keyed Shaft
 - C102 Series SAE "B" 7/8"-13T
 - G102 Series 4S SAE "B" 7/8"-13T
 - G102 Series 4D DIN 1-3/8"-8T
 - SG102 Series SAE "B" 7/8"-13T



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)
3911832323	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



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

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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



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

DIN Mount Pumps

- Bi-Rotational
- DIN mount
- DIN 1-3/8"-8T Shaft
- All pumps are rear ported 1" o-ring boss
- Speeds to 2400 RPM



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



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

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Gear Pumps

PGP051 Pumps (Cont.)

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



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

PGP076 Pumps

- SAE "C" 4-Bolt Flange
- SAE "C" 1-1/4" Rd Key Shaft
- Pressures up to 3000 PSI
- Speeds 2400 RPM



Part Number	Description	Rotation	Port	Inlet	Outlet	Gear	CID
3169610246	PGP076 4C SF SP 1-1/4" K 22	CCW	SF	2"	1-1/4"	2-1/4"	9.22

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

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Vane Pumps

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.

Muncie Commercial Interchange

The Interchanges listed below are for reference to pumps listed in this catalog.

C Series Dump Pumps

Muncie Part Number	Commercial Model Number	10 Digit Order Number	Description
E2XL27-1RPRB	C101D-2.5	3149310226	Remote Mount Bi Rotation 2-1/2" Gear
E2XL27-2BPRL	C102D-2.5-1	3149325229	Direct Mount CCW Rotation 2-1/2" Gear
E2XL27-2BPRR	C102D-2.5	3149325234	Direct Mount CW Rotation 2-1/2" Gear
E3XA27-2BPRL	C102D-2.5-1-AS	3149325227	Direct Mount CCW Rotation 2-1/2" Gear
ACM-300	ASK17	3149414017	Air Shift Kit without Hoses and Fittings

NOTE: E2 Stands for 2 Line and E3 Stands for 3 Line / All Commercial Pumps in this program are 3 Line and include the sleeve. If a 2 Line Hydraulic System is being used do not install the 3rd line sleeve in the suction port.

NOTE: Commercial Always Recommends the use of a Three - Line Dump Pump System for prolonged trouble-free operation.

G Series Dump Pumps

Muncie Part Number	Commercial Model Number	10 Digit Order Number	Description
S2LD15-1-RPRB	G101-1-2.0	3089310047	Remote Mount Bi Rotation 2" Gear
S2LD15-2-BPRL	G102-1-2.0L-4S	3089310418	Direct Mount CCW Rotation 4 Bolt 2" Gear
S2LD15-2BPRR	G102-1-2.0R-4S	3089310416	Direct Mount CW Rotation 4 Bolt 2" Gear
S3AD15-2BPRR	G102-1-2.0R-4S-AS	3089310903	Direct Mount CW Rotation 4 Bolt 2" Gear Air Shift Installed
ACM-400	ASK49	3089414049	Air Shift Kit without Hoses and Fittings

NOTE: S2 Stands for 2 Line and S3 Stands for 3 Line / All Commercial Pumps in this program are 3 Line and include the sleeve. If a 2 Line Hydraulic System is being used do not install the 3rd line sleeve in the suction port.

NOTE: Commercial Always Recommends the use of a Three - Line Dump Pump System for prolonged trouble-free operation.

P20 Series


Muncie Part Number	Commercial Model Number	10 Digit Order Number	Description
PK8-2BPBB	PGP020B346QUYF10-25	3089110271	PGP020 2/4B NPT 7/8" 10T
PK11-2BPBB	PGP020B346QUYF12-25	3089110272	PGP020 2/4B NPT 7/8" 12T
PK13-2BPBB	PGP020B346QUYL15-25	3089110264	PGP020 2/4B NPT 7/8" 15T
PK15-2BPBB	PGP020B346QUYL17-25	3089110265	PGP020 2/4B NPT 7/8" 17T
PK17-2BPBB	PGP020B346QUYL20-25	3089110266	PGP020 2/4B NPT 7/8" 20T
PK8-2BSBB	PGP020B346JEAL10-25	3089110274	PGP020 2/4B ODT 7/8" 10T
PK11-2BSBB	PGP020B346JEAF12-25	3089110278	PGP020 2/4B ODT 7/8" 12T
PK13-2BSBB	PGP020B346JEAL15-25	3089110275	PGP020 2/4B ODT 7/8" 15T
PK15-2BSBB	PGP020B346JEAL17-25	3089110276	PGP020 2/4B ODT 7/8" 17T
PK17-2BSBB	PGP020B346JEAL20-25	3089110277	PGP020 2/4B ODT 7/8" 20T

P51 Series

Muncie Part Number	Commercial Model Number	10 Digit Order Number	Description
PL16-2BPBB	PGP051A346**YL15-65	3139610665	PGP051 2/4B NPT 7/8" 15T
PL19-2BPBB	PGP051A346**YL17-65	3139610664	PGP051 2/4B NPT 7/8" 17T
PL23-2BPBB	PGP051A346**YL20-65	3139610663	PGP051 2/4B NPT 7/8" 20T
PL25-2BPBB	PGP051A346**YR22-65	3139610659	PGP051 2/4B NPT 7/8" 22T
PL27-2BPBB	PGP051A346**YR25-65	3139610658	PGP051 2/4B NPT 7/8" 25T
PL16-2BPBL-20	PBP051A346**YL15-75-RV	3139610677	PGP051 2/4B NPT 7/8" 15T RV
PL19-2BPBL-20	PGP051A346**YL17-65-RV	3139610678	PGP051 2/4B NPT 7/8" 17T RV
PL25-2BPBL-20	PGP051A346**YR22-65-RV	3139610679	PGP051 2/4B NPT 7/8" 22T RV
PL27-2BPBL-20	PGP051A346**YR25-65-RV	3139610699	PGP051 2/4B NPT 7/8" 25 T RV

P76 Series

Muncie Part Number	Commercial Model Number	10 Digit Order Number	Description
PMM27-7-CFSL	PGP076A578**OM15-11	3169610243	PGP076 4B SF 1-1/4" K
PMM31-7-CFSL	PGP076A578**OM17-11	3169610244	PGP076 4B SF 1-1/4" K
PMM35-7-CFSL	PGP076A578**ON20-11	3169610245	PGP076 4B SF 1-1/4" K
PMM40-7-CFSL	PGP076A578**ON22-11	3169610246	PGP076 4B SF 1-1/4" K

 **WARNING:** This product can expose you to chemicals including lead or DEHP which are known to the state of California to cause cancer and birth defects or other reproductive harm. www.p65warnings.ca.gov

Permco Commercial Interchange

The Interchanges listed below are for reference to pumps listed in this catalog.

C Series Dump Pumps

Permco Part Number	Commercial Model Number	10 Digit Order Number	Description
DM-640-25-XR-O-T-250	C101D-2.5	3149310226	Remote Mount Bi Rotation 2-1/2" Gear
DMD-25-X-L-MS-25-EB	C102D-2.5-1	3149325229	Direct Mount CCW Rotation 2-1/2" Gear
DMD-25-X-R-MS-25-EB	C102D-2.5	3149325234	Direct Mount CW Rotation 2-1/2" Gear
DMD-25-X-L-AS-25-EB	C102D-2.5-1-AS	3149325227	Direct Mount CCW Rotation 2-1/2" Gear Air Shift Installed

NOTE: All Commercial Pumps in this program are 3 Line and include the sleeve.

If a 2 Line Hydraulic System is being used do not install the 3rd line sleeve in the suction port.

NOTE: Commercial Always Recommends the use of a Three - Line Dump Pump System for prolonged trouble-free operation.

G Series Dump Pumps

Permco Part Number	Commercial Model Number	10 Digit Order Number	Description
DMR-400-20-X-200	G101-1-2.0	3089310047	Remote Mount Bi Rotation 2" Gear
DMD-400-20-XR-200	G102-1-2.0R-4S	3089310416	Direct Mount CCW Rotation 4 Bolt 2" Gear
DMD-400-20-XL-200	G102-1-2.0L-4S	3089310418	Direct Mount CW Rotation 4 Bolt 2" Gear
DMD-400-20-XR-200-AS	G102-1-2.0R-4S-AS	3089310903	Direct Mount CW Rotation 4 Bolt 2" Gear Air Shift Installed

NOTE: All Commercial Pumps in this program are 3 Line and include the sleeve.

If a 2 Line Hydraulic System is being used do not install the 3rd line sleeve in the suction port.

NOTE: Commercial Always Recommends the use of a Three - Line Dump Pump System for prolonged trouble-free operation.

P20 Series

Permco Part Number	Commercial Model Number	10 Digit Order Number	Description
P2100A290MDXE10-14	PGP020B346QUYF10-25	3089110271	PGP020 2/4B NPT 7/8" 10T
P2100A290MDXE12-14	PGP020B346QUYF12-25	3089110272	PGP020 2/4B NPT 7/8" 12T
P2100A290MDXK15-14	PGP020B346QUYL15-25	3089110264	PGP020 2/4B NPT 7/8" 15T
P2100A290MDXK17-14	PGP020B346QUYL17-25	3089110265	PGP020 2/4B NPT 7/8" 17T
P2100A290MDXK20-14	PGP020B346QUYL20-25	3089110266	PGP020 2/4B NPT 7/8" 20T
P2100A290IDZE10-14	PGP020B346JEAL10-25	3089113274	PGP020 2/4B ODT 7/8" 10T
P2100A290IDZE12-14	PGP020B346JEAF12-25	3089110278	PGP020 2/4B ODT 7/8" 12T
P2100A290IDZK15-14	PGP020B346JEAL15-25	3089110275	PGP020 2/4B ODT 7/8" 15T
P2100A290IDZK17-14	PGP020B346JEAL17-25	3089110276	PGP020 2/4B ODT 7/8" 17T
P2100A290IDZK20-14	PGP020B346JEAL20-25	3089110277	PGP020 2/4B ODT 7/8" 20T

P51 Series

Permco Part Number	Commercial Model Number	10 Digit Order Number	Description
M5151A890AAXK15-54	PGP051B346***YL*15-65	3139610665	PGP051 2/4B NPT 7/8" 15T
M5151A890AAXK17-54	PGP051B346***YL*17-65	3139610664	PGP051 2/4B NPT 7/8" 17T
M5151A890AAXK20-54	PGP051B346***YL*20-65	3139610663	PGP051 2/4B NPT 7/8" 20T
M5151A890AAXQ22-54	PGP051B346***YR*22-65	3139610659	PGP051 2/4B NPT 7/8" 22T
M5151A890AAXQ25-54	PGP051B346***YR*25-65	3139610658	PGP051 2/4B NPT 7/8" 25T

P75 P76 Series

Permco Part Number	Commercial Model Number	10 Digit Order Number	Description
P75C467ADNM22-00	PGP075C578*BE*ON*22-11	3169310187	PGP075 4B SF 1-1/4" K
VP28-4COFLMC	PGP076A578***OM15-11	3169610243	PGP076 4B SF 1-1/4" K
VP32-4COFLMC	PGP076A578***OM17-11	3169610244	PGP076 4B SF 1-1/4" K
VP37-4COFLMC	PGP076A578***ON20-11	3169610245	PGP076 4B SF 1-1/4" K
VP42-4COFLMC	PGP076A578***ON22-11	3169610246	PGP076 4B SF 1-1/4" K



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 ³ /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 ³ /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

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Hydraulic Pumps

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
Displacement [cm ³ /rev]	25.6	40.9	51.1	59.5	81.6	102.9	Shaft speed [rpm]						
Max flow ⁽¹⁾ [l/min]							short circuited pump (low press)	2700	2700	2700	2700	2300	2300
at 350 bar	67	98	112	131	163 ⁽³⁾	185 ⁽³⁾	max speed at 350 bar ⁽²⁾	2600	2400	2200	2200	2000 ⁽³⁾	1800 ⁽³⁾
at 400 bar	56	86	97	113	143	160	at 400 bar ⁽²⁾	2200	2100	1900	1900	1750	1550 ⁽³⁾
Max operating pressure [bar]							Torque ⁽¹⁾ [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
							Input power [kW]						
							continuous	31	46	52	61	76	86
							intermittent ⁽⁴⁾	39	57	66	76	95	108
							Weight [kg]						
								8.5	8.5	8.5	8.5	12.5	12.5

⁽¹⁾ Theoretical Values

⁽²⁾ Valid at an inlet pressure of 1.0 bar (abs.) when operating on mineral oil at a viscosity of 30 mm²/s (cSt).

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

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

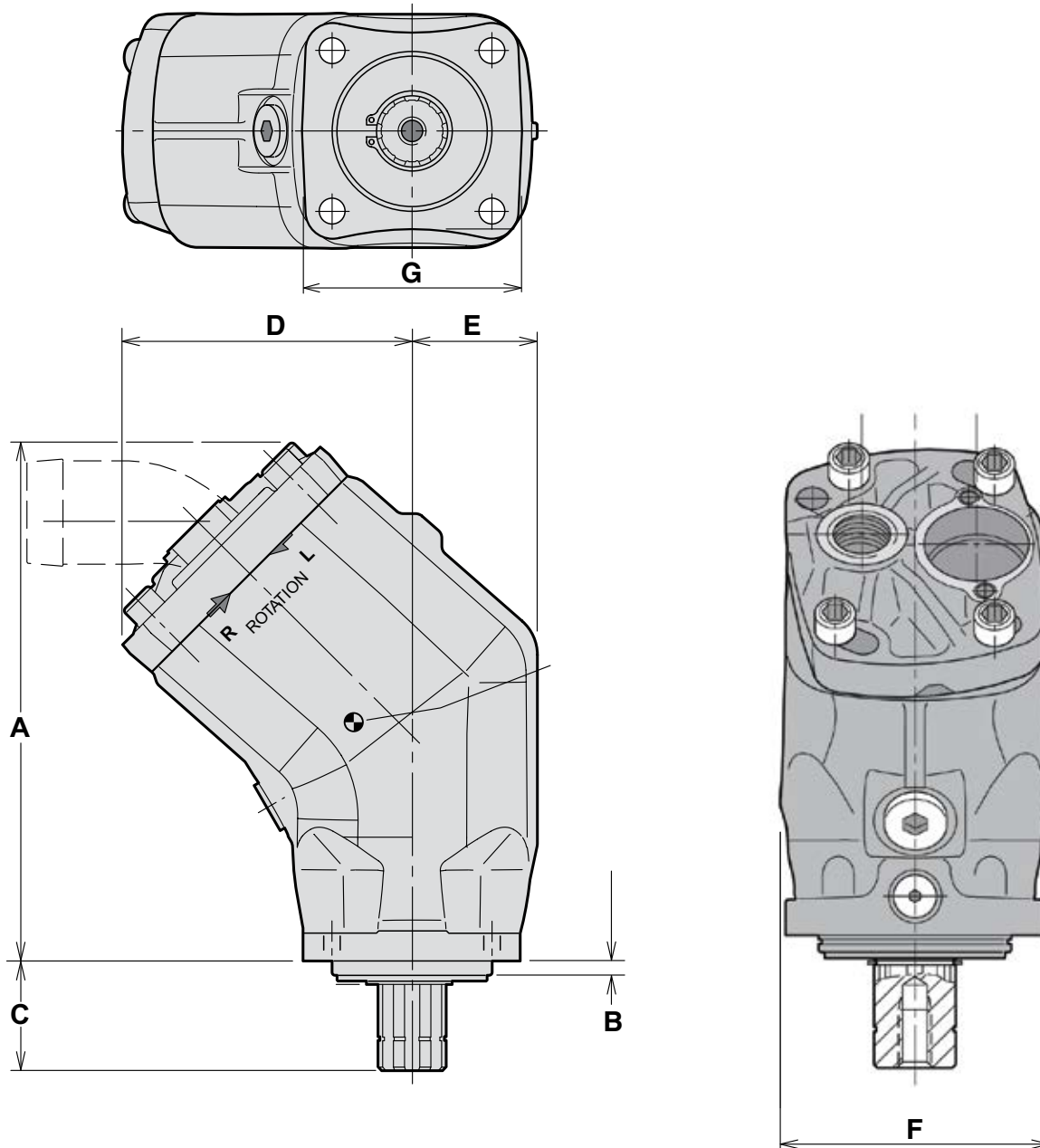
With 2" suction line: F1-81 – max 1400 rpm (Q ≈ 120 l/min);

F1-101 – max 1000 rpm (Q ≈ l/min).

⁽⁴⁾ Max 6 seconds in any one minute.

NOTE: For noise level information, contact Parker Hannifin.

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							

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Hydraulic Pumps

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.



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 ³ /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 ⁽¹⁾⁽²⁾	2550 ⁽³⁾	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 ⁽¹⁾⁽²⁾	2550 ⁽³⁾	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 ⁽¹⁾⁽²⁾	2550 ⁽³⁾	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 ⁽¹⁾⁽²⁾	2550 ⁽³⁾	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 ⁽¹⁾⁽²⁾	2550 ⁽³⁾	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 ⁽¹⁾⁽²⁾	2550 ⁽³⁾	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 ⁽¹⁾⁽²⁾	2550 ⁽³⁾	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 ⁽¹⁾⁽²⁾	2550 ⁽³⁾	32.3 (122.3)	32.3 (122.3)	150 (112.0)

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

⁽¹⁾ 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)

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

⁽³⁾ 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
F2-53/53 flow [l/min]									
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	-	-	-
NOTE: 42/42 values is 80% of 53/53 values & 70/70 values is 130% of 53/53 values									
F2-70/35 flow [l/min]									
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	-	-	-
NOTE: 55/28 values is 80% of 70/35 values									

Shaft Torque vs. Pressure (theoretical)

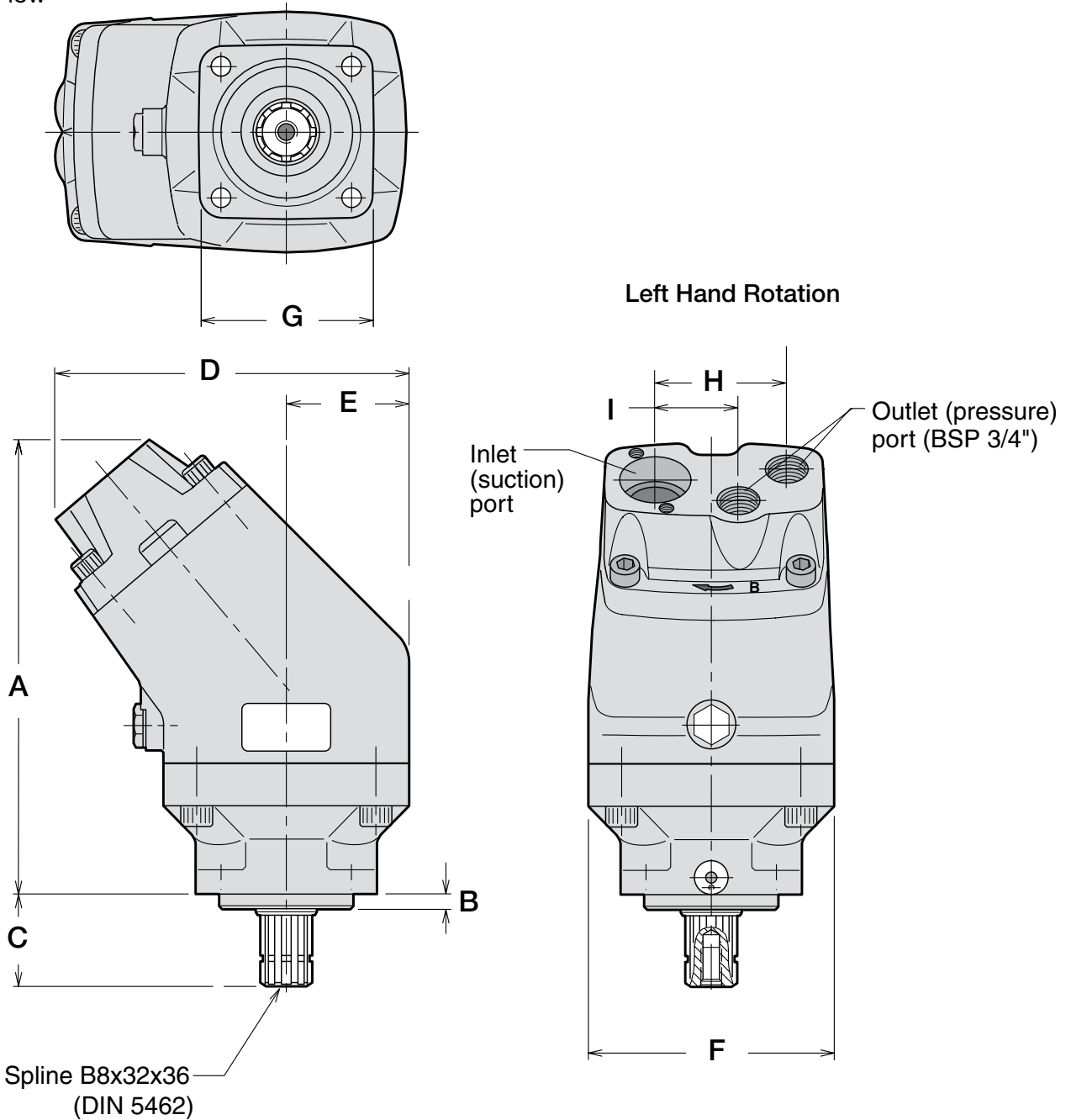
Pressure [bar]	150	200	250	300	350	Pressure [bar]	150	200	250	300	350
F2-53/53 torque [Nm]						F2-70/35 torque [Nm]					
Port A	129	171	214	257	300	Port A	164	219	274	329	383
Port B	124	165	206	248	289	Port B	86	114	143	171	200
Total (ports A + B)	253	336	420	505	589	Total (ports A + B)	250	333	417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

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Hydraulic Pumps

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)

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 ³ /Rev	Rotation	GPM @ 1000 RPM	Max Pressure (Continuous)
12V						
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
24V						
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
Displacement [cm ³ /rev]	81.6	102.9	Torque ⁽¹⁾ [Nm]		
Max flow ⁽¹⁾ [l/min]			at 350 bar	453	572
at 350 bar	163 ⁽³⁾	185 ⁽³⁾	at 400 bar	518	653
at 400 bar	143	400	Input power [kW]		
Max operating pressure [bar]			continuous	76	85
continuous	350	350	intermittent ⁽⁴⁾	95	123
intermittent	400	400	Weight [kg]	16.7	16.7
Shaft speed [rpm]					
short circuited pump (low press)	2300 ⁽³⁾	2300 ⁽³⁾			
max speed at 350 bar ⁽²⁾	2000 ⁽³⁾	1800 ⁽³⁾			
at 400 bar ⁽²⁾	1750	1550 ⁽³⁾			

⁽¹⁾ Theoretical Values

⁽²⁾ Valid at an inlet pressure of 1.0 bar (abs.) when operating on mineral oil at a viscosity of 30 mm²/s (cSt).

⁽³⁾ 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).

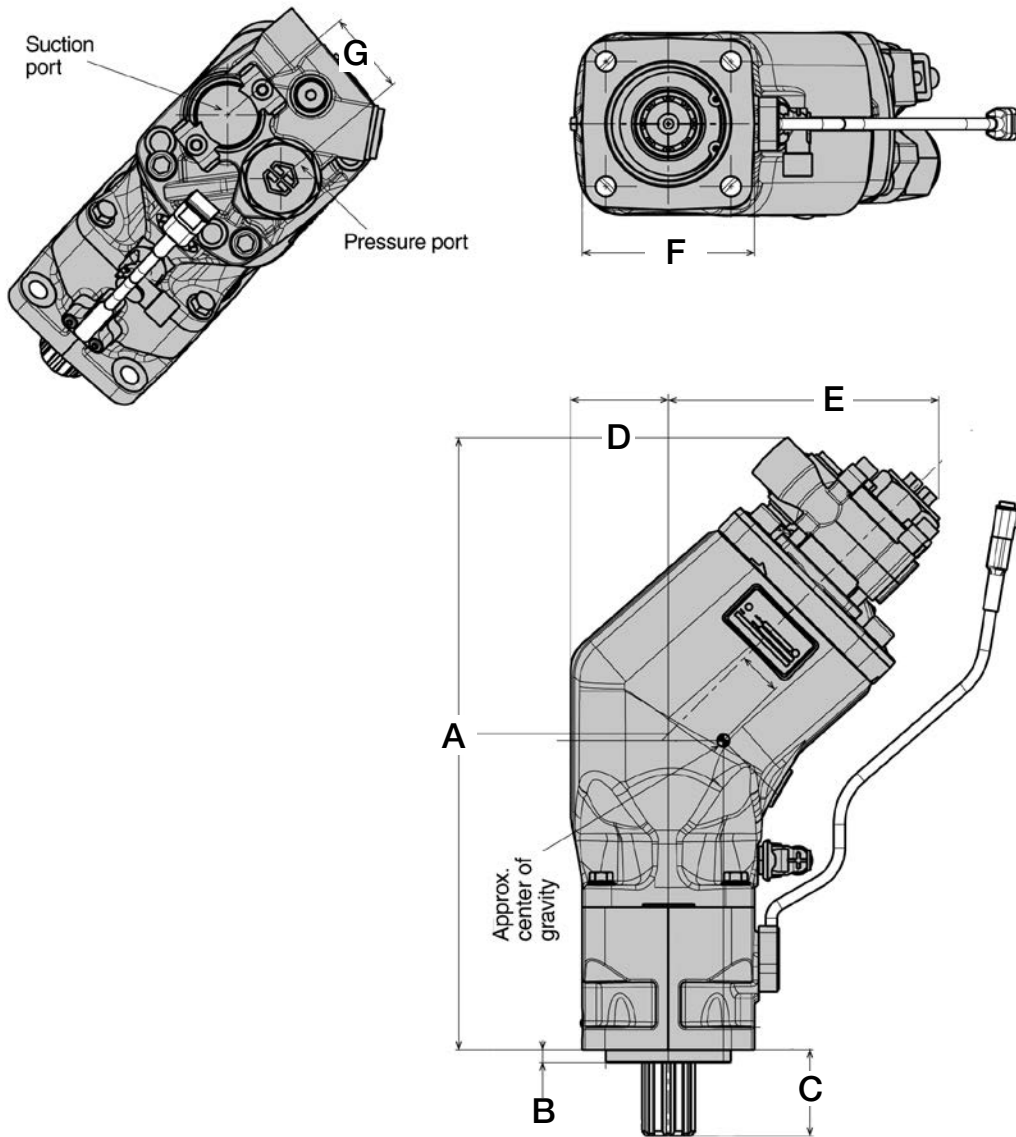
⁽⁴⁾ Max 6 seconds in any one minute.

NOTE: For noise level information, contact Parker Hannifin

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Hydraulic Pumps

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.

BPV-F1 and BPV-T1 Bypass Valve

Without manual override

Bypass Valve, Type	BPV-F1-25 to -101 and BPV-T1-81 and -121
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	Voltage	Ordering Number	For F1 an T1 Size	Torque ¹⁾
BPV-F1-25	24 VDC	378 8803	F1-25	50 Nm
BPV-F1-41	24 VDC	378 7201	F1-41, -51,	50 Nm
BPV-F1-81	12 VDC	378 7202	-61 and T1-81	
BPV-F1-81	24 VDC	378 7203	F1-81, -101,	100 Nm
BPV-F1-121	12 VDC	378 7204	and T1-121	
Drain fitting kit F1-025		378 1640	Contains a drain line fitting a bonded seal and nozzle.	
Drain fitting kit other F1, F2 and T1		378 3039	Contains a drain line fitting and a bonded seal.	

1) Torque pressure connector to:

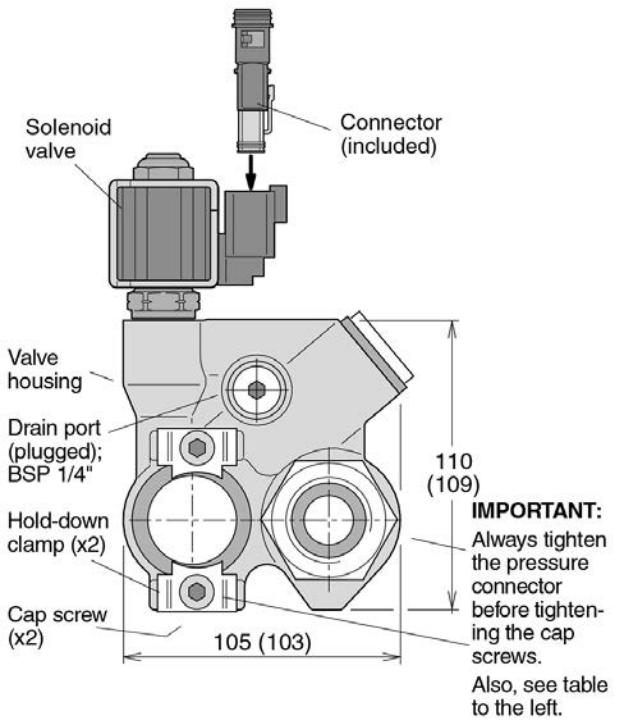
BPV-F1 Bypass Valve

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

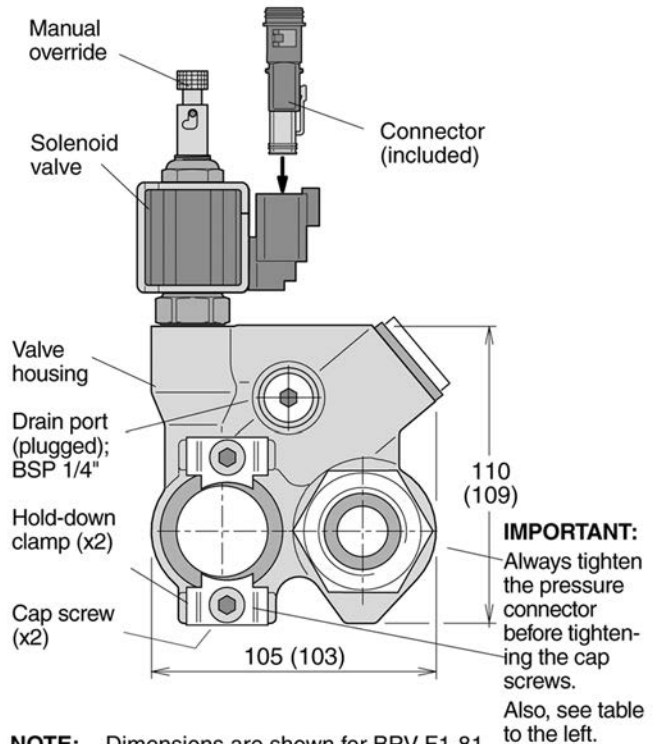
Bypass valve kits	Voltage	Ordering Number	For F1 an T1 sSize	Torque ¹⁾
BPV-F1-25	24 VDC	378 7461	F1-25, -41, -51 and -61	50 Nm
BPV-F1-81	24 VDC	378 7462	F1-81 and -101	100 Nm
Drain fitting kit F1-025		378 1640	Contains a drain line fitting a bonded seal and nozzle.	
Drain fitting kit other F1, F2		378 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 and -T1 installation and cross section without manual override



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

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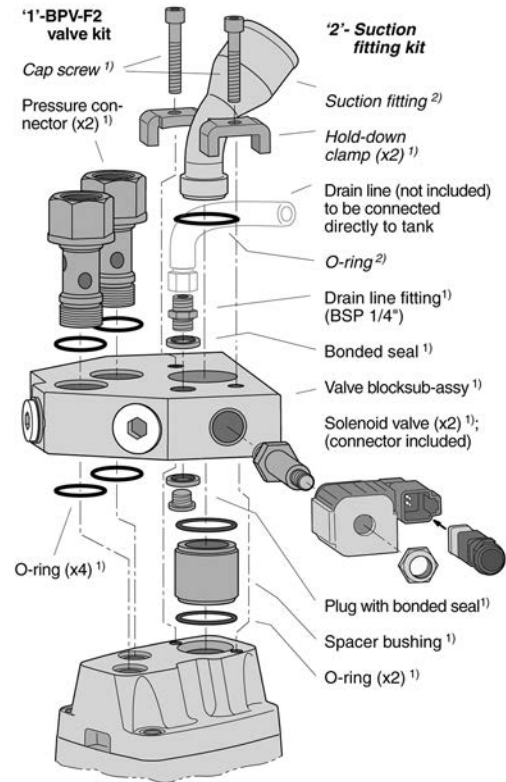
Hydraulic Pumps

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 ¹⁾	Voltage	Ordering number	For F2 size	Torque ³⁾
BPV-F2	24 VDC	378 7424	42/42, 53/53,	50 Nm
	12 VDC	378 7425	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).

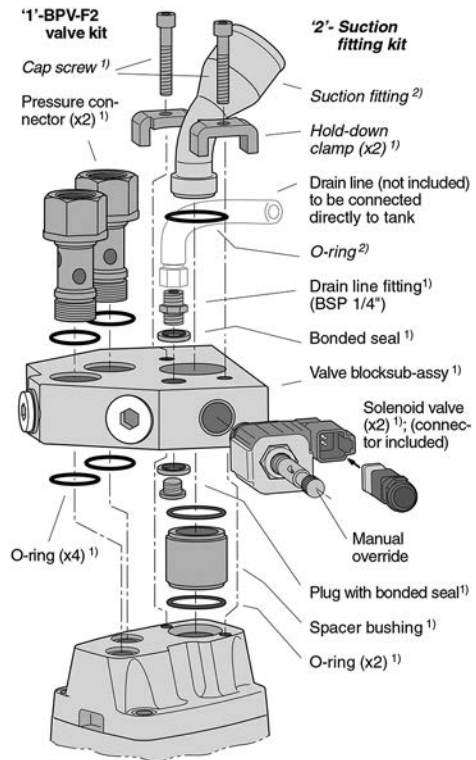
BPV-F2 Bypass Valve

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 ¹⁾	Voltage	Ordering number	For F2 size	Torque ³⁾
BPV-F2	24 VDC	378 7463	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:



Bypass valve split view with 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).

Hydraulic Pumps

F1, F2, F3, VP1 Pumps

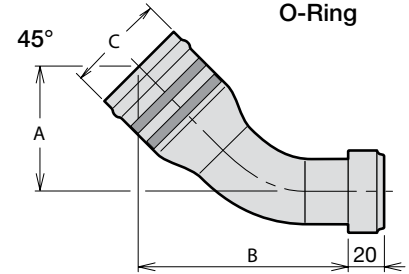
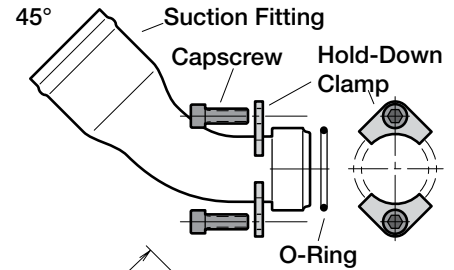
Suction and Pressure Fittings

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

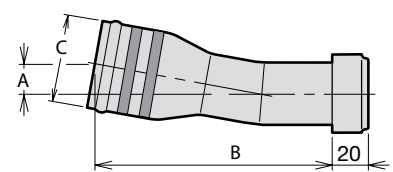
Additional hold-down-clamp kit for mounting on BPV ordering no. 3782439

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 ⁽³⁾	Straight	32	174	75	3.00"
3780633 ⁽¹⁾	45 degree	60	104	38	1.50"
3780364 ⁽²⁾	45 degree	67	110	50	2.00"
3780634 ⁽³⁾	45 degree	75	117	63	2.50"
3780635 ⁽¹⁾	Straight	0	85	38	1.50"
3780636 ⁽²⁾	Straight	17	136	50	2.00"
3780637 ⁽³⁾	Straight	25	145	63	2.50"
3781234 ⁽¹⁾	45 degree	60	104	32	1.25"

⁽¹⁾ Recommended for frame size F1-25

⁽²⁾ Recommended for frame size F1-41, -51, -61, -81, -101

⁽³⁾ 3 clamps and 3 screws

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 ⁽²⁾	Weight [lbs]	Max Pressure RPM ⁽¹⁾ (Continuous)	Displacement [cm ³ /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 ⁽²⁾	Weight [lbs]	Max Pressure RPM ⁽¹⁾ (Continuous)	Displacement [cm ³ /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 ³ /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 ²]	.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.

⁽¹⁾ Max 6 seconds in any one minute.

⁽²⁾ Valid at an inlet pressure of 1.0 bar (abs.) when operating on mineral oil at a viscosity of 30 mm²/s (cSt).



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

VP1 095-110-130, use standard suction fittings

⚠ 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

Hydraulic Pumps

PAVC Piston Pumps Variable Displacement

- Maximum speeds to 3000
- Maximum pressure to 3500 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".

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

Other sizes are available, contact Customer Service.

WARNING: This product can expose you to chemicals, including lead, which is known to the state of California to cause cancer, birth defects, and other reproductive harm, or DEHP, which is known to the state of California to cause birth defects, and other reproductive harm.

Hydraulic Motors

TB Series (Cont.)

TB Series – 4-Bolt

Part Number	Description	Eaton	CIR	GPM	Speed	Max Torque	Max Supply Pressure
TB0036FP100AAAA	1/2" NPT 1" Key	101-1753	2.2	9	932	427 Lbs. in.	2750
TB0050FP100AAAA	1/2" NPT 1" Key	101-1001	3.0	9	678	693 Lbs. in.	2750
TB0065FP100AAAA	1/2" NPT 1" Key	101-1754	4.0	9	511	946 Lbs. in.	2750
TB0080FP100AAAA	1/2" NPT 1" Key	101-1002	5.0	9	409	1193 Lbs. in.	2750
TB0100FP100AAAA	1/2" NPT 1" Key	101-1003	6.0	12-15	454	1411 Lbs. in.	2750
TB0130FP100AAAA	1/2" NPT 1" Key	101-1755	8.0	12-15	430	1951 Lbs. in.	2750
TB0165FP100AAAA	1/2" NPT 1" Key	101-1004	10.0	12-15	343	2428 Lbs. in.	2750
TB0195FP100AAAA	1/2" NPT 1" Key	101-1005	11.9	12-15	287	3011 Lbs. in.	2750
TB02305FP100AAAA	1/2" NPT 1" Key	101-1006	15.9	12-15	246	2797 Lbs. in.	2750
TB0295FP100AAAA	1/2" NPT 1" Key	101-1007	17.9	12-15	191	3096 Lbs. in.	2750
TB0365FP100AAAA	1/2" NPT 1" Key	101-10084	22.6	12-15	151	3897 Lbs. in.	2750
TB0390FP100AAAA	1/2" NPT 1" Key	101-1556	24.0	12-15	143	3792 Lbs. in.	2750
TB0036FS100AAAA	7/8" O-Ring 1" Key	101-1749	2.2	9	932	427 Lbs. in.	2750
TB0050FS100AAAA	7/8" O-Ring 1" Key	101-1009	3.0	9	678	693 Lbs. in.	2750
TB0065FS100AAAA	7/8" O-Ring 1" Key	101-1750	4.0	9	511	946 Lbs. in.	2750
TB0080FS100AAAA	7/8" O-Ring 1" Key	101-1010	5.0	9	409	1193 Lbs. in.	2750
TB0100FS100AAAA	7/8" O-Ring 1" Key	101-1011	6.0	12-15	454	1411 Lbs. in.	2750
TB0130FS100AAAA	7/8" O-Ring 1" Key	101-1751	8.0	12-15	430	1951 Lbs. in.	2750
TB0165FS100AAAA	7/8" O-Ring 1" Key	101-1012	10.0	12-15	343	2428 Lbs. in.	2750
TB0195FS100AAAA	7/8" O-Ring 1" Key	101-1013	11.9	12-15	287	3011 Lbs. in.	2750
TB0230FS100AAAA	7/8" O-Ring 1" Key	101-1014	15.9	12-15	246	2797 Lbs. in.	2750
TB0295FS100AAAA	7/8" O-Ring 1" Key	101-1015	17.9	12-15	191	3096 Lbs. in.	2750
TB0365FP100AAAA	7/8" O-Ring 1" Key	101-1016	22.6	12-15	151	3897 Lbs. in.	2750
TB0390FS100AAAA	7/8" O-Ring 1" Key	101-1564	24.0	12-15	143	3792 Lbs. in.	2750

Other sizes are available, contact Customer Service.

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 Torque	Max Supply Pressure
TE0080AP100AAAA	1/2" NPT 1" Key	103-1026	5.0	12-15	695	1416 Lbs. in.	2900
TE0165AP100AAAA	1/2" NPT 1" Key	103-1028	10.0	12-15	348	2744 Lbs. in.	2900
TE0230AP100AAAA	1/2" NPT 1" Key	103-1030	13.9	15-20	328	3363 Lbs. in.	2900
TE0045AS100AAAA	7/8" O-Ring 1" Key	N/A	2.5	12-15	1024	624 Lbs. in.	2900
TE0080AS100AAAA	7/8" O-Ring 1" Key	103-1034	5.0	12-15	695	1416 Lbs. in.	2900
TE0165AS100AAAA	7/8" O-Ring 1" Key	103-1036	10.0	12-15	348	2744 Lbs. in.	2900
TE0230AS100AAAA	7/8" O-Ring 1" Key	103-1038	13.9	15-20	328	3363 Lbs. in.	2900
TE0390AS100AAAA	7/8" O-Ring 1" Key	103-1040	24.0	15-20	191	3935 Lbs. in.	2900

Other sizes are available, contact Customer Service.

TE Series – 4-Bolt

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

Other sizes are available, contact Customer Service.

WARNING: This product can expose you to chemicals, including lead, which is known to the state of California to cause cancer, birth defects, and other reproductive harm, or DEHP, which is known to the state of California to cause birth defects, and other reproductive harm.

Hydraulic Motors

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 – 2-Bolt

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

Other sizes are available, contact Customer Service.

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 – 4-Bolt Magneto

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

Other sizes are available, contact Customer Service.

TK 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.



TK Series – 2-Bolt

Part Number	Description	Eaton	CIR	GPM	Speed	Max Torque	Max Supply Pressure
TK0250K5320AAAA	1" O-Ring 1-1/2" Key	112-1065	15.3	30	523	7204 Lbs. in.	4750
TK0250K5360AAAA	1" O-Ring 1-1/2" 17T	112-1059	15.3	30	523	7204 Lbs. in.	4750
TK0315K5360AAAA	1" O-Ring 1-1/2" 17T	112-1283	19.2	30	413	9105 Lbs. in.	4750
TK0400K5360AAAA	1" O-Ring 1-1/2" 17T	112-1061	24.4	30	373	10201 Lbs. in.	4750
TK0500K5360AAAA	1" O-Ring 1-1/2" 17T	112-1062	30.5	30	298	12736 Lbs. in.	4750

Other sizes are available, contact Customer Service.

WARNING: This product can expose you to chemicals, including lead, which is known to the state of California to cause cancer, birth defects, and other reproductive harm, or DEHP, which is known to the state of California to cause birth defects, and other reproductive harm.

Kits / Systems

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

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

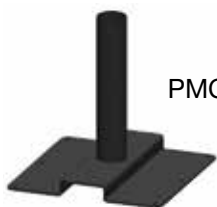
There are two mounting options for this system:

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



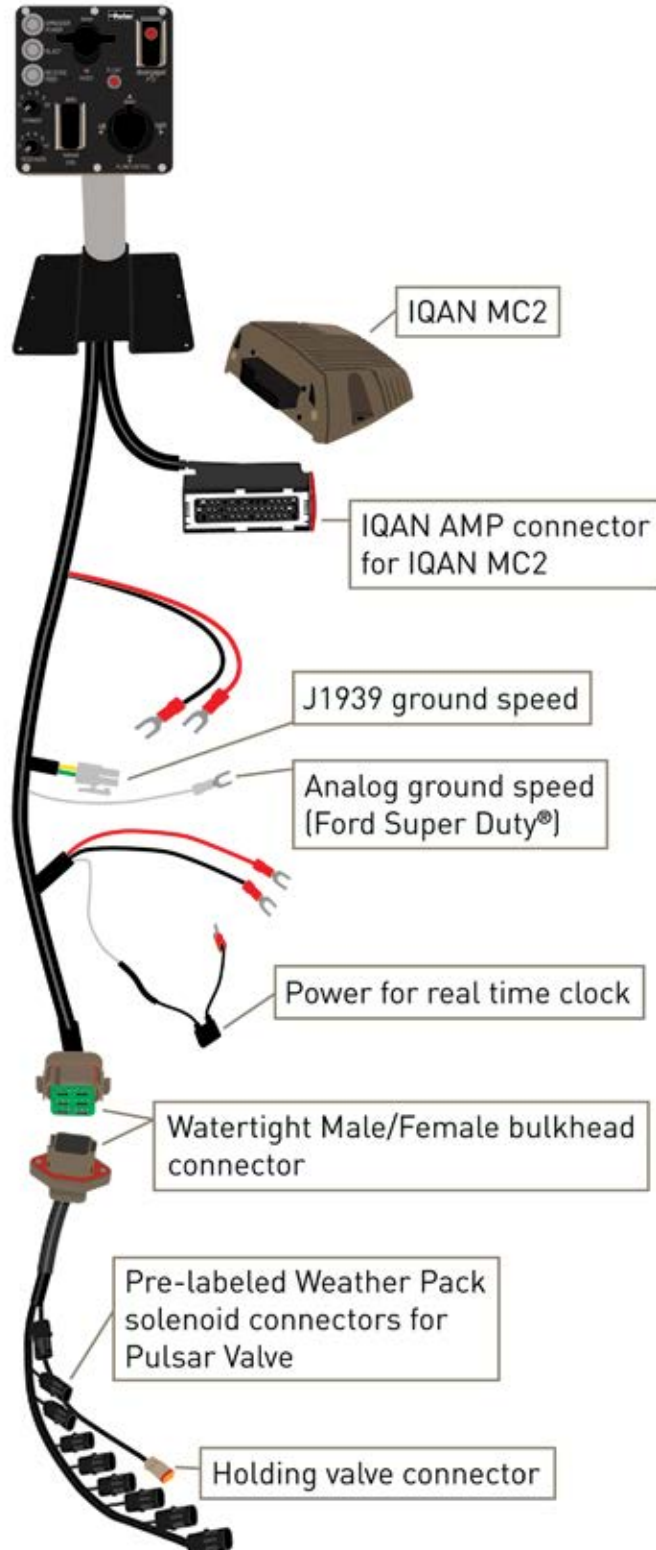
Bracket

Kits / Systems

Snow & Ice System (Continued)

Total System Reliability

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



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

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

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

Accessory Valves

- Flow dividers, pilot operated check valves, relief valves
- 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

Selector Valves

- Manual or air operated
- Flows to 225 LPM (60 GPM)
- Pressures to 207 bar (3000 PSI)
- Cast iron bodies



Part Number	Description
S-100	Selector valve 1" NPT ports, manual shift
AS-100	Selector valve 1" NPT ports, no manual override
AS-100-SR	Selector valve 1" NPT ports, airshift, spring return

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



WARNING: This product can expose you to chemicals including Lead and Lead Compounds, 1,3-Butadiene, Carbon black (airborne, unbound particles of respirable size), or Di(2-ethylhexyl)phthalate (DEHP) which are known to the State of California to cause cancer. For more information go to www.P65Warnings.ca.gov.

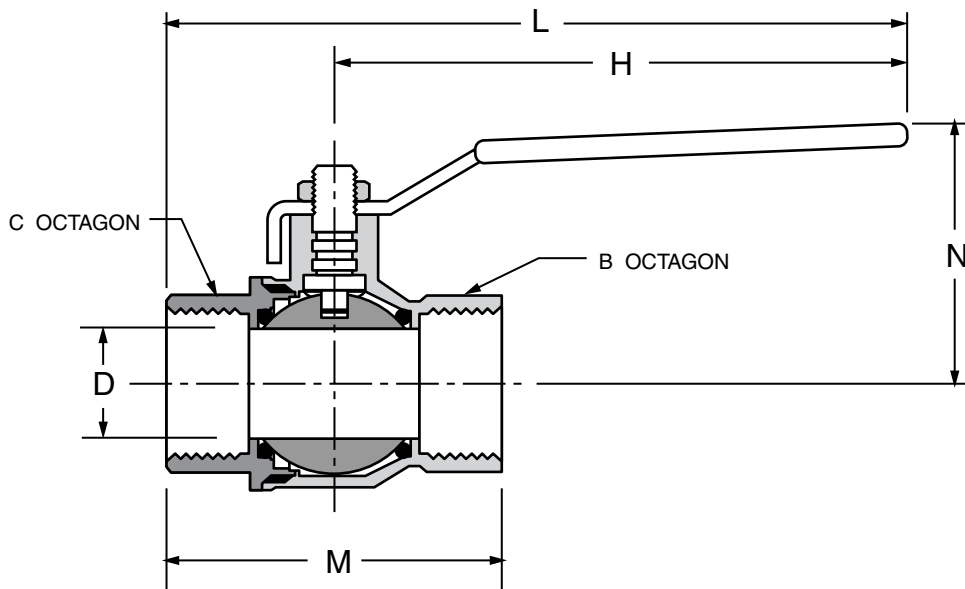
Ball Valves

- 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



⚠ WARNING: This product can expose you to chemicals including Lead, Nickel and/or 1,3-Butadiene, which are known to the State of California to cause cancer, birth defects and/or reproductive harm. For more information go to www.p65warnings.ca.gov

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
12AT10CN25BBH	15 GPM 10 Micron NPT 3/4"
12AT10CN25MMH	15 GPM 10 Micron SAE 12
50AT10CN25DDH	45 GPM 10 Micron NPT 1-1/4"
50AT10CN25OOH	45 GPM 10 Micron SAE 20
50AT210CN25DDH	50 GPM 10 Micron Double NPT 1-1/4"
50AT210CN25OOH	50 GPM 10 Micron Double SAE 20
FSP415-5EFNH	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

Guardian®

- Portable filtration system
- 2 Elements per 250 gallons



Part Number	Description
GT410C6	Guardian® 110/120 VAC, 10 Micron Cellulose with quick disconnect hose connections
932016	10 Micron Cellulose 2-pack

WARNING: This product can expose you to chemicals including Formaldehyde, which is known to the State of California to cause cancer. For more information go to: <http://www.p65warnings.ca.gov>

Filters

Accessories

- Fluid level / temperature gauges



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

Accessories

- Breathers - non-pressurized



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

Accessories

- 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-12	3/4"	19	1.10"	28	3000	21, 0	4-3/4	120
387TC-16	1"	25	1.40"	35	3000	21, 0	6	150
387TC-20	1-1/4"	31, 5	1.82"	46	3000	21, 0	8-1/4	210

Technical reference only / See hose assemblies below.

Hose Assemblies

Part Number	Inch	PSI	Description	Length
F387TC0106121212-84.0	3/4"	3000	Hose w/ Male Pipe and Female JIC Ends	84"
F387TC0106161616-120.0	1"	3000	Hose w/ Male Pipe and Female JIC Ends	120"
F387TC0106161616-180.0	1"	3000	Hose w/ Male Pipe and Female JIC Ends	180"
F387TC0106161616-192.0	1"	3000	Hose w/ Male Pipe and Female JIC Ends	192"
F387TC0106161616-240.0	1"	3000	Hose w/ Male Pipe and Female JIC Ends	240"
F387TC0106161616-48.0	1"	3000	Hose w/ Male Pipe and Female JIC Ends	48"
F387TC0106161616-84.0	1"	3000	Hose w/ Male Pipe and Female JIC Ends	84"
F387TC0606161616-108.0	1"	3000	Hose w/ Female JIC Both Ends	108"
F387TC0606161616-52.5	1"	3000	Hose w/ Female JIC Both Ends	52.5"
F387TC0606161616-60.0	1"	3000	Hose w/ Female JIC Both Ends	60"
F387TC0637161616-69	1"	3000	Hose w/ Straight Female JIC and 45° JIC Ends	69"

WARNING: This product can expose you to chemicals including Carbon Black, which are known to the State of California to cause cancer. For more information go to www.p65warnings.ca.gov

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	MPa	88HC psi	MPa	Inch	mm
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

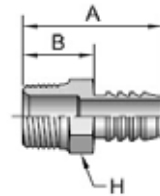
Part Number	Description
2L-TTD-C102	2 Line Dump Trailer - One Line Trailer Connection
2L-TTDE-C102	2 Line Dump Trailer Extended Cab - One Line Trailer Connection
3L-TTD-C102	3 Line Dump Trailer - One Line Trailer Connection
3L-TTDE-C102	3 Line Dump Trailer Extended Cab - One Line Trailer Connection
3L-CLP	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.

88 Series Fittings for 811/881HT/881 Hose

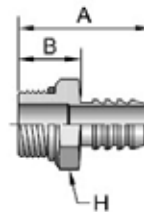
0188 - Male NPTF Pipe - Rigid

Part Number	Thread Inch	Hose I.D. Inch	A Inch	A mm	H Inch	B Inch	B 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



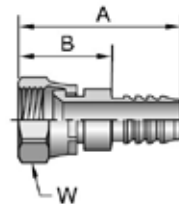
0588 - Male SAE Straight Thread with O-Ring - Rigid

Part Number	Thread Inch	Hose I.D. Inch	A Inch	A mm	H Inch	B Inch	B 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



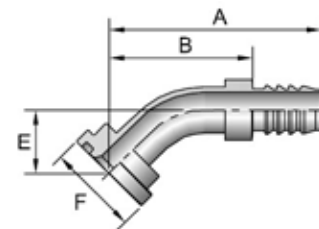
0688 - Female JIC 37° - Swivel

Part Number	Thread Inch	Hose I.D. Inch	A Inch	A mm	W Inch	B Inch	B 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	A mm	E Inch	E mm	F Inch	B Inch	B 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



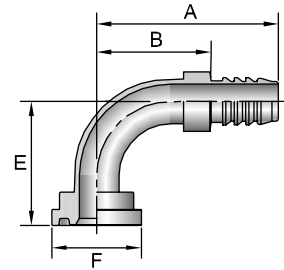
WARNING: This product can expose you to chemicals including Lead, which is known to the State of California to cause cancer and birth defect or other reproductive harm. For more information go to www.p65warnings.ca.gov

Fittings

88 Series Fittings for 811/881 Hose

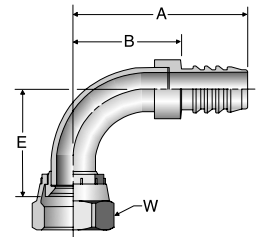
1988 - SAE Code 61 Flange Head - 90° Elbow
 ISO 12151-3 - E90S - L (1 Piece: ISO 12151-3 - E90M - L)

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"



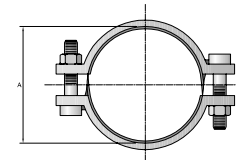
88HC-H - Hose Clamp (High Torque Worm Gear)

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)

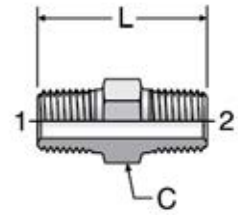
Part Number	Hose I.D. Inch
88DB-12	3/4"
88DB-16	1"
88DB-20	1-1/4"
88DB-24	1-1/2"
88DB-32	2"



Pipe Fittings and Port Adapters

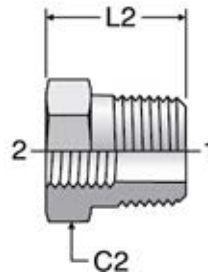
FF - Pipe Nipple NPTF/NPT

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"			



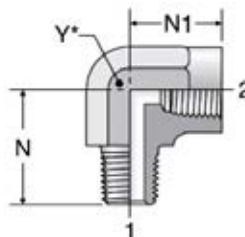
PTR - Pipe Thread Reducer NPTF/NPT

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"



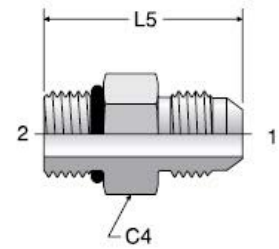
WARNING: This product can expose you to chemicals including Lead, which is known to the State of California to cause cancer and birth defects or other reproductive harm. For more information go to www.p65warnings.ca.gov.

Adapters

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"

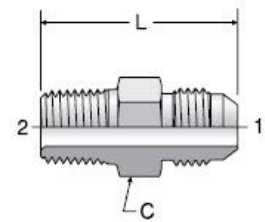
Tube Fitting Part #	End Size	
	1 JIC	2 SAE-ORB
16 F5OX-S	1"	1"
16-8 F5OX-S	1"	1/2"
16-10 F5OX-S	1"	5/8"
16-12 F5OX-S	1"	3/4"
16-14 F5OX-S	1"	7/8"
16-20 F5OX-S	1"	1-1/4"
16-24 F5OX-S	1"	1-1/2"
20 F5OX-S	1-1/4"	1-1/4"
20-12 F5OX-S	1-1/4"	3/4"
20-16 F5OX-S	1-1/4"	1"
20-24 F5OX-S	1-1/4"	1-1/2"
24 F5OX-S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



FTX - Male Connector 37° Flare / NPTF SAE 070102

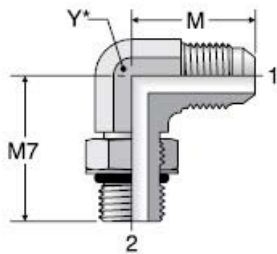
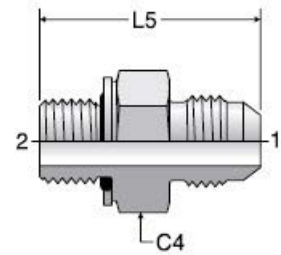
Tube Fitting Part #	End Size	
	1 JIC	2 NPTF
8-8 FTX-S	1/2"	1/2"
8-12 FTX-S	1/2"	3/4"
8-16 FTX-S	1/2"	1"
10 FTX-S	5/8"	5/8"
10-6 FTX-S	5/8"	3/8"
10-12 FTX-S	5/8"	3/4"
12 FTX-S	3/4"	3/4"
12-6 FTX-S	3/4"	3/8"
12-8 FTX-S	3/4"	1/2"
12-16 FTX-S	3/4"	1"
12-20 FTX-S	3/4"	1-1/4"
14 FTX-S	7/8"	7/8"

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"



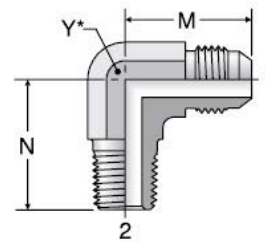
F4OMX
Male Connector - BSPP
37° Flare / BSPP-ORR

Tube Fitting Part #	End Size		Tube Fitting Part #	End Size	
	1 JIC	2 BSPP		1 JIC	2 BSPP
8-4 F4OMXS	1/2"	1/4"	12-16 F4OMXS	3/4"	1"
8 F4OMXS	1/2"	3/8"	16-12 F4OMXS	1"	3/4"
8-8 F4OMXS	1/2"	1/2"	16 F4OMXS	1"	1"
8-12 F4OMXS	1/2"	3/4"	16-20 F4OMXS	1"	1-1/4"
10-6 F4OMXS	5/8"	3/8"	20 F4OMXS	1-1/4"	1-1/4"
10 F4OMXS	5/8"	5/8"	24-20 F4OMXS	1-1/2"	1-1/4"
12-8 F4OMXS	3/4"	1/2"	24 F4OMXS	1-1/2"	1-1/2"
12 F4OMXS	3/4"	3/4"			



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"

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.

Quick Couplers

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"



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

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

⚠ WARNING: The products listed 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

Brass Fittings

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-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"

Nylon Air Brake Tubing

- 100% pressure tested
- Excellent UV stability
- Abrasion resistant
- Kink resistant

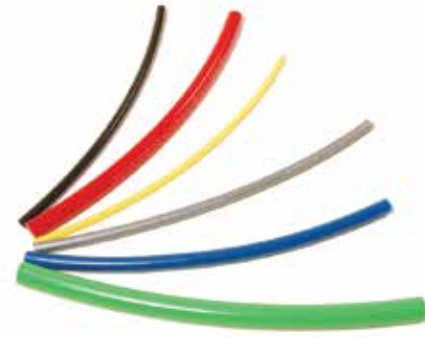
Application: Air brake lines

Construction / Material: Type A – Single-wall extruded nylon (polyamide)

Type B – nylon (polyamide) core, fiber reinforcement, nylon (polyamide) cover/sheath

Temperature Range: -40°F (-40°C) to +200°F (93°C)

Working Pressure: 150 psi (10.3 bar)



Part Number	Tube O.D.		Outside Diameter		Inside Diameter		Nominal Wall Thickness		Burst Pressure at 73°F /23°C		Minimum Bend Radius		Weight		Standard Reel		Standard Pallet	
	Inch	mm	Inch	mm	Inch	mm	Inch	mm	psi	bar	Inch	mm	lbs./100 ft.	kg./31 mtr.	feet	meter	feet	meter
PFT-2A-XXX-1000*	1/8	.125	3.2	.079	2.0	.023	0.6	1000	69.0	.370	9.4	.340	.154	1000	305	24,000	7315	
PFT-2.5-XXX-1000	5/32	.156	4.0	.092	2.3	.032	0.8	1200	82.7	.500	12.7	.570	.259	1000	305	24,000	7315	
PFT-3A-XXX-1000*	3/16	.188	4.8	.118	3.0	.035	0.9	1200	82.7	.750	19.1	.770	.349	1000	305	24,000	7315	
1120-4A-XXX-1000	1/4	.250	6.4	.170	4.3	.040	1.0	1200	82.7	1.00	25.4	1.21	.549	1000	305	24,000	7315	
PFT-5A-BLK-500*	5/16	.313	7.9	.232	5.9	.040	1.0	1000	69.0	1.25	31.8	1.57	.712	500	152	12,000	3658	
1120-6B-XXX-500	3/8	.375	9.5	.251	6.4	.062	1.6	1400	96.5	1.50	38.1	2.70	1.22	500	152	12,000	3658	
1120-8B-XXX-500	1/2	.500	12.7	.376	9.6	.062	1.6	950	65.5	2.00	50.8	3.90	1.77	500	152	6,000	3658	
1120-10B-XXX-250	5/8	.625	15.9	.441	11.2	.092	2.3	900	62.1	2.50	63.5	7.00	3.18	250	76	3,000	914	
1120-12B-XXX-250	3/4	.750	19.1	.566	14.4	.092	2.3	800	55.2	3.00	76.2	8.60	3.90	250	76	3,000	914	

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

XXX represents color code

BLK – Black	GRN – Green	RED – Red	YEL – Yellow
BLU – Blue	ORG – Orange	SIL – Silver	WHT – White
BRN – Brown	PUR – Purple	TAN – Tan	

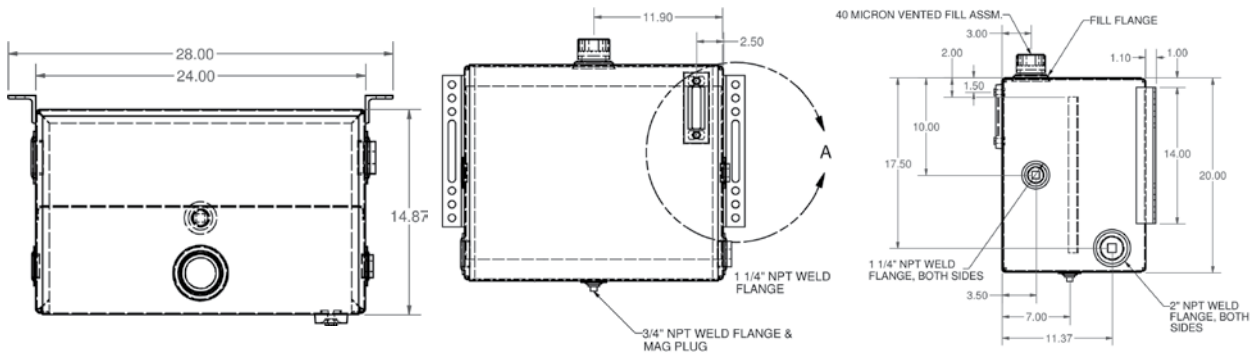
Certifications: Meets SAE Specification J844. Meets DOT FMVSS 49CFR 571.106

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

Reservoirs

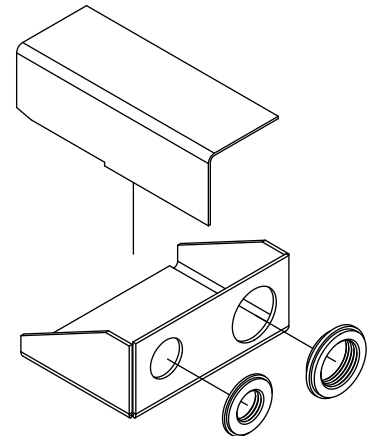
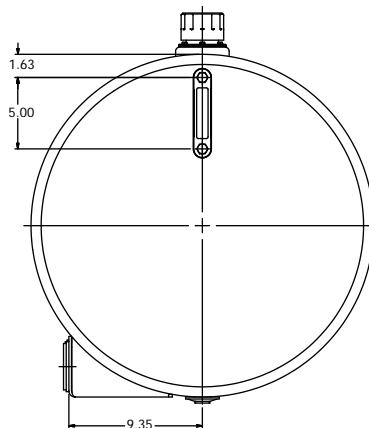
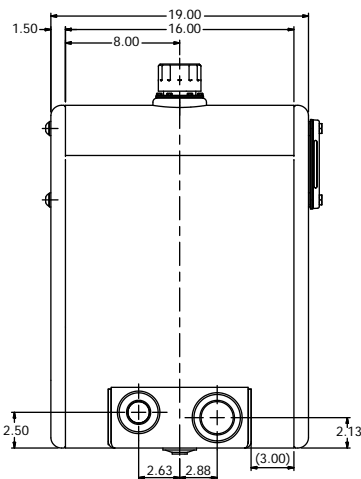
SMS30

- 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



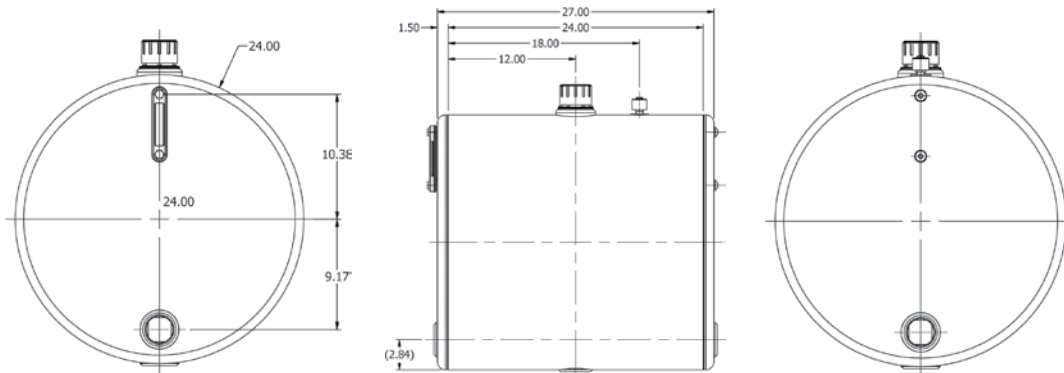
SMA35, SMA35SS

- 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



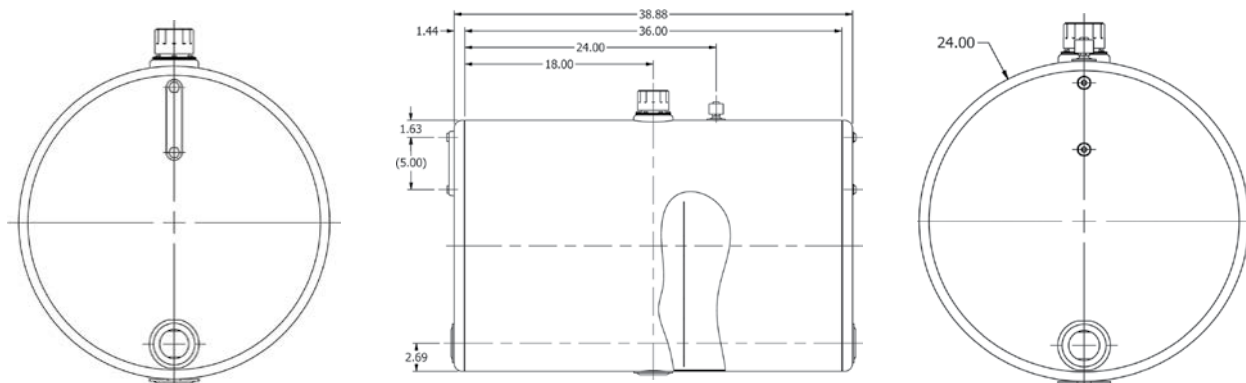
SMS50, SMA50, SMA50SS

- 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



SMS75, SMA75, SMA75SS

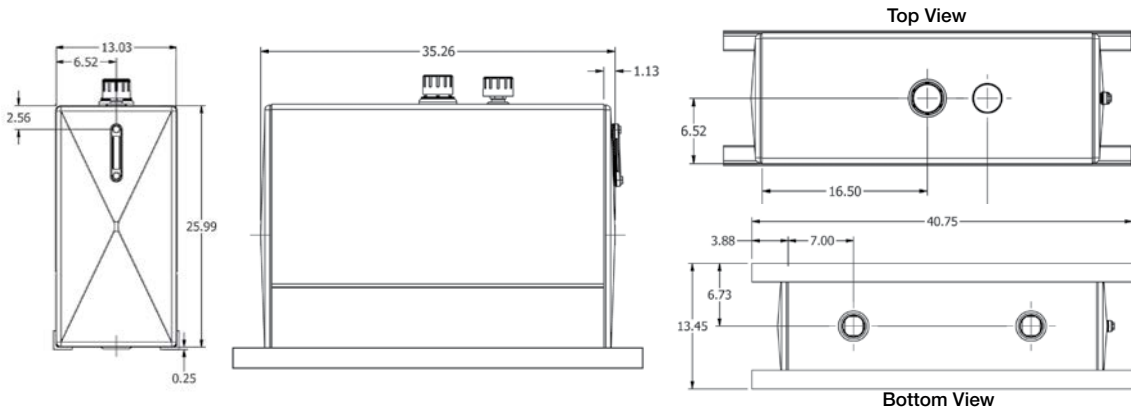
- 75 gallon reservoir
- Tank assembly ships in one carton with mounting kit shipped in separate carton
- Tank assembly is provided with (3) three 2" NPT ports
- Auxiliary mushroom vent(s) in tank top to increase air exchange
- Filler/breather assembly includes a 40 micron filler/breather cap (chain mounted)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



Reservoirs

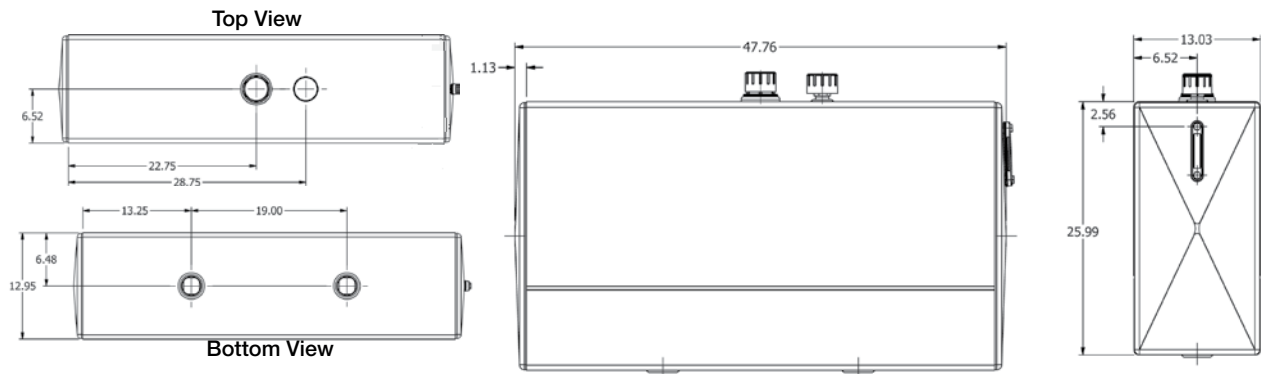
URS50, URA50

- 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



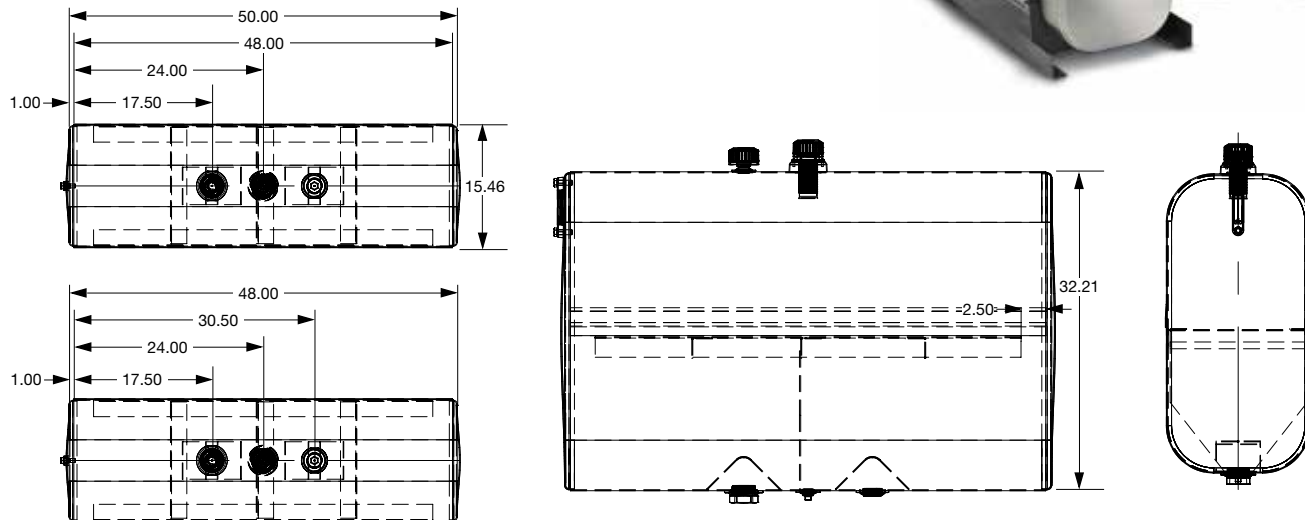
URA70, URS70

- 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



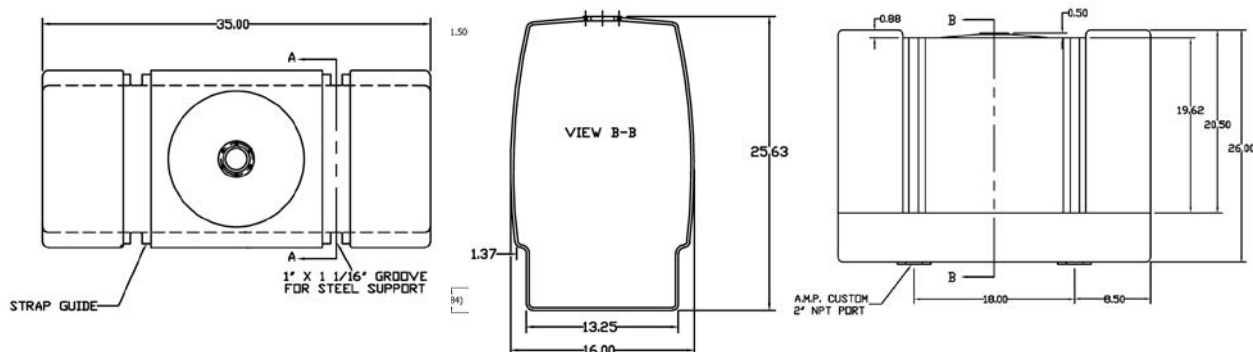
BC100K, BCA100K, BCA100KS

- 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



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 temperature gauge standard
- Heavy duty chain mounted filler/breather cap - 40 micron filtration standard



Oil Coolers

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 (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.

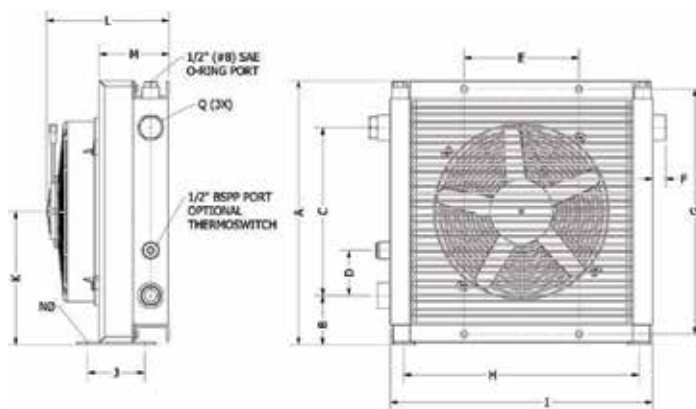
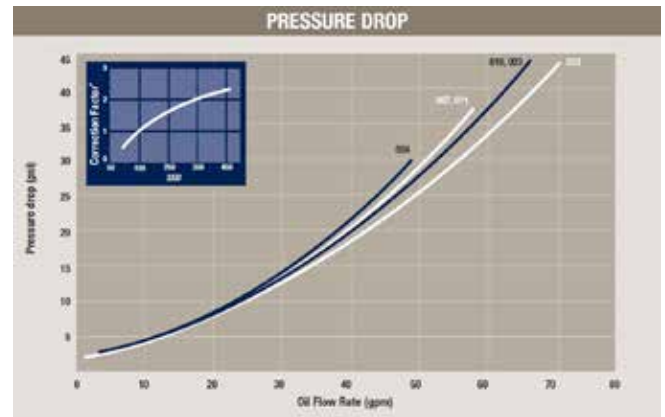
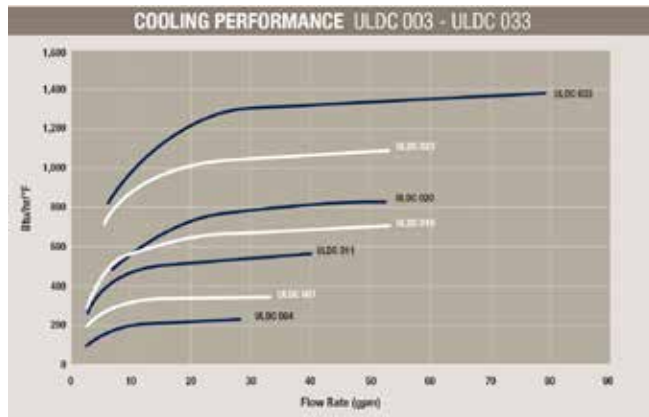
Part Number	Temperature
ATS-GF-C100	104° F
ATS-GF-C120	122° F
ATS-GF-C140	140° F
ATS-GF-C160	160° F
ATS-GF-C175	175° F

 **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: <http://www.p65warnings.ca.gov>

Oil Coolers

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
			12 Volts	24 Volts	
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 ± 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.

WARNING: This product can expose you to chemicals including Carbon black (airborne, unbound particles of respirable size) which is known in the state of California to cause cancer. For more information go to www.P65Warnings.ca.gov

XF2 Multi-Purpose, Single Solution

This behind-the-cab crossflow reservoir combines your tank, cooler and filtration into one system.



XF2 Crossflow Reservoir

How to Order

Select the desired symbol (in the correct position) to construct a model code. Example:

BOX 1	BOX 2	BOX 3	BOX 4	BOX 5	BOX 6	BOX 7	BOX 8
XF2M	2	10Q	B	P	G	S20	1

BOX 1: Series

Symbol	Description
XF2M	Medium - 50 GPM 45K BTU/hr @ 20 GPM

BOX 2: Length

Symbol	Description
2	Double

BOX 3: Media Code

Symbol	Description
10Q	10 micron Microglass
20Q	20 micron Microglass

BOX 4: Seals

Symbol	Description
B	Nitrile
V	Fluorocarbon (FKM)

BOX 5: Indicator

Symbol	Description
P	Port Plugged
G	Pressure Gauge
S	Pressure Switch

BOX 6: Bypass

Symbol	Description
G	25 PSI (1.7 bar)

BOX 7: Ports

Symbol	Description
S20	SAE-20

BOX 8: Options

Symbol	Description
1	None

Replacement Elements

Media	Part Number
10Q	936748
20Q	936749

Feature	Benefit
Compact Footprint	Easy placement / installation options Approx. 30" x 12" Footprint x 23.2" height (w/o breather)
Package Solution	Less Components / Plug and Play / Easy install Less reservoir volume (8 gal) required = less weight, less oil
Top Load Filter Element	No cap to lose, easy change, minimal oil spill Patented element selections (10Q & 20Q) 10" site level gauge & breather
Pressure Protection	Integrated Passive bypass protects system (125 PSI rating)
12 V fan w/ shroud	Better cooling efficiency
45K BTU/hr rating @ 20gpm	Keep systems cool and efficient in small package
Aluminum Construction	Lightweight / High Strength / Non-Corrosive

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Telescopic Cylinders

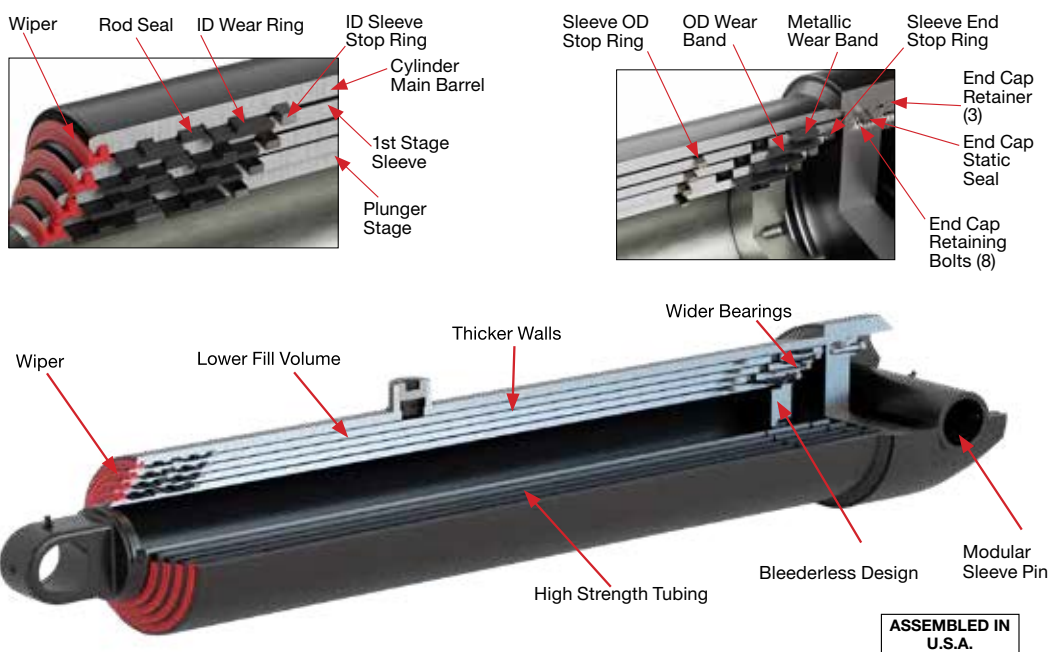
Updated Design from the Industry Leader

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

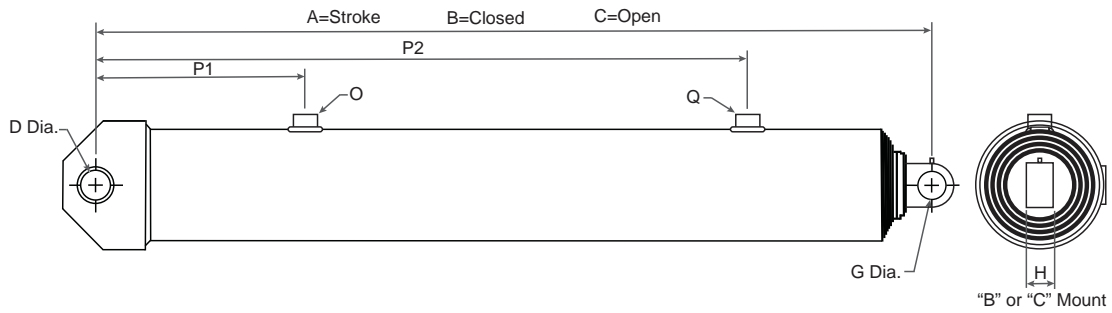


S Series to SAT Series Model Code Conversion

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

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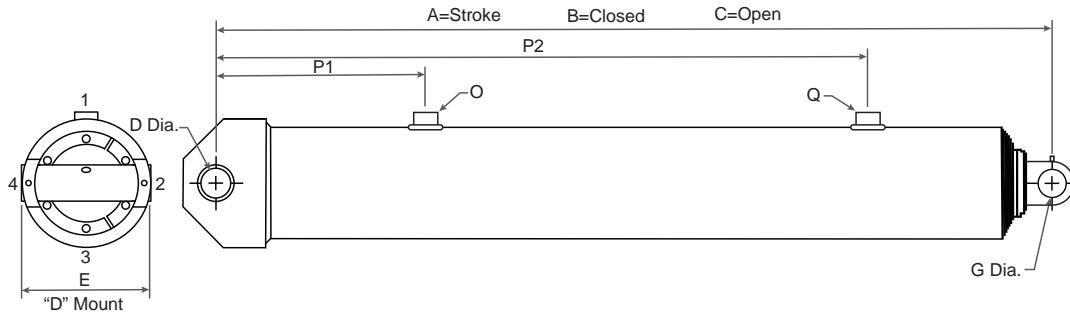
Telescopic Cylinders



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

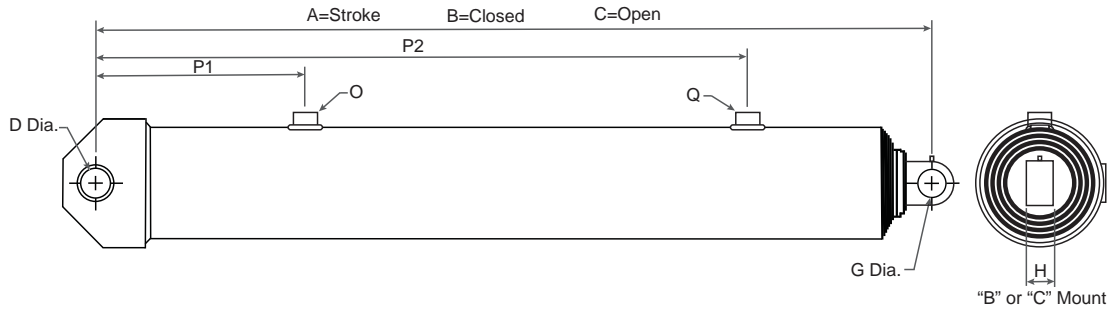
Telescopic Cylinders



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

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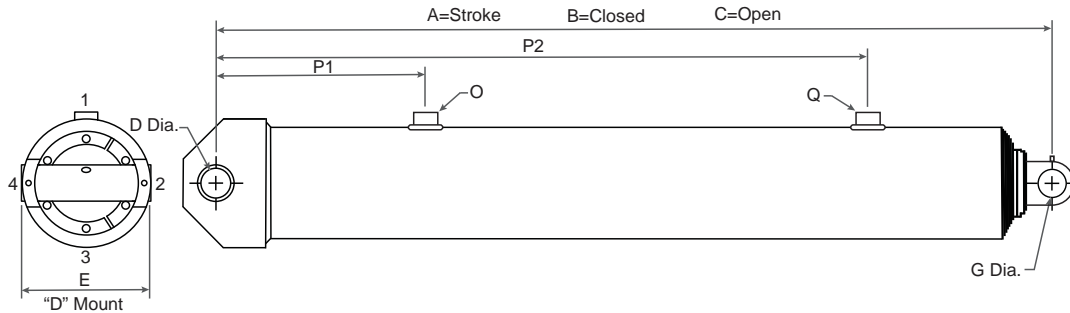
Telescopic Cylinders



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°	18.75	1				0.87	10.96	284	1HSAT000250040

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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

Parker Hannifin Corporation - Offer of Sale

The goods, services or work (referred to as the "Products") offered by Parker-Hannifin Corporation, its subsidiaries, groups, divisions, and authorized distributors ("Seller") are offered for sale at prices indicated in the offer, or as may be established by Seller. The offer to sell the Products and acceptance of Seller's offer by any customer ("Buyer") is contingent upon, and will be governed by all of the terms and conditions contained in this Offer of Sale. Buyer's order for any Products specified in Buyer's purchase document or Seller's offer, proposal or quote ("Quote") attached to the purchase order, when communicated to Seller verbally, or in writing, shall constitute acceptance of this offer.

1. Terms and Conditions. Seller's willingness to offer Products for sale or accept an order for Products is subject to the terms and conditions contained in this Offer of Sale or any newer version of the same, published by Seller electronically at www.parker.com/saleterms/. Seller objects to any contrary or additional terms or conditions of Buyer's order or any other document or other communication issued by Buyer.

2. Price; Payment. Prices stated on Seller's Quote are valid for thirty (30) days, except as explicitly otherwise stated therein, and do not include any sales, use, or other taxes or duties unless specifically stated. Seller reserves the right to modify prices to adjust for any raw material price fluctuations. Unless otherwise specified by Seller, all prices are F.C.A. Seller's facility (INCOTERMS 2010). Payment is subject to credit approval and payment for all purchases is due thirty (30) days from the date of invoice (or such date as may be specified by Seller's Credit Department). 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.

3. Shipment; Delivery; Title and Risk of Loss. All delivery dates are approximate. 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 shipment carrier at Seller's facility. Unless otherwise stated, Seller may exercise its judgment in choosing the carrier and means of delivery. No deferment of shipment at Buyers' request beyond the respective dates indicated will be made except on terms that will indemnify, defend and hold Seller harmless against all loss and additional expense. Buyer shall be responsible for any additional shipping charges incurred by Seller due to Buyer's acts or omissions.

4. Warranty. Seller warrants that the Products sold hereunder shall be free from defects in material or workmanship for a period of twelve (12) months from the date of delivery or 2,000 hours of normal use, whichever occurs first. All prices are based upon the exclusive limited warranty stated above, and upon the following disclaimer: **DISCLAIMER OF WARRANTY: THIS WARRANTY IS THE SOLE AND ENTIRE WARRANTY PERTAINING TO PRODUCTS PROVIDED. SELLER DISCLAIMS ALL OTHER WARRANTIES, EXPRESS AND IMPLIED, INCLUDING DESIGN, MERCHANTABILITY AND FITNESS FOR A PARTICULAR PURPOSE.**

5. Claims; Commencement of Actions. Buyer shall promptly inspect all Products upon receipt. No claims for shortages will be allowed unless reported to the Seller within ten (10) days of delivery. No other claims against Seller will be allowed unless asserted in writing within thirty (30) days after delivery. Buyer shall notify Seller of any alleged breach of warranty within thirty (30) days after the date the defect 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.

6. LIMITATION OF LIABILITY. IN THE EVENT OF A BREACH OF WARRANTY, SELLER WILL, AT ITS OPTION, REPAIR OR REPLACE A DEFECTIVE PRODUCT, OR REFUND THE PURCHASE PRICE WITHIN A REASONABLE PERIOD OF TIME. IN NO EVENT IS SELLER LIABLE FOR ANY SPECIAL, INDIRECT, INCIDENTAL OR CONSEQUENTIAL DAMAGES ARISING OUT OF, OR AS THE RESULT OF, THE SALE, DELIVERY, NON-DELIVERY, SERVICING, USE OR LOSS OF USE OF THE PRODUCTS OR ANY PART THEREOF, OR FOR ANY CHARGES OR EXPENSES OF ANY NATURE INCURRED WITHOUT SELLER'S WRITTEN CONSENT, 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 OF THE PRODUCTS.

7. User Responsibility. The user, through its own analysis and testing, is solely responsible for making the final selection of the system and Product and assuring that all performance, endurance, maintenance, safety and warning requirements of the application are met. The user must analyze all aspects of the application and follow applicable industry standards and Product information. If Seller provides Product or system options based upon data or specifications provided by the user, the user is responsible for determining that such data and specifications are suitable and sufficient for all applications and reasonably foreseeable uses of the Products or systems.

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

9. Special Tooling. A tooling charge may be imposed for any special tooling, including without limitation, dies, fixtures, molds and patterns, acquired to manufacture Products. 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 apparatus belonging to Seller which is utilized in the manufacture of the Products, even if such apparatus has been specially converted or adapted for such manufacture 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 in its sole discretion at any time.

10. Buyer's Obligation; Rights of Seller. To secure payment of all sums due or otherwise, Seller retains a security interest in all Products delivered to Buyer and this agreement 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 its security interest.

11. Improper Use and Indemnity. 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, patent, trademark or copyright infringement or any other claim, brought by or incurred by Buyer, Buyer's employees, or any other person, arising out of: (a) improper selection, application, design, specification or other misuse of Products purchased by Buyer from Seller; (b) any act or omission, negligent or otherwise, of Buyer; (c) Seller's use of patterns, plans, drawings, or specifications furnished by Buyer to manufacture Products; or (d) Buyer's failure to comply with these terms and conditions. Seller shall not indemnify Buyer under any circumstance except as otherwise provided.

12. Cancellations and Changes. Buyer may not cancel or modify or cancel 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. Seller may change Product features, specifications, designs and availability.

13. Limitation on Assignment. Buyer may not assign its rights or obligations under this agreement without the prior written consent of Seller.

14. Force Majeure. Seller does not assume the risk and is not liable for delay or failure to perform any of Seller's obligations by reason of events or circumstances beyond its reasonable control (hereinafter "Events of Force Majeure"). Events of Force Majeure shall include without limitation: accidents, strikes or labor disputes, acts of any government or government agency, acts of nature, delays or failures in delivery from carriers or suppliers, shortages of materials, or any other cause beyond Seller's reasonable control.

15. Waiver and Severability. Failure to enforce any provision of this agreement will not invalidate that provision; nor will any such failure prejudice Seller's right to enforce that provision in the future. Invalidation of any provision of this agreement by legislation or other rule of law shall not invalidate any other provision herein. The remaining provisions of this agreement will remain in full force and effect.

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

17. Governing Law. This agreement 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 this agreement.

18. 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 except as provided in this Section. Seller will defend and indemnify Buyer against allegations of infringement of U.S. patents, U.S. trademarks, copyrights, trade dress and trade secrets ("Intellectual Property Rights"). 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 an allegation that a Product sold pursuant to this agreement infringes the Intellectual Property Rights of a third party. Seller's obligation to defend and indemnify Buyer is contingent on Buyer notifying Seller within ten (10) days after Buyer becomes aware of such allegations of infringement, and Seller having sole control over the defense of any allegations or actions including all negotiations for settlement or compromise. If a Product is subject to a claim that it infringes the Intellectual Property Rights of a third party, Seller may, at its sole expense and option, procure for Buyer the right to continue using the Product, replace or modify the Product so as to make it noninfringing, or offer to accept return of the Product and refund the purchase price less a reasonable allowance for depreciation. Notwithstanding the foregoing, Seller is not liable for claims of infringement based on information provided by Buyer, or directed to Products delivered hereunder for which the designs are specified in whole or part by Buyer, or infringements resulting from the modification, combination or use in a system of any Product sold hereunder. The foregoing provisions of this Section constitute Seller's sole and exclusive liability and Buyer's sole and exclusive remedy for infringement of Intellectual Property Rights.

19. Entire Agreement. This agreement contains the entire agreement between the Buyer and Seller and constitutes the final, complete and exclusive expression of the terms of sale. All prior or contemporaneous written or oral agreements or negotiations with respect to the subject matter are herein merged. The terms contained herein may not be modified unless in writing and signed by an authorized representative of Seller.

20. Compliance with Laws. Buyer agrees to comply with all applicable laws, regulations, and industry and professional standards of care, including those of the United Kingdom, the United States of America, and the country or countries in which Buyer may operate, including without limitation the U. K. Bribery Act, the U.S. Foreign Corrupt Practices Act ("FCPA"), the U.S. Anti-Kickback Act ("Anti-Kickback Act") and the U.S. Food Drug and Cosmetic Act ("FDCA"), each as currently amended, and the rules and regulations promulgated by the U.S. Food and Drug Administration ("FDA"), and agrees to indemnify and hold harmless Seller from the consequences of any violation of such provisions by Buyer, its employees or agents. Buyer acknowledges that it is familiar with the provisions of the U. K. Bribery Act, the FCPA, the FDA, and the Anti-Kickback Act, and certifies that Buyer will adhere to the requirements thereof. In particular, Buyer represents and agrees that Buyer will not make any payment or give anything of value, directly or indirectly to any governmental official, any foreign political party or official thereof, any candidate for foreign political office, or any commercial entity or person, for the purpose of influencing such person to purchase Products or otherwise benefit the business of Seller.

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