



Chelsea 272-F Parts Manual

Pro Gear Chelsea 272-F Parts Manual to assist with technical information for your Chelsea Power Take Off unit.

If you need any assistance identifying the correct Power Take Off unit for your truck and equipment, contact your Chelsea replacement part specialists at Pro Gear and Transmission.

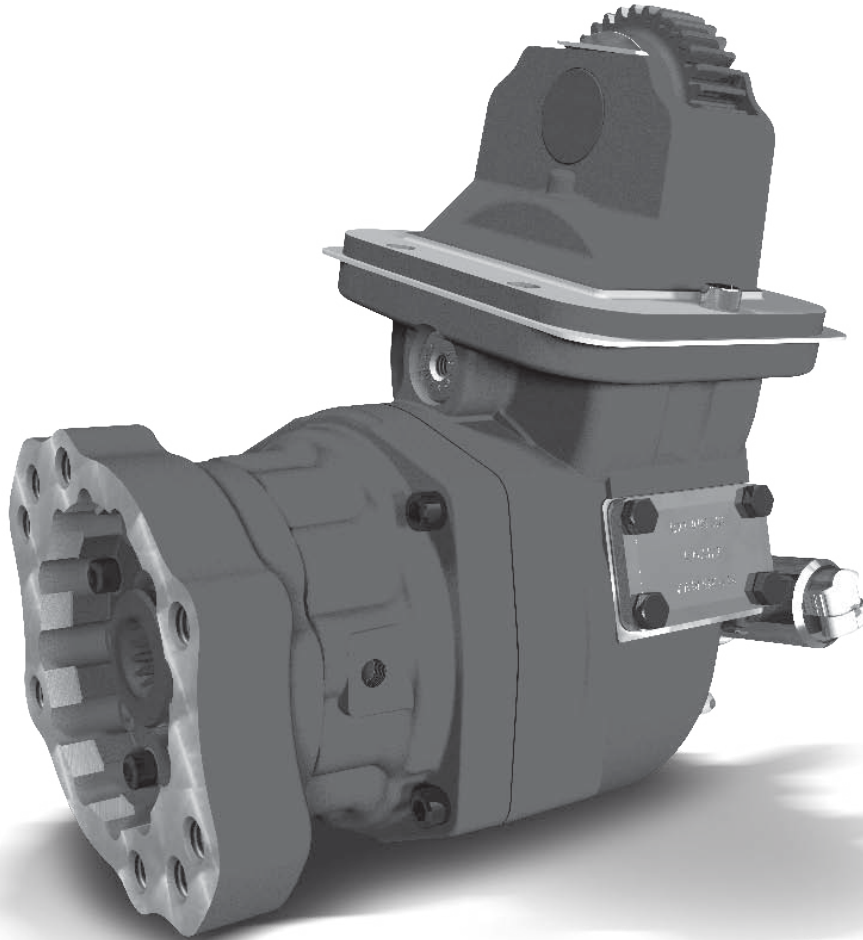
Pro Gear stocks every part for your Parker Chelsea PTO including: PTO housings, mounts, drive-shafts, gears, bearings, gaskets, cable shift cover assembly, post and plate assembly, brackets, stud kits, seal kits, lever control assembly, air shift cover assembly, direct mount pump conversion kits, stud kits including English and metric references, CAT D&H parts and much more.

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Effective: February 1, 2018



Power Take-Offs Parts List

272-FORD Series



ENGINEERING YOUR SUCCESS.



WARNING — User Responsibility

FAILURE OR IMPROPER SELECTION OR IMPROPER USE OF THE PRODUCTS DESCRIBED HEREIN OR RELATED ITEMS CAN CAUSE DEATH, PERSONAL INJURY AND PROPERTY DAMAGE.

This document and other information from Parker Hannifin Corporation, its subsidiaries and authorized distributors provide product or system options for further investigation by users having technical expertise.

The user, through its own analysis and testing, is solely responsible for making the final selection of the system and components 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, follow applicable industry standards, and follow the information concerning the product in the current product catalog and in any other materials provided from Parker or its subsidiaries or authorized distributors.

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Offer of Sale

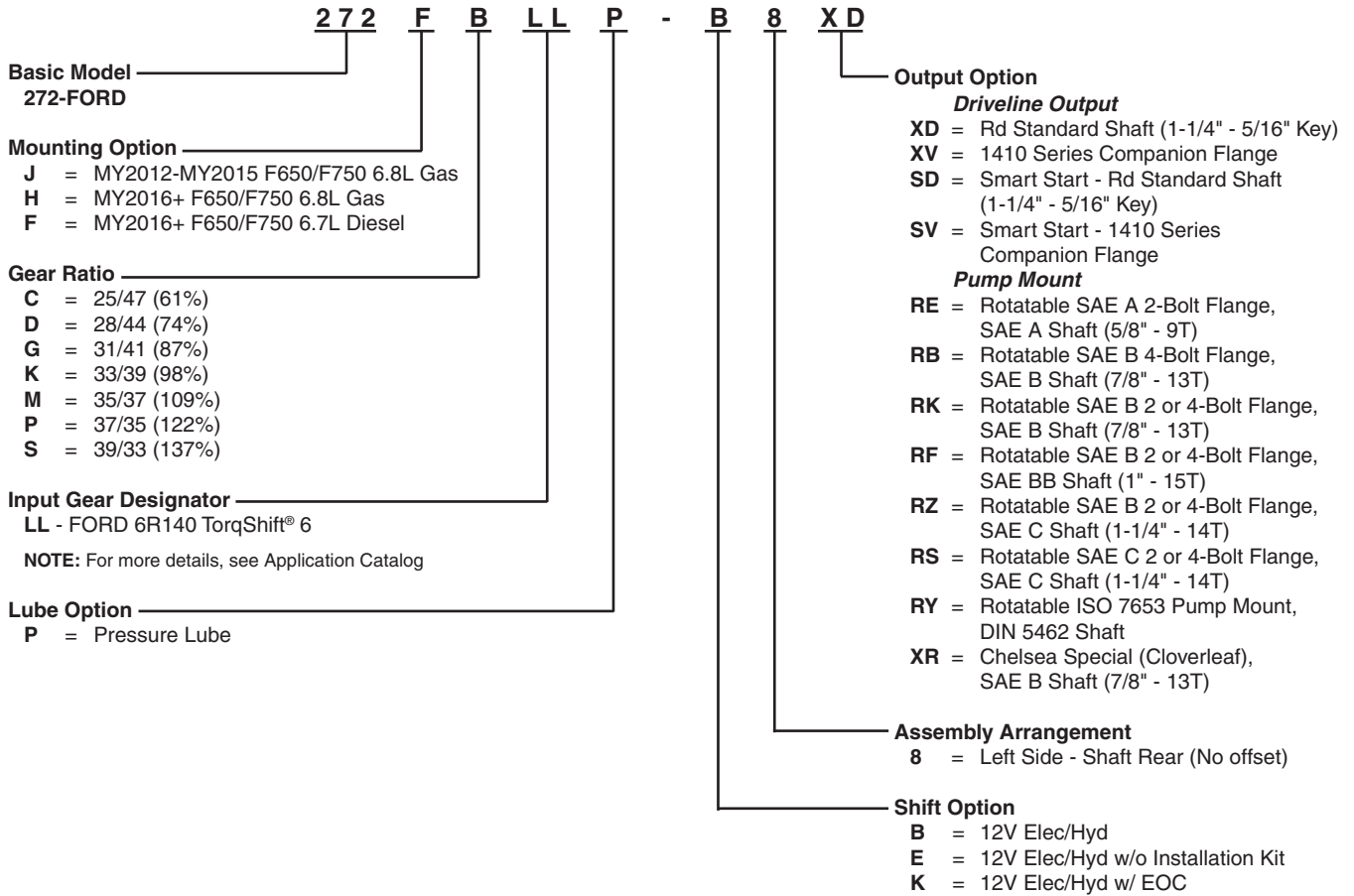
The items described in this document are hereby offered for sale by Parker Hannifin Corporation, its subsidiaries or its authorized distributors. This offer and its acceptance are governed by the provisions stated in the "Offer of Sale".

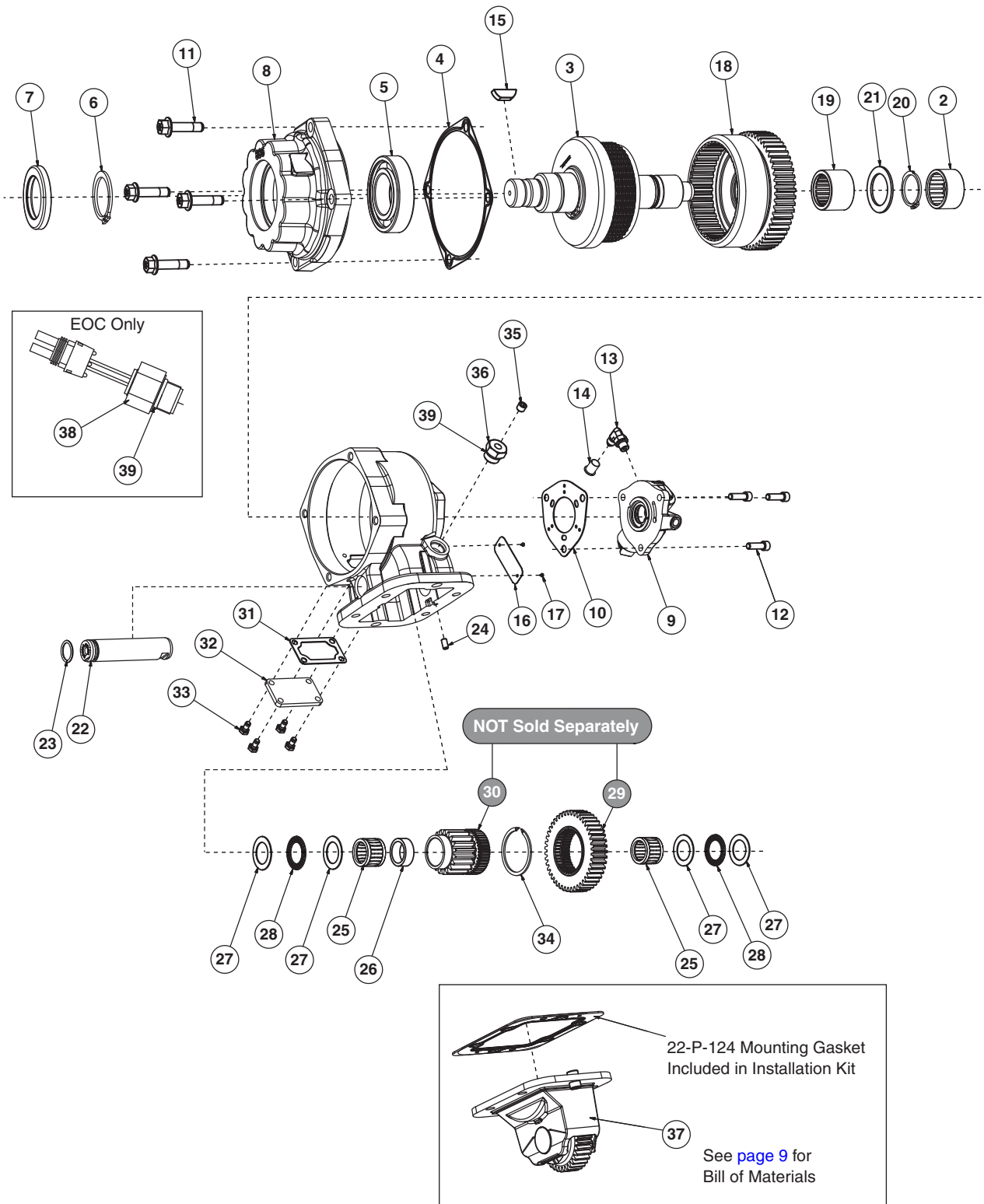
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Model Number Designator



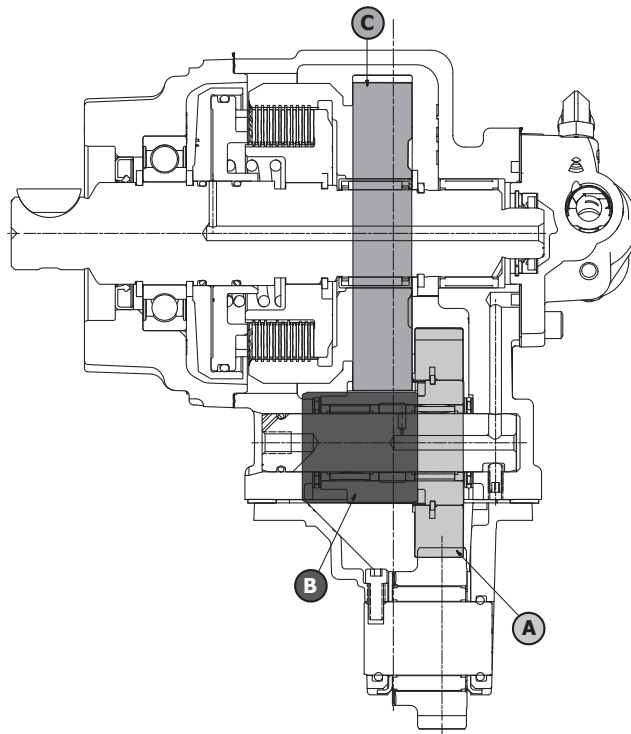


Item	Part Number	Description	Qty.
1	1-P-757	Housing - Machined (8 Arrangement)	1
2	560972	Needle Roller Bearing Ass'y 1.500" x 1.875" x 1.000"	1
3	See page 11	Drive Shaft & Clutch Ass'y.....	1
4	22-P-151	Bearing Cap Gasket	1
5	550311	Bearing-Ball 1.77" x 3.346" x .748"	1
6	379555	Lockring.....	1
7	28-P-267	Oil Seal 2.627" x 1.750" x .312".....	1
8	21-P-886	Bearing Cap	1
9	See page 8	Hydraulic Valve Cap Assembly w/ Lube (12V).....	1
10	22-P-112	Valve Cap Gasket.....	1
11	380563-14	Hex Flange Head Capscrew .375"-16 x 1.500" (Non-Shaft Brake Option).....	4
12	378447-6	Socket Head Capscrew .312"-18 x 1.000".....	3
13	379486	90° Elbow .438"-20 (Hydraulic Shift Options Only).....	1
14	379564-2	Thread Cap .438" (Hydraulic Shift Options Only)	1
15	500007-29	Woodruff Key (XD Output Only)	1
16	68-P-51	Name Plate.....	1
17	378422	Drive Screw	2
18	See page 5	Output Gear.....	1
19	561088	Bearing-Needle Roller Ass'y 1.500" x 1.875" x 1.250"	1
20	379746	Lockring.....	1
21	31-P-70	Thrust Washer 1.507" x 2.167" x .094".....	1
22	9-P-109	Idler Shaft 1.00".....	1
23	28-P-198	O-Ring .798" x .103".....	1
24	378452-7	Set Screw Socket Head .250"-20 x .500"	1
25	550886	Bearing-Needle Roller Ass'y 1.000" x 1.312" x 1.000"	2
26	14-P-54	Spacer 1.035" x 1.310" x .462".....	1
27	31-P-61	Thrust Washer 1.007" x 1.542" x .031".....	4
28	560920	Thrust Bearing 1.000" x .078".....	2
Not Sold Separately			
29	See page 5	Input Gear.....	1
30	See page 5	Ratio Gear	1
31	35-P-118	Gasket - Plate.....	1
32	34-P-315	Cover Plate.....	1
33	378429-4	Hex Head Capscrew .250"-20 x .500"	4
34	379522	Lockring.....	1
35	379231	Pipe Plug .125"-27.....	1
36	379242	Straight Adapter .125" x 27" x .750"-16.....	1
37	329901X	Adapter Assembly	1
38	379917	Speed Sensor (EOC Only)	1
39	28-P-171	O-Ring .644" x .087".....	1

Continued on Next Page

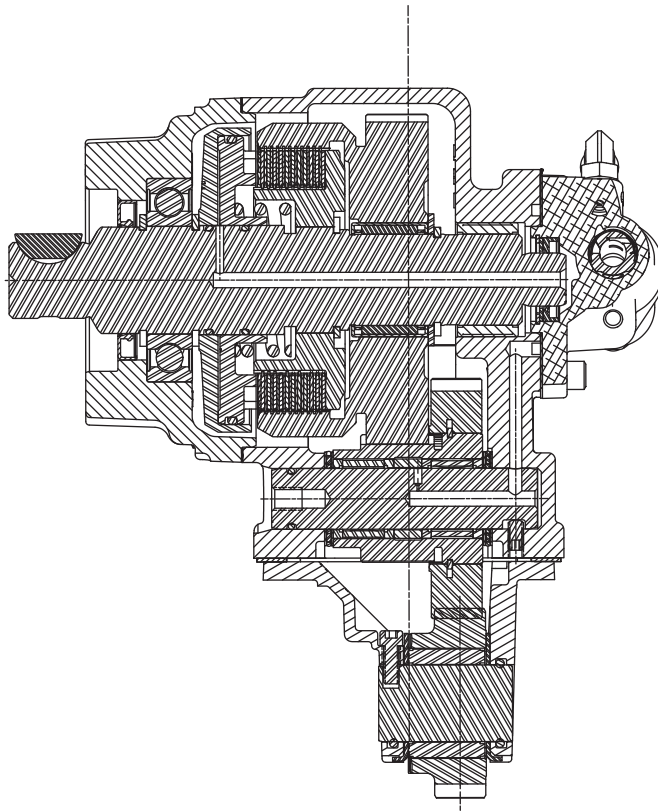
Bill of Materials

Item	Part Number	Description	Qty.
	See pages 24-29 for Bill of Materials for the below loose parts.		
	SERVICE KITS		
	329071-63X	Bearing Kit (Adapter parts ordered seperately, see page 9)	1
	329071-83X	Solenoid Valve O-Ring Kit	1
	329923X	Gasket & Seal Kit	1
	329678X	Gear and Clutch Plates Kit	1
	STUD KITS		
	8000-46X	Stud Kit	1
	INSTALLATION INSTRUCTIONS KITS		
	329248-5X	Gasket & Installation Instructions Kit (All)	1
	INSTALLATION KITS		
	329918X	Installation & Mounting Kit (2011+ Diesel - F Mount; B Shift Option)	1 or
	329919X	EOC Installation & Mounting Kit (2011+ Diesel - F Mount/2016+ Gas - H Mount; K Shift Option)	1 or
	329920X	Installation & Mounting Kit (2013-2015 Gas - J Mount; B Shift Option)	1 or
	329922X	Installation & Mounting Kit (2016+ Gas - H Mount; B Shift Option)	1 or
	329931X	Heat Shield Kit (Gas Only)	1
	329952X	Installation & Mounting Kit (H & J Less Wiring Harness - All Mounting; E Shift Option)	1
	CONVERSION KITS		
	329921X	EOC Conversion Kit (F & H Mount Only; K Shift)	1
	See pages 25-26	Output Conversion Kits Bill of Materials	

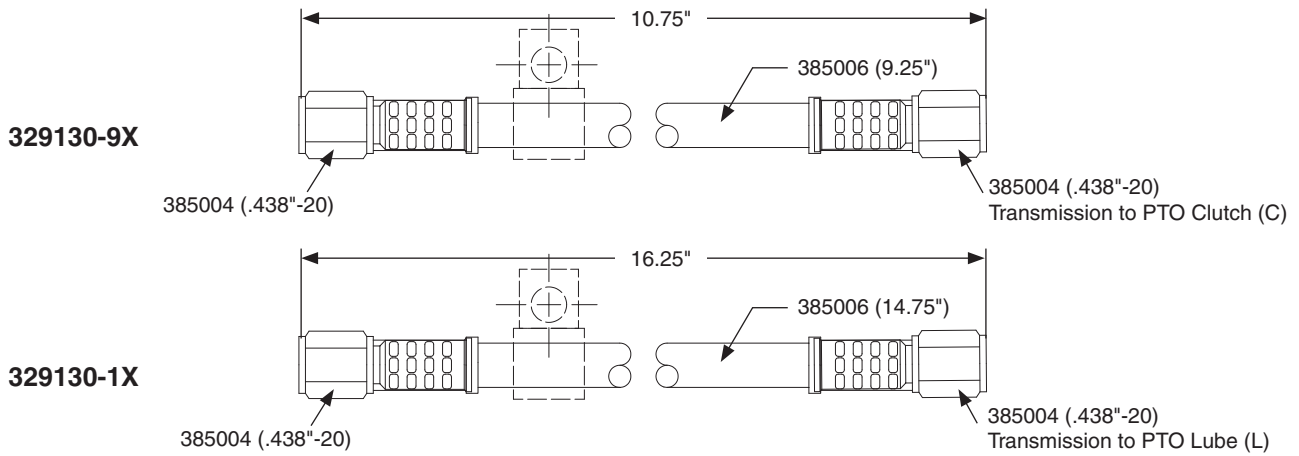


GEAR DESIGNATOR	INPUT GEAR ASSEMBLY	NOT Sold Separately				OUTPUT GEAR (18)	NO. TEETH C
		INPUT GEAR (29)	NO. TEETH A	RATIO GEAR (30)	NO. TEETH B		
272*CLL	5-P-1557-3X	5-P-1557	45	5-P-1560	25	2-P-977	47
272*DLL	5-P-1557-4X	5-P-1557	45	5-P-1561	28	2-P-978	44
272*GLL	5-P-1557-5X	5-P-1557	45	5-P-1562	31	2-P-979	41
272*KLL	5-P-1557-6X	5-P-1557	45	5-P-1563	33	2-P-980	39
272*MLL	5-P-1557-7X	5-P-1557	45	5-P-1564	35	2-P-981	37
272*PLL	5-P-1557-8X	5-P-1557	45	5-P-1565	37	2-P-982	35
272*SLL	5-P-1557-9X	5-P-1557	45	5-P-1566	39	2-P-983	33

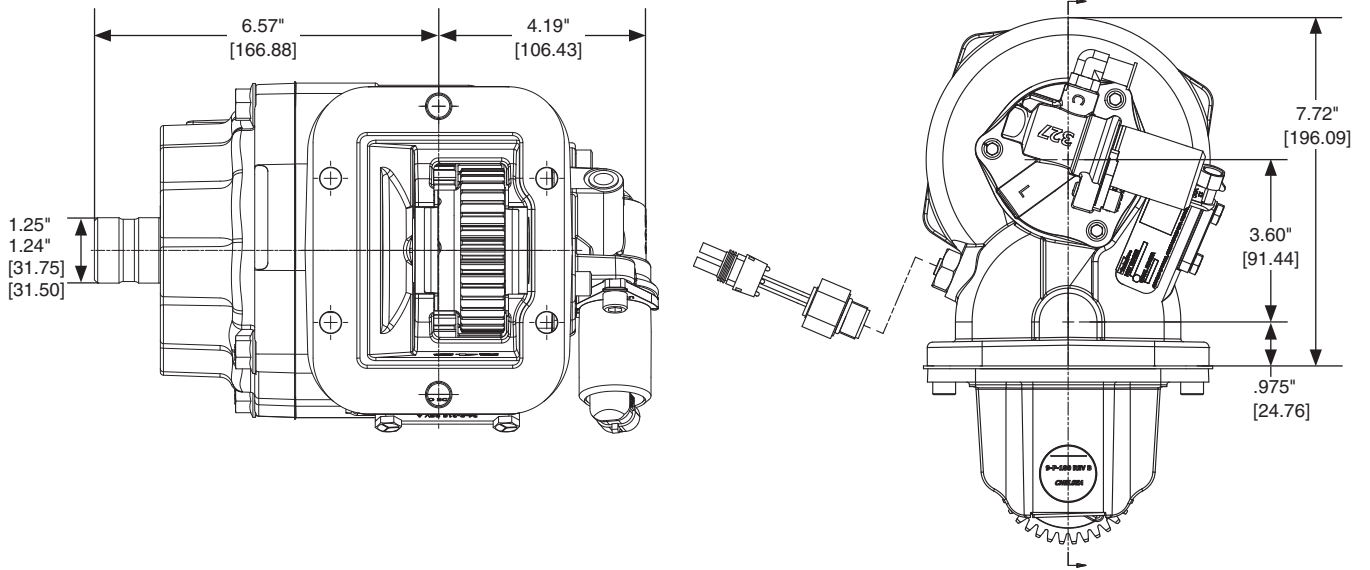
Pressure Lube



Hose Assembly Identification



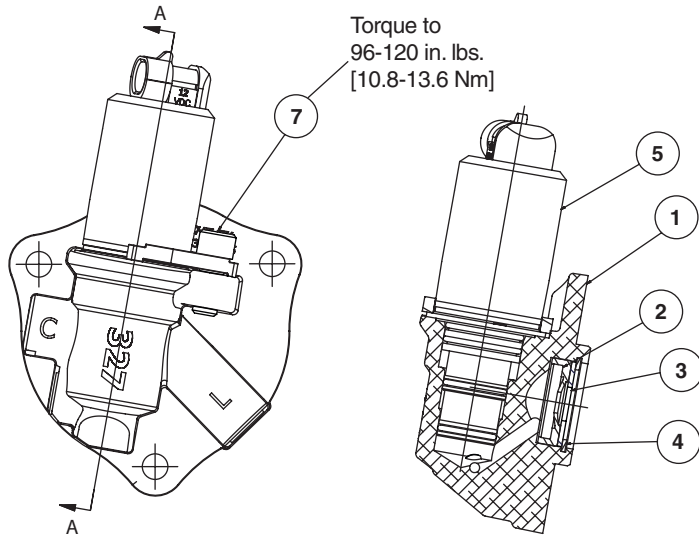
Housing Dimensions



Assembly Arrangement 8

Shift Options

Valve Cap Assembly (Hydraulic) – 329872-1X

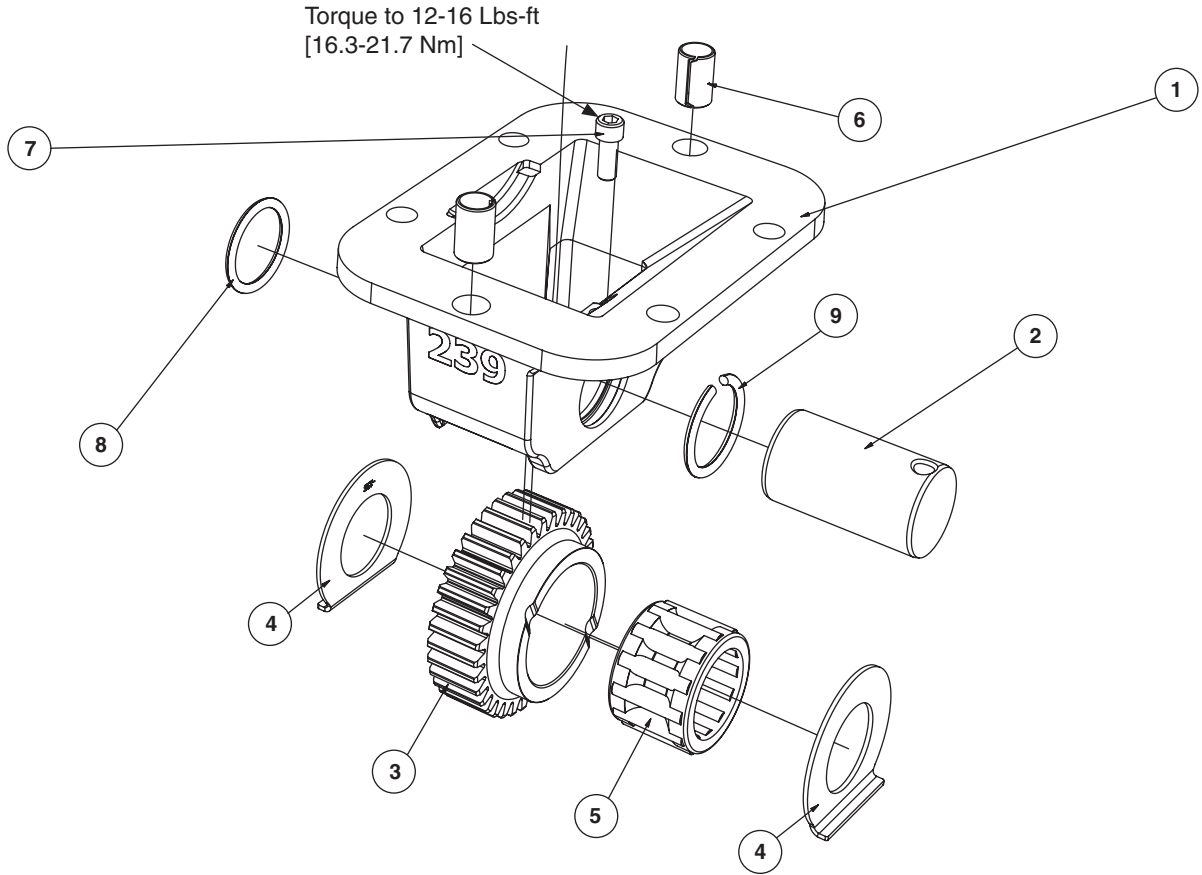


Pressure Lube	Shift Option	Assembly
Yes	B, E, & K	329872-1X

Item	Part Number	Description	Qty.
1	34-P-327	High Pressure w/ Lube Valve Cap Solenoid Port (329872-1X).....	1
2	28-P-119	Oil Seal 1.379" x .875" x .250".....	1
3	378811	Seal Backup Plate.....	1
4	378849	Lock ring.....	1
5	380123-12	Non Regulating Cartridge Valve 12V (329872-1X).....	1
7	378447-4	Socket-Head Capscrew .312"-18 x .750".....	1
N.S.	329071-83X	Hydraulic Solenoid Valve O-Ring Kit.....	1

N.S. – Not Shown

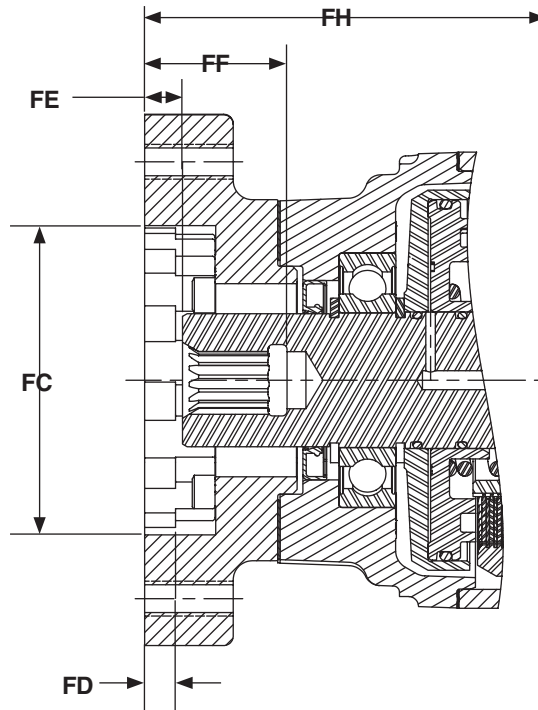
Adapter Assembly 329901X



Item	Part Number	Description	Qty.
1	42-P-245	Housing Adapter.....	1
2	9-P-100	Shaft Idler (1.26")	1
3	5-P-1555	Adapter Gear 35T.....	1
4	35-P-155	Thrust Washer (1.280" x 2.300" x .064")	2
5	561029	Needle Roller Bearing Ass'y (1.26" x 1.811" x 1.26").....	1
6	385078	Bushing Dowel (10.87" x 13.01" x 20").....	2
7	379431-3	Socket Head Capscrew (.250" - 20" x .625").....	1
8	28-P-336	O-Ring (1.171" x .139")	1
9	28-P-337	O-Ring (1.171" x .139") (Modified)	1

Output Options

Pump Flange & Shaft Dimensions



Pump Flange Suffix	Bolt Circle Dia.	Bolt Holes		FC	FD	FE	FF	FH	Output Shaft	
		Tapped Hole	No. Equally Spaced	Female Pilot Dia.	Pilot Depth	Face to End of Shaft	Face thru Hole	Face to Center of PTO	Nominal Shaft Size M = Male F = Female	Key-way Width
RB •	5.000"	1/2"-13 UNC-2B	4	4.003"	.4060"	.497"	1.872"	6.861"	7/8" - 13T Spline - F	
RE •	4.188"	5/16"-18 UNC-2B	16	3.251"	.3440"	.400"	1.502"	5.640"	5/8" - 9T Spline - F	
RF •	5.000"	1/2"-13 UNC-2B	4	4.003"	.4060"	.592"	2.060"	6.861"	1" - 15T Spline - F	
	5.750"		2 ■							
RK •	5.000"	1/2"-13 UNC-2B	4	4.003"	.4060"	.497"	1.872"	6.861"	7/8" - 13T Spline - F	
	5.750"		2 ■							
RS •	6.375"	1/2"-13 UNC-2B	4	5.004"	.5310"	.730"	2.700"	6.861"	1-1/4" - 14T Spline - F	
	7.125"	5/8"-11 UNC-2B	2	5.004"						
RY •	4.454"	M12 x 1.75"	4	3.152" [80MM]		.581"	2.281"	6.456"	DIN 5462 - F	
RZ •	5.000"	1/2"-13 UNC-2B	4	4.003"	.4060"	.730"	2.700"	6.861"	1-1/4" - 14T Spline - F	
	5.750"		2 ■							
XD/SD								6.570"	1-1/4" Round 5/16"	
XR	3.712"			2.752"		1.176"		5.188"	7/8" - 13T Spline - F	
XV/SV	3.750"	.442" ▶	4	2.751"	.0830"			7.486"	1-1/2" - 10T Spline - M	

• Rotatable Flange Rotates in 30° Increments
 ■ Two Set of Holes Spaced 15° Apart
 ▶ Not Tapped

Output Conversion Kits

Output Option	Flange Type	Shaft Type	Conversion Kit	
RE	SAE A 2-Bolt Flange	SAE A Shaft (5/8" - 9T)	XD to RE	329160-118X
RB	SAE B 4-Bolt Flange	SAE B Shaft (7/8" - 13T)	XD to RB	329160-145X
RF	SAE B 2 or 4-Bolt Flange	SAE BB Shaft (1" - 15T)	XD to RF	329160-104X
RK	SAE B 2 or 4-Bolt Flange	SAE B Shaft (7/8" - 13T)	XD to RK	329160-100X
RS	SAE C 2 or 4-Bolt Flange	SAE C Shaft (1-1/4" - 14T)	XD to RS	329160-106X
RY	ISO 7653 Pump Mount	DIN 5462 Shaft	XD to RY	329160-108X
RZ	SAE B 2 or 4-Bolt Flange	SAE C Shaft (1-1/4" - 14T)	XD to RZ	329160-110X
SD	N/A	Rd. Standard Shaft (1-1/4" - 5/16" Keyed)	XD to SD	329160-142X
SV	1410 Series Companion Flange	(1-1/2" - 10T)	XD to SV	329160-110X
XV	1410 Series Companion Flange	(1-1/2" - 10T)	XD to XV	329160-144X
XR	Chelsea Special (Cloverleaf)	SAE B Shaft (7/8" - 13T)	XD to XR	329160-143X

N/A – Not Applicable

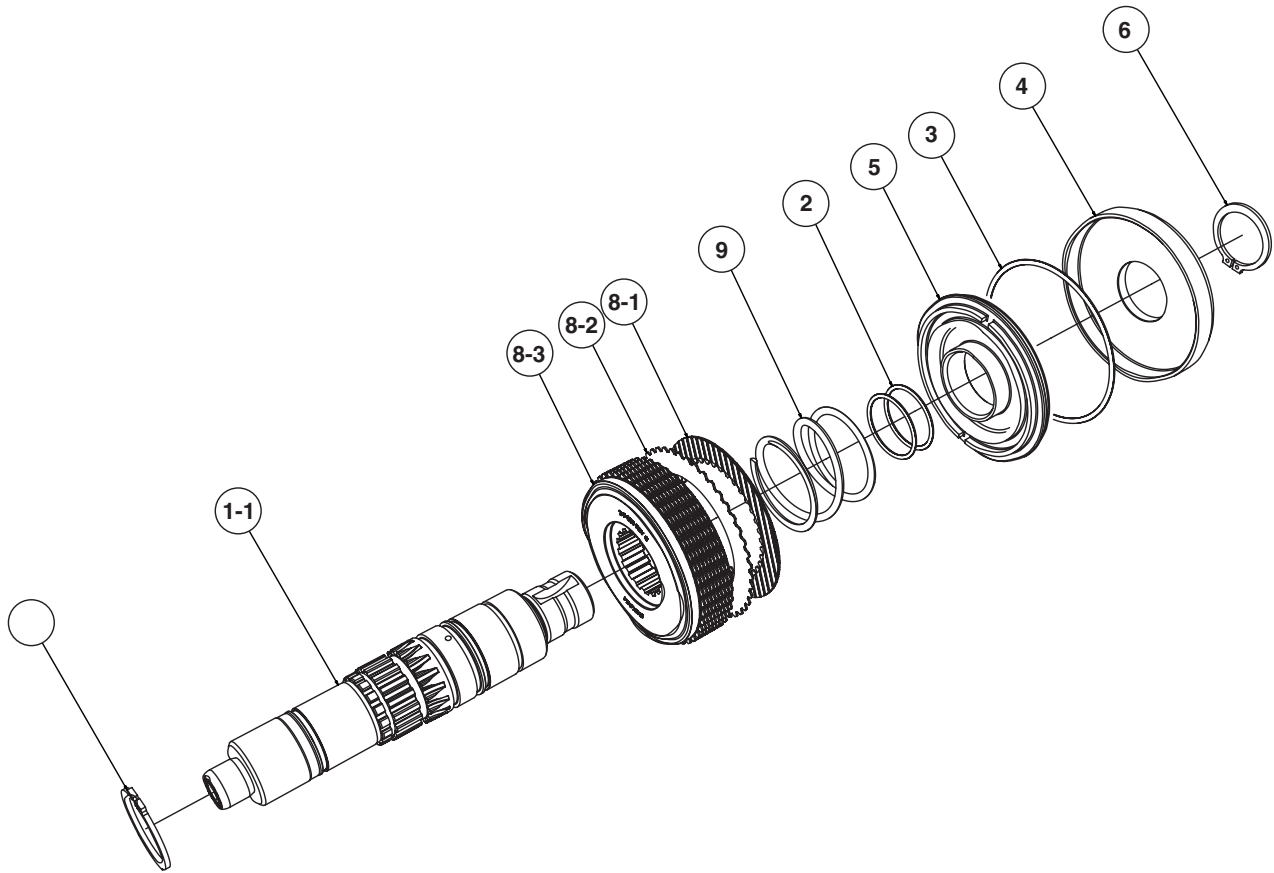
NOTE: Check Current Price Sheet for Availability of Output Options

SAE Chart

SAE Standard	A	B	BB	C	D
Flange Pilot	3.25"	4.00"	N/A	5.00"	6.00"
Shaft	.625"	.875"	1.00"	1.25"	1.75"
Spline Count	9T	13T	15T	14T	13T
N/A – Not Applicable					

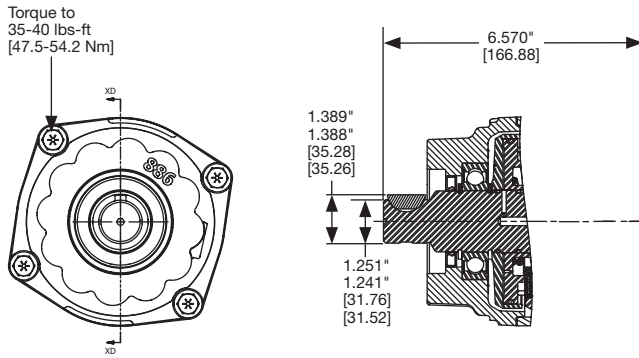
Output Options

Drive Shaft & Clutch Assembly – 329832-*X

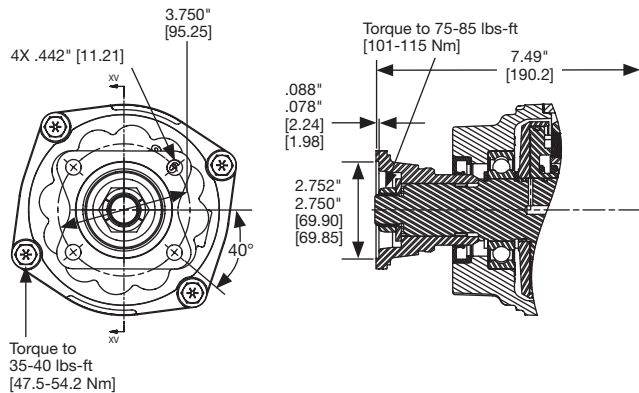


Item	Part Number	Description	Qty.
1-1	3-P-1133	XD Output Shaft (329832-1X).....	1 or
	3-P-1134	XV Output Shaft 10T Straight (329832-2X)	1 or
	3-P-1135	RB, RK & XR Output Shaft .875" - 13T (329832-3X).....	1 or
	3-P-1136	RF Output Shaft 1.02" - 15T (329832-4X)	1 or
	3-P-1137	RS, RZ Output Shaft 1.25" - 14T (329832-5X)	1 or
	3-P-1138	RY Output Shaft DIN 8T (329832-6X)	1
	3-P-1168	SD Smart Start, Output Shaft (329828-9X)	1
	3-P-1169	SV Smart Start, 10T Straight Output Shaft (329828-10X).....	1
	3-P-1170	RE Output Shaft .625" - 9T (329832-8X).....	1
2	28-P-285	O-Ring 1.597" x .103"	2
3	28-P-178	O-Ring 4.484" x .138"	1
4	380051	Clutch Back up Cylinder	1
5	380110-2	Clutch Piston.....	1
6	379555	Lock ring	1
7	380069	Lock ring	1
8	329678X	Gear & Clutch Plates Kit	1
8-1	379485	Friction Disc	11
8-3	2-P-858	Inner Hub Gear.....	1
8-2	380065	Clutch Plate	10
9	37-P-72	Spring 2.14" x 1.941"	1

Bill of Materials - Driveline Output

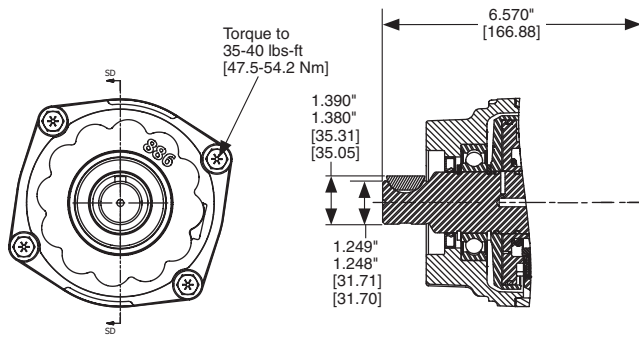


XD Output Option Rd Standard Shaft (1-1/4"-5/16" Key)		
Part Number	Description	Qty.
329832-1X	Shaft & Clutch Ass'y (3-P-1133)	1
28-P-267	Oil Seal 2.627" x 1.75" x .312"	1
21-P-886	Bearing Cap	1
380563-14	Hex Flange Head Capscrew .375"-16 x 1.5"	4
500007-29	Woodruff Key	1

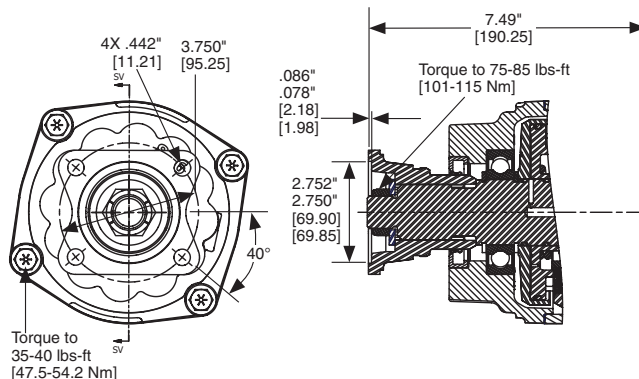


XV Output Option 1410 Series Companion Flange*		
Part Number	Description	Qty.
329832-2X	Shaft & Clutch Ass'y (3-P-1134 Shaft)	1
28-P-211	Oil Seal 3.001" x 2.00" x .375"	1
21-P-886	Bearing Cap	1
380563-14	Hex Flange Head Capscrew .375"-16 x 1.5"	4
380486	Lock Nut - Nylon, Thin .875"-14	1
380076-13	Flat Washer - Hardened .950" x 1.762" x .157"	1
380503	1410 Series Companion Flange	1
†329160-116X	Conversion Kit (XD to XV)	

* 1-1/2" - 10T Spline Shaft



SD Output Option Rd Standard Shaft (1-1/4"-5/16" Key) – Smart Start		
Part Number	Description	Qty.
329832-9X	Shaft & Clutch Ass'y Smart Start (3-P-1168)	1
28-P-267	Oil Seal 2.627" x 1.75" x .312"	1
21-P-886	Bearing Cap	1
380563-14	Hex Flange Head Capscrew .375"-16 x 1.5"	4
500007-29	Woodruff Key	1
†329160-142X	Conversion Kit (XD to SD)	



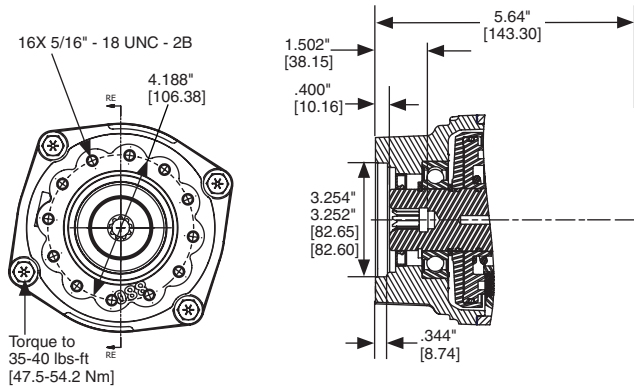
SV Output Option 1410 Series Companion Flange – Smart Start*		
Part Number	Description	Qty.
329832-10X	Shaft & Clutch Ass'y Smart Start (3-P-1169)	1
21-P-886	Bearing Cap	1
28-P-211	Oil Seal 3.001" x 2.00" x .375"	1
380563-14	Hex Flange Head Capscrew .875"-16 x 1.5"	4
380486	Lock Nut - Nylon, Thin .875"-14	1
380076-13	Flat Washer - Hardened .950" x 1.762" x .157"	1
380503	1410 Series Companion Flange	1
†329160-144X	Conversion Kit (XD to SV)	

* 1-1/2" - 10T Spline Shaft

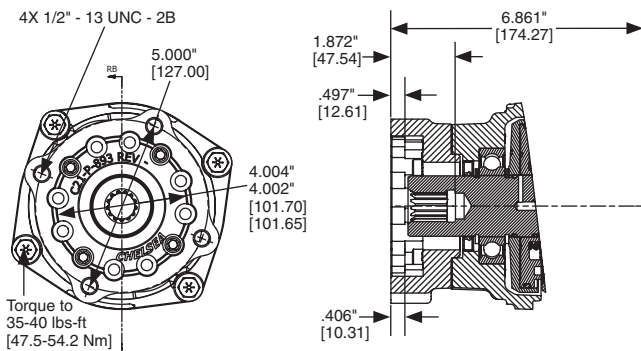
†Conversion Kits do not include all parts shown above. See [pages 25-28](#) for Conversion Kit BOMs.

Output Options

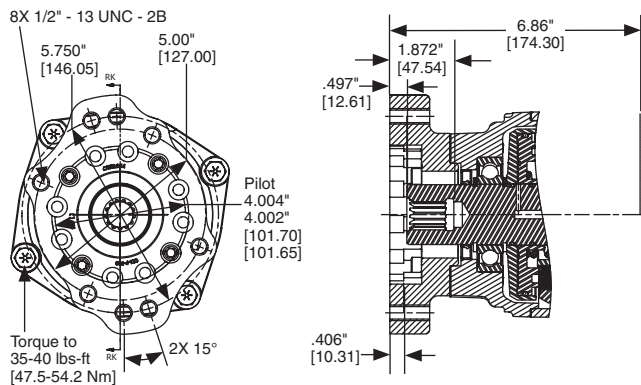
Bill of Materials - Pump Mount



RE Output Option Rotatable SAE A 2-Bolt Flange, SAE A Shaft (5/8" - 9T)		
Part Number	Description	Qty.
329832-8X	Shaft & Clutch Ass'y (3-P-1170 Shaft)	1
28-P-267	Oil Seal 2.627" x 1.750" x .312".....	1
21-P-880	Bearing Cap RE.....	1
380563-14	Hex Flange Head Capscrew .875"-16 x 1.5".....	4
†329160-118X	Conversion Kit (XD to RE)	



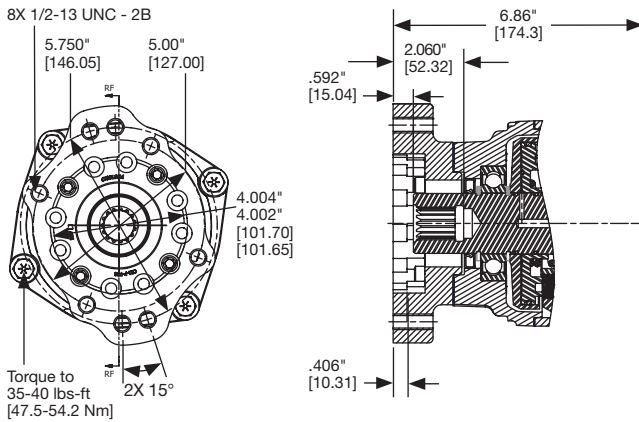
RB Output Option Rotatable SAE B 4-Bolt Flange, SAE B Shaft (7/8" - 13T)		
Part Number	Description	Qty.
329832-3X	Shaft & Clutch Ass'y (3-P-1135 Shaft)	1
28-P-267	Oil Seal 2.627" x 1.750" x .312".....	1
21-P-885	Bearing Cap.....	1 or
380563-14	Hex Flange Head Capscrew .875"-16 x 1.5".....	4
328170-216X	Capscrew Kit (378447-8 Qty. 4).....	1
21-P-894	Pump Flange	1
35-P-101	Bearing Cap Gasket	1
†329160-145X	Conversion Kit (XD to RB)	



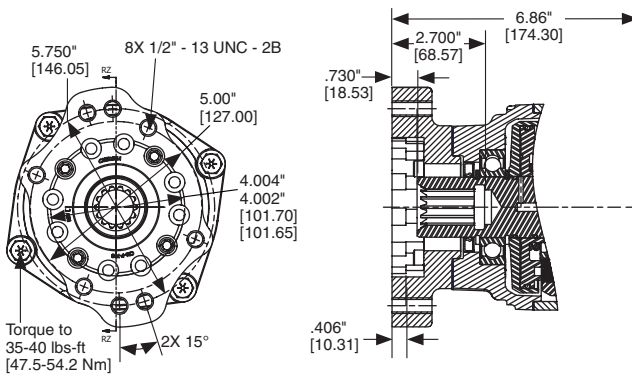
RK Output Option Rotatable SAE B 2 or 4-Bolt Flange, SAE B Shaft (7/8" - 13T)		
Part Number	Description	Qty.
329832-3X	Shaft & Clutch Ass'y (3-P-1135 Shaft)	1
28-P-267	Oil Seal 2.627" x 1.750" x .312".....	1
21-P-885	Bearing Cap.....	1 or
380563-14	Hex Flange Head Capscrew .875"-16 x 1.5".....	4
328170-216X	Capscrew Kit (378447-8 Qty. 4).....	1
21-P-731	Pump Flange	1
35-P-101	Bearing Cap Gasket	1
†329160-100X	Conversion Kit (XD to RK)	

†Conversion Kits do not include all parts shown above. See pages 25-28 for Conversion Kit BOMs.

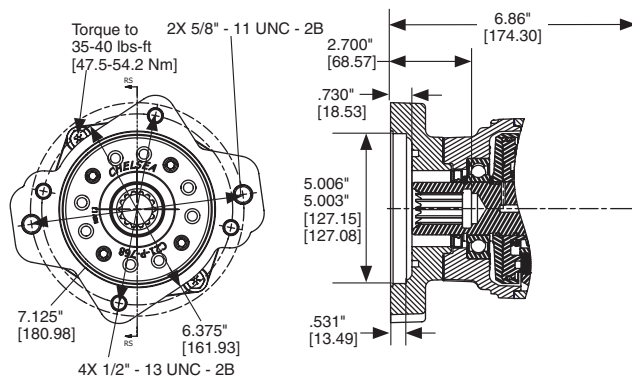
Bill of Materials - Pump Mount



RF Output Option Rotatable SAE B 2 or 4-Bolt Flange, SAE BB Shaft (1" - 15T)		
Part Number	Description	Qty.
329832-4X	Shaft & Clutch Ass'y (3-P-1136 Shaft)	1
28-P-267	Oil Seal 2.627" x 1.750" x .312".....	1
21-P-885	Bearing Cap.....	1 or
380563-14	Hex Flange Head Capscrew .875"-16 x 1.5"	4
328170-216X	Capscrew Kit (378447-8 Qty. 4).....	1
21-P-731	Pump Flange	1
35-P-101	Bearing Cap Gasket	1
†329160-104X Conversion Kit (XD to RF)		



RZ Output Option Rotatable SAE B 2 or 4-Bolt Flange, SAE C Shaft (1-1/4" - 14T)		
Part Number	Description	Qty.
329832-5X	Shaft & Clutch Ass'y (3-P-1137 Shaft)	1
28-P-267	Oil Seal 2.627" x 1.750" x .312".....	1
21-P-885	Bearing Cap.....	1 or
380563-14	Hex Flange Head Capscrew .875"-16 x 1.5"	4
328170-216X	Capscrew Kit (378447-8 Qty. 4).....	1
21-P-731	Pump Flange	1
35-P-101	Bearing Cap Gasket	1
†329160-110X Conversion Kit (XD to RZ)		

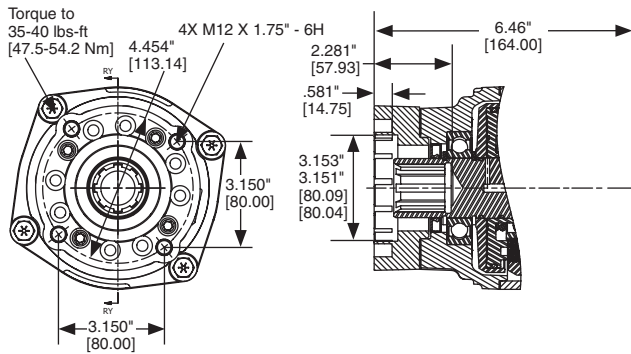


RS Output Option Rotatable SAE C 2 or 4-Bolt Flange, SAE C Shaft (1-1/4" - 14T)		
Part Number	Description	Qty.
329832-5X	Shaft & Clutch Ass'y (3-P-1137 Shaft)	1
28-P-267	Oil Seal 2.627" x 1.750" x .312".....	1
21-P-885	Bearing Cap.....	1 or
380563-14	Hex Flange Head Capscrew .875"-16 x 1.5"	4
328170-216X	Capscrew Kit (378447-8 Qty. 4).....	1
21-P-769	Pump Flange	1
35-P-101	Bearing Cap Gasket	1
†329160-106X Conversion Kit (XD to RS)		

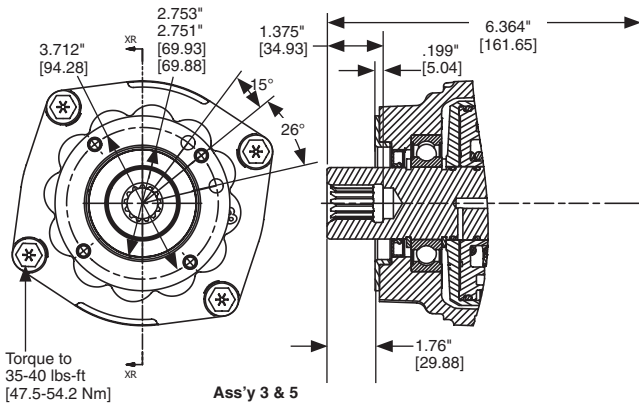
†Conversion Kits do not include all parts shown above. See [pages 25-28](#) for Conversion Kit BOMs.

Output Options

Bill of Materials - Pump Mount



RY Output Option Rotatable ISO 7653 Pump Mount, DIN 5462 Shaft		
Part Number	Description	Qty.
329832-6X	Shaft & Clutch Ass'y (3-P-1138 Shaft)	1
28-P-267	Oil Seal 2.627" x 1.750" x .312"	1
21-P-885	Bearing Cap.....	1 or
380563-14	Hex Flange Head Capscrew .875"-16 x 1.5"	4
328170-216X	Capscrew Kit (378447-8 Qty. 4)	1
21-P-771	Pump Flange	1
35-P-101	Bearing Cap Gasket	1
†329160-108X	Conversion Kit (XD to RY)	

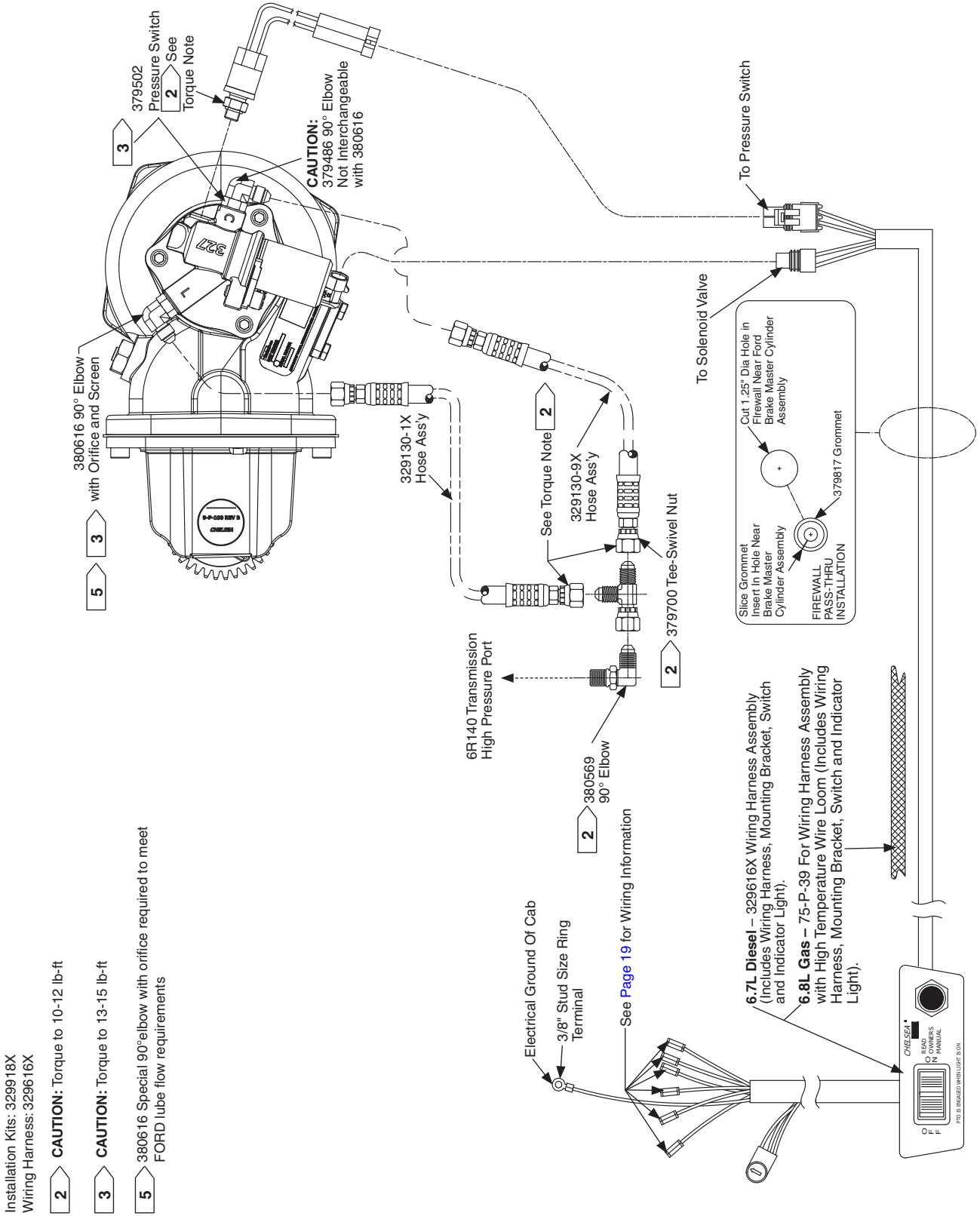


XR Output Option Chelsea Special (Cloverleaf), SAE B Shaft (7/8" - 13T)		
Part Number	Description	Qty.
329832-3X	Shaft & Clutch Ass'y (3-P-1135 Shaft)	1
28-P-267	Oil Seal 2.627" x 1.750" x .312"	1
21-P-885	Bearing Cap.....	1
380563-14	Hex Flange Head Capscrew .875"-16 x 1.5"	4
4-P-209	Spacer, (Included in Kit)	1
328748X	XR Pump Mounting Kit	1
†329160-143X	Conversion Kit (XD to XR)	

†Conversion Kits do not include all parts shown above. See [pages 25-28](#) for Conversion Kit BOMs.

Wiring Chart (Shift Option B)
Medium Duty F650/750 – MY2016-MY2018 – 6.7L Diesel
Medium Duty F650/750 – MY2016-MY2018 – 6.8L Gas
272F & 272H w/o Electronic Overspeed Control (EOC)

(SK-611)



NOTE: Strip wire ends 0.25" Prior to installing connector

Installation Kits: 329918X
 Wiring Harness: 329616X

- 2** CAUTION: Torque to 10-12 lb-ft
- 3** CAUTION: Torque to 13-15 lb-ft
- 5** CAUTION: Special 90° elbow with orifice required to meet FORD lube flow requirements



Wiring Installation Chart (Shift Option B) (SK-611)
Medium Duty F650/750 – MY2016-MY2018 – 6.7L Diesel
272F w/o Electronic Overspeed Control (EOC)

Medium Duty F650/750 – DIESEL							
Chelsea PTO Wire Color		Blunt cut wires found on Driver Side behind Data Link					
		Stationary Mode			Mobile Mode		
		Function	Ford Wire Color	Circuit	Function	Ford Wire Color	Circuit
329616X Wiring Harness	Purple	12V Power	Yellow/Gray	#CBB35	12V Power	Yellow/Gray	#CBB35
	Yellow	PTO REQ1	Yellow/Green	#CE912	PTO REQ1	NOT USED	
	Yellow	PTO REQ2	NOT USED	#CE912	PTO REQ2	Blue/Orange ⁽¹⁾	#CE933
	White	PTO VREF	White/Brown	#LE434	PTO VREF	White/Brown	#LE434
	Green	PTO RPM	Green	#CE914	PTO RPM	Green	#CE914
	Gray	PTO RTN	Gray/Violet	#RE327	PTO RTN	Gray/Violet	#RE327
	Blue/White	PTO RELAY	Blue/White	#CE326	PTO RELAY	Blue/White	#CE326

Medium Duty F650 – MY2016-MY2018 – 6.8L Gas (SK-611)
272H w/o Electronic Overspeed Control (EOC)

Medium Duty F650/750 – GAS							
Chelsea PTO Wire Color		Blunt cut wires found Driver Side behind Data Link					
		Stationary Mode			Mobile ⁽¹⁾		
		Function	Ford Wire Color	Circuit	Function	Ford Wire Color	Circuit
75-P-39 Wiring Harness	Yellow/Gray	12V Power	Yellow/Gray Circuit	#CBB35	12V Power	Yellow/Gray Circuit	#CBB35
	Yellow/Blue	PTO REQ1	Yellow/Blue	#CE912	PTO REQ1	2016 - N/A	
	Blue	PTO REQ2	2016 - Blue/Orange or Red ⁽²⁾ 2017-2018 - NOT USED	#CE933	PTO REQ2	2016 - N/A ⁽¹⁾ 2017-2018 - N/A	#CE933
	Yellow/Green	PTO VREF	Yellow/Green	#LE424	PTO VREF	Yellow/Green	#LE424
	Green	PTO RPM	Green	#CE914	PTO RPM	Green	#CE914
	Yellow/Violet	PTO RTN	Yellow/Violet	#RE407	PTO RTN	Yellow/Violet	#RE407
	Blue/White	PTO RELAY	Blue/White	#CE326	PTO RELAY	Blue/White	#CE326

NOTE:

- ⁽¹⁾ Mobile Mode is not available on the 2016 GAS Trucks.
- ⁽²⁾ Blue/Orange prior to March 2016. Blue/Red after March 2016.

NOTE:

Some early build 2016 6.8L gas F650/750 vehicles have 2 identically colored wires for PTO, which are located in the blunt cut harness under the driver side dash. They are Yellow/Green stripes. Use a voltmeter to identify which circuit you need:

- One wire has 0V to ground (PCM PIN C1551B-84 Circuit #CE912)
- One has +5V to ground (PTO VREF, PCM PIN 01551B-52 Circuit #LE424)
- Circuit #CE912 will be changing to Yellow/Blue in later production.

NOTE:

Early build 2016 6.8L gas F650/750 vehicles (built before 10/22/15) have an incorrectly pinned customer access circuit. Circuit #CE326 is pinned in PCM connector C175B PIN 96. This circuit should be located at PIN 98. Vehicles built after 10/22/15 will have this circuit in the correct PCM connector cavity.

Reference Ford SVE Bulletin Q-241 for more information.



Wiring Installation Chart (Shift Option K) (SK-612)
Medium Duty F650/750 – MY2016-MY2018 – 6.7L Diesel
272F w/ Electronic Overspeed Control (EOC)

Chelsea PTO Wire Harness	Stationary Mode			Mobile Mode			
	Function	Ford Wire Color	Circuit	Function	Ford Wire Color	Circuit	
329617X Wiring Harness	White	PTO REF	White/Brown	#LE434	PTO REF	White/Brown	#LE434
	Gray	PTO RTN	Gray/Violet	#RE327	PTO RTN	Gray/Violet	#RE327
	Green	PTO RPM	Green	#CE914	PTO RPM	Green	#CE914
	Blue/White	PTO RLY	Blue/White	#CE326	PTO RLY	Blue/White	#CE326
	Black w/Ring Terminal	Chassis Ground			Chassis Ground		
	Yellow	PTO REQ1	Yellow/Green	#CE912	PTO REQ2	Blue/Orange (Before March 2016) ⁽¹⁾	#CE933
			Blue/Red (After March 2016) ⁽¹⁾				
	Blue	Chelsea EOC Blue Wire			Chelsea EOC Blue Wire		
Red	Chelsea EOC Green Wire			Chelsea EOC Green Wire			

NOTE: ⁽¹⁾ Early MY2011 Product Units may come with two Blunt Cut Blue/Gray Stripe wires. One wire will be for PTO Function (PTORS2) the other will be a Customer Wire for "Park Only Output" (TRO-P).
NOTE: EOC not available for MY2016 & Prior.
Refer to Ford Body Builders web site for more on this subject.

Wiring Installation Chart (Shift Option K) (SK-612)
Medium Duty F650/750 – MY2017-MY2018 – 6.8L Gas
272H w/ Electronic Overspeed Control (EOC)

Chelsea PTO Wire Harness	Stationary Mode			Mobile Mode			
	Function	Ford Wire Color	Circuit	Function	Ford Wire Color	Circuit	
329617X Wiring Harness	White	PTO REF	Yellow/Green	#LE424	PTO REF	Yellow/Green	#LE424
	Gray	PTO RTN	Yellow/Violet	#RE407	PTO RTN	Yellow/Violet	#RE407
	Green	PTO RPM	Green	#CE914	PTO RPM	Green	#CE914
	Blue/White	PTO RLY	Blue/White	#CE326	PTO RLY	Blue/White	#CE326
	Black w/Ring Terminal	Chassis Ground			Chassis Ground		
	Yellow	PTO REQ1	Yellow/Green F250-550	#CE912	PTO REQ2	Blue/Orange ⁽¹⁾	#CE933
			Yellow/Blue F650/750				
	Blue	Chelsea EOC Blue Wire			Chelsea EOC Blue Wire		
Red	Chelsea EOC Green Wire			Chelsea EOC Green Wire			

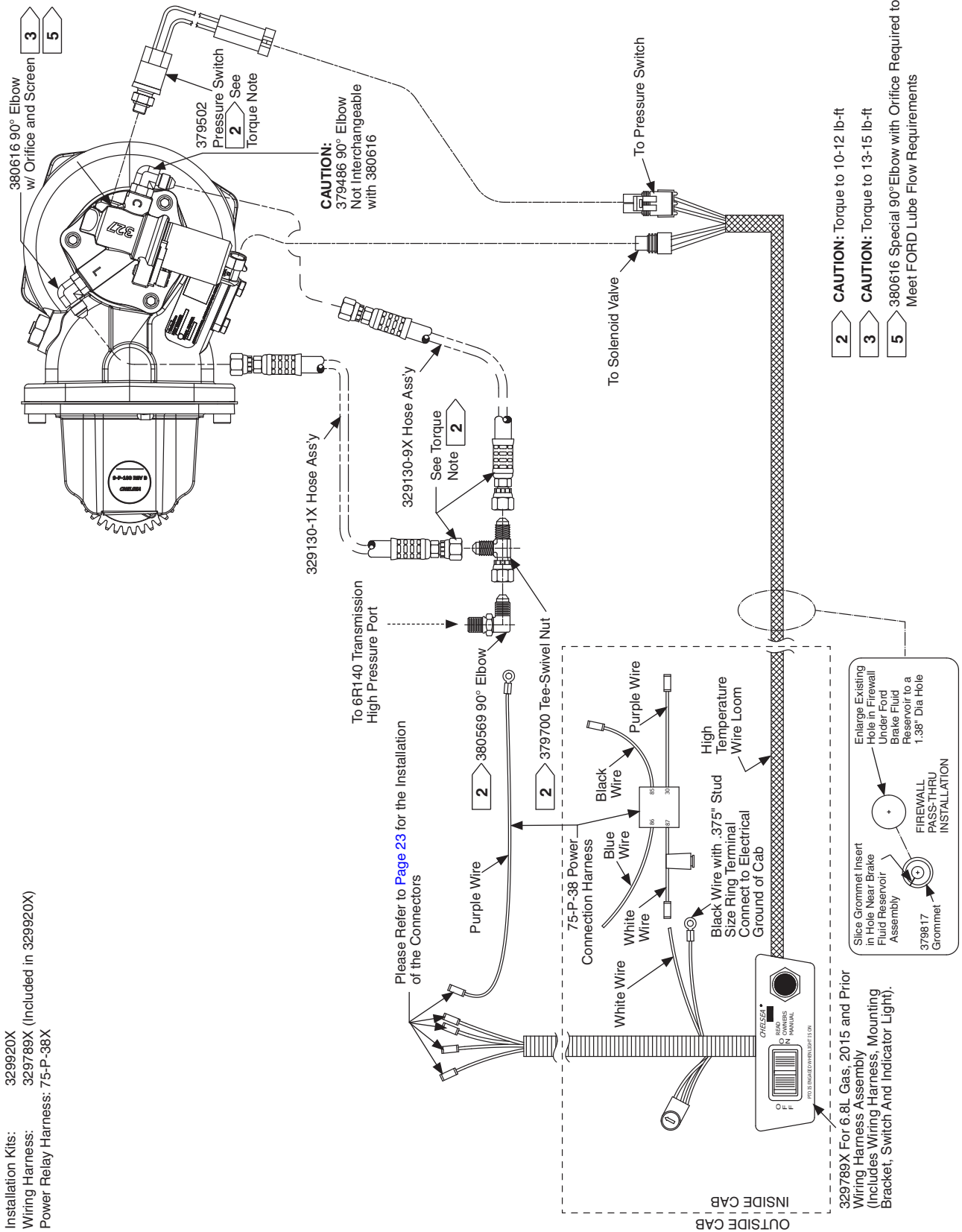
NOTE: ⁽¹⁾ Early MY2011 Product Units may come with two Blunt Cut Blue w/Gray Stripe wires. One wire will be for PTO Function (PTORS2) the other will be a Customer Wire for "Park Only Output" (TRO-P).
NOTE: EOC not available for MY2016 & Prior.
Refer to Ford Body Builders web site for more on this subject.

12V Power	Stationary Mode or Mobile Mode
Chelsea EOC Wire	F650/750
Red Wire	MY2016-MY2018 #CBB35 Yellow/Gray
Black w/Ring Terminal	Chassis Ground



Wiring Chart (Shift Option B)
Medium Duty F650 – MY2012-MY2015 – 6.8L Gas
272J w/o Electronic Overspeed Control (EOC)

(SK-613)



Wiring Chart (Shift Option B)
Medium Duty F650 – MY2012-MY2015 – 6.8L Gas
272J w/o Electronic Overspeed Control (EOC)

(SK-613)

Wiring Interface Configurations

Chelsea PTO Wire Harness		Stationary Mode (Mobile Mode Not Available)		
		Function	Ford Wire Color	Circuit
75-P-38 Power Connection Harness	Under Hood			
	Purple w/ Butt Connector (80")		Violet/Yellow	#870
	Purple w/ Ring Terminal (80")		Battery Junction Box Battery Connection Post	
	Under Dash			
	Black		Ford Ground Circuit Black	#57
	Blue		12V Blue/Green	
	Purple		Violet/Yellow	#870
White		Chelsea White Wire on 329789X Main Harness		
329789X Main Harness	Under Hood			
	Green	PTO RPM	Ford Circuit (Green)	#CE914
	Blue/White	PTO RLY	Ford Circuit (Blue/White)	#CE326
	Blue	PTO REQ2	Blue/Orange or Blue/Red (eff. March 2016)	#CE933
	Yellow	PTO REQ1	Yellow/Green	#CE912
	Under Dash			
	Black w/ Ring Terminal		Chassis Ground	

Part Number	Description	Qty.	Part Number	Description	Qty.
SERVICE KITS			STUD KITS		
329071-63X	Bearing Kit		8000-46X	Metric Stud Kit	
379746	Lock ring.....	1	379428-24	Metric Stud .375" - 24 x M10 - 150 x 2.375".....	6
378263	Internal Lock ring.....	1	379744	Flange Nut .375" - 24	6
379555	Lock ring.....	1	Continued on Next Page		
560972	Needle Roller Bearing Ass'y 1.500" x 1.875" x 1.000".....	2			
550311	Ball Bearing 1.77" x 3.346" x .748".....	1			
550439	Tapered Cone Bearing .750" x .8598".....	2			
31-P-102	Thrust Washer .754" x .440" x .030".....	1			
14-P-73-1	Spacer .762" x 1.500" x .150".....	1			
14-P-73-2	Spacer .762" x 1.500" x .153".....	1			
14-P-73-3	Spacer .762" x 1.500" x .156".....	1			
329071-83X	Hydraulic Solenoid Valve O-Ring Kit				
2016V-7	O-Ring .614" x .070".....	1			
2017V-7	O-Ring .676" x .070".....	1			
2020V-7	O-Ring .864" x .070".....	2			
329923X	Gasket & Seal Kit				
22-P-112	Valve Cap Gasket.....	1			
22-P-151	Bearing Cap Gasket.....	1			
28-P-119	Oil Seal 1.379" x .875" x .250".....	1			
28-P-178	O-Ring 4.359" x .138".....	1			
28-P-198	O-Ring 798" x .103".....	1			
28-P-211	Oil Seal 3.001" x 2.00" x .375".....	1			
28-P-285	O-Ring 1.597" x .103".....	2			
35-P-118	Plate Gasket.....	1			
28-P-267	Oil Seal 2.627" x 1.750" x .312".....	1			
22-P-124	Mounting Gasket.....	2			
329678X	Gear & Clutch Plates Kit				
2-P-858	Inner Hub Gear.....	1			
379485	Friction Disc.....	11			
380065	Clutch Plate.....	10			

BOMs in each kit group are listed in order based on part number.

Part Number	Description	Qty.	Part Number	Description	Qty.
INSTALLATION INSTRUCTIONS KITS			INSTALLATION KITS		
329248-5X	Gasket & Installation Instructions Kit		329918X	Installation & Mounting Kit (2011+ Diesel - F Mount; B Shift Option)	
22-P-124	Mounting Gasket	1	329616X	Wiring Harness w/o EOC	1
69-P-21	Caution Label	1	379502	Pressure Switch.....	1
328946X	Caution Label Kit	1	380569	90° Elbow - M10 to JIC4.....	1
379085-2	Instructions Label	1	379817	Grommet.....	1
379624	Product Warranty Card	1	380616	90° Elbow - Screened Orifice .438"-20.....	1
Owners Manual	HY25-1FRD-M1/US.....	1	329130-1X	Hose Ass'y 16.25"	1
Safety Guide	HY25-1002-M1/US	1	329130-9X	Hose Ass'y 10.75"	1
			379700	Swivel Nut Tee .438"-20	1
			329919X	EOC Installation & Mounting Kit (2011+ Diesel, F Mount/2016+ Gas, H Mount; K Shift Option)	
			329617X	Wiring Harness w/ EOC	1
			379502	Pressure Switch.....	1
			380569	90° Elbow - M10 to JIC4.....	1
			379817	Grommet.....	1
			380616	90° Elbow - Screened Orifice .438"-20.....	1
			329130-1X	Hose Ass'y 16.25"	1
			329130-9X	Hose Ass'y 10.75"	1
			379700	Swivel Nut Tee .438"-20	1
			329920X	Installation & Mounting Kit (2013-2015 Gas - J Mount; B Shift Option)	
			329789X	Wiring Harness w/o EOC	1
			379502	Pressure Switch.....	1
			380569	90° Elbow - M10 to JIC4.....	1
			379817	Grommet.....	1
			380616	90° Elbow - Screened Orifice .438"-20.....	1
			329130-1X	Hose Ass'y 16.25"	1
			329130-9X	Hose Ass'y 10.75"	1
			379700	Swivel Nut Tee .438"-20	1
			329922X	Installation & Mounting Kit (2016+ Gas - H Mount; B Shift Option)	
			75-P-39	Wiring Harness w/o EOC 272H.....	1
			379502	Pressure Switch.....	1
			380569	90° Elbow - M10 to JIC4.....	1
			379817	Grommet.....	1
			380616	90° Elbow - Screened Orifice .438"-20.....	1
			329130-1X	Hose Ass'y 16.25"	1
			329130-9X	Hose Ass'y 10.75"	1
			379700	Swivel Nut Tee .438"-20	1

Continued on Next Page

BOMs in each kit group are listed in order based on part number.

Part Number	Description	Qty.	Part Number	Description	Qty.
INSTALLATION KITS			OUTPUT CONVERSION KITS		
329952X	Installation Kit (Less Wiring Harness - All Mounts; E Shift)		329160-100X	Conversion Kit (XD to RK)	
379502	Pressure Switch.....	1	379555	Lockring.....	1
380569	90° Elbow - M10 to JIC4.....	1	379688	Spline Lubricant.....	1
379817	Grommet.....	1	379746	Lockring.....	1
380616	90° Elbow - Screened Orifice .438"-20.....	1	380069	Lockring.....	1
329130-1X	Hose Ass'y 16.25".....	1	28-P-267	Oil Seal 2.627" x 1.750" x .312".....	1
329130-9X	Hose Ass'y 10.75".....	1	21-P-731	Pump Flange.....	1
379700	Swivel Nut Tee .438"-20.....	1	21-P-885	Bearing Cap.....	1
			22-P-151	Bearing Cap Gasket.....	1
			28-P-285	O-Ring 1.597" x .103".....	2
			328170-216X	Capscrew Kit.....	1
			380563-14	Hex Flange Head Capscrew .375"-16 x 1.5".....	4
			3-P-1135	Output Shaft RK.....	1
			329160-104X	Conversion Kit (XD to RF)	
			379555	Lockring.....	1
			379688	Spline Lubricant.....	1
			379746	Lockring.....	1
			380069	Lockring.....	1
			21-P-731	Pump Flange.....	1
			21-P-885	Bearing Cap.....	1
			22-P-151	Bearing Cap Gasket.....	1
			28-P-267	Oil Seal 2.627" x 1.750" x .312".....	1
			28-P-285	O-Ring 1.597" x .103".....	2
			328170-216X	Capscrew Kit.....	1
			380563-14	Hex Flange Head Capscrew .375"-16 x 1.5".....	4
			3-P-1136	Output Shaft RF.....	1
			329160-106X	Conversion Kit (XD to RS)	
			379555	Lockring.....	1
			379688	Spline Lubricant.....	1
			379746	Lockring.....	1
			380069	Lockring.....	1
			21-P-769	Pump Flange RS.....	1
			21-P-885	Bearing Cap.....	1
			22-P-151	Bearing Cap Gasket.....	1
			28-P-267	Oil Seal 2.627" x 1.750" x .312".....	1
			28-P-285	O-Ring 1.597" x .103".....	2
			328170-216X	Capscrew Kit.....	1
			380563-14	Hex Flange Head Capscrew .375"-16 x 1.5".....	4
			3-P-1137	Output Shaft RS.....	1
			329160-108X	Conversion Kit (XD to RY)	
			379555	Lockring.....	1
			379688	Spline Lubricant.....	1
			379746	Lockring.....	1
			380069	Lockring.....	1
			21-P-771	Pump Flange RY.....	1
			21-P-885	Bearing Cap.....	1
			22-P-151	Bearing Cap Gasket.....	1
			28-P-267	Oil Seal 2.627" x 1.750" x .312".....	1
			28-P-285	O-Ring 1.597" x .103".....	2
			328170-216X	Capscrew Kit.....	1
			380563-14	Hex Flange Head Capscrew .375"-16 x 1.5".....	4
			3-P-1138	Output Shaft RY.....	1

Continued on Next Page

BOMs in each kit group are listed in order based on part number.

Part Number	Description	Qty.	Part Number	Description	Qty.
OUTPUT CONVERSION KITS (Cont'd)			OUTPUT CONVERSION KITS (Cont'd)		
329160-110X	Conversion Kit (XD to RZ)		329160-143X	Conversion Kit (XD to XR)	
379555	Lockring	1	379555	Lockring	1
379688	Spline Lubricant	1	379688	Spline Lubricant	1
379746	Lockring	1	379746	Lockring	1
380069	Lockring	1	380069	Lockring	1
21-P-731	Pump Flange	1	22-P-151	Bearing Cap Gasket	1
21-P-885	Bearing Cap	1	28-P-267	Oil Seal 2.627" x 1.750" x .312"	1
22-P-151	Bearing Cap Gasket	1	28-P-285	O-Ring 1.597" x .103"	2
28-P-267	Oil Seal 2.627" x 1.750" x .312"	1	380563-14	Hex Flange Head Capscrew .375"-16 x 1.5" .	4
28-P-285	O-Ring 1.597" x .103"	2	3-P-1135	Output Shaft XR	1
328170-216X	Capscrew Kit	1	329906X	Pump Kit XR	1
380563-14	Hex Flange Head Capscrew .375"-16 x 1.5" .	4	21-P-885	Bearing Cap	1
3-P-1137	Output Shaft RZ	1			
329160-116X	Conversion Kit (XD to XV)		329160-144X	Conversion Kit (XD to SV)	
379555	Lockring	1	379555	Lockring	1
380503	1410 Series Companion Flange	1	380503	1410 Series Companion Flange	1
379746	Lockring	1	379746	Lockring	1
380069	Lockring	1	380069	Lockring	1
380486	Lock Nut - Nylon, Thin .875"-14	1	380486	Lock Nut - Nylon, Thin .875"-14	1
22-P-151	Bearing Cap Gasket	1	22-P-151	Bearing Cap Gasket	1
28-P-211	Oil Seal 3.001" x 2.00" x .375"	1	28-P-211	Oil Seal 3.001" x 2.00" x .375"	1
28-P-285	O-Ring 1.597" x .103"	2	28-P-285	O-Ring 1.597" x .103"	2
380563-14	Hex Flange Head Capscrew .375"-16 x 1.5" .	4	380563-14	Hex Flange Head Capscrew .375"-16 x 1.5" .	4
380076-13	Flat Washer - Hardened .950" x 1.762" x .157"	1	380076-13	Flat Washer - Hardened .950" x 1.762" x .157"	1
3-P-1134	Output Shaft XV	1	3-P-1169	Output Shaft	1
329160-118X	Conversion Kit (XD to RE)		329160-145X	Conversion Kit (XD to RB)	
379555	Lockring	1	379555	Lockring	1
379688	Spline Lubricant	1	379688	Spline Lubricant	1
379746	Lockring	1	379746	Lockring	1
380069	Lockring	1	380069	Lockring	1
21-P-880	Bearing Cap RE	1	22-P-151	Bearing Cap Gasket	1
22-P-151	Bearing Cap Gasket	1	28-P-267	Oil Seal 2.627" x 1.750" x .312"	1
28-P-267	Oil Seal 2.627" x 1.750" x .312"	1	28-P-285	O-Ring 1.597" x .103"	2
28-P-285	O-Ring 1.597" x .103"	2	380563-14	Hex Flange Head Capscrew .375"-16 x 1.5" .	4
380563-14	Hex Flange Head Capscrew .375"-16 x 1.5" .	4	3-P-1135	Output Shaft RB	1
3-P-1170	Output Shaft RE	1	21-P-885	Bearing Cap	1
			21-P-894	Pump Flange	1
329160-142X	Conversion Kit (XD to SD)		328170-216X	Capscrew Kit	1
379555	Lockring	1	329921X	EOC Conversion Kit (F & H Mount; K-Shift)	
379746	Lockring	1	329617X	Wiring Harness w/ EOC	1
380069	Lockring	1	329650X	Electronic Overspeed Control	1
22-P-151	Bearing Cap Gasket	1	379917	Speed Sensor	1
28-P-267	Oil Seal 2.627" x 1.750" x .312"	1	28-P-171	O-Ring .644" x .087"	1
28-P-285	O-Ring 1.597" x .103"	2			
380563-14	Hex Flange Head Capscrew .375"-16 x 1.5" .	4			
3-P-1168	Output Shaft	1			
500007-29	Woodruff Key	1			

BOMs in each kit group are listed in order based on part number.

Parker Hannifin Corporation – Chelsea Division
Offer of Sale

The items described in this document and other documents and descriptions provided by Parker Hannifin Corporation, its subsidiaries and its authorized distributors ("Seller") are hereby offered for sale at prices to be established by Seller. This offer and its acceptance by any customer ("Buyer") shall be governed by all of the following Terms and Conditions. Buyer's order for any item described in its document, when communicated to Seller verbally, or in writing, shall constitute acceptance of this offer. All goods, services or work described will be referred to as "Products".

1. Terms and Conditions. Seller's willingness to offer Products, or accept an order for Products, to or from Buyer is subject to these Terms and Conditions or any newer version of the terms and conditions found on-line at www.parker.com/salesterms/. Seller objects to any contrary or additional terms or conditions of Buyer's order or any other document issued by Buyer.

2. Price Adjustments; Payments. Prices stated on Seller's quote or other documentation offered by Seller are valid for 30 days, and do not include any sales, use, or other taxes unless specifically stated. Unless otherwise specified by Seller, all prices are F.C.A. Seller's facility (INCOTERMS 2010). Payment is subject to credit approval and is due 30 days from the date of invoice or such other term as required by Seller's Credit Department, after which Buyer shall pay interest on any unpaid invoices at the rate of 1.5% per month or the maximum allowable rate under applicable law.

3. Delivery Dates; Title and Risk; Shipment. All delivery dates are approximate and Seller shall not be responsible for any damages resulting from any delay. Regardless of the manner of shipment, title to any products and risk of loss or damage shall 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 Buyer's 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 all products sold, other than the 590 Series, conform to the applicable Parker Chelsea standard specification for the lesser period of 2 years (24 Months) from date of service or 2-1/2 years (30 Months) from date of build (as marked on the product name plate). Seller warrants that the 590 Series will conform to the applicable Seller standard specification for the lesser period of 2 years (24 Months) from date of service or 2000 hours of usage. The prices charged for Seller's products are based upon the exclusive limited warranty stated above, and upon the following disclaimer: **DISCLAIMER OF WARRANTY: THIS WARRANTY COMPRISES THE SOLE AND ENTIRE WARRANTY PERTAINING TO PRODUCTS PROVIDED HEREUNDER. 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 delivery. No claims for shortages will be allowed unless reported to the Seller within 10 days of delivery. No other claims against Seller will be allowed unless asserted in writing within 30 days after delivery. Buyer shall notify Seller of any alleged breach of warranty within 30 days after the date the defect is or should have been discovered by Buyer. Any action based upon breach of this agreement or upon any other claim arising out of this sale (other than an action by Seller for an amount due on any invoice) must be commenced within 12 months from the date of the breach without regard to the date breach is discovered.

6. LIMITATION OF LIABILITY. UPON NOTIFICATION, SELLER WILL, AT ITS OPTION, REPAIR OR REPLACE A DEFECTIVE PRODUCT, OR REFUND THE PURCHASE PRICE. IN NO EVENT SHALL SELLER BE LIABLE TO BUYER 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, EVEN IF SELLER HAS BEEN NEGLIGENT, WHETHER 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, 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 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 shall have 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 shall retain a security interest in the goods delivered and this agreement shall be deemed 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 claim, liability, damages, lawsuits, and costs (including attorney fees), 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, improper application 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 Product; 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. Orders shall not be subject to cancellation or change by Buyer 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 with notice to Buyer.

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 shall not be liable for delay or failure to perform any of Seller's obligations by reason of circumstances beyond the reasonable control of Seller (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 waive 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 written notice of termination. Seller may immediately terminate this agreement, in writing, if Buyer: (a) commits a breach of 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 by a third party (d) makes an assignment for the benefit of creditors, or (e) dissolves or liquidates all or a majority of its assets.

17. Governing Law. This agreement and the sale and delivery of all Products hereunder shall be 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 shall have no liability 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 return the purchase price less a reasonable allowance for depreciation. Notwithstanding the foregoing, Seller shall have no liability 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 shall 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.

20. Compliance with Law, U. K. Bribery Act and U.S. Foreign Corrupt Practices Act. Buyer agrees to comply with all applicable laws and regulations, including both those of the United Kingdom and the United States of America, and of the country or countries of the Territory in which Buyer may operate, including without limitation the U. K. Bribery Act, the U.S. Foreign Corrupt Practices Act ("FCPA") and the U.S. Anti-Kickback Act (the "Anti-Kickback Act"), 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 they are familiar with the provisions of the U. K. Bribery Act, the FCPA and the Anti-Kickback Act, and certifies that Buyer will adhere to the requirements thereof. In particular, Buyer represents and agrees that Buyer shall 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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