

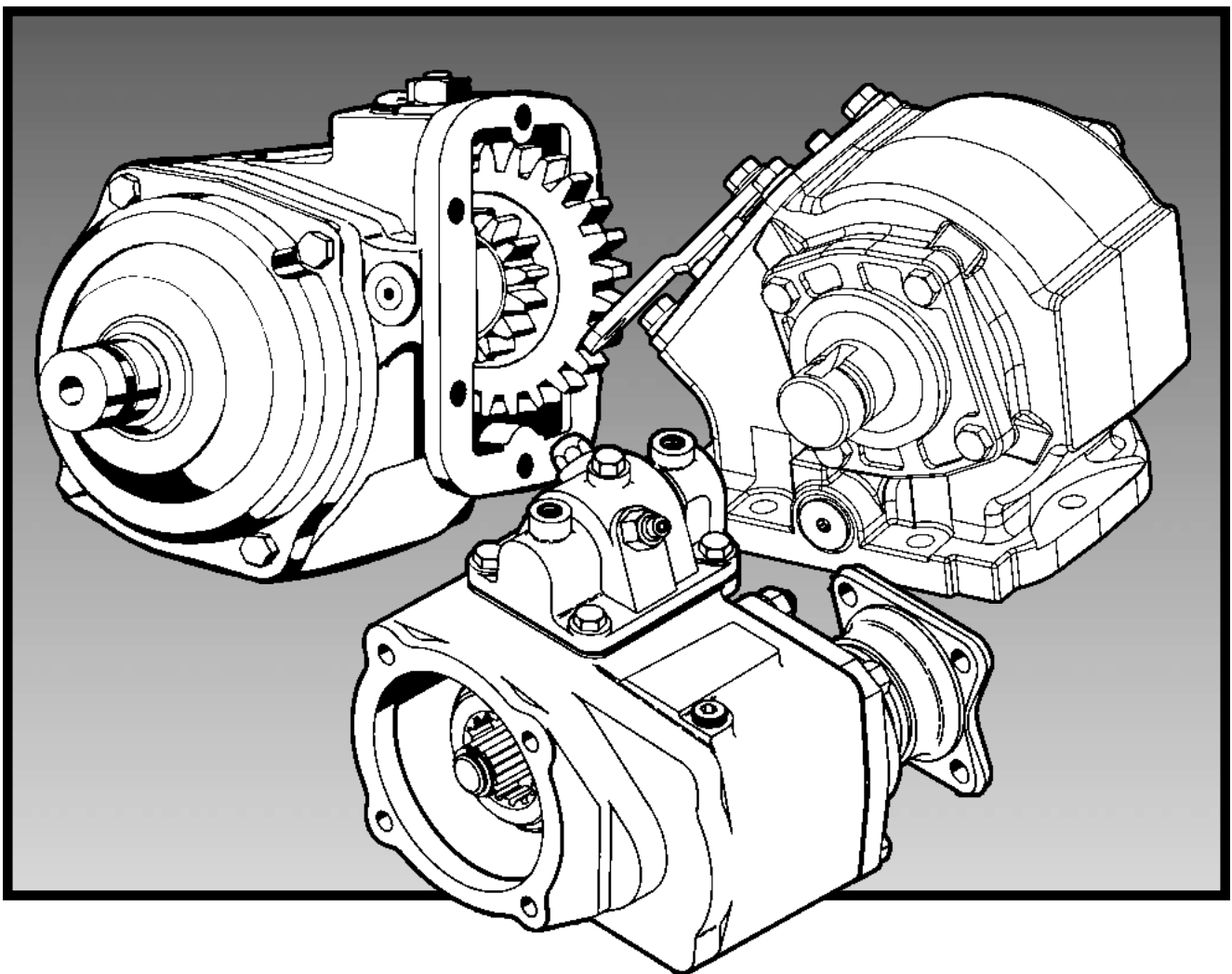
CHELSEA[®]

Bulletin HY25-2277-M1/US

Parts List 277/278 Series

Effective: February 15, 2002

Supersedes: HY25-2277-M1/US December, 2001



Parker
Hydraulics

 **WARNING**

FAILURE OR IMPROPER SELECTION OR IMPROPER USE OF THE PRODUCTS AND/OR SYSTEMS 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 and/or system options for further investigation by users having technical expertise. It is important that you analyze all aspects of your application and review the information concerning the product or system in the current product catalog. Due to the variety of operating conditions and applications for these products or systems, the user, through its own analysis and testing, is solely responsible for making the final selection of the products and systems and assuring that all performance, safety and warning requirements of the application are met.

The products described herein, including without limitation, product features, specifications, designs, availability and pricing, are subject to change by Parker Hannifin Corporation and its subsidiaries at any time without notice.

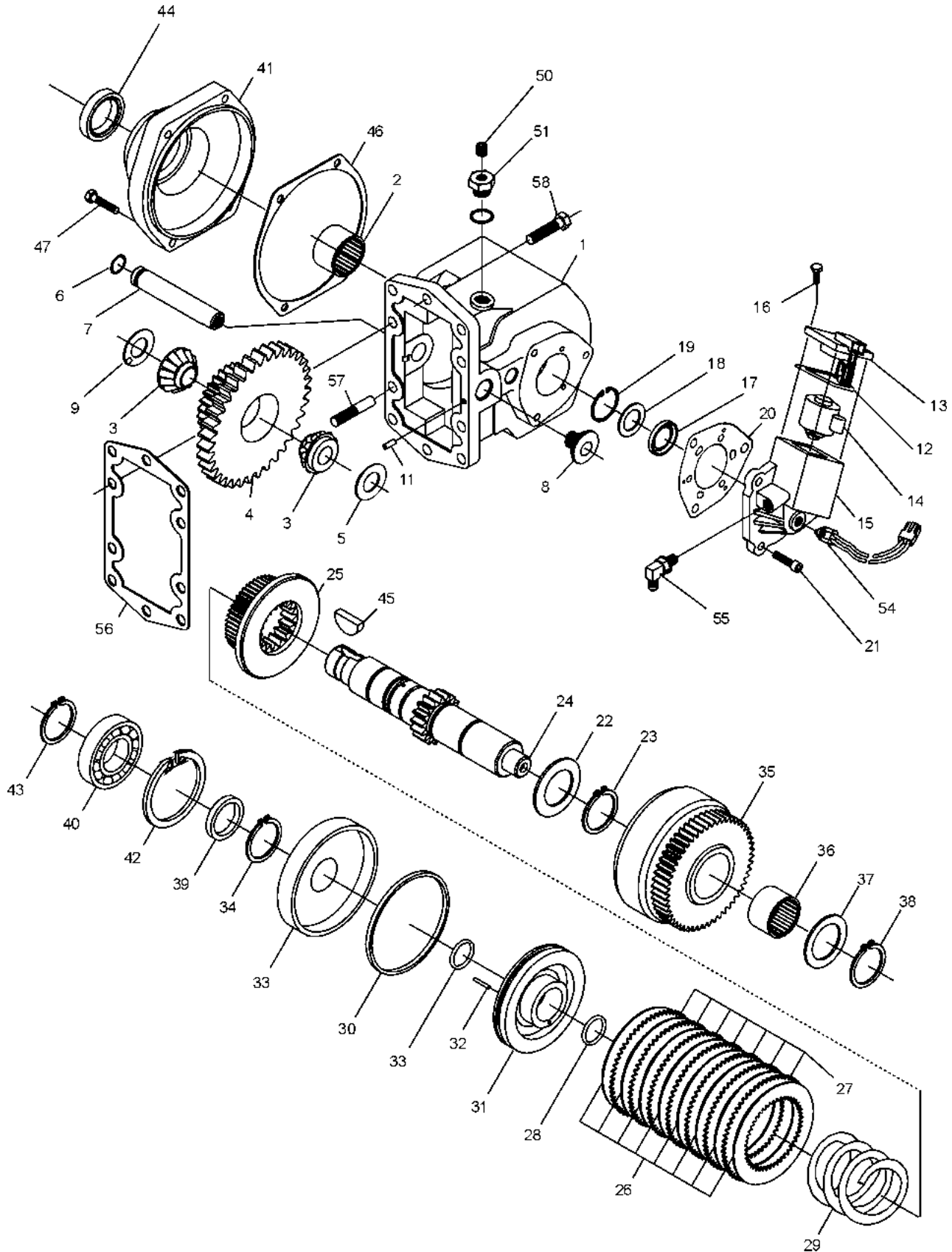
Offer of Sale

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".

© Copyright 2002, Parker Hannifin Corporation, All Rights Reserved

Contents

| | |
|--|-------|
| 277 Exploded View | 1 |
| 277 Bill of Materials | 2-4 |
| 277 Gear Chart | 4 |
| 277 Output Shaft Chart | 4 |
| 277 Model Number Designation | 5 |
| 277 Shift Installation Kits | 6-8 |
| 277 Pump Conversion | 9 |
| 278 Exploded View | 11 |
| 278 Bill of Materials | 12-14 |
| 278 Gear Chart | 14 |
| 278 Output Shaft Chart | 14 |
| 278 Model Designation | 15 |
| 278 Shift Installation Kits | 16-18 |
| 278 Pump Conversion | 19 |
| 277/278 Pump Flange & Shaft Dimensions | 20 |
| Offer of Sale | 24 |



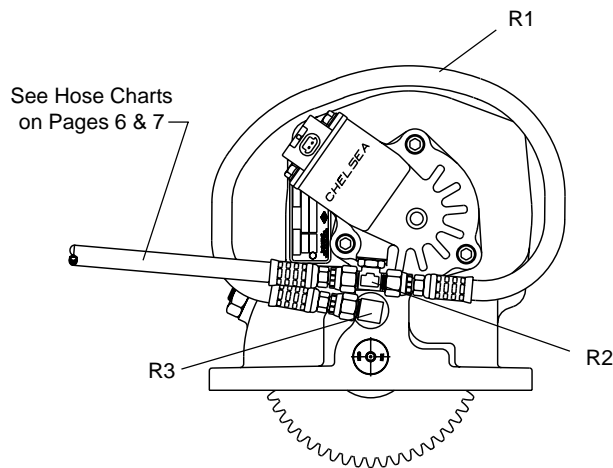
| Item | Part Number | Description | Quantity |
|------|-----------------|---|----------|
| 1 | 1-P-554X | Housing Ass'y 5, includes item 11 | 1 |
| 2 | 560972 | Needle Bearing | 1 |
| 3 | 550439 | Tapered Bearing Cone | 2 |
| 4 | See Chart Pg. 4 | Input Gear | 1 |
| 5 | 14-P-74-1 | Spacers (.112 - .114) | A.R. |
| | 14-P-74-2 | Spacers (.115 - .117) | A.R. |
| | 14-P-74-3 | Spacers (.118 - .120) | A.R. |
| | 14-P-74-4 | Spacers (.121 - .123) | A.R. |
| | 14-P-74-5 | Spacers (.124 - .126) | A.R. |
| 6 | 28-P-191 | O-Ring | 1 |
| 7 | 9-P-91 | Idler Shaft, Pressure Lube | 1 |
| 8 | 379672 | NWD Plug | 1 |
| 9 | 9-P-102 | Thrust Washer | 1 |
| 11 | 500597-16 | Slotted Pin | 1 |
| | 329145-12X | Valve And Valve Cap Assembly (12 Volt) | 1 |
| | 329145-24X | Valve And Valve Cap Assembly (24 Volt) | 1 |
| | | Assemblies include items 12 thru 19 | |
| 12 | 28-P-193 | Block Ring | 1 |
| 13 | 329144X | Valve Cap Assembly (12 Volt) | 1 |
| | 329144-1X | Valve Cap Assembly (24 Volt) | 1 |
| 14 | 379604-1 | Solenoid Valve (12 Volt) | 1 |
| | 379604-2 | Solenoid Valve (24 Volt) | 1 |
| 15 | 34-P-123 | Valve Cap | 1 |
| 16 | 379565 | Hex Capscrew (.250"-20 x .750") | 4 |
| 17 | 28-P-119 | Oil Seal | 1 |
| 18 | 378811 | Washer | 1 |
| 19 | 378849 | Retaining Ring | 1 |
| 20 | 22-P-112 | Gasket, Valve Cap | 1 |
| 21 | 378447-6 | Socket Head Capscrew (.312"-18 x 1.000") | 3 |
| | See Chart Pg. 4 | Output Shaft & Clutch Assembly (Includes items 22 thru 34) | |
| 22 | 14-P-49 | Spacer | 1 |
| 23 | 379746 | Retaining Ring | 1 |
| 24 | See Chart Pg. 4 | Output Shaft | 1 |
| 25 | 2-P-458 | Clutch Gear | 1 |
| 26 | 379485 | Friction Disc | 8 |
| 27 | 379595 | Clutch Plate | 7 |
| 28 | 28-P-244 | O-Ring | 2 |
| 29 | 37-P-39 | Return Spring | 1 |
| | 328895X | Piston & Cylinder Assembly (Includes items 30-32) | |
| 30 | 28-P-121 | Block Vee Ring..... | 1 |
| | 328676X | Piston Assembly (Includes items 31 and 32) | |
| 31 | 379133 | Piston | 1 |
| 32 | 378856 | Wiggler Wire | 1 |
| 33 | 378760 | Clutch Back Up Cylinder | 1 |
| 34 | 378576 | Retaining Ring | 1 |
| | | Output Gear Assembly (Includes items 35 and 36) | |
| | 329005-1X / 6X | "B" Ratio / "B" Ratio Super Torque | |
| | 329005-2X / 7X | "D" Ratio / "D" Ratio Super Torque | |
| | 329005-3X / 8X | "G" Ratio / "G" Ratio Super Torque | |
| | 329005-4X / 9X | "M" Ratio / "M" Ratio Super Torque | |
| | 329005-5X / 10X | "S" Ratio / "S" Ratio Super Torque | |
| 35 | See Chart Pg. 4 | Output Gear | 1 |
| 36 | 560972 | Needle Bearing | 1 |
| 37 | 31-P-70 | Thrust Washer | 1 |
| 38 | 379746 | Retaining Ring | 1 |
| 39 | 4-P-147 | Spacer, Drive Shaft | 1 |
| 40 | 550010 | Ball Bearing | 1 |

A.R.—As Required

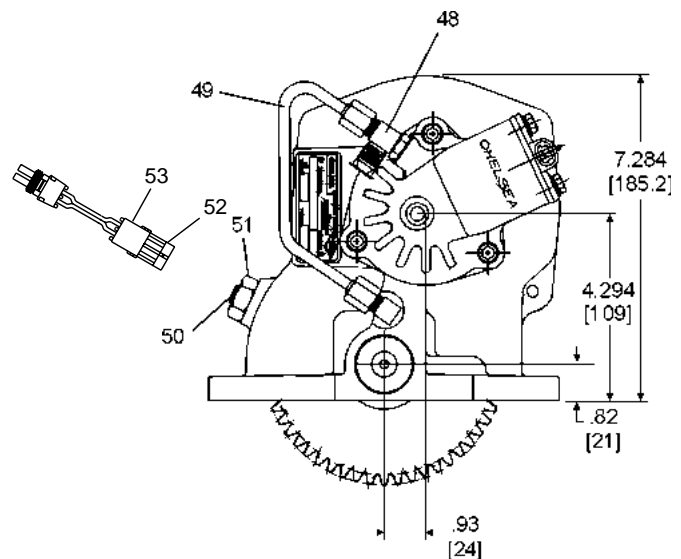
| Item | Part Number | Description | Quantity |
|---|---------------------------------|---|----------|
| 41 | See Chart Pg. 4 | Bearing Cap/Pump Flange | 1 |
| 42 | 378895 | Retaining Ring | 1 |
| Pressure Lube Option "P" | | | |
| 43 | 378576 | Retaining Ring | 1 |
| 44 | 28-P-225 | Oil Seal | 1 |
| 45 | 500007-29 | Woodruff Key | 1 |
| 46 | 22-P-101 | Gasket, Bearing Cap | 1 |
| 47 | 378447-8 | Socket Head Capscrew (.312"-18 x 1.500") | 4 |
| 48 | 379659 | Run Tee, Pressure Lube Only | 1 |
| 49 | 379660 | Steel Tubing, Pressure Lube Only | 1 |
| 50 | 379231 | Pipe Plug .125"-27 NPTF, w/o E.O.C. Only | 1 |
| 51 | 379242 | O-Ring Boss Plug, w/o E.O.C. Only | 1 |
| 52 | 28-P-171 | O-Ring, w/ E.O.C. Only | 1 |
| 53 | 379243 | Speed Sensor, w/ E.O.C. Only | 1 |
| 54 | 379502 | Pressure Switch Assembly | 1 |
| 55 | 379486 | Straight Thread Connector 90 degrees, w/o Pressure Lube | 1 |
| 56 | 35-P-74 | Mounting Gasket | 1 |
| 7170-86X | | | |
| | | Stud Kit | 1 |
| 57 | 379451 | Guide Screw | 2 |
| 58 | 379453-10 | Ferry Capscrew (M10-1.5 x 35mm) | 8 |
| N.S. | 379486 | 90° Elbow Fitting w/O-Ring (Transmission High Pressure) | 1 |
| Lube Option "R" Valve Cap Rotated 120° | | | |
| R1 | 329130-3X | Hose Connector | 1 |
| R2 | 379556 | Straight Thread O-Ring Connector Tee | 1 |
| R3 | 379486 | Straight Thread 90° Elbow | 1 |

N.S. — Not Shown

277X*R-5****



277X*P-5***



| Item | Part Number | Description | Quantity |
|------|-------------|---|----------|
| | | PARTS SHIPPED LOOSE | |
| | 379486 | 90° O-Ring Connector | 1 |
| | 328748X | Pump Mounting Kit, For "XR" Pump Only | 1 |
| | 328948-9X | Gasket & Installation Instructions | 1 |
| | 329024-12X | Installation Kit 12V, Less E.O.C. | 1 |
| | 329024-24X | Installation Kit 24V, Less E.O.C. | 1 |
| | 329076X | Installation Kit 12V, With E.O.C. | 1 |
| | 328924-12X | Control Box 12V, With E.O.C. | 1 |
| | 328924-24X | Control Box 24V, With E.O.C. | 1 |
| | 329327-12X | Installation Kit 12V, Remote Valve Less E.O.C. | 1 |
| | 329327-24X | Installation Kit 24V, Remote Valve Less E.O.C. | 1 |
| | | SERVICE KITS | |
| | 329071-19X | Gasket & Seal Kit | 1 |
| | 329071-33X | Gasket & Seal Kit ("XY" Output Only) | 1 |
| | 329071-5X | Bearing Kit | 1 |
| | 329071-7X | Clutch Repair Kit | 1 |
| | 329175-12X | E.O.C. Field Conversion Kit 12V, Remote Valve | 1 |
| | 329175-24X | E.O.C. Field Conversion Kit 24V, Remote Valve | 1 |
| | 329240-12X | Conversion Kit 12V, Remote Valve | 1 |
| | 329240-24X | Conversion Kit 24V, Remote Valve | 1 |

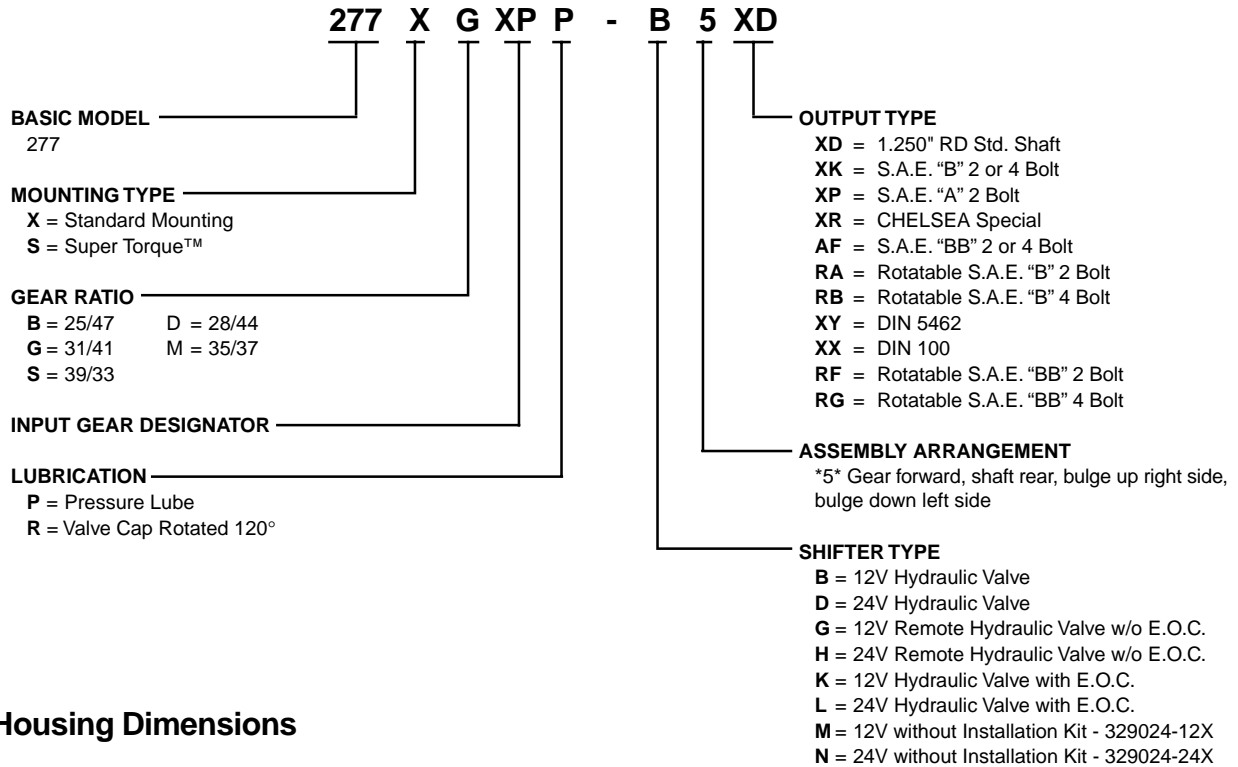
Gear Chart

| Model Number | Input Gear Part Number Item No. 4 | Number Teeth Lg/Sm | Output Gear Item No. 35 | | Gear & Bearing Sub-assembly Items 35 & 36 |
|----------------------|-----------------------------------|--------------------|-------------------------|--------------|---|
| | | | Part Number | Number Teeth | |
| 277XBFJ | 5-P-912 | 25 | 2-P-688 | 47 | 329005-1X |
| 277XDFJ | 5-P-913 | 28 | 2-P-684 | 44 | 329005-2X |
| 277XGFJ | 5-P-914 | 31 | 2-P-683 | 41 | 329005-3X |
| 277XMFJ | 5-P-915 | 35 | 2-P-682 | 37 | 329005-4X |
| 277XSFJ | 5-P-1173 | 39 | 2-P-756 | 33 | 329005-5X |
| SUPER TORQUE™ | | | | | |
| 277SBFJ | 5-P-1350 | 25 | 2-P-800 | 47 | 329005-6X |
| 277SDFJ | 5-P-1293 | 28 | 2-P-790 | 44 | 329005-7X |
| 277SGFJ | 5-P-1225 | 31 | 2-P-779 | 41 | 329005-8X |
| 277SMFJ | 5-P-1351 | 35 | 2-P-801 | 37 | 329005-9X |
| 277SSFJ | 5-P-1278 | 39 | 2-P-789 | 33 | 329005-10X |

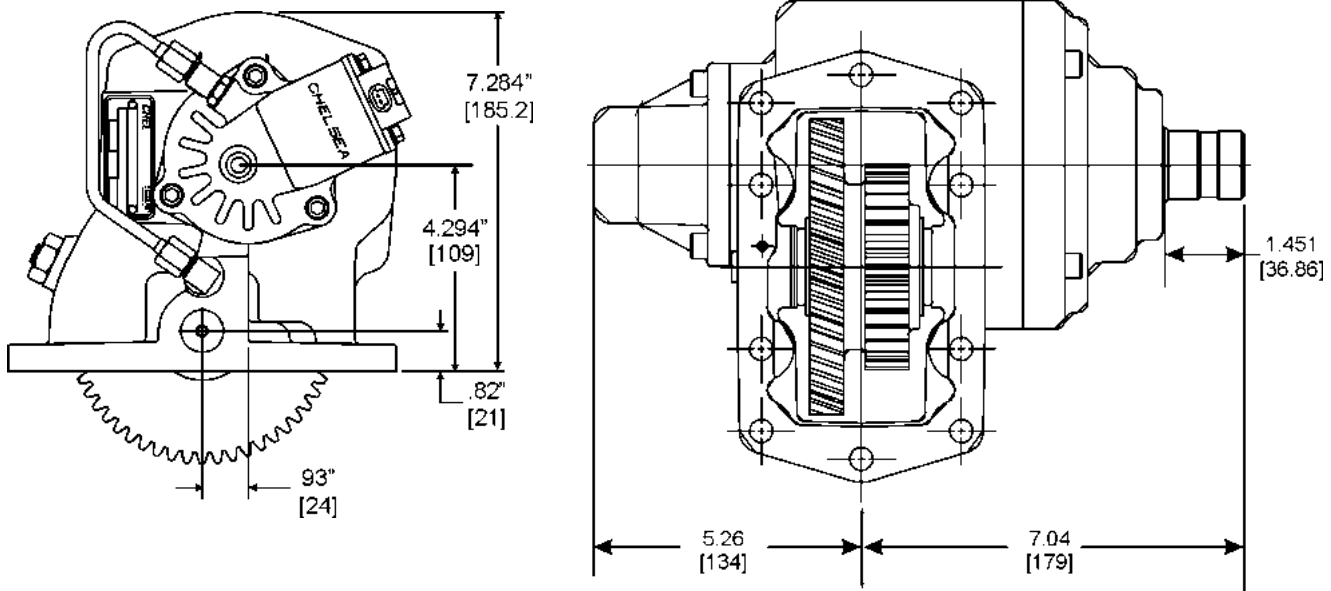
Output Shaft Chart

| Model Number | Output Shaft Item No. 24 | Output Shaft & Clutch Assy No. | Bearing Cap/Pump Flange Item No. 41 | Oil Seal Item No. 44 | Pump Flange |
|--------------|--------------------------|--------------------------------|-------------------------------------|----------------------|-------------|
| 277*-***XD | 3-P-831 | 329006-1X | 21-P-480 | 28-P-225 | |
| 277*-***XK | 3-P-832 | 329006-2X | 21-P-482 | 28-P-225 | |
| 277*-***XP | 3-P-832 | 329006-2X | 21-P-568 | 28-P-225 | |
| 277*-***XR | 3-P-833 | 329006-3X | 21-P-484 | 28-P-225 | |
| 277*-***XY | 3-P-852 | 329006-4X | 21-P-524 | 28-P-230 | |
| 277*-***XX | 3-P-853 | 329006-5X | 21-P-480 | 28-P-225 | |
| 277*-***XP | 3-P-832 | 329006-2X | 21-P-568 | 28-P-225 | |
| 277*-***AF | 3-P-892 | 329006-6X | 21-P-576 | 28-P-225 | |
| 277*-***RA | 3-P-833 | 329006-3X | 21-P-484 | 28-P-225 | 21-P-628 |
| 277*-***RB | 3-P-833 | 329006-3X | 21-P-484 | 28-P-225 | 21-P-572 |
| 277*-***RF | 3-P-925 | 329006-8X | 21-P-484 | 28-P-225 | 21-P-628 |

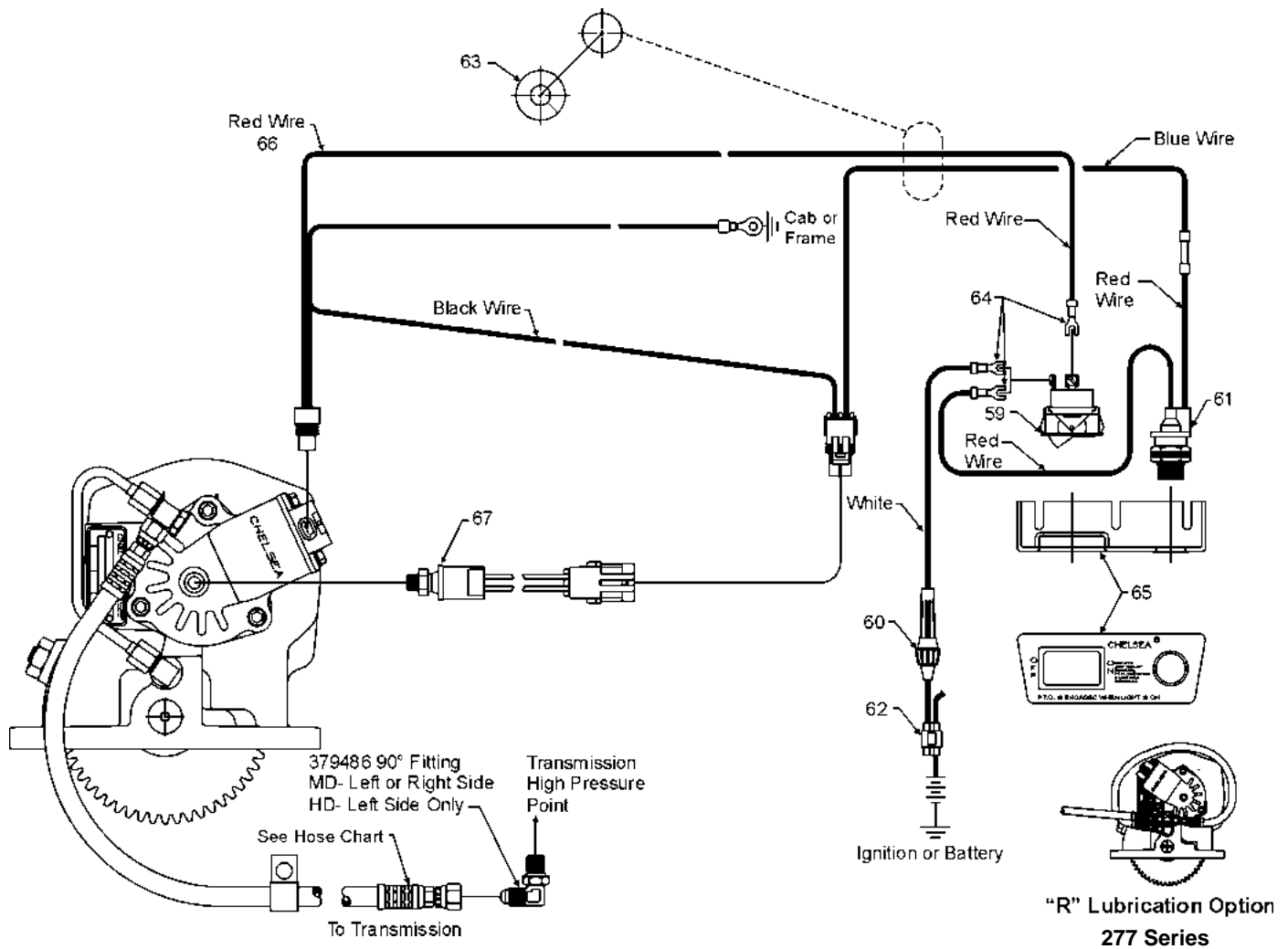
Model Number Designation



P.T.O. Housing Dimensions



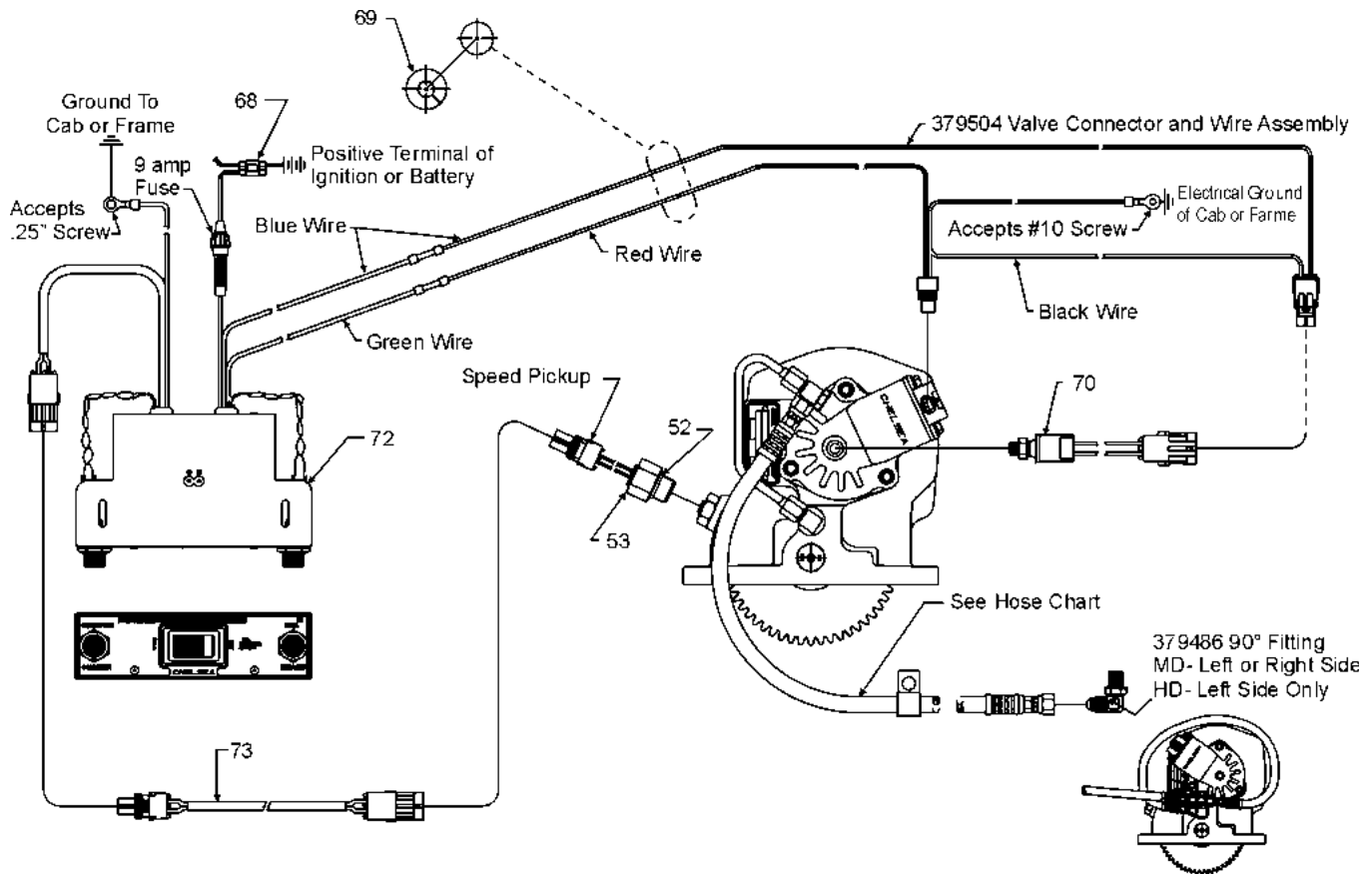
Shift Installation Kit Without Electronic Overspeed Control (SK-247)



| Trans. | P.T.O. Side | Hose Part# | Comments |
|--------|-------------|------------|---|
| MD | LEFT | 329130-5X | 26.5" w/o Hose Clamp (Lube Option "P") Pressure Lube |
| MD | RIGHT | 329075-1X | 26.5" w/ Hose Clamp (Lube Option "P") Pressure Lube |
| HD | LEFT | 329130-4X | 22.0" w/o Hose Clamp (Lube Option "P") Pressure Lube |
| HD | TOP RIGHT | 329075-2X | 42.0" w/ Hose Clamp (Lube Option "P") Pressure Lube |
| MD | LEFT | 329130-5X | 26.5" w/o Hose Clamp (Lube Option "R") Valve Cap Rotated 120° |
| MD | RIGHT | 329075-1X | 26.5" w/ Hose Clamp (Lube Option "R") Valve Cap Rotated 120° |
| HD | LEFT | 329130-5X | 26.5" w/o Hose Clamp (Lube Option "R") Valve Cap Rotated 120° |
| HD | TOP RIGHT | 329075-4X | 47.0" w/ Hose Clamp (Lube Option "R") Valve Cap Rotated 120° |

| Item | Part Number | Description | Quantity |
|------|-------------------|--------------------------------------|----------|
| | 329024-12X | 12 Volt Shift Installation Kit | 1 |
| | 329024-24X | 24 Volt Shift Installation Kit | 1 |
| 59 | 378881 | Switch | 1 |
| 60 | 378884 | Fuse, 9 Amp | 1 |
| 61 | 378978 | Indicator Light, 12 Volt | 1 or |
| | 379005 | Indicator Light, 24 Volt | 1 |
| 62 | 379257 | Connector, Splice | 1 |
| 63 | 379265 | Grommet | 1 |
| 64 | 379306 | Fork Connector | 3 |
| 65 | 379336 | Bracket | 1 |
| 66 | 379504 | Valve Connector & Wire | 1 |
| 67 | 379502 | Pressure Switch | 1 |

Shift Installation Kit With Electronic Overspeed Control (SK-248)



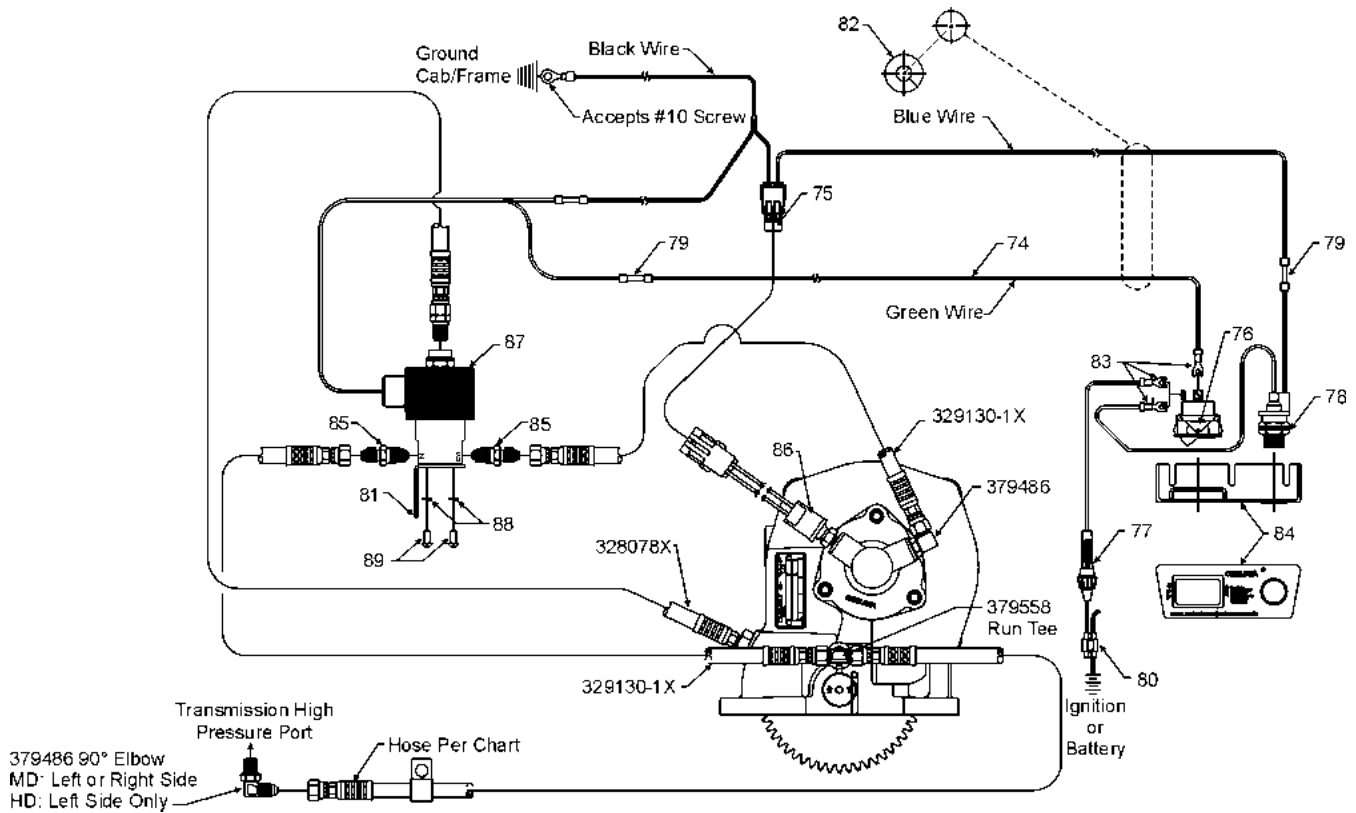
“R” Lubrication Option
277 Series

| Trans. | P.T.O. Side | Hose Part# | Comments |
|--------|-------------|------------|---|
| MD | LEFT | 329130-5X | 26.5" w/o Hose Clamp (Lube Option "P") Pressure Lube |
| MD | RIGHT | 329075-1X | 26.5" w/ Hose Clamp (Lube Option "P") Pressure Lube |
| HD | LEFT | 329130-4X | 22.0" w/o Hose Clamp (Lube Option "P") Pressure Lube |
| HD | TOP RIGHT | 329075-2X | 42.0" w/ Hose Clamp (Lube Option "P") Pressure Lube |
| MD | LEFT | 329130-5X | 26.5" w/o Hose Clamp (Lube Option "R") Valve Cap Rotated 120° |
| MD | RIGHT | 329075-1X | 26.5" w/ Hose Clamp (Lube Option "R") Valve Cap Rotated 120° |
| HD | LEFT | 329130-5X | 26.5" w/o Hose Clamp (Lube Option "R") Valve Cap Rotated 120° |
| HD | TOP RIGHT | 329075-4X | 47.0" w/ Hose Clamp (Lube Option "R") Valve Cap Rotated 120° |

| Item | Part Number | Description | Quantity |
|------|-------------------|--|----------|
| | 329076X | Shift Installation Kit | 1 |
| 68 | 379257 | Connector, Splice | 1 |
| 69 | 379265 | Grommet | 1 |
| 70 | 379502 | Pressure Switch | 1 |
| 71 | 379504 | Valve Connector & Wire | 1 |
| N.S. | 379252 | Butt Connector | 1 |
| N.S. | 379061 | Wire Tie | 6 |
| 72 | 328924-12X | Chelsea E.O.C., 12 Volt | 1 |
| | 328924-24X | Chelsea E.O.C., 24 Volt | 1 |
| | 329175-12X | E.O.C. Field Conversion Kit, 12 Volt (Includes 329076X and items 52, 53 and 72) | |
| | 329175-24X | E.O.C. Field Conversion Kit, 24 Volt (Includes 329076X and items 52, 53 and 72) | |
| 73 | 328923-10X | SPEED SENSOR EXTENSION CABLE* 10' Extension Cable, Supplied with E.O.C. | 1 or |
| | 328923-5X | 5' Extension Cable, Optional | |

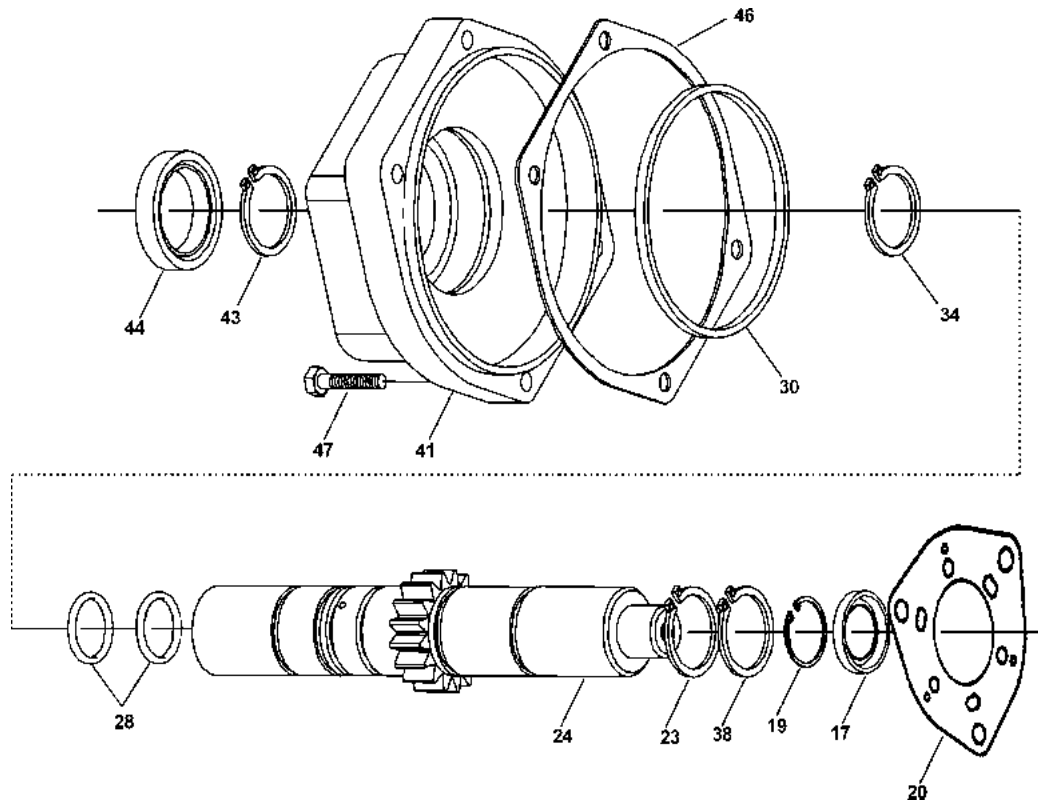
* Run cable through grommet in firewall
 N.S. — Not Shown

Remote Mount Valve Conversion Kits (SK-316)

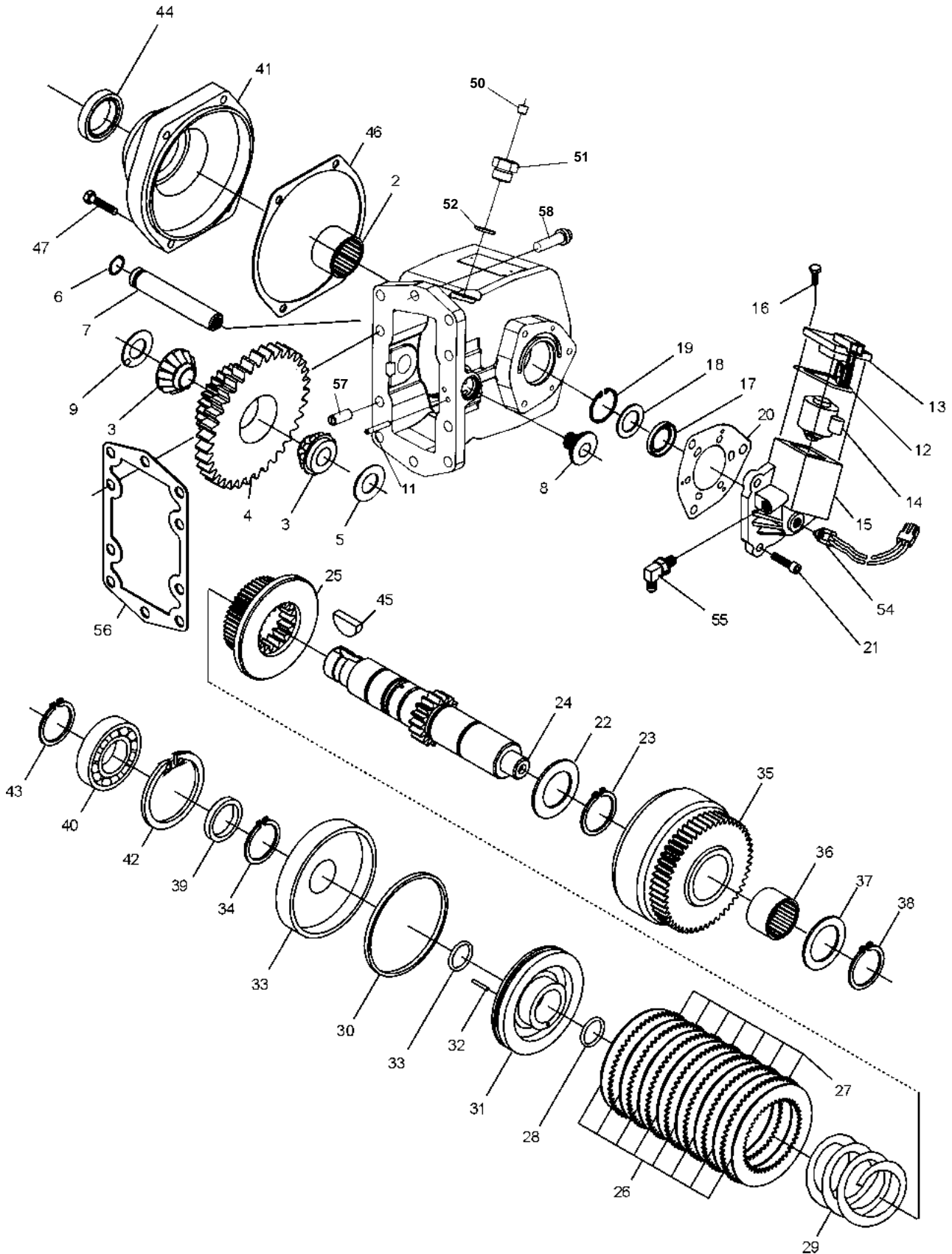


| Trans. | P.T.O. Side | Hose Part# | Comments |
|--------|-------------|------------|--|
| MD | LEFT | 329130-5X | 26.5" w/o Hose Clamp (Shifter "Options G & H") 12V & 24V Remote Hydraulic Valve w/o E.O.C. |
| MD | RIGHT | 329075-1X | 26.5" w/ Hose Clamp (Shifter "Options G & H") 12V & 24V Remote Hydraulic Valve w/o E.O.C. |
| HD | LEFT | 329130-5X | 26.5" w/o Hose Clamp (Shifter "Options G & H") 12V & 24V Remote Hydraulic Valve w/o E.O.C. |
| HD | TOP RIGHT | 329075-4X | 47.0" w/ Hose Clamp (Shifter "Options G & H") 12V & 24V Remote Hydraulic Valve w/o E.O.C. |

| Item | Part Number | Description | Quantity |
|------|-------------------|---------------------------------------|----------|
| | 329237-12X | 12 Volt Shift Installation Kit | |
| | 329237-24X | 24 Volt Shift Installation Kit | |
| 74 | 329230X | Connector Wire | 1 |
| 75 | 329231X | Valve Connector & Wire | 1 |
| 76 | 378881 | Switch | 1 |
| 77 | 378884 | Fuse Holder, 9 AMP | 1 |
| 78 | 378978 | Indicator Light, 12 Volt | 1 or |
| | 379005 | Indicator Light, 24 Volt | 1 |
| 79 | 379252 | Butt Connector | 2 |
| 80 | 379257 | Splice Connector | 1 |
| 81 | 379258 | Mounting Bracket, Solenoid | 1 |
| 82 | 379265 | Grommet | 1 |
| 83 | 379306 | Fork Connector | 3 |
| 84 | 379336 | Name & Plate Bracket | 1 |
| 85 | 379449 | Male Connector | 2 |
| 86 | 379502 | Pressure Switch | 1 |
| 87 | 379686-1 | Solenoid Valve, 12 Volt | 1 or |
| | 379686-2 | Solenoid Valve, 24 Volt | 1 |
| 88 | 500357-7 | Lockwasher | 2 |
| 89 | 500457-6 | Mounting Screw (.790"-32x.438") | 2 |



| Item | Part Number | Description | Quantity |
|------|-------------------|---|----------|
| | 329160-21X | "XK" Output | |
| | 329160-22X | "XR" Output | |
| | 329160-23X | "XP" Output | |
| | 329160-25X | "AF" Output | |
| | 329160-37X | "RA" Output | |
| | 329160-38X | "RB" Output | |
| | 329160-39X | "RF" Output | |
| | 329160-45X | "RG" Output | |
| 17 | 28-P-119 | Oil Seal, High Pressure | 1 |
| 19 | 378849 | Retaining Ring | 1 |
| 20 | 22-P-112 | Gasket, Valve Cap | 1 |
| 23 | 379746 | Retaining Ring | 1 |
| 24 | 3-P-832 | Output Shaft, XK & XP Outputs | 1 or |
| | 3-P-833 | Output Shaft, XR, RA, & RB Outputs | 1 |
| | 3-P-925 | Output Shaft, RF Output | 1 |
| | 3-P-892 | Output Shaft, AF Output | 1 |
| 28 | 28-P-244 | O-Ring | 2 |
| 30 | 28-P-121 | Block -V- Ring | 1 |
| 34 | 378576 | Retaining Ring | 1 |
| 38 | 379746 | Retaining Ring | 1 |
| 41 | 21-P-482 | Bearing Cap, XK Output | 1 or |
| | 21-P-484 | Bearing Cap, XR Output | 1 |
| | 21-P-568 | Bearing Cap, XP Output | 1 |
| | 21-P-576 | Bearing Cap, AF Output | 1 |
| N.S. | 21-P-572 | Pump Flange, RB & RG Output & 21-P-484 Brg. Cap | 1 |
| N.S. | 21-P-628 | Pump Flange, RA & RF Outputs & 21-P-484 Brg. Cap | 1 |
| 43 | 378576 | Retaining Ring | 1 |
| 44 | 28-P-225 | Oil Seal | 1 |
| 46 | 22-P-101 | Gasket, Bearing Cap | 1 |
| 47 | 378447-8 | Socket Head Capscrew (.3125"-18 x 1.500") | 4 |
| N.S. | 378447-6 | Socket Head Capscrew (.3125"-18 x 1.000")(Rotatable Flange) | 4 |
| N.S. | 328748X | Pump Mounting Kit, XR Output | 1 |

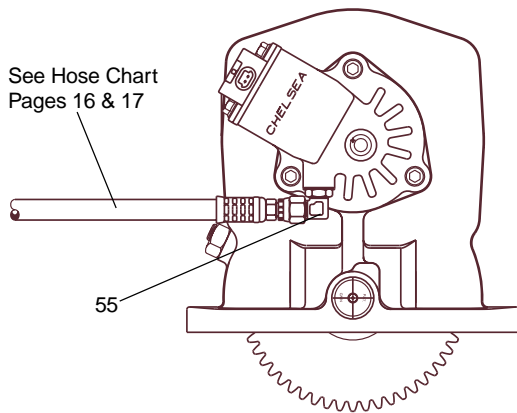


| Item | Part Number | Description | Quantity |
|------|------------------|---|----------|
| 1 | 1-P-591X | Housing Ass'y 3 (Includes Item # 11) | 1 |
| 2 | 560972 | Needle Bearing | 1 |
| 3 | 550439 | Tapered Bearing Cone | 2 |
| 4 | See Chart Pg. 14 | Input Gear | 1 |
| 5 | 14-P-74-1 | Spacers (.112 - .114) | A.R. |
| | 14-P-74-2 | Spacers (.115 - .117) | A.R. |
| | 14-P-74-3 | Spacers (.118 - .120) | A.R. |
| | 14-P-74-4 | Spacers (.121 - .123) | A.R. |
| | 14-P-74-5 | Spacers (.124 - .126) | A.R. |
| 6 | 28-P-191 | O-Ring | 1 |
| 7 | 9-P-91 | Idler Shaft, Pressure Lube | 1 |
| 8 | 379672 | NWD Plug | 1 |
| 9 | 9-P-102 | Thrust Washer | 1 |
| 11 | 500597-16 | Slotted Pin | 1 |
| | 329352-12X | Valve and Valve Cap Assembly (12 Volt) | 1 |
| | 329352-24X | Valve and Valve Cap Assembly (24 Volt) | 1 |
| | | Assemblies include items 12 thru 19 | |
| 12 | 28-P-193 | Block Ring | 1 |
| 13 | 329144X | Valve Cap Assembly (12 Volt) | 1 |
| | 329144-1X | Valve Cap Assembly (24 Volt) | 1 |
| 14 | 379604-1 | Solenoid Valve (12 Volt) | 1 |
| | 379604-2 | Solenoid Valve (24 Volt) | 1 |
| 15 | 34-P-278 | Valve Cover | 1 |
| 16 | 379565 | Hex Capscrew (.250"-20 x .750") | 4 |
| 17 | 28-P-119 | Oil Seal | 1 |
| 18 | 378811 | Washer | 1 |
| 19 | 378849 | Retaining Ring | 1 |
| 20 | 22-P-112 | Gasket, Valve Cover | 1 |
| 21 | 378447-6 | Socket Head Capscrew (.312"-18 x 1.000") | 3 |
| | See Chart Pg. 14 | Output Shaft & Clutch Assembly (Includes items 22 thru 34) | |
| 22 | 14-P-49 | Spacer | 1 |
| 23 | 379746 | Retaining Ring | 1 |
| 24 | See Chart Pg. 14 | Output Shaft | 1 |
| 25 | 2-P-458 | Clutch Gear | 1 |
| 26 | 379485 | Friction Disc | 8 |
| 27 | 379595 | Clutch Plate | 7 |
| 28 | 28-P-244 | O-Ring | 2 |
| 29 | 37-P-39 | Return Spring | 1 |
| | 328895X | Piston & Cylinder Assembly (Includes items 30-32) | |
| 30 | 28-P-121 | Block Vee Ring | 1 |
| | 328676X | Piston Assembly (Includes items 31 and 32) | |
| 31 | 379133 | Piston | 1 |
| 32 | 378856 | Wiggler Wire | 1 |
| 33 | 378760 | Clutch Back Up Cylinder | 1 |
| 34 | 378576 | Retaining Ring | 1 |
| | | Output Gear Assembly (Includes items 35 and 36) | |
| | 329005-11X / 12X | "B" Ratio / "B" Ratio Super Torque | |
| | 329005-1X / 6X | "D" Ratio / "D" Ratio Super Torque | |
| | 329005-2X / 7X | "G" Ratio / "G" Ratio Super Torque | |
| | 329005-13X / 15X | "M" Ratio / "M" Ratio Super Torque | |
| | 329005-14X / 16X | "S" Ratio / "S" Ratio Super Torque | |
| | 329005-5X / 10X | "T" Ratio / "T" Ratio Super Torque | |
| 35 | See Chart Pg. 14 | Output Gear | 1 |
| 36 | 560972 | Needle Bearing | 1 |
| 37 | 31-P-70 | Thrust Washer | 1 |
| 38 | 379746 | Retaining Ring | 1 |
| 39 | 4-P-147 | Spacer, Drive Shaft | 1 |
| 40 | 550010 | Ball Bearing | 1 |

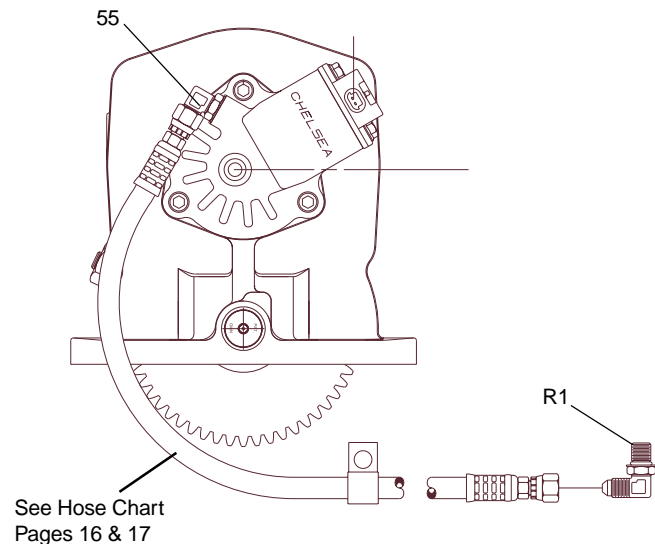
| Item | Part Number | Description | Quantity |
|------|----------------------------------|--|----------|
| 41 | See Chart Pg. 14 | Bearing Cap/Pump Flange | 1 |
| 42 | 378895 | Retaining Ring | 1 |
| 43 | 378576 | Retaining Ring | 1 |
| 44 | 28-P-225 | Oil Seal | 1 |
| 45 | 500007-29 | Woodruff Key | 1 |
| 46 | 22-P-101 | Gasket, Bearing Cap | 1 |
| 47 | 378447-8 | Socket Head Capscrew (.312"-18 x 1.500") | 4 |
| 48 | 379659 | Run Tee, Pressure Lube Only | 1 |
| 49 | 379660 | Steel Tubing, Pressure Lube Only | 1 |
| 50 | 379231 | Pipe Plug .125"-27 NPTF, w/o E.O.C. Only | 1 |
| 51 | 379242 | O-Ring Boss Plug, w/o E.O.C. Only | 1 |
| 52 | 28-P-171 | O-Ring, w/ E.O.C. Only | 1 |
| 53 | 379243 | Speed Sensor, w/ E.O.C. Only | 1 |
| 54 | 379502 | Pressure Switch Assembly | 1 |
| 55 | 379486 | Straight Thread Connector 90° | 1 |
| 56 | 35-P-74 | Mounting Gasket | 1 |
| | 7170-107X | Stud Kit (Includes items 57 and 58) | 1 |
| 57 | 379428-18 | Stud, M10-1.5 & .375-24 x 2.000 | 2 |
| 58 | 379453-10 | Ferry Capscrew (M10-1.5 x 35mm) | 8 |
| N.S. | 379486 | 90° Elbow Fitting w/ O-Ring | 1 |
| N.S. | 379744 | Flange Nut, .375-24 | 2 |
| R1 | 379486 | Straight Thread 90° Elbow | 1 |

N.S. — Not Shown

278X*R-3****



278X*P-3***



| Item | Part Number | Description | Quantity |
|------|-------------|---|----------|
| | | PARTS SHIPPED LOOSE | |
| | 379486 | 90° O-Ring Connector | 1 |
| | 328748X | Pump Mounting Kit, For "XR" Pump Only | 1 |
| | 328948-9X | Gasket & Installation Instructions | 1 |
| | 329024-12X | Installation Kit 12V, Less E.O.C. | 1 |
| | 329024-24X | Installation Kit 24V, Less E.O.C. | 1 |
| | 329076X | Installation Kit 12V, With E.O.C. | 1 |
| | 328924-12X | Control Box 12V, With E.O.C. | 1 |
| | 328924-24X | Control Box 24V, With E.O.C. | 1 |
| | | SERVICE KITS | |
| | 329071-19X | Gasket & Seal Kit | 1 |
| | 329071-33X | Gasket & Seal Kit ("XY" Output Only) | 1 |
| | 329071-5X | Bearing Kit | 1 |
| | 329071-7X | Clutch Repair Kit | 1 |
| | 329175-12X | E.O.C. Field Conversion Kit 12V, Remote Valve | 1 |
| | 329175-24X | E.O.C. Field Conversion Kit 24V, Remote Valve | 1 |

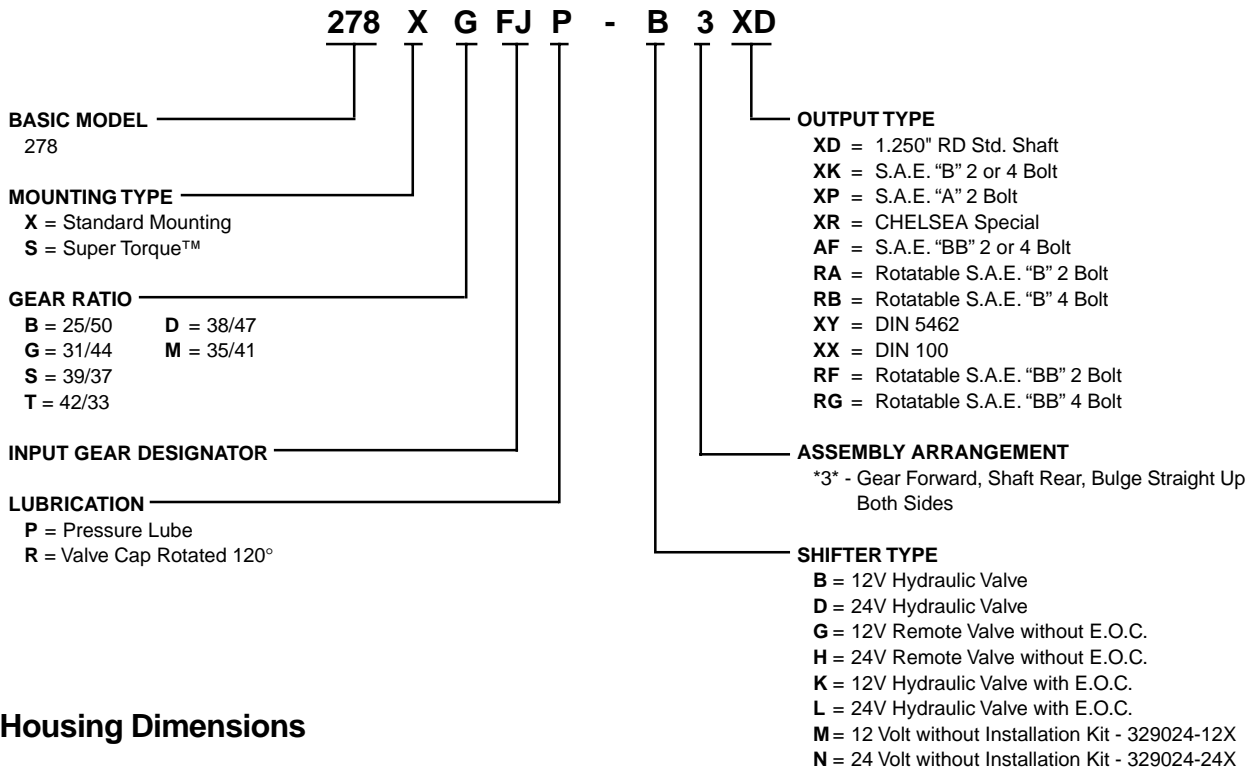
Gear Chart

| Model Number | Input Gear Part Number Item No. 4 | Number Teeth Lg/Sm | Output Gear Item No. 35 | | Gear & Bearing Sub-assembly Items 35 & 36 |
|----------------------|-----------------------------------|--------------------|-------------------------|--------------|---|
| | | | Part Number | Number Teeth | |
| 278XBFJ | 5-P-912 | 50/25 | 2-P-811 | 50 | 329005-11X |
| 278XDFJ | 5-P-913 | 50/28 | 2-P-688 | 47 | 329005-1X |
| 278XGFJ | 5-P-914 | 50/31 | 2-P-684 | 44 | 329005-2X |
| 278XMFJ | 5-P-915 | 50/35 | 2-P-814 | 40 | 329005-13X |
| 278XSFJ | 5-P-1173 | 50/39 | 2-P-815 | 36 | 329005-14X |
| 278XTFJ | 5-P-1409 | 50/42 | 2-P-756 | 33 | 329005-5X |
| SUPER TORQUE™ | | | | | |
| 278SBFJ | 5-P-1350 | 50/25 | 2-P-812 | 50 | 329005-12X |
| 278SDFJ | 5-P-1293 | 50/28 | 2-P-800 | 47 | 329005-6X |
| 278SGFJ | 5-P-1225 | 50/31 | 2-P-790 | 44 | 329005-7X |
| 278SMFJ | 5-P-1351 | 50/35 | 2-P-816 | 40 | 329005-15X |
| 278SSFJ | 5-P-1278 | 50/39 | 2-P-817 | 36 | 329005-16X |
| 278STFJ | 5-P-1410 | 50/42 | 2-P-789 | 33 | 329005-10X |

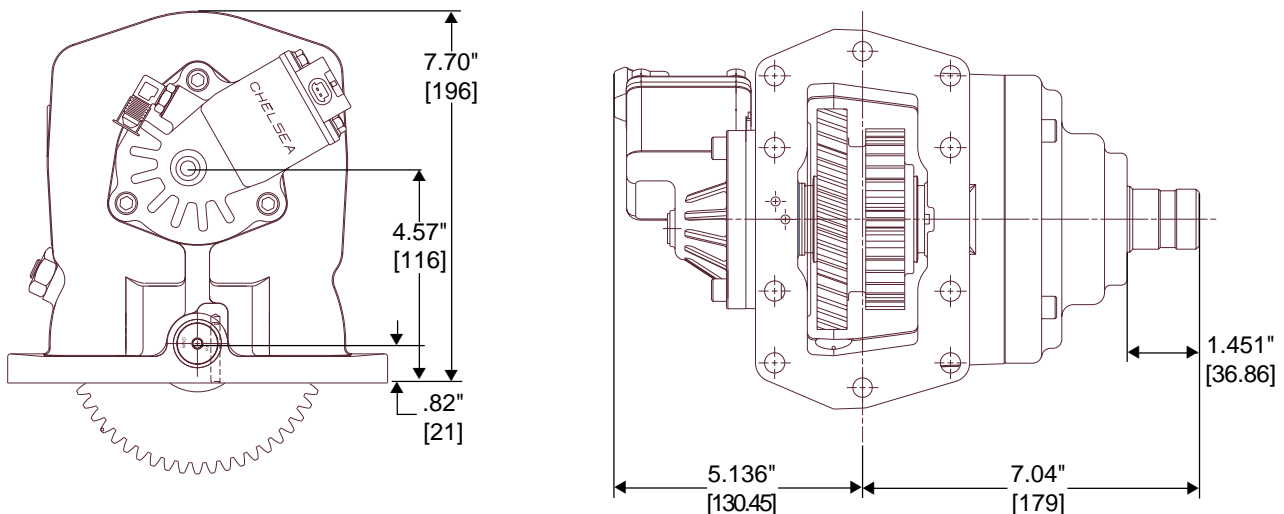
Output Shaft Chart

| Model Number | Output Shaft Item No. 24 | Output Shaft & Clutch Ass'y No. | Bearing Cap/Pump Flange Item No. 41 | Oil Seal Item No. 44 | Pump Flange |
|--------------|--------------------------|---------------------------------|-------------------------------------|----------------------|-------------|
| 278*-***XD | 3-P-831 | 329006-1X | 21-P-480 | 28-P-225 | |
| 278*-***XK | 3-P-832 | 329006-2X | 21-P-482 | 28-P-225 | |
| 278*-***XP | 3-P-832 | 329006-2X | 21-P-568 | 28-P-225 | |
| 278*-***XR | 3-P-833 | 329006-3X | 21-P-484 | 28-P-225 | |
| 278*-***XY | 3-P-852 | 329006-4X | 21-P-524 | 28-P-230 | |
| 278*-***XX | 3-P-853 | 329006-5X | 21-P-480 | 28-P-225 | |
| 278*-***XP | 3-P-832 | 329006-2X | 21-P-568 | 28-P-225 | |
| 278*-***AF | 3-P-892 | 329006-6X | 21-P-576 | 28-P-225 | |
| 278*-***RA | 3-P-833 | 329006-3X | 21-P-484 | 28-P-225 | 21-P-628 |
| 278*-***RB | 3-P-833 | 329006-3X | 21-P-484 | 28-P-225 | 21-P-572 |
| 278*-***RF | 3-P-925 | 329006-8X | 21-P-484 | 28-P-225 | 21-P-628 |

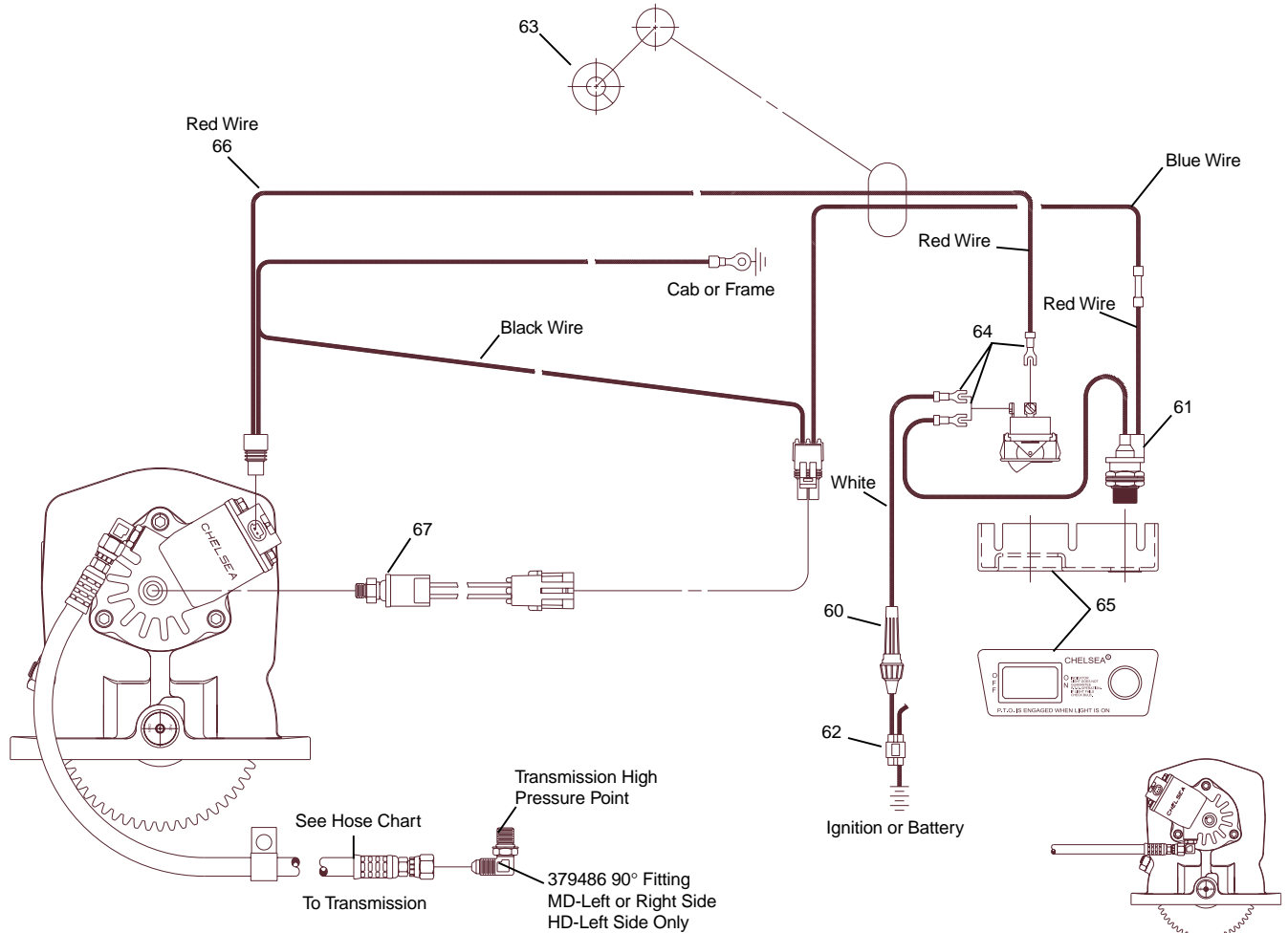
Model Number Designation



P.T.O. Housing Dimensions



Shift Installation Kit Without Electronic Overspeed Control (SK-347)

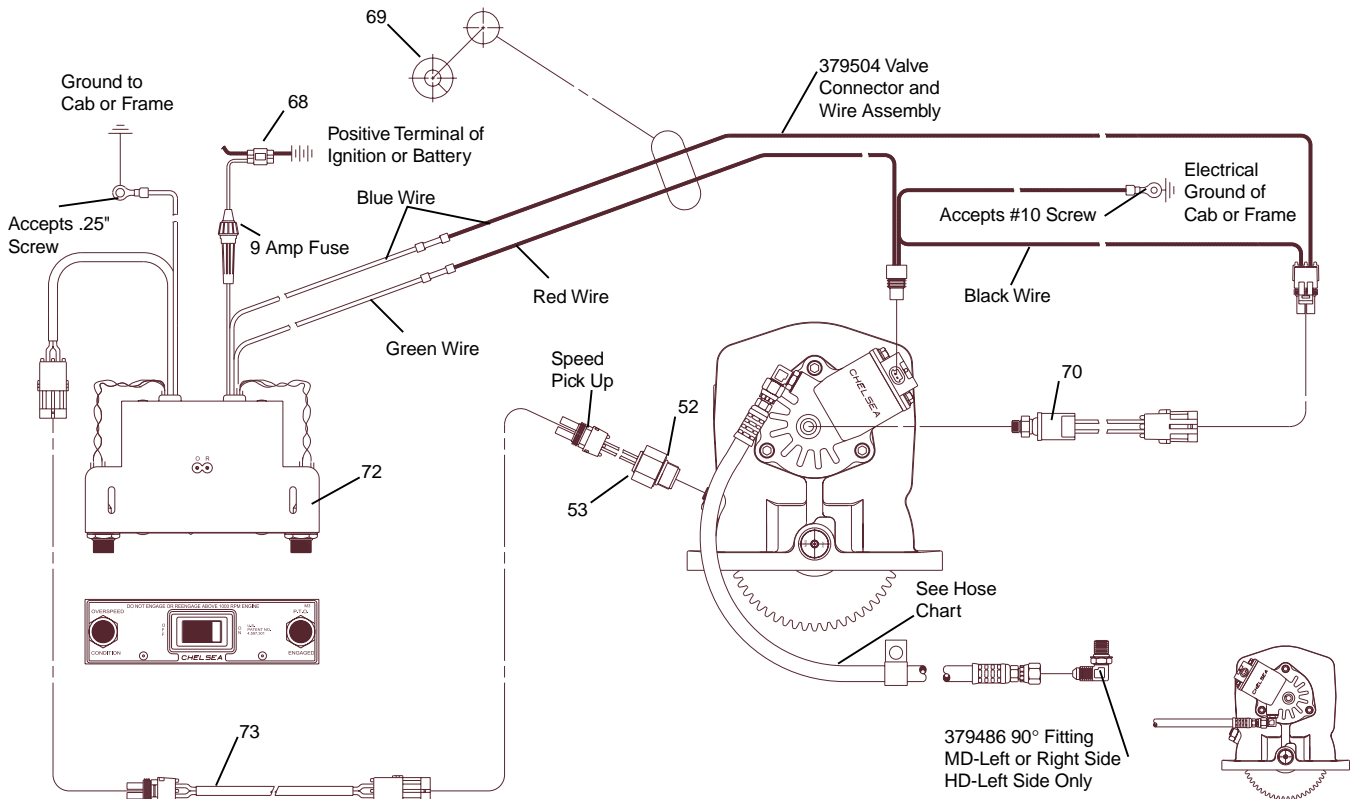


**"R" Lubrication Option
 278 Series**

| Trans. | PTO Side | Hose Part# | Comments |
|--------|-----------|------------|---|
| MD | LEFT | 329130-5X | 26.5" w/o Hose Clamp (Lube Option "P") Pressure Lube |
| MD | RIGHT | 329075-1X | 26.5" w/ Hose Clamp (Lube Option "P") Pressure Lube |
| HD | LEFT | 329130-4X | 22.0" w/o Hose Clamp (Lube Option "P") Pressure Lube |
| HD | TOP RIGHT | 329075-2X | 42.0" w/ Hose Clamp (Lube Option "P") Pressure Lube |
| MD | LEFT | 329130-5X | 26.5" w/o Hose Clamp (Lube Option "R") Valve Cap Rotated 120° |
| MD | RIGHT | 329075-1X | 26.5" w/ Hose Clamp (Lube Option "R") Valve Cap Rotated 120° |
| HD | LEFT | 329130-5X | 26.5" w/o Hose Clamp (Lube Option "R") Valve Cap Rotated 120° |
| HD | TOP RIGHT | 329075-4X | 47.0" w/ Hose Clamp (Lube Option "R") Valve Cap Rotated 120° |

| Item | Part Number | Description | Quantity |
|------|-------------------|--------------------------------------|----------|
| | 329024-12X | 12 Volt Shift Installation Kit | 1 |
| | 329024-24X | 24 Volt Shift Installation Kit | 1 |
| 59 | 378881 | Switch | 1 |
| 60 | 378884 | Fuse, 9 Amp | 1 |
| 61 | 378978 | Indicator Light, 12 Volt | 1 or |
| | 379005 | Indicator Light, 24 Volt | 1 |
| 62 | 379257 | Connector, Splice | 1 |
| 63 | 379265 | Grommet | 1 |
| 64 | 379306 | Fork Connector | 3 |
| 65 | 379336 | Bracket | 1 |
| 66 | 379504 | Valve Connector & Wire | 1 |
| 67 | 379502 | Pressure Switch | 1 |

Shift Installation Kit With Electronic Overspeed Control (SK-348)



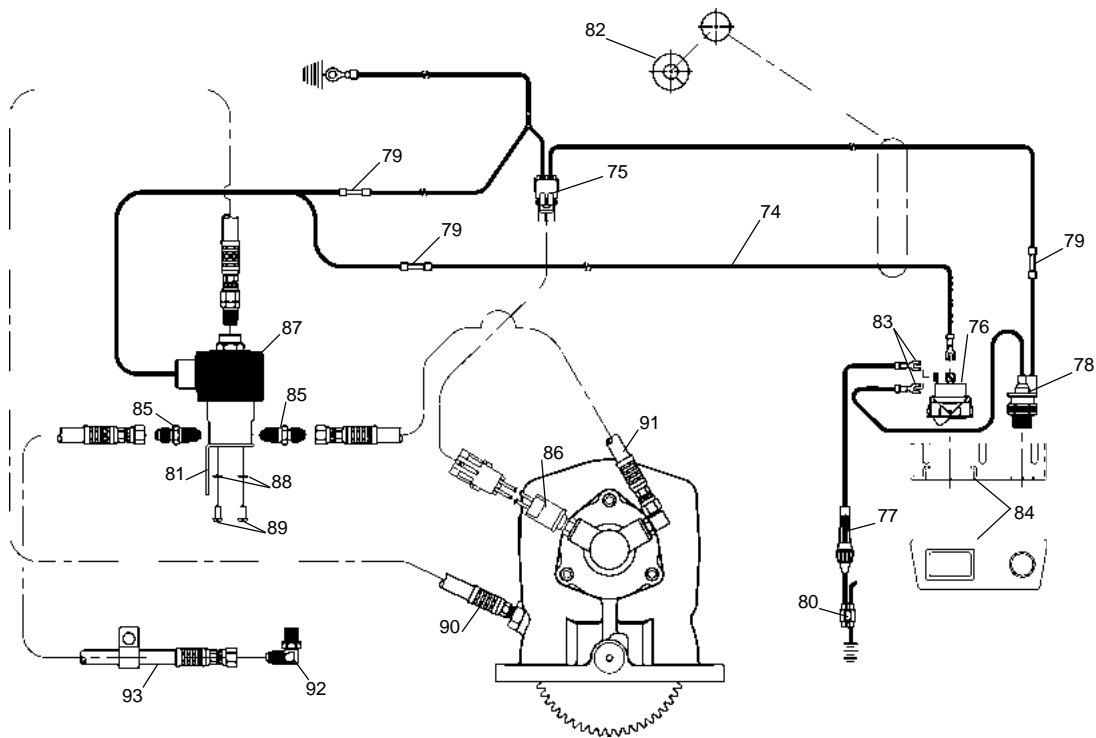
**"R" Lubrication Option
 278 Series**

| Trans. | P.T.O. Side | Hose Part# | Comments |
|--------|-------------|------------|---|
| MD | LEFT | 329130-5X | 26.5" w/o Hose Clamp (Lube Option "P") Pressure Lube |
| MD | RIGHT | 329075-1X | 26.5" w/ Hose Clamp (Lube Option "P") Pressure Lube |
| HD | LEFT | 329130-4X | 22.0" w/o Hose Clamp (Lube Option "P") Pressure Lube |
| HD | TOP RIGHT | 329075-2X | 42.0" w/ Hose Clamp (Lube Option "P") Pressure Lube |
| MD | LEFT | 329130-5X | 26.5" w/o Hose Clamp (Lube Option "R") Valve Cap Rotated 120° |
| MD | RIGHT | 329075-1X | 26.5" w/ Hose Clamp (Lube Option "R") Valve Cap Rotated 120° |
| HD | LEFT | 329130-5X | 26.5" w/o Hose Clamp (Lube Option "R") Valve Cap Rotated 120° |
| HD | TOP RIGHT | 329075-4X | 47.0" w/ Hose Clamp (Lube Option "R") Valve Cap Rotated 120° |

| Item | Part Number | Description | Quantity |
|------|-------------------|--|----------|
| | 329076X | Shift Installation Kit | 1 |
| | 379257 | Connector, Splice | 1 |
| | 379265 | Grommet | 1 |
| | 379502 | Pressure Switch | 1 |
| | 379504 | Valve Connector & Wire | 1 |
| N.S. | 379252 | Butt Connector | 1 |
| N.S. | 379061 | Wire Tie | 6 |
| | 328924-12X | Chelsea E.O.C., 12 Volt | 1 |
| | 328924-24X | Chelsea E.O.C., 24 Volt | 1 |
| | 329175-12X | E.O.C. Field Conversion Kit, 12 Volt (Includes 329076X and items 52, 53 and 72) | |
| | 329175-24X | E.O.C. Field Conversion Kit, 24 Volt (Includes 329076X and items 52, 53 and 72) | |
| | | SPEED SENSOR EXTENSION CABLE* | |
| 73 | 328923-10X | 10' Extension Cable, Supplied with E.O.C. | 1 or |
| | 328923-5X | 5' Extension Cable, Optional | |

* Run cable through grommet in firewall
 N.S. — Not Shown

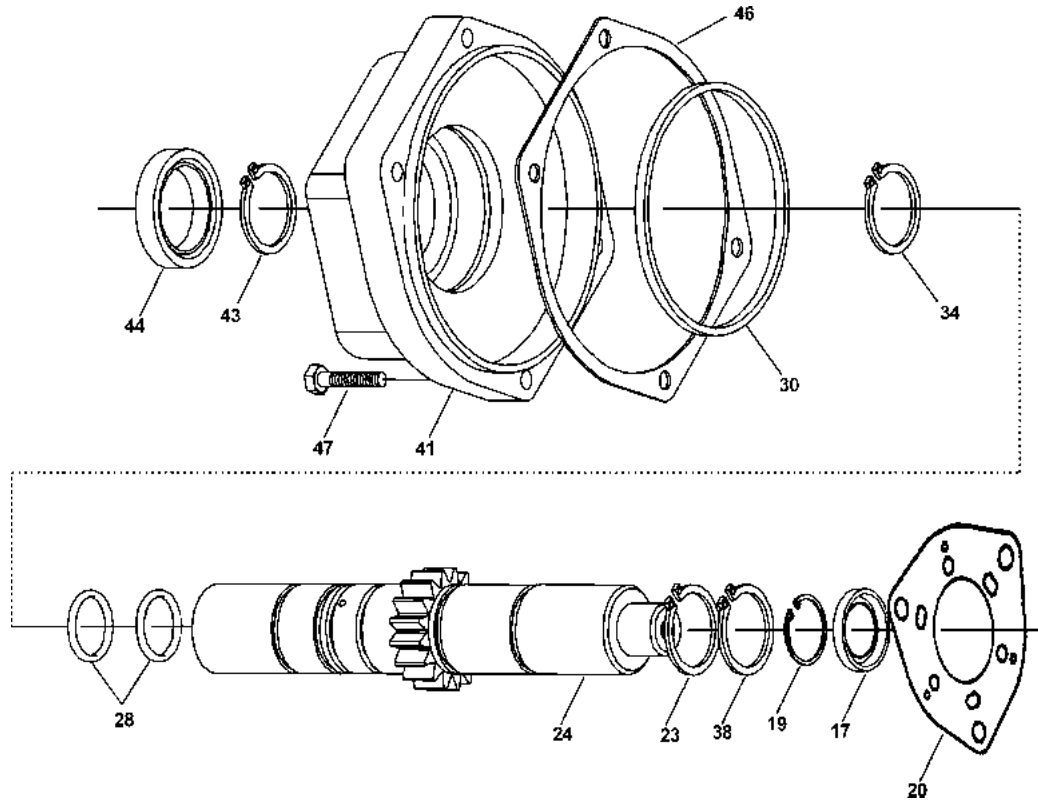
Shift Installation Kit With Remote Solenoid (SK-349)



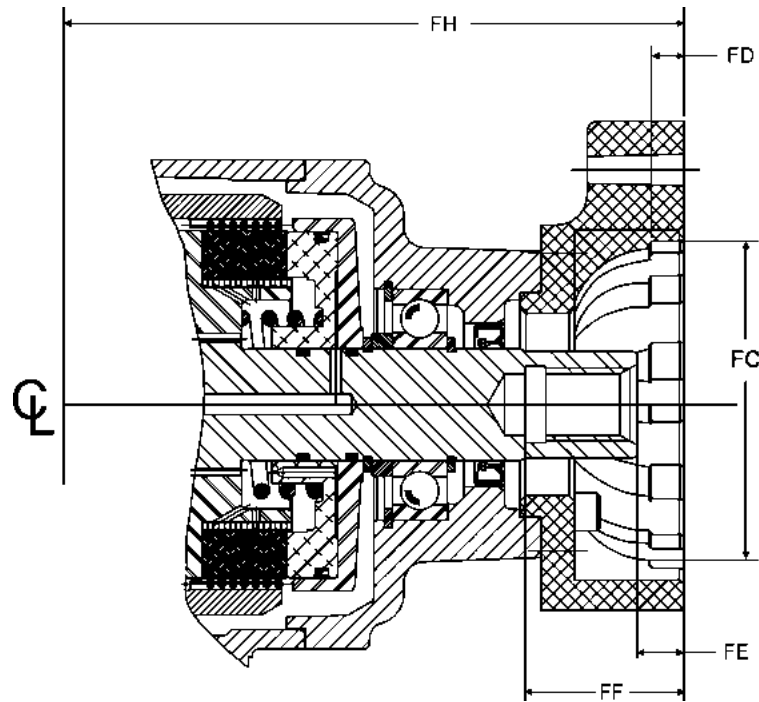
Note: This option is not available nor can it be used on E.O.C. applications

| Trans. | P.T.O. Side | Hose Part# | Comments |
|--------|-------------|------------|----------------------|
| MD | Left | 329130-5X | 26.5" w/o Hose Clamp |
| MD | Right | 329075-1X | 26.5" w/ Hose Clamp |
| HD | Left | 329130-5X | 26.5" w/o Hose Clamp |
| HD | Top Right | 329075-4X | 47.0" w/ Hose Clamp |

| Item | Part Number | Description | Quantity |
|------|-----------------------|--|----------|
| | 329237-12X | 12 Volt Shift Installation Kit | |
| | 329237-24X | 24 Volt Shift Installation Kit | |
| 74 | 329230X | Connector Wire | 1 |
| 75 | 329231X | Valve Connector & Wire | 1 |
| 76 | 378881 | Switch | 1 |
| 77 | 378884 | Fuse Holder, 9 Amp | 1 |
| 78 | 378978 | Indicator Light, 12 Volt | 1 or |
| | 379005 | Indicator Light, 24 Volt | 1 |
| 79 | 379252 | Butt Connector | 2 |
| 80 | 379257 | Splice Connector | 1 |
| 81 | 379258 | Mounting Bracket, Solenoid | 1 |
| 82 | 379265 | Grommet | 1 |
| 83 | 379306 | Fork Connector | 3 |
| 84 | 379336 | Name & Plate Bracket | 1 |
| 85 | 379449 | Male Connector | 2 |
| 86 | 379502 | Pressure Switch | 1 |
| 87 | 379686-1 | Solenoid Valve, 12 Volt | 1 or |
| | 379686-2 | Solenoid Valve, 24 Volt | 1 |
| 88 | 500357-7 | Lockwasher | 2 |
| 89 | 500457-6 | Mounting Screw (.790"-32x.438") | 2 |
| 90 | 329075X | Hose Assembly | 1 |
| 91 | 329130-1X | Hose Assembly | 1 |
| 92 | 379486 | 90° Fitting (Install in Transmission High Pressure Port) | 1 |
| 93 | See Hose Chart | Pressure Lube Hose Assembly | 1 |



| Item | Part Number | Description | Quantity |
|------|-------------------|---|----------|
| | 329160-21X | "XK" Output | |
| | 329160-22X | "XR" Output | |
| | 329160-23X | "XP" Output | |
| | 329160-25X | "AF" Output | |
| | 329160-37X | "RA" Output | |
| | 329160-38X | "RB" Output | |
| | 329160-39X | "RF" Output | |
| | 329160-45X | "RG" Output | |
| 17 | 28-P-119 | Oil Seal, High Pressure | 1 |
| 19 | 378849 | Retaining Ring | 1 |
| 20 | 22-P-112 | Gasket, Valve Cap | 1 |
| 23 | 379746 | Retaining Ring | 1 |
| 24 | 3-P-832 | Output Shaft, XK & XP Outputs | 1 or |
| | 3-P-833 | Output Shaft, XR, RA, & RB Outputs | 1 |
| | 3-P-925 | Output Shaft, RF Output | 1 |
| | 3-P-892 | Output Shaft, AF Output | 1 |
| 28 | 28-P-244 | O-Ring | 2 |
| 30 | 28-P-121 | Block -V- Ring | 1 |
| 34 | 378576 | Retaining Ring | 1 |
| 38 | 379746 | Retaining Ring | 1 |
| 41 | 21-P-482 | Bearing Cap, XK Output | 1 or |
| | 21-P-484 | Bearing Cap, XR Output | 1 |
| | 21-P-568 | Bearing Cap, XP Output | 1 |
| | 21-P-576 | Bearing Cap, AF Output | 1 |
| N.S. | 21-P-572 | Pump Flange, RB & RG Output & 21-P-484 Brg. Cap | 1 |
| N.S. | 21-P-628 | Pump Flange, RA & RF Outputs & 21-P-484 Brg. Cap | 1 |
| 43 | 378576 | Retaining Ring | 1 |
| 44 | 28-P-225 | Oil Seal | 1 |
| 46 | 22-P-101 | Gasket, Bearing Cap | 1 |
| 47 | 378447-8 | Socket Head Capscrew (.3125"-18 x 1.500") | 4 |
| N.S. | 378447-6 | Socket Head Capscrew (.3125"-18 x 1.000")(Rotatable Flange) | 4 |
| N.S. | 328748X | Pump Mounting Kit, XR Output | 1 |



| Pump Flange Suffix | Bolt Circle Diameter | Bolt Holes | | FC Female Pilot of Shaft | FD Pilot Depth Hole | FE Face to End of P.T.O. | FF Face Thru | FH Face to Center | Output Shaft | |
|--------------------|----------------------|-----------------------|--------------------|-----------------------------|------------------------|-----------------------------|-----------------|----------------------|-----------------|--------------|
| | | Tapered Hole Diameter | No. Equally Spaced | | | | | | Hole Diameter | Keyway Width |
| AF | 5.000 | .500-13 | 4 | 4.003 | 0.406 | 2.060 | 7.304 | | 1.000-15 Spline | |
| | 5.750 | .500-13 | 2 | | | | | | | |
| XK | 5.000 | .500-13 | 4 | 4.003 | 0.406 | 0.562 | 1.940 | 6.410 | .875-13 Spline | |
| | 5.750 | .500-13 | 2 | | | | | | | |
| XP | 4.188 | .375-16♦ | 2 | 3.253 | 0.344 | 0.562 | 1.940 | 6.410 | .875-13 Spline | |
| XR | 3.710 | .312-18♦ | 4 | 2.752 | 0.281 | N/A | N/A | 5.860 | .875-13 Spline | |
| XY | 3.150 | M12x1.75 | 4 | 3.152 | 0.394 | 0.55 | 2.250 | 9.030 | 1.420-8 Spline | |
| XX* | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | 1.250 SAE Taper | |
| RA ♦ | 5.750 | 4 x .500-13 | 4 | 4.003 | 0.406 | 0.574 | 2.056 | 7.605 | .875-13 Spline | |
| RF ♦ | 5.750 | 4 x .500-13 | 2● | 4.003 | 0.406 | 0.574 | 2.056 | 7.605 | 1.000-15 Spline | |
| RG ♦ | 3.552 | 4 x .500-13 | 4 | 4.003 | 0.406 | 0.574 | 2.060 | 7.610 | 1.000-15 Spline | |
| RB ♦ | 3.552 | 4 x .500-13 | 4 | 4.003 | 0.406 | 0.574 | 2.060 | 7.610 | .875-13 Spline | |

* Requires customer supplied companion flange, Spicer part number 3-1-604.

- ♦ Rotatable Flange Rotates in 30° Increments
- Flange has two sets of holes offset 14°
- ♦ Hole tapped .750" deep

CAUTION: All pump mounting dimensions shown are compiled to conform to S.A.E. standards; however it shall be the responsibility of the user to determine the correct fit at the time the pump is mounted to the P.T.O. Therefore carefully check the shaft and key or spline engagement.

NOTE: Apply a generous amount of spline lubricant part number 379688 to the inside of shaft. Must cover tooth space.

Offer of Sale

The items described in this document and other documents or descriptions provided by Parker Hannifin Corporation, its subsidiaries and its authorized distributors are hereby offered for sale at prices to be established by Parker Hannifin Corporation, its subsidiaries and its authorized distributors. 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 such items, when communicated to Parker Hannifin Corporation, its subsidiary or an authorized distributor ("Seller") verbally or in writing, shall constitute acceptance of this offer.

1. Terms and Conditions of Sale: All descriptions, quotations, proposals, offers, acknowledgments, acceptances and sales of Seller's products are subject to and shall be governed exclusively by the terms and conditions stated herein. Buyer's acceptance of any offer to sell is limited to these terms and conditions. Any terms or conditions in addition to, or inconsistent with those stated herein, proposed by Buyer in any acceptance of an offer by Seller, are hereby objected to. No such additional, different or inconsistent terms and conditions shall become part of the contract between Buyer and Seller unless expressly accepted in writing by Seller. Seller's acceptance of any offer to purchase by Buyer is expressly conditional upon Buyer's assent to all the terms and conditions stated herein, including any terms in addition to, or inconsistent with those contained in Buyer's offer. Acceptance of Seller's products shall in all events constitute such assent.

2. Payment: Payment shall be made by Buyer net 30 days from the date of delivery of the items purchased hereunder. Amounts not timely paid shall bear interest at the maximum rate permitted by law for each month or portion thereof that the Buyer is late in making payment. Any claims by Buyer for omissions or shortages in a shipment shall be waived unless Seller receives notice thereof within 30 days after Buyer's receipt of the shipment.

3. Delivery: Unless otherwise provided on the face hereof, delivery shall be made F.O.B. Seller's plant. Regardless of the method of delivery, however, risk of loss shall pass to Buyer upon Seller's delivery to a carrier. Any delivery dates shown are approximate only and Seller shall have no liability for any delays in delivery.

4. Warranty: Seller warrants that the items sold hereunder shall be free from defects in material or workmanship for a period of:

(A) All Power Take-Off units one (1) year from date of installation.

(B) Except 267, 277, 278, 242, 244, 250, 251 and 859 series two (2) years from date of installation. **THIS WARRANTY COMPRISES THE SOLE AND ENTIRE WARRANTY PERTAINING TO ITEMS PROVIDED HEREUNDER. SELLER MAKES NO OTHER WARRANTY, GUARANTEE, OR REPRESENTATION OF ANY KIND WHATSOEVER. ALL OTHER WARRANTIES, INCLUDING BUT NOT LIMITED TO, MERCHANTABILITY AND FITNESS FOR PURPOSE, WHETHER EXPRESS, IMPLIED, OR ARISING BY OPERATION OF LAW, TRADE USAGE, OR COURSE OF DEALING ARE HEREBY DISCLAIMED. NOTWITHSTANDING THE FOREGOING, THERE ARE NO WARRANTIES WHATSOEVER ON ITEMS BUILT OR ACQUIRED WHOLLY OR PARTIALLY, TO BUYER'S DESIGNS OR SPECIFICATIONS.**

5. Limitation Of Remedy: SELLER'S LIABILITY ARISING FROM OR IN ANY WAY CONNECTED WITH THE ITEMS SOLD OR THIS CONTRACT SHALL BE LIMITED EXCLUSIVELY TO REPAIR OR REPLACEMENT OF THE ITEMS SOLD OR REFUND OF THE PURCHASE PRICE PAID BY BUYER, AT SELLER'S SOLE OPTION. IN NO EVENT SHALL SELLER BE LIABLE FOR ANY INCIDENTAL, CONSEQUENTIAL OR SPECIAL DAMAGES OF ANY KIND OR NATURE WHATSOEVER, INCLUDING BUT NOT LIMITED TO LOST PROFITS ARISING FROM OR IN ANY WAY CONNECTED WITH THIS AGREEMENT OR ITEMS SOLD HEREUNDER, WHETHER ALLEGED TO ARISE FROM BREACH OF CONTRACT, EXPRESS OR IMPLIED WARRANTY, OR IN TORT, INCLUDING WITHOUT LIMITATION, NEGLIGENCE, FAILURE TO WARN OR STRICT LIABILITY.

6. Changes, Reschedules and Cancellations: Buyer may request to modify the designs or specifications for the items sold hereunder as well as the quantities and delivery dates thereof, or may request to cancel all or part of this order, however, no such requested modification or cancellation shall become part of the contract between Buyer and Seller unless accepted by Seller in a written amendment to this Agreement. Acceptance of any such requested modification or cancellation shall be at Seller's discretion, and shall be upon such terms and conditions as Seller may require.

7. Special Tooling: A tooling charge may be imposed for any special tooling, including without limitation, dies, fixtures, molds and patterns, acquired to manufacture items sold pursuant to this contract. 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 items sold hereunder, 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.

8. 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, may be considered obsolete and may be destroyed by Seller after two (2) consecutive years have elapsed without Buyer placing an order for the items which are 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. Taxes: Unless otherwise indicated on the face hereof, all prices and charges are exclusive of excise, sales, use, property, occupational or like taxes which may be imposed by any taxing authority upon the manufacture, sale or delivery of the items sold hereunder. If any such taxes must be paid by Seller or if Seller is liable for the collection of such tax, the amount thereof shall be in addition to the amounts for the items sold. Buyer agrees to pay all such taxes or to reimburse Seller therefore upon receipt of its invoice. If Buyer claims exemption from any sales, use or other tax imposed by any taxing authority, Buyer shall save Seller harmless from and against any such tax, together with any interest or penalties thereon which may be assessed if the items are held to be taxable.

10. 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 Part 10. Seller will defend and indemnify Buyer against allegations of infringement of U.S. Patents, U.S. Trademarks, copyrights, trade dress and trade secrets (hereinafter '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 an item sold pursuant to this contract 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 an item sold hereunder 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 said item, replace or modify said item so as to make it noninfringing, or offer to accept return of said item 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 items 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 item sold hereunder. The foregoing provisions of this Part 10 shall constitute Seller's sole and exclusive liability and Buyer's sole and exclusive remedy for infringement of Intellectual Property Rights.

If a claim is based on information provided by Buyer or if the design for an item delivered hereunder is specified in whole or in part by Buyer, Buyer shall defend and indemnify Seller for all costs, expenses or judgments resulting from any claim that such item infringes any patent, trademark, copyright, trade dress, trade secret or any similar right.

11. Force Majeure: Seller does not assume the risk of 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, acts of God, strikes or labor disputes, acts, laws, rules or regulations of any government or government agency, fires, floods, delays or failures in delivery of carriers or suppliers, shortages of materials and any other cause beyond Seller's control.

12. Entire Agreement/Governing Law: The terms and conditions set forth herein, together with any amendments, modifications and any different terms or conditions expressly accepted by Seller in writing, shall constitute the entire Agreement concerning the items sold, and there are no oral or other representations or agreements which pertain thereto. This Agreement shall be governed in all respects by the law of the State of Ohio. No actions arising out of the sale of the items sold hereunder or this Agreement may be brought by either party more than two (2) years after the cause of action accrues.

9/01-P



Parker Hannifin Corporation
Chelsea Products Division
8225 Hacks Cross Road
Olive Branch, Mississippi 38654 USA
Tel: (662) 895-1011
Fax: (662) 895-1019
www.parker.com/chelsea

FP 02/02 5M