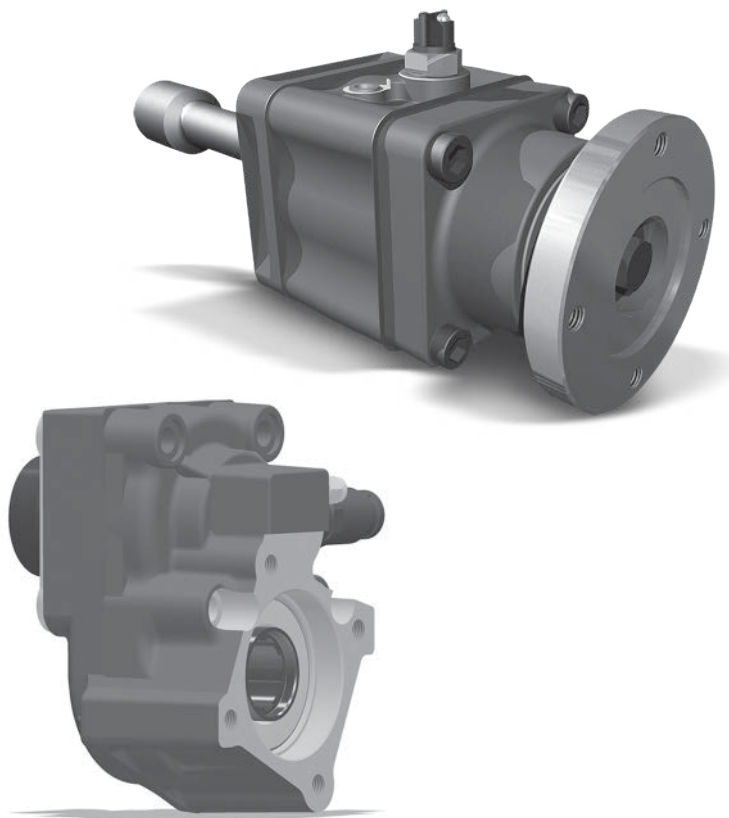


Effective: HY25-1501Z-M1/US April 2019
Supersedes: HY25-1501Z-M1/US January 2019
HY25-1500-M1/US October 2014



Power Take-Offs Owner's Manual

ZF Adapter Manual – 511, 524 Series



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.

To the extent that Parker or its subsidiaries or authorized distributors provide component or system options based upon data or specifications provided by the user, the user is responsible for determining that such data and specifications are suitable and sufficient for all applications and reasonably foreseeable uses of the components or systems.

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.



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

Patent Information

The Chelsea® Power Take-Off or its components shipped with this owner's manual may be manufactured under one or more of the following U.S. patents:

7,159,701 7,007,565 6,962,093 1,326,036 60,321,840.7 9494227 B2

Other patents pending.

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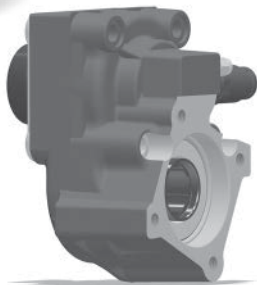
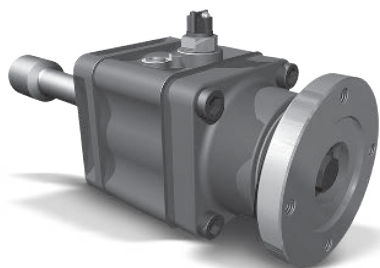
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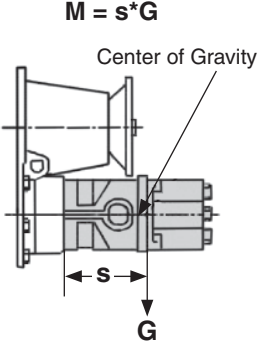
ZF



Direct Mount Pump Support Requirements

ZF-AS Tronic/ZF Meritor FreedomLine™

Limit - The FreedomLine™ transmission PTO flange will accommodate a maximum combined gravity torque of 37 lbs-ft [50 Nm], taking into account all accessories (i.e. PTO, pump, fittings, etc.) attached directly to the transmission PTO flange.

Gravity Torque Equation	Parameters
 <p>$M = s \cdot G$</p> <p>Center of Gravity</p> <p>s</p> <p>G</p>	G = Combined weight of all accessories (i.e. PTO, pump, fittings, etc.)
	M = Gravity torque
	s = Distance between the center of gravity of all accessories (i.e. PTO, pump, fittings, etc.) and the flange mounting face

PTO Driveshaft Angle – The PTO driveshaft angle must not exceed 7 degrees at the transmission.

Overview – ZF-AS Tronic/ZF-FreedomLine™ Transmissions

FreedomLine™ transmissions are designed to operate in automatic or manual mode through a two-pedal driving system (brake and accelerator). Clutch actuation and transmission shifts are pneumatically powered and electronically controlled using a TCU (ZMTEC). PTO installers must ensure that PTOs are integrated in a manner that permits proper transmission control of PTO engagement and PTO disengagement. FreedomLine™ transmissions are designed to communicate transmission – PTO activity to drivers via the transmission display in the vehicle.

CAUTION: To prevent damage to components, PTO interface with FreedomLine™ transmissions must be in accordance with PTO manufacturer guidelines. Any attempt to bypass transmission-control may result in damage to FreedomLine™ transmissions.

! All capscrews and studs are to be assembled using a medium-strength, thread locking product (such as Loctite® 243) to prevent loosening due to vibration. See directions on product. Tighten all assembly hardware to the torque values shown in this manual.

! **Mandatory action needed.**

PTO Installation – 524 Series

ZF-AS Tronic/ZF-FreedomLine™ Transmissions

1. Installation of the 524 Series on the AS Tronic & Freedomline™ transmissions is the same as the standard installation instructions found on [page 4](#) except for the following.

AS Tronic & FreedomLine™

2. The 524 must be positioned as shown in **Fig. 6**. This will allow for proper lubrication of the PTO. **The oil feed port on the transmission and the PTO oil feed port must line up for proper operation.** Also there may be a transmission end yoke swing diameter clearance issue if not mounted in this position.

IMPORTANT: Failure to remove plug will result in premature PTO failure.

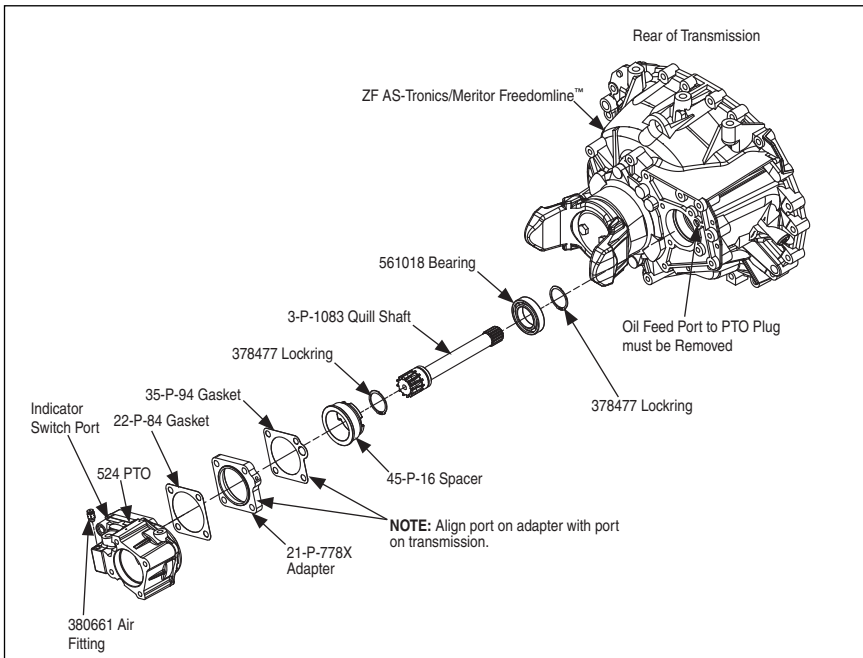


Figure 6

PTO Installation – 524 Series (Continued)

FreedomLine™

3. For installation of the 524 Series on the ZF Meritor Freedomline™ transmissions a wiring harness must be used to connect the transmission control to the PTO.
4. Connect Chelsea wiring harness 75-P-9 to the ZF Meritor PTO harness connector. (**Fig. 7**)
5. For complete FreedomLine™ wiring installation see [page 8](#).

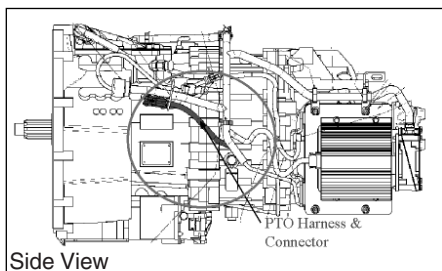
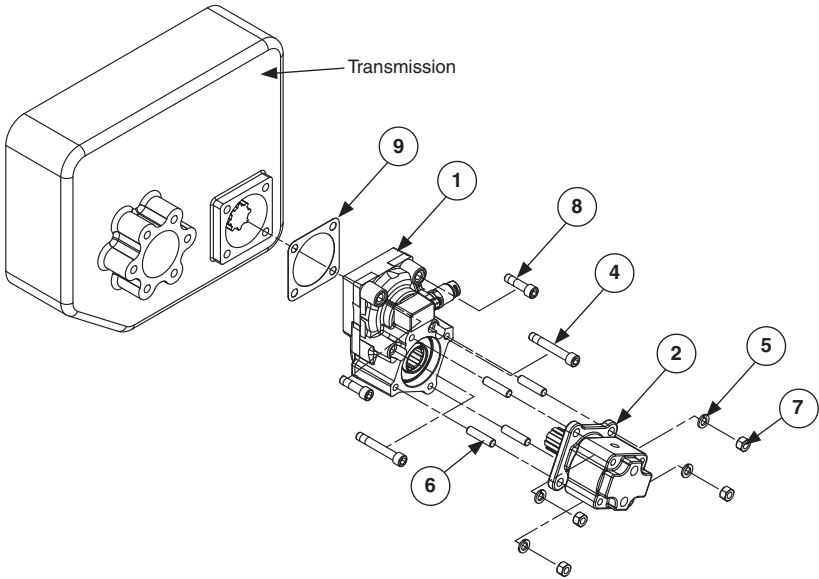


Figure 7

Input AH w/ XY Output DIN 5462 524 Series

Transmissions: See chart below.

NOTE: PTOs require supplementary cooling from the transmission cooling line. The lubrication hose must be supplied between the transmission oil cooler return line and the PTO.



Transmission	Kit Designator	PTO 524
ZF S6-65/66/70/75/80/90	AH	(45MM-SPLINE)
ZF 6S-800	AH	
ZF 6S-1000	AH	
ZF 6S-1200	AH	

Item	Part Number	Description	Torque	
1		524 PTO Assembly		
2		Pump (Not Included)		
4		Capscrew M12-1.75 (Long)	60 lbs-ft	[80 Nm]
5		Lockwasher (M-12)		
6		Stud (M12-1.75 x 50mm)	15 lbs-ft	[20 Nm]
7		Nut (M12-1.75)		
8		Capscrew M12-1.75 (Short)	60 lbs-ft	[80 Nm]
9	22-P-84	Gasket		

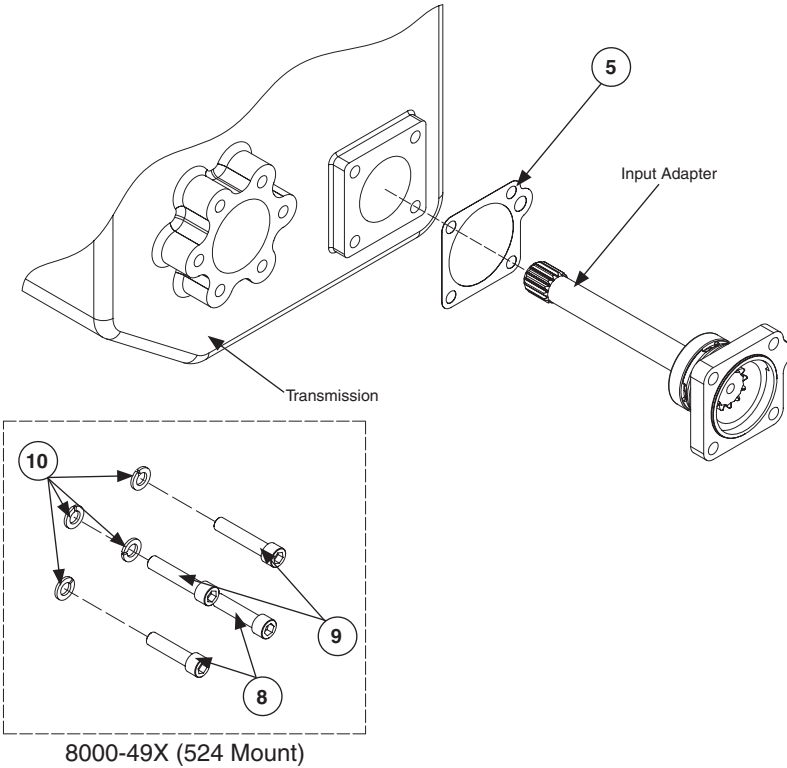
329993X – Input Adapter Kit 524 Series

Transmissions:

12AS-2301, 12AS1930TO, 12AS2130TO, 12AS2330TO, 12AS2530TO,
12AS-2301, 12AS1630TD, 12AS1930TD, 12AS2130TD, 12AS2330TD,
12AS2530TD, 16AS-2601, 16AS2630TO, 16AS-2601, 16AS2230TD

Kit Designator: AC

NOTE: PTOs require interface coupling with a 45mm - 12 Tooth Spline for this application.



Item	Part Number	Description	Torque	
5	35-P-94	Gasket		
8		Capscrew M12-1.75 x 130mm	59-66 lbs-ft	[80-90 Nm]
9		Capscrew M12-1.75 x 110mm	59-66 lbs-ft	[80-90 Nm]
10		Lockwasher M12	59-66 lbs-ft	[80-90 Nm]

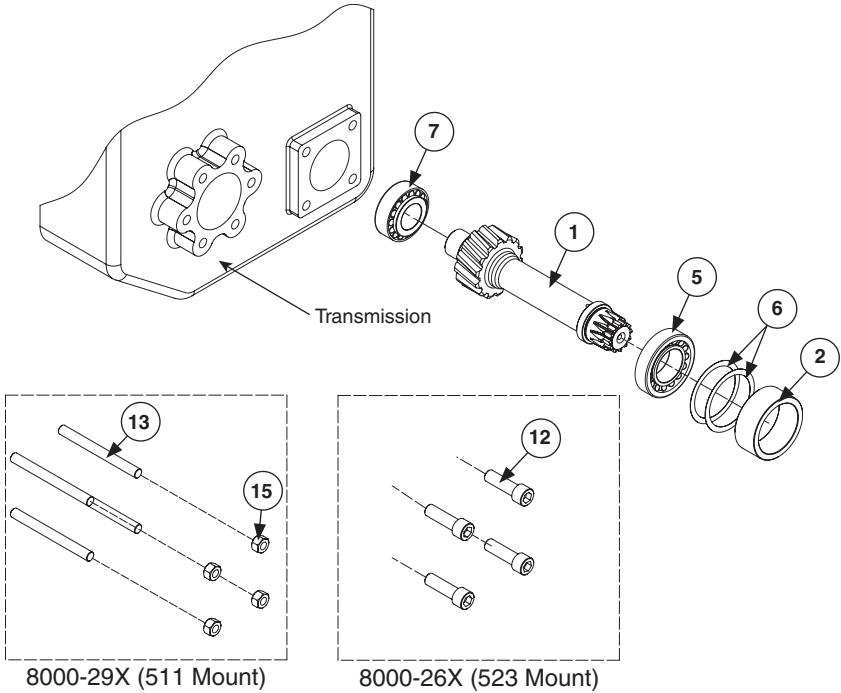
329743X – Input Adapter Kit 511/523 Series

Transmissions:

9S-1110TO (9.48-0.75), 9S-1310TO (9.48-0.75)

Kit Designator: AQ

NOTE: PTOs require interface coupling with a 40mm - 12 Tooth Spline for this application.



Item	Part Number	Description	Torque	
1	329743X	Shaft Quill ZF9S-1110		
2		Spacer		
5		Bearing - Tapered Cone		
6		Shim (.004) Shim (.012) Shim (.020)		
7		Bearing - Tapered Cone		
12	8000-26X	Socket HD Capscrew - M12-1.75 x 35mm Lg	59-66 lbs-ft	[80-90 Nm]
13	8000-29X	Stud - M12-1.75 x 115mm Lg	16-24 lbs-ft	[22-32 Nm]
15		Locknut - M12-1.75	59-66 lbs-ft	[80-90 Nm]

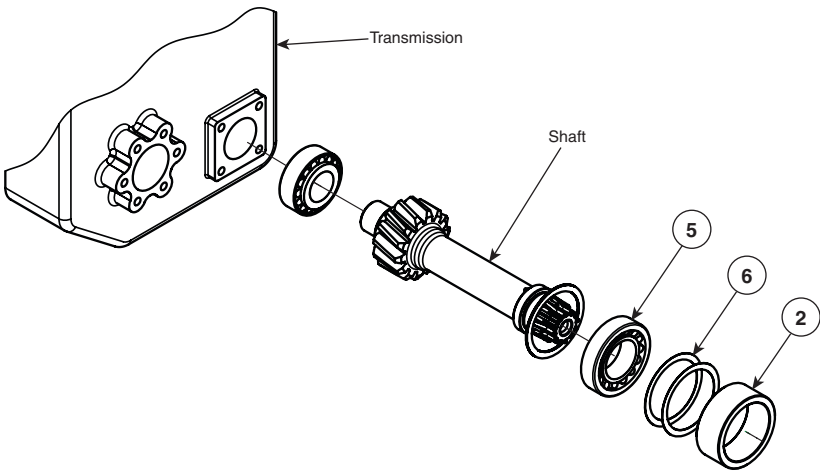
329743X – Input Adapter Kit 511/523 Series (Continued)

For Axial Play

It is very important to check the axial end play in the shaft assembly after completion of assembly. The axial end play should be .002"-.004" (0.05mm-0.10mm).

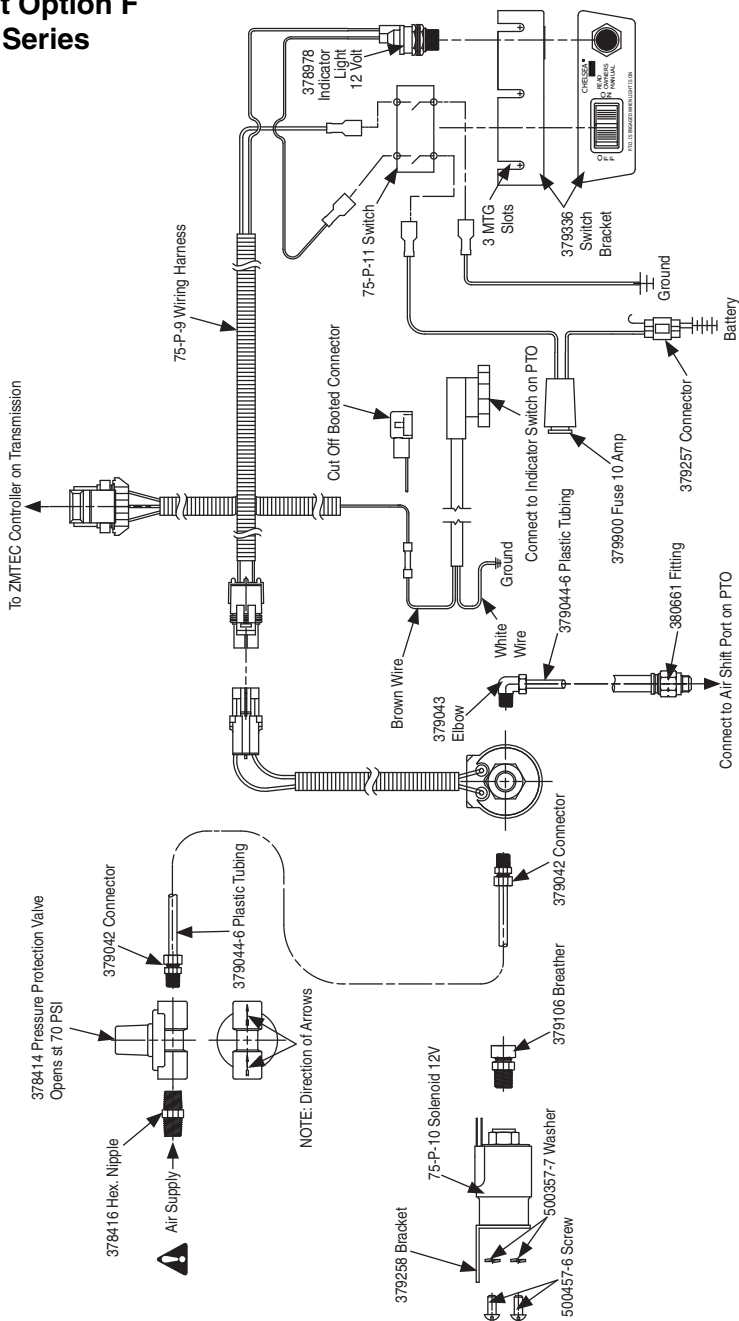
Setting the Axial End Play:

1. Assemble the complete shaft assembly in the transmission. Lightly push the external bearing cup against the inside of the bearing and check that the shaft does not have any end play but can be rotated manually.
2. Place shims (Item #6) between the bearing (Item #5) and the spacer (Item #2) combining the various thicknesses until the spacer protrudes out from the transmission mounting face by .098"-.126" (2.5mm-3.2mm). This will be the axial end play defined for the taper roller bearings.



Item	Part Number	Description	Torque
2	1-P-688	Spacer	
5	561049	Bearing - Tapered Cone	
6	380387	Shim (.004) Shim (.012) Shim (.020)	

Installation Kit: 328388-82X (12V)



WARNING: Connect directly to air supply. Do not use tubing between air supply and pressure protection valve.

Due to the normal and sometime severe torsional vibrations that Power Take-Off units experience, operators should follow a set maintenance schedule for inspections. Failure to service loose bolts or Power Take-Off leaks could result in potential auxiliary Power Take-Off or transmission damage.

Periodic PTO MAINTENANCE is required by the owner/operator to ensure proper, safe, and trouble-free operation.

Daily: Check all air, hydraulic and working mechanisms before operating PTO Perform maintenance as required.

Monthly: Inspect for possible leaks and tighten all air, hydraulic, and mounting hardware, if necessary. Torque all bolts, nuts, etc. to Chelsea specifications. Ensure that splines are properly lubricated, if applicable. Perform maintenance as required.

With regards to the direct mounted pump splines, the PTO requires the application of a specially formulated anti-fretting, high pressure, high temperature grease. The addition of the grease has been proven to reduce the effects of the torsional vibrations, which result in fretting corrosion on the PTO internal splines as well as the pump external splines. Fretting corrosion appears as a “rusting and wearing” of the pump shaft splines. Severe duty applications, which require long PTO running times and high torque may require more frequent regreasing. Applications such as Utility Trucks that run continuously and are lightly loaded also require frequent regreasing due to the sheer hours of running time. It is important to note that service intervals will vary for each and every application and are the responsibility of the end user of the product. Chelsea also recommends that you consult your pump owners manuals and technical services for their maintenance guidelines. Fretting corrosion is caused by many factors and without proper maintenance, the anti-fretting grease can only reduce its effects on components.

Chelsea offers the grease to our customers in two packages. The first is a 5/8 fluid ounce tube (379688), which is included with every applicable PTO, and the second is a 14-ounce grease cartridge (379831).

Warranty: Failure to comply entirely with the provisions set forth in the appropriate Owner's Manual will result in voiding of ALL Warranty consideration.

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".

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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.**

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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.

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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.

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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.

07/14



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

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