

Chelsea® Power Take-Offs

Quick Reference Guide – 2018

Parker Chelsea

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.

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”.

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:

4610175	5228355	4597301	5645363
6151975	6142274	6260682	7159701 B2
690450 B2	7510064	9494227 B2	

Other patents pending.

© Copyright 2018, Parker Hannifin Corporation,
All Rights Reserved

Table of Contents

6-Bolt

221 Series, 252 Series, 272 Series 1

290 Series, 340 Series, 442 Series 2

447 Series, 660 Series 3

8-Bolt

282 Series 3

348 Series, 489 Series, 680 Series 4

823 Series, 852 Series, 863 Series 5

880 Series, 885 Series 6

10-Bolt

267 Series 6

280 Series, 287 Series, 870 Series 7

877 Series, 890/892 Series, 897/899 Series ... 8

Rear Mount

511 Series, 523 Series, 541 Series 9

590 Series 10

PTO Application Worksheet 11-12

Ford

249 Series, 249V Series,
272 Series - Ford 13

Front Mount

2442 Series 14

Split Shaft

901 Series, 912 Series 14

Geared Adapters

626 Series, 628 Series, 630 Series 15

645 Series 16

PTO Application Guidelines 17-19

Troubleshooting 20

Formulas & Abbreviations 21

For more information regarding Chelsea PTOs or Applications, please contact Chelsea Customer Service/Technical Service at 888-PH4-TRUK.

221 Series

6 Bolt

Intermittent Torque Rating

Up to 250 lbs-ft [339 Nm]



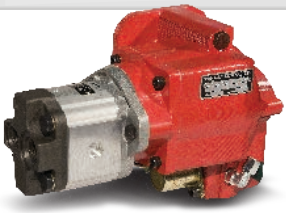
- Mechanical
- 48 HP [36 Kw] at 1000 RPM
- 30 Lbs. [13.6 kg]

252 Series

6 Bolt

Intermittent Torque Rating

Up to 120 lbs-ft [163 Nm]



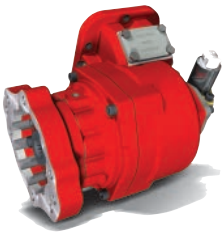
- PowerShift (Hydraulic)
- 23 HP [17 Kw] at 1000 RPM
- 25 Lbs. [11 kg]

272 Series

6 Bolt

Continuous Torque Rating

Up to 300 lbs-ft [407 Nm]



- PowerShift (Air or Hydraulic)
- 57 HP [43 Kw] at 1000 RPM
- 49 Lbs. [22 kg]

Consult Chelsea Application Catalog HY25-3000/US for specific applications.

Parker Chelsea

290 Series

6 Bolt

Intermittent Torque Rating

Up to 175 lbs-ft
[237 Nm]

- Mechanical
- 33 HP [25 Kw] at 1000 RPM
- 37 Lbs. [16.8 kg]



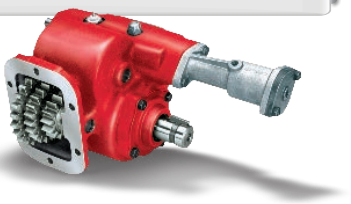
340 Series

6 Bolt

Intermittent Torque Rating

Up to 200 lbs-ft
[271 Nm]

- Mechanical (Reversible)
- 38 HP [28 Kw] at 1000 RPM
- 32 Lbs. [15 kg]



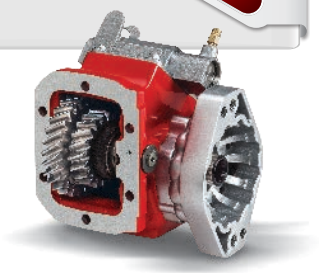
442 Series

6 Bolt

Intermittent Torque Rating

Up to 250 lbs-ft
[339 Nm]

- Mechanical
- 48 HP [36 Kw] at 1000 RPM
- 28 Lbs. [12.7 kg]



Consult Chelsea Application Catalog HY25-3000/US for specific applications.

447 Series

6 Bolt

Intermittent Torque Rating

Up to 225 lbs-ft [305 Nm]



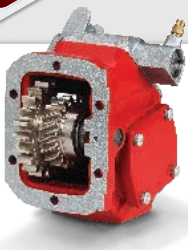
- Mechanical
- 43 HP [32 Kw] at 1000 RPM
- 21 Lbs. [9.5 kg]

660 Series

6 Bolt

Intermittent Torque Rating

Up to 375 lbs-ft [508 Nm]



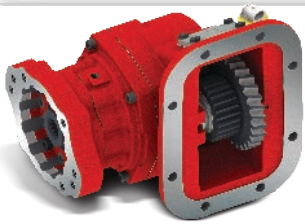
- Mechanical
- 71 HP [53 Kw] at 1000 RPM
- 28.2 Lbs. [12.8 kg]

282 Series

8 Bolt

Continuous Torque Rating

Up to 300 lbs-ft [407 Nm]



- PowerShift (Air or Hydraulic)
- 57 HP [43 Kw] at 1000 RPM
- 49 Lbs. [22 kg]

Consult Chelsea Application Catalog HY25-3000/US for specific applications.

Parker Chelsea

348 Series

8 Bolt

Intermittent Torque Rating

Up to 200 lbs-ft
[271 Nm]

- Mechanical (Reversible)
- 38 HP [28 Kw] at 1000 RPM
- 32 Lbs. [15 kg]



489 Series

8 Bolt

Intermittent Torque Rating

Up to 250 lbs-ft
[339 Nm]

- Mechanical
- 48 HP [36 Kw] at 1000 RPM
- 30 Lbs. [13.6 kg]



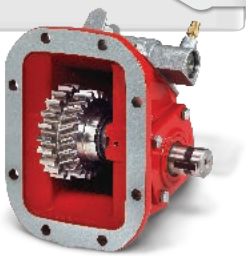
680 Series

8 Bolt

Intermittent Torque Rating

Up to 375 lbs-ft
[508 Nm]

- Mechanical
- 71 HP [53 Kw] at 1000 RPM
- 28.2 Lbs. [12.8 kg]



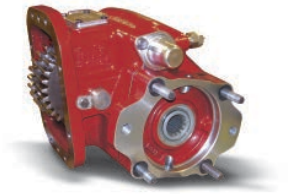
Consult Chelsea Application Catalog HY25-3000/US for specific applications.

823 Series

8 Bolt

Intermittent Torque Rating

Up to 750 lbs-ft [919 Nm]



- Mechanical
- 143 HP [107 Kw] at 1000 RPM
- 76 Lbs. [34.5 kg]

852 Series

8 Bolt

Intermittent Torque Rating

Up to 500 lbs-ft [678 Nm]



- PowerShift (Hydraulic)
- 95 HP [71 Kw] at 1000 RPM
- 88 Lbs. [40 kg]

863 Series

8 Bolt

Intermittent Torque Rating

Up to 500 lbs-ft [678 Nm]



- Reversible
- 95 HP [71 Kw] at 1000 RPM
- 96 Lbs. [44 kg]

Consult Chelsea Application Catalog HY25-3000/US for specific applications.

Parker Chelsea

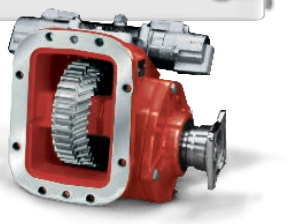
880 Series

8 Bolt

Intermittent Torque Rating

Up to 500 lbs-ft
[678 Nm]

- Mechanical
- 95 HP [71 Kw] at 1000 RPM
- 63 Lbs. [28.6 kg]



885 Series

8 Bolt

Intermittent Torque Rating

Up to 500 lbs-ft
[678 Nm]

- PowerShift (Air)
- 95 HP [71 Kw] at 1000 RPM
- 88 Lbs. [40 kg]



267 Series

10 Bolt

Intermittent Torque Rating

Up to 335 lbs-ft
[454 Nm]

- Constant Mesh
- 64 HP [48 Kw] at 1000 RPM
- 35 Lbs. [16 kg]



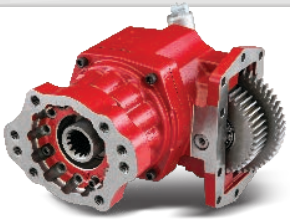
Consult Chelsea Application Catalog HY25-3000/US for specific applications.

280 Series

10 Bolt

Continuous Torque Rating

Up to 390 lbs-ft [529 Nm]



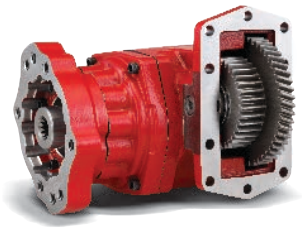
- PowerShift (Hydraulic)
- 74 HP [56 Kw] at 1000 RPM
- 49 Lbs. [22 kg]

287 Series

10 Bolt

Continuous Torque Rating

Up to 390 lbs-ft [529 Nm]



- Constant Mesh
- 74 HP [56 Kw] at 1000 RPM
- 44 Lbs. [20 kg]

870 Series

10 Bolt

Continuous Torque Rating

Up to 670 lbs-ft [908 Nm]



- Powershift (Hydraulic)
- 128 HP [95 Kw] at 1000 RPM
- 56 Lbs. [25 kg]

Consult Chelsea Application Catalog HY25-3000/US for specific applications.

Parker Chelsea

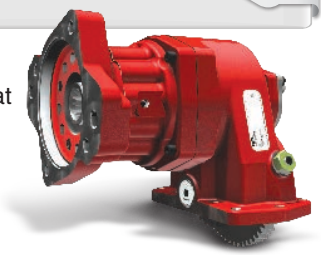
877 Series

10 Bolt

Continuous Torque Rating

Up to 670 lbs-ft
[908 Nm]

- Constant Mesh
- 128 HP [95 Kw] at 1000 RPM
- 48 Lbs. [22 kg]



890/892 Series

10 Bolt

Continuous Torque Rating

Up to 670 lbs-ft
[908 Nm]

- PowerShift (Hydraulic)
- 128 HP [95 Kw] at 1000 RPM
- 97 Lbs. [44 kg]



897/899 Series

10 Bolt

Continuous Torque Rating

Up to 670 lbs-ft
[908 Nm]

- Constant Mesh
- 128 HP [95 Kw] at 1000 RPM
- 86 Lbs. [39 kg]



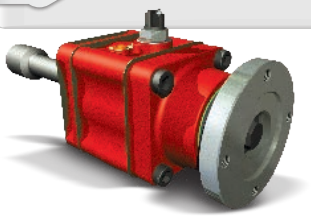
Consult Chelsea Application Catalog HY25-3000/US for specific applications.

511 Series

Rear Mount

Continuous Torque Rating

Up to 590 lbs-ft [800 Nm]



- Mechanical
- 112 HP [84 Kw] at 1000 RPM
- 4.2 Lbs. [1.9 kg]

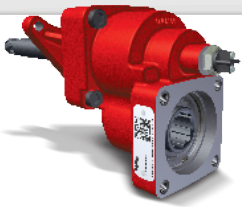
NOTE: Available for Eaton, Mack, Volvo, ZF, Iveco. Check catalog for other offerings.

523 Series

Rear Mount

Continuous Torque Rating

Up to 258 lbs-ft [350 Nm]



- Mechanical
- 49 HP [37 Kw] at 1000 RPM
- 12 Lbs. [5.4 kg]

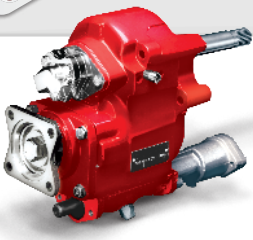
NOTE: Available for Eaton, Mack, Volvo, ZF, Iveco. Check catalog for other offerings.

541 Series

Rear Mount

Intermittent Torque Rating

Up to 400 lbs-ft [542 Nm]



- Mechanical
- 76 HP [57 Kw] at 1000 RPM
- 37 Lbs. [17 kg]

Consult Chelsea Application Catalog HY25-3000/US for specific applications.

Parker Chelsea

590 Series

Rear Mount

Continuous Torque Rating

Up to 650 lbs-ft
[881 Nm]

- PowerShift (Hydraulic)
- 124 HP [93 Kw] at 1000 RPM
- 50 Lbs. [22.8 kg]



Consult Chelsea Application Catalog HY25-3000/US for specific applications.

PTO Application Work Sheet

INFORMATION FROM CUSTOMER:

A. Make and model of transmission.

_____

B. Type of driven equipment.

_____

C. Input horsepower required for driven equipment.

_____

D. Operating speed of driven equipment.

_____

E. Desired engine speed during operation.

_____

-or-

PTO Ratio (if known)

_____

F. From items C and D, determine the torque requirement of the driven equipment using this formula: $\frac{HP \times 5252}{RPM}$ = lbs-ft.
For continuous operation divide by .7 (Torque ÷ .70) to get torque requirement for driven equipment.

_____

G. Direction of driven equipment shaft rotation when equipment is mounted on vehicle.

_____

H Reverse gear requirements.

Yes____ No____

I. Type and size of PTO output required. (i.e. driveshaft, direct mount pump).

_____

USE HY25-3000/US CHELSEA APPLICATION CATALOG:

Steps to specifying proper PTO:

1. Application page number.

   _____

2. Select the proper PTO type (i.e. Mechanical, PowerShift, etc.).

   _____

3. Using the Application page number from step 1, find PTOs that meet or exceed the torque requirements of the application.

   _____

4. From that list, pick the unit that comes closest to satisfying the rotation and speed percentage for the application.

   _____

5. Note the PTO model number and all other kits required on the line to the right.

   _____

   _____

6. Determine what options are needed and change model number designators to obtain correct options (Shifter, Output, etc.).

   _____

   _____

CAUTION: It is very important to read all notes at the bottom of the Application Page. The notes contain warnings and/or special parts that need to be considered for that PTO application.

NOTE: Intermittent – Operating less than 5 minutes in a given 15 minute period of time.

Continuous – Operating longer than 5 minutes in a given 15 minute period of time.

Consult Chelsea Application Catalog HY25-3000/US for specific applications.

249 Series

Ford

Intermittent Torque Rating

Up to 200 lbs-ft [271 Nm]



- PowerShift (Hydraulic)
- Up to 60 HP [45 Kw] at 1200 RPM
- 28 Lbs. [12.7 kg]

NOTE: Ford 6R140 Transmission
Patent #9,494,227 B2

249V Series

THE WORK TRUCK SHOW INNOVATION AWARD 2015

Intermittent Torque Rating

Up to 200 lbs-ft [271 Nm]



- PowerShift (Hydraulic)
- Up to 60 HP [45 Kw] at 1200 RPM
- 54 Lbs. [24.5 kg]

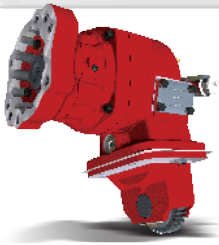
NOTE: Ford 6R140 Transmission
Patent #9,494,227 B2

272-Ford Series

NEW PRODUCT

Intermittent Torque Rating

Up to 300 lbs-ft [407 Nm]



- PowerShift (Hydraulic)
- *40 HP [30 Kw] at 1000 RPM
- 55 Lbs. [25 kg]
- 272F - Ford TorqueShift6® Transmission

Consult Chelsea Application Catalog HY25-3000/US for specific applications.

*See Ford Body Builders for transmission operation specifications.

Parker Chelsea

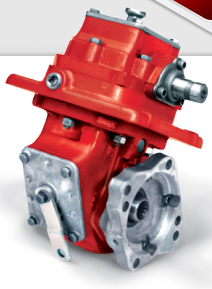
2442 Series

Front Mount

Intermittent Torque Rating

Up to 250 lbs-ft
[339 Nm]

- Mechanical
- 48 HP [36 Kw] at 1000 RPM
- 69 Lbs. [31 kg]



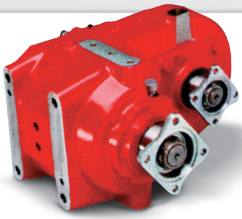
901 Series

Split Shaft

Intermittent Torque Rating

Up to 500 lbs-ft
[678 Nm]

- Mechanical
- Four output options
- 185 Lbs. [84 kg]



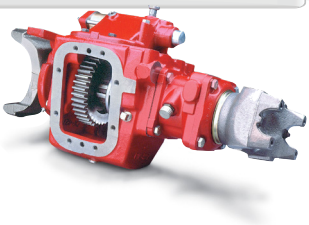
912 Series

Split Shaft

Intermittent Torque Rating

Up to 16,000 lbs-ft Thru-torque
[21,693 Nm]

- Mechanical
- Three 8-Bolt PTO openings
- 130 Lbs. [59 kg]



Consult Chelsea Application Catalog HY25-3000/US for specific applications.

626 Series

Geared Adapter

Intermittent Torque Rating

Torque rating same as PTO in application.



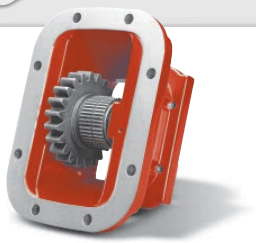
- 6-Bolt-to-6-Bolt SAE
- Moves PTO directly away from trans.
- 1:1 Ratio with the PTO

628 Series

Geared Adapter

Intermittent Torque Rating

Torque rating same as PTO in application.



- 6-Bolt-to-8-Bolt SAE
- Moves PTO directly away from trans.
- 1:1 Ratio with the PTO

630 Series

Geared Adapter

Intermittent Torque Rating

Torque rating same as PTO in application.



- 6-Bolt-to-6-Bolt SAE
- Moves PTO away from trans. at a 30 degree angle.
- 1:1 Ratio with the PTO

Consult Chelsea Application Catalog HY25-3000/US for specific applications.

Parker Chelsea

645 Series

Geared Adapter

Intermittent Torque Rating

Torque rating same as PTO in application.

- 6-Bolt-to-6-Bolt SAE
- Moves PTO away from trans. at a 45 degree angle.
- 1:1 Ratio with the PTO



Consult Chelsea Application Catalog HY25-3000/US for specific applications.

Chelsea PTO Application Guidelines

Application	PTO %	PTO Type (see legend)	Torque Rating (lb-ft)	Comment
Blower (bulk transfer trailer)	150+	b, g, h, k, l, m, n, o	275+	Use HD 6 or 8-bolt only. See Chelsea Blower Guide. Possible Smart Start Application. Continuous Duty
Bucket Truck	100	b, c, d, e, f, g, h, o, p	175	Direct Mount pumps; many are Press Comp systems
Bulk feed body or Trailer	100-125	b, g, h, k, l, m, n, o	250+	Continuous Duty
Car hauler	100-125	b, c, d, e, g, h, k, l, m, n, o	140+	This a multi-car trailer, not a rollback/wrecker.
Chemical sprayers	100-125	b, c, d, e, g, h, k, l, m, n, o	140+	Standard units are ok, hot shifts are preferred.
Compressor (Mech)	100+	b, c, d, e, g, h, k, l, m, n, o	175+	Use PTO with standard output shaft or companion flange. High-Torque Start-Up. Possible Smart Start Application
Compressor (Hydraulic)	100+	b, c, d, e, g, h, k, l, m, n, o	140+	Hyd. motor will probably come with compressor
Crane	100+	b, c, d, e, g, h, k, l, m, n, o	140+	Many types available, use caution.
Dump Trailer/ Walking Floor combo	100-125	b, g, k, l, m, n, o	200+	Do not use plastic reservoir or dump pump. Too much heat for plastic tanks. Systems require more pressure than standard dump pumps.
Dump Body (small)	75-110	g, h, k, l, m, n, o	125	
Dump Truck or Trailer	95-120	b, g, h, k, l, m, n, o	175+	May require 3-Line system to include filter and recirculation line if using for asphalt.
Fire Truck (pump)	125+	g, h, k, l, m, n, o	200+	Continuous Duty. Possible Smart Start Application.
Fifth Wheel (hydraulic)	90-110	b, c, d, e, f, g, h, o	165+	Is the application a yard spotter?

Chelsea PTO Application Guidelines

Application	PTO %	PTO Type (see legend)	Torque Rating (lb-ft)	Comment
Fuel/Oil Delivery tanker	75-95	a, b, c, d, e, g, h	140+	Possible 452 series application; Propane delivery may require a shaft brake.
Generator	100+	a, b, c, d, e, g, h	140+	Could be mechanical or hydraulic drive; Could be high torque if used on shredder trucks. Possible Smart Start Application.
Low Boy Trailer	100-125	b, g, k, l, m, n, o	140+	There are many types, be careful; get all details; some units use a winch.
Product Pump (mech)	65-85	b, g, k, l, m, n, o	140+	Do not exceed 90%
Product Pump (Hyd)	100-125	b, g, k, l, m, n, o	175+	Continuous Duty
Refuse	100-110	g, h, m, p	250+	Front loaders, rear loaders and automated systems.
Roll-Offs	100-125	b, g, k, l, m, n, o	175+	Refuse container truck
Vacuum Truck	100+	b, h, k, l, m, n, o	175+	Continuous Duty; Sewer/septic trucks
Walking Floor	100-125	b, h, k, l, m, n, o	200+	Do not use poly reservoir or dump pump.
Wrecker (small)	100-125	b, c, d, e, g, h	120-200	One ton chassis F550 or equiv; wheel lift or rollback.
Wrecker (medium)	100-125	b, g, h, k, l, m, n, o	175+	All hydraulic including winch.
Wrecker (large)	100-125	b, g, h, k, l, m, n, o	200+	Class 8 chassis

NOTE: Torque rating (above) refers to the minimum “intermittent” PTO torque shown in the catalog.

The information on this sheet is ONLY suggestive and is not intended to be an absolute and comprehensive source for determining the necessary PTO. There is more information required to make an informed decision as to the proper PTO for each application. It is the responsibility of the system designer and/or truck upfitter to determine the proper PTO.

See next page for Legend.

Legend/PTO Type

a = 221, 442 Series – Light Duty

b = 221, 290, 442, 447, 489 Series – Two gear standard PTO; Medium Duty

c = 249, 249V Series – Special hot shift PTOs for Ford Super Duty automatic; Light Duty

d = 272 Series – Medium Duty hot shift for automatic transmissions

e = 252 Series – Special hot shift for Allison 1000-2000; Light Duty

f = 267 Series – Non-shiftable; Special for Allison World Transmission; Medium Duty

g = 272, 282 Series – PowerShift; Medium to Heavy Duty 272 6-Bolt; 282 8-Bolt

h = 280 Series – Allison World Transmission; PowerShift; Heavy Duty

i = 340, 348, 863 Series – 1 forward 1 reverse

k = 511, 523, 541 Series – Countershaft type; Medium to Heavy Duty

l = 880 Series – Heavy Duty

m = 852, 870, 885, 890 Series – Extra Heavy Duty hot shifts; 890 is an extended shaft PTO.

n = 880, 823 Series – 8-Bolt standard PTO; Extra Heavy Duty

o = 660, 680 Series – Heavy Duty 6-Bolt; 680 8-Bolt opening.

p = 877, 897 Series – Non-shiftable; Special for Allison 3000 and 4000 Series; Extra Heavy Duty

Troubleshooting

Noisy PTO

1. **Improper number of gaskets** – Correct as outlined under PTO "Installation."
2. **Gears worn and pitted** – Replace worn gears. Check application to ensure PTO is properly spec'd for torque requirement.
3. **Bearing worn, due to high loads or chips** – Reduce load – Replace worn and rough bearings and races. Change oil.

Jumping Out of Gear

1. **Shift rail poppet spring broken** – Replace poppet spring.
2. **Shift rail poppet notch worn** – Replace shift rail.
3. **Shift fork spring or loose on shift rail** – Replace spring fork or tighten set screw in shift fork.
4. **Gear teeth worn** – Replace worn gears.
5. **Gears not shifted fully in mesh** – Check shift linkage for proper adjustments.
6. **Shift linkage too short** – Adjust linkage to permit full shift.

PowerShift PTO Won't Engage

1. **Incorrect high pressure line plumbing** – Correct plumbing as shown on installation instructions included with PTO.
2. **Incorrect electrical wiring** – Correct wiring as shown on wiring diagram in installation instructions included with PTO.
3. **Restriction in pressure line** – Check hose and fittings for obstructions.

Oil Leakage

1. **Oil seal failure** – Replace worn seal.
2. **Broken gasket** – Replace gaskets.
3. **Crack or hole in housing** – Replace housing.

General

Before disassembling Power Take-Offs, carefully note the arrangement of the gears, output shaft, shift rod and fork.

Useful Formulas
Pump Output Horsepower: HP = GPM x PSI ÷ 1714
Pump Input Horsepower: HP = GPM x PSI ÷ (1714 x E)
Pump Input Torque (Lbs-ft): T = CID x PSI ÷ 75.36
Gallons Per Minute: GPM = CID x RPM ÷ 231
Cubic Inch Displacement: CID = GPM x 231 ÷ RPM
Horsepower: HP = T x RPM ÷ 5252
Flow in GPM using PTO: GPM = (Engine RPM x PTO %) x (CIR ÷ 231) x E
CCM Conversion: CCM = CID x 16.39
CID Conversion: CID = CCM x .06102

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

NOTES

NOTES

NOTES

Parker Hannifin Corporation
Chelsea Products Division
8225 Hacks Cross Road
Olive Branch, Mississippi 38654 USA
www.parker.com/chelsea
www.phtruck.com/chelsea

Supersedes HY25-0175-B1/US
March 2018

HY25-0175-B1/US
HW 1.5C October 2018

Parker Chelsea