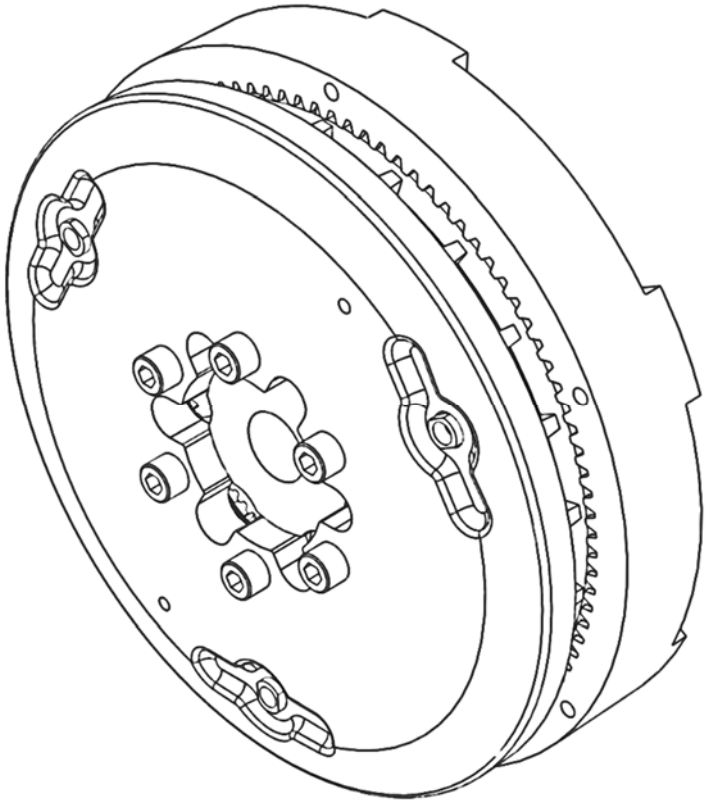
POWER GRIP

Installation & Maintenance Manual

6” THRU 60”



WPT Power Corporation
1600 Fisher Road - Wichita Falls, TX 76305
P.O. Box 8148 - Wichita Falls, TX 76307 Ph. 940-761-1971
www.WPTpower.com

Contents

Cautions and Warnings

Cautions and Warnings

Throughout this manual there are a number of **HAZARD WARNINGS** that must be read and adhered to in order to prevent possible loss of equipment and/or personal injury and /or loss of life. The three warning words are "**Danger**", "**Warning**" and "**Caution**". They are used to indicate the severity of the hazard and may be preceded by a safety alert symbol. 

 **"Danger" -** Denotes the most serious injury hazard and is used when serious injury or death **WILL** result from misuse or failure to follow the specific instructions set forth in this manual.

 **"Warning" -** Denotes when serious injury or death **MAY** result from misuse or failure to follow the specific instructions set forth in this manual.

 **"Caution" -** Denotes when injury or equipment damage may result from the misuse or failure to follow the specific instructions set forth in this manual.

1.0 Introduction

Danger

Forward this manual to the person or persons responsible for the installation and/or operation and/or maintenance of the product described herein. Without access to this information, faulty installation, operation and/or maintenance may occur, which could result in equipment damage, personal injury and even death.

Danger

Read these instructions thoroughly and review until you fully understand all warnings and hazards before proceeding with the work described in this manual. Failure to follow the instructions in this manual can result in unreasonable exposure to hazardous conditions and/or personal injury and/or death.

Danger

Use of improper tools and/or methods when installing or servicing this Unit can result in accidents causing injury and/or death. Adequate lifting points are provided to safely handle only the individual unit components. Lifting and handling of the assembled will require the use of alternate methods.

1.1 Product Description

The WPT Power Grip Clutch is designed to accommodate in-line mounting for heavy duty power transmission. Sometimes used in conjunction with either a quick change or standard driving adapter.

The design of the WPT Power Grip Clutch permits mid-shaft and end-shaft mounting.

WPT units are available in various sizes and quantities of friction discs. Consider for example, a “324 POWER GRIP” indicates that there are three 24” diameter Center Plates.

The Unit must have the Hub attached to the shaft of the equipment that is being managed.

The Unit works when the Actuator is pressurized and applies an axial force to the assembly. The Floating Plate moves towards the Backplate, which engages the friction disc. Release Springs disengage the Unit when pressure is released from the Actuator.

The Unit’s output torque can be controlled by varying the actuation pressure.

The path of the torque passes through the Unit from the equipment’s shaft, through the Hub, through the Center Plates, to the friction material into drive ring. Depending on the application, this process may be reversed.

When ordering replacement parts, use the part numbers from the Bill of Material and drawing supplied with the Unit. The most current documents may be obtained by contacting WPT or an authorized distributor. When ordering parts, provide the assembly number and serial number for the unit found on the brass tag affixed to the front of the Unit. See Example in **Figure 1**.

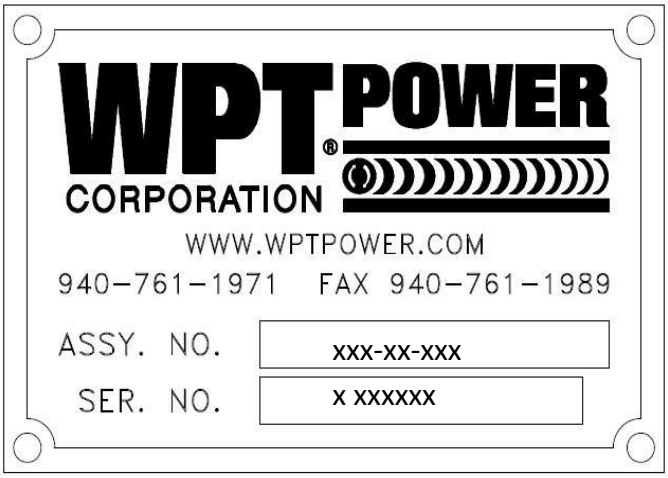
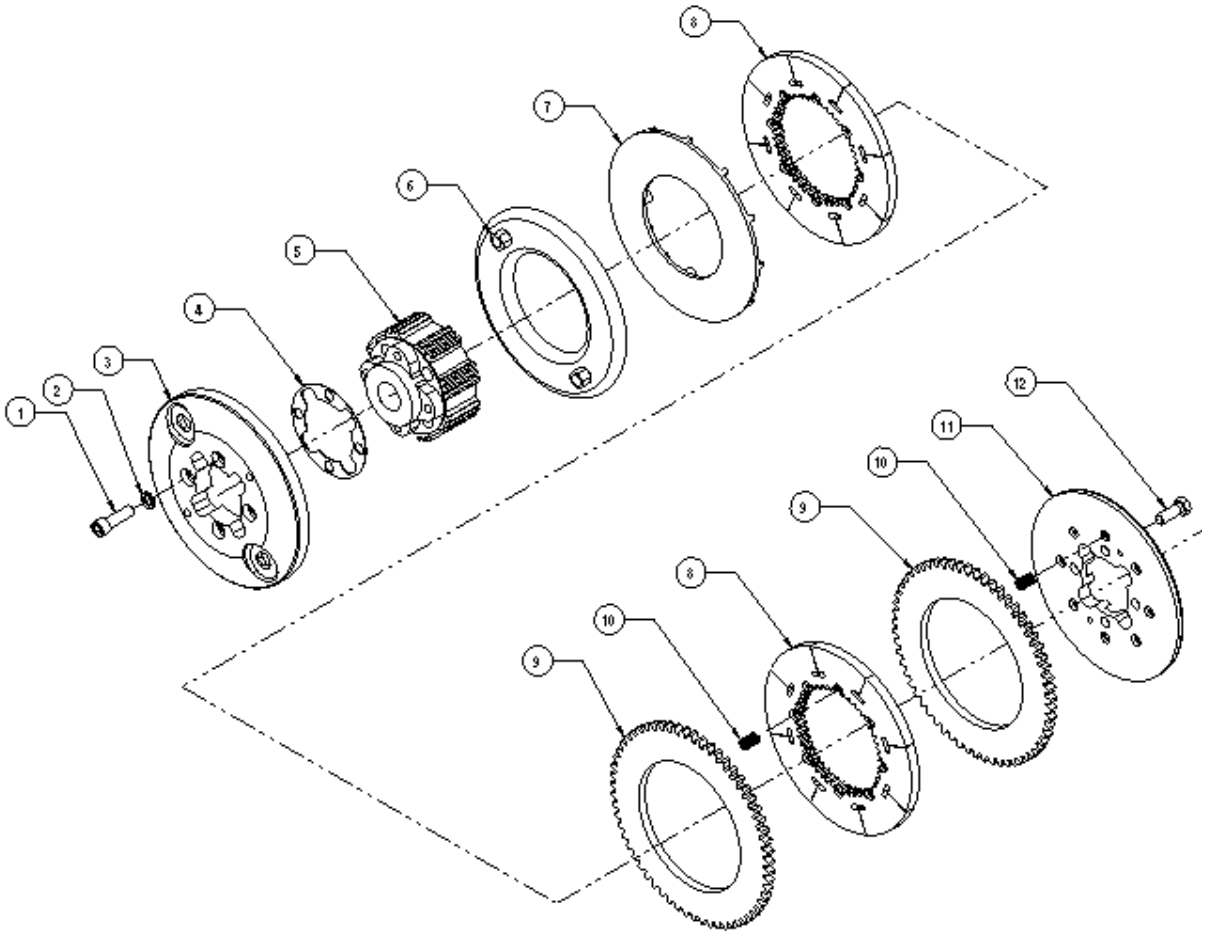


Figure 1

Recommended spare parts should be held by the customer. This will greatly reduce the possibility of ‘costly downtime’. The Airtube may deteriorate quickly if improperly stored. Airtubes are normally stocked at the factory or local distributor and can be shipped quickly from stock.

2.0

Power Grip with Coil Springs



Note: Two plate unit shown

Table 1 – *Power Grip Assembly*

Item	Description	Item	Description
1	SHCS	7	Pressure Plate
2	Washer	8	Center Plate, Slotted
3	ATHP	9	Friction Disc
4	Shim	10	Spring, Coil
5	Hub	11	Backplate
6	Airtube	12	HHCS

2.0

Airtube Style Actuator

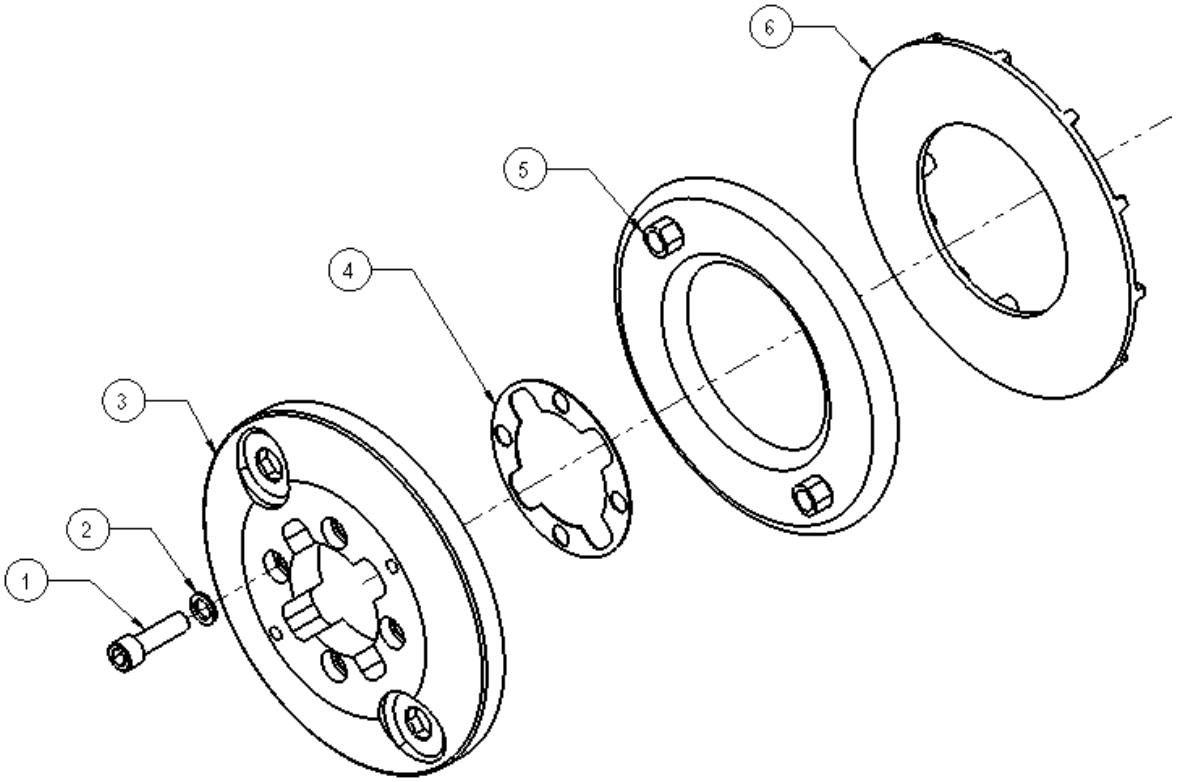


Table 2 – *Airtube Style Actuator Parts*

Item	Description	Item	Description
1	SHCS	4	Shim
2	Washer (Locking)	5	Air tube
3	Airtube Holding Plate	6	Pressure Plate

2.0

Piston Style Actuator - Hydraulic

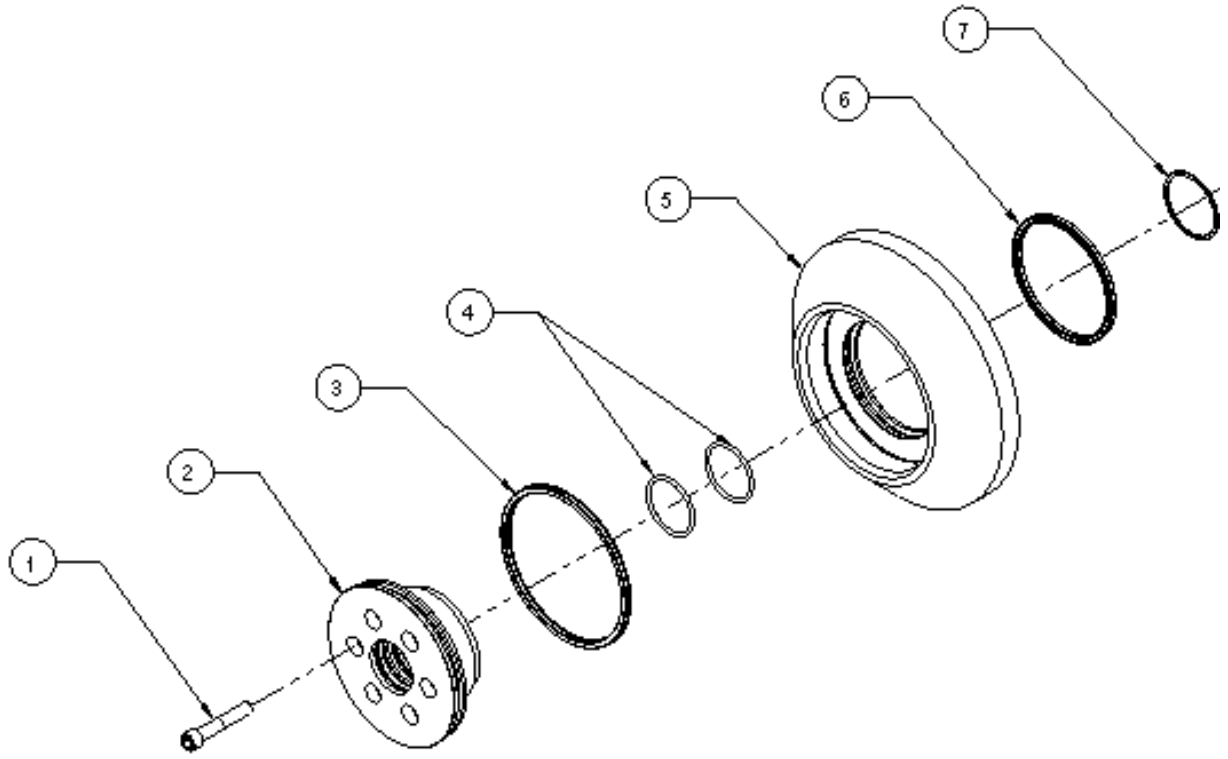
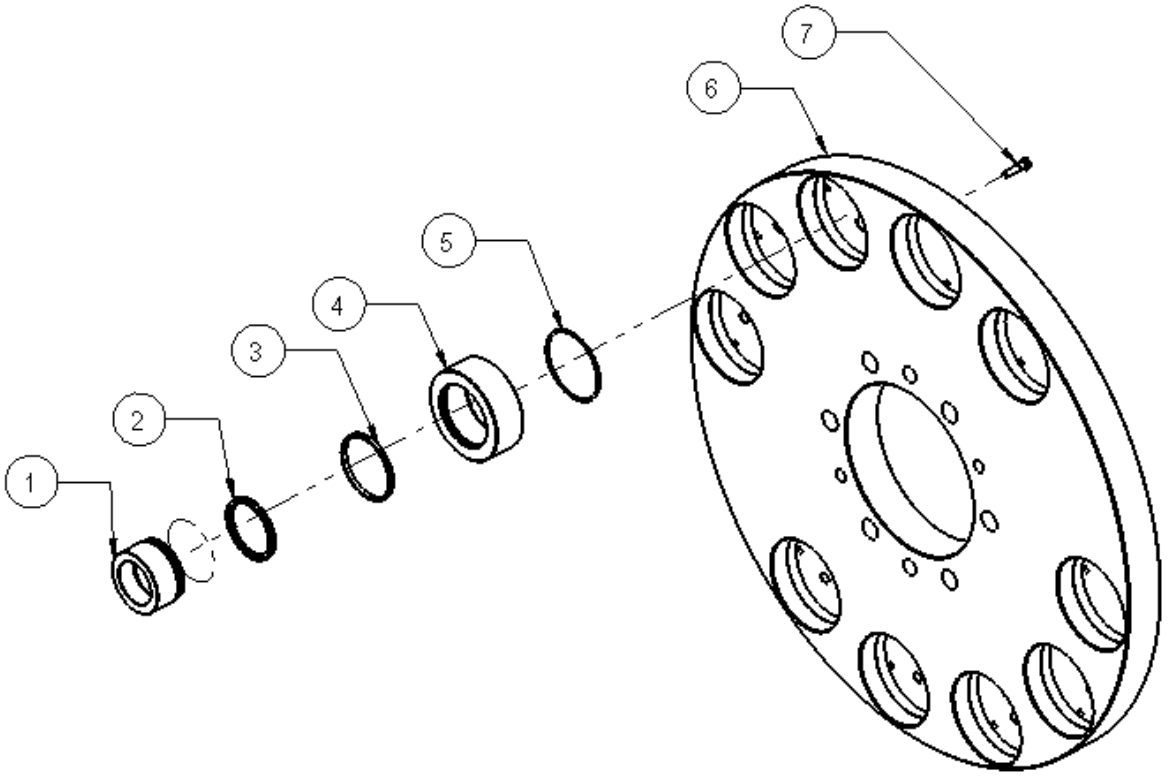


Table 3 – *Hydraulic Piston Style Actuator Parts*

Item	Description	Item	Description
1	SHCS	5	Cylinder Holding Plate
2	Piston	6	Seal (Inner)
3	Seal (Outer)	7	Retaining Ring
4	O-ring		

2.0

Puck Style Actuator - Hydraulic



NOTE: Quantity of actuators may vary with Unit size, example is a 31" Power Grip has 10 actuators.

Table 4 – *Hydraulic Puck Piston Style Actuator Parts*

Item	Description	Item	Description
1	Piston	5	O-Ring
2	Piston Seal	6	Cylinder Holding plate
3	Wear Ring	7	Hex Head Cap Screw
4	Cylinder		

2.0

Center/ Floating Plate, Friction Disc with Wave Spring

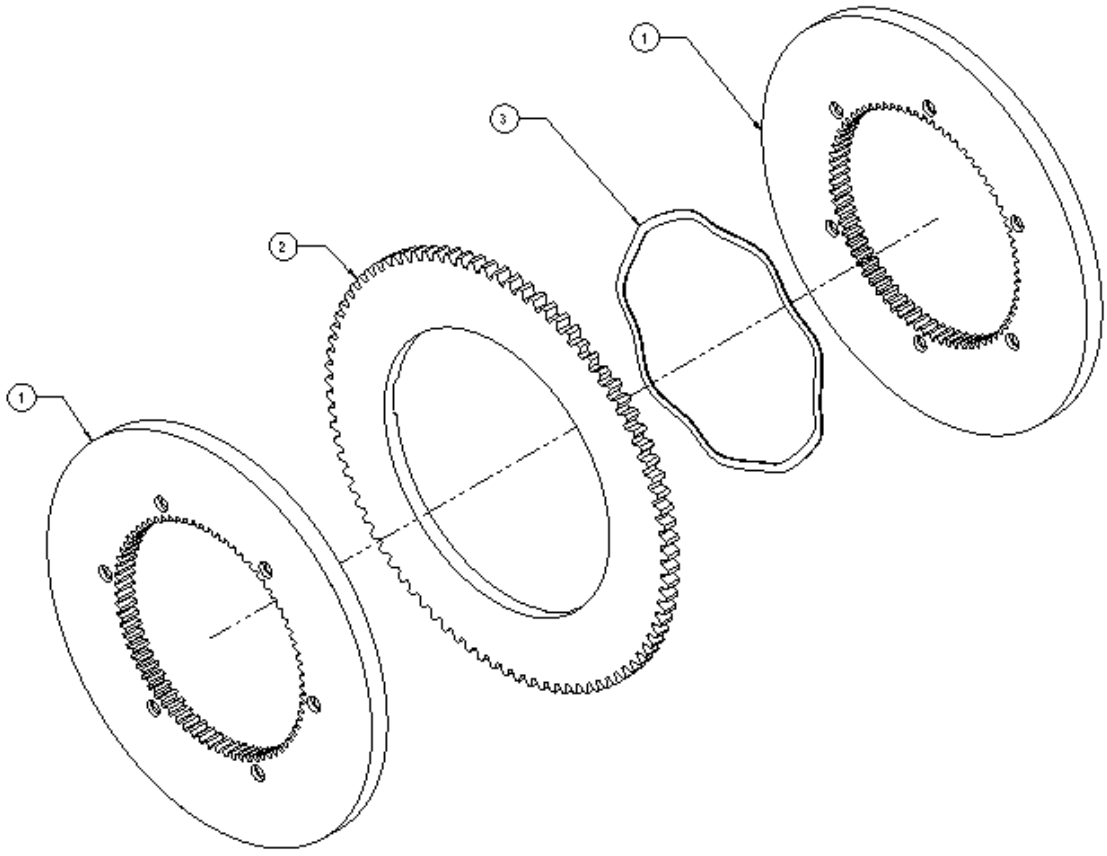


Table 5 – *Center/ Floating Plat, Friction Disc with Wave Spring Parts*

Item	Description	Item	Description
1	Center/ Floating Plate	3	Wave Spring
2	Friction Disc		

2.0

Driving Ring & locking device

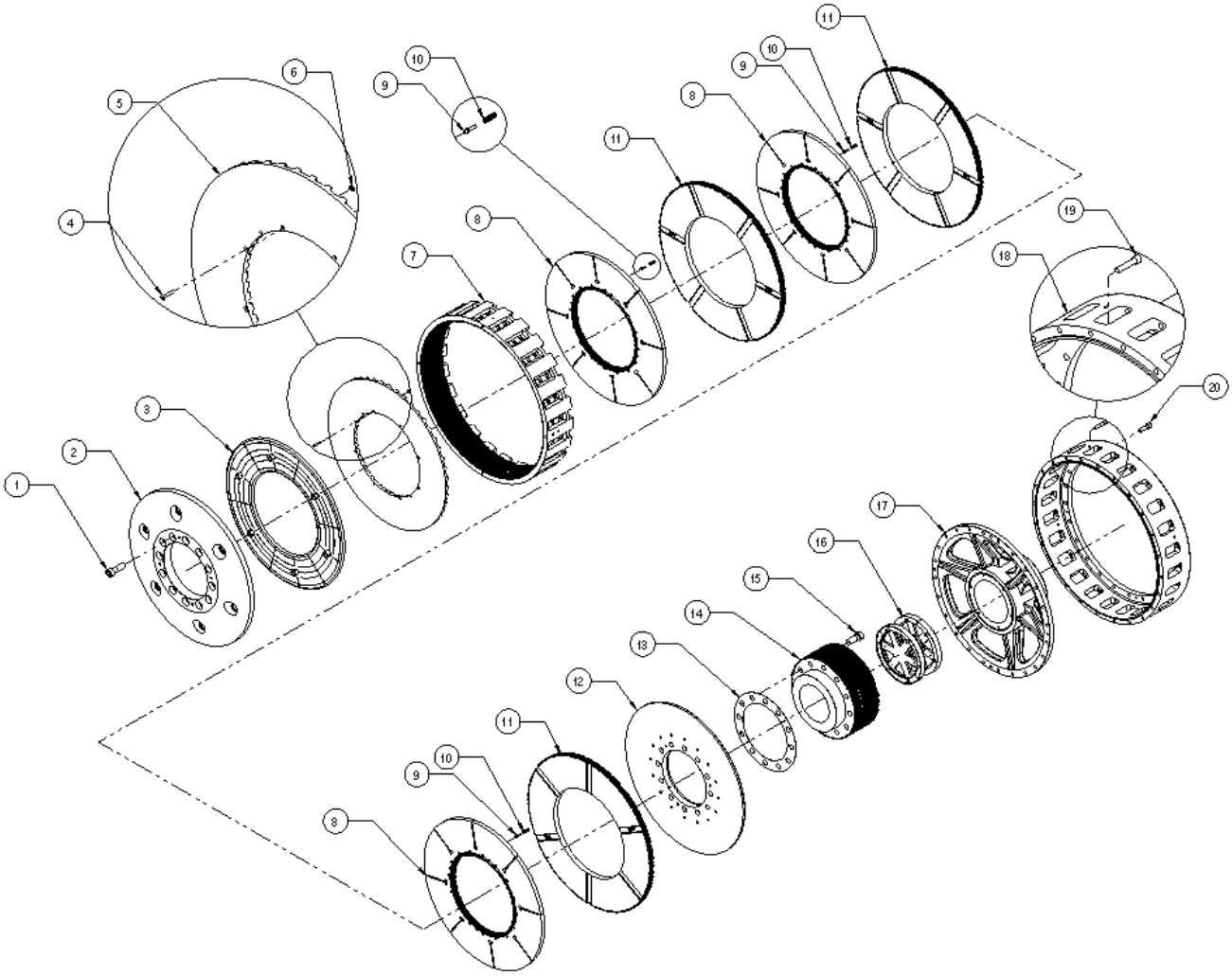


Table 6 – *Power Grip with Driving Ring & Locking Device*

Item	Description	Item	Description
1	SHCS	11	Friction Disc
2	Airtube Holding Plate	12	Backplate
3	Airtube	13	Shim
4	FHSCS	14	Hub
5	Pressure Plate	15	SHCS
6	Nut	16	Axial Locking Device Assembly
7	Driving Ring	17	Quick Change Adapter
8	Center Plate	18	Driving Adapter
9	Pin, Spring Stabilizer	19	SHCS
10	Release Spring	20	Shcs

2.0

Driving Adapter, Driving Elbow, Driving Ring, Axial Locking Device

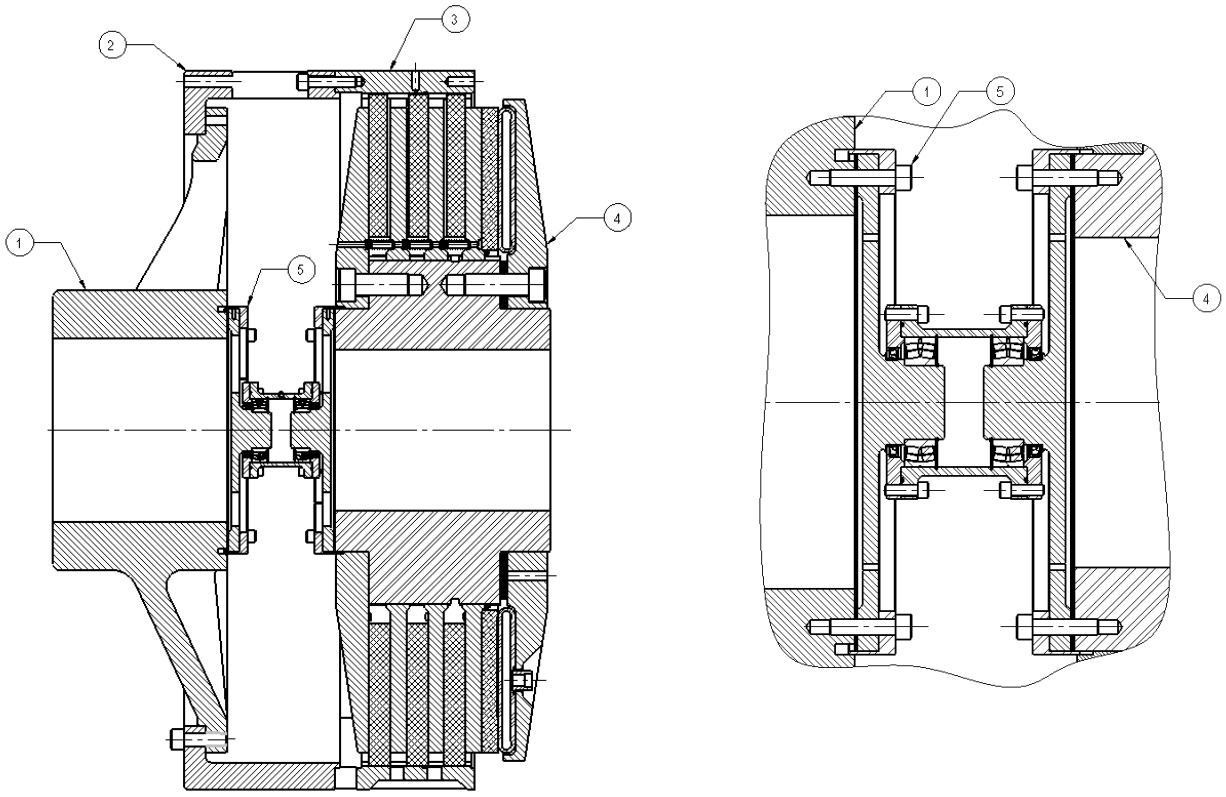


Table 7 – *Power Grip with Driving Ring & Locking Device*

Item	Description	Item	Description
1	Driving Adapter	4	Power Grip Clutch
2	Driving Elbow	5	Axial Locking Device
3	Driving Ring		

Items 1 & 2 can be referred to as "Quick Change" Driving adapter.
Removing the bolts between driving elbow and driving adapter enables you to side driving ring back exposing friction disc. Once friction disc are exposed, break friction disc, each disc may then be replaced by 2 part friction disc.

3.0 Installation

Caution

Follow safety guidelines utilizing lockout tag out procedures before and during all installation and maintenance procedures.

Caution

Proper alignment is necessary to ensure that the friction discs track properly. Improper alignment will result in poor function and reduced service life.

Caution

Even though the units are properly set before shipment from the factory, they should be checked for proper clearance before being put into operation. See Section 7.2 for detailed instructions on checking the clearance.

Danger

Use only the proper quantity and grade of fasteners shown in the drawings. Failure to do so may result in fastener failure and/or a reduction in unit torque.

Installation

3.1.0 FOR PROPER OPERATION AND SERVICE LIFE

3.1.1 **Concentricity of the Shaft**: With the dial indicator mounted to a solid part of the machine, place the indicator tip on the shaft and rotate the shaft. The Total Indicated Reading should have a maximum value shown in **Table 10 value = B**. See **Figure 2** below.

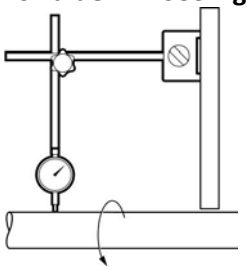


Figure 2

3.1.2 **Concentricity of Mounting Bracket**: With the dial indicator mounted to the shaft, place the indicator tip on the pilot diameter and rotate the shaft. The Total Indicated Reading should have a maximum value shown in **Table 10 value B**. See **Figure 3** below.

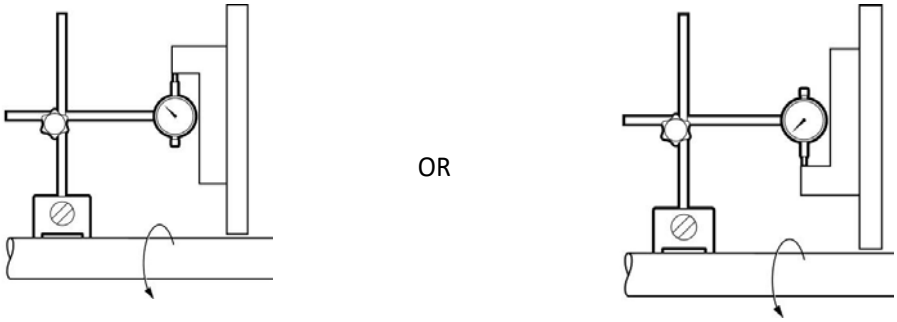


Figure 3

3.1.3 **Perpendicularity of Mounting Bracket**: With the dial indicator mounted to the shaft, place the indicator tip on the face of the mounting bracket/surface and rotate the shaft. The T.I.R. (Total Indicated Reading) should have a maximum value shown in **Table 10 value A**. See **Figure 4** below.

NOTE: Adjustment of the mounting surfaces may be necessary.

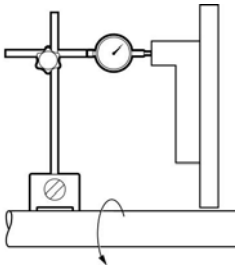


Figure 4

Installation

3.2.0 INSTALLATION OF DRIVING RING

3.2.1 Install customer mounted bracket/pulley in correct position on the shaft.

3.2.2 Mount driving ring (see sections 3.1.2 & 3.1.3 for proper alignment)

3.2.3 After driving ring installation is complete ensure all bolts have been correctly torqued (See torque values in Table 13.)

3.3.0 INSTALLATION OF CLUTCH

3.3.1 Slide main body of clutch into correct position on the shaft, ensuring that the teeth of the friction discs are registered in the teeth of the driving ring.

3.3.2 Clutch must be axially restrained. (Some disassembly & reassembled may be required, of clutch, depending on purposed installation requirements). (See sections 3.1.1 & 3.1.2 & 3.1.3 for proper alignment).

3.3.3 If disassembly is required see section 5.0 & 6.0 for proper process.

3.3.4 Tighten screws. (See torque values in Table 13 as applicable.)

3.1.3 Connect air/ hydraulic hoses between actuator and shaft, as applicable.

3.1.4 Connect air/ hydraulic supply by means of a flexible hose to roto-coupling then connect roto-coupling into shaft. Check supply pressure, place pressure gauge in air/ hydraulic line next to roto-coupling, as applicable.

3.1.5 Although clutches are correctly set before shipping from our factory, they should be checked for proper clearance before placing into operation (see section 7.2 on how to check clearance and refer to Table 12 for operating clearance.) Clearance may be checked by engaging and disengaging clutch and measuring the total axial movement of the pressure plate.

3.4.0 INSTALLATION OF QUICK CHANGE DRIVING ADAPTER (If applicable)

3.4.1 Slide driving adapter on to shaft with driving ring loosely attached (if quick change ring is used be sure that this is fixed to driving adapter before the adapter is mounted on shaft). (See 3.1.1 & 3.1.2 & 3.1.3)

3.4.2 Maneuver shafts into their correct relative position ensuring that the teeth of the friction discs are registered in the teeth of the driving ring.

3.4.3 Tighten capscrews. (See torque values in Table 13.)

Installation

3.5.0 INSTALLATION OF AXIAL LOCKING DEVICE (If applicable)

3.5.1 Slide driving adapter on to shaft with driving ring loosely attached (if quick change ring is used be sure that this is fixed to driving adapter before the adapter is mounted on shaft). (See 3.1.1 & 3.1.2 & 3.1.3).

3.5.2 Maneuver shafts into their correct relative position ensuring that the teeth of the friction discs are registered in the teeth of the driving ring.

3.5.3 Install axial locking device securing both ends, one side secured to driving adapter hub the other side secured to power grip hub.

3.5.4 Torque all bolts per chart (See torque values in Table 13.)

3.6.0 INSTALLATION OF HUB

3.6.1 The Hub should be positioned to ensure that the disc splines will not overhang the end of the Hub when the unit is mounted. Refer to your drawing for the dimension between the unit mounting surface and the end of the Hub. The Hub should be checked for overhang with new and worn conditions after installation is complete.

3.6.2 Check that the shaft of the equipment is free of nicks and burrs. Ensure that the key will fit properly in the shaft and the Hub.

3.6.3 Apply a light coat of anti-seize compound to the shaft and the key. Tap the key into the shaft keyway.

3.6.4 Heat the Hub uniformly to 250° F (121° C) to expand the bore and ease the assembly. Press the Hub onto the shaft, making sure that the dimension between the Hub and the Unit mounting surface is maintained. Allow the Hub to cool.

3.6.5 Ensure that the Hub is positioned on the shaft in relation to the unit, as shown in **Figure 3**. The Hub should be locked in this position to prevent axial movement during operation.

3.6.6 **Perpendicularity of Hub**: With a dial indicator mounted to a solid part of the machine, place the indicator tip on the face of the hub and rotate the shaft. Verify that the Hub face is perpendicular to the shaft should have a maximum value shown in **Table 10 value A.**

Note: If the unit is to be mounted while completely assembled, be sure that the splines on the Drive Plate(s) are aligned with the splines on the Hub. This is accomplished by installing the Hub in the Drive Plates to align the splines. Center the Hub and Drive Plates in the unit and apply and maintain 25% of the rated actuation pressure to engage the unit. Keep pressure applied to the Actuator until the unit is installed.

Installation

3.7.0 Actuation System

Caution

All pipes/hoses should be free of metal chips, cutting compound and any other foreign matter. Pipe ends should be reamed after cutting to eliminate any possible restrictions or burrs. For optimum air system response, a minimum number of bend and elbows should be used.

⚠ Caution

Do not exceed the maximum allowable actuation pressure. Damage to the unit or Personal injury may result.

3.7.1 Install air/hydraulic fittings and piping/ hoses with the appropriate sizes indicated on the drawing. If the size isn't noted contact WPT.

3.7.2 Engage/disengage the unit to verify proper movement. Measure the clearance as instructed in **Section 7.2**, and record the value in your documentation.

3.8.0 Burnishing

3.8.1 Refer to Table 8. Before proceeding, it is important to read and fully understand this section of the manual.

3.8.2 Burnishing is a process used to prepare a clutch or brake for normal service. During the procedure, the wear surfaces are lapped, the contact area of the friction material is increased, and a chemical change happens to the surface of the friction material.

3.8.3 Begin burnishing by applying the clutch or brake with the necessary actuator pressure to meet the power requirement detailed in Table 8. It is recommended to not exceed the burnish speed as noted in Table 8.

3.8.4 During burnishing cycle monitor center plate temperature. When center plate reaches 200F° [93 C°] a burnish cycle is complete.

3.8.5 After each burnish cycle, it is recommended to load test the clutch or brake. Once the product carries the necessary load, the test may be concluded.

3.8.6 In no case should the temperature of the outer diameter of the centerplate be permitted to exceed 250F° [121 C°]. If this temperature is achieved, allow the unit to cool to ambient temperature before continuing the burnishing process.

3.8.7 If at any point smoke is seen, the unit should be allowed to cool to ambient temperature before continuing the burnishing process.

3.8.8 If, after burnishing, the product fails to deliver the appropriate amount of torque, contact WPT power for assistance.

Installation

Unit Size	Burnish Cycle 1-3			Burnish Cycle 4-6			Burnish Cycle 7-9			Burnish Speed
	1 Plate hp (kW)	**2 Plate hp (kW)**	**3 Plate hp (kW)**	**1 Plate hp (kW)**	**2 Plate hp (kW)**	**3 Plate hp (kW)**	**1 Plate hp (kW)**	**2 Plate hp (kW)**	**3 Plate hp (kW)**	**r/min**
6”	0.34 (0.25)	0.45 (0.34)	0.56 (0.42)	0.51 (0.38)	0.68 (0.50)	0.84 (0.63)	0.68 (0.51)	0.90 (0.67)	1.12 (0.84)	950
8”	1.18 (0.88)	1.24 (0.92)	1.30 (0.97)	1.77 (1.32)	1.86 (1.39)	1.95 (1.45)	2.35 (1.76)	2.48 (1.85)	2.60 (1.94)	720
11”	1.10 (0.82)	1.15 (0.85)	1.20 (0.89)	1.64 (1.23)	1.72 (1.28)	1.79 (1.34)	2.19 (1.63)	2.29 (1.71)	2.39 (1.78)	520
14”	0.97 (0.72)	1.11 (0.83)	1.25 (0.93)	1.45 (1.08)	1.66 (1.24)	1.88 (1.40)	1.94 (1.44)	2.22 (1.66)	2.50 (1.87)	410
16”	1.67 (1.24)	2.03 (1.51)	2.39 (1.78)	2.50 (1.87)	3.04 (2.27)	3.58 (2.67)	3.34 (2.49)	4.06 (3.02)	4.77 (3.56)	360
18”	2.37 (1.77)	2.98 (2.23)	3.60 (2.68)	3.56 (2.65)	4.48 (3.34)	5.40 (4.02)	4.74 (3.54)	5.97 (4.45)	7.19 (5.36)	320
21”	2.34 (1.75)	3.13 (2.34)	3.92 (2.92)	3.51 (2.62)	4.70 (3.50)	5.88 (4.39)	4.68 (3.49)	6.26 (4.67)	7.84 (5.85)	270
24”	2.08 (1.55)	3.03 (2.26)	3.98 (2.97)	3.11 (2.32)	4.54 (3.39)	5.97 (4.45)	4.15 (3.10)	6.06 (4.52)	7.97 (5.94)	240
27”	2.33 (1.74)	3.27 (2.44)	4.20 (3.13)	3.50 (2.61)	4.90 (3.65)	6.30 (4.70)	4.67 (3.48)	6.53 (4.87)	8.40 (6.27)	210
30”	2.75 (2.05)	3.88 (2.90)	5.02 (3.74)	4.12 (3.07)	5.82 (4.34)	7.53 (5.61)	5.49 (4.10)	7.77 (5.79)	10.04 (7.48)	190
36”	3.35 (2.50)	4.79 (3.57)	6.23 (4.65)	5.02 (3.75)	7.18 (5.36)	9.35 (6.97)	6.70 (4.99)	9.58 (7.14)	12.46 (9.29)	160
42”	3.95 (2.95)	5.70 (4.25)	7.44 (5.55)	5.93 (4.42)	8.55 (6.37)	11.16 (8.33)	7.90 (5.89)	11.39 (8.50)	14.89 (11.10)	140
48”	4.55 (3.40)	6.60 (4.93)	8.66 (6.45)	6.83 (5.09)	9.91 (7.39)	12.98 (9.68)	9.11 (6.79)	13.21 (9.85)	17.31 (12.91)	120
60”	5.76 (4.29)	8.42 (6.28)	11.08 (8.26)	8.64 (6.44)	12.63 (9.42)	16.62 (12.39)	11.52 (8.59)	16.84 (12.56)	22.16 (16.52)	100

Burnishing Table 8

Burnishing is carried out utilizing a stage process, please refer to Table 8 to help achieve desire load rating. Locate size of unit and its’ operating burnishing speed along with number of plates this will help you set your horse power. Run unit until it reaches 200F° [93 C°] this will note the end of cycle. Repeat each cycle 3 times before proceeding to next stage.

3.9.0 Cover & Shield

3.9.1 WPT Power suggests using a cover or shield for all Power Grip. Particularly, in the following circumstances:

- Used in above deck marine applications
- Used in harsh environments (rain, snow, sun, heat, etc.)
- Used in dirty environments
- When contact of rotating parts could be possible

4.0 Operation

Warning

Do not allow oil, grease, dirt and/or coolant or other liquid to come in contact with the surfaces of the friction discs, or the wear plates. Oil and/or grease on these parts will significantly reduce the torque capacity of the unit. Dirt and/or coolant will produce erratic torque.

Warning

Burnishing before initial operation is recommended to reach rated torque. Failure to do so will reduce the torque capability of the unit until worn in. See **section 3.8.0** for initial setup and verify proper operation before putting the product into service.

Warning

Do not allow freewheeling speed to exceed the maximum speeds listed in **Table 11**. Exposure to speeds in excess of these values may cause the friction discs to burst and result in extensive damage to the unit and/or personal injury.

Operation

4.1 Operating Conditions and Limitations

4.1.1 Allowable actuation pressure:

Size	Hydraulic (Piston style)		Hydraulic (Puck style)		Pneumatic	
	Rated	*Max*	*Rated*	*Max*	*Rated*	*Max*
8"	-	-	*See Assembly drawing*	*See Assembly drawing*	*100 PSI (7 bar)*	***130 PSI (9 bar)***
11"	*500 PSI (35 BAR)*	***650 PSI (45 BAR)***				
14"	*500 PSI (35 BAR)*	***650 PSI (45 BAR)***				
16"	-	-				
18"	*500 PSI (35 BAR)*	***650 PSI (45 BAR)***				
21"	*500 PSI (35 BAR)*	***650 PSI (45 BAR)***				
24"	-	-				
27"	-	-				
30"	-	-				
36"	-	-				
42"	-	-				
48"	-	-				
60"	-	-				

Table 9 – Actuation Pressures

*** Piston output force is equal to Airtube force at pressures shown.**

Caution

Do not operate unit beyond maximum allowable actuation pressure. Exceeding the allowable pressure will cause damage.

4.1.2 Torque is directly proportional to the actuation pressure applied.

4.1.3 Excessive slip speeds will result in rapid friction material wear and reduced torque. To extend the life of the frictions and wear plates, the values listed on the **Table 11** should not be exceeded.

Caution

Do not operate above the maximum slip speeds. Doing so may result in reduced torque.

5.0 Disassembly

Caution

Machinery must be locked and in a safe position before disassembling the unit.

5.1 Unit Disassembly

5.1.1 Remove all flexible hose connections (air, hydraulic) from unit.

5.1.2 If the unit is to be repaired in place, use a suitable lifting device for support while removing the holding plate assembly, friction disc and drive plate assemblies. If the unit is to be removed and repaired off the equipment, use soft slings to support the unit and gently slide the unit off of the equipment's shaft.

5.1.3 Remove the fasteners that hold the unit to the equipment. If the unit is going to be repaired off of the equipment. Transport the unit to a clean working area. Place the unit with the mounting plate face down on a flat clean surface.

5.1.4 Inspect the Hub. If the Hub requires replacement, then remove it from the shaft of the equipment using a portable jack. Use the threaded holes in the end of the Hub for puller holes. Heating the Hub may be required to ease the process of removing the Hub from the equipment's shaft.

STOP

For Pneumatic Airtube Style Unit go to 6.1.5

For Hydraulic Puck Style Unit go to 6.1.7

For Hydraulic Piston Style Unit go to 6.1.13

Airtube Style Disassembly

5.1.5 Remove the bolts, which secure the airtube holding plate assembly to the unit. Turn each bolt a small amount at a time and in a criss-cross pattern until the Release Springs are no longer acting on the airtube holding plate assembly.

5.1.6 Remove the airtube holding plate and the airtube from the unit. Set the assembly in a clean flat area. Make sure to avoid damaging the airtube.

STOP **Go to 6.1.20**

Disassembly

Hydraulic Piston Style Disassembly

Caution

Use caution when removing **bolts (SHCS piston). Springs** within the clutch store energy and could cause the clutch to fly apart. The best removal practice will be to remove 3 of the 6 **bolts,** replace them with 12" long all-thread segments. Place a large outer diameter washer on each of the all thread bolts, followed by a nut. Run the nut down the all-thread segment until it holds the **piston** in place. Remove the remaining 3 **bolts.** Loosen the three nuts on the all-thread bolt, evenly, until all stored energy is removed.

5.1.7 Before removing the cylinder bolts (SHCS piston), see **CAUTION** above.

5.1.8 Separate the Piston from Cylinder, if needed gently tap with a mallet to ensure that the Piston moves evenly out of the Cylinder Plate. Be careful not to damage the sealing surfaces of the Piston or the Cylinder Plate by misalign the Piston in the Cylinder Plate.

5.1.9 After removing the Piston, note the relationship of how the lips of the seals are orientated in the Piston grooves. Remove the seals from the Piston.

5.1.10 Inspect the Cylinder Plate's sealing surface condition for any nicks or scratches or any other defect which may prevent the seals from being effective.

5.1.11 After separating the piston and cylinder assembly and discard the Polypak seals and O-Rings.

5.1.12 Remove the floating plate from the Hub. Remove the 4 roll pins from the floating plate and retain for reassembly.

STOP **Go to 6.1.20**

Hydraulic Puck Style Disassembly

5.1.13 Remove the bolts, which secure the cylinder holding plate assembly to the unit. Turn each bolt one turn at a time using an alternating pattern until the Release Springs are no longer acting on the Cylinder Plate assembly.

5.1.14 Remove the Cylinder Plate Assembly from the unit. Set the assembly in a clean flat area with the Piston facing down.

5.1.15 Remove the bolts holding the piston/cylinder from the Cylinder Plate and remove piston/cylinder.

5.1.16 Repeat this process until all piston/cylinders are removed from Cylinder Plate.

5.1.17 Remove pistons from cylinders and remove seals from pistons.

5.1.18 Inspect the Cylinder's sealing surface and Pistons seal grooves condition for any nicks or scratches or any other defect which may prevent the seals from being effective.

Disassembly

Final Disassembly

5.1.19 Remove the Floating/center plate from the unit and set aside being careful not to damage the plate.

5.1.20 Remove the friction disc from the Hub and set aside. Remove Release Springs.

5.1.21 Repeat steps 5.1.19 and 5.1.20 until all center plates and friction disc along with springs are removed.

5.1.22 If the wear surface on the back plate is to be replaced, support the back plate and remove the mounting bolts from hub. Remove the back plate.

5.1.23 Inspect all components and wear surfaces.

5.1.24 Replace any components in need of replacement.

6.0 Assembly

Caution

***** See Burnishing Process 3.8.0*****

6.1.0 Unit Assembly

6.1.1 Position hub on assembly table

6.1.1.1 (for airtube units) with extended teeth down.

6.1.1.2 (for hydraulic units) with piston end down.

*****For 1 piece hub & back w/backplate. Skip to step 6.1.6*****

6.1.2 Position backplate on hub, being careful to align holes.

6.1.3 Bolt backplate to hub using Loctite (see drawing).

6.1.4 Torque backplate bolts. (see table 13)

6.1.5 Turn hub and back plate over to continue

6.1.6 Install wave spring or coil springs on backplate.

6.1.7 Place 1st friction disk on backplate.

(for 1 plate unit without pressure plate pins proceed to step # 6.1.15)

6.1.8 Install center/floating plate aligning spring pockets.

6.1.9 Install wave spring or coil springs.

6.1.10 Install 2nd friction disk

(for 2 plate unit without pressure plate pins proceed to step # 6.1.15)

6.1.11 Install center/floating plate aligning spring pockets.

6.1.12 Install 3rd friction disk

6.1.13 Install wave spring or coil springs.

6.1.14 Install center/floating plate aligning spring pockets.

6.1.15 If pressure plate pins are required install them now.

******FOR HYDRAULIC ACTUATOR SEE SECTION 6.2.0******
******FOR HYDRAULIC PUCK ACTUATOR SEE SECTION 6.3.0******
******FOR AIRTUBE ACTUATOR SEE SECTION 6.4.0******

6.2.0 Hydraulic Piston actuator assembly

6.2.1 Floating plate must be installed on springs with roll pins up, being careful to align roll pins (per assembly drawing).

6.2.2 Lubricate two (2) Polypak seals with lithium based grease and install in piston and cylinder, being careful to turn seal lips in the proper direction as per drawing.

6.2.3 Lubricate seal surfaces with hydraulic oil and assemble piston and cylinder, being careful to align roll pins (see assembly drawing).

6.2.4 Bolt piston and cylinder assembly to hub (make sure to align roll pins refer to drawing for correct orientation).

6.2.5 Install two "O"-rings in top of piston, lubricating them with hydraulic oil.

6.2.6 Lubricate end of fixture with hydraulic oil.

6.2.7 Inspect for any visible leaks around piston and cylinder.

6.2.8 Pressure test assembly by applying the max hydraulic pressure listed in **Table 9**. Close valve wait until pressure has stabilized then record.

6.2.9 If pressure does not drop, test is acceptable.

6.2.10 If test drops below allowable pressure; disassemble, check for cause of leakage, correct and re-assemble. Re-test per test instructions.

6.2.11 Torque piston/cylinder bolts using Loctite and/ or washers (see drawing and BOM).

***** HYD ACTUATOR ASSEMBLY COMPLETED *****

6.3.0 Hydraulic Puck Actuator Assembly

6.3.1 Floating plate must be installed on springs with roll pins up, being careful to align roll pins (per assembly drawing).

6.3.2 Lubricate the Polypak seals with lithium based grease and install in each piston puck and cylinder, being careful to turn seal lips in the proper direction as per drawing.

6.3.3 Lubricate seal surfaces with hydraulic oil and assemble piston and cylinder, being careful to align roll pins (see assembly drawing).

6.3.4 Bolt each puck piston to cylinder holding plate.

6.3.5 Bolt piston and cylinder assembly to hub (make sure to align roll pins refer to drawing for correct orientation).

6.3.6 Install O-rings in top of each piston, lubricating them with hydraulic oil.

6.3.7 Lubricate end of fixture with hydraulic oil.

6.3.8 Inspect for any visible leaks around piston and cylinder.

6.3.9 Pressure test assembly by applying the max hydraulic pressure listed in **Table 9**. Close valve wait until pressure has stabilized then record.

6.3.10 If pressure does not drop test is acceptable.

6.3.11 If test drops below allowable pressure; disassemble, check for cause of leakage, correct and re-assemble. Re-test per test instructions.

6.3.12 Torque piston/cylinder bolts using Loctite and/or washers (see drawing and BOM).

***** HYD ACTUATOR PUCK ASSEMBLY COMPLETED *****

6.4.0 Airtube Actuator Assembly

6.4.1 Place pressure plate, with rib side down on floating plate align bosses and/or roll/ slotted pins.

6.4.2 Place airtube on top of pressure plate.

6.4.3 Add proper shims on to hub.

6.4.4 Position airtube holding plate over airtube and on hub, being careful to align spuds with holes in airtube holding plate (check drawing for proper orientation of spuds).

6.4.5 Bolt airtube holding plate to hub.

6.4.6 Check clearance as per drawing, adding or removing shims, as required to bring clearance into tolerance.

6.4.7 Remove bolts and reinstall using Loctite and/or washer (see drawing & BOM) & torque.

6.4.8 If applicable; hand tighten positive locking bolts to ATHP.

6.4.9 If applicable; install hose and applicable fittings (QRVS, elbows, etc.).

**** AIRTUBE ACTUATOR COMPLETED****

7.0 Maintenance

Warning

Do not allow unqualified personnel to install, adjust and/or repair the unit. Faulty workmanship could result in faulty installation, dangerous operation of the Unit, repeated costly maintenance and greatly shorten the life of the Unit.

Warning

Do not perform maintenance work on the unit, without making sure that the machinery will remain in a safe position. Failure to do so could result in serious injury or may cause death.

Caution

Examine the unit for wear of the friction material and the wear plates. Failure to perform this examination periodically may result in excessive wear to components, improper operation or a significant reduction in torque and may result in personal injury and/or damage to the machinery.

7.1 Inspection

7.1.1 Periodically observe the rotating disc while the Unit is fully released. Check for dragging or misaligned discs and correct as required.

7.1.2 Occasionally check for external leakage near the actuator.

7.1.3 Pneumatic and electrical control interlocks should be periodically checked for proper settings and operation.

7.2 Checking Clearance

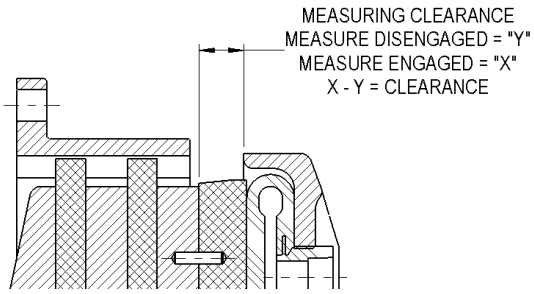


Figure 5

Danger

Do not operate the unit when clearance is beyond the maximum allowance. If a shim is not removed when required, the unit torque may deteriorate to the point where the equipment will not engage and disengage properly.

7.2.1 As the friction material wears, adjustment of the Unit will be required to keep the Unit actuation within proper clearance. See Table 12 in back of this manual for proper clearance of unit.

7.2.2 Operating clearance is calculated by measuring the distance between the base of the actuator plate and the top of pressure plate. Measure distance while unit is engaged and subtract measured distance while unit is disengaged. (see Figure 5)

7.2.3 If the maximum "Clearance" has been reached, Shim removal is required. Removal instructions are provided in Section 7.3

7.3 Shim Removal

Warning

Failure to remove an equal quantity of equal thickness shims during clearance adjustment could cause Unit to malfunction.

Note: There may not be shim adjustment for all single disc units. When Unit torque decreases, inspect the friction material, drive plates, and replace any worn components.

7.3.1 Mark the shim that are to be removed to ensure that the right quantity is removed. Shims must always be removed as a complete set only.

7.3.2 Loosen the bolt one turn at a time, using an alternating pattern to keep the Actuator assembly square to the Hub. Continue to loosen the bolts until the force of the Release Springs is relieved, allowing for access to the shims.

7.3.3 Remove or replace shims as needed for proper clearance and operation.

Warning

Collect ALL shim pieces as they are removed. Shim pieces could lodge in the Unit components and prevent the Unit from properly engaging/releasing.

7.3.4 While supporting the weight of the Actuator Assembly, tighten the bolts. Make sure to tighten one turn at a time, using an alternating pattern to keep the actuator square to the hub. Continue until the Actuator is seated firmly against the Hub. Torque the bolts to the appropriate value listed in **Table 13**.

Caution

Tighten bolts gradually and evenly to prevent damage to the Unit components

7.3.5 Reinstall any hoses, piping and/or covers that were removed prior to the unit being adjusted.

7.4 Replacing the Hydraulic Piston Seals

7.4.1 Thoroughly clean the seal groove in the Piston and apply a thin even coat of hydraulic oil to the Piston seal groove, the chamfer on the Piston, the sealing surfaces of the Cylinder and the seals themselves.

7.4.2 Install new Seal in to the groove in the Piston, noting the orientation of the seal lips. The sealing face of the seal should face the short end of the piston.

7.4.3 The Cylinder should be placed on a clean and flat area with the chamfer facing upward.

7.4.4 Carefully place the Piston onto the Cylinder with the chamfered edge of the Piston upward. Take special care to avoid damaging the lip of the seal.

7.4.5 Gradually apply an evenly distributed force to press the Piston into the Cylinder. Make sure that Piston does not cock because this may damage the sealing surface and/or the seal. Do not use a tool with sharp edges which could damage the seal lips. C-clamp or a press will help with Piston installation.

7.4.6 Place the O-Ring into the Cylinders O-Ring groove. Align the bolt holes of the Cylinder with the bolt holes in the Cylinder Holding Plate. Be careful to not disassemble the piston from the cylinder and keep the O- Ring in the Cylinder groove. Insert the Cylinder until it is seated into the Cylinder Holding Plate.

7.4.7 Install bolts using Loctite and torque to values as shown in Table 13.

7.4.8 Once all the Piston/Cylinder assemblies are installed in the Cylinder Holding Plate, proceed with Unit Assembly, see Section 6.0.

7.4.9 Connect hydraulic supply line to the port in the Cylinder Holding Plate.

7.4.10 Engage and disengage the Unit 4 or 5 times to remove any trapped air from piston/cylinder chamber. Check for proper movement of plates during engage and disengage.

7.4.11 Pressure test assembly by applying the max hydraulic pressure listed in Table 9. Close valve wait until pressure has stabilized then record.

7.4.12 If pressure does not drop test is acceptable.

7.4.13 If test drops below allowable pressure; disassemble, check for cause of leakage, correct and re-assemble. Re-test per test.

7.4.14 Continue checking as shown in 7.4.9 thru 7.4.13 until all cylinders have been inspected for leaks.

General Storage Guidelines

Upon receipt of parts or assemblies, they should be inspected for corrosion or other related damage. If any problem is detected, contact WPT's warranty department.

It is the owner's primary responsibility to store and protect the WPT product.

Products should be stored in a manner that it is protected from the environment and outside sources, which may include but are not limited to the following:

- **Environmental storage requirements should be maintained as follows:**
  - **No exposure to rain water**
  - **Temperatures 32F° (0C°) to 110F° (43C°)**
  - **Below 50% average humidity**
  - **Average sunlight**

- **Hazards that require addition protection:**
  - **Dust and debris**
  - **Oil, water, salt water, acids, or other chemicals**
  - **Any other foreign items which may damage the product**
  - **Other measures include covering the product to prevent ingress of foreign matter**

- **Additional Protection Measures for Long-Term Storage (For storage exceeding 1 month):**
  - **Coating the studs, hub, springs, and exposed metal with Cosmoline RP-342 "HEAVY" Military-Grade Rust Preventive Aerosol Spray, or equal**
  - **Coating of painted surfaces is not required or recommended**
  - **Visually inspect the product for degradation once every three-months**

TABLES

ANGULAR & PARALLEL ALIGNMENT													
CLUTCH SIZE	8	11	14H	16	18, 18H	21	24H, 24SHD	27	30H	36	42	48	60
A = TIR	.004 (0.10)	.006 (0.15)	.007 (0.18)	.008 (0.20)	.009 (0.23)	.011 (0.28)	.012 (0.30)	.014 (0.36)	.015 (0.38)	.018 (0.46)	.021 (0.53)	.024 (0.61)	.030 (0.76)
B = TIR	.004 (0.10)	.006 (0.15)	.007 (0.18)	.008 (0.20)	.009 (0.23)	.011 (0.28)	.012 (0.30)	.014 (0.36)	.015 (0.38)	.018 (0.46)	.021 (0.53)	.024 (0.61)	.030 (0.76)

TABLE 10 – ANGULAR & PARALLEL ALIGNMENT

MAXIMUM RPM & SLIP*													
CLUTCH SIZE	8	11	14H	16	18, 18H	21	24H, 24SHD	27	30H	36	42	48	60
MAX *RPM	3600	2650	2180	1900	1750	1525	1350	1200	1100	900	750	650	525
MAX *SLIP	2860	2080	1640	1430	1270	1090	950	850	760	640	550	480	380

***For Puck style hydraulic actuators, DO NOT EXCEED the Max RPM on the assembly drawing!**

TABLE 11 – MAXIMUM RPM/ MAXIMUM SLIP SPEED

CLUTCH SIZE:	**MINIMUM- MAXIMUM CLEARANCES**					
	1 DISC UNIT		**2 DISC UNITS**		**3 DISC UNITS**	
	DIM. In.	DIM. mm.	DIM. In.	DIM. mm.	DIM. In.	DIM. mm.
8, 11, 14, 14H, 16	1/16-1/8	1.59-3.18	3/32-5/32	2.38-3.97	1/8- 3/16	3.18- 4.76
18, 18H, 21	1/16-1/8	1.59-3.18	3/32-5/32	2.38-3.97	1/8- 3/16	3.18- 4.76
24, 24H, 27	3/32-5/32	2.38-3.97	1/8-3/16	3.18-4.76	5/32-7/32	3.97-5.56
30, 30H, 36	3/32-5/32	2.38-3.97	1/8-3/16	3.18-4.76	3/16-1/4	4.76-6.35
42, 48	1/8-1/4	3.18-6.35	5/32-9/32	3.97-7.14	3/16-5/16	4.76-7.94
60	3/16-5/16	4.76-7.94	1/4-3/8	6.35-9.53	5/16-7/16	7.94-11.11

TABLE 12 - CLEARANCE

Table 13

TORQUE VALUES FOR SOCKET HEAD AND HEX HEAD CAPSCREWS

SOCKET HEAD CAP SCREWS

BOLT SIZE	As Received			Lubricated**		
INCHES	lbf·ft	lbf·in	N·m	lbf·ft	lbf·in	N·m
1/4	13	150	17	10	120	13
5/16	25	305	34	18	244	27
3/8	45	545	62	36	436	49
7/16	70	840	95	56	672	76
1/2	108	1300	147	86	1040	117
9/16	155	1860	210	124	1488	168
5/8	211	2530	286	168	2024	228
3/4	367	4400	497	293	3520	397
7/8	583	7000	791	466	5600	632
1	867	10400	1175	693	8320	940
1 1/8	1242	14900	1684	993	11920	1347
1 1/4	1750	21000	2374	1400	16800	1899
1 3/8	2317	27800	3142	1853	22240	2513
1 1/2	3042	36500	4125	2433	29200	3300
1 3/4	4950	59400	6714	3960	47520	5371
2	7492	89900	10161	5993	71920	8128

HEX HEAD CAP SCREWS - Grade 8

BOLT SIZE	As Received				Lubricated**	
INCHES	lbf·ft	lbf·in	N·m	lbf·ft	lbf·in	N·m
1/4	8	100	11	6	80	9
5/16	17	200	23	13	160	18
3/8	30	360	41	24	288	32
7/16	48	570	64	38	456	51
1/2	83	990	112	66	792	89
9/16	107	1285	145	85	1028	116
5/8	143	1714	194	114	1371	155
3/4	256	3070	347	204	2456	277
7/8	417	5000	565	333	4000	452
1	625	7500	848	500	6000	678

HEX HEAD CAP SCREWS - Grade 5

BOLT SIZE	As Received				Lubricated**	
INCHES	lbf·ft	lbf·in	N·m	lbf·ft	lbf·in	N·m
1/4	6	71	8	5	56	6
5/16	12	142	16	9	113	12
3/8	22	260	29	17	208	23
7/16	34	410	46	27	328	36
1/2	53	636	72	42	508	57
9/16	74	890	101	59	712	80
5/8	104	1250	141	83	1000	112
3/4	183	2200	249	146	1760	199
7/8	298	3570	403	238	2856	322
1	440	5280	597	352	4224	477
1 1/8	553	6640	750	442	5312	600
1 1/4	775	9300	1051	620	7440	840
1 3/8	1012	12140	1372	809	9712	1097
1 1/2	1350	16200	1831	1080	12960	1464

**** NOTE: For Loctite use lubricated values**

Table 13 -continued-

Caution: Torque values on assembly drawings override torque values on these charts.

TORQUE VALUES FOR METRIC SOCKET HEAD AND HEX HEAD CAPSCREWS

4.6 Class

Bolt Size	Dry			Lubricated**		
	lbf•ft	lbf•in	N•m	lbf•ft	lbf•in	N•m
5	1.8	21.2	2.4	1.3	16.8	1.9
6	3	36.3	4.1	2.3	29.2	3.3
8	7.3	87.6	9.9	5.5	69.9	7.9
10	14.5	173	19.6	10.8	139	15.7
12	25.2	302	34.1	18.9	242	27.3
14	40.1	481	54.3	30.1	385	43.5
16	62.5	750	84.8	46.9	600	67.8
18	86.3	1035	117	64.5	826	93.3
20	122	1460	165	91.5	1168	132
22	166	1991	225	124	1593	180
24	211	2531	286	158	2027	229
27	308	3699	418	231	2965	335
30	419	5027	568	314	4018	454
33	570	6841	773	428	5469	618
36	732	8788	993	549	7027	794
39	948	11372	1285	711	9098	1028

8.8 Class

Bolt Size	Dry			Lubricated**		
	lbf•ft	lbf•in	N•m	lbf•ft	lbf•in	N•m
5	4.6	54.9	6.2	3.4	40.7	4.6
6	7.7	92.9	10.5	5.8	69.9	7.9
8	18.8	226	25.5	14.1	169	19.1
10	37.2	447	50.5	27.9	335	37.8
12	64.9	779	88	48.7	584	66
14	103	1239	140	77.5	929	105
16	161	1938	219	121	1451	164
18	229	2752	311	172	2062	233
20	325	3903	441	244	2929	331
22	443	5310	600	332	3983	450
24	562	6744	762	422	5062	572
27	823	9868	1115	617	7407	837
30	1117	13408	1515	838	10054	1136
33	1520	18240	2061	1140	13682	1546
36	1952	23426	2647	1464	17567	1985
39	2527	30320	3426	1895	22736	2569

10.9 Class

Bolt Size	Dry			Lubricated**		
	lbf•ft	lbf•in	N•m	lbf•ft	lbf•in	N•m
5	6.5	77.9	8.8	4.9	58.4	6.6
6	11.1	133	15	8.3	100	11.3
8	26.9	323	36.5	20.2	242	27.3
10	53.3	639	72.2	39.9	480	54.2
12	92.9	1115	126	69.7	836	94.5
14	148	1770	200	111	1328	150
16	231	2770	313	173	2080	235
18	317	3806	430	238	2859	323
20	450	5399	610	337	4053	458
22	612	7346	830	459	5505	622
24	778	9337	1055	586	7000	791
27	1138	13656	1543	854	10239	1157
30	1546	18541	2095	1159	13912	1572
33	2103	25231	2851	1577	18921	2138
36	2701	32409	3662	2026	24302	2746
39	3495	41940	4739	2622	31453	3554

12.9 Class

Bolt Size	Dry			Lubricated**		
	lbf•ft	lbf•in	N•m	lbf•ft	lbf•in	N•m
5	7.6	91.2	10.3	5.7	68.1	7.7
6	12.9	155	17.5	9.7	117	13.2
8	31.4	377	42.6	23.6	283	32
10	62.2	747	84.4	46.7	560	63.3
12	109	1301	147	81.4	974	110
14	173	2071	234	130	1558	176
16	270	3230	365	202	2425	274
18	371	4452	503	278	3336	377
20	526	6310	713	394	4735	535
22	715	8585	970	537	6434	727
24	909	10912	1233	682	8186	925
27	1330	15957	1803	998	11965	1352
30	1806	21674	2449	1355	16257	1837
33	2458	29488	3332	1843	22116	2499
36	3157	37869	4279	2367	28409	3210
39	4085	49011	5538	3064	36763	4154

**** NOTE: For Loctite use lubricated values**

Troubleshooting Guide

Problem	Possible Cause	Remedy
Unit Doesn't Engage Properly	Friction Material reached maximum wear	See Section 7.2 Checking Unit Clearance
	Insufficient actuation pressure/flow	See Section 4.1 Operating Conditions and Limitations
	Excessive Clearance	See Section 7.2 Checking Unit Clearance
Unit Doesn't Disengage Properly	Damaged/ Jammed Release Springs	Check for damaged Springs or debris between discs
	Insufficient actuation pressure/flow	See Section 4.1 Operating Conditions and Limitations
Dragging Drive Plate	Improper Alignment	See Section 3.1 Preparation and Alignment
	Vibration	Observe machinery and supports for excessive vibration
	Insufficient Clearance	See Section 7.2 Checking Unit Clearance

WPT Power Corporation
1600 Fisher Road - Wichita Falls, TX 76305
P.O. Box 8148 - Wichita Falls, TX 76307
Ph. 940-761-1971
www.WPTpower.com