



# SERVICE MANUAL

LOADER  
TM320, TM420

EN - 9813/6850 - ISSUE 2 - 04/2018

This manual contains original instructions, verified by the manufacturer (or their authorized representative).

Copyright 2018 © JCB SERVICE  
All rights reserved. No part of this publication may be reproduced, stored in a retrieval system, or transmitted in any form or by any other means, electronic, mechanical, photocopying or otherwise, without prior permission from JCB SERVICE.

[www.jcb.com](http://www.jcb.com)

## Foreword

### The Operator's Manual

**⚠**  
You and others can be killed or seriously injured if you operate or maintain the machine without first studying the Operator's Manual. You must understand and follow the instructions in the Operator's Manual. If you do not understand anything, ask your employer or JCB dealer to explain it.

Do not operate the machine without an Operator's Manual, or if there is anything on the machine you do not understand.

Treat the Operator's Manual as part of the machine. Keep it clean and in good condition. Replace the Operator's Manual immediately if it is lost, damaged or becomes unreadable.

### Contents

**01 - Machine**

**03 - Attachments, Couplings and Load Handling**

**06 - Body and Framework**

**09 - Operator Station**

**12 - Heating, Ventilating and Air-Conditioning (HVAC)**

**15 - Engine**

**18 - Fuel and Exhaust System**

**21 - Cooling System**

**24 - Brake System**

**25 - Steering System**

**27 - Driveline**

**30 - Hydraulic System**

**33 - Electrical System**

**72 - Fasteners and Fixings**

**75 - Consumable Products**

**78 - After Sales**

## 12 - Clutch - Ratio

### Disassemble and Assemble

#### Special Tools

Description	Part No.	Qty.
Circlip Assembly Tool	998/11334	1

#### Main shaft clutch

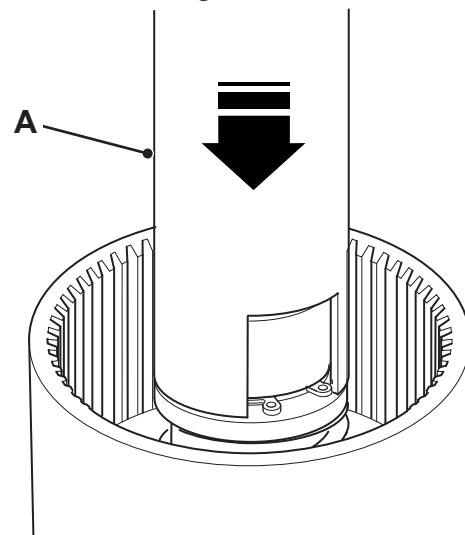
##### Disassembly

The numerical sequence is a guide to the disassembly procedure.

1. Remove and discard the O-ring seals 1.
2. To check the clutch plates.
  - 2.1. Remove the circlip1 from the clutch drum.
  - 2.2. Lift off the thick pressure counter plate then the seven friction plates and seven counter plates.
3. Remove and check the roller bearing race. If necessary discard it.
4. Use either the circlip assembly tool or a tube of suitable diameter to install over the top spring cup.

Special Tool: Circlip Assembly Tool (Qty.: 1)

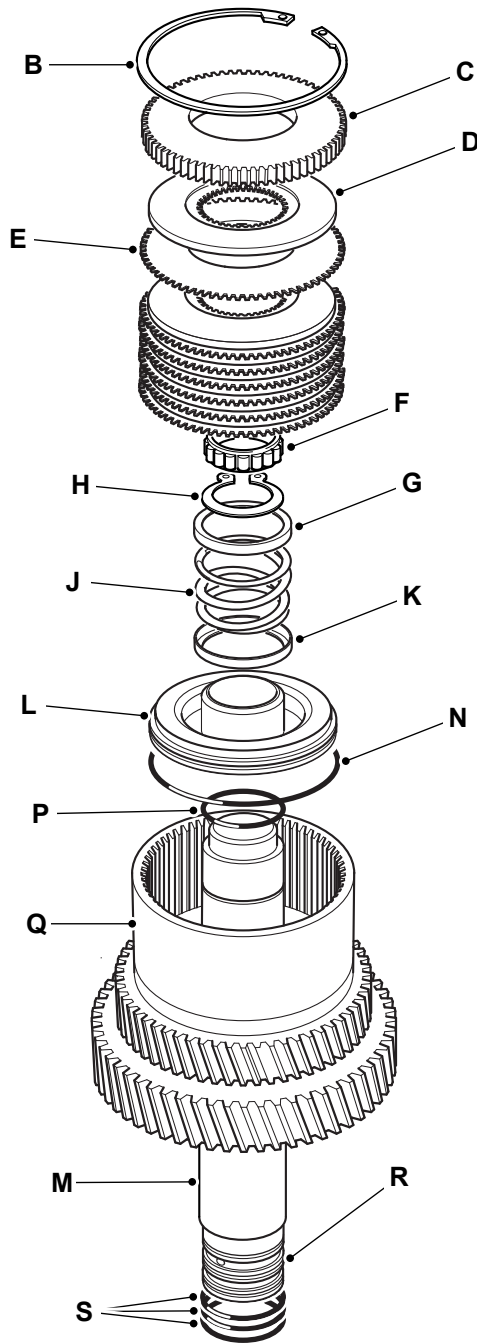
**Figure 567.**



**A** Tube

5. Cut out a small portion of the tube, to allow access, to release the circlip 2.
6. With the clutch drum located in the press, compress the spring sufficiently to allow the circlip 2 to be released.
7. When the circlip 2 is released, remove it from the shaft with the spring cup, spring and the lower spring cup.
8. If necessary the clutch operating piston may be removed by compressed air blown through the drilling in the end of the clutch shaft.
9. Remove and discard the clutch piston O-ring seal 2 and seal 3.

**Figure 568.**



**Table 242.**

Item	Description
B	Circlip 1
C	Thick pressure counter plate
D	Friction plate
E	Counter plate
F	Roller bearing race

Item	Description
G	Upper spring cup
H	Circlip 2
J	Spring
K	Lower spring cup
L	Piston
M	Clutch shaft
N	O-ring seal 2

Item	Description
P	O-ring seal 3
Q	Housing
R	Gallery port
S	O-ring seal 1

### Assembly

Assembly is the opposite of the disassembly procedure with the following precautions.

1. Install the new clutch piston O-ring seals 2 and seal 3 to the piston.
2. Lubricate the new seals and push the piston into the housing by hand.
3. Put the lower spring cup over the central spigot of the piston.
4. Replace the spring and the top spring cup.
5. Keep the circlip 2 on the top cup ready for installation.
6. Use the tube with a cutout to compress the spring.
7. Locate the cutout to give access for circlip 2.
8. Install the circlip 2 and make sure that it is seated correctly in the groove.
9. New clutch friction plates must be soaked in oil before assembly.
10. Install the first counter plate to the clutch drum followed by the friction plate.
11. Alternately install all fourteen plates.
12. Use a scrap splined drive hub to align the splines of the friction plates.
13. Install the thick counter plate at the top of the assembly followed by the circlip 1.
14. Check the free play clearance of the clutch plates and it must be within the specified limit.  
Dimension: 3 –3.5 mm
15. You can adjust the clearance by either changing the thick pressure plate from 6.0mm (0.24in) thick version to 6.5mm (0.26in) thick or by the addition of a shim counter plate installed immediately under the thick pressure plate.
16. Once the clutch is assembled completely then apply compressed air to the gallery port in the end of the shaft to check the clutch operation.

### Ratio Clutches

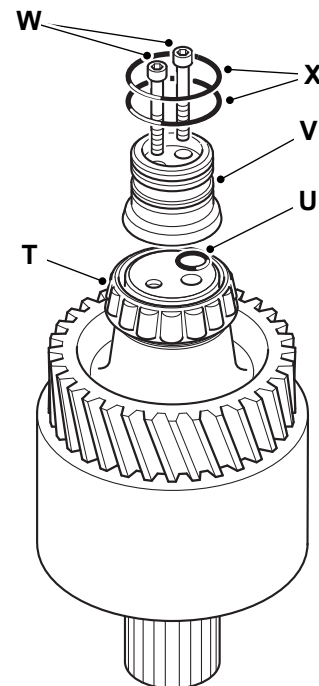
#### Disassembly

1. For the remaining two ratio clutches follow the same disassembly procedure as above.
2. The only difference is the retention of the support taper roller bearing which for each clutch is held in place by a machined cap.

#### Assembly

1. Clutch 1 and clutch 2 assembly.
  - 1.1. Use a mandrel to carefully push the taper bearing 1 into its position.
  - 1.2. Rotate the roller cage as the bearing is pushed into place to make sure that the mandrel does not foul and distort the cage.
  - 1.3. Put the new O-ring seal 4 into the grooves in the cap 1.

**Figure 569.**

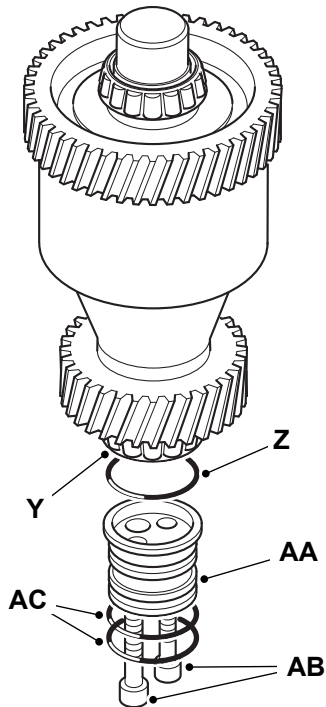


- T** Taper bearing 1
- U** O-ring sea l4
- V** Cap 1
- W** Capscrews 1
- X** O-ring seals 5

- 1.4. Two capscrews 1 hold the cap 1 in place.
- 1.5. Tighten the capscrews 1 to the correct torque value.
- 1.6. Put two new O-ring seals 5 into the groves in cap 1.

2. Clutch 3 and clutch 4 assembly.
  - 2.1. Use a mandrel to carefully push the taper bearing 2 into its position.
  - 2.2. Rotate the roller cage as the bearing is pushed into the place to make sure that the mandrel does not foul and distort the cage..
  - 2.3. Put the new O-ring seal 6 into the grooves in the cap 2.

**Figure 570.**



- Y** Taper bearing 2
- Z** O-ring seal 6
- AA** Cap 2
- AB** Capscrews 2
- AC** O-ring seals 7

- 2.4. Two capscrews 2 hold the cap 2 in place.
- 2.5. Tighten the capscrews 2 to the correct torque value.
- 2.6. Put two new O-ring seals 7 into the groves in cap 2.

**Table 243. Torque Values**

Item	Description	Nm
W	Capscrews1	18
AB	Capscrews2	45

## 13 - Clutch - Master

Remove and Install ..... 27-130  
Disassemble and Assemble ..... 27-136

## Remove and Install

### Special Tools

Description	Part No.	Qty.
Clutch Pack Retainers	892/01048	2
Mandrel	892/01050	1
Locking Plates	892/01052	2

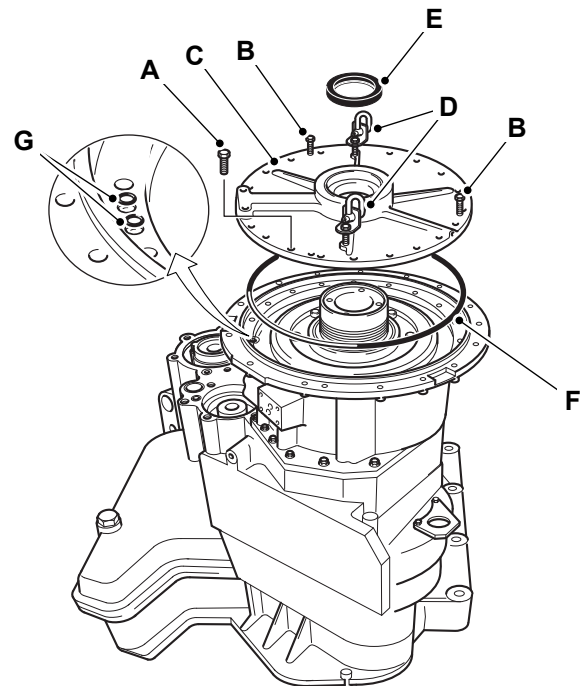
### Consumables

Description	Part No.	Size
JCB Multi-Gasket	4102/1212	0.05 L

### Remove

- Put the gearbox on a suitable manipulator. Rotate the gearbox until the clutch is in the top position.
- Remove all the cover attaching bolts and then install the M10 jacking bolts<sup>1</sup> (x3).
- Screw all the jacking bolts evenly until the cover is clear of its spigot.

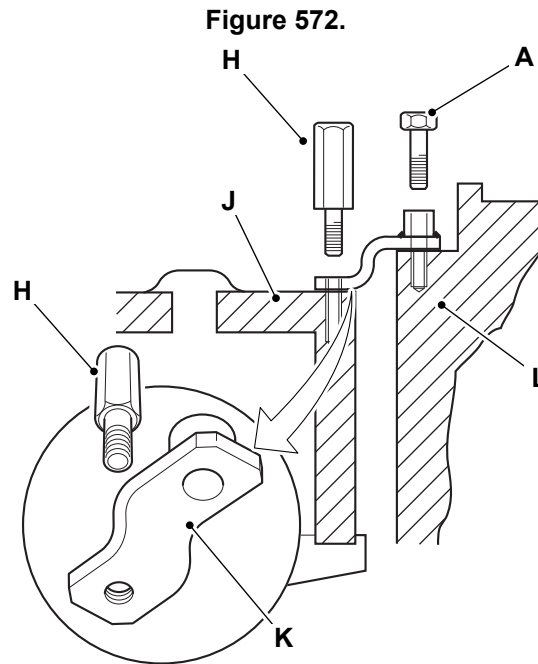
**Figure 571.**



- A** Cover attaching bolts (x18)
- B** M10 jacking bolts<sup>1</sup> (x3)
- C** Cover
- D** M10 threaded lifting eyes (x2)
- E** Oil seal<sup>2</sup>
- F** Cover O-ring seal
- G** O-ring<sup>1</sup> seal

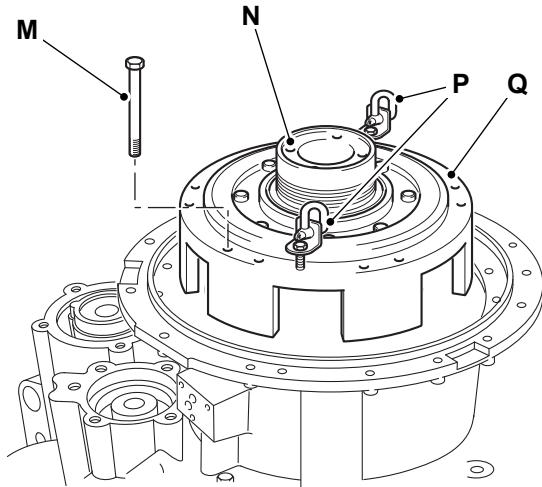
- Install the M10 threaded lifting eyes to lift the cover.

5. Carefully lift off the cover and make sure that you keep it square to the housing.
6. Make sure that you remove and discard all the O-ring<sup>1</sup> seals.
7. Remove the jacking bolt.
8. Remove and discard the cover O-ring seal.
9. Prise out and discard the oil seal<sup>2</sup> carefully and make sure that the seal housing in the cover is not damaged.
10. Install the special locking plates to prevent the clutch assembly from rotating.  
Special Tool: Locking Plates (Qty.: 2)



- |   |   |
|---|---|
| <p><b>A</b> Cover attaching bolts (x18)<br/><b>J</b> Clutch assembly<br/><b>L</b> Housing</p> | <p><b>H</b> Special screws<br/><b>K</b> Special locking plate</p> |
|---|---|

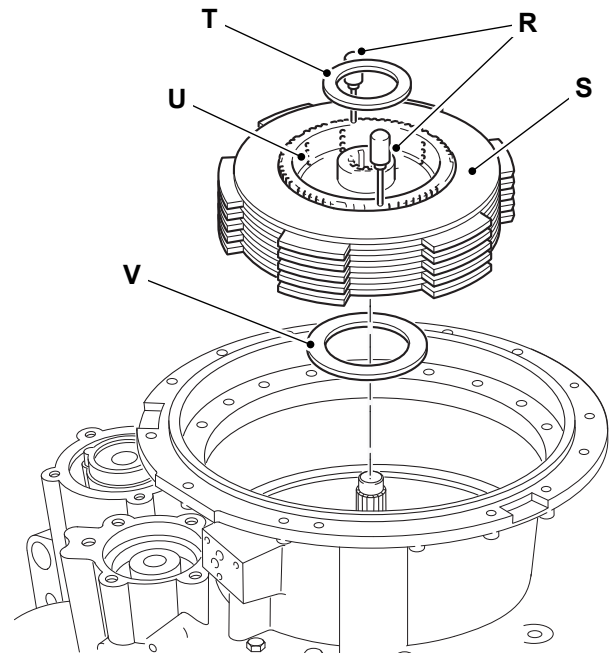
11. Use the cover attaching bolts and the special screws that are supplied with the locking plates, to lock the clutch assembly to the housing.
12. Remove all the clutch drum bolts.

**Figure 573.**


- M** Clutch drum bolts (x12)
- N** Plug1
- P** M8 threaded lifting eye (x2)
- Q** Clutch drum

13. Remove the locking plate.
14. Install the M8 threaded lifting eyes to the clutch drum.
15. Attach suitable lifting equipment to the clutch drum.
16. Carefully remove the clutch drum, hub and the pressure plate assembly.
17. Install the special pack retainers to the clutch plate carrier.

**Special Tool: Clutch Pack Retainers (Qty.: 2)**

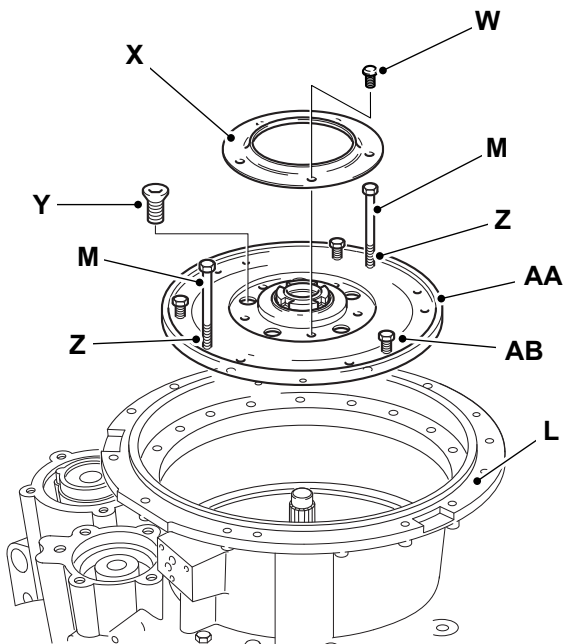
**Figure 574.**


- R** Special pack retainers (x2)
- S** Clutch plates
- T** Thrust washer1
- U** Plate carrier
- V** Thrust washer2

18. Remove the carrier together with the clutch plates and the thrust washer1.
19. Remove the thrust washer2.
20. Remove the button head capscrews.
21. Remove the oil baffle plate.
22. Rotate the drum carrier to align the five holes with countersunk capscrews.
23. Remove the countersunk capscrews.



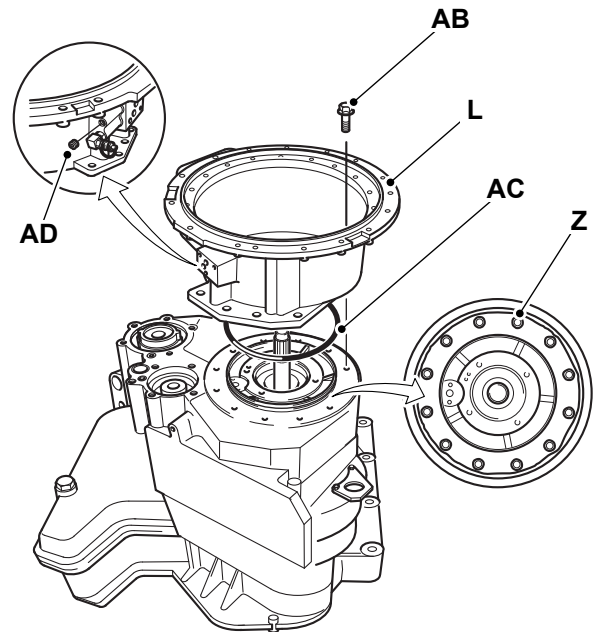
Figure 575.



- M** Clutch drum bolts (x12)
- L** Housing
- W** Button head capscrews (x5)
- X** Oil baffle plate
- Y** Countersunk capscrews
- Z** JCB multigasket
- AA** Drum carrier
- AB** M10 jacking bolts2 (x3)

24. Install the M10 jacking bolts2 and jack the drum carrier to remove it from the housing.
25. Make sure that you install the drum bolts that will assist you to lift the drum carrier clear of the housing.
26. The drum carrier will be removed completely with the PTO (Power Take-Off) input gear and the bearing.
27. It is not necessary to remove the clutch housing unless it is damaged or the PTO/splitter gearbox needs to be disassembled.

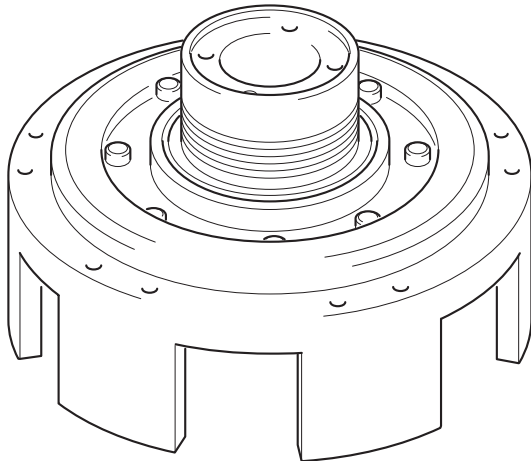
Figure 576.



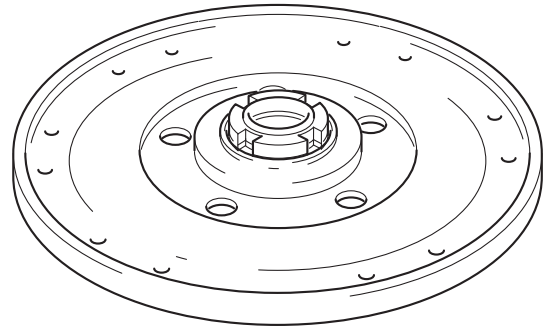
- L** Housing
- Z** JCB multigasket
- AB** Verbus-ripp bolts (x12)
- AC** O-ring2
- AD** Cross drilling blanking plug2

28. The clutch house removal.
  - 28.1. Remove and discard all the Verbus-ripp bolts.
  - 28.2. Use a soft faced hammer to separate the housing from the PTO/splitter gearbox.
  - 28.3. Remove the clutch housing.
29. After you remove the clutch from the housing there will be three main sub assemblies.
  - 29.1. Remove the Clutch drum, hub and pressure plate sub-assembly. Refer to Figure 577.

**Figure 577.**

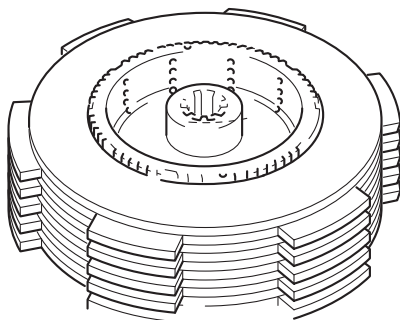


**Figure 579.**



- 29.2. Remove the clutch plates and plate carrier sub-assembly. Refer to Figure 578.

**Figure 578.**



- 29.3. Remove the clutch drum carrier and input gear PTO sub-assembly.

### Install

Installation is the opposite of the removal procedure but make sure that additionally you follow the instructions below.

1. If it is necessary to replace the clutch housing with a new one then make sure that the cross drilling blanking plug<sup>2</sup> is installed to the new housing.
2. Tighten the plug<sup>2</sup> to the correct torque value.
3. Make sure that the oil feed cross drillings are clear.
4. Carefully clean all the traces of the sealing compound from the clutch and the smoothshift gearbox housing mating surfaces.
5. Lightly lubricate with oil and install a new O-ring<sup>2</sup>.
6. Apply even beads of JCB Multigasket to the Smoothshift Gearbox housing (around the outer diameter and around each threaded bolt hole).  
**Consumable: JCB Multi-Gasket**
7. Make sure that you install new Verbus-ripp bolts.
8. Tighten the Verbus-ripp bolts to the correct torque value.
9. Make sure that the clutch components are carefully checked for any signs of wear or damage.
10. If any of the friction or counter plates are damaged or if any of the friction plates are excessively worn (thickness less than 3.5 mm or oil grooves less than 0.1 mm deep) replace the complete set of plates.

11. Make sure that the new friction plates are soaked in transmission oil before you install them.
12. Check the thrust washer<sup>2</sup> for any signs of wear.
13. If the thickness (3.9mm) or the outside diameter (110.0mm) is less than the mentioned value then install a new thrust washer<sup>2</sup>.
14. Before you install the new thrust washer<sup>2</sup> soak it in the transmission oil for at least an hour.
15. Do not apply any kind of thread locking compound to any of the bolts or screws.
16. Tighten the plug<sup>1</sup>s to the correct torque value to prevent oil gallery leakage.
17. It is not possible to locate the clutch drum over the clutch plates and carrier assembly inside the housing.
18. First sub-assemble the components on the bench and then use the retainers to hold the assembly together.
19. Before you replace the drum, plates, carrier and hub assembly install the two guide pins to the M10 threaded holes in the drum carrier.
20. Use a special mandrel to install the new oil seal<sup>2</sup>.  
[Special Tool: Mandrel \(Qty.: 1\)](#)
21. If the clutch plates are replaced with new ones, check to make sure that the clutch is disengaged before installing the cover <sup>2</sup>.
22. Lightly apply oil and install a new O-ring<sup>1</sup> and the cover O-ring.

**Table 244. Torque Values**

Item	Description	Nm
A	Cover attaching bolt	56
M	Clutch drum bolt	52
W	Button head capscrews	12
Y	Countersunk capscrews	38
N	Plug1(Black)	22
N	Plug1(Gold)	12
AB	Verbus-ripp bolt	75
AD	Cross drilling blanking plug <sup>2</sup>	15

## Disassemble and Assemble

### Special Tools

Description	Part No.	Qty.
<a href="#">Peg Socket</a>	<a href="#">892/01045</a>	1
<a href="#">Mandrel</a>	<a href="#">892/01046</a>	1
<a href="#">Clutch Jig</a>	<a href="#">892/01047</a>	1
<a href="#">Clutch Pack Retainers</a>	<a href="#">892/01048</a>	2
<a href="#">Guide Rods</a>	<a href="#">892/01049</a>	2
<a href="#">Slide Hammer Kit</a>	<a href="#">993/68100</a>	1

### Consumables

Description	Part No.	Size
JCB Threadlocker and Sealer (Medium Strength)	<a href="#">4101/0250</a>	0.01 L
	<a href="#">4101/0251</a>	0.05 L

## Master Clutch- Clutch Drum and Hub

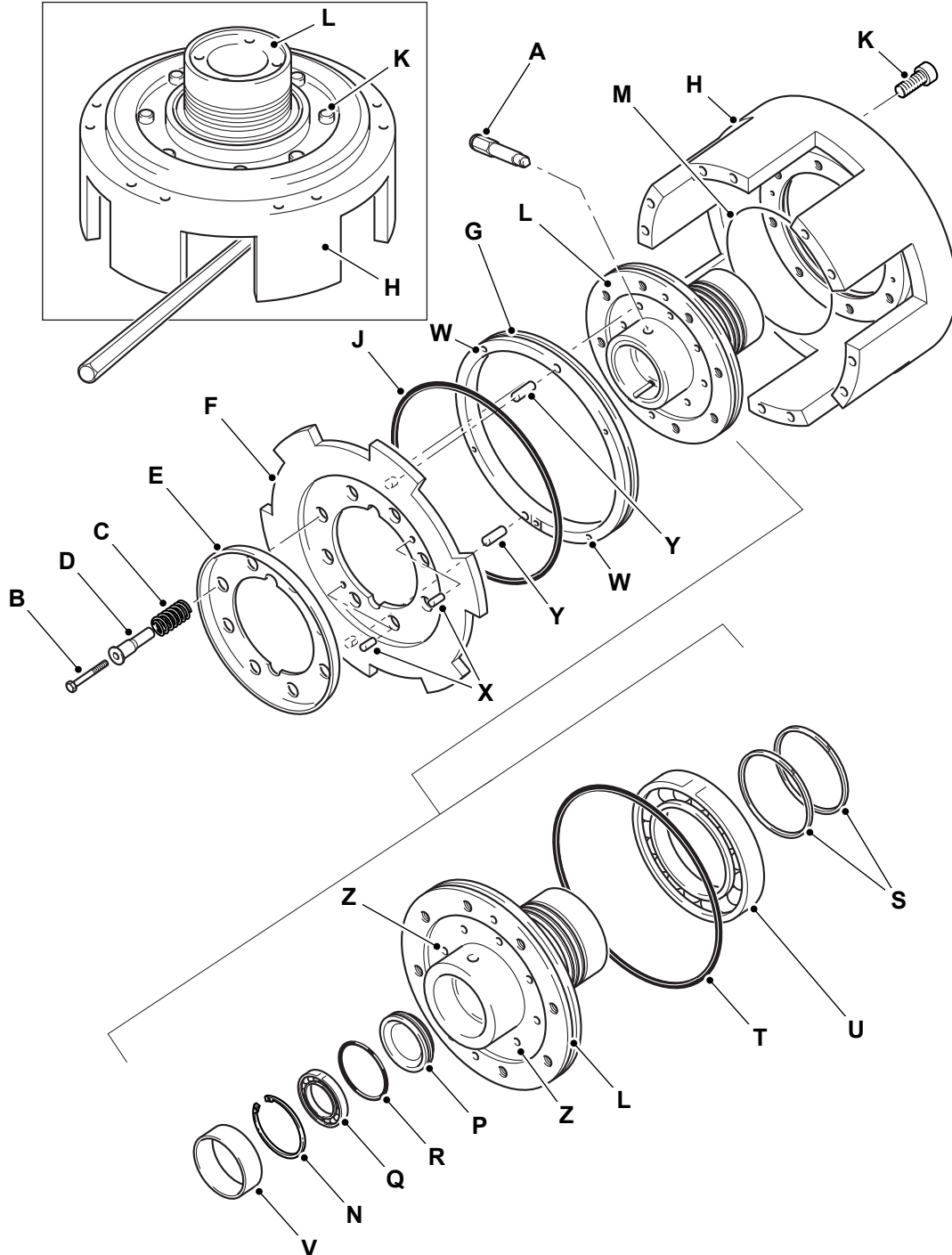
### Disassembly

1. Remove the lubrication nozzles.
2. Remove the bolts.
3. Remove the release springs and the spring pillars then discard the springs.
4. Remove the oil baffle plate from the locating dowel 1.
5. Remove the pressure plate.
6. Make sure that you do not lose the dowel 1 and dowel 2
7. Remove the piston from the drum.

8. Use M6 bolt (x2) and suitable levers to help in removal of the piston.
9. Remove and discard the outer seal from the piston.
10. Remove the socket head capscrews (x8).
11. Use a suitable bar to prevent drum rotation.
12. Use a soft faced hammer to tap out the hub from the drum.
13. Remove and discard the O-ring 1 from the drum.
14. Remove the circlip.
15. Use a suitable drift to tap out the blanking disc together with the inner bearing.
16. Remove and discard the O-ring 2.
17. Remove and discard the iron sealing ring.
18. Remove and discard the inner piston seal from the hub.
19. Do not remove the outer bearing unless it is to be replaced with a new one.
20. At the time of removal the bearing can be damaged. When the bearing is removed it must be replaced.
21. To remove the outer bearing, screw in two jacking bolts at their correct location on the hub.
22. If the bronze bush is to be replaced, then remove it with a suitable puller and slide hammer.

Special Tool: [Slide Hammer Kit \(Qty.: 1\)](#)

Figure 580.



**Table 245.**

Item	Description
A	Lubrication nozzles
B	Bolts
C	Springs
D	Spring pillars
E	Oil baffle plate
F	Pressure plate
G	Piston
H	Drum
J	Outer seal
K	Socket head capscrews (x8)
L	Hub
M	O-ring 1
N	Circlip
P	Blanking disc
Q	Inner bearing
R	O-ring 2
S	Sealing ring

Item	Description
T	Inner piston seal
U	Outer bearing
V	Bronze bush
W	M8 bolt (x2)
X	Dowel 1
Y	Dowel 2
Z	Jacking bolts (x2)

### Assembly

Assembly is the opposite of the disassembly procedure but additionally follow the steps below.

1. Check that the oil feed slots and drillings are clear.
2. Check the condition of the pressure plate, if it is excessively scored then replace with a new one.
3. If it is necessary to replace the pressure plate, dowel 1 and dowel 2 must be installed to the plate before assembly.

**Buy Now**



Our support email:

[ebooklibonline@outlook.com](mailto:ebooklibonline@outlook.com)