Service Manual

Liftall 1253/1202/1553/1554

Service Manual - Liftall 1253/1202/1553/1554

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World Class
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Torque

Torque Settings

Use only where no torque setting is specified in the test.

Values are for dry threads and may be within three percent of the figures stated. For lubricated thread the values should be reduced by one third.

Table 1.

Bolt Size	**Hexagon (A/F)**		**Torque Setting**		
In	(mm)	In	Nm	Kgfm	lbf ft
1/4	(6.3)	7/16	14	1.4	10
5/18	(7.9)	1/2	28	2.8	20
3/8	(9.5)	9/16	49	5.0	36
7/16	(11.1)	5/8	78	8.0	58
1/2	(12.7)	3/4	117	12.0	87
9/10	(14.3)	13/16	170	17.3	125
5/8	(15.9)	15/16	238	24.3	175
3/4	(19.0)	11/8	407	41.5	300
7/8	(22.2)	15/16	650	66.3	480
1	(25.4)	11/2	970	99.0	715
11/4	(31.7)	17/8	1940	198.0	1430
11/2	(38.1)	21/4	3390	345.0	2500

Table 2. Metric Grade 8.8 Bolts

Bolt Size	**Hexagon (A/F)**		**Torque Setting**		
M5	(5)	8	7	0.7	5
M6	(8)	10	12	1.2	9
M8	(8)	13	28	3.0	21
M10	(10)	17	56	5.7	42
M12	(12)	19	98	10	72
M16	(16)	24	244	25	180
M20	(20)	30	476	48	352
M24	(24)	36	822	84	607
M30	(30)	46	1633	166	1205
M36	(36)	55	2854	291	2105

Note: *All bolts used on JCB machines are high tensile and must not be replaced by bolts of a lesser tensile specification.*

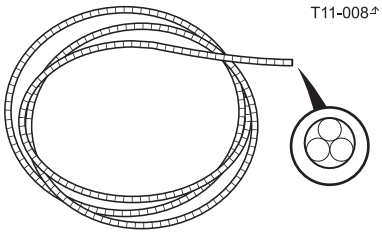

Fig 33. 892/00849 Braided Cutting Wire

Consumable heavy duty cut-out wire used with the glass extraction tool. ⇨ *Fig 30. (1-16)*. Approx 25 m length.

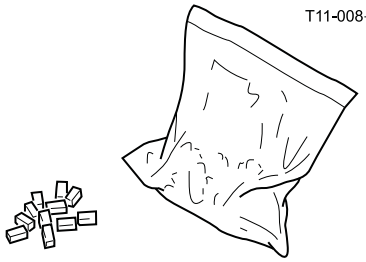

Fig 34. 926/15500 Rubber Spacer Blocks

Used to provide the correct set clearance between glass edge and cab frame. Unit quantity = 500 off.

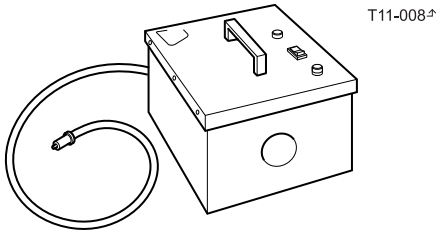

Fig 35. 992/12300 Mobile Oven 12V

1 cartridge capacity. Required to pre-heat adhesive prior to use. It is fitted with a male plug (703/23201) which fits into a female socket (715/04300).

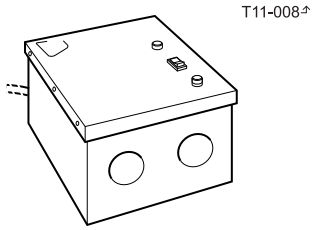

Fig 36. 992/12400 Static Oven 240V

Required to pre-heat adhesive prior to use. No plug supplied.

Note: *110V models available upon request - contact JCB Technical Service.*

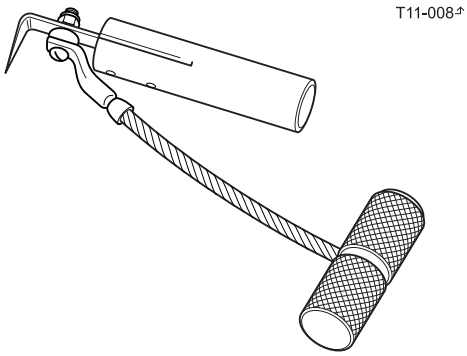

Fig 37. 992/12800 Cut-Out Knife

Used to remove broken glass.

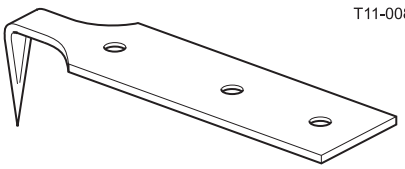

Fig 38. 992/12801 'L' Blades

25 mm (1 in.) cut. Replacement blades for cut-out knife. ⇨ *Fig 37. (1-17)*. Unit quantity = 5 off.

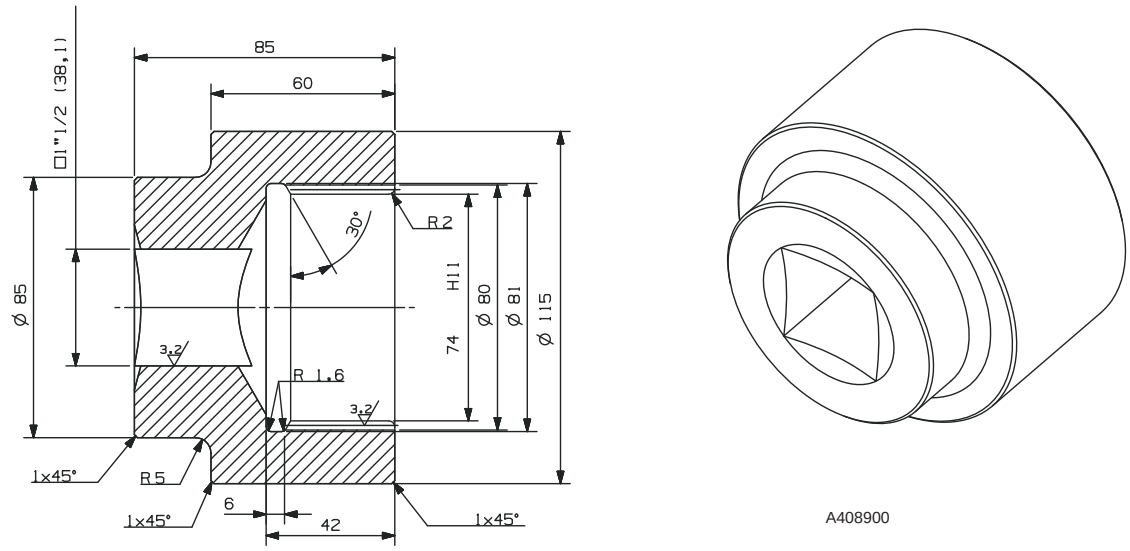

Fig 66. Socket Box Wrench

Note: *For disassembly and assembly of slew motor gearbox. This tool can not be ordered from JCB.*

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(1) If working conditions are extremely dusty and quality of fuel/ lubricant is poor, please change filters earlier than specified period.
(2) Bolts loosening to be checked and worn out lock nuts to be replaced.
(3) Front brake shoe carrier mounting nuts to be checked for loosening at regular intervals and are to be replaced only. Discard old worn out lock nuts.
(4) Wire rope care and lubrication is required at regular intervals for trouble free operations. With time and usage of the machine, the extension and retraction wire rope gets loose and it can affect the boom operations. Adjust the wire rope tension properly.

Shackle Inspection

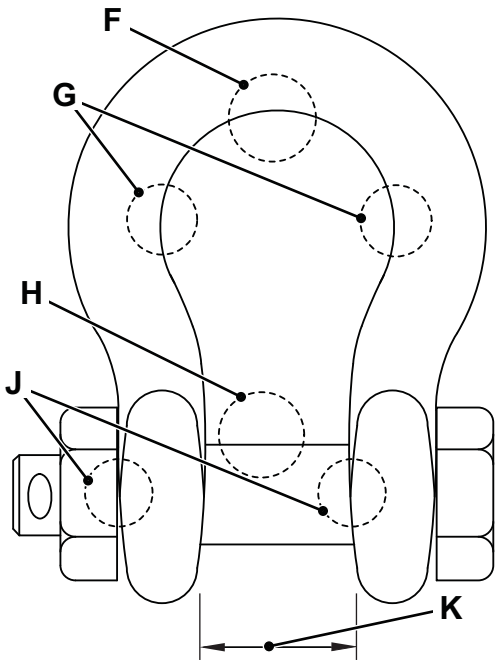

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Fig 4.

F Check for wear

G Check for wear

H Check for wear and straightness

J Check to insure the pin is seated

K Check Shackle for opening

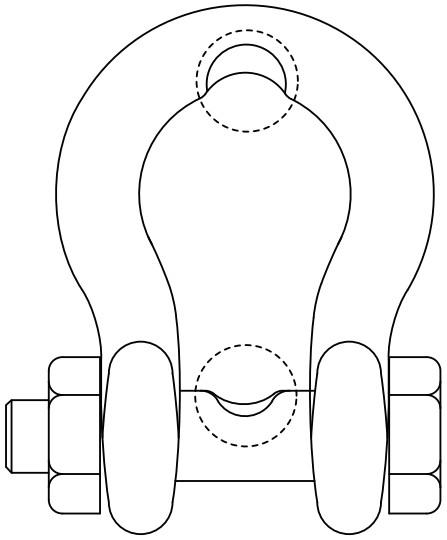

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Fig 5.

Check shackle for excessive wear. ⇒ *Fig 5. (3-20)*.

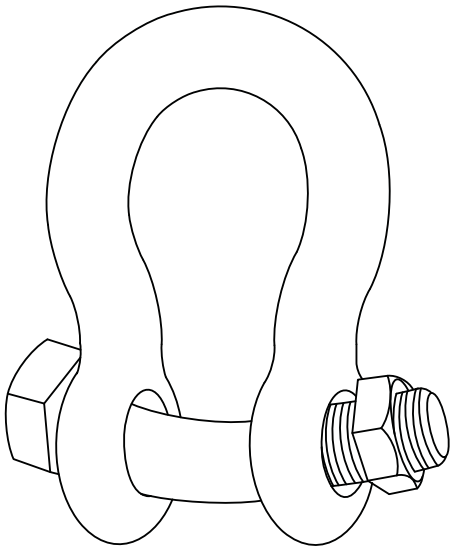

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Fig 6.

Look for improper replacement of pins. ⇒ *Fig 6. (3-20)*.

Do not replace a pin with a bolt or any other fastener. ⇒ *Fig 6. (3-20)*.

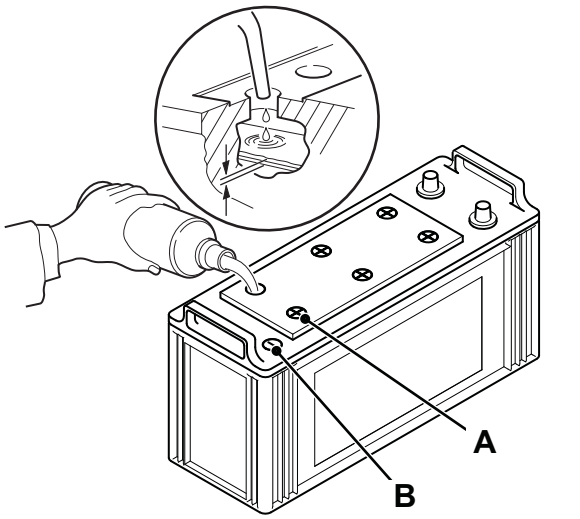


Fig 23.

4 Refit battery.

5 Close and lock the access panels.

Changing the Filter Elements

Note: *Do not try to wash or clean the elements, they must be replaced.*

Note: *In dusty conditions, replace the outer-element more frequently than the service schedule recommendation. Install a new inner-element every other time the outer element is replaced. As a reminder, put a mark on the inner-element with a felt tip pen when you only replace the outer-element.*

1 Stop the engine. Refer to ⇨ ***Prepare the Machine for Maintenance (3-13)***.

2 Clean the pre-cleaner. ⇨ ***Cleaning the Pre-Cleaner (3-38)***.

3 Open the side cover to access the air cleaner.

4 Release the clamps and remove outer end cap **B**.

5 Remove the outer element **G**.

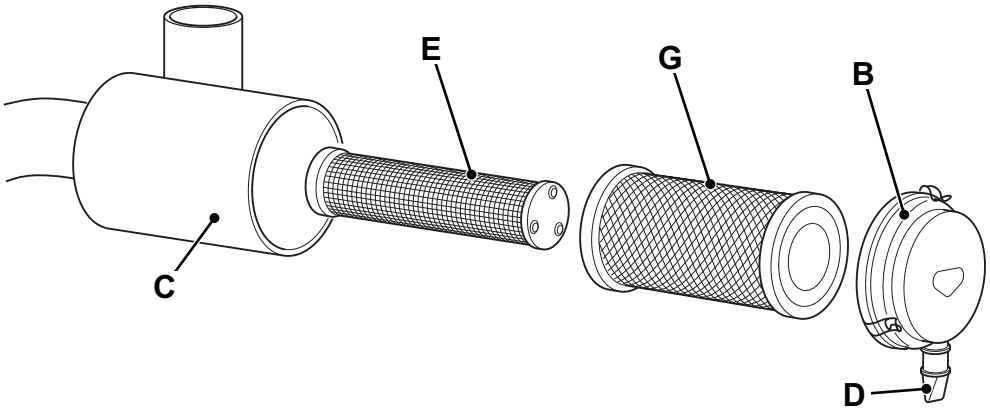
Pull out the element **G**. Take care not to tap or knock the element as you remove it.

6 Clean the canister

Clean the inside of the canister **C** and dust valve **D** ⇨ ***Fig 36. (3-40)***.

7 Fit a new element**.**

Insert the new element into the canister. Make sure it seats correctly. Check all hoses for condition and tightness.



D023849

Fig 36.

Hydraulic Tank Cap/Breather

The hydraulic tank cap/breather (and filter) forms an integral part of the hydraulic tank cap **B**. Replace the cap (and breather filter) with a new one at the recommended interval. ⇨ *Fig 45. (3-50)*.

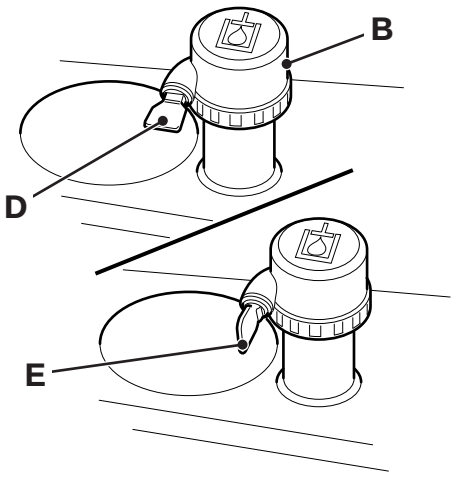


Fig 45.

The cap incorporates a side mounted barrel lock that is operated by the ignition/door key. It is important to note that the seal must be in good condition and correctly installed in the cap.

Fit the Cap

Insert the key and turn anticlockwise **D**, screw the cap on until resistance is felt then turn a further quarter of a turn, turn the key clockwise **E** and remove the key. With the key removed the cap will rotate and can not be undone.

Remove the Cap

Insert the key and turn anticlockwise **D**, unscrew the cap ⇨ *Fig 45. (3-50)*.

Note: *The key must be inserted in the cap when removing and fitting.*

Changing the Return Line Filter Element

⚠ WARNING

Fluid Under Pressure

Fine jets of fluid at high pressure can penetrate the skin. Keep face and hands well clear of fluid under pressure and wear protective glasses. Hold a piece of cardboard close to suspected leaks and then inspect the cardboard for signs of fluid. If fluid penetrates your skin, get medical help immediately.

INT-3-1-10_2

1 Refer to ⇨ *Prepare the Machine for Maintenance (3-13)*

2 Remove the hydraulic tank filler cap.

3 Remove the nuts **C**, cover plate **D** and seal **E**.

4 Remove the complete element assembly **F** and the seal.

5 Remove the nut and spring **K**.

6 Remove the filter element **L** from the spindle and clean magnets **J**.

7 Install the new element **L** and the new seals **G** and **H**.

8 Put the cover plate **D** in position and tighten the nut **C**.

9 Add the recommended hydraulic fluid to the correct level.

10 Attach the filler cap and make sure its tight.

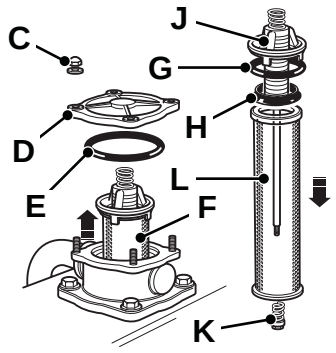


Fig 46.

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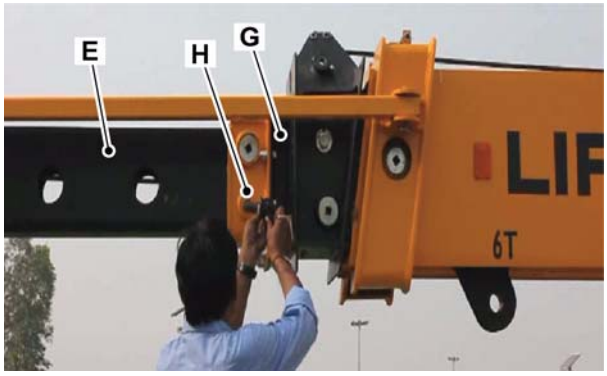
Retracting the 4th Stage Boom inside the Boom Assembly

Refer to following instructions carefully before trying to retract the 4th stage boom inside the boom assembly; Use a suitable platform/ramp to access and carry out the 4th stage boom retraction.

1 Remove the securing pin **H** between inner boom **G** and 4th stage boom **E** rear side. ⇨ *Fig 13. (B-9)*



D068540-12

Fig 14.

2 Now lift up the boom assembly slightly by 5º-10º by operating the lift ram lever. This is required to ensure smooth retraction of 4th stage boom later.

D068540-13

Fig 15.

3 Now operate the winch lever in reverse such that snatch block **L** is fully butting the 4th stage boom **E** nose. After this, keep operating the winch lever in reverse i.e. pulling the snatch block secured at boom base, it will also pull the 4th stage boom inside the boom assembly.

Note: *Do not operate the winch at high speed; operate it at idle rpm (750-800) only.*

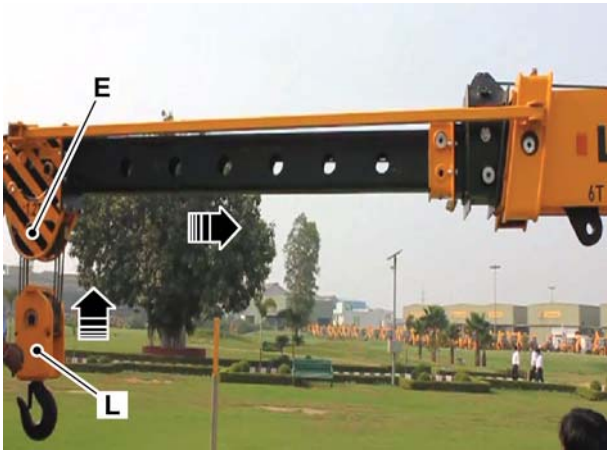


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Fig 16.

4 Stop the winch lever operation when 4th stage boom **E** is completely inside the inner boom **G**. Re-secure pin **H** between inner boom **G** and 4th stage boom **E** front side.

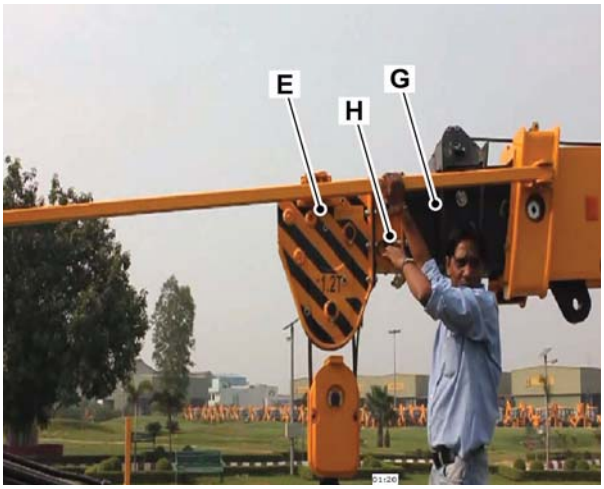

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Fig 17.

5 The machine with 4th stage boom in is ready for use now.

Standard Wear Pads Assembly – Liftall 1253

Different sets of wear pads are provided in boom assembly to ensure running clearance among boom members in assembled condition. These clearances need to be maintained for the trouble free and smooth extension/ retraction operation of the boom assembly.

These wear pads are consumable items with a limited life subjected to wear and tear. Change period depends upon the usage, application and routine maintenance of the boom assembly.

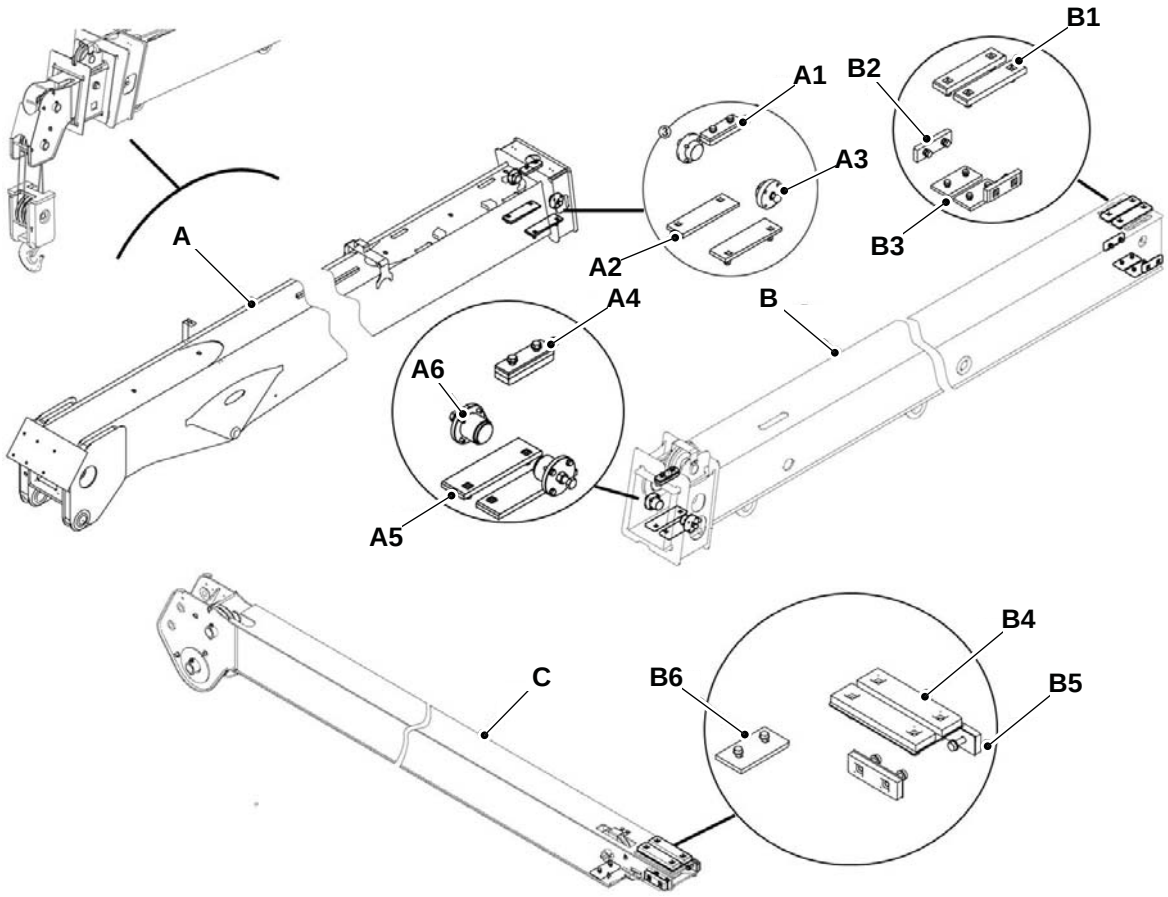

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Fig 27. Standard Wear Pad Assemblies in Liftall 1253

A1, **A2** and **A3**	Between outer boom **A** and middle boom **B** front side.
B1, **B2**, and **B3**	Between outer boom **A** and middle boom **B** rear side.
A4, **A5**, and **A6**	Between middle boom **B** and inner boom **C** front side.
B4, **B5**, and **B6**	Between middle boom **B** and inner boom **C** rear side.

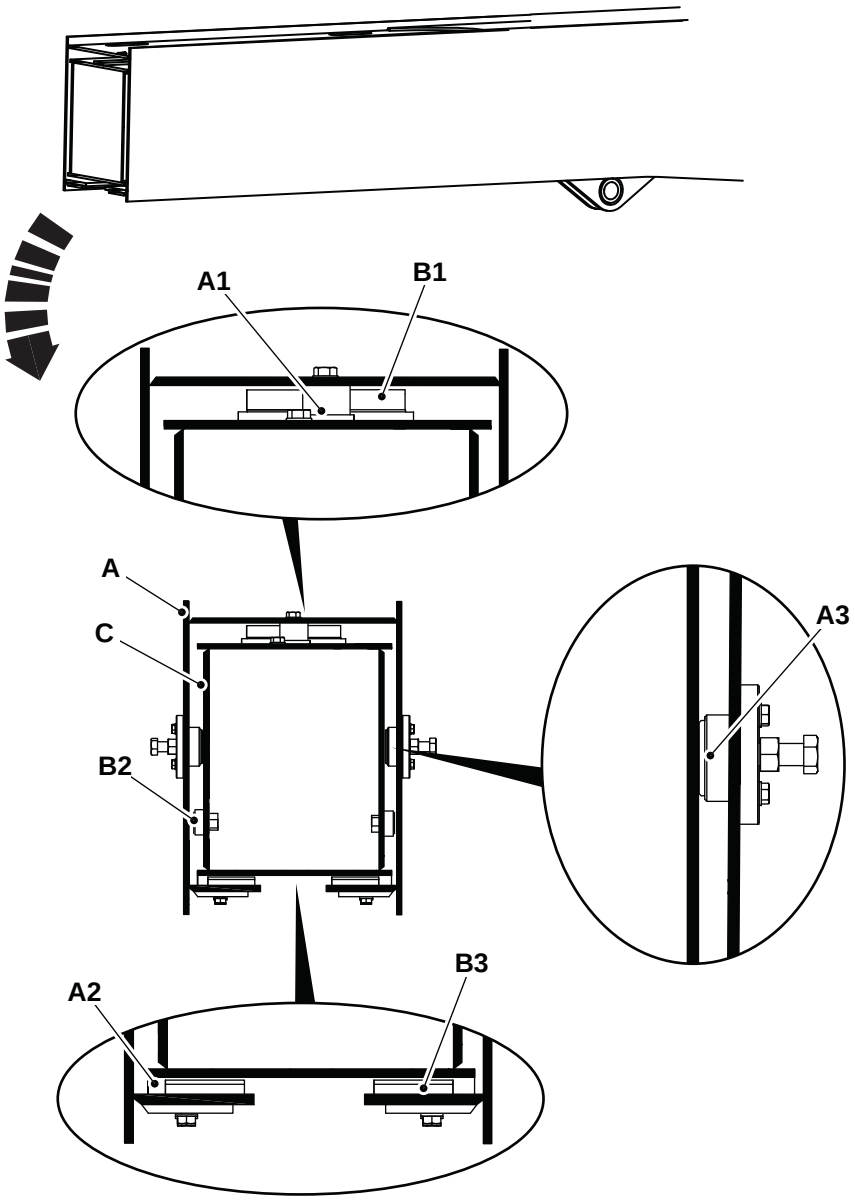

Fig 34. Standard Wear Pads Assembly Arrangement – Liftall 1202

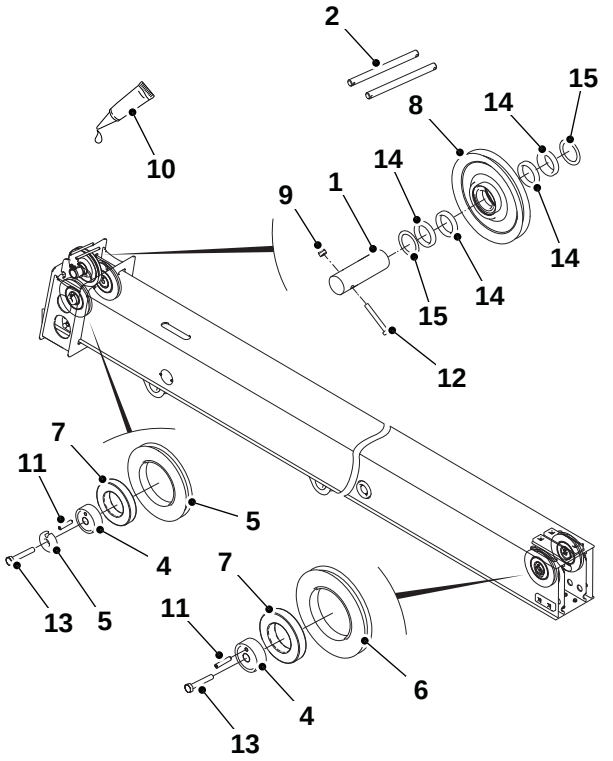

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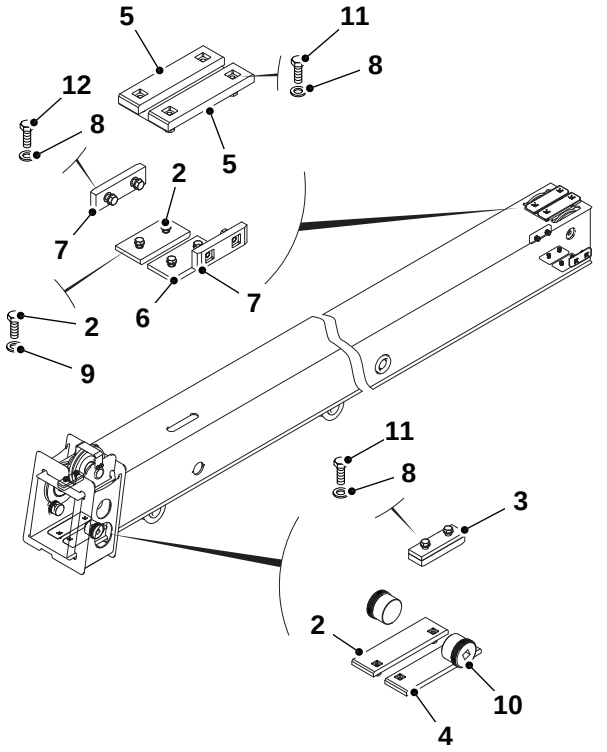
Fig 45. Intermediate Boom Pulley Installation

Item	Description	Qty.
1	Inner boom pin	1
2	Guide rope	2
3	Bolt M24 x 50	2
4	Tapped boss	4
5	Clamp nut	2
6	Middle boom pulley	4
7	Ball bearing deep groove	4
8	Pulley assembly	1
9	Lock nut	1
10	Loctite 262	1
11	Grub screw M10 x 50 long	4
12	Bolt M10 x 80	1
13	Bolt	2
14	Pulley spacer	4
15	Pulley shim	2

Note: *Ensure that the pulleys, guards are not damaged and fitted properly. Always replace if damaged, bent or broken otherwise it can lead to winch rope jumping out pulley and getting damaged.*



D068540-37

Fig 46. Intermediate Wear Pad Assembly

Item	Description	Qty.
1	Adjuster assembly	
2	Setscrew M19 x 20mm	
3	Wear pad spacer 12mm	
4	Wear pad	
5	Wear pad	
6	Wear pad 150 x 75 x 14.25mm	
7	Wear pad 45 x 150 x19mm	
8	Plain washer	
9	Plain washer	
10	Wear pad assemble 2mm	
11	Screw M12 x 35mm	
12	Setscrew	

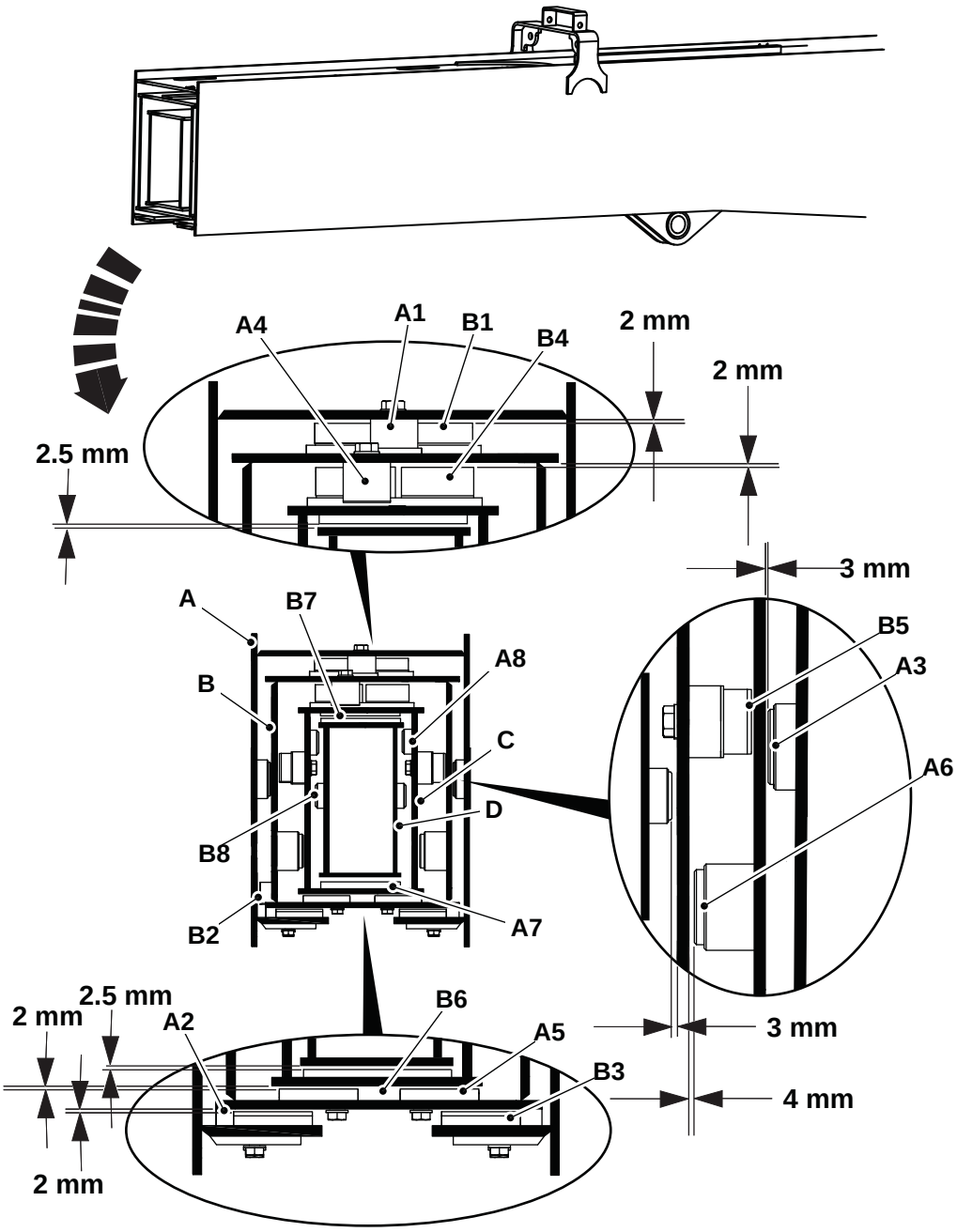


Fig 59.

To Adjust the Clearance from Top and Bottom Sides of the Boom Members

Inspect the wear pads **A1**, **A2**, **A4**, **A5**, and **A7**. If pads have worn-out and clearance among boom members have increased, then shimming can be done by removing the pad and adding the shim below wear pads **A1** and **A4**. This will ensure that boom assembly clearance is restored to its original condition. Use shims properly while fixing the clearance. However If pads have worn-out, and pad insert/

Overload Spring Assembly/Disassembly

Overload Spring Assembly/Disassembly Procedure

Liftalls are fitted with an overload spring assembly **A** which is fitted along pivot pin assembly of mainframe **B** and yoke **C**.

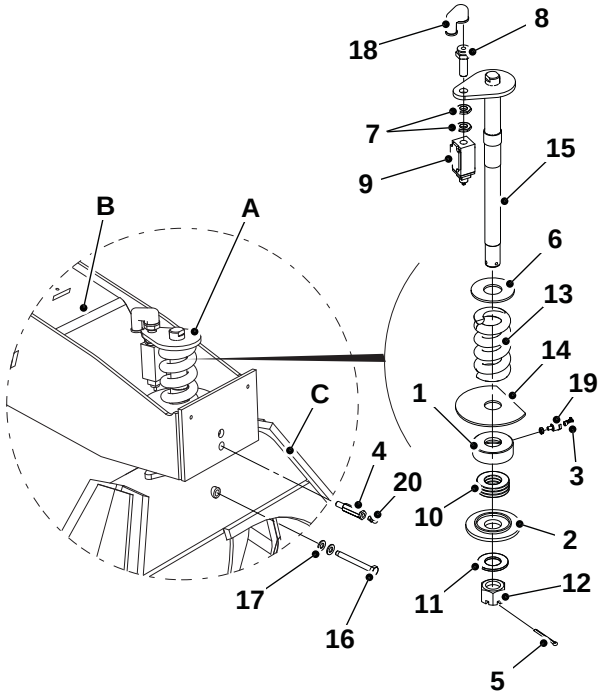


Fig 75.

Item	Description	Qty.
1	Bearing housing	1
2	Bearing plate	1
3	Grease nipple 90º	1
4	Grease nipple adaptor	1
5	Pin cotter	1
6	Washer	1
7	Nut 3/4” UNF hex thin	2
8	3/4” UNF bolt	1
9	Limit switch	1
10	Thrust bearing	1
11	Small bright Inch	1
12	Main pivot nut	1
13	Spring	1
14	Plate	1
15	Main pivot bolt	1
16	Special locking bolt	1
17	Plain washer M10	2
18	Switch cover	1
19	Grease nipple adaptor	1
20	Grease nipple 1/8”	1

This overload spring assembly consists of an overload limit switch **9** that gives an audio visual warning to the operator if there is an overloading.

Overload Spring Assembly and Bearing Change Procedure

Old Liftall machines up to serial number 6600774 (PTL Transmission) and up to serial number 1900689 (ITL Transmission) were using smaller size overload spring assembly, while a bigger diameter spring assembly has been introduced to withstand consequential failures from machine serial number 6600776 onwards and from serial number 1900690 onwards for ITL Transmission.

Note: *Before carrying out the modification, ensure that correct procedure is being followed as per above machine number information.*

Fitment

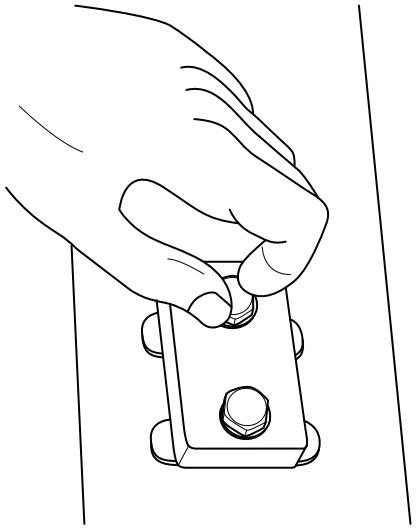


Fig 92.

1 Carefully put the sensor on the mounting surface.

2 Hand tighten both the fixing bolts. ⇒ *Fig 92. (B-70)*

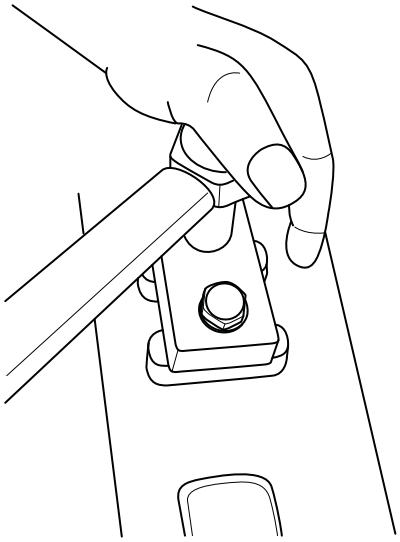


Fig 93.

3 Use a torque wrench and tighten one of the fixing bolt to a torque of 67-70Nm (M10). ⇒ *Fig 93. (B-70)*

4 Give a full torque to other bolt.

Note: *Do not overtighten the bolts.*

Sensor Output Test

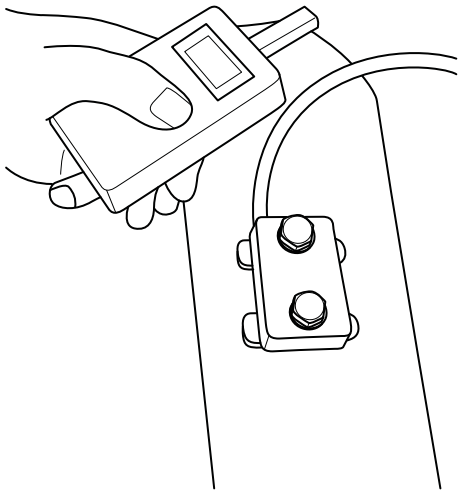


Fig 94.

1 After tightening of the bolts, plug the sensor into the installation test box.

2 Press the test button and check that the sensor output is within the specified range (44mA - 56mA).

Note: *If the reading exceeds the specified range, refer* ⇒ *Adjustment for Out of Range Sensor (B-70)*

Adjustment for Out of Range Sensor

If the output exceeds the allowable range, perform the following steps:

1 Fully loosen and then re-torque the first bolt that was tightened. Re-check output.

2 If the output is still outside the specified range, loosen both the bolts fully and re-torque in the opposite order to the first installation.

3 If the output is still outside the specified range, remove the sensor and clean it. Clean the pad on the surface.

How to Test a Diode or a Diode Wire

A diode wire is a diode with male connector fitted on one end and a female connector fitted on the other end. The diode is sealed in heatshrink sleeving.

1 To test a Diode or a Diode Wire

a On the FLUKE 85.

i Turn the switch to position **D**.

ii Press the **HOLD** button and check that the H sign appears at the top right hand side of the display window.

iii Connect the black probe to the end of the diode with a band or to the male connector of the diode wire. Connect the red probe to the other end of the diode or diode wire. If the beeper does not sound the diode or diode wire is faulty.

iv Connect the red probe to the end of the diode marked with a band, or to the male connector of the diode wire, the black probe should be connected to the other end of the diode or diode wire. If the beeper sounds or the meter does not read **O.L.**, the diode or diode wire is faulty.

v Press the HOLD button and check that the **H** sign disappears from the right hand side of the display window.

b On the AV0 2003.

i Move the right hand slider to position **A**, and the left hand slider switch to position **C**.

ii Connect the black probe to the end of the diode marked with a band, or to the male connector of the diode wire, the red probe should be connected to the other end of the diode or diode wire. If the Avometer does not buzz the diode is faulty.

iii Connect the red probe to the end of the diode marked with a band, or to the male connector of the diode wire, the black probe should be connected to the other end of the diode or diode wire. If the Avometer does not read "1" the diode is faulty.

c On an analogue meter.

i Select the Ohms 1000s (1k) range.

Connect the black probe to the end of the diode marked with a band, or to the male connector of the diode wire, the red probe should be connected to the other end of the diode or diode wire. The meter should read 20- 400 KW, if it reads more than this the diode is faulty.

ii Select the Ohms 100s range.

Connect the red probe to the end of the diode marked with a band, or to the male connector of the diode wire, the black probe should be connected to the other end of the diode or diode wire. The meter should read 300- 400W, if it reads less than this the diode is faulty..

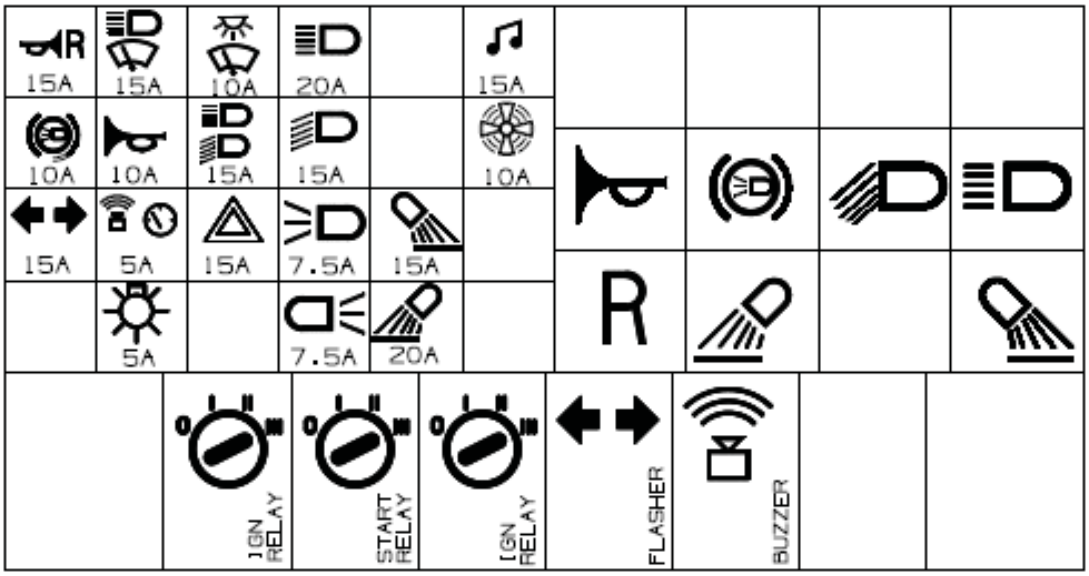


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Fig 15. Fuse Box Lable (Liftall 1253/1202/1553/1554)

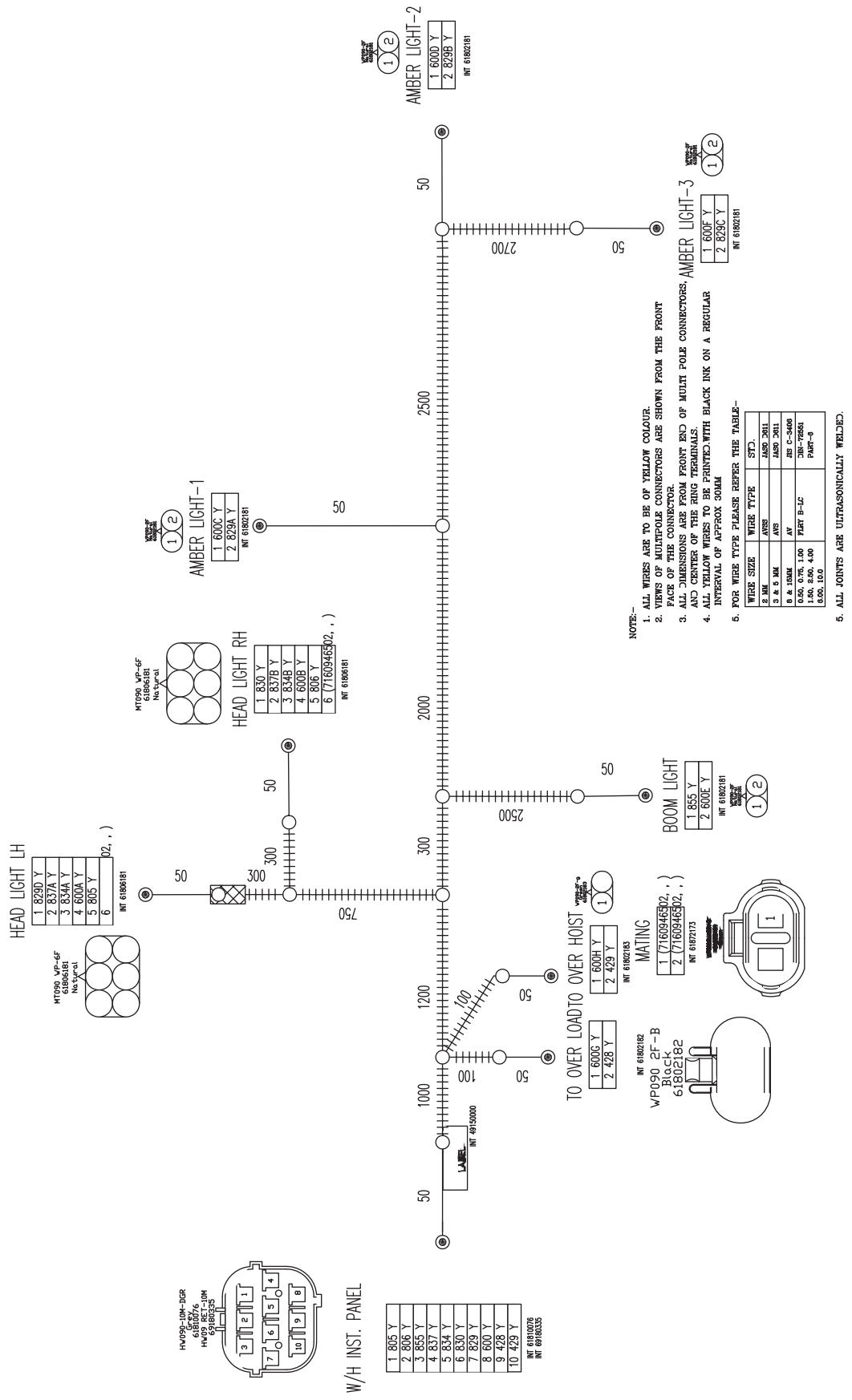


Fig 23. 332/Y7445

Table 1.

Lever Movement	Steering	Boom Lift	Boom Extension	Winch (Hoist)
Neutral	Remain in position	Boom remains in position	Boom remains in position	Snatch block remains Stationary
Forward (Away from operator)	Crane turns towards left	Boom is lowered	Boom extends	Snatch block is lowered
Backward (Towards Operator)	Crane turns towards right	Boom is raised	Boom retracts	Snatch block is raised

Cut-in Information	Cut-in Number
Control valve directly mounted inside cabin	Up to serial number 6600467
Control valve mounted through remote linkage arrangement	From serial number 6600468

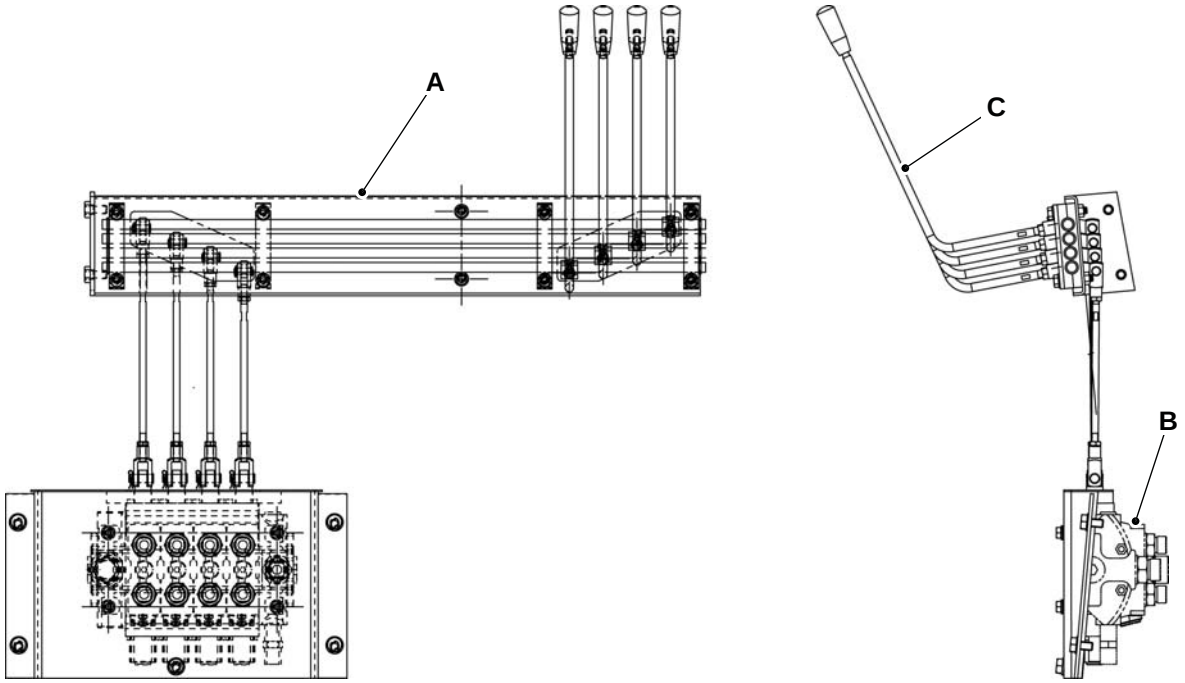


Fig 2. New Remote Linkage Control Valve Arrangement

A Remote linkage arrangement

B Control valve

C Main levers

Note: *Verify the linkage arrangement before ordering parts for repair/replacement as per machine serial numbers.*

Note: *Old liftalls had control valve directly mounted inside cab and four levers arrangement for operating the hydraulic system, whereas new liftalls are now having a remote linkage arrangement* ***A*** *to operate the control valve* ***B*** *which has been shifted to the wall of cabin. The main levers* ***C*** *are connected to this remote linkage for operating the control valve.* ***⇨ Fig 2. (D-2)***

Notes:

Circuit Schematics

Circuit Schematics

For liftall 1253, liftall 1202 (with winch), Liftall 1553 and Liftall 1554 ⇨ *Fig 9. (E-10)*.

Pump Cartridge Assembly

1 Insert all vane pins with special tool in the rotor.

Make sure to use flat pin, without chamfer.

Keep the rotor on the front pressure port plate. ⇨ *Fig 15. (E-18)*

Fig 15.

2 Fit vanes in all the slots of the rotor. Ensure the flat face is towards the rotor. ⇨ *Fig 16. (E-18)*

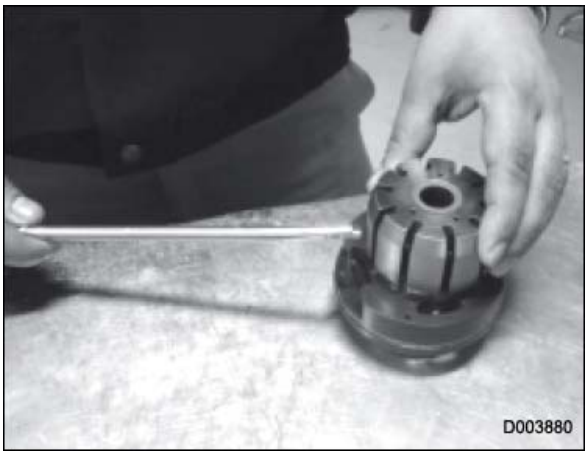


Fig 16.

3 Use correct cam ring marked VTG-14 for the 46 CC per rev displacement and fit dowel pins both sides. ⇨ *Fig 17. (E-18)*

Fig 17.

4 Place the cam ring on the front pressure port plate and rotor assembly.

Ensure port on the cam ring and front pressure plate match. ⇨ *Fig 18. (E-18)*

Fig 18.

5 Fit the rear port assembly (already fitted with bush) on to the assembly and fit the screws.

Do not tight the screws. ⇨ *Fig 19. (E-19)*

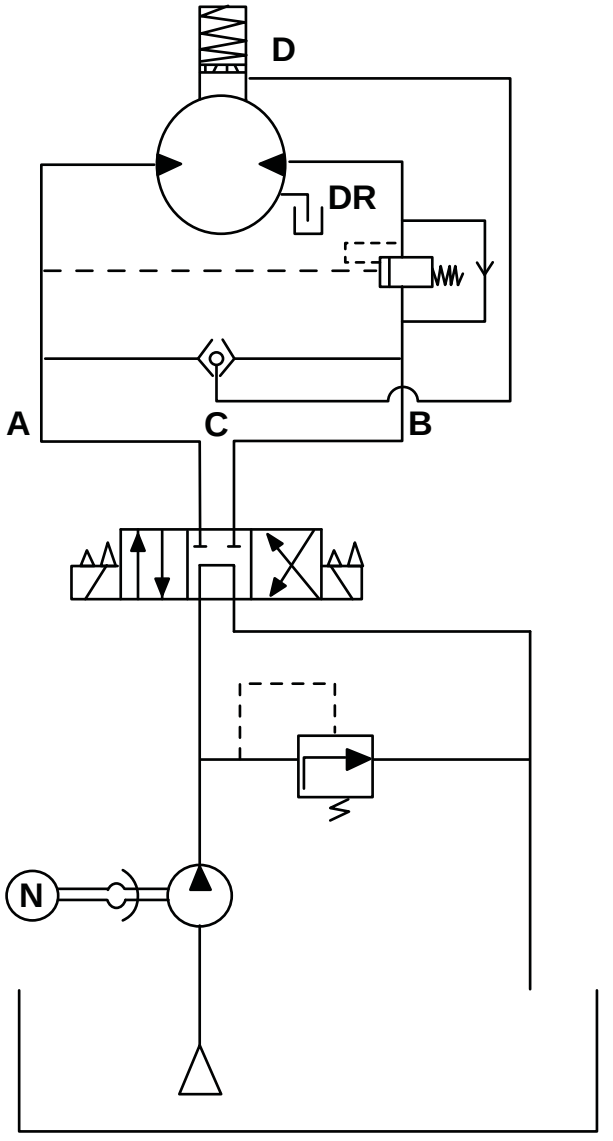
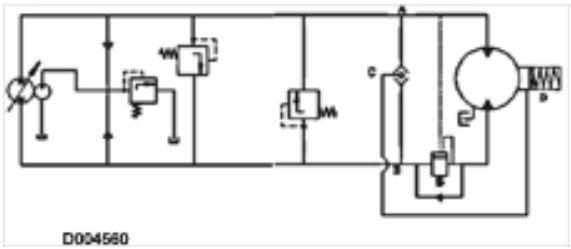


Fig 32.

Hydraulic Circuit of Winch



D04560

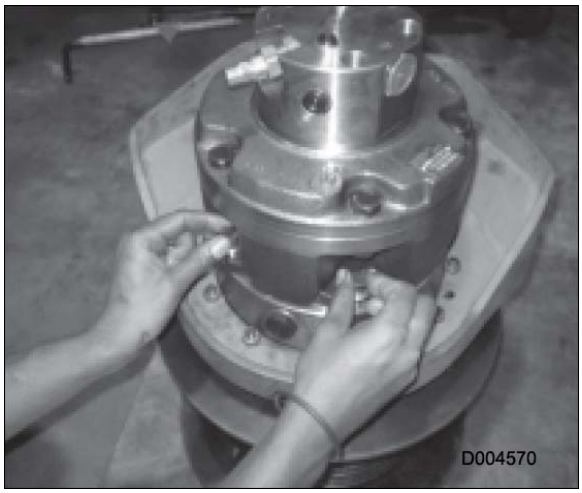
Fig 33.

Winch Overhauling

Disassembly of Hydraulic Motor

Following steps describes the disassembly procedure of the hydraulic motor.

1 Unscrew M10×35 hex head bolt. ⇨ *Fig 33. (E-26)*



D004570

Fig 34.

2 Remove the hydro motor assembly. ⇨ *Fig 35. (E-27)*

Fig 70.

18 Fix the M10×55 SHCS bolts to a torque of 78 Nm. ⇨ *Fig 71. (E-36)*

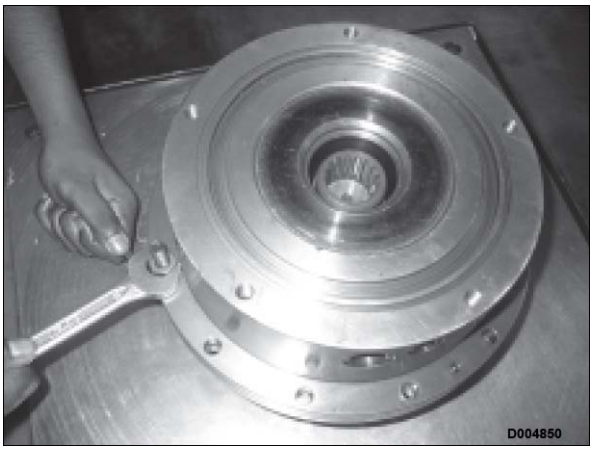


Fig 71.

19 Fix the M6×35 SHCS bolt in the counter bolt hole. ⇨ *Fig 72. (E-36)*

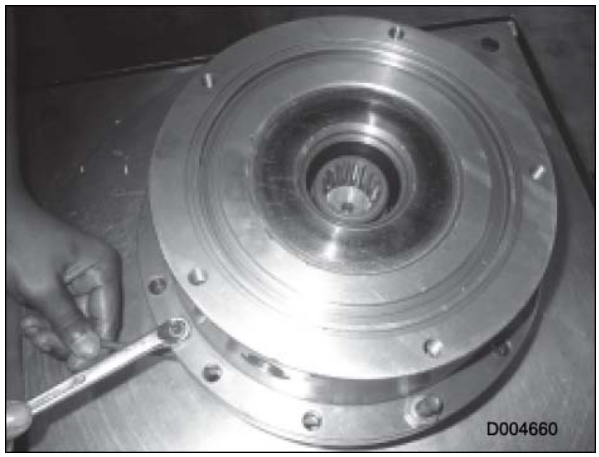


Fig 72.

20 Fix the oil window. ⇨ *Fig 73. (E-36)*

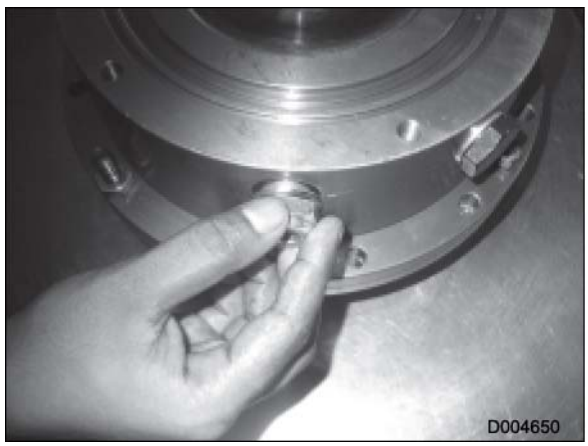


Fig 73.

Note: *Ensure that oil plug are hand tightened only. Do not overtighten it else it may damage the threads.*

21 Fix the metallic plugs after assembly ⇨ *Fig 74. (E-37)*

Hydraulic Winch (Liftall 1553 & Liftall 1554)

Item	Description	Quantity
1	Plug	2
2	Washer copper	2
3	Drum winch	1
4	Bearing ball	1
5	Joint O-ring	1
6	Retainer oil seal	1
7	Flange closing	1
8	Capscrew head socked	6
9	Plate fastening surface	1
10	Motor side support	1
11	Capscrew head socked	8
12	Plate fastening surface	1
13	Capscrew head hex socked	10
14	Flange antirotation	1
15	Gear side support	1
16	Ring -V	1
17	Capscrew hex socked head	6
18	Clamp	3
19	Flange side	1
20	Screw hexagon	8
21	Cross member	2
22	Oil level plug	1
23	Oil retainer seal	1
24	Joint O-ring	1
25	Bearing ball	1
26	Ring retaining	1
27	Spacer	1
28	Gear reduction unit	1
29	Gear ring	1
30	Insert	1
31	Spring pin	1
32	Gear sun	1
33	Capscrew hex socked head	12
34	Capscrew hex socked head	8
35	Brake flange mount	1
36	Seal	1
37	Ring shoulder	1

Item	Description	Quantity
38	Capscrew head socked	8
39	Sleeve	1
40	Disk bronze	13
41	Disk steel	12
42	Brake body	1
43	Joint O-ring	1
44	Joint O-ring	1
45	Ring anti-extrusion	1
46	Ring anti-extrusion	1
47	Piston	1
48	Washer belleville	2
49	Shim	1
50	Motor mounting flange	1
51	Capscrew head hex socked	9
52	Joint O-ring	1
53	Shim	4
54	Bushing	2
55	Capscrew hex socked head	2
56	Hydraulic motor	1
57	Lowering control valve	1
58	Capscrew head socked hex	2
59	Pipe straight fitting	1
60	Connector	1
61	Brake unit	1

In case of oil replacement:

- Put a container under the drum to drain used oil
- Turn the drum to position the level hole to the lowest position
- Drain off oil completely
- Turn the drum to position the level hole on the horizontal axis and the filling hole on top
- Put oil through the filling hole until it pours out level hole
- Re-tighten level cap **B** and filling cap **A**.

Problems and Solutions

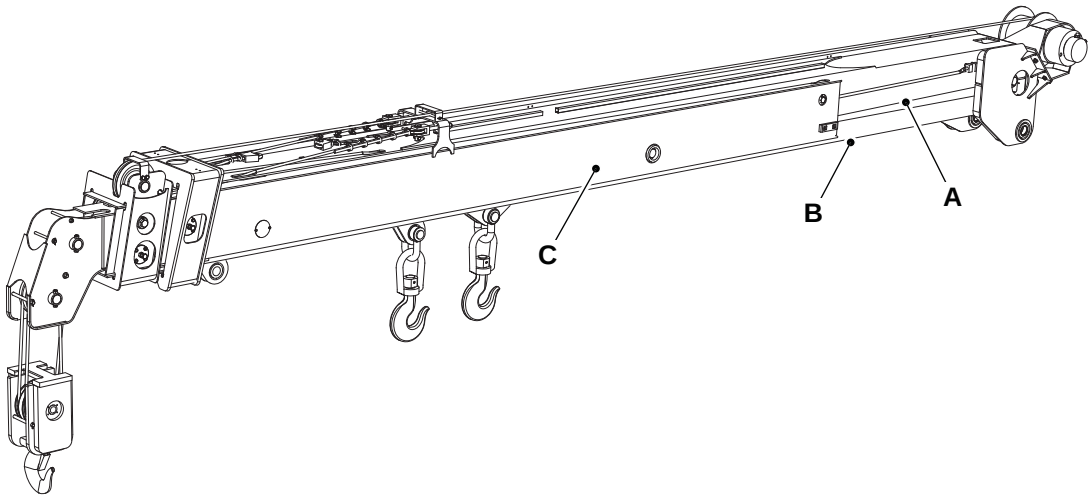
Note: If the problem persists, report to JCB authorized Dealer.

Troubleshooting

In the event of the winch malfunctioning, please refer to the table below to identify the cause of the problem and possible remedy.

Fault	Possible cause	Remedy
Noises in the hydraulic circuit	Presence of air in the circuit	Purge the circuit
Noises during hoisting accompanied by jerky rotation	Insufficient circulation of oil in the circuit	Operate the hoist with gradually increasing loads until it turns regularly and the noise disappears. If this condition occurs increase the quantity of oil in circulation. If this is not possible, contact Manufacturer Technical Office ***Note:*** The insufficient circulation might be caused by a pro longed choking of the oil flow by the operator manoeuvring the lever of the dealer. This operation is dangerous.
The load being lowered tends to fall	– Impurities in the valve – Cable wound in opposite direction to that indicated by the arrows	– Remove the valve and clean it with compressed air and naphtha. Check the cartridge of the circuit filter and replace it if necessary – Wind the cable in the direction indicated by the arrows
With the distributor/safety valve set in the centre the load tends to go down	– Excessively high counterpressure – Brake springs are broken	– Connect the drain of the motor directly to the tank – Replace springs – You are advised to have this operation performed by an authorised repair centre or by the manufacturer

Extension Ram



D068100-4

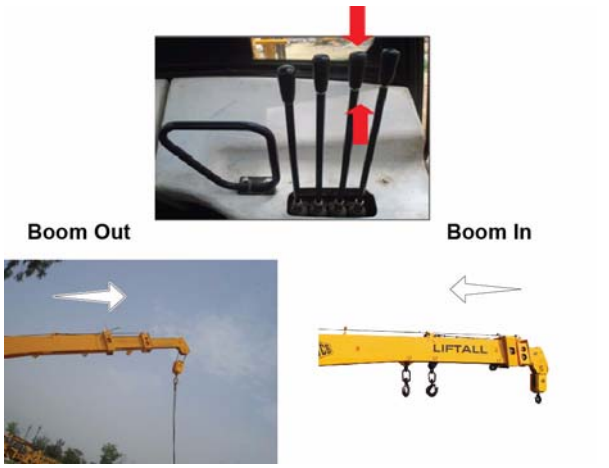
Fig 152.

Extension ram **A** is fitted between outer boom **B** and middle boom **C**. ⇨ *Fig 152. (E-74)*

Extension ram operation is controlled by the control valve extension ram spool section which is operated by a hand lever. Refer to ⇨ *Hand Operated RH Side Controls (D-1)*.

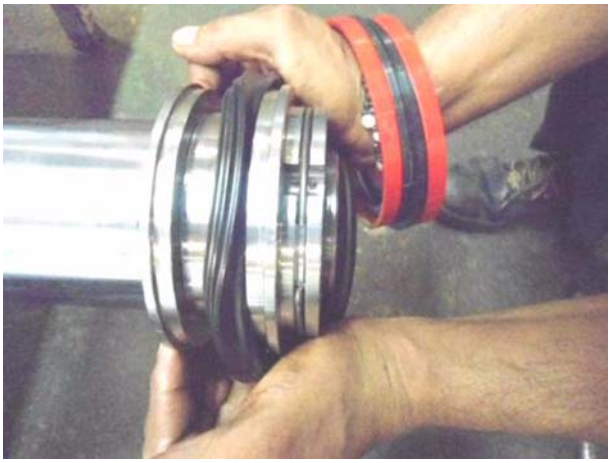
Table 13.

Lever Movement	Boom Extension
Neutral	Boom remains in position
Forward (away from operator)	Boom extends
Backward (towards operator)	Boom retracts



D068100-38

Fig 153.

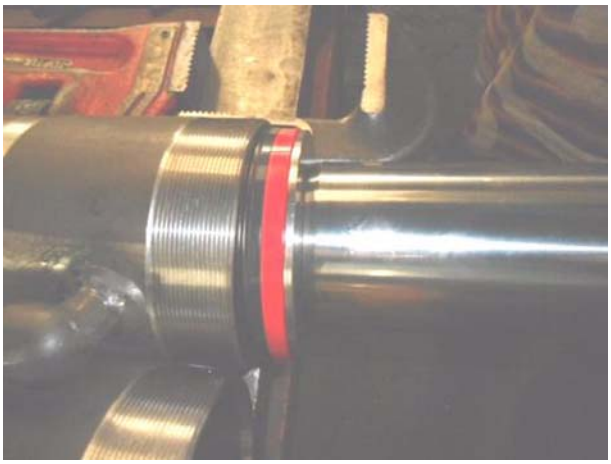


D068100-32

Fig 183.

17 Push the piston rod in to the face of tube, at this point carefully hold the rod with upward force and push the piston from cylinder tube. Ensure no damage to the piston seal. ⇨ *Fig 184. (E-84)*

Make sure not to damage to the piston seal.



D068100-33

Fig 184.

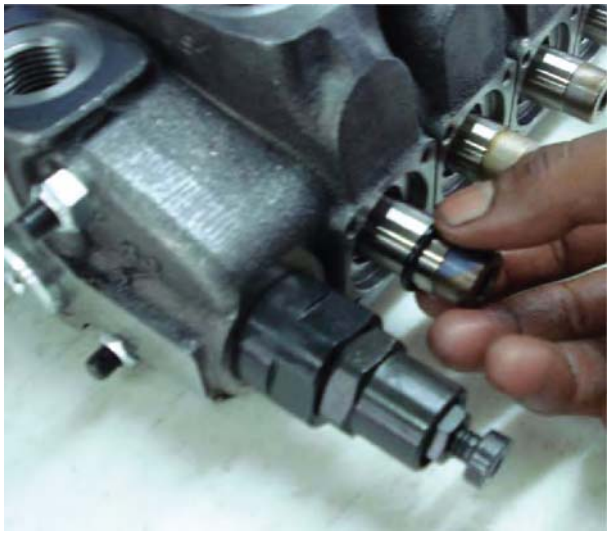
18 Insert the gland inside the cylinder tube carefully so that no damage to the O-ring from the cylinder tube threads.

After pushing the piston rod in tube then tight the gland two or three threads manually.

19 Use a C-spanner and tighten the gland. ⇨ *Fig 185. (E-84)*

D068100-34

Fig 185.



D067640-25

Fig 198.

12 Assemble the spacer in the groove provided in spool cavity. ⇒ *Fig 199. (E-90)*

D067640-26

Fig 199.

13 Assemble all the O-rings and spacer in all respective grooves.

D067640-27

Fig 200.

14 Apply a drop of thread lock on the control kit screw threads.

D067640-28

Fig 201.

15 Put control kit spring in between two bushes, then assemble these into the spool with control kit screw. ⇒ *Fig 202. (E-91)*

Tighten it to 9.8Nm torque. ⇒ *Fig 203. (E-91)*

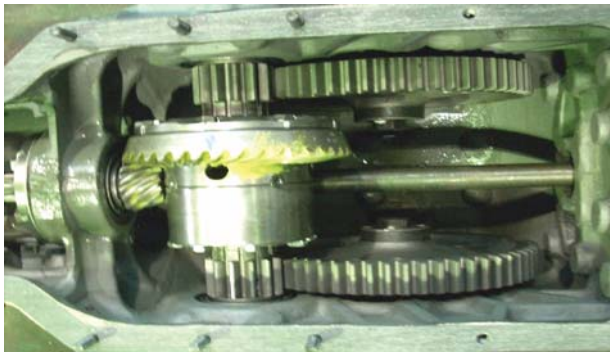
Table 3.

S.No	Fault	Probable Cause	Action
1	Lack of power in all hydraulic functions	Insufficient hydraulic fluid.	Check for leaks and top up as required.
		Hydraulic leaks in system.	Check hoses, replace as required
		Engine performance	Check engine performance
		Main relief valve (MRV) setting incorrect.	Check and adjust as required.
		Low pump flow.	Check pump flow, if required service or replace pump.
		Hydraulic tank breather.	Clean or replace the breather
		Tank filter bypass valve.	Check condition of hydraulic filter
2	All hydraulics rams slow to operate.	Neutral circuit or low pressure lines leaking, damaged, trapped or kinked.	Check pipe lines and replace as required.
		Low pump flow.	Check pump flow , if required service or replace pump.
		Main relief valve (MRV) setting incorrect.	Check and adjust as required.
		Tank filter by-pass valve	Check condition of hydraulic filter.
		Hydraulic tank breather.	Clean or replace the breather
3	One hydraulic service fails to operate or is slow to operate.	Associated service pipe lines, leaking damaged, trapped or kinked.	Check hoses , replace as required.
		Associated ram leaking.	Complete ram leakage check, replace seals as required.
		Associated valve block section leaking or not operating.	Check for leaks , rectify as required. Also, see fault 6 “leaking oil seal (control valve)”
			Make sure that the associated linkages is operating the spool , as required. Also , see fault 5, “A spool is sticking”
		Hoses burst protection valve (if fitted) malfunctioning.	Test HBVP , service as required
			Check for contamination and leakages. Replace is required.
		Piston rod is bent.	Check that associated pivot pins are adequately greased.
4	The engine tends to stall when hydraulics are under load.	M.R.V setting incorrect.	Check and adjust as required.
		Poor engine performance.	Check engine performance fip calibration.
		Oil temperature abnormally high.	Check for correct fluid , see lubricants and capacities.Check grille for blockage.

Differential

When tractor negotiates turns outer wheels has to travel more than the inner wheels, it is only possible when differential is fitted.

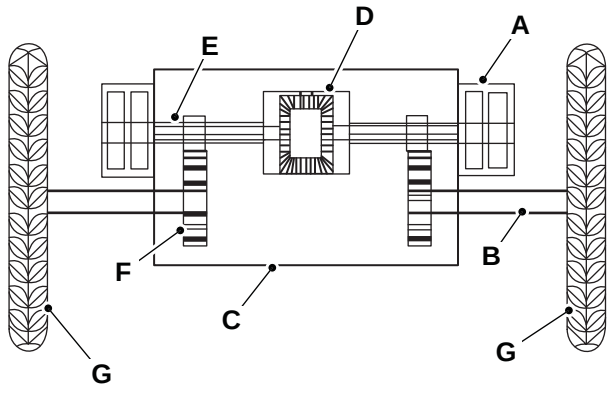
- On straight travel, it gives equal power to both wheels.
- On turn, it allow outer wheel to travel more with respect to inner wheel.



D068220-3

Fig 5.

Bull Gear and Bull Pinion Reduction



D068220-4

Fig 6.

A	Brake housing
B	Axle shaft
C	Differential housing
D	Differential mechanism
E	Bull primary shaft
F	Bull gear
G	Wheel

Differential Cage Assembly

D068220-5

Fig 7.

D068220-6

Fig 8.

Important: *Crown wheel tail pinion is replaced always in set. Never replace invidual crown wheel or tail pinion.*

D060610

Fig 26.

8 Remove shifter rod locking springs (Four numbers) ⇒ *Fig 27. (F-14)*.

D060620

Fig 27.

9 Remove steel balls carefully ⇒ *Fig 28. (F-14)*.

D060630

Fig 28.

10 Remove clutch actuator guide mounting bolts ⇒ *Fig 29. (F-14)*.

D060640

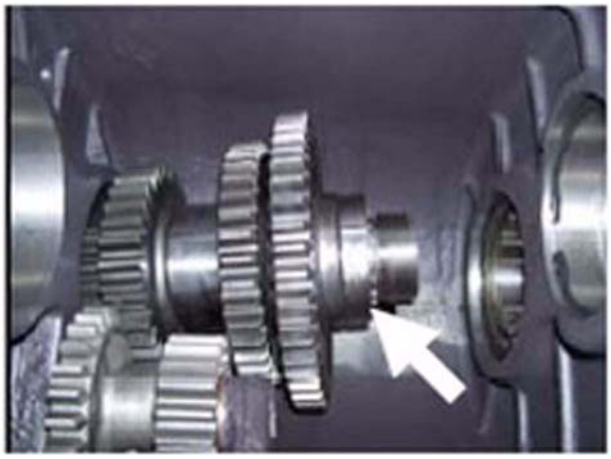
Fig 29.

11 Remove clutch actuator guide along with gasket ⇒ *Fig 30. (F-15)*.

D061100

Fig 66.

50 Remove spacer (placed between CM gear and 3rd speed gear) ⇨ *Fig 67. (F-24)*.



D061120

Fig 67.

51 Remove gear Z - 46 (3rd speed) ⇨ *Fig 68. (F-24)*.

D061120

Fig 68.

52 Remove gear Z - 39 (2nd speed) ⇨ *Fig 69. (F-24)*.

D061190

Fig 69.

53 Remover spacer (placed between 1st & 2nd gear) ⇨ *Fig 70. (F-25)*.

D061560

Fig 106.

Note: *Keep the locking pin of hi-low shifter. With care during dismantling of shifter.*

Inspection of Components

1 Clean all components with clean diesel.

2 Check release bearing for seizure or over hearting marks.

3 Check balls and free length of springs. Replace if necessary.

4 Check bearings for chipping, crack or pitting/ excessive wear if any. Replace if necessary.

5 Check inner splines and teeth of all gears and shafts and replace if found distorted or damaged.

6 Check clutch actuator guide, cover plate and gear box housing for cracks/damage and replace if necessary.

7 Renew thrust plates and locking washers.

8 Renew oil seals and gaskets.

Assembly of Sub-assemblies

Idler Cluster

1 Apply grease in inner bore and insert spacer ⇨ *Fig 107. (F-34)*.

D061570

Fig 107.

2 Assemble 30 no of needle rollers on each side ⇨ *Fig 108. (F-34)*.

D061580

Fig 108.

3 Fit one spacer ring on each side ⇨ *Fig 109. (F-35)*.

D062180

Fig 143.

10 Fit the spring of hi-low shifter ⇨ *Fig 144. (F-44)*.

D062190

Fig 144.

11 Fit the spring seat ⇨ *Fig 145. (F-44)*.

D062200

Fig 145.

12 Insert the split pin to lock the spring seat and bend it ⇨ *Fig 146. (F-44)*.

D062210

Fig 146.

Note: *Repeat the same procedure on forward-reverse Shifter.*

13 Complete assembly of shifter housing ⇨ *Fig 147. (F-45)*.

D062570

Fig 182.

36 Torque the cover plate and C.A. guide bolts ⇒ *Fig 183. (F-54)*.

D062580

Fig 183.

37 Insert caps for shifter rods holes in gear box assembly ⇒ *Fig 184. (F-54)*.

D062590

Fig 184.

38 Push it with soft hammer ⇒ *Fig 185. (F-54)*.

D062600

Fig 185.

39 Insert locking pin between 1st - rev & 2nd and 2nd and 3rd – 4th gear shifter rod bore position ⇒ *Fig 186. (F-55)*.

D062950

Fig 220.

74 Pass the C.A. shaft through bell housing ⇒ *Fig 221. (F-64)*.

Note: *Apply a little grease on shaft before fitment.*

Note: *Do not use local grease as it can jam the shaft leading to clutch malfunctioning. Always use JCB approved grease.*

D062960

Fig 221.

75 Fit the C.A. fork on C.A. shaft ⇒ *Fig 222. (F-64)*.

D062970

Fig 222.

Note: *Ensure proper fitment of rubber ring on C.A. shaft ⇒ Fig 223. (F-65).*

D063100

Fig 258.

6 Unscrew trumpet cover mounting bolts (4 nos) ⇒ *Fig 259. (F-74)*.

D063110

Fig 259.

7 Tap on axle shaft flange with soft hammer ⇒ *Fig 260. (F-74)*.

D063120

Fig 260.

8 Axle shaft slide out ⇒ *Fig 261. (F-74)*.

D063130

Fig 261.

9 Remove bull gears ⇒ *Fig 262. (F-75)*.

D063440

Fig 297.

25 Fit the special bolt with locking washer ⇨ *Fig 298. (F-84)*.

D063450

Fig 298.

26 Tight the special bolt ⇨ *Fig 299. (F-84)*.

D063460

Fig 299.

27 Lock the Special bolt by bending the locking washer ⇨ *Fig 300. (F-84)*.

D063470

Fig 300.

D064570

Fig 336.

9 Remove the both outer races from tail pinion carrier ⇨ *Fig 337. (F-94)*.

D064580

Fig 337.

Bull Pinion Shaft LH

1 Remove the outer taper roller bearing ⇨ *Fig 338. (F-94)*.

D063890

Fig 338.

2 Remove the inner taper roller bearing ⇨ *Fig 339. (F-94)*.

D063900

Fig 339.

3 Remove the needle bush ⇨ *Fig 340. (F-95)*.

Observation	Conclusion	Action
Tail pinion rotate freely and pre loading bar moves down rapidly	Pre-load is less	Tighten withdrawal nut.
Tail pinion does not move at all.	Pre-load is excessive	Loosen withdrawal nut.
Tail pinion starts moving and pre loading bar starts slowly coming down	Pre-load is correct	Lock withdrawal nut.

Bull Pinion Shaft LH

1 Fit needle bush in inner bore of BP shaft. ⇒ *Fig 375. (F-104)*.

D064070

Fig 375.

2 Fit inner taper roller bearing. ⇒ *Fig 376. (F-104)*.

D064080

Fig 376.

3 Fit outer taper roller bearing. ⇒ *Fig 376. (F-104)*.

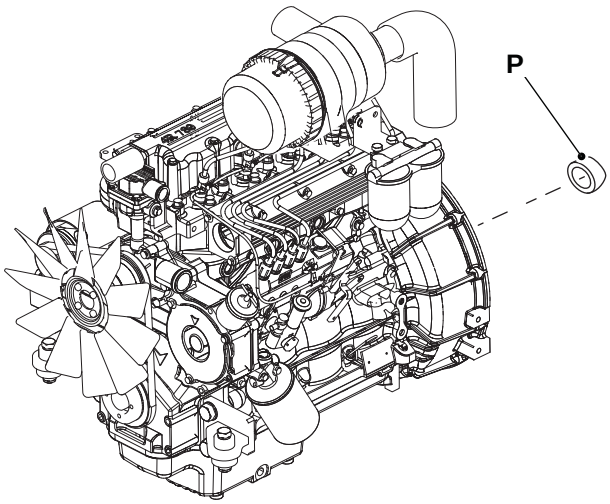
D064090

Fig 377.

Bull Pinion Shaft RH

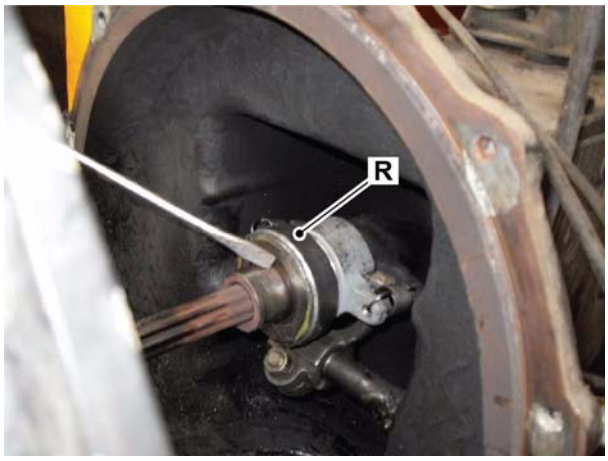
1 Fit inner taper roller bearing. ⇒ *Fig 375. (F-104)*.

Case	Tooth contact pattern	Interpretation and Adjustment	Contact
5	Tooth contact at thinner end .	Insufficient backlash. Move the crown wheel away from tail pinion by transferring shim seal carrier right side and this may necessitate changing tail pinion position.	
6	Tooth contact at the thinner end while riding forward and at the thicker end while reversing.	Poor teeth machining, or faulty arrangement of holes in the housing. Do not interfere it covers 60% of tool length.	
7	Tooth contact at the thicker end while riding forward, and at the thinner tooth end while reversing.	Do not assemble.	



D068220-23

Fig 423.



D068220-24

Fig 424.

27 Inspect carefully both the clutch plate and pressure plate and clutch release fingers for any visual defects, such as cracks, wear or damage.

28 Discard the clutch plate but use pressure plate again, if it is not damaged.

29 Replace both, if there is clear damage to the surface of both the plates.

30 Clutch release fingers on the new pressure plate are already set and it can be fitted as it is.

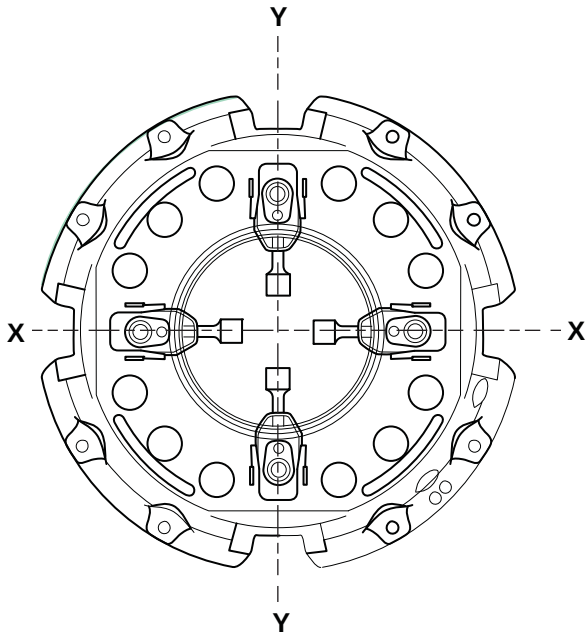
31 Finger setting adjustment is required if the old pressure plate is being used. Refer to below ***⇒ Clutch Release Finger Setting Procedure (F-125)***

Clutch Release Finger Setting Procedure

Correct setting of the clutch release fingers is essential when replacing a worn out clutch plate.

The procedure for clutch release fingers setting is as follows:

1 While refitting the clutch assembly to the engine flywheel, thoroughly check the clutch assembly and clutch release fingers. All the four fingers should be on the same level with respect to the X-X and Y-Y axis. If not, then set the fingers to be on the same level using fingers end joint hardware.

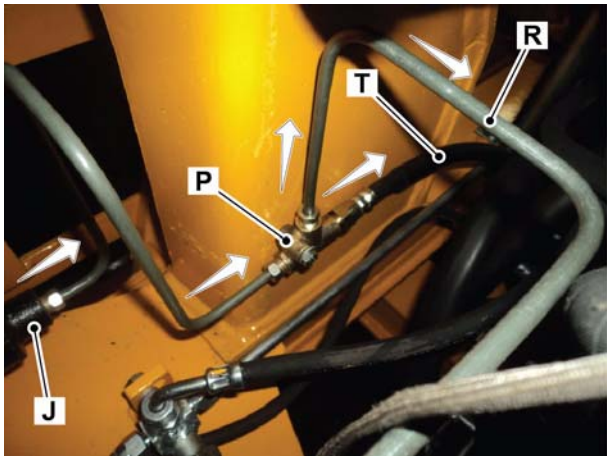


D068220-29

Fig 425.

2 Please note that the force for releasing the clutch disc should come into play at the end of 10 mm movements of the clutch release fingers.

3 There should be no fouling at 12 mm release stroke.



D068140-7

Fig 9.

J Master cylinder
P T-adaptor
T To front brakes
R To rear brakes

8 Pressurized oil is directed to the front brake pipping and is further branched for LH and RH side front brake assembly through brake hoses and bundy pipes. ⇨ *Fig 10. (G-6)*

D068140-9

Fig 10.

9 Brake oil pressure operates the wheel cylinder **W** which actuates the brake shoes **S**, moving it outward and coming into contact with brake drum **V** inner surface thereby applying the front brakes. ⇨ *Fig 11. (G-6)*

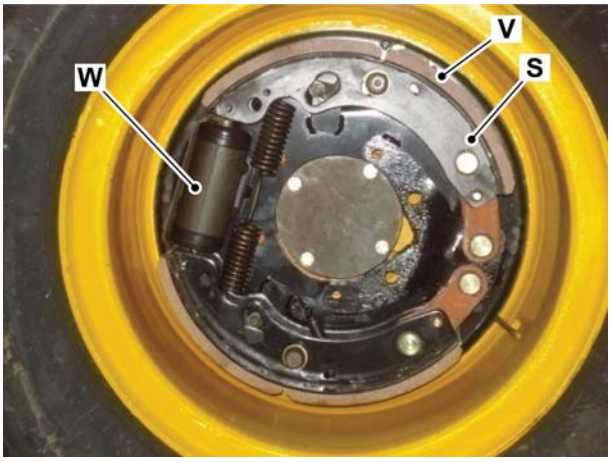


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Fig 11.

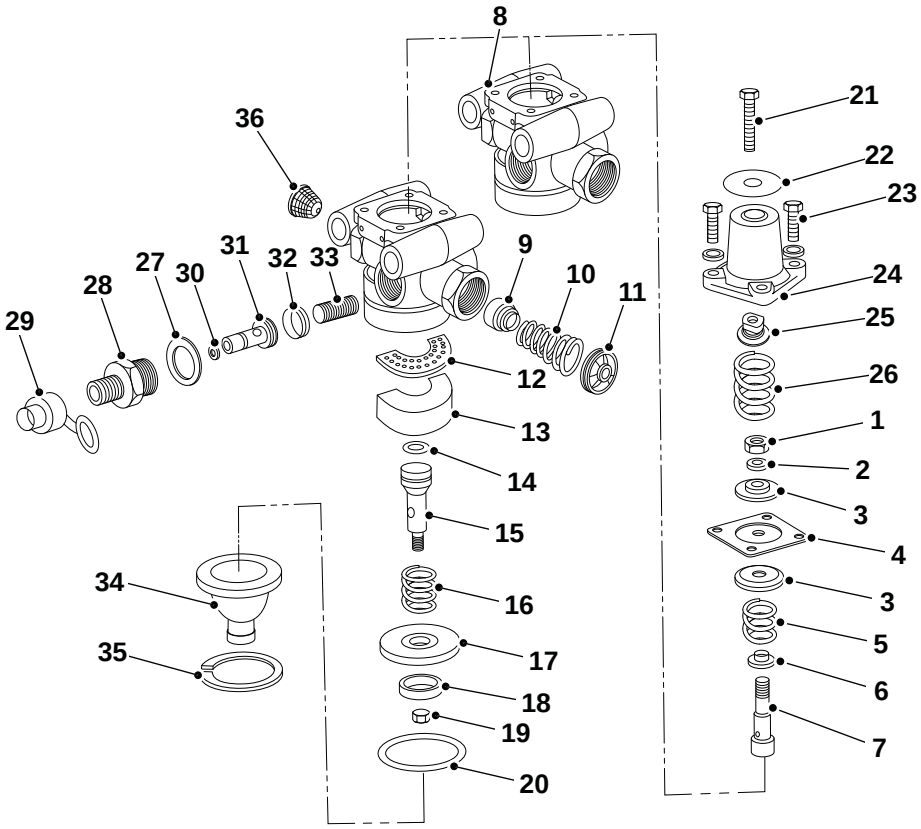

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Fig 28.