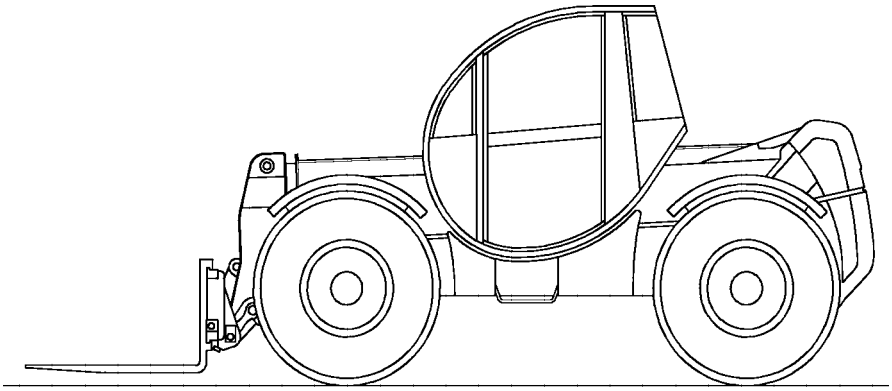
REPAIR MANUAL

AXLES AND STEERING
ENGINE
TRANSMISSION
BOOM
CHASSIS
TECHNICAL DATA

CLAAS



LH70010

CLAAS TARGO K50 K60 K70

Axles

Description

The front and rear axles are both double reduction by bevel set and planetary hub reduction gears, both have limited slip differentials. The front axle incorporates a parking brake.

Steering is available to both axles, depending on the steering mode selected. The axle hubs are steered by the operation of a double acting hydraulic cylinder attached to the axle.

Front axle

Removal

1. Park the machine on firm level ground and set the wheels straight ahead, in line with the chassis. Fit chocks to the front and rear of the rear wheels.

2. Raise the boom and fit the boom safety stop.

3. Stop the engine and apply the parking brake**.**

4. Refer to page 1.53 and dump hydraulic pressure from the brake systems, then disconnect the battery.

CAUTION *Support the drive shaft clear of the axle to make sure it is not damaged during axle removal.*

5. Disconnect the drive shaft from the axle flange and support clear of axle.

6. Disconnect the inductive magnetic steering sensor electrical lead.

7. Slacken front axle wheel nuts.

8. Support the chassis at a sufficient height to allow the wheels to be removed.

9. Support axle with a fork-lift or trolley jacks.

10. Remove front wheels.

11. Disconnect brake pipes (2) and (3) from left and right brake unit, fit blanks to open pipes and brake unit connections.

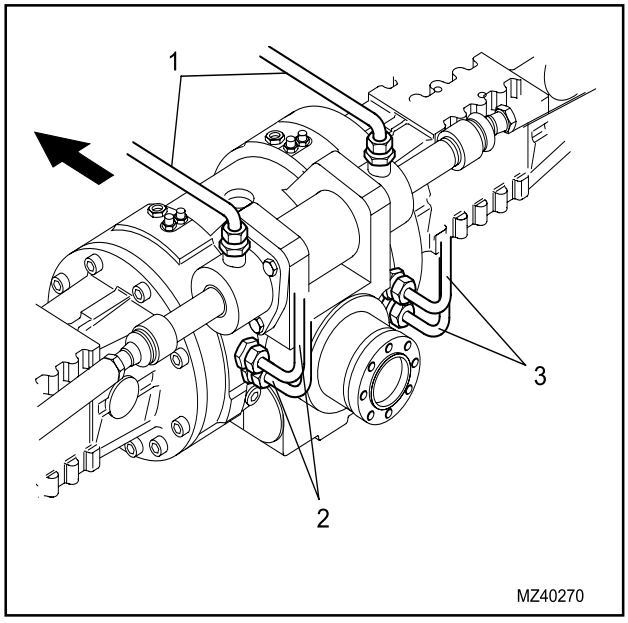
12. Disconnect steering pipes (1) from steering cylinder, fit blanks to open pipes and steering cylinder connections.

WARNING *Secure the axle to the fork-lift/trolley jacks to prevent axle tipping on removal.*
The axle weighs 443 kg, take care when removing and transporting.

13. Remove the eight attachment bolts/nuts securing axle to chassis (four each side) and remove support plates.

14. Lower axle on fork-lift/trolley jacks.

15. Move axle clear of machine and place on a suitable support.



1. Steering pipes
2. Left brake pipes
3. Right brake pipes

WARNING *Hydraulic or air pressure can be used to remove the brake piston. Only use the minimum pressure necessary to move piston.*

13. Attach a suitable hydraulic or air supply to the brake inlet connection (22) on the brake pack (12). Apply the minimum pressure to move the piston.

14. Remove piston (23) and O-rings (24).

15. Remove O-rings from piston and inspect for wear. Remove the three self-adjust split bushings (25) from the piston bores.

CAUTION *Unscrew the parking brake adjuster screws one turn at a time alternately to avoid damage to the brake.*

16. Remove the three parking brake adjuster screws (26) and O-rings.

WARNING *The next step separates the brake pack from the differential unit. Make sure the brake pack is attached to suitable lifting equipment before removal.*

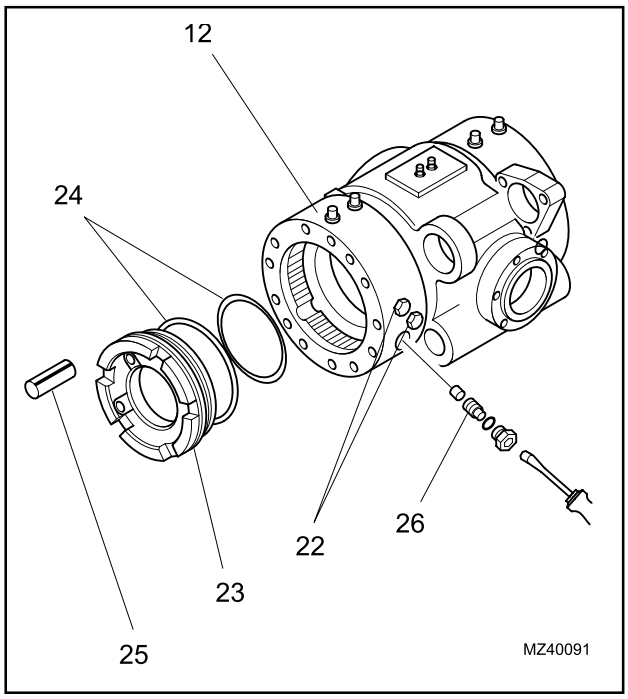
17. Connect the brake pack (12) to suitable lifting equipment .

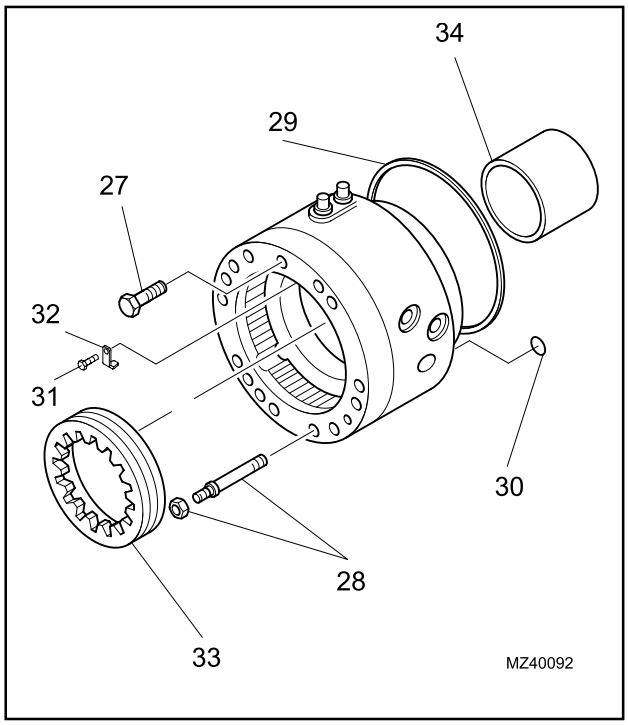
18. Remove the upper securing screw (27) and the lower stud bolt (28). Remove the brake pack from the differential unit.

19. Remove the housing O-ring (29) and the oil pipe O-ring (30).

20. Remove the bolt (31) and lock nut retainer (32).

21. Remove the lock nut (33) from the brake flange, using special tool Part No, CA119030.





22. Brake inlet connection
23. Piston
24. O-ring
25. Bushing
26. Adjuster screw
27. Screw
28. Stud bolt
29. O-ring
30. O-ring
31. Bolt
32. Retainer
33. Lock nut
34. Bearing cup

8. Fit split bushes (14) to piston (15).

9. Fit the O-rings (16 & 17) to the piston and lubricate piston faying surfaces and O-rings with a thin layer of grease.

NOTE: Carry out the following steps to all three brake release bolts.

10. Lubricate the O-ring (18) with grease and fit to bolt (19). Fit the pin (20) and bolt (19) to the brake pack.

NOTE: The pin (20) must seat on the negative acting brake piston (6). Hydraulic pressure must be applied to the negative acting brake piston to allow the bolts to be screwed in completely.

11. Connect a suitable hydraulic pressure supply to the brake pressure connection (21) and apply a pressure of 20 bar (290 psi).

12. Screw the adjuster bolts (19) fully in.

13. Release hydraulic pressure, then push the negative acting brake piston (6) until it contacts the pins (20).

14. Apply Loctite 518 to threads of screw (22), fit to brake pack and torque load to 30 Nm (22 lbf ft.).

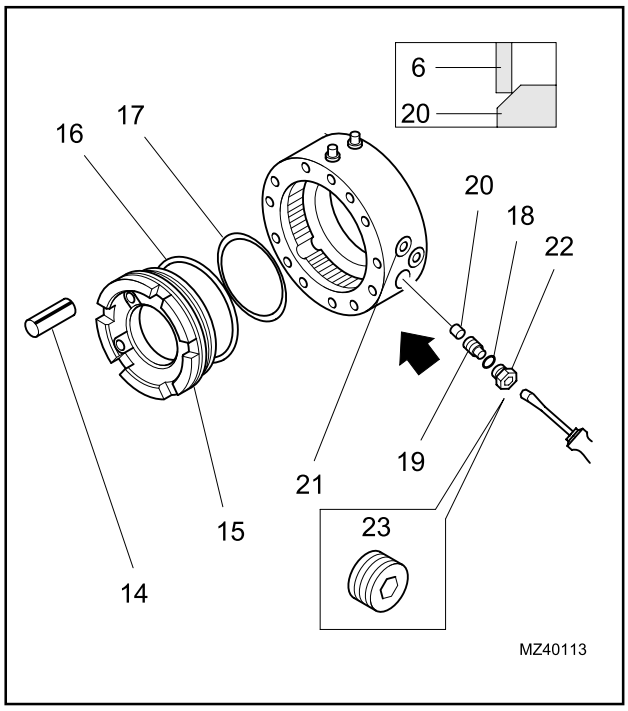
15. Fit plug (23) to screw (22) and torque load to 20 Nm (15 lbf ft.).

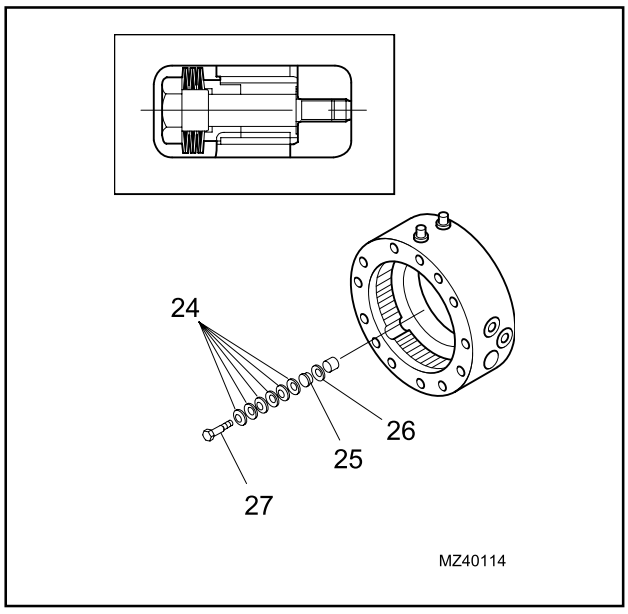
16. Fit piston (15) into brake pack (1) and using special tool Part No. CA715056, press piston into brake pack until it is just engaged.

NOTE: Make sure the belleville washers are fitted in the correct orientation on the bolt.

17. Assemble the belleville washers (24), bush (25) and belleville washer (26) to the bolt (27).

18. Fit the three bolts (27) to the piston (15) and torque load to 10 Nm (7.5 lbf ft.).





14. Split bush (Qty 3)
15. Piston
16. O-ring
17. O-ring
18. O-ring
19. Bolt
20. Pin
21. Brake pressure connection
22. Screw
23. Plug
24. Belleville washers
25. Bush
26. Belleville washer
27. Bolt

Epicyclic reduction gear

NOTE: This procedure is for the left or right hand epicyclic reduction gear.

When a new planetary gear is fitted, it is recommended that new needle roller bearings are fitted.

1. Position the planetary carrier (1) on a clean workbench.

2. Fit the upper and lower needle roller bearings (2) to the planetary gears (3).

3. Fit planetary gears (3) to the pins (4), then fit thrust washers (5) and secure with circlip (or snapring) (6).

4. Fit new O-ring (7) to the planetary carrier (1).

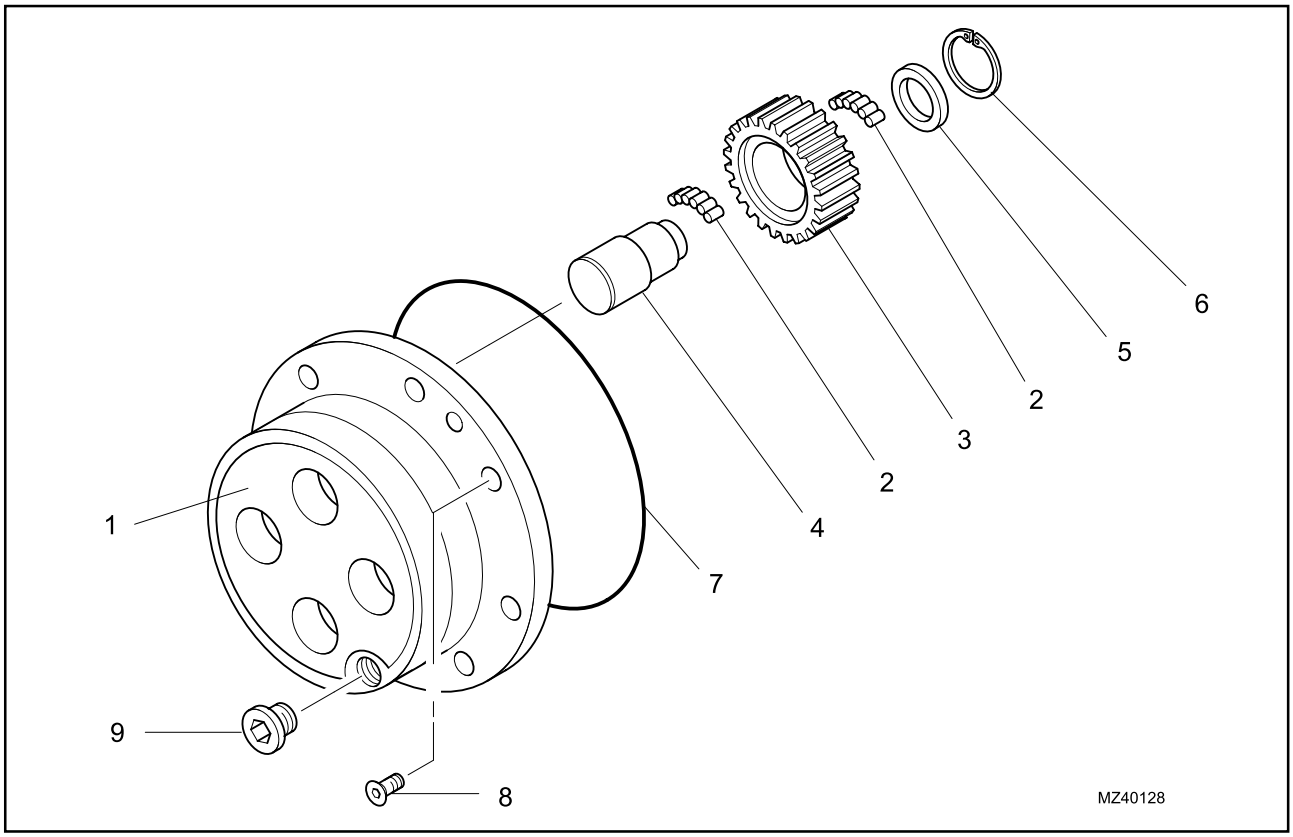
5. Fit the planetary carrier to the wheel hub and secure with retaining screws (8). Torque load retaining screws to 25 Nm (18 lbf ft.).

6. Fit drain plug (9) and torque load to 80 Nm (59 lbf ft.).

7. Refer to Service Manual and fill the hubs and differential unit with oil.

8. Test differential unit operation after installation to the machine.

1. Planetary carrier
2. Needle roller bearings
3. Planetary gear
4. Pin
5. Washer
6. Circlip
7. O-ring
8. Screw
9. Drain plug



Rear axle pivots

Removal

NOTE: This operation is to be carried out with the axle removed.

1. Remove the front and rear pivots (1) from the axle housing.

2. Remove the grease nipples (2) and bolts (3 & 4) from the front and rear pivots.

3. Press the inner and outer bushes (5 & 6) out of the front and rear pivots.

4. Remove the O-ring (7) the front pivot.

5. Remove the front and rear thrust washers (8) from the axle housing.

6. Remove the bushes (9) from the front and rear pivots.

7. Inspect all components for signs of wear and damage, replace as necessary.

Installation

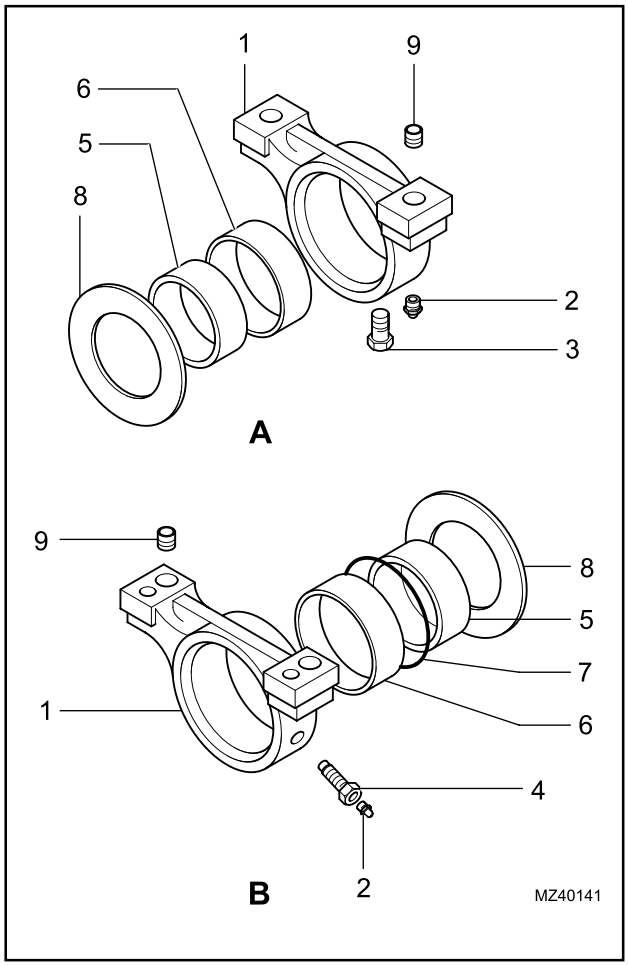
1. Installation is reverse of the above procedure.

2. Fit a new O-ring to the front pivot.

3. Lubricate the pivots after assembly to the axle housing.

4. Torque load components as follows:

Bush retaining bolts	84 Nm (62 lbf ft.).



1. Pivot
2. Grease nipple
3. Bolt
4. Bolt
5. Inner bush
6. Outer bush
7. O-ring
8. Thrust washer
9. Bush

A Rear pivot
B Front pivot

Dismantling

1. Remove the four cap head screws (1) attaching the steering valve (2) to the adapter (6). Remove and discard the O-ring seals (3).

2. Remove the two cap head screws (7) attaching the adapter (6) to the steering unit (4). Remove and discard the O-ring seals (5).

3. Examine the steering valve for damage to the block or solenoids and electrical connectors. If any damage is found, the valve must be replaced as a unit.

4. Examine the adapter for damage to the block. If any damage is found, the adapter must be replaced.

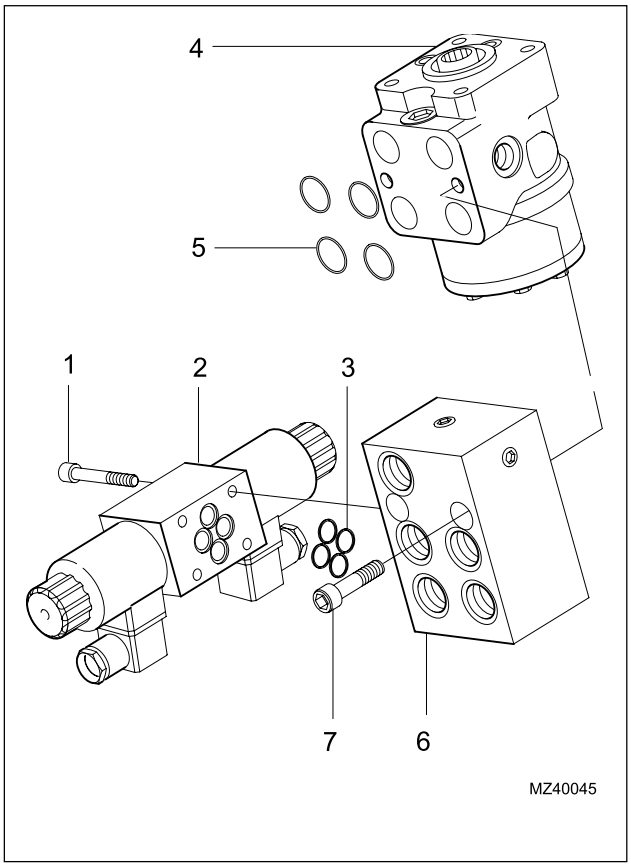
5. Examine the steering unit for damage to the block. If any damage is found, the unit must be replaced.

Assembly

1. Assemble the steering valve assembly in the reverse order to dismantling.

2.Use new O-rings during assembly.

3.Tighten the screws progressively in rotation.



1. Cap head screw – M5 x 45
2. Steering valve
3. O-ring
4. Steering unit
5. O-ring
6. Adapter
7. Cap head screw – M10 x 46

17. Disconnect the rear drive shafts from the drop down box and tie clear of gearbox.

18. Disconnect the inlet and outlet hoses from the gearbox and fit suitable blanks to the gearbox and hoses.

19. Remove the hydraulic pump from the gearbox and support clear of gearbox.

20. Disconnect the speed sensor from the gearbox.

NOTE: Before disconnecting the solenoids, mark the wiring/plugs to prevent cross connections.

21. Disconnect the solenoid plugs from the APC connectors.

22. Disconnect the following:

Air cleaner blocked cables
Oil pressure sender cable
Transmission dump
Thermostat cable.

23. Unclip the wiring loom from the engine and tie clear of engine.

24. Disconnect the accelerator cable from the engine.

25. Disconnect the air cleaner to engine hose. Remove the air cleaner assembly from the machine.

26. Disconnect and remove the flexible exhaust pipe between the engine and silencer. Remove the silencer.

27. Fit a suitable lifting sling to the engine and attach to a suitable overhead lifting device.

WARNING 

The engine and transmission assembly is heavy take care during removal.

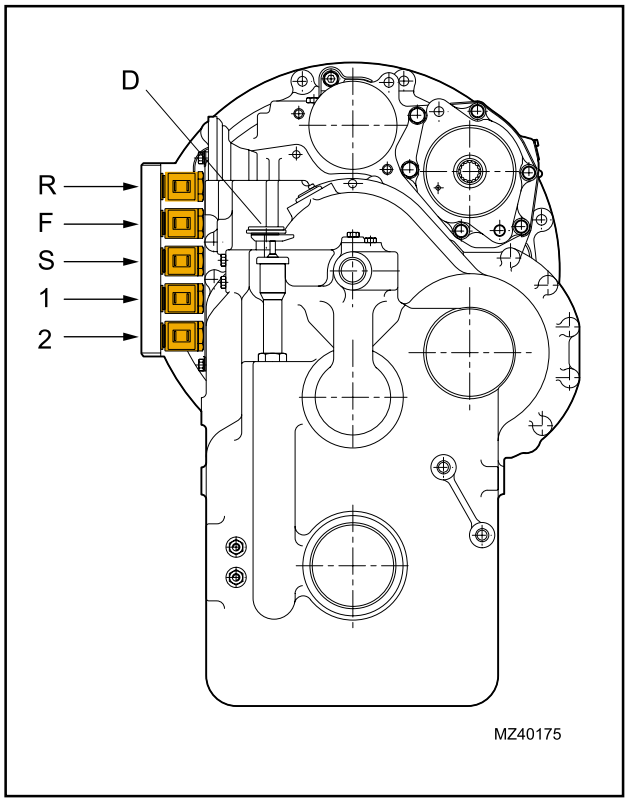
CAUTION 

During removal make sure the engine and chassis components are not damaged.
Make sure all hoses, electrical cables and controls are disconnected.

28. Remove the four mounting bolts securing engine and transmission to chassis.

29. Lift the engine and transmission from the chassis. Place the unit on a suitable work stand.

Arrangement of solenoids



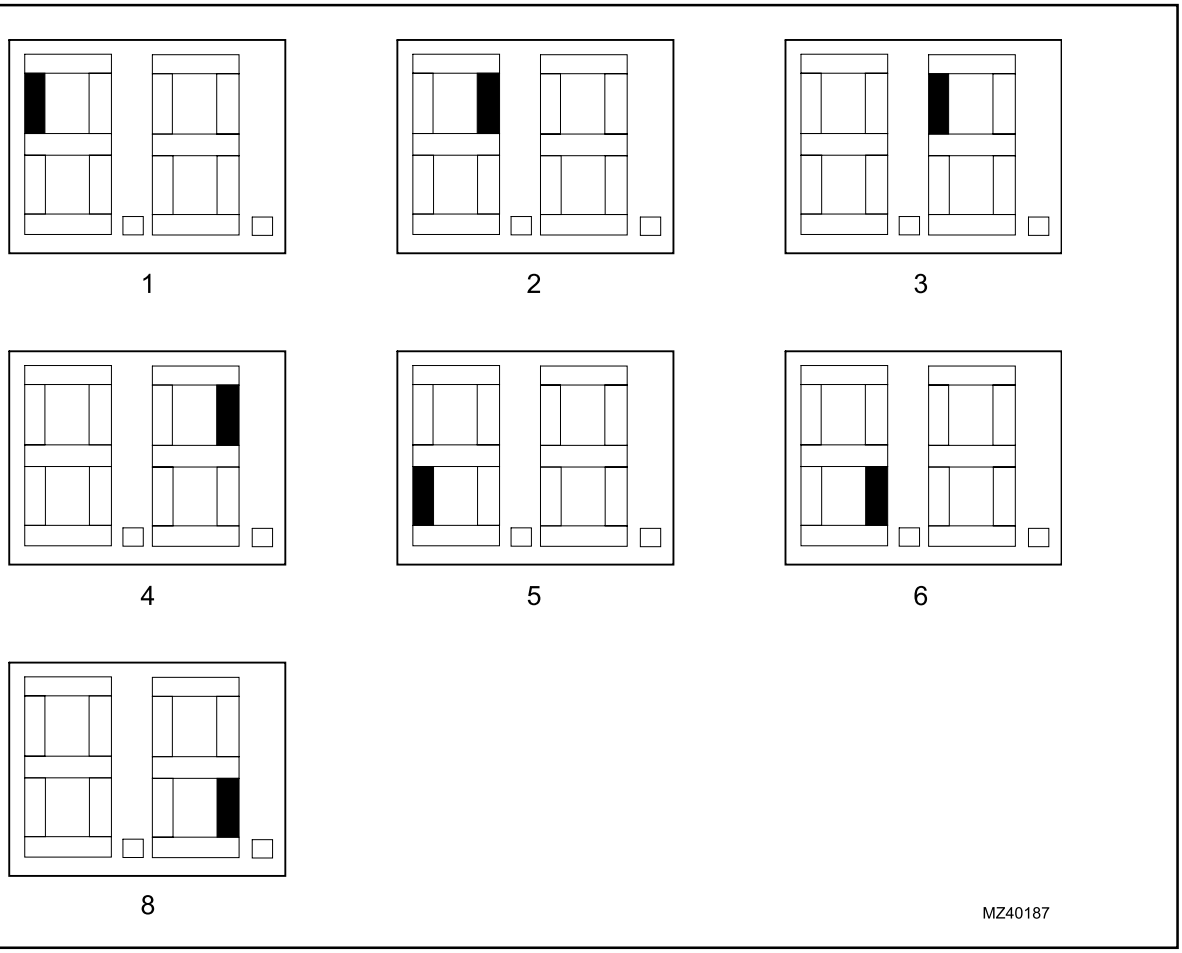
D Gearbox module
R Reverse solenoid valve
F Forwards solenoid valve
S Splitter solenoid valve
1 Solenoid valve 1
2 Solenoid valve 2

The solenoids are mounted on the left side of the gearbox.

- The reverse solenoid valve controls the reverse clutch.
- The forwards solenoid valve controls the oil flow to the splitter solenoid of the reverse solenoid.
- The splitter solenoid valve controls the oil to 4th high clutch and the forwards clutch.
- The solenoid valve 1 controls clutch 1.
- The solenoid valve 2 controls oil flow to clutch 2 or clutch 3.

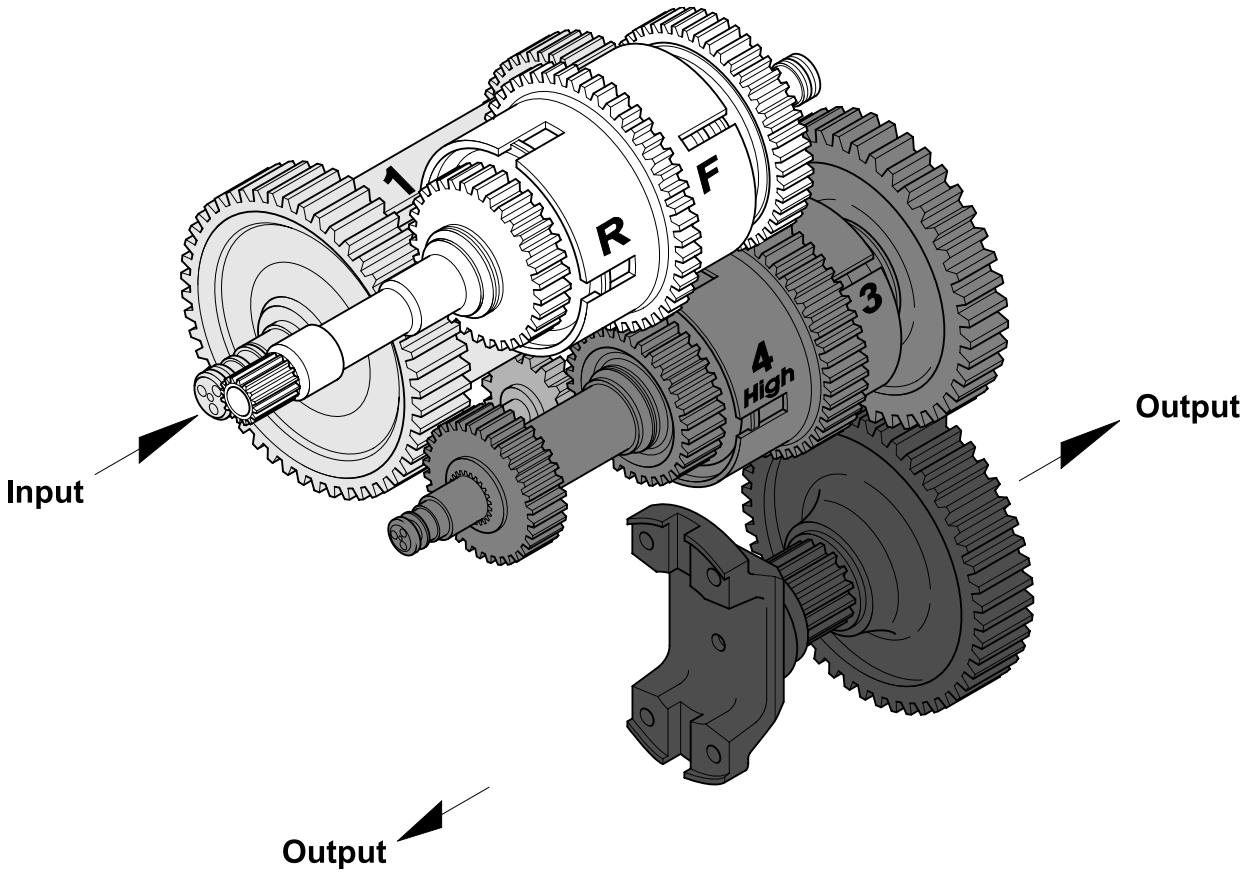
Testing display inputs

All the signals from the lever to the APC can be tested. Segments in the LED are numbered 1 to 8 (No 7 is not used).



Operator function	Position of the segment	Pin on lever connection +ve	Pin on APC connector +ve
Lever forwards	1	3	12
Lever select 1st gear	2	2	14
Lever select 3rd gear	6	13	15
Lever select 5th gear	3	9	16
Kick-down button	4	1	26
Lever reverse	5	8	19
Brake dump switch	8	Pin external	25
Parking brake	8	Pin external	25
Lever select 2nd gear	2 + 6	2 + 13	14 + 15
Lever select 4th gear	3 + 6	9 + 13	16 + 15
Lever select 6th gear	2 + 3	9 + 2	16 + 14

Gear and clutch layout



Forwards and Reverse

1st and 2nd

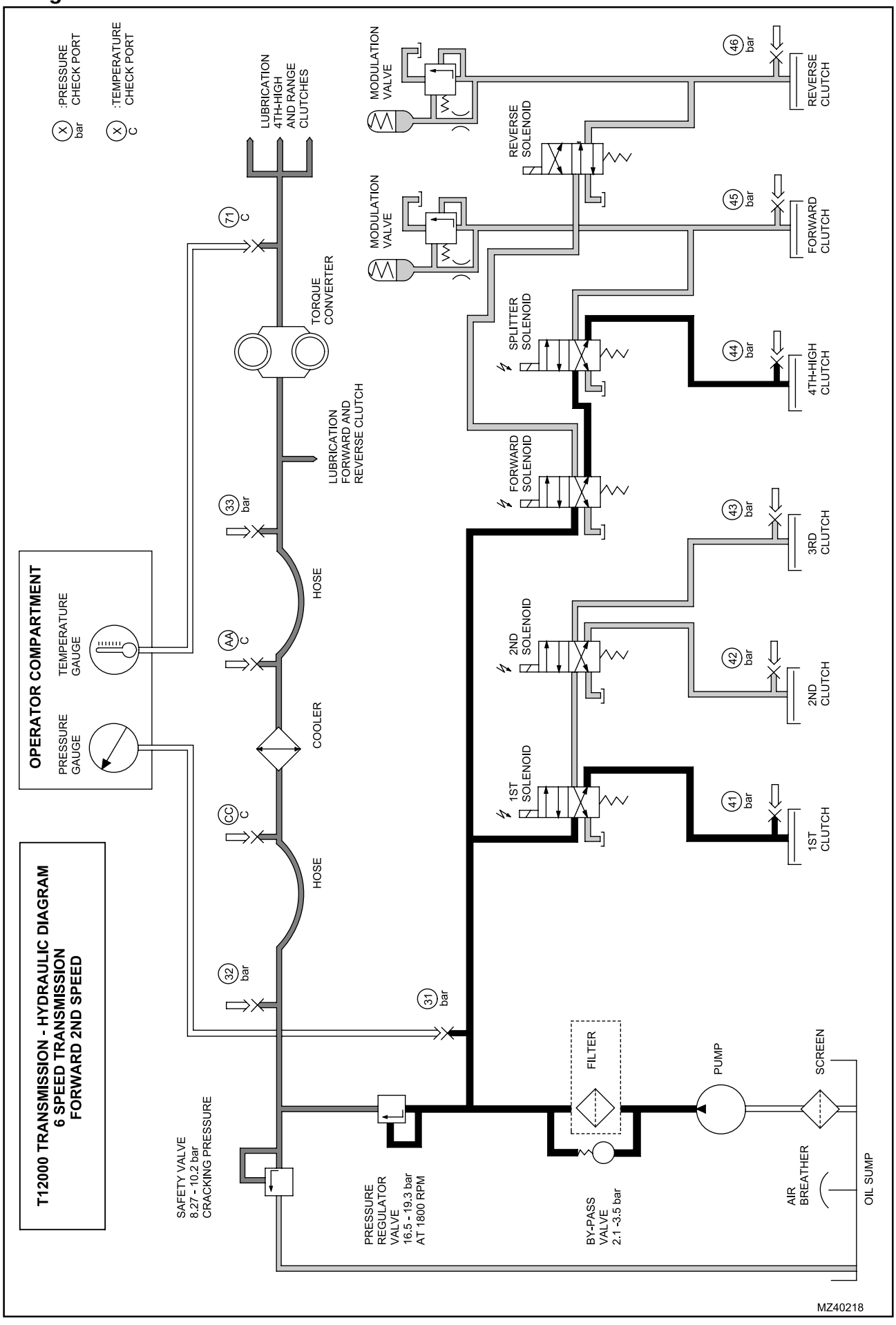
Reverse idler

4th high and 3rd

Output section

MZ40201

2nd gear


T12000 TRANSMISSION - HYDRAULIC DIAGRAM
6 SPEED TRANSMISSION
FORWARD 2ND SPEED
OPERATOR COMPARTMENT
PRESSURE GAUGE
TEMPERATURE GAUGE
: PRESSURE CHECK PORT
: TEMPERATURE CHECK PORT
LUBRICATION 4TH-HIGH AND RANGE CLUTCHES
TORQUE CONVERTER
LUBRICATION FORWARD AND REVERSE CLUTCH
HOSE
COOLER
HOSE
SAFETY VALVE 8.27 - 10.2 bar CRACKING PRESSURE
PRESSURE REGULATOR VALVE 16.5 - 19.3 bar AT 1800 RPM
BY-PASS VALVE 2.1 -3.5 bar
FILTER
PUMP
SCREEN
AIR BREATHER
OIL SUMP
MODULATION VALVE
MODULATION VALVE
REVERSE SOLENOID
SPLITTER SOLENOID
FORWARD SOLENOID
2ND SOLENOID
1ST SOLENOID
REVERSE CLUTCH
FORWARD CLUTCH
4TH-HIGH CLUTCH
3RD CLUTCH
2ND CLUTCH
1ST CLUTCH
MZ40218

Reverse gear

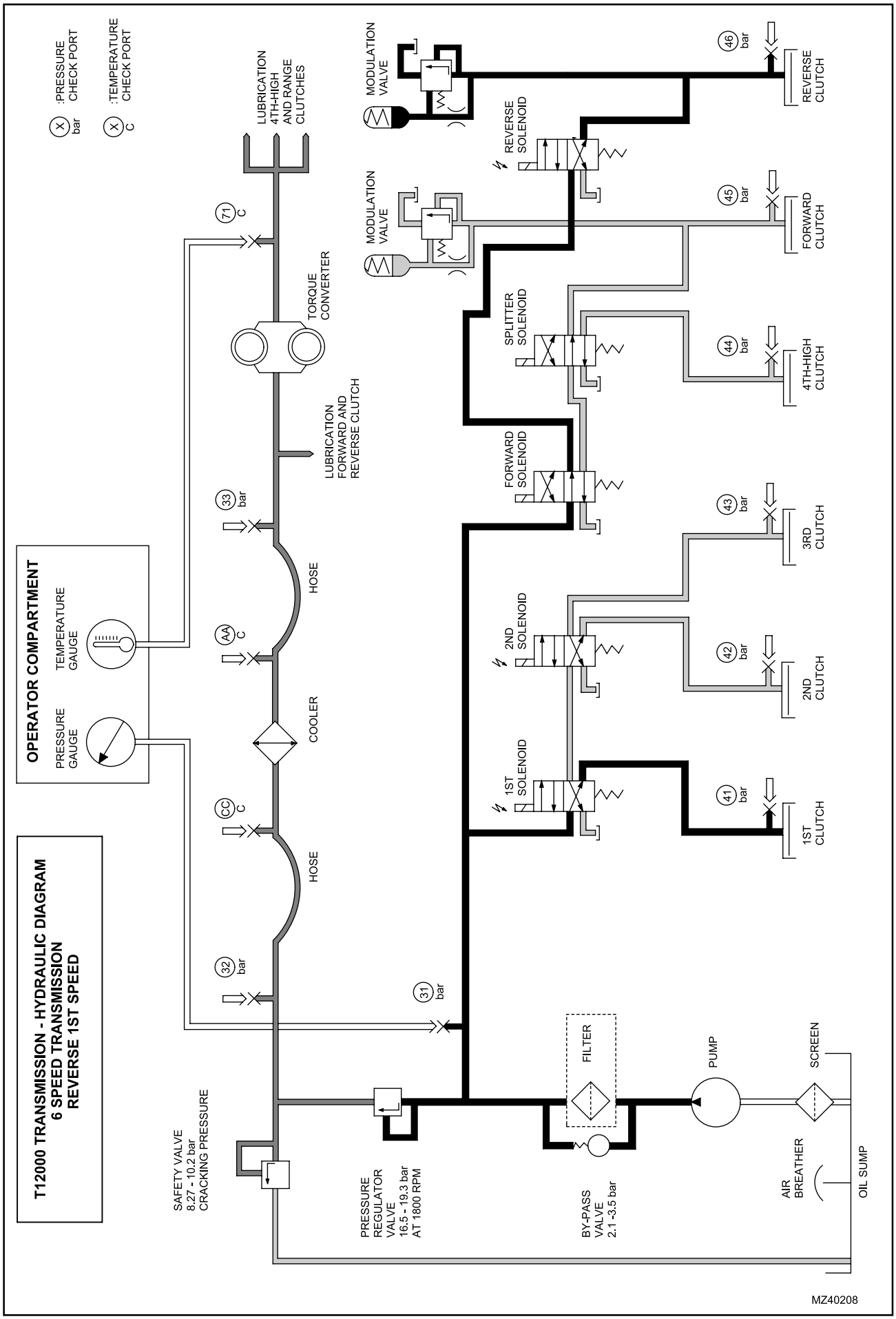


Figure 25
Repeat procedures (Fig 22 thru 25) for remaining solenoid valves.
NOTE: A 3-speed will have a bore plug in the centre box. Remove bore plug.

Figure 26
Remove spacer plate bolts and washers.

Figure 27
Pry spacer plate away from transmission case at dowel pin holes.

Figure 28
Remove spacer plate and gasket.

Figure 29
Remove 1st and 2nd clutch assembly.

Figure 30
Remove forward and reverse clutch assembly.

Figure 85
Remove inner and outer clutch discs.

Figure 86
Compress disc springs and remove retainer ring.

Figure 87
Remove retainer ring.

Figure 88
Remove retainer ring retainer.

Figure 89
Remove disc springs.

Figure 90
Remove clutch piston wear plate.

Figure 145
Remove bearings and spacer from clutch gear.

Figure 146
Remove outer thrust washer, thrust bearing and inner thrust washer.

Figure 147
Remove end plate retainer ring.

Figure 148
Remove end plate.

Figure 149
Remove clutch discs.

Figure 150
Compress disc springs and remove retainer ring.

Figure 205
Position thrust bearing on clutch shaft against inner thrust bearing washer.

Figure 206
Install outer thrust bearing washer against thrust bearing.

Figure 207
Press needle bearings in clutch gear and disc hub. Make sure bearings are pressed flush with face of gear on both sides.

Figure 208
Install the clutch gear in the clutch assembly by aligning the clutch hub teeth with the clutch inner discs. Make sure the clutch hub is fully engaged in the clutch assembly. Do not force this operation.

Figure 209
Position thrust bearing inner washer on clutch shaft.

Figure 210
Position thrust bearing on clutch shaft against inner thrust bearing washer.

Figure 265
Use a sleeve with the correct inner diameter to fit over shaft and against retainer ring. Strike the sleeve with a sharp blow, using a soft hammer, to compress the springs and seat the retainer ring. Make sure ring is fully seated in groove.

Figure 266
Install first steel (outer) clutch disc.

Figure 267
Install first friction (inner) clutch disc. Alternate steel and friction discs until six (6) steel and six (6) friction discs are in position.

Figure 268
Install clutch disc end plate.

Figure 269
Install end plate retainer ring.

Figure 270
NOTE: Check forward clutch pack disc clearance. Stand the clutch assembly on end. The clutch discs on the bottom will fall on to the end plate. Measure the distance between the clutch piston and the first steel disc using a feeler gauge or a taper gauge through the slots in the clutch drum and make sure between 0.048 - 0.108 in. (1.22 - 2.74 mm). If the clearance is greater than 0.108 in. (2.74 mm), add one steel disc under the end plate.

Figure 325
Install stator support oil sealing ring expander ring.

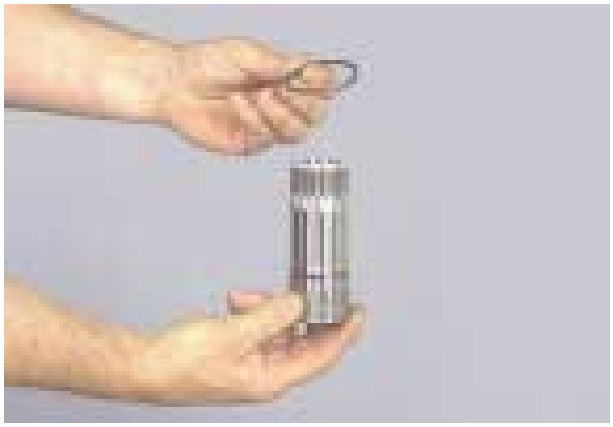


Figure 326
Install oil sealing ring on expander ring.
NOTE: Expander spring gap is to be 180° from sealing ring hook joint.

Figure 327
Position impeller hub gear washer on spacer plate.

Figure 328
Install stator support through washer and spacer plate.

Figure 329
Install stator support locating ring.

Figure 330
Push support back through spacer until locating ring shoulders in support bore. Turn spacer plate over and install support retaining ring.

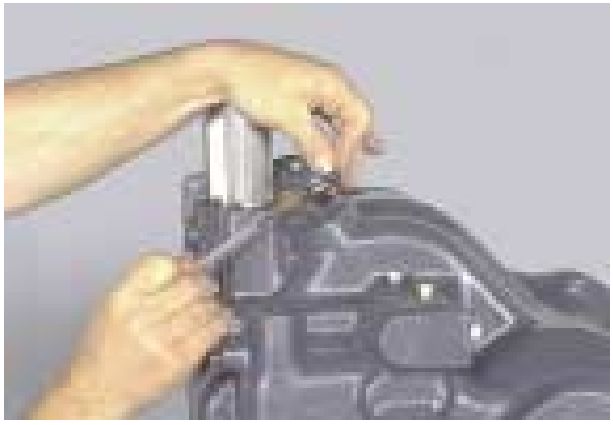


Figure 385
Install sensor hole plug and O-ring.

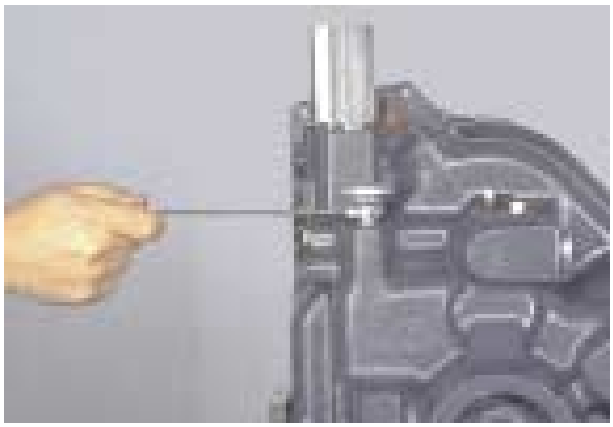


Figure 386
Install air breather.

Figure 387
Install dipstick tube and dipstick.

Figure 388
Install output shaft inner bearing locating ring in rear of transmission.

Figure 389
Install rear bearing in case against locating ring.

Figure 390
Install a new O-ring on rear oil seal sleeve.

Procedures

Stall test

A stall test identifies transmission, converter or engine problems.

Use the following procedure:

1. Put the machine against a solid barrier, such as a wall and chock the wheels.
2. Put the directional control lever in FORWARD (or REVERSE as applicable).
3. Select the highest speed.

With the engine running, slowly increase engine speed to approximately half throttle and hold until transmission (converter outlet) temperature reaches the operating range.

CAUTION 

Do not operate the converter at stall condition longer than 30 seconds at one time. Shift to neutral for 15 seconds and repeat the procedure until the desired temperature is reached. Excessive temperature, 120°C (250°F), maximum will cause damage to transmission clutches, fluid, converter and seals.

Transmission pressure checks

Transmission problems can be isolated by the use of pressure tests. When the stall test indicates slipping clutches, then measure clutch pack pressure to determine if the slippage is due to low pressure or clutch plate friction material failure.

Converter charging pressure and transmission lubrication pressure can also be measured.

Mechanical and electrical checks

Before checking any part of the system for hydraulic function (pressure testing), the following mechanical and electrical checks should be made:

- Check the parking brake and inching pedal for correct adjustment.
- Make sure all lever linkage is properly connected and adjusted in each segment and at all connecting points.
- The controls are actuated electrically. Check the wiring and electrical components.

OPERATION

The ‘Solo’ handle in the cab operates all boom services.

The carriage crowd cylinder is hydraulically connected to the compensator cylinder. Oil is transferred between the crowd and compensator cylinders during the lifting/lowering of the boom to make sure the carriage stays at the same angle to the ground throughout the arc of the lift. This works independently of the crowd function, which allows the carriage to be rolled forwards or backwards.

The extension cylinder is fitted inside the inner boom. The forward end is secured to the inner boom and the rear end is secured to the outer boom.

When the boom is operated, the hydraulic hoses for the front auxiliary services and the crowd cylinder are withdrawn from the cassette to allow the boom to extend.

The front auxiliary services are connected to a manifold on the left side of the inner boom drop-down link and are connected, by flexible pipes to the carriage.

A Joystick/Boom control isolator switch, in the cab, gives the following facilities:

- To prevent operation of the carriage locking pins when attachments are fitted to the carriage
- To prevent all boom and auxiliary hydraulic functions
- To prevent the carriage tilt function.

Replacement of outer boom wear pads (side)

NOTE: Side boom wear pads are only fitted to models from Serial No. 51200020 to 51200480.

1. Park machine on firm level ground.

2. Extend the boom and roll the carriage face down onto the ground until the weight of the inner boom is supported.

3. Stop the engine, apply the parking brake and chock the wheels.

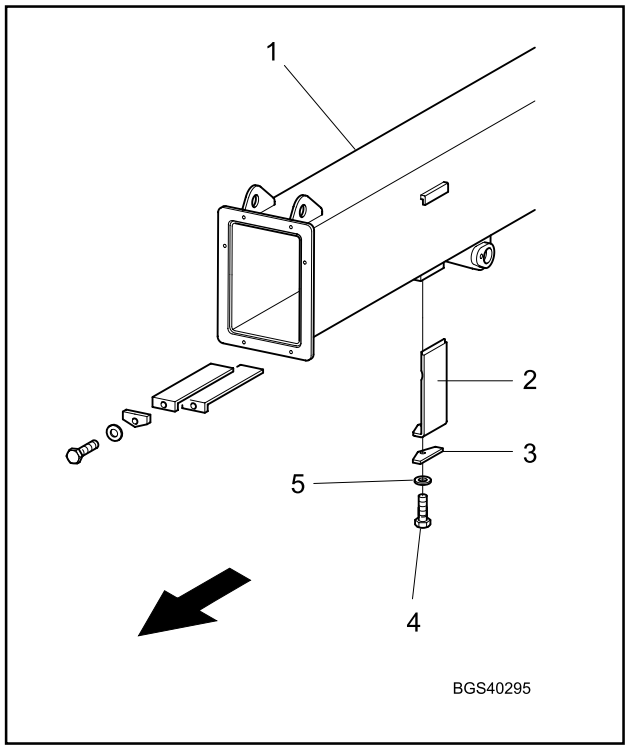
4. Refer to Page 1.53 and dump hydraulic pressure.

5. Remove the bolt (4), washer (5), retainer (3) and withdraw the wear pad (2) from both side positions on the outer boom (1).

Clean and inspect the wear pads for wear and damage.

Refit wear pads in reverse order of removal but renew wear pads excessively worn or damaged.

NOTE: Shims are not fitted to the side position wear pads.



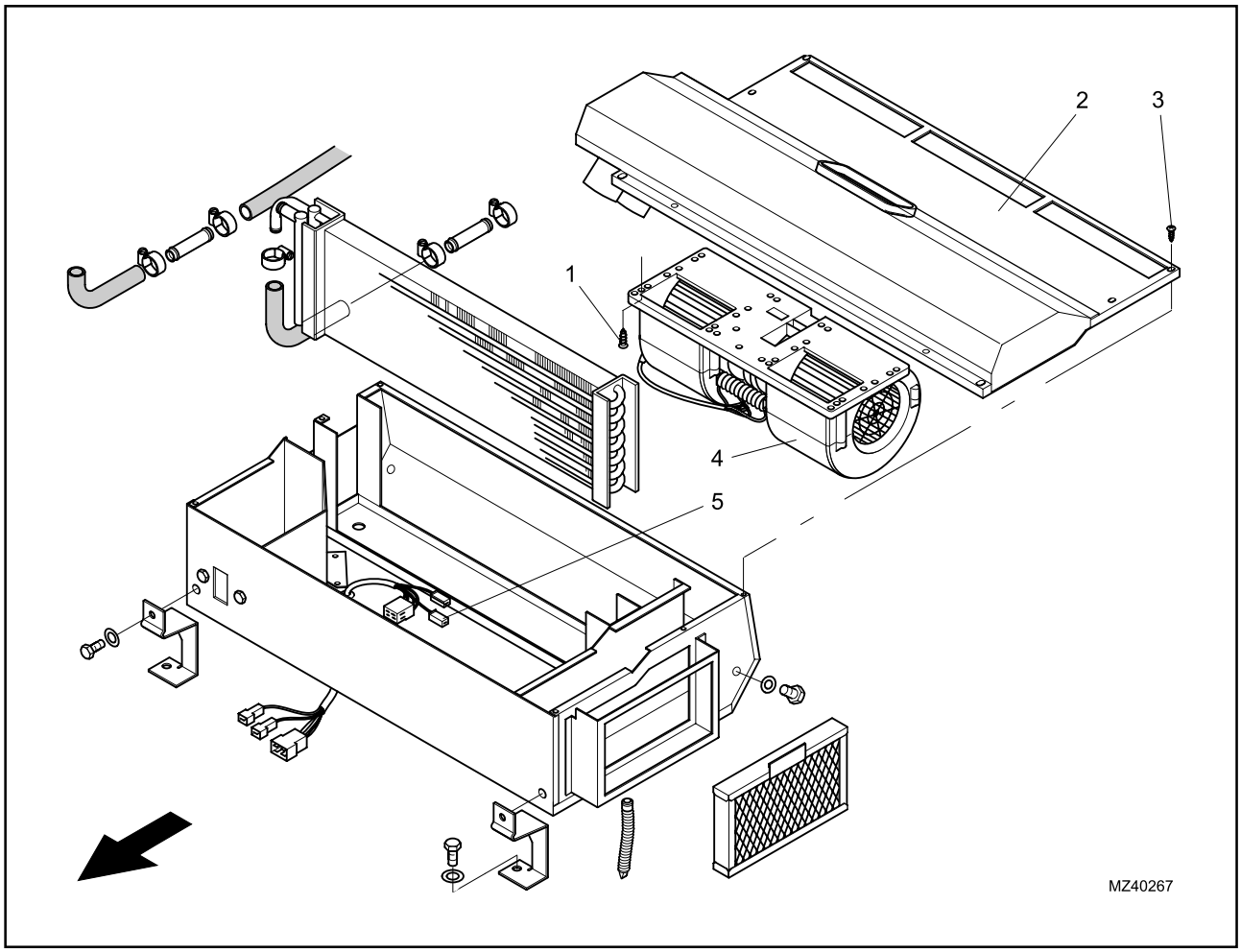
1. Outer boom
2. Wear pad
3. Retainer
4. Bolt
5. Washer

Installation

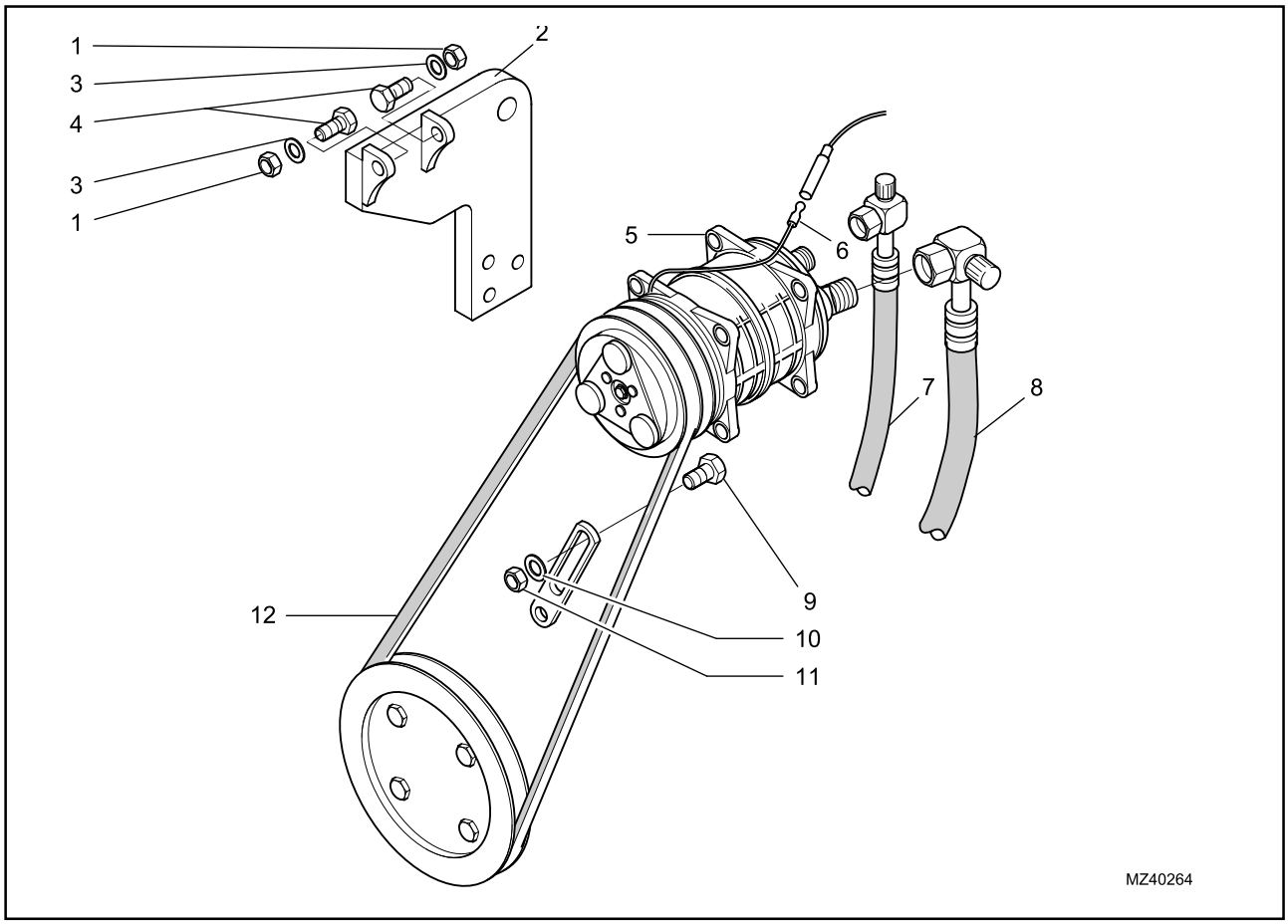
1. Installation is the reverse of the above procedure.

2. Test the blower motor before fitting the seat.

3. After fitting the seat, test the joystick controls.



1. Self-tapping screw
2. Housing lid
3. Self-tapping screw
4. Blower motor
5. Electrical connectors



1. Nut
2. Support Bracket
3. Washer
4. Bolt
5. Compressor
6. Electrical lead
7. Hose
8. Hose
9. Bolt
10. Washer
11. Nut
12. Pulley Belt