# Service Manual

# VM RANGE - TIER III

Service Manual - VM RANGE - TIER III


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*Section 2 - Care and Safety*

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## Example of Schematic Circuit

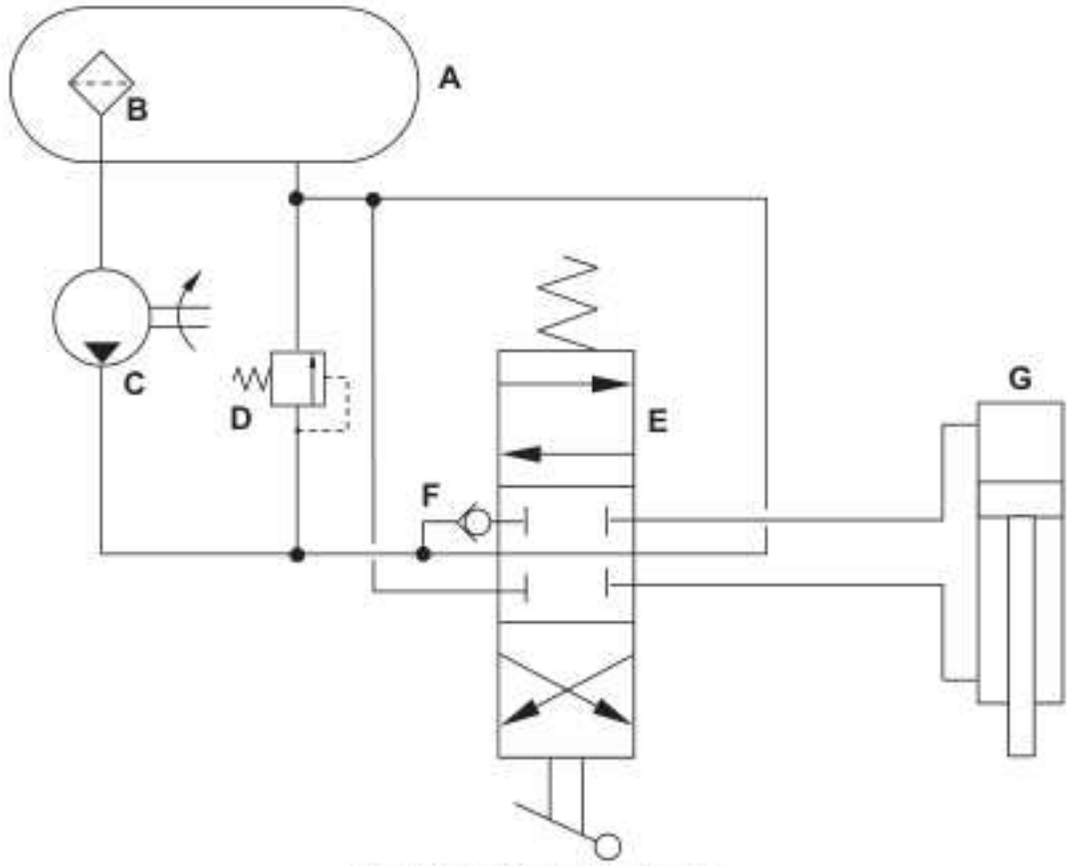



**Fig 7. Simple Schematic Circuit**

Some of the symbols described on the preceding pages have been arranged into a simple schematic circuit. ⇨ *Fig 7. (🗋 E-6)*.

Hydraulic tank **7-A** is a pressurised tank with an internally mounted strainer **7-B** on the suction line to the fixed displacement pump **7-C**. System pressure is limited to the setting of relief valve **7-D**.

Valve spool **7-E** is an open-centre spool that is in neutral position; flow from the pump passes through the spool and returns to the hydraulic tank.

If the lever operated spool is moved away from neutral position hydraulic fluid is directed to either head side or rod side of hydraulic ram **7-G**. Notice that the fluid must first open one way valve **7-F** before flowing to the ram.

### Example Circuit Key

| | |
|---|---|
| **7-A** | Hydraulic Tank |
| **7-B** | Strainer |
| **7-C** | Fixed Displacement Pump |
| **7-D** | Relief Valve |
| **7-E** | Spool |
| **7-F** | One Way Valve |
| **7-G** | Double Acting Hydraulic Ram |



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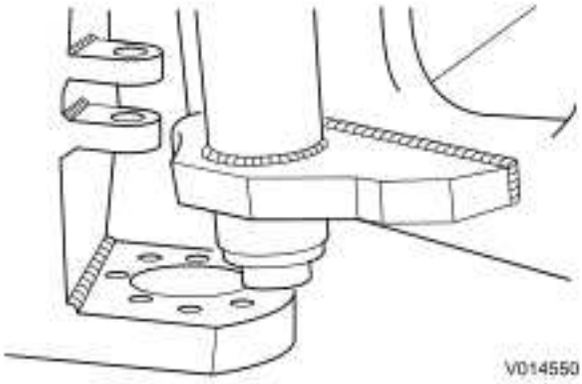



**Fig 2.**

## Assembly

***Note:*** *The bearings in the steering articulation joints are designed to be assembled without grease or other lubricants. Lubrication of these bearings will actually shorten bearing life.*

1 Install bearing cup ⇨ *Fig 1. (H-3)* **28** into the steering link **31** until it is fully seated.

2 With the eye bolt inserted in place of capscrew **30** lift the steering link up and over the upper rear frame lug.

3 Lower the link and guide it over the lower rear frame lug ⇨ *Fig 2. (H-4)*.

4 Lift the link upward and evenly space the link between the upper and lower lugs.

5 Install a new sealing ring ⇨ *Fig 1. (H-3)* **6** into the upper link bearing bore. Make sure it is pressed into place.

6 Install the new bearing cone **5** onto the upper rear frame lug.

7 Install the new bearing cup **4** into the bearing bore and make sure it is fully seated.

8 Install the upper bearing cover **3** using Loctite 271 and capscrews **1.** Torque the capscrews to (247 Nm) 182 ft lbs.

9 Install a new sealing ring into the lower bearing bore and press into place.

10 Install a new bearing cone **15** onto the lower rear frame lug.

11 Install the new bearing cup **16** into the bearing bore and make sure it is fully seated.

12 Install the spring washer **18** and thrust collar **17** into the lower bearing cover **19.** The spring washer's outer diameter should contact the thrust collar.

13 Install the lower bearing cover using Loctite 271 on capscrews **20** and torque the capscrews to (247 Nm) 182 ft lbs.

14 Remove the lifting eye bolt from the steering link and install capscrew **30.**

15 Install new front and rear sealing rings **14** onto the roller frame lugs.

16 Install new front and rear bearing cones **27** onto the roller frame lugs.

**⚠ WARNING**

**Lifting Equipment**

**You can be injured if you use faulty lifting equipment. Make sure that lifting equipment is in good condition. Make sure that lifting tackle complies with all local regulations and is suitable for the job. Make sure that lifting equipment is strong enough for the job.**

INT-1-3-7

17 Move the roller frame into position in the steering link. Roller frame weight - (4910 Kg) 10,827 lbs. Be careful not to damage the bearing parts.

18 Install link plate **28** with the ten capscrews **15** using Loctite 271 and torque the capscrews to (402 Nm) 297 ft lbs.

19 Install the bearing cup **26** into the link plate **28** bore and make sure it is fully seated.

20 Install the spring washer **23** and the thrust collar **24** into the bearing cover **22.** The spring washer's outer diameter must contact the thrust collar.



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## VM 200

| Vibration System | VMT200D | VM200PD |
|---|---|---|
| 1st vibration stage | | |
| Frequency | 1740 rpm (29Hz) | 1740 rpm (29Hz) |
| Nominal amplitude | 2.0 mm (0.08 in) | 2.0 mm (0.08 in) |
| Centrifugal force | 370 kN | 370 kN |
| 2nd vibration stage | | |
| Frequency | 2100rpm (35Hz) | 2100rpm (35Hz) |
| Nominal amplitude | 0.75 mm (0.03 in) | 0.75 mm (0.03 in) |
| Centrifugal force | 205 kN | 205 kN |



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Fig 41.

6 Insert sun gear, item 3 into internal teeth of planet carrier, item 7.



Fig 42.

7 Secure with snap ring, item 16.



Fig 43.

**Assembly of Cylindrical Roller Bearing - Item 10 - Input Stage**

1 Install snap ring, item 18.

2 Push cylindrical roller bearing, item 10 directly out of transport packing into the locating hole of the planet gear, item 2.

3 Install snap ring, item 18.

4 Install disk, item 49

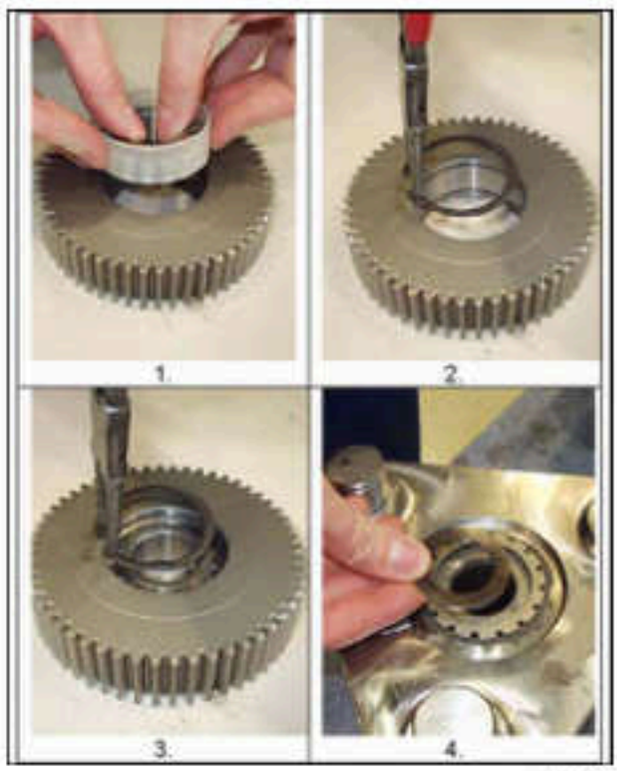



Fig 44.

5 Heat pre-assembled planet wheels, item 2 to approx. 120°C - 130°C and mount them onto the planetary bolts of planet carrier, item 89.

***Important:*** *Wear suitable safety gloves.*



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## Assembly

### Gearbox

1 Clean all parts before assembly of the gearbox.

2 Use nitrogen to cool down the outer rings of tapered roller bearings item 9 to approx. –180°C.

3 De-grease and dry the cavities for the face seal, item 8 in the spindle, item 1. (e.g. with LOCTITE 7061)

4 Prior to assembly of the seal half, item 8 into the spindle, item 1 put an o-Ring between metal axial face seal ring and axial face seal o-ring as assembly aid (wet axial face seal o-ring with white spirit).



Fig 100.

5 Install one half of face seal, item 8 into cavity of spindle, item 1 with even pressure around its circumference.

***Important:*** *Do not use a tool with a sharp edge.*



Fig 101.

6 Remove assembly aid (o-ring).



Fig 102.

7 Clean the sliding surfaces of the face seal, item 8 with an oil tinctured suede towel.



Fig 103.



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