Product: JCB ROBOT 160,170,180 Steer Loader Service Repair Manual
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Section F

Transmission

Service Manual - JCB Robot 160, 170 and 180
Section 1 - General Information
Section 2 - Care and Safety
Section 3 - Maintenance
Section A - Attachments
Section B - Body and Framework
Section C - Electrics
Section D - Controls
Section E - Hydraulics
Section F - Transmission
Section G - Brakes
Section J - Tracks
Section K - Engine

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Description

Drive Train

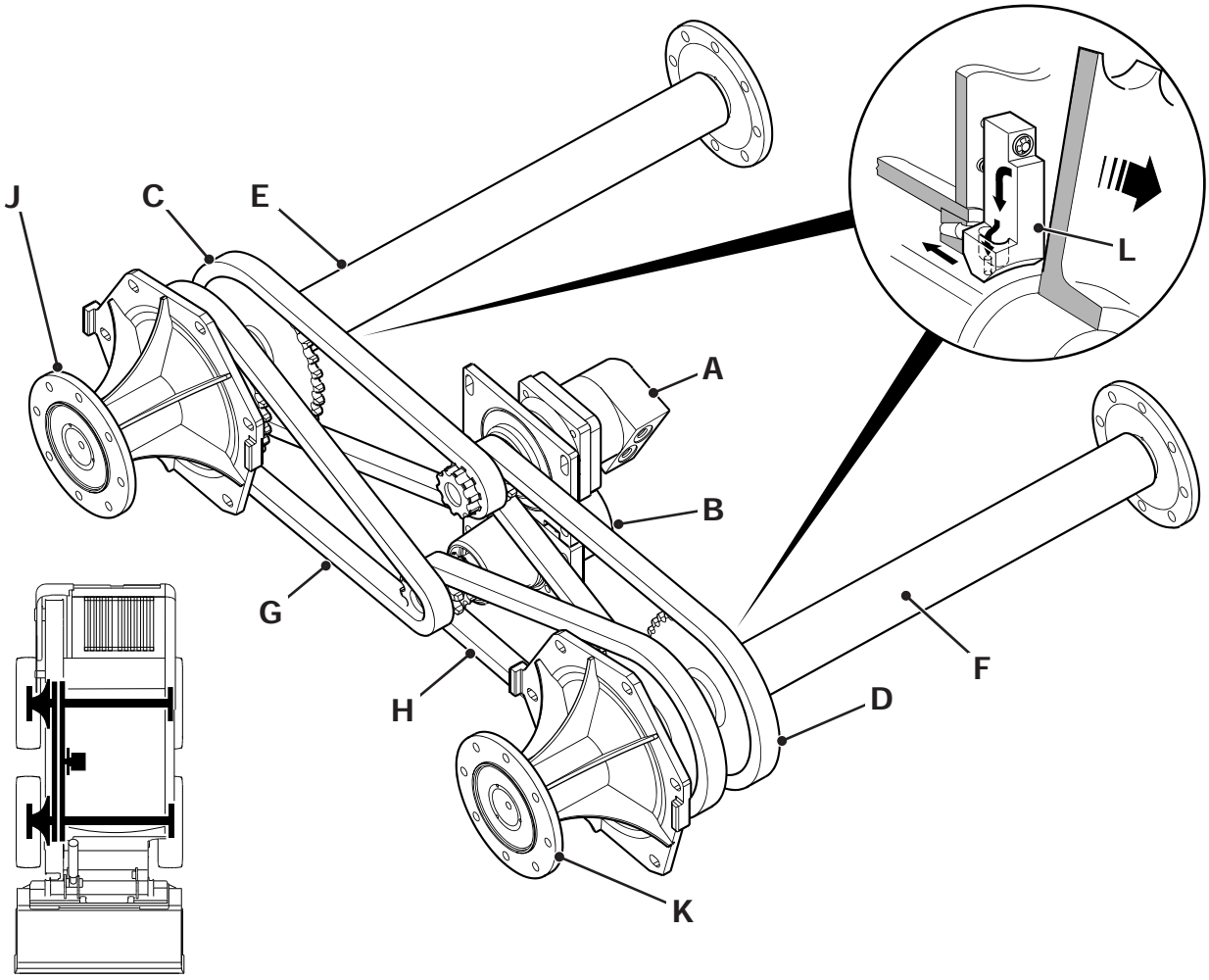

Fig 1.

The drive train consists of two hydraulic motors, four drive chains, two right hand hub assemblies and two left hand drive shafts. The drive chains run in an oil bath contained within a chain case on the right hand side of the machine.

The hydraulic motors **A** and **B** are mounted one above the other onto adapter housings which are bolted to the inner side of the chain case. Each adapter housing contains a drive shaft which extends into the chain case and on which is mounted a double sprocket. The motor output shafts are splined into the drive shafts.

The upper motor **A** drives the left hand wheels by means of two chains **C** and **D** to sprockets mounted on the inner ends of long driveshafts **E** and **F**. The driveshafts rotate on taper roller bearings within tubes which extend through the chassis to the left hand side of the machine.

Adjustment for the chains is provided on the right hand side by rotation of the hub assemblies which alters the position of the sprockets. The left side chains are adjusted by repositioning the upper motor adapter housing which is mounted on slotted holes for this purpose.

Lubrication of the right hand hub assemblies occurs due to oil picked up by the chains and sprockets which runs along the driveshafts and to the bearings.

The left hand driveshaft bearings are lubricated by means of an oil scraper **L** which is spring loaded so that it presses against the inside face of the sprocket. Oil from the face of the sprocket is collected by the scraper and is directed through holes into the driveshaft tube. The oil runs the full length of the tube, lubricating the bearings at both ends.

Tracked machines

The drive train consists of left and right hand hydraulic motors, each mounted directly onto the track frame.

Sprockets mounted on the output flanges of the motors transmit drive directly to the tracks (***see Section J***)

Tyres and Wheels

Roadwheels

Removal

Procedure is the same for all four wheels.

Slacken off the road wheel retaining nuts **A**, then raise and support the ends of the machine on blocks as indicated. Remove the roadwheels.

Replacement

Replacement is a reversal of the removal procedure.

Tighten road wheel retaining nuts to the correct torque: 220 Nm (162 lbf ft; 22.5 kgf m).

⚠ WARNING

A raised and badly supported machine can fall on you. Position the machine on a firm, level surface before raising one end. Ensure the other end is securely chocked. Do not rely solely on the machine hydraulics or jacks to support the machine when working under it.

Disconnect the battery, to prevent the engine being started while you are beneath the machine.

GEN-1-1

⚠ WARNING

If, for whatever reason, a wheel stud is renewed, all the studs for that wheel must be changed as a set, since the remaining studs may have been damaged.

2-3-2-8

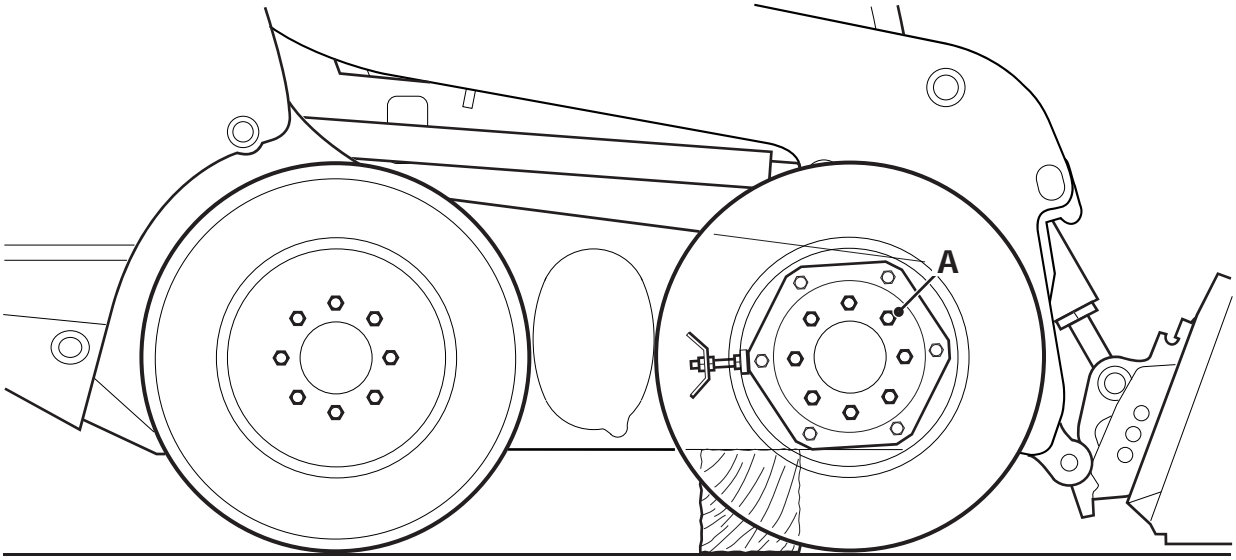

Fig 2.

Wheel Hubs and Drive Shafts

Wheel Hub Assembly (right hand)

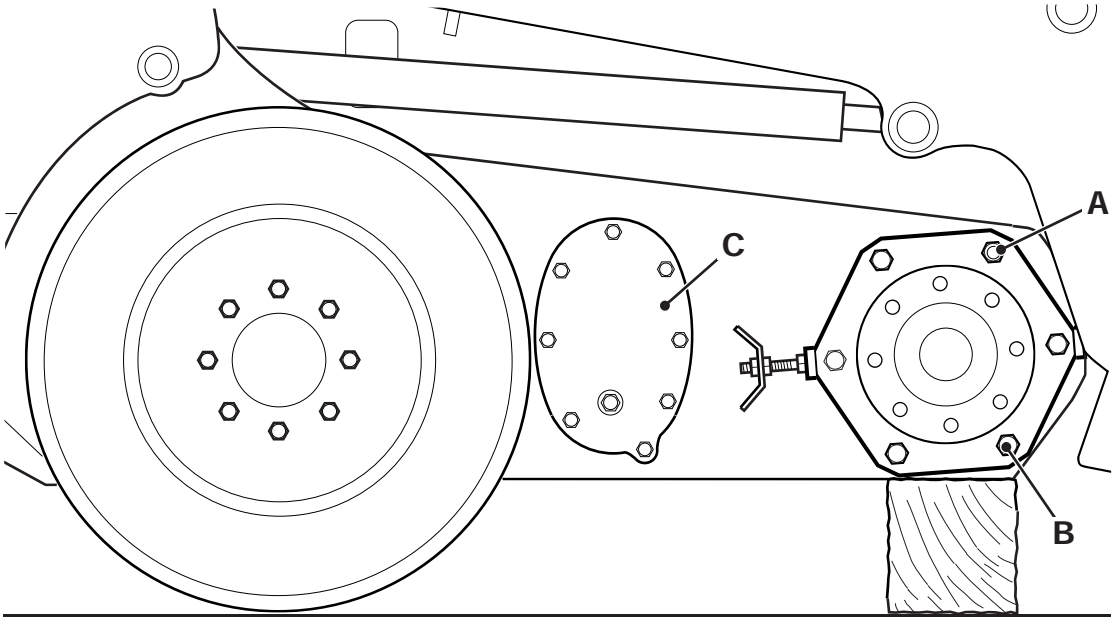

Fig 3.

Removal

It is assumed that roadwheels are removed and the machine is correctly supported.

Drain the oil from the chain case (***see Section 3***).

Slacken nut **A** and remove bolts **B** (4 off). Swing the hub assembly towards the centre of the machine so that the drive chain is at its slackest. Use a suitable bar to wedge the hub.

Note: *If the front hub is to be removed, both hubs on that side must be rotated to slacken both chains.*

Remove cover plate **C**. Lift off the appropriate chain from the drive sprocket. Note that the front hub is driven by the inner chain, therefore the rear chain will need to be lifted off first.

Remove the nut **B** and pull the hub assembly out; remove the chain from the sprocket. Remove the hub assembly from the chassis. Remove and discard seal.

Replacement

Replacement is a reversal of the removal procedure.

A new 'O' ring must be fitted. Apply a smear of petroleum jelly to the groove before fitting the ‘O’ ring, this will retain the ring in the groove. Smear the hub mounting face and ‘O’ ring with petroleum jelly.

Fit the chain(s) over the drive sprocket and mount the hub onto the machine. Fit nut **B** finger tight only.

Adjust the drive chain(s) (⇨ ***Adjustment (F-15)***). When the correct tension is achieved, fit and tighten bolts **B** and tighten nut **A**.

Torque tighten nut **A** and bolts **B** to 220 Nm (162 lbf ft, 22.4 kgf m).

Refit cover plate **C** using a new gasket.

Refill the chain case with the correct oil.

Dismantling

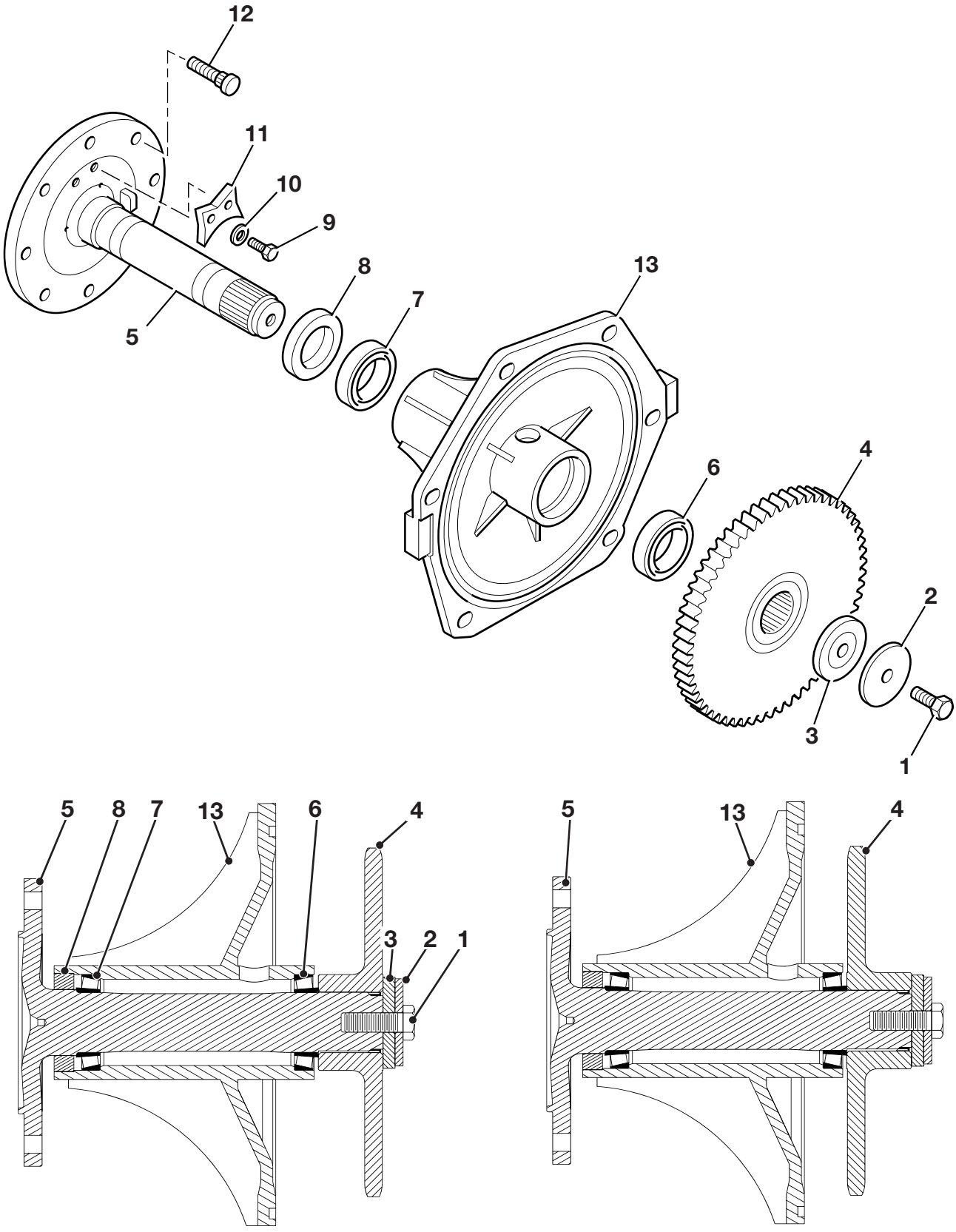

Fig 4.

Remove bolt **1**, plain washer **2** and preload washer **3**. Remove drive sprocket **4**.

Support the casing assembly on its outer flange with the wheel hub facing downwards and press out the axle shaft assembly **5**. Bearing **6** will remain in the casing **13** and can be removed separately if necessary. The outer race of bearing **7** will also be left in the casing and can be removed if necessary. Shaft seal **8** should be removed and discarded.

If fitted and if necessary, remove bolts **9** with washers **10** and remove twine cutter **11**.

Inspection

Thoroughly clean and dry all components. Examine the bearings, axle shaft and casing for wear or damage. Renew as necessary.

Assembly

When renewing wheel studs **12**, press fully into hub making sure that there is no gap between the stud head and the hub face.

⚠ WARNING

If, for whatever reason, a wheel stud is renewed, all the studs for that wheel must be changed as a set, since the remaining studs may have been damaged.

2-3-2-8

Assemble the twine cutter, if previously removed, and tighten bolts **9** to the correct torque.

Lubricate outer bearing **7** and seal **8** with JCB Special HP Grease before assembly. Inner bearing **6** should be assembled without grease.

Press bearing **7** into casing **13** ensuring that the outer race is pressed fully home.

Assemble outer race of bearing **6** into casing **13**. Ensure it is pressed fully home.

Fit the two halves of the oil seal installer **A** (825/10003) around the axle shaft **5** and position a new oil seal **8**, with the seal lip facing inwards, against the installer. Feed axle shaft **5** into the casing.

Assemble the inner race of bearing **6** onto axle shaft **5** and slide sprocket **4** onto the splines of the axle shaft.

Note: *The front sprocket should be assembled with its boss towards the casing, as at **X**. The rear sprocket should be assembled with its boss away from the casing, as at **Y**.*

Screw threaded stud **C** of assembly tool **B** (825/10002) fully into the end of the axle shaft as shown then continue turning the stud to pull the axle shaft into the casing so that the oil seal is fully installed. Release the assembly tool and remove the oil seal installer. Note that it may be necessary to gently tap the end of the shaft to release the installer.

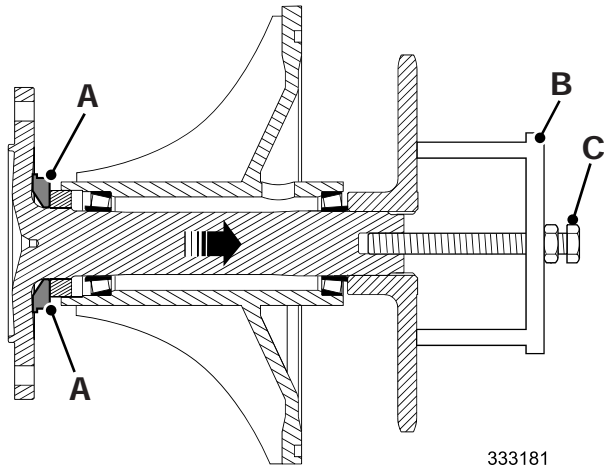

Fig 5.

Reassemble tool **B** and continue pulling the axle shaft into position by tightening stud **C** to preload the bearings. Rotate the shaft during this process to seat the bearings.

Tighten stud **C** to 80 Nm (59 lbf ft, 8.2 kgf m). Rotate the axle shaft 5 full revolutions to ensure that the bearings are fully seated then recheck and, if necessary, tighten stud **C** further to 80 Nm (59 lbf ft, 8.2 kgf m).

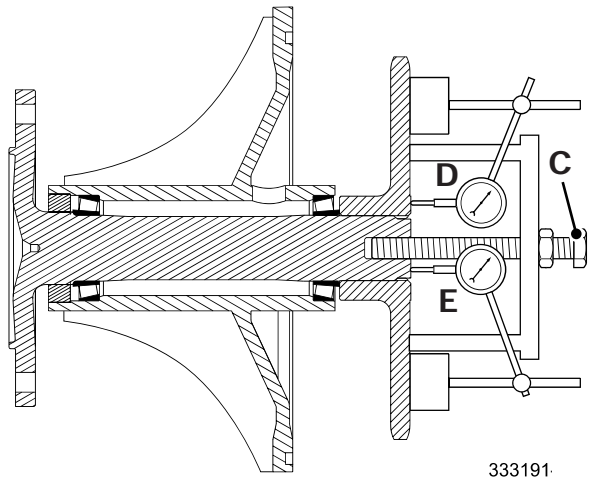

Fig 6.

Position a dial gauge against the flat face of the sprocket as shown at **D** and zero the gauge. Reposition the dial gauge onto the end of the axle shaft as shown at **E** and note the reading. Remove the gauge and assembly tool.

Preload washer **3** is available in various thicknesses to allow for the correct preload of bearings **6** and **7** as follows:

Part No.	Thickness
242/00096	0.025 - 0.045 mm
823/10303	0.05 - 0.11 mm
823/10304	0.115 - 0.175 mm
823/10254	0.18 - 0.24 mm
823/10255	0.245 - 0.305 mm
823/10256	0.31 - 0.37 mm
823/10257	0.375 - 0.435 mm
823/10258	0.44 - 0.50 mm
823/10259	0.505 - 0.565 mm
823/10317	0.57 - 0.63 mm

Select the preload washer which gives the closest match to the dial gauge reading.

Assemble the preload washer **3** onto the axle shaft with the stepped face towards the shaft (part numbered face away from the shaft). Fit washer **2** and bolt **1**. Progressively tighten bolt **1** to 220 Nm (162 lbf ft, 22.4 kgf m) whilst rotating the shaft to seat the bearings.

Check that the hub rotates freely by hand.

Table 1. Torque Settings

Item	Nm	kgf m	lbf ft
C (1)	80	59	8.2
1	220	162	22.4
9	28	21	3

(1) Torque setting whilst checking Preload

Drive Shaft Assembly (left hand)

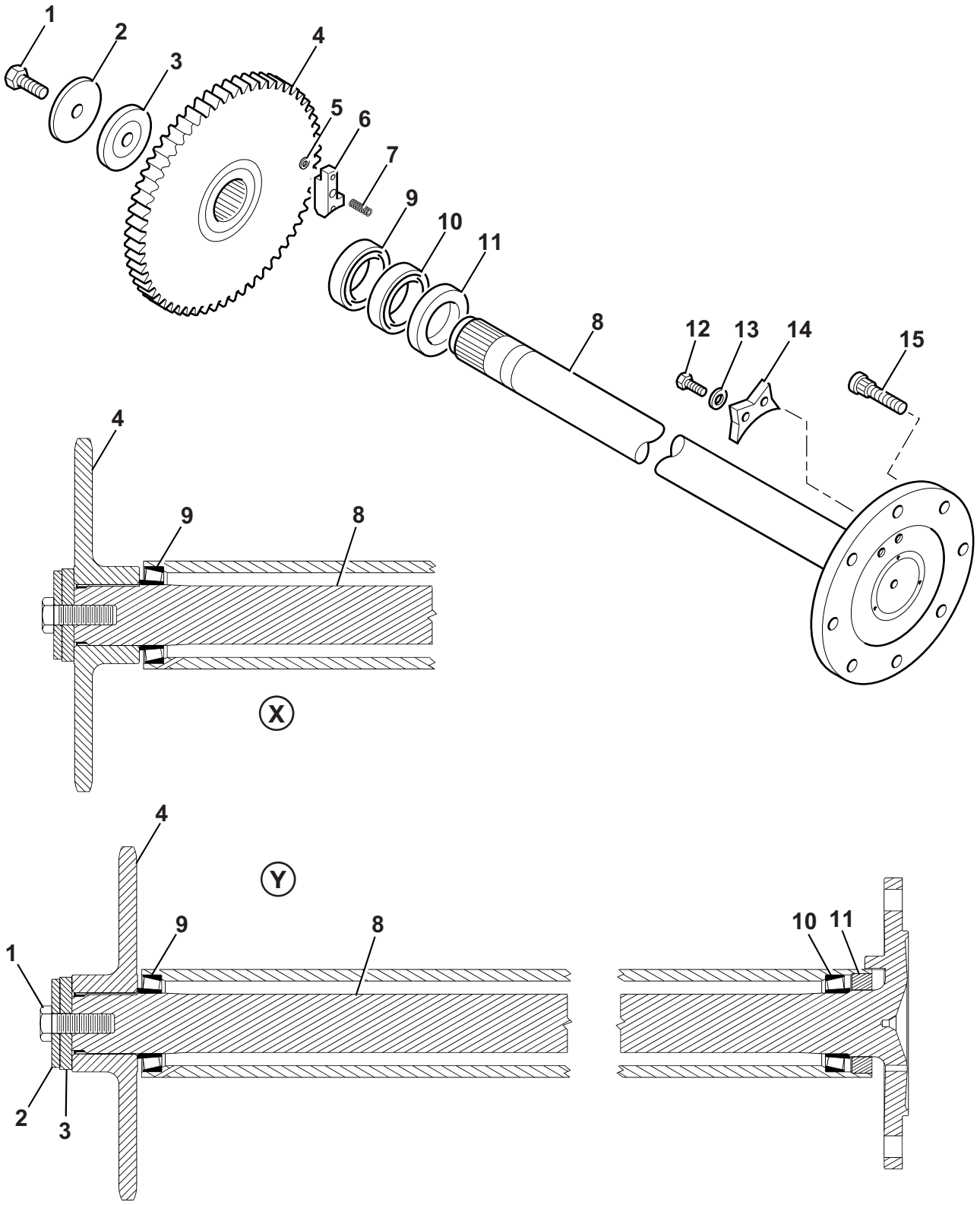

Fig 7.

Dismantling

It is assumed that roadwheels are removed and the machine is correctly supported.

Drain the oil from the chain case (***see Section 3***).

Remove the appropriate right hand hub assembly to gain access to the shaft retaining bolt ⇨ ***Wheel Hub Assembly (right hand) (F-5)***.

Remove the seat base. Slacken the nuts securing the upper motor mounting to the chain case. Screw in the adjustment bolts to lower the mounting and thus slacken the drive chains ⇨ ***Adjustment (F-15)***.

Remove bolt **1**, plain washer **2** and preload washer **3**. Remove drive sprocket **4**. Release the drive chain from the sprocket. Remove spring clip **5** and withdraw oil scraper 6 and spring **7** from inside the chain case.

Drift the axle shaft **8** out of the axle tube. Bearing **9** will remain in the axle tube and can be removed separately if necessary. The outer race of bearing **10** will also be left in the axle tube and can be removed if necessary. Shaft seal **11** should be removed and discarded.

If fitted and if necessary, remove bolts **12** with washers **13** and remove twine cutter **14**.

Inspection

Thoroughly clean and dry all components. Examine the bearings and axle shaft for wear or damage. Renew as necessary. Examine axle tube for wear of the bearing bores.

Check oil scraper for wear, renew as necessary. Check that oil holes in scraper, and in axle tube, are clear.

Assembly

When renewing wheel studs **15**, press fully into hub making sure that there is no gap between the stud head and the hub face.

⚠ WARNING

If, for whatever reason, a wheel stud is renewed, all the studs for that wheel must be changed as a set, since the remaining studs may have been damaged.

2-3-2-8

Assemble the twine cutter, if previously removed, and tighten bolts **12** to the correct torque.

Lubricate outer bearing **10** and seal **11** with JCB Special HP Grease before assembly. Inner bearing **9** should be assembled without grease.

Press outer bearing **10** into axle tube ensuring that the outer race is pressed fully home.

Assemble outer race of inner bearing **9** into axle tube. Ensure it is pressed fully home.

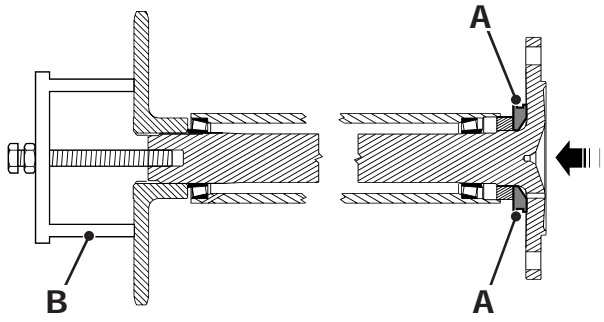

Fig 8.

Fit the two halves of the oil seal installer **A** (825/10003) around the axle shaft **8** and position a new oil seal **11**, with the seal lip facing inwards, against the installer. Slide axle shaft **8** into the axle tube.

Fit oil scraper **6** with its spring **7** onto the dowels protruding from the inner face of the chaincase and secure with spring clip **5**. Check that the scraper slides freely on the dowels.

Note: *The short oil scraper fits against the front sprocket. The long oil scraper fits against the rear sprocket.*

Assemble the inner race of bearing **9** onto axle shaft **8** and slide the sprocket **4** onto the splines of the axle shaft. Do not fit the drive chain to the sprocket at this stage.

Note: *The front sprocket should be assembled with its boss away from the axle tube, as at **X**. The rear sprocket should be assembled with its boss towards the axle tube, as at **Y**.*

Screw threaded stud **C** of assembly tool **B** (825/10002) fully into the end of the axle shaft as shown then continue turning to pull the axle shaft into the axle tube so that the oil seal is fully installed. Release the assembly tool and

remove the oil seal installer. Note that it may be necessary to gently tap the end of the shaft to release the installer.

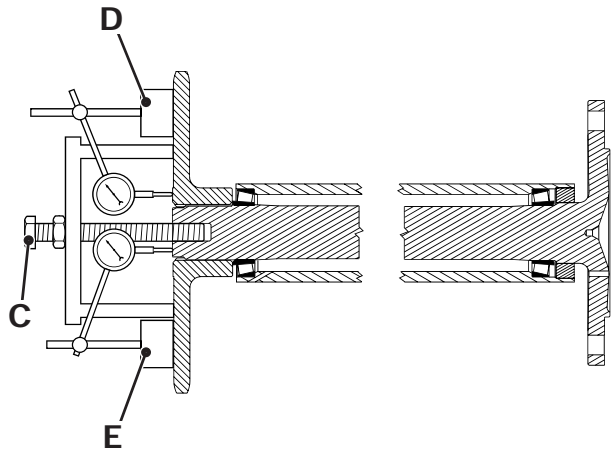

Fig 9.

Reassemble tool **B** and continue pulling the axle shaft into position by tightening stud **C** to preload the bearings. Rotate the shaft during this process to seat the bearings.

Tighten stud **C** to 80 Nm (59 lbf ft, 8.2 kgf m). Rotate the axle shaft 5 full revolutions to ensure that the bearings are fully seated then recheck and, if necessary, tighten stud **C** further to 80 Nm (59 lbf ft, 8.2 kgf m). Continue rotating the shaft until the stud requires no further retightening.

Position a dial gauge against the flat face of the sprocket as shown at **D** and zero the gauge. Reposition the dial gauge onto the end of the axle shaft as shown at **E** and note the reading. Remove the gauge and assembly tool.

Preload washer **3** is available in various thicknesses to allow for the correct preload of bearings **9** and **10** as follows:

Part No.	Thickness
242/00096	0.025 - 0.045 mm
823/10303	0.05 - 0.11 mm
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823/10257	0.375 - 0.435 mm
823/10258	0.44 - 0.50 mm
823/10259	0.505 - 0.565 mm
823/10317	0.57 - 0.63 mm

Select the preload washer which gives the closest match to the dial gauge reading.

Assemble the preload washer **3** onto the axle shaft with the stepped face towards the shaft (part numbered face away from the shaft). Fit washer **2** and bolt **1**. Progressively tighten bolt **1** to 220 Nm (162 lbf ft, 22.4 kgf m) whilst rotating the shaft to seat the bearings.

Check that the hub rotates freely by hand.

To fit the drive chain it is necessary to remove the sprocket. Fit the chain around the sprocket and also the motor sprocket. Refit the sprocket and washers making sure that the stepped face of preload washer 3 is towards the shaft. Retighten bolt 1 to 220 Nm (162 lbf ft, 22.4 kgf m).

Adjust the chains ⇨ *Adjustment (F-15)*.

Refit the right hand wheel hub assembly ⇨ *Replacement (F-5)*).

Refit the chaincase access cover using a new gasket. Refill the chain case with the correct oil.

Table 2. Torque Settings

Item	Nm	kgf m	lbf ft
C (1)	80	59	8.2
1	220	162	22.4
12	28	21	3

(1) Torque setting whilst checking Preload

Drive Chains

Removal and Replacement

Removal

It is assumed that roadwheels are removed and the machine is correctly supported.

Drain the oil from the chain case (***see Section 3***)

Remove the chain case access cover.

Note: *The rear chains must be released from the motor sprockets before the front chains can be removed.*

Remove the right hand hub assemblies ⇨ *Removal (F-5)*.

Lift out the right hand chains.

Remove the seat base. Slacken the nuts **A** securing the upper motor mounting to the chain case. Slacken locknuts **B** and screw in the adjustment bolts **C** to lower the mounting and thus slacken the left hand drive chains.

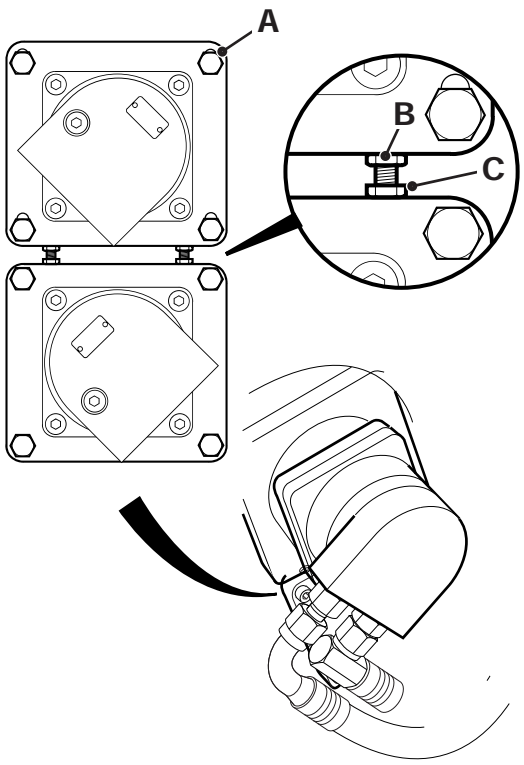

Fig 10.

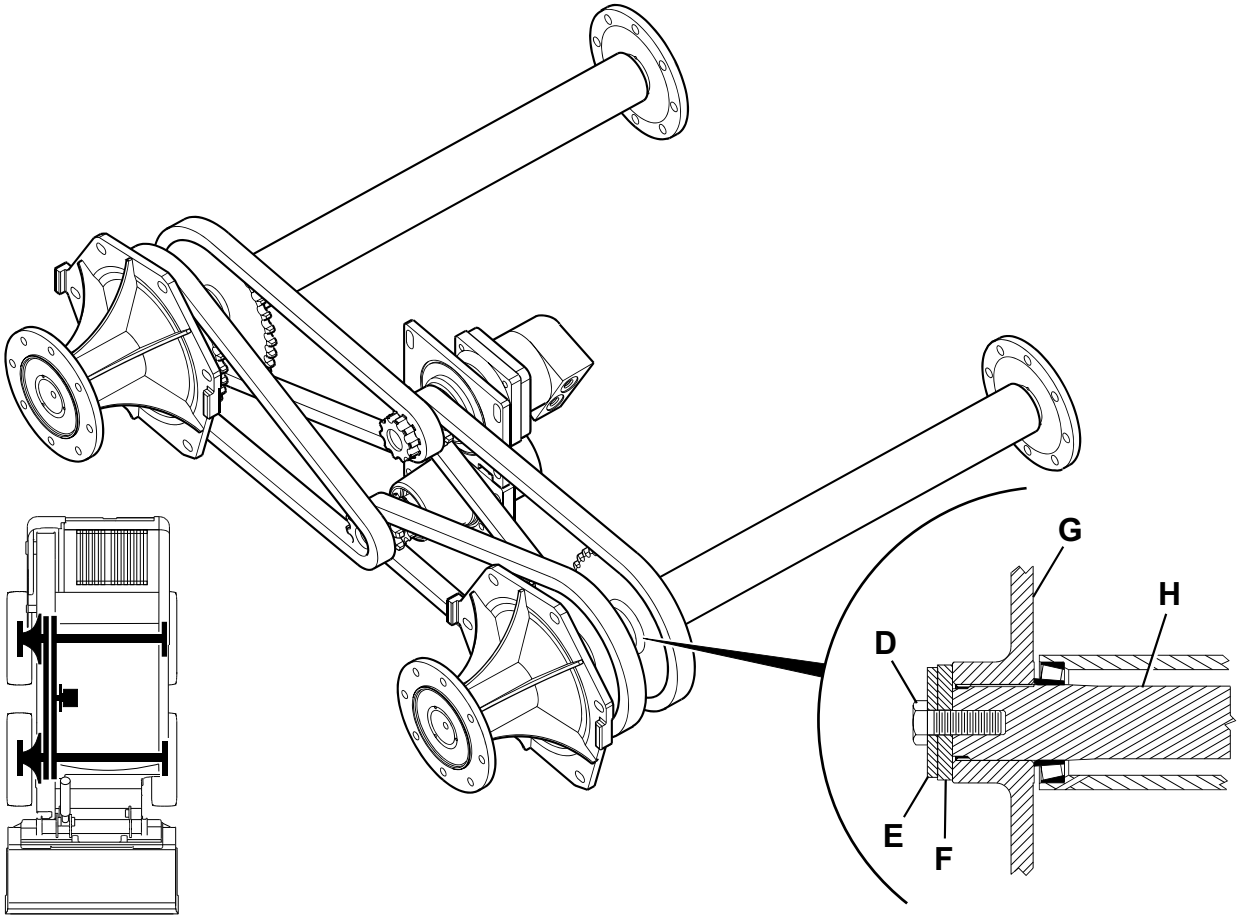

Fig 11.

Starting with the rear chain, remove bolt **D**, washer **E** and preload washer **F** then withdraw sprocket **G** from shaft **H**.

Release the chain from the motor drive sprocket then lift out sprocket **G** and chain from the chaincase.

Repeat for the front chain.

Replacement

Replacement is the reverse of the removal sequence.

After fitting sprocket G make sure that preload washer F is fitted with the stepped face towards the sprocket. Tighten bolt **D** to 220 Nm (162 lbf ft, 22.4 kgf m).

Refit the right hand wheel hub assembly ⇨ ***Replacement (F-5)***.

Adjust the chains ⇨ ***Adjustment (F-15)***.

Refit the chaincase access cover using a new gasket. Refill the chaincase with the correct oil (see ***Fluids, Lubricants and Capacities***).

Adjustment

Note: *The drive chains are pre-tensioned during manufacture and do not require routine adjustment in service. The following procedure should be carried out whenever the chains are disturbed or renewed.*

Left Hand Chain Adjustment

Adjust as follows:

1 Drain the oil from the chaincase.

2 Remove the seat and pump cover. Remove the chaincase access cover **D** ⇨ *Fig 13. (F-16)*.

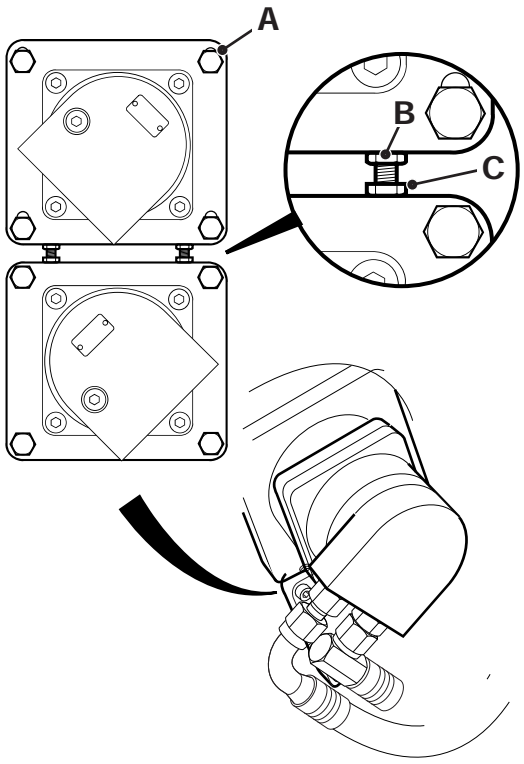

Fig 12.

3 Slacken the four bolts **A** securing the upper motor mounting to the chaincase.

4 Slacken locknuts **B** and tighten or loosen bolts **C** to raise or lower the mounting. Rotate the sprocket so that one side of the chain is taut. Position the motor mounting to give 10 mm (0.4 in) of slack on the opposite side of the chain at the midway point.

5 When the correct adjustment is achieved, tighten locknuts **B**. Tighten the upper motor mounting bolts

6 Refit the chaincase access cover **D** using a new gasket. Refill the chaincase with the correct oil.

7 Refit the seat and floorplate.

Right Hand Chain Adjustment

Adjust as follows:

1 Drain the oil from the chaincase.

2 Remove the chaincase access cover **D**.

3 The hub mounting bolts **E** should be loosened and nut **F** finger tight only.

4 Slacken locknut **G** and screw adjustment bolt **H** out to push the hub away from the centre of the machine and so tighten the chain.

5 Rotate the sprocket so that one side of the chain is taut. Position the hub to give 10 mm (0.4 in) of slack on the opposite side of the chain at the midway point.

6 When the correct tension is achieved, tighten bolts **E** and nut **F**. Tighten the second locknut to the adjustment bolt **H**.

7 Torque tighten nut **F** and bolts **E** to 220 Nm (162 lbf ft, 22.4 kgf m).

8 Refit the chaincase access cover **D** using a new gasket. Refill the chaincase with the correct oil.

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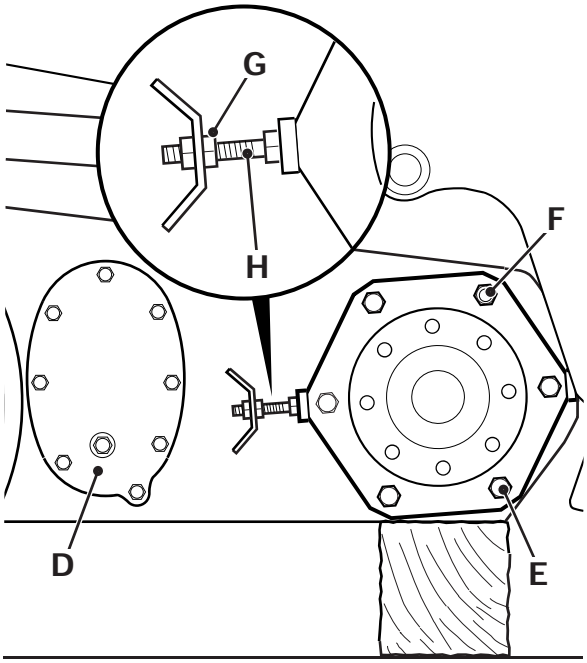

Fig 13.

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