

Backhoe Loader

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World Class
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Dismantle and Assemble

Typical Ram

The procedures described below are applicable for the following rams:

- Loader Shovel Ram
- Loader Lift Ram
- Stabiliser Ram
- Bucket Crowd Ram
- Boom Ram
- Extending Dipper Ram - if fitted

Dismantle

⇒ [Fig 13.](#) ([□ E25-23](#))

⇒ [Fig 14.](#) ([□ E25-23](#))

The numerical sequence shown on the illustration is intended as a guide to dismantling.

For assembly the sequence should be reversed.

Place ram assembly on a locally manufactured strip and rebuild bench as shown. ⇒ [Fig 11.](#) ([□ E25-21](#))

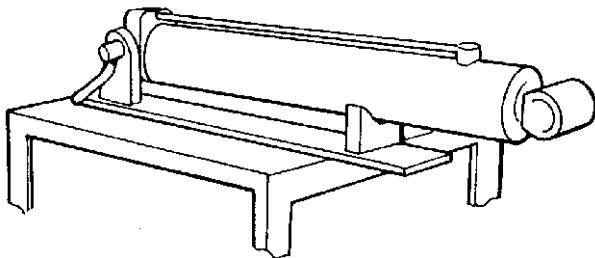


Fig 11.

Slacken end cap **1** using special spanner (see **Service Tools**), and remove the piston rod assembly **2** from the cylinder.

WARNING

If air or hydraulic pressure is used to force out the piston assembly, ensure that the end cap is securely fitted. Severe injury can be caused by a suddenly released piston rod.

HYD-1-2

Position piston rod assembly on bench in place of ram cylinder. Remove seal **4** and wear rings **3** and **5** from piston head.

Extract dowel **6** from the piston head using a metric screw (M3, M4, or M6 depending on ram size) threaded into the extractor hole.

Remove piston head from rod using special spanner (see **Service Tools**).

Remove gland bearing and end cap **1** from piston rod and remove the 'O' ring **9**, wiper seal **10** and rod seal **11**. Check the end cap bearing for damage, scores or nicks. If damaged, the bearing must be replaced as part of the end cap assembly.

Ensure that metal components are free from scoring, nicks and burrs. A damaged rod will impair the life of the seals.

Check the bore of the ram cylinder for damage.

Assemble

Clean threads of piston rod, piston head, end cap and cylinder using a wire brush. Use JCB Cleaner and Degreaser to ensure that all threads are free from grease, hydraulic oil and sealant. Allow 15 minutes for solvent to dry before applying JCB Threadlocker and Sealer (High Strength).

Ensure that lubricants used during assembly do not come into contact with the JCB Threadlocker and Sealer (High Strength).

For fitting seals to the end cap and piston head refer to the correct procedure. ⇒ [JCB Ram Sealing Procedure](#) ([□ E25-33](#))

Apply JCB Activator to threads of end cap and cylinder. Allow Activator to dry for 15 minutes before bringing into contact with the JCB Threadlocker and Sealer (High Strength).

Note: *Neither the JCB Threadlocker and Sealer (High Strength) nor Activator must be allowed to contact seals, bearing rings, or 'O' rings.*

Fit locking dowel **6** to piston head and rod as follows:

- 1 Fit 'O' ring **8** into piston head **7**.
- 2 Fit piston head to piston rod and torque tighten. ⇒ [Table 5. Torque Settings](#) ([□ E25-22](#))
- 3 New ram Shaft and piston head fitted. If both are required, the following procedure should be followed:
 - a Drill through piston head into piston rod. Use an undersized diameter drill first as a guide and then drill with the correct size diameter drill to suit.

⇒ [Fig 12. \(□ E25-22\)](#) ⇒ [Table 6. Drill Diameters and Depths \(□ E25-22\)](#)

recommended that the rams are operated slowly to their full extent before commencing normal working.

- b Remove all swarf and contamination. Insert dowel 6 into drilled hole, make sure tapped extractor hole is to outside.
- 4 New piston head fitted on a **pre-drilled piston rod**. Re-drill and dowel **BOTH** the piston head and piston rod at 90° from the existing drilled dowel hole in the piston rod. Follow the procedures described in step 3.
- 5 New piston rod fitted to a **pre-drilled piston head**. Use the pre-drilled hole in the piston head. Care must be taken not to elongate the existing hole in the piston head.
 - a Use a drill the same diameter as the pre-drilled hole in the piston head to make a 'centre mark' in the piston rod. DO NOT drill the piston rod at this stage.
 - b Use an undersized diameter drill as a guide and drill into the piston rod to the required depth. ⇒ [Table 6. Drill Diameters and Depths \(□ E25-22\)](#)

Table 5. Torque Settings

Item	Nm	kgf m	lbf ft
1	678	69.2	500
7	405	41.3	300

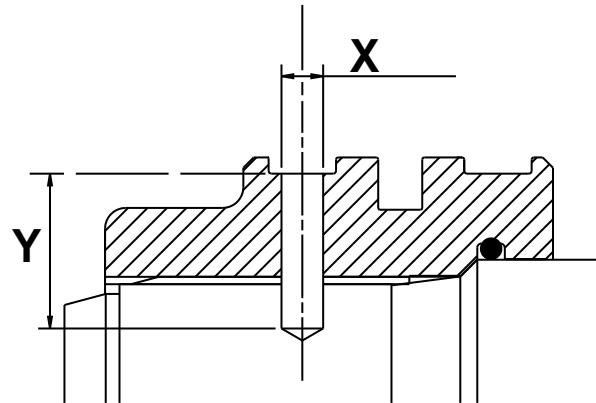


Fig 12.

Make sure the drill has centred correctly on the 'centre mark' made at step 5a.

Table 6. Drill Diameters and Depths

- c Use the correct size diameter drill to suit the dowel and drill to the required depth, ⇒ [Table 6. Drill Diameters and Depths \(□ E25-22\)](#)
- d Remove all swarf and contamination, insert the dowel.

All Dimensions are in mm

Ram Size	Dowel Size	Guide Drill Ø	Guide Drill Depth	Dowel Drill Ø X	Dowel Drill Depth Y
80 x 50	6Ø x 20	4	21	6.02-6.1	22-23
70 x 40					
90 x 50	8Ø x 25	5	24	8.02-8.1	27-28
100 x 60					
110 x 60	12Ø x 30	8	28	12.02-12.1	32-33
110 x 65					
120 x 65	12Ø x 35	8	33	12.02-12.1	37-38
130 x 75					

Position cylinder on bench and install rod assembly into cylinder.

Apply JCB Threadlocker and Sealer (High Strength) to first three threads of cylinder, torque tighten the end cap. ⇒ [Table 5. Torque Settings \(□ E25-22\)](#)

Note: If hydraulic oil contacts the uncured JCB Threadlocker and Sealer (High Strength) a weakening of the bond will result. Cure times vary according to the ambient temperature. Allow a minimum of 2 hours between assembly and filling the ram with oil.

Note: Cold weather operation. When operating in conditions which are consistently below freezing, it is

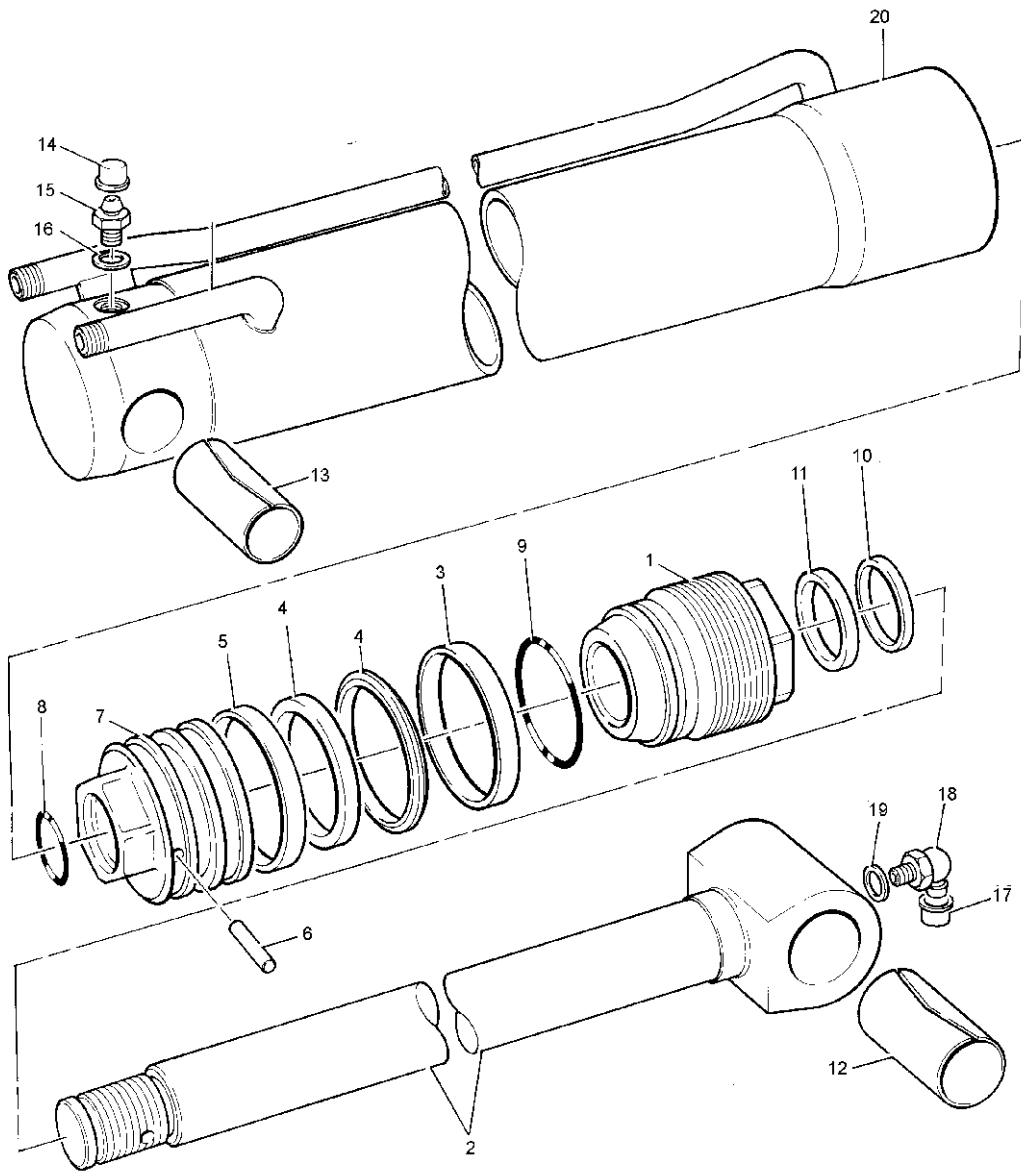


Fig 13.

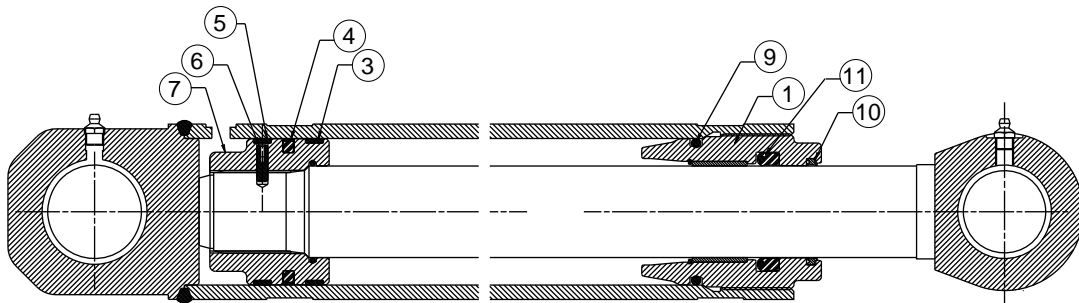


Fig 14. Typical Ram Assembly

On boom and bucket rams, pivot pin grease seals are fitted.

Slew Ram

Dismantle

⇒ [Fig 17.](#) (□ [E25-27](#))

The numerical sequence shown on the illustration is intended as a guide to dismantling.

For assembly the sequence should be reversed.

Place ram assembly on a locally manufactured strip and rebuild bench as shown or alternatively, hold the ram in a suitable vice taking care not to damage machined faces.

Remove cylinder **6** using special spanner (see **Service Tools**). Tap the cylinder off the piston head assembly using a suitable drift (e.g. nylon).

Position the piston rod assembly in a vice, use soft jaws and stand the assembly vertical whilst clamping on the eye end as shown. ⇒ [Fig 15.](#) (□ [E25-24](#))

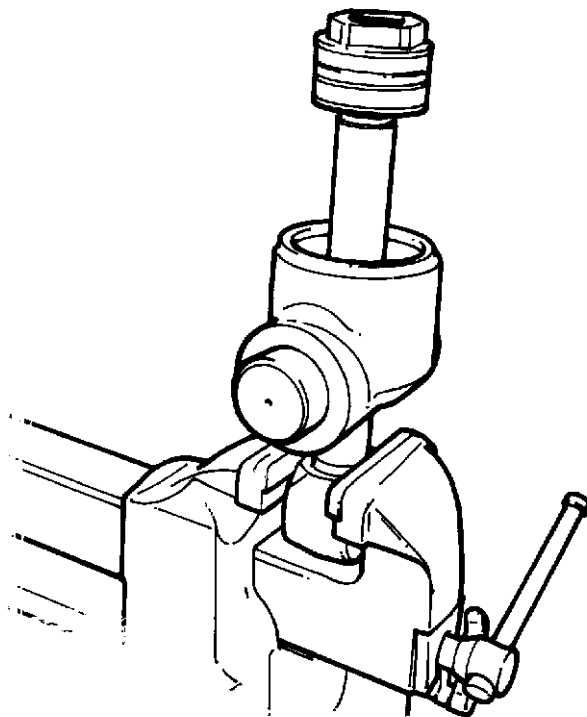


Fig 15.

Remove seal **8** and wear rings **7** and **9** from piston head. Extract dowel **10** from the piston head using a metric screw threaded into the extractor hole.

Remove piston head from rod using special spanner (see **Service Tools**).

Remove 'O' ring **12**.

Lift the end cap assembly **13** off the piston rod. Remove 'O' ring **14**, rod wiper seal **15** and rod seal **16** from the end cap assembly. Check the end cap bearing **13A** for damage, scores or nicks.

Item **18** is the metering orifice plate and item **17** its retaining wire, do not remove these items unless problems with the metering are suspected.

Ensure that metal components are free from scoring, nicks and burrs. A damaged rod will impair the life of the seals.

Check the bore of the ram cylinder for damage.

Assemble

Clean threads of piston rod, piston head, end cap and cylinder using a wire brush. Use JCB Cleaner and Degreaser to ensure that all threads are free from grease, hydraulic oil and sealant. Allow 15 minutes for solvent to dry before applying JCB Threadlocker and Sealer (High Strength).

Ensure that lubricants used during assembly do not come into contact with the JCB Threadlocker and Sealer (High Strength).

For the correct method of fitting seals to the end cap and piston head. ⇒ [JCB Ram Sealing Procedure](#) (□ [E25-33](#))

Apply JCB Activator to threads of end cap and cylinder. Allow Activator to dry for 15 minutes before bringing into contact with the JCB Threadlocker and Sealer (High Strength).

Note: Neither the JCB Threadlocker and Sealer (High Strength) nor Activator must be allowed to contact seals, bearing rings, or 'O' rings.

Fit locking dowel **10** to piston head and rod as follows:

- 1 Fit 'O' ring **12** into piston head **11**.

- 2 Fit piston head to piston rod and torque tighten.
⇒ [Table 7. Torque Settings \(□ E25-25\)](#)
- 3 New ram Shaft and piston head fitted. If both are required, the following procedure should be followed:
 - a Drill through piston head into piston rod. Use an undersized diameter drill first as a guide and then drill with the correct size diameter drill to suit.
⇒ [Fig 16. \(□ E25-26\)](#) ⇒ [Table 8. Drill Diameters and Depths \(□ E25-26\)](#)
 - b Remove all swarf and contamination. Insert dowel **10** into drilled hole, make sure tapped extractor hole is to outside.
- 4 New piston head fitted on a **pre-drilled piston rod**. Re-drill and dowel **BOTH** the piston head and piston rod at 90° from the existing drilled dowel hole in the piston rod. Follow the procedures described in step 3.
- 5 New piston rod fitted to a **pre-drilled piston head**. Use the pre-drilled hole in the piston head. Care must be taken not to elongate the existing hole in the piston head.
 - a Use a drill the same diameter as the pre-drilled hole in the piston head to make a 'centre mark' in the piston rod. DO NOT drill the piston rod at this stage.
 - b Use an undersized diameter drill as a guide and drill into the piston rod to the required depth.
⇒ [Table 8. Drill Diameters and Depths \(□ E25-26\)](#)

Make sure the drill has centred correctly on the 'centre mark' made at step 5a.
 - c Use the correct size diameter drill to suit the dowel and drill to the required depth. ⇒ [Table 8. Drill Diameters and Depths \(□ E25-26\)](#)
 - d Remove all swarf and contamination, insert the dowel.

Install cylinder onto the rod assembly, make sure that the cylinder is fitted square to the rod assembly. Firmly push the cylinder over the piston head seals.

Apply JCB Threadlocker and Sealer (High Strength) to first three threads of cylinder, torque tighten the cylinder.
⇒ [Table 7. Torque Settings \(□ E25-25\)](#)

Note: If hydraulic oil contacts the uncured JCB Threadlocker and Sealer (High Strength) a weakening of the bond will result. Cure times vary according to the ambient temperature. Allow a minimum of 2 hours between assembly and filling the ram with oil.

Note: Cold weather operation. When operating in conditions which are consistently below freezing, it is recommended that the rams are operated slowly to their full extent before commencing normal working.

Position pipe assembly in correct position and torque tighten probe assembly **2** to 75Nm (55 lbf ft; 7.6 kgf m). DO NOT over-tighten the probe.

Make sure seals **19** and **21** are fitted the correct way as shown.

Table 7. Torque Settings

Item	Nm	kgf m	lbf ft
6	678	69.2	500
11	405	41.3	300

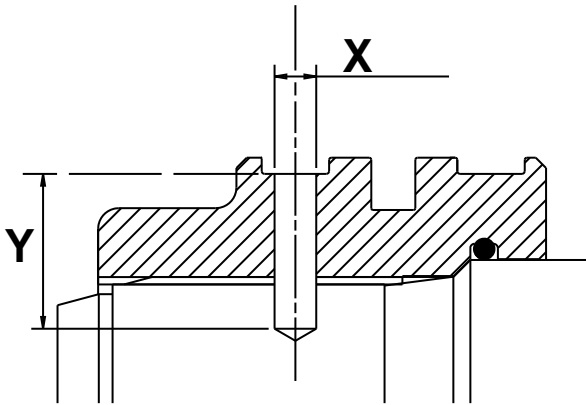


Fig 16.

Table 8. Drill Diameters and Depths

All Dimensions are in mm

Ram Size	Dowel Size	Guide Drill Ø	Guide Drill Depth	Dowel Drill Ø X	Dowel Drill Depth Y
80 x 50	6Ø x 20	4	21	6.02-6.1	22-23
70 x 40					
90 x 50	8Ø x 25	5	24	8.02-8.1	27-28
100 x 60					
110 x 60	12Ø x 30	8	28	12.02-12.1	32-33
110 x 65					
120 x 65	12Ø x 35	8	33	12.02-12.1	37-38
130 x 75					

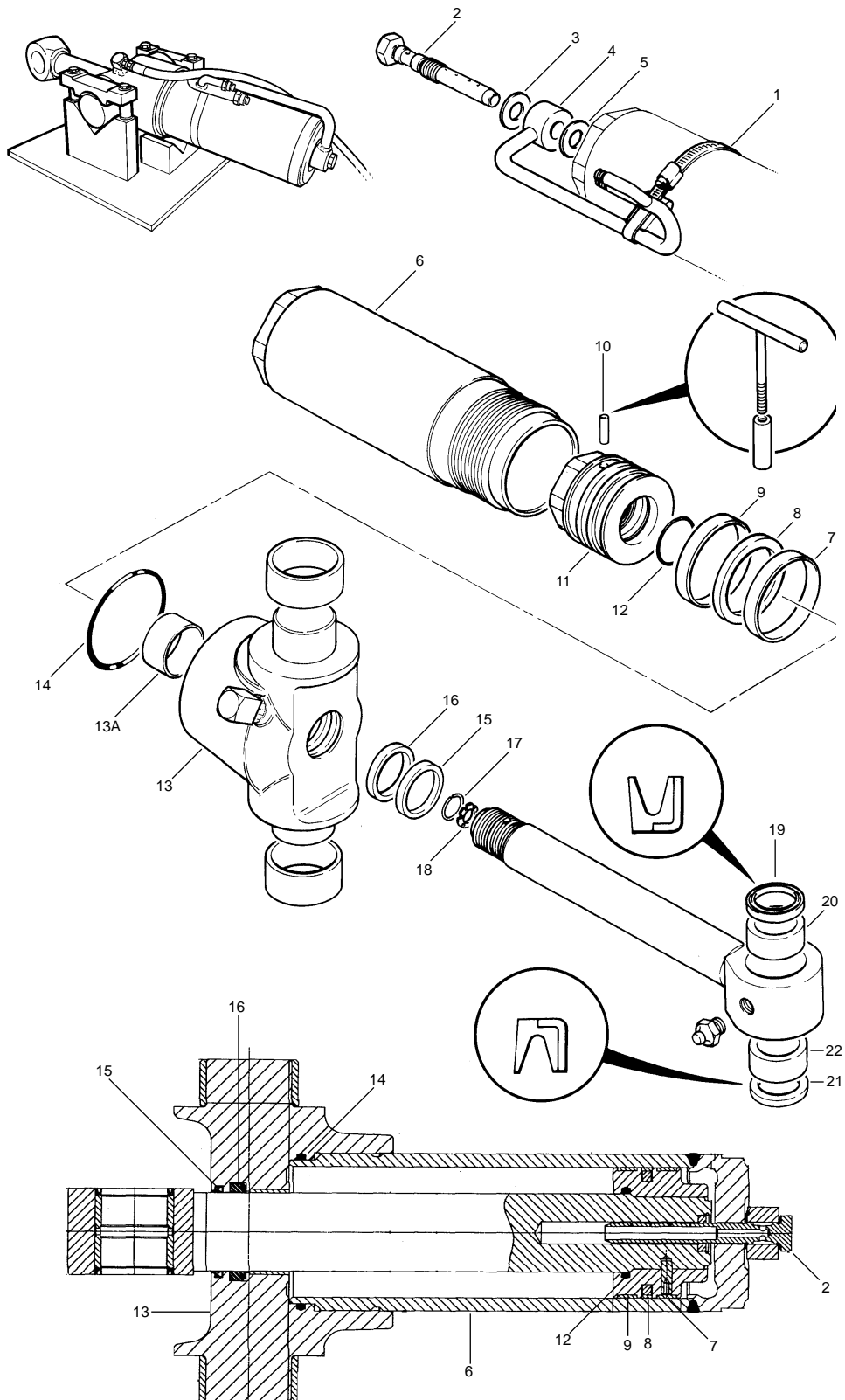


Fig 17. Slew Ram

Dipper Ram

Dismantle

⇒ [Fig 20.](#) (□ [E25-30](#))

The numerical sequence shown on the illustration is intended as a guide to dismantling.

For assembly the sequence should be reversed.

Place ram assembly on a locally manufactured strip and rebuild bench as shown. ⇒ [Fig 18.](#) (□ [E25-28](#))

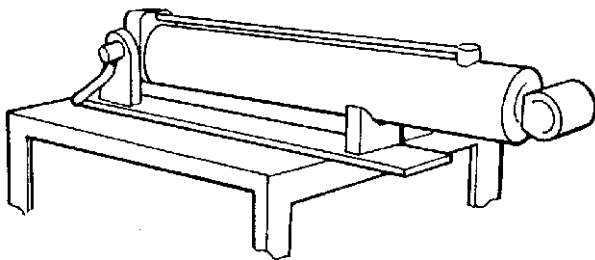


Fig 18.

Slacken end cap **1** using special spanner (see **Service Tools**), and remove the piston rod assembly **2** from the cylinder.

WARNING

If air or hydraulic pressure is used to force out the piston assembly, ensure that the end cap is securely fitted. Severe injury can be caused by a suddenly released piston rod.

HYD-1-2

Position piston rod assembly on bench in place of ram cylinder. Remove seal **4** and wear rings **3** and **5** from piston head.

Extract dowel **6** from the piston head using a metric screw (M3, M4, or M6 depending on ram size) threaded into the extractor hole.

Remove piston head from rod using special spanner (see **Service Tools**).

Remove gland bearing and end cap **1** from piston rod and remove the 'O' rings **11** and **12**, wiper seal **13** and rod seal **14**. Check the end cap bearing for damage, scores or nicks. If damaged, the bearing must be replaced as part of the end cap assembly.

Ensure that metal components are free from scoring, nicks and burrs. A damaged rod will impair the life of the seals.

Check the bore of the ram cylinder for damage.

Assemble

Clean threads of piston rod, piston head, end cap and cylinder using a wire brush. Use JCB Cleaner and Degreaser to ensure that all threads are free from grease, hydraulic oil and sealant. Allow 15 minutes for solvent to dry before applying JCB Threadlocker and Sealer (High Strength).

Ensure that lubricants used during assembly do not come into contact with the JCB Threadlocker and Sealer (High Strength).

For the correct method of fitting seals to the end cap and piston head. ⇒ [JCB Ram Sealing Procedure](#) (□ [E25-33](#))

Apply JCB Activator to threads of end cap and cylinder. Allow Activator to dry for 15 minutes before bringing into contact with the JCB Threadlocker and Sealer (High Strength).

Note: Neither the JCB Threadlocker and Sealer (High Strength) nor Activator must be allowed to contact seals, bearing rings, or 'O' rings.

Ensure that end damping spring **9** is engaged with collar **10** and piston head **7**.

Fit locking dowel **6** to piston head and rod as follows:

- 1 Fit 'O' ring **8** into piston head **7**.
- 2 Fit piston head to piston rod and torque tighten. ⇒ [Table 9. Torque Settings](#) (□ [E25-29](#))
- 3 New ram shaft and piston head fitted. If both are required, the following procedure should be followed:
 - a Drill through piston head into piston rod. Use an undersized diameter drill first as a guide and then drill with the correct size diameter drill to suit. ⇒ [Fig 19.](#) (□ [E25-29](#)) ⇒ [Table 10. Drill Diameters and Depths](#) (□ [E25-29](#))
 - b Remove all swarf and contamination. Insert dowel **6** into drilled hole, make sure tapped extractor hole is to outside.
- 4 New piston head fitted on a **pre-drilled piston rod**. Re-drill and dowel **BOTH** the piston head and piston rod at 90° from the existing drilled dowel hole in the piston rod. Follow the procedures described in step 3.
- 5 New piston rod fitted to a **pre-drilled piston head**. Use the pre-drilled hole in the piston head. Care must be taken not to elongate the existing hole in the piston head.
 - a Use a drill the same diameter as the pre-drilled hole in the piston head to make a 'centre mark' in

the piston rod. DO NOT drill the piston rod at this stage.

- b Use an undersized diameter drill as a guide and drill into the piston rod to the required depth. ⇒ [Table 10. Drill Diameters and Depths \(□ E25-29\)](#)

Make sure the drill has centred correctly on the 'centre mark' made at step 5a.

- c Use the correct size diameter drill to suit the dowel and drill to the required depth. ⇒ [Table 10. Drill Diameters and Depths \(□ E25-29\)](#)
- d Remove all swarf and contamination, insert the dowel.

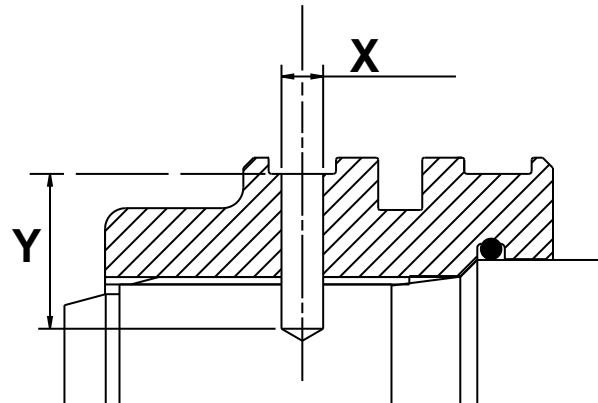


Fig 19.

Position cylinder on bench and install rod assembly into cylinder.

Apply JCB Threadlocker and Sealer (High Strength) to first three threads of cylinder, torque tighten the end cap. ⇒ [Table 9. Torque Settings \(□ E25-29\)](#)

Note: If hydraulic oil contacts the uncured JCB Threadlocker and Sealer (High Strength) a weakening of the bond will result. Cure times vary according to the ambient temperature. Allow a minimum of 2 hours between assembly and filling the ram with oil.

Note: Cold weather operation. When operating in conditions which are consistently below freezing, it is recommended that the rams are operated slowly to their full extent before commencing normal working.

Table 10. Drill Diameters and Depths

All Dimensions are in mm					
Ram Size	Dowel Size	Guide Drill Ø	Guide Drill Depth	Dowel Drill Ø X	Dowel Drill Depth Y
80 x 50	6Ø x 20	4	21	6.02-6.1	22-23
70 x 40					
90 x 50	8Ø x 25	5	24	8.02-8.1	27-28
100 x 60					
110 x 60	12Ø x 30	8	28	12.02-12.1	32-33
110 x 65					
120 x 65	12Ø x 35	8	33	12.02-12.1	37-38
130 x 75					

Table 9. Torque Settings

Item	Nm	kgf m	lbf ft
1	678	69.2	500
7	405	41.3	300

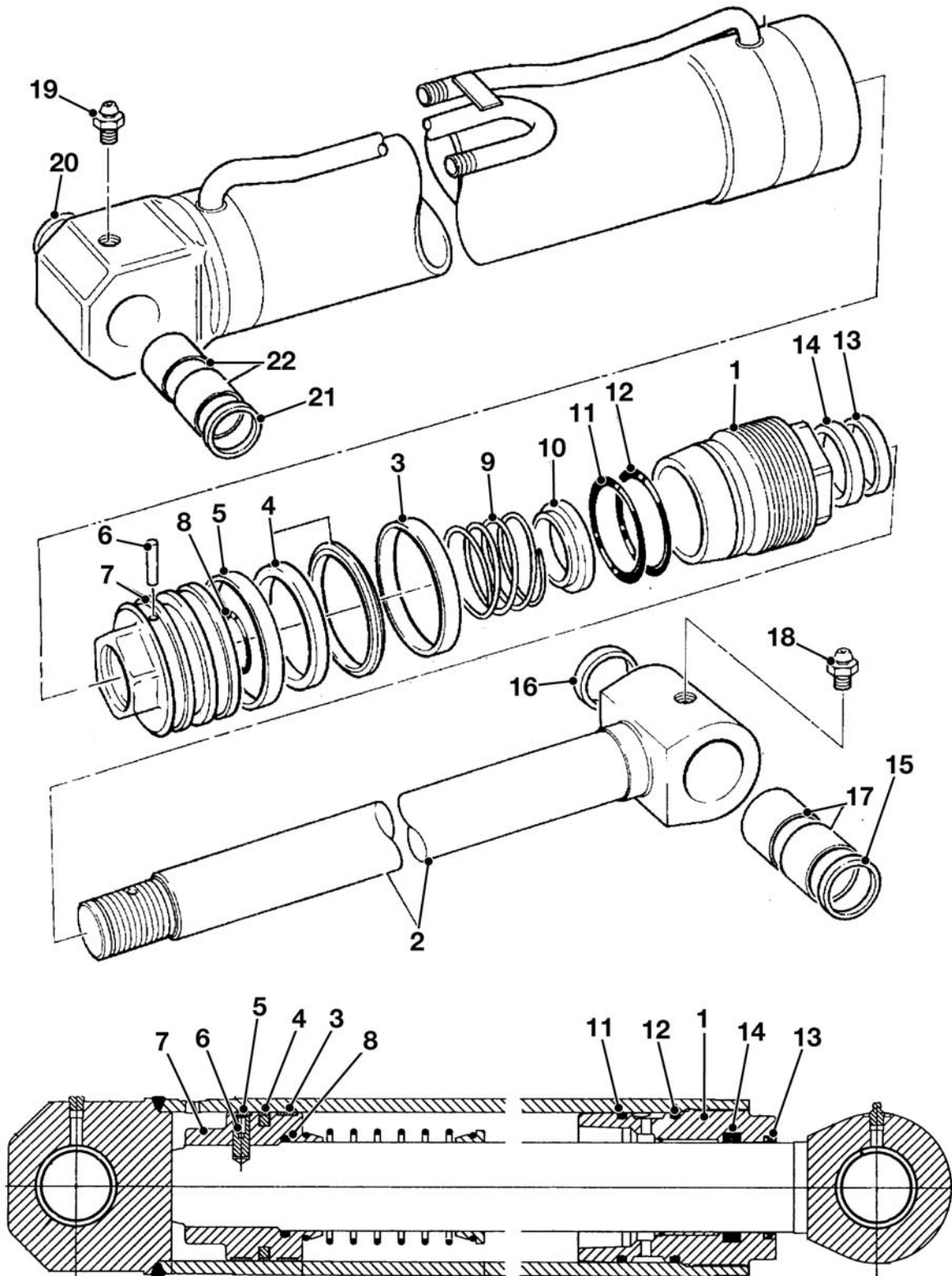


Fig 20. Dipper Ram

C000480-C1

Power Sideshift Ram

⇒ [Fig 21.](#) (□ [E25-32](#))

The numerical sequence shown on the illustration is intended as a guide to dismantling.

For assembly the sequence should be reversed.

Dismantle

- 1 Fix the ram assembly on a locally manufactured strip and rebuild bench as shown at **A**.
- 2 Remove both end caps **1**, (46mm AF). Pull the piston rod assembly from the cylinder.

Note: DO NOT allow the piston rod to come into contact with the cylinder bore. The cylinder bore may be damaged by careless dismantling.

- 3 Position the piston rod assembly on a bench in place of the ram cylinder. Remove the wear rings **2** and seal **3** from the piston head.

Note: The piston head cannot be removed from the rod. If there is damage to the rod or piston head, replace the complete assembly.

- 4 Carefully inspect the bore of the cylinder and the piston rod outer diameter for scoring, nicks and burrs. If such damage is visible the components must be renewed.

Note: If burrs are evident on the ends of the piston rod at positions **C** or **D** remove by careful filing.

- 5 Remove the end cap seal **4**, wiper seal **5** and 'O' ring **6**, both end caps are the same.
- 6 Remove spacers **7** and 'O' rings **8**.

Assemble

- 1 Clean the threads of the end caps and cylinder using a wire brush.
- 2 Use JCB Cleaner and Degreaser to ensure that all threads are free from grease, hydraulic oil and sealant. Allow 15 minutes for solvent to dry before applying JCB Threadlocker and Sealer (High Strength). Ensure that lubricants used during assembly do not come into contact with the JCB Threadlocker and Sealer (High Strength).
- 3 For the correct method of fitting seals to the end cap and piston head. ⇒ [JCB Ram Sealing Procedure](#) (□ [E25-33](#))
- 4 Clamp the cylinder vertically and lower the piston rod assembly in from the top, as shown at **B**. Take care

not to allow the piston rod to come into contact with the cylinder bore. Be sure to engage the piston head new wear rings and seal carefully into the cylinder. If the piston head wear rings or seal are damaged during this stage, they must be renewed.

- 5 Fit new 'O' rings **8** to spacers **7**, slide onto the piston head and rod assembly.
- 6 Apply JCB Activator to threads of the end caps and cylinder. Allow Activator to dry for 15 minutes before bringing into contact with the JCB Threadlocker and Sealer (High Strength).

Note: Neither the JCB Threadlocker and Sealer (High Strength) nor Activator must be allowed to contact seals, bearing rings or 'O' rings.

- 7 Apply JCB Threadlocker and Sealer (High Strength) to threads of the ends caps, fit new 'O' rings **6**.
- 8 Ensure that there are no burrs at the ends of the piston rod.

Note: If burrs are evident on the ends of the piston rod at positions **C** or **D** remove by careful filing.

- 9 Fit an end cap over the piston rod. Apply light hand pressure to the cap to engage the gland seal on the piston rod. DO NOT use excessive force. Screw on the first end cap and then fix the assembly on the strip and rebuild bench as shown at **A**. Fit the remaining cap and then torque tighten both caps. ⇒ [Table 11. Torque Settings](#) (□ [E25-31](#))

Note: If hydraulic oil contacts the uncured JCB Threadlocker and Sealer (High Strength) a weakening of the bond will result. Cure times vary according to the ambient temperature. Allow a minimum of 2 hours between assembly and filling the ram with oil.

Table 11. Torque Settings

Item	Nm	kgf m	lbf ft
1	400	40.8	295

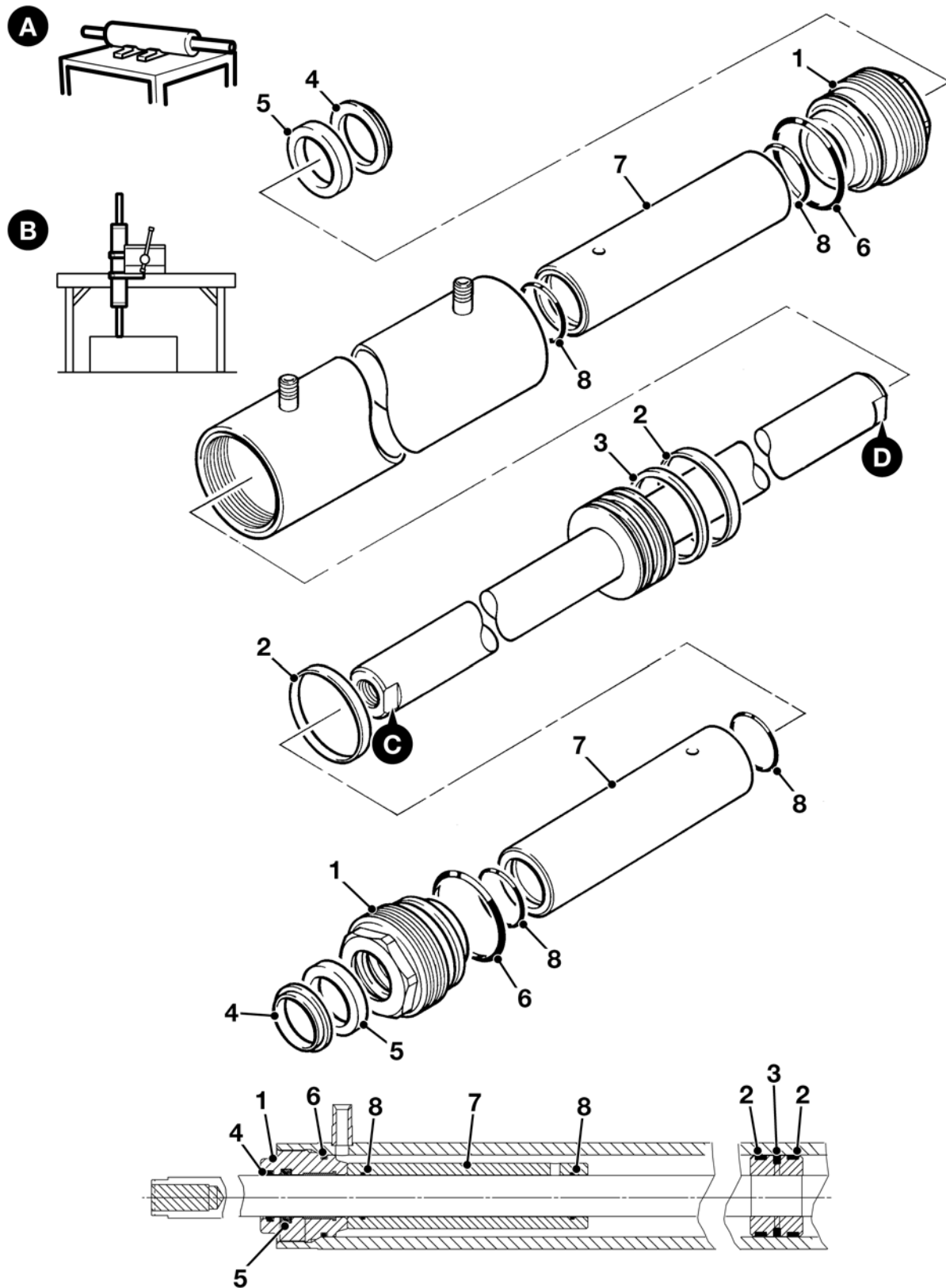


Fig 21. Power Sideshift Ram

C000490-C2

JCB Ram Sealing Procedure

TE-005

1 Fit new rod seals.

Use seal fitting tool **22-A** to fit rod seals, the size (diameter) and position of pins **22-B** is determined by the diameter and radial width of the rod seal being fitted.

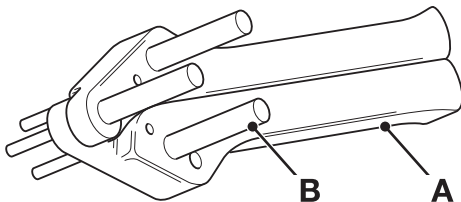


Fig 22. Seal Fitting Tool

The pins are screwed into threaded holes in the tool body, the spacing of the holes is designed to suit small or large diameter rod seals.

- a Open the tool and insert the new rod seal **23-A**. The seal must be fitted behind the two front pins but in front of the rear pin as shown.

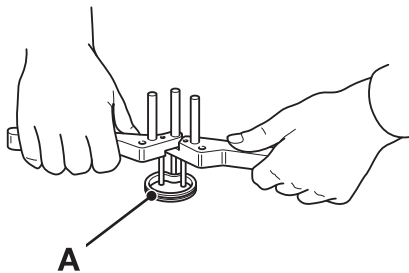


Fig 23.

Note: Later ram end caps and piston heads are metric threads. The seals are also different, make sure the correct seals are fitted. On metric threaded rams make sure the seals are fitted the correct way round, as shown at **24-A** and **24-B**.

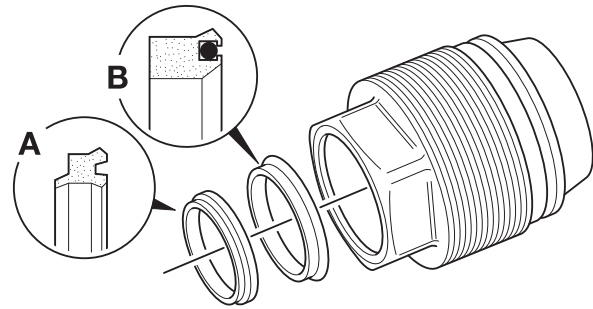


Fig 24.

- b Close the tool. → [Fig 25. \(□ E25-33\)](#). The seal must form a reniform (kidney shape).

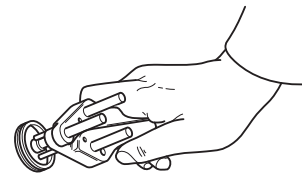


Fig 25.

- c Before fitting the rod seals check the seal grooves are free of contamination and sharp edges.
- d Locate the seal in the end cap groove. → [Fig 26. \(□ E25-33\)](#). When the seal is in position, open the tool to release the seal. Make sure the seal is correctly installed in its grooved and remove the tool.



Fig 26.

- e Fit rod wiper seal **24-A** into seal groove. Make sure the seal is correctly installed as shown.

Note: Some rod wipers, i.e. power track rod, may use a metal encased seal which is pressed into the housing.

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