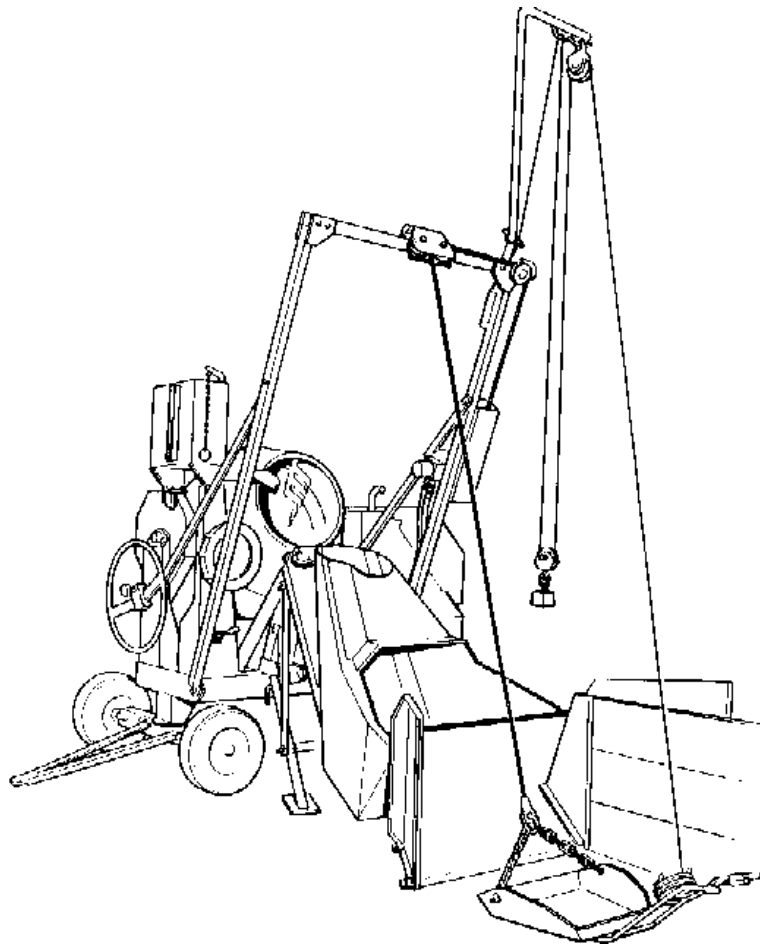


WINGET

WORKSHOP MANUAL 200TM MIXER



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SECTION 1

INTRODUCTION

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Introduction

It is assumed that Personnel involved in either the Assembly or repair of Winget Mixers will be familiar with the product, either through the operation of, or previous repair and maintenance work. It is not intended to be used by Personnel who are neither familiar with the product or mechanically inexperienced.

It is also assumed that personnel are aware of the Health and Safety Regulations, which should be applied to all working practices, but the following should act as a reminder.

Ensure all work tools are in good condition.

Always wear Safety Spectacles when using Soft or Hard Faced Hammers, Chisels or when using Air Tools. Wear Safety Spectacles when cleaning Hardened Concrete or Mortar off components.

Do not misuse Air Lines and be aware of the damage Compressed Air can cause if misused.

Always make sure Lifting Equipment is in good condition and the Safe Working Loads exceed the weights of the components to be lifted.

Oils, Fuels, Silicone Sealer and Open Gear Lubricants can cause skin diseases if allowed to contaminate the skin. Always apply barrier creams, wear suitable protective clothing or when contamination is unavoidable clean the area with soap and water as soon as possible. Do not use thinners or other solvents to clean skin.

Health and Safety is a matter of common sense. If common sense is applied correctly Health and Safety can be improved upon and the risk of accidents reduced.

L/H and R/H views are taken when standing directly behind and facing the engine housing.

Whilst every effort is made to ensure the contents of this manual are accurate, Winget Limited accept no responsibility for errors or omissions and reserve the right to alter specification without prior notification and certain sections may then no longer apply.

Repair & Maintenance Procedures

The following procedures are based in part on the procedures issued to Distributors and the instructions should be used in conjunction with the appropriate Parts and Operators Manual or Parts Microfiche. Reference should also be made to the Parts Listings in Section 10 for a guide to the correct sequence for assembling components and sub assemblies.

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- 1) Clean any paint or debris from bores and shaft surfaces. Threaded holes should preferably be cleaned out using the correct tap
- 2) All sealed for life bearings should be packed with a good quality grease prior to installation. Carefully remove a seal, pack the bearing with grease and refit the seal ensuring it is correctly seated.
- 3) Apart from installing the electric motor, mounting brackets and conduit as described in this manual under the heading '415 volt 3 ph Electric Motor' all wiring and other work concerned with the installation of 415 volt components and supply should be left to a suitably qualified electrician, who is conversant with 3 ph 415 volt electric circuits.

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SECTION 2

REPAIR & SERVICE PROCEDURES

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Lifting Points

Lifting points capable of supporting the weight of the mixer are incorporated in both the rear leg of the mainframe and on the upper leading edge of the hopper cradle.

The lifting points are highlighted with an ISO 'Hook' symbol adjacent to each point.

On Military/Nato mixers the lifting points are also painted white.

The hopper also incorporates lifting points to assist in removing the hopper. The hopper lifting points are not highlighted to avoid confusion with the main lifting points. On no account must the hopper lifting points be used to support the weight of the mixer.

Pneumatic/Steel Wheel Replacement.

The pneumatic or steel wheels are secured to the axle stub shafts using a collar retained via a long bolt and binx nut. To replace a wheel jack up and support the axle adjacent to the stub shaft, undo and remove the retaining bolt slide off the collar followed by the wheel. Pneumatic wheels are fitted with a removable needle bearing, which can be greased via the grease point. Reverse the procedure to replace a wheel not forgetting to lubricate the stub shaft and needle bearings with grease prior to assembly.

Axles Front & Rear.

Using suitable lifting equipment lift and support the mainframe. The Rear axle is retained to the mainframe using four bolts, flat washers and binx nuts. Remove the bolts and carefully manoeuvre the axle clear off the frame. Reverse the procedure to refit.

The front axle is retained via a pivot pin, washers and split pins, to remove lift and support the mainframe using suitable lifting equipment. Straighten the split pins and remove from the pivot pin. Using a suitable drift and hammer knock the pivot pin up through the axle and manoeuvre the axle clear. Reverse the procedure to refit not forgetting to coat the pivot pin with anti-seize compound and fit new split pins. The axle is prevented from rotating too far by the use of two M10 set screws as axle stops if the axle is changed do not forget to replace the stop screws.

Lower the mainframe and allow to stand on the wheels, if pneumatic wheels are fitted check and adjust the tyre pressures.

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Drawbar-Standard

The standard drawbar is attached to the front axle via two bolts, flat washers and binx nuts, to remove simply undo and remove the bolts and lift the drawbar clear. Reverse the procedure to refit.

Drum Removal

Attach suitable lifting equipment through the Drum Blades. Knock back the tabs on the tabwasher securing the Drum Shaft setscrews. Remove the setscrews and washers securing the Shaft and Flange. With the Drum Mouth upright lift the Drum assembly clear of the Trunnion. It may be necessary to rock the Trunnion via the Tiltwheel to free the Drum Shaft.

In exceptional circumstances it may be necessary to use a Two-Leg Puller/Pusher Tool to assist in pushing the Drum Shaft through the Trunnion. When using such tools follow the manufacturers instructions.

Replacement of Drum Shaft, Bevel Gear and Bearings

Remove the drum as described previously and turn upside down so that the assembly stands on the open mouth of the drum. Before removing the bevel gear from the drum base use suitably sized circlip pliers and remove the large circlip retaining the lower shaft bearing into the gear.

Remove the setscrews securing the bevel gear and shaft assembly to the drum base, use two of the setscrews as jacking as screws utilising the threaded holes in the bevel gear and jack the assembly out of the base.

With the assistance of suitable lifting equipment lift the assembly onto a suitable supporting surface and using a soft faced hammer or mallet knock the shaft back through the bevel gear. Support the shaft in a suitable soft jawed vice and remove the smaller circlip from the end of the shaft retaining the upper drum bearing, using a suitable drift or puller remove both bearings from the shaft. Clean all the components.

Before fitting new bearings carefully remove the seals from the bearings and pack the bearings with good quality grease, refit the seals, do not completely fill the bearings with grease leave some room for expansion as the grease warms up in service.

Fit the new bearings to the shaft and retain the upper smaller bearing using a new circlip. Clean out the drum centre shaft housing and smear a little anti-seize compound round the circumference of the upper bearing seat within the housing.

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Place the bevel gear on the drum base and loosely retain with the setscrews and washers, apply threadlock to the screw threads before inserting, smear a little anti-seize compound round the circumference of the lower bearing seat in the bevel gear.

Lower the shaft through the bevel gear and using a suitable mallet or soft faced hammer knock the shaft fully home, fit the large retaining circlip and fully tighten the setscrews.

Once the setscrews are tight it may be necessary to give the shaft end a sharp tap to fully seat the bearings.

Drum Cone Replacement, Diesel TS/TR1 Engine

Clean hardened concrete or mortar from around the drum clip and bolts securing the drum blades. Remove the bolts securing the blades to the drum cone and slacken the bolts through the base. Cut through the drum clip and remove. Lift off the drum cone. If necessary clean out the drum base. Clean any old silicone sealer and hardened concrete from the drum flange.

The 200T and 200TM both utilise the same drum cone, however because the TS/TR1 diesel version of the 200TM rotates in the opposite direction to the 200T and electric driven 200TM different drum blades are used. The standard cone must therefore be modified prior to use as follows.

Using the special template/tool available from Winget under part number 513360100, (a drawing is enclosed in the 'special tools section') insert the template into the existing holes in the cone and mark out the new upper holes.

Remove the template and drill the two new holes, weld up the existing upper holes, the cone is now ready for fitment.

Run a generous bead of silicone sealer around the flange of the drum base and inside the new drum clip. Leave the last 150mm of each end of the clip free from sealer.

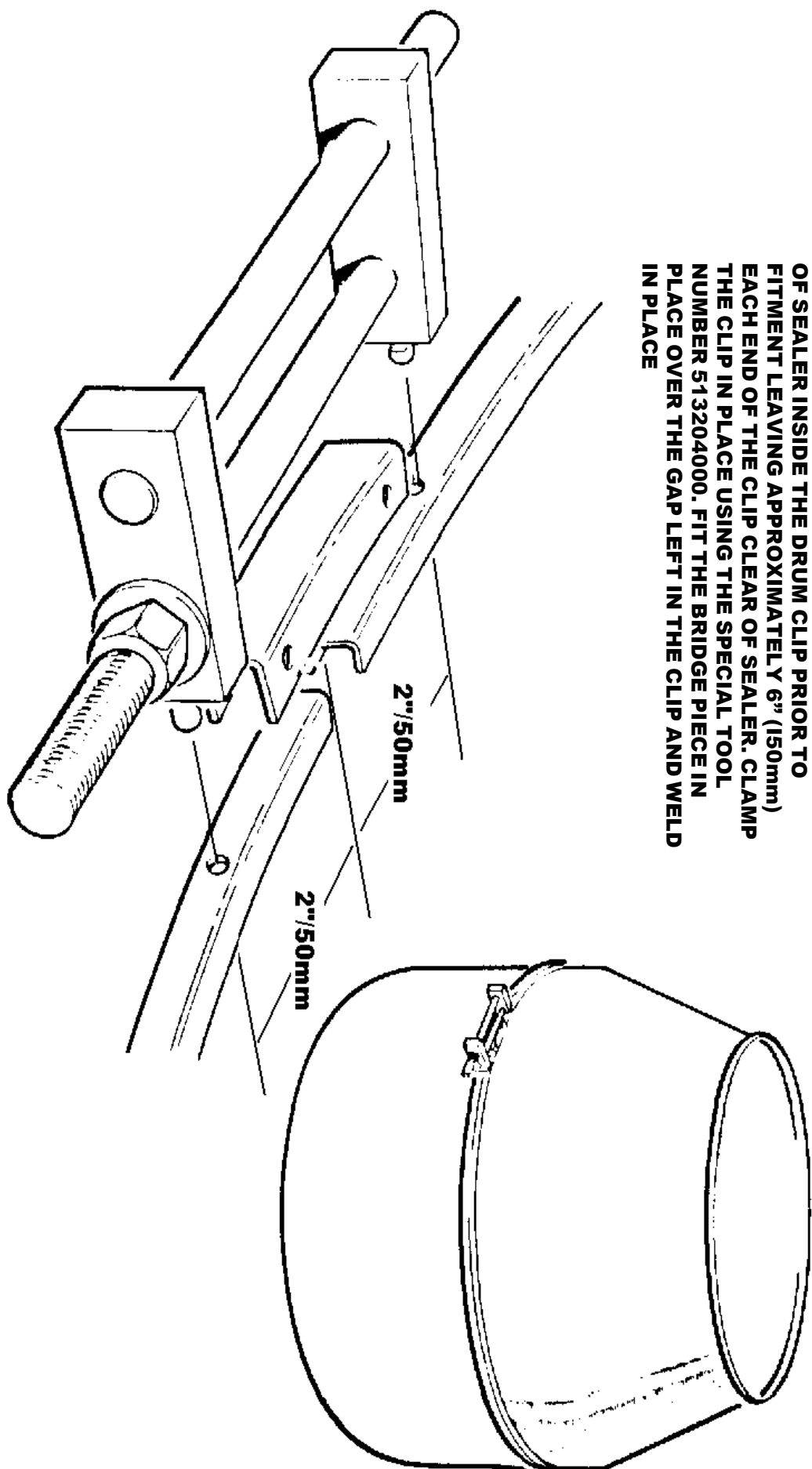
Using suitable lifting equipment lift the new drum cone in place lining up the holes in the cone with those in the blades. Loosely refit in the bolts, nuts and washers. Fit the new drum clip around the circumference of the two halves of the drum tapping in place over the flanges using a soft faced hammer.

Attach the special drum clip tool placing the pins on the tool into the holes in each end of the clip.

Using a suitable spanner tighten the drum clip to the drum until it is secure. Do not overtighten the clip or the pins in each end of the tool will shear off. Slip the bridge

200TM DRUM CLIP FIXING

AFTER COATING THE MATING FACES OF THE DRUM BASE AND CONE WITH SILICONE SEALER FIT THE CLIP AROUND THE DRUM AS SHOWN. RUN A BEAD OF SEALER INSIDE THE DRUM CLIP PRIOR TO FITMENT LEAVING APPROXIMATELY 6" (150mm) EACH END OF THE CLIP CLEAR OF SEALER. CLAMP THE CLIP IN PLACE USING THE SPECIAL TOOL NUMBER 513204000. FIT THE BRIDGE PIECE IN PLACE OVER THE GAP LEFT IN THE CLIP AND WELD IN PLACE



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piece over the remaining gap in the drum clip and weld in place. Remove the tool. Fully tighten the drum blades.

Run the mixer, tilting the drum via the tiltwheel making sure that the drum, clip or bridge piece do not foul the mainframe or guards.

Stop the engine, clean any excess silicone off the drum or clip.

Drum Blade Replacement

It is unlikely that drum blades will require replacement separately to the drum cone. However in the event that it should prove necessary, clean any hardened concrete or mortar from around the bolts securing the blades. Remove the bolts and blades. Due to the corrosive action of concrete and mortar it may be necessary to cut through the old bolts using oxyacetylene equipment. Be aware that hot concrete can “explode” violently spitting concrete - wear suitable eye protection and protective clothing.

Attach the new blades into the drum assembly finger tighten the bolts until all the bolts are in place. Tighten the bolts.

The bolts should go into the drum from the outside and only round or dome headed bolts should be used.

Bevel Gear Guard Replacement

Remove the drum assembly as previously described. Remove the four setscrews, nuts, etc. holding the guard in place. Fit the new guard tighten the setscrews. Replace the drum assembly as described below.

Refitting Drum Assembly

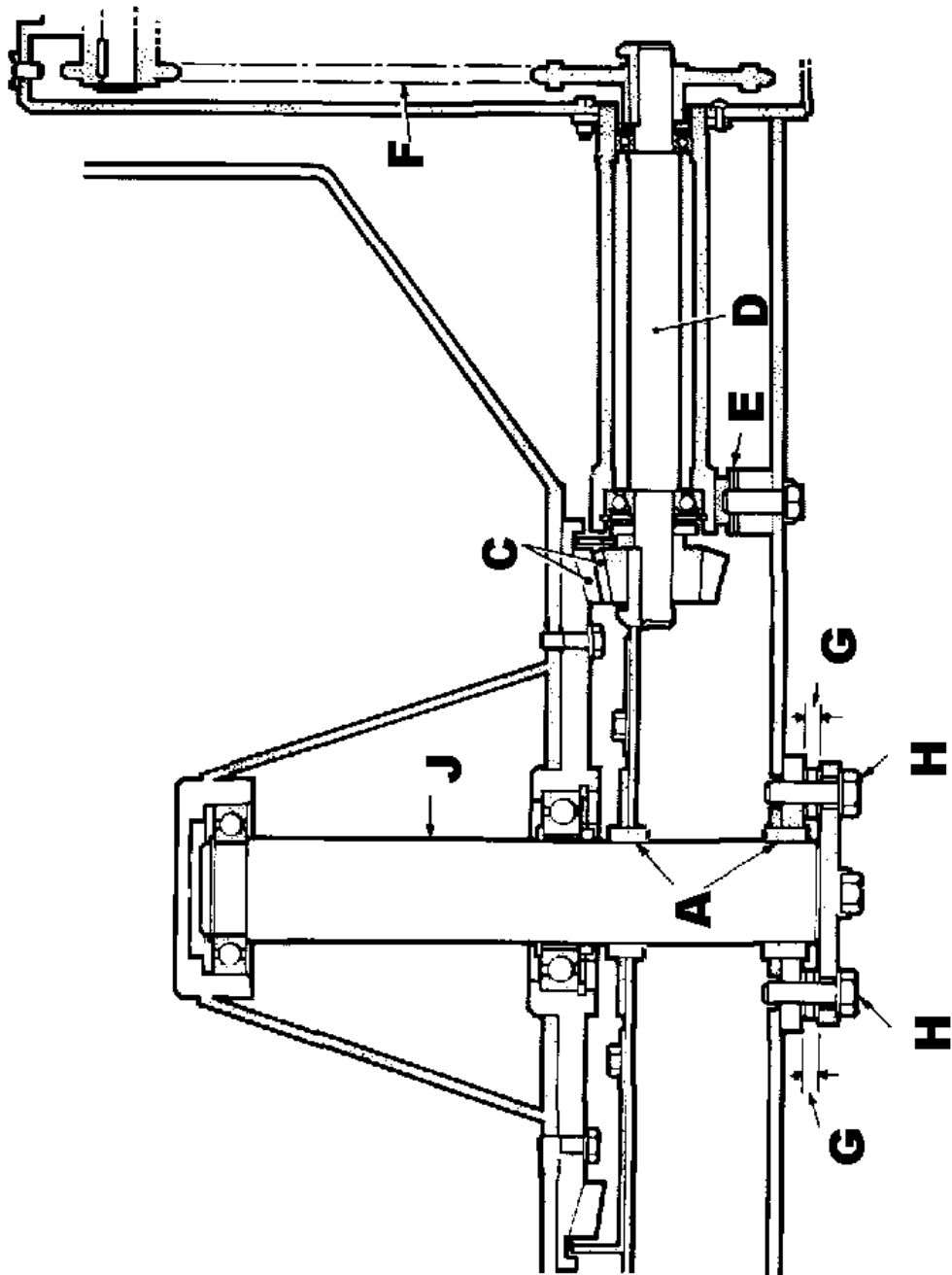
Using suitable lifting equipment lift the drum assembly, check the drum shaft is clean and referring to the Drum Adjustment illustration coat the drum shaft **(J)** and trunnion with anti-seize compound at **(A)**.

Turn the drum shaft so the threaded holes in the base of the shaft are at 90 degrees to those in the trunnion base blocks.

Position the drum over the trunnion and lower into place making sure the bevel gear and pinion are fully in mesh and the drum is fully seated down.

Apply anti-seize compound to the drum shaft setscrews and secure the flange to the drum shaft not forgetting the tabwasher. Using the flange turn the drum shaft until the remaining holes in the flange align with the holes in the base block.

200TM DRUM ADJUSTMENT



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Refer to the Drum Adjustment illustration and check the number of flat washers required to fill the gap **(G)** between the flange and base block. Remove one washer from each side. Apply anti-seize compound to the setscrews **(H)** and pass the setscrews through the flange and flat washers, fully tighten the setscrews into the trunnion.

Check for free play between the drum bevel gear and bevel pinion **(C)** by gently rocking the drum (approximately 5mm is acceptable). Remove the lifting equipment.

Tilting Handwheel and Locking Plunger

The tilting handwheel wheel is secured to the tilting pinion via a feather key and M10 grubscrew. With the drum in the vertical position slacken and remove the grub screw, pull off the handwheel. Note on mixers, which have been in service for some time it may be necessary to use a suitable puller on the handwheel.

The locking Plunger is held in place in the Tilting Wheel by a small spiral pin. Knock out this pin and remove the locking plunger.

Re-assemble in the reverse order coating the locking plunger and pinion shaft with anti-seize compound.

Tilting Bracket and Pinion

With the Drum in the vertical position remove the lower tilting pinion guard. Remove the four setscrews securing the tilting bracket taking care not to drop the retaining plate on the inside of the mainframe front leg. Lift the pinion teeth clear of the tilting chain, remove the inner retaining bracket and lift out the tilting bracket assembly.

Remove the handwheel as described above, remove the feather key and using a soft faced hammer knock the tilting shaft and pinion out of the bracket. Check the condition of the bushes and replace and/or lubricate as required. Note, very occasionally new bushes will require reaming to size.

Reassemble the tilting bracket in reverse order lubricating bushes with engine oil. Coat shafts, pinions and plungers with anti-seize compound.

When refitting the tilting bracket assembly to the mixer engage and lock the plunger into the lower single hole in the bracket whilst ensuring the drum is still vertical. Pass the assembly through the front leg of the mainframe, slip the retaining plate over the bracket before engaging the pinion into the tilting chain.

Align the bracket and inner retaining plate with the slots in the front leg and insert the setscrews and washers. Finger tighten the setscrews to hold the bracket in place and slide the assembly in the slots to correctly tension the tilting chain, fully tighten the four setscrews. Refit the lower tilting pinion guard.

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Turn the handwheel and check the drum and trunnion operate correctly and contact the travel stops without unduly stressing the tilting chain.

Tilting Chain

To access the tilting chain remove the upper and lower chain guards behind the front plate of the trunnion. The chain is anchored to the trunnion end plate by means of two split links one in each end of the chain.

To replace the chain, place the drum in the vertical position and engage the handwheel locking plunger in the lower single hole. Slacken the four setscrews retaining the tilting bracket and lift the bracket in the slots to release any tension on the chain, tighten at least one of the setscrews to hold the bracket in place. Separate the split links and unhook the chain. Reverse the procedure to refit the chain adjusting the final chain tension by sliding the tilting bracket in the slots. Refit the guards and check the trunnion contacts the travel stops without unduly stressing the chain.

Countershaft/Bevel Pinion Drive Chain.

Remove the chain guard from the rear of the trunnion. Crank the engine over until the chain split link is visible. Disconnect the split link, hook the new chain loosely onto the split link slowly crank the engine and pull the new chain in place round the countershaft sprocket. Remove the old chain and link. Loop the new chain round the sprocket in the bevel pinion shaft and fit the new split link. The open end of the split end should point away from the normal direction of rotation, which is anti-clockwise when looking directly at the chain. Check and adjust the chain tension. (See Bevel Pinion Shaft and Housing). Refit the chain guard.

Bevel Pinion Shaft and Housing

Follow the procedures described earlier and remove the drum, bevel gear guard and disconnect the countershaft bevel pinion drive chain.

Rotate the trunnion until it reaches its highest point and lock in place. Remove the gib head key securing the sprocket to the bevel pinion shaft. Remove the bevel pinion guard, release the tabwashers and remove the setscrews, packers and shims securing the bevel pinion housing. At this point the bevel pinion housing should be supported by a second pair of hands, strapped or supported in some other manner to prevent it dropping down sharply and causing damage to the casting, it will otherwise only be secured by the loose fitting retaining plate and sprocket.

Remove the nuts and washer off the two bolts retaining the bevel pinion housing adjusting plate. Using a soft faced hammer knock the bevel pinion shaft through the sprocket until it is possible to remove the sprocket. Remove the bolts through the retaining plate and lift the bevel pinion housing out of the trunnion.

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Clamp the housing in a soft jawed vice and remove the gib head key retaining the bevel pinion and pull off the bevel pinion.

Remove the circlip from the groove within the housing and using a soft faced hammer knock the shaft and bearings out of the housing. The bearings can now be removed from the shaft.

Carefully remove the seals from the bearings and pack the bearings with good quality grease, refit the seals, do not completely fill the bearings with grease leave some room for expansion as the grease warms up in service.

To reassemble secure the bevel pinion shaft into a soft jawed vice. Using the correct size of Bearing tube and a soft faced hammer or suitable drift fit the bearings to the shaft. Note the larger of the two bearings is fitted to the longer shank of the shaft.

Remove the shaft from the vice and using the vice support the bevel pinion housing. Using the correct size of bearing tube or suitable drift and the soft faced hammer

knock the shaft fully into the housing. Fit the retaining circlip into the groove within the housing. Check the shaft turns freely.

Assemble the bevel pinion to the shaft, fitting the gib head key. The pinion is fitted to the longer shank of the shaft. If correctly assembled the threaded holes in the casting will be at the same end. Do not at this stage fit the sprocket to the opposite end of the bevel pinion assembly, as this will prevent re-assembly of the housing back into the trunnion.

Loosely fit the triangular adjusting plate back into the trunnion, locating the plate on the peg. Fit the two bolts through the adjusting plate from the rear of the trunnion so that when assembled the head of the bolts will be sandwiched between the trunnion rear plate and the bevel pinion shaft drive sprocket.

Work the bevel pinion housing back into the trunnion and through the adjusting plate. As the shaft protrudes through the rear of the trunnion slide on the sprocket until it is fully home.

Refit the setscrews, tabwashers, packer and shim set retaining the bevel pinion housing and finger tighten only.

Fit the gib head key retaining the drive sprocket and refit the drive chain, when connecting the split link the open end of the link should be fitted so that it points away from the normal direction of rotation which is anti-clockwise when looking directly at the chain.

Release the trunnion and turn back to its lowest position.

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Refer to the Drum Adjustment illustration. The Adjusting Plate holding the rear of the Bevel Pinion Housing (**D**) is slotted to allow the Housing to move up and down enabling correct adjustment of the chain tension (**F**). Check and adjust the Chain Tension and tighten the bolts holding the Adjusting Plate. By adding or subtracting shims (**E**) between the thick packer and the Bevel Pinion Housing ensure the housing is horizontal in the Trunnion and square to the rear plate. Re-check the Chain Tension and fully tighten the bolts and setscrews securing the Bevel Pinion Housing (**D**), knock over the Tab Washers.

Crank the engine ensuring both the countershaft and bevel pinion turn freely. Coat the bevel pinion with grease or open gear lubricant and fit the pinion guard. Fit the rear chain guard.

Following the procedures described earlier refit the Bevel Gear Guard and Drum Assembly.

Countershaft, Trunnion Journal and Driven Chainwheel/ 'V' Pulley

Although it is recommended that the trunnion is removed completely from the mixer should the countershaft or trunnion journal require attention it is possible to leave the trunnion assembly in place provided it is properly supported.

Remove the engine housing lid, top plate, engine housing chain guard and infill plate. Slacken the two bolts through the bevel pinion housing adjusting plate and the two setscrews which secure the casting at the pinion end to release the tension on the countershaft chain.

Disconnect the split links retaining both the engine drive and countershaft chains and remove the chains. On electric drive mixers the drive is transmitted to the countershaft by means of a 'V' belt in place of the chain.

Withdraw the gib head key retaining the driven chainwheel/'V' belt pulley to the countershaft and pull off the chainwheel/pulley.

Lock the drum in the vertical position using the handwheel locking plunger and using suitable lifting equipment, jacks or chocks secure the trunnion to prevent it moving when the journal is withdrawn.

Remove the two setscrews retaining the journal casting to the mainframe, take the weight off the trunnion and withdraw the journal from the trunnion.

Support the assembly in a soft jawed vice, remove the circlip retaining the countershaft sprocket and pull off the sprocket, remove the feather key. Remove the circlip in front of the bearing and using a soft faced hammer and suitable drift knock the shaft out of the journal from the opposite end.

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Remove the bearings and clean all the components. Carefully remove the seals from the new bearings and pack the bearings with good quality grease, refit the seals, do not completely fill the bearings with grease leave some room for expansion as the grease warms up in service.

Reverse the procedure to re-assemble using a suitable bearing tube or drift to seat the front bearing into the housing, retain with the circlip. Pass the countershaft (end with feather key way and circlip groove) through the housing and into the bearing and knock fully home using a soft faced mallet or hammer. Fit the second bearing over the shaft and knock fully home using a bearing tube or drift until it contacts the shoulder on the shaft.

Fit the feather key, slide on the small sprocket and retain with the circlip. Smear a little grease around the circumference of the trunnion/journal bearing face and in the bore of the corresponding bearing boss on the trunnion. Slide the journal fully home into the end of the trunnion and retain using the two setscrews. Remove the chocks, lifting equipment or jacks and tighten the setscrews fully.

Coat the end of the countershaft with anti-seize compound and slide on the chainwheel/'V' belt pulley, pushing fully onto the shaft, fit the gib head key.

Refit both the countershaft chain and the engine chain/'V' belt, ensuring that the open end of the split links point away from the normal direction of rotation.

Adjust the countershaft chain tension (refer to the 'drum adjustment illustration' and 'bevel pinion housing') and tighten the bevel pinion housing, check the engine drive chain tension or 'V' belt pulley tension, adjust the tension as necessary. On diesel engines adjust the shimming below the engine (see 'engines'), on electric drive machines move the motor either upwards or downwards on the threaded adjusters as required. (see 415v motors)

Fit the infill plate, chain guards and plastic plug, top plate and engine-housing lid.

Release the locking plunger and operate the handwheel ensure the trunnion tilts correctly, start the engine and check the operation of the drum drive, also check for unusual noises.

Front Trunnion Bearing Replacement

Lock the drum and trunnion in the vertical position using the handwheel locking plunger. Using suitable lifting equipment, jacks or chocks support the trunnion just behind the front leg of the mainframe.

Remove the two nuts and washers securing the profiled retaining plate, take the weight of the trunnion and pull off the plate and bearing boss. Clean all parts. Reverse the procedure to refit, not forgetting the grease nipple which also prevents the bearing from turning. Remove the chocks, jacks or lifting equipment.

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Trunnion Removal/Replacement

Remove the drum, engine housing lid, top plate, chain guards and infill plate in the engine housing. Remove the upper and lower tilting chain guards and remove the tilting chain. Remove the engine drive chain, undo and remove the two setscrews retaining the journal and the two nuts securing the front bearing, attach lifting suitable equipment to the trunnion and take the weight, remove the front bearing.

Note, to remove the trunnion fully it will be necessary to rotate the trunnion as it is being lifted in order for it to clear the engine housing.

Slide the trunnion towards the engine housing until it can be seen that the travel stop pegs welded in the front leg and trunnion end plate are clear of each other, rotate the trunnion and move backwards and upwards to clear the engine housing.

Place the trunnion on a suitable surface and remove the bevel pinion housing and journal as previously described.

When replacing a 200TM trunnion ensure it has three travel stop pins, part no 513310000 welded into the front plate.

Reverse the procedure to rebuild the trunnion and refit it into the mixer referring to the relevant sections to set up bevel pinion, journal, front bearing, drum etc.

Hydraulic Hopper Ram

The single acting hopper ram is retained via two pivot pins, to remove fully raise the hopper and engage the hopper support. Disconnect the hydraulic hoses, note later rams have a return hose vented back to the hydraulic tank whilst earlier rams have a small breather hole open to atmosphere. Support the weight of the ram and remove both pivot pins lift the ram clear of the mainframe.

If installing a seal kit note that later rams vented back to tank have additional wiper and pressure seals fitted in the cylinder end cap. Also some machines do not have a loose travel restrictor in the form of a small spacer installed on the piston rod.

Reverse the procedure to refit the ram coating the pivot pins with anti-seize compound and not forgetting to install the grease nipples, straight into the cylinder base, 90 degree angled into the piston rod.

Refit the hoses, start the engine or motor and slowly extend the piston via the control valve, the movement may be 'jerky' as the system will be contaminated with air, refit the upper pivot pin and continue to extend the rod to raise the hopper, disengage the hopper support and lower the hopper. Stop the engine motor and top up the hydraulic oil tank. Start the engine/motor and lower and raise the hopper a number of times to fully expel all the air from the system.

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EC machines, which are "CE", marked are fitted with a hose burst valve to protect the operator in the event of a hose failing.

The valve are pre-set on leaving the factory fitted to a machine but occasionally require adjusting as they wear in service. To adjust, ensure the hopper is lowered and any residual hydraulic pressure has been dissipated by operating the control lever a number of times with the engine/motor stopped. Remove the valve from the ram noting which way round it was installed, the body is marked. Unscrew the inner baffle assembly, noting which way it was installed and adjust the baffles by holding the nut and turning the capscrew with a hexagon key until the gap between the baffles measures 0.889mm.

The valve should then be re-assembled and screwed onto the ram, ensuring the valve is the correct way round. Fit the hydraulic adapter and bonded seal coating the threads with hydraulic sealer. See Service Bulletin in SB100 for further details on the valve.

Note, position the assembled ram into the mainframe so that the fitting/hose burst valve face the L/H side (hopper cradle) of the mainframe.

New valves supplied or received as a spares item should be dismantled before fitting and the inner baffles adjusted by holding the nut and turning the capscrew with an hexagon key until the gap between the baffles measures 0.889mm.

It is quite common for machines fitted with hose burst valves to 'lock out' in service with the result that a raised hopper will not lower. Operating the control lever in a 'violent' manner to shake material free is the major cause of 'lock outs.' To release a 'locked out' hose burst valve slowly and gently operate the control lever to raise the hopper, this will blow off the 'locked out' valve allowing the hopper to be gently lowered approximately 150mm following which the hopper can be used as normal.

Hydraulic Tank

The hydraulic tank is mounted below the cover on the side of the engine housing. To gain access to the suction strainer or clean the filler breather it will be necessary to remove the cover and the open up the tank via the removable circular cover located on top of the tank.

The suction strainer is screwed onto the suction fitting inside the tank and should be removed and cleaned in accordance with the service schedules. A drain plug is provided below the tank assisting oil changes, and the tank can be quickly removed should it be necessary to steam or pressure clean out.

Hopper Removal

The hopper is retained to the cradle by means of a number of 'coach bolts'. To remove fully lower the hopper, attach suitable lifting equipment to the hopper lifting points, remove the coach bolts and lift the hopper clear.

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Hopper Cradle – Non Weigher

The standard hopper cradle pivots on a simple pin, which passes through the replaceable inserts in the mainframe, through the hopper cradle, being retained at one end by a single M8 setscrew.

To remove, fully lower the hopper, stop the engine/motor and release any residual hydraulic pressure. Remove the hopper and upper ram pivot pin as described previously. Remove the single retaining setscrew, attach suitable lifting equipment to the cradle take the weight and using a suitable drift and soft faced hammer knock out the pivot pin and lift the cradle clear.

To remove the inserts use a suitable hexagon wrench and remove the cap screws retaining the inserts into each side of the mainframe use a suitable drift and knock out both inserts, note the indent which aligns with the threaded hole in each side of the mainframe.

Reverse the procedure to refit, coating the insets and pivot pins with anti-seize compound on assembly, align the threaded holes and indents in the inserts.

Insert the two capscrews with spring washers to lock the inserts in place.

Batchweigher Pivot

The batchweigher pivot is fitted with replaceable bushes and is retained to the mainframe between the hopper cradle via a simple pivot pin.

To remove, raise the hopper and engage the hopper support. Remove the grubscrew holding the pivot pin in place and using a suitable drift knock out the pin.

Fit new bushes using a suitable bearing tube and if necessary reamer to size. Coat the pivot pin with anti-seize compound and lubricate the bushes with grease refit the pivot pin and secure with the grubscrew. Check the pivot is free both on the pin and between the bosses.

Remove the hopper support and lower the hopper.

Note in order to retain the batchweigher calibration, do not disturb the loadcell striker capscrew unless the pivot is to be replaced.

Hopper Cradle – Batchweigher

The batchweigher hopper cradle is slightly more complicated than the standard cradle as there are two pivot shafts each being supported on inserts/bearing carriers in both the mainframe and hopper cradle fitted with needle roller bearings. The shafts are threaded at each end and are retained in the mainframe and cradle via large locking nuts.

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The shafts appear identical but the hopper cradle shaft has a longer un-machined centre section.

To remove, fully lower the hopper, stop the engine/motor and release any residual hydraulic pressure. Remove the hopper and upper ram pivot pin as described previously.

Attach suitable lifting equipment to the hopper cradle and take the weight, remove the four locking nuts and weigher links from both shafts on each side of the cradle. Once the links are removed the cradle will be free and can safely be placed on a suitable surface.

Slide the shaft out of the inserts in the mainframe taking care not to lose the washers. The inserts are retained via the capscrews which pass through the mainframe and enter indents in the side of each insert, remove the inserts and using a suitable bearing tube knock out the needle bearings and seals.

Reverse the procedure to fit new bearings and seals, the lips on the seals should face outwards, before refitting the inserts into the mainframe and over the shaft lubricate the needle bearings with grease and smear the outer diameter of the inserts with anti-seize compound.

Place the shaft through the mainframe and push on the special washers, one each end, slide the inserts onto each end of the shaft and push home into the mainframe aligning the indents in the inserts with the threaded holes in the mainframe. Refit the capscrews to prevent the inserts rotating.

Note the capscrews in the mainframe are of a different length to those in the hopper cradle, take care that the capscrews do not bottom on the needle rollers otherwise the shafts will be prevented from turning and the batchweigher will read inaccurately.

Repeat the operation on the hopper cradle shaft.

Coat the inserts with anti-seize compound and push the inserts home into the cradle and over the shaft. Align the indent in the collars with the threaded holes into the cradle securing the inserts in place using the capscrews and washers. Take care that the capscrews do not bottom onto the needle rollers causing damage. Turn both shafts within the needle bearings, the shafts should turn relatively freely.

Using suitable lifting equipment lift the hopper cradle into place over the shaft on the mainframe and fit both links, secure the links to the shafts using the flat washers and nuts, check the hopper cradle lifts freely and refit the grease nipples into the shaft ends.

The pivot pin supporting the roller is retained in the operating bracket attached to the rear of the hopper cradle via a grubscrew, remove the grubscrew and using a suitable drift and soft faced hammer knock out the pivot pin and catch the roller.

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Using a suitable tool replace the nylon bushes in the roller, coat the bushes, pin and bosses on the pivot operating bracket with anti-seize compound and locate the roller into the bracket. Insert the pivot pin and secure using the small grubscrew.

Coat the hopper ram pivot pin with anti-seize compound and supporting the cradle with suitable lifting equipment start the engine/motor extend the hopper ram piston and insert the pin securing the ram to the cradle. Retain the pin using the bolt and binx nut. Ensure the grease nipples are accessible. Stop the engine/motor.

Refit the hopper as previously described.

Hydraulic Control Valve

The hydraulic control valve is attached to the inner face of the water tank support and is protected by a removable cover.

The valve contains an adjustable relief valve and in the case of a machine with a dragline a HPCO option.

To Check the Hydraulic Pressure.

Check the hydraulic oil level and connect a tee piece into the hydraulic circuit between the control valve and hopper ram, attach a 0-3000psi pressure gauge to the tee piece, ensure the stabiliser legs and struts are fitted.

Start and run the engine/motor until the hydraulic oil is up to normal working temperature, check the engine speed it should read 1500 rpm, another way is to count the drum revolutions, the drum should rotate at 22 rpm.

On later machines disconnect the return hose attached to the upper part of the ram cylinder. On earlier machines simply observe the open to atmosphere breather hole in the cylinder as the control valve is operated to extend the piston and raise the hopper. Note if excessive oil is ejected from the cylinder, if so the ram seals should be replaced or the ram repaired as necessary prior to the pressures being checked.

Raise the hopper until the relief valve "blows off", check the maximum pressure recorded on the gauge. If necessary adjust the relief valve to give a maximum pressure of 2000 psi. Following adjustment tighten the relief valve locking nut to prevent oil leaks. Lower the hopper and stop the engine/motor disperse any residual hydraulic pressure and remove the tee piece and pressure gauge.

Blowing off the relief valve on EC machines fitted with a hose burst valve may cause the valve to "lock out" preventing the hopper from lowering. To release a locked valve operate the control lever to slowly raise the hopper, releasing the hose failure valve, then gently operate the lever to slowly lower the hopper approximately 150mm following which the hopper can be lowered in the normal manner.

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If a dragline or batchweigher is to be installed information on the control block, solenoid or bleed valve can be found later in this manual as can a detailed description of the hydraulic system.

Engine TS/TR1 Hand Start

“CE” marked machines are fitted with an extended engine oil drainpipe and ‘anti-kick back starting handles’ in order to comply with local legislation. For information on the starting handles refer to the engine operators handbook or engine workshop manual.

For details on engine services or overhauls, changing engine oils, filters and bleeding the fuel system refer to the engine operator’s handbook or engine workshop manual.

Note, the engine is set to run at 1500 rpm and rotates Anti-clockwise at the flywheel end.

Drive Sprocket Removal/Replacement

The drive sprocket is mounted onto flywheel end extension shaft, approximately 40mm from the end of the shaft and is secured with a gib head key and grubscrew.

To remove the sprocket, first remove the engine housing closing and top plate, exhaust extension pipe, upper and lower chain guard, drive chain and engine housing support bracket, If a dragline option is fitted remove the dynamo drive belt.

Remove the four bolts securing the engine to the bed and slide the engine backward allowing access to the extension shaft. Turn the flywheel until the key and grubscrew are visible. Mark the position of the sprocket on the shaft and remove the grubscrew and key, tapping the sprocket backward on the shaft away from the key will assist in the removal of the key.

Smear the bore of the new sprocket with anti-seize compound and slide onto the shaft up to the mark made earlier. Fit the key and grubscrew, due to manufacturing differences it may be necessary to fit a new key. Reposition the engine, refit the bolts and drive chain, if a dragline is fitted slip the dynamo drive belt over the shaft and sprocket onto the pulley before fitting the chain, confirm the chain is correctly aligned and check the chain tension.

The chain tension is correct when the chain deflects approximately 5mm about the centre line, the deflection should be checked midway between the lower sprocket and upper chainwheel.

Add or subtract shims below the engine to correctly tension the chain.

A chain running too tight will cause starting problems and the increased loadings will increase the rate of wear on the chain and sprocket and may also damage the

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crankshaft bearings. A chain running too slack may run off the sprocket or chainwheel.

Adjust the dynamo drive "V" belt tension (if fitted) by altering the position of the dynamo on the slotted adjuster so the belt deflects approximately 12mm, check midway between the pulleys.

Refit the guards, not forgetting the plastic plug, top plate closing plate, exhaust extension and engine housing support bracket.

Dynamo Drive Pulley Removal/Replacement

If a dragline option is fitted an alloy "V" belt drive pulley is fitted onto the extension shaft prior to the sprocket.

To remove follow the above procedure and remove the engine sprocket and dynamo drive belt, mark the position of the pulley on the shaft. Undo the grub screw retaining the pulley and slide off the pulley.

Reverse the procedure to fit the new pulley smearing the bore with anti-seize compound prior to fitting.

Check the drive chain alignment and tension as described above, adjust the dynamo drive "V" belt tension by altering the position of the dynamo on the slotted adjuster so the belt deflects approximately 12mm, check midway between the pulleys.

Refit the guards, not forgetting the plastic plug, top plate closing plate, exhaust extension and engine housing support bracket.

Hydraulic Pump Removal/Replacement-Hydraulic PTO (Not Direct Drive)

The hydraulic pump is secured via four studs to an adapter plate, which is in turn bolted to the engine gearcover, and it is not possible to remove the pump without removing the backplate. The pump is driven by a gear mounted on the pump shaft, it being driven by a gear bolted to the end of the crankshaft. The pump being clockwise rotation.

Ensure any residual hydraulic pressure is dissipated as previously described. Place a suitable container below the hydraulic pump to catch any hydraulic and engine oil spills, remove and plug the supply and feed hoses and plug the ports in the pump to prevent the ingress of dirt and foreign matter.

Remove the four nuts and bolts securing the backplate to the engine and carefully remove the pump and backplate assembly. Note early backplates are fitted with a gasket between the plate and gearcover whilst later engines have an 'O' Ring fitted.

Hold the assembly in a suitable soft jawed vice and bend back the tabs on the tabwasher locking the driven gear retaining nut. Remove the nut and any washers,

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the gear is keyed onto a tapered shaft using a small woodruff key, remove the gear taking care not to lose the key.

Remove the four small nuts and washers holding the pump to the backplate and remove the pump, taking care not to damage the gasket sandwiched between the two. Clean any sealing compound from the mating surfaces.

Reverse the procedure to fit the new pump not forgetting the new gaskets and 'O' Rings, take care not to dislodge the woodruff key when installing the drive gear. Tighten the pump drive gear locking nut and bend over the tabwasher, Refit the assembly to the engine and reconnect the hydraulic hoses, top up the engine and hydraulic oil levels. Mop up any oil spills.

Note, if the studs securing the backplate to the engine are removed from the gearcase ensure they are refitted the correct way round, i.e. short thread length into the cover, otherwise they will foul the camshaft and crankshaft gears preventing the engine cranking over.

Crank the engine over ensuring all is free and correct.

Hydraulic Pump Removal/Replacement-Hydraulic Direct Drive PTO

The hydraulic pump is mounted on a bracket bolted to the gear end cover and coupled to the engine by a toothed/splined drive coupling with nylon driving sleeve. The drive being transmitted from the engine by a crankshaft mounted extension shaft.

The pump being anti-clockwise rotation.

Ensure any residual hydraulic pressure is dissipated as previously described. Place a suitable container below the hydraulic pump to catch any hydraulic oil spills, remove the coupling guard held with a single setscrew and washers. Remove and plug the supply and feed hoses and plug the ports in the pump to prevent the ingress of dirt and foreign matter.

Slacken and remove the three long bolts, washers and spacers securing the pump bracket to the engine and withdraw the assembly off the extension shaft, if the nylon sleeve is retained on the extension shaft slide it off and remove it. Inspect the teeth of the sleeve for wear or damage, replace if necessary.

The splined drive coupling is retained to the extension shaft by a short parallel key, setscrew and washers. The threads on the setscrew are sealed with hydraulic sealer or other suitable compound to prevent oil leakage via the threads down the centre of the shaft.

Hold the pump and bracket assembly in a suitable soft jawed vice and bend back the tabs on the tabwasher locking the driven gear retaining nut. Remove the nut and any

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washers, the gear is keyed onto a tapered shaft using a small woodruff key, remove the gear taking care not to lose the key.

Remove the four M6 bolts retaining the pump to the bracket.

Reverse the procedure to fit the new pump, take care not to dislodge the woodruff key when installing the driven gear. Tighten the pump driven gear locking nut and bend over the tabwasher.

Fit the nylon sleeve over the driven gear and offer up to the extension shaft. Install the three long bolts, washers and spacers, two per bolt. Finger tighten the three bolts, adjust the position of the pump and bracket assembly in relation to the extension shaft, aligning the couplings until the nylon sleeve moves on the teeth/splines with end float.

Tighten the retaining bolts and check the sleeve is still free to move. Refit the coupling guard. Remove the plugs and reconnect the hydraulic hoses, top up the hydraulic oil levels. Mop up any oil spills.

Engine TS/TR1 Electric Start

“CE” marked machines are fitted with an extended engine oil drainpipe and ‘anti-kick back starting handles’ in order to comply with local legislation. For information on the starting handles refer to the engine operators handbook or engine workshop manual.

For details on engine services or overhauls, changing engine oils, filters and bleeding the fuel system refer to the engine operator’s handbook or engine workshop manual.

When an electric start engine is fitted in conjunction with a dragline, the power for the dragline solenoids and switches is taken directly from the engine ignition switch and a dynamo is not required.

Note, the engine is set to run at 1500 rpm and rotates Anti-clockwise at the flywheel end.

Drive Sprocket Removal/Replacement

The drive sprocket is mounted onto flywheel end extension shaft, approximately 40mm from the end of the shaft and is secured with a gib head key and grubscrew.

To remove the sprocket, first remove the engine housing closing and top plate, exhaust extension pipe, upper and lower chain guard and drive chain. Disconnect the battery, remove the engine housing support bracket taking care with the basic instrument panel and wiring.

Remove the four bolts securing the engine to the bed and slide the engine backward allowing access to the extension shaft. Turn the flywheel until the key and grubscrew

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are visible. Mark the position of the sprocket on the shaft and remove the grub screw and key, tapping the sprocket backward on the shaft away from the key will assist in the removal of the key.

Smear the bore of the new sprocket with anti-seize compound and slide onto the shaft up to the mark made earlier. Fit the key and grub screw, due to manufacturing differences it may be necessary to fit a new key. Reposition the engine, refit the bolts and drive chain, confirm the chain is correctly aligned and check the chain tension.

The chain tension is correct when the chain deflects approximately 5mm about the centre line, the deflection should be checked midway between the lower sprocket and upper chainwheel.

Add or subtract shims below the engine to correctly tension the chain.

A chain running too tight will cause starting problems and the increased loadings will increase the rate of wear on the chain and sprocket and may also damage the crankshaft bearings. A chain running too slack may run off the sprocket or chainwheel.

Refit the guards, not forgetting the plastic plug, top plate closing plate and exhaust extension. Refit the engine housing support bracket and panel, reconnect the battery.

Hydraulic Pump Removal/Replacement-Hydraulic PTO (Not Direct Drive)

The hydraulic pump is secured via four studs to an adapter plate, which is in turn bolted to the engine gearcover, and it is not possible to remove the pump without removing the backplate. The pump is driven by a gear mounted on the pump shaft, it being driven by a gear bolted to the end of the crankshaft. The pump being clockwise rotation.

Ensure any residual hydraulic pressure is dissipated as previously described. Place a suitable container below the hydraulic pump to catch any hydraulic and engine oil spills, remove and plug the supply and feed hoses and plug the ports in the pump to prevent the ingress of dirt and foreign matter.

Remove the four nuts and bolts securing the backplate to the engine and carefully remove the pump and backplate assembly. Note early backplates are fitted with a gasket between the plate and gearcover whilst later engines have an 'O' Ring fitted.

Hold the assembly in a suitable soft jawed vice and bend back the tabs on the tabwasher locking the driven gear retaining nut. Remove the nut and any washers, the gear is keyed onto a tapered shaft using a small woodruff key, remove the gear taking care not to lose the key.

Remove the four small nuts and washers holding the pump to the backplate and remove the pump, taking care not to damage the gasket sandwiched between the two. Clean any sealing compound from the mating surfaces.

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Reverse the procedure to fit the new pump not forgetting the new gaskets and 'O' Rings, take care not to dislodge the woodruff key when installing the drive gear. Tighten the pump drive gear locking nut and bend over the tabwasher, Refit the assembly to the engine and reconnect the hydraulic hoses, top up the engine and hydraulic oil levels. Mop up any oil spills.

Note, if the studs securing the backplate to the engine are removed from the gearcase ensure they are refitted the correct way round, i.e. short thread length into the cover, otherwise they will foul the camshaft and crankshaft gears preventing the engine cranking over.

Crank the engine over ensuring all is free and correct.

Hydraulic Pump Removal/Replacement-Hydraulic Direct Drive PTO

The hydraulic pump is mounted on a bracket bolted to the gear end cover and coupled to the engine by a toothed/splined drive coupling with nylon driving sleeve. The drive being transmitted from the engine by a crankshaft mounted extension shaft.

The pump being anti-clockwise rotation.

Ensure any residual hydraulic pressure is dissipated as previously described. Place a suitable container below the hydraulic pump to catch any hydraulic oil spills, remove the coupling guard held with a single setscrew and washers. Remove and plug the supply and feed hoses and plug the ports in the pump to prevent the ingress of dirt and foreign matter.

Slacken and remove the three long bolts, washers and spacers securing the pump bracket to the engine and withdraw the assembly off the extension shaft, if the nylon sleeve is retained on the extension shaft slide it off and remove it. Inspect the teeth of the sleeve for wear or damage, replace if necessary.

The splined drive coupling is retained to the extension shaft by a short parallel key, setscrew and washers. The threads on the setscrew are sealed with hydraulic sealer or other suitable compound to prevent oil leakage via the threads down the centre of the shaft.

Hold the pump and bracket assembly in a suitable soft jawed vice and bend back the tabs on the tabwasher locking the driven gear retaining nut. Remove the nut and any washers, the gear is keyed onto a tapered shaft using a small woodruff key, remove the gear taking care not to lose the key.

Remove the four M6 bolts retaining the pump to the bracket.

Reverse the procedure to fit the new pump, take care not to dislodge the woodruff key when installing the driven gear. Tighten the pump driven gear locking nut and bend over the tabwasher.

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Fit the nylon sleeve over the driven gear and offer up to the extension shaft. Install the three long bolts, washers and spacers, two per bolt. Finger tighten the three bolts, adjust the position of the pump and bracket assembly in relation to the extension shaft, aligning the couplings until the nylon sleeve moves on the teeth/splines with end float.

Tighten the retaining bolts and check the sleeve is still free to move. Refit the coupling guard. Remove the plugs and reconnect the hydraulic hoses, top up the hydraulic oil levels. Mop up any oil spills.

415 Volt 3PH Electric Motor

Note, Depending on the model of motor fitted (from March 2002) the motor may be wired either Direct On Line or Star Delta.

The motors run at approximately 1420/1470 rpm and rotate Clockwise.

This reverses the drum rotation and consequently the drum requires different drum blades (same as 200T diesel). To accommodate the reduction in rpm at the motor and to prevent the characteristics of chain drives damaging the motor the countershaft chainwheel and engine drive chain are replaced by a "V" belt and "V" drive pulley.

The motor is also mounted differently in that it is bolted to a height adjustable bedplate to allow for belt tensioning.

The motors are also twin shafts, i.e. a driveshaft at end in order to provide a power take off for the hydraulic pump drive.

Similar to the hand start diesel engine if a dragline is fitted power for the solenoids and switches is provided via a 12-volt automotive dynamo. Drive being taken from the pump drive p.t.o. shaft.

The contactor enclosure is fitted inside the engine housing usually to the L/H side of the housing whilst a key lockable 'emergency' stop button is fitted to the exterior of the housing again on the left hand side just above the hydraulic tank housing.

Note, locking off the stop button prevents any un-authorised person from starting the equipment BUT does not isolate the electricity supply, before carrying out any work on the motor, contactor or enclosure isolate the supply at the main distribution board and attach a suitable 'locked out' tag to prevent the supply being inadvertently re-connected.

Belt Drive Pulley Removal/Replacement

The drive pulley is mounted onto the motor extension shaft, and is secured with a feather key and grub screw.

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Unlike the diesel driven versions it is possible to remove the pulley without removing the motor. To remove the pulley, first remove the engine housing closing and top plates, upper and lower belt guard and 'V' belt. Mark the position of the pulley on the shaft. Turn the motor shaft until the grub screw is visible slacken the screw and remove the pulley. Reverse the procedure to refit coating the bore of the pulley with anti-seize compound prior to assembly.

Fit the "V" belt and confirm the alignment of the pulleys. Adjust the height of the motor to tension the "V" belt. The tension is correct when the belt deflects 12mm check midway between the pulleys.

Refit the engine housing closing and top plates and upper and lower belt guards. Not forgetting the plastic plug

The hydraulic pump is driven by toothed drive adapters and nylon sleeve mounted directly on the opposite end of the motor. The pump is mounted on a mounting bracket, which provides some degree of adjustment to enable correct alignment of the toothed adapters and nylon sleeve.

When a dragline is fitted a 'V' belt pulley, (available separately) to drive the dynamo is welded to the rear of the toothed adapter mounted on the motor.

Hydraulic Pump Removal/Replacement

Remove the engine housing closing plate.

Ensure any residual hydraulic pressure is dissipated as previously described. Place a suitable container below the hydraulic pump to catch any hydraulic oil spills, remove and plug the supply and feed hoses and plug the ports in the pump to prevent the ingress of dirt and foreign matter.

Un-bolt the hydraulic pump from the mounting bracket and withdraw leaving the nylon sleeve on the motor shaft.

Hold the pump assembly in a suitable soft jawed vice and bend back the locking tabs on the tabwasher locking the toothed adapter retaining nut. Remove the nut and any washers, the adapter is keyed onto a tapered shaft using a small woodruff key, remove the adapter taking care not to lose the key.

Reverse the procedure to refit the pump, taking care not to dislodge the woodruff key as the adapter is fitted. Bend over the tabwasher to lock the retaining nut in place.

Bolt the pump in place on the bracket inserting the driven adapter into the nylon sleeve.

It is important that the motor and pump are in line to prevent premature failure of the nylon sleeve. Connect the hoses to the hydraulic pump. Top up the hydraulic oil levels. Mop up any oil spills.

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Rotate the motor to check all is free and correct.

Refit the closing plate.

Batchweigher Installation & Adjustment

The batchweigher gauge is mounted on rubber isolation mounts attached to the water tank support whilst the loadcell, attached to the gauge via a capillary hose is mounted vertically on the mainframe behind the hopper cradle.

The capillary hose must on no account be disconnected from the gauge.

Although this manual contains a section on maintenance relating to the batchweigher gauge in reality the gauge contains no user serviceable parts and we would recommend that faulty units be returned to the factory for repair by the manufacturers.

Installation

Note To attach the rubber mounts to a new gauge it will be necessary to drill out the mounting flanges on the rear of the gauge to suit the mountings.

Raise and support the hopper. Attach the loadcell to the mainframe behind the pivot, secure the capillary hose between the loadcell and gauge to the mainframe using the "P" clips, setscrews, nuts and washers.

Adjust the height of the loadcell so that the adjustable striker bolt through the pivot rest centrally on the loadcell. Tighten the setscrews securing the loadcell to the mainframe and run the lower locking screw upto the loadcell before tighten the locking nuts.

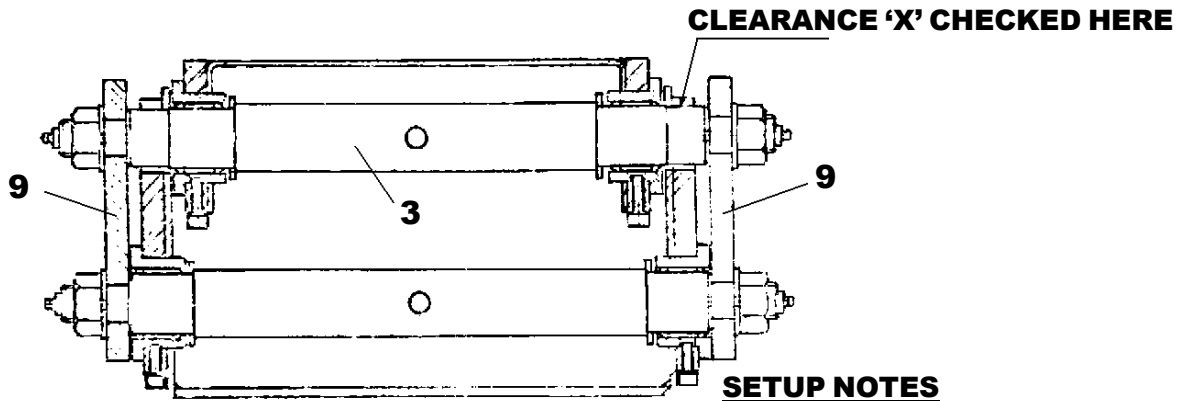
Lower the hopper and check the roller carried by the operating bracket which is in turn attached to the rear of the hopper cradle enters the pivot bracket freely, if necessary adjust the brackets position on the cradle before fully tightening the nuts, bolts and washers.

Refer to the illustration and notes overleaf and adjust the position of the cradle brackets so that the centre line of the pins (**item 16 & 17**) lie parallel to the link arms (**item 9**).

Adjust the striker bolt (**item 8**) so that equal clearances "**X**" are obtained between the pivot shaft (**item 3**) and the slots in the cradle.

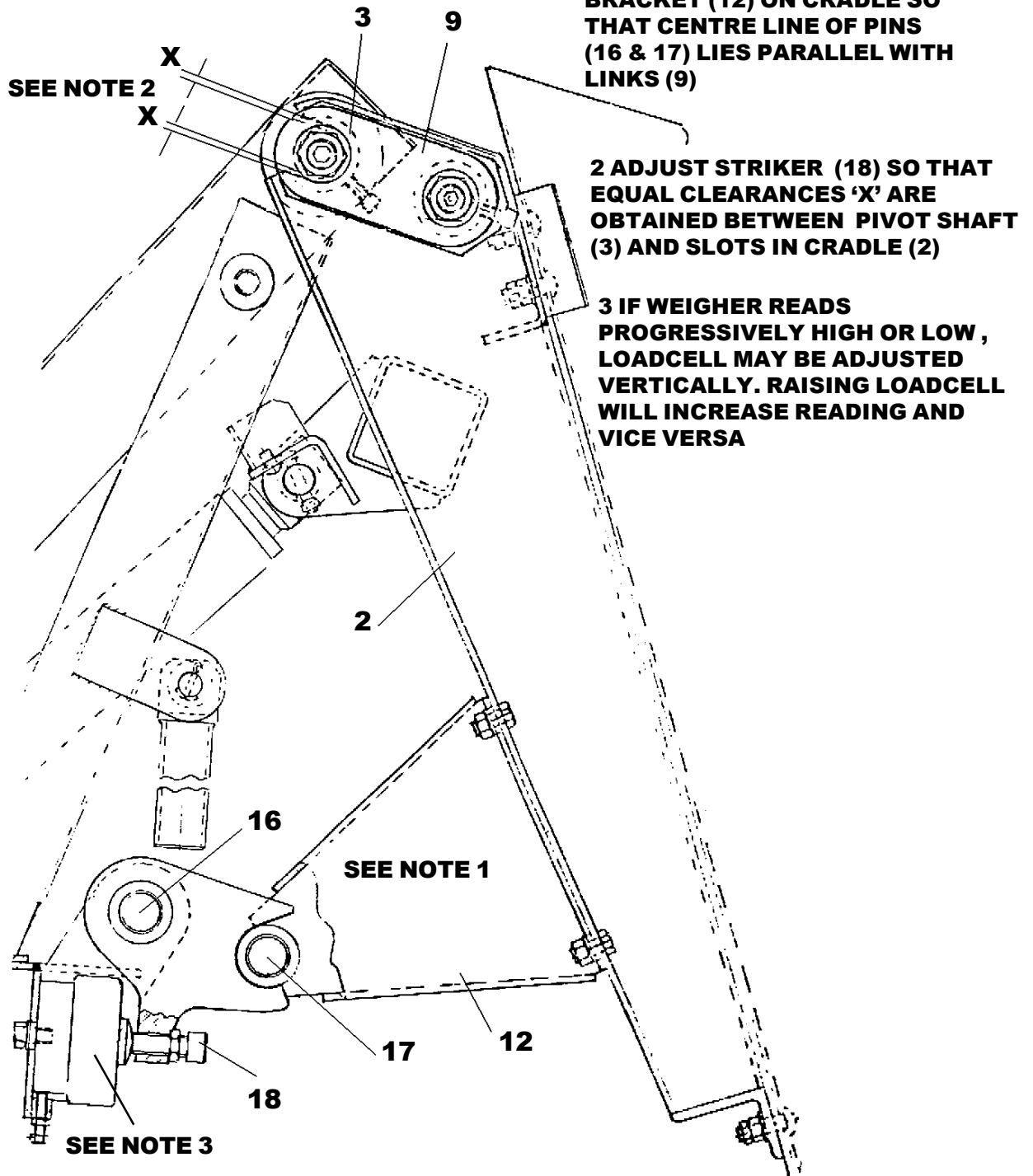
Zero the weighgauge using the knurled knot on the side of the gauge and place a 100 kilo weight into the hopper, carefully adjust the striker bolt so that the gauge registers 100 kilo and tighten the locknut. If adjusting the striker bolt fails to give the correct reading on the gauge it may be necessary to adjust the position of the

200TM BATCHWEIGHER SETUP



SETUP NOTES

1 ADJUST POSITION OF CRADLE BRACKET (12) ON CRADLE SO THAT CENTRE LINE OF PINS (16 & 17) LIES PARALLEL WITH LINKS (9)



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loadcell vertically on the mainframe. Raising the loadcell will increase the reading, lowering the loadcell will decrease the reading.

When the reading is correct to the weight in hopper, progressively add weights checking the accuracy of the gauge.

Remove the weights, raise the hopper and allow to rest back onto the loadcell check the gauge registers zero.

Water Tank and Calibration

The water tank is a simple cistern type capable of dispensing quantities of water from 4 to 38 litres and is mounted above the tilting handwheel.

The main problems in service through leakage will be caused by corrosion of the outlet valve seat and the rubber valve perishing.

The seat can be cleaned up if corrosion is not too far advanced and the rubber outlet valve can be replaced quite simply.

Calibration

Fill the tank with an amount of water to check that the discharge valve does not leak, operate the discharge valve and drain the tank.

Fill the tank with a measured amount of water, normally 5 litres, allowing the ball within the indicator tube to stabilise adjust the scale so that the 5 litre mark is aligned with the water level and tighten the scale. Discharge the water.

Dragline Winch Motor

The dragline winch motor is mounted on the R/H jib leg and is protected by a relief valve set to 1000/1500 psi contained within the dragline control block. The motor contains no user serviceable components and if one fails or begins to leak a new motor should be fitted. If a new motor is to be fitted mark the hoses before disconnecting them from the old unit to ensure they are reconnected correctly.

The winch motor rotates anti-clockwise when looking directly at the rope drum transposing the hoses will cause the motor to run in the reverse direction resulting in damage to the wire rope.

Dragline Control Block & Solenoid

The dragline control block containing the relief valve is mounted on the exterior of the engine housing beneath the hydraulic tank cover.

Mounted on the block is the 12-volt ceetop solenoid valve, which controls the flow of oil to the dragline winch motor. The valve is sealed to the control block via small 'O'

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rings. Although it is possible to remove the energiser coil from the valve to remove corrosion dirt etc the ceetop valve contains no user serviceable parts and should be replaced if it fails and cleaning the coil fails to rectify any faults.

If a new control block is ever fitted the internal galleries should be thoroughly cleaned out to remove any swarf left over from the manufacturing process.

The two upper hoses from the block connect to the winch motor, the L/H hose on the underside of the block is the supply from the H.P.C.O. in the main control valve mounted on the water tank support. The two remaining hoses on the underside are return lines and attach to the tee piece on the centre of the three threaded adapters on the side of the hydraulic tank (see Service Bulletin SB73 for further information).

The relief valve consists of a poppet, spring and guide/retainer and the addition or subtraction of small flat washers, which increase or decrease or pressure on the spring, adjusts pressure.

Relief Valve Adjustment

Note the pressure at the relief valve in the control block should only be checked when the main system relief valve has been set.

Disconnect the supply hose from the control block to the winch motor and fit a 0-3000psi gauge to the hose.

Ensure the electrical cable from the shovel to the socket below the hydraulic tank is connected, start the engine or electric motor and briefly depress the shovel switch noting the pressure that registers on the gauge. The pressure is correct when the gauge registers no less than 1000psi and no more than 1500psi. Adjust by adding or subtracting 10S02 washers from the relief valve guide within the control block.

Dragline Electric System

Two different electrical systems or method of power generation are utilised depending on the engine or electrical motor fitted.

Hand Start Lister Petter TS/TR1 and Electric Motor

A 12-volt automotive type dynamo provides the 12-volt power for the dragline driven by a 'V' belt from either the engine or motor. The belt is correctly adjusted when no more than 12mm deflection exists midway between the pulleys.

The voltage regulator and resistor are secured to the exterior of the engine housing above the hydraulic tank underneath the cover. The resistor is mounted on a heat shield/insulation board. The loom connects to the dynamo, passes through the engine housing and connects to the resistor, regulator, the two pin socket connector beneath the mainframe and the solenoid. (See the wiring diagrams)

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Testing & Adjustment

Start the engine or electric motor and plug in the shovel cable.

Refer to the wiring diagram, disconnect the plug on the solenoid valve and connect a D.C. voltmeter to the plug terminals, with the engine running operate the shovel mounted switch and note the reading on the voltmeter, it should read 12 volts. If the voltmeter indicates a negative reading or reads in the reverse direction interchange the voltmeter leads.

If the voltage is incorrect, then with the voltmeter still connected and the switch still depressed, turn the voltage regulator adjusting screw (located above connection point A on the regulator) with a short screwdriver clockwise or anti-clockwise until the voltmeter reads a constant 12-13 volts. Remove the voltmeter, release the switch and reconnect the plug to the solenoid. Stop the engine.

Electric Start Lister Petter TS/TR1

When an electric start engine is fitted the charging system built into the engine provides the electrical power to operate the dragline solenoid valve, and the wiring is much simpler as the regulator, resistor and dynamo are not required.

Power is taken from terminal 2 on the start switch, through two core cable via a two pin plug and socket, through the shovel mounted switch, back through the plug and socket down to the solenoid valve and to earth (see the wiring diagram).

The two-core cable from the start switch passes through the engine housing (protected by a grommet) down the mainframe by the hydraulic tank and terminates at the two-pin socket secured to the mainframe below the hydraulic tank.

The two-core cable is also connected to the plug on the solenoid valve, the cable is then run back to the start switch where the 'earth' of the two wires connects to earth on the panel. The other 'positive' wire connects to the remaining wire in the two-core cable, which terminates at the start switch. (see the wiring diagrams)

Testing & Adjustment

Start the engine and plug in the shovel cable.

Disconnect the plug on the solenoid valve and connect a DC voltmeter to the plug terminals. With the engine running depress the shovel mounted switch and note the voltage reading, it should not exceed 14 volts. If the voltmeter indicates a negative reading or reads in the reverse direction interchange the voltmeter leads.

Note It is not possible to adjust the voltage settings on engines fitted with charge windings or integral alternator.

WORKSHOP MANUAL
Winget Mechanically Fed Mixers
Models: 200TM
From 1998

Dragline Wire Rope Renewal

Remove the covers and guards over the winch motor. Disconnect and remove the old rope, note wear protective gloves and safety glasses.

Stretch the new wire rope out in front of the machine, turn the rope drum until the two small holes into which the "Bulldog" clip locates are at the six o'clock position.

Locate the "Bulldog" clip into the rope drum, push the end of the wire rope into the bulldog clip and tighten the clip securing the rope to the drum.

Start the engine or electric motor and, either get assistance from someone else who can operate the shovel mounted switch on your behalf, or make up a short "slave cable". This can consist of around a metre of two core cable, two pin plug and a switch, which can be connected into the two pin socket below the hydraulic tank to allow you to operate the winch motor whilst feeding the wire rope onto the drum as it rotates. Do not feed the rope onto the drum unless you are wearing protective gloves.

Once the rope is correctly run onto the rope drum, stop the engine or electric motor and feed the loose end of the rope through the pulley on the end of the jib leg, then round the back and between the double pulley on the top beam.

Bend the end of the rope round the thimble allowing enough of a tail on the rope to attach a second bulldog clip. The clip should be close enough to the thimble so that when tight the thimble is held in the loop of the rope. Fit the "D" shackle and pin through the thimble.

Refer to the illustrations of the Dragline Jib and secure the three part sectional rope drum and wire rope guards in place using the combination of spire nuts, setscrews, spring washers and nuts.

Dragline Jib Installation & Erection

Also refer to the operators handbook

Note, the jib assembly weighs approximately 125kgs

Loosely fit the two jib legs to the mainframe, winch motor nearest to the hydraulic tank, and attach the top crossbeam. Attach the tie bars to the mainframe with the longer tie bar attached to the front leg below the water tank. Attach suitable lifting equipment and raise and support the jib on a trestle approximately 1200mm high.

Pull out the wire rope from the winch motor and remove the clip and thimble, thread the rope around the pulley at the top of the R/H leg and between the pulleys in the centre of the crossbeam.

WORKSHOP MANUAL
Winget Mechanically Fed Mixers
Models: 200TM
From 1998

Replace the clip and thimble and connect to the shovel ring. Slot the cable mast into its sleeve on the R/H jib leg Unwind the electric cable from the shovel and connect the two-pin plug into the socket below the mainframe. Loop the cable around the crossbar at the base of the cable mast and then over the cleat at the top allowing sufficient slack to allow the jib assembly to pivot upwards.

Assemble the two pulley blocks onto the cable. The first one is suspended from the top of the cable mast, while the second hangs free between the first pulley and the cleat on the cable mast (see the illustration in the operator's handbook). The cable is tensioned by means of a weight added to the free hanging pulley block.

Ensure the stabiliser legs are attached and securely chocked to prevent the mixer toppling over and using the lifting equipment raise the jib assembly until the two tie bars can be attached, tighten all the retaining nuts and bolts.

Connect the winch motor hoses, ensuring they are connected to the correct ports and cable tie them neatly to the jib leg.

Start the engine or electric motor and move the hanging wire rope out of the path of the hopper and fully raise the hopper checking it clears the top beam and pulleys.

Operate the dragline, check for hydraulic oil leaks and correct operation, Lower the hopper and stop the engine.

Dragline Shovel

The handle assembly is attached to the shovel body via split pins and can be replaced if worn or damaged. The grips are replaceable and simply push on.

The dragline operating switch is secured to the R/H handle using a simple clamp and when if replacing reference should be made to the wiring diagrams to ensure it is correctly connected.

Dragline Jib Dismantling

Also refer to the operators handbook

Attach suitable lifting equipment and take the weight of the jib, detach the tie bars, lower the jib assembly and support in a horizontal position.

Unscrew the "D" link securing the shovel to the wire rope and remove one of the pulleys from the double pulley allowing the rope to come free. Rebuild the pulley, using a cable tie secure the end of the wire rope to the jib by the winch motor. Start the engine, plug in the shovel and operate the switch to carefully rewind excess wire rope back onto the rope drum. Stop the engine disconnect the hydraulic hoses at the winch motor plugging both the hoses and the motor adapters to prevent the ingress of dirt etc.

WORKSHOP MANUAL
Winget Mechanically Fed Mixers
Models: 200TM
From 1998

Unbolt the jib top beam from both jib legs, unbolt and remove both jib legs refit all setscrews and bolts back into the jib legs and top beam to prevent loss.

Feed Apron

Two Compartment Feed Aprons are designed to assist the flow of materials into the hopper in conjunction with a dragline shovel.

The feed apron consists of L/H and R/H side panels, base panel, centre divider, support bar, rubber flap, (to prevent materials falling between the hopper and apron) and rubber flap retaining bar.

To assemble the feed apron, place the base smooth side up in front of the hopper, lay the rubber flap on the base and secure with the retainer and countersunk screws.

Using a suitable support raise the base so that rubber is approximately 470 millimetres (18") off the ground and the base slopes back at an angle, both bolt the side panels in place. Remove the support so the weight of the base is taken by the side panels. Fit the support bar between the side panels and bolt the centre divider in place.

Hydraulic System Description – Basic

The basic hydraulic system is simple in design consisting of an engine or electric motor driven hydraulic pump, hydraulic tank containing the suction strainer, a single spool control valve and a single acting hydraulic cylinder onto which is mounted the hose burst valve. The hose burst valves are only fitted to those machines intended for use within the European Community or the USA. Early single acting rams have a

cylinder with an open to atmosphere breather, later rams have the breather piped directly back to the hydraulic tank.

The pump draws oil from the tank through the suction strainer and delivers the oil to the control valve, if the valve control lever is in the neutral position the oil is directed back to the tank through the return port.

If the lever is raised oil is directed to the hydraulic cylinder which raises the hopper, the maximum pressure being dictated by the adjustable relief valve contained within the control valve.

If the lever is lowered the weight of the hopper displaces oil out of the cylinder back through the valve out through the return port to the tank.

If the lever is returned to the neutral position during the lowering cycle the return port is closed and oil is trapped between the cylinder and spool preventing the hopper from dropping.

WORKSHOP MANUAL
Winget Mechanically Fed Mixers
Models: 200TM
From 1998

Any hydraulic oil, which bypasses the piston seals, is ejected via the breather hole on earlier machines, on later machines the return hose directs this hydraulic oil back to the tank and is much more environmentally friendly.

Hydraulic System Description – Batchweigher

The basic hydraulic system is modified when a batchweigher is fitted to include a bleed valve, which is inserted into the circuit between the control valve and hydraulic cylinder and adds an extra return line back to the tank.

The bleed valve is designed to ensure that when the hopper is fully lowered no residual pressure remains in the circuit between the cylinder and control valve, which could affect the batchweigher readings.

The bleed valve assembly contains a valve and spring and is ported to allow oil to flow either to the hydraulic cylinder or to the hydraulic tank. (see the illustration)

On raising the hopper, hydraulic oil flows into the bleed valve body through the orifice in the valve and out to the hopper ram. As the oil flows through the orifice under pressure the valve is forced across the body compressing the return spring and closing off the return port to the hydraulic tank.

On releasing the control lever to neutral during either the raising or lowering cycle, hydraulic oil under pressure trapped in the line between the piston and control valve spool holds the bleed valve against the return port seat. This prevents the oil returning to the tank, thereby preventing the hopper from dropping.

Should the hopper continue to drop the seat/valve within the bleed valve assembly possibly requires attention using the special tool. (see below)

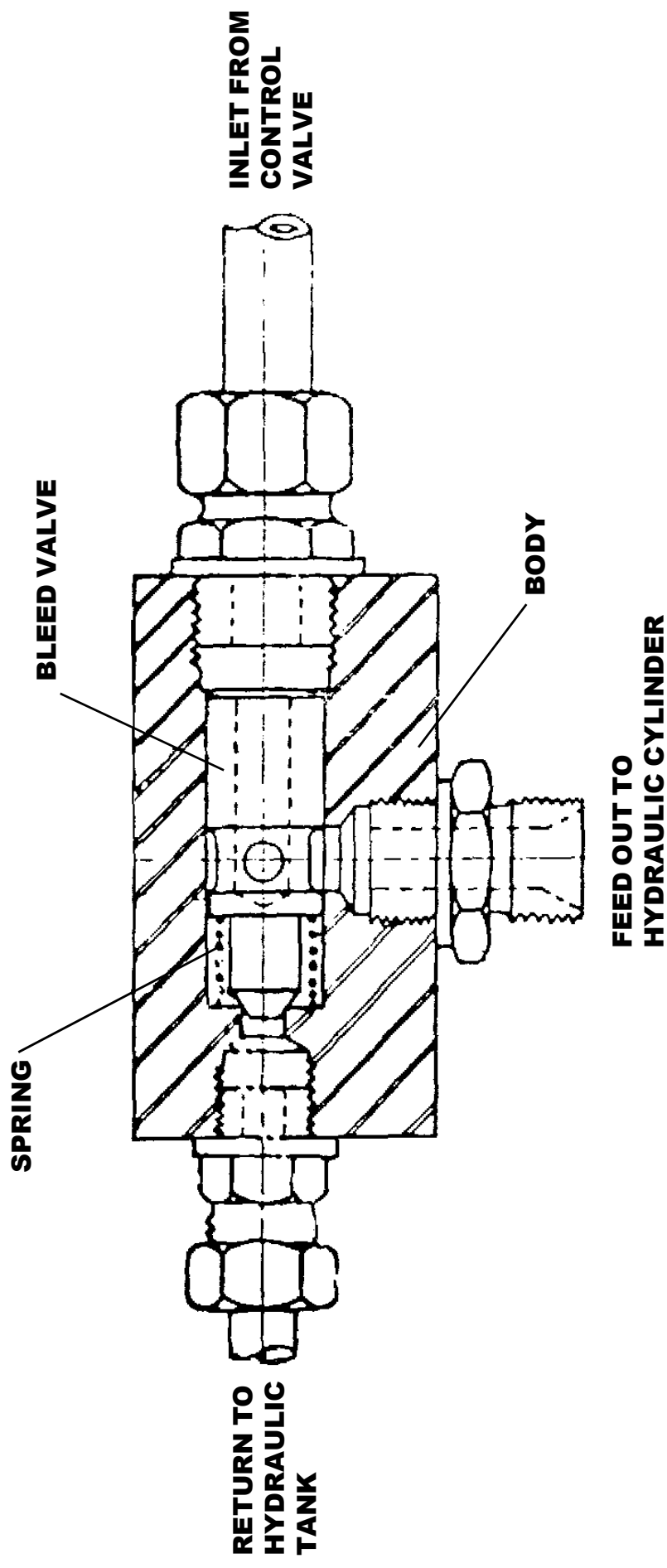
If the system is operating correctly the hopper should remain stationary until the control lever is operated.

On fully lowering the hopper, the reduction in pressure will allow the spring within the valve body to push the bleed valve back across the body. This action opens the tank return port allowing any residual oil/pressure trapped in the base of the cylinder to return to the tank, thereby ensuring that the hopper is completely lowered, allowing the striker to fully contact the loadcell ensuring the accuracy of the batchweigher reading.

On assembling the bleed valve it is important that a good seat is formed within the valve body using the special tool/punch part no. V2003698. The punch should be inserted into the valve, shaped end first, and a seat formed by driving the punch sharply down into the body using a soft faced hammer.

200TM BLEED VALVE ASSEMBLY

(USED IN CONJUNCTION WITH BATCHWEIGHER)



WORKSHOP MANUAL
Winget Mechanically Fed Mixers
Models: 200TM
From 1998

Hydraulic System Description Dragline

The dragline hydraulic system consists of a 12 volt solenoid controlled oil distribution block (otherwise known as the Dragline Control Block) containing a relief valve set to a maximum of 1500psi. A hydraulic motor is fitted operating the dragline winch.

The system is continuously supplied with oil whilst the engine or electric motor are running via a High Pressure Carryover (H.P.C.O) contained within the main control valve.

When the 12-volt solenoid is not energised oil flow is directed by the control block back to the hydraulic tank through the return line which terminates at the tee piece on the side of the tank.

The supply and return hoses supplying oil to the winch motor from the distribution block are ported within the block to form a closed loop enabling the winch motor to revolve freely within minimum resistance when the dragline shovel is manually pulled backwards by the operator.

When the 12-volt solenoid is energised by operating the shovel button/switch, the tank return is closed, the loop is opened and oil is directed to the winch motor, which revolves reeling in the dragline shovel. Oil exiting the winch motor is directed by the control block through the tank mounted tee piece and back into the tank. Should the motor jam or seize in operation the relief valve in the control block will “blow off” dumping the oil back to the tank through the tee piece.

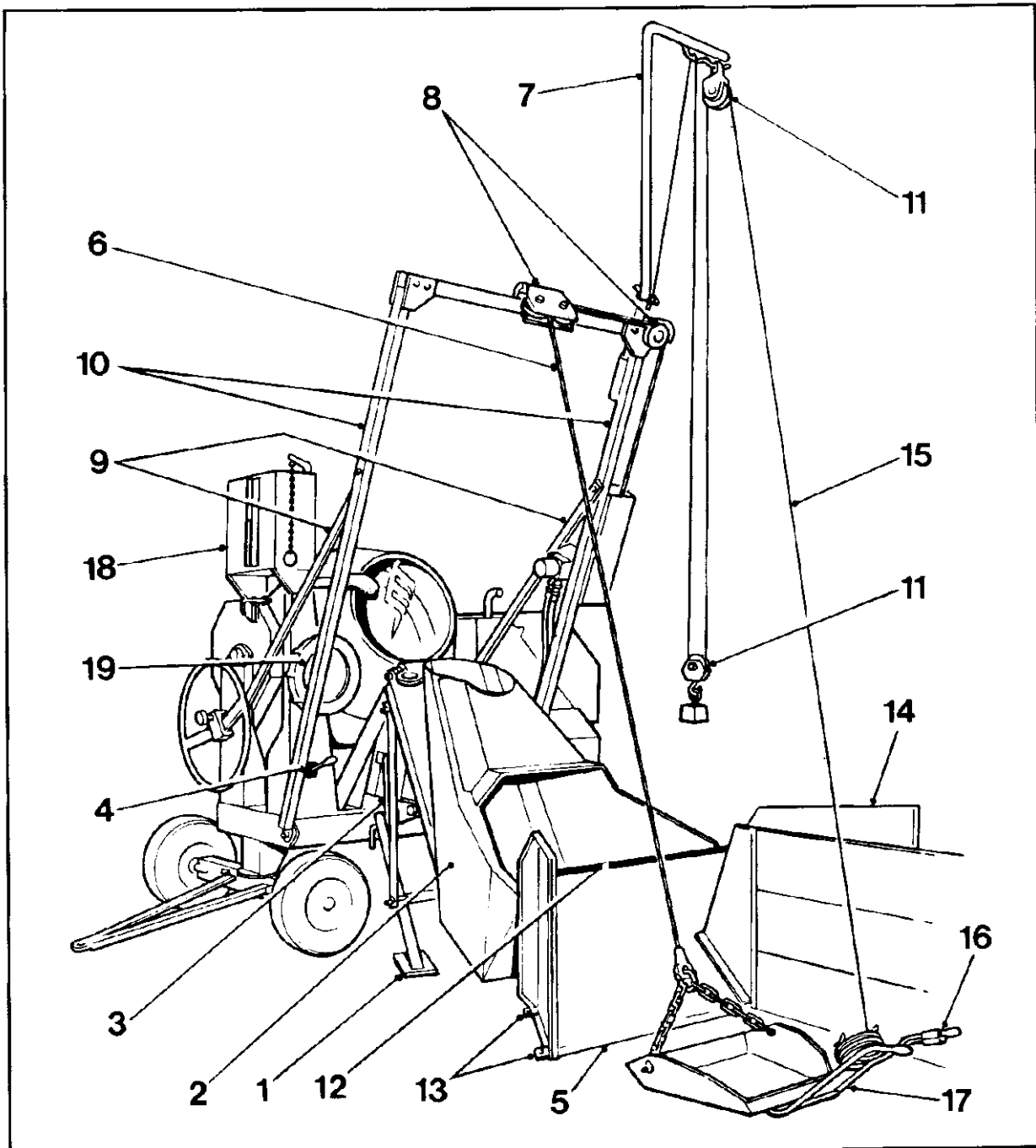
WORKSHOP MANUAL

200TM

SECTION 3

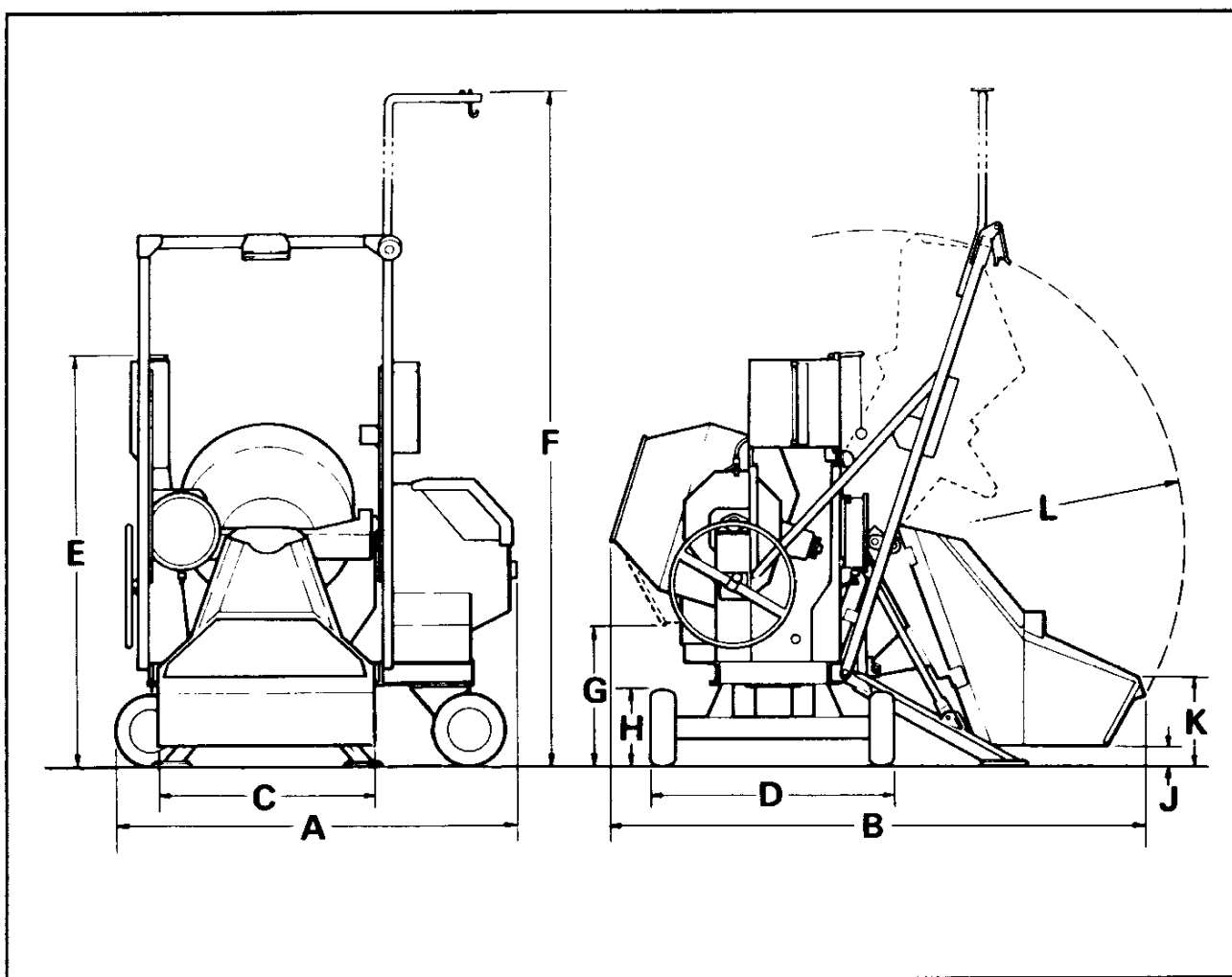
GENERAL ARRANGEMENT DIMENSIONS

GENERAL ARRANGEMENT



- | | | |
|------------------------|-------------------------------|--------------------|
| 1 Stabiliser | 8 Dragline pulleys | 15 Electric cable |
| 2 Hopper | 9 Jib tie bars | 16 Micro switch |
| 3 Hopper safety prop | 10 Jib legs | 17 Dragline shovel |
| 4 Hopper control lever | 11 Pulleys for electric cable | 18 Water tank |
| 5 Hopper loading ramp | 12 Rubber flap | 19 Weigher gauge |
| 6 Dragline cable | 13 Staking lugs | |
| 7 Cable support | 14 Feed apron | |

DIMENSIONS



Dimensions in millimetres

A	2320
B	2920
C	1210
D	1630
E	2200
F	2980
G	756
H	451
J	105
K	470
L	1710

WORKSHOP MANUAL

200TM

SECTION 4

**SERVICE SCHEDULES
LUBRICATION DIAGRAM**

WORKSHOP MANUAL
Winget Mechanically Fed Mixers
Models: 200TM
From 1998

Service Schedule

The engine will require additional services or adjustments in addition to those listed below. (See the appropriate Engine Operators Handbook or Workshop Manual)

Daily: (8) Hours

Before Work

- Lubricate all grease points.
- Check fuel and lubricating oil levels.
- Check for oil and fuel leaks.
- Check/clean/replace air filter element

After Work

- Top up fuel tank.
- Clean out drum and hopper.
- Wash down the mixer.
- Drain the water tank.

Weekly: (40 Hours)

The above and the following:

- | | |
|------------------------|---|
| Dragline Wire Rope | Check for wear or damage |
| Dragline Shovel Switch | Check operation, lubricate contact pin |
| Drive Chain/Belt | Check tension, adjust if necessary |
| Hydraulic Oil | Check level in tank.
(with hopper down and engine stopped) |
| Dynamo Drive | Check belt tension, adjust if necessary |
| Controls and Pivots | Lubricate all levers, rods, pivots and pins with oil |

WORKSHOP MANUAL
Winget Mechanically Fed Mixers
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From 1998

Tilting Pinion Chain	Check Tension
Battery (if fitted)	Check terminals, clean if necessary, top up
Drum Drive	Inspect and lubricate the chain and teeth of the drum bevel gear and pinion.

Monthly: (100 Hours)

The above and the following:

Hydraulic Tank	Check oil tank, filler and breather, clean if necessary.
Batchweigher	Check Calibration

Every 3 Months: (300 Hours)

The above and the following:

Engine	Change air filter element
	Change lubrication oil and filter
	Change fuel filter

(Also see relevant Engine Handbook/Workshop Manual)

Every 6 Months: (600 Hours)

The above and the following:

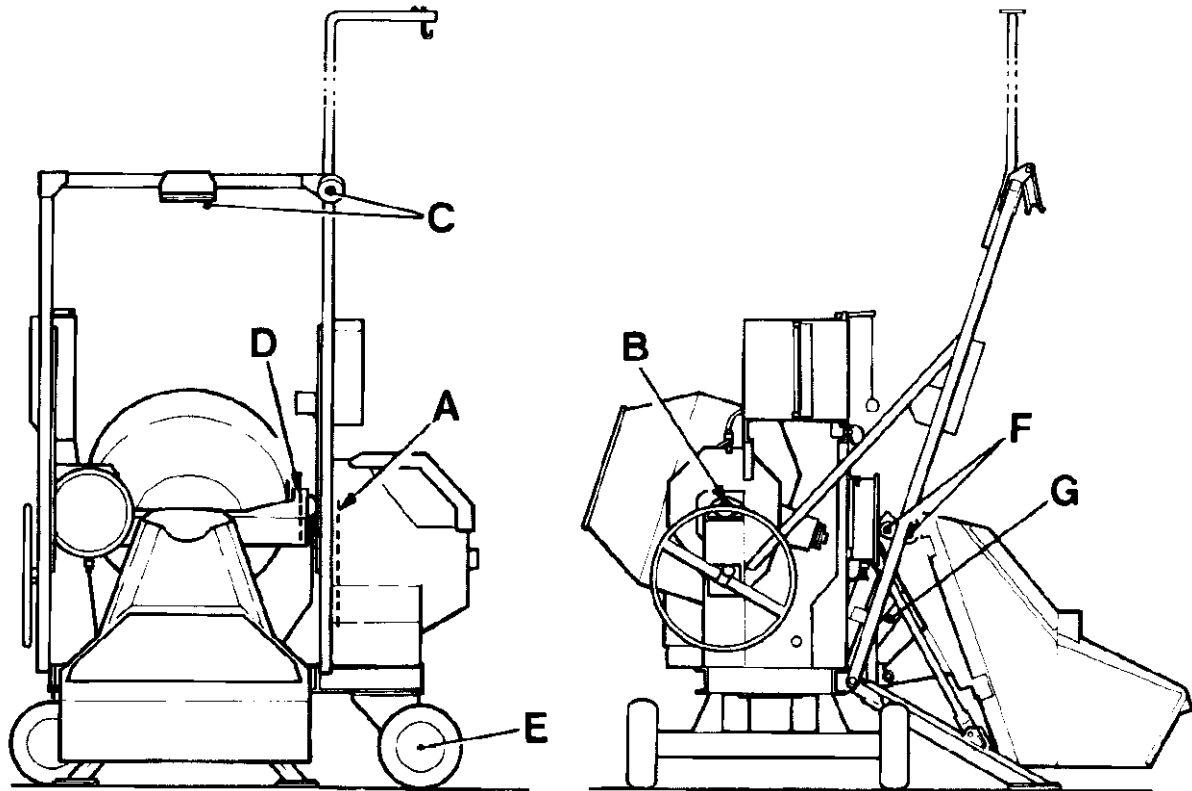
Check the Dynamo Brushes

Every 12 Months: (1200 Hours or earlier if conditions dictate)

The above and the following:

Hydraulics	Drain and clean out tank, suction strainer and filling filter, refill with clean hydraulic oil.
------------	---

LUBRICATION POINTS



Number of points

A	Main drive chain	Oil	1
B	Trunnion pivots	Grease	2
C	Dragline pulleys	Grease	3
D	Drive chain	Oil	1
E	Road wheels (pneumatic tyres)	Grease	4
F	Hopper pivots	Grease	4
G	Ram	Grease	2

LUBRICANTS

Mixers are factory filled with the following TOTAL oils.

Engine	<i>"see Engine Operator's Handbook"</i>
Electric motor bearing	Multis EP 2
Drive chains	Rubia B 20W/30
Bevel gears	Open gear fluid
Drum shaft	Anti-seize compound
Grease nipples	Multis EP 2
Linkages and hinges	Rubia B 20W/30

MIXER DRUM SEALANT

Silicone sealant	Part number: V2000772 (Winget)
------------------	--------------------------------

HYDRAULIC OPERATING OIL

Mixers are factory filled with the following TOTAL oil.

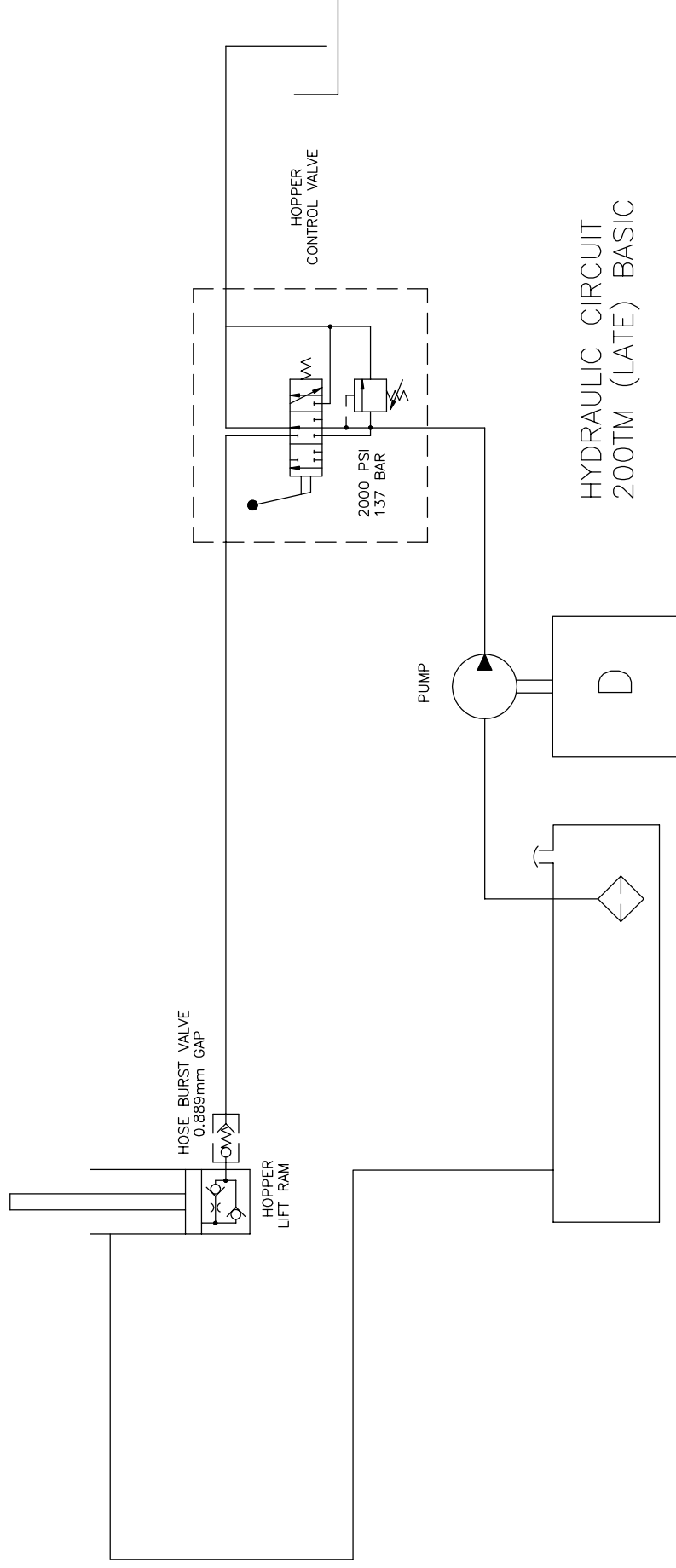
Hydraulic oil	Equivis ZS 46
	SAE 10 oil for temperatures up to 60°F (15°C)
	SAE 20 oil for temperatures between 60°F & 90°F (15°C & 32°C)
	SAE 30 oil for temperatures above 90°F (32°C)

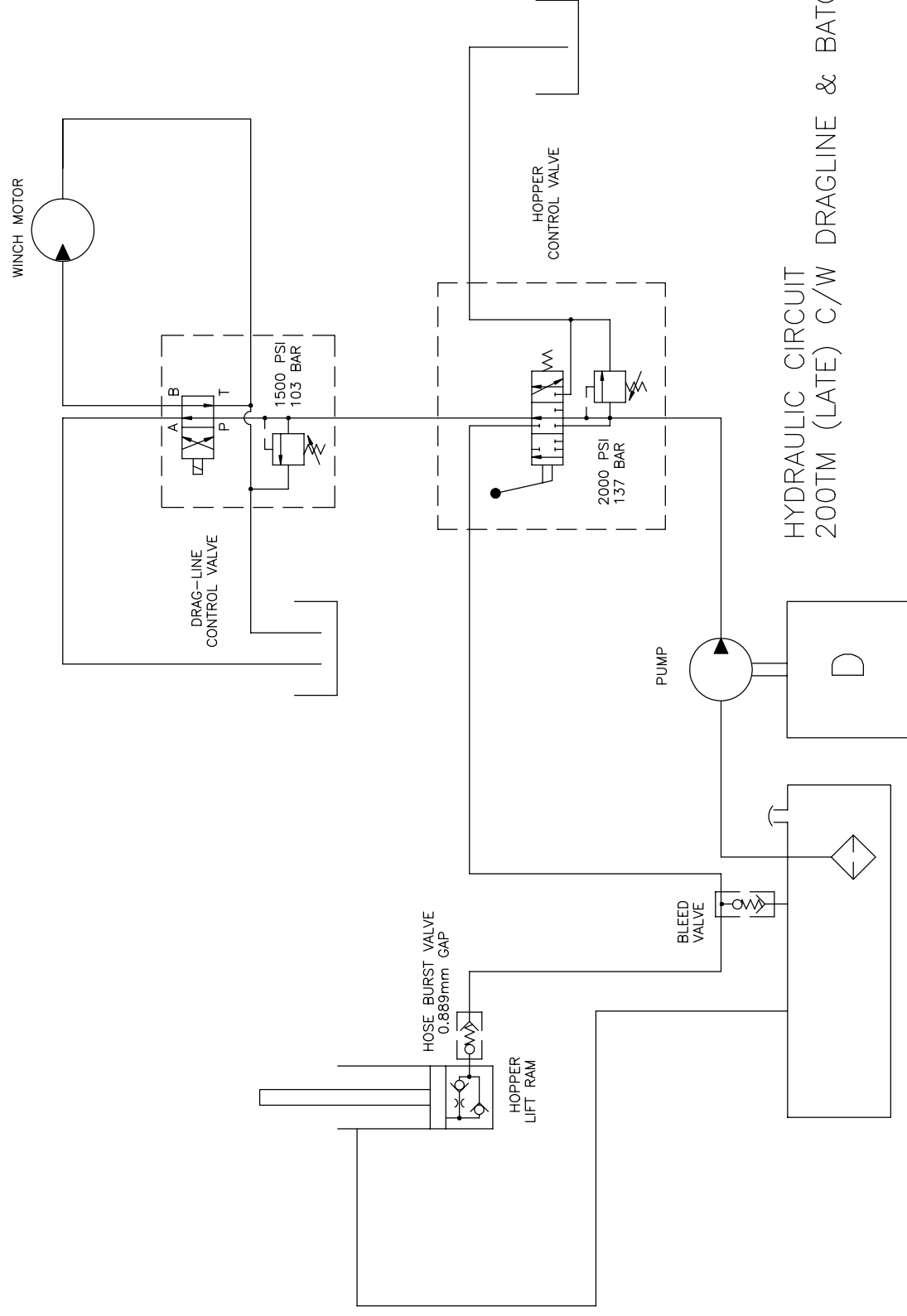
WORKSHOP MANUAL

200TM

SECTION 5

HYDRAULIC CIRCUIT DIAGRAMS





HYDRAULIC CIRCUIT
200TM (LATE) C/W DRAGLINE & BATCHWEIGHER

WORKSHOP MANUAL

200TM

SECTION 6

WIRING DIAGRAMS

200TM MOTOR & CONTACTOR CONNECTIONS 415VOLT DIRECT ON LINE CRABTREE 6-10AMP OVERLOAD RELAY

Contactor-Overload Relay-Stop Button Connections

Markings for terminals L1, L2, L3 & NO on front of the Contactor will be obscured once the auxiliary contact block is slid in place on front of the Contactor. Use visible terminal markings 1, 3 & 5 for incoming 415V supply.

Before fitting Overload Relay to underside of Contactor connect small grey Wire to terminal A2 below Contactor

Remove any existing link between terminals 96 and 64 to allow connection of external Emergency Stop Button.

Link terminal 5 on upper face of Contactor to terminal 63NO

Link terminal 95 on Overload Relay to terminal A2 on upper face of Contactor

Link terminal 1 on upper face of Contactor to terminal A1, also on upper face of Contactor

No external wiring link fitted between 51NC and 52NC on auxiliary contact block

Connect Emergency Stop Button to terminal 96 on Overload Relay and terminal 64NO on Contactor

Link W2, U2 & V2 in motor connection box using brass links supplied.

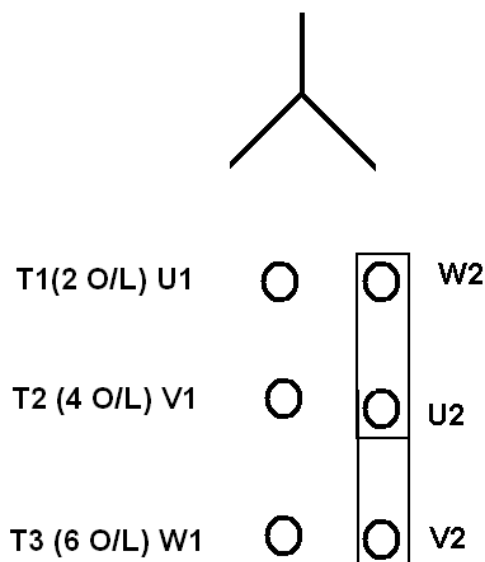
Overload Relay to Motor Connections

Link T1 (2 on O/L Relay) to U1, Red Wire \

Link T2 (4 on O/L Relay) to V1, Yellow Wire > or use all red cables

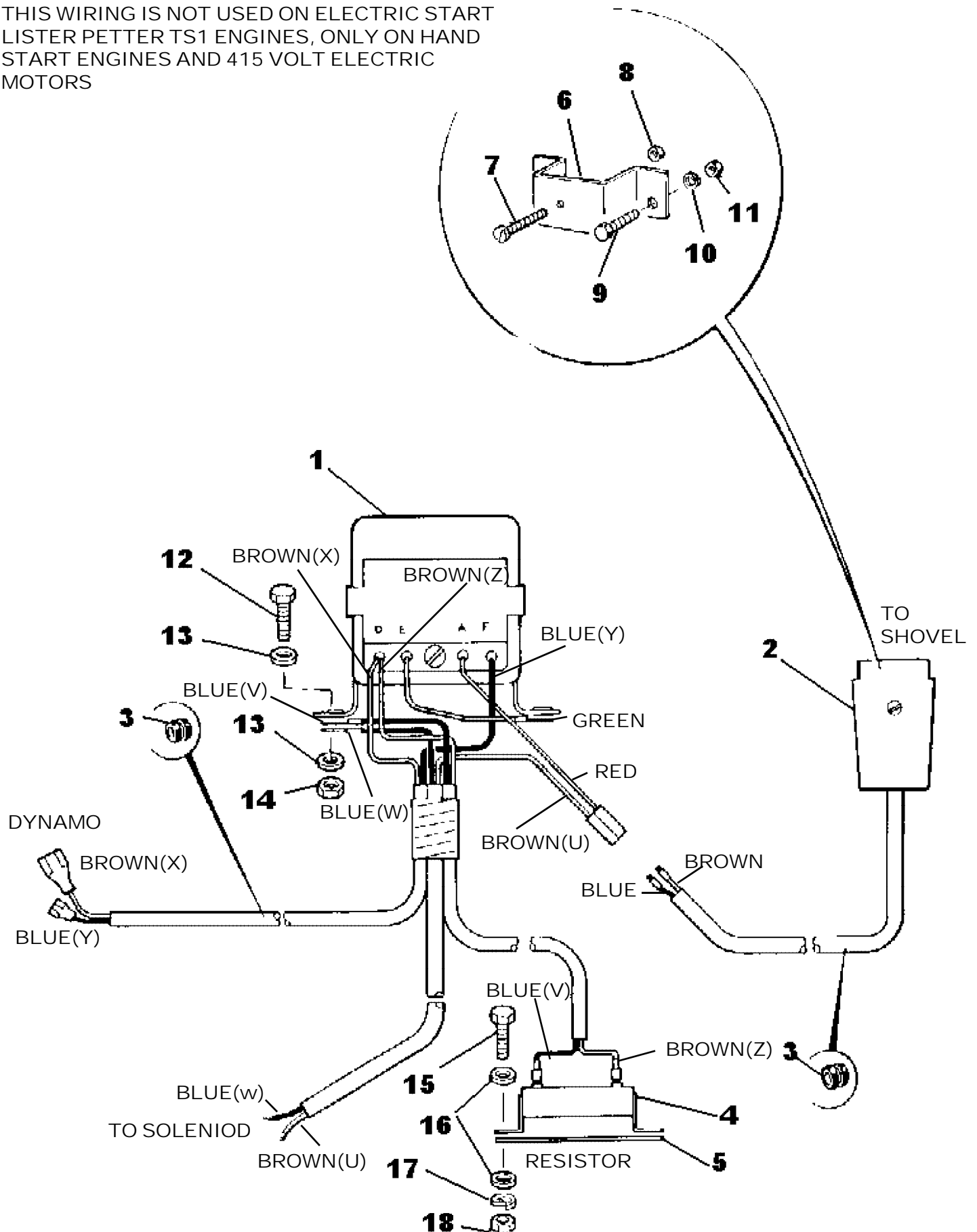
Link T3 (6 on O/L Relay) to W1, Blue Wire /

Use 2.5/4mm² Cable size **DOL MOTOR CONNECTIONS**



200TM DRAGLINE WIRING LOOM HS-415 VOLT

THIS WIRING IS NOT USED ON ELECTRIC START
LISTER PETTER TS1 ENGINES, ONLY ON HAND
START ENGINES AND 415 VOLT ELECTRIC
MOTORS



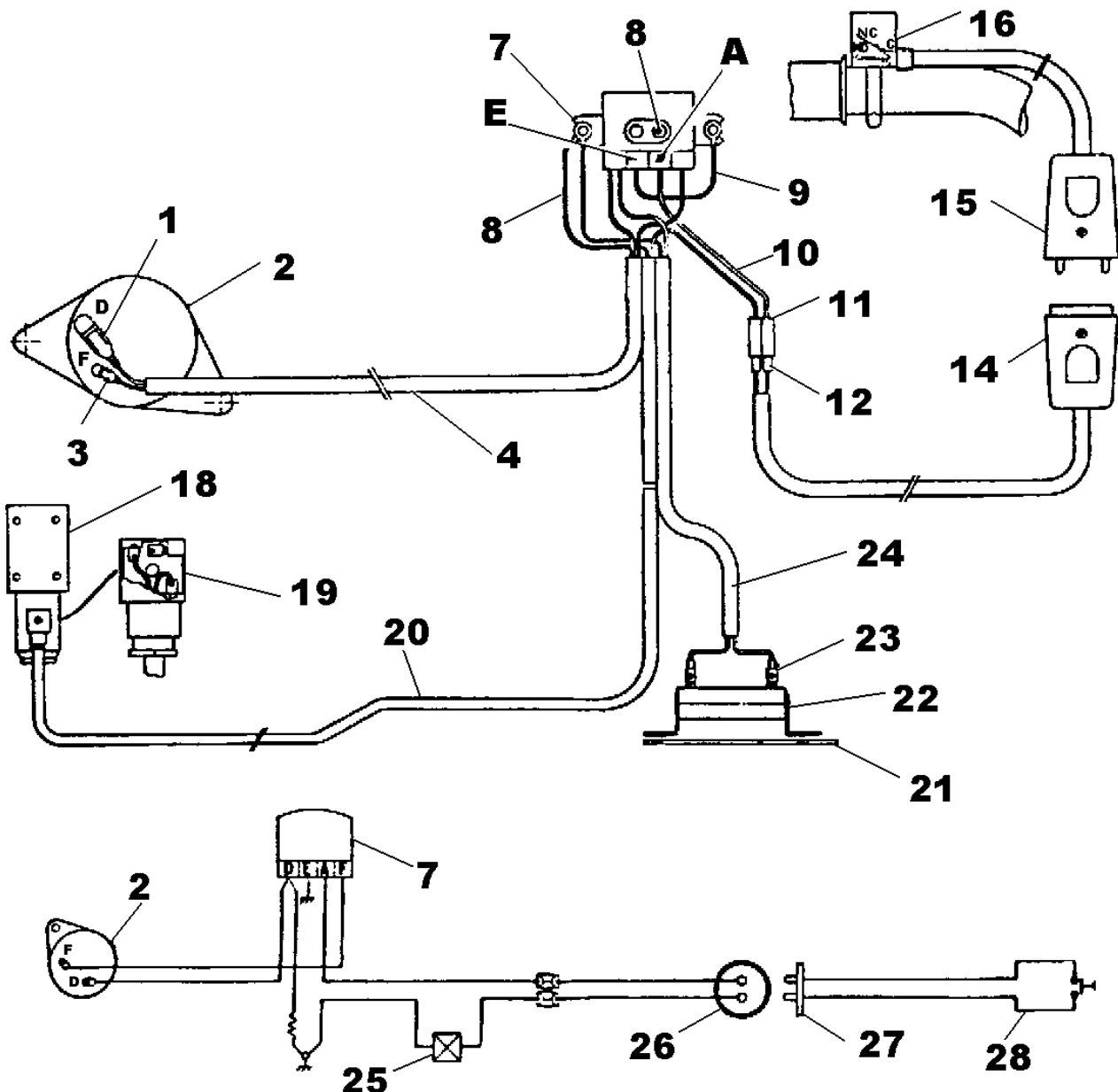
200TM DRAGLINE WIRING LOOM

1	513340300	LOOM ASSEMBLY DRAGLINE	1
2	205304600	PLUG	1
3	V2003252	GROMMET	2
4	207652000	RESISTOR	1
5	555213700	BOARD INSULATING	1
6	555253800	CLAMP-CABLE	1
7	82S07F	SCREW ROUND HEAD	1
8	83S07	NUT	1
9	11S01A	SCREW SET	2
10	17S02	WASHER SPRING	2
11	7S01	NUT	2
12	11S02B	SCREW SET	2
13	267S04	WASHER FLAT	4
14	61SD2	NUT BINX	2
15	11S01A	SCREW SET	2
16	267S03	WASHER FLAT	4
17	17S03	WASHER SPRING	2
18	7S01	NUT	2

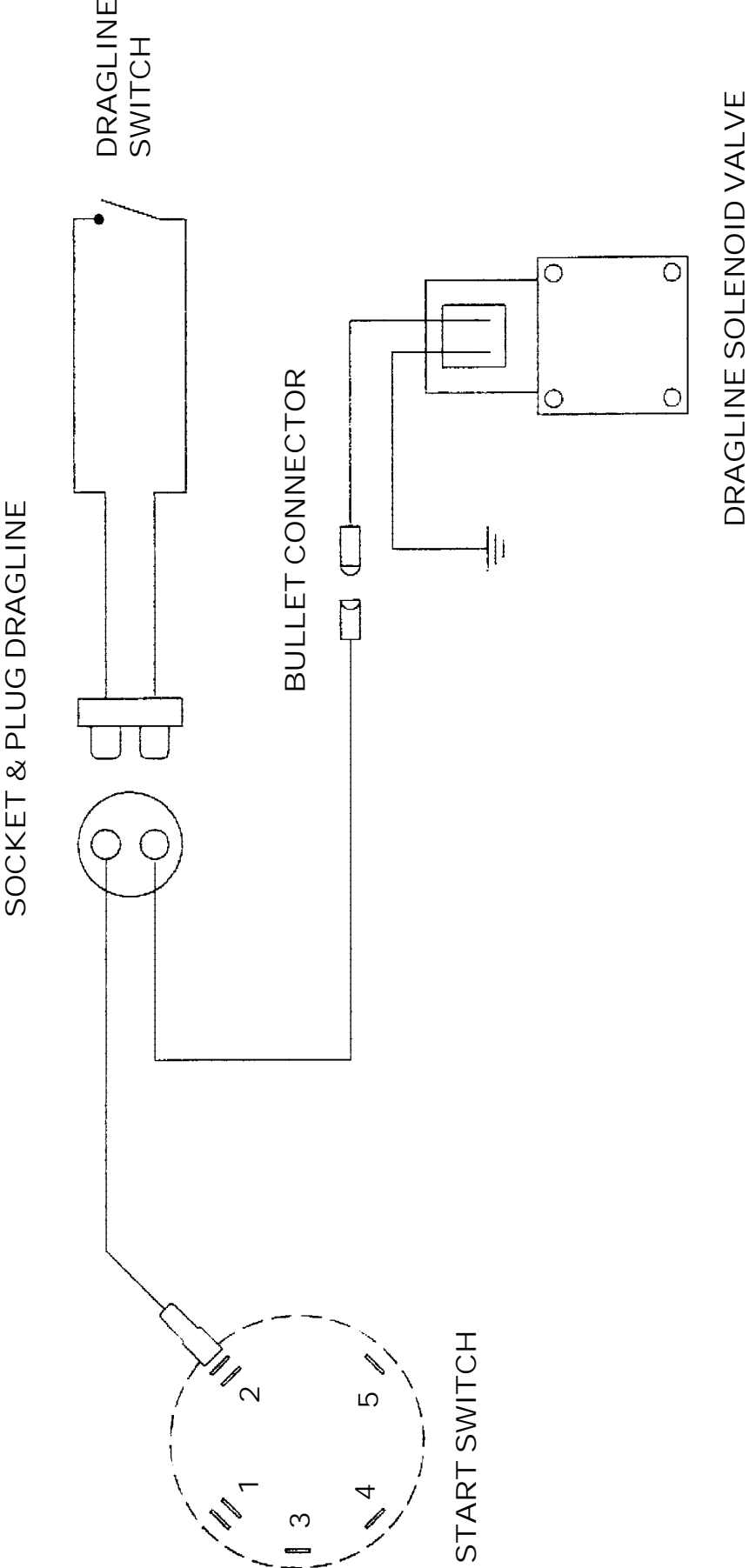
DRAGLINE WIRING HANDSTART TS ENGINES AND ELECTRIC MOTORS

ELECTRICAL WIRING LAYOUT

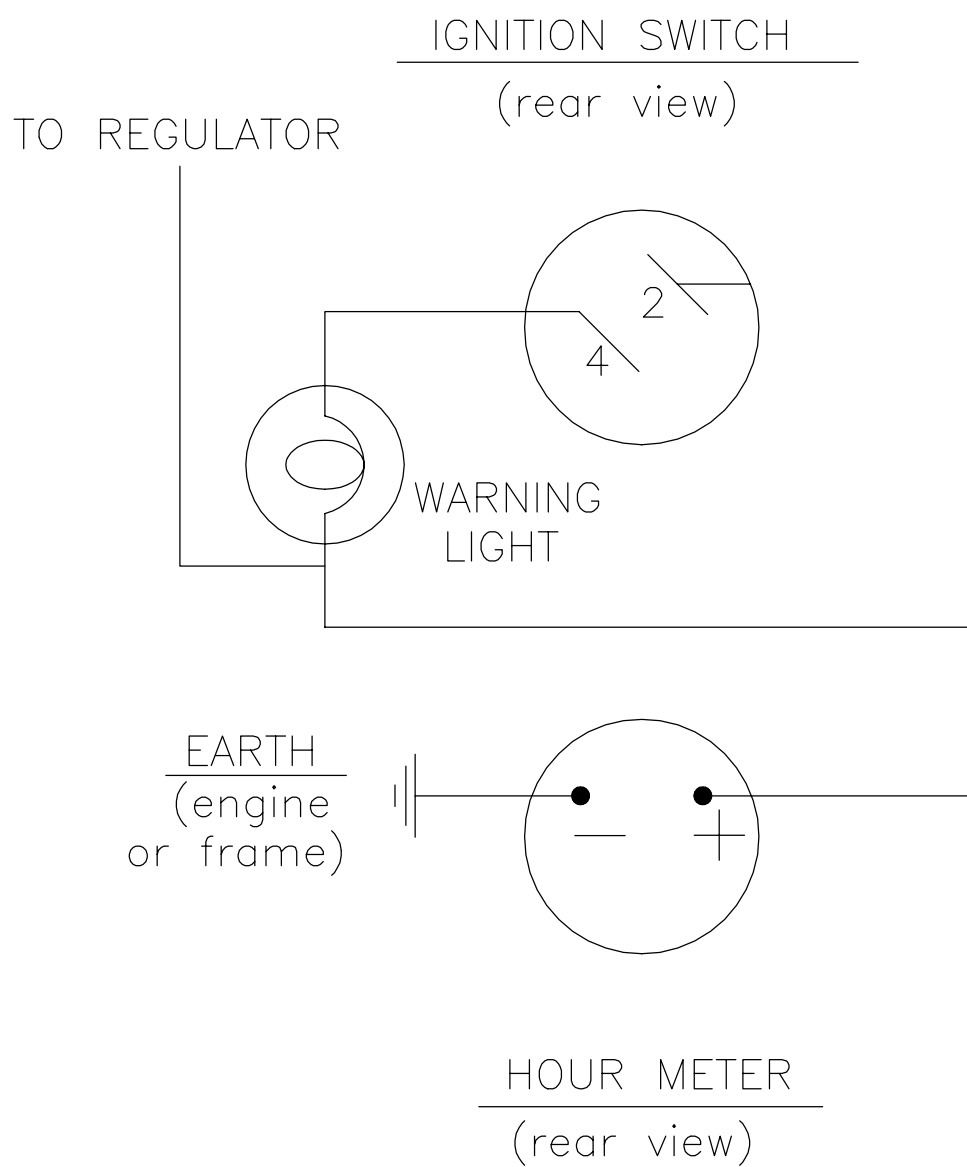
- | | | | |
|----|---------------------------------|----|---|
| 1 | Terminal with Insulator | 16 | Control, shovel unit |
| 2 | Generator | 18 | Dragline solenoid valve |
| 3 | Terminal with Insulator | 19 | Connect cable to solenoid valve plug as shown |
| 4 | Cable, twin core brown and blue | 20 | Cable, twin core brown and blue |
| 6 | Cable, blue | 21 | Board, insulating |
| 7 | Regulator | 22 | Resistor |
| 8 | Screw, voltage adjusting | 23 | Connector |
| 9 | Cable, green | 24 | Cable, twin core brown and blue |
| 10 | Cable, red | 25 | Dragline solenoid valve |
| 11 | Connector | 26 | Socket, dragline |
| 12 | Nipples | 27 | Plug, dragline |
| 13 | Cable, twin core brown and blue | 28 | Button, dragline operating |
| 14 | Socket, shovel unit | | |
| 15 | Plug, shovel unit | | |



200TM DRAGLINE WIRING TS1 ES



HOUR METER WIRING WITH WARNING LIGHT

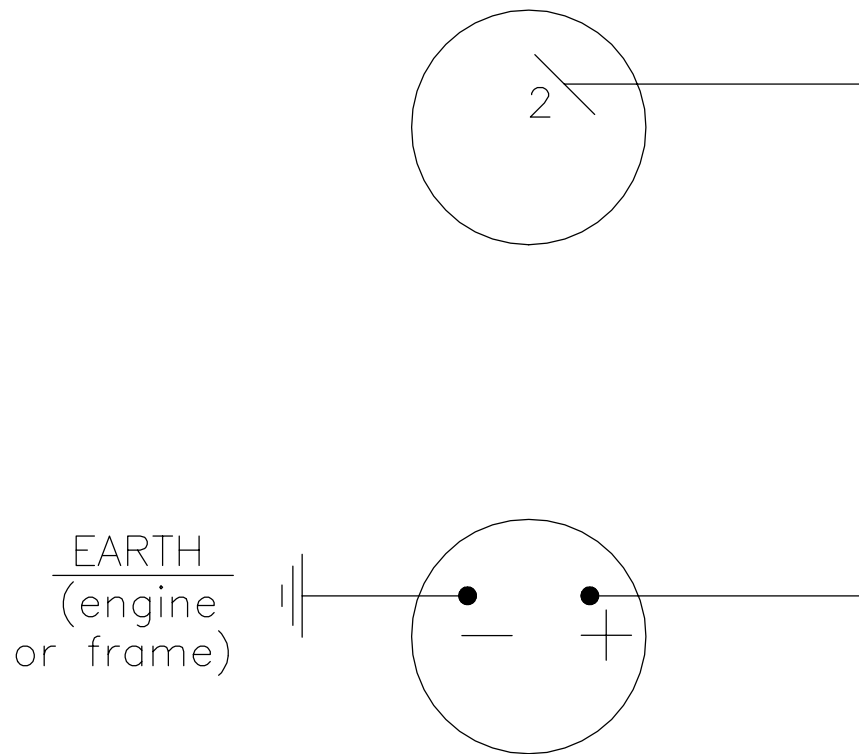


HOUR METER WIRING

NO WARNING LIGHT

IGNITION SWITCH

(rear view)



HOUR METER

(rear view)

LISTER-PETTER 'NISCA' CHARGING SYSTEM

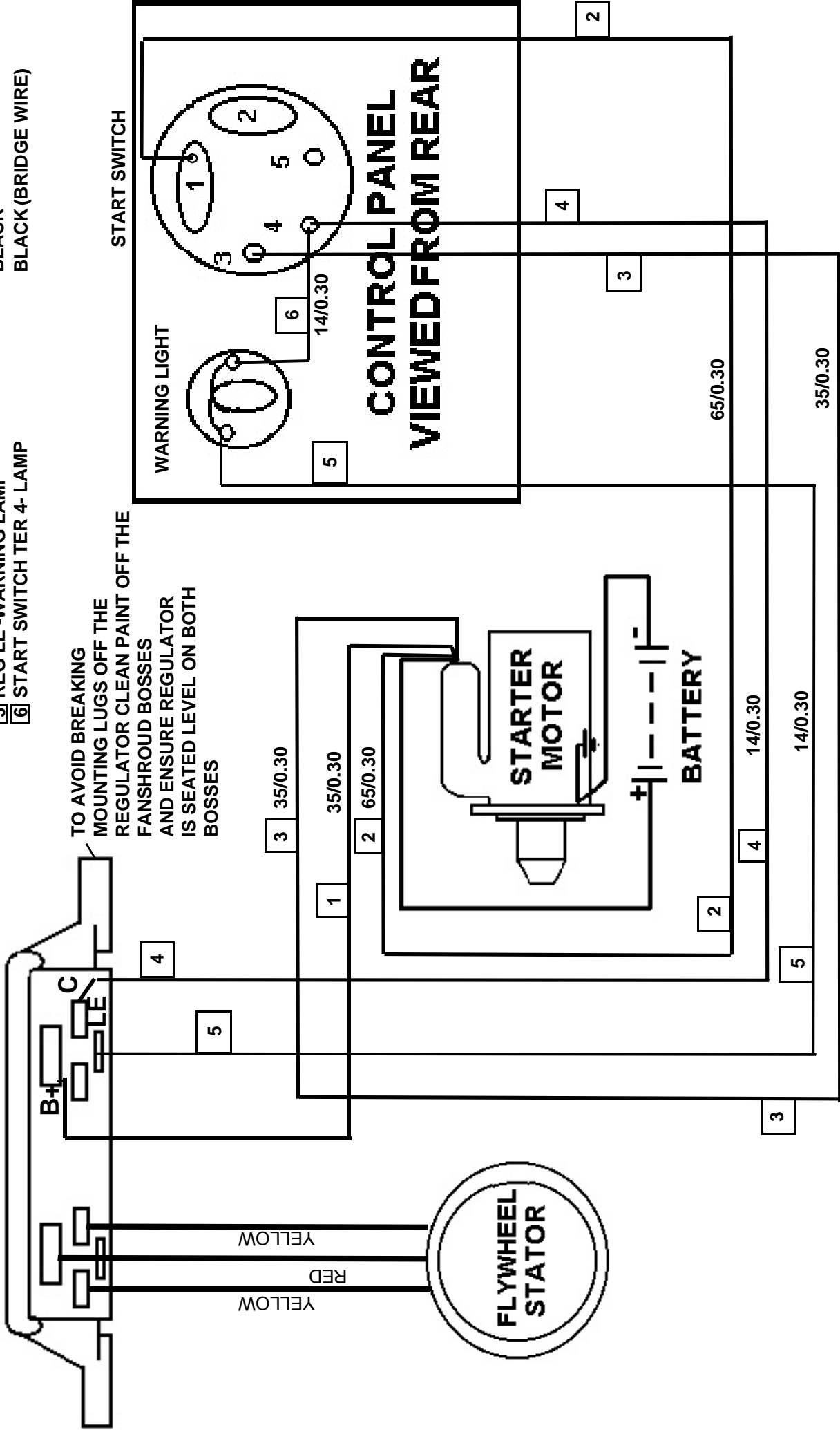
WIRING DIAGRAM

WIRING COLOUR CODES

- 1 STARTER MOTOR-REG 'B'
- 2 START SWITCH TER 1-STARTER MOTOR
- 3 START SWITCH TER 3 -STARTER SOLENOID
- 4 START SWITCH TER 4-REG 'C'
- 5 REG'LE'-WARNING LAMP
- 6 START SWITCH TER 4- LAMP

- RED (THICK)
- BROWN
- WHITE/RED
- RED (THIN)
- BLACK
- BLACK (BRIDGE WIRE)

REGULATOR



WORKSHOP MANUAL

200TM

SECTION 7

NOISE LEVELS

SECTION 7

NOISE LEVELS

Noise Tests were carried out in accordance with EC Directive 79/113 on a 10 metre Hemisphere with the drum empty and rotating and in accordance with EC Directive 2000/14/EC again on a 10 metre hemisphere with the drum loaded and rotating.

Operators Ear Tests were carried out at a distance 1 metre from the Hopper and Handwheel at a height of 1 metre.

Lister Petter TS1-06 Standard Build (79/113)

10 metre	104Lwa
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Operators Ear	85Lpa
---------------	-------

Lister Petter TS1-06 Standard Build (2000/14/EC)

10 metre	105Lwa
----------	--------

Operators Ear	85Lpa
---------------	-------

415 Volt Electric Motor (79/113)

10 metre	88Lwa
----------	-------

Operators Ear	67Lpa
---------------	-------

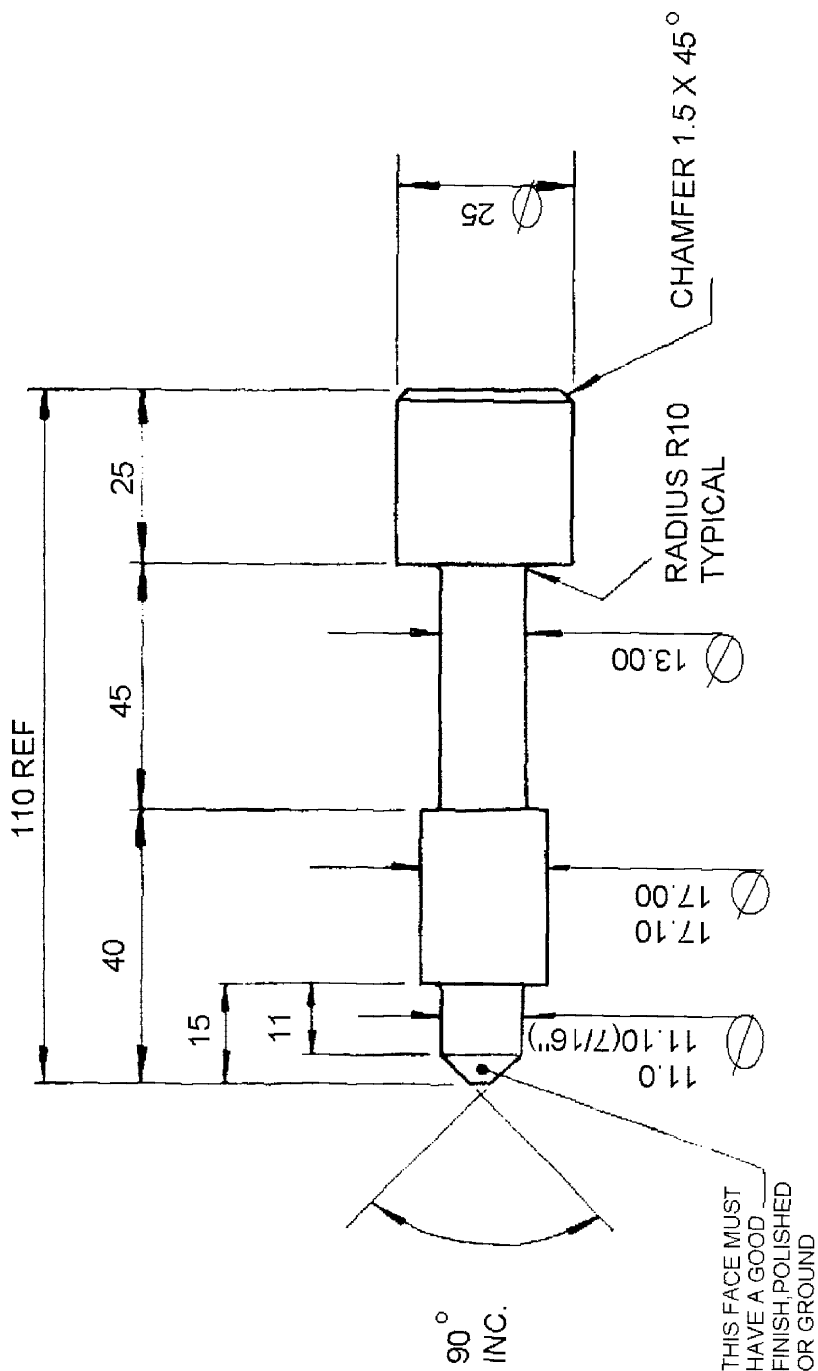
WORKSHOP MANUAL

200TM

SECTION 8

SPECIAL TOOLS

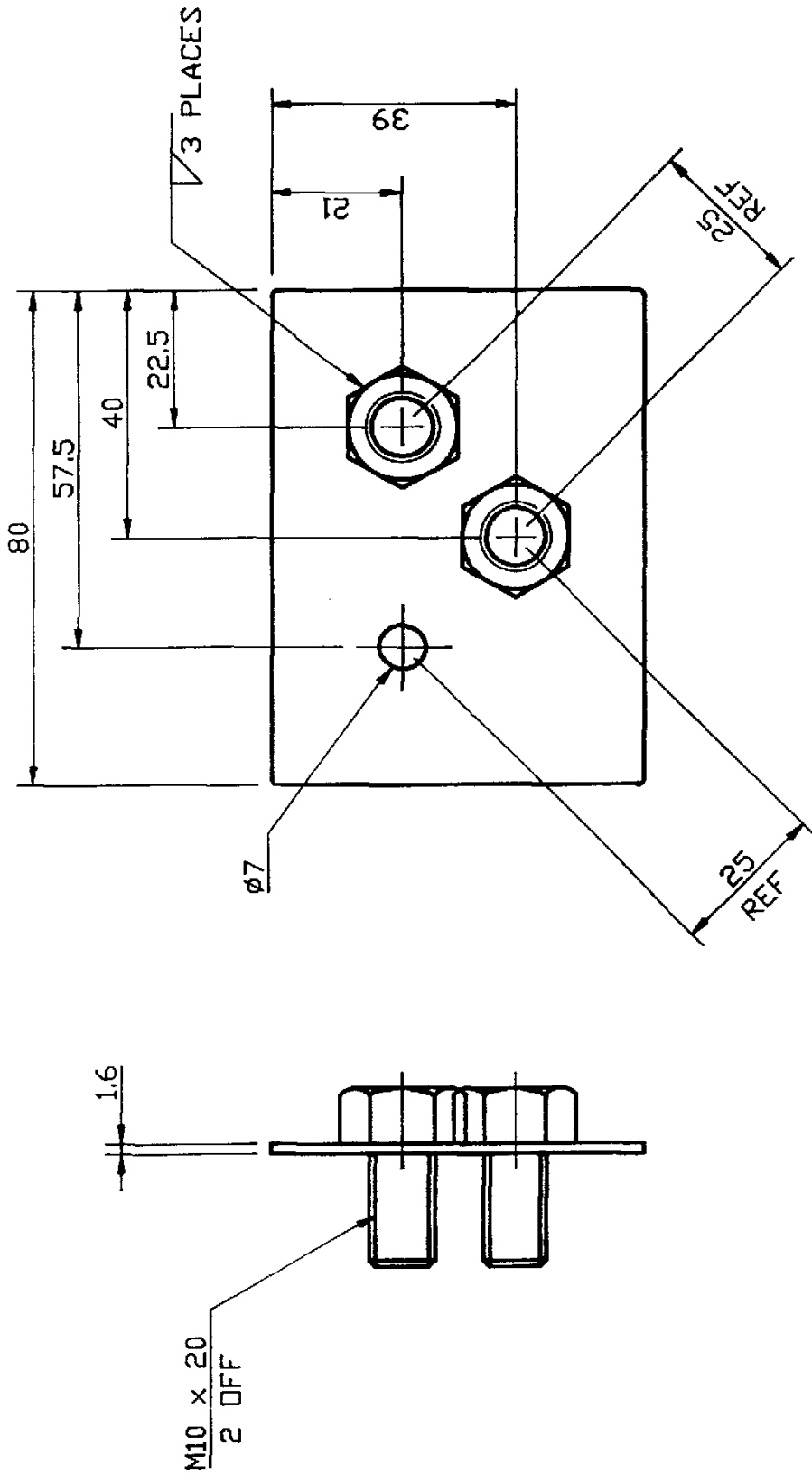
200TM PUNCH- VALVE SEAT



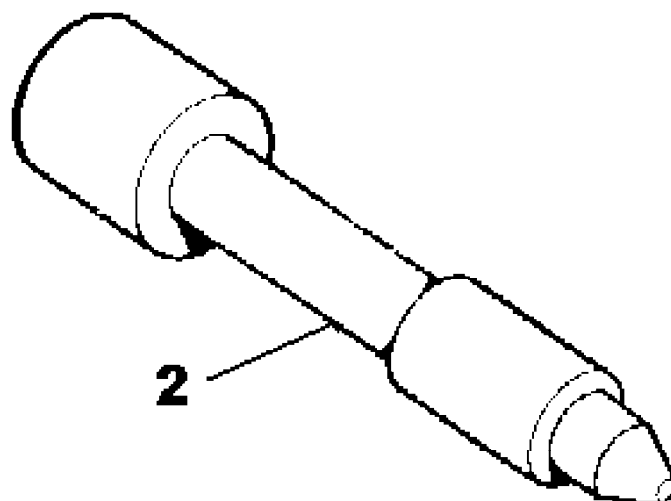
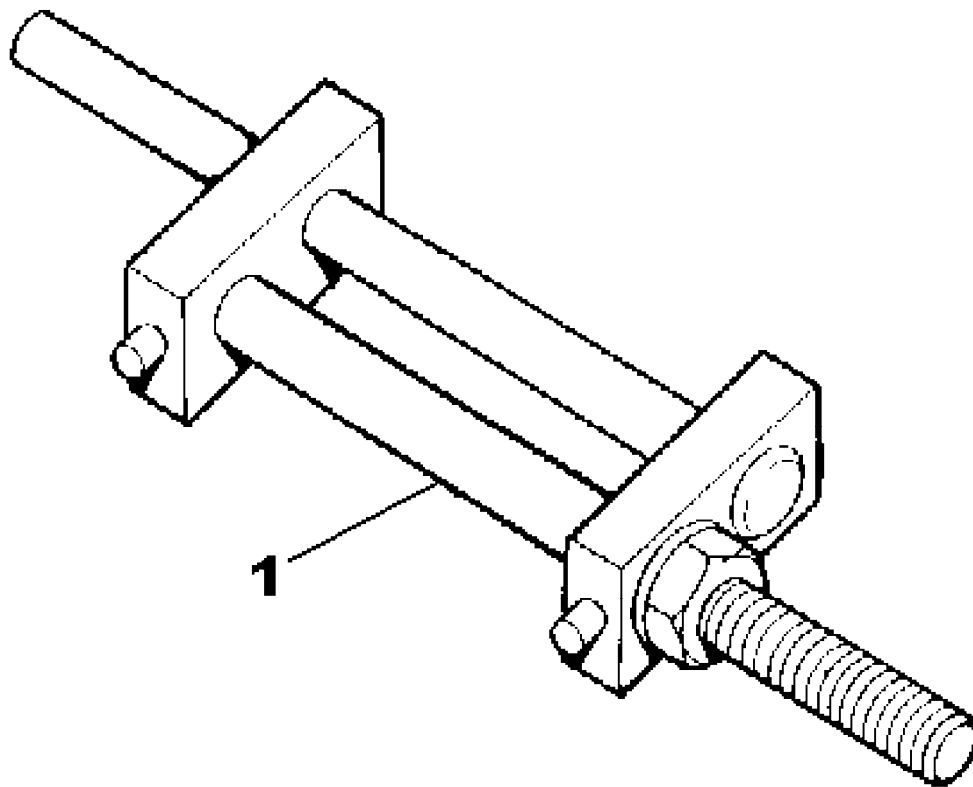
CASE HARDEN TO 45/50 ROCKWELL

200TM SPECIAL TOOL V2003698

200™ DRUM BLADE DRILLING GUIDE



SPECIAL TOOL 200™ 513360100



200TM SPECIAL TOOLS

1	513204000	CLAMP-DRUM CLIP	1
2	V2003698	PUNCH-BLEED VALVE SEAT	1

WORKSHOP MANUAL

200TM

SECTION 9

HYDRAULIC CONTROL VALVE SERVICE MANUAL

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WORKSHOP MANUAL

200TM

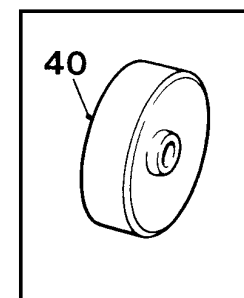
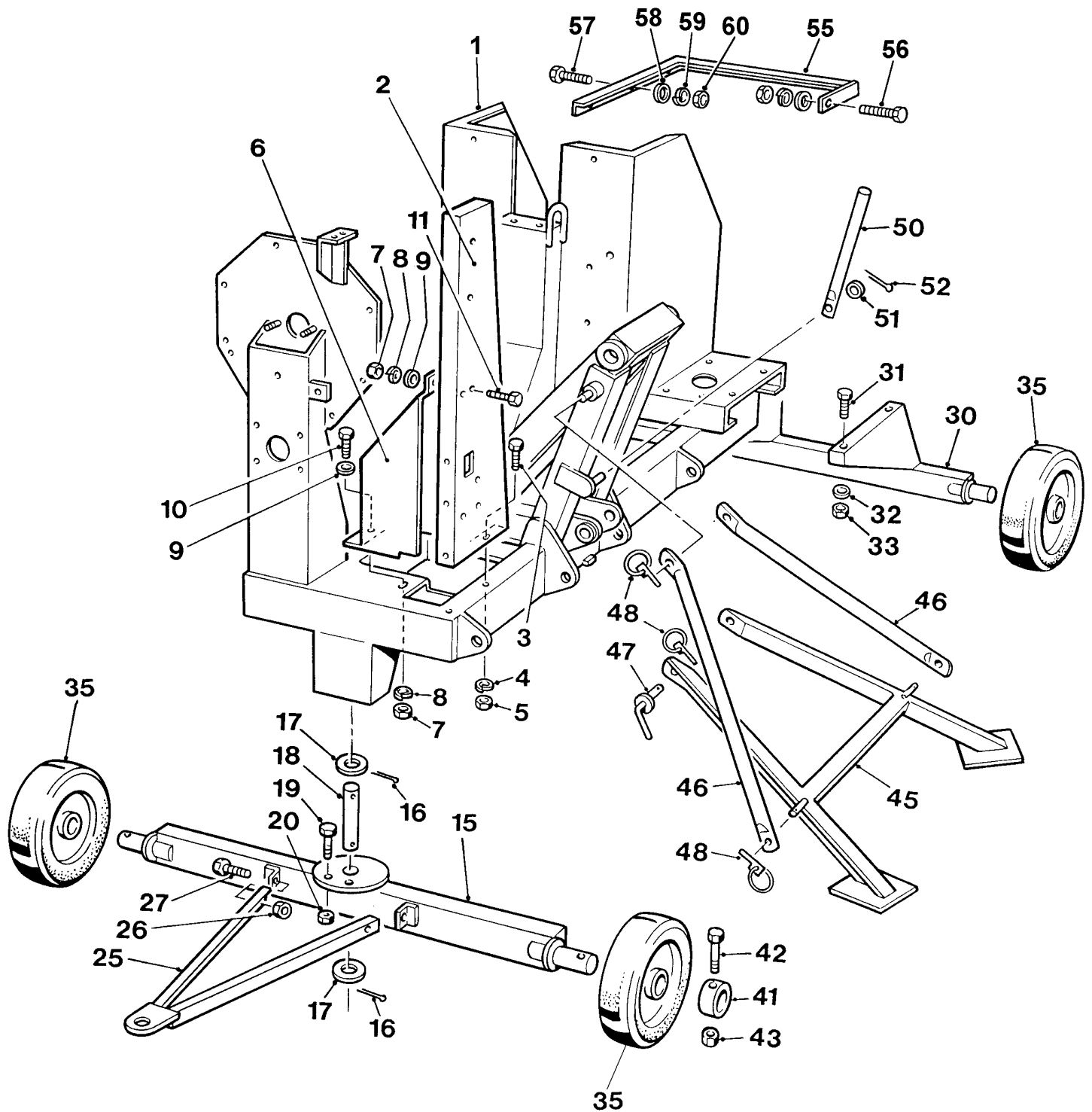
SECTION 10

PARTS LISTINGS

The following Parts Illustrations do not contain a breakdown of assemblies such as Hydraulic Winch Motor, Hydraulic Ram etc, only the complete items are shown.

For a breakdown of these items please refer to the attached Parts Microfiche or Operators and Parts Manual

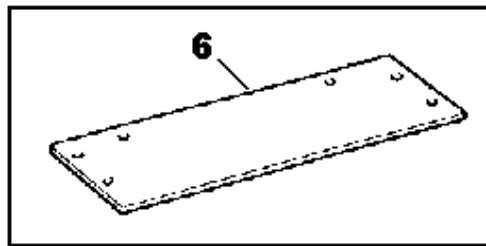
200TM MAINFRAME AXLES AND STABILISERS



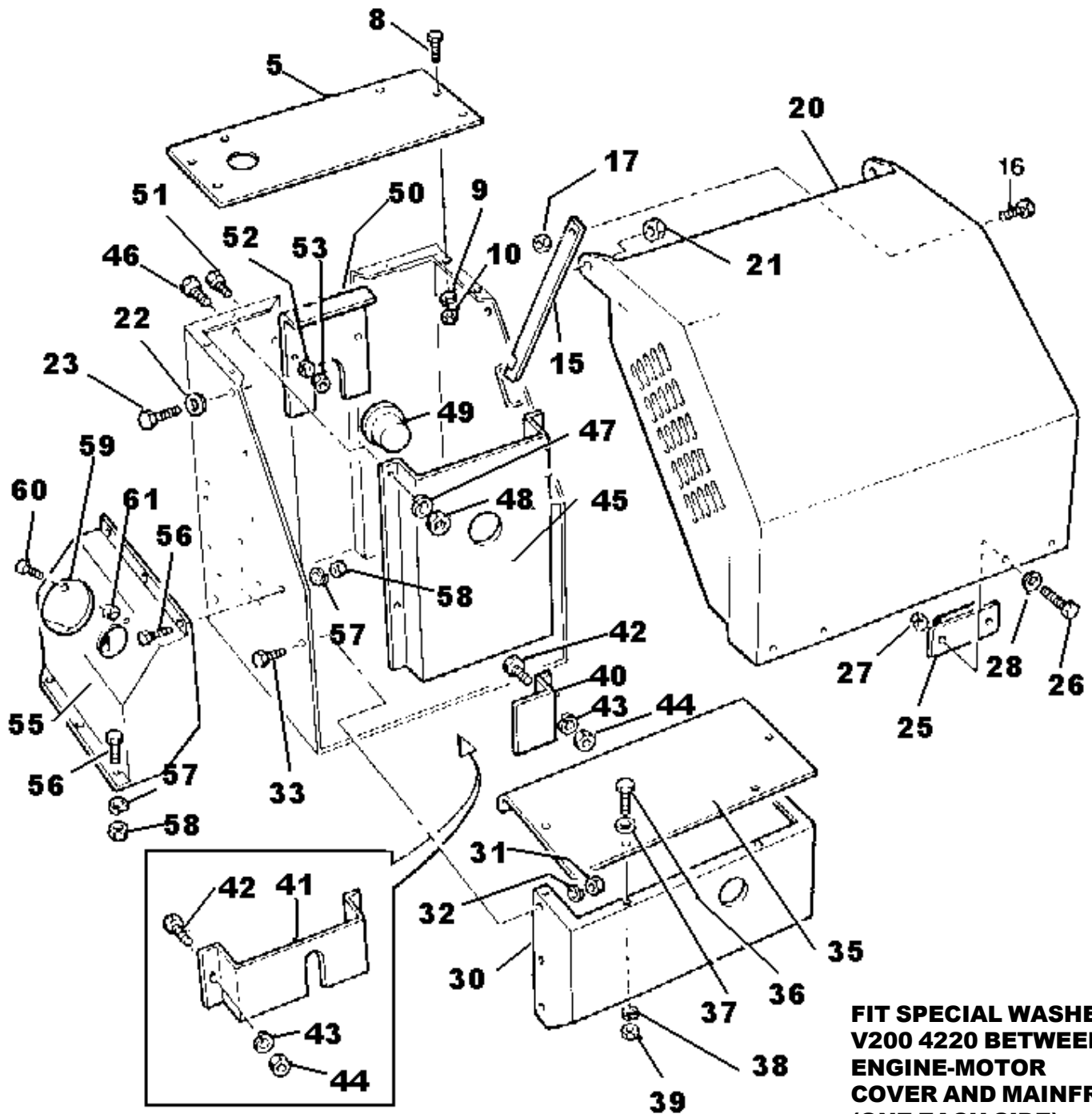
200TM MAINFRAME AXLES STABILISERS

1	513350700	MAINFRAME	1
2	513327300	SUPPORT - TANK	1
3	11S05E	SCREW SET	2
4	17S06	WASHER SPRING	2
5	7S05	NUT	2
6	513355700	COVER - HYD CON VALVE	1
7	7S03	NUT	3
8	17S04	WASHER SPRING	3
9	267S05	WASHER FLAT	3
10	11S03C	SCREW SET	3
15	51334000	AXLE FRONT	1
16	353308200	PIN SPLIT	2
17	10S31	WASHER FLAT	2
18	513315100	PIN SWIVEL	1
19	11S05C	SCREW SET	2
20	61S05	NUT BINX	2
25	513315200	BAR TOWING	1
26	61S05	NUT BINX	2
27	11S05D	SCREW SET	2
30	513340100	AXLE REAR	1
31	11S05D	SCREW SET	4
32	267S07	WASHER FLAT	4
33	61S05	NUT BINX	4
35	475122000	WHEEL PNEUMATIC	4
40	513198500	WHEEL STEEL	4
41	513324700	COLLAR	4
42	8S02H	BOLT	4
43	61S02	NUT BINX	4
45	513353100	STABLISERS	1
46	513353000	STRUT	2
47	513354800	PIN STABILISER	2
48	902S02	PIN LYNCH & CHAIN	6
50	513354100	STRUT HOPPER	1
51	267S10	WASHER FLAT	1
52	44S17J	PIN SPLIT	1
55	V2004201	HOUSING SUPPORT BRACKET, DIESEL ONLY	1
56	11S03A	SCREW SET	1
57	11S03A	SCREW SET	3
58	267S05	WASHER FLAT	3
59	17S04	WASHER SPRING	3
60	7S03	NUT	3

200TM SHEETMETAL PANELS AND GUARDS



**USE BLANK TOP PANEL ITEM 6 WITH
ELECTRIC MOTOR DRIVEN MACHINES**



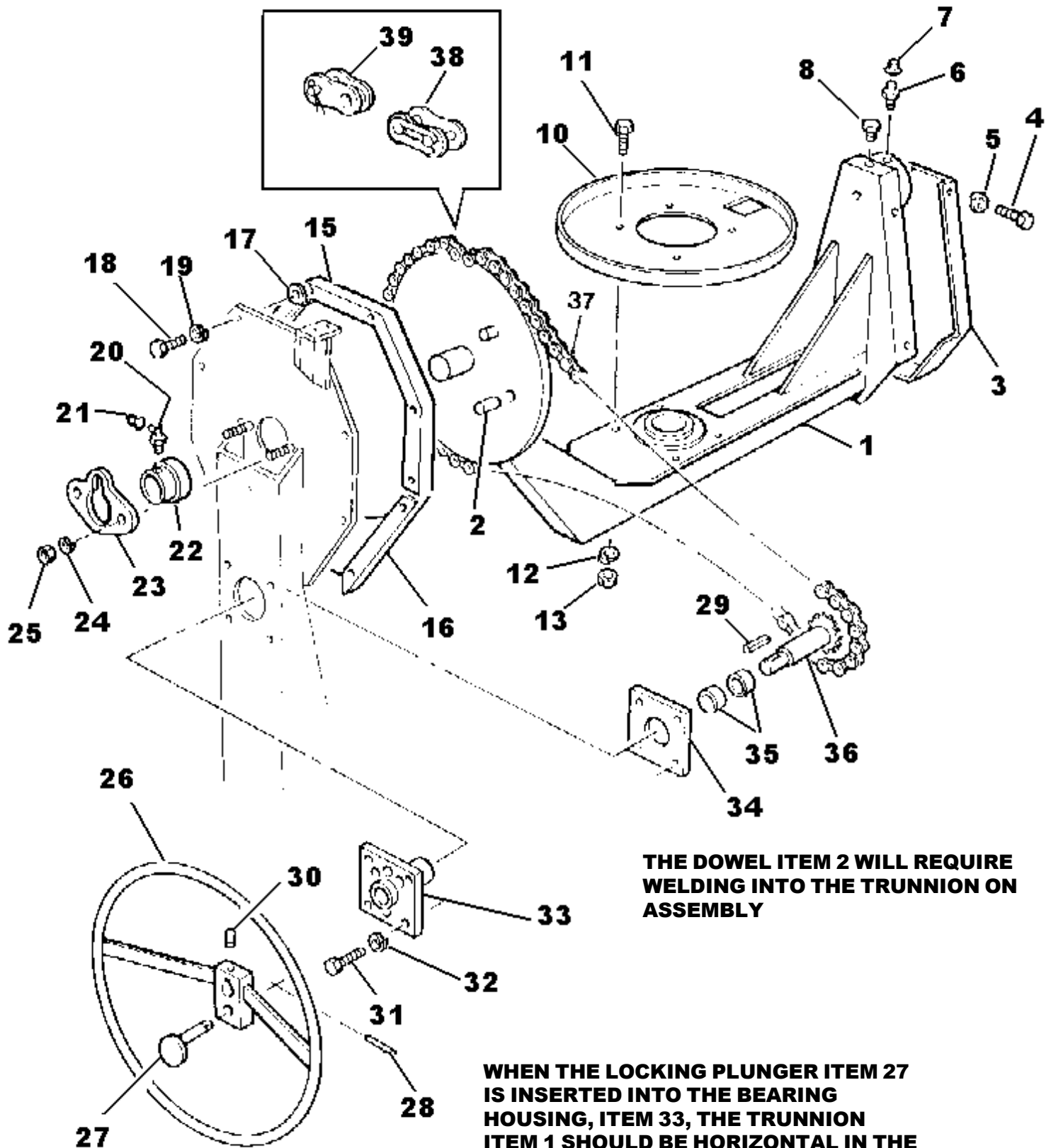
**FIT SPECIAL WASHERS
V200 4220 BETWEEN
ENGINE-MOTOR
COVER AND MAINFRAME
(ONE EACH SIDE)**

200TM SHEETMETAL PANELS AND COVERS

5	513347100	PLATE TOP-DIESEL	1
6	513360000	PLATE TOP - ELECTRIC	1
8	11S03A	SCREW SET	6
9	17S04	WASHER SPRING	6
10	7S03	NUT	6
15	513325800	STRUT COVER SUPPORT	1
16	11S03D	SCREW SET	1
17	61S03	NUT BINX	1
20	513346700	COVER ENGINE/MOTOR	1
21	7S04	NUT	2
22	267S06	WASHER FLAT	2
23	11S04E	SCREW SET	2
25	513205300	STOP-COVER	2
26	11S02A	SCREW SET	4
27	61S02	NUT BINX	4
28	267S04	WASHER FLAT	4
30	513346800	PLATE CLOSING	1
31	7S03	NUT	4
32	17S04	WASHER SPRING	4
33	11S03A	SCREW SET	4
35	513356000	COVER - ELECTRIC MOTOR	1
36	11S03B	SCREW SET	4
37	267S05	WASHER FLAT	4
38	17S04	WASHER SPRING	4
39	7S03	NUT	4
40	513350500	GUARD (SPROCKET DIESEL)	1
41	513336100	GUARD (SPROCKET ELECTRIC)	1
42	11S04B	SCREW SET	1/2
43	17S05	WASHER SPRING	1/2
44	7S04	NUT	1/2
45	513248700	GUARD CHAIN/BELT	1
46	11S04B	SCREW SET	4
47	17S05	WASHER SPRING	4
48	7S04	NUT	4
49	241859000	PLUG	1
50	513354600	PLATE	1
51	11S02A	SCREW SET	2
52	17S03	WASHER SPRING	2
53	7S02	NUT	2
55	513307000	COVER HYD TANK	1
56	11S03A	SCREW SET	6
57	17S04	WASHER SPRING	6
58	7S03	NUT	6
59	513307100	COVER HYD FILLER	1
60	11S02A	SCREW SET	1
61	61S02	NUT BINX	1
62	V2004220	WASHER SPECIAL (NOT ILLUSTRATED)	2
63	V2004201	HOUSING SUPPORT BRACKET-DIESEL ONLY (NOT ILLUSTRATED)	1
64	11S03A	SCREW SET (NOT ILLUSTRATED)	3
65	17S04	WASHER SPRING (NOT ILLUSTRATED)	3
66	7S03	NUT (NOT ILLUSTRATED)	3

200TM TRUNNION AND TILT WHEEL

COAT LOCKING PLUNGER ITEM 27 AND BORE OF ITEM 22 LIBERALLY WITH COPPERSLIP ON ASSEMBLY



THE DOWEL ITEM 2 WILL REQUIRE WELDING INTO THE TRUNNION ON ASSEMBLY

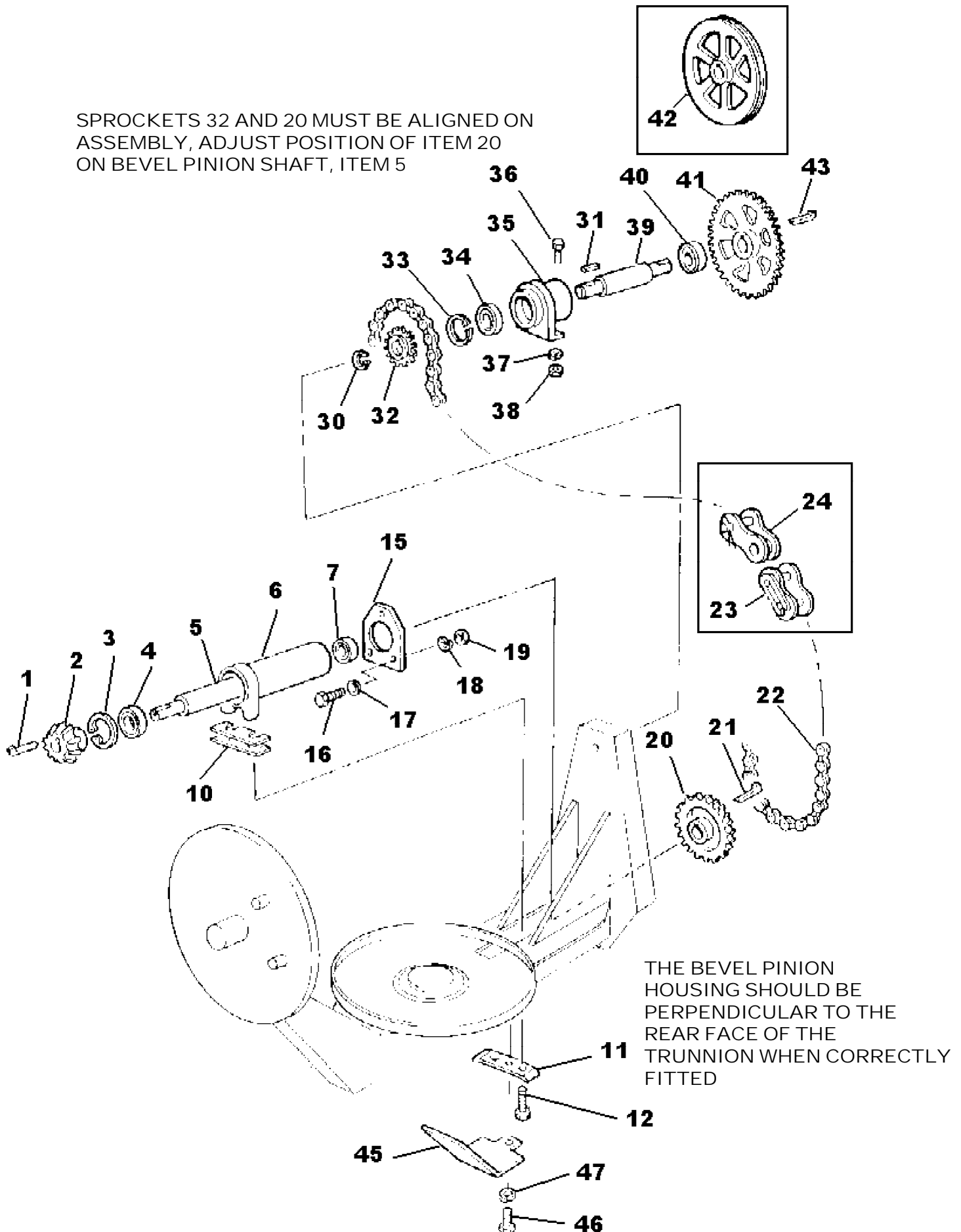
WHEN THE LOCKING PLUNGER ITEM 27 IS INSERTED INTO THE BEARING HOUSING, ITEM 33, THE TRUNNION ITEM 1 SHOULD BE HORIZONTAL IN THE MAINFRAME

200TM TRUNNION + TILT WHEEL

1	513354000	TRUNNION	1
2	513310000	DOWEL	1
3	513316600	COVER REAR CHAIN	1
4	11S02AA	SCREW SET	4
5	17S03	WASHER SPRING	4
6	131S01	NIPPLE GREASE	1
7	176S01	CAP NIPPLE	1
8	315803100	GREASE PLUG	1
10	513316500	GUARD DRUM GEAR	1
11	11S03B	SCREW SET	4
12	17S04	WASHER SPRING	4
13	7S03	NUT	4
15	513316300	GUARD - UPPER	1
16	513316400	GUARD - LOWER	1
17	332719000	NUT SPIRE	10
18	11S02C	SCREW SET	10
19	17S03	WASHER SPRING	10
20	131S02	NIPPLE GREASE 90°	1
21	176S01	CAP NIPPLE	1
22	513323700	INSERT	1
23	513323800	PLATE	2
24	17S06	WASHER SPRING	2
25	7S05	NUT	1
26	513315400	WHEEL TILT	1
27	513194400	PLUNGER LOCKING	1
28	54S01A	PIN ROLL	1
29	304710840	KEY FEATHER	1
30	57S06F1	SCREW GRUB	1
31	11S04E	SCREW SET	4
32	17S05	WASHER SPRING	4
33	513315600	BEARING-TILT WHEEL	1
34	513315900	PLATE	1
35	112803400	BUSH	2
36	513316000	SHAFT TILT WHEEL	1
37	134105107	CHAIN TILT WHEEL	1
38	134105002	LINK CONNECTING	1
39	134105001	LINK HALF	A/R

200TM DRUM DRIVE

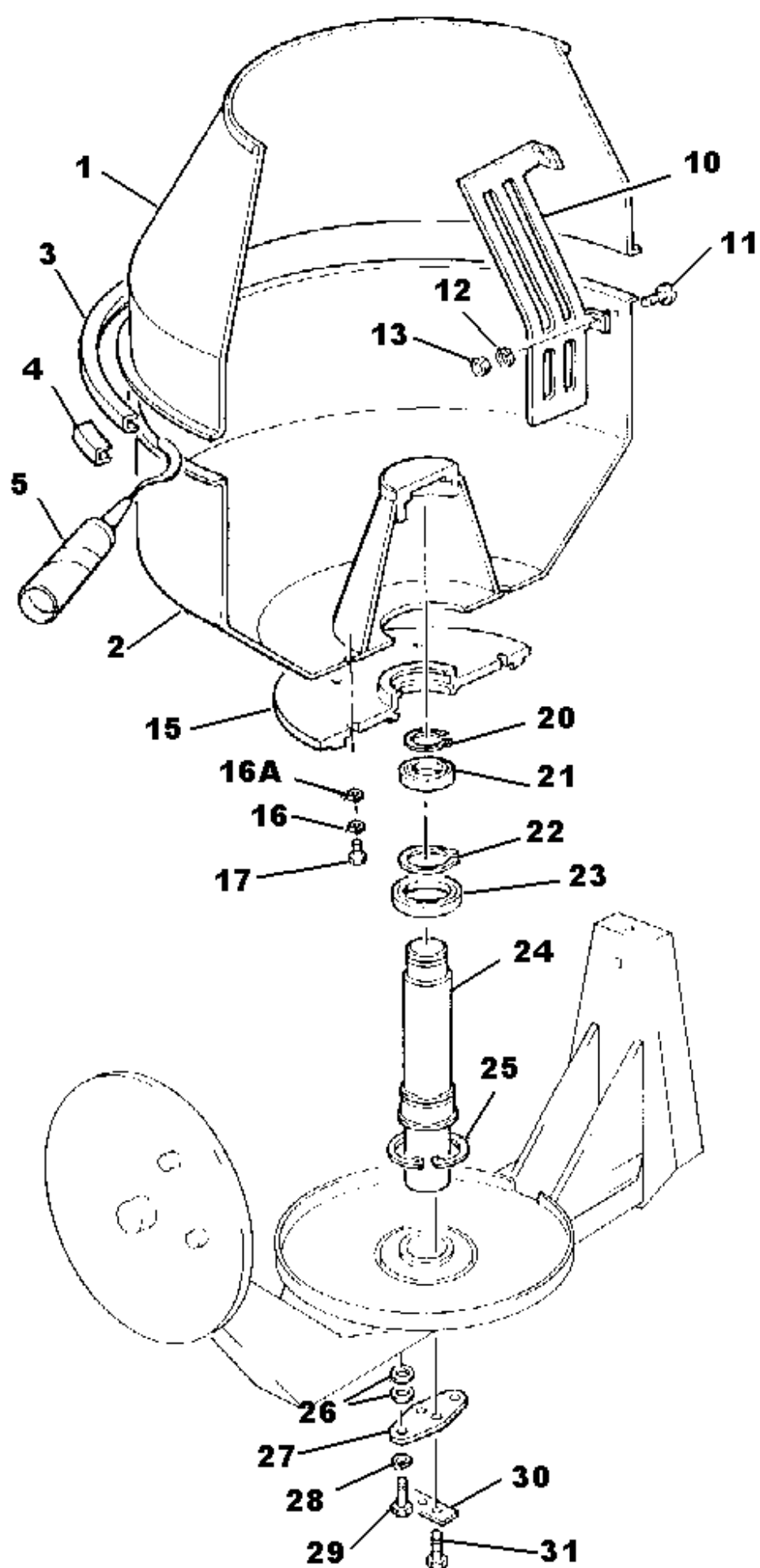
SPROCKETS 32 AND 20 MUST BE ALIGNED ON ASSEMBLY, ADJUST POSITION OF ITEM 20 ON BEVEL PINION SHAFT, ITEM 5



200TM DRUM DRIVE

1	300110845	KEY TAPER GIB HEAD	1
2	513310700	PINION	1
3	132362000	CIRCLIP	1
4	88S05D	BEARING	1
5	513310300	SHAFT	1
6	513305400	HOUSING	1
7	55S15D	BEARING	1
10	513152400	SHIM PACK	1 SET
11	513324400	WASHER LOCK STRIP	1
12	11S05H	SCREW SET	2
15	513298900	PLATE	1
16	11S04C	SCREW SET	2
17	267S06	WASHER FLAT	2
18	17S05	WASHER SPRING	2
19	7S04	NUT	2
20	513305300	SPROCKET	1
21	300110845	KEY TAPER GIB HEAD	1
22	134105070	CHAIN	1
23	134105002	LINK CONNECTING	A/R
24	134105001	LINK HALF	A/R
30	132725000	CIRCLIP	1
31	304708035	KEY FEATHER	1
32	513310500	SPROCKET	1
33	132362000	CIRCLIP	1
34	88S05D	BEARING	1
35	513305500	HOUSING	1
36	11S05F	SCREW SET	2
36A	267S07	WASHER FLAT	2
37	17S06	WASHER SPRING	2
38	7S05	NUT	2
39	513310400	SHAFT COUNTER	1
40	88S15D	BEARING	1
41	513310800	SPROCKET (DIESEL)	1
42	513331800	PULLEY (ELECTRIC)	1
43	300110845	KEY TAPER GIB HEAD	1
45	513211800	GUARD - BEVEL PINION	1
46	66S03AA	SCREW SET	1
47	41S05	WASHER SPRING	1

200TM DRUM ASSEMBLY

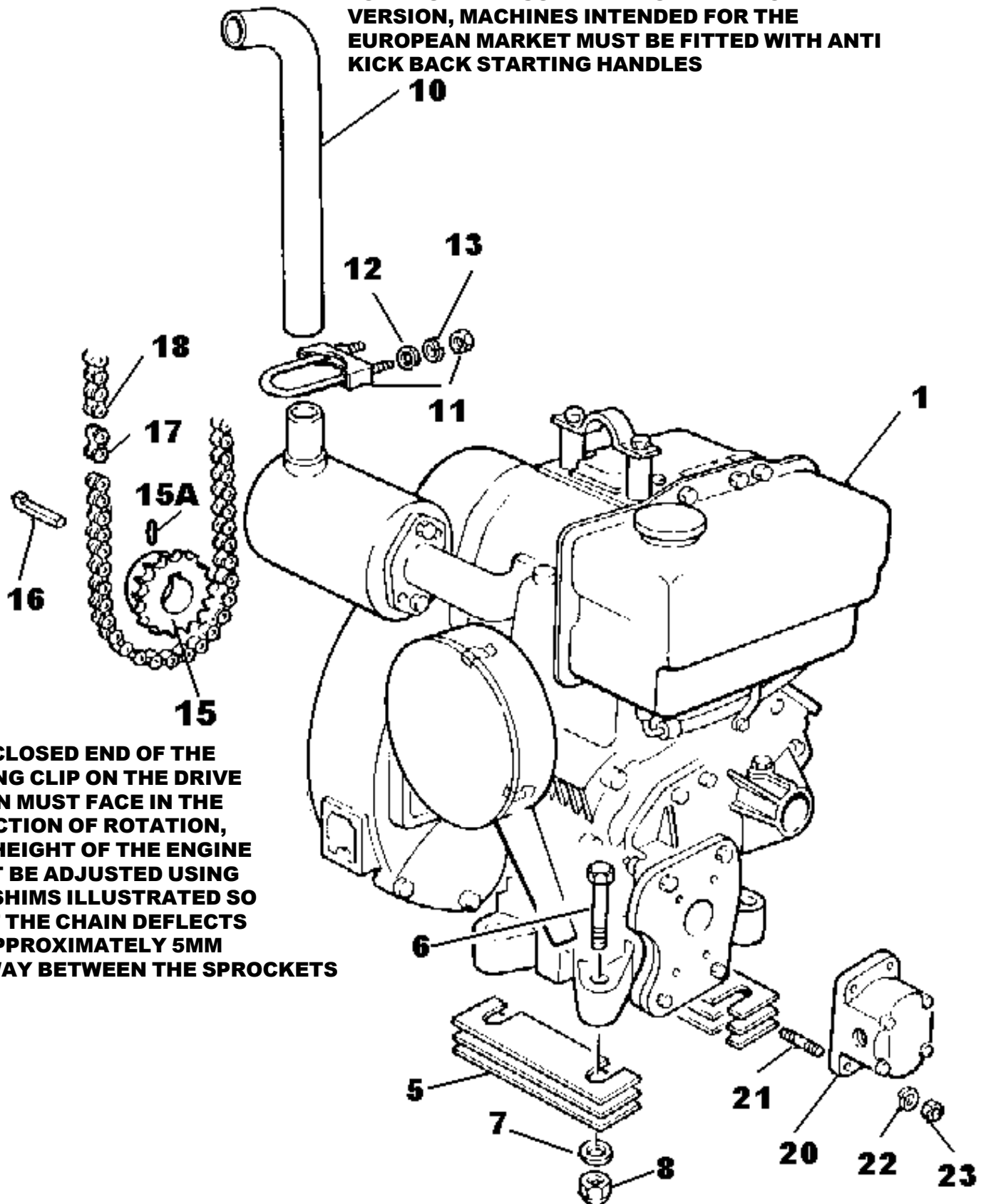


200TM DRUM ASSEMBLY

1	513323902	DRUM TOP	1
2	513324000	DRUM BASE	1
3	513324100	CLIP DRUM	1
4	513324200	BRIDGE PIECE	1
5	V2000772	ADHESIVE FLEXIBLE	1
10	513348200	BLADE (DIESEL- ILLUSTRATED)	2
10	513324300	BLADE (ELECTRIC-NOT ILLUSTRATED)	2
11	16S09D	SCREW SLOTTED	8
12	17S05	WASHER SPRING	8
13	7S04	NUT	8
15	513305200	GEAR	8
16	17S06	WASHER SPRING	6
16A	267S07	WASHER FLAT	6
17	11S05D	SCREW SET	6
20	132760000	CIRCLIP	1
21	88S42D	BEARING	1
22	132775000	CIRCLIP	1
23	88S45D	BEARING	1
24	513310100	SHAFT DRUM	1
25	132313000	CIRCLIP	1
26	267S09	WASHER FLAT	A/R
27	513310600	PLATE	1
28	17S08	WASHER SPRING	2
29	11S06H	SCREW SET	2
30	513326300	WASHER LOCKING STRIP	1
31	11S06E	SCREW SET	2

200TM LISTER-PETTER TR1

TS1 ENGINE ILLUSTRATED IS THE EXPORT VERSION, MACHINES INTENDED FOR THE EUROPEAN MARKET MUST BE FITTED WITH ANTI KICK BACK STARTING HANDLES



THE CLOSED END OF THE SPRING CLIP ON THE DRIVE CHAIN MUST FACE IN THE DIRECTION OF ROTATION, THE HEIGHT OF THE ENGINE MUST BE ADJUSTED USING THE SHIMS ILLUSTRATED SO THAT THE CHAIN DEFLECTS BY APPROXIMATELY 5MM MIDWAY BETWEEN THE SPROCKETS

SEAL THE HYDRAULIC PUMP TO THE ENGINE USING A GOOD QUALITY JOINTING COMPOUND

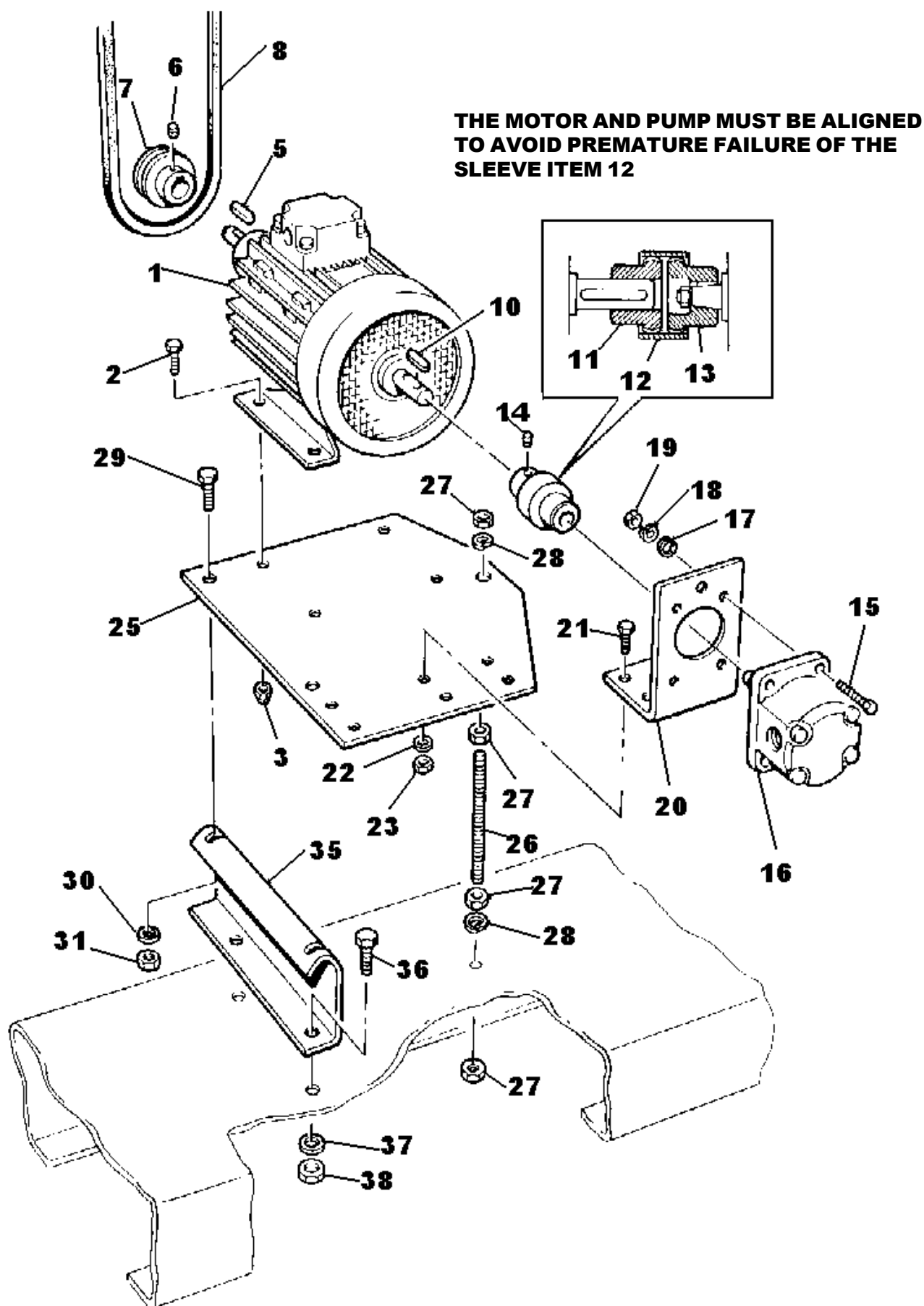
200TM LISTER-PETTER TR1 & HYD PTO (NOT DIRECT DRIVE)

1	V2001661 (NO ANTI KICK BACK)	ENGINE TR1-06 HS (EXPORT)	1
1A	V2001660 (NO ANTI KICK BACK)	ENGINE TR1-ES (EXPORT)	1
1B	V2004279 (ANTI KICK BACK)	ENGINE TR1-06 HS (UK/EEC)	1
1C	V2004394 (ANTI KICK BACK)	ENGINE TR1-ES (UK/EEC)	1
5	513348400	SHIMS	1 SET
6	8S05L	BOLT	4
7	267S07	WASHER FLAT	4
8	59S04	NUT NYLOC	4
10	513347900	PIPE EXHAUST	1
11	153S08	CLAMP EXHAUST PIPE	1
12	267S05	WASHER FLAT	2
13	17S04	WASHER SPRING	2
15	513348300	SPROCKET	1
15A	57S05D2	SCREW GRUB	1
16	304312050	KEY GIB HEAD	1
17	134105102	CHAIN	1
18	134105002	LINK CONNECTING	A/R
18A	134105001	LINK HALF	A/R
20	10977A03	HYDRAULIC PUMP, CLOCKWISE ROTATION	1
21	SUPPLIED WITH	STUD	4
22	ENGINE ACESSORY	WASHER SPRING	4
23	KIT	NUT	4

FOLLOWING ITEMS USED ON UK-EEC SPEC MACHINES

24	241904000	SOCKET 1/2" BSP OIL DRAIN	1
25	513359800	PIPE 1/2" BSP OIL DRAIN	1

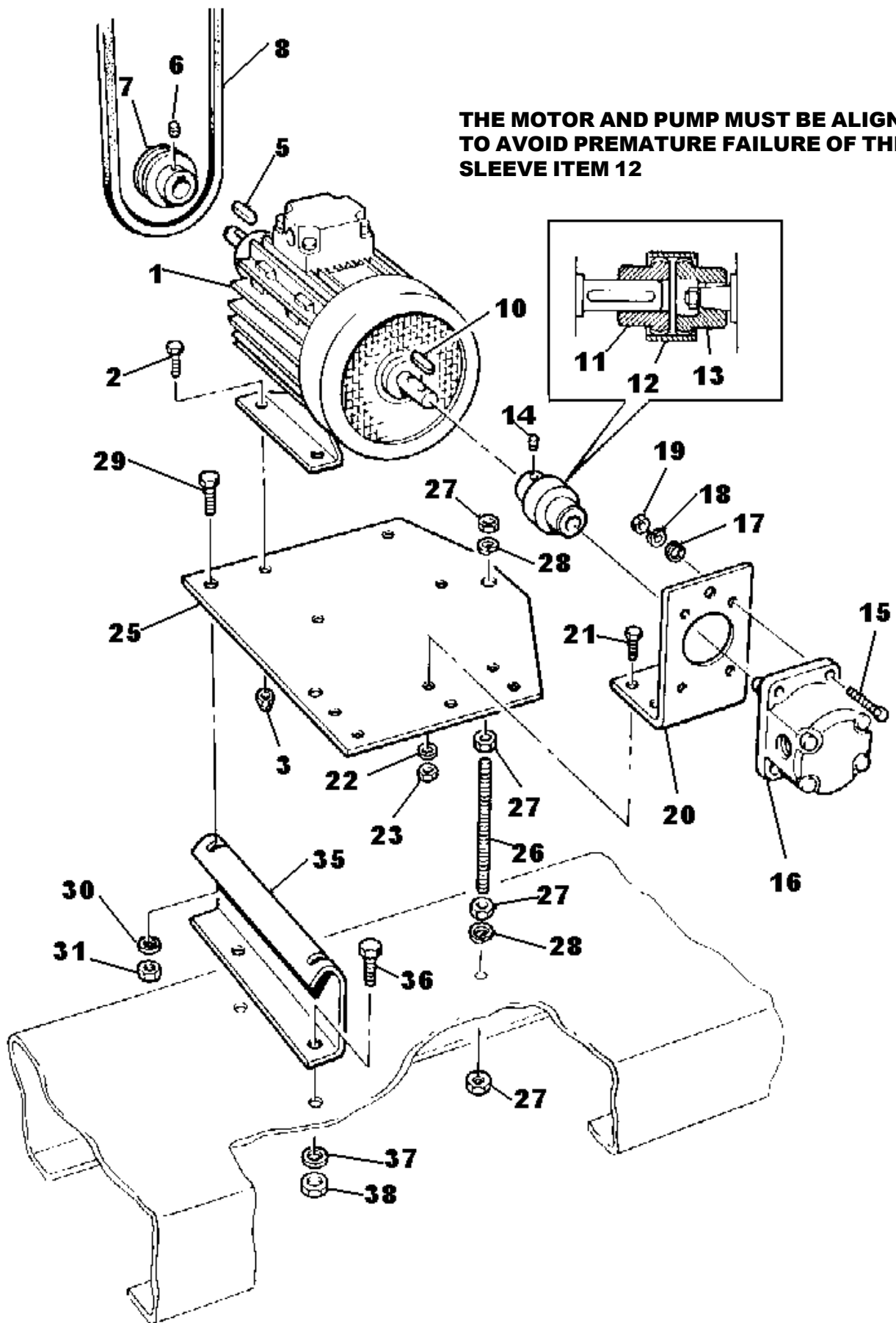
200TM 415 VOLT ELECTRIC MOTOR STAR DELTA



200TM ELECTRIC MOTOR 415V & DRIVE STAR DELTA

1	202440000	MOTOR ELECTRIC 415V STAR DELTA	1
2	8S04D	BOLT	4
3	59S03	NUT NYLOC	4
5	304710840	KEY PARALLEL	1
6	57S04D2	SCREW GRUB	1
7	513334700	PULLEY VEE	1
8	397400100	BELT VEE	1
10	304710840	KEY PARALLEL	1
11	147320500	COUPLING DRIVE HALF	1
12	147320303	SLEEVE COUPLING	1
13	513332900	COUPLING PUMP HALF	1
14	57S05C1	GRUB SCREW (FITTED IN COUPLING)	
15	10977A05	PUMP	1
16	8S02C	BOLT	1
17	267S04	WASHER FLAT	4
18	17S03	WASHER SPRING	4
19	7S02	NUT	4
20	513332800	PLATE MOUNT PUMP	1
21	11S03C	SCREW SET	4
22	267S05	WASHER FLAT	4
23	61S03	NUT BINX	4
25	513332600	PLATE MOUNT MOTOR	1
26	513333100	STUD	1
27	7S05	NUT	4
28	17S06	WASHER SPRING	2
29	8S05E	BOLT	2
30	267S07	WASHER FLAT	2
31	59S04	NUT NYLOC	2
35	513332700	SUPPORT MOUNT MOTOR	1
36	11S05D	SCREW SET	2
37	267S07	WASHER FLAT	2
38	59S04	NUT NYLOC	2

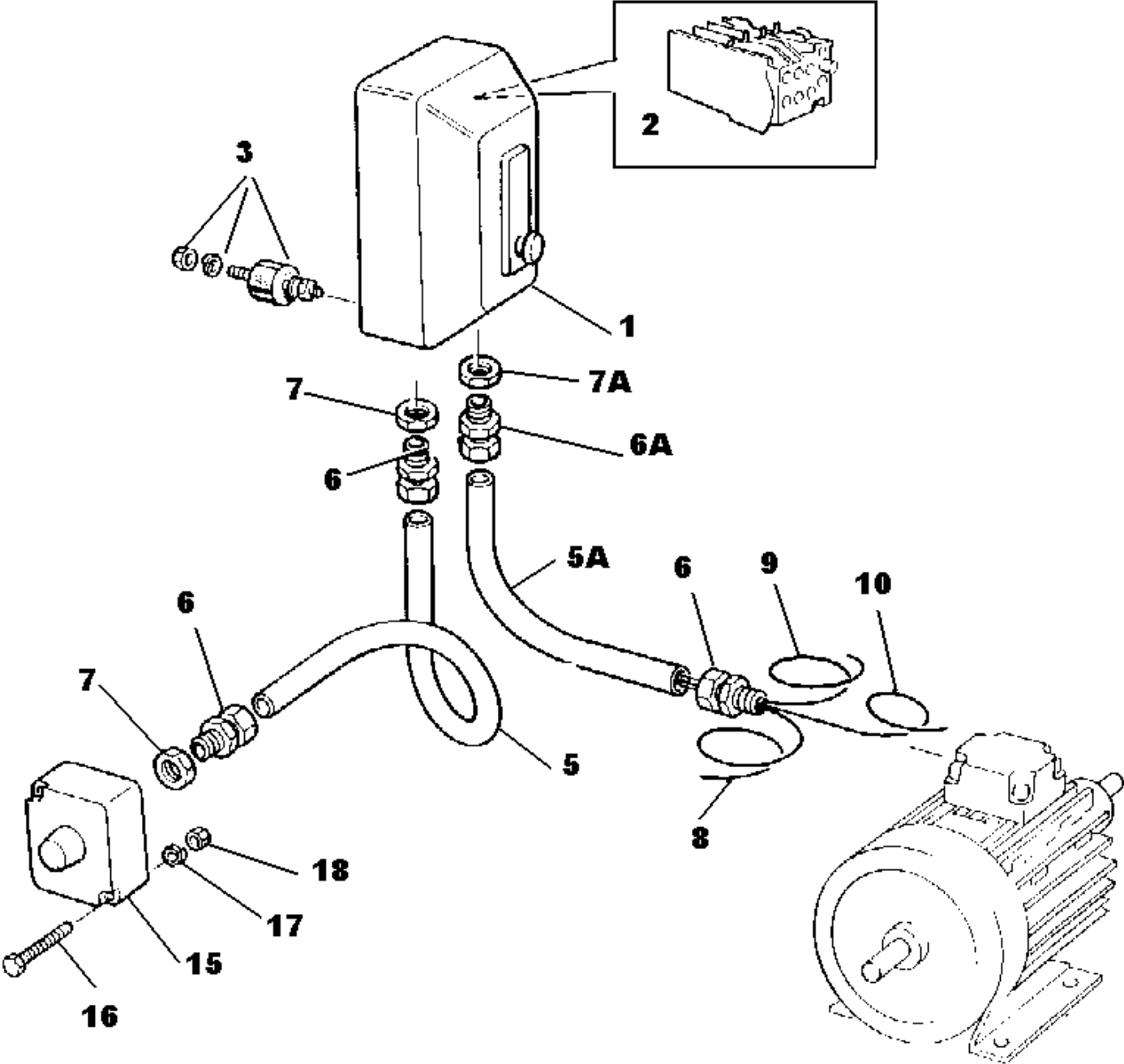
200TM 415 VOLT ELECTRIC MOTOR DIRECT ON LINE



200TM ELECTRIC MOTOR 415V & DRIVE DIRECT ON LINE

1	202450000	MOTOR ELECTRIC 415V DIRECT ON LINE	1
2	8S04D	BOLT	4
3	59S03	NUT NYLOC	4
5	304710840	KEY PARALLEL	1
6	57S04D2	SCREW GRUB	1
7	513334700	PULLEY VEE	1
8	397400100	BELT VEE	1
10	304710840	KEY PARALLEL	1
11	147320500	COUPLING DRIVE HALF	1
12	147320303	SLEEVE COUPLING	1
13	513332900	COUPLING PUMP HALF	1
14	57S05C1	GRUB SCREW (FITTED IN COUPLING)	
15	10977A05	PUMP	1
16	8S02C	BOLT	1
17	267S04	WASHER FLAT	4
18	17S03	WASHER SPRING	4
19	7S02	NUT	4
20	513332800	PLATE MOUNT PUMP	1
21	11S03C	SCREW SET	4
22	267S05	WASHER FLAT	4
23	61S03	NUT BINX	4
25	513332600	PLATE MOUNT MOTOR	1
26	513333100	STUD	1
27	7S05	NUT	4
28	17S06	WASHER SPRING	2
29	8S05E	BOLT	2
30	267S07	WASHER FLAT	2
31	59S04	NUT NYLOC	2
35	513332700	SUPPORT MOUNT MOTOR	1
36	11S05D	SCREW SET	2
37	267S07	WASHER FLAT	2
38	59S04	NUT NYLOC	2

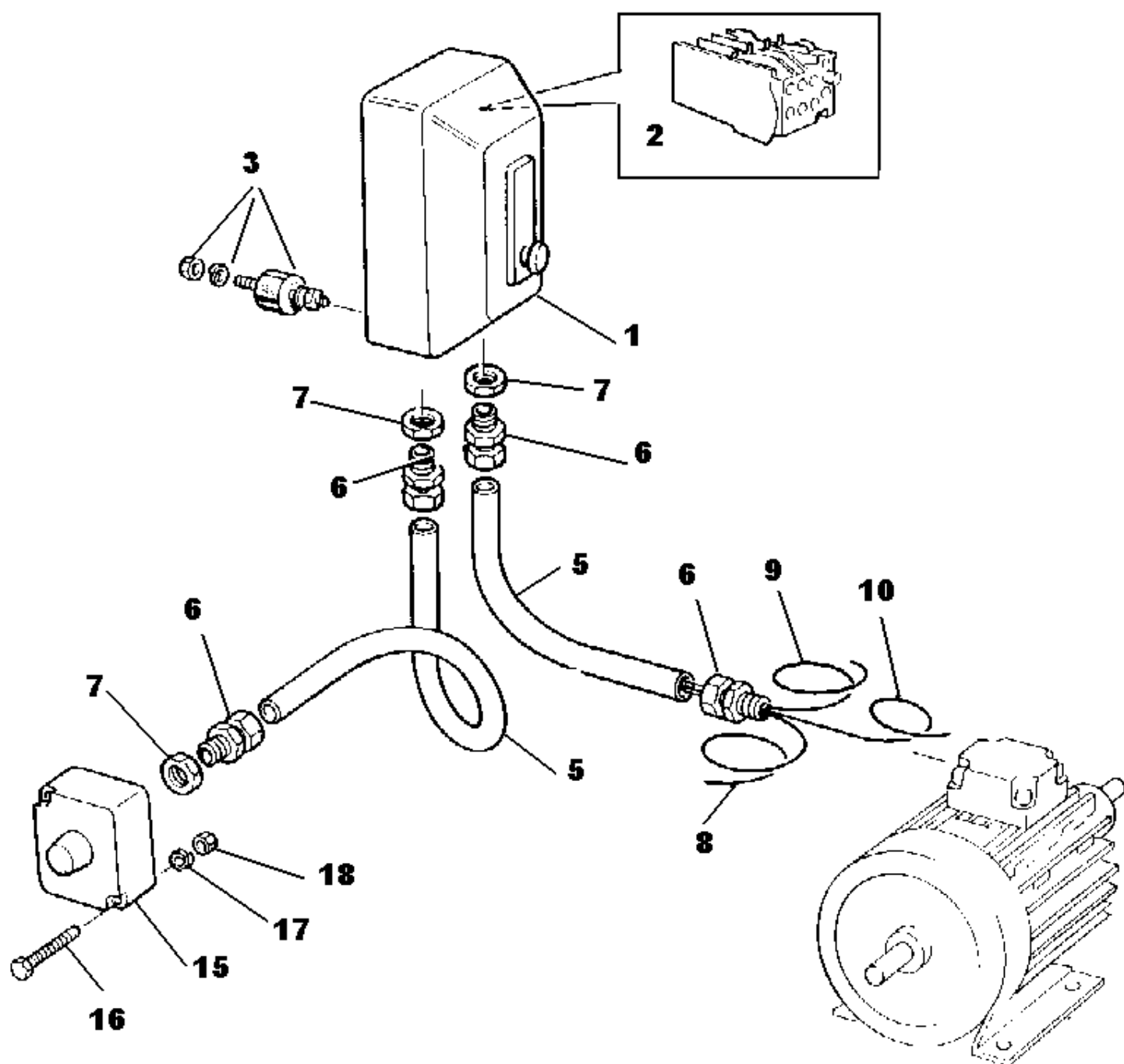
200TM 415 VOLT START/STOP SWITCH STAR DELTA



200TM START/STOP SWITCH 415V 3PH STAR DELTA

1	208304103	SWITCH - START/STOP STAR DELTA	1
2	208304107	RELAY OVERLOAD 4.5/7.5a STAR DELTA	4
3	013203000	MOUNTING C/W NUTS	4
5	131770010	TUBE CONDUIT 20MM	.75 METRES
5A	131736000	TUBE CONDUIT 25MM	.75 METRES
6	131271000	COUPLING KOPEX 20MM	2
6A	131272000	COUPLING KOPEX 25MM	2
7	56S07	NUT BACK - THIN	2
7A	133275050	NUT BACK - THIN	1
8	144797000	CABLE RED	1 METRE
9	144799000	CABLE GREEN/YELLOW	1 METRE
10	144798000	CABLE BLACK	1 METRE
15	208870000	SWITCH STOP	1
16	16S06H	SCREW SET	2
17	17S02	WASHER SPRING	2
18	7S01	NUT	2
19	131593025	CONVERTER B/PG21-M25/TC (NOT ILLUSTRATED)	1

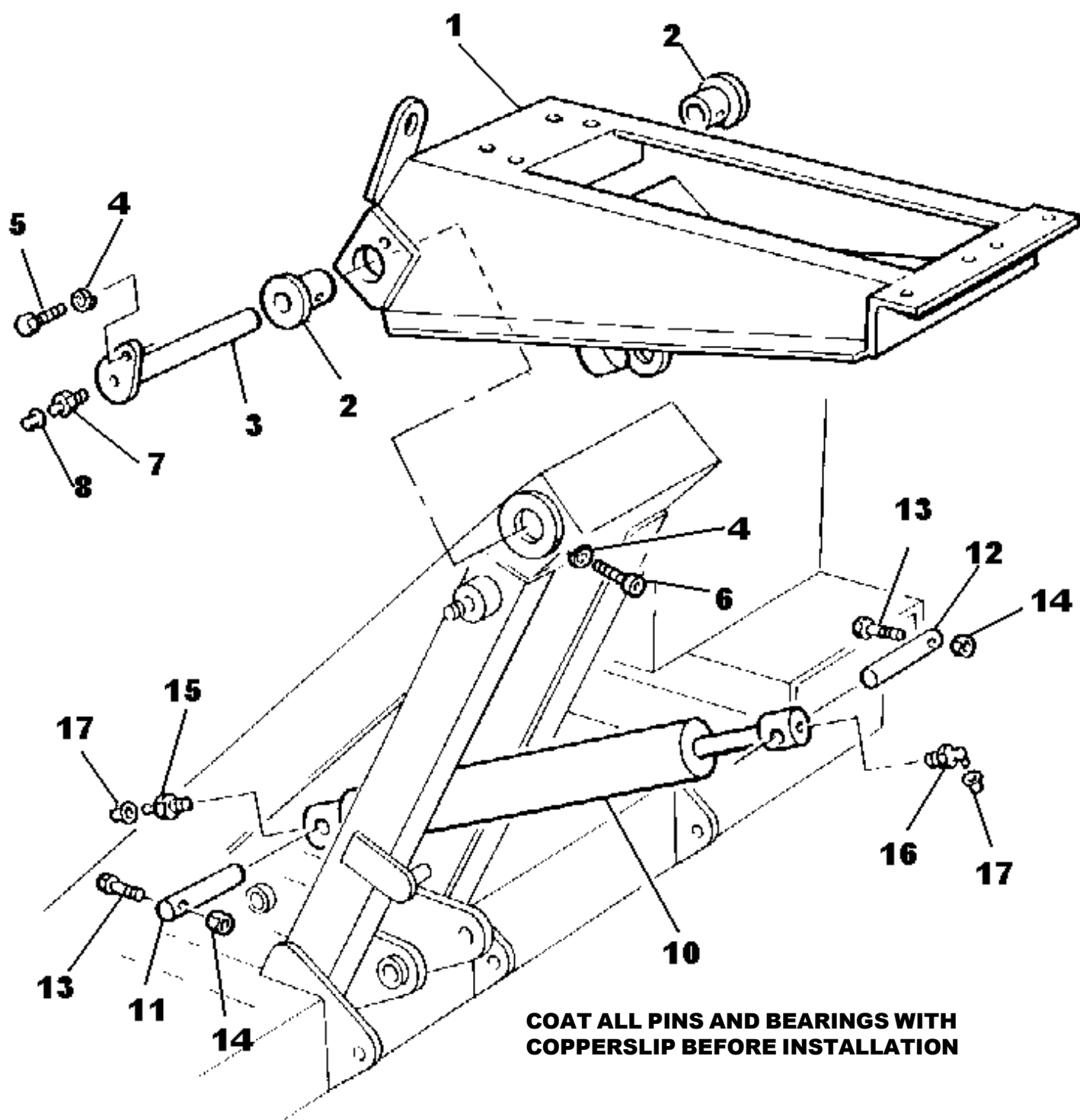
200TM 415 VOLT START/STOP SWITCH DIRECT ON LINE



200TM START/STOP SWITCH 415V 3PH DIRECT ON LINE

1	208304109	SWITCH - START/STOP DIRECT ON LINE	1
2	208304108	RELAY OVERLOAD DIRECT ON LINE	1
3	013203000	MOUNTING C/W NUTS	3
5	131770010	TUBE CONDUIT 20MM	1.5 METRE
6	131271000	COUPLING KOPEX 20MM	4
7	56S07	NUT BACK - THIN M20	4
8	144797000	WIRE RED	1.5 METRE
9	144799000	WIRE GREEN/YELLOW	1.5 METRE
10	144798000	WIRE BLACK	1.5 METRE
15	208880000	SWITCH STOP	1
16	11S01D	SCREW SET	2
17	17S02	WASHER SPRING	2
18	7S01	NUT	2
19	131593025	CONVERTER B/PG21-M25/TC (NOT ILLUSTRATED)	1

200TM HOPPER CRADLE BASIC NON WEIGHER

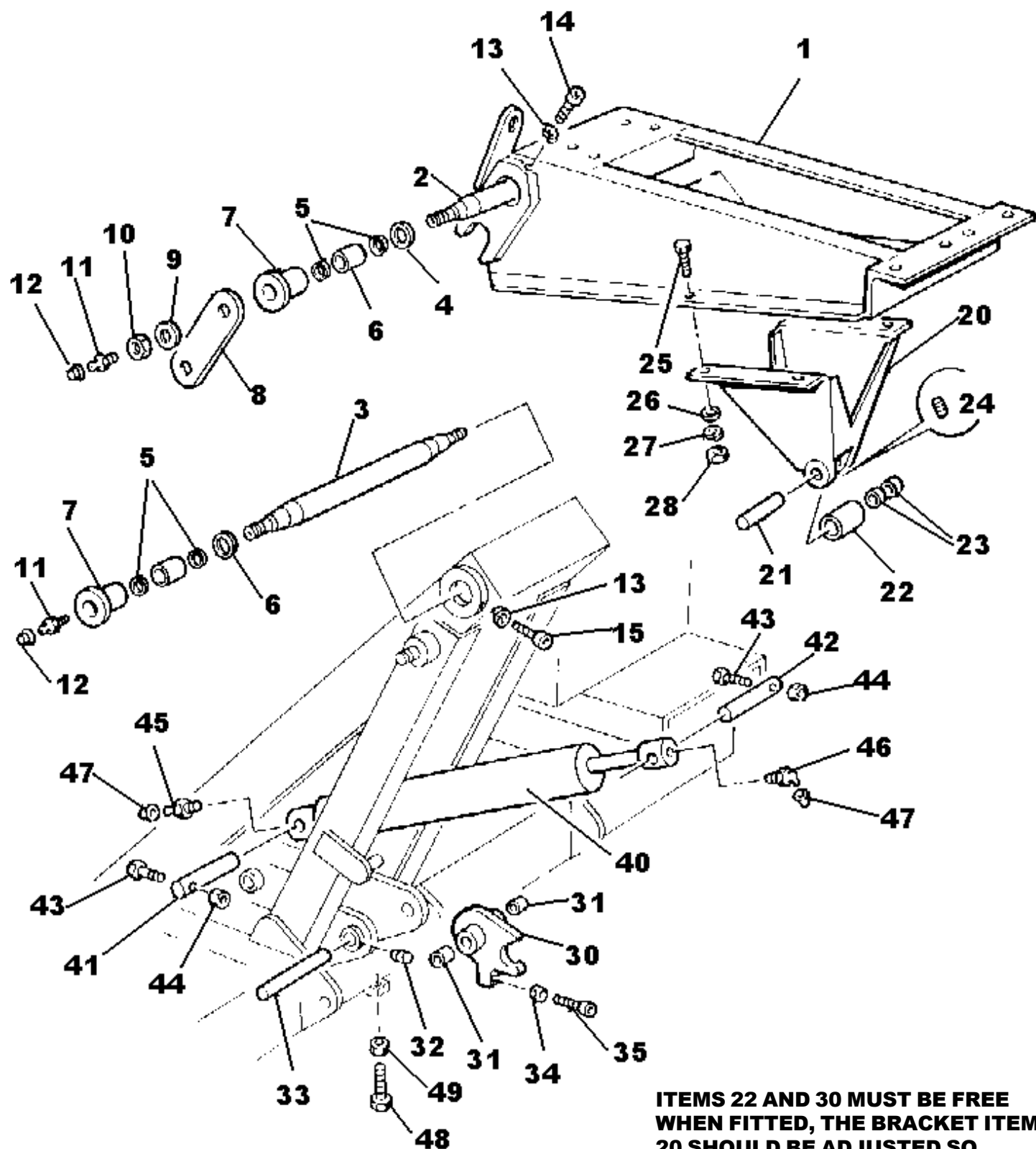


200TM HOPPER CRADLE NON WEIGHER

1	513311800	CRADLE NON WEIGHER	1
2	513312600	BEARING	2
3	513312700	PIN PIVOT HOPPER	1
4	17S04	WASHER SPRING	3
5	11S03A	SCREW SET	1
6	68S04D	SCREW SPROCKET HD CAP	2
7	131S01	NIPPLE GREASE	2
8	17601	CAP NIPPLE	2
10	513369100	HOPPER RAM, METRIC	1
11	513312900	PIN RAM LOWER	1
12	513313000	PIN RAM UPPER	1
13	8S03F	BOLT	2
14	61S03	NUT BINX	2
15	131S01	NIPPLE GREASE	1
16	131S02	NIPPLE GREASE 90 ⁰	1
17	176S01	CAP NIPPLE	2

200TM HOPPER CRADLE BATCHWEIGHER

**COAT ALL PINS AND BUSHES WITH COPPERSLIP
ON ASSEMBLY**

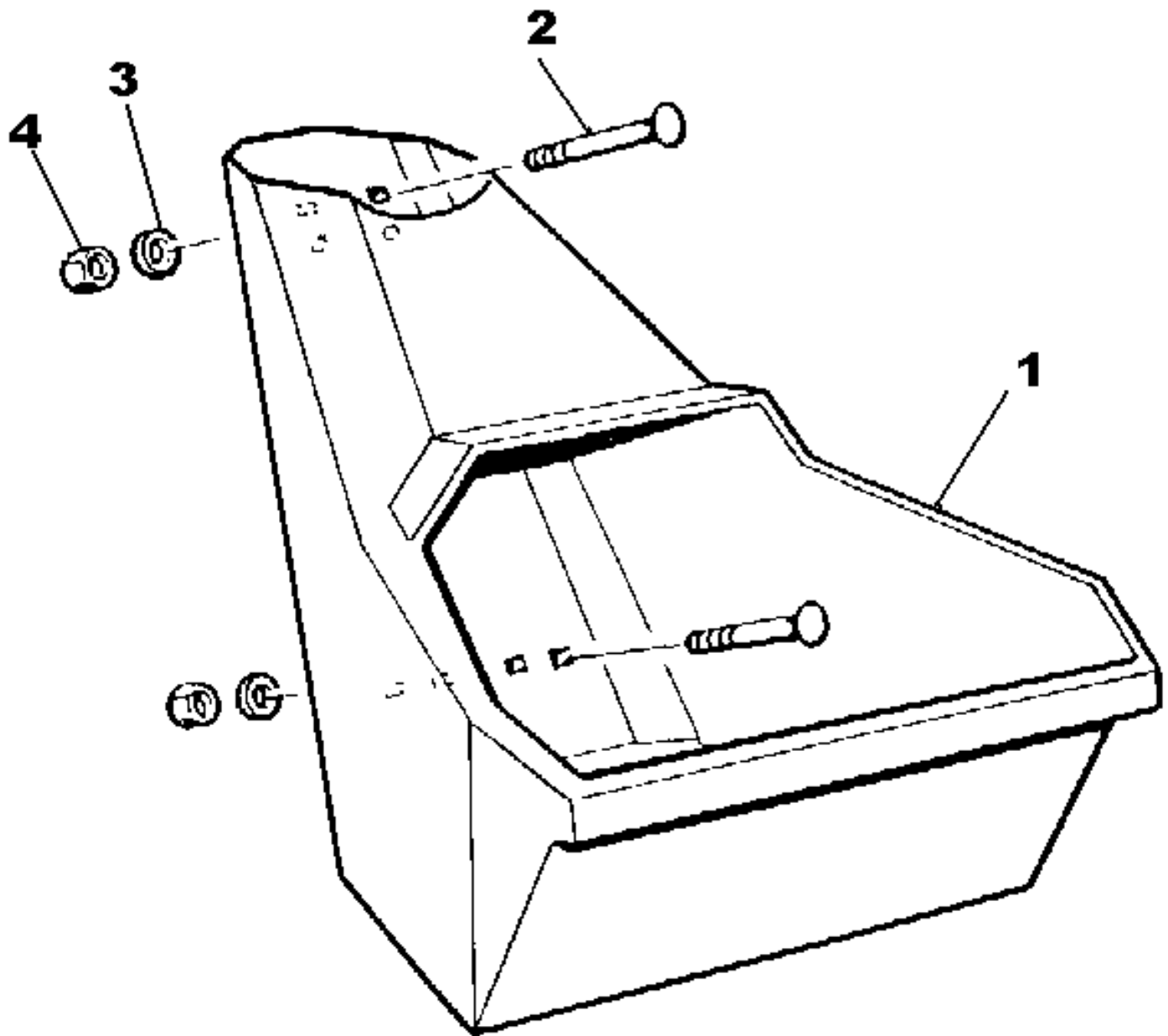


**ITEMS 22 AND 30 MUST BE FREE
WHEN FITTED, THE BRACKET ITEM
20 SHOULD BE ADJUSTED SO
THAT THE ROLLER ITEM 22
ENGAGES WITH THE PIVOT ITEM
30 WHEN THE HOPPER IS FULLY
LOWERED**

200TM HOPPER CRADLE WEIGHER

1	513317500	CRADLE WEIGHER	1
2	513316700	SHAFT CRADLE	1
3	513316800	SHAFT HOPPER	1
4	513328800	WASHER	4
5	417705600	SEAL	8
6	113179100	BEARING NEEDLE	4
7	513317100	CARRIER	4
8	513316900	LINK WEIGHER	2
9	267S12	WASHER FLAT	4
10	7S08	NUT	4
11	131S01	NIPPLE GREASE	4
12	176S01	CAP NIPPLE	4
13	17S04	WASHER SPRING	4
14	68S04C	SCREW SOCKET CAP	2
15	68S04D	SCREW SOCKET CAP	2
20	513322200	BRACKET - CRADLE	1
21	513317400	PIN	1
22	513317200	ROLLER	1
23	112753000	BUSH	2
24	57S05E2	GRUB SCREW	1
25	11S05C	SCREW SET	4
26	267S07	WASHER FLAT	4
27	61S05	NUT BINX	4
30	513321000	PIVOT	1
31	112753000	BUSH	2
32	57S05E2	SCREW GRUB	1
33	513317300	PIN	1
34	56S06	NUT LOCK THIN	1
35	68S08M	SCREW SOCKET CAP	1
40	513369100	RAM HOPPER, METRIC	1
41	513312900	PIN RAM LOWER	1
42	513313000	PIN RAM UPPER	1
43	8S03F	BOLT	2
44	61S03	NUT BINX	2
45	131S01	NIPPLE GREASE	1
46	131S02	NIPPLE GREASE 90°	1
47	176S01	CAP NIPPLE	2

200TM HOPPER

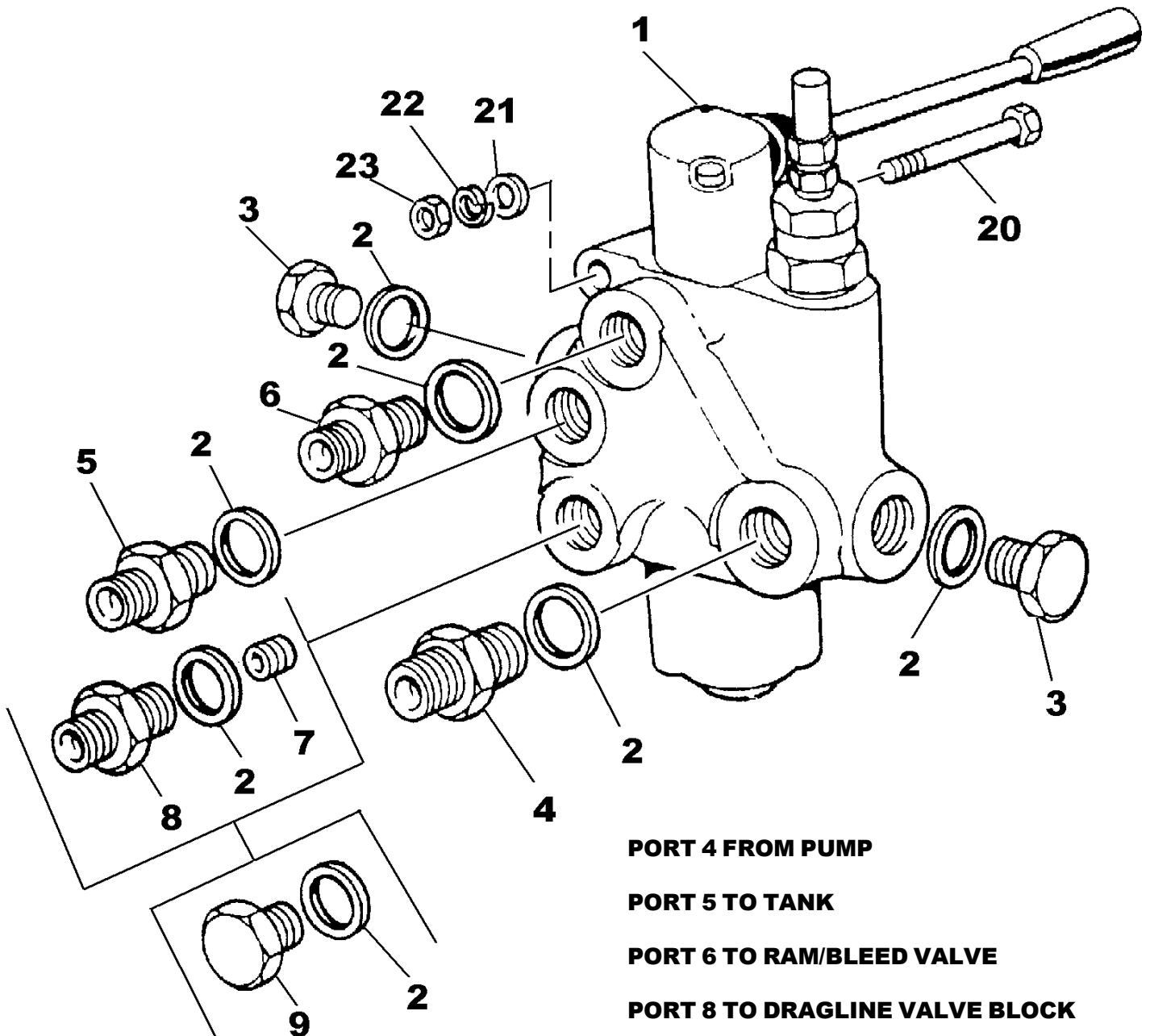


200TM HOPPER

1	513310900	HOPPER ASSEMBLY	1
2	172S05D	BOLT COACH	8
3	267S07	WASHER FLAT	8
4	61S05	NUT BINX	8

200TM HYDRAULIC CONTROL VALVE MHS-DINOIL

THE HYDRAULIC PRESSURE SHOULD BE ADJUSTED TO 2000PSI (138 BAR)



PORT 4 FROM PUMP

PORT 5 TO TANK

PORT 6 TO RAM/BLEED VALVE

PORT 8 TO DRAGLINE VALVE BLOCK

IF NO DRAGLINE IS FITTED PORT 8 IS PLUGGED WITH ITEM 9. WHEN A DRAGLINE IS FITTED, ITEM 7, THE H.P.C.O. SHOULD BE SCREWED FULLY HOME INTO THE VALVE PORT FOLLOWED BY THE ADAPTOR AND BONDED SEAL ITEMS 8 AND 2. THE THREADS ON ALL THE ADAPTORS MUST COATED WITH HYDRAULIC SEALER ON ASSEMBLY TO PREVENT OIL LEAKS

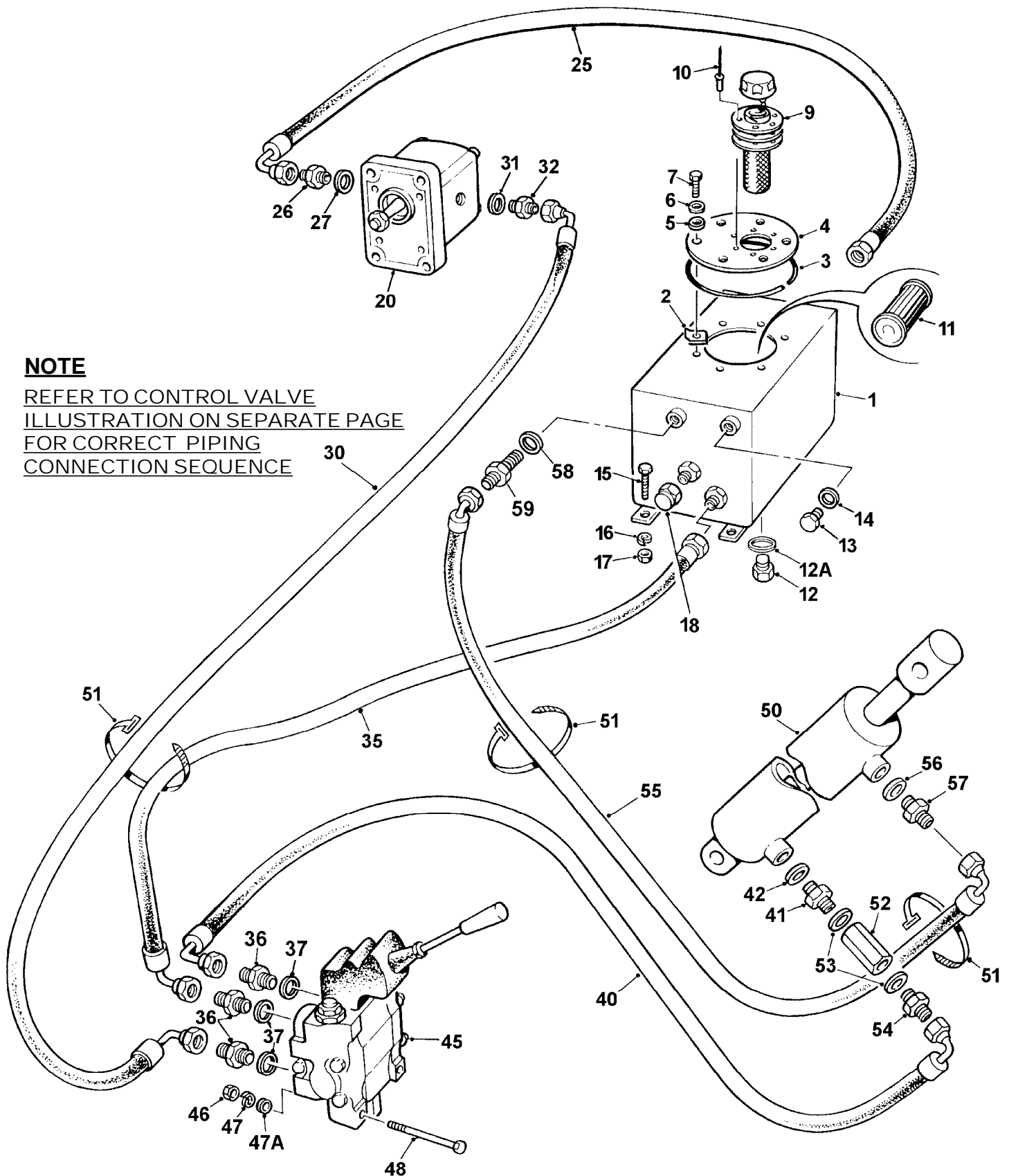
200TM HYDRAULIC CONTROL VALVE MHS

1	V2004605	VALVE CONTROL	1
2	100S03	SEAL BONDED	6
3	127S03	PLUG BLANK	
4	122S03	ADAPTOR M/M FROM PUMP	1
5	122S03	ADAPTOR M/M TO TANK	1
6	122S03	ADAPTOR M/M TO RAM	1
7	V2004607	SCREW SOCKET HEAD H.P.C.D. FIT INSIDE VALVE WHEN DRAGLINE FITTED	1
8	122S03	ADAPTOR M/M WHEN DRAGLINE FITTED	1
9	127S03	PLUG BLANKING WHEN NO DRAGLINE FITTED	1
20	8S03H	BOLT	2
21	267S05	WASHER FLAT	2
22	17S04	WASHER SPRING	2
23	7S03	NUT	2

200TM BASIC HYDRAULIC CIRCUIT

NOTE

REFER TO CONTROL VALVE
ILLUSTRATION ON SEPARATE PAGE
FOR CORRECT PIPING
CONNECTION SEQUENCE

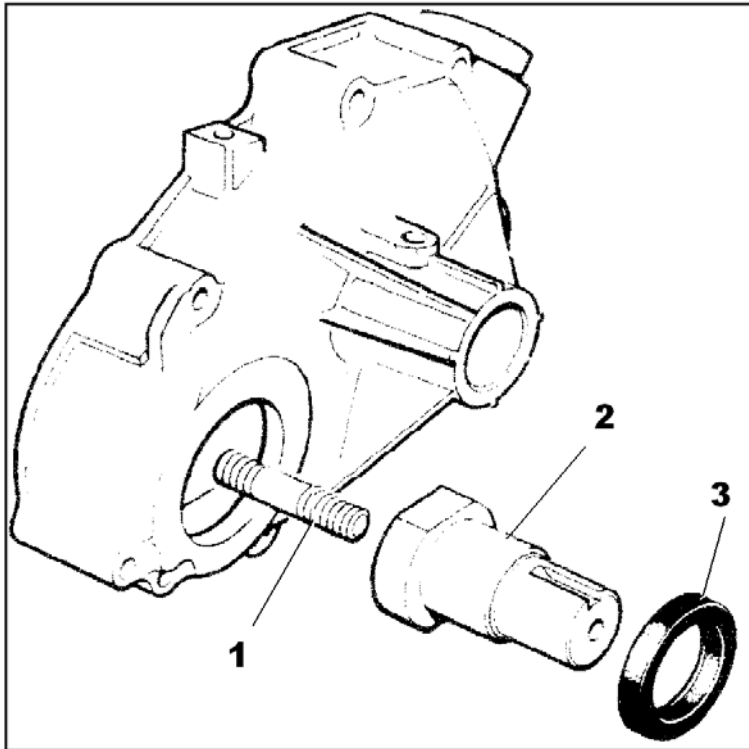


THE HOSE FAILURE VALVE, ITEM 52 IS ONLY FITTED TO EUROPEAN SPEC 'CE' MARKED MODELS. THE VALVE MUST BE SET BEFORE INSTALLATION, REFER TO THE ASSEMBLY PROCEDURES AT THE BEGINNING OF THIS MANUAL.

200TM BASIC HYDRAULIC CIRCUIT

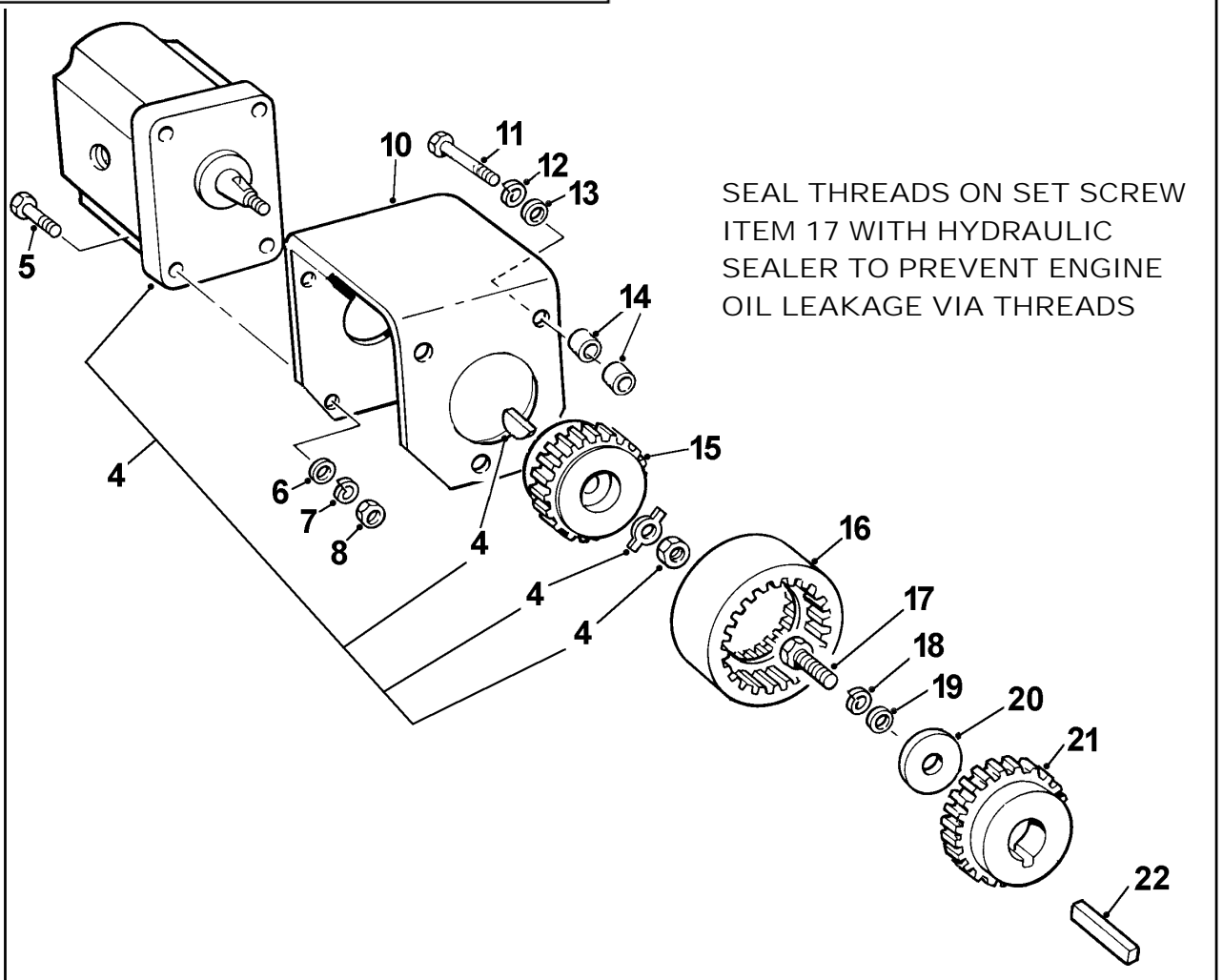
1	513305800	TANK OIL	1
2	332719000	NUT SPIRE	6
3	417735000	GASKET STRIP	1 METRE
4	513306400	LID TANK	1
5	186S02	WASHER SELON	6
6	267S04	WASHER FLAT	6
7	11S02A	SCREW SET	6
9	10565A01	FILLER/BREATHER	1
10	101S07E	RIVET POP	6
11	220592000	STRAINER	1
12	127S02	PLUG, OIL DRAIN	1
12A	100S02	SEAL BONDED	1
13	127S02	PLUG (NON WEIGHER)	1
14	100S02	SEAL BONDED	1
15	11S03A	SCREW SET	4
16	17S04	WASHER SPRING	4
17	7S03	NUT	4
18	120S02	CAP BLANKING	1
20	10977A03	PUMP HYDRAULIC C/R (NOT DIRECT DRIVE TR1 ENGINES)	1
25	V2003289	HOSE TANK TO PUMP (DIESEL)	1
25	31S03Q	HOSE TANK TO PUMP (ELECTRIC)	1
26	122S04	ADAPTOR	1
27	100S04	SEAL BONDED	1
30	513329800	HOSE PUMP TO CONTROL VALVE	1
31	100S04	SEAL BONDED	1
32	119S08	ADAPTOR M/M	1
35	31S02G	HOSE CONTROL VALVE TO TANK	1
36	122S03	ADAPTOR M/M	3
37	100S03	SEAL BONDED	3
40	36S02Z	HOSE CONTROL VALVE-RAM	1
41	122S03	ADAPTOR M/M	1
42	100S03	SEAL BONDED 3/8	1
45	V2004605	VALVE CONTROL MHS	1
46	7S03	NUT	2
47	17S04	WASHER SPRING	2
47A	267S05	WASHER FLAT	2
48	8S03H	BOLT	2
50	513369100	RAM HOPPER (METRIC)	1
51	V2003253	TIE CABLE NYLON	4
52	V2004171	VALVE HOSE FAILURE EC SPEC MODELS ONLY	1
53	100S03	SEAL BONDED	2
54	122S03	ADAPTOR	1
55	53S01D	HOSE, RETURN TO TANK	1
56	100S03	SEAL BONDED 3/8	1
57	119S03	ADAPTOR 3/8 X 1/4 BSP	1
58	100S02	SEAL BONDED 1/4	1
59	122S02	ADAPTOR 1/4 X1/4 BSP	1

200TM DIRECT DRIVE HYDRAULIC PUMP



ENSURE THE EXTENSION SHAFT, ITEM 2 IS SEATED FULLY DOWN ON THE FACE OF THE CRANKSHAFT WHEN TIGHTENED ONTO THE STUD, ITEM 1.

OIL SEAL SHOULD BE FITTED FLUSH WITH FACE OF GEAR COVER



SEAL THREADS ON SET SCREW ITEM 17 WITH HYDRAULIC SEALER TO PREVENT ENGINE OIL LEAKAGE VIA THREADS

200TM DIRECT DRIVE HYDRAULIC PUMP

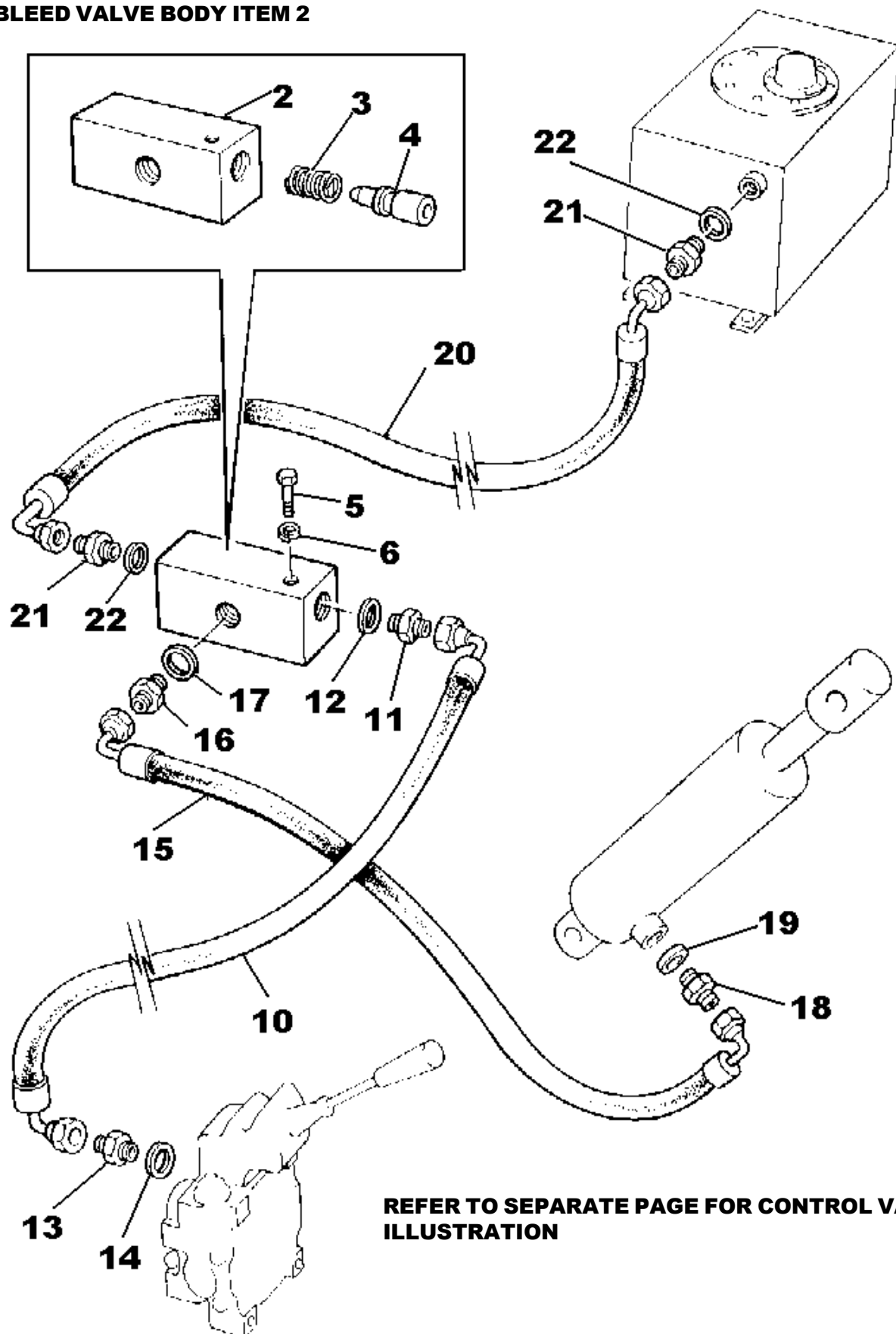
1	V2006390	STUD, MAKE FROM EL201-31930	1
2	V2006381	ENGINE CRANKSHAFT EXTENSION SHAFT, PUMP DRIVE	1
3	417732500	OIL SEAL, GEAR COVER, MAY ALREADY BE INSTALLED	1
4	10977A06	PUMP HYDRAULIC ANTI-CLOCKWISE	1
5	8S02C	BOLT M8 X 35	4
6	267S04	WASHER FLAT	4
7	17S03	WASHER SPRING	4
8	7S02	NUT	4
10	V2006385	BRACKET PUMP MOUNTING	1
11	8S03N	BOLT, M8 X 90	3
12	17S04	WASHER SPRING	3
13	267S05	WASHER FLAT	3
14	513340800	SPACER, TWO PER BOLT BETWEEN BRACKET & GEAR COV	6
15	V2006389	COUPLING ASSEMBLY, CONSISTS OF ITEMS 15, 16 & 21	1
17	11S03B	SCREW SET	1
18	17S04	WASHER SPRING	1
19	267S05	WASHER FLAT	1
20	V2004220	WASHER SPECIAL, FLAT	1
22	305110550	KEY, PARALLEL, CUT TO SIZE TO MAKE TWO KEYS	1

THE FOLLOWING PARTS ARE NOT ILLUSTRATED

23	V2006388	GUARD, COUPLING	1
24	11S03B	SCREW SET	1
25	17S04	WASHER SPRING	1
26	267S05	WASHER FLAT	1

200TM HYDRAULIC CIRCUIT BATCHWEIGHER

REFER TO THE ASSEMBLY INSTRUCTIONS IN THE FRONT OF THIS MANUAL AND USE THE SPECIAL TOOL TO ENSURE A GOOD SEAT IS FORMED IN THE BLEED VALVE BODY ITEM 2



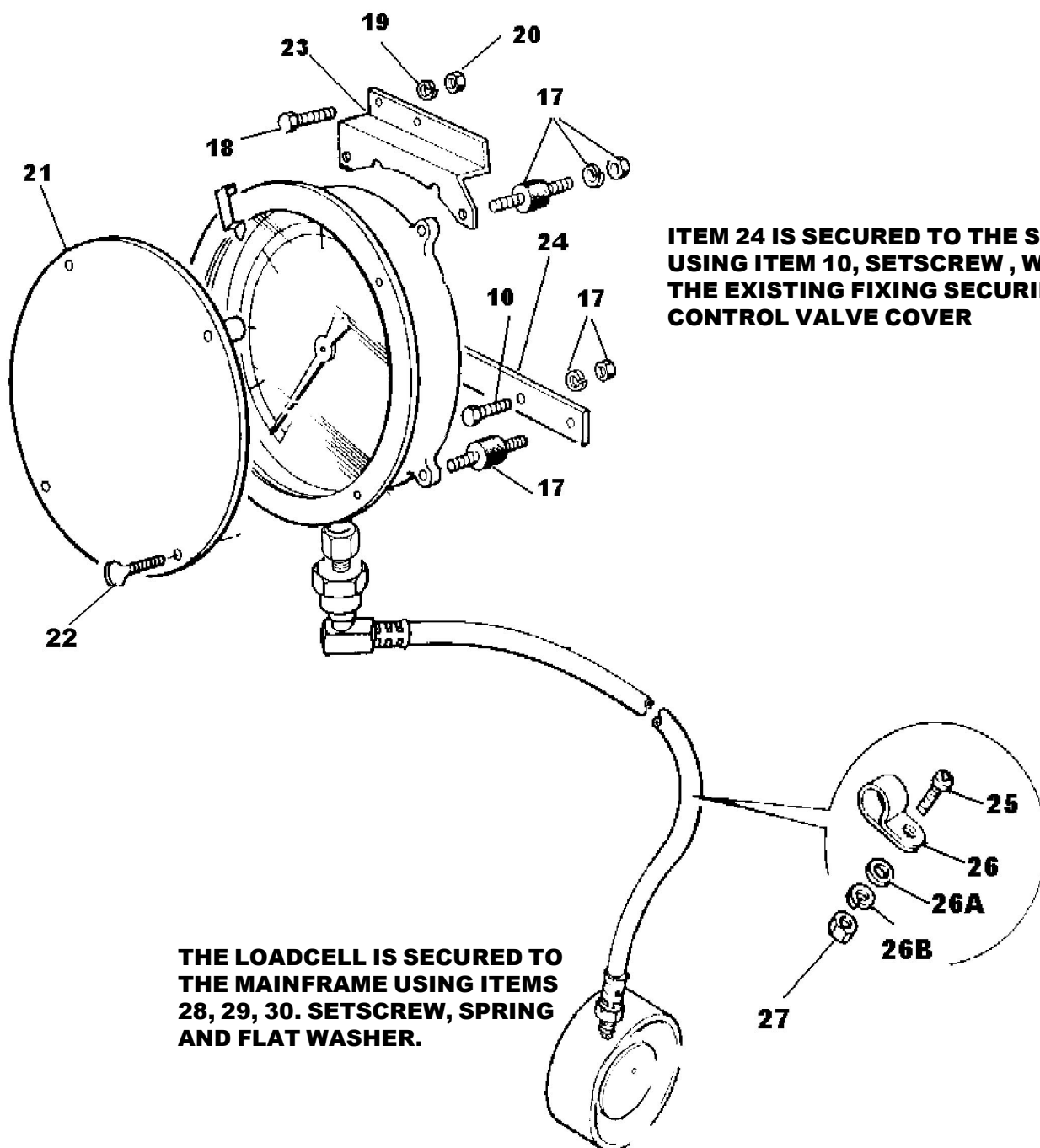
200TM HYDRAULIC CIRCUIT BATCHWEIGHER

2	503139400	BODY BLEED VALVE	1
3	423208280	SPRING	1
4	503139500	PLUNGER	1
5	66S03CC	SCREW SET	1
6	41S05	WASHER SPRING	1
10	36S02Z	HOSE	1
11	119S08	ADAPTOR M/M	1
12	100S04	SEAL BONDED	1
13	122S03	ADAPTOR M/M	1
14	100S03	SEAL BONDED	1
15	36S02VV	HOSE	1
16	122S03	ADAPTOR M/M	1
17	100S03	SEAL BONDED	1
18	122S03	ADAPTOR M/M	1
19	100S03	SEAL BONDED	1
20	36S02B	HOSE	1
21	119S03	ADAPTOR	2
22	100S02	SEAL BONDED	2

FOLLOWING PARTS USED ON UK-EEC SPEC MACHINES

23	V2004171	VALVE HOSE FAILURE	1
24	100S03	SEAL BONDED	2
25	122S03	ADAPTOR	1

200TM BATCHWEIGHER LOADCELL & GAUGE



ITEM 24 IS SECURED TO THE SUPPORT USING ITEM 10, SETSCREW , WHICH IS THE EXISTING FIXING SECURING THE CONTROL VALVE COVER

THE LOADCELL IS SECURED TO THE MAINFRAME USING ITEMS 28, 29, 30. SETSCREW, SPRING AND FLAT WASHER.

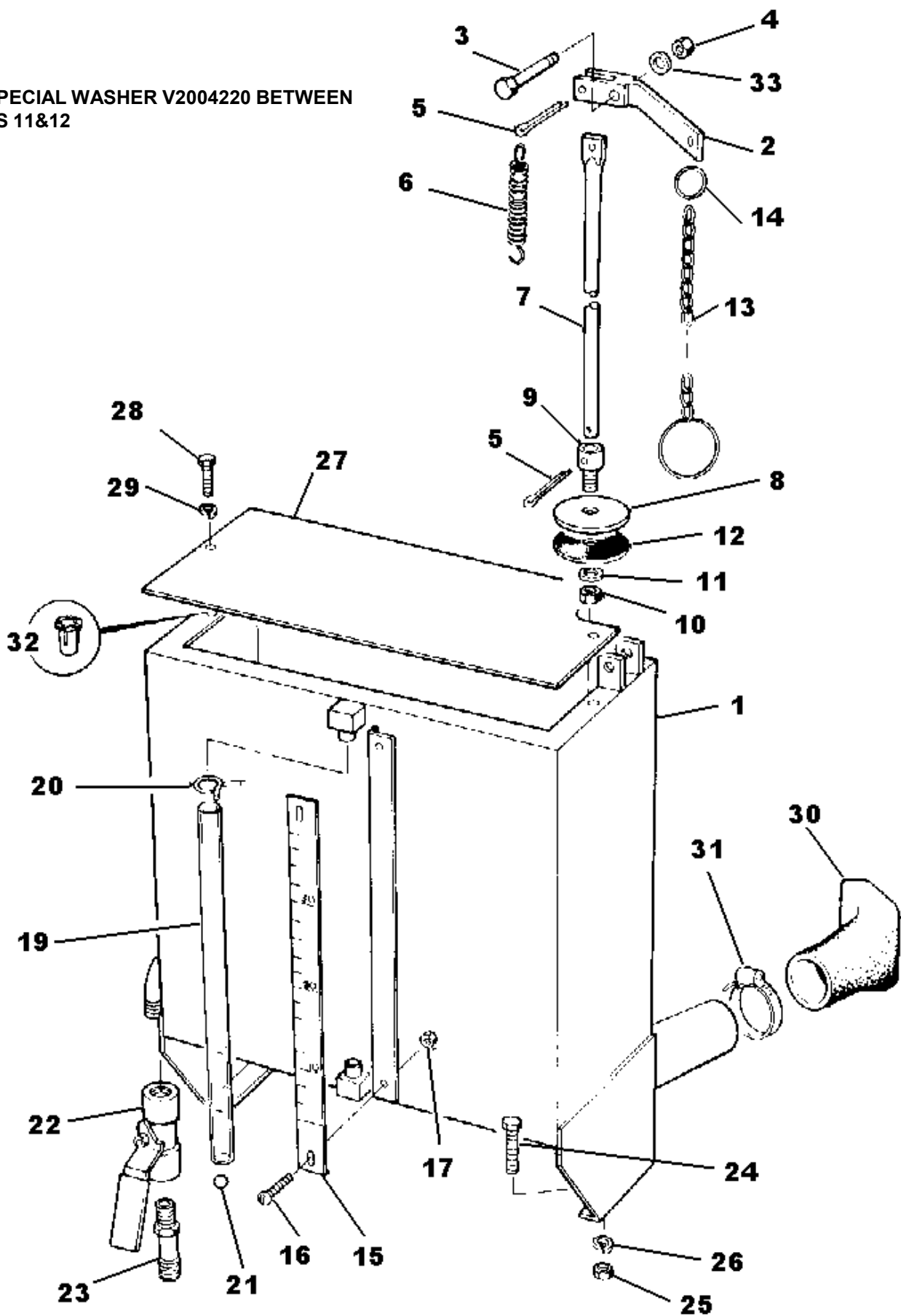
THE LOADCELL IS ALSO PREVENTED FROM MOVING BY A STOP SCREW IN THE MAINFRAME DIRECTLY BELOW THE LOADCELL, SEE ITEMS 31 AND 32 SETSCREW AND LOCK NUT

200TM LOADCELL + GAUGE BATCHWEIGHER

1	513338440	LOADCELL + GAUGE	1
17	013203000	MOUNTING RUBBER C/W NUTS	4
18	11S03B	SCREW SET	2
19	17S04	WASHER SPRING	2
20	7S03	NUT	2
21	555125000	COVER DIAL	1
22	261S02M	SCREW THUMB	4
23	513327700	BRACKET MOUNTING	1
24	513327800	BRACKET MOUNTING	1
25	16S05B	SCREW SET PAN HEAD	2
26	143200900	CLIP NYLON	2
26A	267S02	WASHER FLAT	2
26B	17S10	WASHER SPRING	2
27	7S09	NUT	2
28	11S05C	SCREW SET	1
29	17S06	WASHER SPRING	1
30	267S07	WASHER FLAT	1
31	7S03	NUT	1
32	11S03E	SCREW SET	1

200TM WATER TANK

FIT SPECIAL WASHER V2004220 BETWEEN
ITEMS 11&12

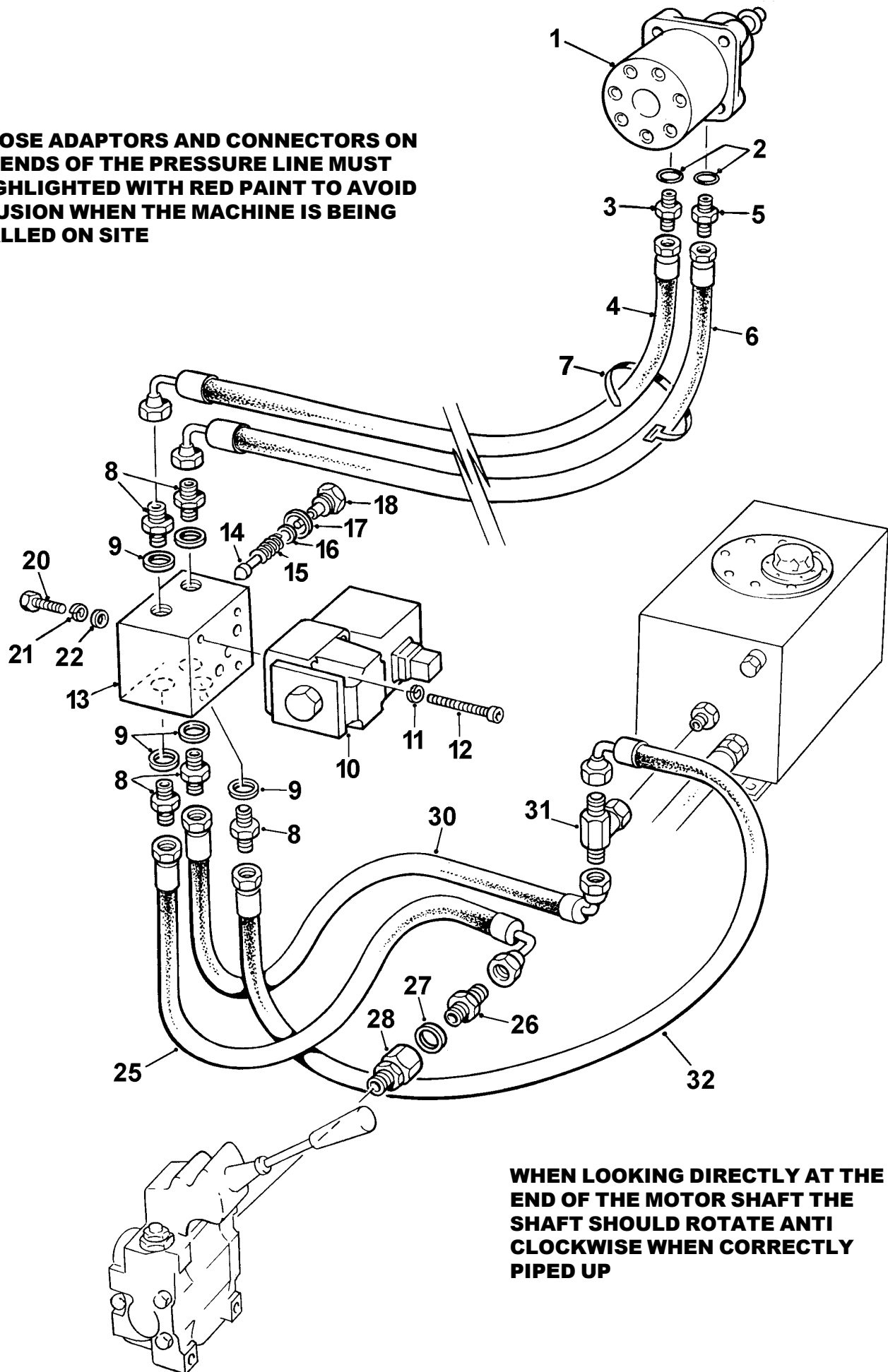


200TM WATER TANK ASSEMBLY

1	513327100	WATER TANK BODY	1
2	513327000	STRUT	1
3	8S03E	BOLT	1
4	61S03	NUT BINX	1
5	44S17J	PIN SPLIT	2
6	425435000	SPRING	1
7	513326600	ROD	1
8	513326700	PLATE	1
9	513326800	CONNECTOR	1
10	61S04	NUT BINX	1
11	267S06	WASHER FLAT	1
11A	V2004220	WASHER SPECIAL	1
12	513286200	VALVE RUBBER	1
13	513286400	CHAIN + RING	1
14	383106000	RING SPLIT	1
15	513324600	SCALE	1
16	70S04D	SCREW PAN HEAD	2
17	59S13	NUT NYLOC	2
19	430904001	TUBE	1
20	132111200	CLIP HOSE	2
21	101256000	BALL	1
22	450150000	VALVE RUBBER	1
23	130354000	CONNECTOR HOSE	1
24	11S05C	SCREW SET	4
25	7S05	NUT	4
26	17S06	WASHER SPRING	4
27	513337800	LID TANK	1
28	11S02C	SCREW SET	2
29	17S03	WASHER SPRING	2
30	504531500	NOZZLE RUBBER	1
31	97S13	CLIP HOSE	1
32	236S04	NUT BLIND	2
33	267S05	WASHER FLAT	1

200TM DRAGLINE HYDRAULIC CIRCUIT

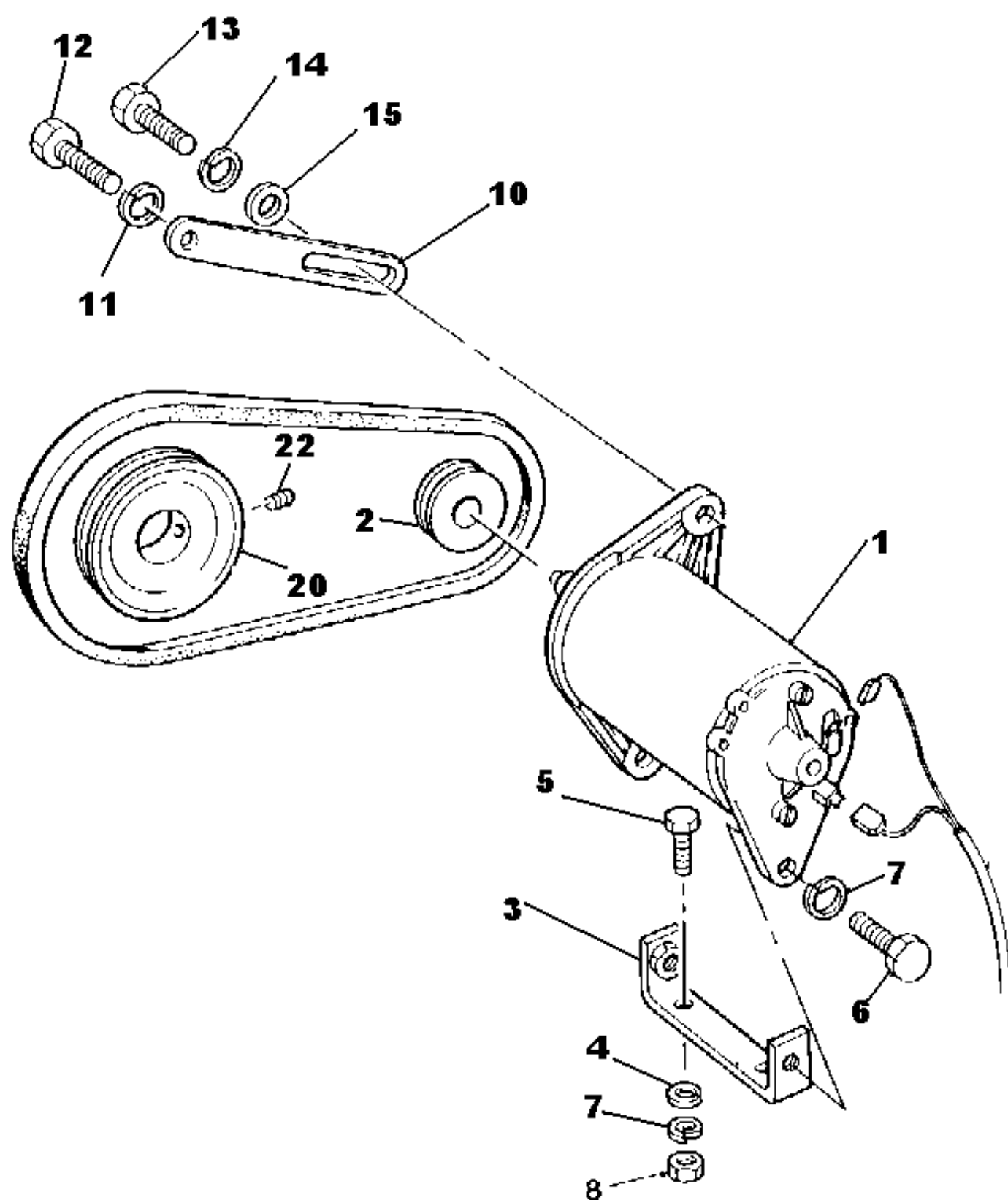
THE HOSE ADAPTORS AND CONNECTORS ON BOTH ENDS OF THE PRESSURE LINE MUST BE HIGHLIGHTED WITH RED PAINT TO AVOID CONFUSION WHEN THE MACHINE IS BEING INSTALLED ON SITE



200TM HYDRAULIC CIRCUIT DRAGLINE WINCH MOTOR

1	267118000	MOTOR HYDRAULIC	1
2	391111000	SEAL O RING	2
3	126S09	ADAPTOR	2
4	31S02M	HOSE	2
7	V2003253	STRAP NYLON	4
8	122S03	ADAPTOR M/M	5
9	100S03	SEAL BONDED	5
10	211158000	VALVE SOLENOID	1
11	41S03	WASHER SPRING	4
12	103S02H OR 103S02G	SCREW SOCKET HEAD	4
13	555284600	MANIFOLD DRAGLINE	1
14	555138300	VALVE RELIEF	1
15	555556100	SPRING	1
16	10S02	WASHER FLAT	1
17	100S04	SEAL BONDED	1
18	555138200	VALVE GUIDE	1
20	66S01AA	SCREW SET	2
21	41S03	WASHER SPRING	2
22	10S01	WASHER FLAT	2
25	31S02G	HOSE MANIFOLD TO CON VALVE	1
26	122S03	ADAPTOR M/M	1
27	100S03	SEAL BONDED	1
28	V2004607	ADAPTOR HPCO (SEE CONTROL VALVE)	1
30	31S02LL	HOSE MANIFOLD TO TANK	1
31	154S09	ADAPTOR 'T' M/M/F	1
32	31S02GG	HOSE RETURN	1

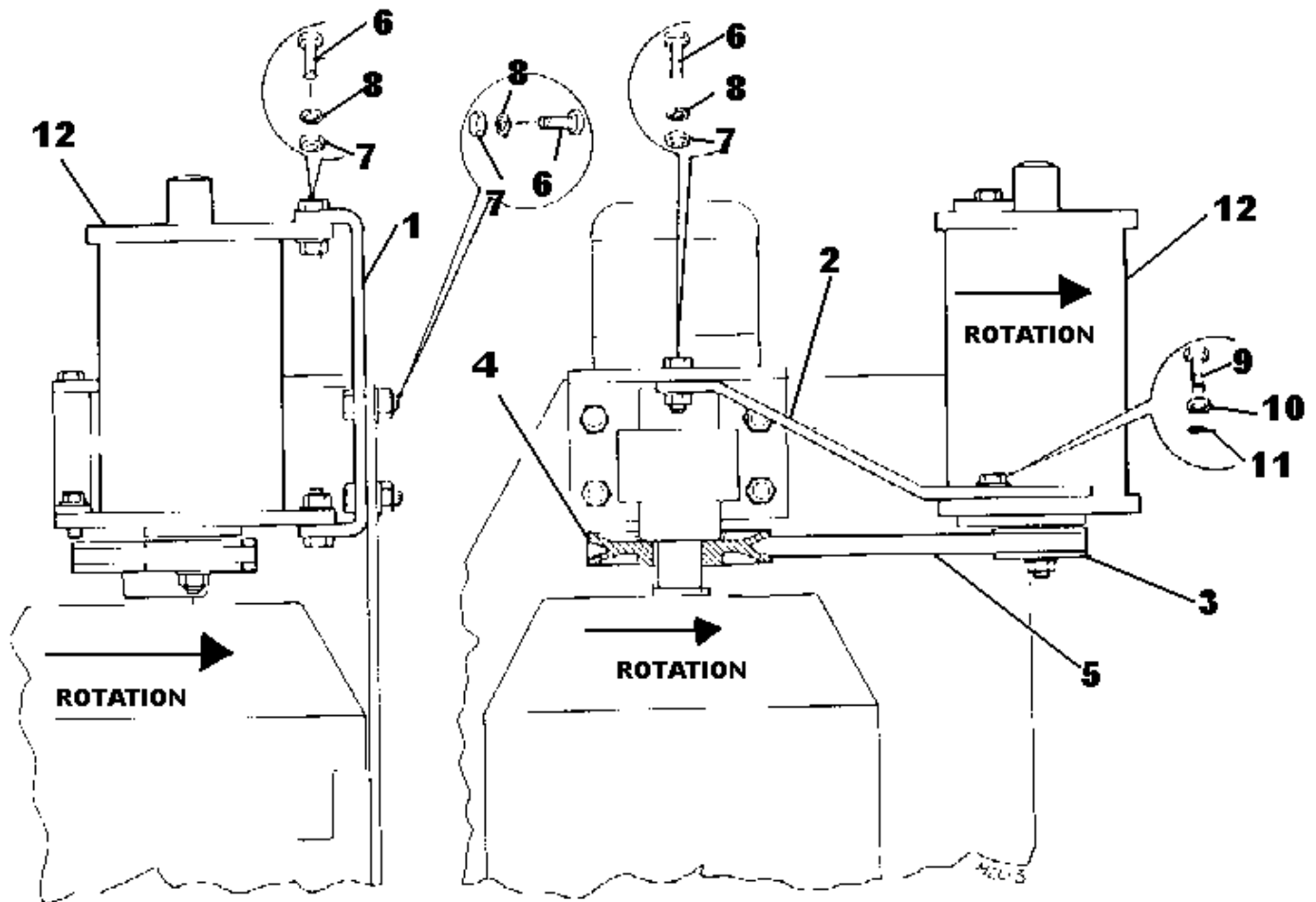
200TM DYNAMO AND MOUNTING LISTER-PETTER TS1 HS



200TM DYNAMO + MOUNTING LISTER PETTER TS1 HAND START

1	205501100	DYNAMO ANTICLOCKWISE	1
2	513334300	PULLEY DYNAMO	1
3	513347300	BRACKET DYNAMO MOUNT	1
4	267S05	WASHER FLAT	2
5	11S03B	SCREW SET	2
6	11S03C	SCREW SET	2
7	17S04	WASHER SPRING	4
8	7S03	NUT	2
10	513347400	ADJUSTER DYNAMO	1
11	66S03A	SCREW SET	1
12	41S05	WASHER SPRING	1
13	66S02CC	SCREW SET	1
14	41S04	WASHER SPRING	1
15	10S02	WASHER FLAT	1
20	513348500	PULLEY ENGINE	1
21	189S02A	BELT 850MM LONG	1
22	57S05E1	GRUB SCREW (SUPPLIED WITH PULLEY)	1

200TM DRAGLINE DYNAMO- 415 VOLT MOTOR

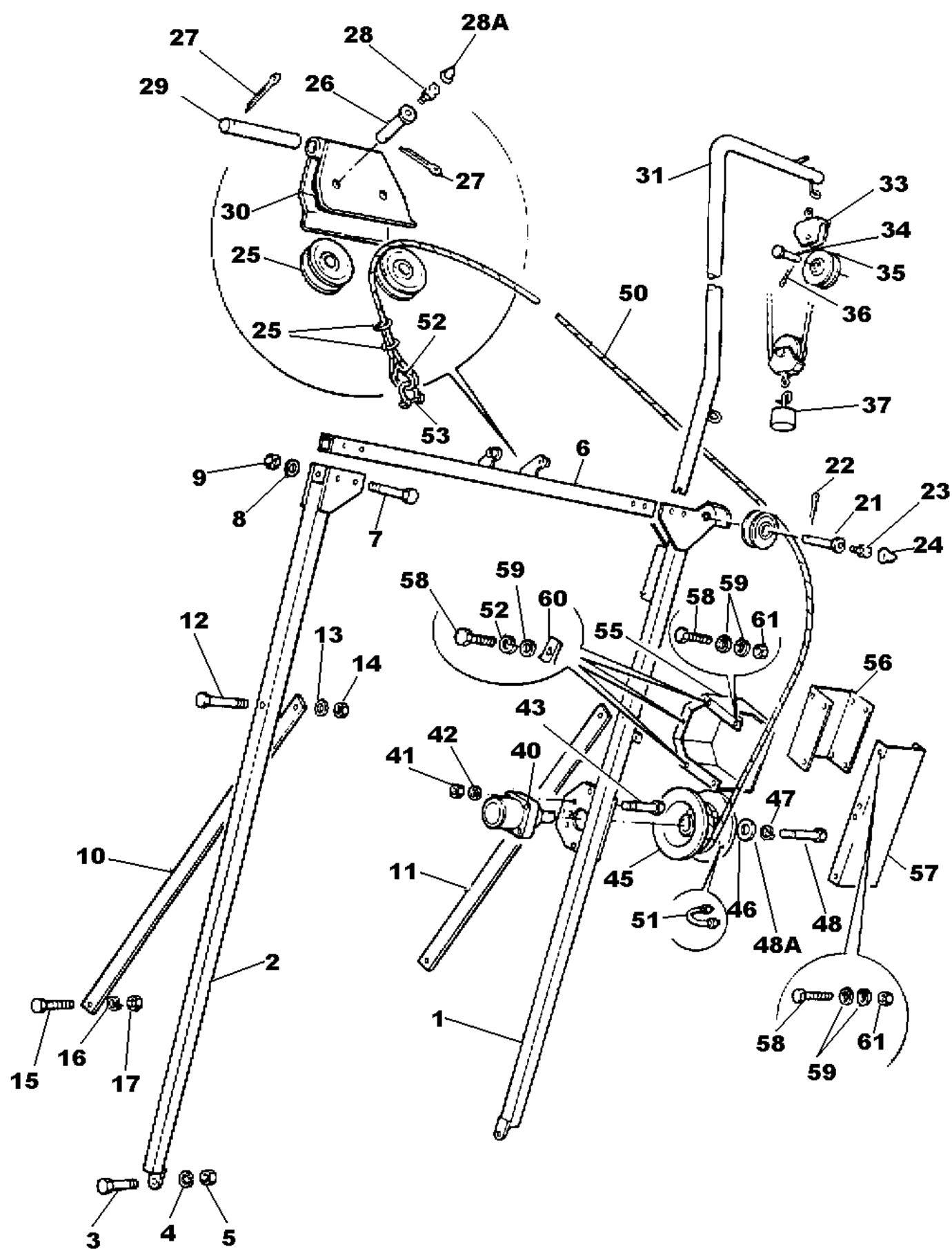


THE HYDRAULIC PUMP AND ELECTRIC MOTOR SHOULD BE CORRECTLY ALIGNED TO PREVENT PREMATURE FAILURE OF THE NYLON COUPLING SLEEVE. CHECK THAT THE TWO PULLIES ARE ALIGNED AND THE V BELT IS CORRECTLY TENSIONED

200TM DRAGLINE DYNAMO-ELECTRIC DRIVE 415V 3PH

1	513333000	BRACKET DYNAMO	1
2	513333200	BRACKET DYNAMO ADJ	1
3	513334300	PULLEY DYNAMO	1
4	513350600	PULLEY DYNAMO DRIVE 28MM	1
5	397436000	BELT VEE	1
6	11S03C	SCREW SET	5
7	7S03	NUT	5
8	17S04	WASHER SPRING	5
9	66S02CC	SCREW SET	1
10	41S04	WASHER SPRING	1
11	10S02	WASHER FLAT	1
12	205501000	DYNAMO-CLOCKWISE	1

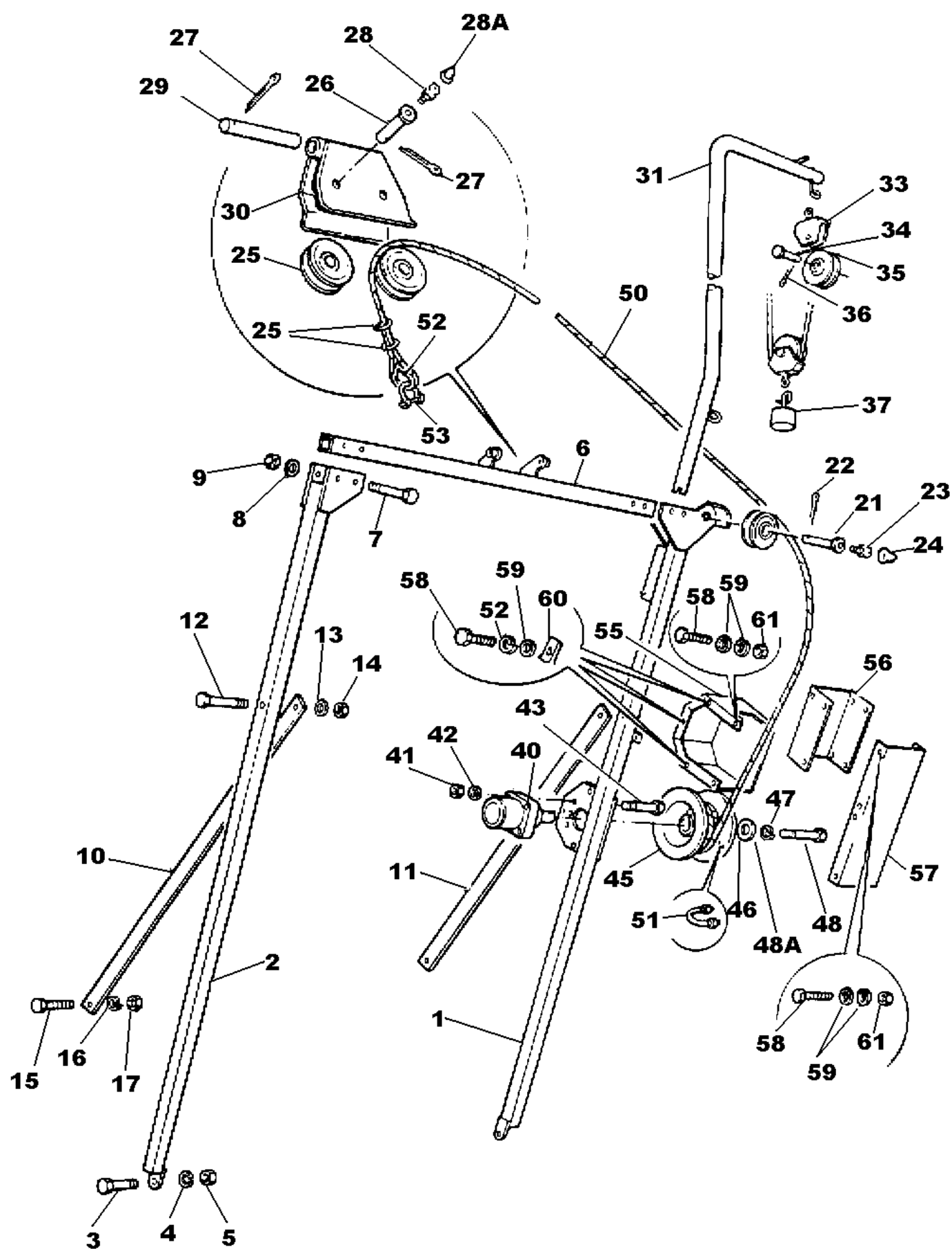
200TM DRAGLINE ASSEMBLY



200TM DRAGLINE

1	513355100	JIB LEG RH	1
2	513355000	JIB LEG LH	1
3	8S07G	BOLT	2
4	17S09	WASHER SPRING	2
5	7S07	NUT	2
6	513322600	BEAM TOP	1
7	8S05L	BOLT	4
8	267S07	WASHER FLAT	4
9	61S05	NUT BINX	4
10	513322700	TIE BAR 1570MM (TILT WHEEL END)	1
11	513323400	TIE BAR 1390MM (ENGINE END)	1
12	8S05L	BOLT	2
13	267S07	WASHER FLAT	2
14	61S05	NUT BINX	2
15	11S05C	SCREW SET	2
16	17S06	WASHER SPRING	2
17	7S05	NUT	2
20	555285500	PULLEY (RH JIB LEG)	1
21	513323500	PIN PULLEY	1
22	44S17K	PIN SPLIT	1
23	131S01	NIPPLE GREASE	1
24	176S01	CAP NIPPLE	1
25	555285500	PULLEY (TOP BEAM)	2
26	555265000	PIN PULLEY	2
27	44S17K	PIN SPLIT	3
28	131S01	NIPPLE GREASE	2
28A	176S01	CAP NIPPLE	2
29	513330000	PIN PIVOT	1
30	555228100	BRACKET PULLEY	1
31	513330300	MAST ELECTRIC CABLE	1
33	555208400	PULLEY BLOCK	2
34	555208300	PIN PULLEY	2
35	555208100	PULLEY	2
36	44S03C	PIN SPLIT	2
37	555204800	WEIGHT SHEAVE	1
40	267115000	MOTOR HYDRAULIC	1
41	7S05	NUT	4
42	17S06	WASHER SPRING	4
43	8S05H	BOLT	4
45	513330100	DRUM WINDING	1
46	555266300	WASHER CENTRE	1
47	41S09	WASHER SPRING	1
48	6S06H	SCREW SET	1
49	10S05	WASHER FLAT (NOT ILLUS)	1
50	477502000	ROPE WIRE	1
51	132204000	CLIP ROPE	3
52	443105010	THIMBLE	1
53	412606000	SHACKLE	1
55	513330200	GUARD-WINCH	1
56	513330400	GUARD-ROPE	1
57	513330500	PLATE ROPE GUARD	1
58	11S02A	SCREW SET	12

200TM DRAGLINE ASSEMBLY

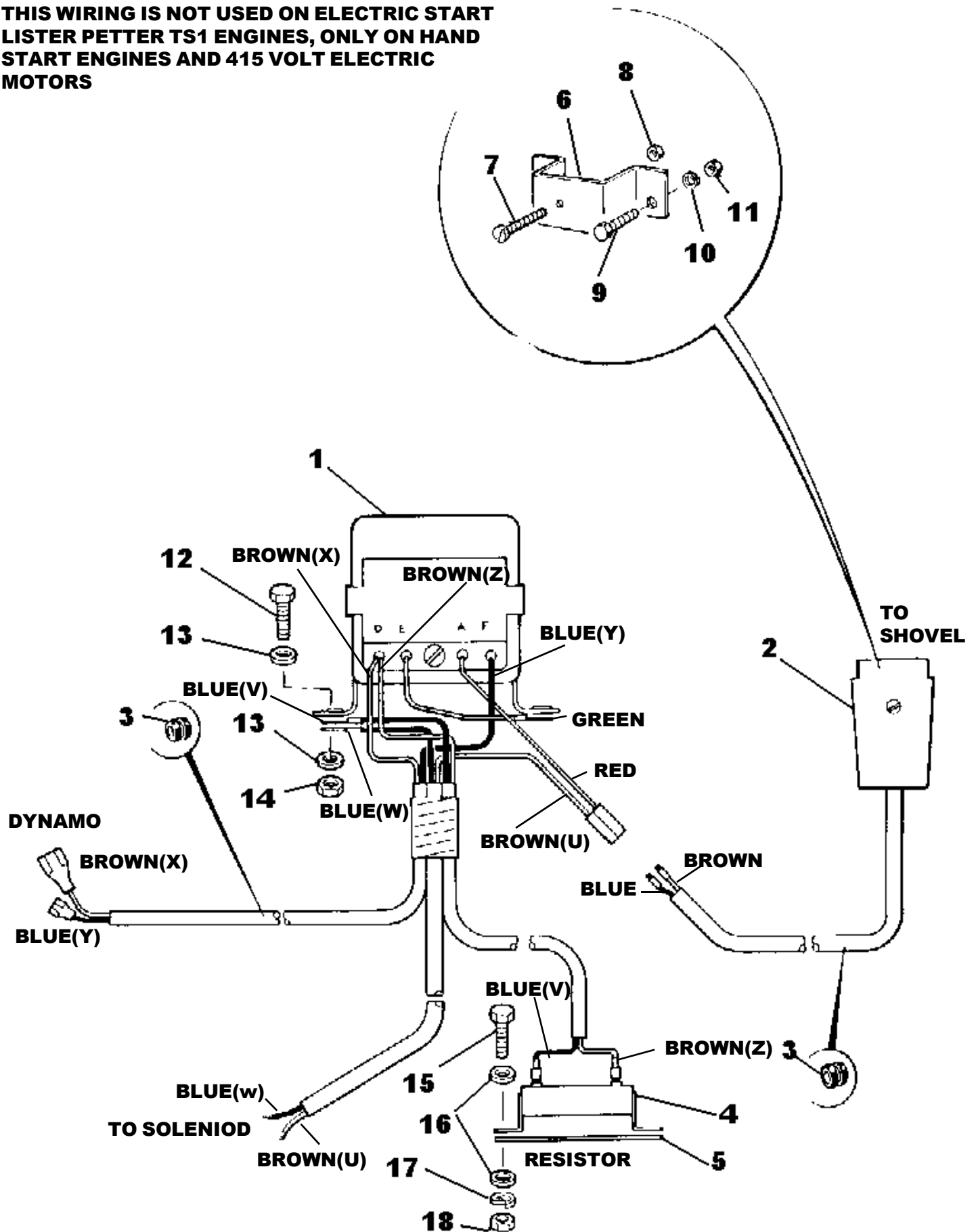


200TM DRAGLINE

59	267S04	WASHER FLAT	21
60	332719000	NUT SPIRE	3
61	61S02	NUT BINX	9
62	17S03	WASHER SPRING	3
63	267S07	WASHER FLAT	1

200TM DRAGLINE WIRING LOOM HS-415 VOLT

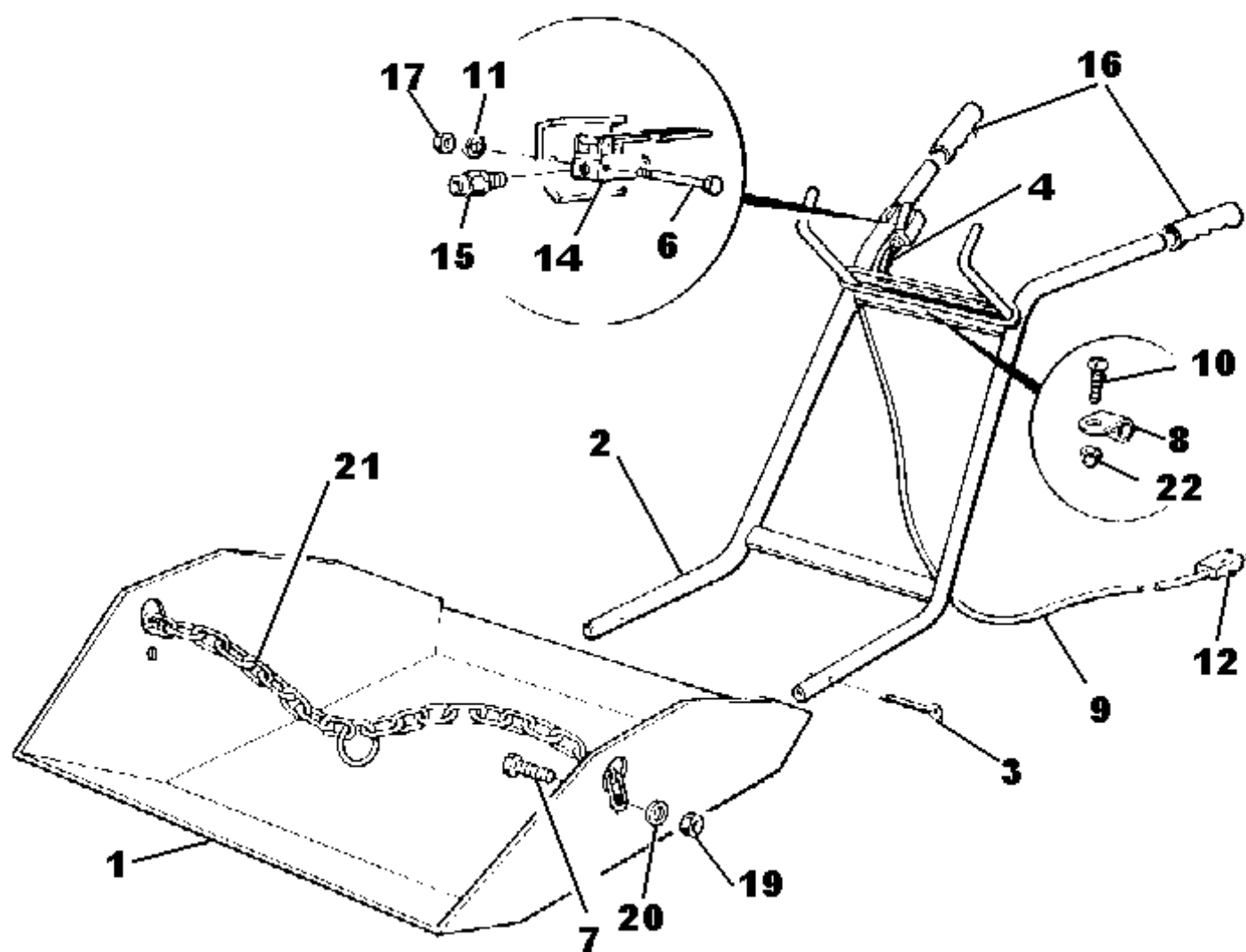
**THIS WIRING IS NOT USED ON ELECTRIC START
LISTER PETTER TS1 ENGINES, ONLY ON HAND
START ENGINES AND 415 VOLT ELECTRIC
MOTORS**



200TM DRAGLINE WIRING LOOM

1	513340300	LOOM ASSEMBLY DRAGLINE	1
2	205304600	PLUG	1
3	V2003252	GROMMET	2
4	207652000	RESISTOR	1
5	555213700	BOARD INSULATING	1
6	555253800	CLAMP-CABLE	1
7	82S07F	SCREW ROUND HEAD	1
8	83S07	NUT	1
9	11S01A	SCREW SET	2
10	17S02	WASHER SPRING	2
11	7S01	NUT	2
12	11S02B	SCREW SET	2
13	267S04	WASHER FLAT	4
14	61SD2	NUT BINX	2
15	11S01A	SCREW SET	2
16	267S03	WASHER FLAT	4
17	17S03	WASHER SPRING	2
18	7S01	NUT	2

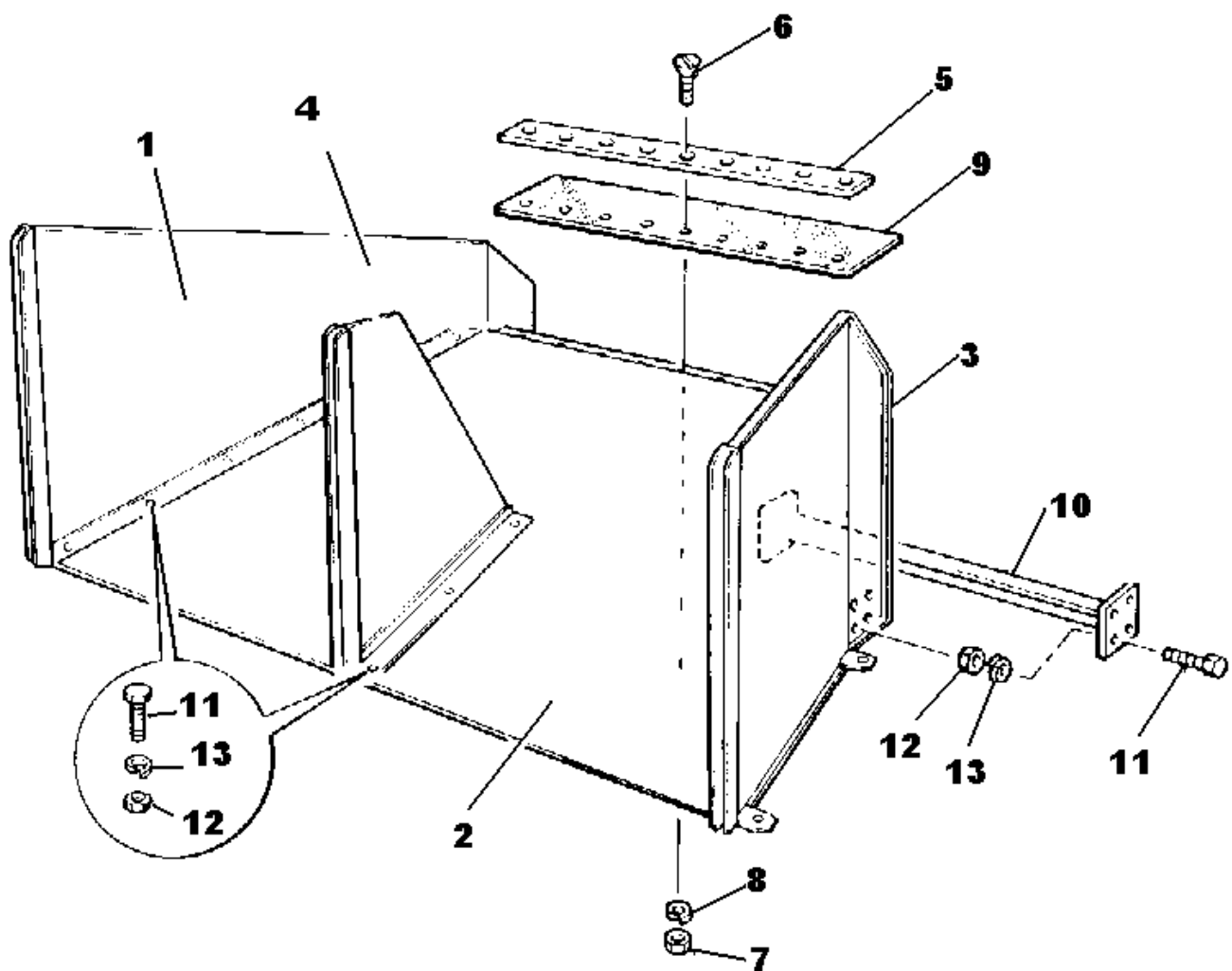
200TM DRAGLINE SHOVEL



200TM DRAGLINE SHOVEL

1	555209200	SHOVEL	1
2	555209100	HANDLE SHOVEL	1
3	44S17K	PIN SPLIT	2
4	369200000	TUBE 12" LONG	1
5	555214800	CLAMP SWITCH	1
6	8S01H	BOLT	2
7	11S05D	SCREW SET	2
8	143200300	CLIP CABLE	1
9	144734000	CABLE	1
10	16S05B	SCREW PAN HEAD	1
11	17S02	WASHER SPRING	2
12	205304600	PLUG	1
13	208143000	SLEEVE 55MM LONG	1
14	208561000	SWITCH	1
15	250166010	GLAND CABLE	1
16	264705000	HANDLE GRIP	2
17	7S01	NUT	2
19	59S04	NUT NYLOC	2
20	267S07	WASHER FLAT	2
21	135905000-15 LINKS	CHAIN + RING	1
22	59S02	NUT NYLOC	1

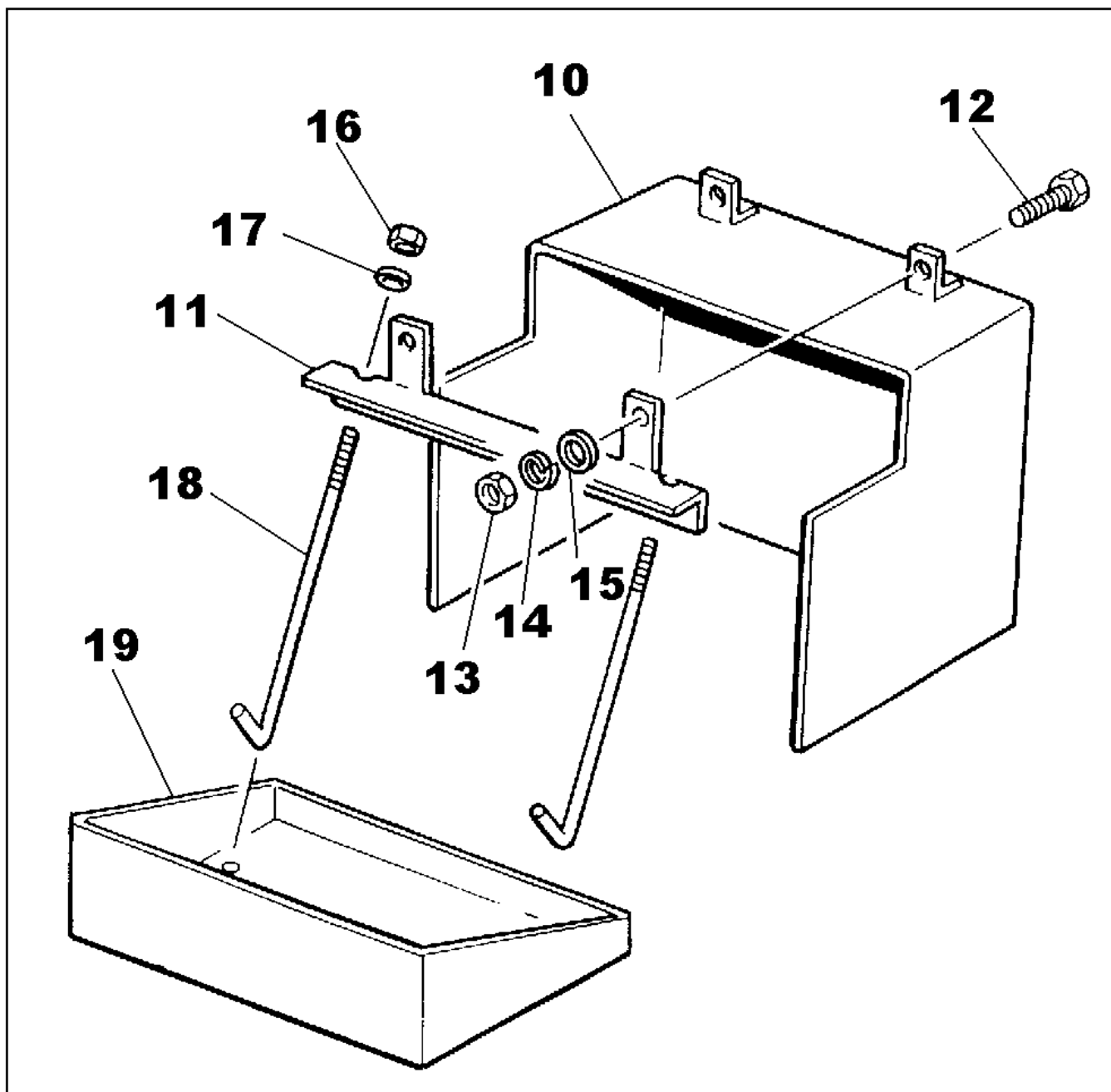
200TM DRAGLINE FEEDAPRON



200TM FEED APRON

1	513336900	PANEL SIDE L.H.	1
2	513332000	PLATE FLOOR	1
3	513336901	PANEL SIDE R.H.	1
4	513337000	PANEL PARTITION	1
5	513332300	RETAINER COUNTER SUNK	1
6	52S04G	SCREW COUNTER SUNK	9
7	7S04	NUT	9
8	17S05	WASHER SPRING	9
9	513332500	TRIM RUBBER	1
10	513336700	ANGLE TIE	1
11	11S05C	SCREW SET	26
12	7S05	NUT	26
13	17S06	WASHER SPRING	26

200TM BATTERY TRAY LISTER-PETTER TS1 ES

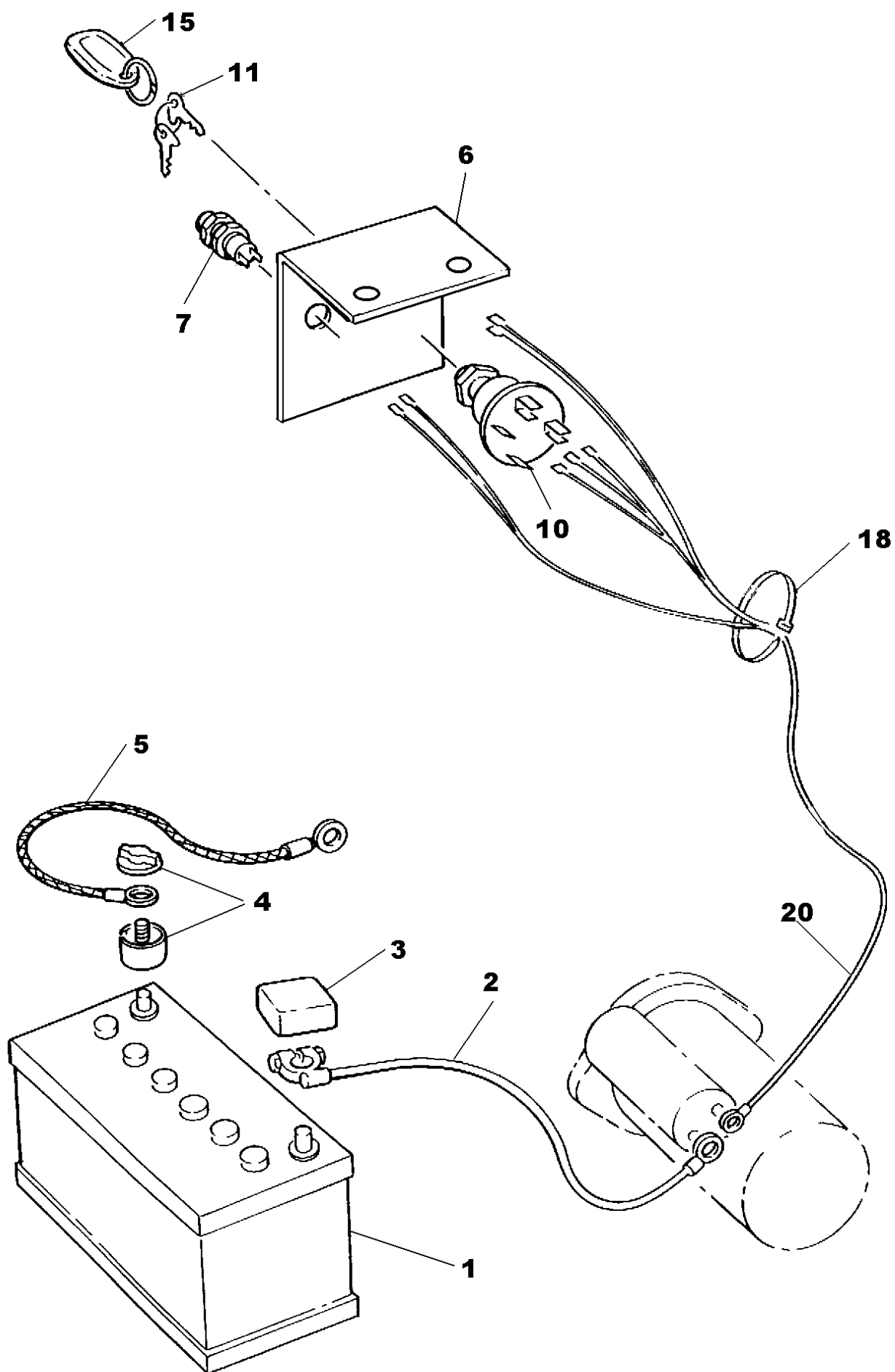


**WELD TRAY TO THE REAR OF THE MAINFRAME
BELOW THE ENGINE HOUSING**

200TM BATTERY TRAY LISTER-PETTER TS1 ES

10	513358600	COVER BATTERY	1
11	V2004055	CLAMP BATTERY	1
12	11S04B	SCREW SET	2
13	7S04	NUT	2
14	17S05	WASHER SPRING	2
15	267S06	WASHER FLAT	2
16	61S02	NUT BINX	2
17	267S04	WASHER FLAT	2
18	V2004120	ROD CLAMP	2
19	513358500	TRAY BATTERY	1

200TM LISTER-PETTER TS1 ELECTRIC START



200TM LISTER-PETTER TR1 ELECTRIC START

1	109S08	BATTERY	1
2	10989A10	CABLE POSITIVE	1
3	V2004204	INSULATOR BATTERY POSITIVE	1
4	V2004214	ISOLATOR BATTERY NEGATIVE	1
5	V2003510	CABLE NEGATIVE	1
6	20313A05	PANEL INSTRUMENT	1
6A	11S04B	SCREW SET (NOT ILLUSTRATED)	2
6B	7S04	NUT (NOT ILLUSTRATED)	2
6C	17S05	WASHER SPRING (NOT ILLUSTRATED)	2
7		LIGHT WARNING	1
10		START SWITCH	1
11		START KEYS	2
ITEMS 7, 10 & 11 SUPPLIED WITH ENGINE			
15	V2003540	RING KEY	1
18	V2003111	TIE CABLE NYLON	5
18A	V2003253	TIE CABLE NYLON	2
20	30231A11	LOOM WIRING	1

200TM DECALS AND LOGOS

1 **200 TM**

2

WINGET	
Model	
Serial no.	
Engine no.	Power Output
Capacity	Weight kg.
SRD	Year of mfg.
A Bore Day Coding	

3

DANGER
KEEP ENGINE HOUSING
LID CLOSED WHEN
ENGINE IS RUNNING

4

SAFETY WARNING

1. Before starting this machine, the operator should be familiar with the operating instructions supplied by the manufacturer.
2. The manufacturer's recommendations must never be exceeded.
3. Before carrying out any adjustments, servicing or greasing, please ensure that the engine has been switched off. Never work on a machine which is in running.

5

WATER TANK OPERATION

FILL OPEN INLET VALVE UNTIL DESIRED QUANTITY SHOWN IN GAUGE OR AIR

REMARKS: PULL AND HOLD BRAKE DOWN UNTIL OVERCHARGE IS COMPLETE

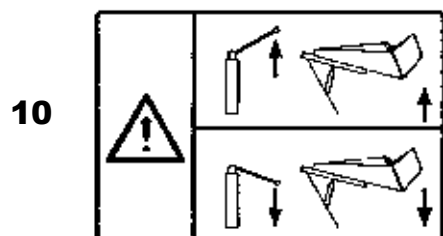
6

DANGER
DO NOT WALK, STAND OR LEAN
UNDER RAISED HOPPER UNLESS
IT IS SECURELY PROPPED



9

WARNING
DO NOT TAMPER
WITH THE PIPE
CONNECTION ON
THE LOAD CELL
OF GAUGE
THIS IS A SEALED
CIRCUIT AND MUST
NOT BE INTERFERED
WITH



11 **WINGET**



16 50 p.s.i.

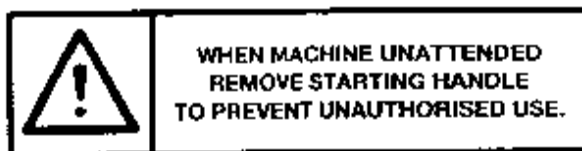


200TM DECALS AND LOGOS

1	V2003108	DECAL 200TM	2
2	V2003037	PLATE SERIAL NUMBER	1
2A	15S01A	RIVET/SCREW	4
3	504600900	DECAL DANGER	1
4	504694600	DECAL SAFETY	1
5	513331500	DECAL WATER TANK	1
6	513331600	DECAL DO NOT WALK	2
7	V2003101	DECAL DIESEL	1
8	V2003100	DECAL HYDRAULIC OIL	1
9	515175000	PLATE WEIGHBATCHER	1
9A	101S05D	RIVET POP	4
10	V2004259	DECAL HOPPER CONTROLS	1
11	V2003039	DECAL WINGET	4
12	V2003038	DECAL STRIPES	4
13	V2004137	DECAL EAR PROTECTION	2
14	V2003665	DECAL SLING POINT	2
15	V2003598	DECAL BRITISH MADE	1
16	10166A02	DECAL TYRE PRESSURES	4
17	V2004227	DECAL BATTERY ISOLATOR	1
18	V2004229	DECAL OPS BOOK	2
19	V2004282	DECAL HOT SURFACE	1
20	V2004289	DECAL HANDS CLEAR	2
21	V2004302	DECAL ENGINE STOP	1
22	V2004307	DECAL ELECTRICAL HAZARD	2
23	V2004288	DECAL REMOVE HANDLE	1
24	V2004235	DECAL NEGATIVE EARTH	1
25	V2004281	DECAL ENTRAPMENT	1
26	V2004223	DECAL 'CE' MARK	1
	(ONLY APPLIED TO EC SPEC MACHINES)		1
27	V2004131	DECAL 85 LPA	1
28	V2003575	DECAL 105 LWA	1
29	V2004744	DECAL EYE PROTECTION	2

200TM DECALS AND LOGOS

23



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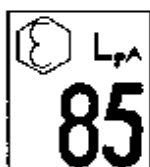
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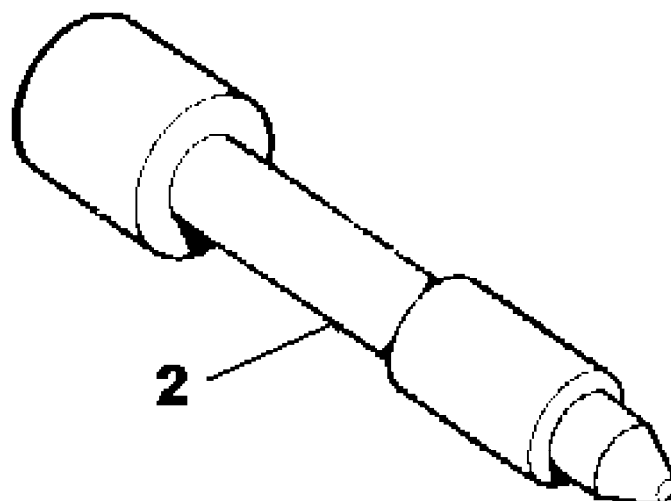
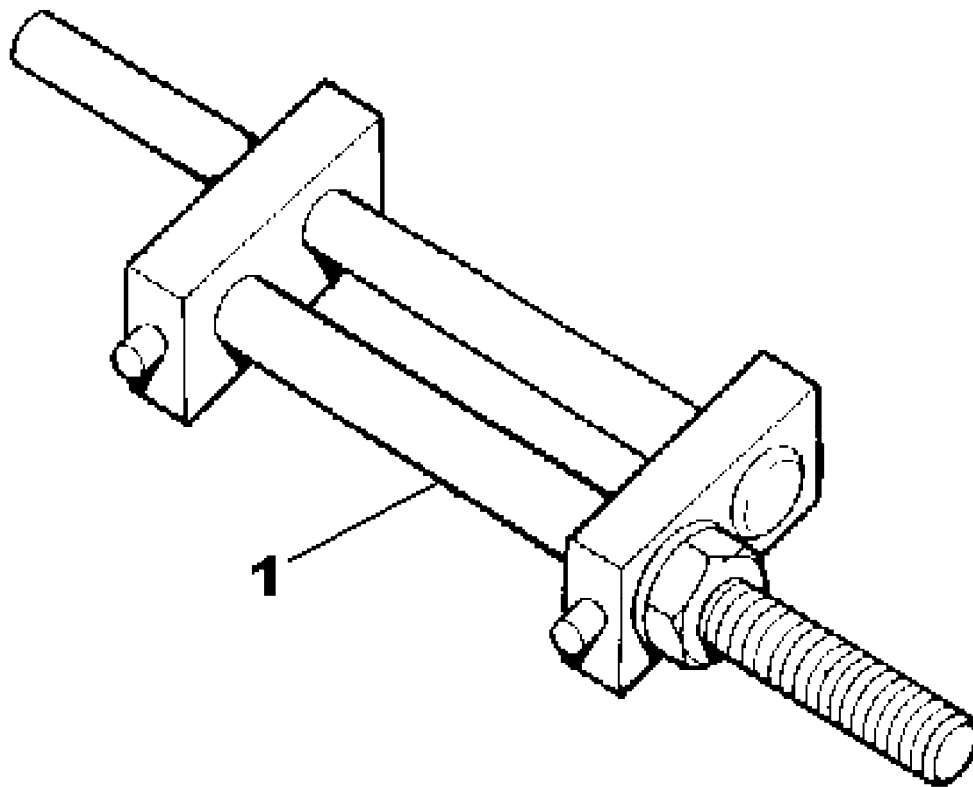


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200TM SPECIAL TOOLS

1	513204000	CLAMP-DRUM CLIP	1
2	V2003698	PUNCH-BLEED VALVE SEAT	1

WORKSHOP MANUAL

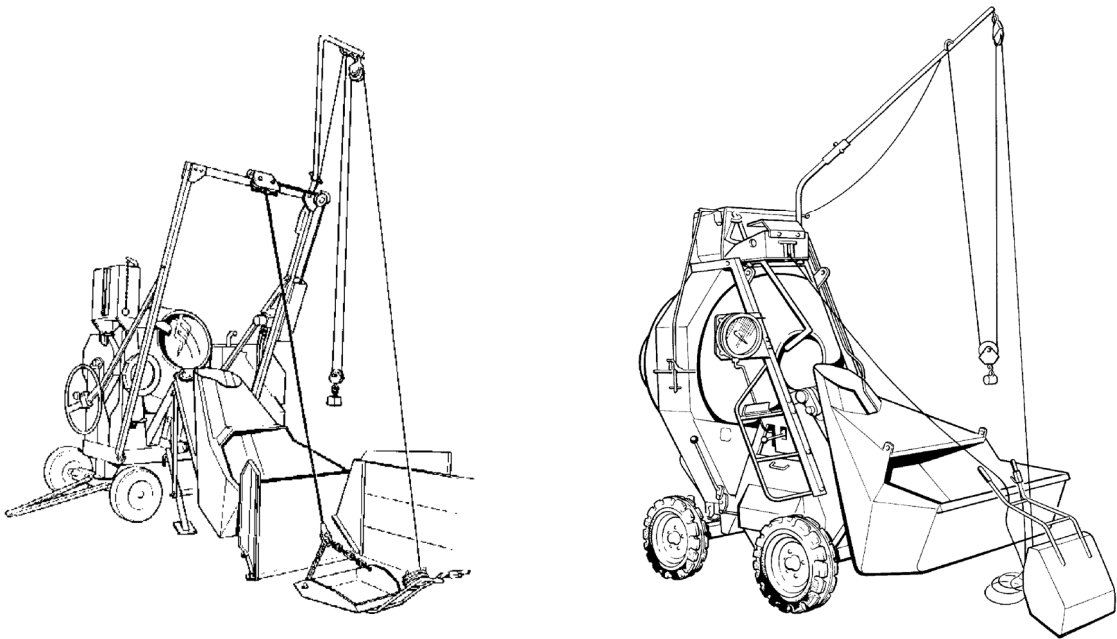
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SECTION 11

BATCHWEIGHER MAINTENANCE INSTRUCTIONS

WINGET

MAINTENANCE INSTRUCTIONS



HYDRAULIC WEIGHING UNITS

INTRODUCTION

This manual covers the Batchweigher Loadcell and Gauge installed into 200TM Mechanically Fed Mixers and 300R, 400R and 500R Reversing Drum Mixers.

Winget Limited do not recommend that attempts are made in the field to rectify faulty loadcells and gauges as the special tools and equipment required are unlikely to be available. It is recommended that faulty units are returned to Winget Limited for repair or overhaul. However in recognition of the fact that this advice is not always practicable Winget Limited have released this manual subject to the disclaimer below:-

The contents of this manual although correct at the time of publication, may be subject to alteration by the manufacturers without notice and Winget Limited can accept no responsibility for any errors or omissions contained within the following pages. Nor can we accept any liability whatsoever arising from the use of this manual howsoever caused.

Winget Limited operate a policy of continuous product development, therefore some illustrations or text within this publication may differ from your machine.

HYDRAULIC WEIGHING UNIT

(British Provisional Patent 15633/59)

"WINGET LIMITED" sealed unit for bulk weighing comprises a load sensing cell coupled hydraulically to an indicating dial gauge of very robust design. The application of a weight to the load cell causes the displacement of a diaphragm of special design and consequently the build up of a hydraulic pressure. This pressure, which is directly proportional to the applied weight, is then measured by the pressure sensitive element in the dial gauge and the pointer is rotated an amount proportiona to the applied weight. The dial of the gauge, which can be either 12" or 18" in diameter, is calibrated in the desired weight units and thus the pointer will indicate immediately the value of the weight which has been applied to the load cell. The sweep of the pointer on the dial is 295° in order that divisions as large as possible may be used.

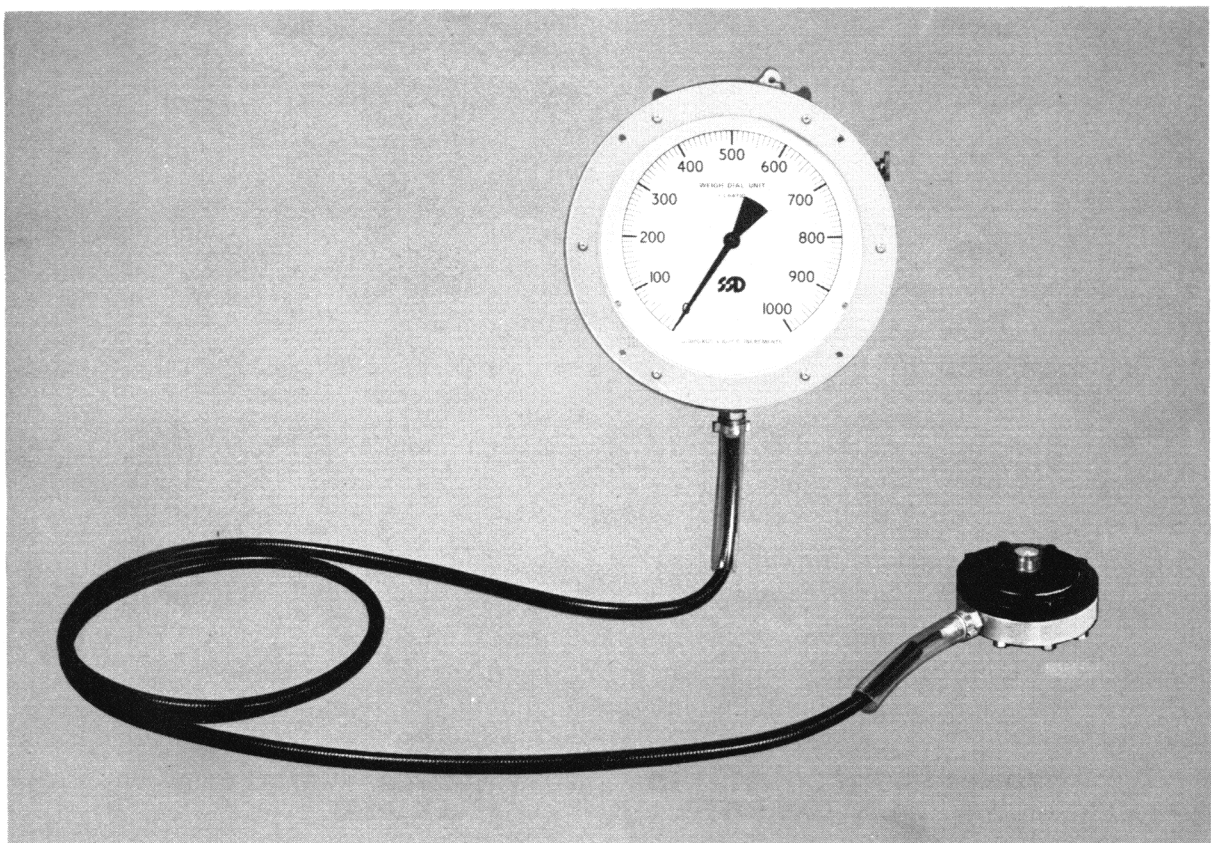
Being completely self contained, with no exposed moving parts, the **"WINGET LIMITED"** HYDRAULIC WEIGHING UNIT offers considerable advantages over conventional types of weighing systems which may employ beams, knife edges, etc. The units are thus particularly valuable for use on concrete mixing or batching plants where dirt and grit may affect the operation of a conventional weighing system.

The hydraulic connection between the cell and the indicating dial gauge is made with a flexible armoured capillary tube which will withstand rough handling and the end fittings have been specially designed to prevent unauthorised tampering with the sealed hydraulic system.

The load indicating dial may be placed remotely from the load cell or at any height above or below it without the calibration being affected, and the very sensitive gauge mechanism is provided with an adjustable pointer dampener should excessive vibration be present in the structure on which it is mounted.

The indicating dial mechanism is provided with an externally operated adjustment so that the pointer may be "zeroed" as desired to compensate for changes in skip or container weights due to the adherence of the material being weighed. Standard "clip-on" pointers, are fitted to the rim of the indicating dial where mixed loads are to be weighed in the same container. These can be supplied in different colours to represent the different materials being loaded.

The accuracy of the hydraulic weighing unit is of the order of + or - 3 % of its maximum capacity, *i.e.* the accuracy of indication of weight on a system capable of weighing, say 1000 lbs., will be within + or - 30 lbs.



HEAVY DUTY HYDRAULIC WEIGHING UNITS

GENERAL INFORMATION, INSTALLATION, OPERATING AND MAINTENANCE INSTRUCTIONS

1. Introduction

These units consist of a dial indicator connected to a load cell by a flexible capillary tube. Upon the application of a load to a load cell a hydraulic pressure is generated which is transmitted to the indicator through the capillary tube.

The indicator is calibrated in units of nett weight (lbs or kgs) or in the case of liquids - gallons or litres.

WARNING

The system is sealed at the Factory after filling with hydraulic fluid by a special high vacuum process. Any attempt to disconnect the capillary tube, at either end, or to dismantle the load cell will immediately render the whole unit inoperative.

In the event of fluid leakage or damage to the capillary tube, the indicator will give a false reading and the whole unit must be returned for repair to the works or an agent having the necessary fluid filling and calibrating facilities.

Never allow the load cell or the gauge to be suspended by the capillary tube.

Note:

The weighing unit should always be mounted with anti-vibration pads onto the machine structure and we would advise that the machine motor is similarly mounted to give steady pointer reading.

2. Specification

a) Heavy duty pattern, weatherproof indicators for surface mounting.

This indicator is extremely robust, fully weatherproof and capable of withstanding excessive overload conditions. The movement is fitted with a friction type damping device which can be adjusted to reduce pointer oscillation caused by excessive vibrations. Adjustable coloured pointers are provided on the front flange for use as required. A pointer zero reset device is fitted and this is operated by a knob projecting from the side of the case. 12" (300mm) and 18" (450mm) sizes are available and the indicators can be provided with electrical contacts.

Note:

Although the indicator will withstand extreme overloads, it must be emphasised that the load cell must be protected from excessive shock loads (for example, a skip unladen or laden must not be allowed to drop on to the load cell without restriction).

3. Load Cell Specification

The load cell consists of a central plattern bonded with natural rubber to the walls of the cell body. Standard indicators are fitted with 3 sq. in., 5 sq. in. or 10 sq. in. load cells, depending upon the loads to be applied.

Load cells of greater capacity are also available.

The standard load cells are suitable for the following conditions:-

- 3 sq. in. Maximum occasional load 1500 lb. (680 Kg)
Maximum continuous load 900 lb. (408 Kg)
- 5 sq. in. Maximum occasional load 2500 lb. (1134 Kg)
Maximum continuous load 1500 lb. (680 Kg)
- 10 sq. in. Maximum occasional load 5000 lb. (2268 Kg)
Maximum continuous load 3000 lb. (1361 Kg)

4. Capillary Tube Specification

Flexible nylon tube, terylene braided with an outer nylon coating, protected by a terylene reinforced PVC armouring.

Bursting pressure 11,000 p.s.i. (773.40 Kg/cm²) at an ambient temperature of 20°C.

Operating temperature -40°C to 100°C continuous, or up to 120°C intermittent.

5. Installation

a) Application of Load

The load cell has a central domed button to which the load must be applied by means of a flat, hardened steel plate. A suitable plate must therefore be rigidly fixed to the bottom of the skip or whatever container carries the material to be weighed, and arranged to be at right angles to the load cell centre line when in the weighing position.

Note:

1. For some applications, for example, hanging loads, a 'V' button and ball is fitted as an alternative to the domed button.
2. Weighing units can be supplied for systems employing lever action, offset, unbalanced loading and for other applications where the ratio of the weight of the container and contents are not on a 1:1 ratio to the load on the load cell. In such applications, full details should be provided.

Shock and Overload

The load must be applied to load cell with the minimum amount of shock. The unit will accept an accidental overload (this varies with the calibration) but repeated dropping of an empty skip on to the load cell will eventually rupture the rubber bonding. Any arrestor gear to prevent shock must be arranged so that this does not bear any of the load during the actual weighing process. Buffers or cushions interposed between the skip and the load cell domed button are usually ineffective due to the relatively small movement of the load cell diaphragm.

Note:

The weight of the empty skip or container must not exceed one-third of the total scale reading of the indicator required.

b) Load Cell

The load cell must be positioned to meet all the above requirements of load application and securely bolted to a suitably rigid support which will accept the maximum load with a minimum of deflection. The location should be free from excessive heat and from danger of contamination by mineral oils which adversely affect the natural rubber diaphragm bonding.

Note:

Additional protection has now been provided by the application of a Neoprene coating.

c) Dial Indicator and Capillary

Before mounting, check that the capillary can be conveniently routed, protected from abrasion, excessive heat, etc., and secured avoiding tension, compression, sharp bends or kinks. Excess length should be coiled (min. radius 6" (150mm)) and secured to prevent vibration which would otherwise cause pointer oscillation. Securely fix the dial indicator in a vertical position, with anti-vibration pads if necessary. Ensure that the zero adjustment-knob is accessible for tone adjustment. Under no load conditions the pointer will be in a position anti-clockwise from zero on the scale. This is normal and the pointer will approach zero when the weight of the empty skip is applied to the load cell.

6. Operation

The weighing action is entirely automatic giving a direct reading on the dial instantaneously and continuously. The operator should ensure that the skip or container is settling correctly on to the load cell dome, with the smallest possible shock, and check that the pointer reads zero with the empty container at rest.

Zero or tare adjustment

Compensation for any change in weight of the skip is quickly and simply achieved by turning the zero re-set knob in a clockwise or anti-clockwise direction as necessary until the pointer rests at zero.

7. Maintenance

a) Lubrication

DO NOT attempt to lubricate any part of this system. The movement bearings of the indicator are pre-lubricated and the load cell diaphragm will be attacked by any form of mineral oil.

b) Routine checks

Make regular checks of:-

- i) Security of load cell and indicator mounting.
- ii) Security, protection and condition of capillary.
- iii) Hardened steel plate and load cell domed button.
- iv) Correct operation of any arrestor gear.
- v) Correct application of load to cell.

c) Oil Contamination

In the event of contamination of the load cell by diesel fuel or mineral oil, petrol or paraffin, as quickly as possible remove the drip shield (when fitted) and scrub the top of the load cell with warm water and ordinary soap (not detergents or solvents).

d) Calibration Check

The calibration can be checked by placing known weights in the skip. In the event of error, the calibration can be adjusted but this requires the service of a skilled mechanic. (See Appendix A).

e) Pointer oscillation

Excessive pointer oscillation caused by erratic filling of the skip or container or by external vibrating sources can be damped by means of an adjustable mechanism inside the dial indicator. (Fitted to Heavy Duty Units only).

Note:

If this adjustment entails removal of the indicator from its mounting take care that the capillary is not in any way strained. Do not disconnect the capillary. (See Appendix B).

HYDRAULIC WEIGHING UNITS

APPENDIX A

POINTER ADJUSTMENT

The instructions set out below are for the adjustment of the pointer only, if the readings are overweight or underweight.

1. Remove backplate.
2. Before adjusting the pointer, release the blue locknut on the pointer oscillation damper and turn the blue hexagon headed screw in an anti-clockwise direction as this will release any restriction on the pointer.
3. Set pointer to read zero on dial by means of adjusting knob on side of case after applying equivalent skip weight to load cell.
4. Take various readings on the gauge by applying known weights and thus giving some indication as to whether the gauge is reading over or underweight.
5. If the gauge reads overweight throughout the complete scale of the dial, slacken off the link screw (painted green) and turn the toggle screw (painted red) in an anti-clockwise direction. Only slight adjustments of the toggle screw should be made. Note: $\frac{1}{2}$ turn of the toggle screw makes approximately 1" difference in linear travel of the pointer (tip).
6. Re-tighten link screw (painted green).
7. If the gauge reads underweight throughout the complete scale of the dial, slacken off link screw (painted green) and turn the toggle screw (painted red) in a clockwise direction, this being the reverse procedure to Note (5).
8. Re-tighten link screw (painted green).
9. Before re-checking calibration it is most important that the gauge pointer should be set at zero, otherwise a false impression of the errors may result.
10. To re-set oscillating damper, see Oscillating Damper Instructions.
11. Re-fit backplate.

APPENDIX B

POINTER OSCILLATING DAMPER ADJUSTMENT

The instructions set out below are for the adjustment of the pointer oscillating damper only.

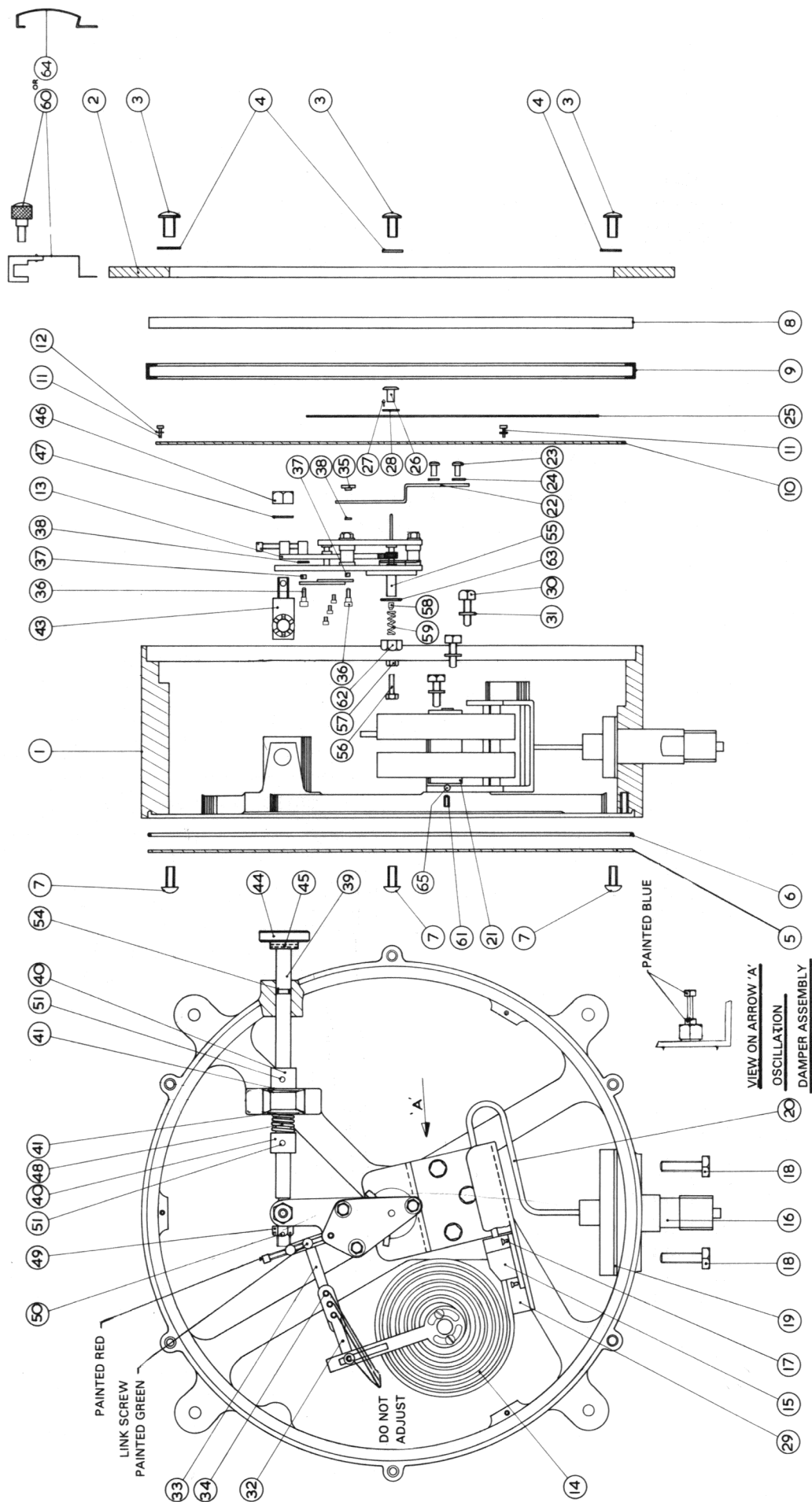
The oscillating damper will be found on the rear side of the movement comprising a small blue hexagon screw with a blue locknut.

With machine running and skip in the "ready to load" position:-

1. Remove backplate.
2. Release the blue locknut.
3. Turn the hexagon headed screw in a clockwise direction until pointer oscillation is reduced to a minimum, at the same time avoid excessive tightening of hexagon headed screw.
4. Add known weights to ensure that application of damper has not affected weight readings.

5. If the readings have been affected this will indicate that the hexagon headed screw has been tightened down too far and it should be released slightly until the readings become accurate.
6. Remove the weights and check that pointer returns to zero.
7. Re-tighten blue locknut.
8. Re-fit backplate.

These instructions are for the adjustment of the pointer and oscillating damper only and on no account should any other form of adjustment take place or screws interfered with as this may result in making the whole unit unserviceable.



HYDRAULIC WEIGHING UNIT

Item No.	Description	Qty	Part No.	Code	DRG. No.
1	Case	1	WDG12-MK.2-1-1		A1-3545
2	Rim	1	WDG 12-2-1		G/1987
3	Rim Screws	6	WDG 12-3-6		None
4	Rim Screw Washers	6			None
5	Backplate	1	WDG 12-4-1		A3-1699
6	Backplate Gasket	1	WDG 12-5-1		A4-3599
7	Backplate Screws	6	WDG 12-6-6		None
8	Window	1	WDG 12-7-1		A4-3599
9	Window Gasket	1	WDG 12-8-1		G/1981/Item 21
10	Dial	1	WDG 12-9-1		A4-3599
11	Dial Screw	3	WDG 12-10-3		None
12	Dial Screw Washers	3			None
13	Movement Assembly	1	WDG 12/18-11-1		G/3241/C
14	Tube	2	WDG 12/18-12-2		A4-3598
15	Tube Block	1	WDG 12/18-13-1		G/1980/Item 11
16	Connection Block	1	WDG 12/18-14-1		G/1980/Item 12
17	Tube Block Screws	4			None
18	Connection Block Bolts	4	WDG 12/18-15-4		None
19	Connection Block Gasket	1	WDG 12/18-16-1		G1988/Item 26
20	Connecting Tube	1	WDG 12/18-17-1		G1988/Item 29
21	Endbit	1	WDG 12/18-18-1		G1980/Item 13
22	Endbit Lever	1	WDG 12/18-19-1		G1738/Item 1
23	Endbit Screws	2	WDG 12/18-20-2		None
24	Endbit Washers	2			None
25	Pointer	1	WDG 12-21-1		G/16/460
26	Pointer Bush	1	WDG 12-22-1		G3696 B
27	Pointer Rivet	1			None
28	Pointer Washer	1	WDG 12/18-23-1		G/16/460
29	Mounting Frame	1	WDG 12/18-24-1		A2/3530
30	Mounting Frame Screws	3	WDG 12/18-25-3		None
31	Mounting Washers	3	WDG 12/18-26-3		None

Item No.	Description	Qty	Part No.	Code	DRG No.
32	Link	1	WDG 12/18-27-1		G3446B
33	Slotted Link	1	WDG 12/18-28-1		4G-5169
34	Link Adjustment Screws	3	WDG 12/18-29-3		None
35	Link Nut	1	WDG 12/18-30-1		G3592B
36	Link Screw	2	WDG 12/18-31-2		G3591B
37	Link Screw Brush	2	WDG 12/18-32-2		G3595B
38	Link Washer	2	WDG 12/18-33-2		G3593B
39	Adjustment Rod	1	WDG 12-34-1		3G-5166
40	Adjustment Rod Bush	2			None
41	Adjustment Rod Thrust Washer				
43	Adjustment Pillar	1	WDG 12/18-37-1		G1981/Item 18
44	Adjustment Knob	1	WDG 12/18-38-1		G1979/Item 10
45	Adjustment Knob Pin	1			None
46	Adjustment Pillar Nut	1	WDG 12/18-39-1		None
47	Adjustment Pillar Washer	1	WDG 12/18-40-1		None
48	Adjustment Rod Spring	1	WDG 12/18-41-1		4G5170
49	Adjustment Rod Castle Nut	1	WDG 12/18-42-1		None
50	Adjustment Rod. Nut Cotter Pin.	1	WDG 12/18-43-1		None
51	Adjustment Rod. Bush Cotter Pin	2	WDG/12/18-44-2		4G-5170
54	Spindle 'O' Ring	1	WDG 12/18-47-1		None
55	Swivel Plate	1	WDG 12/18-50-1		G2091/Item 1
56	Damper Adjustment Screw	1	WDG 12/18-51-1		G2091/Item 2
57	Lock Nut	1	WDG 12/18-52-1		G2091/Item 3
58	Friction Pad	1	WDG 12/18-53-1		G2091/Item 4
59	Friction Pad Spring	1	WDG 12/18-54-1		G2091/Item 5
60	Screw-on-Pointer	3	WDG 12-55-3-8		G/9/160 & G1910 Item 8
61	End Bit Bleeder Screw	1	WDG 12/18-57-1		G1980 Item 13a
62	Swivel Plate Nut	1			None
63	Swivel Plate Washer	1			None
64	Clip-on Pointer	3			G/1988 Item 31
65	Steel Ball Bleed Seal	1			G1980 Item 13b

PARTS LIST

WORKSHOP MANUAL

200TM

SECTION 12-18

BLANK

CALIFORNIA

Proposition 65 Warning

Diesel engine exhaust and some of its constituents are known to the State of California to cause cancer, birth defects, and other reproductive harm