MACHINE SHOP, RE, TRANSPORTABLE, CB 366/1C

OPERATING INFORMATION, TECHNICAL DESCRIPTION, REPAIR INSTRUCTIONS AND COMMERCIAL PARTS LIST

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AMENDMENT RECORD

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PREFACE

1 Amendments are identified by marginal side lining.

2 Comments on this publication are to be forwarded in accordance with AESP 0100-P-011-013 to Vehicles and Weapons Branch REME, Chobham Lane, Chertsey, Surrey KT16 0EE.

ASSOCIATED PUBLICATIONS

EMER Wksp U 191	Tapping Drill Sizes for Screw threads.
EMER Wksp U 192	Sharpening and Use of Twist Drills.
EMER Power H 180 - H 189	Shock Protection Devices.
EMER Power J 009	Battery Acid Hazard Precautions
Misc Instr No 1	
EMER Power J 305 & J 330	Secondary Batteries, Lead Acid - Vehicle and Signal Types.
EMER T & M A 028 Chap 063	Inspection and Test Secondary Batteries
EMER Whld Vehs F 230/239	Truck, Cargo, 4 Ton, 4x4, Bedford MK
EMER Whld Vehs U 210/13-219/13	Trailer, 1.5 Ton, 2 Whld, Flat Platform, 219/13 Specialist (FV 2421).
EMER Eng & Misc G 122/1	Space Dehumidifier, Westair, Drymatic - 50KM
EMER T & M A 028 Chap 659	Inspection and Examination of Truck Mounted Transportable Containers.

AESP 2510-C-030	Transportable Container 3 ton, Truck Mounted (CB 300 Series) Common Items.
AESP 4940-W-300-201	Machinery, Metal work, fitted in container, Transportable Automotive Repair, 3 ton (CB 366/2).
AESP 2610-C-030	Transportable, Containers 3 ton Truck mounted (CB 300 Series) Common Items.
AESP 6115-H-500	Generating Set, Engine Driven 16/24 240/416V 1/3 phase 50Hz (Newton Derby)
Army Code No 22211	User Handbook, Truck, 4 Tonne, 4x4, Bedford MK

The Abrasive Wheel Regulation 1970

Material Regulations, Volume 6, Accommodation Services Pamphlet 1, Section 22.

WARNINGS ...

(1) ALL MACHINE TOOL GUARDS MUST BE USED.

(2) SAFETY GLASSES OR GOGGLES MUST BE WORN.

(3) DO NOT TRY TO STOP A MACHINE WITH HANDS OR BODY AFTER POWER IS SWITCHED OFF.

(4) TORN OR LOOSE CLOTHING, RINGS, WATCHES OR OTHER JEWELLERY THAT COULD GET CAUGHT IN MOVING MACHINERY MUST NOT BE WORN.

(5) THE FLOOR MUST BE KEPT FREE OF METAL CHIPS, SWARF, GREASE, OIL AND COOLANT.

(6) GRINDING WHEEL MOUNTING MUST ONLY BE CARRIED OUT PERSONNEL APPROVED AND CERTIFIED FOR THE MOUNTING OF ABRASIVE WHEELS.

(7) ALWAYS CHECK GRINDING WHEELS FOR CHIPS AND CRACKS BEFORE FITTING AND APPLY RING TEST.

(8) ALWAYS CHECK THE RATING (MAX ALLOWABLE REV/MIN) OF GRINDING WHEELS IS NOT EXCEEDED BY MACHINE SPEED.

(9) ALWAYS FIT PAPER BLOTTERS ON EACH SIDE OF WHEEL.

(10) GRINDING WHEELS MUST NOT BE BROUGHT TO REST BY APPLYING PRESSURE TO THE PERIPHERY OR FACE.

(11) PERSONNEL MUST NOT TRAVEL OR SLEEP IN A CONTAINER.

(12) PERSONNEL MUST NOT WORK IN A CONTAINER IN AMBIENT TEMPERATURES ABOVE 32°C (90°F), WITHOUT ADEQUATE VENTILATION.

(13) THE 4 TONNE, FLAT PLATFORM, 4x4, TRUCK WHEN FITTED WITH A 3 TONNE CONTAINER BODY AND ASSOCIATED SYSTEM EQUIPMENT HAS A RELATIVELY HIGH CENTRE OF GRAVITY. IF TRAFFIC HAZARDS (SUCH AS BENDS, ROUNDABOUTS AND OFF-ROAD SURFACES) ARE NEGOTIATED AT EXCESSIVE SPEEDS, BODY ROLL CAN RESULT. TO REDUCE BODY ROLL, DRIVERS SHOULD EXERCISE EXTREME CAUTION AND REDUCE SPEED ACCORDINGLY WHEN APPROACHING AND NEGOTIATING SUCH HAZARDS.

(14) A CONTAINER MAY BE FITTED WITH MAINS ELECTRICAL EQUIPMENT AND IS THEREFORE POTENTIALLY DANGEROUS. DO NOT CONNECT A CONTAINER TO THE MAINS SUPPLY UNTIL THE EARTH SPIKES HAVE BEEN POSITIONED A MINIMUM OF 2 m (6.5 ft) APART AND 2 m (6.5 ft) FROM THE STEPS. THE SPIKES MUST BE DRIVEN INTO THE GROUND AT LEAST 0.6 m (20 in). ENSURE THAT THE GROUND IS DAMP IN THE VICINITY OF EACH SPIKE.

(15) DO NOT USE A CONTAINER INSTALLATION UNLESS THE RELEVANT ELCBs HAVE BEEN CHECKED FOR TRIPPING TO 'OFF' AND THE 'MAINS ON' LIGHT EXTINGUISHED.

(16) LETHAL VOLTAGE: THE VOLTAGES USED IN THIS INSTALLATION CAN ENDANGER LIFE. CARELESSNESS CAN BE FATAL. ENSURE THAT THE CONTAINER IS CORRECTLY EARTHED AND THAT THE EARTH LEAKAGE CIRCUIT BREAKER OPERATES SATISFACTORILY.

CAUTIONS ...

(1) When mounting chucks, centres and toolposts ensure all location surfaces are free from swarf and foreign matter.

(2) When mounting or removing chucks place a protective board on the lathe bed.

(3) Always keep machines well lubricated and gearbox oil at the correct level.

(4) When replenishing grease in the Wolf valve seat grinder drill do not overpack. Grease expands when warm and too much will damage bearing seals.

Chapter 1

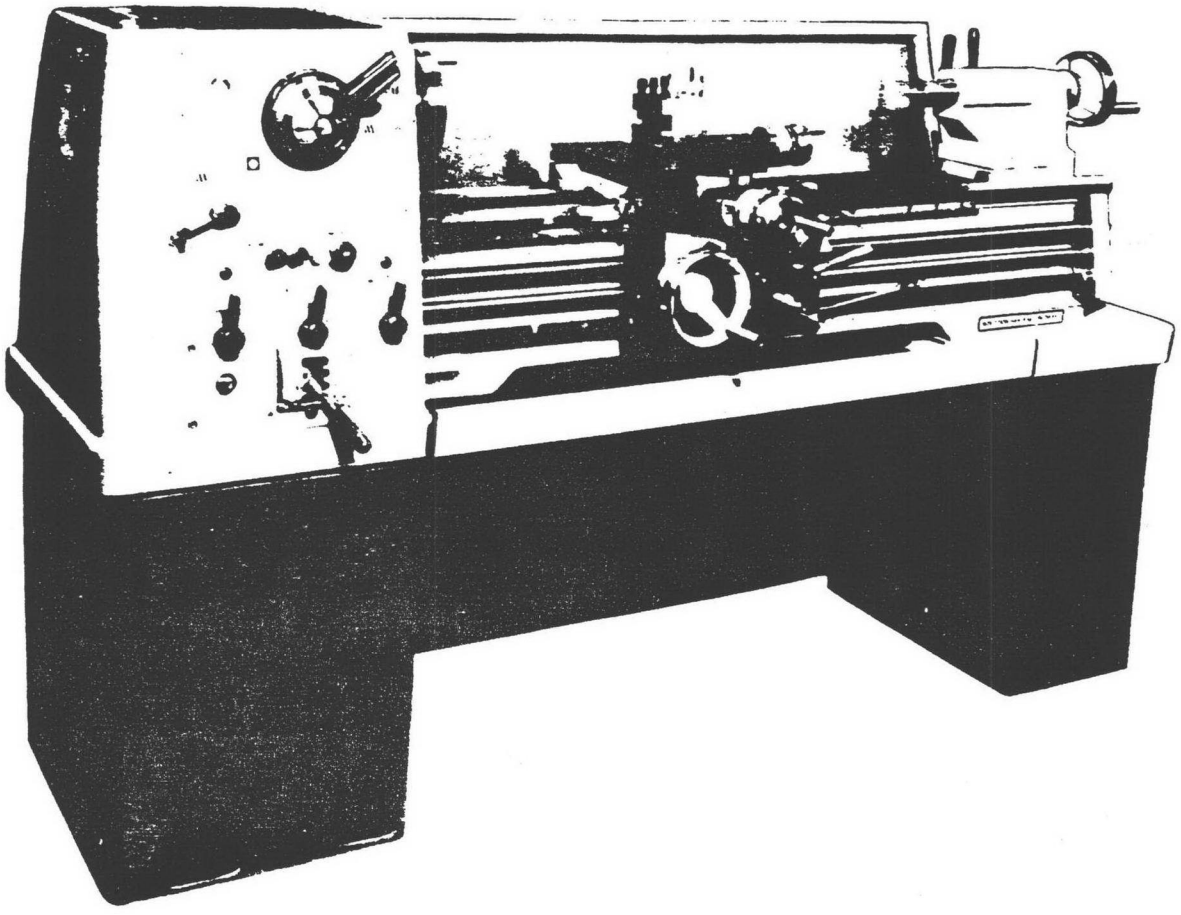
MACHINE TOOLS, POWER TOOLS AND CONTAINER INSTALLATIONS

CONTENTS

Chapter 1-1

COLCHESTER LATHE MASTER 2500 AND MICROPROCESSOR DIGITAL READOUT

COLCHESTER MASTER 2500



This manual applies only to the machine having the serial number shown; this is stamped on the front of the lathe bed at the tailstock end and MUST be quoted in all communications.

Machine Serial Number .....

THE COLCHESTER LATHE COMPANY LTD.,
COLCHESTER ESSEX ENGLAND

Printed in England

CLC 016/5534 685/6C/1P.

INDEX

MACHINE SPECIFICATION

Centres

Height	165 mm (6.5 in)
Admits between	635 or 1015 mm (25 or 40 in)

Swing

Over bed (saddle wings)	335 mm (13.25 in)
Over cross-slide	210 mm (8.25 in)
In gap	480 mm (19 in)
Length in front of spindle nose	115 mm (4.5 in)

Spindle

Bored to pass	40 mm (1.625 in)
Nose type	4 in. D.1 camlock
Morse tape in bush	3 MT

Spindle speeds

No. off			16
Selected in four ranges of four speeds in each range			
30	40	54	72
98	130	175	235
320	425	570	770
1030	1380	1860	2500

Motor (main)

1400 r.p.m. (50 Hz)	3.7 KW (5 HP) C.M.R. D100L Frame size
or	
1800 r.p.m. (60Hz)	3.7Kw (5 HP) Cont. L184T Frame size

Bed

Width of ways	230 mm (9.125 in)
Type of ways	Vee and flat

Cross-slide

Width and length	149 mm x 486 mm (5.875 in x 19.125 in)
Travel	210 mm (8.25 in)

Top slide

Width	89 mm (3.5 in)
Travel	95 mm (3.75 in)
Tool section	25 x 25 mm (1 x 1 in)
Quick change tooling	Dickson No. 2

Tailstock

Quill diameter (nominal)	50.8 mm (2 in)
travel	145 mm (5.75 in)
Morse taper	3 MT
Set over	(0.250 in)

Leadscrew

Diameter	28.58 mm (1.125 in)
Thread	6 mm pitch or 4 T.P.I.

Threads

Metric pitches	0.2–14 mm (39)
Imperial T.P.I.	2–72 TPI (45)
Module pitches	0.3–3.5 MOD (18)
Diametral pitches	8–44 D.P. (21)

Feeds

Metric (R10 Series)	0.03 mm – 1.0 mm
Imperial (R10 Series)	0.001 in x 0.040 in
Cross feeds = half longitudinal (approx) values	

Height of machine

Floor to spindle centre	1061 mm (41.75 in)

Overall length

635 mm (25 in) machine	1605 mm (63 in)
1000 mm (40 in) machine	1985 mm (78 in)

Weight

635 mm (25 in) machine	840 kg (approx)
1000 mm (40 in) machine	890 kg (approx)

For other dimensions see foundation plan

Coolant pump unit

Type AQ3 50/60Hz	1/20 h.p.

INSTALLATION

CLEANING

Before operating any controls, remove the anti-corrosion coating from all slideways, the leadscrew and feedshaft anc from the end-gear train, see Fig. 1; using only white spirit or Kerosene

DO NOT USE UNAPPROVED SOLVENTS FOR CLEANING AS THEY WILL DAMAGE THE PAINT FINISH.

Oil all bright, machined surfaces immediately after cleaning; use heavy oil or grease on the end-train gears and oil the intermediate gear (idler) spindle through the oilers furnished.

Operate the slideways lubrication pump, mounted on the front of the apron, several times to ensure that the last traces of anti-corrosion coating are removed from under the bedway wipers and slide edges.

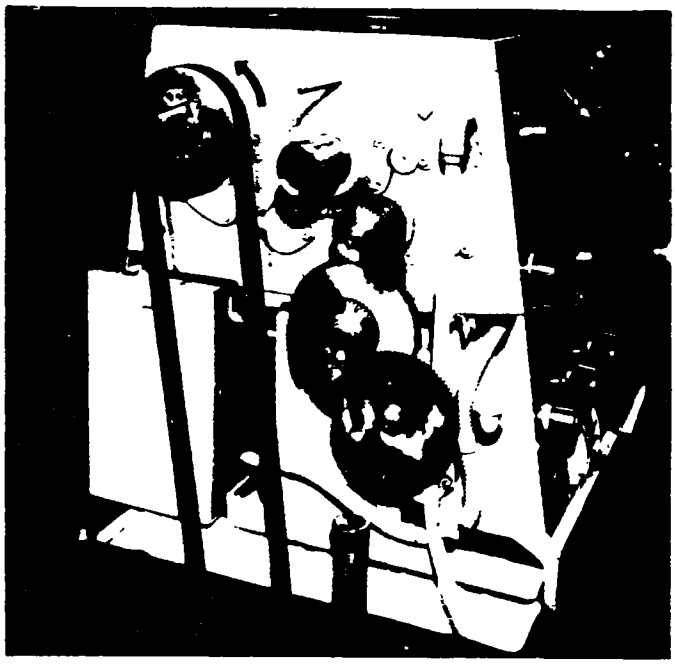


Fig. 1

LIFTING

A) Preparation and Safety Checks

1. Remove all items of loose equipment
2. Carefully clean bedways and the underside of the lifting tackle.
3. Clamp the tailstock securely at the tailend of the bed.
4. Ensure eyebolts, shackle pins and securing screws are correctly tightened
5. Always place thick paper between top plates and the bedway to protect the bed surface
6. USE ONLY THE CORRECT EQUIPMENT – DO NOT SLING AROUND THE LATHE BED – LEADSCREW AND SHAFTS MAY BECOME BENT AND DAMAGED

B) Lifting

1a. Position the bed-clamping plate and eyebolt as in Fig. 2. ensuring that the bottom clamp does not straddle the joint between gap piece (A) and bed.

2a. Firmly tighten bolts to clamp tackle to the bedway.

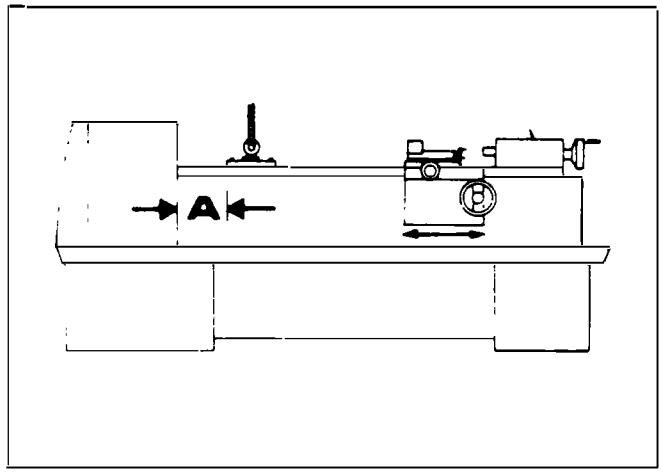


Fig. 2

3a. Carefully lift the lathe just clear of the ground, then reposition the saddle (carriage) to achieve balance before lifting further.

Store all lifting tackle in dry locations and protect from corrosion and damage.

INSTALLATION

Locate the machine on a solid foundation, allowing sufficient area for easy working and maintenance (see Fig. 5). The lathe may be used when free-standing, but for maximum performance it should be bolted to the foundation.

Free-standing: Position lathe on foundation and adjust each of the six mounting feet to take an equal share of the load. Then using an engineer's precision level on the bedways (as in Fig. 3) adjust the feet to level the machine. Periodically check bed level to assure continued lathe accuracy.

Fixed installation: Position lathe over six bolts (½ in. or 12 mm dia.) set into the foundation to correspond with mounting feet; dimensions are shown in Fig. 5. Accurately level the machine as in Fig. 3, then tighten the holding-down bolts and re-check bed level.

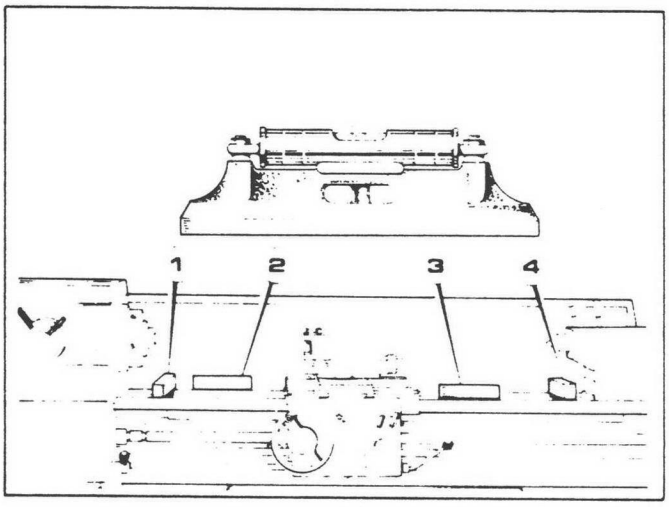


Fig. 3

ELECTRIC SUPPLY CONNECTION

Power should be supplied through a separate isolator, the input wires being connected to mains terminals of the electrical panel at the back of the headstock.

Main motor rotation must be anti-clockwise, viewed from the pulley end. Should the motor run in the wrong direction, interchange any two of the three phase-lines; a wiring diagram is included in the Servicing and Maintenance Section.

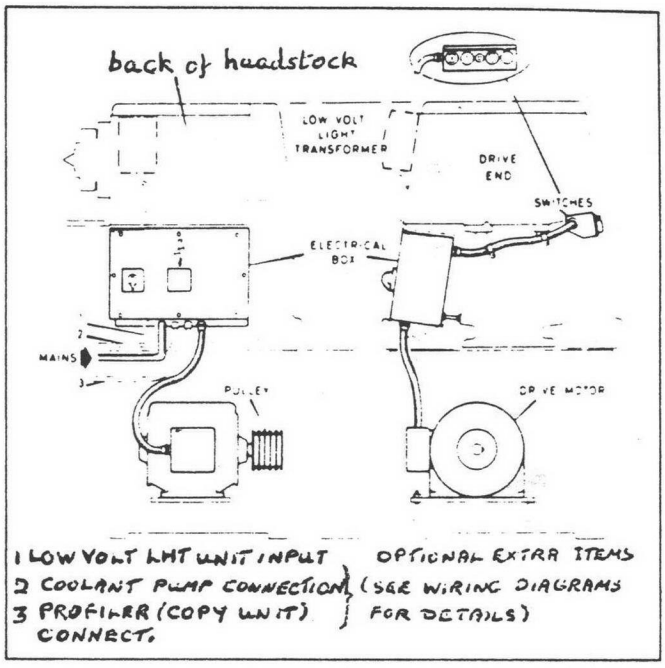


Fig. 4

LUBRICATION CHECKS

Ensure the headstock lubrication tank and gearbox are filled with Shell Tellus oil 37 (I.S.O. VG 37) to correct level, and the apron reservoir filled to the level of the sight window with Shell Tonna 68 (I.S.O. VGT 68) lubricant.

Oil compound slide and tailstock through oilers furnished.

Before each working shift, operate the manual lubrication pump to ensure adequate lubrication of carriage slideways.

Refer to page 14 for further information.

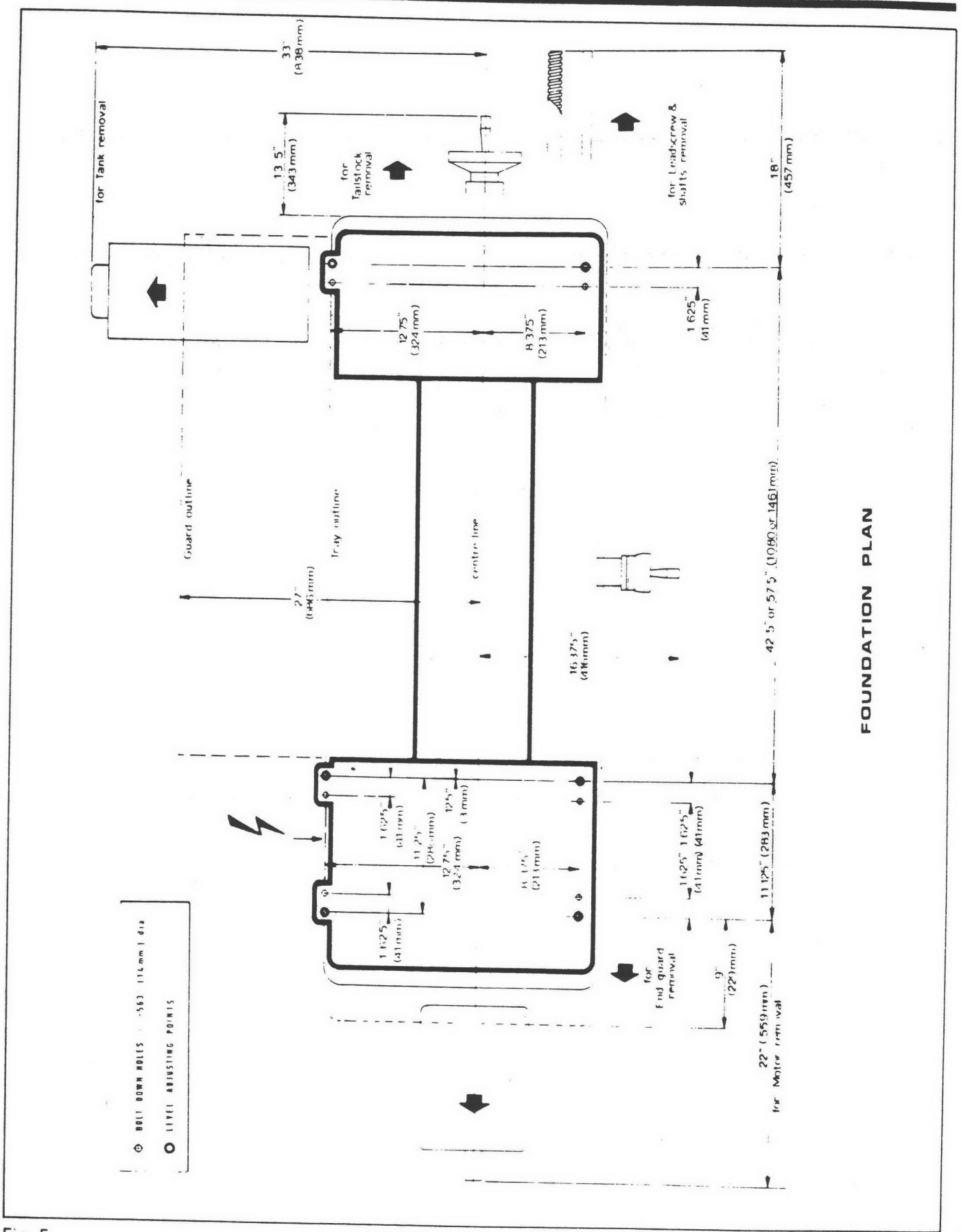

FOUNDATION PLAN
for Tank removal
33" (838 mm)
13.5" (343 mm)
for Tailstock removal
for Leadscrew & shafts removal
18" (457 mm)
12.75" (324 mm)
8.375" (213 mm)
1.625" (41 mm)
Guard outline
Tray outline
Centre line
27" (686 mm)
16.375" (416 mm)
42.5" or 57.5" (1080 or 1461 mm)
1.625" (41 mm)
12.75" (324 mm)
8.375" (213 mm)
1.625" (41 mm)
1.625" (41 mm)
11.125" (283 mm)
for End guard removal
9" (229 mm)
22" (559 mm)
for Motor removal
BOLT DOWN HOLES
LEVEL ADJUSTING POINTS

Fig. 5

CHUCKS AND CHUCK MOUNTING – Fig. 6

When fitting chucks or faceplates, first ensure that spindle and chuck tapers are scrupulously clean and that all cams lock in the correct position. It may be necessary when mounting a new chuck to re-set the camlock studs (A). To do this, remove the cap-head locking screws (B) and set each stud so that the scribed ring (C) is flush with the rear face of the chuck – with the slot lining up with the locking screw hole (see inset).

Now mount the chuck or faceplate on the spindle nose and tighten the six cams in turn. When fully tightened, the cam lock line on each cam should be between the two V marks on the spindle nose.

If any of the cams do not tighten fully within these limit marks, remove the chuck or faceplate and re-adjust the stud as indicated in the illustration.

WARNING: USE ONLY HIGH-SPEED CHUCKS WITH THESE MACHINES.

Fit and tighten the locking screw (B) at each stud before mounting the chuck for work.

A reference mark should be made on each correctly fitted chuck or faceplate to coincide with the reference mark scribed on the spindle nose. This will assist subsequent remounting. DO NOT INTERCHANGE CHUCKS OR FACE PLATES BETWEEN LATHES WITHOUT CHECKING FOR CORRECT CAM LOCKING.

IMPORTANT

Take careful note of speed limitations when using faceplates: 12 in. faceplates should not be run at more than 1400 rev/min and 18 in. faceplates at not more than 1050 rev/min.

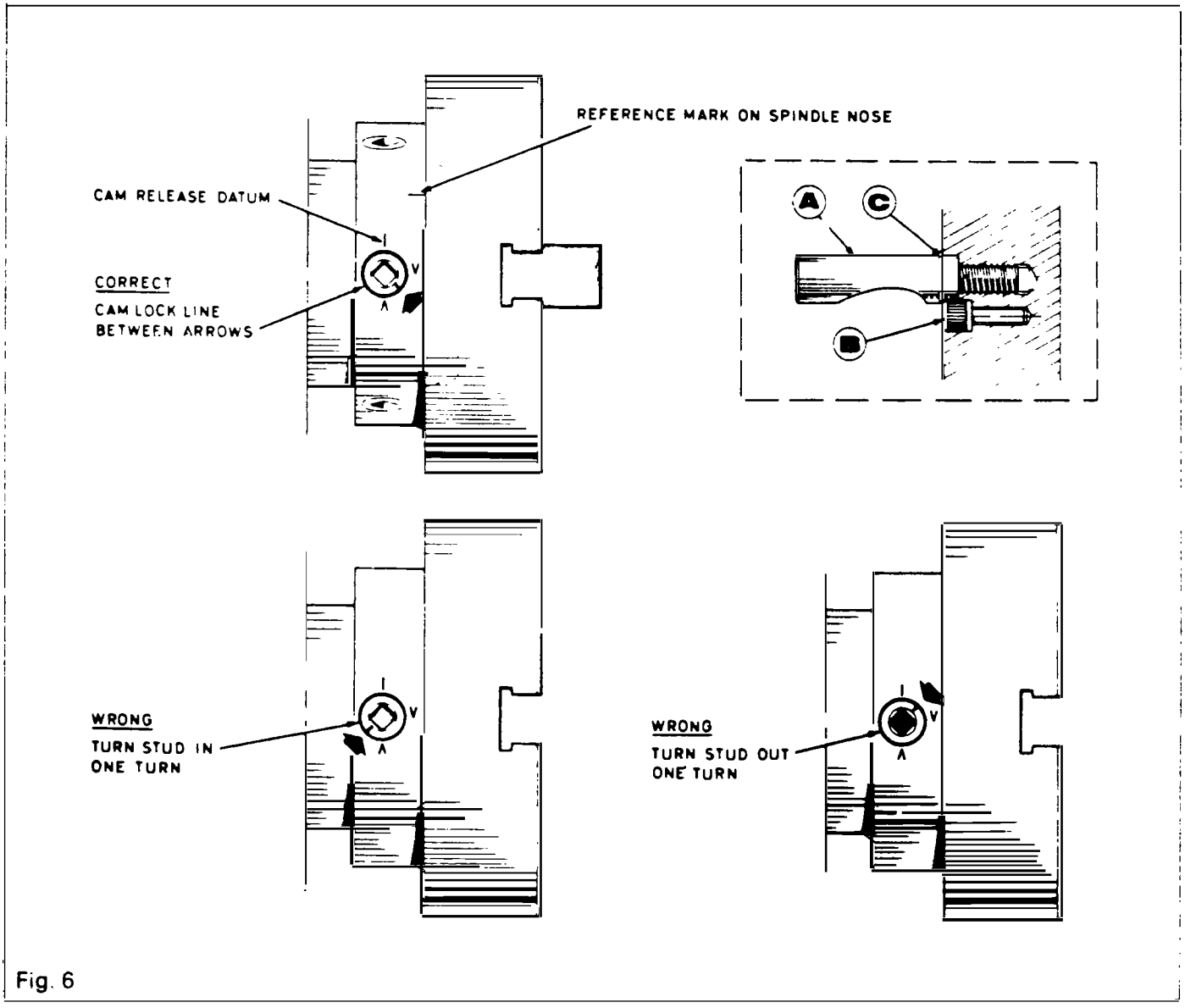


Fig. 6

IMPORTANT

Please read before starting machine

When this machine leaves the factory the end train gears are set for the fine range of feeds (L) as shown on the gearbox data plate, to avoid any possibility of damage to the leadscrew and feedshaft by accidental starting on high speeds and coarse feeds.

DO NOT select spindle speeds above 770 RPM with standard end train gear settings (H) or (K).

Before operating the machine read carefully OPERATION INSTRUCTIONS – pages 7–11 in the manual.

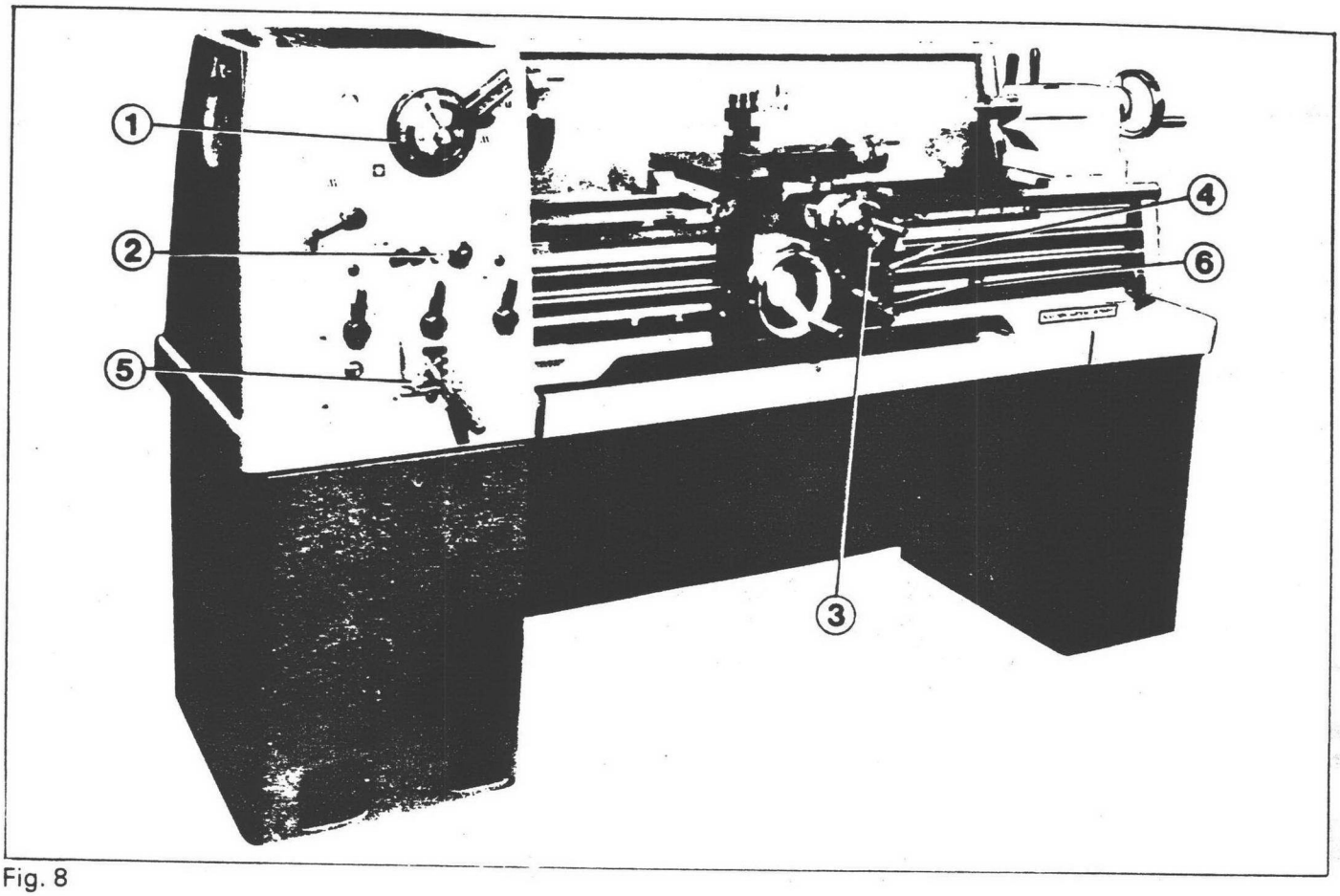


Fig. 8

LATHE CONTROLS – Fig. 8

1. Spindle speed selector.
2. Electrical push-buttons.
3. Apron, surfacing or sliding feeds.
4. Apron, leadnut engagement lever.
5. Gearbox, threads and feeds.
6. Spindle rotation (forward, brake and reverse).

Fig. 9

ELECTRICAL CONTROLS – Fig. 9

With the exception of the Disconnect Switch all lathe electrical controls are fitted in the front face of the headstock.

1. Press the button to start the main drive motor. The indicator lamp glows whilst the motor is running.
2. Press the RED button to stop the main motor and also shut down electrical supply to ancillary services. Reset to allow restart by normal sequence.
3. Press the BRAKE RELEASE button to free main spindle for hand rotation during chuck or faceplate adjustment.
4. Coolant pump STOP/START button.

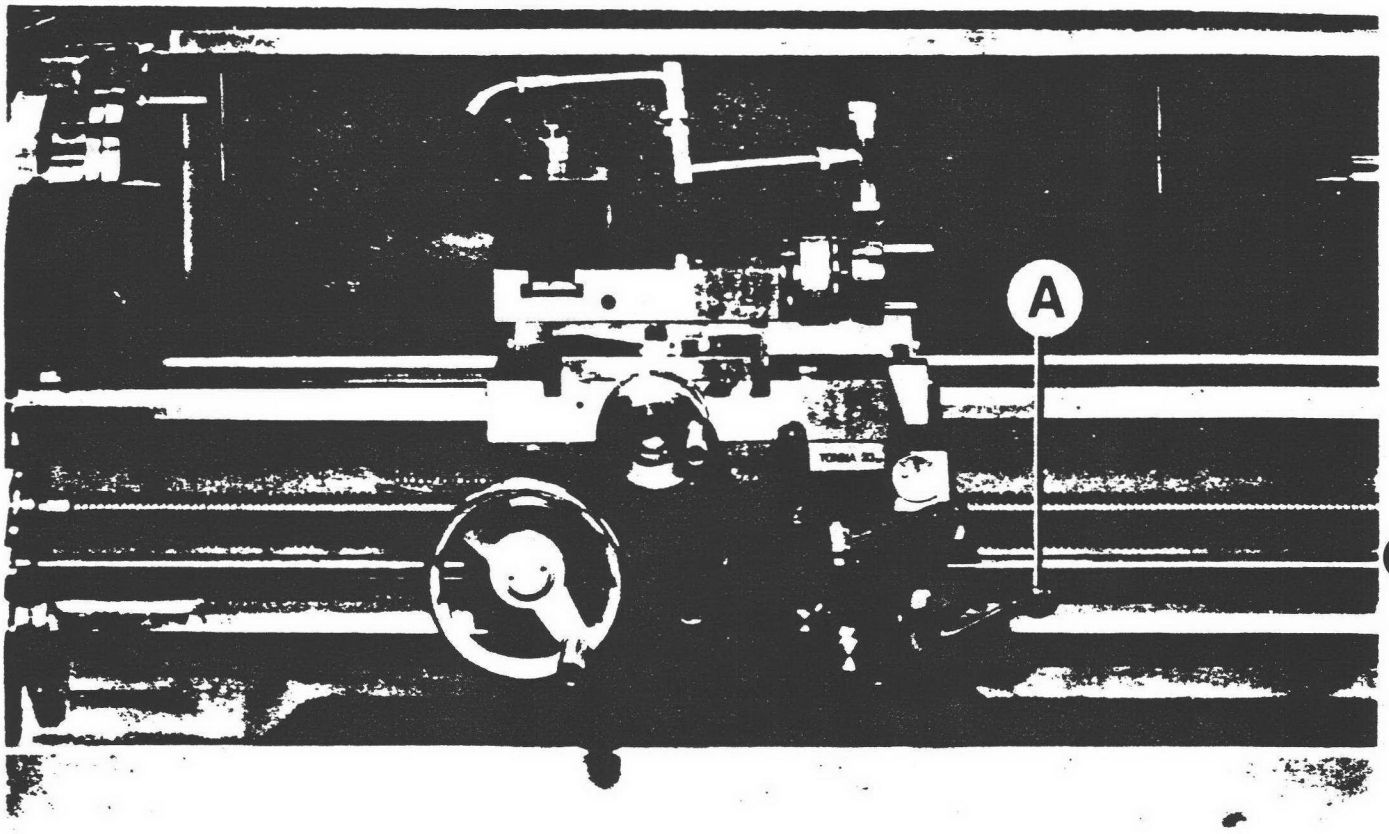


Fig. 10

SPEED CONTROLS

Spindle Rotation – Fig. 10

Selected by the apron lever (A).

With the main motor running, move lever (A) out then down for forward rotation. Return it to the central position for spindle braking. When spindle is stopped move the lever out and upward for reverse rotation.

Safety-gate location of the apron lever in the braking position prevents inadvertant operation.

Spindle brake

An electro-magnetic brake is mounted on the inter-shaft. It is of the fail-safe type where braking automatically occurs when the lever control is returned to the braking position.

A push button (3 of Fig. 9) is provided to release the main spindle for hand rotation whilst manually depressed.

SPINDLE SPEEDS – Fig. 11

Selected by the grouped dial controls on the headstock, the sixteen available speeds are shown directly on the lever-operated dial (A) in four groups each of which is divided into four spindle speeds. Rotate this dial to bring the required speed group uppermost and opposite the fixed section (B). Now rotate lever (C) until the appropriate coloured arrow is aligned with the required speed on dial (A).

CAUTION: DO NOT MOVE SPEED SELECTOR CONTROLS WHILST THE SPINDLE IS ROTATING.

To free the spindle for hand rotation set any one of the blank spaces of dial (A) to the mid-position of the fixed section (B).

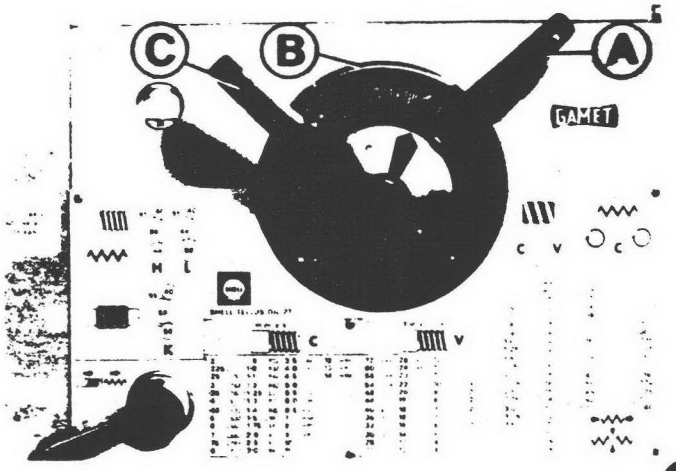


Fig. 11

THREAD AND FEED SELECTION – Fig. 12

All threads and feeds directly available from the gearbox are given on the data plate fitted at the front of the headstock, with the settings of control levers shown in Fig. 12.

The end gear train should be arranged as in the diagrams (H, L or K) shown on the data plate for either English or Metric pitches.

CAUTION: DO NOT SELECT COARSE RANGE (H or K) AT SPINDLE SPEEDS ABOVE 745 REV/MIN.

For any special threads not covered by the data plate, our Technical Department is available to specify the most convenient change gearing required.

Feeds: Sliding feeds per spindle revolution range from 0.001 to 0.040 in. (0.03 to 1.0 mm).

Surfacing feeds are approximately half sliding feeds (0.452 actual).

Lever (A) is provided for left-hand thread-cutting, and reversal of feeds.

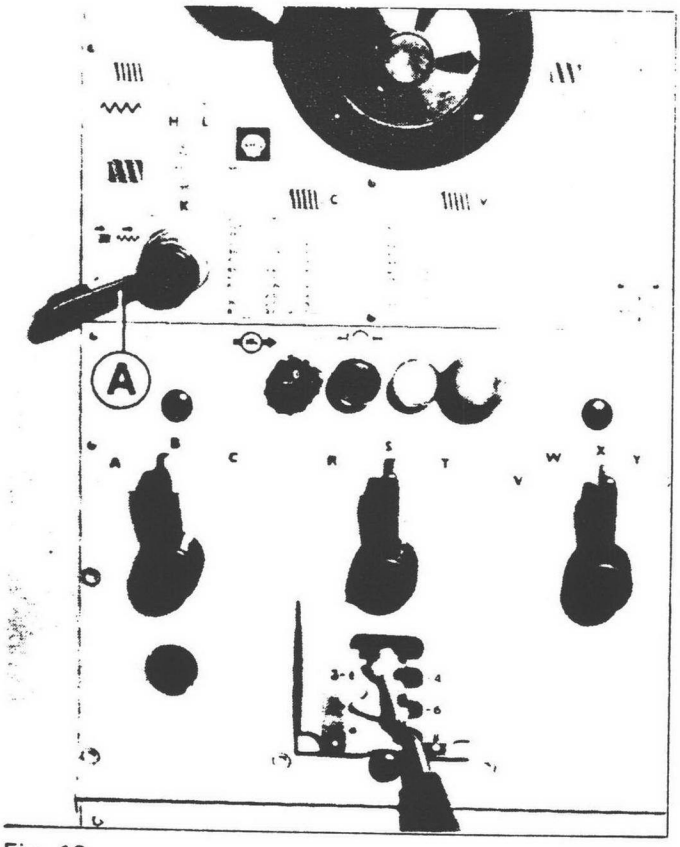


Fig. 12

Threading dial indicator – Inch (Fig. 13): To cut threads of even number per inch, close the lead-screw nut at any line on the dial; to cut threads of odd number per inch, close the leadscrew nut at any numbered line. Ensure that the appropriate dial line coincides exactly with the fixed point (A) on each pass.

For metric thread cutting (and certain fractional English threads) the dial cannot be used. The leadscrew nut must be closed and the machine reversed by the apron control lever (A of Fig. 10) after each pass and tool withdrawal.

For D.P. and module pitches, keep leadscrew nut closed and operate machine as for metric threads.

Fig. 13

Fig. 14

Threading dial indicator – Metric (Fig. 14): Supplied with lathes incorporating a metric leadscrew. This combination unit enables the majority of metric pitches shown on the data plate to be cut in a similar manner to that employed to cut English threads on lathes fitted with an English leadscrew, releasing the leadnut after each pass.

The correct pinion must be engaged with the leadscrew to suit the pitch to be cut. For clarity, all pitches available through the gearbox have not been shown on the indicator plate, but any pitch may be cut providing it is divisible into the pinion selected, e.g. 0.4 mm is divisible into 16T.

Using the 14, 18 or 22T pinion the leadscrew nut may be closed as dial line 1 or 3 passes the datum mark. Using the 16 or 20T pinion the leadscrew nut may be closed as any numbered line is passing the datum.

Unnumbered lines on the dial are not used.

Metric pitches not divisible into the pinions supplied, D.P., module and English threads can only be cut with the leadnut closed throughout.

MULTI-START THREADS

Multi-start threads can be cut on a lathe in three ways:

1. By repositioning the compound (top) slide one pitch forward for each start. Note that the slide is normally set at 90° to the axis of the machine cross-slide. The accuracy of this method depends upon the skill of the operator.
2. By using an accurately-divided driver plate and turning the workpiece one division forward for each start.
3. By advancing the driver gear a calculated number of teeth to advance the spindle by one pitch of the thread to be cut. The accuracy of this method is that of the machine.

The ratio between the spindle and driver gear is 1 : 1.

In order to use this method, the number of teeth on the driver gear must be divisible by the number of starts being cut. The driver gear is then advanced by this number of teeth, i.e. 40T ÷ 4 starts = 10.

The limitation of this method depends upon whether the number of starts required can be divided equally into the number of teeth on the driver gear without a remainder.

On the standard English gear train for this machine the driver gear has 40 teeth; so that two or four start threads can readily be cut. For other odd numbers of starts a choice must be made of methods 1 or 2.

APRON AND SLIDE CONTROLS – Fig. 15

In addition to manual operation of the saddle by rotating apron handwheel (A), of the cross-slide by handwheel (B) and of the topslide by handwheel (C), power feed is available to the saddle and cross-slide.

1. Push-pull knob (D) selects power surfacing or sliding feeds; pull out for sliding, push in for surfacing operation.
2. Lever (E) is moved up for power feed engagement, down for manual operation.
3. Lever (F) is pressed down to engage leadscrew nut for screw cutting.

Use headstock lever (A) of Fig. 12 for reversing feed; and, left-hand screw cutting.

Feed trip adjustment: A trip mechanism is incorporated in the apron, enabling saddle and/or cross-slide to be fed up to fixed stops. Trip loads can be set high or low by adjustment of the knurled handwheel on the side of the apron.

The apron handwheel may be disengaged from its gear train during power operation or when screw-cutting, by pulling the handwheel outwards to another spring-ball detent.

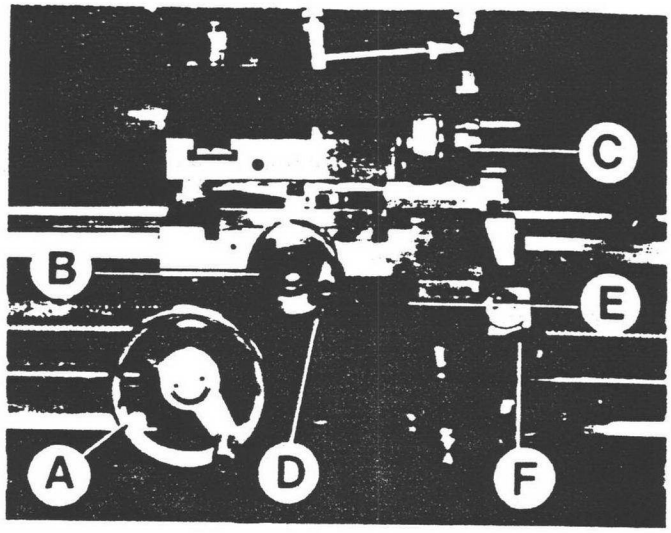


Fig. 15

Cross-slide and Topslide handwheels carry dials graduated in inch and metric dimensions, except when dual reading English/Metric dials are fitted when rotation of the sleeve carrying the datum marks through 180° will reveal the appropriate scale. A thumb wheel lock is fitted to the cross-slide dual dial, which should be released when adjusting the scale and relocked before further cuts are taken.

Note: The cross-slide dial is graduated to indicate changes in workpiece DIAMETER and the topslide is graduated to indicate tool movement.

The topslide is mounted on a rotatable base graduated 0–90–0–90 degrees. The fixed datum is located on the cross-slide at 90° to the front edge. Care should be exercised when rotating the base ensuring that the correct spanner is used to slacken the lock nuts and that they are adequately tightened after adjustment.

Whenever possible the topslide should be positioned with the toolblock located over the rotatable base to give maximum support, particularly when using parting off tools.

Saddle Lock Screw (H)

This locks the saddle to the bed for facing or cut off operations.

BE SURE TO RELEASE BEFORE ATTEMPTING TO MOVE THE SADDLE.

TAILSTOCK – Fig. 16

Is freed for movement along the bed by unlocking the clamp lever (A).

The tailstock barrel is locked by lever (B).

Can be set over for the production of shallow tapers, or for re-alignment by adjustment of the screws (S) at each side of the base – see Fig. 16. Release the clamping lever and loosen screws (C) beneath the tailstock which hold base to main casting, then retighten and check after adjustment of set-over.

An indication of the set-over is given by the datum mark (D) at the tailstock end face.

The barrel is graduated in inch and metric dimensions.

Standard tang drills with 3 M.T. shank can be used, but barrel travel will be reduced by the difference in length of the Standard 3 M.T. shank and the tang length.

A datum line is stamped on the front face of the barrel nose chamfer to assist in setting tools to centre height.

Safety Stop

Stop pin (E) is fitted to prevent the tailstock inadvertently sliding off the end of the bed.

Always ensure that the pin is secure and replaced after removal.

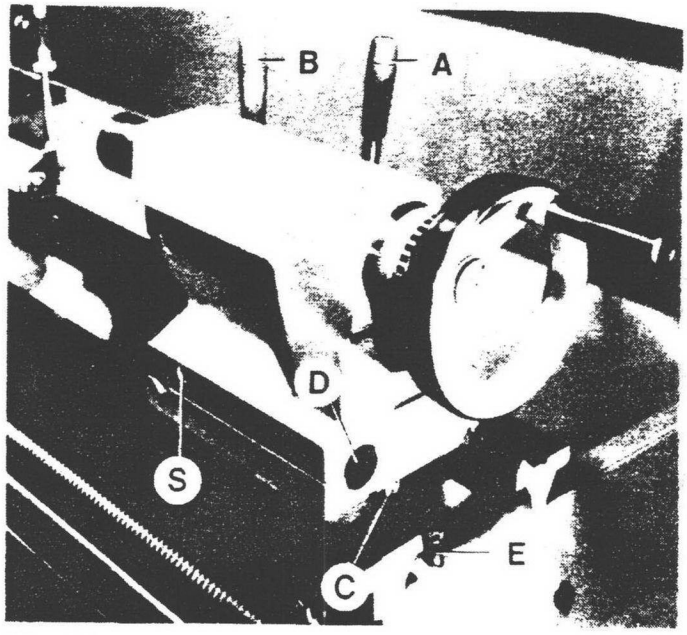


Fig. 16

LATHE ALIGNMENT – Figs. 17/18

With the lathe installed and running, we recommend a check on machine alignment before commencing work. Check alignment and levelling at regular periods to assure continued accuracy.

Headstock check: Take a light cut over a 6 in. (150 mm) length of 2 in. dia. (50 mm) steel bar held in the chuck (but not supported at the free end). Micrometer readings at each end of the turned bar at A and B should be the same.

To correct a difference in readings, slacken the four headstock screws (A) shown in Fig. 18 then adjust the set-over pad (C) to pivot the headstock about the dowel (B). Tighten all securing screws after each adjustment and repeat the test cut and alignment check until the micrometer readings are identical.

Tailstock check: Using a 12 in. (305 mm) ground steel bar between centres, check alignment by fitting a dial test-indicator to the topslide and traversing the centre-line of the bar.

To correct error, release the tailstock clamp lever (A) and adjust the two screws (S) shown in Fig. 16 after releasing the screws beneath the tailstock base.

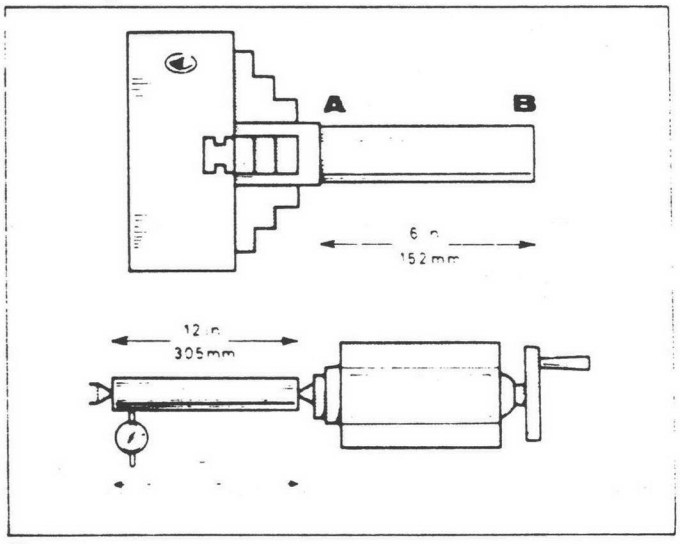


Fig. 17

END-GEAR TRAIN – Fig. 19

Drive from headstock to gearbox is transmitted through a gear train enclosed by the headstock end-guard. Intermediate gears are carried on the adjustable swing-frame (A).

Gears must be thoroughly cleaned before fitting and backlash should be maintained at 0.005 in. (0.127 mm) for correct mesh.

Lubricate gears regularly with thick machine oil or grease, and apply oil can to the intermediate gear spindle.

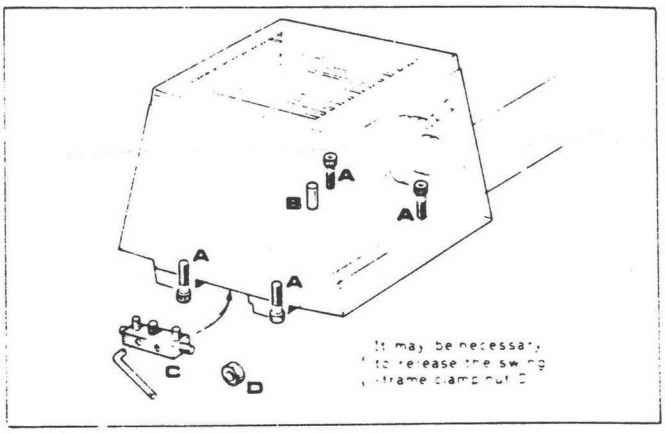


Fig. 18

DRIVING BELTS – Figs. 19/20

To alter belt tension, remove the cover plate behind the headstock plinth and adjust the two screws (A) on the hinged motor platform. Ensure that the motor axis is kept level.

Light finger-pressure at a point mid-way between motor and headstock pulleys should produce approximately ¾ in. (19 mm) movement of each belt when under correct tension.

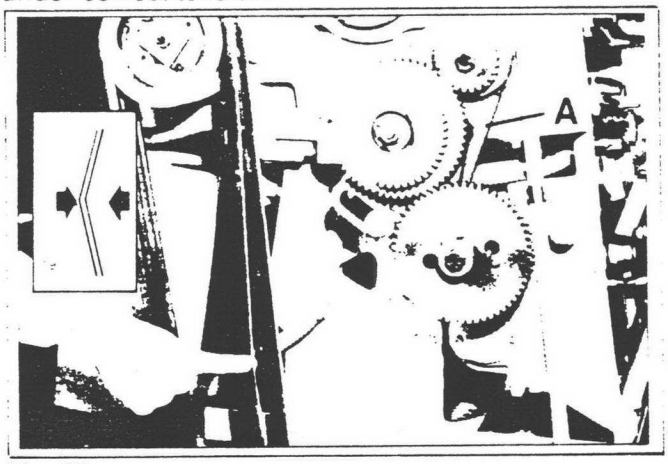


Fig. 19

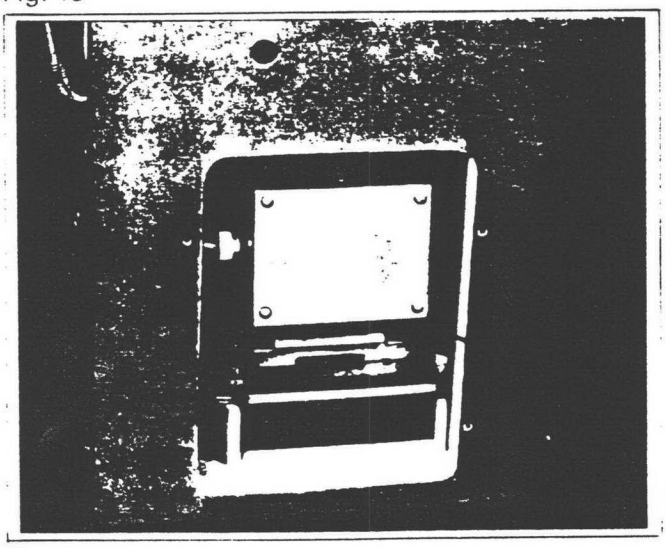


Fig. 20

OVERLOAD PROTECTION – Fig. 21

The transmission is protected against severe overload by shearpins fitted into the gearbox and leadscrew drive shafts.

SHEARPIN REPLACEMENT

Gearbox Drive Shaft (Fig. 21A). Isolate electrical supply and remove endguard. Remove driven gear (A) and spacer (B) exposing bush (C). Withdraw sheared pin head from bush and remove bush. Push rest of shear pin through the locating hole (E) in drive shaft.

Replace bush (C) aligning holes in bush and driveshaft. Insert new pin and refit spacer (B) and change gear (A).

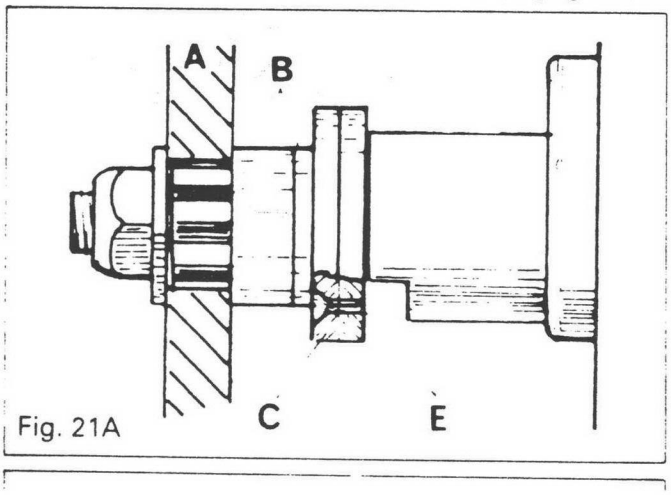


Fig. 21A

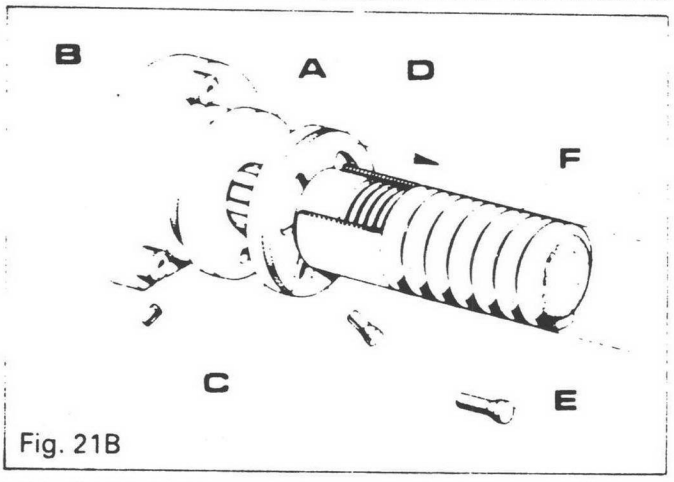


Fig. 21B

LEADSCREW DRIVE SHAFT (Fig. 21B)

Disengage drive to the leadscrew (F) by setting the right-hand lever of the gearbox to position R. Then rotate the flanged shaft (A) carrying the broken pin to the slot at the bottom of the gearbox housing (B). Press the springloaded collar (C) to the right and push the pin into the slot. Rotate the shroud washer (D) to expose the pin head for removal from the leadscrew collar (C).

Align the holes in flanged-shaft (A) and collar (C) then insert a new pin (E) and rotate the shroud washer to cover and retain the new shearpin.

CAUTION: USE ONLY CORRECT REPLACEMENT SHEARPINS OF ⅛ in. (3.175 mm) DIAMETER STEEL, 30 TON TENSILE STRENGTH.

SLIDWAYS – Fig. 22

Tapered gib-strips are fitted to slideways of cross and compound slides and any slackness which may develop can be rectified by resetting the gibs with the adjusting screws provided.

To adjust the cross-slide slacken the rear screw (A) and tighten the front screw (B), making only a slight alteration with constant checking for smooth action. The top-slide is adjusted by the single screw (S).

Tapered gibs are fitted to each wing of the saddle and may be adjusted by the single screws (C).

Ensure that slideways are thoroughly cleaned and lubricated before making any adjustment. Avoid over-adjustment which will only result in stiff, jerky action of the slide concerned.

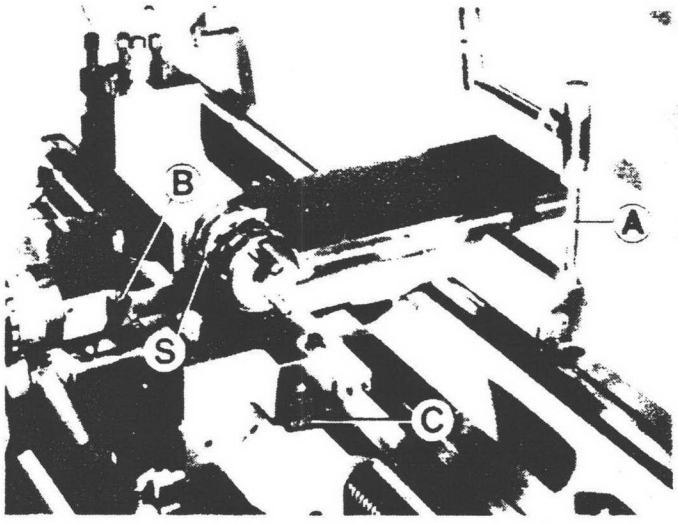


Fig. 22

CROSS-SLIDE NUT – Fig. 23

This is adjustable for elimination of slackness which may develop in service. Reduce backlash by loosening the rear caphead screw (A), then carefully screw in the centre screw (B) to adjust a wedge within the split nut. Make only a slight alteration at a time and operate the cross-slide repeatedly through full travel to be sure of smooth action.

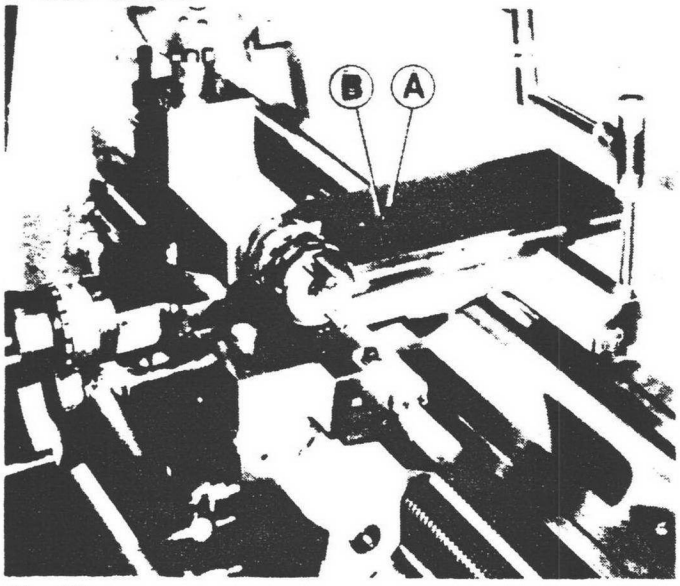


Fig. 23

DRIVE CLUTCHES

Two multi-plate clutches on the headstock clutch shaft provide drive for forward or reverse spindle rotation.

Clutches are Matrix or Ortlinghaus wet-type multiplate pattern which are matched to power requirements under Standard operating conditions. Initial bedding-in of friction surfaces, however, may necessitate some adjustment to avoid overheating due to slip.

Before adjusting the clutches, first isolate the lathe from the mains power supply at the switch on the electrical panel in rear of the headstock.

READ CAREFULLY THE INSTRUCTIONS GIVEN ON THE ACCESS COVER PLATE – instructions for precise adjustment vary according to the types of clutch fitted to individual machines.

SPINDLE BRAKE – Fig. 24

The spindle brake is of the spring-applied type requiring practically no maintenance apart from ensuring that the friction disc and its mating faces are clean and free from oil and grease at all times. After many thousands of operations, however, adjustment of the air gap may be needed. The gap 'A' should be measured with feeler gauges at three points around the circumference and should be between a minimum of 0.016 in. (0.4 mm) and a maximum of 0.08 in. (2 mm).

When, due to normal wear on the friction disc, the maximum allowable air gap is exceeded, the bolts holding the magnet assembly to the machine should be removed and the spacer sleeves on these bolts reduced in length by the appropriate amount to restore the air gap to its normal minimum dimension and the unit re-assembled and tested.

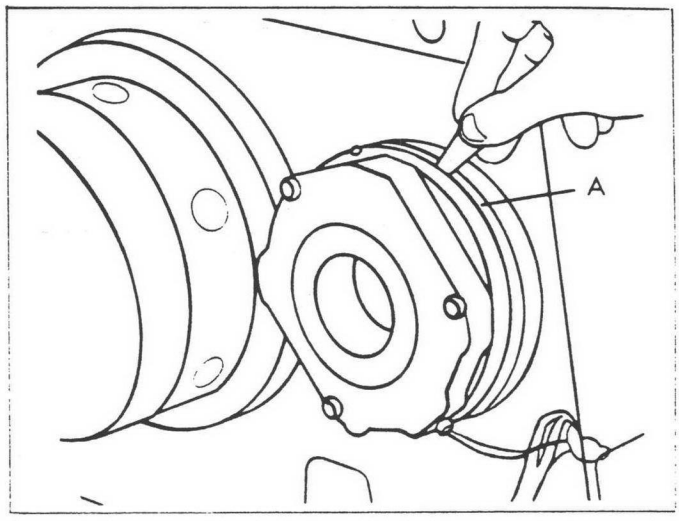


Fig. 24

SPINDLE BEARINGS

A pre-loaded spindle bearing arrangement is incorporated which does not require adjustment. Any wear which may take place is automatically compensated.

LUBRICATION – General – Fig. 25

Headstock

Spindle bearings, gearing and drive-shaft clutches are jet-lubricated from a distributor box located beneath the headstock top cover; supplied by an impeller-type pump attached to a tank in the head-end plinth.

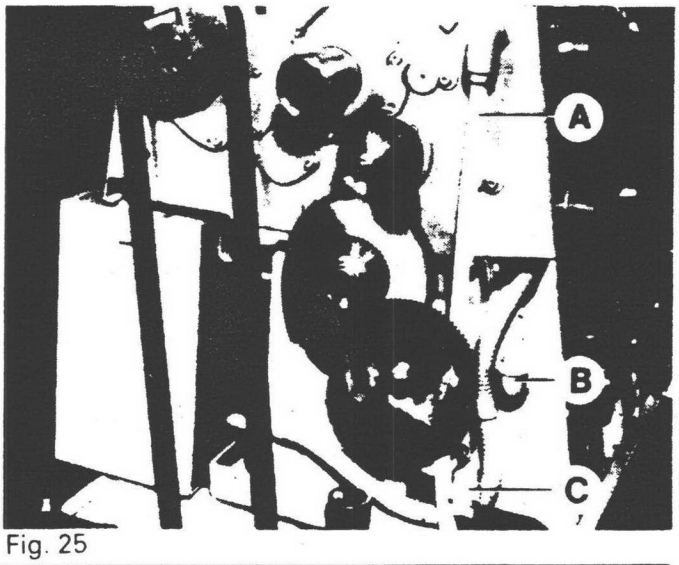


Fig. 25

The oil pump is driven by a belt from the main motor pulley, ensuring a continuous supply of lubricant to the headstock whilst the main motor is running. Evidence of supply is shown in an oil-sight glass in the headstock front face.
A large-bore pipe returns oil from the bottom of the headstock into the tank. Ensure that the oil level in the tank is kept topped up to the mark on the filler-cap dip-stick. Check oil level weekly and change the oil every year using Shell Tellus oil 37 (I.S.O. VG 37).

Tank capacity is 2½ gallons (11.4 litres).

To empty the tank, set apron control lever to central position and stop the main motor. Detach the delivery pipe (A) at the headstock, remove pipe cleats and with the pipe directed into a suitable container restart the main motor so causing the pump to empty the tank contents. The small quantity of oil left in the tank below the level of the pump intake can then be drained off through the drain plug projecting from the tank through the plinth wall.

Gearbox

All gears are splash lubricated from an integral oil bath. An oil level sight window is furnished in the end face of the gearbox. Top up or refill gearbox with Shell Tellus oil 37 (I.S.O. VG 37) through filler elbow (B).

Approximate quantity of oil required is 2 pints (1.14 litres).

NOTE: Use only clean containers for refilling or topping up oil level.

To drain gear box, unscrew drain plug (C) in the end of gearbox casting.

Where the specified lubricant is unobtainable, a grade with the following characteristics can be used:

Viscosity	40°C	36.2
Centistokes	100°C	6.10
Viscosity Index		115
Density 15°C kg/1		0.875
Flash point closed		210°C
Pour point		–30°C

APRON AND SLIDEWAY LUBRICATION – Fig. 26

A manually-operated pump (A) is incorporated in the apron; drawing oil from the apron reservoir, it enables the operator to ensure that the slideways and cross-slide nut are kept adequately lubricated.

Operate the pump until oil flows from the hole (B) to ensure that the system is primed.

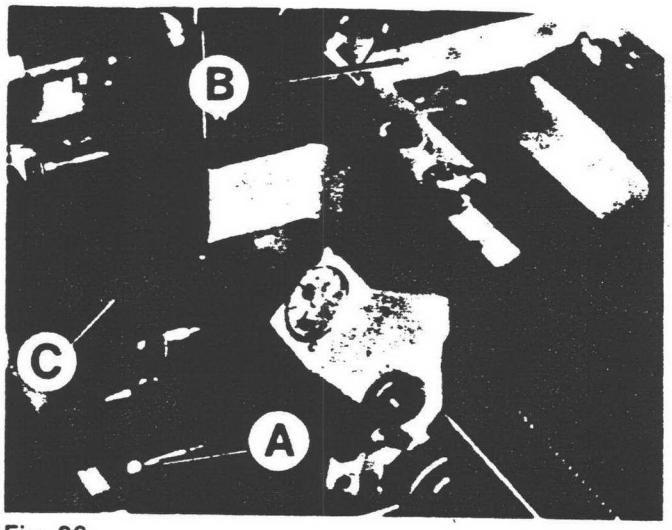


Fig. 26

When the oil level of the apron reservoir falls below the mark on the sight-glass (C) the system should be topped up through the filler hole in the saddle with Shell Tonna T68 oil (I.S.O. VG T68). When the specified lubricant is unobtainable a grade with the following characteristics can be used:

Viscosity	40°C	36.2
Centistokes	100°C	9.30
Viscosity Index		114
Density 15°C kg/1		0.882
Flash point closed		219°C
Pour point		–27°C

Reservoir capacity is 2 pints (1.14 litres approximately).

A drain plug is provided on the under surface of the apron casting.

DO NOT MIX LUBRICANTS. When alternative lubricants are to be used, the system or reservoir should be drained and flushed out before refilling with the equivalent grade.

REGULAR ATTENTION – Fig. 27

For trouble-free operation keep the lathe clean and regularly lubricated. The chart shows the recommended attention and frequency.

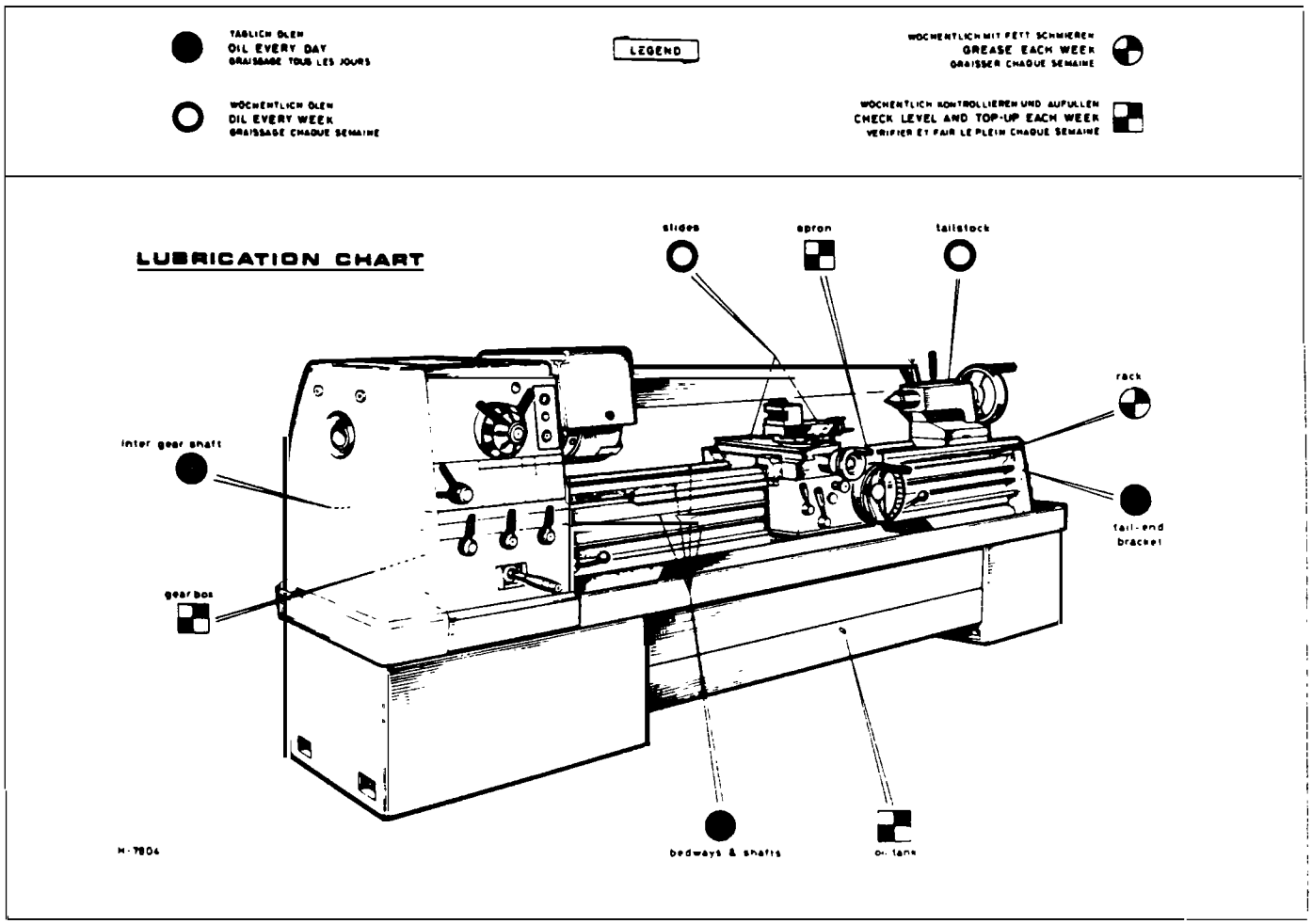
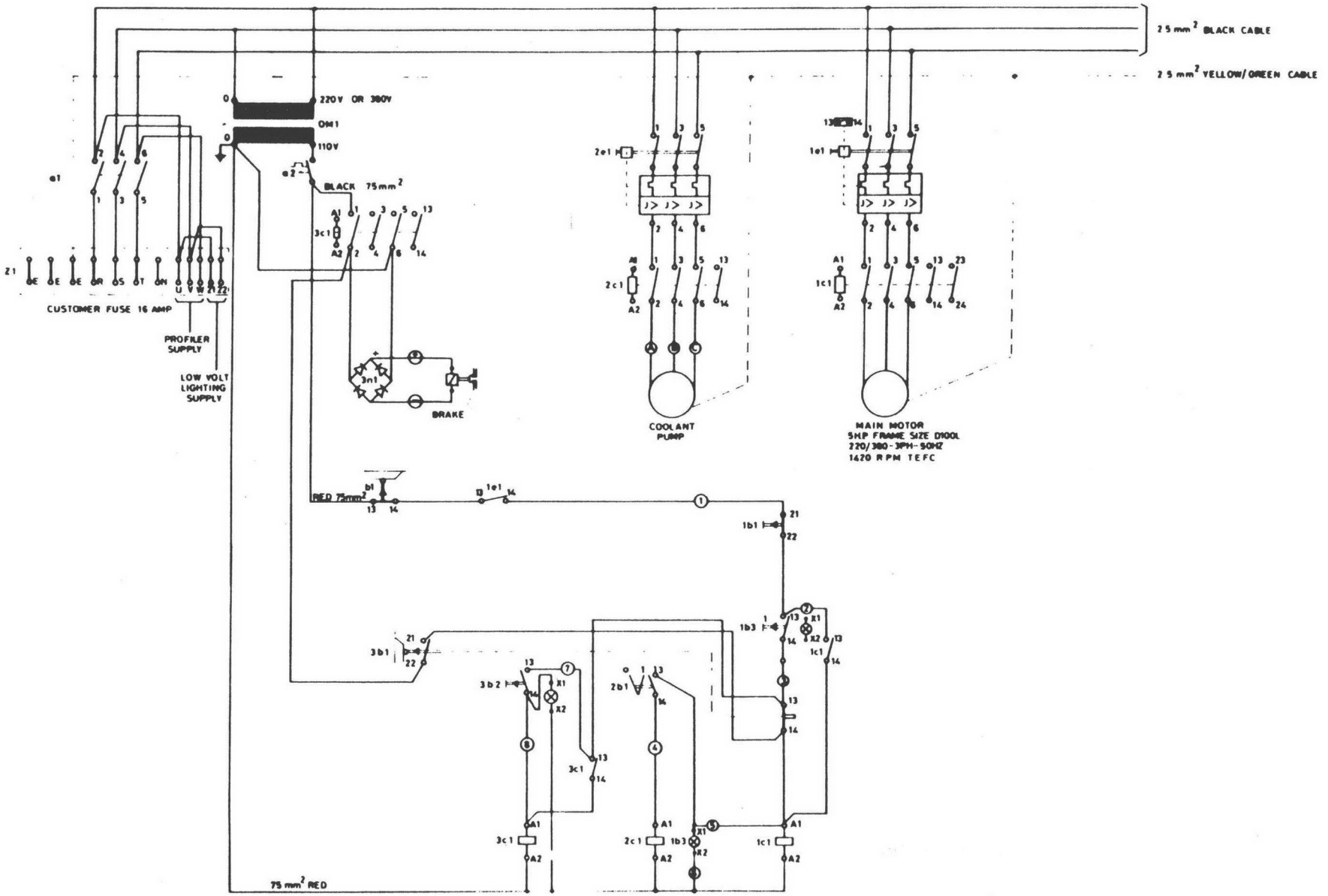
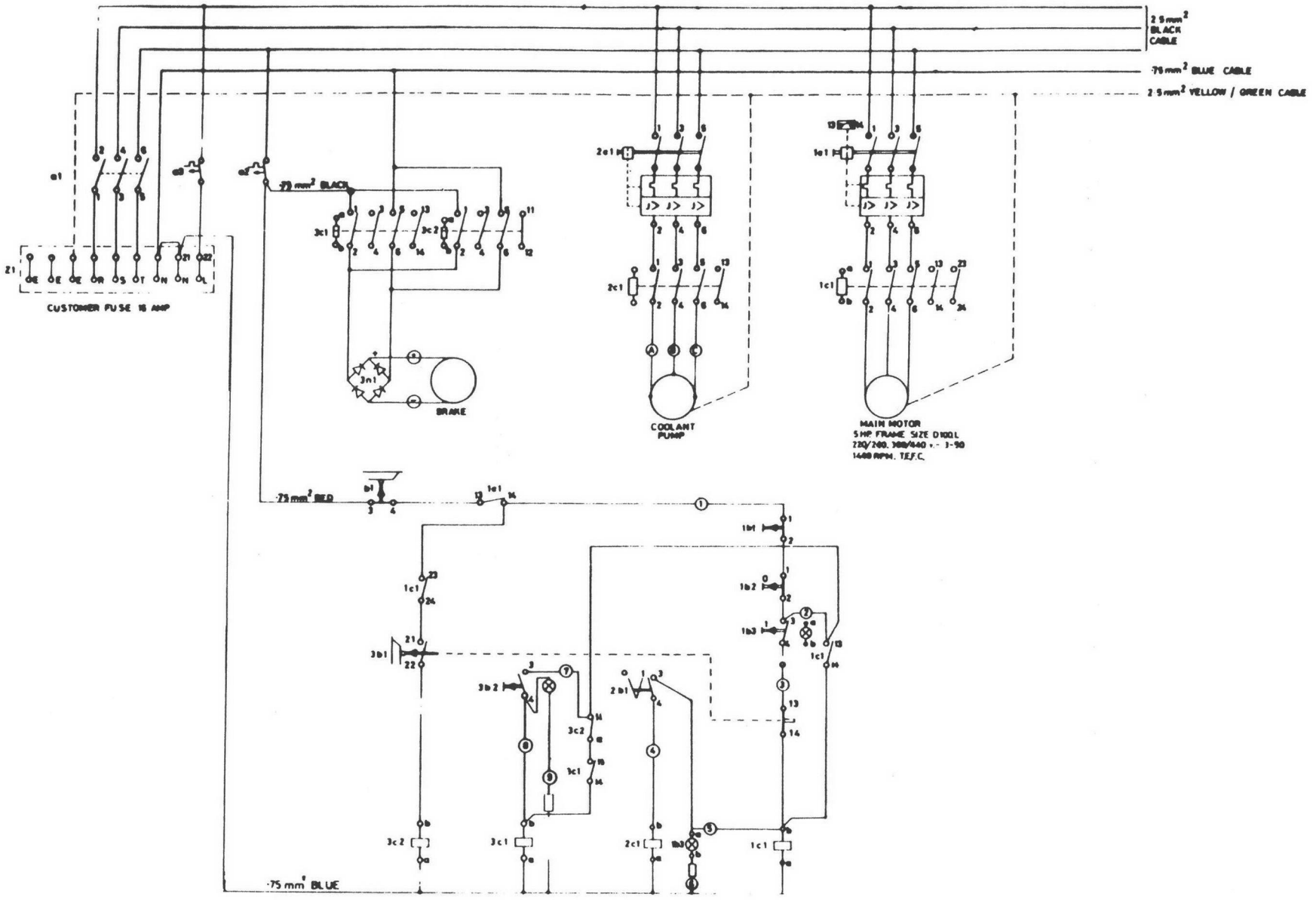

TÄGLICH ÖLEN
OIL EVERY DAY
GRAISSAGE TOUS LES JOURS
WÖCHENTLICH ÖLEN
OIL EVERY WEEK
GRAISSAGE CHAQUE SEMAINE
LEGEND
WÖCHENTLICH MIT FETT SCHMIEREN
GREASE EACH WEEK
GRAISSER CHAQUE SEMAINE
WÖCHENTLICH KONTROLLIEREN UND AUFFÜLLEN
CHECK LEVEL AND TOP-UP EACH WEEK
VERIFIER ET FAIR LE PLEIN CHAQUE SEMAINE
LUBRICATION CHART
slides
apron
tailstock
rack
inter gear shaft
tail-end bracket
gear box
bedways & shafts
H-7804

Fig. 27



MASTER 2500 · ELECTRO-MAGNETIC BRAKE

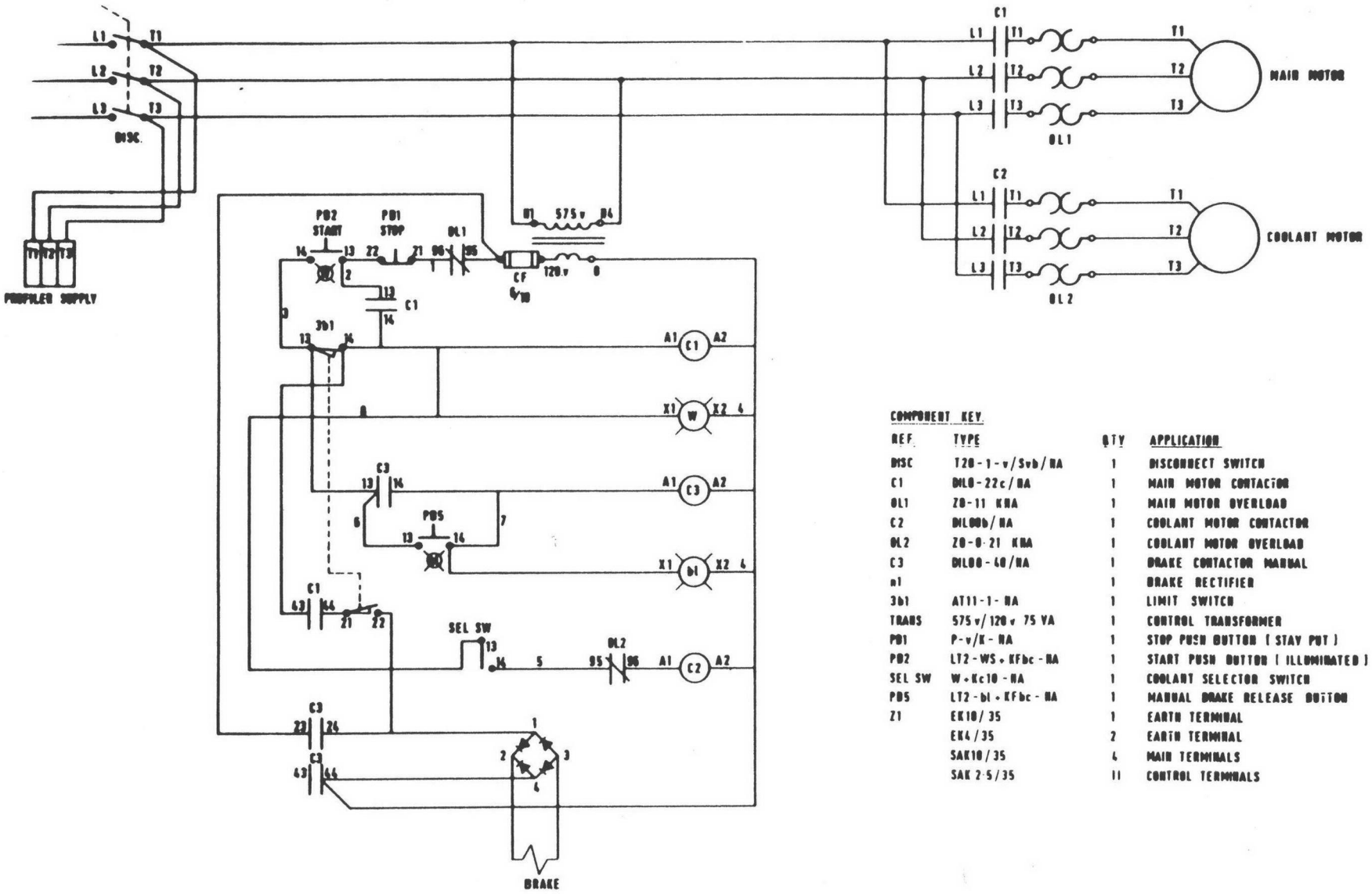
WIRING DIAGRAM
220/380-3-50 110V Control EP 518



MASTER 2500 - ELECTRO MAGNETIC BRAKE

WIRING DIAGRAM 380v -3-50
4 WIRE - 220v CONTROL

EP491



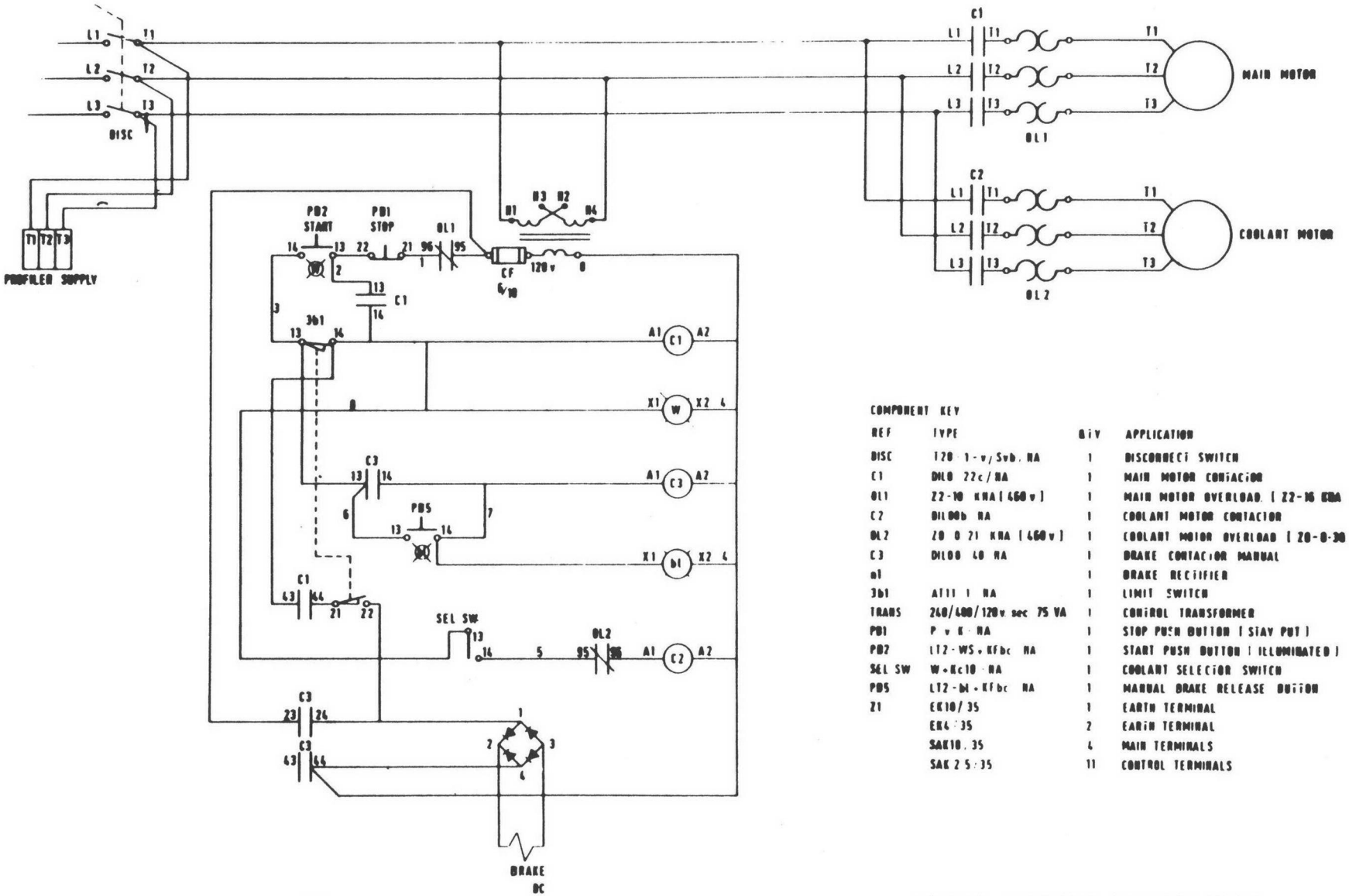
C.S.A.
575 v 3ph 60 hz 120 v Control

COMPONENT KEY

REF.	TYPE	QTY	APPLICATION
DISC	T20-1-v/Svb/HA	1	DISCONNECT SWITCH
C1	DILO-22c/HA	1	MAIN MOTOR CONTACTOR
OL1	ZO-11 KHA	1	MAIN MOTOR OVERLOAD
C2	DILOOb/HA	1	COOLANT MOTOR CONTACTOR
OL2	ZO-0.21 KHA	1	COOLANT MOTOR OVERLOAD
C3	DILOO-40/HA	1	BRAKE CONTACTOR MANUAL
n1		1	BRAKE RECTIFIER
3b1	AT11-1-HA	1	LIMIT SWITCH
TRANS	575 v/120 v 75 VA	1	CONTROL TRANSFORMER
PB1	P-v/K-HA	1	STOP PUSH BUTTON (STAY PUT)
PB2	LT2-WS+KFbc-HA	1	START PUSH BUTTON (ILLUMINATED)
SEL SW	W+Kc10-HA	1	COOLANT SELECTOR SWITCH
PB5	LT2-bl+KFbc-HA	1	MANUAL BRAKE RELEASE BUTTON
Z1	EK10/35	1	EARTH TERMINAL
	EK4/35	2	EARTH TERMINAL
	SAK10/35	4	MAIN TERMINALS
	SAK 2.5/35	11	CONTROL TERMINALS

WIRING DIAGRAM. MASTER 2500
ELECTRO-MAGNETIC BRAKE

EP-508



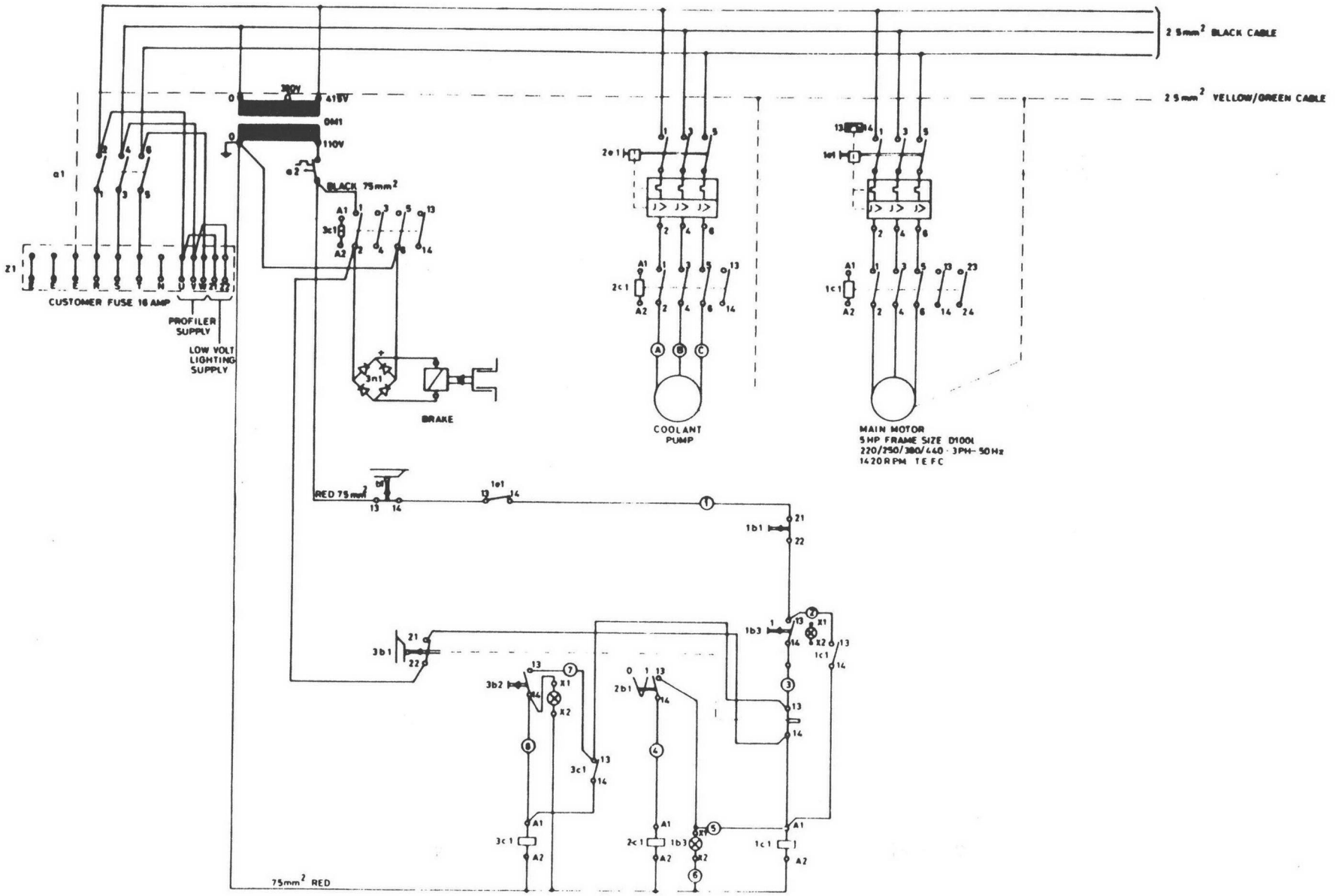
CSA
208/230/460 v 3ph 60 hz 120 v Control

COMPONENT KEY

REF	TYPE	Q'TY	APPLICATION
DISC	120-1-v/Svb. HA	1	DISCONNECT SWITCH
C1	DILO 22c/HA	1	MAIN MOTOR CONTACTOR
OL1	Z2-10 KHA [460v]	1	MAIN MOTOR OVERLOAD. [Z2-16 KHA 230v]
C2	DILOOb HA	1	COOLANT MOTOR CONTACTOR
OL2	Z0 0 21 KHA [460v]	1	COOLANT MOTOR OVERLOAD [Z0-0-30 KHA. 230v]
C3	DILOO 40 HA	1	BRAKE CONTACTOR MANUAL
a1		1	BRAKE RECTIFIER
3b1	AT11 1 HA	1	LIMIT SWITCH
TRANS	240/480/120v sec 75 VA	1	CONTROL TRANSFORMER
PB1	P v K HA	1	STOP PUSH BUTTON [STAY PUT]
PB2	LT2-WS-KFbc HA	1	START PUSH BUTTON [ILLUMINATED]
SEL SW	W-Kc10-HA	1	COOLANT SELECTOR SWITCH
PB5	LT2-bl-KFbc HA	1	MANUAL BRAKE RELEASE BUTTON
Z1	EK10/35	1	EARTH TERMINAL
	EK4/35	2	EARTH TERMINAL
	SAK10.35	4	MAIN TERMINALS
	SAK 2.5/35	11	CONTROL TERMINALS

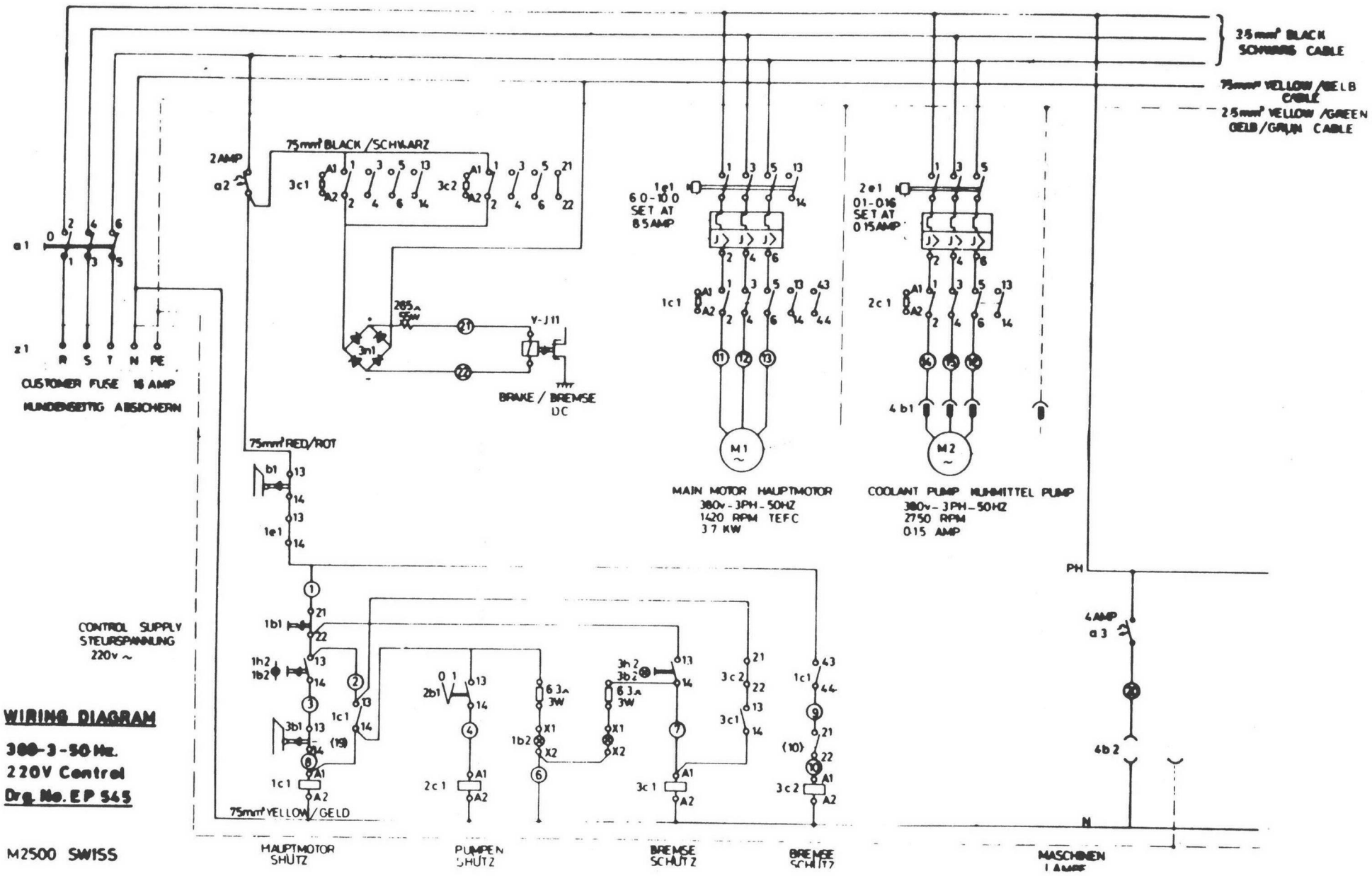
WIRING DIAGRAM. MASTER 2500
ELECTRO-MAGNETIC BRAKE

EP - 509



MASTER 2500 ELECTRO-MAGNETIC BRAKE

WIRING DIAGRAM
380/415-3-50 110V CONTROL EP 536


MAIN CIRCUIT HAUPTSTOMLAUF
35mm² BLACK SCHWARZ CABLE
75mm² YELLOW /GELB CABLE
25mm² YELLOW /GREEN GELB/GRUN CABLE
2AMP
75mm² BLACK /SCHWARZ
3c1
3c2
1e1
60-100 SET AT 85AMP
2e1
01-016 SET AT 015AMP
1c1
2c1
4b1
a1
a2
z1
R S T N PE
CUSTOMER FUSE 16 AMP
KUNDENSEITIG ABSICHERN
285A 55W
3n1
Y-J11
BRAKE / BREMSE DC
M1
M2
MAIN MOTOR HAUPTMOTOR
380v - 3PH - 50HZ
1420 RPM TEFC
3.7 KW
COOLANT PUMP KUHMITTEL PUMP
380v - 3PH - 50HZ
2750 RPM
0.15 AMP
75mm² RED/ROT
75mm² YELLOW / GELD
CONTROL SUPPLY
STEUERSPANNUNG
220v ~
PH
4AMP
a3
4b2
N
WIRING DIAGRAM
380-3-50 Hz.
220V Control
Drg. No. EP 545
M2500 SWISS
HAUPTMOTOR SHÜTZ
PUMPEN SHÜTZ
BREMSE SCHÜTZ
BREMSE SCHÜTZ
MASCHINEN LAMP

COLCHESTER

CENTRE LATHE

PARTS SECTION

IMPORTANT

IMPORTANT when ordering —

1. Quote component Order Number and description against each parts illustration for all component parts required.
2. Some parts are standard items which can generally be purchased locally; e.g. nuts, bolts, screws, washers. In such instances, the component Order Number and description is followed by a code reference which can be used with Appendix 1 to furnish a full specification.
3. Always quote lathe Serial Number in all parts orders or technical enquiries. This number is stamped into lathe bed at tailstock end.

ERSATZTEILE

WICHTIG

WICHTIG bei bestellung-

1. Teilnummer und Bezeichnung anhand der Illustration für sämtliche Teile unbedingt erforderlich.
2. Einige Ersatzteile sind Standardteile, welche generell auf dem hiesigen Markt beschafft werden können. In solchen Fällen hat die Ersatzteil-Bestellnummer und Bezeichnung eine Kenn-Nummer aus welcher in Anhang 1 detaillierte Angaben zu ersehen sind.
3. Immer die Serien-Nummer der Maschine bei sämtlichen Ersatzteil-Bestellungen oder technischen Anfragen angeben. Die Serien-Nummer ist im Drehbankbett am Reitstockende eingeschlagen.

SECTION PIECES

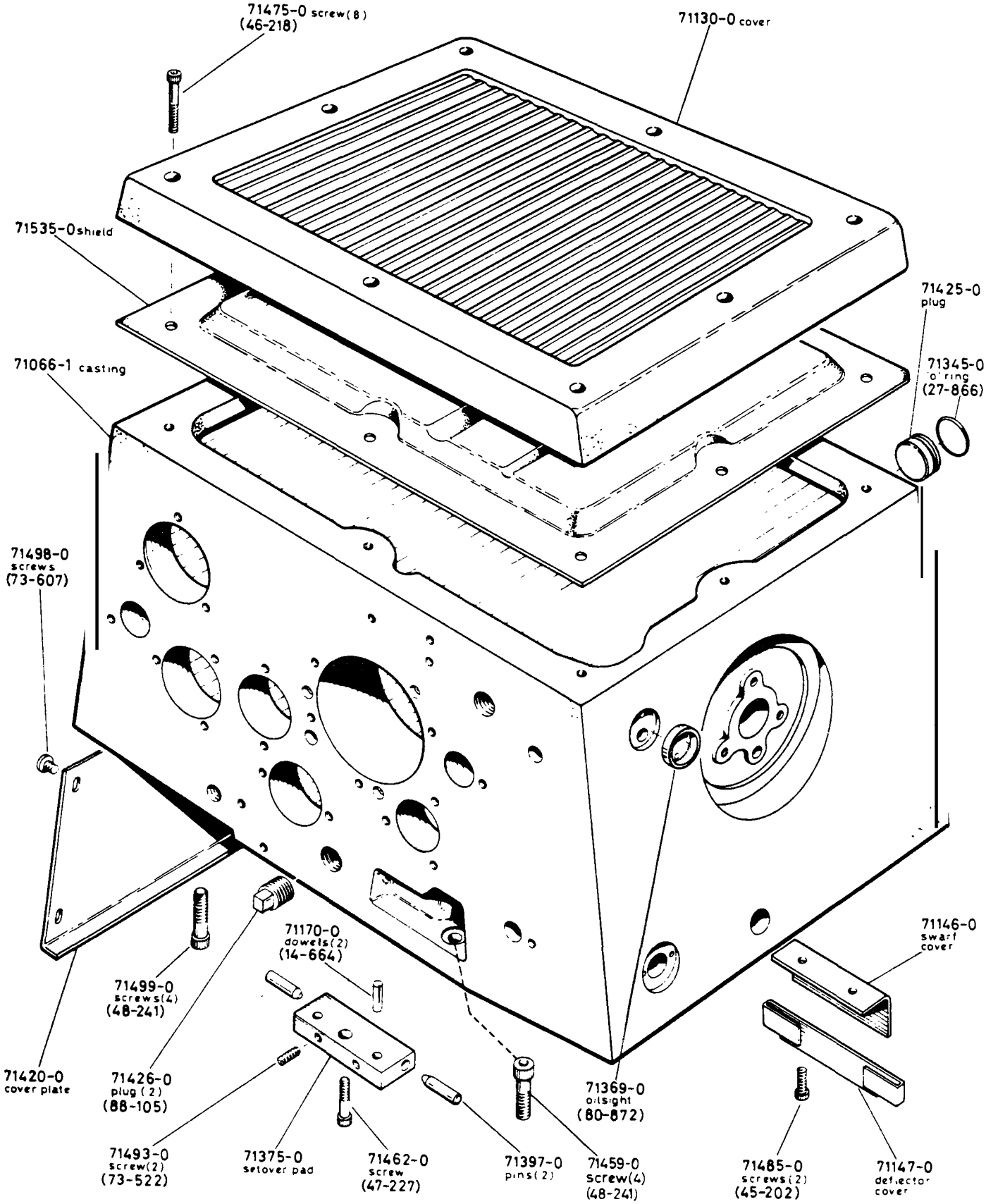
IMPORTANT

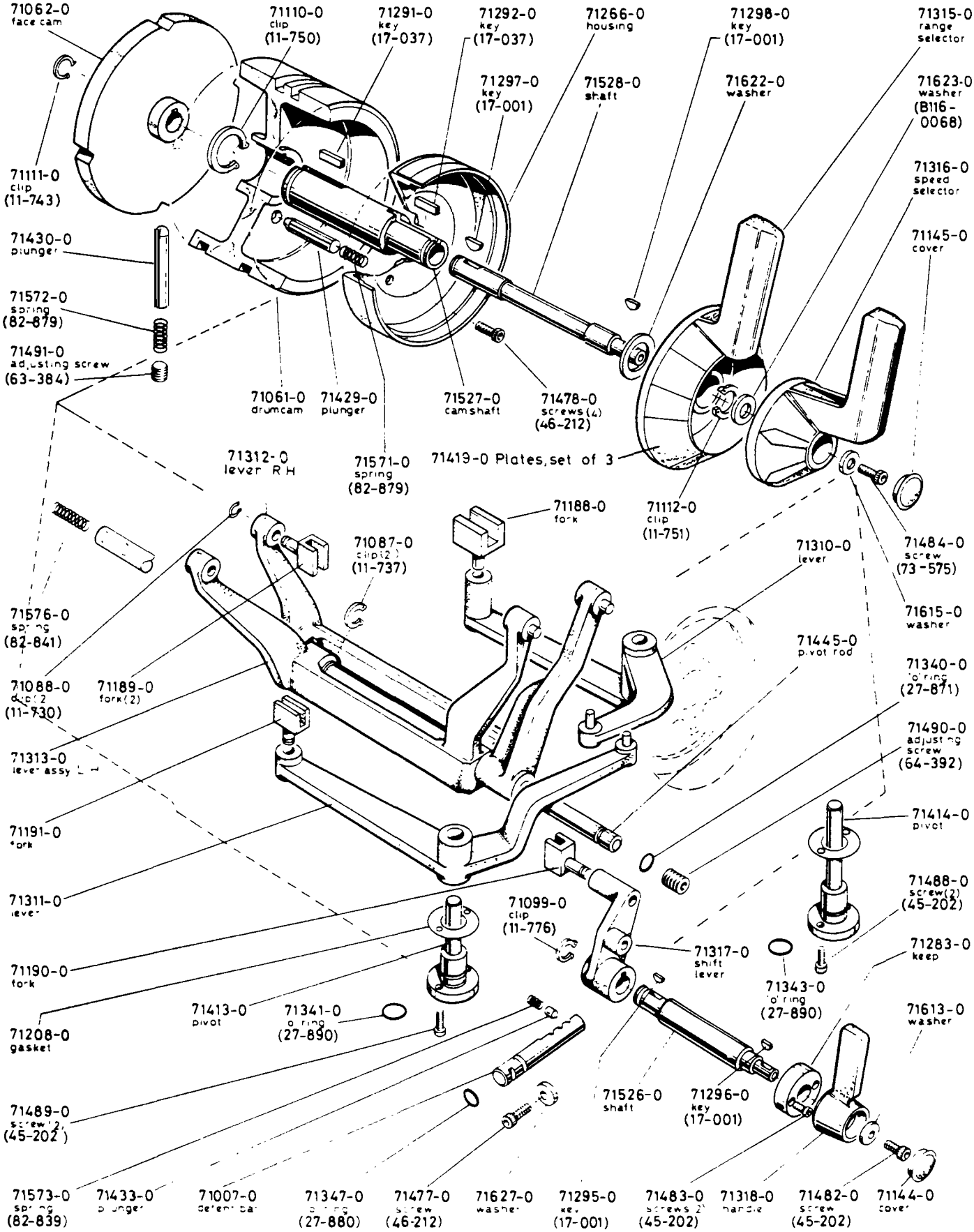
IMPORTANT pour passer commande:

1°) Indiquer le n° d'ordre de la pièce de rechange ainsi que la description figurant en regard de chaque pièce demandée.

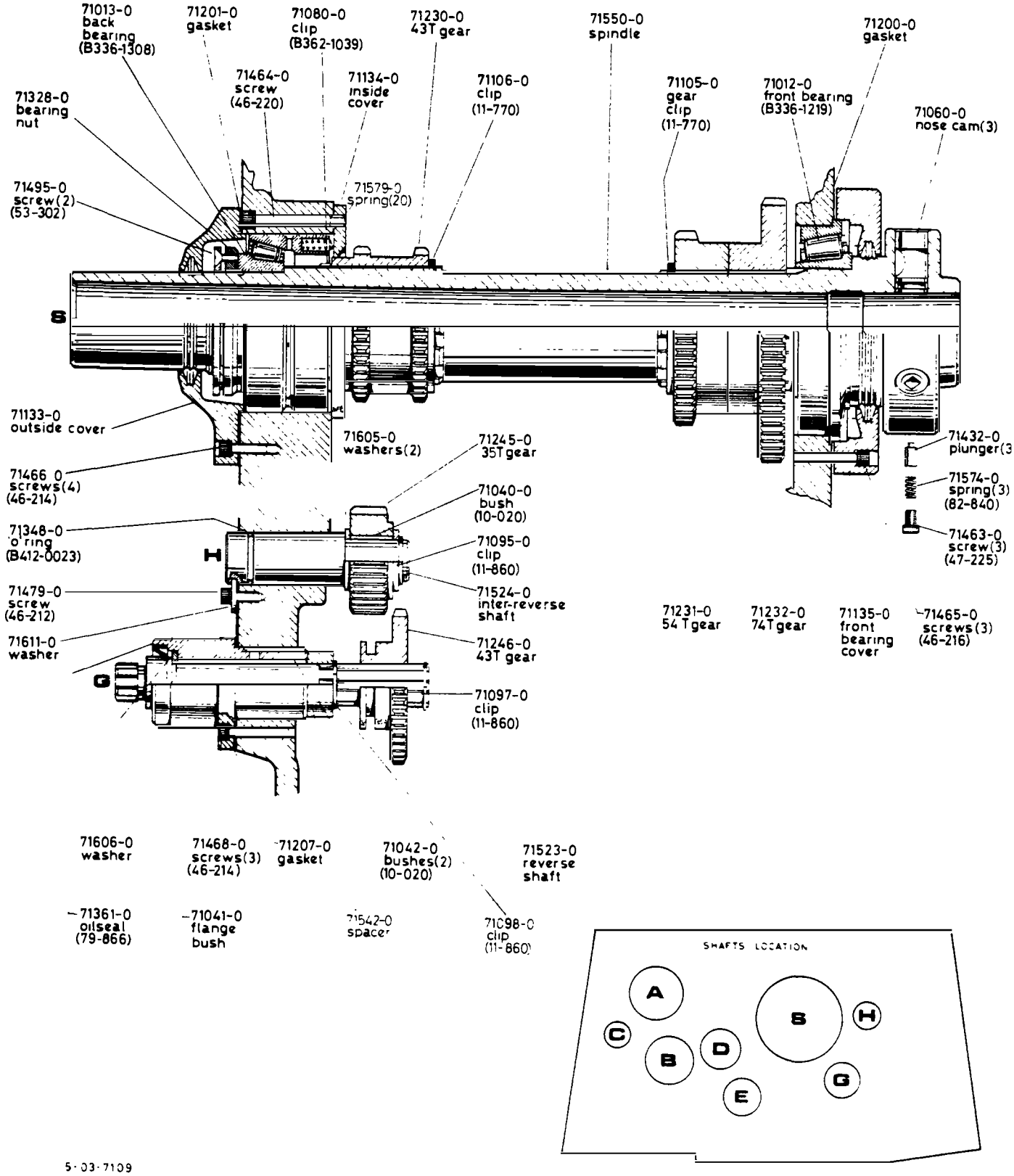
2°) Certaines pièces sont d'un type standard et peuvent être achetées sur place comme: écrous, boulons, vis, lames. Dans ces cas le n° d'ordre est suivi d'une référence de commande qui 1 donnant une spécifi sert à utiliser l'appendice cation complète.

3°) Spécifier toujours le n° de série du tour pour toute commande de pièces ou demande de renseignements techniques. Ce numéro est gravé sur le banc du coté de la contre-pointe.

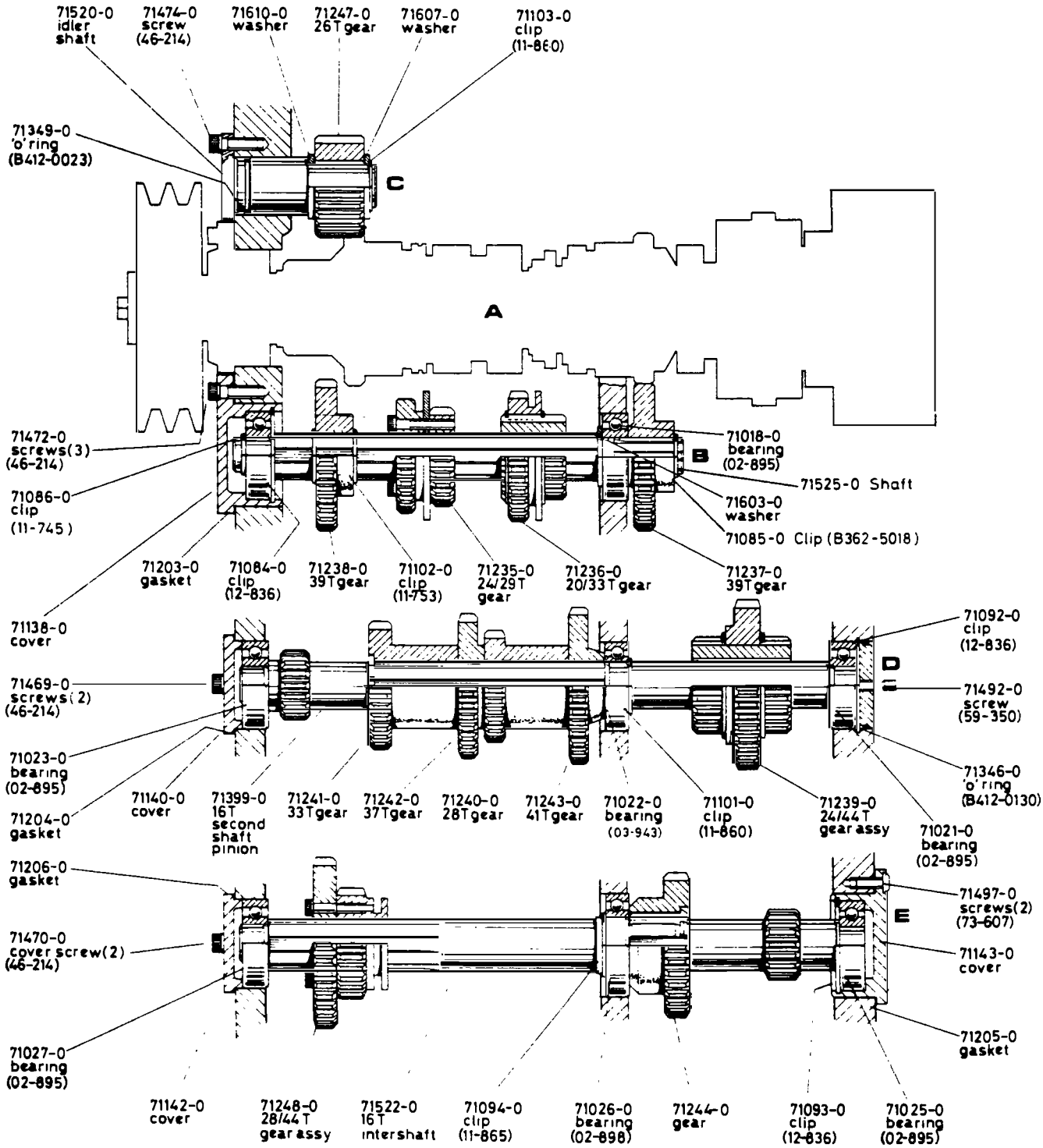

71475-0 screw(8)
(46-218)
71130-0 cover
71535-0 shield
71425-0
plug
71345-0
o'ring
(27-866)
71066-1 casting
71498-0
screws
(73-607)
71146-0
swarf
cover
71170-0
dowels(2)
(14-664)
71499-0
screws(4)
(48-241)
71420-0
cover plate
71426-0
plug (2)
(88-105)
71369-0
oilsight
(80-872)
71493-0
screw(2)
(73-522)
71375-0
setover pad
71462-0
screw
(47-227)
71397-0
pins(2)
71459-0
screw(4)
(48-241)
71485-0
screws(2)
(45-202)
71147-0
deflector
cover

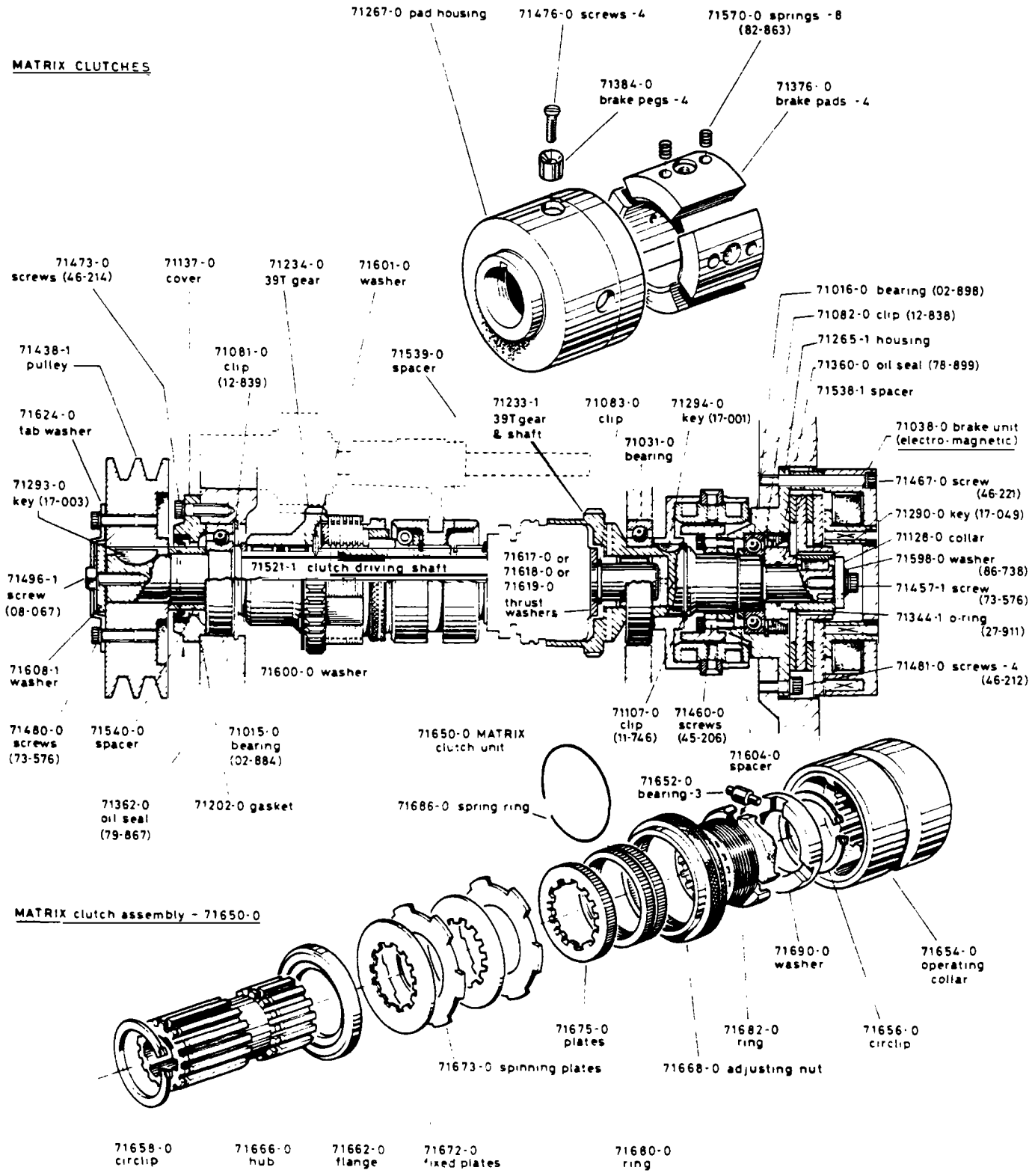

71062-0 face cam
71110-0 clip (11-750)
71291-0 key (17-037)
71292-0 key (17-037)
71266-0 housing
71298-0 key (17-001)
71315-0 range selector
71297-0 key (17-001)
71528-0 shaft
71622-0 washer
71623-0 washer (B116-0068)
71111-0 clip (11-743)
71316-0 speed selector
71430-0 plunger
71145-0 cover
71572-0 spring (82-879)
71491-0 adjusting screw (63-384)
71061-0 drumcam
71429-0 plunger
71527-0 camshaft
71478-0 screws(4) (46-212)
71312-0 lever RH
71571-0 spring (82-879)
71419-0 Plates,set of 3
71188-0 fork
71112-0 clip (11-751)
71087-0 clip(2) (11-737)
71310-0 lever
71484-0 screw (73-575)
71576-0 spring (82-841)
71615-0 washer
71445-0 pivot rod
71088-0 clip(2) (11-730)
71189-0 fork(2)
71340-0 o'ring (27-871)
71313-0 lever assy LH
71490-0 adjusting screw (64-392)
71414-0 pivot
71191-0 fork
71311-0 lever
71099-0 clip (11-776)
71488-0 screw(2) (45-202)
71317-0 shift lever
71283-0 keep
71190-0 fork
71343-0 o'ring (27-890)
71413-0 pivot
71341-0 o'ring (27-890)
71613-0 washer
71208-0 gasket
71489-0 screw(2) (45-202)
71526-0 shaft
71296-0 key (17-001)
71573-0 spring (82-839)
71433-0 plunger
71007-0 detent bar
71347-0 o'ring (27-880)
71477-0 screw (46-212)
71627-0 washer
71295-0 key (17-001)
71483-0 screws 2 (45-202)
71318-0 handle
71482-0 screw (45-202)
71144-0 cover

5-02-7109


71013-0 back bearing (B336-1308)
71201-0 gasket
71080-0 clip (B362-1039)
71230-0 43T gear
71550-0 spindle
71200-0 gasket
71464-0 screw (46-220)
71134-0 inside cover
71106-0 clip (11-770)
71105-0 gear clip (11-770)
71012-0 front bearing (B336-1219)
71328-0 bearing nut
71060-0 nose cam(3)
71495-0 screw(2) (53-302)
71579-0 spring(20)
S
71133-0 outside cover
71605-0 washers(2)
71245-0 35T gear
71432-0 plunger(3
71466 0 screws(4) (46-214)
71040-0 bush (10-020)
71574-0 spring(3) (82-840)
71348-0 o'ring (B412-0023)
H
71095-0 clip (11-860)
71463-0 screw(3) (47-225)
71479-0 screw (46-212)
71524-0 inter-reverse shaft
71231-0 54 T gear
71232-0 74T gear
71135-0 front bearing cover
71465-0 screws(3) (46-216)
71611-0 washer
71246-0 43T gear
G
71097-0 clip (11-860)
71606-0 washer
71468-0 screws(3) (46-214)
71207-0 gasket
71042-0 bushes(2) (10-020)
71523-0 reverse shaft
71361-0 oilseal (79-866)
71041-0 flange bush
71542-0 spacer
71098-0 clip (11-860)
SHAFTS LOCATION
A
B
C
D
E
G
H
S

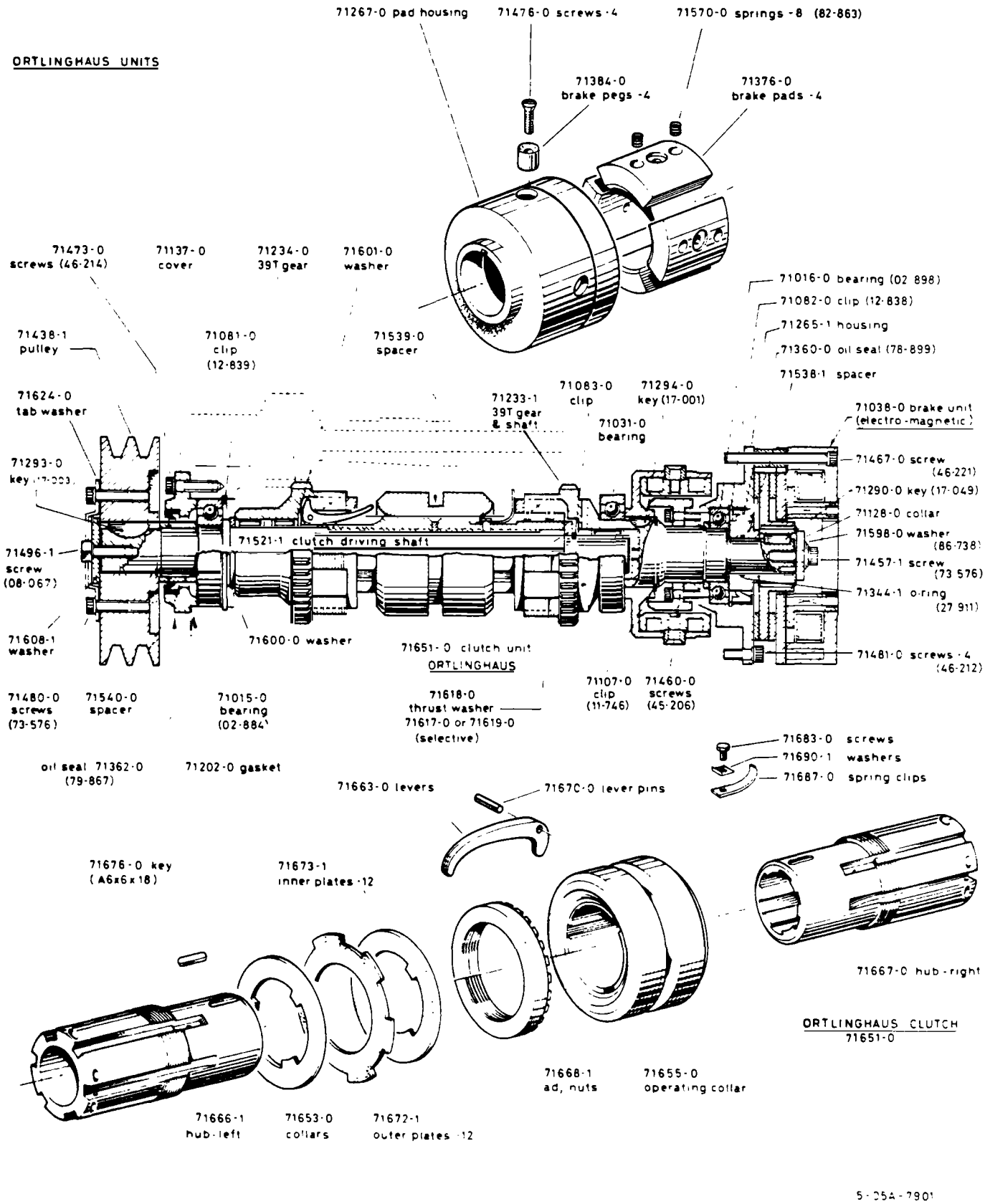
5·03·7109


71520-0 idler shaft
71474-0 screw (46-214)
71610-0 washer
71247-0 26T gear
71607-0 washer
71103-0 clip (11-860)
71349-0 'o' ring (B412-0023)
C
A
71472-0 screws(3) (46-214)
71086-0 clip (11-745)
71203-0 gasket
71084-0 clip (12-836)
71238-0 39T gear
71102-0 clip (11-753)
71235-0 24/29T gear
71236-0 20/33T gear
71237-0 39T gear
71018-0 bearing (02-895)
B
71525-0 Shaft
71603-0 washer
71085-0 Clip (B362-5018)
71138-0 cover
71469-0 screws(2) (46-214)
71023-0 bearing (02-895)
71204-0 gasket
71140-0 cover
71399-0 16T second shaft pinion
71241-0 33T gear
71242-0 37T gear
71240-0 28T gear
71243-0 41T gear
71022-0 bearing (03-943)
71101-0 clip (11-860)
71239-0 24/44T gear assy
71092-0 clip (12-836)
D
71492-0 screw (59-350)
71346-0 'o' ring (B412-0130)
71021-0 bearing (02-895)
71206-0 gasket
71470-0 cover screw(2) (46-214)
71027-0 bearing (02-895)
71142-0 cover
71248-0 28/44T gear assy
71522-0 16T intershaft
71094-0 clip (11-865)
71026-0 bearing (02-898)
71244-0 gear
71093-0 clip (12-836)
71025-0 bearing (02-895)
E
71497-0 screws(2) (73-607)
71143-0 cover
71205-0 gasket


MATRIX CLUTCHES
71267-0 pad housing
71476-0 screws -4
71570-0 springs -8 (82-863)
71384-0 brake pegs -4
71376-0 brake pads -4
71473-0 screws (46-214)
71137-0 cover
71234-0 39T gear
71601-0 washer
71016-0 bearing (02-898)
71082-0 clip (12-838)
71265-1 housing
71438-1 pulley
71081-0 clip (12-839)
71539-0 spacer
71360-0 oil seal (78-899)
71538-1 spacer
71624-0 tab washer
71233-1 39T gear & shaft
71083-0 clip
71294-0 key (17-001)
71038-0 brake unit (electro-magnetic)
71031-0 bearing
71293-0 key (17-003)
71467-0 screw (46-221)
71290-0 key (17-049)
71128-0 collar
71521-1 clutch driving shaft
71617-0 or 71618-0 or 71619-0 thrust washers
71598-0 washer (86-738)
71496-1 screw (08-067)
71457-1 screw (73-576)
71344-1 o-ring (27-911)
71608-1 washer
71600-0 washer
71481-0 screws -4 (46-212)
71480-0 screws (73-576)
71540-0 spacer
71015-0 bearing (02-884)
71650-0 MATRIX clutch unit
71107-0 clip (11-746)
71460-0 screws (45-206)
71604-0 spacer
71652-0 bearing -3
71362-0 oil seal (79-867)
71202-0 gasket
71686-0 spring ring
MATRIX clutch assembly - 71650-0
71690-0 washer
71654-0 operating collar
71675-0 plates
71682-0 ring
71656-0 circlip
71673-0 spinning plates
71668-0 adjusting nut
71658-0 circlip
71666-0 hub
71662-0 flange
71672-0 fixed plates
71680-0 ring

5-05-7901

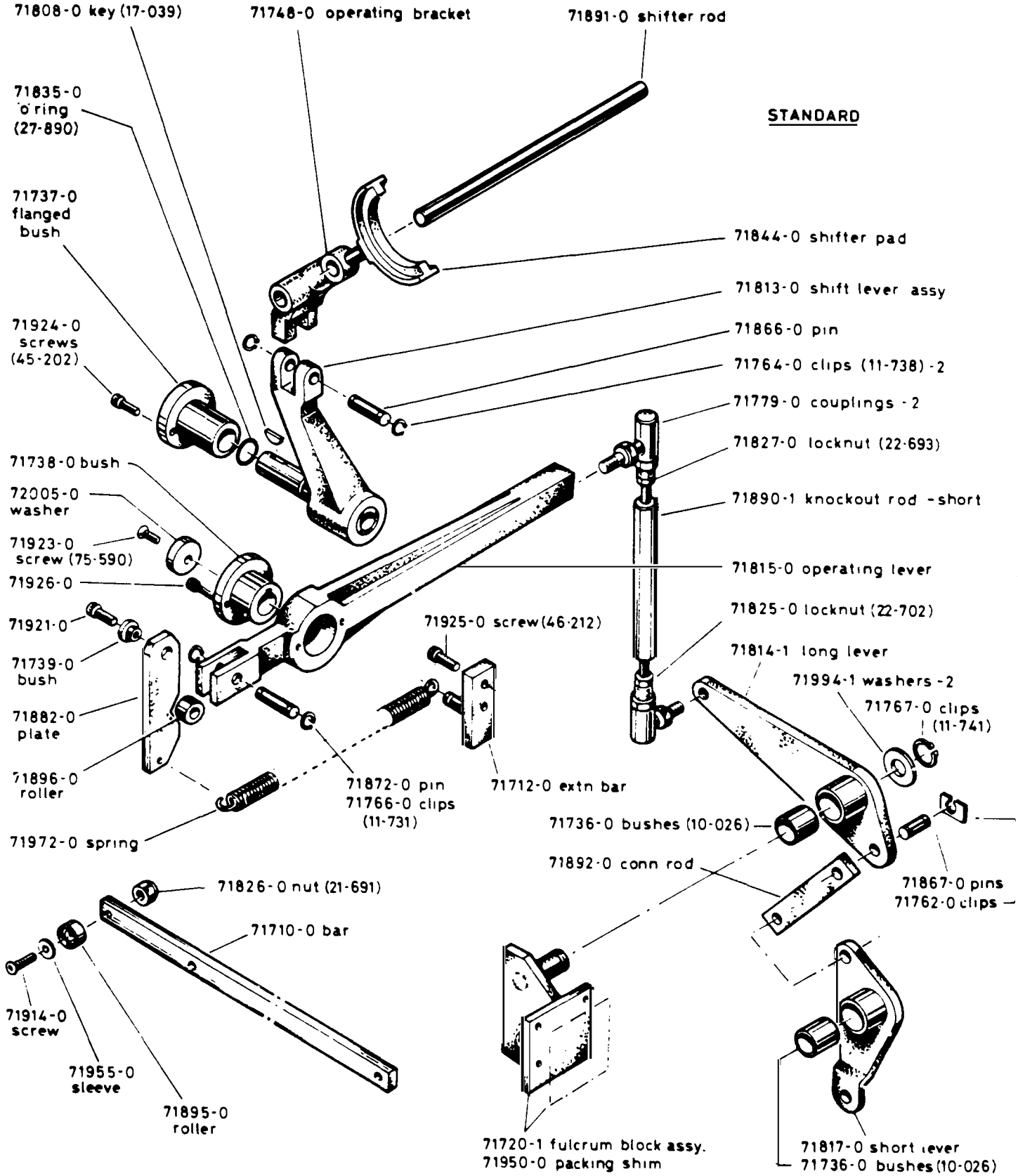
HEADSTOCK; CLUTCH SHAFT



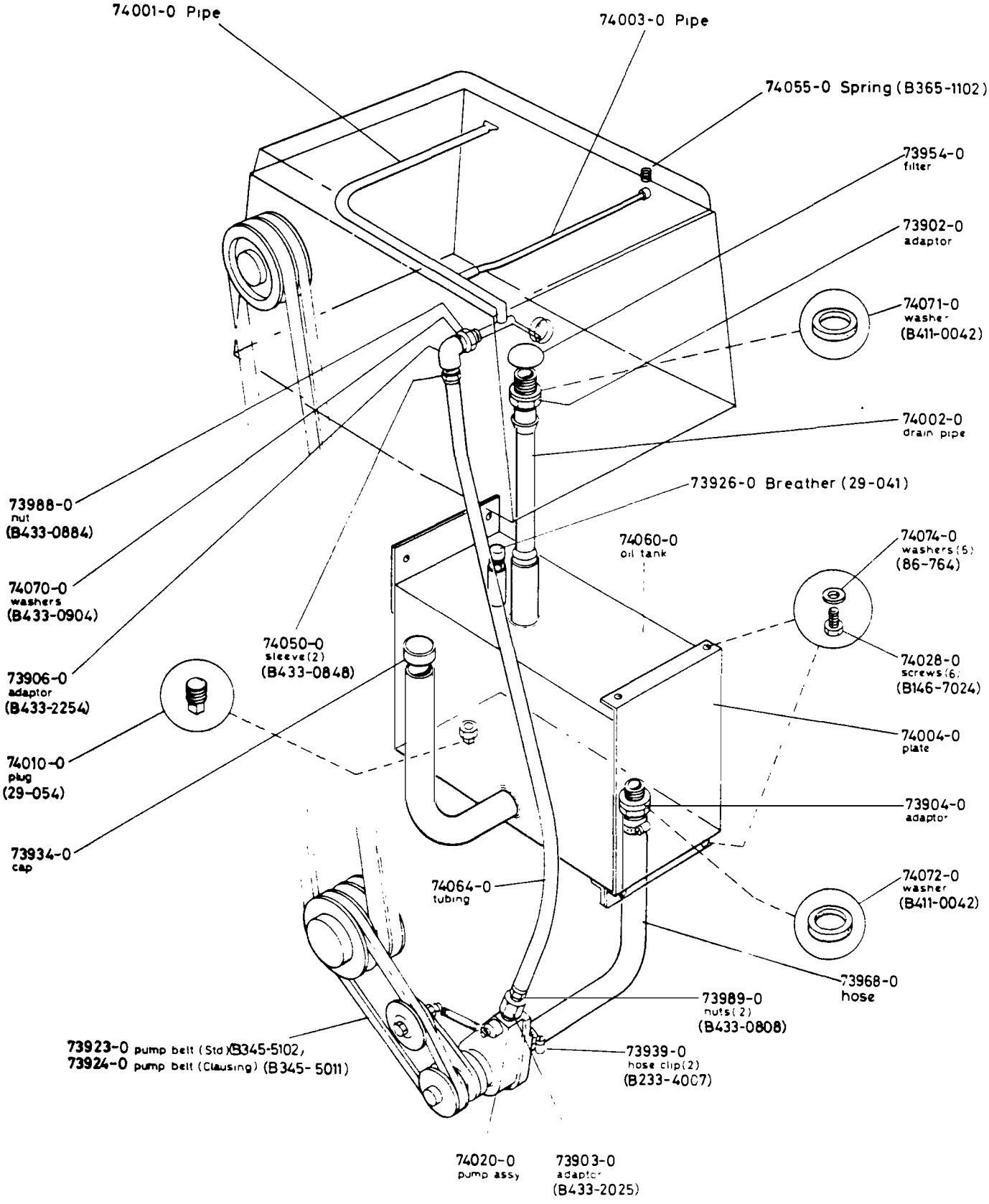
5-054-7901

CLUTCH LINKAGE

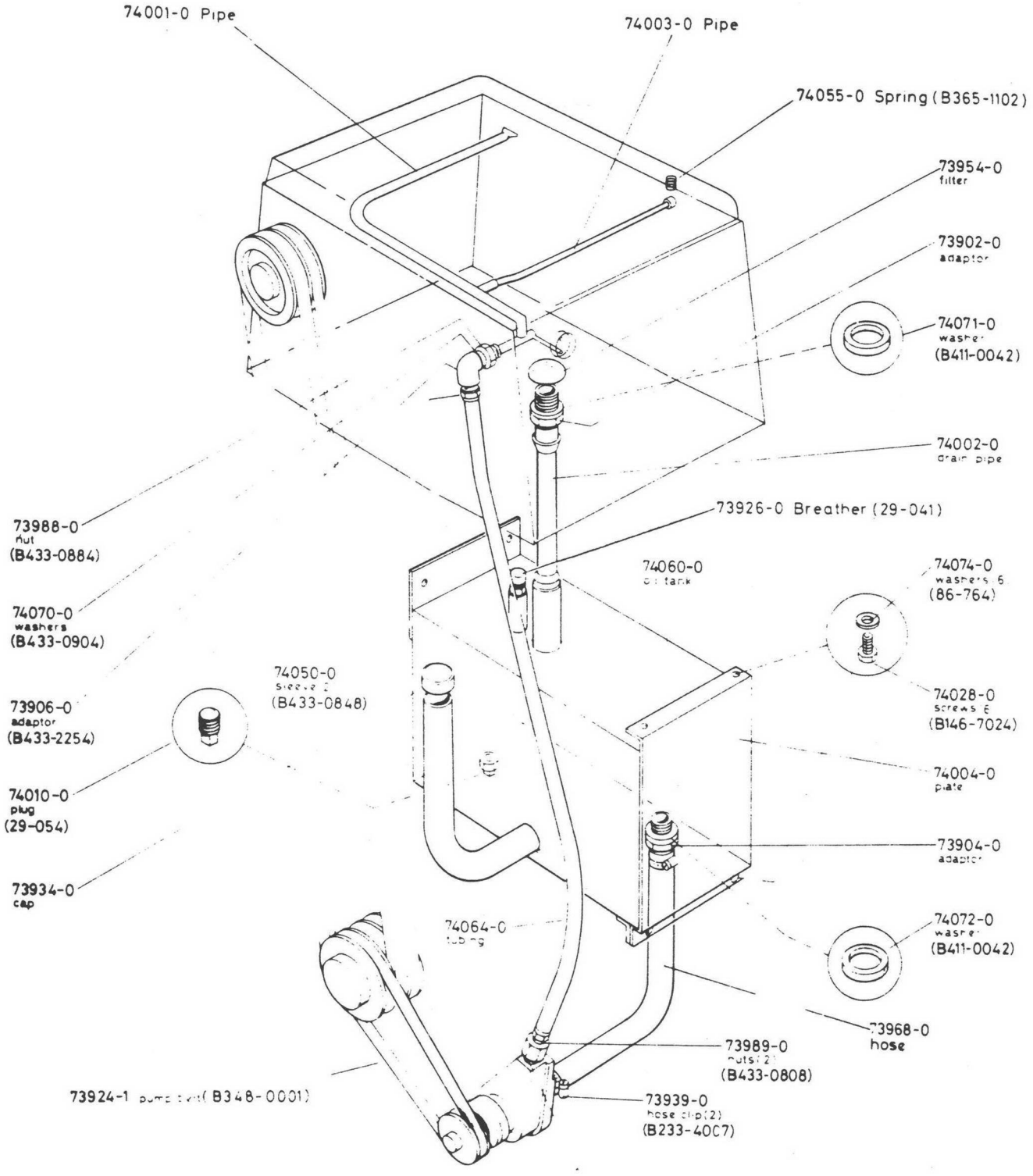
FROM SER No. 0762
TO SER.No



5-06-7804


74001-0 Pipe
74003-0 Pipe
74055-0 Spring (B365-1102)
73954-0 filter
73902-0 adaptor
74071-0 washer (B411-0042)
74002-0 drain pipe
73926-0 Breather (29-041)
73988-0 nut (B433-0884)
74070-0 washers (B433-0904)
74060-0 oil tank
74074-0 washers (5) (86-764)
74050-0 sleeve (2) (B433-0848)
73906-0 adaptor (B433-2254)
74028-0 screws (6) (B146-7024)
74010-0 plug (29-054)
74004-0 plate
73934-0 cap
73904-0 adaptor
74064-0 tubing
74072-0 washer (B411-0042)
73968-0 hose
73989-0 nuts (2) (B433-0808)
73923-0 pump belt (Std) (B345-5102)
73924-0 pump belt (Clausing) (B345-5011)
73939-0 hose clip (2) (B233-4007)
74020-0 pump assy
73903-0 adaptor (B433-2025)

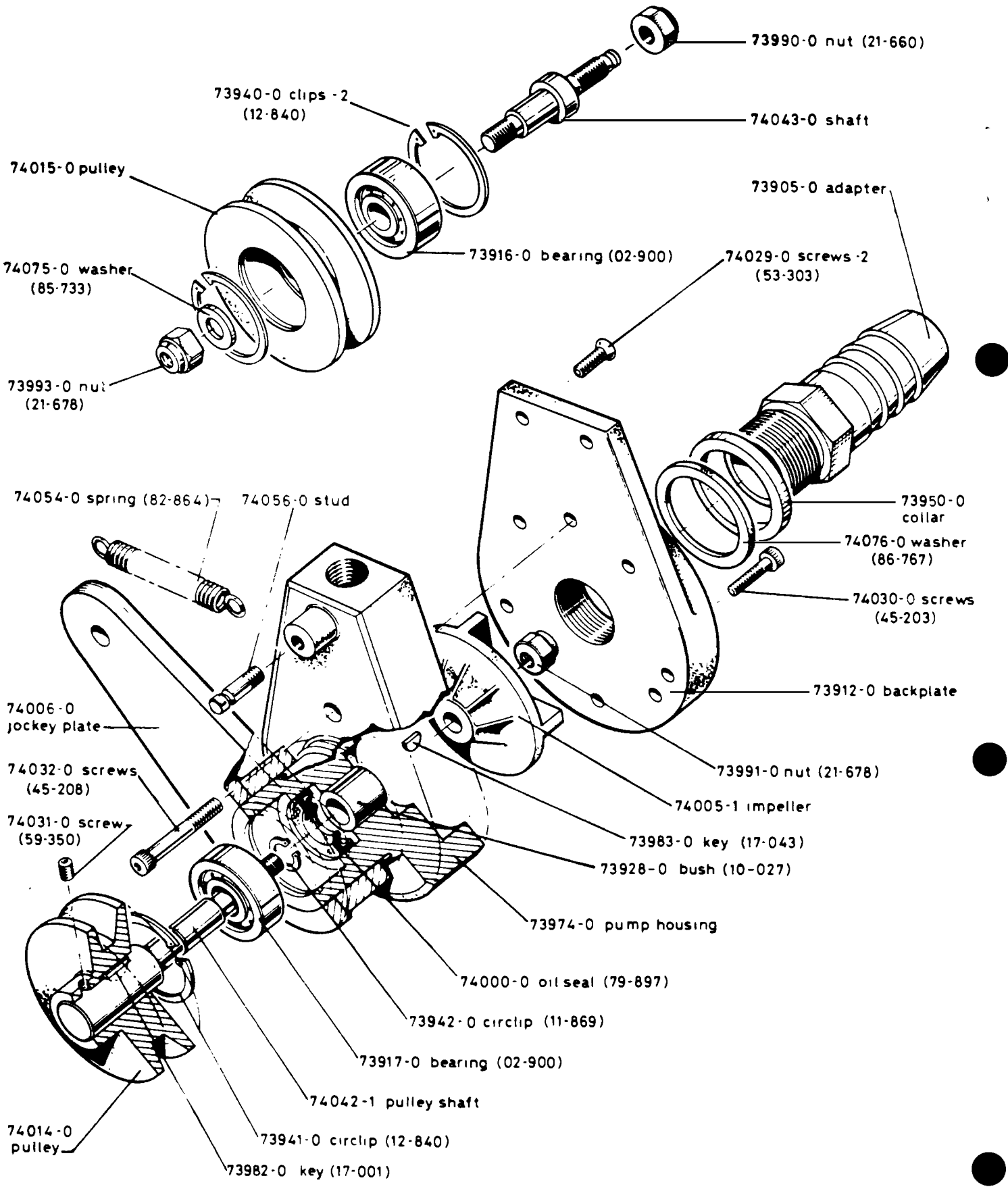
5-08A-7201


74001-0 Pipe
74003-0 Pipe
74055-0 Spring (B365-1102)
73954-0 filter
73902-0 adaptor
74071-0 washer (B411-0042)
74002-0 drain pipe
73926-0 Breather (29-041)
73988-0 nut (B433-0884)
74060-0 oil tank
74074-0 washers 6 (86-764)
74070-0 washers (B433-0904)
74050-0 sleeve 2 (B433-0848)
74028-0 screws 6 (B146-7024)
73906-0 adaptor (B433-2254)
74004-0 plate
74010-0 plug (29-054)
73904-0 adaptor
73934-0 cap
74064-0 tubing
74072-0 washer (B411-0042)
73968-0 hose
73989-0 nuts (2) (B433-0808)
73924-1 pump unit (B348-0001)
73939-0 hose clip (2) (B233-4007)
74020-1 pump assy
73903-0 adaptor (B433-2025)

5-08A-8307

HEADSTOCK: LUBRICATION PUMP

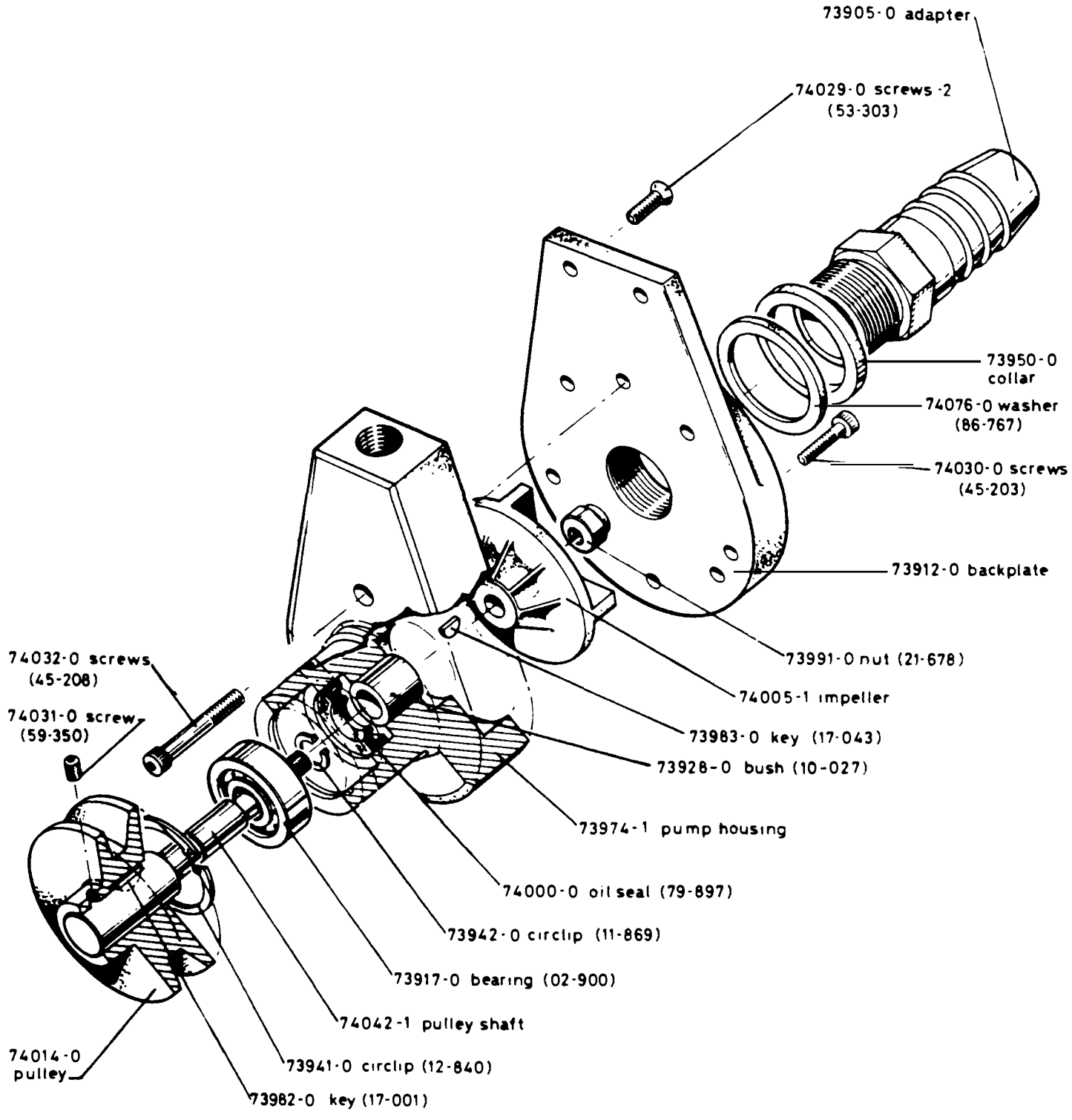
FROM SER.No.08745
TO SER.No. 11047



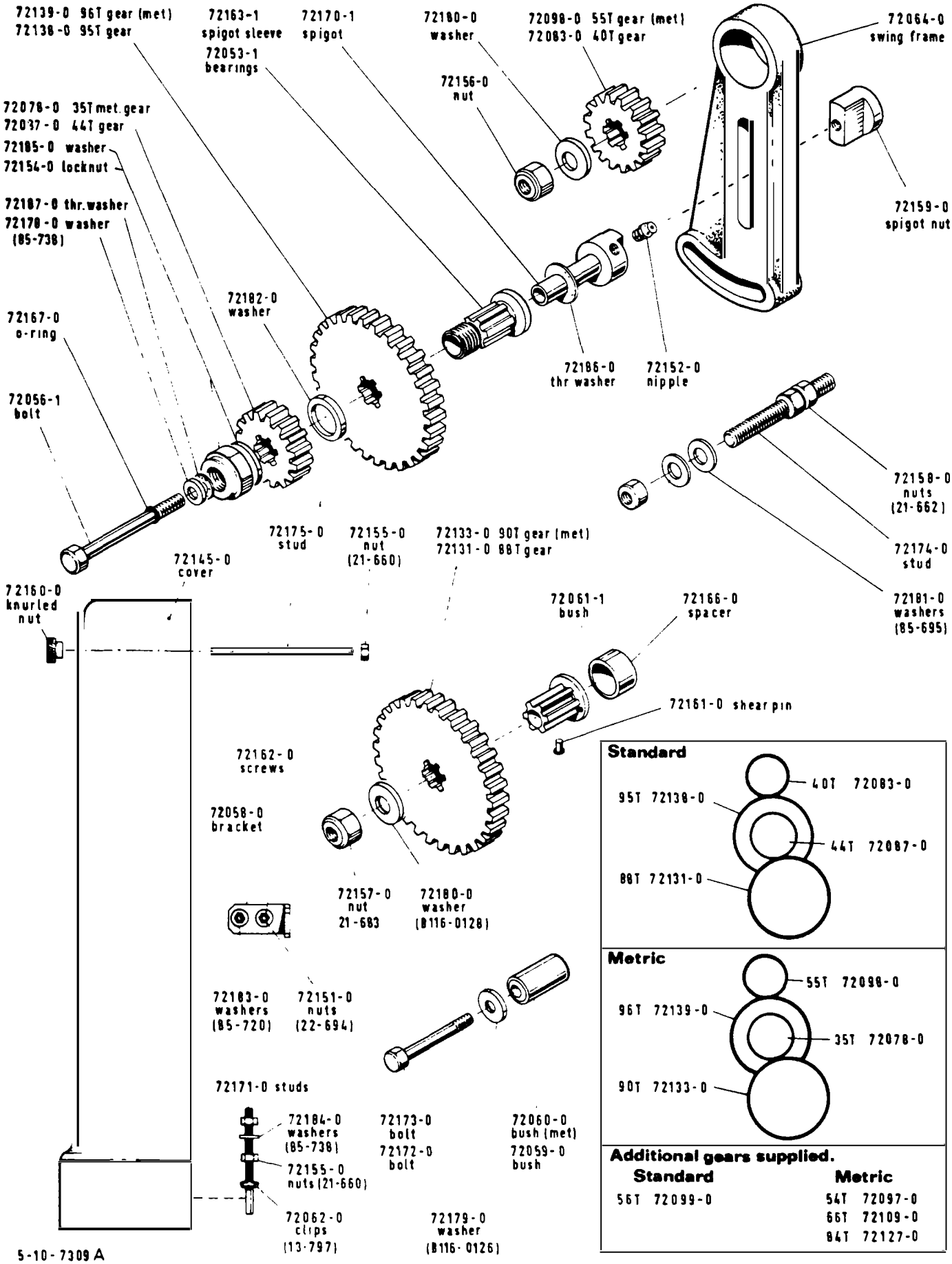
5-09-7905

HEADSTOCK: LUBRICATION PUMP

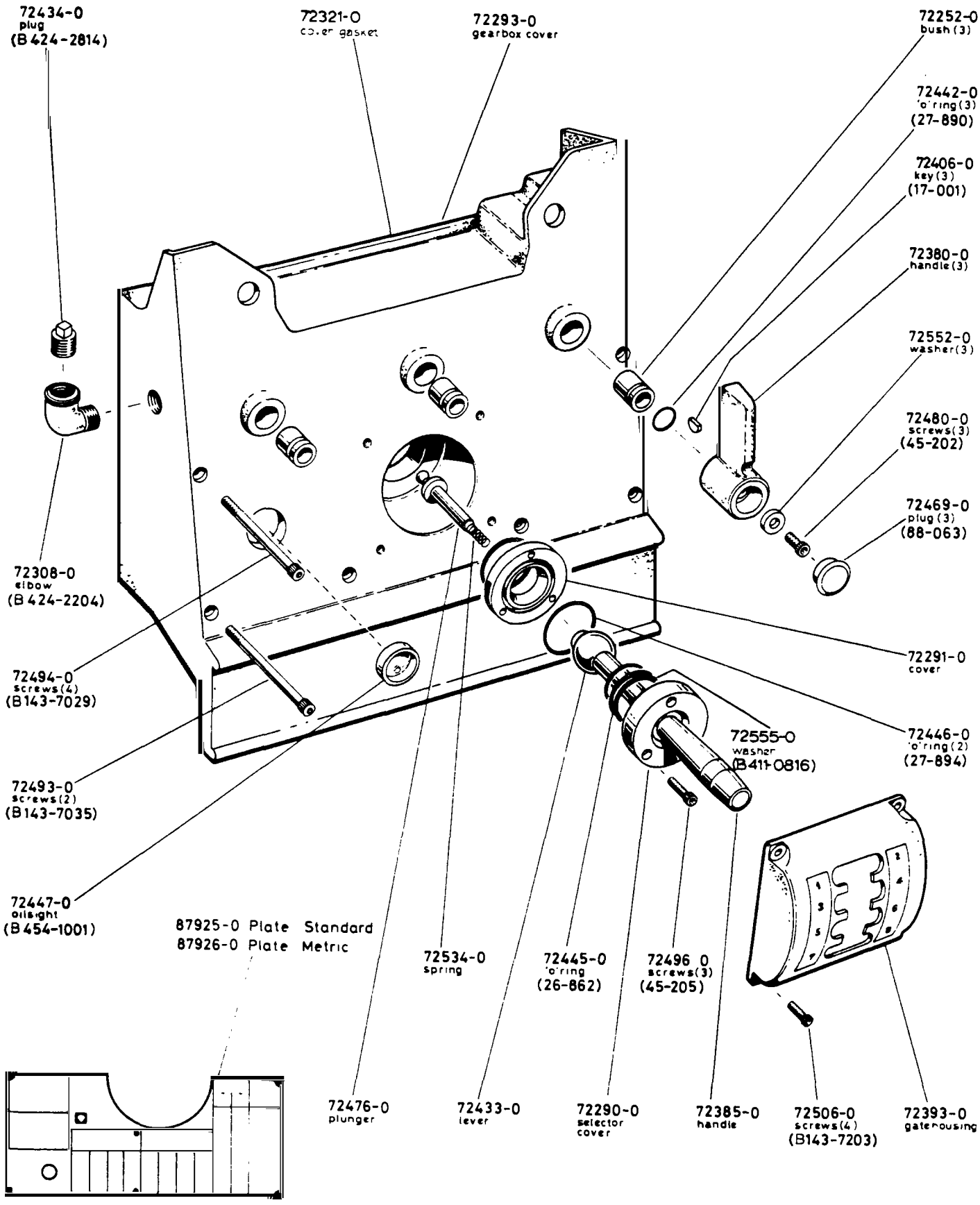
FROM SER.No. 11048
TO SER. No.

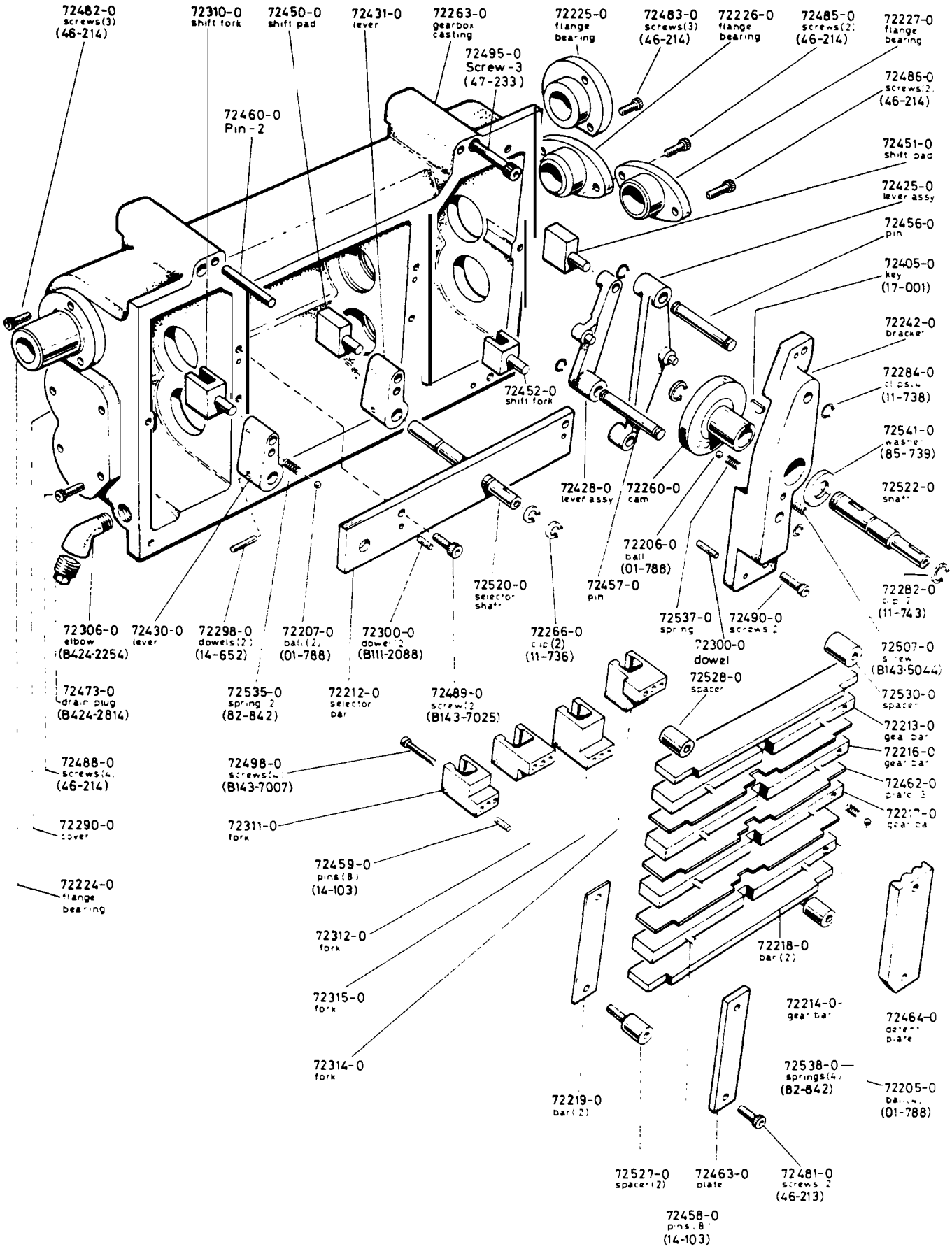


5-09-8307

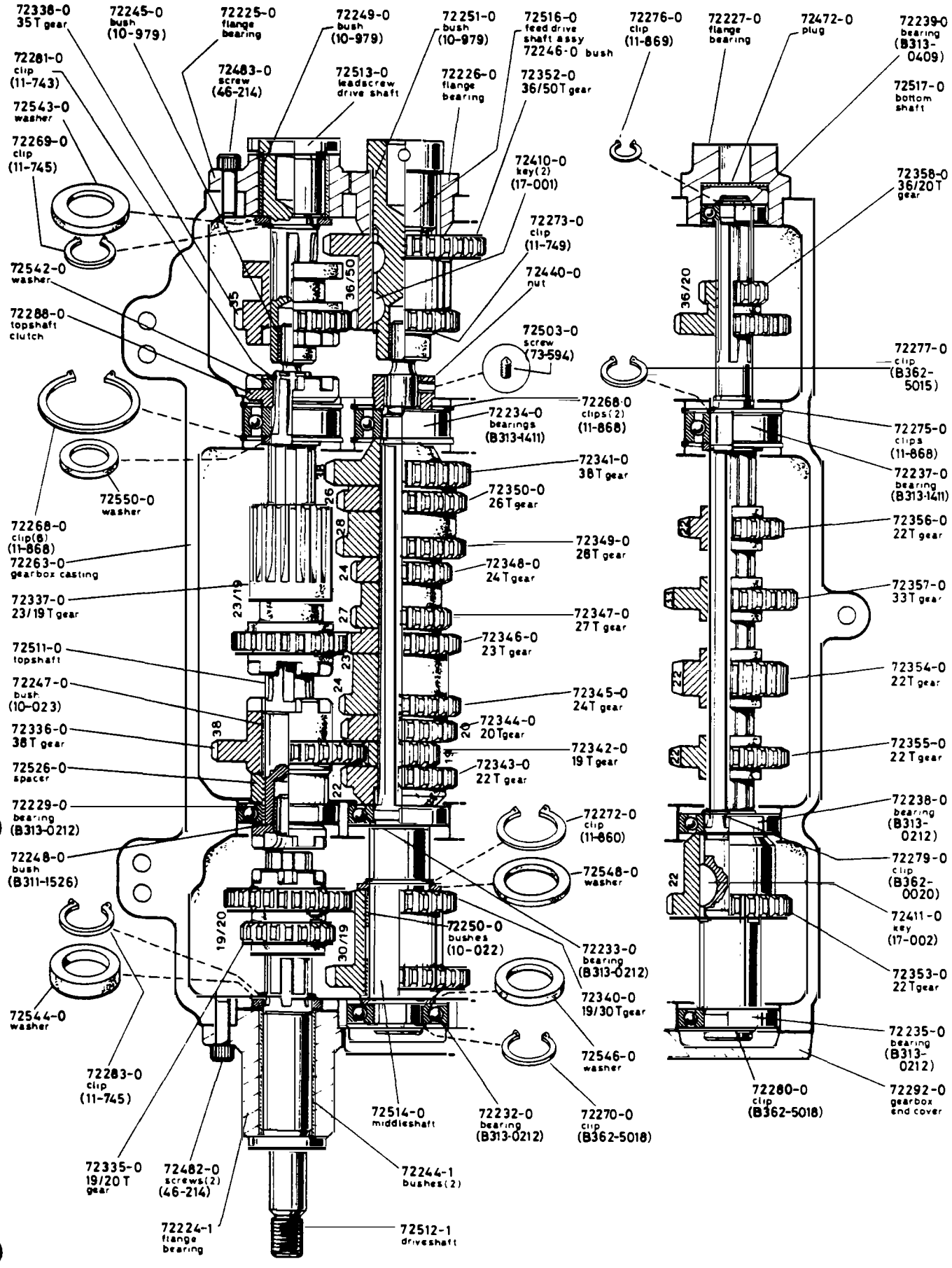

72139-0 96T gear (met)
72138-0 95T gear
72163-1 spigot sleeve
72170-1 spigot
72053-1 bearings
72180-0 washer
72098-0 55T gear (met)
72083-0 40T gear
72064-0 swing frame
72156-0 nut
72078-0 35T met. gear
72037-0 44T gear
72185-0 washer
72154-0 locknut
72187-0 thr. washer
72178-0 washer (85-738)
72159-0 spigot nut
72182-0 washer
72167-0 o-ring
72056-1 bolt
72186-0 thr washer
72152-0 nipple
72158-0 nuts (21-662)
72174-0 stud
72181-0 washers (85-695)
72175-0 stud
72155-0 nut (21-660)
72133-0 90T gear (met)
72131-0 88T gear
72145-0 cover
72160-0 knurled nut
72061-1 bush
72166-0 spacer
72161-0 shear pin
72162-0 screws
72058-0 bracket
72157-0 nut 21-683
72180-0 washer (B116-0128)
72183-0 washers (85-720)
72151-0 nuts (22-694)
72171-0 studs
72184-0 washers (85-738)
72155-0 nuts (21-660)
72173-0 bolt
72172-0 bolt
72060-0 bush (met)
72059-0 bush
72062-0 clips (13-797)
72179-0 washer (B116-0126)
Standard
40T 72083-0
95T 72138-0
44T 72087-0
88T 72131-0
Metric
55T 72098-0
96T 72139-0
35T 72078-0
90T 72133-0
Additional gears supplied.
Standard
56T 72099-0
Metric
54T 72097-0
66T 72109-0
84T 72127-0

5-10-7309 A

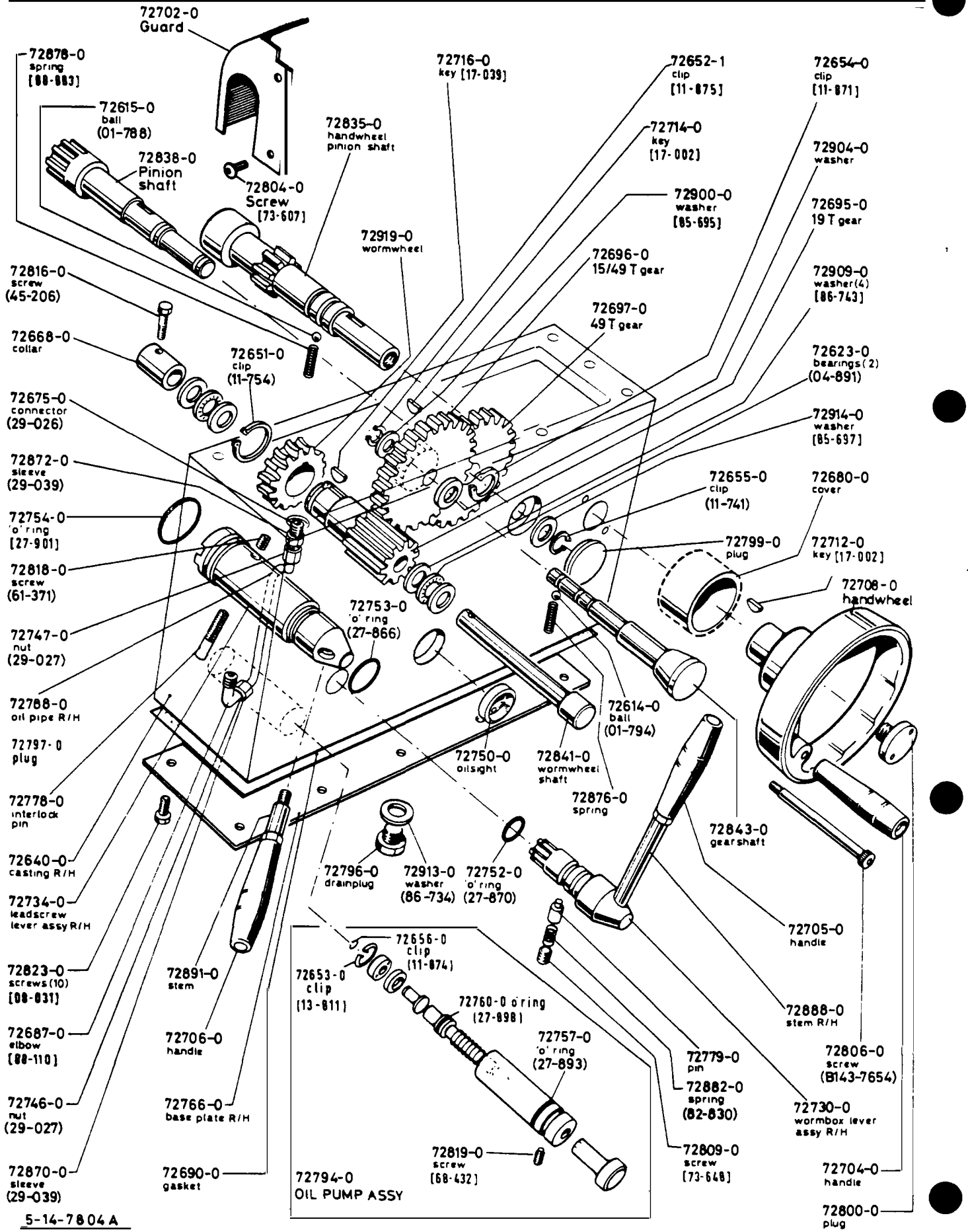

72434-0
plug
(B424-2814)
72321-0
cover gasket
72293-0
gearbox cover
72252-0
bush (3)
72442-0
'o' ring (3)
(27-890)
72406-0
key (3)
(17-001)
72380-0
handle (3)
72552-0
washer (3)
72480-0
screws (3)
(45-202)
72469-0
plug (3)
(88-063)
72308-0
elbow
(B424-2204)
72494-0
screws (4)
(B143-7029)
72493-0
screws (2)
(B143-7035)
72447-0
oil sight
(B454-1001)
72291-0
cover
72446-0
'o' ring (2)
(27-894)
72555-0
washer
(B411-0816)
87925-0 Plate Standard
87926-0 Plate Metric
72534-0
spring
72445-0
'o' ring
(26-862)
72496 0
screws (3)
(45-205)
72476-0
plunger
72433-0
lever
72290-0
selector
cover
72385-0
handle
72506-0
screws (4)
(B143-7203)
72393-0
gatehousing


72482-0 screws(3) (46-214)
72310-0 shift fork
72450-0 shift pad
72431-0 lever
72263-0 gearbox casting
72225-0 flange bearing
72483-0 screws(3) (46-214)
72226-0 flange bearing
72485-0 screws(2) (46-214)
72227-0 flange bearing
72495-0 Screw-3 (47-233)
72460-0 Pin-2
72486-0 screws(2) (46-214)
72451-0 shift pad
72425-0 lever assy
72456-0 pin
72405-0 key (17-001)
72242-0 bracket
72284-0 circlip (11-738)
72541-0 washer (85-739)
72522-0 shaft
72452-0 shift fork
72428-0 lever assy
72260-0 cam
72206-0 ball (01-788)
72520-0 selector shaft
72457-0 pin
72282-0 circlip (2) (11-743)
72306-0 elbow (B424-2254)
72430-0 lever
72298-0 dowels(2) (14-652)
72207-0 ball(2) (01-788)
72300-0 dowel(2) (B111-2088)
72266-0 circlip(2) (11-736)
72537-0 spring
72490-0 screws 2
72300-0 dowel
72507-0 screw (B143-5044)
72528-0 spacer
72530-0 spacer
72473-0 drain plug (B424-2814)
72535-0 spring 2 (82-842)
72212-0 selector bar
72489-0 screw(2) (B143-7025)
72213-0 gear bar
72216-0 gear bar
72488-0 screws(4) (46-214)
72498-0 screws(4) (B143-7007)
72462-0 plate
72217-0 gear bar
72290-0 cover
72311-0 fork
72459-0 pins(8) (14-103)
72224-0 flange bearing
72312-0 fork
72218-0 bar(2)
72315-0 fork
72214-0 gear bar
72464-0 detent plate
72314-0 fork
72538-0 springs(4) (82-842)
72205-0 ball(4) (01-788)
72219-0 bar(2)
72527-0 spacer(2)
72463-0 plate
72481-0 screws 2 (46-213)
72458-0 pins(8) (14-103)

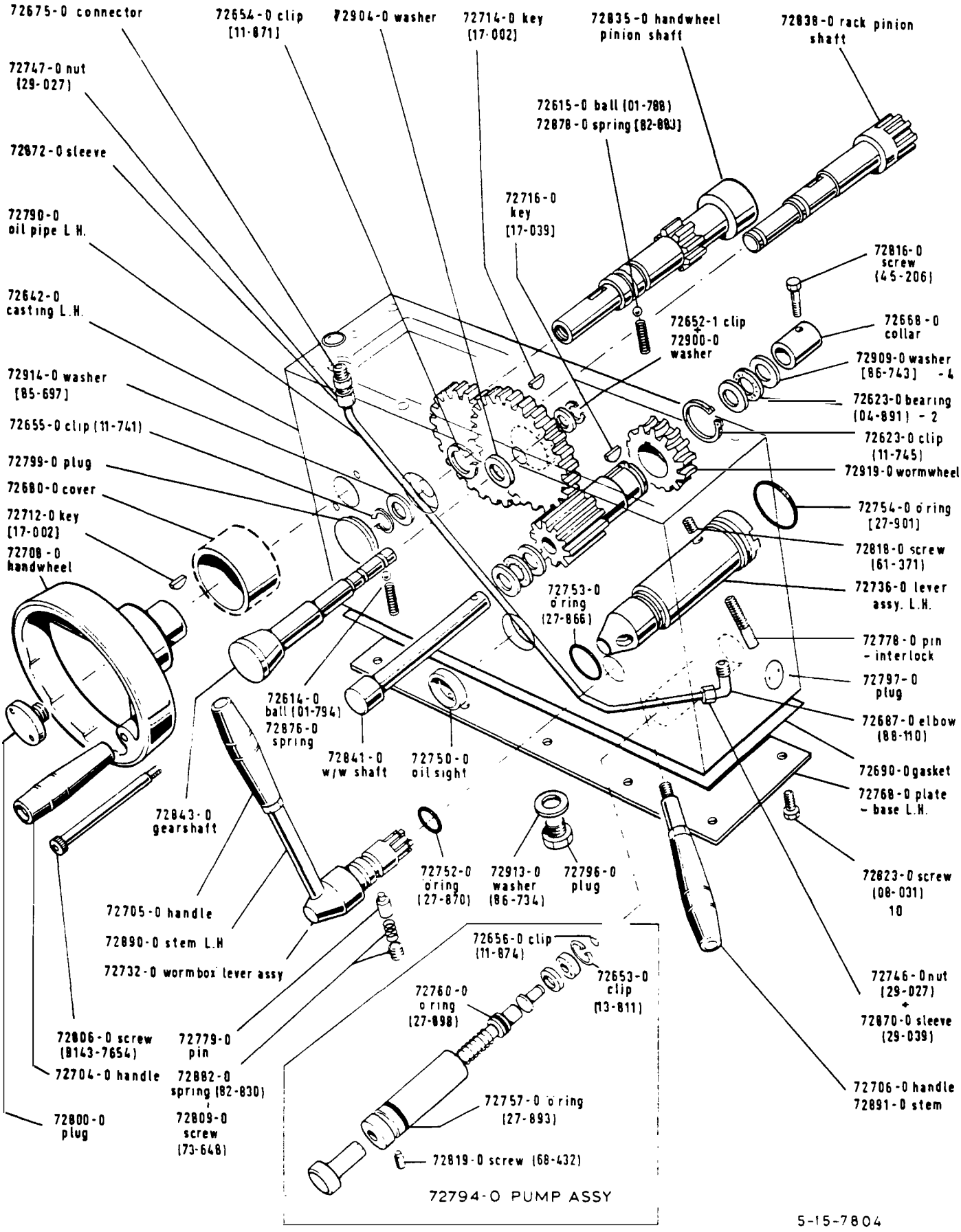
5-12-7106/A


72338-0 35T gear
72245-0 bush (10-979)
72225-0 flange bearing
72249-0 bush (10-979)
72251-0 bush (10-979)
72516-0 feed drive shaft assy
72246-0 bush
72276-0 clip (11-869)
72227-0 flange bearing
72472-0 plug
72239-0 bearing (B313-0409)
72281-0 clip (11-743)
72483-0 screw (46-214)
72513-0 leadscrew drive shaft
72226-0 flange bearing
72352-0 36/50T gear
72517-0 bottom shaft
72543-0 washer
72269-0 clip (11-745)
72410-0 key(2) (17-001)
72358-0 36/20T gear
72273-0 clip (11-749)
72542-0 washer
72440-0 nut
72288-0 topshaft clutch
72503-0 screw (73-594)
72277-0 clip (B362-5015)
72268-0 clips(2) (11-868)
72234-0 bearings (B313-1411)
72275-0 clips (11-868)
72341-0 38T gear
72237-0 bearing (B313-1411)
72550-0 washer
72350-0 26T gear
72356-0 22T gear
72268-0 clip(6) (11-868)
72349-0 28T gear
72263-0 gearbox casting
72348-0 24T gear
72357-0 33T gear
72337-0 23/19T gear
72347-0 27T gear
72346-0 23T gear
72511-0 topshaft
72354-0 22T gear
72247-0 bush (10-023)
72345-0 24T gear
72336-0 38T gear
72344-0 20Tgear
72355-0 22T gear
72526-0 spacer
72342-0 19T gear
72343-0 22T gear
72238-0 bearing (B313-0212)
72229-0 bearing (B313-0212)
72272-0 clip (11-860)
72279-0 clip (B362-0020)
72248-0 bush (B311-1526)
72548-0 washer
72411-0 key (17-002)
72250-0 bushes (10-022)
72233-0 bearing (B313-0212)
72353-0 22Tgear
72340-0 19/30Tgear
72544-0 washer
72235-0 bearing (B313-0212)
72546-0 washer
72280-0 clip (B362-5018)
72292-0 gearbox end cover
72283-0 clip (11-745)
72514-0 middleshaft
72232-0 bearing (B313-0212)
72270-0 clip (B362-5018)
72335-0 19/20T gear
72482-0 screws(2) (46-214)
72244-1 bushes(2)
72224-1 flange bearing
72512-1 driveshaft
36/50
36/20
35
26
28
24
23/19
27
23
24
38
20
19
22
19/20
30/19
22

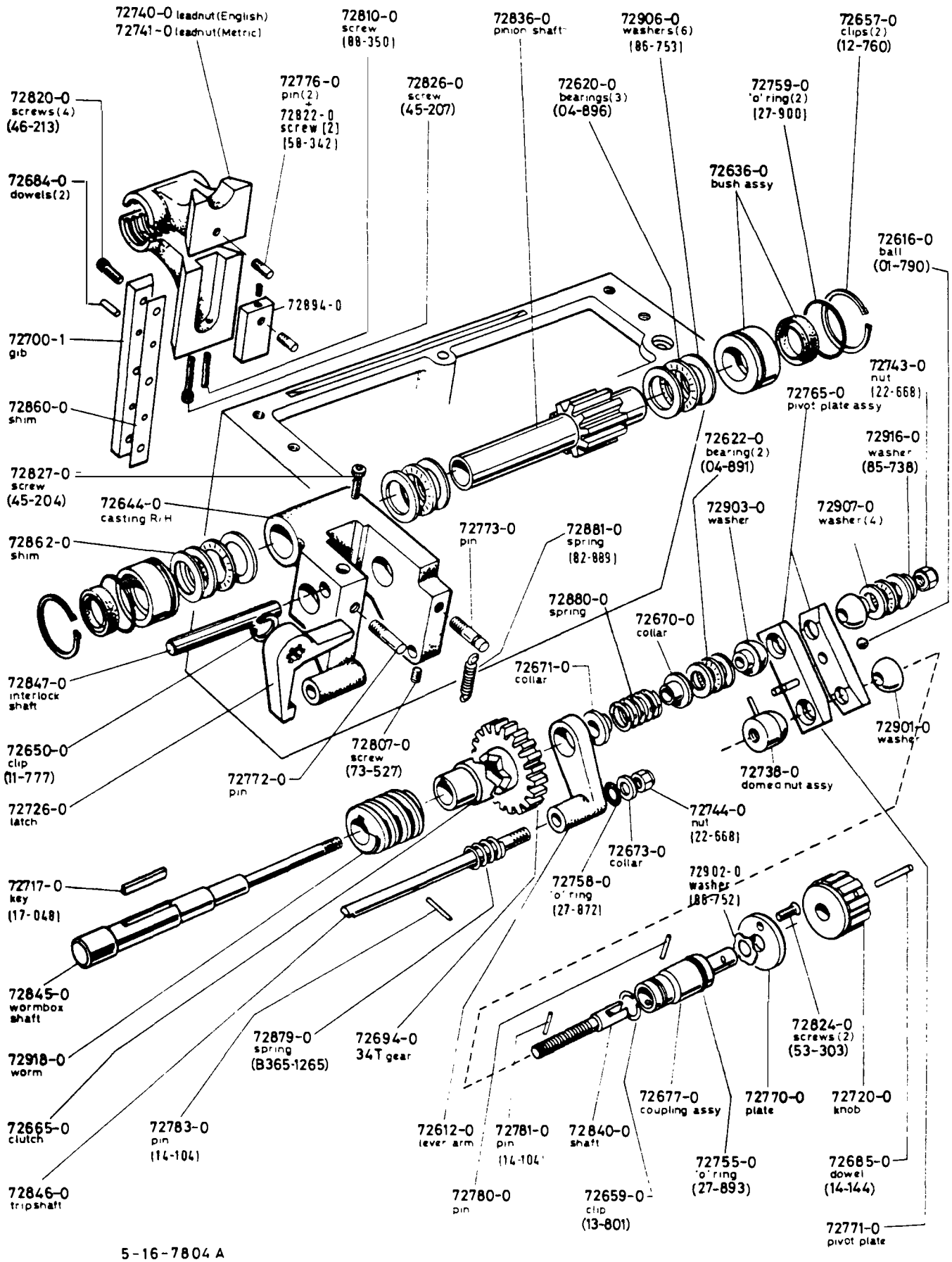
5-13-7410 A


72702-0 Guard
72878-0 spring [88-883]
72615-0 ball (01-788)
72838-0 Pinion shaft
72804-0 Screw [73-607]
72835-0 handwheel pinion shaft
72716-0 key [17-039]
72652-1 clip [11-875]
72654-0 clip [11-871]
72714-0 key [17-002]
72904-0 washer
72900-0 washer [85-695]
72695-0 19 T gear
72919-0 wormwheel
72696-0 15/49 T gear
72816-0 screw (45-206)
72909-0 washer(4) [86-743]
72697-0 49 T gear
72668-0 collar
72651-0 clip (11-754)
72623-0 bearings(2) (04-891)
72675-0 connector (29-026)
72914-0 washer [85-697]
72872-0 sleeve (29-039)
72655-0 clip (11-741)
72680-0 cover
72754-0 'o' ring [27-901]
72799-0 plug
72712-0 key [17-002]
72818-0 screw (61-371)
72708-0 handwheel
72753-0 'o' ring (27-866)
72747-0 nut (29-027)
72614-0 ball (01-794)
72768-0 oil pipe R/H
72797-0 plug
72750-0 oilsight
72841-0 wormwheel shaft
72876-0 spring
72778-0 interlock pin
72843-0 gearshaft
72640-0 casting R/H
72796-0 drainplug
72913-0 washer (86-734)
72752-0 'o' ring (27-870)
72734-0 leadscrew lever assy R/H
72705-0 handle
72656-0 clip (11-874)
72653-0 clip [13-811]
72823-0 screws(10) [08-831]
72891-0 stem
72760-0 'o' ring (27-898)
72888-0 stem R/H
72687-0 elbow [88-110]
72706-0 handle
72757-0 'o' ring (27-893)
72779-0 pin
72806-0 screw (B143-7654)
72882-0 spring (82-830)
72746-0 nut (29-027)
72766-0 base plate R/H
72730-0 wormbox lever assy R/H
72809-0 screw [73-648]
72819-0 screw [68-432]
72870-0 sleeve (29-039)
72690-0 gasket
72794-0 OIL PUMP ASSY
72704-0 handle
72800-0 plug

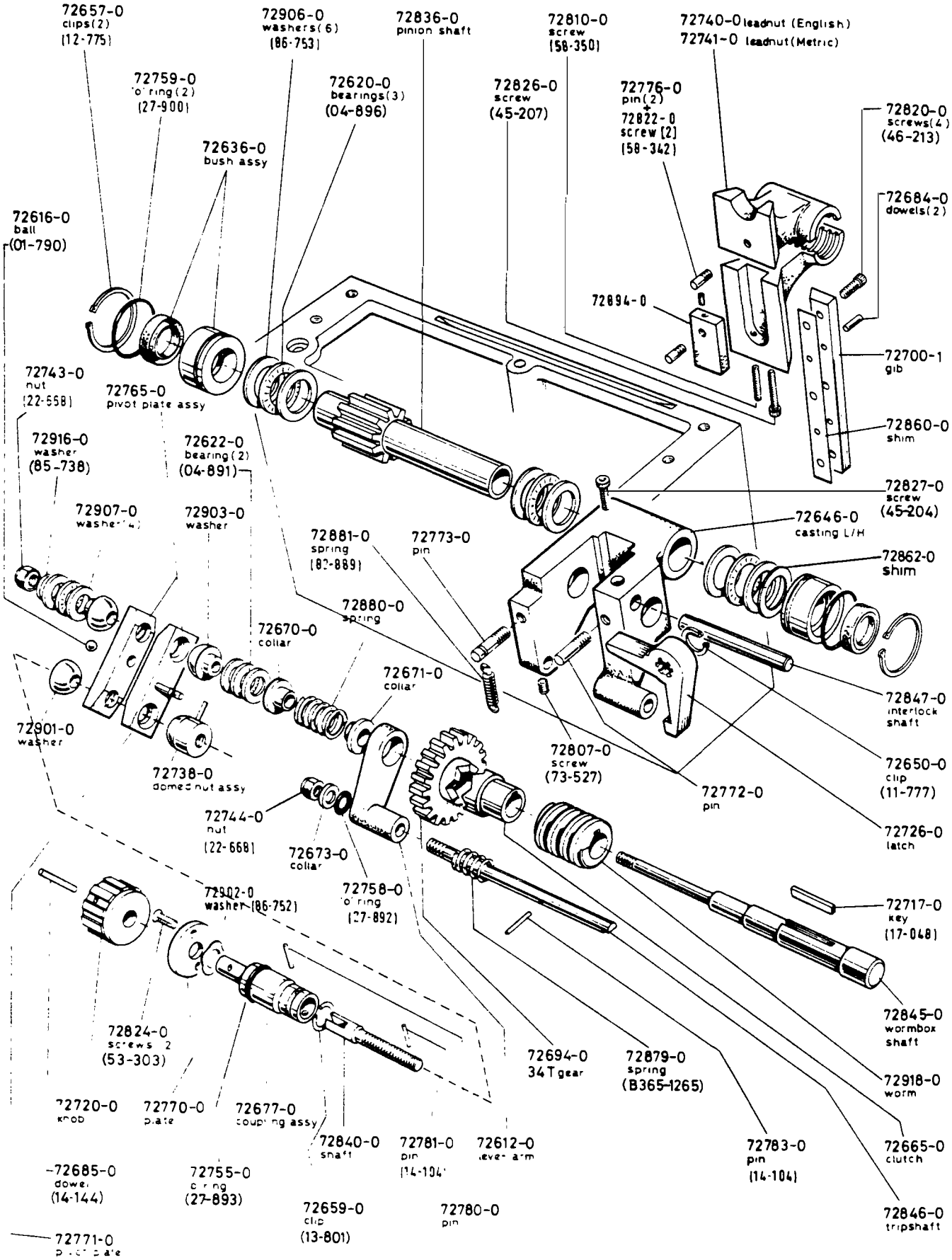
5-14-7804A


72675-0 connector
72654-0 clip (11-871)
72904-0 washer
72714-0 key (17-002)
72835-0 handwheel pinion shaft
72838-0 rack pinion shaft
72747-0 nut (29-027)
72615-0 ball (01-788)
72878-0 spring (82-883)
72672-0 sleeve
72716-0 key (17-039)
72790-0 oil pipe L.H.
72816-0 screw (45-206)
72642-0 casting L.H.
72652-1 clip
72900-0 washer
72668-0 collar
72914-0 washer (85-697)
72909-0 washer (86-743) - 4
72623-0 bearing (04-891) - 2
72655-0 clip (11-741)
72623-0 clip (11-745)
72799-0 plug
72919-0 wormwheel
72680-0 cover
72754-0 o ring (27-901)
72712-0 key (17-002)
72818-0 screw (61-371)
72708-0 handwheel
72753-0 o ring (27-866)
72736-0 lever assy. L.H.
72778-0 pin - interlock
72797-0 plug
72614-0 ball (01-794)
72876-0 spring
72687-0 elbow (88-110)
72841-0 w/w shaft
72750-0 oil sight
72690-0 gasket
72768-0 plate - base L.H.
72843-0 gearshaft
72752-0 o ring (27-870)
72913-0 washer (86-734)
72796-0 plug
72823-0 screw (08-031) 10
72705-0 handle
72656-0 clip (11-874)
72653-0 clip (13-811)
72890-0 stem L.H
72760-0 o ring (27-898)
72746-0 nut (29-027) + 72870-0 sleeve (29-039)
72732-0 wormbox lever assy
72806-0 screw (8143-7654)
72779-0 pin
72704-0 handle
72882-0 spring (82-830) + 72809-0 screw (73-648)
72706-0 handle
72891-0 stem
72800-0 plug
72757-0 o ring (27-893)
72819-0 screw (68-432)
72794-0 PUMP ASSY

5-15-7804

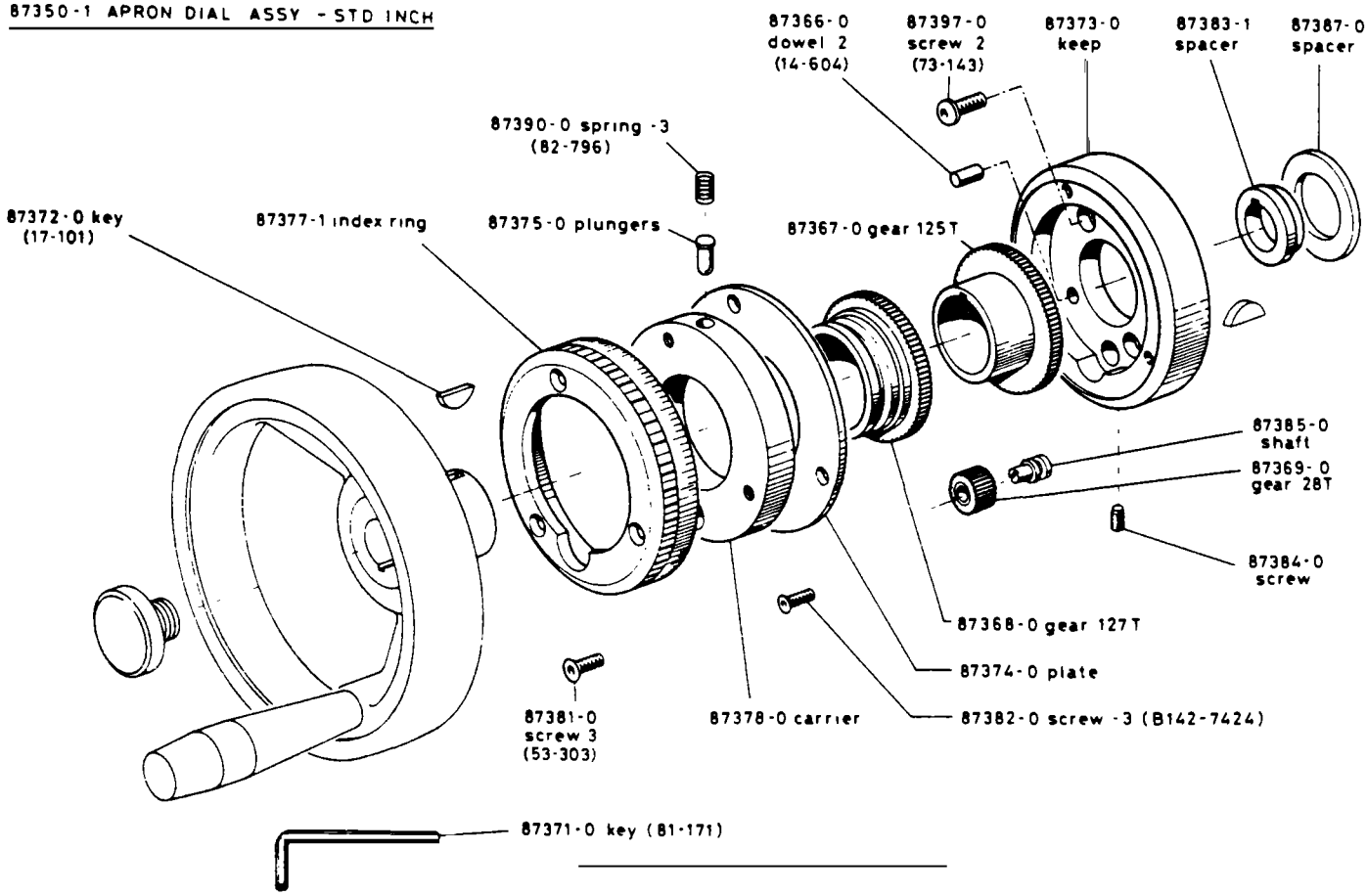

72740-0 leadnut(English)
72741-0 leadnut(Metric)
72810-0 screw (88-350)
72836-0 pinion shaft
72906-0 washers(6) (86-753)
72657-0 clips(2) (12-760)
72820-0 screws(4) (46-213)
72776-0 pin(2) + 72822-0 screw (2) (58-342)
72826-0 screw (45-207)
72620-0 bearings(3) (04-896)
72759-0 'o' ring(2) (27-900)
72636-0 bush assy
72684-0 dowels(2)
72616-0 ball (01-790)
72894-0
72700-1 gib
72743-0 nut (22-668)
72765-0 pivot plate assy
72860-0 shim
72622-0 bearing(2) (04-891)
72916-0 washer (85-738)
72827-0 screw (45-204)
72644-0 casting R/H
72903-0 washer
72907-0 washer(4)
72862-0 shim
72773-0 pin
72881-0 spring (82-889)
72880-0 spring
72670-0 collar
72847-0 interlock shaft
72671-0 collar
72901-0 washer
72650-0 clip (11-777)
72807-0 screw (73-527)
72772-0 pin
72738-0 domed nut assy
72726-0 latch
72744-0 nut (22-668)
72673-0 collar
72758-0 'o' ring (27-872)
72902-0 washer (86-752)
72717-0 key (17-048)
72845-0 wormbox shaft
72824-0 screws(2) (53-303)
72879-0 spring (B365-1265)
72694-0 34T gear
72918-0 worm
72677-0 coupling assy
72770-0 plate
72720-0 knob
72665-0 clutch
72783-0 pin (14-104)
72612-0 lever arm
72781-0 pin (14-104)
72840-0 shaft
72755-0 'o' ring (27-893)
72685-0 dowel (14-144)
72846-0 tripshaft
72780-0 pin
72659-0 clip (13-801)
72771-0 pivot plate

5-16-7804 A

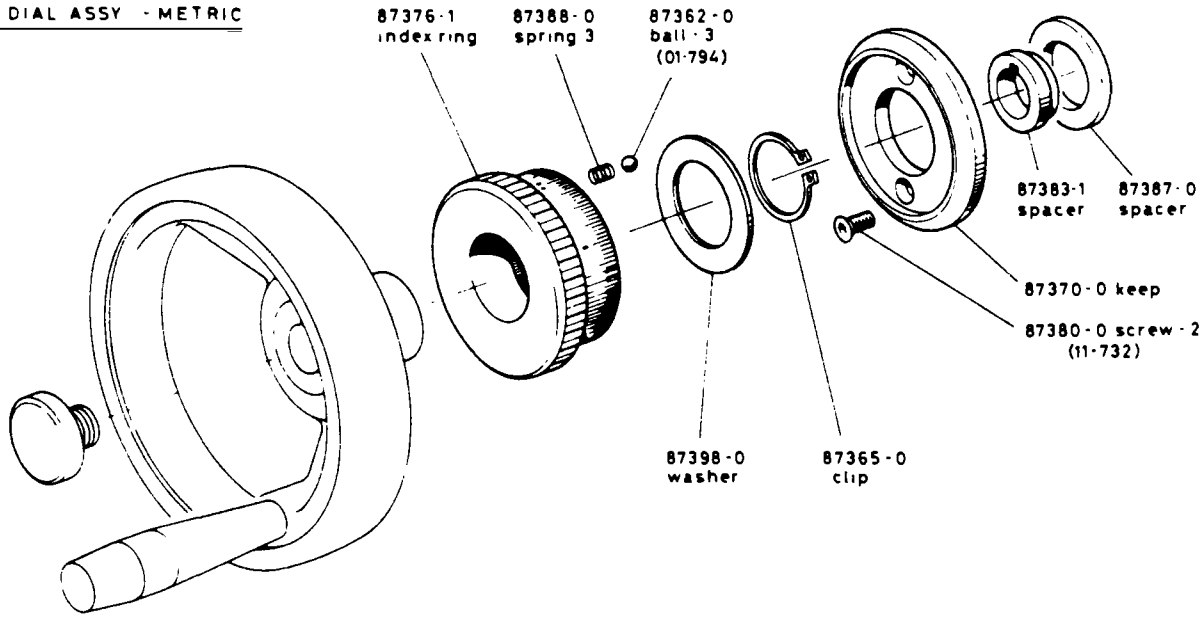

72657-0 clips(2) (12-775)
72906-0 washers(6) (86-753)
72836-0 pinion shaft
72810-0 screw (58-350)
72740-0 leadnut (English)
72741-0 leadnut(Metric)
72759-0 'o' ring(2) (27-900)
72620-0 bearings(3) (04-896)
72826-0 screw (45-207)
72776-0 pin(2)
72822-0 screw (2) (58-342)
72820-0 screws(4) (46-213)
72636-0 bush assy
72684-0 dowels(2)
72616-0 ball (01-790)
72894-0
72700-1 gib
72743-0 nut (22-658)
72765-0 pivot plate assy
72860-0 shim
72916-0 washer (85-738)
72622-0 bearing(2) (04-891)
72827-0 screw (45-204)
72907-0 washer(4)
72903-0 washer
72646-0 casting L/H
72881-0 spring (82-889)
72773-0 pin
72862-0 shim
72880-0 spring
72670-0 collar
72671-0 collar
72847-0 interlock shaft
72901-0 washer
72807-0 screw (73-527)
72650-0 clip (11-777)
72738-0 domed nut assy
72772-0 pin
72744-0 nut (22-668)
72726-0 latch
72673-0 collar
72758-0 'o' ring (27-892)
72902-0 washer (86-752)
72717-0 key (17-048)
72824-0 screws 2 (53-303)
72845-0 wormbox shaft
72694-0 34T gear
72879-0 spring (B365-1265)
72918-0 worm
72720-0 knob
72770-0 plate
72677-0 coupling assy
72840-0 shaft
72781-0 pin (14-104)
72612-0 lever arm
72783-0 pin (14-104)
72665-0 clutch
72685-0 dowel (14-144)
72755-0 'o' ring (27-893)
72659-0 clip (13-801)
72780-0 pin
72846-0 tripshaft
72771-0 pivot plate

5-17-7804A

87350-1 APRON DIAL ASSY - STD INCH

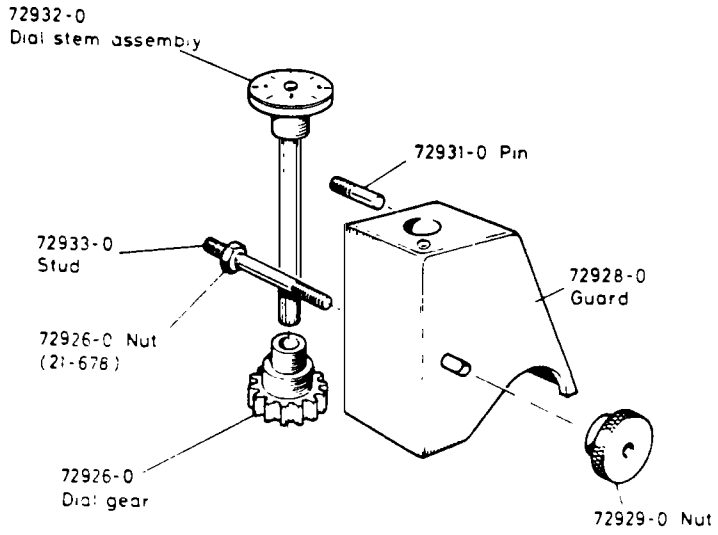


87355-1 APRON DIAL ASSY - METRIC



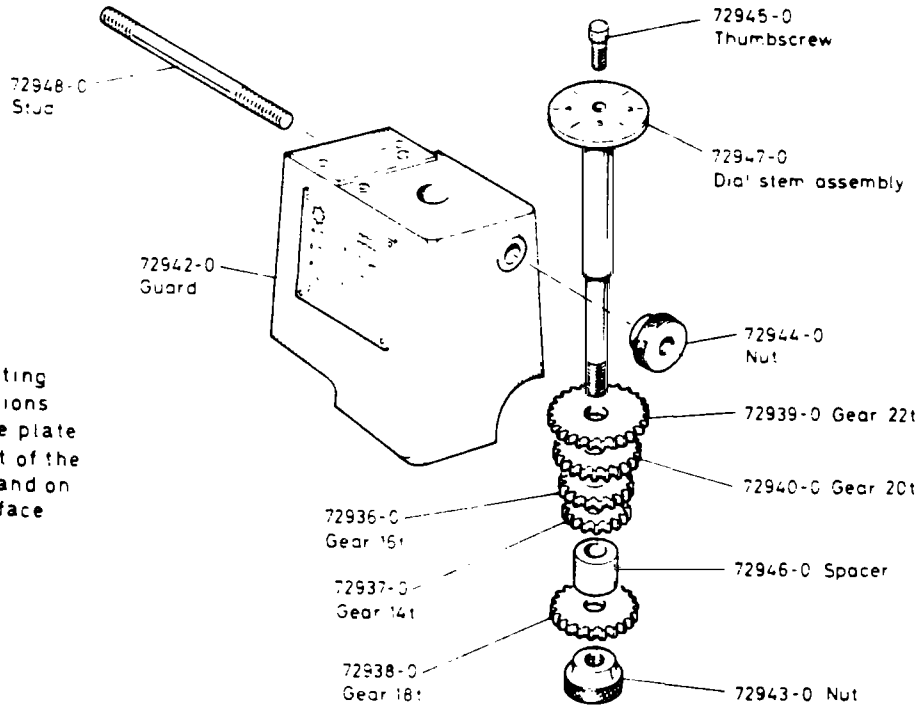
5-32-7209

72925-0 DIAL INDICATOR ASSEMBLY (English)



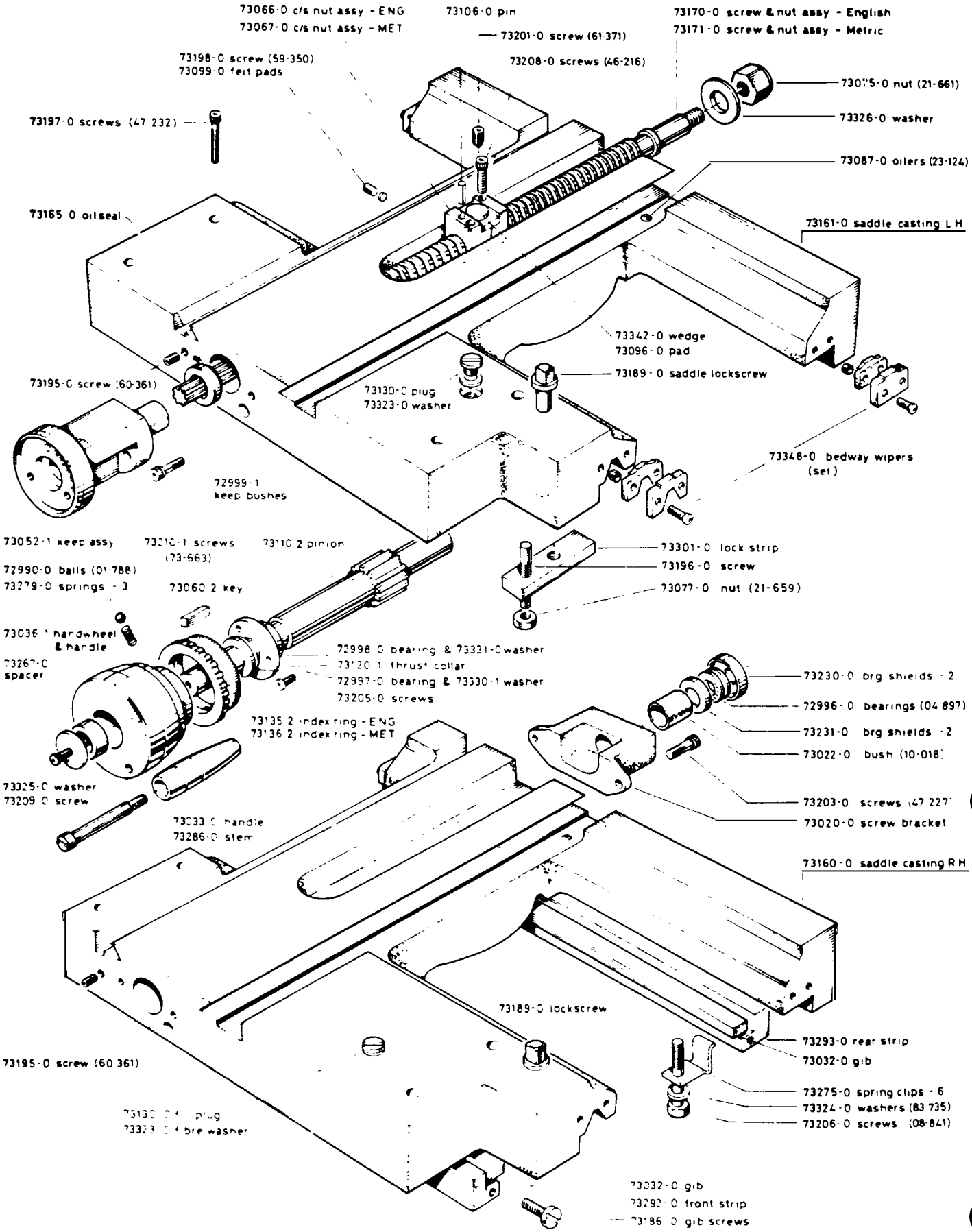
ENGLISH

72935-0 DIAL INDICATOR ASSEMBLY (Metric)

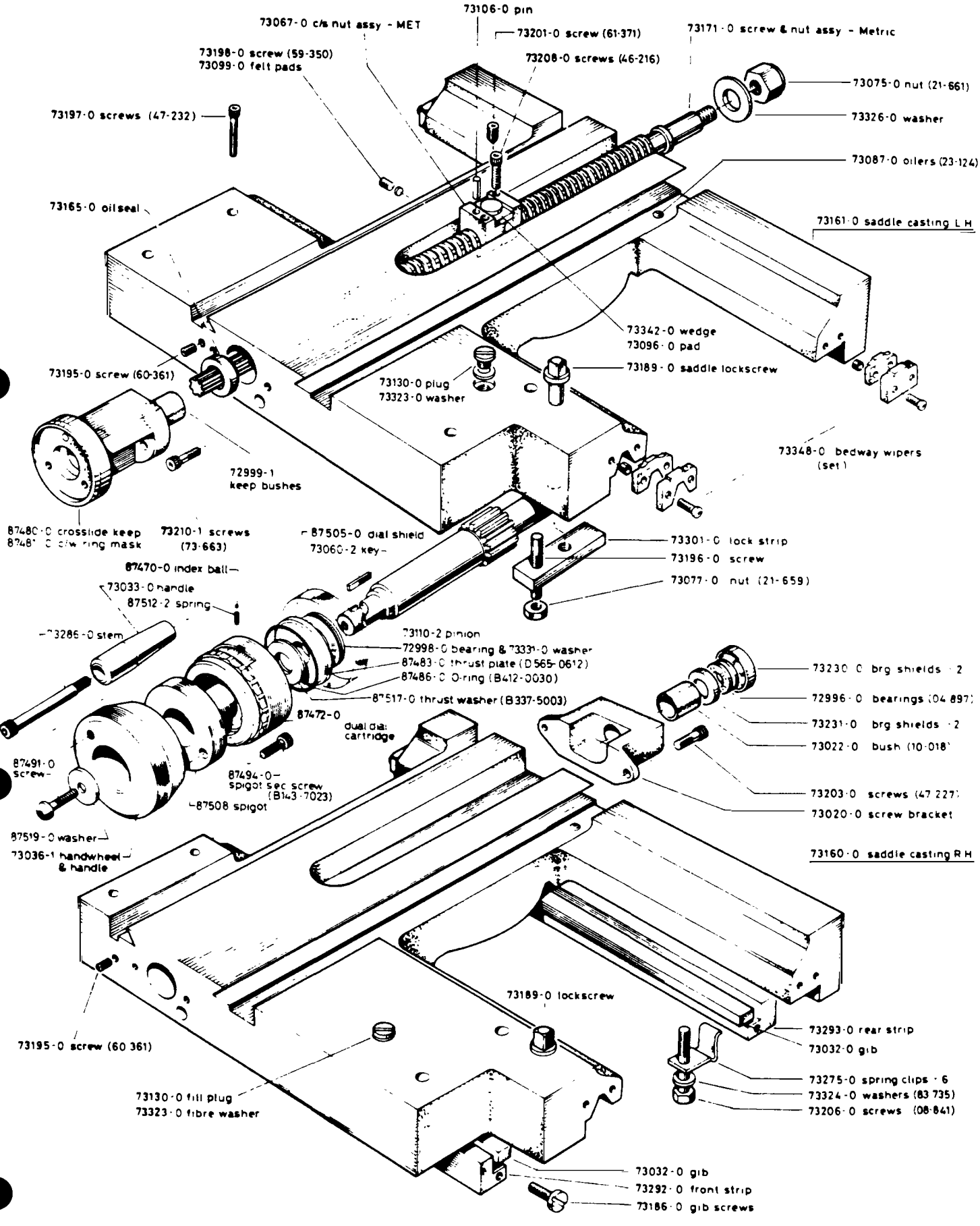


METRIC

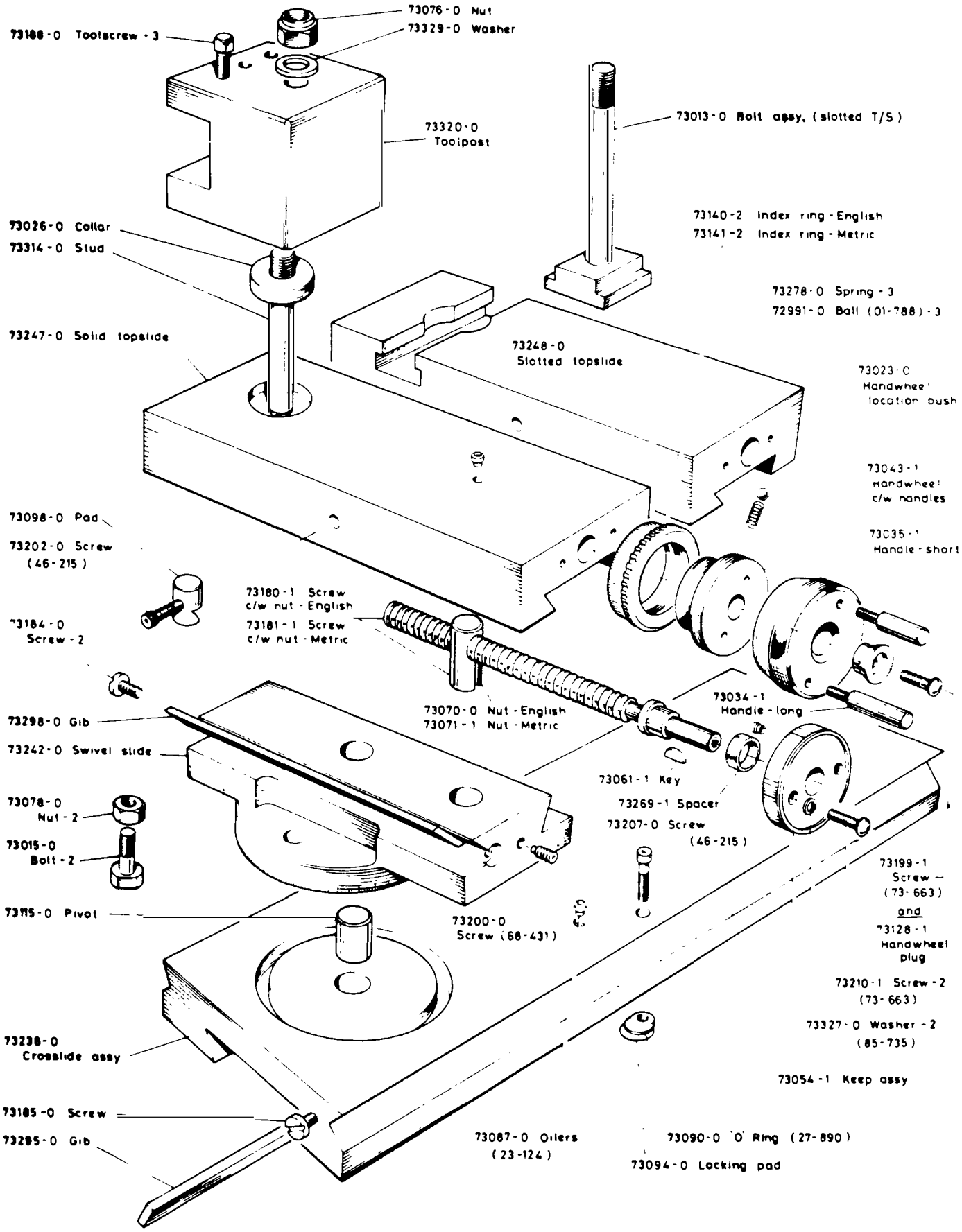
For setting instructions read the plate on front of the guard, and on top surface


73066·0 c/s nut assy - ENG
73067·0 c/s nut assy - MET
73106·0 pin
73201·0 screw (61·371)
73170·0 screw & nut assy - English
73171·0 screw & nut assy - Metric
73198·0 screw (59·350)
73099·0 felt pads
73208·0 screws (46·216)
73197·0 screws (47 232)
73165 0 oilseal
73161·0 saddle casting L H
73342·0 wedge
73096·0 pad
73189·0 saddle lockscrew
73195·0 screw (60·361)
73130·0 plug
73323·0 washer
72999·1 keep bushes
73348·0 bedway wipers (set)
73052·1 keep assy
73210·1 screws (73·663)
73110 2 pinion
72990·0 balls (01·788)
73279·0 springs - 3
73060 2 key
73301·0 lock strip
73196·0 screw
73077·0 nut (21·659)
73036 1 handwheel & handle
73267·0 spacer
72998 0 bearing & 73331·0 washer
73120 1 thrust collar
72997·0 bearing & 73330·1 washer
73205·0 screws
73135 2 indexring - ENG
73136 2 indexring - MET
73230·0 brg shields · 2
72996·0 bearings (04 897)
73231·0 brg shields · 2
73022·0 bush (10·018)
73325·0 washer
73209 0 screw
73033 0 handle
73286·0 stem
73203·0 screws (47 227)
73020·0 screw bracket
73160·0 saddle casting R H
73189·0 lockscrew
73195·0 screw (60 361)
73293·0 rear strip
73032·0 gib
73275·0 spring clips · 6
73324·0 washers (83 735)
73206·0 screws (08·841)
73130 0 4 plug
73323 0 4 bre washer
73032·0 gib
73292·0 front strip
73186 0 gib screws

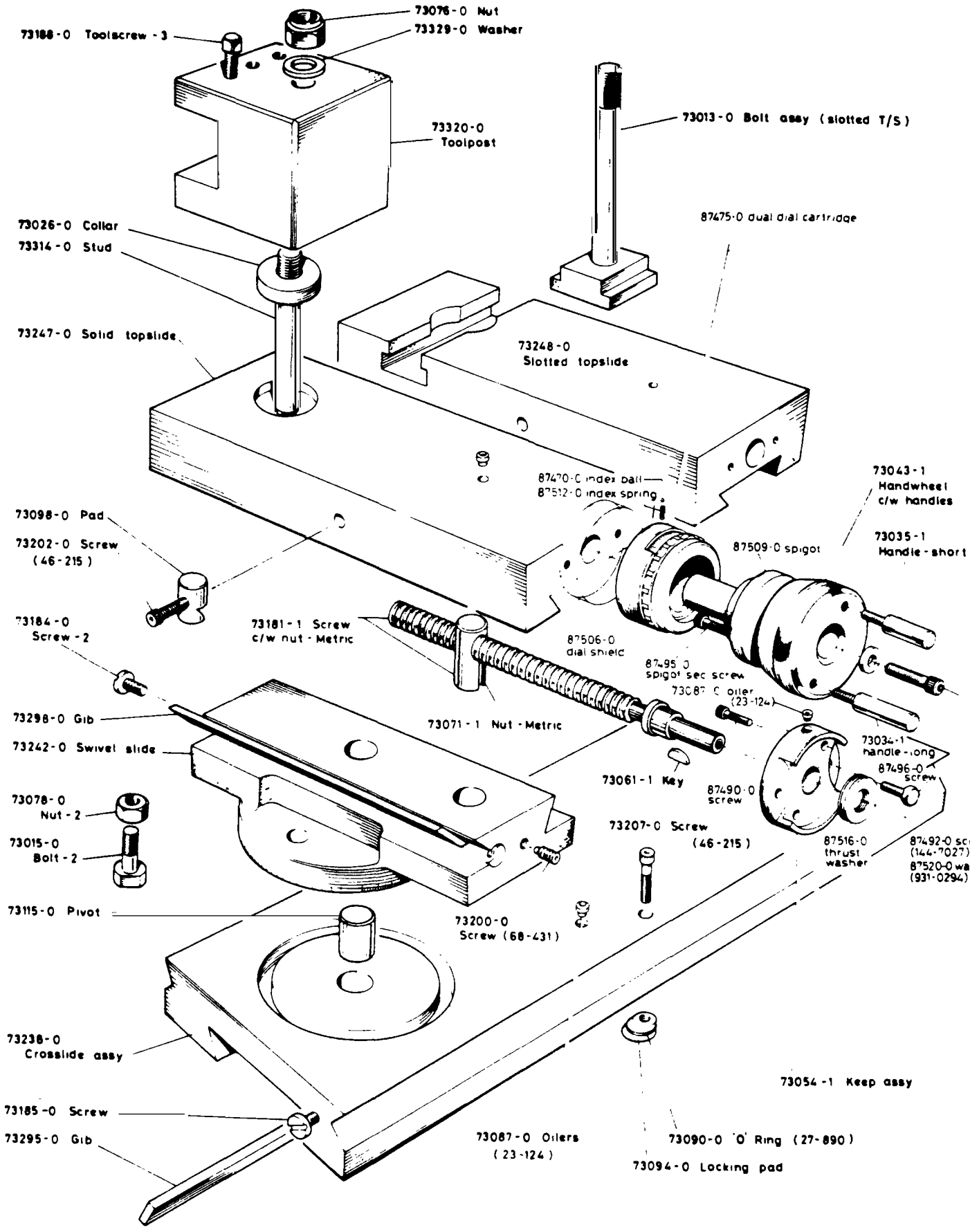
5-19-7909A


73106-0 pin
73067-0 c/s nut assy - MET
73201-0 screw (61-371)
73171-0 screw & nut assy - Metric
73198-0 screw (59-350)
73099-0 felt pads
73208-0 screws (46-216)
73075-0 nut (21-661)
73197-0 screws (47-232)
73326-0 washer
73087-0 oilers (23-124)
73165-0 oilseal
73161-0 saddle casting L H
73342-0 wedge
73096-0 pad
73195-0 screw (60-361)
73189-0 saddle lockscrew
73130-0 plug
73323-0 washer
73348-0 bedway wipers (set)
72999-1 keep bushes
87480-0 crosslide keep
87481-0 c/w ring mask
73210-1 screws (73-663)
87505-0 dial shield
73060-2 key
73301-0 lock strip
73196-0 screw
73077-0 nut (21-659)
87470-0 index ball
73033-0 handle
87512-2 spring
73286-0 stem
73110-2 pinion
72998-0 bearing & 73331-0 washer
87483-0 thrust plate (D565-0612)
87486-0 O-ring (B412-0030)
87517-0 thrust washer (B337-5003)
73230-0 brg shields - 2
72996-0 bearings (04 897)
73231-0 brg shields - 2
73022-0 bush (10-018)
87472-0
dual dia. cartridge
87491-0 screw
87494-0 spigot sec screw (B143-7023)
87508 spigot
73203-0 screws (47 227)
73020-0 screw bracket
87519-0 washer
73036-1 handwheel & handle
73160-0 saddle casting R H
73189-0 lockscrew
73293-0 rear strip
73032-0 gib
73195-0 screw (60 361)
73275-0 spring clips - 6
73324-0 washers (83 735)
73206-0 screws (08-841)
73130-0 fill plug
73323-0 fibre washer
73032-0 gib
73292-0 front strip
73186-0 gib screws

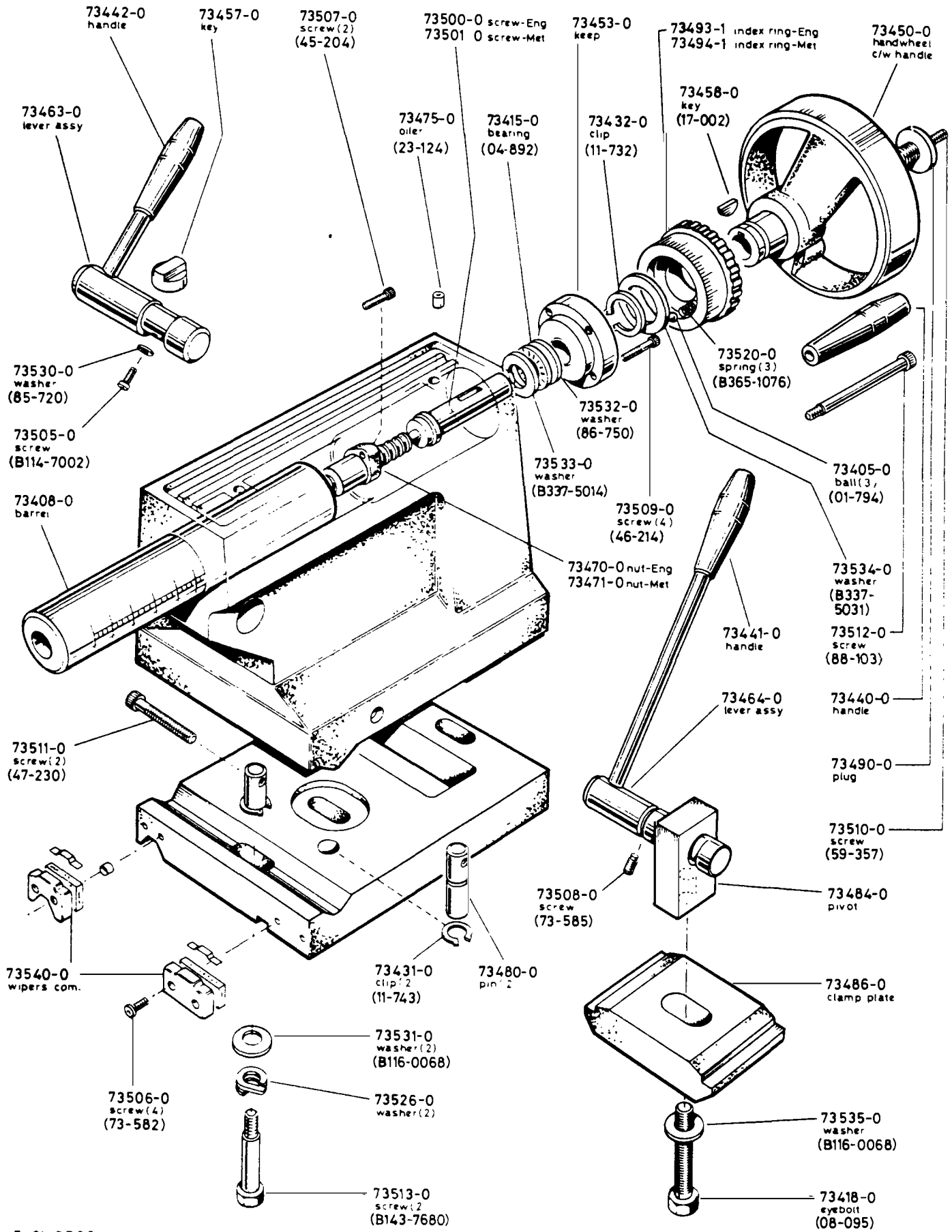
5-19-8205


73076-0 Nut
73329-0 Washer
73188-0 Toolscrew - 3
73320-0 Toolpost
73013-0 Bolt assy. (slotted T/S)
73140-2 Index ring - English
73141-2 Index ring - Metric
73026-0 Collar
73314-0 Stud
73278-0 Spring - 3
72991-0 Ball (01-788) - 3
73247-0 Solid topslide
73248-0 Slotted topslide
73023-0 Handwheel location bush
73043-1 Handwheel c/w handles
73098-0 Pad
73202-0 Screw (46-215)
73035-1 Handle - short
73180-1 Screw c/w nut - English
73181-1 Screw c/w nut - Metric
73184-0 Screw - 2
73070-0 Nut - English
73071-1 Nut - Metric
73034-1 Handle - long
73298-0 Gib
73242-0 Swivel slide
73061-1 Key
73269-1 Spacer
73207-0 Screw (46-215)
73078-0 Nut - 2
73015-0 Bolt - 2
73199-1 Screw - (73-663)
and
73128-1 Handwheel plug
73115-0 Pivot
73200-0 Screw (68-431)
73210-1 Screw - 2 (73-663)
73327-0 Washer - 2 (85-735)
73238-0 Crossslide assy
73054-1 Keep assy
73185-0 Screw
73295-0 Gib
73087-0 Oilers (23-124)
73090-0 'O' Ring (27-890)
73094-0 Locking pad

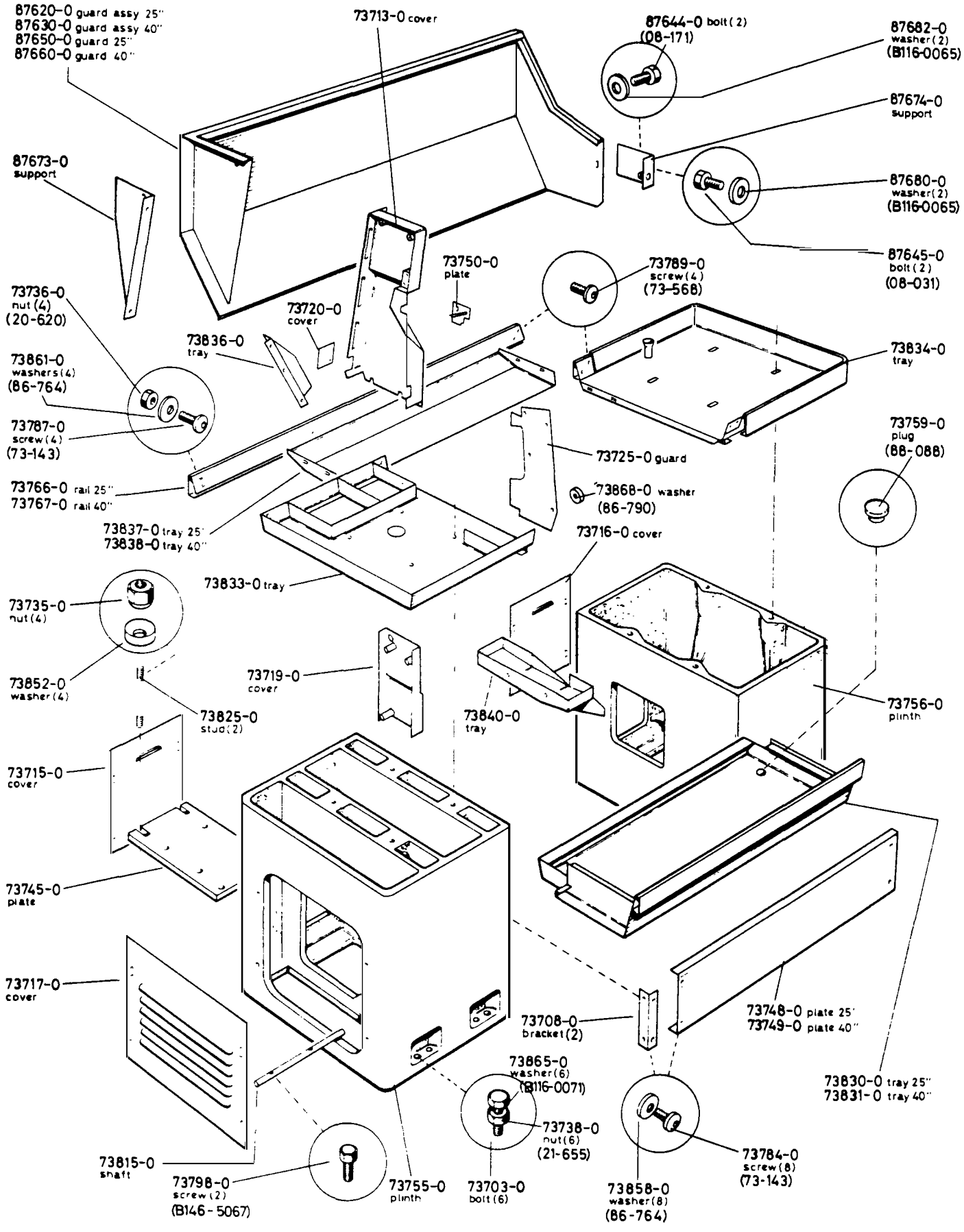
5-20-7908


73076-0 Nut
73329-0 Washer
73188-0 Toolscrew - 3
73320-0 Toolpost
73013-0 Bolt assy (slotted T/S)
87475-0 dual dial cartridge
73026-0 Collar
73314-0 Stud
73247-0 Solid topslide
73248-0 Slotted topslide
87470-0 index ball
87512-0 index spring
73043-1 Handwheel c/w handles
73098-0 Pad
73202-0 Screw (46-215)
87509-0 spigot
73035-1 Handle - short
73184-0 Screw - 2
73181-1 Screw c/w nut - Metric
87506-0 dial shield
87495-0 spigot sec screw
73087-0 oiler (23-124)
73298-0 Gib
73071-1 Nut - Metric
73242-0 Swivel slide
73034-1 handle - long
87496-0 screw
73061-1 Key
87490-0 screw
73078-0 Nut - 2
73207-0 Screw (46-215)
73015-0 Bolt - 2
87516-0 thrust washer
87492-0 screw (144-7027)
87520-0 washer (931-0294)
73115-0 Pivot
73200-0 Screw (68-431)
73238-0 Crossslide assy
73054-1 Keep assy
73185-0 Screw
73295-0 Gib
73087-0 Oilers (23-124)
73090-0 'O' Ring (27-890)
73094-0 Locking pad

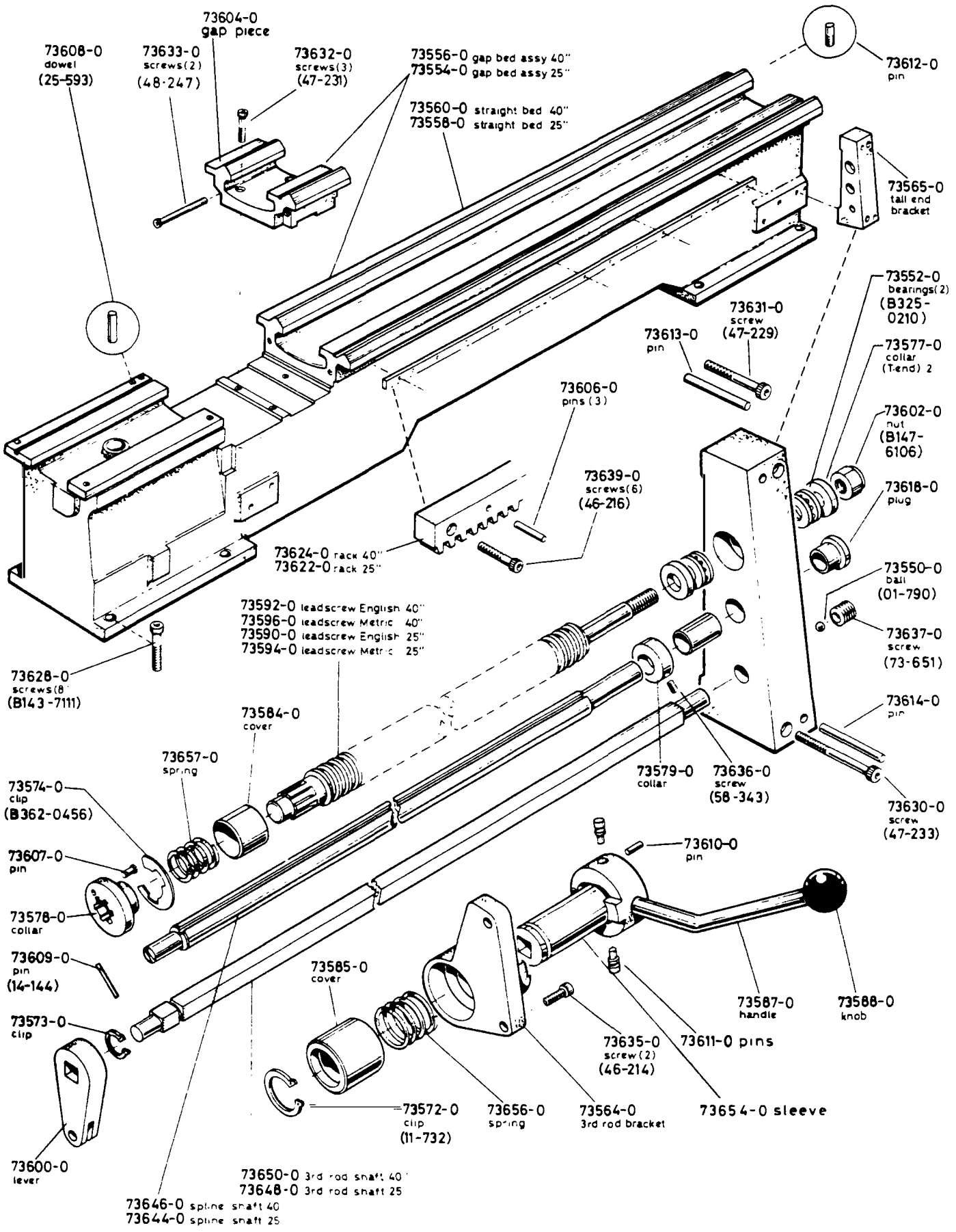
5-20-8205


73442-0 handle
73457-0 key
73507-0 screw(2) (45-204)
73500-0 screw-Eng
73501 0 screw-Met
73453-0 keep
73493-1 index ring-Eng
73494-1 index ring-Met
73450-0 handwheel c/w handle
73463-0 lever assy
73475-0 oiler (23-124)
73415-0 bearing (04-892)
73432-0 clip (11-732)
73458-0 key (17-002)
73520-0 spring(3) (B365-1076)
73530-0 washer (85-720)
73505-0 screw (B114-7002)
73532-0 washer (86-750)
73533-0 washer (B337-5014)
73405-0 ball(3) (01-794)
73408-0 barrel
73509-0 screw(4) (46-214)
73470-0 nut-Eng
73471-0 nut-Met
73534-0 washer (B337-5031)
73441-0 handle
73512-0 screw (88-103)
73464-0 lever assy
73440-0 handle
73511-0 screw(2) (47-230)
73490-0 plug
73510-0 screw (59-357)
73508-0 screw (73-585)
73484-0 pivot
73540-0 wipers com.
73431-0 clip(2) (11-743)
73480-0 pin(2)
73486-0 clamp plate
73531-0 washer(2) (B116-0068)
73506-0 screw(4) (73-582)
73526-0 washer(2)
73535-0 washer (B116-0068)
73513-0 screw(2) (B143-7680)
73418-0 eyebolt (08-095)

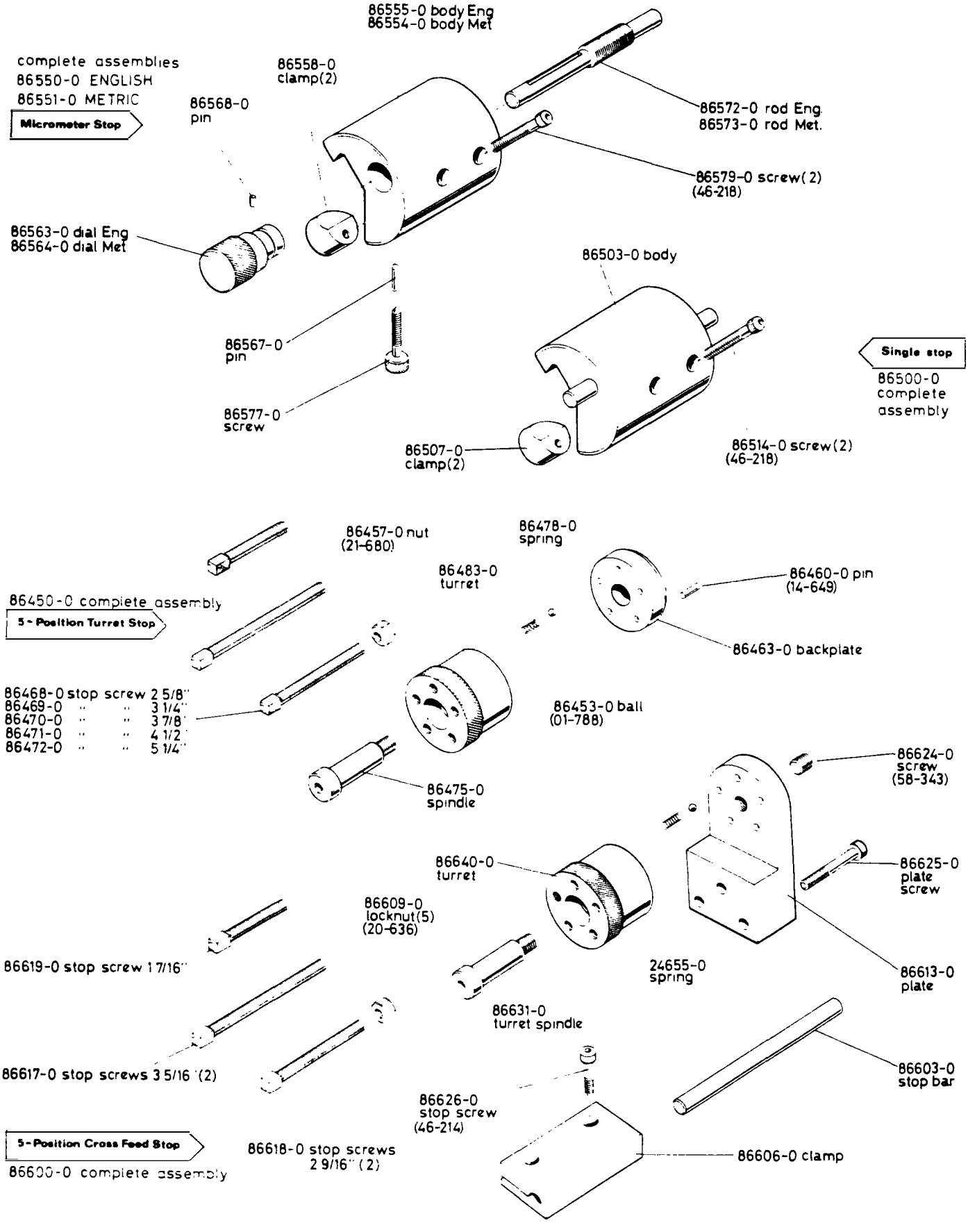
5-21-7706


87620-0 guard assy 25"
87630-0 guard assy 40"
87650-0 guard 25"
87660-0 guard 40"
73713-0 cover
87644-0 bolt (2)
(08-171)
87682-0
washer (2)
(B116-0065)
87674-0
support
87673-0
support
87680-0
washer (2)
(B116-0065)
87645-0
bolt (2)
(08-031)
73750-0
plate
73789-0
screw (4)
(73-568)
73736-0
nut (4)
(20-620)
73720-0
cover
73836-0
tray
73834-0
tray
73861-0
washers (4)
(86-764)
73787-0
screw (4)
(73-143)
73759-0
plug
(88-088)
73725-0 guard
73766-0 rail 25"
73767-0 rail 40"
73868-0 washer
(86-790)
73837-0 tray 25"
73838-0 tray 40"
73716-0 cover
73833-0 tray
73735-0
nut (4)
73719-0
cover
73852-0
washer (4)
73825-0
stud (2)
73840-0
tray
73756-0
plinth
73715-0
cover
73745-0
plate
73717-0
cover
73708-0
bracket (2)
73748-0 plate 25"
73749-0 plate 40"
73865-0
washer (6)
(B116-0071)
73830-0 tray 25"
73831-0 tray 40"
73738-0
nut (6)
(21-655)
73784-0
screw (8)
(73-143)
73815-0
shaft
73798-0
screw (2)
(B146-5067)
73755-0
plinth
73703-0
bolt (6)
73858-0
washer (8)
(86-764)

5-22-7106/1


73604-0 gap piece
73608-0 dowel (25-593)
73633-0 screws(2) (48-247)
73632-0 screws(3) (47-231)
73556-0 gap bed assy 40"
73554-0 gap bed assy 25"
73560-0 straight bed 40"
73558-0 straight bed 25"
73612-0 pin
73565-0 tail end bracket
73552-0 bearings(2) (B325-0210)
73631-0 screw (47-229)
73613-0 pin
73577-0 collar (T-end) 2
73606-0 pins (3)
73602-0 nut (B147-6106)
73639-0 screws(6) (46-216)
73618-0 plug
73624-0 rack 40"
73622-0 rack 25"
73550-0 ball (01-790)
73592-0 leadscrew English 40"
73596-0 leadscrew Metric 40"
73590-0 leadscrew English 25"
73594-0 leadscrew Metric 25"
73637-0 screw (73-651)
73628-0 screws(8) (B143-7111)
73584-0 cover
73614-0 pin
73657-0 spring
73579-0 collar
73636-0 screw (58-343)
73574-0 clip (B362-0456)
73630-0 screw (47-233)
73610-0 pin
73607-0 pin
73578-0 collar
73609-0 pin (14-144)
73585-0 cover
73587-0 handle
73588-0 knob
73573-0 clip
73635-0 screw(2) (46-214)
73611-0 pins
73572-0 clip (11-732)
73656-0 spring
73564-0 3rd rod bracket
73654-0 sleeve
73600-0 lever
73650-0 3rd rod shaft 40"
73648-0 3rd rod shaft 25"
73646-0 spline shaft 40
73644-0 spline shaft 25

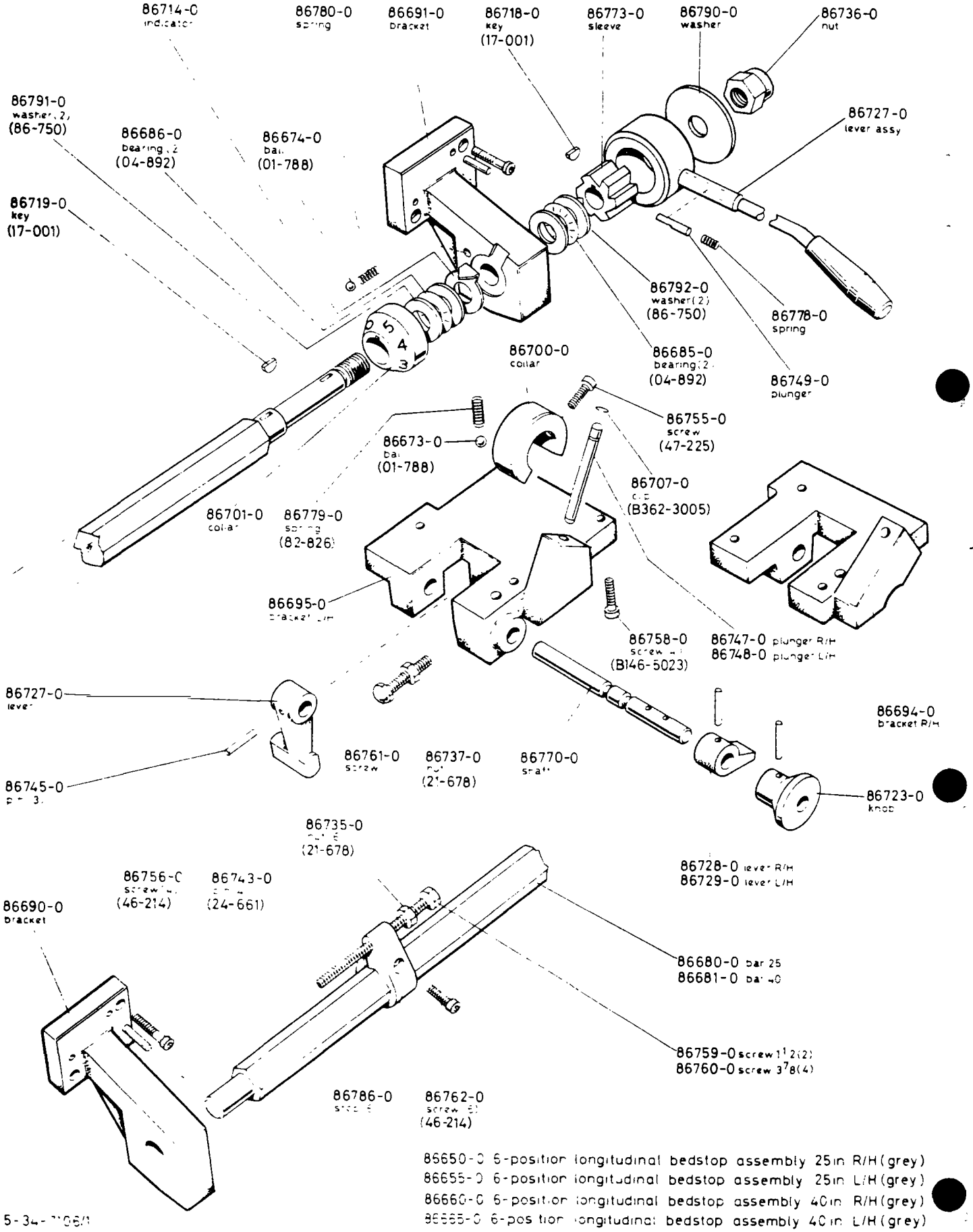
5-23-7309


86555-0 body Eng
86554-0 body Met
complete assemblies
86550-0 ENGLISH
86551-0 METRIC
Micrometer Stop
86558-0
clamp(2)
86568-0
pin
86572-0 rod Eng.
86573-0 rod Met.
86579-0 screw(2)
(46-218)
86563-0 dial Eng
86564-0 dial Met
86503-0 body
86567-0
pin
86577-0
screw
Single stop
86500-0
complete
assembly
86507-0
clamp(2)
86514-0 screw(2)
(46-218)
86457-0 nut
(21-680)
86478-0
spring
86483-0
turret
86460-0 pin
(14-649)
86450-0 complete assembly
5-Position Turret Stop
86463-0 backplate
86468-0 stop screw 2 5/8"
86469-0 " " 3 1/4"
86470-0 " " 3 7/8"
86471-0 " " 4 1/2"
86472-0 " " 5 1/4"
86453-0 ball
(01-788)
86624-0
screw
(58-343)
86475-0
spindle
86640-0
turret
86625-0
plate
screw
86609-0
locknut(5)
(20-636)
86619-0 stop screw 1 7/16"
24655-0
spring
86613-0
plate
86631-0
turret spindle
86603-0
stop bar
86617-0 stop screws 3 5/16" (2)
86626-0
stop screw
(46-214)
5-Position Cross Feed Stop
86618-0 stop screws
2 9/16" (2)
86606-0 clamp
86600-0 complete assembly

5-33-7106

BED STOP; 6 POSITION LONGITUDINAL

FROM SER No 00001
TO SER No

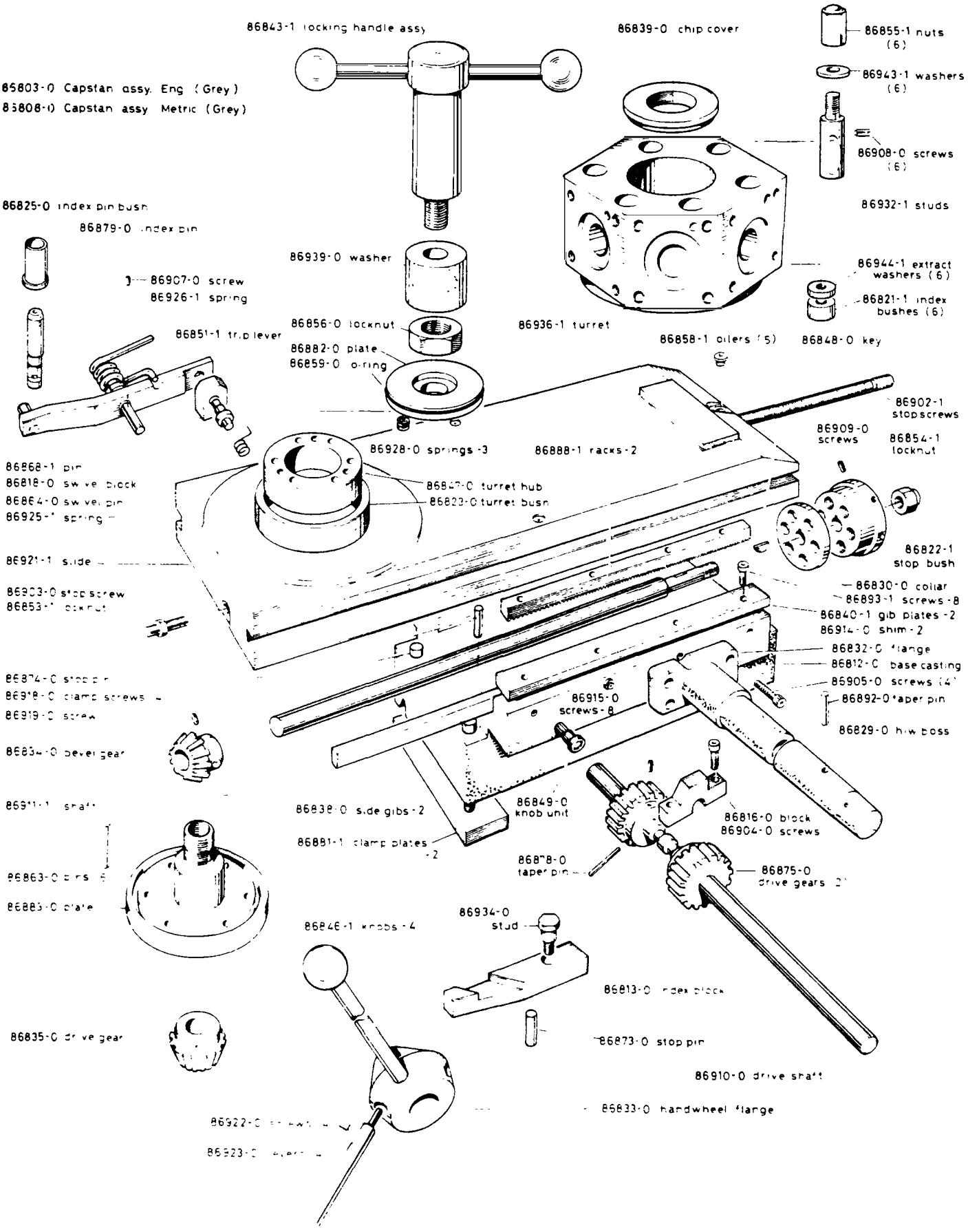


86650-0 6-position longitudinal bedstop assembly 25in R/H (grey)
86655-0 6-position longitudinal bedstop assembly 25in L/H (grey)
86660-0 6-position longitudinal bedstop assembly 40in R/H (grey)
86665-0 6-position longitudinal bedstop assembly 40in L/H (grey)

5-34-7106/1

CAPSTAN UNIT

FROM October 1979

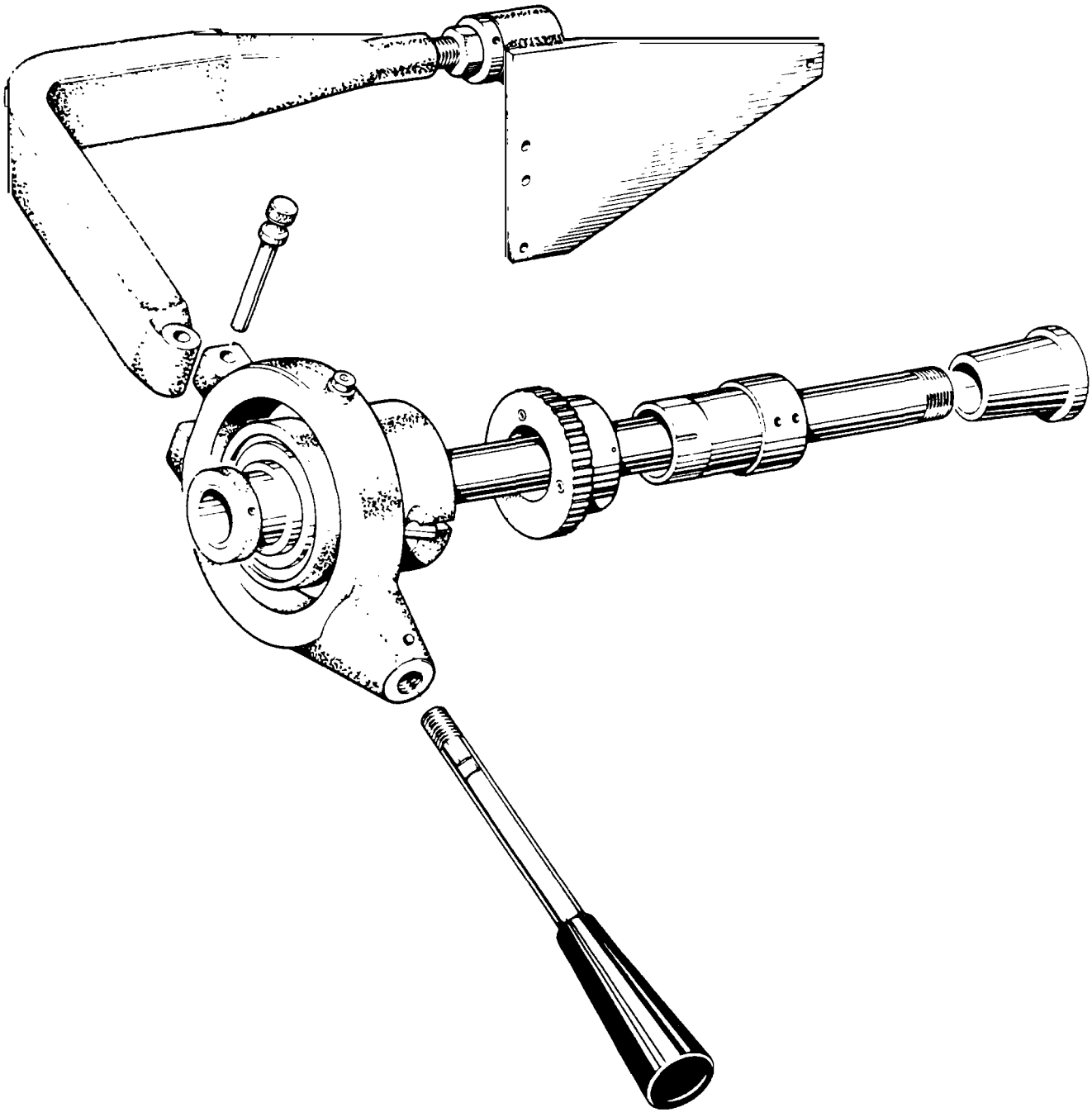


5-42-7911

87120-0

DRAW-BAR COLLET CHUCK ASSY (Accro type)

collets available in mm or inch sizes

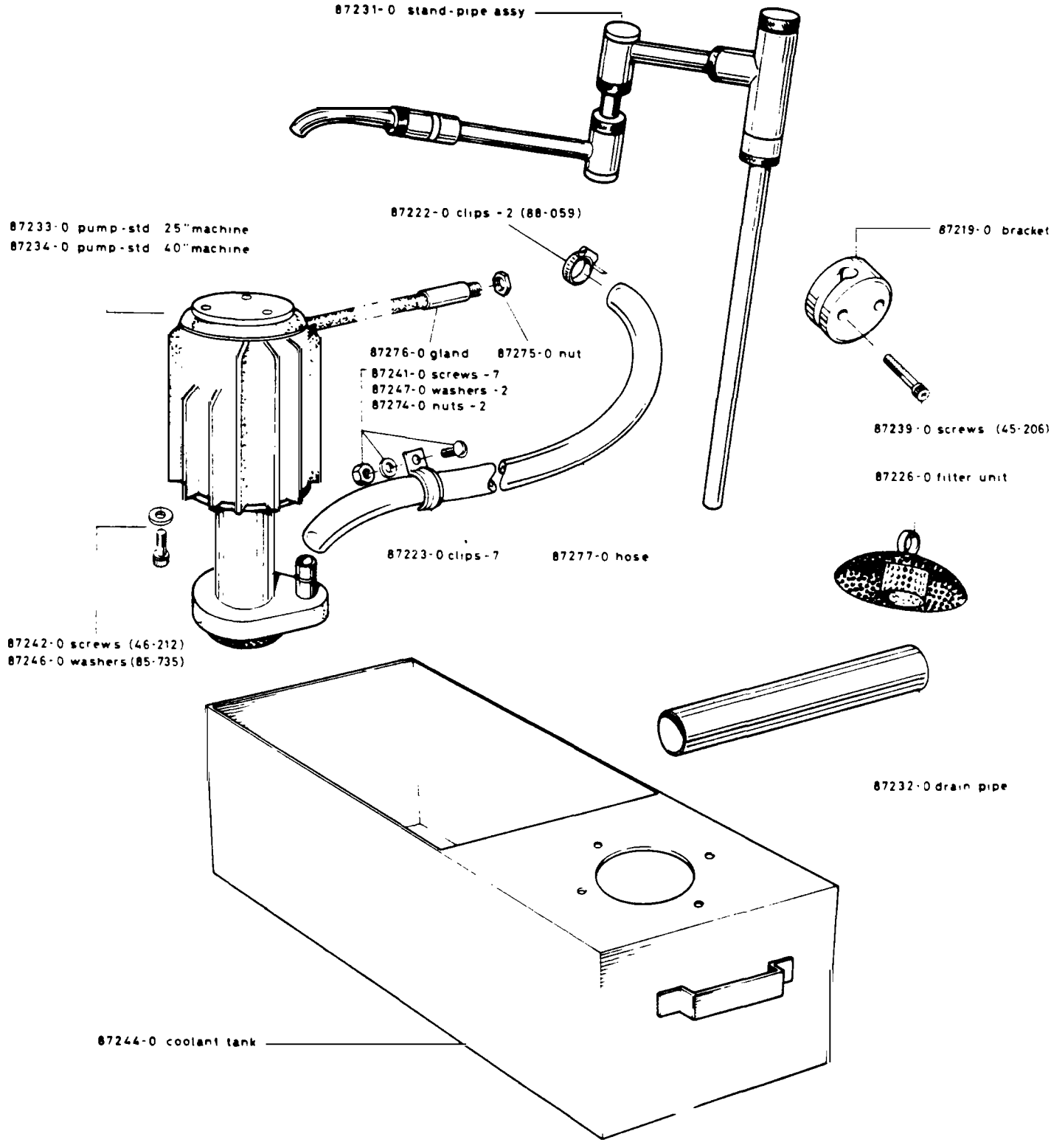


5-ACC 490-7910

COOLANT UNIT

FROM SER No 00001
TO SER No

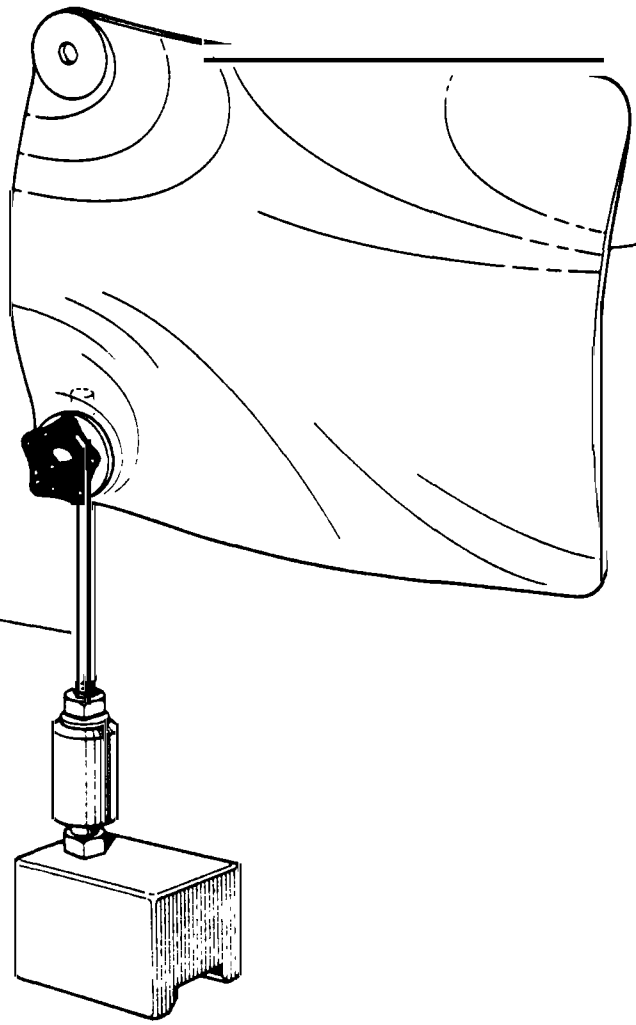
COMPLETE ASSY (25") - 87200-0
COMPLETE ASSY (40") - 87201-0



5-26-7304/1

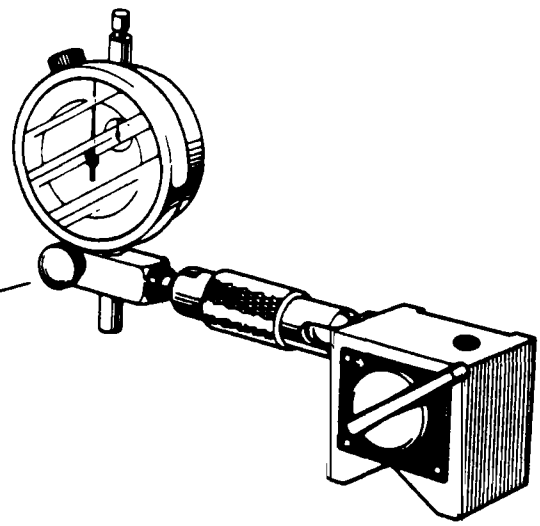
MAGNETIC CHIP GUARD / DIAL INDICATOR

FROM SER No 00001
TO SER No ...



87612-0 Shield

87600-0 MAGNETIC CHIP GUARD ASSEMBLY



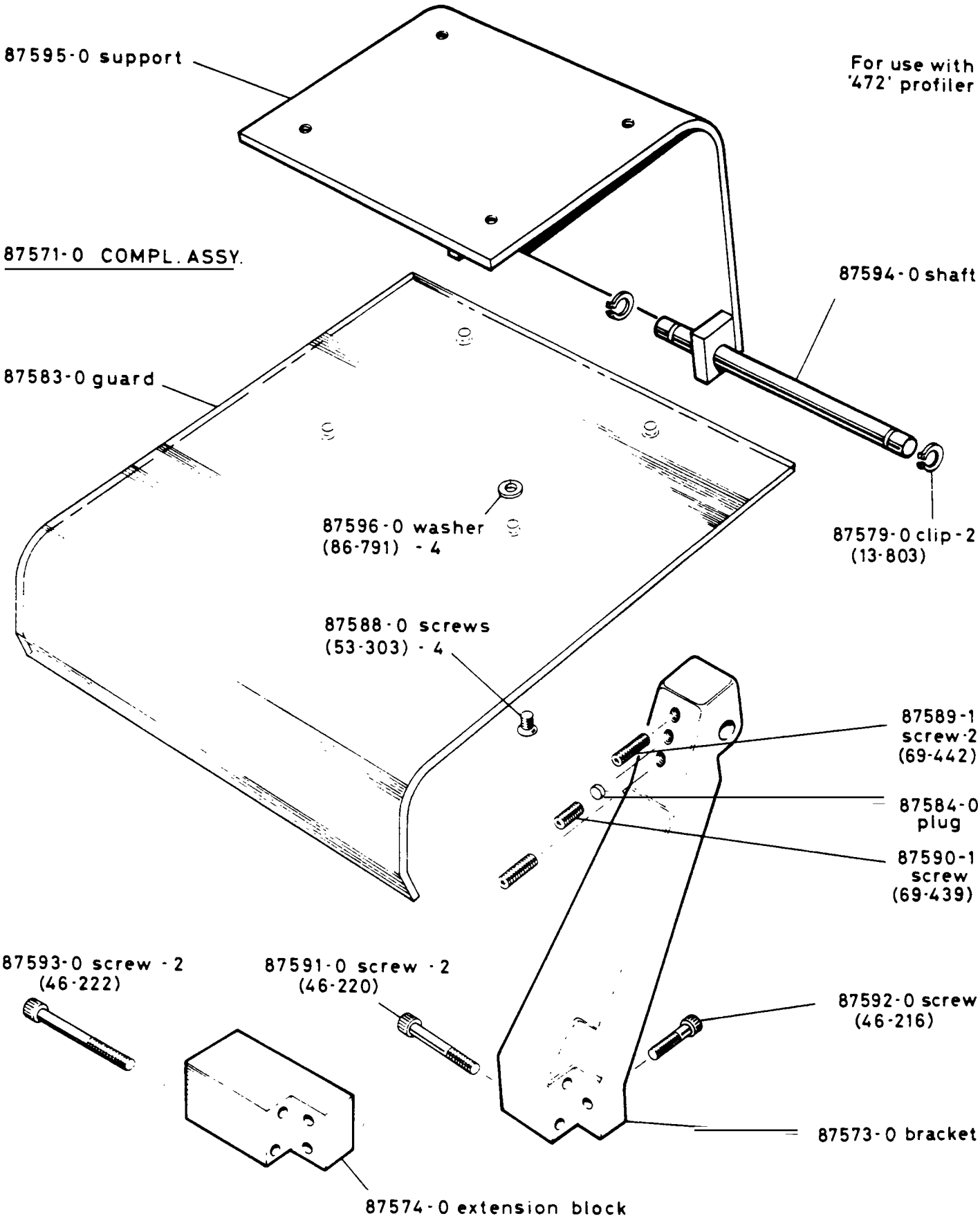
87460-0 MAGNETIC BASED DIAL INDICATOR ASSEMBLY : English

87461 -0 MAGNETIC BASED DIAL INDICATOR ASSEMBLY Metric

5-38-7106

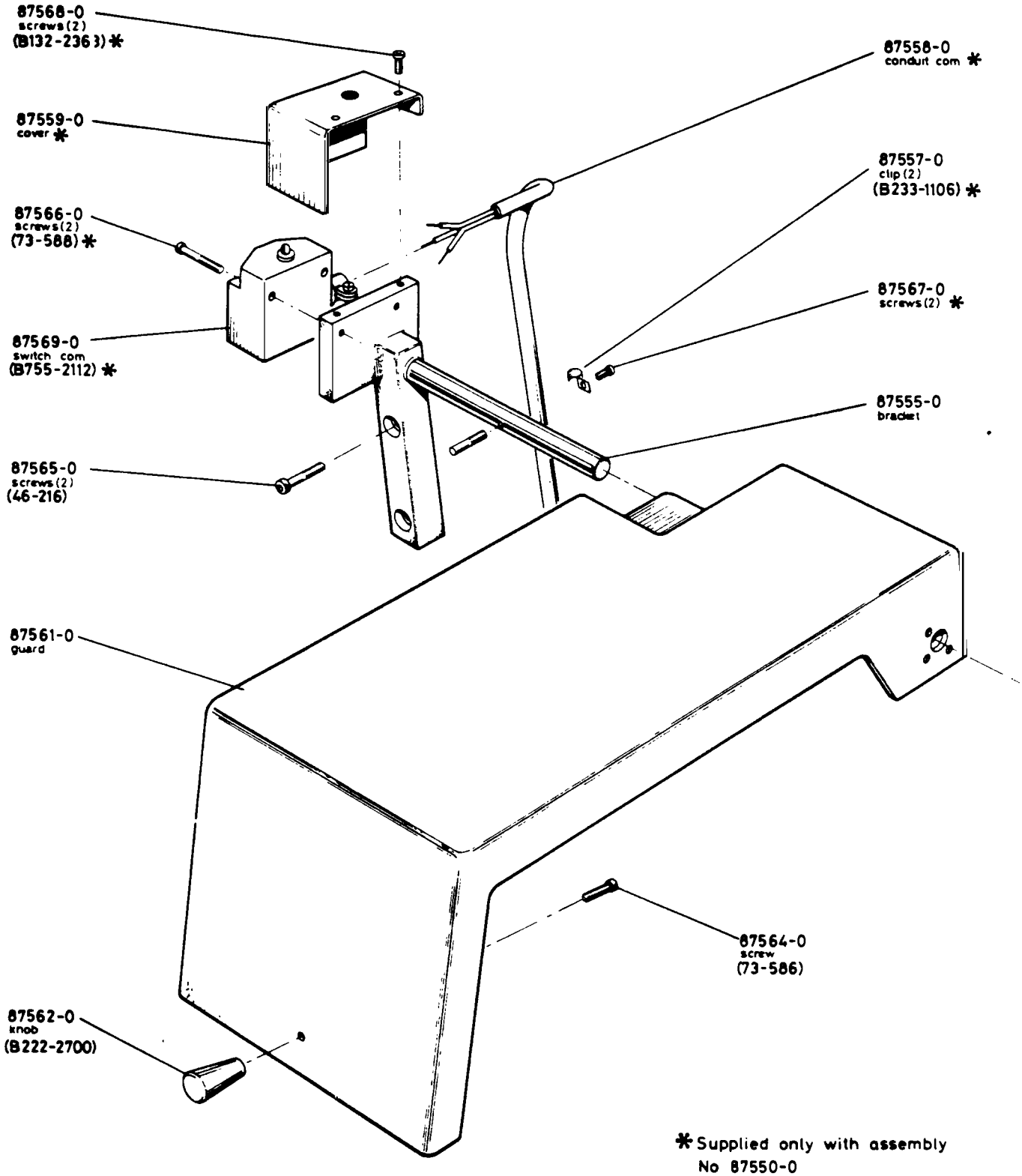
CHIP GUARD

FROM SER. No. 00550
TO SER. No.



5-37-7207

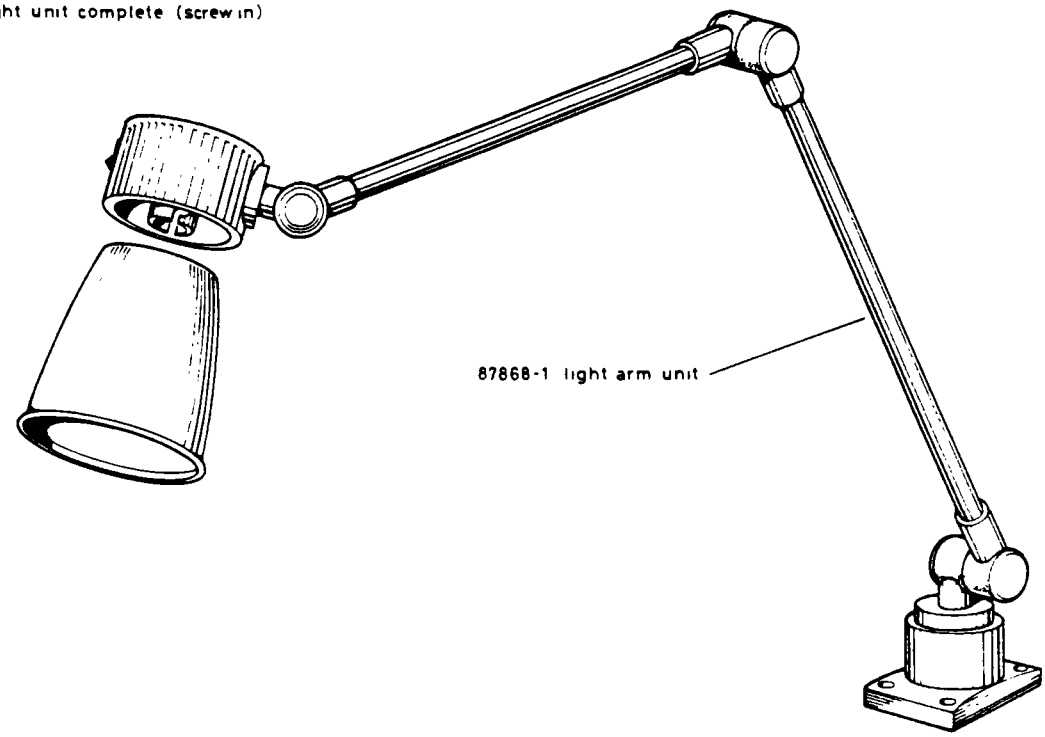
87550-0 CHUCK GUARD ASSEMBLY with LIMIT SWITCH
87551-0 CHUCK GUARD ASSEMBLY without LIMIT SWITCH

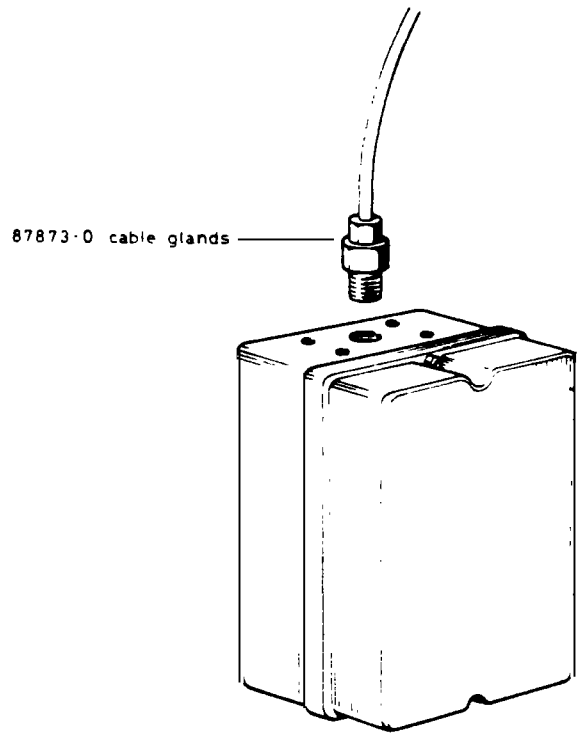


* Supplied only with assembly No 87550-0

LOW VOLT LIGHT

87850-1 Light unit complete (bayonet)
87857-0 Light unit complete (screw in)



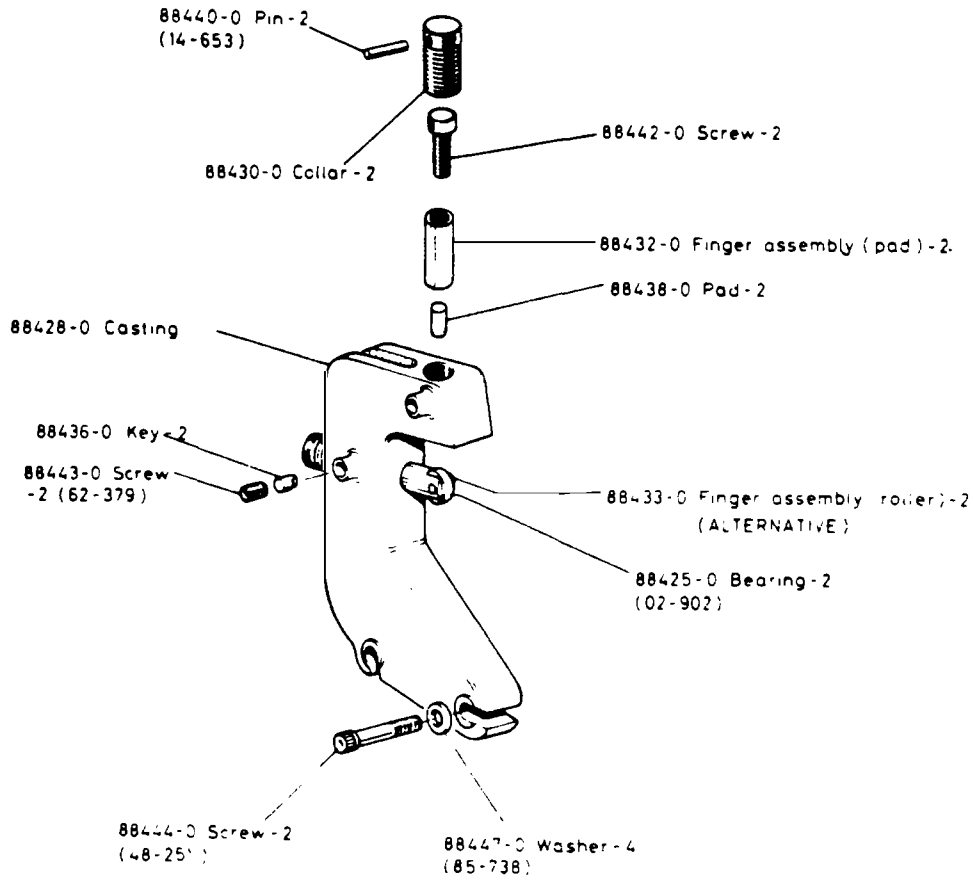


TRANSFORMERS

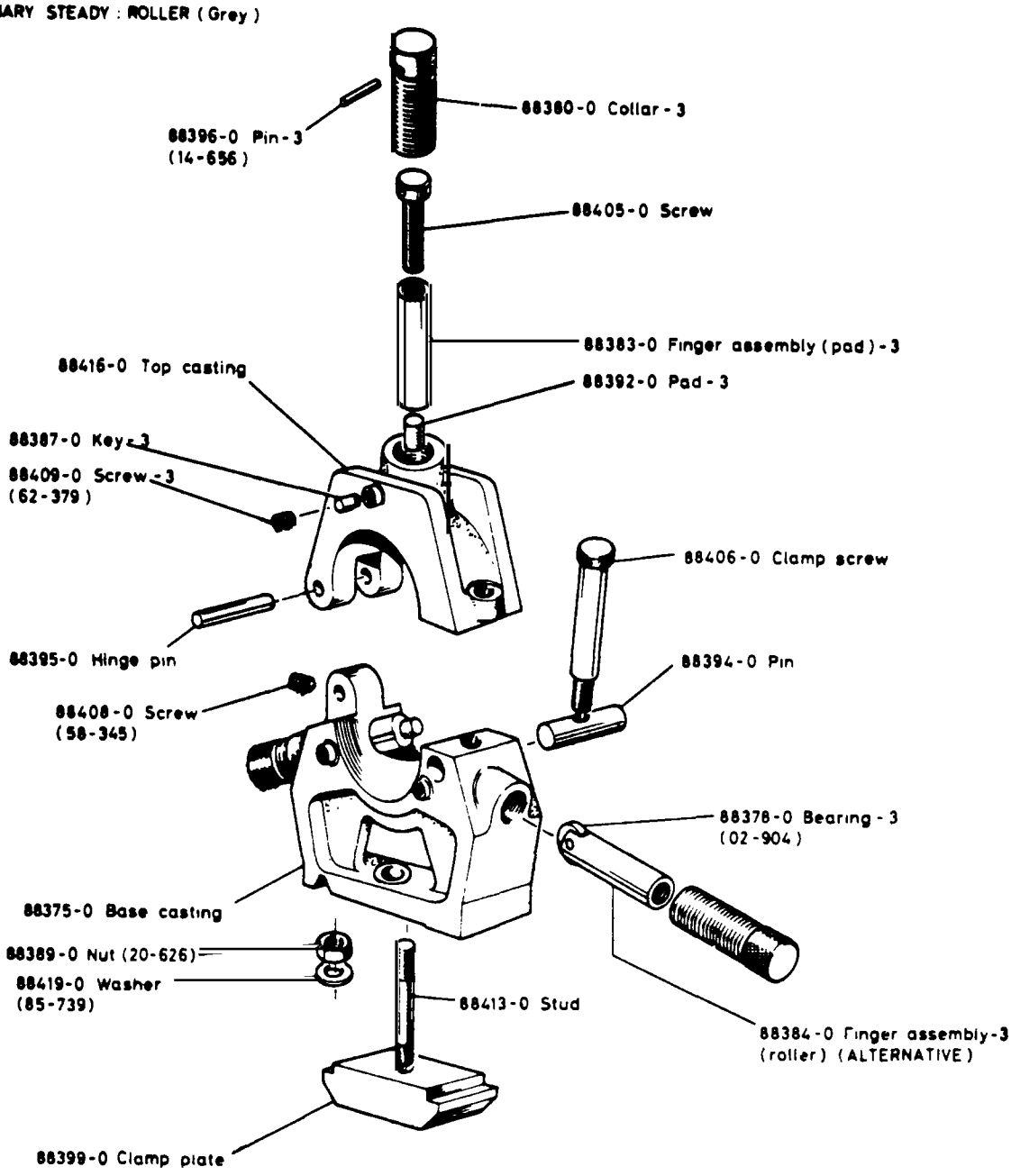
T 256	210/230/250V 25V	87888-1
T 255	210/230/250V 50V	87882-1
T 254	365/380/415/440V 25V	87890-1
T 253	365/380/415/440V 50V	87884-1
T 257	500/550V 50V	87886-1

5-40-8005

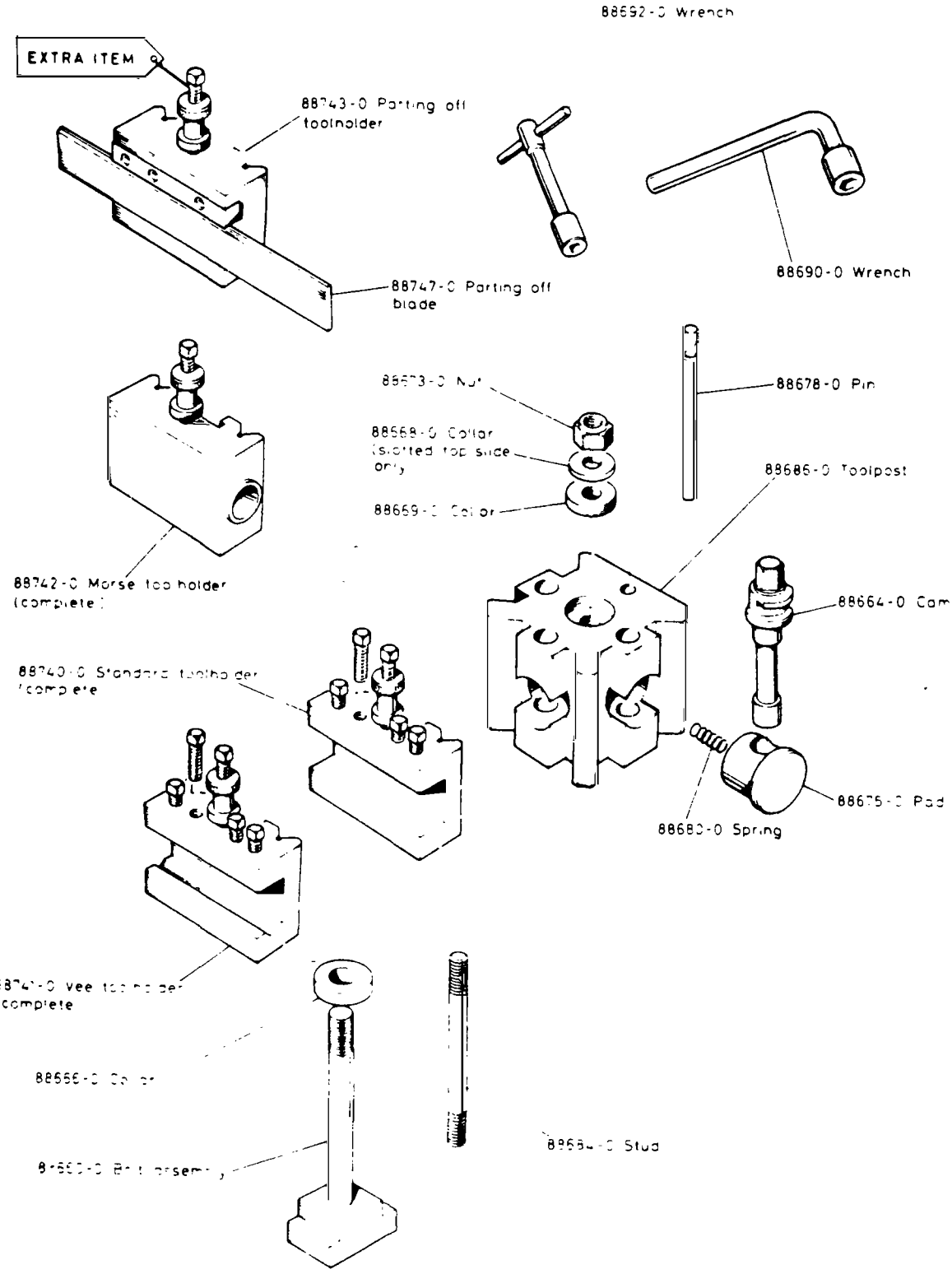
88360-0 TRAVELLING STEADY ASSEMBLY PADDED (Grey)
88365-0 TRAVELLING STEADY ASSEMBLY ROLLER (Grey)



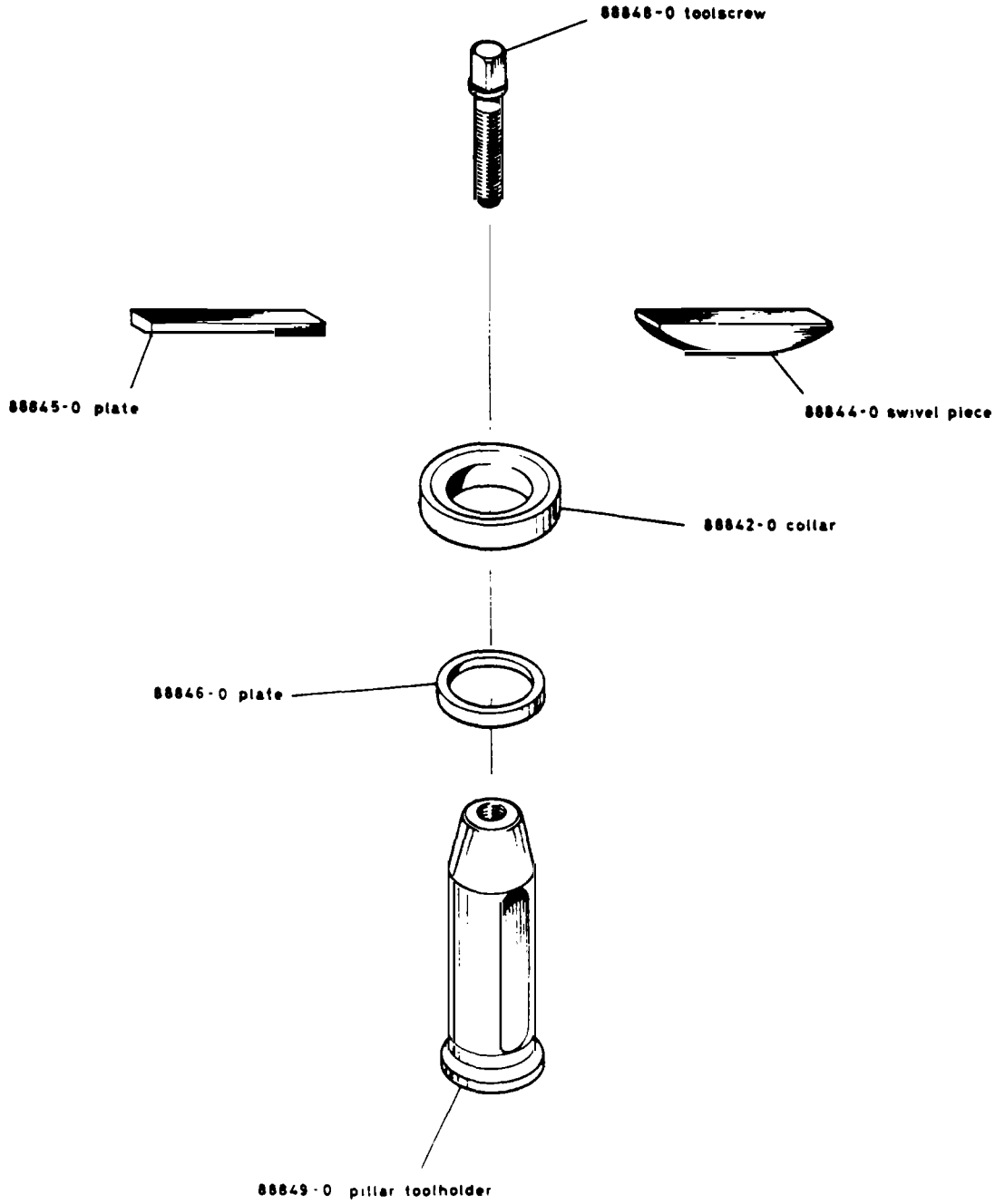
88350-0 STATIONARY STEADY · PADDED (Grey)
88355-0 STATIONARY STEADY : ROLLER (Grey)



88650-0 TOOLPOST ASSEMBLY (for solid top side)
88652-0 TOOLPOST ASSEMBLY (for slotted top side)



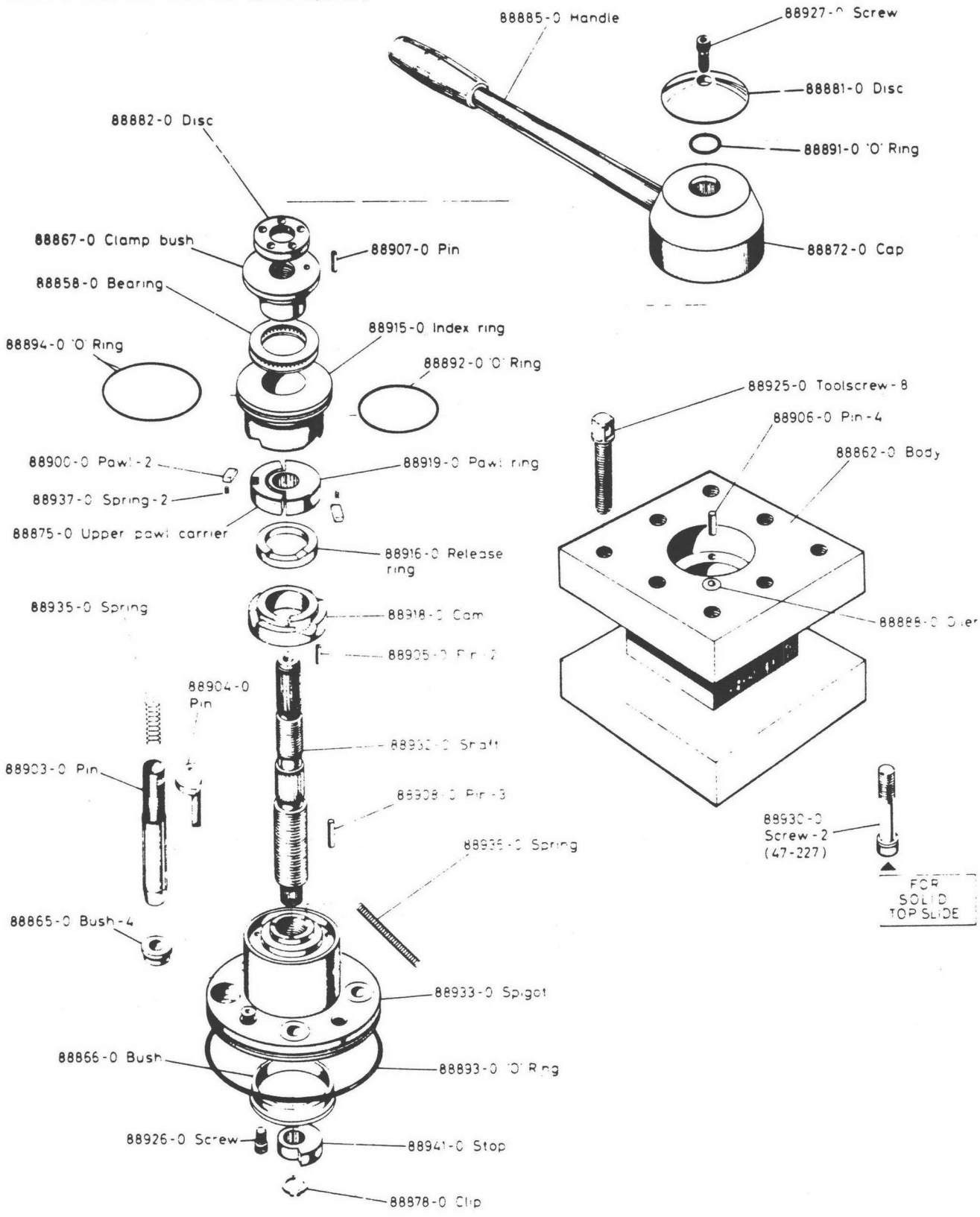
88840-0 TOOLPOST COMPLETE ASSY.



(for Armstrong T-1-S & FT-1-S and 1-S & 1-L toolholders)

5-47A-7206

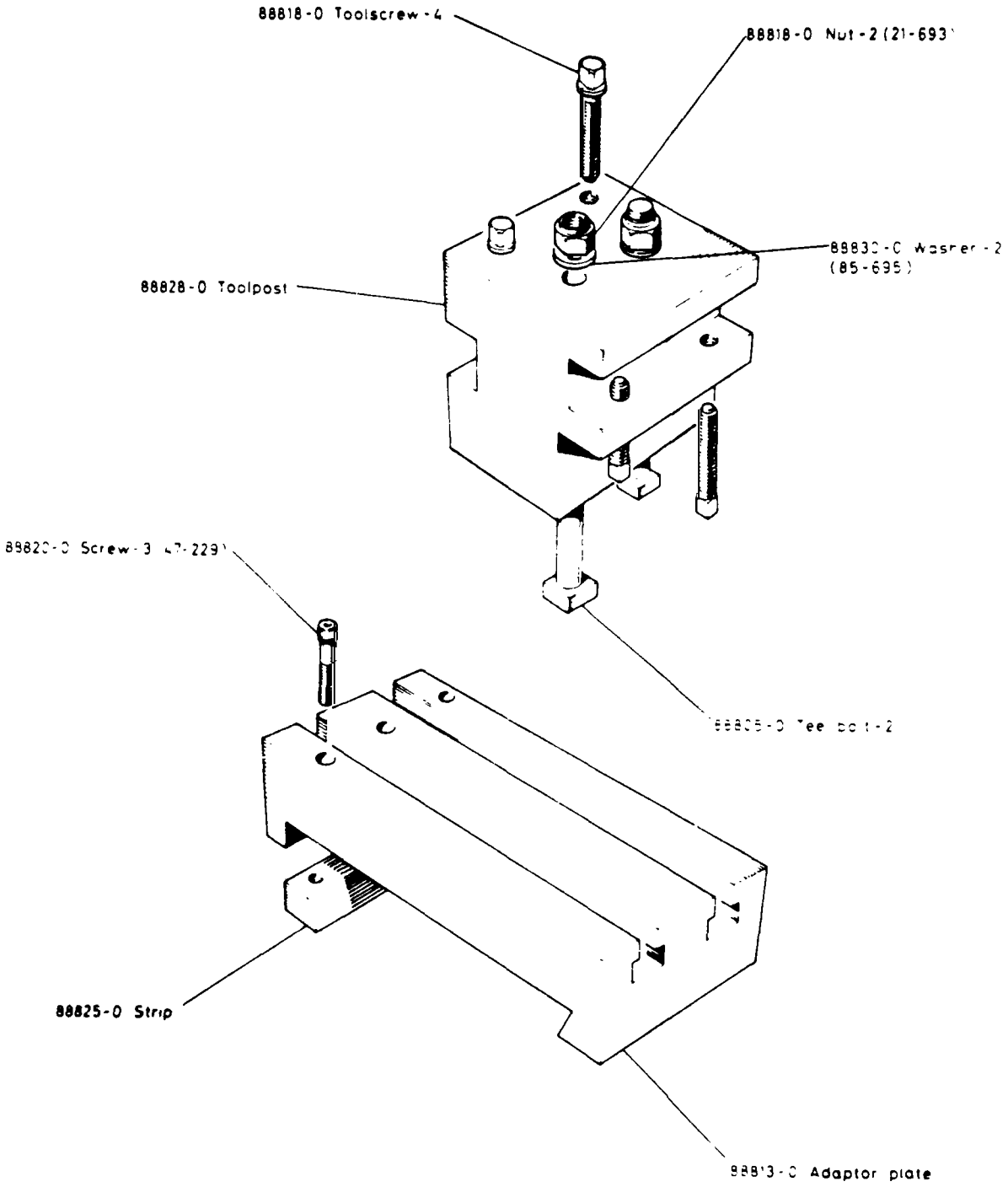
88850-0 TOOLPOST ASSEMBLY (solid topslide)



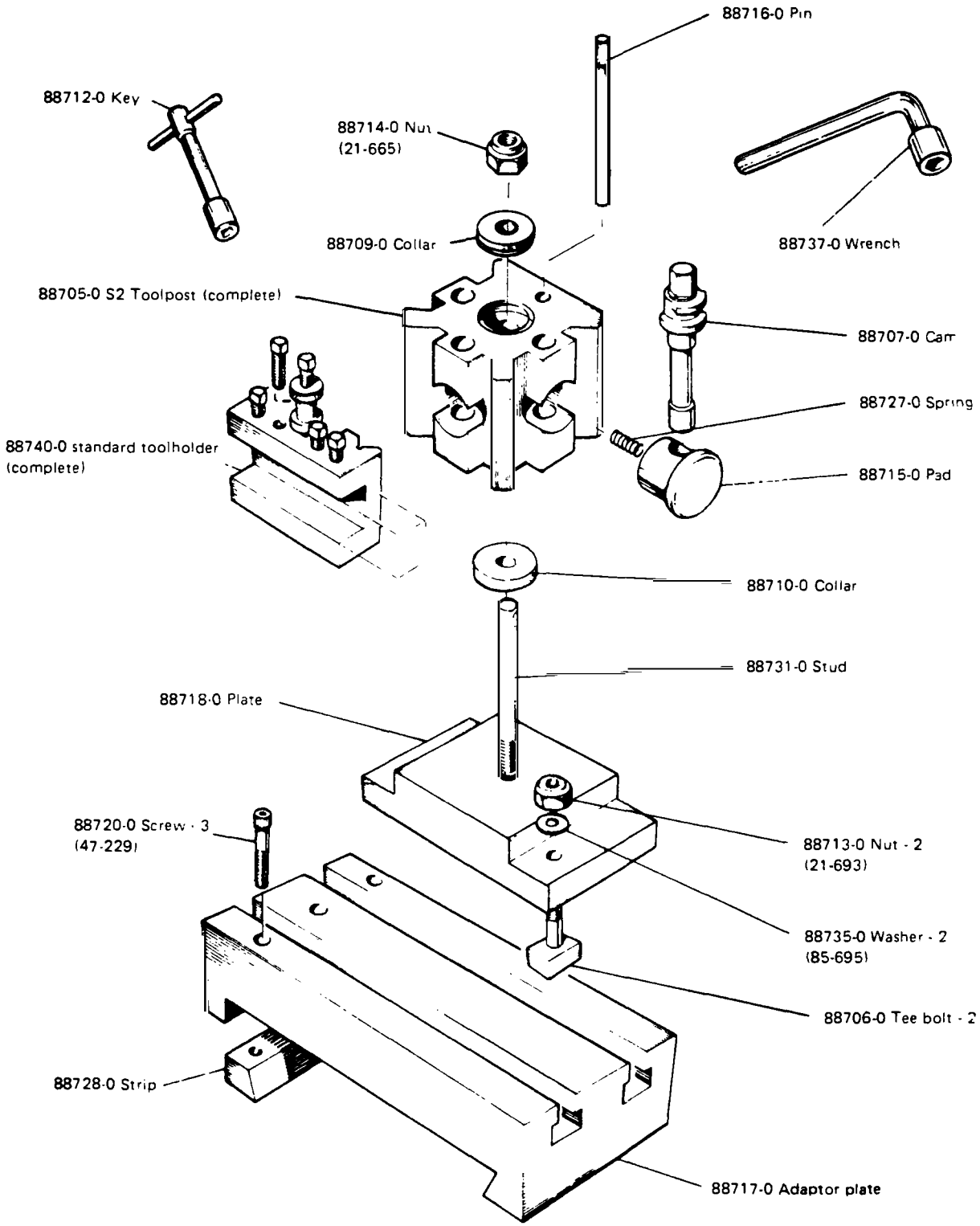
5-28-7106

REAR TOOLPOST; STANDARD

88800-0 REAR TOOLPOST STANDARD COMPLETE



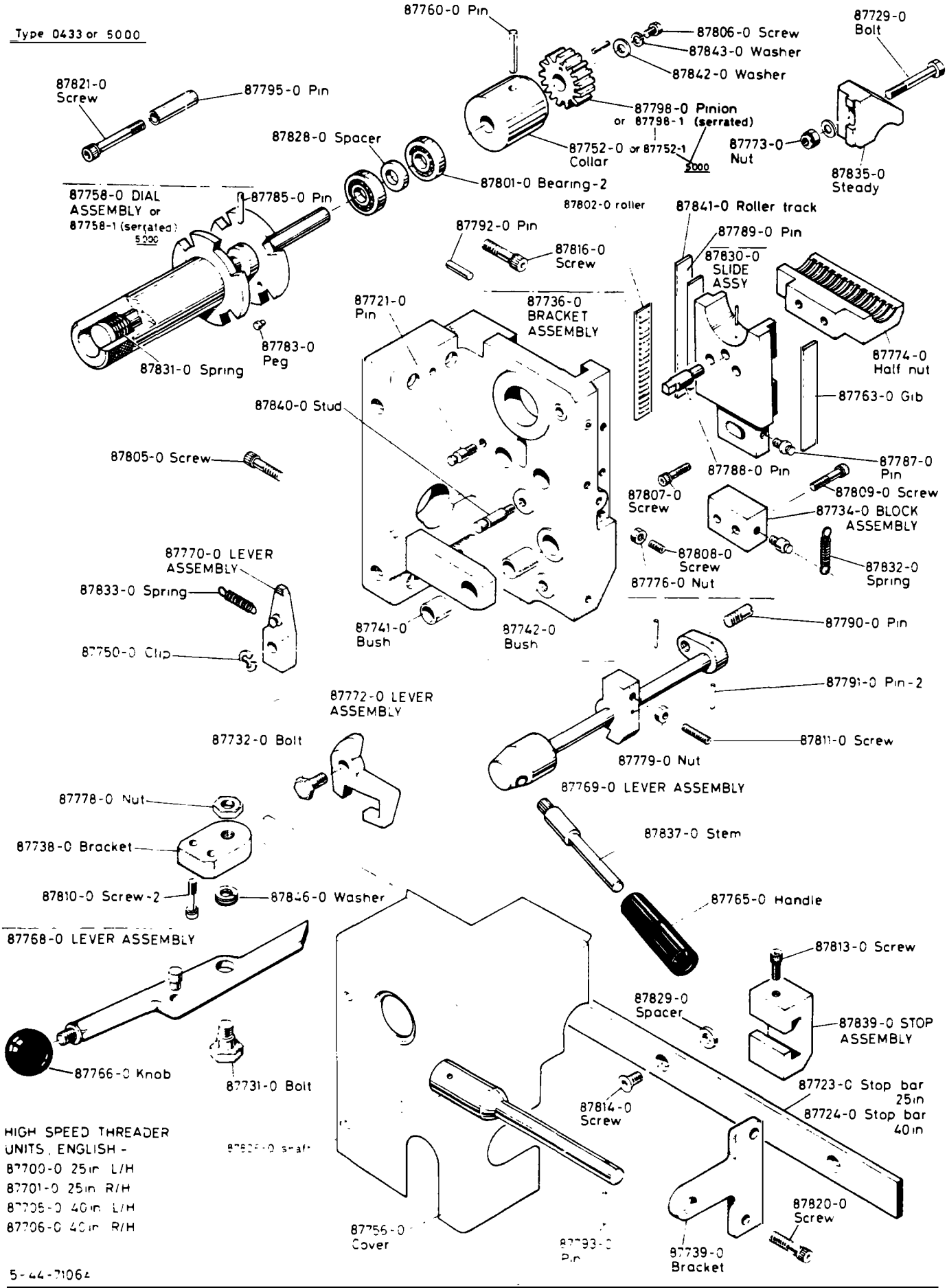
88700-0 REAR TOOLPOST QUICK CHANGE COMPLETE



5-30-7106

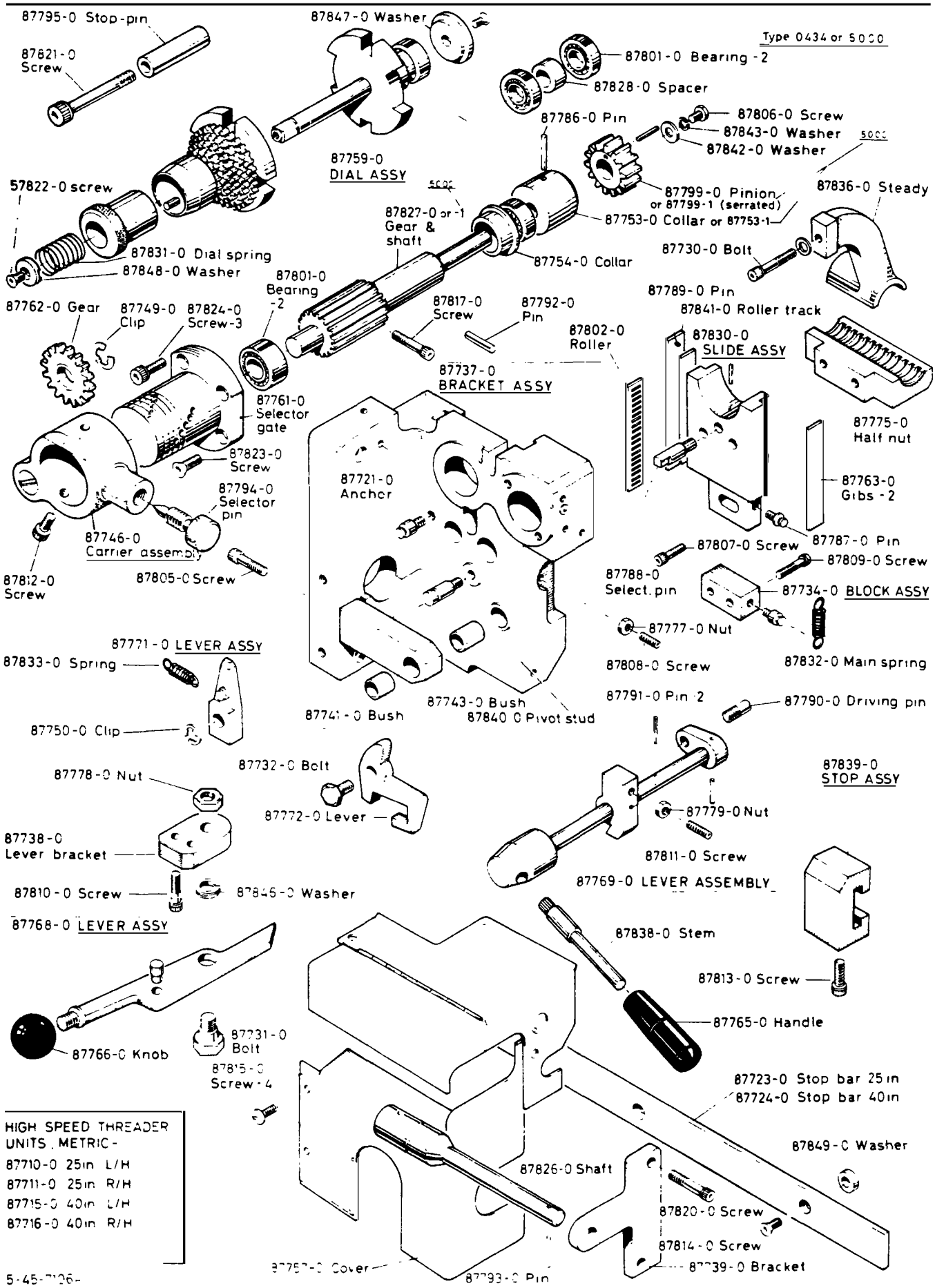
RAPID THREADER UNIT; ENGLISH

FROM SER No 00001
TO SER No



HIGH SPEED THREADER UNITS, ENGLISH -
87700-0 25in L/H
87701-0 25in R/H
87705-0 40in L/H
87706-0 40in R/H

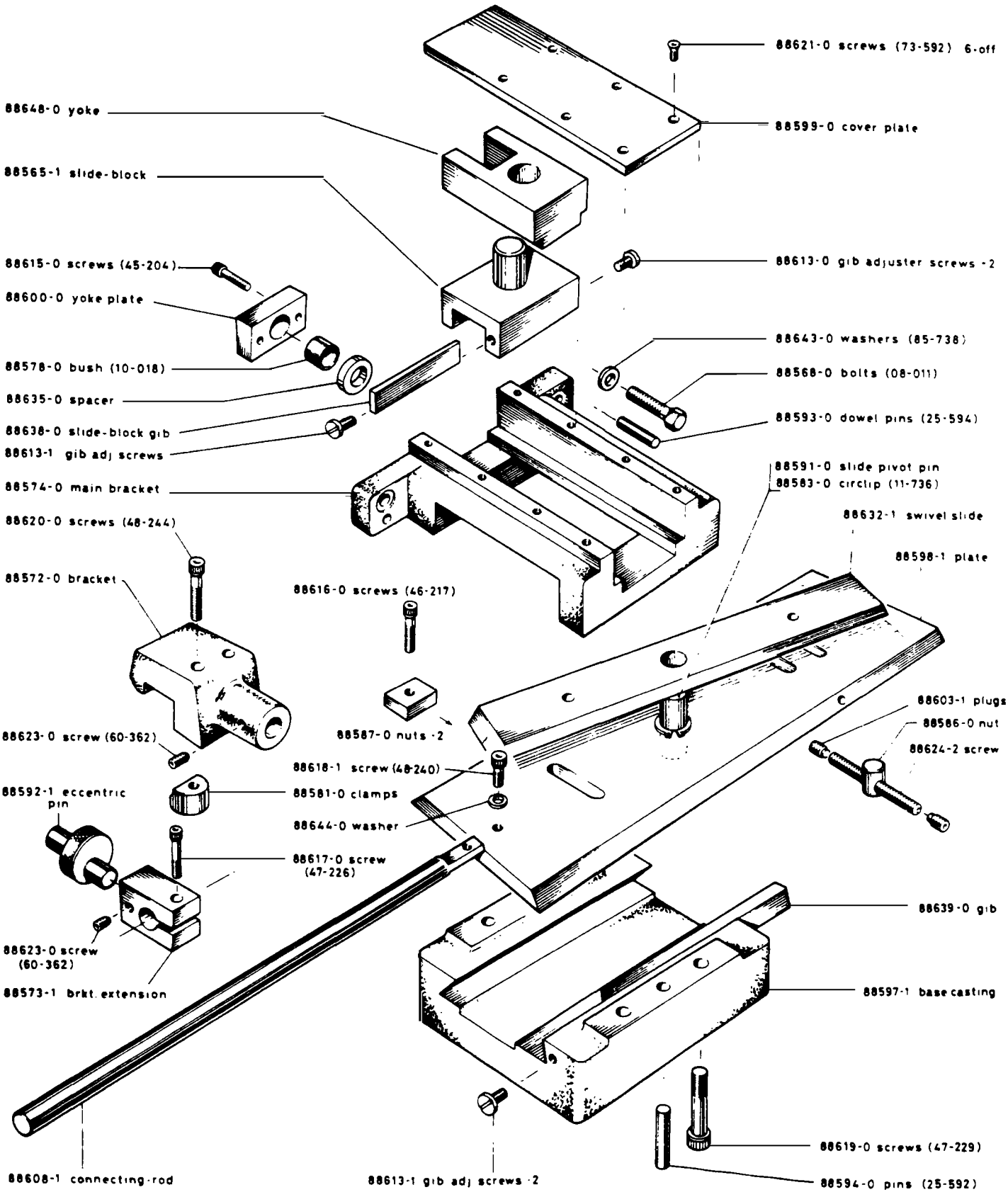
5-44-71064



HIGH SPEED THREADER UNITS, METRIC -
87710-0 25in L/H
87711-0 25in R/H
87715-0 40in L/H
87716-0 40in R/H

5-45-7106-

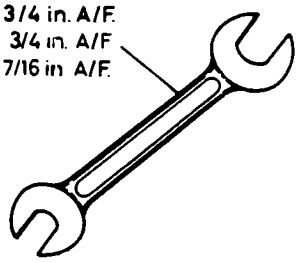
88550-2 TAPER TURNER ASSY (grey)

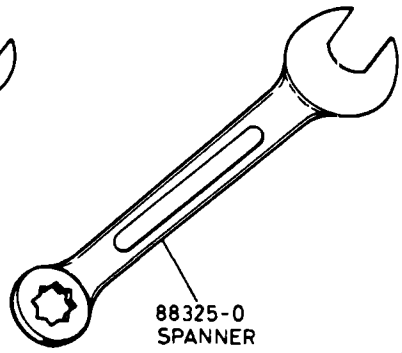


5-39-7912

88300-0 TOOL KIT COMPLETE

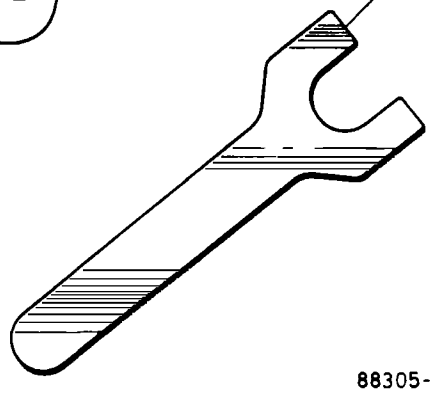
Standard SPANNERS :
88320-0 1⅛ in. x 3/4 in. A/F.
88321-0 15/16 in. x 3/4 in. A/F
88322-0 9/16 in. x 7/16 in A/F.





88325-0 SPANNER

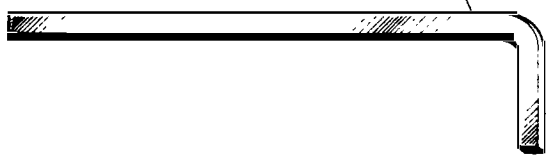
88330-0 SPANNER

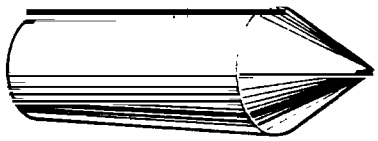


88301-0 TOOLBOX

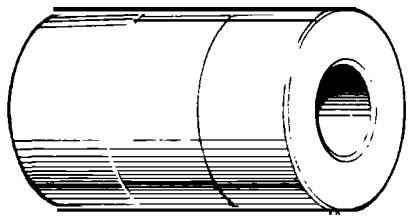
ALLEN KEYS :
88310-0 1/8 in. A/F
88311-0 5/32 in A/F
88312-0 3/16 in A/F
88313-0 7/32 in A/F
88314-0 1/4 in A/F
88315-0 5/16 in. A/F
88316-0 3/8 in. A/F

88305-0 KEY

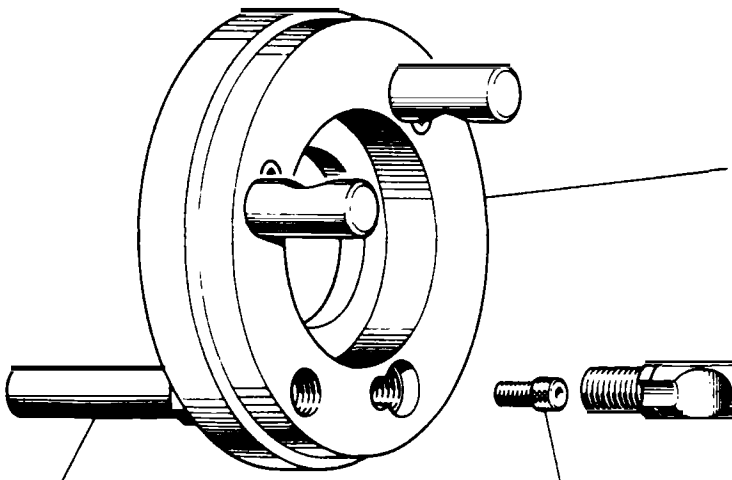




86950-0 CENTRE 3 M.T



86967-0 CENTRE BUSH



87907-0 DRIVE PLATE COMPLETE ASSEMBLY

87918-0 Stud

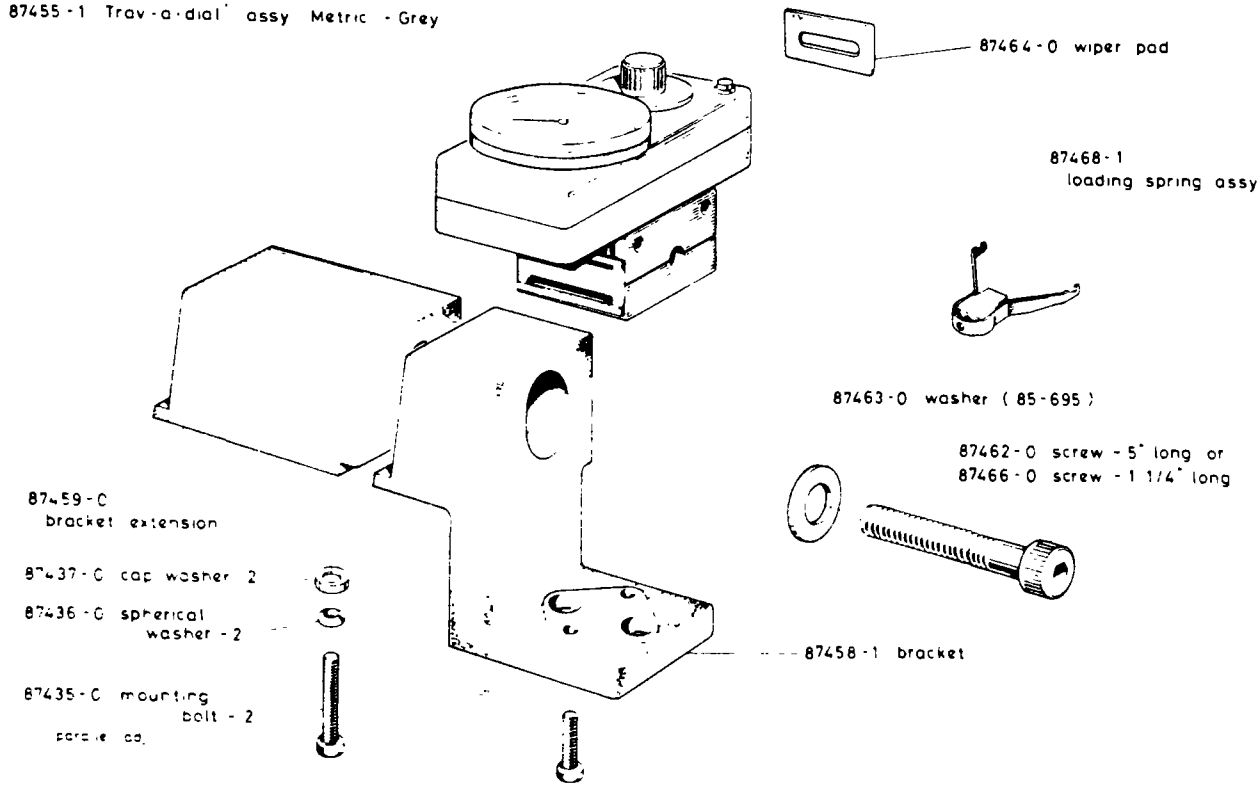
87917-0 Screw (46-212)

87919-0 Stud

5-41-8306

LONGITUDINAL POSITIONING DIALS

87450-1 'Trav-a-dial' assy English - Grey
87455-1 Trav-a-dial' assy Metric - Grey



Colchester

Microprocessor Digital Readout

Instruction Manual

The Colchester Lathe Co. Ltd.
Colchester, Essex, England.

Theory of Operation

To understand and to be in a position to fully utilise the Colchester DRO, it is first necessary to review some basics in dimensioning.

(A) Absolute Dimensioning

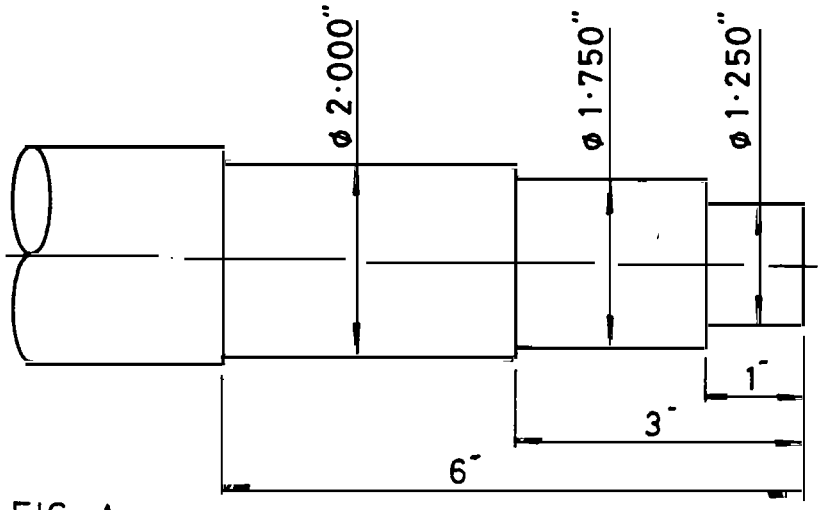


FIG. A

The single axis print shown in Fig. A is dimensioned from a common or line datum, hence the name absolute datum. In other words, steps in the print are referenced from the same datum at '0'.

(B) Incremental Dimensioning

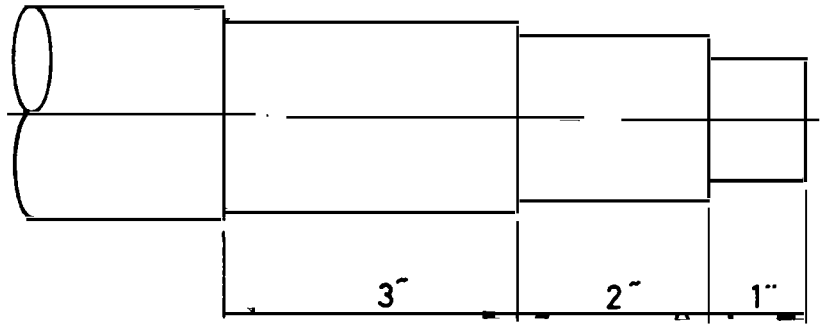


FIG. B

The single axis print shown in Fig. B has no common datum line. Rather, each end location serves as the reference or datum for the next dimension. Hence it has been dimensioned incrementally.

Please notice that both prints call for the same job to be performed, however, their dimensional layouts are completely different.

(C) Combination Incremental-Absolute Dimensioning

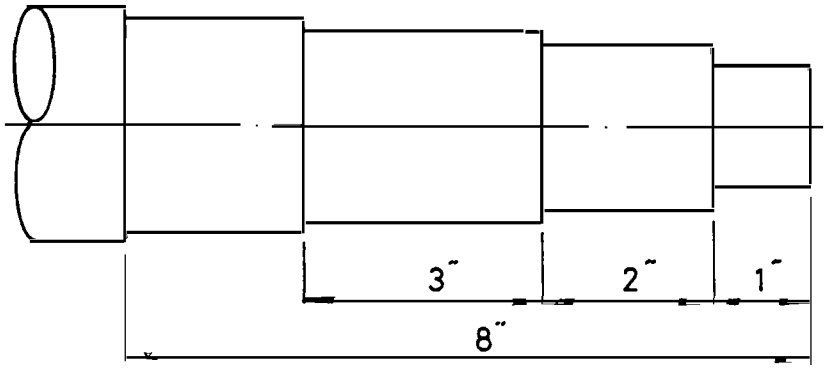


FIG. C

In Fig. C we illustrate a combination dimension where the first three steps are dimensioned incrementally and the fourth is referenced from the original zero datum or dimensioned absolutely.

Analysis

In the typical shop operation, we are faced with the need to deal with prints that come in all the varieties shown in Figs. A, B and C. In order to accomplish this, the Colchester DRO incorporates two separate digital readouts for each axis. It can be used as an incremental readout or as an absolute readout, or both.

How does an Incremental-Absolute Readout Work?

As described above, in effect, there are two counters for each axis in the Colchester DRO. Both count at the same time. You may choose which one you wish to display at will by selecting either the incremental or absolute mode (described later). Resetting the incremental counter does not reset the absolute counter, therefore, you get a running total of actual absolute position (distance from original datum) at all times.

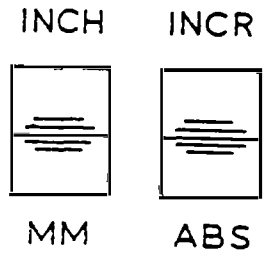
With this basic theory, we now turn to the actual operation of the Colchester DRO.

SYSTEM TURN ON

Turn the system 'On' via the toggle switch located on the rear of the console. Upon turn on, or low voltage, the displays will commence blinking. Depress the 'test' key once and this blinking will cease and your system will be ready to accept data. This blinking will also occur at the end of the diagnostics cycle. Once again, depress the 'test' key.

All zeros should appear in both Ø (diameter) and ⟷ (longitudinal) axis displays. The system is now immediately ready for operation once connected with the appropriate transducers.

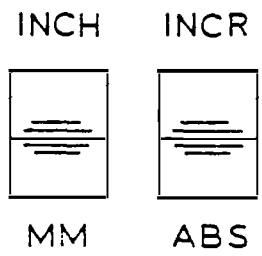
Rocker Switches



Ø	7	8	9
⟷	4	5	6
TEST	1	2	3
+/−	PRESET	0	RESET

RESET TO ZERO

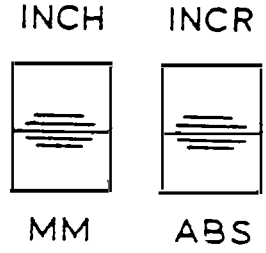
Resetting an axis to zero is accomplished by depressing 'Ø Reset' or '⟷ Reset'. By depressing only Ø or only ⟷ the counter will go to zero, however, should the slide move, new information will not be recorded until the reset button is depressed. Should the slide move before the reset button is depressed, upon depression the updated information will automatically appear in the display. In other words, information is not lost at this time. Depressing the axis designation (i.e. Ø or ⟷) once tells the MicroProcessor that you are addressing that particular axis. By depressing it again the information previously in the readout will once again appear. In other words, you are telling the processor that you no longer want to address that axis.



① Ø	7	8	9
⟷	4	5	6
TEST	1	2	3
+/−	PRESET	0	② RESET

Example: Resetting 'Ø' axis to zero.

You cannot address both axes at the same time. Should you attempt to do so the readout will blink once telling you that you have made a mistake. Depressing a given axis twice will permit you to re-address a second axis. As an example, should you depress Ø but intend to depress ⟷ you must depress Ø again to release that axis which is waiting for information, then depress ⟷. Failure to follow this procedure will cause the readout to blink, indicating an error by the operator.

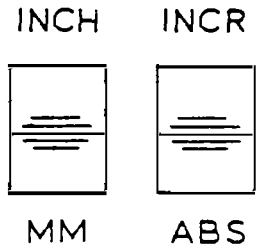


Ø	7	8	9
⟷	4	5	6
TEST	1	2	3
+/−	PRESET	0	RESET

Depressing Ø, ⟷, will cause blinking of display.

PRESET

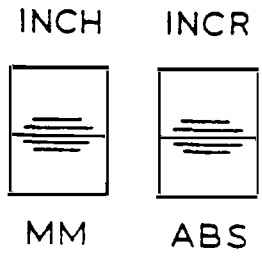
In order to preset the DRO with any number, simply depress the appropriate axis key on the keyboard, (Ø or ⟷), and the appropriate digits you wish entered. Then depress the key labeled 'Preset'. As an example, suppose you wish to preset one inch into the Ø axis of the readout, depress 'Ø 10000 Preset'. One inch should now appear in the readout and your readout system is ready for operation. Once again, ensure you depress the button labeled 'Preset'. If not depressed, the one inch will appear in the display, however, should you move your slide, the digital readout will not change to add the new information. Be confident that once the 'Preset' is depressed, the readout will update with the true position of the tool. In other words, under no circumstances will you lose numbers by not depressing 'Preset'; they just will not be visualized at the moment.



① Ø	7	8	9
⟷	4	5	6
TEST	② 1	2	3
+/−	⑦ PRESET	③④⑤⑥ 0	RESET

Presetting 1" in (Ø) axis.

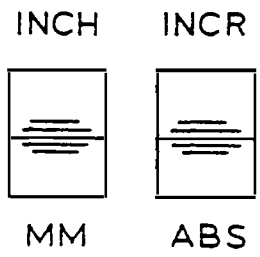
To preset the number zero (0), one 0 digit must be keyed in before depressing 'Preset'. When the appropriate axis is keyed (Ø or ⟷), the readout will immediately go to zero. Should the number you wish to preset be incorrect, simply depress the display axis (Ø or ⟷) once again and the previous number will once again appear. For example, had the machine tool been at .5000, by depressing (Ø) the readout would have cleared to all zeros. At that time, suppose we had wished to preset our one inch as shown above, but we had hit by mistake 12500, by depressing Ø once again, .5000 would appear so that you may commence the operation anew and ensure its proper accuracy.



① Ø	7	8	9
⟷	4	5	6
TEST	1	2	3
+/−	③ PRESET	② 0	RESET

PRESET MEMORY RECALL

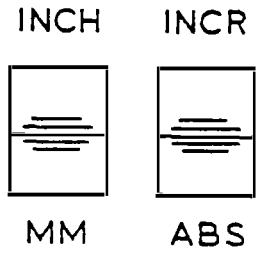
Each DRO is provided with one level of memory in order to store the preset value described above. At any time should you wish to recall the preset stored value, simply depress the appropriate axis and the preset key. Immediately the numbers stored in memory will appear on the display. To alter the memory, follow the presetting procedure described above.



① Ø	7	8	9
—	4	5	6
TEST	1	2	3
+/−	② PRESET	0	RESET

Recalling preset memory in Ø axis.

Depressing preset alone without either an Ø or ⟷ axis depressed will cause the readout to blink once again, indicating an operator error. You must tell the system which axis you wish to recall first.

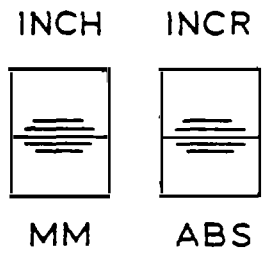


Ø	7	8	9
⟷	4	5	6
TEST	1	2	3
+/−	① PRESET	0	RESET

An error causing blinking.

PRESETTING PLUS AND MINUS

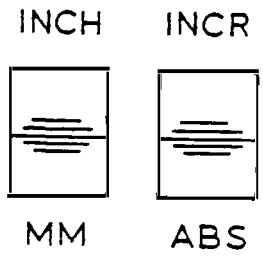
In the normal operating mode, unless otherwise indicated, all numbers are assumed to be plus. To preset a minus sign, the numbers must first be keyed before the sign. For example, had we wished to preset minus one inch in the Ø axis, we would depress 'Ø 1 0 0 0 0 - Preset'.



① Ø	7	8	9
—	4	5	6
TEST	② 1	2	3
⑦ +/−	⑧ PRESET	③④⑤⑥ 0	RESET

CLEARING MEMORY

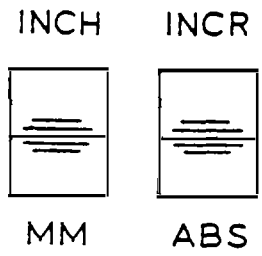
To clear or enter zero into the preset memory, simply depress the appropriate axis (Ø or ⟷) zero, Preset. Upon recalling preset, you will note the zero now is displayed.



① Ø	7	8	9
⟷	4	5	6
TEST	1	2	3
+/−	③ PRESET	② 0	RESET

INCH - METRIC

Each Colchester DRO has true inch-metric conversion capability. Any number in the readout, once preset, plus any dimension moved, may be directly converted to its metric or inch equivalent by depressing the rocker switch in the appropriate direction; top for inch, bottom for millimetres.



Ø	7	8	9
⟷	4	5	6
TEST	1	2	3
+/−	PRESET	0	RESET

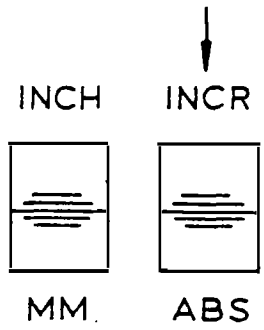
SETTING Ø (DIAMETER) DATUM

Grip a length of mild steel bar in the lathe chuck and with the appropriate speed and feed selected take a light cut. Leave the bar in the chuck and using a micrometer measure the cut diameter. With the tool intended for use on further workpieces set in the lathe toolpost, and the spindle stopped, position the cross-slide so that the tip of the tool just touches the cut diameter on the bar. Now preset the DRO Ø axis with the measurement obtained by micrometer of the cut diameter, i.e. as described on page 6. Enter by depressing:- ABS Ø 'measured diameter' Preset. Check the datum setting by taking another light cut, measuring the diameter with a micrometer and comparing it with the Ø axis display. Correct as necessary.

Note The above procedure must be carried out whenever a tool is changed or resharpened.

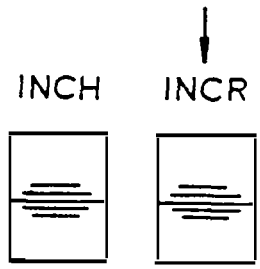
INCREMENTAL - ABSOLUTE ZERO

One of the most useful features of the Colchester DRO is its ability to be utilized in either incremental or absolute modes. Up to now, this is an area in digital readouts that has not been fully promoted. Please refer to Fig. 2 to discuss the utilization of absolute and incremental zero. Suppose we had a drawing showing a shaft with three shoulders. On the drawing you can see that this particular part was programmed incrementally; that is the first shoulder is one inch from the end, the second shoulder is two inches from the first and the third shoulder is three inches from the second. Place the selector switch in the incremental mode, reset the counter to zero at the end of the bar and turn the diameter shown for one inch. At this time reset the turning diameter for the second step and reset the —— axis counter once again to zero. Turn the second diameter for two inches, reset the turning diameter for the third step, reset to —— counter to zero and turn the third diameter three inches again to complete the part. At this point the question is asked, how far have I moved totally so that I may go back to the initial starting point of my part. To find this out, simply depress the rocker switch to absolute, labeled 'ABS'.



Ø	7	8	9
——	4	5	6
TEST	1	2	3
+/−	PRESET	0	RESET

At that point, 6 inches will appear on the ⟷ axis which will be the total distance to the starting point(!) The flexibility arises in that we can set absolute zero anywhere on the work piece, we do not have to depend on a scale or machine zero to determine our starting point. Absolute zero becomes flexible and easily usable with any part required. Note in Figs. B and C how easy these parts can now be done.

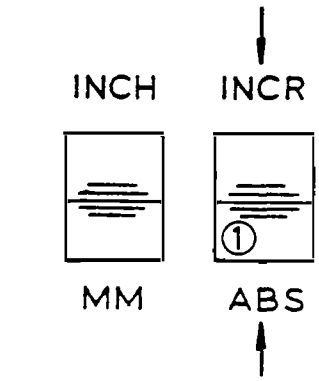


Ø	7	8	9
⟷	4	5	6
TEST	1	2	3
+/−	PRESET	0	RESET

You may change from incremental to absolute any time by depressing a switch.

RESETTING ABSOLUTE ZERO

To reset absolute zero, depress the rocker switch to 'ABS' and then utilize the procedure described above for resetting the incremental zero.



Ø	7	8	9
② ⟷	4	5	6
TEST	1	2	3
+/−	PRESET	0	③ RESET

Resetting ⟷ axis in absolute.

TROUBLE SHOOTING VIA DIAGNOSTICS

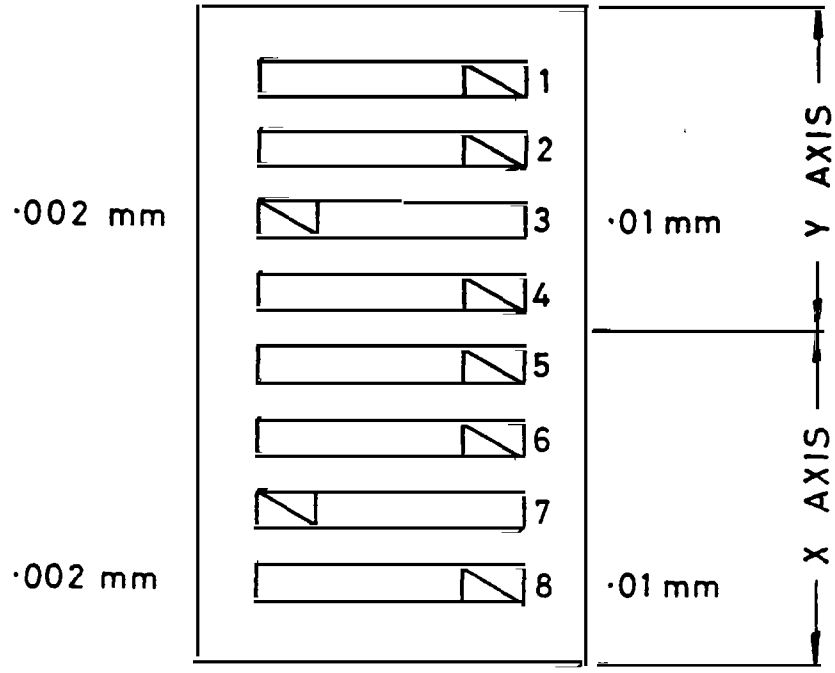
In the unlikely event that a problem should occur with the Colchester MicroProcessor readout, included, as standard equipment, is an internal diagnostic system to locate the source of the problem quickly and efficiently. Understand that diagnostics is a separate subroutine within the system and once enacted, the data in the display is immediately destroyed as indeed we are testing every single function of the digital readout with our diagnostics to insure that it is functioning properly. To utilize the diagnostic subroutine, we have devised a method of protection so that it cannot occur accidentally. To run the subroutine to check out the system, first, disconnect the transducer cables from the rear panel of the Colchester DRO, then depress the Test key and the number Nine (9) key within one-tenth of a second of each other. Usually this will require two hands as one finger cannot move from the Test key to the nine key fast enough. If not depressed quickly enough, the display will simply blink at you to tell you that you performed an operator error. Should the Test and Nine be depressed fast enough, immediately all eights will appear in the top and bottom axis of the digital readout. This is the beginning of the testing phase. These eights will remain in the display for approximately a second at which point the display will automatically begin to count up and down by itself checking the count mode of operation. This count process will again end with all eights in the display. The second step of the diagnostics is to check each digit of each display individually. To accomplish this, the number eight will start at the right end of the readout and move to the left end, this will occur in both axis so that you may verify that each digit is functioning satisfactorily. Once this is accomplished, the diagnostics will proceed to the third step. In the third step, the Ø axis will display all zeros while the ⟷ axis displays ones, then the Ø axis, ones, and the ⟷ axis, twos, etc. as all digits are counted upward to verify the count sequence of the system. The last step of the diagnostics is to

verify the decimal points. Once the diagnostic is complete, a process taking about thirty seconds, the Ø axis will show all eights and the ⟷ axis will show all nines. In this manner, the system is functioning properly. To return the system to its operating mode, you may at your leisure, depress the Test and Nine at which point zeros will appear in the Ø and ⟷ axis thereby enabling you to utilize your digital readout once again. Ensure that the transducer cables are again connected to the proper axis of the Colchester DRO prior to attempting to utilize the system.

Should there be a problem with the Colchester DRO, the diagnostic system will stop immediately in the middle of the process and either all ones, all two, all threes, all fours, all fives or all sixes continuously blink on and off in both axis and the diagnostics will stop. It is at this point that you realize there is a problem with one of the cards of the Colchester DRO and you may take appropriate action to either change the card or call the service technician. You are also sure at this time that the problem does exist with the Colchester DRO and not with your transducers.

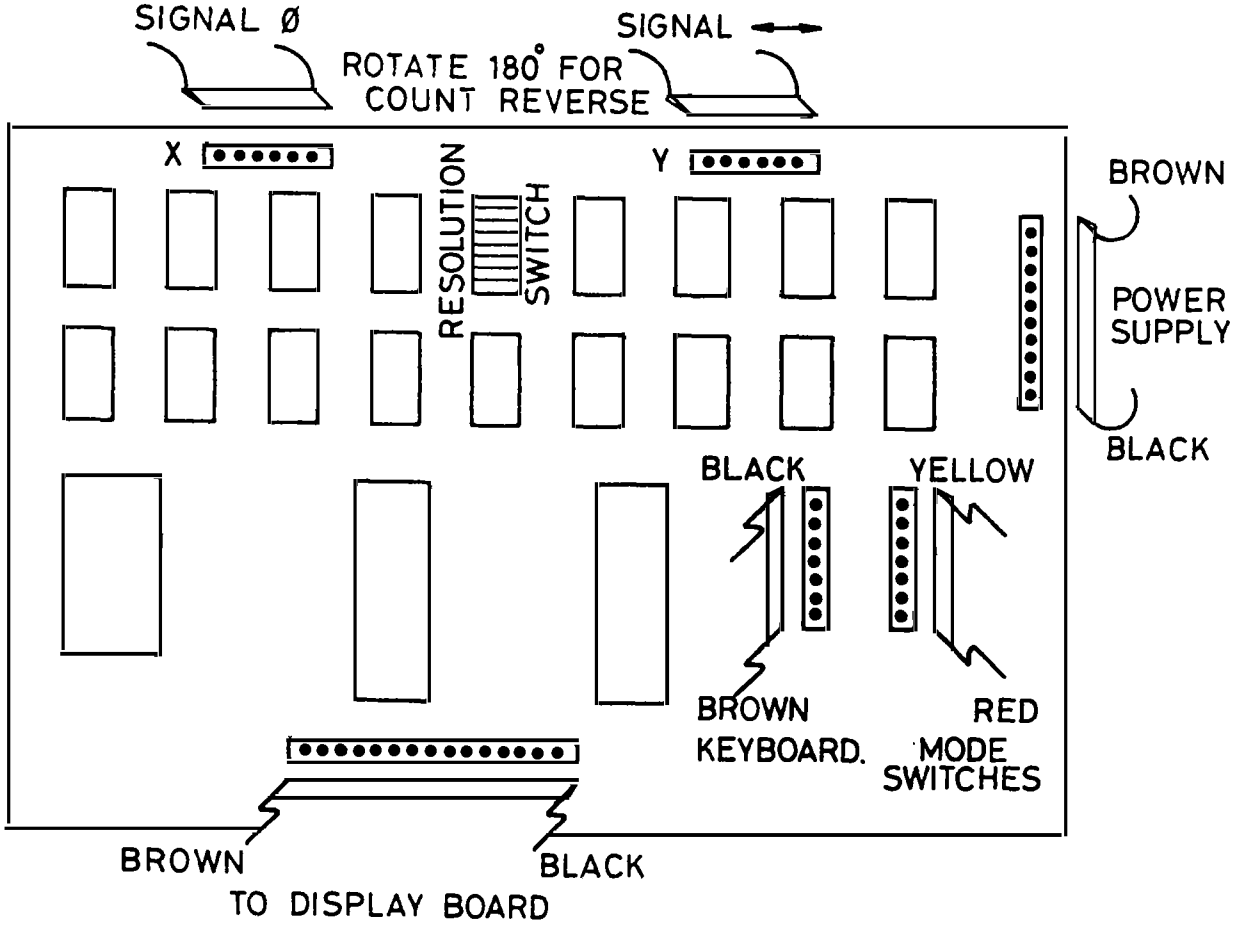
When a problem is encountered (numbers blinking on both axis), the RESET key must be depressed to complete the diagnostics and permit return to the main operating system.

PC 815 RESOLUTION SWITCH

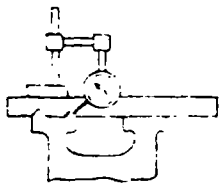
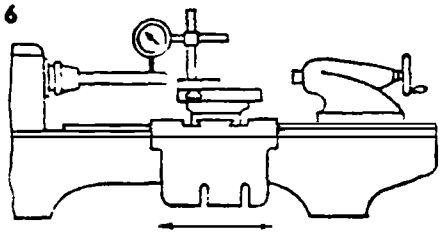
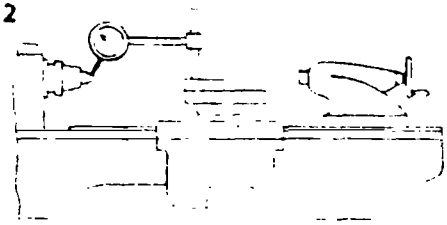
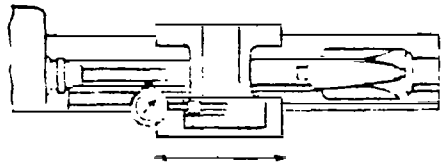
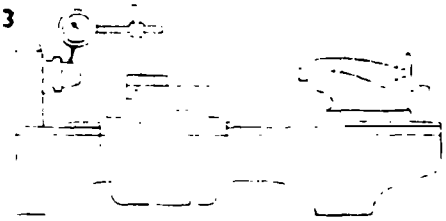
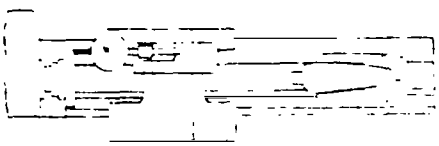
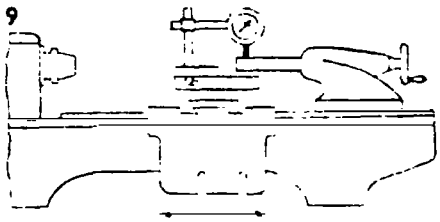
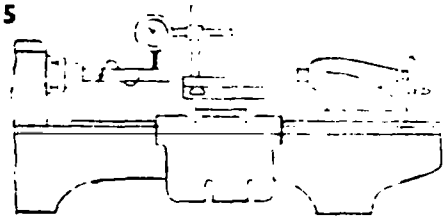
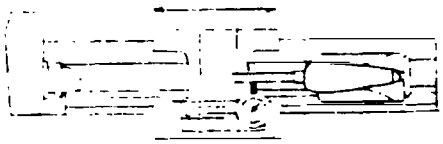


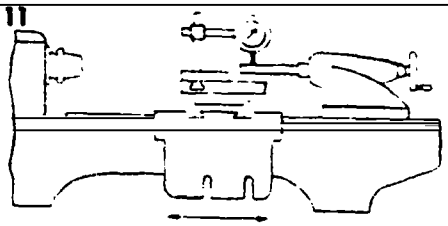
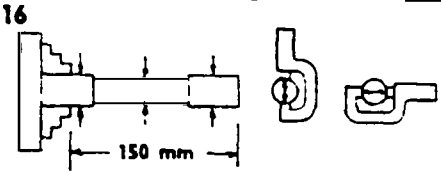
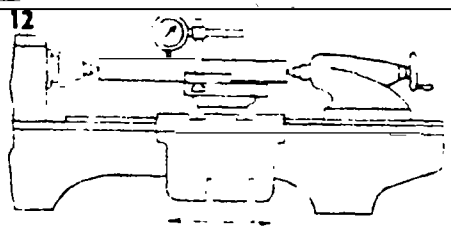
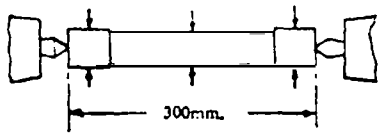
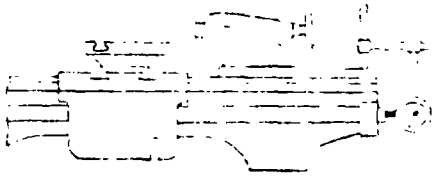
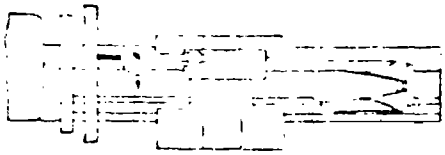
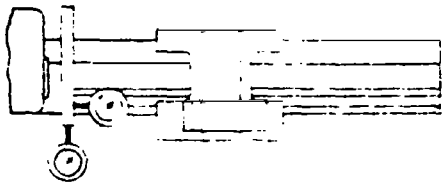
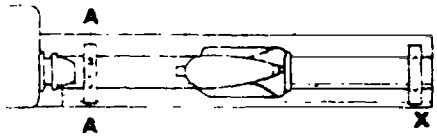
NOTES.

1. SLIDE SWITCH 3 LEFT FOR ⟷ AXIS ·002mm. RIGHT FOR ·01mm.
2. SLIDE SWITCH 7 LEFT FOR Ø AXIS ·002mm. RIGHT FOR ·01mm.



PC 815 INTERCONNECTION

TEST	PERMISSIBLE ERROR / ACTUAL ERROR	TEST	PERMISSIBLE ERROR / ACTUAL ERROR
1  TAILSTOCK WAY ALIGNMENT	Max. Reading along Length of Bed 0.0125 mm in 1200 mm	6  HEADSTOCK ALIGNMENT—VERTICAL	High at end of 300 mm Test Bar rising towards Tailstock End 0 to 0.0125 mm
2  SPINDLE CENTER RUNOUT	Total Indicator Reading 0 to 0.01 mm	7  HEADSTOCK ALIGNMENT—HORIZONTAL	At end of 300 mm Test Bar 0 to - 0.015 mm toward tool pressure
3  SPINDLE NOSE RUNOUT	Total Indicator Reading 0 to 0.0075 mm	8  TAILSTOCK SPINDLE ALIGNMENT—HORIZONTAL	Forward at end of Spindle when fully extended 0 to 0.010 mm
4  CAM ACTION OF SPINDLE	Total Indicator Reading with Indicator on face of Spindle 0 to 0.0075 mm	9  TAILSTOCK SPINDLE ALIGNMENT—VERTICAL	High at end Spindle wh fully extende 0 to 0.0125 mm
5  SPINDLE TAPER RUNOUT	Total Indicator Reading at end of 300 mm Test Bar 0 to 0.015 mm. At end of Spindle Nose 0 to 0.0075 mm	10  TAILSTOCK TAPER ALIGNMENT—HORIZONTAL	End of 300 mm Test Bar 0 to - 0.020 mm toward tool pressure

TEST	PERMISSIBLE ERROR / ACTUAL ERROR	TEST	PERMISSIBLE ERROR / ACTUAL ERROR
11  TAILSTOCK TAPER ALIGNMENT— VERTICAL	High at end of 300 mm Test Bar 0 to 0.0125 mm	16  WORK MOUNTED IN CHUCK	Must turn round 0.0025 mm. Must turn cylindrical on 150 mm length of workpiece 0.01 mm
12  VERTICAL ALIGNMENT OF HEAD AND TAIL CENTERS	High at Tailstock 0 to 0.020 mm	17  WORK MOUNTED IN CENTERS	Must turn cylindrical on a 300 mm length of workpiece 0.010 mm
13  LEADSCREW CAM ACTION	Maximum 0 0075 mm	18 LEADSCREW LEAD PER 300 mm LEAD IN ANY 100 mm	- 0.025 mm - 0 010 mm
		19 BACK LASH ON CROSS FEED SCREW ON COMPOUND REST SCREW	0.10 mm 0.10 mm
14  CROSS SLIDE ALIGNMENT	To face hollow or concave only on 300 mm diameter 0 to 0 0125 mm	20 INDEXING OF SQUARE TURRET	0.025 mm
15  FACE PLATE RUNOUT	On diameter 0 to 0.0125 mm On face at normal diameter 0 to 0.025 mm	21  BED LEVEL - TRANSVERSE	Bed level A-A : Zero X :____

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INSPECTED BY . MACHINE NO. . . . . .

Illustrated or specified data is not binding in detail. The manufacturers reserve the right to modify design, specification and price without notice.

THE COLCHESTER LATHE COMPANY LTD.
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CLC/005/5497/385/1C/SW

Chapter 1-2

SAWMASTER 150 TERRIER

MEDIUM DUTY HACKSAW

COOLANT SUPPLY (See Drawing No. 150H/C)

A large amount of swarf accumulates during cutting and it is advisable to remove this frequently.

Periodically, the coolant tank should be removed and cleaned out to remove any build-up of fine swarf, though there is a Baffle plate in the tank which prevents swarf reaching the pump impeller.

NOTE: The drive motor must be moved away from the tank before the tank can be removed.

LUBRICATION (See Drawing No. 150H/F)

Daily: Apply oil to the following point:

(1) Inside faces of yoke end of connecting rod.

Apply grease to the following point:

(1) Eccentric strap.

Weekly: Apply grease to the following points:

(1) Big end of connecting rod.

(2) Main spindle.

(3) Inter pulley spindle.

(4) Bow slide pivot shafts.

Apply oil to the following points:

(1) Vice screw.

(2) Top up Bow slide reservoir if necessary.

Monthly: Check level of hydraulic relief cylinder.

SPEED

Two speeds of 100 and 150 strokes per minute can be obtained on this machine. To change speed the detachable guard must be removed and the vee belt changed over to the correct pair of pulleys.

FEED (See Drawing No. 150 H/D)

The saw stops automatically in the bottom position when the material has been sawn through. To raise the bow, turn control lever 8H/263 fully clockwise, press the start button and keep it depressed until the knock-off cam has released the limit switch. When the blade is clear of the work, press the stop button.

To activate downfeed, press the start button and turn control lever 8H/263 counterclockwise until desired feed rate is obtained.

THE RELIEF CYLINDER (See Drawing No. 150 H/D)

It is advisable to check the oil level in the relief cylinder periodically and top up with oil if found necessary. Topping up should be carried out with the bow in its lowest position and the oil plunger in its maximum forward position. The filler plug should then be removed and the cylinder filled with oil.

IMPORTANT

RELEASE RESTRAINT BEFORE USING MACHINE!

FOUNDATIONS (See Drawing No. 150H/E)

The machine must be bolted down onto a flat and level floor, using ½" dia. bolts, before use. It is important not to overtighten the bolts as the machine base may distort.

MAINS CONNECTION

Connect the machine to the mains and ensure that the machine runs in the correct direction when the start button is depressed. This is in the direction of the arrow on the interpulley i.e. clockwise rotation when viewed from the operating side of the machine. If the direction of the rotation is wrong change any two of the three incoming power lines.

SETTING OF WORK (See Drawing No. 150H/B)

Material up to 6" wide can be accomodated at 90° and up to 3½" wide at 45°. The rear vice jaw is provided with a dowel pin which locates in a hole in the slideway thus ensuring that the work is positioned within the stroke of the bow.

The difference in width is taken up by the moveable vice jaw.

An adjustable bar stop is fitted to facilitate work setting when repetition cutting.

BLADE TENSIONING (See Drawing No. 150H/A)

Incorrect tensioning of the blade greatly affects squareness of the cut. Correct tensioning should be obtained as follows.

1. Place the blade between the clamps and tighten the nuts on the clamp bolts finger tight.

2. The knurled tension nut should be tightened until all slackness is taken up (this is approximately finger tight).

3. Working tension is now imparted to the blade by turning the tension nut a further 1½ turns only.

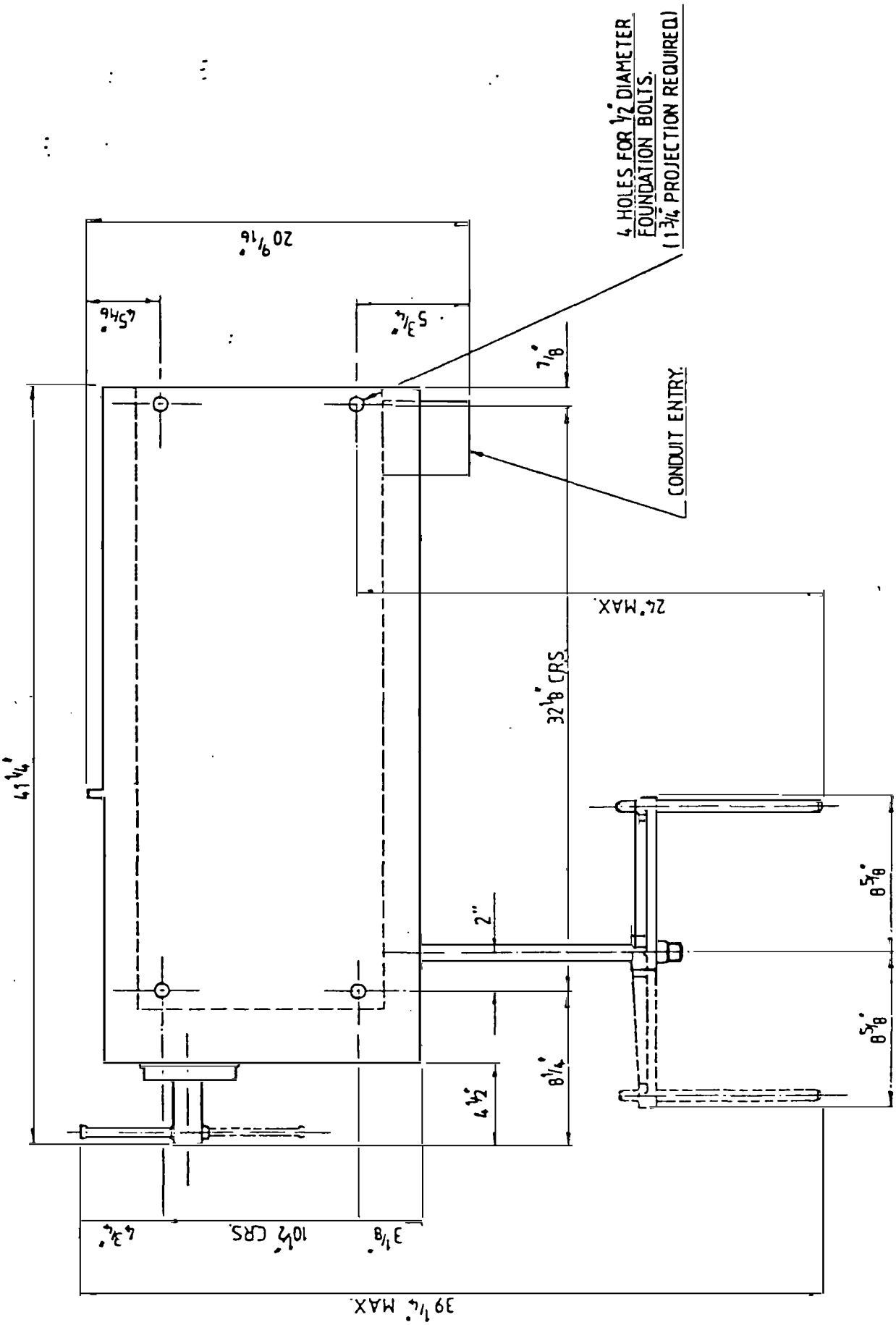
4. The clamp bolts can now be tightened.

SELECTION OF BLADE AND SPEED

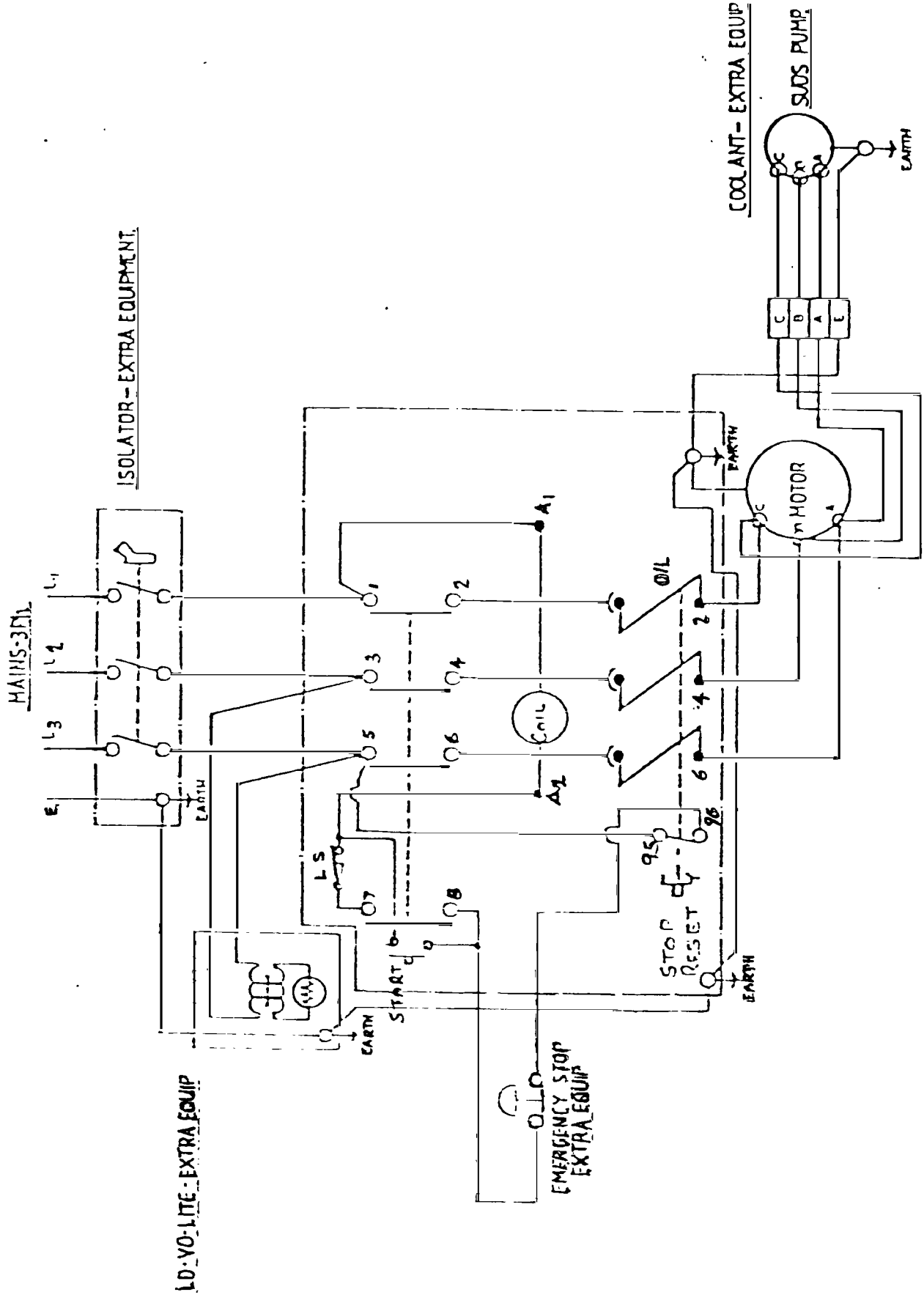
The standard blade size is 14" x 1¼" (350mm x 32mm)

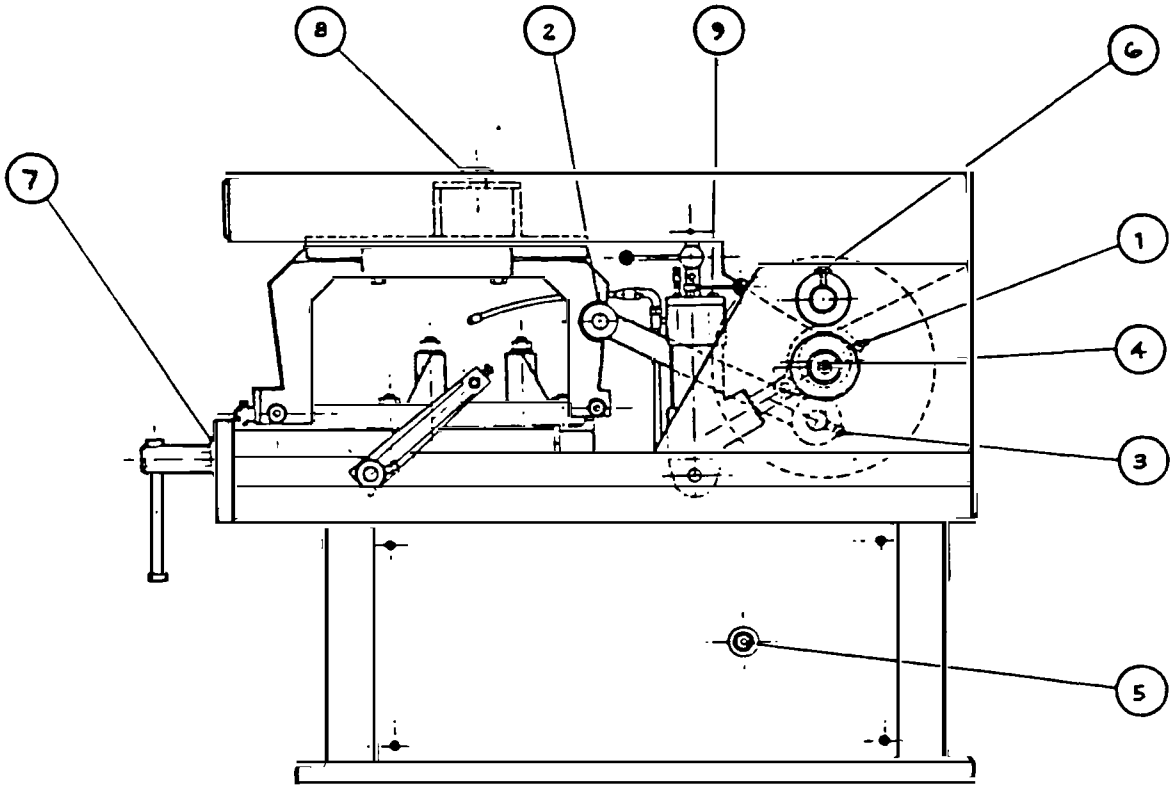
The blades should be set so that cutting takes place on the draw stroke. The following table gives recommended pitches and strokes per minute when using high speed steel blades.

Material	Teeth per Inch	Strokes per minute
Mild Steel	6	100 or 150
Construction steel or tubing	6 or 10	100
Cast Iron	10	100
Hard Steels	6	100
Brass and light Alloys	6	100 or 150


4 HOLES FOR ½" DIAMETER FOUNDATION BOLTS. (1¾" PROJECTION REQUIRED)
CONDUIT ENTRY.
20 9/16"
4 5/16"
5 3/4"
7/8"
24" MAX.
32 1/8" C/S
41 1/4"
2"
8 1/4"
4 1/2"
8 5/8"
8 5/8"
3 1/8"
10½" CRS.
4 3/4"
39 1/4" MAX.

CIRCUIT DIAGRAM (3 PHASE SUPPLY)
(STARTER - CUTLER HAMMER)



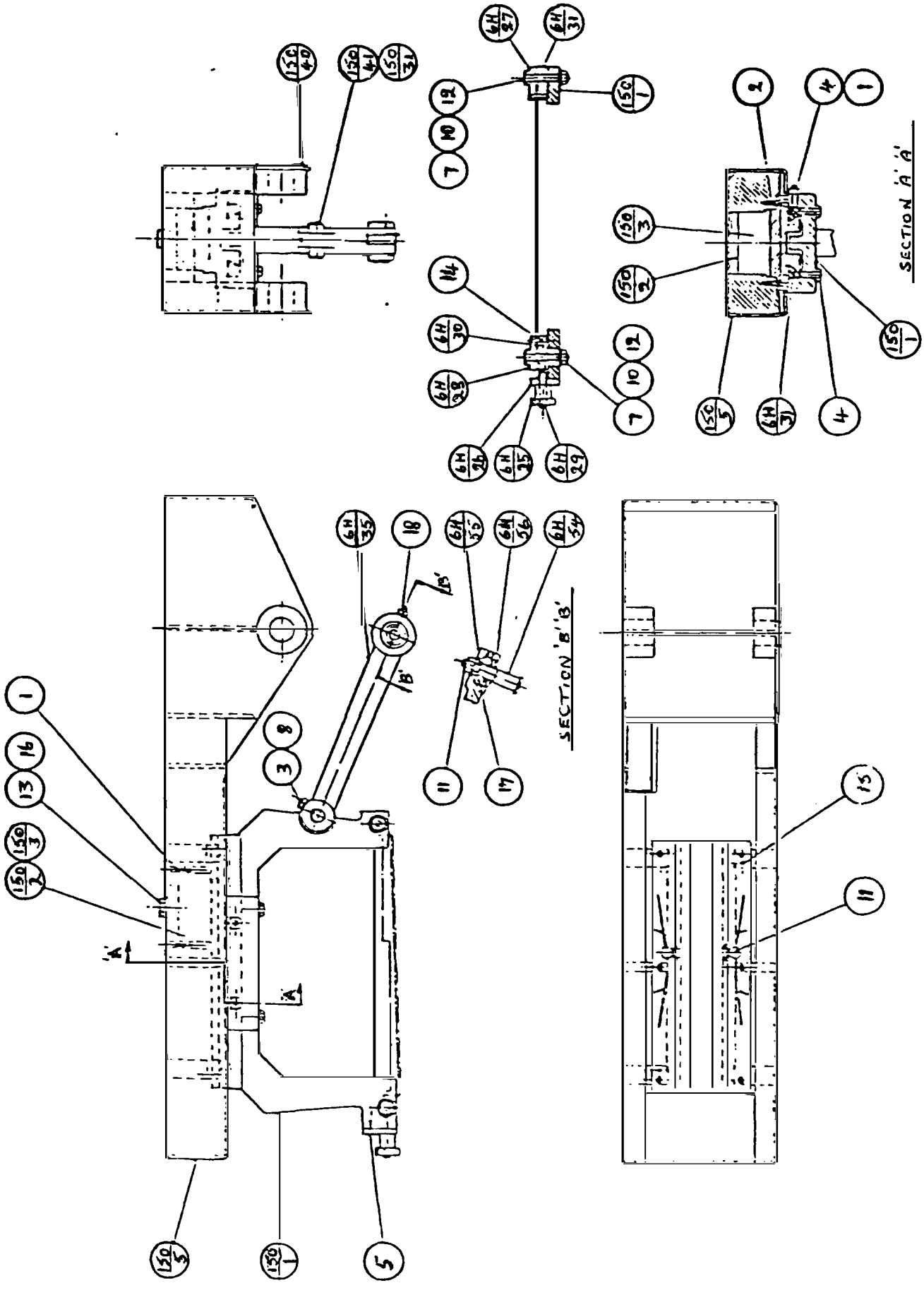


LUBRICATION INSTRUCTIONS

1 ECCENTRIC STRAP - GREASE DAILY
2 CONN-ROD - OIL DAILY
3 CONN-ROD - GREASE WEEKLY
4 CRANKSHAFT - GREASE WEEKLY
5 INTER PULLEY SHAFT - GREASE WEEKLY
6 PIVOT SHAFT AND KNOCK SHAFT - GREASE WEEKLY
7 VEE SCREW - OIL WEEKLY
8 OIL RESERVOIR - CHECK WEEKLY TOP UP IF NECESSARY
9 RELIEF CYLINDER - CHECK MONTHLY TOP UP IF NECESSARY

MODEL 150	PARTS LIST BOWSLIDE ASSEMBLY	REFER TO DRG. 150H/A

ITEM NUMBER	DESCRIPTION	QUANTITY
150H/1	Bow	1
150H/2	Lid	1
150H/3	Bowslide	1
150H/5	Head	1
150H/33	Bush	2
150H/35	Con-Rod	1
150H/40	Washer	1
150H/41	Con-Rod pin	1
6H/25	Blade nut	1
6H/26	Retaining plate	1
6H/27	Rear clamp plate	1
6H/28	Front clamp plate	1
6H/29	Blade adjusting screw	1
6H/30	Blade adjusting plate	1
6H/31	Blade retaining plate	1
6H/51	Strip	1
6H/54	Crank pin	1
6H/55	Collar	1
6H/56	Crank washer	1
1	RD. HD. Screws - No. 10 unc x $\frac{3}{4}$" lg	4
2	SK. HD. Capscrew - $\frac{1}{4}$" unc x $\frac{3}{4}$" lg	6
3	SK. Setscrew - $\frac{1}{4}$" unc x $\frac{7}{8}$" lg dogpoint	1
4	SK. Setscrew - 5/16" unc x 1" lg dogpoint	2
5	C'SK. HD M/C Screw - $\frac{1}{4}$" unc x $\frac{1}{2}$" lg	3
6	Hex HD. Bolts - 5/16" unc x $1\frac{1}{4}$" lg	4
7	Hex HD. Bolts - $\frac{3}{8}$" x $2\frac{1}{4}$" lg	2
8	Locknut - $\frac{1}{4}$" unc	1
9	Locknut - 5/16" unc	2
10	Nut - $\frac{3}{8}$" unc	2
11	Nut - $\frac{1}{2}$" unc	1
12	Washer - $\frac{3}{8}$" unc	2
13	No. 9 Selon washer	1
14	Mills pin - $\frac{1}{4}$" dia x $\frac{7}{8}$" lg GP4	2
15	Mills pin - $\frac{1}{4}$" dia x 1" lg GP4	2
16	$\frac{1}{2}$" B.S.P. Brass filler plug	1
17	Ball bearing FBC P203 or Hoff. ULS 7	1
18	Grease nipple - $\frac{1}{8}$" BSP	1
19	Felt pad	2

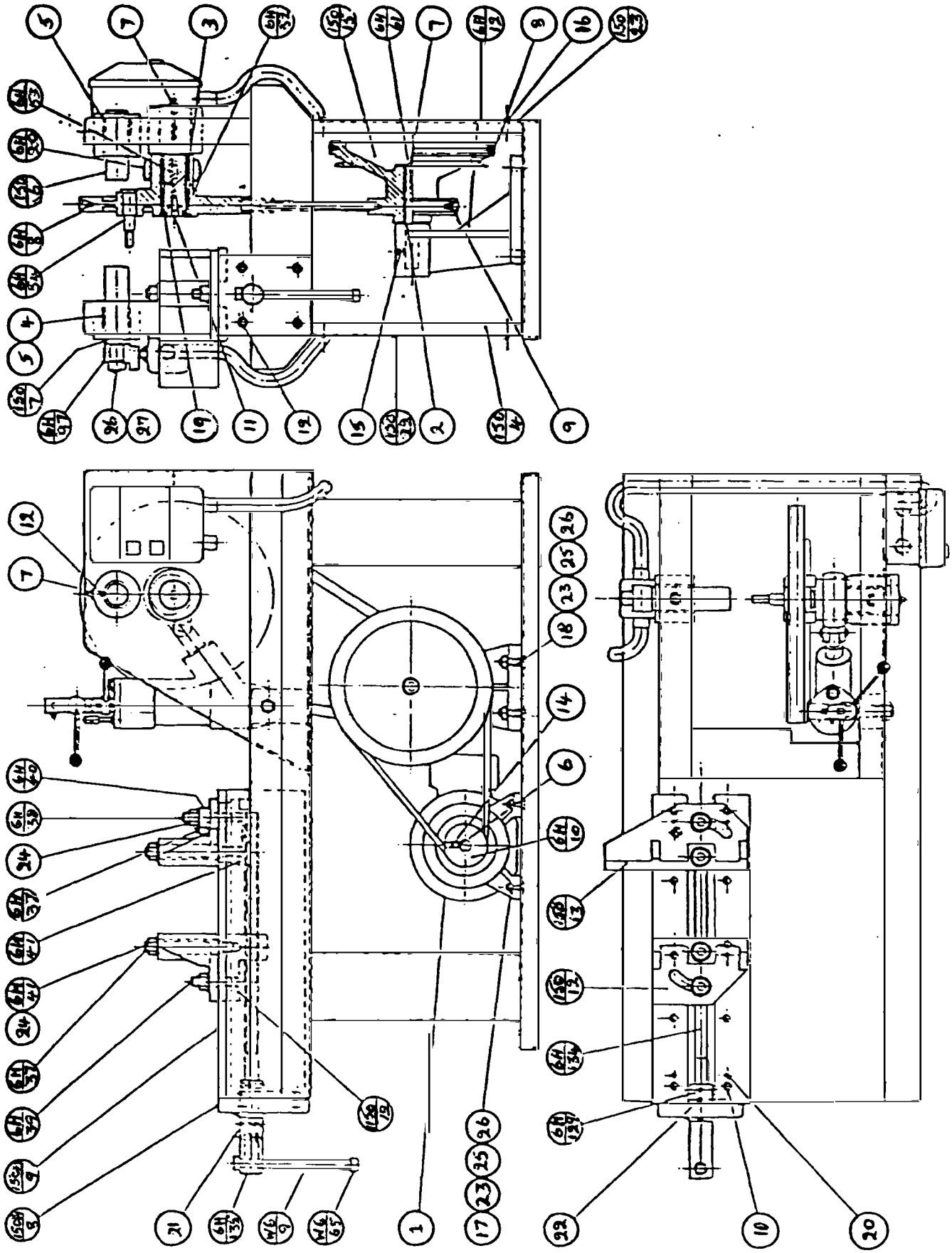

SECTION 'A' 'A'
SECTION 'B' 'B'

MODEL 150	PARTS LIST BED/BASE ASSEMBLY	REFER TO DRG. 150H/B

ITEM NUMBER	DESCRIPTION	QUANTITY
150H/4	**Bed/Base**	1
150H/6	**Pivot shaft**	1
150H/7	**Knock off shaft**	1
150H/8	Vice retaining plate	1
150H/9	Wear strip	2
150H/10	Vice nut	1
150H/11	Vice clamp	1
150H/12	Front vice bracket	1
150H/13	Rear vice bracket	1
150H/15	Inter pulley	1
150H/22	Side plate	1
150H/23	Side Plate	1
6H/8	Drive pulley	1
6H/10	Motor pulley	1
6H/12	Inter pulley bracket	1
6H/20	Eccentric strap	1
6H/37	Pivot stud	2
6H/38	Rear retaining stud	1
6H/39	Front retaining stud	1
6H/40	Front vice washer	1
6H/41	Rear vice washer	3
6H/42	Locating pin	1
6H/52	Crankshaft washer	1
6H/53	Crankshaft	1
6H/54	Crankpin	1
6H/61	Inter pulley shaft	1
6H/97	Knock off cam	1
6H/129	Vice screw collar	1
6H/134	Vice screw	1
6H/135	Vice Knob	1
W6/9	Handle shaft	1
W6/65	Handle retainer	1
1	Metric motor .75 hp. 3 phase, 415v 50Hz D80 frame	1
2	Bush SN009 - $\frac{3}{4}$"ID x 1"OD x $1\frac{1}{8}$"lg	2
3	Bush SN515 - $1\frac{1}{2}$"ID x $1\frac{5}{8}$"OD x $1\frac{1}{2}$"lg	2
4	Bush BS70 - $1\frac{3}{8}$"ID x $1\frac{5}{8}$"OD x 1"lg	1
5	Bush BS70 - $1\frac{5}{8}$"ID x $1\frac{5}{8}$"OD x $1\frac{1}{4}$"lg	3
6	BSSP Key - 6mm sq x 25mm lg	1
7	Grease nipple - $\frac{1}{8}$" B.S.P.	4
8	Vee belt A1020	1
9	Vee belt B1340	1
10	SK HD Capscrew - $\frac{1}{4}$"unc x $\frac{5}{8}$" lg	10
11	SK HD Capscrew - 5/16" unc x $\frac{3}{4}$" lg	1
12	SK HD Capscrew - $\frac{3}{8}$" unc x $\frac{3}{8}$" lg	4
13	SK setscrew - No. 6 unc x $\frac{1}{4}$" lg	1
14	SK setscrew - 5/16" unc x $\frac{1}{2}$" lg	1
15	SK setscrew - $\frac{3}{8}$" unc x $\frac{3}{4}$" lg	1
16	RD HD screws - No. 10 unc x $\frac{1}{2}$" lg	8
17	Coach bolts - 5/16"unc x 1" lg	4
18	Coach bolts - 5/16" unc x $1\frac{1}{2}$" lg	4

MODEL 150 TERRIER	PARTS LIST BED/BASE ASSEMBLY	REFER TO DRG. 150H/B

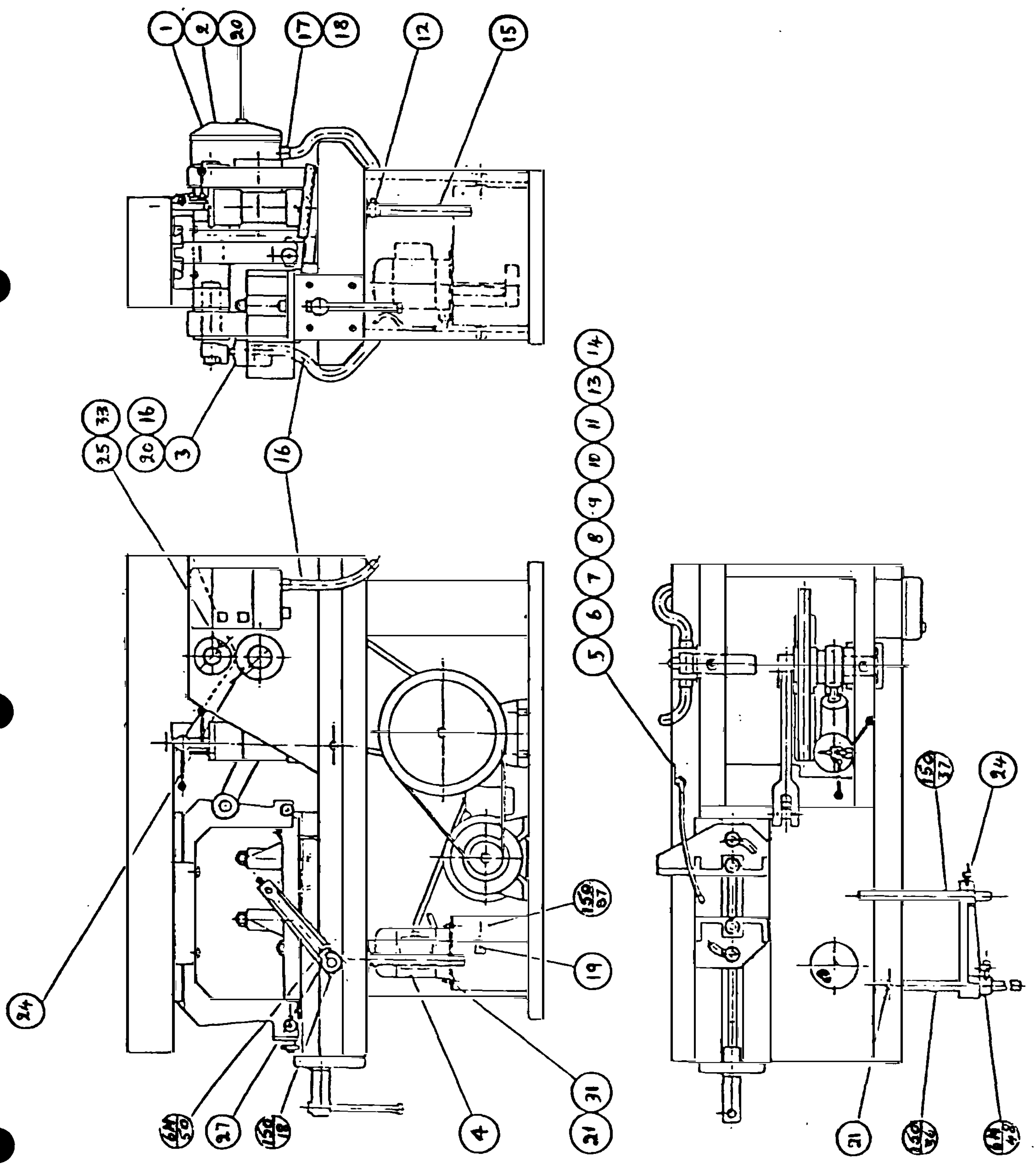
ITEM NUMBER	DESCRIPTION	QUANTITY
19	Mills pin - $\frac{1}{8}$" dia x $\frac{3}{8}$" lg GPI	1
20	Mills pin - $\frac{1}{4}$" dia x $\frac{3}{8}$" lg GP4	6
21	Mills pin - $\frac{1}{4}$" dia x $1\frac{1}{4}$" lg GPI	2
22	Mills pin - $\frac{1}{4}$" dia x $\frac{1}{2}$" lg GPI	2
23	Nut - 5/16" unc	8
24	Nut - $\frac{1}{2}$" unc	5
25	Washer - 5/16" dia	8
26	Washer - 7/16" dia	8
27	Washer - $\frac{1}{2}$" dia	1



	PARTS LIST FINAL ASSEMBLY	REFER TO DRG. 150H/C
ITEM NUMBER	DESCRIPTION	QUANTITY

NOTE:- * DENOTES EXTRA EQUIPMENT.

*150H/87	Coolant tank	1
150H/18	Bar stop body	1
150H/36	Bar stop shaft	1
150H/37	Bar stop shaft	1
6H/48	Bar stop collar	1
6H/50	Bar stop pin	1
1.	Starter	1
2.	Heater	1
3.	Limit switch	1
*4.	Coolant pump AQ. 3/2 - 6¼"S.S.	1
*5.	Tubing sleeve enots 34 0278 05	2
*6.	Tubing nut enots 34 0279 05	2
*7.	Bulkhead connector 34 0021 05	1
*8.	Male elbow adaptor enots 34 0330 25	1
*9.	Coolant tap ¼ BSP	1
*10.	Locknut 34 0223 03	1
*11.	Nippled adaptor 34 035017	1
*12.	Jubilee clip 18-35mm	1
*13.	Coolant pipe SP1425 14" x ¼"	1
*14.	Nylon pipe 5/16" dia	
*15.	Nylon pipe ⅜" ID x 1" OD	
16.	Veriflex conduit - 16mm	
17.	PVC couplings - 16mm	6
18.	PVC locknuts - 16mm	6
*19.	SK HD Capscrew - No. 10 UNC x ⅜" LG	2
20.	- No. 10 UNC x ½" LG	2
*21.	SK HD Capscrew - ¼" UNC x ⅜" LG	1
23.	SK Setscrew - ⅜" UNC x ⅜" LG	1
24.	SK Setscrew - ⅜" UNC x ⅛" LG	1
25.	SK Setscrew - ⅜" UNC x 1" LG Dogpoint	2
26.	Hex HD Bolt - 5/16" UNC x ⅜" LG	2
27.	Hex HD Setscrew - ⅜" UNC x 1½" LG	1
*31.	Nut - ¼" UNC	2
33.	Locknut - ⅜" UNC	1
34.	- 3/16" dia	2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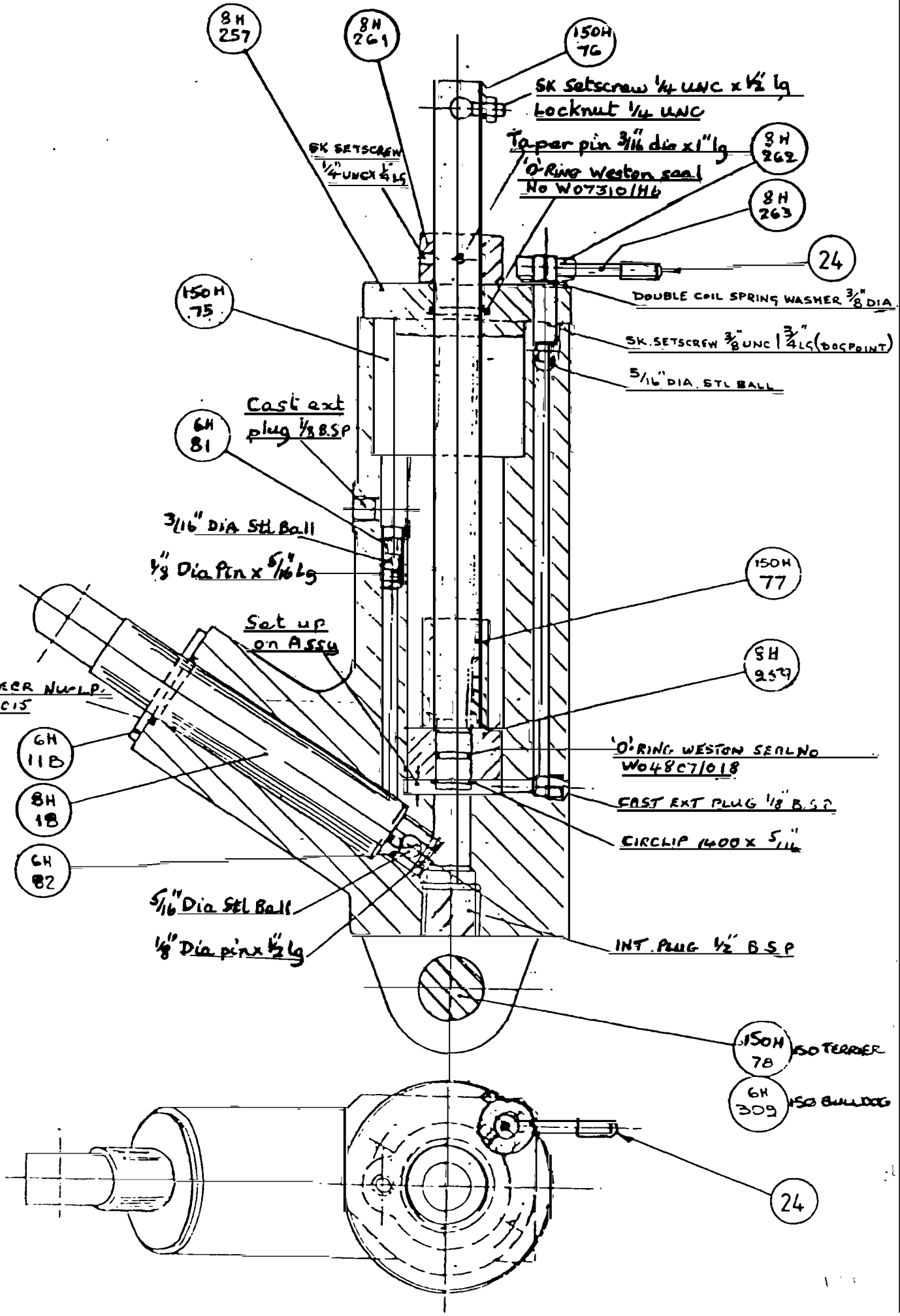
TERRIER	PARTS LIST RELIEF CYLINDER ASSEMBLY	REFER TO DRG. 150H/D

ITEM	DESCRIPTION	QUANTITY
6H/75	OIL PLUNGER	1
6H/20	ECCENTRIC STRAP	1
150H/78	SUPPORT PIN	1
150H/75	RELIEF CYLINDER	1
8H/257	CYLINDER CAP	1
150H/76	PISTON ROD	1
8H/259/1	PISTON	1
150H/77	SPACER SLEEVE	1
8H/261	PISTON ROD COLLAR	1
8H/262	BOSS FOR PRESSURE REGULATOR	1
8H/263	PRESSURE REGULATING STEM	1
		2
6H/62	PIN FOR ECCENTRIC STRAP	1
6H/70	PIN FOR (PISTON ROD)	1
6H/81	3/16" DIA BALL VALVE	1
6H/82	5/16" DIA BALL VALVE	1
6H/118	WASHER RETAINING PLATE	1
1	SK. SETSCREW 3/8" UNC x 1¾"LG (DOG POINT)	1
2	SK. HD. CAPSCREW No. 10 UNC x ½"LG	2
3	SK. SETSCREW ¼" UNC x ½"LG (DOG POINT)	1
4	LOCKNUT ¼" UNC	2
5	NO. 3 SELON WASHER	1
6	PIONEER NU-LIP 4/019	1
7	SPLIT PIN 3/32" x ¾"LG	1
8	BRASS PLUG 1/8" BSP	1
9	CAST, EXT. PLUG 1/8" BSP	2
10	CAST, INT PLUG ½" BSP	1
11	GREASE NIPPLE 1/8" BSP	1
12	CIRCLIP 1400- 7/8" DIA	1
13	CIRCLIP 1400- 9/16" DIA	1
14	'O' RING SEAL (WESTON No WO7310/116)	1
15	'O' RING SEAL (WESTON No WO4207/013)	1
16	5/16" DIA BALL (STEEL)	1
17	TAPER PIN 3/16" DIA x 1 3/8"LG	1
18	DOUBLE COIL SPRING WASHER 3/8" DIA	1
19	MILLS PIN 1/8" DIA X ¾"LG	1
20	3/16" DIA BALL (STEEL)	1
21	MILLS PIN 1/8" DIA x ½"LG	2
22	1½" DIA PISTON RING	1
23	'O' RING BSO23N	1
24	RED PLASTIC KNOB	1


8H 257
8H 261
150H 76
SK Setscrew 1/4 UNC x 1 1/2" lg
Locknut 1/4 UNC
SK SETSCREW 1/4" UNC x 1 1/2" LG
Taper pin 3/16 dia x 1" lg
8H 262
'O' Ring Weston seal No W07310/H6
8H 263
24
150H 75
DOUBLE COIL SPRING WASHER 3/8" DIA
SK. SETSCREW 3/8" UNC | 3/4" LG (DOGPOINT)
5/16" DIA. STL BALL
Cast ext plug 1/8 B.S.P
6H 81
3/16" DIA STL Ball
1/8" Dia Pin x 5/16" Lg
150H 77
Set up on Assy
8H 259
PIONEER NUMP. +/C15
'O' RING WESTON SEAL NO W048C7/018
6H 11B
8H 18
CAST EXT PLUG 1/8" B.S.P
CIRCLIP 1400 x 5/16"
6H 82
5/16" Dia Stl Ball
1/8" Dia pin x 1/2" lg
INT. PLUG 1/2" B.S.P
150H 78
150 TERRIER
6H 309
150 BULLDOG
24

FOR THE BEST RESULTS ALWAYS USE

CUTMASTER SAW BLADES

BIRKETT CUTMASTER LTD

AVAILABLE FROM – P.O. BOX 30, HIGHTOWN ROAD, CLECKHEATON, WEST YORKSHIRE, ENGLAND, BD19 5JU.

Phone: 0274 - 870311 Telex: 517200 FWB G

Machine	Blade Size	TPI	High Speed Steel Ordering Code	Bimetal Ordering Code
150 Husky	14 × 1¼ × 0.062	6	HS350321606	BM350321606
150 Husky	14 × 1¼ × 0.062	10	HS350321610	BM350321610
150 Husky	14 × 1¼ × 0.062	14	HS350321614	
150 Terrier	14 × 1¼ × 0.062	6	HS350321606	BM350321606
150 Terrier	14 × 1¼ × 0.062	10	HS350321610	BM350321610
150 Terrier	14 × 1¼ × 0.062	14	HS350321614	
200 Terrier	16 × 1¼ × 0.062	6	HS400321606	BM400321606
200 Terrier	16 × 1¼ × 0.062	10	HS400321610	BM400321610
200 Terrier	16 × 1¼ × 0.062	14	HS400321614	BM400321614
150 Bulldog	14 × 1¼ × 0.062	6	HS350321606	BM350321606
150 Bulldog	14 × 1¼ × 0.062	10	HS350321610	BM350321610
150 Bulldog	14 × 1¼ × 0.062	14	HS350321614	
200 Bulldog	16 × 1¼ × 0.062	6	HS400321606	BM400321606
200 Bulldog	16 × 1¼ × 0.062	10	HS400321610	BM400321610
200 Bulldog	16 × 1¼ × 0.062	14	HS400321614	BM400321614
250 Bulldog	21 × 1¾ × 0.088	4	HS525452304	
250 Bulldog	21 × 1¾ × 0.088	6	HS525452306	
250 Bulldog	21 × 1¾ × 0.088	10	HS525452310	
300 Bulldog	21 × 1¾ × 0.088	4	HS525452304	NOTE! Use 22" long (550mm) blade if square material to be cut is above 11" (275mm)
300 Bulldog	21 × 1¾ × 0.088	6	HS525452306	
300 Bulldog	21 × 1¾ × 0.088	10	HS525452310	

Chapter 1-3

DRILLMASTER QDM 32

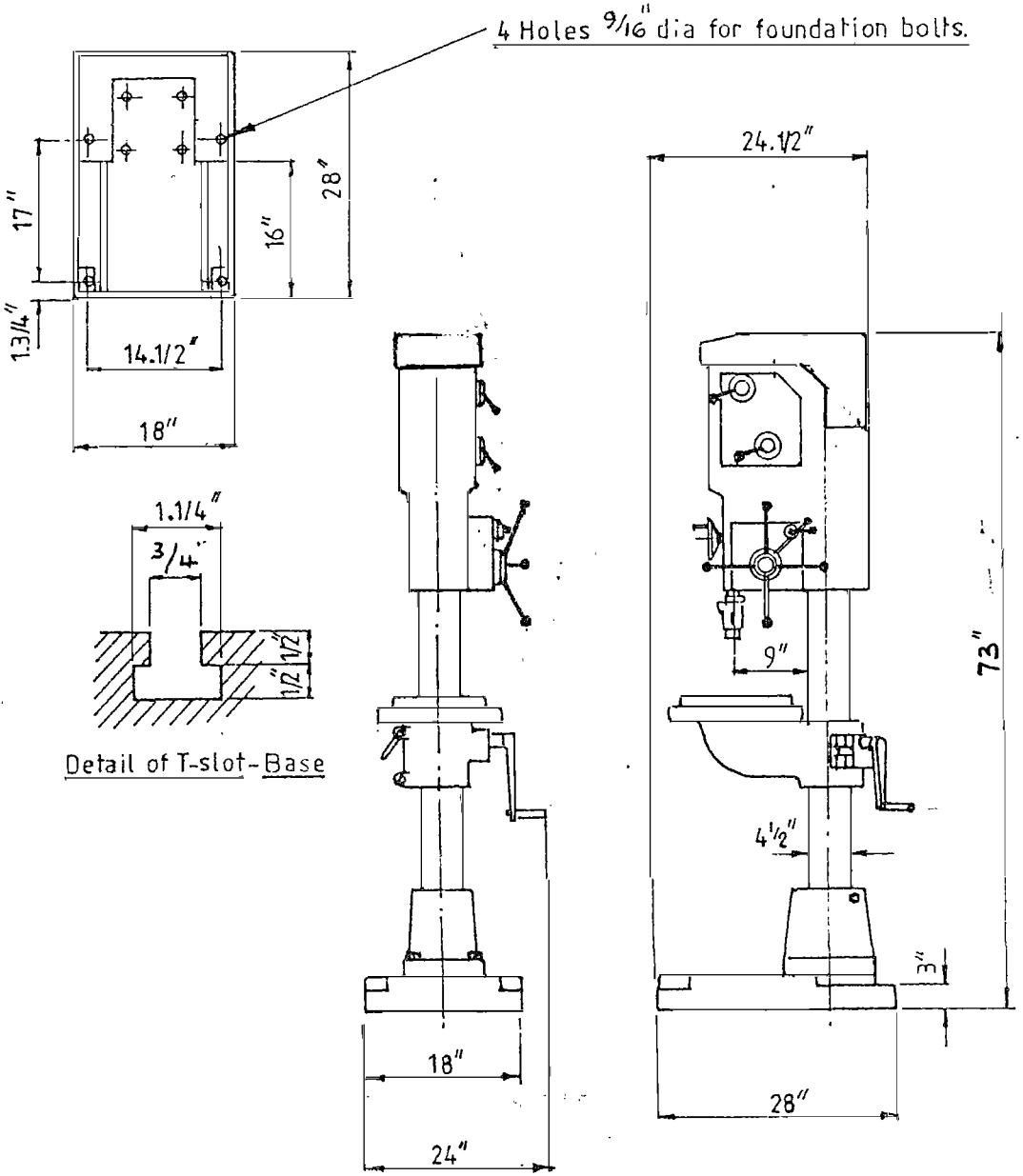
Q D M 3 2 (M O D)

****

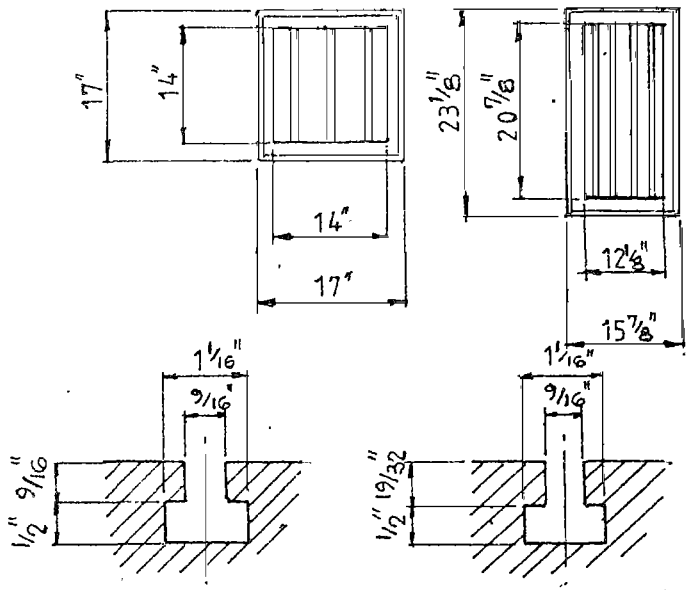
OPERATING MANUAL / PARTS LIST

C O N T E N T S

QDM32 (MOD) DRILLING MACHINE



Detail of T-slot-Base



Detail of T-slot

Detail of T-slot

SPECIFICATION	
Max Capacity. Steel.	1¼" dia. 32mm.
Throat Depth.	9". 228mm.
Stroke of Spindle.	6". 152mm.
Spindle Nose to Table. Max	26¾". 679mm.
Spindle Nose to Base. Max	44⅝". 113mm.
Table Working Surface (Std.)	14" sq. 355mm.
Table Working Surface (Optl.)	20⅛" × 12⅛". 511 × 373mm
Base Working Surface	17" × 18". 431 × 457mm.
Spindle Speeds	9.
Speed Range	70 to 1500 r.p.m.
Spindle Nose	N° 3 Morse
Sleeve Dia.	3¼ Dia 82 mm.
Motor H.P.	1½ @ 1440 r.p.m.
Column Dia	4⅛" Dia. 114 mm
Overall Dimensions (H×W×D)	73" × 24" × 28"
Nett Weight	1120 lbs. 500 kg.

Installation

Check that the machine has not been damaged in transit and that all accessories ordered are received.

Choose a level floor for the machine, preferably on concrete.

Parts of the machine which are not painted have been coated with a protective to prevent rust. This should be removed by using a cloth moistened with paraffin or white spirit.

After the permanent position of the machine is determined locate the machine to the floor by foundation bolts as indicated in the foundation plan in this booklet.

Electrics

The machine is wired complete from the supply input point which should have means of isolation.

The supply is connected to the D.C. Injection Braking Unit which when switched on at the isolation point feeds the control circuit. This circuit senses the presence of D.C. before allowing the machine to be started.

The Reset Button on the Braking Unit must be pressed before a supply is put through to the machine contactor. In the event of the trip switch (probe) being actuated the A.C. supply is completely disconnected and a D.C. supply is put into the motor stator winding, bringing it to a rapid stop.

After each braking operation the Braking Unit must be reset manually before the machine can be restarted.

Check that the supply details shown on the motor plate agree with the actual supply provided. Check that the spindle rotation agrees with the starter push buttons, i.e. that the spindle runs forward when the 'Forward' push button is depressed. Direction of spindle rotation can be corrected by changing over any two of the incoming supply leads.

The machine is powered by a 1½HP (1.1KW) motor which is controlled by a reversing starter mounted at the foot of the column. The starter is operated by push buttons mounted at the front of the head. These buttons are marked 'Forward Stop and Reverse'. The forward and reverse buttons cannot be operated directly after each other - the stop button must first be depressed.

A wiring diagram is shown in Fig.1.

Gearbox

The main gearing for the machine is contained in one gearbox from which the two gear shifters protrude. Each of these gear shifters moves into three different positions to give a total of 9 speeds. The speeds obtainable when the machine is operating on a 50c supply are as follows:

SELECTOR POSITION	CE	AE	BE	CF	AF	BF	CD	AD	BD
SPEED	70	102	150	221	324	475	700	1023	1500

When 60c motors are fitted the speeds are increased by 20%. Similarly any motor running at a speed other than 1420 rpm (standard 50c 4 pole motor speed) will affect the speed range of the machine in the same ratio as the motor speed difference.

The gears run in an oil reservoir and the level of oil can be seen in the oil sight glass mounted on the left hand side of the head.

Feedbox

The feed box allows power feed to be selected as follows:

TOP	3 Speeds	Power Feed = .001/Rev
MIDDLE	3 Speeds	Power Feed = .003/Rev
BOTTOM	3 Speeds	Power Feed = .010/Rev

Feedbox (Continued)

To engage power feed the lever at the end of the star wheel shaft must be tightened to engage the feed clutch. This clutch acts as a safety device should the machine be overloaded and can be made to operate at any required load, this being dependent upon the pressure applied to the feed clutch lever. Next engage the feed lever situated to the right of the star wheel. When this lever is engaged the spindle will move downwards at the approximate feed rates until automatic disengagement takes place as selected on the depth dial or until the feed lever is disengaged.

To return the spindle to the original position release the feed clutch and turn the star handwheel in a clockwise direction.

To use the slow hand feed engage the feed clutch and move the handwheel at the front of the machine.

The spring which balances the sleeve is contained in a housing at the left hand side of the head. This can be adjusted by removing the securing screws and turning the housing one screw pitch at a time. Note that when the screws are removed the housing will tend to rotate due to the spring tension.

Drive

The drive between motor and gearbox is by means of a timing belt and pulleys mounted on gearbox input and motor shafts. Should this belt require adjustment or replacement, belt tension is released or applied by means of the locknuts on the motor mounting studs (S3506 + S3507, Fig.3).

General

The head is not intended to move up or down or around the column.

The table assembly can be moved up or down the column by means of the cranked lever which operates a rack and pinion mechanism. The table can also swing around the column and is locked in position by a handle fitted at the rear.

Lubrication

The oiling points are shown on Fig.2 and attention should be given as follows:

MAIN GEARBOX (4½pints)	-	Top up as necessary	Oil Ref A
FEEDBOX (Oil Can)	-	Top up flapped lubricator as necessary	Oil Ref A
SLEEVE - Outside	-	Apply Oil daily	Oil Ref A
SLEEVE (2 Nipples)	-	Apply grease once weekly one nipple exposed, one covered by plug on L.H. side of Head	Grease Ref C

	MOBIL	ESSO	SHELL	CASTROL	GULF	BP	CENTURY	DUCKHAM
A	Vactra Oil DTE BB	NUTRAX 220	Vitrea 220	Magna 220	Harmony 220E	Energol 220	PWLR	Garnet 220
C	Mobilplex Grease 48	Beacon 3	Alvania R3	Spheerol AP3	Crown No. 3	Energrease L53	Lupus A2	Admax Lep 2

A parts list and drawings of the machine are given on the following pages. It is essential that when spares are ordered, the serial number of the machine is given together with the reference number and title of the spare item required.

P A R T S L I S T
****

F O R

Q D M 3 2 (M O D) D R I L L I N G M A C H I N E
****

Ref.	Description	No.
32/1	Wormwheel	1
32/2	Wormshaft	1
32/9	63T Gear	1
32/10	Triple Gear	1
32/11	75T Gear	1
32/12	53T Gear	1
32/13	Sleeve	1
32/14	Bearing Cap	1
32/16	Double Gear	1
32/17	41T Gear	1
32/18	Triple Gear	1
32/19	Gear Selector Arm	1
32/20	Gear Selector	1
32/21	Top Shoe	1
32/22	Shaft	2
32/24	Handle	3
32/25	Boss	2
32/26	Wear Plate	1
32/27	Wear Plate	1
32/28	Bearing Cap	1
32/29	Side Cover R.H.	1
32/30	Side Cover L.H.	1
32/31	16T Gear	1
32/32	Shaft	1
32/33	42T GEar	1
32/34	Shoe	1
32/35	Worm	1
32/36	63T Wormwheel	1
32/37	Shaft	1
32/38	Spacer	1
32/39	Shoe Boss	1
32/40	Collar	1
32/41	Stem	1
32/42	Spindle Sleeve	1
32/43	Pinion	1
32/44	Control Boss	1
32/45	Hub Nut	1
32/46	Depth Dial	1
32/47	Stem	4
32/48	Dial Locking Screw	2
32/49	Oil Block	1
32/51	Nameplate	1
32/52	Bolt	1
32/53	Gear Position Label	1
32/54	Gear Position Label	1
32/55	Feed Plate Label	1
32/56	Lubrication Label	1
32/57	Feed Box Cover	1
32/58	Speed Label	1
32/61	Bottom Shoe	1
32/62	Bush (GH57)	1
32/65	Label	1
32/66	Felt Washer	1
32/67	Washer	1
32/70	Label	1
32/72	Pad	1
32/74	Gasket	1
32/84	Head Casting	1
32/85	Cap	1
32/86	Input Shaft	1
32/87	Top Bearing Plate	1
32/98	Top Cover	1
32/99	Access Cover	1
DA218	Spindle	1
DA219	Cap	1
DA220	Cap	1
DA221	Cap	1
DA222	Nose Nut	1
DA251	Cover Plug	1
DA260	Pin Locator	1
DB203	Spinning Plate	5
DB204	Thrust Plate	1
DB205	End Clutch Plate	1
DB206	Fixed Plate	4
DB207	Push Plate	1
DB232	Pin	1
DB233	Hub Washer	1
DB239	Clutch Rod	3
DB242	Return Spring	1
P4/4/857	Pointer	1
6H/84	Spring	4
36R/680	Handwheel	1

135

Ref.	Description	No.
S2504	Motor 1½HP (1.1KW) TEFC 1440rpm Foot Mtd D90S	1
S2512	Pushbutton Station 3 button Forward/Stop/Reverse	1
S2574	Chuck Guard LRTS2	1
S2563	Double Spring 3/16" i.d.	15
S2562	Key 3/8"x3/8"x4" Rad Ends	1
S2404	Key 3/8"x3/8"x2¾"Rad Ends	1
S2406	Key 5/16"x¼"x4" Rad Ends	1
S2405	Key 8mm x 7mm x 1½" (with motor)	1
S2506	Handle ½"UNC	1
S2565	Handle 3/8" bore	1
S2509	Knob Patt.1033 3/8"UNC	8
S12	Thrust Bearing FT 5/8"	1
S1341	Ball Bearing 6305	2
S1973	Ball Bearing 6205	3
S2429	Ball Bearing 7307	1
S2430	Ball Bearing 6009	1
S2431	Ball Bearing 6206	1
S304	Steel Ball 5/16" i.d.	4
S2409	Oil Seal W 205 118 39	1
S2410	Oil Seal W283 177 39	1
S2407	'O' Ring BS113	2
S2411	Circlip 75mm Int	1
S2412	Circlip 25mm Ext	1
S2413	Circlip 45mm Ext	1
S2414	Circlip 30mm Ext	1
S2415	Circlip 1¼" Ext	1
S2504	Circlip 1¾" Ext	1
S1594	Plug 3/8"BSP Brass	2
S65	Oil Sight Glass IC4612	1
S2557	Flip Flap Oiler No.16	1
S2422	Oil Nipple NC6055	1
S2423	Oil Nipple NC6057	1
S2424	Oil Nipple NC6250	2
S2403	Sk.Hd.Capscrew 3/8"UNCx2"	4
S357	Sk.Hd.Capscrew 3/8"UNCx1"	12
S302	Sk.Hd.Capscrew 5/16"UNCx¾"	4
S2360	Sk.Hd.Capscrew ¼"UNCx1¼"	1
S377	Sk.Hd.Capscrew ¼"UNCx5/8"	8
S242	Sk.Hd.Capscrew ¼"UNCx¾"	7
S2292	Sk.Hd.Capscrew No.10UNCx1½"	3
S380	Sk.Hd.Capscrew No.10UNCx¾"	2
S311	Sk.Hd.Capscrew No.10UNCx3/8"	2
S2564	Sk.Hd.Shoulder Screw 5/16"W x 2¼"L x 3/8" dia.	1

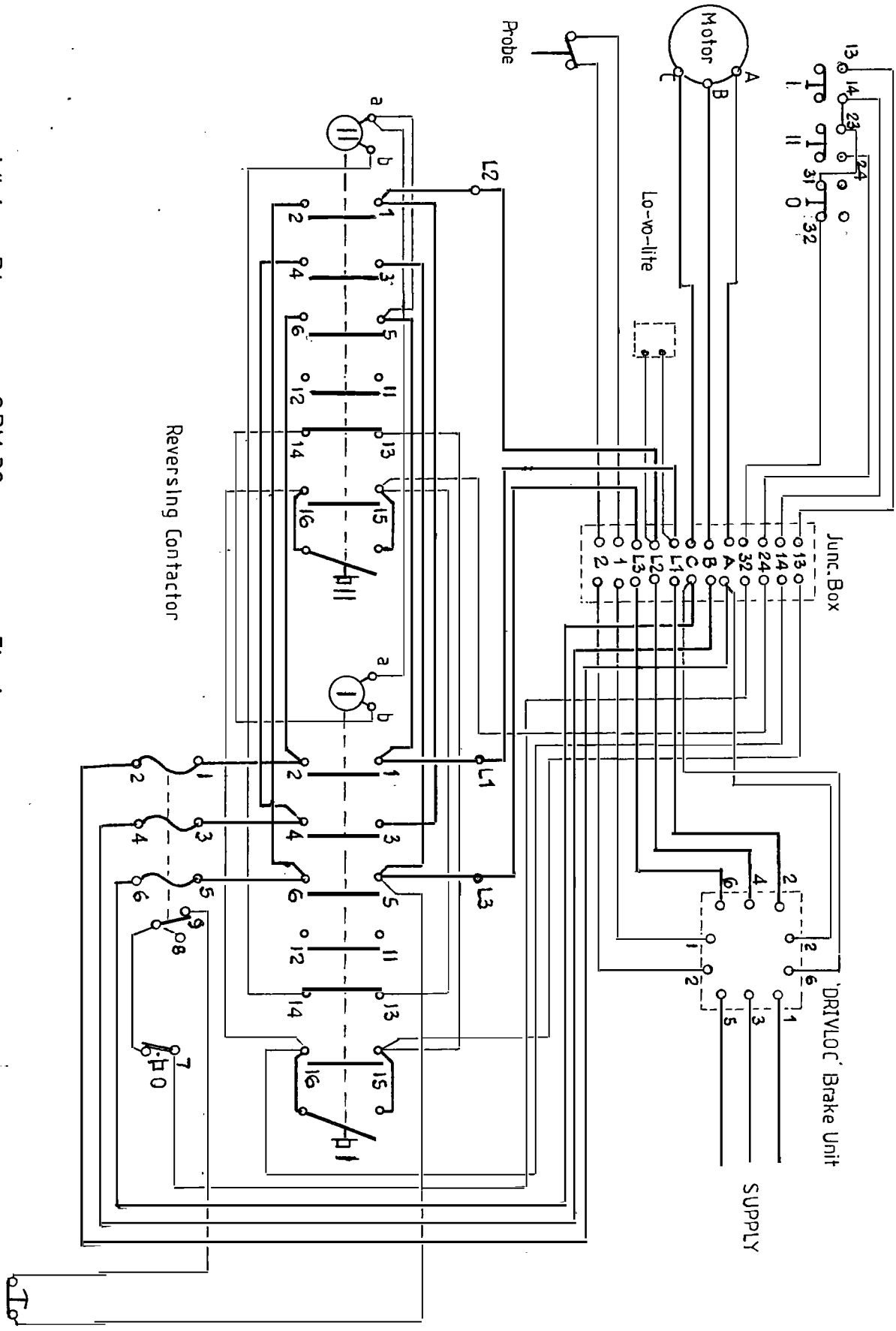
Ref.	Description	No.
S943	Sk.Setscrew 3/8"UNCx3/8"	4
S2559	Sk.Setscrew 5/16"UNCx1¼"	2
S2503	Sk.Setscrew 5/16"UNC x ¼"	2
S245	Sk.Setscrew 1/4"UNCx ½"	2
S344	Sk.Setscrew 1/4"UNCx3/8"	1
S2560	Hx.Hd.Setscrew 3/8"UNCx¾"	4
S2416	Hx.Hd.Bolt 5/8"UNCx2½"	4
S2417	Hx.Hd.Bolt 5/8"UNCx6"	1
S2558	Hx.Hd.Bolt ½"UNCx6"	2
S2418	Hx.Hd.Bolt ½"UNCx3½"	2
S2419	Hx.Hd.Bolt 3/8"UNCx1½"	4
S265	Hx.Nut 5/8"UNC	1
S1502	Hx.Nut ½"UNC	4
S362	Hx.Locknut ¼"UNC	1
S2408	Sk.Csk.Screw No.8UNCx¼"	4
S277	Sk.Csk.Screw No.10UNCx½"	2
S1126	Sk.Btn.Hd.Screw No.10UNCx3/8"	7
S312	Sk.Btn.Hd.Screw No.6UNCx3/8"	7
S446	Rd.Hd.Screw ¼"UNCx½"	3
S2541	Rd.Hd.Screw No.10UNCx3/8"	3
S1610	Grv.Pin 3/8"ø x1¾"L GP1	1
S390	Grv.Pin 3/8"ø x1.3/8"L GP1	1
S2399	Grv.Pin 5/16"ø x2"L GP4	1
S2398	Grv.Pin 5/16"ø x1¼"L GP4	1
S2154	Grv.Pin 5/16"ø x1"L GP1	1
S2401	Grv.Pin ¼"ø x3"L GP1	2
S963	Grv.Pin ¼"ø x1½"L GP1	5
S2402	Grv.Pin ¼"ø x1½"L GP2	4
S262	Grv.Pin ¼"ø x1¼"L GP1	1
S2502	Grv.Pin ¼"ø x1¼"L GP2	4
S1609	Grv.Pin ¼"ø x1"L GP2	4
S1460	Grv.Pin ¼"ø x7/8"L GP1	1
S742	Grv.Pin 3/16"ø x1"L GP1	1
S1786	Self Drive Screw U2x¼"	24
S267	Washer 5/8" dia.	5
S333	Washer ½" dia.	2
S394	Washer 3/8" dia.	4
S2561	Washer 2BA dia.	15
S2421	Selon Washer	2
S3501	Bronze Bush CT174 x 1"	2
S3502	Bronze Bush CT174 x ¾"	1
S3503	Bronze Bush CT174 x ½"	2
S3001	Copper Tube 3/16"o.d.x1¼"	
S3504	Pulley 22H100	2
S3505	Timing Belt 270H100	1
S3506	Stud 3/8"UNC x 2¼"L	4
S3507	Nut 3/8"UNC	8

COLUMN, BASE AND TILTING TABLE

Ref.	Description	No.
DC13A	Handle	1
DC25	Column	1
DC42	Elevating Rack	1
DC43	Elevating Box	1
DC44	Elevating Gear	1
DC45	Elevating Worm	1
DC46	Elevating Worm Shaft	1
DC47	Elevating Gear Spindle	1
DC48	Clamping Handle	1
DC50	Column Foot	1
DC51	Base	1
S12	Thrust Bearing FT 5/8"	1
S265	Hex.Nut 5/8"UNC	1
S267	Washer 5/8" dia.	1
S302	Sk.Hd.Capscrew 5/16"UNCx$\frac{3}{4}$"	4
S333	Washer $\frac{1}{2}$" dia.	3
S344	Sk.Setscrew $\frac{1}{4}$"UNC x 3/8"	1
S394	Washer 3/8" dia.	4
S1502	Hex.Nut $\frac{1}{2}$"UNC	3
S2408	Sk.Csk.Screw No.8UNCx$\frac{1}{4}$"	1
S2416	Hex.Hd.Bolt 5/8"UNCx2$\frac{1}{2}$"	4
S2417	Hex.Hd.Bolt 5/8"UNCx6"	1
S2418	Hex.Hd.Bolt $\frac{1}{2}$"UNCx3$\frac{1}{2}$"	2
S2419	Hex.Hd.Bolt 3/8"UNCx1$\frac{1}{2}$"	4
S2506	Handle $\frac{1}{2}$"UNC	1
S2620	Stud $\frac{1}{2}$"UNC x 2" Long	1
S2621	Stud $\frac{3}{4}$"UNCx3$\frac{1}{2}$"Long	1
S2622	Hex.Nut $\frac{3}{4}$"UNC	1
S2623	Washer $\frac{3}{4}$"dia.	1
S3508	Compound Table	1
S3509	Reversing Contactor T8 in enclosure.No Buttons	1

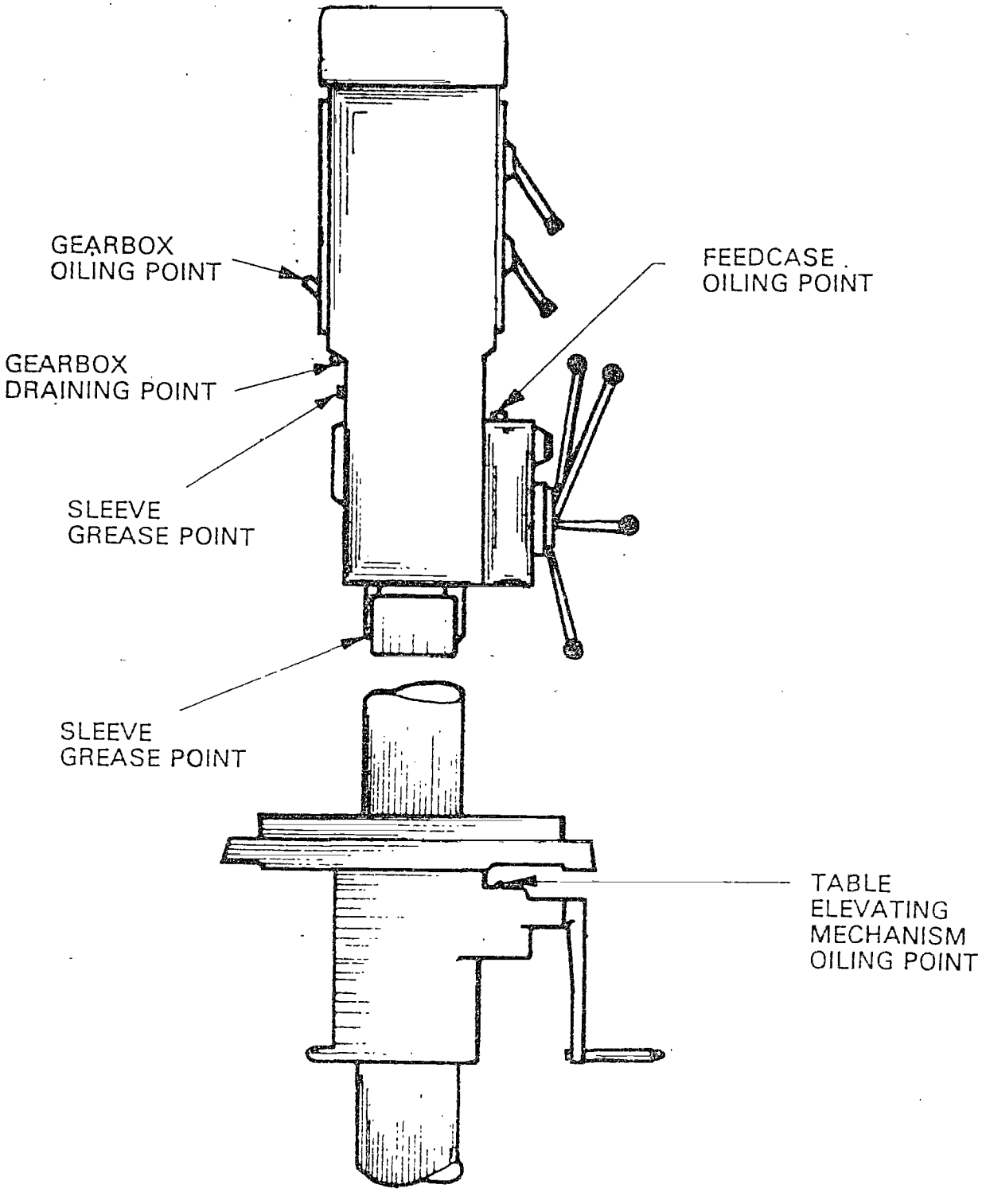
EXTRA EQUIPMENT - COOLANT ASSEMBLY

Ref.	Description	No.
LL013	Support Bracket	1
LL017	Fitting Tube	1
LL001	Coolant Tank	1
DD006B	Coolant Tank Lid	1
	Drain Tube	1
S64	Coolant Pump EMU50a/1	1
S252	Sk.Capscrew $\frac{1}{4}$"UNCx$\frac{1}{2}$"	2
S783	Sk.Setscrew $\frac{1}{4}$"UNCx$\frac{1}{4}$"	1
S2567	Hx.Hd.Setscrew $\frac{1}{4}$"UNCx5/8"	2
S2568	PVC Tube 3/8"i.d.5/8"o.d.x48"L	1
S2573	PVC Tube $\frac{3}{4}$"i.d.1"o.x.x50"L	1
	Coolant Delivery Pipe	1
	Coolant Tap 3005M	1



Wiring Diagram - QDM 32.

Fig. 1



LUBRICATION DETAILS

FIG NO. 2

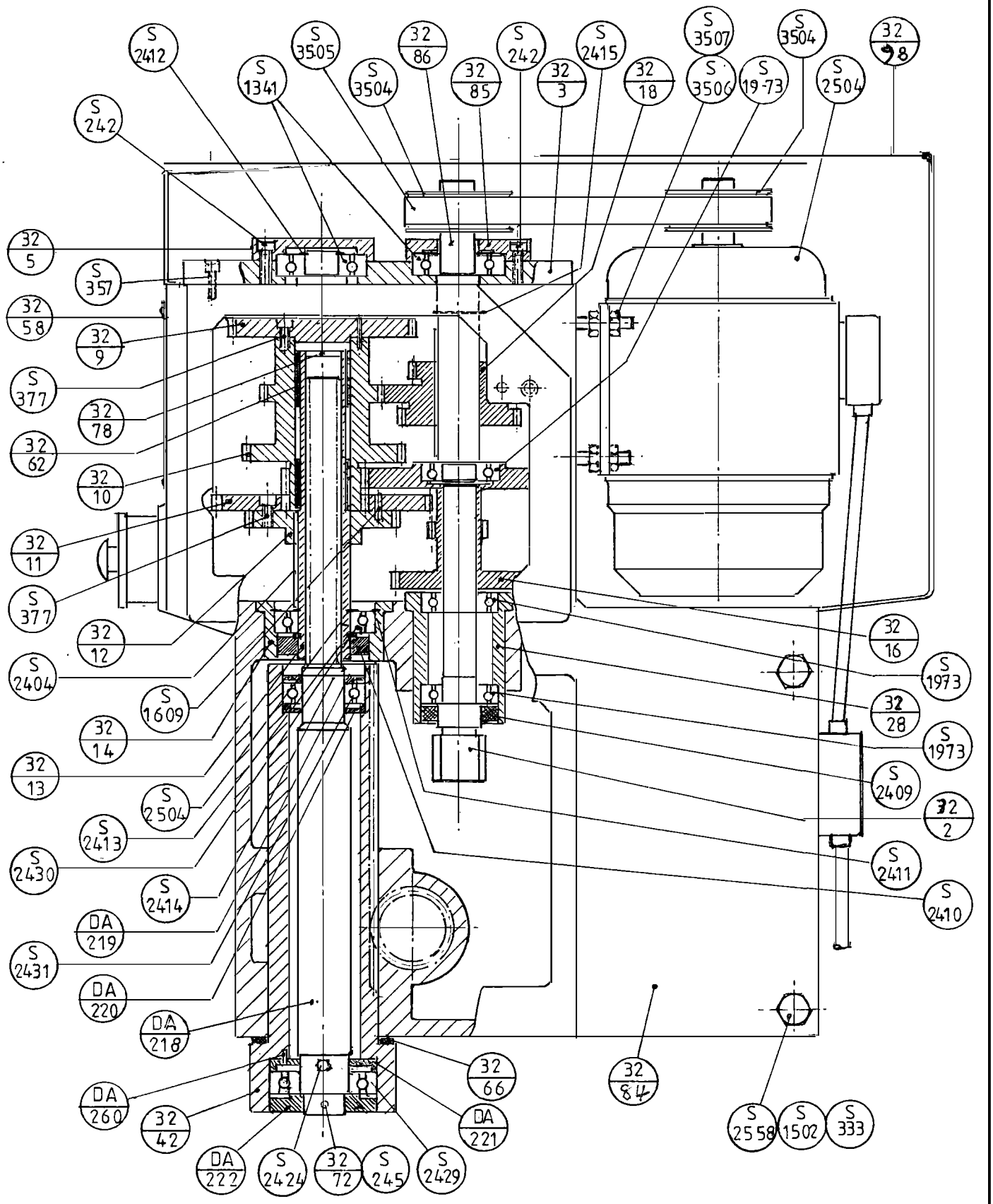

S 2412
S 1341
S 3505
S 3504
32 86
32 85
S 242
32 3
S 2415
32 18
S 3507
S 3506
S 3504
S 19-73
S 2504
32 98
S 242
32 5
S 357
32 58
32 9
S 377
32 78
32 62
32 10
32 11
S 377
32 12
S 2404
S 1609
32 14
32 13
S 2504
S 2413
S 2430
S 2414
DA 219
S 2431
DA 220
DA 218
DA 260
32 42
DA 222
S 2424
32 72
S 245
S 2429
32 66
DA 221
32 84
S 2558
S 1502
S 333
32 16
S 1973
32 28
S 1973
S 2409
32 2
S 2411
S 2410

FIG. 3

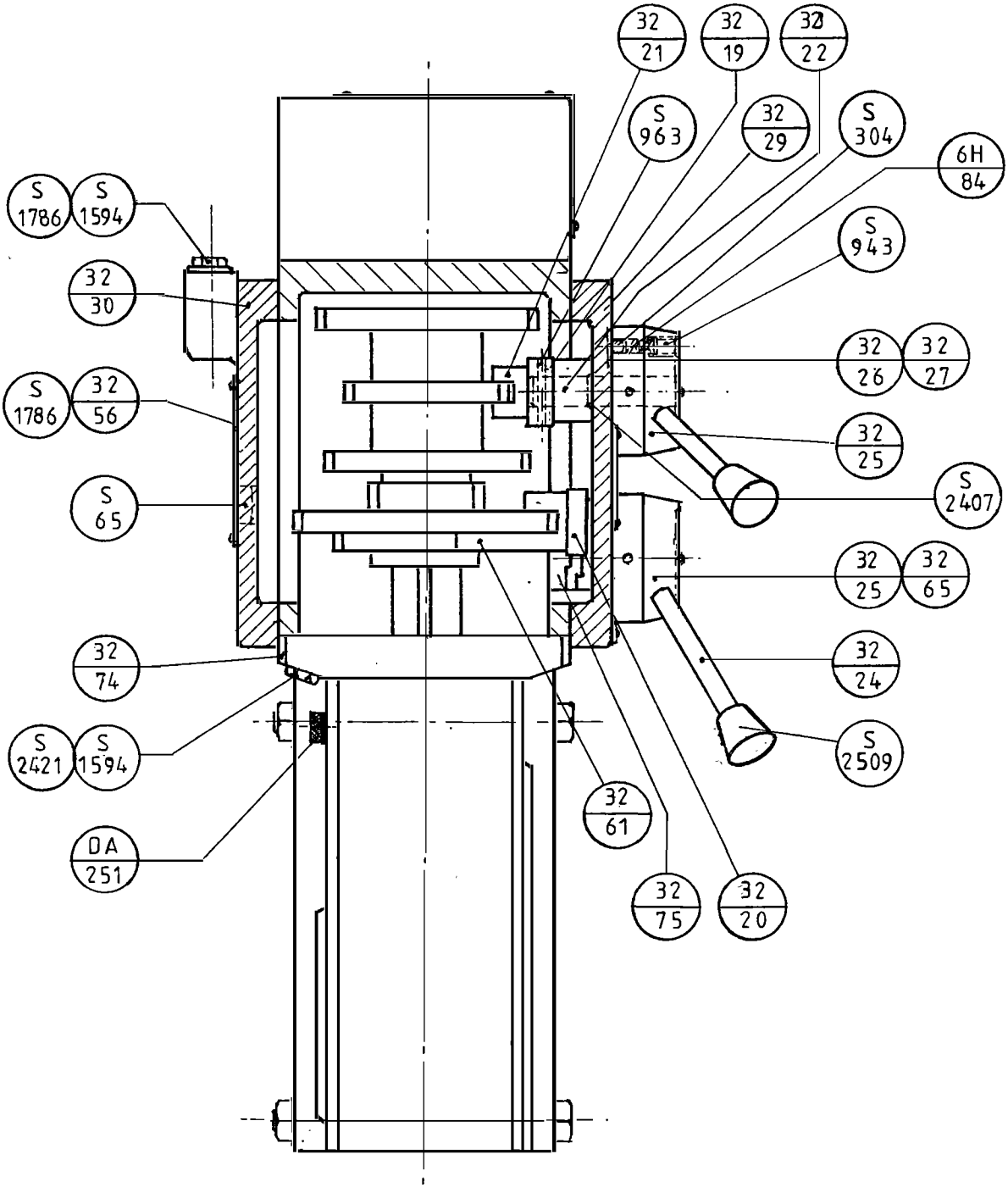

32/21
32/19
32/22
S/963
32/29
S/304
6H/84
S/1786
S/1594
S/943
32/30
32/26
32/27
S/1786
32/56
32/25
S/65
S/2407
32/25
32/65
32/74
32/24
S/2421
S/1594
S/2509
32/61
DA/251
32/75
32/20

FIG. 4

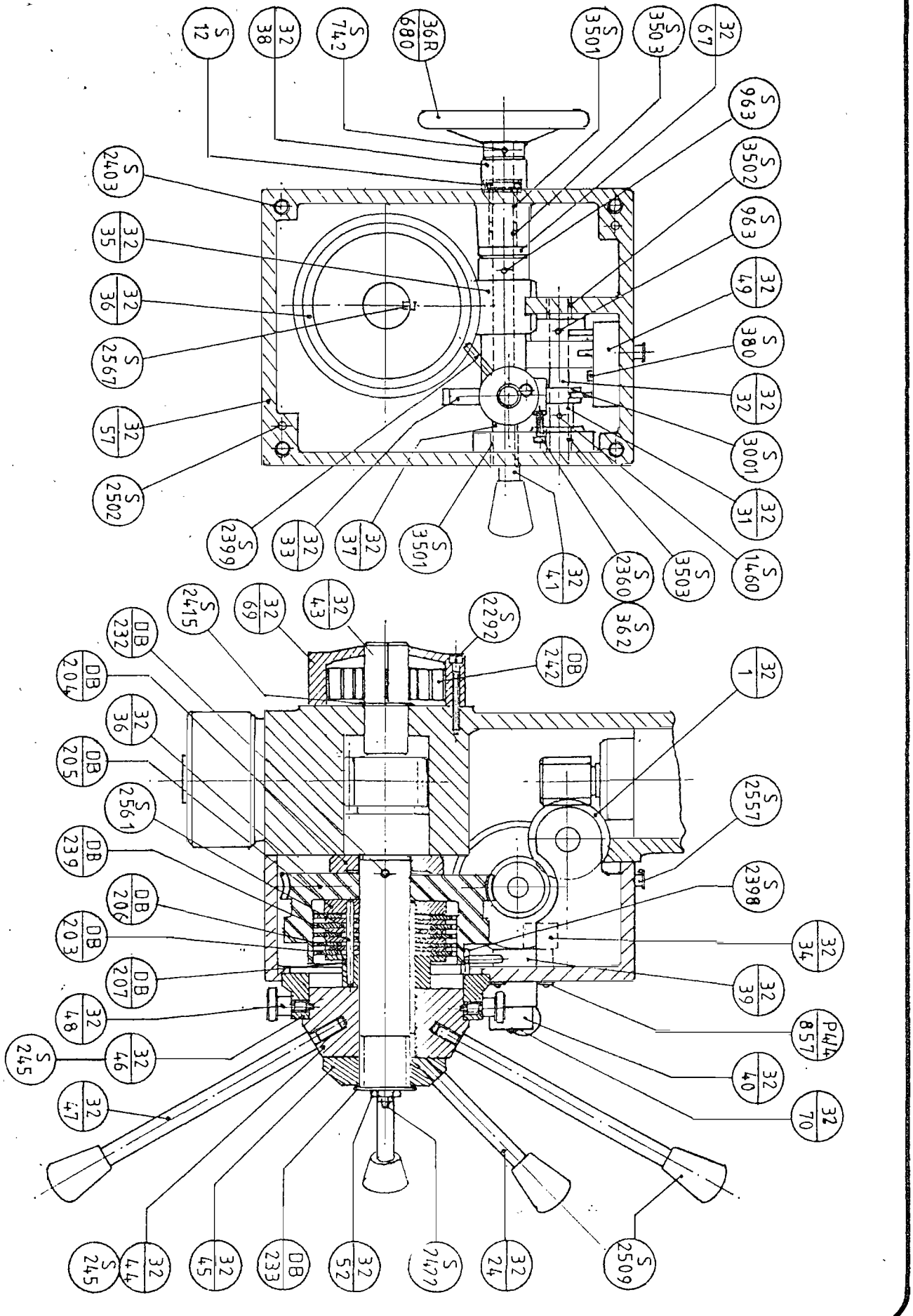

S 12
32 38
S 742
36R 680
S 3501
S 3503
32 67
S 963
S 3502
S 963
32 49
S 380
32 32
S 3001
32 31
S 1460
S 3503
S 2360
S 362
32 41
S 3501
32 37
32 33
S 2399
S 2403
32 35
32 36
S 2567
32 57
S 2502
S 2415
32 69
32 43
S 2292
DB 242
DB 232
DB 204
32 36
DB 205
S 2561
DB 239
DB 206
DB 203
DB 207
32 48
S 245
32 46
32 47
32 1
S 2557
S 2398
32 34
32 39
P44 857
32 40
32 70
S 2509
32 24
S 7477
32 52
DB 233
32 45
32 44
S 245

FIG.5

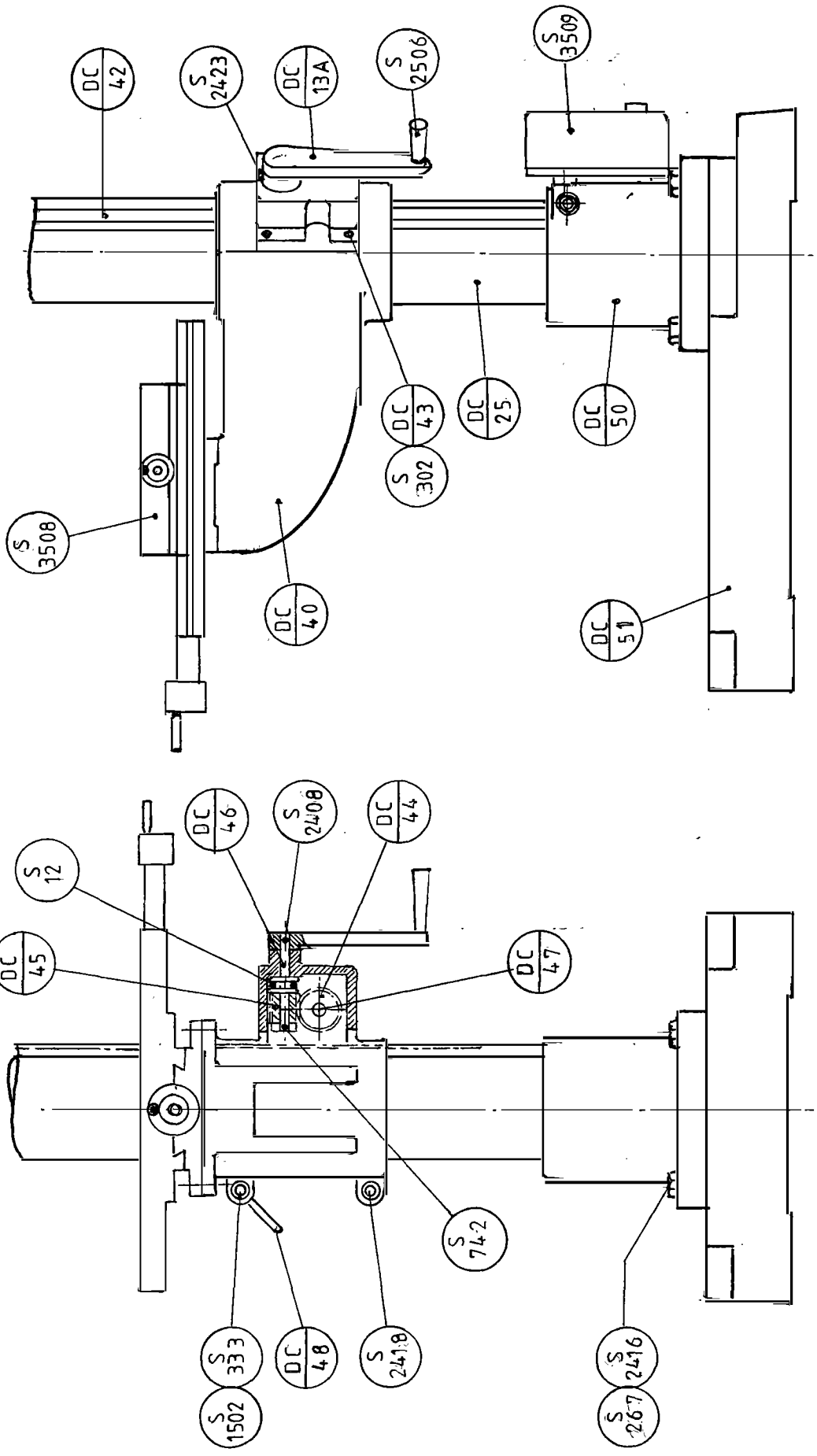

DC 42
S 2423
DC 13A
S 2506
S 3509
DC 43
DC 25
DC 50
S 302
S 3508
DC 40
DC 51
DC 46
S 2408
DC 44
S 12
DC 45
DC 47
S 74-2
S 333
S 1502
DC 48
S 2418
S 2416
S 267

FIG.6

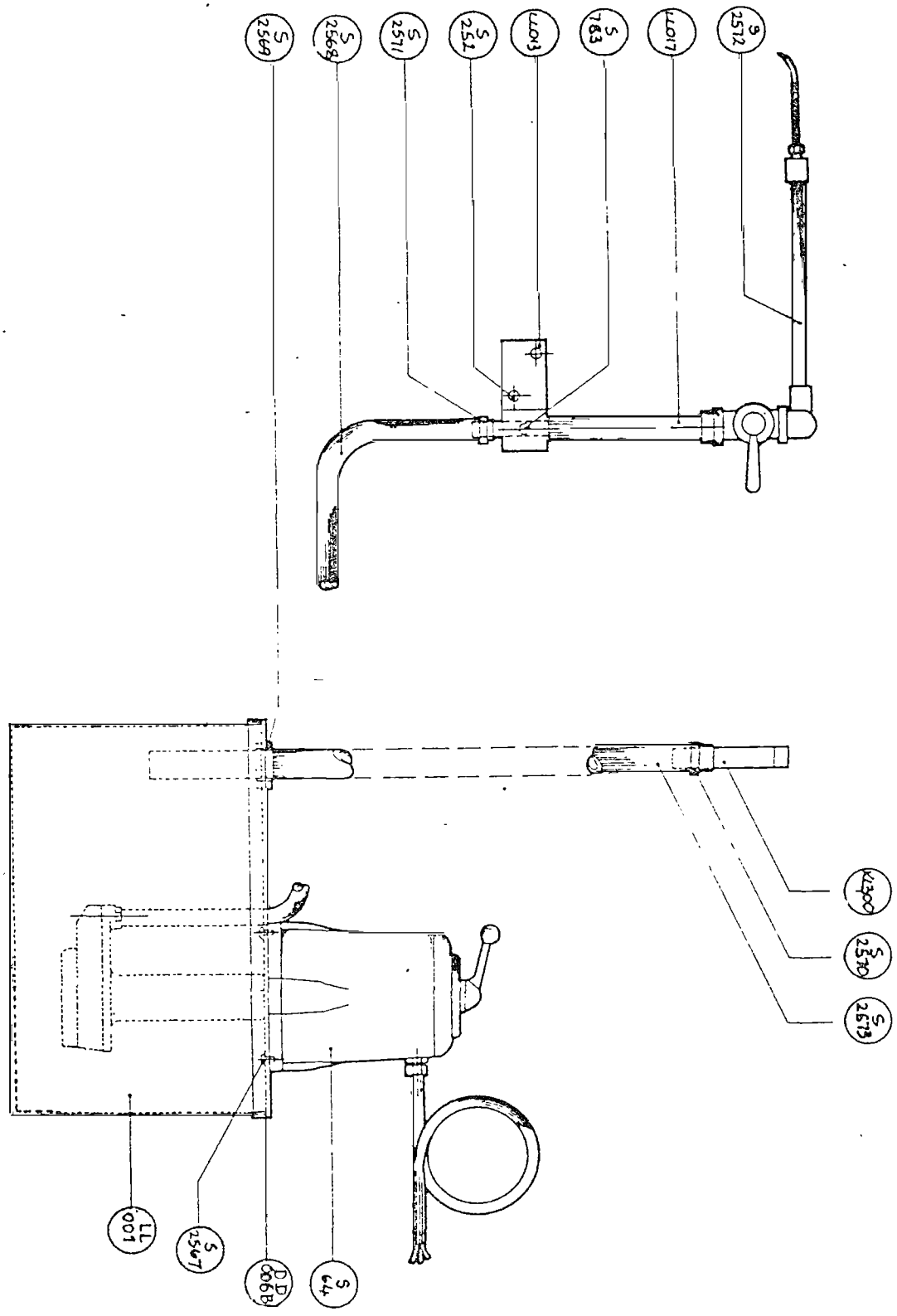

S 2569
S 2568
S 2571
S 252
LL013
S 783
LL017
S 2572
K4300
S 2570
S 2573
LL 001
S 2567
DD 006B
S 64

FIG. 7.

OPERATORS NOTES

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Chapter 1-4

ORTHOGONAL COMPOUND TABLE

MAIN FEATURES

The upper table and the saddle are mounted on ground, adjustable dovetail guide-ways. The trapezoidal lead screws are mounted on double-acting thrust bearings and are axially adjustable. The indexing dials are provided with zeroing devices and graduated in .001 inches. The upper table has a scale graduated in inches, so that the operator can make rapid and direct readings of the traverses. All cast parts are in Ductite (international patent) cast-iron which the manufacturers guarantee for 5 years.

1) DISASSEMBLY AND ASSEMBLY OF THE FRICTION SPRING (Fig 1)

DISASSEMBLY:

a) remove nut (2) and washer (3);
b) remove the control-wheel (15), paying attention not to lose the Woodruff key (4);
c) extract the indexing dial (7) from the control-wheel (15);
d) remove friction spring (6).

ASSEMBLY

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a) clean all the sliding surfaces;
b) place the friction spring (6) in the opposite grooved housing in the control-wheel (15);
c) wind a string (C) around the friction spring (6) and pull;
d) partially insert the indexing dial (7) until more than half of the width of the friction spring (6) is covered;
e) take away the string;
f) completely insert the indexing dial (7);

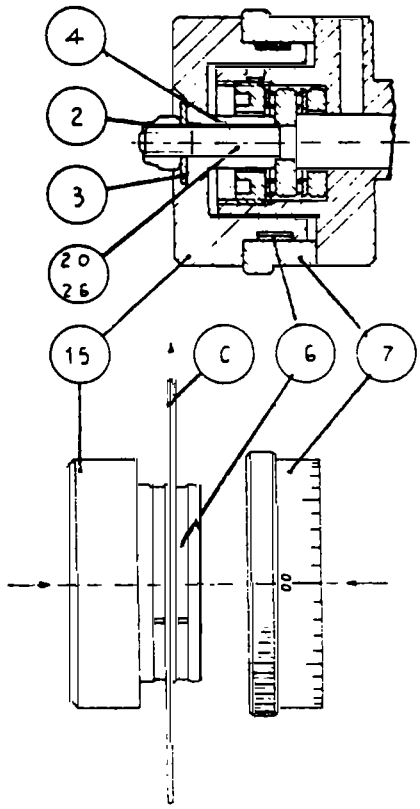
2) DISASSEMBLY AND ASSEMBLY OF THE CENTRAL SCREW BRACKET (Fig 2)

DISASSEMBLY

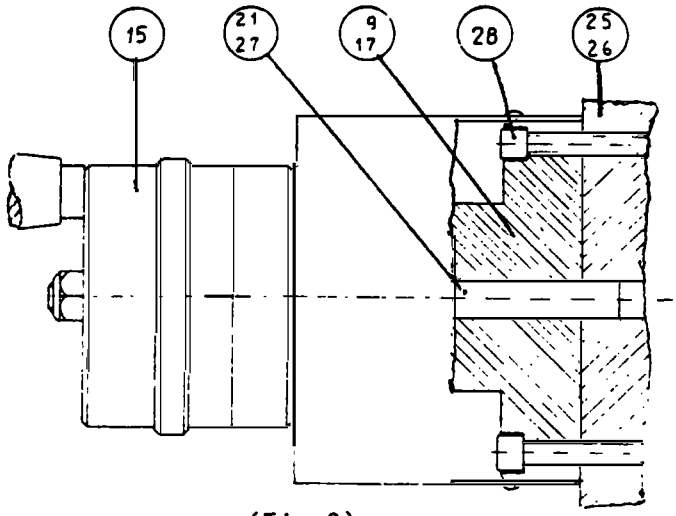
a) unscrew screws (28);
b) turn the control-wheel (15) in a clock-wise direction if the lower control-wheel is concerned or in a counter clock-wise direction if the upper control-wheel is concerned.

ASSEMBLY

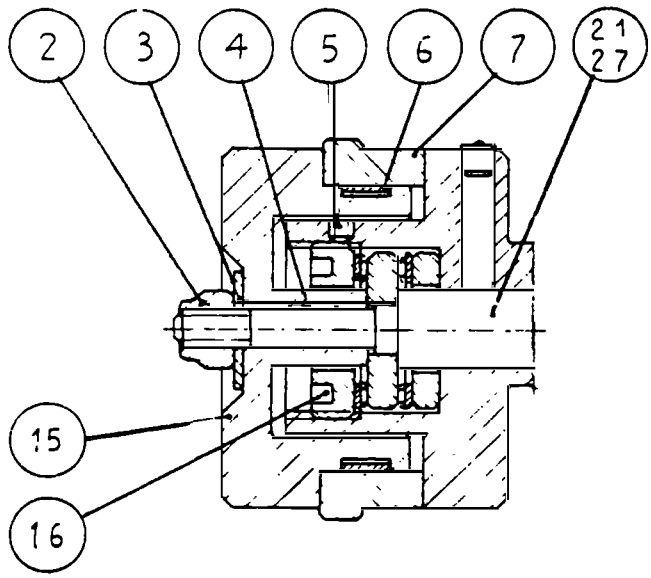
a) clean and lubricate the central screw (21) or (27);
b) Insert the bracket (9) or (17) and position the central screw (21) or (27) in its seat;
c) turn the control-wheel (15) in a counter clock-wise direction if the lower control-wheel is concerned or in a clock-wise direction if the upper control-wheel is concerned;
d) replace screws (28).



(Fig 1)



(Fig 2)



(Fig 3)

3) DISASSEMBLY AND ASSEMBLY OF THE CENTRAL SCREW (fig. 3)

DISASSEMBLY

a) disassemble the central screw bracket (9)
b) remove nut (2) and washer (3);
c) remove the control-wheel (15), paying attention not to lose the Woodruff key (4);
d) remove the central screw (21) or (27)

ASSEMBLY

a) clean and lubricate the sliding surfaces;
b) insert the central screw
c) re-insert the Woodruff key (4) in its seat in the central screw;
d) re-insert the control-wheel (15);
e) place washers (3) and nut (2).

4) DISASSEMBLY AND ASSEMBLY OF THE SPLINED TABLE (fig. 4).

DISASSEMBLY

a) disassemble the central screw bracket
b) loose nuts (22);
c) loose screws (23);
d) remove the gib (10);
e) raise the splined table (25) first by lifting one side then by lifting both sides;

ASSEMBLY

a) clean and lubricate all the sliding surfaces;
b) keep the splined table (25) inclined on one side by letting in rest on the guides of the cross-piece (11);
c) place the gib (10) with its notches outwards;
d) tighten screws (23) inserting them in the gib notches;
e) tighten the nuts (22);
f) assemble the central screw bracket (9)

5) DISASSEMBLY AND ASSEMBLY OF THE CROSS-PIECE (fig. 5)

DISASSEMBLY

a) disassemble the lower central screw bracket (9).
b) loose nuts (22);
c) loose screws (23);
d) remove the gib (24);
e) raise the cross-piece (11) first by lifting one side then by lifting both sides.

ASSEMBLY

a) clean and lubricate carefully all sliding surfaces;
b) keep the cross-piece (11) inclined on one side by letting it rest on the guide-ways on the base (26);
c) place the gib (24) with its notches outward;
d) tighten screws (23) placing them in the gib notches;
e) tighten the nuts (22);
f) assemble the central screw bracket (4)

6) ADJUSTMENT OF THE GIBS (fig. 6)

a) withdraw the splined table (25) and the under-laying cross-piece (11) as far as possible;
b) tighten screws (23) as indicated with the arrows (a);
c) advance the splined table (25) and the under-laying cross-piece (11) as far as possible;
d) tighten the screws (23)
e) bring the splined table (25) and the cross-piece (11) back to the central position;
f) while keeping the screws (23) fixed, tighten their respective nuts (22).

7) AXIAL ADJUSTMENT OF THE CENTRAL SCREW (fig. 7) (a)

a) remove nut (2) and washer (3);
b) remove the details (6 and 7) together with the control-wheel (15), paying attention not to lose the Woodruff key (4);
c) loosen the security dowel (5);
d) with a suitable spanner adjust the end play of the central screw (21) or (27), operating on the adjusting ring nut (16);
e) lock the adjusting ring-nut (16) by tightening the security dowel (5);
f) position the Woodruff key (4) in its seat in the central screw;
g) place wheel and washer;
e) tighten nut (2).

8) MAINTENANCE OPERATIONS

At regular intervals the following operations must be performed:

CLEANING: disassemble the orthogonal table, wash with kerosene and clean all parts.

LUBRICATION: cover all sliding surfaces with **OM 58** lubricating oil.

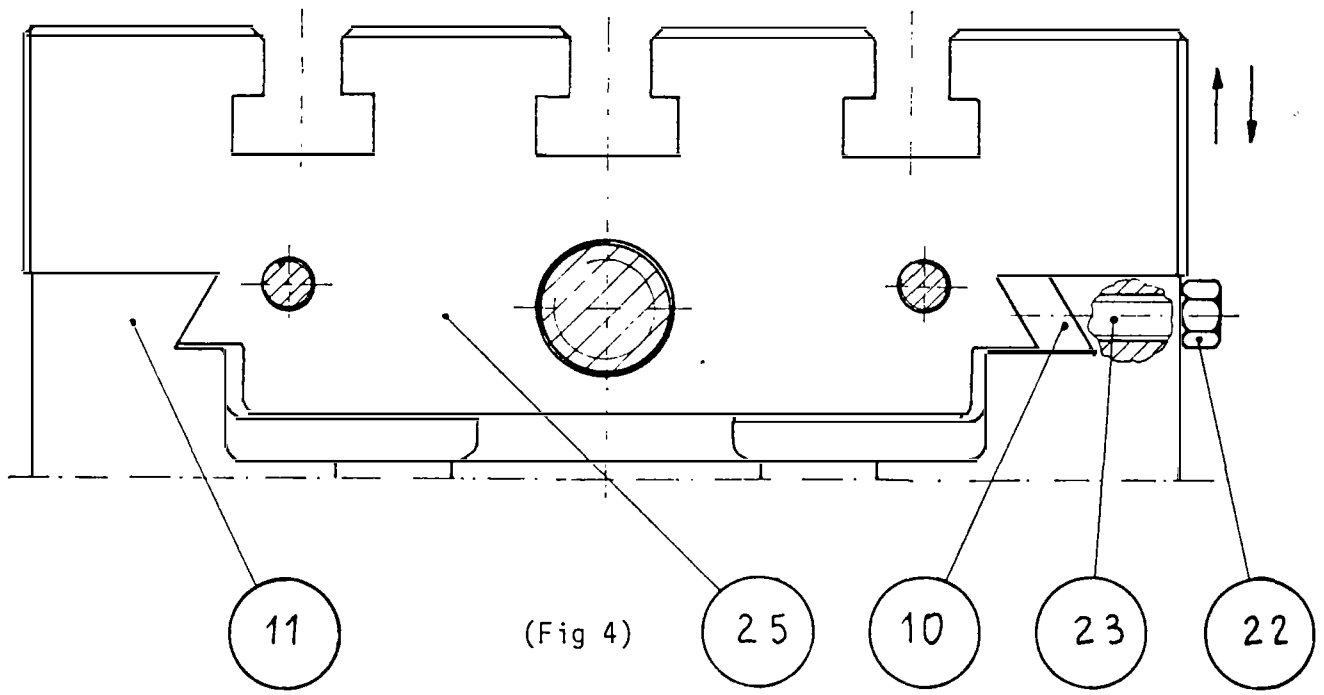
NOTE: all the moving parts composing the central screw bracket group may be lubricated by means of the 2 oil feeders (8).

9) PRACTICAL SUGGESTIONS

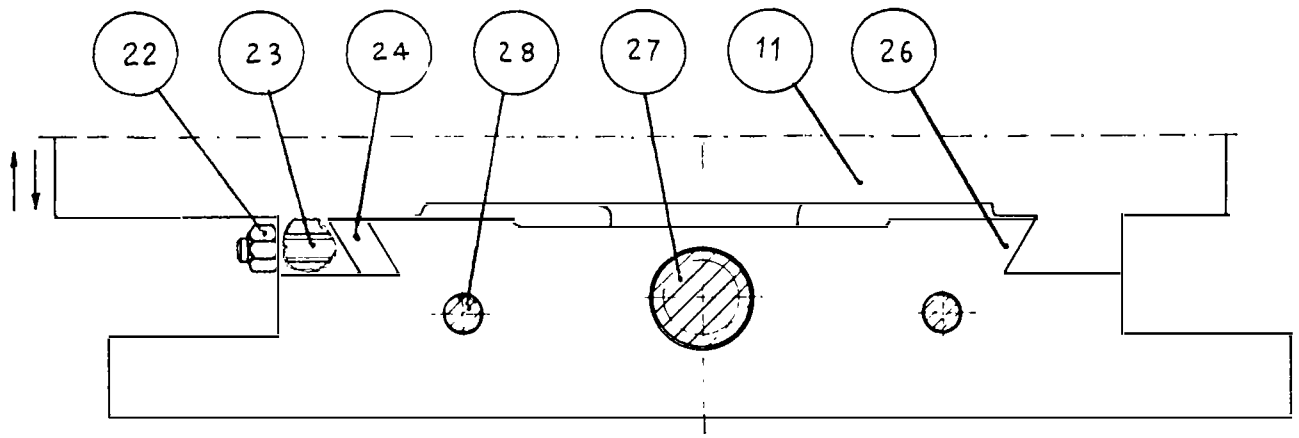
LOCKING-SCREWS

The table is equipped with two locking-screws (pos. 31, fig.6) which act on each of the gibs (24 and 10) and high allow the independent locking of either the upper table or the saddle, according to necessity.
Within the locking-screw housings there is threaded steel ring of the «Heli-Coil» type which serves to prevent thread-stripping. This ring may be easily substituted (fig.6 , pos. 32).

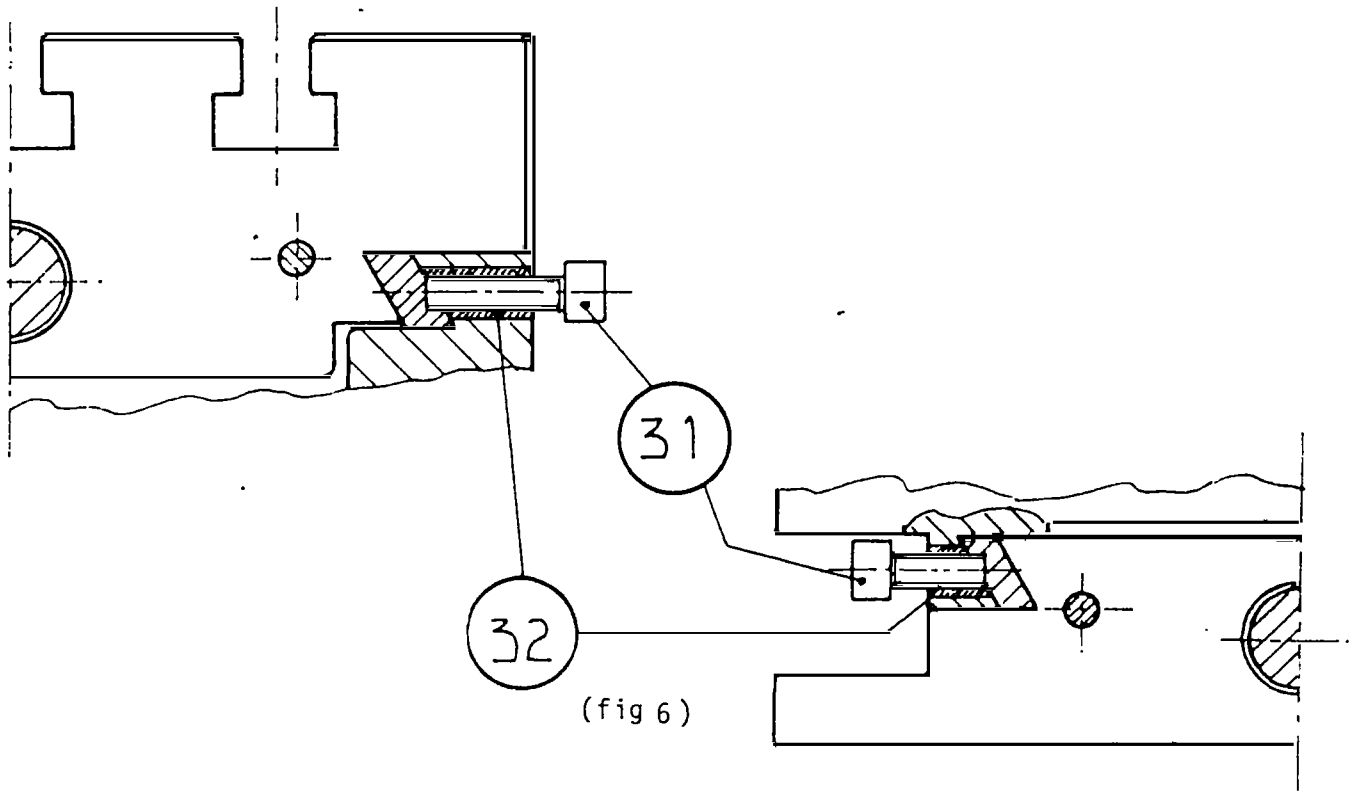
NOTE: while the upper table and the saddle are moving, their respective locking-screws must be loosened.



(Fig 4)



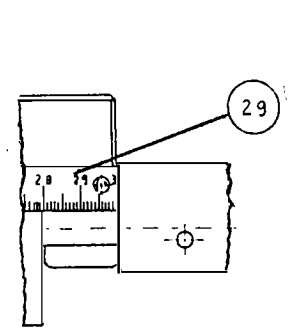
(Fig 5)

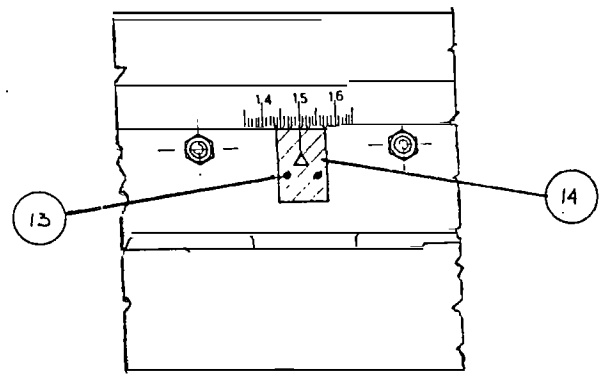


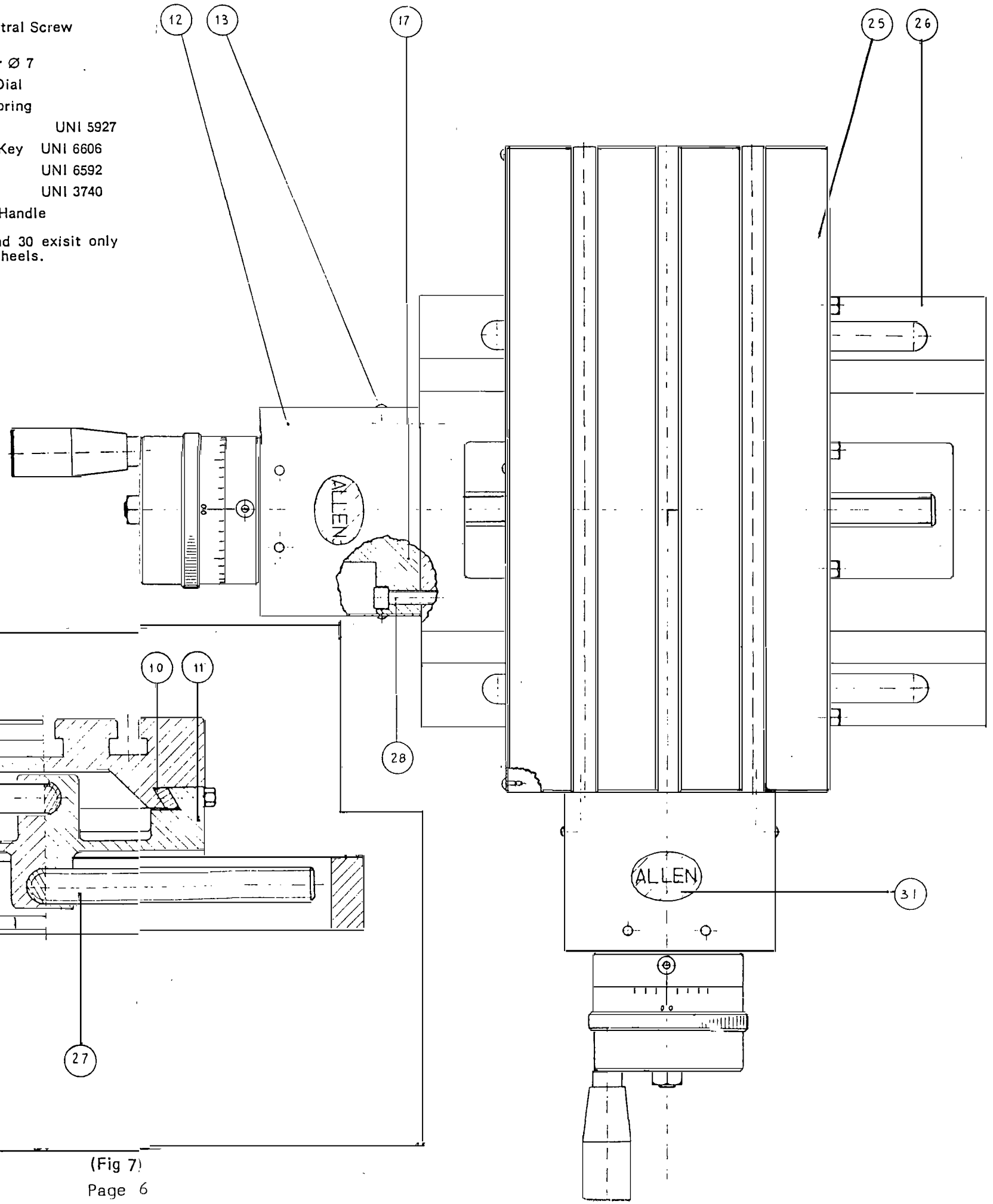
(fig 6)

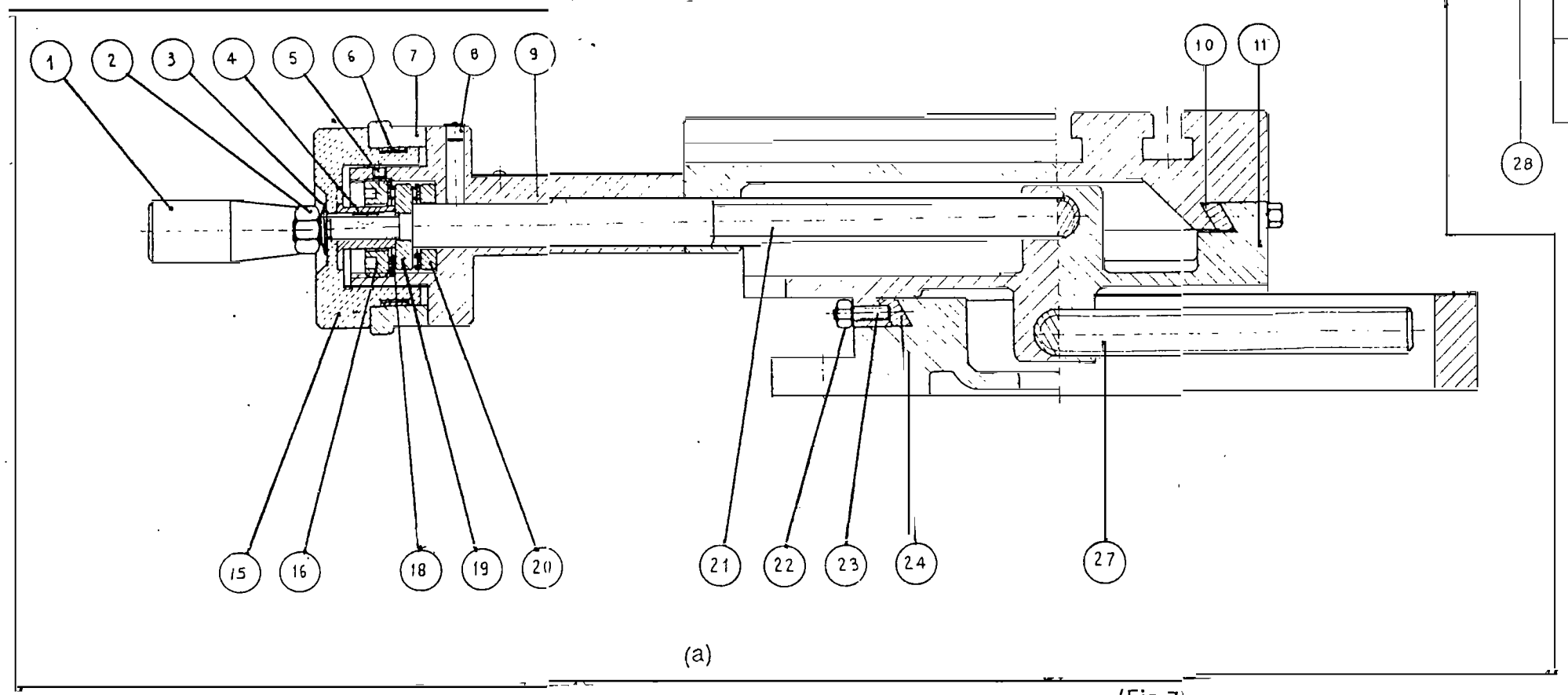
Position Number	Quantity	Item	
30.	2	Bush	
29.		Millimeter scale	
28.	4	Screw	UNI 5331
27.		Lower Central Screw	
26.		Base	
25.		Splined table	
24.		Lower gib	
23.	7	Screw	UNI 5923
22.	7	Nut	UNI 5587
21.		Upper Central Screw	
20.	2	Screw-side bearing thrust-collar	
10.	2	Central bearing thrust-collar	
18.	4	AX Bearing	
17.		Lower Central Screw Bracket	
16.	2	Adjusting Ring Nut	
15.	2	Control-Wheel	
14.	2	Hub	
13.	11	Rivet	UNI 7346
12.	2	Bracket cover made of sheet-metal	
11.		Cross-Piece	
10.		Upper Gib	
9.		Upper Central Screw Bracket	
8.	2	Oil Feeder Ø 7	
7.	2	Indexing Dial	
6.	2	Friction Spring	
5.	2	Screw	UNI 5927
4.	2	Woodruff Key	UNI 6606
3.	2	Washer	UNI 6592
2.	2	Nut	UNI 3740
1.	2.	Rotation Handle	

Note: Position 14 and 30 exisit only on plastic control-wheels.









(a)

(Fig 7)

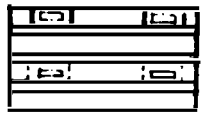
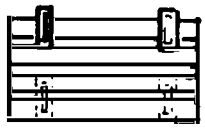
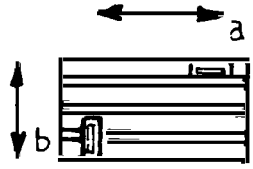
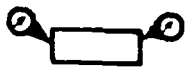
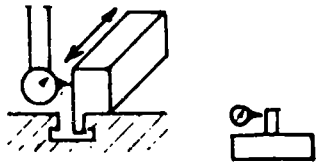
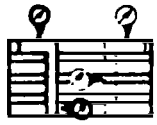
CHAPTER 2-0

CONTAINER TRANSPORTABLE AUTOMOTIVE REPAIR CB 366-1C

CONTENTS

USEFUL INFORMATION: ORTHOGONAL TABLE CHECK

1) The direction in which the error takes place makes no difference.
2) During testing, the orthogonal table is to be positioned in a horizontal plane .
3) The testing is to be performed at room temperature (approx. 20° C.) at the manufacturer's workshop.

Sequence number	Object of Test	Symbol	Max. reported error	Notes
1	Levelness of splined table surface in longitudinal direction.			Check must be performed on the whole table length
2	Levelness of splined table surface in transversal direction.			Check must be performed on the whole table width
3	Parallelism of the guide-ways in respect to the splined table surface during longitudinal movement.			Check must be performed on the whole table length
4	Parallelism of the guide-ways in respect to the splined table surface during transversal movement.			Check must be performed on the whole table width
5	Inclination of the splined table in respect to its initial position during longitudinal movement.			The check must be performed in position «a»
6	Inclination of the splined table in respect to its initial position during transversal movement.			The check must be performed in position «b»
7	Parallelism of the edges of the splined table in respect to the longitudinal direction of its movement.			Check must be performed on the whole table length
8	Parallelism of the central slot on the splined table in respect to the longitudinal direction of its movement.			The check must be performed on the whole table width
9	Perpendicularity of the directions of longitudinal and transversal movement.			The check must be performed on the whole table length
10	Pitch precision of the two central screws.			

Chapter 1-5

WOLF BENCH/PEDESTAL GRINDERS AND POLISHERS

Introduction

The Grinders are constructed to comply with the Abrasive Wheels Regulations 1970. The fixed eyeshields meet the mandatory requirements of the Protection of Eyes Regulations 1970.

Installation

1. Check that mains supply voltage and frequency correspond to that shown on machine nameplate. If a fused plug is used the fuse rating should be approximately twice the full load rating of the machine.
   Unless otherwise stated, the machine is *only* suitable for use on an AC 50Hz supply frequency. The machine is single insulated and **MUST BE EARTHED.**
2. Connect supply cable to the plug as follows:
   BROWN core to live (L) terminal.
   BLUE core to neutral (N) terminal.
   YELLOW/GREEN core to earth (E) pin.
   Note: 3-Phase Models—Remove grinding wheels and flange assemblies, connect to 3-phase supply and check that spindle is rotating in the correct direction as shown by arrow on wheelguard.
   If rotation is found to be in reverse, disconnect from power supply, change over connection of any TWO supply leads, and re-check.
   The earth connection must be maintained at all times.
3. Secure the machine firmly to a workbench or pedestal. The pedestal used must be fixed to a firm, level surface.
4. Abrasive wheels must be checked to make sure that the manufacturer's maximum permissible safe operating speed shown on label exceeds the maximum machine speed as shown on the nameplate.
5. Switch markings—move or rotate switch control (as applicable) to the position marked '**I**' (ON) to start motor and to the position marked '**O**' (OFF) to stop motor.

Wheel Mounting

1. Check the wheel dimensionally. Ensure that the outside diameter and thickness does not exceed the recommended size, and that the bore is correct.
2. Before mounting an abrasive wheel on the machine, check it for cracks or damage. Test a vitrified wheel by suspending it to hang freely and lightly tap it with a piece of wood round the circumference, on both sides.

A good wheel will give a clear ringing sound, whereas a damaged wheel will sound 'dead'.

3. Make sure that the centre bush (where used) in the bore of the wheel does not project beyond the sides of the wheel.
4. Make sure (where required) that a pair of plastic bore reducing bushes are fitted to ensure wheel is accurately positioned on spindle.
5. Wheels are supplied with blotters (discs of compressible material) fitted around the bore on each side of the wheel. These blotters identify the type of wheel and the maximum safe operating speed. Do not fit a wheel if blotters are missing or damaged.
6. Inner and outer wheel mounting flanges, as supplied with the machine, must always be used. These are of equal diameter and must be maintained clean and free from damage. The inner flange (driving) is securely located on the rotor shaft with a screw, key, pin or otherwise to meet the requirements of the Abrasive Wheels Regulations 1970.
7. Mount the wheel between two flanges and secure with the clamp nut supplied. Take care to tighten the nuts just enough to hold the wheel firmly. Avoid excessive clamping pressure. The right-hand threaded nut must be on the right-hand side of the machine when looking at the nameplate and switch from the front.

Operating the Grinder

Before starting the motor check that:

1. All adjustments and checks are made with the machine disconnected from the power supply.
2. End shields are secured to the main wheel guard assembly with screws or nuts and bolts which must be secure at all times.
3. Wheel can be revolved freely by hand.
4. The tool rests are in position, adjusted to within 3 mm (⅛") of the periphery face of the wheel, and firmly secured.
5. The protective eyeshields fitted to Bench Grinders are clean and secured in the correct position or that recommended and approved type of protective goggles with clean lenses are worn before operating the machine.
6. Where spark arresters (shields) are fitted check that they are adjusted and secured to just clear the wheel.

Some models are fitted with spark arresters within the main wheel guard and these are adjusted and secured by a moulded knob located on the top inside section of the main wheel guard.

When starting and using the machine:

1. Check that the wheel, especially a new replacement wheel, is in sound condition by allowing the machine to run up to a maximum speed and remain there for at least 30 seconds before it is put into use. During this check make sure that all personnel are standing clear of the machine.
2. Allow the machine to run up to full speed before applying the workpiece to be ground.
3. Should vibration be experienced on initial run-up, the grinding wheels should be dressed to a balanced condition.
4. Feed the workpiece smoothly onto the grinding wheel and avoid harsh intermittent pressure and 'bumping' onto the wheel.
5. Always apply light but firm pressure and allow the wheel to rotate at the maximum possible speed.
6. Avoid excessive pressure as this will tend to *decrease* the wheel speed, and the amount of stock removal, and cause uneven wear on the grinding wheel, to overload the motor.
7. Avoid grinding on the side face of the wheel.
8. Do not arrest the wheel by applying pressure to it at the conclusion of the grinding operation. Always allow the machine to run down freely to rest.
9. All Grinders and Polishers are ½ hour rated.

Wheel Care

Store grinding wheels (Type 1, straight-sided) in a rack with two-point cradle support to prevent rolling, or on a central support with a layer of compressible material between the wheels when a number are being stored.

As the grinding wheel is used it will wear. It is recommended that the wheel be replaced when the diameter has been reduced approximately 25% below the original size (e.g. 200 mm to 150 mm; 150 mm to 112 mm; and 125 mm to 94 mm).

Wear on the wheel can cause excentricity, leading to machine vibration and 'bouncing' of the workpiece.

This condition must be corrected before it results in further dangerous damage to the wheel and possible harm to the rotor bearings. To obtain wheel balance and good, efficient grinding action, the wheel must be redressed.

A suitable wheel dressing tool is available under Part No. 1168.

Bench Polisher Models

The motor is similar to that of the 200 mm Bench Grinder. The grinding wheels, wheel guards and tool rest assemblies are replaced by tapered extension spindles on which polishing bobs or wheels can be mounted. The spindles should be guarded.

Where a Kango Wolf shrouded calico polishing mop (Part No. 10600) is used, the projecting 'point' of the extension spindle is guarded by the leather cap, and exposed spindle and threads to the inside face of the mop are covered with the cardboard tube. With this polishing mop or other small polishing accessories, the spindles should be guarded by enclosing them in lengths of similar tube. These tubes must be smooth and of sufficient internal diameter to rotate freely about the full length of the exposed extension spindle. The tube will rotate with the spindle but will cease to do so should anything come into contact with it. If the tube is painted in a contrasting colour to the machine body, it will be easily seen.

The guard tube supplied can be trimmed to length with a sharp knife or hacksaw blade to suit the machine to which the mop (10600) is fitted.

General

Always disconnect the machine from the power supply before making any adjustment to the wheels or any other attachment. Check the supply cable and replace any damaged length. Replacement cables must be of the same current rating as that originally fitted.

The earth wire must always be connected and maintained. Keep the area around the machine as clean as possible.

Replace damaged tool rests and eyeshields. Failure to do this can cause accidents.

Bearings should be regreased when a major overhaul of the machine is carried out.

Maintenance

It is a Statutory Requirement that portable tools used in premises or processes subject to the Factories Act 1961, and the Electricity Regulations 1908 (Portable Apparatus Exemption) Order 1968, must be maintained in such a condition as to prevent danger. Advice on the carrying out of regular preventative maintenance is available from Kango Wolf Power Tools Limited—Training Department.

Accessories and Spare Parts

Accessories for Bench Grinder 125 mm

Part No.	*Description*
90879	Grinding Wheel—Fine, 125 × 16 × 13 mm bore
90881	Grinding Wheel—Coarse, 125 × 16 × 13 mm bore
91305	Replacement Eyeshield

Accessories for Bench Grinder 150 mm

Part No.	*Description*
24696	Grinding Wheel—Coarse, 150 × 20 mm × ½" bore
24697	Grinding Wheel—Fine, 150 × 20 mm × ½" bore
1168	Grinding Wheel Dresser
10634	Replacement Wheels for 1168 Dresser
24790	Wire Brush 140 × 16 mm × ½" bore
24652	Replacement Eyeshield
0602	Pedestal Assembly

Accessories for Bench Grinder and Polisher 200 mm

Part No.	*Description*
***24666**	Grinding Wheel—Coarse, 200 × 25 mm × ⅝" bore
***24667**	Grinding Wheel—Fine, 200 × 25 mm × ⅝" bore
1168	Grinding Wheel Dresser
10634	Replacement Wheels for 1168 Dresser
10600	Shrouded Calico Polishing Mop & spindle guard sleeve
24740	Tapered Extn. Spindle R.H.
24739	Tapered Extn. Spindle L.H.
24652	Replacement Eyeshield
***24791**	Wire Brush 200 × 16 mm × ⅝" bore
0602	Pedestal Assembly

***IMPORTANT: If Grinding Wheels or wire scratch brushes are used with Polisher models 8372 and 8380, please note that guards, tool rest, eyeshields and flange assemblies will be required.**

Service

There is no substitute for a regular overhaul at a Kango Wolf Branch or Official Service Agent, whose address can be obtained from your usual electric tool supplier. In the event of a breakdown send the machine complete. If ordering spare parts quote the Model number, type and voltage as shown on the nameplate.

Chapter 1-6

WOLF VALVE SEAT GRINDER

SPECIFICATION
MODEL 8545

Capacity — Valve Seat Stones up to 2¼"	
Spindle Speed running light	16,000 r.p.m.
Spindle Speed with Stone	12,500 r.p.m.
Watts Input on full load	270 watts

VALVE SEAT GRINDING STONES

The face of the Stone must be dressed each time the Stone is fitted on the Stone Sleeve to ensure concentricity and whenever the face has become dull or filled with dirt. It is necessary to dress the periphery of a new Stone as an unbalanced Stone will cause vibration which, however slight, will be transmitted on to the work.

In selecting the size of Valve Seat Stones always allow, whenever possible, that these are at least 1/8" larger in diameter than the top diameter of the Valve Seat. Where a Seat is pocketed and close to the wall, it may be necessary to dress the periphery of the Stone to just clear the wall.

FITTING THE EXPANDING PILOT

The valve guides must be thoroughly cleaned with a valve guide cleaner. It is important to use the correct size cleaner as, if too small, it will not be effective. Valve guides must be carefully checked for wear and the allowable limit of wear as recommended by the Motor Manufacturer should be followed.

Insert an expanding pilot of the correct size in the valve guide and push it down as far as it will go.

Maintaining downward pressure. screw down the pilot by means of the special tommy bar provided.

The maximum capacity of a pilot is the same size as the minimum capacity of the next larger pilot, but on such sizes covered by two pilots it is important to use the larger size as there may be a tendency for the smaller pilot to work loose.

The maximum capacity of a pilot is the same size as the minimum capacity of the next larger pilot, but on such sizes covered by two pilots it is important to use the larger size as there may be a tendency for the smaller pilot to work loose.

VALVE SEAT GRINDING

Having wiped clean and placed a film of thin oil over that part of the pilot covered by the stone sleeve, fit the sleeve over the pilot and insert the arbor of the valve seat grinder into the hexagon socket of the stone sleeve. Supporting the machine so that the Arbor Shaft is in line with the stone sleeve, switch on and at short intervals, say, every second, raise and lower the machine, 1/4" movement is ample. This action will raise the stone sleeve and allow the stone to clear itself. Only a light pressure sufficient to keep the stone cutting is necessary when grinding. On no account should sufficient pressure be applied to make any appreciable reduction in the speed of the motor. No more material must be ground off than will develop a true seal as to do so will only widen the face more than is necessary. If the seat is in fairly good condition, very little grinding will be necessary. Some castings vary and it may be found on occasions that a suitable finish can be obtained with the coarse stone without the need of using the finishing stone. If, on an overhead valve job, it is found that the stone is not seating on the valve seat due to the pilot being just a little too long, this can be remedied by fitting two or three bright steel washers on the stone sleeve behind the seating stone before dressing it.

MAINTENANCE

General

To prevent the accumulation of metal dust and foreign matter, the motor should be cleaned periodically by blowing through with a jet of air. Also take off the switch cover and remove any swarf, sawdust, etc. Do not clamp this machine in a vice as this may damage the frame.

Carbon Brushes

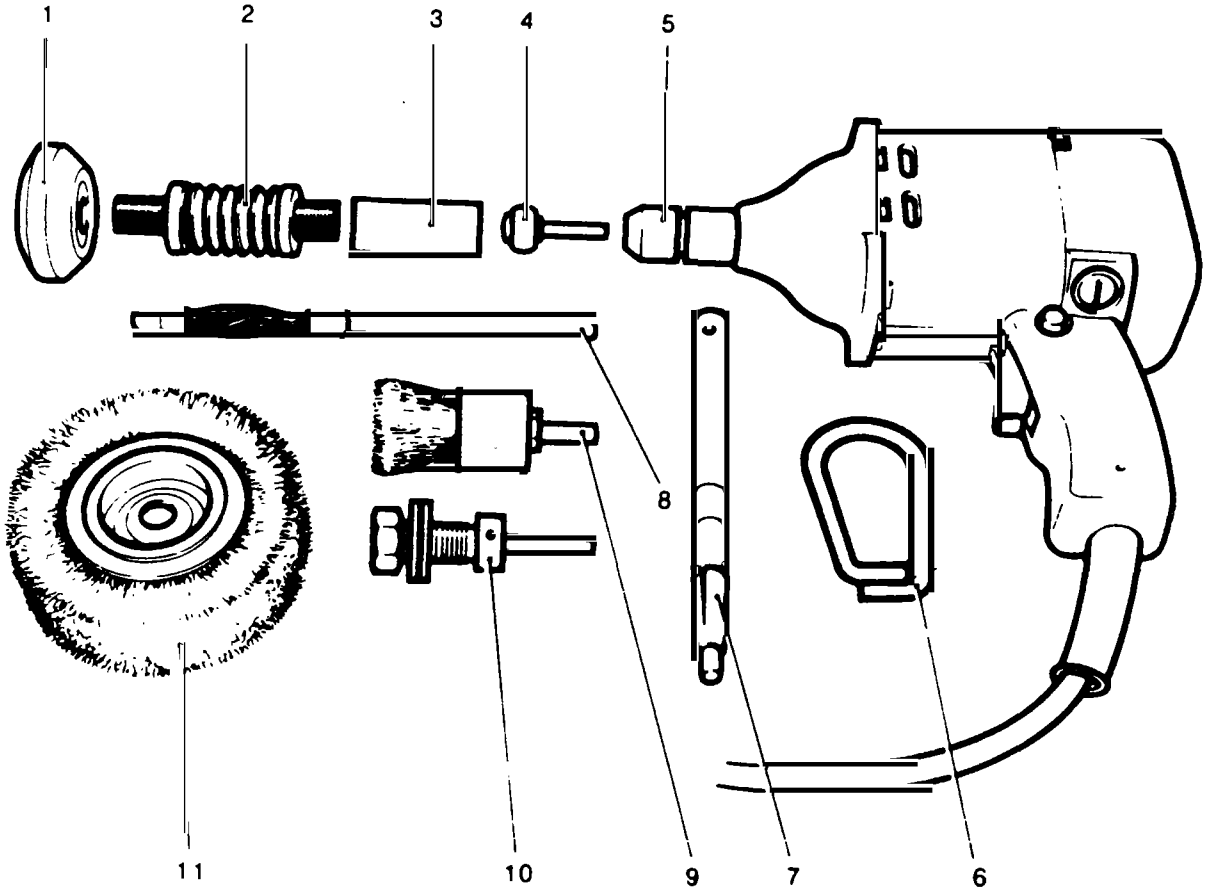
Do not allow the carbon brushes to wear below 5/16" in length, otherwise loading will be too weak to keep the brushes on commutator at correct pressure. If Carbon Brushes are found to be unevenly worn, they should always be replaced in pairs to ensure equal spring pressure.

Lubrication

Ball Bearings:—These are packed with grease and require no attention other major overhaul of machine.

Gears:— If the machine is used extensively, it is advisable to thoroughly clean out the old grease in the gearbox every six months and replenish with **XG 279**

Grease expands when warm and an excessive amount can cause overheating with sub- sequent damage to seals, etc.; therefore it is important that the original amount of grease is not exceeded.



1 Stone
2 Stone sleeve
3 Drive sleeve
4 Drive arbor
5 Collet chuck
6 Pilot tommy bar
7 Expanding pilot
8 Valve guide cleaner
9 Decarbonising brush
10 Wire brush arbor
11 Wire brush

Fig 1 - Components of valve seat grinding kit

Chapter 1-7

AIRSCREW DEHUMIDIFIER D50

OPERATORS HANDBOOK

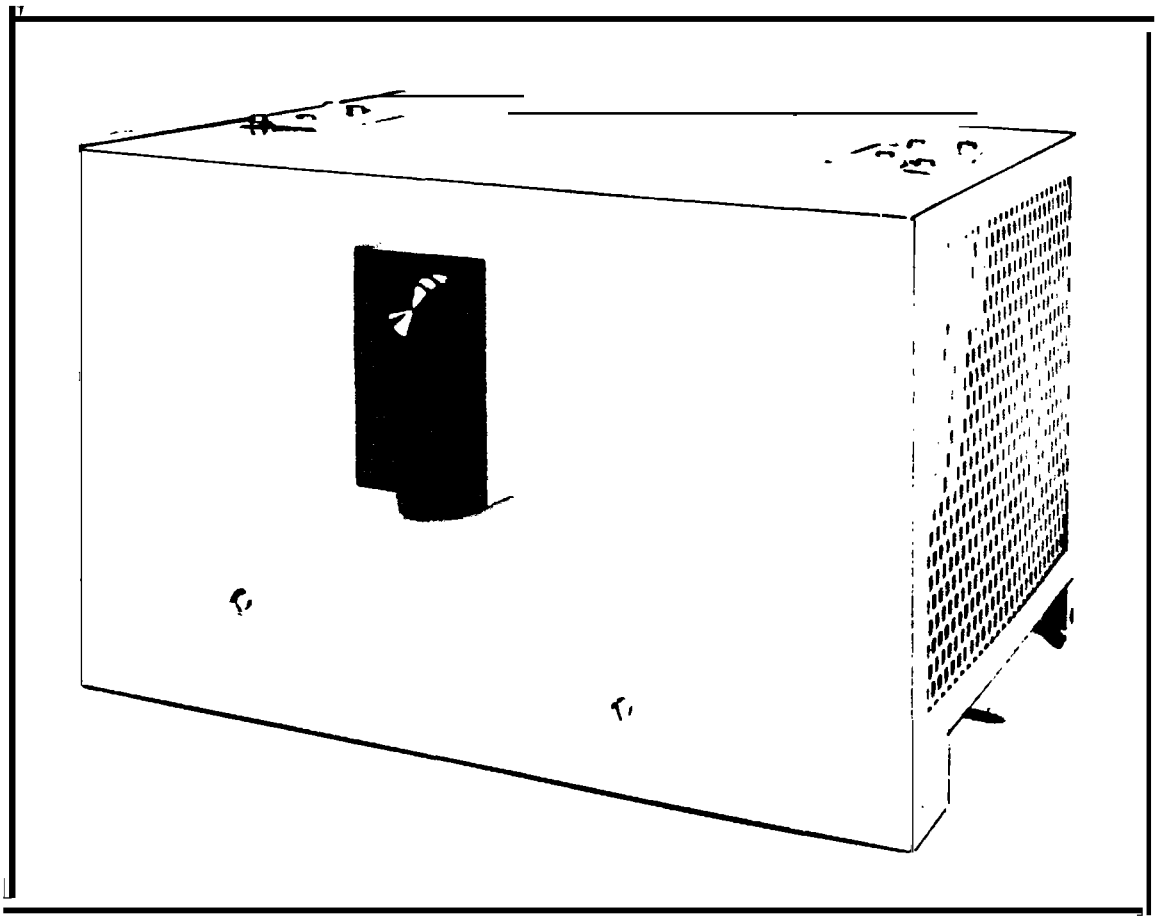
FOR

AIRSCREW DEHUMIDIFIER

D50

1863

CONTENTS



Models DAC25A1 and DAC25A3 (Humidistat shown)

THE PURPOSE OF AN AIRSCREW DEHUMIDIFIER

1. a. Introduction

An Airscrew dehumidifier is designed to extract moisture, at low cost from the air in an enclosed room. When moisture is extracted from the air, the condition of any product placed within the room will also be directly affected. For example, products that retain moisture will have their moisture content reduced, whereas products that are degraded by air moisture will be protected.

b. Functions

To control the moisture content of the air in an enclosed room, Airscrew Dehumidifiers are capable of the following functions:-

1. The continuous circulation of the room air through the Dehumidifier.

2. The cooling of the room air, so that air moisture is condensed and removed from the room. (Air drying.)

3. The warming of the room air as it is returned to the room. (Air heating.)

1985

c. Applications

Airscrew Dehumidifiers are intended to be used in all parts of the world and have a variety of applications which fall into two categories:

1. Product Drying, which is mainly a commercial application of controlled moisture reduction, such as the drying of wood, leather, ceramics, fabrics, plaster castings etc.

2. General Air Drying, which includes commercial and military applications of controlled product protection against corrosion, fungal growth, paper distortion etc.

PRINCIPLES OF OPERATION

(See Fig. 1)

2. a. The cold and hot coils within the Dehumidifier are part of a refrigeration system which is similar to household refrigerator. The cold coil is comparable to the "ice-box" and the hot coil comparable to the coil at the back of the refrigerator. All refrigeration systems are filled with an exact amount of pressurised refrigerant.

b. Room air is drawn into the Dehumidifier and recirculated by the electric fan.

c. As the room air passes over the cold coil it is cooled because the refrigerant passing through the coil is at a lower temperature than that of the air. The reduction in air temperature results in moisture condensing on the cold coil.

d. As the room air passes over the hot coil it is warmed because the refrigerant passing through the coil is at a higher temperature than that of the air.

e. Warm air is therefore returned to the room where it will absorb more moisture. Since the air is being repeatedly passed through the Dehumidifier, the air moisture content is continually being reduced.

NOTE: Many Airscrew Dehumidifiers have an electric heater fitted behind the hot coil for additional air heating.

f. The drain tray collects and removes the water from the Dehumidifier.

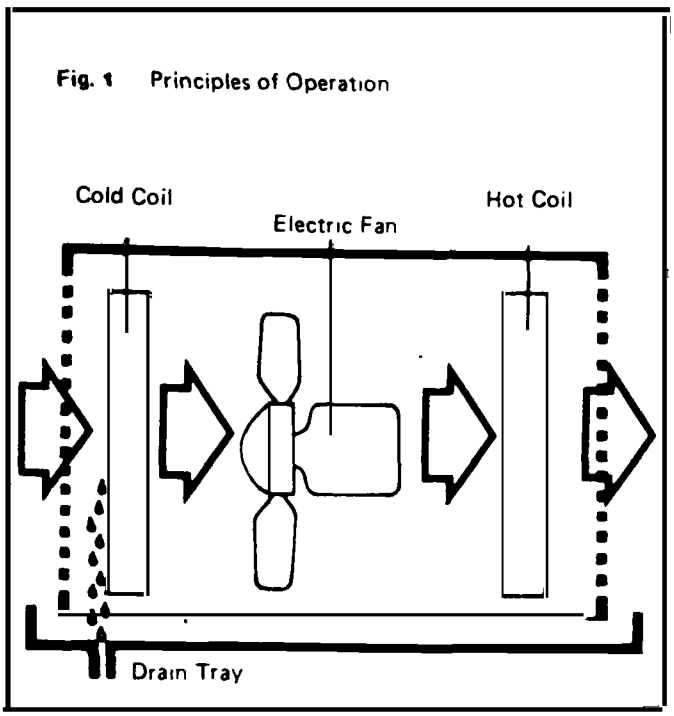


Fig. 1 Principles of Operation

FEATURES OF THE D50

3. a. Controls

The D50 can be supplied with or without a humidistat.

1. Without a humidistat, continuous dehumidification and air circulation is provided.

2. With a humidistat, continuous air circulation and controlled dehumidification is provided.

b. Heating Elements

The D50 is not supplied with heating elements.

c. Safety Devices

If frost forms on the cold coil, air drying will cease for 5 minutes in each hour and the frost will be melted. Air circulation will continue during this period.

d. Technical Data

1. Model DAC25A1 - 230 Volts, Single Phase, 50 Hz power supply, externally fused at 13 amps.

2. Model DAC25A3 - 115 Volts, Single Phase, 60 Hz power supply, externally fused at 13 amps.

3. Operating Range - 0°C - 50°C.

4. Maximum Power consumption - 340 Watts.

5. Weight - 23Kg.

6. Dimensions - Height 287mm
   Width 307mm (Humidistat 51mm extra)
   Length 452mm

OPERATING INSTRUCTIONS

4. a. Start-up Checks.

1. Ensure that all doors, windows and ventilators are closed.

2. The air intake and discharge grilles must not be obstructed.

3. The water discharge tube connected to the dehumidifier must be led out of the room, or placed in a narrow necked container, and must not rise above the base of the dehumidifier.

4. If a humidistat is fitted, ensure that it is set below its "click" point, or at the required relative humidity value.

b. Switching ON.

1. Switch ON the mains power. Air circulation will immediately commence.

2. Within a few minutes, moisture will be seen to form on the cold coil.

3. After approximately 15 minutes (but depending on the room air moisture content), water will be seen to run from the discharge tube.

4. The dehumidifier can be quite safely left running.

5. If the dehumidifier stops and does not restart, check the external fuses and reset the overheat protector. If the dehumidifier still does not restart, an approved service technician should consult the enclosed wiring diagram.

NOTE: Less than 30% relative humidity is unlikely to be achieved except in controlled high temperature conditions.

c. Switching OFF.

1. Move the humidistat (if fitted) to the OFF position then switch off the mains power supply.

2. Do not restart the dehumidifier within 5 minutes of switching off.

OPERATOR MAINTENANCE

5. Twice per year the chassis and the cold and hot coils must be cleaned. The Dehumidifier cover is removed by extracting the securing screws.

WARNING: Ensure that the Dehumidifier power supply has been switched OFF before commencing any maintenance.

a. The Cold and Hot Coils

Brush clean the surfaces of the coils by using strokes down the fins and tubes until all excess dust and fluff has been removed. By using a compressed air line, blow the remaining dirt out from between the tubes and the fins of the coils. Use the fin comb to straighten any bent fins. (Airscrew Part Number AC20C501/47.)

NOTE: Do not steam clean any part of the Dehumidifier because the refrigeration system may rupture.

b. Chassis

Clean all parts of the chassis, including the drain tray, and in particular the drain hose, by using a compressed air line and a damp cloth.

AFTER SALES SERVICE

6. a. Airscrew offers a preventative maintenance contract for all Dehumidifiers. For further details, please contact:

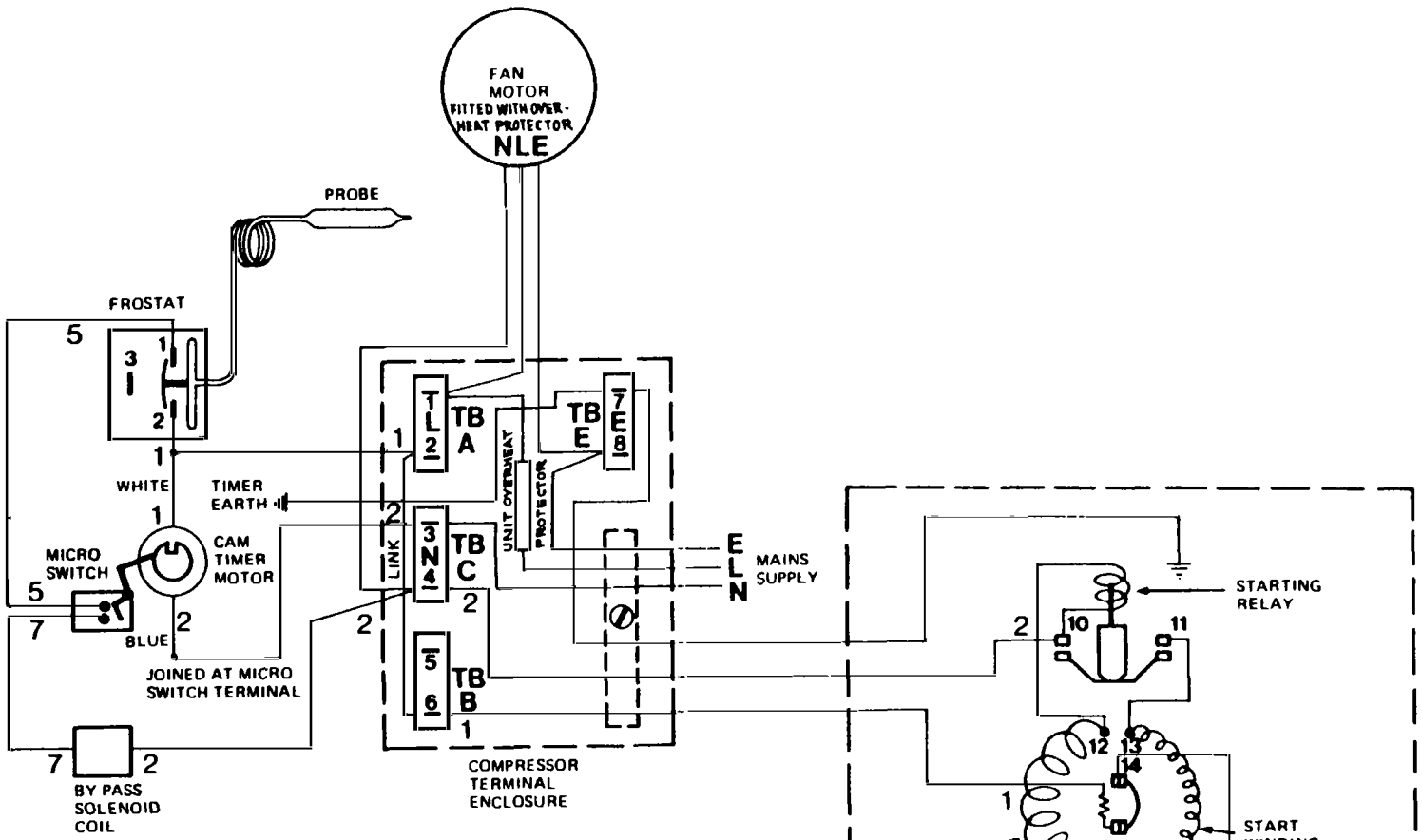
Airscrew Howden Limited
Weybridge, Surrey, KT15 2QR
England

Telephone: Weybridge (0932) 45511
Telex: 929515

b. A comprehensive service manual (including spare parts lists) can also be purchased. Please quote the Part Number and Serial Number of the Dehumidifier when ordering.

c. Some older Dehumidifiers may bear the name WESTAIR, but have the same Part Number DAC25A1, DAC25A3 etc. Airscrew Howden Limited acquired certain business assets including Process Dryers and Dehumidifiers from Westair Limited in November 1983.

Airscrew offers a preventative maintenance contract for Dehumidifiers with either the Westair label or Airscrew label.



NOTES

This dehumidifier can operate in three modes

a) **Continuous, dehumidification and air circulation**
Wired as shown

b) **Continuous air circulation but controlled dehumidification**
Remove the link between terminal A2 and B6 and replace the link with a humidistat.

c) **Controlled air circulation and dehumidification**
Remove the link between terminal A2 and B6, replace the link with a humidistat and change the fan motor lead (L) from terminal A1 to terminal B5.

d) The cam timer revolves at 1 revolution per hour and closes the micro switch for 5 minutes per hour. The by-pass solenoid will be energised only if frost is detected during the 5 minute period.

WIRING DIAGRAM FOR D50 DEHUMIDIFIER

Chapter 1-8

VENT-AXIA

1.

How to assemble the Vent-Axia

(a) From inside, place the shroud through the hole in the glass, ensuring that the rubber gasket is located properly on the shroud and that the lip of the gasket has passed through the hole in the glass all round its circumference. Hold the shroud in position against the glass with the arrow 1 at the bottom when cable entry is required from below the housing, or the arrow 1 to the right hand side, left hand side or top when cable entry is required from these positions.

(b) From outside, screw the hood assembly on to the shroud by turning it in a clockwise direction ensuring that the rubber seal remains properly seated and that the shroud is held securely in position against the glass.

(c) From inside, release the three catches which retain the grille by turning them to one side. Then adjust the grille in the hood so that the word 'BASE' can be read from inside and is positioned at the bottom (this ensures proper weather protection). Then return the catches to their former position to lock the grille in place. If a shutter is required this should now be fitted into the housing, instructions being contained in the shutter carton.

(d) Position the housing so that when it is turned slightly in a clockwise direction the locking bolt is located against arrow 1 on the shroud. Then replace the housing which contains the motor and impeller (and the shutter if fitted), and turn it in a clockwise direction until it meets the stop.

(e) Screw up the captive locking bolt until the knurled portion is in contact with the housing and ensure that it is fully engaged by checking that the housing is securely bolted to the shroud.

2. Connect the LINE conductor from the supply to terminal AO.

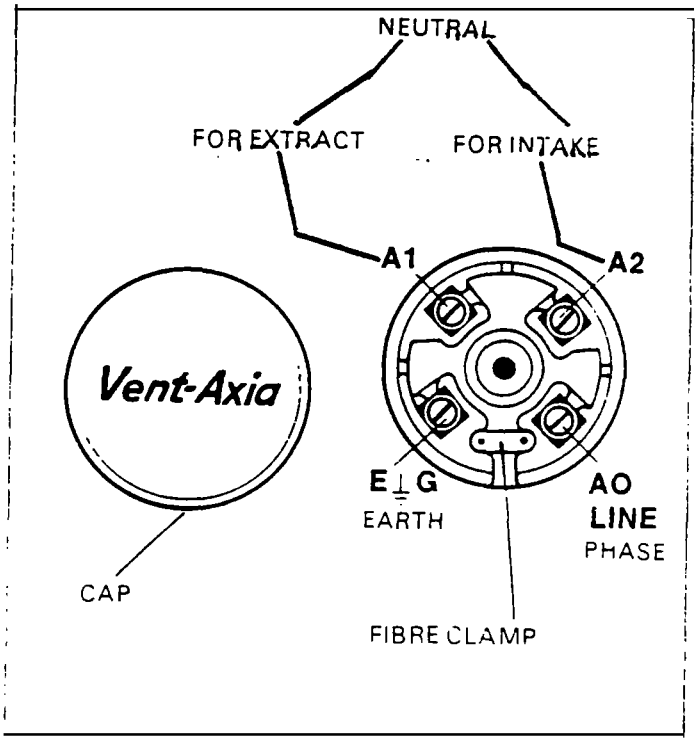
3. Connect EARTH to terminal E ⏚ G which is bright plated for easy identification.

4. If the Vent-Axia is required for:
EXTRACT, connect NEUTRAL to A1
INTAKE, connect NEUTRAL to A2.

5. Screw down the fibre clamp over the flex.

6. Replace the cap so that the wording runs left to right when the socket is plugged into the motor.

7. Press the cable into the retaining clip so that it is held neatly at the outer circumference of the housing.



2. Vent-Axia Wiring Instructions

WARNING
THIS EQUIPMENT MUST BE EARTHED

First ensure that the unit is installed so that the cable entry on the housing is in the required position (see assembly instructions) and check that the equipment supplied is for the correct voltage. (See carton).

(a) **With Vent-Axia Controller**

Two types of controller are available for use with Vent-Axia units:
Type SD, giving a choice of three speeds — low, bormal, and boost, in one direction of air movement.
Type R, giving a choice of extract or intake ventilation at all three speeds — low, normal and boost.
See instructions for electrical connection in controller carton.

(b) **Without Controller**

Where speed control is not required, the unit may be connected to any suitable socket outlet, or, if permanently wired, a double-pole switch must be used.

1. Pull off the connector socket, unscrew the fixing screw from the rear, and lift off the cap.

3. Power Consumption

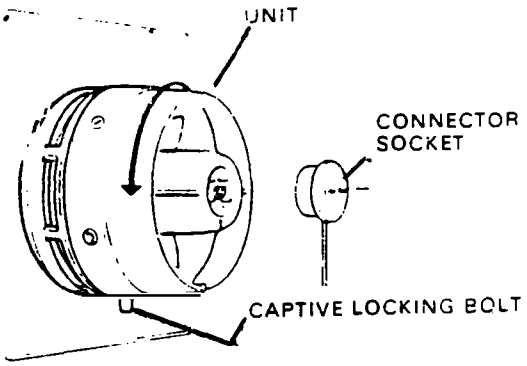
The power consumption is as follows:

SIZE	6	7	9	12
Watts input, low	19	20	33	50
Watts input, normal	32	34	53	84
Watts input, boost	38	44	81	112

Note: When used with a controller, low, normal and boost performances are all available according to the knob position. Without a controller the normal performance only is obtained.

Designed for long, trouble-free life, your Vent-Axia unit is very easy to clean. It can be taken down from inside the room without the use of special tools. The drawings below show how easy it is.

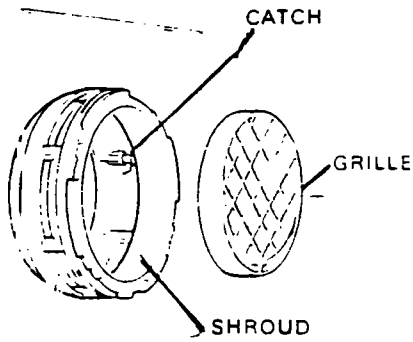
4.



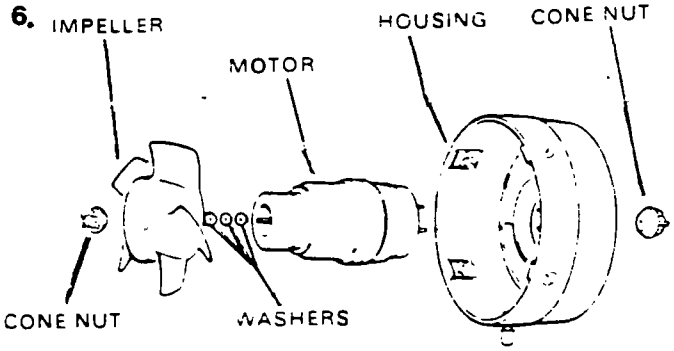
Switch off and remove the connector socket Unscrew the captive locking bolt and turn the unit slightly anti-clockwise to release.

5.

Release the three catches to remove the grille

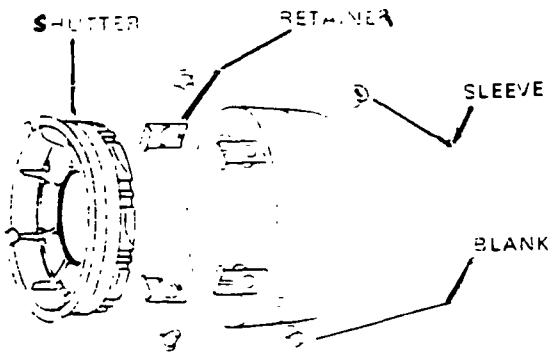


6.



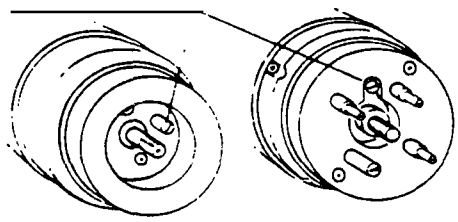
Unscrew both cone nuts and remove the impeller and motor
N B Note order of washers for re-assembly

7.



Wash all the plastic parts (but not the motor) in warm water with soap or detergent

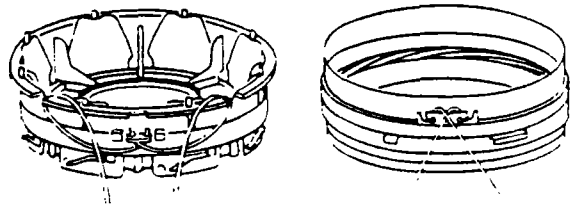
8. OILING POINTS



The motor bearings simply require the periodical addition of a little light mineral oil - in normal circumstances only once or twice a year

9. AUTOMATIC SHUTTER
TYPE R

IRIS SHUTTER



If a shutter is fitted – Replace the cords as shown
Automatic Shutter. Replace the shutter in the housing, ensuring that the word 'BASE' is visible and is at the bottom when fitted in the window
Iris Shutter. Replace the shutter in the housing, ensuring that the mark 'O' is visible and is at the top when fitted in the window Slide in the retainers and replace the blanks and sleeves If cords are fitted, feed them through the retainers and housing and then replace the sleeves

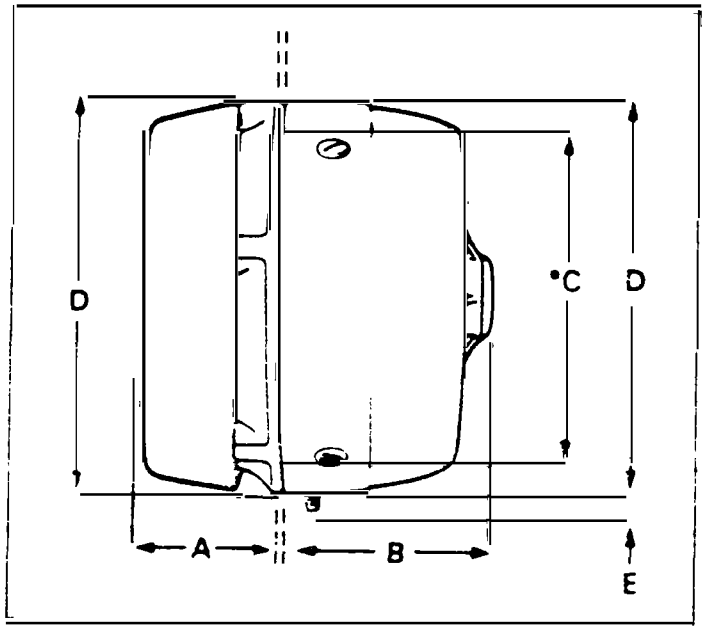
If a shutter is fitted – unscrew the 2 sleeves and 2 blanks slide out the retainers, and lift out the shutter (remove cords if fitted)

Replace the grille in the hood so that the word 'BASE' can be read from inside and is at the bottom Replace the motor, washers and impeller in the housing and screw up the two cone nuts Replace the complete unit (positioned so that when it is turned slightly clockwise the captive locking bolt is located against the arrow 1 on the shroud) and turn it in a clockwise direction until it meets the stop Screw up the captive locking bolt so that it is fully engaged and the knurled portion screwed up tightly

10. Dimensions

SIZE	6	7	9	12
A mm	83	83	92	105
ins	3¼	3¼	3⅝	4⅛
B mm	133	140	159	194
*ins	5¼	5½	6¼	7⅝
*C mm	184	222	260	337
ins	7¼	8¾	10¼	13¼
D mm	216	254	295	381
ins	8½	10	11⅝	15
E mm	28	28	28	28
ins	1⅛	1⅛	1⅛	1⅛

* Diameter of hole in glass.



CHAPTER 2-1

GENERAL DESCRIPTION

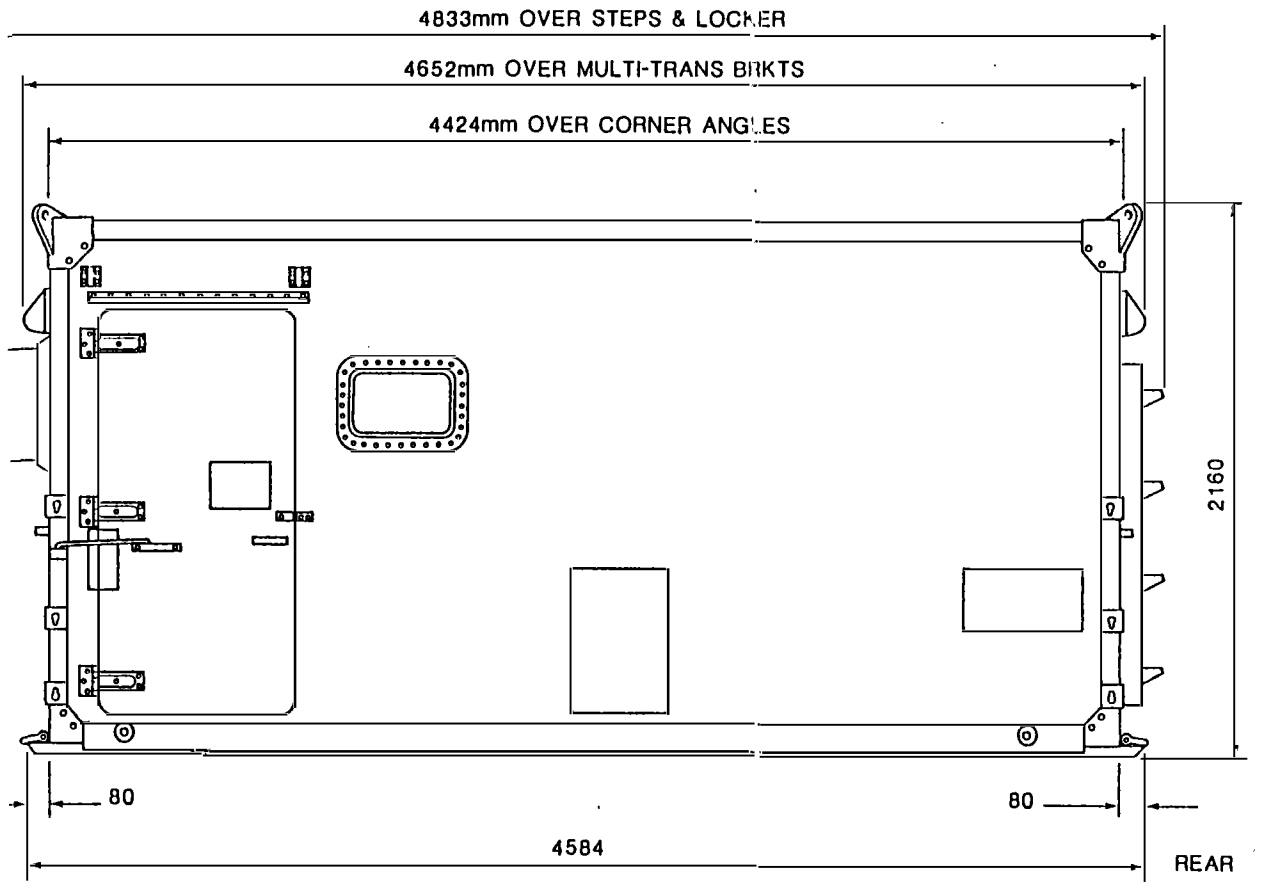
CONTENTS

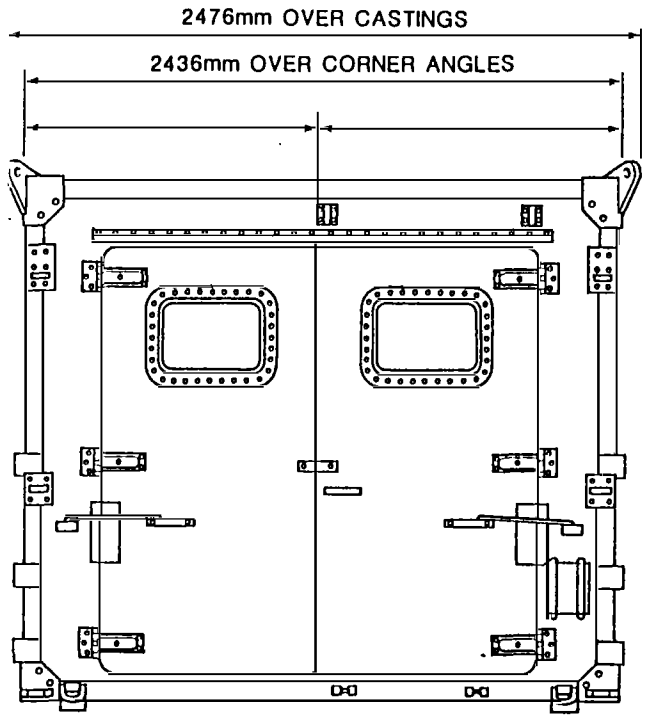
EQUIPMENT IDENTITY

1 The subject equipment is identified by: Container, Transportable, Automotive Repair, 3 Tonne, (CB 366/IC).
Contract - FVE 21A/372, CES.

INTRODUCTION

2 With the Container Body Fig 1 - Vehicle mounted or unmounted, any reference to left or right hand - 'means', as viewed, facing the rear doors looking into the interior of the container.





INTERIOR DIMENSIONS

LENGTH 4261mm
WIDTH 2330mm
HEIGHT 2015mm

Fig 1 Container body

3 The Container Body is designed for normal road and cross country transportation on a flat platform, 4 Ton Truck. The basic container is a CSC H190.

4 Specialised equipment weighing not more than 3048 Kg (3 ton), uniformly distributed, is housed in the container. Due to the type of underfloor construction DGFVE must be consulted before carrying out any modification involving alterations to the floor.

5 During road transportation, the container body is secured to the vehicle by a series of hook bolts attached to the truck platform.

6 The container can be off-loaded from its flat platform vehicle onto the ground or convenient stillage either by means of special high lift jacks, or, sling and crane.

7 The container is capable of fording in 1.524 m (5 ft) of water with minimum of preparation when mounted on its flat platform truck.

CONTAINER BODY STRUCTURE

8 The container body walls are constructed from a composite panel as follows:

8.1 Outer Skin 2 mm GRP

8.2 Insulation layer expanded PVC 50 mm density 55 Kg/m^3

8.3 Inner skin 2 mm GRP + finished Gell coat

9 The container roof is constructed from a composite panel as follows:

9.1 Outer skin 2 mm GRP

9.2 Plywood 5 mm

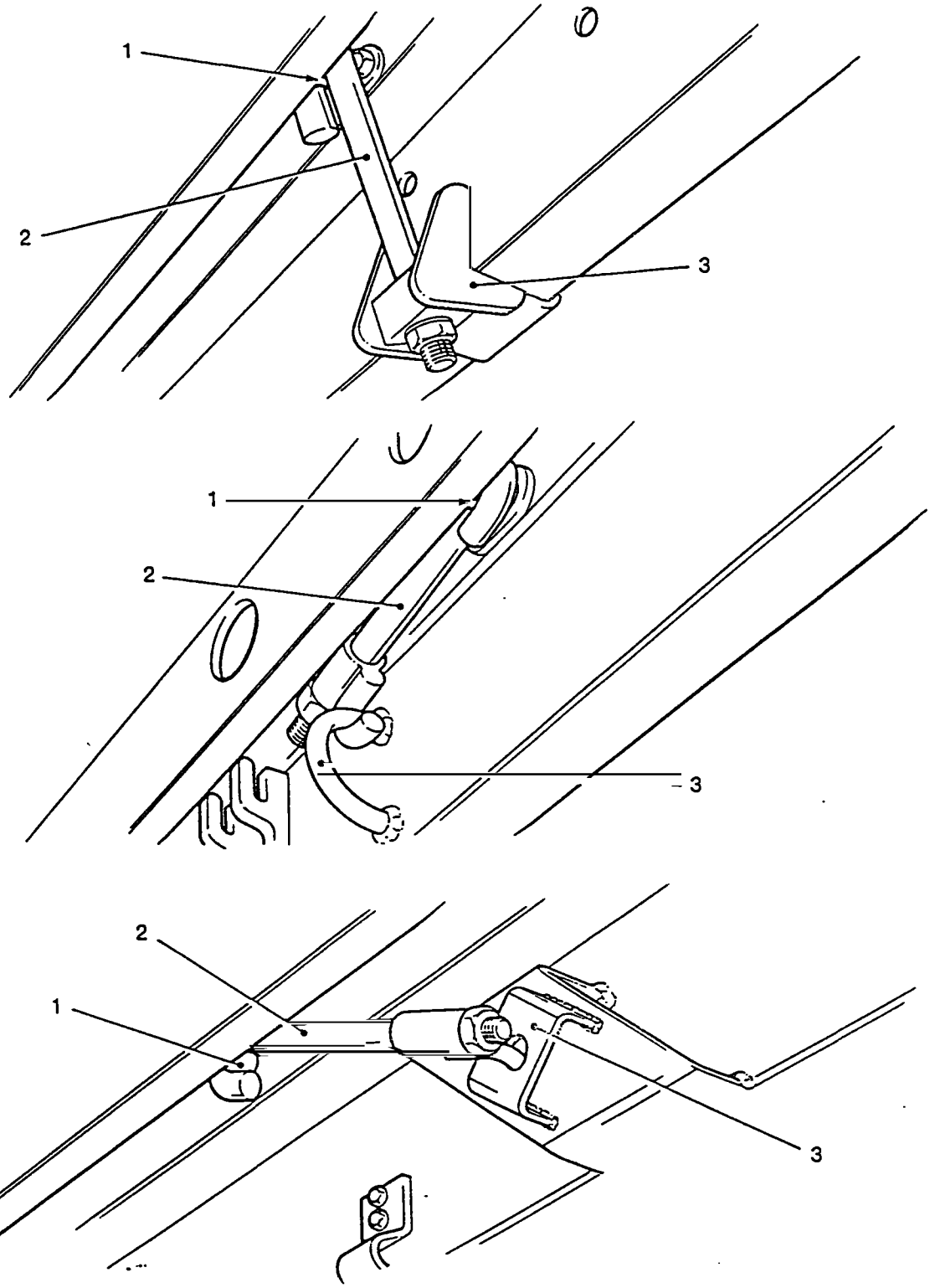
9.3 Inner insulation layer expanded PVC density 55 Kg/m^3

9.4 Plywood 5 mm

9.5 Inner skin 2 mm GRP + finished Gell coat

10 The container floor is constructed from a composite panel, identical to the roof except that the PVC insulation layer has a density of 75 Kg/m^3. Load bearing 'U' Sections are also bonded into the floor at intervals of approx 235 mm running parallel to the double doors.

11 The container panels are assembled into a box using a tongue and hook method. The exterior is then capped with aluminium angles. Tapping plates are included where necessary to provide secure fixings and fittings.



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1 Container cross bar 2 Body retaining hooks 3 Attachment bracket

Fig 2 Body retaining hooks

12 The floor to wall longitudinal angles are a special to type aluminium extrusion into which are fitted cross bars to allow attachment of the 'J' bolt tie down system.

13 The angles fitted to the vertical corners are also used to provide attachment of lifting equipment i.e. High Lift Jack or Multi-trans.

14 Fitted inside the container on the sides and blank end walls are 'C' rails. These are fitted at three levels. The rails are for mounting equipment.

15 Fitted to the underside of the container floor are two skids. On each end of the skids are fitted towing eyes consisting of mounting brackets, post threaded pivot pin and an eye.

16 Fitted to the four top corners are corner castings which include shackle attachment holes to allow lifting of the container by crane and slings. This casting also includes fixing holes for lashing the container to a flat bed by the use of chains or stays.

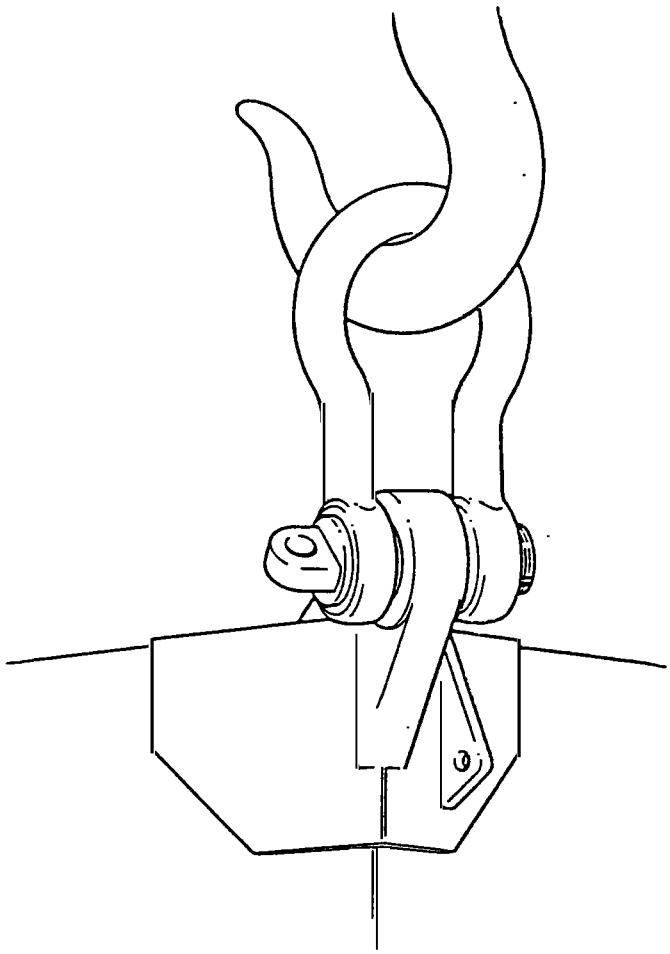
17 Fitted to the four bottom corners are corner castings which include bottom fixings for multi-trans.

Doors

18 All doors are of identical construction to the sides. The doors are retained by slam locks, and are finally secured by a hasp, staple and padlock. The slam locks are triple in-line, mounted inside the side door and the rear right hand door (on the double door) where they are operated by external and internal handles. The side door is also fitted with an internal locking catch which secures the slam locks in position. The catch is pressed down to lock, and released by operating the internal handle. On the double doors the rear left hand door is retained by a single slam lock fitted at the bottom which engages a plate in the floor, the lock is released by operating its adjacent handle.

19 Each door has a double glazed fixed window incorporating a Silica-Gel desiccator screwed into the frame, to absorb condensation.

20 All windows are fitted with internal black-out facilities which consists of shutters on slides.



V 10166/2

Fig 3 Lifting shackles

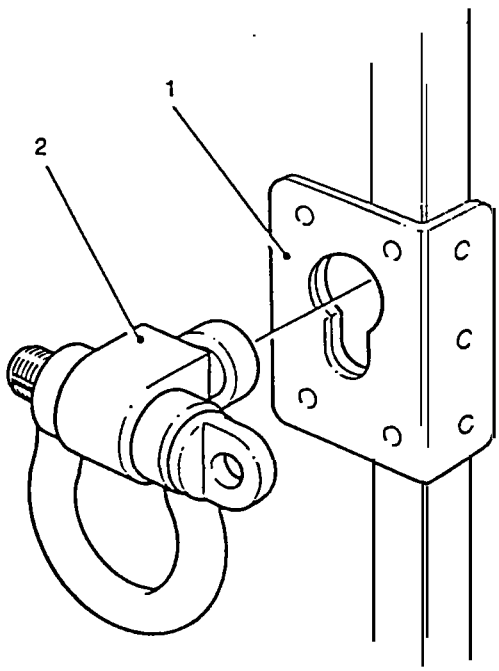


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Fig 4 Lashing eye

Entrance steps

21 Entrance steps are provided for use when the container is situated on the cargo truck. These are stowed vertically on two brackets attached to the rear left hand door on the double door and are secured by two pins on captive chains.

22 Attachment points are provided to enable the steps to be used at the side door and at the right hand rear door of the double door.

Roof access

23 A ladder (not supplied) is required for access to the roof. Crawling Boards are NOT REQUIRED on the roof.

ON/OFF LOADING EQUIPMENT

24 Special lifting frames are NOT REQUIRED for on and off loading, this can be done by means of slinging, shackles and crane.

Lifting shackles

25 Four lifting shackles are provided, fitted to the top corner castings, for use with sling and crane. (See Fig 3)

Lashing eye

26 Facilities to attach lashing eye assemblies (Fig 4) are provided for securing the container during transit. Each assembly consists of an eye, a part threaded pivot pin and an attachment block.

27 The lashing eye (2) has a cylindrical stub shaft which is shouldered for attachment in any of the keyhole slots (1) positioned in the four upright corner brackets of the body.

PENTHOUSE TENTAGE

28 Facilities are provided on both sides of the container body for assembling the penthouse tentage. Two canvas fillets under which the tentage is attached to the side wall, are situated each side of the body, one at the top of the wall and the other at the lower mid section. Thus the tentage may be erected either when the container is secured on the truck platform or when it is on the ground. The canvas fillets extend from the rear end of the body to a short distance from the side door or the position in which a side door would be fitted. A large penthouse is available to fit from the roof of the container while mounted on the truck.

ELECTRICAL SYSTEM

Electrical earth braid

29 An earth braid may be attached to the rear end of the container adjacent to the left hand towing eye, and a bolt is provided for this purpose. When mounted on the Bedford MK truck the earth braid is clamped between the tailboard hinge bracket and the cross member of the platform.

Direct earthing

30 Two parallel direct earth return paths are provided between the container and its power source. One is via the earth continuity condition which is an integral part of the power cable connecting the incoming supply panel on the container with the generator set, and the other is via the chassis earth spike and the generator earth spike.

Earth leakage circuit breaker (ELCB)

31 Basically there are two types of ELCB used to give shock risk protection on container bodies and installed equipment, these are the current operated unit and the Fault Voltage type. Both types have a test button incorporated. For repair see AESP 2510-C-030-522 Chaps 3-1. 3-1-1, 3-2 and 3-2.1.

Depot storage unit (DSU)

32 The DSU (Fig 5) is fitted to the exterior of the container generally in the rear bulkhead either on the left or right of the door. It is used when the container is in barracks or depot location and a single phase 240V 50 Hz mains supply is available.

33 The DSU is fitted with a waterproof lift up cover which is held in the closed position by four toggle clamps. The unit incorporates a current operated ELCB with test button and 'Mains on' indicating lamp, an input socket and a 15A fuse cartridge. For repair see AESP 2510-C-030-522 Chapter 7.

Power supplies and distribution

34 Power is supplied from an external source, the 3 phase 415 V 50 Hz input being connected to the incoming supply panel which is positioned inside a flap on the LHS of the container. The incoming supply panel contains an ELCB, 'Mains on' lamp, Input socket and two earth terminals.

35 AC Power is distributed in the container through the distribution panel which is attached to the inside LHS wall of the container. The unit contains individually switched circuit breakers which control the power for the mains operated equipment. For repair see AESP 2510-C-030-522 Chapter 5.

36 Interior wiring between the distribution panel and installed equipment and fittings are conveyed via surface mounted metal trunking. The trunking cover is also used to accommodate socket outlets for installed equipment.

Lighting fixtures

37 The main lighting consists of fluorescent strip lights fitted to the roof of the container. Each lamp unit has an integral ON/OFF switch.

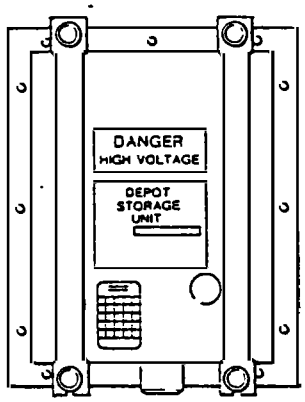
38 Black-out facilities are available and operated by using microswitches at each entrance, these break the lighting circuit when a door is opened. Blue shaded tungsten lamp fittings (moonlight) are incorporated into the black-out system. Lighting switches are adjacent to each door and an override switch is fitted to isolate the microswitches when required. For repair see AESP 2510-C-030-522 Chap 9.

Ventilation fans

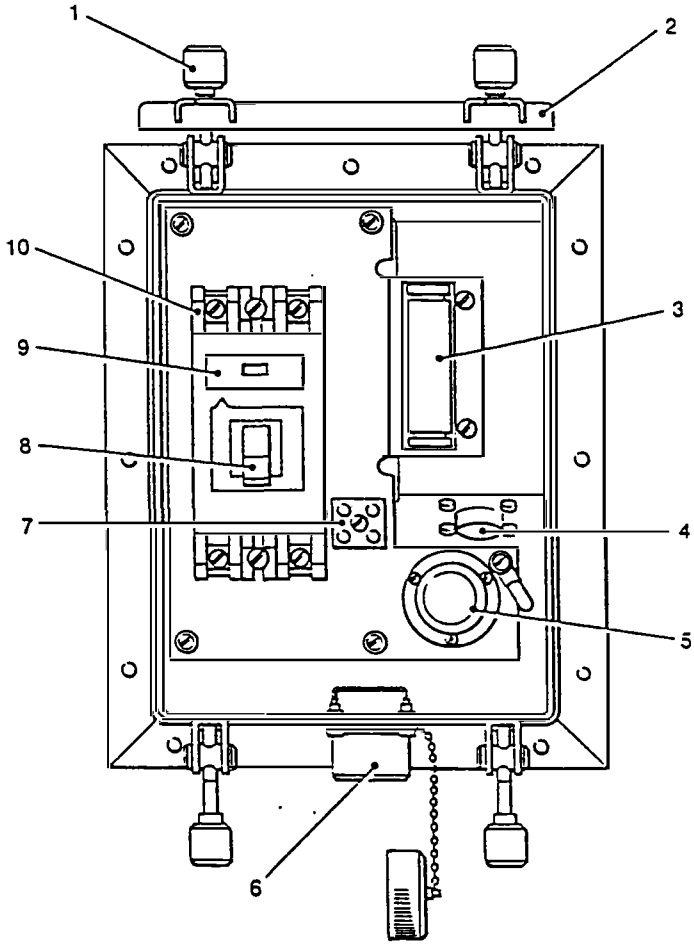
39 Two ventilation fans are fitted in the blank end wall, for exhausting stale air and must be used in conjunction with an opened grille or with the main door open. For repair see AESP 2510-C-030-522 Chap 9.

Dehumidifier

40 A space dehumidifier can be plugged into a 13 amp socket, when the container is in a barracks or depot location and the depot storage unit is being used. Moisture extracted from the internal atmosphere is routed from the dehumidifier to a floor level drainage hole via a plastic tube through the container wall. A screw capped plug, attached to the wall by a chain, seals the drainage hole during normal operation of the equipment. For repair see EMER Eng & Misc G 122/1 Space Dehumidifier, Westair, Drymatic 50km^3.



FRONT VIEW



FRONT COVER OPEN

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1 Toggle clamp
2 Front cover (open)
3 Fuse
4 Transfer socket
5 Mains ON indicating lamp
6 Input socket
7 Terminal block
8 Switch ON/OFF
9 Test button
10 E.L.C.B.

Fig 5 Depot storage unit

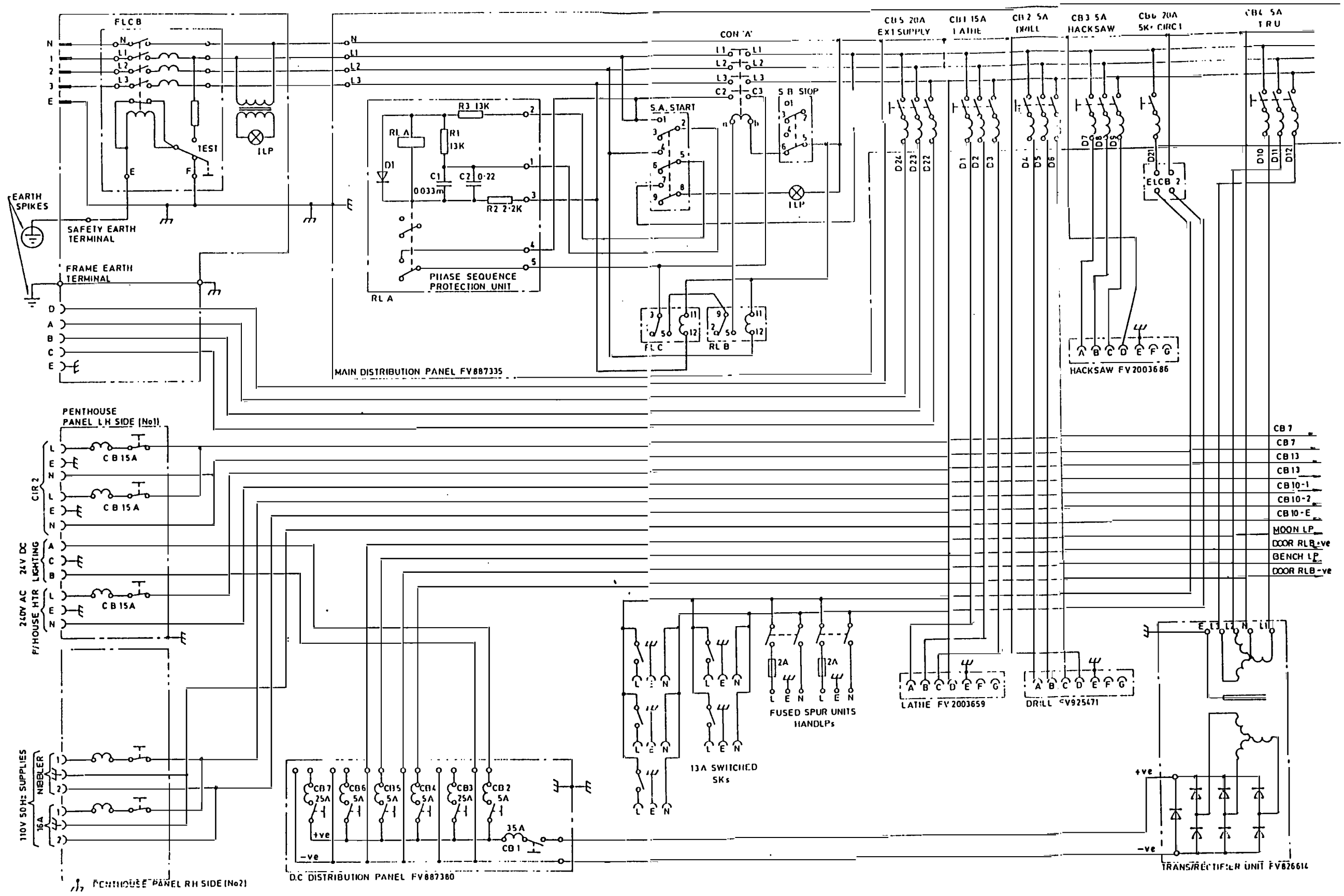

Fig 6a
Chap 2-1

Circuit diagram for CB 366/1C (Sheet 1 of 2)

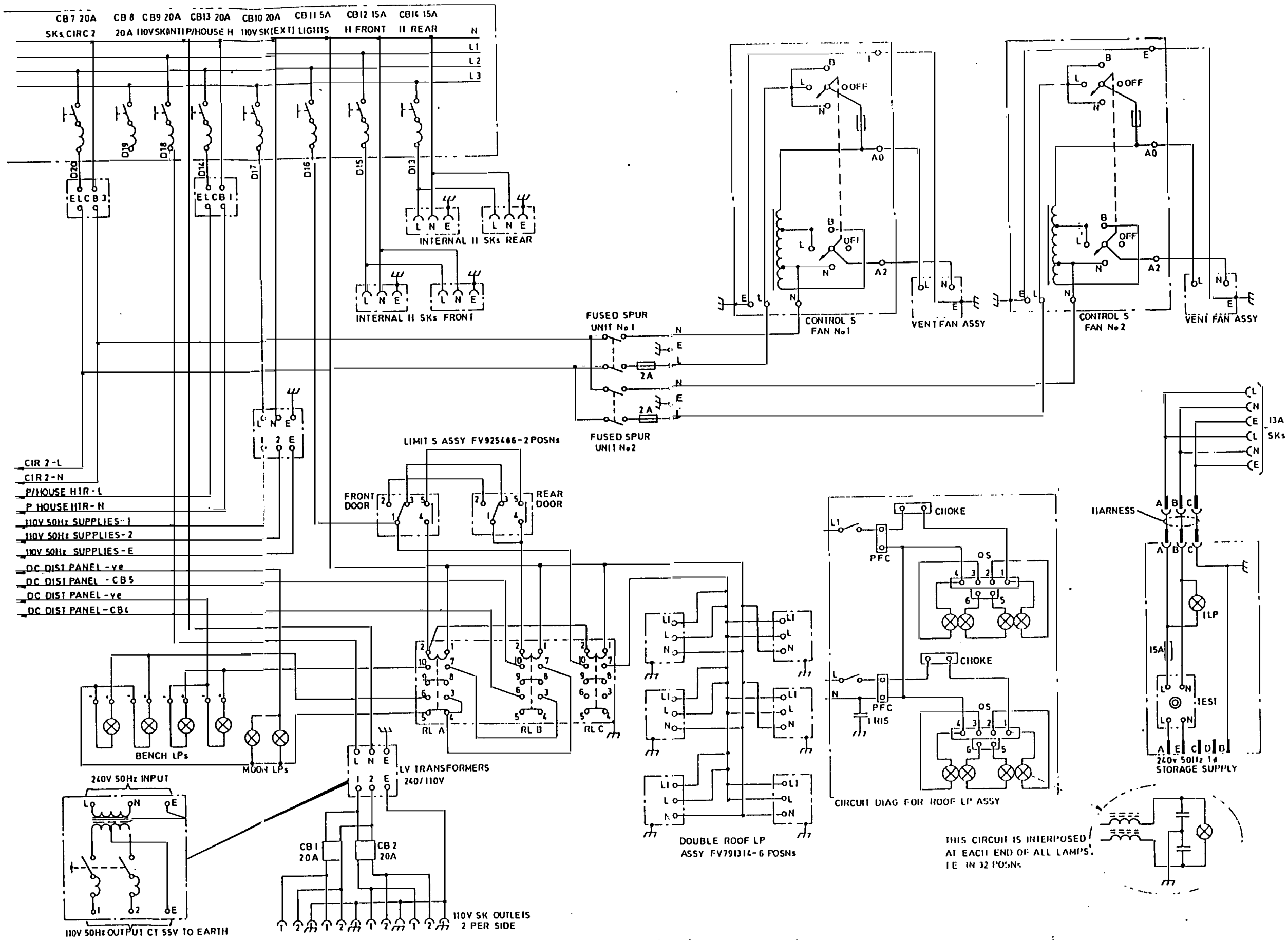

Fig 6b
Chap 2-1

Circuit diagram for CB 366/13 (Sheet 2 of 2)

V9920/2

Fig 6b

Page 12

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Chapter 2-2

OPERATING INSTRUCTIONS (CONTAINER)

CONTENTS

WARNINGS ...

(1) LETHAL VOLTAGE. THE VOLTAGES USED IN THIS INSTALLATION CAN ENDANGER LIFE. CARELESSNESS CAN BE FATAL.
ENSURE THAT THE CONTAINER IS CORRECTLY EARTHED AND THAT THE EARTH LEAKAGE CIRCUIT BREAKER OPERATES SATISFACTORILY BEFORE UNDERTAKING WORK ON THE EQUIPMENT. OTHER PERSONNEL SHOULD KEEP CLEAR OF THE VEHICLE UNTIL THE ELCB TEST IS SATISFACTORY.

(2) DO NOT CONNECT A CONTAINER TO THE POWER SUPPLY UNTIL THE EARTH SPIKES HAVE BEEN POSITIONED A MINIMUM OF 2 m (6.5 ft) APART AND 2 m (6.5 ft) FROM THE STEPS. THE SPIKES MUST BE DRIVEN INTO THE GROUND AT LEAST 0.6 m (20 in). ENSURE THE GROUND IS DAMP IN THE VICINITY OF EACH SPIKE.

(3) DO NOT USE A CONTAINER INSTALLATION UNLESS THE RELEVANT ELCBS HAVE BEEN CHECKED FOR TRIPPING TO 'OFF' AND THE 'MAINS ON' LIGHT EXTINGUISHED.

(4) PERSONNEL MUST NOT WORK IN A CONTAINER IN AMBIENT TEMPERATURES ABOVE 32°C (90°F), WITHOUT ADEQUATE VENTILATION.

(5) THE 4 TONNE, FLAT PLATFORM, 4x4, TRUCK WHEN FITTED WITH A 3 TONNE CONTAINER BODY AND ASSOCIATED SYSTEM EQUIPMENT HAS A RELATIVELY HIGH CENTRE OF GRAVITY. IF TRAFFIC HAZARDS (SUCH AS BENDS, ROUNDABOUTS AND OFF-ROAD SURFACES) ARE NEGOTIATED AT EXCESSIVE SPEEDS, BODY ROLL CAN RESULT. TO REDUCE BODY ROLL, DRIVERS SHOULD EXERCISE EXTREME CAUTION AND REDUCE SPEED ACCORDINGLY WHEN APPROACHING AND NEGOTIATING SUCH HAZARDS.

(6) PERSONNEL MUST NOT TRAVEL OR SLEEP IN A CONTAINER

CAUTION ...

Before lowering the Container to the ground, ensure that there are no obstructions - on the ground, likely to cause damage to the underfloor of the Container - when it is lowered.

Off-loading container

1 Off-load as follows:

1.1 Attach the four lifting shackles to top corner castings of the container body.

1.2 Ensure the vehicle hand brake is applied, then slacken the nuts and disconnect the body retaining hook bolts from the container.

1.3 Disconnect the electrical earth braid from the vehicle - leaving the braid affixed to the container.

1.4 Attach the slinging hooks to each of the four shackles, see Fig 1.

1.5 Ensure that it is safe to lift the container without causing injury or damage, lift the container from the vehicle.

1.6 Release the vehicle hand brake and drive away the vehicle. Lower container to the ground.

Loading container

2 Loading container is the reverse of Para 1.

Preparation of container for use

3 The container may be used either when mounted on the truck or off loaded onto the ground. If the container is to be used when secured to the cargo truck proceed as follows:

3.1 Select a suitable site on firm, level ground, and position the vehicle. Apply the parking brake.

3.2 Release the clamps securing the steps to the rear door or rear left hand door on the double door version and remove the steps from the mounting brackets.

3.3 Place the steps in position and adjust the leg lengths to suit.

3.4 Ensure that the electrical braid is effectively connected to both container and vehicle.

3.5 Erect the requisite tentage, see Para 9.

Note ...

On containers embodying side doors, recesses are provided below the doors for the attachment of the entrance steps.

4 If the container is to be used on the ground, off-load as described in Para 1.

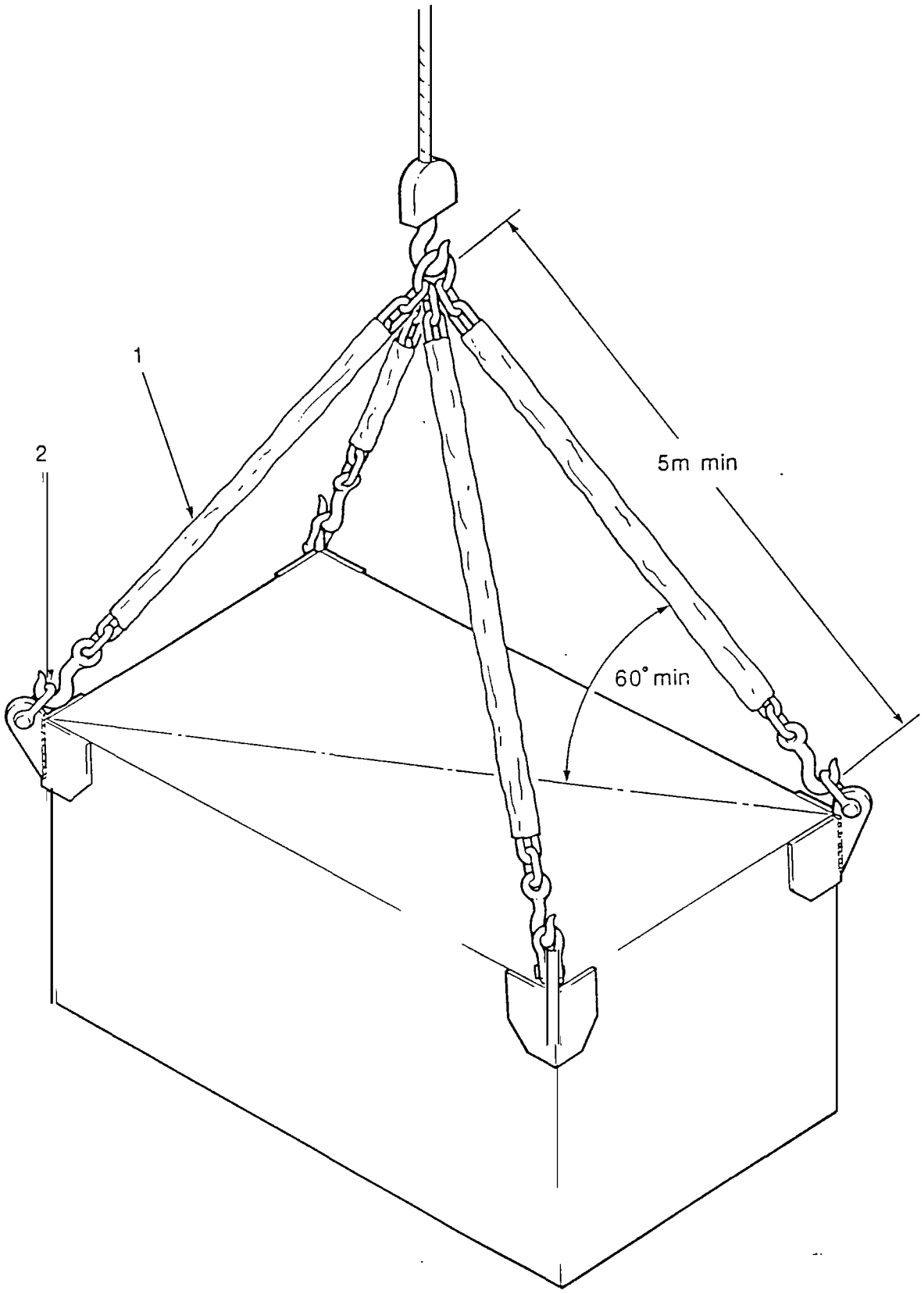


Fig 1 Loading on/off (Container)

5 Whether the container is to be used on the vehicle or on the ground, before the electrical power supply is connected the following must be done.

5.1 Check that all the circuit breakers are in the 'OFF' position.

5.2 Position the earth spikes a minimum of 2 m (6.5 ft) apart and 2 m (6.5 ft) from the steps.

5.3 Drive the spikes into the ground to a minimum depth of 0.6 m (20 in). Ensure that the ground is damp in the vicinity of each spike.

6 Check the function of the ELCBs as follows:

6.1 Connect the mains supply and switch on the power.

6.2 Set the ELCB switch to ON.

6.3 Check that the 'MAINS ON' indicator illuminates.

6.4 Press the ELCB test button and check that the 'MAINS ON' indicator extinguishes and that the switch trips to 'OFF'.

7 To check the ELCB on the Depot Storage Unit proceed as follows:

7.1 Check that all circuit breakers are in the 'OFF' position.

7.2 Open the front cover of the unit by releasing the toggle clamp and lift the cover.

7.3 Connect the chassis earth terminal on the main input panel to a suitable earthing point.

7.4 Connect the 240 V 50 HZ mains supply to the unit input socket and switch on the supply.

7.5 Set the ELCB switch to 'ON' and check that the indicator light illuminates.

7.6 Press the ELCB switch test button and check that the switch trips to 'OFF' and the indicator light extinguishes.

WARNING ...

IF THE ELCB DOES NOT TRIP, DO NOT PROCEED FURTHER, SWITCH 'OFF' THE SUPPLY AT SOURCE AND IMMEDIATELY REPORT THE FAULT.

Preparing to move the container

8 When it is necessary for the container to be moved prepare to move as follows:

8.1 Switch off power supply, disconnect supply cables and remove earth spikes or connections.

8.2 Dismantle the tentage, if erected. Clean and tidy the container interior and stow all loose items carried inside the container.

8.3 Close and secure the windows. Close the side doors, rear doors and secure. Stow and secure the ladder.

8.4 Connect the electrical earth braid to the vehicle.

TENTAGE (small penthouse)

Assembling

9 The penthouse (Fig 2 and 3) may be erected on either side of the container, in the upper or lower position according to whether the container is on the cargo truck or the ground.

9.1 Sort the tubes into their lengths, and the brackets into their various angular configurations.

9.2 If the container is to remain on the vehicle secure the skin flap canvas to the bottom rail of the container.

9.3 Assemble one double entry (8) and one triple entry bottom corner bracket (11) to the 1740 mm (68.5 in) long tube (9). Place at right angles to the skirt flap, with the entry bracket adjacent to the flap inboard end.

9.4 Assemble the top bracket (4) on to the 1778 mm (70 in) long tube (5) and then position the tube into the bottom corner adjacent to the skirt flap.

9.5 Assemble a container attachment tube (1) into the top bracket (4) and support the tube.

9.6 Assemble two side brackets (13) onto two 822 mm (32.375 in) long tubes (10) and fit this assembly between the container attachment tube (1) and bottom corner bracket (11) on the 1740 mm (68.5 in) long tube (9).

9.7 Assemble the end strainer wire (7) into the built up frame and lightly tension.

9.8 Fit three 1372 mm (54 in) long tubes (14) into the open ends of the assembled side brackets and bottom corner brackets. Support the assembly in a vertical position.

9.9 Assemble the two centre brackets (16) and one bottom centre bracket (15) onto two 822 mm (32.375 in) long tubes (10).

9.10 Align and fit the assembled tubes and centre brackets to the ends of the three 1372 mm (54 in) long tubes (14).

9.11 Fit the three 1676 mm (66 in) long tubes (17) into the open ends of the centre brackets. Support the assembly in the vertical position.

9.12 Fit the blackout curtain support tubes (2, 18 and 19) onto the three 1676 mm (66 in) long tubes (17).

9.13 Assemble two side brackets (13) and one bottom corner bracket (8) onto the remaining two 822 mm (32.375 in) long tubes (10).

9.14 Align and fit the assembled tubes, side and bottom corner brackets onto the ends of the three 1676 mm (66 in) long, horizontal tubes (17).

9.15 Assemble the front strainer wire (12) over the front of the frame and lightly tension.

9.16 Fit the two remaining container attachment tubes (1) into the side and centre brackets, move the whole frame up to the container side and connect the top bracket and two container support tubes to the fittings under the penthouse fillet on the side of the container. Secure the fittings with quick release pins.

9.17 Assemble the top strainer wire (3) and lightly tension.

9.18 Ensure that the framework is aligned correctly with the container and vehicle, then tighten the end, top and front strainer wire assemblies, hand tight only.

9.19 Secure the black-out curtain to its support.

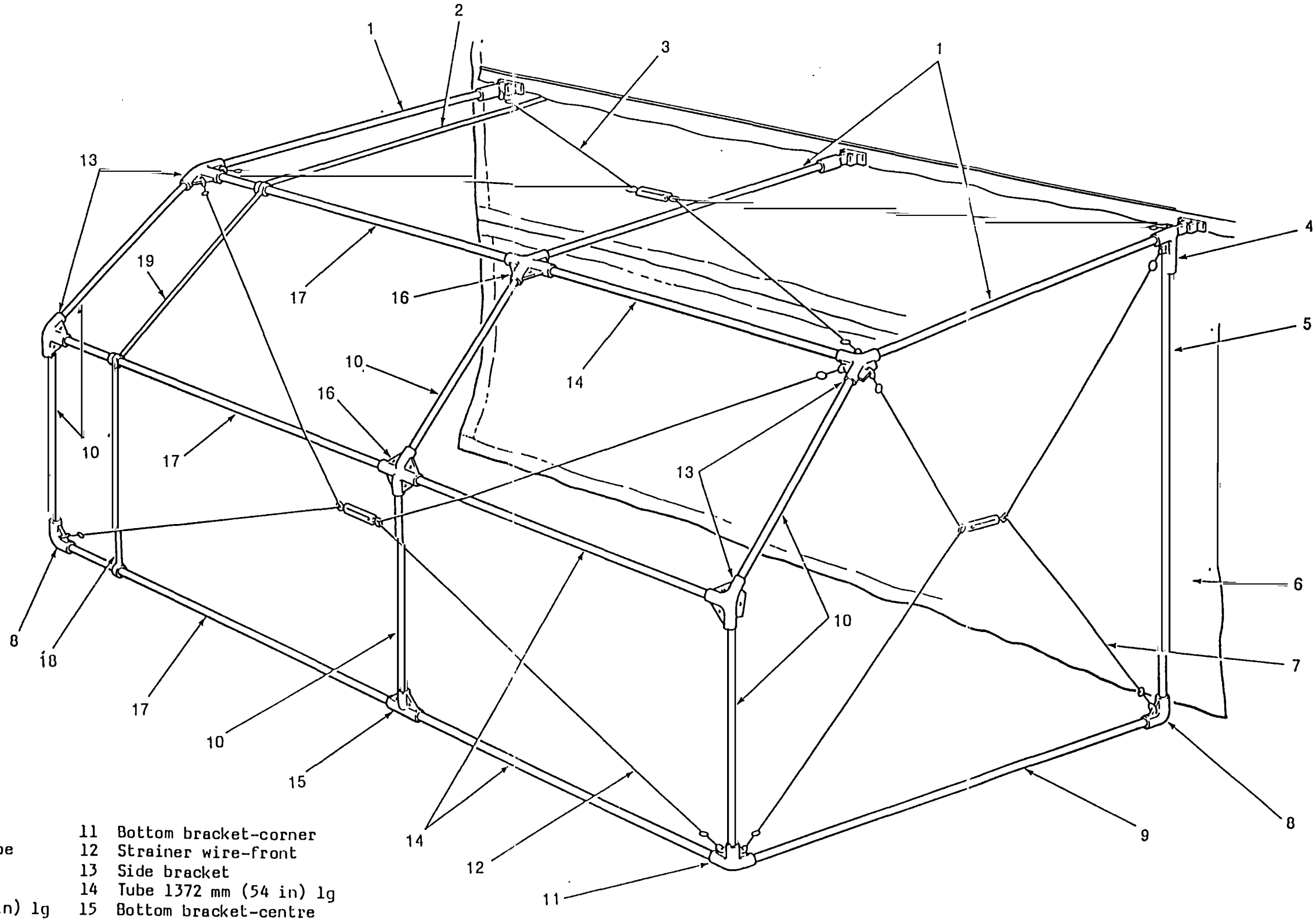
9.20 Unroll the canopy, fit it over the framework and secure the top edge to the underside of the penthouse fillet on the side of the container, and the framework, see Fig 3.

9.21 Fit the end wall entrance curtain and secure to the canopy and framework as required.

9.22 If required, secure the lighting set to the framework and connect to outlet plug on the container side.

Dismantling

10 Dismantling the penthouse is a reversal of the assembly sequence.



1 Container attachment tube
2 Blackout curtain support tube
3 Strainer wire-top
4 Top bracket
5 Tube drilled - 1778 mm (70 in) lg
6 Skirt flap
7 Strainer wire
8 Bottom bracket-corner
9 Tube 1740 mm (68½ in)lg
10 Tube 822 mm (32 3/8 in) lg
11 Bottom bracket-corner
12 Strainer wire-front
13 Side bracket
14 Tube 1372 mm (54 in) lg
15 Bottom bracket-centre
16 Centre bracket
17 Tube 1676 mm (66 in) lg
18 Blackout curtain support tube
19 Blackout curtain support tube

Fig 2

Penthouse frame (small)

V10166/6

Fig 2

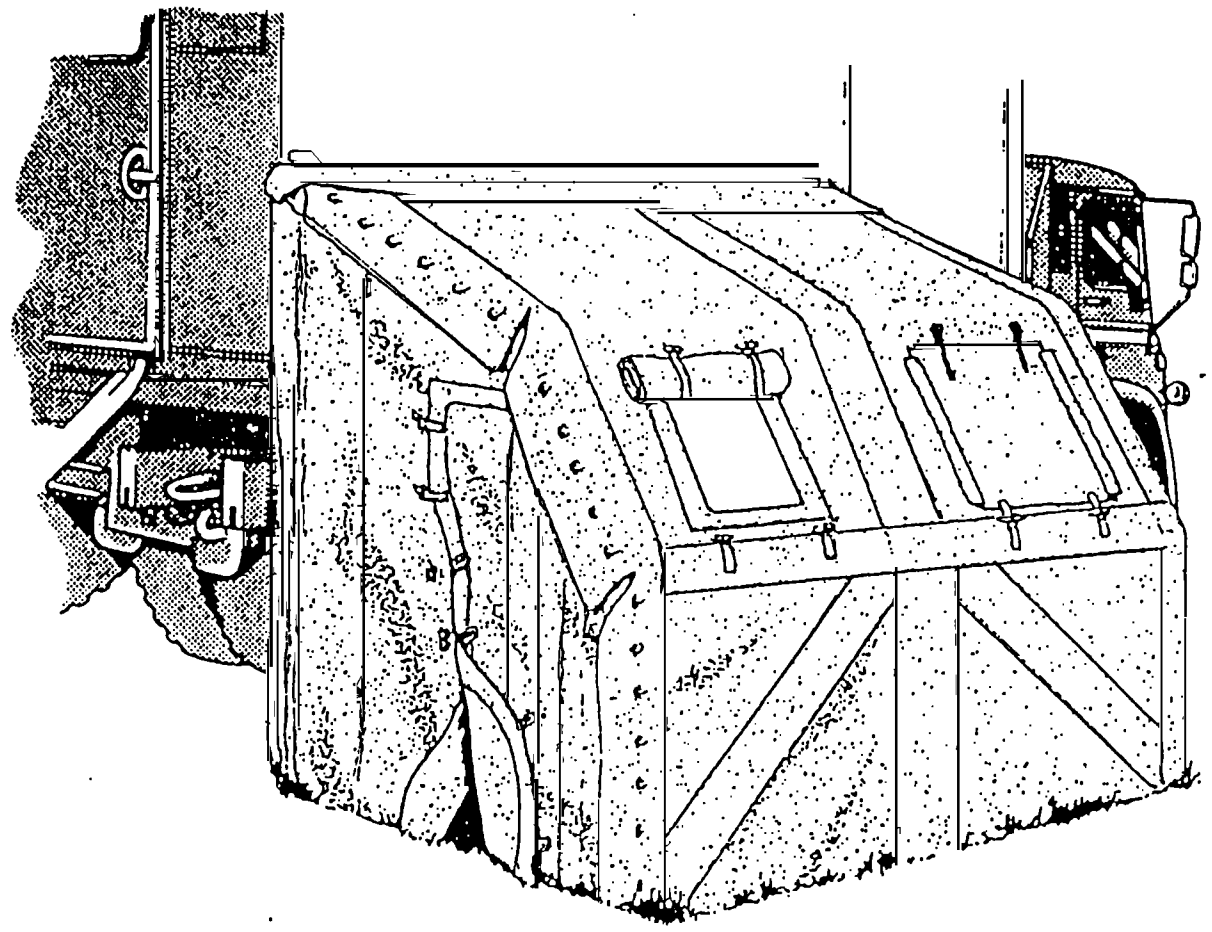


Fig 3 Penthouse tentage (small)

Chapter 2-3

MAINTENANCE REQUIREMENT

CONTENTS

GENERAL SERVICING

1 After use the tentage should be cleaned and dried (when applicable). Check the fabric for tears and that the straps buckles and fasteners are serviceable. Check the frame parts for mechanical damage and bending.

2 At all lubricating areas the surrounding surface must be cleaned before applying the approved lubricant. All excess lubricant should be wiped off after working the joints to ensure that all inaccessible parts are adequately greased.

3 The lubrication of the container and its equipment should be carried out at the same time as the 1,000 mile of the cargo truck. The intervals, however, should be extended during periods of inactivity, commensurate with adequate preservation or shortened after prolonged periods of operation in sand or dust, immersion in water, or exposure to moisture.

Maintenance after fording

4 After fording, especially in salt water, corrosion and subsequent failure may occur in exposed assemblies. Therefore, the assemblies which have been exposed must be removed, dismantled, cleaned, dried, re-lubricated and re-assembled at the earliest opportunity.

Internal Maintenance

5

5.1 The interior of the container is GRP which may be maintained in its original condition by wiping clean with warm soapy water.

5.2 The PVC floor covering may be cleaned by washing or scrubbing by cleaning agents, detergent or caustic soda based.

CAUTION ...

Only sufficient water should be used for the purpose of cleaning and care must be taken to avoid damage to installed equipment and electrical wiring.

Desiccator

6 The desiccator which is fitted to the window in the door embodies an indicator, which turns from blue to pink when the Silica Gel is saturated and requires activating. Reactivating of the Silica Gel may be effected by unscrewing the assembly from the door, then further unscrewing the Silica Gel container from the indicator. The Silica Gel container should be placed in an oven or other clean source of heat, for approximately two hours at a temperature of 121 to 149°C (250 to 300°F). When cooled the container should be refitted to the body and screwed back into the container door.

Container body panel repair

7 Should a container body panel be damaged the method of repair will be dependent upon the size of damage. Repair as follows:

7.1 Small hole or dent i.e. less than 50 mm diameter:

7.1.1 Clean damaged area of all foreign bodies etc.

7.1.2 Abrade surface local to the damaged area.

7.1.3 Fill damaged area with fibre glass i.e. isopon or similar. It may be necessary to fill hole in three or four stages depending upon size depth etc.

7.1.4 Smooth down final coat and when fully hardened sand smooth.

7.1.5 Touch up paint in affected area.

7.2 Large holes or gashes greater than 50 mm:

7.2.1 Clean damaged area of all foreign bodies, etc.

7.2.2 Abrade surface local to damaged area.

7.2.3 Seal inner core and damaged panel with fibre glass resin.

7.2.4 Make a patch of aluminium sheeting, not less than 1 mm thick, such that the patching plate is at least 50 mm greater than the damaged area.

7.2.5 Drill suitable size rivet holes at a convenient pitch, around the perimeter of the patching plate.

7.2.6 Treat the patching plate with suitable etch, primer, etc. to ensure plate will not corrode.

7.2.7 Apply mastic to the plate/container such that when fitted a good weather seal is made.

7.2.8 Position plate and spot through hole, rivet firmly in position.

7.2.9 Apply a bead of mastic around the plate to ensure a neat weather seal.

7.2.10 Paint repaired area to match rest of container.

Note ...

Methods of repair are applicable to both exterior and interior damage.

Chapter 2-4

DESTRUCTION OF EQUIPMENT TO PREVENT ENEMY USE

CONTENTS

MANDATORY DIRECTIVE

1 Destruction of the equipment, when subject to capture by the enemy, will be undertaken by the user arm, ONLY WHEN, in the judgement of the unit commander concerned, such action is necessary in accordance with orders of, or policy established by, the Army or Divisional Commanders.

2 The reporting of the destruction of the equipment is to be done through command channels.

Degree of damage

3 The degree of damage inflicted, to prevent the equipment being used by an enemy, shall be as follows:

3.1 Methods of destruction should achieve such damage to equipment and essential spare parts, that it will not be possible to restore the equipment to a usable condition in the combat zone either by repair or cannibalization.

3.2 Classified equipment must be destroyed in such degree as to prevent, whenever possible, duplication, or determination of operation or function by the enemy.

3.3 Any classified documents, notes, instruction or other written material pertaining to function, operation, maintenance or employment, including drawings or parts lists, must be destroyed in a manner to render them useless to the enemy.

4 In general, destruction of essential parts, followed by burning will usually be sufficient to render the equipment useless. However, selection of the particular method of destruction requires imagination and resourcefulness in utilization of the facilities at hand under the existing conditions. Time is usually critical.

Spare parts

5 The same priority, for destruction of component parts of a major item necessary to render the item inoperable, must be given to the destruction of similar components in spare parts storage areas.

MEANS AND PROCEDURES

6 If the destruction is ordered, due consideration should be given to:

6.1 Selection of a point of destruction that, will cause greatest obstruction to enemy movement and also prevent hazard to friendly troops from fragments of ricocheting projectiles which may occur incidental to the destruction by gunfire.

6.2 Observance of appropriate safety precautions.

7 The following information is for guidance only. Of the several means of destruction, those most generally applicable are as follows:

Mechanical

8 This requires an axe, pick, crowbar or similar implement. The equipment should be destroyed in accordance with the priorities given in Table 1.

Burning

WARNING ...

DUE CONSIDERATION SHOULD BE GIVEN TO THE HIGHLY FLAMMABLE NATURE OF GASOLINE AND ITS VAPOUR. CARELESSNESS IN ITS USE MY RESULT IN PAINFUL BURNS.

9 This requires gasoline, oil or other flammables:

9.1 Remove and empty the portable fire extinguishers.

9.2 If quantities of combustibles are limited, smash all vital elements, such as switches, instruments and control levers.

9.3 Place ammunition and charges in and about the equipment so that the greatest damage will result from the explosion.

9.4 Pour gasoline and oil over the equipment. Ignite by means of an incendiary grenade fired from a safe distance, by a burst from a flame thrower, by a combustible train of suitable length or other appropriate means. Take cover immediately.

Gunfire

WARNING ...

FIRING ARTILLERY AT RANGES OF 500 YARDS OR LESS, AND FIRING GRENADES OR ANTI-TANK ROCKETS, SHOULD BE FROM COVER.

10 When destroying the equipment by gunfire, proceed as follows:

10.1 Remove and empty the portable fire extinguishers.

10.2 Smash all vital elements as outlined in Para 9.2.

10.3 Destroy the equipment by gunfire, using tank guns, self-propelled guns, artillery, rifles using the rifle grenades or launchers using anti-tank rockets.

PRIORITIES

11 The priorities for destruction should be considered as follows:

11.1 Priority must be given to the destruction of classified equipment associated documents.

11.2 When lack of time and/or means prevents complete destruction of equipment, priority is to be given to the destruction of essential parts and the same parts are to be destroyed on all like equipment.

11.3 A guide to priorities for destruction of the equipment is shown in Table 1.

TABLE 1 PRIORITIES FOR DESTRUCTION

Ser	Item	Priority
(1)	(2)	(3)
1	Installed Equipment	1
2	Container Body	2