Harrison

Harrison M300

330mm — 13in swing centre lathe

machine manual

machine manual

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Machine Specification

330mm (13in) swing CENTRE LATHE

630mm MODEL – 630mm (25") between centres
1000mm MODEL – 1000mm (40") between centres

This machine is manufactured to British metric standards throughout, and is available in two bed lengths each with either gap or straight bed versions.

A left or right hand apron handwheel and either Metric or English drive screws (together with the appropriate micrometer dials) are optional variations.

summarised specification

Centres	Height	167mm ($6\frac{9}{16}$")
	Admits between	635mm (25")
	or	1000mm (40")
Swing	Over Bed	330mm (13")
	Over Cross Slide	210mm ($8\frac{1}{4}$")
	In Gap Diameter	480mm (19")
	Length	115mm ($4\frac{1}{2}$")
Spindle	Bored to Pass	38mm Ø ($1\frac{1}{2}$"Ø)
	Nose	No. 4-D1 Camlock
	Morse Taper in Nose	No. 5
	in Bush	No. 3
Speeds	Number	12
	Progression Ratio	1.46
	Range	40 to 2500 r.p.m
Motor	(1500 r.p.m. @ 50Hz)	2.2kW 3hp
Leadscrew	Diameter	28mm ($1\frac{1}{8}$")
	Thread	6mm pitch or 4 TPI
Threads	39 Metric Pitches	from 0.2 to 14mm Pitch
	35 English Pitches	from 2 to 56 TPI
	18 Module Pitches	from 0.3 to 3.5 MOD.
	18 Diametral Pitches	from 8 to 56 DP

Feeds	16 Metric (R.10 Series)	from .03 to 1mm/rev.
	16 English	from .001 to .040"/rev.
	Cross Feeds Half Longitudinal Values	
Cross Slide	Width	140mm ($5\frac{1}{2}$")
	Travel	190mm ($7\frac{1}{2}$")
Top Slide	Width	82mm ($3\frac{1}{4}$")
	Travel	92mm ($3\frac{5}{8}$")
Tool	Max. Section	16 x 20mm ($\frac{5}{8}$" x $\frac{3}{4}$")
Tailstock	Quill Diameter	42mm ($1\frac{21}{32}$")
	Travel	110mm ($4\frac{3}{8}$")
	Morse Taper	No. 3
	Set-Over	± 12mm (± $\frac{1}{2}$")
Weight	630mm Model 630mm (25") Cts	583kg (1288 lbs)
	1000mm Model 1000mm (40") Cts	685kg (1512 lbs)

standard equipment

Single Toolpost
Work Driver Plate
No. 5/3 Morse Centre Bush
2 No. 3 M.T Centres
Spanners, Keys and Oil Gun
Machine Manual
& Standard Inspection Certificate

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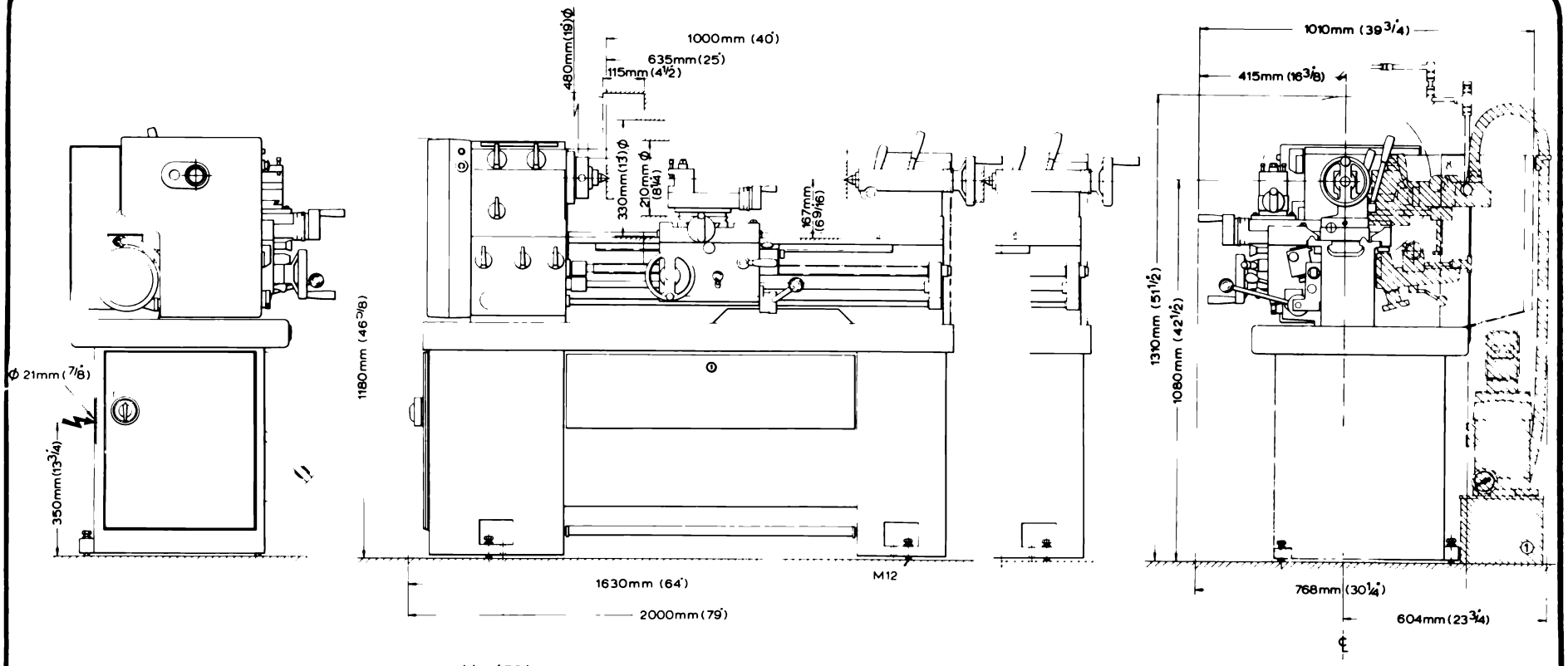
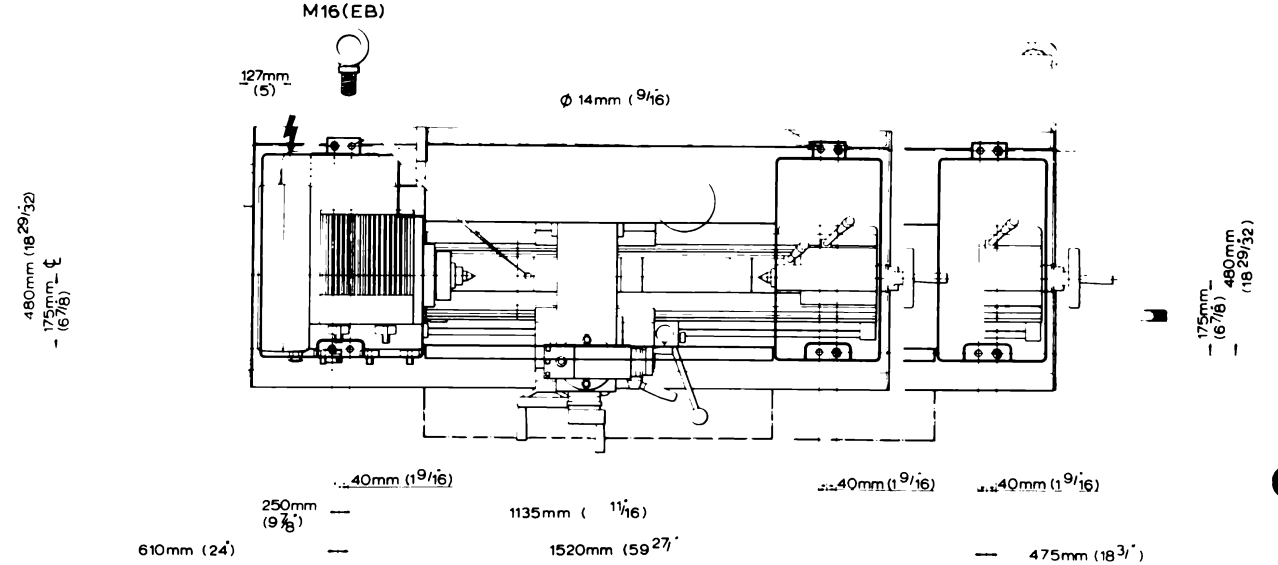
Illustrated or specified data is not binding in detail: The manufacturers reserve the right to modify design, specification and price without notice.

Installation





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Lifting

The approximate weights of the machine are:-

630mm Model (630 mm/25" between centres) 583 kg (1285 lb).
1000mm Model (1000 mm/40" between centres) 685 kg (1512 lb).

The machine should be lifted using the eye-bolt supplied (SEE GENERAL ARRANGEMENT AND FOUNDATION PLAN) with the apron/saddle assembly positioned, as despatched, towards the tailstock end of the bed.

Alternatively, a rope sling may be used, being looped under both ends of the swarf tray.

Cleaning

Bright surfaces are coated with an anti-corrosive compound at despatch and this must be completely removed using White Spirit or Paraffin (Kerosene) before operating the controls or moving the slides. DO NOT USE CELLULOSE SOLVENTS. Oil the bright surfaces and slideways AFTER CLEANING. (see Lubrication diagram).

Positioning

Locate the machine on a solid foundation allowing sufficient area for operation and maintenance access. (SEE GENERAL ARRANGEMENT AND FOUNDATION PLAN).

The lathe may be used when free standing, but for maximum performance it should be bolted down.

(1) **Free standing.** Position the machine on its foundation and adjust each of the four levelling screws to take an equal share of the weight. Then using an engineer's precision level on the bedways make further adjustments for level conditions.

(2) **Fixed installation.** Position the machine over four 12 mm (1/2") diameter foundation bolts, set to suit the base. (SEE GENERAL ARRANGEMENT AND FOUNDATION PLAN).

Accurately level the machine as in (1), then tighten the foundation bolts evenly to avoid distortion and finally re-check for level conditions.

Electrical Supply

Power should be supplied through an external fused isolator recommended fuses being 25 amp for 220 volts supply and 16 amp for 380 to 440 volts supply. External wiring should be of a permanent character and be undertaken by a competent electrician. Electrical entry is at the rear left-hand end of the cabinet. (SEE GENERAL ARRANGEMENT AND FOUNDATION PLAN).

Line connections should be to the isolator terminals and a substantial earth continuity conductor must be connected to the earth terminal on the panel. (SEE ELECTRICAL WIRING DIAGRAM).

Main spindle rotation must be anti-clockwise (looking from tailstock) for a downward movement of the spindle control lever. Interchanging two line connections should rectify wrong direction of rotation.

continued

Lubrication (Refer to Lubrication diagram)

Ensure that the headstock, gearbox and apron are filled to the level of the relevant oil sight windows operate the centralised slideway lubrication system by pulling and releasing the knob at the bottom corner of the apron and oil the cross-slide nut, dials and changewheel stud etc. through the appropriate oil nipples using the oil gun provided.

Running-in

For optimum bearing life and performance it is recommended that high spindle speeds be avoided during the initial life of the machine.

Alternatively a running-in procedure should be adopted as follows:-

Make a low feed rate selection and run the machine light for 3 hours at 540 rpm
then for 2 hours at 800 rpm
then for 1 hour at 1200 rpm
then for 1/2 hour at 1700 rpm

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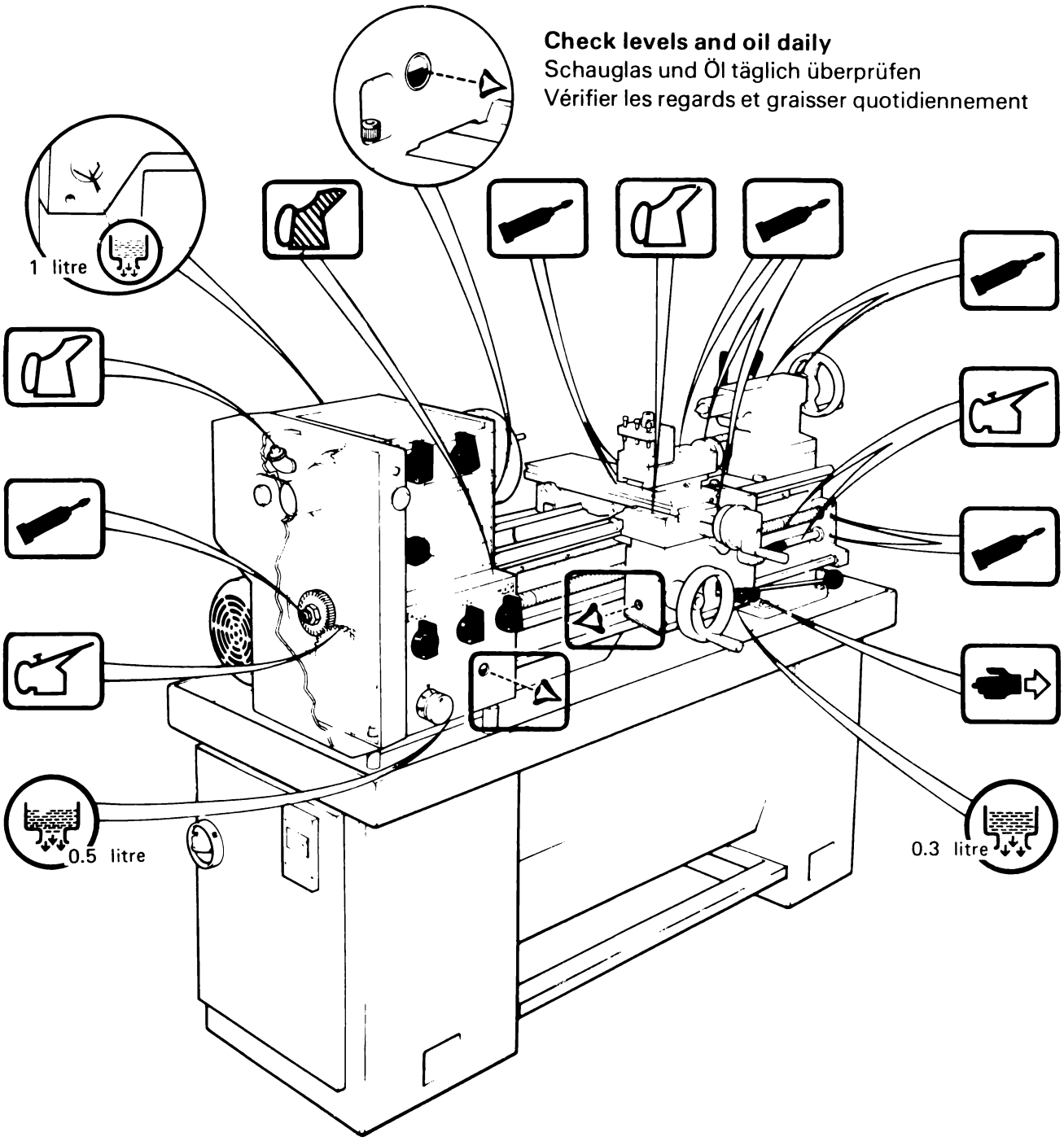
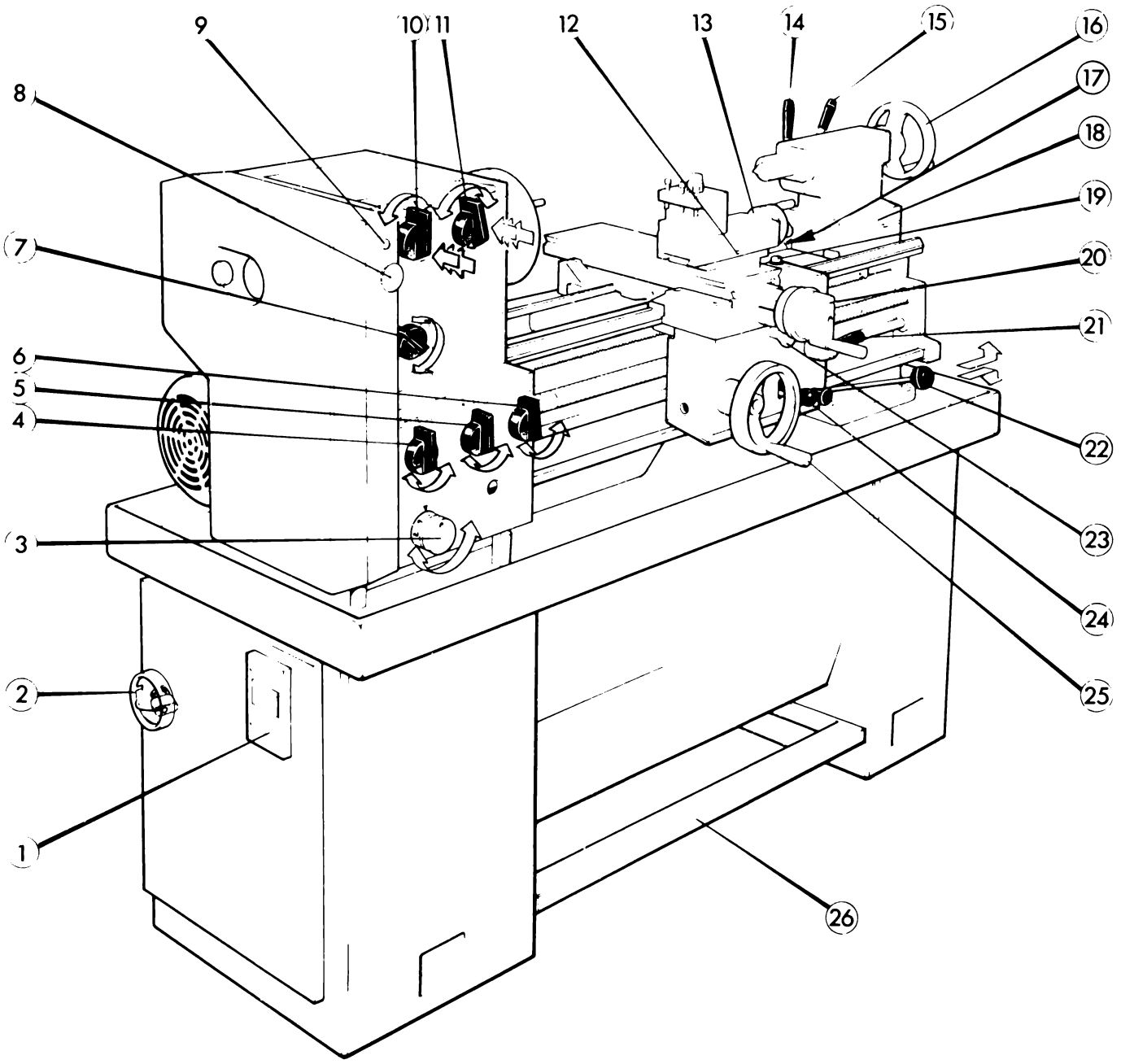
Lubrication

Check levels and oil daily
Schauglas und Öl täglich überprüfen
Vérifier les regards et graisser quotidiennement



Mobil	BP	Castrol	C	Esso	Shell	Texaco
DTE OIL HEAVY MEDIUM	ENERGOL HLP 68 (ISO)	HYSPIM AWS 68	P W.L.C	NUTO H68	TELLUS 68 OR R68	RANDO HD 68
DTE EXTRA HEAVY	ENERGOL HP 150 (ISO)	ALPHA ZN 220	WLM	NURAY 100	VITREA 220	REGAL R &O 220

Operation



1. COOLANT PUMP STARTER (When fitted)
2. MAINS ISOLATOR
3. FEED SELECTOR DIAL
4. FEED SELECTOR HANDLE
5. FEED SELECTOR HANDLE
6. FEED SELECTOR HANDLE
7. FEED DIRECTION SELECTOR
8. EMERGENCY STOP
9. 'SUPPLY ON' LAMP
10. SPEED SELECTOR
11. SPEED SELECTOR
12. TOP SLIDE LOCK
13. TOP SLIDE TRAVERSE HANDLE
14. QUILL LOCK
15. TAILSTOCK CLAMP
16. QUILL TRAVERSE HANDWHEEL
17 CROSS-SLIDE LOCK (In R.H. side of cross-slide)
18. TAILSTOCK SET-OVER SCREW
19. CARRIAGE LOCK
20. CROSS TRAVERSE HANDLE
21. THREADCUTTING ENGAGEMENT
22. SPINDLE CONTROL LEVER
23. FEED AXIS SELECTOR
24. FEED ENGAGE
25. LONGITUDINAL TRAVERSE HANDWHEEL
26. BRAKE PEDAL

Starting the Machine

1. **Ensure that lubrication has been carried out in accordance with the Lubrication diagram.**

2. **Check** that the spindle control lever (22) is in the central (STOP) position, the feed engage lever (24) and thread-cutting lever (21) are in the disengaged positions and that the changewheel cover is firmly secured in place.

3. **Select** Feed Axis i.e. cross or longitudinal by means of the apron push-pull knob (23).
   Select Direction of feed by means of the headstock lower selector handle (7)
   Select *Feed Rate by referring to the charts on the headstock and selecting (in the sequence listed) the appropriate positions on the gearbox selector dial (3) and handles (4), (5) and (6) (Engagement of the feed gears may be assisted by turning the main spindle)
   Select **Spindle speed by means of the selector handles (10) and (11).

   NOTE: THE SPINDLE SPEED SELECTORS ARE TO BE PUSHED IN BEFORE TURNING AND THAT SPEED SELECTIONS ARE TO BE MADE ONLY WHEN THE SPINDLE IS STATIONARY
   (Engagement of the drive gears may be assisted by manually turning the spindle).

4. **Switch on the electrical supply** at the mains isolator (2) which is the red knob at the L.H. end of the cabinet, when 'SUPPLY ON' will be indicated by the white lamp (9) mounted adjacent to the emergency stop push-button (8).

5. **Start the spindle** in the direction of rotation required by lifting (FOR REVERSE) or lowering (FOR FORWARD) the "gated" spindle control lever (22) on the apron.

6. **Start and stop the feed motion** as required by means of the feed engage lever (24).

Stopping the Machine

The machine may be stopped in the following ways:

Return the spindle control lever (22) to its central (STOP) position
OR Depress the full-length foot-brake pedal (26)
OR Press the emergency stop push-button (8).

Operational Notes

CHUCKS	USE ONLY HIGH SPEED TYPES
FACEPLATES	NOTE MAXIMUM SPEEDS:-
	1200 rpm for 300 mm (12") dia.
	and 800 rpm for 460 mm (18") dia.
COARSE FEED RANGE	(i.e. when secondary changewheels are inverted to give 88/44T) SHOULD NOT BE USED WITH SPINDLE SPEEDS ABOVE 540 RPM.

NOTES
* Feed selections from the charts automatically disengage the leadscrew drive at the gearbox (i.e. by calling for selector position X) and for minimum wear the thread indicator dial should be disengaged by swinging the pinion out of mesh with the leadscrew when not in use.

** See Installation instructions (RUNNING-IN) if starting the machine for the first time.

continued

Operational notes continued

Micrometer dials are direct reading (for work piece diameter reduction on the cross-slide) and are of the friction-grip type for easy index settings.

Longitudinal traverse handwheel (25) may be disengaged by pulling it away from the apron face.

Tailstock set over adjustment is provided in the form of socket screws (18) mounted in each side of the tailstock body, a similar but 'location-screw' is fitted in the rear face of the body.

Set-over adjustment is made as follows:-

Unclamp the tailstock (lever (15))
Slacken the rear 'location-screw' (say one half turn)
Then Alternatively slacken one set-over screw and tighten the other until the required setting is achieved.

Tighten the rear 'location-screw'
And Re-clamp the tailstock.

MOUNTING OF CHUCKS, FACEPLATES and other SPINDLE MOUNTED ATTACHMENTS.

Ensure that the location faces on both nose and attachment are scrupulously clean.

Check that all the cams are in the release position (Fig. 1).

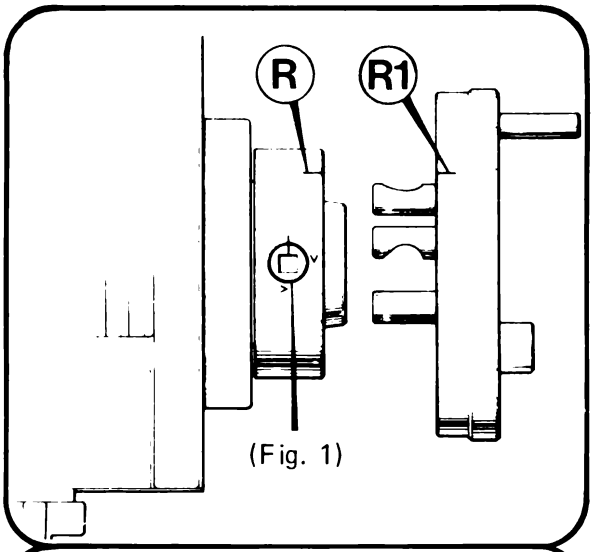
Mount the attachment on to the spindle nose and lock each cam by turning it clockwise using the key provided.

A reference line R1 (Fig. 1) should be scribed on each chuck or faceplate to coincide with the reference line R on the spindle nose. This assists subsequent re-mounting

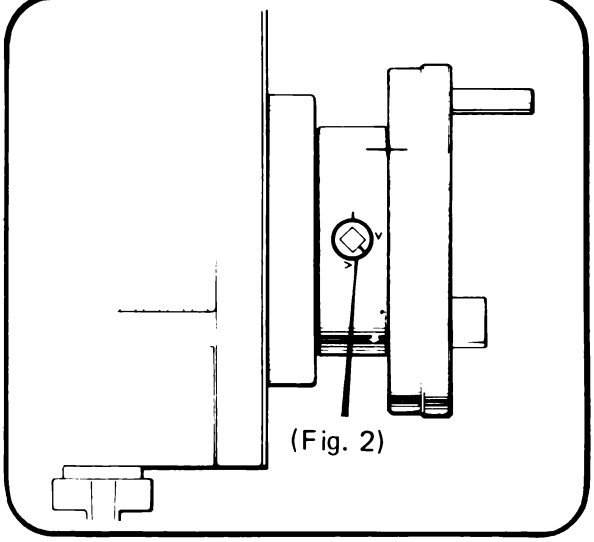
NOTE:-

For correct locking conditions each cam must tighten with its index line between the two vee marks on the nose (Fig. 2).

DO NOT INTERCHANGE CHUCKS OR OTHER SPINDLE MOUNTING ITEMS BETWEEN LATHES WITHOUT CHECKING EACH CAM FOR CORRECT LOCKING.



(Fig. 1)


(Fig. 2)

TO ADJUST 'CAMLOCK STUDS'

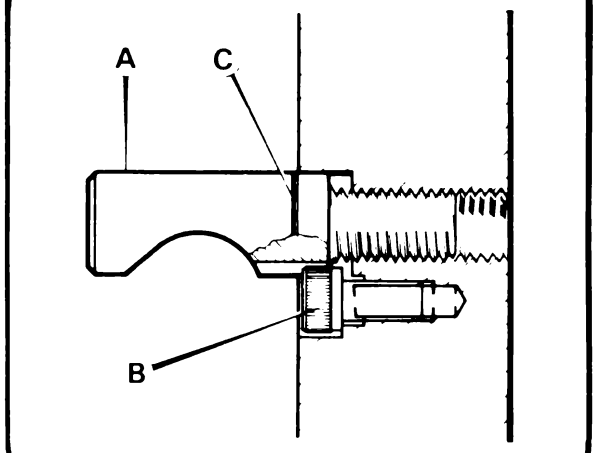
Remove Lockscrew (B).

Turn Stud (A) one full turn, in or out as required.

Re-fit and tighten lockscrew (B).

NOTE:-

A datum ring (C) is marked on each stud as a guide to the original or initial setting.



Spindle Nose

(A) METRIC THREADS on METRIC LEADSCREW MACHINES
or
ENGLISH THREADS on ENGLISH LEADSCREW MACHINES

For these threads it is recommended that the "thread indicator dial" be used this allows the leadscrew nuts to be disengaged at the end of each screwcutting pass, provided that they are re-engaged in accordance with the chart mounted on the front face of the dial unit.

METRIC LEADSCREW MACHINES
(METRIC THREADS ONLY)

The chart shows:-

in column 1. mm pitch to be cut.

in column 2. (✱) The number of teeth in the 'pick-off gear' arranged to mesh with the leadscrew, (this being selected from the stack, stored on the bottom of the dial spindle).

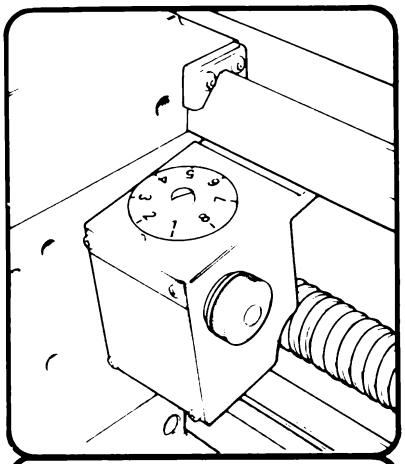
in column 3. The dial numbers at which the leadscrew nuts may be engaged.

ENGLISH LEADSCREW MACHINES
(ENGLISH THREADS ONLY)

The chart shows:-

in column 1. T.P.I. to be cut.

in column 2. Dial numbers at which the leadscrew nuts may be engaged.



mm

✱		✱	
225	18 15	4	16 1-8
25	16 1 8	4 5	18 15
75	16 1 8	5	20 1357
1	16 1 8	5 5	22 15
1 25	20 1357	6	16 1-8
1 5	16 1 8	7	14 15
1 6	16 1357	8	16 1357
1 75	14 15	9	18 15
2	16 1 8	10	20 1357
2 5	20 1357	11	22 15
3	16 1 8	12	16 1 8
3 5	14 15	14	14 15

812

ins

2	1 8	8	1-8	22	1 8
$2\frac{1}{2}$	15	9	1357	24	1 8
$2\frac{3}{4}$	1	10	1 8	26	1 8
3	1357	11	1357	27	1357
$3\frac{1}{4}$	1	$11\frac{1}{2}$	15	28	1 8
$3\frac{1}{2}$	15	12	1 8	30	1 8
4	1 8	13	1357	32	1 8
$4\frac{1}{2}$	15	14	1-8	36	1-8
5	1357	16	1-8	40	1 8
6	1-8	18	1-8	44	1-8
7	1357	19	1357	48	1-8
$7\frac{1}{2}$	15	20	1 8	56	1-8

813

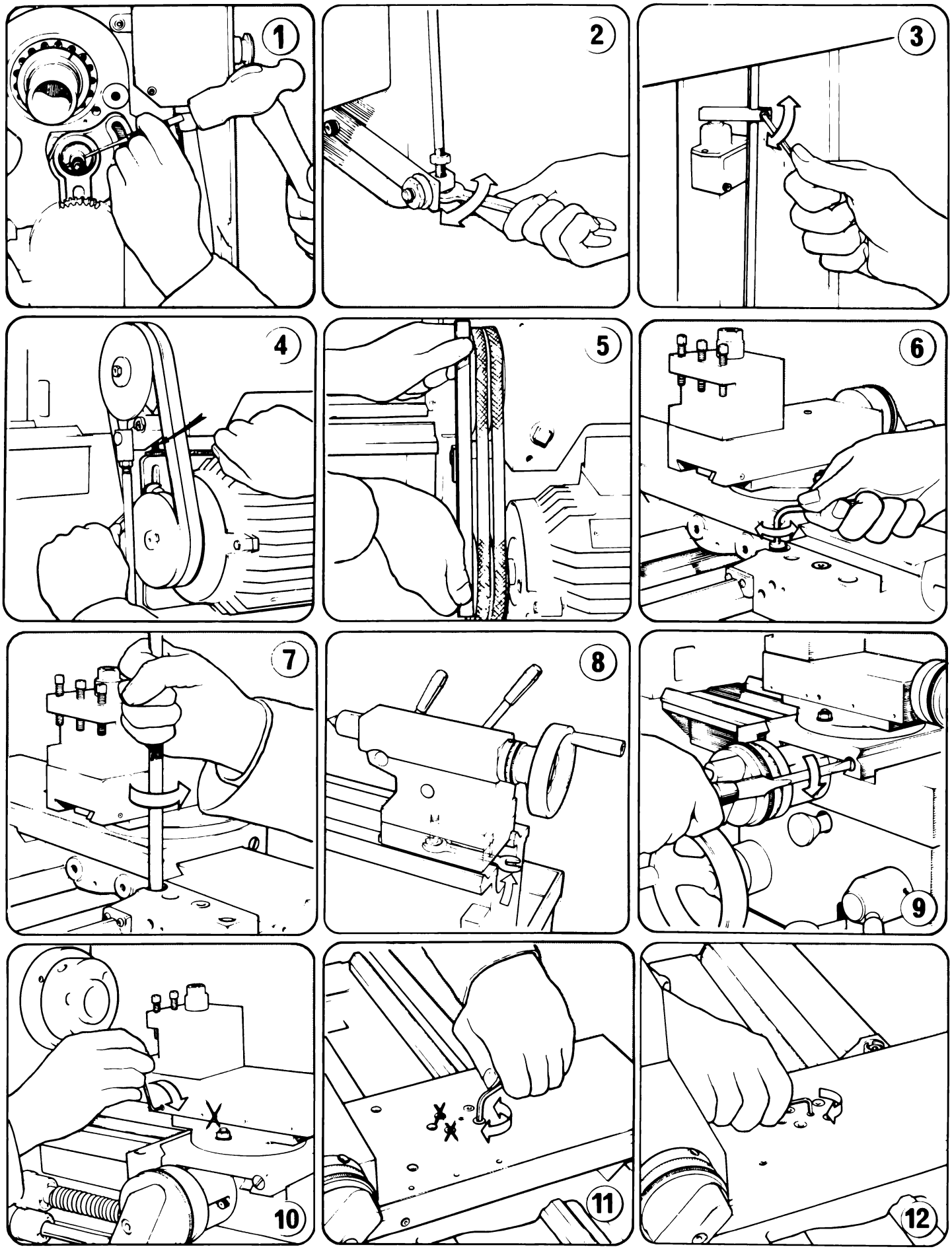
(B) ENGLISH THREADS on METRIC LEADSCREW MACHINES
or
METRIC THREADS on ENGLISH LEADSCREW MACHINES

For these threads the leadscrew nuts are kept engaged throughout the cutting of any one thread. This involves reversing the whole drive by means of the 'spindle control lever' (22) at each end of the screwcutting pass whilst at the same time relieving or increasing the cut as required.

(Threads 'A' may also be cut by this method).

Thread–cutting

Maintenance


1
2
3
4
5
6
7
8
9
10
11
12

Changewheel Shear Pin (Fig. 1)

A protection against accidental overload in the end gear train is provided in the form of a shear pin fitted in the splined sleeve on the top changewheel shaft. In the event of replacement being necessary a 4 mm (5/32") diameter x 20 mm (3/4") long mild steel pin should be fitted as follows:-

Remove the hexagon nut, washer and changewheel, pull off the splined sleeve and remove the broken pin parts from both sleeves and shaft. Fit new pin.

NOTE: The pin acts in single shear and will only enter the sleeve from the 'big-hole' side.

Brake Adjustments (Fig.2 and 3)

Adjustment for wear on the brake pad (which is mounted on the headstock pulley) is made at the pivot connection between the foot brake pedal and the vertical link rod. This is readily accessible from the rear of the machine where adjustment is made by turning the two locknuts on the link rod. A limit switch is mounted on the cabinet higher up the link rod and a slight re-positioning of the contact block may be necessary after adjustment for brake pad wear.

NOTE: The function of the limit switch is to cut-out the motor drive when the brake pedal is operated, i.e. the plunger should be depressed when the brake pedal is in its free position and released at the moment the brake pedal is operated.

Drive Belts (Fig. 4 and 5)

Access to the vee belts is gained by removal of the rear splash guard (when fitted) and the sheet metal drive covers.

The drive motor is bolted to a slotted mounting plate which is vertically adjustable on the rear face of the bed. This is clamped by three hexagon head screws. Belt tension adjustment is achieved by adjusting the two vertical screws against the top edge of the mounting plate.

It is important that when making adjustments a straight edge be placed accross the face of each pulley to ensure that correct alignment is maintained.

Saddle Strips (Fig. 6 and 7)

Wear on the rear and front saddle strips may be accommodated by adjustment of the retaining sleeves located in the top face of the saddle; two for the rear and one each for the two front strips.

The procedure for adjustment is to first release the socket head screw, slightly turn the slotted head sleeve anti-clockwise and then re-clamp the cap screw. Care should be taken to avoid over adjustment; a 30^{o} turn at the sleeve represents approximately 0.1 mm (.004") take up in the strip.

Tailstock Bed Clamp (Fig. 8)

The angular lock position of the bed clamp lever is adjusted by means of the self-locking hexagon headed bolt located on the underside of the tailstock and between the bed ways.

continued

Cross-slide (Fig. 9)

Wear on the taper-gib strip may be adjusted for by clockwise rotation of the slotted head screw on the front face of the cross-slide. The procedure being to first slacken the similar screw at the rear then re-tighten this after adjustment to clamp the strip in its new position.

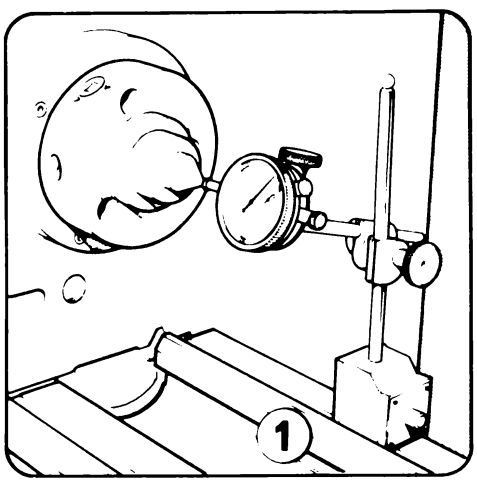
Top Slide (Fig. 10)

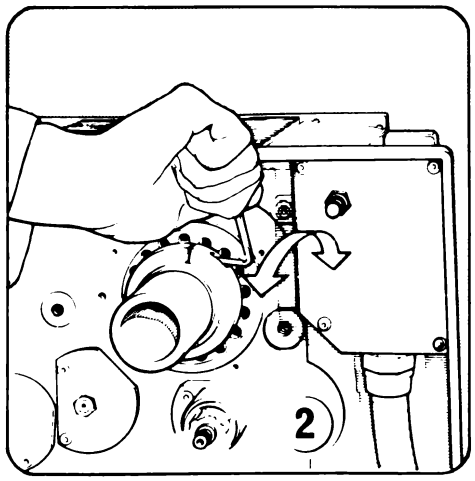
Take up for wear on the top slide strip is by means of the four (self-locking) socket set screws in the front face of the top slide casting.

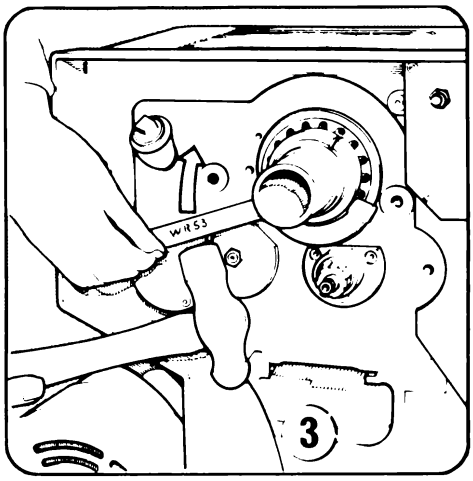
Cross-slide Nut (Fig. 11 and 12)

Provision is made for the elimination of backlash in the cross-slide nut, the procedure for adjustment being as follows:-

Slightly release, only the rear pair of socket cap head screws in the top face of the cross-slide, turn the centre socket set screw in a clockwise direction as required then re-clamp the two rear cap screws. Care should be taken to avoid over adjustment; a 120^{o} turn at the centre screw represents approximately 0.1 mm (.004") take up of backlash.







The spindle bearing assembly is carefully set before despatch of the Lathe from our Works which should ensure a high standard of performance without the need for further attention.

THE USER IS ADVISED NOT TO DISTURB THIS SETTING DURING NORMAL USE OF THE MACHINE AND TO CONSULT OUR SERVICE DEPARTMENT IN THE UNLIKELY EVENT OF A BEARING PROBLEM.

WHERE ADJUSTMENT IS UNDERTAKEN THEN IT IS ESSENTIAL THAT THE FOLLOWING PROCEDURES ARE STRICTLY COMPLIED WITH.

'A' TO CHECK FOR CORRECT SETTING

Set up a dial test indicator having 0.0025 mm (0.0001") divisions with the stylus registered on the nose-end of the headstock spindle. Preferably, locate the stylus centrally on a flat-nosed centre placed in the spindle bore. Fig. 1.

Take off the end drive cover and ROTATE THE SPINDLE by hand from the back of the headstock whilst pulling and pushing so that any end-float present can be read off the test indicator dial.

The correct setting of the bearings, with the headstock cold is when the end-float condition does not exceed two ten-thousandths of an inch (0.0002" or 0.0050 mm) whilst THE SPINDLE REMAINS FREE TO BE TURNED BY HAND.

'B' TO RESTORE THE LIMITED END-FLOAT CONDITION:-

Remove changewheels, swing frame and rear bearing cover. Release the locking screw of the screwed adjusting collar Fig. 2 and push the spindle forward whilst rotating it in the hand to ensure that the bearing rollers are registering correctly on the inner ring thrust faces.

Whilst keeping watch on the indicator dial, tighten the bearing adjusting collar using the special spanner provided Fig. 3 until the excessive end-float is taken up. Now ascertain the end-float by pushing and pulling upon the spindle and make any necessary slight adjustment required to provide the correct setting (0.0002" or 0.0050 mm).

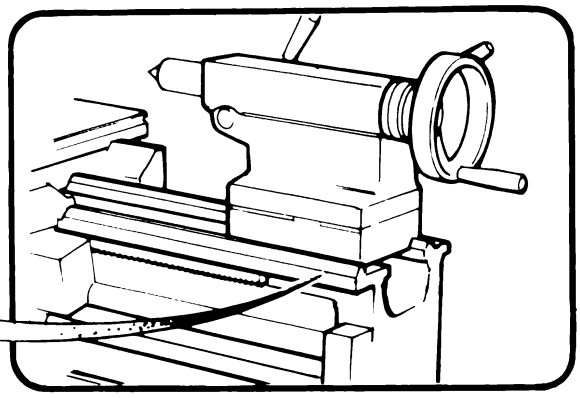
Tighten the locking screw of the adjusting collar and REPEAT PROCEDURE 'A' to be sure that no inadvertent alteration of the setting has taken place.

Refit the rear bearing cover, swing frame, changewheels and end drive cover.

Parts Ordering Procedure

1

Quote:
Machine Serial Number
which will be found stamped into the front face of the bedways at the tailstock end.



2

Refer to the appropriate assembly and
Quote:
Individual Part Numbers taken direct from the Illustrations

NOTE: Quantity used (when other than one) is given in a circle following the Part Number itself.

Where part numbers change with machine bed length then the model number is given, vis.

630mm	or	1000mm

Standard/Proprietary Parts (i.e. items which can be purchased from local Engineering suppliers) may be identified by the "bracketed" letter code included in the Part Number, and reference to the appendix at the end of this manual will provide a full description of such items.

Parts Section

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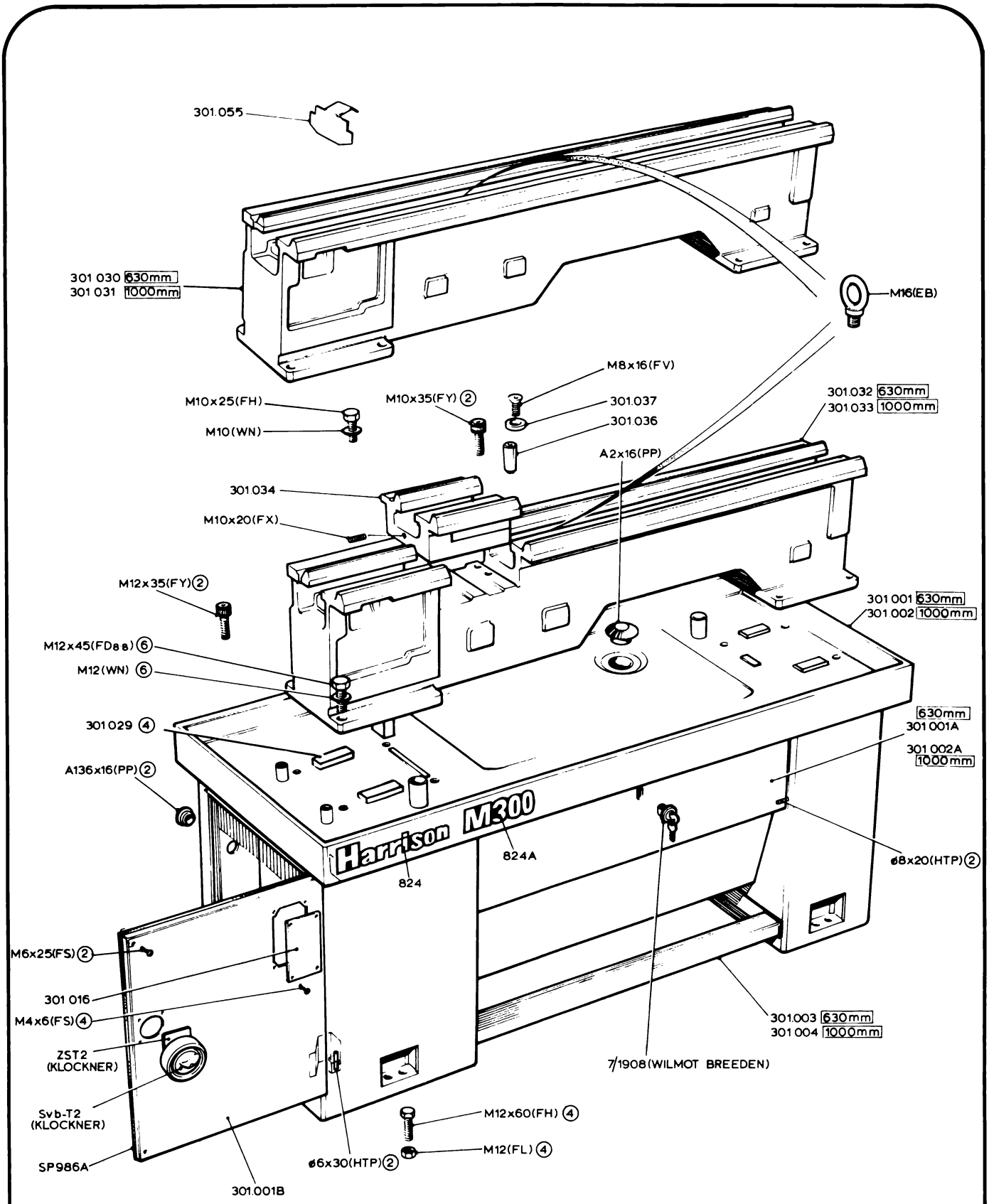
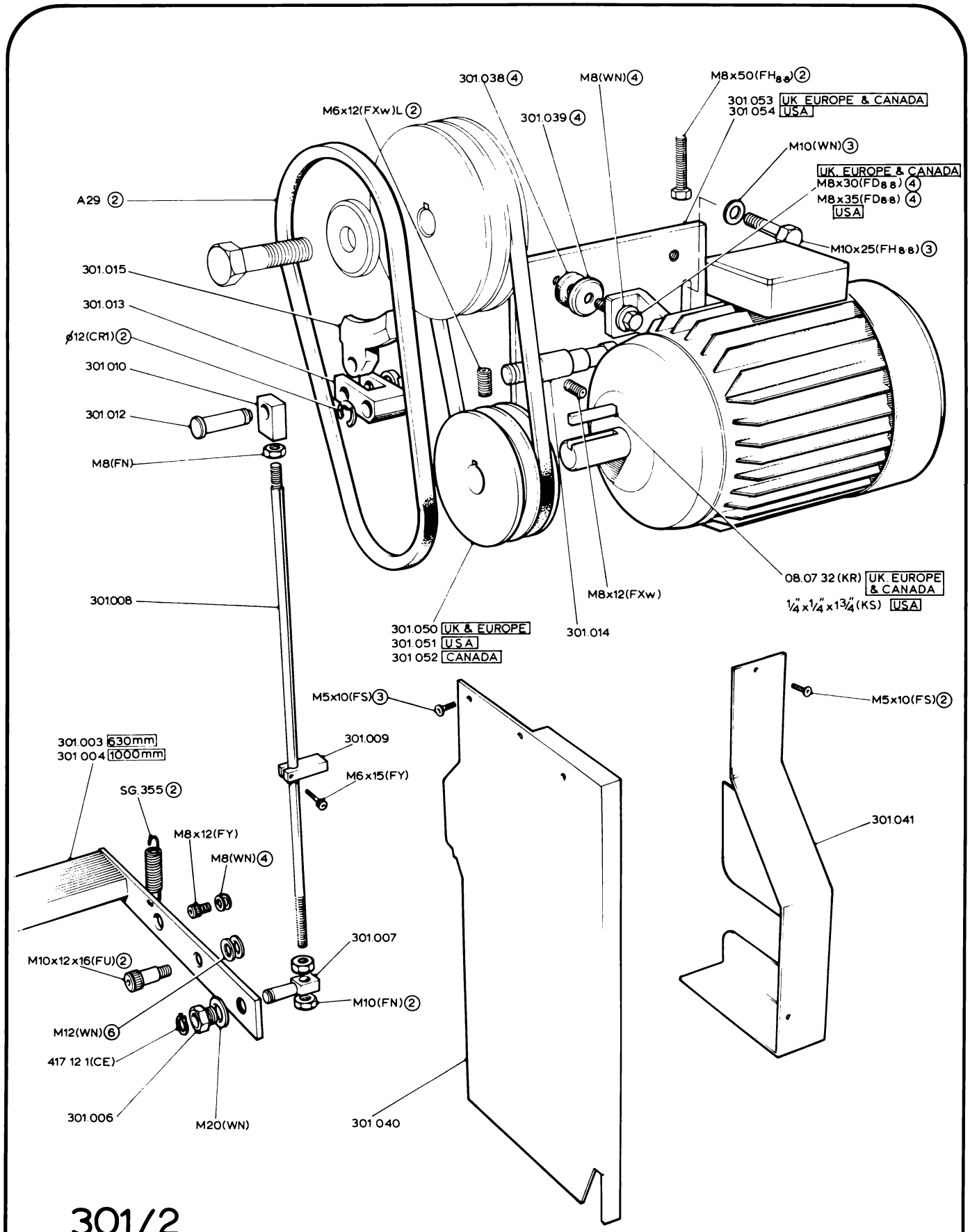

301.055
301 030 630mm
301 031 1000mm
M16(EB)
M8x16(FV)
M10x25(FH)
M10(WN)
M10x35(FY) ②
301.037
301.036
301.032 630mm
301.033 1000mm
A2x16(PP)
301.034
M10x20(FX)
M12x35(FY)②
301 001 630mm
301 002 1000mm
M12x45(FD88) ⑥
M12(WN) ⑥
301 029 ④
630mm
301 001A
301 002A
1000mm
A136x16(PP)②
Harrison M300
824A
824
ø8x20(HTP)②
M6x25(FS)②
301 016
M4x6(FS)④
ZST2
(KLOCKNER)
Svb-T2
(KLOCKNER)
SP986A
301.001B
ø6x30(HTP)②
M12x60(FH) ④
M12(FL) ④
301.003 630mm
301 004 1000mm
7/1908(WILMOT BREEDEN)

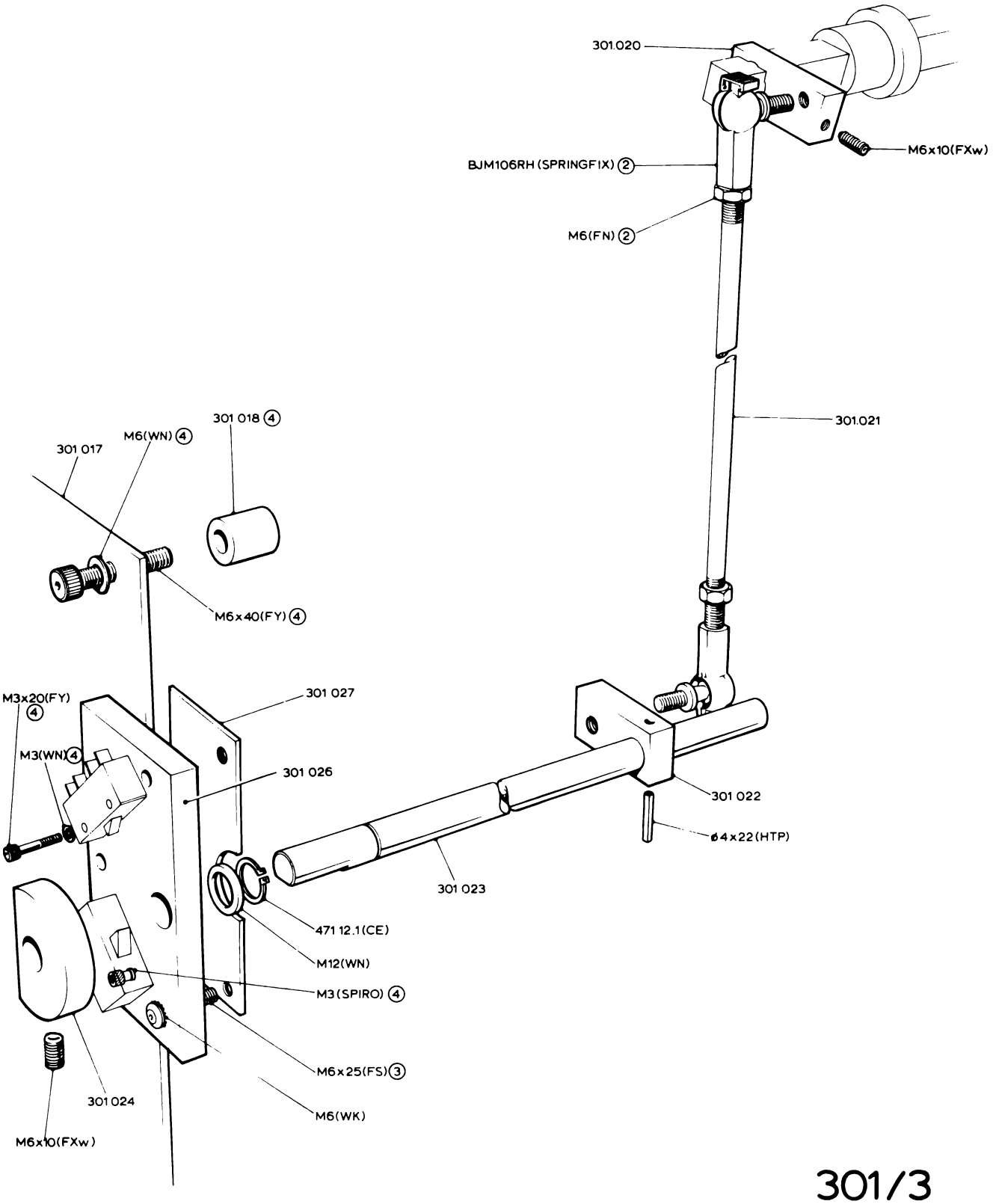
301/1

4 75


301.038 (4)
M8(WN)(4)
M8x50(FH8.8)(2)
301.053 UK EUROPE & CANADA
301 054 USA
M6x12(FXw)L (2)
301.039 (4)
M10(WN)(3)
UK. EUROPE & CANADA
M8x30(FD8.8) (4)
M8x35(FD8.8) (4)
USA
A29 (2)
M10x25(FH8.8)(3)
301.015
301.013
ø12(CR1)(2)
301 010
301.012
M8(FN)
301.008
08.07 32 (KR) UK. EUROPE & CANADA
1/4"x1/4"x1 3/4" (KS) USA
M8x12(FXw)
301.050 UK & EUROPE
301.051 USA
301 052 CANADA
301.014
M5x10(FS)(3)
M5x10(FS)(2)
301.003 630mm
301 004 1000mm
301.009
M6x15(FY)
SG.355 (2)
M8x12(FY)
M8(WN)(4)
301.041
301.007
M10x12x16(FU)(2)
M10(FN)(2)
M12(WN)(6)
417 12 1(CE)
301.006
M20(WN)
301 040

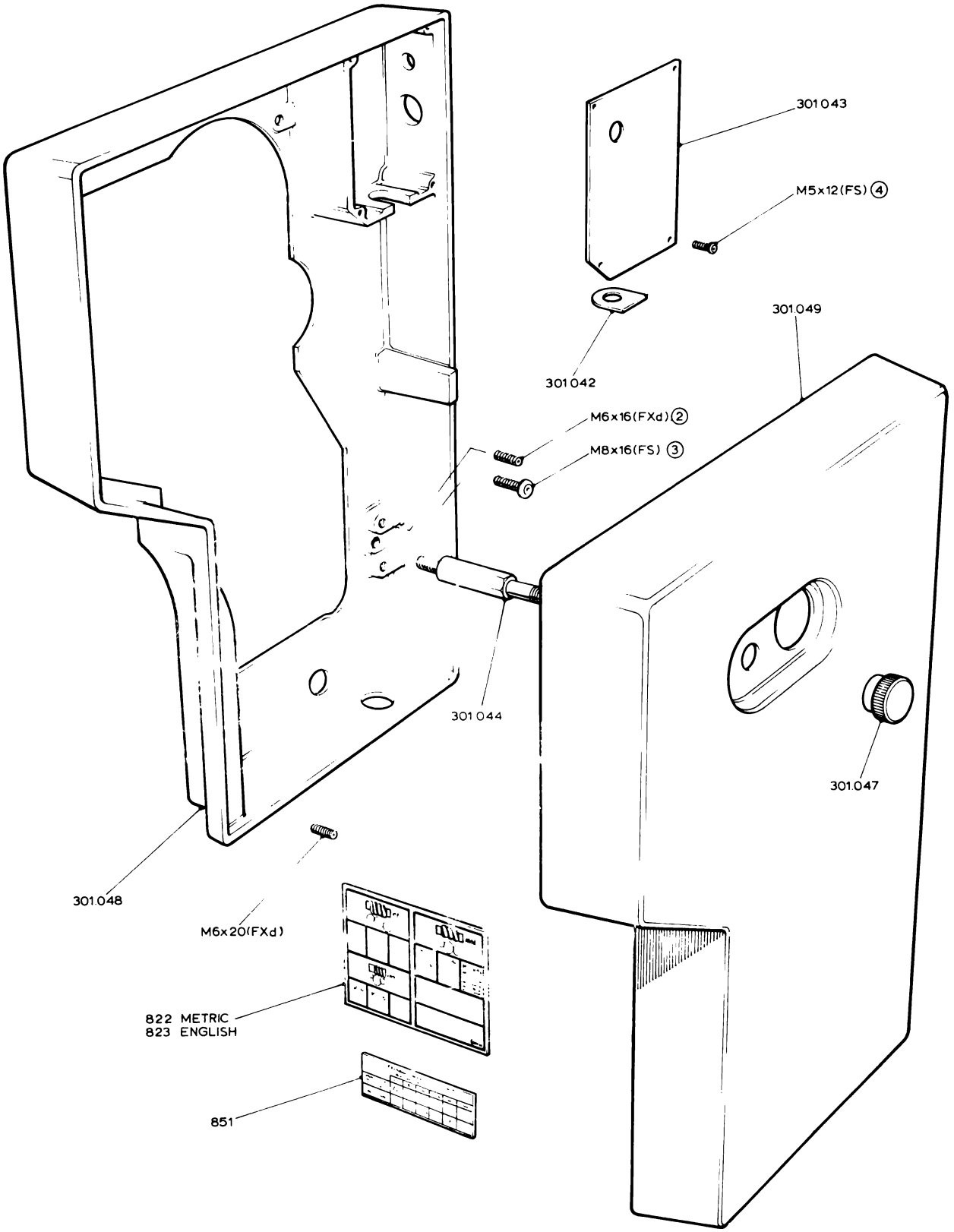
301/2

4 75


301.020
M6x10(FXw)
BJM106RH (SPRINGFIX) ②
M6(FN) ②
301.021
301 018 ④
M6(WN) ④
301 017
M6x40(FY) ④
M3x20(FY) ④
301 027
M3(WN) ④
301 026
301 022
ø4x22(HTP)
301 023
471 12.1(CE)
M12(WN)
M3(SPIRO) ④
M6x25(FS) ③
M6(WK)
301 024
M6x10(FXw)

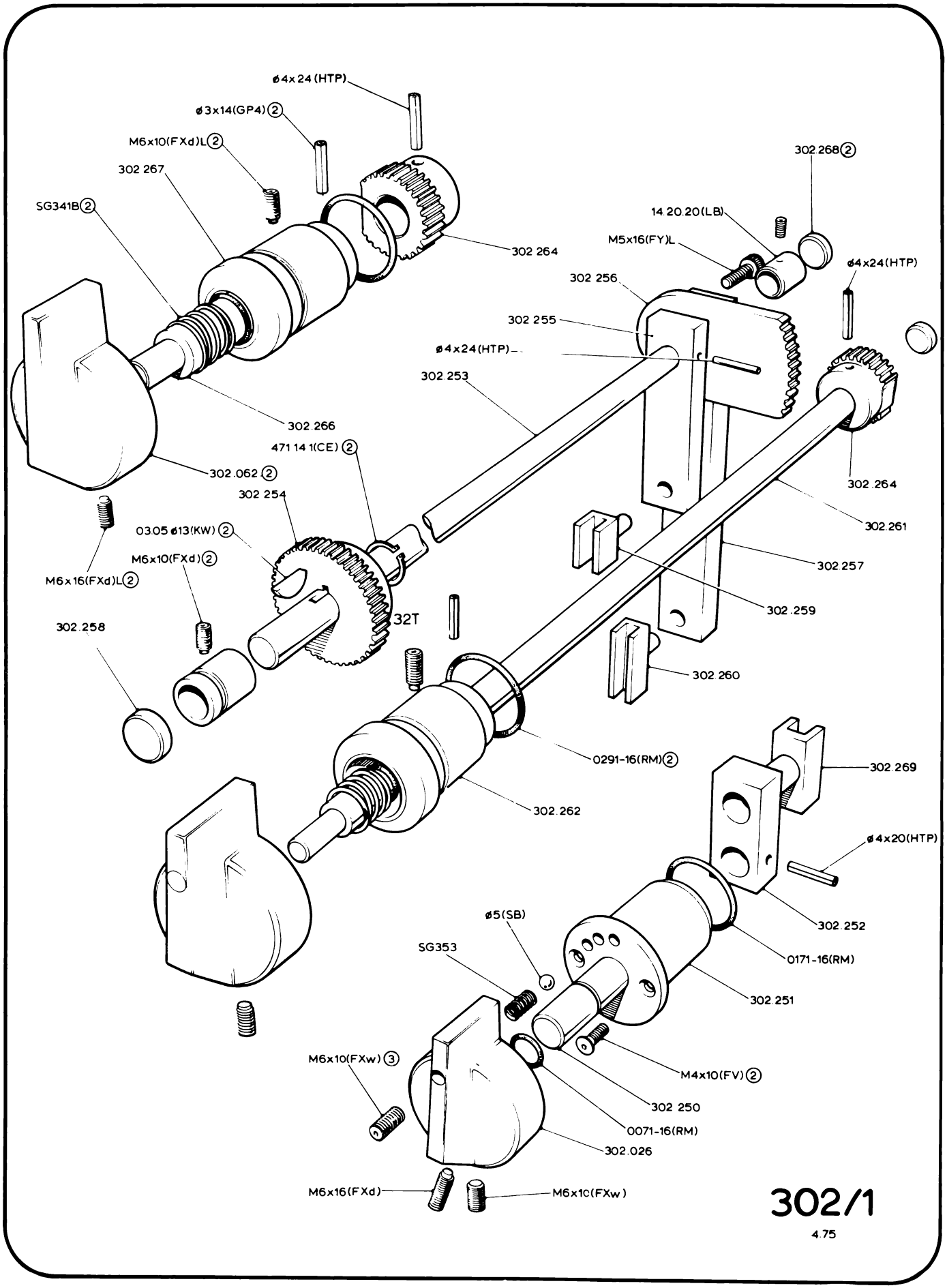
301/3

4.75


301043
M5x12(FS) ④
301049
301042
M6x16(FXd) ②
M8x16(FS) ③
301044
301047
301048
M6x20(FXd)
822 METRIC
823 ENGLISH
851

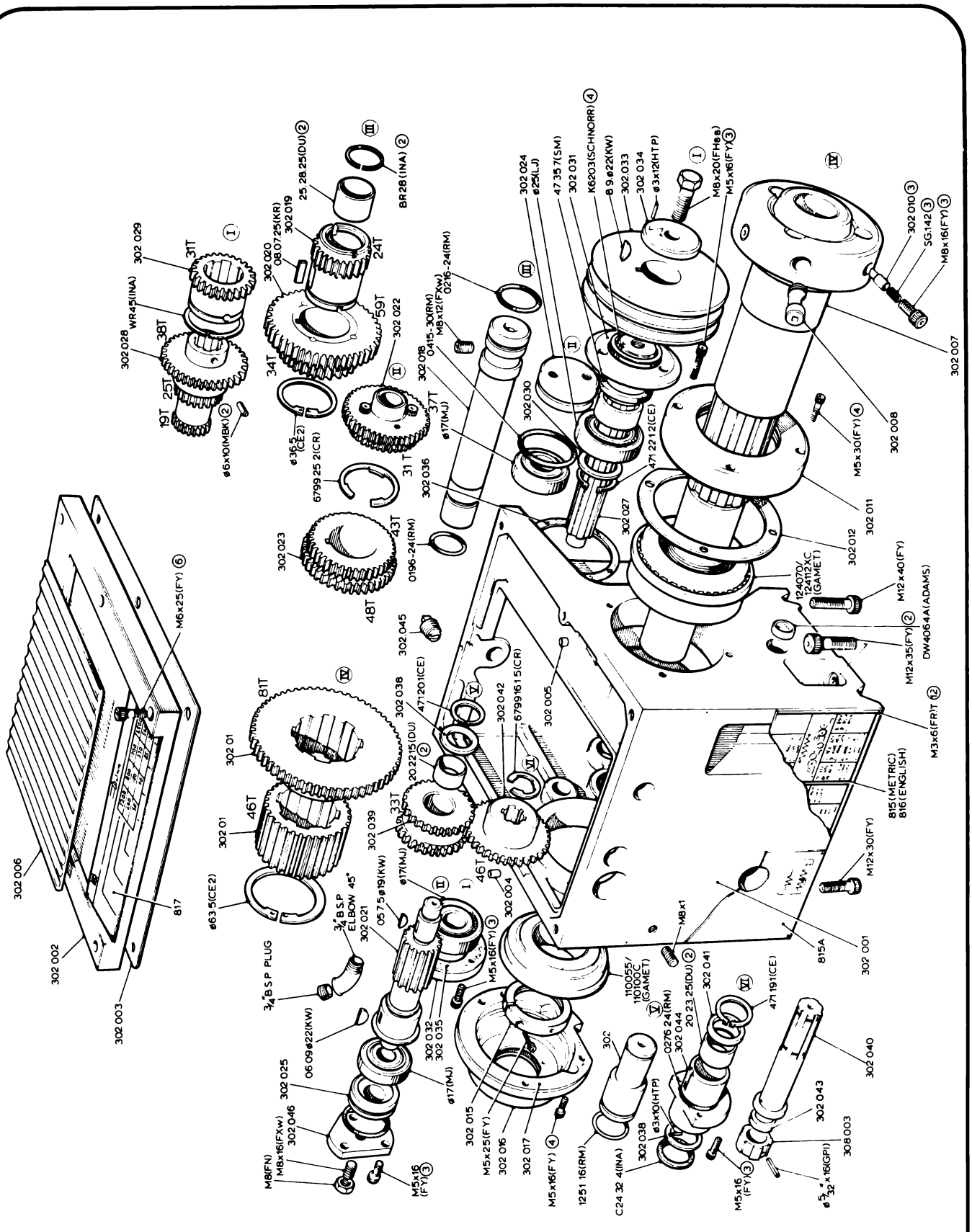
301/4

4.75


ø4x24(HTP)
ø3x14(GP4)②
M6x10(FXd)L②
302.267
SG341B②
302.264
302.266
302.062②
471.14.1(CE)②
302.254
03.05ø13(KW)②
M6x10(FXd)②
M6x16(FXd)L②
302.258
32T
302.268②
14.20.20(LB)
M5x16(FY)L
ø4x24(HTP)
302.256
302.255
ø4x24(HTP)
302.253
302.264
302.261
302.257
302.259
302.260
0291-16(RM)②
302.262
302.269
ø4x20(HTP)
302.252
ø5(SB)
SG353
0171-16(RM)
302.251
M4x10(FV)②
302.250
0071-16(RM)
302.026
M6x10(FXw)③
M6x16(FXd)
M6x10(FXw)

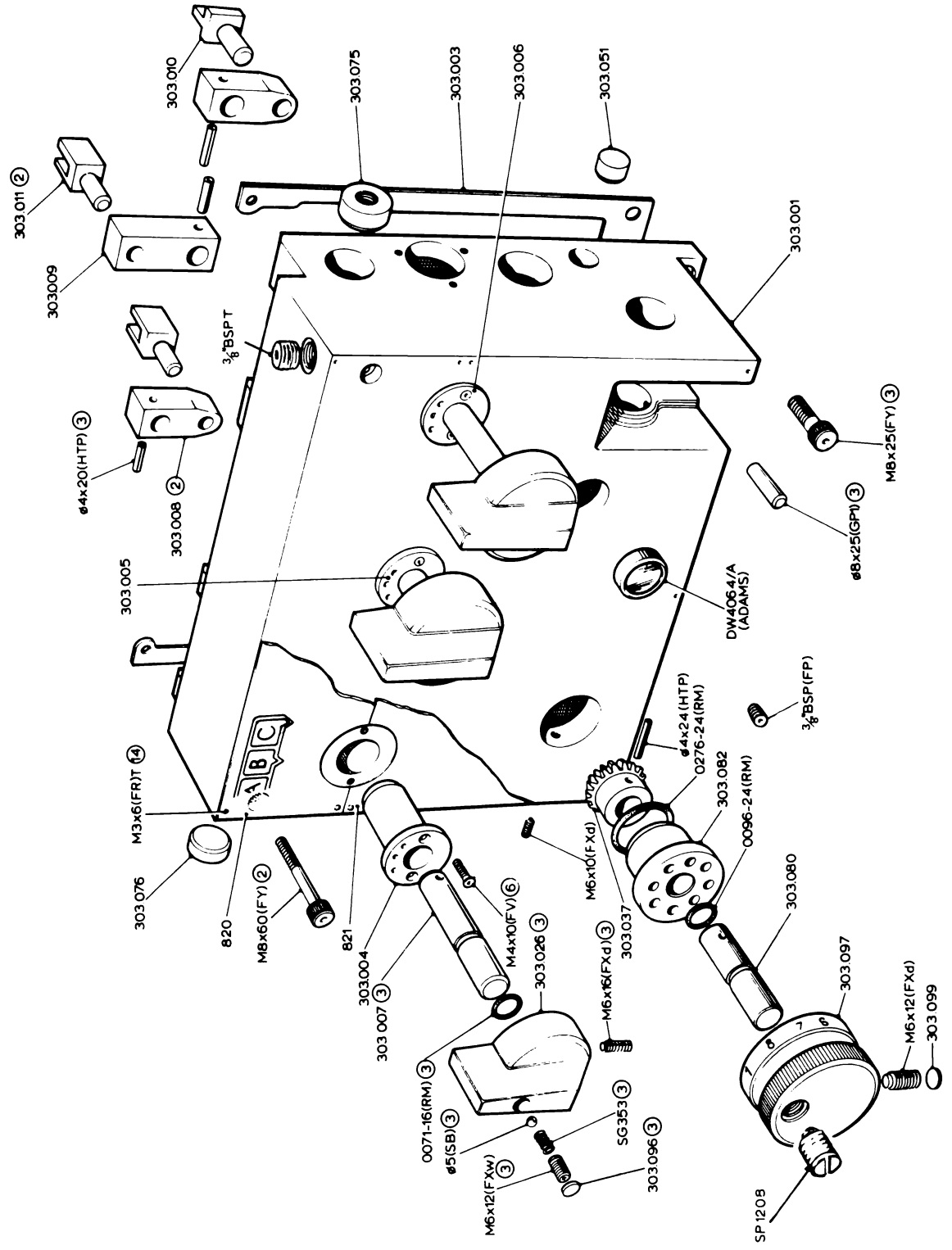
302/1

4.75


302 006
302 002
302 003
817
M6x25(FY) ⑥
302 029
31T
WR45(INA)
302 028
38T
25T
19T
ø6x10(MBK) ②
302 020
08 07 25(KR)
302 019
25 28 25(DU) ②
BR28 (INA) ②
34T
59T
24T
302 022
ø365 (CE2)
6799 25 2(CR)
31T
302 023
43T
48T
0196-24(RM)
302 036
37T
ø17(MJ)
0415-30(RM)
M8x12(FXw)
0216-24(RM)
302 018
302 030
302 024
ø25(LJ)
47357(SM)
302 031
K6203(SCHNORR) ④
B 9.ø22(KW)
302 033
302 034
ø3x12(HTP)
M8x20(FH8.8)
M5x16(FY) ③
302 010 ③
SG142 ③
M8x16(FY) ③
302 007
302 008
M5x30(FY) ④
471 2212(CE)
302 027
302 012
302 011
124070/
124112XC
(GAMET)
M12x40(FY)
M12x35(FY) ②
DW4064A(ADAMS)
M3x6(FR)T ⑫
815(METRIC)
816(ENGLISH)
M12x30(FY)
815A
302 001
M8x1
110055/
110100C
(GAMET)
302 041
471 191(CE)
20 23 25(DU) ②
0276 24(RM)
302 044
ø3x10(HTP)
302 038
C24 32 4(INA)
1251 16(RM)
M5x16(FY) ④
302 015
M5x25(FY)
302 016
302 017
M5x16(FY) ③
ø17(MJ)
302 032
302 035
M5x16
(FY) ③
M8(FN)
M8x16(FXw)
302 046
302 025
06 09 ø22(KW)
3/4" BSP PLUG
3/4" BSP ELBOW 45°
302 021
05 75 ø19(KW)
ø17(MJ)
ø635(CE2)
302 01
46T
81T
302 01
302 039
33T
20 22 15(DU) ②
302 038
471 201(CE)
302 045
302 042
6799 16 15(CR)
302 005
302 004
M5x16(FY) ③
M5x16
(FY) ③
302 040
302 043
308 003
ø5/32"x16(GPI)

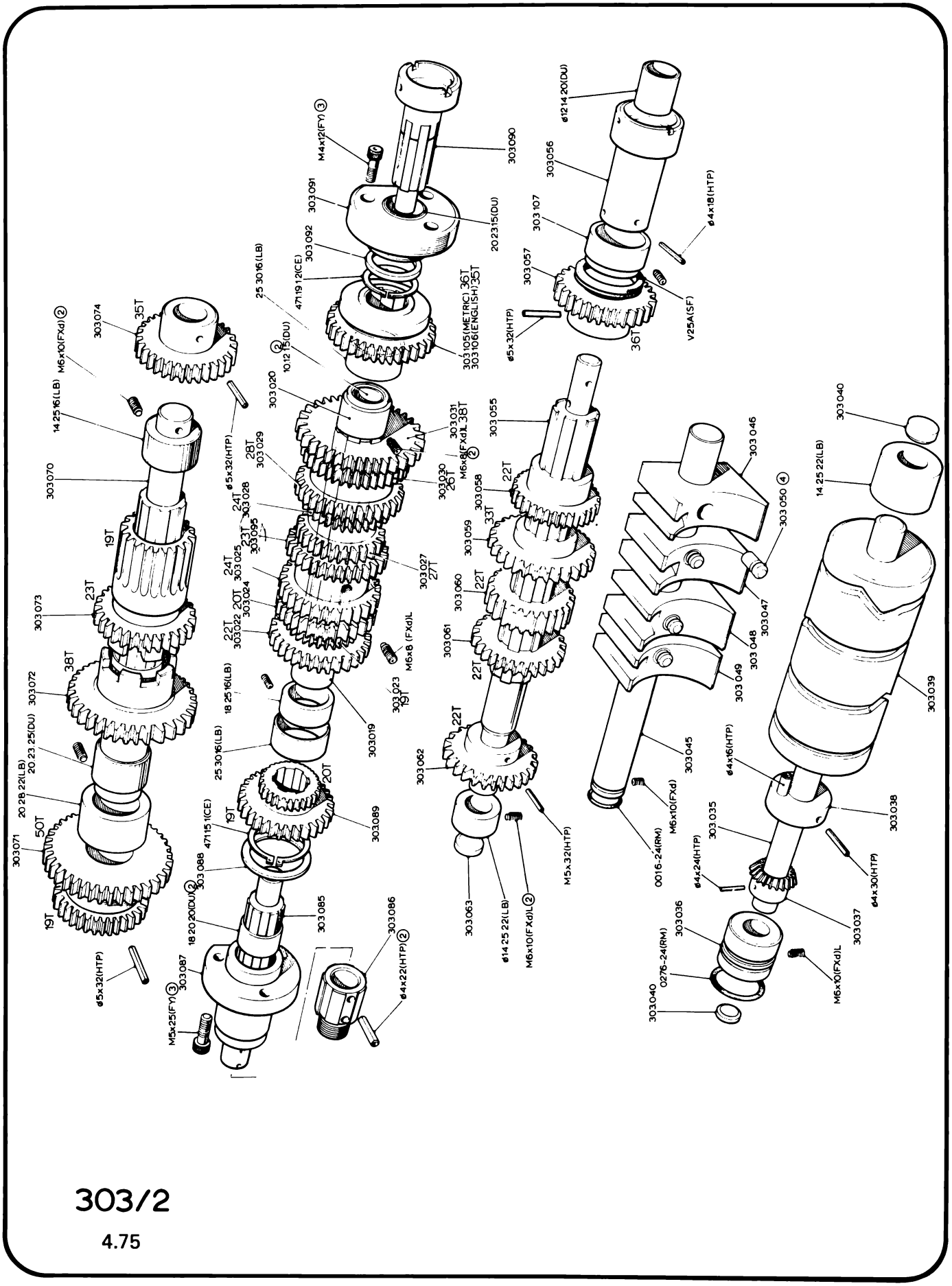
302/2

4.75


303.010
303.075
303.003
303.006
303.051
303.011 (2)
303.009
303.001
3/8"BSPT
ø4x20(HTP) (3)
303.008 (2)
M8x25(FY) (3)
ø8x25(GP1) (3)
303.005
DW4064/A (ADAMS)
3/8"BSP(FP)
ø4x24(HTP)
0276-24(RM)
303.082
0096-24(RM)
M3x6(FR)T (4)
303.076
820
M8x60(FY) (2)
821
303.004
303.007 (3)
M4x10(FY) (6)
303.026 (3)
M6x10(FXd)
303.037
M6x16(FXd) (3)
303.080
303.097
M6x12(FXd)
303.099
0071-16(RM) (3)
ø5(SB) (3)
M6x12(FXw) (3)
SG353 (3)
303.096 (3)
SP1208

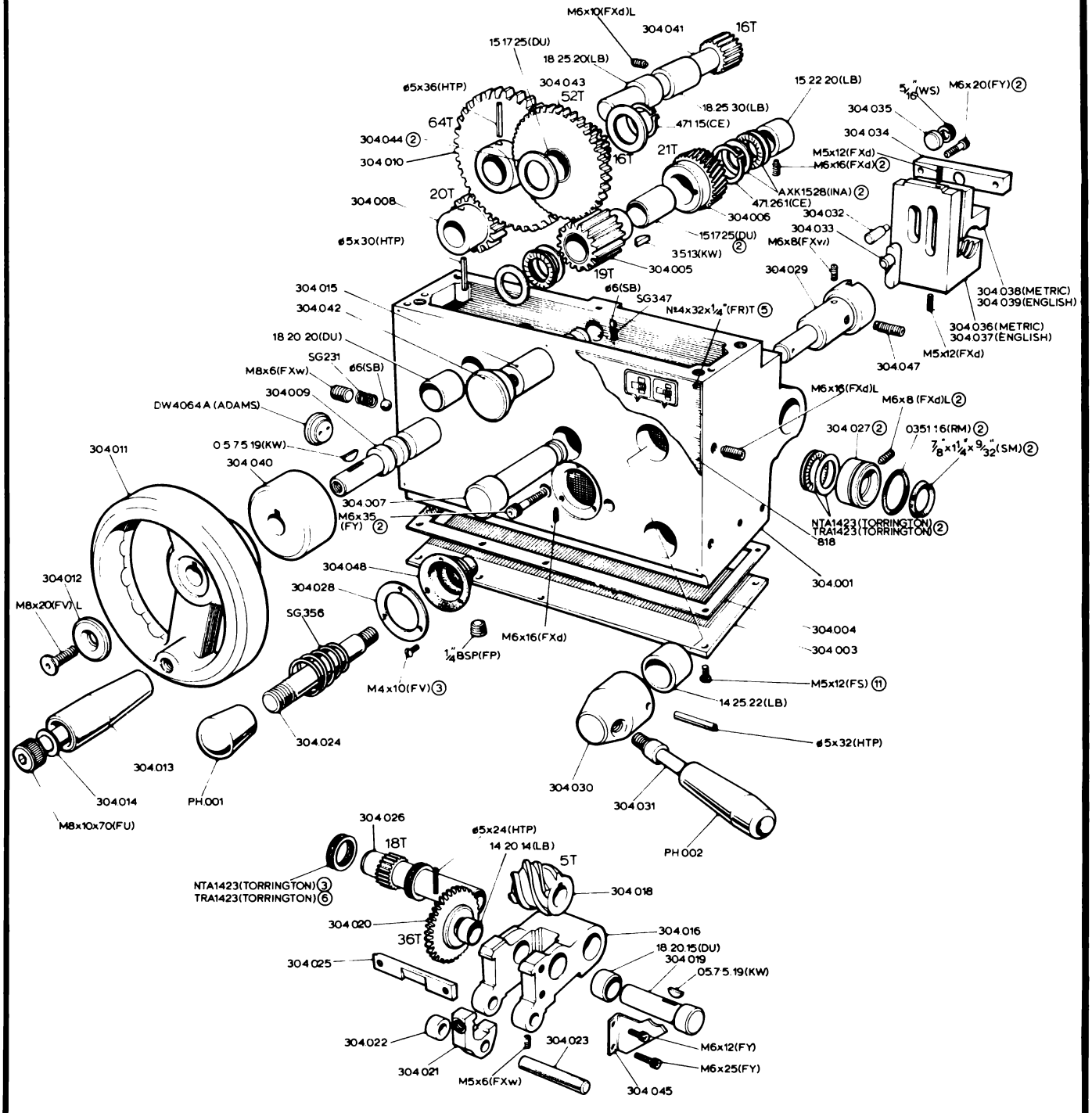
303/1

4.75


303071
20 28 22(LB)
20 23 25(DU)
303072
303073
303074
M6x10(FXd) ②
14 25 16(LB)
303070
35T
19T
23T
38T
50T
19T
ø5x32(HTP)
M5x25(FY) ③
303087
18 20 20(DU) ②
303088
47115 1(CE)
19T
20T
303089
25 3016(LB)
18 25 16(LB)
303085
303086
ø4x22(HTP) ②
303019
303023
19T
M6x8 (FXd)L
303027
27T
303024
22T
303022
20T
303025
24T
303095
23T
303029
28T
303028
24T
ø5x32(HTP)
303020
10 12 15(DU) ②
25 3016(LB)
47119 1(CE)
303092
303091
M4x12(FY) ③
303090
20 23 15(DU)
303105(METRIC) 36T
303106(ENGLISH) 35T
303031
M6x8(FXd)L 38T ②
303030
26T
303062
22T
303063
ø14 25 22(LB)
M6x10(FXd)L ②
M5x32(HTP)
303061
22T
303060
22T
303059
33T
303058
22T
303055
ø5x32(HTP)
303057
303107
303056
ø12 14 20(DU)
36T
V25A(SF)
ø4x18(HTP)
303050 ④
303047
303048
303049
303046
303045
0016-24(RM)
M6x10(FXd)
ø4x24(HTP)
303035
303036
0276-24(RM)
303040
303040
14 25 22(LB)
ø4x16(HTP)
303038
ø4x30(HTP)
303037
M6x10(FXd)L
303039

303/2

4.75


M6x10(FXd)L
304 041
16T
15 17 25(DU)
18 25 20(LB)
304 043
52T
ø5x36(HTP)
64T
304 044 ②
304 010
16T
15 22 20(LB)
18 25 30(LB)
47 11 5(CE)
21T
5/16"(WS)
M6x20(FY)②
304 035
304 034
M5x12(FXd)
M6x16(FXd)②
AXK1528(INA)②
47 12 61(CE)
304 006
20T
304 008
ø5x30(HTP)
151725(DU)②
3513(KW)
304 005
19T
304 032
304 033
M6x8(FXw)
304 029
304 038(METRIC)
304 039(ENGLISH)
304 036(METRIC)
304 037(ENGLISH)
M5x12(FXd)
304 047
304 015
304 042
ø6(SB)
SG347
N14x32x1/4"(FR)T ⑤
18 20 20(DU)
SG231
M8x6(FXw)
ø6(SB)
304 009
DW4064A (ADAMS)
05 75 19(KW)
304 040
304 011
304 007
M6x35
(FY) ②
M6x16(FXd)L
M6x8 (FXd)L②
304 027②
0351 16(RM)②
7/8"x1 1/4"x 9/32"(SM)②
NTA1423(TORRINGTON)②
TRA1423(TORRINGTON)②
818
304 001
304 048
304 028
SG356
M6x16(FXd)
1/4"BSP(FP)
M4x10(FV)③
304 004
304 003
M5x12(FS) ⑪
14 25 22(LB)
ø5x32(HTP)
304 012
M8x20(FV)L
304 024
304 013
304 014
PH 001
M8x10x70(FU)
304 030
304 031
PH 002
304 026
18T
ø5x24(HTP)
14 20 14(LB)
5T
NTA1423(TORRINGTON)③
TRA1423(TORRINGTON)⑥
304 018
304 020
36T
304 016
18 20 15(DU)
304 019
05 75 19(KW)
304 025
304 022
304 021
M5x6(FXw)
304 023
M6x12(FY)
M6x25(FY)
304 045

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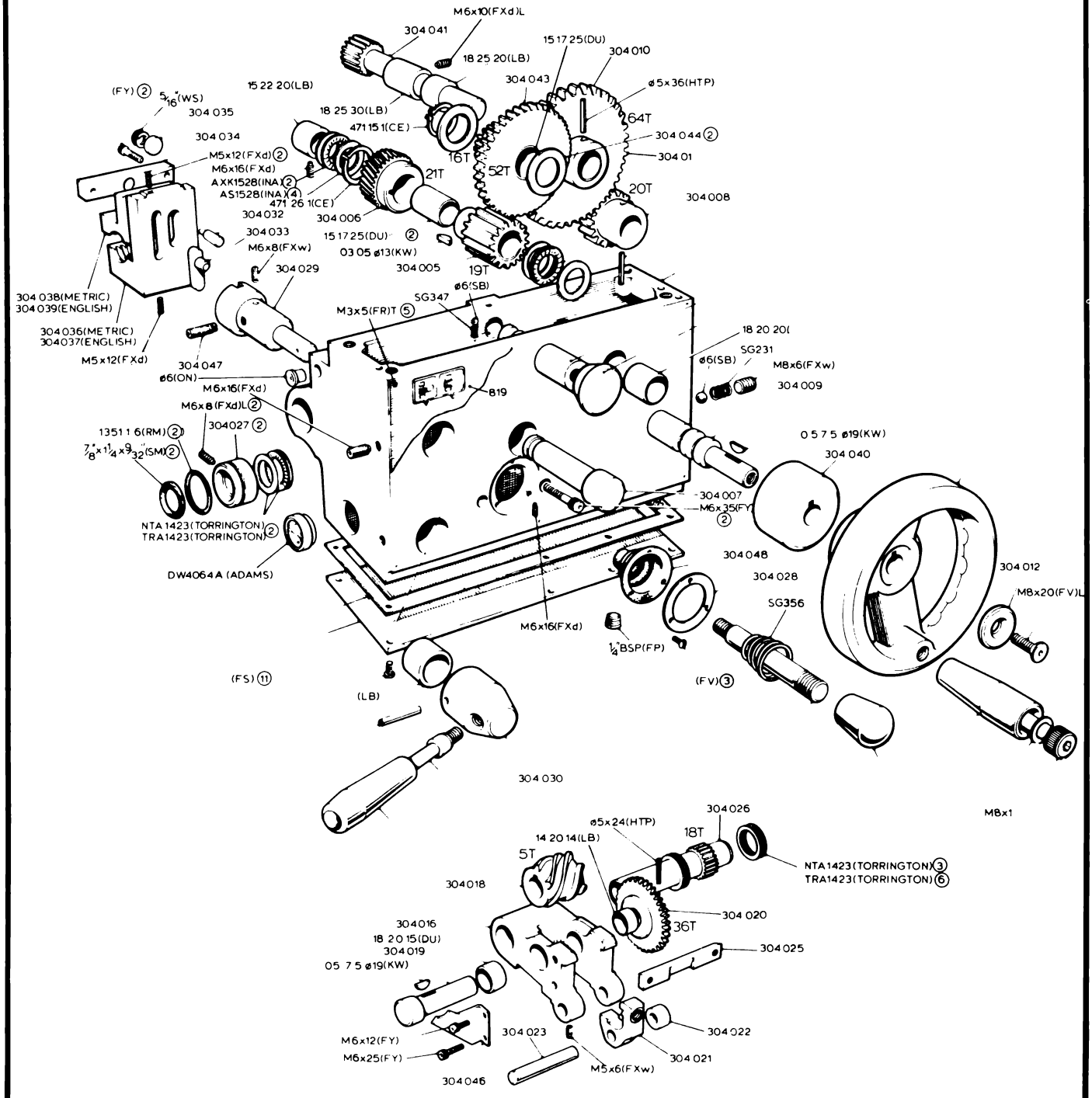
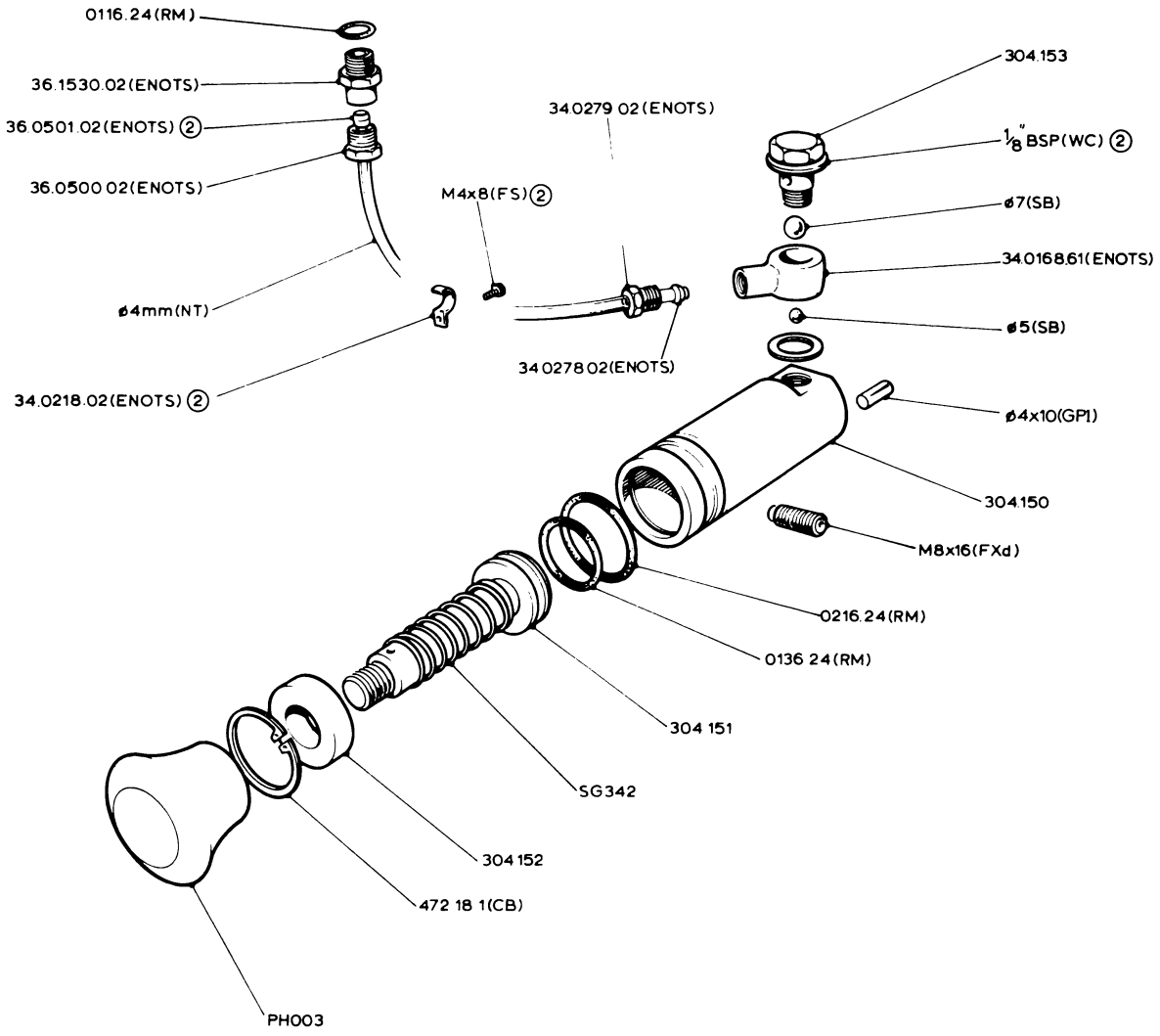
4.75


M6x10(FXd)L
304 041
15 17 25(DU)
304 010
18 25 20(LB)
304 043
ø5x36(HTP)
15 22 20(LB)
(FY) ② 5/16"(WS)
304 035
18 25 30(LB)
64T
471151(CE)
304 044 ②
304 034
M5x12(FXd) ②
M6x16(FXd)
AXK1528(INA) ②
AS1528(INA) ④
471 26 1(CE)
16T
52T
21T
304 01
20T
304 008
304 032
304 006
304 033
15 17 25(DU) ②
03 05 ø13(KW)
M6x8(FXw)
304 029
304 005
19T
ø6(SB)
SG347
304 038(METRIC)
304 039(ENGLISH)
M3x5(FR)T ⑤
18 20 20(
SG231
304 036(METRIC)
304037(ENGLISH)
M5x12(FXd)
ø6(SB)
M8x6(FXw)
304 047
ø6(ON)
819
304 009
M6x16(FXd)
M6x8(FXd)L ②
0 5 7 5 ø19(KW)
135116(RM) ②
304027 ②
304 040
7/8"x1 1/4"x9/32"(SM) ②
304 007
M6x35(FY) ②
NTA 1423(TORRINGTON) ②
TRA1423(TORRINGTON) ②
304 048
304 028
304 012
M8x20(FV)L
DW4064A (ADAMS)
SG356
M6x16(FXd)
1/4"BSP(FP)
(FS) ⑪
(FV) ③
(LB)
304 030
M8x1
304 026
ø5x24(HTP)
18T
14 20 14(LB)
5T
NTA1423(TORRINGTON) ③
TRA1423(TORRINGTON) ⑥
304 018
304 020
304 016
18 20 15(DU)
304 019
36T
304 025
05 7 5 ø19(KW)
M6x12(FY)
304 023
304 022
M6x25(FY)
304 021
M5x6(FXw)
304 046

304/2

475


0116.24(RM)
36.1530.02(ENOTS)
36.0501.02(ENOTS) ②
36.0500 02(ENOTS)
ø4mm(NT)
34.0218.02(ENOTS) ②
M4x8(FS) ②
34.0279 02(ENOTS)
34 0278 02(ENOTS)
304.153
1/8" BSP(WC) ②
ø7(SB)
34.0168.61(ENOTS)
ø5(SB)
ø4x10(GP1)
304.150
M8x16(FXd)
0216.24(RM)
0136 24(RM)
304 151
SG342
304 152
472 18 1(CB)
PH003

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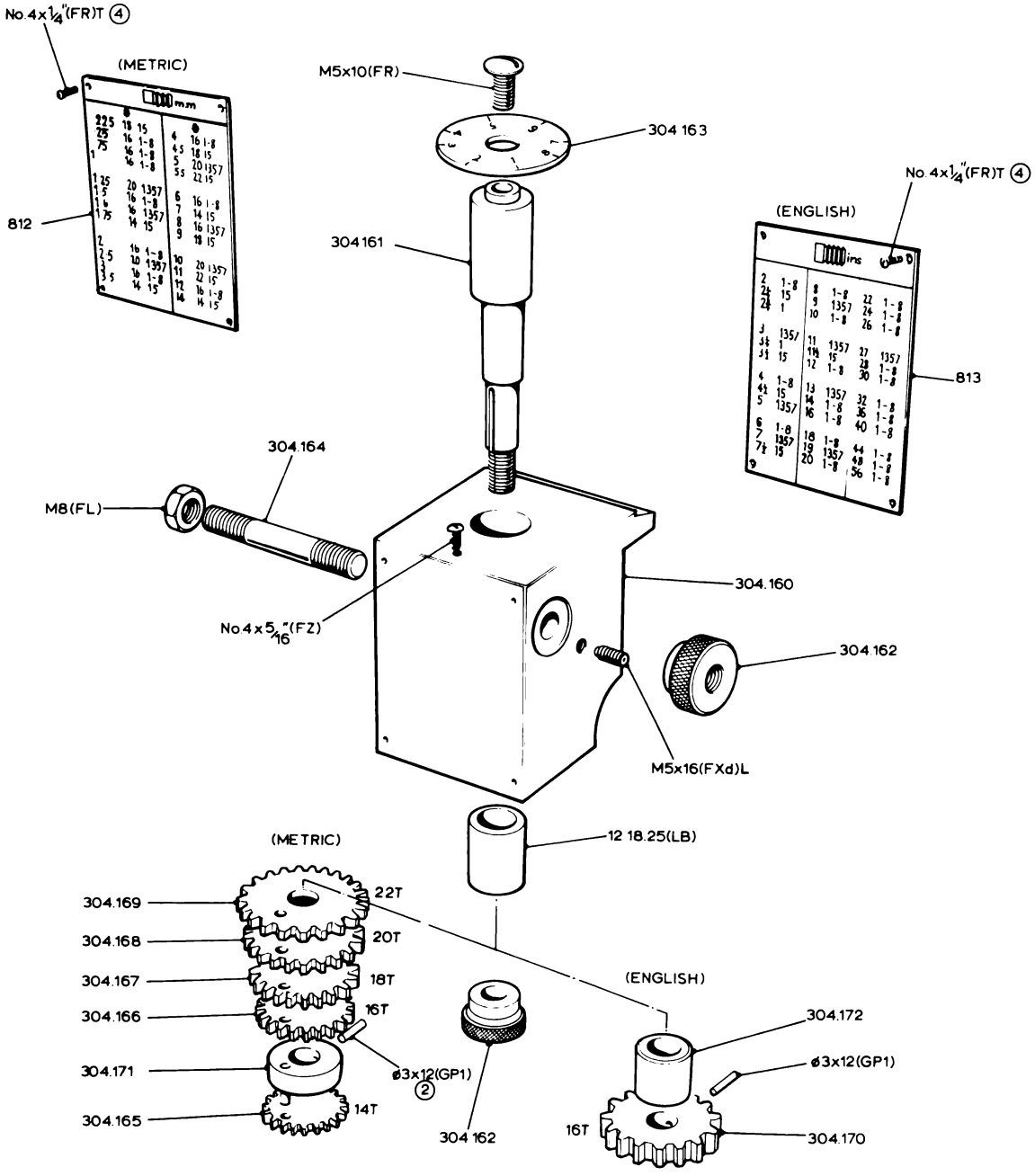
4.75


No.4x1/4"(FR)T ④
(METRIC)
812
M5x10(FR)
304.163
304.161
No.4x1/4"(FR)T ④
(ENGLISH)
813
304.164
M8(FL)
No.4x5/16"(FZ)
304.160
304.162
M5x16(FXd)L
12 18.25(LB)
(METRIC)
304.169
304.168
304.167
304.166
304.171
304.165
22T
20T
18T
16T
14T
ø3x12(GP1) ②
304.162
(ENGLISH)
304.172
ø3x12(GP1)
16T
304.170

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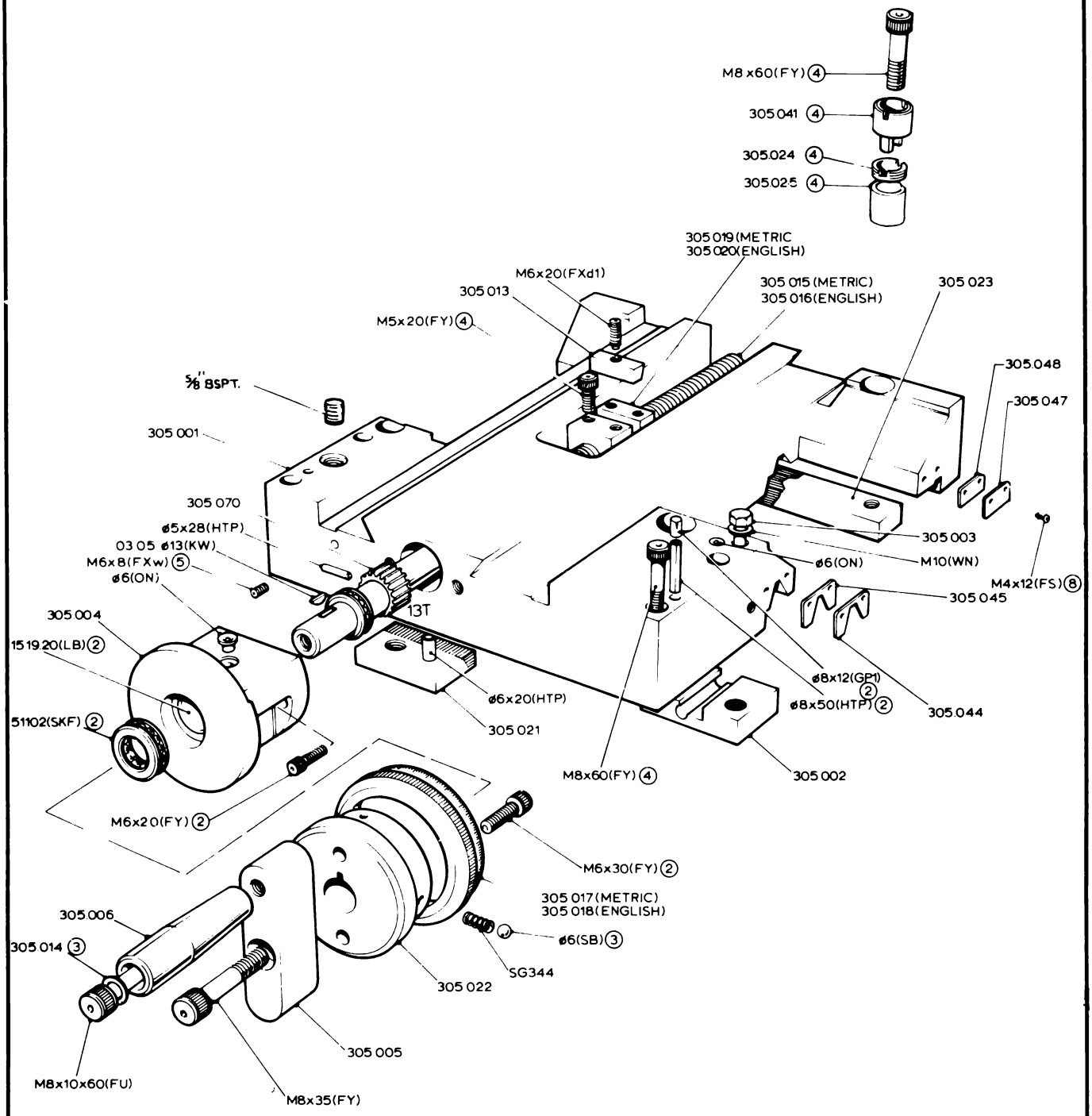
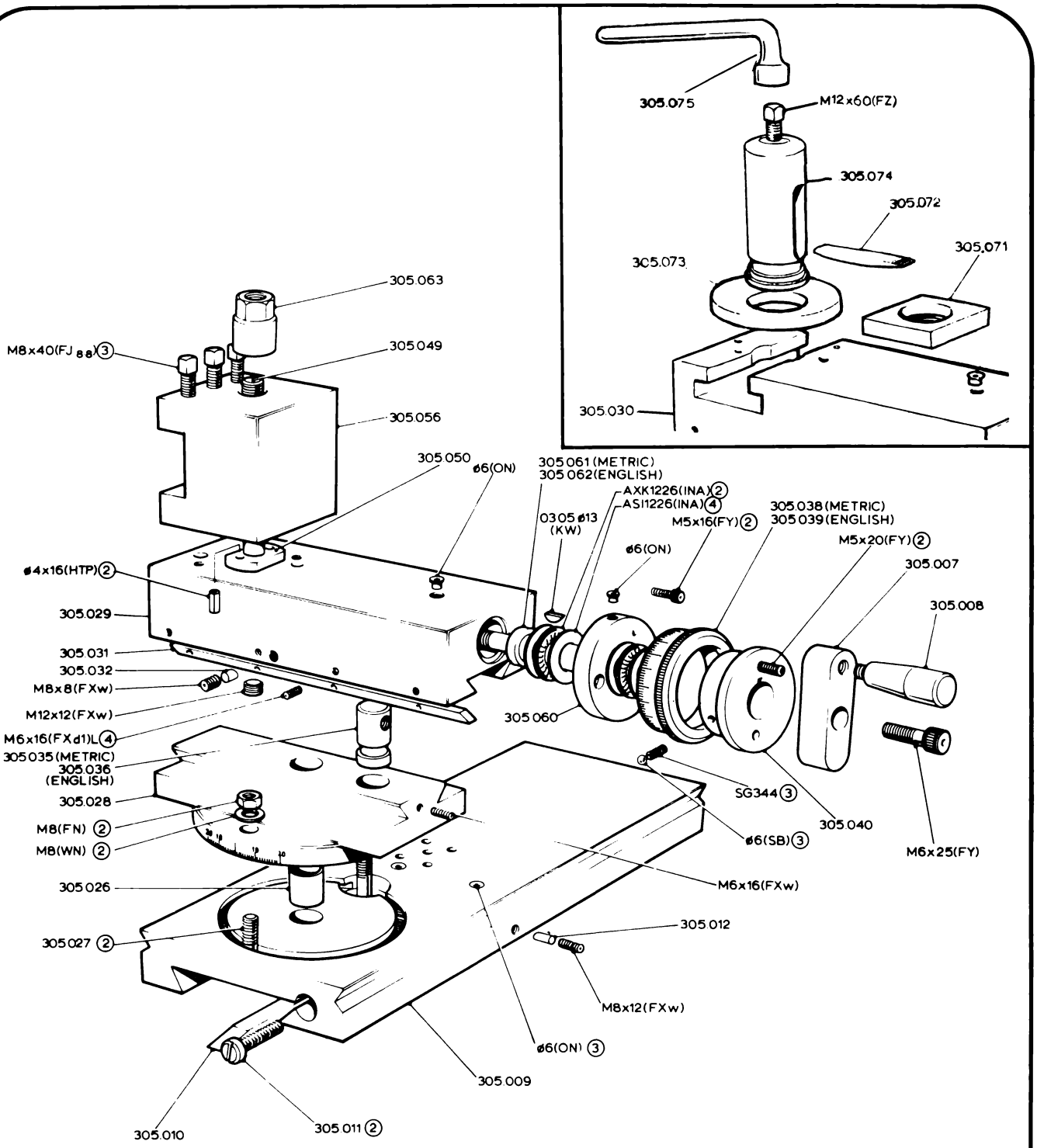
4.75


M8 x60(FY) (4)
305.041 (4)
305.024 (4)
305.025 (4)
305 019(METRIC
305 020(ENGLISH)
M6x20(FXd1)
305 013
M5x20(FY) (4)
305 015 (METRIC)
305 016(ENGLISH)
305 023
305.048
305.047
5/8" BSPT.
305 001
305 070
ø5x28(HTP)
03 05 ø13(KW)
M6x8(FXw) (5)
ø6(ON)
305 003
ø6(ON)
M10(WN)
M4x12(FS) (8)
305 045
13T
305 004
15 19 20(LB) (2)
ø8x12(GP1) (2)
ø8x50(HTP) (2)
305.044
ø6x20(HTP)
305 021
51102(SKF) (2)
M8x60(FY) (4)
305 002
M6x20(FY) (2)
M6x30(FY) (2)
305 017(METRIC)
305 018(ENGLISH)
305.006
305 014 (3)
ø6(SB) (3)
SG344
305 022
305 005
M8x10x60(FU)
M8x35(FY)

305/1

4.75


305.075
M12x60(FZ)
305.074
305.072
305.071
305.073
305.030
305.063
M8x40(FJ 88)③
305.049
305.056
305.050
ø6(ON)
305.061 (METRIC)
305.062(ENGLISH)
AXK1226(INA)②
ASI1226(INA)④
0305ø13
(KW)
M5x16(FY)②
305.038(METRIC)
305.039(ENGLISH)
M5x20(FY)②
ø6(ON)
305.007
305.008
ø4x16(HTP)②
305.029
305.031
305.032
M8x8(FXw)
M12x12(FXw)
M6x16(FXd1)L④
305.035(METRIC)
305.036
(ENGLISH)
305.028
M8(FN) ②
M8(WN) ②
305.026
305.027 ②
305.060
SG344③
305.040
ø6(SB)③
M6x25(FY)
M6x16(FXw)
305.012
M8x12(FXw)
ø6(ON) ③
305.009
305.010
305.011 ②

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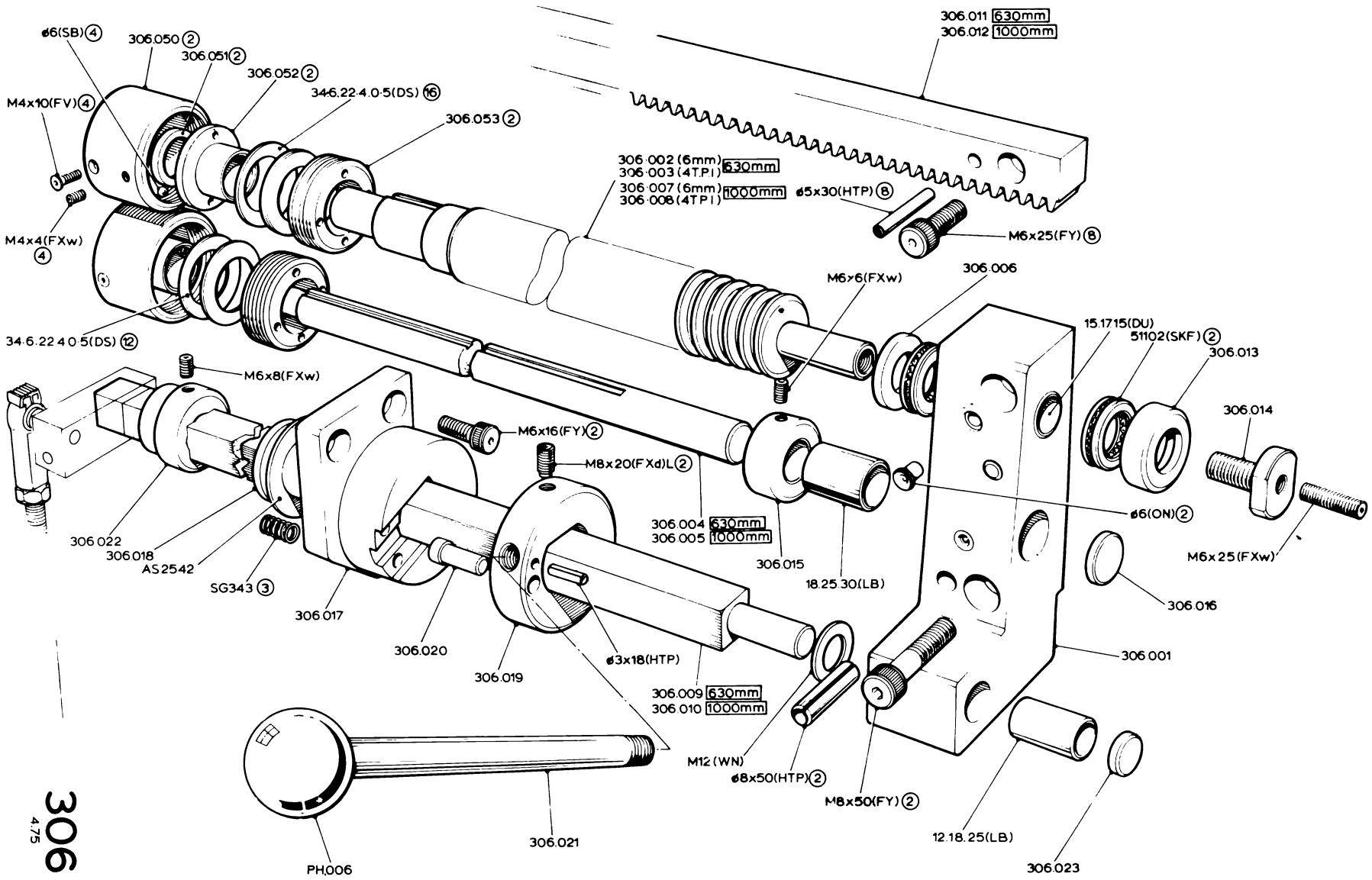
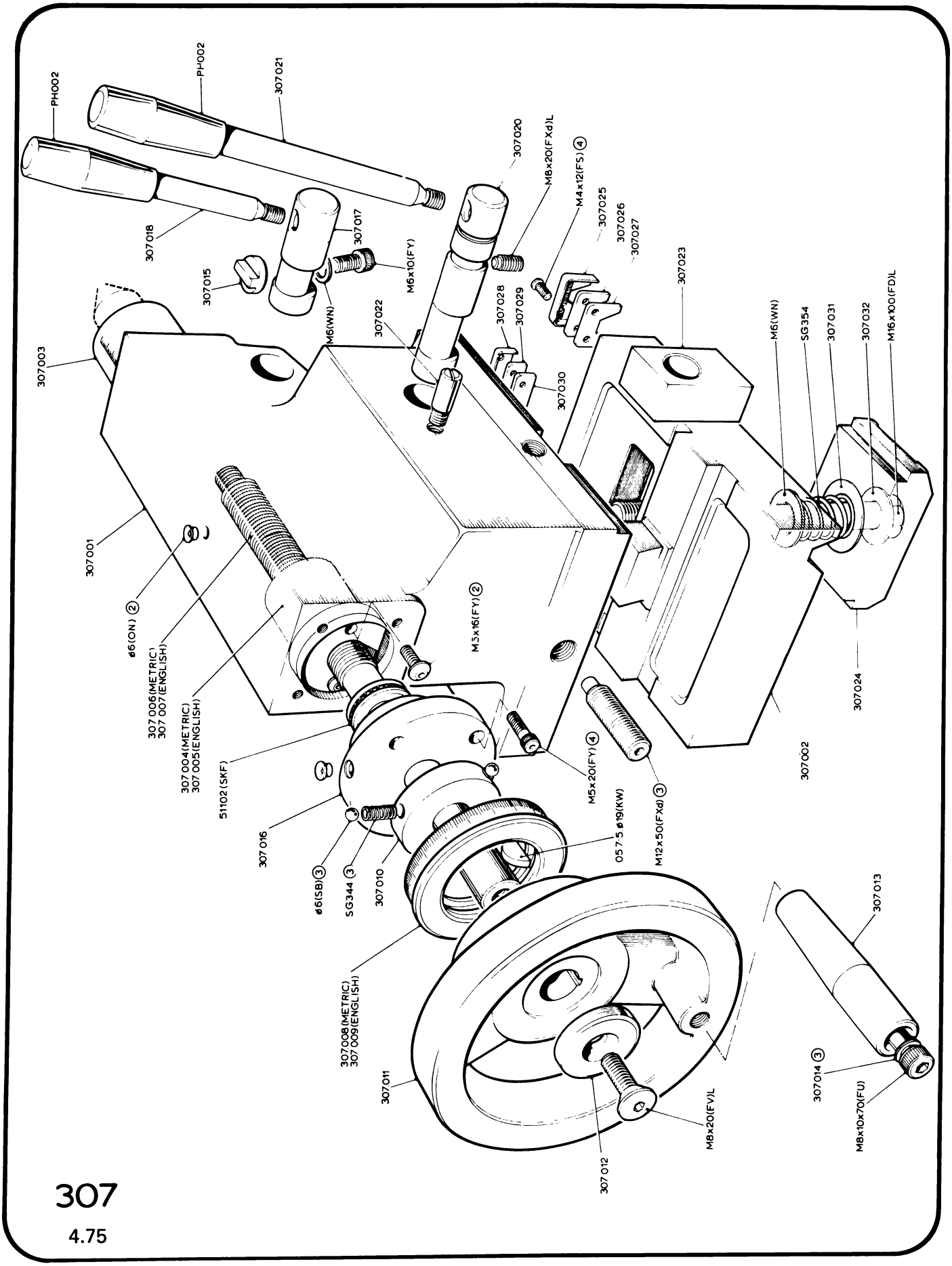
4.75

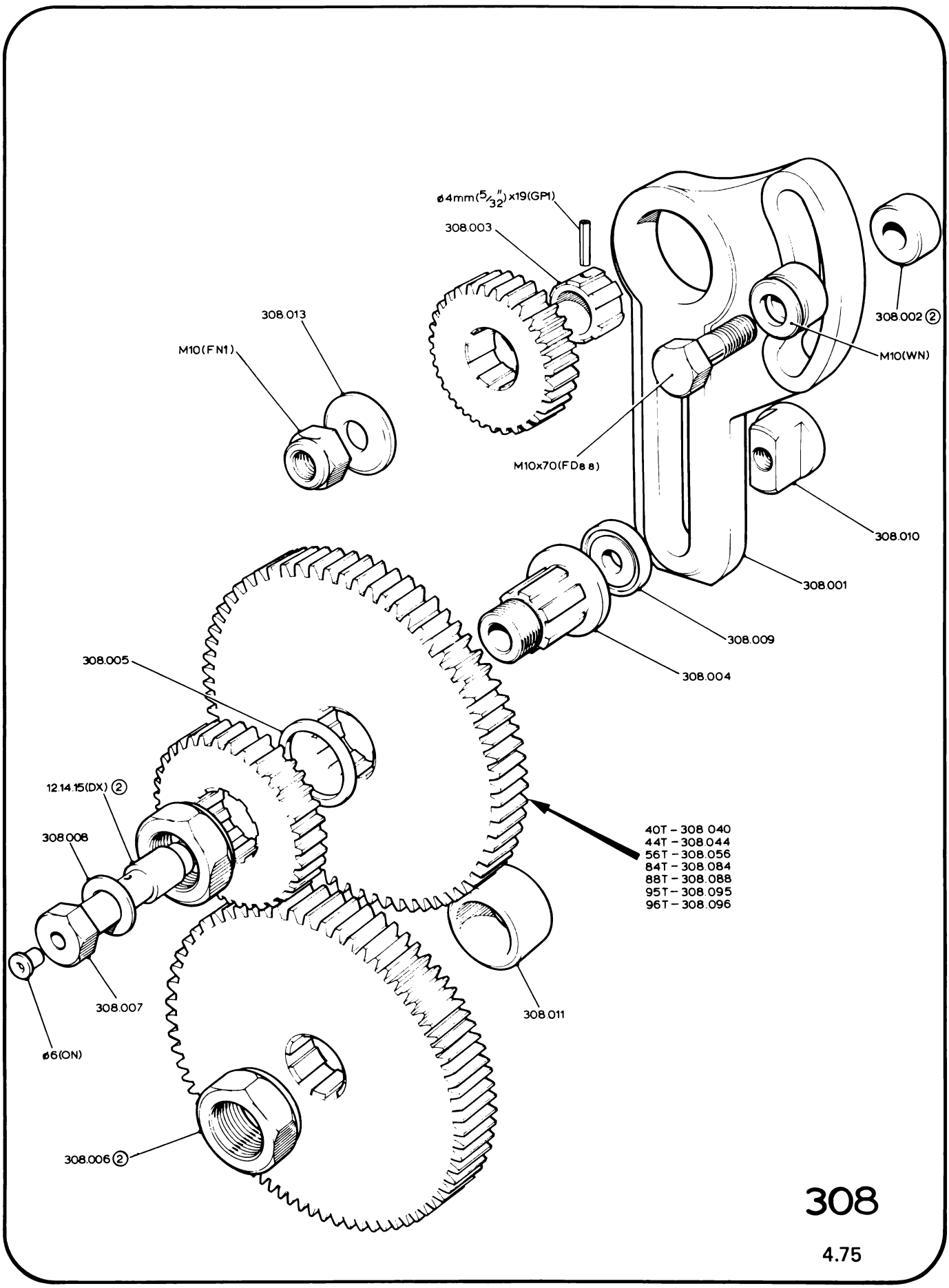

306.011 630mm
306.012 1000mm
ø6(SB) (4)
306.050 (2)
306.051 (2)
306.052 (2)
34.6.22.4.0.5(DS) (16)
306.053 (2)
M4x10(FV) (4)
M4x4(FXw) (4)
306·002 (6mm) 630mm
306·003 (4T.P.I.)
306·007 (6mm) 1000mm
306·008 (4T.P.I.)
ø5x30(HTP) (8)
M6x25(FY) (8)
M6x6(FXw)
306.006
34.6.22.4.0.5(DS) (12)
15.17.15(DU)
51102(SKF) (2)
306.013
306.014
M6x8(FXw)
M6x16(FY) (2)
M8x20(FXd)L (2)
ø6(ON) (2)
306.004 630mm
306.005 1000mm
306.015
18.25.30(LB)
M6x25(FXw)
306.022
306.018
AS2542
SG343 (3)
306.017
306.016
306.020
306.019
ø3x18(HTP)
306.001
306.009 630mm
306.010 1000mm
M12 (WN)
ø8x50(HTP) (2)
M8x50(FY) (2)
12.18.25(LB)
306.021
306.023
PH.006

306
4.75


PH002
PH002
307021
307018
307017
307015
M6(WN)
M6x10(FY)
307020
M8x20(FXd)L
M4x12(FS) ④
307025
307026
307027
307023
307028
307029
307030
307022
307003
M6(WN)
SG354
307031
307032
M16x100(FD)L
307001
ø6(ON) ②
307006(METRIC)
307007(ENGLISH)
307004(METRIC)
307005(ENGLISH)
M5x16(FY) ②
307024
307002
51102(SKF)
M5x20(FY) ④
M12x50(FXd) ③
307016
ø6(SB) ③
SG344 ③
307010
057-5 ø19(KW)
307008(METRIC)
307009(ENGLISH)
307011
307012
M8x20(FV)L
307013
307014 ③
M8x10x70(FU)

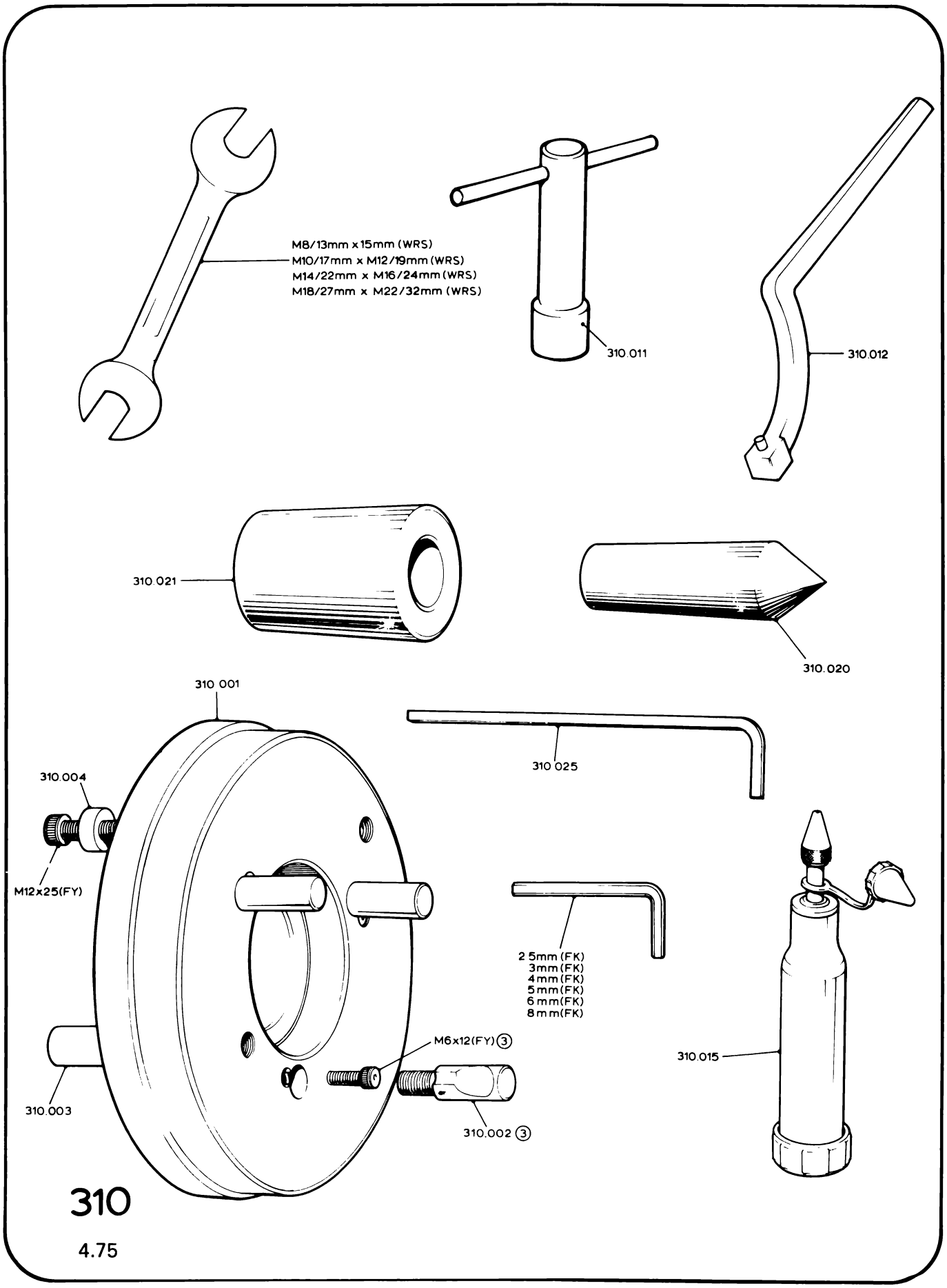
307

4.75


ø4mm(5/32") x19(GPI)
308.003
308.013
M10(FNI)
308.002 ②
M10(WN)
M10x70(FD8.8)
308.010
308.001
308.009
308.004
308.005
12.14.15(DX) ②
308.008
40T - 308.040
44T - 308.044
56T - 308.056
84T - 308.084
88T - 308.088
95T - 308.095
96T - 308.096
308.007
308.011
ø6(ON)
308.006 ②

308

4.75


M8/13mm x 15mm (WRS)
M10/17mm x M12/19mm (WRS)
M14/22mm x M16/24mm (WRS)
M18/27mm x M22/32mm (WRS)
310.011
310.012
310.021
310.020
310.001
310.025
310.004
M12x25(FY)
2.5mm (FK)
3mm (FK)
4mm (FK)
5mm (FK)
6mm (FK)
8mm (FK)
310.015
M6x12(FY) (3)
310.003
310.002 (3)

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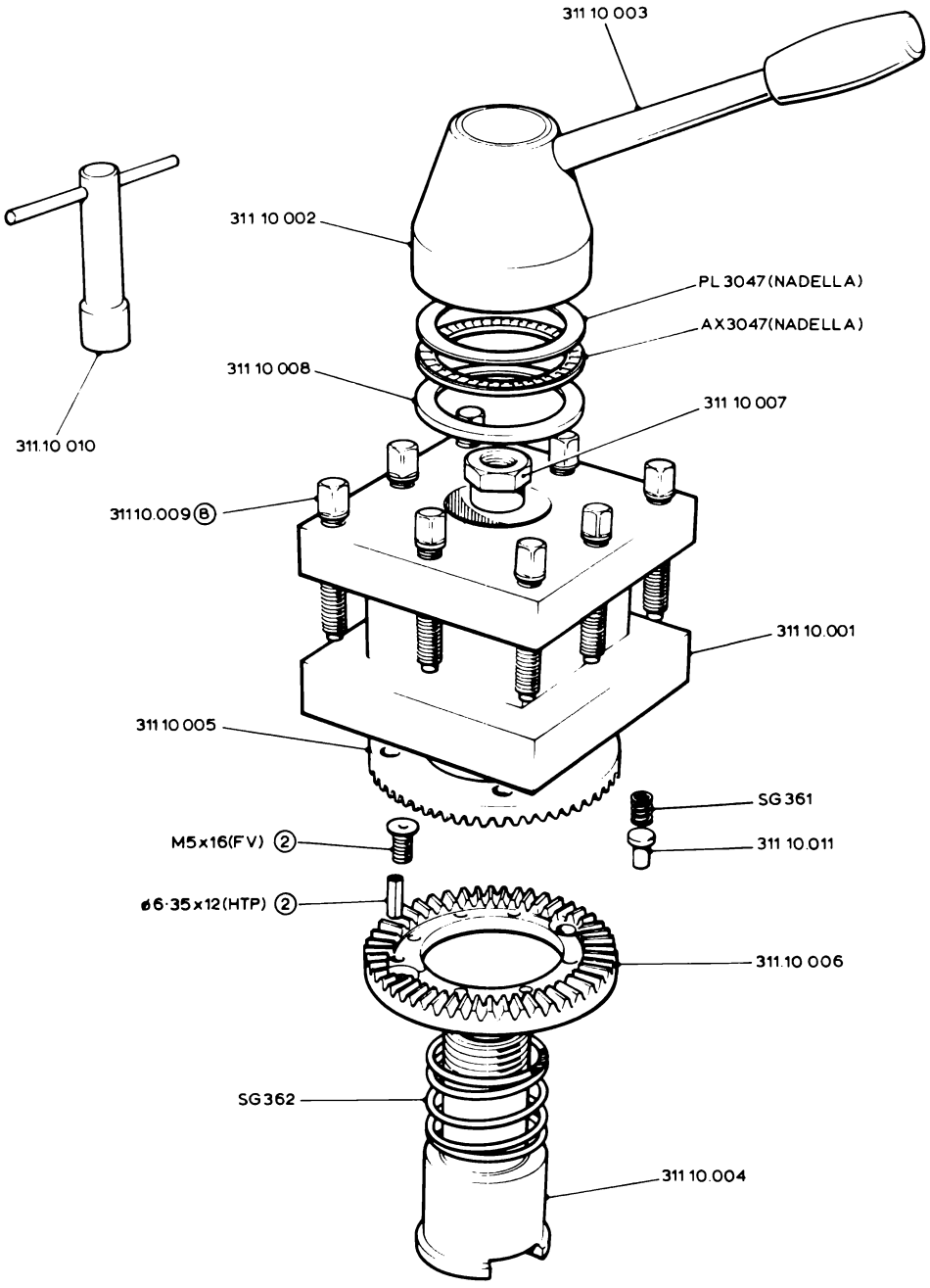
311 10 003
311 10 002
PL 3047(NADELLA)
AX3047(NADELLA)
311 10 008
311 10 007
311.10 010
31110.009 (8)
311 10.001
311 10.005
SG 361
M5x16(FV) (2)
311 10.011
ø6·35x12(HTP) (2)
311.10 006
SG 362
311 10.004

311.10

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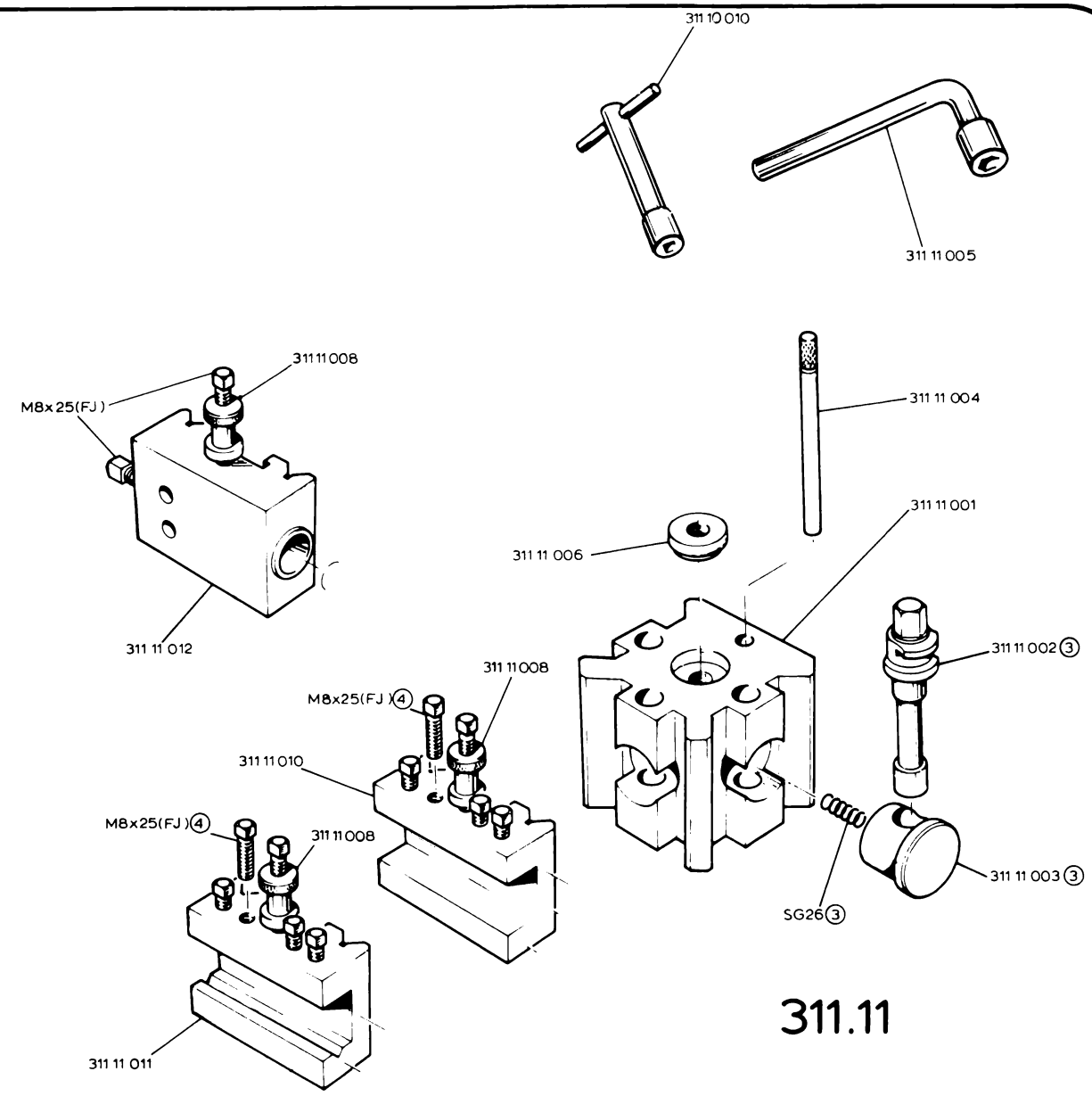
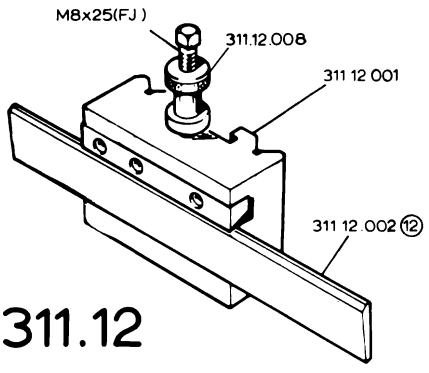
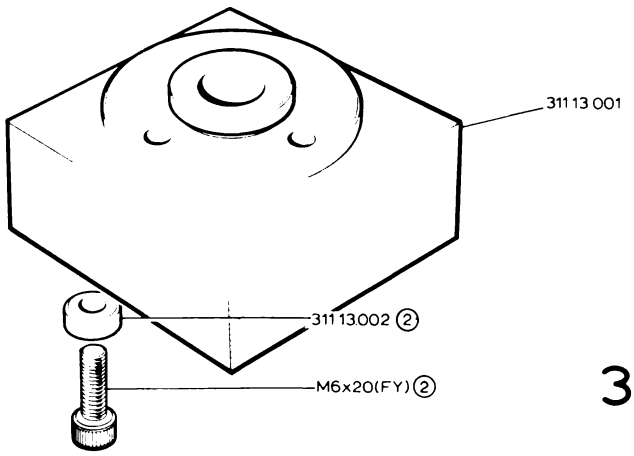


311.11



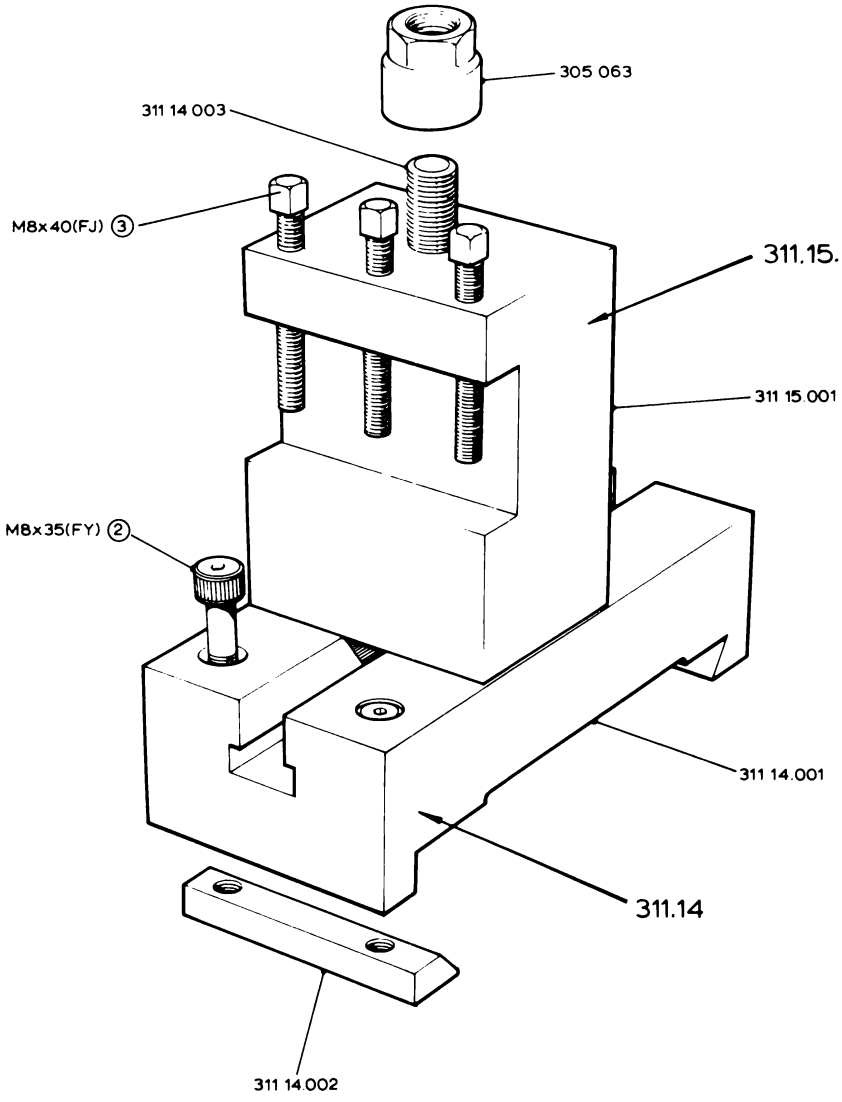
311.12



311.13

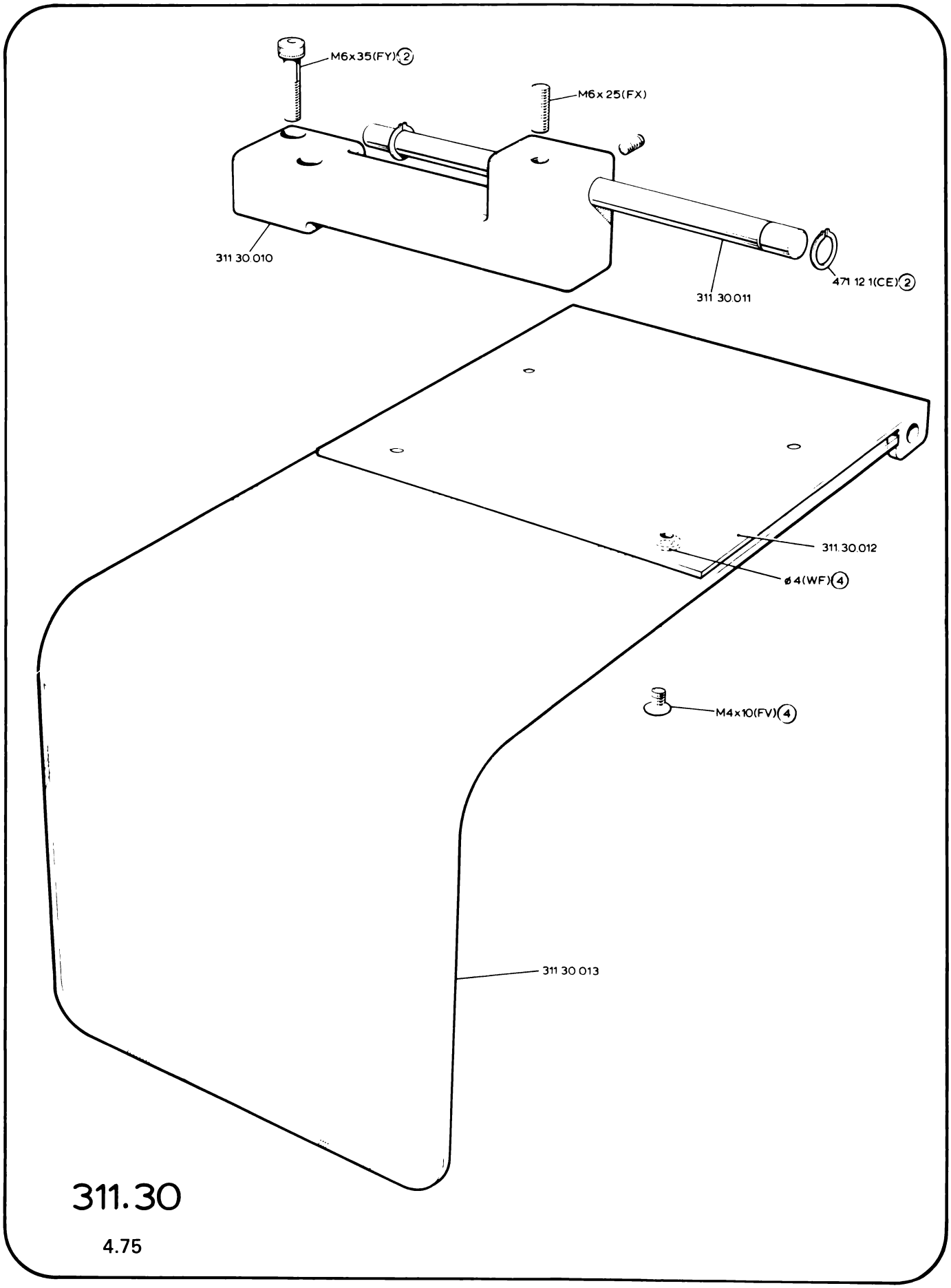
311.11-12-13

4.75


305 063
311 14 003
M8x40(FJ) ③
311.15.
311 15.001
M8x35(FY) ②
311 14.001
311.14
311 14.002

311.14-15

4.75


M6x35(FY)(2)
M6x25(FX)
311 30.010
311 30.011
471 12 1(CE)(2)
311.30.012
ø4(WF)(4)
M4x10(FV)(4)
311 30.013

311.30

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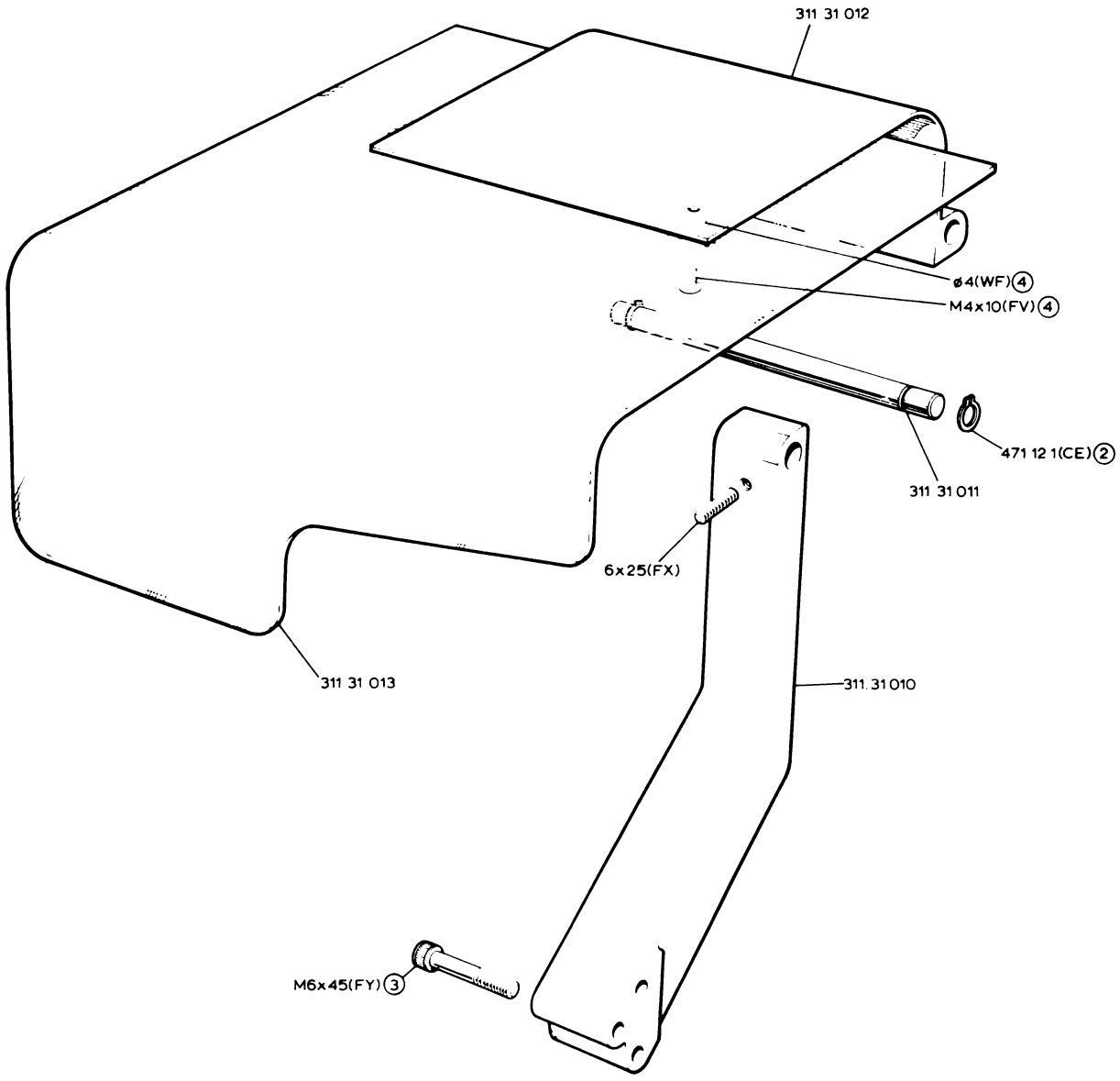
311 31 012
ø4(WF)④
M4x10(FV)④
471 12 1(CE)②
311 31 011
6x25(FX)
311 31 013
311.31010
M6x45(FY)③

311.31

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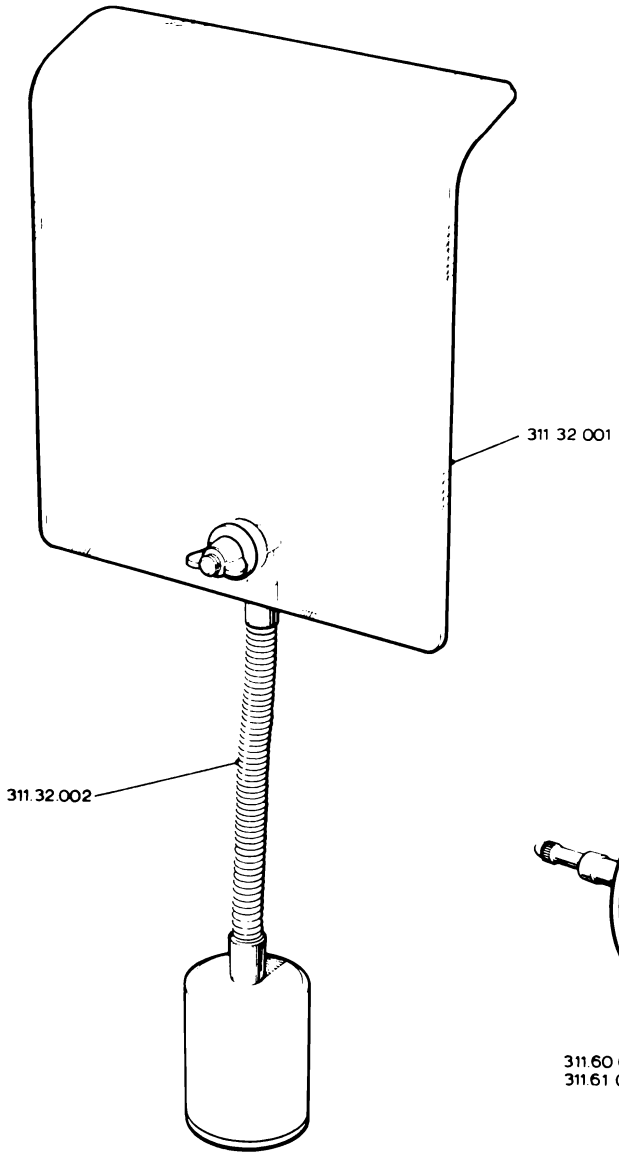

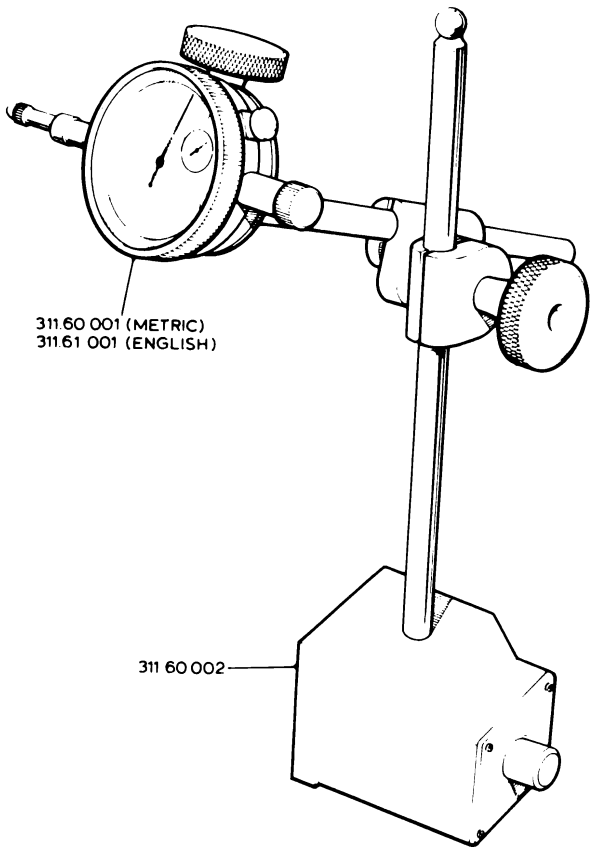

311.60-61

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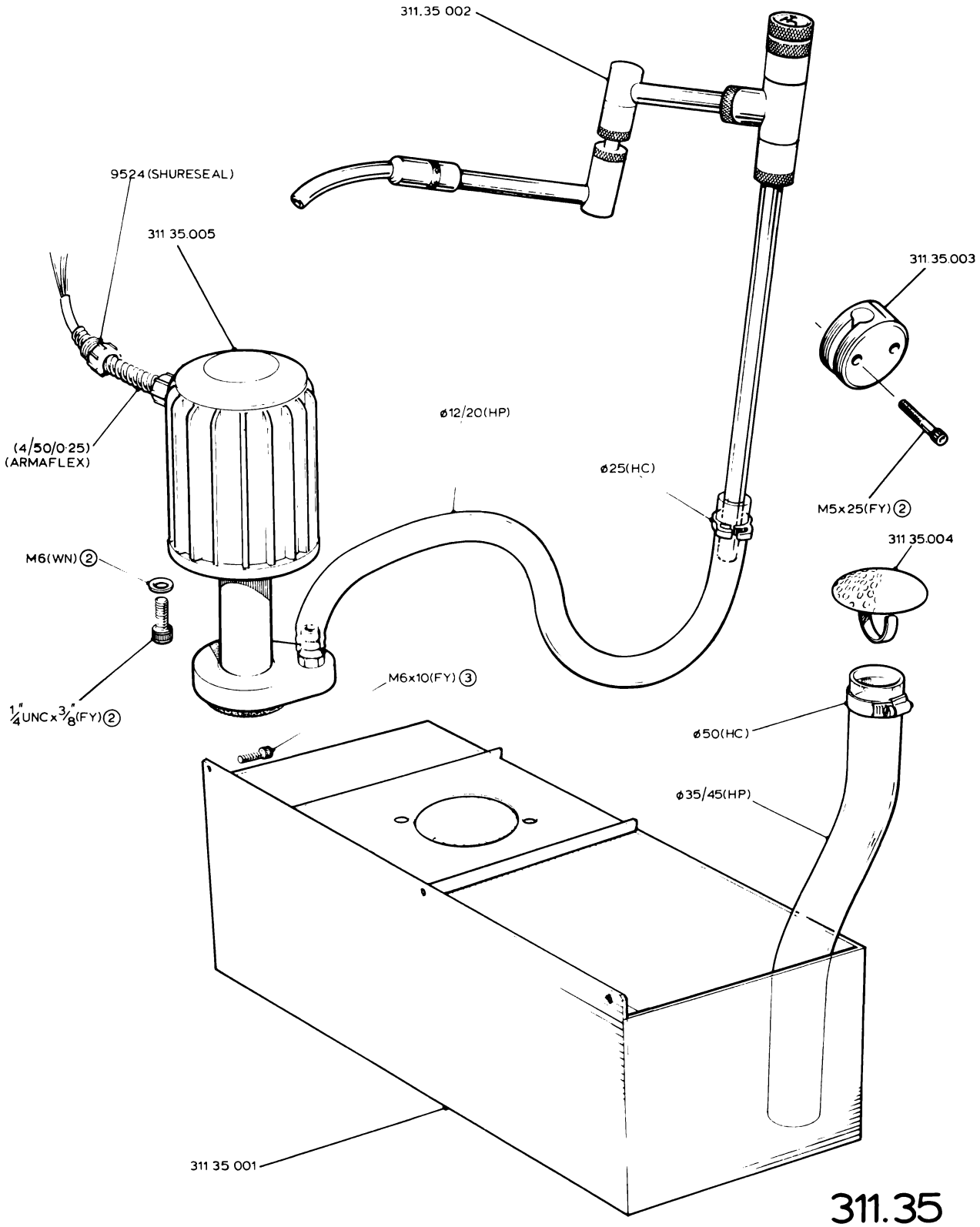
311.35 002
9524 (SHURESEAL)
311 35.005
311.35.003
ø12/20(HP)
(4/50/0·25)
(ARMAFLEX)
ø25(HC)
M5x25(FY) ②
311.35.004
M6(WN) ②
M6x10(FY) ③
1/4"UNC x 3/8"(FY) ②
ø50(HC)
ø35/45(HP)
311 35 001

311.35

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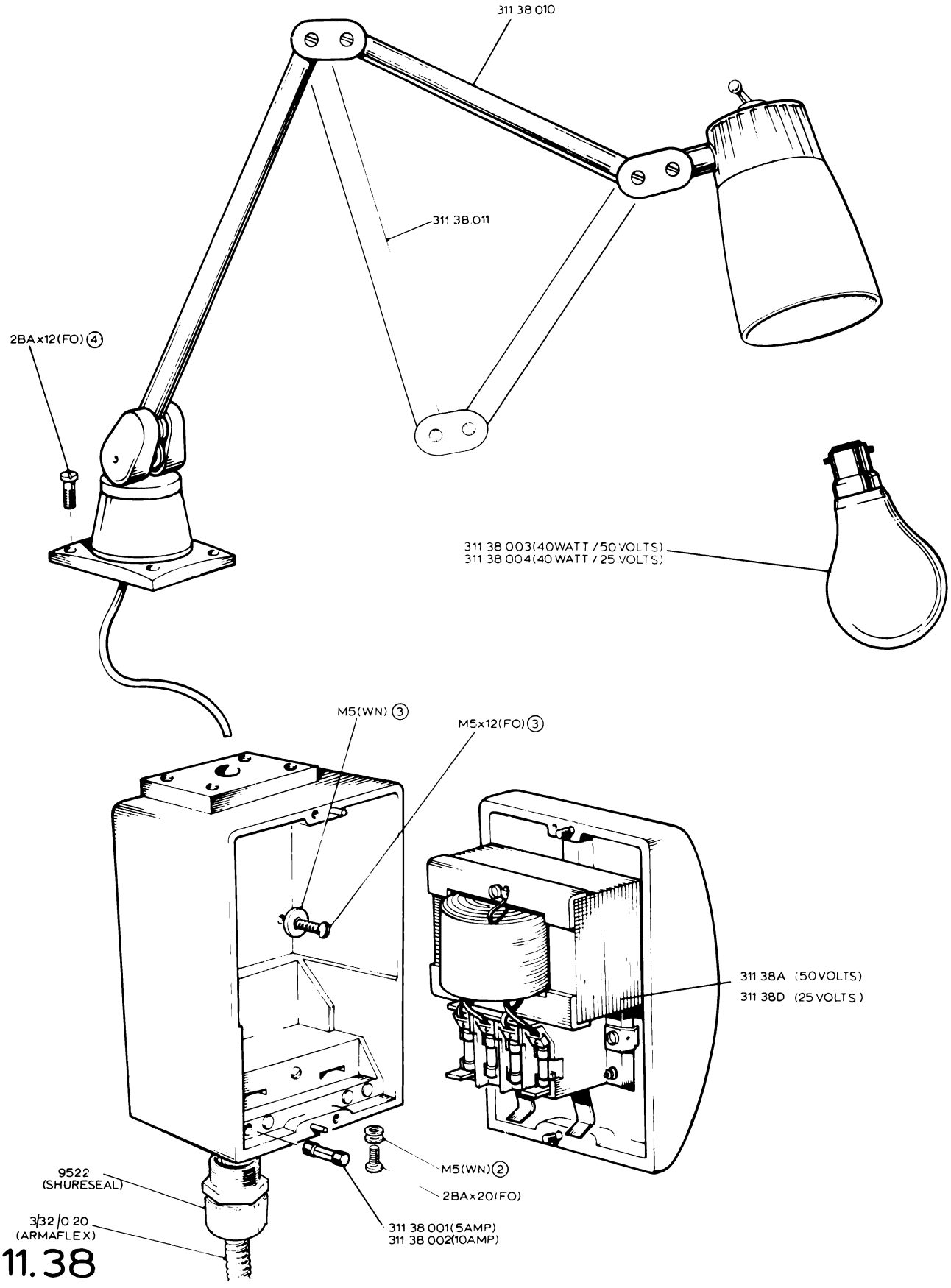
311 38 010
311 38.011
2BA x 12 (FO) ④
311 38 003 (40 WATT / 50 VOLTS)
311 38 004 (40 WATT / 25 VOLTS)
M5 (WN) ③
M5 x 12 (FO) ③
311 38A (50 VOLTS)
311 38D (25 VOLTS)
9522
(SHURESEAL)
3/32 / 0·20
(ARMAFLEX)
M5 (WN) ②
2BA x 20 (FO)
311 38 001 (5 AMP)
311 38 002 (10 AMP)

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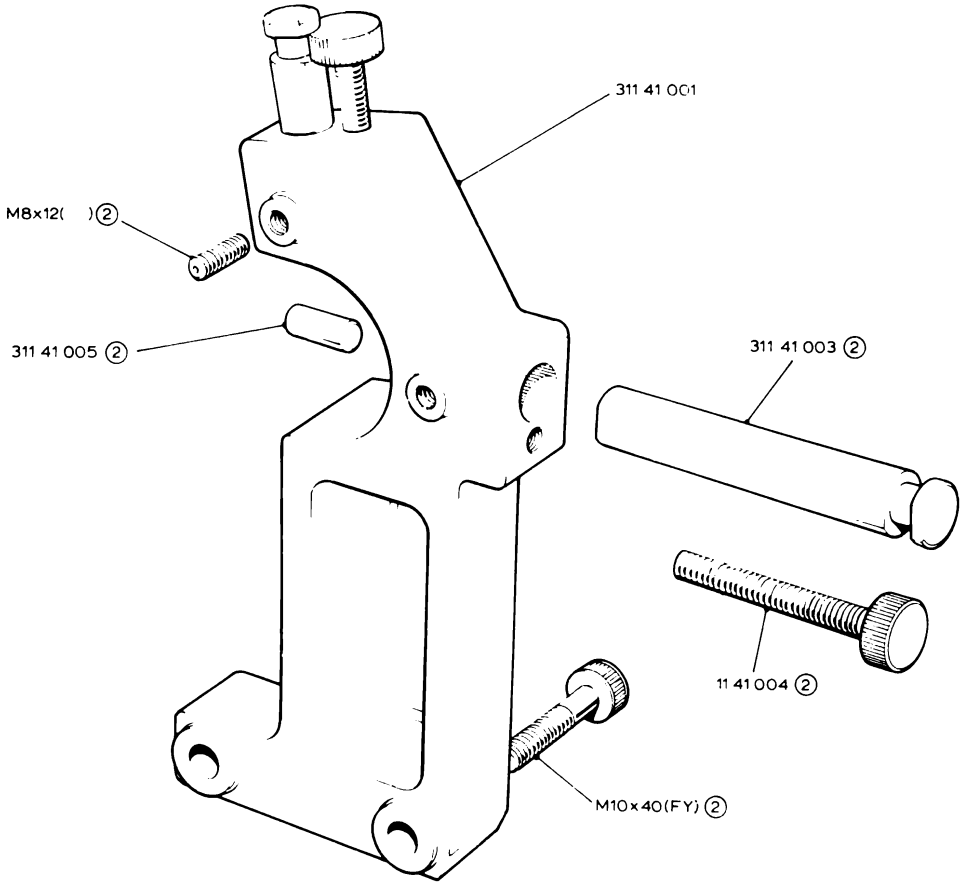
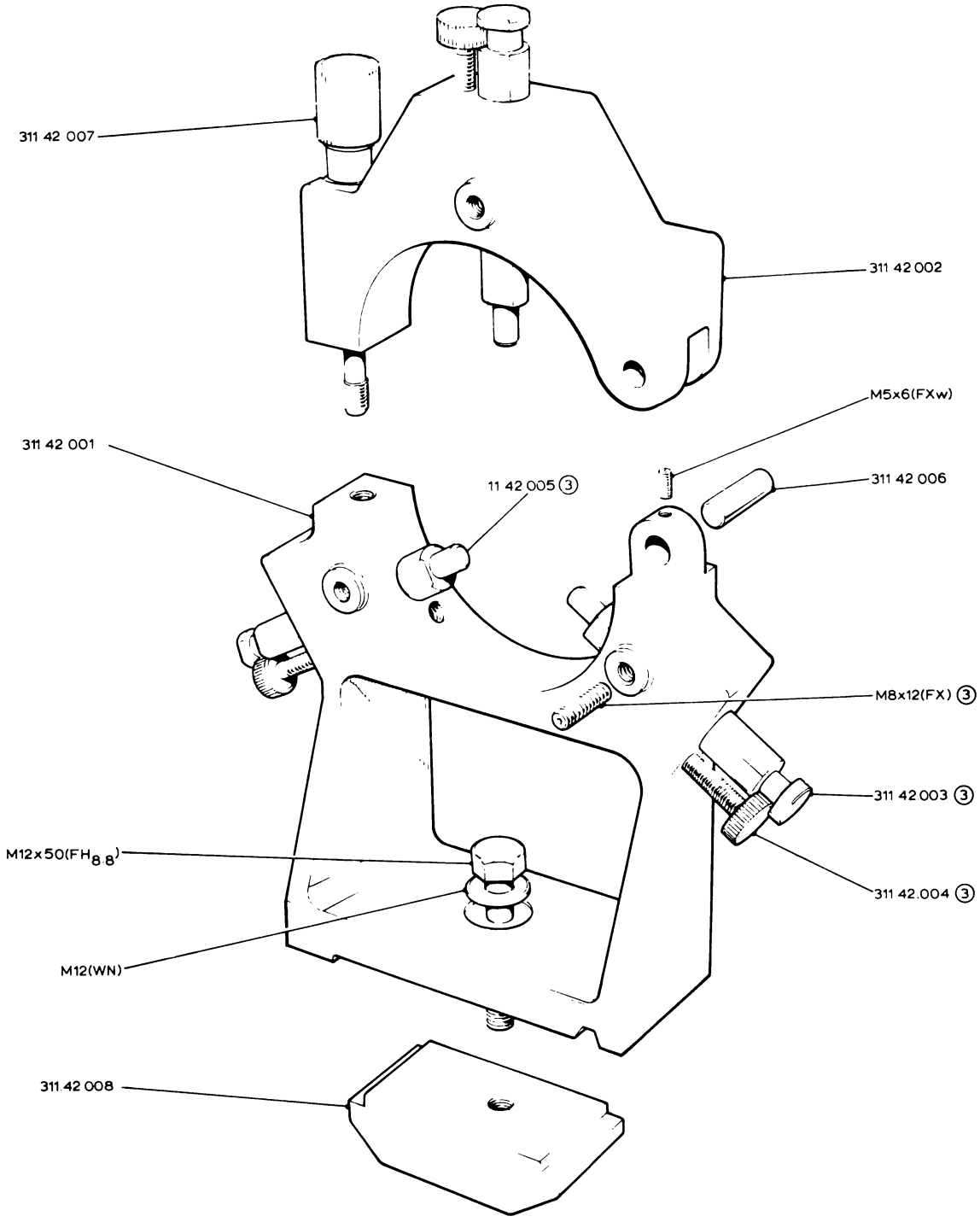


311.41

4.75


311 42 007
311 42 002
M5x6(FXw)
311 42 001
11 42 005 ③
311 42 006
M8x12(FX) ③
311 42 003 ③
M12x50(FH8.8)
311.42.004 ③
M12(WN)
311.42 008

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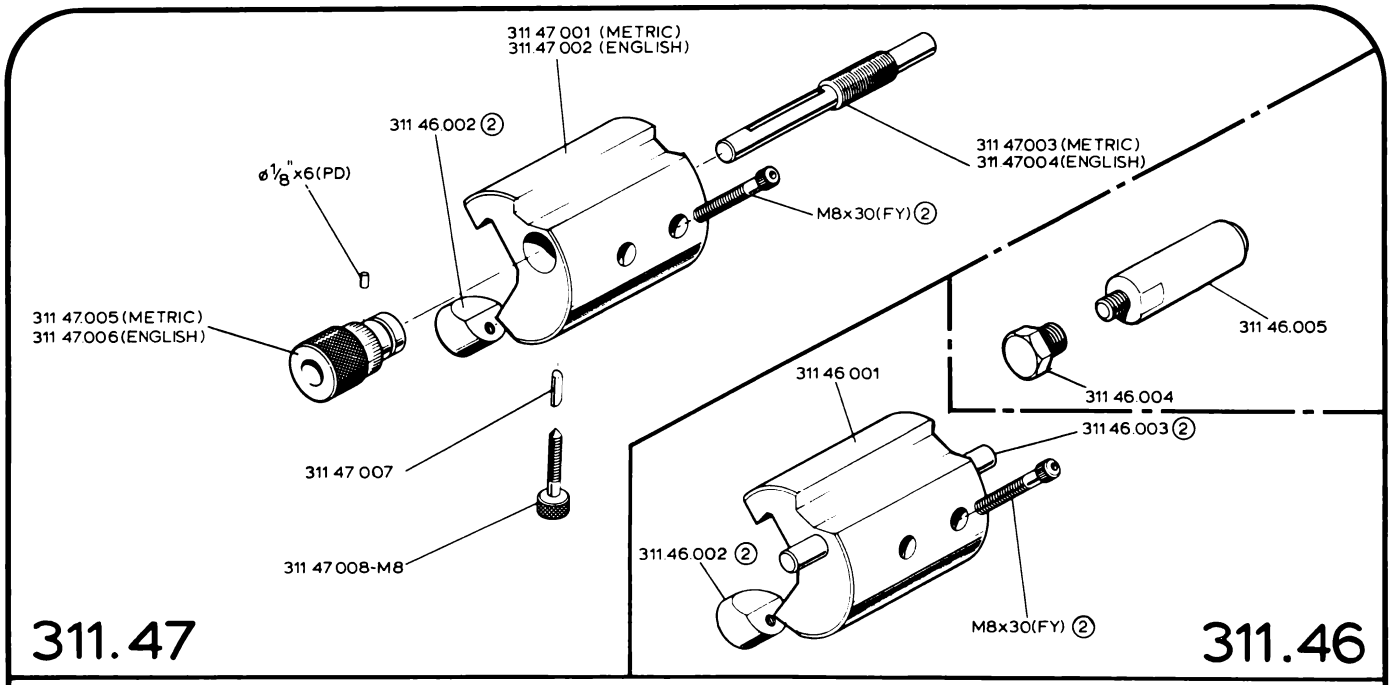
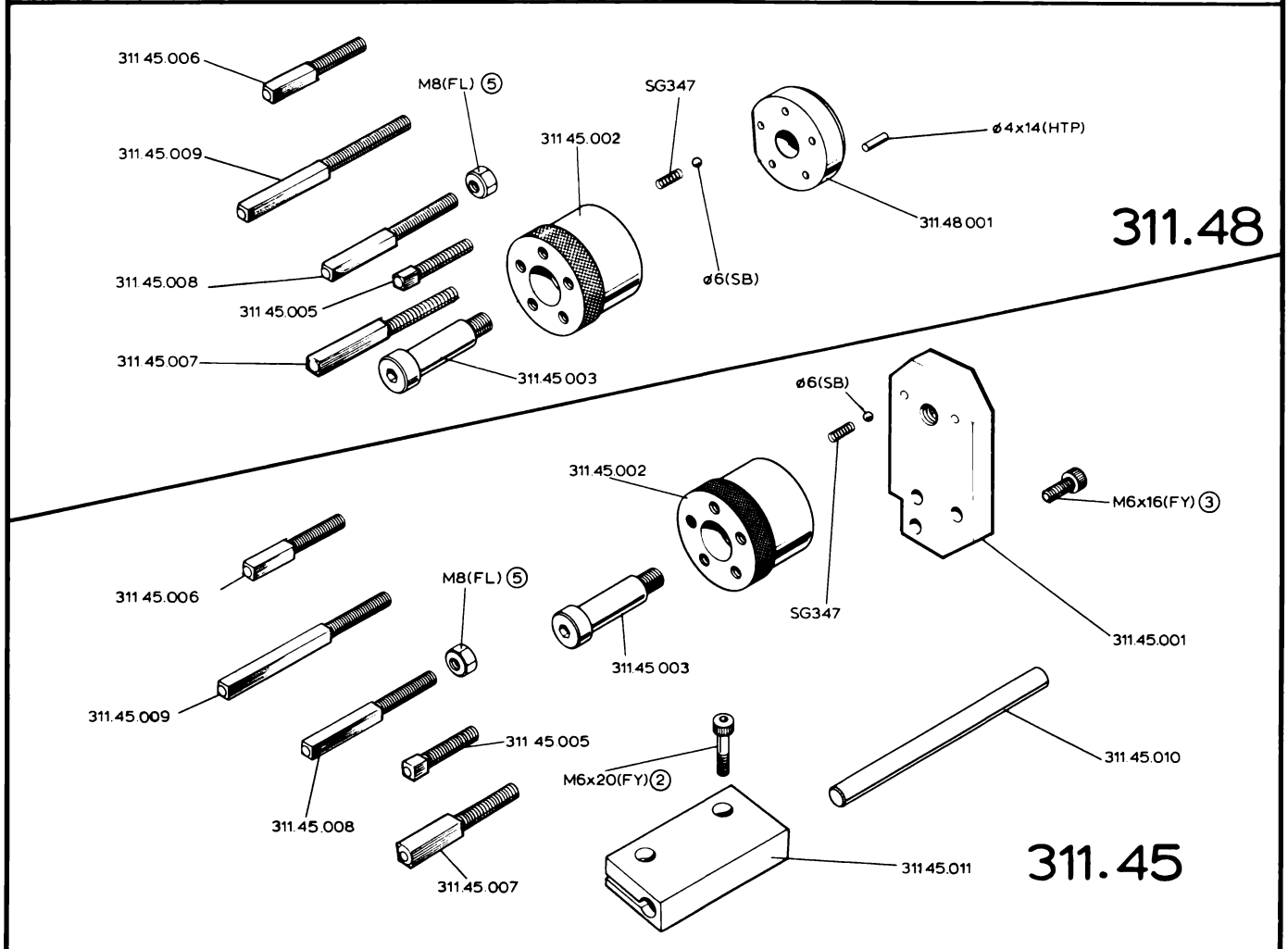

311 47 001 (METRIC)
311.47 002 (ENGLISH)
311 46.002 ②
ø1/8"x6(PD)
311 47003 (METRIC)
311.47004(ENGLISH)
M8x30(FY) ②
311 47.005 (METRIC)
311 47.006(ENGLISH)
311 47 007
311 47 008-M8
311 46.005
311 46.004
311 46 001
311 46.003 ②
311.46.002 ②
M8x30(FY) ②
311.47
311.46


311 45.006
M8(FL) ⑤
SG347
311 45.009
311 45.002
ø4x14(HTP)
311 48 001
311 45.008
311 45.005
ø6(SB)
311 45.007
311.45 003
311.48
ø6(SB)
311.45.002
M6x16(FY) ③
311 45.006
M8(FL) ⑤
SG347
311.45.001
311.45.009
311 45 003
311 45.005
311.45.010
M6x20(FY) ②
311.45.008
311.45.007
311 45.011
311.45

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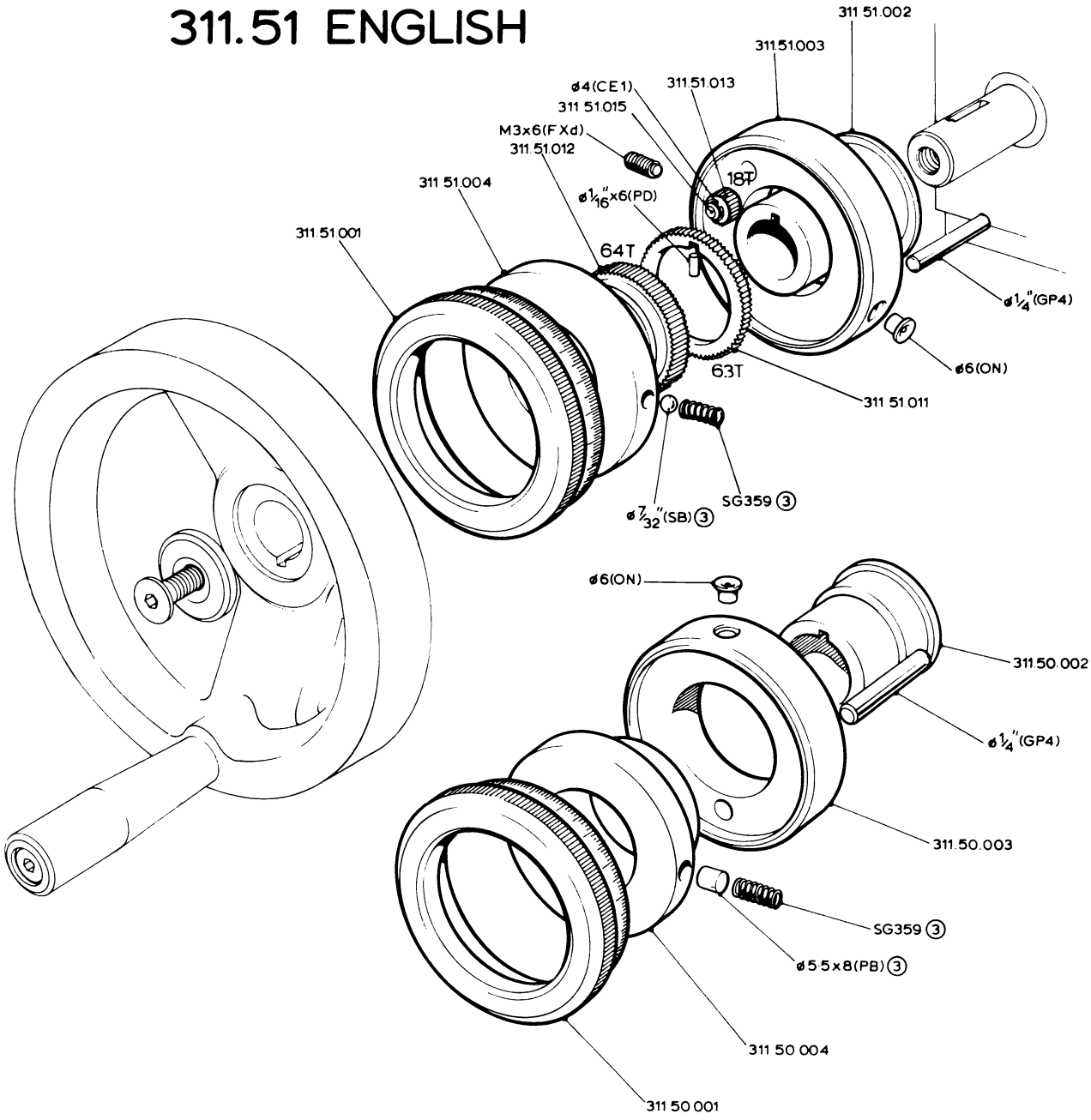
311.51 ENGLISH



311.50 METRIC

311.50-51

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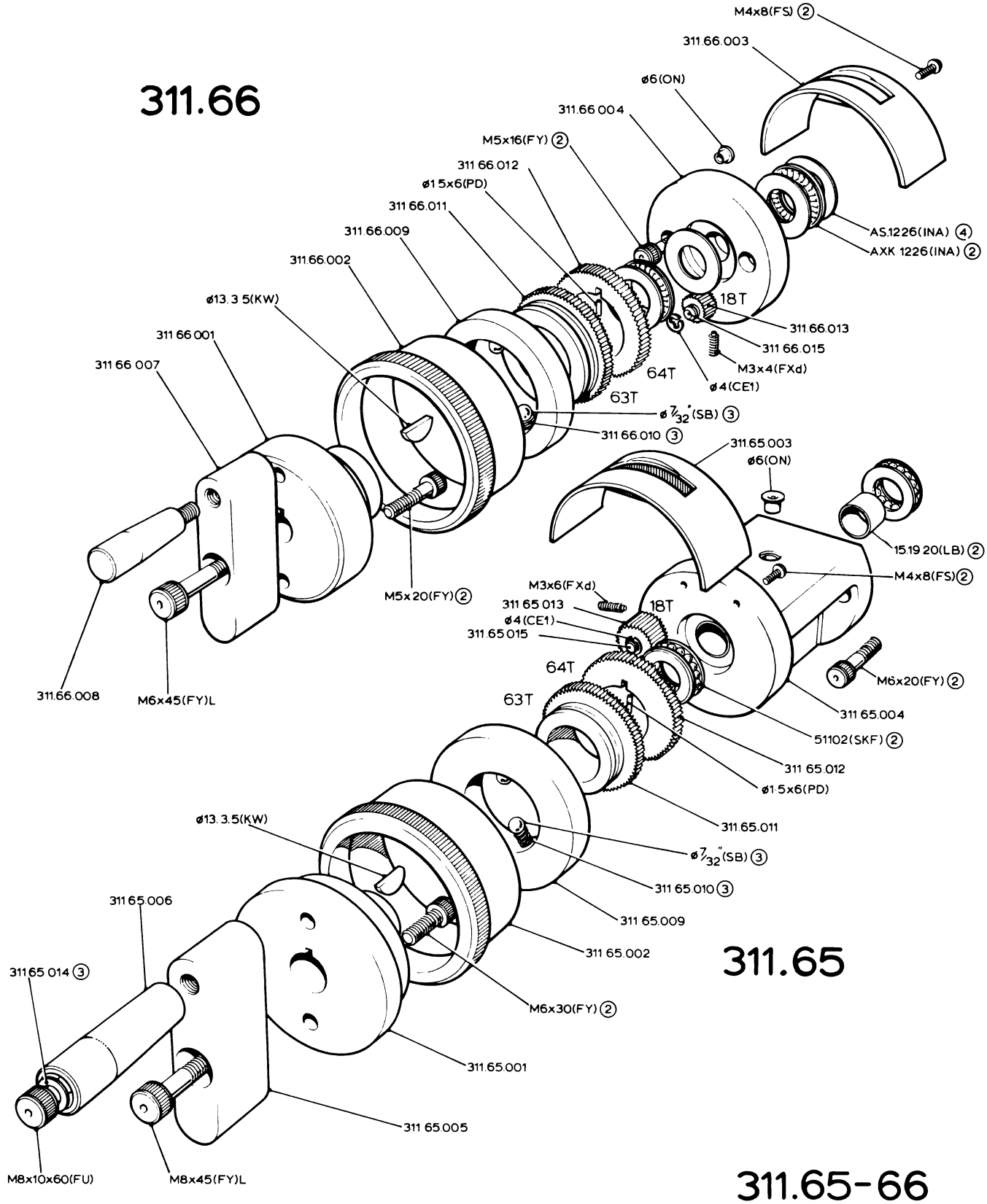
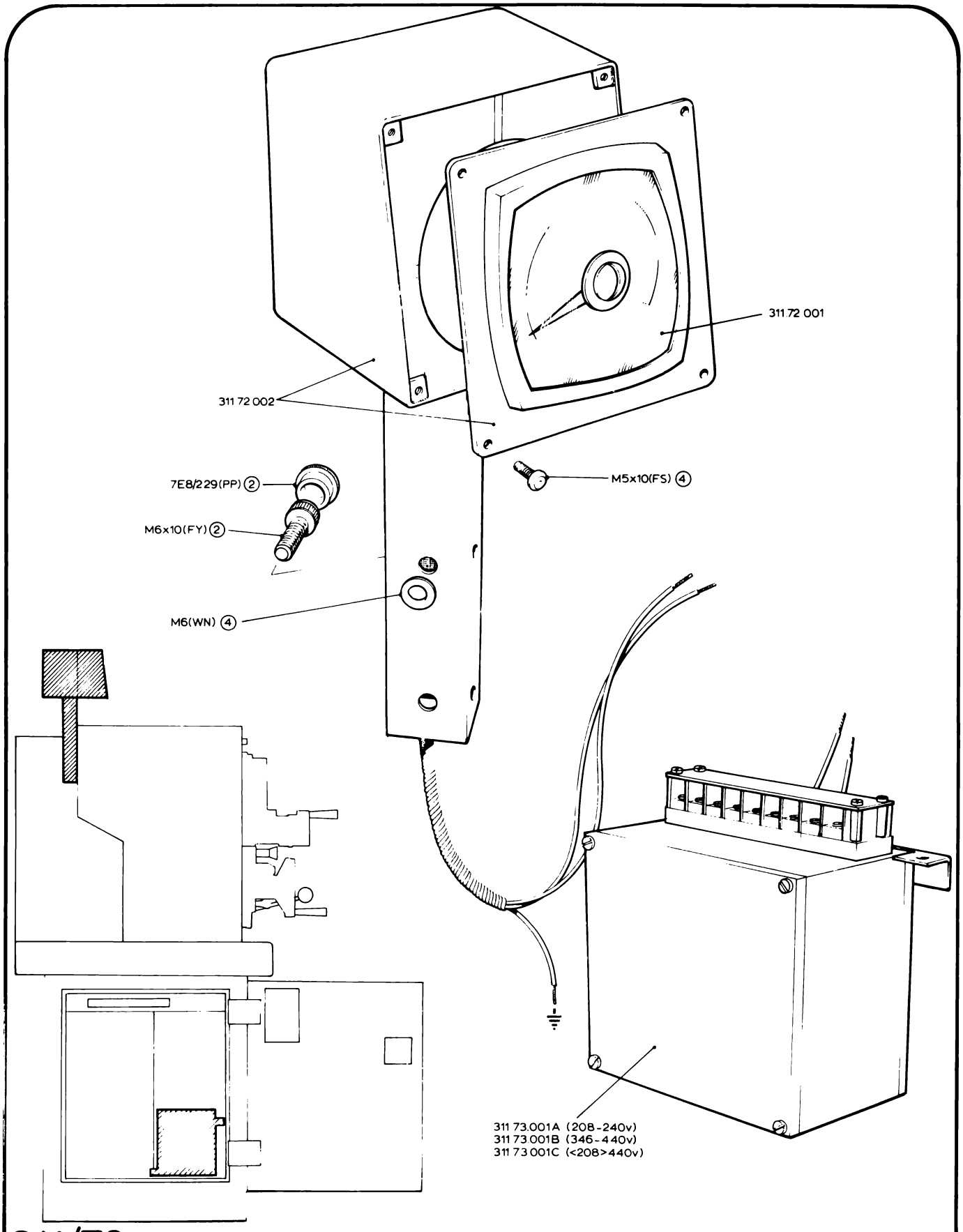

311.66
M4x8(FS) ②
311.66.003
ø6(ON)
311.66.004
M5x16(FY) ②
311.66.012
ø1.5x6(PD)
311.66.011
311.66.009
311.66.002
ø13.3.5(KW)
311.66.001
311.66.007
AS.1226(INA) ④
AXK 1226(INA) ②
18T
311.66.013
311.66.015
M3x4(FXd)
ø4(CE1)
64T
63T
ø 7/32" (SB) ③
311.66.010 ③
M5x20(FY) ②
311.66.008
M6x45(FY)L
311.65.003
ø6(ON)
15.19.20(LB) ②
M4x8(FS) ②
M3x6(FXd)
311.65.013
ø4(CE1)
311.65.015
18T
64T
63T
M6x20(FY) ②
311.65.004
51102(SKF) ②
311.65.012
ø1.5x6(PD)
311.65.011
ø 7/32" (SB) ③
311.65.010 ③
311.65.009
311.65.002
M6x30(FY) ②
311.65.001
311.65.005
311.65.006
311.65.014 ③
M8x10x60(FU)
M8x45(FY)L
311.65
311.65-66
4.75


311 72 001
311 72 002
7E8/229(PP) ②
M6x10(FY) ②
M5x10(FS) ④
M6(WN) ④
311 73.001A (208-240v)
311 73.001B (346-440v)
311 73.001C (<208>440v)

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Attachments

		Page No.
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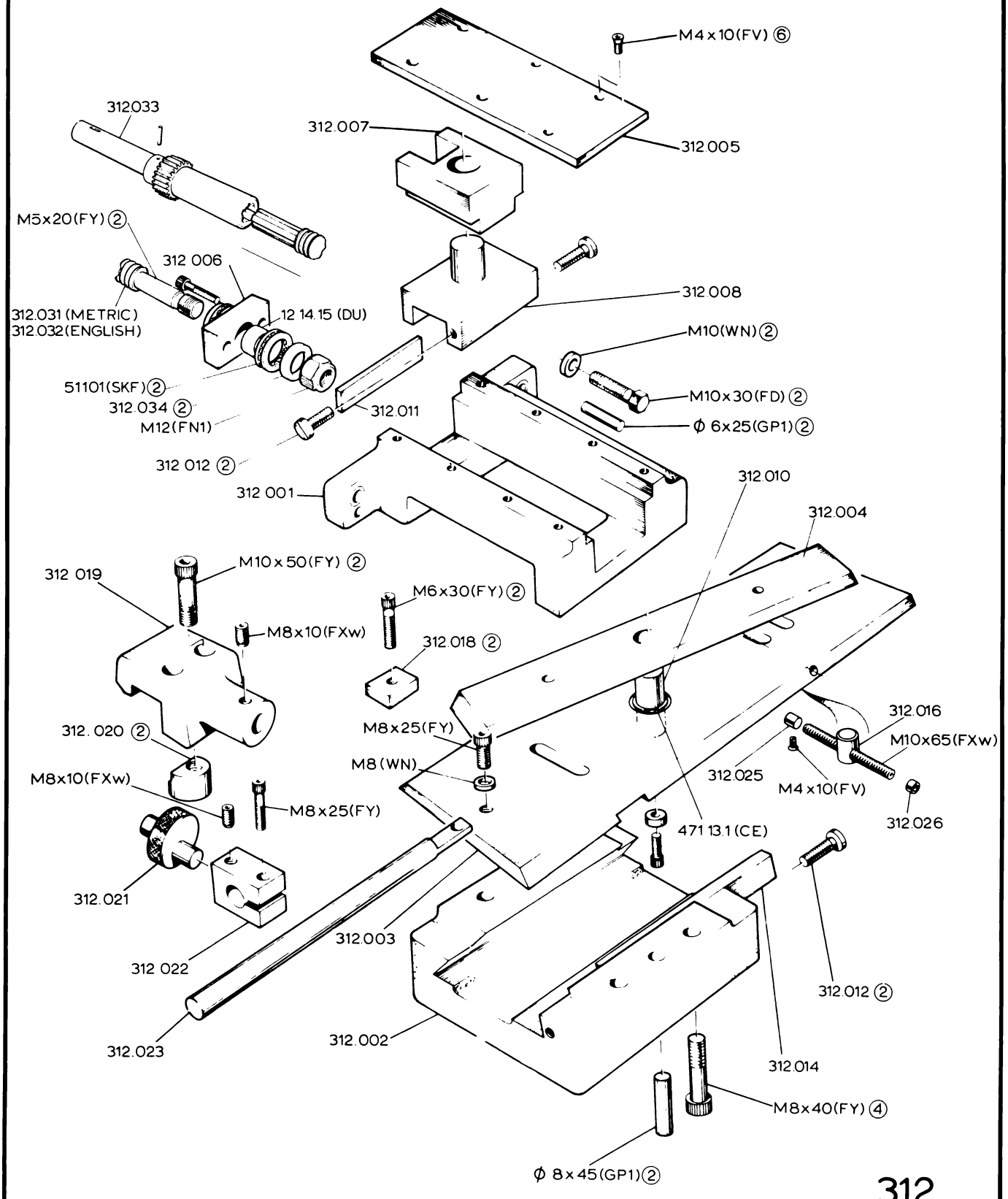
313	Bed capstan unit	60
314	High speed threading attachments	61
316	Hydraulic copying attachment (See separate Manual)	

4.75


M4x10(FV) ⑥
312.033
312.007
312.005
M5x20(FY) ②
312 006
312.008
312.031 (METRIC)
312.032(ENGLISH)
12 14.15 (DU)
M10(WN) ②
51101(SKF) ②
M10x30(FD) ②
312.034 ②
312.011
ϕ 6x25(GP1) ②
M12(FN1)
312 012 ②
312.010
312 001
312.004
M10x50(FY) ②
312 019
M6x30(FY) ②
M8x10(FXw)
312.018 ②
312.016
312. 020 ②
M8x25(FY)
M10x65(FXw)
M8 (WN)
312.025
M8x10(FXw)
M4x10(FV)
M8x25(FY)
312.026
471 13.1 (CE)
312.021
312.003
312.012 ②
312 022
312.002
312.014
312.023
M8x40(FY) ④
ϕ 8x45(GP1) ②

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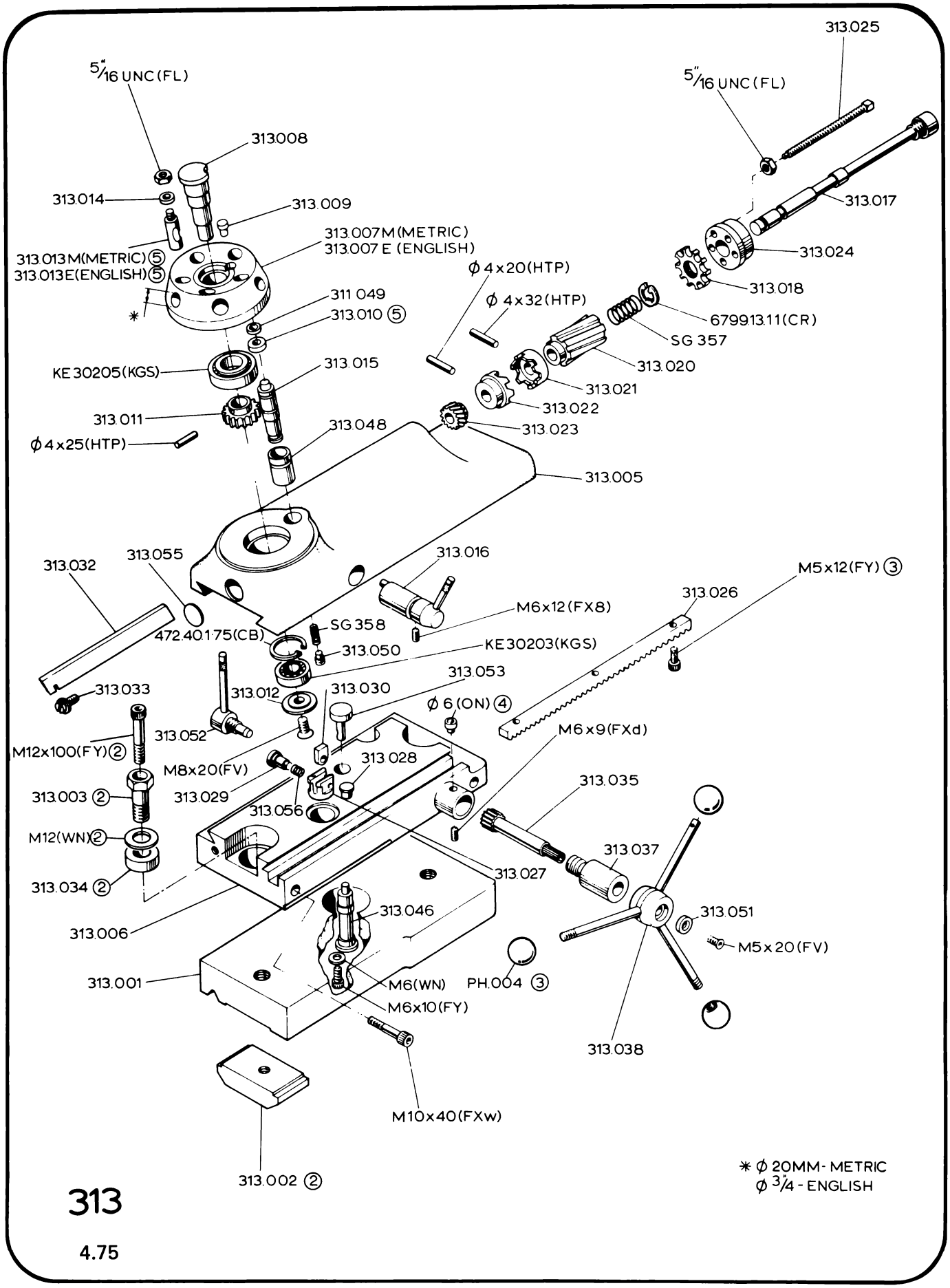
4.75


313.025
5"/16 UNC (FL)
5"/16 UNC (FL)
313.008
313.014
313.009
313.017
313.007M (METRIC)
313.007 E (ENGLISH)
313.013M (METRIC) ⑤
313.013E (ENGLISH) ⑤
313.024
ϕ 4x20 (HTP)
313.018
311 049
313.010 ⑤
ϕ 4x32 (HTP)
679913.11 (CR)
SG 357
KE 30205 (KGS)
313.015
313.020
313.021
313.011
313.022
313.048
313.023
ϕ 4x25 (HTP)
313.005
313.032
313.055
313.016
M5x12 (FY) ③
313.026
M6x12 (FX8)
472.401.75 (CB)
SG 358
313.050
KE 30203 (KGS)
313.053
313.033
313.012
313.030
ϕ 6 (ON) ④
M6x9 (FXd)
313.052
M12x100 (FY) ②
M8x20 (FV)
313.028
313.035
313.003 ②
313.029
313.056
M12 (WN) ②
313.037
313.034 ②
313.027
313.046
313.051
313.006
M5x20 (FV)
313.001
M6 (WN)
PH.004 ③
M6x10 (FY)
313.038
M10x40 (FXw)
313.002 ②
* ϕ 20MM - METRIC
ϕ 3/4 - ENGLISH

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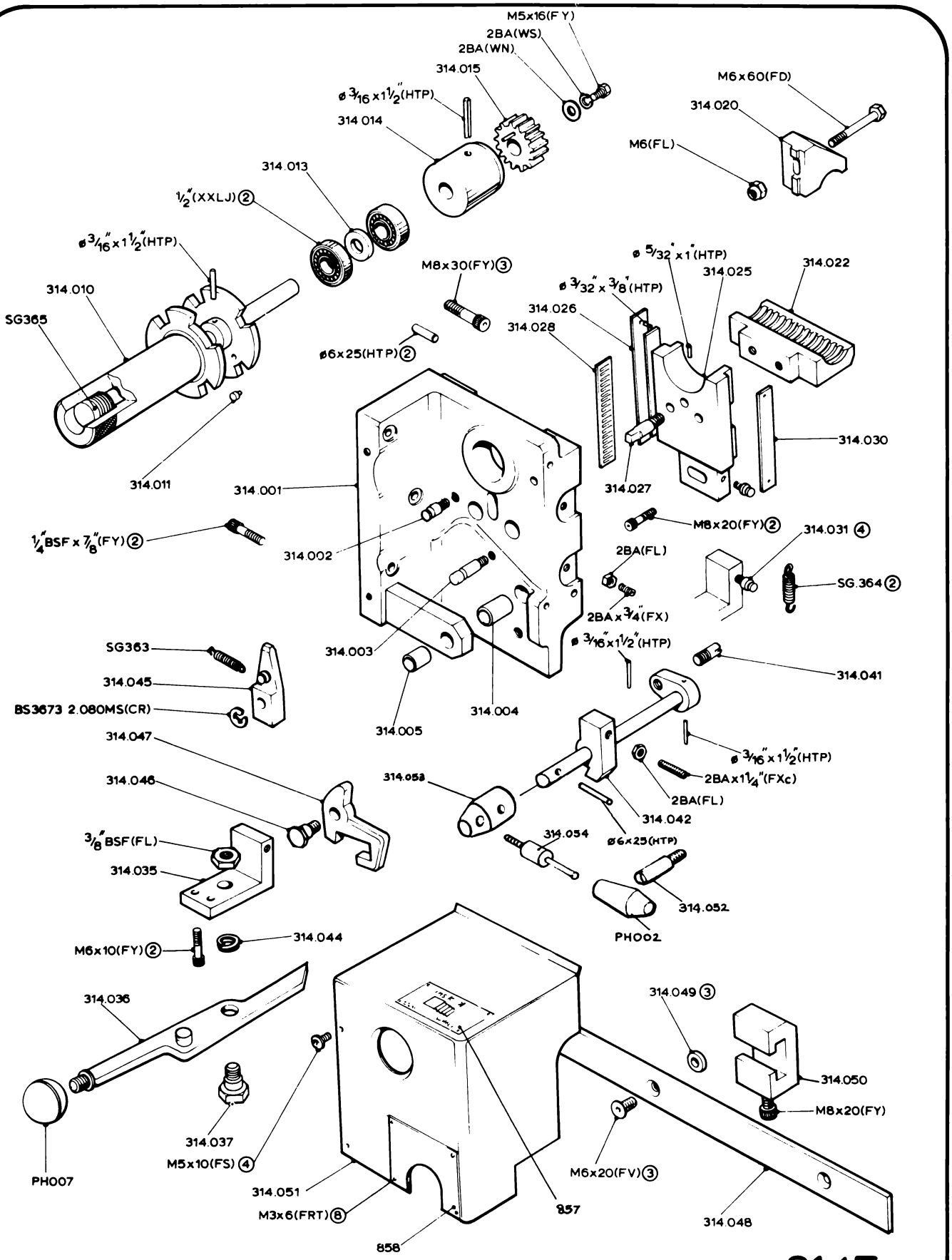
4.75


M5x16(F Y)
2BA(WS)
2BA(WN)
314.015
ø 3/16 x 1 1/2"(HTP)
314 014
M6x60(FD)
314.020
M6(FL)
314.013
1/2"(XXLJ) ②
ø 3/16" x 1 1/2"(HTP)
M8x30(FY) ③
ø 5/32" x 1"(HTP)
314.025
314.022
ø 3/32" x 3/8"(HTP)
314.010
314.026
SG365
314.028
ø6x25(HTP) ②
314.030
314.027
314.011
314.001
M8x20(FY) ②
314.031 ④
1/4"BSF x 7/8"(FY) ②
314.002
2BA(FL)
SG.364 ②
2BA x 3/4"(FX)
SG363
314.003
ø 3/16" x 1 1/2"(HTP)
314.041
314.045
314.005
314.004
BS3673 2.080MS(CR)
314.047
ø 3/16" x 1 1/2"(HTP)
314.053
2BA x 1 1/4"(FXc)
314.046
2BA(FL)
314.042
3/8"BSF(FL)
314.054
ø6x25(HTP)
314.035
314.052
PH002
M6x10(FY) ②
314.044
314.049 ③
314.036
314.050
M8x20(FY)
314.037
M5x10(FS) ④
M6x20(FV) ③
PH007
314.051
857
M3x6(FRT) ⑧
314.048
858

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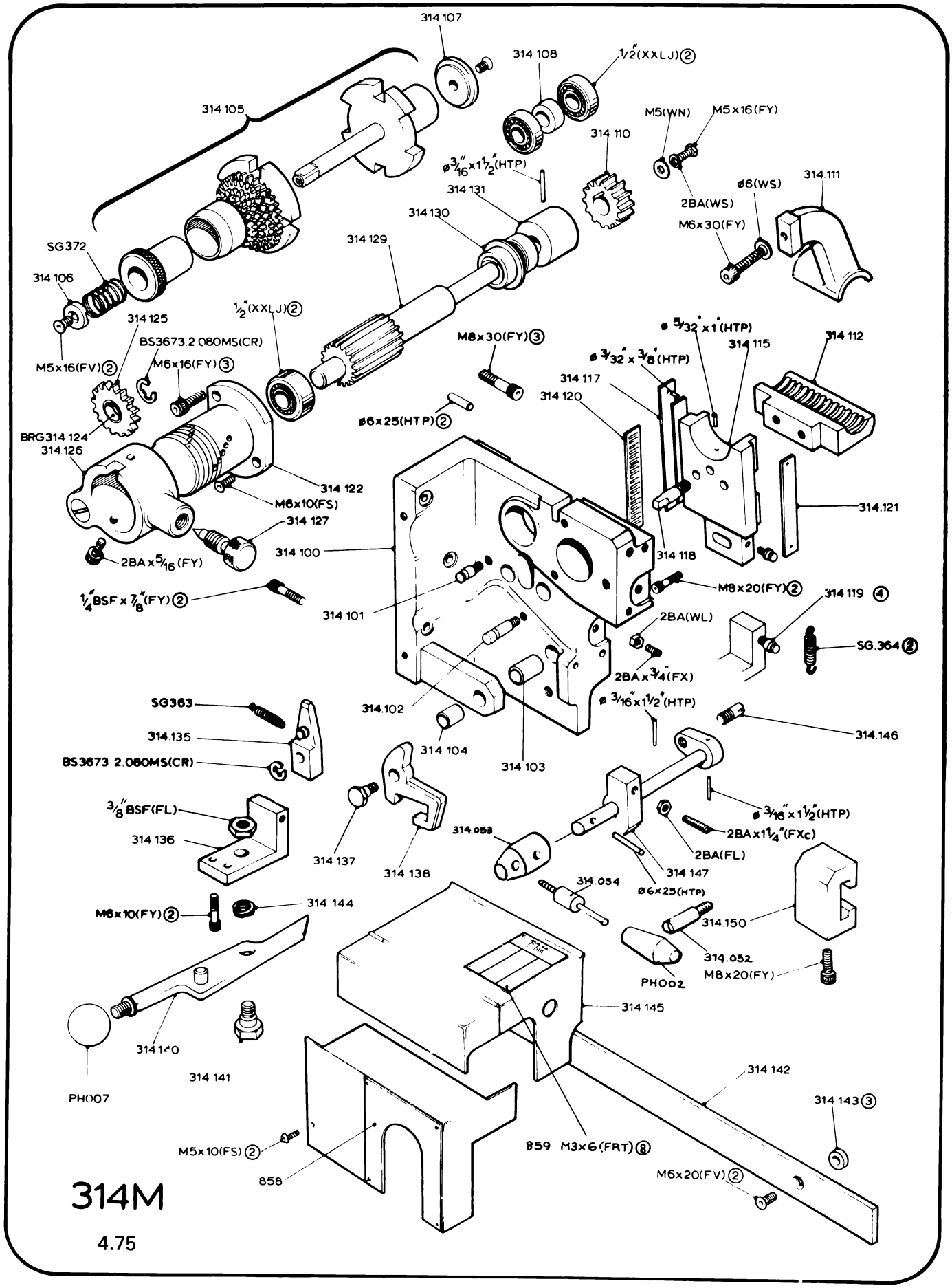

314 107
314 108
½"(XXLJ)②
314 105
M5(WN)
M5x16(FY)
314 110
ø3/16"x1½"(HTP)
314 131
314 130
2BA(WS)
ø6(WS)
314.111
M6x30(FY)
SG372
314 129
314 106
½"(XXLJ)②
314 125
BS3673.2 080MS(CR)
M5x16(FV)②
M6x16(FY)③
M8x30(FY)③
ø 5/32" x 1" (HTP)
314 115
314 112
ø 3/32" x 3/8" (HTP)
314 117
314 120
ø6x25(HTP)②
BRG314 124
314 126
314 122
M8x10(FS)
314 127
314.121
314 100
314 118
2BA x 5/16 (FY)
¼"BSF x ⅞"(FY)②
M8x20(FY)②
314 119 ④
314 101
2BA(WL)
SG.364②
2BA x ¾"(FX)
SG363
314.102
ø 3/16"x1½"(HTP)
314.146
314.135
314 104
314 103
BS3673 2.080MS(CR)
3/8"BSF(FL)
ø 3/16"x1½"(HTP)
314 136
314.053
2BA x 1¼"(FXc)
2BA(FL)
314 137
314 138
314 147
314.054
ø6x25(HTP)
M8x10(FY)②
314 144
314.150
314.052
M8x20(FY)
PH002
314 145
314 140
314 141
PH007
314 142
314 143③
M5x10(FS)②
858
859 M3x6(FRT)⑧
M6x20(FV)②

314M

4.75

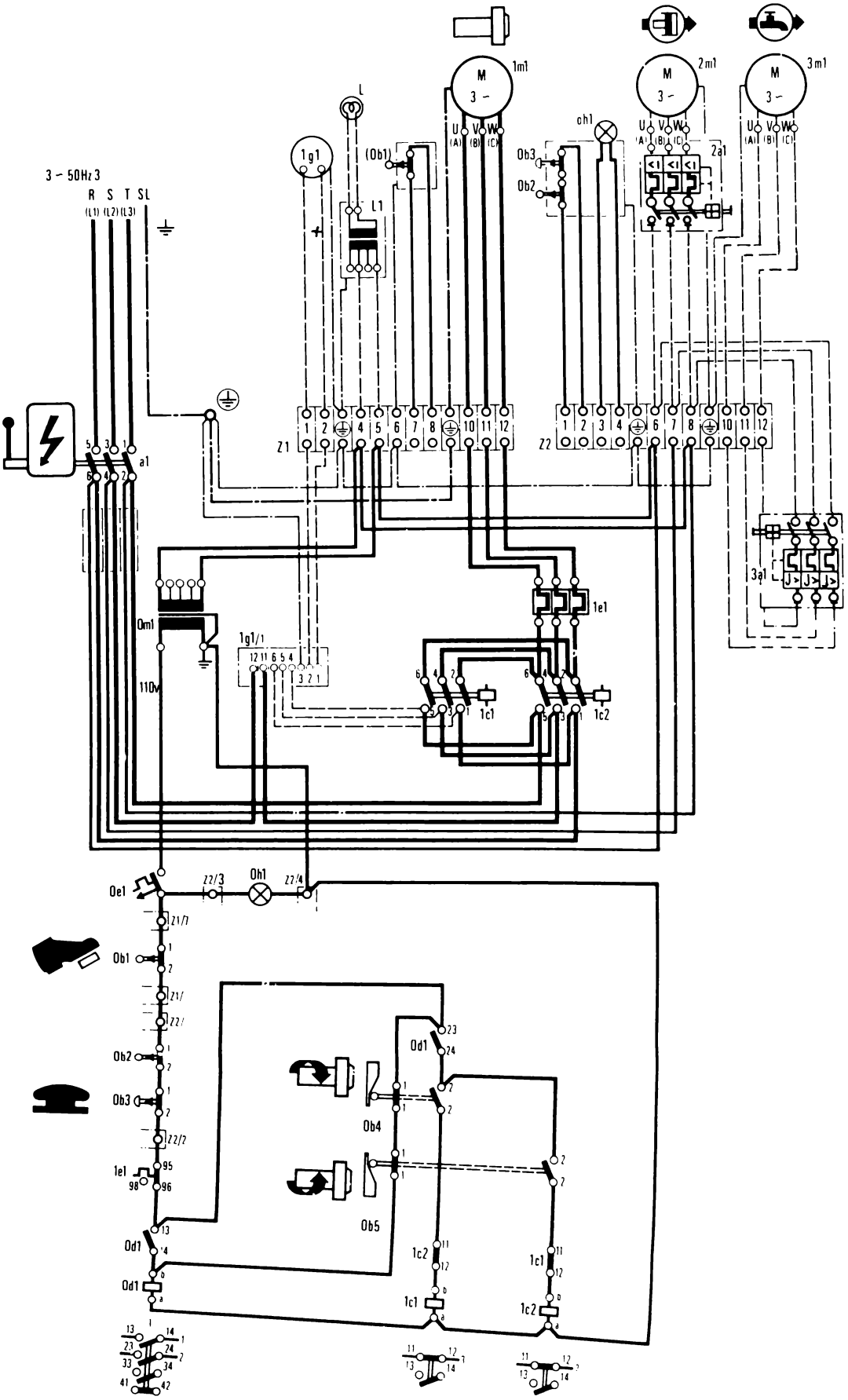
Standard/Proprietary Parts

Letter Codes

"Bracketed" Letter Code	Component	Conventional Description Given
Screws and Nuts		
FX	Socket Set (Grub) Screw · Flat Point	Thread X O all Length
FXd	Dog Point (Normal)	
FXd1	Dog Point (Long)	
FXc	Cone Point	
FXw	Cup, knurled or 'W' Point	
FY	Socket Head Cap Screw	Thread X Length under head
FV	Socket Countersunk Screw	
FS	Socket Button Head Screw	
FU	Socket Shoulder Screw	Thread X ϕ Shank X Shank length
FP	Socket Pressure Plug	Thread and Form
FO	Slotted Set (Grub) Screw	Thread X O/all Length
FT	Slotted or Pozidriv Screw Countersunk Head	Thread X length under head
FI	Raised C/sunk Head	
FR	Pan Head	
FE	" Cheese Head	
	Suffix 'B' for Thread Forming Type	
	Suffix 'T' for Thread Cutting Type	
FJ	Square Head (Toolpost) Screw	Thread X Length under head
FH	Hexagon Head Screw	Thread X Length under head
FD	Bolt	
FN	Standard Hexagon Nut	
FL	Locknut	
	Suffix '8.8' for High Tensile Types	
	Suffix 'L' for 'Self-Locking' versions of the above	
FZ	Hammer Drive Screw	Nom ϕ X Length under head
FW	Wing Nut	Thread details
DN	Domed Nut	Thread details
CN	Castle of Slotted Type Nut	
FNI	Nylon Ring Locking Nut	
Thread Inserts		
TI1	Press in Type Thread Insert	Thread details
TI2	Coil Type Thread Insert	
Washers		
WN	Bright Washer Normal Diameter	Nominal Hole ϕ
WL	Large Diameter	
WK	Crinkle (Wavy) Washer	
WS	Spring Washer Single Coil	
WSs	Double Coil	
WC	Folded Copper Sealing Washer	
WF	Felt Washer	
DS	Disc Spring (Belleville Washer)	Nom. Hole ϕ X O.D.X thickness

"Bracketed" Letter Code	Component			Conventional Description Given
Pins and Dowels				
GP1	Grooved Pin	Full length groove	Tight at one end	Nom O all length
GP2		Half	on end	
GP3		Full length groove	Parallel	
GP4		Half length groove	Tight at Centre	
GP5		Centre groove		
PD	Dowel Pin			Nom ϕ × O all length
PB	Brass Pin or Pad			
PT	Taper Pin			Nom ϕ (small end) × O/all length
PS	Split Pin			Nom ϕ × O/all length
LTP	Tension Pin	Light Duty		Nom ϕ × O/all length
HTP	Tension Pin	Heavy Duty		
Keys				
KS	Square Parallel Key			Width × Thickness × Length
KR	Rectangular Parallel Key			
KW	Woodruff Key			Width Height × Diameter
Circlips				
CE	External Circlip	DIN 471		DIN Ref Nom Shaft ϕ and Thickness
CE1	Round Section Circlip			Nom. Shaft ϕ, Wire ϕ
CE2	Inverted Retainer (Truarc)			
CB	Internal Circlip	DIN 472		DIN. Ref Nom Bore and Thickness
CR	Radial Fitting Circlip. DIN 6799			DIN Ref. Nom ϕ and Thickness
CR1	Radial Retaining Clip (Spring fix)			Nom shaft ϕ
Plain Bearings				
DU	Composite Bearing Bush 'Glacier'			Nom Bore. O.D. and Length
DX				
LB	Sintered Bronze Bush			Nom Bore O.D and Length
Ball Bearings				
XLJ	Ball Journal Bearing	Extra Light Type		Nom Bore
LJ		Light Type		Nom Bore
MJ		Medium Type		Nom Bore
For Needle Roller Brgs, Needle Thrust Races Ball Thrust Brgs. and Taper Roller Bearings Is Quoted as Letter Code (INA.) (SKF) (TORRINGTON) or (GAMET)				Manufacturers Part No. Quote
Seals				
SM	Standard Oil Seal			Nom O D and Width
SF	V Ring Seal (FORSHEDA)			Manufacturers Part No.
RM	Standard Ring Seal			of Ring, and Section
RMI	Nu Ring (Plone			urers Part No

"Bracketed" Letter Code	Component	Conventional Description Given
Lubrication Equipment		
ON	Concave Oil Nipple Dri Type	Nom Hole
ONI	Threaded Type	Thread details
For Compression and other Pipe Fitting Letter Code (ENOTS or (TECALEMIT)	Manufacturers Name is quoted as	Manufacturers Part Number Quoted
Miscellaneous Items		
SB	Steel Ball	Nom ϕ
FK	Hexagon Wrench Key	Nom width across flats
HP	P.V.C. Hose	Nom Bore and O.D.
HC	Hose Clip	Max. Hose ϕ
PP	Plastic Plug	Manufacturers Part Number
WRS	Standard Spanner	Std. Bolt size and width across flats
EB	Eye Bolt	Thread details
OW	Oil wick	Nom Ø x Length
CT	Copper tube	Nom outside Ø
NT1	Nylon Tube Natural	Nom Bore
NT2	Nylon Tube Blue	Nom Bore
NT3	Nylon Tube Green	Nom Bore
NT4	Nylon Tube Red	Nom Bore


3 ~ 50Hz 3
R S T SL
(L1) (L2) (L3)
1m1
2m1
3m1
M
3 ~
U V W
(A) (B) (C)
1g1
(Ob1)
L
L1
oh1
Ob3
Ob2
2a1
3a1
Z1
Z2
1 2 3 4 5 6 7 8 10 11 12
5 3 1
6 4 2
a1
Qm1
1g1/1
12 11 6 5 4
3 2 1
110v
1e1
1c1
1c2
Qe1
Z2/3
Oh1
Z2/4
Z1/1
Ob1
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Ob2
Ob3
Z2/2
1e1
95
98
96
Od1
13
4
b
a
Od1
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Ob4
Ob5
1c2
11
12
1c1
1c2
1c1
13 14
23 24
33 34
41 42
11 12
13 14

PONENT LIST

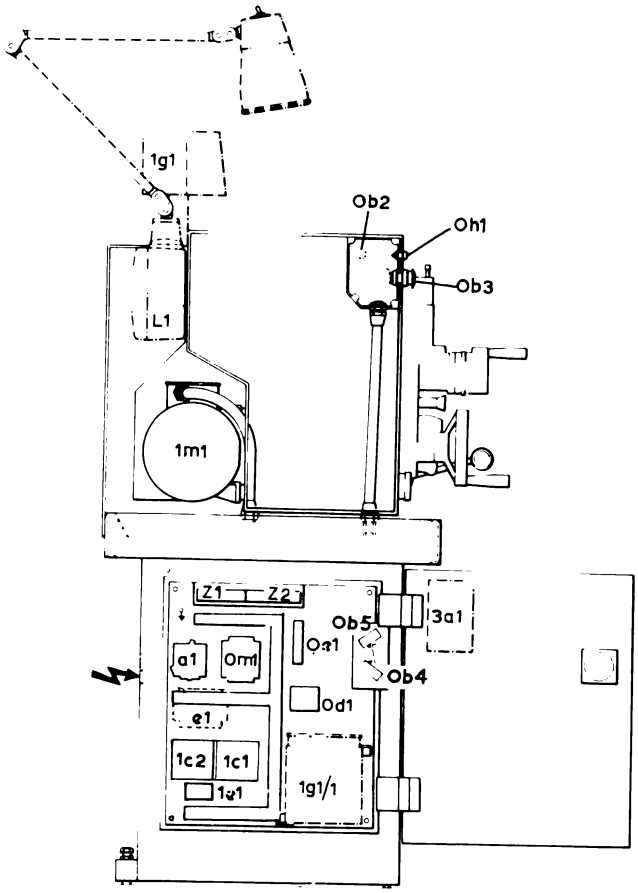
em	Type	Manufacturer
ain Motor (2.2 kW 3 hp 1 suit supply voltage)	D90L	
in Switch (Isolator)	T20b 1 V 5vb	lockner-Moell r
orward Contactor 380V & above	DIL00 41	Klockner-Moeller
nder 380V and 220 380V	DIL0 41	Klockner Moeller
everse Contactor 380V & above	DIL00 41	Klockner-Moeller
nder 380V and 220 380V	DIL0 41	Klockner-Moeller
	DIL00L 31	Kl r-Moell
l overload 380V & above	Z0 6 6	Klockner-Moeller
Under 380V	Z0 12	Klockner-Moeller
l Circuit Breaker Unit	5SL1 301	Siemens
rd Micro Switch	K5C	Burgess
rse Micro Switch	K5C	Burgess
l Bl	BK12	Klippon
inal Bl	BK12	Klippon
To suit Supply Voltage	WF40 150 VA at 11	Partridge Wil
		lockner-Moeller
		r-Moeller
	(M)V3HM6S	Burgess
	V3Q1	Burgess
	P r	Klockner Moeller
	SL77	Arcolectri
olant Pump Motor (45W ($\frac{1}{20}$hp) suit supply voltage)	AQ3/2	lectrics
lant Pump Starter	PKZM0 0 4/e	r Moeller
ydraulic Pump Motor (0.37kW ($\frac{1}{2}$hp/ 500 rev/min to suit supply voltage)	VMF5341F	ton-Parkinson
ydraulic Pump Starter		
380V and above	PKZM0 1 6/e	lockner-Moeller
Under 380V	PKZM0 2 4/e	lockner-Moeller
achine Light Unit		
2 Arm Fitting	68700/H110/	
3 Arm Fitting	68700/H510/	
ransformer Unit 50V 40W	68600/H100/-	
Machine Light) 25V 40W	68600/H100/	
	35ASM1488	rd Electrical Co.
attmeter Transducer o suit supply voltage)	UE3K6G5	Record Electri

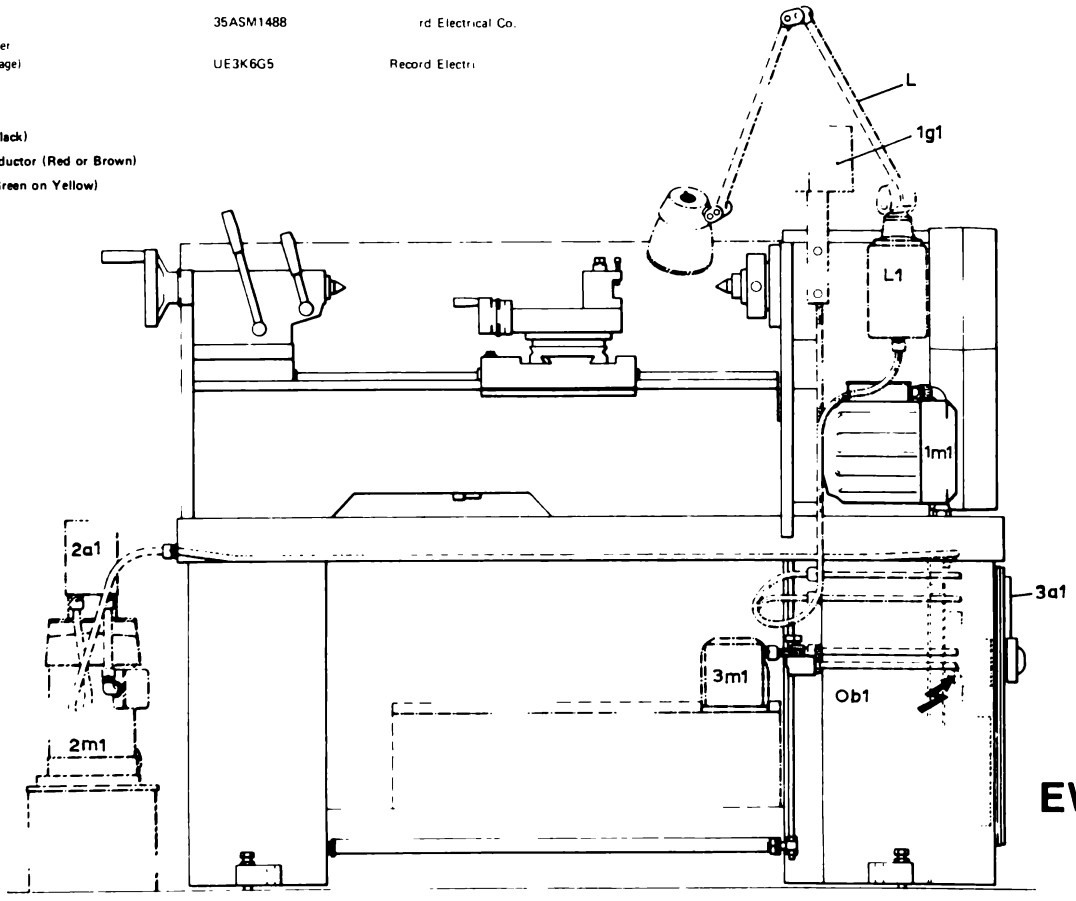
ire Identification

lains Conductor (Black)

ontrol Circuit Conductor (Red or Brown)

arth Conductor (Green on Yellow)





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