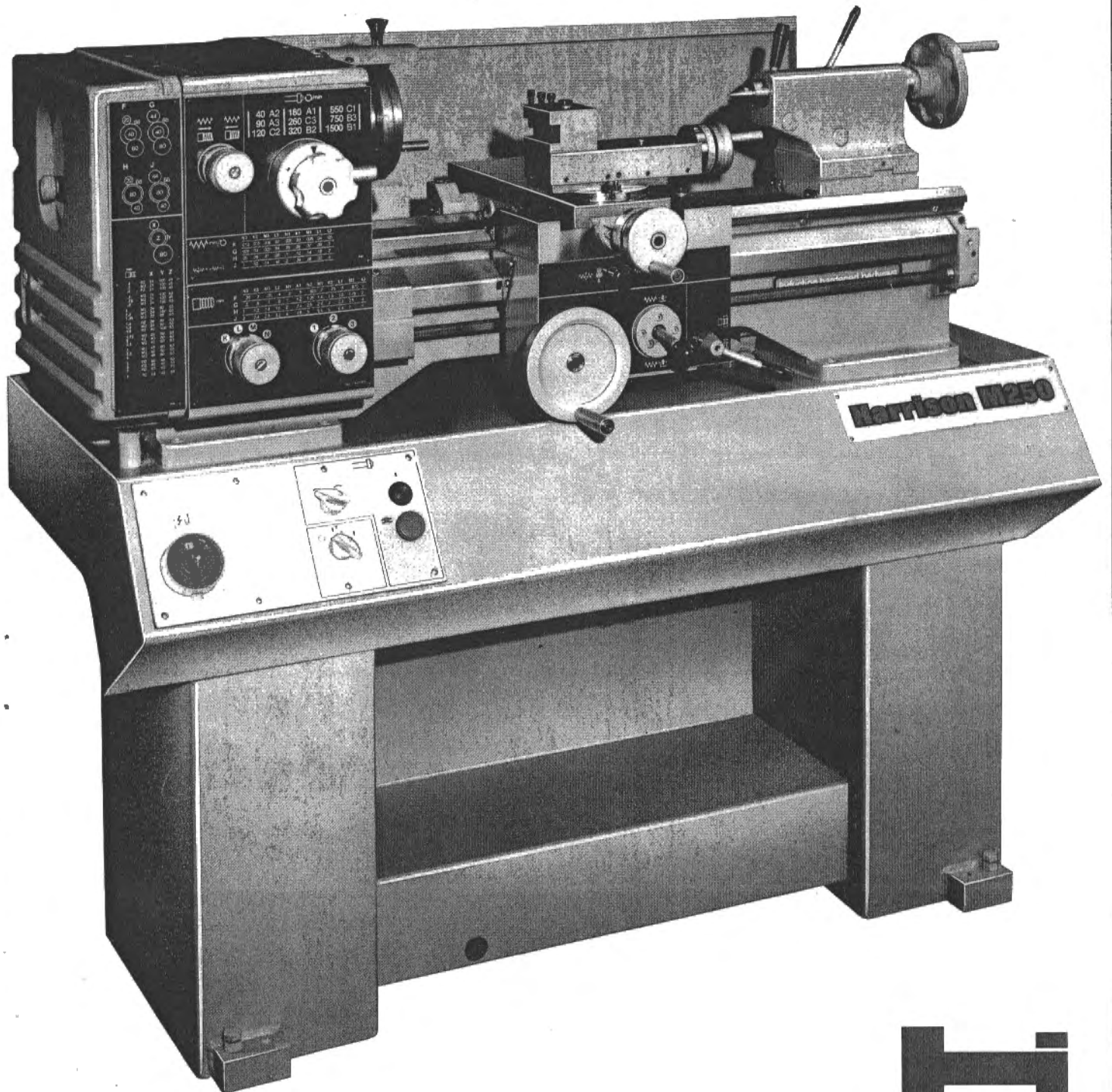


Harrison M250

280mm (11in) swing centre lathe



H
Harrison

machine manual

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Machine Specification

280mm (11in) swing Centre Lathe

500mm MODEL – 500mm (20 in) between centres
 750mm MODEL – 750mm (30 in) between centres

This machine is manufactured to British metric standards throughout, and is available in two bed lengths

Metric or English gear boxes and drive screws (together with the appropriate micrometer dials) are optional variations.

summarised specification

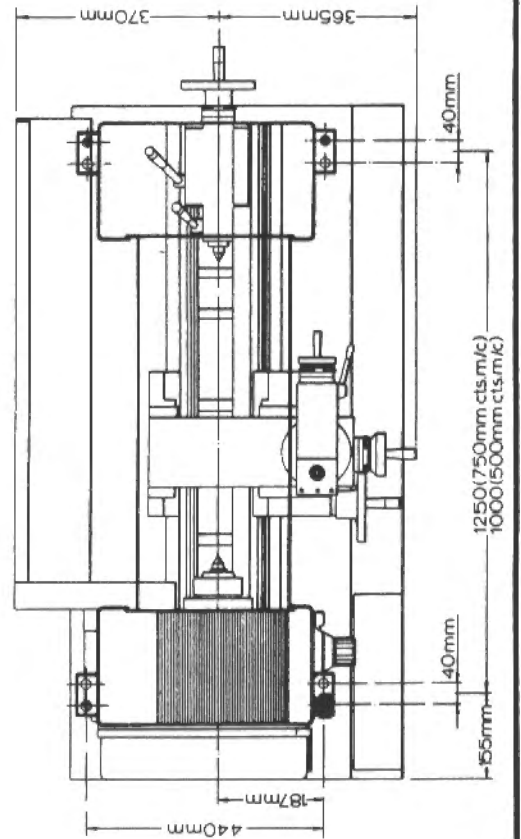
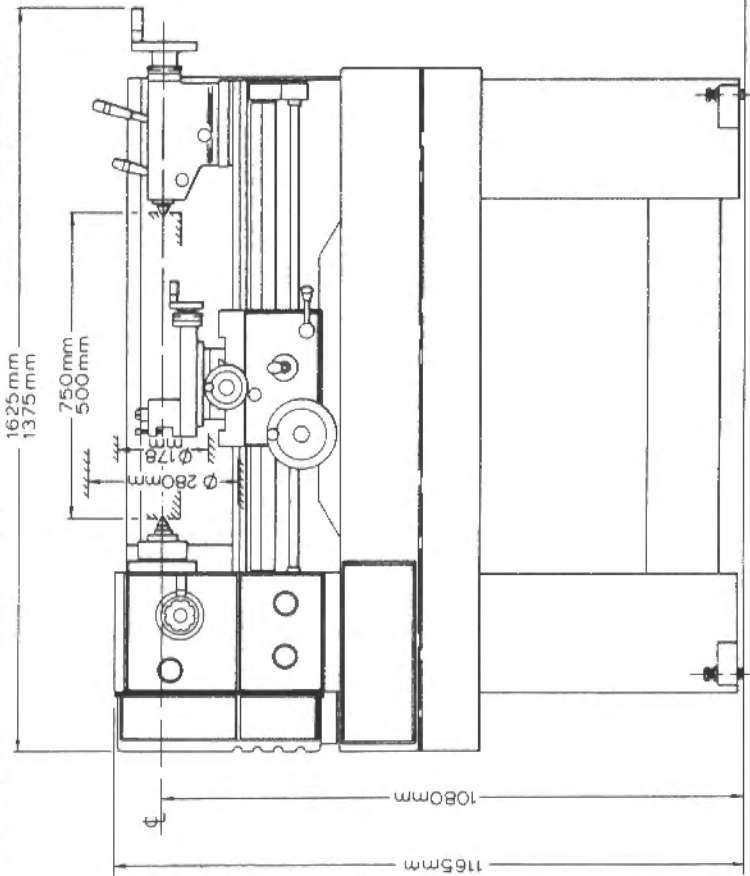
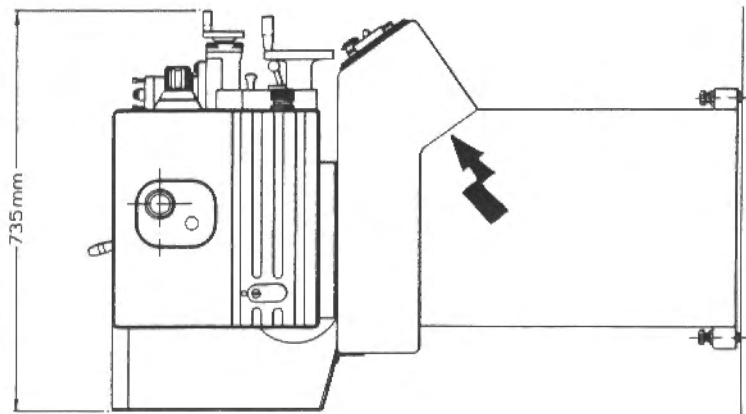
Centres	Height	145mm (5.7 in)	English Gearbox with 4 TPI Leadscrew	Threads English Pitches (56)	4 - 84 TPI
	Admits Between	500mm (20 in) or 750mm (30 in)		Threads Metric Pitches (23)*	0.4 - 10mm <i>*(available by changewheels supplied as additional equipment)</i>
Swing	Over Bed	280mm (11 in)	Feeds	Longitudinal (24)	0.0006 - 0.016 in
	Over Cross Slide	178mm (7 in)		Cross (24)	0.0003 - 0.008 in
Spindle	Bored to Pass	35mm (1.375 in)	Bed	Width Over Ways	190mm (7.5 in)
	Nose	D1-3		Depth Under Headstock	230mm (9 in)
Morse Taper In Nose Bush		.3	Cross Slide	Width	130mm (5.1 in)
				Travel	165mm (6.5 in)
Speeds	Number	9	Top Slide	Width	76mm (3 in)
	50 Hz Machines	Range		40 - 1500 rpm	Travel
or	Motor	0.9 kW (1.2hp)	Tailstock	Quill Diameter	38mm (1.5 in)
	Range	80 - 3000 rpm		Travel	95mm (3.7 in)
or	Motor	1.3 kW (1.8hp)	Weight	500mm (20 in) Centres	356 kg (785 lbs)
	Range	40 - 1500 rpm		750mm (30 in) Centres	457 kg (1008 lbs)
60 Hz Machines	Motor (Single Phase)	1.1 kW (1.5hp)	Shipping Data	Gross Weight	Packing Case Dimensions
	Range	40 - 1500 rpm			L W H
or	Motor	1.5 hp	500mm (20 in) Centres	457 kg (1008 lbs)	1574 x 838 x 1371mm (62" x 33" x 54")
	Range	52 - 2000 rpm		750mm (30 in) Centres	559 kg (1232 lbs)
or	Motor	1.5 hp			
	Range	52 - 2000 rpm			
Leadscrew	Motor (Single Phase)	1.5 hp			
	Diameter	25mm (0.98 in)			
Metric Gearbox with 6mm pitch Leadscrew	Thread	6mm pitch or 4 TPI			
	Threads Metric pitches (33)	0.25 - 8mm			
	English Pitches (33)*	3 - 72 TPI			
	<i>*(available by changewheels supplied as additional equipment)</i>				
	Feeds Longitudinal (21)	0.012 - 0.4mm			
	Cross (21)	0.006 - 0.2mm			

standard equipment

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

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

Installation



Lifting

The approximate weights of the machine are:-

500mm Model (500 mm/20") between centres - 400 kg (880 lbs)

750mm Model (750 mm/30") between centres - 460 kg (1010 lbs)

The machine should be lifted using a rope sling 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 15 amp for 220 volts supply and 10 amp for 380 to 440 volts supply. External wiring should be of a permanent character and be undertaken by a competent electrician. SEE GENERAL ARRANGEMENT AND FOUNDATION DRAWING FOR CABLE ENTRY.

Line connections and a substantial earth continuity conductor should be connected to the terminal block (SEE ELECTRICAL WIRING DIAGRAM).

If main spindle rotation does not coincide with that indicated by forward/reverse switch at control station, interchange two line connections.

continued

Lubrication (Refer to Lubrication diagram)

Ensure that the headstock, gearbox and apron are filled to the level of the relevant oil sight windows - 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: -

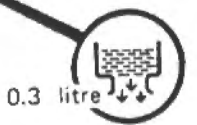
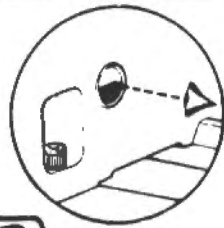
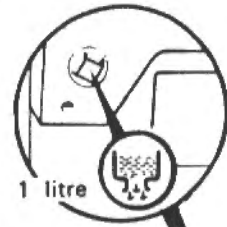
Make a low feed rate selection and run the machine light for 3 hours at 260 rpm
then for 1 hour at 550 rpm
then for ½ hour at 750 rpm

Lubrication

Check levels and oil daily

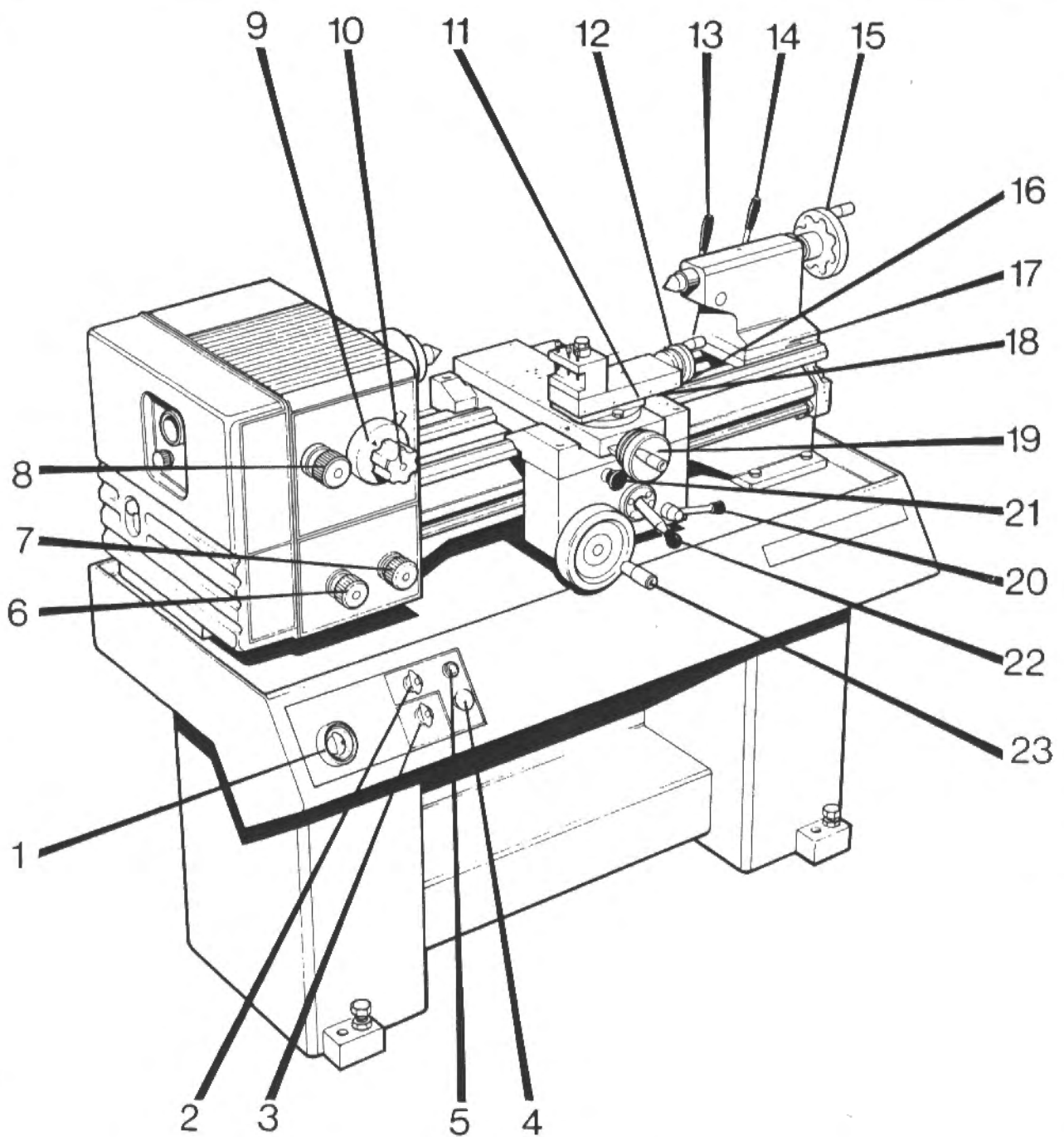
Schauglas und Öl täglich überprüfen

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. MAINS ISOLATOR | 9. SPEED SELECTOR LEVER | 17. TAILSTOCK SET-OVER SCREW |
| 2. FORWARD/REVERSE SWITCH | 10. SPEED RANGE SELECTOR DIAL | 18. CARRIAGE LOCK |
| 3. COOLANT ON/OFF SWITCH | 11. TOP SLIDE LOCK | 19. CROSS TRAVERSE HANDLE |
| 4. EMERGENCY STOP PUSHBUTTON | 12. TOP SLIDE TRAVERSE HANDLE | 20. TREADCUTTING ENGAGEMENT |
| 5. START PUSHBUTTON | 13. QUILL LOCK | 21. FEED AXIS SELECTOR |
| 6. FEED SELECTOR | 14. TAILSTOCK CLAMP | 22. FEED ENGAGE |
| 7. FEED SELECTOR | 15. QUILL TRAVERSE HANDWHEEL | 23. LONGITUDINAL TRAVERSE HANDWHEEL |
| 8. FEED DIRECTION SELECTOR | 16. CROSS-SLIDE LOCK (in R.H. side of cross slide) | |

Starting the Machine

1. **Ensure that lubrication has been carried out in accordance with the Lubrication diagram.**
2. **Check that the feed engage lever (22) and thread-cutting lever (20) 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 (21).**
Select - Direction of feed - by means of the headstock lower selector (8)
Select - Feed Rate - by referring to the charts on the headstock and selecting (in the sequence listed) the appropriate positions on the gearbox selectors (6) and (7). (Engagement of the feed gears may be assisted by turning the main spindle)
Select ** Spindle speed by turning the speed range selector dial (10) to present the appropriate range i.e. A B or C, then turn the speed selector lever (9) to point to the required speed from the chart. (Engagement of the drive gears may be assisted by manually turning the spindle)
4. **Switch on the electrical supply at the mains isolator (1) which is the red knob at the L.H. end of control station.**
5. **Select direction of spindle rotation by means of forward/reverse switch (2).**
6. **Start the spindle by means of start push-button (5).**
7. **Start and stop the feed motion as required by means of the feed engage lever (22)**

Stopping the Machine

The machine may be stopped by the Emergency Stop pushbutton (4).

Operational Notes

FACEPLATES

NOTE MAXIMUM SPEEDS:-

1500 rpm for 260 mm (12") dia.

COARSE SCREWCUTTING/
FEED RANGE 'J'

SHOULD NOT BE USED WITH
SPINDLE SPEEDS ABOVE 750 RPM.

NOTES

** 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 (23) may be disengaged by pulling it away from the apron face.

Tailstock set over adjustment - is provided in the form of socket screws (17) 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 14)
- 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.

Leadscrew Drive

Drive to the leadscrew is obtained by first removing the torque limiter cover plate. Then slide the driving sleeve towards the gearbox so engaging the shear pin with the leadscrew shaft. When not in use it is recommended that the leadscrew be disengaged.

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).

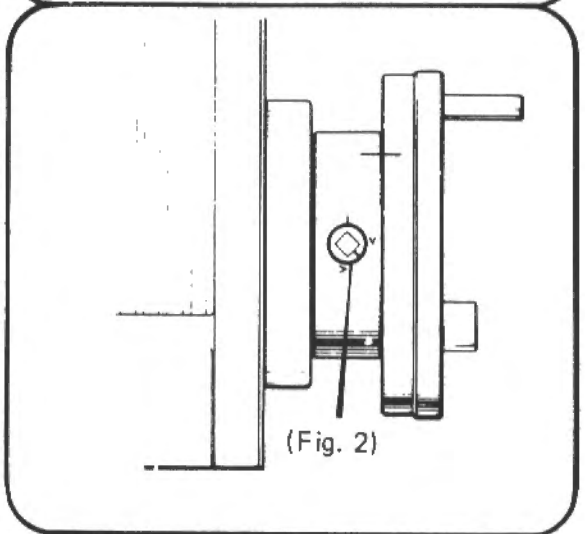
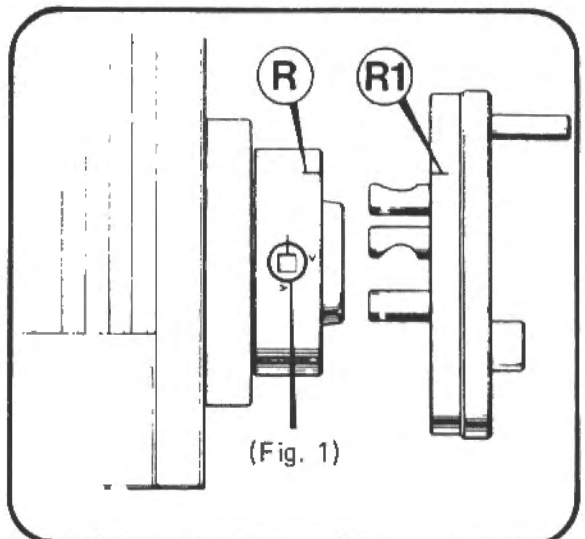
Mount the attachment on to the spindle nose and lock each cam by turning it clockwise using the key provided.

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.



TO ADJUST 'CAMLOCK STUDS'

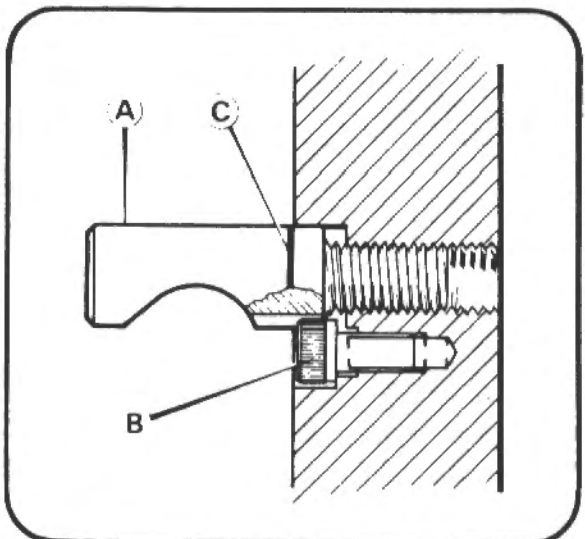
Remove Lockscrew (B).

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

Re-fit and tighten lockscrew (B).

NOTE:-

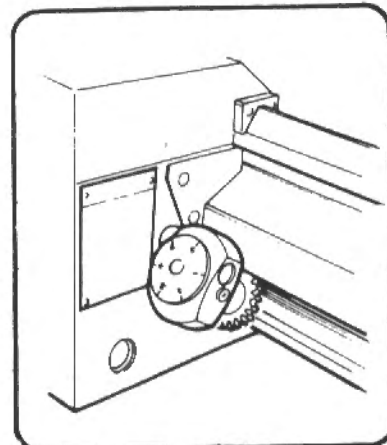
A datum ring (C) is marked on each stud as a guide to the original or initial setting.



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 requisite gear of the double pinion should be arranged to mesh with the leadscrew.

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

mm					
0.25	20	14	1.4	21	135
0.3	20	14	1.5	20	14
0.35	21	135	1.75	21	135
0.4	20	14	2	20	14
0.5	20	14	2.5	20	14
0.6	20	14	3	20	14
0.7	21	135	3.5	21	135
0.75	20	14	4	20	14
0.8	20	14	5	20	14
1	20	14	6	20	14
1.2	20	14	7	21	135
1.25	20	14	8	20	1

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.

ins					
4	1-6	11	1-6	28	1-6
4½	135	12	1-6	30	1-6
5	1-6	14	1-6	32	1-6
5½	135	15	1-6	36	1-6
6	1-6	16	1-6	38	1-6
6½	135	18	1-6	40	1-6
7	1-6	19	1-6	44	1-6
7½	135	20	1-6	48	1-6
8	1-6	22	1-6	52	1-6
9	1-6	24	1-6	54	1-6
9½	135	26	1-6	56	1-6
10	1-6	27	1-6	60	1-6

(B) ENGLISH THREADS on METRIC LEADSCREW MACHINES
 or
METRIC THREADS on ENGLISH LEADSCREW MACHINES
 or
ALL THREADS ON MACHINES NOT FITTED WITH THREAD INDICATOR

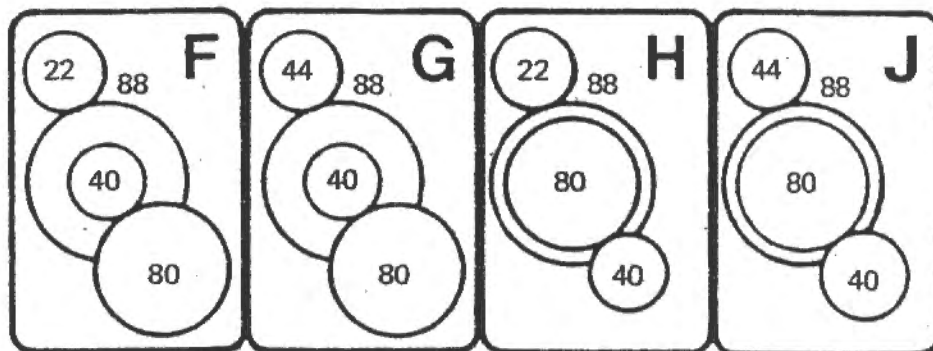
For these threads the leadscrew nuts are kept engaged throughout the cutting of any one thread. This involves reversing the whole drive by means of the reverse switch (2) at each end of the screwcutting pass whilst at the same time relieving or increasing the cut as required.

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

Thread – cutting

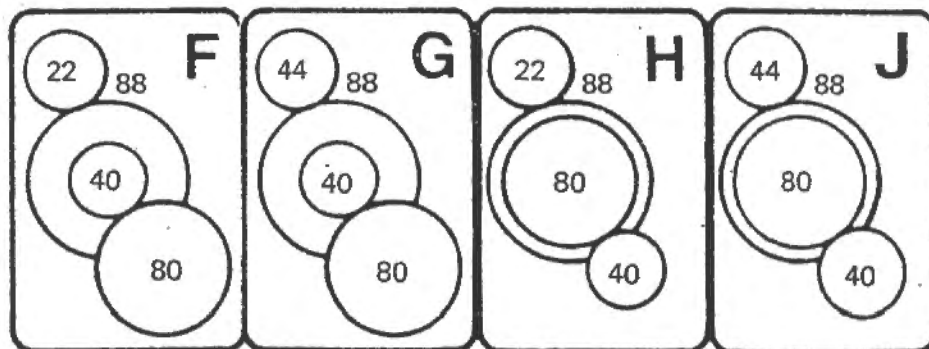
CHANGEWHEEL COMBINATIONS

Fig. 2A for Metric Leadscrew Machines



6 mm. pitch Leadscrew

Fig. 2B for English Leadscrew Machines




4 tpi. Leadscrew


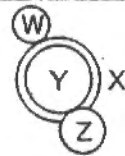


THREADCUTTING — METRIC GEARBOX



STANDARD THREADS AVAILABLE


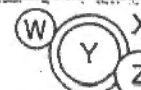
 mm									
0.25	N3F	0.7	M1F	1.2	K1G	2	L2G	3.5	M2H
0.3	K3F		M3G		K3H		N1H	4	L2H
0.35	M3F	0.75	K2F	1.25	N2G		N3J		N1J
0.40	L3F	0.8	L1F	1.4	M1G	2.4	K1H	4.8	K1J
0.5	N1F		L3G		M3H		K3J	5	N2J
	N3G	0.875	M2F	1.5	K2G	2.5	N2H	5.6	M1J
0.6	K1F	1	L2F	1.6	L1G	2.8	M1H	6	K2J
	K3G		N1G		L3H		M3J	6.4	L1J
0.625	N2F		N3H	1.75	M2G	3	K2H	7	M2J
						3.2	L1H	8	L2J
							L3J		

THREADS AVAILABLE WITH ADDITIONAL CHANGEWHEELS

 ins					
		W	X	Y	Z
72	N3	30	81	40	84
64	N3	35	84	40	84
56	N3	40	84	40	84
48	N3	40	84	40	72
40	N3	22	88	80	63
36	N3	30	81	60	63
32	N3	35	84	60	63
28	N3	30	84	80	63
27	N3	30	81	80	63
26	N3	30	78	80	63
25	L3	22	88	80	63
24	N3	35	84	80	63
23	N3	40	92	80	63
22	N3	40	88	80	63
20	K3	35	84	80	63
19	N3	40	76	80	63
18	N3	40	72	80	63
16	N2	22	88	80	63
14	N1	30	84	80	63
13	N1	30	78	80	63
12	N1	35	84	80	63
11.5	N1	40	92	80	63
11	N1	40	88	80	63
10	K1	35	84	80	63
9	N1	40	72	80	63
8	K2	35	84	80	63
7.5	L1	35	84	80	63
7	L2	30	84	80	63
6	L2	35	84	80	63
5	K1	60	72	80	63
4.5	L2	40	72	80	63
4	K2	60	72	80	63
3	L2	60	72	80	63

993

				
MOD		X	Y	Z
.3	K3	22	88	56
.4	L3	22	88	56
.5	N1	22	88	56
.6	K1	22	88	56
.7	M1	22	88	56
.8	L3	44	88	56
1	N1	44	88	56
1.25	N2	44	88	56
1.5	K2	44	88	56
1.75	M2	44	88	56
2	L2	44	88	56
2.5	N2	44	88	28
3	K2	44	88	28
3.5	M2	44	88	28

					
DP		W	X	Y	Z
56	N3	44	98	100	63
48	N3	44	84	100	63
40	N3	55	81	72	49
36	N3	44	81	100	49
32	N3	55	56	80	63
28	N3	55	63	80	49
24	N3	55	63	80	42
22	N3	60	63	80	42
20	K3	55	63	80	42
18	N1	44	81	100	49
16	N2	44	63	80	56
14	N1	55	63	80	49
12	N1	55	63	80	42
11	N1	60	63	80	42
10	K1	55	63	80	42
9	L2	44	81	100	49
8	K2	55	63	80	42

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Lathe Safety

Every effort has been made in the design and production of the M250 lathe to comply with statutory safety requirements and to provide a fundamentally safe machine tool. Its safety features include:-

Covered leadscrew

Torque limiter on Feed Shaft

Fail-Safe switch operates if End Guard removed.

Shear Pin for leadscrew

Interlock in Apron prevents simultaneous engagement of feed shaft and leadscrew.

In the further interests of safety, attention should be given to the following notes:-

A. Machine Capacity

The dimensions of a component which can be accommodated on the M250 lathe are limited only by the physical restrictions of the machine itself but responsibility for the following points with respect to machining a component must inevitably rest with the user.

- (1) Ensuring that the operator has had suitable training and possesses the required degree of skill and experience to undertake the work.
- (2) Providing suitable work holding and/or supporting equipment, i.e. chucks, steadies, revolving centres, etc.
- (3) Ensuring that suitable tooling is provided and correctly mounted.
- (4) Ensuring that suitable feeds and speeds are selected (if in doubt select the lowest).
- (5) Providing suitable workpiece guards and ensuring that these are consistently used.

B. Lathe Safety Rules

- (1) Read and understand operation notes before attempting to use the machine.
- (2) Keep lathe work areas clean.
- (3) Keep area surrounding machine tidy.
- (4) **ENSURE YOU KNOW HOW TO STOP THE MACHINE BEFORE STARTING IT.**
- (5) Do not interchange chucks or other spindle mounting items between lathes without checking for correct locking (see operational notes).
- (6) Use only 'high speed' chucks.
- (7) Note maximum permissible speeds of faceplates (see operational notes).
- (8) Remove chuck key immediately after use.
- (9) Check load capacity of revolving centres.
- (10) Ensure workpiece guards are in position before starting machine.
- (11) **Do not** use cracked or chipped tools.
- (12) Check —
 - Spindle speed selected.
 - Feed rate selected.
 - Direction of feed, and that
 - Feed & thread cutting levers are disengaged before starting the spindle.
- (13) **STOP MACHINE IMMEDIATELY ANYTHING UNEXPECTED HAPPENS.**
- (14) Do not use coarse feed range on high spindle speeds (see operational notes).
- (15) **Do not** change spindle speeds when spindle is rotating.
- (16) **Do not** touch revolving chuck, spindle, or workpiece.
- (17) **Do not** remove work from the machine without retreating the tool to a safe position.
- (18) Stop motors and switch off isolator when leaving machine unattended.

C. Personal Safety Rules

- (1) Report any accident, however small, immediately it happens.
- (2) Wear safety glasses.
- (3) Wear safety shoes.
- (4) Use barrier creams provided.
- (5) Wear your overalls buttoned up.
- (6) Roll sleeves up, or button the cuffs.
- (7) Keep hair short or wear a cap.
- (8) Use the correct size spanners at all times.
- (9) Be careful of, and remove if possible, burrs and sharp edges.
- (10) Use the correct type of sling when lifting workpieces, of the correct safe working load and ensure it is not worn or damaged.
- (11) Stand clear when lifting workpieces or equipment by crane.
- (12) Obtain assistance when mounting heavy or awkwardly shaped workpieces.
- (13) **Do not** wear rings, watches, ties, etc.
- (14) **Do not** keep tools (scribers, etc.) in overall pockets.
- (15) **Do not** remove guards unless machine is stationary.
- (16) **Do not** wash hands in coolant.
- (17) **Do not** remove swarf with bare hands, use a rake or brush.
- (18) **Do not** manually lift heavy equipment.
- (19) **Do not** use files, scrapers, etc. without handles.
- (20) **Do not** lean on the machine.
- (21) **Do not** interfere with electrical equipment.

Maintenance

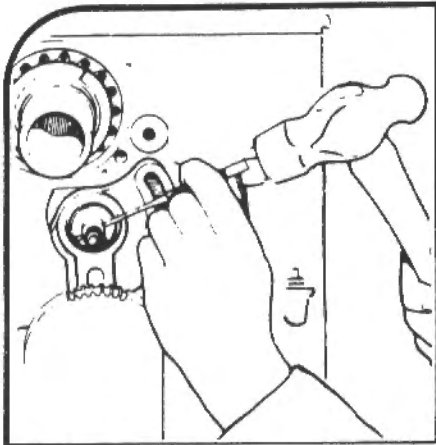


FIG. 1

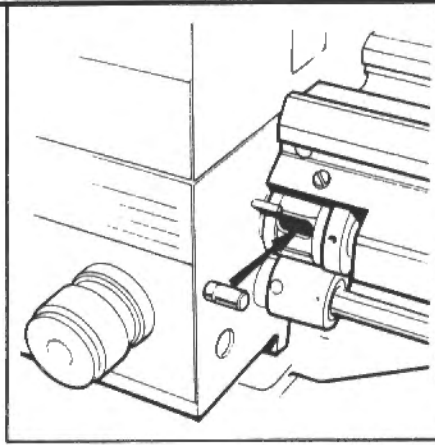


FIG. 2

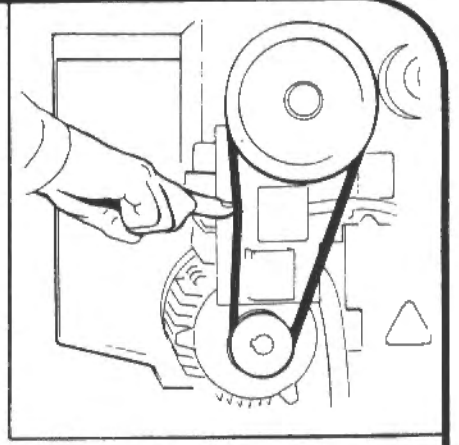


FIG. 3

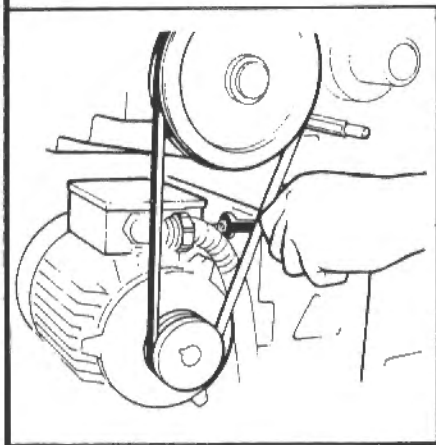


FIG. 4

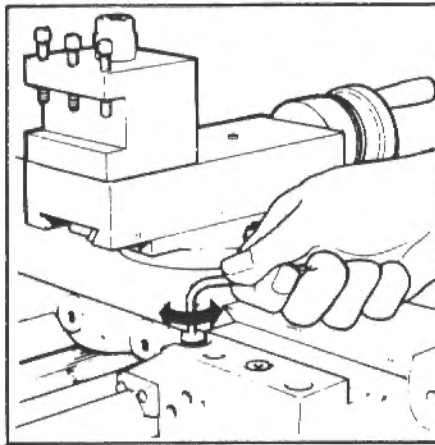


FIG. 5

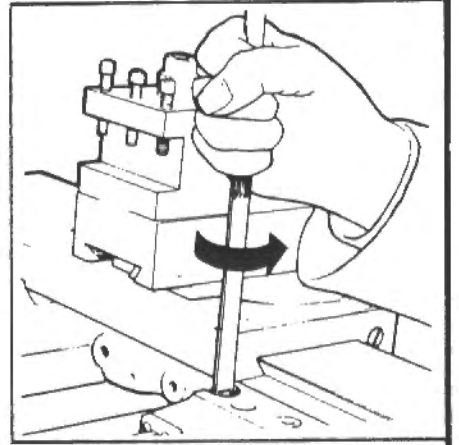


FIG. 6

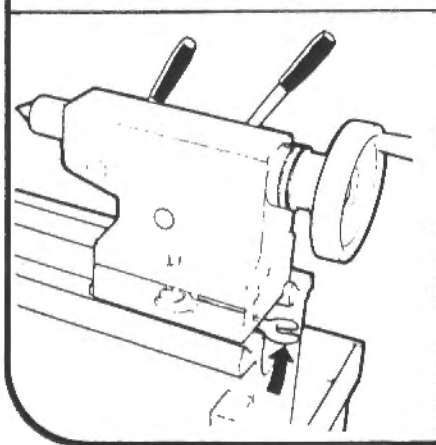


FIG. 7

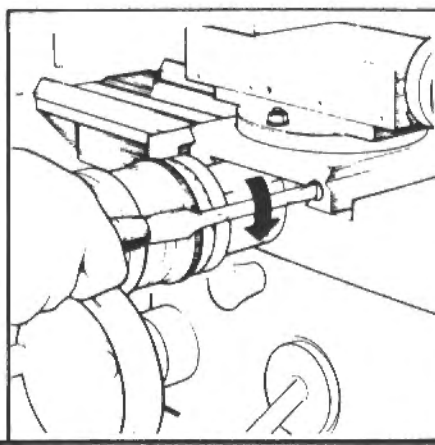


FIG. 8

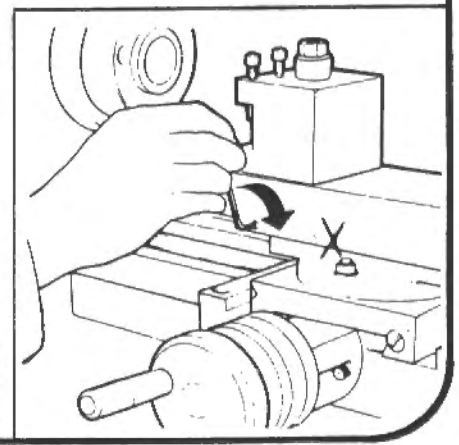


FIG. 9

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.

Leadscrew Shear Pin (Fig.2)

A shear pin device is incorporated on the leadscrew adjacent to the gearbox, as protection against overload. Instructions for replacing the shear pin are as follows:-

Remove the torque limiter cover plate.

Disengage shear pin assembly by sliding away from gearbox face.

Rotate spring steel cover on its locating sleeve until access slot is exposed.

Release M5 dog-point set screw in sleeve and rotate sleeve and cover until shear pin is exposed through slot.

Replace shear pin as shown in illustration (2) and re-assemble ensuring that the dog point of the M5 set screw is correctly located.

Drive Belts (Fig. 3 and 4)

Access to the Drive Belt is gained by removal of the moulded end guard when vee Belt tension may be assessed by applying finger pressure on the belt at a point midway between the two pulleys (fig. 3). For correct tension a deflection of about 10 mm should be possible.

To adjust the vee belt tension – release the lock nut on the adjusting screw (fig. 4) to increase tension, tighten screw against the bed until correct tension is obtained then re-tighten lock nut.

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

Saddle Strips (Fig. 5 and 6)

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° turn at the sleeve represents approximately 0.1 mm (.004") take up in the strip.

Tailstock Bed Clamp (Fig. 7)

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. 8)

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.

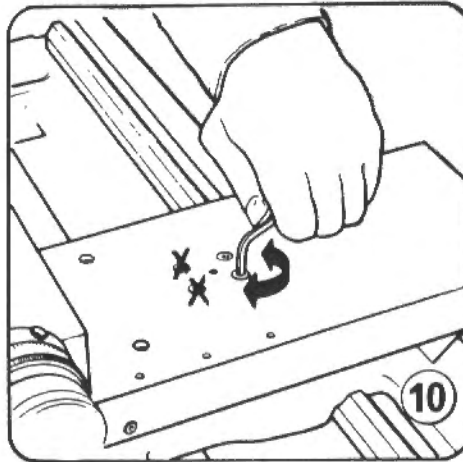
Top Slide (Fig. 9)

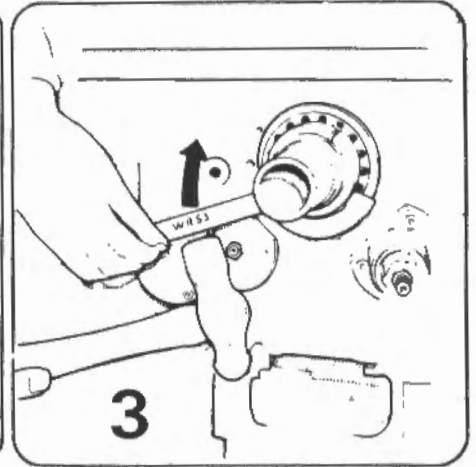
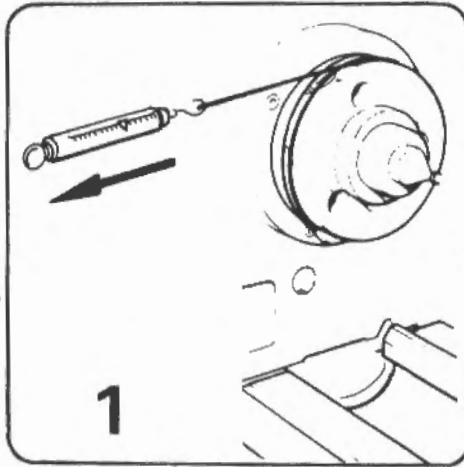
Take up for wear on the top slide strip is by means of the four (self-locking) socket set screws in the front face of the top slide casting.

Cross-slide Nut (Fig. 10)

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

Release **only** the rear pair of socket cap head screws in the top face of the cross-slide, which allows a spring loaded device to automatically remove backlash. Re-tighten cap head screws.





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.

TO CHECK FOR CORRECT SETTING

Checks should be carried out with the headstock in a warm condition achieved by running at a spindle speed of 800 rpm for approximately ten minutes.

The correct bearing torque setting is 0.9/1.1 Nm (8/10 in lbs) and can be determined as follows (Fig. 1):-

Wrap a length of string approximately three turns around the body of the chuck.

To the free end of the string attach a light spring balance and pull gently until spindle commences to turn, continuing to apply a steady load just sufficient to maintain the spindle in motion and noting the steady load registered on the balance.

Example: Using a 160 mm (6¼ in) chuck, the spring balance reading should be 1.14/1.36 kg (2½/3 lbs).

BEARING ADJUSTMENT

Remove end drive guard, changewheels, swing frame and rear bearing cover.

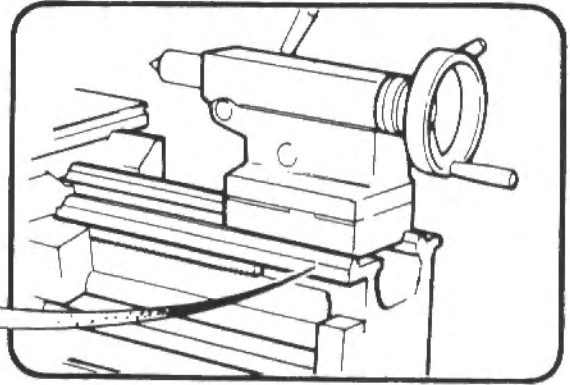
Release locking screw in the bearing adjusting nut, Fig. 2. With the pin-key provided adjust the nut as required - clockwise rotation to increase bearing load, Fig. 3. As over tightening will seriously impair the life of the bearings it is recommended that adjustment be made in increments not exceeding 3 mm (1/8 in) measured on the nut periphery. After each incremental adjustment, the spindle should be run for a few minutes and the bearing load re-checked, as described above.

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.

500

or

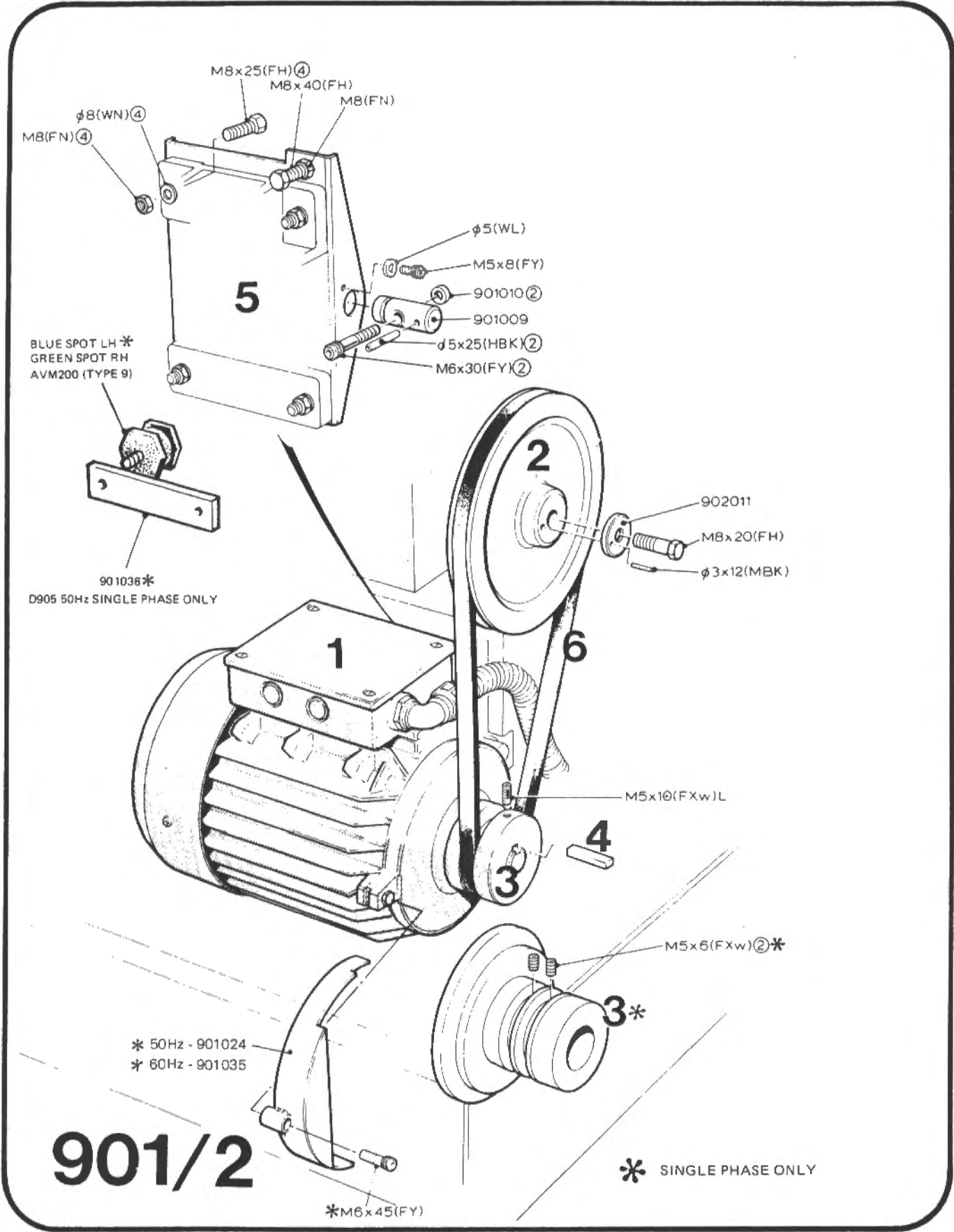
750

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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KEY TO DRIVE ASSEMBLY COMPONENTS (901/2)

1

2

3

4

5

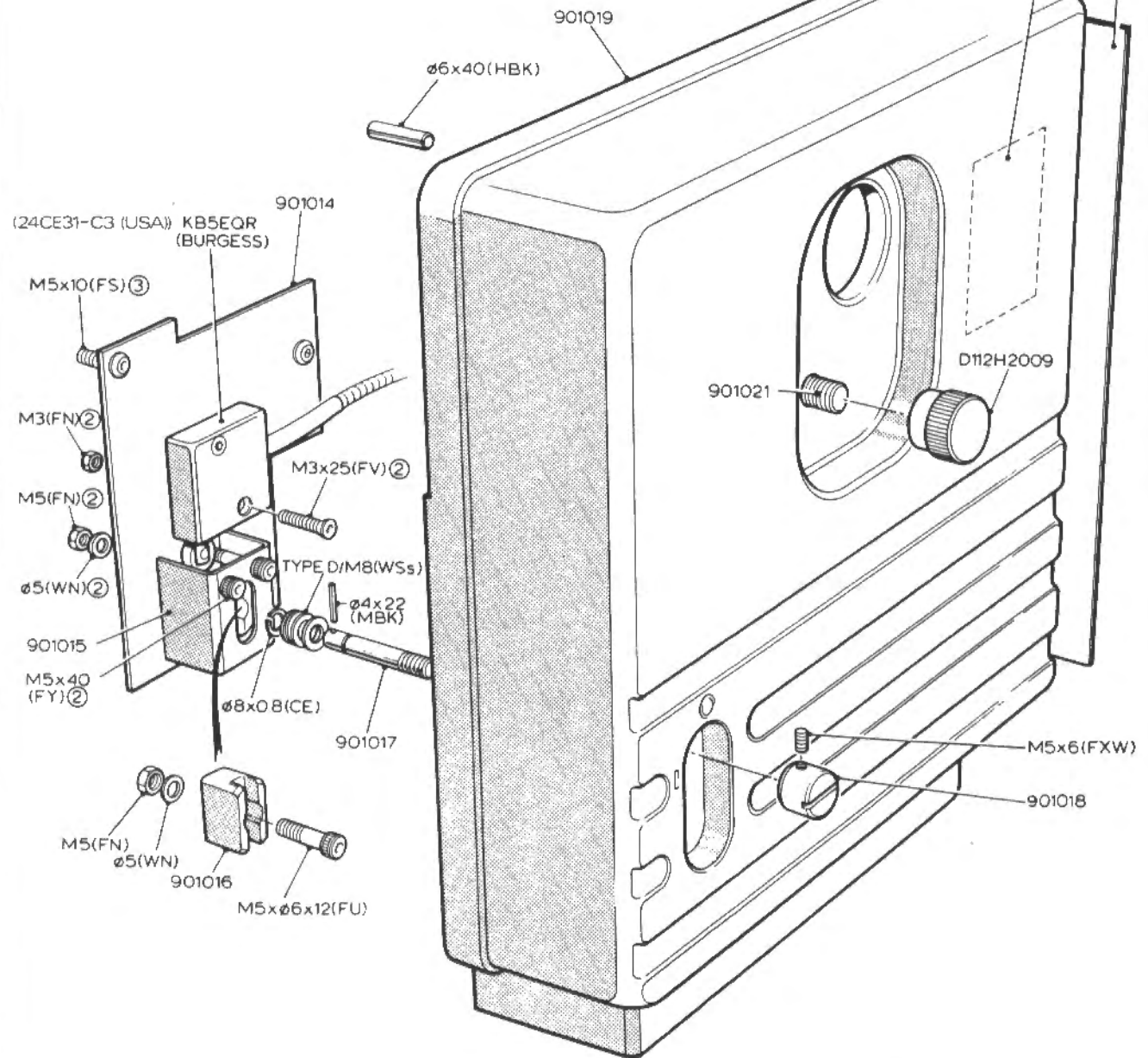
6

MOTOR		TOP SPEED SPINDLE	TOP PULLEY	MOTOR PULLEY	KEY	MOUNTING BRACKET	BELTS
D80	3 PH 50Hz	1500 3000	902010	901012	6x5x40 (KR)	901007	SPZ 800
D90S	Single PH 50Hz	1500	902053	901023	8x7x32 (KR)	901037	NU-T-Z/10(40°) Brammer ②
D80	3 PH 60Hz	1500 3000	902010	901028	6x5x40 (KR)	901007	SPZ 800
LS145T	3 PH 60Hz	1500	902010	901013	3/16"x3/16"x1.3/8"(KS)	901008	SPZ 800
LS145T	3 PH 60Hz	2000	902057	901026	3/16"x3/16"x1.3/8"(KS)	901008	SPZ/3V 787
EL145T	Single PH 60Hz	2000	902061	901033	3/16"x3/16"x1.3/8"(KS)	901008	SPZ/3V 787
EL145T	Single PH 60Hz	1500	902089	901051	3/16"x3/16"x1.3/8"(KS)	901008	SPZ 800

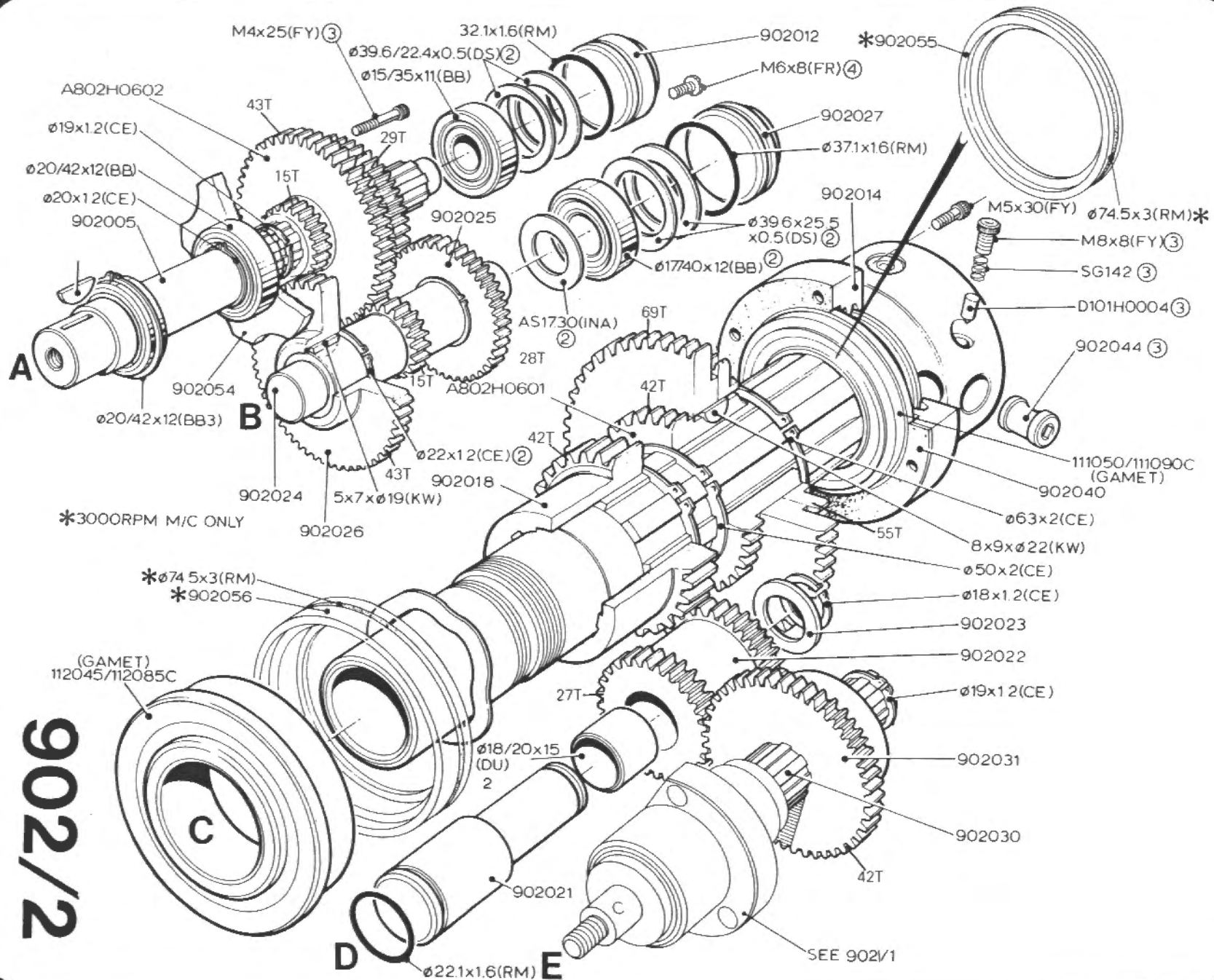


1035 - METRIC THREAD ENGLISH GEARBOX
 1145 - ENGLISH THREAD METRIC GEARBOX

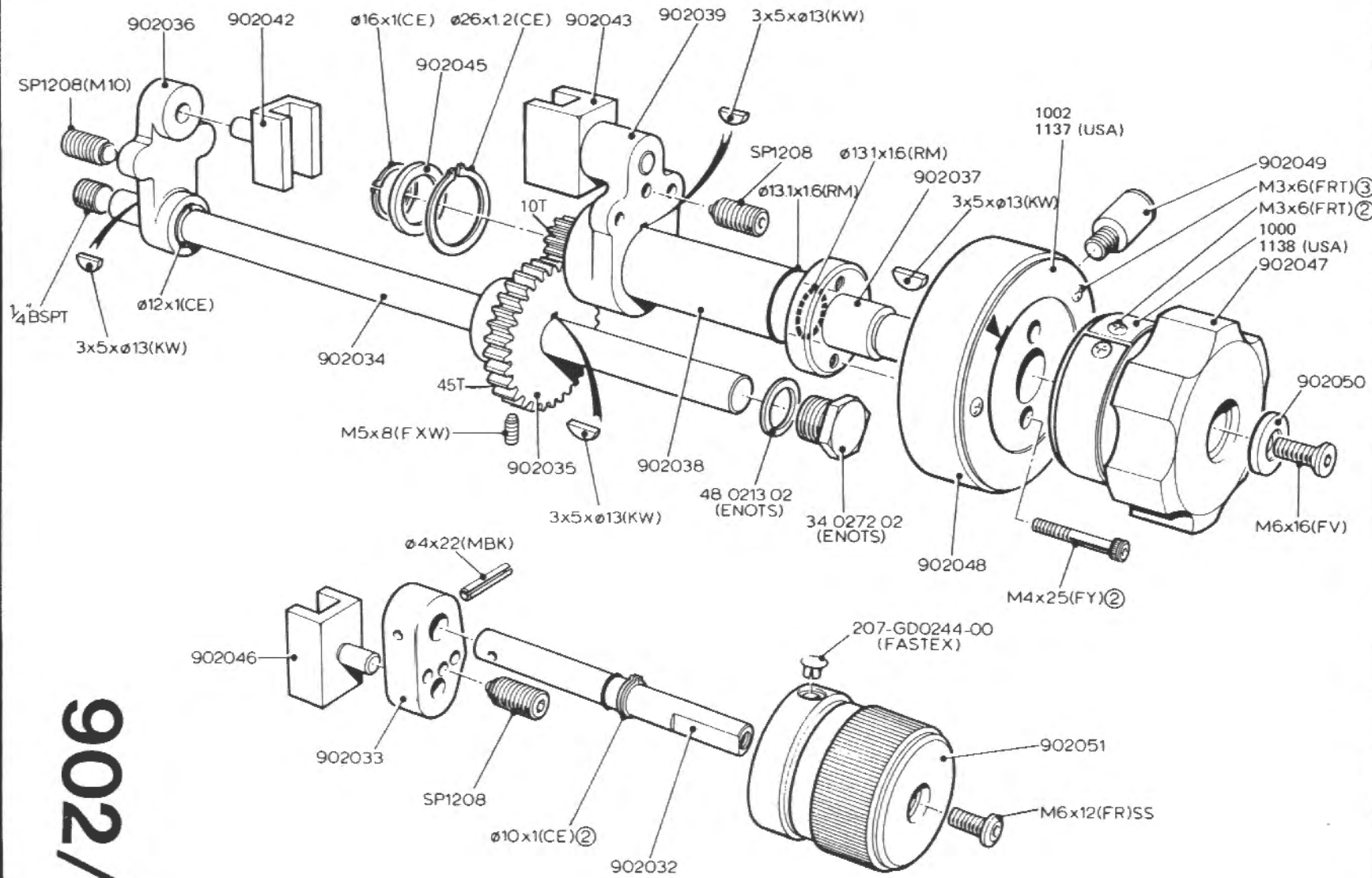
1037 (METRIC)
 1140 (ENGLISH)



901/3



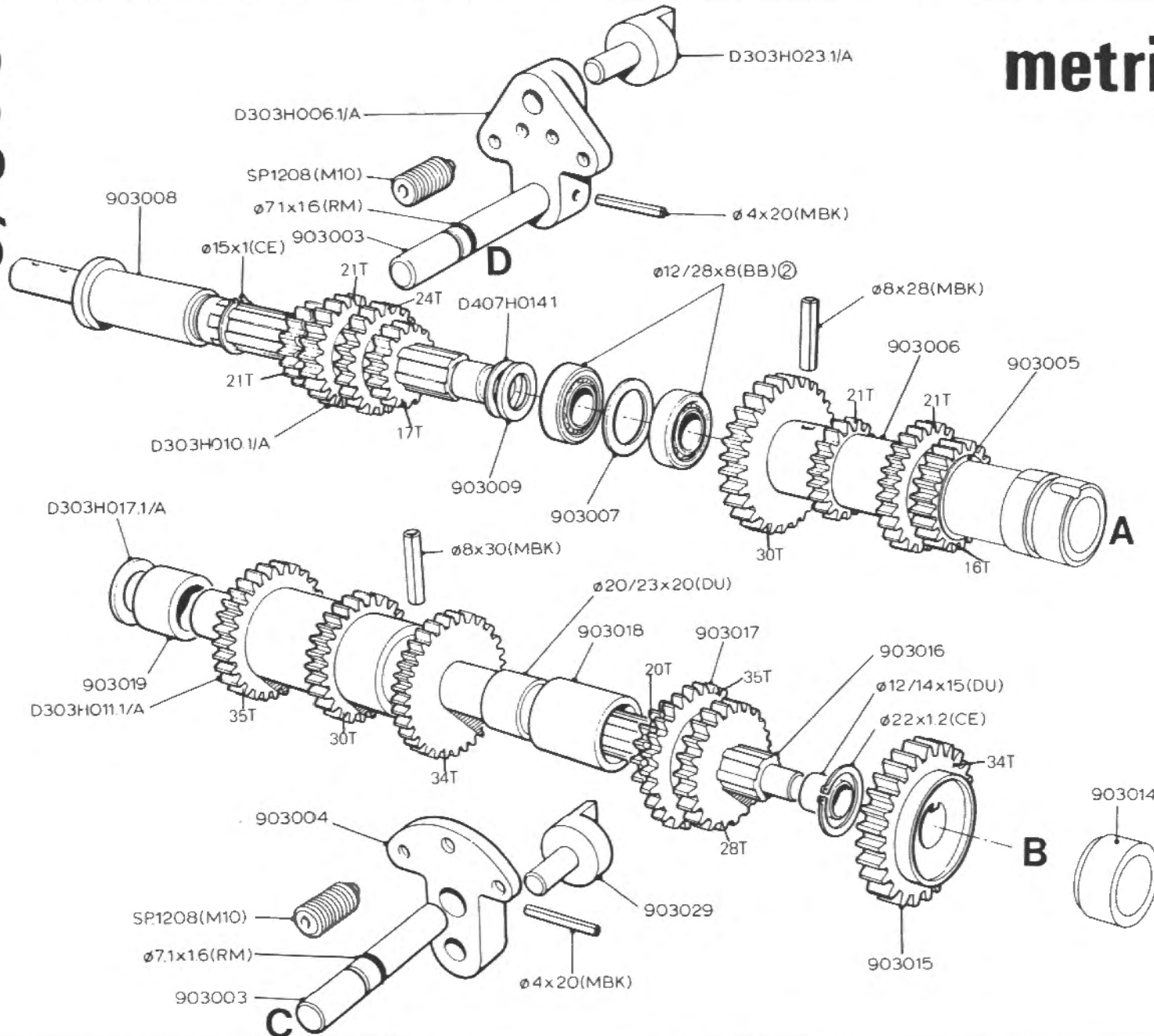
902/2



902/3

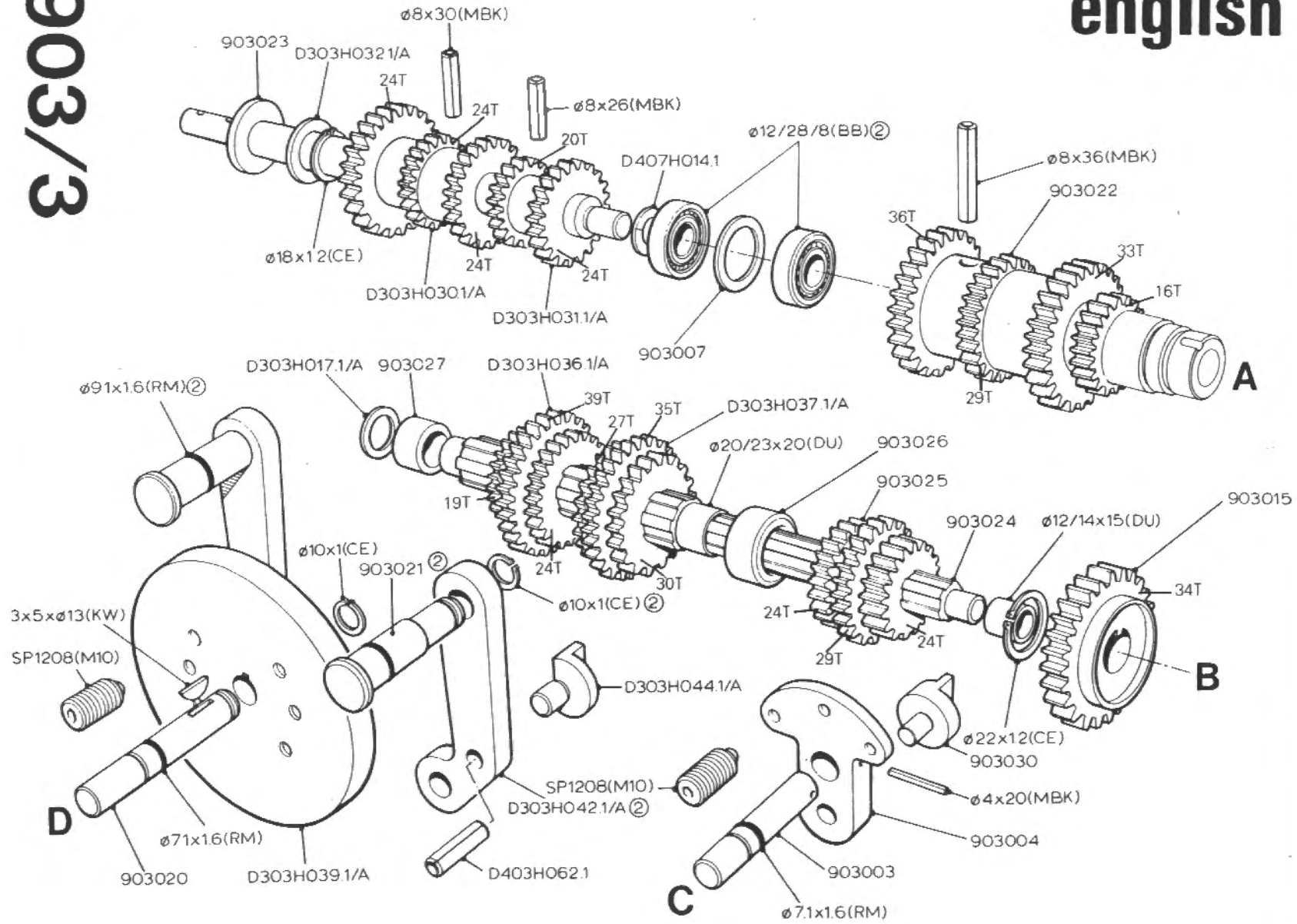
903/2

metric

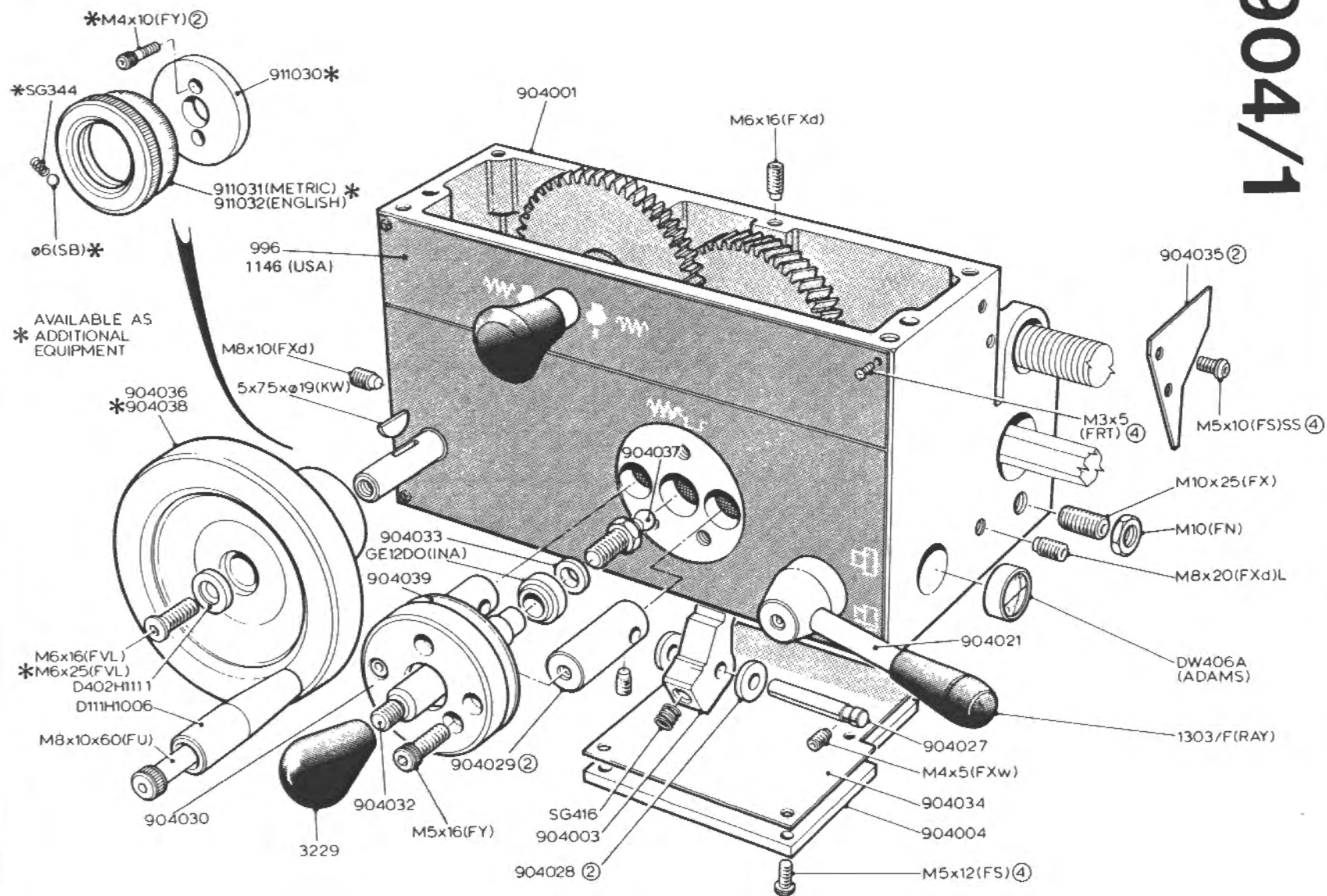


903/3

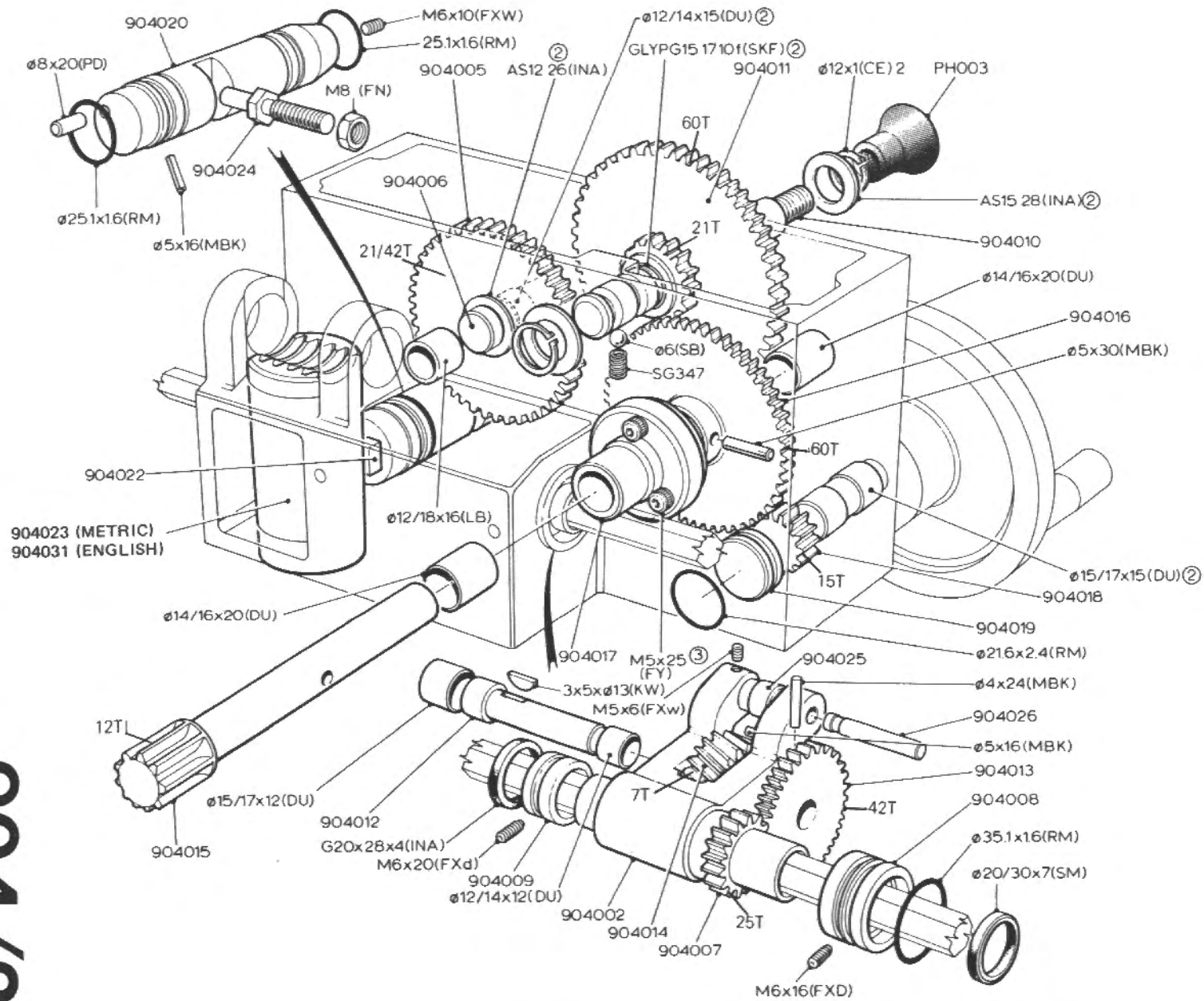
english

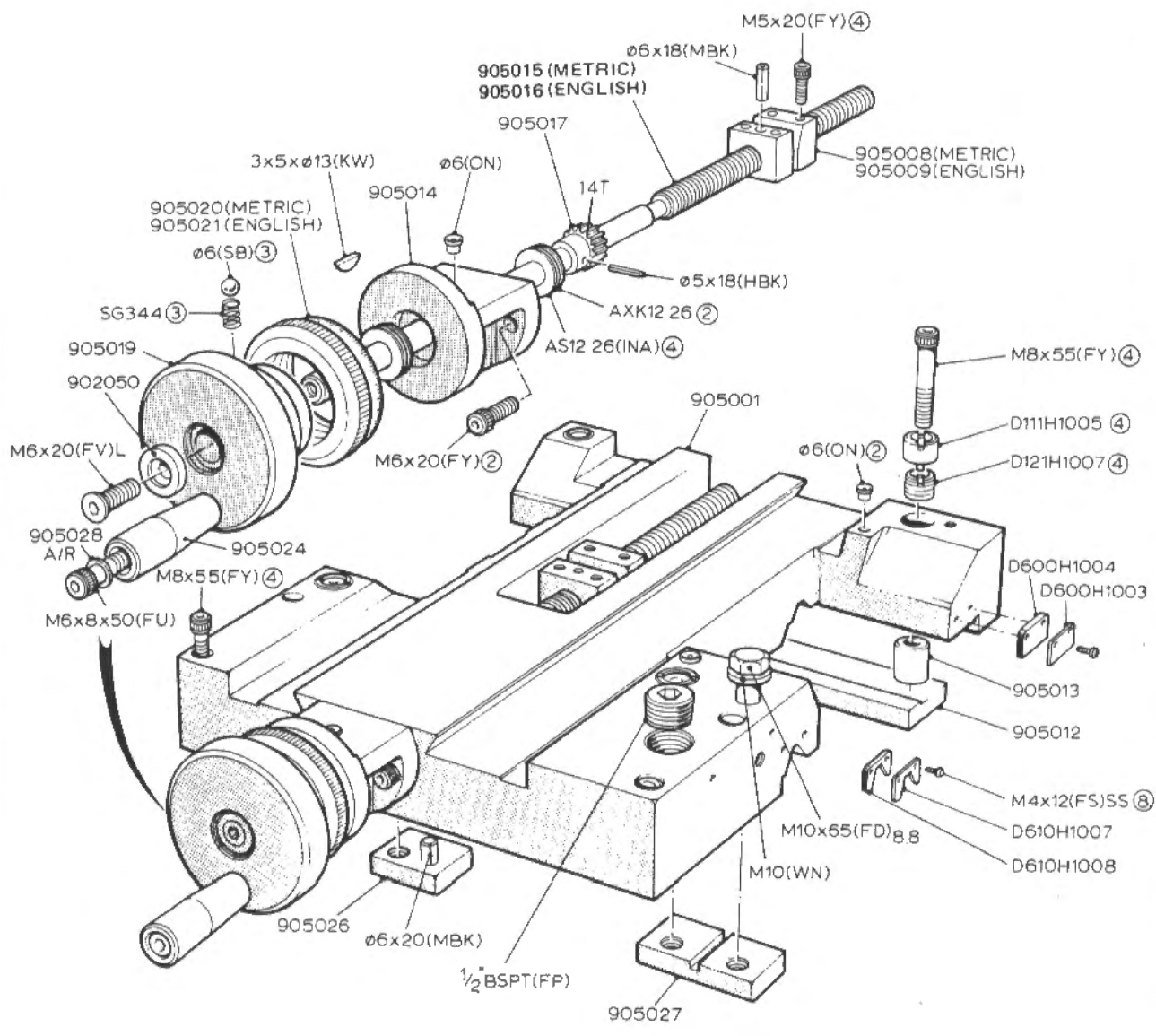


904/1

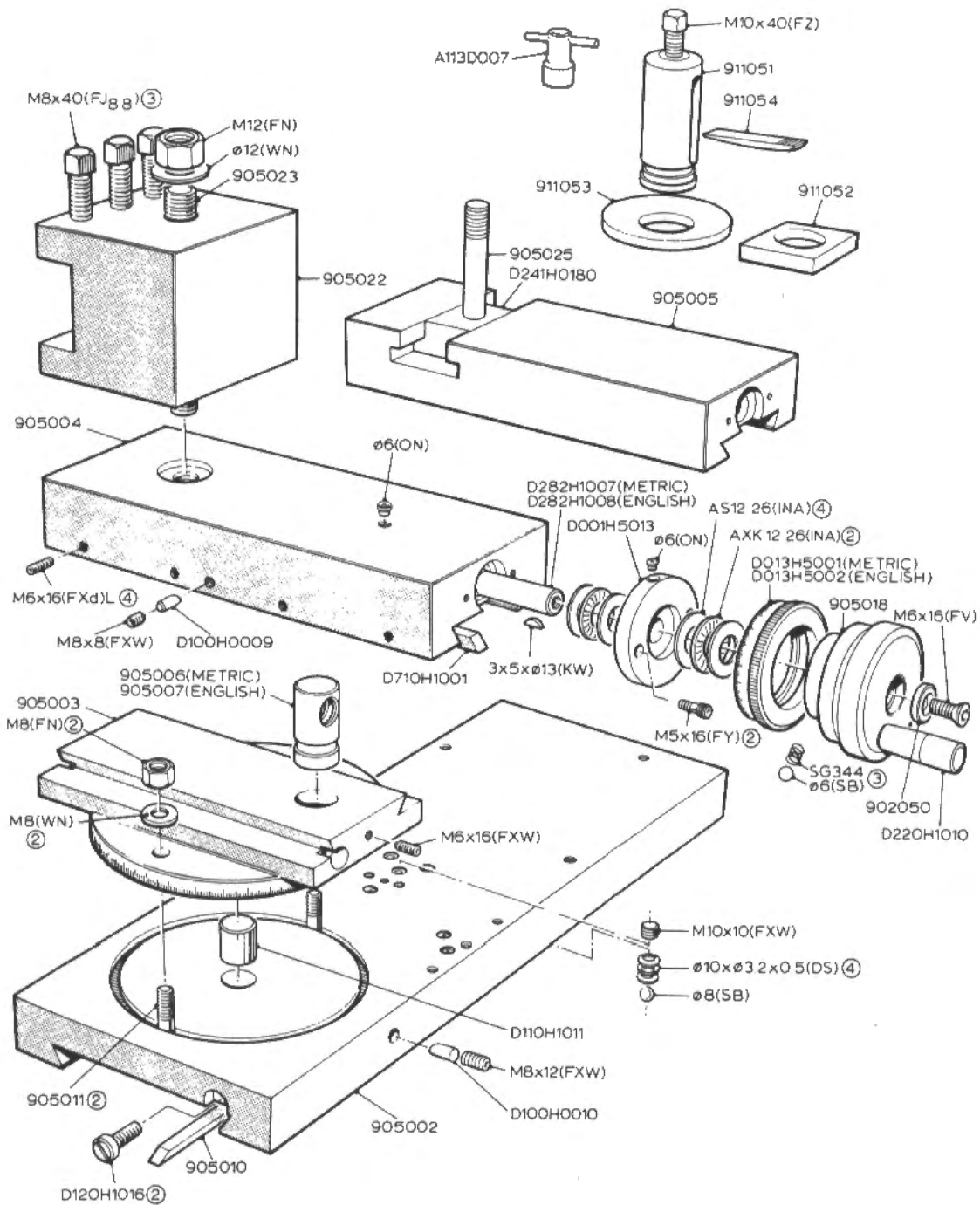


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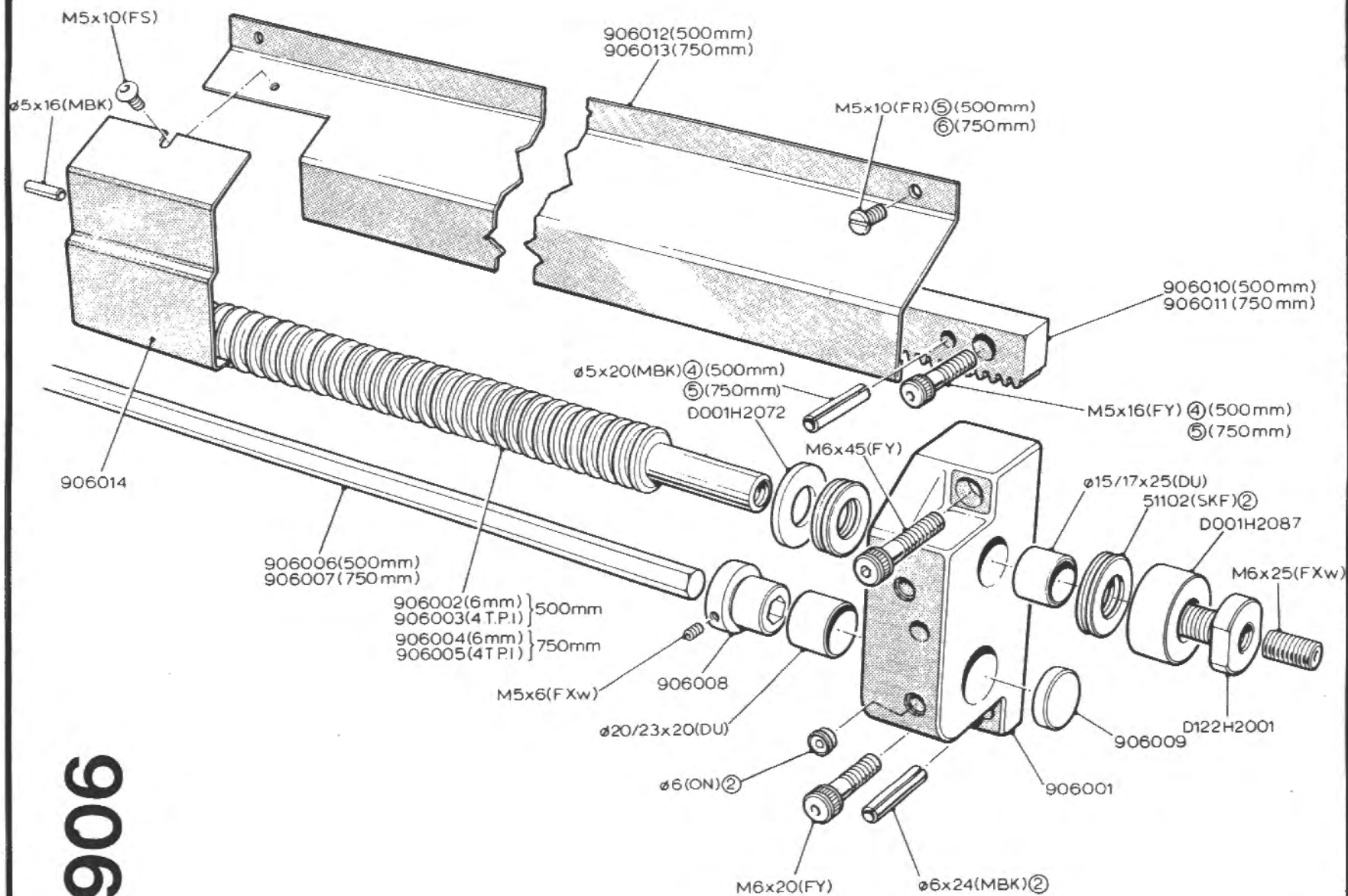




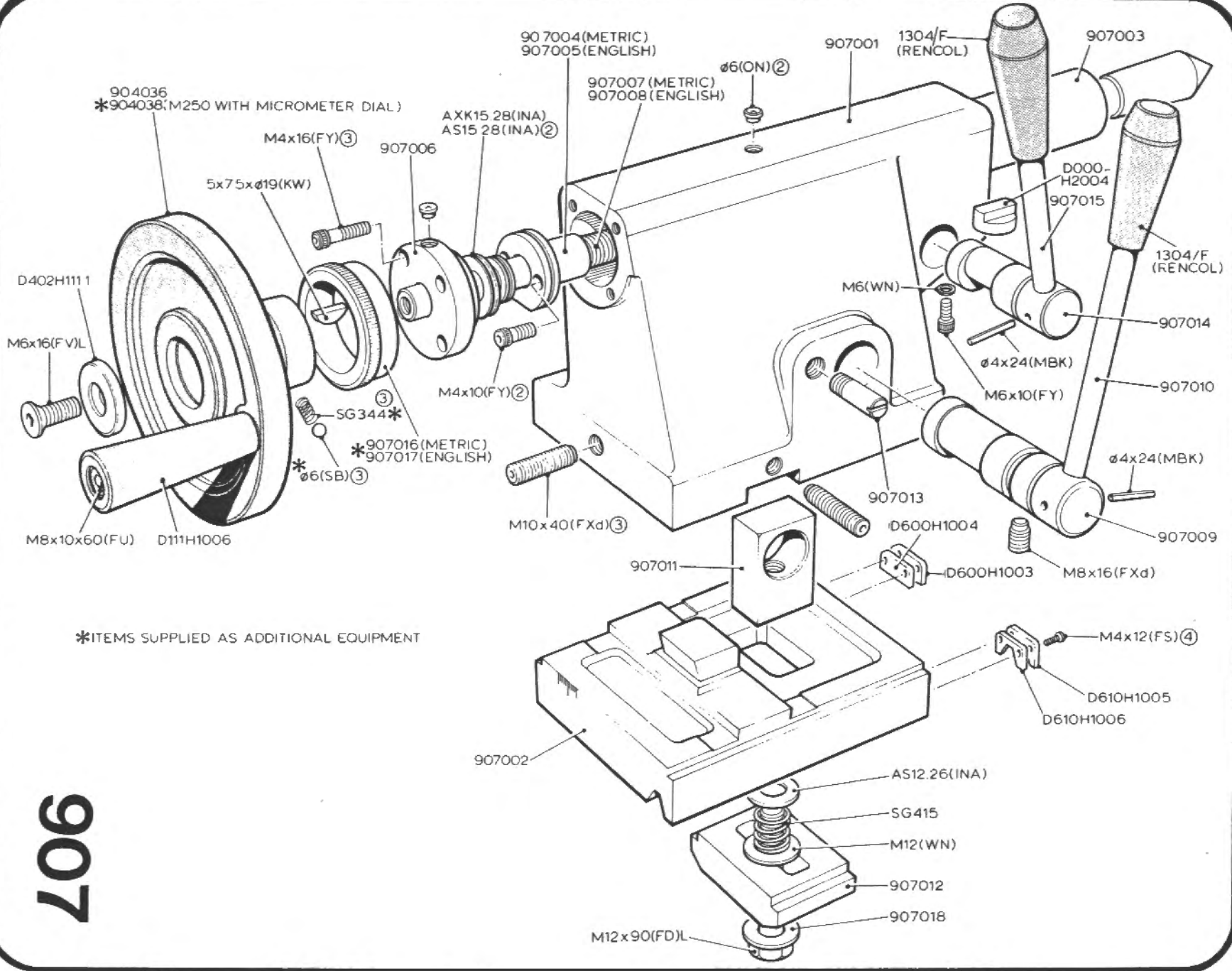
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905/2

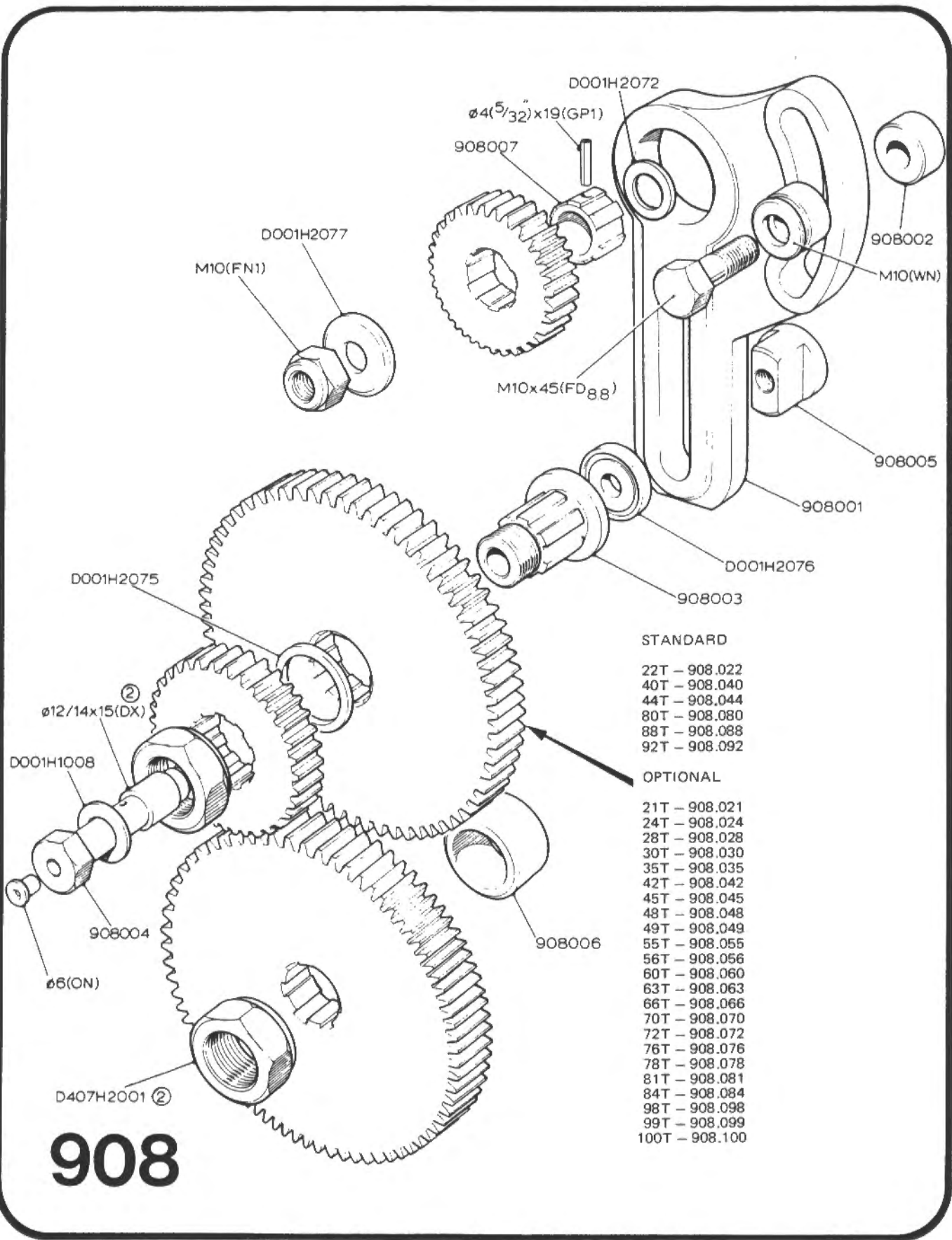


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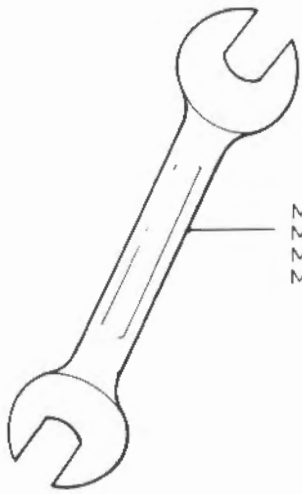


*ITEMS SUPPLIED AS ADDITIONAL EQUIPMENT

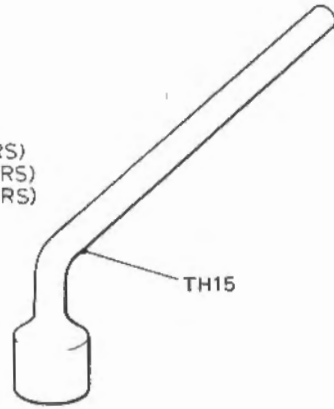
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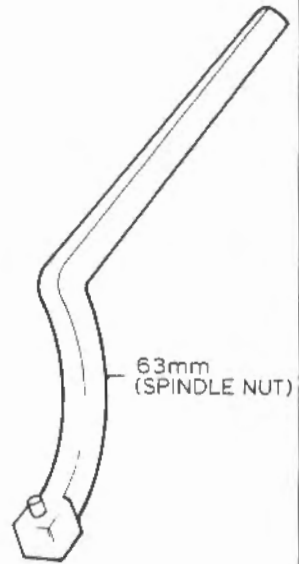
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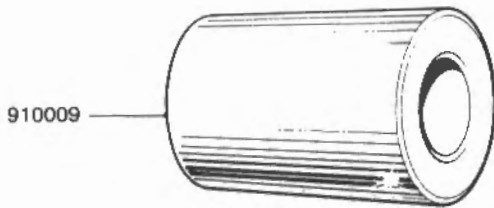
M8/13mm x 15mm (WRS)
 M10/17mm x M12/19mm (WRS)
 M14/22mm x M16/24mm (WRS)
 M18/27mm x M22/32mm (WRS)



TH15



63mm
(SPINDLE NUT)

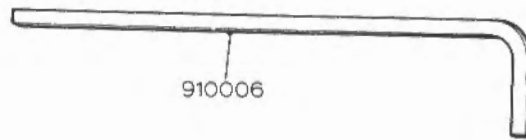


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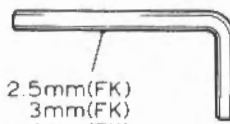


L5-585A

910001



910006

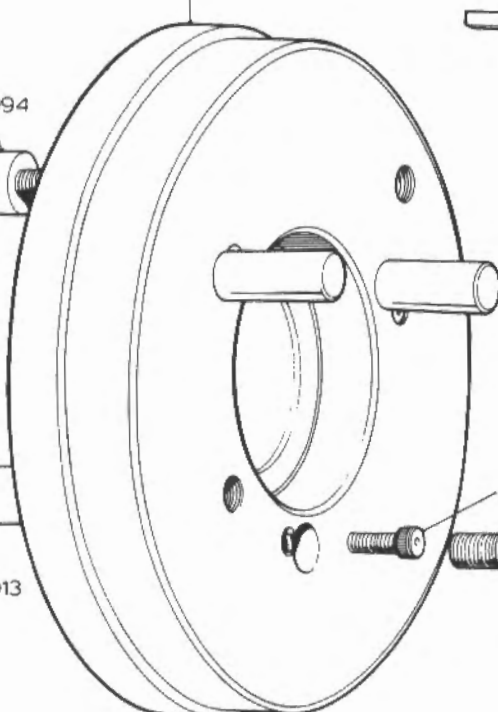


2.5mm(FK)
 3mm(FK)
 4mm(FK)
 5mm(FK)
 6mm(FK)
 8mm(FK)

D101H2094

M12 x 25
(FY)

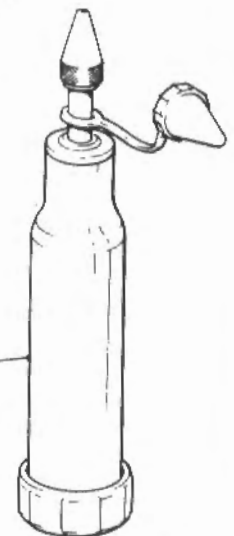
D220H1013



M6 x 12 (FY) ③

910005 ③

F60
(OIL GUN)



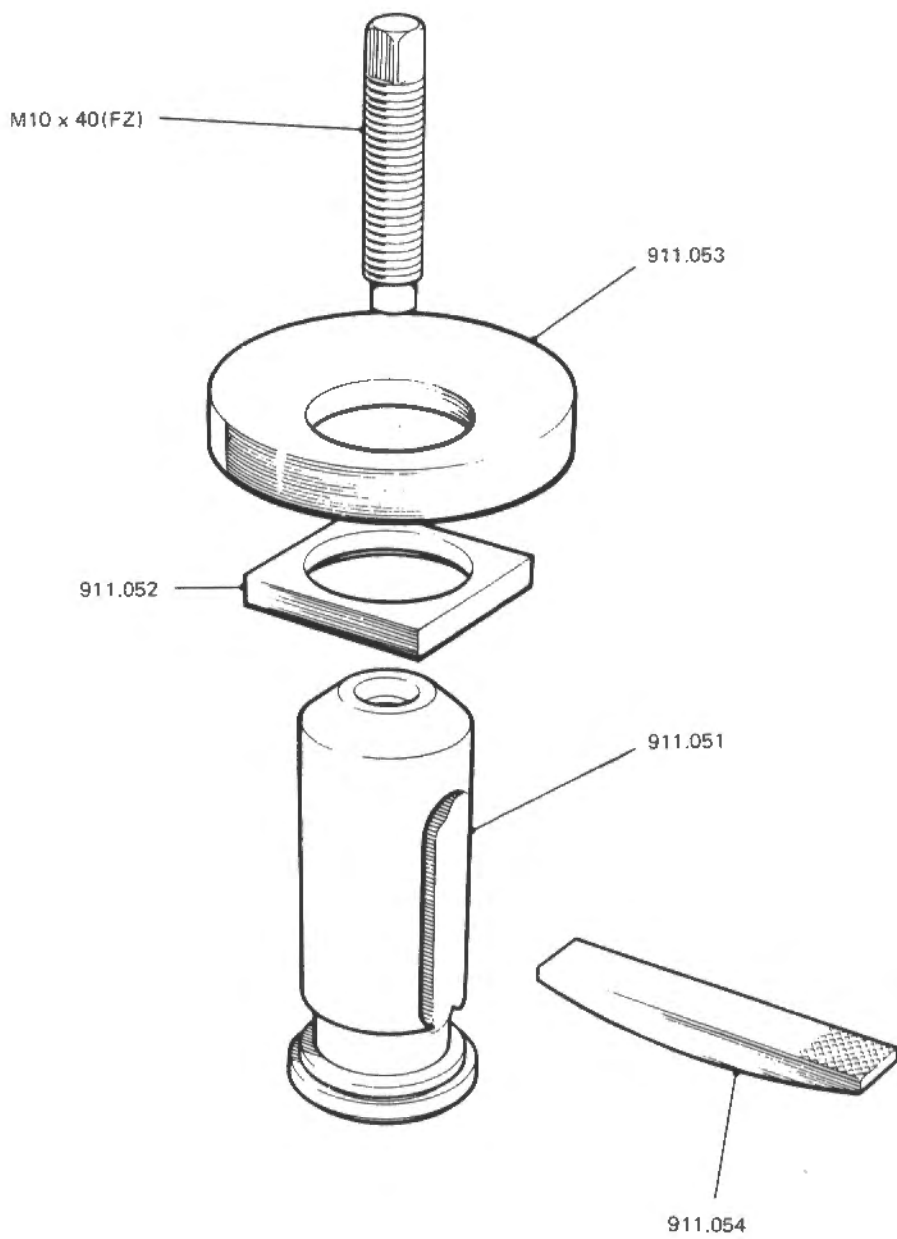
910

Additional Equipment

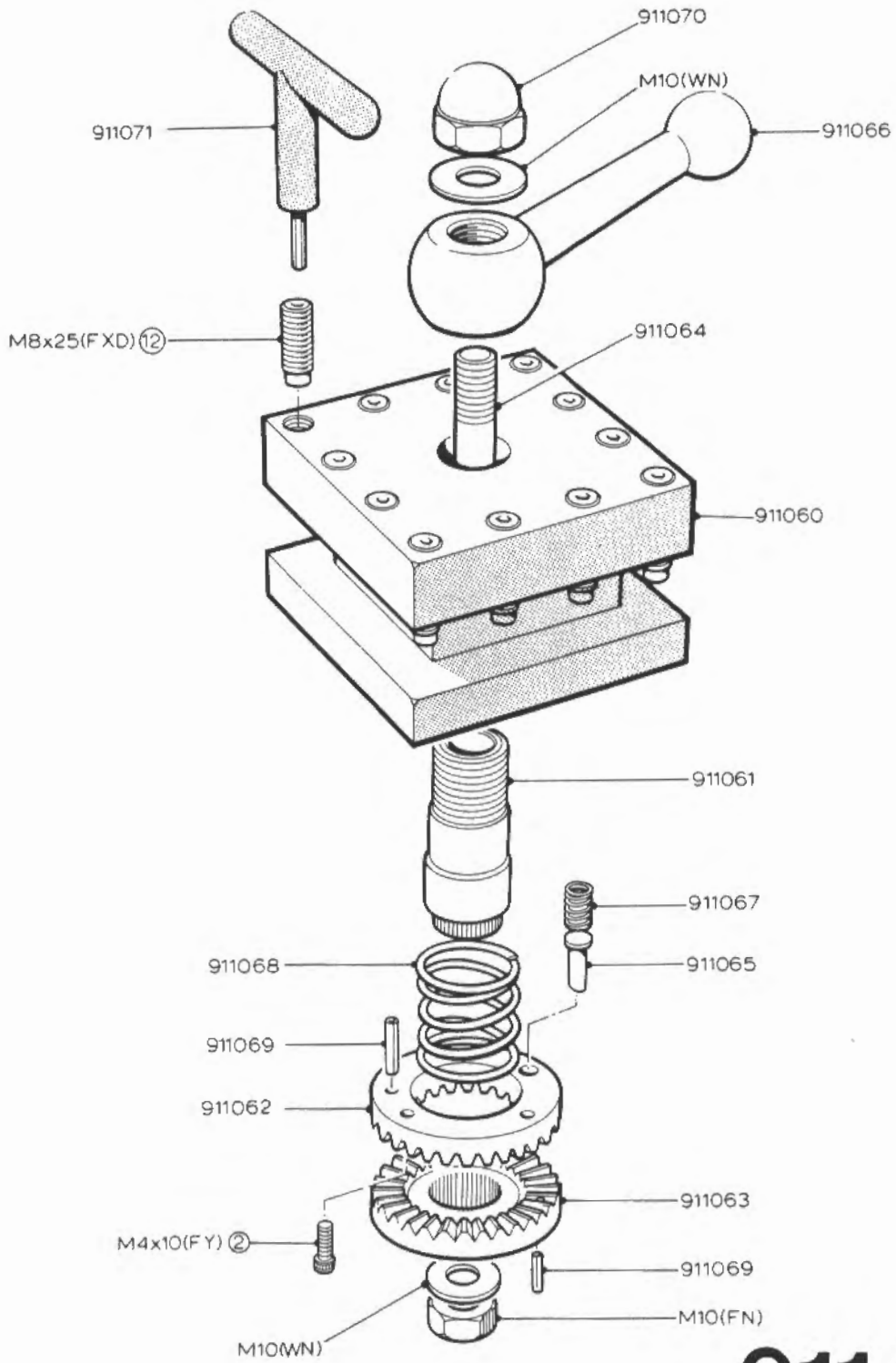
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Parts available as assemblies (not illustrated):

911.65	Metric/English dual reading dial - Cross-slide (English cross-slide screw and nut required)	
911.66	Metric/English dual reading dial - Topslide (English topline screw and nut required)	
911.72	Wattmeter	
1542-21601	4-jaw chuck	
1212-21305	3-jaw chuck	
D911H007.1	Faceplate	

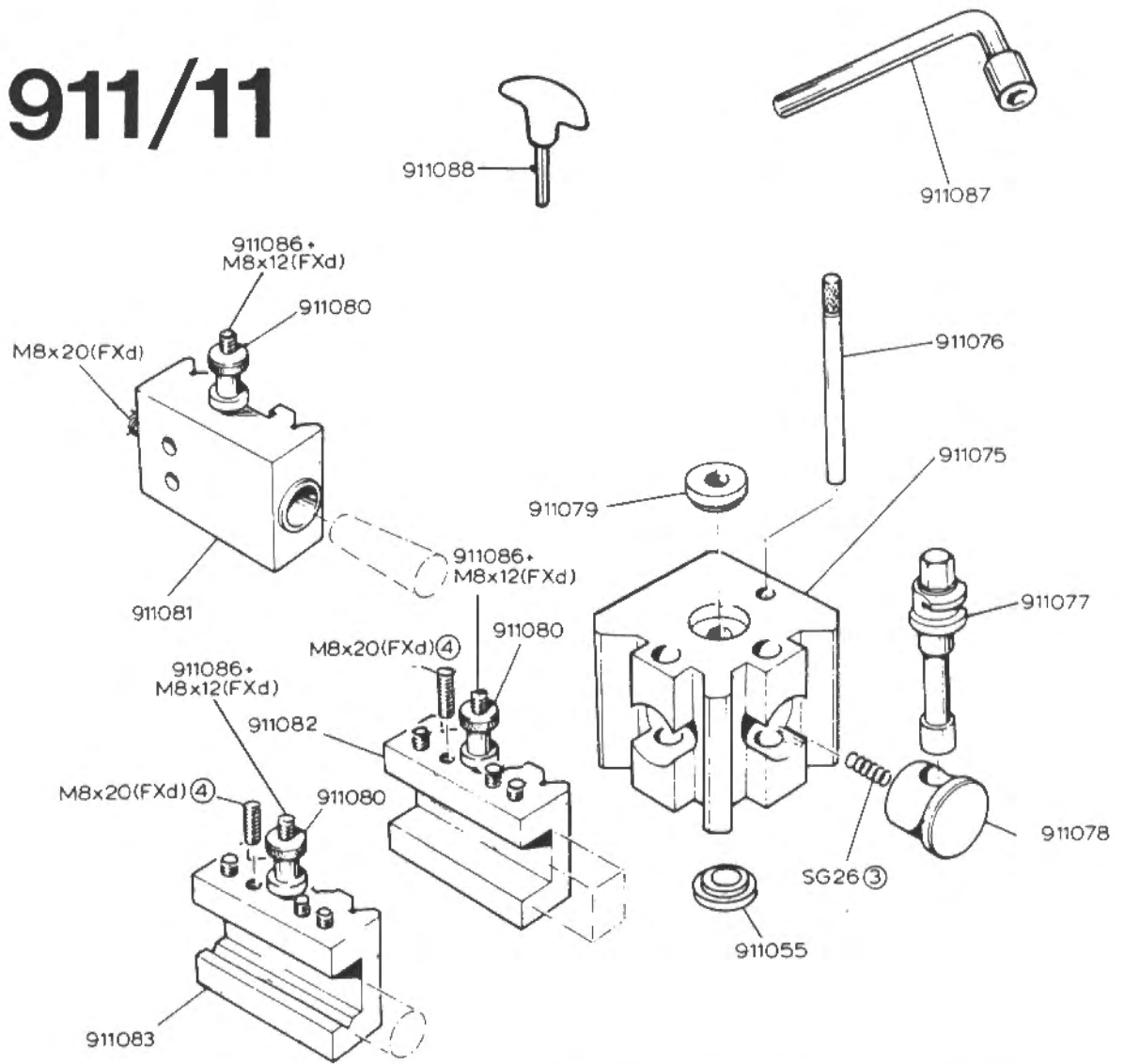


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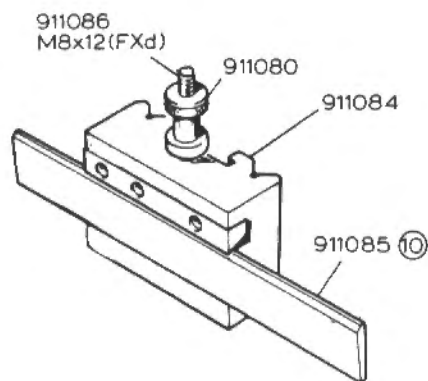


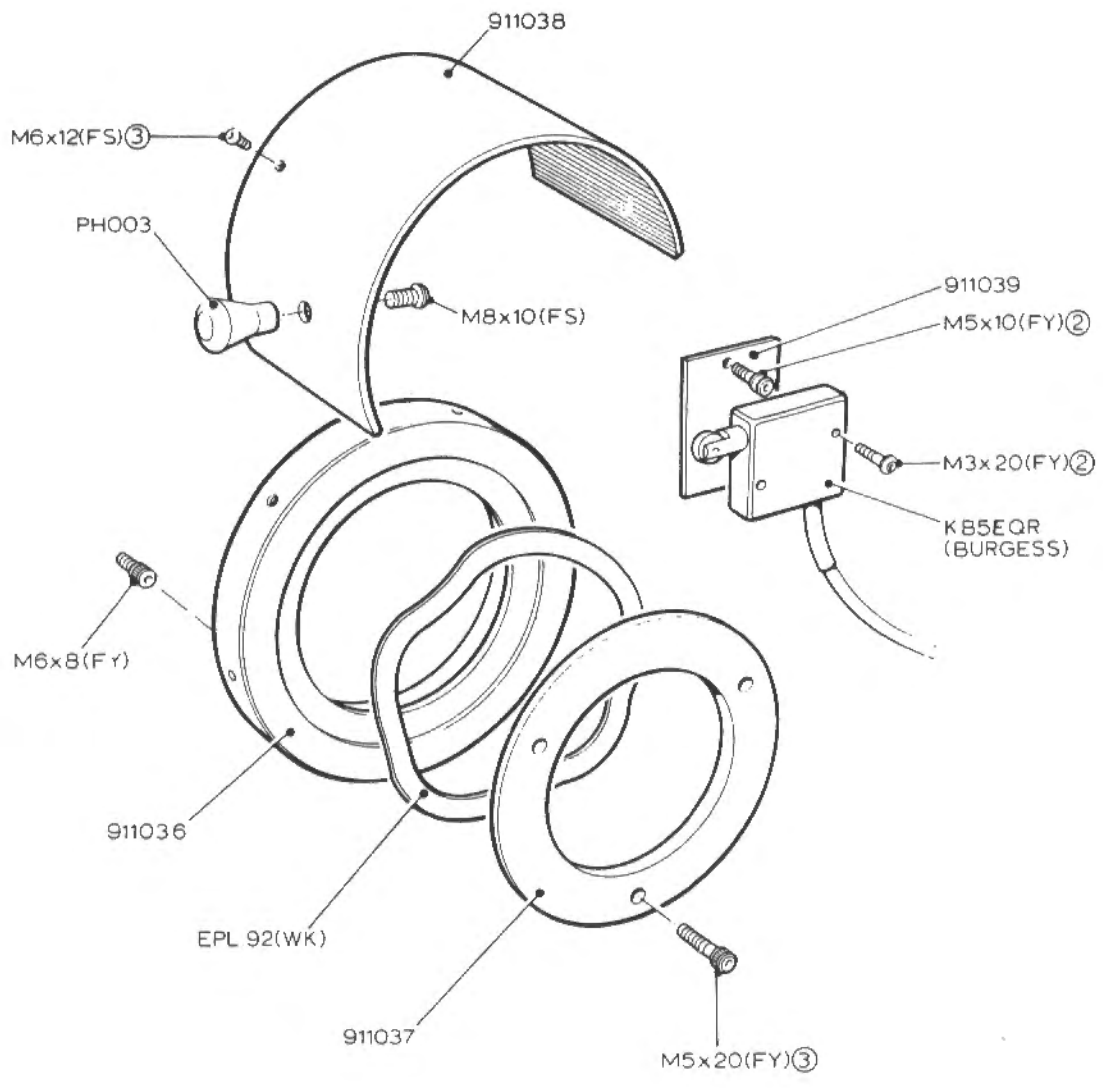
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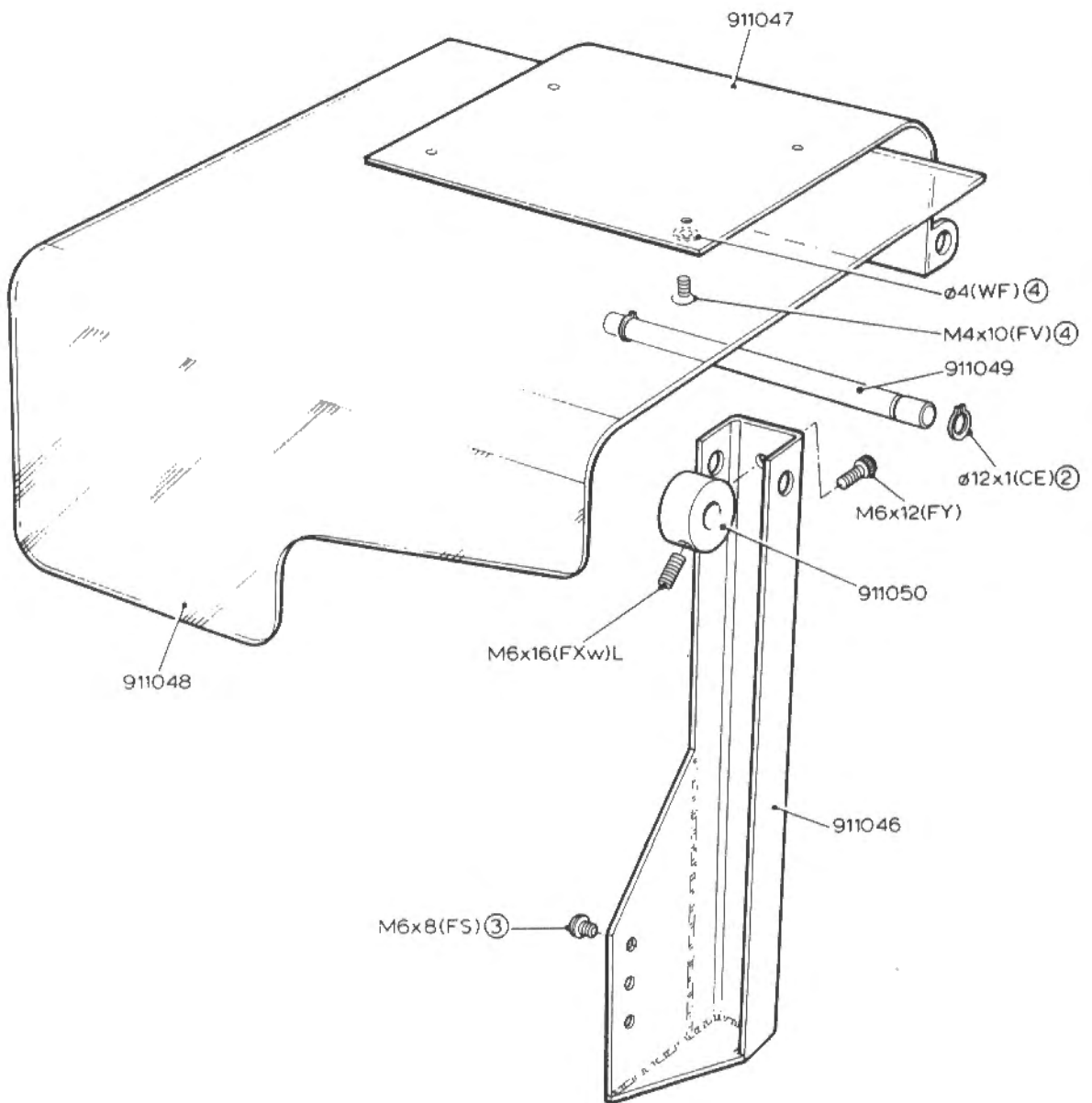


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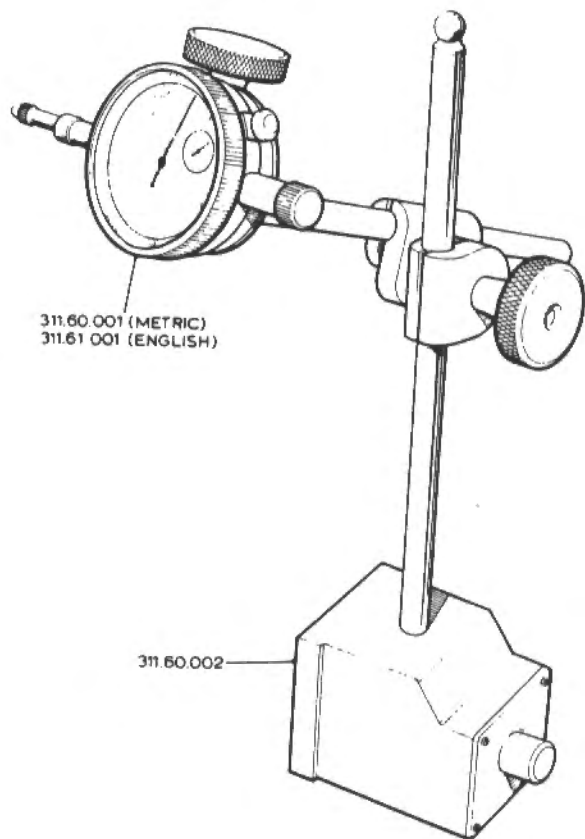
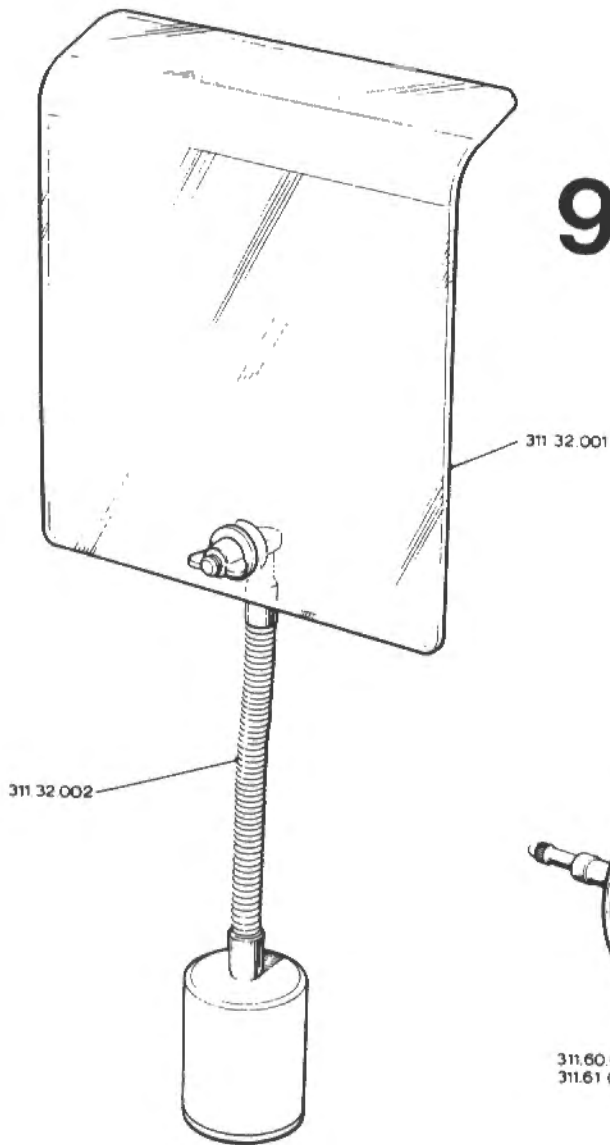


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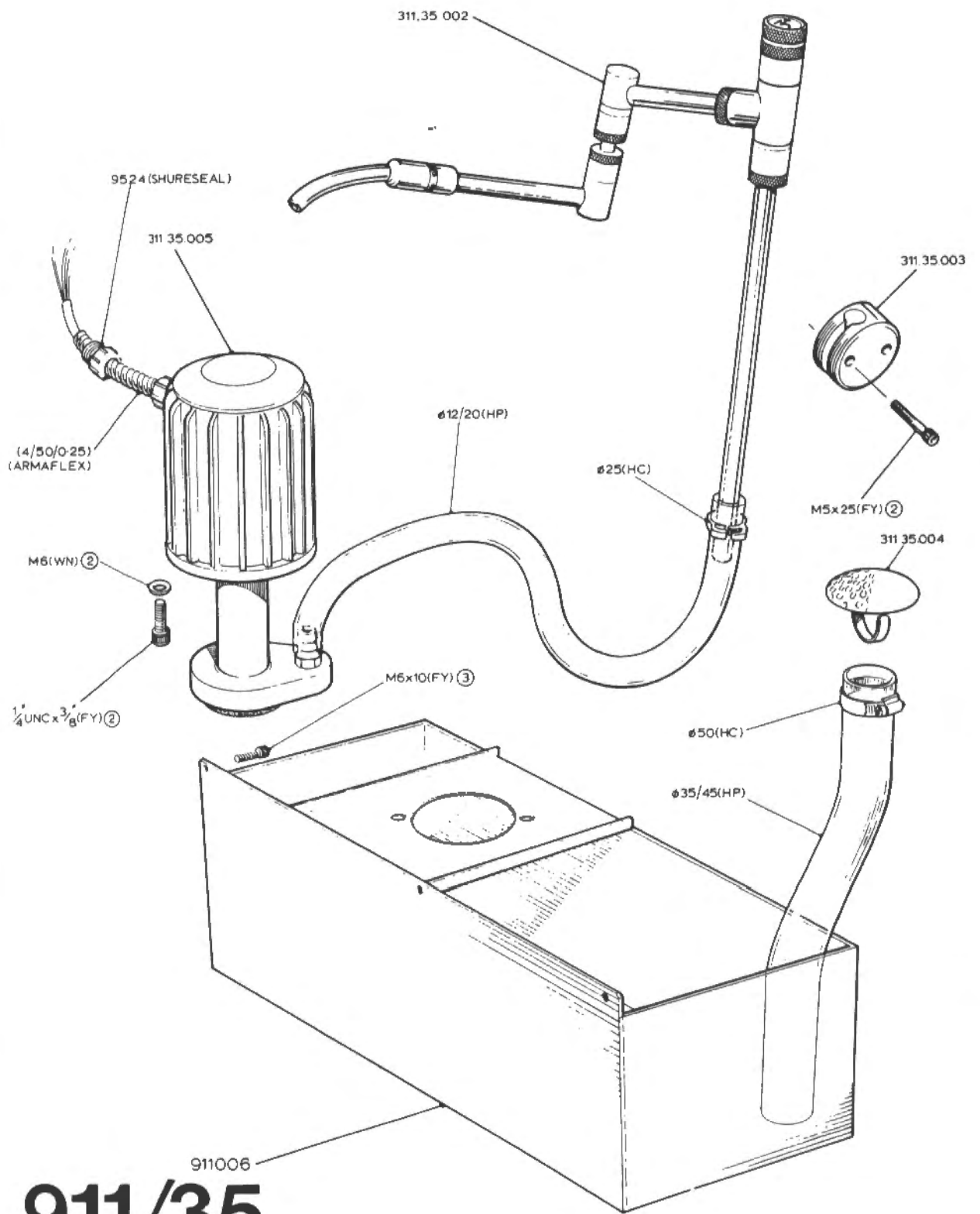


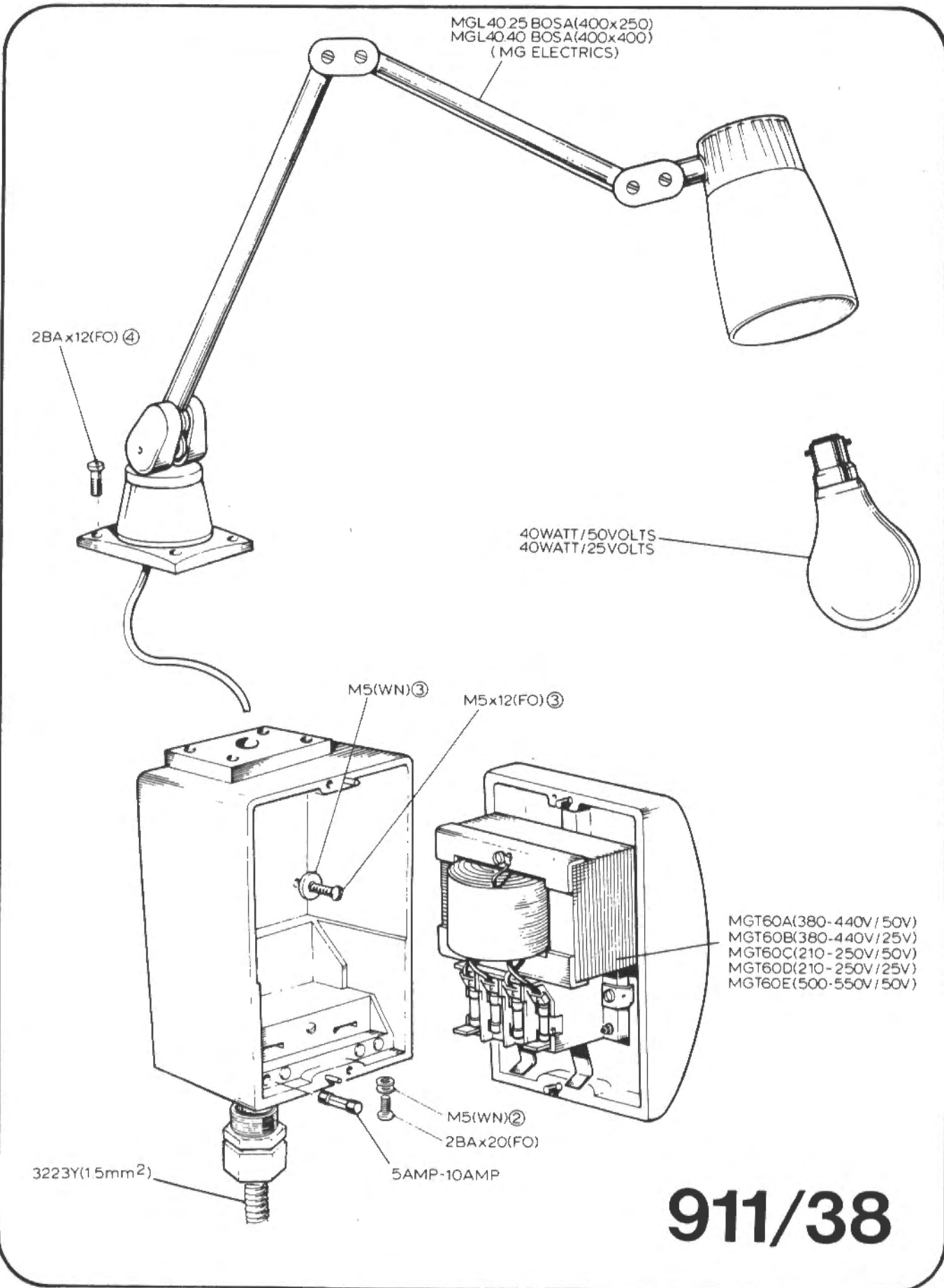
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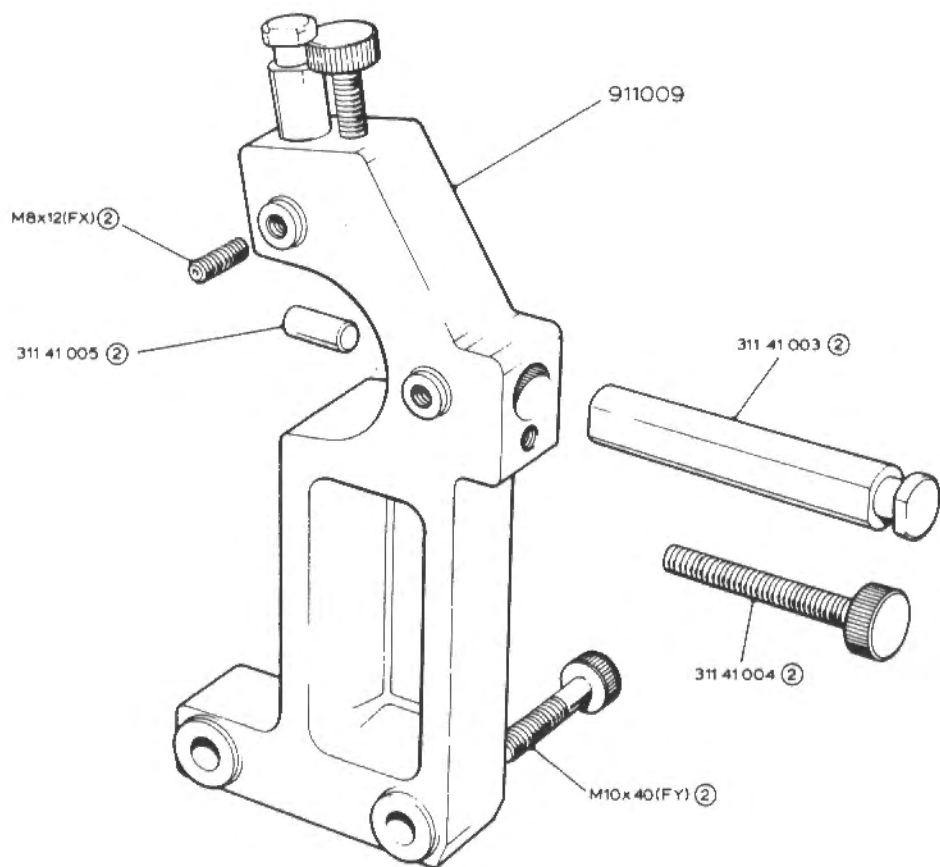
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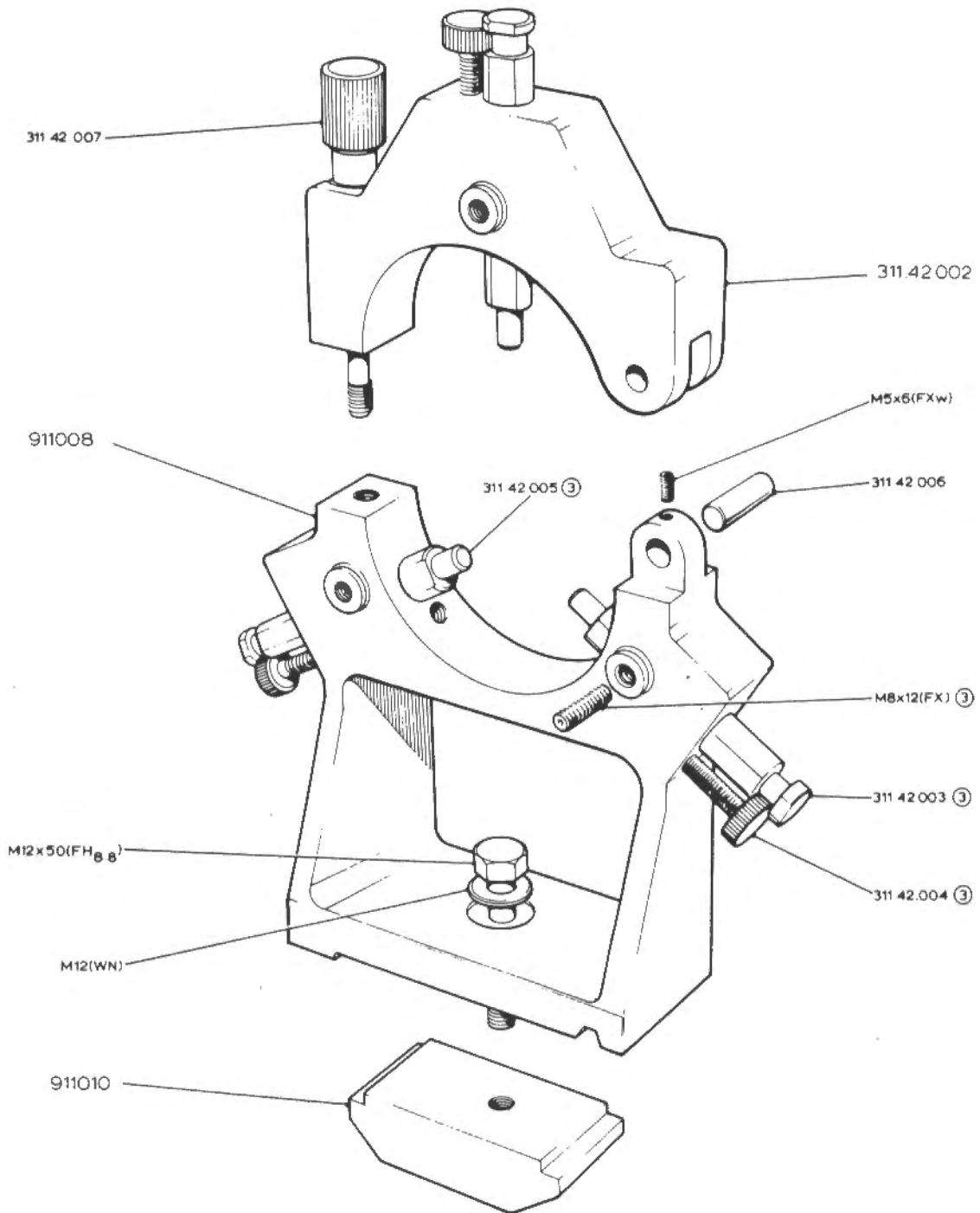
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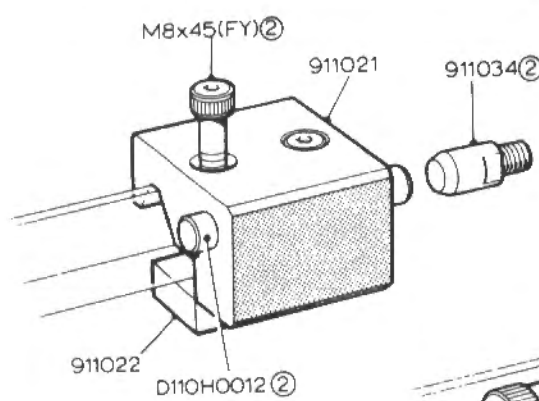




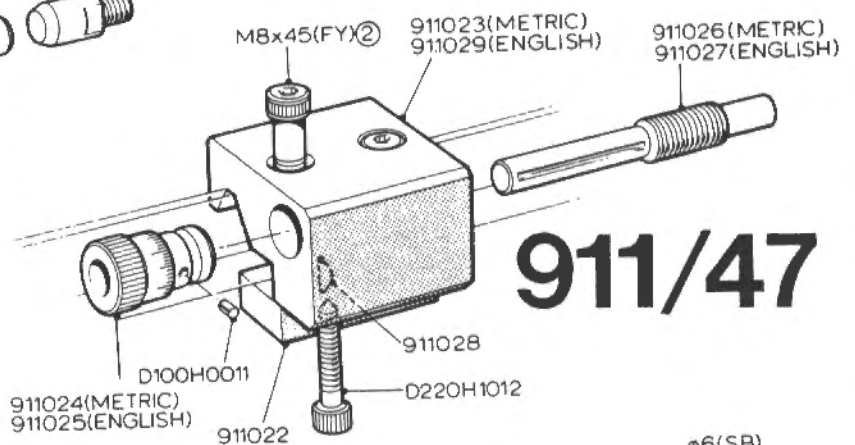
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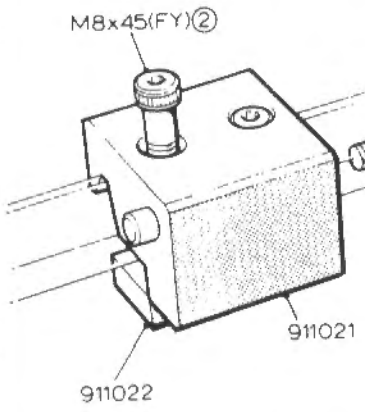
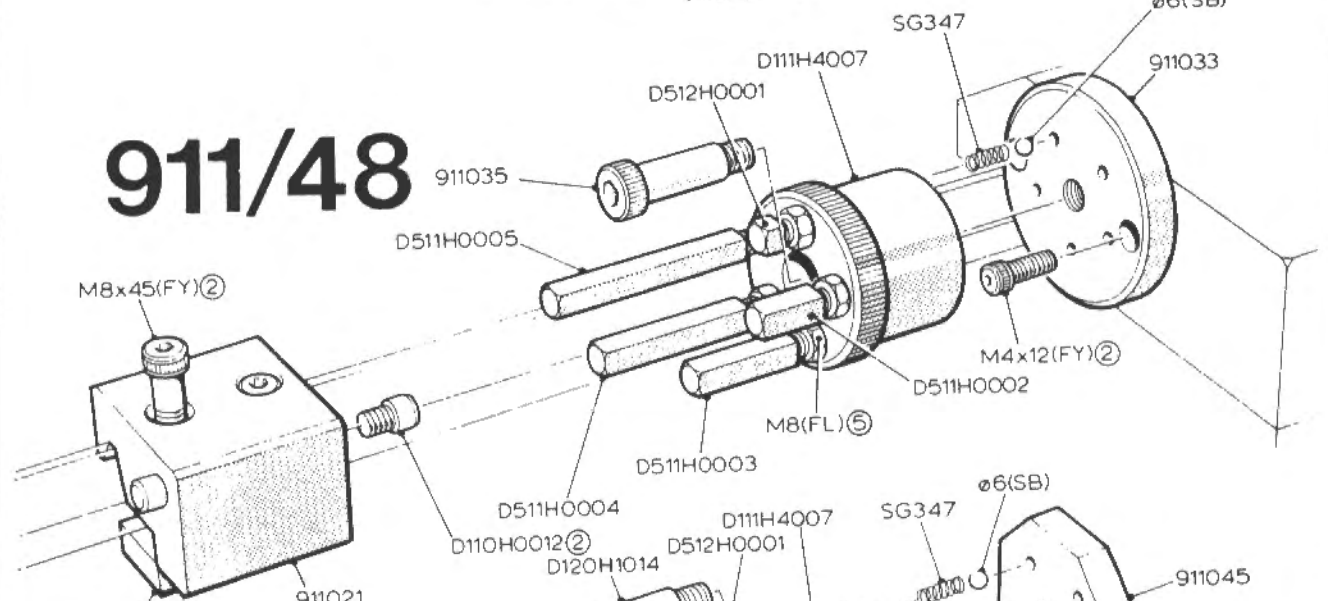


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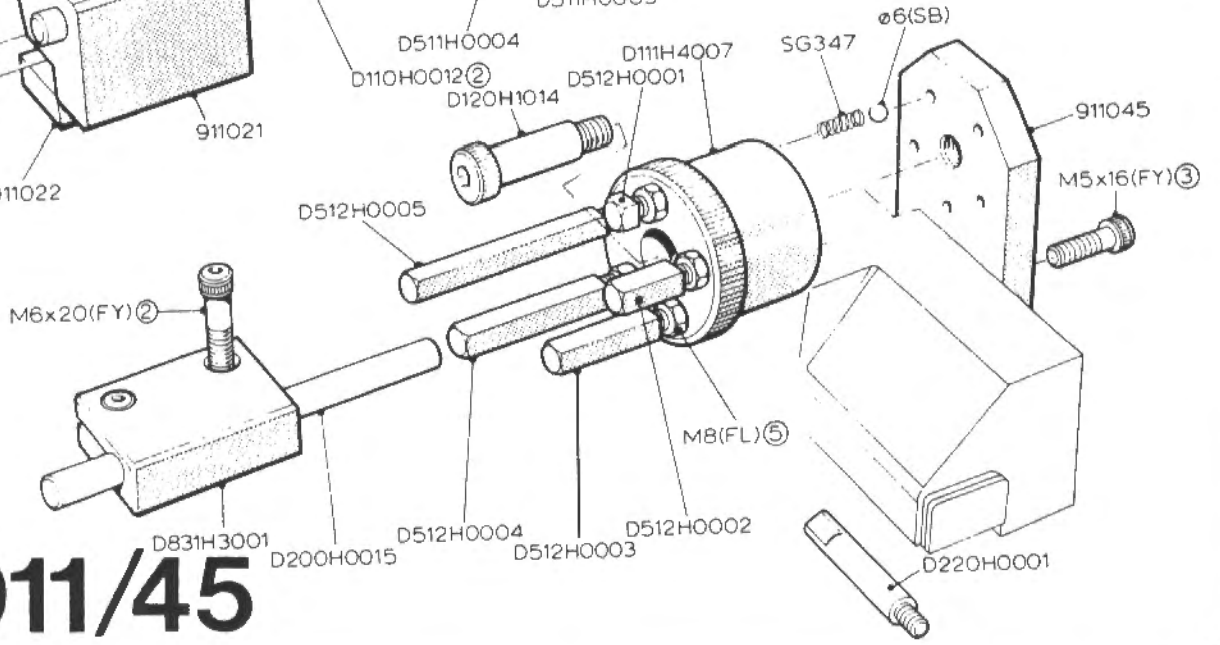


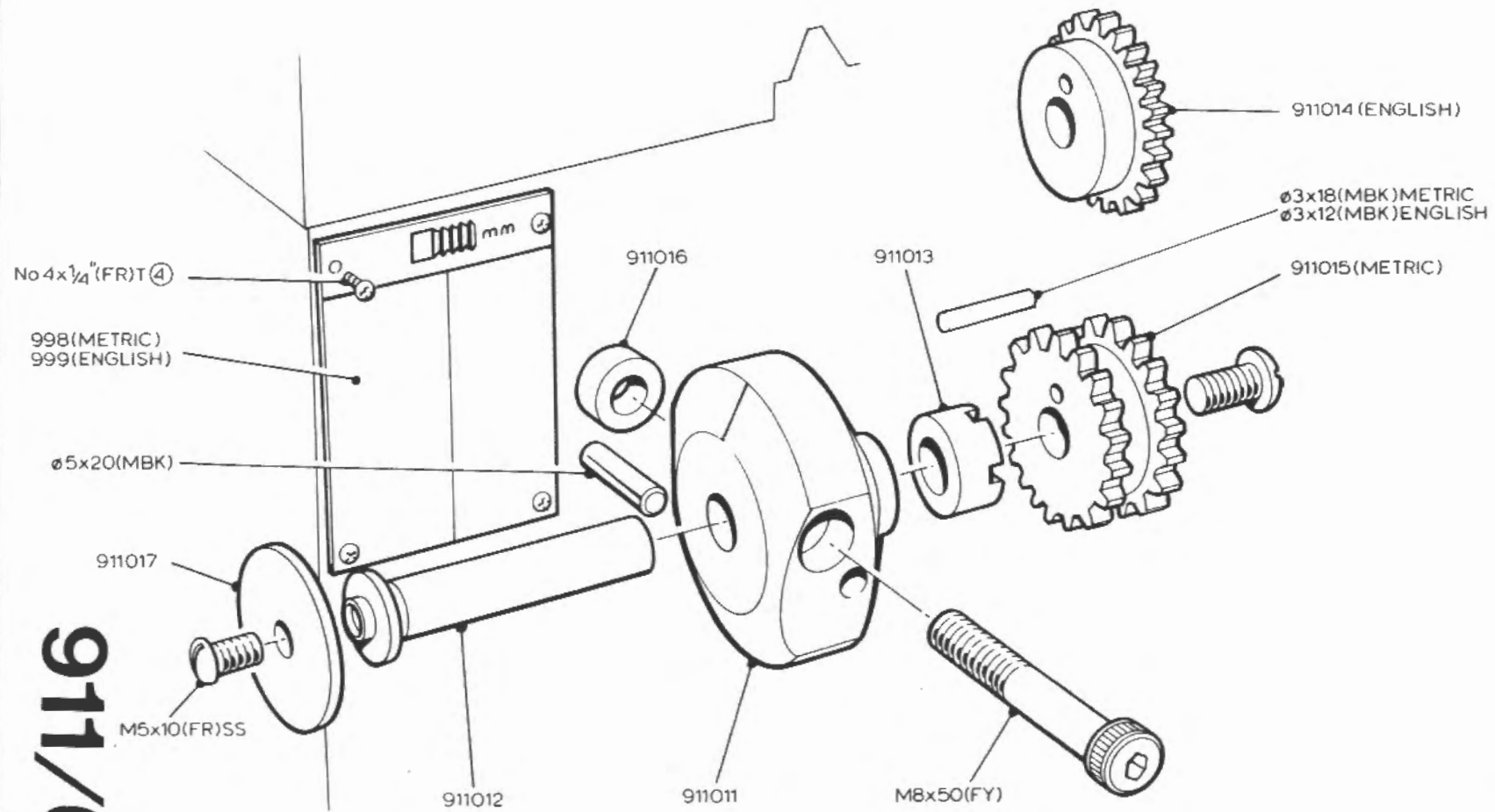
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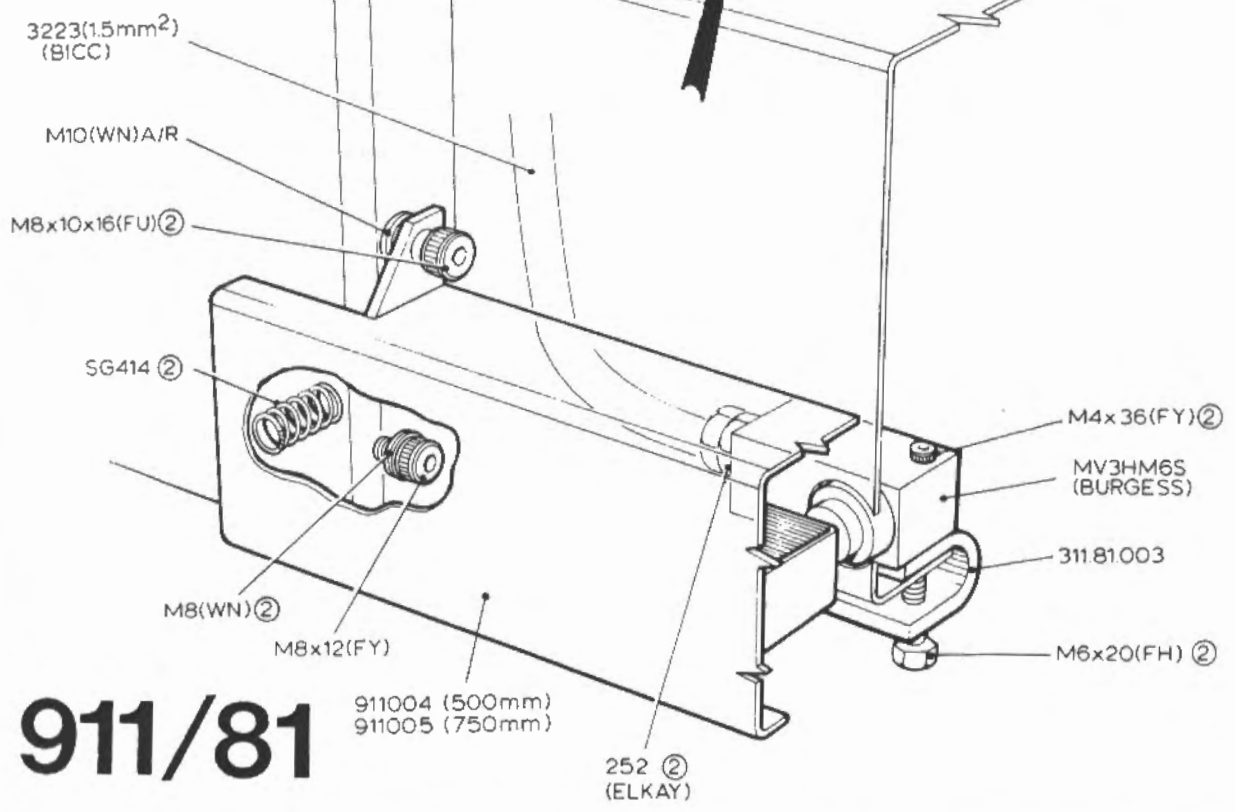
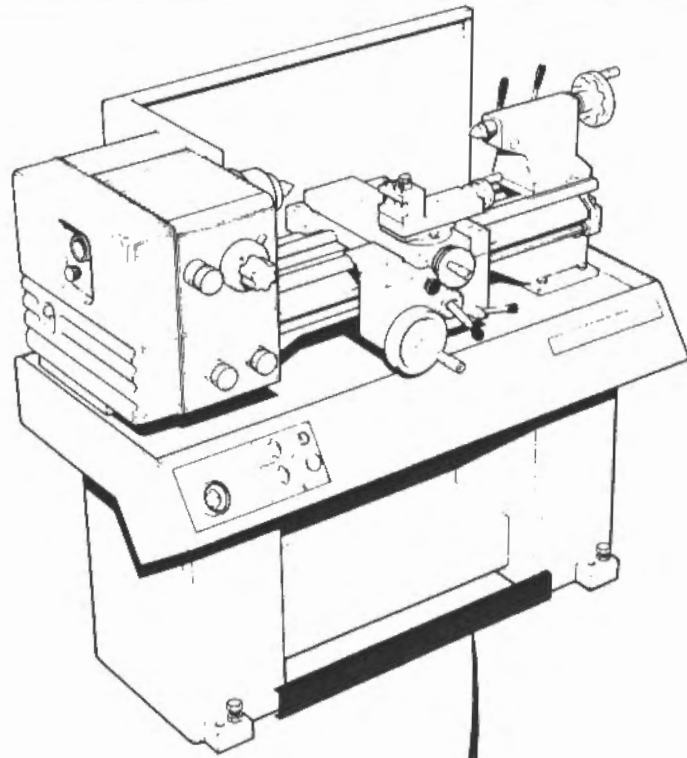


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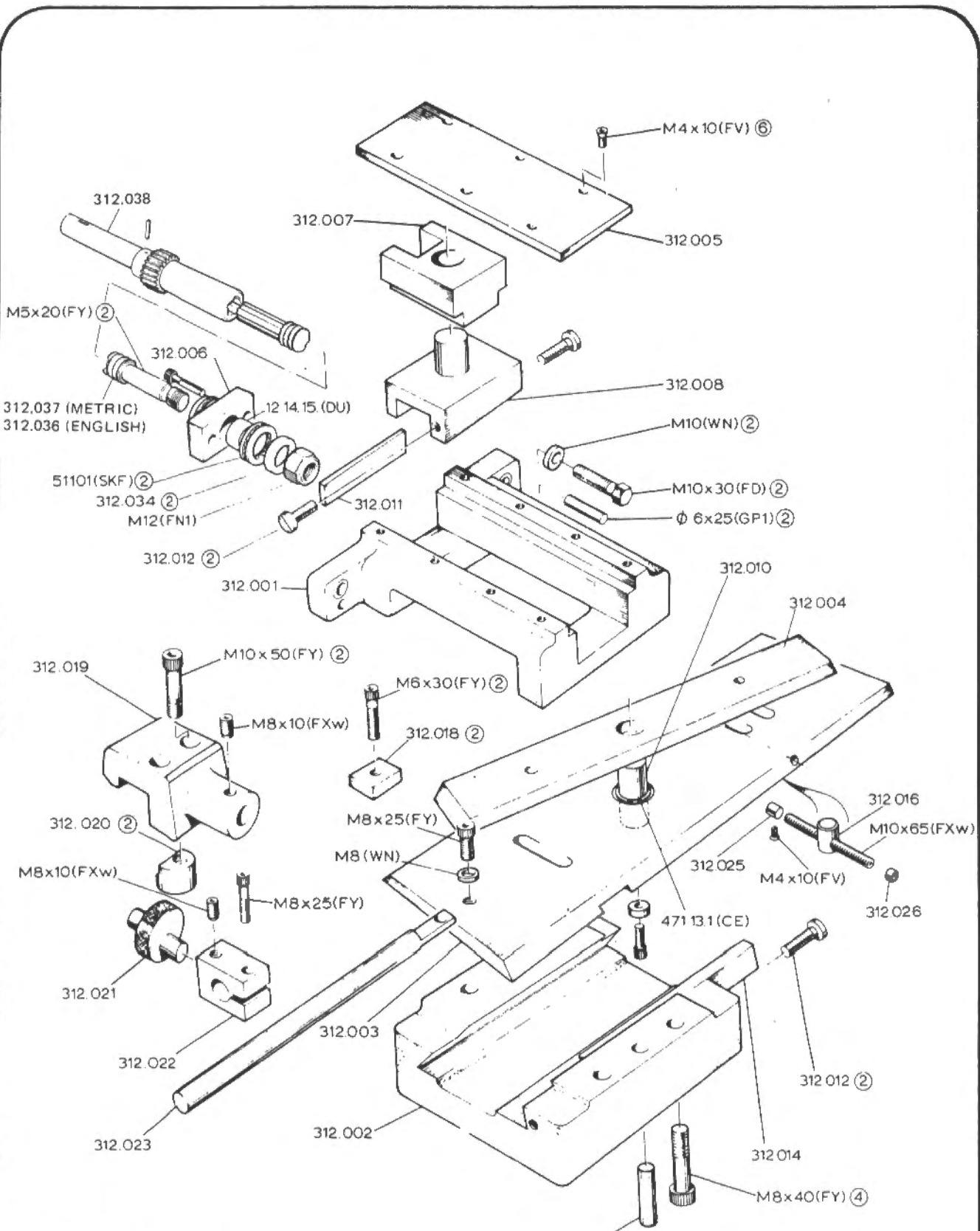
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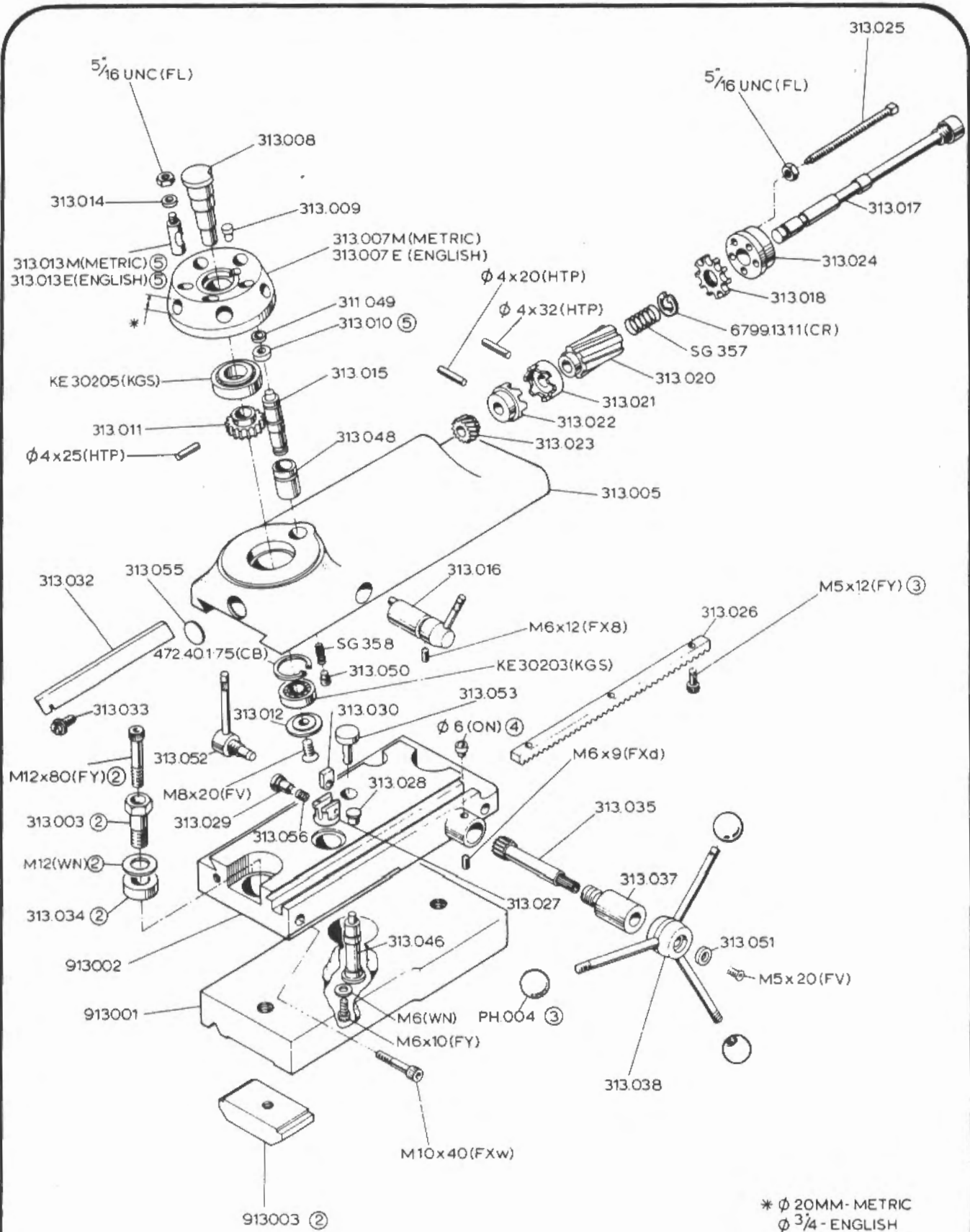
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Attachments

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912



* φ 20MM - METRIC
 φ 3/4 - ENGLISH

913

Standard/Proprietary Parts

'Bracketed' Letter Code Component		Letter Codes 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
FY1	Socket Head Cap Screw (Threaded to Head)	" " " " "
FV	Socket Countersunk Screw	" " " " "
FS	Socket Button Head Screw	" " " " "
FU	Socket Shoulder Screw	Thread X Ø Shank X Shank length
FP	Socket Pressure Plug	Thread and Form
FPS	Press Plug (Square Head)	" "
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	
	Suffi: 'SS' for Stainless Steel	
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 Ø X Length under head
FW	Wing Nut	Thread details
DN	Domed Nut	Thread details
CN	Castle of Slotted Type Nut	" "
FN1	Nylon Ring Locking Nut	" "
Thread Inserts		
T11	Press in Type Thread Insert	Thread details
T12	Coil Type Thread Insert	" "
Washers		
WN	Bright Washer: Normal Diameter	Nominal Hole Ø
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 Ø 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
GP2	" " Half length groove — Tight on end
GP3	" " Full length groove — Parallel
GP4	" " Half length groove — Tight at centre
GP5	" " Centre groove
PD	Dowel Pin
PB	Brass Pin or Pad
PT	Taper Pin
PS	Split Pin
LTP	Tension Pin: Light Duty
HTP	" " Heavy Duty

Nom. Ø X O/all length
" " "
" " "
" " "
" " "
Nom Ø X O/all length
" " "
Nom Ø (small end) X O/all leng
Nom Ø X O/all length
Nom Ø X O/all length
" " "

Keys

KS	Square Parallel Key
KR	Rectangular Parallel Key
KW	Woodruff Key

Width X Thickness X Length
" " " "
Width X Height X Diameter

Circlips

CE	External Circlip: DIN 471
CE1	Round Section Circlip
CE2	Inverted Retainer (Truarc)
CB	Internal Circlip: DIN 472
CR	Radial Fitting Circlip. DIN 6799
CR1	Radial Retaining Clip (Spring fix)
CR2	Radial Fitting Circlip BS3673/3

DIN. Ref. Nom Shaft Ø and Thickness
Nom. Shaft Ø, Wire Ø
" " "
DIN. Ref. Nom Bore and Thickness
DIN Ref. Nom Ø and Thicknes
Nom shaft Ø
" "

Plain Bearings

DU	Composite Bearing Bush 'Glacier'
DX	" " " " " "
LB	Sintered Bronze Bush

Nom Bore. O.D. and Length
" " " "
Nom Bore O.D. and Length

Ball & Roller Bearings

BB	Std. Ball Bearing
BB1	Std. Ball Bearing with Shield or Seal one side
BB2	Std. Ball Bearing with Shield or Seal both sides
BB3	Std. Ball Bearing with Snap Ring
BBT	Angular Contact Ball Bearing
RB	Cylindrical Roller Bearing

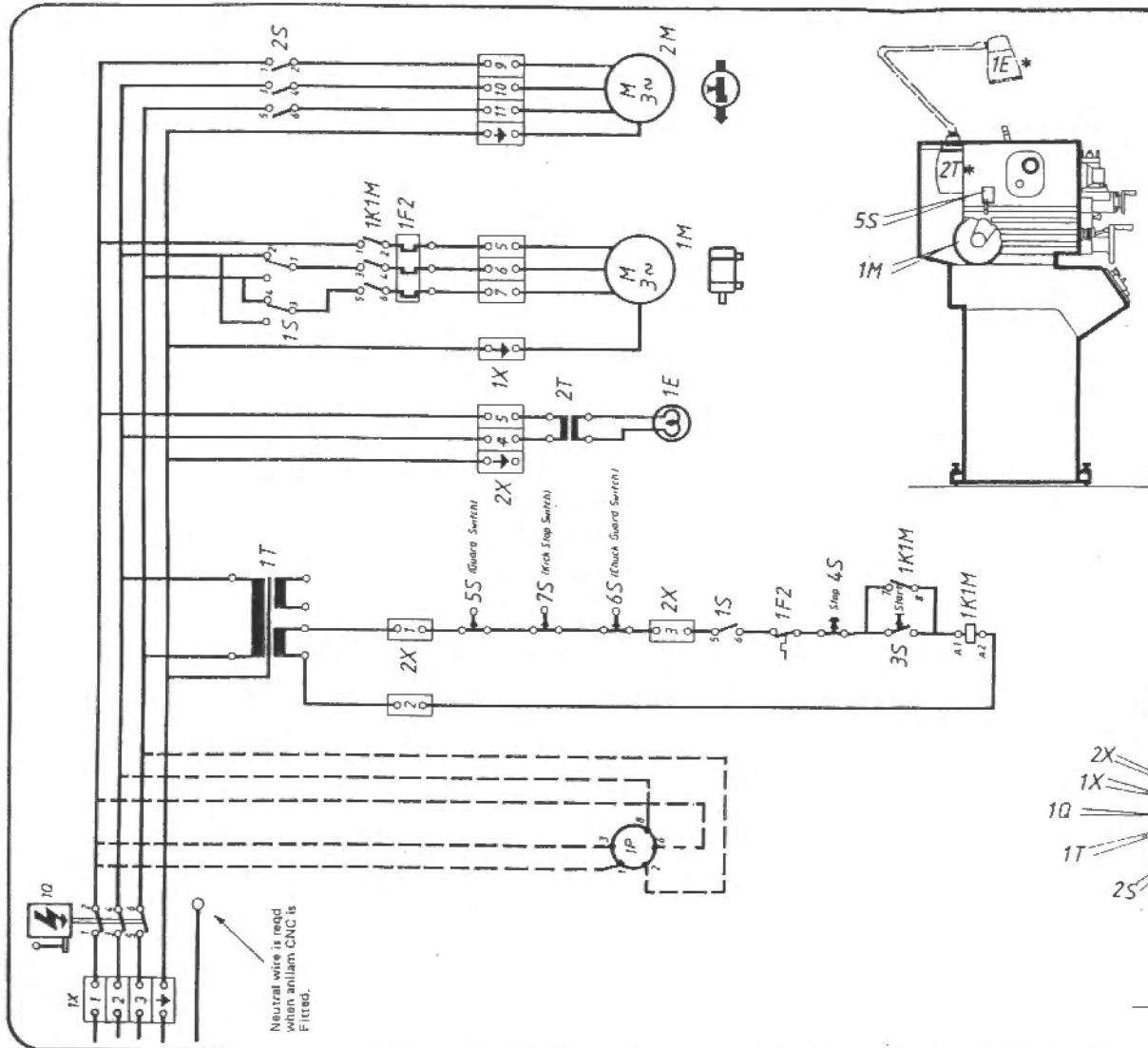
Nom Bore Outside Ø and Leng
" " " " "
" " " " "
" " " " "
" " " " "
" " " " "

For Needle Roller Brgs, Needle Thrust Races
Ball Thrust Brgs. and Taper Roller Bearings —
Manufacturers Name is Quoted as Letter Code — vis.

(INA.) (TORRINGTON)
(SKF) or (GAMET)

Manufacturers Part No.
Quoted

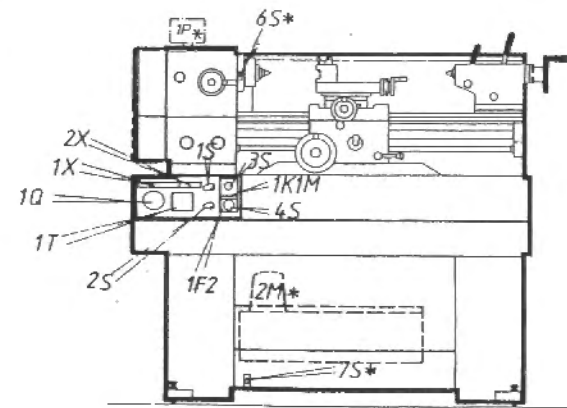
'Bracketed' Letter Code	Component	Conventional Description Given
Seals		
SM	Standard Oil Seal	Nom Shaft \emptyset O.D. and Width
SF	'V' Ring Seal (FORSHEDA)	Manufacturers Part No.
RM	Standard 'O' Ring Seal	Internal \emptyset of Ring, and Section \emptyset
RM1	'Nu-Lip Ring' (Pioneer)	Manufacturers Part No.
Lubrication Equipment		
ON	Concave Oil Nipple: Drive in Type	Nom Hole \emptyset
ONI	" " " Threaded Type	Thread details
OS	Oil Sight Glass	Nom Outside \emptyset
OS1	Oil Level Glass	" "
OW	Oil Wick	Nom \emptyset X Length
For Compression and other Pipe Fitting — Manufacturers Name is quoted as Letter Code vis.		
(ENOTS.) or (TECALEMIT)		
Manufacturers Part Number Quoted		
Miscellaneous Items		
BJ	Ball Joint	Thread Details
SB	Steel Ball	Nom \emptyset
FK	Hexagon Wrench Key	Nom width across flats
HP	P.V.C. Hose	Nom Bore and O.D.
HC	Hose Clip	Max. Hose \emptyset
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 \emptyset X Length
CT	Copper tube	Nom outside \emptyset
NT1	Nylon Tube Natural	Nom Bore
NT2	Nylon Tube Blue	" "
NT3	Nylon Tube Green	" "
NT4	Nylon Tube Red	" "



KEY & COMPONENT LIST

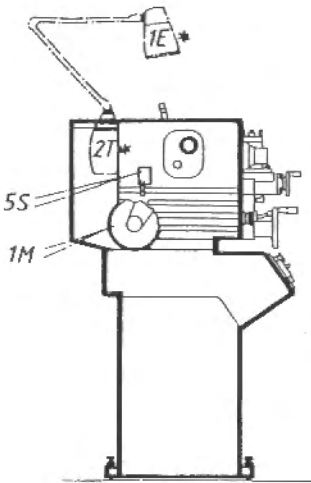
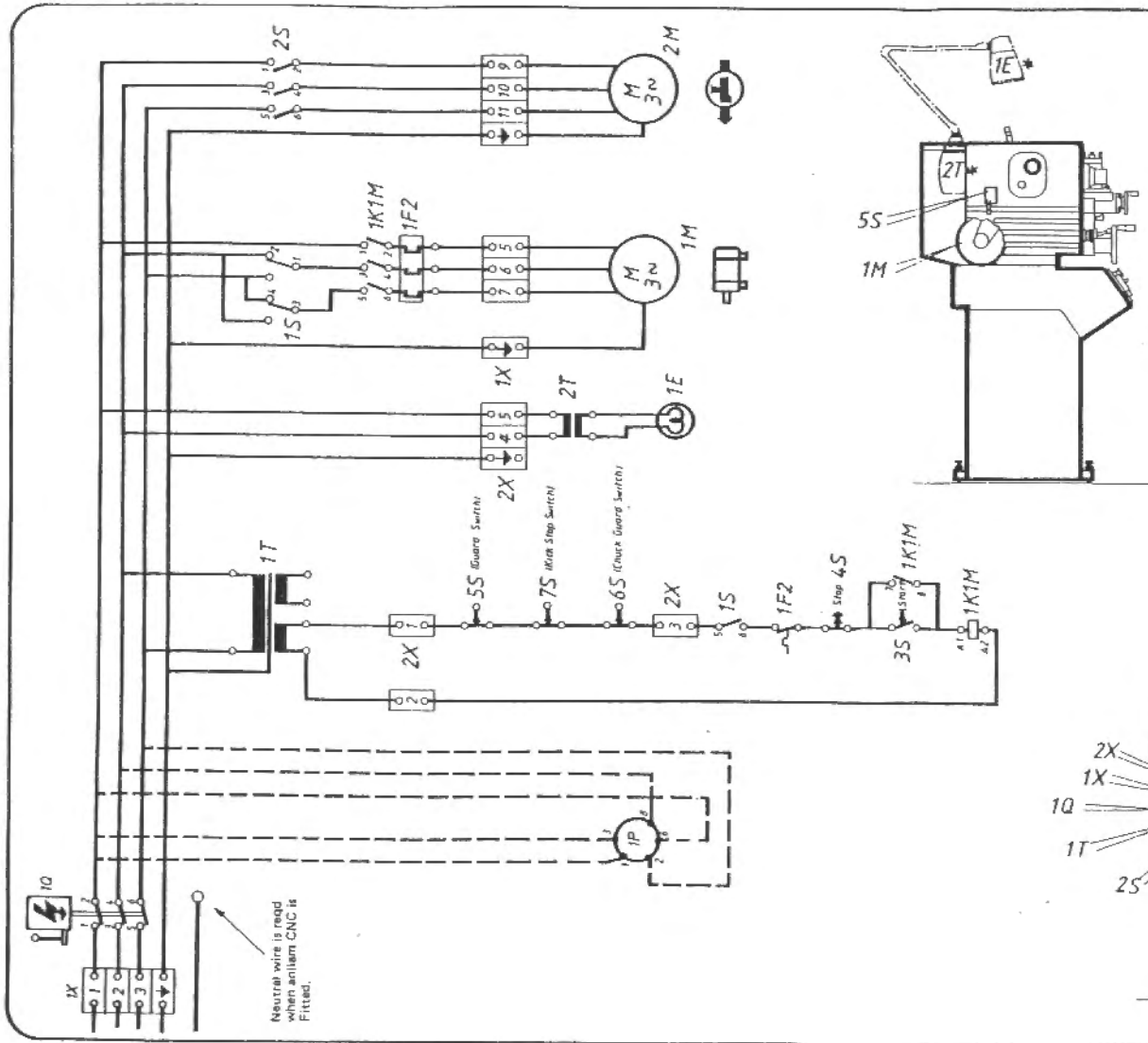
REF	ITEM	SUPPLY	MANUFACTURER	TYPE
PANEL MOUNTED COMPONENTS				
1D	Main disconnect switch (breaker)	All	Klockner Moeller	F1-25
1K1M	Main selector	All	Yokawa	HE-165
1F2	Over-load relay	380V 415V	Yokawa	RH-10/3K RH-10/4K
1T	Control circuit transformer	220V	Romash or alt.	220V/380V 415/440V Primary with 110V & 12V Secondary @ V.A.
1R	Reverse switch	All	Klockner Moeller	T1-3-2
2S	Coolant on/off switch	All	Klockner Moeller	T1-3-50
3S	Start pushbutton (main motor)	All		
4S	Stop pushbutton (main motor)	All		
1X	Terminal Block	All	Kilgus	BR-12
2X	Terminal Block	All	Kilgus	BR-12
MACHINE MOUNTED COMPONENTS				
1M	Main motor	To suit supply voltage	GEC	D800 8rwh/1.2HP 1500 RPM
5S	Guard limit switch	All	Burgess	KB 5EQM
6S	Chuck guard limit switch	All	Burgess	KB 5EQR
7S	Chuck stop limit switch	All	Burgess	SM V3HMB5
2M	Coolant pump motor	All	MG Electric	AG37D
1E	Machine light unit 2 arm fitting	(400+250)	MG Electric	MGL 4025 B05A
2T	Transformer unit 2 arm fitting	(400+400)	MG Electric	MGL 4040 B05A
		50V (210/414/440)	MG Electric	MGT 80A
		25V (315/414/440)	MG Electric	MGT 80B
		50V (210/230/250)	MG Electric	MGT 80C
		25V (210/230/250)	MG Electric	MGT 80D
		50V (500/550)	MG Electric	MGT 80E
1P	Wattmeter		Crompton Inst.	057-2168

*When fitted



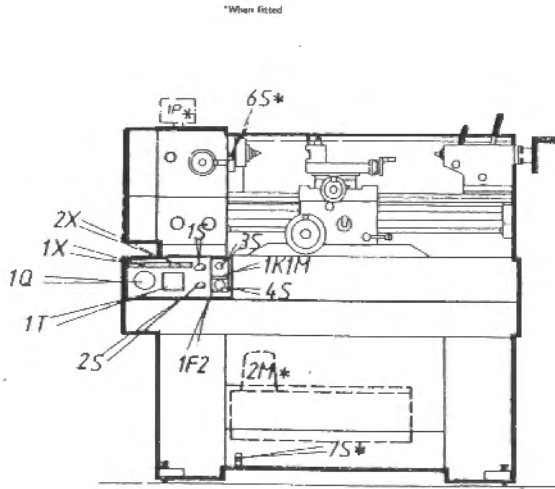
EWD 901.1 Standard
220/380/415 V 3PH 50Hz
1500 RPM m/c / 0.9Kw Motor

Wiring Diagram



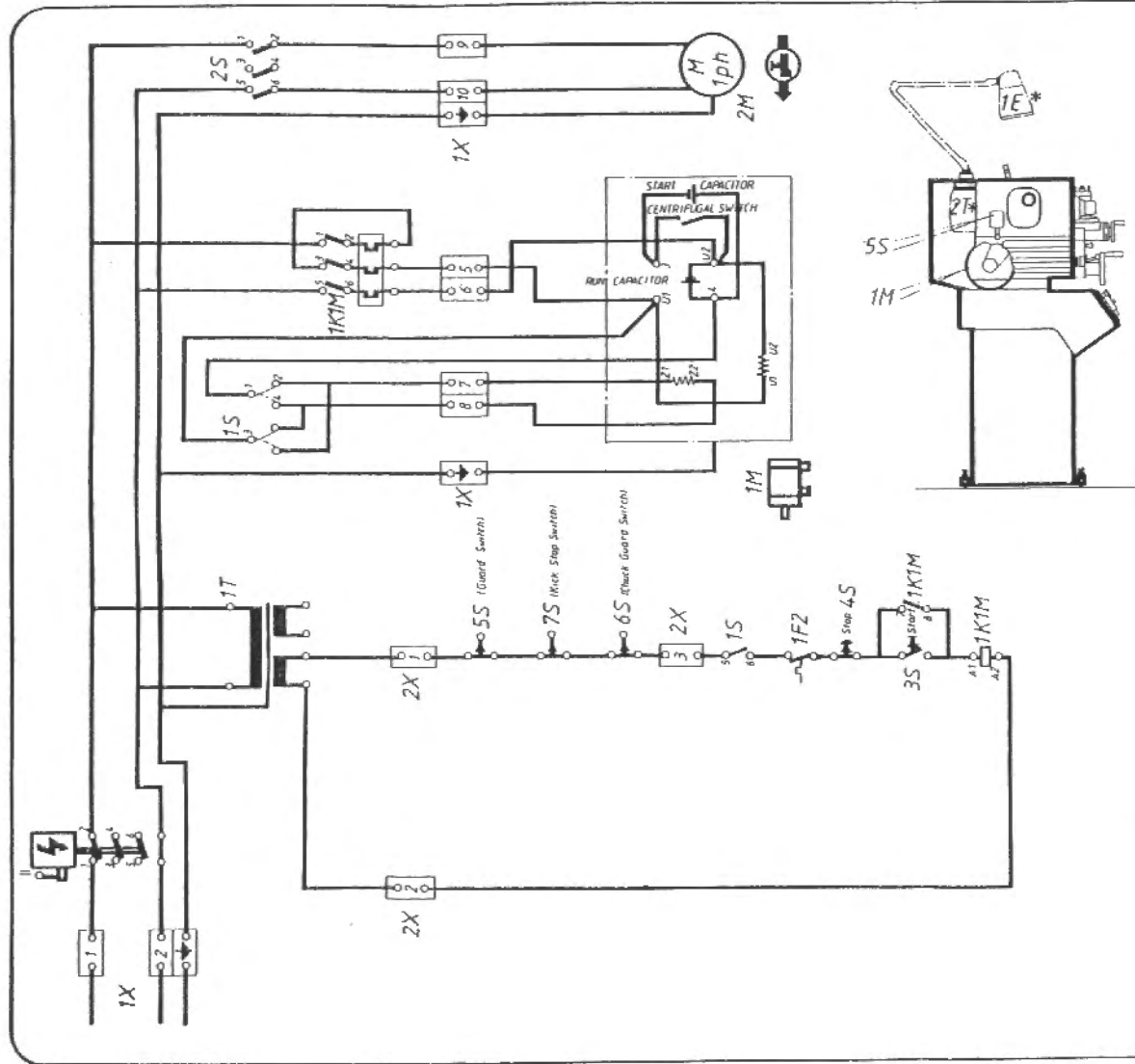
KEY & COMPONENT LIST

REF	ITEM	SUPPLY	MANUFACTURER	TYPE
PANEL MOUNTED COMPONENTS				
1Q	Main disconnect switch (isolator)	AB	Klockner Moeller	P1-25
1K1M	Main contactor	AB	Yaskawa	HE 16S
1F2	Overload relay	380V 415V 220V	Yaskawa	RH-10/3K RH-10/4K
1T	Control circuit transformer	AB	Ramaksh or stl	200V/250V 415/540V Primary with 110V & 12V Secondary @ V.A
1S	Reverse switch	AB	Klockner Moeller	T1-3-2
2S	Coilings on off switch	AB	Klockner Moeller	T1-3-60
3S	Start pushbutton (main motor)	AB		
4S	Stop pushbutton (main motor)	AB		
1X	Terminal Block	AB	Klippen	BK 12
2X	Terminal Block	AB	Klippen	BK-12
MACHINE MOUNTED COMPONENTS				
1M	Main motor	To suit supply voltage	GET	0909/1.5K-2 HP 1500 RPM
5S	Guard limit switch	AB	Burgess	KB 5E0R
6S	Chuck guard limit switch	AB	Burgess	KB 5E0R
7S	Kick stop limit switch	AB	Burgess	SM V310MS
2M	Coolant pump motor	AB	MG Electric	AC220
1E	Machine light unit: 2 arm fitting (400x250)	MG Electric	MG Electric	MGL 4026 BCSA
	2 arm fitting (400x400)	MG Electric	MG Electric	MGL 4040 BCSA
2T	Transformer unit 50V (318/414/440) (machine light)	MG Electric	MG Electric	MGT 60A
	50V (210/230/250)	MG Electric	MG Electric	MGT 60C
	25V (210/230/250)	MG Electric	MG Electric	MGT 60D
	50V (500/550)	MG Electric	MG Electric	MGT 60E
1P	Well-motor		Compton Inst.	067 2168



EWD 901.1A Standard
220/380/415 V 3PH 50Hz
2000 RPM m/c /1.5Kw motor

Wiring Diagram

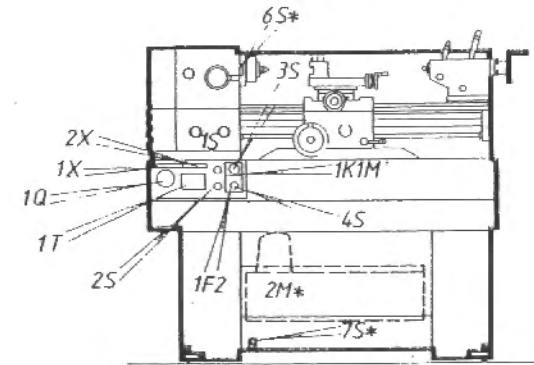


KEY AND COMPONENT LIST

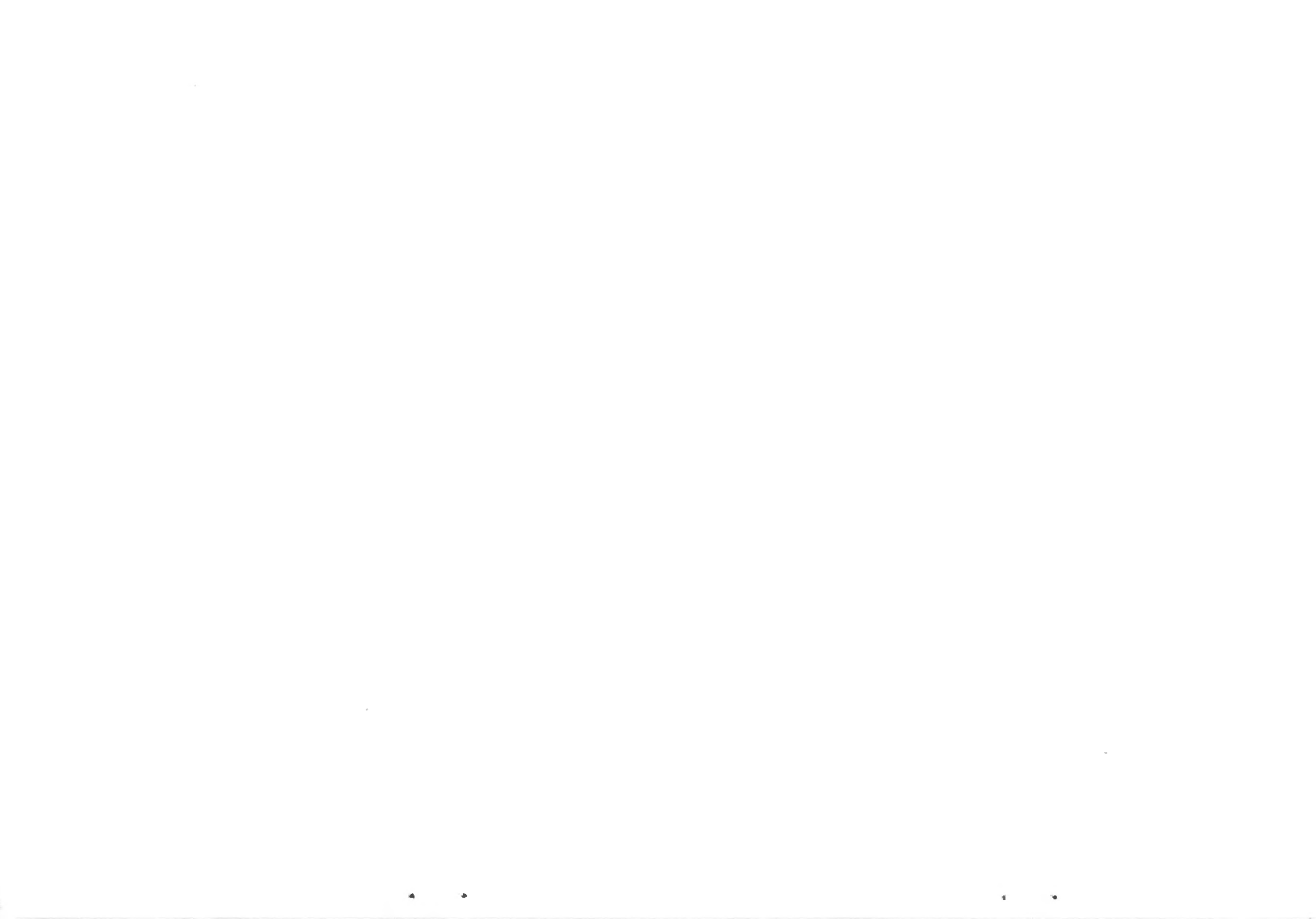
REF	ITEM	SUPPLY	MANUFACTURER	TYPE
PANEL MOUNTED COMPONENTS				
1Q	Mixing dipswitch switch (Isolator)	AB	Klockner Mofeller	91-25
1K1M	Main contactor	AB	Yaskawa	HE-165
1F2	Overload relay	AB	Yaskawa	RH-10/7X
1T	Control circuit transformer	AB	Flomersh on site	240V # Primary with 110V & 12V Secondary at VA
1S	Reverse switch	AB	Klockner Mofeller	T1-3-2
2S	Coolant on off switch	AB	Klockner Mofeller	T1-3-50
3S	Start pushbutton (main motor)	AB		
4S	Stop pushbutton (main motor)	AB		
1X	Terminal block	AB	Klappan	8K-12
2X	Terminal block	AB	Klappan	8K-12
MACHINE MOUNTED COMPONENTS				
1M	Main motor	To suit supply voltage	GEC	D 905/1.1/1.5
5S	Guard limit switch	AB	Burgess	KBS EDR
6S	Chuck guard limit switch	AB	Burgess	KBS EDR
7S	Kick stop limit switch	AB	Burgess	MS V3M465
2M	Coolant pump motor	AB	MG Electric	AO 3/1/E
1E	Machine light unit 2 arm fitting 1400x2500		MG Electric	MGL 4025 BOSA
2T	Transformer unit 10V (machine light) 25V		MG Electric	MGL 4040 BOSA

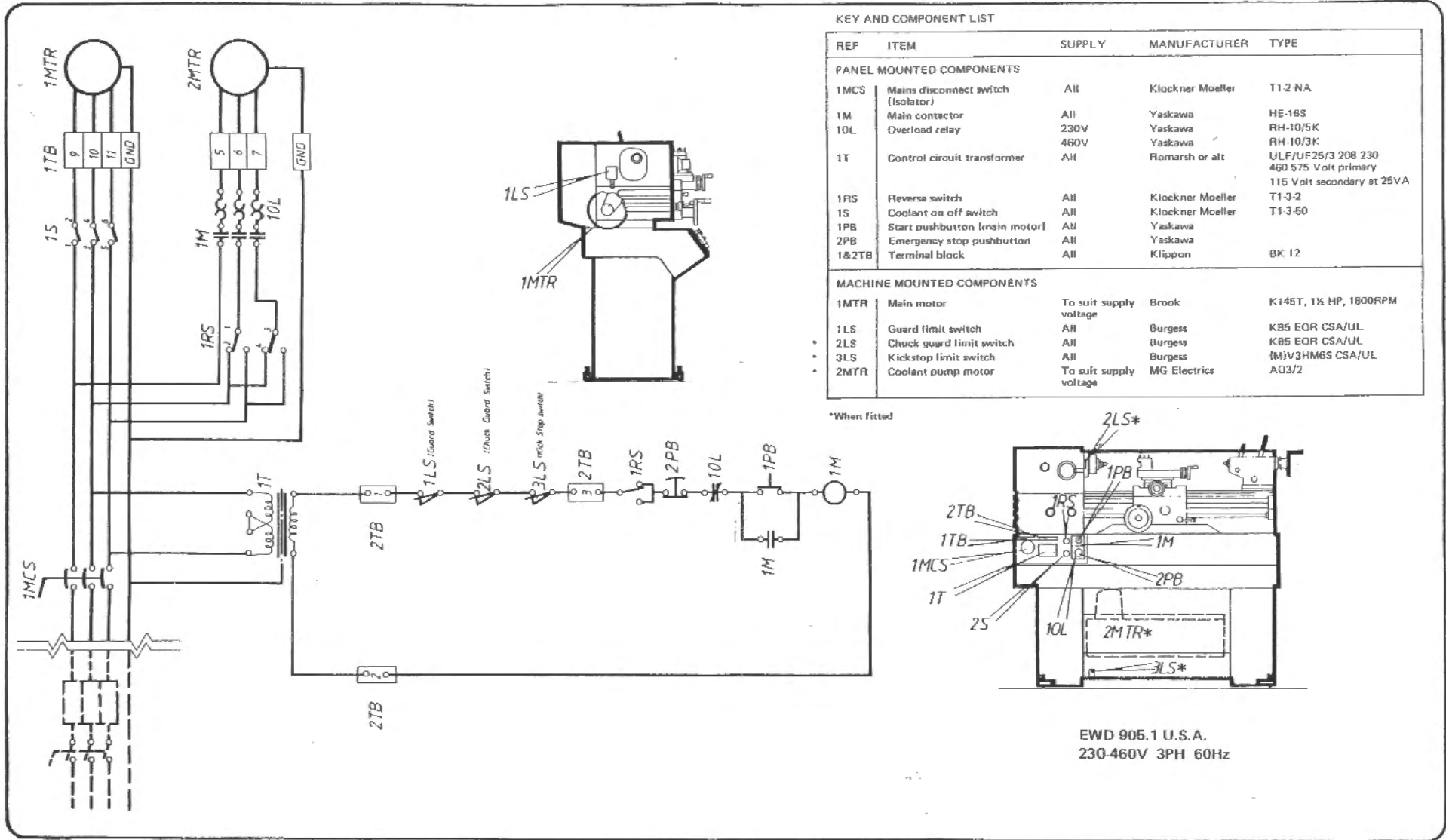
*When fitted

EWD 903.1 Single phase
240V 1PH 50Hz

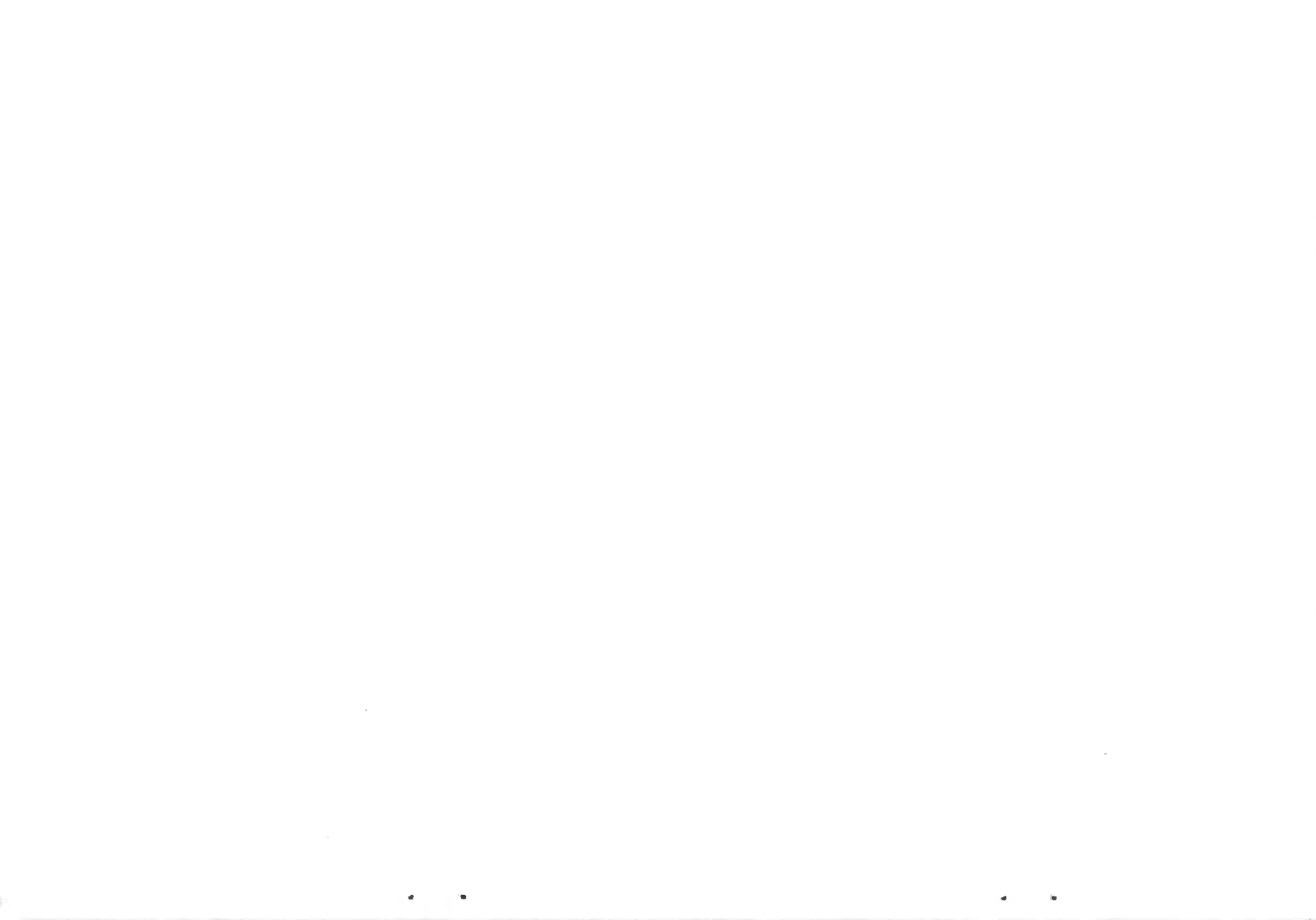


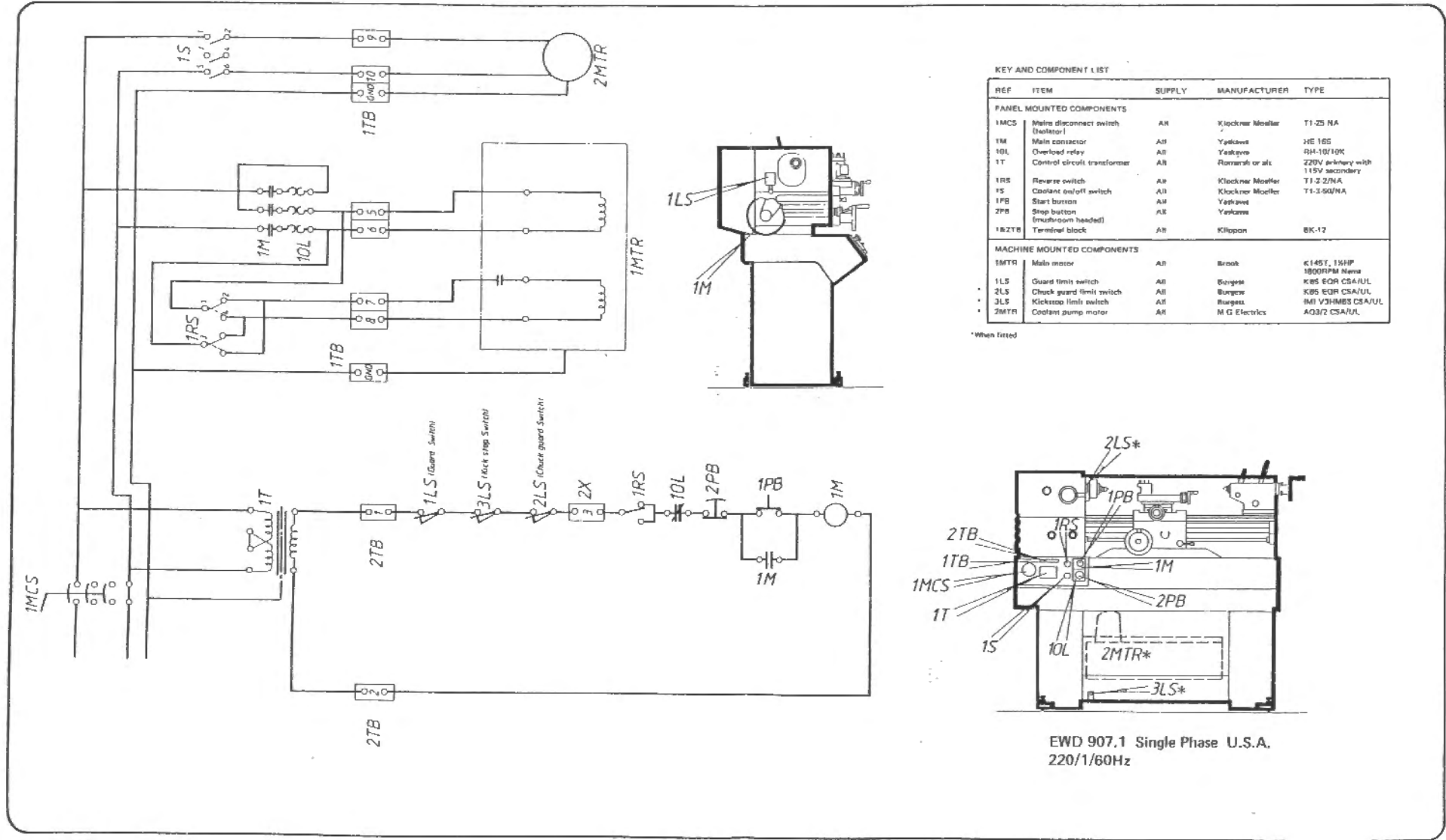
Wiring Diagram





Wiring Diagram

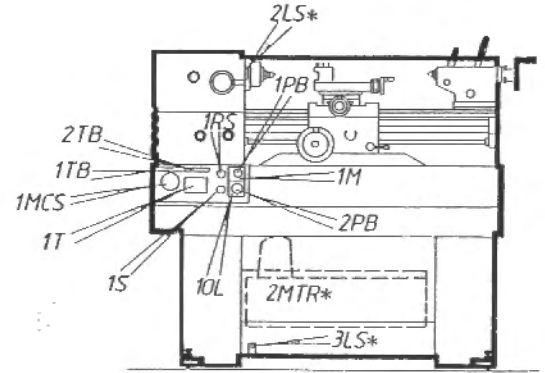




KEY AND COMPONENT LIST

REF	ITEM	SUPPLY	MANUFACTURER	TYPE
PANEL MOUNTED COMPONENTS				
1MCS	Main disconnect switch (isolator)	AR	Klockner Moeller	T1-25 HA
1M	Main contactor	AR	Yokogawa	HE 16S
1OL	Overload relay	AR	Yaskawa	RH-10/10K
1T	Control circuit transformer	AR	Romarrsh or alt.	220V primary with 115V secondary
1RS	Reverse switch	AR	Klockner Moeller	T1-2 2/NA
1S	Coolant on/off switch	AR	Klockner Moeller	T1-3-50/NA
1PB	Start button	AR	Yokogawa	
2PB	Stop button (push-on headed)	AR	Yaskawa	
1TB	Terminal block	AR	Killepon	BK-12
MACHINE MOUNTED COMPONENTS				
1MTR	Main motor	AR	Brook	K145T, 15HP 1800RPM Name
1LS	Guard limit switch	AR	Borgese	KBS EDR CSA/UL
2LS	Check guard limit switch	AR	Borgese	KBS EDR CSA/UL
3LS	Kickstop limit switch	AR	Rueggli	IMI V3HMS CSA/UL
2MTR	Coolant pump motor	AR	M G Electric	AQ3/2 CSA/UL

*When fitted



EWD 907.1 Single Phase U.S.A.
220/1/60Hz

Wiring Diagram