



Harrison M400

420mm – 16 1/2” heavy duty centre lathe

Operations Manual

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machine manual

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Electrical Wiring Diagram

Summarised specification

Centres	Height	200mm (8in)
	Admits between	1000mm (40in)
	or	1500mm (60in)
	or	2000mm (80in)
Swing	Over Bed	420mm (16 ¹ / ₂ in)
	Over Cross Slide	254mm (10in)
	In gap Diameter	610mm (24in)
	Length	200mm (7 ⁷ / ₈ in)
Spindle	Bored to Pass	65mm (2 ¹ / ₂ in)
	Nose	No 8 D1 Camlock
	Morse Taper in Nose Bush	No 5
Speeds	Number	18
	Range	40 to 2000 rpm
Motor	(1500 rpm @ 50 Hz)	7.5 kW (10 h.p.)
Leadscrew	Diameter	32mm (1 ¹ / ₂ in)
	Thread	6mm Pitch or 4 T.P.I.
Threads	Metric Pitches	from 0.2 to 14mm Pitch
	English Pitches	from 2 to 72 T.P.I.
	Module Pitches	from 0.2 to 3.5 MOD
	Diametral Pitches	from 8 to 72 D.P.
Feeds	Metric	from 0.04 to 0.71mm/rev
	English	from 0.0016 to 0.028in/rev.
	Cross Feeds Half Longitudinal Values	
Bed	Width over ways	360mm (14 ¹ / ₈ in)
	Depth under headstock	380mm (15in)
Cross Slide	Width	195mm (7 ⁵ / ₈ in)
	Travel	250mm (9 ⁷ / ₈ in)
Top Slide	Width	115mm (4 ¹ / ₂ in)
	Travel	120mm (4 ³ / ₄ in)
Tool	Max. Section	32 x 25mm (1 ¹ / ₄ x 1in)
Tailstock	Quill — Diameter	73mm (2 ⁷ / ₈ in)
	Travel	155mm (6 ¹ / ₈ in)
	Morse Taper	No 5
	Set-Over	± 12mm (1/2in)
Weight	1000mm (40in) crs	1753kg (3857 lb)
	1500mm (60in) crs	1956kg (4304 lb)
	2000mm (80in) crs	2159kg (4760 lb)

Standard Equipment

Single Toolpost
Work Driver Plate
Spindle Centre Bush
2 No 5 MT Centres
Full Length Rear Splash Guard

Chuck Guard
Instruction & Spare Parts Manual
Spanners, Keys and Oil Gun
Accuracy Chart

Shipping Data

1000mm (40in) crs
1500mm (60in) crs
2000mm (80in) crs

Gross Weight

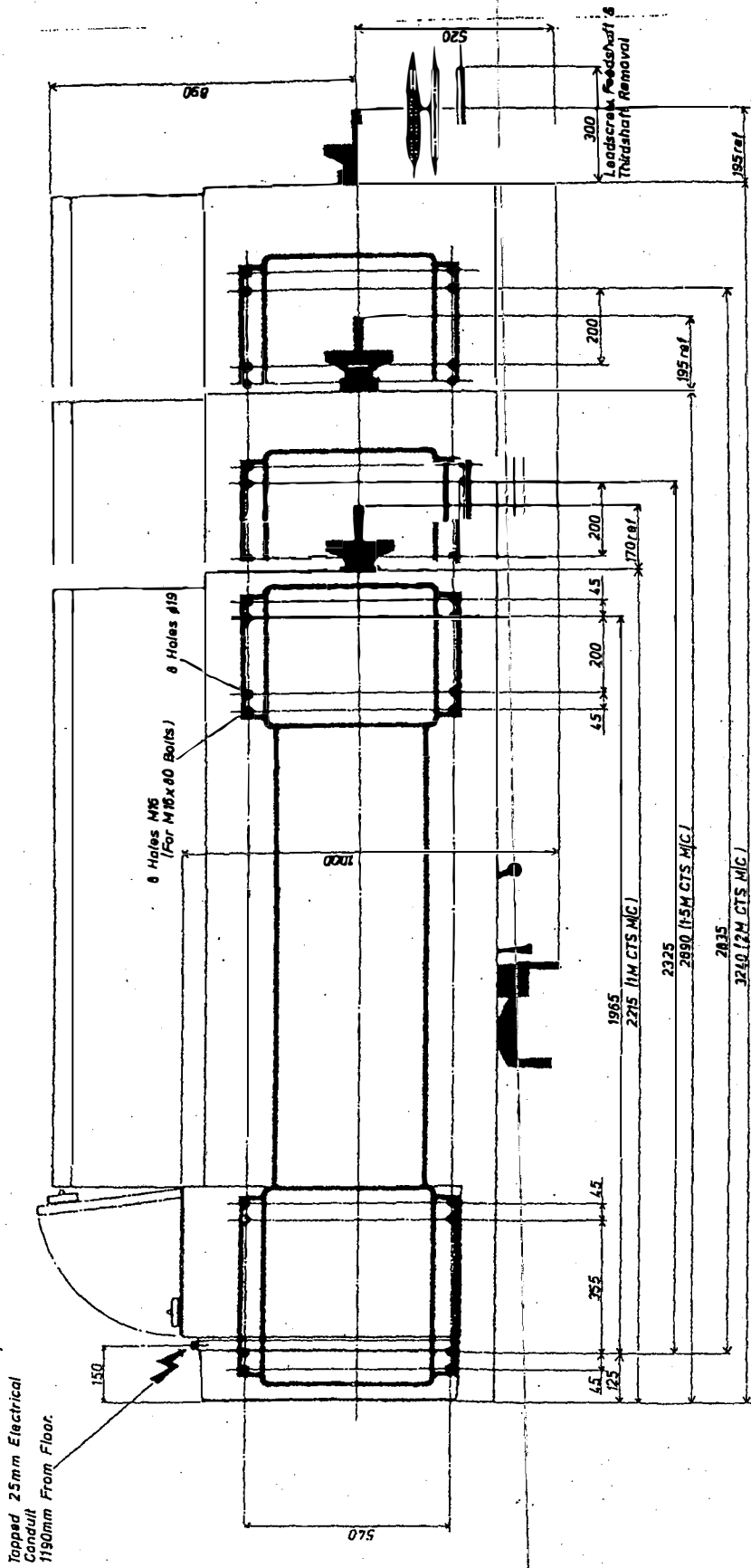
2007kg (4416 lb)
2311kg (5085 lb)
2642kg (5825 lb)

Packing Case Dimensions

L	x	W	x	H
2.54m		1.17m		1.75m
3.00m		1.17m		1.75m
3.45m		1.17m		1.75m

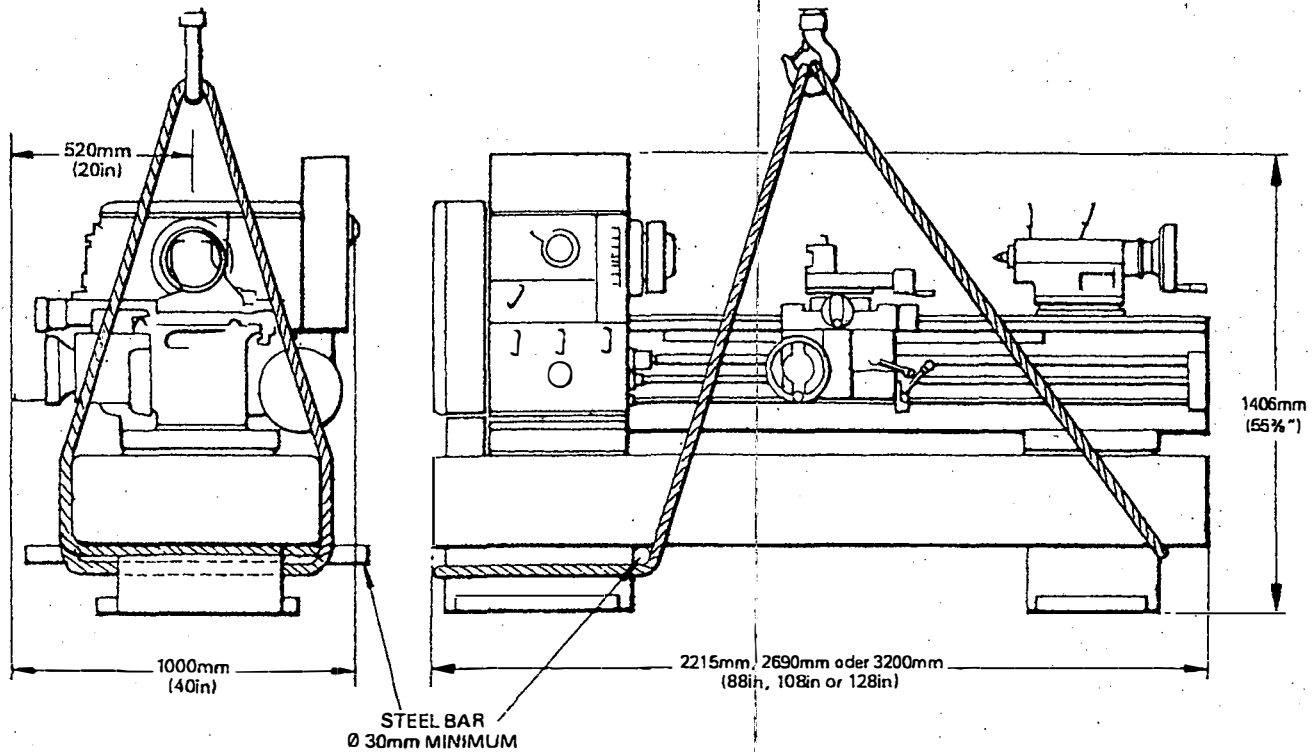
*Illustrated or specified data is not binding in detail.
The manufacturers reserve the right to modify design, specification and price without notice.*

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Installation



Lifting

The approximate weights of the machine are:-

1000mm (40in) between centres model — 1753kg (3857 lb)

1500mm (60in) between centres model — 1956kg (4304 lb)

2000mm (80in) between centres model — 2159kg (4760 lb)

The machine should be lifted using rope slings as shown — with the rear splash guard removed and with the carriage and tailstock assemblies displaced (as despatched) towards the tail end of the bed to give an equilibrium condition under the lifting hook.

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 and Levelling

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

Although foundation bolt holes are provided for use where a fixed installation is considered essential, for normal working it is not necessary to bolt the lathe to the floor.

The following levelling procedure is recommended:

Insert steel plates approximately 150mm x 150mm x 12mm thick under each (8) jacking point.

Level the machine using only two outer pairs of jacking screws, at this stage ensuring that the two inner pairs of screws are retracted.

The two inner pairs of jacking screws should then be carefully screwed down, adjusting only to a finger tight condition.

Electrical Supply

Over-current protection for the machine supply conductors is to be provided by user as follows (preferably through a fused isolator sighted at the origin of the main supply cable):-

3 Phase Supply Voltage	Under 320V	Over 320V
Conductor Capacity	40 AMP MIN	30 AMP MIN
Over-Current Device	60 AMP MAX	40 AMP MAX

External wiring should be of a permanent character and be undertaken by a competent electrician.

Electrical entry is at the R.H. side of the control cabinet (looking from the rear of the machine) and tapped '25mm electrical conduit'.

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

Motor direction must be CLOCKWISE looking on driving end, (SEE DIRECTION ARROW ON MACHINE FRAME).

Lubrication (REFER TO THE LUBRICATION DIAGRAM)

Lathes are normally despatched without lubricating oils.

Ensure that the headstock lubrication tank (mounted in the rear of the machine base at the headstock end), gearbox and apron are filled to the level of their respective oil sight windows.

Operate the centralised slidway lubrication system by pulling and releasing the knob at the bottom of the apron and oil the topslide dials and changewheel stud, etc. through the appropriate oil nipples using the oil gun provided.

On starting the main motor check for evidence of oil flow at the headstock sight glass.

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:-

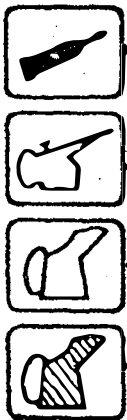
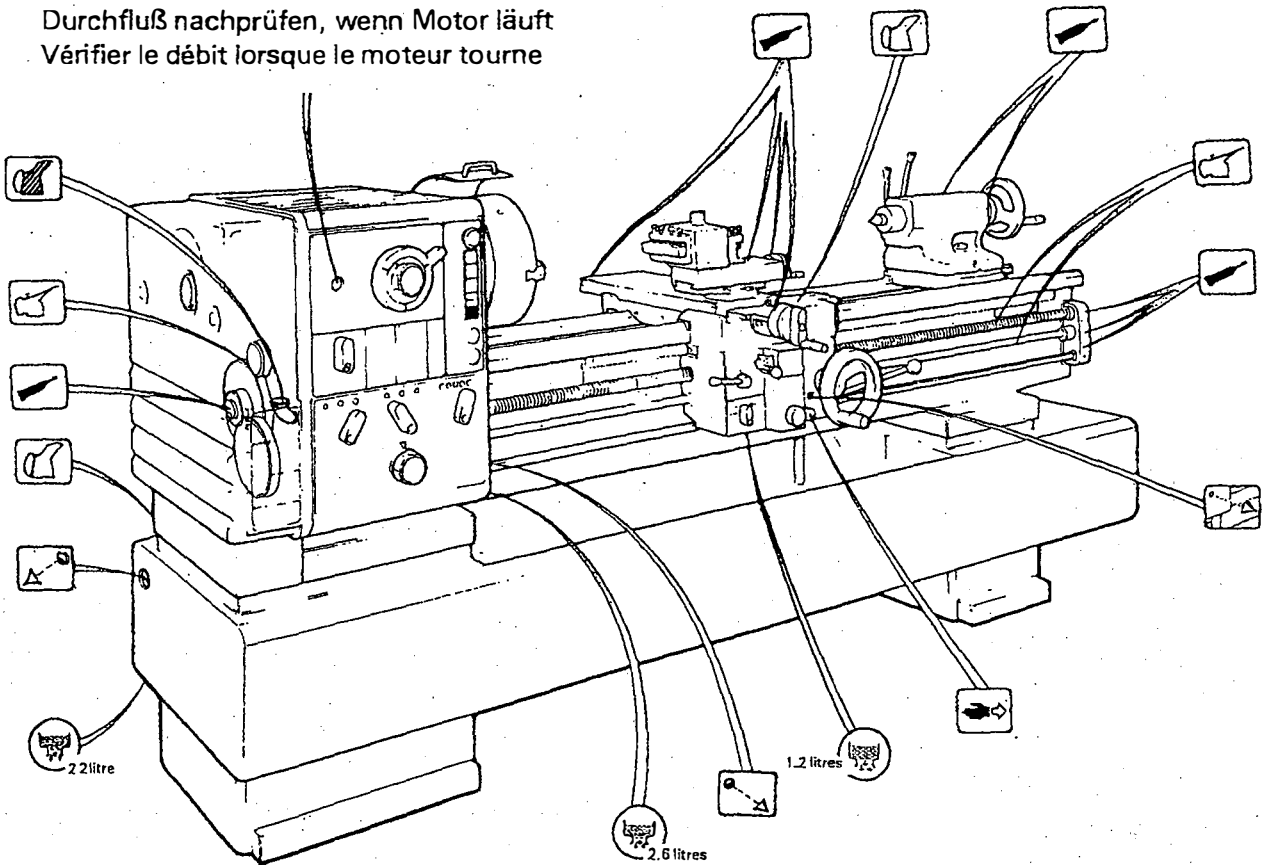
Make a low feed rate selection and run the machine light for 3 hours at 500 r.p.m.
then for 2 hours at 800 r.p.m.
then for 1 hour at 1250 r.p.m.
then for 1/2 hour at 1600 r.p.m.

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Lubrication

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Check for flow when motor is running
 Durchfluß nachprüfen, wenn Motor läuft
 Vérifier le débit lorsque le moteur tourne



Mobil	BP	Castrol	C	ESSO	Shell	TEXACO
DTE OIL HEAVY MEDIUM	ENERGOL HLP 68 (150)	HYSPIN AWS 68	P.W.L.C.	NUTO H68	TELLUS 68 OR R68	RANOO HD 68
DTE EXTRA HEAVY	ENERGOL HP 150 (150)	ALPHA ZN 220	WLM	NURAY 100	VITREA 220	REGAL R&O220

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

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Operation

Lathe Safety

Every effort has been made in the design and production of the M400 lathe to comply with statutory safety requirements and to provide a fundamentally safe machine tool.

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 M400 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.

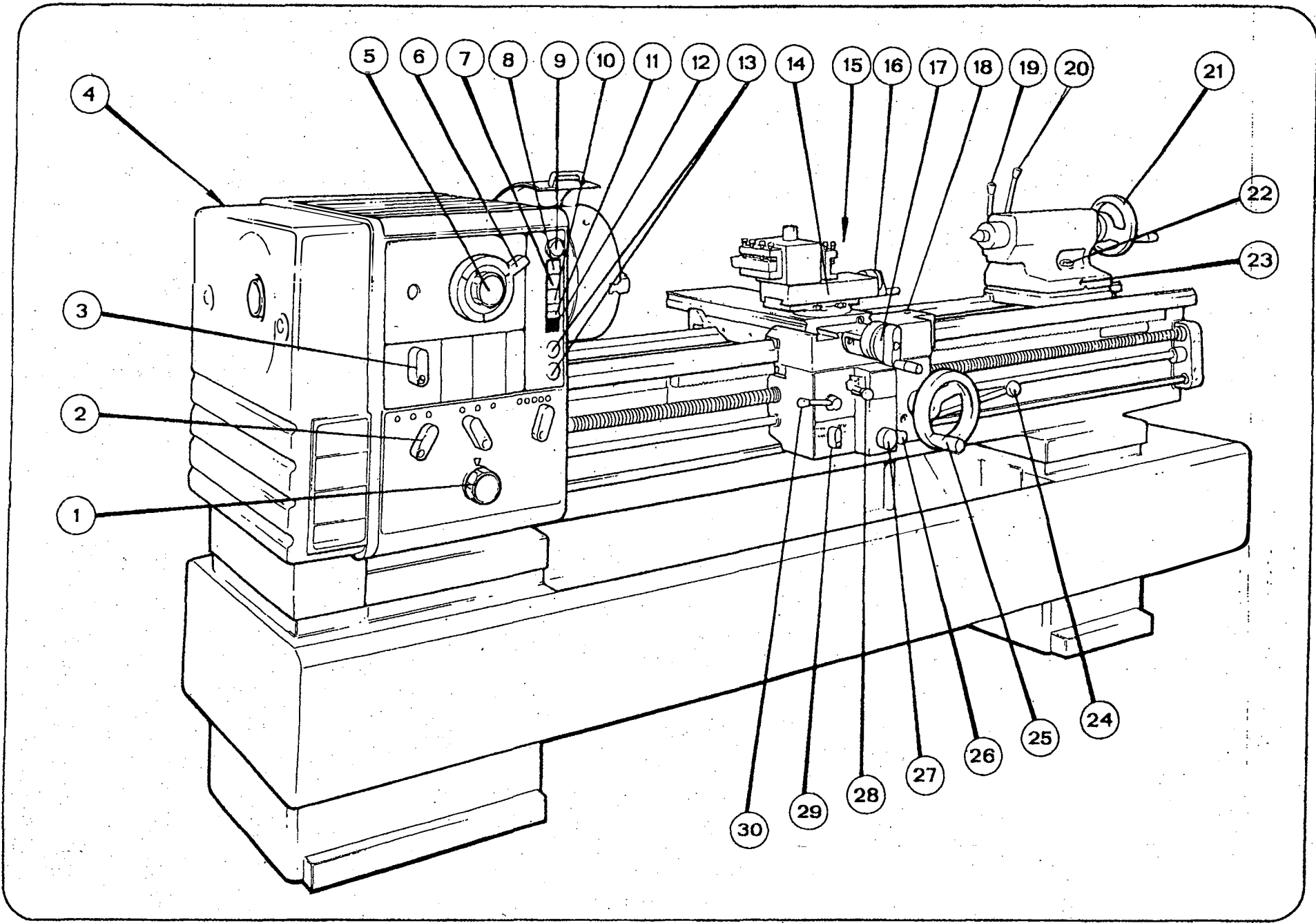
- (1) Ensuring that the operator has had suitable training and possesses the required degree of skill and experience to undertake the work.
- (2) Providing suitable work holding and/or supporting equipment, i.e. chucks, steadies, revolving centres, etc.
- (3) Ensuring that suitable tooling is provided 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 control lever is in stop position before starting motors.
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.



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1. Feed Selector Dial
2. Feed Selectors (3)
3. Feed-Direction/Thread-Hand Selector
4. Mains Isolator (at Rear)
5. Speed Selector Dial
6. Speed Range Selector Lever
7. Start Pushbutton (Main Motor)
8. Stop Pushbutton (Main Motor)
9. Emergency-Stop Pushbutton
10. Brake-Release Pushbutton
11. Coolant-Pump Pushbuttons
12. Hydraulic-Pump(s) Pushbuttons*
13. Power-Chuck Pushbuttons*
14. Top-Slide Lock Screw
15. Cross-Slide Lock Screw
(on R.H. of Crossslide)
16. Top-Slide Traverse Handle
17. Cross-Slide Traverse Handle
18. Carriage Lock Bolt
19. Tailstock Quill Lock
20. Quill Traverse Handwheel
22. Tailstock Auxiliary Clamp Bolt
23. Tailstock Set-Over Screw
24. Spindle Control Lever
25. Carriage Traverse Handwheel
26. Centralised Lubrication Knob
27. Feed Trip Adjustment
28. Feed Engagement
29. Feed Reverse
30. Thread Cutting Engagement

*When Fitted

Starting the Machine**

1. Ensure that lubrication has been carried out in accordance with the Lubrication diagram.
2. **Check** - that the spindle control lever (24) is in the central (stop) position, the feed engagement lever (28) and threadcutting engagement lever (30) are in the disengaged positions and that the changewheel guard is firmly secured in place.
3. Switch on the electrical supply — at the mains isolator (4) and press the main motor start pushbutton (7) — when 'motor running' will be indicated by this button becoming illuminated.
4. Select spindle speed (only when the spindle is stationary) by first turning the three position range selector lever (6) to present the appropriate speed range on the top segment of the dial, then turning the speed selector dial (5) to point to the required speed within this segment (engagement of the gears may be assisted by pressing the brake release pushbutton (10) and turning the spindle by hand.

NOTE: Brake release pushbutton (10) will become illuminated and flash when pressed, to indicate that the spindle is free — and may 'creep'. This condition may be cancelled by 'inching' the spindle control lever (24).

5. **Select** - forward longitudinal feed direction — at the headstock lever (3) i.e. feeding towards headstock and check that the feed reverse lever (29) 'matches' the direction selected.
6. **Select** - feed rate*, by referring to the charts on the headstock and selecting (in the sequence listed) the appropriate positions on the feed selector dial (1) and levers (2) (engagement of the feed gears may be assisted by 'inching' the spindle using the spindle control lever (24)) or pressing the brake release pushbutton (10) and turning the spindle by hand.
7. **Start the spindle** - in the direction of rotation required by: lowering (for forward) or lifting (for reverse) the 'gated' spindle control lever (24) on the carriage.
8. **Start the feed motion** as required by: lifting (for cross feed) or lowering (for longitudinal feed) the 'gated' feed engagement lever (28). Stop the feed motion as required by returning this lever (28) to the central stop position.
9. **Stop the machine** - by returning the spindle control lever (24) to its central (stop) position or: Press the emergency stop pushbutton.

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.

Operational Notes

- CHUCKS — use only high speed types
- FACEPLATES — NOTE MAXIMUM SPEEDS
800 r.p.m. for 380mm (15in) dia.
& 400 r.p.m. for 580mm (23in) dia.
- COARSE FEED RANGES — (i.e. when changewheels are inverted as in set up 'G' or 'H')
SHOULD NOT BE USED ON THE HIGH SPEED RANGE,
i.e. ABOVE 500 R.P.M.
- 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
- TAILSTOCK SET-OVER
ADJUSTMENT — is provided in the form of socket screws (28) mounted one each
side of the tailstock body — a similar but 'location-screw' is
provided in the rear face of the body.

Set-over adjustment is achieved as follows:
Unclamp tailstock-lever (20) and bolt (22). Slacken rear
'location-screw' (say one half turn) then simultaneously slacken
one 'set-over screw' and tighten the other until the required
setting is obtained. Retighten the rear 'location-screw'.
- CARRIAGE TRAVERSE
HANDWHEEL (25) — may be disengaged by pulling it outwards from the carriage
face.
- FEED TRIP DEVICE — a trip device is incorporated in the carriage which affords
protection against accidental overload and also permits feeding up
to fixed stops with automatic dis-engagement; the trip load setting
is by means of the knurled dial (27) on the apron.

It is recommended that the dial setting be selected to suit the
particular cutting load condition and not permanently adjusted to
its maximum load setting otherwise premature wear to the feed
drive components will ensue.

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).

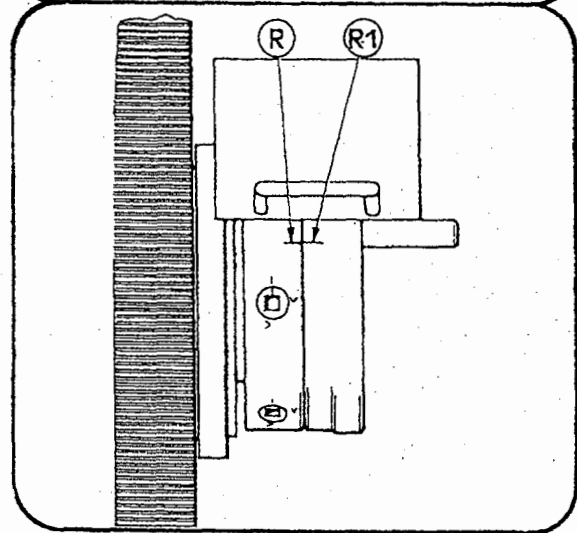
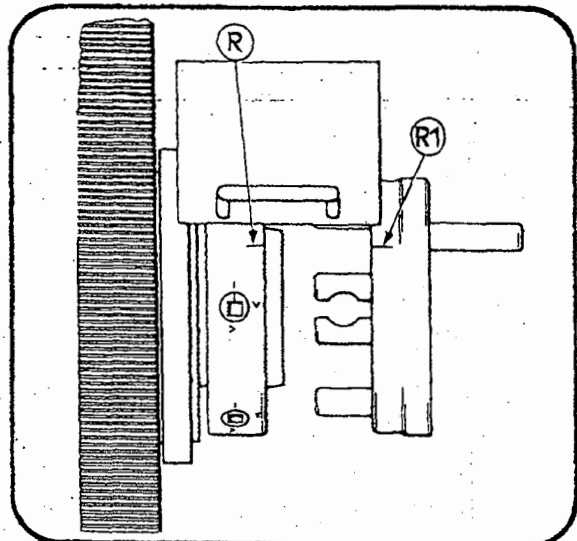
Mount the attachment on to the spindle nose and lock each cam by turning it clockwise using the key provided.

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'

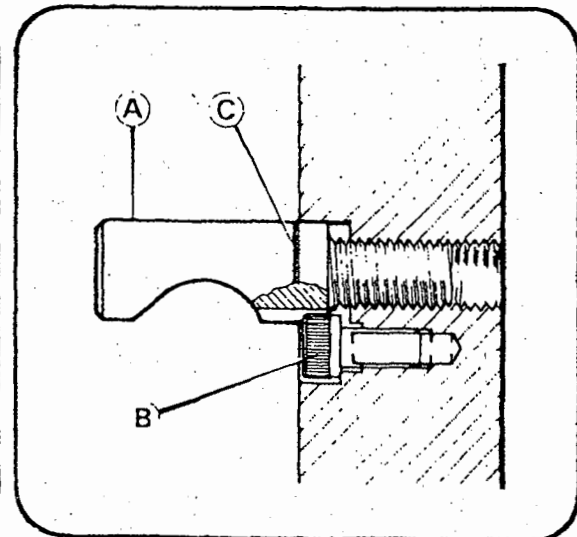
Remove Lockscrew (B).

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

Thread-cutting

Machine Thread Plates

Fig. 1 and 1A.

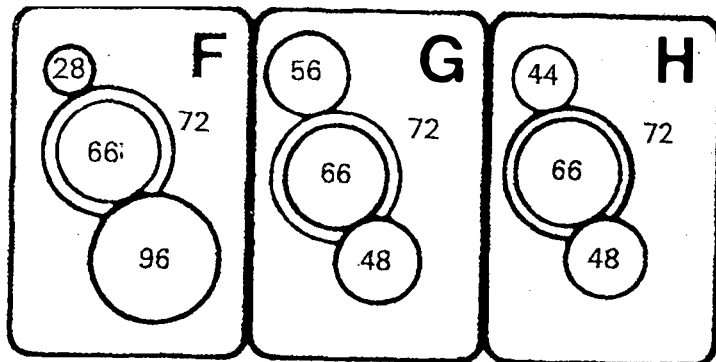
ins						mm						ins F mm		
F	F	G	F	F	G	F	F	G	F	F	G	ins	F	mm
72	AT6Z	18	AS2Y	7½	AS3Z	.2	CR1W	1.2	CT6W	4.0	BS1W	.0016	CR1X	.04
60	AT3Z	16	AS1Y	7	AS8Y	.225	CR2W	1.25	BS3W	4.5	BS2W	.002	CR3X	.05
56	AT8Y	14	AR8Y	6	AS6Y	.25	CR3W	1.3	CT7W	5.0	BS3W	.0025	CR7X	.063
48	AT6Y	13	AR7Y	5	AS3Y	.3	CR6W	1.4	CT8W	6.0	BS6W	.003	CS1X	.08
44	AT4Y	12	AR6Y	4½	AS2Y	.35	CR6W	1.5	BS6W	7.0	BS8W	.004	CS3X	.10
40	AT3Y	11½	AR5Y	4	AS1Y	.4	CS1W	1.75	BS8W	8.0	BT1W	.005	CS7X	.125
36	AT2Y	11	AR4Y	3½	AR8Y	.45	CS2W	2.0	BT1W	9.0	BT2W	.0053	CT1X	.16
32	AT1Y	10	AR3Y	3¼	AR7Y	.5	CS3W	2.5	BT3W	10.0	BT3W	.007	BR8X	.18
28	AS8Y	9	AR2Y	3	AR6Y	.6	CS6W	3.0	BT6W	12.0	BT5W	.009	BS2X	.23
27	AS2Z	8	AR1Y	2½	AR5Y	.7	CS8W	3.5	BT8W	14.0	BT8W	.011	BS4X	.28
26	AS7Y			2¼	AR4Y	.75	BR6W					.014	BS8X	.35
24	AS6Y			2½	AR3Y	.8	CT1W					.018	BT2X	.45
22	AS4Y			2	AR1Y	.9	CT2W					.022	BT4X	.56
20	AS3Y					1.0	BS1W					.028	BT8X	.71
19	BR1Y					1.1	CT4W							

dp				mod			
H				H			
72	AT6Z	20	AS3Y	.2	CR1W	2.75	BT4W
60	AT3Z	19	BR1Y	.3	CR6W	3.0	BT6W
56	AT8Y	18	AS2Y	.4	CS1W	3.5	BT8W
48	AT6Y	16	AS1Y	.5	CS3W		
46	AT5Y	15	AR3Z	.6	CS6W		
44	AT4Y	14	AR8Y	.7	CS8W		
42	AT8Z	13	AR7Y	.8	CT1W		
40	AT3Y	12	AR6Y	.9	CT2W		
36	AT2Y	11	AR4Y	1.0	BS1W		
32	AT1Y	10	AR3Y	1.25	BS3W		
30	AS3Z	9	AR2Y	1.5	BS6W		
28	AS8Y	8	AR1Y	1.75	BS8W		
26	AS7Y			2.0	BT1W		
24	AS6Y			2.25	BT2W		
22	AS4Y			2.5	BT3W		

Only standard thread pitches have been listed, for the full range of pitches available see Fig. 3.

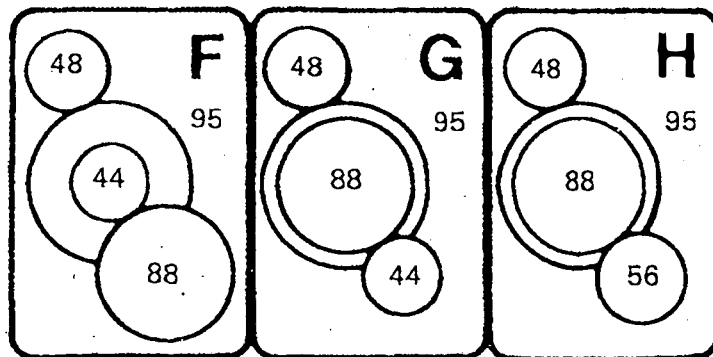
Changewheel Combinations

Fig. 2A for metric leadscrew machines.







6 mm. pitch Leadscrew

Fig. 2B for English leadscrew machines.



4 tpi. Leadscrew

THREAD CUTTING Fig. 3

 mm				 ins				 mod				 dp			
0.2	CR1WF	2	BT1WF	2	AR1YG	14	AR8YF	0.2	CR1WH	8	AR1YH				
0.225	CR2WF		BR1WG	2.25	AR2YG		AT8YG	0.225	CR2WH	9	AR2YH				
0.25	CR3WF		CS3WG	2.5	AR3YG	15	AR3ZF	0.25	CR3WH	10	AR3YH				
0.275	CR4WF	2.2	CS4WG	2.75	AR4YG		AT3ZG	0.275	CR4WH	11	AR4YH				
0.2875	CR5WF	2.25	BT2WF	2.875	AR5YG	16	AS1YF	0.2875	CR5WH	11.5	AR5YH				
0.3	CR6WF		BR2WG	3	AR6YG	16.5	AS4ZF	0.3	CR6WH	12	AR6YH				
0.325	CR7WF	2.3	CS5WG		AR1ZG		AT4ZG	0.325	CR7WH		AR1ZH				
0.35	CR8WF	2.4	CS6WG	3.25	AR7YG	17.25	AR5ZF	0.35	CR8WH	13	AR7YH				
0.4	CS1WF	2.5	BT3WF	3.375	AR2ZG		AT5ZG	0.4	CS1WH	13.5	AR2ZH				
0.45	CS2WF		BR3WG	3.5	AR8YG	17.8125	CR1ZG	0.45	CS2WH	14	AR8YH				
0.5	CS3WF	2.6	CS7WG	3.75	AR3ZG	18	AS2YF	0.5	CS3WH	15	AR3ZH				
	BR1WF	2.75	BT4WF	4	AS1YG		AR6ZF		BR1WH	16	AS1YH				
0.55	CS4WF		BR4WG	4.125	AR4ZG		AT6ZG	0.55	CS4WH	16.5	AR4ZH				
0.5625	BR2WF	2.8	CS8WG	4.3125	AR5ZG	19	BR1YF	0.5625	BR2WH	17.25	AR5ZH				
0.575	CS5WF	2.875	BT5WF	4.5	AS2YG	19.5	AR7ZF	0.575	CS5WH	18	AS2YH				
0.6	CS6WF		BR5WG		AR6ZG		AT7ZG	0.6	CS6WH		AR6ZH				
0.625	BR3WF	3	BT6WF	4.75	BR1YG	20	AS3YF	0.625	BR3WH	19	BR1YH				
0.65	CS7WF		BR6WG	4.875	AR7ZG	21	AR8ZF	0.65	CS7WH	19.5	AR7ZH				
0.6875	BR4WF	3.2	CT1WG	5	AS3YG		AT8ZG	0.6875	BR4WH	20	AS3YH				
0.7	CS8WF	3.25	BT7WF	5.25	AR8ZG	22	AS4YF	0.7	CS8WH	21	AR8ZH				
0.71875	BR5WF		BR7WG	5.5	AS4YG	23	AS5YF	0.7185	BR5WH	22	AS4YH				
0.75	BR6WF	3.5	BT8WF	5.75	AS5YG	24	AS6YF	0.75	BR6WH	23	AS5YH				
0.8	CT1WF		BR8WG	6	AS6YG		AS1ZF	0.8	CT1WH	24	AS6YH				
	CR1WG	3.6	CT2WG		AS1ZG	26	AS7YF	0.8125	BR7WH		AS1ZH				
0.8125	BR7WF	4	BS1WG	6.5	AS7YG	27	AS2ZF	0.875	BR8WH	26	AS7YH				
0.875	BR8WF		CT3WG	6.75	AS2ZG	28	AS8YF	0.9	CT2WH	27	AS2ZH				
0.9	CT2WF	4.4	CT4WG	7	AS8YG	28.5	BR1ZF	1	BS1WH	28	AS8YH				
	CR2WG	4.5	BS2WG	7.125	BR1ZG	30	AS3ZF		CT3WH	28.5	BR1ZH				
1	BS1WF	4.6	CT5WG	7.5	AS3ZG	32	AT1YF	1.1	CT4WH	30	AS3ZH				
	CT3WF	4.75	AT8WG	8	AR1YF	33	AS4ZF	1.125	BS2WH	32	AT1YH				
	CR3WG	4.8	CT6WG		AT1YG	34.5	AS5ZF	1.15	CT5WH	33	AS4ZH				
1.1	CT4WF	5	BS3WG	8.25	AS4ZG	36	AT2YF	1.1875	AT8WH	34.5	AS5ZH				
	CR4WG	5.2	CT7WG	8.625	AS5ZG		AS6ZF	1.2	CT6WH	36	AT2YH				
1.125	BS2WF	5.5	BS4WG	9	AR2YF	39	AS7ZF	1.25	BS3WH	39	AS6ZH				
1.15	CT5WF	5.6	CT8WG		AT2YG	40	AT3YF	1.3	CT7WH	39	AS7ZH				
	CR5WG	5.75	BS5WG		AS6ZG	42	AS8ZF	1.375	BS4WH	40	AT3YH				
1.1875	AT8WF	6	BS6WG	9.75	AS7ZG	44	AT4YF	1.4	CT8WH	42	AS8ZH				
1.2	CT6WF	6.5	BS7WG	10	AR3YF	46	AT5YF	1.4375	BS5WH	44	AT4YH				
	CR6WG	7	BS8WG		AT3YG	47.5	CR1YF	1.5	BS6WH	46	AT5YH				
1.25	BS3WF	8	BT1WG	10.5	AS8ZG	48	AT6YF	1.625	BS7WH	47.5	CR1YH				
1.3	CT7WF	9	BT2WG	11	AR4YF		AT1ZF	1.75	BS8WH	48	AT6YH				
	CR7WG	10	BT3WG		AT4YG	52	AT7YF	2	BT1WH		AT1ZH				
1.375	BS4WF	11	BT4WG	11.5	AR5YF	54	AT2ZF	2.25	BT2WH	52	AT7YH				
1.4	CT8WF	11.5	BT5WG		AT5YG	56	AT8YF	2.5	BT3WH	54	AT2ZH				
	CR8WG	12	BT6WG	11.875	CR1YG	60	AT3ZF	2.75	BT4WH	56	AT8YH				
1.4375	BS5WF	13	BT7WG	12	AR6YF	66	AT4ZF	2.875	BT5WH	60	AT3ZH				
1.5	BS6WF	14	BT8WG		AT6YG	69	AT5ZF	3	BT6WH	66	AT4ZH				
1.6	CS1WG				AR1ZF	71.25	CR1ZF	3.25	BT7WH	69	AT5ZH				
1.625	BS7WF				AT1ZG	72	AT6ZF	3.5	BT8WH	71.25	CR1ZH				
1.75	BS8WF			13	AR7YF	78	AT7ZF			72	AT6ZH				
1.8	CS2WG			13.5	AT7YG	84	AT8ZF			78	AT7ZH				
					AR2ZF					84	AT8ZH				
					AT2ZG										

(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 re-engaged in accordance with the chart mounted on the 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).

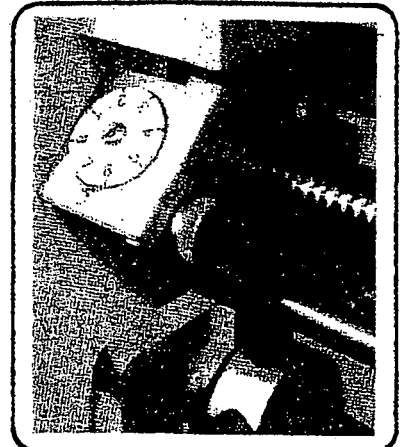
in column 3. The dial numbers at which the leadscrew nuts may be engaged.

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
2½	15	9	1357	24	1-8
2¾	1	10	1-8	26	1-8
3	1357	11	1357	27	1357
3½	1	11½	15	28	1-8
3¾	15	12	1-8	30	1-8
4	1-8	13	1357	32	1-8
4½	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
7½	15	20	1-8	56	1-8

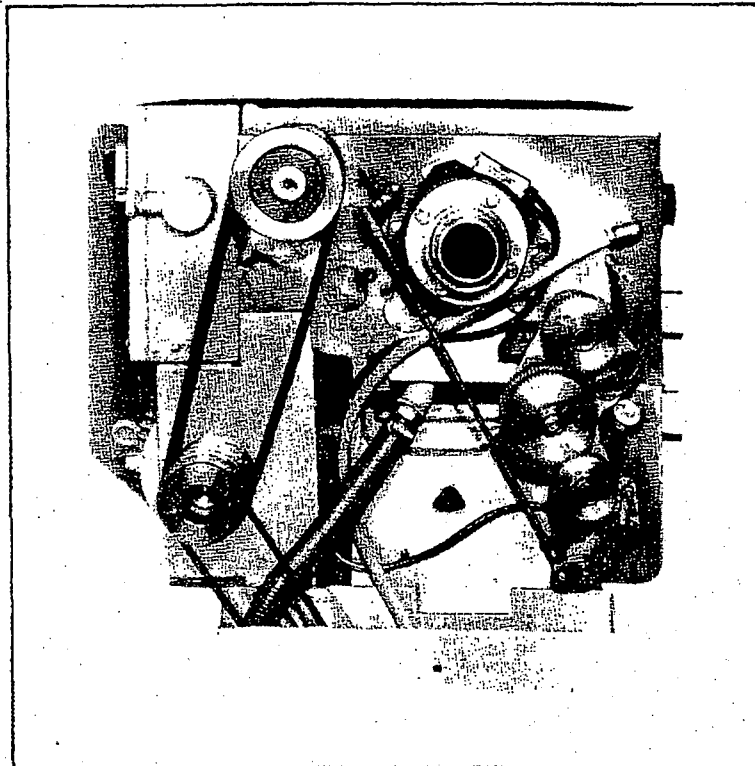
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(B) ENGLISH THREADS on METRIC LEADSCREW MACHINES
or
METRIC THREADS on ENGLISH LEADSCREW MACHINES

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' (24) 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 dial



MULTI-START THREADS — 'SPINDLE GEAR' METHOD

When using this method, it must be noted that the top Changewheel rotates at **half** the Spindle speed and the number of starts which can be cut is limited to figures which can be divided (without a remainder) into **half** the number of teeth on the top Changewheel.

THEN

$$\text{Number of teeth to be indexed between each 'Thread-start'} = \frac{\text{No. Teeth of Top Changewheel}}{2 \times \text{No. of Starts Required}}$$

E.G.

For a Two-Start Thread, index top Changewheel by:-

$$\frac{\text{No. Teeth on Top Changewheel}}{4}$$

Or:-

One whole quarter of a revolution.

Maintenance

Drive Belts (Fig. 1 and 2)

Access to the Drive Belts is gained by removal of the moulded End Guard, when Vee Belt tension may be assessed by applying finger pressure to each Belt in turn at a point midway between the two Pulleys (Fig. 1). For correct tension a deflection of about 10mm should be possible in each Belt.

To adjust the Vee Belt tension — release the Lock Nuts on the two Adjusting Screws (Fig. 2) and alternatively slacken one Screw and tighten the other against the Motor Platform until the correct tension is obtained then re-tighten the two Lock Nuts.

NOTE: The round 'elastic' Belt Drive to the Lubricant Pump will compensate for any Motor Platform movement and needs no adjustment.

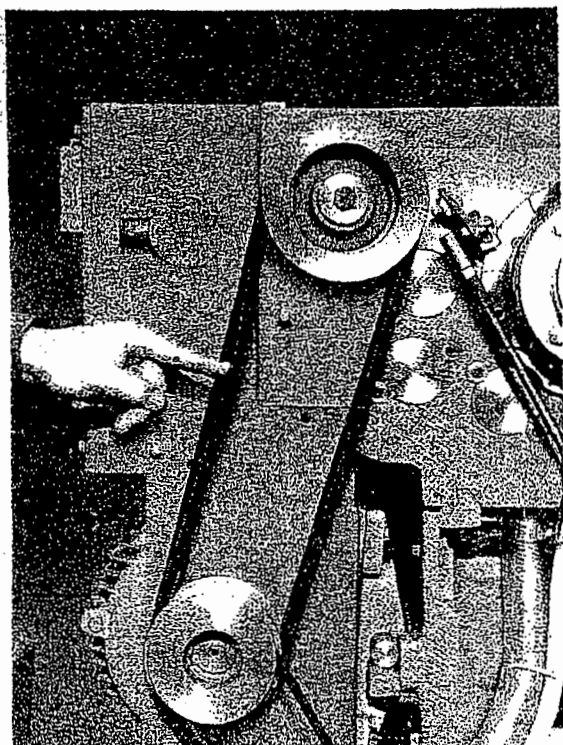


Fig. 1

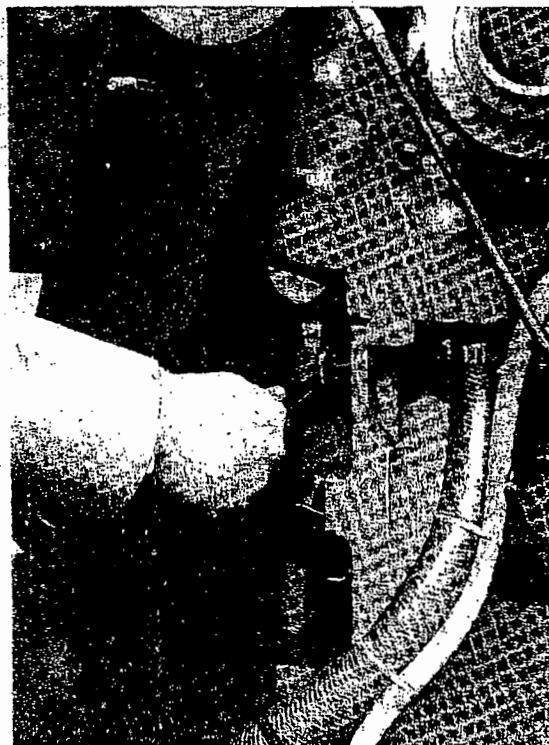


Fig. 2

Spindle Bearings

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

Spindle Brake

The Spindle Brake is self compensating for wear and should require no adjustment during the normal use and life of the machine. In the event of adjustment or 'set-up' being necessary, consult separate Instruction Sheet.

Drive Clutches

Access

- (1) Disengage Clutches at Spindle Control Lever (24 on Controls Diagram). Switch off power supply at Mains Isolator.
- (2) Remove Headstock Cover as follows:-
 - Remove Rubber Mat.
 - Remove Fixing Screws.
 - Lift Cover using Ø12mm Eye Bolt. (Weight 28kg (62 lb)).

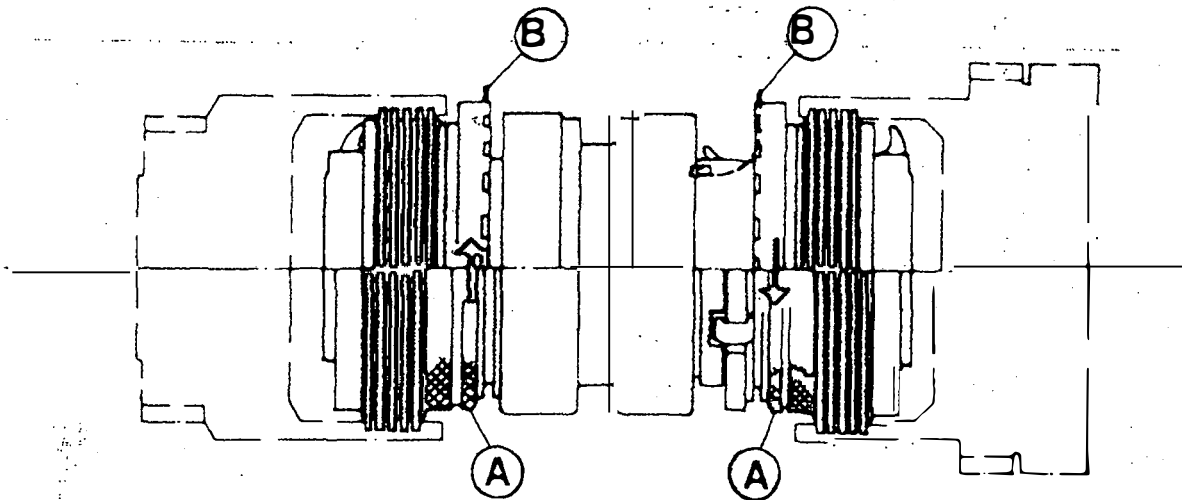


Fig. 3

Adjustment (Fig. 3 and 3a)

- (1) Select Clutch to be adjusted, i.e. R.H. for forward L.H. for reverse.
- (2) (Roller type Clutch-Matrix) Slide back Knurled Lock Ring (A) and rotate one notch at a time in direction of arrow to tighten.
- (3) (Lever type Clutch-Ortlinghaus) Rotate Input Pulley until spring tab (B) which locks adjustment nut is accessible, prise tab away just clear of slot. Rotate nut by one notch at a time in direction of arrow to tighten.
- (4) Reset locking.

NOTE: OVER ADJUSTMENT MAY CAUSE SERIOUS DAMAGE TO CLUTCHES.

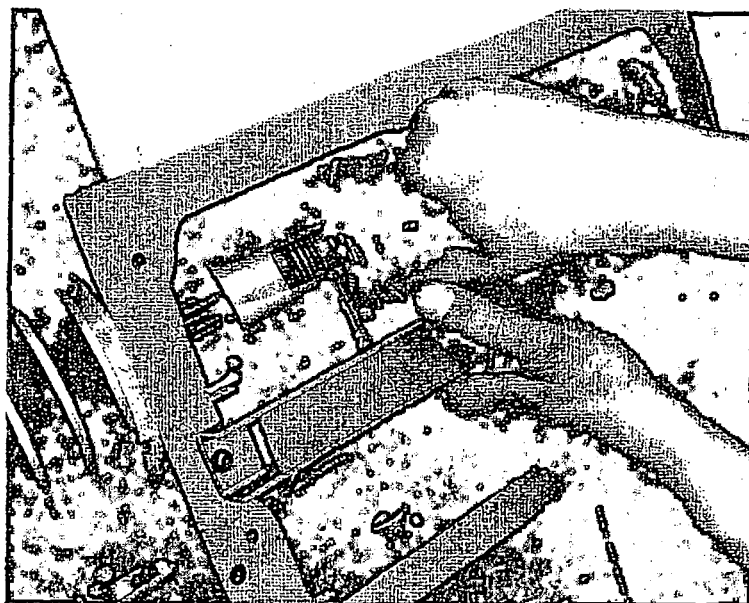


Fig. 3a

Saddle Keep Strips (Fig. 4)

Four self-locking Adjusting Screws are provided which operate independently. These are the Slotted Head Screws located under each end of both the front and rear Saddle Wings.

The procedure for adjustment being to turn each Screw in turn (clockwise to take up play) until required setting is obtained.

Traverse Saddle by hand over full travel at each adjustment to be sure of an even action.

Note 5° movement of the Adjusting Screw will provide approximately .017mm (.007in) take up of play in the Strip.

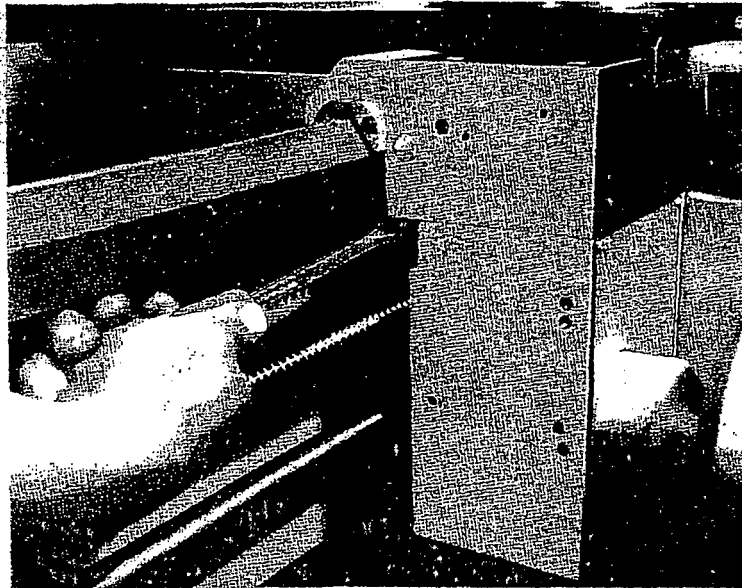


Fig. 4

Cross Slide Ways (Fig. 5)

Wear in the Cross Slide Ways must be adjusted for by means of the 'Taper-Gib Strip' as follows:-

Turn the Slotted Head Screw on the Front Face of the Cross Slide in a clockwise direction to tighten the 'Gib' — the procedure being, to first slacken the similar Screw in the Rear Face, then re-tighten this after adjustment to lock the 'Gib' in its new position.

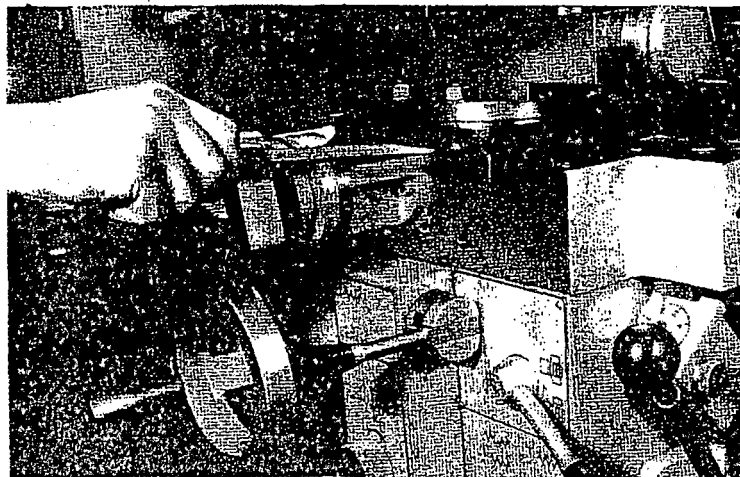


Fig. 5

Cross Slide Nut (Fig. 6)

Provision is made for the elimination of backlash in the Cross Slide Nut, the procedure for adjustment being as follows:-

Remove only the M12 'Blanking' Screw which is the L.H. Rear one of the group of three, in the top face of the Cross Slide.

Insert a screw driver into the tapped hole and turn the Captive Adjusting Screw to give the required setting — clockwise for positive adjustment.

Care should be taken to avoid over adjustment since a 90° turn of the Adjusting Screw will provide approximately .017mm (.007in) take up of backlash.

Traverse Cross Slide by hand over full travel to be sure of an even action.

Re-fit M12 Blanking Screw.

'Recommended working backlash is one and a half divisions on the Micrometer Dial'.



Fig. 6

Top Slide Ways (Fig. 7)

Wear in the Top Slide Ways may be adjusted for by means of the Taper-Gib Strip as follows:-

Turn the Slotted Head Screw at the 'Micrometer Dial end' in a clockwise direction to tighten the 'Gib' — the procedure being to first slacken the similar Screw at the opposite end, then re-tighten this after adjustment to lock the Gib in its new position.

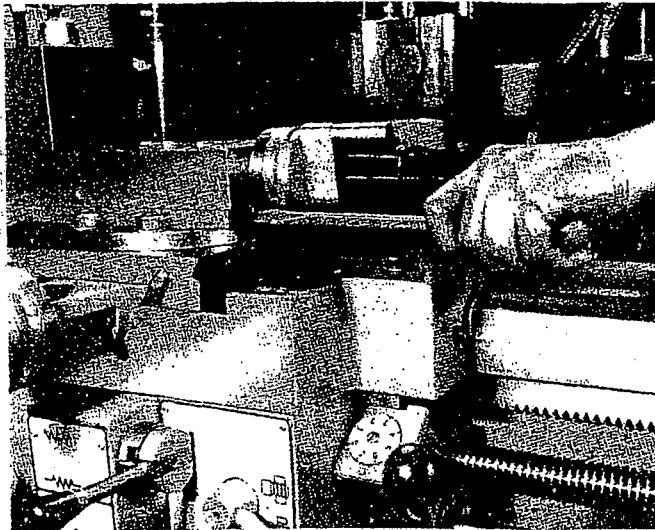


Fig. 7

Tailstock Bed Clamp (Fig. 8)

The Angular Lock Position of the Bed Clamp Lever is adjusted by means of the Self-Locking Hexagon Bolt located on the underside of the Tailstock Front Clamp Plate and between the Bedways.

Turn clockwise to increase clamping action.

The auxiliary Clamp Bolt needs no adjustment and is simply tightened to give an additional locking action when required.

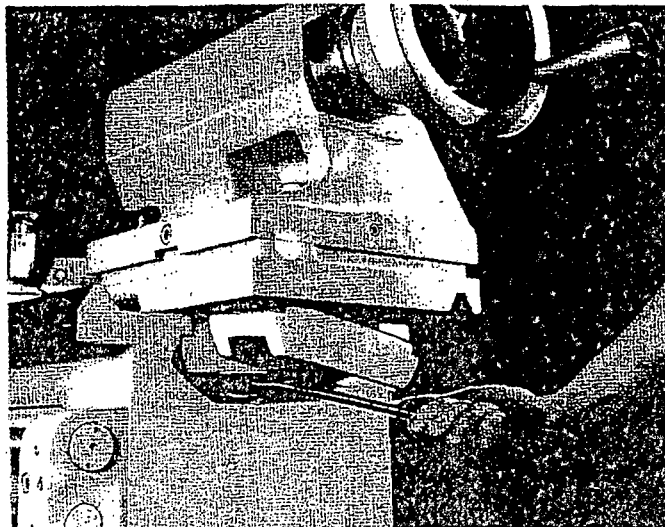
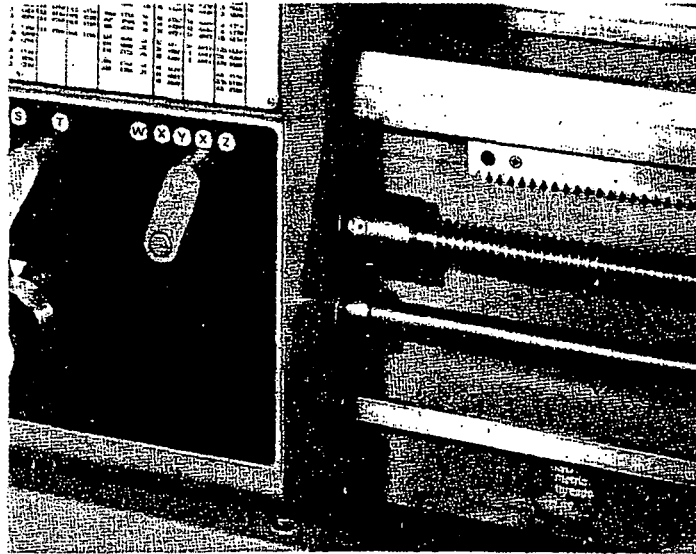


Fig. 8



Leadscrew Torque Limiting Device

This unit (mounted at the L.H. end of the leadscrew) is provided to protect the gearbox and end drive from damage in the event of a 'collision' during the thread cutting cycle and is carefully set to a pre-determined slipping torque before the machine is dispatched from our works.

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

Adjustment may be achieved however as follows:

1. Slacken the two M4 socket grub screws on the R.H. O.D. of the unit.
2. Turn the inner adjusting ring (clockwise to increase slipping torque) by means of the two holes in the R.H. end face of the unit.
3. Re-tighten the two M4 'Locking' screws, on the O.D. of the shell.

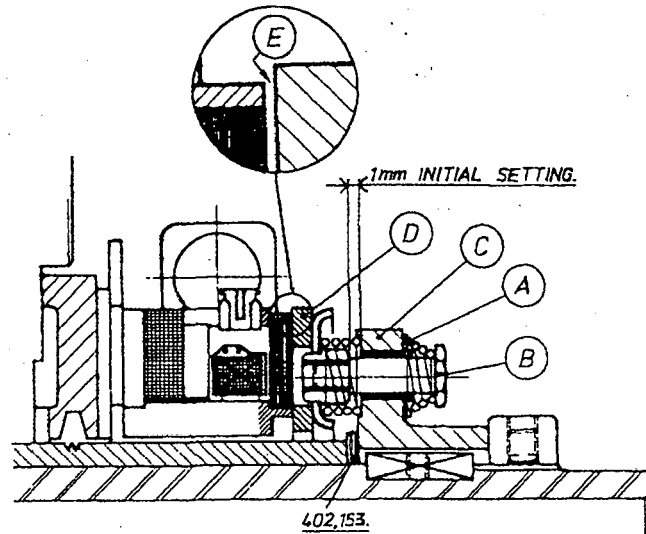
An assessment of the slipping torque can be made by holding the apron handwheel in order to stop the saddle movement whilst the screw cutting traverse is in operation.

Warner Fail-Safe Spindle Brake

This Unit is a permanent 'Ceramic-Magnet' type which is released (by reversing the direction of magnetic flux) when its electromagnet coil is energised.

THE BRAKE IS SELF-COMPENSATING FOR WEAR AND SHOULD REQUIRE NO ADJUSTMENT DURING THE NORMAL USE AND LIFE OF THE MACHINE.

The associated power supply unit, which is mounted in the electrical cabinet and marked 2w1 is designed to give a constant D.C. output, irrespective of mains supply fluctuations.



Each Unit is carefully 'trimmed' to suit the customers specified supply voltage before the machine is despatched from our Works — should an adjustment be necessary the following procedure should be complied with and only undertaken by a competent Electrician.

NOTE: Spacers (402.152) on the main spindle should allow for 1mm movement of armature at initial setting (Fig. 1).

- (1) Switch off mains supply at the isolator, remove moulded end guard, depress and 'hold' end guard interlock switch, open electrical cabinet door.
- (2) Release potentiometer lock nut on brake power supply unit (2w1) and turn adjusting screw anti-clockwise as far as it will go.
- (3) Switch on mains supply at the isolator interlock part and press the brake release push button at the control station.

Then, using a D.C. voltmeter (100V scale) across terminals 25 and 26 (on 2w1) or at the brake unit terminals, slowly turn the adjusting screw clockwise until the brake disengages and note the D.C. voltage at this point.

- (4) Further turn the adjusting screw until 6 volts have been added to the 'release' figure.
ON NEW INSTALLATIONS — AT THIS POINT SET 'AUTOGAP' ASSEMBLY AS IN (II)
- (5) Switch off mains supply at the isolator interlock part, retighten the potentiometer lock nut, close electrical cabinet, release end guard interlock switch and refit moulded end guard.
- (6) Check for correct operation.

(II) TO SET 'AUTOGAP' ASSEMBLY (Fig. 1)

With armature (D) in the disengage position and pulled fully away from the magnet (to give 1mm air gap (E) all round the periphery) — slide the detent spring retainer (A) on each drive pin (B) until it bottoms against the carrier (C). Switch off mains supply — or cancel brake release when setting will be complete (nominal working air gap is $.79\text{mm}$ ($\frac{1}{32}$ in)).

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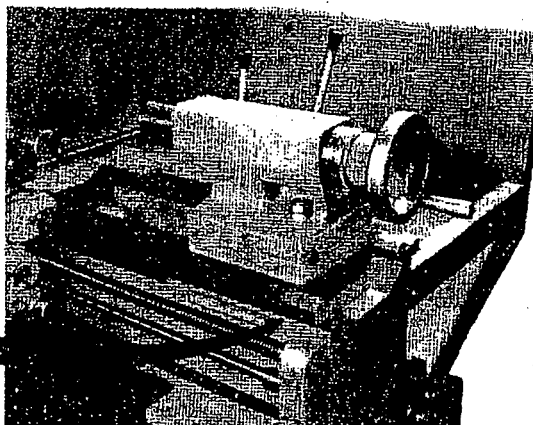
Parts Section

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.

1000

or

1500

or

2000

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.

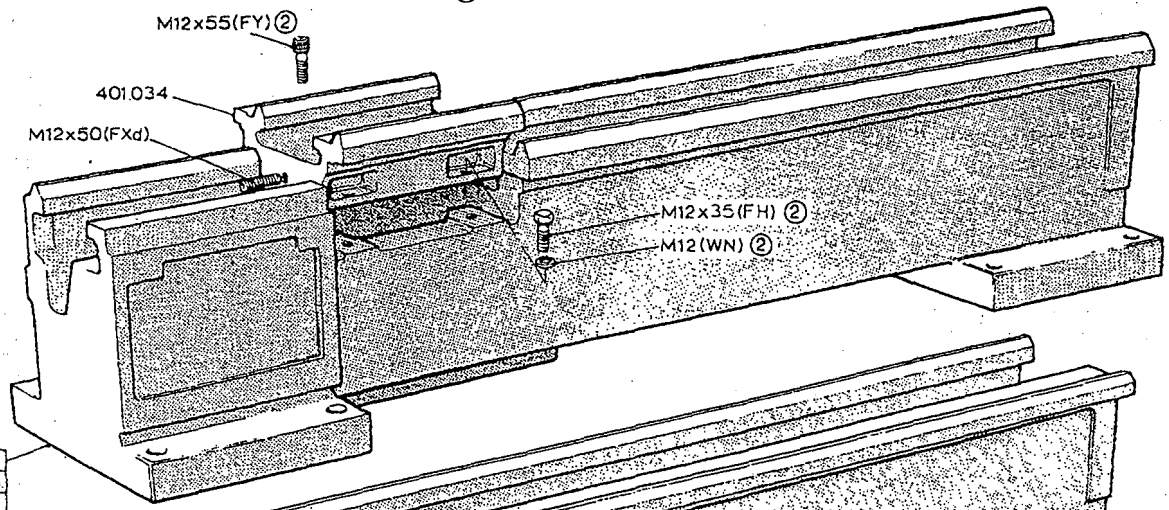
Parts Section

Contents List

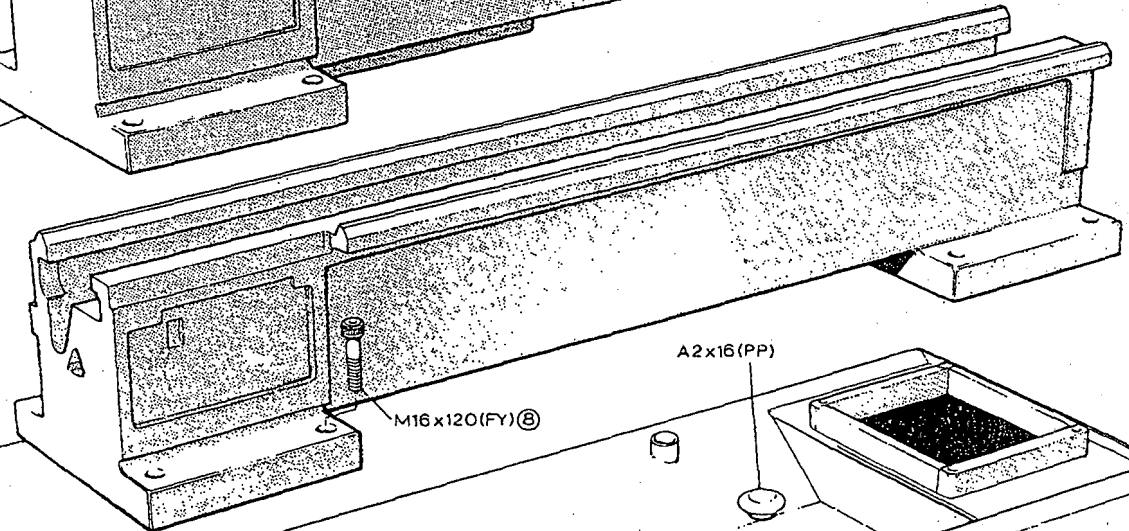
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401/2	Brake and Clutch Linkage
401/3	Lubrication Pump
402/1	Headstock Main Casting
402/2	Headstock Spindle and Gearing
402/3	Headstock Clutch and Gearing
402/4	Gear Shifting Mechanism
402/5	Gear Shifting Mechanism
403/1	Gear Box Casting
403/2	Gear Box Gearing
403/3	Gear Box Gear Shifting
404/1	Apron
404/2	Apron Gearing
404/3	Apron Gears
404/4	Apron — Pump
404/5	Thread Indicator Dial
405/1	Saddle
405/2	Slides
406	Shafts, rack and bracket
407	Tailstock
408	Chargewheels — Swing Frame
410	Standard Equipment

M400

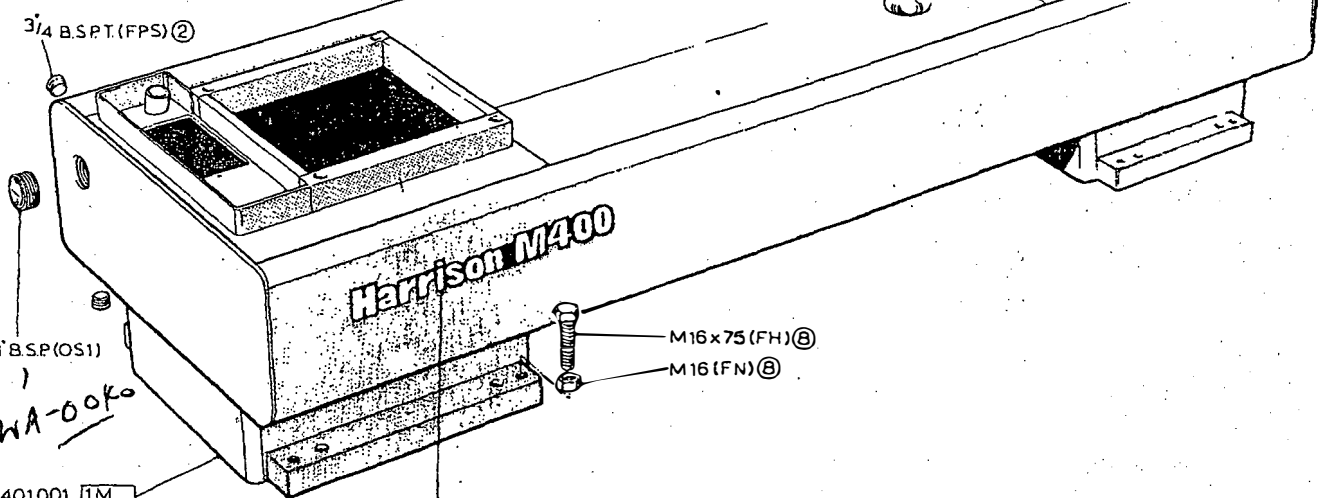
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- D001H2093
- D272H1002



- 401.032 1M
- 401.033 1.5M
- 401.036 2M



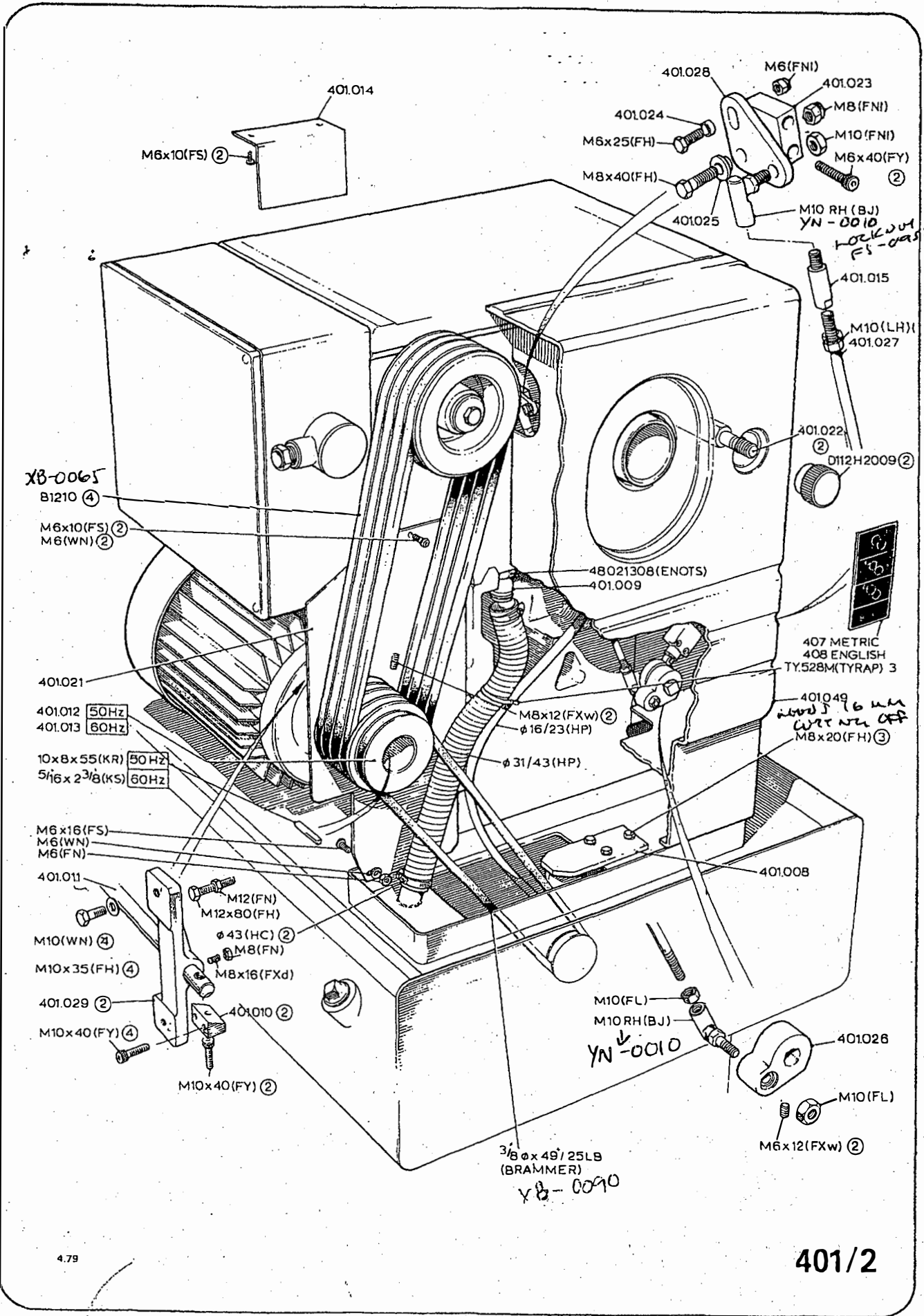
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- 401.035 2M



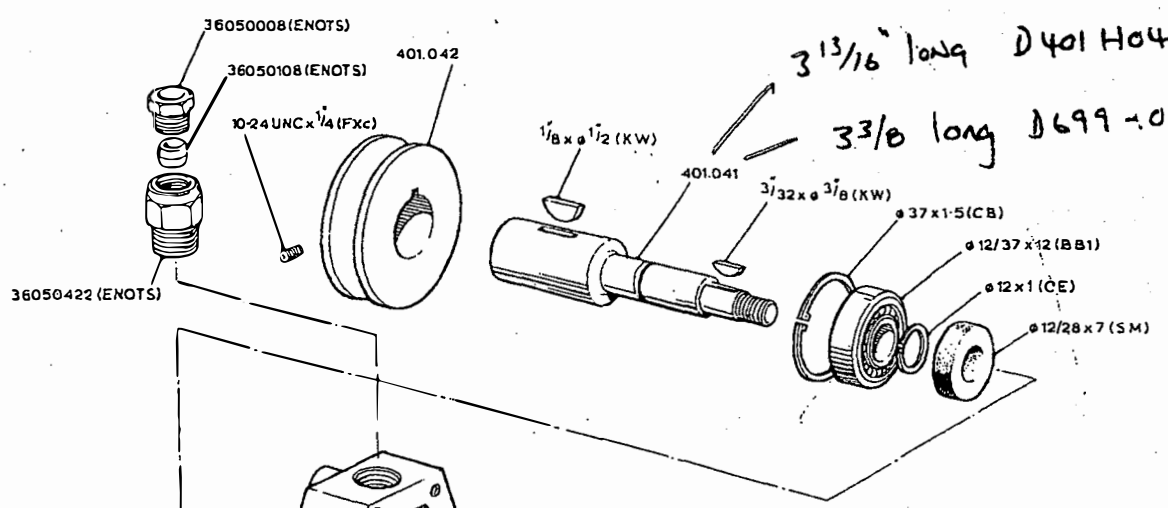
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- 401.002 1.5M
- 401.003 2M

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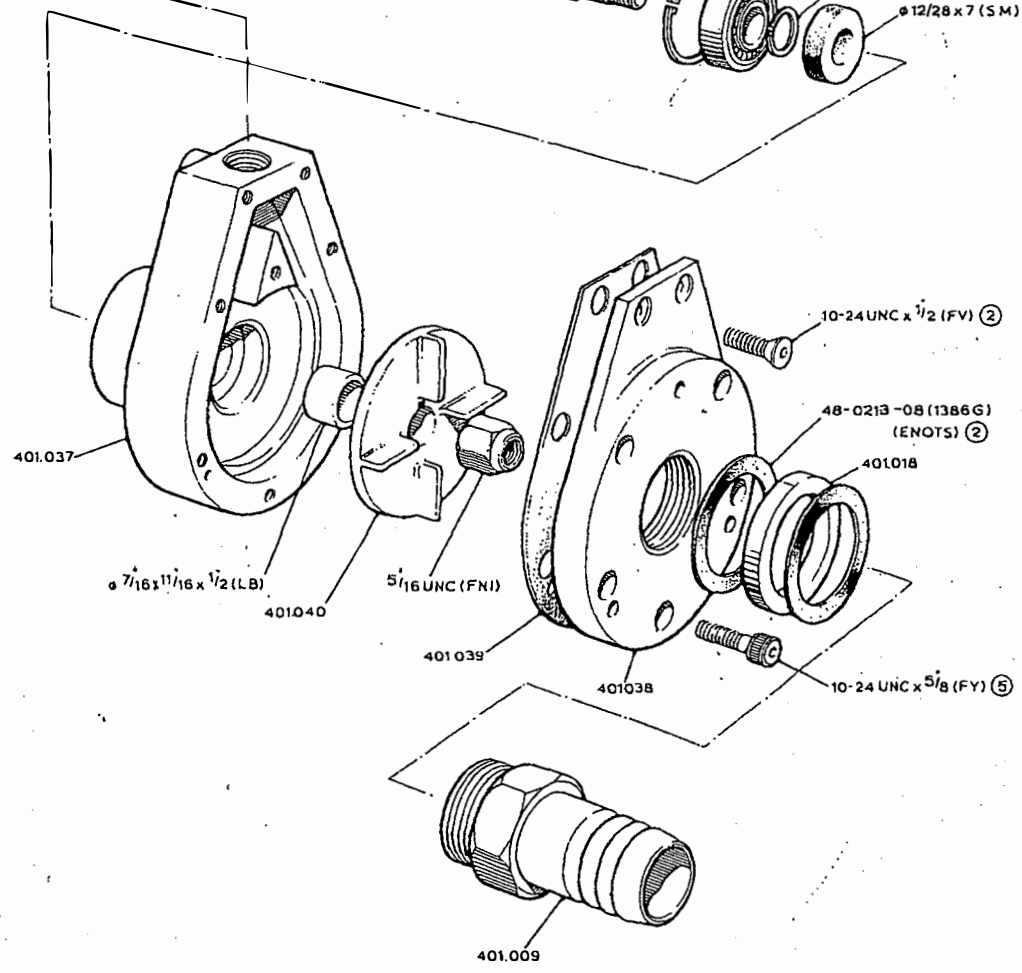
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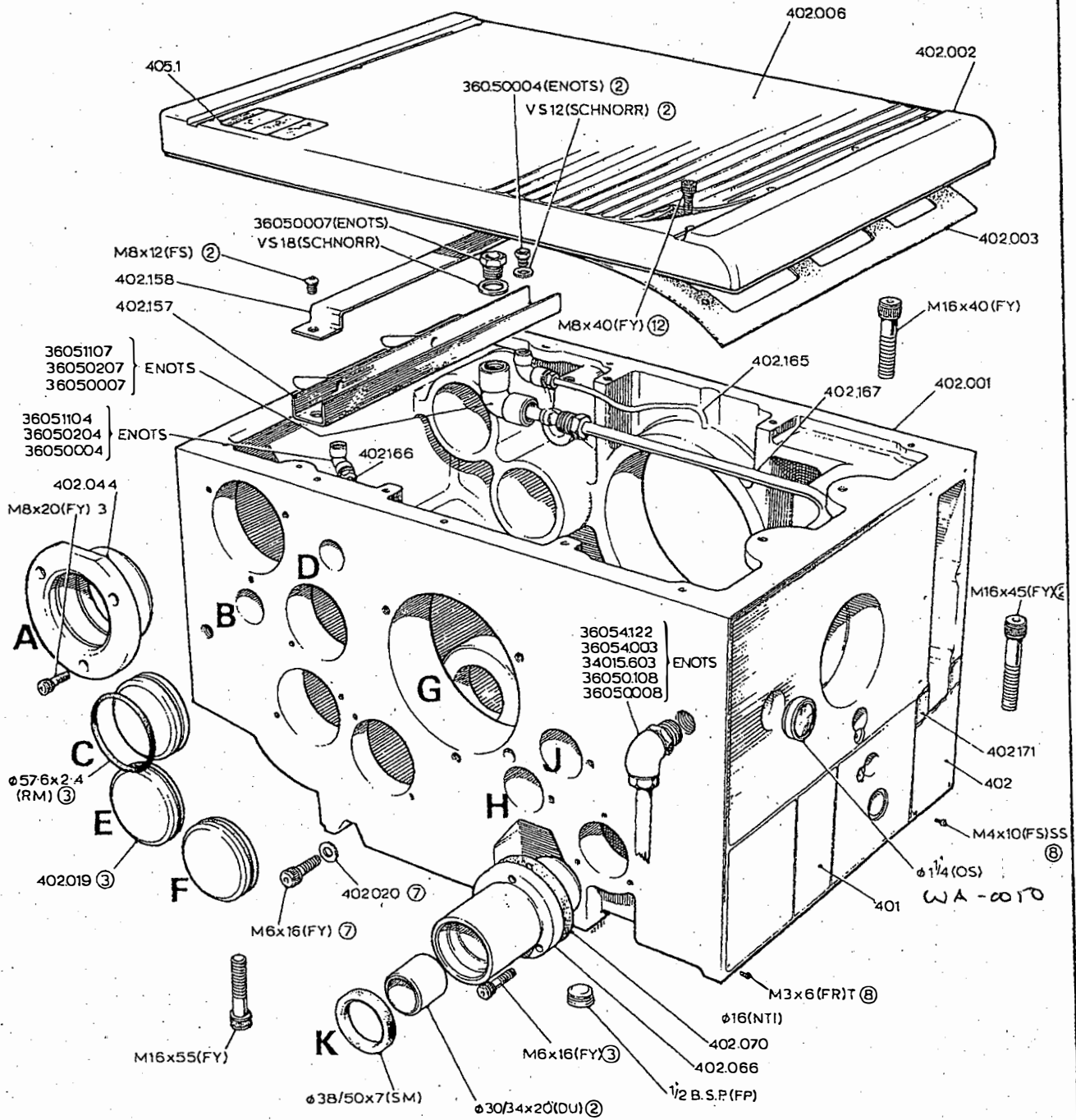
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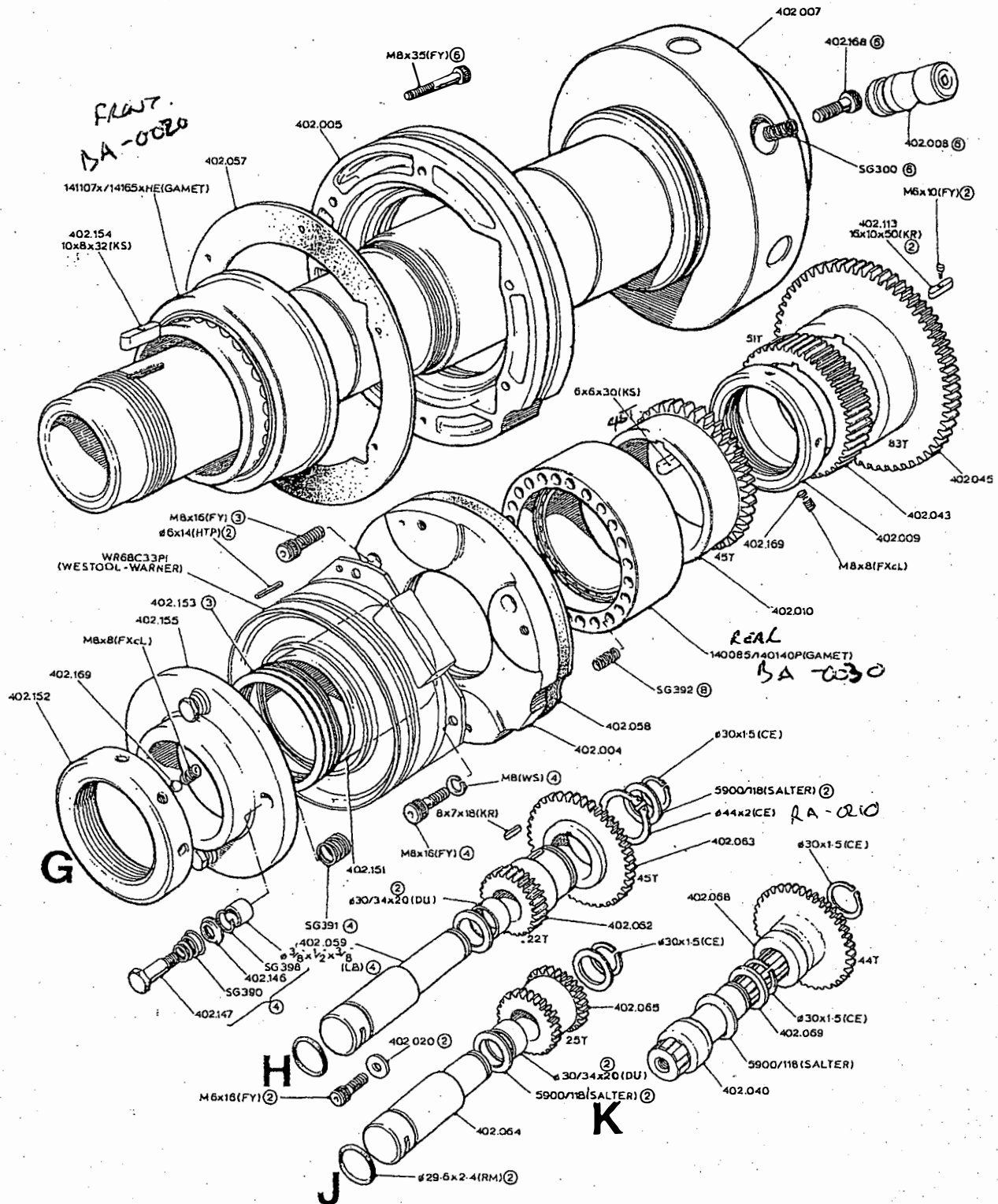
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3 3/8" long D699-0632



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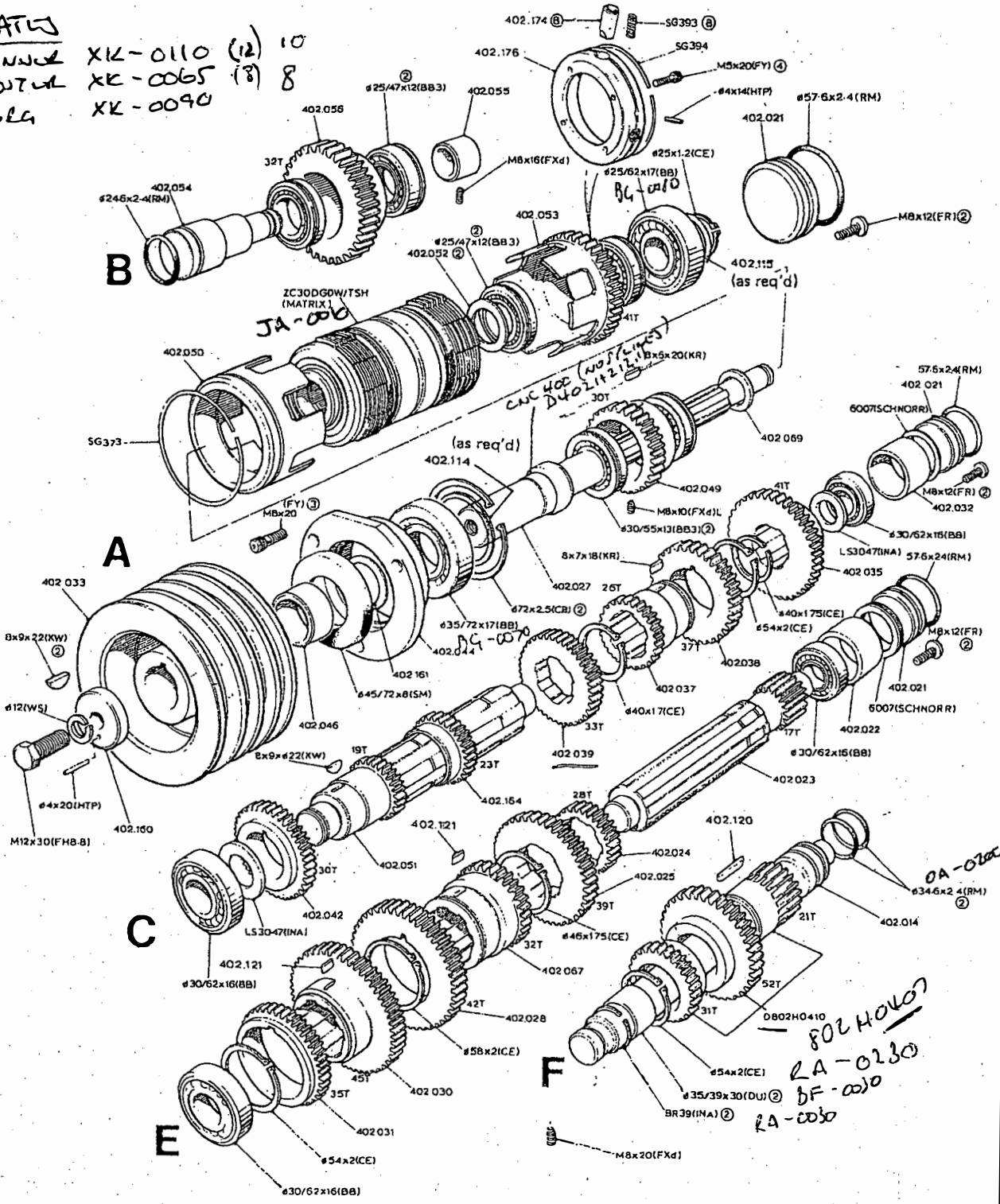
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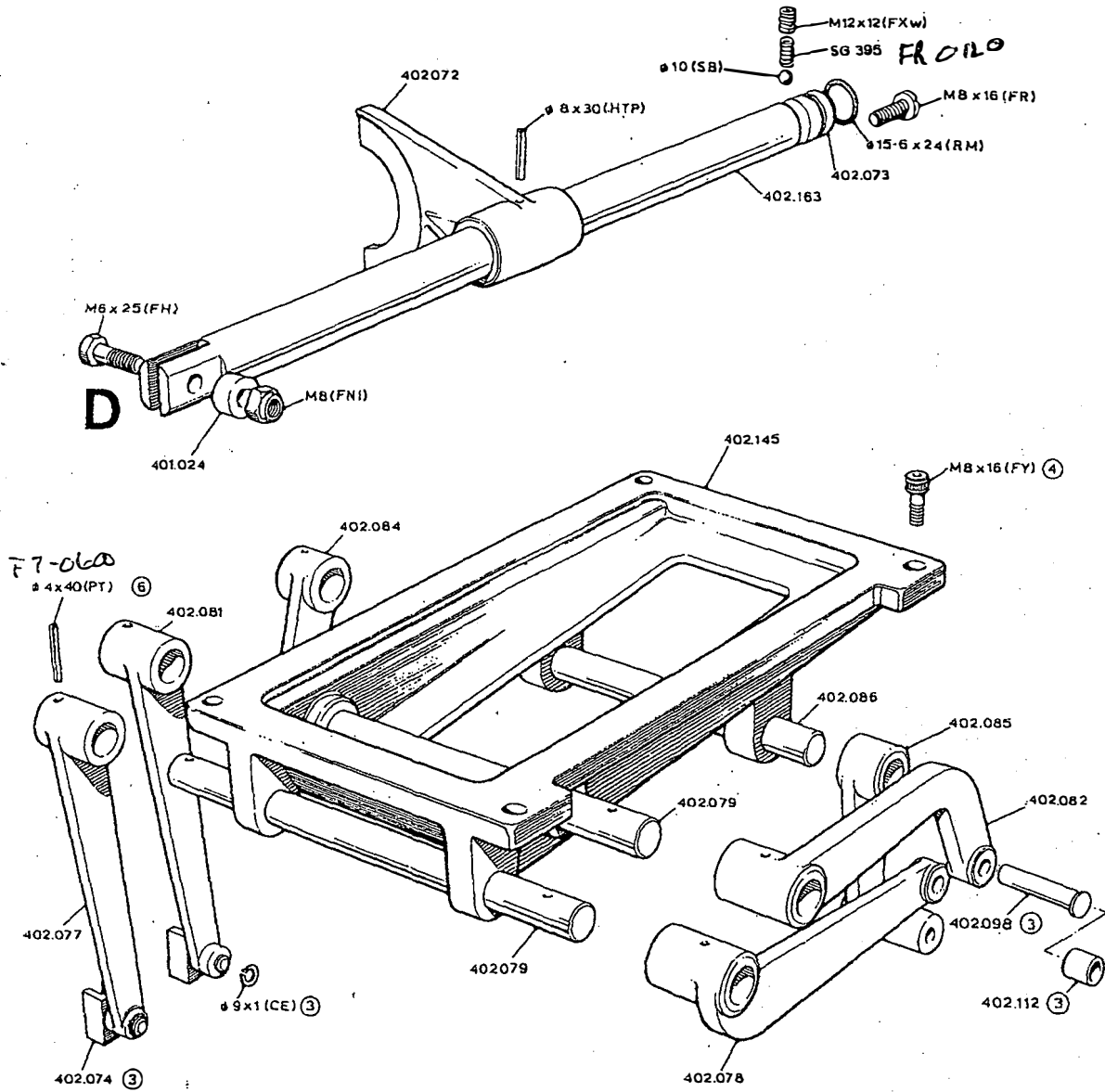
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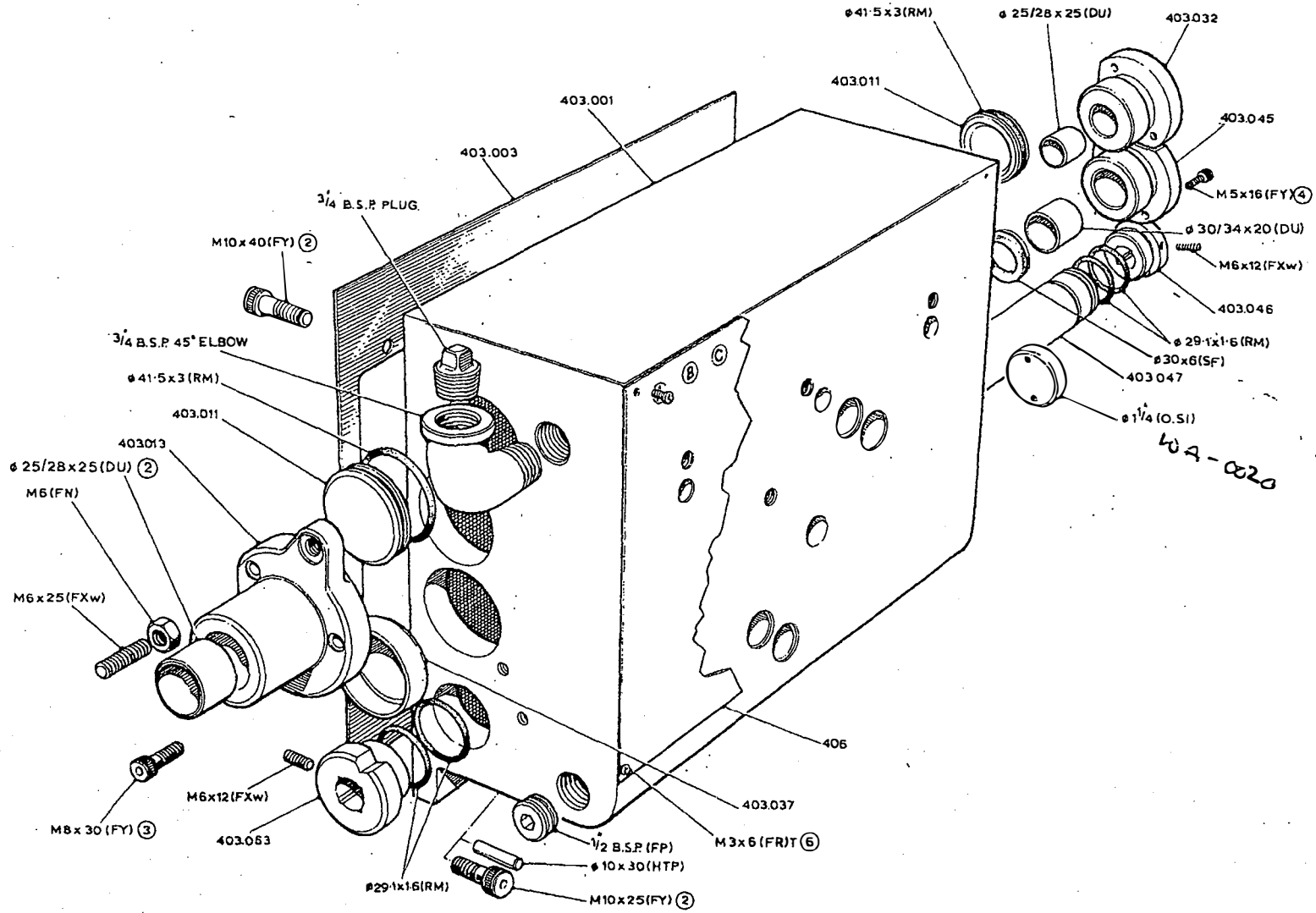
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 OUTL
 BLG

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 XK-0065 (8) 8
 XK-0090



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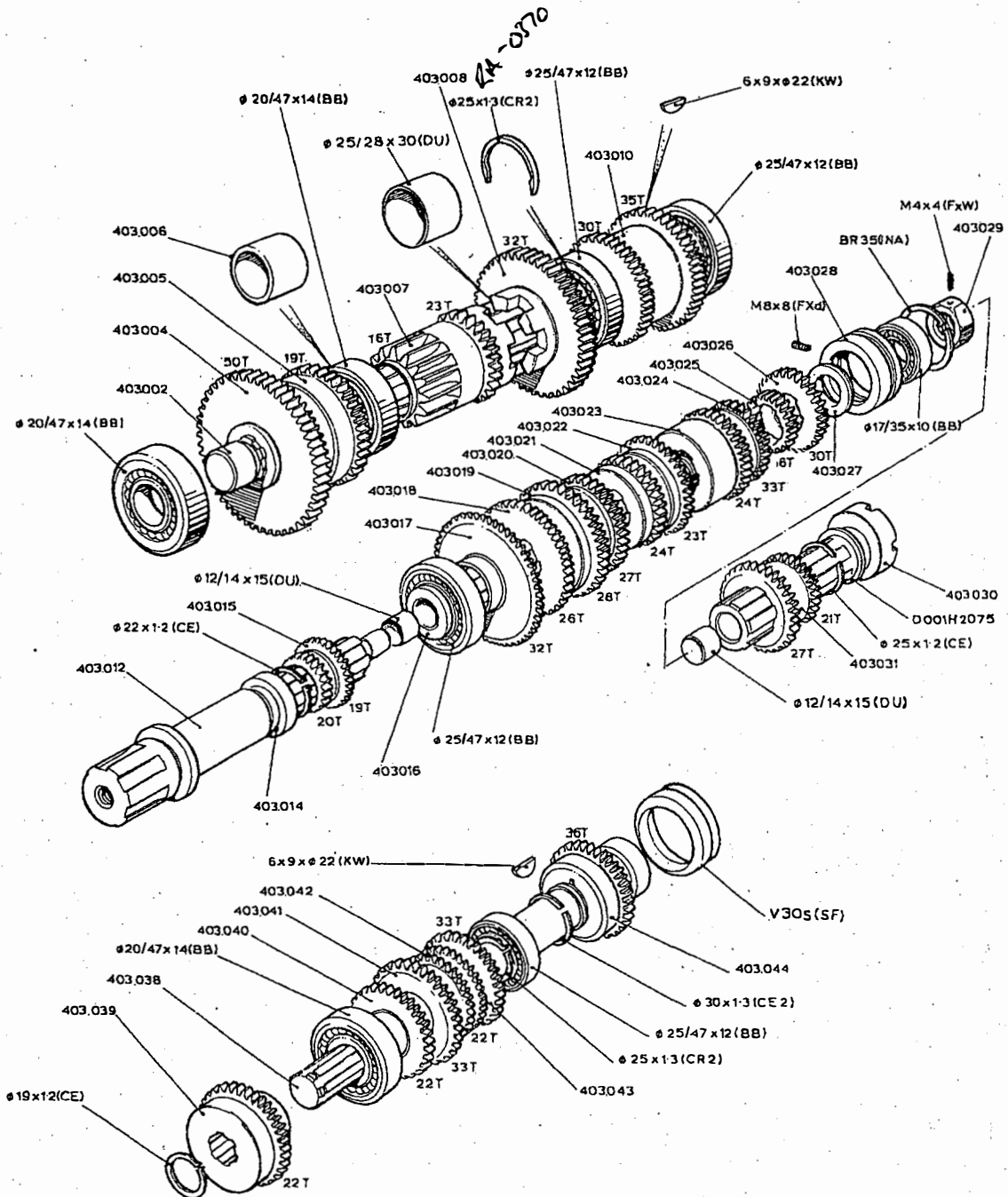


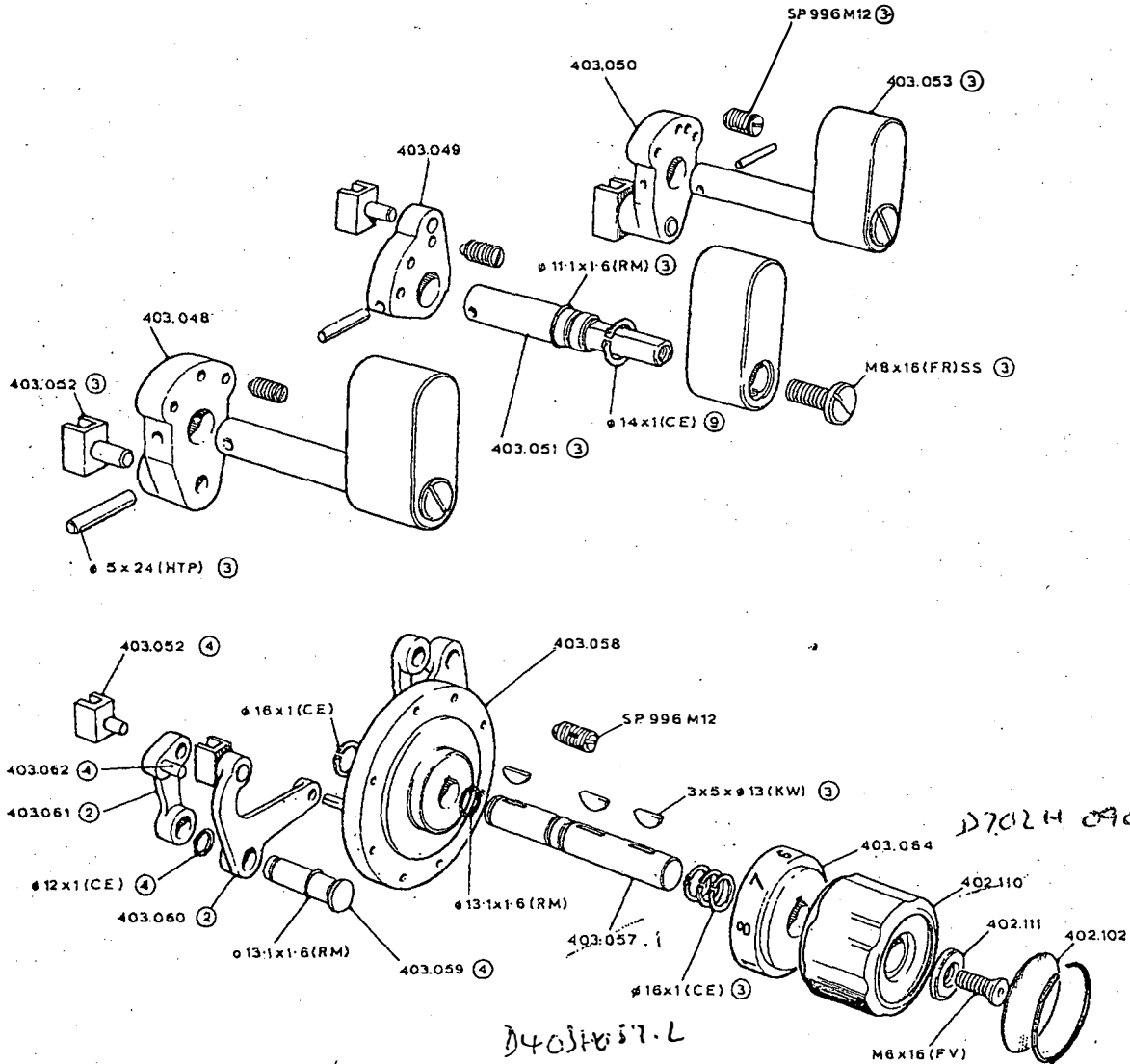
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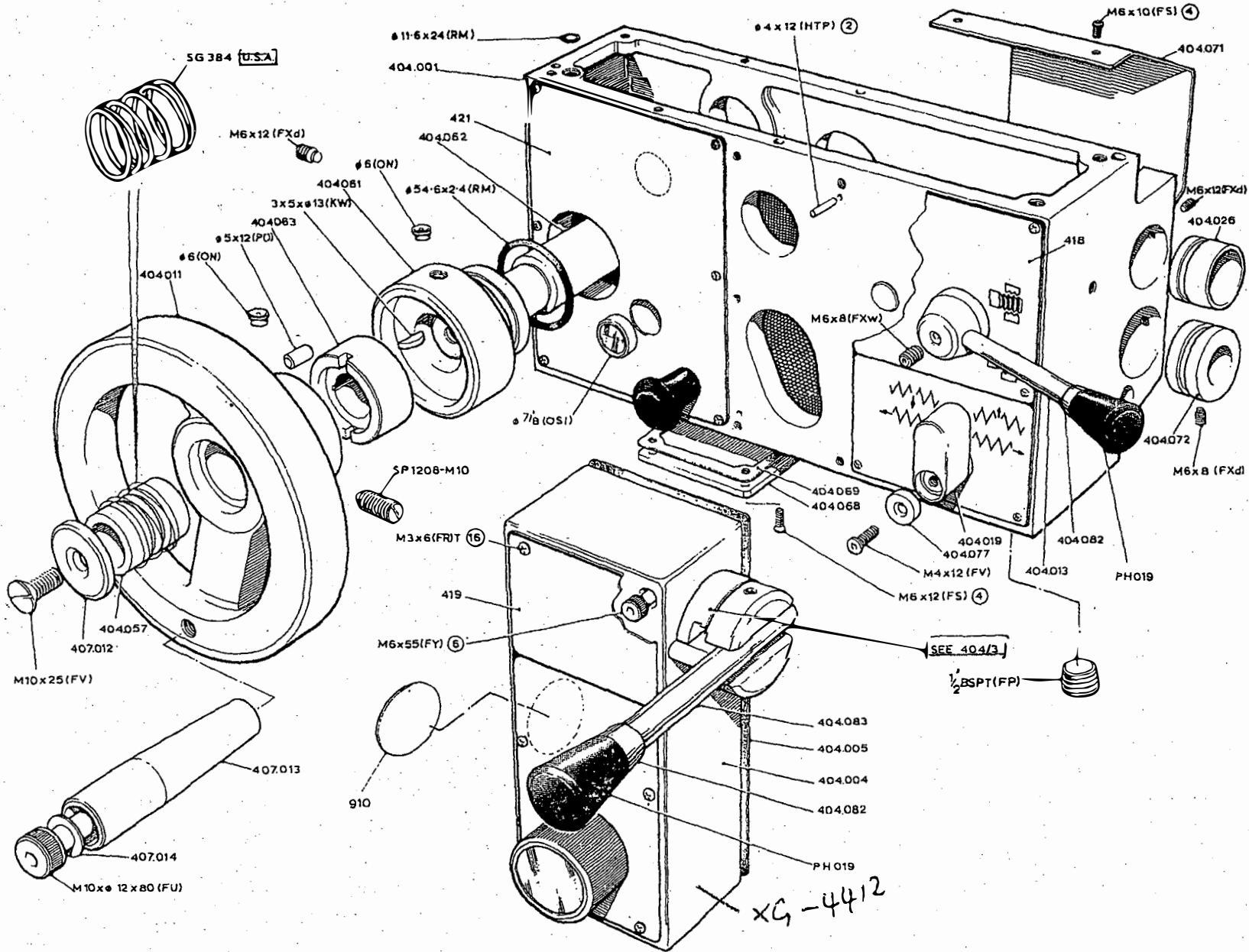




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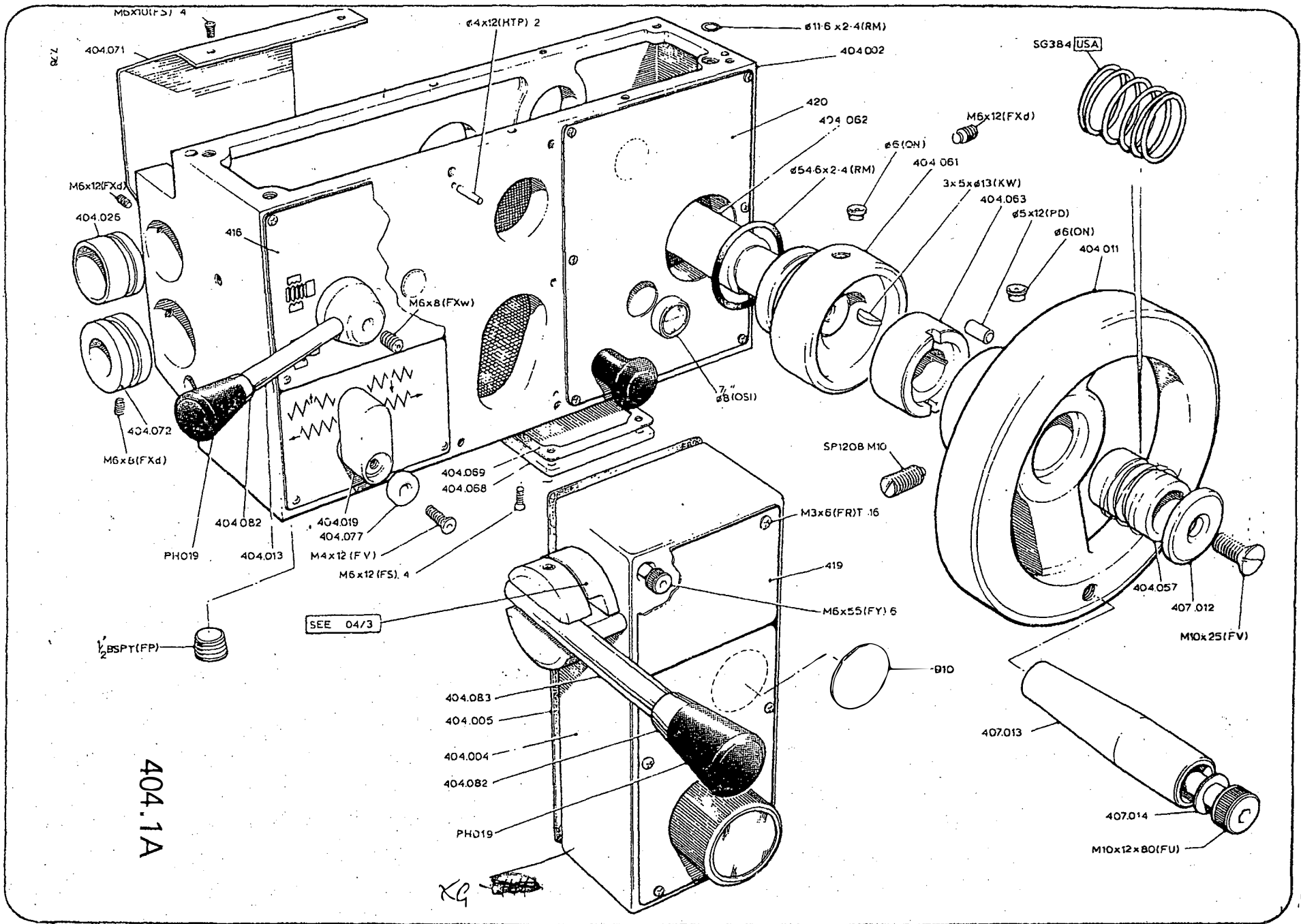
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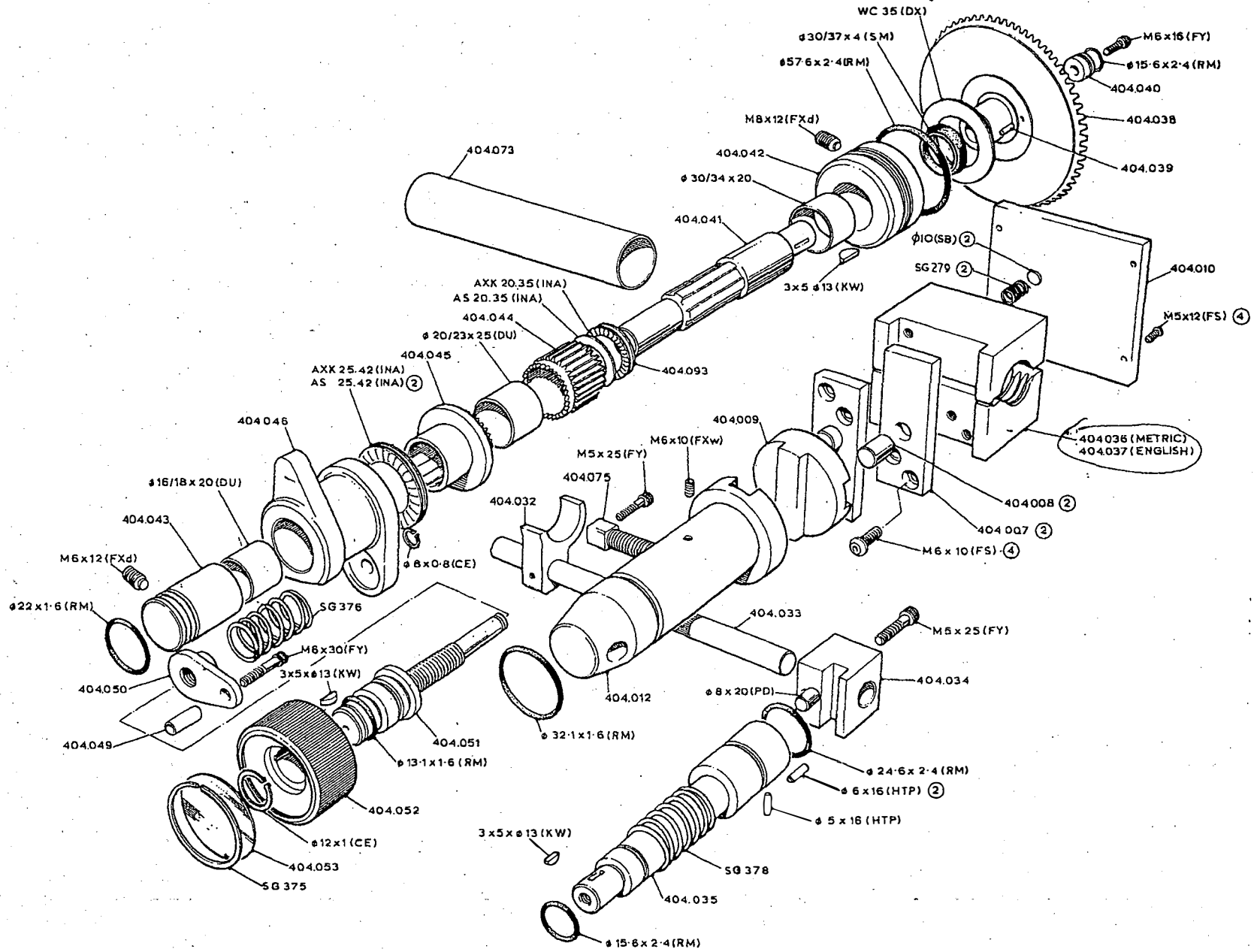
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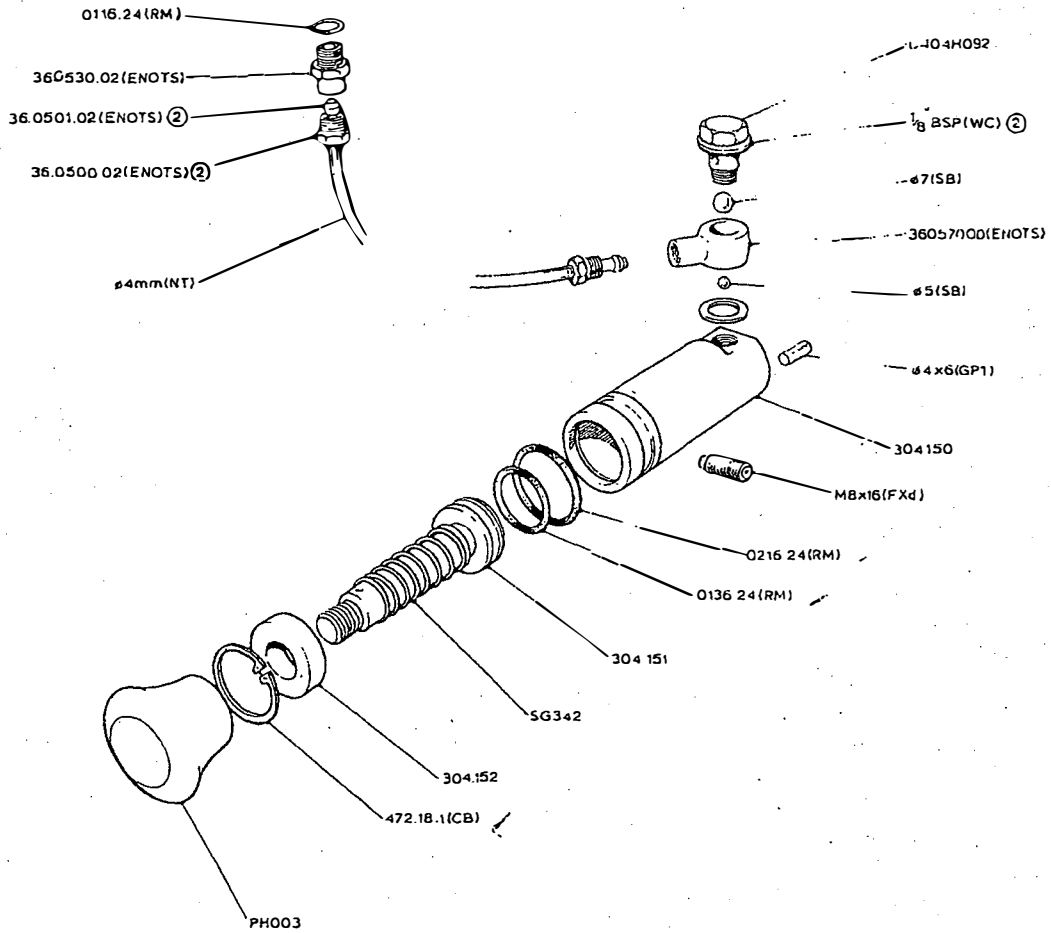
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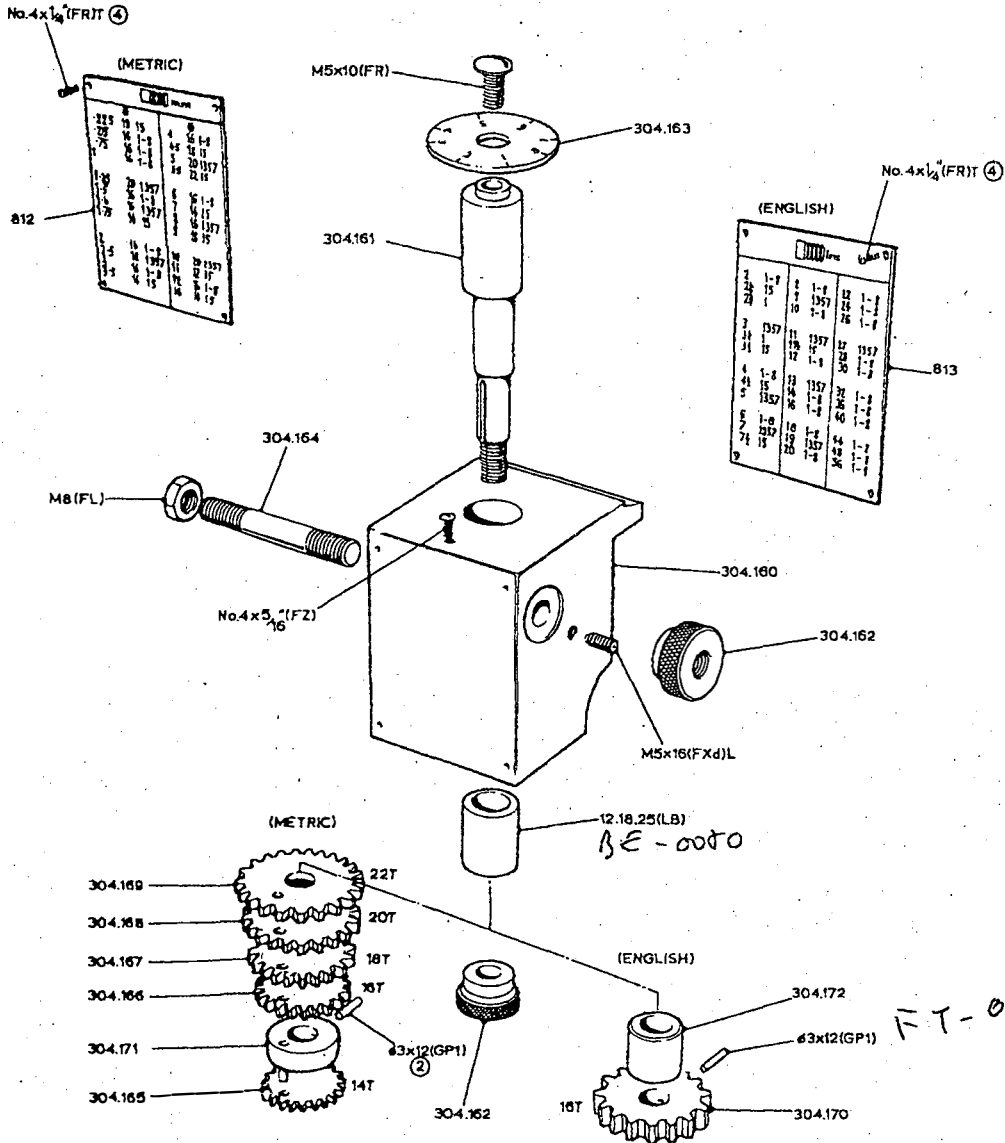
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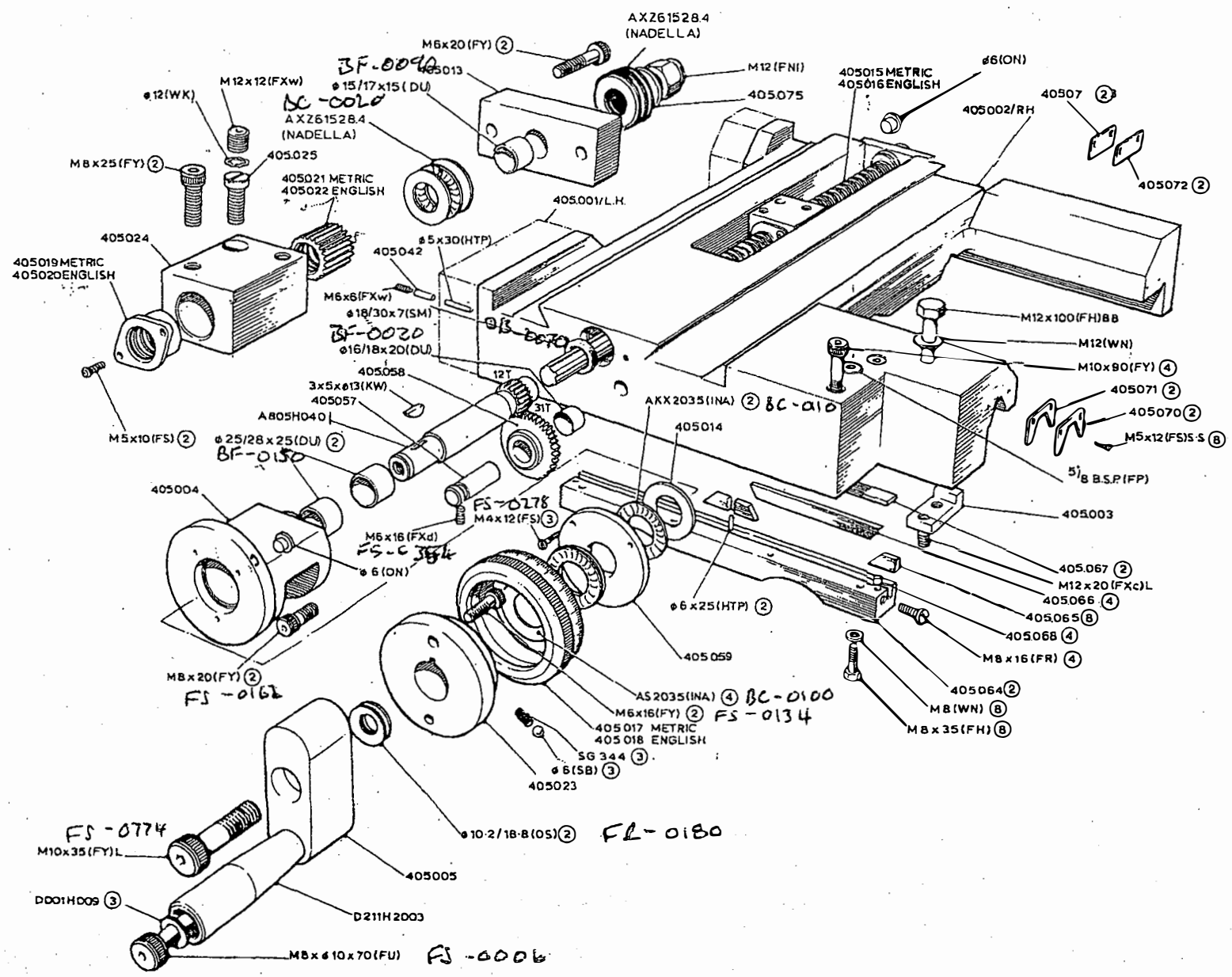
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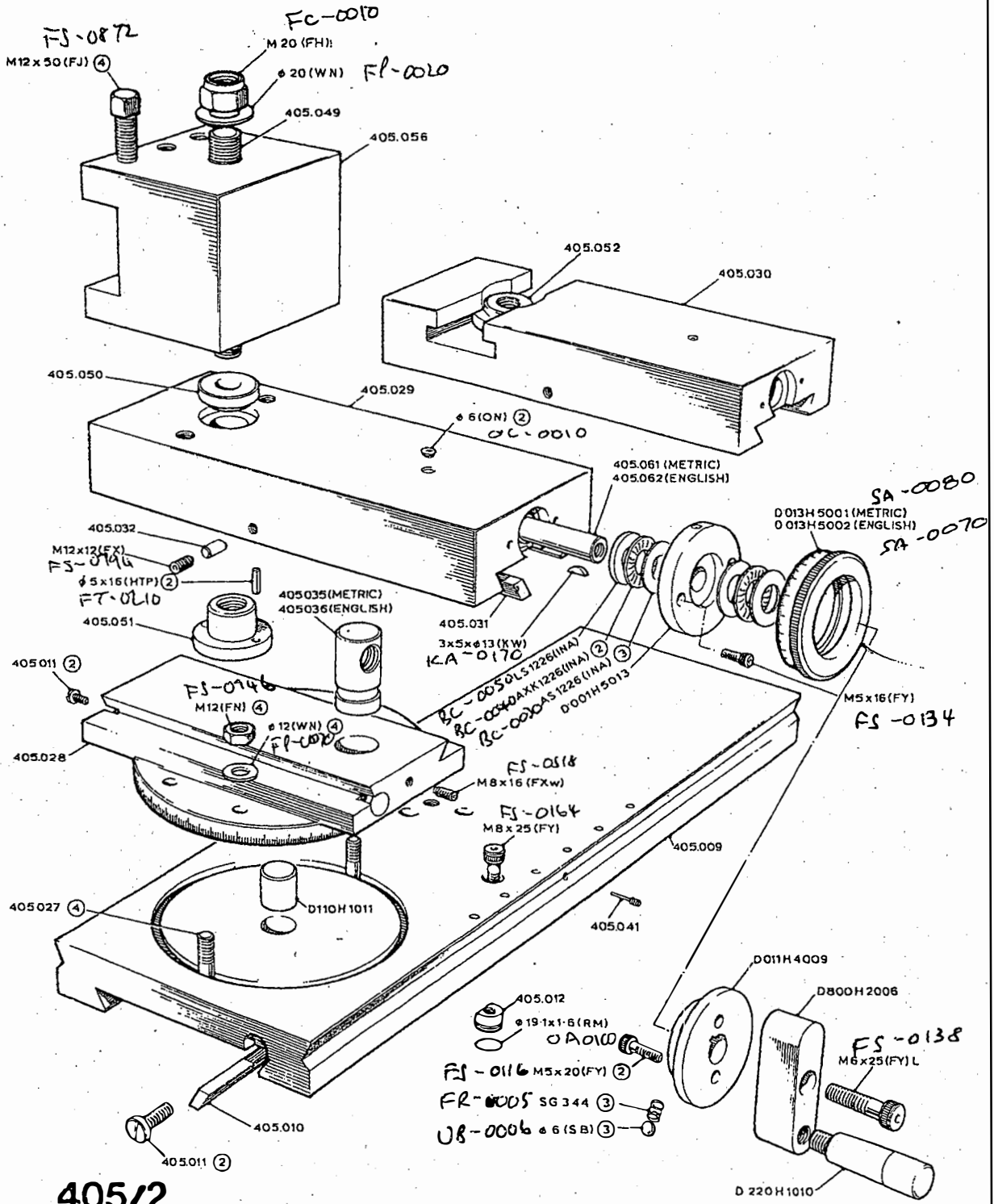




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M400

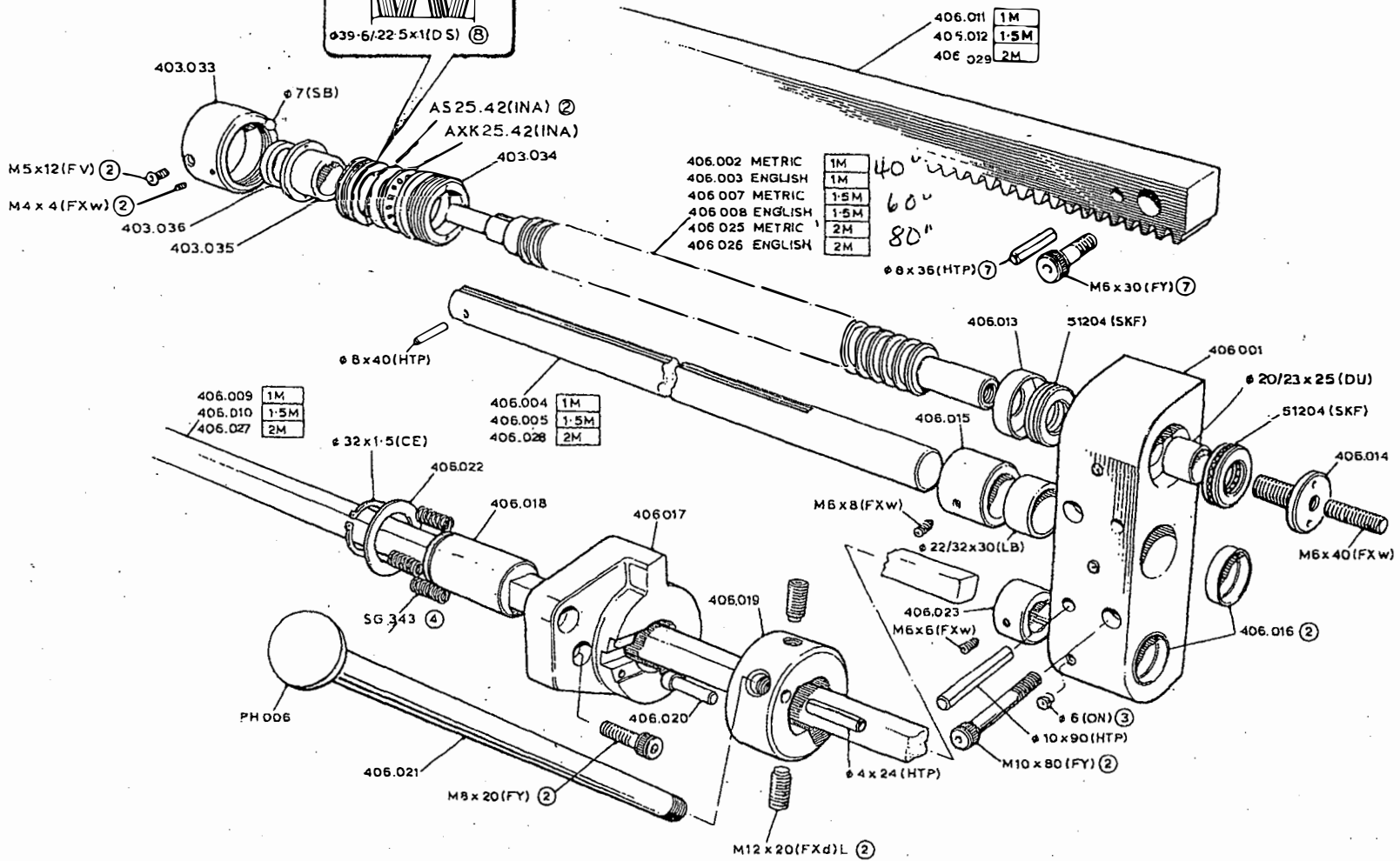
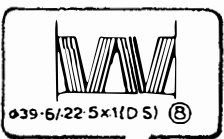


405/2

405/2

FL-0170

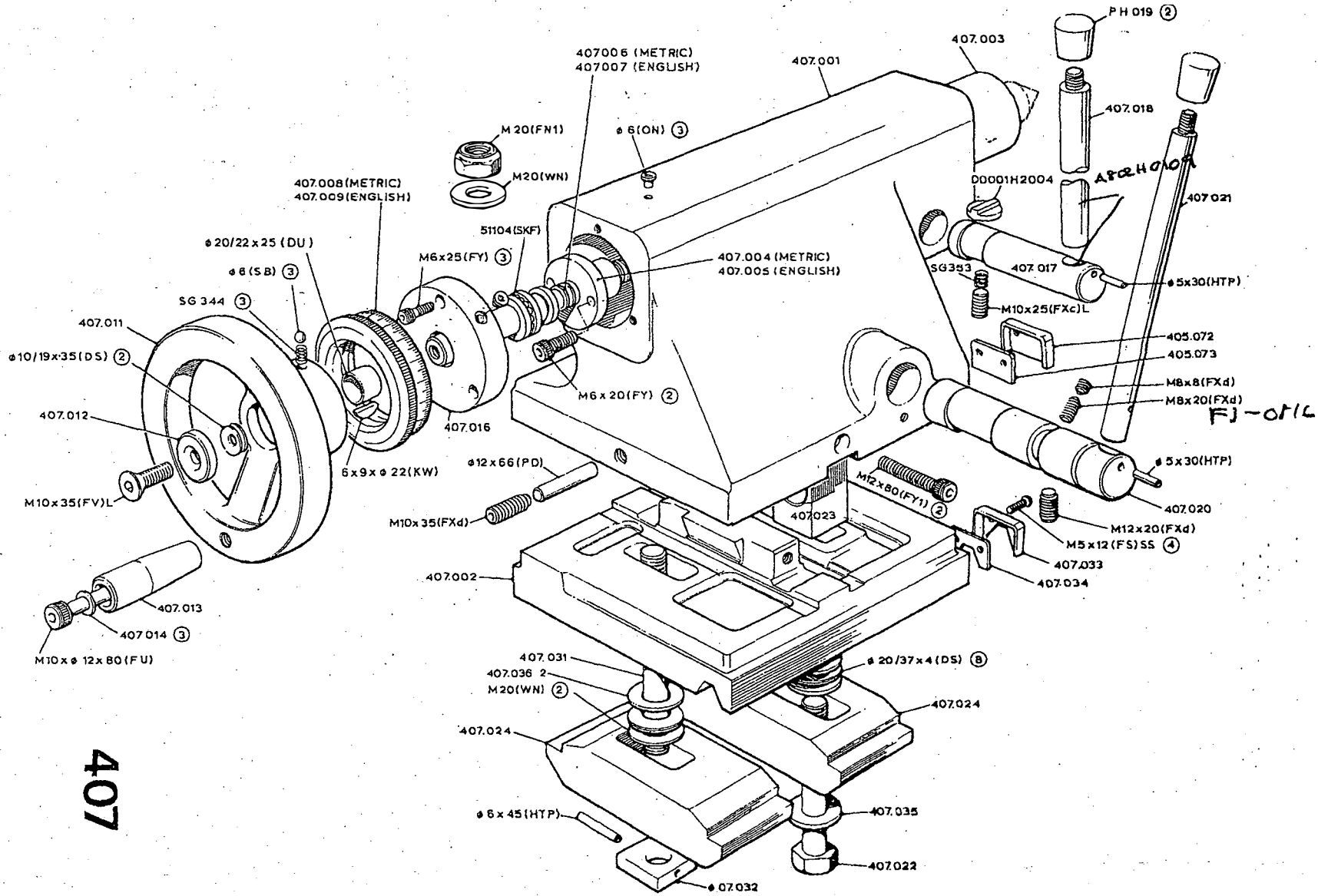
479



53

406

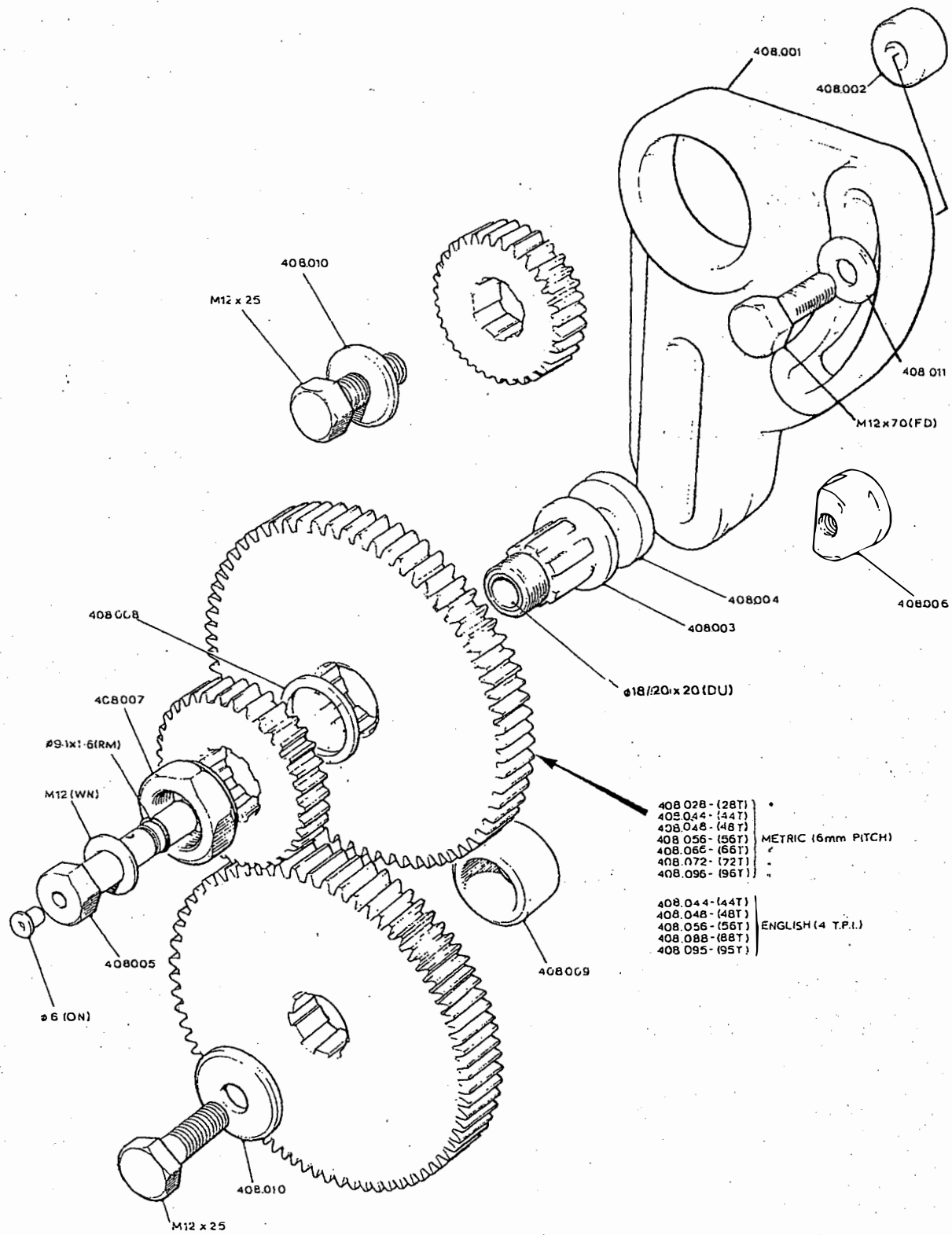
M400



407

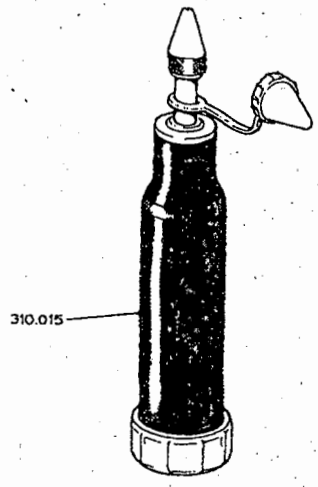
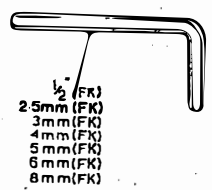
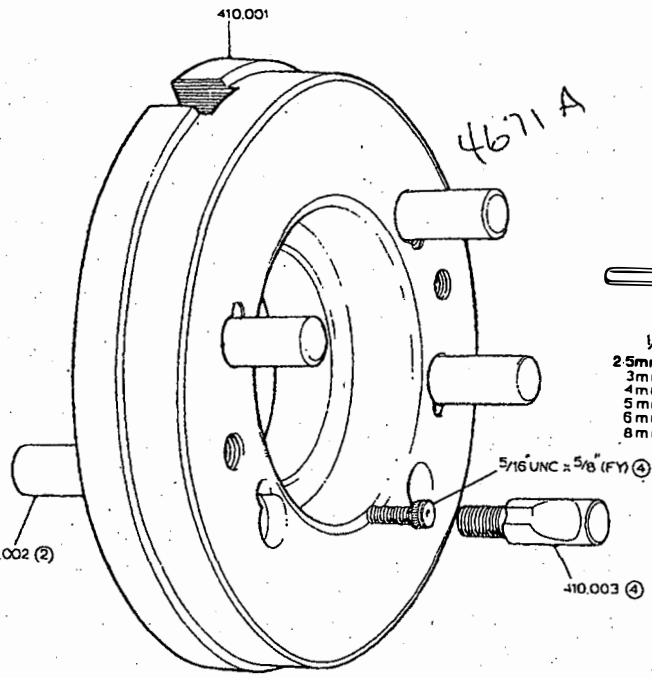
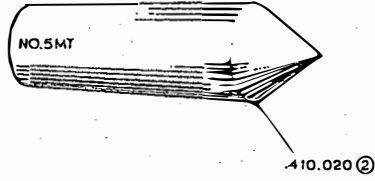
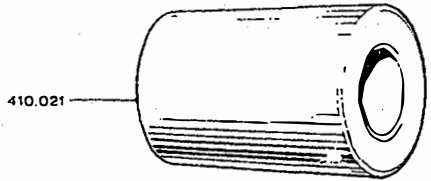
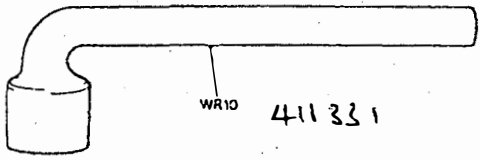
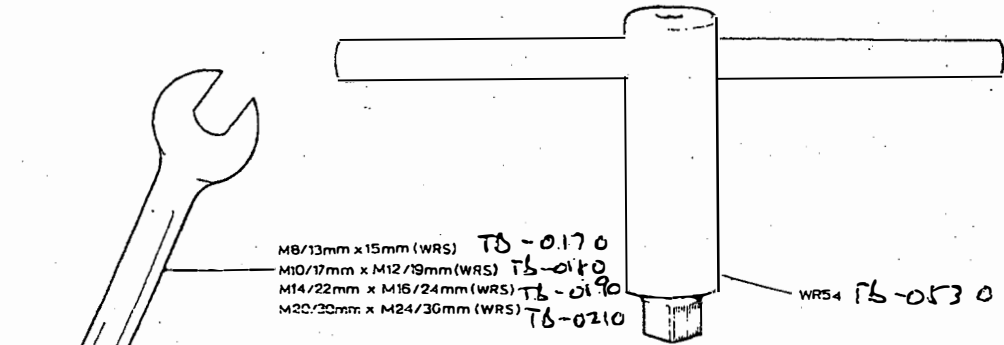
M400

M400



- | | |
|-----------------|--------------------|
| 408.028 - (28T) | * |
| 408.044 - (44T) | |
| 408.048 - (48T) | |
| 408.056 - (56T) | METRIC (6mm PITCH) |
| 408.066 - (66T) | |
| 408.072 - (72T) | |
| 408.096 - (96T) | |
| | |
| 408.044 - (44T) | |
| 408.048 - (48T) | ENGLISH (4 T.P.I.) |
| 408.056 - (56T) | |
| 408.088 - (88T) | |
| 408.095 - (95T) | |

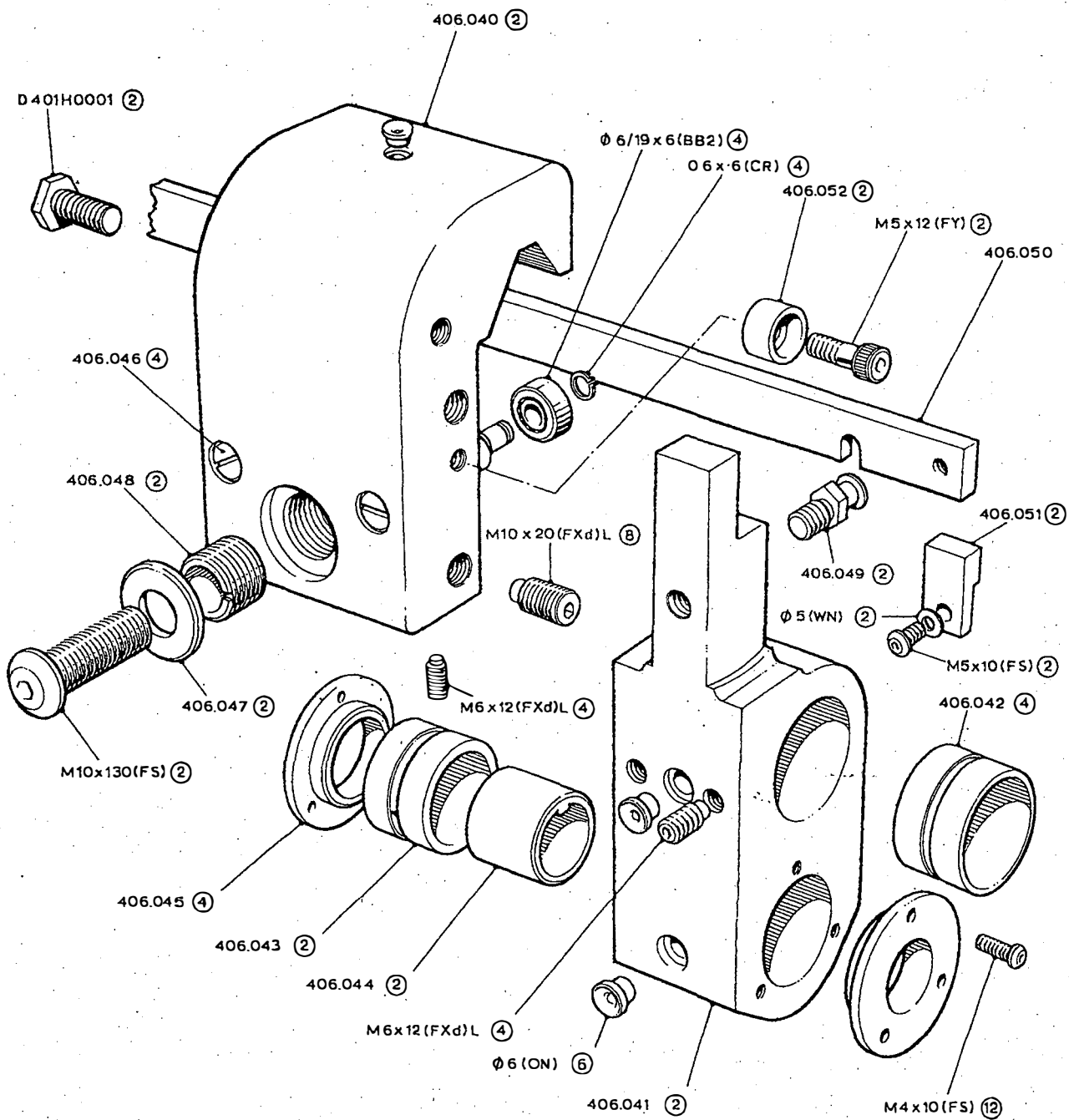
M400



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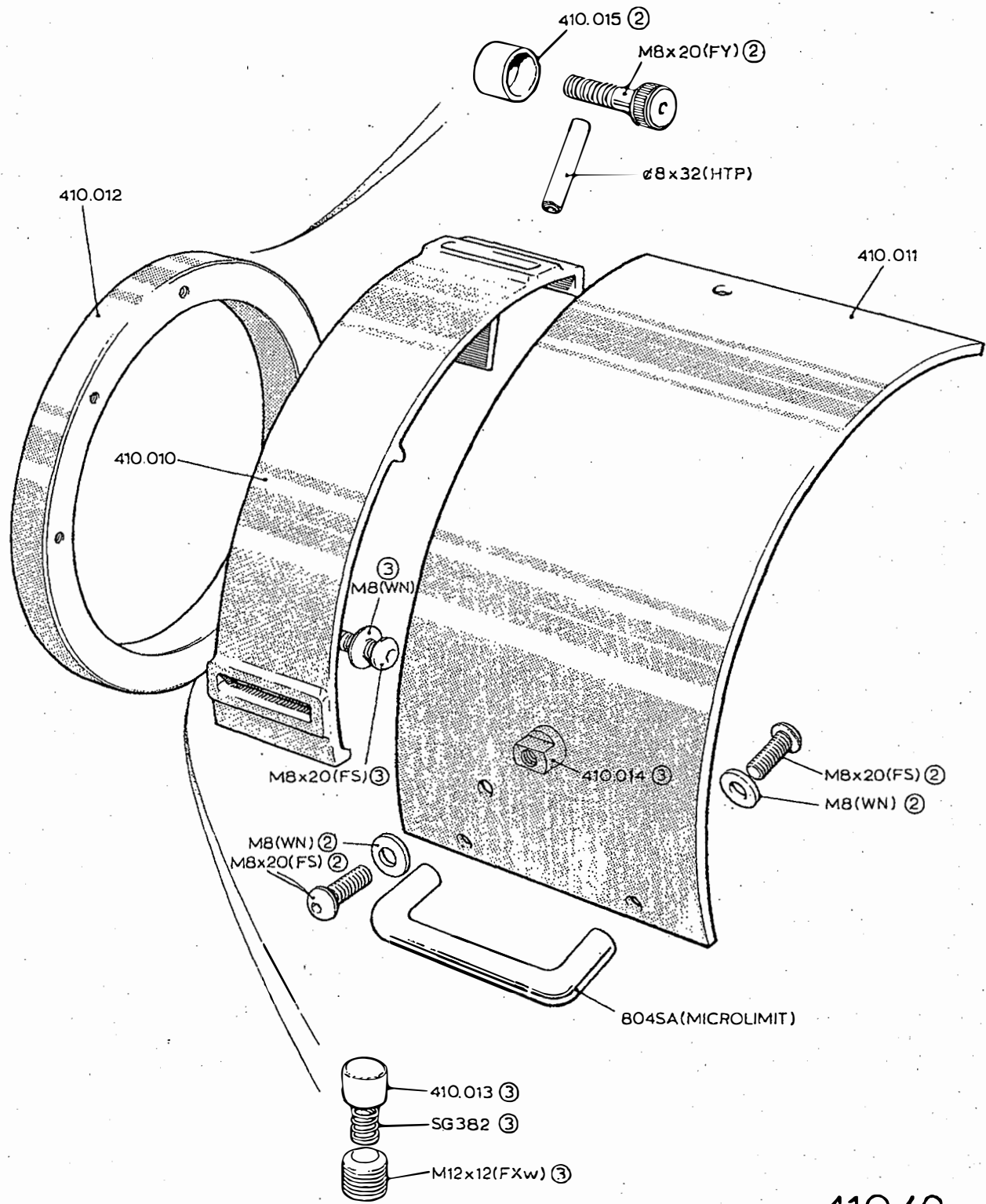
M400



406/2

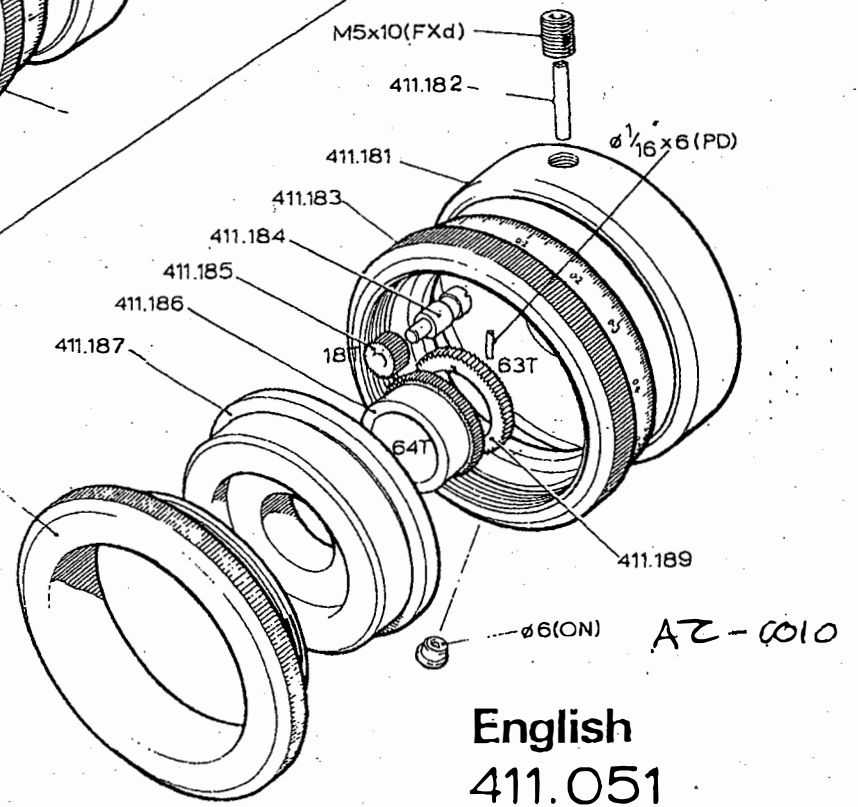
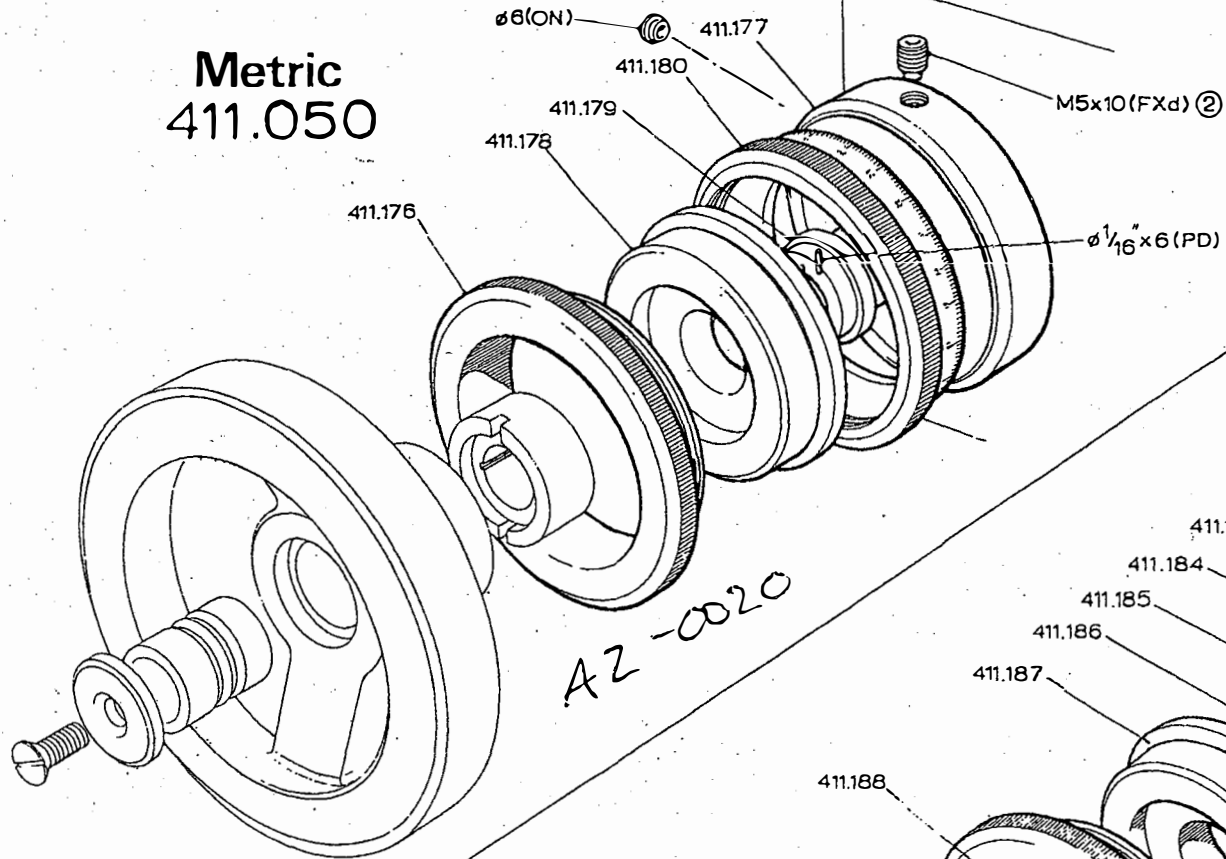
XG - 4210

M400



410/2

**Metric
411.050**



M400

M400

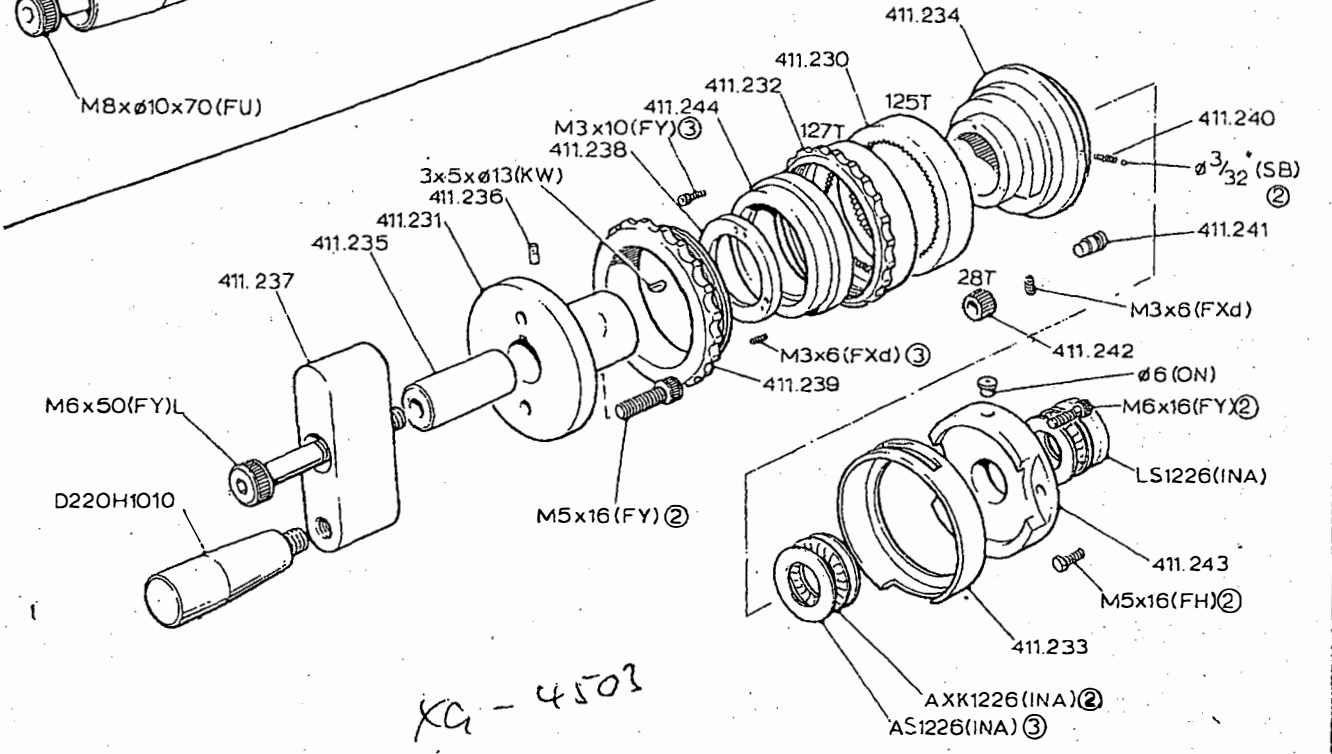
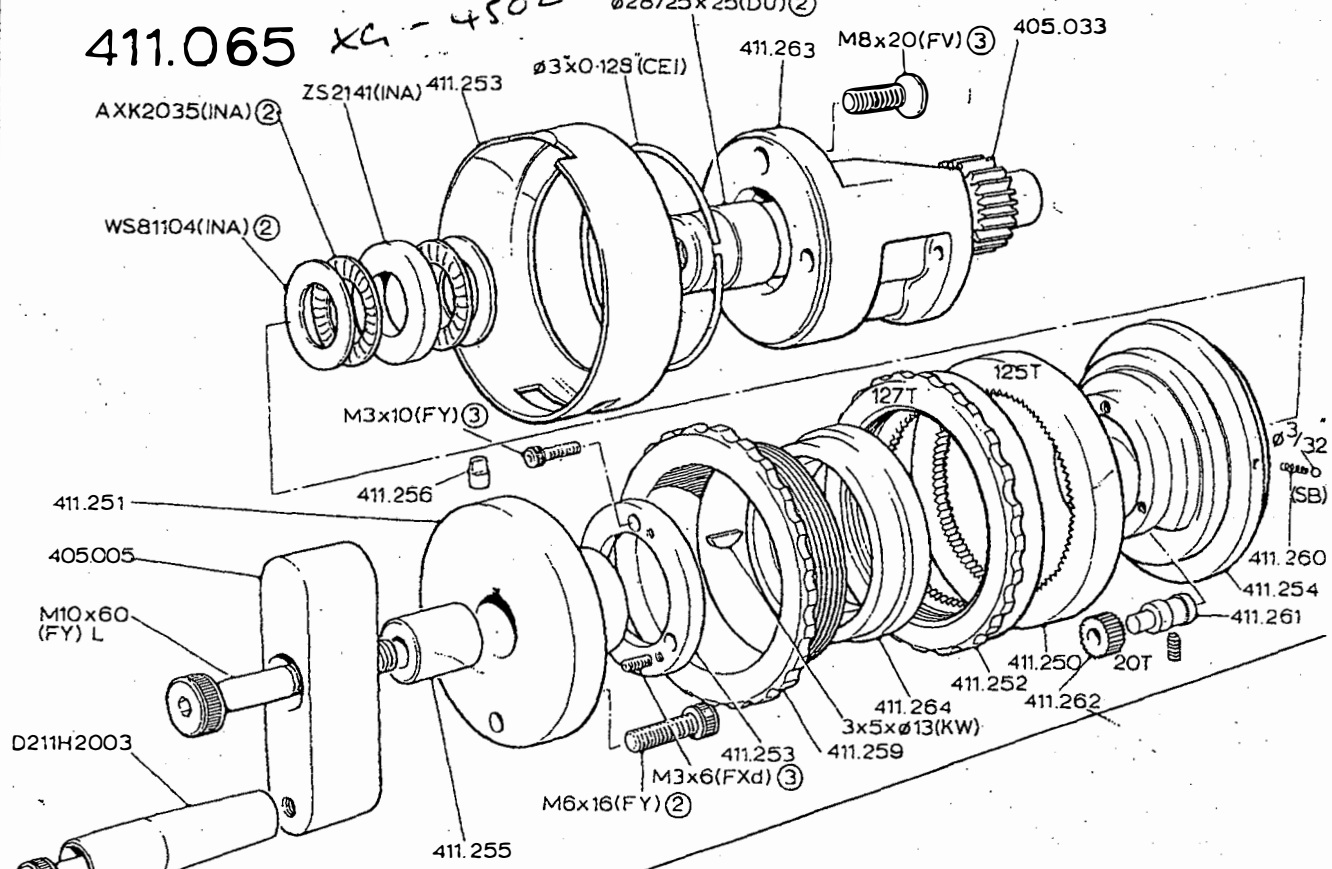
Obsolète Pinion

To Replace Setlow etc

XG-4506
XG-4502

M6T-ON
ON-M6T-
ø28/25x25(DU) ②

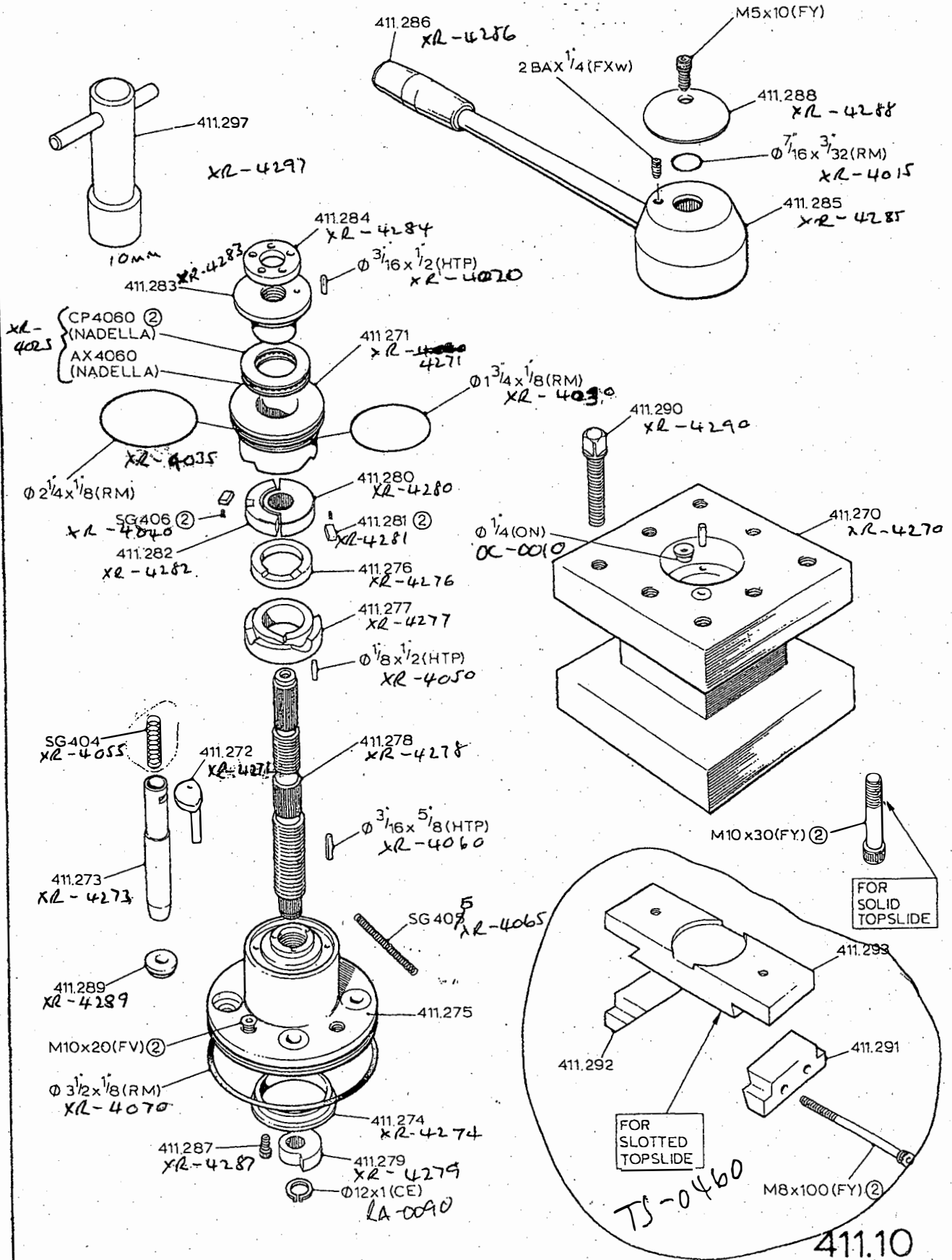
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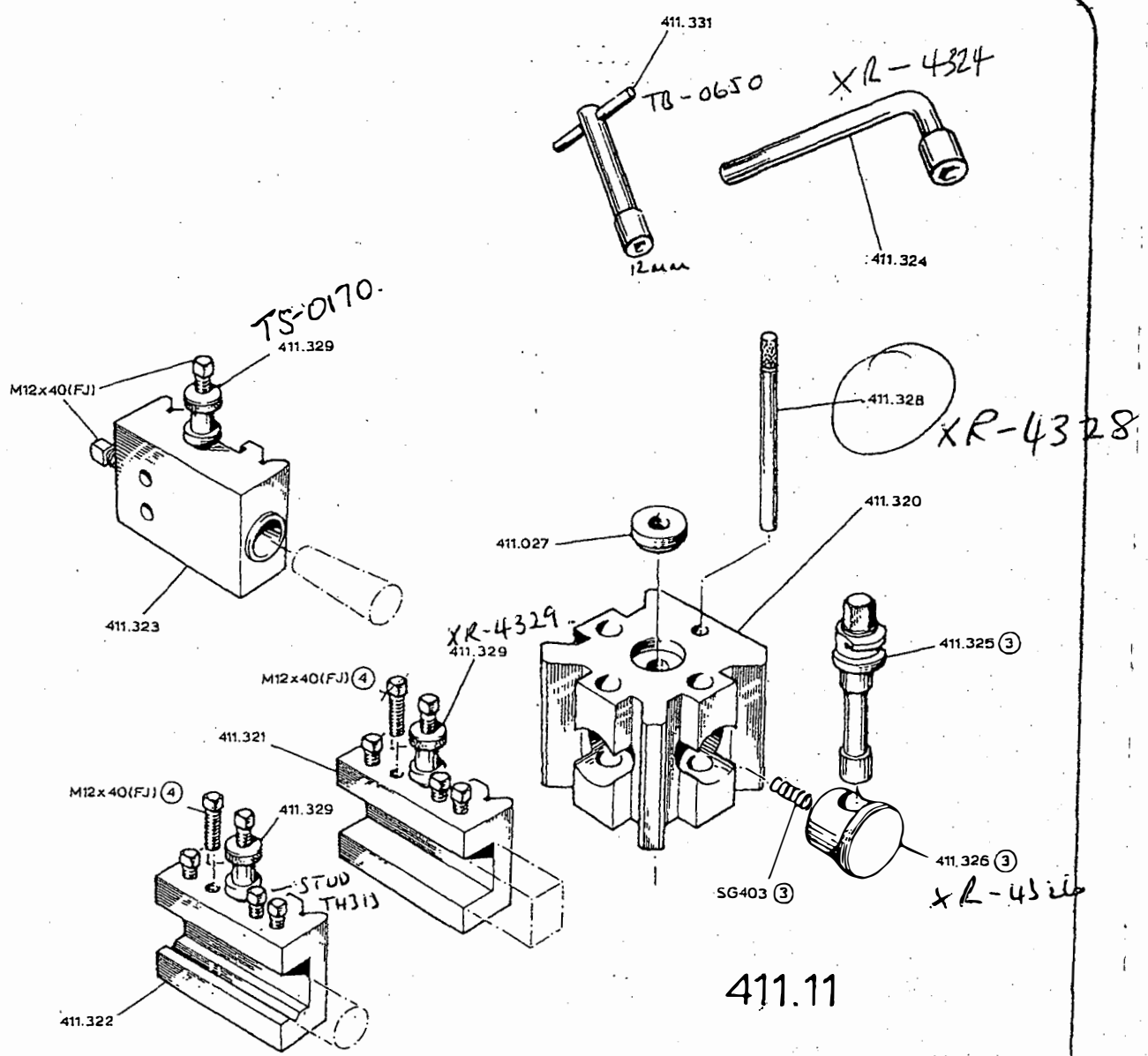


XG-4503

411.066

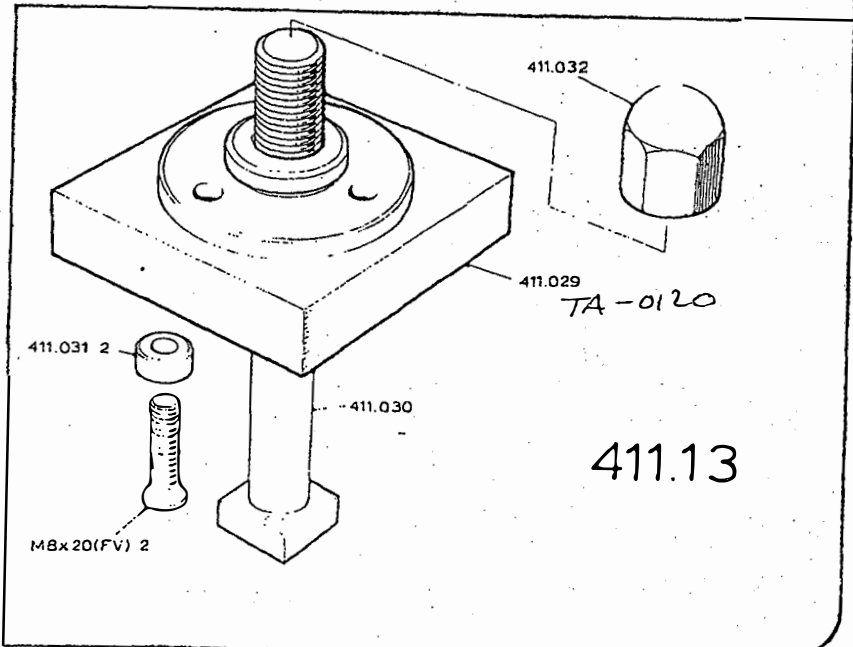
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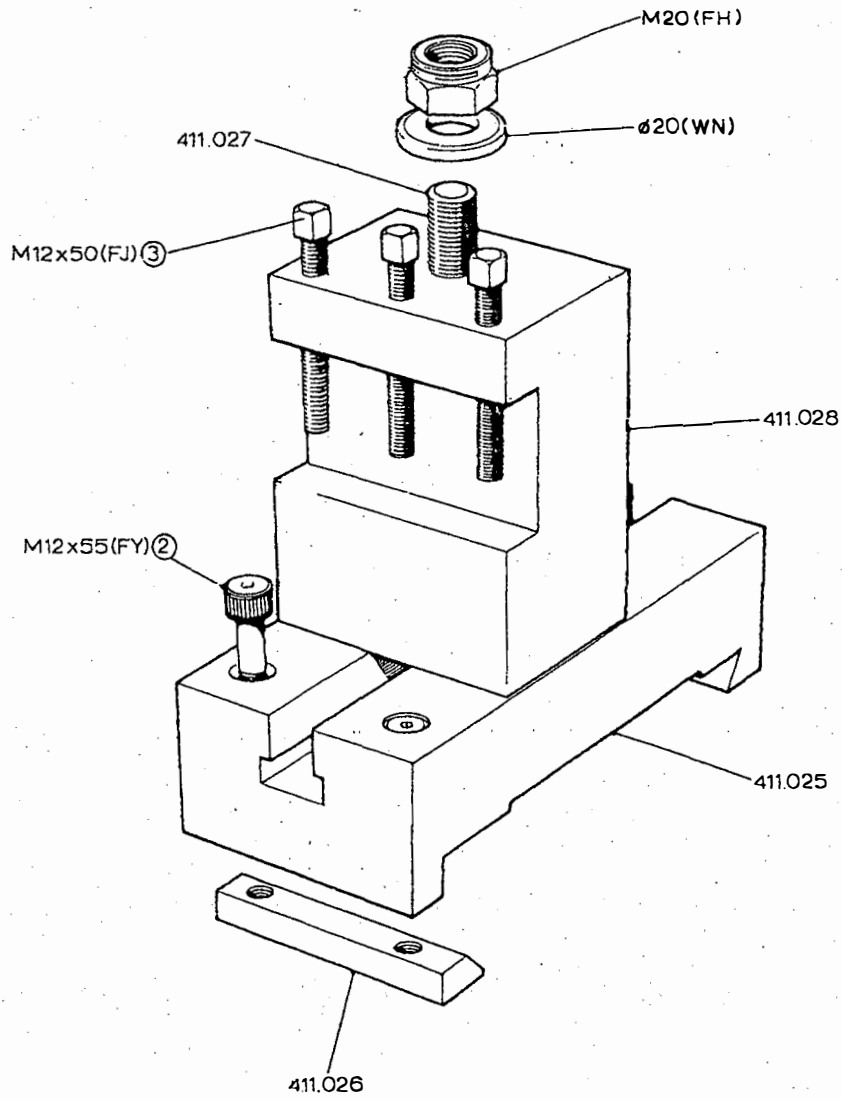


411.11

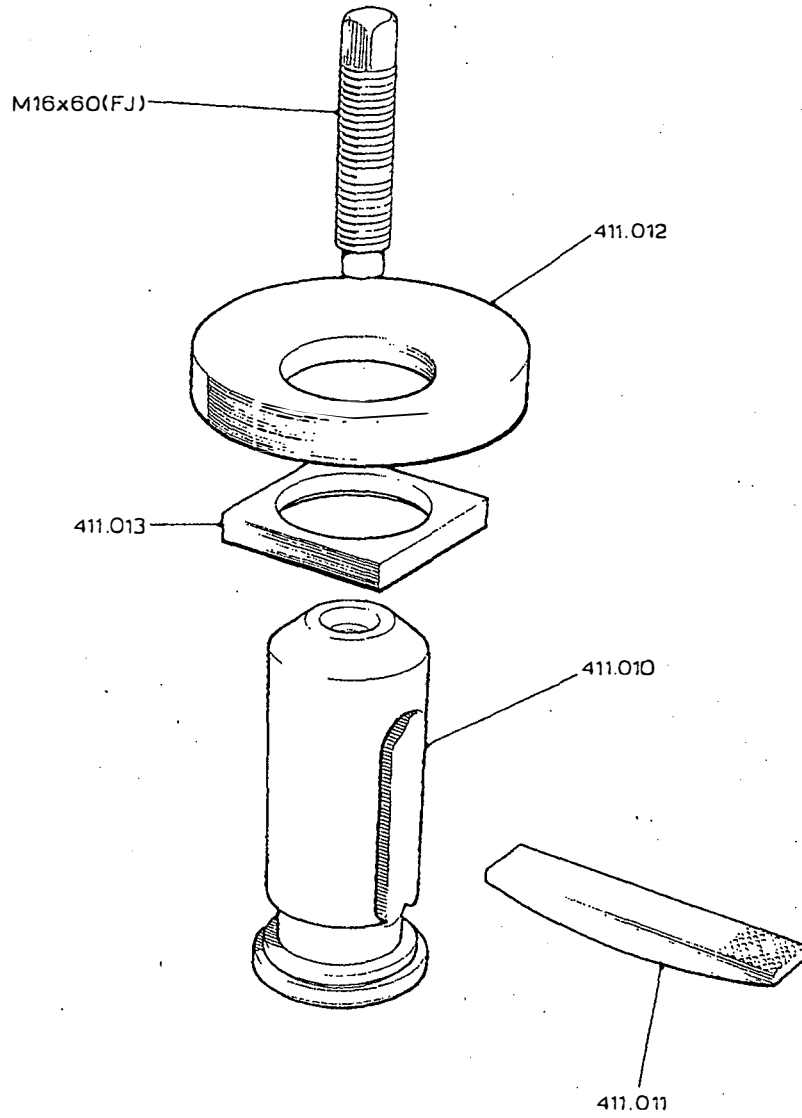
411.11-13



411.13



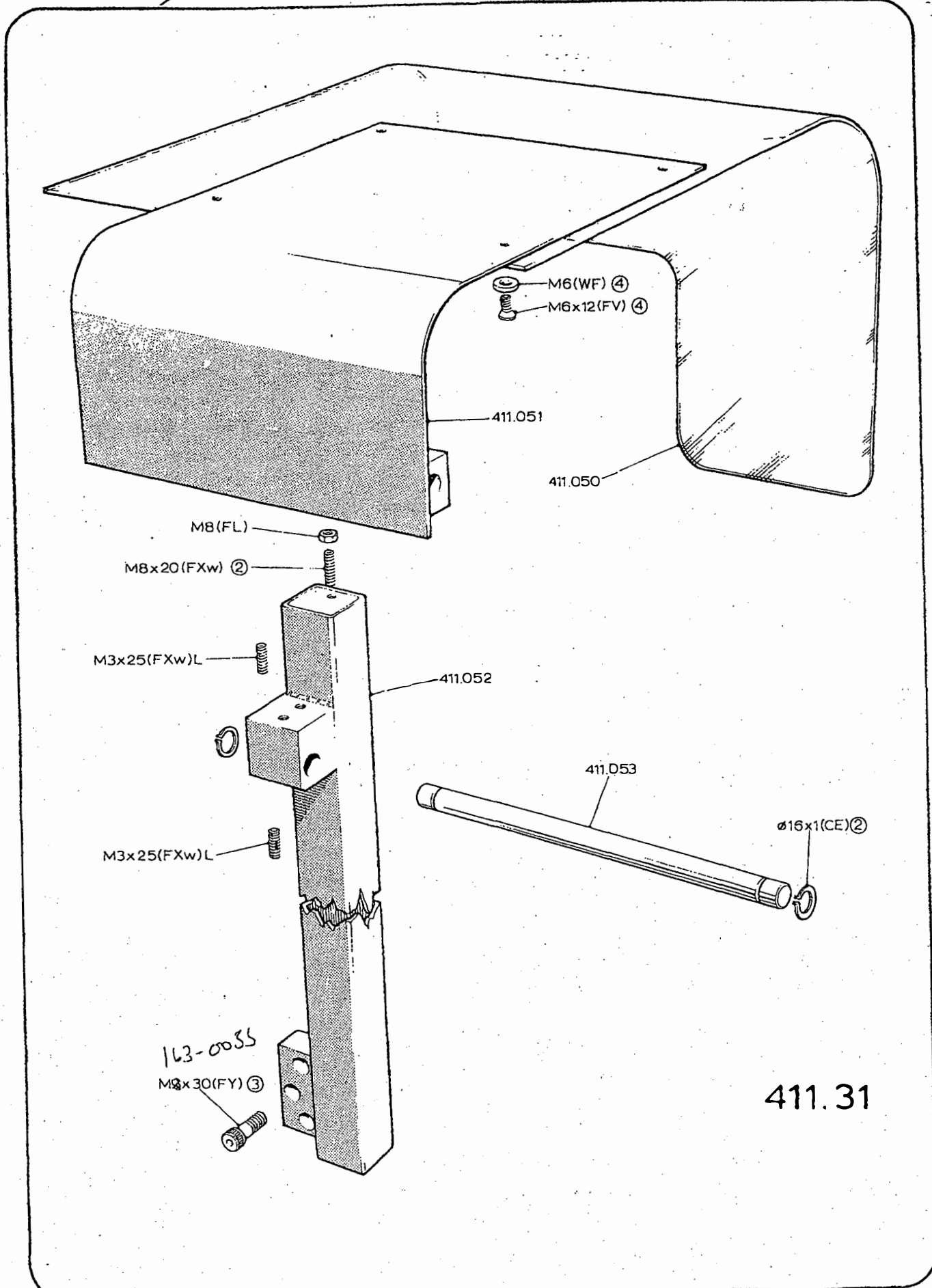
411.14



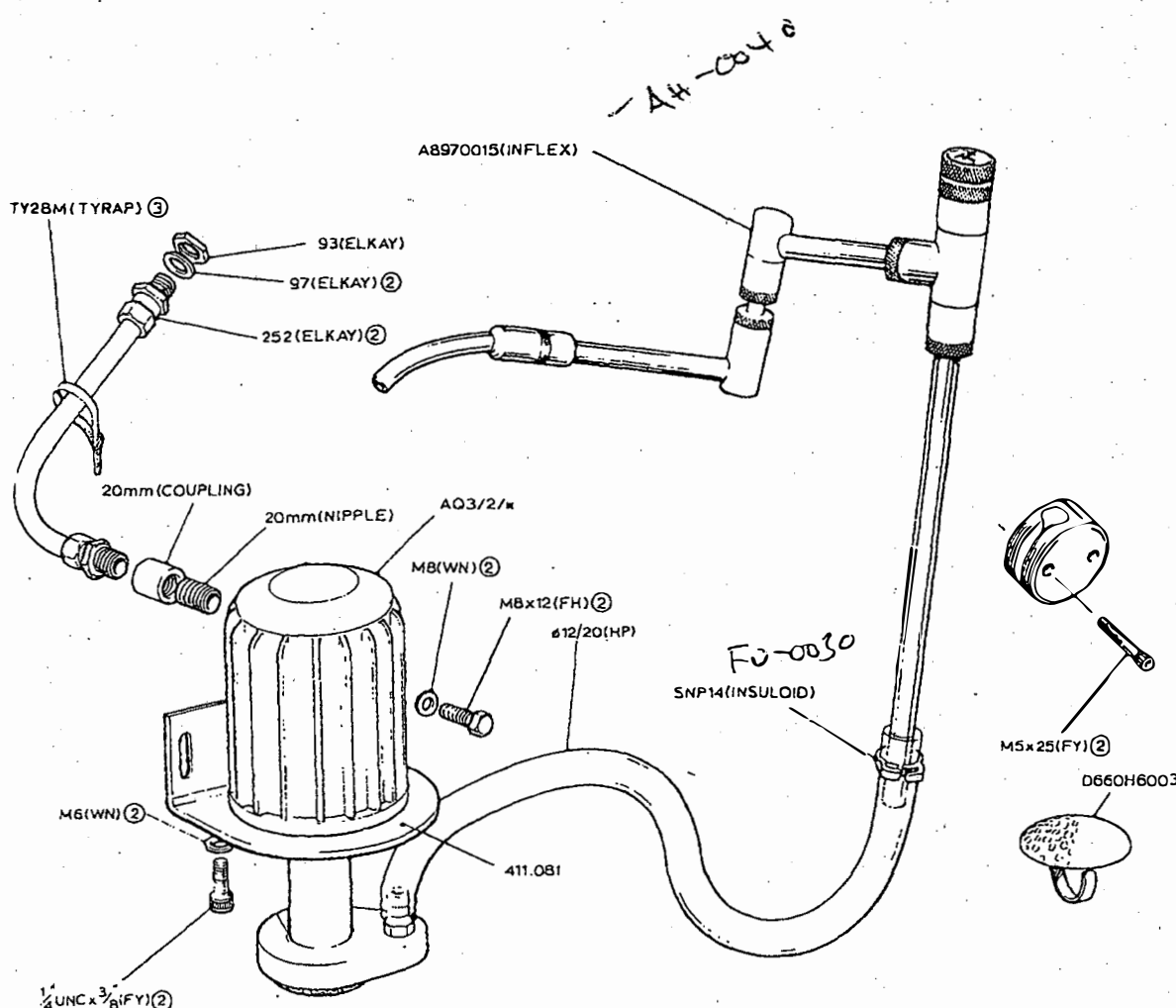
411.16

A-1
~~checked~~
~~checked~~

M400



411.31

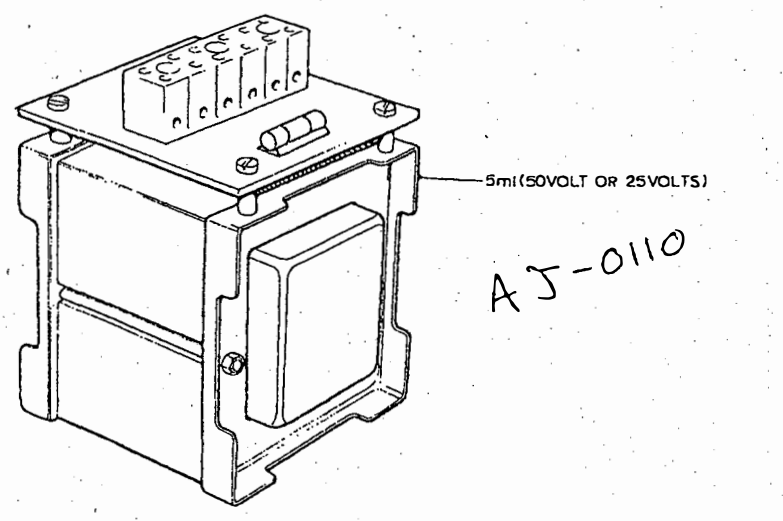
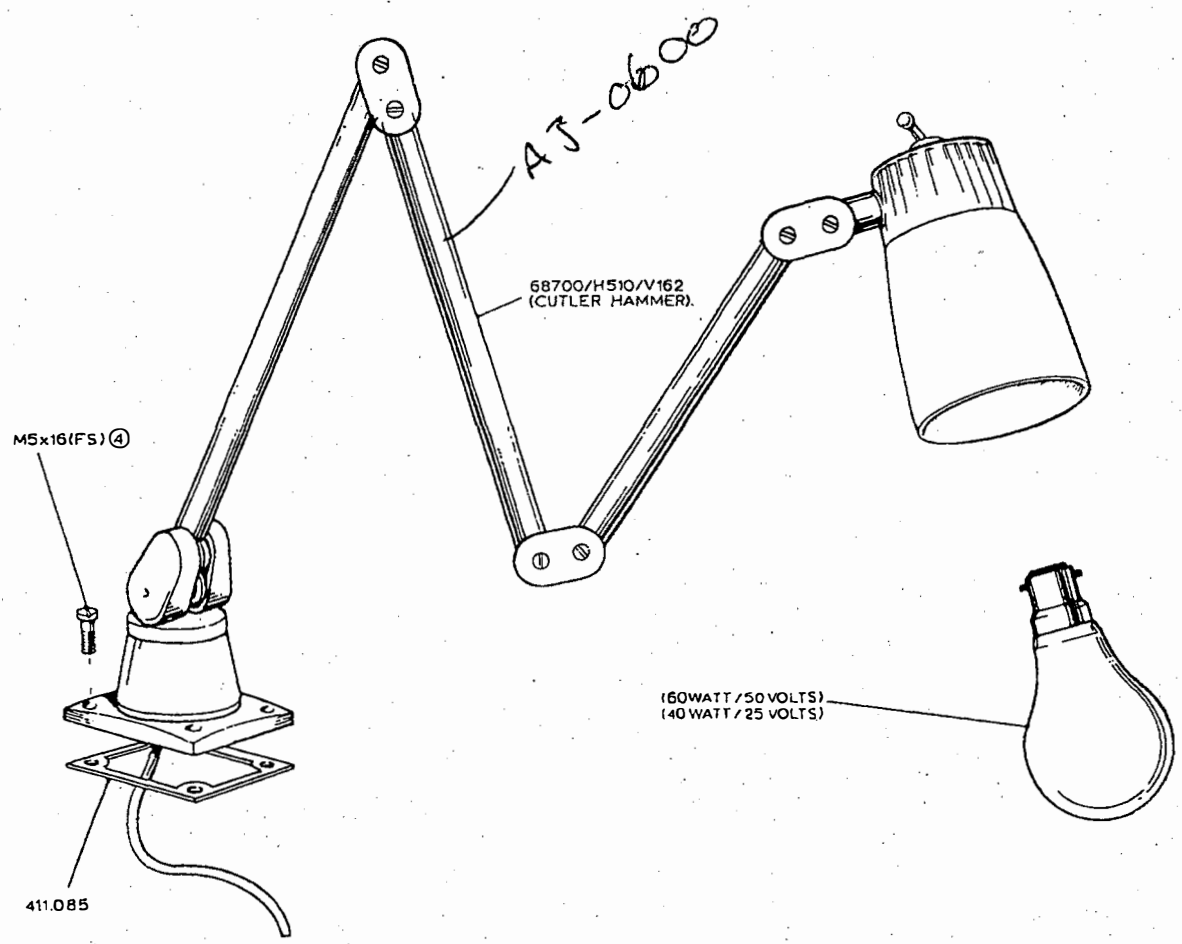


*STATE SUPPLY VOLTAGE

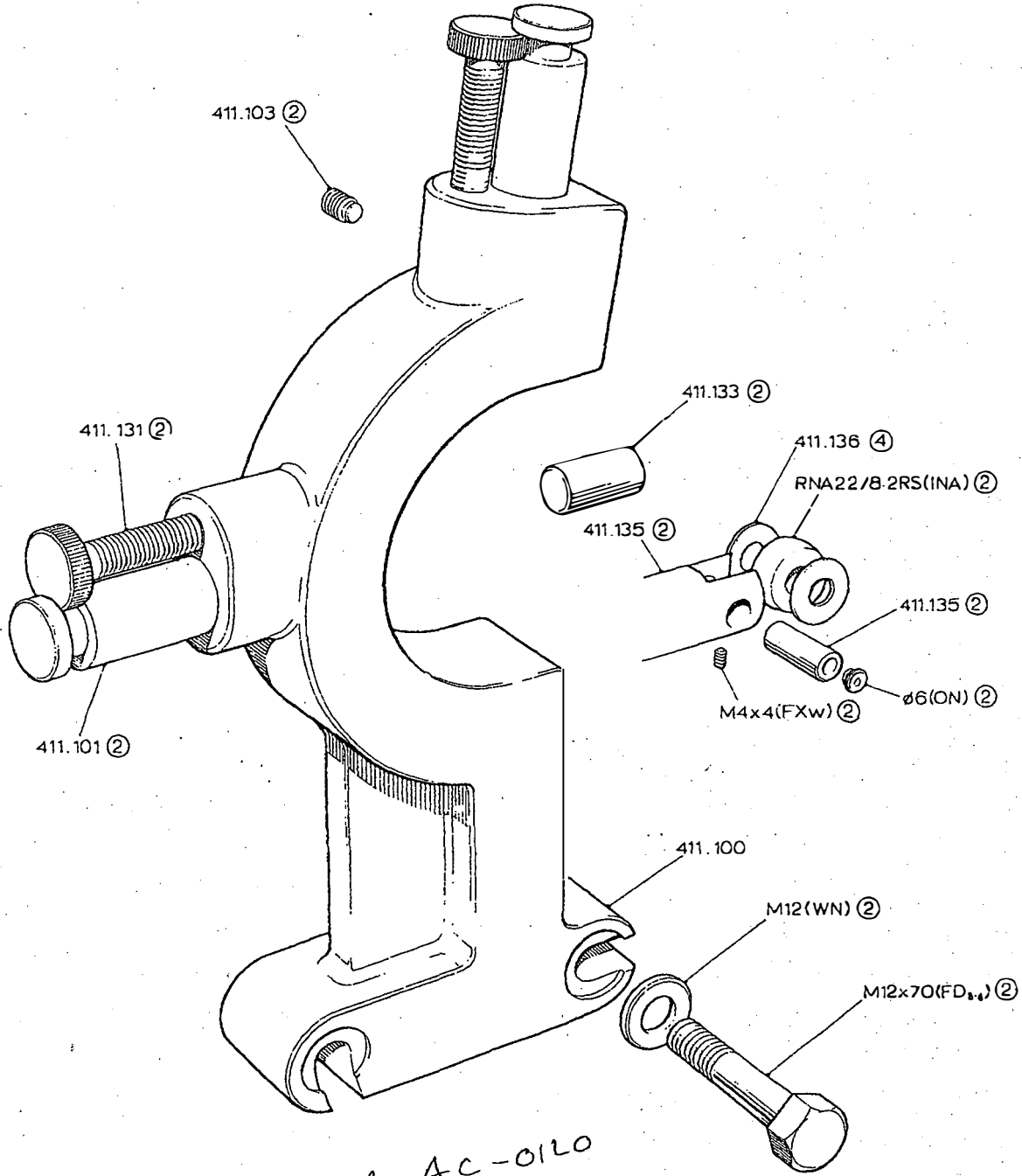
411.35

J004:MS00

M400



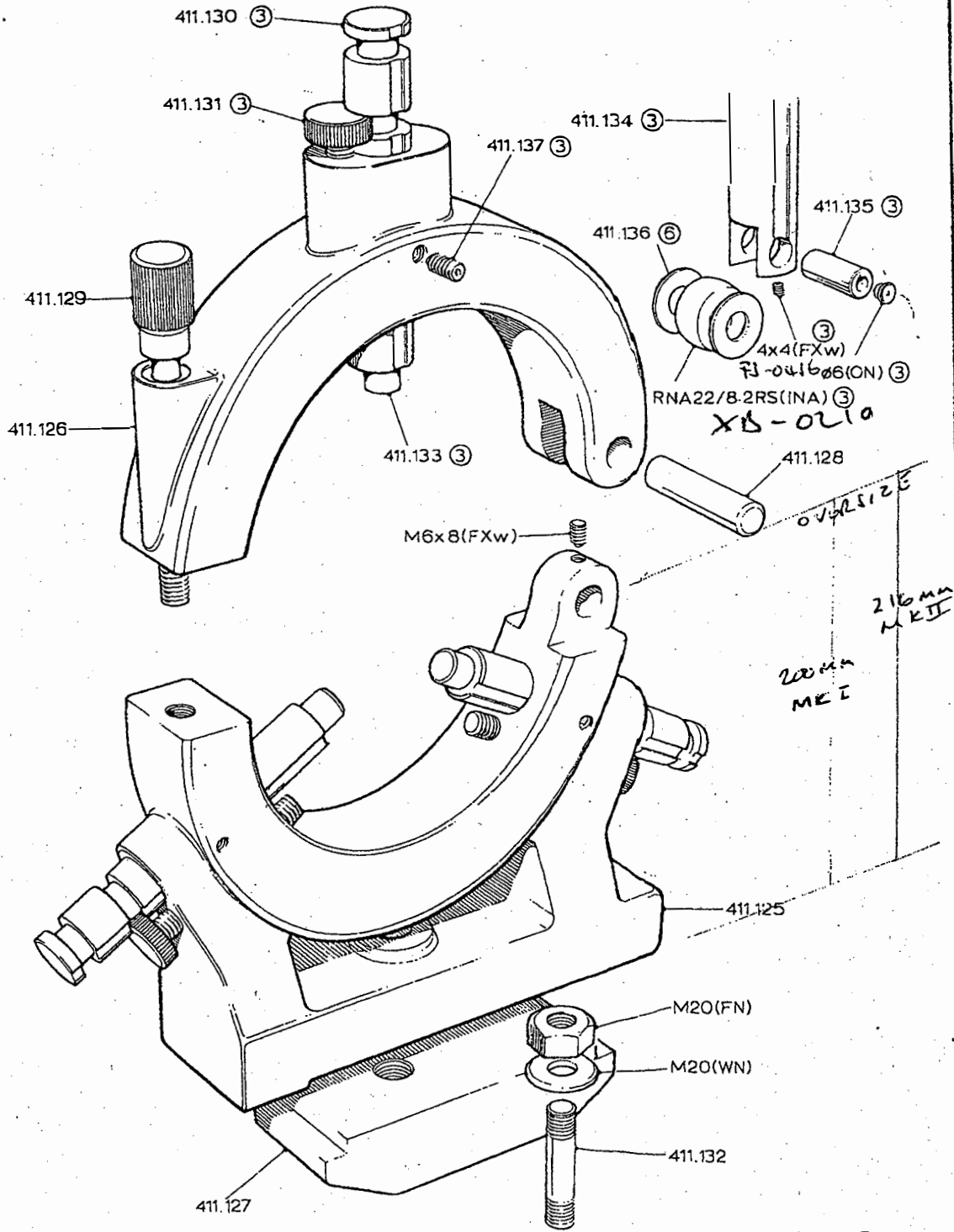
411.38



Low AC-0120

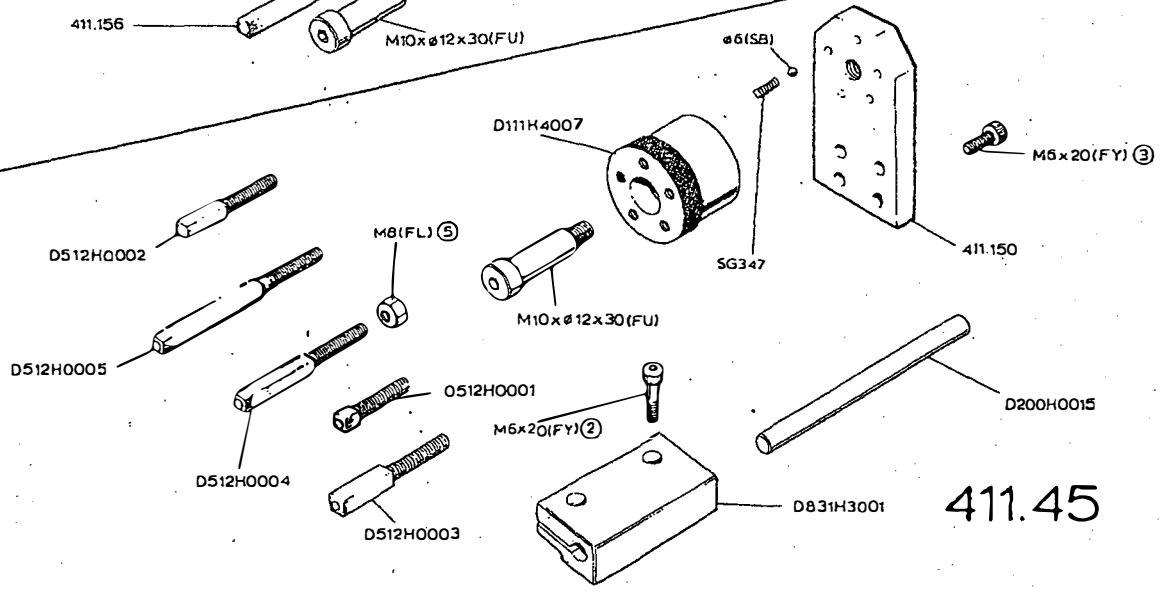
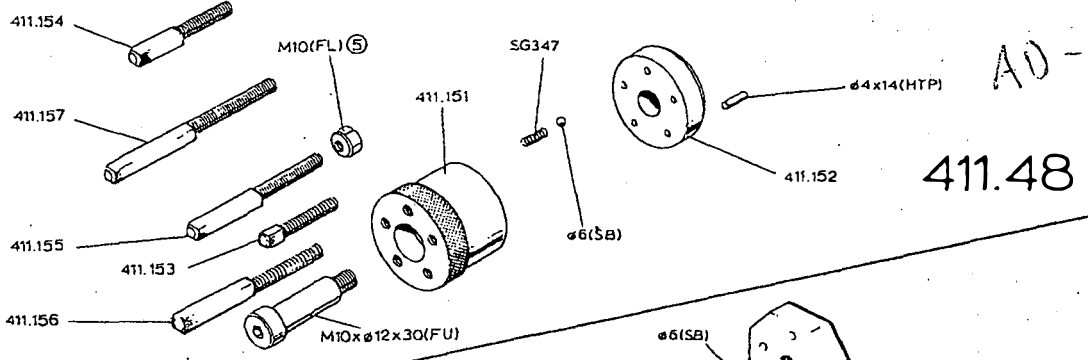
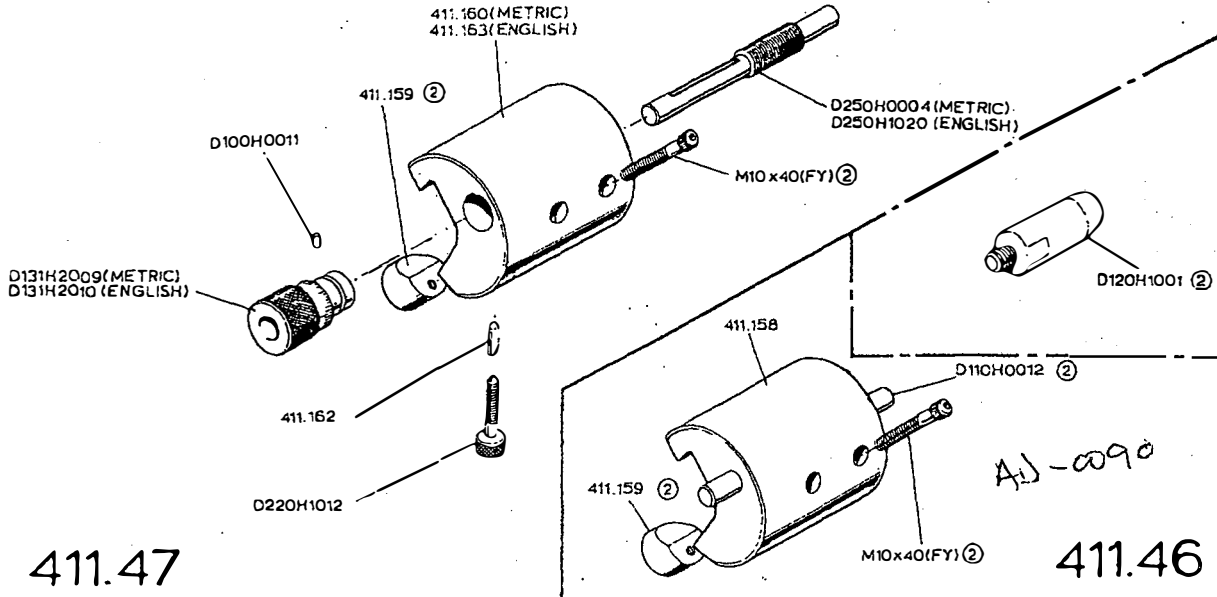
411.41

Roller Final Ass'y AC-0080



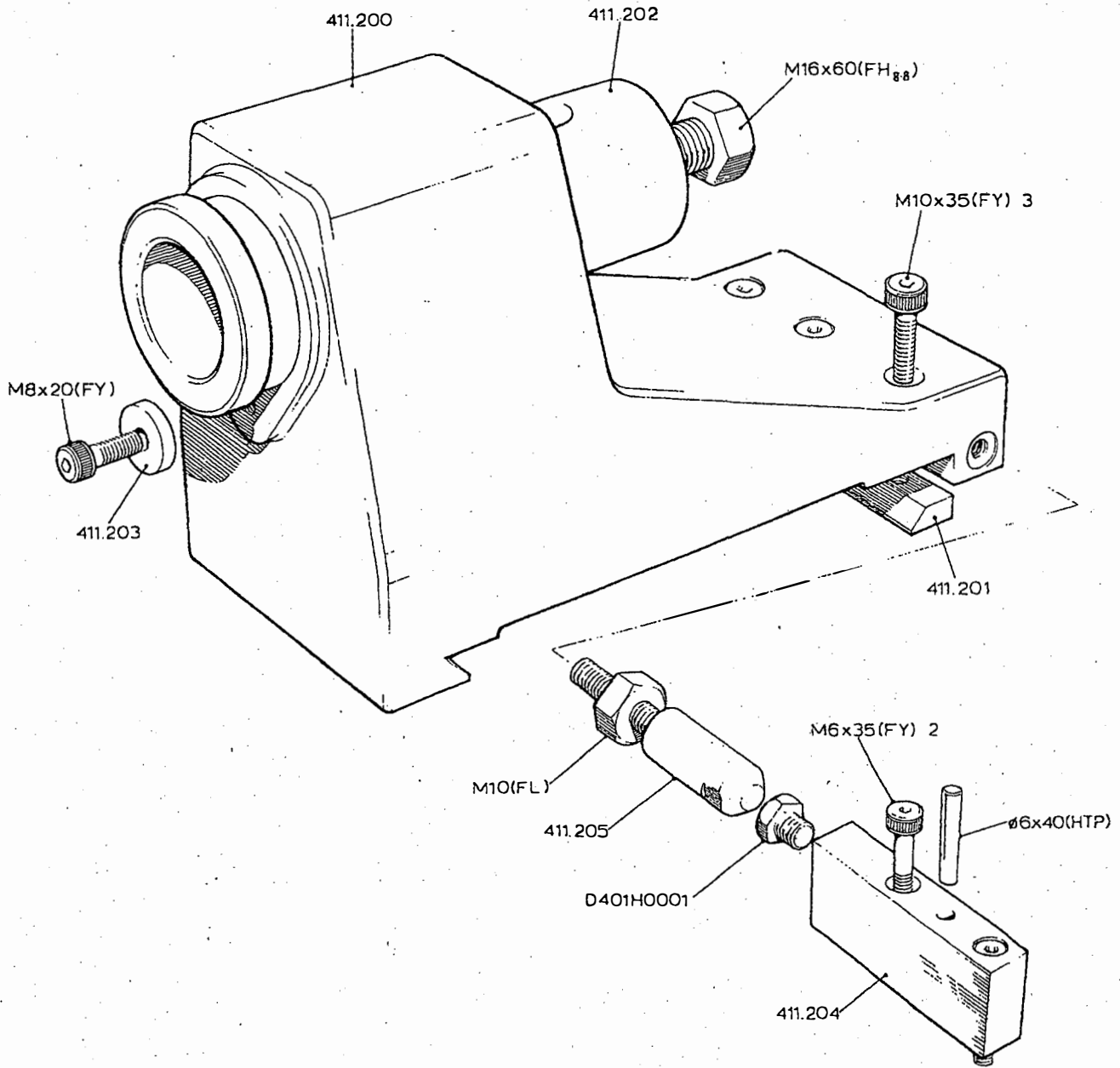
OVERSIZE
 Roller M 400 AC-0086
 Roller 450 AC-0085

411.42

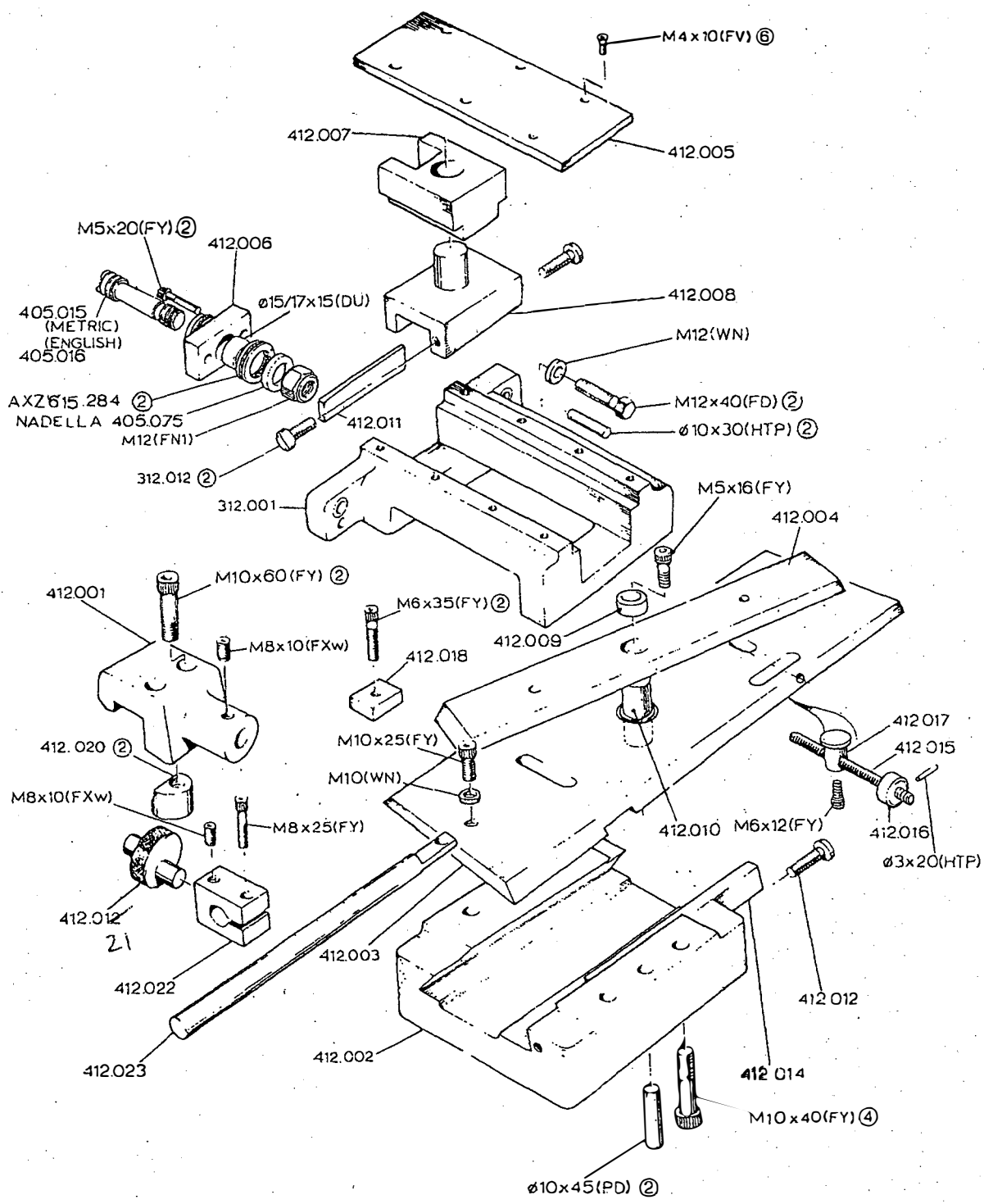


411.45-48

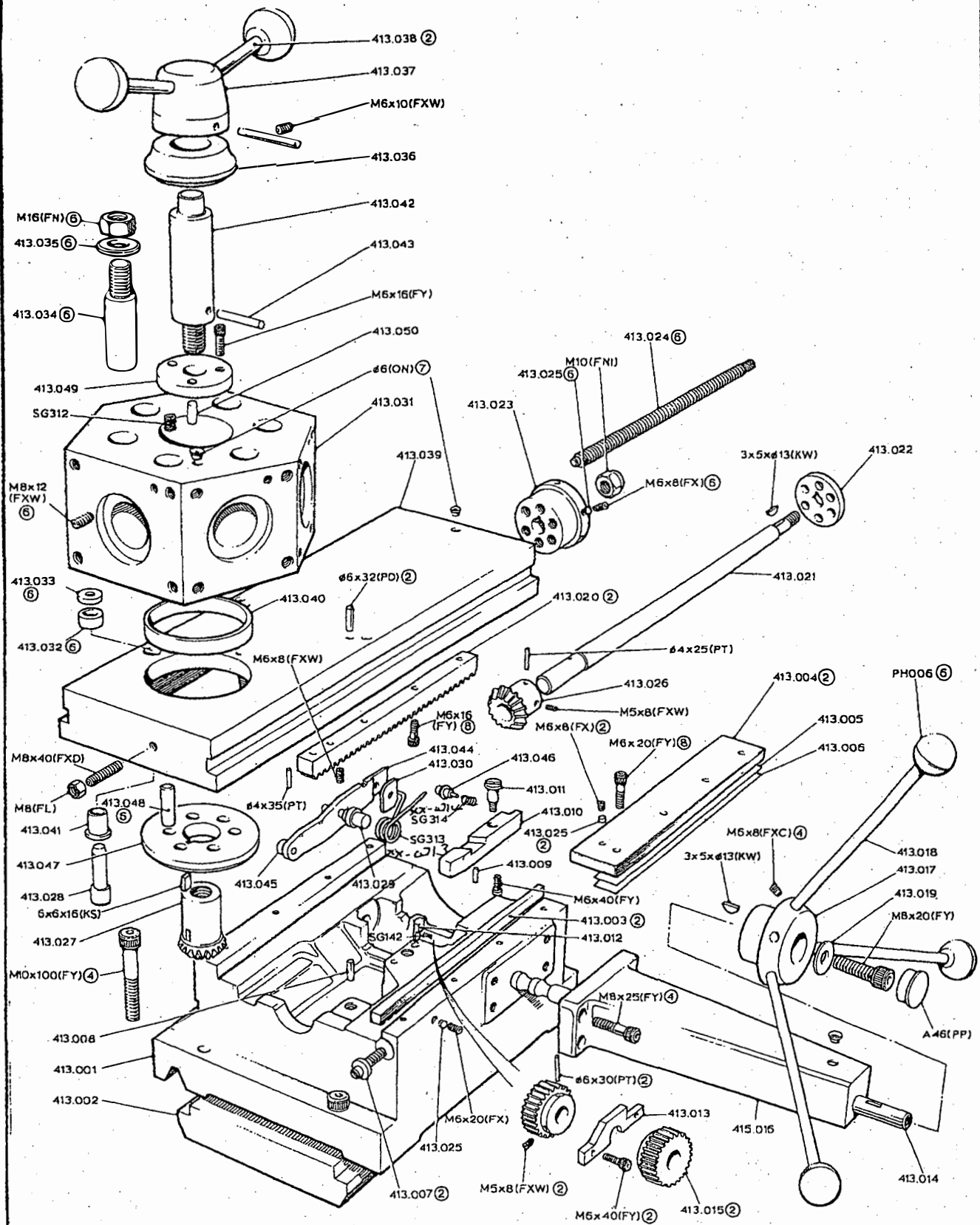
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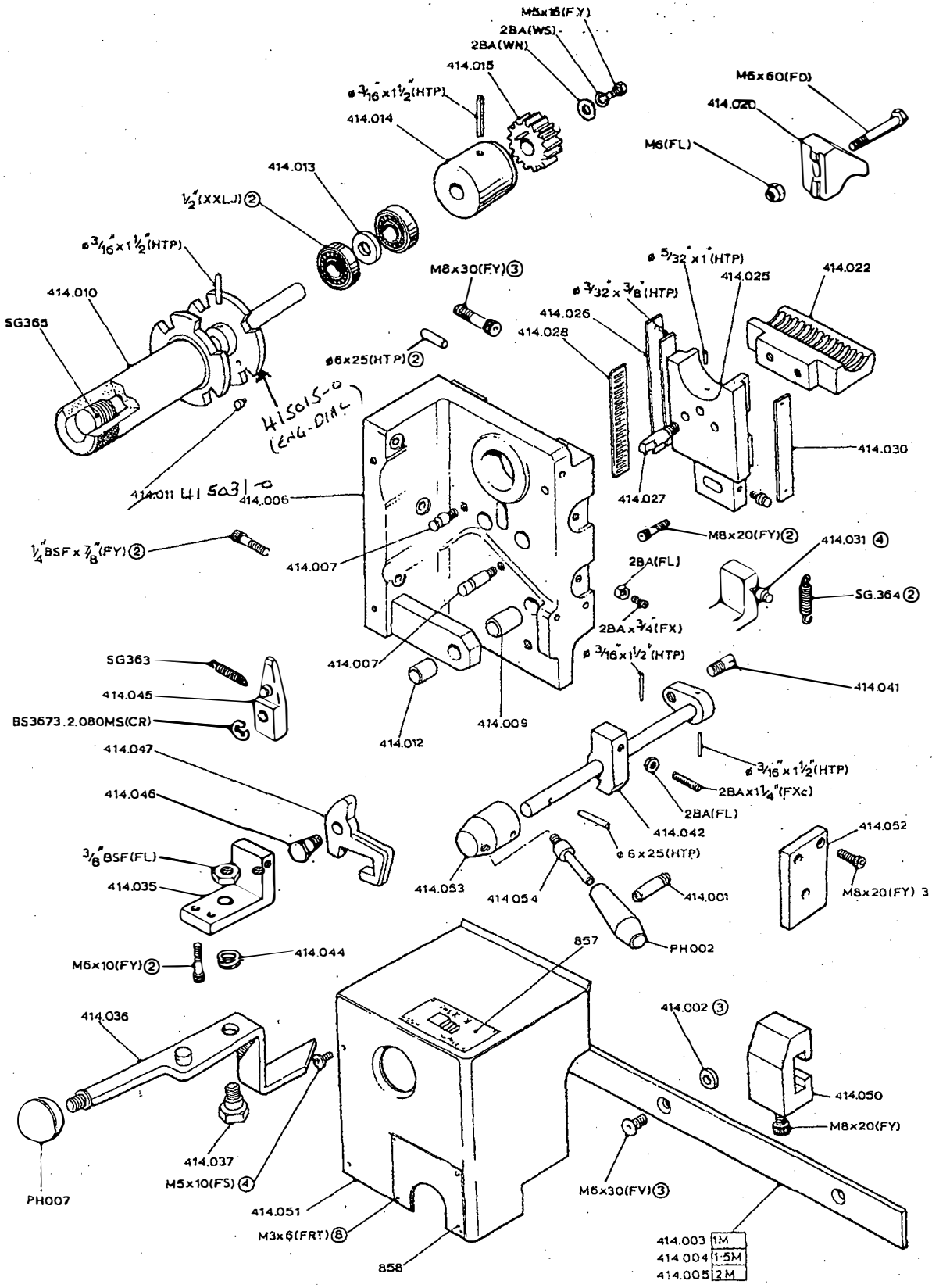
411.67



M400

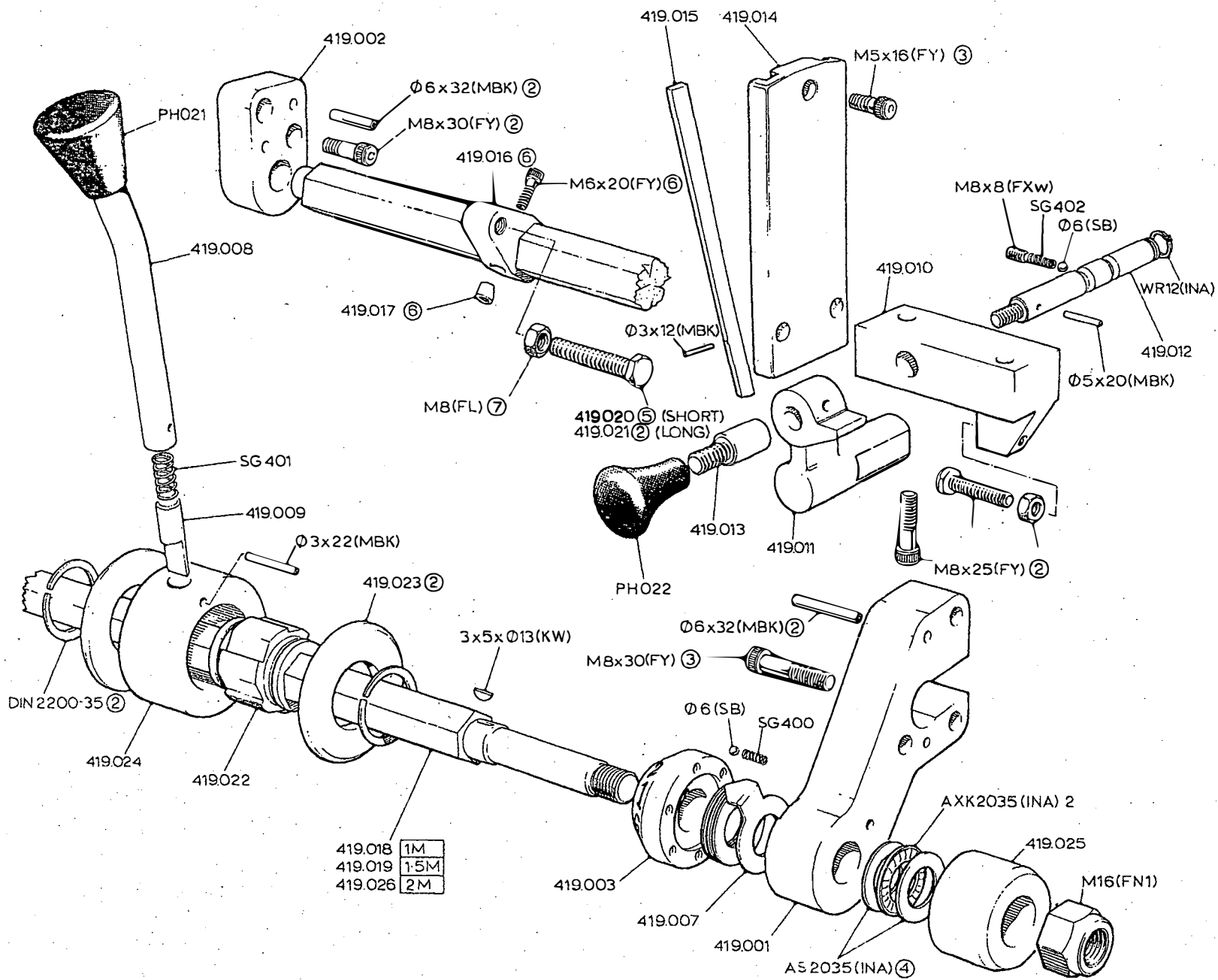


413



414.003	1M
414.004	1.5M
414.005	2M

414E



419

M400

Standard/Proprietary Parts

Letter Codes

'Bracketed'

Conventional
Description Given

Letter Code

Component

Screws and Nuts

FX Socket Set (Grub) Screw: Flat Point
 FXd " " " " Dog Point (Normal)
 FXd1 " " " " Dog Point (Long)
 FXc " " " " Cone Point
 FXw " " " " Cup, knurled or 'W' Point

Thread X O/all Length

" " " "
 " " " "
 " " " "

FY Socket Head Cap Screw
 FY1 Socket Head Cap Screw (Threaded to Head)
 FV Socket Countersunk Screw
 FS Socket Button Head Screw

Thread X Length under head

" " " "
 " " " "

FU Socket Shoulder Screw

Thread X Ø Shank X Shank length

FP Socket Pressure Plug
 FPS Press Plug (Square Head)

Thread and Form

" "

FO Slotted Set (Grub) Screw

Thread X O/all Length

FT Slotted or Pozidriv Screw: Countersunk Head
 FI " " " " Raised C/sunk Head
 FR " " " " Pan Head
 FE " " " " Cheese Head

Thread X length under head

" " " "

Suffix 'B' for Thread Forming Type
 Suffix 'T' for Thread Cutting Type
 Suffix '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

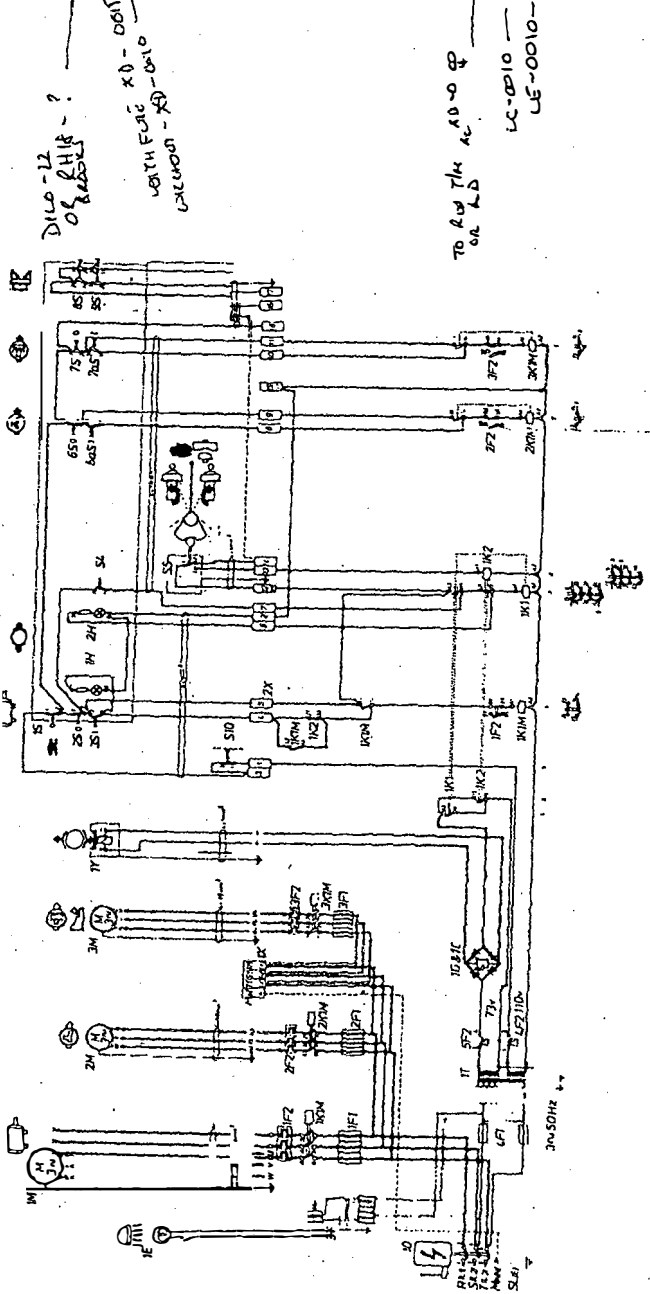
'Bracketed' Letter Code	Component	Conventional Description Given
Pins and Dowels		
GP1	Grooved Pin: Full length groove — Tight at one end	Nom. \emptyset X O/all length
GP2	" " Half length groove — Tight on end	" " "
GP2	" " Full length groove — Parallel	" " "
GP4	" " Half length groove — Tight at centre	" " "
GP5	" " Centre groove	" " "
PD	Dowel Pin	Nom \emptyset X O/all length
PB	Brass Pin or Pad	" " "
PT	Taper Pin	Nom \emptyset (small end) X O/all length
PS	Split Pin	Nom \emptyset X O/all length
LTP	Tension Pin: Light Duty	Nom \emptyset X O/all length
HTP	" " Heavy Duty	" " "
Keys		
KS	Square Parallel Key	Width X Thickness X Length
KR	Rectangular Parallel Key	" " " "
KW	Woodruff Key	Width X Height X Diameter
Circlips		
CE	External Circlip: DIN 471	DIN. Ref. Nom Shaft \emptyset and Thickness
CE1	Round Section Circlip	Nom. Shaft \emptyset , Wire \emptyset
CE2	Inverted Retainer (Truarc)	" " "
CB	Internal Circlip: DIN 472	DIN. Ref. Nom Bore and Thickness
CR	Radial Fitting Circlip. DIN 6799	DIN Ref. Nom \emptyset and Thickness
CR1	Radial Retaining Clip (Spring fix)	Nom shaft \emptyset
CR2	Radial Fitting Circlip BS3673/3	" "
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 & Roller Bearings		
BB	Std. Ball Bearing	Nom Bore Outside \emptyset and Leng
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	" " " " "
For Needle Roller Brgs, Needle Thrust Races Ball Thrust Brgs. and Taper Roller Bearings — Manufacturers Name is Quoted as Letter Code — vis.		
(INA.)	(TORRINGTON)	Manufacturers Part No. Quoted
(SKF)	or (GAMET)	

'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
ON1	" " " 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	" "

LIFE M40

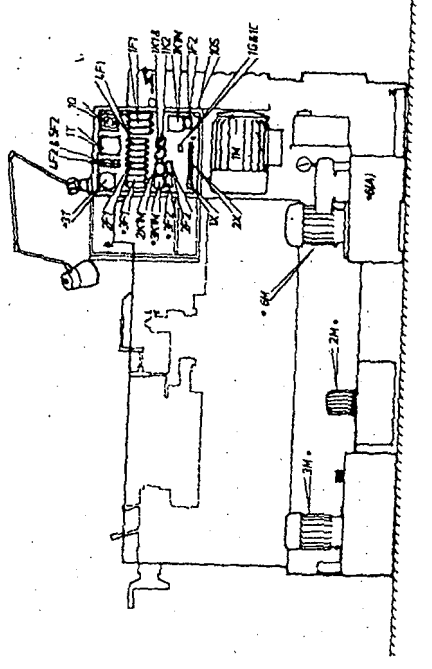
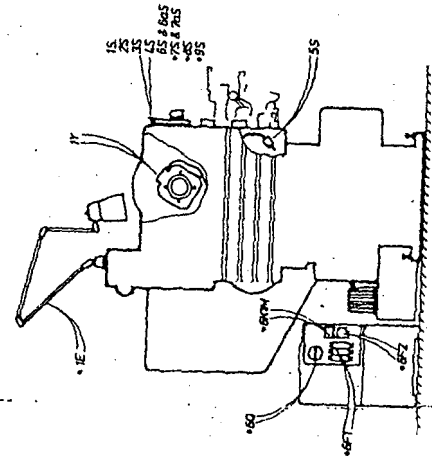
SAFETY
LIFE-10-10
SAME LF

REF. I. EQUIPMENT LIST	ITEM	DESCRIPTION	QTY	UNIT	REMARKS
10	10	Motor	1	HP	1/2 HP
11	11	Control Panel	1	PCB	1/2 HP
12	12	Control Panel	1	PCB	1/2 HP
13	13	Control Panel	1	PCB	1/2 HP
14	14	Control Panel	1	PCB	1/2 HP
15	15	Control Panel	1	PCB	1/2 HP
16	16	Control Panel	1	PCB	1/2 HP
17	17	Control Panel	1	PCB	1/2 HP
18	18	Control Panel	1	PCB	1/2 HP
19	19	Control Panel	1	PCB	1/2 HP
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24	24	Control Panel	1	PCB	1/2 HP
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44	44	Control Panel	1	PCB	1/2 HP
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96	96	Control Panel	1	PCB	1/2 HP
97	97	Control Panel	1	PCB	1/2 HP
98	98	Control Panel	1	PCB	1/2 HP
99	99	Control Panel	1	PCB	1/2 HP
100	100	Control Panel	1	PCB	1/2 HP



D10-12
OR BATTERY
WITH FUSE X0-0010
CALCULATED - X0-0010

TO 207 TH 40-00
OR 207
LC-0010
LE-0010



METALFORMA WITH FUSE X0
WITHOUT FUSE X

EWD-4013
380, 415, 440V/3Ph/50Hz

Wiring Diagram



NOTES

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call 800-575-2843

fax 888-839-6434

info@harrisonlathe.com



www.harrisonlathe.com