NARDINI

SPARE PARTS
AND
OPERATIONS MANUAL
FOR

MS-1400S
MS-1400E
(inch version)
MS-1600S
MS-1600E

MS-175S
MS-175E
(metric version)
MS-205AS
MS-205AE

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INTRODUCTION

This manual describes the MASCOTE lathe models **MS-1400S/E, MS-1600S/E, MS-175S/E** and **MS-205AS/AE.**

It has been carefully prepared to assist you to take advantage of the qualities of these machines.

The first sections present instructions about foundation, leveling, lubrication, main-shaft adjustment, axial adjustment of the spindle, drive-belt adjustment and other details important to correct operation of the machine.

The second part presents blown-up views in perspective, parts list and information on ordering spare parts.

In the interest of continuing industrial and technological development, NARDINI reserves the right to change the design and specifications of its machines without previous notice.

NARDINI's expert technicians are always avaiable to help you solve any problem in the operation of these machines.

The serial number of the lathe is stamped on the back part of the bed. For any claims please always refer to this number.

INDUSTRIAS NARDINI S.A.
Americana - SP - Brazil

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SPECIFICATIONS

CAPACITY	MS-1400 MS-175	MS-1600 MS-205	
Height of centers	6.7/8"- *175*	8.5/64"- *205*	Inch/*mm*
Distance between centers	20"- *500* 32"- *800*	40"- *1000*	Inch/*mm*
Swing over bed	13.25/32"- *350*	15.15/16"- *405*	Inch/*mm*
Swing over wings of saddle	12.13/64"- *310*	14.9/16"- *370*	Inch/*mm*
Swing in gap	20"- *500*	22.3/64"- *560*	Inch/*mm*
Gap length in front of faceplate	5.45/64"- *145*		Inch/*mm*
Cross slide travel	8"- *205*	9.1/4"- *235*	Inch/*mm*
Top slide travel	4" *100*		Inch/*mm*
Tool section	5/8"x5/8" - *16x16*		Inch/*mm*
BED			
Widht	8.21/32"- *220*		Inch/*mm*
Height	11.13/16"- *300*		Inch/*mm*
HEADSTOCK			
Spindle bore	1.13/16"- *46* *		Inch/*mm*
Spindle nose	ASA L-O**		
Spindle internal taper	1:20		
Taper in reduction sleeve	3		MT
Spindle speeds:			
MS-175S, 205AS, 1400S and 1600S	9		
MS-175E, 205AE, 1400E and 1600E	18		
Speeds range:			
MS-175S, 205S, 1400S and 1600S	50 to 2000		rpm
MS-175E, 205E, 1400E and 1600E	25 to 2000		rpm
TAILSTOCK			
Quill diameter	2" - *50*		Inch/*mm*
Quill internal taper	3		MT
Quill travel	5.33/64"- *140*		Inch/*mm*
Lateral adjustment	3/8" - *10*		Inch/*mm*
GEAR BOX - Pitch of Leadscrew - 6mm			
Threads number	192		
Metric threads (64)	0,375 to 7,0		*mm*
Inch threads (32)	3 to 56		Inch
Module threads (64)	0,1875 to 3,5		MOD
Diametral pitch threads (32)	12 to 208		DP
FEEDS RANGE			
Number of feeds	256		
Longitudinal feeds (128)	0,042 to 0,929		*mm* Rev
Cross feeds (128)	0,015 to 0,338		*mm* Rev
GEAR BOX - Pitch of Leadscrew 4 T.P.I.			
Threads number	135		
Metric threads (45)	0,4 to 7,0		*mm*
Inch threads (33)	3 to 5,6		Inch
Module threads (25)	0,25 to 3,75		MOD
Diametral pitch threads (32)	12 to 208		DP
FEEDS RANGE			
Number of feeds	256		
Longitudinal feeds (128)	0,0015" to 0,0427"- *0,038 to 1,085*		Inch/*mm* Rev
Cross feeds (128)	0,00075" to 0,02135"- *0,019 to 0,5425*		Inch/*mm* Rev
MOTORS			
Main motor:			
MS-175S, 205S, 1400S and 1600S	6 (60Hz) or 5,5 (50Hz) (one speed motor)		HP
MS-175E, 205E, 1400E and 1600E	6,3/4 (two speed motor)		HP
Coolant pump	0,12		HP

Optional

** Cam Lock D1 - 5 — * 1.21/32" (42mm)

** Cam Lock DIN 55022-5 — * 1.13/16" (46mm)

Under Request

** Cam Lock D1-6 or DIN 55022-6 — * 2.1/32" (52mm)

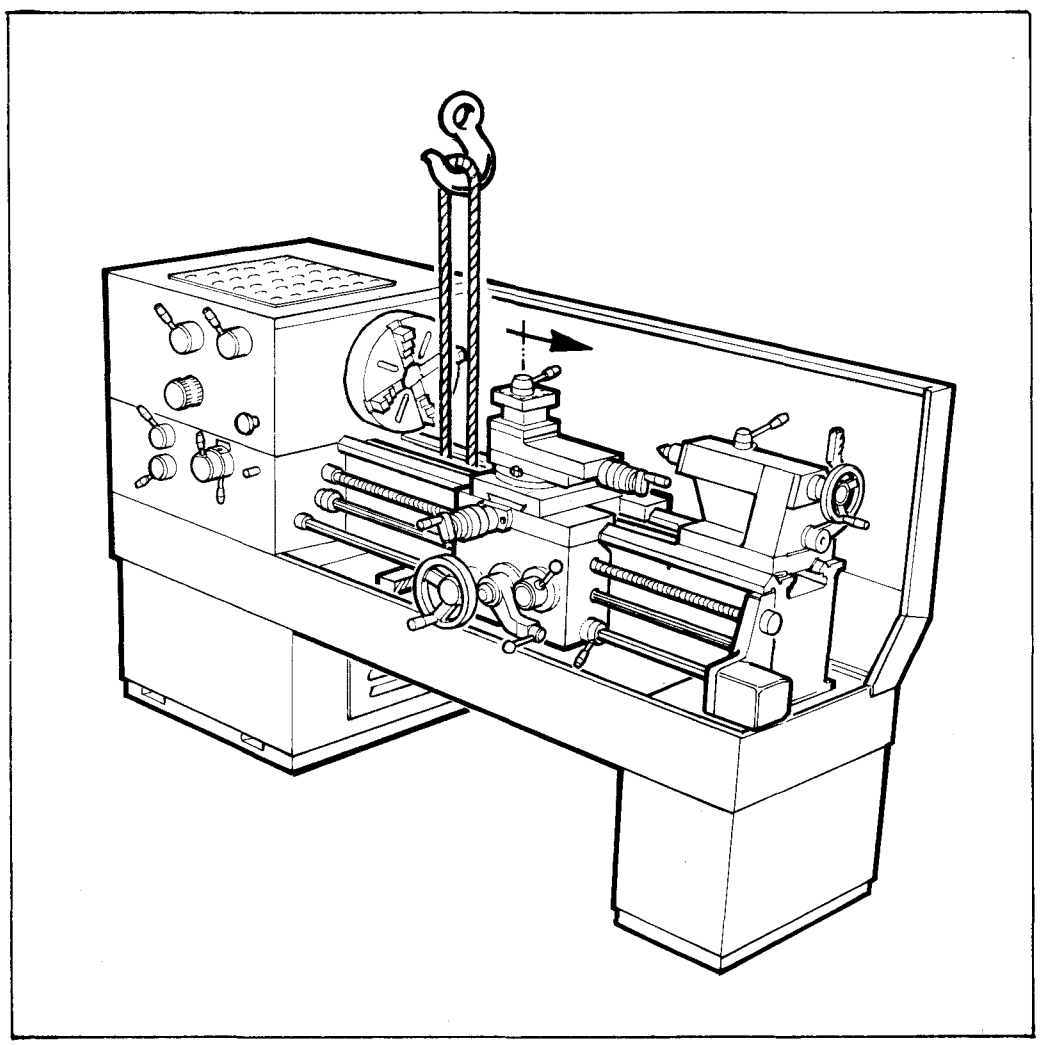
LIFTING

To raise the lathe, move the transversal carriage and tailstock to the right extremity of the bed and fix them, making sure that they will not slide and cause damage to others parts.

Put an square steel bar of aproximated 2" (50mm) under the bed. place the cables through the first vertical discharge for chips and tie on the square steel bar.

For safety precautions, prop the cables with wooden blocks.

When the lifting process begins the cables are taut, check if the square steel bar is upholded and leveled properly.



CLEANLINESS

All NARDINI lathes leave the factory protected by grease and preventatives which must be removed. Use a soft cloth moistened with kerosene.

Do not use thinner, gasoline or other kinds of removers.

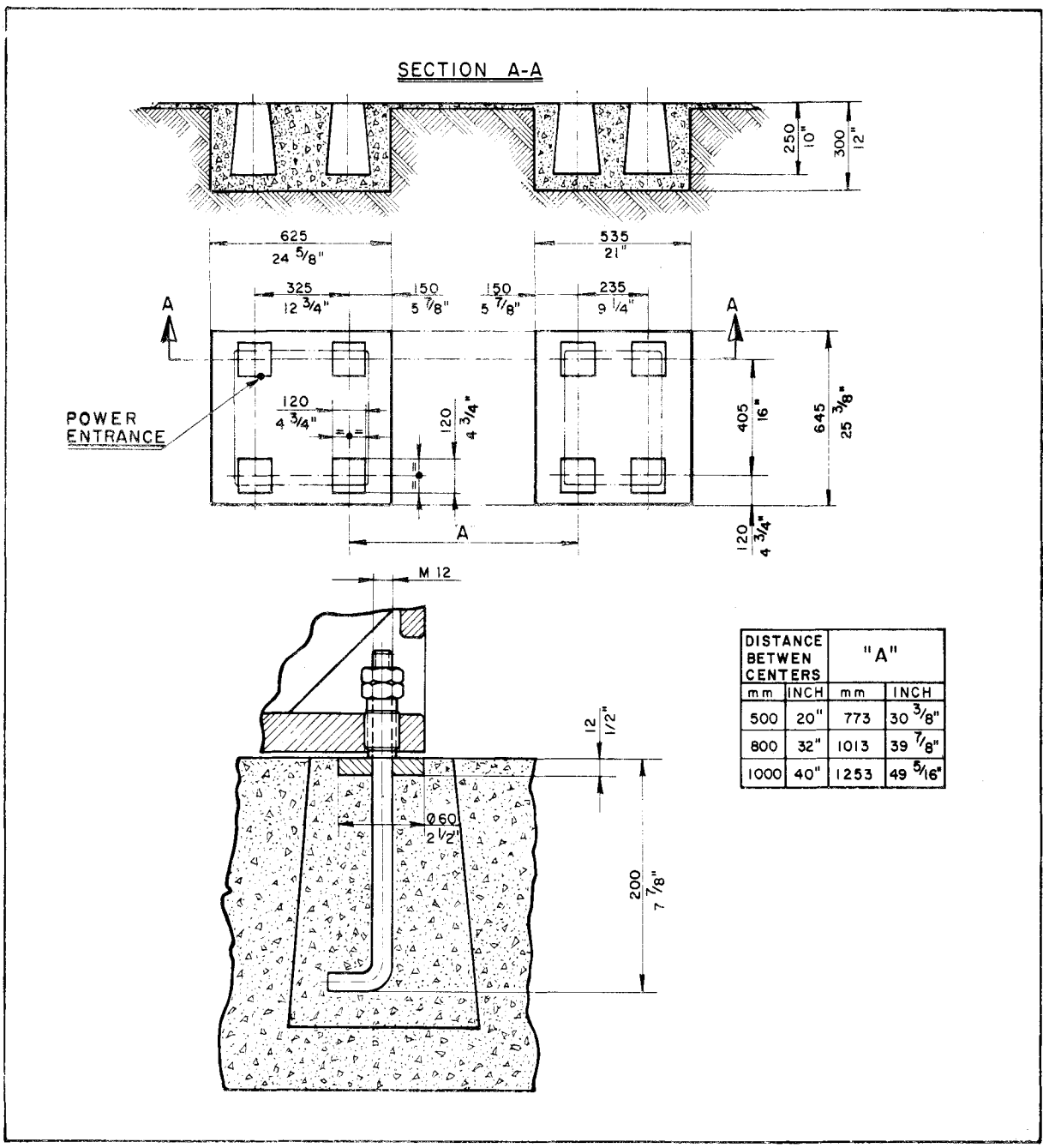
Give special attention to cleaning the guides of the bed and then lubricate them.

FOUNDATION

The precision of the lathe depends on how well it is installed. The durability of the machine is only guaranteed if the lathe has been firmly and precisely installed.

The foundation area must consist of good concret and have minimum depth of 12" (300mm) to support the lathe's weight at the columns areas.

NOTE: Anchor screws and plates are not included with the machine.



DISTANCE BETWEN CENTERS		"A"	
mm	INCH	mm	INCH
500	20"	773	30 3/8"
800	32"	1013	39 7/8"
1000	40"	1253	49 5/16"

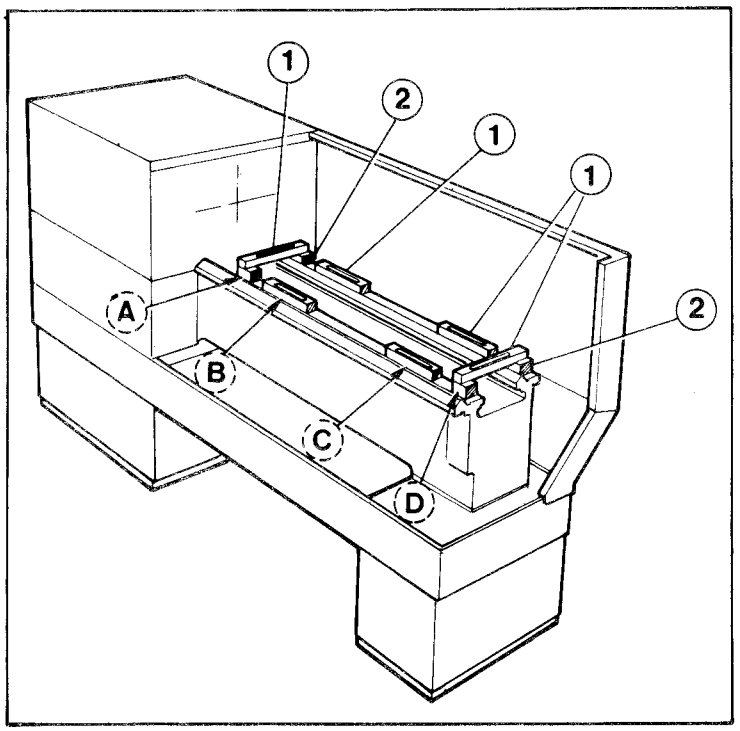
LEVELING

The precision and durability of the lathe depends on its being perfectly level. Final inspection must be done only when the machine has been correctly leveled. When the machine is on its foundation, level readings must be done with the level in positions A, B, C and D (see figure). Use a precise level of 0.0008"x40" (0,02/1000mm)

The transversal reading must be done using a precision level (1) and two parallel wedges (2).

Care must be taken that the machine is not moved untill the screws are fixed in the concrete (minimum 48 hours). After his period of time, use the precision level again to obtain a perfect levelness.

Note - Leveling of the machine should be checked again after the first week of the operation to ensure its permanency. Repeat this operation each six months.



ELECTRICAL CONNECTIONS

All electrical connections are by L1, L2, L3 and GRD terminals found in the electrical cabinet, wich is equiped with circuit breakes and contactors.

Before connecting the lathe to power source, ensure that the source does not vary more than + 10 or - 5%. Variations outside this range may be harmful.

The power lines must be well dimensioned, by preferance 4x6mm^2 (L1, L2, L3 and GRD).

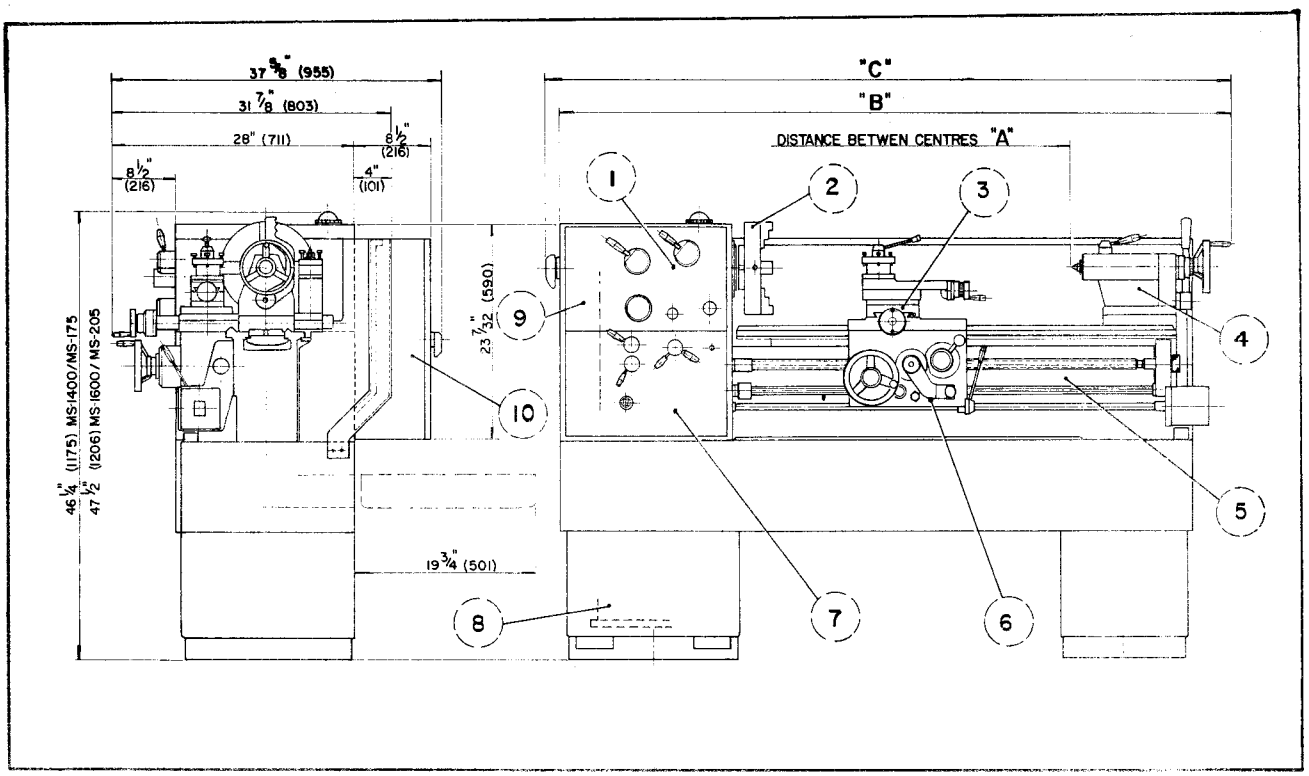
We recommend the grounding for your protection (see electrical diagramns).

The following is recommended for preventive maintenance of electrical system –

Every three months - Tighten all contact screw.

Every six months - Clean the motor and its electrical connections.
Clean all electrical equipment, including microswitches, cabinets and pumps.

Annualy - If necessary, change the contacts.



PRINCIPAL ASSEMBLIES

1. Headstock
2. Four independent jaw chuck
3. Saddle
4. Tailstock
5. Bed
6. Apron
7. Gear box
8. Drive unit
9. Change gears
10. Electric panel

DIMENSIONS

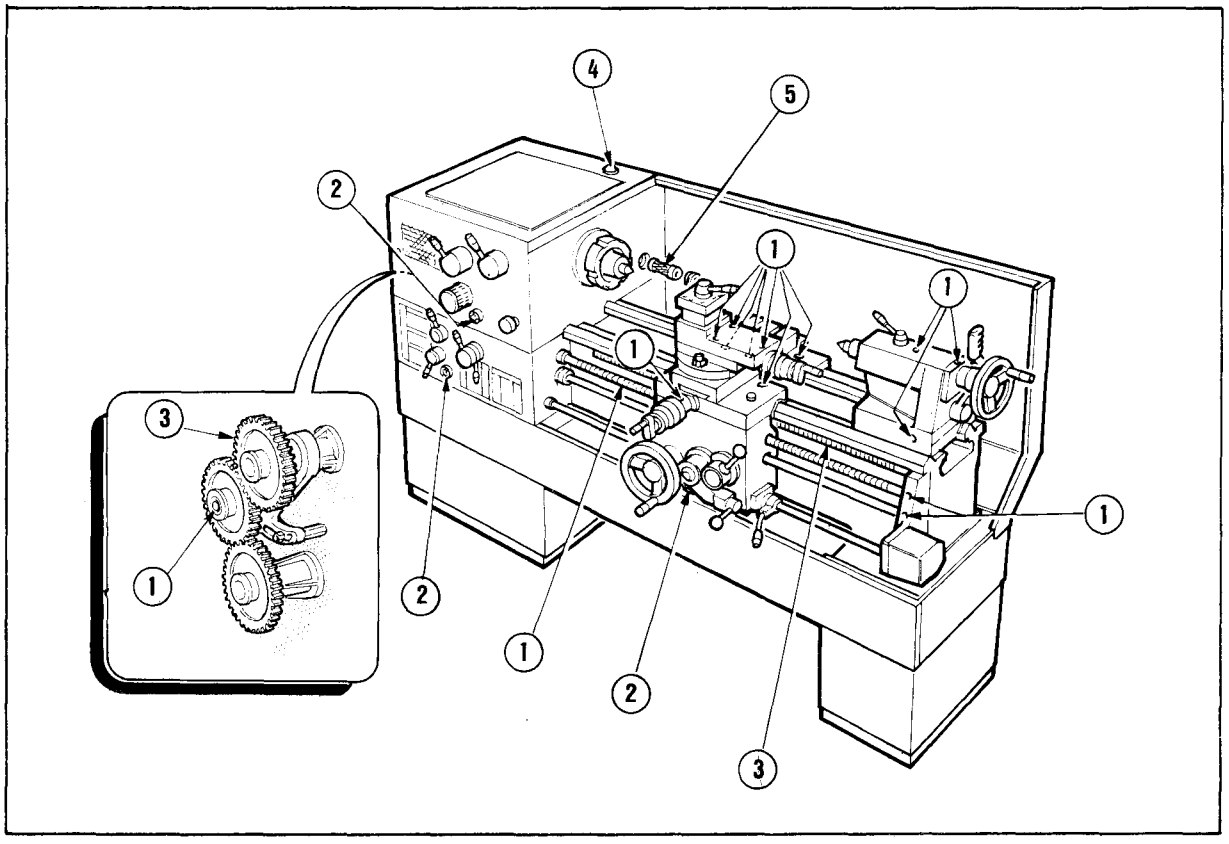
A	B	C
20" 500mm	64.1/2" 1638mm	66.1/8" 1680mm
32" 800mm	73.1/2" 1867mm	75.1/8" 1908mm
40" 1000mm	83.1/8" 2111mm	84.3/4" 2153mm

LUBRICATION

The machine must be lubricated with strict regularity. Before using the lathe, the operator should familiarize himself with all lubrication points (see figure below), verify that they are lubricated correctely and thereafter take responsability for regular lubrication of the machine.

TABLE OF EQUIVALENT LUBRICANTS

SUPPLIERS	RECOMMENDED OILS	RECOMMENDED GREASES
CASTROL	Hyspin AWS-68	Castrol LM Grease
SHELL	Tellus 68	Alvania EP-2
TEXACO	Rando HD-68	Marfax All Purpose or Multifak EP-2
EXXON	Teresso/Turbine Oil 68	Beacon 2
MOBIL	DTE-26	Mobil Grease MP
E.F. HOUGHTON	Hydro Drive HP-68	LA-2



GENERAL LUBRICATION

1. Oil lubrication points (daily)
2. Oil level indicator.
3. Grease lubrication points (wekly)
4. Headstock oil sight.
5. Headstock oil filter (clean it anually in the oil changing)

LUBRICATION

ASSEMBLY	FREQUENCY OF OIL CHANGE	QUANTITY
HEADSTOCK	ANNUALLY	3,5 LITRES
GEAR BOX		2,5 LITRES
APRON		1,5 LITRES

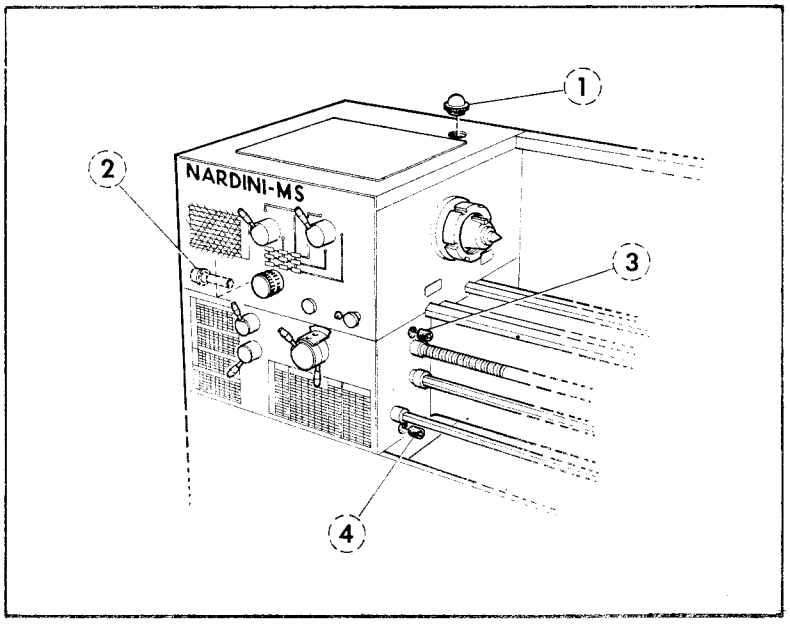
TO CHANGE OIL

HEADSTOCK

Drain the oil through plug (2). Refill with fresh oil through the oil sight (1).

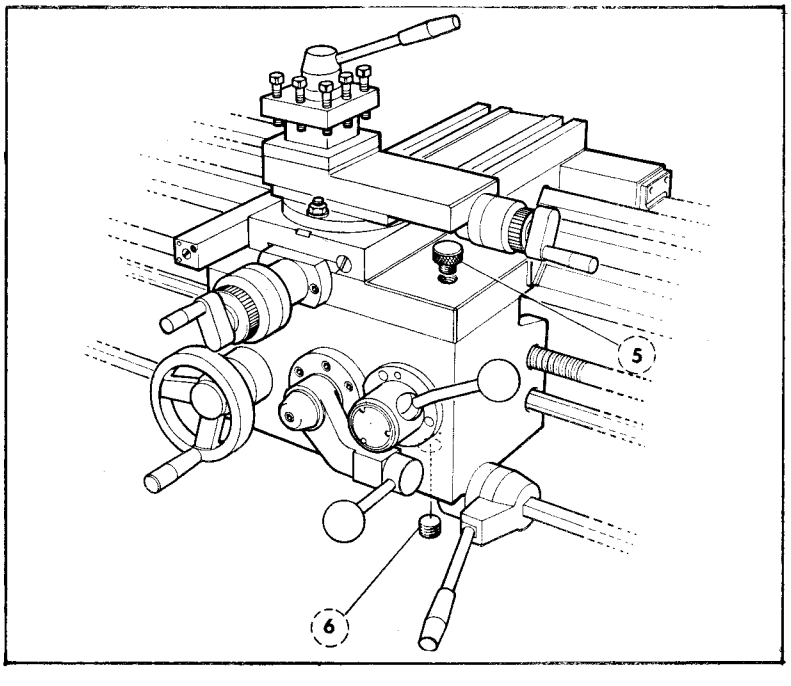
GEAR BOX

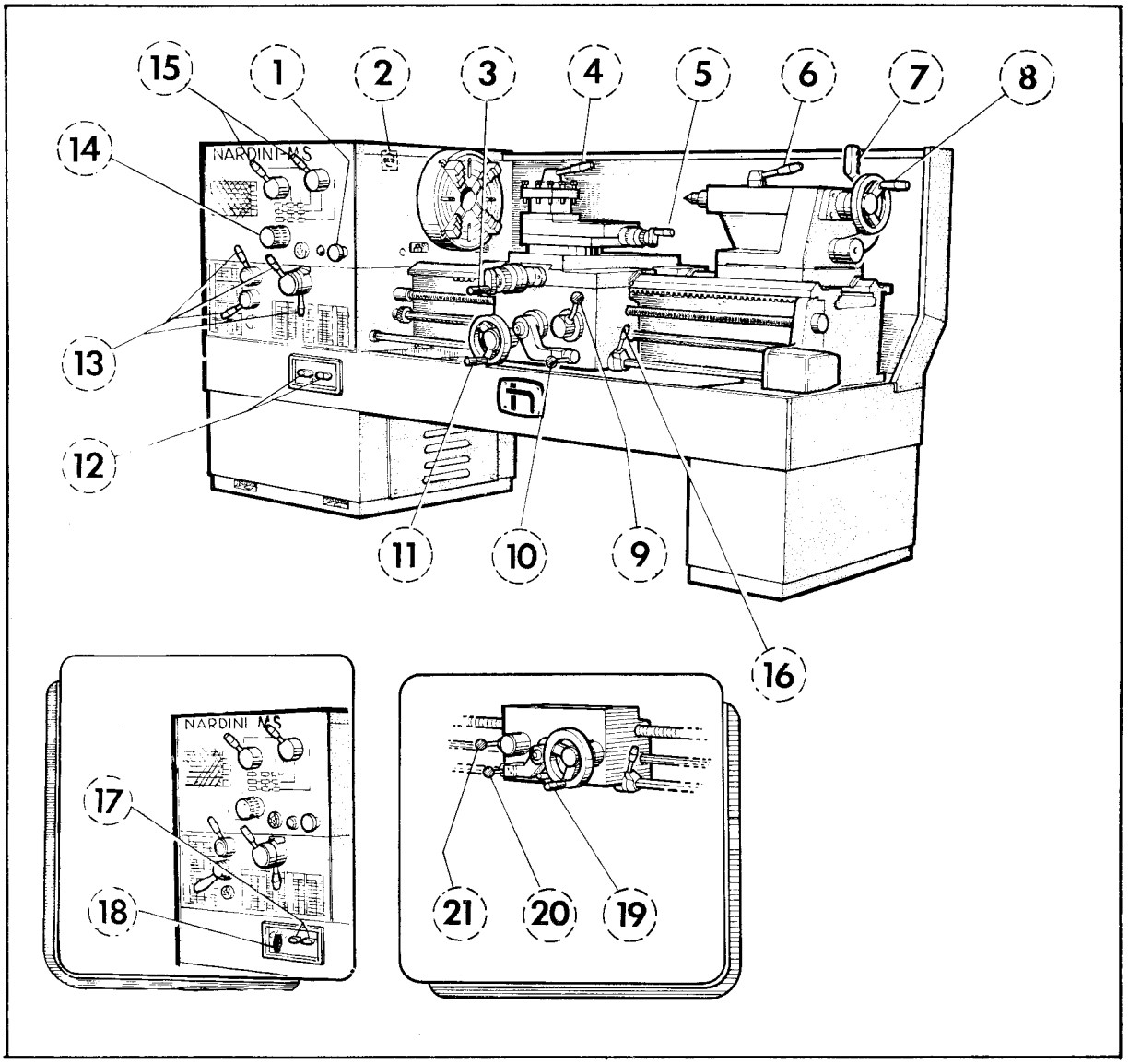
Drain the oil through plug (4). Refill with fresh oil through the plug (3).



APRON

Drain the oil through plug (6). Refill with fresh oil through the plug (5).





LATHE CONTROLS

1. Circuit control ON and emergency stop.
2. General switch.
3. Cross slide handle.
4. Toolpost handle.
5. Top slide handle.
6. Tailstock barrel lever.
7. Tailstock clamp lever.
8. Tailstock handwheel.
9. Lever for engaging the leadscrew nut, the longitudinal and transversal feeds.
10. Engage and desengage of automatic feeds lever.
11. Apron handwheel.
12. Coolant pump ON/OFF button.
13. Threads and feeds selectors.
14. Saddle longitudinal motion handle.
15. Spindle speeds selectors.
16. Spindle rotation forward, reverse and stop.

For models MS-1400E, MS-175E MS-1600E and MS-205AE

17. Coolant pump ON/OFF button.
18. Low and higth main motor rotation.

For rigth hand apron models

19. Apron handwheel.
20. Engage and desengage of automatic feeds levers.
21. Lever for engaging the leadscrew nut, the longitudinal and transversal feeds.

LATHE OPERATION

CAUTIONS -

- To safeguard against damage or injury, it is recommended that the operator read carefully all instructions in this manual before beginning operation of the lathe.

- Check the oil level of the headstock and lubrication of the threads, feeds gear box and all other lubrication points. The lathe leaves the factory correctly lubricated at all points, but a general inspection before operation is important.

- Before cleaning the lathe, verify that the spindle lever is in the center position.

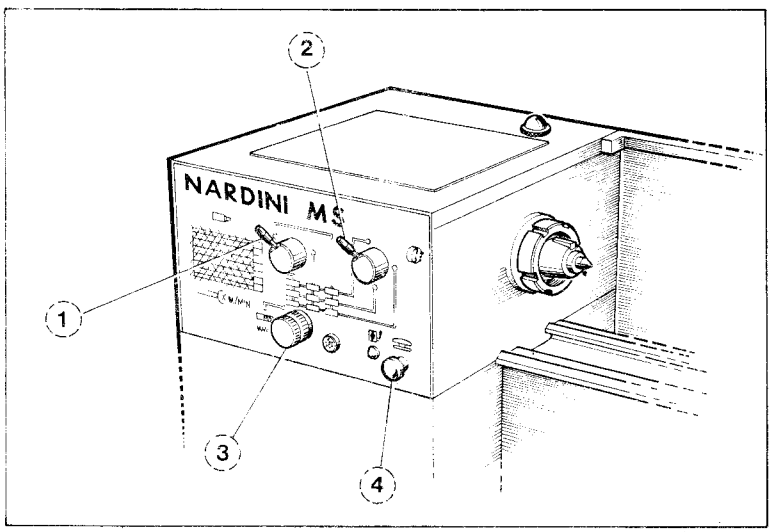
- Until the operator has become completely familiarized with all the lathe's controls, he should operate it only with the motor at low speed.

IMPORTANT -

Do not change speeds, threads or feeds selectors with the spindle in motion. This can wear or break the gear teeth.

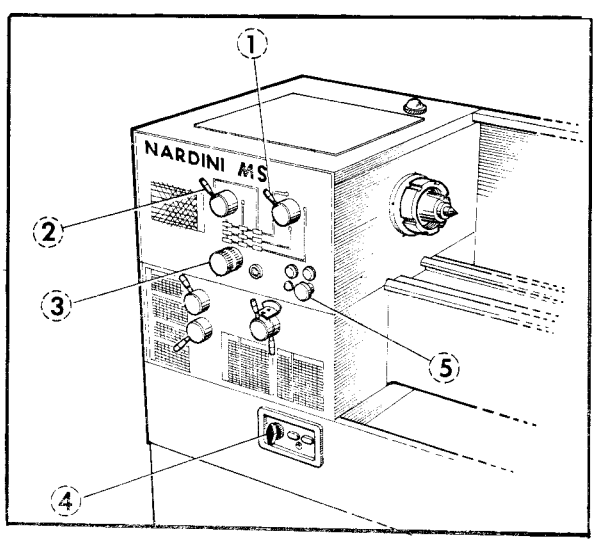
HEADSTOCK FOR MODELS:
MS-1400S, MS-1600S, MS-175S and MS-205AS

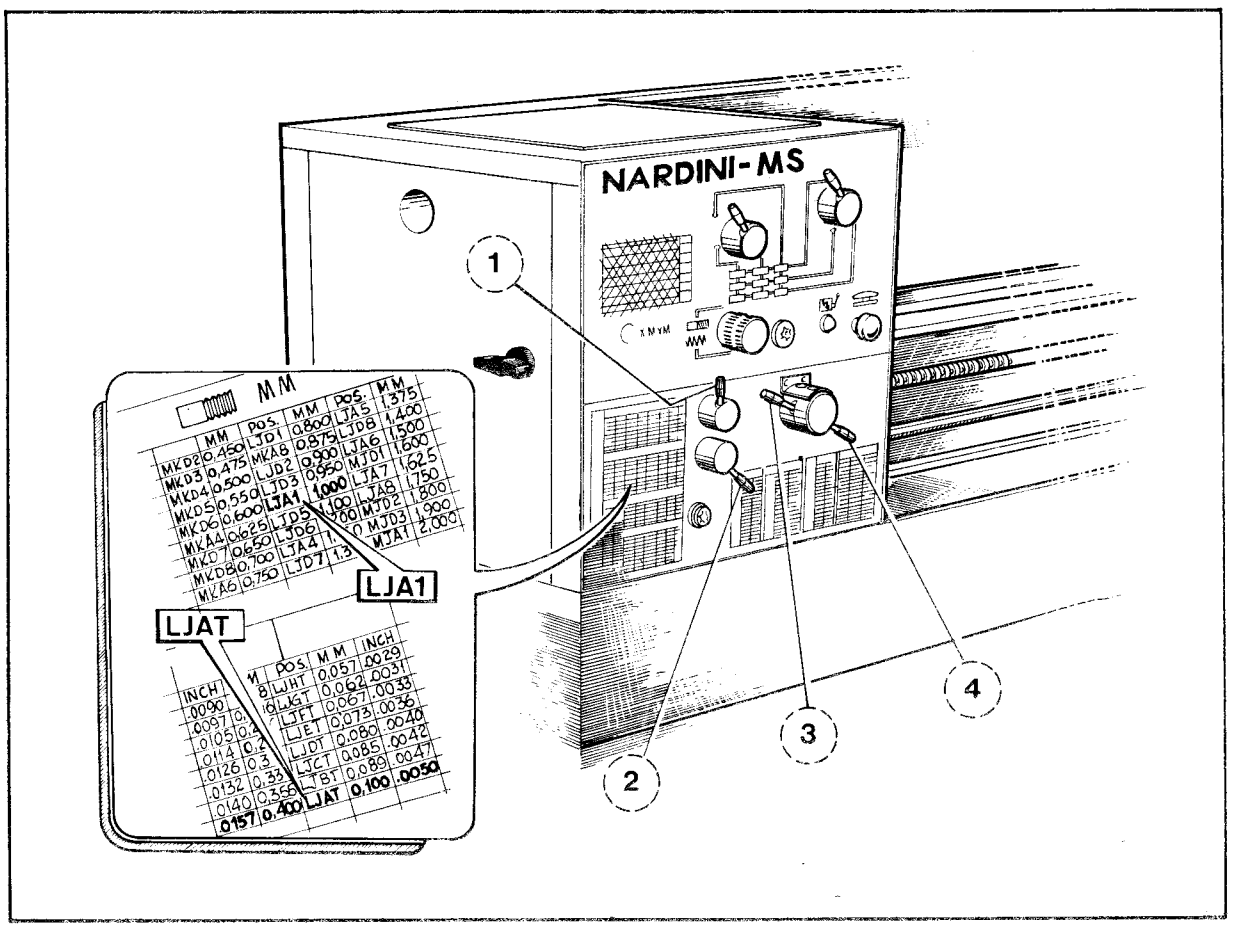
Selection of speeds is through the handle wheels (1) and (2). These controls allow 9 different speeds.
When the circuit control and emergency stop buttons (4) are pulled out, all electric commands of the lathe are ON. Pushing them in bring the reverse - all commands are OFF.
The handle wheel (3) controls the rotation of the leadscrew, bringing it to reverse or to full stop.



HEADSTOCK FOR MODELS:
MS-1400E, MS-1600E, MS-175E and MS-205AE

Selection of speeds is through the handle wheels (1) and (2). These controls allow 9 different speeds.
Nine additional speeds may be obtained by changing motor speed from low to high rotation, or vice-versa, through key (4), giving a total of 18 speeds.
When circuit control and emergency stop buttons (5) are pulled out, all electric commands of the lathe are ON. Pushing then in brings the reverse - all commands are OFF.
The handle (3) controls the rotation of the leadscrew, bringing it to reverse or to full stop.





THREADS AND FEEDS GEAR BOX

Selection of threads is through levers (1), (2), (3)and (4).

The lubrication is made by an internal pump placed in the box, with reservoirs and channels distributed through the wole set, guaranteeing that every parts is well lubricated.

To set a specific pitch of thread or feed, find it on the data plate the value of this pitch. Then, on the same line, find the letters and numbers that indicate the position of levers (1), (2), (3) and (4)

Example : Tooling of a metric thread pitch of 1mm.

– Locate the pitch on the data plate.

– Set the levers according to the letters and numbers corresponding to pitch 1,00 (LJA1).

– The assembly is now prepared to make threads of 1mm pitch.

To obtain a tooling with tranversal and longitudinal advances, proceed in the same way.

GEAR BOX DATA PLATE
(Leadscrew pitch: 4TPI)

M.M.

POS.	mm	POS.	mm	POS.	mm	POS.	mm	POS.	mm
LKD1	0,400	MKD2	0,900	LJD1	1,600	LJA5	2,750	MJD5	4,400
LKD2	0,450	MKD3	0,950	MKA8	1,750	LJD8	2,800	MJD6	4,800
LKB2	0,500	MKD4	1,000	LJD2	1,800	LJA6	3,000	MJA4	5,000
LKD5	0,550	MKD5	1,100	LJD3	1,900	MJD1	3,200	MJD7	5,200
LKD6	0,600	MKD6	1,200	LJA1	2,000	LJA7	3,250	MJA5	5,500
LKD7	0,650	MKA4	1,250	LJD5	2,200	LJA8	3,500	MJD8	5,600
LKD8	0,700	MKD7	1,300	LJD6	2,400	MJD2	3,600	MJA6	6,000
LKA6	0,750	MKD8	1,400	LJA4	2,500	MJD3	3,800	MJA7	6,500
MKD1	0,800	MKA6	1,500	LJD7	2,600	MJA1	4,000	MJA8	7,000

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W x INCH M.M. /

INCH	POS.	mm	INCH	POS.	mm	INCH	POS.	mm
.0015	LKHT	0,038	.0039	MKET	0,099	.0096	LJBT	0,244
.0016	LKGT	0,040	.0043	MKDT	0,109	.0108	LJAT	0,274
.0018	LKFT	0,046	.0045	MKCT	0,114	.0124	MJHT	0,315
.0019	LKET	0,048	.0048	MKBT	0,122	.0134	MJGT	0,340
.0021	LKDT	0,053	.0054	MKAT	0,137	.0145	MJFT	0,368
.0022	LKCT	0,056	.0062	LJHT	0,157	.0158	MJET	0,400
.0024	LKBT	0,060	.0067	LJGT	0,170	.0174	MJDT	0,442
.0027	LKAT	0,068	.0072	LJFT	0,183	.0183	MJCT	0,465
.0031	MKHT	0,079	.0079	LJET	0,200	.0193	MJBT	0,490
.0033	MKGT	0,084	.0087	LJDT	0,221	.0217	MJAT	0,552
.0036	MKFT	0,090	.0091	LJCT	0,231			

MOD.

POS.	MOD.	POS.	MOD.	POS.	MOD.	POS.	MOD.	POS.	MOD.
LKD1	0,250	MKD8	0,875	LJD6	1,500	MJD2	2,250	MJA4	3,125
LKD6	0,375	LJD1	1,000	LJD7	1,625	MJD3	2,375	MJD7	3,250
MKD1	0,500	LJD2	1,125	LJD8	1,750	MJG7	2,500	MJB6	3,333
MKA1	0,625	LJB2	1,250	LJA6	1,875	MJD5	2,750	MJD8	3,500
MKD6	0,750	LJD5	1,375	MJD1	2,000	MJD6	3,000	MJA6	3,750

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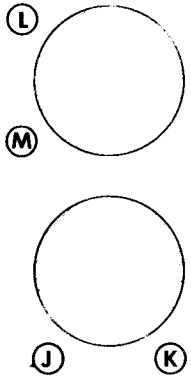
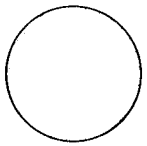
W x INCH M.M. /

INCH	POS.	mm	INCH	POS.	mm	INCH	POS.	mm
.0030	LKHT	0,075	.0078	MKET	0,198	.0190	LJBT	0,483
.0033	LKGT	0,084	.0085	MKDT	0,216	.0214	LJAT	0,544
.0036	LKFT	0,091	.0090	MKCT	0,228	.0244	MJHT	0,620
.0039	LKET	0,099	.0095	MKBT	0,241	.0263	MJGT	0,668
.0043	LKDT	0,109	.0107	MKAT	0,272	.0285	MJFT	0,724
.0045	LKCT	0,114	.0122	LJHT	0,310	.0311	MJET	0,790
.0047	LKBT	0,119	.0131	LJGT	0,332	.0342	MJDT	0,868
.0053	LKAT	0,135	.0142	LJFT	0,361	.0360	MJCT	0,914
.0061	MKHT	0,155	.0155	LJET	0,394	.0380	MJBT	0,965
.0066	MKGT	0,168	.0171	LJDT	0,434	.0427	MJAT	1,085
.0071	MKFT	0,180	.0180	LJCT	0,457			





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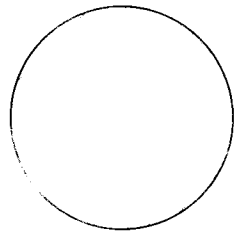

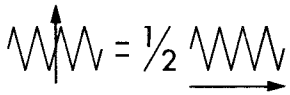

T.P.I.

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POS.	T.P.I.
MJB6	3
MJA1	4
MJB1	4.1/2
MJC1	4.3/4
MJD1	5
MJE1	5.1/2
MJF1	6
MJG1	6.1/2
MJH1	7
LJA1	8
LJB1	9
LJC1	9.1/2
LJD1	10
LJE1	11
LJF1	12
LJG1	13
LJH1	14
MKA1	16
MKB1	18
MKC1	19
MKD1	20
MKE1	22
MKF1	24
MKG1	26
MKH1	28
LKA1	32
LKB1	36
LKC1	38
LKD1	40
LKE1	44
LKF1	48
LKG1	52
LKH1	56

W x INCH M.M. /

INCH	POS.	mm
.0025	LKHT	0,063
.0026	LKGT	0,066
.0029	LKFT	0,074
.0031	LKET	0,079
.0034	LKDT	0,086
.0036	LKCT	0,091
.0038	LKBT	0,096
.0043	LKAT	0,109
.0049	MKHT	0,124
.0053	MKGT	0,135
.0058	MKFT	0,147
.0063	MKET	0,160
.0069	MKDT	0,175
.0073	MKCT	0,185
.0077	MKBT	0,195
.0086	MKAT	0,218
.0099	LJHT	0,251
.0106	LJGT	0,269
.0115	LJFT	0,292
.0126	LJET	0,320
.0138	LJDT	0,350
.0145	LJCT	0,368
.0154	LJBT	0,391
.0173	LJAT	0,439
.0197	MJHT	0,500
.0213	MJGT	0,540
.0230	MJFT	0,584
.0251	MJET	0,638
.0276	MJDT	0,701
.0291	MJCT	0,739
.0307	MJBT	0,780
.0346	MJAT	0,879

D. PITCH

71 / 75 / 113 / 120

POS.	D.P.
MJB6	12
MJF6	16
MJB1	18
MJC1	19
MJD1	20
MJE1	22
MJF1	24
MJG1	26
MJH1	28
LJG7	32
LJB1	36
LJC1	38
LJD1	40
LJE1	44
LJF1	48
LJG1	52
LJH1	56
MKA1	64
MKB1	72
MKC1	76
MKD1	80
MKE1	88
MKF1	96
MKG1	104
MKH1	112
LKA1	128
LKB1	144
LKC1	152
LKD1	160
LKE1	176
LKF1	192
LKG1	208

W x INCH M.M /

INCH	POS.	mm
.0019	LKHT	0,048
.0021	LKGT	0,053
.0023	LKFT	0,058
.0025	LKET	0,063
.0027	LKDT	0,068
.0028	LKCT	0,071
.0030	LKBT	0,076
.0034	LKAT	0,086
.0039	MKHT	0,099
.0042	MKGT	0,107
.0045	MKFT	0,114
.0049	MKET	0,124
.0054	MKDT	0,137
.0057	MKCT	0,145
.0060	MKBT	0,152
.0068	MKAT	0,173
.0077	LJHT	0,195
.0083	LJGT	0,210
.0090	LJFT	0,228
.0099	LJET	0,251
.0109	LJDT	0,276
.0114	LJCT	0,289
.0121	LJBT	0,307
.0136	LJAT	0,345
.0155	MJHT	0,394
.0167	MJGT	0,424
.0181	MJFT	0,460
.0197	MJET	0,500
.0217	MJDT	0,551
.0229	MJCT	0,582
.0241	MJBT	0,612
.0271	MJAT	0,688

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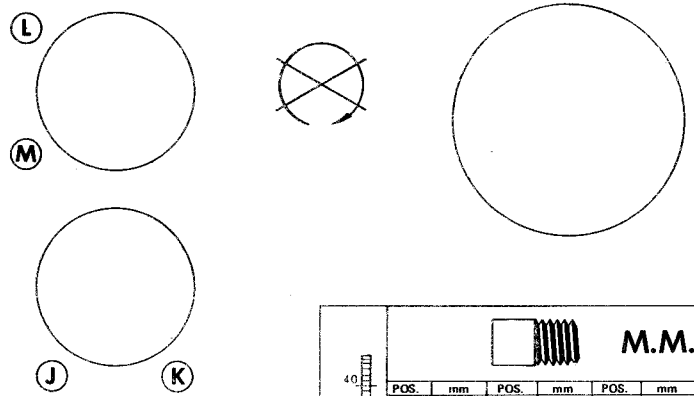
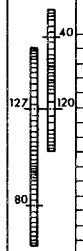
GEAR BOX DATA PLATE

(Leadscrew pitch: 6mm)

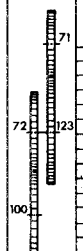




T.P.I.

mm / ↻

POS.	T.P.I.	POS.	T.P.I.	mm	POS.	mm	mm	POS.	mm
MJB6	3	MKA1	16	0,066	LKHT	0,024	0,266	LJHT	0,096
MJA1	4	MKB1	18	0,071	LKGT	0,026	0,286	LJGT	0,104
MJB1	4.1/2	MKC1	19	0,077	LKFT	0,028	0,310	LJFT	0,113
MJD1	5	MKD1	20	0,084	LKET	0,031	0,338	LJET	0,123
MJE1	5.1/2	MKE1	22	0,093	LKDT	0,034	0,372	LJDT	0,135
MJF1	6	MKF1	24	0,098	LKCT	0,036	0,391	LJCT	0,142
MJG1	6.1/2	MKG1	26	0,103	LKBT	0,038	0,413	LJBT	0,150
MJH1	7	MKH1	28	0,116	LKAT	0,042	0,465	LJAT	0,169
LJA1	8	LKA1	32	0,133	MKHT	0,048	0,531	MJHT	0,193
LJB1	9	LKB1	36	0,143	MKGT	0,052	0,572	MJGT	0,208
LJC1	9.1/2	LKC1	38	0,155	MKFT	0,056	0,620	MJFT	0,225
LJD1	10	LKD1	40	0,169	MKET	0,061	0,676	MJET	0,246
LJE1	11	LKE1	44	0,186	MKDT	0,068	0,743	MJDT	0,270
LJF1	12	LKF1	48	0,196	MKCT	0,071	0,783	MJCT	0,284
LJG1	13	LKG1	52	0,207	MKBT	0,075	0,826	MJBT	0,300
LJH1	14	LKH1	56	0,232	MKAT	0,084	0,929	MJAT	0,338

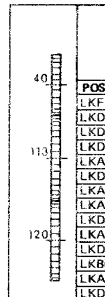


D.P.

mm / ↻

POS.	D.P.	POS.	D.P.	mm	POS.	mm	mm	POS.	mm
MJB6	12	LJH1	56	0,052	LKHT	0,019	0,209	LJHT	0,076
MJA1	16	MKA1	64	0,056	LKGT	0,020	0,225	LJGT	0,082
MJB1	18	MKB1	72	0,061	LKFT	0,022	0,243	LJFT	0,088
MJC1	19	MKC1	76	0,066	LKET	0,024	0,265	LJET	0,096
MJD1	20	MKD1	80	0,073	LKDT	0,027	0,292	LJDT	0,106
MJE1	22	MKE1	88	0,077	LKCT	0,028	0,307	LJCT	0,112
MJF1	24	MKF1	96	0,081	LKBT	0,029	0,324	LJBT	0,118
MJG1	26	MKG1	104	0,091	LKAT	0,033	0,365	LJAT	0,133
MJH1	28	MKH1	112	0,104	MKHT	0,038	0,417	MJHT	0,152
LJA1	32	LKA1	128	0,112	MKGT	0,041	0,449	MJGT	0,163
LJB1	36	LKB1	144	0,122	MKFT	0,044	0,487	MJFT	0,177
LJC1	38	LKC1	152	0,133	MKET	0,048	0,531	MJET	0,193
LJD1	40	LKD1	160	0,146	MKDT	0,053	0,584	MJDT	0,212
LJE1	44	LKE1	176	0,154	MKCT	0,056	0,615	MJCT	0,223
LJF1	48	LKF1	192	0,162	MKBT	0,059	0,649	MJBT	0,236
LJG1	52	LKG1	208	0,182	MKAT	0,066	0,730	MJAT	0,265

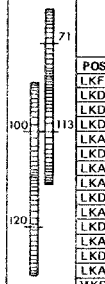
1:1 = LJD4



M.M.

mm / ↻

POS.	mm	POS.	mm	POS.	mm	POS.	mm	mm	POS.	mm	mm	POS.	mm
LKF2	0,375	LKA7	0,812	MKA7	1,625	LJA7	3,250	0,042	LKHT	0,015	0,167	LJHT	0,061
LKD1	0,400	LKA8	0,875	MKA8	1,750	LJA8	3,500	0,045	LKGT	0,016	0,180	LJGT	0,065
LKD2	0,450	MKD2	0,900	LJD2	1,800	MJD2	3,600	0,049	LKFT	0,018	0,195	LJFT	0,071
LKD3	0,475	MKD3	0,950	LJD3	1,900	MJD3	3,800	0,053	LKET	0,019	0,213	LJET	0,077
LKA1	0,500	MKA1	1,000	LJA1	2,000	MJA1	4,000	0,059	LKDT	0,021	0,234	LJDT	0,085
LKD5	0,550	MKD5	1,100	LJD5	2,200	MJD5	4,400	0,062	LKCT	0,022	0,246	LJCT	0,090
LKA2	0,562	MKA2	1,125	LJA2	2,250	MJA2	4,500	0,065	LKBT	0,024	0,260	LJBT	0,095
LKA3	0,593	MKA3	1,187	LJA3	2,375	MJA3	4,750	0,073	LKAT	0,027	0,293	LJAT	0,106
LKD6	0,600	MKD6	1,200	LJD6	2,400	MJD6	4,800	0,084	MKHT	0,030	0,335	MJHT	0,122
LKA4	0,625	MKB5	1,222	LJB5	2,444	MJA4	5,000	0,090	MKGT	0,033	0,360	MJGT	0,131
LKD7	0,650	MKA4	1,250	LJA4	2,500	MJD7	5,200	0,098	MKFT	0,035	0,390	MJFT	0,142
LKB6	0,666	MKD7	1,300	LJD7	2,600	MJA5	5,500	0,106	MKET	0,039	0,426	MJET	0,155
LKA5	0,687	MKA5	1,375	LJA5	2,750	MJD8	5,600	0,117	MKDT	0,043	0,468	MJDT	0,170
LKD8	0,700	MKD8	1,400	LJD8	2,800	MJA6	6,000	0,123	MKCT	0,045	0,493	MJCT	0,179
LKA6	0,750	MKA6	1,500	LJA6	3,000	MJA7	6,500	0,130	MKBT	0,047	0,520	MJBT	0,189
MKD1	0,800	LJD1	1,600	MJD1	3,200	MJA8	7,000	0,146	MKAT	0,053	0,585	MJAT	0,213

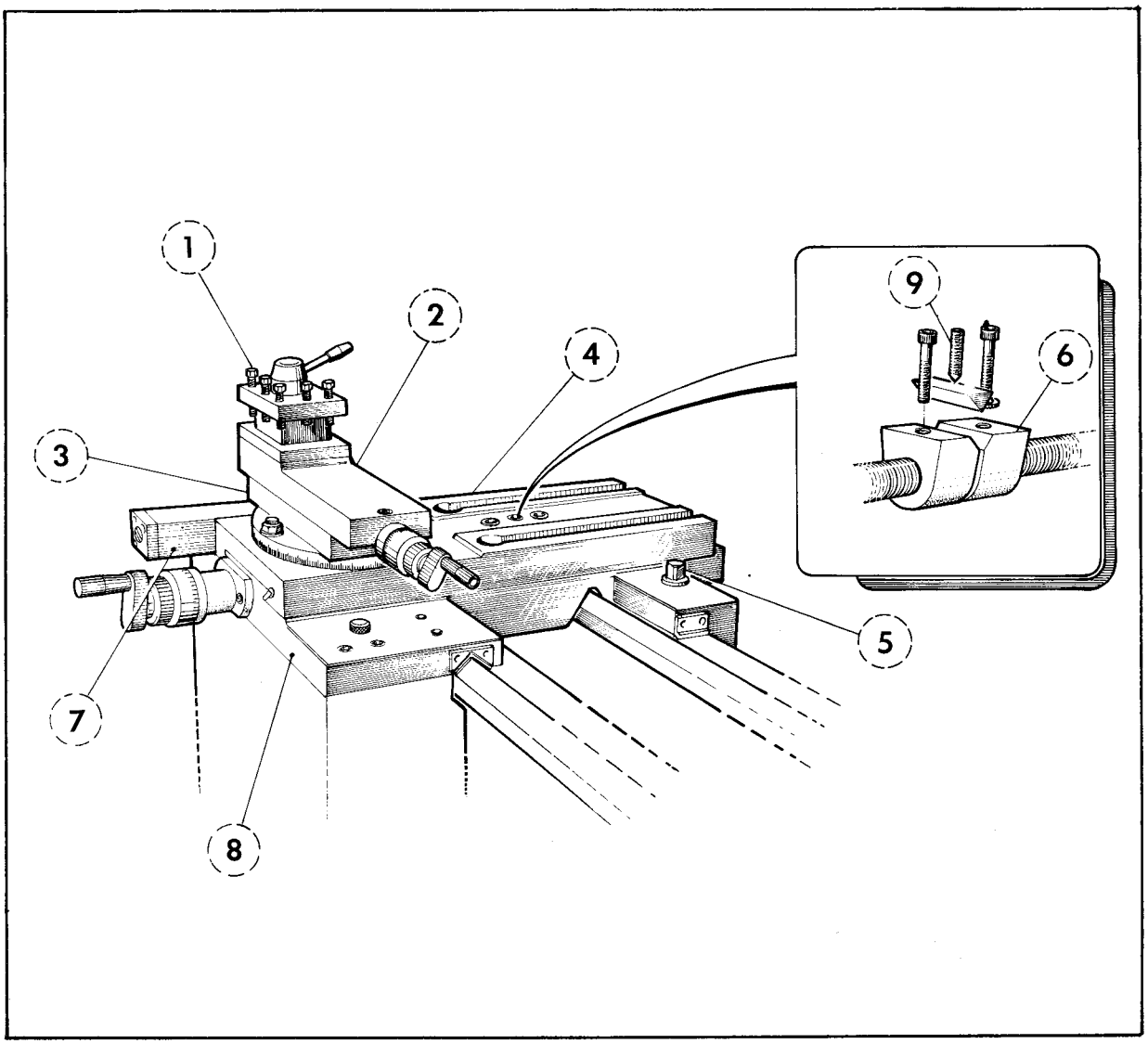


MOD.

mm / ↻

POS.	MOD.	POS.	MOD.	POS.	MOD.	POS.	MOD.	mm	POS.	mm	mm	POS.	mm
LKF2	0,1875	LKA6	0,4375	LJD1	0,8000	LJA8	1,7500	0,066	LKHT	0,024	0,263	LJHT	0,095
LKD1	0,2000	MKD2	0,4500	LJD2	0,9000	MJD2	1,8000	0,071	LKGT	0,026	0,283	LJGT	0,103
LKD2	0,2250	MKD3	0,4750	LJD3	0,9500	MJD3	1,9000	0,077	LKFT	0,028	0,307	LJFT	0,111
LKD3	0,2375	MKA1	0,5000	LJA1	1,0000	MJA1	2,0000	0,084	LKET	0,030	0,334	LJET	0,121
LKA1	0,2500	MKD5	0,5500	LJD5	1,1000	MJD5	2,2000	0,092	LKDT	0,033	0,368	LJDT	0,134
LKD5	0,2750	MKA2	0,5625	LJA2	1,1250	MJA2	2,2500	0,097	LKCT	0,035	0,387	LJCT	0,141
LKA2	0,2812	MKA3	0,5937	LJA3	1,1875	MJA3	2,3750	0,102	LKBT	0,037	0,409	LJBT	0,148
LKA3	0,2968	MKD6	0,6000	LJD6	1,2000	MJD6	2,4000	0,115	LKAT	0,042	0,460	LJAT	0,167
LKD6	0,3000	MKA4	0,6250	LJA4	1,2500	MJA4	2,5000	0,131	MKHT	0,048	0,525	MJHT	0,191
LKA4	0,3125	MKD7	0,6500	LJD7	1,3000	MJD7	2,6000	0,141	MKGT	0,051	0,566	MJGT	0,206
LKD7	0,3250	MKA5	0,6875	LJB6	1,3333	MJB6	2,6666	0,153	MKFT	0,056	0,613	MJFT	0,223
LKA5	0,3437	MKD8	0,7000	LJA5	1,3750	MJA5	2,7500	0,167	MKET	0,061	0,669	MJET	0,243
LKD8	0,3500	MKA6	0,7500	LJD8	1,4000	MJD8	2,8000	0,184	MKDT	0,067	0,736	MJDT	0,267
LKA6	0,3750	MKA7	0,8125	LJA6	1,5000	MJA6	3,0000	0,194	MKCT	0,070	0,774	MJCT	0,281
MKD1	0,4000	MKA8	0,8750	MJD1	1,6000	MJA7	3,2500	0,204	MKBT	0,074	0,817	MJBT	0,297
LKA7	0,4062	LJF1	0,6666	LJA7	1,6250	MJA8	3,5000	0,230	MKAT	0,084	0,920	MJAT	0,334

012 005 088 A



SADDLE

The saddle assembly consists of a toolpost (1), a top slide (2), a swivel slide (3), a cross slide (4), a device to automatic desengage of the transversal feed (7) and the housing of the saddle (8).

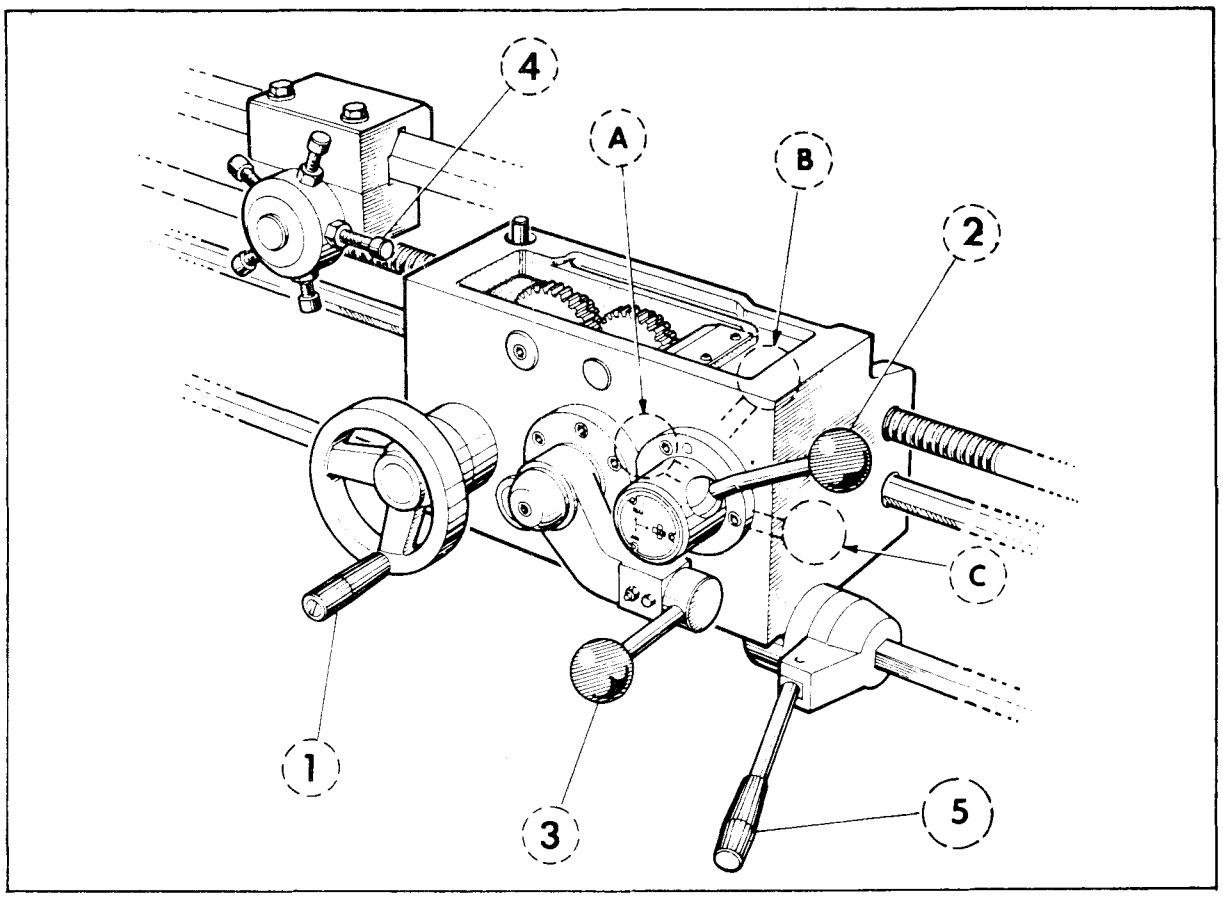
It was projected to offer easy handling that is smooth and precise.

To ensure precision readings on the cross slide dial, the nut (6) is special designed to eliminate all looseness, that is regulated through set screw (9).

Always, when turning faces, lock the saddle in its correct position using screw (5).

Give special attention to lubrication of the saddle, wich is done handle (see pag. 10).

APRON
(left hand)



The apron is positioned mannualy by handwheel (1).

The longitudinal and transversal feeds and leadscrew nut are clamped using only one lever (2) in three positions.

Position A - Transversal feeds clamp.

Position B - Longitudinal feeds clamp.

Position C - Leadscrew nut clamp.

The automatic disengage or engage is done through the lever (3).

The lubrication is done by a pump located inside the apron, with oil reservoirs and channels distributed inside the box guaranteeing that every part of the set is perfectly lubricated.

Spindle rotation and neutral position are done through lever (5) with three positions:

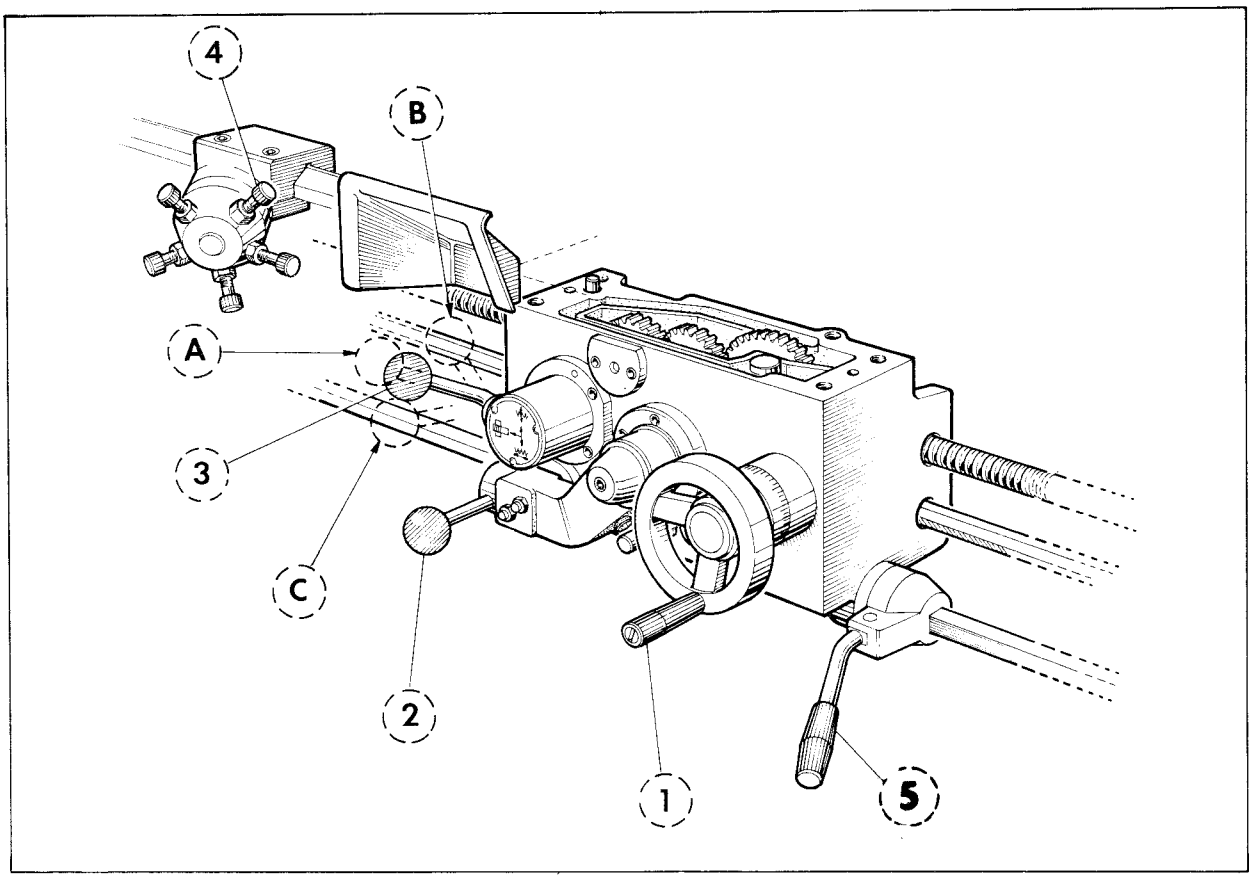
Downward position - The spindle turns forward.

Upward position - The spindle turns backward.

Central position - The spindle remains stopped.

The bed stops (4) does the longitudinal automatic disengage system, wich can be fitted at any position along the bed to be used in five stop positions.

APRON
(right - hand)



The apron is positioned mannualy by handwheel (1).

The longitudinal and transversal feeds and leadscrew nut are clamped using only one lever **(3)** in three positions.

Position A - Leadscrew nut clamp.

Position B - Transversal feeds clamp.

Position C - Longitudinal feeds clamp.

The automatic disengage or engage is done through the lever (2).

The lubrication is done by a pump located inside the apron, with oil reservoirs and channels distributed inside the box guaranteeing that every part of the set is perfectly lubricated.

Spindle rotation and neutral position are done through lever (5) with three positions:

Downward position - The spindle turns forward.

Upward position - The spindle turns backward.

Central position - The spindle remains stopped.

The bed stops (4) does the longitudinal automatic disengage system, wich can be fitted at any position along the bed to be used in five stop positions.

TAILSTOCK

The tailstock is moved over the base mannualy and fixed by lever (1).

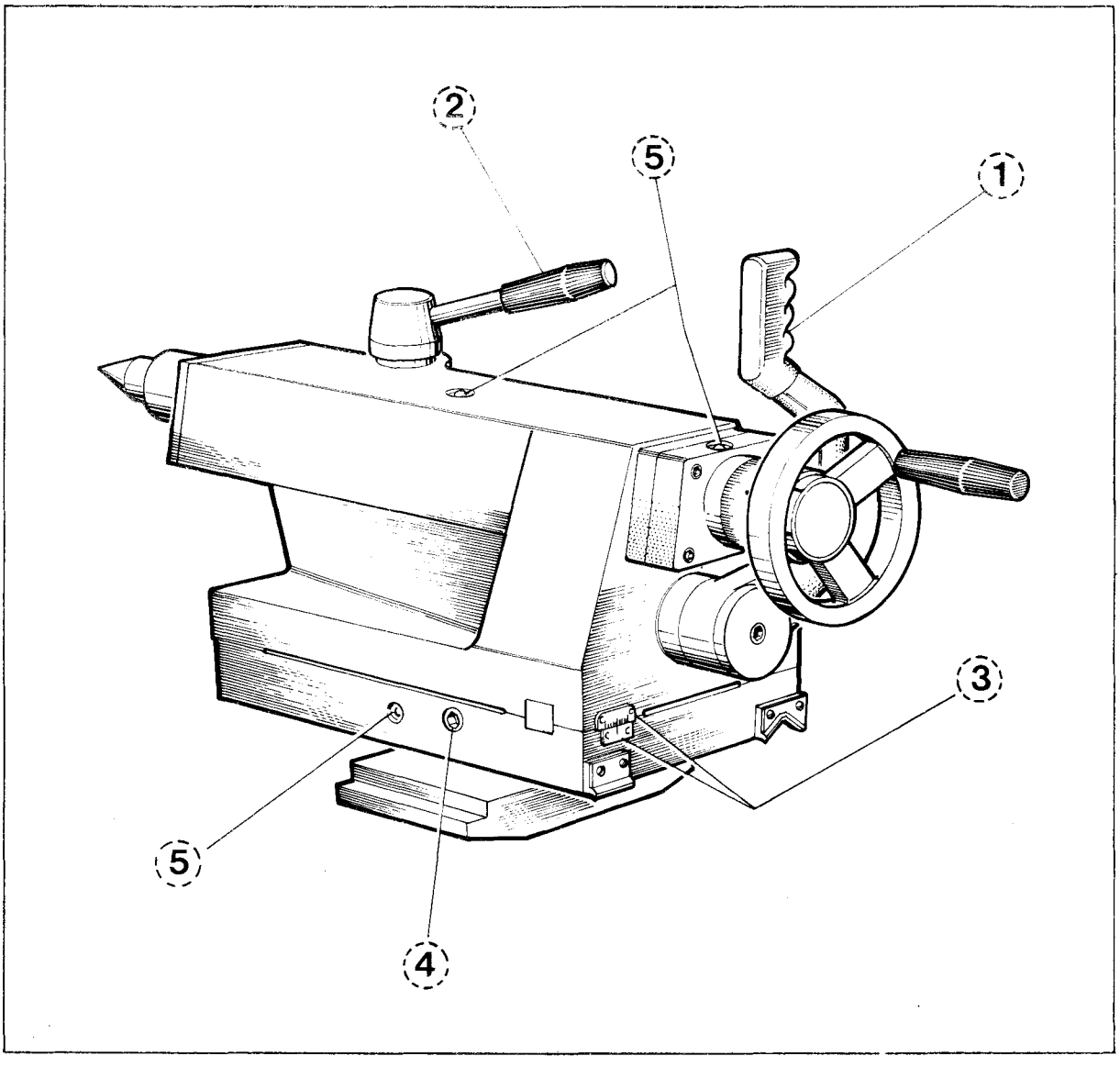
Center squaring and lateral displacement are made by leadscrew (4).

The index plate (3) provides a reading of the desired displacement. Each mark on the index plate corresponds to 1mm (0.039").

Before adjustment the tailstock must be loosened by turning of lever (1).

Barrel fixation is done by lever (2).

Lubrication of the screw and base is made at the lubrication points (5).



MOTOR DRIVING SYSTEM

The drive system consists of the motor, mounted on a base, supported by the axle and articulated over two screws that permit easy regulation of the drive belts.

The column points are reinforced by strong cording. Undesirable vibration is completely avoided when the motor is well balanced.

To adjust the drive belts, proceed in the following manner -

– Remove the covers (1) and (4).

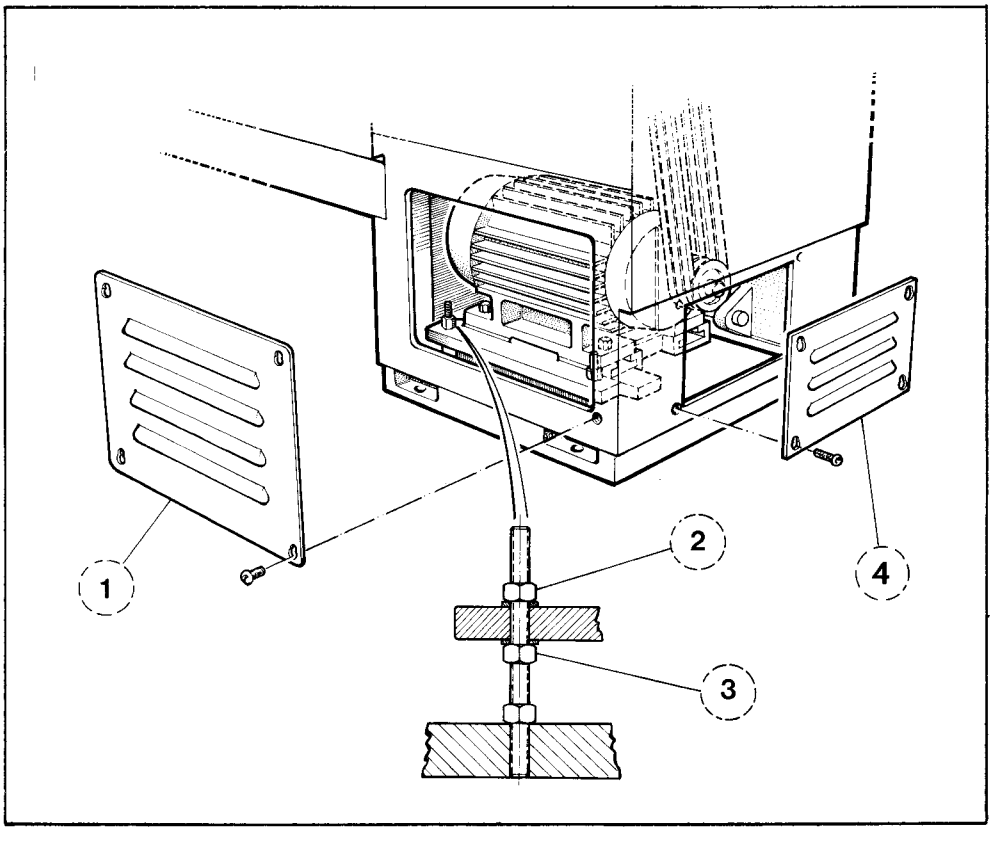
-- Loosen screw (3).

– Fasten screw (2) until the desired belt tension is achieved.

The verify correct belt tension, hold a ruler across space between the two sides of the belt.Press one half of the belt with the fingers. The belt shold move 6 to 10mm (.25" to .40").

– Tighten screw (3).

The complet set of belt must be replaced when there is sufficient wear that the belts ride near the botton of the pulley groove or are noticeably unequal in shape.

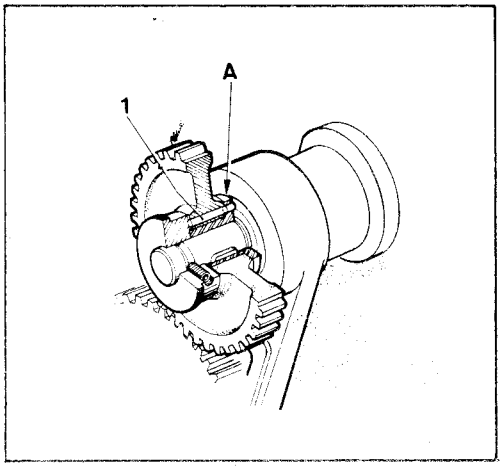


CHANGE GEAR

The change gear allows the operator to change or invert the position of the gears to obtain threads of Whitworth, Metric, Modular or Diametral Pitch. Instructions for mounting the change gears are on data plate of the threads-and-feeds gears box. After any change gears, the backlash must be .008" to .010".(0,1 to 0,2mm).

CHANGE GEAR SAFETY PIN

To avoid possible damage when the machine is used improperly or with excessive loads, the assembly includes a safety pin (1) which breaks (in part "A") before the gears themselves are damaged.



SAFETY COUPLING

A safety coupling is placed between the threads-and-feeds gear box transmisson and the feeds shaft. Its function also is to avoid possible damage caused by excessive loads or improper use of the lathe.

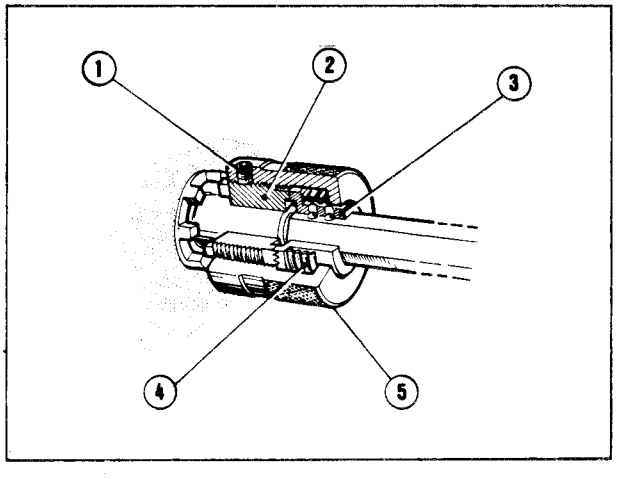
FUNCTION

When an excessive force bears on the feeds shaft, wheel (4) yields and drives coupling (3) away from piece (2), stopping the transmission of force.

When the assembly is reset, coupling (3) join again, impelled by spring (4) and the connection is re-established.

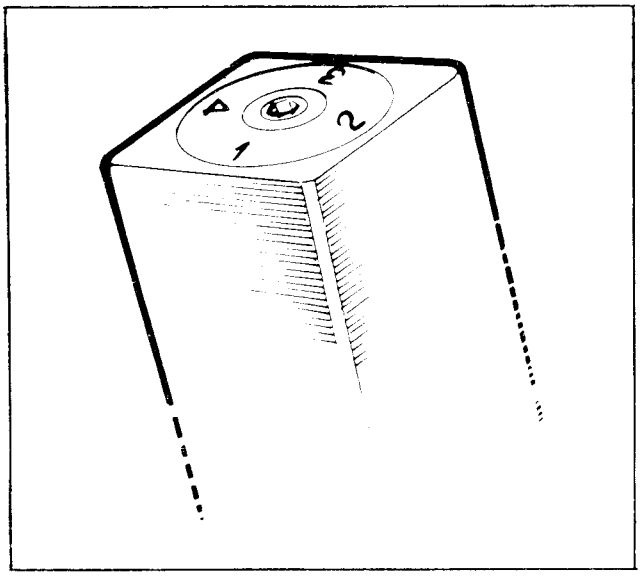
An easier or more difficult clamp is obtained by loosening the leadscrew (1) and adjusting the ratchet protector (5).

For easier unclamping, tighten the ratchet protector. After adjustment, refasten the leadscrew (1).



THREAD CUTING INDICATOR DIAL
(leadscrew 4 TPI)

This assembly shows the clamp point of half-nut so that the starting point of each of the different pitch sizes is coincident with that of the first one.



The dial indicator is divided into four numbered parts (1, 2, 3 and 4).

The example below shows how to use the dial –

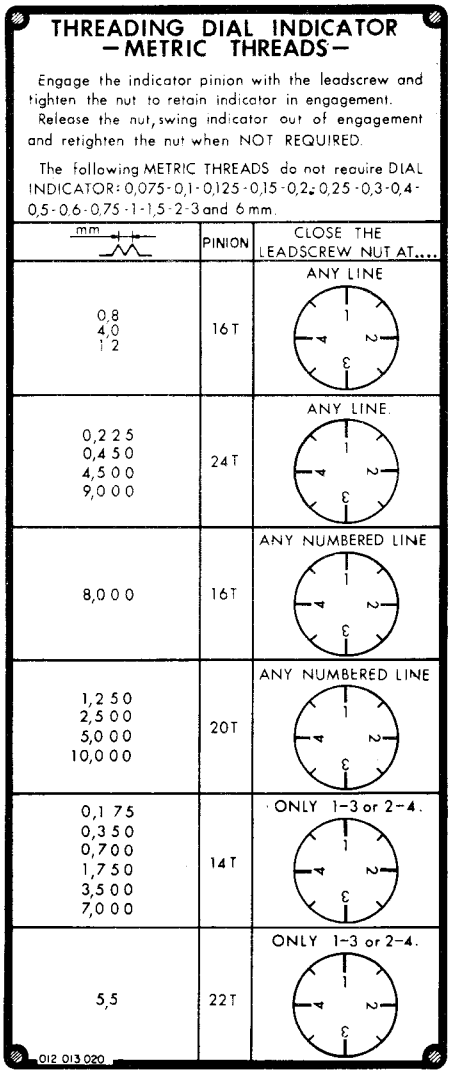
PITCH	EXAMPLE	CLAMP POINT
Multiples of 4	4 - 8 - 12 - 16 - 20 - 24 - 28 - . . .	The half nut may be engaged at any point without using the dial.
Even pair pitches	4 - 6 - 8 - 10 - 12 - 14 - 16 - . . .	At any number on dial.
Odd pair pitches	5 - 7 - 9 - 11 - 13 - 15 - 17 - . . .	At two opposed numbers, 1-3 or 2-4
Half pitches	4.1/2" - 5.1/2" - 6.1/2" - . . .	At any number. Always use the same
Quarter pitches	4.3/4" - 5.3/4" - 6.3/4" - . . .	Do not unclamp the half nut screw

If the thread is Metric, Module or Diametral Pitch, the half-nut must remain engaged through the operation (until the end of the thread).

THREAD CUTTING INDICATOR DIAL
(leadscrew pitch - 6mm)

This assembly shows the clamp point of the half-nut screw, so that the starting point of each of the different pitch sizes is coincident with that of the first one. The dial is divided into four numbered parts (1, 2, 3 and 4).

The example below shows how to use the dial.

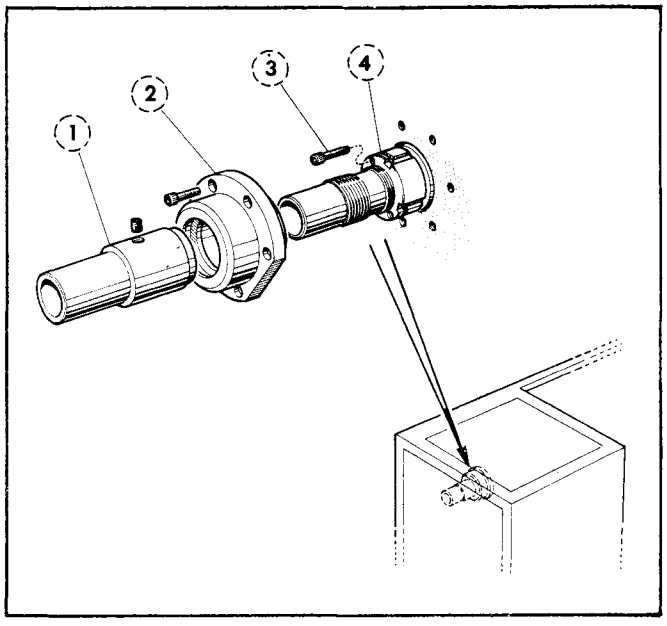


If the thread is T.P.I., Modular or Diametral Pitch, the half-nut screw must remain engaged throughc the operation (until the end of the thread).

SPINDLE ADJUSTMENT

The spindle is mounted over precision conical bearings and gives the headstock exact and silent operation. After prolonged use, however, adjustment is required. Proceed in this way -

- Remove the spindle complement (1) and the cover (2).
- Lossen the cap screws (3).
- Adjust the bearings through nut (4).
- Tighten cap screws (3), locking the nut (4).
- Replace the spindle complement (1) and the cover (2).



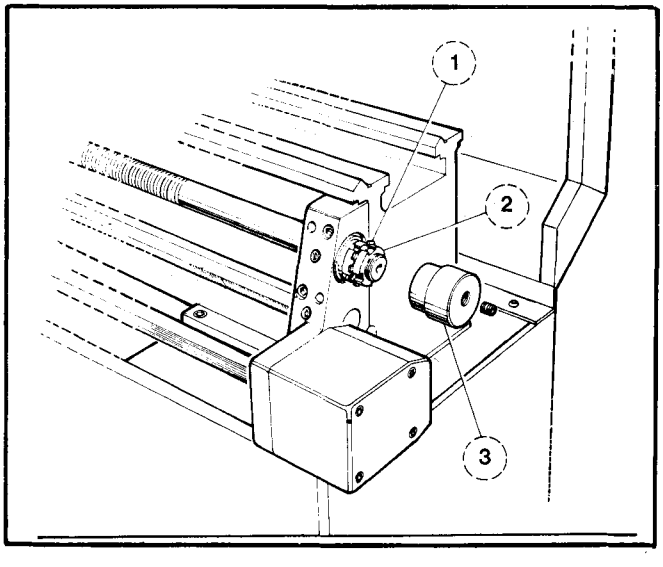
Because the bearings are of high precision, we recommend that this operation be done only by qualified personnel.

NOTE - Excessive pressure on the bearings will cause serious damage.
When the levers of the headstock are in the neutral position, the spindle must turn freely.
Axial clearance must be readjusted to easy pressure in the case of heating after the adjustment has been performed.

LEADSCREW AXLE ADJUSTMENT

Adjust the leadscrew axle as follows -

- Remove the cover (3)
- Loosen the trammel ot washer (1)
- Adjust the leadscrew axial clearance by turning the nuts (2).
  (This clearance must be measured using a precision comparator with magnetic base and a bearing ball.
  Apply a little grease, then fix the ball on the leadscrew point. Turn the spindle and press the comparator. The axial clearance must be a maximun of 0.01mm).



- Replace the cover (3)

BRAKE SYSTEM

Spindle rotation command is made by using lever located at the right end of apron.

Reverse or forward rotation is obtained moving lever up or down.

The Electromagnetic Brake is automatically energized when this lever is placed on, or passes through the central position.

When stoping the spindle by placing lever on its central position the brake is energized and after the spindle is completely stoped, the brake is desenergized.

The reversion of spindle is made through the lever without stoping in its central position because the RELAY/SENSOR of moving, free the selected revolution direction after total spindle tops.

HOW TO ADJUST THE SENSOR'S POSITION

To adjust the SENSOR/RELAY of moving system (see electrical diagram) follow the instructions:

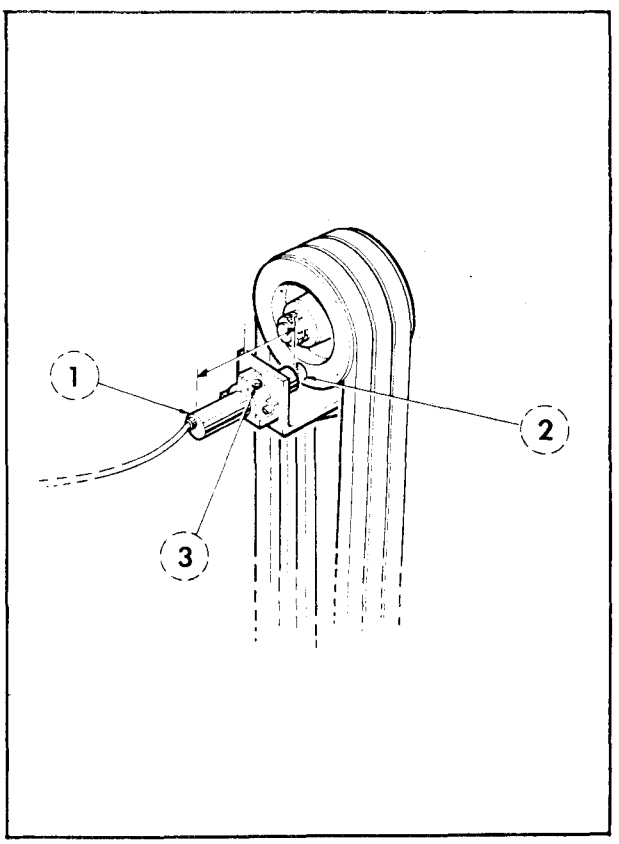
A – Verify the SENSOR A2 (1) alignment in relation to the pulley hole (2) (Ø 18mmx1,5mm deep).

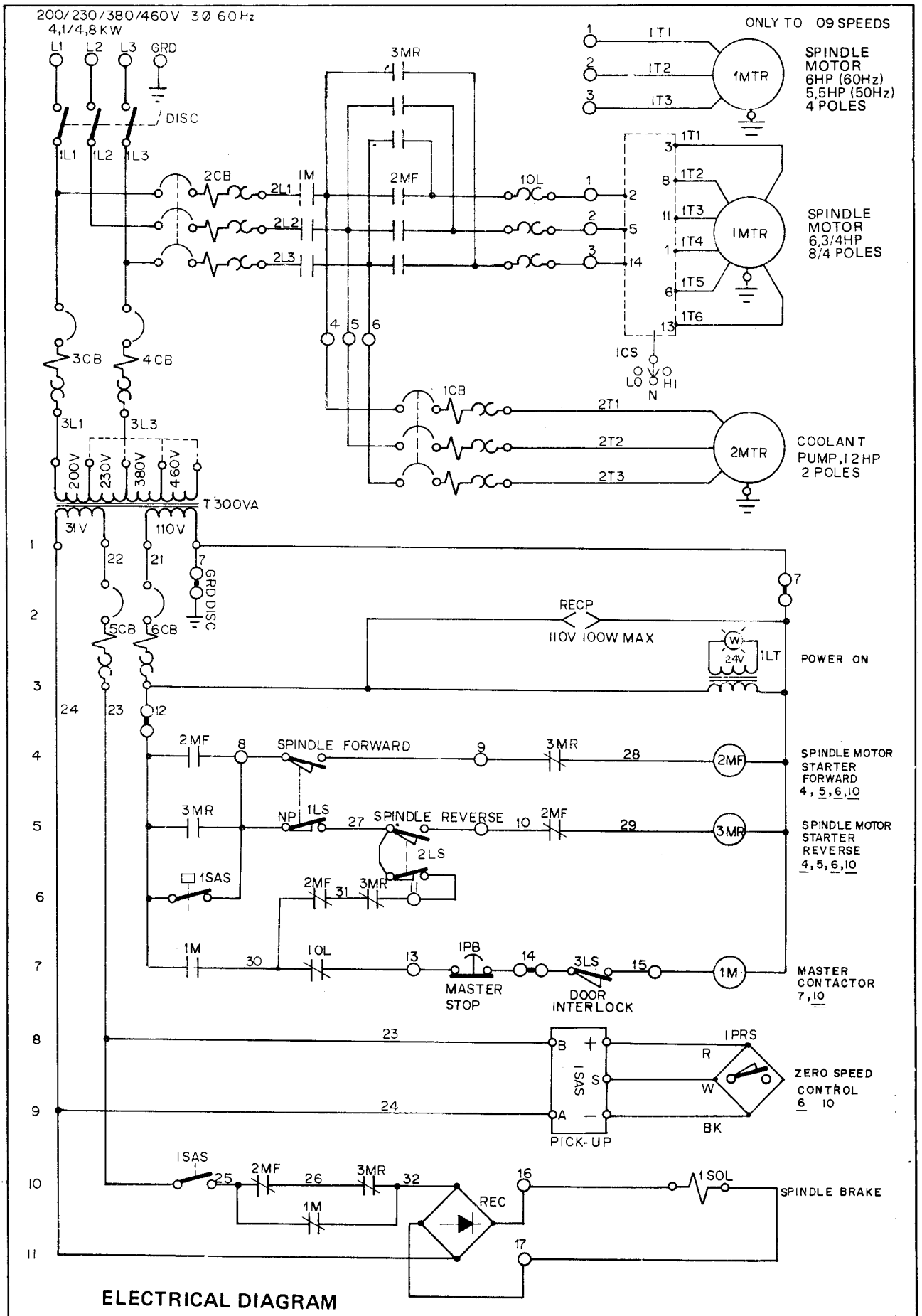
B – Put the spindle in motion (any speed).

C – Loose the nuts (3) and aproximate carefuly the SENSOR to the Pulley until that the LED of the RELAY (A1) turn "OFF". Make note on the sensor's position.

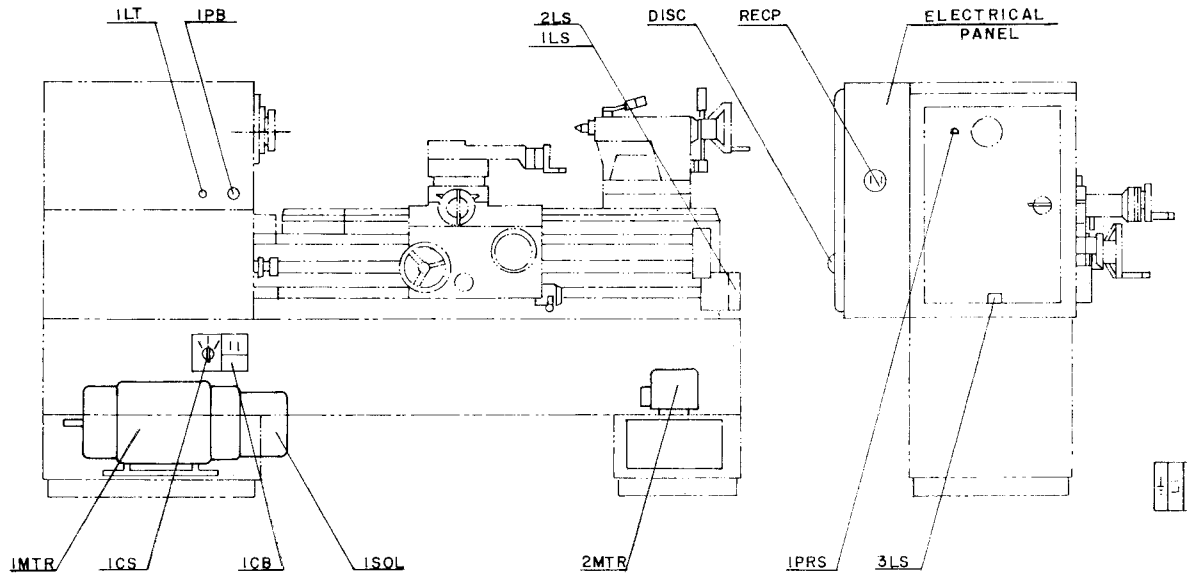
D – Move back the SENSOR carefuly (the LED will be "ON" again) until that the LED turn "OFF" again. Make note on the sensor's position.

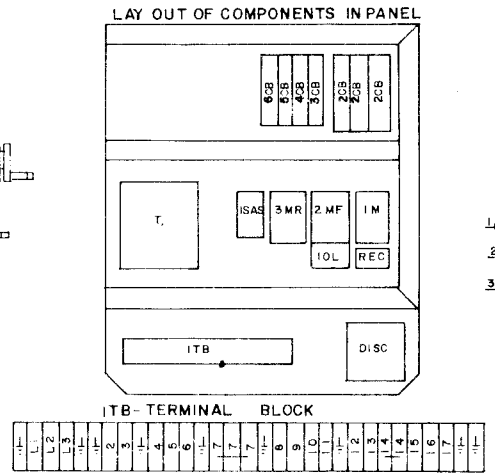
E – Fix the SENSOR between the two position obtained in "C" and "D"

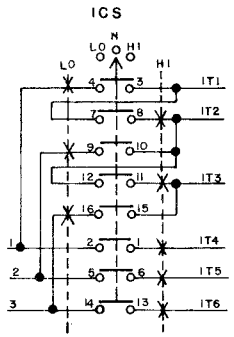




ELECTRICAL DIAGRAM
012015018DE







ELECTRICAL DIAGRAM
012015018DE

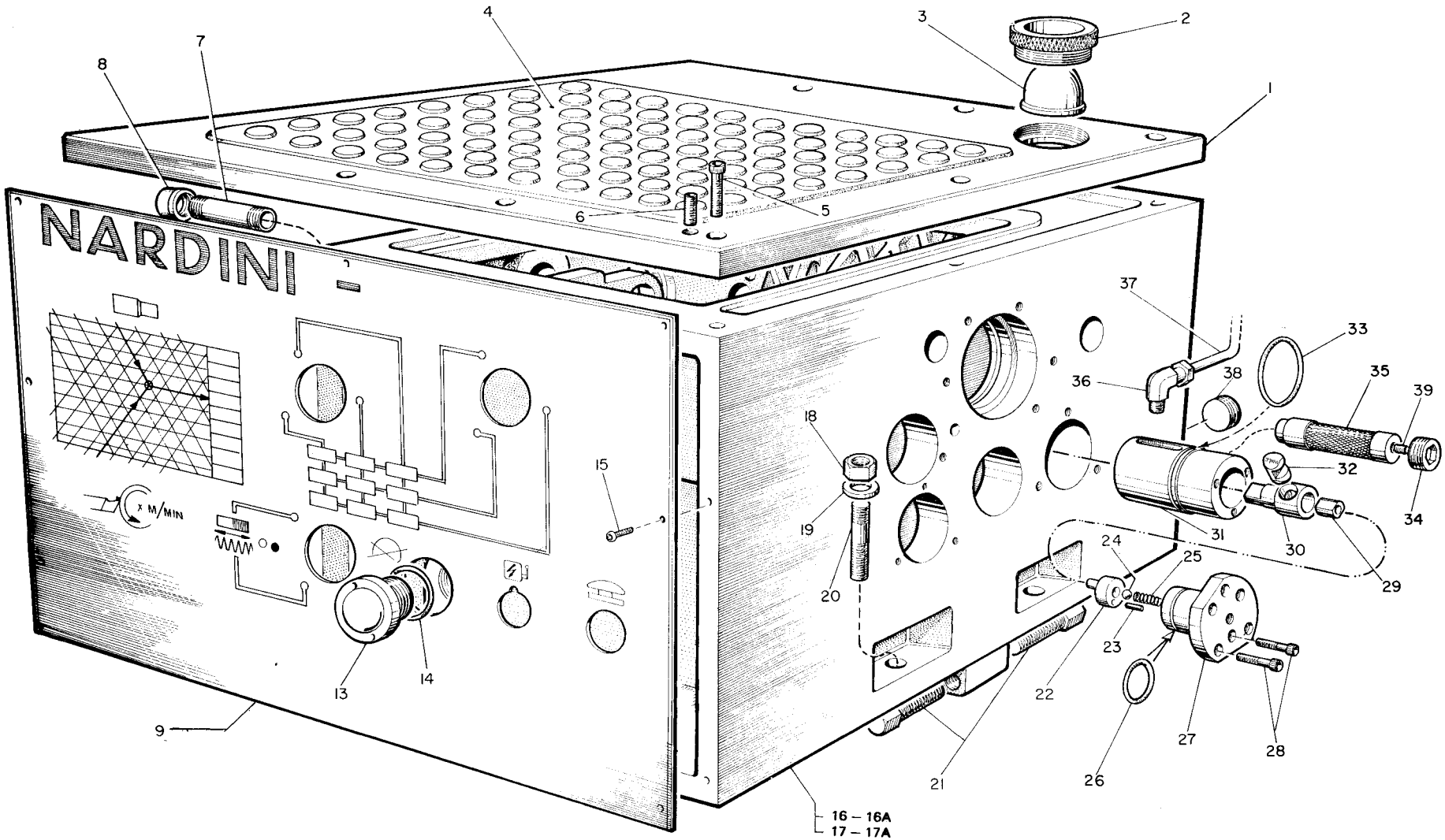
SIMBOL	QT	FUNCTION	TYPE	200/208V	220/230V	380/460V	MANUFACTURER.
1CS	01	CAM SWITCH	PO 12/40E	●	●		SEMITRANS
			PO 12/32E			●	
1OL	01	OVERLOAD RELAY	LR1- D25322	●	●		TELEMECANIQUE
			LR1 - D16321			●	
2MF-3MR	02	SPINDLE MOTOR STARTERS	LC1 -D259- ZK	●	●		TELEMECANIQUE
			LC1-D169 - ZK			●	
1M	01	MASTER CONTACTOR	LC1-D253 - ZK	●	●		TELEMECANIQUE
			LC1-D163 - ZK			●	
5CB-6CB	02	CIRCUIT BREAKER	5SP3- 141	●	●	●	SIEMENS
3CB-4CB	02	CIRCUIT BREAKER	5SP3- 141	●	●	●	SIEMENS
2CB	01	CIRCUIT BREAKER	5SK7- 332	●	●		SIEMENS
			5SK7- 316			●	

SIMBOL	QT	FUNCTION	TYPE	200/208V	220/230V	380/460V	MANUFACTURER
1CB	01	CIRCUIT BREAKER	PKZM0-0,6	●	●		K. MOELLER
			PKZM0-0,4			●	
DISC	01	POWER DISCONNECT	C26- AG7- 359	●	●		KRAUS NAIMER
			B21- AG7- 359			●	
T	01	CONTROL TRANSFORMER	PRIM.200/230/380/460V 300VA 1º SEC.0/110V.200VA	●	●	●	KRON
			2º SEC.0/31V.100 VA				
1LT	01	PILOT LIGHT	BA9s-24V- 40mA	●	●	●	BLINDEX
			2000/0 TRI40x24V				
1PB	01	MASTER STOP	2B- 2002G. VM	●	●	●	BLINDEX
3LS	01	MICROSSWITCH	MC 5S1	●	●	●	KAP
1LS-2LS	02	MICROSSWITCH	LM7	●	●	●	LIMIT
1SOL	01	SPINDLE BRAKE	UPF-5	●	●	●	UNITEC
1SAS	01	ZERO SPEED CONTROL RELAY	MPU13- 30VCA	●	●	●	DIGIMEC
1PRS	01	PICK-UP	PS5 -16P-E/SX	●	●	●	SENSE
REC	01	RECTIFIER	MSK B 250/220-1,5	●	●	●	SEMIKRON
RECP	01	RECEPTACLE	S-2006	●	●	●	STECK

PARTS LIST

Spare parts orders can be answered quicly and correctly if the followin information is provided:

- Lathe's model
- Lathe's serial number (it is written on the back part of the bed)
- Name, reference and number of the piece
- Quantity of pieces desired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MS-MI-401C

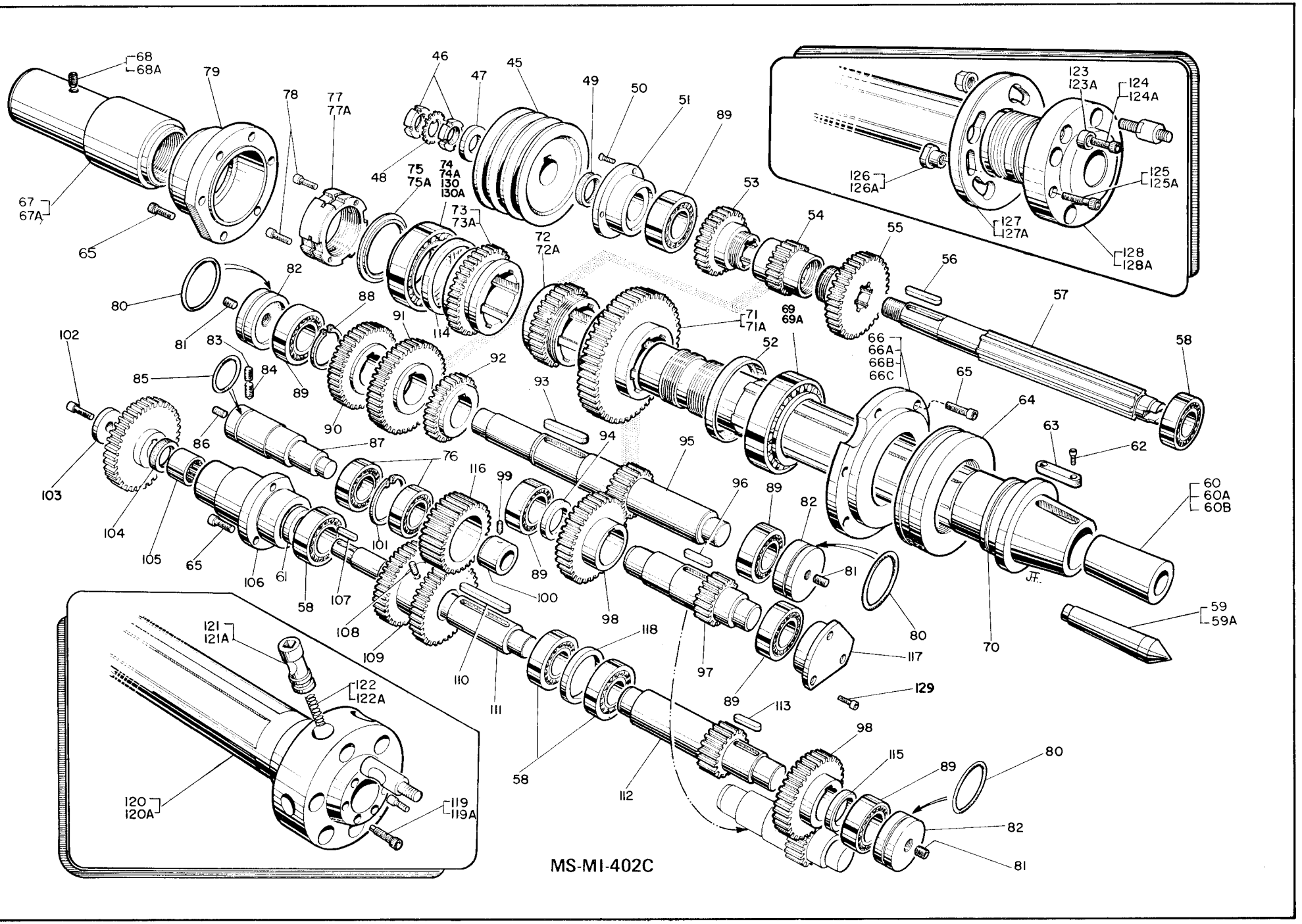
HEADSTOCK MS-MI-401C

REF.	NUMBER	NAME
1	012001003	Cover
2	012001060	Nut
3	001118040	Oil sight
4	012001080	Shield
5	001001208	Cap screw (M8x25)
6	001008410	Set screw (M10x20)
7	012001077	Drain pipe
8	001207003	Elbow
9	012001123	Data plate ***
13	001118010	Oil sight
14	001133117	Oil ring
15	001036154	Cap screw (M3x8)
16	012001001	Casting (spindle bore - 46 and 42mm)*
16A	012001133	Casting (spindle bore - 52mm)*
17	012001002	Casting (spindle bore - 46 and 42mm)**
17A	012001134	Casting (spindle bore - 52mm)**
18	001012112	Nut
19	001014015	Washer
20	001024306	Stud
21	012001059	Pin
22	012001086	Wheel pin
23	001020355	Pin (4x12)
24	001127030	Ball (6,5)
25	001117052	Spring
26	C01133122	Oil ring
27	012001058	Cover
28	001001156	Cap screw (M8x16)
29	012001083	Bushing
30	012001052	Shaft
31	012001048	Pump housing
32	012001084	Impeller pin
33	001133227	Oil ring
34	001205007	Plug
35	012001117	Oil filter
36	001254005	Connector
37	001263103	Pipe
38	001205005	Plug
39	001008407	Set screw (M10x10)

* Models MS-1400 S/E and MS-175 S/E

** Models MS-1600 S/E and MS-205 AS/AE

*** When asking this part, specify the model and between centers.


MS-MI-402C

HEADSTOCK MS-MI-402C

REF.	NUMBER	NAME
45	012001126	Pulley
46	001030005	Lock nut KM-4
47	001014019	Washer
48	001031005	Lock washer MB - 4
49	001113056	Oil seal
50	001002106	Cap screw (M6x16)
51	012001127	Cover
52	013001016	Clipping
53	012001042	Gear Z =36
54	012001033	Gear Z =27
55	012001032	Gear Z =46
56	001023161	Key
57	012001125	Shaft
58	001300049	Bearing 6305
59	001121004	Center *
59A	001121005	Center **
60	012001088	Conical bushing (ASA - DIN)*
60A	012001085	Conical bushing (CAMLOCK)*
60B	014001046	Conical bushing (CAMLOCK,DIN)**
61	013001025	Clipping
62	001028204	Cap screw (3/16"Wx3/8")(ASA)*
63	001016002	Key (ASA)*
64	012001070	Chuck nut (ASA)*
65	001001157	Cap screw (M6x20)
66	012001110	Cover (ASA)*
66A	012001111	Cover (CAMLOCK and DIN)*
66B	012001120	Cover (CAMLOCK)**
66C	013001024	Cover (DIN)**
67	012001121	Spindle extention*
67A	012001132	Spindle extention**
68	001010356	Set screw (M8x10)*
68A	001010357	Set screw (M8x12)**
69	001316022	Bearing TINKEN
69A	001316322	Bearing TIMKEN (cup)*
70	012001109A	Spindle (ASA)*
71	012001004	Gear Z =57*
71A	014001042	Gear Z =57 **
72	012001012	Gear Z =41*
72A	014001041	Gear Z =41**
73	012001024	Gear Z =48*
73A	014001040	Gear Z =48**
74	001316015	Bearing TIMKEN (cone)*
74A	001316315	Bearing TIMKEN (cup)*
75	012001072	Collar*
75A	014001045	Collar**
76	001300053	Bearing 6006
77	012001122	Nut*
77A	014001044	Nut**
78	001001106	Cap screw (M5x20)
79	012001074A	Rear Cover
Ø0	001133227	Oil ring
Ø1	001008357	Set screw (M8x10)
82	012001018	Cover
83	001008359	Set screw (M8x16)
Ø4	001009359	Set screw (MØx16)
85	001133125	Oil ring
86	001008459	Set screw (M12x16)
87	012001010	Shaft
88	001033031	Snap ring (38)
89	001300054	Bearing 6206
90	012001030	Gear Z =45
91	012001029	Gear Z =54
92	012001031	Gear Z =35
93	001023214	Key
94	012001013	Spacer
95	012001039	Gear shaft
96	001023210	Key
97	012001011	Gear Z =19
98	012001005	Gear Z =38
99	001009359	Set screw (M8x20)
100	012001014	Bushing
101	001034036	Snap ring (55)
102	001001207	Cap screw (M8x20)
103	012001026	Washer
104	001113144	Oil seal
105	001309038	Bearing NKI 22/20
106	012001028	Bearing flanged housing
107	001023106	Key
108	001009409	Set screw (M10x16)
109	012001025	Double gear
110	001023215	Key
111	012001021	Shaft
112	012001022	Gear shaft
113	001023210	Key
114	013001005	Clipping
115	012001020	Spacer
116	012001006	Gear Z =40
117	014001018	Cover
118	012001019	Spacer
129	001001156	Cap screw (M8x16)
130	001316017	Bearing TIMKEN (cone)**
130A	001316317	Bearing TIMKEN (cup)**

SPINDLE NOSE CAMLOCK D1-5
(Spindle bore - 46mm)(1.21/32")

119	001016011	Cam screw
120	012001112A	Spindle
121	001107034	Cam
122	001117085	Cam spring

SPINDLE NOSE CAMLOCK D1-6
(Spindle bore - 52mm)(2.1/32")

119A	001016012	Cam screw
120A	014001039A	Spindle
121A	001107035	Cam
122A	001107141	Cam spring

SPINDLE NOSE DIN 55022 - 5
(Spindle bore - 46mm)(1.13/16")

123	001107012	Drag pin
124	001001156	Cap screw (M6x16)
125	001001158	Cap screw (M6x25)
126	001107113	Nut
127	001107103	Collar
128	012001108A	Spindle

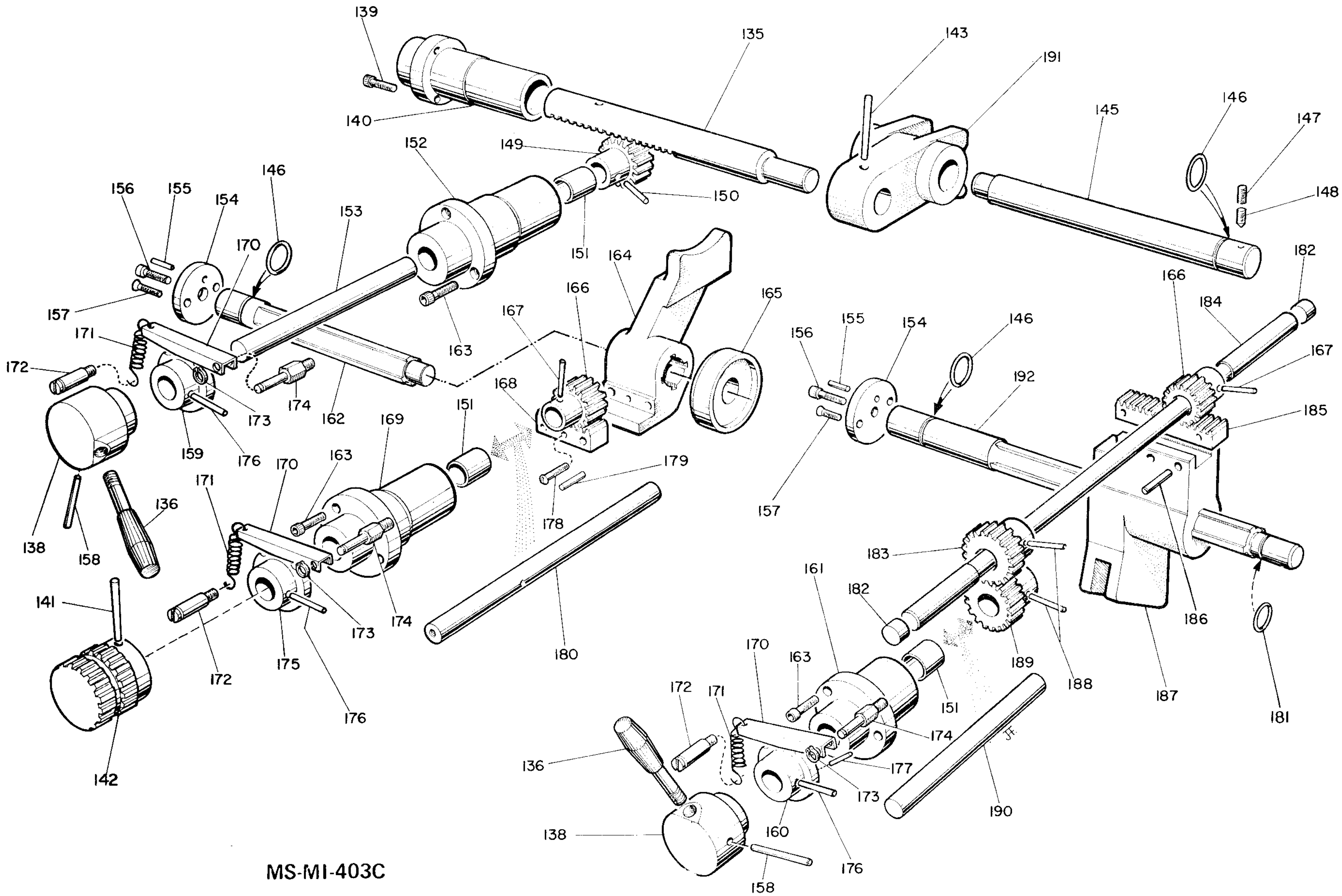
SPINDLE NOSE DIN 55022 - 6
(Spindle bore - 52mm)(2.1/32")

123A	001107013	Drag pin
124A	001001207	Cap screw (M7x16)
125A	001001209	Cap screw (M6x25)
126A	001107114	Nut
127A	001107104	Collar
128A	014001065	Spindle

* Spindle bore - 46mm (1.13/16") or 42mm (1.21/32")

** Spindle bore - 52mm (2.1/32")

Spindle nose ASA LO - Spindle bore 46mm (1.13/16")



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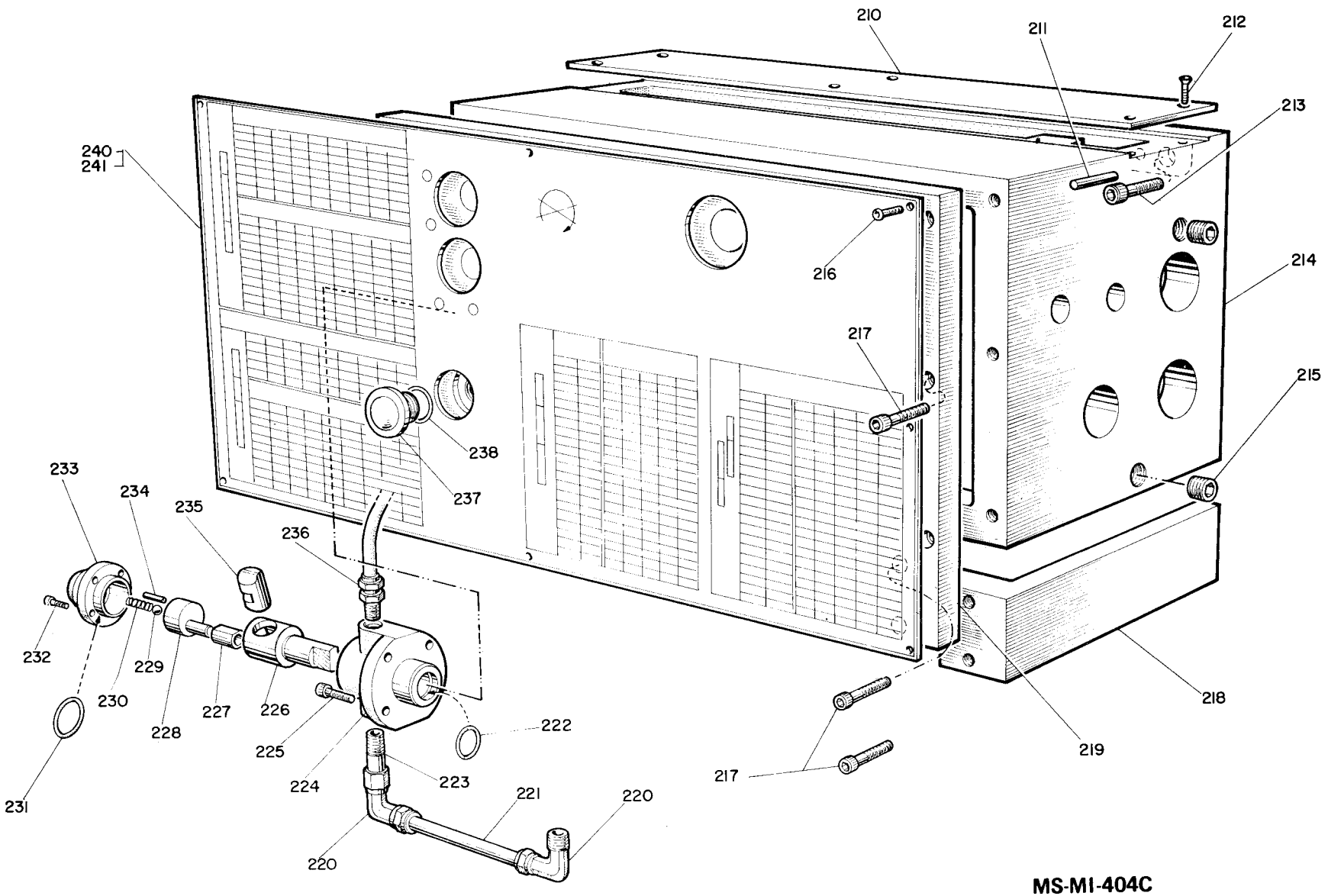
MS-MI-403C

REF.	NUMBER	NAME
135	012001046	Rack shaft
136	001112010	Handle
138	012001091	Handle sleeve
139	001001157	Cap screw (M6x20)
140	012001047	Cover
141	001017416	Taper pin (5x50)
142	016005084	Handle
143	001018008	Taper pin (5x45)
144	013001026	Collar
145	012001008	Shaft
146	001133115	Oil ring
147	001008358	Set screw (M8x12)
148	001009358	Set screw (M8x12)
149	012001087	Gear Z=18
150	001021313	Split pin (5x28)
151	001114156	Bushing
152	012001096	Flanged bushing
153	012001093	Shaft
154	012001016	Flange
155	001021256	Split pin (4x14)
156	001001207	Cap screw (M8x20)
157	001002106	Cap screw (M6x16)
158	001017417	Taper pin (5x55)
159	012001090	Ratchet
160	012001089	Ratchet
161	012001095	Flanged bushing
162	012001007	Shaft
163	001001156	Cap screw (M6x20)
164	012001027	Shifting fork
165	012001015	Spacer
166	012001035	Gear Z=15
167	001021311	Split pin (5x24)
168	012001050	Rack
169	012001097	Flanged bushing
170	012001057	Ratchet guide
171	001116100	Spring
172	012001056	Shaft
173 •	001033003	Snap ring (5)
174	012001055	Shaft
175	012001045	Ratchet
176	001021316	Split pin (5x36)
177	001021206	Split pin (3x14)
178	001003158	Cap screw (M6x25)
179	001021315	Split pin (5x32)
180	012001094	Shaft
181	001133113	Oil ring
182	012001079	Plug
183	012001036	Gear Z=22
184	012001034	Shaft
185	012001051	Rack
186	001021314	Split pin (5x30)
187	012001017	Shifting fork
188	001021315	Split pin (5x32)
189	012001040	Gear Z=20
190	012001092	Shaft
191	012001023	Shifting fork
192	012001049	Shaft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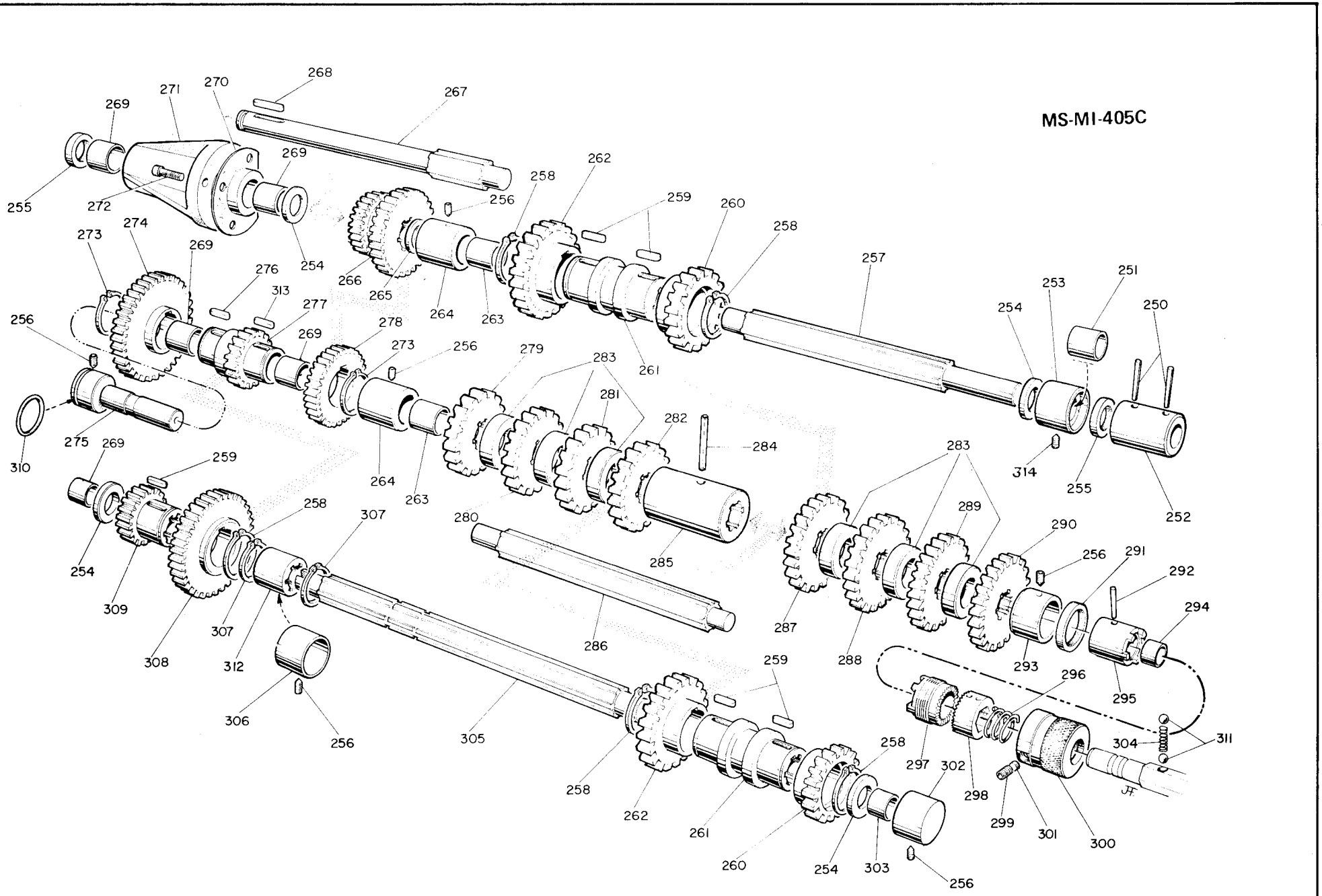
MS-MI-404C

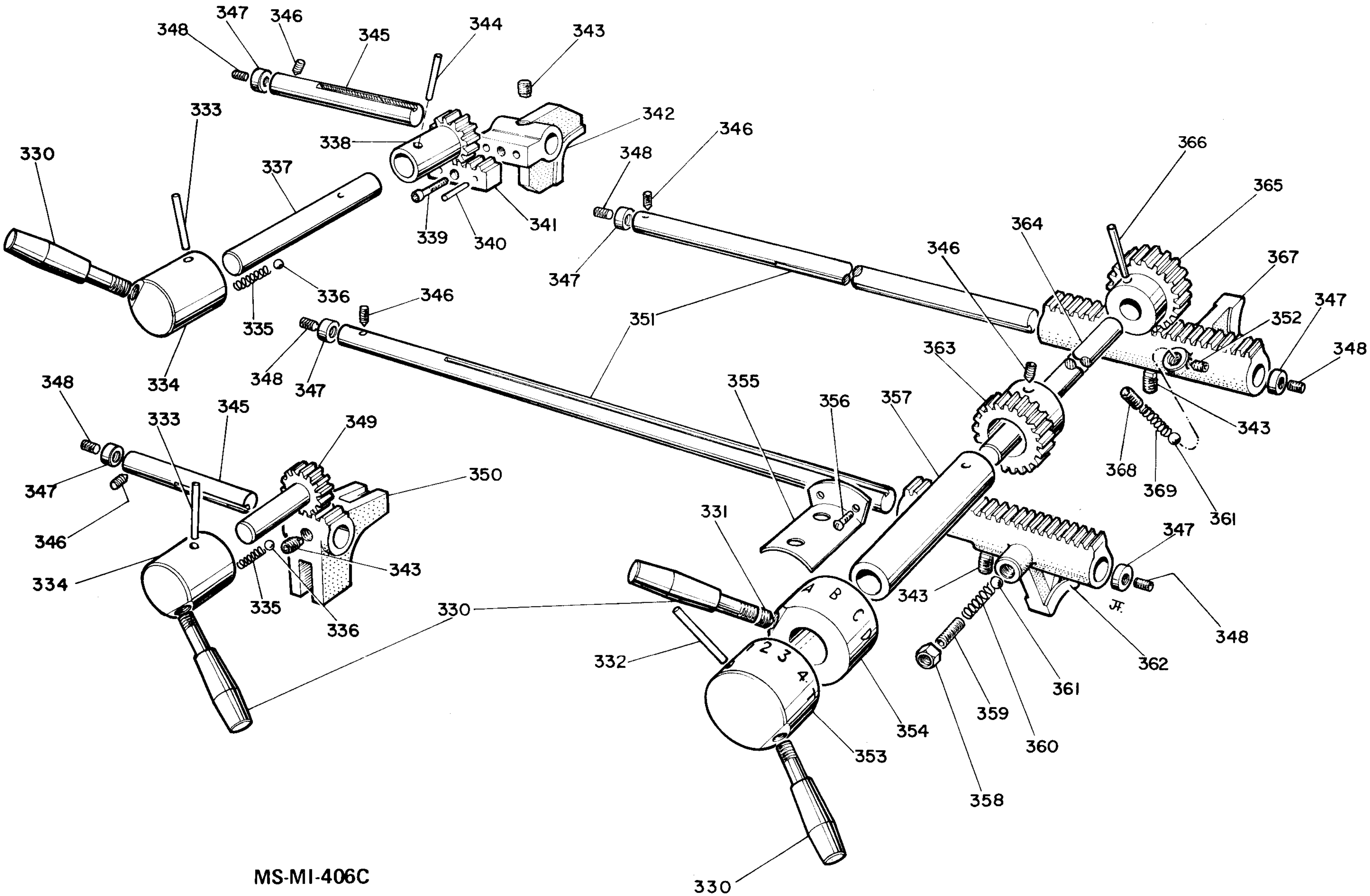
GEAR BOX MS-MI-404C

REF.	NUMBER	NAME
210	012005019	Cover
211	001018005	Taper pin (6x32)
212	001013406	Cap screw (M5x10)
213	001001259	Cap screw (M10x25)
214	012005001	Casting
215	001205003	Plug
216	001036154	Cap screw (M3x8)
217	001001156	Cap screw (M6x16)
218	012005072	Cover
219	012005002	Cover
220	001229012	Connector
221	001231005	Pipe (nylon)
222	001133013	Oil ring
223	012005097	Connector
224	012005092	Pump housing
225	001001160	Cap screw (M6x35
226	012001052	Shaft
227	012001083	Bushing
228	012001086	Wheel pin
229	001127030	Ball
230	001117052	Spring
231	001133019	Oil ring
232	001007358	Cap screw (M4x12)
233	012005093	Cover
234	001021255	Split pin (4x12)
235	012001084	Impeller pin
236	001227013	Connector
237	001118010	Oil sight
238	001133117	Oil ring
240	012005096	Data plate (leadscrew pitch - 4 TPI
241	012005088A	Data plate (leadscrew pitch - 6mm


MS-MI-405C

GEAR BOX MS-MI-405C

REF.	NUMBER	NAME
250	001017413	Taper pin (5x36)
251	001114257	Bushing
252	012005044	Sleeve
253	012005043	Bushing
254	012005022	Washer
255	005.05 BR	Oil seal
256	001009307	Set screw (M6x10)
257	012005004	Shaft
258	001033030	Snap ring (36)
259	001023104	Key
260	012005042	Gear Z=20
261	012005014	Spacer
262	012005041	Gear Z=20
263	001114258	Bushing
264	012005030	Bushing
265	012005029	Spacer
266	012005008	Double gear Z=22 - Z=33
267	012005007	Shaft
268	001023110	Key
269	001114256	Bushing
270		Gasket
271	012005005	Flanged bearing
272	001001156	Cap screw (M6x16)
273	001033028	Snap ring (34)
274	012005025	Gear Z=44
275	012005009	Shaft
276	012005023	Key
277	012005010	Gear Z=22
278	012005026	Gear Z=33
279	012005037	Gear Z=16
280	012005036	Gear Z=18
281	012005040	Gear Z=19
282	012005038	Gear Z=20
283	012005039	Spacer
284	001021318	Split pin (5x45)
285	012005031	Spacer
286	012005013	Shaft
287	012005032	Gear Z=22
288	012005033	Gear Z=24
289	012005034	Gear Z=26
290	012005035	Gear Z=28
291	015.35 BR	Oil seal Sabo
292	001017410	Taper pin (5x28)
293	012005051	Bushing
294	012005050	Bushing
295	012005049	Clutch
296	001117490	Spring
297	012005048	Clutch
298	012005046	Clutch
299	001008305	Set screw (M6x16)
300	012005047	Clamp bushing
301	012005045	Contact point
302	012005027	Bushing
303	001114255	Bushing
304	001117045	Spring
305	012005011A	Bushing
306	012005063	Bushing
307	001033022	Snap ring (25)
308	012005028	Gear Z=44
309	012005012	Gear Z=22
310	001133125	Oil ring
311	001127030	Ball (6,5)
312	012005064	Sleeve
313	012005024	Key
314	001009305	Set screw (M6x6)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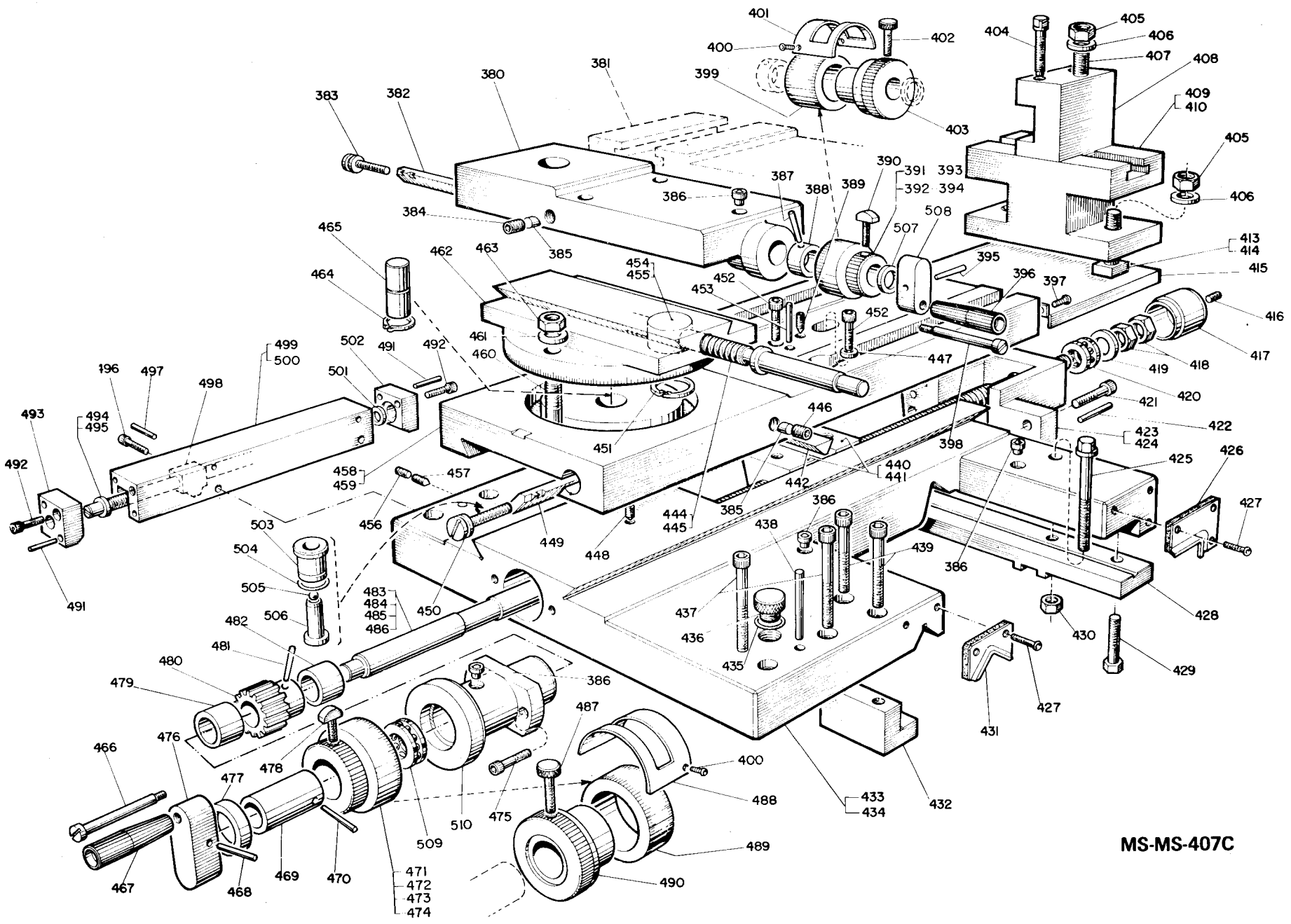
MS-MI-406C

GEAR BOX MS-MI-406C

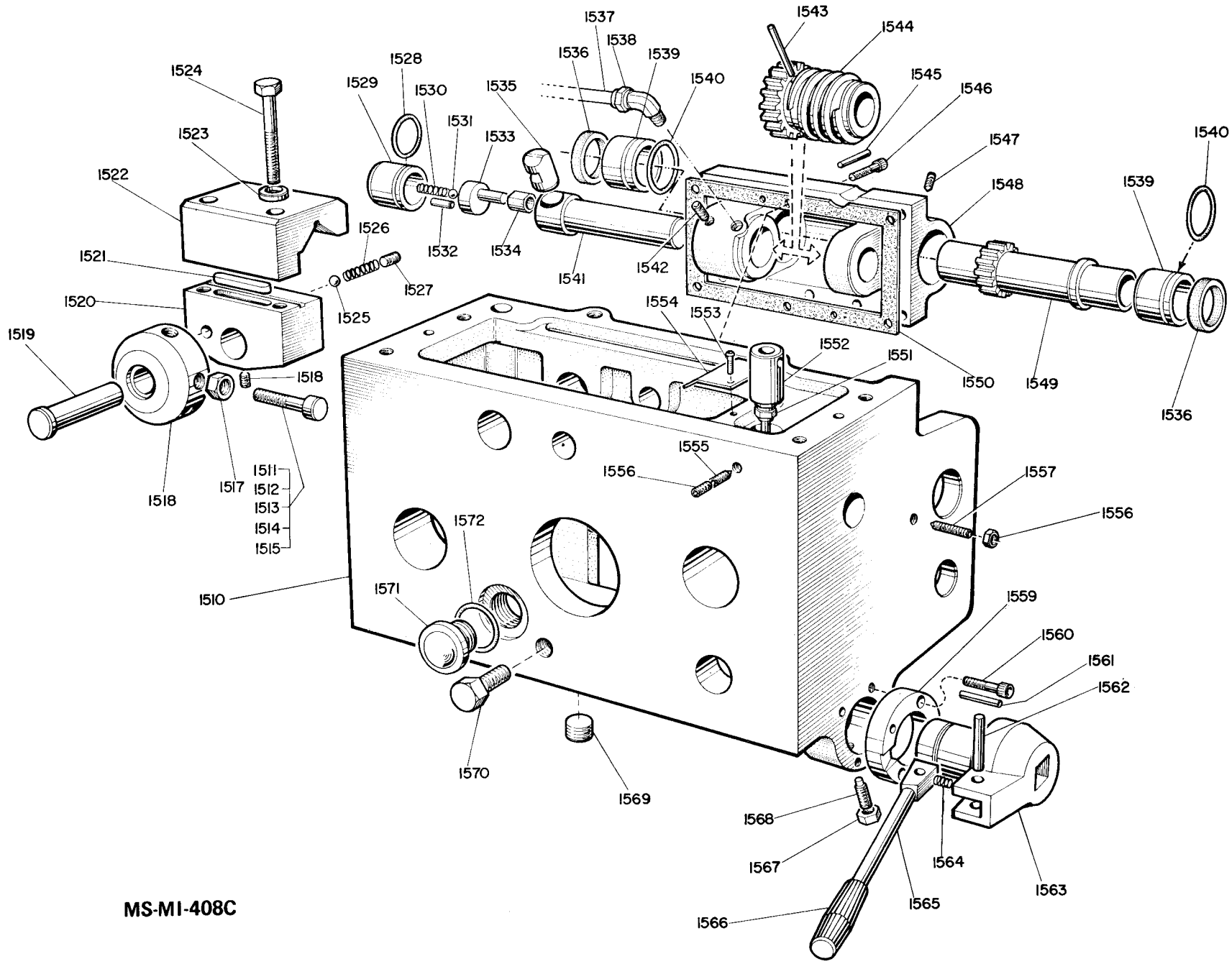
REF.	NUMBER	NAME
330	001112010	Lever
331	001009356	Set screw (M8x8)
332	001017418	Taper pin (5x60)
333	001017414	Taper pin (5x40)
334	012005085	Handle boss
335	001117050	Spring
336	001127030	Ball (6,5)
337	012005067	Shaft
338	012005066	Gear Z =15
339	001001056	Cap screw (M4x16)
340	001021261	Split pin (4x24)
341	012005065	Rack
342	012005006	Shifting fork
343	012005061	Set screw
344	001021311	Split pin (5x24)
345	012005020	Shaft
346	001009307	Set screw (M6x10)
347	012005021	Cover
348	001008306	Set screw (M6x18)
349	012005071	Gear Z =14
350	012005018	Shifting fork
351	012005062	Shaft
352	001008256	Set screw (M4x8)
353	012005086	Selection ring
354	012005084	Selection ring
355	012005078	Window bracket
356	001036155	Cap screw (M3x10)
357	012005073	Bushing
358	001012002	Nut
359	001008408	Set screw (M10x12)
360	001117080	Spring
361	001127040	Ball (8)
362	012005016	Shifting fork
363	012005074	Gear Z =26
364	012005068	Shaft
365	012005075	Gear Z =26
366	001021316	Split pin (5x36)
367	012005017	Shifting fork
368	001008407	Set screw (M10x10)
369	001117075	Spring


MS-MS-407C

SADDLE MS-MI-407C

REF.	NUMBER	NAME
380	012006104	Top slide
381	012006105	Top slide ("T")
382	012006026	Gib
383	012006065	Adjusting screw
384	001008407	Set screw (M10x10)
385	012006115	Contact point
386	001122001	Oiler
387	001017359	Taper pin (4x26)
388	012006025	Collar
389	001009310	Set screw (M6x20)
390	013003025A	Checking bolt
391	012006122	Indexing ring (1 div. =0,025mm)
392	012006123	Indexing ring (inch)
393	012006152	Indexing ring (1 div. =0,02mm)
394	012006153	Indexing ring (1 div. =0,05mm)
395	001017356	Taper pin (4x22)
396	001109004	Handle
397	001003104	Cap screw (M5x10)
398	001109009	Socket head shoulder screw
399	012006142	Indexing ring (inch/mm) ***
400	001003104	Cap screw (M5x0,8) ***
401	012006148	Index plate ***
402	012004144	Checking bolt ***
403	012006143	Handwheel ***
404	001006160	Tool screw (M10x50) ***
405	001012111	Nut ***
406	001014014	Washer ***
407	012006043	Bolt ***
408	012006029	Tool post ***
409	012006012	Rear tool post *(***)
410	012006053	Rear tool post *(***)
413	013006033	Bolt *(***)
414	013006047	Bolt **(***)
415	012006058	Cover
416	001008305	Set screw (M6x6)
417	012006117	Cover
418	001012011	Nut
419	001014016	Washer
420	001305005	Bearing 51102
421	001001257	Cap screw (M10x40)
422	001017409	Taper pin (5x26)
423	012006135	Bracket *
424	012006138	Bracket **
425	012006019	Screw
426	012006006	Wiper
427	001003105	Set screw (M5x12)
428	012006007	Strip
429	001004359	Hexagonal head screw (M8x25)
430	001012111	Nut
431	012006035	Wiper
432	012006124	Strip
433	012006101	Casting *
434	012006136	Casting **
435	001133012	Oil ring
436	013006042	Plug
437	001001261	Cap screw (M10x40)
438	001017417	Taper pin (5x55)
439	001001211	Cap screw (M8x40)
440	012006109	Nut (mm)
441	012006110	Nut (inch)
442	012006033	Wedge
444	012006118	Top slide leadscrew (mm)
445	012006119	Top slide leadscrew (inch)
446	001008408	Set screw (M10x12)
447	012006041	Washer
448	001009307	Set screw (M6x10)
449	012006011	Gib
450	012006030	Adjusting screw
451	001034026	Snap ring (36)
452	001001207	Cap screw (M8x20)
453	001018001	Taper pin (6x24)
454	012006120	Nut (mm)
455	012006121	Nut (inch)
456	001008308	Set screw (M6x12)
457	001009309	Set screw (M6x16)
458	012006102	Cross slide *
459	012006137	Cross slide **
460	013006033	Bolt
461	001014014	Washer
462	012006103	Indexing ring
463	001012111	Nut
464	001033016	Snap ring (18)
465	012006021	Pivot
466	001109010A	Socket head shoulder screw
467	001109005A	Handle
468	001017407	Taper pin (5x22)
469	012006113	Bushing
470	001017412	Taper pin (5x32)
471	012006111	Indexing ring (1 div. =0,025mm)
472	012006112	Indexing ring (inch)
473	012006154	Indexing ring (1 div. =0,02mm)
474	012006155	Indexing ring (1 div. =0,05mm)
475	001001158	Cap screw (M6x25)
476	001129014A	Handle
477	012006114	Spacer
478	013006023A	Checking bolt
479	012006139	Spacer (MS-205 and MS-1600)**
480	015006026	Gear Z =14
481	001017409	Taper pin (5x26)
482	012006116	Bushing
483	012006140	Saddle leadscrew (mm) **
484	012006141	Saddle leadscrew (inch) **
485	012006107	Saddle leadscrew (mm) *
486	012006108	Saddle leadscrew (inch) *
487	012006147	Checking bolt ***
488	012006149	Indexing plate ***
489	012006145	Indexing ring (inch/mm) ***
490	012006146	Handwheel ***
491	001017359	Taper pin (4x26) ***
492	001001157	Cap screw (M6x20) ***
493	012006128	Flange bearing ***
494	012006130	Screw *(***)
495	012006151	Screw **(***)
496	001001155	Cap screw (M6x12) ***
497	001017364	Taper pin (4x40) ***
498	012006131	Stop ***
499	012006127	Support *(***)
500	012006150	Support *(***)
501	001014011	Washer ***
502	012006129	Flange bearing ***
503	012006132	Bushing ***
504	001133112	Oil ring ***
505	001127030	Ball (6,5) ***
506	012006133	Piston ***
507	012006125	Spacer
508	001129012	Handle
509	001305009	Bearing 51104
510	012006106	Flanged bushing

* Models MS-1400 S/E and MS-175 S/E
** Models MS-1600 S/E and MS-205 AS/AE
*** Optional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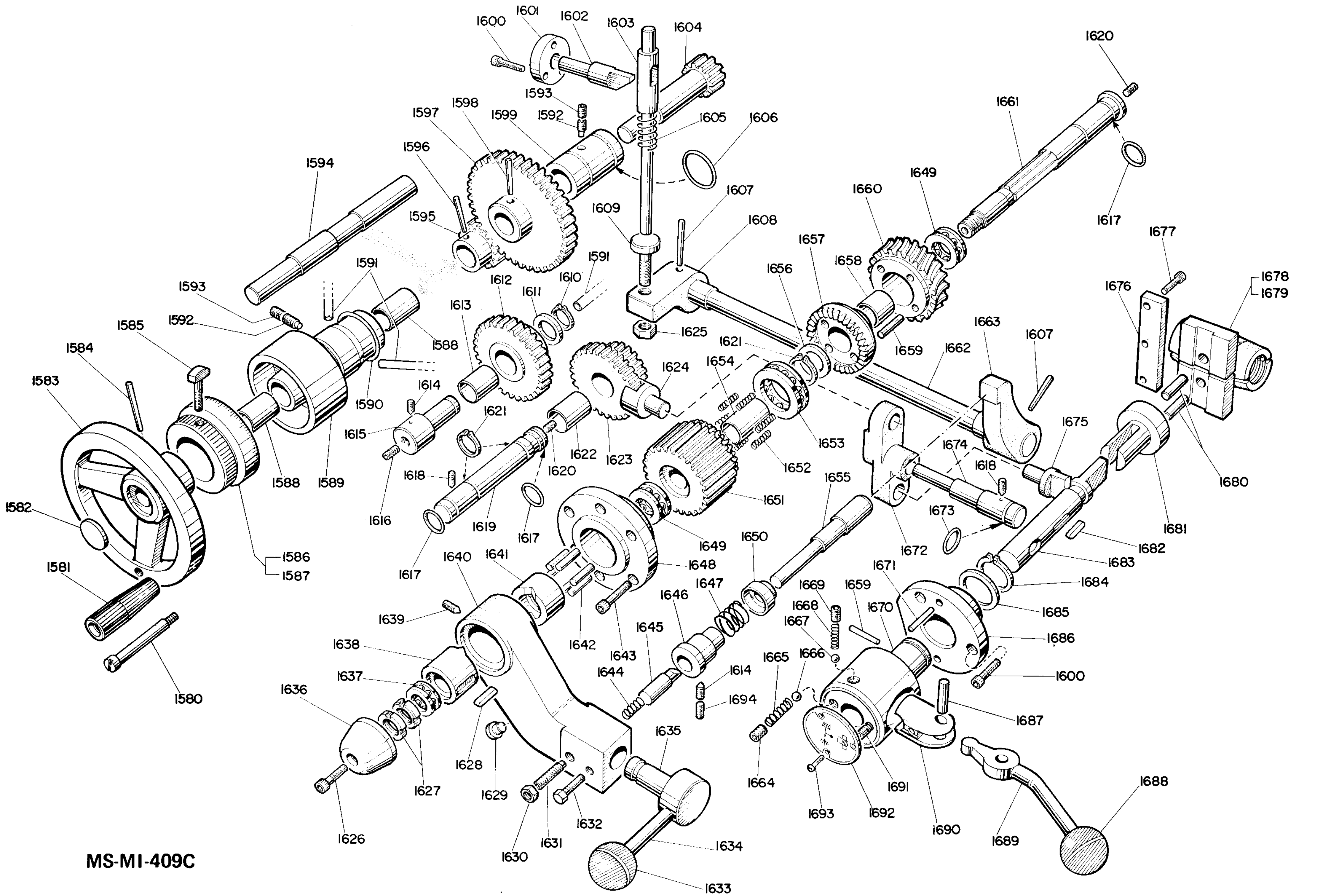
MS-MI-408C

APRON MS-MI-408C
(left hand)

REF.	NUMBER	NAME
1510	012004201	Apron casting
1511	012004182	Screw (M10x33)
1512	012004183	Screw (M10x43)
1513	012004184	Screw (M10x48)
1514	012004185	Screw (M10x53)
1515	012004186	Screw (M10x58)
1516	012004230	Handle boss
1517	001012002	Nut
1518	001009408	Set screw (M10x12)
1519	012004177	Shaft
1520	012004214	Bracket
1521	001023162	Key
1522	012004213	Bracket
1523	001014014	Washer
1524	001005210	Hexagonal head screw (M10x60)
1525	001127040	Ball (8)
1526	001117115	Spring
1527	001008408	Set screw (M10x12)
1528	001133119	Oil ring
1529	012004236	Pump housing
1530	001117052	Spring
1531	001127030	Ball (6,5)
1532	001021255	Split pin (4x12)
1533	012001086	Excentric pin
1534	012001083	Bushing
1535	012001084	Impeller
1536	001113201	Oli seal
1537	001231003	Pipe (nylon 1/4")
1538	001229006	Connector
1539	012004032	Bushing
1540	001133121	Oil ring
1541	012004235	Shaft
1542	001009307	Set screw (M6x10)
1543	001017412	Taper pin (5x32)
1544	012004229	Worm
1545	001017406	Taper pin (5x20)
1546	001001206	Cap screw (M8x16)
1547	001009307	Set screw (M6x10)
1548	012004210	Bracket
1549	012004029	Gear
1550		Gasket
1551	001227007	Connector
1552	015004066	Bushing
1553	001003054	Cap screw (M4x7)
1554	012004259	Protector
1555	001009308	Set screw (M6x12)
1556	001008307	Set screw (M6x10)
1557	012004253	Screw
1558	001012110	Nut
1559	012004057	Ratchet
1560	001001107	Cap screw (M5x12)
1561	001021309	Split pin (5x20)
1562	001020462	Pin (6x32)
1563	012004056	Handle boss
1564	001117090	Spring
1565	012004228	Lever
1566	001108030	Handle
1567	001012001	Nut
1568	001010359	Set screw (M8x20)
1569	001205004	Plug
1570	015004054	Stop
1571	001118010	Oil sight
1572	001133117	Oil ring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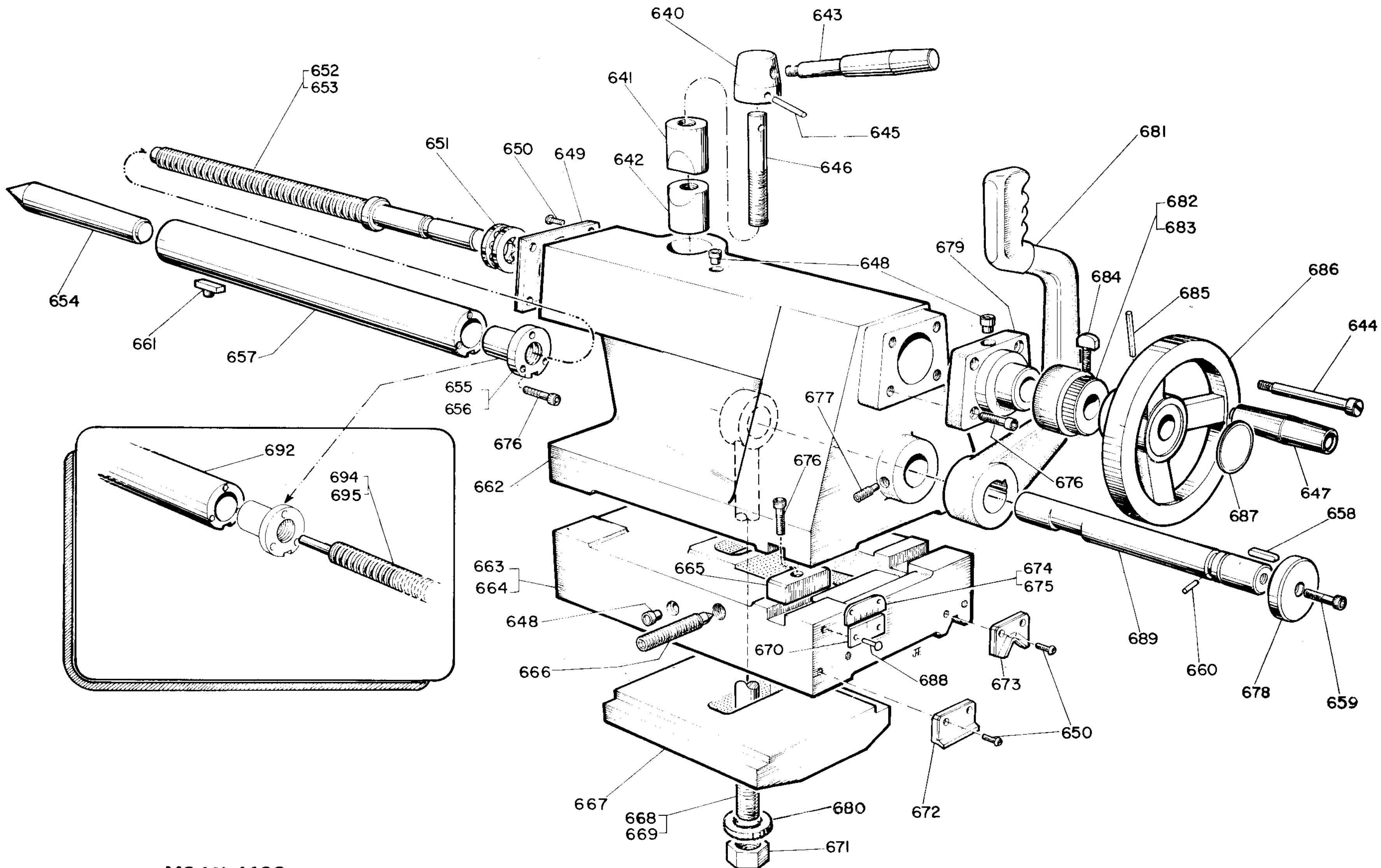
MS-MI-409C

APRON MS-MI-409C
(left hand)

REF.	NUMBER	NAME
1580	001109010A	Shaft
1581	001109005A	Handle
1582	001130105	Cover
1583	001100040B	Handwheel
1584	001017416	Taper pin (5x50)
1585	013006023A	Screw
1586	012004216	Indexing ring (mm)
1587	012004217	Indexing ring (inch)
1588	001114208	Bushing
1589	012004203	Flange
1590	001133128	Oil ring
1591	001263102	Pipe
1592	001010409	Set screw (M10x20)
1593	001008408	Set screw (M10x12)
1594	012004244	Shaft
1595	012004243	Gear
1596	001017412	Taper pin (5x32)
1597	012004219	Gear
1598	001017414	Taper pin (5x40)
1599	012004208	Bushing
1600	001001155	Cap screw (M6x12)
1601	012004233	Cover
1602	012004234	Pin
1603	012004238	Pin
1604	012004242	Rack pinion
1605	001117275	Spring
1606	001133122	Oil ring
1607	001017413	Taper pin (5x36)
1608	012004211	Lever
1609	015004016	Screw
1610	001033016	Snap ring (18)
1611	012004048	Spacer
1612	012004220	Double gear
1613	001114207	Bushing
1614	001009308	Set screw (M6x12)
1615	012004250	Shaft
1616	001008358	Set screw (M8x12)
1617	001133113	Oil ring
1618	001009310	Set screw (M6x20)
1619	012004245	Shaft
1620	001008556	Set screw (M5x8)
1621	001033018	Snap ring (20)
1622	001114258	Bushing
1623	012004221	Gear
1624	012004247	Shifting fork
1625	001012002	Nut
1626	001001106	Cap screw (M5x16)
1627	001030003	Nut
1628	001023105	Key
1629	015004068	Protector
1630	001012109	Nut
1631	001010309	Set screw (M6x20)
1632	001008311	Set screw (M6x25)
1633	001105030	Ball
1634	012004249	Lever
1635	012004232	Pin
1636	012004207	Cover
1637	001305007	Bearing 51103
1638	012004240	Cam
1639	001009307	Set screw (M6x10)
1640	012004202	Bracket
1641	012004241	Cam
1642	013004121	Pin
1643	001001156	Cap screw (M6x16)
1644	001117270	Spring
1645	013004124	Pin
1646	013004123	Bearing
1647	001117410	Spring
1648	012004204	Cover
1649	001305009	Bearing 51104
1650	012004258	Spring housing
1651	012004222	Gear
1652	001117085	Spring
1653	001305019	Bearing 51107X
1654	001114259	Bushing
1655	012004248	Shaft
1656	012004251	Spacer
1657	012004223	Clutch
1658	001114256	Bushing
1659	001020460	Pin (6x24)
1660	012004209	Worm gear
1661	012004224	Shaft
1662	012004231	Shaft
1663	012004206	Lever
1664	001008409	Set screw (M10x20)
1665	001117120	Spring
1666	001127040	Ball (8)
1667	001127030	Ball (6,5)
1668	001117045	Spring
1669	001008357	Set screw (M8x10)
1670	012004215	Handle shifting register
1671	001017406	Taper pin (5x20)
1672	012004205	Shifting fork
1673	001133112	Oil ring
1674	012004239	Shaft
1675	012004246	Shifting fork
1676	012004252	Gib
1677	001001105	Cap screw (M5x12)
1678	012004260	Double half nut (mm)
1679	012004212	Double half nut (inch)
1680	001020558	Pin (10x18)
1681	012004225	Cam
1682	001023106	Key
1683	012004226	Shaft
1684	001033027	Snap ring (32)
1685	012004254	Spacer
1686	012004218	Cover
1687	001020561	Pin (10x28)
1688	001105020	Ball
1689	012004237	Lever
1690	012004227	Wedge
1691	001010306	Set screw
1692	012004255	Plate
1693	001036154	Cap screw (M3x8)
1694	001008308	Set screw (M6x12)



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MS-MI-410C

TAILSTOCK MS-MI-410C

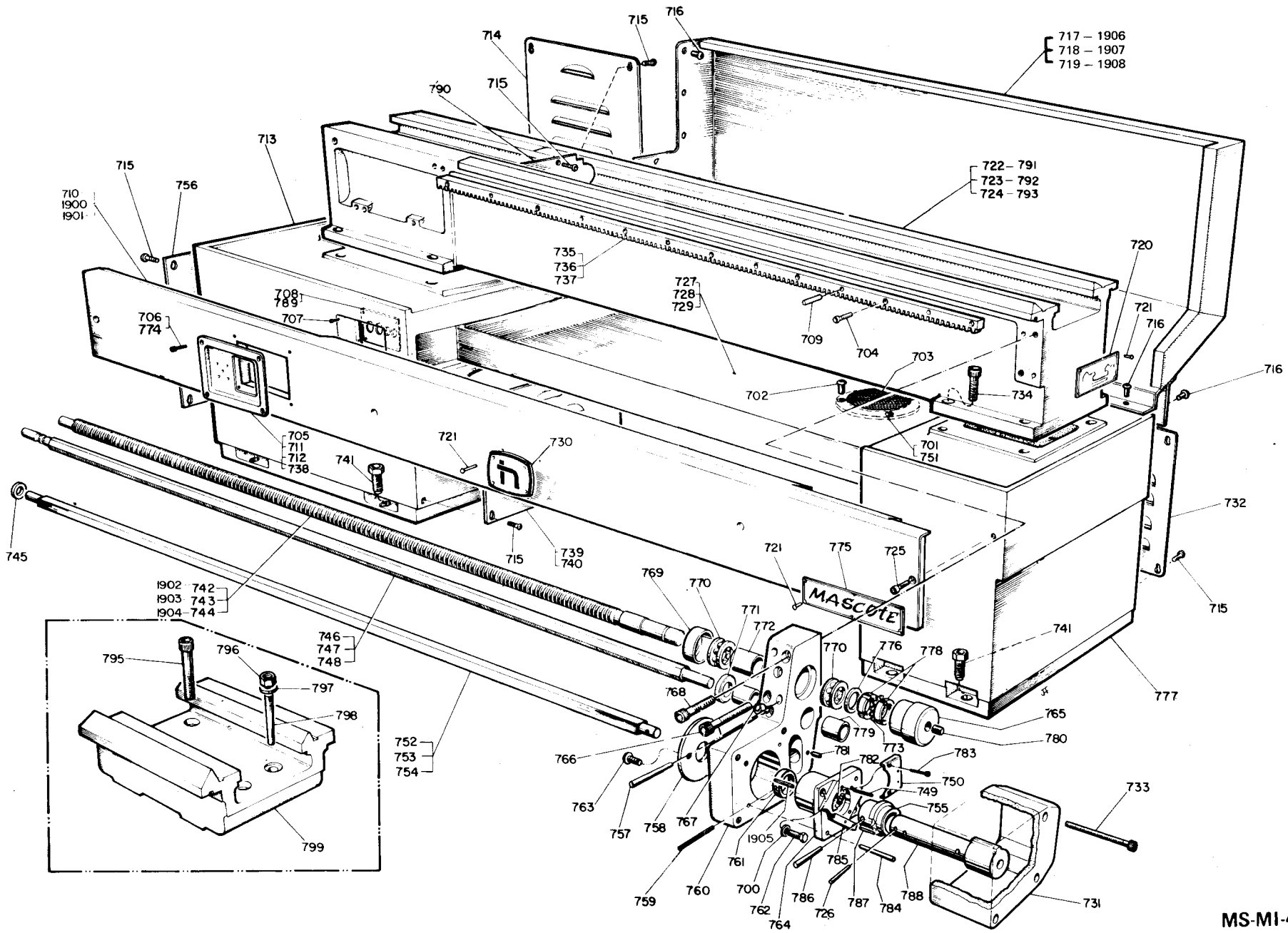
REF.	NUMBER	NAME
640	013003015	Handle boss
641	012003062	Motion bushing
642	013003018	Fix bushing
643	001112040	Lever
644	001109010A	Socket head shoulder screw
645	001017364	Taper pin (4x40)
646	013003016	Stud
647	001109005A	Handle
648	001122001	Oiler
649	013003028	Cover
650	001003105	Cap screw (M5x12)
651	001305009	Bearing 51104
652	012003060	Tailstock screw (mm)
653	012003061	Tailstock screw (inch)
654	001121004	Center MT-3
655	012003055	Nut (mm)
656	012003056	Nut (inch)
657	012003054	Barrel
658	001023106	Key
659	001001107	Cap screw (M5x20)
660	001020409	Pin (5x20)
661	013003020	Key
662	012003051	Tailstock casting
663	012003052	Base *
664	012003063	Base **
665	012003030	Key
666	001009467	Set screw (M12x60)
667	012003004	Clamp
668	012003068	Bolt *
669	012003069	Bolt **
670	013003007	Indexing plate
671	001012113	Nut
672	013003027	Wiper
673	013003029	Wiper
674	012003011	Indexing plate (mm)
675	012003023	Indexing plate (inch)
676	001001157	Cap screw (M6x20)
677	001010358	Set screw (M8x16)
678	012003018	Cover
679	012003057	Tailstock screw guide
680	012003070	Washer
681	012003033	Lever
682	012003058	Indexing ring (mm)
683	012003059	Indexing ring (inch)
684	013003025A	Screw
685	001017416	Taper pin (5x50)
686	001100030B	Handwheel
687	001130105	Cover
688	001035010	Rivet
689	012003014	Shaft

CATCH DRILL QUILL
(optional)

692	012003053	Barrel
694	012003064	Tailstock screw (mm)
695	012003065	Tailstock screw (inch)

* Models MS-175 S/E and MS-1400 S/E

** Models MS-205 AS/AE and MS-1600 S/E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MASCOTE
MS-MI-411C

BED MS-MI-411C

REF.	NUMBER	NAME
700	001014011	Washer
701	013002041	Flange ***
702	001003104	Cap screw (M5x10)
703	013002042	Screen ***
704	001001107	Cap screw (M5x20)
705	012002081	Cover (9 speeds) ****
706	001003156	Cap screw (M6x16)(9speeds)****
707	001001057	Cap screw (M4x16) ***
708	012002084	Support (9 speeds) ***
709	001017407	Taper pin (5x22)
710	012002070	Plate *(500)(20")
711	012002082	Cover (9 speeds) ***
712	012002083	Cover (18 speeds) ***
713	012002010	Plinth (head end)
714	012002096	Cover
715	001003154	Cap screw (M6x10)
716	001003155	Cap screw (M6x12)
717	012026001	Splash guard (500)(20") *
718	012026017	Splash guard (800) (32") *
719	012026018	Splash guard (1000)(40") *
720	001130001	Data plate
721	001035010	Rivet
722	012002001	Bed (500)(20")
723	012002002	Bed (800)(32")
724	012002003	Bed (1000)(40")
725	001001158	Cap screw (M6x25)
726	001017307	Taper pin (3x22)
727	012002077	Tray (500)(20")
728	012002078	Tray (800)(32")
729	012002079	Tray (1000)(40")
730	001130010	Plate
731	012002064	Cover
732	012002025	Cover
733	001001164	Cap screw (M6x60)
734	001001311	Cap screw (M12x40)
735	012002032	Rack (500)(20")
736	012002033	Rack (800)(32")
737	012002034	Rack (1000)(40")
738	012002089	Cover (18 speeds)****
739	012002024	Cover
740	012002061	Brake motor cover
741	012002046	Jacking bolt
742	012002097	Leadscrew (4 T.P.I.)(500)(20")
743	012002098	Leadscrew (4.T.P.I.)(800)(32")
744	012002099	Leadscrew (4 T.P.I.)(1000)(40")
745	012002059	Collar
746	012002028	Feed shaft (500)(20")
747	012002029	Feed shaft (800)(32")
748	012002030	Feed shaft (1000)(40")
749	001021264	Split pin (4x30)
750	013002065	Support
751	013002062	Flange ****
752	012002040	Third rod shaft (500)(20")
753	012002041	Third rod shaft (800)(32")
754	012002042	Third rod shaft (1000)(40")
755	013002032	Ratchet
756	012002095	Cover
757	001017465	Taper pin (6x45)
758	012002067	Cover
759	001021266	Split pin (4x36)
760	012002063	Bracket
761	012002068	Collar
762	001004307	Hexagonal head screw (M6x18)
763	001003155	Cap screw (M6x12)
764	012002065	Flanged bearing
765	012002047	Cover
766	001001265	Cap screw (M10x70)
767	001122001	Oiler
768	001001263	Cap screw (M10x50)
769	012002094	Cover
770	001305009	Bearing 51104
771	012002058	Collar
772	001114255	Bushing
773	001031005	Lock washer
774	001001156	Cap screw (M6x16) (9/18 speeds)***(18 speeds)****
775	012002060	Name plate
776	012002062	Washer
777	012002011	Plinth (tail end)
778	001030005	Nut
779	001114105	Bushing
780	001008305	Set screw (M6x6)
781	001009307	Set screw (M6x10)
782	001116030	Spring
783	001001106	Cap screw (M5x16)
784	001017407	Taper pin (5x22)
785	013002037	Ratchet guide
786	001017360	Taper pin (4x28)
787	001020311	Pin (3x28)
788	012002066	Shaft
789	012002085	Support (18 speeds) **
790	012002057	Cover
1900	012002102	Plate (800)(32")
1901	012002103	Plate (1000)(40")
1902	012002093	Leadscrew (6mm)(500)(20")
1903	012002090	Leadscrew (6mm)(800)(32")
1904	012002091	Leadscrew (6mm)(1000)(40")
1905	001021256	Split pin (4x14)
1906	012026009	Splash guard (500)(20") **
1907	012026019	Splash guard (800)(32") **
1908	012026020	Splash guard (1000)(40") **

BED WITH GAP

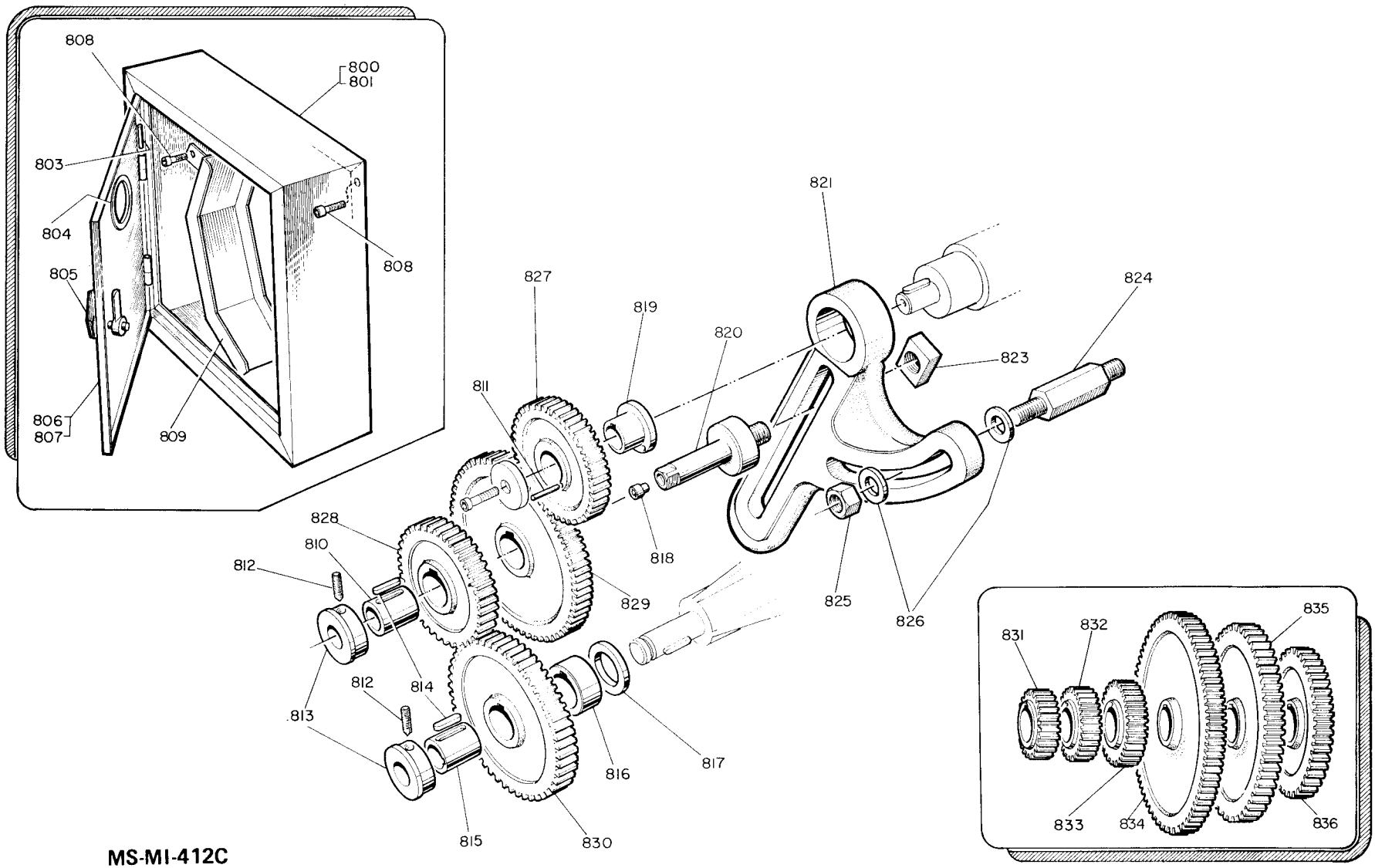
791	012002005	Bed (500)(20")
792	012002006	Bed (800)(32")
793	012002007	Bed (1000)(40")
795	001001261	Cap screw (M10x40)
796	001012001	Nut
797	001014013	Washer
798	001019106	Taper pin(8x65)
799	012002009	Gap

* MS-175 S/E and MS-1400 S/E

** MS-205 AS/AE and MS-1600 S/E

*** Lathes with coolant unit.

**** Lathes without coolant unit.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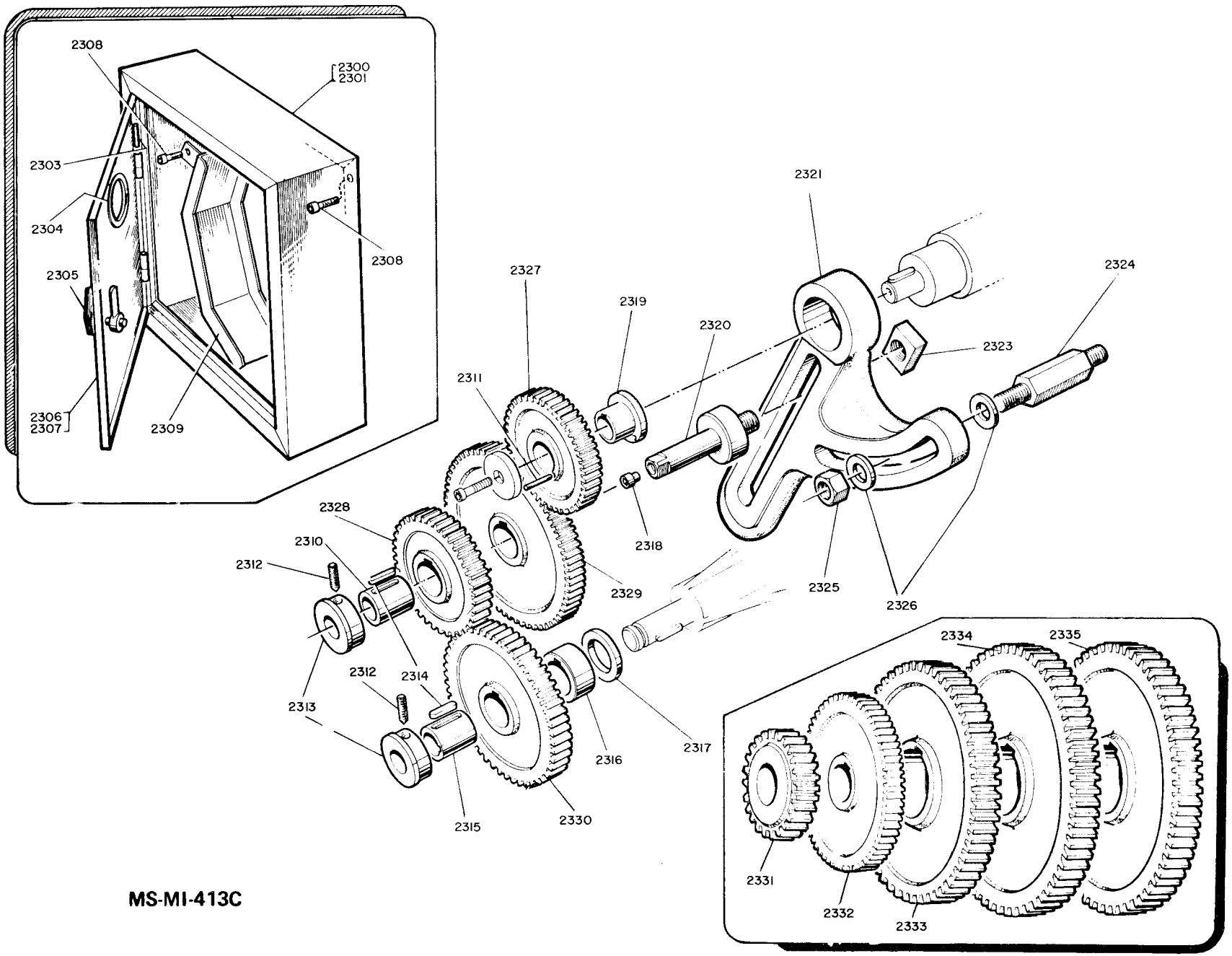
MS-MI-412C

CHANGE GEARS MS-MI-412C
(leadscrew pitch - 4 TPI)

REF.	NUMBER	NAME
800	012014030	End cover*
801	012014031	End cover**
803	013014039	Pin
804	014014041	Ring
805	001518017	Door lock
806	012014013	Door*
807	012014014	Door**
808	001001155	Cap screw (M6x12)
809	012014032	Splash guard
810	012014018	Bushing
811	012014020	Safety pin
812	001009308	Set screw (M6x12)
813	012014017	Washer
814	001023110	Key
815	012014021	Bushing
816	012014023	Spacer
817	012014022	Collar
818	001122001	Oiler
819	012014019	Bushing
820	012014004	Shaft
821	012014001	Swing bracket
823	012014005	Nut
824	013014013	Pin
825	001012112	Nut
826	001014015	Washer
827	012014027	Gear Z=71
828	012014042	Gear Z=75
829	012014026	Gear Z=113
830	012014039	Gear Z=120
831	012014028	Gear Z=40
832	012014003	Gear Z=47
833	012014041	Gear Z=50
834	012014024	Gear Z=127
835	012014025	Gear Z=100
836	012014044	Gear Z=76

* MS-MI-1400S/E and MS-MI-175E

** MS-1600S/E and MS-205AS/AE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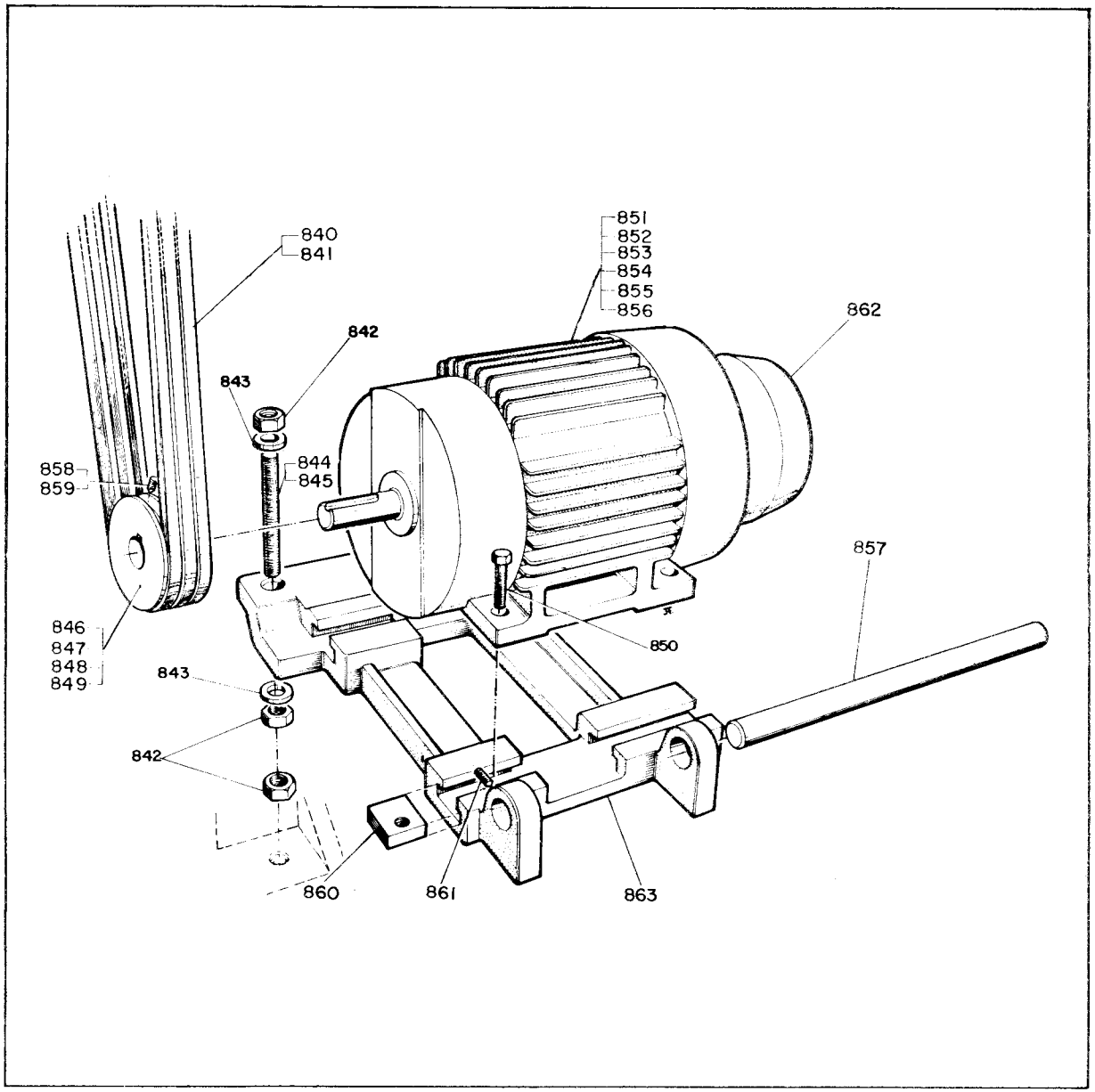
MS-MI-413C

CHANGE GEARS MS-MI-413C
(leadscrew pitch - 6mm)

REF.	NUMBER	NAME
2300	012014030	End cover*
2301	012014031	End cover**
2303	013014039	Pin
2304	014014041	Ring
2305	001130200	Door lock
2306	012014013	Door*
2307	012014014	Door**
2308	001001155	Cap screw (M6x12)
2309	012014032	Splash guard
2310	012014018	Bushing
2311	012014020	Safety pin
2312	001009308	Set screw (M6x12)
2313	012014017	Washer
2314	001023110	Key
2315	012014021	Bushing
2316	012014023	Sleeve
2317	012014022	Spacer
2318	001122001	Oiler
2319	012014019	Bushing
2320	012014004	Shaft
2321	012014001	Swing bracket
2323	012014005	Nut
2324	012014037	Pin
2325	001012112	Nut
2326	001014015	Washer
2327	012014027	Gear Z=71
2328	012014038	Gear Z=72
2329	012014040	Gear Z=123
2330	012014025	Gear Z=100
2331	012014028	Gear Z=40
2332	012014029	Gear Z=80
2333	012014026	Gear Z=113
2334	012014039	Gear Z=120
2335	012014024	Gear Z=127

* Models MS-1400S/E and MS-175S/E

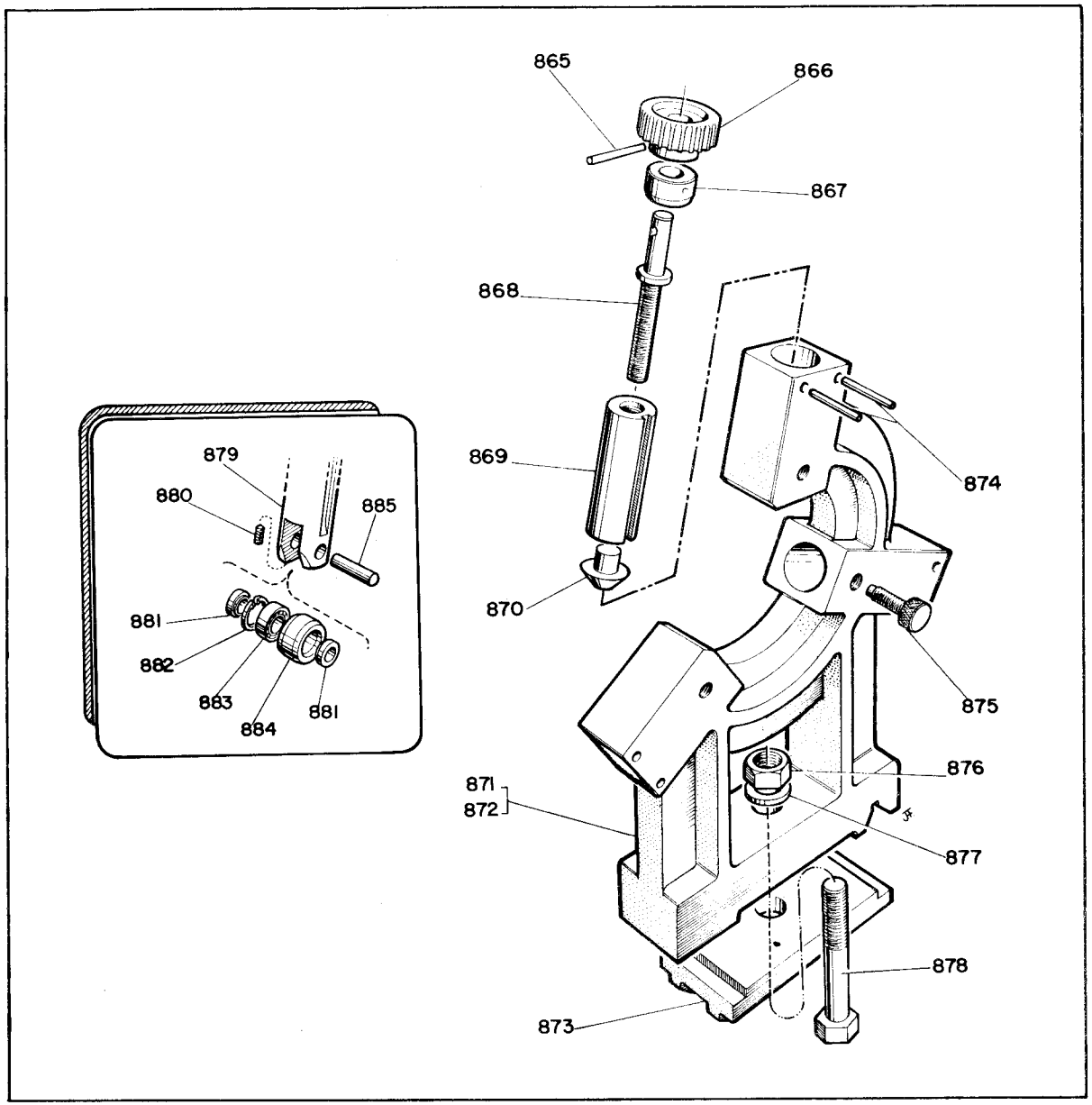
** Models MS-1600S/E and MS-205AS/AE



MOTOR DRIVE SYSTEM MS-MI-414C

REF.	NUMBER	NAME
840	A - 68	Belts (*) (**)
841	A - 69	Belts (***) (****)
842	001012112	Nut
843	012007009	Washer
844	012007011	Stud (main motor without brake)
845	012007010	Stud (main motor with brake)
846	012007023	Pulley - 60Hz (*) (***)
847	012007026	Pulley - 50Hz (*) (***)
848	013007024	Pulley - 60Hz (**)(****)
849	012007005	Pulley - 50Hz (**)(****)
850	001004412	Hexagonal head screw (M10x40)
851	00113630103	Main motor (60cv-60Hz)(*)(***)
852	00113630106	Main motor (5,5cv-50Hz)(*)(***)
853	00113635102	Main motor (6,3/4cv-50/60Hz)(**) (****)
854	00113630203	Main motor (with brake) (6cv-60Hz)(*)(***)
855	00113630205	Main motor (with brake) (5,5cv-50Hz)(*)(***)
856	00113635202	Main motor (with brake) (6,3/4cv-50/60Hz)(**)(****)
857	012007013	Shaft
858	001011309	Set screw (M6x16)
859	001011306	Set screw (M6x8)
860	012007008	Nut
861	001008308	Set screw (M6x12)
862	012007012	Brake
863	012007007	Base

(*) MS-175S and MS-1400S
(**) MS-175E and MS-1400E
(***) MS-205 AS and MS-1600S
(****) MS-205AE and MS-1600E



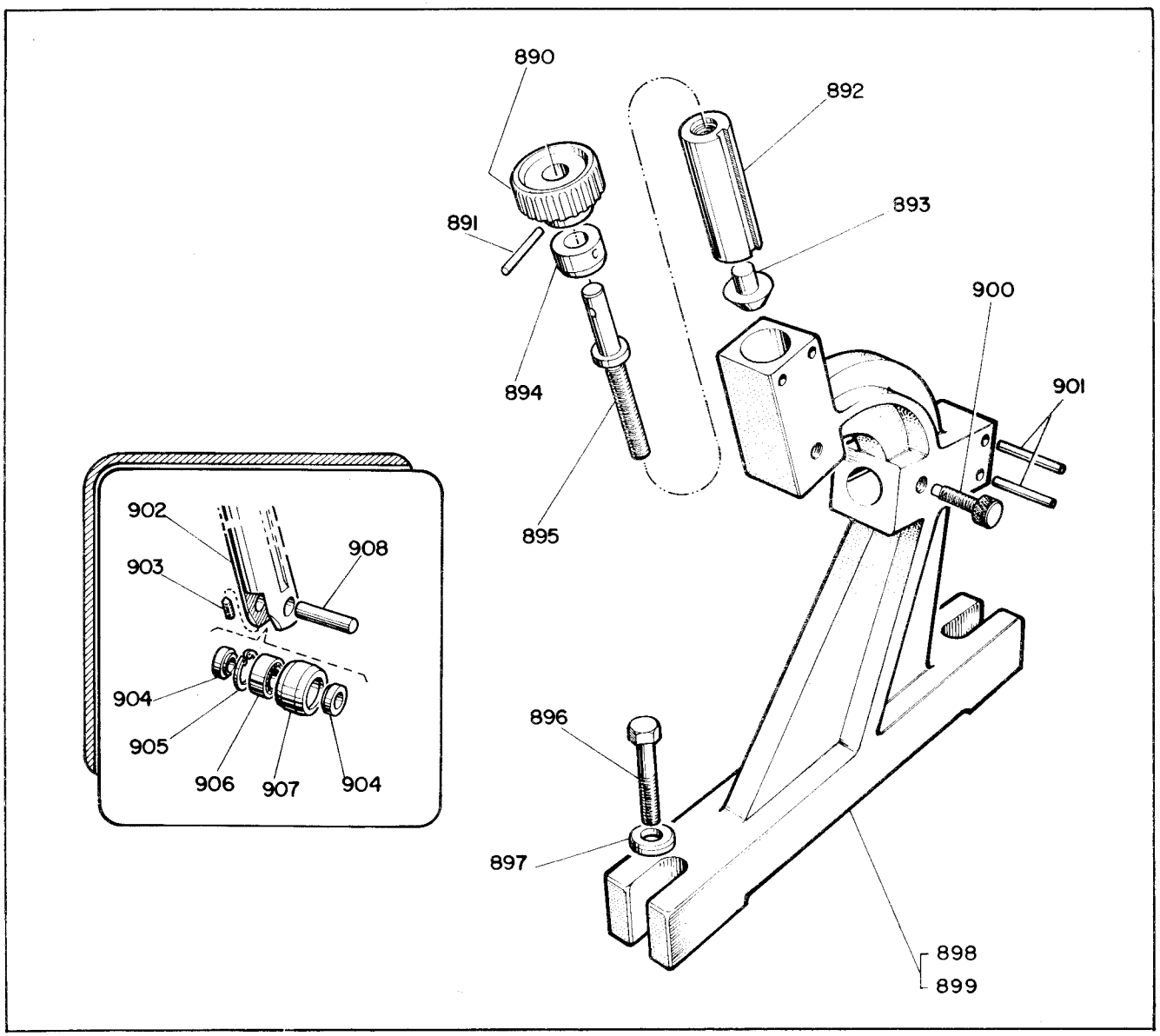
STEADY REST

MS-MI-415C

REF.	NUMBER	NAME
865	001017307	Taper pin (3x22)
866	001126010	Hand knob
867	010009003	Collar
868	012009007	Screw
869	012009005	Governor sleeve
870	010009007	Bronze point
871	012010010	Casting (MS-1400 S/E and MS-175 S/E)
872	012010011	Casting (MS-1600 S/E and MS-205 AS/AE)
873	012010009	Clamping plate
874	001021268	Split pin (4x45)
875	012010008	Screw
876	001012112	Nut
877	001014015	Washer
878	001005261	Hexagonal head screw (M12x80)

ASSEMBLY WITH BEARINGS (optional)

879	012009006	Governor sleeve
880	001009255	Set screw (M4x6)
881	010009010	Spacer
882	001034015	Snap ring (22)
883	001304005	Bearing 608 - 2RS
884	010009009	Roller
885	010009008	Shaft



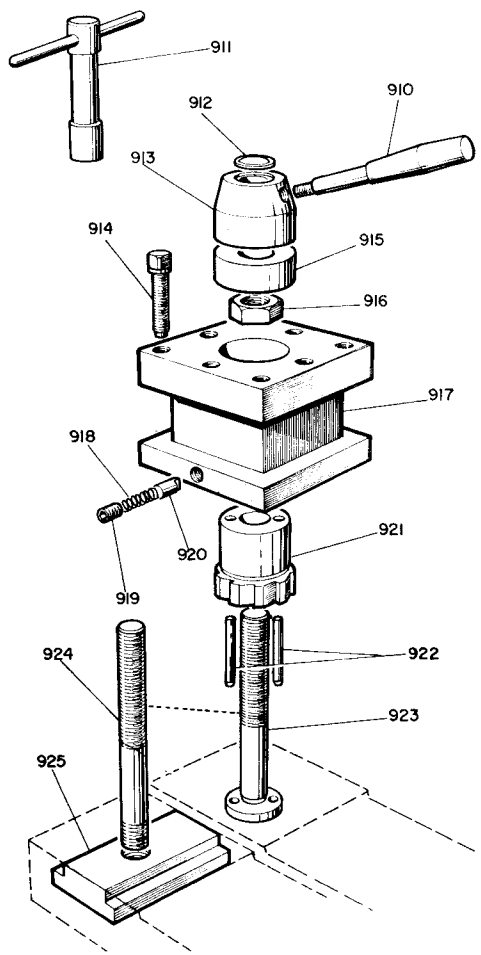
FOLLOW REST

MS-MI-416C

REF.	NUMBER	NAME
890	001126010	Hand knob
891	001017307	Taper pin (3x22)
892	012009005	Governor sleeve
893	010009007	Bronze point
894	010009003	Collar
895	012009007	Screw
896	001005208	Hexagonal head screw (M10x4
897	001014014	Washer
898	012009003	Casting (MS-1400S/E and MS-175 S/E)
899	012009004	Casting (MS-1600 S/E and MS-205 AS/AE)
900	012010008	Screw
901	001021268	Split pin (4x45)

ASSEMBLY WITH BEARINGS (optional)

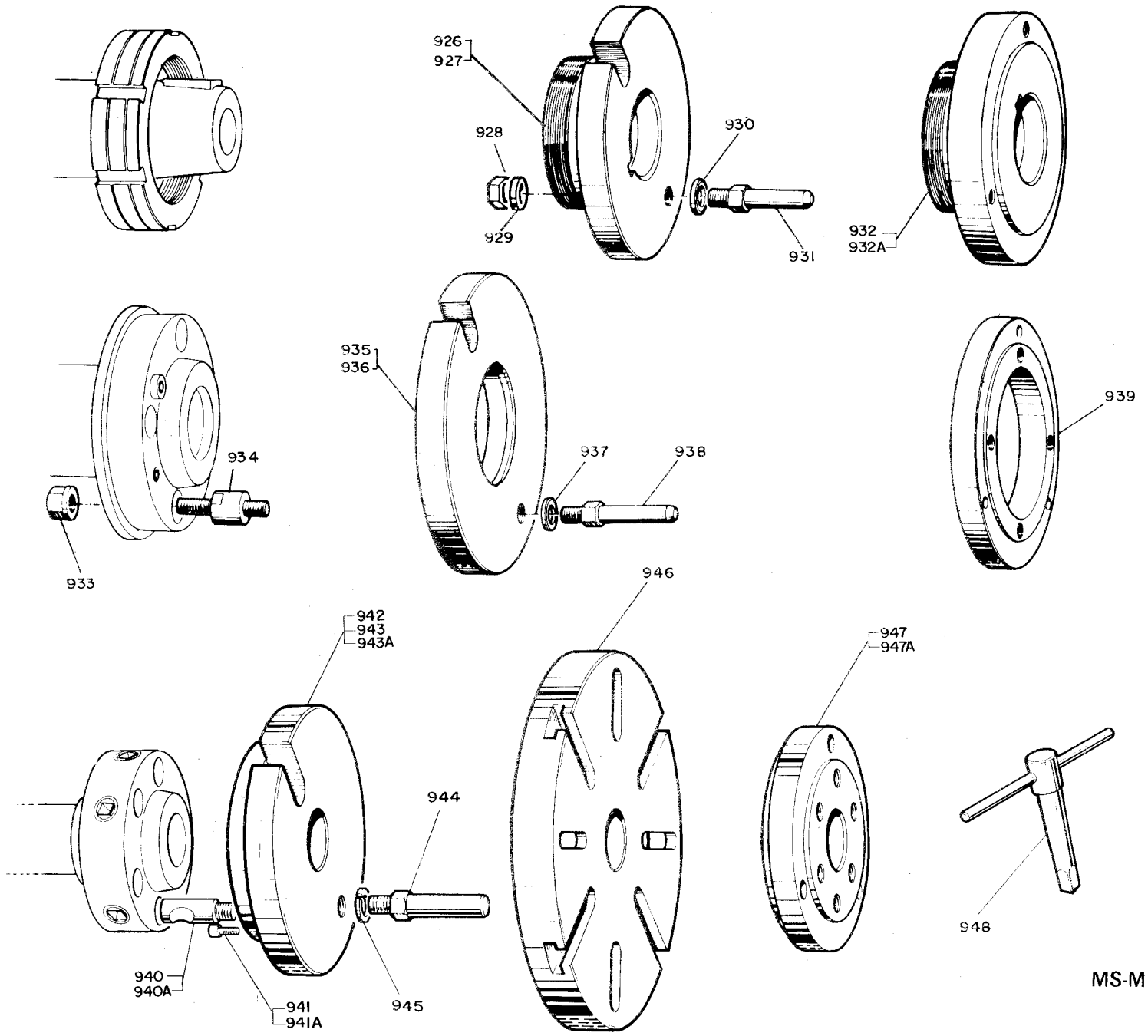
902	012009006	Governor sleeve
903	001009255	Set screw (M4x6)
904	010009010	Spacer
905	001034015	Snap ring (22)
906	001304005	Bearing 608 - 2RS
907	010009009	Roller
908	010009008	Shaft



TOOL POST - 4 WAY TURRET

MS-MI-417C

REF.	NUMBER	NAME
910	012019006	Lever
911	012019008	Wrench
912	001130150	Cover
913	012019004	Turret cap head
914	001006160	Tool screw (M10x50)
915	012019005	Collar
916	001012113	Nut
917	012019001	Turret
918	013019008	Spring
919	001008356	Set screw (M8x8)
920	012019007	Lock pin
921	012019002	Ratchet
922	001020414	Pin (5x40)
923	012019011	Shaft
924	012019012	Shaft "T"
925	012019013	Key "T"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MS-MI-418C

SPINDLE NOSE ASA LO

DRIVE PLATE

REF.	NUMBER	NAME
926	013023001	Plate*
927	013023003	Plate**
928	001012003	Nut
929	001015008	Washer
930	001014015	Washer
931	012023002	Drag pin

UNIVERSAL CHUCK FLANGE

932	012024001	Flange (chuck standard")
932A	012024002	Flange (chuck super)

* Models MS-1400 S/E and MS-175 S/E

** Models MS-1600 S/E and MS-205 AS/AE

SPINDLE NOSE DIN 55022 - 5

DRIVE PLATE

REF.	NUMBER	NAME
933	001107131	Nut
934	001107123	Stud
935	012023001	Plate*
936	012023002	Plate **
937	001015008	Washer
938	012023006	Drag pin

UNIVERSAL CHUCK FLANGE

933	001107131	Nut
934	001107123	Stud
939	012024005	Flange

SPINDLE NOSE CAM-LOCK

DRIVE PLATE

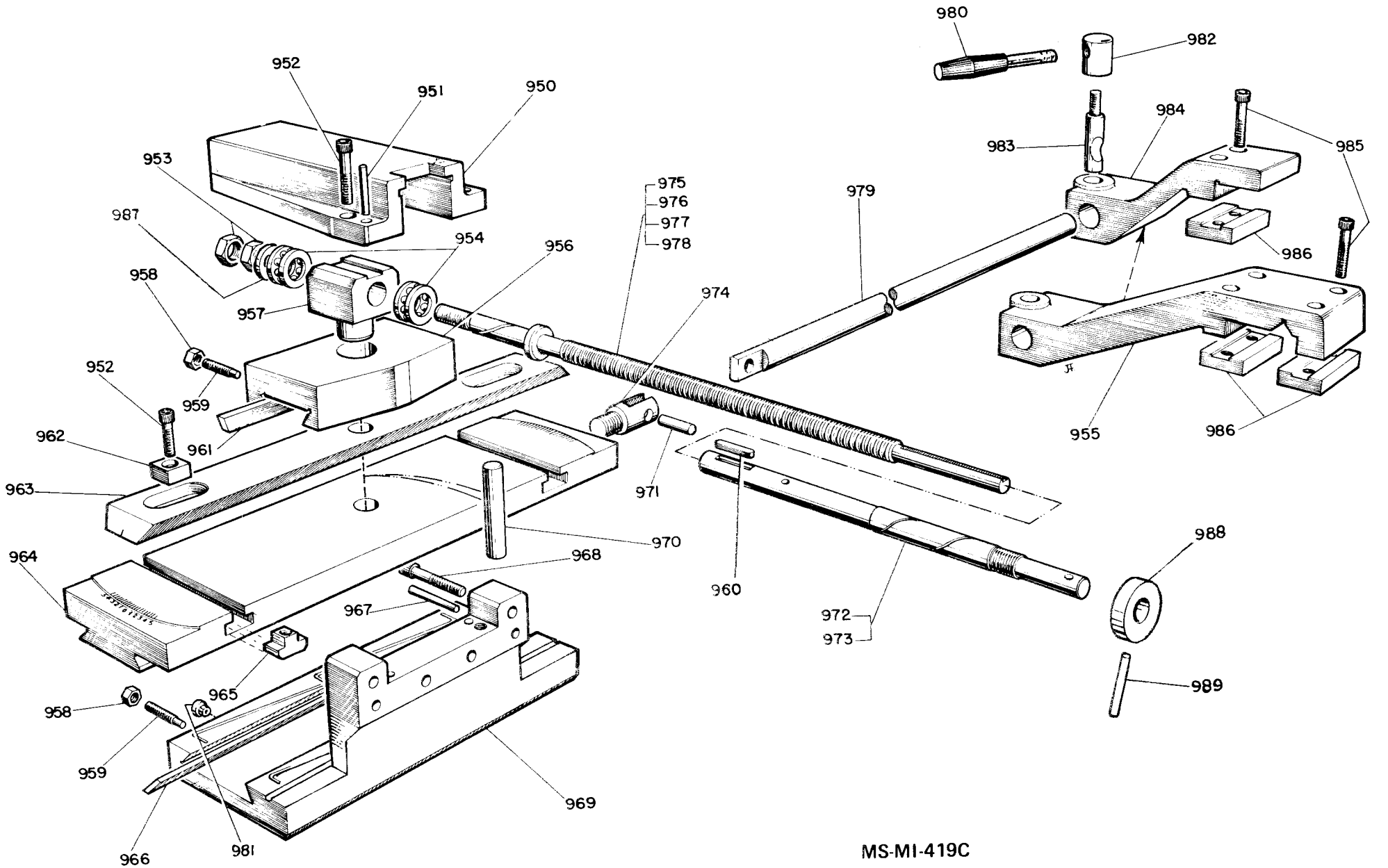
REF.	NUMBER	NAME
940	001107044	Pin (D1 - 5)
940A	001107045	Pin (D1 - 6)
941	001028254	Cap screw
941A	001028305	Cap screw
942	013023004	Plate (D1 - 5)*
943	013023005	Plate (D1 - 5)**
943A	012023003	Plate (D1 - 6)
944	013023006	Drag pin
945	001015008	Washer

BACK PLATE

940	001107044	Pin (D1 - 5)
941	001028254	Cap screw (D1 - 5)
946	012049001	Plate (D1 - 5)

UNIVERSAL CHUCK FLANGE

940	001107044	Pin (D1 - 5)
940A	001107045	Pin (D1 - 6)
941	001028254	Cap screw (D1 - 6)
941A	001028305	Cap screw (D1 - 5)
947	012024003	Plate (D1 - 6)
947A	012024004	Plate (D1 - 6)
948	001107055	Wrench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MS-MI-419C

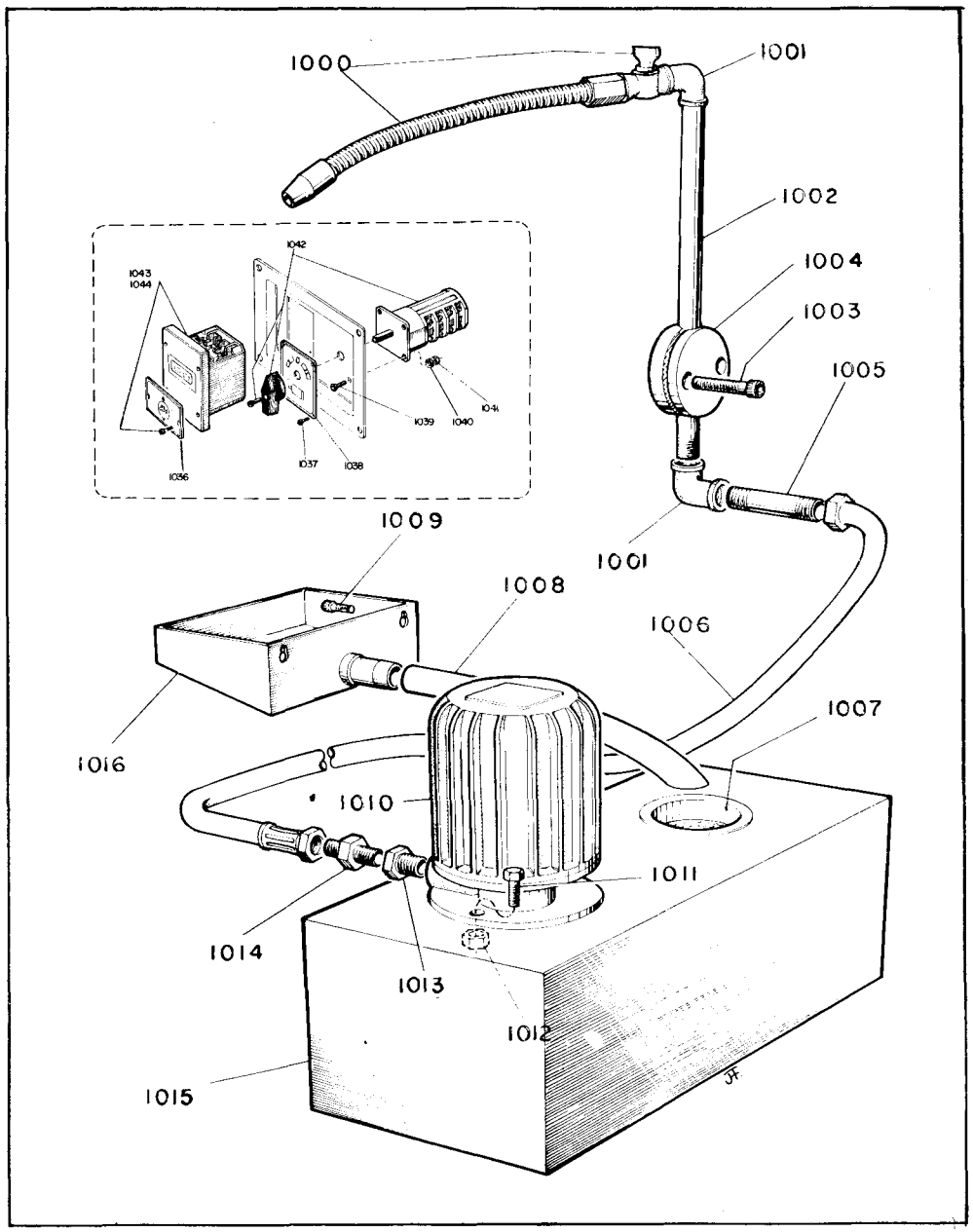
TAPER ATTACHMENT MS-MI-419C

(optional)

REF.	NUMBER	NAME
950	012017058	Plate
951	001018003	Pin (6x28)
952	001001207	Cap screw (M8x20)
953	001030003	Nut
954	001305005	Bearing 51102
955	012017060	Bracket **
956	012017013	Slide block
957	012017015	Yoke
958	001012109	Nut
959	001010310	Set screw (M6x25)
960	001023008	Key
961	012017022	Gib
962	012017019	Washer
963	012017005	Slide
964	012017001	Plate
965	001022004	Nut
966	012017023	Gib
967	001018057	Pin (8x40)
968	001001260	Cap screw (M10x35)
969	012017057	Base plate
970	012017024	Pivot
971	001020511	Pin (8x25)
972	012017054	Screw extention *
973	012017055	Screw extention **
974	012017018	Bracket
975	012017061	Screw (mm) *
976	012017062	Screw (inch) *
977	012017063	Screw (mm) **
978	012017064	Screw (inch) **
979	012017016	Rod
980	0120112030	Handle
981	001122001	Oiler
982	012017017	Handle boss
983	012017021	Stem
984	012017059	Bracket *
985	001001210	Cap screw (M8x35)
986	012017014	Slide holder
987	012017020	Washer
988	012017056	Collar
989	001021265	Split pin (4x32)

* Models MS-1400 S/E and MS-175 S/E

** Models MS-1600 S/E and MS-205 AS/AE

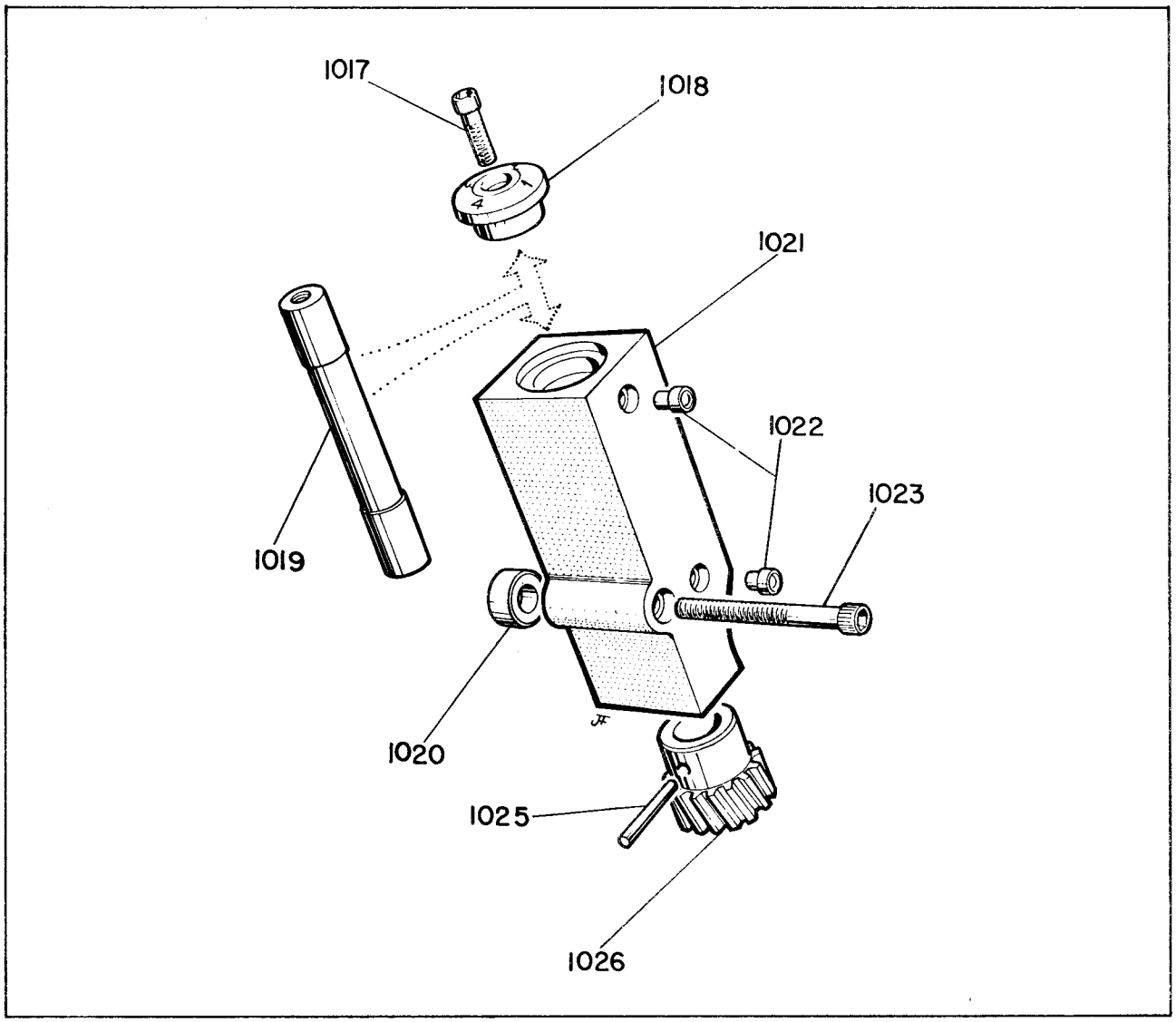


COOLANT PUMP
(optional)

MS-MI-420C

REF.	NUMBER	NAME
1000	001131060	Flexible tube
1001	001200002	Elbow
1002	013012007	Pipe
1003	001001214	Cap screw (M8x60)
1004	012012003	Bracket
1005	012012004	Pipe
1006	013012008	Hose
1007	013012003	Filter
1008	013012002	Hose
1009	001003105	Screw (M5x12)
1010	001104003	Pump
1011	001004308	Screw (M6x20)
1012	001012109	Nut
1013	001206005	Sleeve
1014	001203002	Union
1015	013012001	Tank
1016	013012004	Colector
1036	001130014	Data plate
1037	001007305	Cap screw (M3x6)
1038	012015022	Data plate
1039	001013358	Cap screw (M4x16)
1040	001015003	Washer
1041	001012107	Nut
1042	001507016	Cam swith *
1043	001514016	Circuit breaker (220V)*
1044	001514001	Circuit breaker (380/440V)*

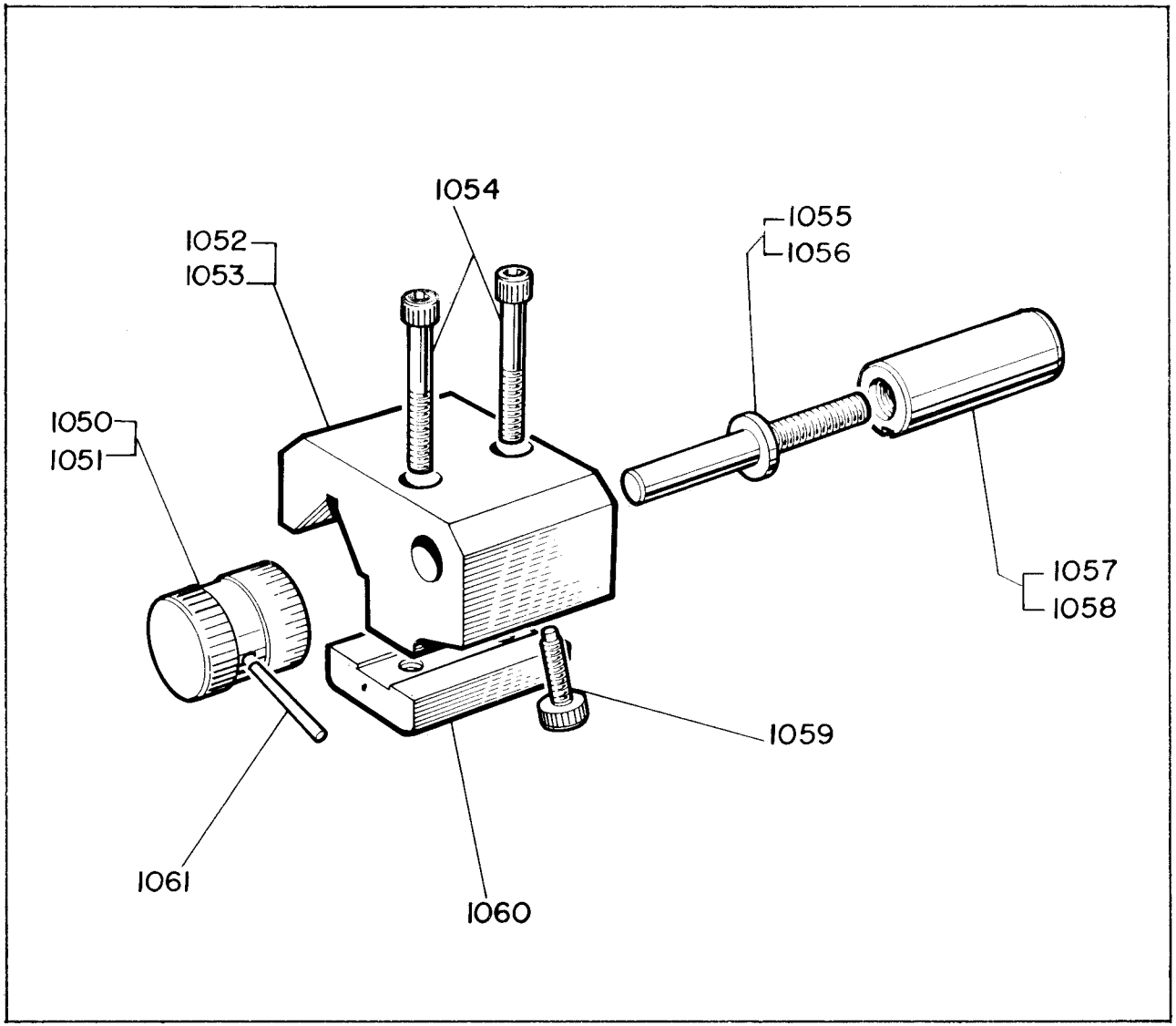
* These parts are included in the electrical diagram - page 29



THREADS CUTTING INDICATOR
(leadscrew pitch - 4 TPI)
(optional)

MS-MI-421C

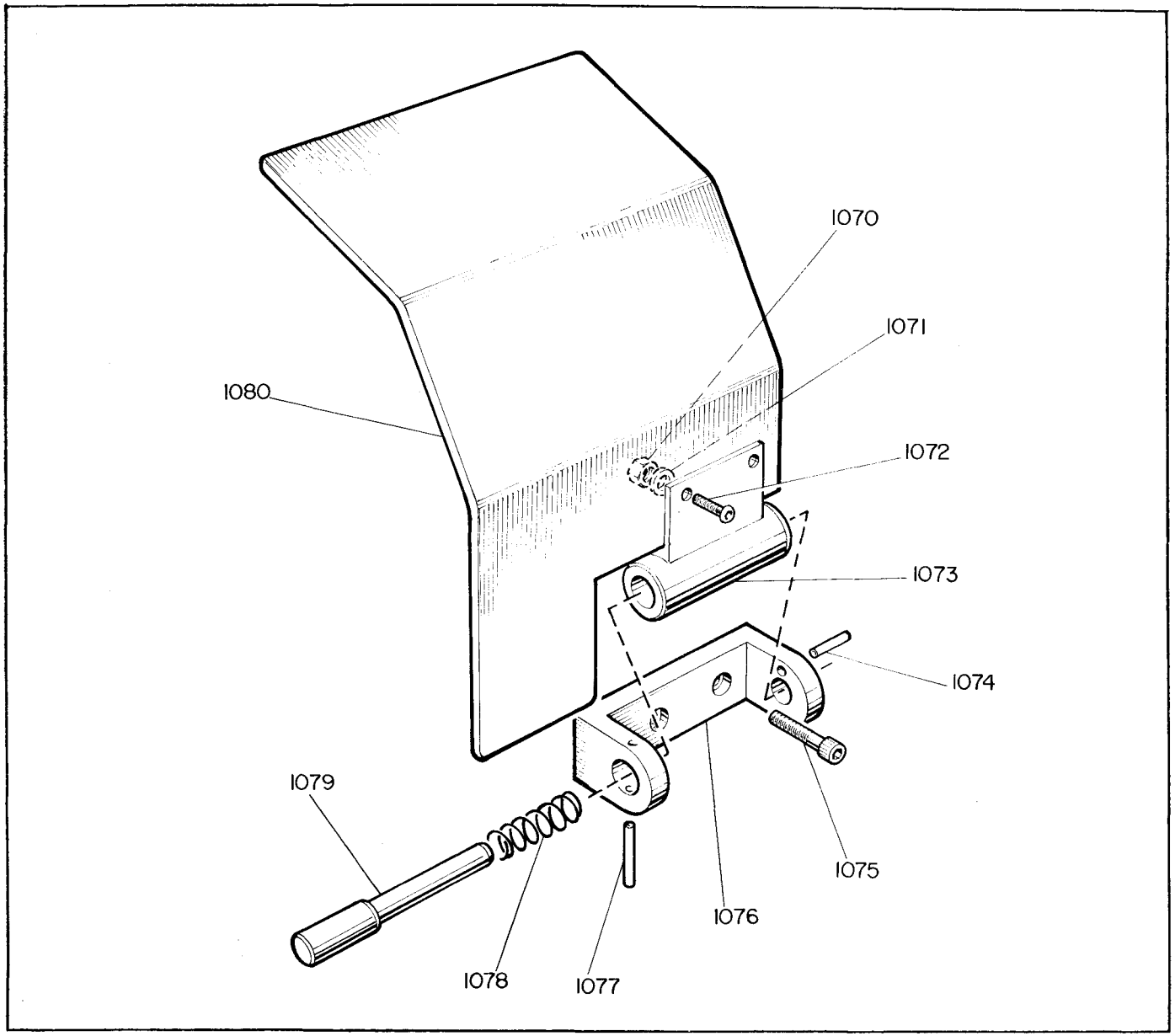
REF.	NUMBER	NAME
1017	001001107	Cap Screw (M5x20)
1018	012013004	Dial
1019	012013021	Shaft
1020	012013005	Spacer
1021	012013001	Casting
1022	001122001	Oiler
1023	001001264	Cap Screw (M10x60)
1025	001021263	Split pin (4x28)
1026	013013004	Gear



MICROMETER STOP
(optional)

MS-MI-422C

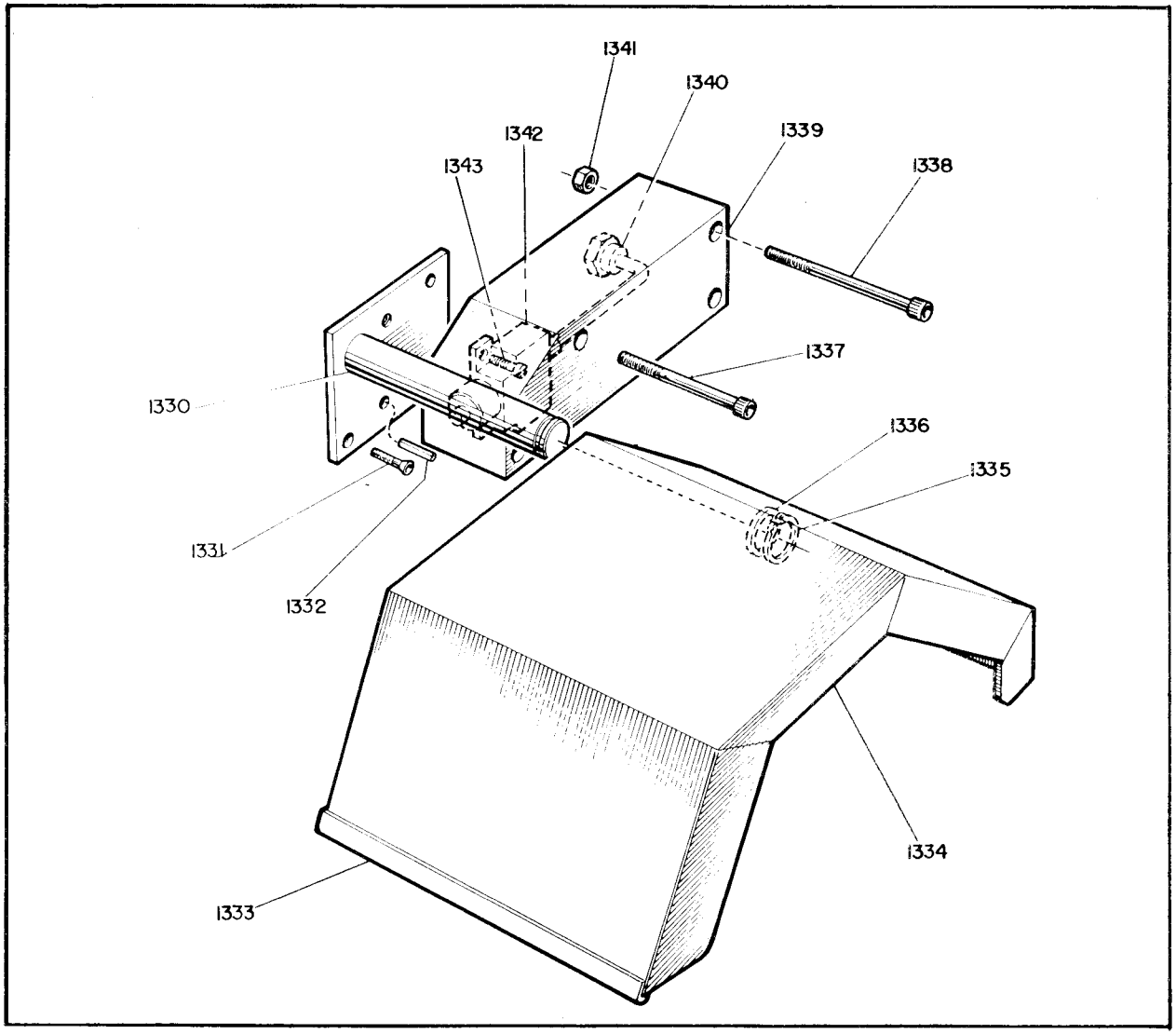
REF.	NUMBER	NAME
1050	012047003	Indexing ring (mm)
1051	012047007	Inedxing ring (inch)
1052	012047001	Casting (mm)
1053	012047006	Casting (inch)
1054	001001213	Cap screw (M8x50)
1055	012047005	Screw (mm)
1056	012047009	Screw (inch)
1057	012047004	Stop (mm)
1058	012047008	Stop (inch)
1059	012010008	Knurled head screw
1060	012047002	Slide holder
1061	001017310	Taper pin (3x28)



CHIP GUARD
(optional)

MS-MI-423C

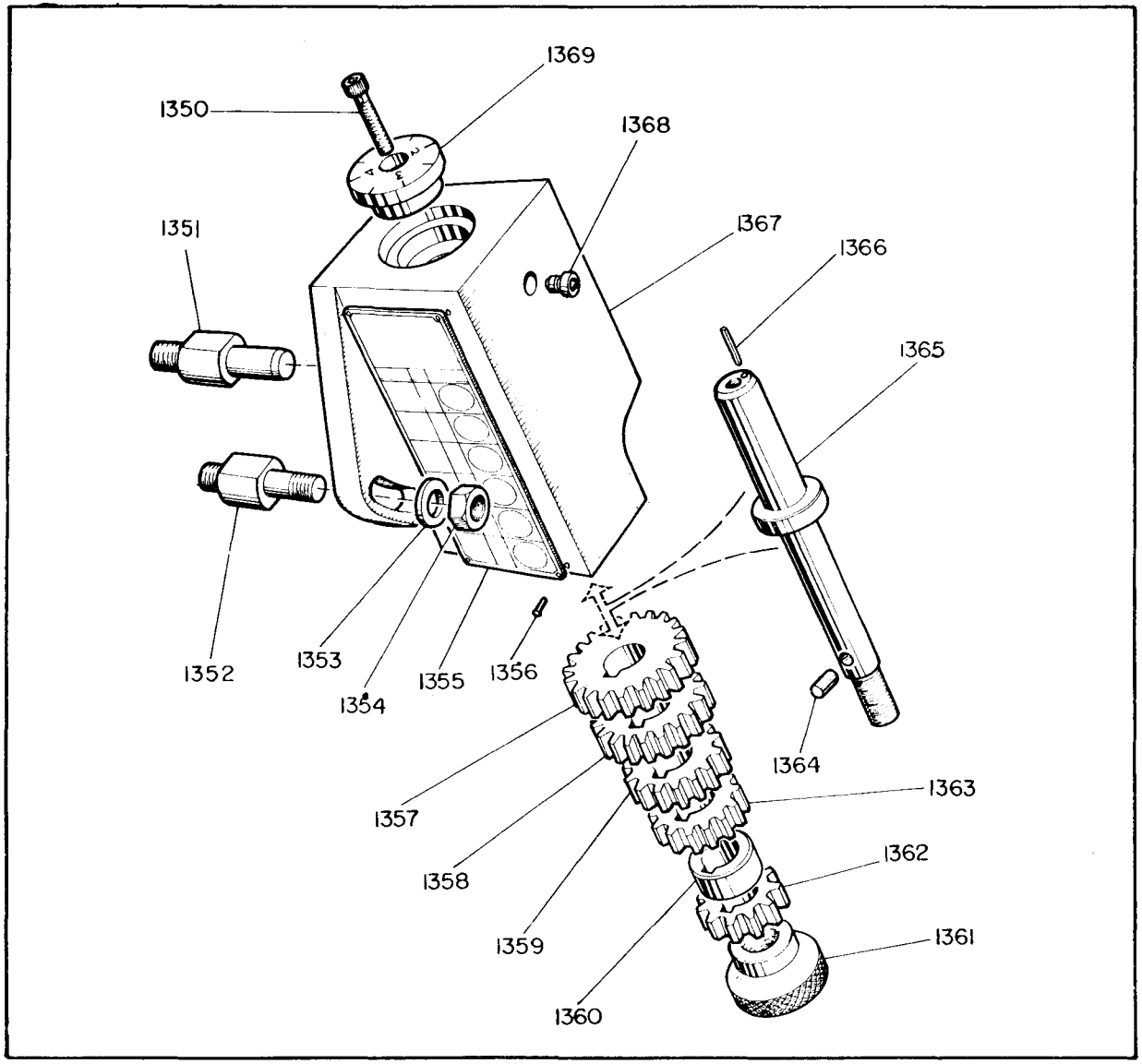
REF.	NUMBER	NAME
1070	001012108	Nut
1071	001014010	Washer
1072	001003105	Cap screw (M5x10)
1073	012046005	Flanged bearing
1074	001021205	Split pin (3x12)
1075	001001156	Cap screw (M6x16)
1076	012046001	Bracket
1077	001021261	Split pin (4x22)
1078	001117240	Spring
1079	012046002	Shaft
1080	012046006	Protector



CHUCK GUARD
(optional)

MS-MI-424

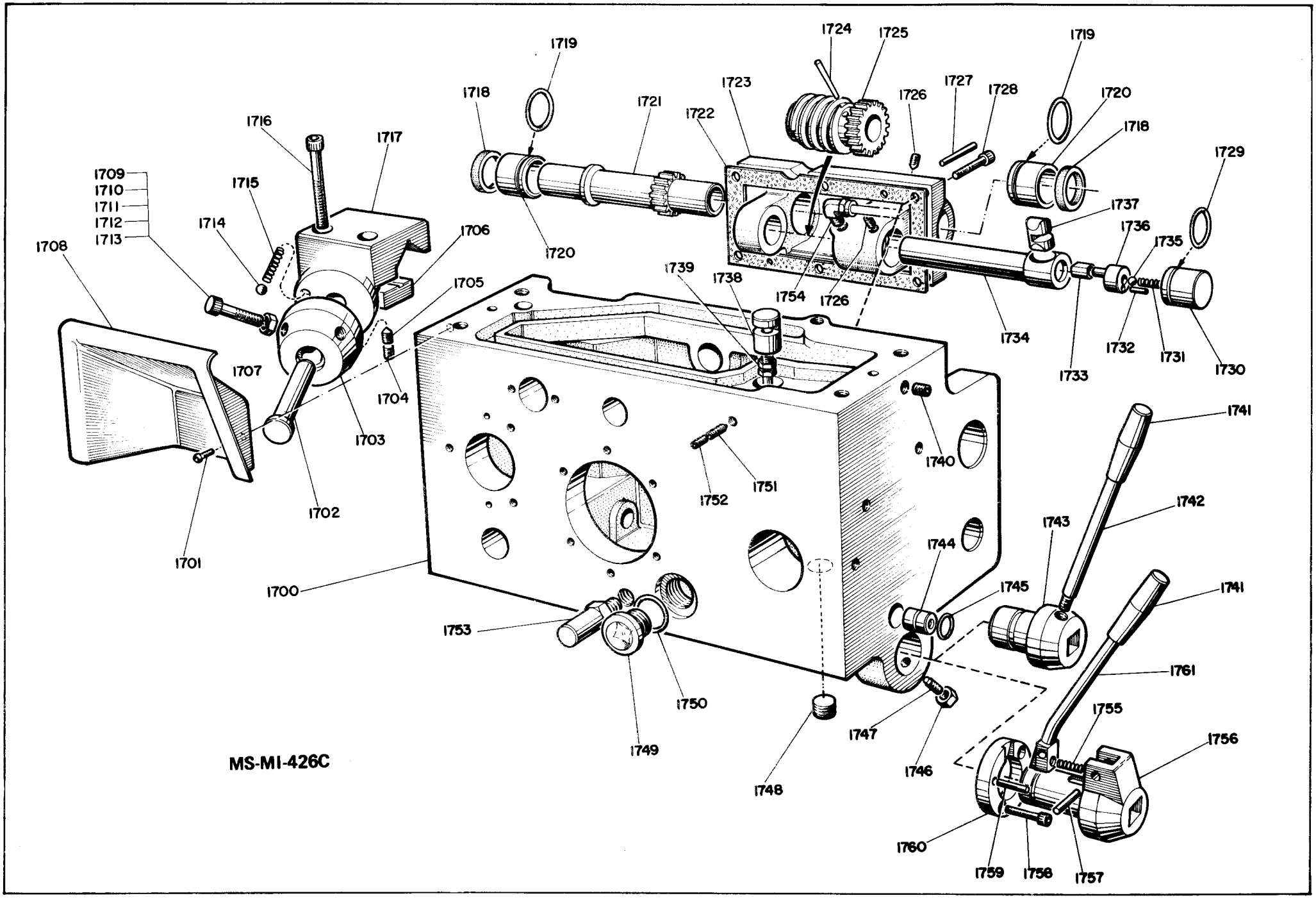
REF.	NUMBER	NAME
1330	012039010	Support
1331	001002106	Cap screw (M6x16)
1332	001021365	Split pin (6x32)
1333	001137001	Fitting
1334	012039001	Protector
1335	001033018	Snap ring (20)
1336	012039013	Spacer
1337	001001162	Cap screw (M6x45)
1338	001001164	Cap screw (M6x60)
1339	012039005	Housing
1340	IE-462	Connector
1341	001012109	Nut
1342	IE-633	Micro switch
1343	001007357	Cap screw (M4x10)



THREADS CUTTING INDICATOR
(leadscrew pitch - 6mm)
(optional)

MS-MI-425C

REF.	NUMBER	NAME
1350	001001108	Cap screw (M8x25)
1351	012013018	Pin
1352	012013016	Stud
1353	001014014	Washer
1354	001012111	Nut
1355	012013020	Data plate
1356	001035010	Rivet
1357	012013015	Gear Z= 24
1358	012013014	Gear Z= 22
1359	012013013	Gear Z= 20
1360	012013010	Spacer
1361	012013009	Nut
1362	012013001	Gear Z= 14
1363	012013012	Gear Z= 16
1364	012020402	Pin (5x6)
1365	012013008	Shaft
1366	001021204	Split pin (3x10)
1367	012013007	Casting
1368	001122001	Oiler
1369	012013004	Dial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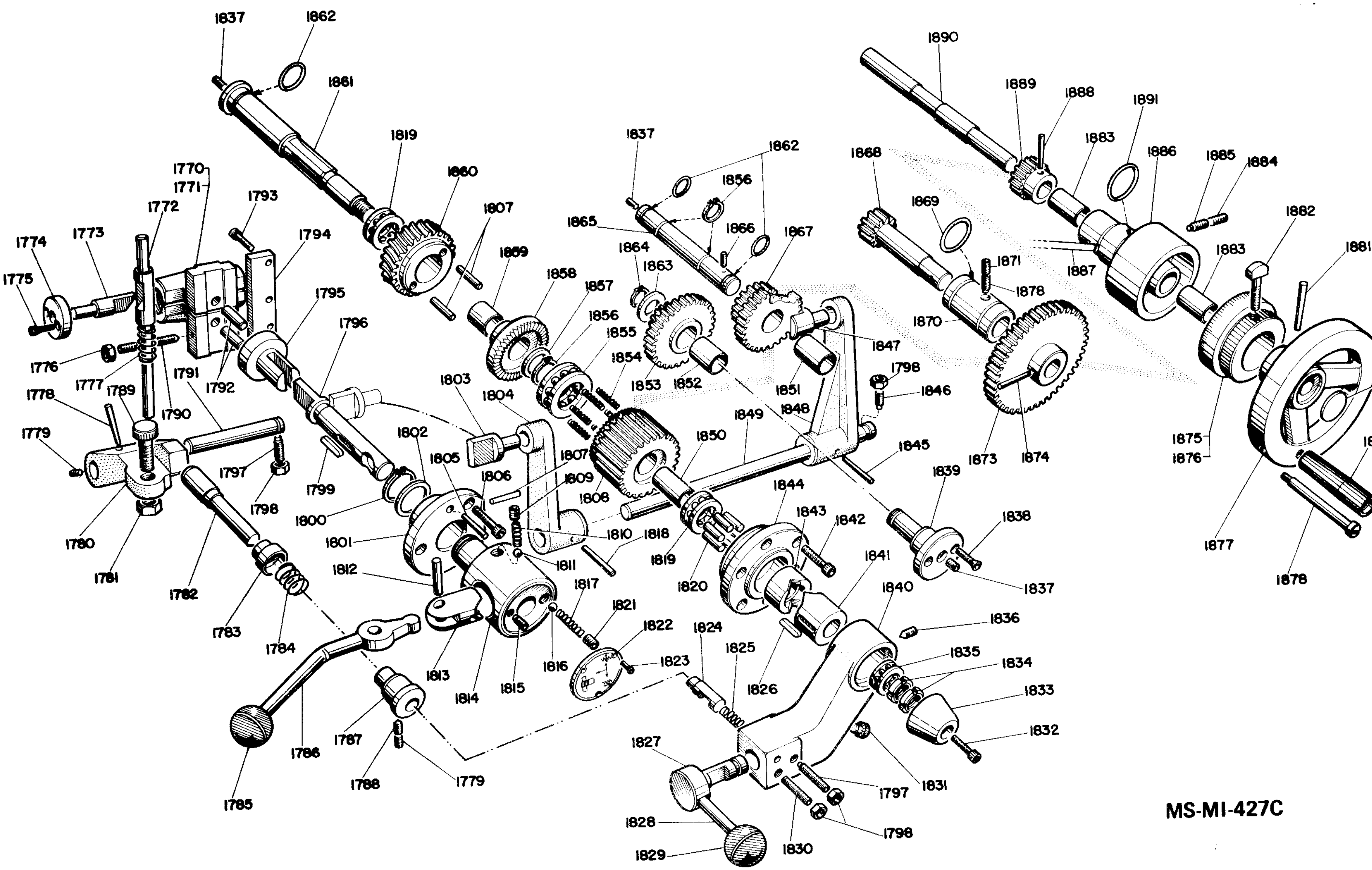
MS-MI-426C

APRON MS-MI-426C
(right - hand)

REF.	NUMBER	NAME
1700	012004301	Casting
1701	001003105	Cap screw (M5x12)
1702	012004314	Shaft
1703	012004312	Handle boss
1704	001008409	Set screw (M10x16)
1705	001009409	Set screw (M10x16)
1706	012004178	Slide holder
1707	001012002	Nut
1708	013004065	Protector (optional)
1709	012004182	Screw (M10x33)
1710	012004183	Screw (M10x43)
1711	012004184	Screw (M10x48)
1712	012004185	Screw (M10x53)
1713	012004186	Screw (M10x58)
1714	001127040	Ball (8)
1715	00117115	Spring
1716	001001263	Cap screw (M20x50)
1717	012004175	Bracket
1718	A-2 -24555	Oil seal
1719	001133121	Oil ring
1720	012004032	Bushing
1721	012004029	Bushing
1722		Gasket
1723	012004306	Bracket
1724	001017412	Taper pin (5x32)
1725	012004229	Worm
1726	001009307	Set screw (M6x10)
1727	001017406	Taper pin (5x20)
1728	001001206	Cap screw (M8x16)
1729	001133119	Oil ring
1730	012004236	Cover
1731	001117052	Spring
1732	001021255	Split pin (4x12)
1733	012001083	Bushing
1734	012004235	Shaft
1735	001127030	Ball (6,5)
1736	012001086	Excentric pin
1737	012001084	Impeller
1738	015004066	Bushing
1739	001227007	Connector
1740	001008407	Set screw (M10x10)
1741	001108030	Handle
1742	012004045	Lever
1743	012004044	Handle boss
1744	012004317	Plug
1745	001133010	Oil ring
1746	001012001	Nut
1747	001010359	Set screw (M8x20)
1748	001205004	Plug
1749	001118010	Oil sight
1750	001133117	Oil ring
1751	001009309	Set screw (M6x16)
1752	001008307	Set screw (M6x10)
1753	015004054	Stop
1754	001229006	Connector

D - THENT CONTROL LEVER
(optional)

1755	001117090	Spring
1756	012004056	Handle boss
1757	001020462	Pin (6x32)
1758	001001107	Cap screw (M5x20)
1759	001021309	Split pin (5x20)
1760	012004057	Collar
1761	012004228	Lever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MS-MI-427C

APRON MS-MI-427C
(right - hand)

REF.	NUMBER	NAME
1770	012004212	Half nut (4 TPI)
1771	012004260	Half nut (6mm)
1772	012004316	Shaft
1773	012004234	Pin
1774	012004233	Cover
1775	001001155	Cap screw (M6x12)
1776	001012110	Nut
1777	001117275	Spring
1778	001017413	Taper pin (5x36)
1779	001008308	Set screw (M6x12)
1780	012004303	Fork
1781	001012002	Nut
1782	012004313	Shaft
1783	012004258	Spring housing
1784	001117410	Spring
1785	001105020	Handle
1786	012004237	Lever
1787	013004123	Bushing
1788	001009308	Set screw (M6x12)
1789	015004016	Screw
1790	012004253	Set screw
1791	012004307	Shaft
1792	001020558	Pin (10x18)
1793	001001105	Cap screw (M5x12)
1794	012004252	Strip
1795	012004311	Cam
1796	012004226	Shaft
1797	001010309	Set screw (M6x20)
1798	001012109	Nut
1799	001023106	Key
1800	001033027	Snap ring (32)
1801	012004310	Cover
1802	012004254	Spacer
1803	012004246	Shifting fork
1804	012004304	Fork
1805	001017406	Taper pin (5x20)
1806	001001155	Cap screw (M6x12)
1807	001020460	Pin (6x24)
1808	012004222	Gear
1809	001008357	Set screw (M8x10)
1810	001117045	Spring
1811	001127030	Ball (6,5)
1812	001020561	Pin (10x28)
1813	012004227	Wedge
1814	012004215	Handle shifting register
1815	001010306	Set screw (M6x10)
1816	001127040	Ball (8)
1817	001117120	Spring
1818	001021312	Split pin (5x26)
1819	001305009	Bearing 51104
1820	013004121	Pin
1821	001008409	Set screw (M10x16)
1822	012004318	Data plate
1823	001036154	CAp screw (M3x8)
1824	013004124	Pin
1825	001117270	Spring
1826	001023105	Key
1827	012004232	Pin
1828	012004249	Lever
1829	001105030	Handle
1830	001008311	Set screw (M6x25)
1831	015004068	Protector
1832	001001106	Cap screw (M5x16)
1833	012004207	Cover
1834	001030003	Nut
1835	001305007	Bearing 51103
1836	001009307	Set screw (M6x10)
1837	001008556	Set screw (M5x8)
1838	001002105	Cap screw (M6x12)
1839	012004315	Shaft
1840	012004302	Bracket
1841	012004240	Cam
1842	001001156	Cap screw (M6x16)
1843	012004241	Cam
1844	012004204	Cover
1845	001021312	Split pin (5x26)
1846	001010308	Set screw (M6x16)
1847	012004309	Shifting fork
1848	012004305	Fork
1849	012004308	Shaft
1850	001114259	Bushing
1851	001114258	Bushing
1852	001114207	Bushing
1853	012004220	Double gear
1854	001117085	Spring
1855	001305019	Bearing 51107
1856	001033018	Snap ring (20)
1857	012004251	Spacer
1858	012004223	Clutch
1859	001114256	Bushing
1860	012004209	Worm gear
1861	012004224	Shaft
1862	001133113	Oil ring
1863	012004048	Spacer
1864	001033016	Snap ring (18)
1865	012004245	Shaft
1866	001009307	Set screw (M6x10)
1867	012004221	Gear
1868	012004242	Rack pinion
1869	001133122	Oil ring
1870	012008208	Bushing
1871	001008408	Set screw (M10x12)
1872	001010409	Set screw (M10x16)
1873	012004219	Gear
1874	001017414	Taper pin (5x40)
1875	012004216	Indexing ring (mm)
1876	012004217	Indexing ring (inch)
1877	001100040B	Handwheel
1878	001109010A	Shaft
1879	001109005A	Handle
1880	001130105	Cover
1881	001017416	Taper pin (5x50)
1882	013006023A	Screw
1883	001114208	Bushing
1884	001008408	Set screw (M10x12)
1885	001010408	Set screw (M10x16)
1886	012004203	Bushing
1887	001263102	Pipe
1888	001017412	Taper pin (5x32)
1889	012004243	Gear
1890	012004244	Shaft
1891	001133128	Oil ring

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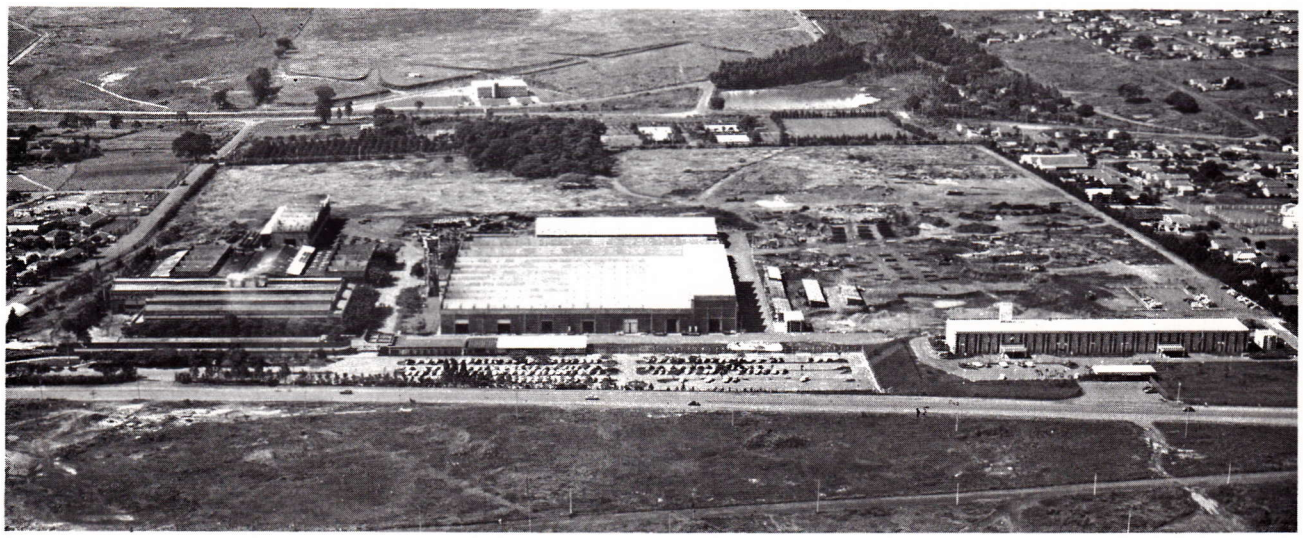

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