



OPERATION MANUAL

DYNAMIC 38”~63” Series

HEAVY DUTY ENGINE LATHE

Model: Dynamic 3860D~63320DH

Taiwan: Ya-Gin Machine Tool Manufacturing Inc.
Ya-Wei Machine Tool Manufacturing Inc.
No. 101 Lane 506, Seng-Tso Rd., Seng Karng Sharng,
Taichung County, 429 Taiwan
Tel: 886-42-520-4120 Fax: 886-42-520-4123

NJ: Klim Industrial, Inc.
244 N. Randolphville Rd., Piscataway, NJ 08854 USA
Tel: 732-752-9100 Fax: 732-752-9101

CA: Springwood Industrial, Inc.
1062 N. Kraemer Place, Anaheim, CA 92806 USA
Tel: 714-632-9701 Fax: 714-632-9730

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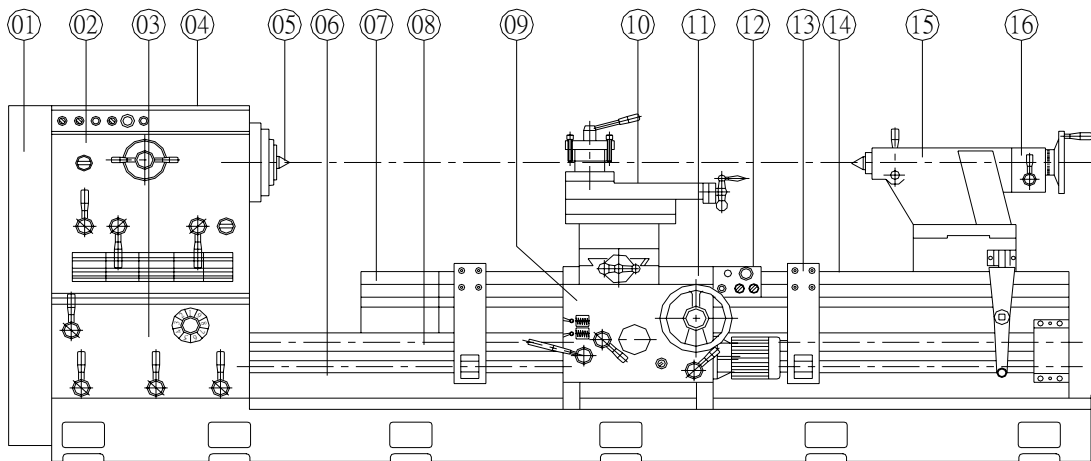
SPECIFICATIONS

UNIT: mm / inch

MODEL		Dynamic 38"	Dynamic 44"	Dynamic 63"
		80" ,120" ,160" , 200" 240" , 280" ,320"		
CAPACITY	Swing over bed	960(37.8")	1120(44")	1600(63")
	Swing over cross slide	650(25.6")	810(32")	1290(50.8")
	Distance between centers	2000 (80") ,3000 (120") ,4000 (160") , 5000 (200") ,6000 (240") ,7000 (280") , 8000(315")		
BED	Swing over gap	1390 (54.7")	1550 (61")	2030 (80")
	Width of bed	610 (24")/810 (32")		
	Width of gap	495 (19.5")		
	Length of bed	3900 (154") , 4900 (193") , 5900 (232") 6900 (272") , 7900 (311") , 8900 (350") 9900 (390")		
HEADSTOCK	Spindle bore diameter	152 (6")/230 (9")/305 (12")		
	Numbered of spindle speeds	16 steps		
	Range of spindle speeds	4-420/7-266 Opt. RPM		
	Spindle nose	ASA A2-11/A2-15 Opt./A2-20 Opt.		
CARRIAGE	Width of carriage	800 (31.5")		
	Cross slide travel	600 (23.6")		
	Top slide travel (Compound rest travel)	370 (14.57")		
	Max. size cutting size	40 x 40 (1.57" x 1.57")		
TAILSTOCK	Diameter of barrel	150 (5.91")		
	Travel of barrel	305 (12")		
	Taper of barrel	M.T.# 6		
THREADS	Lead screw diameter & pitch	Dia.60mm,Pitch:12mm/Dia.1" X2T.P.I.		
	Range of metric pitches	1-120 (62 Nos)		
	Range of inch pitches	0.25-30T.P.I.(70Nos)		
	Diametrical pitches	1-120DP (70Nos)		
	Range of module pitches	0.25-30MP (53Nos)		
FEEDS	Feed rod diameter	32 (1.26")		
	Range of longitudinal feeds	0.06-7.04 (0.0024" -0.28")		
	Range of cross feeds	0.03-3.52 (0.0012" -0.14")		
MOTOR	Main spindle motor	40HP (30kw)		
	Coolant pump motor	1/8HP(0.1kw)		
	Rapid motor	1HP (0.75kw)		

GENERAL LAYOUT

- | | |
|-----------------------|---------------------------|
| 1.END GEAR TRAIN | 9.APRON |
| 2.HEADSTOCK | 10.TOP-SLIDE |
| 3.GEAR BOX | 11.SADDLE AND CROSS-SLIDE |
| 4.ELECTRIC CONTROL | 12.CONTROL PANEL |
| 5.SPINDLE CENTER LINE | 13.SLIDING BRACKET |
| 6.FEED ROD | 14.BED |
| 7.GAP BED | 15.TAILSTOCK |
| 8.LEADSCREW | 16.CHANGE SPEED GEARBOX |



MACHINE OPERATION

Input Power Source Wiring

- Power terminals are located at lower right hand side of the lathe (facing lathe from back-side of the headstock!).
- The input power source and electric control circuit must set up with fuse breakers to ensure safety. The lathe must also be grounded with external ground rod.
- After power connection, please turn on the power by pushing the power on button. To check the spindle rotation, please pull the starting lever on the right side of the Apron, and see the rotation is counterclockwise or not. In this case, the spindle happens to also be turning toward the operator. At this point, we can say the rotation is correct if it is turning counterclockwise. If the spindle rotates on the opposite direction, you can replace any two of the three-phase to change the spindle rotation.

Identification and preparation before operation

1. Make sure all necessary oiling positions are supplied with adequate oil.
2. Check all the levers and handles, whether or not they are in normal operating condition?
3. Check the V-belts of the spindle motor, whether or not there is enough tension in the belts.
4. Make sure operator understand the relative positions before operating the transmission mechanisms such as head stock, feed gear box, cross slide, automatic feeding, thread cutting, etc.

MAINTENANCE

Identification and Preparation before Operation

- Accurately operating the lathe and doing scheduled maintenance will prolong the life span of the machine.
- It is important to check the oil level through oil gauges on all oil reservoirs and fill to “high” level as necessary before starting the machine. Especially please pay attention to lubricate between saddle and cross slide daily.
- Replace the lubrication oil in headstock after first three months of usage. This is to prolong the life of the bearings and gears, and in long term, it will reduce the noise to be produced.
- Stop the machine immediately if the following are happening, overheat and vibration in headstock, oil leakage or no oil is visible on any of the gauge. Please find the problem and repair it as soon as possible.
- Please do not use hammer or other tool to adjust the work piece. This is to prevent damage to spindle bearing and to help keeping the accuracy of spindle.
- Place cutting tools, hand tools and chuck jaws away from the slideways. This will prevent damaging the slideways and affecting the accuracy of the machine.
- Unless it's the operator or maintenance personnel, please do not adjust or operate this machine arbitrarily.
- Periodically maintaining the machine will prolong the life span and accuracy of the machine.
- At the end of each day's work, it is recommended to clean the machine, remove the chips from machine and its surroundings, apply oil on the sliding surfaces and turn off the power source to prevent accidents.

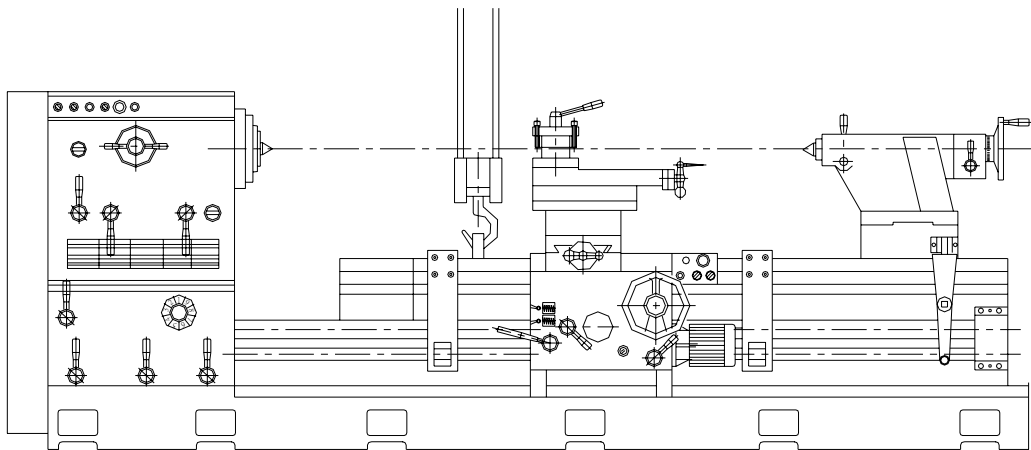
UNPACKING AND UNLOADING

Each machine is shipped fully assembled except for accessories such as taper turning attachment, 4 jaw scroll chuck, etc.

To unload the machine from the wooden case or pallet, it is recommended to use hoisting cable from the overhead crane or forklift that is rated for the machine's weight.

Lifting unpacked machine is made easily by the method shown in the below figure and according to the center of gravity of the lathe.

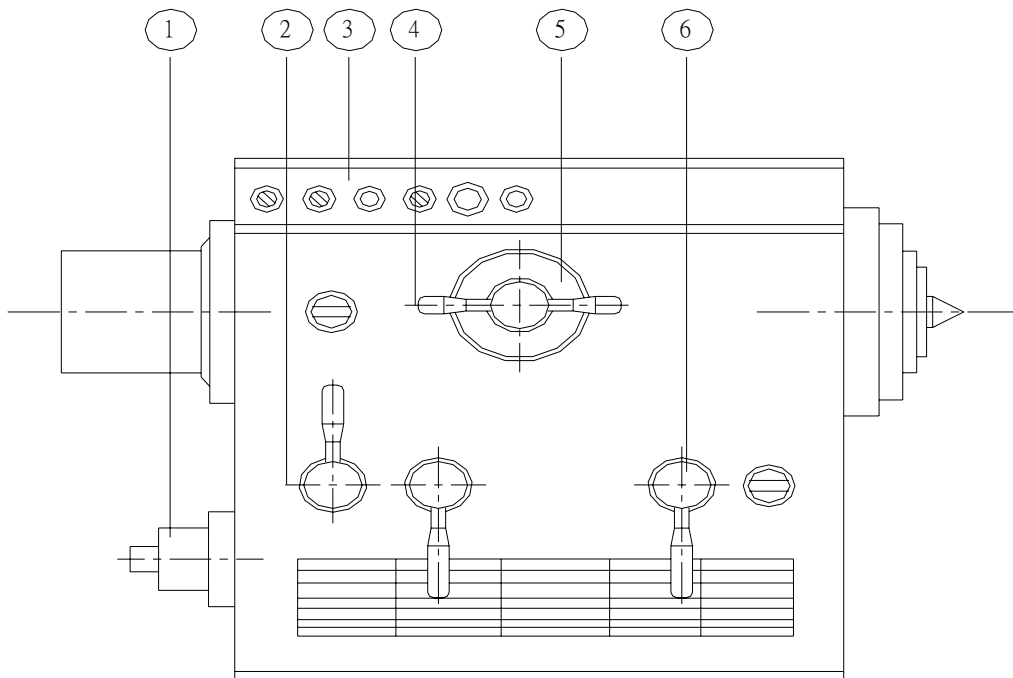
Raising and lowering of the lathe should be done carefully, especially when you are lowering the lathe, be careful not to bump it against the floor or other workers. Please pay attention to other workers and ask them to attain the purpose of safety also.



SPINDLE SPEED CONTROL

The 16-step spindle speeds are obtained by selecting the proper lever combination matching the position shown on the speed dial (#5 on the drawing).

Please do not move speed-selector levers while the spindle is still rotating!



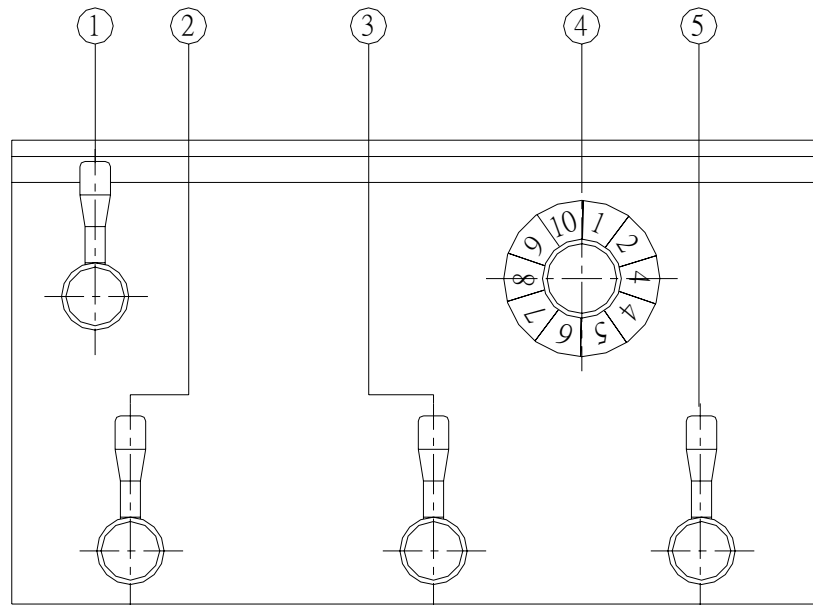
1. END GEARS OUTPUT
2. FORWARD/REVERSE ROTATION LEVER
3. CONTROL PANEL
4. 8-STEP LEVER
5. SPEED DIAL
6. HIGH/LOW SPEED LEVER

THEADS AND FEEDS

(GEARBOX OPERATION)

All threads and feeds directly available from the gearbox are shown on the data plate fitted in the front of the headstock, and the setting of control levers are shown in the figure below.

If you want to cut DP/MP threads, please set #5 change lever to “DP/MP” and must set #3 change lever to ”IN” or “MM” (DP=IN,MP=MM)



1. A, B-STEP CHANGE LEVER
2. C, D, E-STEP CHANGE LEVER
3. IN, MM-STEP CHANGE LEVER
4. 10-STEP CHANGE LEVER
5. THREADS IN/MM OR DP/MP, AND FEEDS CHANGE LEVER

THEAD CUTTING INDEX

MM										MP									
1	2	3	4	5	6	7	8	9	10	1	2	3	4	5	6	7	8	9	10
1			1.25			1.5		1.75		0.25						0.375			
2	2.25		2.5	2.75		3	3.25	3.5	3.75	0.5			0.625			0.75		0.875	
4	4.5	4.75	5	5.5	5.75	6	6.5	7	7.5	1	1.125		1.25	1.375		1.5	1.625	1.75	
8	9	9.5	10	11	11.5	12	13	14	15	2	2.25	2.375	2.5	2.75	2.875	3	3.25	3.5	3.75
16	18	19	20	22	23	24	26	28	30	4	4.5	4.75	5	5.5	5.75	6	6.5	7	7.5
32	36	38	40	44	46	48	52	56	60	8	9	9.5	10	11	11.5	12	13	14	15
64	72	76	80	88	92	96	104	112	120	16	18	19	20	22	23	24	26	28	30

IN										DP										
1	2	3	4	5	6	8	9	10		1	2	3	4	5	6	7	8	9	10	
AC	16	18	19	20	22	23	24	26	28	30	64	72	76	80	88	92	96	104	112	120
AD	8	9	9 1/2	10	11	11 1/2	12	13	14	15	32	36	38	40	44	46	48	52	56	60
AE	4	4 1/2	4 3/4	5	5 1/2	5 3/4	6	6 1/2	7	7 1/2	16	18	19	20	22	23	24	26	28	30
BD	2	2 1/4	2 3/8	2 1/2	2 3/4	2 7/8	3	3 1/4	3 1/2	3 3/4	8	9	9 1/2	10	11	11 1/2	12	13	14	15
BE	1	1 1/8	1 3/16	1 1/4	1 1/8	1 1/8	1 1/2	1 3/8	1 3/4	1 7/8	4	4 1/2	4 3/4	5	5 1/2	5 3/4	6	6 1/2	7	7 1/2
BD	1/2	9/16	19/32	3/8	1/16	23/32	3/4	13/16	7/8	15/16	2	2 1/4	2 3/8	2 1/2	2 3/4	2 7/8	3	3 1/4	3 1/2	3 3/4
BE	1/4	9/32	19/64	5/18	1/32	23/64	3/8	13/32	7/18	15/32	1	1 1/8	1 1/8	1 1/4	1 1/8	1 1/8	1 1/2	1 5/8	1 3/4	1 7/8

IN									
1	2	3	4	5	6	7	8	9	10
0.11	0.10	0.095	0.09	0.082	0.078	0.075	0.07	0.065	0.06
0.22	0.20	0.19	0.18	0.164	0.156	0.15	0.14	0.13	0.12
0.44	0.40	0.38	0.36	0.328	0.312	0.30	0.28	0.26	0.24
0.88	0.80	0.76	0.72	0.656	0.624	0.6	0.56	0.52	0.48
1.76	1.60	1.52	1.44	1.312	1.248	1.2	1.12	1.04	0.96
3.52	3.20	3.04	2.88	2.624	2.496	2.4	2.24	2.08	1.92
7.04	6.40	6.08	5.76	5.248	4.992	4.8	4.48	4.16	3.84

JUST FOR INFORMATION

MM/REV. : 1		: 1/2									
	1	2	3	4	5	6	7	8	9	10	
I	AC	0.110	0.100	0.095	0.090	0.082	0.078	0.075	0.070	0.065	0.060
	AD	0.220	0.200	0.190	0.180	0.164	0.156	0.150	0.140	0.130	0.120
	AE	0.440	0.400	0.380	0.360	0.328	0.312	0.300	0.280	0.260	0.240
	BC	0.440	0.400	0.380	0.360	0.328	0.312	0.300	0.280	0.260	0.240
	BD	0.880	0.800	0.760	0.720	0.656	0.624	0.600	0.560	0.520	0.480
BE	1.760	1.600	1.520	1.440	1.312	1.248	1.200	1.120	1.040	0.960	
II	AC	0.440	0.400	0.380	0.360	0.328	0.312	0.300	0.280	0.260	0.240
	AD	0.880	0.800	0.760	0.720	0.656	0.624	0.600	0.560	0.520	0.480
	AE	1.760	1.600	1.520	1.440	1.312	1.248	1.200	1.120	1.040	0.960
	BC	1.760	1.600	1.520	1.440	1.312	1.248	1.200	1.120	1.040	0.960
	BD	3.520	3.200	3.040	2.880	2.624	2.496	2.400	2.240	2.080	1.920
BE	7.040	6.400	6.080	5.760	5.248	4.992	4.800	4.480	4.160	3.840	

FUNCTION OF THE GEAR BOX

·The main function of the gear box is to cut threads and auto-feed.

OPERATION OF THREAD CUTTING

·When thread cutting is desirable, select and set all the speed-change levers to the proper positions according to the chart of “thread cutting index”. Then thread cutting can be performed to cut the required kind and pitch of the thread.

Finally, move the feeds-change lever to “leadscrew” position, and then the operation of thread cutting can be started.

OPERATION OF AUTOMATIC FEED

·When operating automatic feed, at first, select and set all the speed-change levers to the proper positions according to the chart of “thread cutting index” to match the speed of cutting requirement, and then move the feeds-change lever to “feed” position, thereupon the operation of auto feed can be started.

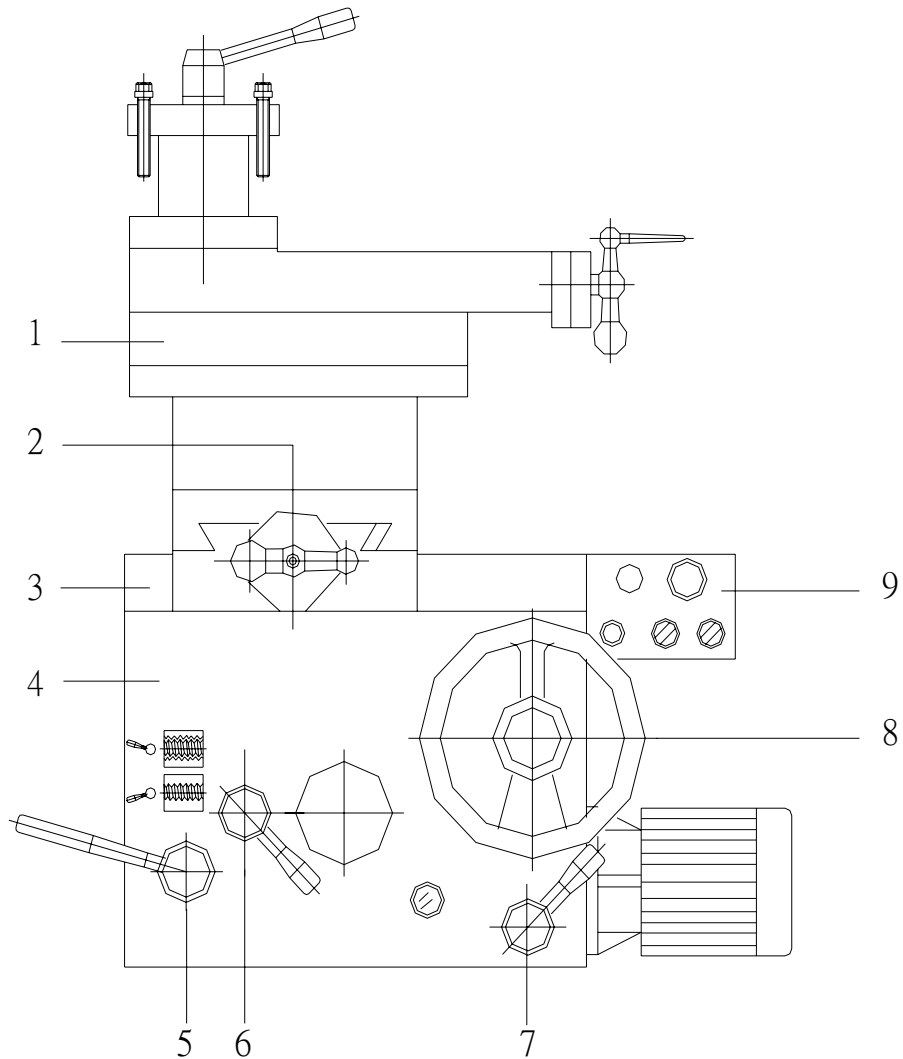
LUBRICATION

·The gear box is lubricated by both oil bath and splash lubrication. When the machine is running, the oil will be supplied to all bearings and gears by the method of turning gears splashing the lube oil in all direction, thus lubricating all required areas of the gear box. We can check the oil level through the oil gauge and fill lube oil to the top red line of the gauge when not enough oil level is present on the glass.

THREAD INDICATOR

- Thread cutting indicator is attached to the thread chasing dial on the left side of the Apron. Its sole function is to assist on cutting inch or metric threads.
- To cut even number thread per inch, please match datum mark to any line on the thread chasing dial.
- To cut odd number thread per inch, please match datum mark to any number on the thread chasing dial.
- To cut fractional threads of $1/2$ or $3/4$ T.P.I, please match datum to the same line on the thread chasing dial.
- This dial indicator can't be used with an inch leadscrew to cut metric threads, D. P., and module pitches. To cut the metric threads repeatedly, the half nut of the Apron must remain engaged, cutting tool is retracted, move forward-reverse lever in Apron to reverse the leadscrew rotation and then carriage assembly will move toward starting point of the cutting cycle. When the position is reached, operator must engage the cutting tool and reverse the leadscrew rotation again to initiate the cutting cycle.

SADDLE AND APRON CONTROL



1. FOUR WAY TOOL POST AND TOP-SLIDE
2. CROSS-SLIDE HANDWHEEL
3. SADDLE CASTING
4. APRON CASTING
5. THE LEVER IS PRESSED DOWNWARD TO ENGAGE THE HALF-NUT FOR THREAD-CUTTING.
6. THE LEVER IS PULL UP FOR LONGITUDINAL FEEDING AND PUSH DOWN FOR CROSS FEEDING.
7. THE LEVER IS PULL UP FOR AUTO-FEED AND PUSH DOWN FOR AUTO MOTOR-FEED.
8. LONGITUDINAL HANDWHEEL.
9. CONTROL PANEL.

CUTTING OF FACE PLANE

- When cutting large amount in the cross direction, in order to avoid the carriage movement and unbalance cutting of face plane , we have designed a locking bolt “D” on the saddle. Please fasten it tightly! This action will increase the stability of compound rest and help to obtain a more stable cut. It also will result the cut with a higher accuracy in finish.

CUTTING OF TAPERED WORKPIECE

- There are many graduated divisions on the sliding plate of the carriage. To cut tapered-plane, please loosen the locking screws “B” then rotate the compound rest according to the specified angle. After the angle adjustment is done, fasten the locking screws “B” again, and then the cutting of tapered plane can be started.

ADJUSTMENT OF THE GIB

- Owing to the friction of long time motion between saddle and cross slide or within compound rest itself, there will be wear produced on the gibs, thus creating a backlash between the adjacent parts. In order to eliminate the excess value, the gibs should be adjusted. Their adjusting method are: First loose the gib screw in the thinner end of the gib, and then screw in the adjusting screw “A” half turn or more. The gib is now pushed in to reduce the backlash between saddle and cross slide or within compound rest itself. If this first tightening cycle is adequate, the backlash will be smaller and closer to the original value. At this point you may choose to fasten both gib screws to tighten the gib. If not, please repeat the adjustment cycle again.

GRADUATED DIAL (MICROMETER COLLAR)

- There are the graduated dials on both the longitudinal and cross feed handle.

The dials are divided into 200 divisions, each division means 0.05mm (0.002") and 10mm (0.4") for one revolution.

To set the zero position on the dial, please loosen the set screw and rotate the dial to match the indicator line on the collar. After zeroing the dial, please remember to tighten the set screw again.

LUBRICATION OF THE CARRIAGE ASSEMBLY

The oiling inlets are installed on the carriage and cross slide. Before each operation, please inject lube oil into each inlet. These inlets must be hand-lubed, since they are not designed to lubricate automatically. To lubricate oil inlets on the carriage, please inject the lube oil by oil gun.

TRANSMISSION OF THREAD CUTTING

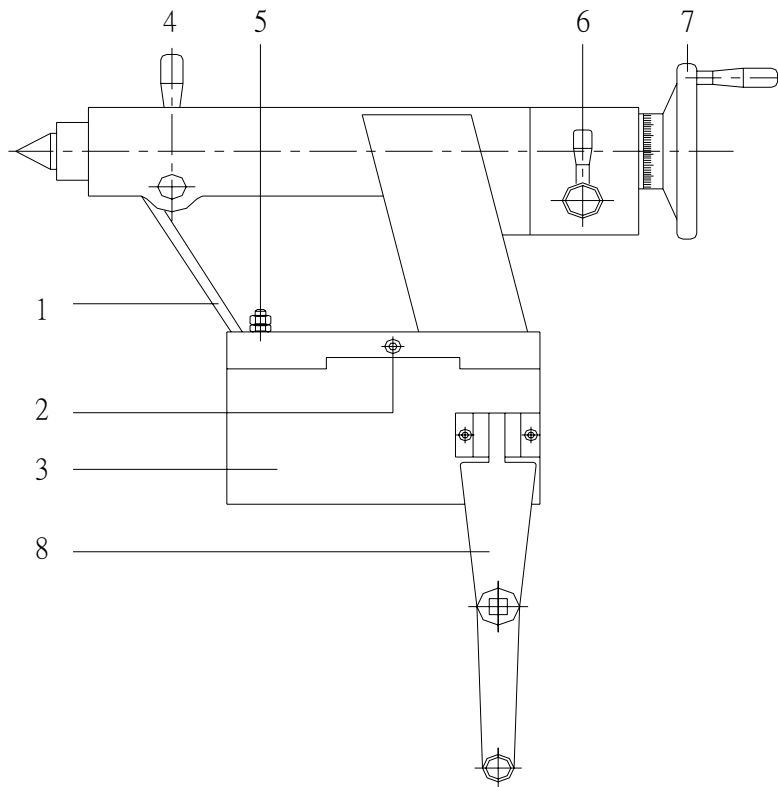
When the autofeed lever is at the neutral position, the half-nut engagement lever can be push down to engage the half-nut with the lead screw. After the engagement, the carriage then can be moved leftward or rightward to perform the function of thread cutting. To stop thread cutting, please pull up the half-nut engagement lever to release the engagement and cutting.

There is a safety device installed in the apron to keep the thread cutting and autofeed function from simultaneously operating. This is done to attain the purpose of safety.

TAILSTOCK OPERATION

GENERAL DESCRIPTION OF THE TAILSTOCK

The main structure of tailstock consists of tailstock body, base mounting, quill and change speed box. The quill of tailstock and the spindle of headstock share the concentric line. The tailstock depends on the length of the workpiece or required position, can be clamped at anywhere on the bed ways. After the clamping, it works with spindle for cutting cycle between two centers and to bore a hole.



1. TAIL STOCK CASTING
2. GIB SCREW
3. BASE CASTING
4. SPINDLE LOCKING LEVER
5. CLAMPING NUTS
6. HIGH-LOW SPEED CHANGE LEVER
7. HANDWHEEL
8. TAILSTOCK SLIDING MECHANISM

OPERATIONAL METHOD FOR TAILSTOCK

·When the tailstock quill and spindle center are not in the same center line. Please loose the gib screws “A” on both sides of the tailstock, tap tailstock casting to align the center line, tighten it when the center line is concentric. Using the same method, adjust the tailstock center position to set up a deviation measure between itself and the spindle. This will provide a taper cut between two center positions when desired angle is achieved.

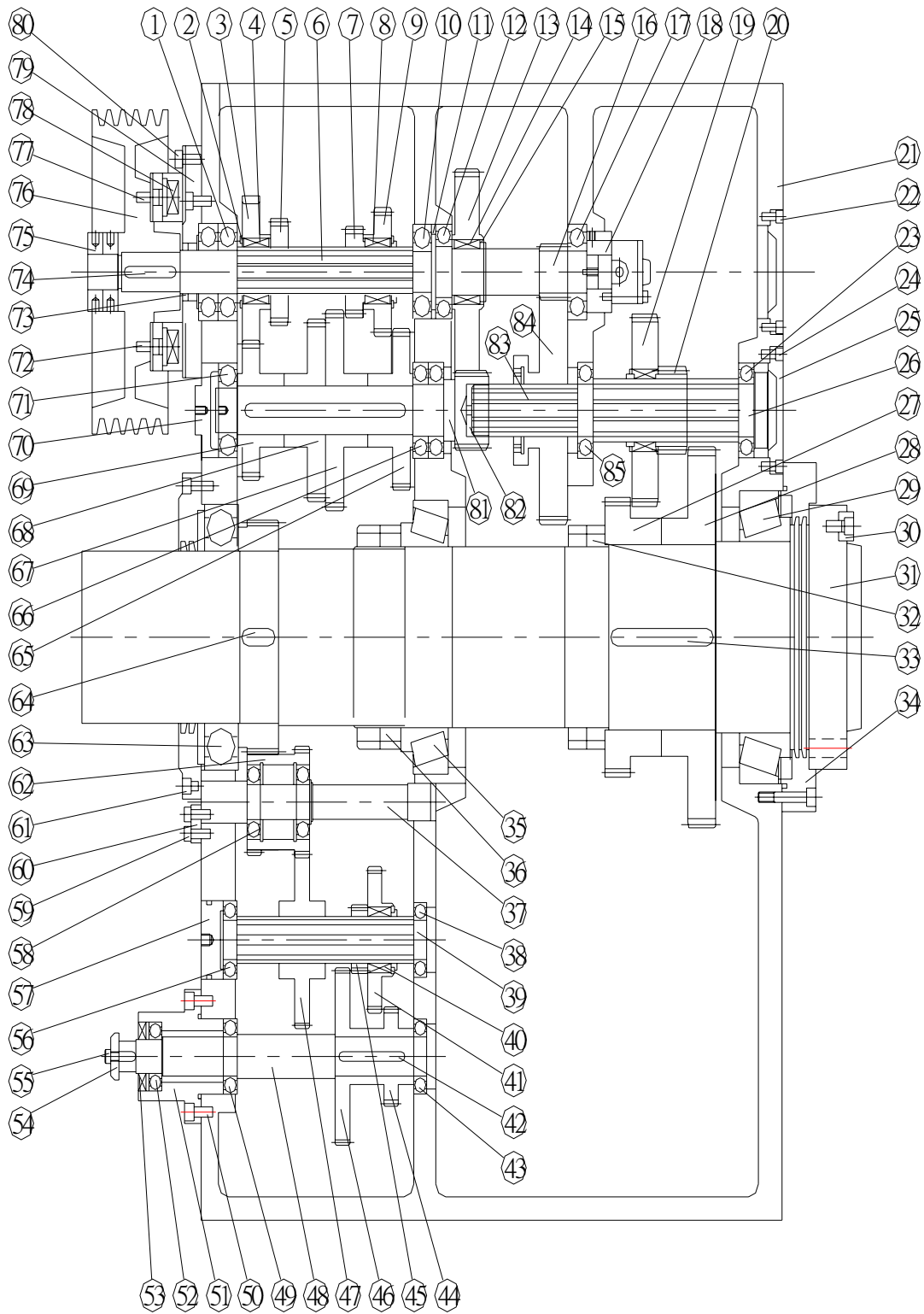
LUBRICATION OF TAILSTOCK

·The speed change gear box of the tailstock is lubricated by the method of oil bath. Please check and fill lube oil whenever possible. Its quill taper, quill surface and sliding parts must be hand oiled from time to time.

Mechanical Drawings & Parts Breakdown List

Note: When ordering parts, please be prepared with,

1. Machine model & serial number.
2. Item number.
3. Part number and description.
4. Year of Production.
5. Voltage & horsepower.
6. Quantity



PARTS LIST

HEADSTOCK

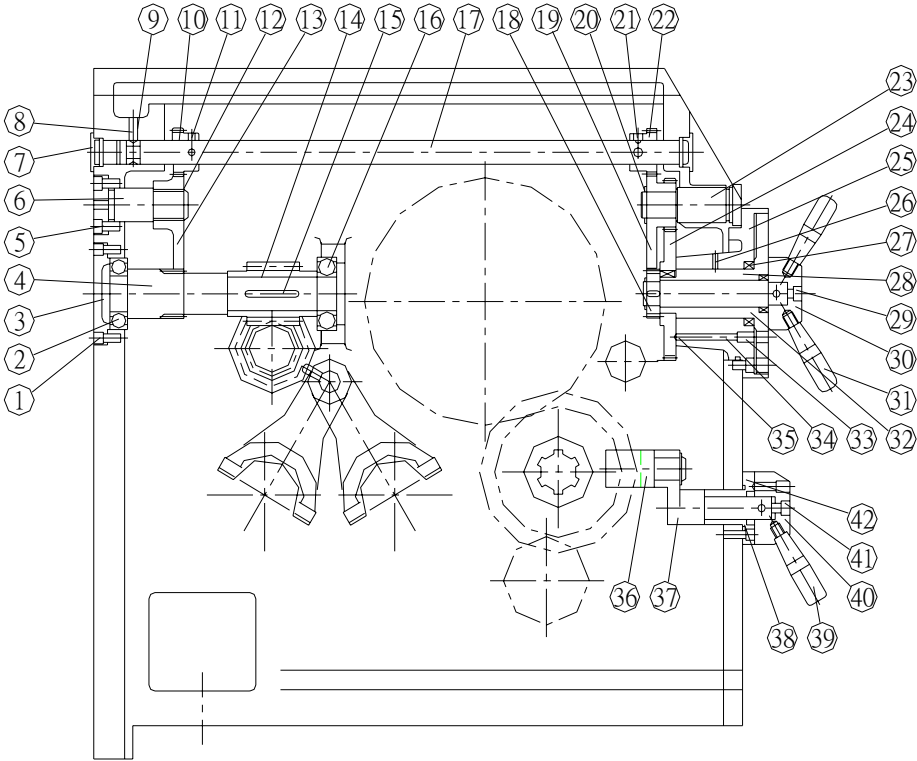
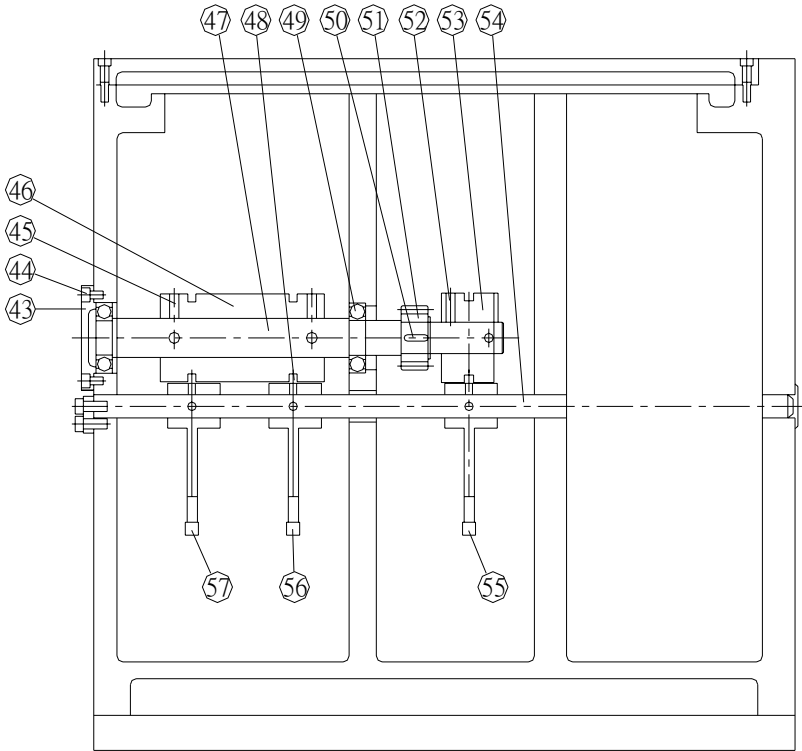
HEADSTOCK				
REF NO.	PART NO.	DESCRIPTION	PARTS NAME	Q'TY
0 1		BEARING	6309	2
0 2		SNAP RING	S65	1
0 3	HL- 2006	GEAR		1
0 4		KEY	10 x 8 x 35L	1
0 5	HL- 2005	GEAR		1
0 6	HL- 2004	SHAFT		1
0 7	HL- 2007	GEAR		1
0 8		KEY	10 x 8 x 35L	1
0 9	HL- 2008	GEAR		1
1 0		BEARING	6309	1
1 1	HL- 2009	COLLAR		1
1 2		BEARING	6211	1
1 3	HL- 2011	GEAR		1
1 4		KEY	10 x 8 x 35L	1
1 5		SNAP RING	S65	1
1 6	HL- 2010	BEARING SHAFT		1
1 7		BEARING	6309	1
1 8	HL- 2012	PUMP BASE		1
1 9	HL- 2026	GEAR		1
2 0	HL- 2025	GEAR		1
2 1	HL- 2001	HEADTOCK CASTING		1
2 2		SOCKET CAP SCREW	M8	3
2 3		BEARING	6211	1
2 4		SOCKET CAP SCREW	M8	3
2 5	HL- 2014	COVER		2
2 6	HL- 2023	SHAFT		1

HEADSTOCK

REF NO.	PART NO.	DESCRIPTION	PARTS NAME	Q'TY
27	HL- 2030	GEAR		1
28	HL- 2029	GEAR		1
29		TAPER ROLLER BEARING	32040x	1
30		DRIVING BOTTON		1
31	HL- 2002	SPINDLE		1
32	HL- 2031	LOCK NUT		2
33		KEY	18 x 12 x 140L	2
34	HL- 2034	COVER		1
35		TAPER ROLLER BEARING	32038x	1
36	HL- 2032	LOCK NUT		2
37	HL- 2036	SHAFT		1
38		BEARING	6208	1
39	HL- 2039	SHAFT		1
40		KEY	10 x 8 x 30L	1
41	HL- 2042	GEAR		1
42		KEY	10 x 8 x 90L	1
43		BEARING	6208	1
44	HL- 2046	GEAR		1
45	HL- 2041	GEAR		1
46	HL- 2045	GEAR		1
47	HL- 2040	GEAR		1
48	HL- 2044	SHAFT		1
49		BEARING	6208	1
50		SOCKET CAP SCREW	M10	4
51	HL- 2047	COVER		1
52		BEARING	6207	1

HEADSTOCK				
REF NO.	PART NO.	DESCRIPTION	PARTS NAME	Q'TY
53		OIL SEAL	TC357210	1
54	HL- 3064	WASHER		1
55		SOCKET CAP SCREW	M8	1
56		BEARING	6208	1
57	HL- 2043	COVER		1
58		BEARING	6208	2
59		SOCKET CAP SCREW	M10	2
60	HL- 2038	PRESS BLOCK		1
61	HL- 2035	COVER		1
62	HL- 2037	GEAR		1
63		BALL BEARING	6036	2
64		KEY	18 x 12 x 45L	1
65	HL- 2021	GEAR		2
66		BEARING	6211	1
67	HL- 2020	GEAR		1
68	HL- 2019	GEAR		1
69	HL- 2018	GEAR		1
70	HL- 2027	COVER		1
71		BEARING	6309	1
72		SOCKET CAP SCREW	M10	3
73		OIL SEAL	TC45608	1
74		KEY	10 x 8 x 70L	2
75	HL- 2016	NUT		2
76	HL- 2015	V BELT PULLEY		1
77		SOCKET CAP SCREW	M10	
78		CLUTCH	TMB20	1

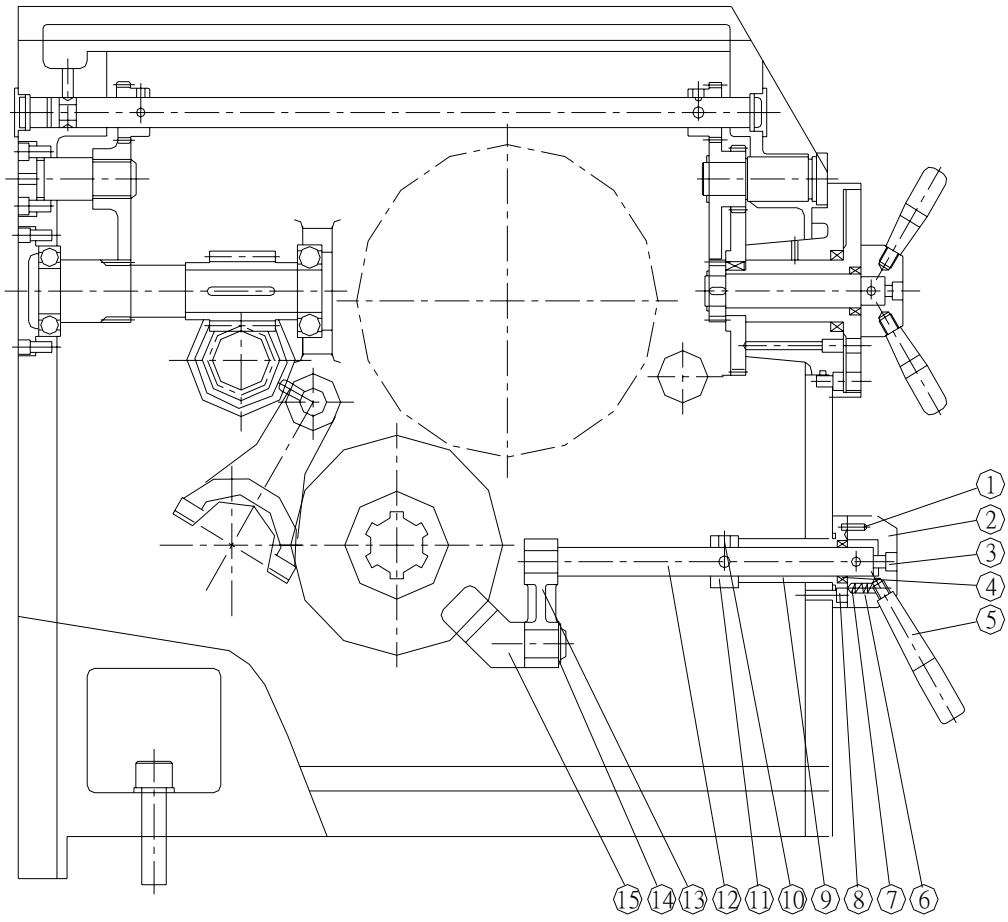
HEADSTOCK



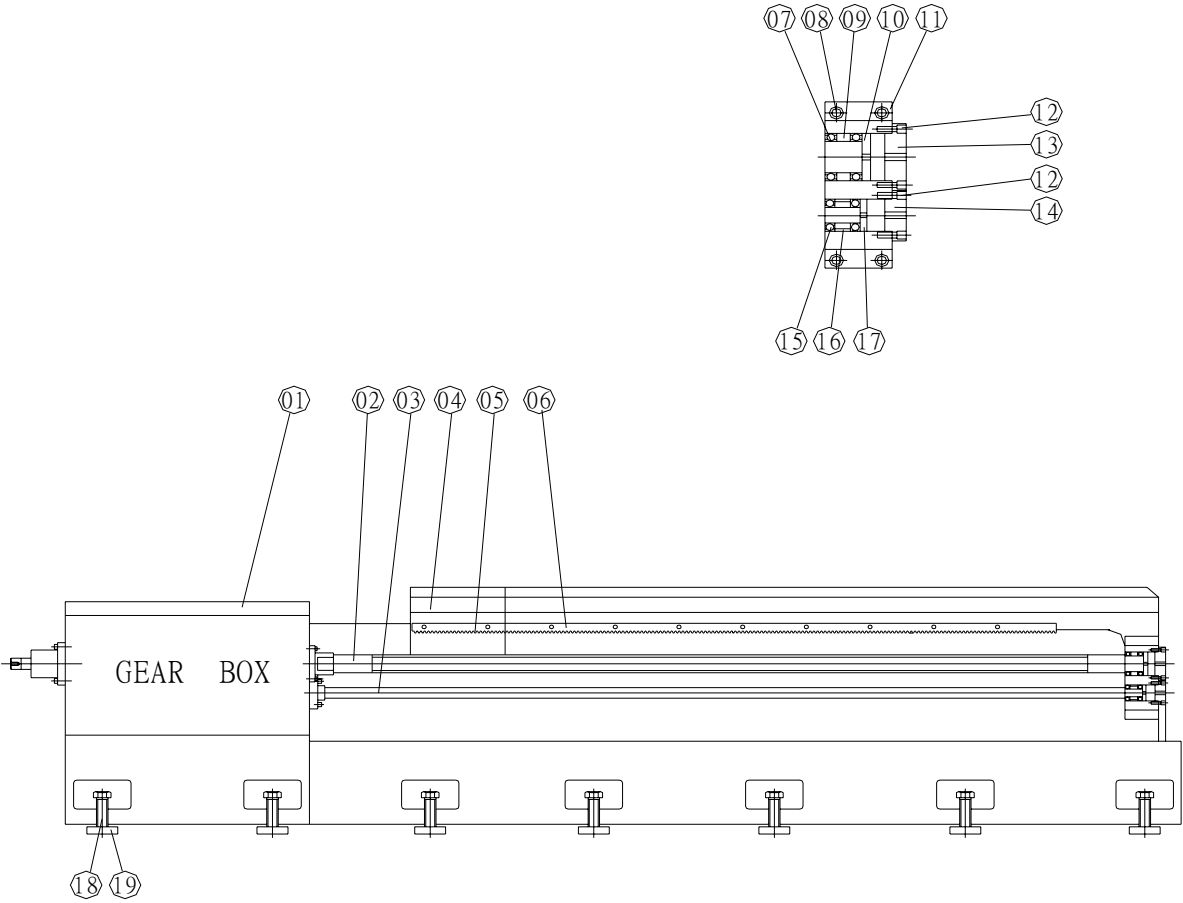
HEADSTOCK				
REF NO.	PART NO.	DESCRIPTION	PARTS NAME	Q'TY
0 1		SOCKET CAP SCREW	M8	3
0 2		BEARING	6208	1
0 3	HL- 2052	COVER		1
0 4	HL- 2063	GEAR SHAFT		1
0 5		SOCKET CAP SCREW	M8	3
0 6	HL- 2067	SHAFT		1
0 7		OIL COVER	§ 32	3
0 8		SET SCREW	M10	1
0 9	HL- 2071	COLLAR		1
1 0	HL- 2070	GEAR		1
1 1		SET SCREW	M10	2
1 2		SNAP RING	S30	1
1 3	HL- 2068	GEAR		1
1 4	HL- 2064	WORM		1
1 5		KEY	6 x 6 x 60L	1
1 6		BEARING	6307	1
1 7	HL- 2069	SHAFT		1
1 8	HL- 2062	GEAR		1
1 9	HL- 2066	GEAR		1
2 0		SNAP RING	S30	1
2 1		SET SCREW	M10	2
2 2	HL- 2070	GEAR		1
2 3	HL- 2065	SHAFT		1
2 4	HL- 2061	GEAR		1
2 5	HL- 2058	NAME PLATE COVER		1
2 6		OIL CAP	M6	1

HEADSTOCK				
REF NO.	PART NO.	DESCRIPTION	PARTS NAME	Q'TY
27		OIL SEAL	TC-357010	1
28	HL- 2059	NAME PLATE COVER		1
29		SOCKET CAP SCREW	M8	1
30	HL- 2057	LEVER BOSS		1
31	HL- 2056	HANDLE		2
32	HL- 2060	SHAFT		1
33		SOCKET CAP SCREW	M10	1
34		SPRING	M8	1
35		STEEL BALL		1
36	HL- 2076	FORK		2
37	HL- 2075	FORK ARM		2
38		SOCKET CAP SCREW	M8	4
39	HL- 2056	HANDLE		2
40	HL- 2073	LEVER BOSS		2
41		SOCKER CAP SCREW	M8	2
42	HL- 2074	BUSHING		2
43	HL- 2052	COVER		1
44		SOCKET CAP SCREW	M8	3
45		SET SCREW	M10	4
46	HL- 2049	CAM		1
47	HL- 2048	SHAFT		1
48	HL- 2055	PIN		3
49		BEARING	6208	1
50		KEY	6 x 6 x 25L	1
51	HL- 2051	GEAR		1
52		SOCKET CAP SCREW	M10	1

HEADSTOCK

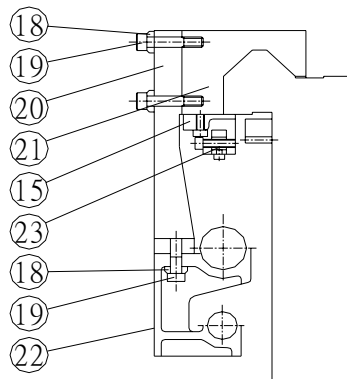
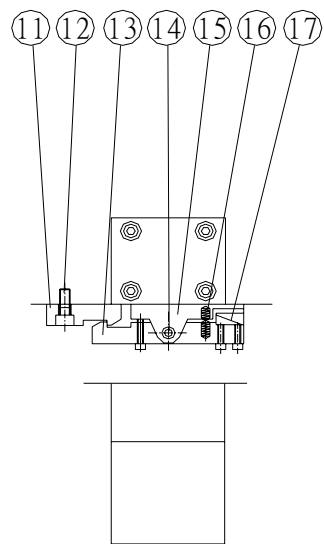
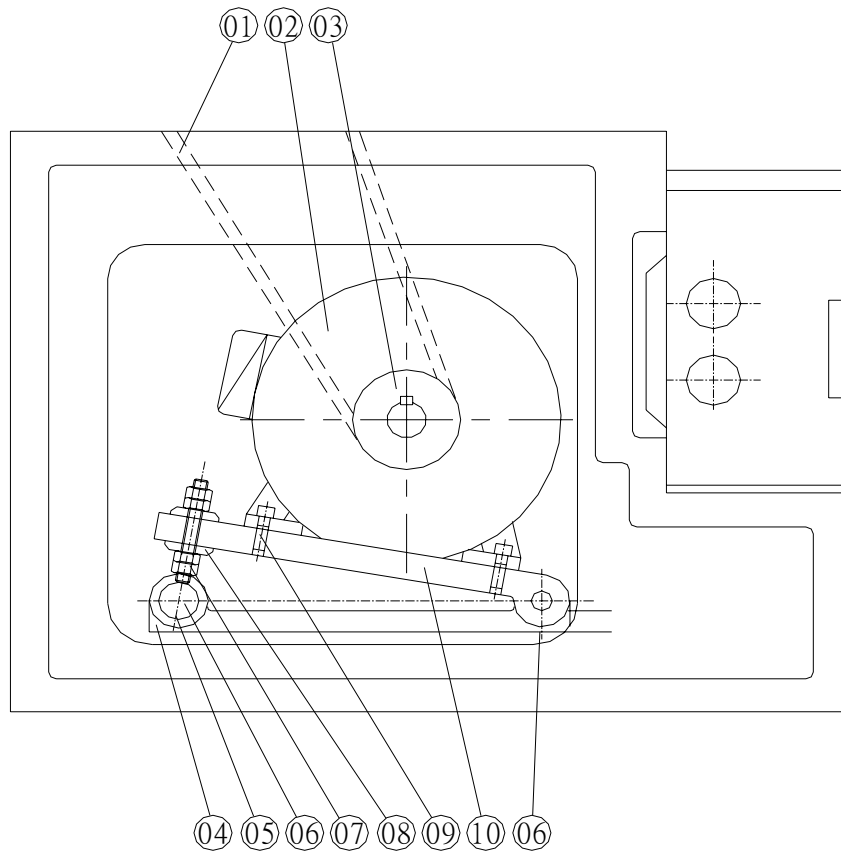


BED



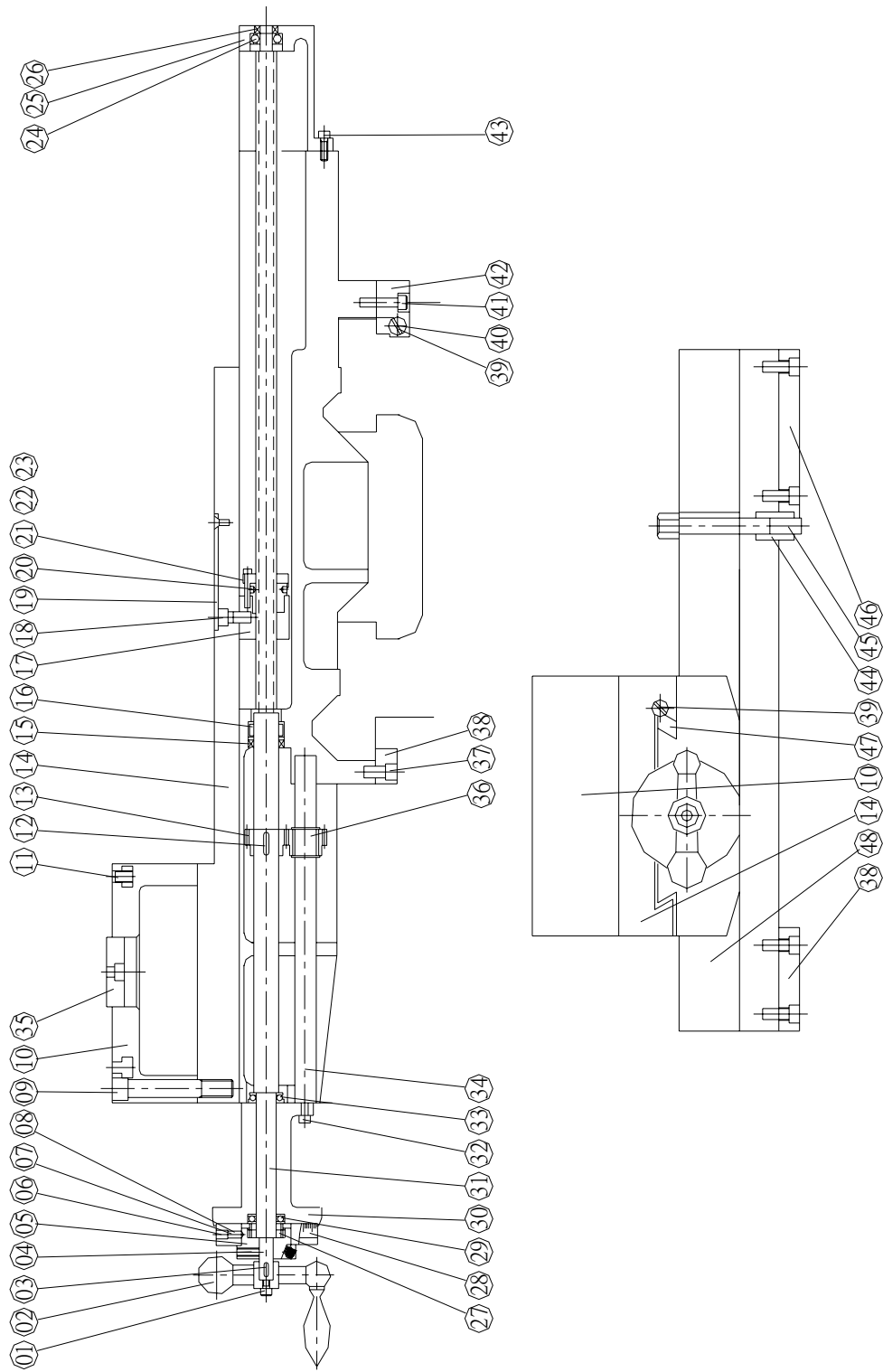
BED				
REF NO.	PART NO.	DESCRIPTION	PARTS NAME	Q'TY
0 1	HL- 1001	MACHINE BED CASTING		1
0 2	HL- 1006	LEADSCREW		1
0 3	HL- 1007	FEED ROD		1
0 4	HL- 1002	GAP		1
0 5	HL- 1003	GEAR RACK		1
0 6	HL- 1004	GEAR RACK		1~
0 7		BEARING	#6008	2
0 8		SOCKET CAP SCREW	M10	4
0 9	HL- 1009	COLLAR		1
1 0	HL- 1010	COLLAR		1
1 1	HL- 1008	BRACKET		1
1 2		SOCKET CAP SCREW	M8	6
1 3	HL- 1011	COVER		1
1 4	HL- 1014	COVER		1
1 5		BEARING	6005	1
1 6	HL- 1012	COLLAR		2
1 7	HL- 1013	COLLAR		1
1 8	HL- 1030	LEVELING SCREW		14~
1 9	HL- 1031	LEVELING PAD		14~

BED



BED				
REF NO.	PART NO.	DESCRIPTION	PARTS NAME	Q'TY
0 1		V-BELT	B-	5
0 2		SPINDLE MOTOR	40HP	1
0 3	HL- 1019	V BELT PULLEY		1
0 4	HL- 1016	LOW-PLATE		1
0 5	HL- 1018	SCREW SLEEVE		2
0 6	HL- 1017	SHAFT		2
0 7		NUT	M16	8
0 8		WASHER		4
0 9		SCREW		4
1 0	HL- 1015	MOTOR PLATE		1
1 1	HL-1019-1	CONNECTING ROD		2
1 2		SCREW	M8	2
1 3	HL-1025	CONNECTING ROD		2
1 4		SOCKET CAP SCREW	M8	2
1 5	HL-1023	LOCKING PLATE		2
1 6	HL- 1024	LOCKING SCREW		2
1 7		SPRING	M8	2
1 8	HL- 1027	SUPPORT BLOCK		2
1 9	HL- 1028	SCREW		2
2 0	HL- 1029	WASHER		12
2 1		SOCKET CAP SCREW	M10	12
2 2	HL- 1021	TOP BRACKET		2
2 3	HL- 1020	BRACKET		2
2 4	HL- 1022	BOTTOM BRACKET		2

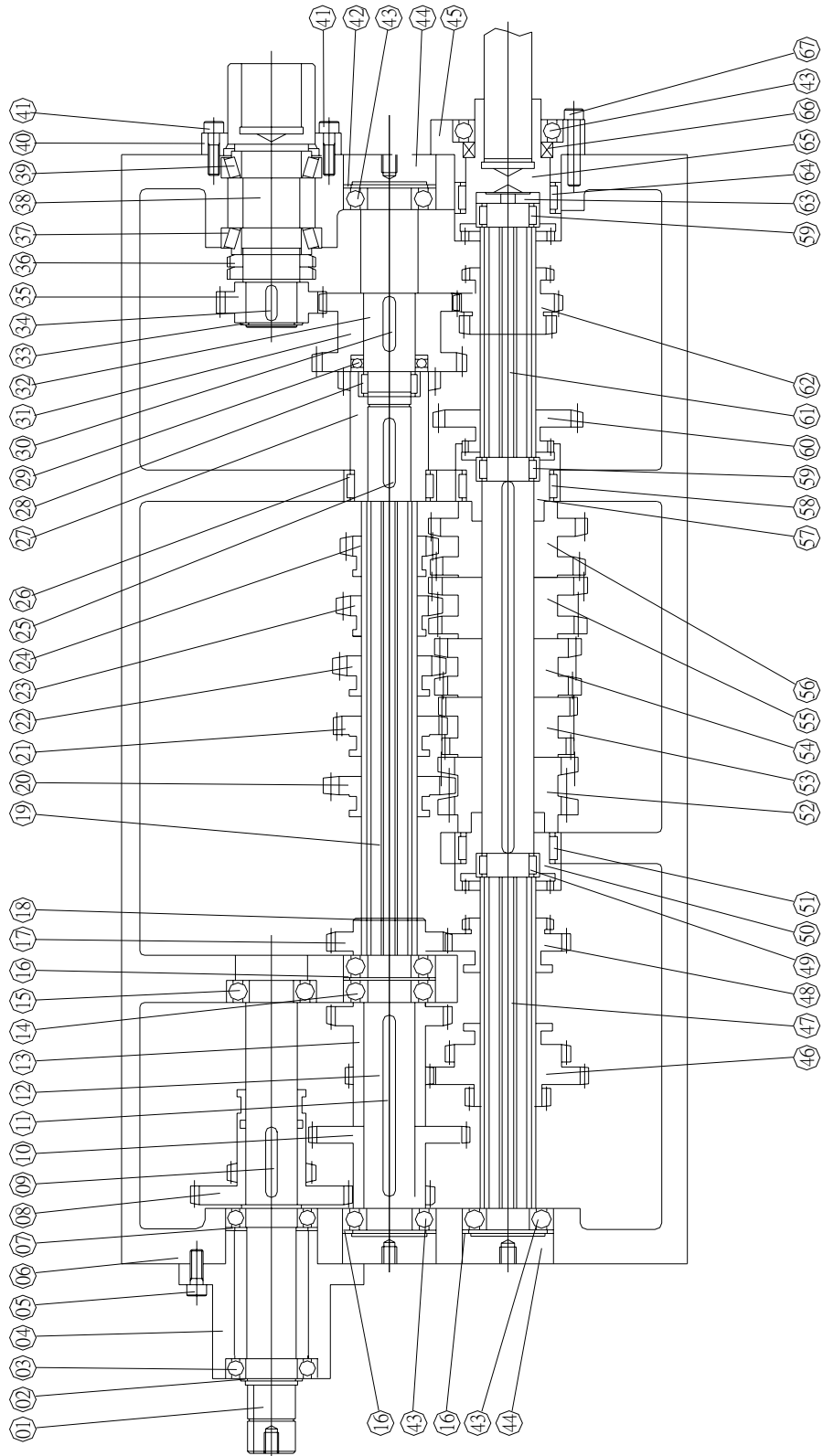
CARRIAGE



CARRIAGE				
REF NO.	PART NO.	DESCRIPTION	PARTS NAME	Q'TY
01		SCREW	M8	1
02		HANDLE		1
03		KEY	4 x 16	1
04		SOCKET CAP SCREW	M10	1
05	HL- 5005	BUSHING		1
06		SOCKET CAP SCREW	M10	1
07		SPRING	M8	1
08		STEEL BALL	M8	1
09		SOCKET CAP SCREW	M16	4
10	HL- 5003	GRADUATON SLIDE		1
11	HL- 5023	NUT		4
12		KEY	6 x 25	1
13	HL- 5009	GEAR	18T	1
14	HL- 5002	SADDLE SLIDE		1
15		OIL SEAL	TC30428	1
16		NEEDLE BEARING	RNA4905	1
17	HL- 5010	NUT		1
18		SOCKET CAP SCREW	M10	2
19	HL- 5024	COVER		1
20	HL- 5011	NUT		1
21	HL- 5012	COLLAR		1
22		SOCKET CAP SCREW	M6	4
23		SOCKET CAP SCREW	M5	4
24		BEARING	6004	1
25	HL- 5013	BRACKET		1
26		OIL COVER	ø32	1

CARRIAGE				
REF NO.	PART NO.	DESCRIPTION	PARTS NAME	Q'TY
27		NUT	AN05	1
28	HL- 5006	GRADUATION DIAL		1
29		THRUST BEARING	51105	1
30	HL- 5007	BRACKET		1
31	HL- 5008	LEADSCREW		1
32		SOCKET CAP SCREW	M8	2
33		THRUST BEARING	51105	1
34	HL- 5014	SHAFT		1
35	HL- 5022	SHAFT		1
36	HL- 5015	GEAR	M2.5 x 18T	1
37		SOCKET CAP SCREW	M12	4
38	HL- 5019	LOCK PLATE		1
39		SOCKET CAP SCREW	M8	4
40	HL- 5021	GIB		1
41		SOCKET CAP SCREW	M12	5
42	HL- 5020	LOCK PLATE		1
43		SOCKET CAP SCREW	M8	3
44	HL- 5016	LOCK PLATE		1
45		SCREW SLEEVE	M16	1
46	HL- 5018	LOCK PLATE		1
47	HL- 5004	GIB		1
48	HL- 5001	CARRIAGE		1

GEAR BOX

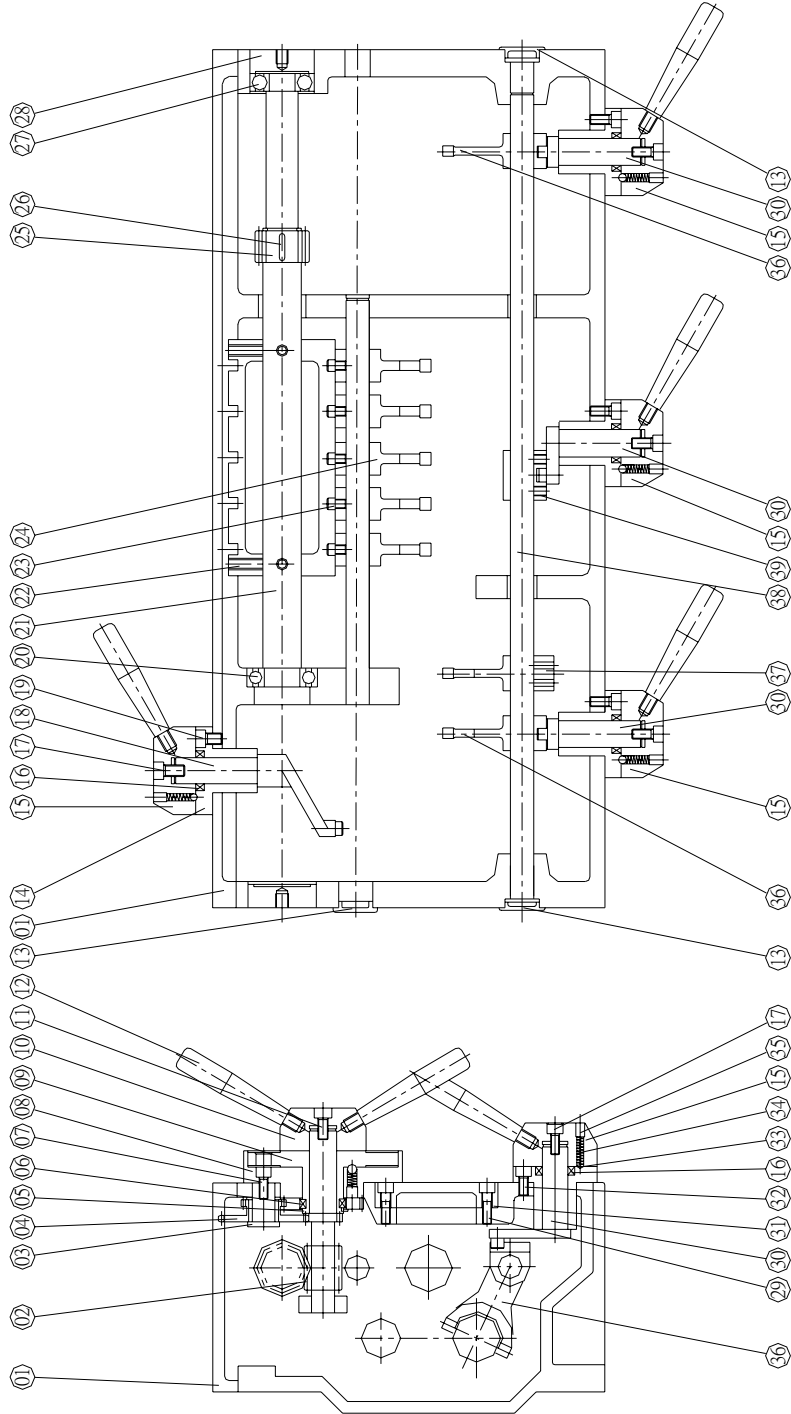


GEAR BOX				
REF NO.	PART NO.	DESCRIPTION	PARTS NAME	Q'TY
0 1	HL- 3005	SHAFT		1
0 2		SNAP RING	S25	1
0 3		BEARING	6007	2
0 4	HL- 3004	A1 COVER		1
0 5		SOCKET CAP SCREW	M8	3
0 6	HL- 3001	GEAR BOX		1
0 7		SPRING WASHER	ø62	1
0 8	HL- 3006	GEAR		1
0 9		KEY	8 x 7 x 50L	1
1 0	HL- 3012	GEAR		1
1 1		KEY	8 x 7 x 130L	1
1 2	HL- 3011	SHAFT		1
1 3	HL- 3013	GEAR		1
1 4		BEARING	#6206	2
1 5		BEARING	6206	2
1 6		SPRING WASHER	RTW56	1
1 7	HL- 3015	GEAR		1
1 8		SNAP RING	S38	1
1 9	HL- 3014	B2 SHAFT		1
2 0	HL- 3016	GEAR		1
2 1	HL- 3017	GEAR		1
2 2	HL- 3018	GEAR		1
2 3	HL- 3019	GEAR		1
2 4	HL- 3020	GEAR		1
2 5		KEY	8 x 7 x 50L	1
2 6		NEEDLE BEARING	RNA4908	1

GEAR BOX				
REF NO.	PART NO.	DESCRIPTION	PARTS NAME	Q'TY
27	HL- 3021	GEAR		1
28		NEEDLE BEARING	RNA4905	1
29		NEEDLE BEARING	RNA4905	1
30		KEY	8 x 7 x 40	1
31	HL- 3023	GEAR		1
32	HL- 3022	B3 SHAFT		1
33		SNAP RING	S35	1
34		KEY	8 x 7 x 25	2
35	HL- 3009	GEAR		1
36		NUT	AN08	2
37		TAPER ROLLER BEARING	#32008X	1
38	HL- 3008	A2 SHAFT		1
39		TAPER ROLLER BEARING	#32008X	1
40	HL- 5007	COVER		1
41		SOCKET CAP SCREW	M8	3
42		SPRING WASHER	ø68	1
43		BEARING	6206	3
44	HL- 3010	COVER		3
45	HL- 3039	C COVER		1
46	HL- 3025	GEAR		1
47	HL- 3024	C1 SHAFT		1
48	HL- 3026	GEAR		1
49		NEEDLE BEARING	RNA4905	1
50	HL- 3028	GEAR		1
51		NEEDLE BEARING	RNA4910	1
52	HL- 3029	GEAR		1

GEAR BOX				
REF NO.	PART NO.	DESCRIPTION	PARTS NAME	Q'TY
5 3	HL- 3030	GEAR		1
5 4	HL- 3031	GEAR		1
5 5	HL- 3032	GEAR		1
5 6	HL- 3033	GEAR		1
5 7	HL- 3028	GEAR		1
5 8		NEEDLE BEARING	RNA4910	1
5 9		NEEDLE BEARING	RNA4905	2
6 0	HL-3035	GEAR		1
6 1	HL- 3034	SHAFT		1
6 2	HL- 3036	GEAR		1
6 3	HL- 3038	COLLAR		1
6 4		NEEDLE BEARING	RNA4910	1
6 5	HL- 3037	SHAFT		1
6 6		OIL SEAL	TC45608	1
6 7		SOCKET CAP SCREW	M8	3

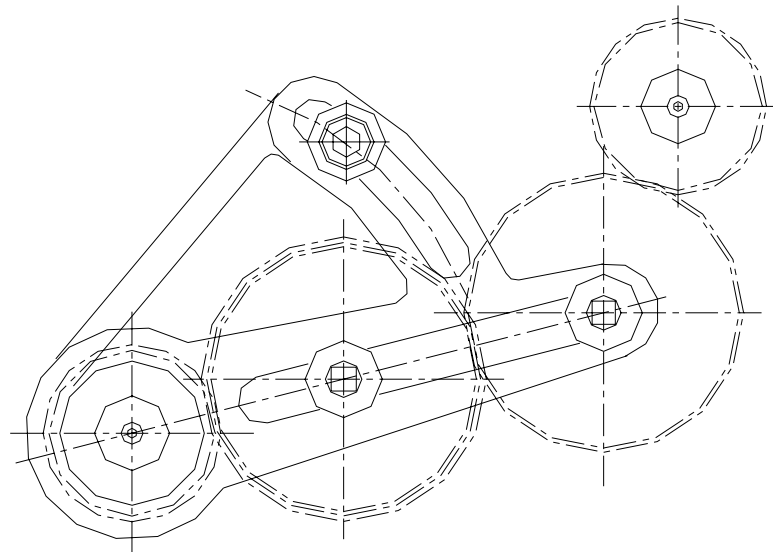
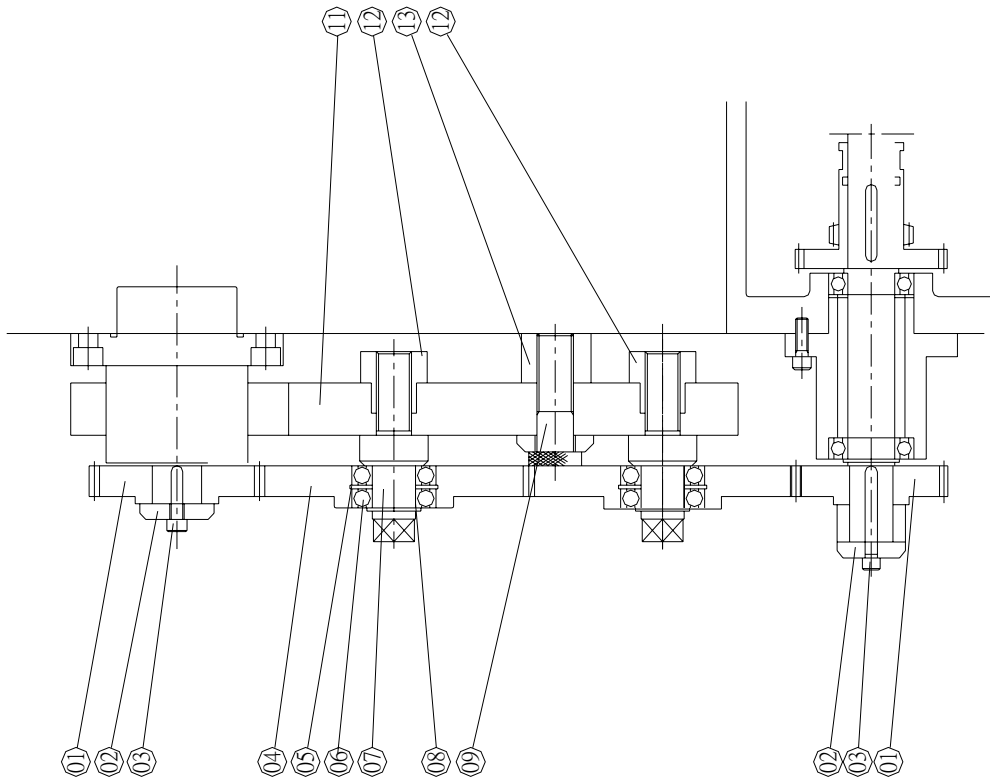
GEAR BOX



GEAR BOX				
REF NO.	PART NO.	DESCRIPTION	PARTS NAME	Q'TY
0 1	HL- 3002	TOP COVER		1
0 2	HL- 3055	SHAFT		1
0 3	HL- 3056	SHAFT		1
0 4	HL- 3057	GEAR		1
0 5		SNAP RING	S38	1
0 6		KEY	5 x 5 x 8L	1
0 7		SOCKET CAP SCREW	M8	4
0 8	HL- 3052	LOCATING BASE		1
0 9	HL- 3053	NAME-PLATE COVER		1
1 0	HL- 2073	LEVER BOSS		4
1 1		SOCKET CAP SCREW	M8	1
1 2	HL- 2072	HANDLE		6
1 3		OIL COVER	ø32	3
1 4	HL- 3049	BUSHING		4
1 5	HL- 2073	LEVER BOSS		4
1 6		OIL SEAL	TC25357	4
1 7		SOCKET CAP SCREW	M8	4
1 8	HL- 3050	FORK ARM		1
1 9		SOCKET CAP SCREW	M8	8
2 0		BEARING	6206	1
2 1	HL- 3040	SHAFT		1
2 2		SET SCREW	M10	4
2 3	HL- 2055	PIN		5
2 4	HL- 3044	FORK		5
2 5	HL- 3042	GEAR		1
2 6		KEY	6 x 6 x 25L	1

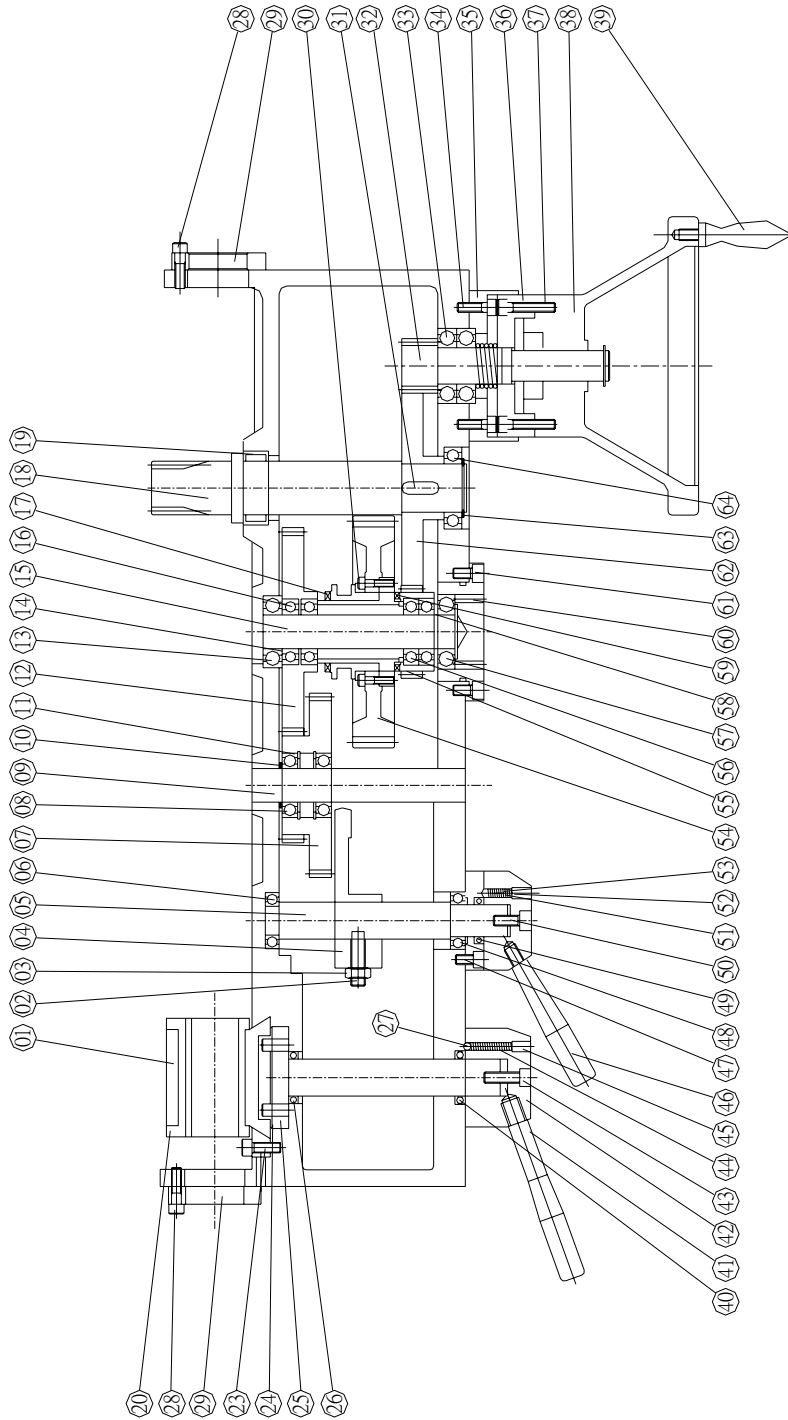
GEAR BOX				
REF NO.	PART NO.	DESCRIPTION	PARTS NAME	Q'TY
27		BEARING	6305	1
28	HL- 3010	COVER		1
29		SOCKET CAP SCREW	M8	8
30	HL- 3051	FORK ARM		3
31	HL- 3003	COVER		1
32		SOCKET CAP SCREW	M8	2
33		STEEL BALL	M8	5
34		SPRING	M8	5
35		SOCKET CAP SCREW	M10	5
36	HL- 3047	FORK		2
37	HL- 3048	FORK		1
38	HL- 3045	SHAFT		1
39	HL- 3046	FORK		1

END GEARS



END GEARS				
REF NO.	PART NO.	DESCRIPTION	PARTS NAME	Q'TY
0 1	HL- 3059	GEAR		1
0 2	HL- 3064	WASHER		2
0 3		SOCKET CAP SCREW	M8	2
0 4	HL- 3060	GEAR		2
0 5		SNAP RING	R55	2
0 6		BEARING	6006	4
0 7	HL- 3061	SHAFT		2
0 8		SNAP RING	S30	2
0 9		CAP SCREW	M24	1
1 0		WASHER	M24	1
1 1	HL- 3058	BRACKET		1
1 2	HL- 3062	NUT		2
1 3	HL- 3063	WASHER		1

APRON

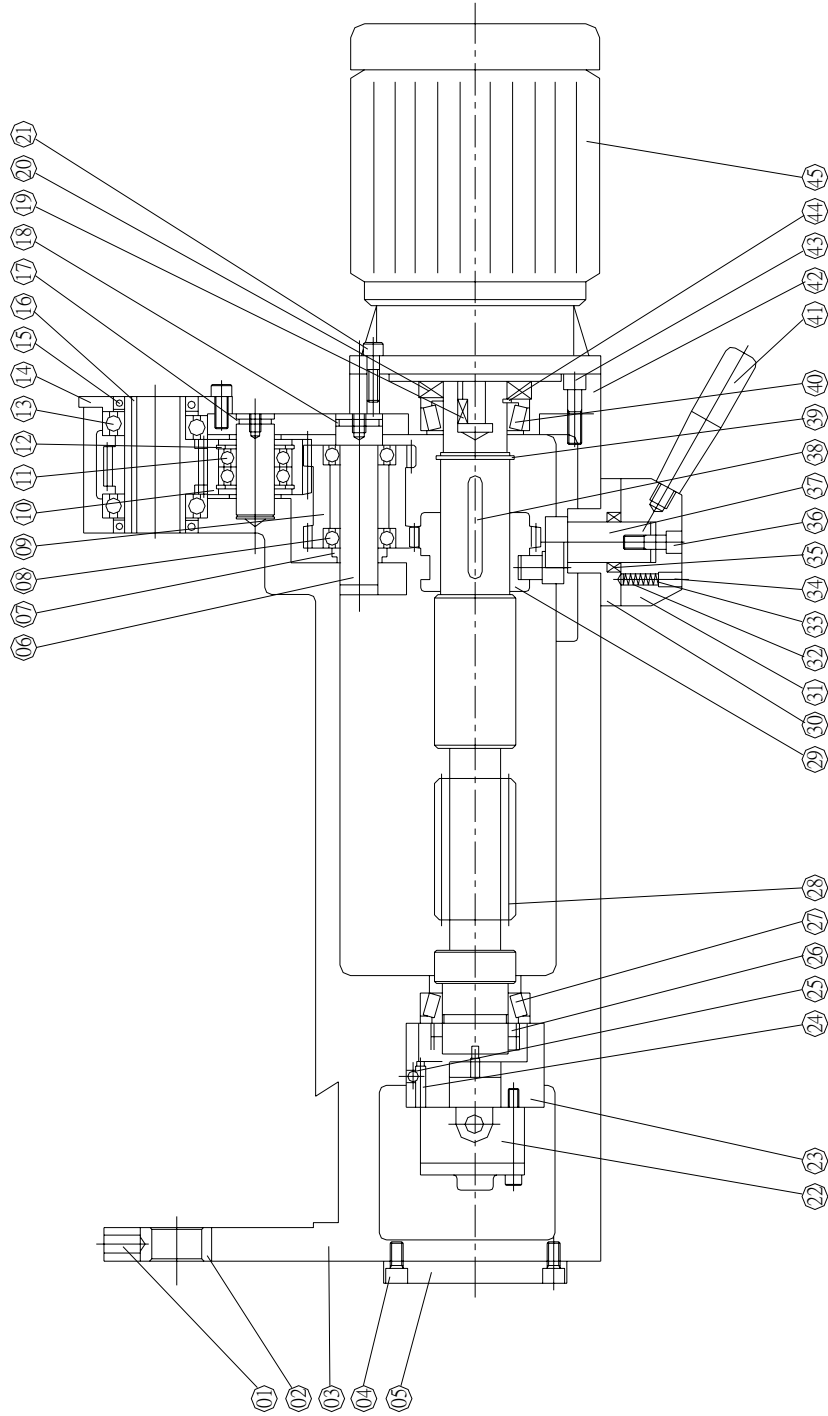


APRON				
REF NO.	PART NO.	DESCRIPTION	PARTS NAME	Q'TY
0 1	HL- 4043	HALF NUT		1
0 2		SOCKET CAP SCREW	M12	1
0 3		NUT	M12	1
0 4	HL- 4038	FORK		1
0 5	HL- 4037	SHAFT		1
0 6		BEARING	6005	1
0 7	HL- 4012	GEAR		1
0 8		BEARING	6006	2
0 9	HL- 4011	SHAFT		1
1 0		SNAP RING	S30	2
1 1		SNAP RING	R55	2
1 2	HL- 4005	GEAR		1
1 3		BEARING	6206	1
1 4		SPRING WASHER	STW35	1
1 5	HL- 4004	B SHAFT		1
1 6		BEARING	6006	2
1 7	HL- 4007	CLUTCH GEAR		1
1 8	HL- 4002	GEAR-SHAFT		1
1 9		NEEDLE BEARING	RNA4908	1
2 0	HL- 4033	NUT		1
2 1	HL- 4001	APRON		1
2 2		SCREW	M8	4
2 3	HL- 4035	GIB		1
2 4		PIN	ø10	2
2 5	HL- 4032	SHAFT		1
2 6		OIL SEAL	TC30428	1

APRON				
REF NO.	PART NO.	DESCRIPTION	PARTS NAME	Q'TY
27		STEEL BALL	M8	1
28		SOCKET CAP SCREW	M8	2
29	HL- 4042	COVER		2
30		SCREW	M6	6
31		KEY	8 x 7 x 30	1
32	HL- 4026	GEAR		1
33		BEARING	6206	2
34		SOCKET CAP SCREW	M8	2
35	HL- 4027	COVER		1
36	HL- 4028	GRADUATION DIAL		1
37		SOCKET CAP SCREW	M8	3
38	HL- 4029	HAND WHEEL		1
39		HANDLE	ø25	1
40		OIL SEAL	TC30428	1
41	HL- 4030	HANDLE		1
42	HL- 4031	LEVER BOSS		1
43		SOCKET CAP SCREW	M8	1
44		SPRING	M8	1
45		SET SCREW	M10	1
46	HL- 2072	HANDLE		1
47		SOCKET CAP SCREW	M8	2
48		BEARING	6005	1
49		OIL SEAL	TC253507	1
50		SSOCKET CAP SCREW	M8	1
51		SPRING	M8	1
52		SOCKET CAP SCREW	M10	1

APRON				
REF NO.	PART NO.	DESCRIPTION	PARTS NAME	Q'TY
5 3		STEEL BALL	ø8	1
5 4	HL- 4008	GEAR		1
5 5	HL- 4009	GEAR		1
5 6		BEARING	6006	2
5 7		BEARING	6206	1
5 8		SNAP RING	S30	1
5 9	HL- 4006	SPLINE SHAFT		1
6 0		SOCKET CAP SCREW	M6	4
6 1		SOCKET CAP SCREW	M8	3
6 2	HL- 4003	GEAR		1
6 3		SNAP RING	S40	1
6 4		BEARING	6008	1

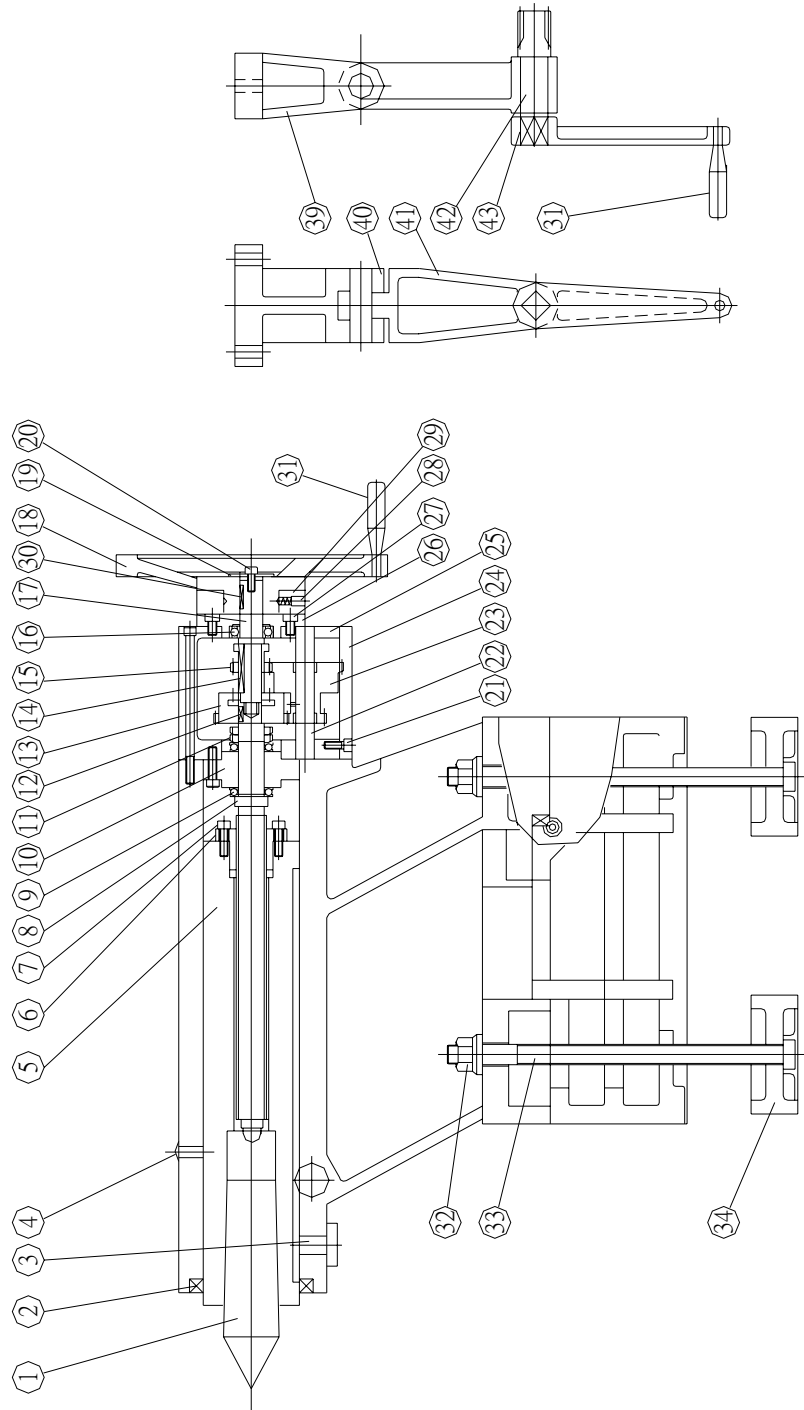
APRON



APRON				
REF NO.	PART NO.	DESCRIPTION	PARTS NAME	Q'TY
0 1		SOCKET CAP SCREW	M10	1
0 2	HL- 4015	BUSHING		1
0 3	HL- 4001	APRON CASTING		1
0 4		SOCKET CAP SCREW	M8	2
0 5	HL- 4025	COVER		1
0 6	HL- 4018	F SHAFT		1
0 7	HL- 4020	COLLAR		1
0 8		BEARING	6005	2
0 9	HL- 4019	GEAR		1
1 0	HL- 4017	GEAR		1
1 1		BEARING	6005	2
1 2		SNAP RING	R47	2
1 3		BEARING	6008	2
1 4	HL- 4014	COVER		1
1 5		OIL SEAL	TC40558	2
1 6	HL- 4013	GEAR		1
1 7		O-RING	P21	1
1 8		O-RING	G25	1
1 9		KEY	5 x 5 x 15L	1
2 0		OIL SEAL	TC40708	1
2 1		SOCKET CAP SCREW	M8	4
2 2		PUMP	AM2	1
2 3	HL- 4023	PUMP BASE		1
2 4		SET SCREW	M6	1
2 5		STEEL BALL	M8	1
2 6		NUT	AN08	2

APRON				
REF NO.	PART NO.	DESCRIPTION	PARTS NAME	Q'TY
27		TAPER ROLLER BEARING	32008	1
28	HL- 4021	CONNECTING SLEEVE		1
29	HL- 4022	GEAR		1
30	HL- 4040	BUSHING		1
31	HL- 2037	LEVER BOSS		1
32		STEEL BALL	M8	1
33		SPRING	M8	1
34		SOCKET CAP SCREW	M10	1
35		OIL SEAL	TC25357	1
36		SOCKET CAP SCREW	M8	1
37	HL- 4041	SHAFT		1
38		KEY	8 x 7 x 65L	1
39		SNAP RING	S42	1
40		TAPER ROLLER BEARING	32008	1
41	HL- 2072	HANDLE		1
42	HL- 4024	COVER		1
43		SOCKET CAP SCREW	M8	4
44		SNAP RING	S40	1
45		MOTOR	1 / 8HP	1

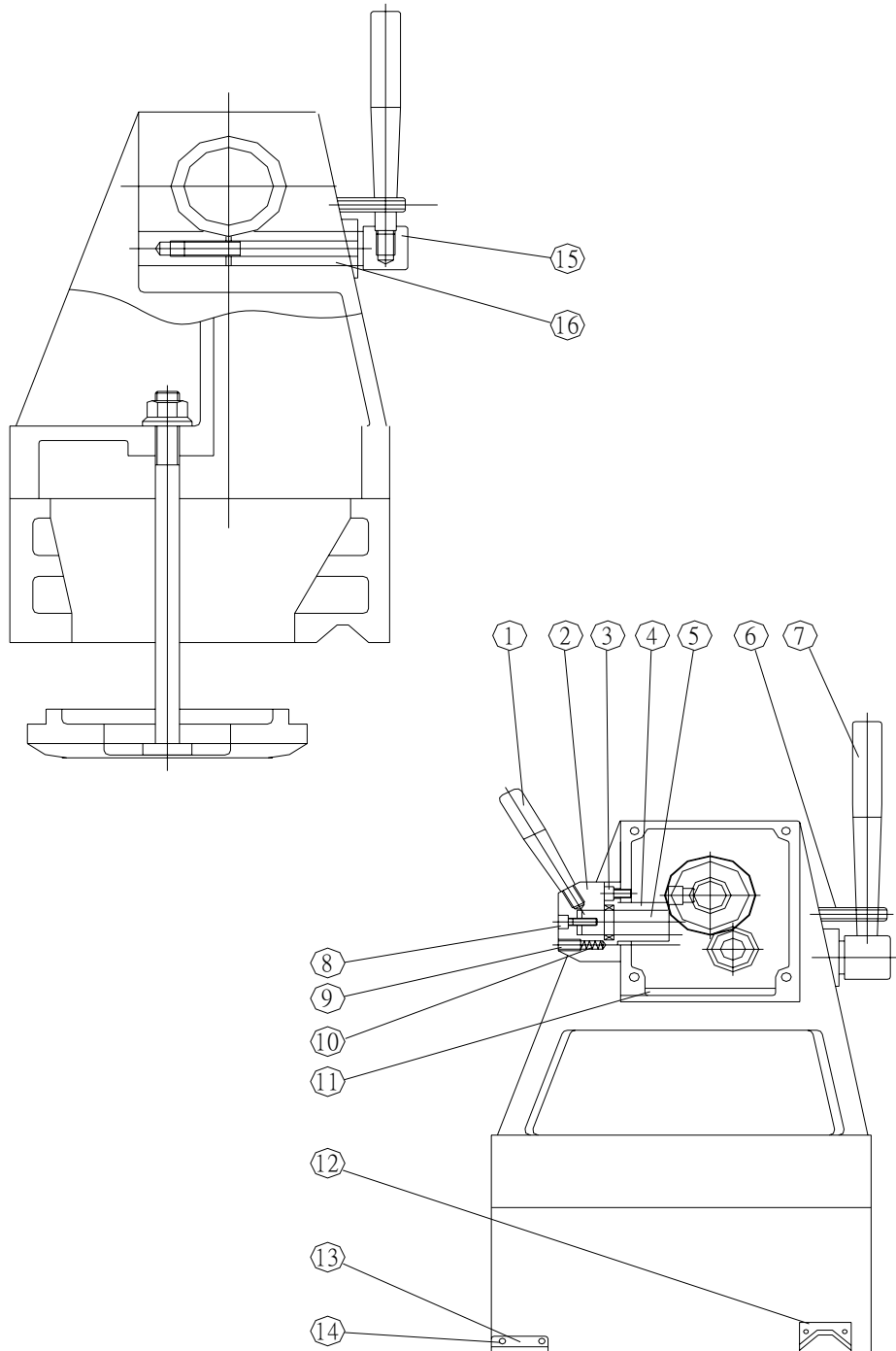
TAILSTOCK



TAILSTOCK				
REF NO.	PART NO.	DESCRIPTION	PARTS NAME	Q'TY
0 1		DEAD CENTER	MT#6	1
0 2		OIL SEAL	TC-10513013	1
0 3	HL- 7019	T-KEY		1
0 4		OILER	3 / 8"	1
0 5	HL- 7004	BARREL		1
0 6	HL- 7005	NUT		1
0 7		SOCKET CAP SCREW	M8	3
0 8	HL- 7009	LEADSCREW		1
0 9		THRUST BEARING	51106	2
1 0	HL- 7008	LEFT COVER		1
1 1		NUT	AN06	2
1 2		KEY	5 x 5 x 16L	1
1 3	HL- 7010	GEAR		1
1 4		KEY	5 x 5 x 50L	1
1 5	HL- 7012	GEAR		1
1 6		BEARING	6005RS	1
1 7	HL- 7011	SHAFT		1
1 8	HL- 7014	HAND WHEEL		1
1 9	HL- 5064	WASHER		1
2 0		SOCKET CAP SCREW	M8	1
2 1		SOCKET CAP SCREW	M8	4
2 2	HL- 7016	SHAFT		1
2 3	HL- 7017	GEAR		1
2 4	HL- 7007	COVER		1
2 5	HL- 7006	SPEED CHANGE GEAR BOX		1
2 6	HL- 7013	BRACKET		1

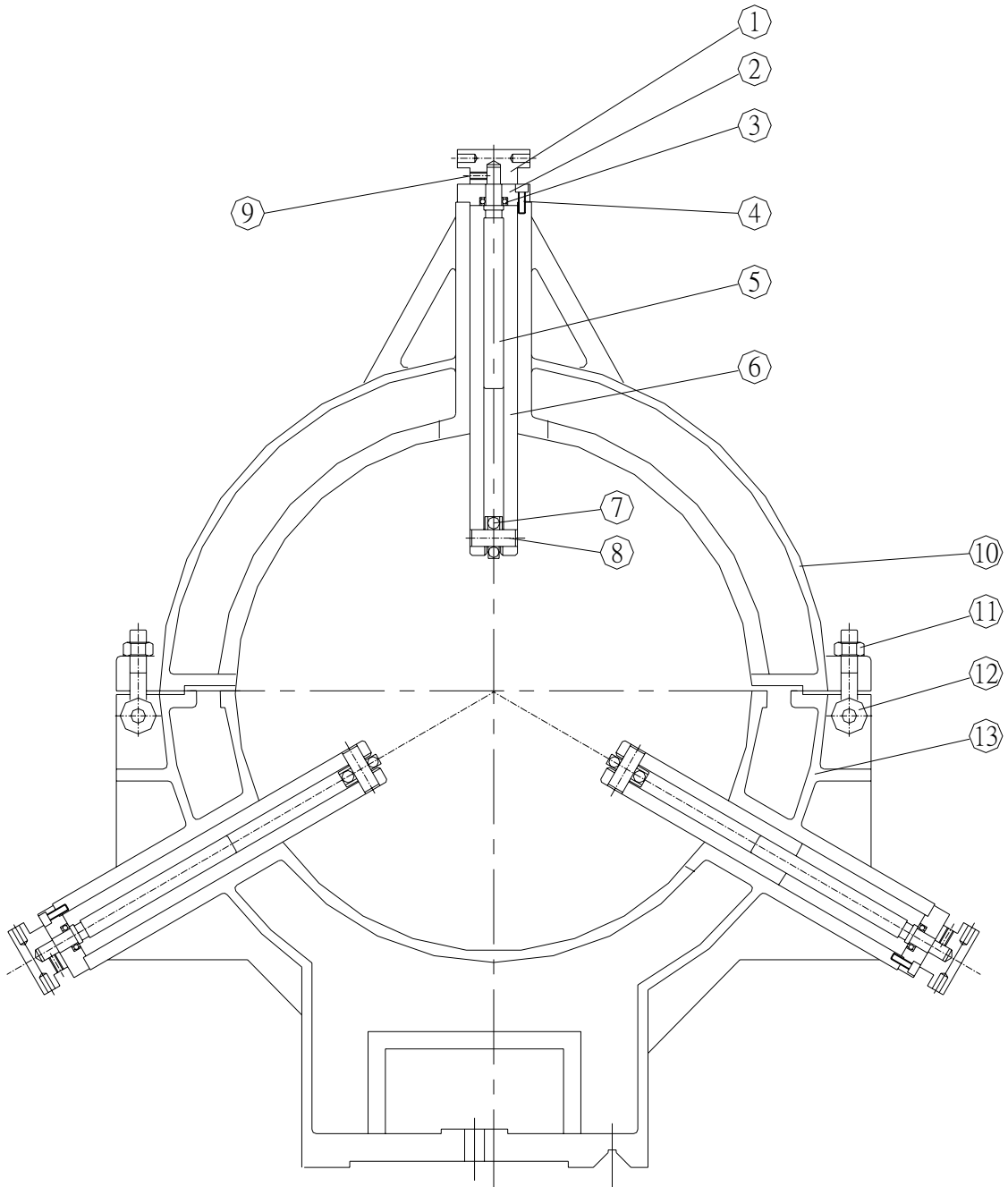
TAILSTOCK				
REF NO.	PART NO.	DESCRIPTION	PARTS NAME	Q'TY
27		SOCKET CAP SCREW	M8	2
28		SET SCREW	M10	1
29	HL- 7015	GRADUATION DIAL		1
30		KEY	5 x 5 x 25L	1
31		HANDLE		1
32	HL- 7026	NUT		2
33	HL- 7025	BOLT		2
34	HL- 7024	CLAMPING PLATE		2
35		SET SCREW	M16	1
36	HL- 7003	GIB		1
37	HL- 7002	TAILSTOCK BASE		1
38	HL- 7001	CASTING		1
39	HL- 7029	BRACKET		1
40	HL- 7032	PIN		1
41	HL- 7030	BRACKET		1
42	HL- 7031	GEAR SHAFT		1
43	HL- 7033	LEVER		1

TAILSTOCK : CONTROLS



TAILSTOCK				
REF NO.	PART NO.	DESCRIPTION	PARTS NAME	Q'TY
0 1	HL- 2056	HANDLE		1
0 2	HL- 2073	LEVER BOSS		1
0 3		SOCKET CAP SCREW	M8	2
0 4	HL- 2074	BUSHING		1
0 5	HL- 7018	LEVER		1
0 6	HL- 7023	SCREW		1
0 7	HL- 7022	HANDLE		1
0 8		SOCKET CAP SCREW	M8	1
0 9		SET SCREW	M10	1
1 0		STEEL BALL	ø8	1
1 1	HL- 7007	COVER		1
1 2	HL- 7028	REAR WIPER		2
1 3	HL- 7027	FRONT WIPER		2
1 4		ROUND CAP SCREW	M5	8
1 5	HL-7021	STUD		1
1 6	HL- 7020	BUSHING & NUT		1

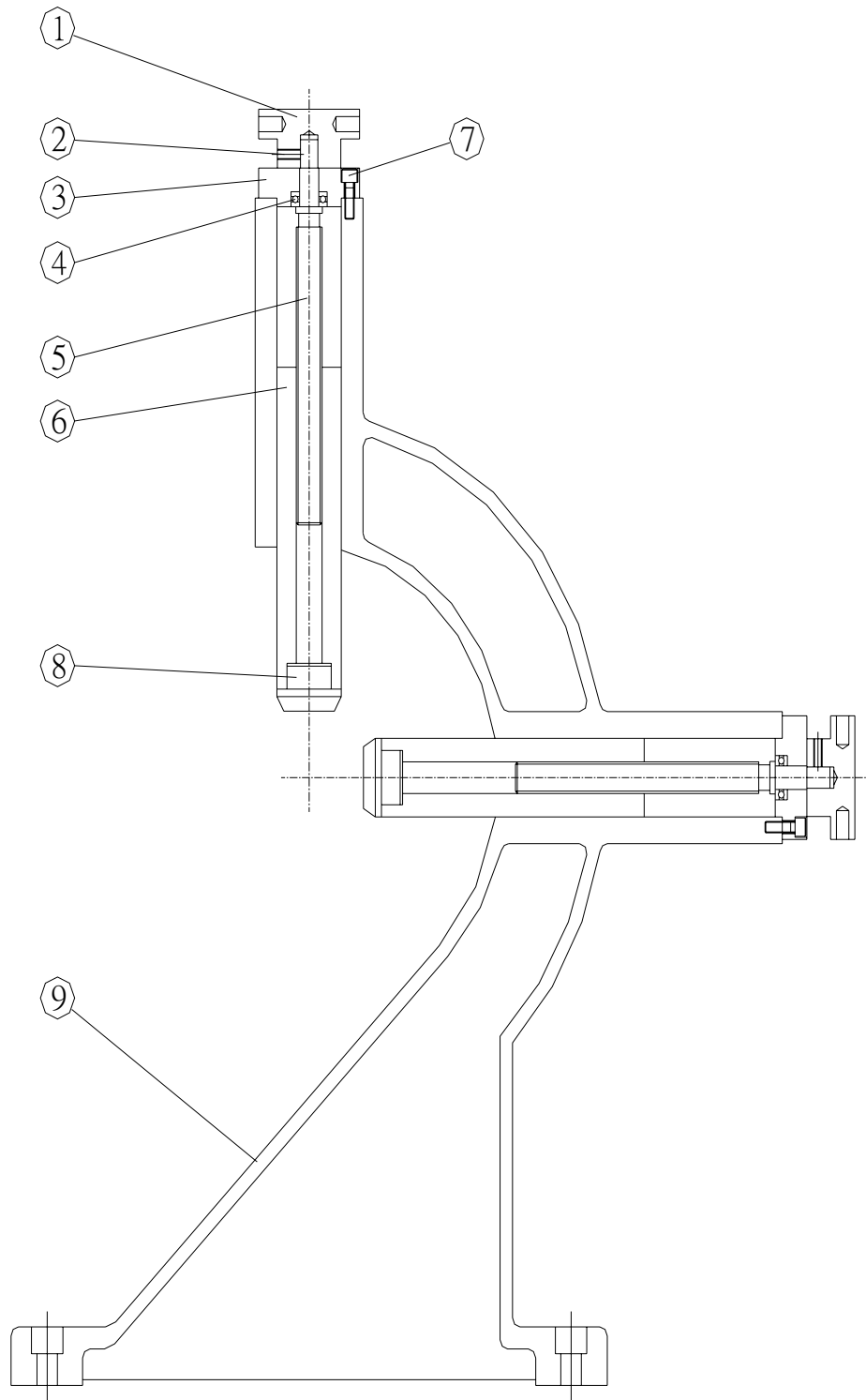
STEADY REST



STEADY REST

REF NO.	PART NO.	DESCRIPTION	PARTS NAME	Q'TY
0 1	HL- 8003	HANDLE		3
0 2	HL- 8004	COVER		3
0 3		BEARING	51103	3
0 4		SOCKET CAP SCREW	M8	9
0 5	HL- 8005	ADJUSTMENT SCREW		3
0 6	HL- 8006	SHAFT		3
0 7		BEARING		3
0 8	HL- 8007	SHAFT		3
0 9		SET SCREW	M8	3
1 0	HL- 8001	TOP CASTING		1
1 1		NUT		2
1 2	HL- 8009	BOLT		2
1 3	HL- 8002	BOTTOM CASTING		1

FOLLOW REST



FOLLOW REST

REF NO.	PART NO.	DESCRIPTION	PARTS NAME	Q'TY
01	HL- 8003	HANDLE		2
02		SET SCREW		2
03	HL- 8004	COVER		2
04		BEARING	51103	2
05	HL- 8005	ADJUSTMENT SCREW		2
06	HL- 8102	SHAFT		2
07		SCREW		6
08	HL- 8103	BRASS TIP		2
09	HL- 8101	FOLLOW REST CASTING		1

Electric Circuit, Diagram
&
Breakdown of Electrical
Components

ELECTRIC DRAWING

