

The SHARP logo consists of the word "SHARP" in a bold, white, sans-serif font, centered within a solid blue rectangular background.

**HEAVY DUTY PRECISION &  
POWERFUL LATHE**

**OPERATION MANUAL & PARTS LIST**

**MODEL: 3480M, 34120M, 34160M,  
34200M, 34240M**

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# 1-1. SPECIFICATIONS

Unit: mm(inch)

ITEM		34/38 /44
MODEL	X	40 / 80 /120 /160 /200/240
CAPACITY	SWING OVER BED	860 (33.86") / 960(37.8")/ 1120(44.09")
	SWING OVER CROSS SLIDE	540(21.26") / 640(25.20")/ 800(31.50")
	SWING OVER GAP	1200(47.24")/1300(51.18")/ 1460(57.48")
BED	DISTANCE BETWEEN CENTERS	1000(39.37")/ 2000(78.74")/ 3000(118.11")/ 4000(157.48")/ 5000(196.85")/6000 (236.22")
	WIDTH OF BED	510 (20.08")
	WIDTH OF GAP	240 (9.45")
	LENGTH OF BED	3340(131.5") / 4340(170.87") / 5340(210.24") / 6340(249.61") / 7340(288.98") / 8340(328.35")
HEADSTOCK	SPINDLE BORE DIAMETER	105 (4") / OP: 152 (5.98"), 230 (9.06"), 255 (10")
	SPINDLE NOSE	4" : A2-8 / OP: A2-11, A2-15
	NUMBER OF SPINDLE SPEEDS	12 steps
	RANGE OF SPINDLE SPEEDS	4" : 23-1300 rpm / OP: 6"~ 16- 810 rpm, <b>9"&amp;10"~8-291 rpm</b>
CARRIAGE	WIDTH OF CARRIAGE	655 (25.79")
	CROSS SLIDE TRAVEL	510 (20.08")
	COMPOUND REST TRAVEL	370 (14.57")
	MAX. SIZE CUTTING SIZE	32 (1.26") x 32 (1.26")
TAILSTOCK	DIAMETER OF BARREL	125 (4.92")
	TRAVEL OF BARREL	200 (7.87")
	TAPER OF BARREL	MT6
THREADS	LEAD SCREW DIAMETER & PITCH	Dia.45 mm. Pitch 12 mm. / Dia.1.77"X2 T.P.I.
	RANGE OF METRIC PITCHES	0.8-14 mm (65 Nos)
	RANGE OF INCH PITCHES	2-28 TPI (36 Nos)
	RANGE OF DIAMETRICAL PITCHES	4-56 DP (36 Nos)
	RANGE OF MODULE PITCHES	0.5-7 MP (22 Nos)
FEEDS	FEED ROD DIAMETER	Dia. 32 (1.26")
	RANGE OF LONGITUDINAL FEEDS	0.05-0.7 mm/rev (0.002"-0.0276" in/rev)
	RANGE OF CROSS FEEDS	0.025-0.35 mm/rev (0.001"-0.0138" in/rev)
MOTOR	MAIN SPINDLE MOTOR	15 HP /OP: 20 HP
	COOLANT PUMP MOTOR	1/8 HP
	RAPID MOTOR	1/4 HP

## 1-2. FEATURES

### MAIN FEATURES:

Structurally this machine is suitable for heavy cutting, easy operation, high tenacity, stability and heavy work load, which are good for heavy turning of mold, gear, shaft, central spindle etc.

#### 1. BASE:

Designed for heavy duty machining, high body structure to carry heavy workload and improve operational stability.

#### 2. FEED GEAR BOX:

- 1. Full range metric/inch gear box, no-need for gear exchange and is easy for operation.
- 2. Two thread per inch (1" X 2 T.P.I ) available, which offers much larger machining range than same class of lathes and pretty convenient to use.

#### 3. APRON:

Enforced oil supply with safety device is used to avoid collision during turning operation.

#### 4. SPINDLE:

12-step speed change, the spindle is supported by three points with NSK bearings. Gears and spindle are made of high quality alloy carbon treated, spindle bore diameter 105 mm, optional 152 mm, precision ground to acquire much superior hardness and tenacity.

#### 5. CARRIAGE & SADDLE:

This part has been ultra-frequency treated with much longer service life.

#### 6. CROSS WAY FEEDING GUIDE SCREW:

Two point support and suitable for heavy duty turning.

#### 7. COMPOUND REST:

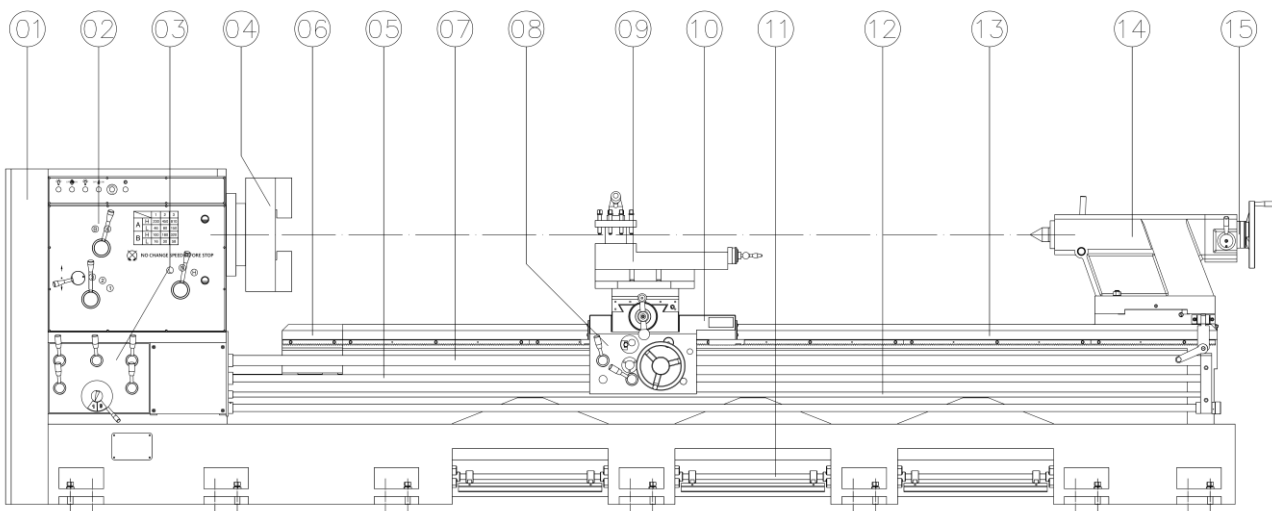
Four point tightening with enhanced mechanical stability. Wider front top slide is treated with high frequency precision ground and has extended service life.

#### 8. TAILSTOCK:

Two stage fixed tailstock for heavy turning and drilling stability. Two stage feeding device for easy operation.

## 2. GENERAL LAYOUT

1. END GEAR ASSEMBLY
2. HEADSTOCK
3. GEAR BOX
4. CHUCK
5. FEED ROD
6. GAP BED
7. LEADSCREW
8. APRON
9. TOP-SLIDE
10. SADDLE AND CROSS –SLIDE
11. BREAK PEDAL
12. START SWITCH ROD
13. BED
14. TAILSTOCK
15. CHANGE SPEED GEAR BOX



### 3. MACHINE OPERATION

#### 1. POWER SOURCE WIRING:

1. Power connector at lower left part of the lathe.
2. Power source switches with fuse must be set up in the lathe and electric circuit ,the wire of the lathe must be ground connected ,too.
3. After wire connection, then input the power source by power source button to change the spindle in low speed, check the spindle rotating direction by operating the tart-lever in the right side of APRON.

See the result whether it is normal or not, in this case, the spindle rotates to the direction of operator, then the rotation is normal.

As the spindle rotates to the opposite direction , you should replace any two of the three electric wires.

#### 2. IDENTIFICATION AND PREPARATION BEFORE OPERATION:

1. Supply oil to all the necessary positions.
2. Check all the levers and handles, whether or not in normal condition.
3. Check the V-belt of headstock motor, whether or not in adequate tension state.
4. Make clear the relative positions before operate the transmission mechanism, such as head stock, feed gear box, cross slide, etc, and automatic feeding, tread cutting.

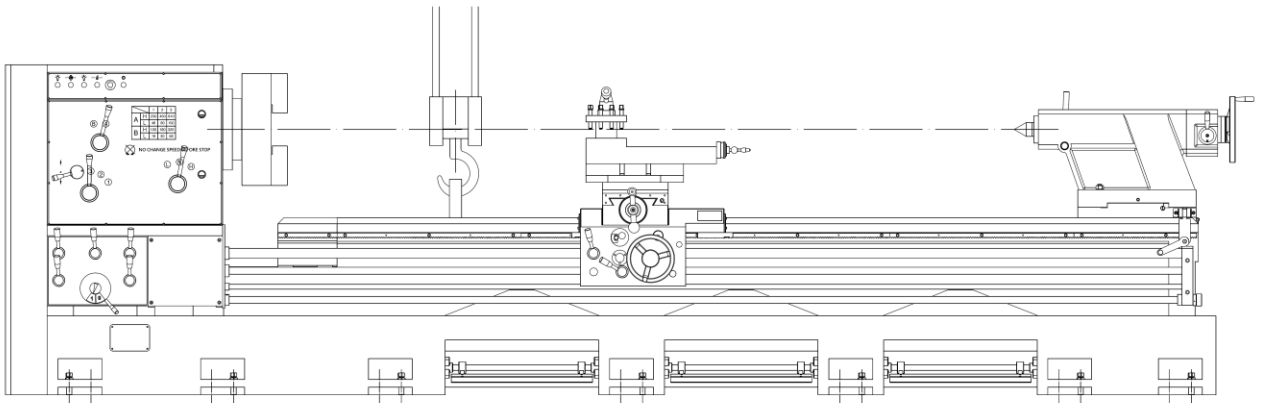
## 4. MAINTENANCE

### IDENTIFICATION ON OPERATION

1. Keep the machine in accurate state and long life under normal conditions of usage.
2. It's important to check the oil level through oil windows all oil reservoirs and top up as necessary before starting the machine.  
Especially pay attention to hand oiling daily between saddle and bed ways.
3. Renew the lubrication oil in headstock after first 3 months usage, in order to reduce the noise be produced.
4. Stop the machine immediately if the following are happened, overheat in headstock, vibration, oil leakage or no oil, and then repair it as soon as possible.
5. Don't use hammer or other tool to knock the workpiece, in order to keep the accuracy of spindle.
6. Be careful not let the tool to hurt the slide ways.
7. Don't to adjust or operate this machine arbitrary unless well-known to it.
8. It is great profit to the life and accuracy of this machine to maintain it periodically.
9. Clean the machine, remove the chips from machine and surroundings, apply oil on the sliding surfaces and turn off the power source after per work day.

## 5. UNPACKING AND UNLOADING

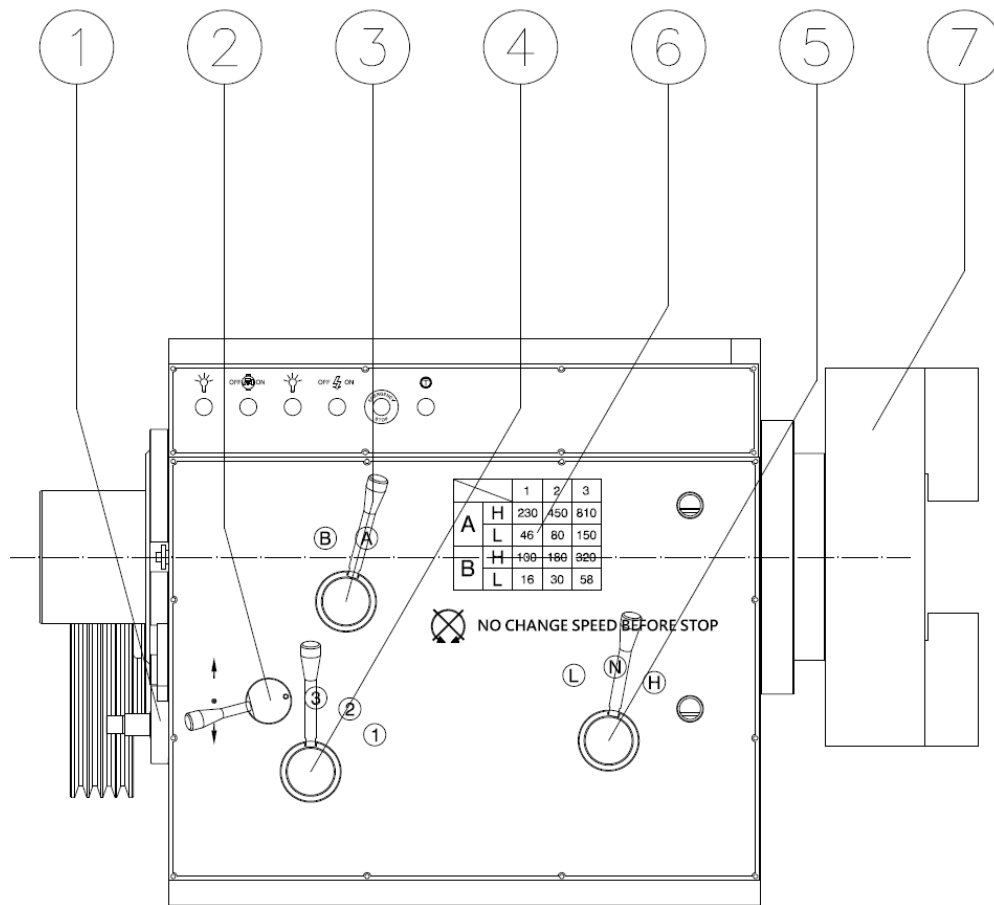
1. Each machine is dispatched fully assembled except for attachment such as taper attachment etc.
2. Unloading the machine, packed in the wooden case, should be made by wiring cable from the sleepers.
3. Lifting unpacked machine is made easily by the method shown in the following figure and according to the center of gravity of this lathe.
4. Raising and lowering the lathe should be done carefully, especially when you lower the lathe, be careful not to bump it against the floor and give attention to the other men to attain the safety.





## 6. SPINDLE SPEED CONTROL

1. The 12-step spindle speeds are obtained by selecting the proper lever position shown on the speed name plate.
2. Do not move speed-selector controls while the spindle is rotating.
3. Layout of headstock:



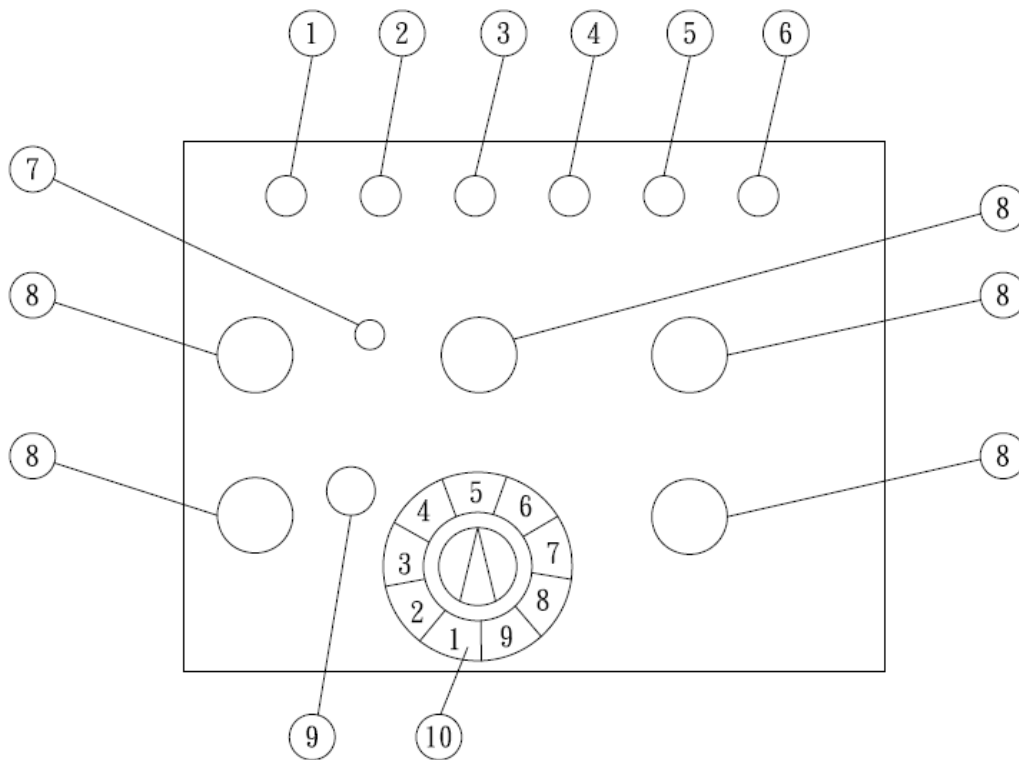
1. END GEARS OUPUT
2. FOR/REV LEVER
3. A / B LEVER
4. 3-STEP LEVER
5. HIGH/LOW LEVER
6. SPINDLE SPEED CHANGE PLATE
7. SPINDLE CHUCK

## 7. GEARBOX OPERATION -THREADS AND FEEDS

### 7-1 GEARBOX OPERATION

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

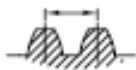
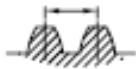


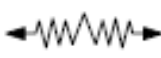
Layout of gearbox:



### AB-STEP CHANGE LEVER

1. COOLANT PUMP SWITCH LAMP
2. COOLANT PUMP SWITCH
3. ELECTRIC SUPPLY LAMP
4. ELECTRIC CONTROL SWITCH
5. EMERGENCY STOP
6. MICRO SWITCH
7. BORE OF LUBRICATING DEVICE
8. GEAR CHANGE
9. OIL WINDOW
10. 9-STEP CHANGE LEVER

7-2 THREAD CUTTING INDEX

in 									
	1	2	3	4	5	6	7	8	9
ADWF	2	$2\frac{1}{4}$	$2\frac{3}{8}$	$2\frac{1}{2}$	$2\frac{3}{4}$	$2\frac{7}{8}$	3	$3\frac{1}{4}$	$3\frac{1}{2}$
BDWF	4	$4\frac{1}{2}$	$4\frac{3}{4}$	5	$5\frac{1}{2}$	$5\frac{3}{4}$	6	$6\frac{1}{2}$	7
ACWF	8	9	$9\frac{1}{4}$	10	11	$11\frac{1}{2}$	12	13	14
BCWF	16	18	19	20	22	23	24	26	28
MM 									
	1	2	3	4	5	6	7	8	9
ACME	8	9	9.5	10	11	11.5	12	13	14
BCME	4	4.5	4.75	5	5.5	5.75	6	6.5	7
ADME	2	2.25	/	2.5	2.75	/	3	3.25	3.5
BDME	1	/	/	1.25	/	/	1.5	/	1.75
ACMH	0.5						0.75		
BCMh	3.2	3.6	$3\frac{5}{4}$	4	4.4	$4\frac{5}{3}$	4.8	5.2	5.6
ADMh	1.6	1.8	1.9	2	2.2	2.3	2.4	2.6	2.8
BDMh	0.80	0.90	0.95	1	1.1	1.15	1.2	1.3	1.4
DP 									
	1	2	3	4	5	6	7	8	9
ADWF	4	4.50	4.75	5	5.5	5.75	6	6.50	7
BDWF	8	9	9.50	10	11	11.5	12	13	14
ACWF	16	18	19	20	22	23	24	26	28
BCWF	32	36	38	40	44	46	48	52	56
MP 									
	1	2	3	4	5	6	7	8	9
ACME	4	4.5	4.75	5.00	5.50	5.75	6.00	6.50	7.00
BCME	2.00	2.25	/	2.50	2.75	/	3.00	3.25	3.50
ADME	1.00	/	/	1.25	/	/	1.50	/	1.75
BDME	0.50	/	/	/	/	/	0.75	/	/
 MM ( $\frac{1}{2}$ )									
	1	2	3	4	5	6	7	8	9
ACMG	0.40	0.44	0.46	0.48	0.52	0.56	0.60	0.64	0.70
BCMG	0.20	0.22	0.23	0.24	0.26	0.28	0.30	0.31	0.35
ADMG	0.10	0.11	0.11	0.12	0.13	0.14	0.15	0.16	0.17
BDMG	0.05	0.05	0.05	0.06	0.06	0.07	0.07	0.08	0.09

### 7-3 FOUNCTION OF GEARBOX

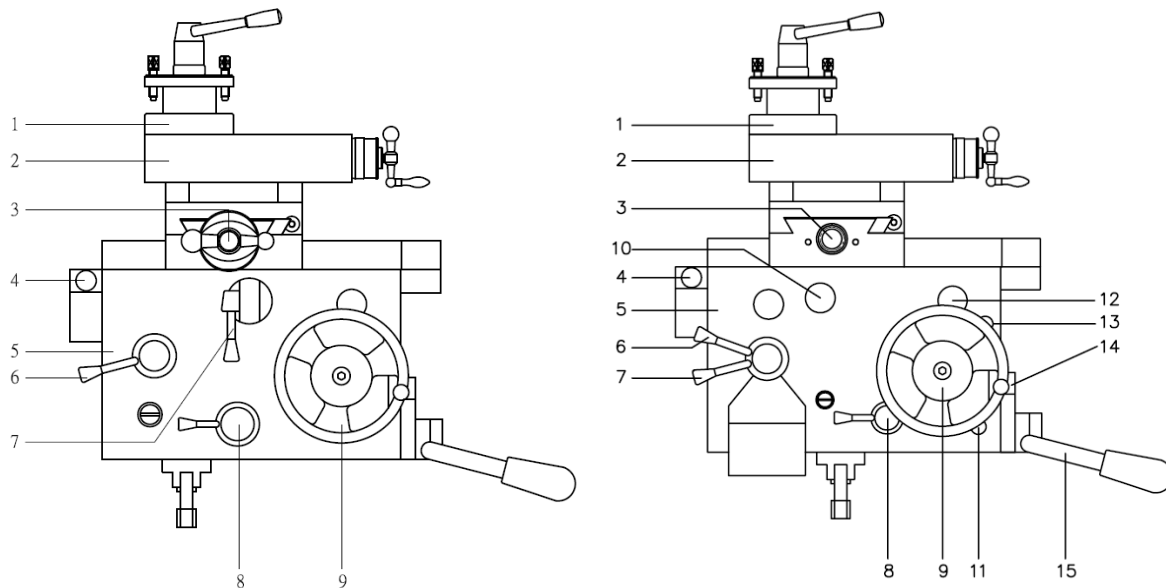
1. The main function of the gear box is to cutting thread and auto-feed, full range metric/inch gear box.
2. Operation of thread cutting:  
When the thread outing is desired, operate all the speed change lever and set at proper positions according to the thread cutting index, then thread outing can be operated to cut the required kind and pitch of thread. Finally, rotate the feed change lever to “leadscrew” position, then the operation of thread outing can be proceeded.
3. Operation of automatic feed:  
When the operation of automatic feed should be operated, at first operate all the speed change levers and set at the proper positions according to the feed speed of requirement (refer to the thread cutting index chart),and then operate the feed change lever to “feed” position, there upon the operation of auto feed can be proceeded.
4. Lubrication:  
The gear box is lubricated by oil bath lubrication and splash lubrication. During the machine is running, the oil will be supplied to all bearings and gears by gears and driving shafts splashed. We can check the oil quantity through the oil window and fill oil into oil inlet should up to the red line of oil window in gear box.

#### 7-4 THREAD INDICATOR

1. Thread outing indicator is installed on the left side of APRON. It is used for cutting inch thread.
2. To cut threads of an even number per inch, close the half nut as any line on the dial pass datum mark.
3. To cut threads of odd numbers per inch close the half nut as any one long number on the dial passes datum mark.
4. Fractional threads of  $1/2$  or  $3/4$  T.P.I. may be by closing the half nut at the same line on each pass of the tool.
5. This dial indicator can't be used with an inch lead screw to cut metric threads, D.P., module pitches. For that will cut the metric threads, the half nut of APRON must be kept closed ,can only be cut by the spindle reverse-forward rotation lever in APRON and carriage return is driven by half nut and lead screw.

## 8. SADDLE AND APRON CONTROL

### 8-1 LAYOUT OF APRON



1. SQUARE TOOL HODLE
2. TOP-SLIDE
3. CROSS-SLIDE HANDWHEEL
4. SADDLE CASTING
5. APRON CASTING
6. LEVER FOR THREADING
7. LEVER FOR RAPID FEED
8. LEVER FOR AUTO-FEED
9. LONGITUDINAL FEED OF HANDWHEEL
10. THIS LEVER IS DREW OUT FOR LOCATION FIXED OF CROSS (X-AXIS)  
AUTO-FEED AND PUSHED FOR LOCATION FIXED OF LONGITUDINAL (Z-AXIS)  
AUTO-FEED
11. LEVER TO LUBRICATE MANUALLY
12. LEVER FOR AUTOMATIC LUBRICATION
13. HOLD FOR LUBRICATING
14. LEVER FOR ADJUSTING THE FEEDS
15. LEVER FOR SPINDLE FORWARD AND REVERSE

## 8-2 OPERATION MENTHOD

### 1. CUTTING OF PLANE

When the longitudinal feed will be moved large in the plane outing. In order to avoid the carriage back ware and unbalance of cutting plate, so that there is a look bolt “ D” on the carriage, and fast on it tightly can increase the stability of compound rest to obtain the plane cutting in accurate value.

### 2. CUTTING OF TAPERED PLANE

There are many graduated divisions on the slice plate of carriage. For the cutting tapered-plane, please loose the locking screw “ B” first, then rotate the compound rest according to the required angle. After the adjustment had finished, fasten the setting screw again, then the cutting of tapered plane can be proceeded.

### 3. ADJUSTMENT OF BEVEL-GIB

Owing to the friction of long time relative motion between saddle and cross slide, there will be wear produced. In order to eliminate the excess clearance, the Bevel-Gib should be adjusted. Its adjusting method: Loose the set screw in the end of gib first, and fasten the adjusting screw A, then the gib will be pushed forward to proper position that the clearance between saddle and cross slide is adequate. Then fasten the setting screw again.

### 4. CRADUATED COLLER ( MICROMETER COLLAR )

There are the graduated collars (dial) on the longitudinal feed and cross feed handle. There are 250 scales on the dials; each division means 0.02mm, 5mm for one revolution. When the zero will be return, please loose the setting screw first. After the adjustment had finished, fasten the setting screw again.

### 5. LUBRICATION OF CARRIAGE

The oiling inlets are installed on the carriage and cross slide. Before the operating, in order to eliminate the wear, it must hand oiling usually. Lubricate the sliding surface from the oil inlet on carriage by oil gun.

#### 6. AUTOMATIC FEED TRANSMISSION

The auto-feed transmission of apron include cross feed and longitudinal feed. According to the index plate, when you pull the auto feed lever upward, the carriage with apron can be moved to perform the longitudinal feeding. When you pull this lever to downward position, the tool –rest with cross slide can be moved to perform the cross feeding. The stop device installed in the under side of auto –feed lever and it is used for stopping the auto-feeding. When you make use of this stop device, loose the setting screw of stop block first, then move stop block to proper position, and then fasten it.

#### 7. TRANSMISSION OF THREAD CUTTING

Only as the automatic feed lever at the central position, the half nut control lever can be put out downward position, and the half nut engage with the lead screw, then the carriage can be moved leftward or right –ward to perform the thread cutting. To stop thread cutting by push up the half nut lever only to release the engagement of half –nut with lead screw. The safety bar installed in the apron to keep the thread cutting and auto feed from simultaneous operation to attain the purpose of safety.

#### 8. FORWARD –REVERSE CHANGE LEVER

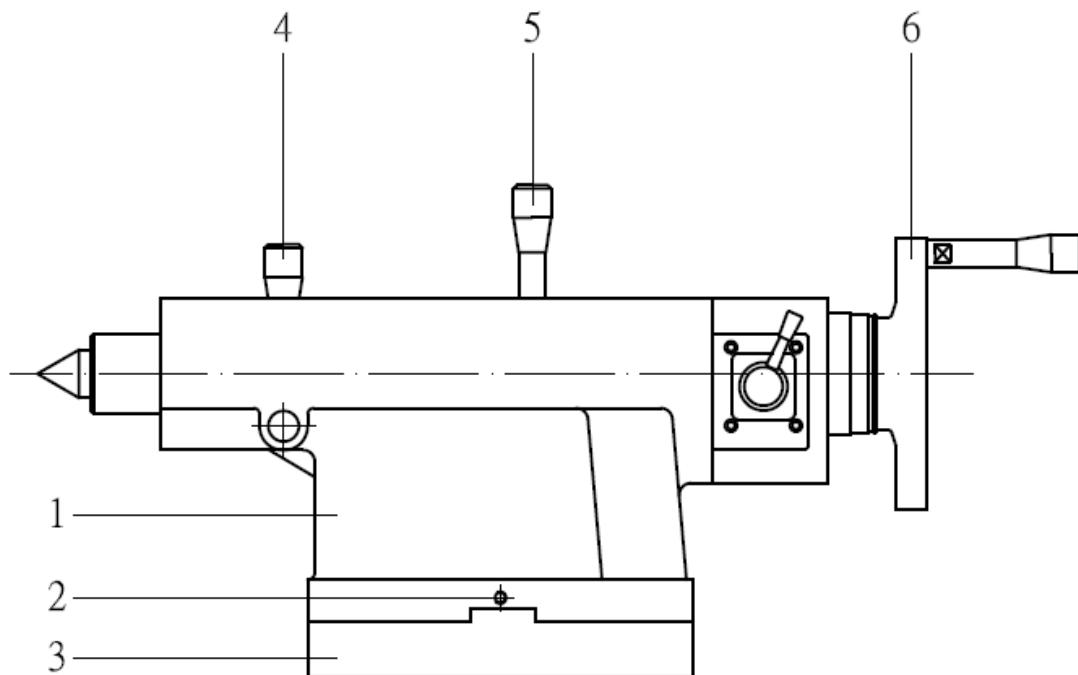
The forward –reverse change lever is installed at the right side of apron. It couple on the starting rod, so that the cutting and feeding work can be operated conveniently. When you pull this lever right and upward, the spindle will rotate in reverse direction. When you pull this lever right and downward the spindle will rotate in forward direction. When this lever at central position, the spindle will stop.



## 9. TAIL STOCK

### 9-1 LAYOUT OF TAIL STOCK

The main structure of tailstock is consisted of tailstock body, base mounting, and mandrel and change speed box. The mandrel of tailstock and the spindle of headstock are in the same central line. The tailstock depend on the long or short of work pieces, or required position, can be clamped at anywhere arbitrarily along bed, then it cooperate with the spindle to proceed to cut work between two centers and to bore hole.



1. TAILSTOCK CASTING
2. ADJUST SCREW
3. BASE CASTING
4. SPINDLE LOCKING LEVER
5. BASE CLAMPING LEVER
6. SPINDLE FORWARD-BACKWARD HANDWHEEL

## 9-2 OPERATIONAL METHOD

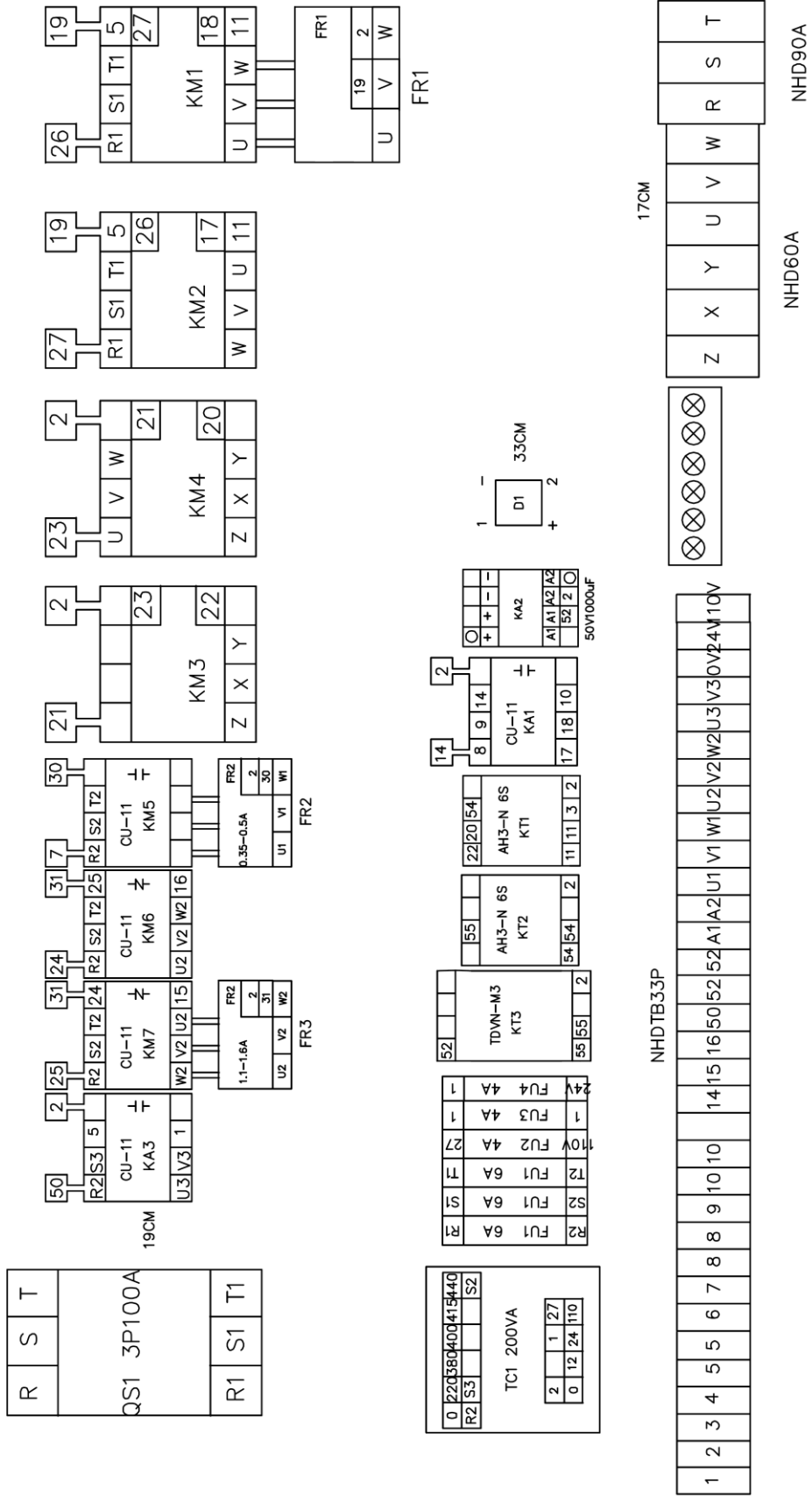
1. When the tailstock mandrel and spindle center are not in the same central line, loose the adjusting screws “2” in the both side, adjust the tailstock center until its central line is same as spindle, then fasten both adjusting screw “2”. Use the same method, adjust the tailstock central line to set up a deviation measure with the spindle and provide for the taper cutting between two centers.
2. Lubrication of tailstock: tailstock is lubricated by oil bath lubrication system and its mandrel, center and slide parts must hand oiling from time to time.

## 10. BRAKE DEVICE

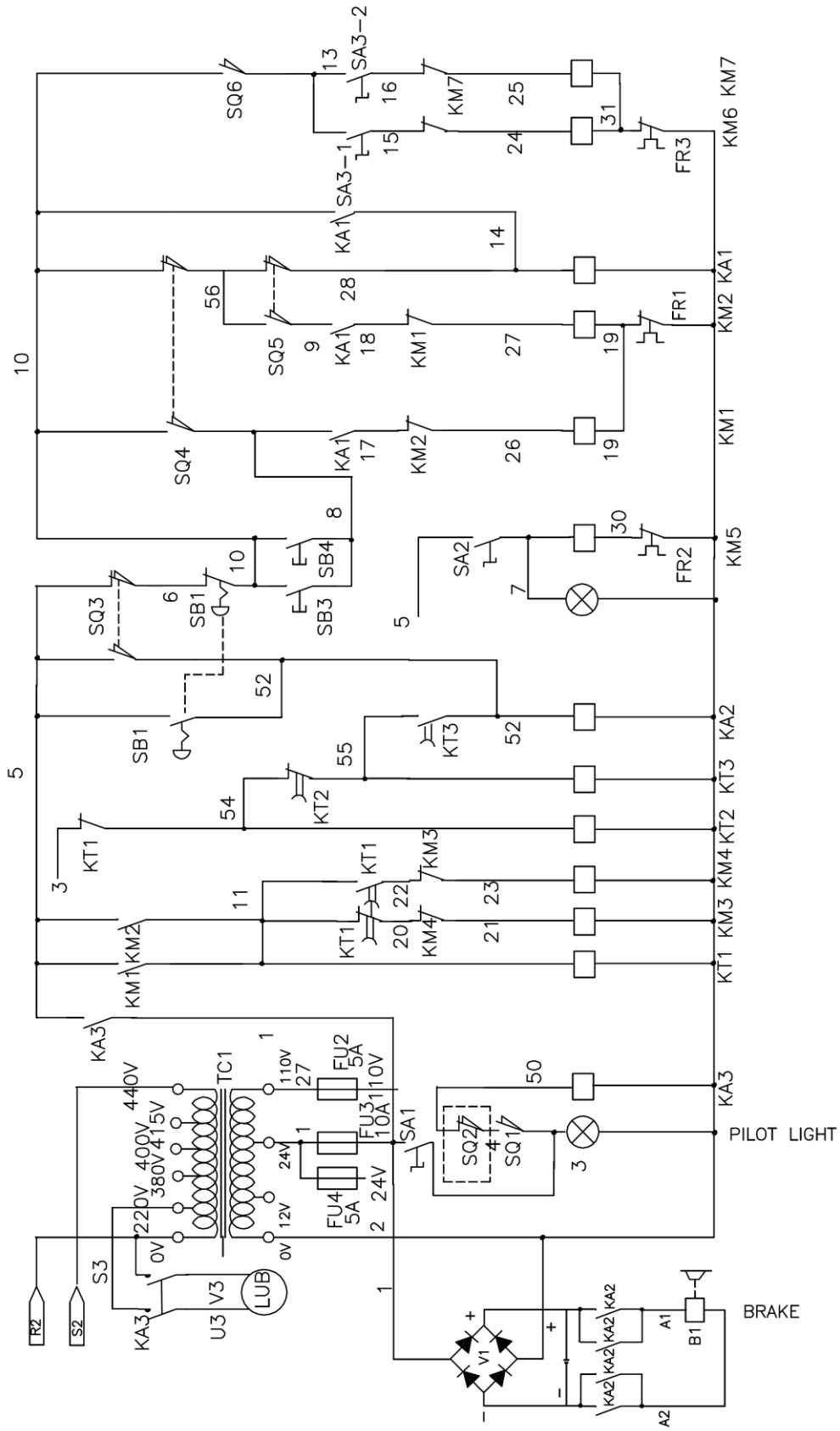
1. Use foot to tread upon the pedal is adopted for the brake mode of this machine. When the stopping of machine operation is necessary .a momentary force applied to the foot-brake pedal after can stop the spindle running immediately; and it had been touched the limited switch to cut off the power source of motor.

# 11. ELECTRICAL CIRCUIT DIAGRAM

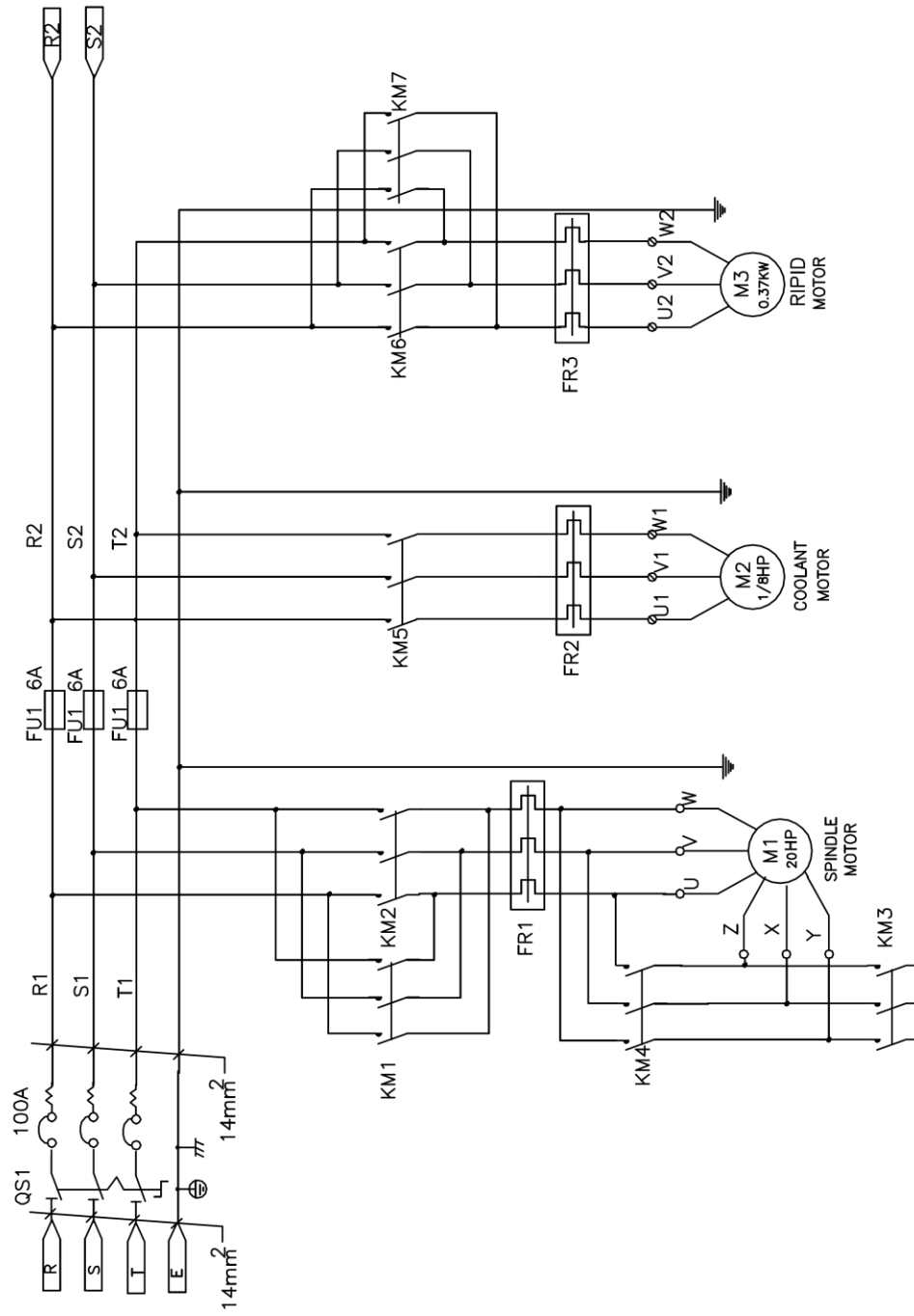
HT 20HP







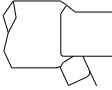

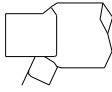











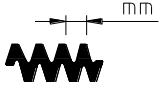

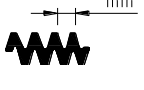

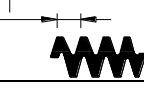

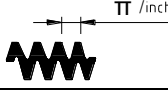



HT 20HP



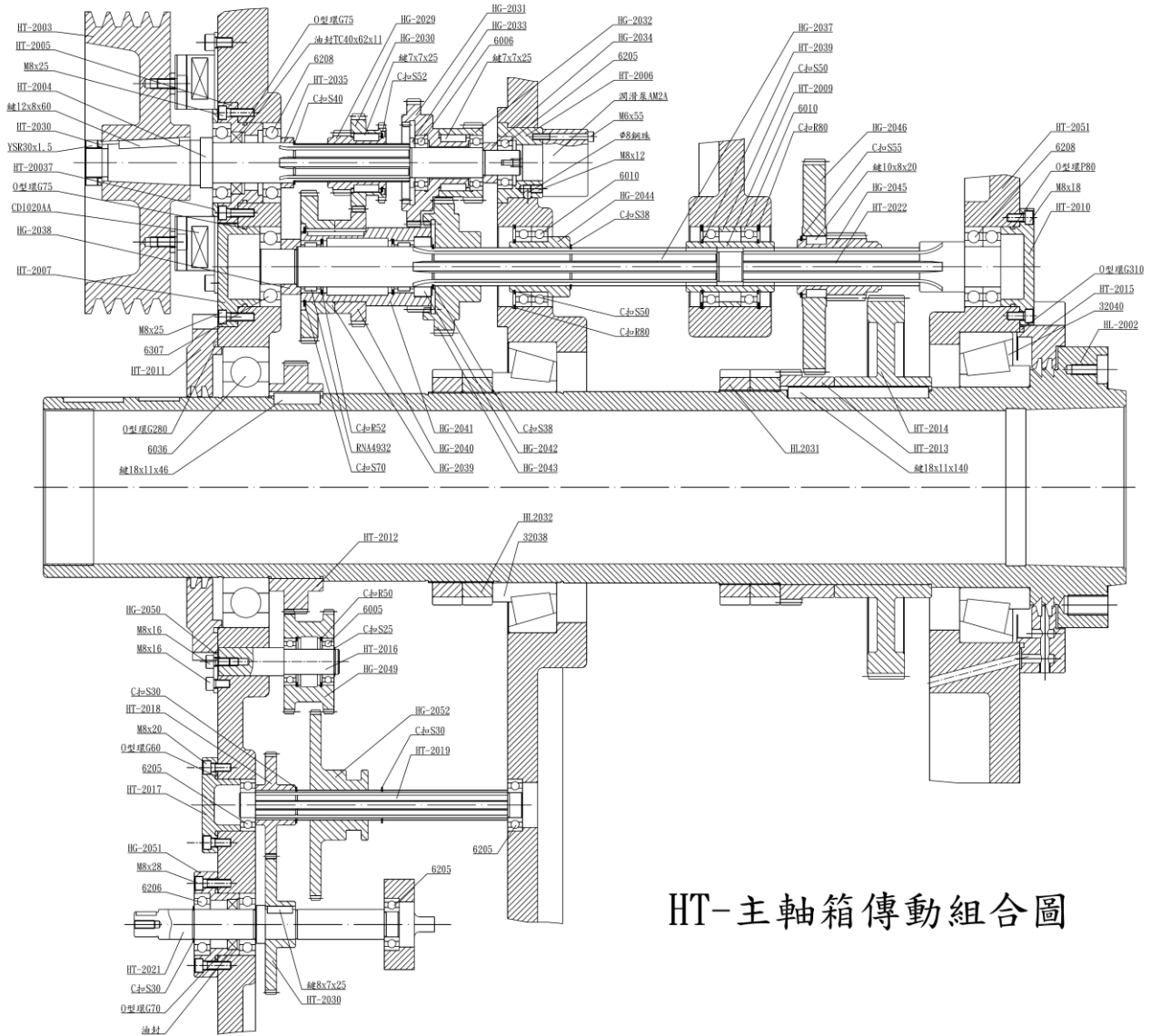
HT 20HP



## 12.IDENTIFICATION SYMBOLS

1		Feed disengaged	15		r.p.m.
2		Feed engaged	16		Half-nut disengaged
3		Lead screw forward	17		Half-nut engaged
4		Lead screw reverse	18		Main switch
5		Feeding	19		Coolant switch
6		Threading	20		Pilot lamp
7		High speed	21		JOG button
8		Low speed	22		Electrical control box
9		Longitudinal feed	23		Don't change over while rotation
10		Cross feed	24		Main spindle forward
11		Metric thread	25		Main spindle stop
12		Inch thread	26		Main spindle reverse
13		D.P. Screw	27		Clutch
14		Modular screw	28		Stepless pressure

### 13-1 HEADSTOCK DRIVING STRUCTURE



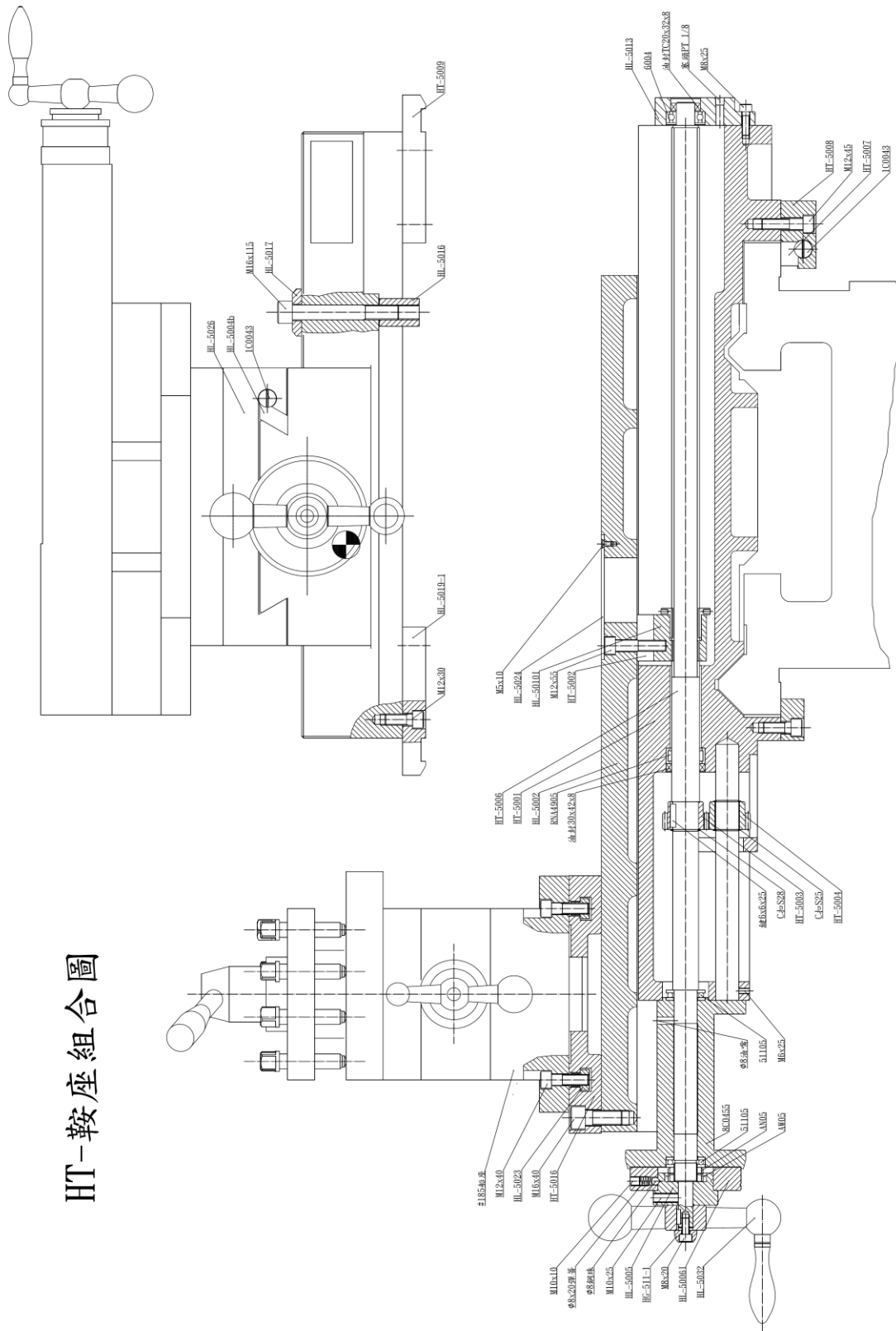
HT-主軸箱傳動組合圖



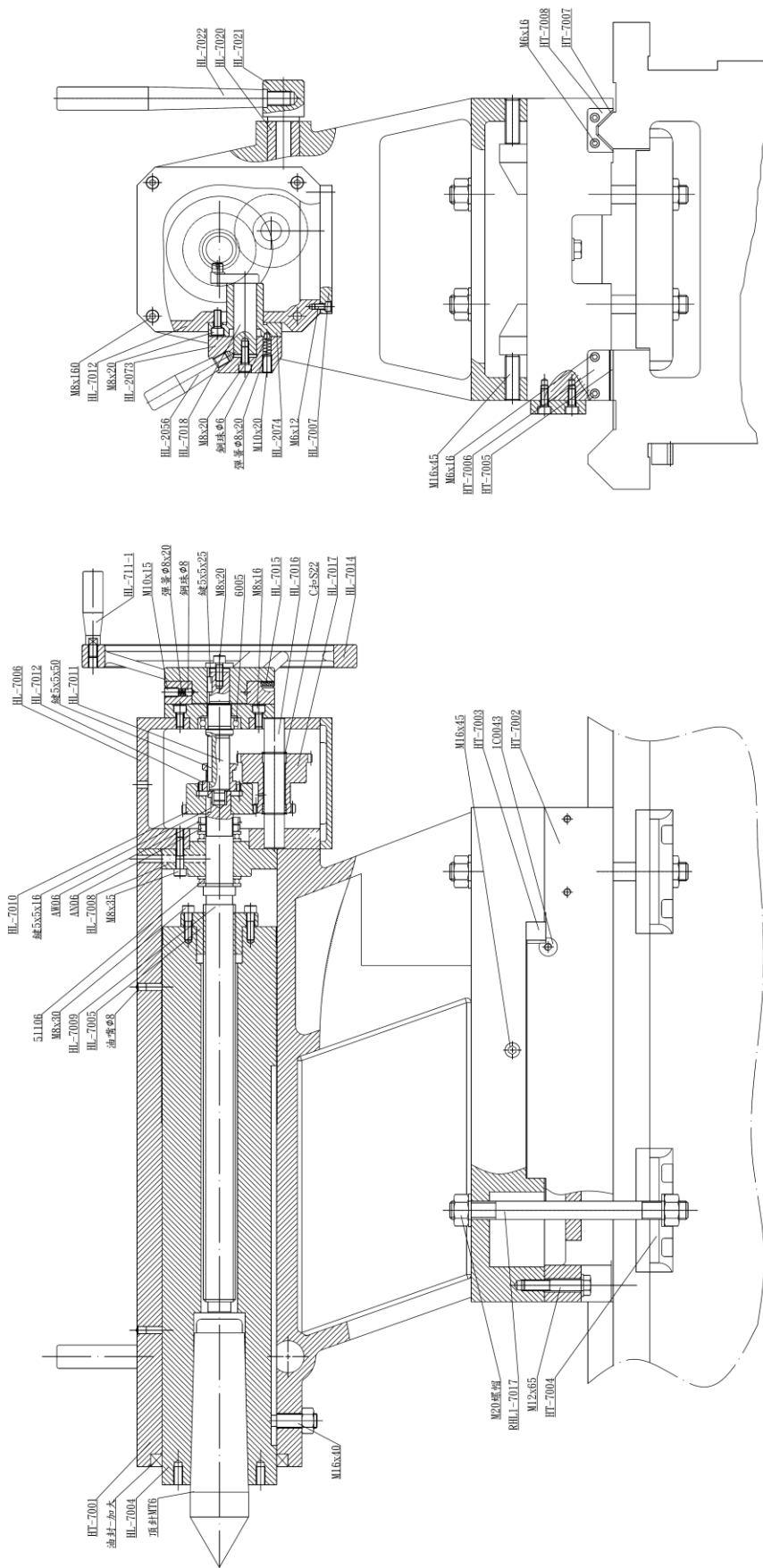


### 13-3 SADDLE AND CROSS-SLIDE STRUCTURE

HT-鞍座組合圖

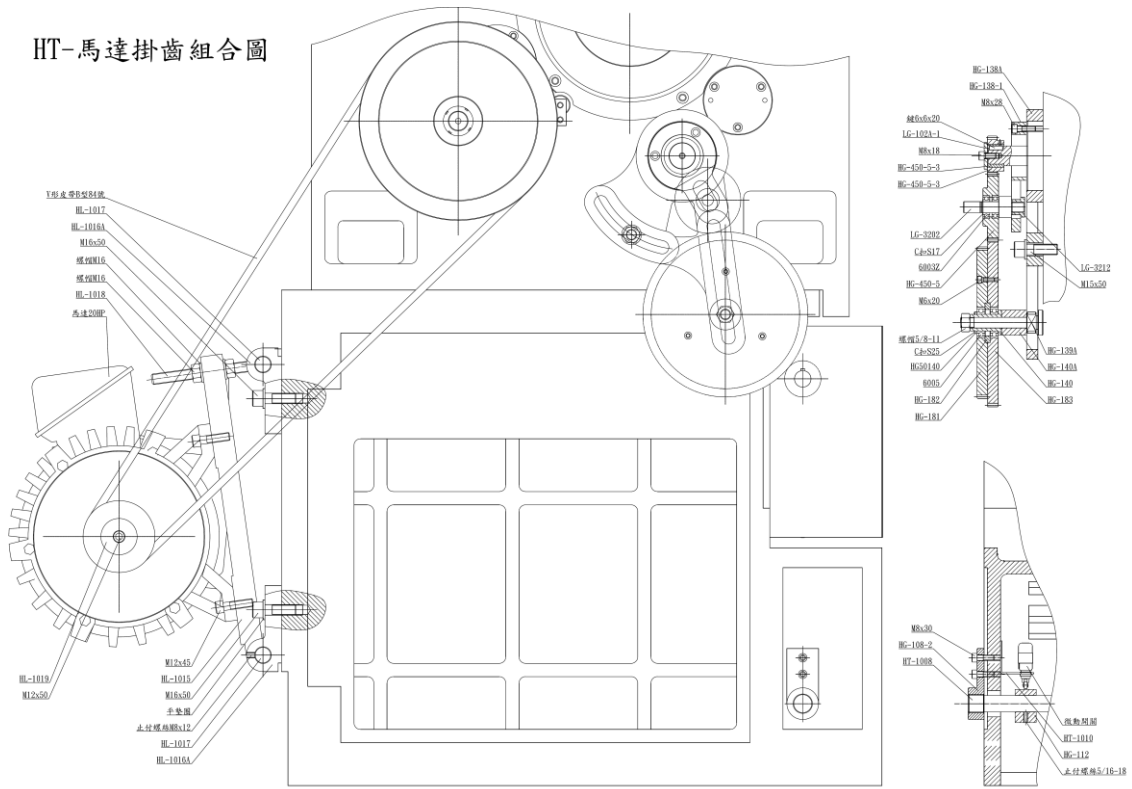


### 13-4 TAILSTOCK STRUCTURE



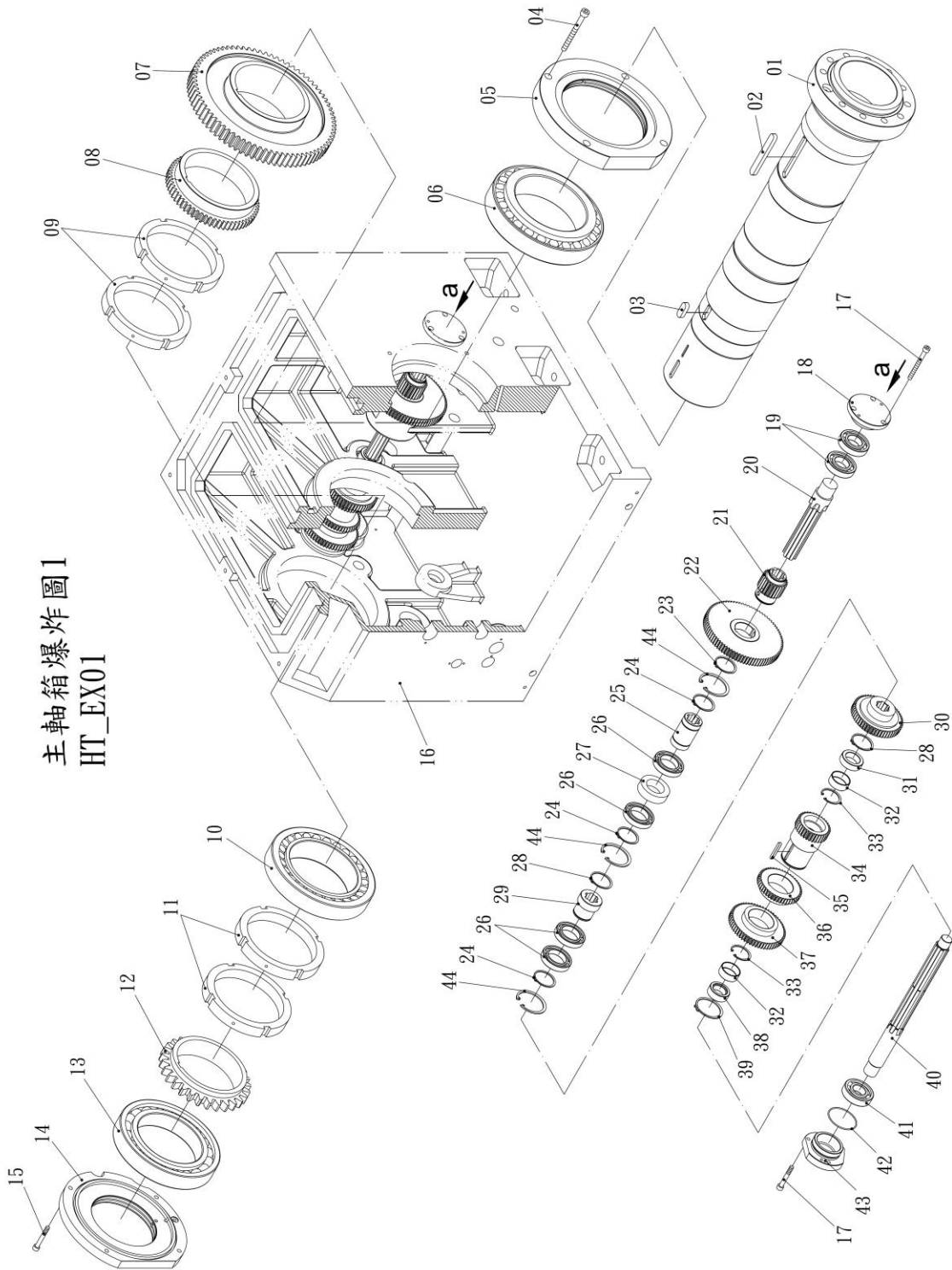
# 13-5 MOTOR AND END GEARS STRUCTURE

HT-馬達掛齒組合圖



# 14 PARTS LIST

## 14-1 HEADSTOCK EX01

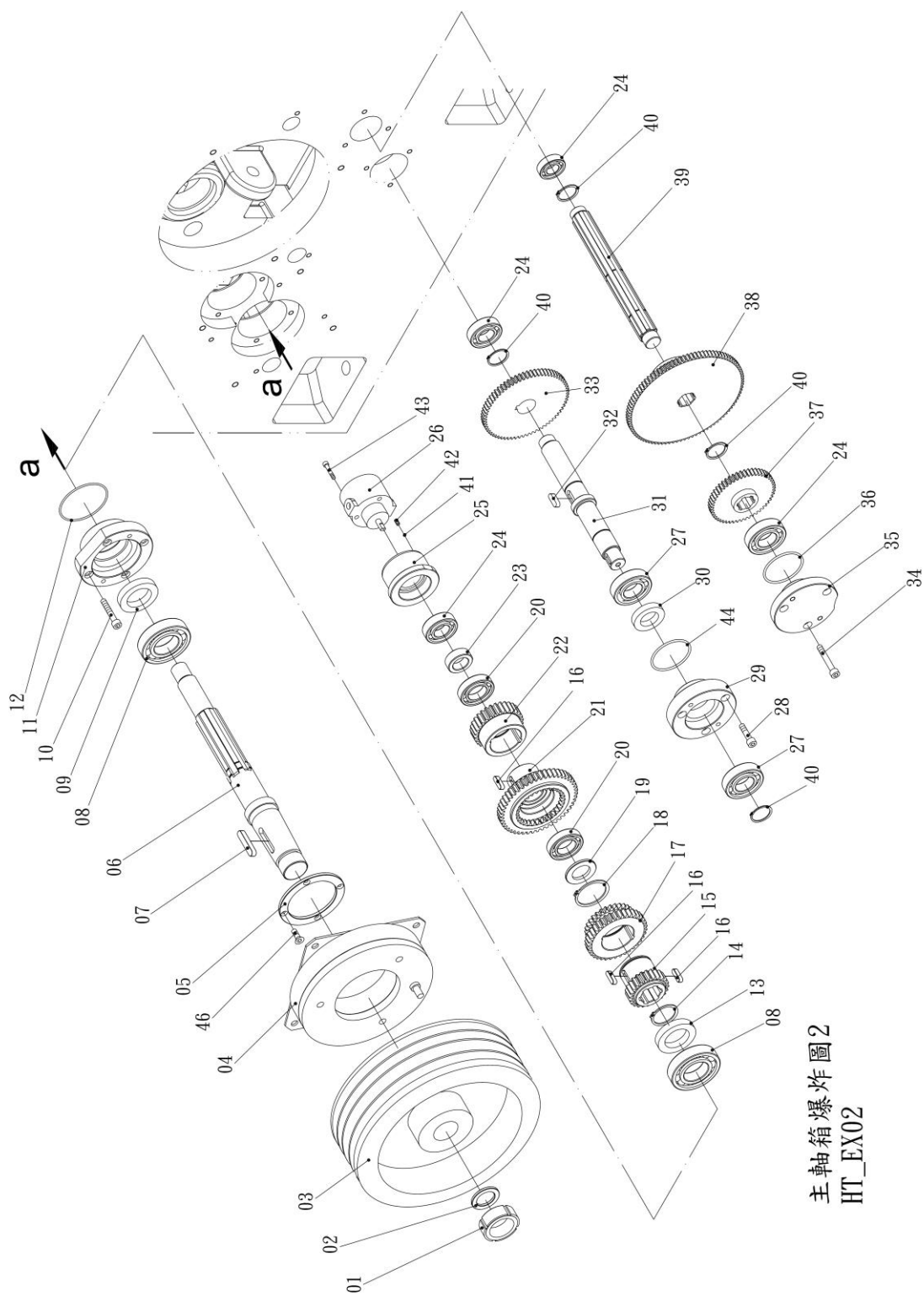


## 14-1 HEADSTOCK EX01

## PARTS LIST

NO.	PART NAME	PART No. / DESCRIPTION	Qty	REM	NO.	PART NAME	PART No. / DESCRIPTION	Qty	REM
01	SHAFT	HL-2002	1		36	GEAR	HG-2040	1	
02	KEY	18x12x141	1		37	GEAR	HG-2039	1	
03	KEY	18x12x46	1		38	WASHER	HG-2038	1	
04	SCREW	M12x60	4		39	C-TYPE CIRCLIP	S70	1	
05	COVER	HT-2015	1		40	SHAFT	HG-2037	1	
06	BEARING	32040X	1		41	BEARING	6307	1	
07	GEAR	HT-2014	1		42	O-RING	G75	1	
08	GEAR	HT-2013	1		43	COVER	HT-2007	1	
09	NUT	HL-2031	2		44	C-TYPE CIRCLIP	R80	3	
10	BEARING	32038X	1		45				
11	NUT	HL-2032	2		46				
12	GEAR	HT-2012	1		47				
13	BEARING	6036	1		48				
14	COVER	HT-2011	1		49				
15	SCREW	M10x65	4		50				
16	BODY	HT-2051	1		51				
17	SCREW	M8x20	6		52				
18	COVER	HT-2010	1		53				
19	BEARING	6208	2		54				
20	SHAFT	HT-2022	1		55				
21	GEAR	HG-2045	1		56				
22	GEAR	HG-2046	1		57				
23	C-TYPE CIRCLIP	S55	1		58				
24	C-TYPE CIRCLIP	S50	3		59				
25	SHAFT	HT-2009	1		60				
26	BEARING	6010	4		61				
27	GASKET	HT-2039	1		62				
28	C-TYPE CIRCLIP	S38	2		63				
29	SHAFT BUSHING	HG-2044	1		64				
30	GEAR	HG-2043	1		65				
31	WASHER	HG-2042	1		66				
32	BEARING	RNA49/32	2		67				
33	C-TYPE CIRCLIP	R52	2		68				
34	GEAR	HG-2041	1		69				
35	KEY	7x7x56	1		70				

14-2 HEADSTOCK EX02



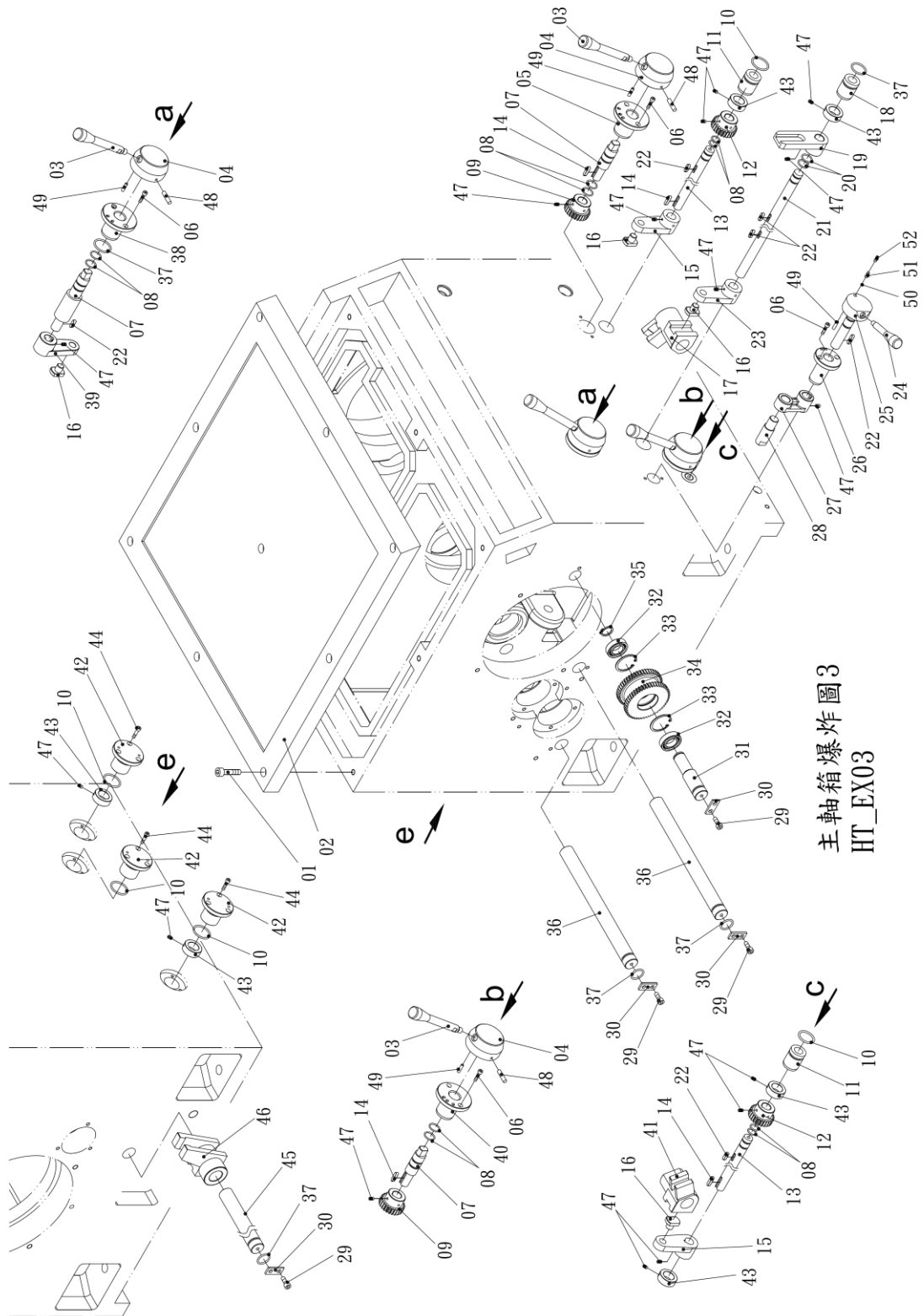
主軸箱爆炸圖2  
HT\_EX02

## 14-2 HEADSTOCK EX02

## PARTS LIST

NO.	PART NAME	PART No. / DESCRIPTION	Qty	REM	NO.	PART NAME	PART No. / DESCRIPTION	Qty	REM
01	NUT	YSR30x1.5	1		36	O-RING	G70	1	
02	WASHER	HT-2030	1		37	GEAR	HT-2018	1	
03	BELT PULLEY	HT-2003	1		38	GEAR	HG-2052	1	
04	CLUTCH	CDI020AA	1		39	SHAFT	HT-2019	1	
05	GASKET	HT-2037	1		40	C-TYPE CIRCLIP	S30	1	
06	SHAFT	HT-2004	1		41	BALL STEEL	φ 8	3	
07	KEY	12x8x60	1		42	SET SCREW	M8x15	3	
08	BEARING	6208	2		43	SCREW	M6x60	3	
09	OIL SEAL	40x62x11	1		44	O-RING	G70	1	
10	SCREW	M8x25	4		45	SCREW	M5x12	4	
11	COVER	HT-2005	1		46				
12	O-RING	G75	1		47				
13	SPACER RING	HT-2035	1		48				
14	C-TYPE CIRCLIP	S40	1		49				
15	GEAR	HG-2029	1		50				
16	KEY	7x7x25	3		51				
17	GEAR	HG-2030	1		52				
18	C-TYPE CIRCLIP	S52	1		53				
19	SPACER RING	HG-2033	1		54				
20	BEARING	6006	2		55				
21	GEAR	HG-2031	1		56				
22	GEAR	HG-2032	1		57				
23	SPACER RING	HG-2034	1		58				
24	BEARING	6205	4		59				
25	PUMP BASE	HT-2006	1		60				
26	PUMP	AM2A	1		61				
27	BEARING	6206	2		62				
28	SCREW	M8x30	3		63				
29	COVER	HG-2051	1		64				
30	OIL SEAL	30x50x10	1		65				
31	SHAFT	HT-2021	1		66				
32	KEY	8x7x25	1		67				
33	GEAR	HT-2030	1		68				
34	SCREW	M8x20	3		69				
35	COVER	HT-2017	1		70				

14-3 HEADSTOCK EX03



主軸箱爆炸圖3  
HT\_EX03

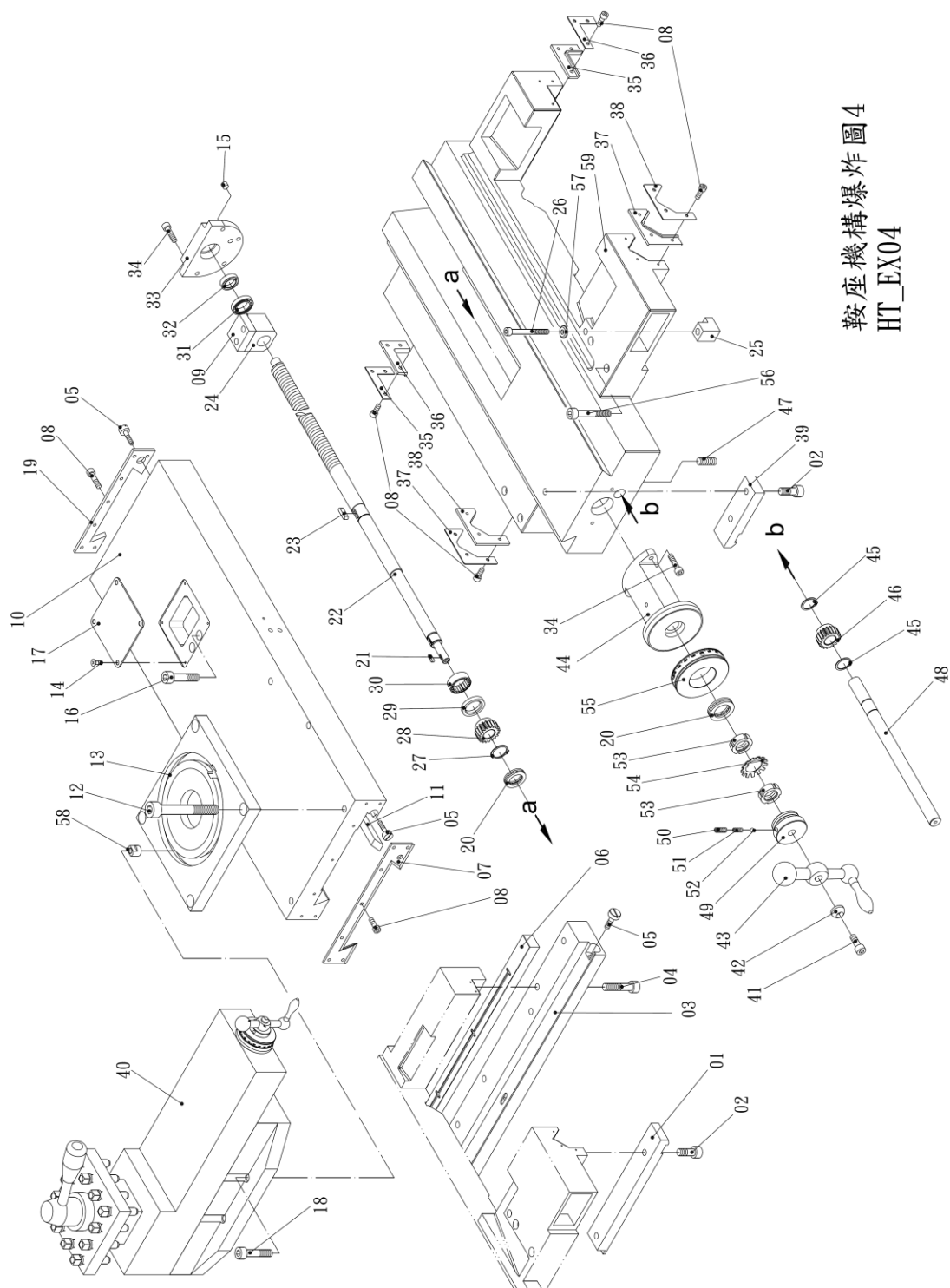


## 14-3 HEADSTOCK EX03

## PARTS LIST

NO.	PART NAME	PART No. / DESCRIPTION	Qty	REM	NO.	PART NAME	PART No. / DESCRIPTION	Qty	REM
01	SCREW	M12x55	8		36	SHAFT	HT-2031	2	
02	COVER	HL-2003	1		37	O-RING	G70	4	
03	HANDLE	HG-2054	3		38	BUSHING	HG-2057	1	
04	STEM ARM	HG-2055	3		39	FORK ARM	HT-2026	1	
05	BUSHING	HG-2057	1		40	BUSHING	HG-2057	1	輸入軸
06	SCREW	M6x16	8		41	FORK	HT-2025	1	
07	SHAFT	HG-2056	3		42	COVER	HT-2033	3	
08	O-RING	P21	10		43	SET RING	HT-2034	4	
09	GEAR	HG-2058	2		44	SCREW	M6x12	9	
10	O-RING	G35	5		45	SHAFT	HT-2032	1	
11	SHAFT SLEEVE	HT-2042	2		46	FORK	HT-2036	1	
12	GEAR	HT-2041	2		47	SET SCREW	M6x6	4	
13	SHAFT	HT-2024	2		48	PIN	φ 5x80	3	
14	KEY	6x6x25	1		49	SPRING PIN	φ 5x12	3	
15	FORK ARM	HT-2050	2		50	BALL STEEL	φ 6	1	
16	FORK	HG-2062	4		51	SPRING	φ 6x15	1	
17	FORK	HT-2028	1		52	SCREW	M8x8	1	
18	SHAFT SLEEVE	HG-2059	1		53				
19	FORK ARM	HT-2027	1		54				
20	O-RING	P16	2		55				
21	SHAFT	HT-2029	1		56				
22	KEY	6x6x30	2		57				
23	FORK ARM	HG-2061	1		58				
24	HANDLE	HG-256	1		59				
25	STEM ARM	HG-2070	1		60				
26	BUSHING	HG-2071	1		61				
27	FORK ARM	HG-2072	1		62				
28	FORK	HT-2023	1		63				
29	SCREW	M8x16	4		64				
30	PRESS BLOCK	HG-2050	4		65				
31	SHAFT	HT-2016	1		66				
32	BEARING	6005	2		67				
33	C-TYPE CIRCLIP	R47	2		68				
34	GEAR	HG-2049	1		69				
35	C-TYPE CIRCLIP	S30	1		70				

14-4 SADDLE AND CROSS – SLIDE EX04



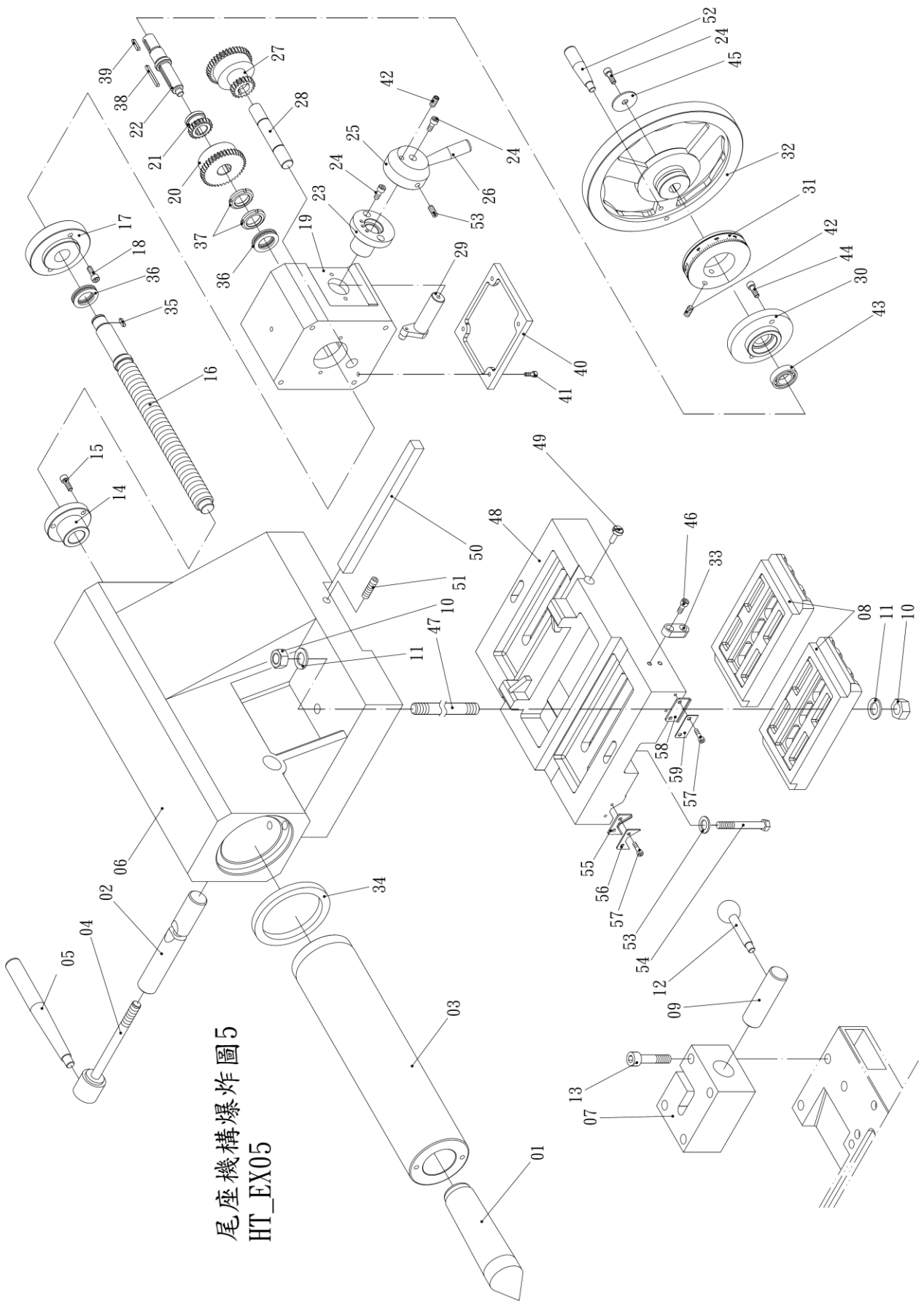
鞍座機構爆炸圖4  
HT\_EX04

## 14-4 SADDLE AND CROSS – SLIDE EX04

## PARTS LIST

NO.	PART NAME	PART No. / DESCRIPTION	Qty	REM	NO.	PART NAME	PART No. / DESCRIPTION	Qty	REM
01	LOCK PLATE	HT-5009	1		36	PRESS PLATE	HT-5015	2	
02	SCREW	M12x30	4		37	WIPER	HT-5011	2	
03	FIXED PLATE	HT-5008	1		38	PRESS PLATE	HT-5012	2	
04	SCREW	M12x45	4		39	LOCK PLATE	HL-5019-1	1	
05	FIXED SCREW	1C0043	4		40	船座	HL-6000	1	185
06	PRESS PLATE	HT-5007	1		41	SCREW	M8x20	1	
07	WIPER	HL-5026	1		42	WASHER	HG-515	1	
08	SCREW	M5x16	14		43	HANDLE	HL-5032	1	
09	PLATE	HT-5002	1		44	BRACKET	HL-5007	1	
10	SLIDING	HL-5002	1		45	C-TYPE CIRCLIP	S25	2	
11	STRIP	HL-5004b	1		46	GEAR	HT-5004	1	
12	SCREW	M16x40	4		47	SET SCREW	M6x25	1	
13	GRADUATON BED	HT-5016	1	860	48	SHAFT	HT-5005	1	
14	SCREW	M5x10	4		49	BUSHING	HL-5005	1	
15	SET SCREW	PT1/8	1		50	SET SCREW	M10x10	1	
16	SCREW	M12x55	3		51	SPRING	ø8x20	1	
17	COVER	HL-5024	1		52	BALL STEEL	ø8	1	
18	SCREW	M12x40	4		53	NUT	AN05	2	
19	WIPER	8C0384	1		54	WASHER	AW05	1	
20	BEARING	51105	2		55	INDEX RING	HL-5006I	1	英制
21	KEY	4x4x16	1		56	SCREW	M10x90	4	
22	LEAD SCREW	HT-5006	1		57	WASHER	HL-5017	1	
23	KEY	6x6x25	1		58	NUT	HL-5023	4	
24	NUT	HL-5010I	1	英制	59	CARRIAGE	HT-5001	1	
25	LOCK PLATE	HL-5016	1		60	SCREW	M6x12	2	
26	SCREW	M16x115	1		61				
27	C-TYPE CIRCLIP	S28	1		62				
28	GEAR	HT-5003	1		63				
29	OIL SEAL	30x42x8	1		64				
30	BEARING	RNA4905	1		65				
31	BEARING	6004	1		66				
32	OIL COVER	TC20x32x8	1		67				
33	BRACKET	HL-5013	1		68				
34	SCREW	M8x15	2		69				
35	WIPER	HT-5014	2		70				

14-5 TAILSTOCK ASSEMBLY EX05



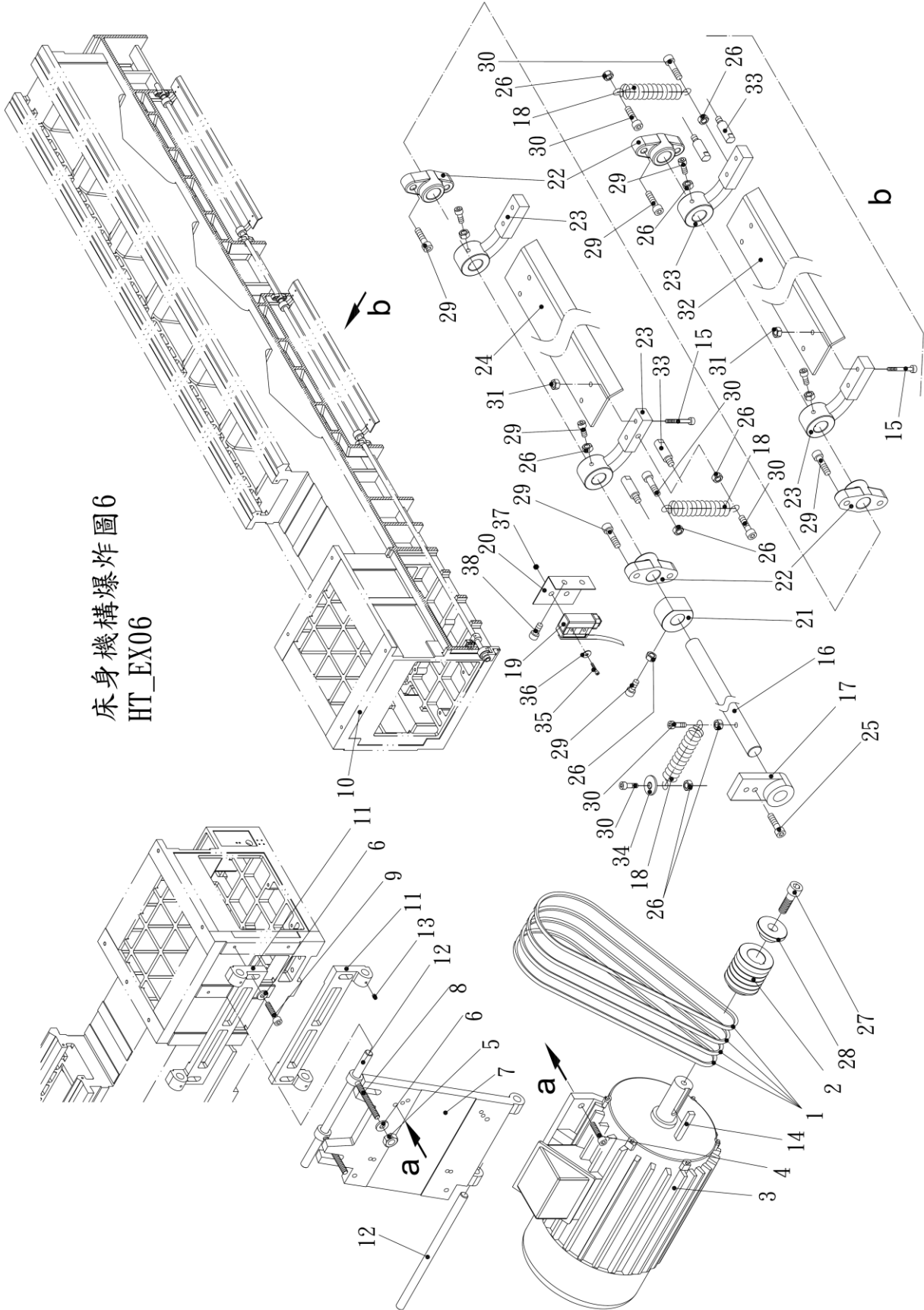
尾座機構爆炸圖5  
HT\_EX05

## 14-5 TAILSTOCK EX05

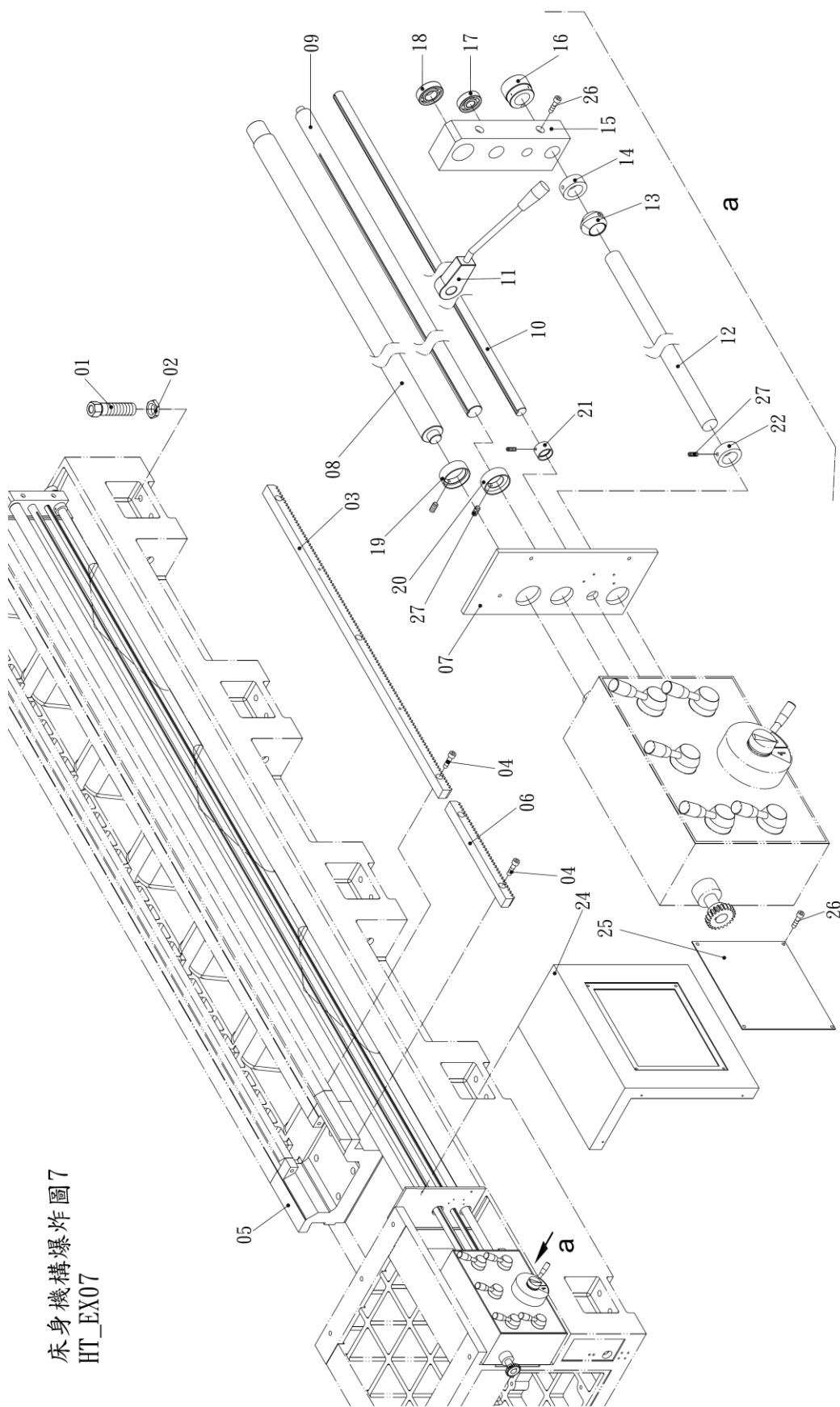
## PARTS LIST

NO.	PART NAME	PART No. / DESCRIPTION	Qty	REM	NO.	PART NAME	PART No. / DESCRIPTION	Qty	REM
01	CENTER	MT6	1		36	BEARING	51106	2	
02	BUSH & NUT	HL-7020	1		37	NUT	AN06	2	
03	BARREL	HL-7004	1		38	KEY	5x5x50	1	
04	STUD	HL-7021	1		39	KEY	5x5x25	1	
05	HANDLE	HL-7022	1		40	COVER	HL-7007	1	
06	TAILSTOCK BODY	HT-7001	1		41	SCREW	M6x14	4	
07	DRIVE SEAT	9C0007	1		42	SET SCREW	M10x20	2	
08	CLAMP	HT-7004	2		43	BEARING	6005	1	
09	SHAFT	9C0006	1		44	SCREW	M8x16	2	
10	NUT	M20	6		45	WASHER	HL-5064	1	
11	WASHER	M20	6		46	SCREW	M8x30	2	
12	HANDLE	HL-7031	1		47	BOLT	RHL1-7017	3	
13	SCREW	M12x55	3		48	TAILSTOCK BASE	HT-7002	1	
14	NUT	HL-7005	1		49	FIXED SCREW	1C0043	2	
15	SCREW	M8x30	3		50	PRESS PLATE	HT-7003	1	
16	LEAD SCREW	HL-7009	1		51	SET SCREW	M16x50	2	
17	COVER	HL-7008	1		52	HANDLE	HG-711-1	1	
18	SCREW	M8x35	2		53	WASHER	M12	2	
19	GEAR BOX	HL-7006	1		54	SCREW	M12X65	2	
20	GEAR	HL-7010	1		55	WIPER	HT-7007	2	
21	GEAR	HL-7012	1		56	PLATE	HT-7008	2	
22	SHAFT	HL-7011	1		57	SCREW	M6X16	8	
23	BUSHING	HL-2074	1		58	WIPER	HT-7005	2	
24	SCREW	M8x20	4		59	PLATE	HT-7006	2	
25	LEVER BOSS	HL-2073	1		60				
26	HANDLE	HL-2056	1		61				
27	GEAR	HL-7017	1		62				
28	SHAFT	HL-7016	1		63				
29	LEVER	HL-7018	1		64				
30	LINKAGE PLATE	HL-7013	1		65				
31	INDEX RING	HL-7015	1		66				
32	HANDLE WHEEL	HL-7014	1		67				
33	LEVER	6C0092	1		68				
34	OIL SEAL	115x145x3	1		69				
35	KEY	5x5x16	1		70				

床身機構爆炸圖6  
HT\_EX06



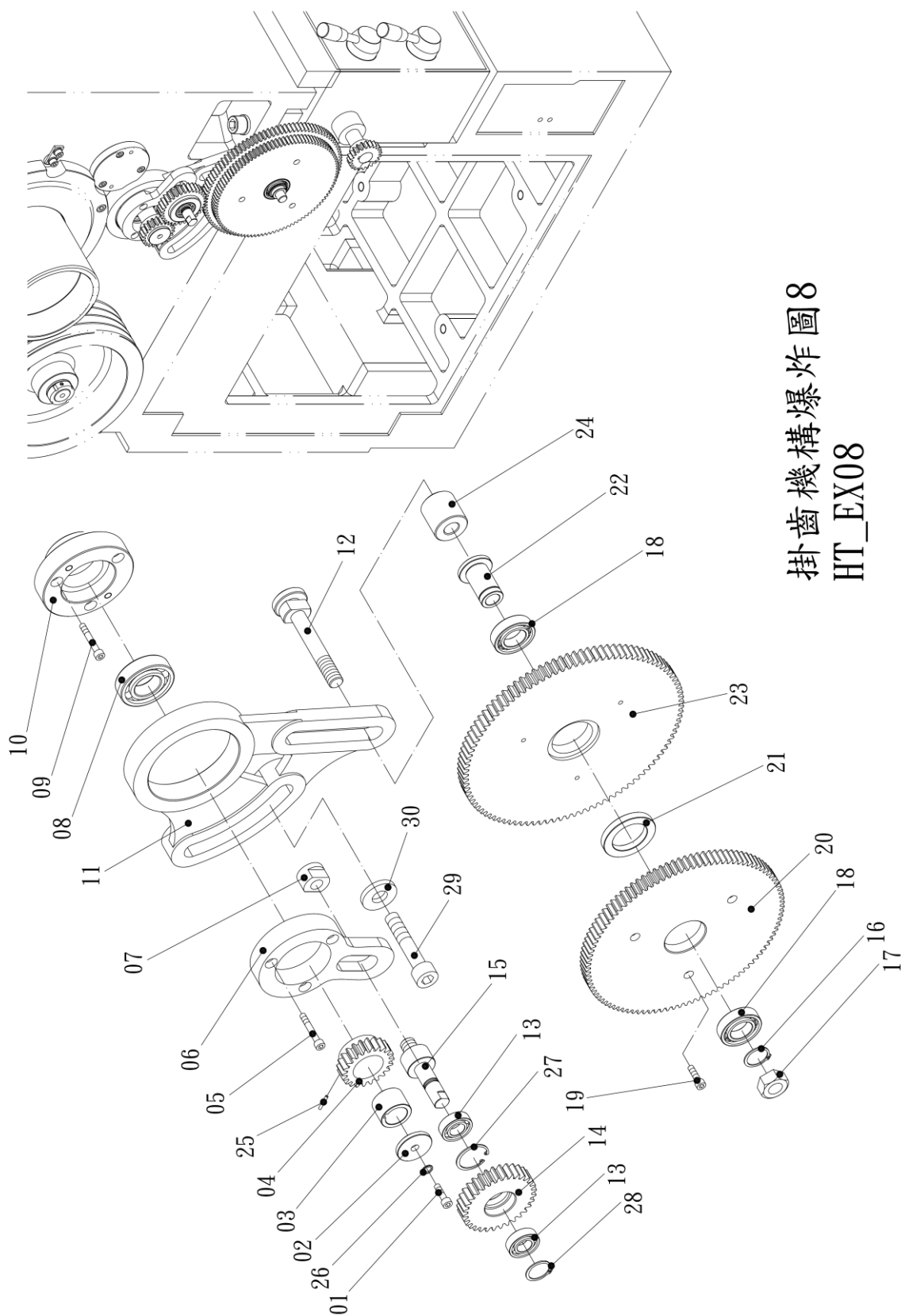
NO.	PART NAME	PART No. / DESCRIPTION	Qty	REM	NO.	PART NAME	PART No. / DESCRIPTION	Qty	REM
01	V-BELT	B-84	4		36	WASHER	M4	2	
02	PULLEY	HL-1019	1		37	NUT	M4	2	
03	MOTOR	20HP-4P	1		38	SCREW	M6x12	2	
04	SCREW	M12x45	4		39				
05	NUT	M16	4		40				
06	WASHER	M16	8		41				
07	MOTOR PLATE	HL-1015-2	1		42				
08	BLOT	HL-1018	2		43				
09	SCREW	M16x50	4		44				
10	BED	HT-1001	1		45				
11	LOW-PLATE	HL-1016A	2		46				
12	SHAFT	HL-1017	2		47				
13	SET SCREW	M8x16	4		48				
14	KEY	#12x80	1		49				
15	SCREW	M10x35	6		50				
16	BRAKE ROD	HT-1008	1		51				
17	BRACKET	HG-108-2	1		52				
18	SPRING	LG-1062	3		53				
19	LIMIT SWITCH	AM-1701	1	SOLON	54				
20	BRACKET	HT-1010	1		55				
21	BRAKE CONTROL WHELL	HG-112	1		56				
22	FIXED BLOCK	HG-108	4		57				
23	FIXED PLATE	HG-118-1	4		58				
24	BRAKE PEDAL	HT-1006	2		59				
25	SCREW	M8x20	2		60				
26	NUT	M8	15		61				
27	SCREW	M12x30	1		62				
28	WASHER	M12	1		63				
29	SCREW	M8x25	16		64				
30	SCREW	M8x35	6		65				
31	NUT	M6	16		66				
32	BRAKE PEDAL	HT-1006	2		67				
33	BRAKE LEVER	LG-1016	4		68				
34	WASHER	M10	1		69				
35	SCREW	M4x40	2		70				



床身機構爆炸圖7  
HT\_EX07



NO.	PART NAME	PART No. / DESCRIPTION	Qty	REM	NO.	PART NAME	PART No. / DESCRIPTION	Qty	REM
01	SCREW	1-12UNF	8		33				
02	NUT	1-12UNF	8		34				
03	RACK	HG-529	4	1060	35				
04	SCREW	M8x15	25		36				
05	GAP BED	HT-1016	1		37				
06	RACK	HG-532-1	1	188	38				
07	COVER PLATE	HG-130	1		39				
08	LEAD SCREW	HT-1002	1		40				
09	FEED ROD	HT-1003	1		41				
10	SWITCH ROD	HT-1004	1		42				
11	START LEVER		1	床裙附件	43				
12	4th ROD	HT-1005	1		44				
13	ECCENTRIC BLOCK	HG-1803	6		45				
14	CHIP-PROOF WASHER	HG-1802	1		46				
15	BRACKET	HG-182	1		47				
16	POSITION INDEXING RING	HG-1818	1		48				
17	BEARING	6303	1		49				
18	BEARING	6205	1		50				
19	CHIP-PROOF WASHER	HG-132-1	1		51				
20	CHIP-PROOF WASHER	HG-133-1	1		52				
21	CHIP-PROOF WASHER	HG-134-1	1		53				
22	CHIP-PROOF WASHER	HG-133-1	1		54				
23	SCREW	M12x85	2		55				
24	COVER	HT-1012	1		56				
25	COVER PLATE	HT-1020	1		57				
26	SCREW	M5x20	6		58				
27	SET SCREW	M6x10	4		59				
28	SET SCREW	M8x10	7		60				
29	RACK	HG-532	1	520	61				
30					62				
31					63				
32					64				



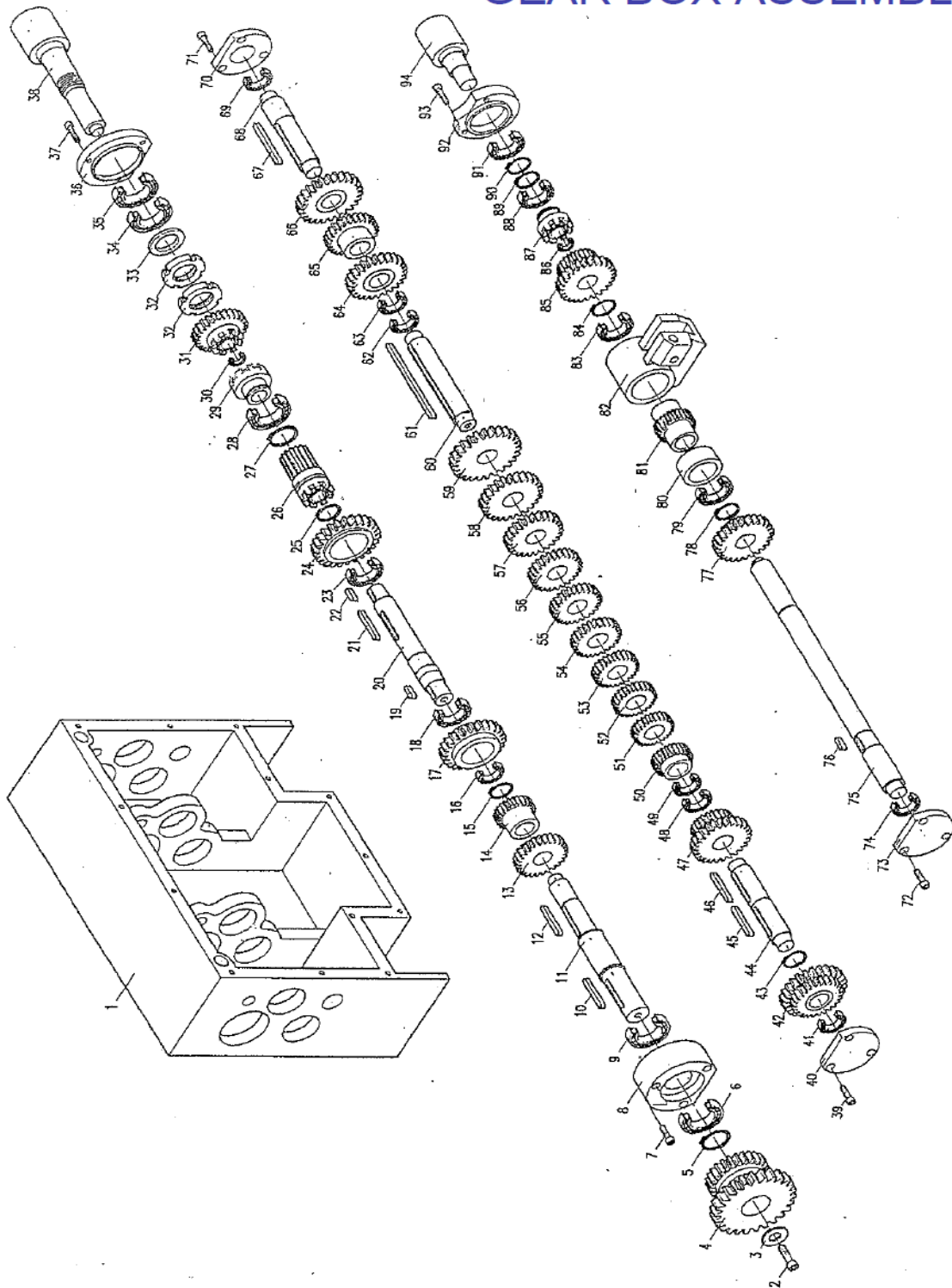
掛齒機構爆炸圖8  
HT\_EX08

## 14-8 END GEARS STRUCURE EX08

## PARTS LIST

NO.	PART NAME	PART No. / DESCRIPTION	Qty	REM	NO.	PART NAME	PART No. / DESCRIPTION	Qty	REM
01	SCREW	M8x18	1		36				
02	WASHER	LG-1021A-1	1		37				
03	SHAFT	HG-450-5-3	1		38				
04	GEAR	HG-450-5-3	1		39				
05	SCREW	M8x28	3		40				
06	BRACKET	HG-138-1	1		41				
07	NUT	LG-3212	1		42				
08	BEARING	6206	1		43				
09	SCREW	M8x30	3		44				
10	COVER	HG-N234	1		45				
11	BRACKET	HG-138A	1		46				
12	SHAFT	HG-139A	1		47				
13	BEARING	6003Z	2		48				
14	GEAR	HG-450-5	1		49				
15	SHAFT	LG-3202	1		50				
16	C-TYPE CIRCLIP	S25	1		51				
17	NUT	5/8-11UNC	1		52				
18	BEARING	6005	2		53				
19	SCREW	M6x20	3		54				
20	GEAR	HG-181	1		55				
21	CONNECTION COLLAR	HG-182	1		56				
22	SHAFT	HG-140	1		57				
23	GEAR	HG-183	1		58				
24	SHAFT COLLAR	HG-140A	1		59				
25	SPRING PIN	$\phi$ 4x16	1		60				
26	SPRING WASHER	M8	1		61				
27	C-TYPE CIRCLIP	R37	1		62				
28	C-TYPE CIRCLIP	S17	1		63				
29	SCREW	M12x50	1		64				
30	WASHER	HG-N279-1	1		65				
31					66				
32					67				
33					68				
34					69				
35					70				

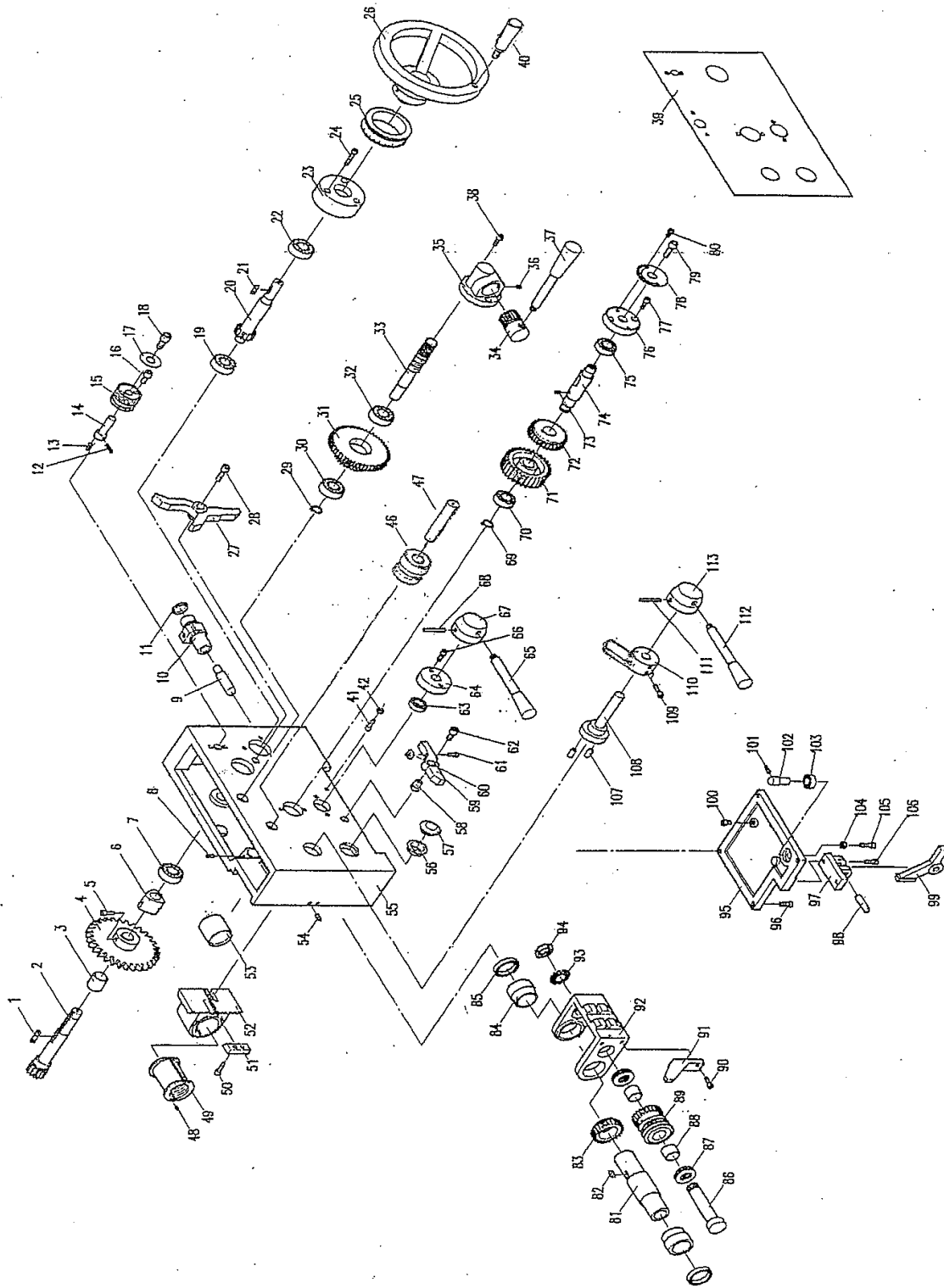
# GEAR BOX ASSEMBLY



14-9 GEAR BOX EX09 PARTS LIST

No.	Description	Qty	No.	Description	Qty
1	Gear box	1	48	Bearing 6204	1
2	Bolt M8x25L	1	49	Bearing 6204	3
3	Washer	1	50	Gear	1
4	Gear	1	51	Gear	1
5	Snap ring	1	52	Gear	1
6	Bearing 6006	1	53	Gear	1
7	Bolt M6x50L	3	54	Gear	1
8	Cover	1	55	Gear	1
9	Bearing 6206	1	56	Gear	1
10	Key 6x6x25L	1	57	Gear	1
11	Shaft	1	58	Gear	1
12	Key 6x6x50L	1	59	Gear	1
13	Gear	1	60	Shaft	1
14	Gear	1	61	Key 6x6x130L	1
15	Snap ring	1	62	Bearing 6204	1
16	Bearing 6203	1	63	Bearing 6204	1
17	Gear	1	64	Gear	1
18	Bearing 6205	1	65	Gear	1
19	Key 6x6x20L	1	66	Gear	1
20	Shaft	1	67	Key 6x6x70L	1
21	Key 6x6x50L	1	68	Shaft	1
22	Key 6x6x20L	1	69	Bearing 6204	1
23	Bearing 6005	1	70	Cover	1
24	Gear	1	71	Bolt M6x16L	3
25	Snap ring	1	72	Bolt M6x16L	3
26	Gear	1	73	Cover	1
27	Snap ring	1	74	Bearing 6204	1
28	Bearing 6006	1	75	Shaft	1
29	Clutch	1	76	Key 6x6x20L	1
30	Bearing 6002	1	77	Gear	1
31	Gear	1	78	Snap ring	1
32	Nut	2	79	Bearing 6205	1
33	Washer	1	80	Washer	1
34	Bearing 30206	1	81	Gear	1
35	Bearing 30206	1	82	Gear housing	1
36	Cover	1	83	Bearing 6205	1
37	Bolt M6x25L	1	84	Snap ring	1
38	Shaft	1	85	Gear	1
39	Bolt M6x16L	3	86	Bearing 6002	1
40	Cover	1	87	Clutch	1
41	Bearing 6204	1	88	Bearing 6006	1
42	Gear	1	89	Snap ring	1
43	Snap ring	1	90	Snap ring	1
44	Shaft	1	91	Bearing 6005	1
45	Key 6x6x55L	1	92	Cover	1
46	Key 6x6x55L	1	93	Bolt M6x16L	3
47	Gear	1	94	Shaft	1

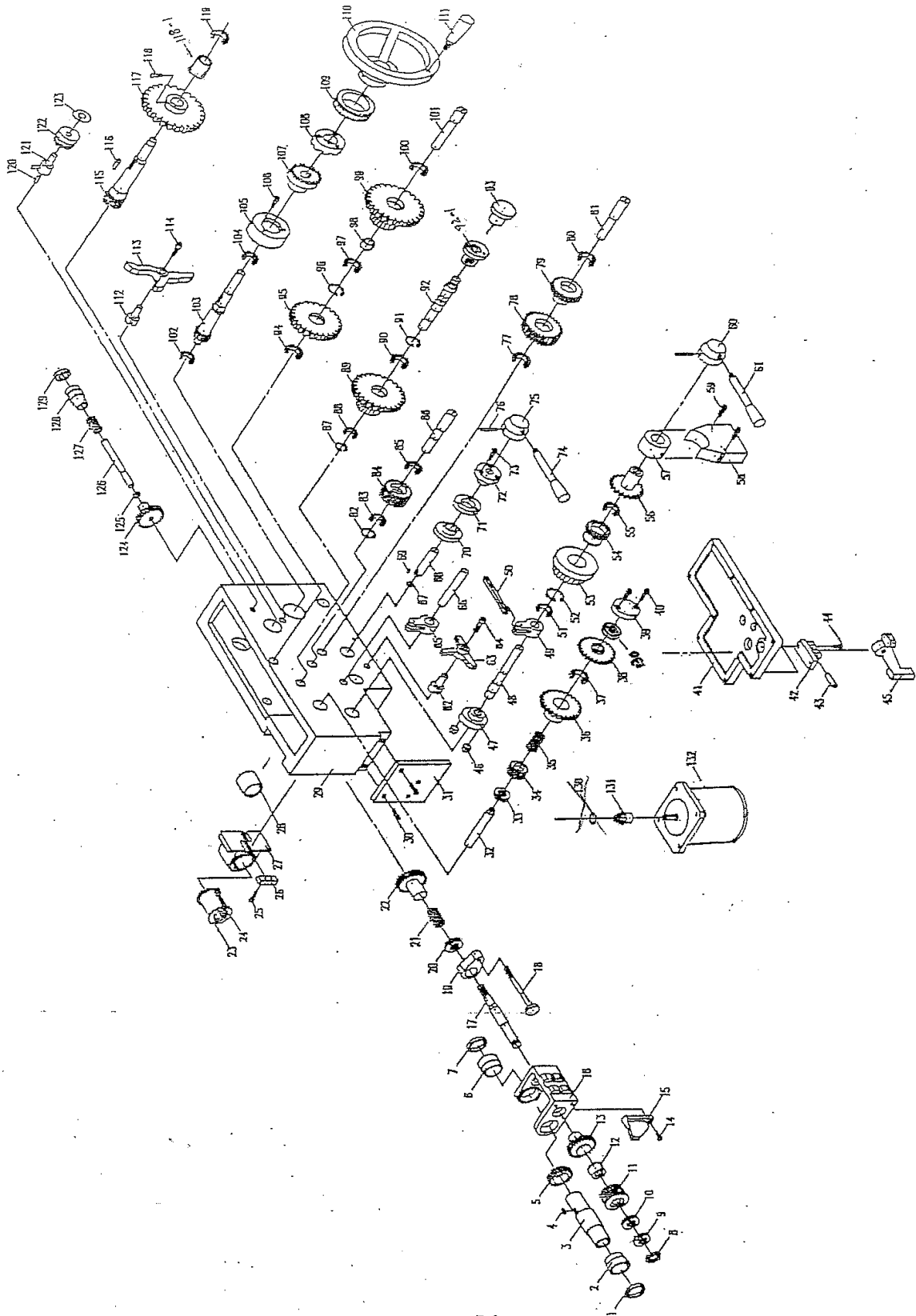
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No.	Description	Qty	No.	Description	Qty
1	Key 6x6x25L	1	43	Snap ring STW17	1
2	Gear shaft	1	44	Bearing 6003	1
3	Du Bearing DU25/25	1	45	Gear	1
4	Gear	1	46	Collar	1
5	Screw M6x15L	1	47	Shaft	1
6	Cam	1	48	Pin $\varnothing$ 3 x 8L	1
7	Bearing 6203	1	49	Sleeve	1
8	Set screw M6x12L	1	50	Bolt M6x20L	2
9	Pump rod	1	51	Regulator	1
10	Pump stand	1	52	Bracket	1
11	Snap ring P19	1	53	Sleeve	1
12	Pin $\varnothing$ 4 x 18L	1	54	Set screw M6x12L	2
13	Pin $\varnothing$ 5 x 14L	1	55	Apron casting	1
14	Shaft	1	56	Sleeve	1
15	Bushing	1	57	Cover	1
16	Bolt M8x15L	2	58	Shaft	1
17	Name plate	1	59	Swing arm	1
18	Bolt M5x12L	1	60	Nut	1
19	Bearing 6203	1	61	Bolt M5x12L	1
20	Gear shaft	1	62	Bolt M8x15L	1
21	Key 5x5x20L	1	63	Oil seal TC16307	1
22	Bearing 6203	1	64	Bearing housing	1
23	Bushing	1	65	Handle	1
24	Bolt M6x30L	3	66	Bolt M6x16L	3
25	Index ring	1	67	Hub	1
26	Handwheel	1	68	Pin $\varnothing$ 5 x40L	1
27	Bracket	1	69	Snap ring STW17	1
28	Bolt 5/16"x1"	1	70	Bearing 6203	1
29	Snap ring STW17	1	71	worm	1
30	Bearing 6003	1	72	Gear	1
31	Gear	1	73	Spring pin $\varnothing$ 4 x8L	1
32	Bearing 6003	1	74	Shaft	1
33	Shaft	1	75	Bearing 6204	1
34	Stud	1	76	Bushing	1
35	Shaft housing	1	77	Bolt M6x16L	3
36	Set screw 1/4"	1	78	Name plate	1
37	Handle	1	79	Bolt M10x30L	1
38	Bolt M6x16L	3	80	Bolt M6x16L	3
39	Name plate	1	81	Shaft	1
40	Handle	1	82	Key 6x6x20L	1
41	Bolt M8x25L	1	83	Gear	1
42	Nut M8	1	84	Bushing	2

No.	Description	Qty	No.	Description	Qty
85	Oil seal TC40528	2	124	Gear	1
86	Shaft	1	125	Snap ring S12	1
87	Bearing 51104	2	126	Shaft	1
88	Du Bearing	2	127	Spring	1
89	Worm	1	128	Shaft	1
90	Bolt M6x16L	1	129	Oil seal 13246	1
91	Swing arm	1	130	top cover	2
92	Bracket	1	131	pinion gear	1
93	Washer AN04	1	132	Rapid motor 1/4HP	1
94	Nut AN04	1			
95	Cover	1			
96	Bolt M6x16L	4			
97	Bracket	1			
98	Pin ø10x30L	1			
99	Swing arm	1			
100	Bolt M6x8L	1			
101	Pin ø5x14L	1			
102	Stud	1			
103	Oil seal	1			
104	Nut M6	1			
105	Bolt M6x20L	1			
106	Bolt M6x16L	2			
107	Pin ø5/16"x16L	2			
108	Shaft	1			
109	Bolt M6x20L	2			
110	Swing block	1			
111	Pin ø5x40L	1			
112	Handle	1			
113	Hub	1			





No.	Description	Qty	No.	Description	Qty
1	Oil seal 40528	1	43	Shaft	1
2	Bushing	1	44	Screw M6x16L	2
3	Shaft	1	45	Rack	1
4	Key 6x6x20L	1	46	Pin	1
5	Gear	1	47	Shaft	1
6	Bushing	1	48	Shaft	1
7	Oil seal 40528	3	49	Bracket	1
8	Nut AN03	1	50	Shaft	1
9	Bearing 51103	1	51	Bearing 6003	1
10	Bearing 51103	1	52	Snap ring S40	1
11	Worm	1	53	Gear	1
12	Bushing	1	54	Gear	1
13	Gear	1	55	Bearing 6003	1
14	Screw M6x16L	2	56	Gear	1
15	Rack	1	57	Cover	1
16	Bracket	1	58	Cover	1
17	Shaft	1	59	Screw M6 x 35L	2
18	Shaft	1	60	Hub	1
19	Bracket	1	61	Handle	1
20	Bearing 51103	1	62	Shaft	1
21	Spring	1	63	Bracket	1
22	Gear	1	64	Screw M12x35L	1
23	Pin $\varnothing 3 \times 8L$	4	65	Bracket	1
24	Sleeve	1	66	Shaft	1
25	Screw M6x20L	2	67	Snap ring S16	1
26	Regulator	1	68	Shaft	1
27	Bracket	1	69	Key 5x5x10L	1
28	Sleeve	1	70	Lever	1
29	Apron Box	1	71	Lever	1
30	Screw M6x16L	2	72	Cover	1
31	Cover	1	73	Screw M6x16L	3
32	Shaft	1	74	Handle	1
33	Bearing 51103	1	75	Hub	1
34	Gear	1	76	Pin	1
35	Spring	1	77	Bearing 6203	1
36	Gear	1	78	Gear	1
37	Bearing 6003	1	79	Gear	1
38	Gear	1	80	Bearing 6203	1
39	Cover	1	81	Shaft	1
40	Screw M6x16L	2	82	Snap ring S17	1
41	Cover	1	83	Bearing 6003	1
42	Bracket	1	84	Gear	1

No.	Description	Qty	No.	Description	Qty
85	Bearing 6203	1	123	Cover	1
86	Shaft	1	124	Gear	1
87	Snap ring S17	1	125	Snap ring S12	1
88	Bearing 6003	1	126	Shaft	1
89	Gear	1	127	Spring	1
90	Bearing 6003	1	128	Shaft	1
91	Snap ring S20	1	129	Oil seal 13246	1
92	Shaft	1	130	top cover	2
92-1	Bushing	1	131	pinion gear	1
93	Handle	1	132	Rapid motor 1/4HP	1
94	Bearing 6003	1			
95	Gear	1			
96	Snap ring R35	1			
97	Bearing 6003	1			
98	Washer	1			
99	Gear	1			
100	Bearing 6003	1			
101	Shaft	1			
102	Bearing 6203	1			
103	Gear shaft	1			
104	Bearing 6005	1			
105	Cover	1			
106	Screw M6x16L	3			
107	Clutch	1			
108	Clutch	1			
109	Index ring	1			
110	Handwheel	1			
111	Handle	1			
112	Shaft	1			
113	Bracket	1			
114	Screw M12x30L	1			
115	Gear shaft	1			
116	Key 8x8x30L	1			
117	Gear	1			
118	Screw M6x12L	1			
118-1	Collar				
119	Bearing 6203	1			
120	Pin	1			
121	Shaft	1			
122	Handle	1			