SHARP

PRECISION MACHINE TOOLS

HIGH SPEED PRECISION LATHE

INSTRUCTION MANUAL AND PARTS LIST

For Models : 22/ 26/ 30 CNC

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SAFETY INSTRUCTIONS
FOR
TURNING CENTERS

WARNING

Please read this manual before operation or maintaining the machine, everyone working on the machine must know how to operate it safety and correctly to avoid possible injury.

1. SAFETY INSTRUCTIONS

WARNING:

Do not install, operate, or service this machine unless:

(1) You have to read and understand the safety instructions on the pages that follow.
(2) You have to read and understand the SHARP operator's manual, especially knowing the function and locations of all machine controls and read manuals for any related accessories.
(3) You have to read and understand all safety and instruction plates attached to the machine and its related accessories.
(4) Prior to installing or servicing the machine read and understand the SHARP maintenance manual, servicing the machine must be done only by competent and trained personnel.

NOTE:
The SHARP'S operation manual and maintenance manual, each containing a copy of these safety instructions, should be keep in the vicinity of the machine so they are accessible to the operator and maintenance personel.
The following safety instructions are general recommendations for most common operations on a turning machine.
Additional safety measures may be required for your particular application, SHARP therefore, makes no warranty or representation as to the absolute correctness or sufficiency of the instructions.

1. 1 GENERAL SAFETY INSTRUCTIONS FOR OPERATING THE MACHINE
(1) The best defense against injuries on a turning machine is to be alert, never initiate a machine function unless you completely understand what the function will cause the machine to do.
(2) Never operate the machine with any cover or shield open or removed.
(3) Never reach into the work area when the spindle is turning or if the machine is in automatic mode.
(4) Put the machine in manual mode and be sure last programmed function has be completed before reaching inside of the work area

(5) The function of the machine make it impossible to eliminate all pinch points, bc particularly aware of the following pinch points:
-Spindlc and chuck rotation
-Indexing of turret and tools
-Carriage and cross slide movement
-Tailstock movement, both quill and body

(6) Never allow chips, coolant or oil remain on the floor, do not leave loose object on or around machine.

(7) Clothing:
*Know the correct way to wear protective devices.
*Wear safety glasses with eye shields all times.
*Never use a compressed air hose to remove chips from a machine
*Do not wear rings, watches, tie or loose sleeve clothing.
*Gloves are easily caught in moving parts, take them off before turning machine .
*Always wear safety shoes with steel toes and oil resistance soles.
*Never remove protection for even a short time when operating the machine.
If operator has long hair, hair should always be tucked under a cap or tied back and up, beware of loose hair near the rotating parts of lathe.

(8) Turning machines are designed to be ran by one person, persons other than the designed operator should stay out of the machine area during operation.

(9) Take care not to bump or accidentally touch any machine control.

(10) Do not paint, alter, deface or remove any warning plates from the machine, replacement plates are available from SHARP

(11) Do not operate machine while talking.

(12) Never operate the machine after taking strong medication, using non-prescription drugs or consuming alcoholic beverages. Persons with illnesses which might cause dizziness or fainting should never operate this machine.

(13) The electric components arc protected from normal moisture resulting from humidity use of water base solubles as coolant, etc., DO NOT use water clean the machine or the are around it.

(14) Never touch a machine control device or electrical component when your hand is wet.

(I5) Keep flammable liquids and materials away from the work area and hot chips.

(16) Never clean up clips while the machine is running or is in automatic mode.

(17) Do not file work pieces being rotated under power.

(18) At the end of work day, the machine should be placed in either "CONTROL OFF" or "POWER OFF" modes.

(19) When restarting machine after it has been shut down always, assume it has been tampered with, recheck all phases of the job as though you were running the first piece.

(20) Never touch spindle start or spindle job control until hands, feet body are well clear of the work area.

(21) Do not stand on any parts of machine while coolant and oil make surface on the machine slippery which present electrical hazard under machine has power on.

(22) Never extend an unsupported bar out of the rear of the spindle or hydraulic cylinder a distance from a concentric support more than 10 times its diameter. Doing so can cause the bar to bend or break. When any bar is extended a large sign should be placed to warn people to stay away from the area.

(23) If you work turning machine with bar feeder together, please keep away from the exit end of the bar feeder when the machine is running.

1.2 SAFETY INSTRUCTIONS FOR WORKHOLDING:

(1) Never running machine until your workpiece was held 100% sure.

(2) A chuck is the most common workholding device used on this machine, some of the factors which affect the holding ability of a chuck are:

*Clamping force of jaws

*Rotational speed of the spindle

*Type of jaw surface (serrated, smooth,etc.,)

*Area of chuck jaws in contact with the workpiece

* Type of chuck

*Configuration of the workpiece ...shape, weight and balance

*Jaw weight and location

(3) Before running machine, make sure the workpiece is gripping internally or internally, since low chuck pressure will diminish jaw gripping force which may allow the workpiece to come out of the jaws. Excessive pressure can damage a power chuck which could cause a loss of jaw force. The gripping force of a power chuck can be ordiminished as much as 50% because of lack of lubrication or lack of periodic cleaning, components of the chuck are subject to wear and damage which also can lessen gripping power. Need support workpiece by steady rest or tailstock center while workpiece length over 200mm.

A. Grease the chuck at the beginning of every shift, use only the chuck manufacturer's recommended lubricant.

B. A weekly examination of the condition of the chuck, this examination should include the measurement of jaw clamping force with a jaw force gage to insure that chuck is functioning as it should.

C. With reference to manufacturer's manual for chuck and cylinder to any other maintenance requirements. As the spindle r.p.m. increase the gripping force of the jaw decreases, various types of top jaws are used on chucks for different applications, the best workholding conditions that need use serrated contact surfaces on work gripping surfaces and use the maximum area of contact between the jaws and the workpiece, improper use cause injury.

(4) If chuck or accessory was not supplied by SHARP with machine together, verify the safe operating speed by their manufacturer.
(5) Always be sure the chuck or acccssory is located correctly on the spindle nose and it is securely bolted to the face of spindle.
(6) Be sure any item bolted or clamped to a chuck or fixture is securely fastened before starting the spindle.
(7) The spindle speed could not be high speed during the workpiece too long.
(8) Always be aware that closing chuck jaws can trap fingers or hands.
(9) The same safety instructions apply to power chucks and manual operated chucks, the following additional precautions for manual chuck when you use it.

A. Always use spring-loaded, self-ejecting type safety wrenches.
B. Never put an extension bar on chuck wrench or hit it hammer.
C. Centrifugal force can cause the scroll to unwind if the chuck is empty. the jaws may come out of the chuck while the spindle is turning.

(10) If a workpiece is extend from the chuck, the distance of 3 to 4 times it diameter, without being supported by the tailstock, poor cutting conditions will normally occur, check load capacity of revolving centres for application in hand.

1.3 MAINTENANCE SAFETY INSTRUCTIONS,

(1) WARNING:Only authorized electricians can install or modify any electrical component failure. Disconnect main power and lock in "OFF" position beforeattempting any repair, tag disconnect switch "DO NOT START".
(2) Read and understand safety instructions before servicing this machine.
(3) Know all points were voltages are present on this machine and in electrical boxes.
(4) Residual voltages can exist in the electrical cabinets for a period of time after power has been turned off. Check any component inside cabinet by meter before touching.

1.4 INSTALLATION SAFETY INSTRUCTIONS:

(1) Verify machine weight and make sure lifting equipment, cables, etc., are sufficient capacity, refer to follow SHARP'S maintenance manual to lift and move machine.
(2) SHARP machine has transformer tapes for various voltages and power cycles, if machine subsequently moved by user, the transformer taps must be checked and be sure which are wired correctly for new location.

(3) A copper (5/8" minimum diameter) rod must be sunk through foundation into the earth at the machine, length should be sufficient to provide less than 80 ohms resistance between the end of the rod and earth ground, a large copper wire must directly connect this earth ground to the ground connection provided on the machine.

1.5 INSTALLATION PRECAUTIONS

To ensure the safe operation of the NC machine, note the following during installation:

1.5.1 Wiring

(1) Be sure to use electrical conductors with performance ratings equivalent or superior to those described in the maintenance manual.

(2) Do not connect to the power distribution panel any power cables for devices which can cause line noise, such as are welders and high frequency quenching machines.

(3) Arrange for qualified engineer to connect the power lines.

1.5.2 Grounding

Use a grounding wire with a cross section of more than 14mm^2, for protective earth conditions, please follow the law of each country.

This wire size should be greater than AWG (American Wire Gauge) No.5 and SWG (British Legal Standard Wire Gauge) No.6

Generally, the NC machine should be grounded to a separate grounding rod, if an independent ground can not be provided for the machine, prepare the ground connection as follows:

(1)Connect a single conductor to its own grounding terminal, this will avoid possible serious accidents resulting from ground currents which might otherwise flow in the NC machine if a peripheral device should malfunction.

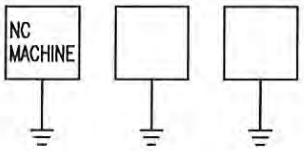
(2)Be careful when using concrete reinforcing rods as grounding points, these reinforcing rods often are used to ground equipment because they usually offer a resistance to ground of less than 100 ohms, in doing so, makes the connection as following:
This also applies to connecting ground wires to regular grounding terminals.

a. Do not use the same grounding reinforcing rod or grounding terminal for the devices since this could lead to line noise such as produced electric welders and high frequency quenching machines.

b. Use a grounding terminal with an adequate electrical performance rating and which is durable.

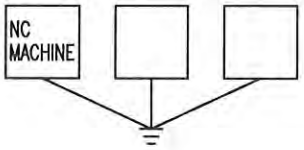
(3) A separate grounding wire should be used, one whose length is as short as possible.
(4) Check the resistance to ground by actual measurement. This should measure less than 100 ohms if the single device is connect to its own grounding rod.

DESIRABLE INDEPENDENT GROUNDING:



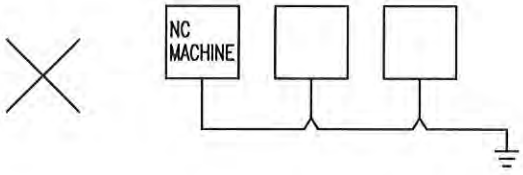
Earth resistance:
Less than 100 ohms

COMMON GROUNDS:



Resistance to ground=100/
the number of devices
connected to the ground (Ω)

NEVER GROUND EQUIPMENT AS SHOWN IN THE FOLLOWING FIGURE:



1.5.3 Environmental Conditions

Generally, the machine will be installed on the following conditions, however these may change over a period of time or in response to reason changes.

(1) Supply voltage :90% to 110% of supply voltage

(2) Source frequency :±2 HZ frequency

(3) Ambient temperature :0°C to 45°C (32°F to 113°F)

(4) Relative humidity :Less than 80%
Temperature changes should not cause condensation.

(5) Atmosphere : Free from excessive dust, acid fumes corrosive gase and salt.

(6) It should be avoided to expose the machine to direct sunlight or heat rays which can change the environmental temperature.

(7) Avoid exposing the NC machine to abnormal vibration, if it is different to observe meet these conditions contact us immediately.

1.6 SAFETY PRECAUTIONS

The operator should not rely solely the safety devices, operator must understand special precautions as following before operate machine.

1.6.1 Basic Operating Practices

DANGER:

(1) Some control panels, transformers, motors, junction boxes and other parts have high voltage terminals, these should not be touched or a severe electric shock will be sustained.

(2) Do not touch switch by wet hands.

WARNING:

(1) The emergency stop push button switch location should be well know and it can be operated at any time without having to look for it.

(2) After switch off machine one minute, the replacing fuse.

(3) Provide sufficient working space to avoid hazardous falls.

(4) Keep the machine and work area neat, clean and orderly.

(5) Before operating switches, always check that they are the right ones.

(6) Never touch a switch accidentally.

(7) Never lay anything on the working surface of the machine, where it may foul with rotating or moving parts.

(8) If job to be done by two or more persons, coordinating signals should be given at each step of the operation, unless a signal is given and acknowledges, the next step should not be taken.

CAUTION:

(1) When power failure, turn off the main circuit breaker immediately.

(2) Dispose of oils CORRECTLY.

(3) Replacement fuses should have the proper current ratings.

(4) Protect the NC unit, operating panel, electric control panel, etc., from shocks, since this could cause a failure or malfunction.

(5) Do not change parameters, values and other electrical settings, if change are un-avoidable, record the values prior that they can be returned to their original settings if necessary.

(6) Do not soil, scratch or remove the caution plate, should it become illegible or be missing, order another caution plate from the supplier shown on machine and suitable place.

1.6.2 Before Switching On:

DANGER:

When cables, cords or electric wire whose insulation is damaged that will cause current leaking and electric shocks, check above before switch on,

WARNING:

(1) Be sure the instruction manual and the programming manual are fully understood, every function and operating procedure should completely clear.

(2) Do not wear oil soaked or contaminated clothing, always wear safety shoes, safety goggles with side covers, safety clothes and other safety protection correctly.

(3) Close all NC unit, operating panel and electric control panel doors and cover.

CAUTION:

(1) The power cable from the factory feeder switch to the machine main circuit breaker should have a sufficient sectional area to handle the electric power used.

(2) Cables which must be laid on the floor must be protected against chips so that short circuits will not occur.

(3) Before first operating the machine after un-packing or keeping the machine idle for a long period (several or more), each sliding parts must be freshly lubricated, keep lubricating oil pump working until oil oozes out from wiper.
(4) Oil reservoirs should be filled to indicated levels, check and add oil, if necessary.
(5) For lubricating points, oil brands and appropriate levels, see the various instruction plates.
(6) Switches And levers should operate smoothly.
(7) When switching machine on, put the factory feeder switch, the machine main circuit breaker and the power switch on the operating panel to the "ON" position in the order.
(8) Check the coolant level, and add coolant, if necessary.

1.6.3 After Control Power Switch Has Been Turned On

CAUTION:

When the power switch on, the operating panel is "ON" position as described is 7 above, the READY lamp should be also be check.

1.6.4 Routine Inspections

WARNING:

When checking belt tensions, keep your fingers away between belt and pulley.

CAUTION:

(1) Check pressure gages for proper readings.
(2) Check motors, headstock and other parts for abnormal noises.
(3) Check the motor lubrication and sliding parts for evidence of proper lubrication.
(4) Check safety covers and safety devices for proper operation.
(5) Check belt tensions, replace any set of belts that has become stretched with a fresh matching set.

1.6.5 Warm Up

CAUTION:

(1) Warm up the machine, especially the spindle and feed shaft by running for 10 to 20 minutes at about half or one third the maximum speed in the automatic operation mode.

(2) This automatic operation program should cause each machine component operate, at the same time, check their operations.

(3) Be particularly careful to warm up the spindle which over maximum speed running.

If the machine is used for actual machining immediately after being started; following a long idle period, sliding parts may be worn due to lack of oil, thermal expansion of the machine components can jeopardize machining accuracy to avoid above condition, always warm machine up.

1.6.6 Preparations

WARNING:

(1) Tooling should conform to the machine specifications, dimensions and types.

(2) Seriously worn tools can cause injuries, replace all such tools with new ones beforehand.

(3) The work area should be adequately lighted to facilitate safety checks.

(4) Tools and other items around machine or equipment should be stored to ensure good footing and clear aisles.

(5) Tools or any items must not be place on the headstock, turret, cover and similar places.

(6) If the center holes of heavy cylindrical workpiece are too small, the workpieces will jump out when loaded, be careful the center holes and angles.

CAUTION:

(1) Too lengths should be within specified tolerances to prevent interference.

(2) Make trail running after installed tool .

1.6.7 Operation

WARNING:

(1) Do not work with long hair that can be caught by machine.

(2) Do not operate switches with gloves on that could cause malfunctions, etc.

(3) Whenever a heavy workpiece must be moved, two or more persons should always work together of there is any risk involved.

(4) Only trained, qualified workers should operate forklift trucks.
(5) Whenever operating a forklift truck, special care should be taken to prevent collisions and damage any surroundings.
(6) Wire ropes or slings should be strong enough to load and lifting should conform to the mandatory previsions.
(7) Grip workpieces securely.
(8) Stop machine before adjusting the coolant nozzle at the tip.
(9) Never touch a turning workpiece, spindle by hands or by any other way.
(10) While a workpiece is turning, do not wipe it off or remove chips by cloth or hand, always stop machine first and then use a brush and sweeper.
(11) Keep all guards and cover plates in place and all machine cabinet doors closed.
(12) Stop the machine whenever installing or removing a tool.
(13) Whenever machining magnesium alloy parts, wear a protective mask.

CAUTION:

(1) During automatic operation, never open the machine door.
(2) When performing heavy duty machining, carefully prevent chips from being accumulate since hot chips can catch fire.

1.6.8 To Interrupt Machining

WARNING:

When leaving the machine temporarily after completing a job, turn off the power switch on the operation panel and the main circuit breaker.

1.6.9 Completing A Job

CAUTION:

(1) Always clean the machine or equipment, remove and dispose of chips and clean cover windows, etc.,
(2) Do not clean the machine or equipment before it had stopped.
(3) Return each machine component to its initial condition.
(4) Check wipers does any breakage, replace broken wipers.
(5) Check coolant, hydraulic oil and lubricant does any contaminate.
(6) Check coolant, hydraulic oil and lubricant levels, add, if necessary.
(7) Clean the oil pan filter.
(8) Before leaving the machine at the end of the shift, turn off the power switch on the operating panel, machine main circuit breaker and factory feeder switch in that order.

1.6.10 Safety Devices

(1) Front cover, rear cover and coolant cover.
(2) Over travel limit switches.
(3) Chuck barrier, tail barrier and tool barrier (NC software).
(4) Stored stroke limit (NC software).
(5) Emergency stop push button switch.

1.6.11 Maintenance Operation Preparations

(1) Do not proceed any maintenance operation unless instructed to do by specialist.
(2) Replacement parts, consumables (packing, oil seals, o-rings, bearing, oil and grease etc.,) should be arranged in advance.
(3) Prepare to record preventive and corrective maintenance operations.

CAUTION:

(1) Thoroughly read and understand the safety precautions from the instruction manual.
(2) Thoroughly read the whole maintenance manual and fully understand the principles, construction and precautions involved.

1.6.12 Maintenance Operation

DANGER:

(1) During maintenance working should not operate the main circuit breaker or the control power ON switch on the operating panel. for this purpose. "Do not touch the switch during maintenance operating in progress".or similar wording should be indicated on such switches and at any other appropriates locations, such indication should be secured by a semi-premanent means in the reading direction.
(2) With the machine turned on, any maintenance operation can be dangerous, in principle, the main circuit breaker should be turned off throughout the operation.

WARNING:

(1) The electrical maintenance should be done by a qualified person or by others competent person, keep close contact with the responsible person, do not decide byyour-selves.
(2) Overtravel limit and proximity switches and interlock mechanism including functional parts should not be removed or modified.
(3) When maintenance should be use steps or ladders, the safety is very important.
(4) Fuses, cables, etc., made by qualified manufacturers should be employed.

1.6.13 Until Operation Is Begun After Maintenance

WARNING:

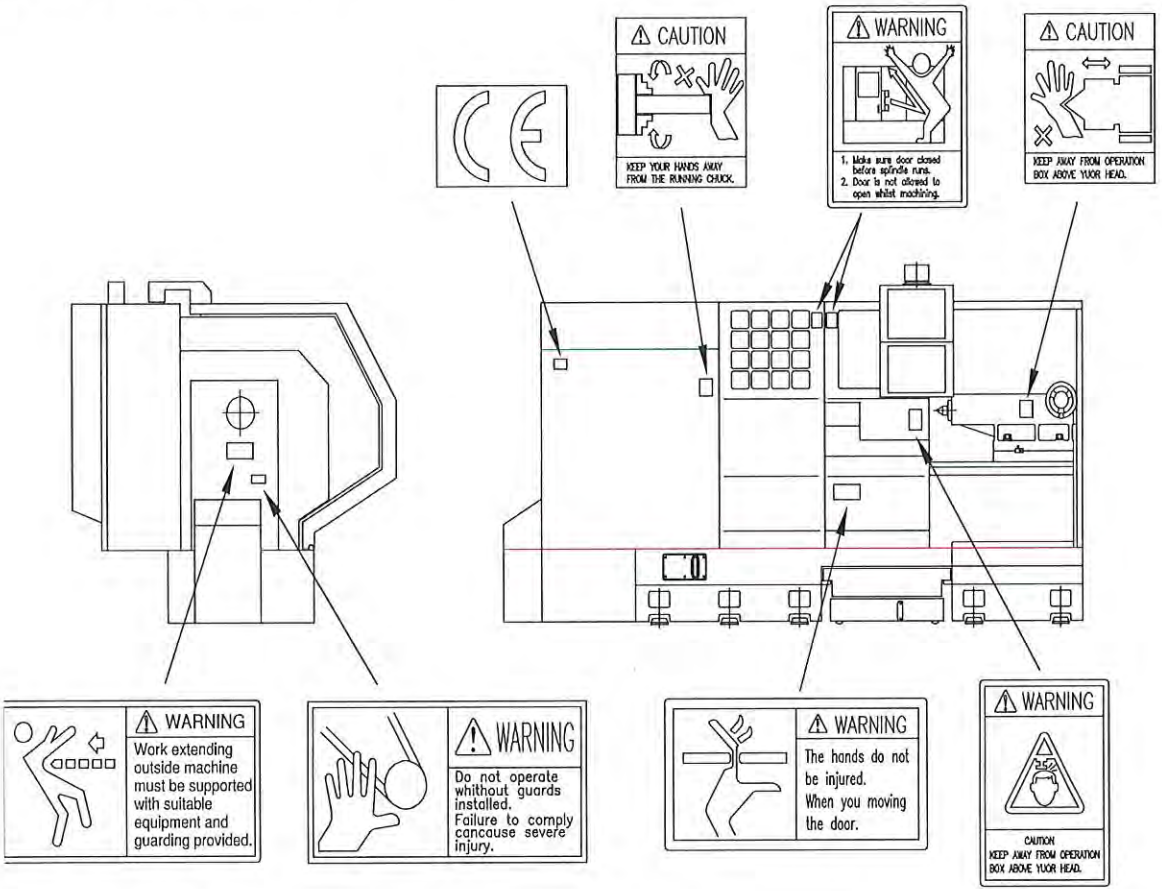
All parts and waste oil should be removed by the operator and placed far enough away from the machine to be safe.

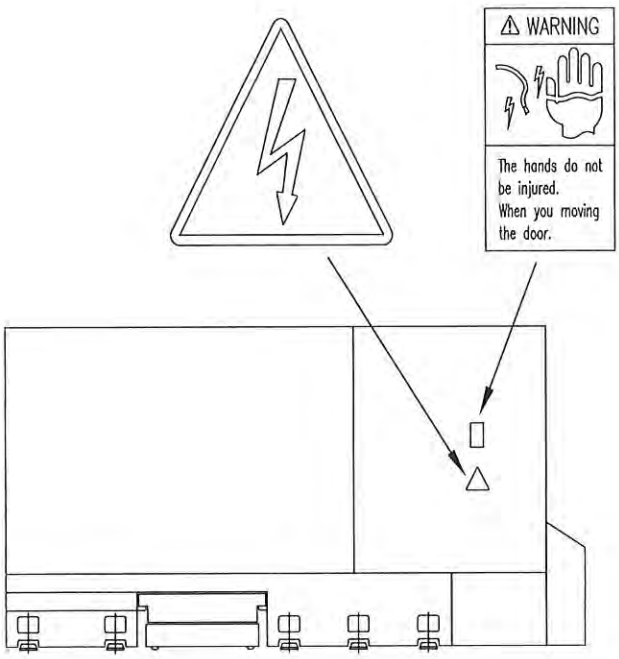
CAUTION:

(1) The maintenance person should check that the machine operates safely.
(2) Maintenance and inspection data should be recorded and kept for reference.

1.7 WARNING SIGNS PLATE ON THE MACHINE

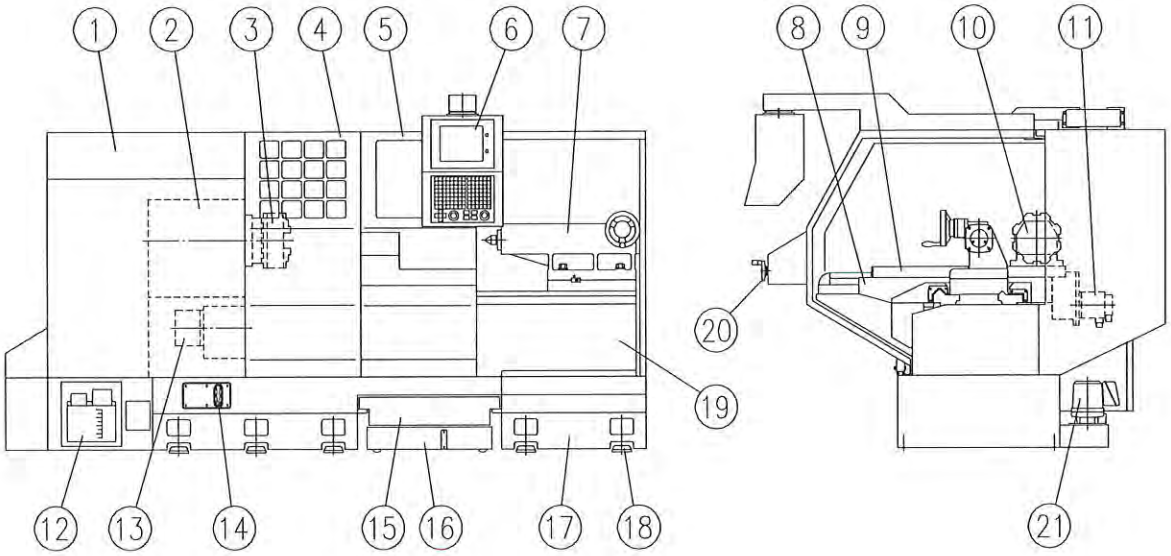
Safety related informatino, with must be strictly ovserved by all machine operators, is given on warning signs plate, these warning signs plate are attached to the machine.





2. SPECIFICATION

2.1 GENERAL LAYOUT OF LATHE



1.Electrical control box

2.Headstock

3.Chuck

4.Left moving door

5.Right moving door

6.Operation panel

7.Tailstock

8.Carriage

9.Cross slide

10.Tool turret

11.X-Axis servo motor

12. Lubrication unit

13. Z-Axis servo motor

14.Oil gauge

15.Chip tray

16.Coolant tank

17.Base

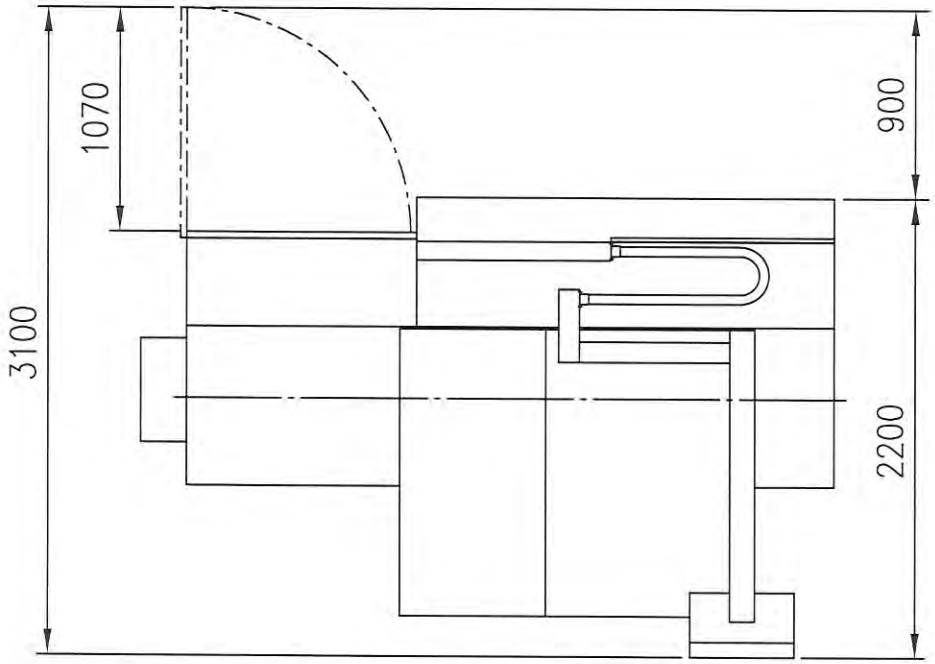
18.Installation block

19.Bed

20.2Electrical handwheels for X,Z axis manual operation

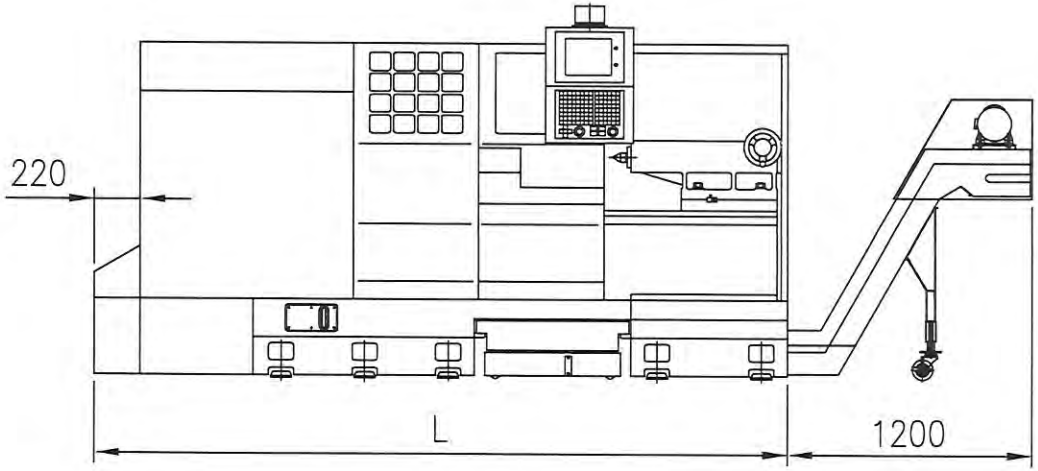
21.Coolant pump

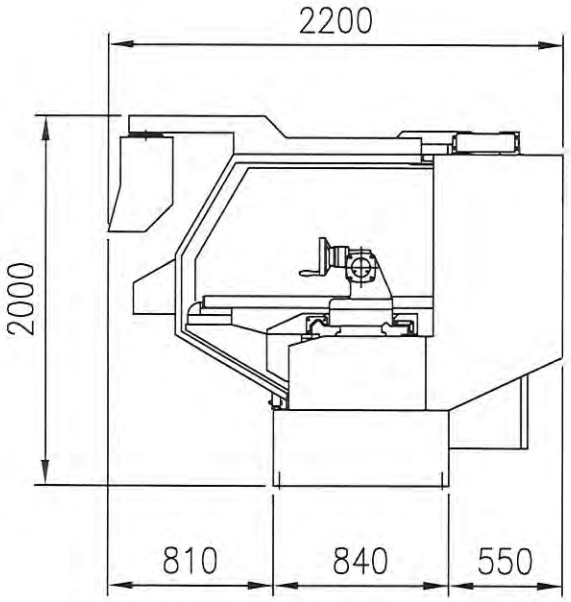
2.2 DIMENSIONAL DRAWING



MODEL / ITEM	2260 2660 3060	2280 2680 3080	22120 26120 30120	22160 26160 30160
L	3820	4320	5320	6320

Unit : mm





2.3. MACHINE SPECIFICATION

Swing over bed .....560mm (22"), 660mm (26") ,760mm (30")

Swing over cross slide ....280mm (11"), 380mm (15") , 480mm (19")

Swing in gap diameter (Optional)...760mm (30"), 860mm (33-3/4") , 960mm (37-3/4")

Length of gap in spindle nose (Opt)420mm (16-1/2 ")

Center height .....280mm (11"),330mm(13"), 380mm (15")

Center admits between .....1500mm (59"), 2000mm (78-3/4") ,
3000mm (118"), 4000mm (157-1/2")

Bed width .....460mm (18")

Bed lenght .....3000mm (118"), 3500mm (137-3/4"),
4500mm (177"), 5500mm (216-1/2")

Bed lenght .....400mm (15-3/4")

Motor for main spindle .....15 HP For spindle bore 86mm (20HP,Optional)
20HP For spindle bore 105mm
25 HP For 30CNC

Motor for main pump 1/4HP

The headstock noise level under 85db before machine delivered from manufacturer

MODEL 22A/26A	22B/26B	22C/26C	22D/26D	30	30A
Spindle speed.....15-1500	20-2000	12-1200	16-1600	10-1000	6-600
Spindle nose no..D1-8	A2-8	D1-11	A2-11	A2-11	A2-15
Spindle bearing..Taper roller type	Cylindrical rolle	Taper roller	Cylindrical rolle	Taper roller	Taper roller

Spindle taper in nose/sleeve.....MT#6

Spindle bore .....86mm(3-3/8")	105mm(4-1/4")	170mm(6-5/8")	255mm(10")

Longitudinal travel (Z-axis) 1400mm, 1900mm, 2900mm, 3900mm
(taper roller bearing spindle)
1320mm,1820mm,2820mm, 3820mm,
(cylindrical roller bearing spindle)

Cross slide travel (X-axis) .....310mm(12-1/5")for swing 22"
360mm (14") for swing 26"
410mm(16-1/8")for swing 30"

Cross slide dimension..... .....1000mm(39-3/8")X258mm(10-1/8")

Tailstock Quill diameter .....90mm (3-1/2") / 125mm (4-29/32") (option for 30CNC)

Quill travel..... .....200mm (7-7/8")

Quill taper.....MT#5 / MT#6 (option for 30CNC)

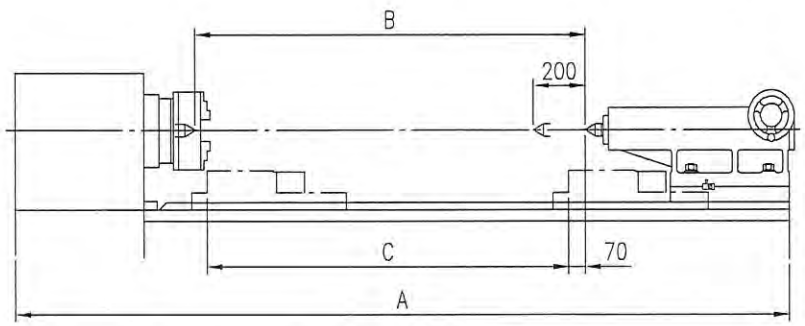
Ballscrew diameter X-axis.... .....32mm(3-1/2")
Z-axis.....50mm(2")
Servo motor for X-axis.....AC1.5KW
Z-axis.....AC2.0KW
Rapid traverse X-axis .....10m/min.
Z-axis.....10m/min.

Machine dimension L..... 4200mm(165-3/8"), 4700mm(185"),
5700mm(224-1/2"), 6700mm(263-3/4")
W.....2200mm(86-5/8")
H.....2000mm(78-3/4")
Machine packing dimension (LxWxH).176"x90"x85", 195"x90"x85",
235"x90"x85", 274"x90"x85"
Machine net weight..... 4200Kg, 4600Kg, 5200Kg, 5800Kg
Machine gross weight..... 5000Kg, 5400Kg, 6000Kg, 6600Kg

Chuck using:
*The maximum 10"-3-jaw universal chuck for spindle nose D1-8
*The maximum 12"-3-jaw universal chuck for spindle nose D1-8
*The maximum 15"-3-jaw universal chuck for spindle nose D1-11,A2-11
*The maximum 16"-3-jaw universal chuck for spindle nose D1-11,A2-11
*The maximum 16"-4-jaw universal chuck for spindle nose D1-8
(The high speed range under 300 r.p.m.)
*The maximum 18"-4-jaw universal chuck for spindle nose D1-8
(The high speed range under 300 r.p.m.)
*The maximum 22"-4-jaw universal chuck for spindle nose D1-11,A2-11
(The high speed range under 200 r.p.m.)
*The maximum 24"-4-jaw universal chuck for spindle nose D1-11,A2-11
(The high speed range under 200 r.p.m.)

22/26/30CNC Distance between centers and Z-axis travel

(A). Taper roller type spindle bearing



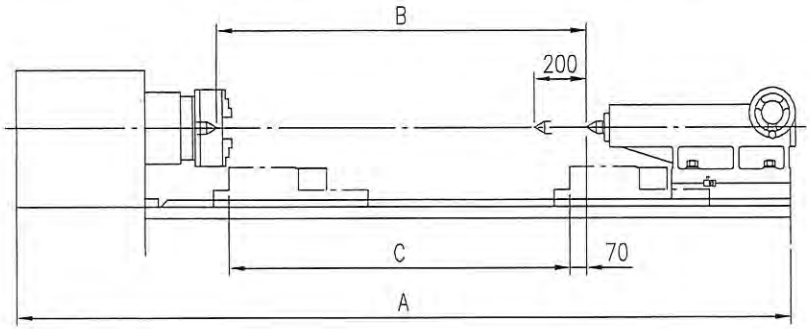
Unit : mm

MODEL / ITEM	2260 2660 3060	2280 2680 3080	22120 26120 30120	22160 26160 30160
A	3000	3500	4500	5500
B	1500	2000	3000	4000
C	1400	1900	2900	3900

(*) Z-axis travel "C",

"C" Dimension be changed according to what kind of chuck or turret be installed.

(B). Cylindrical type spindle bearing



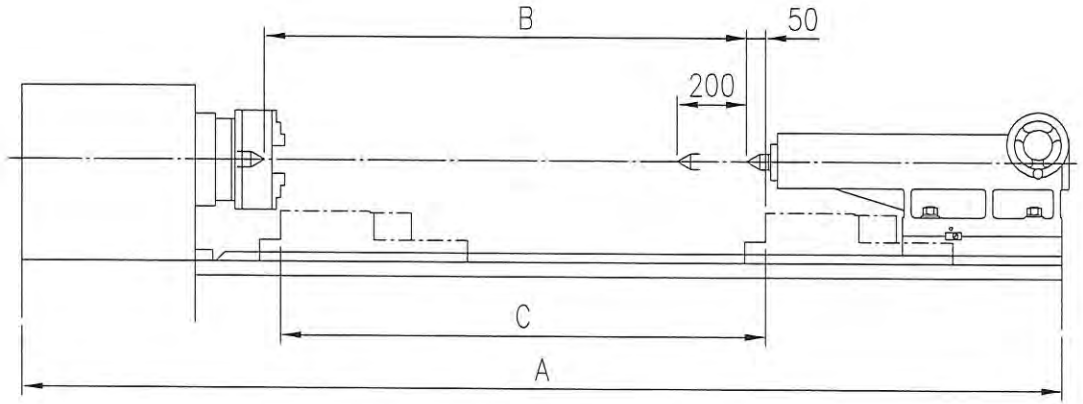
Unit : mm

MODEL / ITEM	2260 2660 3060	2280 2680 3080	22120 26120 30120	22160 26160 30160
A	3000	3500	4500	5500
B	1420	1920	2920	3920
C	1320	1820	2820	3820

(*) Z-axis travel "C",

"C" Dimension be changed according to what kind of chuck or turret be installed.

30CNC Distance between centers and Z-axis travel



MODEL / ITEM	3060	3080	30120	30160
A	3000	3500	4500	5500
B	1400	1900	2900	3900
C	1400	1900	2900	3900

Unit : mm

(*) Z-axis travel "C",

"C" Dimension be changed according to what kind of chuck or turret be installed.

22CNC Working area drawing

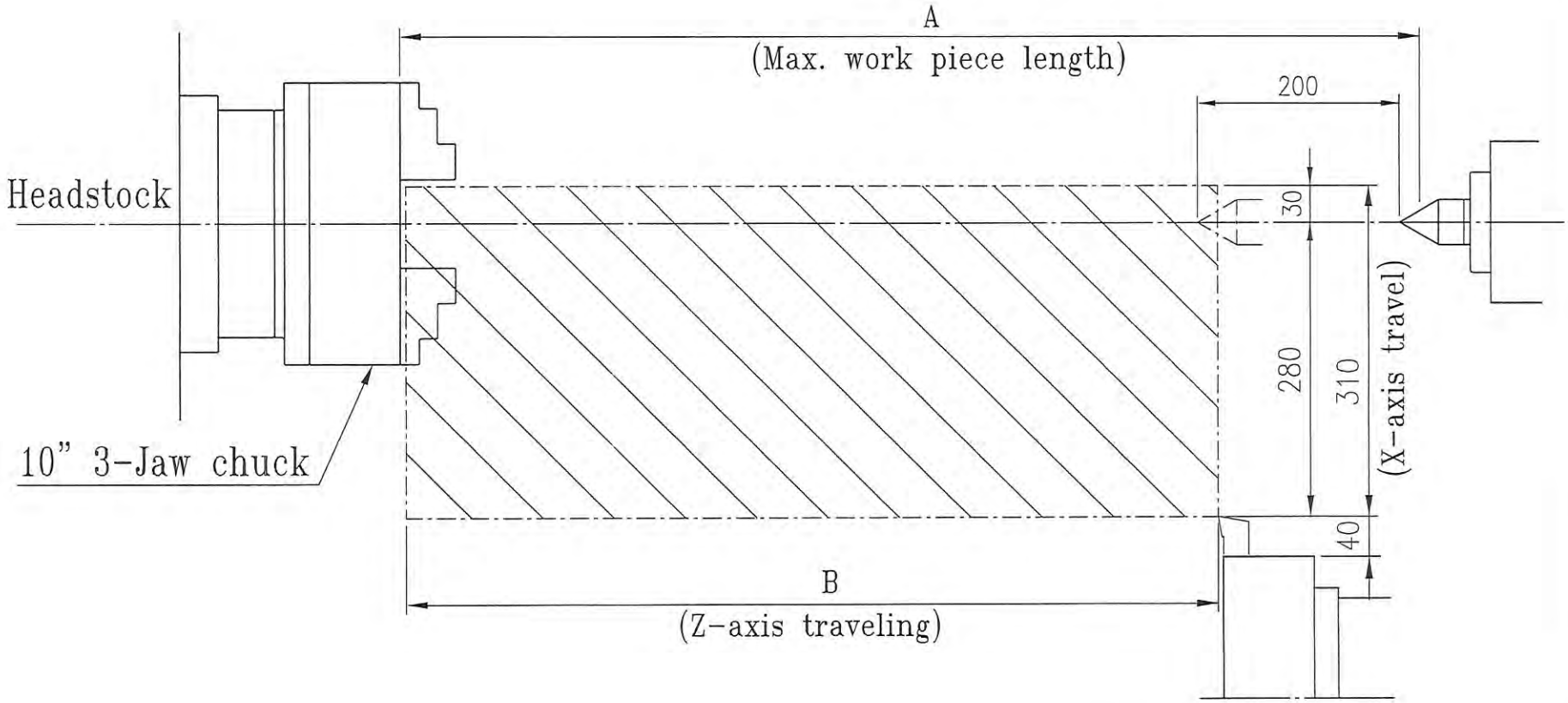
Hydraulic 8 Position Turret (12Pos./0pt.)

Taper roller type spindle bearing

MODEL / ITEM	2260	2280	22120	22160
A	1480	1980	2980	3980
B	1280	1780	2780	3780

Unit : mm

(*) "A" and "B" dimension are changed according to different size of chuck.



22CNC Working area drawing

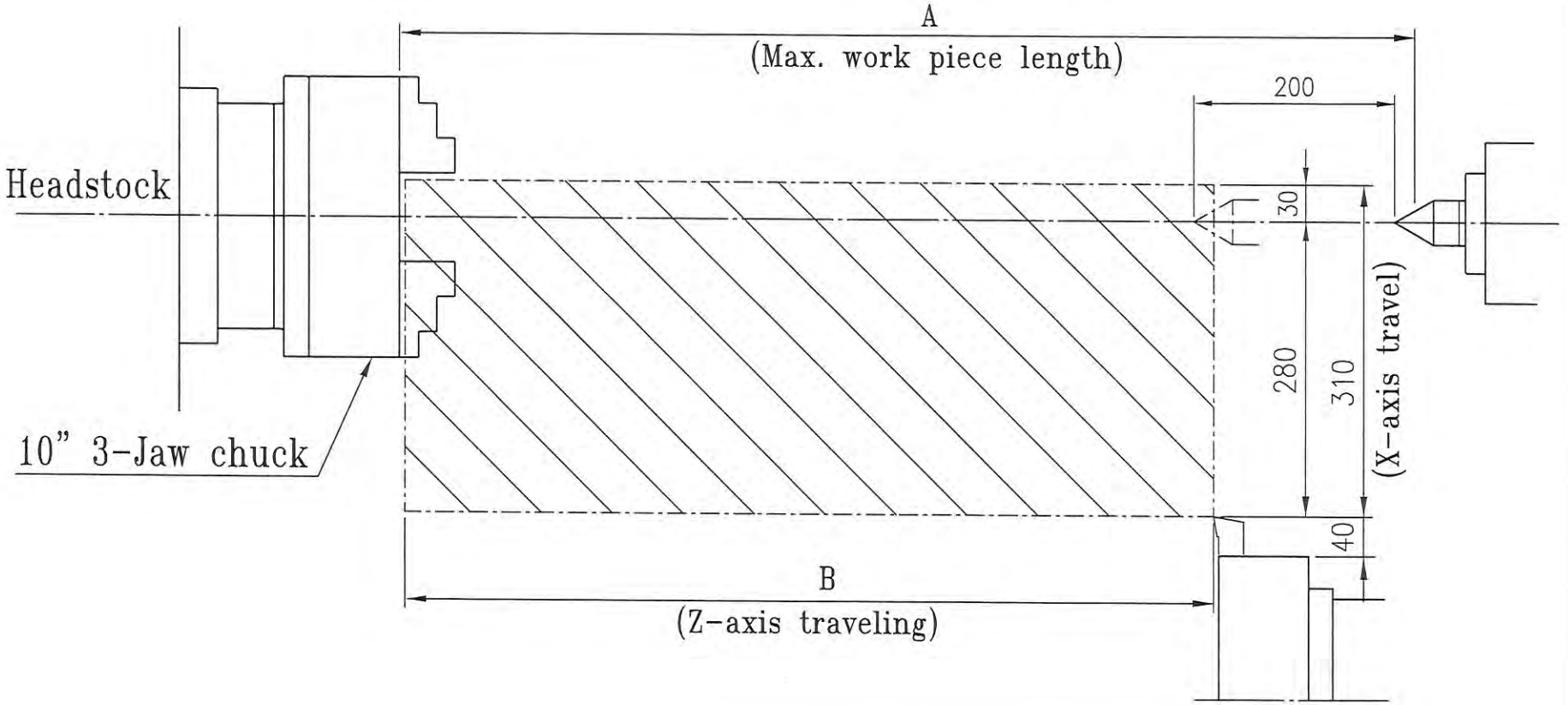
Hydraulic 8 Position Turret (12Pos./0pt.)

Cylindrical type spindle bearing

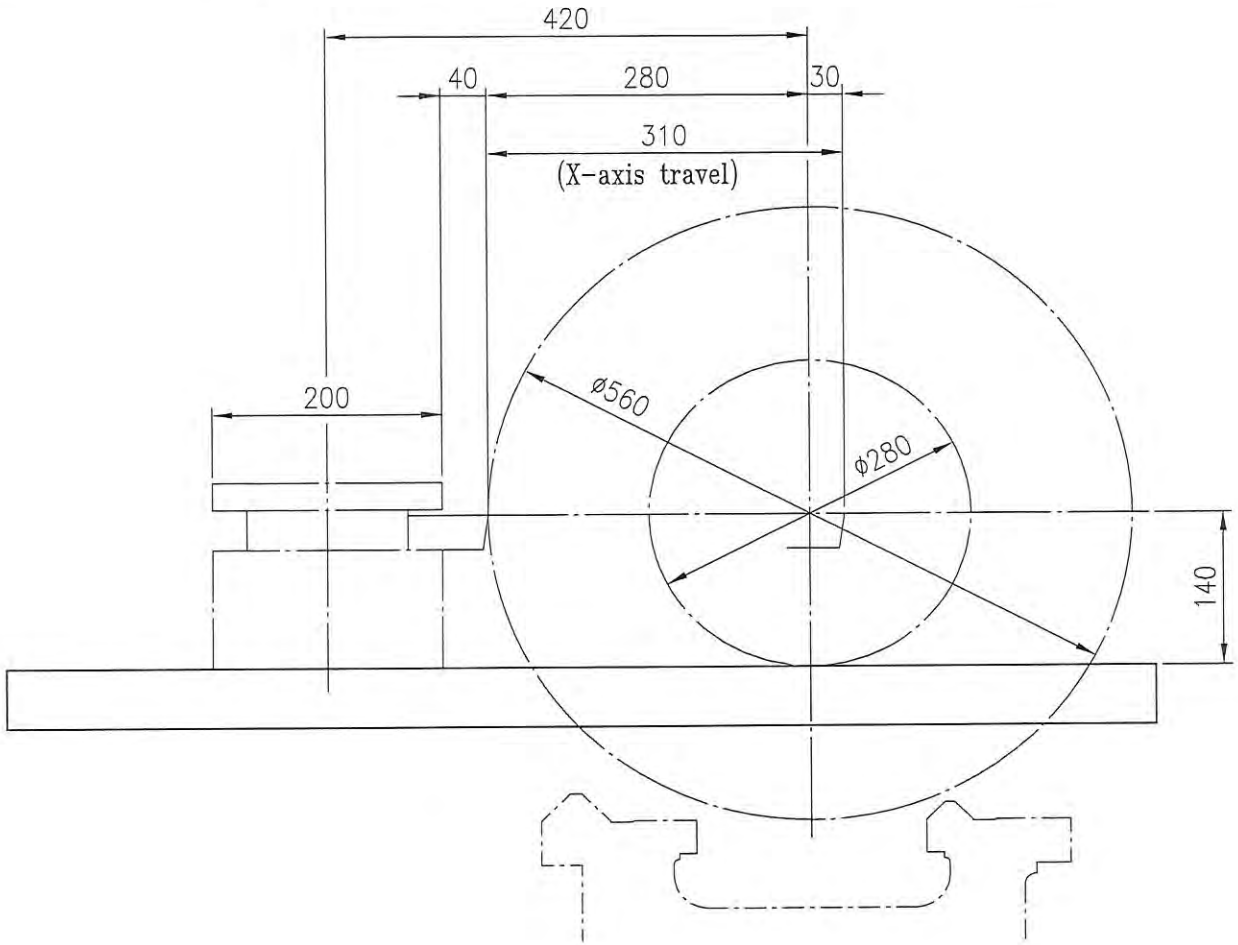
MODEL / ITEM	2260	2280	22120	22160
A	1400	1900	2900	3900
B	1200	1700	2700	3700

Unit : mm

(*) "A" and "B" dimension are changed according to different size of chuck.

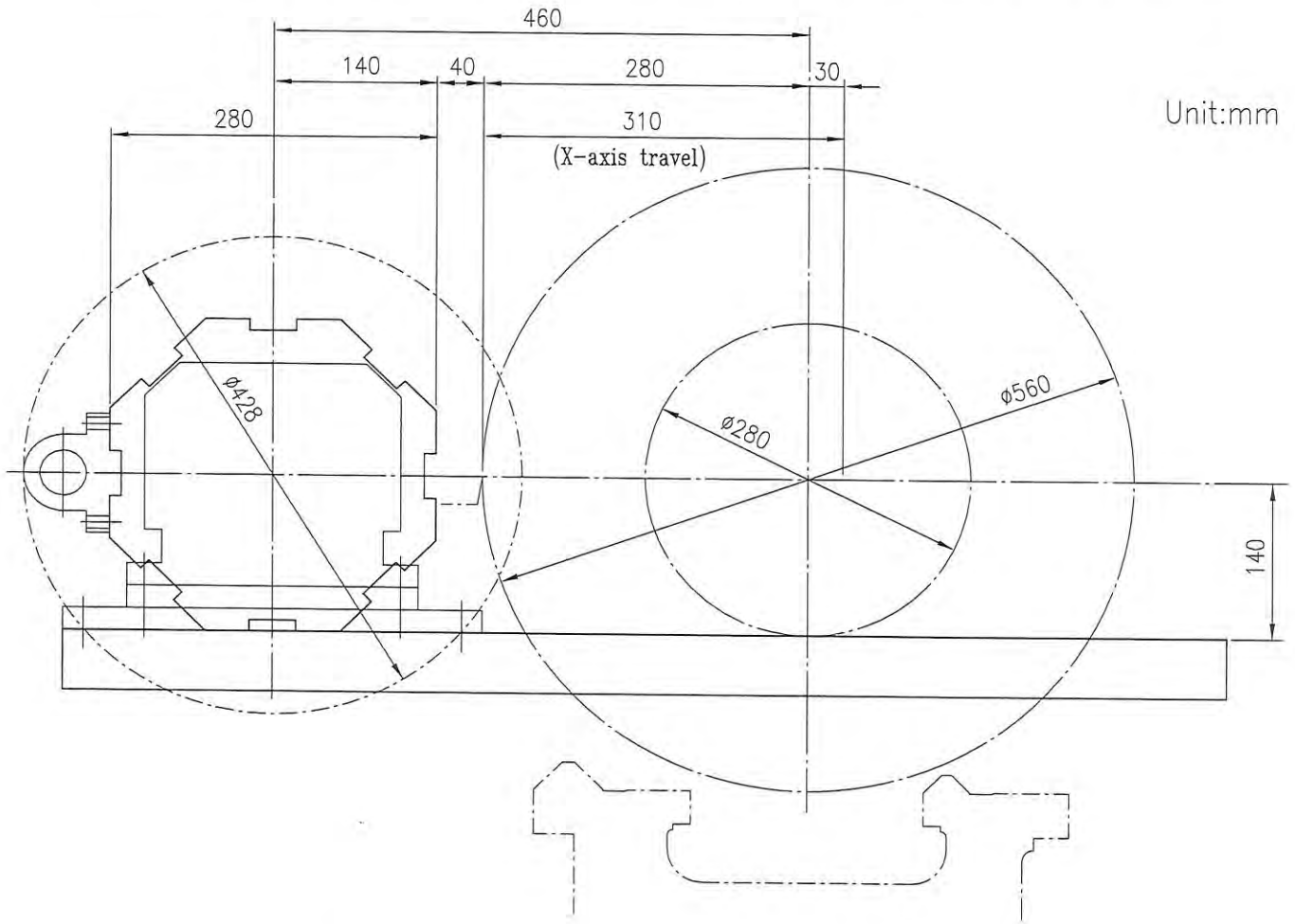


22CNC Swing Capacity (Be Installed Automatic 4-Way Tool Post)

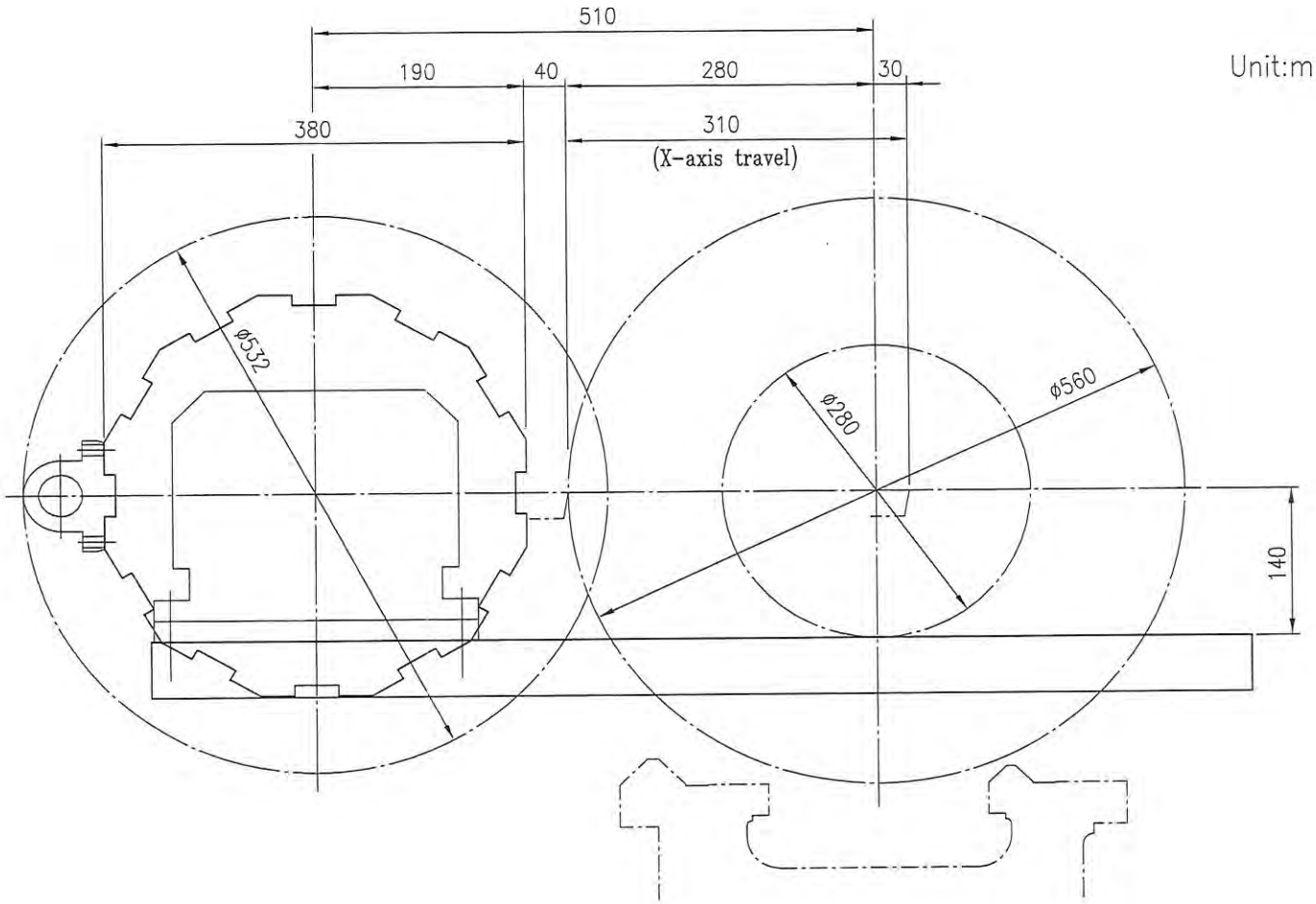


Unit:mm

22CNC Swing Capacity (Be Installed Hydraulic 8 Position 280mm Turret)



22CNC Swing Capacity (Be Installed Hydraulic 12 Position 380mm Turret)



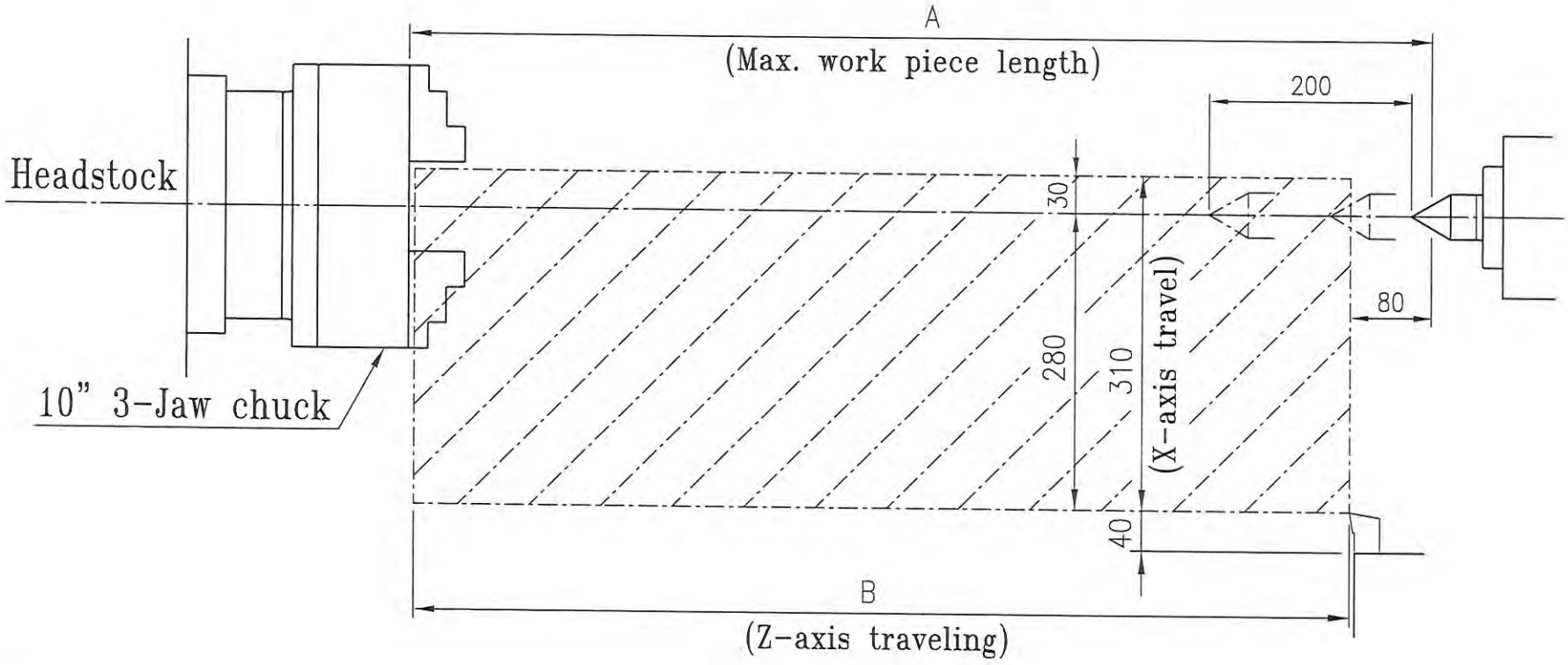
22CNC Working area drawing

Automatic 4-Way Tool Post
Taper roller type spindle bearing

MODEL / ITEM	2260	2280	22120	22160
A	1480	1980	2980	3980
B	1400	1900	2900	3900

Unit : mm

(*) "A" and "B" dimension are changed according to different size of chuck.



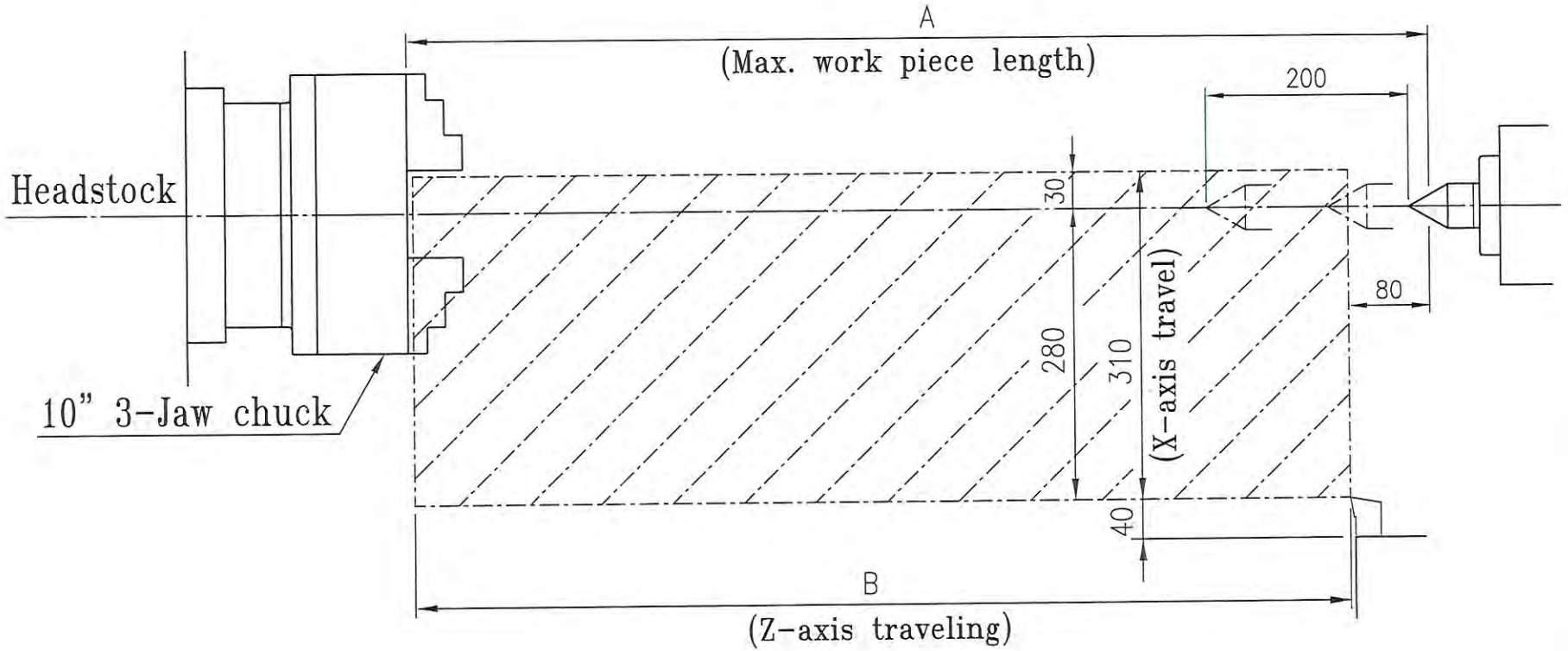
22CNC Working area drawing

Automatic 4-Way Tool Post
Cylindrical type spindle bearing

MODEL / ITEM	2260	2280	22120	22160
A	1400	1900	2900	3900
B	1320	1820	2820	3820

Unit : mm

(*) "A" and "B" dimension are changed according to different size of chuck.



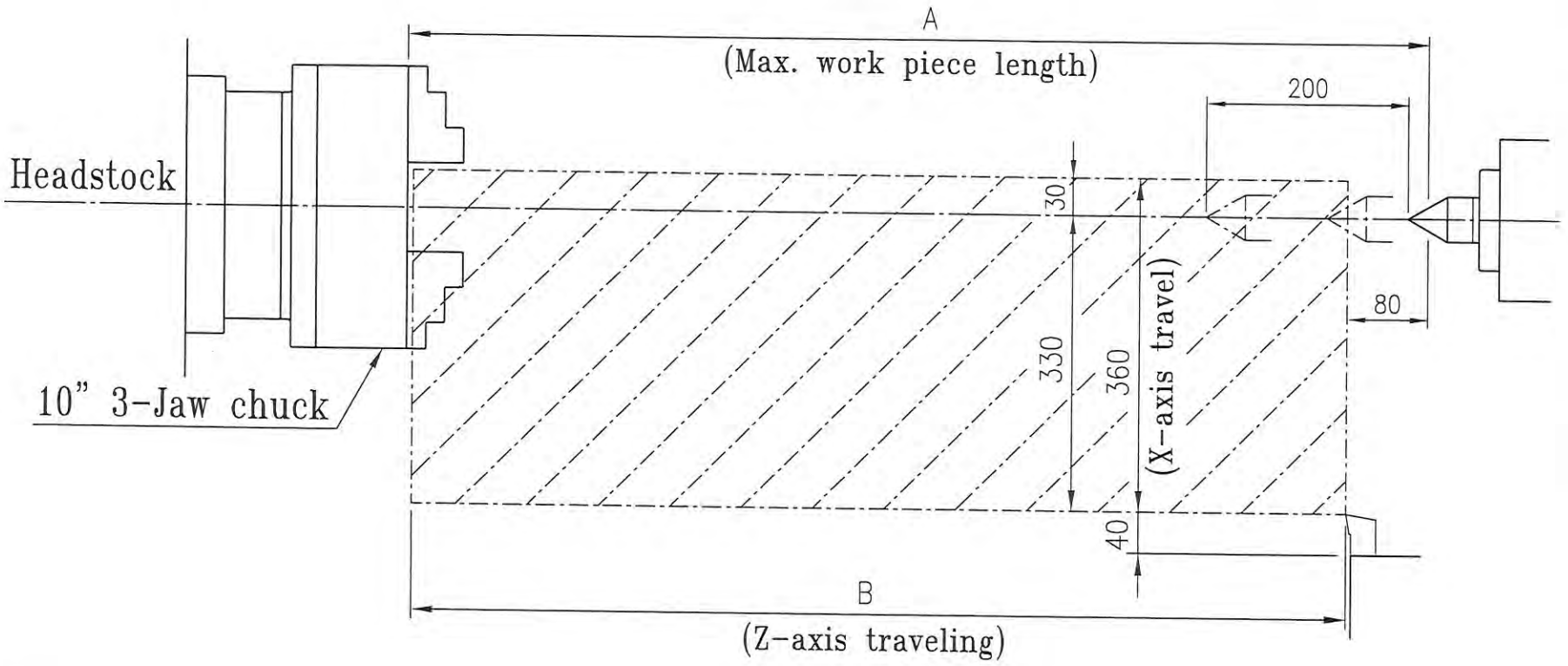
26CNC Working area drawing

Automatic 4-Way Tool Post
Taper roller type spindle bearing

MODEL / ITEM	2660	2680	26120	26160
A	1480	1980	2980	3980
B	1400	1900	2900	3900

Unit : mm

(*) "A" and "B" dimension are changed according to different size of chuck.



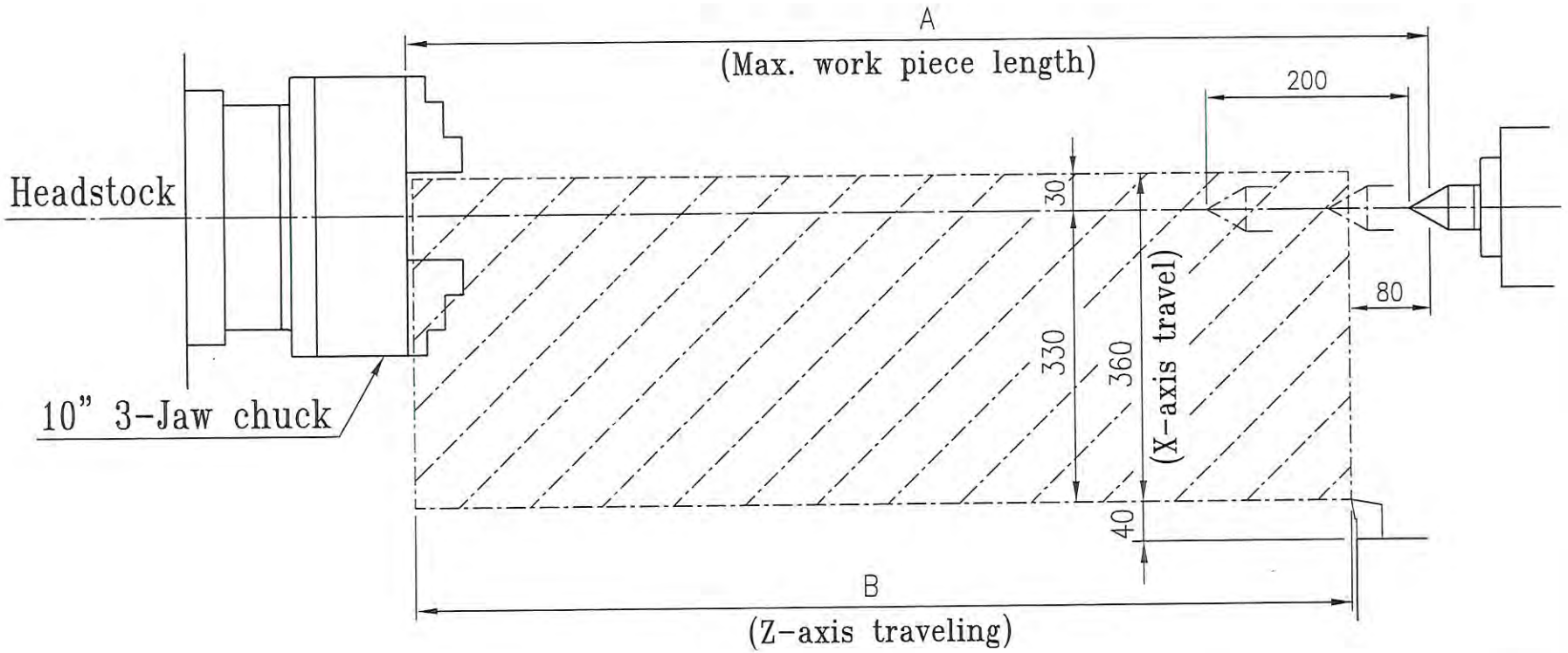
26CNC Working area drawing

Automatic 4-Way Tool Post
Cylindrical type spindle bearing

MODEL / ITEM	2260	2280	22120	22160
A	1400	1900	2900	3900
B	1320	1820	2820	3820

Unit : mm

(*) "A" and "B" dimension are changed according to different size of chuck.



26CNC Working area drawing

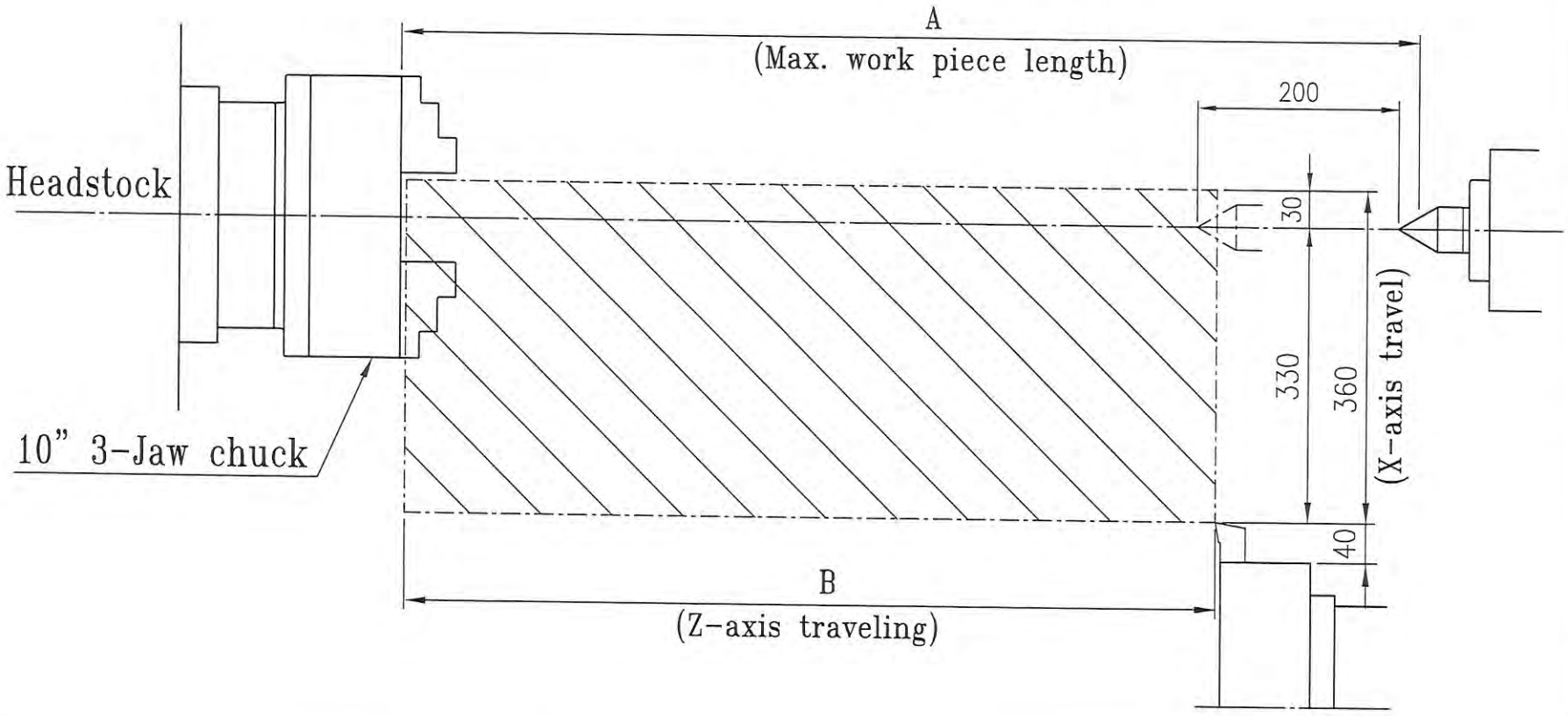
Hydraulic 8 Position Turret (12Pos./0pt.)

Taper roller type spindle bearing

MODEL / ITEM	2660	2680	26120	26160
A	1480	1980	2980	3980
B	1280	1780	2780	3780

Unit : mm

(*) "A" and "B" dimension are changed according to different size of chuck.



26CNC Working area drawing

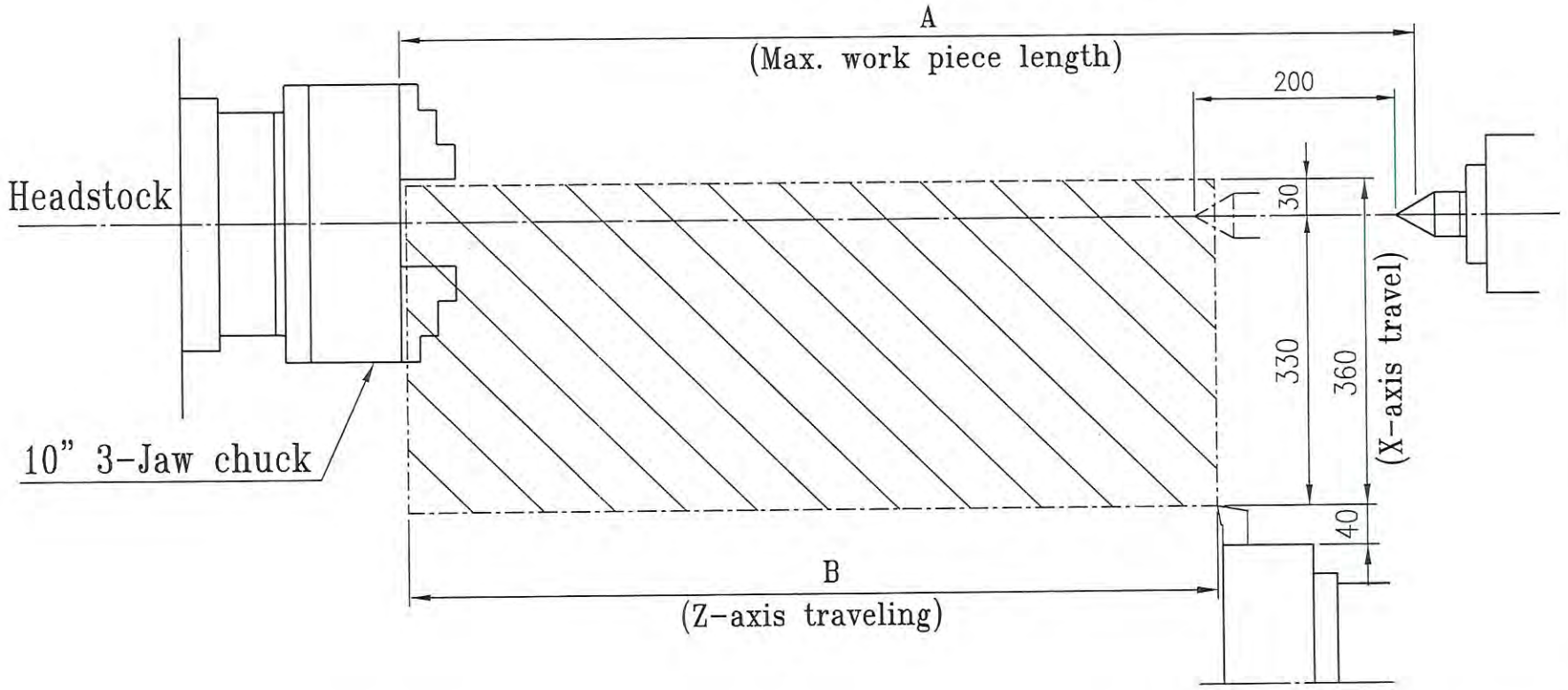
Hydraulic 8 Position Turret (12Pos./0pt.)

Cylindrical type spindle bearing

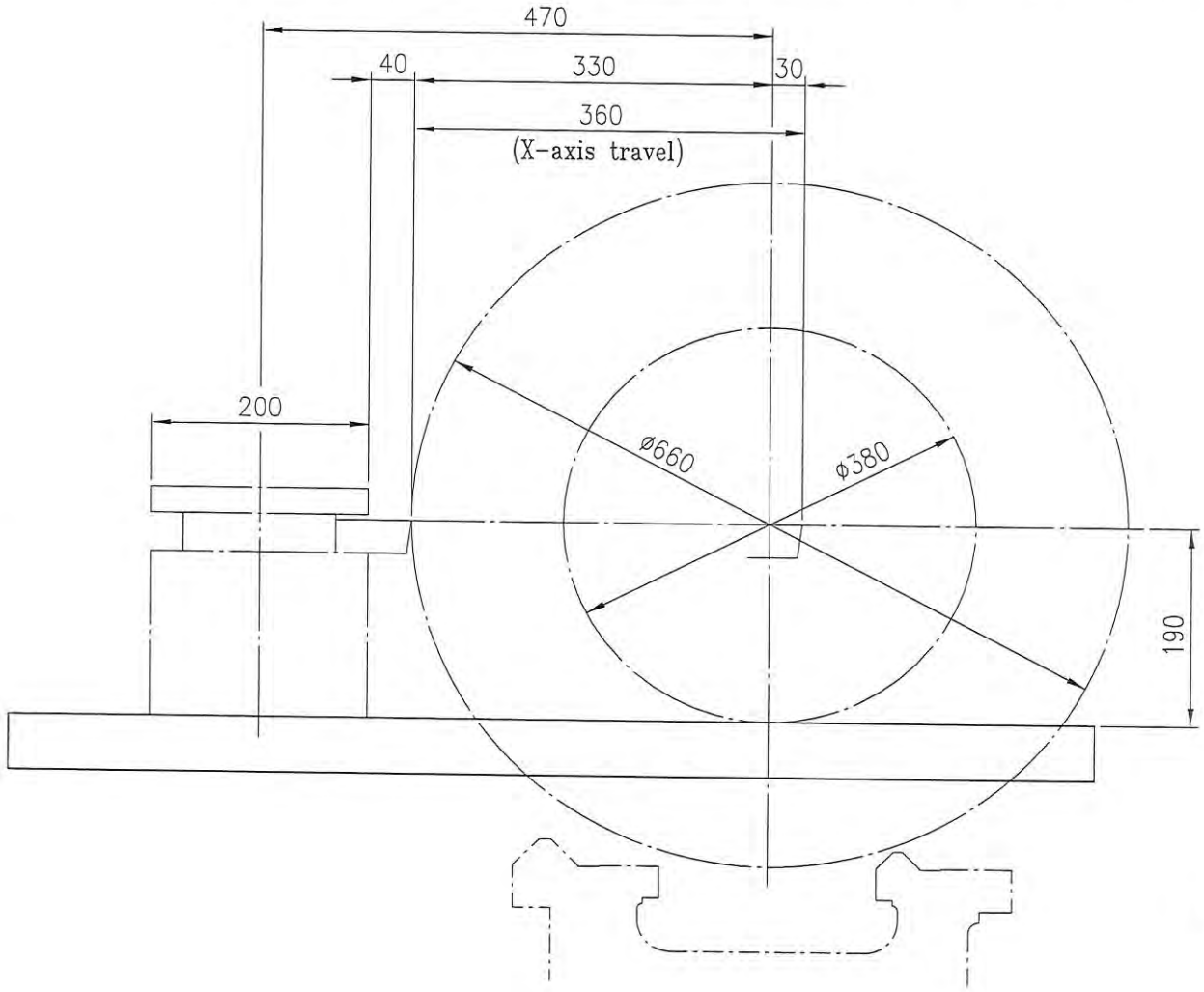
MODEL / ITEM	2660	2680	26120	26160
A	1400	1900	2900	3900
B	1200	1700	2700	3700

Unit : mm

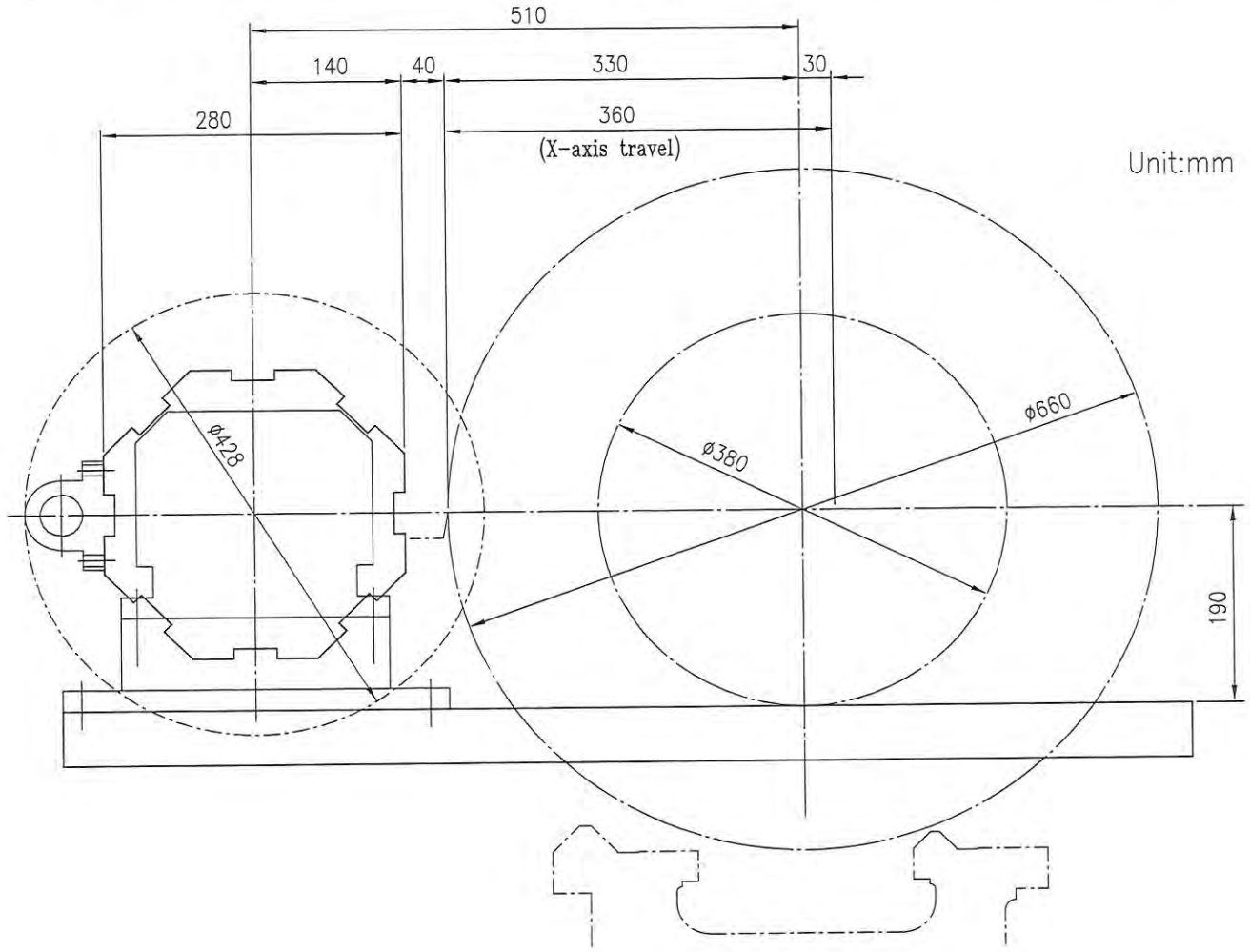
(*) "A" and "B" dimension are changed according to different size of chuck.



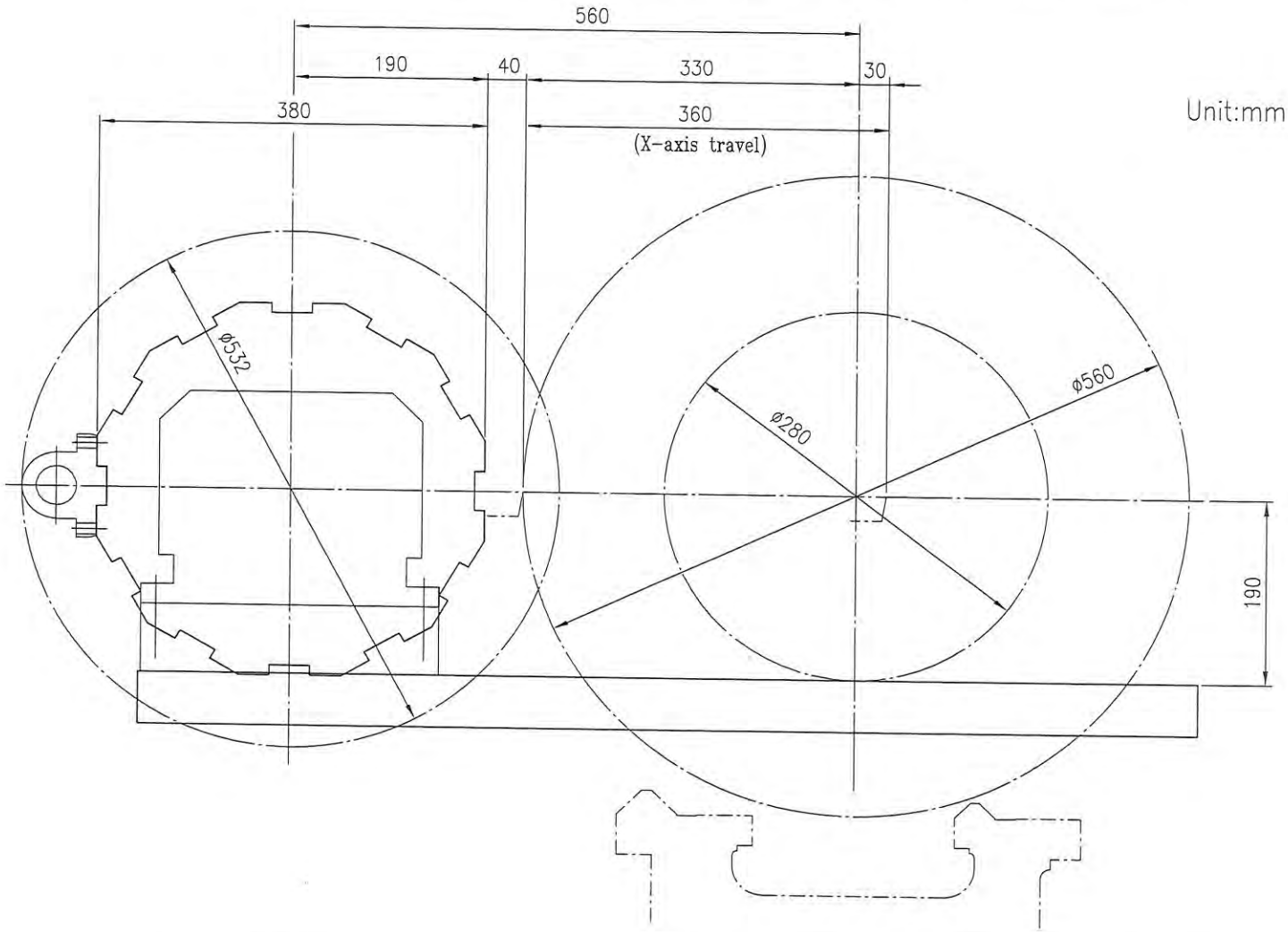
26CNC Swing Capacity (Be Installed Automatic 4-Way Tool Post)



26CNC Swing Capacity (Be Installed Hydraulic 8 Position 280mm Turret)



26CNC Swing Capacity (Be Installed Hydraulic 12 Position 380mm Turret)



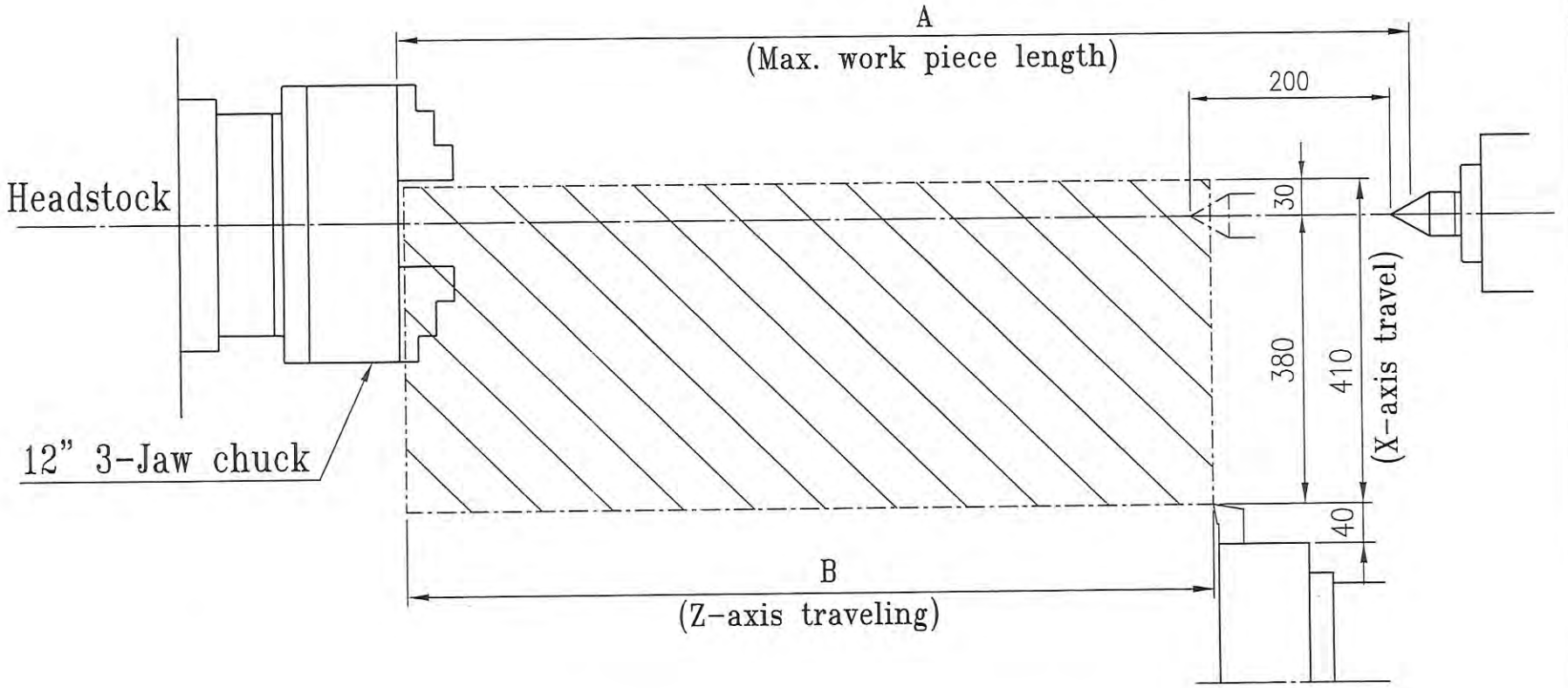
30CNC Working area drawing

With Hydraulic 8 Position 280mm Turret

MODEL / ITEM	3060	3080	30120	30160
A	1400	1900	2900	3900
B	1200	1700	2700	3700

Unit : mm

(*) "A" and "B" dimension are changed according to different size of chuck.



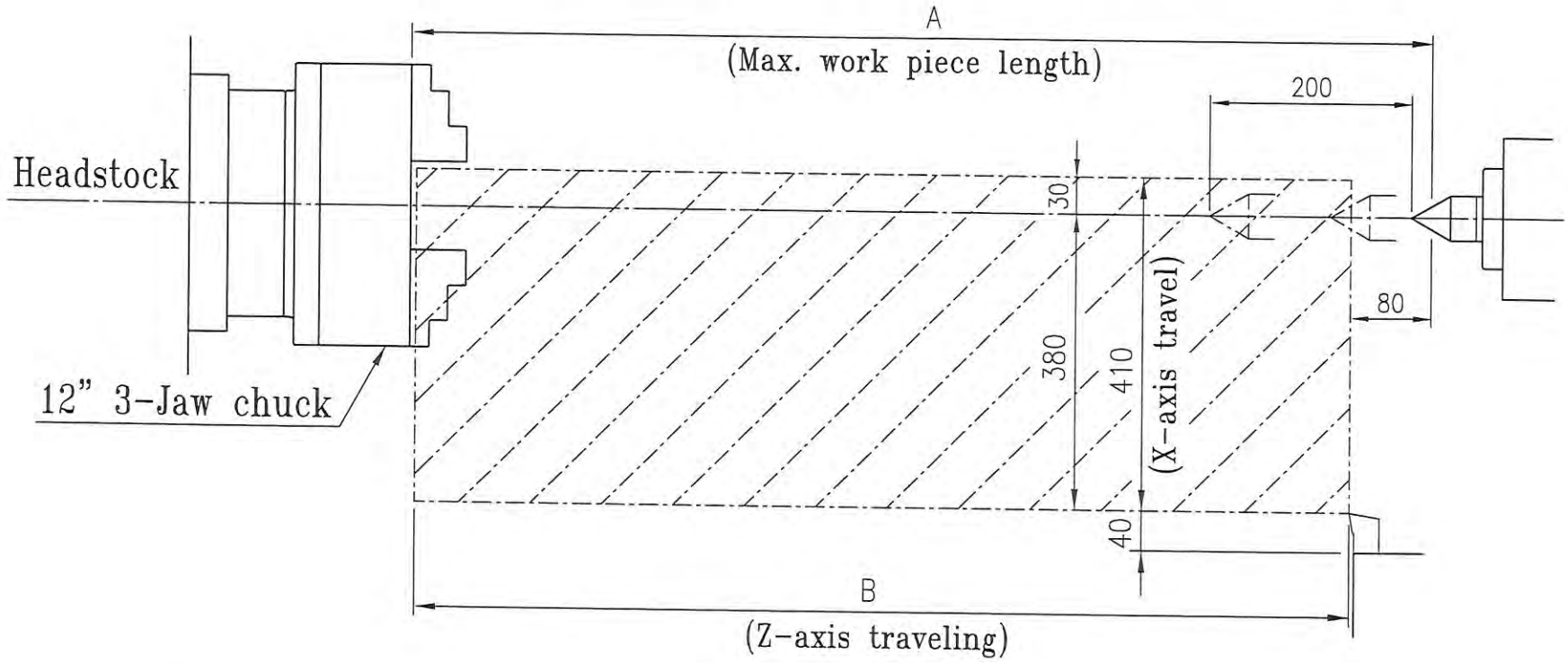
30CNC Working area drawing

Automatic 4-Way Tool Post

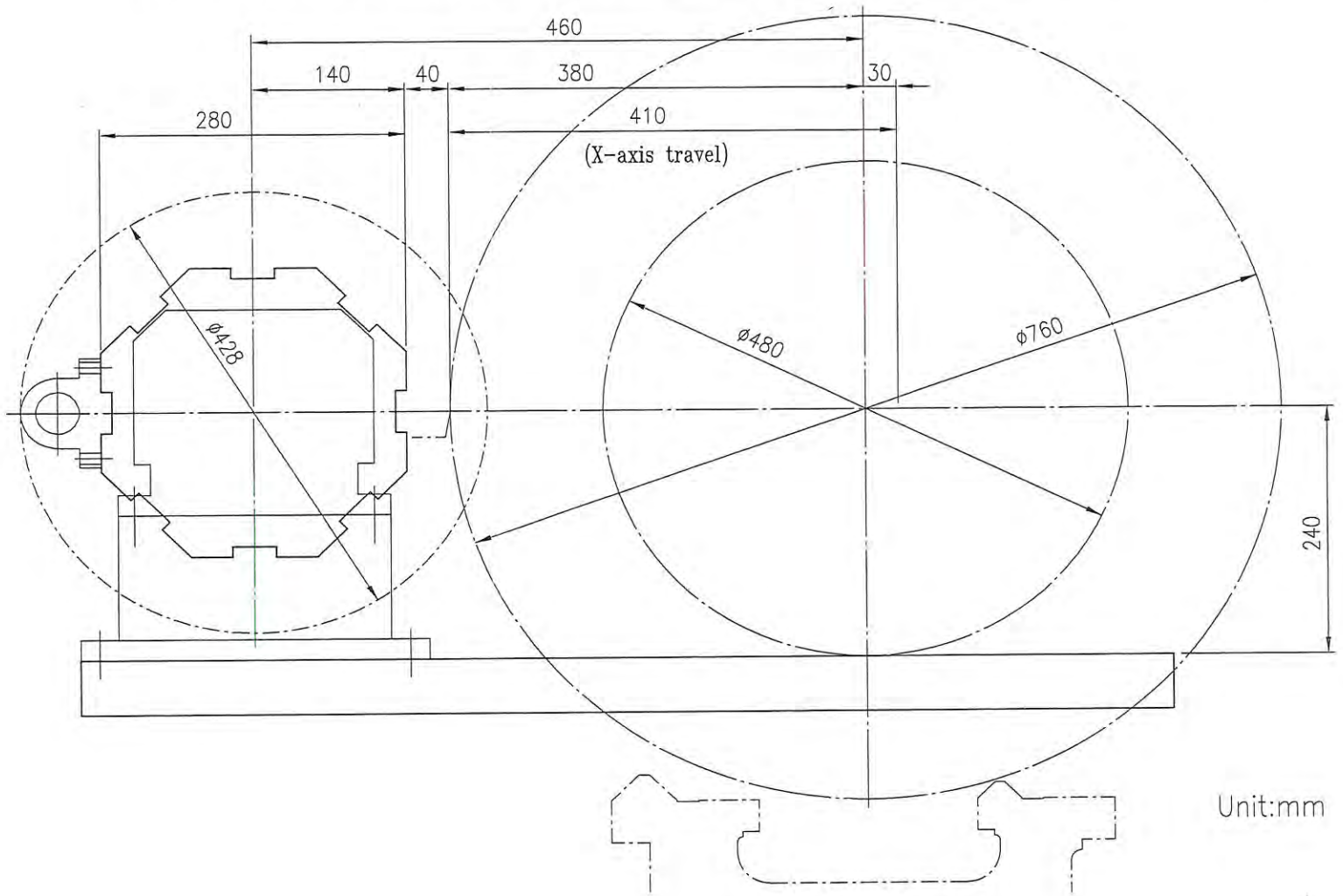
MODEL / ITEM	3060	3080	30120	30160
A	1480	1980	2980	3980
B	1400	1900	2900	3900

Unit : mm

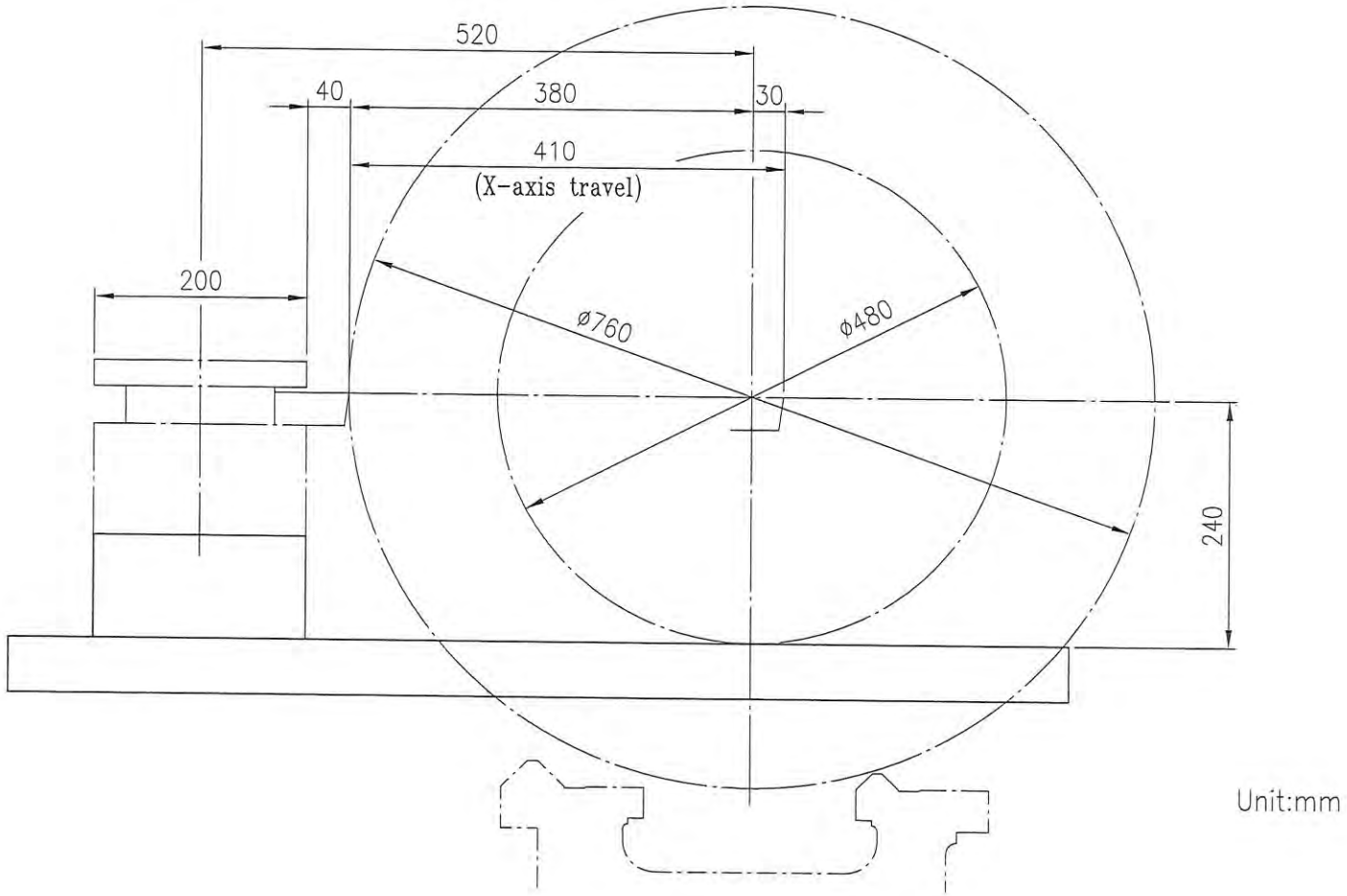
(*) "A" and "B" dimension are changed according to different size of chuck.



30CNC Swing Capacity (Be Installed Hydraulic 8 Position 280mm Turret)

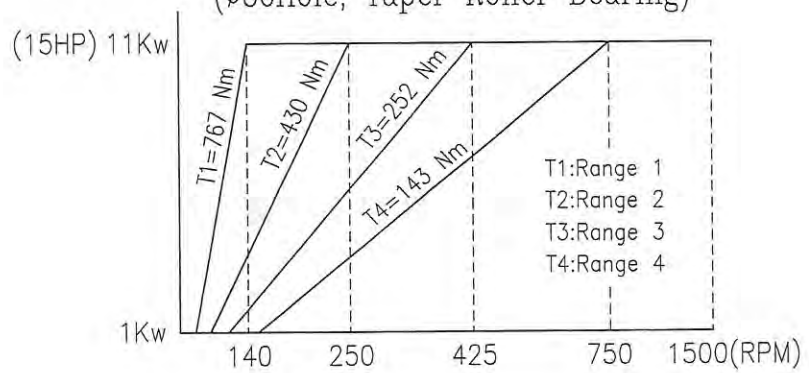


30CNC Swing Capacity (Be Installed Automatic 4-Way Tool Post)

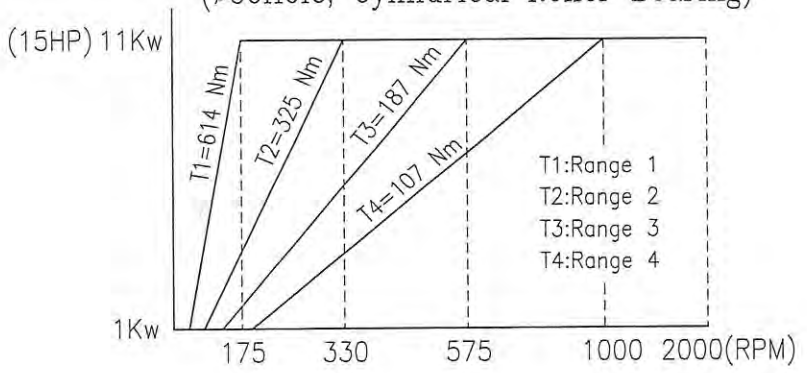


22/26 CNC Spindle Power Capacity

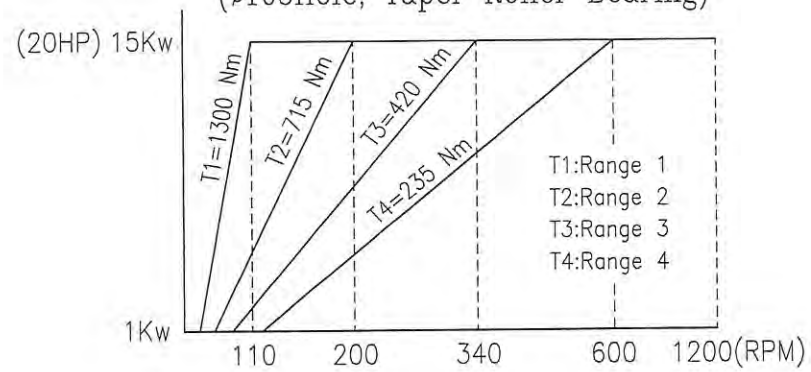
22/26NC(A)
(ø86Hole, Taper Roller Bearing)



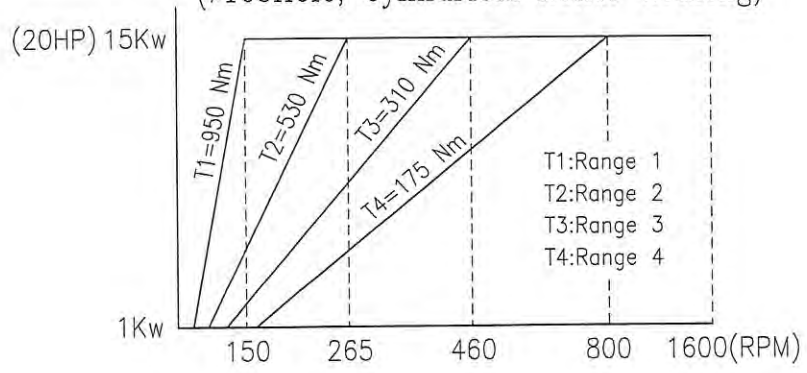
22/26NC(B)
(ø86Hole, Cylindrical Roller Bearing)



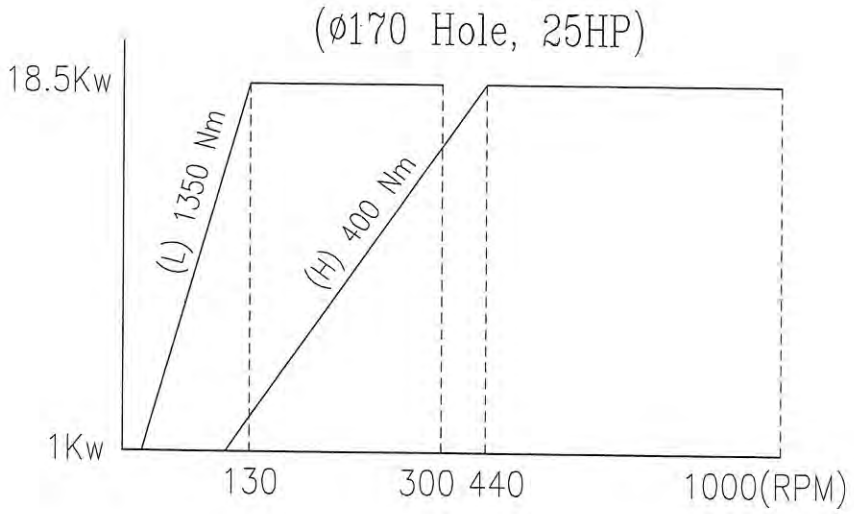
22/26NC(C)
(ø105Hole, Taper Roller Bearing)

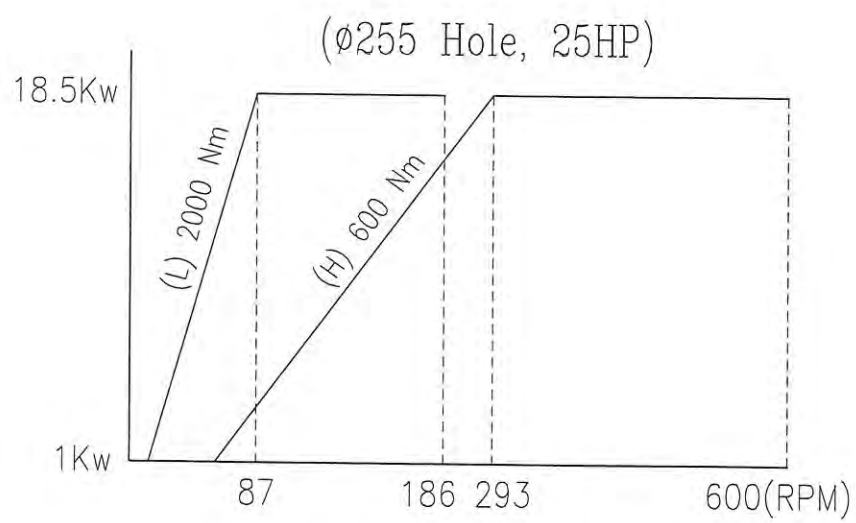


22/26NC(D)
(ø105Hole, Cylindrical Roller Bearing)



·30 CNC Spindle Power Capacity





2.4 HARDWARE & OPERATION

-11"LCD Monitor with softkey (Half key)
-Axes module (PLC-40I/24O)
-Coversational turning application software.
-CPU-CNC with 128 Ram memory.
-32K Eeprom me,ory for PLC and customizing cover.
-Turning job panel.
-Turning DNC soft floppy disk.
-RS232 Interface (V24), RS-422 Interface.
-Constant surface speed (CSS)
-2 Electronic handwheel
-PLC with 16/32 bit processor/input/output module

2.5 CONTROL PANEL FUNCTION KEYS

1. Coordinate preset.
2. Tool management (Tool selection, tool calibration, geometry, location codes).
3. Spindle control (Forward, backward, stop, speed enter).
4. Operation at constant surface speed (CSS).
5. Operation with live tools.
6. Operation with axes job keys.
7. Operation with handwheels.
8. Operation with conversational icons (Facing/turning/taper/rounding/grooving/ threading/drilling/tapping/positioning/profiling cycle).
9. Parts memory storage (P.Prog).
10. Single block mode.
11. Numeric key (A-Z, 0-9).
12. Cycle start & cycle stop.
13. Graphics representation.
14. Recall function.
15. Reset, Esc, Shift.
16. Main menu.
17. Home search.
18. ISO key:Conversational mode insert ISO program.
19. Feedrate enter & feedrate override.
20. Help.
21. Spindle speed override.
22. Shift + ESC :TC Mode (Conversational model) & T Mode (ISO) convert.
23. Video Off:Shift + Clear.
24. PCALL:User defined operation.

2.6 STANDARD ACCESSORIES:

1. Automatic lubrication for all sliding surface.
2. 10" 3-Jaw heavy duty chuck for spindle bore 80mm.
   12" 3-Jaw heavy duty chuck for spindle bore 105mm.
3. Hydraulic 4-way tool post for 22" swing.
   8 Position hydraulic turret for 26"/30" swing.
4. Coolant system.
5. Motor : 15HP for spindle bore 86mm.
   Motor :20HP for spindle bore 105mm.
   Motor :25HP for spindle bore170mm and 255mm.
6. Work light.
7. Splash guard featuring sliding door with inspection door.
8. Tool box with kits.
9. Inspection manual & parts list.

2.7 SPECIAL ACCESSORIES:

1. Hydraulic 3- Jaw chuck.
2. Built-In rotating, tailstock spindle.
3. Hydraulic tailstock.
4. Steady rest.
5. Follow rest.
6. 12 Position hydraulic turret.
7. Chip conveyer.

2.8 CHECK LIST
Check list for operation

Item	Job	Description No.
1. Read through operating manual thoroughly		
2. Read through all instruction manual thoroughly		
3. Lifting machine		Chapter 3
4. Installing machine		Chapter 3
5. Leveling machine		Chapter 3
6. Lubricating instruction		Chapter 3
7. Checking electrical circuit connection		
8. Main switch and button "ON"		
9. Press emergency stop button to stop machine		
10. Learn safety rules		Chapter
11. Simple trouble shooting		Chapter
12. Maintenance		Chapter

2.9 CHECK LIST
Check list for maintenance

Item	Job	Interval
1. Clean machine (Do not use air compressor)		Weekly
2. Checking electrical circuit connection		Every time before operation
3. Replacing coolant and clean coolant tank		3 months
4. Clean motor		Annually
5. Slide (X-Axis)		Annually
6. Slide (Z-Axis)		Semiannually
7. Spindle tip		Annually
8. Automatic lubrication unit/Add grease		Weekly

3. MAINTENANCE

3.1 INSTALLATION

3.1.1 General Preparations & Selecting Location

To upgrade the operation efficiency and accuracy of precision machining, a proper foundation is required.

The machine body is not allowed to be exposed to sunshine or rain, please be sure not install the machine adjacent to planing machine (milling machine, molding or punching machine), it will result in poor performance.

It is required at least 45" (1140mm) distance from machine to wall and objects or between machines to ensure easy reparation, cleaning and maintenance of machine as well as easy opening of the door of electric cabinet.

3.1.2 Foundation

With special torque resistant capability at the machine base, this machine requires no particular foundation, provide 6" (150mm) thick of concrete on floor and leave space of component for leveling.

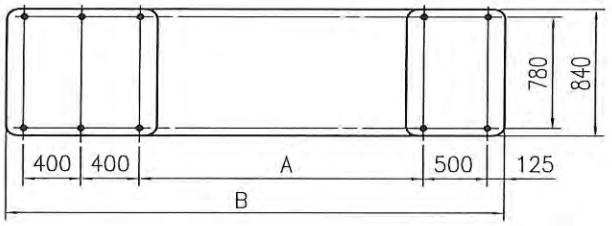
Do not use wood foundation which with nature of un-stability, may cause the machine to move gradually. Install the machine on the first or second floor, careful consideration if machine can be loaded.

3.1.3 Foundation layout

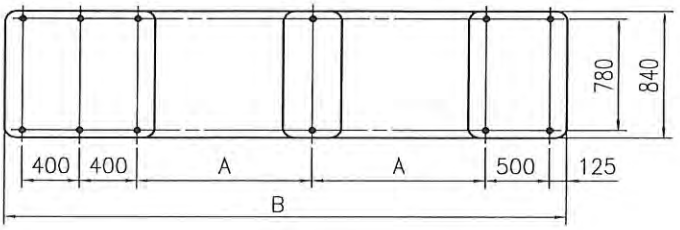
Please dig holes as big as shown in Figure 1 for setting foundation bolts, place the bolts in the holes then fill the holes with cement, lift the machine on the bolts after the cement has turned into solid concrete, then fix the bolts with screw nuts.

22/26/30 CNC FOUNDATION (Figure 1-1)

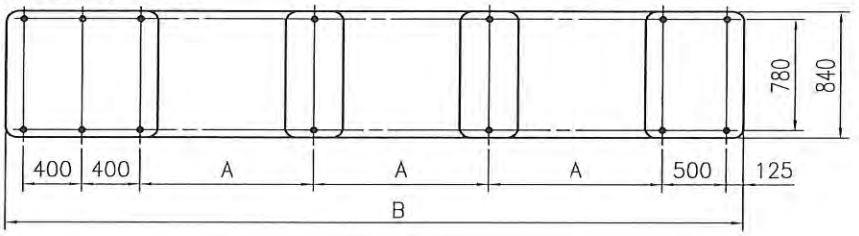
2260, 2660, 3060



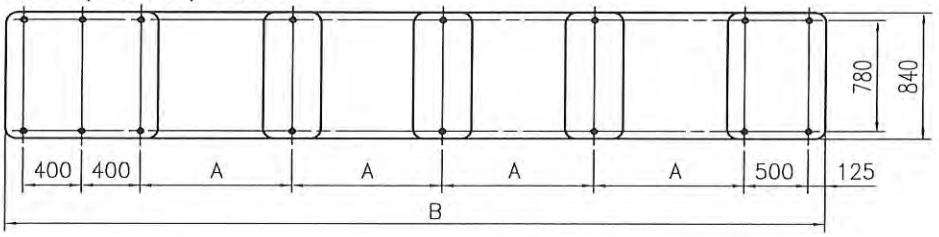
2280, 2680, 3080



22120, 26120, 30120

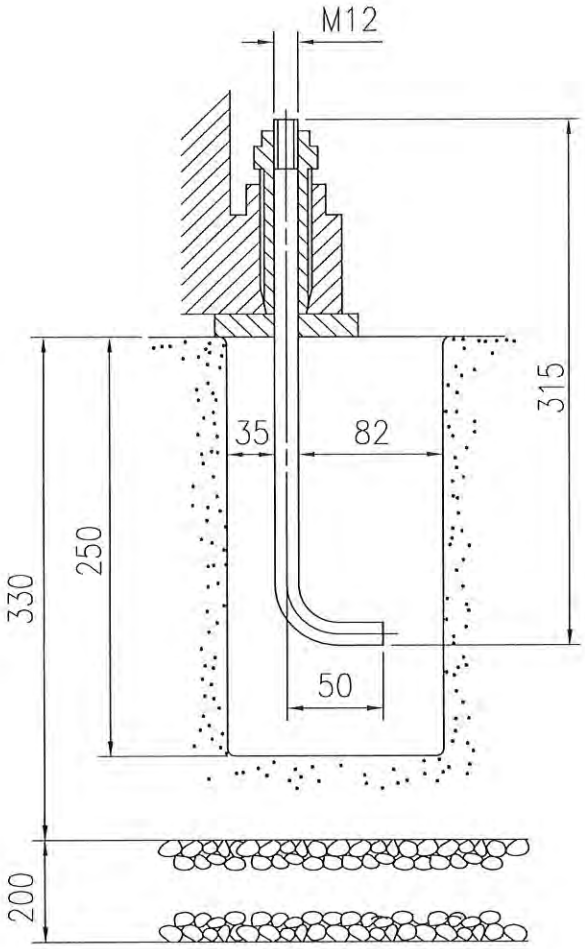


22160, 26160, 30160



Unit : mm

MODEL / ITEM	2260 2660 3060	2280 2680 3080	22120 26120 30120	22160 26160 30160
A	1500	1000	1000	1000
B	3050	3550	4550	5550



FOUNDATION

3.2 CONNECTION OF POWER LINE

(1) Make sure the voltage of incoming power supply is correct according to required or as marked on the unit.

(2) Power wires, grounding and over voltage protector should be comply with the local electricity regulations.

For wiring to other voltages, be sure to rewire the spindle motor, coolant system, dust suction device and transformer to correct voltage, the relevant currents, fuses and overload relays are shown in the electrical manual.

Note:Do not turn on the machine motor when its voltage is different from power voltage and contact electric technician from reparation.

(3) For connecting the power supply, the electrical technical valued are provided as following:

400V, 3 – 50HZ

Cable cross section:16mm² (For spindle motor 15HP/20HP)

22mm² (For spindle motor 25HP)

Fuse:60A (For spindle motor 15HP)

75A (For spindle motor 20HP/25HP)

3.3 UNPACKING

Remove the top cover of wooden case first and then the plates on four sides, carefully take out fittings at first, if necessary. Remove the set screw used for holding the machine on the pallet.

Dis-assembling packing crate and remove skids as carefully as possible to avoid damaging the machine, if the machine is damaged during transportation, contact with your local dealer and transportation company who delivered your machine immediately.

3.3.1 Checking for shortage

Be sure to check your machine against the packing list which his shipped with every machine, in case of shortages, note items not received and contact with your local dealer.

3.4 LIFTING MACHINE
Transportation by crane

Notice :

1. Only an authorized technician should be perform work with machine lifting.
2. Capacity of crane must be 5 tons at least (machine between center 2 meters). Capacity of crane must be 8 tons at least (machine between center 2.5-4 meters).
3. Make sure there is no obstacle or personnel on the move, path and left on the machine.
4. Keep machine's balance and move slowly.

Procedure:

1. The clamping block "A" and "B" are locked on the bed by screw "C".
2. Lock clamping ring "D".
3. Use steel cable through 2 pieces of clamping ring and use hook of crane sliding and lifting.
4. Before lifting position the tailstock and carriage towards the tailstock end of the bed to help distribute and balance the machine weight.

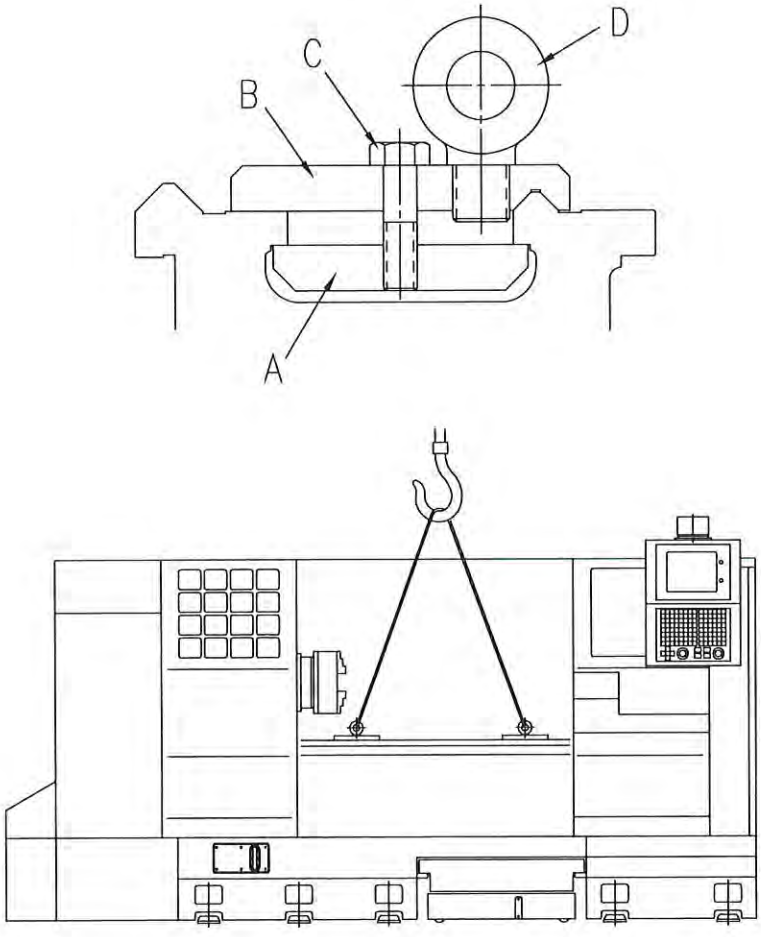


Figure 2

3.5 PLACING THE MACHINE

Before placing the machine, fix the adjusting screw on the base, makes machine as Close as possible to the floor and position of leveling pads in their most suitable place, increase the stability of machine.

3.6 CLEAN & LUBRICATING MACHINE

All protective coating must be removed before using machine, do not attempt to move any ways if the coating still exists.

Be cautious while selecting a suitable cleaning agent, paraffin applied with a clean brush to take off protective coating, the protective coating be removed with lean rags.

Note:1. Do not use gasoline or any other flammable solution clean machine.

2. Clean and lubricate all the exposed ways of table and saddle, drive the table and saddle to one end of travel, clean and lubricate ways thoroughly then drive table and saddle to the other end, and clean lubricate ways thoroughly as well, be sure to use a suitable lubricant such as Sunoco Way lube#11180 or Mobil Vactra Oil#2.

3.7 LEVELLING MACHINE

It is necessary to level the machine before starting to operate the machine.

Please prepare the following tools to adjust machine leveling:

1. Accurate spirit leveling gauge (spec. 0.02mm/1000mm or 0.001in/4 ft.).
2. Two adjustable wrench

   Clean the table surface thoroughly, set one of the spirit leveling gauge on the longitudinal direction and the other on the cross direction of the slide.

   If there is only one leveling gauge available, then use it on both direction alternately.

Adjust at least the six leveling screws bolts which located the bottom of the machine base (as shown in Figure 3) until the machine is leveled within 0.02mm/1000mm (0.001'/4ft) in both directions.

Lock the nut "A" on the leveling screws, and re-check the level to see whether the level of machine is still correct.

Suggestion:For the newly installed machine, check its level once every week. When the foundation is rigid enough, then you may level the machine once per month.

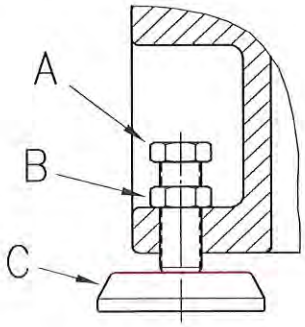


Figure 3

3.8 ELECTRICAL EQUIPMENTS

3.8.1 Electric Cabinet

The main power cable can be put into the cabinet through the bottom of the cabinet, the main switch is located on the right side of the cabinet and electrical diagram can be found from manual.

3.8.2 Power Line

1. Make sure the voltage of incoming power supply is right type that the machine requires or as marked on the unit.
2. Power wires, ground and over voltage protector should comply with the local electricity regulations.
3. For wiring to other voltages, be sure to rewire the spindle motor, coolant system and transformer to correct voltage, the relevant currents, fuse and overload relays are shown in the electrical manual, see note 2.

Note:1. Do not turn on the machine motor when its voltage is different from power voltage and contact electric technician for reparation.

2. The spindle drive is 220 volts only and must be replaced for other voltages.

3.9 LUBRICATION

3.9.1 Automatic Lubrication System

This system adopts automatic intermission lubricant supply which includes discharge oil of proportional distribution and an alarm for low fluid level warnint. Still, please check the fluid level before operation, the following recommend lubricant to the reservoir.

1. Shell Spirax HD90
2. Mobil Vactra Oil#2
3. Esso Gear Oil GX90
4. Chinese Petroleum Corp. R32
5. Other equivalent grade lubricant

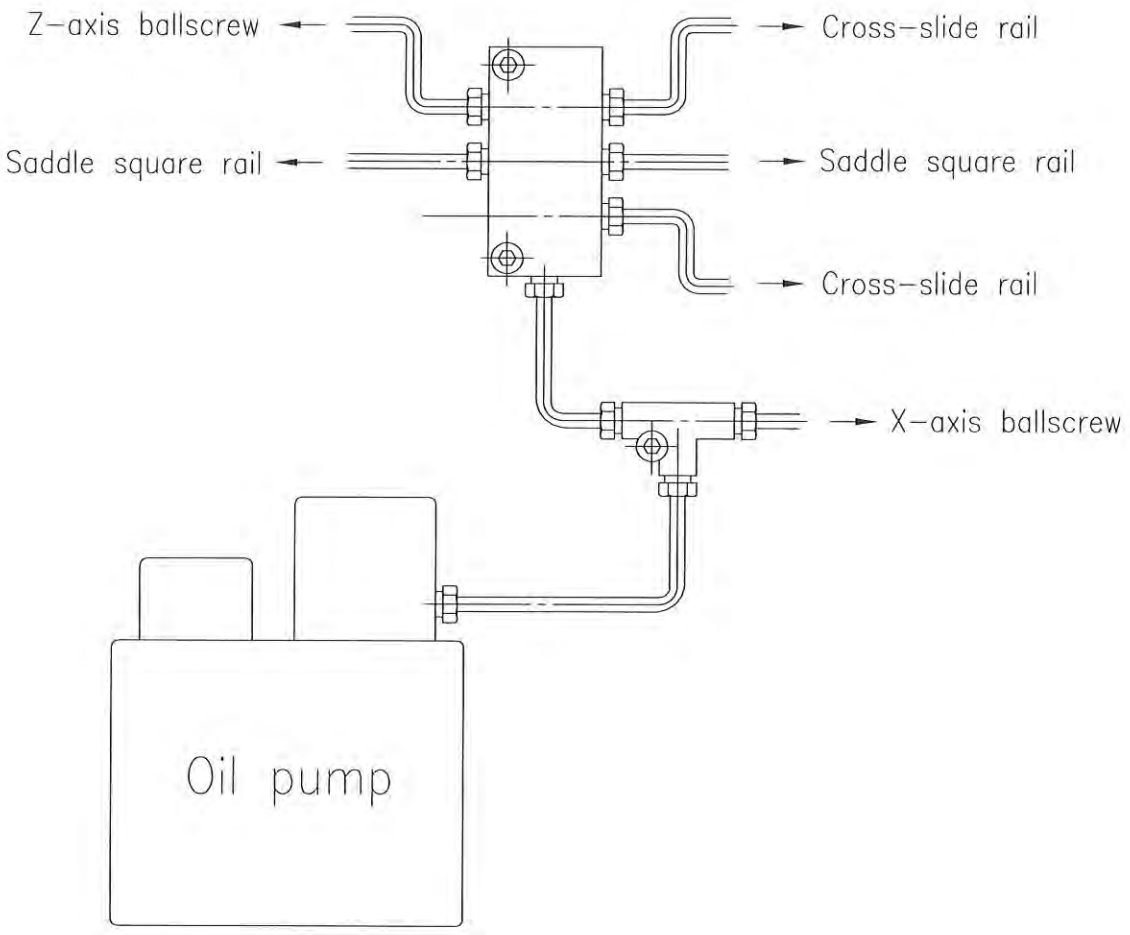


Figure 4

3.9.2 Lubrication System On Headstock

The gear construction in headstock is lubricated by mechanical type of direct drive pump. The pump will supply lubrication during power on.

A : For Taper roller type spindle bearing.

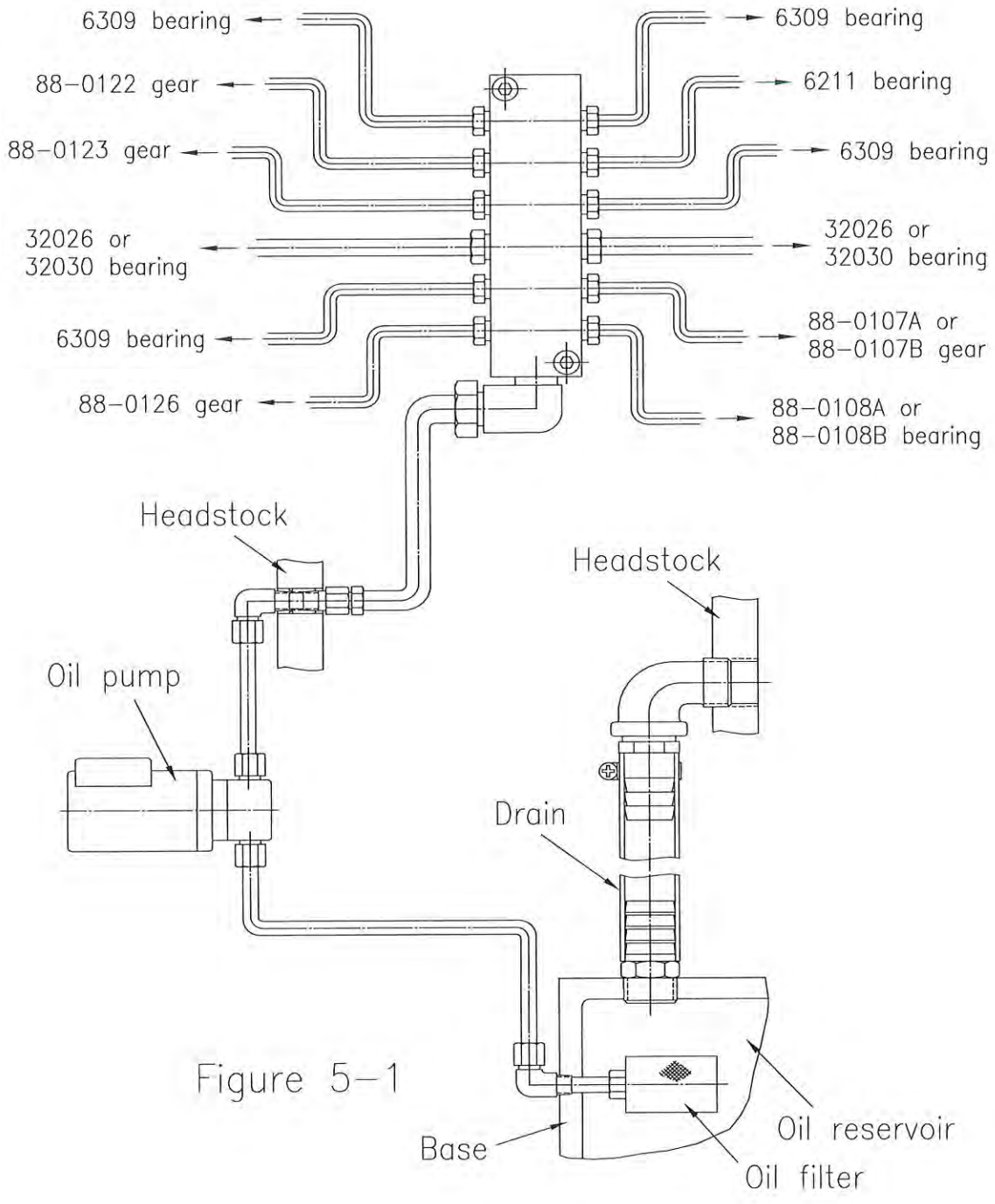


Figure 5-1

B : For Cylindrical type spindle bearing.

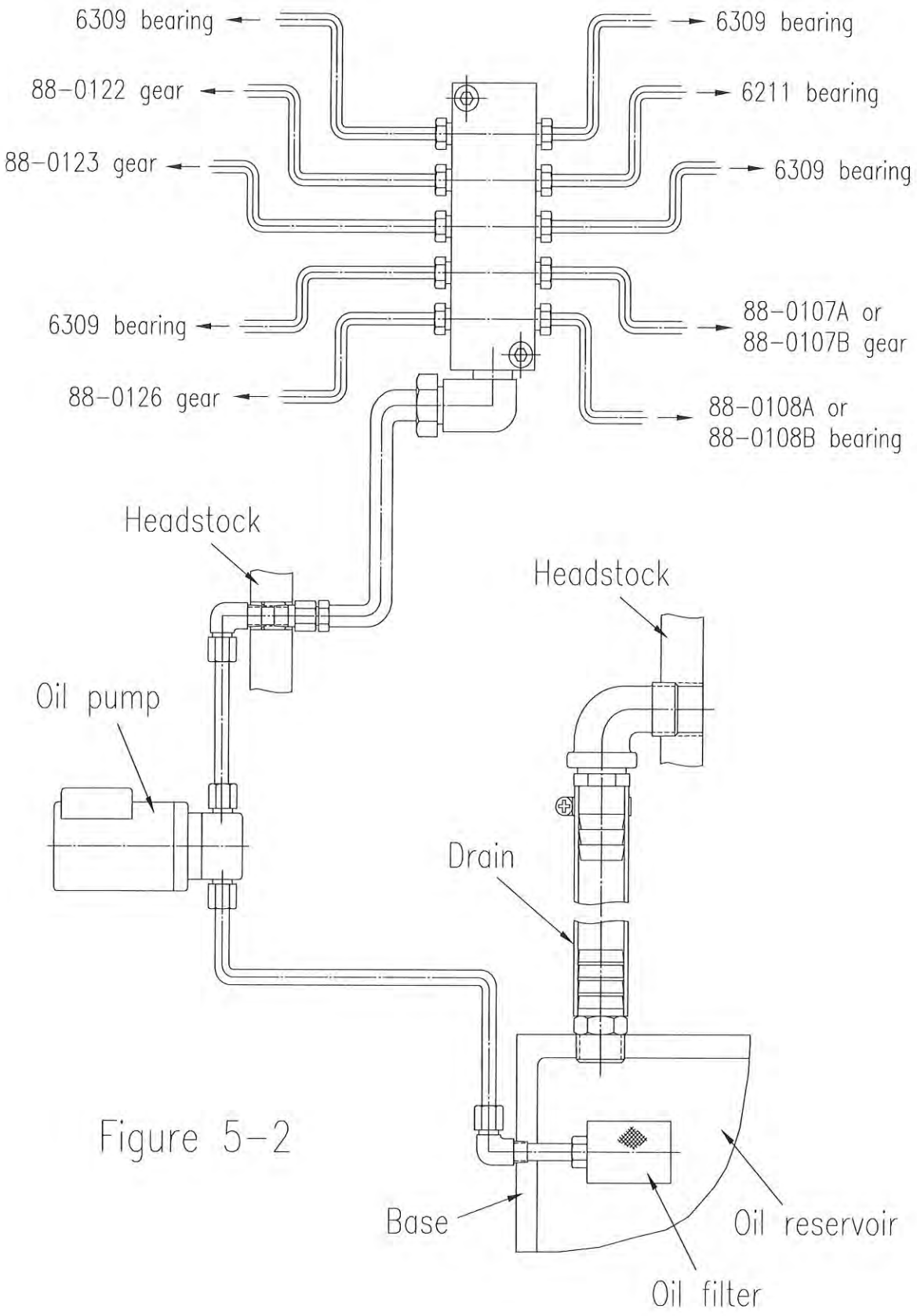


Figure 5-2

3.9.3 The Method Of Pressure-Adjusting Value

1.Take off nut "A"

2.Release nut "C"

3.Use flat head screw driver to adjust screw "B":C.W. direct increase pressure.

4.Use flat head screw driver to adjust screw "B":C.W. direct increase pressure.

5.Tighten nut "B"

6.Tighten nut "A"

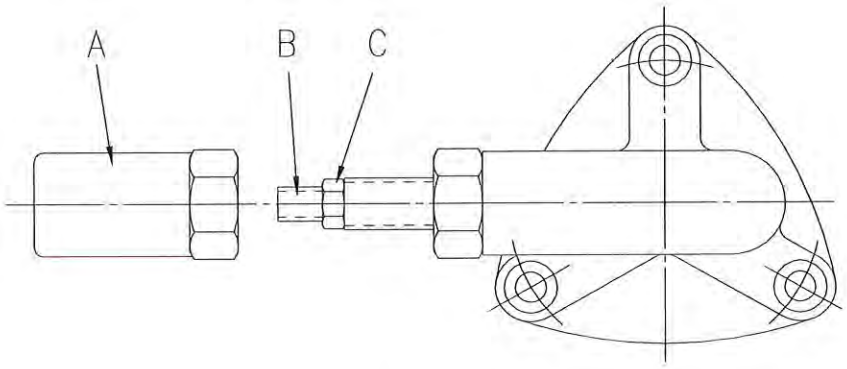


Figure 6

3.9.4 Others

There are four oil balls on the tailstock, please add 10 drops of recommended lubricant to them respectively every day before operating to ensure the smoothness of way.

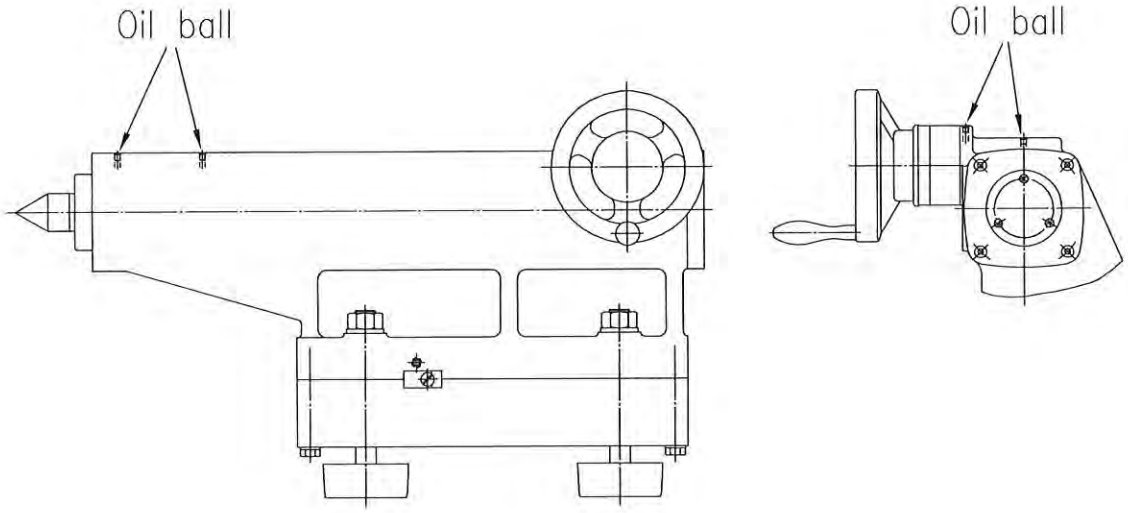


Figure 7

3.9.5 Lubrication System

Check all the fittings of lubrication system operation tamperature, if oil leaking is found, tighten the fittings, inspect oil level daily.

3.9.6 Replacing Oil On The Headstock

1. Loosen the screw "B" and remove cover "C".
2. Remove the drain plug "A".
3. Put drain oil tube "E" into empty oil tank.
4. Turn switch "D" on and drain off the oil.
5. Turn "D" off.
6. Fill in the new lubricant into "A" position, the oil amount reach the top of oil sight glass.
7. Tighten the drain plug "A".
8. Fit the cover "C" back and tighten the screw "B".

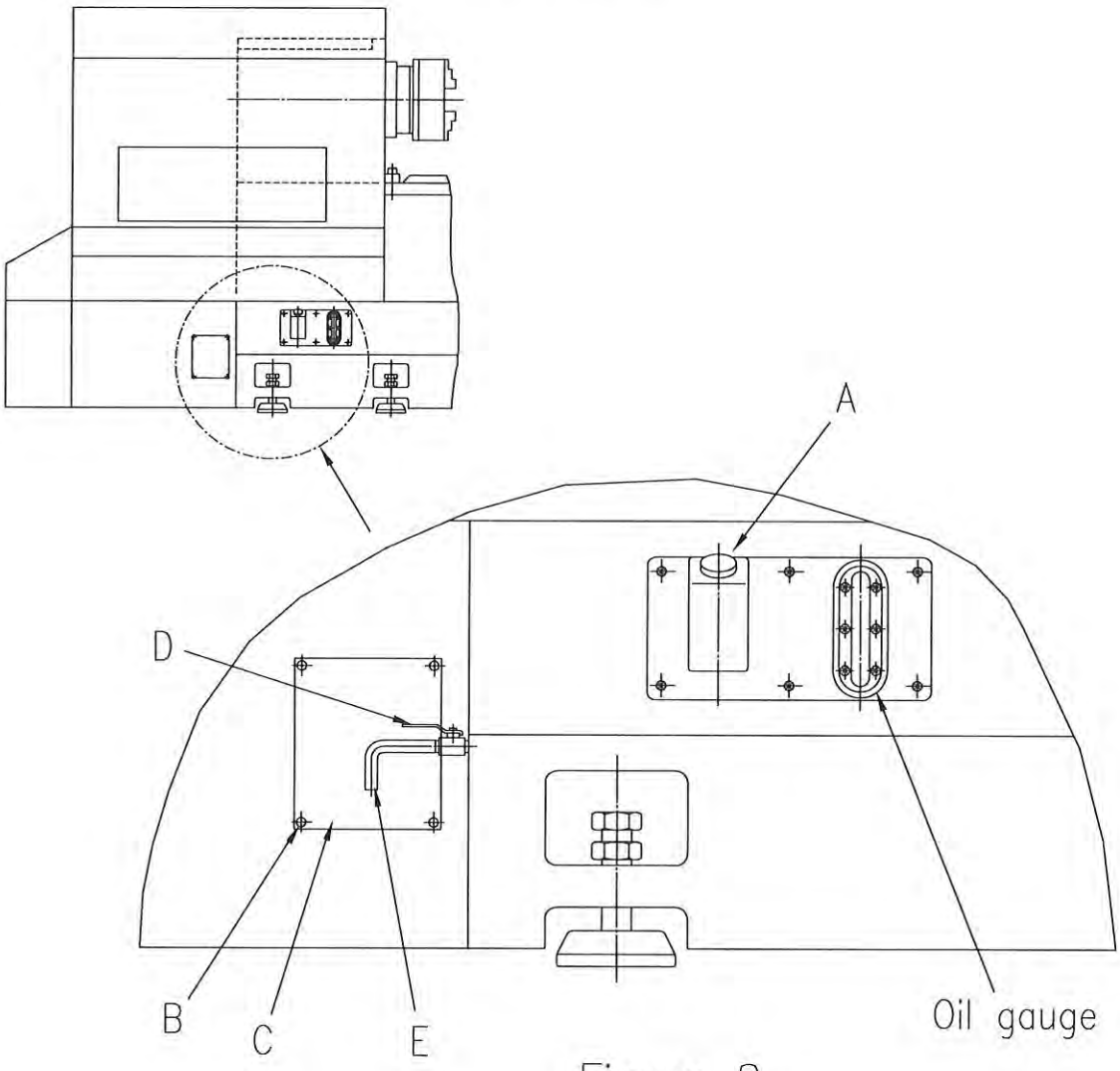


Figure 8

3.9.7. Fittings
Check all fittings after 50 hours of operation especially their tightness between tubes, regular check every 200 hours.

3.10 MACHINE BODY
In order to maximize the machine performance, the accuracy on headstock and all slides have to be re-adjust after three months of operation. After that, re-adjust every six months to one year to keep the; machine in best accuracy.

3.10.1 Headstock
Aligning Headstock:

If taper appears on turning workpiece and convex on rounding, adjust the parallel of headstock by the following steps:

1. Insert test bar in the spindle bore, attach the base of test indicator to tool post, apply the stylus of the indicator to the outer diameter of the bar.
2. If indicator needle of swings drastically, release the headstock fixing screws and adjust the adjusting screws to fine the paralleled of spindle and Z-axis.
3. After adjustment, tighten the fixing screws and move the saddle to observe the indicator needle.

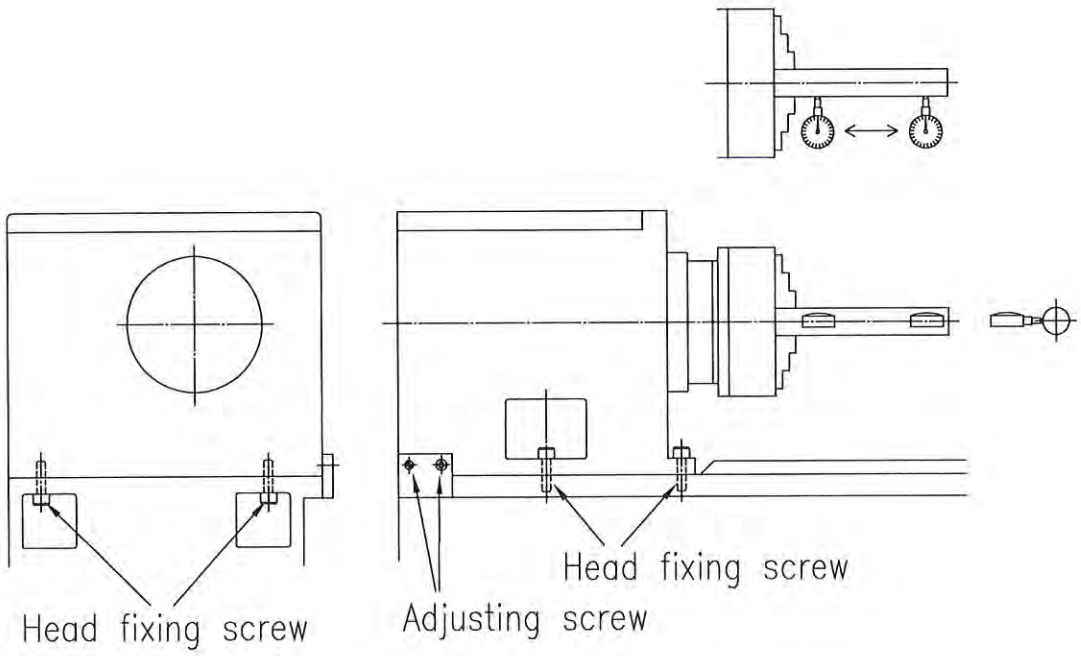


Figure 9

3.10.2 Chuck and Chuck Mounting

WARNING: USE ONLY HIGH SPEED CHUCKS WITH THESE MACHINE

When fitting chucks or face plates, first ensure that spindle and chuck taper are scrupulously clean and that all cams lock in the correct positions.

Chuck that all the cams are in the released positions (See Fig.10) Mount that attachment on to the spindle nose and lock each by turning it clockwise using The key provided.

A reference line R1 (Fig.10) should be scribed on each chuck or face plate to coincide with the reference line R on the spindle nose. This assists subsequent re-mounting.

NOTE : For correct locking conditions each cam must tighten with its index line between the two vee marks on the nose (Fig.11)

DO NOT INTERCHANGE CHUCK OR OTHER SPINDLE MOUNTING ITEMS BETWEEN LATHES WITHOUT CHECKING EACH CAM FOR CORRECT LICKING.

To adjust "CAMLOCK STTUS"

Remove lock screw "B", turn stud "A" one full turn ,in or out as required, then re-fit and tighten lead screw "B".

NOTE : A datum "C" is marked on each stud as a guide to the original or initial setting.

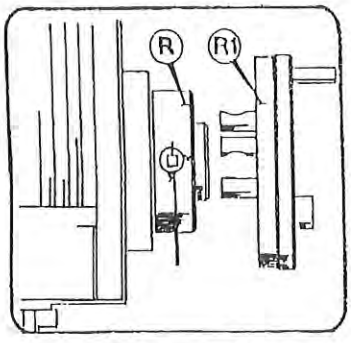


Figure 10

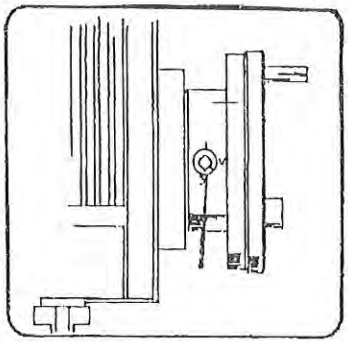
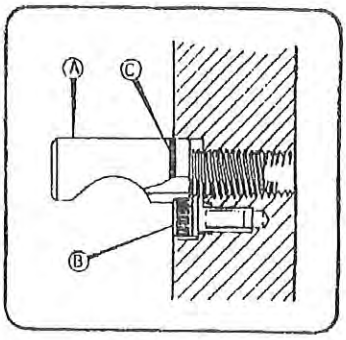


Figure 11



3.10.3 Cross Slide

If the gibs between slide and saddle become loose, it will affect the machining accuracy, you should regularly check and adjust them every six months according to the following steps.

1. Release the screw "A" and "C".
2. Remove wiper "B" and "D" then the gibs can be seen.
3. Use flat head screw driver to release the adjust screw "F" ABOUT 1/2 circle CCW.
4. Tighten screw "E" about 1/2 circle CW.
5. Move the slide back and forth to a satisfied smoothness.
6. Re-assemble the wiper "B", "D" and screw "A","C".

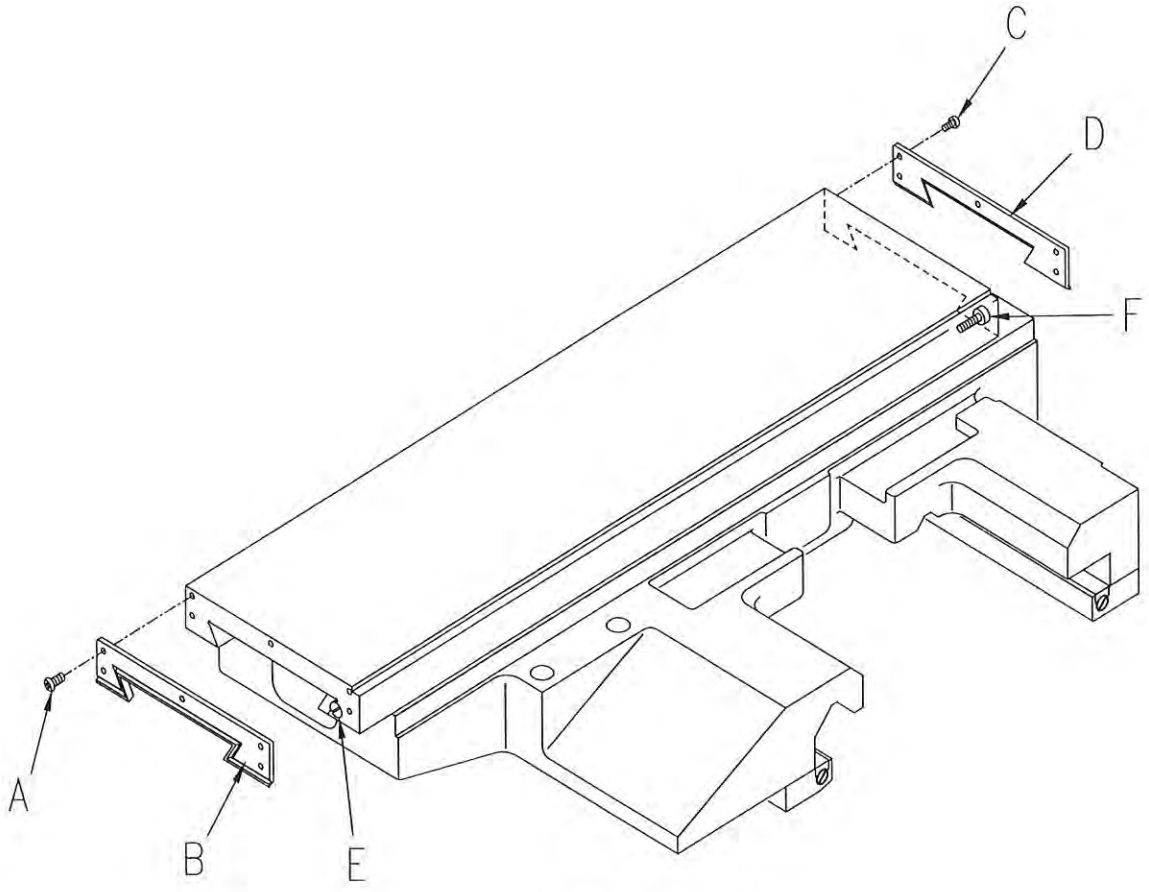


Figure 12

3.10.4 SADDLE

If the gibs between saddle and bed become loose, it will affect the accuracy of saddle travel. Check and adjust them every six months according to the following steps.

1. Use flat head screw driver to loose the adjust screw "A" and "B" as shown in Figure 12 about 1/2 circle CCW.
2. Appropriately tighten adjust screw "C" and "D" as shown in Figure 12 about 1/2 circle CW.
3. Move saddle left and right to a satisfied smoothness.

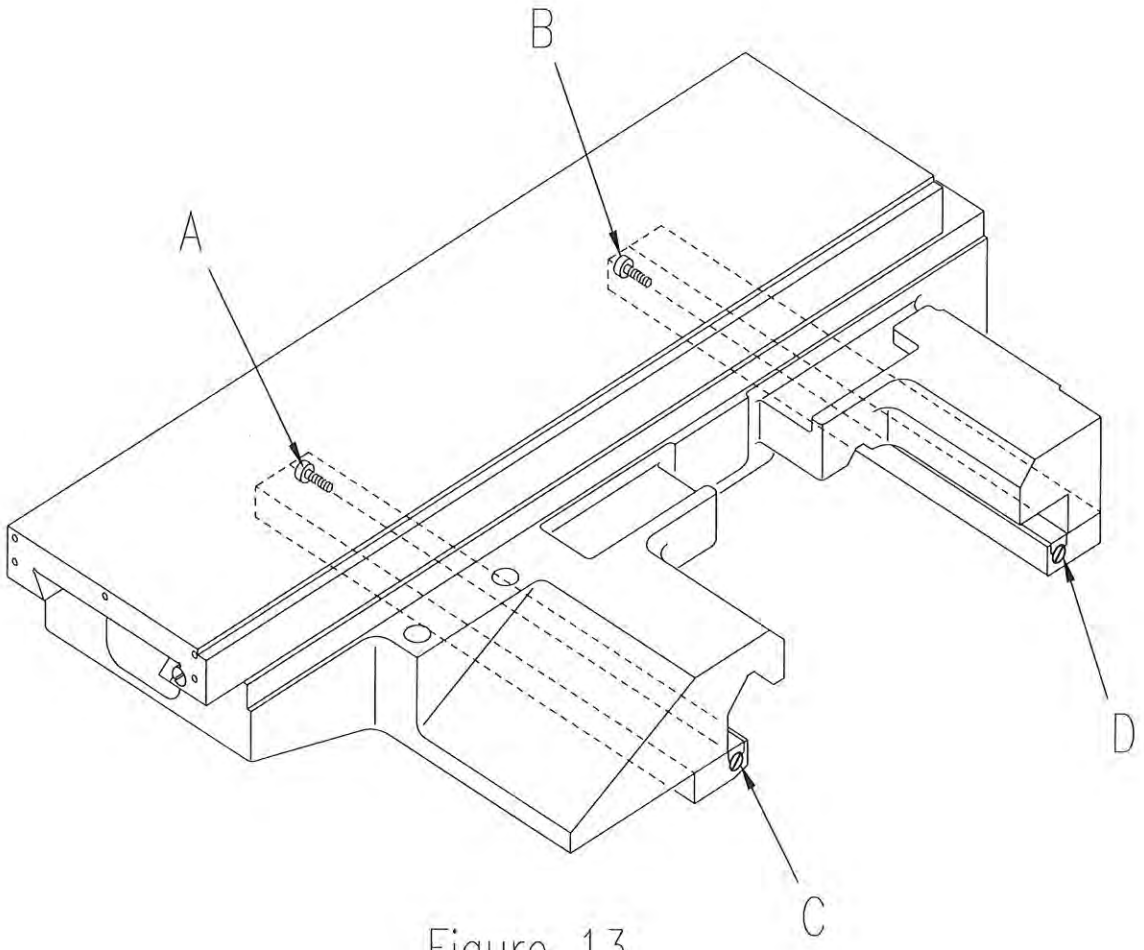


Figure 13

3.10.5 Load & Unload Center Of Tailstock

To unload the center adjust hold the center and back the tail spindle, clean the taper of the center before loading it to the tail spindle.

3.10.6 Aligning Tailstok To Spindle

If there is taper appearing on workpiece while machining by using tailstock, re-align tailstock to the spindle, steps as following:

1. Insert a gauge bar between the spindle and tailstock, attach the base of a test indicator to the saddle, apply the needle of indicator to the surface of the bar, then move the saddle through the full longitudinal travel. Take the measurement of its maximal difference for later adjustment.
2. Release the 4 pcs of fixing screw "A".
3. Release the screw "B".
4. Adjust screw "C", process adjustment.
5. Adjust the adjusting screw "C" until fine alignment.
6. Lock and locking nut "A".

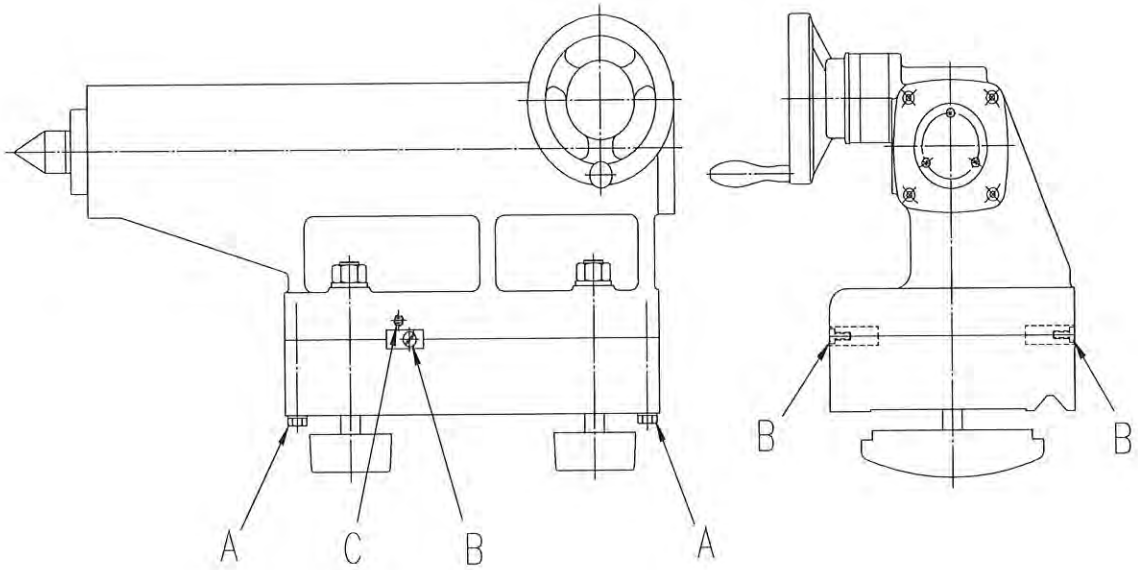


Figure 14

3.10.7 Adjusting Belt Tension

1. Release the locking screw "A" from headsstock end cover , remove end cover "B".
2. Release the locking screw "C" (4 pcs) from motor seat .
3. Adjust screw "D" ,till desire tension is achieved.
4. Tighten screw "C" .
5. Put headsstock end cover "C"bake on the machine.
6. Lock screw "A"

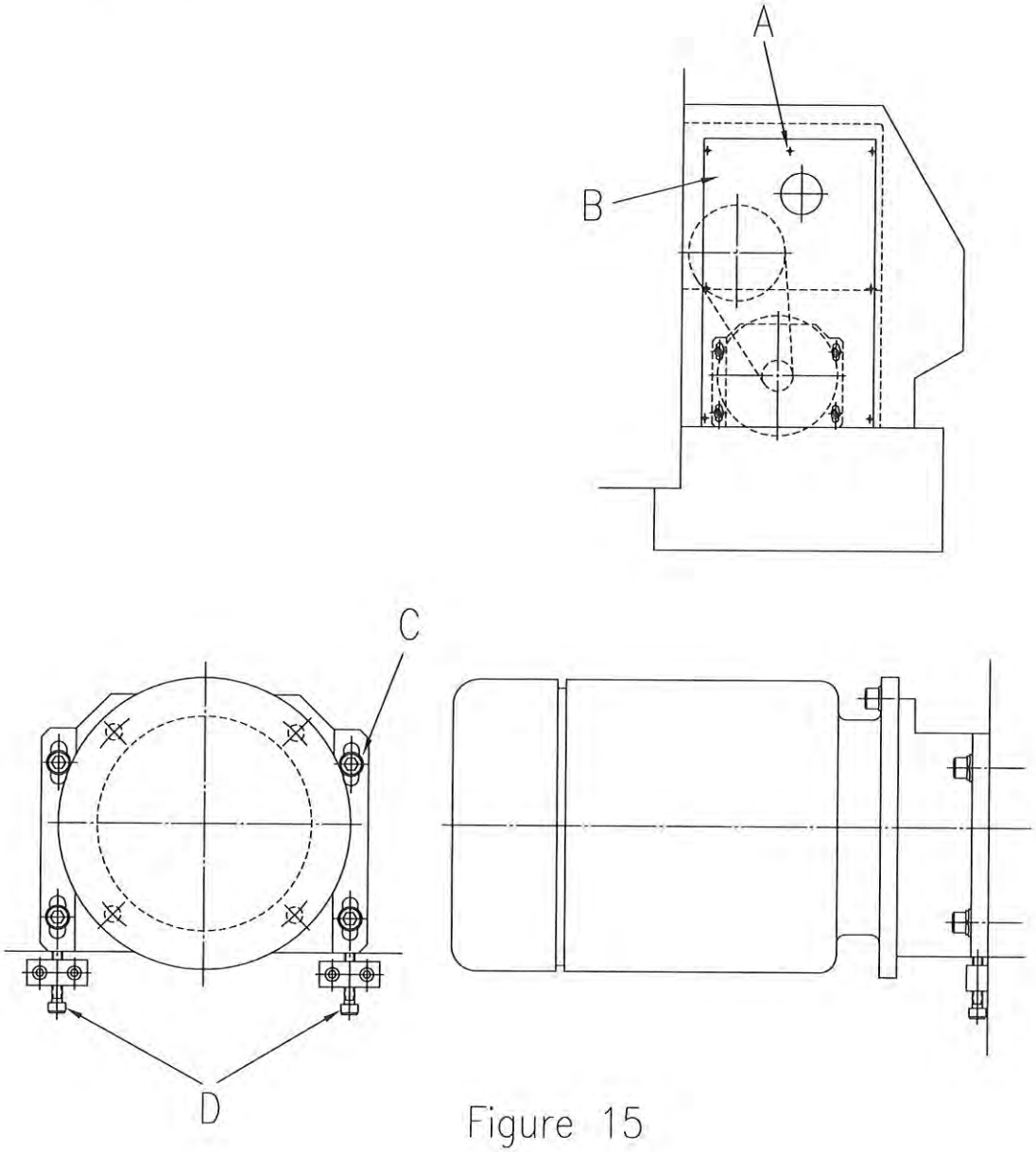


Figure 15

1.Before connecting the power, please notice that the power arrangement of the machine for the spindle requires according to your order to SHARP plus transformer. The way of how to connect the wires is indicated inside the inverter, please input the right voltage then test if the output is exactly 220VAC, then connect to the machine if the output is correct.

2.Before power on, scrutinize if every equipment is complete and fixed in the proper place.

3.Input the power after everything is checked normal, press down the emergency button before turning on the power switch on, you can release the button if everything come out OK., this is a must procedure for the every first installation.

4.When the power is turned on, press the RESET key to check if the rotating directions of spindle and coolant motor are correct.

5.Check if the lub is functioning and infuse to prevent table from damage.

6.Do not pile stuff within operating range.

7.Before turning the power on, please check:

(1) Inspect if any external damage on cord, if yes, contact local dealer.
Inspect if any damage on CNC panel or screen, if yes, contact local dealer.

(2) Fill up the lubrication in the lub tank.

(3) Check if any wire dropped off.

(4) Check up the accessories against the list.

8. After power, please check:

(1) Make sure that the rotation directions of spindle motor and coolant motor are correct.

(2) Inspect if the lub working properly.

(3) Check if the machine lamp working.

(4) Check if the servo motor on 2 axes working properly.

9. Voltages required:

Spindle: 15HP, 220V,50A /15HP,380V,35A

Spindle: 20HP, 220V,75A /20HP,380V,50A

Spindle: 25HP, 220V,100A /25HP,380V,60A

10. Power rate:

(1) Spindle : 15HP,20HP, 25HP

(2) Coolant: 1/4HP

(3) Lub: 1/4W

(4) Machine lamp : 50W

(5) X & Z axes : 2000W

(6) Controller : 300W

3.11 ELECTRIC EQUITMENT

3.11.1 Motor

Spindle motor is equipped with IP . Therefore, no special care in required. Have qualified technician check and clean it every six months is OK. Other motors should be checked annually.

Spindle with taper roller bearings by force lubrication. Spindle speed for with cylindrical roller bearing is already greased before shipping, grease amount is able to support 8-10 hours of daily operation up tow years, Still, it is recommended to check it annually by qualified mechanic, the bearing in other shaft of headstock by force lubrication.

3.11.2 Control Units

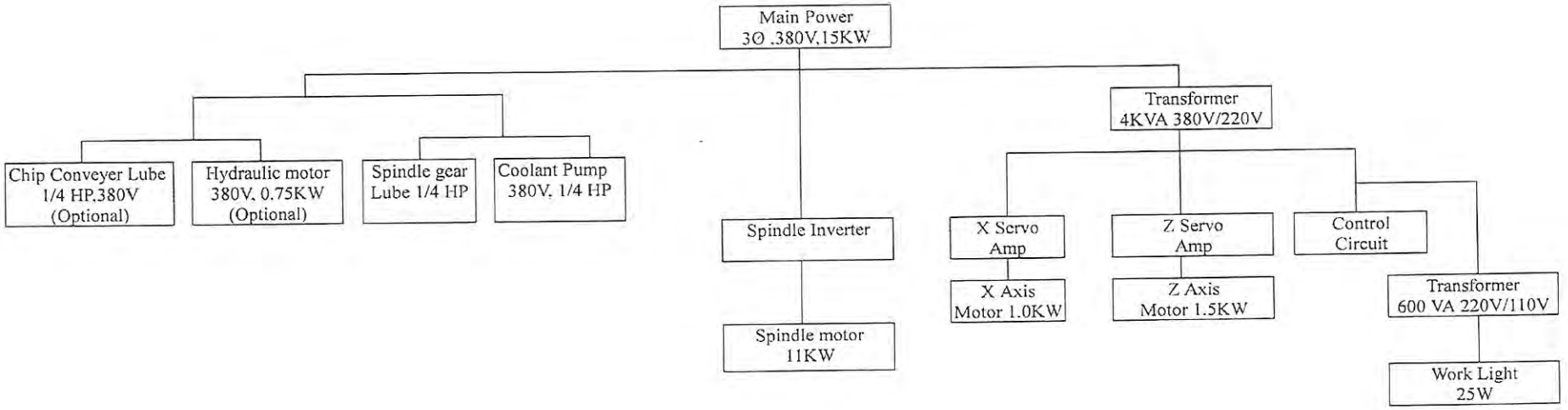
No special care is required. Cleaning LCD monitor and key board by using none detergent soap.

3.11.3 Wire Connectors

Check them annually, and tighten if necessary.

3 11.4 Simple Trouble Shooting

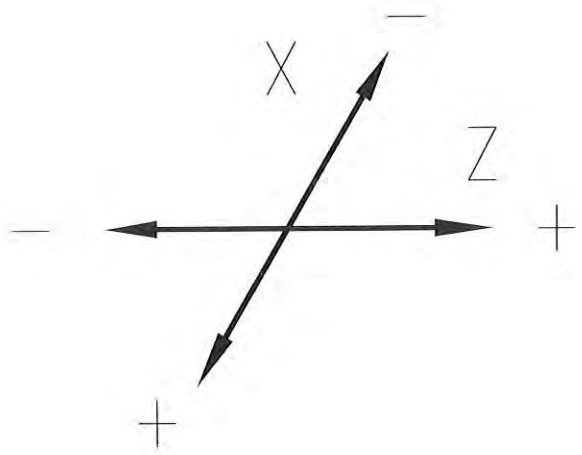
Description	Possible Cause	Repair Method
Lubricant level down to bottom while spindle is runnmg	Oil insufficient	Add oil into headstock
	Pump path clogged	Remove the object that clogs the pump outlet
Rails on bed tum black	Automatic lubrication system out of lubricant	Add lubricant
	Inappropriate oil proper ties	Immediately replace the oil
	Oil tube clogged	Replace tube or clear the clogged object
Cylindrical machined into conical shape	Spindle head slick	Please refer to Chapter 3.10.1 to adjust the accuracy
Inaccurate machining between two centers	Poor accuracy on centers	Please refer to Chapter 3.10.6 to adjust the accuracy
Step appear on spherical workpiece surface	Inaccurate backlash compensation	Please refer to Chapter backlash Offset and adjustment
Too much temperature rise during spindle running	Invalid greasing	Check if there is oil leaking from the oil gauge

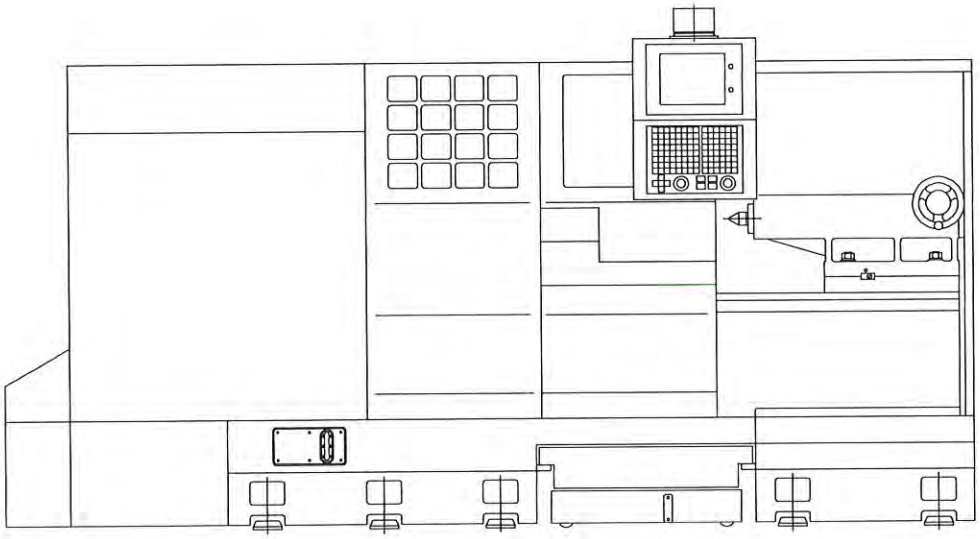

Main Power
3Ø ,380V,15KW
Chip Conveyer Lube
1/4 HP,380V
(Optional)
Hydraulic motor
380V, 0.75KW
(Optional)
Spindle gear
Lube 1/4 HP
Coolant Pump
380V, 1/4 HP
Spindle Inverter
Spindle motor
11KW
Transformer
4KVA 380V/220V
X Servo
Amp
X Axis
Motor 1.0KW
Z Servo
Amp
Z Axis
Motor 1.5KW
Control
Circuit
Transformer
600 VA 220V/110V
Work Light
25W

4. OPERATION

4.1 MOVING DIRRECTION

X=Moving direction of cross slide.
Z=Moving direction of saddle.





4.2 MACHINE OPERATION

Start Machine Procedure

1. Power On
2. Press "ON" switch from control panel
3. Check if the monitor flashed
4. Release "EMERGENCY" stop from control panel
5. Press " CLEAR" button from control panel

CLOSE MACHINE PROCEDURE

1. Press "EMERGENCY" stop from control panel
2. Turn "OFF" from control panel
3. Power OFF

The spindle speed of this machine is 50 r.p.m. while safety door is opened under manual mode.

The safety door can not open unless change workpiece or manual operation condition.

HOW TO USE DOOR INTERLOCK FUNCTION

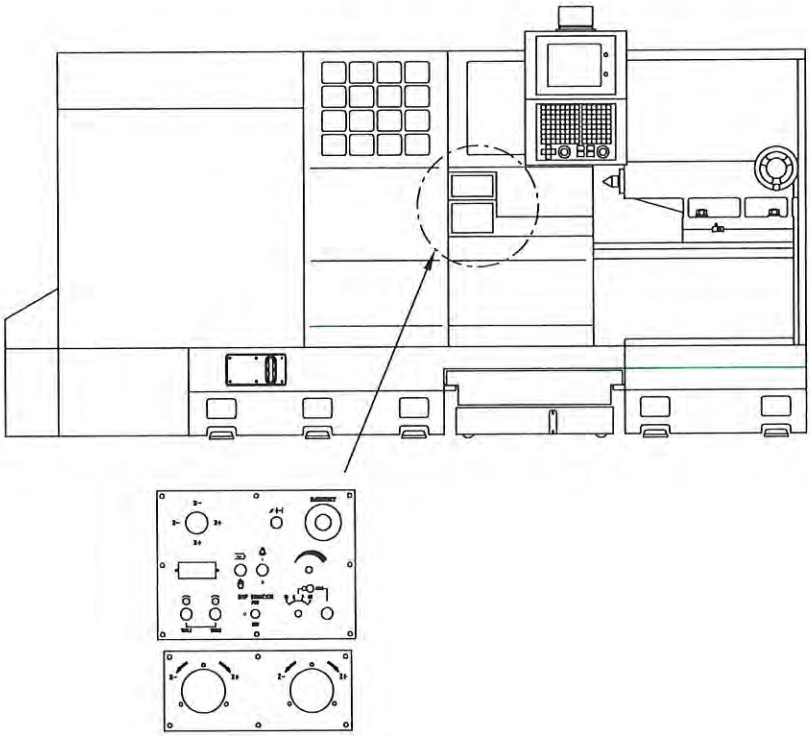
To protect operator while machine is operated, the door can not open to avoid workpiece injury operator.

The operator clamp workpiece into chuck first, then close door next, press "CYCLE START" button from control panel.

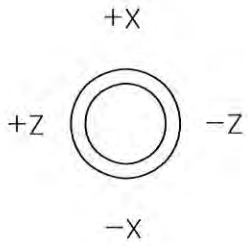
How to close safety door: Press "02"pad from key board, the monitor will shows "door is lock or not"

How to open safety door: Stop machine first, then press"02"from keyboard, the safety door can be opened.

4.2.1 Operatior Panel

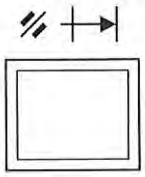


X-Axis Rapid Feed Handle



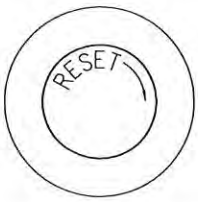
The handle move to the action, the tool rapid move to its action(for example, the handle one "X" direction, the tool goes to"X" direction.

X-Axis over-travel release button



The machine will emergency stop while X,Z axis overtravel,press this button then move manual feed handwheel ,makes tool pust leave overtravel area, then release this switch.

Emergency Stop



This button is used in case of emergency, if this machine gets any trouble or works in wrong way, push this button immediately.

Spindle load meter

This meter indicates the load applied to the main motor in percent (%),when the spindle speed is in the rated output range, the 100% on the scale drepresents continuous rating, 150% represents 30 minutes, do not overload running which will cause spindle motor be damaged.

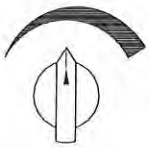
Automatic, Manual select switch

Turn this switch on "Automatic"position , mcahine operation by control panel.
Turn this switch on "Manual"position , mcahine operation manual turning.

Light

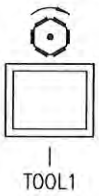
Turn this switch on "On"position ,then light eell be open.

Spindle Speed Manual



This switch could control spindle speed, the speed change to slow when switch turn left, the speed change to quickly when switch turn right.

Tools changeed button(Option)



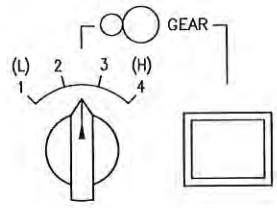
Push this button once, the tool goes to next position.

Chip conveyer control button(Option)

Chip conveyer

1.Turn this switch on "FOR" position , the chip come out.
2.Turn this switch on "O" position , the chip conveyer stop running.
3.If chips cound not come out,turn this switch on " REV"position , keep chip conveyer reverse running several second, the turn the switch on "FOR" position.

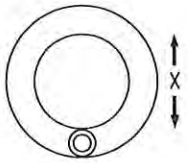
Spindle speed control switch



1)Turn this switch to the position

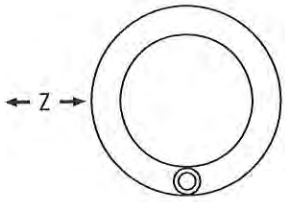
2)Push the right side of the button ,then the spindle running.

X Axis select switch



Select X axis push +X or -X and the lamp o

Z Axis select switch



Select Z axis push +Z or -Z and the lamp on.

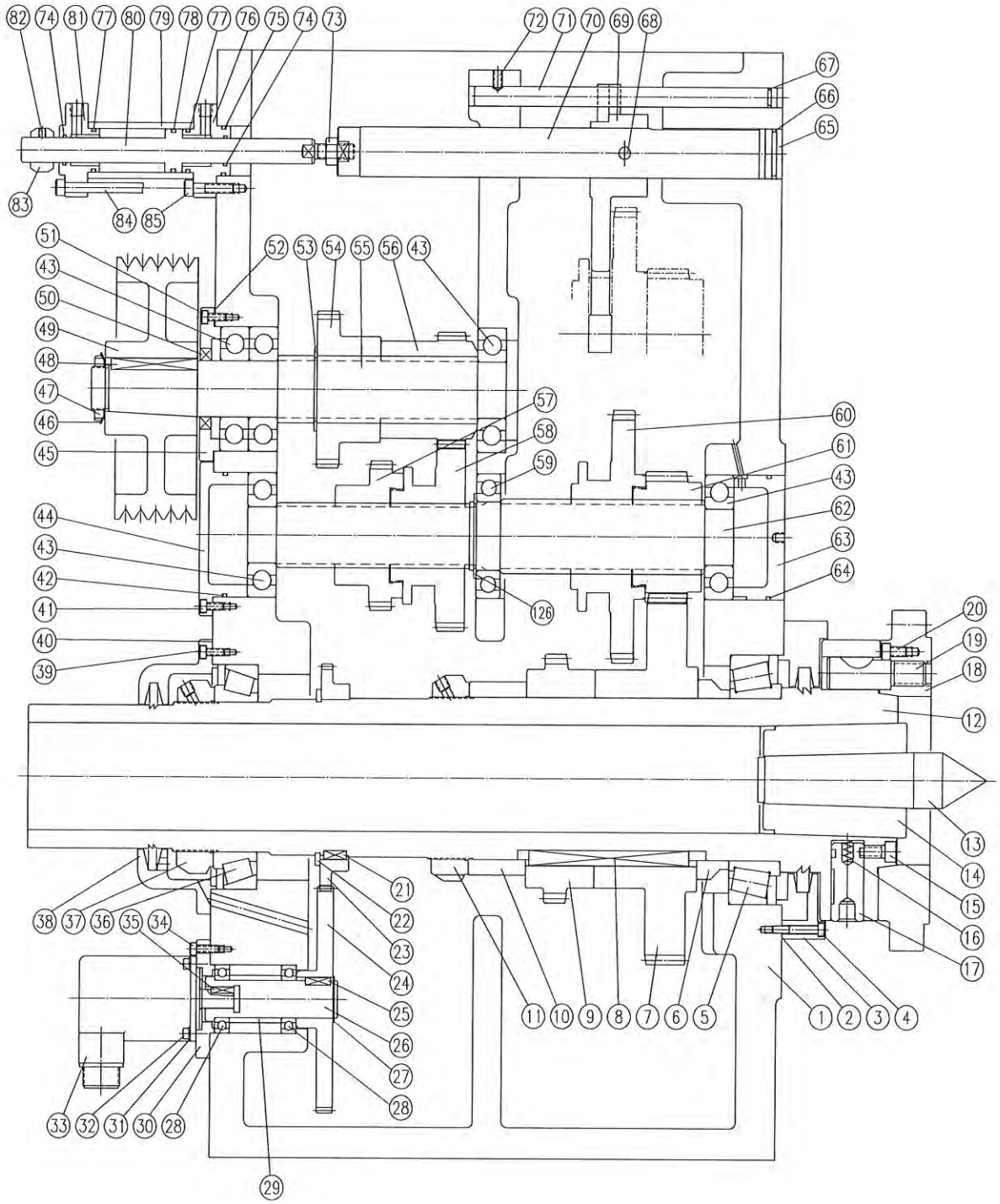
5. PARTS LIST

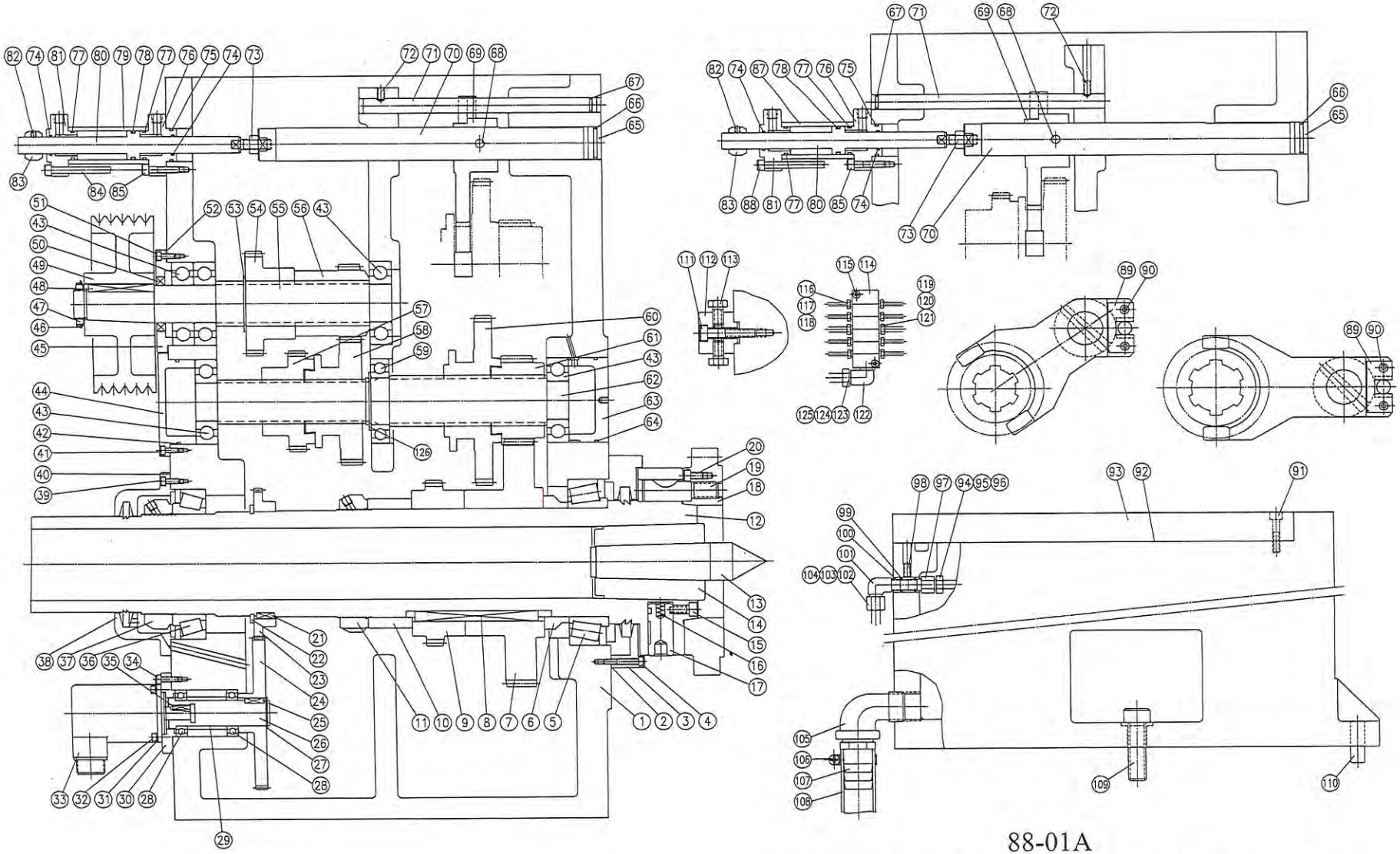
CONTENT

Construction	Page
Headstock	77- 116
X,Z- Axis	117-126
Tailstock	127-130
Sheet Metal	131-138

88-01A

Headstock (Spindle bore 86mm,taper roller bearing) (1/3)



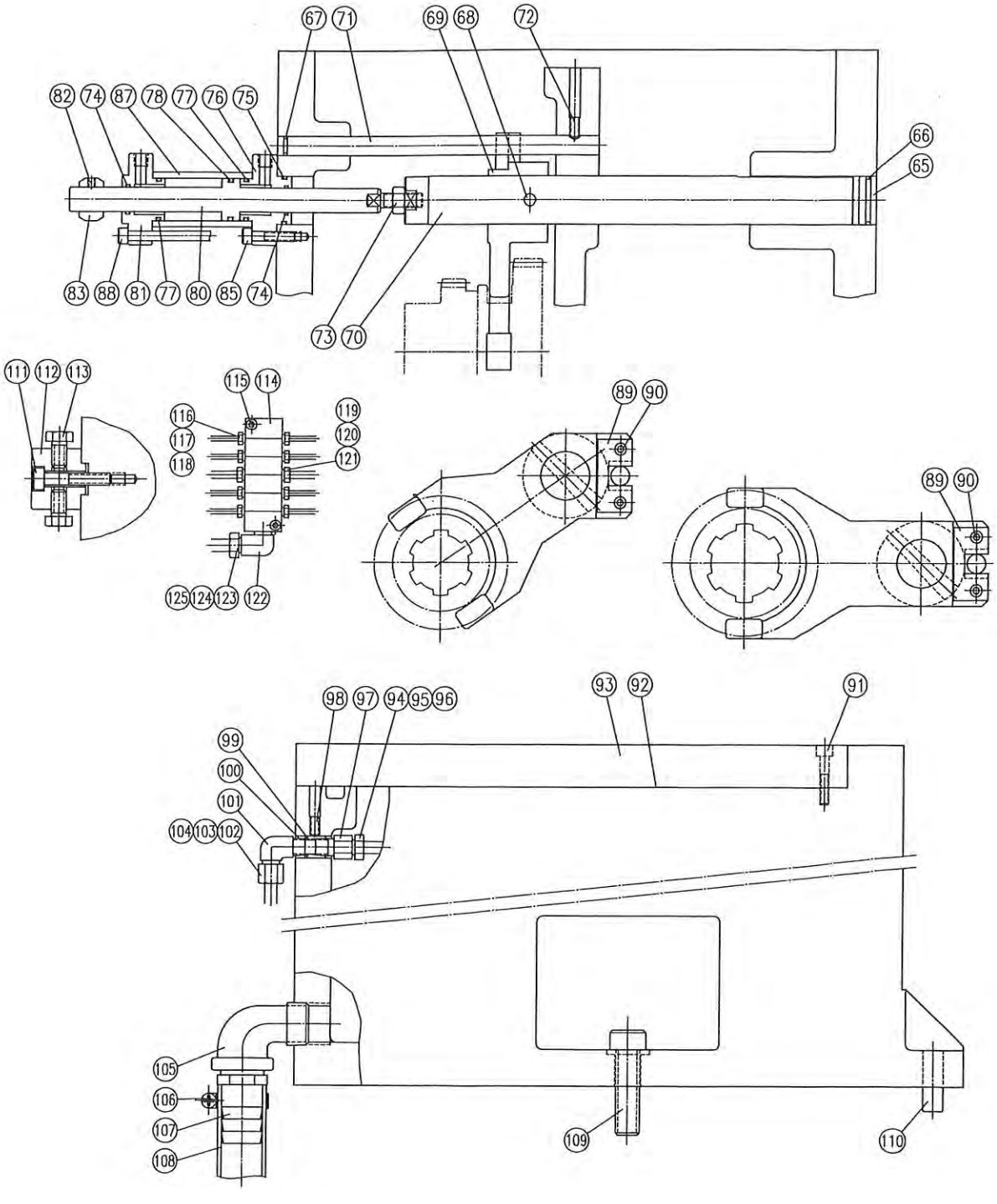


88-01A

dstock (Spindle bore 86mm,taper roller bearing) (2/3)

88-01A

Headstock (Spindle bore 86mm,taper roller bearing) (3/3)



88-01A

HEADSTOCK (TAPER ROLLER BEARING, SPINDLE BORE 86MM, 1600 R.P.M.)

REF. NO.	PARTS NO.	PARTS NAME	DIMENSION	Q'TY
1	88-0101A-00	Headstock Casting		1
2	88-0161A-00	Packing		1
3	88-0151A-00	Bearing Cover		1
4		Socket Head Cap Screw	M6x45L	6
5		Taper Roller Bearing	#32026	1
6	88-0103A-00	Spacer		1
7	88-0107A-00	Gear	2.5Mx83T	1
8	88-0144A-00	Parallel Key		1
9	88-0108A-00	Gear		1
10	88-0106A-00	Spacer		1
11	69-0146-00	Nut	M130xP2.0	1
12	88-0102A-00	Spindle	D1-8	1
13	63-01118-00	Center		1
14	88-0148A-00	Center Sleeve		1
15	63-01112-00	Detent Screw		6
16	50-01111-00	Detent Spring		6
17	63-01110-00	Cam		6
18	63-01122A-00	Back Plate For 3-Jaw Chuck	10"	1
19	63-01119-00	Cam Luck Stud		6
20		Socket Head Cap Screw	5/16"-18UNCx16L	6
21		Double Round Head Key	8x7x20L	1
22		Retaining Ring	S125	1
23	88-0109A-00	Gear	2.0Mx89T	1
24	88-0126-00	Gear	2.0Mx89T	1
25		Double Round Head Key	6x6x20L	1
26	88-0127-00	Shaft		1
27		Retaining Ring	S30	1
28		Deep Groove Ball Bearing	#6006	2
29	88-0128-00	Spacer		1
30	88-0129-00	Support Bracket		1
31		Spring Washer	M5	4
32		Socket Head Cap Screw	M5x16L	4
33		Encoder		1

88-01A

HEADSTOCK(TAPER ROLLER BEARING, SPINDLE BORE 86MM 1600 R.P.M.)

REF. NO.	PARTS NO.	PARTS NAME	DIMENSION	Q'TY
34		Socket Head Cap Screw	M6X20L	4
35		Double Round Head Key	5x5x20L	1
36		Taper Roller Bearing	#32024	1
37	88-0147A-00	Nut	M120xP2.0	1
38	88-0113A-00	Bearing Cover		1
39		Socket Head Cap Screw	M6x16L	5
40	88-0162A-00	Packing		1
41		Socket Head Cap Screw	M6x16L	4
42		O-Ring	G95	1
43		Deep Groove Ball Bearing	#6309	5
44	88-0120-00	Bearing Cover		1
45	88-0124-00	Bearing Cover		1
46		Locking Washer	AW07	1
47		Locking Nut	AN07	1
48		Double Round Head Key	14x9x75L	1
49	88-0149A-00	Pulley		1
50		Oil Seal	TC45x65x10	1
51		Socket Head Cap Screw	M6x16L	4
52	88-0125-00	Packing		1
53		Retaining Ring	S55	1
54	88-0123-00	Gear	3.0M x40T	1
55	88-0121-00	Input Shaft		1
56	88-0122-00	Gear	3.0M x29T	1
57	88-0119-00	Gear	3.0M x38T	1
58	88-0118-00	Gear	3.0M x49T	1
59		Deep Groove Ball Bearing	#6211	1
60	88-0117-00	Gear	3.5M x56T	1
61	88-0116-00	Gear	3.5M x28T	1
62	88-0115-00	Gear Shaft		1
63	88-0114-00	Bearing Plug		1
64		O-Ring	G95	1

88-01A

HEADSTOCK (TAPER ROLLER BEARING, SPINDLE BORE 86MM 1600 R.P.M.)

REF. NO.	PARTS NO.	PARTS NAME	DIMENSION	Q'TY
65	88-0145-00	Cover		2
66		O-Ring	G35	2
67		O-Ring	P12	2
68		Taper Pin	φ 10x70L	2
69	88-0131-00	Shifting Arm		1
70	88-0130-00	Change Speed Rod		2
71	88-0140-00	Positioning Rod		2
72		Set Screw	M8x16L	2
73		Hexagon Nut	M12xP1.25	2
74		O-Ring	P20	4
75		O-Ring	G35	2
76	88-0136-00	Front Cover		2
77		O-Ring	G30	4
78		O-Ring	P29	2
79	88-0137-00	Hydraulic Cylinder		1
80	88-0135-00	Hydraulic Rod		2
81	88-0138-00	Rear Cover		2
82		Set Screw	M6x8L	2
83	77A-0153-00	Touch Block		2
84		Socket Head Cap Screw	M8x130L	4
85		Socket Head Cap Screw	M8x35L	8
87	88-0139-00	Hydraulic Cylinder Tank		1
88		Socket Head Cap Screw	M8x120L	4
89	79-0134-00	Positioning Block		2
90		Socket Head Cap Screw	M6x20L	4
91		Socket Head Cap Screw	M8x40L	8
92	88-0165-00	Packing Pad		1
93	88-0164-00	Upper Cover		1
94		Thimble	φ 10	1
95		Thimble Nut	φ 10	1

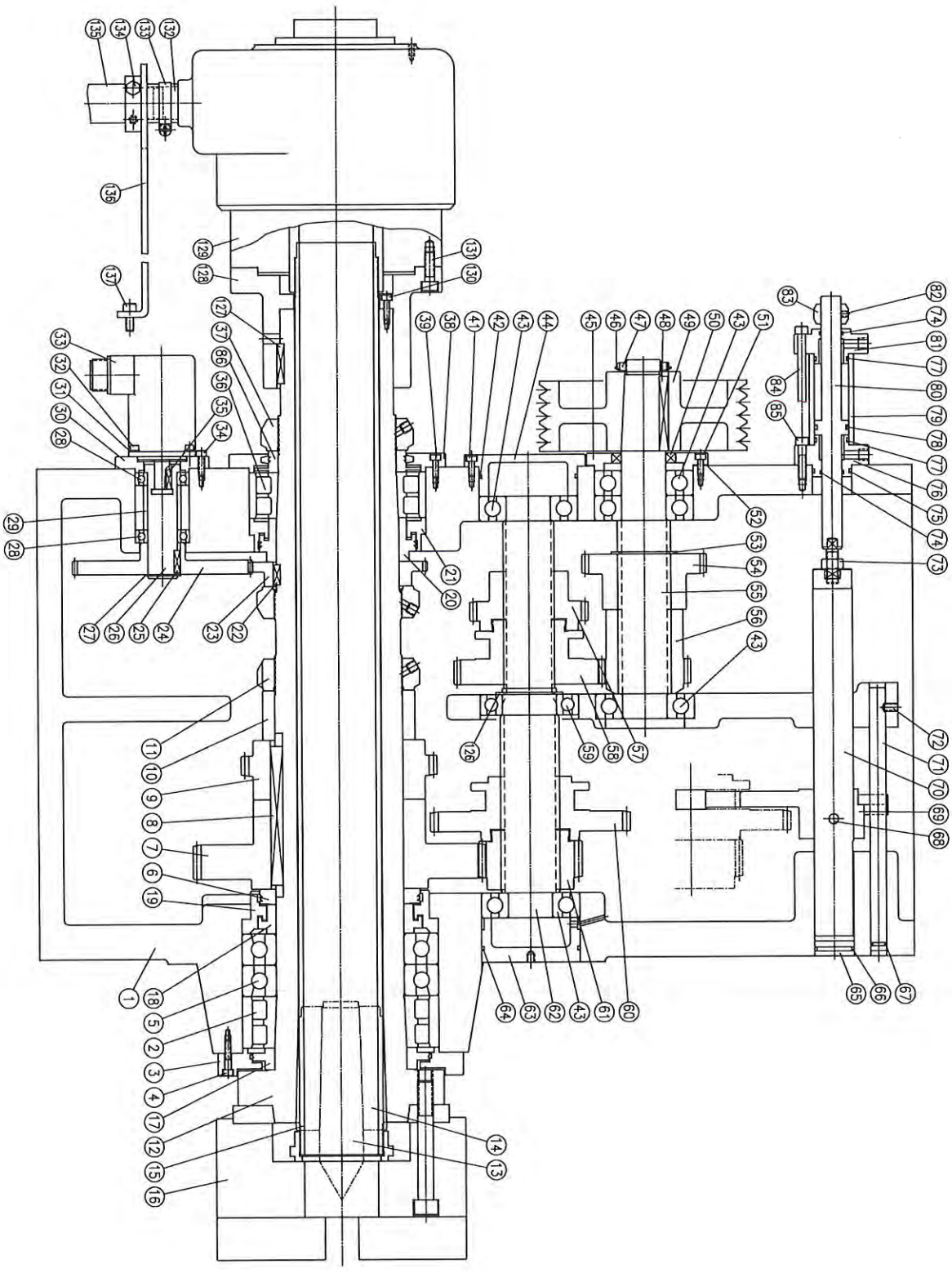
88-01A

HEADSTOCK (TAPER ROLLER BEARING, SPINDLE BORE 86MM 1600 R.P.M.)

REF.NO.	PARTS NO.	PARTS NAME	DIMENSION	Q'TY
96		Oil Tube	φ10	1
97		Coupling	PT1/4-M16	1
98		Set Screw	M8x16L	1
99		O-Ring	P14	1
100	77A-0163-00	Coupling		1
101		Straight Joint	PT1/4-M16	1
102		Thimble	φ10	1
103		Thimble Nut	φ10	1
104		Oil Tube	φ10	1
105		Straight Joint	PT1"	1
106		Tube Tighter	1-1/2"	1
107		Adapter	PT1"xφ33	1
108		Rubber Tube	φ33	1
109		Socket Head Cap Screw	M20x70L	6
110	50-01113-00	Positioning Pin		1
111		Socket Head Cap Screw	M12x55L	1
112	50-01114-00	Adjusting Block		1
113		Hexagon Nut	M12x25L	2
114	77A-0164-00	Oil Distributor		1
115		Socket Head Cap Screw	M5x30L	2
116		Thimble	φ4	8
117		Thimble Nut	φ4	8
118		Oil Tube	φ4	8
119		Thimble	φ6	2
120		Thimble Nut	φ6	2
121		Oil Tube	φ6	2
122		Straight Joint	PT1/4-M16	1
123		Thimble	φ10	1
124		Thimble Nut	φ10	1
125		Oil Tube	φ10	1
126		Retaining Ring	S55	1

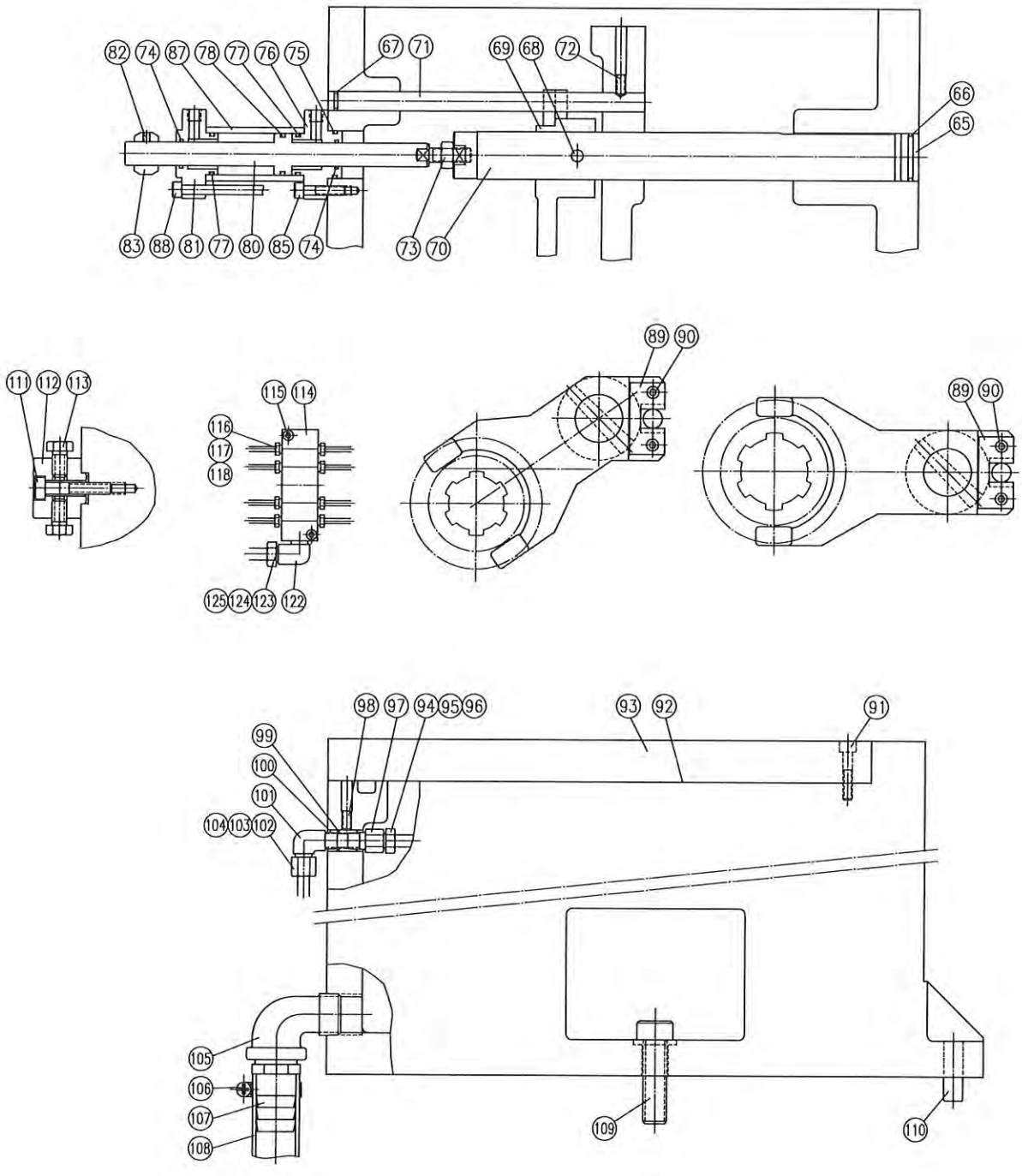
88-01B

Headstock (Spindle bore 86mm,cylindrical roller bearing) (1/4)



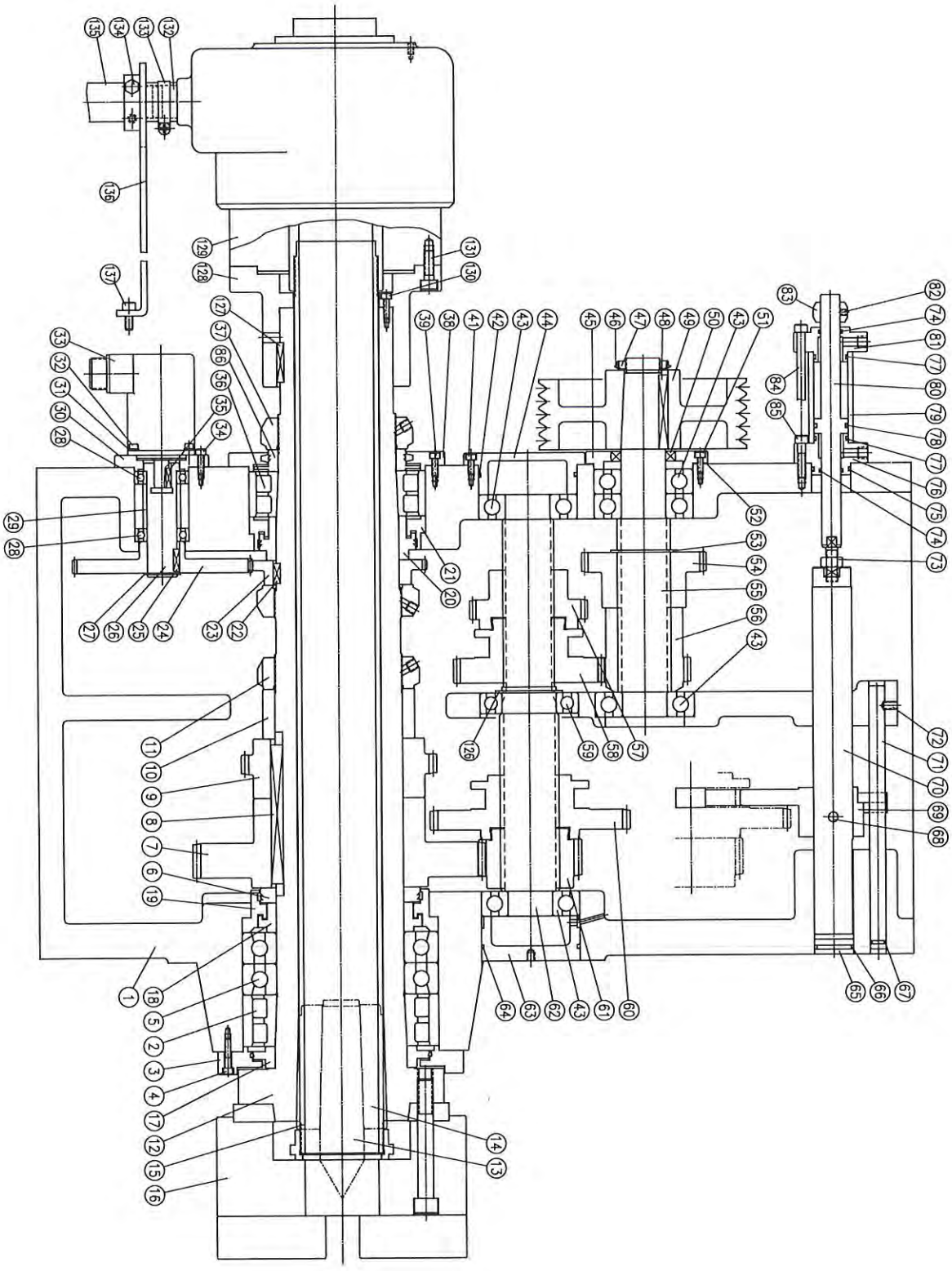
88-01B

Headstock (Spindle bore 86mm,cylindrical roller bearing) (2/4)



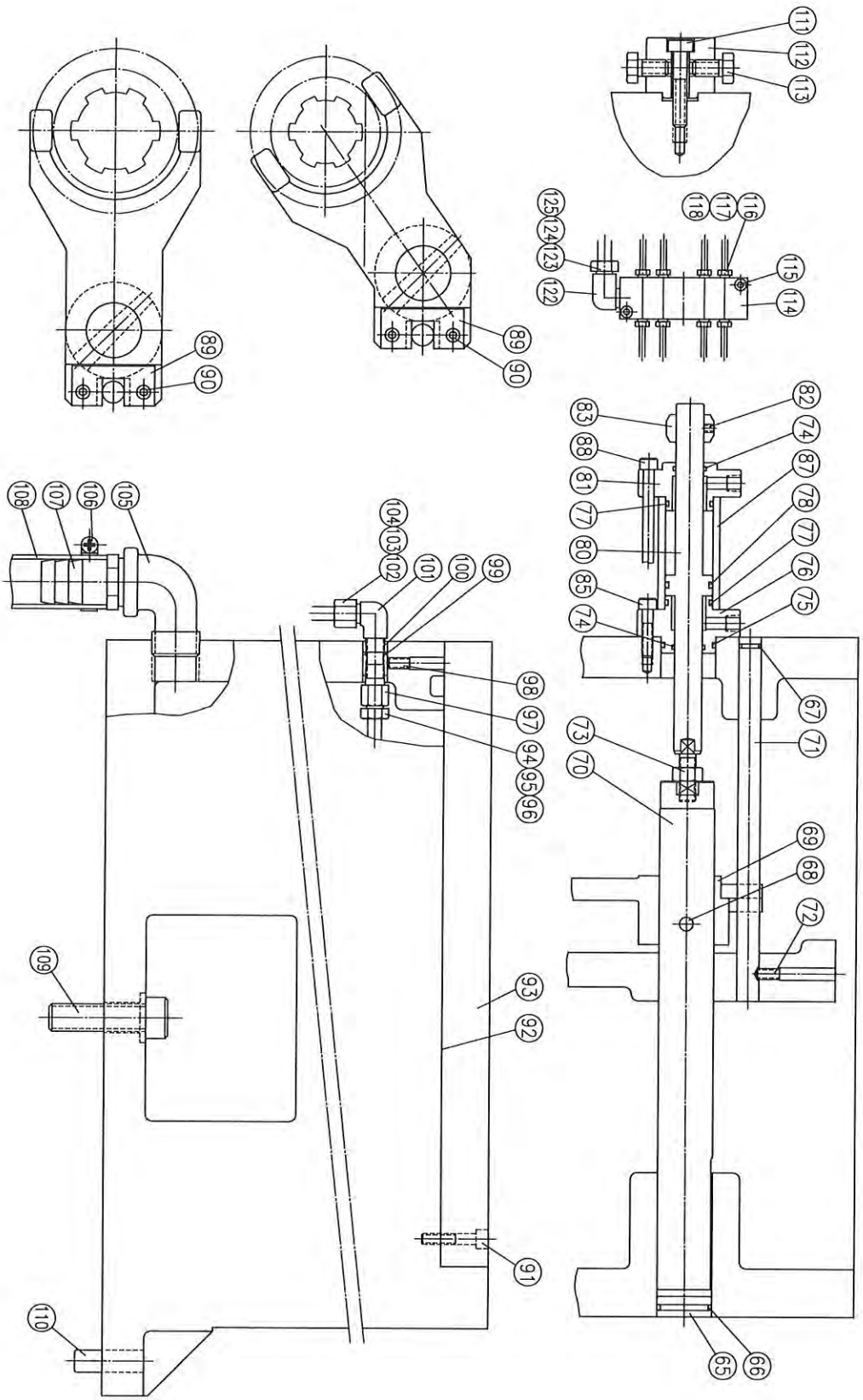
88-01B

Headstock (Spindle bore 86mm,cylindrical roller bearing) (3/4)



88-01B

Headstock (Spindle bore 86mm,cylindrical roller bearing) (4/4)



88-01B

HEADSTOCK (CYLINDRICAL BEARING, SPINDLE BORE 86MM, 2000 R.P.M.)

REF.NO.	PARTS NO.	PARTS NAME	DIMENSION	Q'TY
1	88-0101B-00	Headstock Casting		1
2		Cylindrical Roller Bearing	NN3026K	1
3	88-0151B-00	Bearing Cover		1
4		Socket Head Cap Screw	M6x45L	6
5		Angular Contact Ball Bearing	130BA10X	1
6	88-0105B-00	Spacer		1
7	88-0107A-00	Gear	2.5Mx83T	1
8	88-0144A-00	Parallel Key		1
9	88-0108A-00	Gear		1
10	88-0106A-00	Spacer		1
11	69-0146-00	Nut	M130xP2.0	2
12	88-0102B-00	Spindle	A2-8	1
13	63-01118-00	Center		1
14	88-0148A-00	Center Sleeve		1
15	88-0142B-00	Draw Tube		1
16		Hydraulic Chuck		1
17	88-0152B-00	Spacer		1
18	88-0103B-00	Spacer		1
19	88-0104B-00	Anti-Leaking Ring		6
20	88-0110B-00	Spacer		1
21	88-0111B-00	Anti-Leaking Ring		1
22		Double Round Head Key	8x7x20L	1
23	88-0109A-00	Gear	2.0Mx89T	1
24	88-0126-00	Gear	2.0Mx89T	1
25		Double Round Head Key	6x6x20L	1
26	88-0127-00	Shaft		1
27		Retaining Ring	S30	1
28		Deep Groove Ball Bearing	#6006	2
29	88-0128-00	Spacer		1
30	88-0129-00	Support Bracket		1
31		Spring Washer	M5	4

88-01B

HEADSTOCK (CYLINDRICAL BEARING, SPINDLE BORE 86MM, 2000 R.P.M.)

REF.NO.	PARTS NO.	PARTS NAME	DIMENSION	Q'TY
32		Socket Head Cap Screw	M5x16L	4
33		Speed Coder		1
34		Socket Head Cap Screw	M6X20L	4
35		Double Round Head Key	5x5x20L	1
36		Cylindrical Roller Bearing	NN3024K	1
37	88-0147A-00	Nut	M120xP2.0	1
38	88-0113B-00	Bearing Cover		1
39		Socket Head Cap Screw	M6x16L	5
41		Socket Head Cap Screw	M6x16L	4
42		O-Ring	G95	1
43		Deep Groove Ball Bearing	#6309	5
44	88-0120-00	Bearing Cover		1
45	88-0124-00	Bearing Cover		1
46		Locking Washer	AW07	1
47		Locking Nut	AN07	1
48		Double Round Head Key	14x9x75L	1
49	88-0149B-00	Pulley		1
50		Oil Seal	TC45x65x10	1
51		Socket Head Cap Screw	M6x16L	4
52	88-0125-00	Packing		1
53		Retaining Ring	S55	1
54	88-0123-00	Gear	3.0M x40T	1
55	88-0121-00	Input Shaft		1
56	88-0122-00	Gear	3.0M x29T	1
57	88-0119-00	Gear	3.0M x38T	1
58	88-0118-00	Gear	3.0M x49T	1
59		Deep Groove Ball Bearing	#6211	1
60	88-0117-00	Gear	3.5M x56T	1
61	88-0116-00	Gear	3.5M x28T	1
62	88-0115-00	Gear Shaft		1

88-01B

HEADSTOCK (CYLINDRICAL BEARING, SPINDLE BORE 86MM, 2000 R.P.M.)

REF.NO.	PARTS NO.	PARTS NAME	DIMENSION	Q'TY
63	88-0114-00	Bearing Plug		1
64		O-Ring	G95	1
65	88-0145-00	Cover		2
66		O-Ring	G35	2
67		O-Ring	P12	2
68		Taper Pin	φ 10x70L	2
69	88-0131-00	Shifting Arm		1
70	88-0130-00	Change Speed Rod		2
71	88-0140-00	Positioning Rod		2
72		Set Screw	M8x16L	2
73		Hexagon Nut	M12xP1.25	2
74		O-Ring	P20	4
75		O-Ring	G35	2
76	88-0136-00	Front Cover		2
77		O-Ring	G30	4
78		O-Ring	P29	2
79	88-0137-00	Hydraulic Cylinder		1
80	88-0135-00	Hydraulic Rod		2
81	88-0138-00	Rear Cover		2
82		Set Screw	M6x8L	2
83	77A-0153-00	Touch Block		2
84		Socket Head Cap Screw	M8x130L	4
85		Socket Head Cap Screw	M8x35L	8
86	88-0112B-00	Spacer		1
87	88-0139-00	Hydraulic Cylinder Tank		1
88		Socket Head Cap Screw	M8x120L	4
89	79-0134-00	Positioning Block		2
90		Socket Head Cap Screw	M6x20L	4
91		Socket Head Cap Screw	M8x40L	8
92	88-0165-00	Packing Pad		1
93	88-0164-00	Upper Cover		1

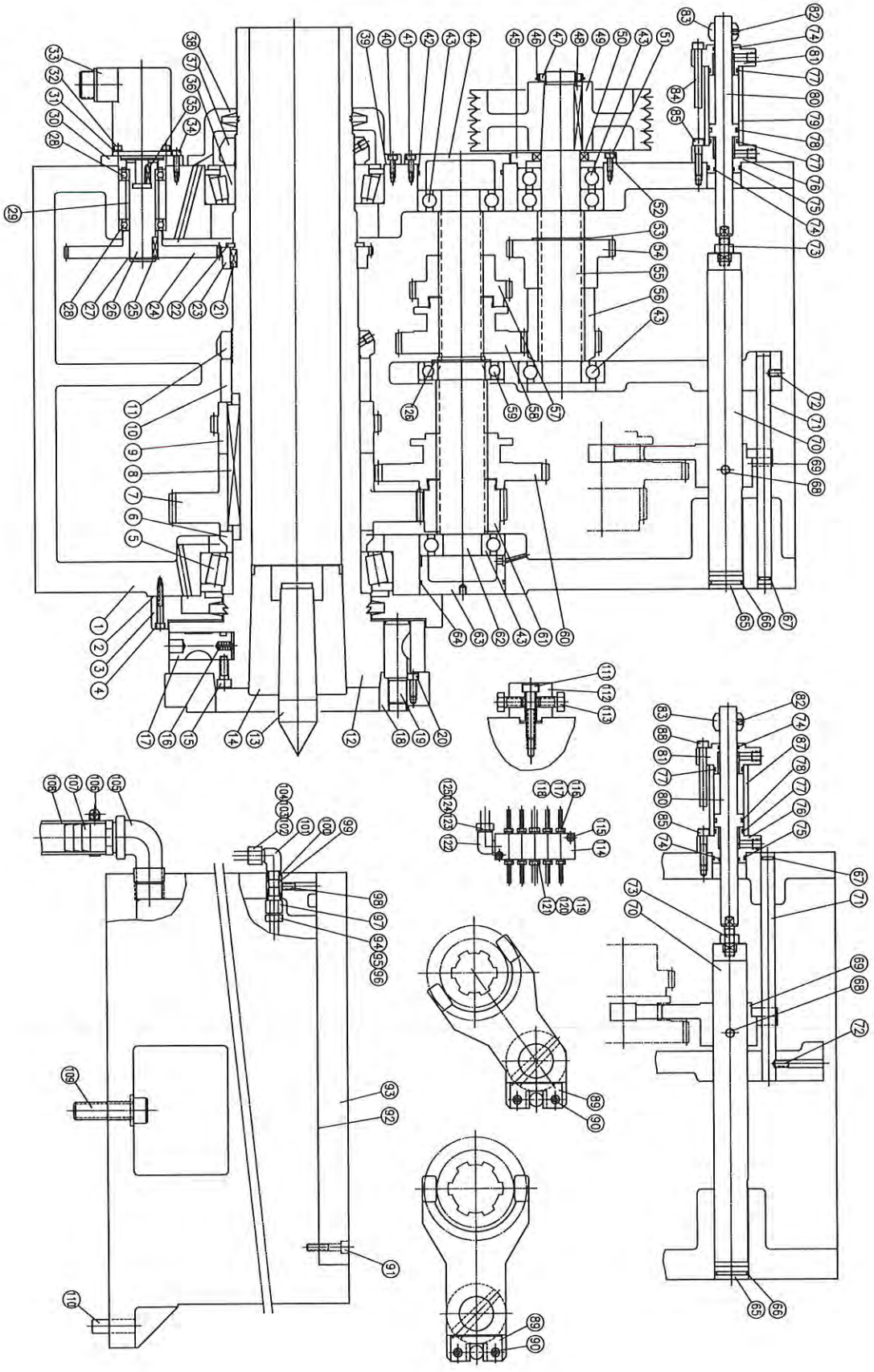
88-01B

HEADSTOCK (CYLINDRICAL BEARING, SPINDLE BORE 86MM, 2000 R.P.M.)

REF.NO.	PARTS NO.	PARTS NAME	DIMENSION	Q'TY
125		Oil Tube	φ10	1
126		Retaining Ring	S55	1
127		Double Round Head Key	8x7x40L	1
128	88-0141B-00	Hydraulic Cylinder Connection Bracket		1
129		Cylinder	S1875	1
130		Socket Head Cap Screw	M6x20L	4
131		Socket Head Cap Screw	M10x30L	6
132		Adapter	PT1"x φ33	1
133		Tube Tighter	1-1/2"	1
134		Socket Head Cap Screw	M5x10L	2
135		Rubber Tube	φ33	1
136	88-0150B-00	Stop Running Plate		1
137		Socket Head Cap Screw	M8x20L	2

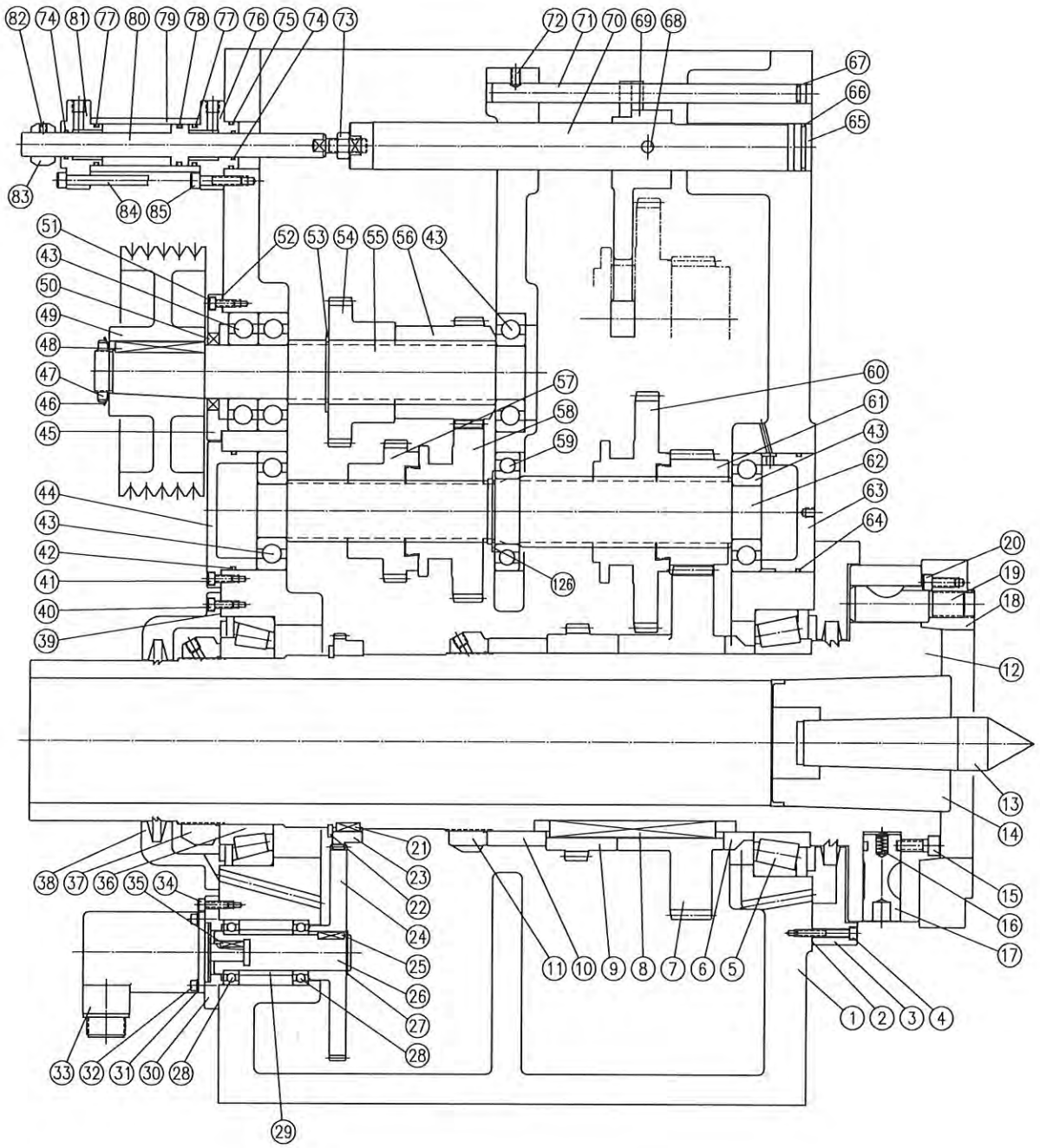
88-01C

Headstock (Spindle bore 105mm,taper roller bearing) (1/3)



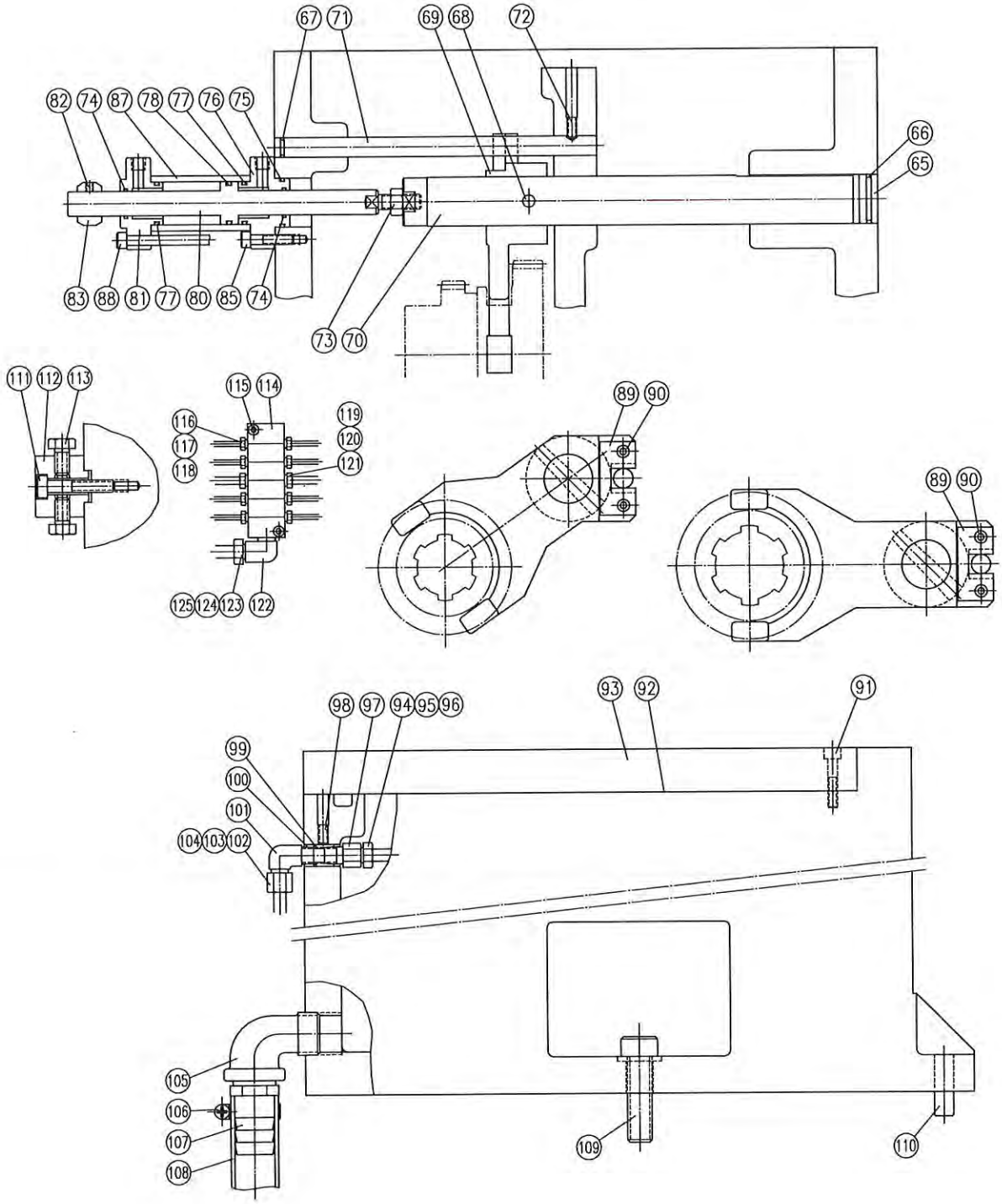
88-01C

Headstock (Spindle bore 105mm,taper roller bearing) (2/3)



88-01C

Headstock (Spindle bore 105mm,taper roller bearing) (3/3)



88-01C

HEADSTOCK (TAPER ROLLER BEARING, SPINDLE BORE 105MM, 1200 R.P.M.)

REF. NO.	PARTS NO.	PARTS NAME	DIMENSION	Q'TY
1	88-0101C-00	Headstock Casting		1
2	88-0161C-00	Packing		1
3	69-0151A-01	Bearing Cover		1
4		Socket Head Cap Screw	M6x45L	6
5		Taper Roller Bearing	#32030	1
6	88-0103C-00	Spacer		1
7	88-0107C-00	Gear	2.5Mx83T	1
8	88-0144C-00	Parallel Key		1
9	88-0108C-00	Gear		1
10	88-0106C-00	Spacer		1
11	88-0146C-00	Nut	M150xP2.0	1
12	88-0102C-00	Spindle		1
13	63-01118-00	Center		1
14	69-01117-00	Center Sleeve		1
15	69-01112-00	Detent Screw		6
16	50-01111-00	Detent Spring		6
17	69-01110-00	Cam		6
18	69-01122A-00	3-Jaw Chuck Back Plate	12"	1
19	69-01119-00	Cam Stud		6
20		Socket Head Cap Screw	M8xP1.25x20L	6
21		Double Round Head Key	8x7x20L	1
22		Retaining Ring	S145	1
23	88-0109C-00	Gear	2.0Mx89T	1
24	88-0126-00	Gear	2.0Mx89T	1
25		Double Round Head Key	6x6x20L	1
26	88-0127-00	Shaft		1
27		Retaining Ring	S30	1
28		Deep Groove Ball Bearing	#6006	2
29	88-0128-00	Spacer		1
30	88-0129-00	Support Bracket		1

88-01C

HEADSTOCK (TAPER ROLLER BEARING, SPINDLE BORE 105MM, 1200 R.P.M.)

REF. NO.	PARTS NO.	PARTS NAME	DIMENSION	Q'TY
31		Spring Washer	M5	4
32		Socket Head Cap Screw	M5x16L	4
33		Speed Coder		1
34		Socket Head Cap Screw	M6X20L	4
35		Double Round Head Key	5x5x20L	1
36		Taper Roller Bearing	#32028	1
37	69-0147-00	Nut	M140xP2.0	1
38	88-0113C-00	Bearing Cover		1
39		Socket Head Cap Screw	M6x16L	5
40	88-0162C-00	Packing		1
41		Socket Head Cap Screw	M6x16L	4
42		O-Ring	G95	1
43		Deep Groove Ball Bearing	#6309	5
44	88-0120-00	Bearing Cover		1
45	88-0124-00	Bearing Cover		1
46		Locking Washer	AW07	1
47		Locking Nut	AN07	1
48		Double Round Head Key	14x9x75L	1
49	88-0149C-00	Pulley		1
50		Oil Seal	TC45x65x10	1
51		Socket Head Cap Screw	M6x16L	4
52	88-0125-00	Packing		1
53		Retaining Ring	S55	1
54	88-0123-00	Gear	3.0M x40T	1
55	88-0121-00	Input Shaft		1
56	88-0122-00	Gear	3.0M x29T	1
57	88-0119-00	Gear	3.0M x38T	1
58	88-0118-00	Gear	3.0M x49T	1
59		Deep Groove Ball Bearing	#6211	1
60	88-0117-00	Gear	3.5M x56T	1
61	88-0116-00	Gear	3.5M x28T	1

88-01C

HEADSTOCK (TAPER ROLLER BEARING, SPINDLE BORE 105MM, 1200 R.P.M.)

REF. NO.	PARTS NO.	PARTS NAME	DIMENSION	Q'TY
62	88-0115-00	Gear Shaft		1
63	88-0114-00	Bearing Plug		1
64		O-Ring	G95	1
65	88-0145-00	Cover		2
66		O-Ring	G35	2
67		O-Ring	P12	2
68		Taper Pin	φ 10x70L	2
69	88-0131-00	Shifting Arm		1
70	88-0130-00	Change Speed Rod		2
71	88-0140-00	Positioning Rod		2
72		Set Screw	M8x16L	2
73		Hexagon Nut	M12xP1.25	2
74		O-Ring	P20	4
75		O-Ring	G35	2
76	88-0136-00	Front Cover		2
77		O-Ring	G30	4
78		O-Ring	P29	2
79	88-0137-00	Hydraulic Cylinder		1
80	88-0135-00	Hydraulic Rod		2
81	88-0138-00	Rear Cover		2
82		Set Screw	M6x8L	2
83	77A-0153-00	Touch Block		2
84		Socket Head Cap Screw	M8x130L	4
85		Socket Head Cap Screw	M8x35L	8
87	88-0139-00	Hydraulic Cylinder Tank		1
88		Socket Head Cap Screw	M8x120L	4
89	79-0134-00	Positioning Block		2
90		Socket Head Cap Screw	M6x20L	4
91		Socket Head Cap Screw	M8x40L	8
92	88-0165-00	Packing Pad		1

88-01C

HEADSTOCK (TAPER ROLLER BEARING, SPINDLE BORE 105MM, 2000 R.P.M.)

REF. NO.	PARTS NO.	PARTS NAME	DIMENSION	Q'TY
93	88-0164-00	Upper Cover		1
94		Thimble	φ10	1
95		Thimble Nut	φ10	1
96		Oil Tube	φ10	1
97		Straight Joint	PT1/4-M16	1
98		Set Screw	M8x16L	1
99		O-Ring	P14	1
100	77A-0163-00	Adapter		1
101		Straight Joint	PT1/4-M16	1
102		Thimble	φ10	1
103		Thimble Nut	φ10	1
104		Oil Tube	φ10	1
105		Straight Joint	PT1"	1
106		Tube Tighter	1-1/2"	1
107		Adapter	PT1"x φ33	1
108		Rubber Tube	φ33	1
109		Socket Head Cap Screw	M20x70L	6
110	50-01113-00	Positioning Pin		1
111		Socket Head Cap Screw	M12x55L	1
112	50-01114-00	Adjusting Block		1
113		Hexagon Nut	M12x25L	2
114	77A-0164-00	Oil Distributor		1
115		Socket Head Cap Screw	M5x30L	2
116		Thimble	φ4	8
117		Thimble Nut	φ4	8
118		Oil Tube	φ4	8
119		Thimble	φ6	2
120		Thimble Nut	φ6	2
121		Oil Tube	φ6	2
122		Straight Joint	PT1/4-M16	1
123		Thimble	φ10	1

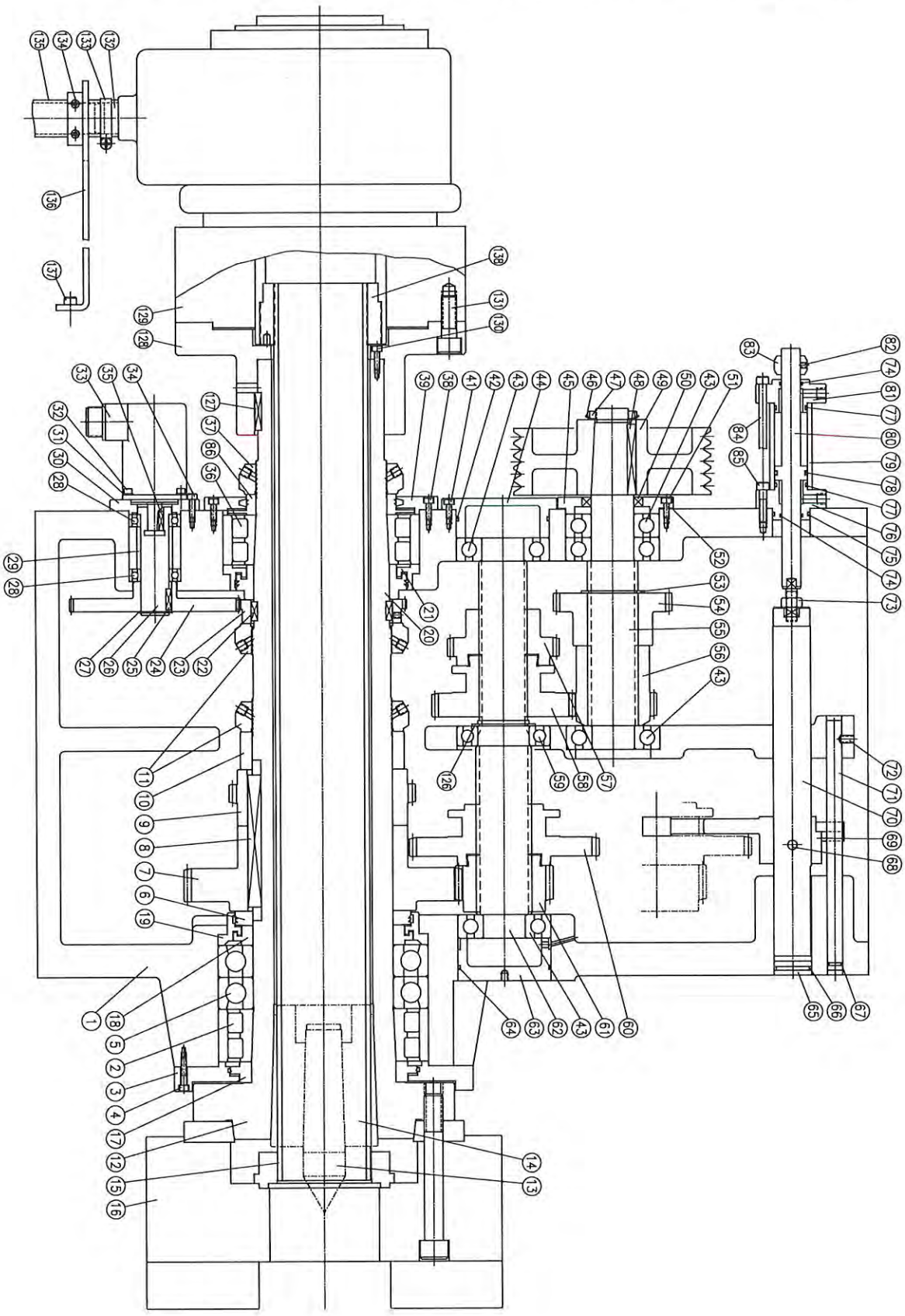
88-01C

HEADSTOCK (TAPER ROLLER BEARING, SPINDLE BORE 105MM, 1200 R.P.M.)

REF. NO.	PARTS NO.	PARTS NAME	DIMENSION	Q'TY
124		Thimble Nut	φ 10	1
125		Oil Tube	φ 10	1
126		Retaining Ring	S55	1

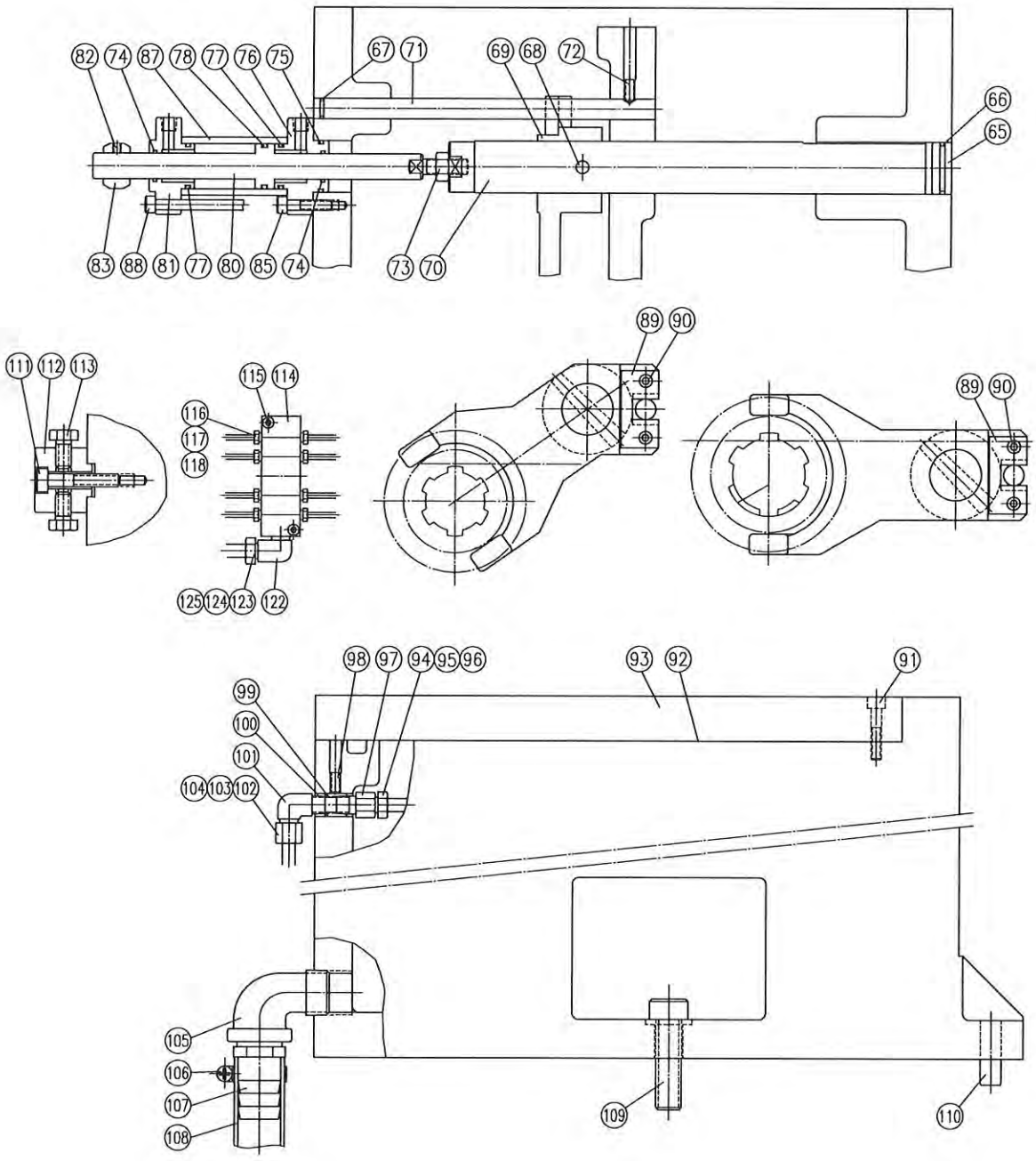
88-01D

Headstock (Spindle bore 105mm,cylindrical roller bearing) (1/4)



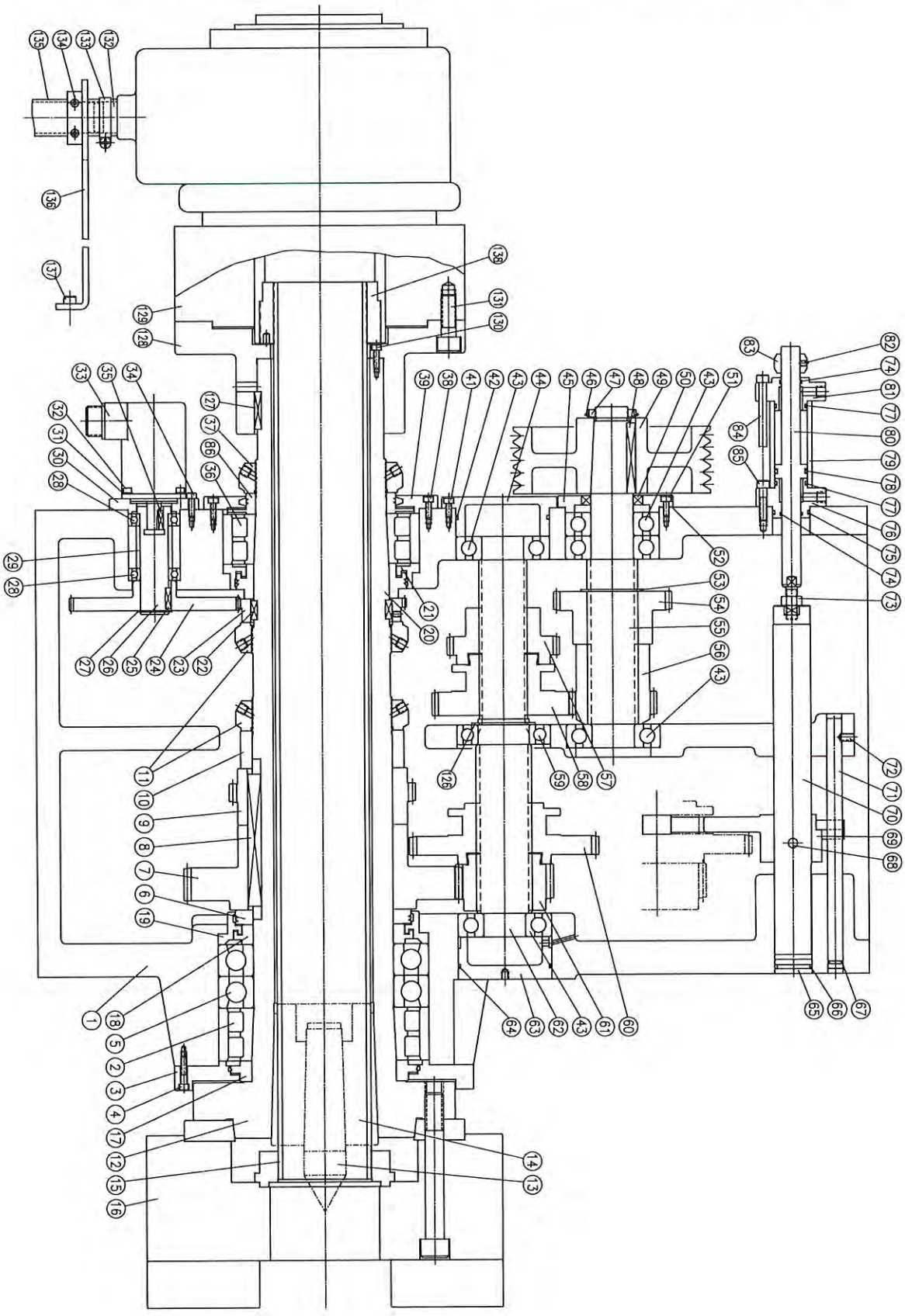
88-01D

Headstock (Spindle bore 105mm,cylindrical roller bearing) (2/4)



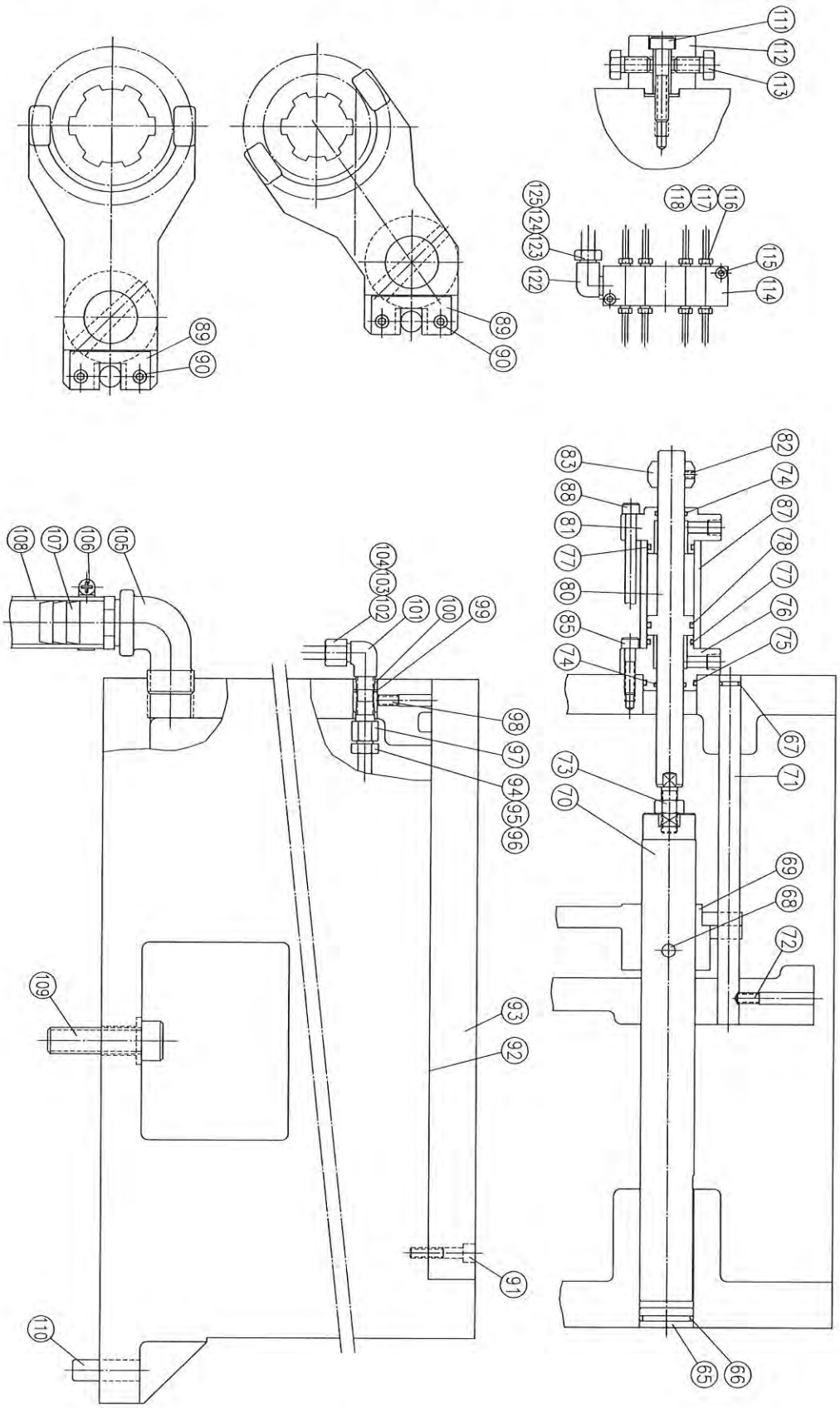
88-01D

Headstock (Spindle bore 105mm,cylindrical roller bearing) (3/4)



88-01D

Headstock (Spindle bore 105mm,cylindrical roller bearing) (4/4)



88-01D

HEADSTOCK (CYLINDRICAL BEARING, SPINDLE BORE 105MM, 1500 R.P.M.)

REF. NO.	PARTS NO.	PARTS NAME	DIMENSION	Q'TY
125		Oil Tube	φ 10	1
126		Retaining Ring	S55	1
127		Double Round Head Key	8x7x40L	1
128	88-0141D-00	Hydraulic Cylinder Connection Bracket		1
129		Cylinder		1
130		Socket Head Cap Screw	M6x20L	4
131		Socket Head Cap Screw	M16x45L	6
132		Adapter	PT1"x φ 33	1
133		Tube Tighter	1-1/2"	1
134		Socket Head Cap Screw	M5x10L	2
135		Rubber Tube	φ 33	1
136	88-0150D-00	Stop Running Plate		1
137		Socket Head Cap Screw	M8x20L	2
138	88-0143D-00	Thimble		1

88-01D

HEADSTOCK (CYLINDRICAL BEARING, SPINDLE BORE 105MM, 1500 R.P.M.)

REF. NO.	PARTS NO.	PARTS NAME	DIMENSION	Q'TY
1	88-0101D-00	Headstock Casting		1
2		Cylindrical Roller Bearing	NN3030K	1
3	88-0151D-00	Bearing Cover		1
4		Socket Head Cap Screw	M6x45L	6
5		Angular Contact Ball Bearing	150BA10X	1
6	88-0103D-00	Spacer		1
7	88-0107C-00	Gear	2.5Mx83T	1
8	88-0144C-00	Parallel Key		1
9	88-0108C-00	Gear		1
10	88-0106C-00	Spacer		1
11	88-0146C-00	Nut	M150xP2.0	2
12	88-0102D-00	Spindle	A2-11	1
13	63-01118-00	Center		1
14	69-01117-00	Center Sleeve		1
15	88-0142D-00	Draw Tube		1
16		Hydraulic Chuck		1
17	88-0152D-00	Spacer		1
18	88-0103D-00	Spacer		1
19	88-0104D-00	Anti-Leaking Ring		6
20	88-0110D-00	Spacer		1
21	88-0111D-00	Anti-Leaking Ring		1
22		Double Round Head Key	8x7x20L	1
23	88-0109C-00	Gear	2.0Mx89T	1
24	88-0126-00	Gear	2.0Mx89T	1
25		Double Round Head Key	6x6x20L	1
26	88-0127-00	Shaft		1
27		Retaining Ring	S30	1
28		Deep Groove Ball Bearing	#6006	2
29	88-0128-00	Spacer		1
30	88-0129-00	Support Bracket		1
31		Spring Washer	M5	4

88-01D

HEADSTOCK (CYLINDRICAL BEARING, SPINDLE BORE 105MM, 1500 R.P.M.)

REF. NO.	PARTS NO.	PARTS NAME	DIMENSION	Q'TY
32		Socket Head Cap Screw	M5x16L	4
33		Speed Coder		1
34		Socket Head Cap Screw	M6X20L	4
35		Double Round Head Key	5x5x20L	1
36		Cylindrical Roller Bearing	NN3028K	1
37	69-0147-00	Nut	M140xP2.0	1
38	88-0113B-00	Bearing Cover		1
39		Socket Head Cap Screw	M6x16L	5
40		Packing		1
41		Socket Head Cap Screw	M6x16L	4
42		O-Ring	G95	1
43		Deep Groove Ball Bearing	#6309	5
44	88-0120-00	Bearing Cover		1
45	88-0124-00	Bearing Cover		1
46		Locking Washer	AW07	1
47		Locking Nut	AN07	1
48		Double Round Head Key	14x9x75L	1
49	88-0149A-00	Pulley		1
50		Oil Seal	TC45x65x10	1
51		Socket Head Cap Screw	M6x16L	4
52	88-0125-00	Packing		1
53		Retaining Ring	S55	1
54	88-0123-00	Gear	3.0M x40T	1
55	88-0121-00	Input Shaft		1
56	88-0122-00	Gear	3.0M x29T	1
57	88-0119-00	Gear	3.0M x38T	1
58	88-0118-00	Gear	3.0M x49T	1
59		Deep Groove Ball Bearing	#6211	1
60	88-0117-00	Gear	3.5M x56T	1
61	88-0116-00	Gear	3.5M x28T	1
62	88-0115-00	Gear Shaft		1

88-01D

HEADSTOCK (CYLINDRICAL BEARING, SPINDLE BORE 105MM, 1500 R.P.M.)

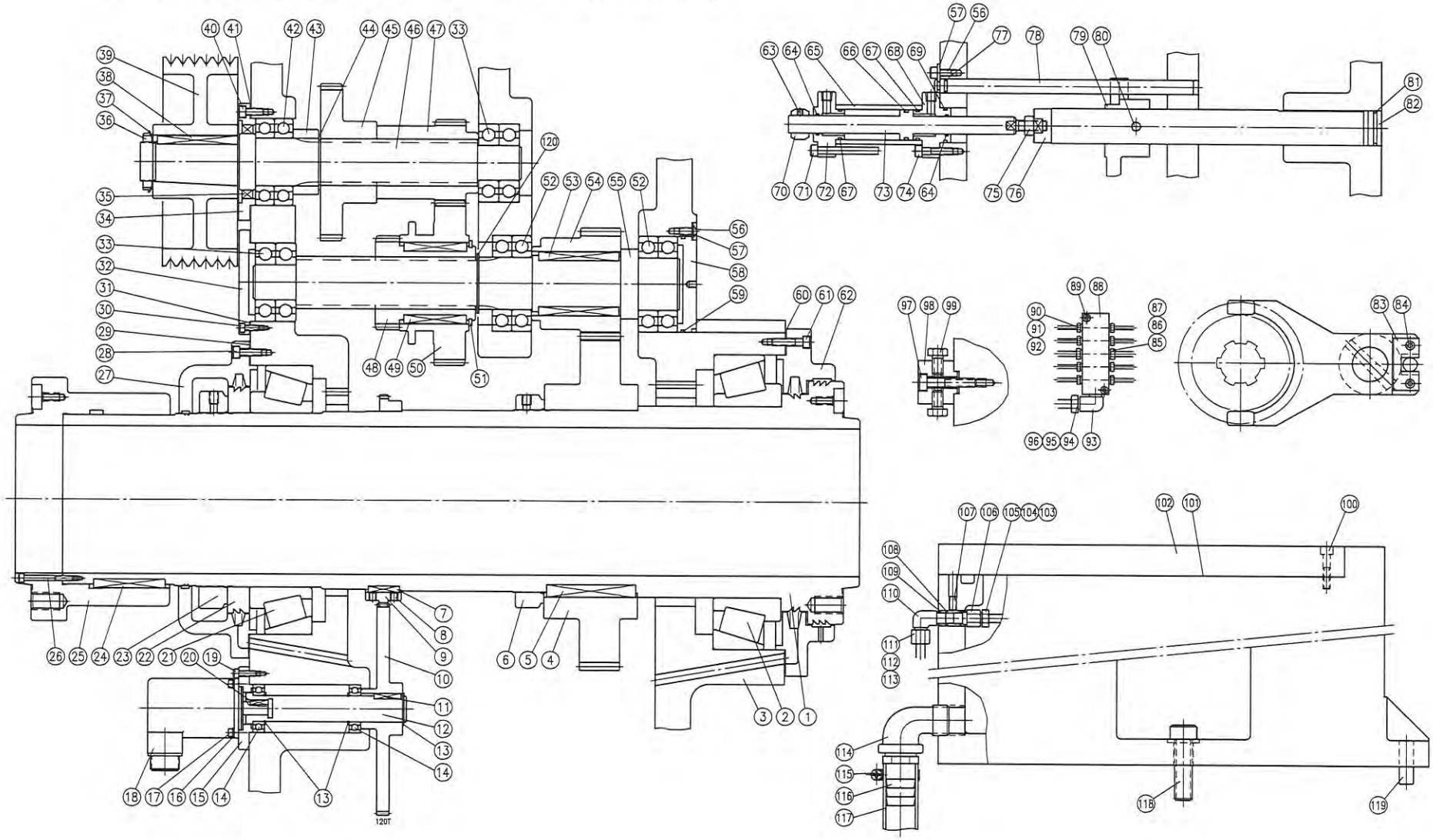
REF. NO.	PARTS NO.	PARTS NAME	DIMENSION	Q'TY
94		Thimble	φ 10	1
95		Thimble Nut	φ 10	1
96		Oil Tube	φ 10	1
97		Straight Joint	PT1/4-M16	1
98		Set Screw	M8x16L	1
99		O-Ring	P14	1
100	77A-0163-00	Adapter		1
101		Straight Joint	PT1/4-M16	1
102		Thimble	φ 10	1
103		Thimble Nut	φ 10	1
104		Oil Tube	φ 10	1
105		Straight Joint	PT1"	1
106		Tube Tighter	1-1/2"	1
107		Adapter	PT1"x φ 33	1
108		Rubber Tube	φ 33	1
109		Socket Head Cap Screw	M20x70L	6
110	50-01113-00	Positioning Pin		1
111		Socket Head Cap Screw	M12x55L	1
112	50-01114-00	Adjusting Block		1
113		Hexagon Nut	M12x25L	2
114	77A-0164-00	Oil Distributor		1
115		Socket Head Cap Screw	M5x30L	2
116		Thimble	φ 4	8
117		Thimble Nut	φ 4	8
118		Oil Tube	φ 4	8
122		Straight Joint	PT1/4-M16	1
123		Thimble	φ 10	1
124		Thimble Nut	φ 10	1

88-01D

HEADSTOCK (CYLINDRICAL BEARING, SPINDLE BORE 105MM, 1500 R.P.M.)

REF. NO.	PARTS NO.	PARTS NAME	DIMENSION	Q'TY
125		Oil Tube	φ 10	1
126		Retaining Ring	S55	1
127		Double Round Head Key	8x7x40L	1
128	88-0141D-00	Hydraulic Cylinder Connection Bracket		1
129		Cylinder		1
130		Socket Head Cap Screw	M6x20L	4
131		Socket Head Cap Screw	M16x45L	6
132		Adapter	PT1"x φ 33	1
133		Tube Tighter	1-1/2"	1
134		Socket Head Cap Screw	M5x10L	2
135		Rubber Tube	φ 33	1
136	88-0150D-00	Stop Running Plate		1
137		Socket Head Cap Screw	M8x20L	2
138	88-0143D-00	Thimble		1

90-01
Headstock (Spindle bore 170mm)



90-01 HEADSTOCK (SPINDLE BORE 170mm)

REF NO.	PARTS NO.	PARTS NAME	DIMENSION	Q'TY
1	90-0102-00	Spindle		1
2		Taper Roller Bearing	#32044	1
3	90-0101-00	Headstock Casting		1
4	90-0107-00	Gear		1
5	90-0144-00	Key	25x14x100L	1
6	90-0146-00	Locknut	M210x3.0	1
7		Key	8x7x20L	1
8		Socket Head Set Screw	M8x10L	1
9	90-0109-00	Gear	2.0Mx120T	1
10	90-0126-00	Gear	2.0Mx120T	1
11		Key	6x6x20L	1
12	90-0127-00	Shaft	6x6x20L	1
13		Retaining Ring	S30	3
14		Deep Groove Ball Bearing	#6006	2
15	88-0129-00			1
16		Spring Washer	M5	4
17		Socket Head Cap Screw	M5x16L	4
18		Position Code		1
19		Socket Head Cap Screw	M6x20L	4
20		Key	5x5x20L	1
21		Taper Roller Bearing	#32040	1
22	90-0112-00	Spacer		1
23	90-0147-00	Locknut	M200x3.0	1
24		Key	16x10x80L	1
25	90-0141-00	Connection Bracket		1
26		Socket Head Cap Screw	M6x55L	6
27	90-0113-00	Bearing Cover		1
28		Socket Head Cap Screw	M8x25L	6
29	90-0162-00	Packing		1
30		Socket Head Cap Screw	M6x16L	4
31	90-0163-00	Packing		1
32	90-0119-00	Bearing Cover		1
33		Deep Groove Ball Bearing	#6308	4
34	90-0124-00	Bearing Cover		1
35		Oil Seal	TC65x85x12	1
36		Locking Nut	AN09	1
37		Locking Washer	AW09	1
38		Key	16x10x90L	1
39	90-0149-00	Pulley		1
40		Socket Head Cap Screw	M8x20L	4

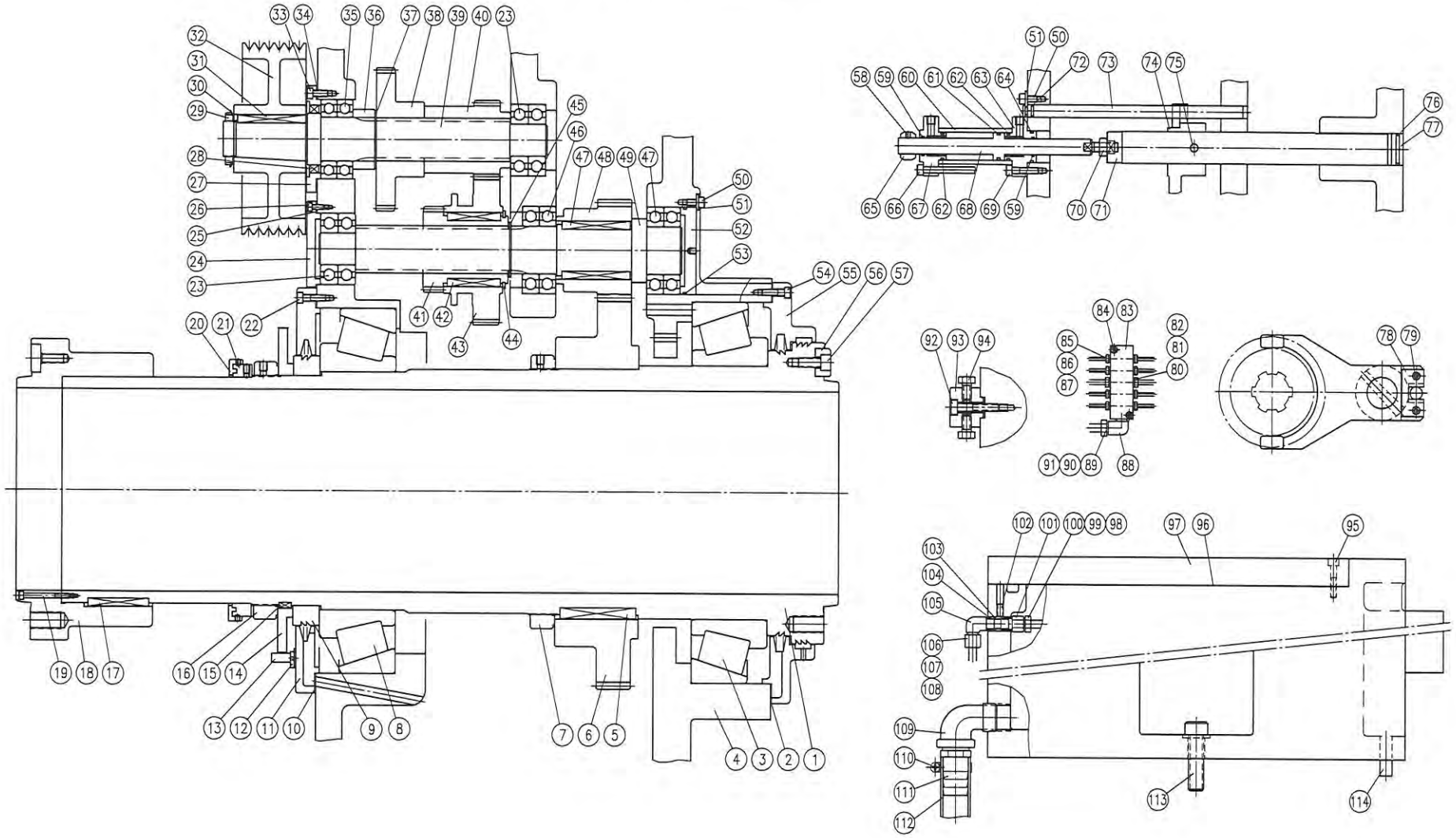
90-01 HEADSTOCK (SPINDLE BORE 170mm)

REF NO.	PARTS NO.	PARTS NAME	DIMENSION	Q'TY
41	90-0125-00	Packing		1
42		Deep Groove Ball Bearing	#6211	2
43	90-0120-00	Spacer		1
44		Retaining Ring	S55	1
45	90-0123-00	Gear	3.0M x51T	1
46	90-0121-00	Input Shaft		1
47	90-0122-00	Gear	3.0M x31T	1
48	90-0118-00	Gear	3.0M x34T	1
49		Key	16x10x70L	2
50	90-0117-00	Gear	3.0M x61T	1
51		Retaining Ring	S85	1
52		Deep Groove Ball Bearing	#6212	4
53		Key	16x10x90L	1
54	90-0116-00	Gear	4.0M x29T	1
55	90-0115-00	Shaft		1
56		Socket Head Cap Screw	M8x20L	3
57	90-0128-00	Washer		3
58	90-0114-00	Bearing Plug		1
59		O-Ring	G105	1
60	90-0161-00	Packing		1
61		Socket Head Cap Screw	M8x30L	6
62	90-0151-00	Bearing Cover		1
63		Socket Head Set Screw	M6x8L	1
64		O-Ring	P20	2
65	90-0137-00	Cylinder		1
66		O-Ring	P29	1
67		O-Ring	G30	2
68	88-0136-00	Hydraulic End Cover		1
69		O-Ring	G35	1
70	77A-0153-00	Touch Block		1
71		Socket Head Cap Screw	M8x135L	4
72	88-0138-00	Hydraulic End Cover		1
73	88-0135-00	Piston		1
74		Socket Head Cap Screw	M8x35L	4
75		Nut	M12xP1.25	1
76	90-0130-00	Change speed Rod		1
77		O-Ring	P12	1
78	90-0140-00	Positioning Rod		1
79	90-0131-00	Shifting Arm		1
80		Taper Pin	φ 10x70L	1

90-01 HEADSTOCK (SPINDLE BORE 170mm)

REF NO.	PARTS NO.	PARTS NAME	DIMENSION	Q'TY
81		O-Ring	G35	1
82	88-0145-00	Plug		1
83	88-0134-00	Positioning Block		1
84		Socket Head Cap Screw	M6x20L	2
85		Thimble	φ6	2
86		Thimble Nut	φ6	2
87		Oil Pipe	φ6	2
88	77A-0164-00	Oil Distributor		1
89		Socket Head Cap Screw	M5x30L	2
90		Thimble	φ4	8
91		Thimble Nut	φ4	8
92		Oil Pipe	φ4	8
93		Quarter Joint	PT1/4-M16	1
94		Thimble	φ10	1
95		Thimble Nut	φ10	1
96		Oil Pipe	φ10	1
97		Socket Head Cap Screw	M12x55L	1
98	50-01114-00	Adjusting Block		1
99		Hexagon Head Bolt	M12x25L	2
100		Socket Head Cap Screw	M8x40L	8
101	88-0165-00	Packing		1
102	88-0164-00	Upper Cover		1
103		Thimble	φ10	1
104		Thimble Nut	φ10	1
105		Oil Pipe	φ10	1
106		Straight Joint	PT1/4-M16	1
107		Socket Head Set Screw	M8x16L	1
108		O-Ring	P14	1
109	77A-0163-00	Hose		1
110		Quarter Joint	PT1/4-M16	1
111		Thimble	φ10	1
112		Thimble Nut	φ10	1
113		Oil Pipe	φ10	1
114		Quarter Joint	PT1"	1
115		Tube Tighter	1-1/2"	1
116		Quarter Joint	PT1"x φ33	1
117		Hose	φ33	1
118		Socket Head Cap Screw	M20x70L	6
119	50-01113-00	Pin		1
120		Retaining Ring	S60	1

90-01A
Headstock (Spindle bore 255mm)



90-01A HEADSTOCK (SPINDLE BORE 255mm)

REF NO.	PARTS NO.	PARTS NAME	DIMENSION	Q'TY
1	90-0102A-00	Spindle		1
2	98-0104B	Packing		1
3		Taper Roller Bearing	#32064	1
4	90-0101A-00	Headstock Casting		1
5	90-0144	Key	25x14x100L	2
6	98-0105B	Gear		1
7	98-0106B	Locknut	M310xP3.0	1
8		Taper Roller Bearing	#32060	1
9	95-0108B	Spacer		1
10	95-0111B	Packing		1
11	95-0110B	Bearing Cover		1
12	98-0159	Fixing Plate		1
13		Sensor		1
14	98-0112E	Sensor Gear	(CHIAREY)	1
14	98-0112F	Sensor Gear	(FANUC)	1
15		Key	8x7x16L	1
16	98-0113B	Locknut		1
17		Key	16x10x80L	1
18	98-0114B	Connection Bracket		1
19		Socket Head Cap Screw	M6x60L	6
20	98-0161B	Balancing Block		3
21	98-0160B	Dynamic Balancing Collar		1
22		Socket Head Cap Screw	M8x30L	6
23		Deep Groove Ball Bearing	#6308	4
24	90-0119-00	Bearing Cover		1
25	90-0163-00	Packing		1
26		Socket Head Cap Screw	M6x16L	4
27	90-0124-00	Bearing Cover		1
28		Oil Seal	TC65x85x12	1
29		Locking Nut	AN09	1
30		Locking Washer	AW09	1
31		Key	16x10x90	1
32	90-0149-00	Pulley		1
33		Socket Head Cap Screw	M8x25L	4
34	90-0125-00	Packing		1
35		Deep Groove Ball Bearing	#6211	2
36	90-0120-00	Spacer		1
37		Retaining Ring	S55	1
38	90-0123-00	Gear	3.0M x51T	1
39	90-0121-00	Input Shaft		1
40	90-0122-00	Gear	3.0M x31T	1

90-01A HEADSTOCK (SPINDLE BORE 255mm)

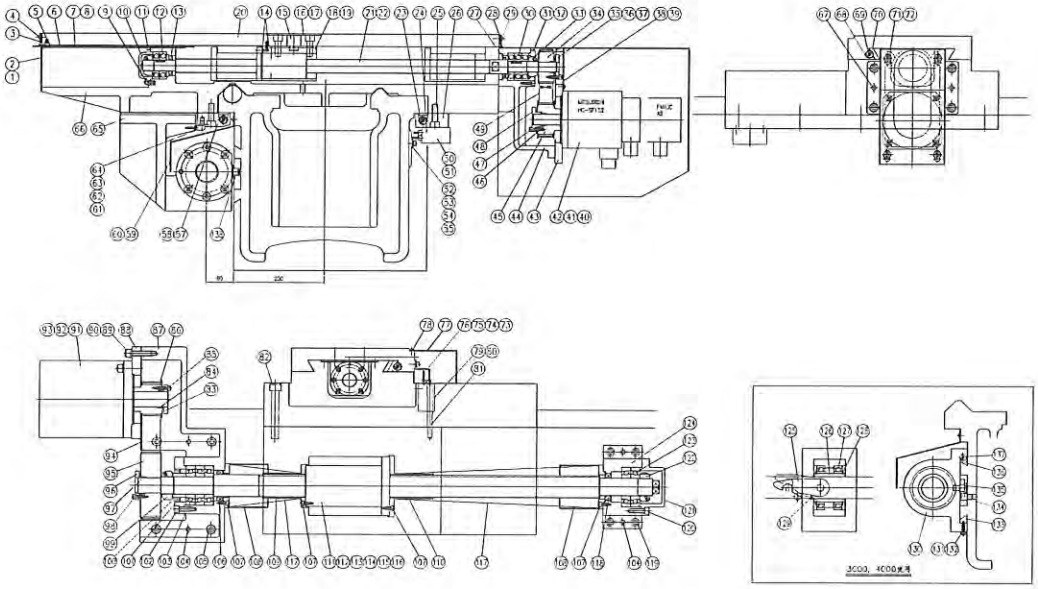
REF NO.	PARTS NO.	PARTS NAME	DIMENSION	Q'TY
41	90-0118-00	Gear	3.0M x34T	1
42		Key	16x10x70	2
43	90-0117-00	Gear	3.0M x61T	1
44		Retaining Ring	S85	1
45		Retaining Ring	S60	1
46		Deep Groove Ball Bearing	#6212	4
47		Key	16x10x90	2
48	90-0116-00	Gear	4.0M x29T	1
49	90-0115-00	Gear Shaft		1
50		Socket Head Cap Screw	M8x20L	3
51	90-0128-00	Washer		3
52	90-0114-00	Bearing Plug		1
53		O-Ring	G105	1
54		Socket Head Cap Screw	M8x30L	6
55	90-0103A	Bearing Cover		1
56	98-0165B	Position Pin		1
57		Socket Head Cap Screw	M10x30L	1
58		Set Screw	M6x8L	1
59		O-Ring	P20	2
60	90-0137-00	Cylinder		1
61		O-Ring	P29	1
62		O-Ring	G30	2
63	88-0136-00	Hydraulic End Cover		1
64		O-Ring	G35	1
65	77A-0153-00	Touch Block		1
66		Socket Head Cap Screw	M8x135L	1
67	88-0138-00	Hydraulic End Cover		4
68	88-0135-00	Piston		1
69		Socket Head Cap Screw	M8x35L	4
70		Nut	M12xP1.25	1
71	90-0130-00	Change Speed Rod		1
72		O-Ring	P12	1
73	90-0140-00	Positioning Rod		1
74	90-0131-00	Shifting Arm		1
75		Taper Pin	φ 10x70L	1
76		O-Ring	G35	1
77	88-0145-00	Plug		1
78	88-0134-00	Positioning Block		1
79		Socket Head Cap Screw	M6x20L	2
80		Thimble	φ 6	2

90-01A HEADSTOCK (SPINDLE BORE 255mm)

REF NO.	PARTS NO.	PARTS NAME	DIMENSION	Q'TY
81		Thimble Nut	φ 6	2
82		Oil Pipe	φ 6	2
83	77A-0164-00	Oil Distributor		1
84		Socket Head Cap Screw	M5x30L	2
85		Thimble	φ 4	8
86		Thimble Nut	φ 4	8
87		Oil Pipe	φ 4	8
88		Quarter Joint	PT1/4-M16	1
89		Thimble	φ 10	1
90		Thimble Nut	φ 10	1
91		Oil Pipe	φ 10	1
92		Socket Head Cap Screw	M12x55L	1
93	50-01114-00	Adjusting Block		1
94		Hexagon Head Bolt	M12x25L	2
95		Socket Head Cap Screw	M8x40L	8
96	90-0165A-00	Packing		1
97	90-0164A-00	Upper Cover		1
98		Thimble	φ 10	1
99		Thimble Nut	φ 10	1
100		Oil Pipe	φ 10	1
101		Straight Joint	PT1/4-M16	1
102		Set Screw	M8x16L	1
103		O-Ring	P14	1
104	77A-0163-00	Joint		1
105		Quarter Joint	PT1/4-M16	1
106		Thimble	φ 10	1
107		Thimble Nut	φ 10	1
108		Oil Pipe	φ 10	1
109		Quarter Joint	PT1"	1
110		Tube Tighter	1-1/2"	1
111		Quarter Joint	PT1"x φ 33	1
112		Hose	φ 33	1
113		Socket Head Cap Screw	M20x70L	6
114	50-01113-00	Pin		1

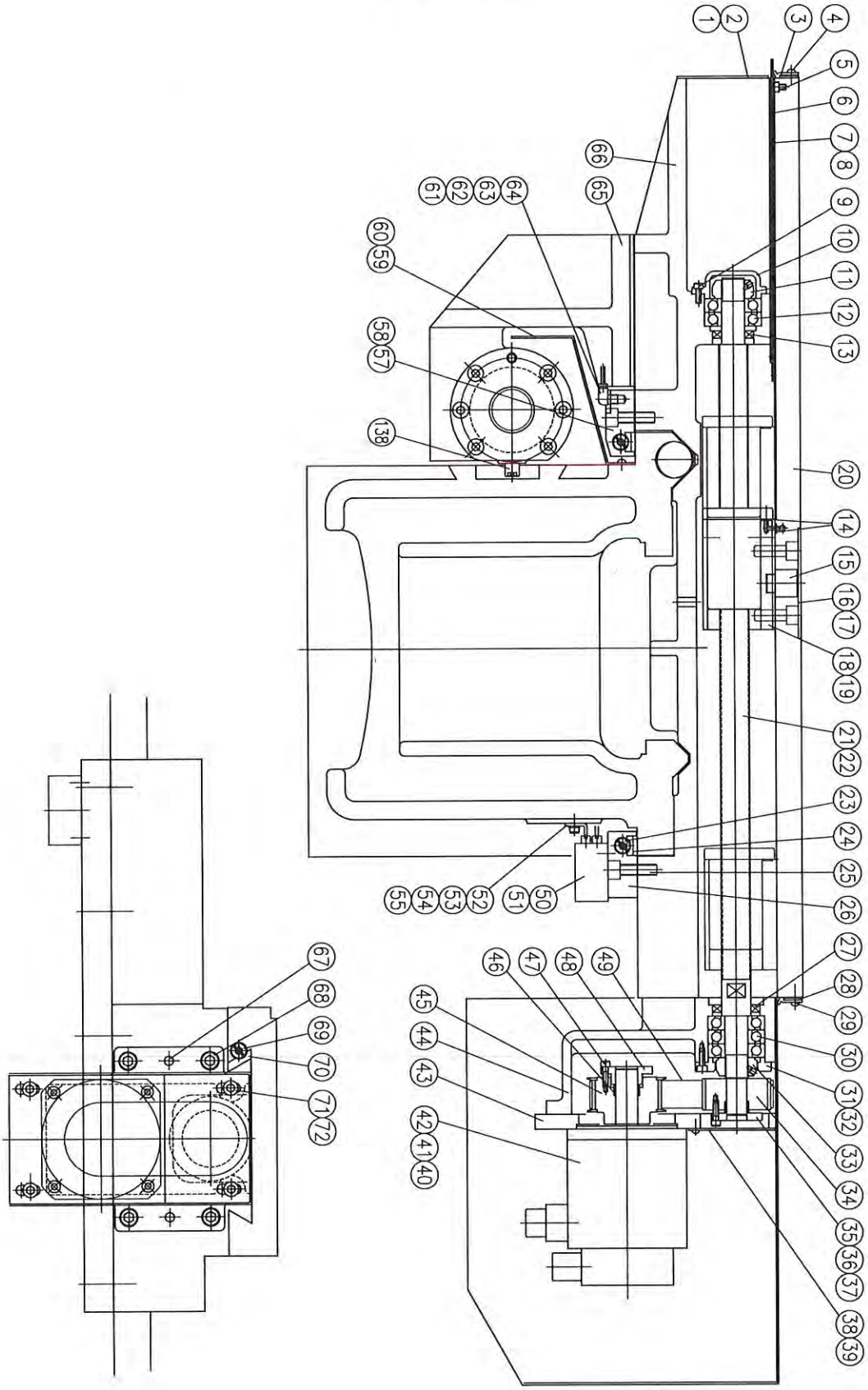
88-02

X,Z Axis(1/4)



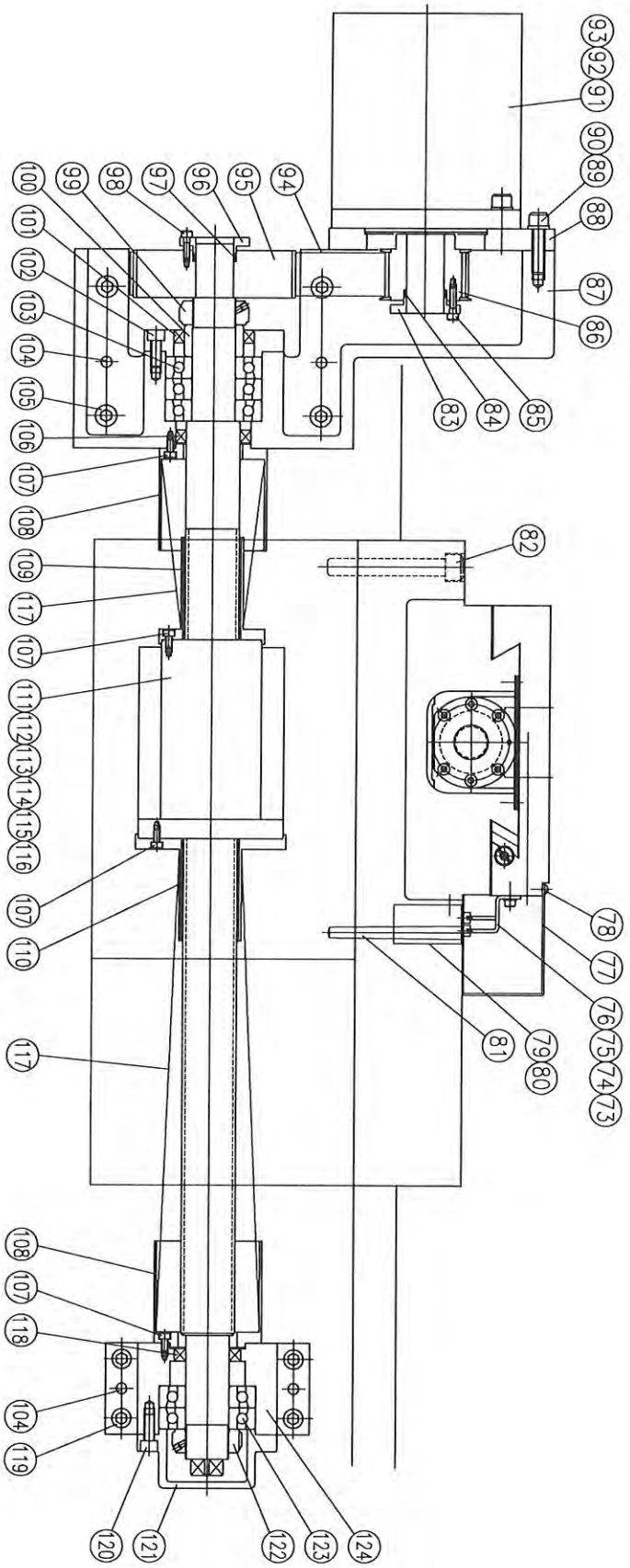
88-02

X,Z Axis(2/4)

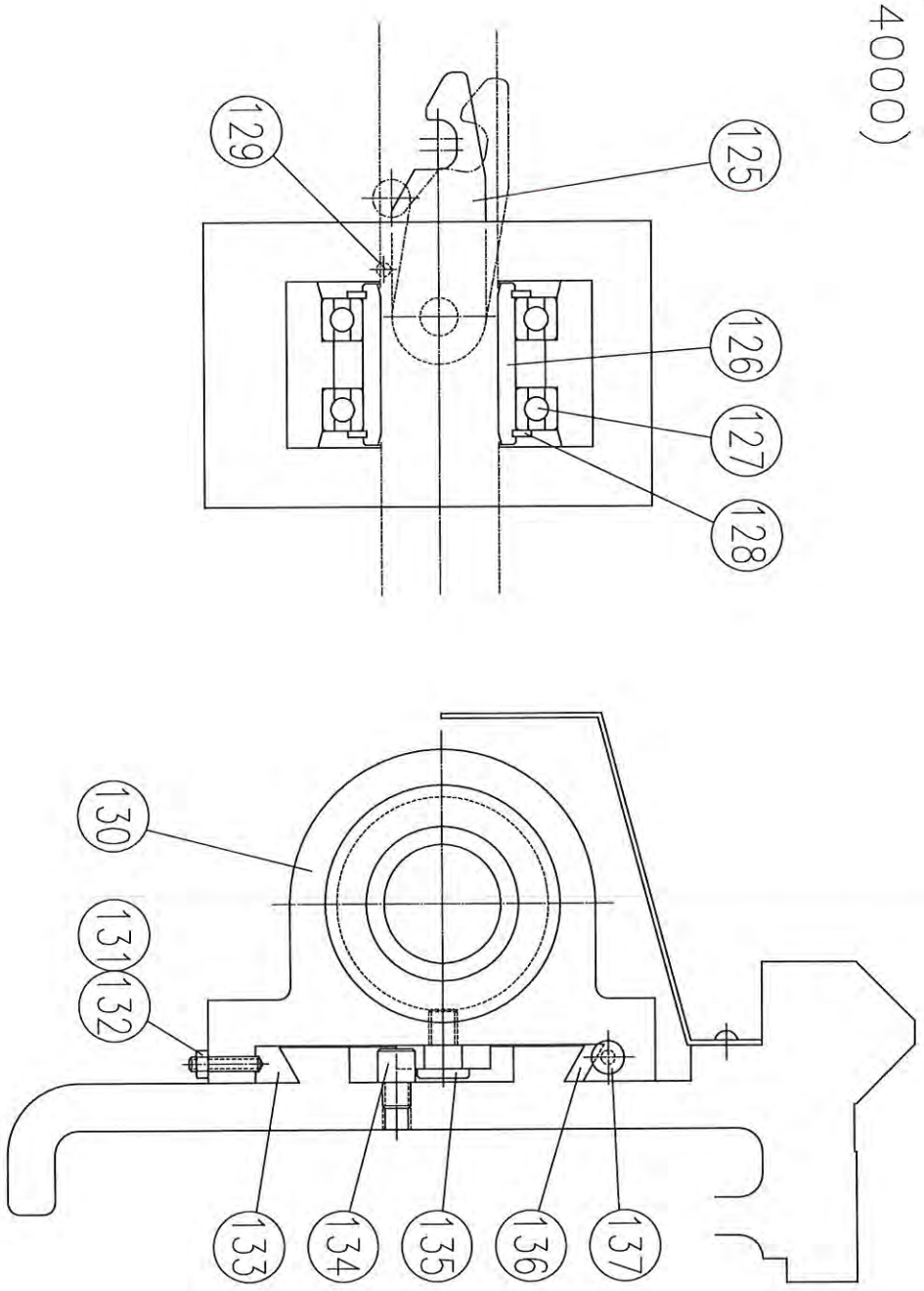


88-02

X,Z Axis(3/4)



Z-AXIS(2/2)
(For 3000, 4000)



88-02

X, Z AXIS

REF. NO.	PARTS NO.	PARTS NAME	DIMENSION	Q'TY
1	88-0224-00	Cover Plate		1
2		Cross Recessed Head Screw	M6x8L	4
3	88-0220-00	Bedway Wiper (Front)		1
4		Cross Recessed Head Screw	M6X12L	5
5		Socket Head Cap Screw	M6x8L	1
6	88-0222-00	Plate		1
7	88-0223-00	Plate		1
8		Counter Sunk Flat Screw	M4x8L	4
9		Socket Head Cap Screw	M6x16L	4
10	88-0210-00	Bearing Cover		1
11		Locking Nut	SK25	1
12		Angular Contact Ball Bearing	25TAC62BDF	1
13		Oil Seal	TC25x45x8	1
14		O-Ring	P7	2
15	88-0208-00	Positioning Pin		1
16	88-0227-00	Cover Plate		1
17		Counter Sunk Flat Screw	M6x12L	4
18	88-0209-00	Nut Base		1
19		Socket Head Cap Screw	M12x35L	4
20		Cross Slide		1
21	88-0211-00	X Axis Ball Screw		1
22		Socket Head Cap Screw	M6x16L	6
23	50-0325-00	Adjusting Screw		4
24	88-0333-00	Taper Gib		2
25		Socket Head Cap Screw	M12x45L	5
26	88-0332-00	Locking Block		1
27		Oil Seal	TC32x52x8	1
28	88-0221-00	Bedway Wiper (Rear)		1
29		Cross Recessed Head Screw	M6X12L	5
30		Angular Contact Ball Bearing	25TAC62BDD	1
31	88-0213-00	Bearing Cover		1

88-02
X, Z AXIS

REF. NO.	PARTS NO.	PARTS NAME	DIMENSION	Q'TY
32		Socket Head Cap Screw	M6x16L	4
33		Locking Nut	SK25	1
34	88-0214-00	Pulley		1
35	88-0215-00	Packing Ring		1
36		Key	22x26	1
37		Socket Head Cap Screw	M6x20L	4
38	88-0228-00	Cover Plate		1
39		Cross Recessed Head Screw	M6x8L	4
40		Servo Motor		1
41		Socket Head Cap Screw	M8x30L	4
42		Spring Washer	M8	4
43	88-0218-00	Motor Plate		1
44	88-0212-00	Transmission Box		1
45	88-0216-00	Pulley (For Mitsubish,Seimen	s)	1
45	88-0216P-00	Pulley (For Panasonic)		1
45	88-0216F-00	Pulley (For Fanuc)		1
46		Key (For Mitsubish,Siemens)	24x28	4
46		Key (For Pansonic)	22x26	1
47		Socket Head Cap Screw	M6x20L	1
48	88-0217-00	Packing Ring (For Mitsubishi,	Siemens)	1
48	88-0217P-00	Packing Ring (For Panasonic)		1
49		Belt	8M-480-30	1
50		Micro Switch	BNS-543B02D12	1
51		Socket Head Cap Screw	M6x20L	2
52	77A-0697-00	Z Axis Touch Block		1
53	77A-0698-00	Z Axis Touch Block		2
54		Socket Head Cap Screw	M6x20	6
55		Flat Washer	M6	6

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X, Z AXIS

REF. NO.	PARTS NO.	PARTS NAME	DIMENSION	Q'TY
57	88-0332-00	Locking Block		1
58		Socket Head Cap Screw	M12x45L	5
59	88-0335A-00	Ball Screw Cover Plate	1000mm	1
59	88-0335B-00	Ball Screw Cover Plate	1500mm	1
59	88-0335C-00	Ball Screw Cover Plate	2000mm	1
59	88-0335D-00	Ball Screw Cover Plate	3000mm	1
59	88-0335E-00	Ball Screw Cover Plate	4000mm	1
60		Cross Recessed Head Screw	M6X8L	1
61		Straight Joint	PT 1/8xM8	1
62		Thimble	PB-4	1
63		Thimble Nut	PA-4	1
64		Oil Tube	φ 4	1
65	88-0311-00	Apron		1
66	88-0201-00	Saddle		1
67		Taper Pin	φ 10x35L	2
68		Socket Head Cap Screw	M12x35L	4
69	50-0325-00	Adjusting Screw		2
70	88-0207-00	Taper Gib		1
71		Socket Head Cap Screw	M10x30L	4
72		Flat Washer	M10	4
73	88-0225-00	X Axis Touch Block		1
74	88-0226-00	X Axis Touch Block		2
75		Socket Head Cap Screw	M6X16L	6
76		Flat Washer	M6	6
77	88-0229-00	Cover Plate		1
78		Cross Recessed Head Screw	M6x8L	8
79		Micro Switch	BNS-543-B02D12	1
80		Socket Head Cap Screw	M6x20L	2

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X, Z AXIS

REF. NO.	PARTS NO.	PARTS NAME	DIMENSION	Q'TY
81		Taper Pin	φ 10x125L	2
82		Socket Head Cap Screw	M16x110L	4
83	88-0308S-00	Packing Ring		1
84		Key (For Mitsu., Pana.,Fanuc)	35x40	1
84		Key (For Siemens)	32X36	1
85		Socket Head Cap Screw	M6x25L	6
86	88-0307M-00	Pulley (For Mit.,Fanuc, Pana.)	8M-30T	1
86	88-0307S-00	Pulley (For Siemens)	8M-30T	1
87	88-0301-00	Motor Seat		1
88	88-0302M-00	Motor Plate(For Mit.,Fan.,Pan)	M12x35L	1
88	88-0302S-00	Motor Plate(For Siemens)		1
89		Socket Head Cap Screw	M12x45L	4
90		Washer	M12	4
91		Servo Motor (For Mitsubishi)	HF-SF202	1
92		Socket Head Cap Screw	M12x40L	4
93		Spring Washer	M12	4
94		Belt	8M-760-40	1
95	88-0305-00	Pulley	8M-60T	1
96	88-0306-00	Packing Ring		2
97		Key	35x40	1
98		Socket Head Cap Screw	M6x25L	6
99		Locking Nut	SK40	1
100	88-0304-00	Spacer		1
101	88-0215-00	Oil Seal	TC55x75x12	1
102		Socket Head Cap Screw		4
103		Angular Contact Ball Bearing	40TAC 90BDFD	1
104	88-0218-00	Taper Pin	φ 10X40	4
105		Socket Head Cap Screw	M12x40L	4
106		Oil Seal	TC50x70x12	4

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X, Z AXIS

REF. NO.	PARTS NO.	PARTS NAME	DIMENSION	Q'TY
107		Socket Head Cap Screw	M6x12L	8
108	88-0314A-00	Protection Cover Seat	1000mm	2
108	88-0314B-00	Protection Cover Seat	1500mm	2
108	88-0314C-00	Protection Cover Seat	2000mm	2
109	88-0315A-00	Protection Cover Seat	1000mm 1500mm 2000mm	1
110	88-0316A-00	Protection Cover Seat	1000mm 1500mm 2000mm	1
111	88-0310A-00	Z-Axis Ball Screw	1000mm	1
111	88-0310B-00	Z-Axis Ball Screw	1500mm	1
111	88-0310C-00	Z-Axis Ball Screw	2000mm	1
111	88-0310D-00	Z-Axis Ball Screw	3000mm	1
111	88-0310E-00	Z-Axis Ball Screw	4000mm	1
112		Socket Head Cap Screw	M10x30L	6
113		Straight Joint	PT1/8xM8	1
114		Thimble	PB-4	1
115		Thimble Nut	PA-4	1
116		Oil Tube	φ 4	1
117		Protection Cover	1000mm	2
117		Protection Cover	1500mm	2
117		Protection Cover	2000mm	2
118		Oil Seal	TC40x62x12	1
119		Socket Head Cap Screw	M12x40L	4
120		Socket Head Cap Screw	M10x25L	4
121	88-0313-00	Bearing Cover		1
122		Locking Nut	SK40	1
123		Angular Contact Bearing	40TAC90BDF	1

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X, Z AXIS

REF. NO.	PARTS NO.	PARTS NAME	DIMENSION	Q'TY
124	88-0312-00	Bearing Seat		1
125	88-0325D-00	Hook		2
126	88-0321D-00	Thimble		2
127		Deep Groove Ball Bearing	#6013ZZ	4
128		Retaining Ring	S-65	4
129		Spring Pin	φ 6x20L	2
130	88-0320D-00	Bracket		2
131		Socket Set Screw	M6X30L	6
132		Hexagon Nut	M6	6
133	88-0323D-00	Adjusting Block		2
134	88-0326D-00	Pin		1
135	88-0324D-00	Set Screw		2
136	88-0322D-00	Taper Gib		2
137	88-0327D-00	Adjusting Screw		4
138	88-0328D-00	Pin		2

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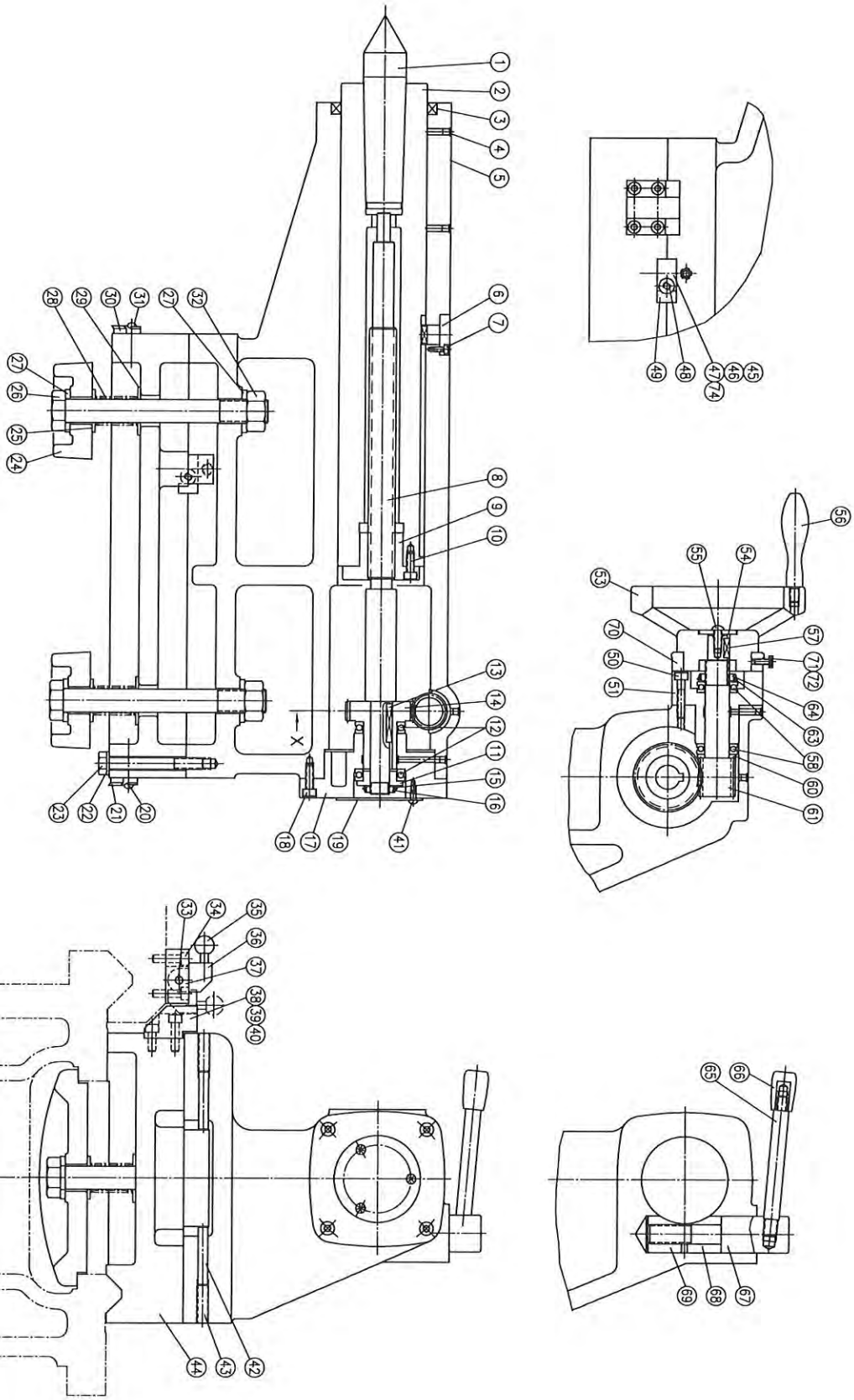
Tailstock



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TAILSTOCK(STANDARD TYPE)

REF NO.	PARTS NO.	PARTS NAME	DIMENSION	Q'TY
1	63-01118-00	Center	MT#5	1
2	88-0503A-00	Sleeve		1
3		Oil Seal	TC90x110x12	1
4		Ball Cup	1/4"	4
5	88-0501-01	Tailstock Body		1
6	88-0514-00	Positioning Pin		1
7		Socket Head Cap Screw	M5x12L	2
8	88-0504A-00	Shaft		1
8	88-0504D-00	Shaft		1
9	88-0505A-00	Thimble Net		1
9	88-0505D-00	Thimble Net		1
10		Socket Head Cap Screw	M8x16L	4
11	88-0506A-01	Washer		1
12		Thrust Bearing	#51107	2
13		Double Round Hand Key	6x6x40L	1
14	88-0508A-01	Gear		1
15		Lock Washer	AW04	1
16		Lock Nut	AN04	1
17	88-0507A -01	Bearing Housing		1
18		Socket Head Cap Screw	M8x25L	4
19	88-0513A-00	Rear Cover		1
20		Cross Recessed Head Screw	M6x12L	4
21	88-0527-00	Bed way Wiper		2
22		Flat Washer	M12	2
23		Hexagon Screw	M12x100L	2
24	88-0521-00	Connection Bracket		2
25	88-0523-00	Flat Washer		2
26		Hexagon Screw	M24x210L	2
27	88-0522-00	Flat Washer		4
28	88-0524-00	Spring		2
29	88-0522-00	Flat Washer		2
30	88-0526-00	Bed way Wiper		2
31		Cross Recessed Head Screw	M6x12L	4
32		Hexagon Screw	M24	2
33		Straight Pin	φ 8x55L	1
34		Socket Head Cap Screw	M8x30L	4
35		Knob		1
36	77A-0532-00	Shifting Block		1
37	77A-0531-00	Setting Plate		1
38	88-0528-00	Setting Plate		1

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TAILSTOCK(STANDARD TYPE)

REF NO.	PARTS NO.	PARTS NAME	DIMENSION	Q'TY
39		Socket Head Cap Screw	M8x40L	2
40		Socket Head Cap Screw	M8x20L	2
41		Cross Recessed Head Screw	M6x10L	3
42		Straight Pin	φ 10x60L	1
43		Socket Head Cap Screw	M12x40L	2
44	88-0502-00	Tailstock Base		1
45	88-0519-00	Front Block		1
46		Straight Pin	φ 8x30L	2
47		Socket Head Cap Screw	M10x20L	2
48	50-0325-00	Adjusting Screw		2
49	88-0520-00	Taper Gibs		2
50		Socket Head Cap Screw	M8x40L	4
51	88-0512A-01	Bearing Housing		1
53	69-0512A-01	Head wheel		1
54	50-0513-00	Washer		1
55		Screw	M8x20L	1
56	50-0431-00	Knob		1
57		Double Round Hand Key	6x6x20	1
58		Thrust Bearing	#51105	2
60	88-0510A-00	Washer		1
61	88-0509-01	Gear		1
63		Lock Washer	AW05	1
64		Lock Nut	AN05	1
65	88-0518-00	Shifting Rod		1
66	88-01138-00	Knob		1
67	88-0515-00	Lock Rod		1
68	88-0516-00	Clamping Block		1
69	88-0517-00	Clamping Block		1
70	88-0518A-00	Dial(Metric)		1
70	88-0518D-00	Dial(Metric)		1
71	50-0540-00	Screw		1
72	50-0538-00	Brass Pad		1
73		Socket Head Cap Screw	M5xP0.8X20L	1
74	88-0529-00	Rear Block		1

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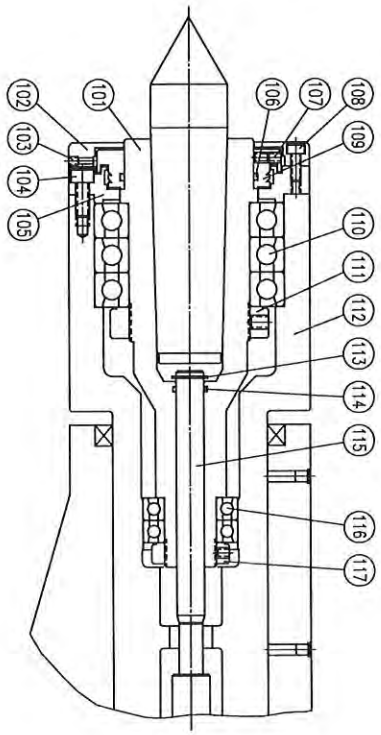
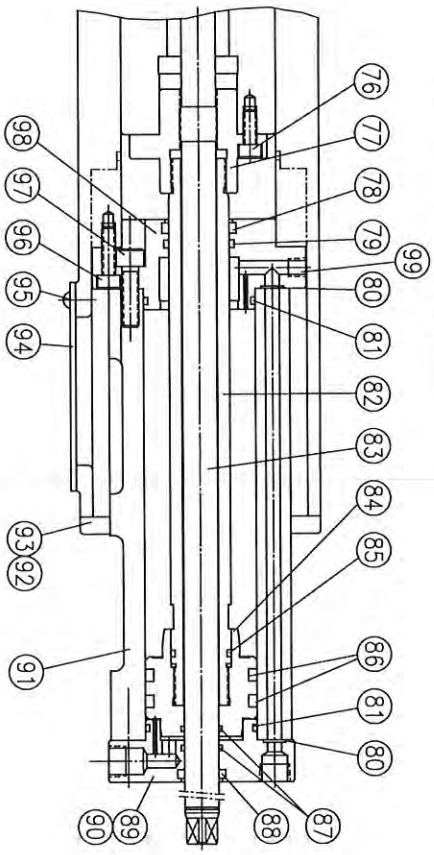
Tailstock



Built-Rotating(Optional)



Hydraulic Type(Optional)

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TAILSTOCK(STANDARD TYPE)

REF NO.	PARTS NO.	PARTS NAME	DIMENSION	Q'TY
1	63-01118-00	Center	MT#5	1
2	88-0503A-00	Sleeve		1
3		Oil Seal	TC90x110x12	1
4		Ball Cup	1/4"	4
5	88-0501-01	Tailstock Body		1
20		Cross Recessed Head Screw	M6x12L	4
21	88-0527-00	Bed way Wiper		2
22		Flat Washer	M12	2
23		Hexagon Screw	M12x100L	2
24	88-0521-00	Connection Bracket		2
25	88-0523-00	Flat Washer		2
26		Hexagon Screw	M24x210L	2
27	88-0522-00	Flat Washer		4
28	88-0524-00	Spring		2
29	88-0522-00	Flat Washer		2
30	88-0526-00	Bed way Wiper		2
31		Cross Recessed Head Screw	M6x12L	4
32		Hexagon Nut	M24	2
33		Straight Pin	φ 8x55L	1
34		Socket Head Cap Screw	M8x30L	4
35		Knob		1
36	77A-0532-00	Shifting Block		1
37	77A-0531-00	Setting Seat		1
38	88-0528-00	Shifting Seat		1
39		Socket Head Cap Screw	M8x40L	2
40		Socket Head Cap Screw	M8x20L	2
41		Socket Head Cap Screw	M6x10L	4
42		Straight Pin	φ 10x60L	1
43		Socket Head Set Screw	M12x40L	2
44	88-0502-00	Tailstock Base		1
45	88-0519-00	Front Block		1
46		Straight Pin	φ 8x30L	2
47		Socket Head Cap Screw	M10x20L	2
48	50-0325-00	Adjusting Screw		2
49	88-0520-00	Taper Gibs		2
74	88-0529-00	Rear Block		1
76		Socket Head Cap Screw	φ 8x20L	4
77	88-0505B-00	Thimble Nut		1
78		Protection Ring	DH-35	1
79		O-Ring	P35	1

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TAILSTOCK(STANDARD TYPE)

REF NO.	PARTS NO.	PARTS NAME	DIMENSION	Q'TY
80		O-Ring	P10	2
81		O-Ring	G60	2
82	88-0506B-00	Piston Rod		1
83	88-0504B-00	Shaft		1
84	88-0508B-00	Piston		1
85		O-Ring	G30	1
86		Oil Seal	UHS-55	2
87		O-Ring	P20	2
88		Protection Ring	DH-20	1
89	88-0510B-00	Hydraulic Rear Cover		1
90		Socket Head Cap Screw	M10x35L	4
91	88-0509B-01	Hydraulic Tank		1
92		Socket Head Cap Screw	M8x30L	4
93	88-0513B	Rear Cover		1
94	88-0511B-01	Plate		1
95		Cross Recessed Head Screw	M6x10L	4
97		Socket Head Cap Screw	M10x35L	4
98	88-0507B-01	Hydraulic Cylinder Front Cover		1
99		Plugs	PT1/8"	1
101	88-0531C-00	Sleeve		1
102	88-0534C-00	Protection Cover		1
103		Socket Head Set Screw	M5x6L	1
104		Socket Head Cap Screw	M8x20L	4
105	88-0533C-00	Bearing Cover		1
106		O-Ring	G75	1
107		Socket Head Set Screw	M6x8L	2
108		Socket Head Cap Screw	M6x16L	4
109	88-0532C-00	Protection Ring		1
110		Deep Groove Ball Bearing	7014C/DBD/P4	1
111		Locking Nut	FK70	1
112	88-0503C-00	Sleeve		1
113		Retaining Ring	S-16	1
114		O-Ring	P16	1
115	88-0535C-00	Shaft		1
116		Deep Groove Ball Bearing	7006C/DB/P4	1
117		Locking Nut	FK30	1

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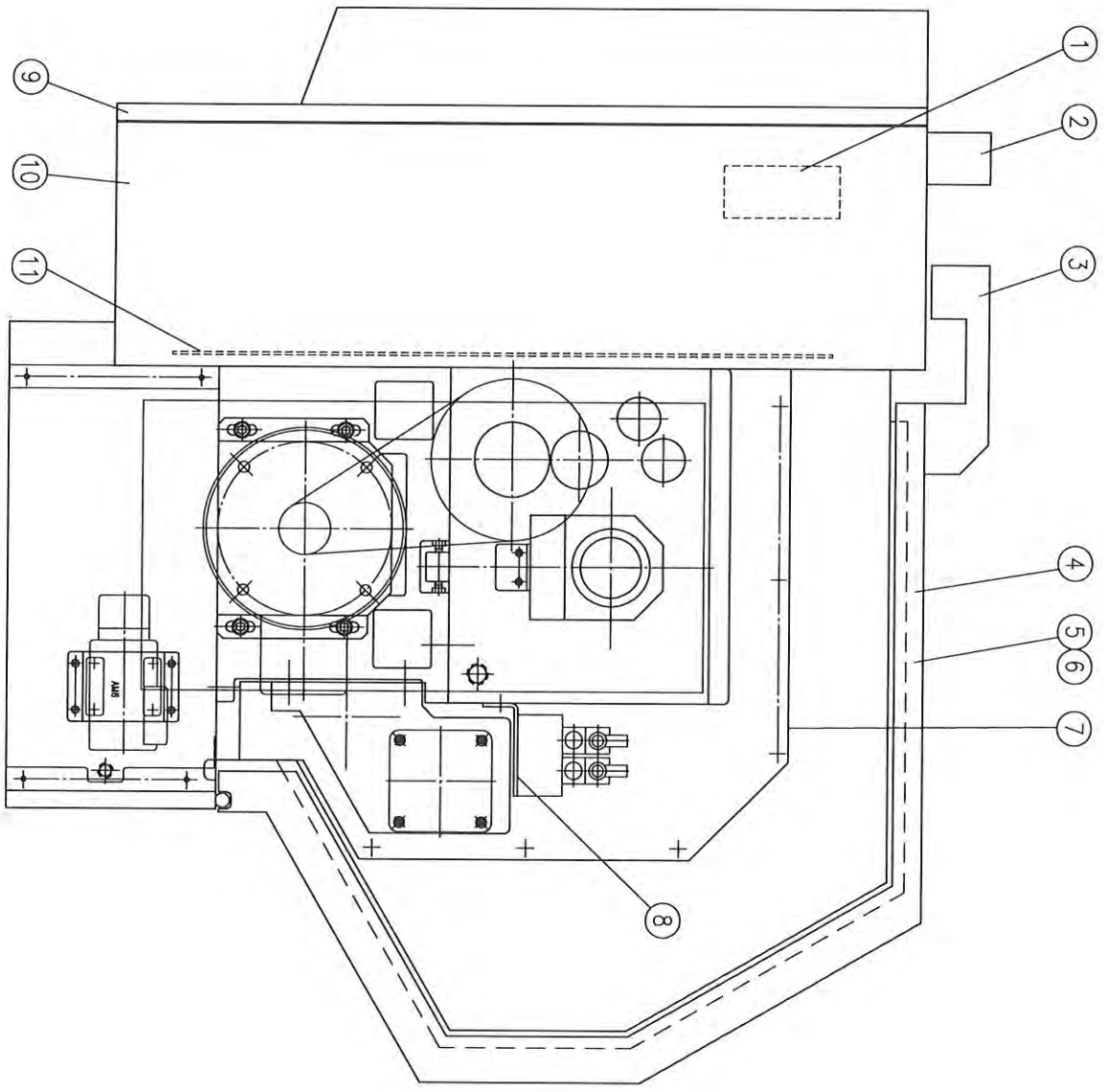
Sheet Metal(1/3)



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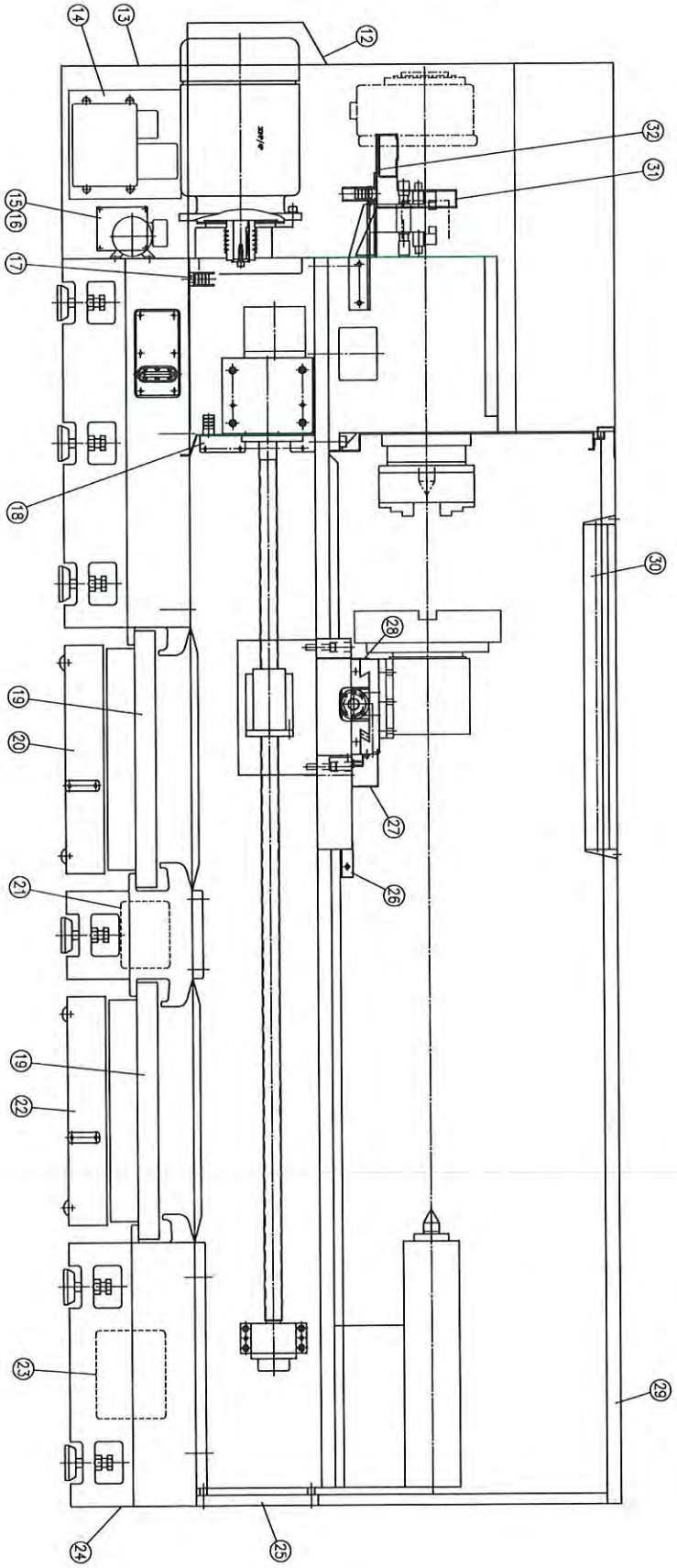
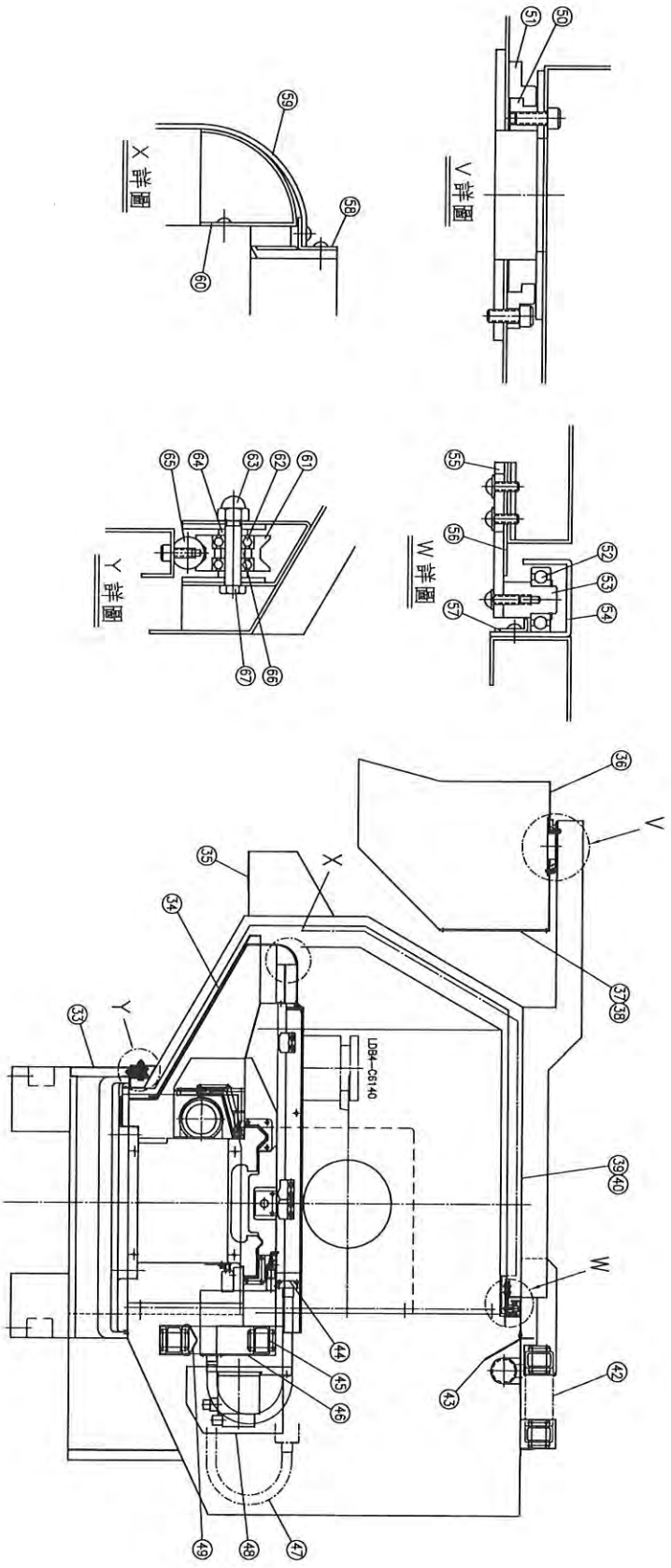
Sheet Metal(2/3)



88-07

Sheet Metal(3/3)



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SHEET METAL

REF. NO.	PARTS NO.	PARTS NAME	DIMENSION	Q'TY
1	77A-0648-01	Switch Seat		1
2	88-0705-00	Upper Cover		1
3	88-0722-01	Connection Tube		1
4	88-0712A-02	Spindle Protection Cover	For88-0101A	1
4	88-0712B-02	Spindle Protection Cover	For88-0101B	1
4	88-0712C-02	Spindle Protection Cover	For88-0101C	1
4	88-0712D-02	Spindle Protection Cover	For88-0101D	1
5	88-0715A-01	Left Safety Door	1000mm	1
5	88-0715B-01	Left Safety Door	1500mm	1
5	88-0715C-01	Left Safety Door	2000mm	1
6	88-0716A-01	Safety Glass	1000mm	1
6	88-0716B-01	Safety Glass	1500mm	1
6	88-0716C-01	Safety Glass	2000mm	1
7	88-0731-02	Spindle Protection Cover		1
8	88-0784-01	Setting Seat		1
9	88-0707-01	Electrical Control Box Door		1
10	88-0706-01	Electrical Control Box		1
11	88-0708-01	Bottom Plate		1
12	88-0732-01	Left End Cover		1
13	88-0735-02	Lower End Cover		1
14	88-0739-00	Lubrication Pump Seat		1
15	88-0772-00	Cover		1
16	88-0773-00	Drain Oil Indicator		1
17	88-0736-01	Upper Cover For Left Stand		1
18	88-0714-00	Front Cover Plate		1
19	88-0741A-01	Chip Tray	1000mm 2000mm	1
19	88-0741B-01	Chip Tray	1500mm	1
20	88-0742A-02	Coolant Tank	1000mm 2000mm	1
20	88-0742B-02	Coolant Tank	1500mm	1
21	88-0766-01	Rear Cover	2000mm	1
22	88-0740C-00	Coolant Tank	2000mm	1

88-07
SHEET METAL

REF. NO.	PARTS NO.	PARTS NAME	DIMENSION	Q'TY
23	88-0764-00	Rear Cover For Right Stand		1
24	88-0765-00	Right Side Cover For Right Stand		1
25	88-0704-00	Right End Cover		1
26	88-0763-00	Micro-switch Seat		1
27	88-0759-01	Touch Cover (For Hydraulic	Turret)	1
27	88-0759A-01	Touch Cover (For Tool Post)		1
28	88-0781-01	Left Side Cover		1
29	88-2701A-02	Rear Cover	1000mm	1
29	88-2701B-02	Rear Cover	1500mm	1
29	88-2701C-02	Rear Cover	2000mm	1
30		Fluorescent Lamp	A-W520DB	1
31	88-0733-00	Bracket		1
32	88-0734-00	Chip Box		1
33	88-0727A-00	Front Cover Plate	1000mm	1
33	88-0727B-00	Front Cover Plate	1500mm	1
33	88-0727C-00	Front Cover Plate	2000mm	1
34	88-0730-02	Apron Cover		1
35	88-0721-00	Plate on Right Moving Door		3
36	88-0752F-00	Operation Box	FANUC	1
36	88-0752G-00	Operation Box	FAGOR	1
37	88-0753F-00	Rear Cover For Operation Box	FANUC	1
37	88-0753G-00	Rear Cover For Operation Box	FAGOR	1
38	88-0754F-00	Rubber Pad	FANUC	1
38	88-0754G-00	Rubber Pad	FAGOR	1
39	88-0719A-02	Right Side Moving Door	1000mm	1
39	88-0719B-02	Right Side Moving Door	1500mm	1
39	88-0719C-02	Right Side Moving Door	2000mm	1
40	88-0720A-02	Safety Glass	1000mm	1
40	88-0720B-02	Safety Glass	1500mm	1
40	88-0720C-02	Safety Glass	2000mm	1

88-07
SHEET METAL

REF. NO.	PARTS NO.	PARTS NAME	DIMENSION	Q'TY
42		Cable Carrier	1000mm	1
42		Cable Carrier	1500mm	1
42		Cable Carrier	2000mm	1
43	88-0703B	Lamp Protection Plate		1
44	88-0758-01	Protection Tube Seat		1
45		Cable Carrier (1000mm)	80x45AAx1400	1
45		Cable Carrier (1500mm)	80x45AAx1600	1
45		Cable Carrier (2000mm)	80x45AAx1800	1
46	88-0761-01	X Axis Motor Plate		1
47		Cable Protection Tube	80x45SAx800	1
48	88-0760-01	Set Seat		1
49	88-0702B	Upper Cover		1
50	88-0750-00	Upper Swivel Seat		1
51	88-0751-00	Lower Swivel Seat		1
52		Deep Groove Ball Bearing	6203ZZ	6
53	77A-0614-01	Shaft		6
54	88-0725A-02	Upper Sliding Plate		1
55	88-0718A-01	Set Plate for Upper Roller		7
56	88-0787A-01	Cover Plate For Right Door	1000mm	1
56	88-0787B-01	Cover Plate For Right Door	1500mm	1
56	88-0787C-01	Cover Plate For Right Door	2000mm	1
57	88-0724A-01	Supporting Plate	1000mm	1
57	88-0724B-01	Supporting Plate	1500mm	1
57	88-0724B-01	Supporting Plate	2000mm	1
58	88-0778-00	Set Plate		1
59	88-0791-00	Ant-Chip Plate		1

88-07
SHEET METAL

REF NO.	PARTS NO.	PARTS NAME	DIMENSION	Q'TY
60	88-0780-01	Set Plate		1
61	77-0626-00	Roller Wheel		4
62		Deep Groove Ball Bearing	6000ZZ	8
63		Cup Type Nut	M10	4
64	77-0628-00	Ring		8
65	88-0726A-01	Sliding Way	1000mm	1
65	88-0726B-01	Sliding Way	2000mm	1
65	88-0726C-01	Sliding Way	3000mm	1
66	77-0627-00	Spacer Ring		4
67	77-0629-00	Shaft		4
68	77-0767A-01	Cover Plate For Left Door	1000mm	1
68	77-0767B-01	Cover Plate For Left Door	2000mm	1
68	77-0767C-01	Cover Plate For Left Door	3000mm	1

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I. Safety Regulation

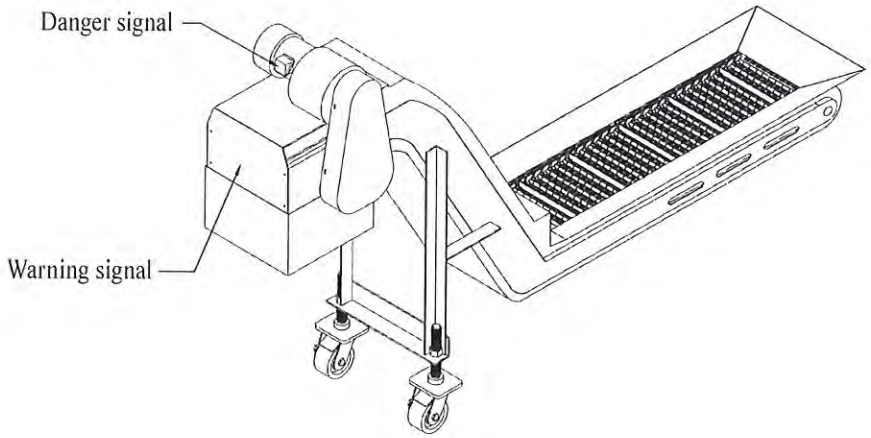
1-1 Preface

The main function of the metal chippings conveyor is moving the chippings produced by the processing machines. It is powered from motor to move the conveyor chain belt for performing the purpose of cleaning metal chippings. The operation contains some invisible dangerous factors, and for safety requirements, the related operators, such as for assembling, testing and maintenance···etc. should read this operation manual carefully before performing the related procession procedures of the conveyor to assure the safety.

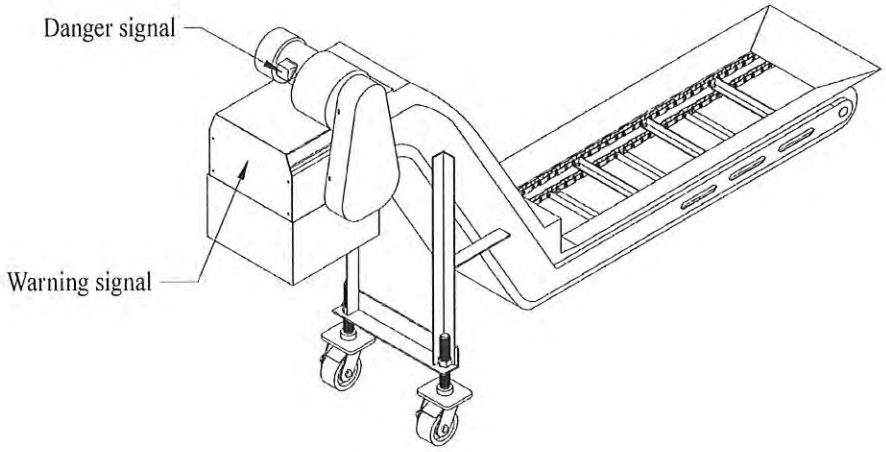
1-2 Warning signal plates

There are dangerous or warning label plates adhered at major positions of the conveyor. All operators must obey it and prohibited to contact in order not to get injury.

*** Chain Board Style :**

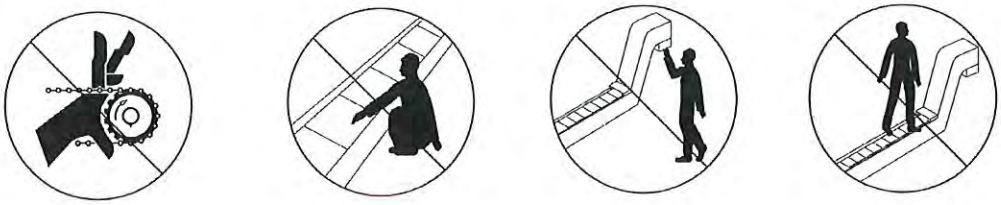


✻Scraper Style:

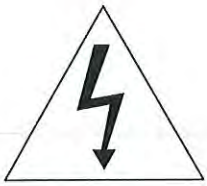


✻Contains of the signal plates:

Danger signal



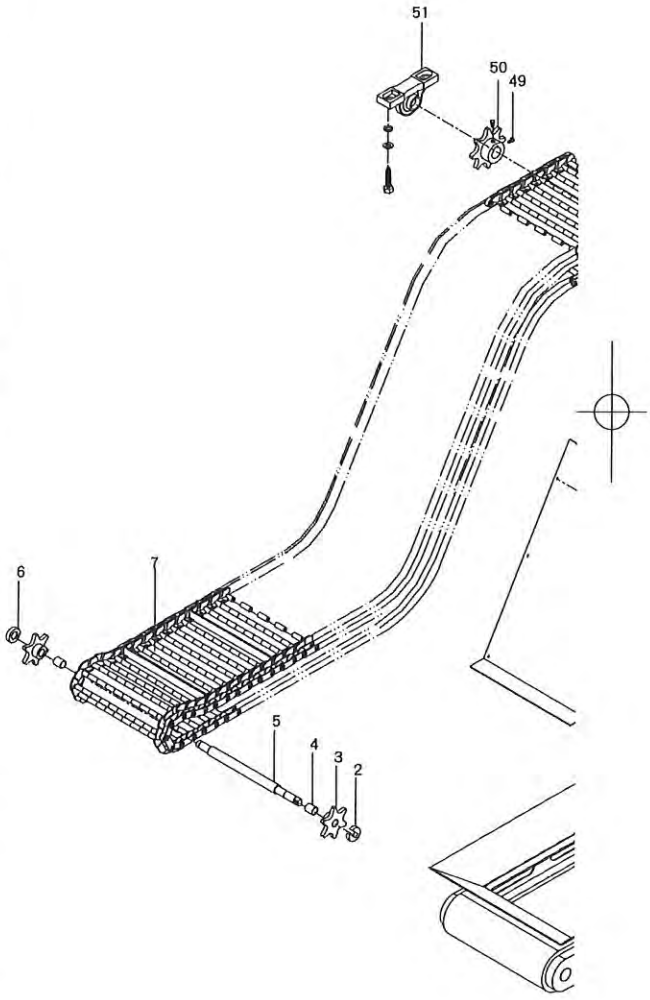
Warning signal

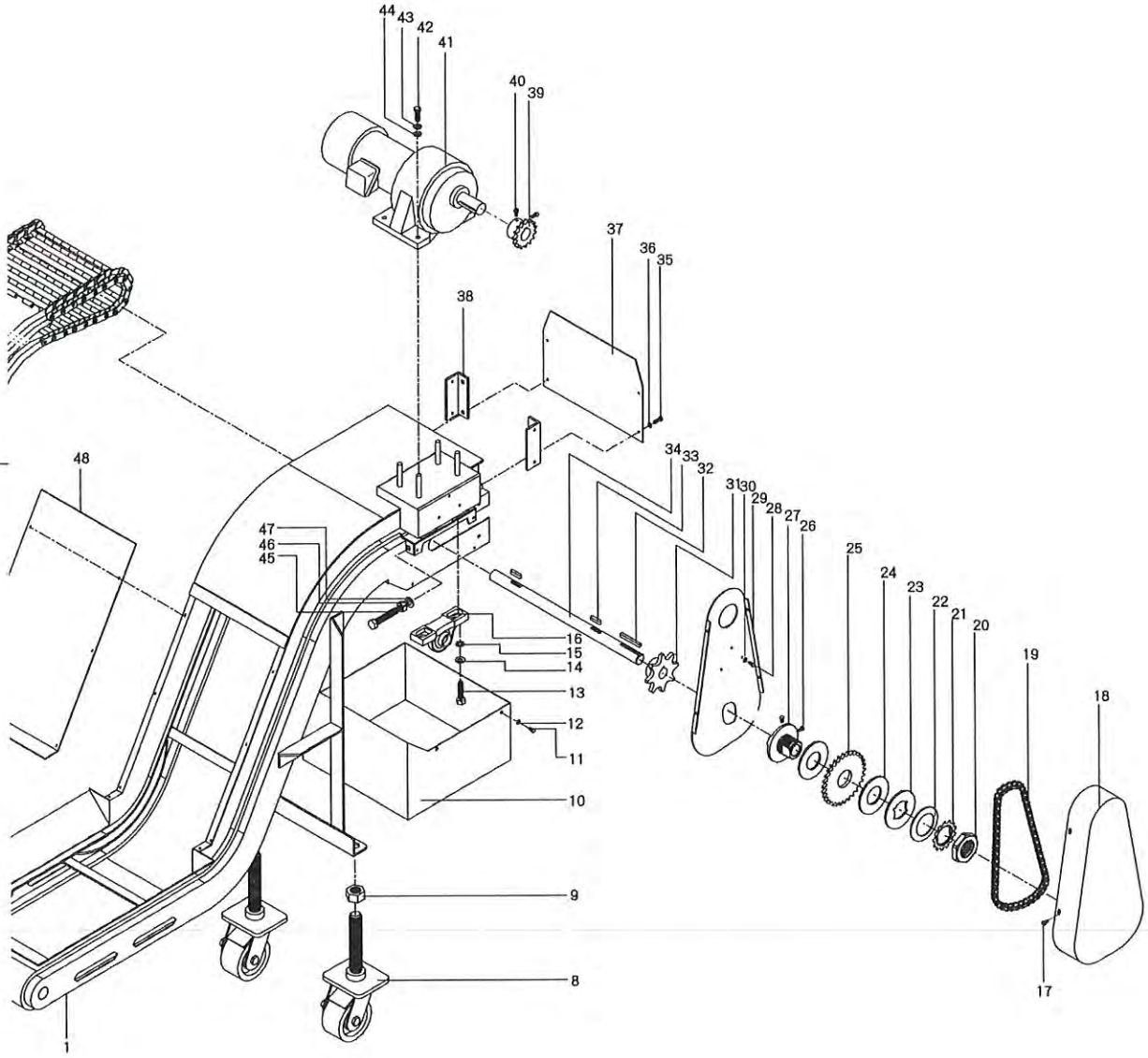


2. Name of each parts of the conveyor

2-1 Chain Board Style

Item No.	Name	Item No.	Name
1	Frame Body	27	Torque Controller Body
2	Left Ring	28	Screw M5
3	Sprocket Gear	29	Motor Inner Cover
4	Dry Bearing	30	Spring Washer
5	Real Shaft	31	Former Shaft Gear
6	Right Ring	32	Key
7	Chain Board	33	Key
8	4" PU Wheel	34	Former Shaft
9	Bolt M20	35	Screw M5
10	Funnel	36	Spring Washer
11	Bolt M5	37	Frong Guard Plate
12	Spring Washer	38	Support Base
13	Bolt M10	39	Motor Gear
14	Spring Washer	40	Bolt M8
15	Flat Washer	41	Motor
16	Bearing P205	42	Bolt
17	Bolt M5	43	Spring Washer
18	Motor Cover	44	Flat Washer
19	Transmission Chain	45	Bolt M12
20	Nut	46	Nut M12
21	Washer	47	Spring Washer
22	Spring Washer	48	Upper Cover
23	Washer	49	Screw M8
24	Break Lining	50	Former Sprocket Gear
25	Gear	51	Bearing P205
26	Bolt M8	52	

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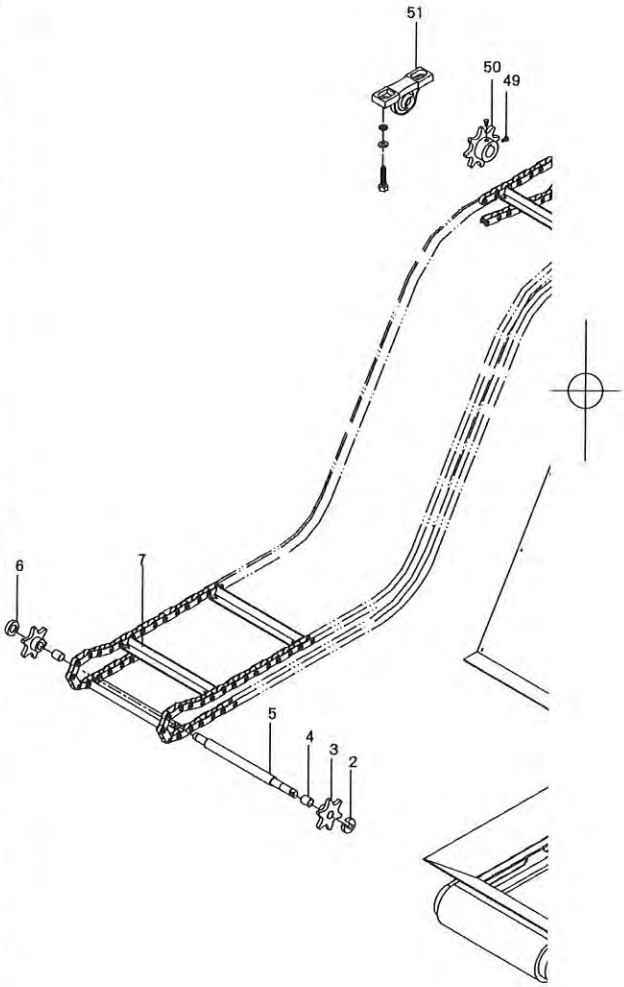
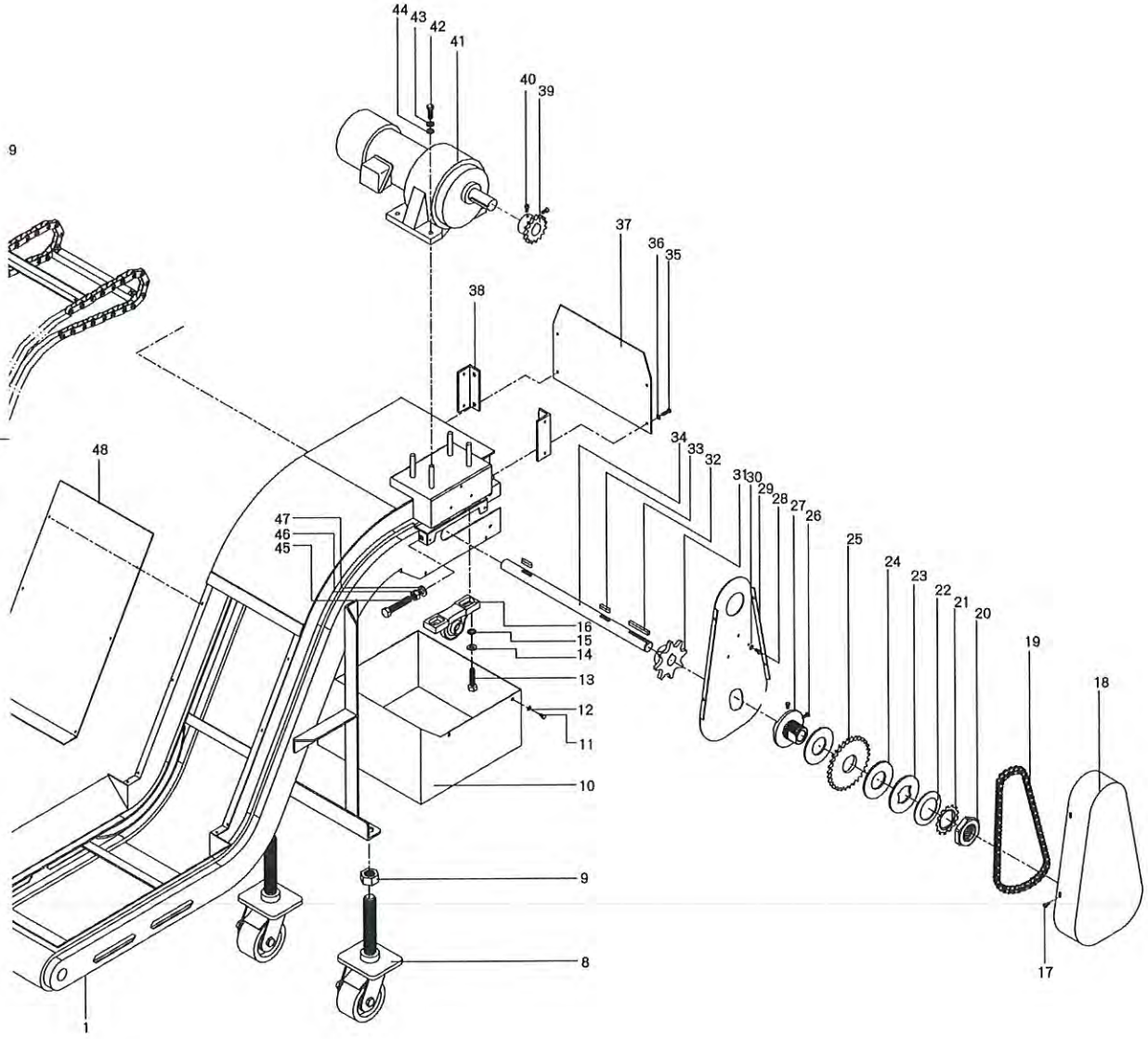
2-2 Scraper Style

Item No.	Name	Item No.	Name
1	Conveyor Frame Body	27	Torque Controller Body
2	Left Ring	28	Fixing Screw M5
3	Sprocket Gear	29	Motor Inner Cover
4	Dry Bearing	30	Spring Washer
5	Real Shaft	31	Former Heart Shaft Gear
6	Right Ring	32	Flat Key
7	Scraper	33	Flat Key
8	4" PU Wheel	34	Former Heart Shaft
9	Nut M20	35	Fixing Screw M5
10	Funnel	36	Spring Washer
11	Bolt M5	37	Former Cover Plate
12	Spring Washer	38	Support Base
13	Bolt M10	39	Motor Gear
14	Spring Washer	40	Screw M8
15	Flat Washer	41	Motor
16	Shaft P205	42	Screw
17	Fixing Screw M5	43	Spring Washer
18	Motor Cover	44	Flat Washer
19	Transmission Chain	45	Screw M12
20	Nut	46	Nut M12
21	Washer	47	Spring Washer
22	Spring Washer	48	Upper Cover Plate
23	Washer	49	Fixing Screw M8
24	Break Lining	50	Former Heart Shaft Gear
25	Gear	51	Shaft P205
26	Screw M8	52	

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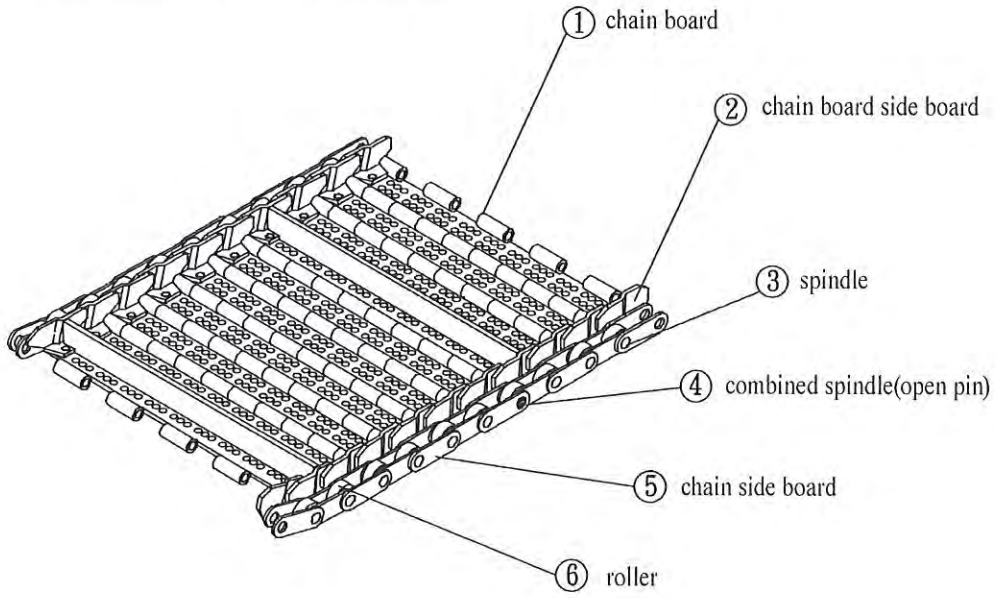
3. The methods of installation and operation

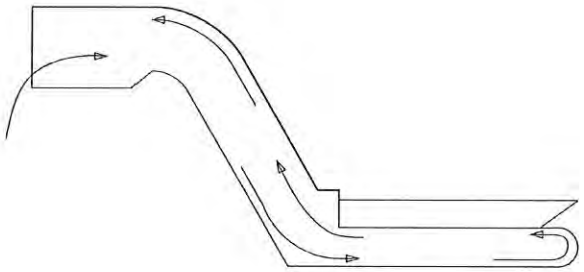
3-1 Chain Board Style Conveyor

3-1-1 The construction drawing of chain board

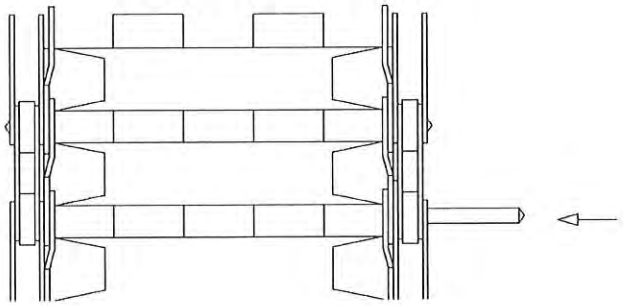


3-1-2 assembling methods

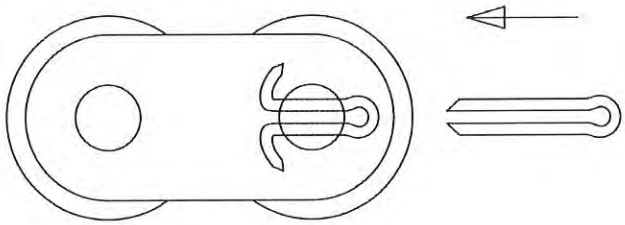
3-1-2-1 The chain board is formed by connecting boards, chains, and shafts with head and tail ends both opened. The tail end is placed into the rails underneath the conveyor and run through the underneath rails to the upper rails to form a sealed run ways. (as per drawing)



3-1-2-2 To put head and tail ends together, and joint side boards, rollers in order, then insert the heart shaft. (as per drawing)



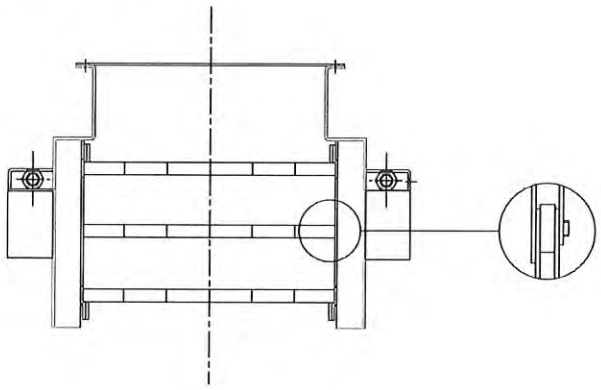
3-1-2-3 To insert the open pin into the fixed hole of the heart shaft after the heart shaft is placed. And then unfold the open pin outward.



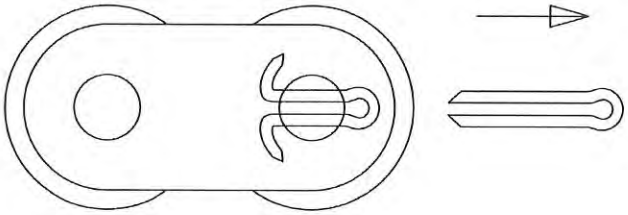
3-1-2-4 To load the motor, gear, chain, and adjust the chain to a proper tension for completing the assemble task.

3-1-3 The methods of dismantle

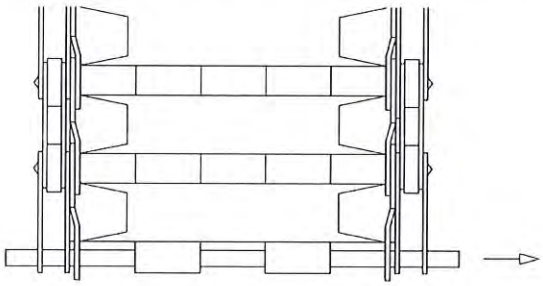
3-1-3-1 To turn the connection position of heart shaft and the open pin at the chain board to the former part of the conveyor.



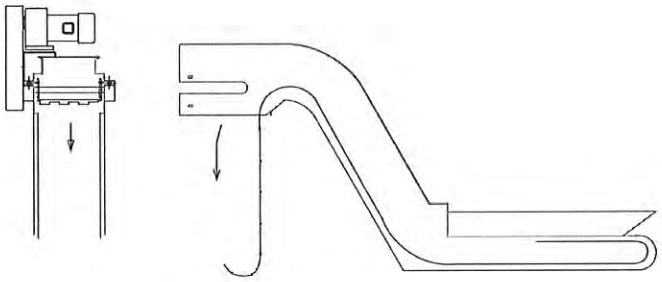
3-1-3-2 To take off the open pin from the heart shaft.



3-1-3-3 To take out the heart shaft for separating from chain board

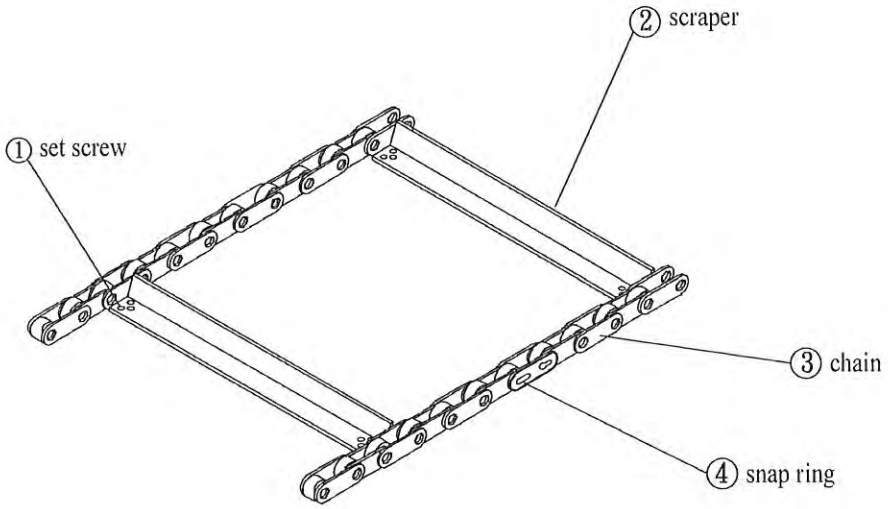


3-1-3-4 To draw out the chain board from the conveyor to complete the dismantle task.



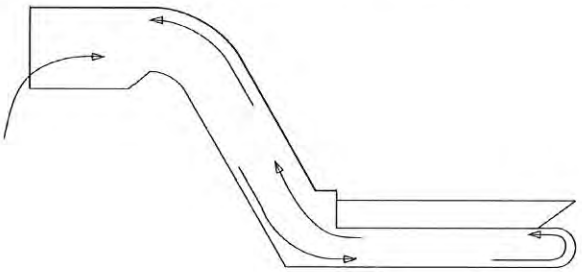
3-2 Scraper style conveyor

3-2-1 The construction drawing of scraper

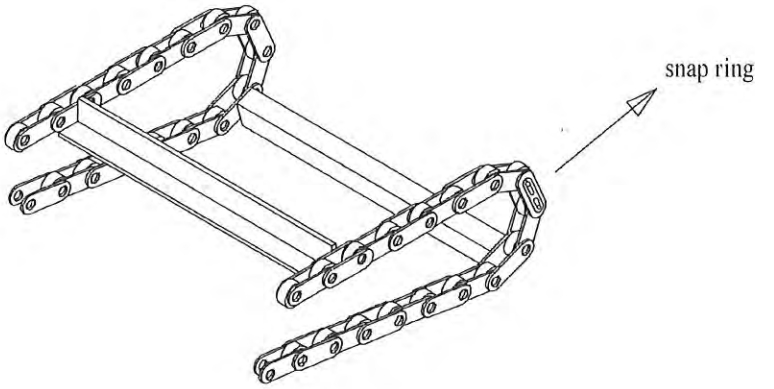


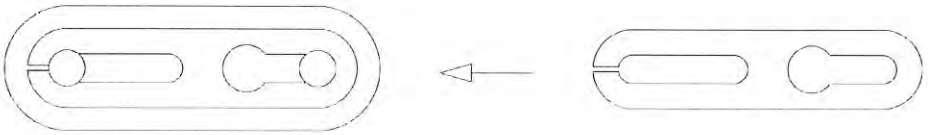
3-2-2 The methods of assembling

3-2-2-1 The scraper is formed by connecting scraper boards, chains, and shafts with head and tail ends both opened. The tail end is placed into the rails underneath the conveyor and run through the underneath rails to the upper rails to form a sealed run ways. (as per drawing)



3-2-2-2 To put head and tail ends together, and joint side boards, rollers in order, then insert the buckle into side board to complete the assemble task.





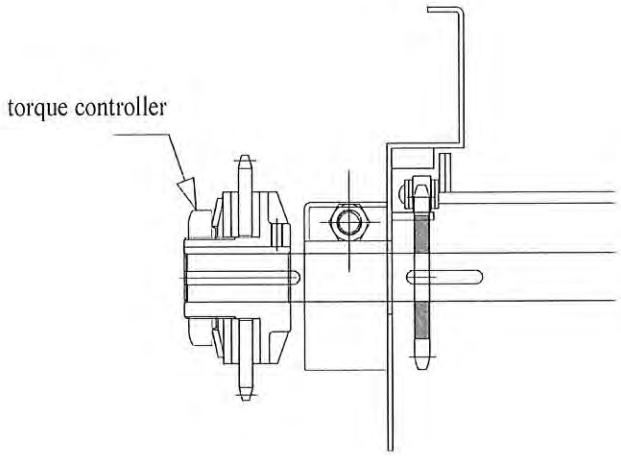
3-2-3 The methods of dismantle

3-2-3-1 To turn the connection position of moving heart shaft of scraper' s chain and the buckle to the former part of the conveyor.

3-2-3-2 To take off the buckle and side boards to separate from the chain, then draw out the scraper' s chain from down side of the conveyor to complete the dismantle task.

3-3 Overload protection device

The conveyor equipped with a torque controller at motor transmission side. When it' s overloaded, the rubbing sheet of the controller will slip to protect the whole construction of the conveyor.



3-4 Installation

The conveyor has to adjust the horizontal after placed into the working machine by adjusting the supporting wheels. The outlet of chippings is a little bit higher to prevent the cutting liquid flowing down through the frame body to ground.

3-5 Note for operation

1. Body and hands are prohibited to get-close or touch the transmission parts of the conveyor to avoid from being drawn into the machine to get hurt.

2. The maintenance of controlling box and motor must be executed by professional people only.

3. When the hands are wet, please don' t touch any switch or button to avoid from getting any electric shock.

4. Please turn off the electric power first before proceeding any operation of inspection of maintenance of the conveyor.

5. Please maintain the ground clean and dry to prevent operator to slip or tumble.

6. Please don' t take off or amend the warning signal plate of the conveyor. If the plate was damaged, it needs to be replaced by a new one and adhered at the same position.

7. To check whether the electric wire is fine or not to prevent electric leakage or shock to occurred.

8. To prevent the clothes or hair to be drawn into the moving and turning parts of the conveyor.

9. Please don' t clean the metal chippings adhered at the conveyor during operation. Please stop the operation first while if the cleaning is necessary, And please don' t move the conveyor during operation. Please also stop operating while if the moving is required.

10. The conveyor must be operated with working machine simultaneously.

3-6 To eliminate the malfunction

1. The metal chippings dropping into the conveyor consecutively is the best working condition which should avoid loading too much quantity at the same time or dropping big articles into inner side of the conveyor (such as jobs, wrenches, screws etc.,) to cause chain boards or scrapers broken down.

2. While if the conveyor is unable to be operated regularily and accumulate too much chippings to cause the cleaning machine run idly or and cause the electricity cut-off, it is needed to stop the machine for cleaning the accumulated chippings first by pushing the button of REV to return

the conveyor for cleaning the surplus chippings, then pushing the button of FOR to run the machine for restoring the normal function of cleaning chippings.

4. Maintenance and Inspection

1. The reducer machine is filled with lubricant oil already, it' s no need to supply lubricant oil, but please be awared to check whether it' s leakage or not during daily maintenance.

2. When there is any abnormal sound or the temperature is too high, please check whether the current load is abnormal or not.

3. Please always inspect whether the chain of the chain board style conveyor is loose or not. Adjust the screws from left to right back and forth of the head to an appropriate tension while it is loose.

4. To inspect whether the chain of the chain board style conveyor gets damaged or not, and also check if there is any abnormal sound during operation.

5. To inspect whether the chain of the scraper style conveyor is too loose or not. if it' s too loose, then the screws at left an right side of the head must be adjusted to appropriate tension.

6. To inspect whether the scraper of the scraper style conveyor is becoming deformed shape, and if there' s any abnormal sound during operation.

7. The transmission chain of connection the motor and shaft must maintain appropriate tension. And adjusting the screws at upper and lower sides, If it' s too loose.

8. The transmission shaft is equipped with a torque controller for overloaded protection, it is needed to check whether the rubbing sheet gets damaged or not during inspection.