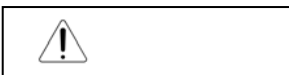




OPERATION MANUAL



Persons unable to read English must have this manual read and explained to them before operating or maintaining the machine. Everyone working on the machine must know how to operate it safely and correctly to avoid possible injury.



Version & relative revise record

1) Updated date: April 2007

Version: 002 version date: April 2007	
Relative Chapters/Pages	Modification context
All Chapters	Revised manual version
Ch 7-3, 7-4	Add 7..5 Replacing oil on headstock and 7.6 Aligning headstock
Ch 8-13, 8-14	8.6 Full splash guard
Ch 8-16, 8-17	8.7 Encoder
Ch 8-18~8-47	Add 8.8~8.22 parts list & drawing into manual

2) Updated date: Jun. 2008

Version: 003 version date: Jun. 2008	
Relative Chapters/Pages	Modification context
All Chapters	Revised manual version
Ch 2.4	Add Power turret
Ch 2.5	Add Spindle rpm(s) & output diagram
Ch 3.8	Add Tooling system & limitation
Ch 3.9	Add Hydraulic unit

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1 GENERAL SAFETY INSTRUCTION



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1 GENERAL SAFETY INSTRUCTION

1.1 General safety regulation

- 1) All factory supervisors, machine operators, and other related personnel must read the operation manual thoroughly.
- 2) High-speed spindle is the part of the structure of this machine. Dangerous situations such as filings or work pieces may fly off due to the high speed RPM, or impact produced by inserting or removing object. Therefore safe operation procedures must followed to avoid personal injuries.
- 3) Machine operator must adhere and follow the operation instructions and safety precautions. In addition, operator must follow the safety operation standard of his factory.
- 4) To avoid danger, it is forbidden for any persons wearing gloves, tie, or with loose hair to operate this machine.
- 5) To avoid danger, it is forbidden for any persons to operate this machine after consuming alcohol or medication.
- 6) Do not come in contact with power switch with wet or damp hands.
- 7) Maintain clean surrounding and floor on machine area.
- 8) Before operating this machine, follow the daily maintenance routine.
- 9) In the working area, fire extinguisher must be placed in a visible area for emergency use.
- 10) All power supply system and circuitry must follow your country's standard.
- 11) If vehicle is used to transport material, clear the passageway and keep the floor clean.

1.2 Specific safety rules



In order to avoid accidental injuries to machine operators, various safety features are installed onto the machine. It is not recommended for operators to solely rely on these features. It is strongly recommended for operators to follow and remember the following safety instruction:

1.2.1 Confirmation before power on

- 1) Control box and operation panel must be secured.
- 2) In the working area and surrounding area, miscellaneous objects must be removed and cleaned.
- 3) Starting procedure is as follows:
 - (a) Main power breaker switched to “ ON ” position.
 - (b) Press the control switch “ ON “ on the operating panel.

1.2.2 Using oil pressurized chuck

- 1) Before starting main spindle or processing work, all safety doors must be closed.
- 2) When using chuck or other clamping tools, do not exceed the maximum RPM or load.
- 3) In order to control the RPM of main axle, when programming, follow the below settings. For FAGOR system, apply G50 to set maximum RPM. For safety precaution, set appropriate maximum RPM before starting main spindle.
- 4) For processing, when reaching the maximum main spindle RPM, pay attention to the following:
 - a. When chucking work, pay attention to leveling the work. To avoid using the maximum clamping force, keep the work as leveled as possible.
 - b. Follow the operation manual for allowable maximum RPM and pressure of chuck. Read and adhere to these rules.
- 5) Follow the standard for all chuck lubrication or screws.
- 6) If using larger than standard size chuck, pay attention to the following:
 - a. When using larger than standard size chuck, the center of gravity will be higher. This will decrease the clamping force, thus affect the main spindle performance. Therefore, the maximum allowable RPM must be below the RPM of using standard chuck.
 - b. The screws of chuck cannot extend outside of chuck. By using one screw to secure chuck will cause danger.
 - c. Use suitable chuck for the work.

1.2.3 Before operation

- 1) Before operation, check the amount of lubricant before operations.



- 2) Use the specified type of amount of lubricants in operation manual.
- 3) Use the specified cutting liquid in the operation manual.
- 4) Lubricants for every unit must be changed as it is specified in t Use the specified in the operation manual.
- 5) Follow the scheduled filter cleaning.
- 7) All pressure capacity must follow the standard set in the operation manual.
- 8) Cut power supply when opening the safety door of main spindle, tail stock door, and side door of main spindle conveyor belt. Only after following all safety precautions, proceed servicing activities.

1.2.4 Automatic or manual operation

- 1) Follow the instruction in the operation manual.
- 2) Do not start machine when moving or removing safety guards.
- 3) Power must be turned off before safety guards can be removed.
- 4) When processing work, check all program action. The procedure is idling then single block program cutting then continuous program cutting.
- 5) When reversing main spindle, turret and other axle, consider safety precautions.
- 6) When reversing main spindle to cut, do not touch with hand.
- 7) Do not stop the piece of work with hand or other object when reversing main spindle.
- 8) Confirm the maximum reverse RPM and chucking pressure, check the locking of hydraulic pressurized chuck.
- 9) Check the locking condition of tools and accessories of turret.
- 10) Reconfirm the setting value of tools.
- 11) Reconfirm all default value.
- 12) Confirm the ratio value of spindle on the NC operation panel and input speed is set at 100%
- 13) Confirm the position of the limit of X/Z axis software and limit switch. Also check for interference of spindle and tailstock or sub spindle when turret is moving.
- 14) Inspect and check the reverse range of all tools on the turret.
- 15) Check the position of tailstock or sub spindle.
- 16) The actual transferring force when cutting should maintain at the torque force range.
- 17) Follow the clamping method and tightness when chucking work.
- 18) Adjust the direction of cutting liquid nozzle.

1.2.5 Preparation and setting

- 1) Execute all preparation work when exchanging work.

- 2) Execution single block operation procedure when performing new processing to new condition.
- 3) Follow safety procedures when changing chuck and claws
- 4) Communication must be set when two or more persons operate on the same machine.
- 5) Avoid manual operation when loading and unloading heavy work. Use life to execute this type of operation.
- 6) Before initial operation, go through all procedures if unfamiliar with the usage of this machine.

1.2.6 Loading and unloading work

- 1) Procedure before loading and unloading work must be confirmed.
- 2) When loading or unloading work, move the turret to the right-up side or left-up side to avoid injuries or interference.
- 3) When loading or unloading work, spindle must be in a stop position.
- 4) Reverse the spindle when chucking work for the first time to confirm the tightness of chuck.
- 5) When operating on irregular form of work, besides checking the tightness, also check for leveling.
- 6) Use life to handle heavy work to avoid slipping when loading or unloading.
- 7) Evaluate the chucking position.

1.2.7 Completion of work

- 1) Through cleaning of machine and surrounding area after completion of work.
- 2) Turret must return to home position after completion of work.
- 3) After completion of work, before operator leaves machine, shut down the power.
- 4) Procedure for shut down power: Push "EMERGENCY STOP", CNC power off, Main power switch off.

1.2.8 Unusual situations

- 1) When unusual situation occurs, press the emergency stop button on the operation panel.
- 2) Immediately handle the situation. Locate the responsible party of the machine.
- 3) When operating by more than two people, locate the problem and eliminate it.



- 4) When replacing fuse or other parts, follow the specified model and maker.

1.2.9 Others

- 1) Operators should dress in the proper attire, hat and shoes.
- 2) Execute the necessary maintenance and cleaning of machine and it's surrounding.
- 3) Wet or damp hand is forbidden to touch any switches.



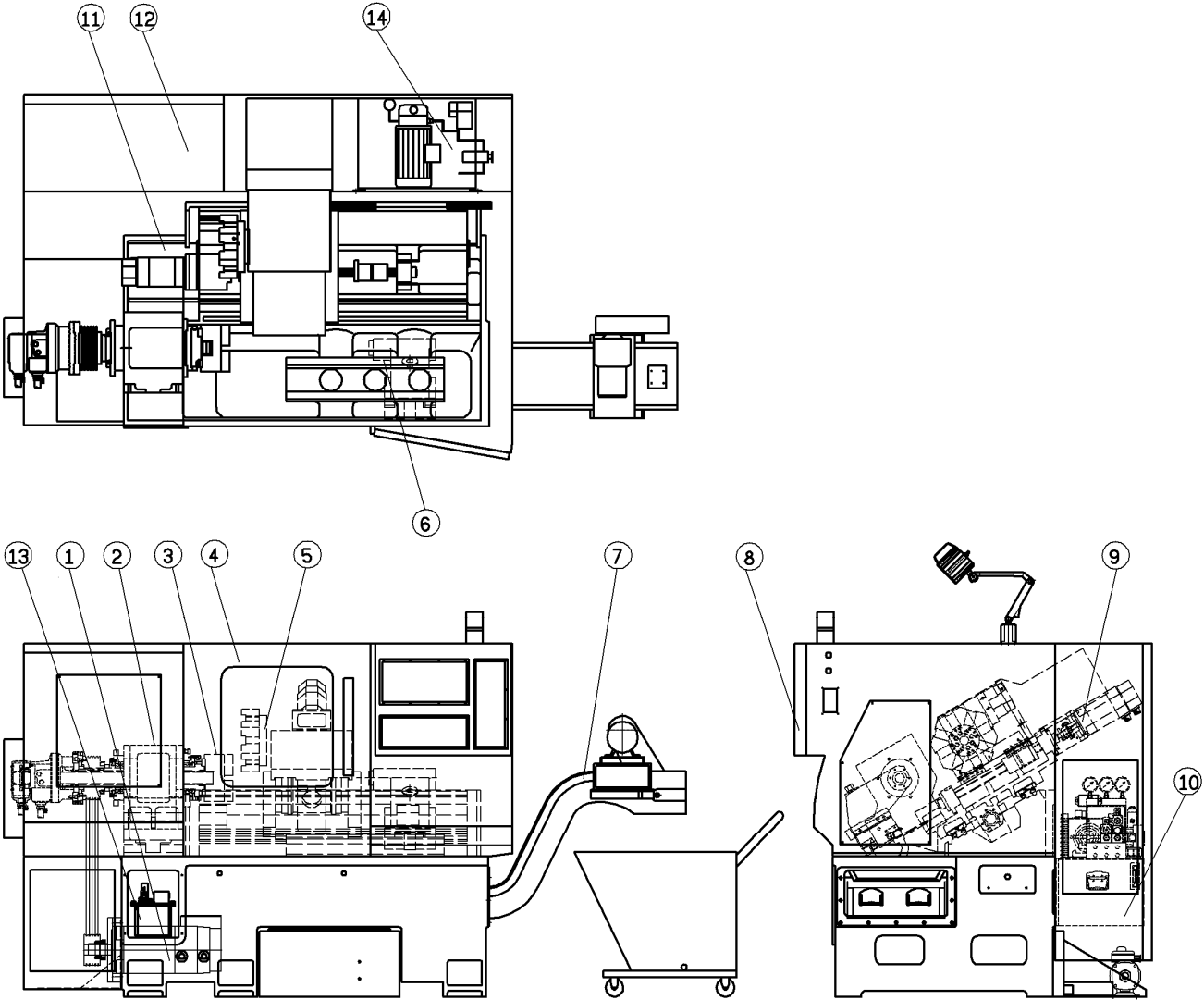
2 MACHINE GENERAL INFORMATION



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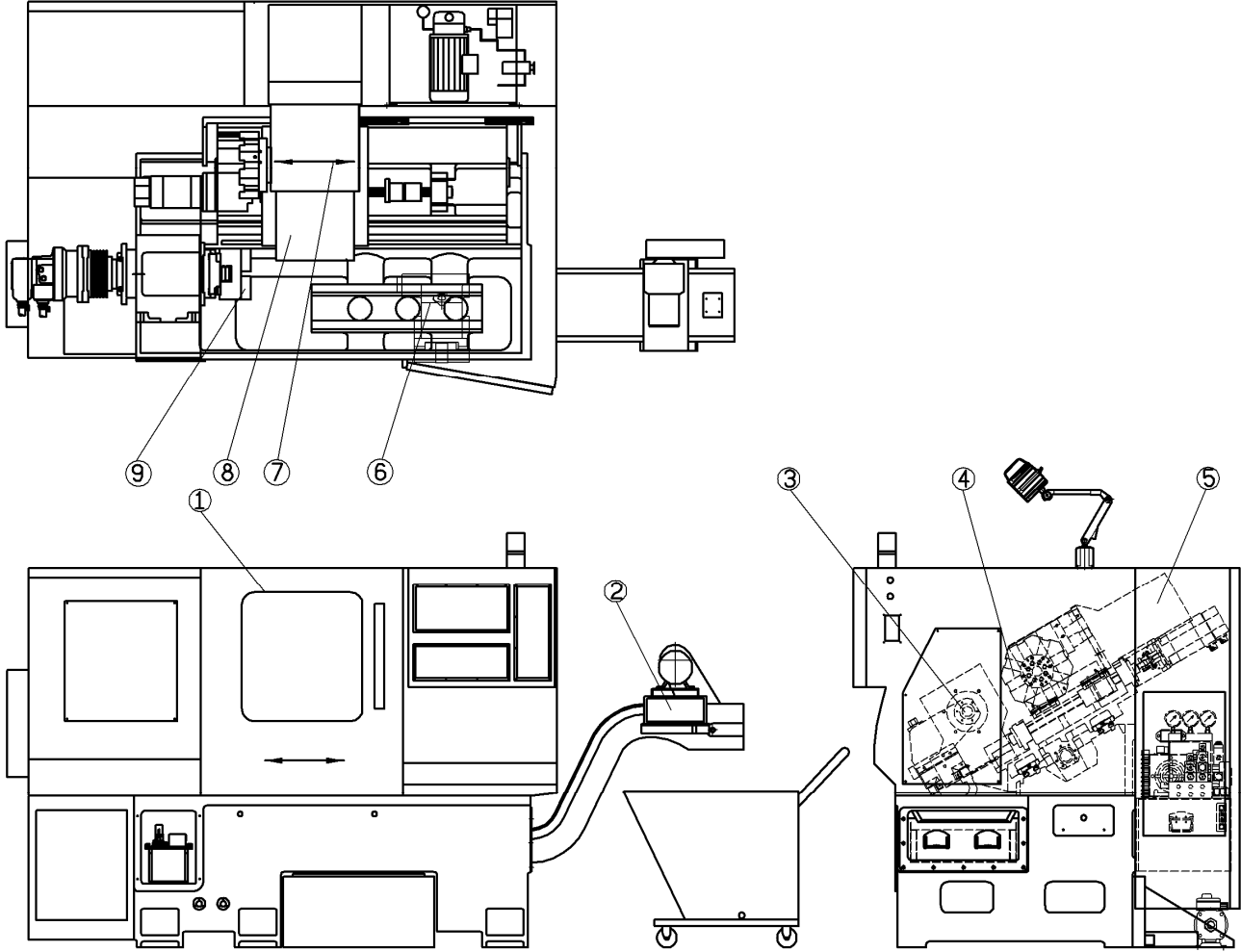
2 MACHINE GENERAL INFORMATION

2.1 Main parts of machine



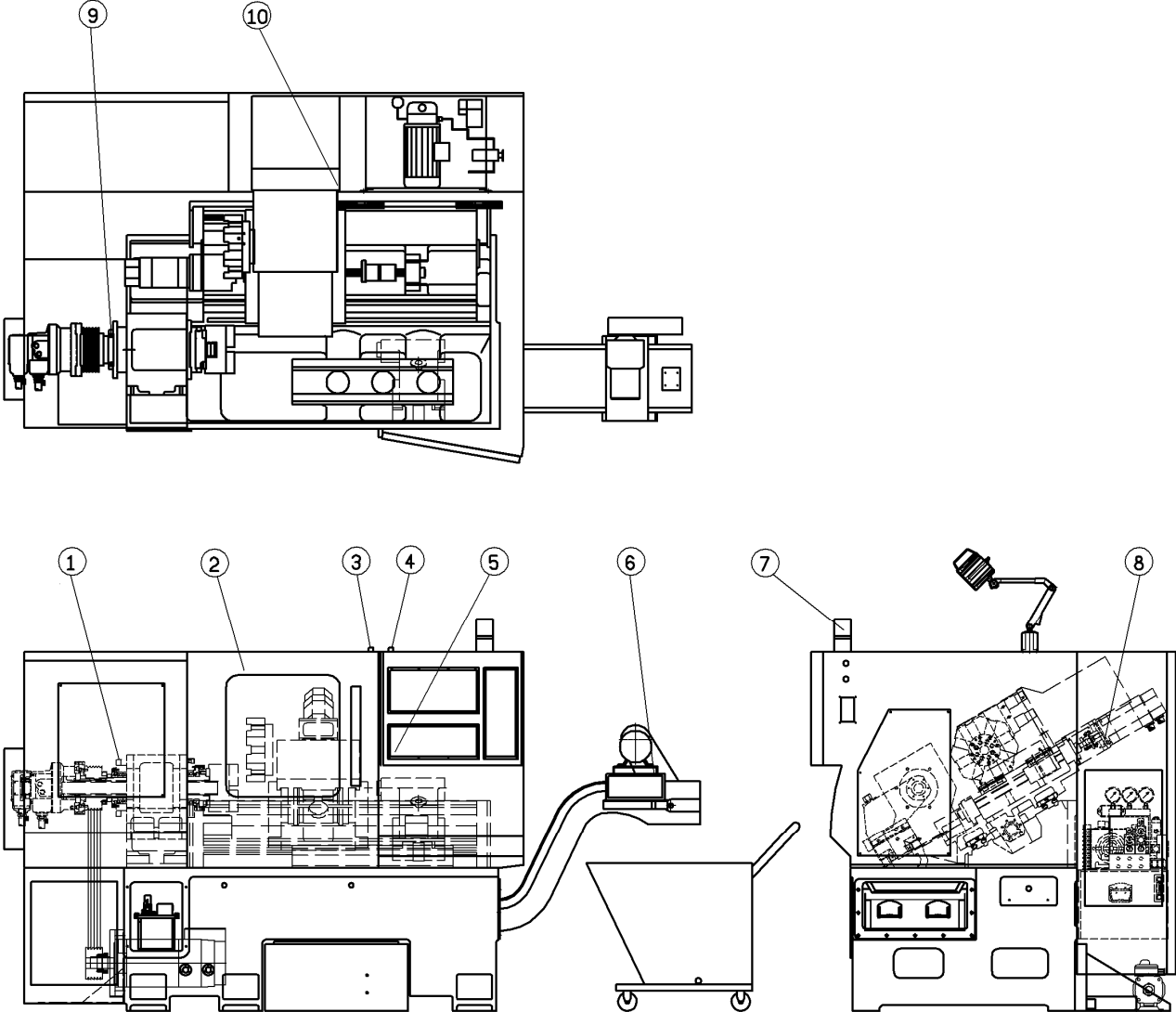
1. Ac Spindle Motor	6. Tail Stock	11. Ac Y Axis Motor
2. Headstock	7. Chip Conveyor	12. Electrical Cabinet
3. Hydraulic Chuck	8. Operation	13. Lube Tank
4. Safety Door	9. Ac X Axis Motor	14. Hydraulic Unit
5. Turret Turning	10. Oiler	

2.2 Movable part



1. door	4. Turret index	7. Z-axis
2. Chip conveyor (opt.)	5. X-axis	8. Turret
3. Main spindle	6. Tailstock	9. Chuck jaws

2.3 Location of safety devices



1. Chuck sensor	4. Safety switch	7. Alarm lamp	10. X-axis limit switch
2. Safety door	5. Emergency stop	8. Z-axis limit switch	
3. Interlock switch	6. Chip stop switch (opt.)	9. Spindle encoder	



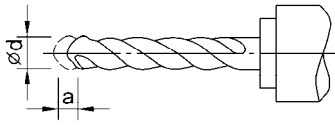
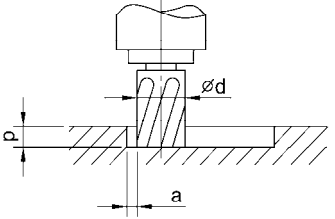
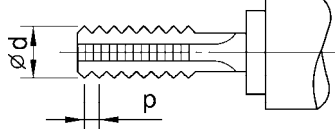
2.4 Power Turret

2.4.1 Specification

		TBMA			
Turret size		120	160	200	250
Tool holder size	Mm	20	30	40	50
Max. power	KW	4	5	9	12
Max. torque	Nm	15	20	50	55
Max. speed at the spindle	rpm	6000	6000	5000	5000
Transmission ratio	τ	1:1	1:1	1:1	1:1
Fagor		FM7-A037-S1C1-E01			
Fanuc		$\alpha 2/10000i$		$\alpha 3/10000i$	
Siemens 802Dsl		1FT6084-1AH71-1DG1			
Siemens 810D		1FT6084-8AH71-3AG1			
Heidenhain		QSY-155 D			

2.4.2 Cutting Capacity (with fit motors)

- * Work piece material: 600N/squre mm steel
- * Cutting tool materials: HSS

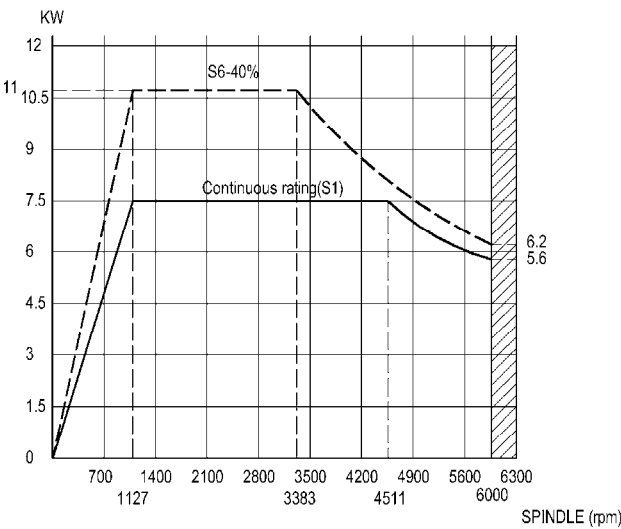
	Twist drilling	Tapping	Slot milling
			
	$d \times a$ [mm] x [mm]	$d \times p$ [mm] x [mm]	$d \times p \times a$ [mm] x [mm]
TBMA-120	8 x 0.15	M6 x 1	12 x 8 x 45
TBMA-160	12 x 0.20	M8 x 1.25	20 x 10 x 40
TBMA-200	20 x 0.20	M16 x 2	25 x 14 x 40
TBMA-250	22 x 0.20	M18 x 2	25 x 20 x 40

2.5 Spindle rpm(s) & output diagram

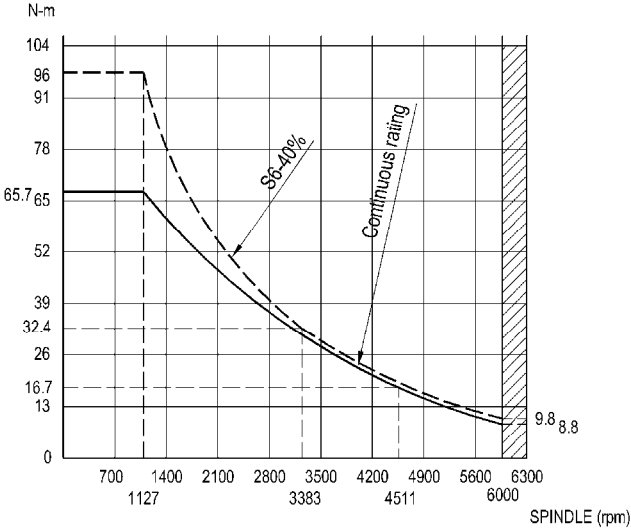
■ LT-42

1) Fagor FM7-A075_7.5/11Kw

Horsepower Chart

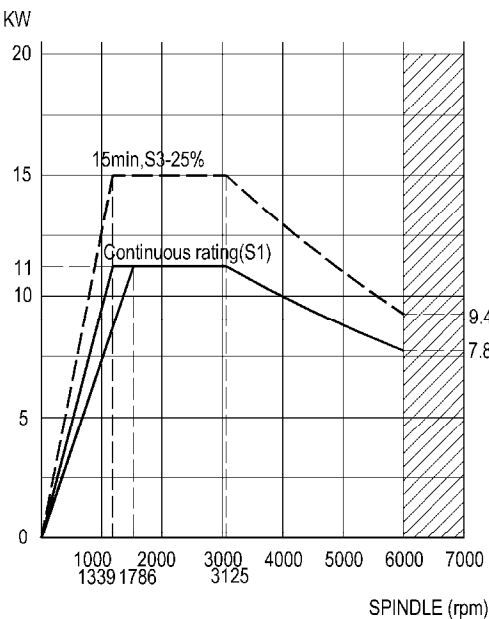


Torque Chart

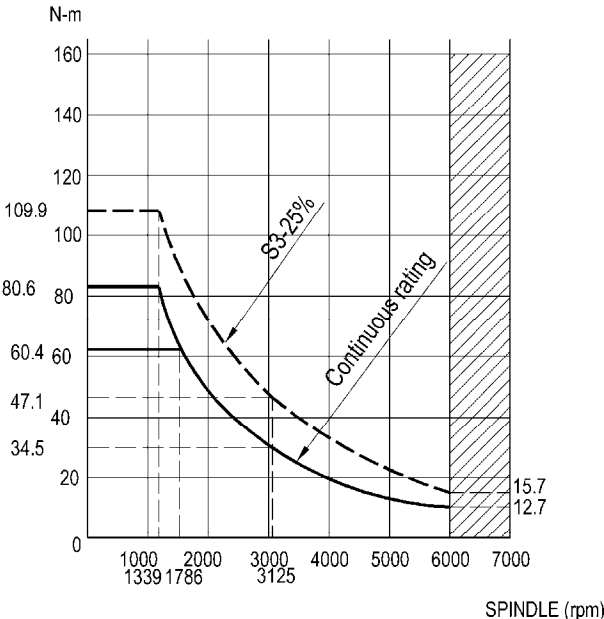


2) Fanuc 12/7000i_6000rpm

Horsepower Chart



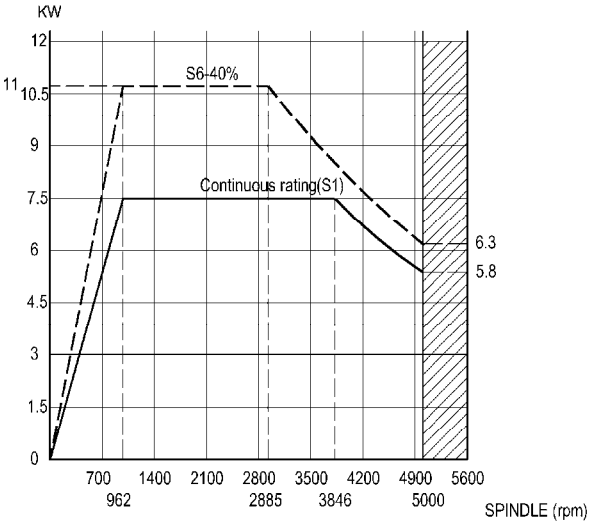
Torque Chart



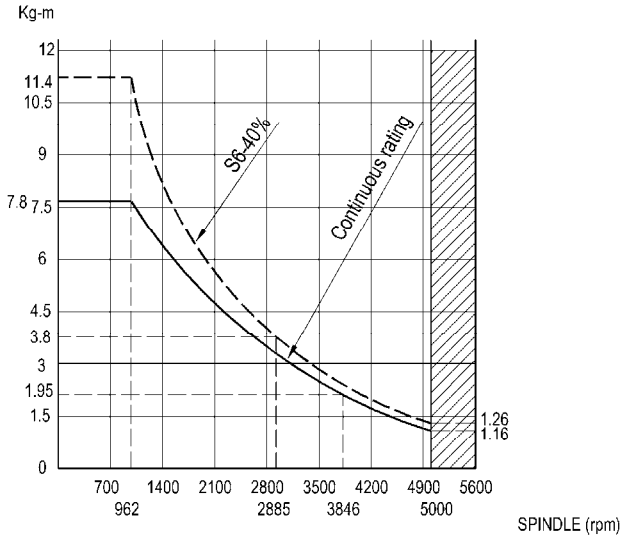
■ LT-52

1) Fagor FM7-A075_7.5/11Kw

Horsepower Chart

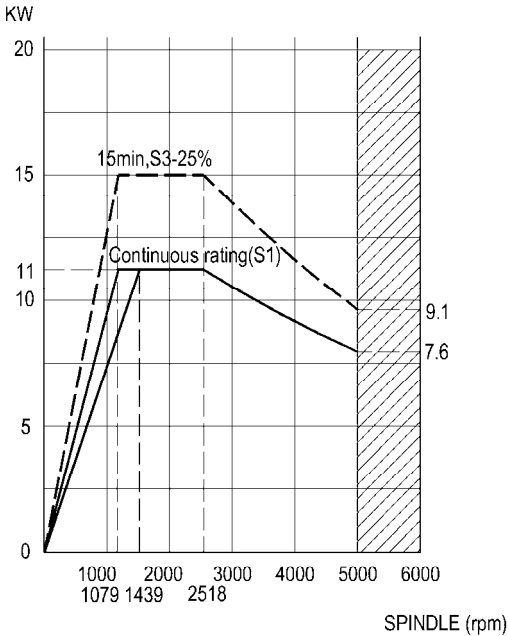


Torque Chart

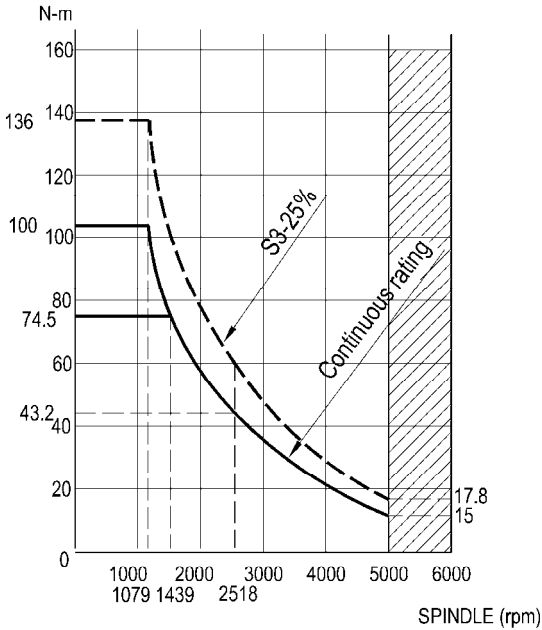


2) Fanuc 12/7000i_5000rpm

Horsepower Chart



Torque Chart

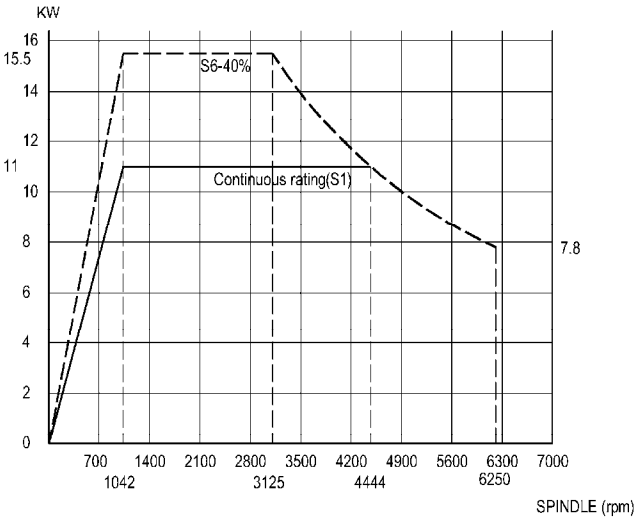




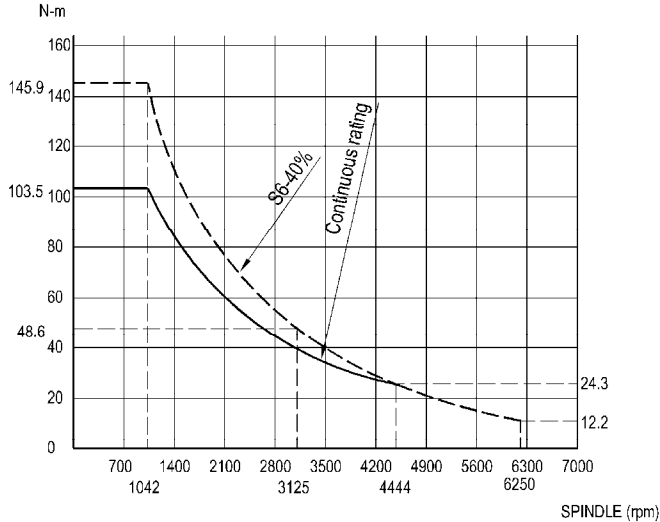
■ LT-65

1) Fagor FM7-A110_11/15.5Kw

Horsepower Chart

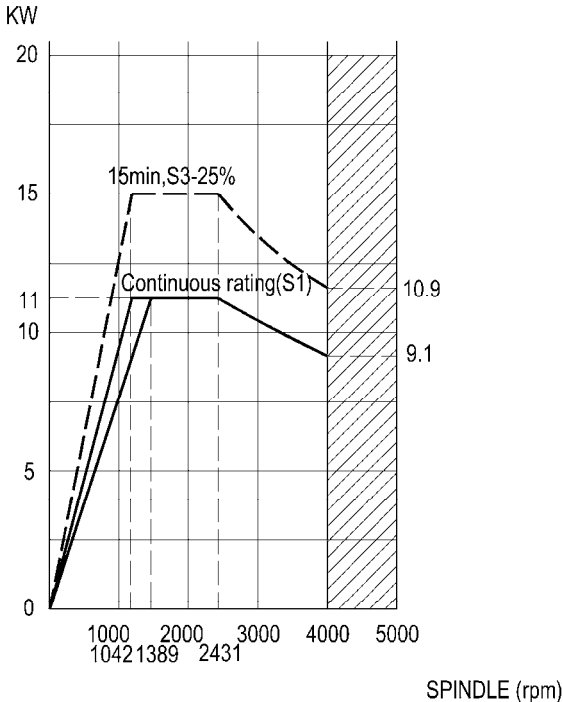


Torque Chart

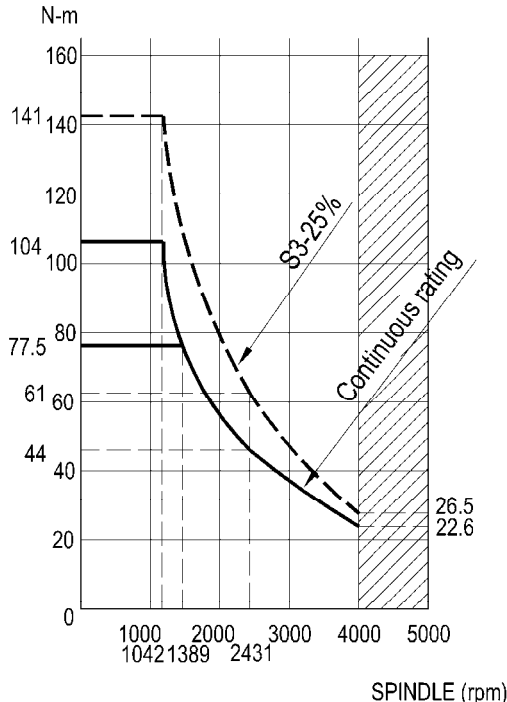


2) Fanuc 12/7000i_4000rpm

Horsepower Chart



Torque Chart



3 MACHINE INSTALLATION AND PREPARATION



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3 MACHINE INSTALLATION AND PREPARATION

3.1 Explanation of Important Parts

- 1) This machine is a CNC machine. It would perform the required eroding operation mode according to the program written on the base of working condition and program set rules.
- 2) This is a machining machine, which is made from steel metal and non-iron metal material. This machine can perform the machining program of outer diameter cutting, milling and drilling.
- 3) The main parts of the machine are main shaft box, turret, foot stock, tool slider, power supply box and guard plate etc.
- 4) The machine uses high output AC servomotor, which has high torque force output and consistent speed control to match with the conveyer of the high torque belt for the best cutting effect.
- 5) This main shaft is equipped with high accuracy bearing to make the main shaft with high-speed steel and high main shaft speed.
- 6) 45°bank machine unit, which makes it easier for cutting, tool installation and unload, could keep stable and high accurate performance.
- 7) The foot stock arbor controlled by oil pressure could be moved by hand or auto adjustment. Use the pinion gear to make the band pulley move to make sure the stability of drive.

Remark:

The machine unit is assembled with computer control system and the oil pressure system to make a complete set. It's more convenient for moving and takes smaller space. It will be easier for operation.

3.2 Cautions and Hazardous Area

3.2.1 Cautions while in storage status

- 1) Turn off all of the outer power.
- 2) Remove the cutting fluid, hydraulic oil and other fluid. Make sure there is no fluid in the machine or the fluid reservoir so that there will no fluid overflow while moving.
- 3) Make the turret back to home position and then fix it to avoid touching the drill chuck.
- 4) Make the foot stock away from the drill chuck and then tighten it.
- 5) Make sure to have proper anti-rust process for the parts. Which are easy to get rusted.
- 6) Make sure if the power specification on the machine on the machine is same as the specification on the delivery invoice such as: voltage, frequency, current etc.
- 7) Check if the quantities of the standard and optional accessories are the same as listed on the delivery invoice.
- 8) Put the dryer in the machines to avoid humid and use the plastic bag to cover the exterior of the machine for anti-humidity.
- 9) Check if wooden plate is strong enough to bear the machine weights and the possible force occurred during moving.
- 10) Fix the machine tightly on the wooden plate according to the illustration and check if the machine is fixed securely on the wooden plate.
- 11) Check if every kind of mark is marked properly on the wooden case such as CE mark, the front and back of the machine, weight, up, down, and anti-humidity.
- 12) Be careful with the environment and should be kept between 5° and 40°C

3.2.2 Caution while removing the wooden case

- 1) While removing the wooden case, the agent should send a representative to inspect the machine, accessories and relevant document.
- 2) Remove the wooden case from top first, then the sides and the wooden plates. Remove the wooden case carefully. The torn wooden plates should be clear up quickly so that the nails and chips will not hurt anyone.
- 3) Before moving the machine after removing the wooden case, take the accessories, tools box and relevant documents away first.
- 4) Before moving the machine after removing the wooden case, loosen the fixed base screw bolts and remove the nuts.

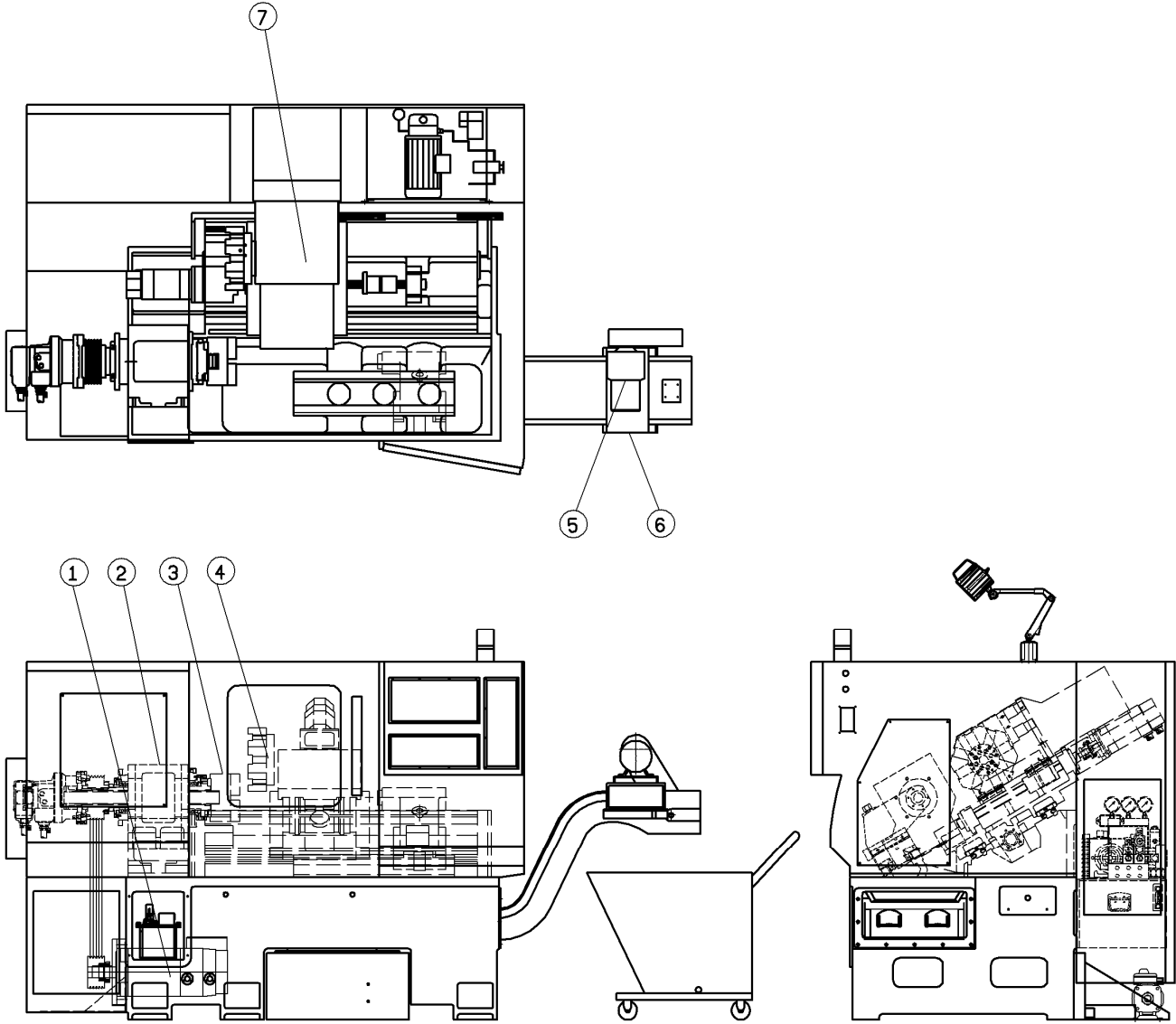
3.2.3 Cautious while moving

- 1) Before using the fork truck, make sure the fork truck has more than 5 tons bearing capacity.
- 2) Make enough and proper space for the machine and leave space for operation.
- 3) Clear all of the possible obstacles on the way. Which the fork truck uses.
- 4) During moving the machine, make sure the temperature of the surrounding is between 5°C to 40°C
- 5) When using the fork truck to carry the machine, the speed of the fork truck can't be over 5 km/hr and the height should be kept between 100mm to 1000mm.
- 6) When using the fork truck to carry the machine, an assistant should be accompanied with the driver to be in charge of moving and other assorted work. The illustration is the gestures used for conduct.
- 7) During the way of moving, avoid the curved road and choose the smooth road.
- 8) After the machine is fixed, connect the oil tubes and wires etc.

3.2.4 Cautions while re-setup

- 1) Turn off all of the power.
- 2) Remove the cutting fluid, oil pressure oil and other fluid, Make sure there is no fluid in the machine or the fluid reservoir so that there will no fluid overflow while moving.
- 3) Make the turret back to home position and then fix it to avoid touching the drill chuck.
- 4) Make the foot stock away from the drill chuck and then tighten it.
- 5) Before moving, make sure the fork truck has more than 5 tons capacity.
- 6) Make sure to have enough space for machine operation.
- 7) Remove all of the possible obstacles on the way so that the fork truck can go along the road smoothly.
- 8) While moving, the environment temperature should be kept between 5° C and 40° C.
- 9) When using the fork truck to carry the machine, the speed of the fork truck can't be over 5 km/hr and the height should be kept between 100mm to 1000mm.
- 10) When using the fork truck to carry the machine, and assistant should be accompanied with the driver to be in charge of moving and other assorted work, the illustration is the gestures used for conduct.
- 11) During the way of moving, avoid the curved road and choose the smooth road.
- 12) After the machine is fixed, connect the oil tubes and wires etc.

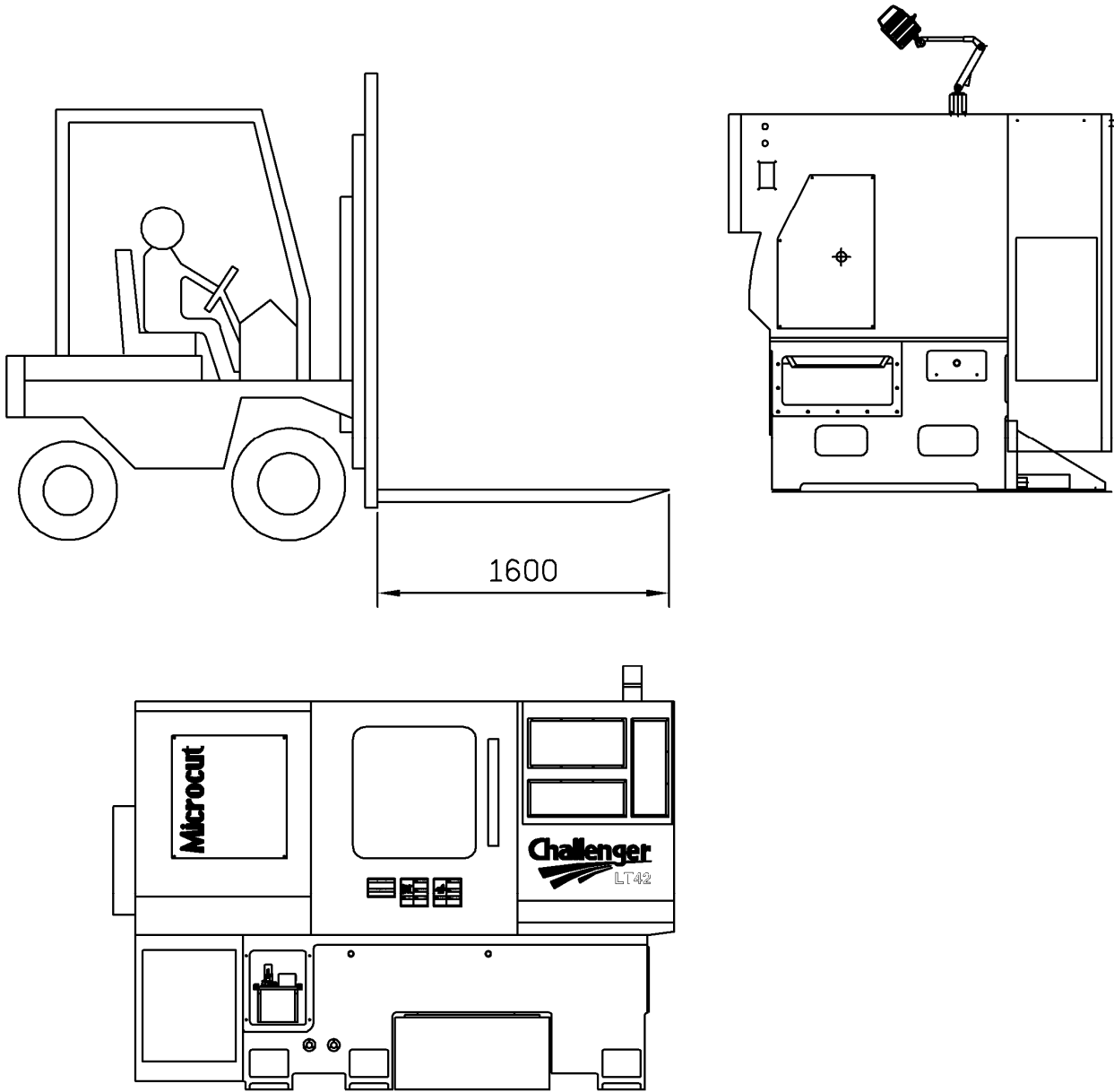
3.2.5 Machine Hazardous Area Diagram



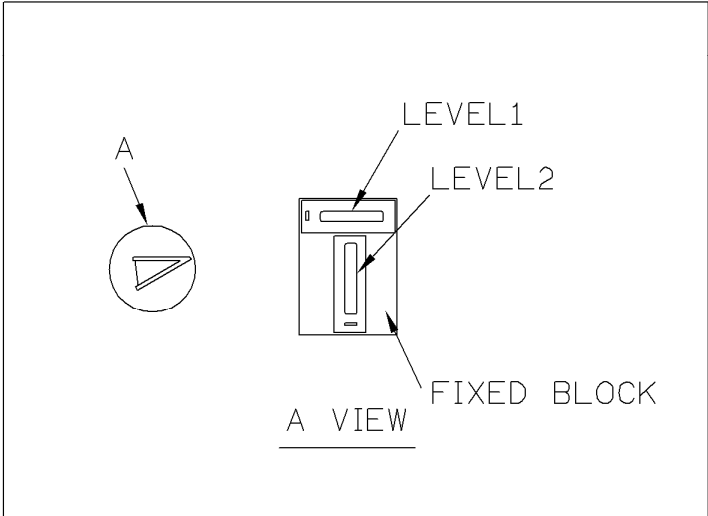
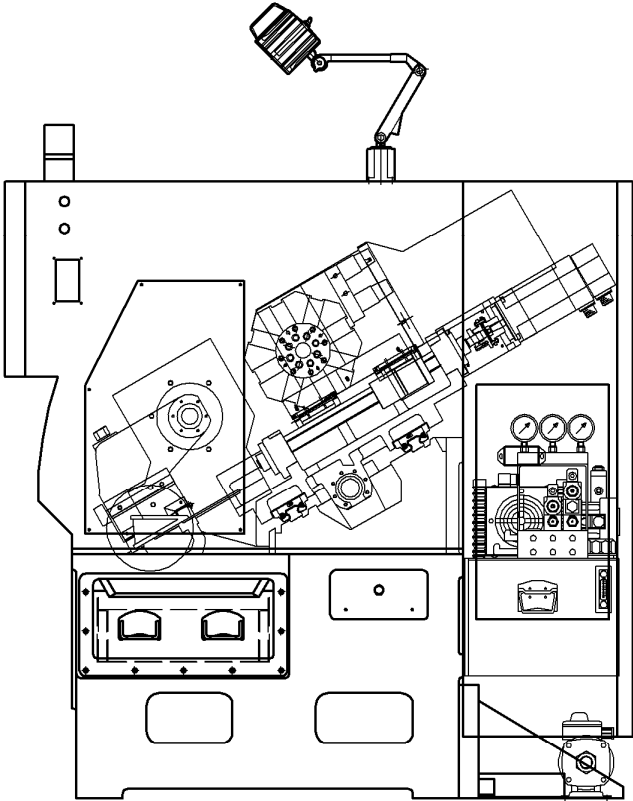
1. Spindle Motor	4. Turret Turning	7. Turret Moving
2. Headstock	5. Conveyor Motor	
3. Hydraulic Chuck	6. Chip Conveyor Outlet	

3.3 Machine Movement and Installation

3.3.1 Lifting method with fork lifter



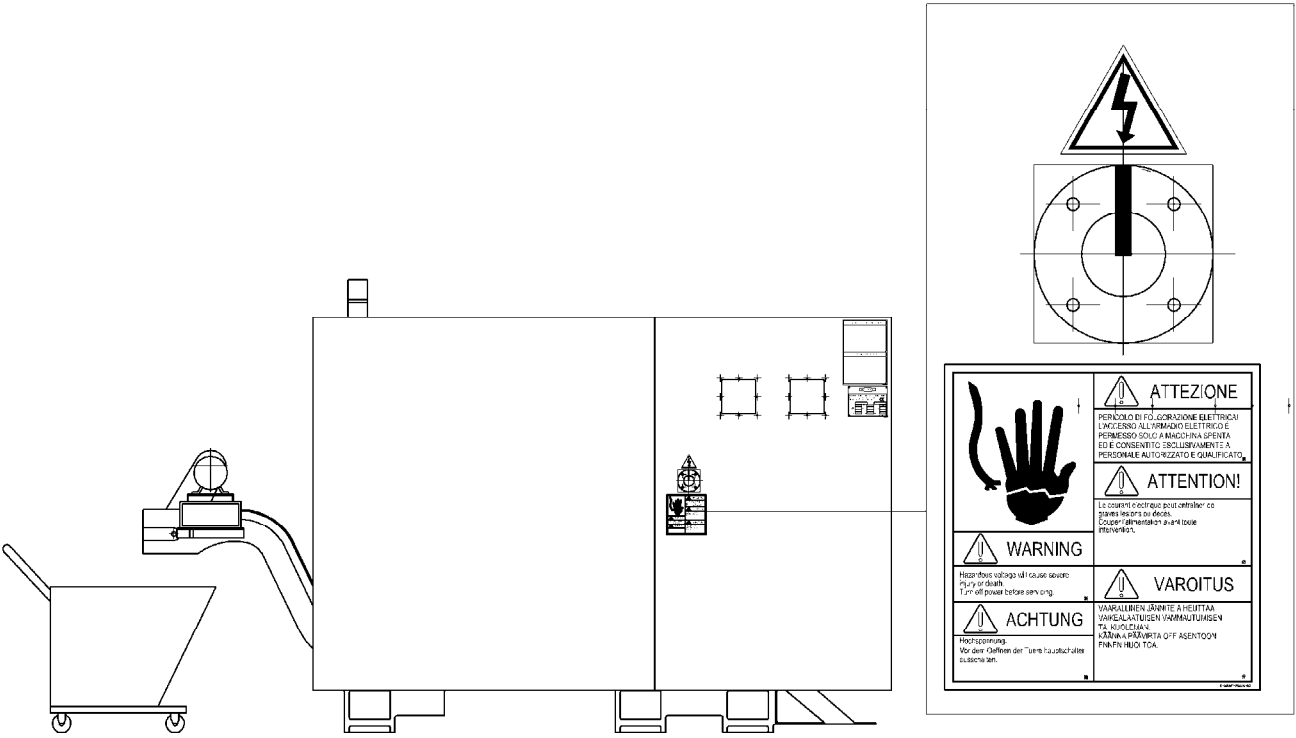
3.3.2 Machine Leveling Adjustment



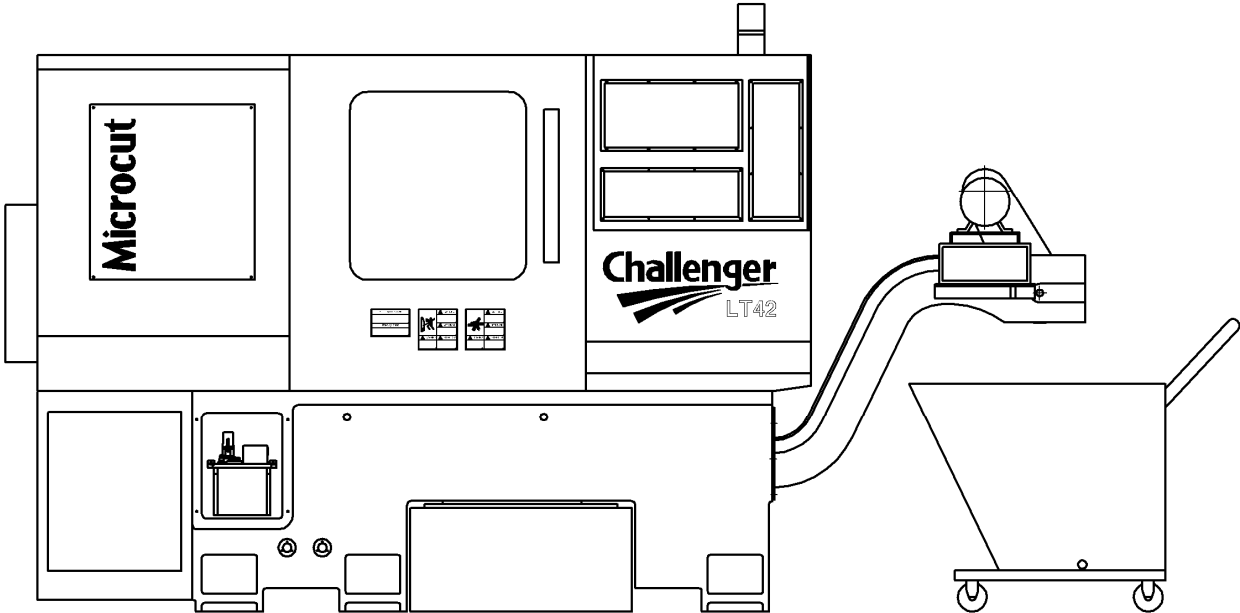
Method to adjust the level of the machine

- 1) Before adjusting the level of the machine, make sure the tolerance of the accuracy exceeds 0.04mm/min. perform the steps of level adjustment.
- 2) Before confirming the accuracy of the level, be sure to adjust the screw bolt first and then tighten the bolts.
- 3) The illustration on the top of the right shows the simple way to confirm the accuracy of the level: Put the level on the turret. Then move the left, right, front and back fixed positions of the turret. Observe the values on the level while moving the turret to get the accuracy values of the level for X and Z-axis of this machine.
- 4) Standard way of adjusting the level
 - (a) Place a ground parallel block with two-side parallel on the track of the machine unit as the illustration shown on the bottom of the right. Then put the level on it. Move the left, right front and back fixed positions of the parallel block. Observe the values of the level while moving to the fixed positions to get the level accuracy of X and Z-axis of this machine.
 - (b) Use the value of the level as the standard to get the highest and the lowest position of the machine and record them according to the facts.
 - (c) Use the positions of the record to adjust the screw bolts until they reach the required accuracy of level within 0.04mm/M.

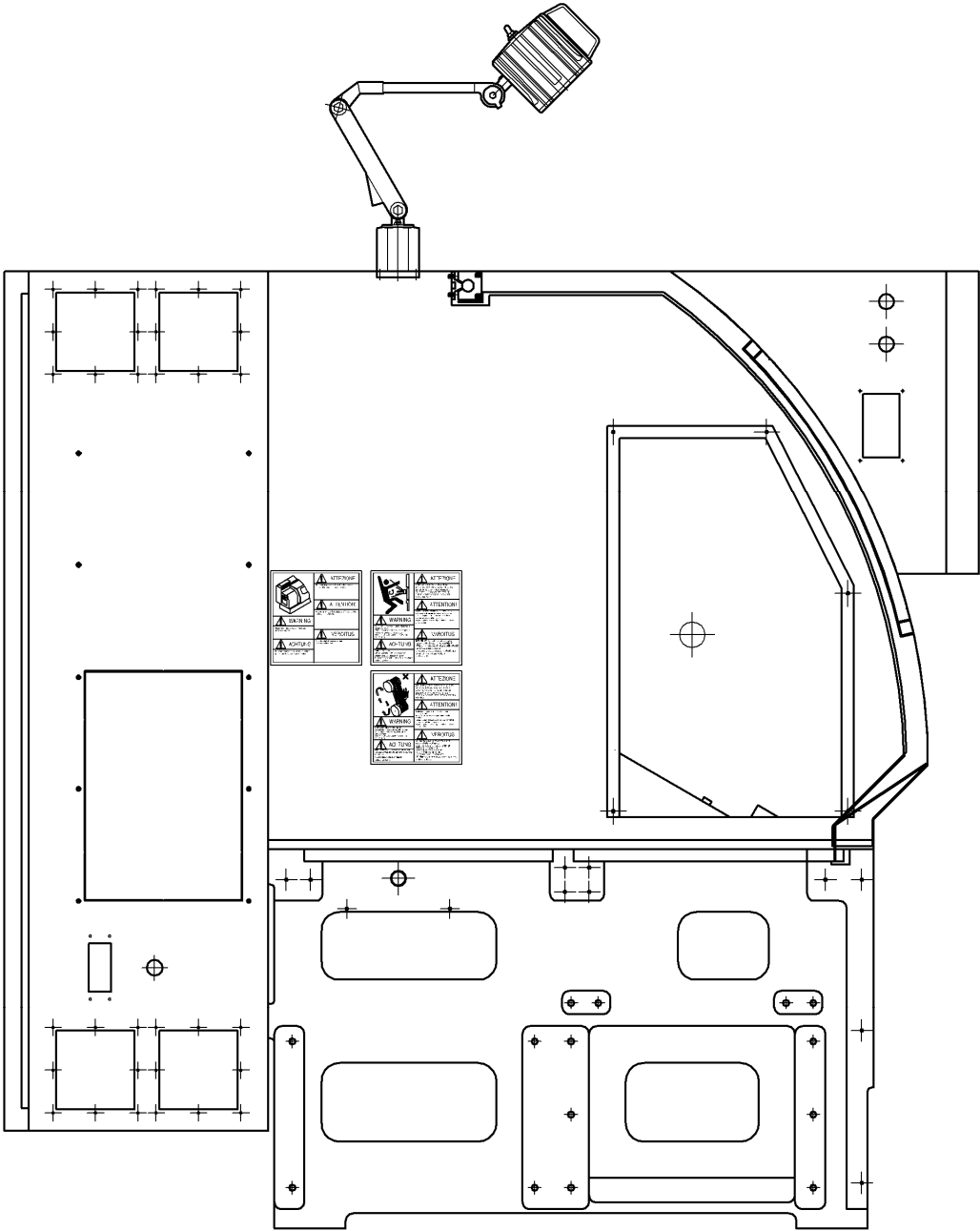
3.4 Location and Description of Warning Level



3.4.1 Location and description of warning label



3.4.2 Location and description of warning label





3.5 Power Demand and Environment Requirement

- 1) Main power
 1. The supply voltage is $220\pm 10\%$ VAC (Standard) or $380\pm 10\%$ VAC (Special)
 2. The frequency of power is $60\pm 1\%$ HZ (Standard) or $50\pm 1\%$ HZ (Special)
 3. The total capacity of power is 25 KVA
- 2) Ground wires
 1. The ground wires must bigger then 8mm^2 and should as short as possible.
 2. The side of the power switch is connected with the end of the ground wire must be marked "PE". Put the copper tube into the depth of 1.5M below the ground and then connect the copper tube with the ground wire. The resistance value of the ground wire should not exceed 100Ω
 3. Ground wires can not be connected to the steel poles in the plant because the steel poles might be connected with an electric discharge machines and thus will cause other signals

3.6 Requirement of Oil

3.6.1 Choose the oil for the machine according to the following

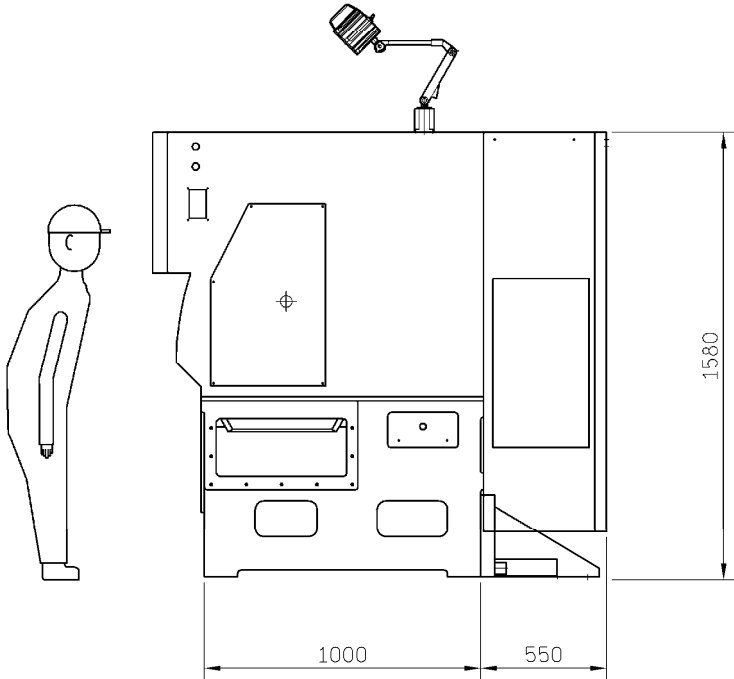
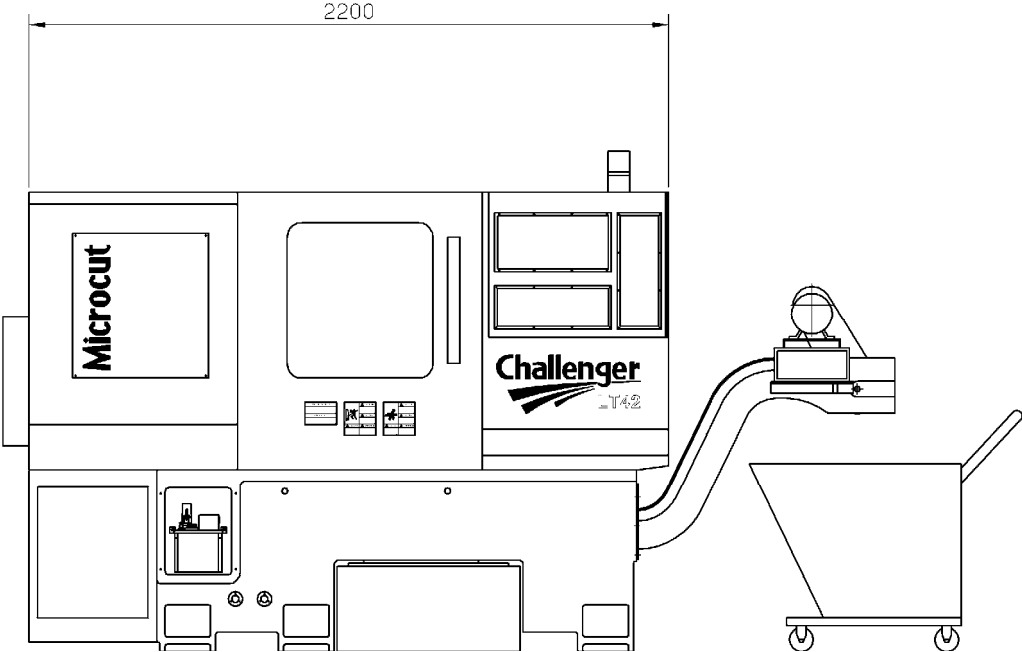
■ table

	Code	ESSO	Shell	Mobil
Hydraulic system	HL32	Unipower FM32	TETRA 32	DTE oil light
Slide way lube	G68, G220	Febis K68, 220	TONNA T68, T220	
Coolant tank		Cut well 30	DROMUS oil B	MET 150
Jaw on chuck	Grease			
Chip conveyor	Grease			
Gear box	CB32	Unipower FM32	TETRA 32	DTE oil light

3.6.2 Oil Pressure

Main pressure	$25\sim 30\text{ kgf/cm}^2$
Chuck pressure	$20\sim 30\text{ kgf/cm}^2$
Tail stock	$5\sim 12.5\text{ kgf/cm}^2$
Max flow value	30L/min.

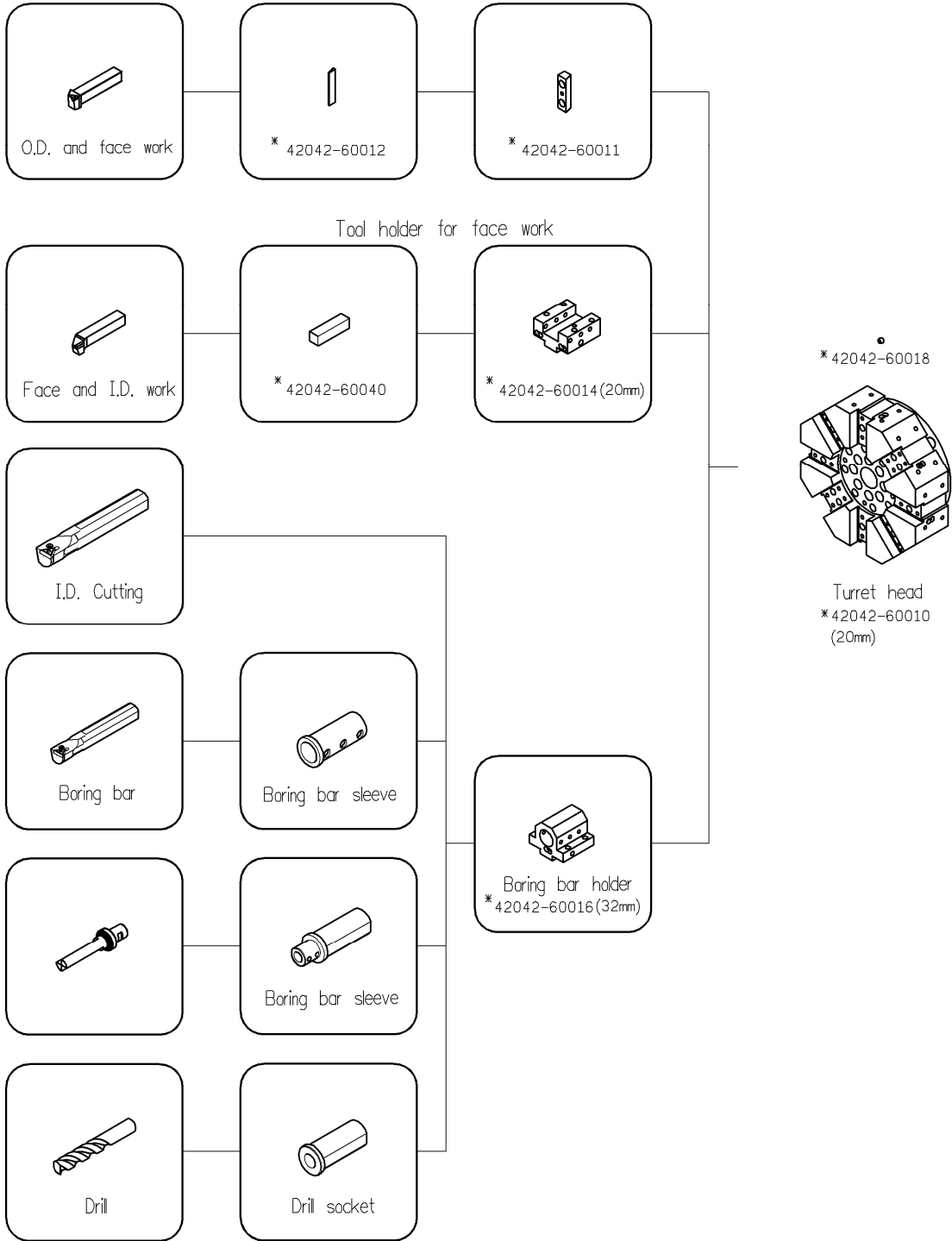
3.7 Operators Position



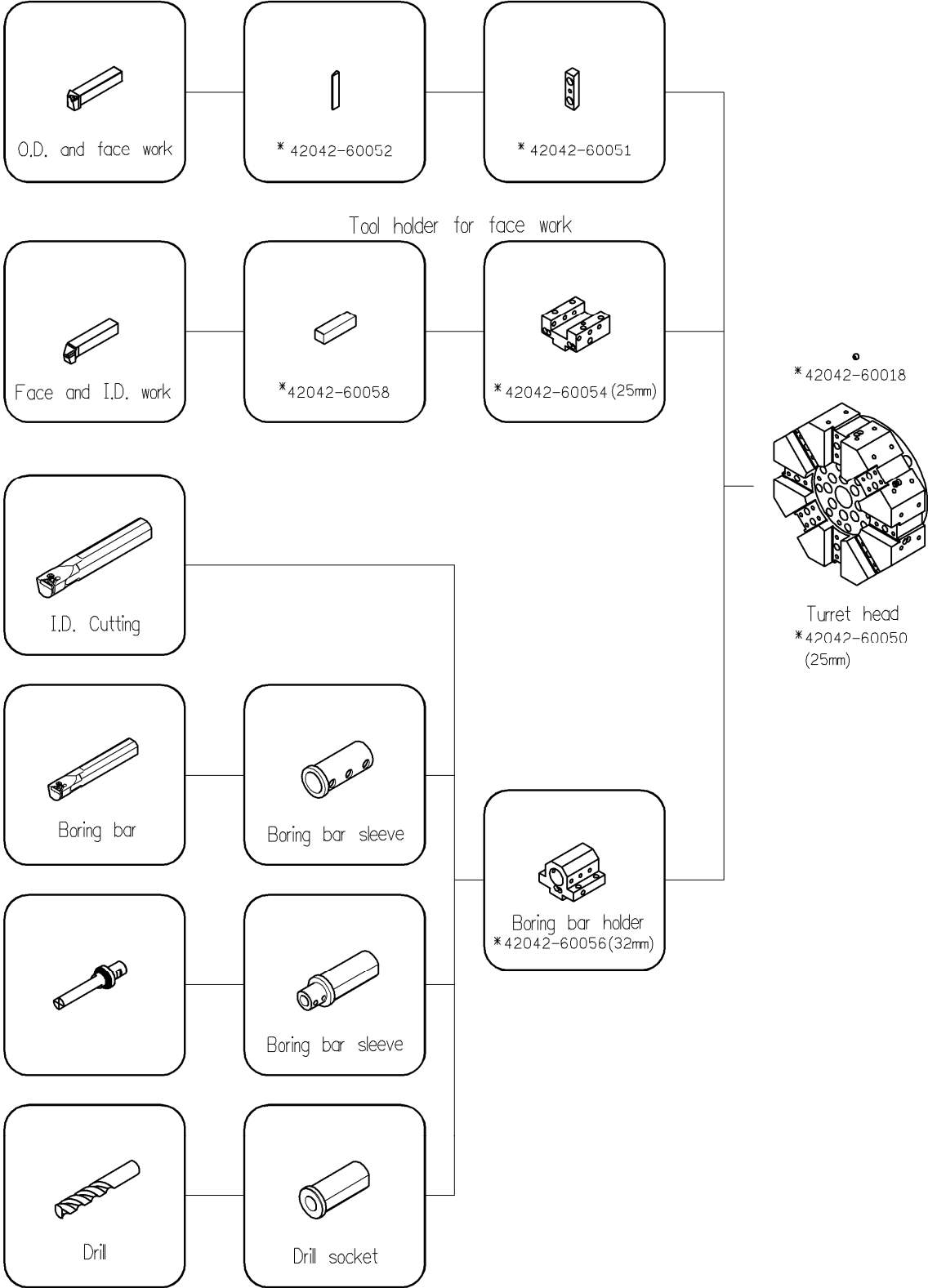
3.8 Tooling System & Limitation

3.8.1 Tooling system

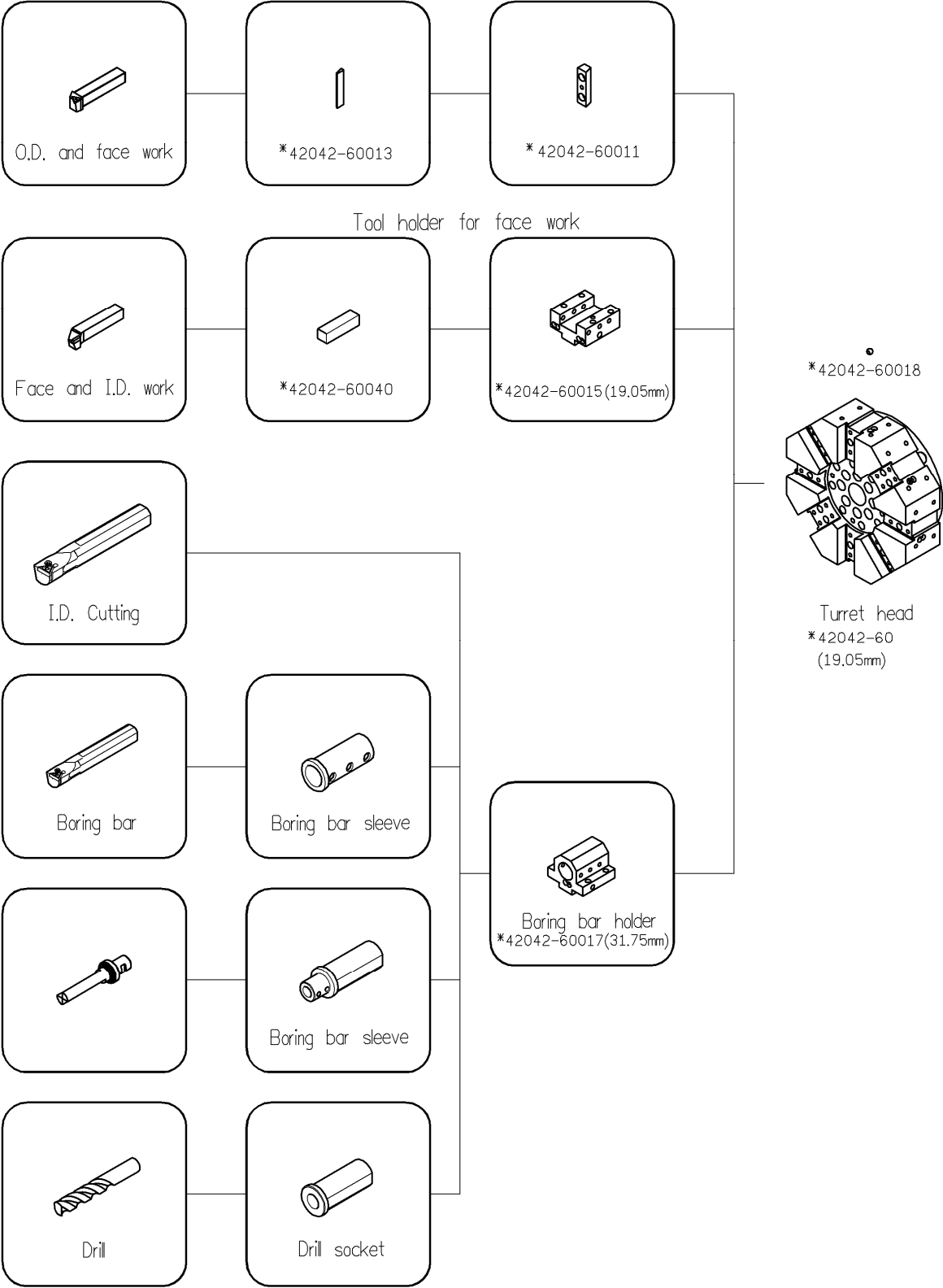
1) LS-160_STD_8T (Metric-20mm)



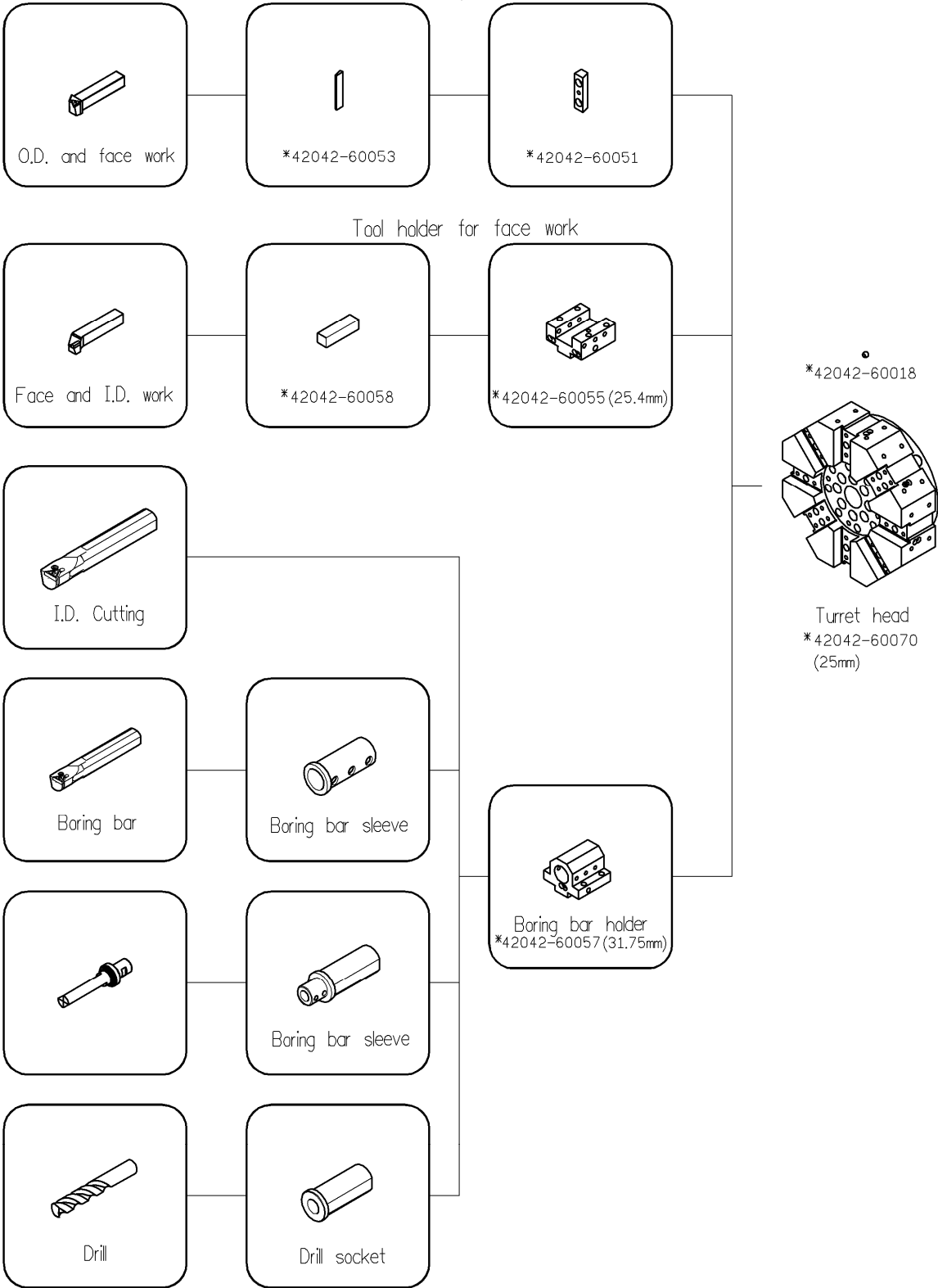
2) LS-160_STD_8T (Metric-25mm)



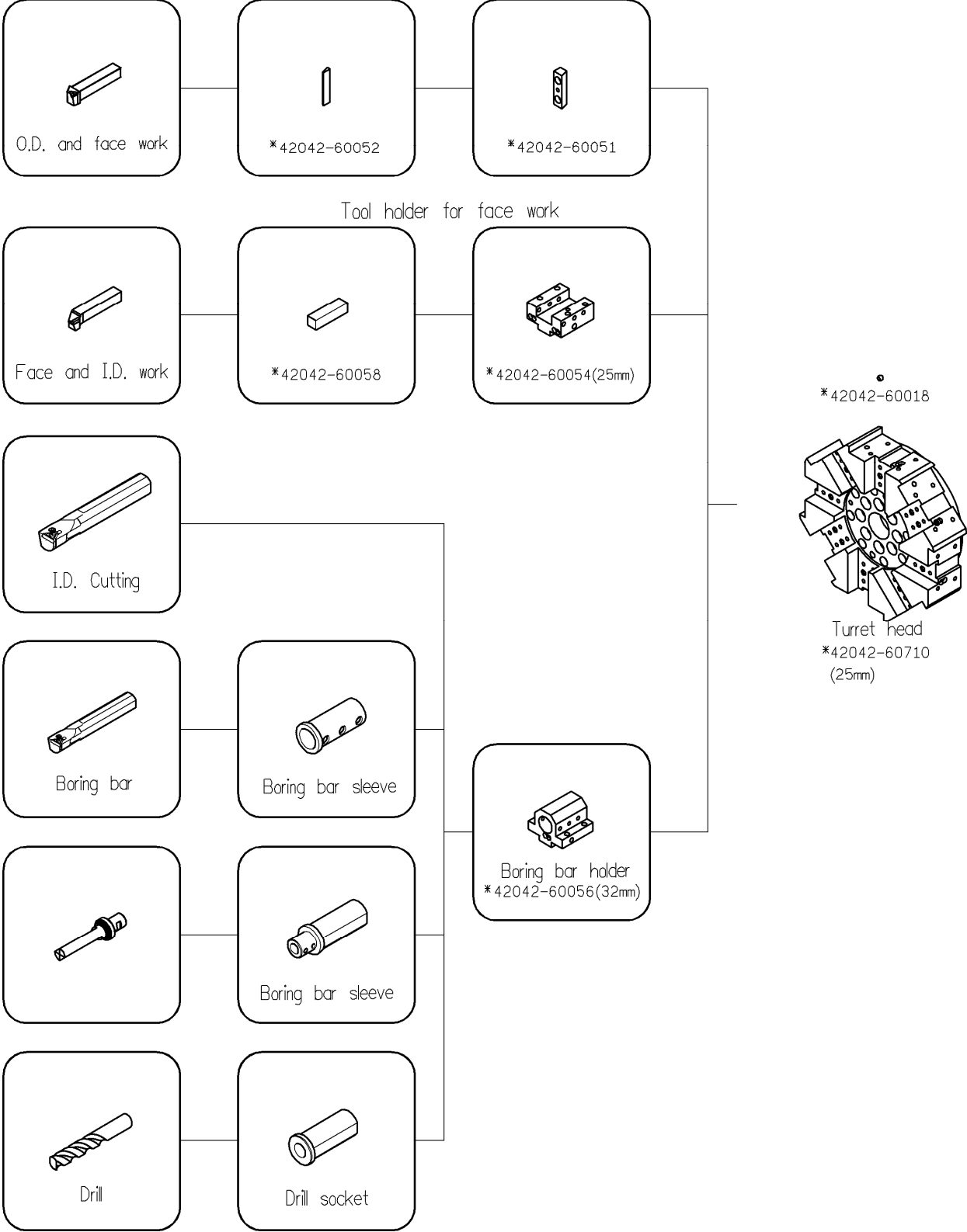
3) LS-160_STD_8T (Imperial-3/4")



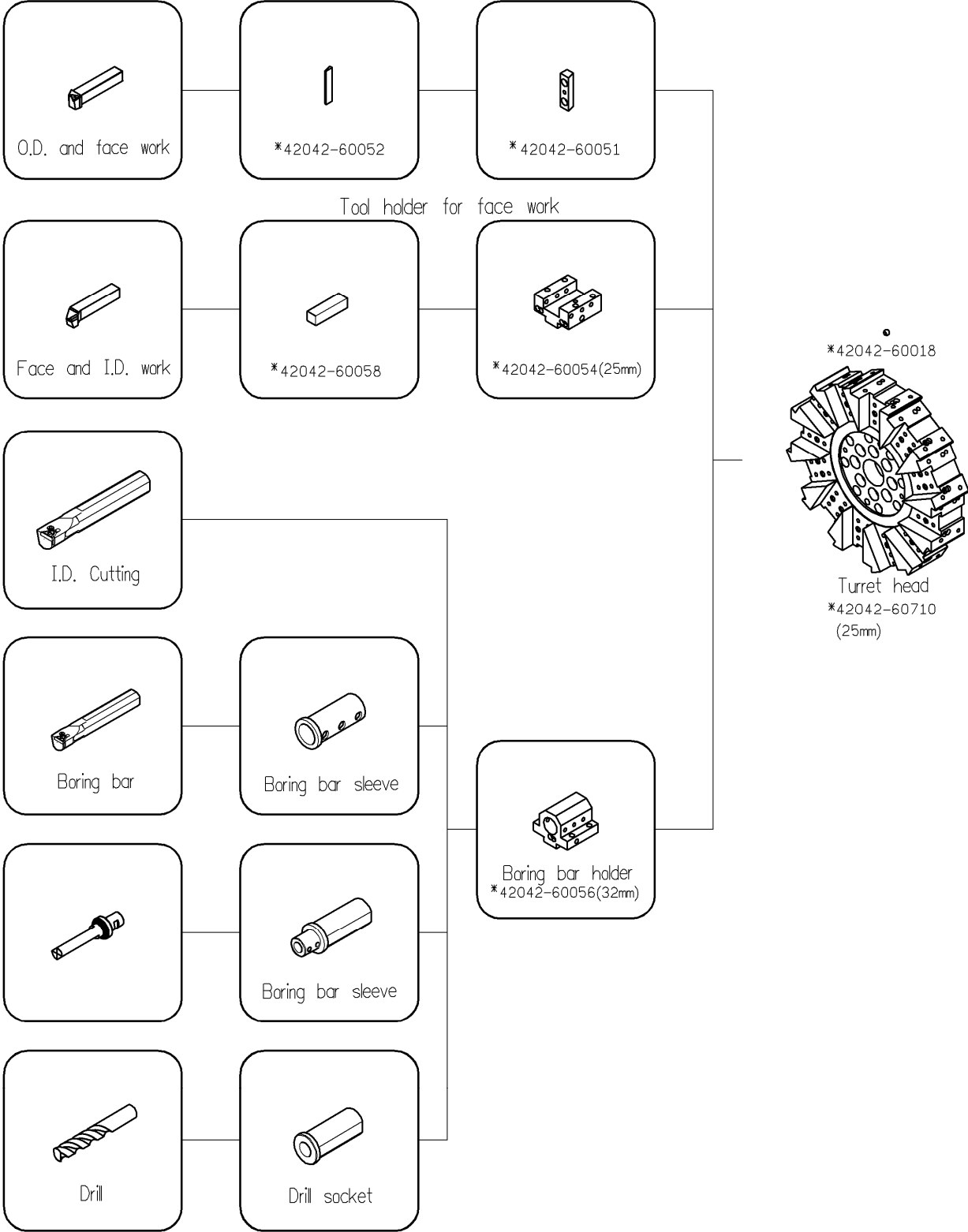
4) LS-160_STD_8T (Imperial-1")



5) LS-200_STD_8T (Metric-25mm)



6) LS-200_STD_12T (Metric-25mm)



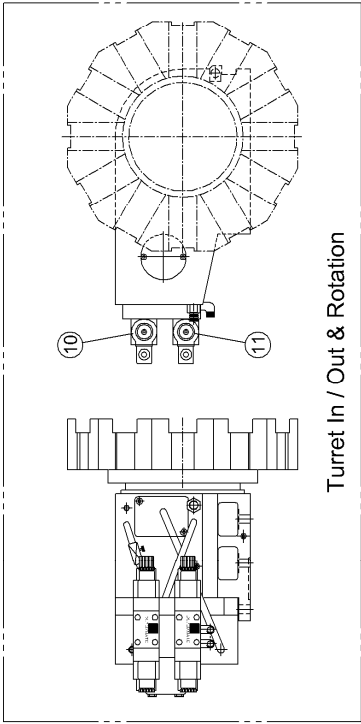
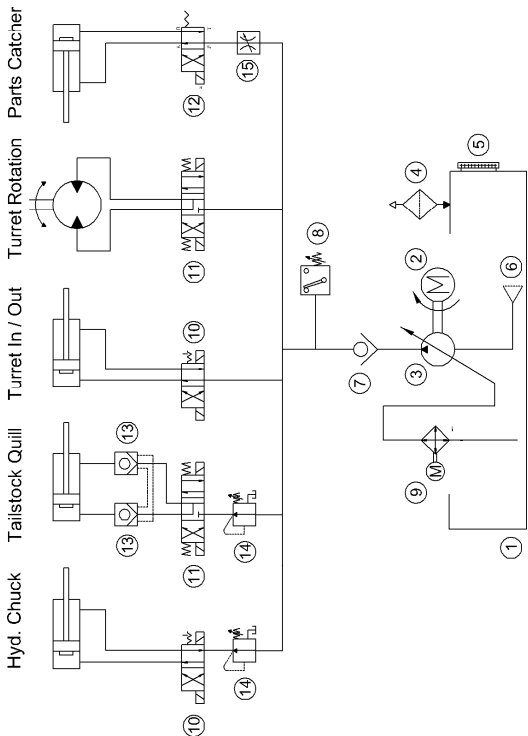
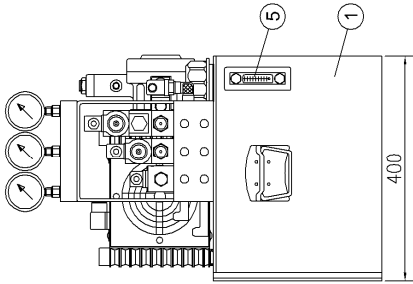
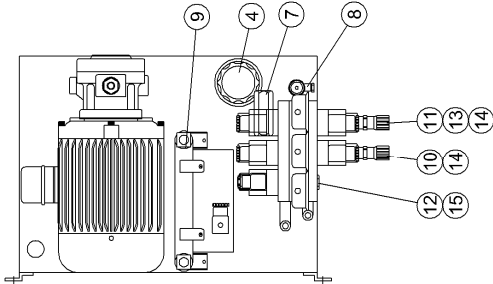
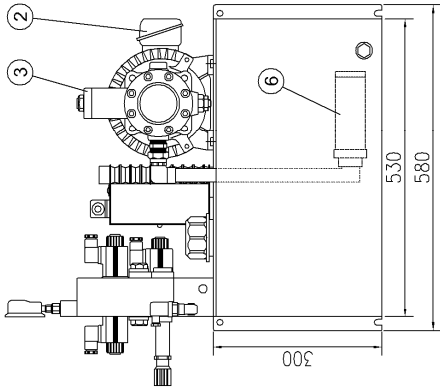


3.9 Hydraulic Unit

- Oil type : ISO VG32
- Tank capital : 80L(2HP)
- Period renewing Hydraulic oil :
 1. Renewing oil in 3 months after machine start usage.
 2. Then replace oil every one year of 1st renewal.

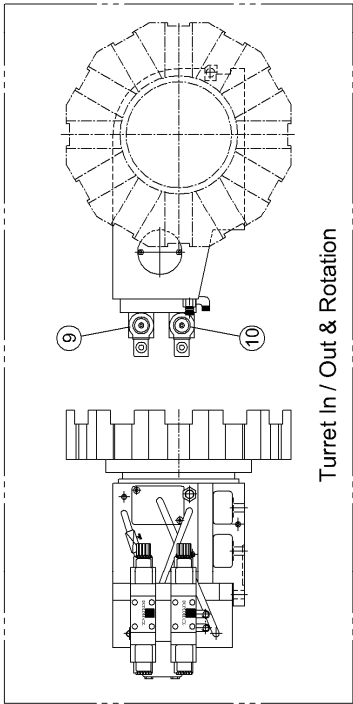
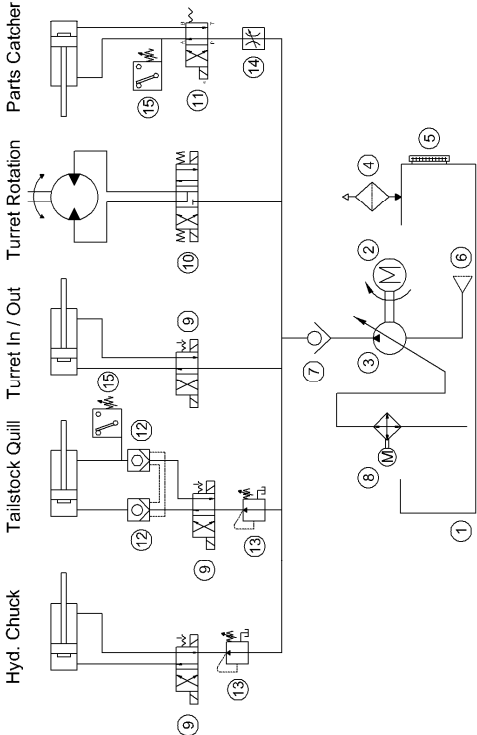
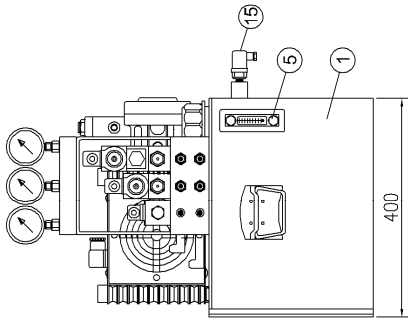
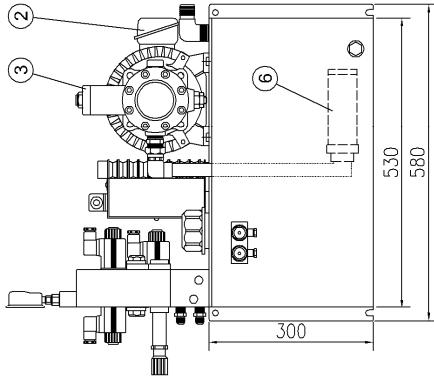
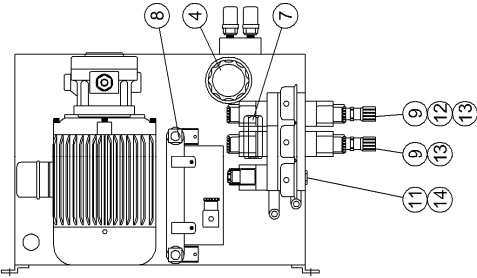
1) Chuck+ Tailstock+ Turret in/out+ Turret Rotation+ Parts Catcher (Standard)

No.	Unit Name	Q'ty	Type
1	Oil Tank	1	
2	Motor	1	2HP4P5623
3	Pump	1	TCVP-20L-35kg
4	Oil Filter Port / Air Breather	1	AB-1163
5	Oil Level Gage	1	LS-3B
6	Filter	1	MF-08
7	Check Valve	1	CV-04
8	Pressure Switch	1	PMM10A14K
9	Air Cooler	1	AL608-CA2
10	Solenoid Valve	2	MD1D-RK DC24V
11	Solenoid Valve	2	MD1D-S3 DC24V
12	Solenoid Valve	1	MD1D-TA DC24V
13	Prefill Valve	2	MVPP-D-BB
14	Pressure Reducing Valve	2	MZ-2L2H
15	Throttle Valve	1	MERS-P



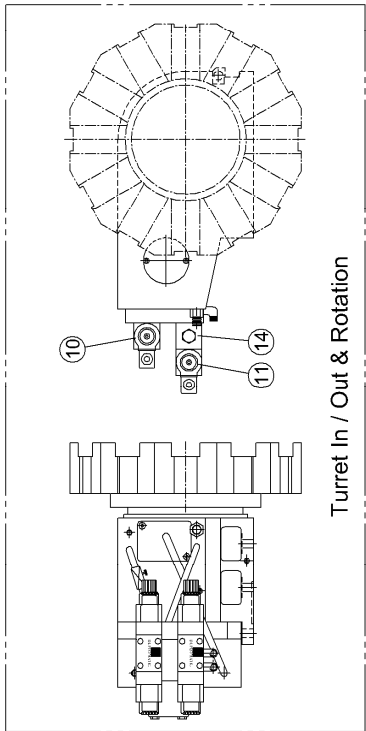
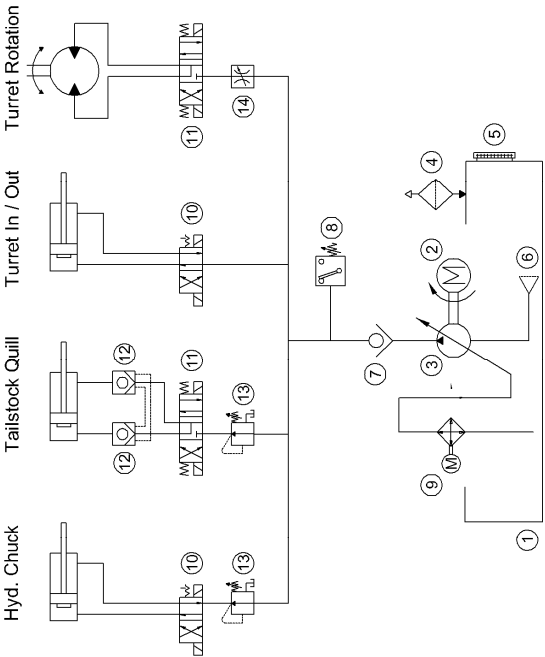
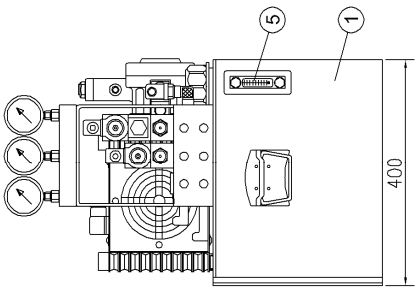
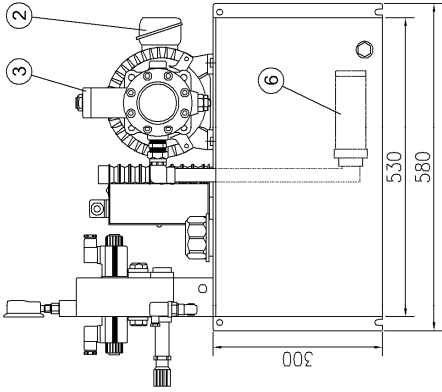
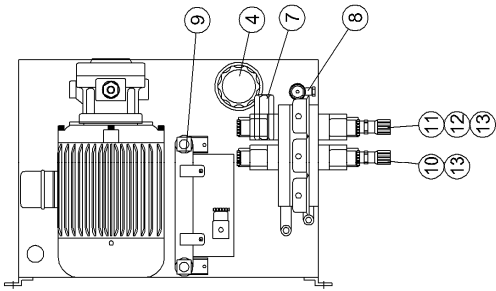
2) Chuck+ Tailstock+ Turret in/out+ Turret Rotation+ Parts Catcher (for MILL)

No.	Unit Name	Qty	Type
1	Oil Tank	1	
2	Motor	1	2HP4P5623
3	Pump	1	TCVP-20L-35kg
4	Oil Filter Port / Air Breather	1	AB-1163
5	Oil Level Gage	1	LS-3B
6	Filter	1	MF-08
7	Check Valve	1	CV-04
8	Air Cooler	1	AL608-CA2
9	Solenoid Valve	3	MD1D-RK DC24V
10	Solenoid Valve	1	MD1D-S3 DC24V
11	Solenoid Valve	1	MD1D-TA DC24V
12	Prefill Valve	2	MVPP-D-BB
13	Pressure Reducing Valve	2	MZ-2I-2H
14	Throttle Valve	1	MERS-P
15	Pressure Switch	2	PMM10A14K



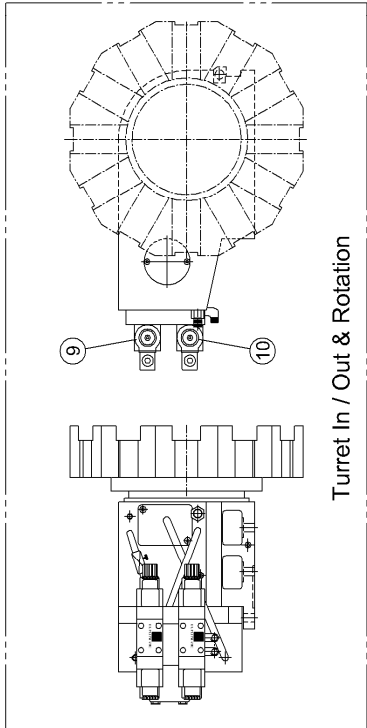
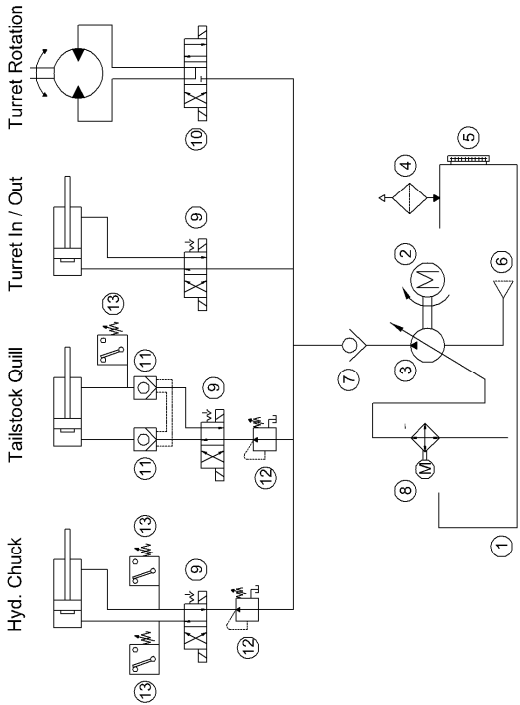
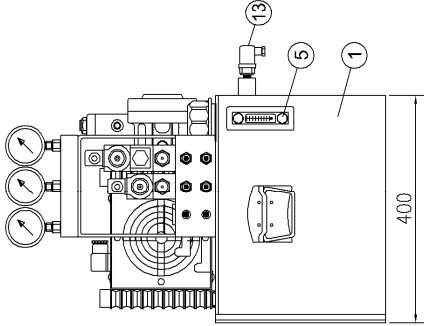
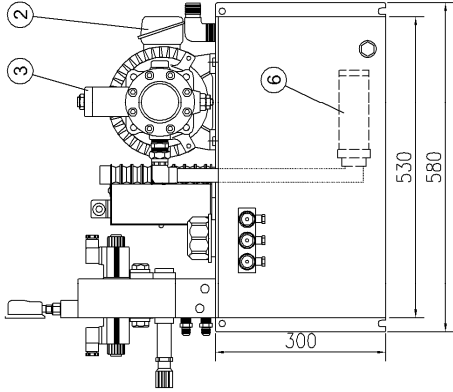
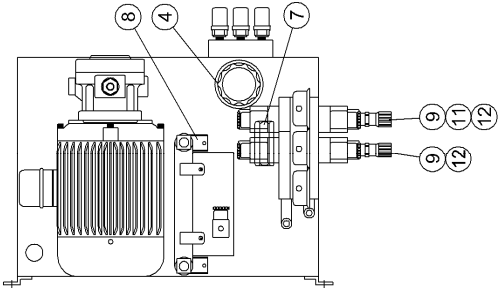
3) Chuck+ Tailstock+ Turret in/out+ Turret Rotation (Standard)

No.	Unit Name	Qty	Type
1	Oil Tank	1	
2	Motor	1	2HP4P5623
3	Pump	1	TCVP-20L-35kg
4	Oil Filter Port / Air Breather	1	AB-1163
5	Oil Level Gage	1	LS-3B
6	Filter	1	MF-08
7	Check Valve	1	CV-04
8	Pressure Switch	1	PMM10A14K
9	Air Cooler	1	AL608-CA2
10	Solenoid Valve	2	MD1D-RK DC24V
11	Solenoid Valve	2	MD1D-S3 DC24V
12	Prefill Valve	2	MVPP-D-BB
13	Pressure Reducing Valve	2	MZ-2I-2H
14	Throttling Valve	1	MERS-P



4) Chuck+ Tailstock+ Turret in/out+ Turret Rotation (for MILL)

No.	Unit Name	Qty	Type
1	Oil Tank	1	
2	Motor	1	2HP4P5623
3	Pump	1	TCVP-20L-35kg
4	Oil Filter Port / Air Breather	1	AB-1163
5	Oil Level Gage	1	LS-3B
6	Filter	1	MF-08
7	Check Valve	1	CV-04
8	Air Cooler	1	AL608-CA2
9	Solenoid Valve	3	MD1D-RK DC24V
10	Solenoid Valve	1	MD1D-S3 DC24V
11	Prefill Valve	2	MVPP-D-BB
12	Pressure Reducing Valve	2	MZ-2I-2H
13	Pressure Switch	3	PMM10A14K





4 TEST RUN PREPARATION



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4.2 ADDING LUBRICATION OIL2

4.3 OIL TABLE FOR EACH LUBRICATION SITE AND CONDITION.....2

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4 TEST RUN PREPARATION

4.1 Cleaning Machine

- 1) Make sure that the machine is unplugged and the power shut off before cleaning the machine to guard against potential hazards.
- 2) Clean away the rust proofing grease on the machine especially on the lathe rail (X, Z direction) and roller bolts before testing the machine.
- 3) Make sure there is no grease, water or contaminants present and the floor is clean when testing the machine so no one will fall, slip or injure themselves.

4.2 Adding Lubrication Oil

- 1) Use only approved lubrication oils from reliable sources to ensure precision operation and extend the life span of the machine.
- 2) Do not remove the oil filter when adding the lubrication oil.

4.3 Oil Table for Each Lubrication Site and Condition

Filling location	Amount	Brand
Spindle bearings	As needed	ISO flex NBU 15
Hydraulic chuck	As needed	Grease for chuck
Turret	As needed	Grease
Cutting fluid	40 Litter	Water soluble cutting fluid
Lubrication oil for slide surface	2 Litter	CALTEX VICATAC oil 68 Shell TONNA 68 Mobil VACTRA 2 ESSO FEBIX K68
Hydraulic tank	60 litter	CALTEX RANDO HD32 Shell TELLA 32 Mobil DTE 24 ESSO MUTO H32



4.4 Inspecting Hydraulic System

- 1) Inspect the hydraulic line connections on the hydraulic bath at the back of the hydraulic pump and check for loose connections, brakes or other problems in the hoses and replace or fix immediately if found.
- 2) Inspect the hydraulic line connections on the solenoid valve unit and check for loose connections, brakes or other problems in the hoses and replace or fix immediately if found.
- 3) Inspect all of the inlet and outlet connections.



5 OPERATION PROCEDURE

6 MACHINE SETTING AND ADJUSTMENT

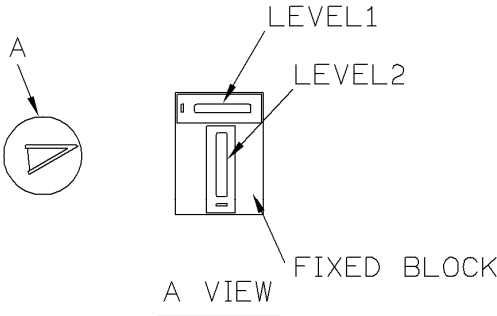
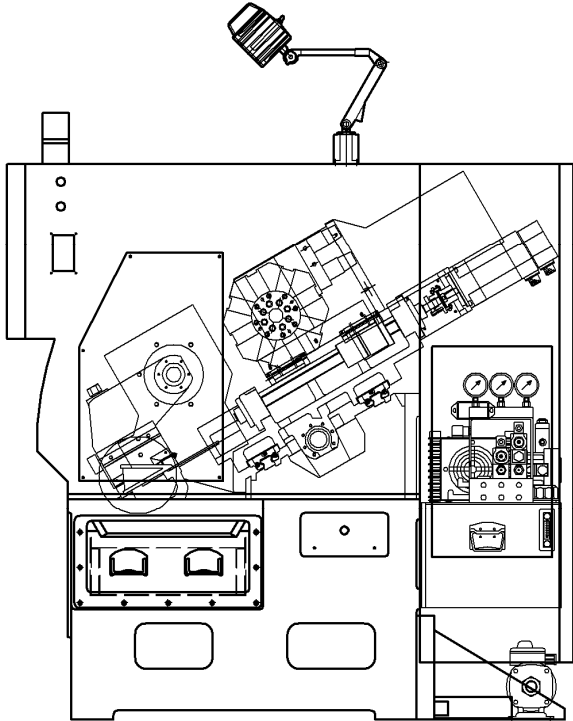


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6 MACHINE SETTING AND ADJUSTMENT

6.1 Machine Leveling Adjustment





7 MAINTENANCE



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7 MAINTENANCE

7.1 Before and After Starting, End of Daily Inspection

- 1) Inspection all components, gauge and indicators. If oil or cutting water level is below the required level, re-fill with the specified oil or water.
- 2) Before starting the pressurized tri-jaws, replenish the specified grease and again after every 8 hours. If the machine is operated under high revolution condition and increase lubrication frequency.
- 3) Lubricant for oil pressurized tail stock mandrel needs to be re-filled constantly. It can't be below required level.
- 4) Check for abnormality of main power source.
- 5) Check for normal operation and warning of warning light.
- 6) Check for normal operation of the emergency button switch.
- 7) After daily operation, machine must be wiped clean, and rustproof or motor oil applied to the exposed movable surfaces.

7.2 Weekly, Monthly, Seasonally, Yearly Maintenance

- 1) Heat exchanger of electrical box. To maintain optimal performance for radiator inspect and clean the vents weekly.
- 2) After using the hydraulic chuck, remove the chips accumulated in the center hole of the spindle.
- 3) Seasonal check for abnormalities and damages of all connections, plugs, sockets, and switches.
- 4) After using lubricant pump for 6 months, clean oil filter and oil tank.
- 5) Hydraulic chuck must disassemble and cleaning is required at least once every 2 months.
- 6) Chips conveyor belt must be cleaned every 6 months.

7.3 Parts Clean and Replacement

- 1) To maintain visibility, fluorescent light tube should be cleaned on a regular basis. Replace light tube if flashing or tube becomes hazy.
- 2) Regularly inspect the shaving performance of the shaving board. If shaving board becomes old, cracked or unable to perform, contact agent and replace.
- 3) Chips produced from cutting accumulate in the cutting liquid box. It will affect the flow of cutting liquid. Therefore, regularly clean the cutting liquid box, and maintain the liquid level and flow at normal condition.
- 4) In CNC control unit, if fuse burn out, determine the cause then replace the fuse.
- 5) In CNC control unit, if the battery voltage drops, the warning message "BAT" appears on the CRT screen. To replace the batteries, keep power switch on when replacing the batteries. Do not forget that disconnecting the memory backup batteries with the power switched off will result in the total lose of the memory contents.

7.4 Disposal Method for Oil, Water and Material Waste

Oil, water and material waste produced by process should be appropriately handled. Contact local environment protection agency or qualified waste treatment company for disposal. Waste can be disposed privately to create pollution.

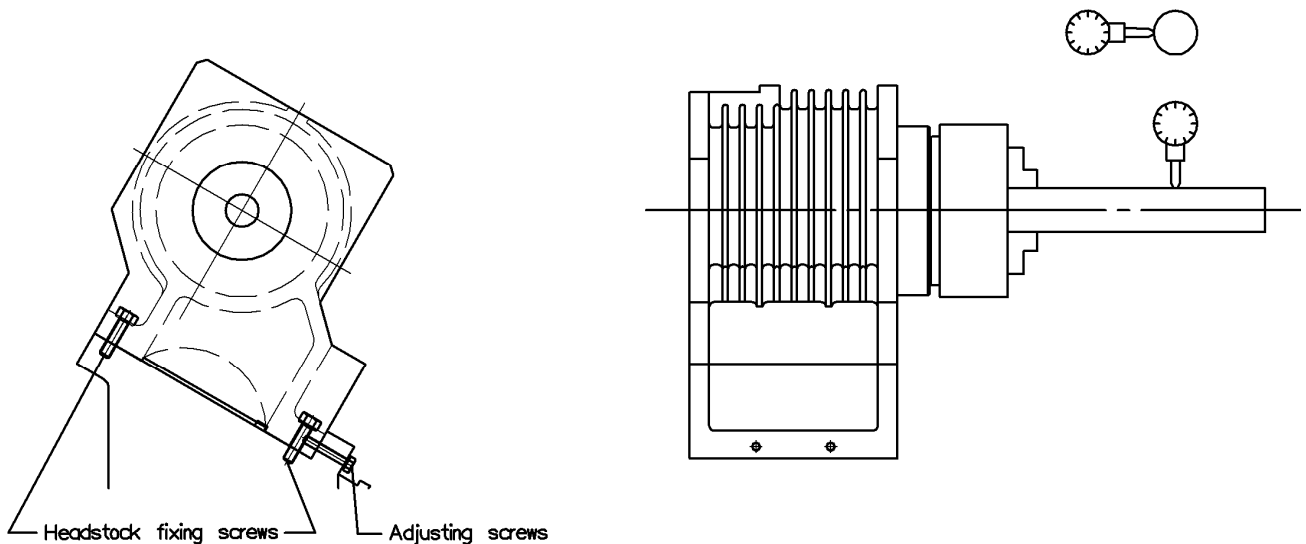
7.5 Replacing Oil on Headstock

It is not necessary to replace the oil for machine unless you have to change bearing set inside of this device. Grease has been used as lubricant fitting, you are free to work here. The bearing set has long life with machining, so it is no common to change it in normal condition. In case of any damage under warranty period, we will supply the fitting free of charge.

7.6 Aligning Headstock

If taper appears on turning work piece and convex on rounding, adjust the parallel of headstock by the following steps.

1. Insert gauge bar in the spindle bore, attach the base of test indicator to the tool post. Apply the stylus of the indicator to the outer diameter of the bar. Move the saddle along Z axis and measure the maximal difference.
2. If the pointer of the indicator 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 pointer of the indicator.





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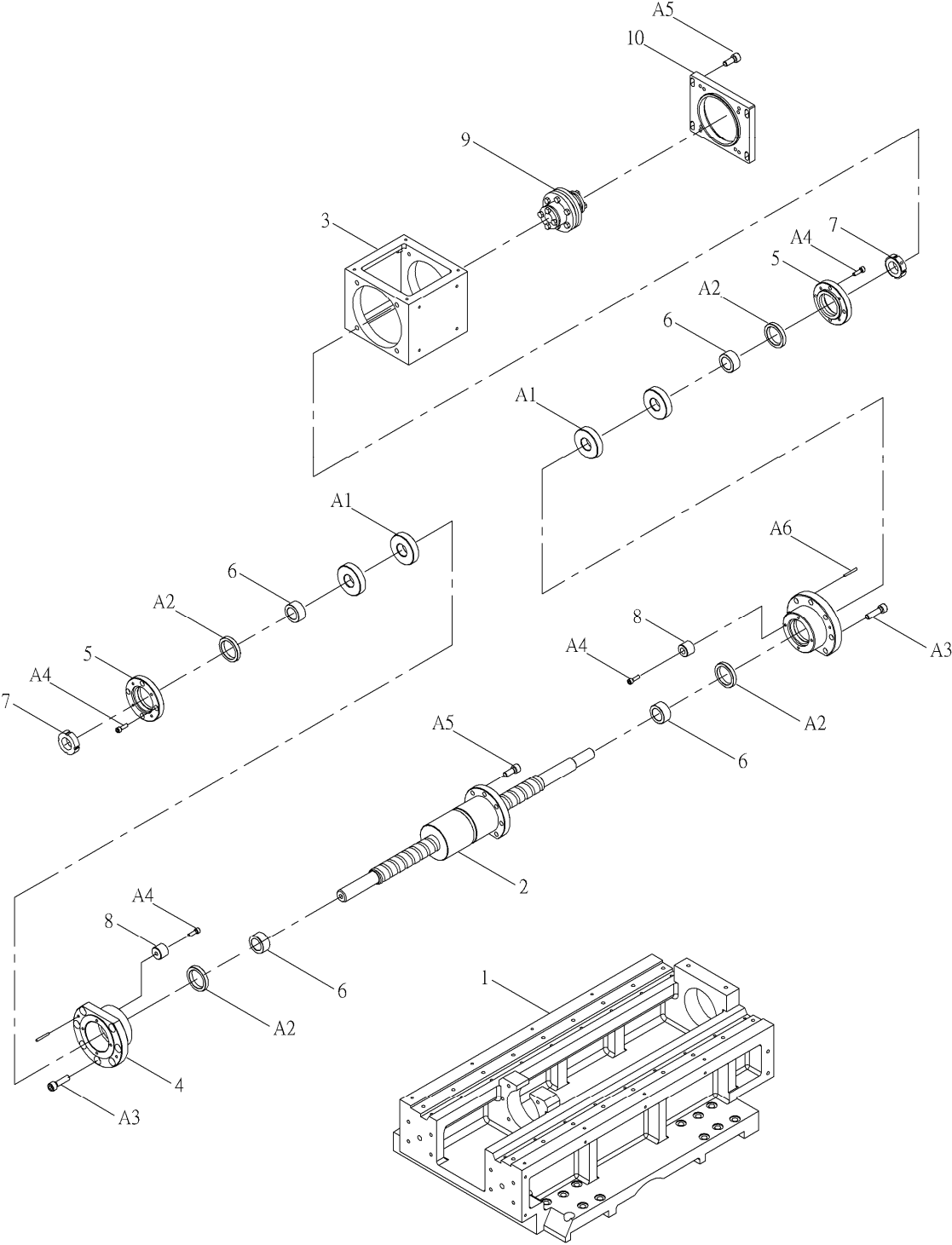
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8 PARTS LIST

8.1 X-axis

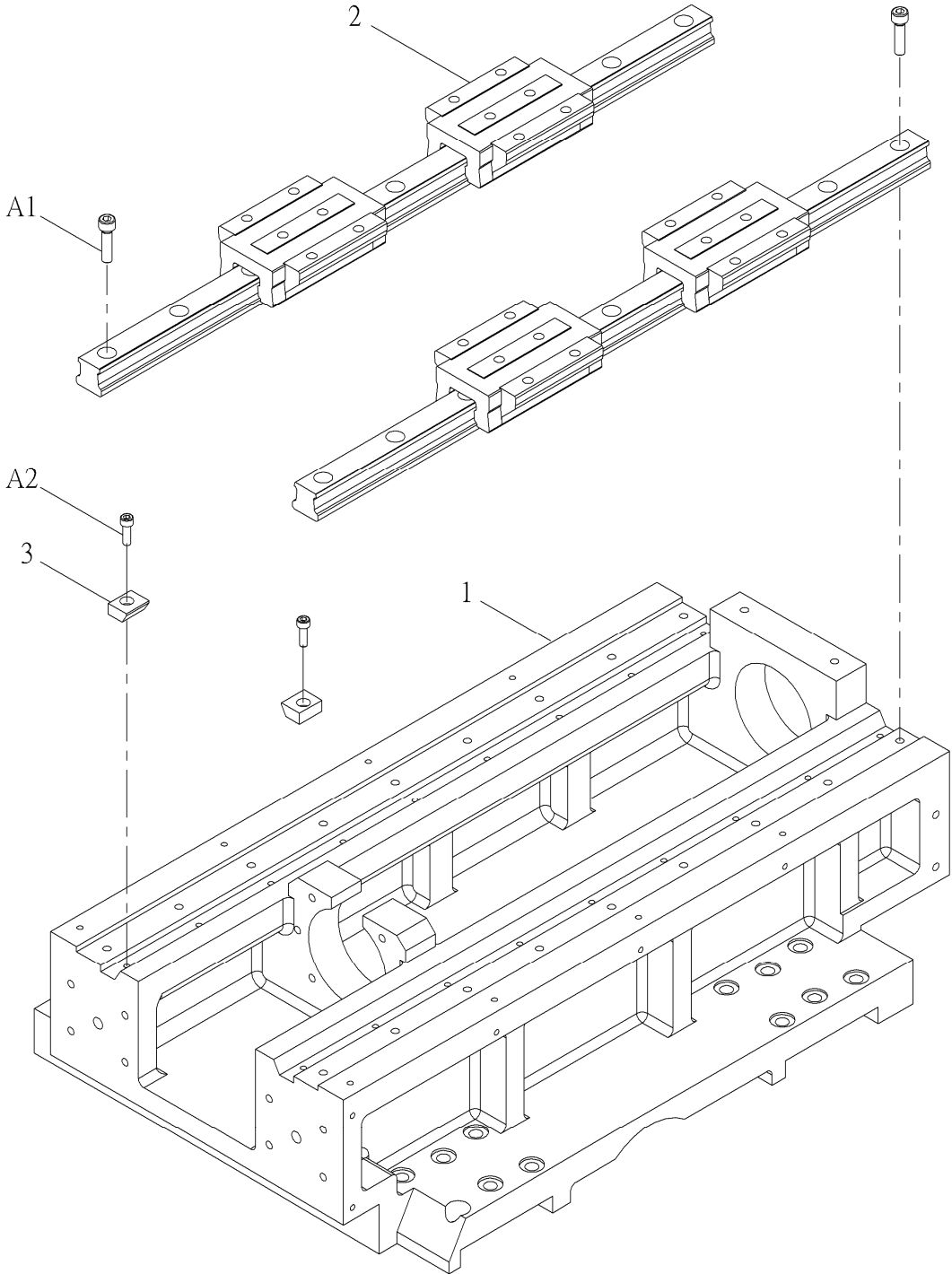




8.1.1 Parts List of X-axis

Item	Part no.	Description	Q'ty	Remark
1	42042-20001	Carriage	1	
2	42042-51001	Ball Screw & Nut	1	32*669
3	42042-51002	Motor Seat	1	
4	42042-51008	Bearing Seat	2	
5	43130-52004	Cover	2	
6	42042-51005	Collar	4	38*18
7	42042-51007	Lock Nut	2	YSF M25*P1.5*18
8	43061-51006	Stopper	4	
9	42042-51009	Coupling	1	FANUC
10	43061-51002	Motor Flange	1	FANUC
A1		Bearing	4	NSK 25TAC62B
A2		Oil Seal	4	38* 50*8
A3		Socket Screw	14	M10*1.5*30L
A4		Socket Screw	12	M6*1*20L
A5		Socket Screw	11	M8*1.25*25L
A6		Taper Pin	4	#5

8.2 X-axis Linear Guideway

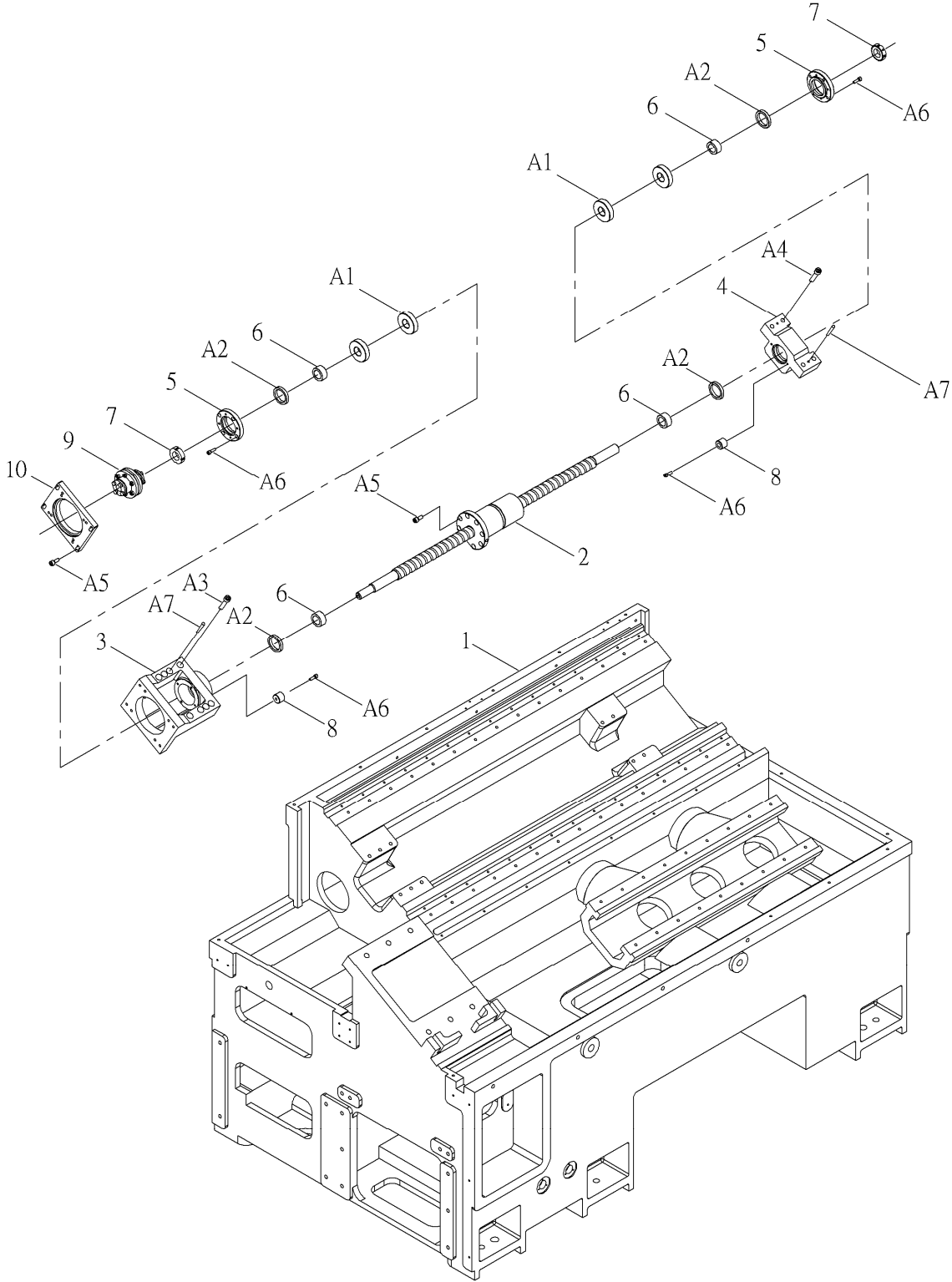




8.2.1 X-axis Linear Guideway

Item	Part no.	Description	Q'ty	Remark
1	42042-20001	Carriage	1	
2	42042-51011	Linear Guideway	2	H30LEAB2T3-680
3	42042-51012	Block	14	T2
A1		Socket Screw	14	M8*1.25*30L
A2		Socket Screw	14	M6*1*20L

8.3 Z-Axis

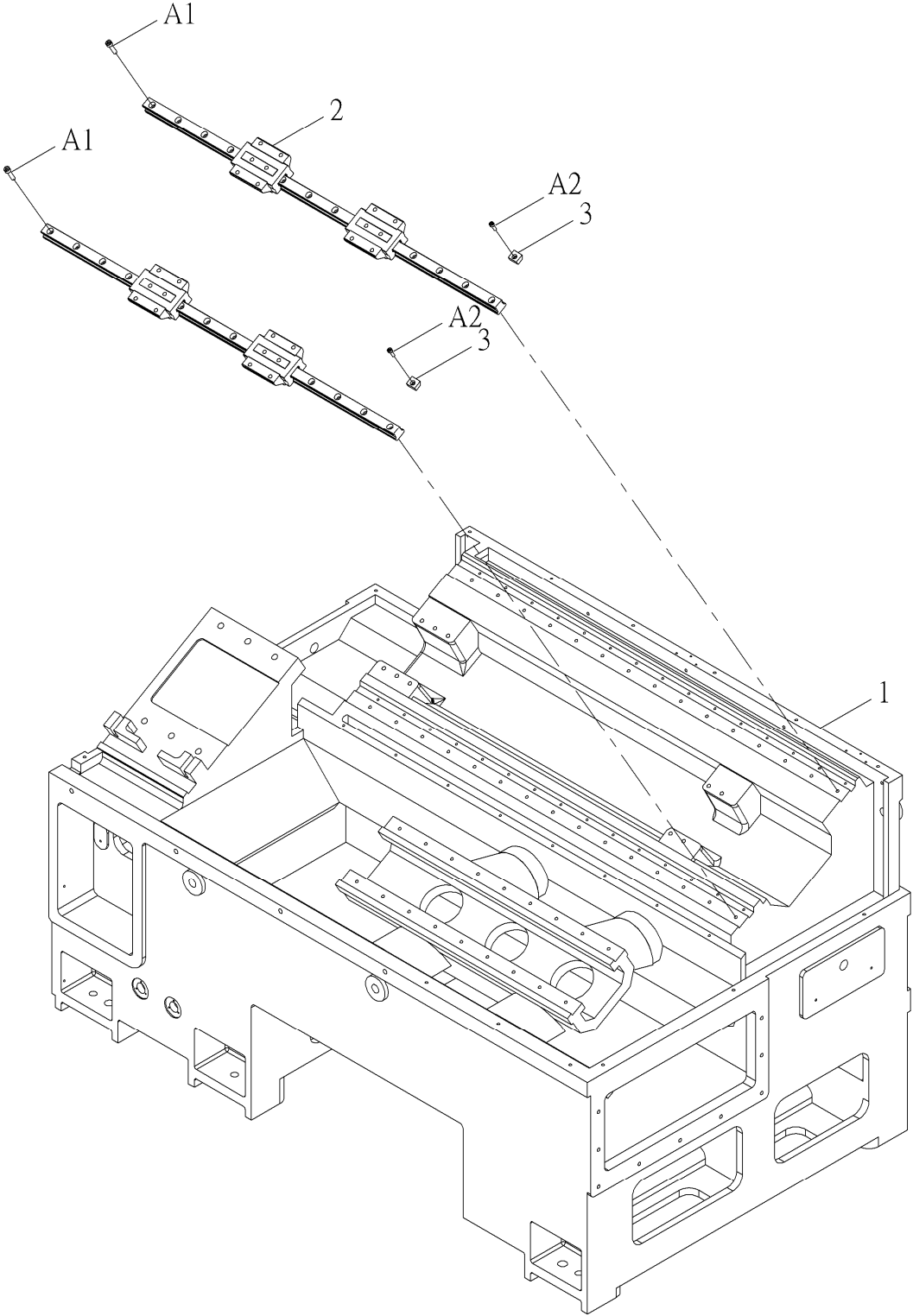




8.3.1 Z-Axis

Item	Part no.	Description	Q'ty	Remark
1	42042-40001	Base	1	
2	42042-53001	Ball Screw & Nut	1	32*974
3	42042-53002	Motor Seat	1	
4	42042-53003	Bearing Seat	1	
5	43130-52004	Cover	2	
6	42042-51005	Collar	4	38*18
7	42042-51007	Lock Nut	2	YEF M25*P1.5*18
8	43061-51006	Stopper	4	
9	42042-51009	Coupling	1	FANUC
10	43061-51002	Motor Flange	1	FANUC
A1		Bearing	4	NSK 25TAC62B
A2		Oil Seal	4	38* 50*8
A3		Socket Screw	6	M10*1.5*45L
A4		Socket Screw	4	M10*1.5*55L
A5		Socket Screw	11	M8*1.25*25L
A6		Socket Screw	12	M6*1*20L
A7		Taper Pin	4	#5

8.4 Z-axis Linear Guideway

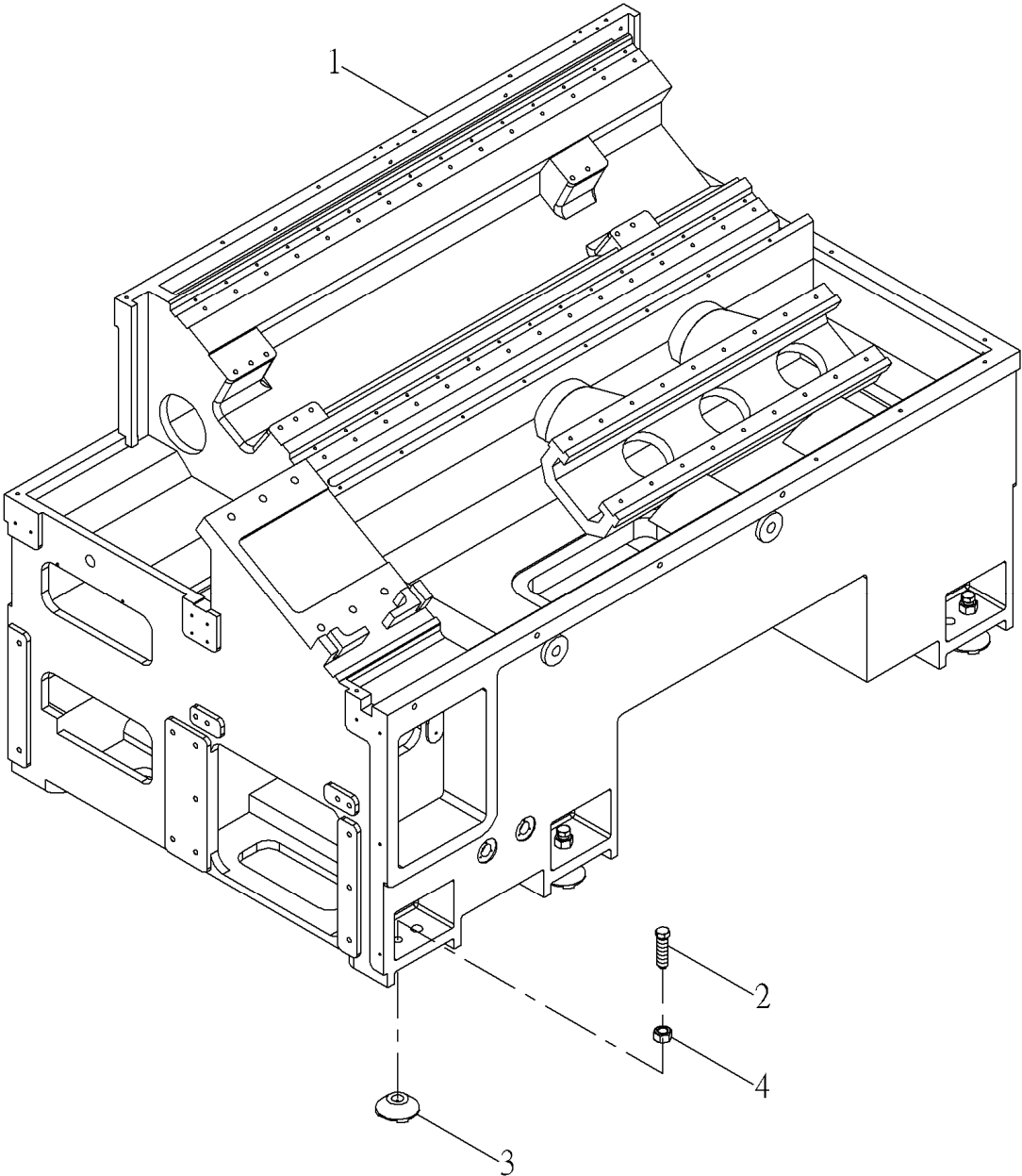




8.4.1 Z-Axis Linear Guideway

Item	Part no.	Description	Q'ty	Remark
1	42042-40001	Base	1	
2	42042-53011	Linear Guideway	2	H35LEAB2T3-1080
3	42042-51012	Block	28	T2
A1		Socket Screw	28	M8*1.25*35L
A2		Socket Screw	28	M6*1*20L

8.5 Base

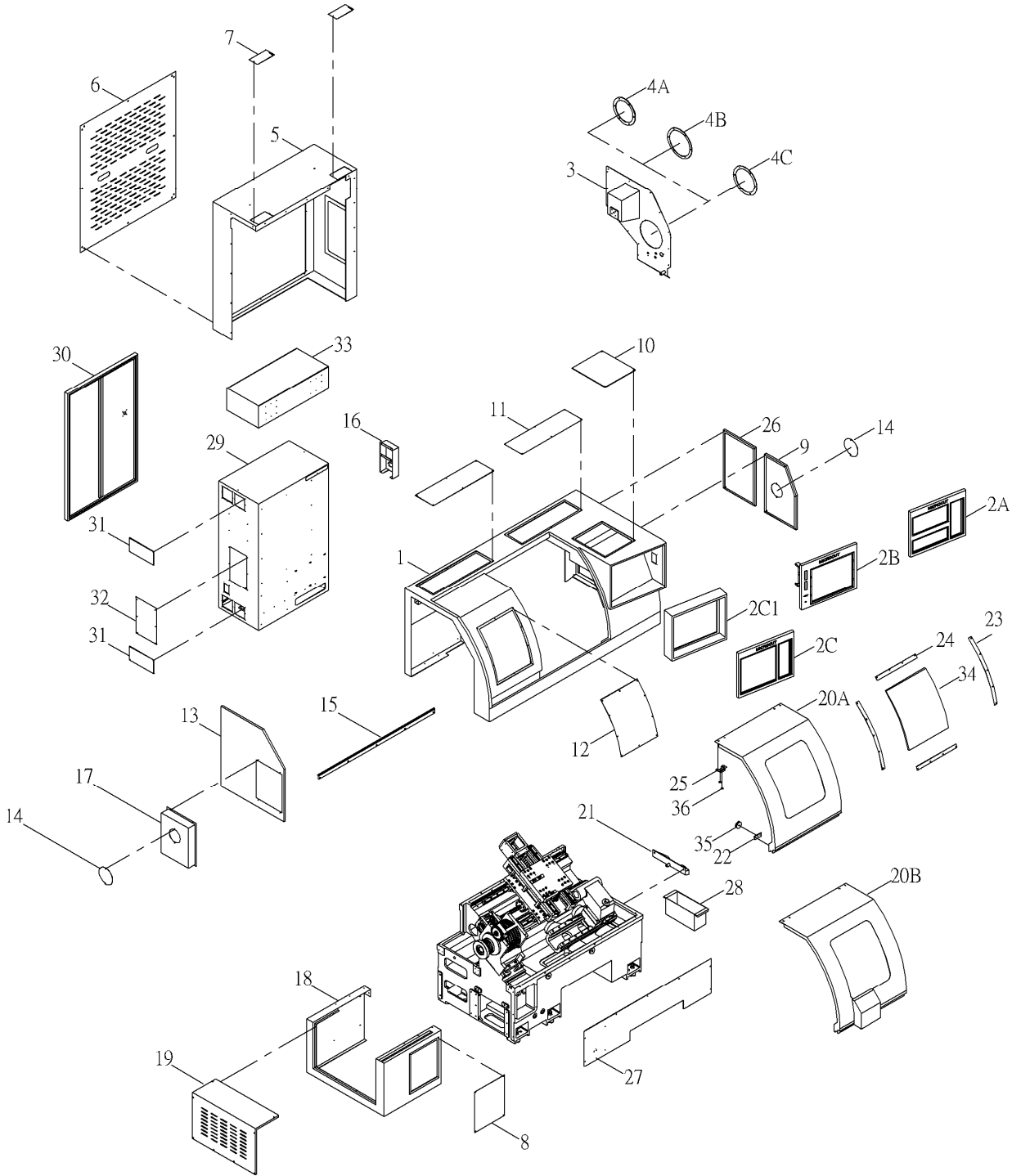




8.5.1 Base

Item	Part no.	Description	Q'ty	Remark
1	42042-40001	Base	1	
2	43061-40002	Levelling Bolt	6	M20*P1.5
3	43061-40003	Levelling Block	6	80*27
4	43061-40007	Nut	6	M20*P1.5

8.6 Full Splash Guard



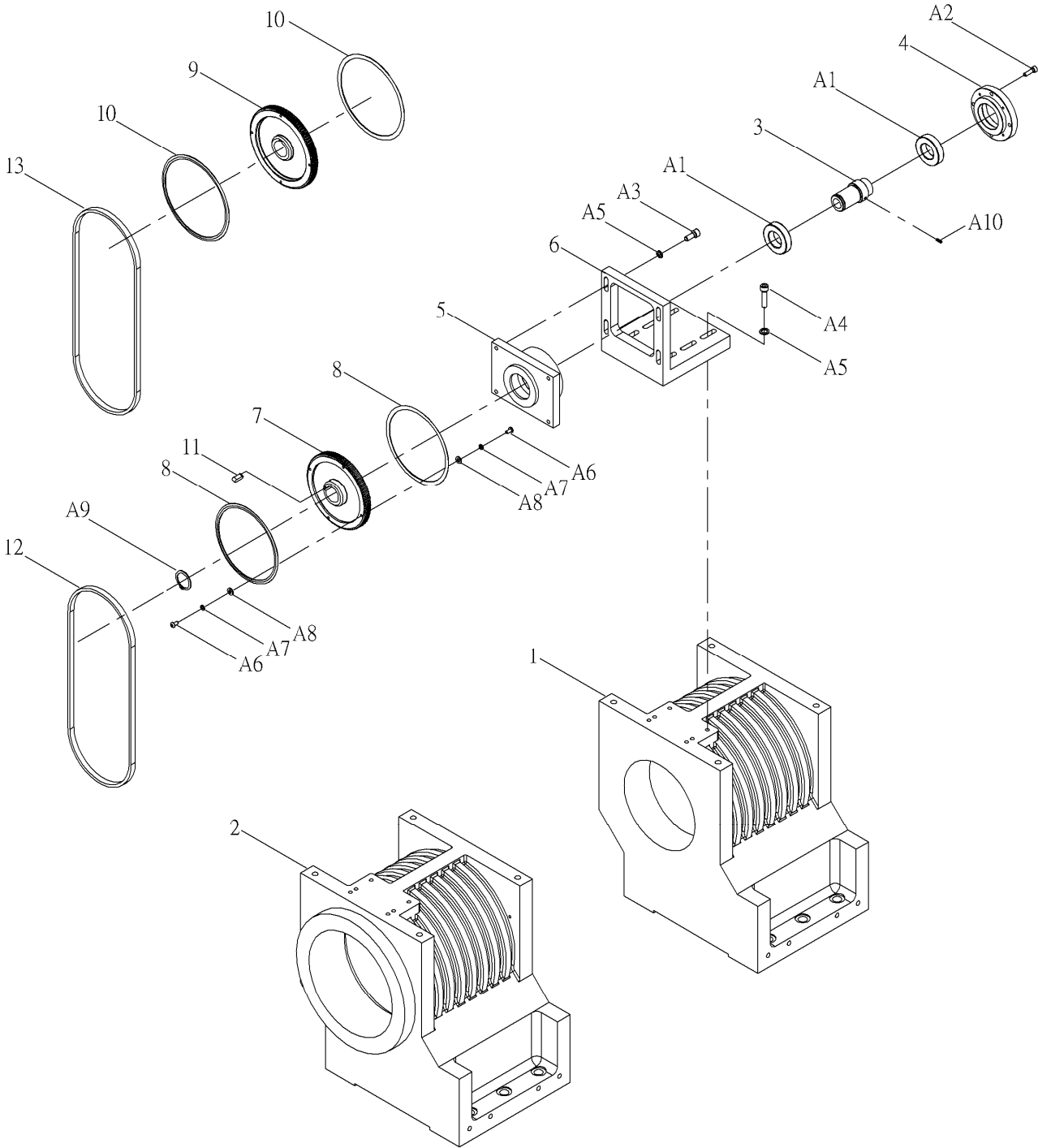
8.6.1 Full Splash Guard

Item	Part no.	Description	Q'ty	Remark
1	42042-70001	Full Guard	1	
2A	42042-70005	Control Panel	1	FANUC
2B	42042-70008	Control Panel	1	For Milltronic
2C	42042-70006	Control Panel	1	Fagor
2C1	42042-70007	Control Box	1	Fagor 8040
3	42042-70003	Side Guard-Right Headstock	1	
4A	42042-70012	Clamp Plate	1	LT-42
4B	42042-70013	Clamp Plate	1	LT-52
4C	42042-70036	Clamp Plate	1	LT-65
5	42042-70010	Rear Guard	1	
6	42042-70011	Rear Cover	1	
7	42042-70014	Cover	2	
8	42042-70017	Cover	1	
9	42042-70018	Cover	1	
10	42042-70019	Cover	1	
11	42042-70020	Cover	2	
12	42042-70021	Front Cover	1	
13	42042-70022	Left Cover	1	
14	42042-70023	Cover-Spindle Bore	2	
15	42042-70024	Slide	1	
16	42042-70028	Transfer Box	1	
17	42042-70029	Side Cover	1	
18	42042-70037	Guard-Base	1	
19	42042-70038	Cover	1	
20A	42042-70040	Sliding Door	1	
20B	42042-70070	Sliding Door	1	For Parts catcher
21	42042-70041	Oil Collector	1	
22	42042-70046	Clamper-Wheel	2	
23	42042-70047	Clamp Plate	2	



24	42042-70048	Clamp Plate	2	
25	42042-70055	Roller Bracket	2	
26	42042-70058	Right Cover	1	
27	42042-70067	Front Cover	1	
28	42042-70073	Oil Revisor	1	
29	42042-71001	Electric Box	1	

8.7 Encoder

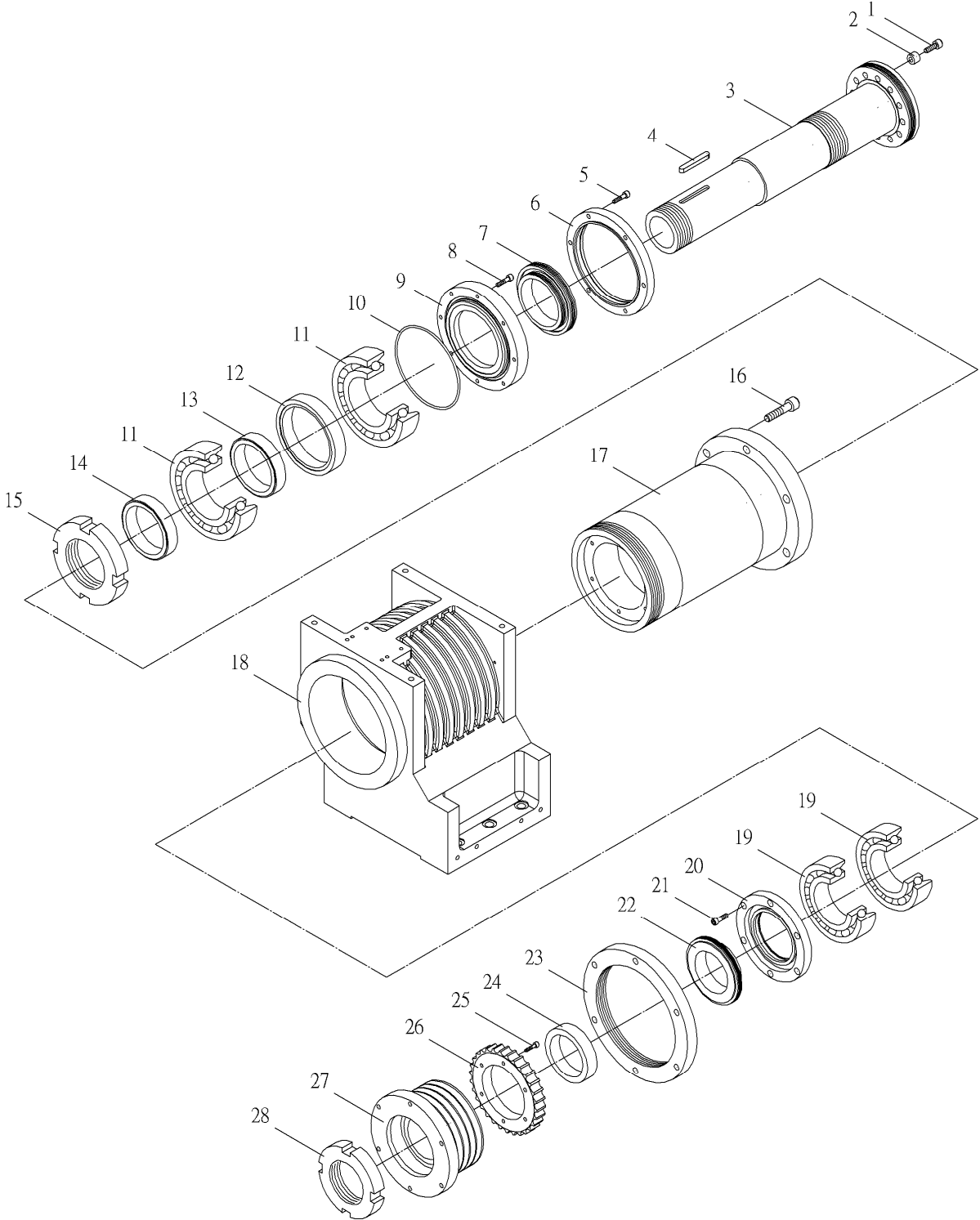




8.7.1 Encoder

Item	Part no.	Description	Q'ty	Remark
1	42042-00001	Head Stock	1	LT-42
2	42042-00051	Head Stock	1	LT-52,LT-65
3	42042-01001	Shaft	1	
4	42042-01002	Adapter	1	
5	42042-01013	Encoder Housing	1	
6	42042-01014	Mounting Bracket	1	
7	42042-01005	Pulley	1	LT-42,LT-52
8	42042-01006	Belt Guide	2	LT-42,LT-52
9	42042-01010	Pulley	1	LT-65
10	42042-01011	Belt Guide	2	LT-65
11	42042-01007	Key	1	
12		Belt(935-5GT10)	1	LT-42,LT-52
13		Belt(960-5GT10)	1	LT-65
A1		Bearing	2	30* 50*13
A2		Socket Screw	4	M6*1*20L
A3		Socket Screw	4	M8*1.25*35L
A4		Socket Screw	4	M8*1.25*40L
A5		Washer	4	M8
A6		Cap Screw	8	M5*0.8*10L
A7		Spring Washer	8	M5
A8		Washer	8	M5
A9		Clip	1	30(STW)
A10		Socket Screw	1	M5*0.8*12L

8.8 Headstock (LT-42)

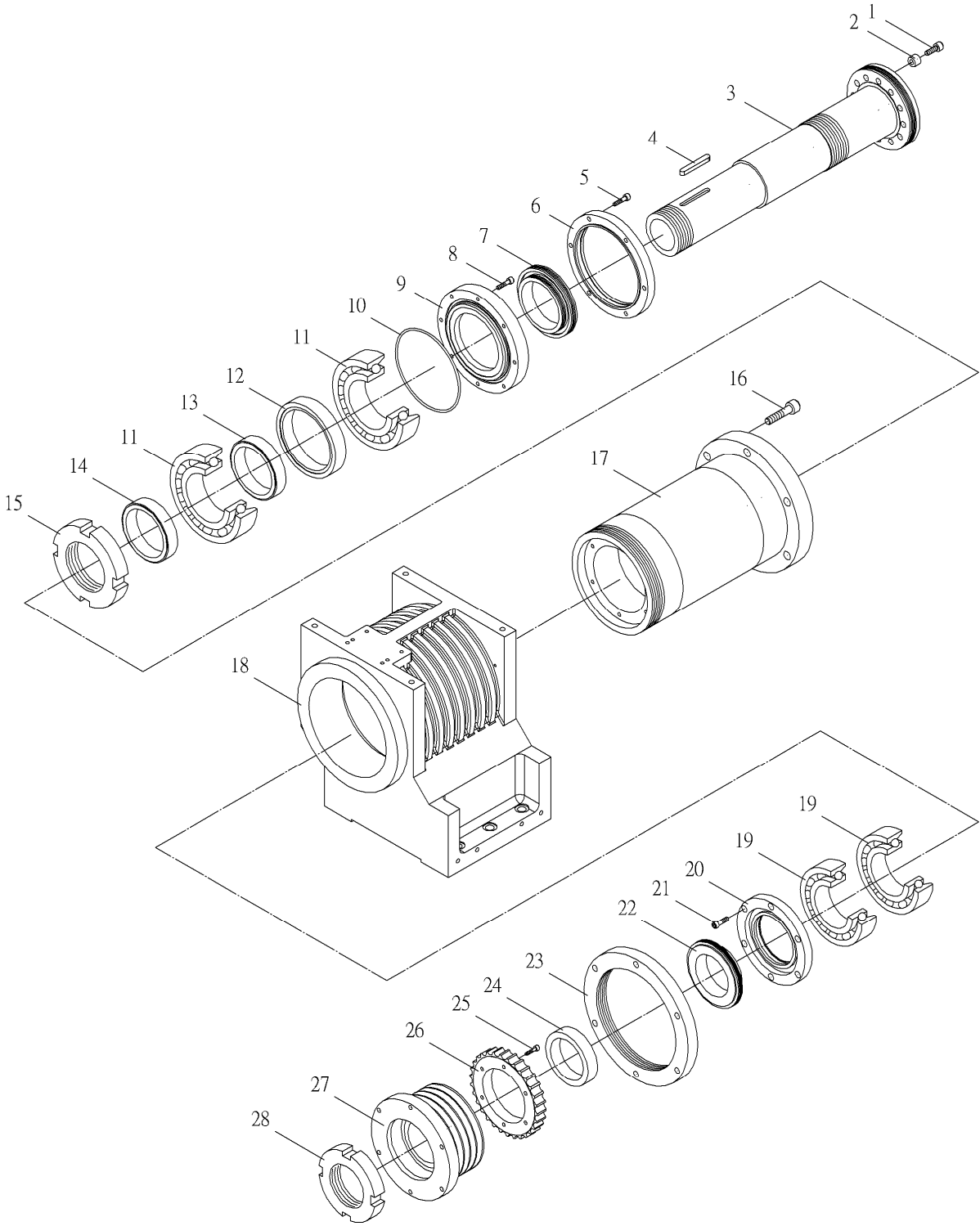




8.8.1 Headstock (LT-42)

Item	Part no.	Description	Q'ty	Remark
1		Socket Screw	1	M6XP1.0X16L
2		Drive Key	1	
3		Spindle	1	
4		Key	1	8X7X60
5		Socket Screw	6	M6XP1.0X20L
6		Cover	1	
7		Seal Ring	1	
8		Socket Screw	8	M6XP1.0X30L
9		Cover	1	
10		O Ring	1	G130
11		Bearing	2	7016
12		Spacer	1	
13		Spacer	1	
14		Spacer	1	
15		Nut	1	YSRM80XP2.0
16		Socket Screw	6	M12XP1.75X45L
17		Sleeve	1	
18	42042-00001	Headstock	1	
19		Bearing	2	7014
20		Cover	1	
21		Socket Screw	6	M6XP1.0X20L
22		Seal Ring	1	
23		Cover	1	
24		Spacer	1	
25		Socket Screw	6	M5XP0.8X25L
26		Timing Belt Pulley	1	
27		Pulley	1	
28		Nut	1	YSAM70XP2.0

8.9 Headstock (LT-52)

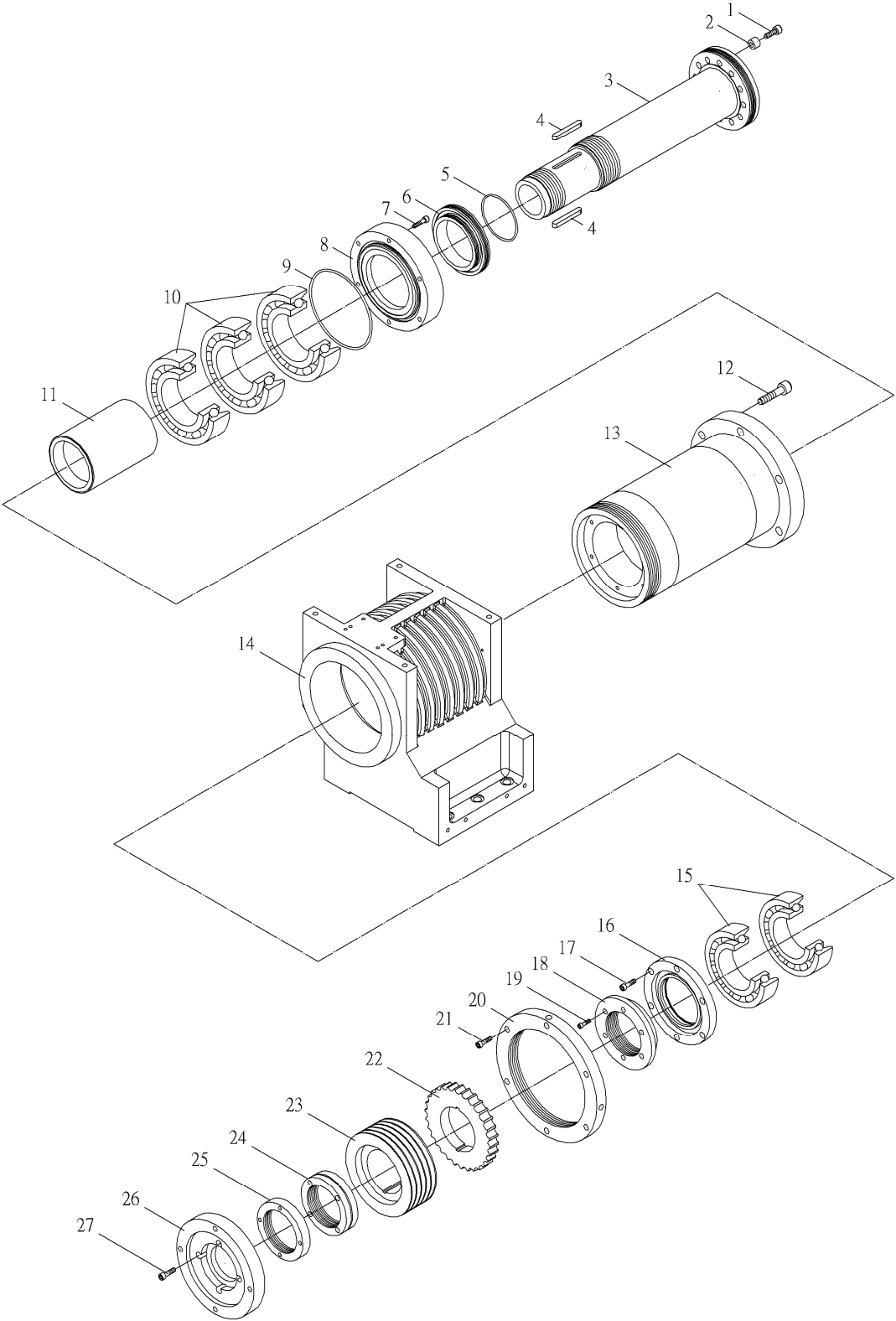




8.9.1 Headstock (LT-52)

Item	Part no.	Description	Q'ty	Remark
1		Socket Screw	1	M8XP1.25X16L
2		Drive Key	1	
3		Spindle	1	
4		Key	1	12X8X70
5		Socket Screw	4	M6XP1.0X25L
6		Cover	1	
7		Seal Ring	1	
8		Socket Screw	8	M6XP1.0X35L
9		Cover	1	
10		O Ring	1	G155
11		Bearing	2	7020
12		Spacer	1	
13		Spacer	1	
14		Spacer	1	
15		Nut	1	YSRM100XP2.0
16		Socket Screw	6	M12XP1.75X45L
17		Sleeve	1	
18	42042-00051	Headstock	1	
19		Bearing	2	7018
20		Cover	1	
21		Socket Screw	6	M6XP1.0X30L
22		Seal Ring	1	
23		Cover	1	
24		Spacer	1	
25		Socket Screw	6	M5XP0.8X25L
26		Timing Belt Pulley	1	
27		Pulley	1	
28		Nut	1	YSAM90XP2.0

8.10 Headstock (LT-65)

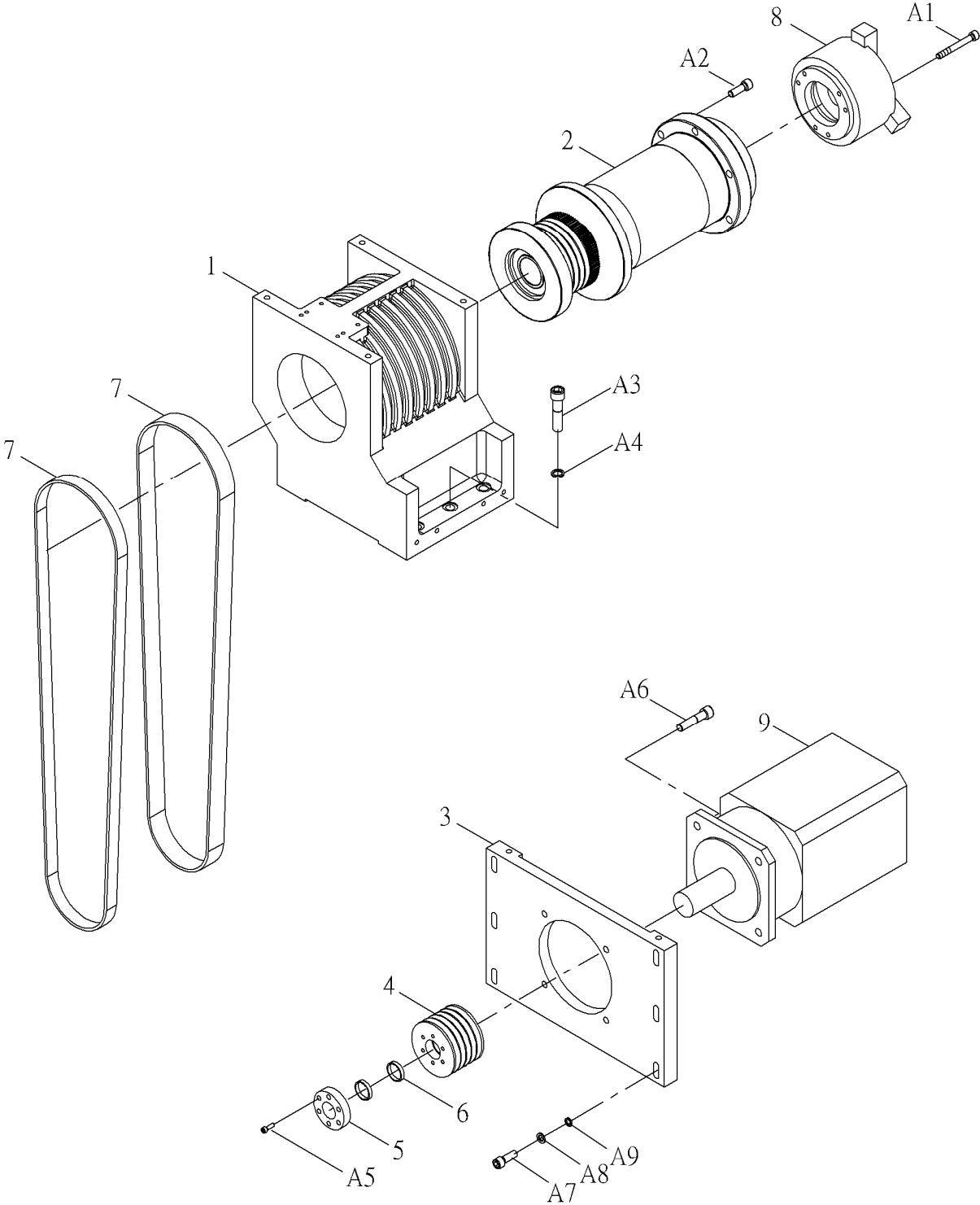




8.10.1 Headstock (LT-65)

Item	Part no.	Description	Q'ty	Remark
1		Socket Screw	1	M6XP1.0X50L
2		Drive Key	1	
3		Spindle	1	
4		Key	2	12X8X60
5		O Ring	1	G100
6		Seal Ring	1	
7		Socket Screw	6	M6XP1.0X50L
8		Cover	1	
9		O Ring	1	G150
10		Bearing	3	7020
11		Spacer	1	
12		Socket Screw	6	M8XP1.25
13		Sleeve	1	
14	42042-00051	Headstock	1	
15		Bearing	2	7020
16		Cover	1	
17		Socket Screw	6	M5XP0.8X20L
18		Seal Ring	1	
19		Socket Screw	6	M6XP1.0X20L
20		Cover	1	
21		Socket Screw	6	M8XP1.25X20L
22		Timing Belt Pulley	1	
23		Pulley	1	
24		Cover	1	
25		Cover	1	
26		Cover	1	
27		Socket Screw	4	M8XP1.25X40L

8.11 Spindle Motor Pulley- Inside the base housing (LT-42/65)

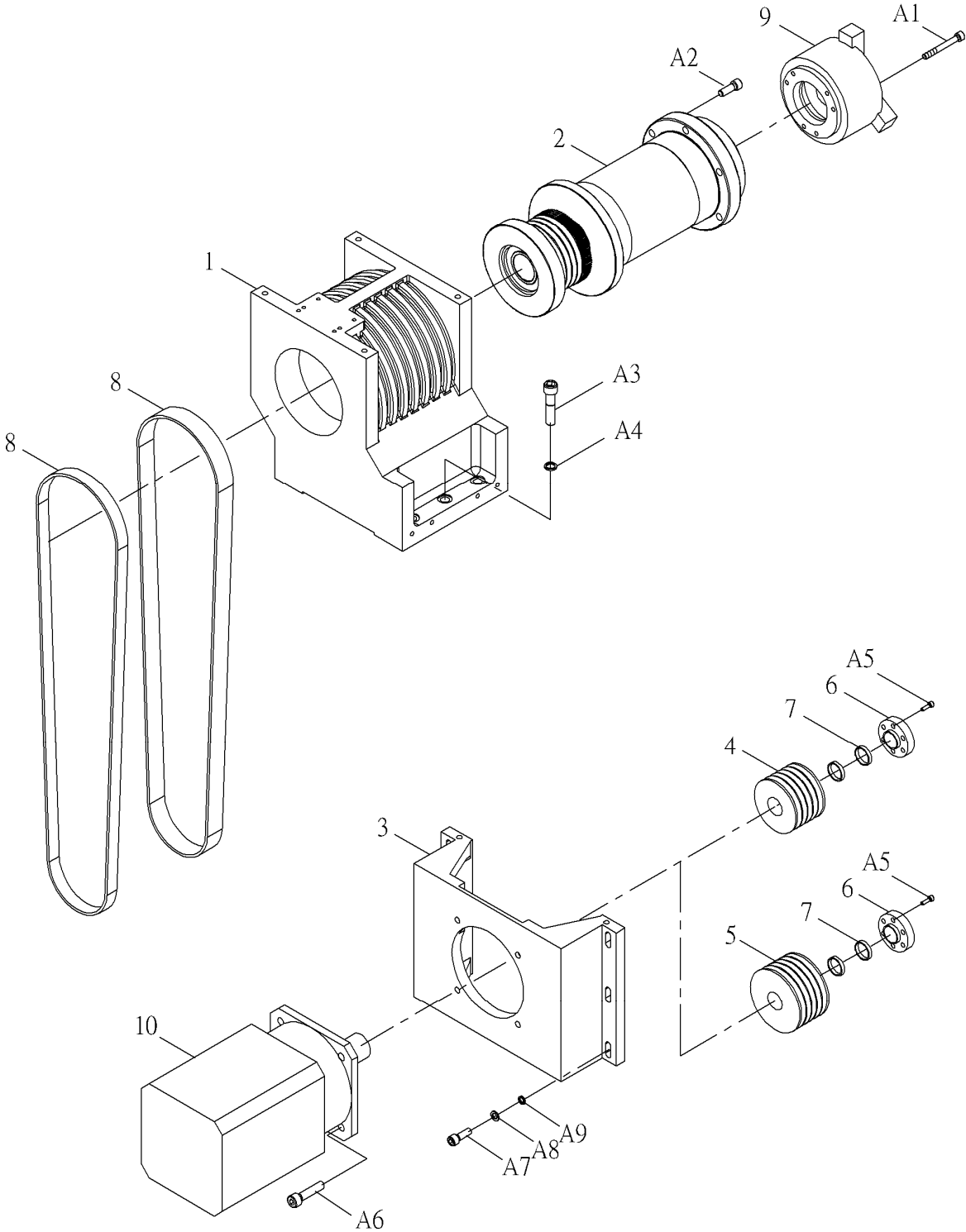




8.11.1 Spindle Motor Pulley- Inside the base housing (LT-42/65)

Item	Part no.	Description	Q'ty	Remark
1	42042-00001	Headstock	1	LT-42
	42042-00051	Headstock	1	LT-65
2	42042-03001	Spindle	1	LT-42
	42042-03101	Spindle	1	LT-65
3	42042-05003	Spindle Motor Mounting Bracket	1	
4	42042-05007	Spindle Motor Pulley	1	LT-42
	42042-05010	Spindle Motor Pulley	1	LT-65
5	43210-552014	Clamp Ring	1	LT-42
	42042-05011	Clamp Ring	1	LT-65
6	43210-520019	Clamp Ring	2	LT-42
	43130-05004	Clamp Ring	2	LT-65
7		V-Belt (LT-42)	1	4R11M2000(2+2)
		V-Belt (LT-65)	1	4R11M2120(2+3)
8		3-Jaw Chuck (LT-42)	1	6"
		3-Jaw Chuck (LT-65)	1	8" (10")
9		Spindle Motor	1	
A1		Socket Screw (LT-42)	6	M10XP1.5X100L
		Socket Screw (LT-65)	6	M12XP1.75X100L
A2		Socket Screw	6	M12XP1.75X40L
A3		Socket Screw	6	M16XP2.0X65L
A4		Spring Washer	6	M16
A5		Socket Screw	6	M8XP1.25X30L
A6		Hex. Head Screw	4	M14XP2.0X35L
A7		Socket Screw	6	M12XP1.75X60L
A8		Spring Washer	6	M12
A9		Flat Washer	6	M12

8.12 Spindle Motor Pulley- Out the base housing (LT-42/52)

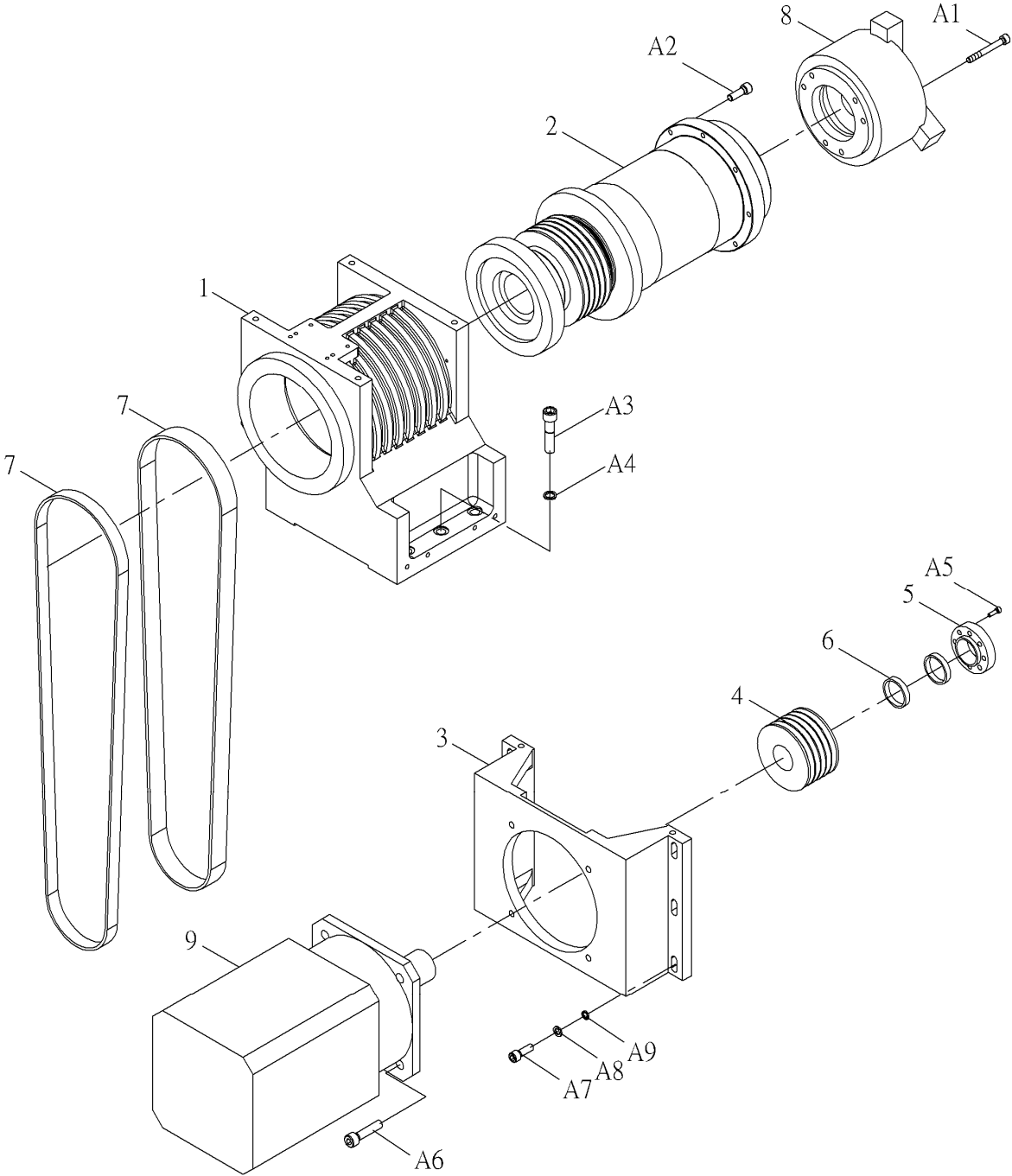




8.12.1 Spindle Motor Pulley- Out the base housing (LT-42/52)

Item	Part no.	Description	Q'ty	Remark
1	42042-00001	Headstock	1	LT-42
	42042-00051	Headstock	1	LT-52
2	42042-03001	Spindle	1	LT-42
	42042-03051	Spindle	1	LT-52
3	42042-05005	Spindle Motor Mounting Bracket	1	LT-42
	42042-05006	Spindle Motor Mounting Bracket	1	LT-52
4	42042-05007	Spindle Motor Pulley (Fagor)	1	LT-42
	42042-05009	Spindle Motor Pulley (Fagor)	1	LT-52
5	42042-05008	Spindle Motor Pulley (Fanuc)	1	LT-42
	42042-05010	Spindle Motor Pulley (Fanuc)	1	LT-52
6	43210-552014	Clamp Ring	1	LT-42
	42042-05011	Clamp Ring	1	LT-52
7	43210-520019	Clamp Ring	2	LT-42
	43120-05004	Clamp Ring	2	LT-52
8		V-Belt (LT-42)	1	4R11M2000(2+2)
		V-Belt (LT-65)	1	4R11M2120(2+3)
9		3-Jaw Chuck (LT-42)	1	6"
		3-Jaw Chuck (LT-52)	1	8"
10		Spindle Motor	1	
A1		Socket Screw (LT-42)	6	M10XP1.5X100L
		Socket Screw (LT-52)	6	M12XP1.75X100L
A2		Socket Screw	6	M12XP1.75X40L
A3		Socket Screw	6	M16XP2.0X65L
A4		Spring Washer	6	M16
A5		Socket Screw	6	M8XP1.25X30L
A6		Hex. Head Screw	4	M14XP2.0X35L
A7		Socket Screw	6	M12XP1.75X60L
A8		Spring Washer	6	M12
A9		Flat Washer	6	M12

8.13 Spindle Motor Pulley- Out the base housing (LT-65)

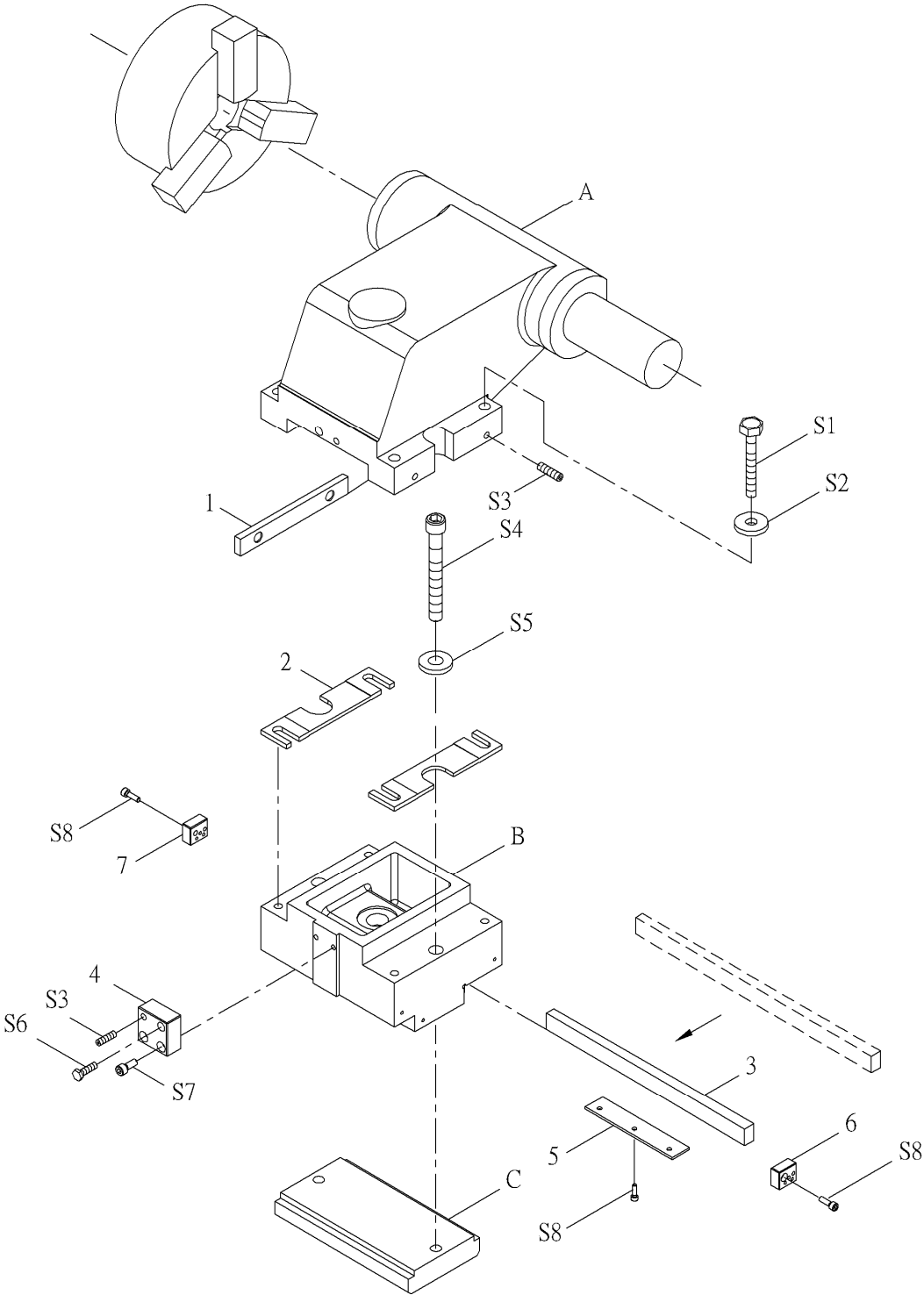




8.13.1 Spindle Motor Pulley- Out the base housing (LT-65)

Item	Part no.	Description	Q'ty	Remark
1	42042-00051	Headstock	1	
2	42042-03101	Spindle	1	
3	42042-05001	Spindle Motor Mounting Bracket	1	
4	42042-05009	Spindle Motor Pulley	1	
5	42042-05011	Clamp Ring	1	
6	43130-05004	Clamp Ring	2	
7		V-Belt	1	4R11M2120(2+3)
8		3-Jaw Chuck	1	8" (10")
9		Spindle Motor	1	
A1		Socket Screw	6	M12XP1.75X100L
A2		Socket Screw	6	M12XP1.75X40L
A3		Socket Screw	6	M16XP2.0X65L
A4		Spring Washer	6	M16
A5		Socket Screw	6	M8XP1.25X30L
A6		Hex. Head Screw	4	M14XP2.0X35L
A7		Socket Screw	6	M12XP1.75X60L
A8		Spring Washer	6	M12
A9		Flat Washer	6	M12

8.14 Tailstock Body

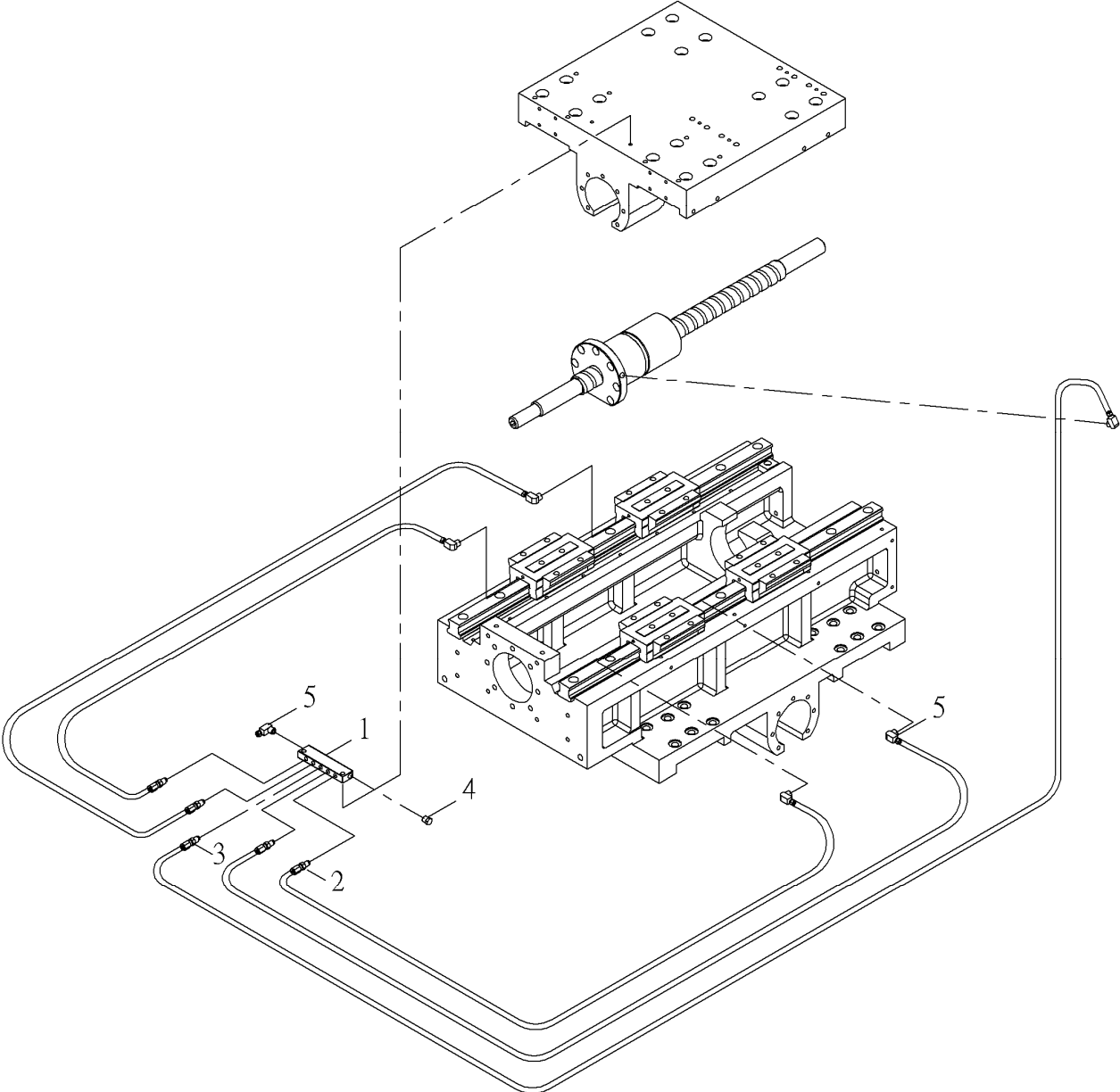




8.14.1 Tailstock Body

Item	Part no.	Description	Q'ty	Remark
A	42042-86001	Tailstock Body	1	
B	42042-86002	Tailstock Base	1	
C	42042-86010	Clamp Pad	1	
1	42042-86004	Clamp Plate	1	
2	42042-86003	Riser	2	
3	42042-86007	Gib	1	
4	42042-86005	Adjusting Block	1	
5	42042-86006	Clamp Plate	1	
6	42042-86008	Adjusting Block	1	
7	42042-86009	Adjusting Block	1	
S1		Hex. Head Screw	4	M12X75L
S2		Flat Washer	4	M12
S3		Screw	3	M8X30L
S4		Socket Screw	2	M16X150L
S5		Flat Washer	2	M16
S6		Hex. Head Screw	1	M10X30L
S7		Socket Screw	2	M8X25L
S8		Socket Screw	5	M6X12L

8.15 X-axis Lubrication System

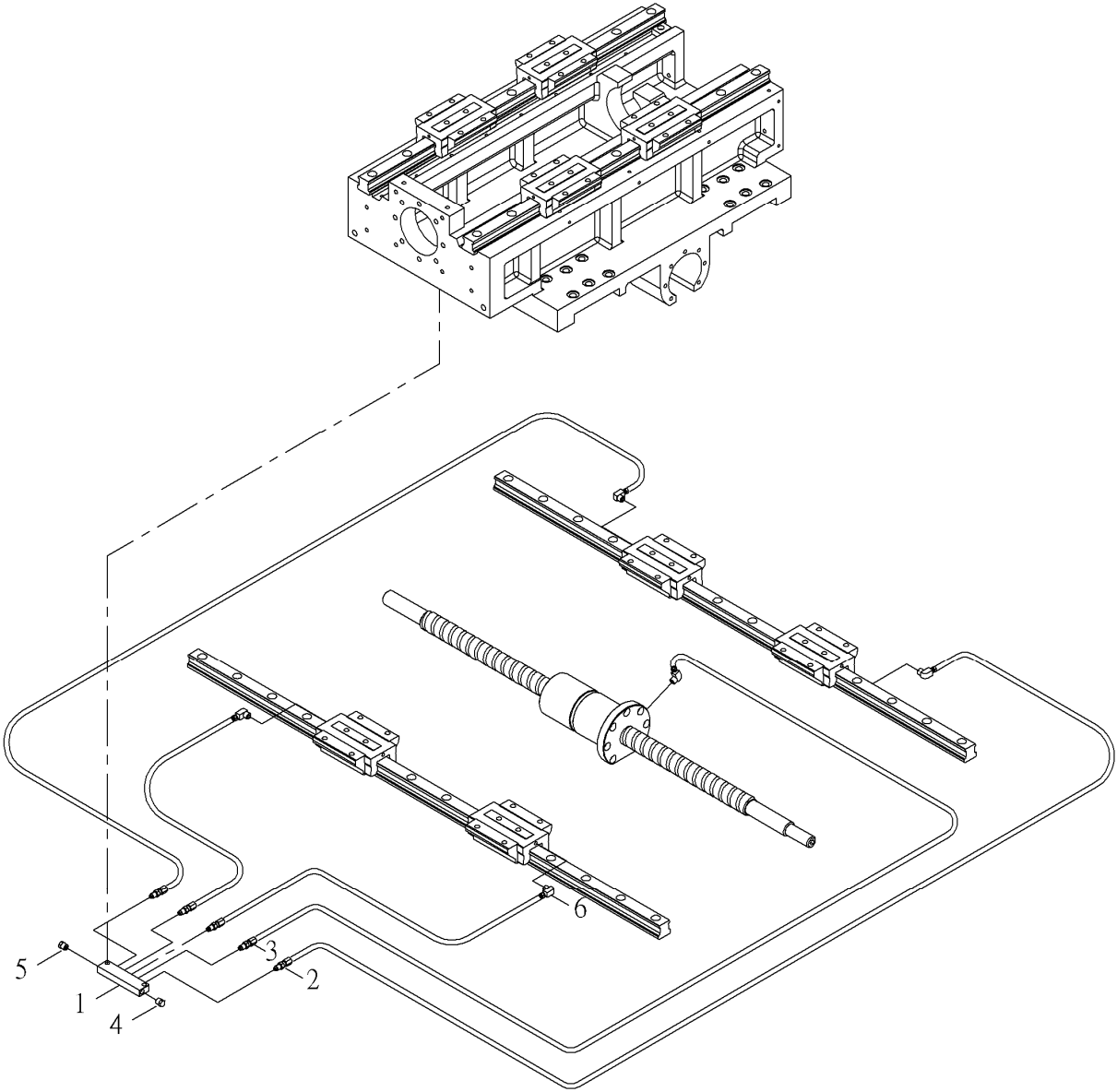




8.15.1 X-axis Lubrication

Item	Part no.	Description	Q'ty	Remark
1		Distributor	1	
2		Meter Valve	4	#3
3		Meter Valve	1	#4
4		Plug	1	
5		Fitting	6	

8.16 Z-axis Lubrication System

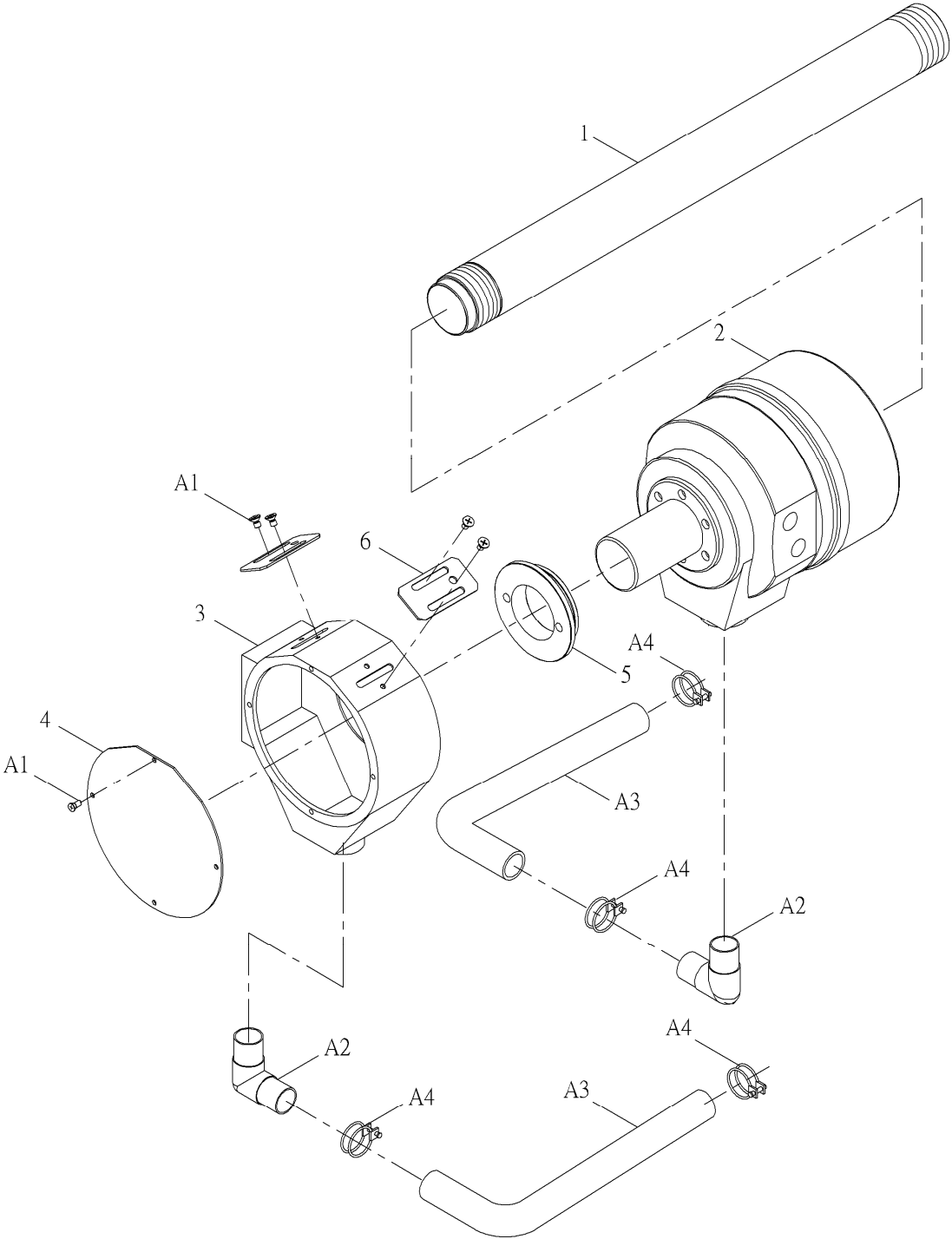




8.16.1 Z-axis Lubrication

Item	Part no.	Description	Q'ty	Remark
1		Distributor	1	
2		Meter Valve	4	#3
3		Meter Valve	1	#4
4		Plug	1	
5		Plug	1	
6		Fitting	5	

8.17 Cylinder

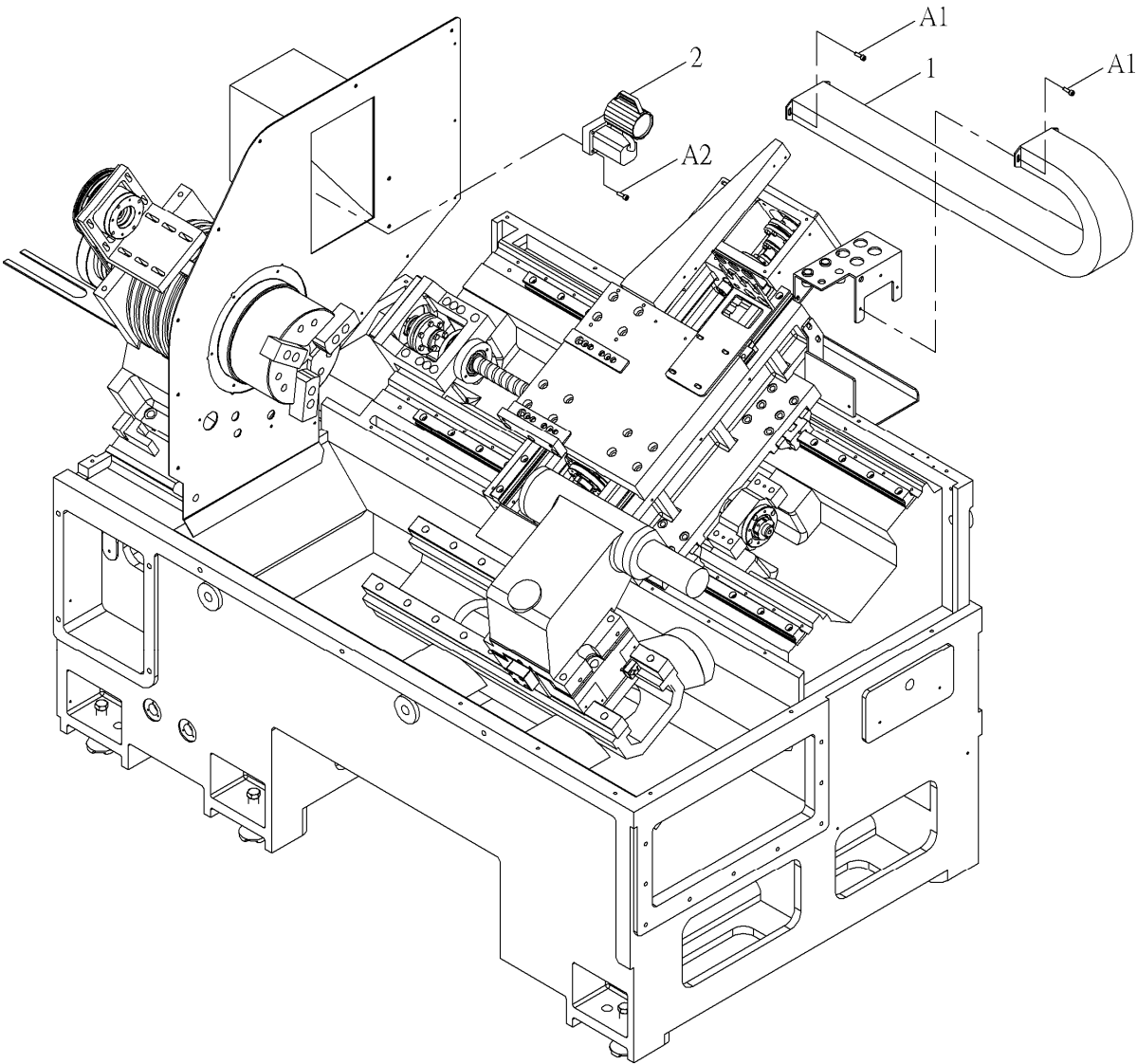




8.17.1 Cylinder

Item	Part no.	Description	Q'ty	Remark
1	42042-04002	Draw tube	1	
	42042-04052	Draw tube	1	
	42042-04102	Draw tube	1	
2	42042-04003	Cylinder	1	6"
	42042-04053	Cylinder	1	8"
	42042-04103	Cylinder	1	10"
3	42042-04004	Coolant Collector	1	
	42042-04054	Coolant Collector	1	
	42042-04104	Coolant Collector	1	
4		Cover	1	
5	42042-04007	Nut	1	6"
	42042-04057	Nut	1	8"
	42042-04107	Nut	1	10"
6		Adjusting Plate	2	
A1		Screw	8	M5X10L
A2		Fitting	2	1"PTX1"L
A3		Hyd. Hose	2	3/8R1X2800-90°
A4		Clamper	4	

8.18 Cable Track & Work Light

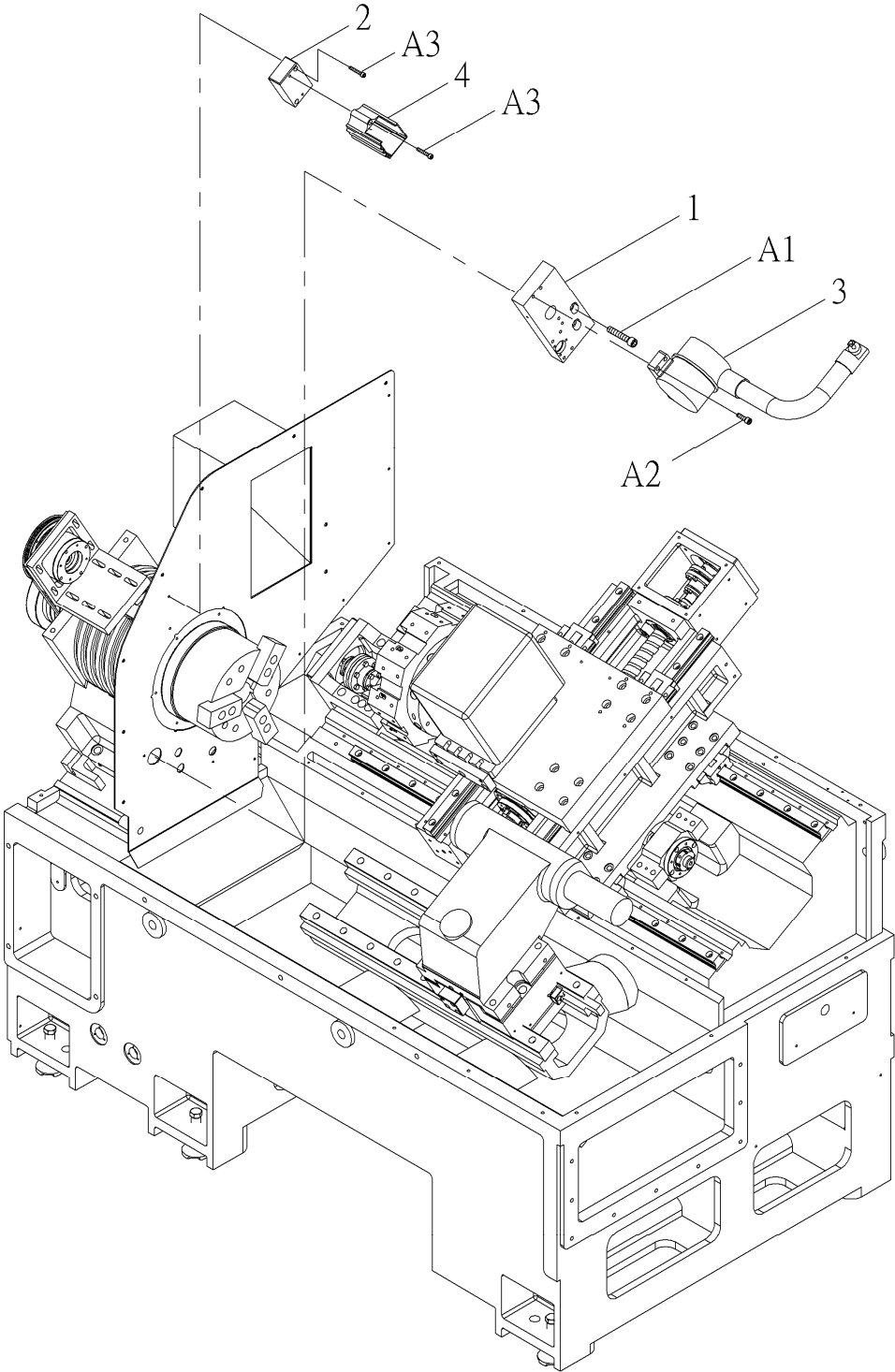




8.18.1 Cable Track & Work Light

Item	Part no.	Description	Q'ty	Remark
1		Cable Track	1	74X39XKR100
2		Work Light	1	
A1		Socket Screw	4	M6X12L
A2		Socket Screw	4	M6X40L

8.19 Tool Setter

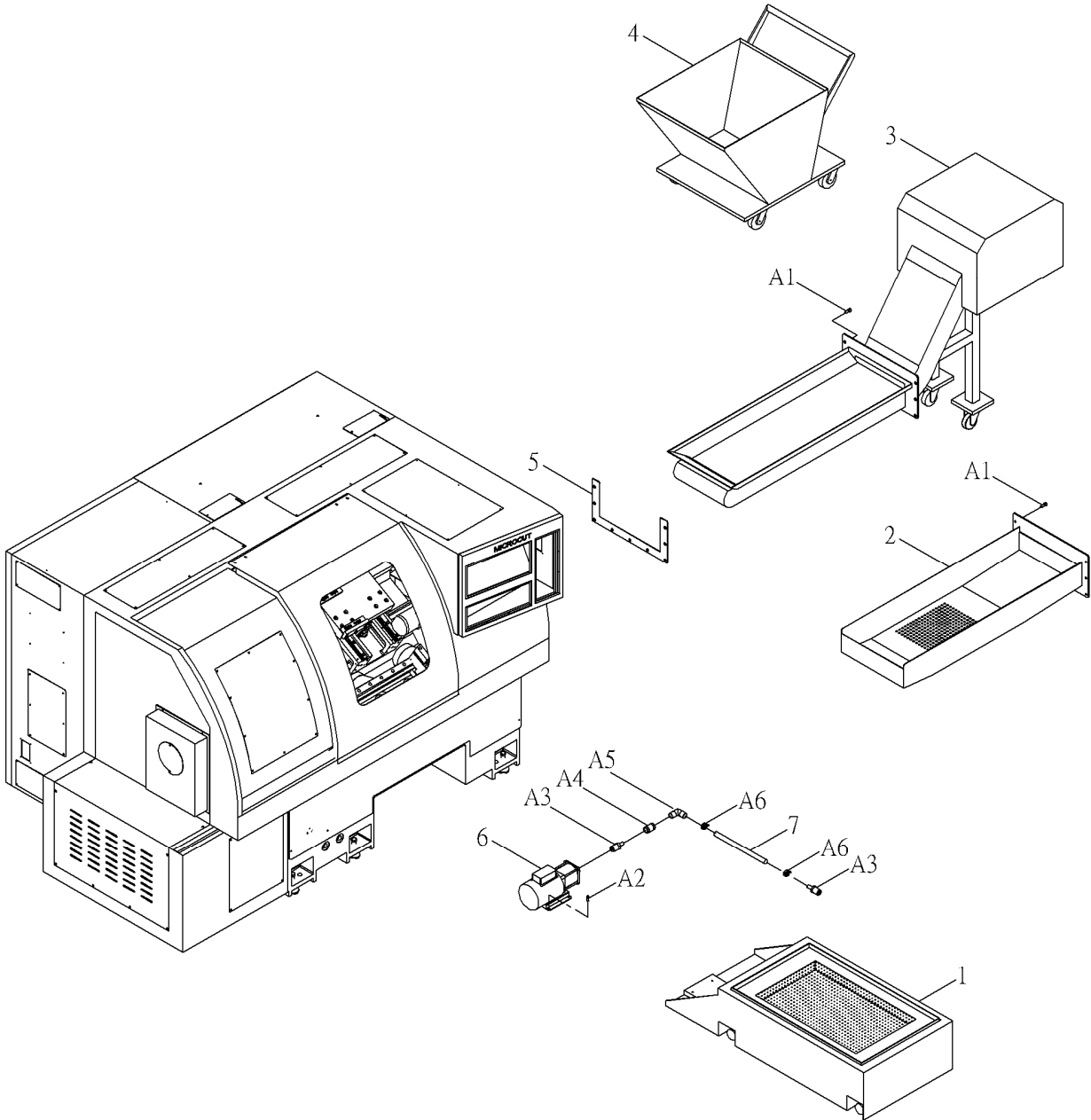




8.19.1 Tool Setter

Item	Part no.	Description	Q'ty	Remark
1	42042-85010	Seat	1	
2	42042-04052	Block	1	
3		Tool Setter	1	
4		Tool Setter Seat	1	
A1		Socket Screw	1	M12X35L
A2		Socket Screw	1	M8XP1.25X35L
A3		Socket Screw	1	M6XP1X50L

8.20 Chip Conveyor & Coolant Tank

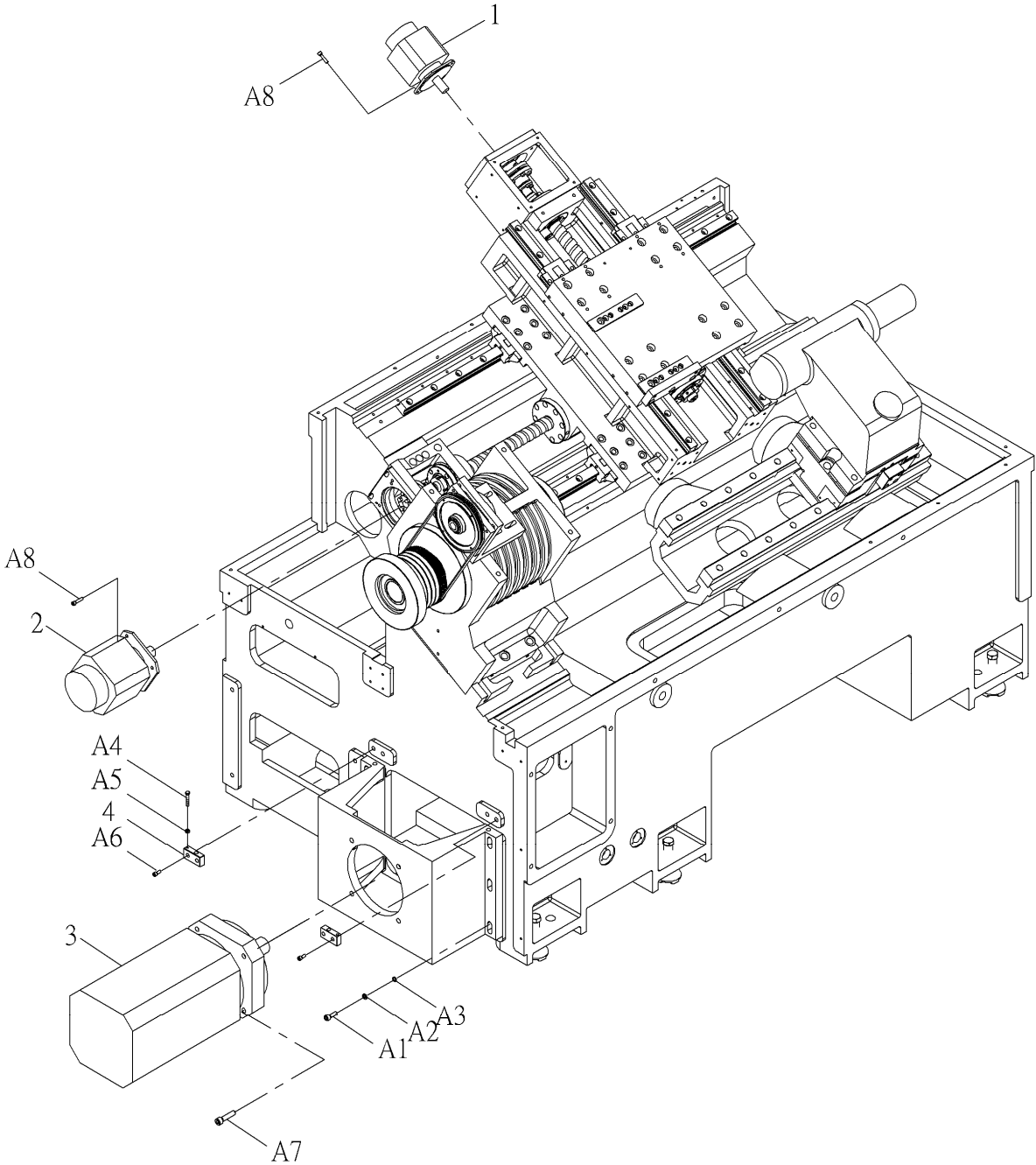




8.20.1 Chip Conveyor & Coolant Tank

Item	Part no.	Description	Q'ty	Remark
1	42042-41001	Coolant Tank	1	
2	42042-41010	Chip Tank	1	
3	42042-41015	Chip Conveyor	1	
4		Bucket	1	
5		Spacer	1	
6	42042-41050	Coolant Pump	1	
7		Pipe	1	
A1		Socket Screw	9	M10X30L
A2		Socket Screw	4	M80X30L
A3		Fitting	2	1"PTX3/8"H
A4		Check Valve	1	3/4"PT
A5		Fitting	1	3/4"PT
A6		Clamper	2	

8.21 Motor

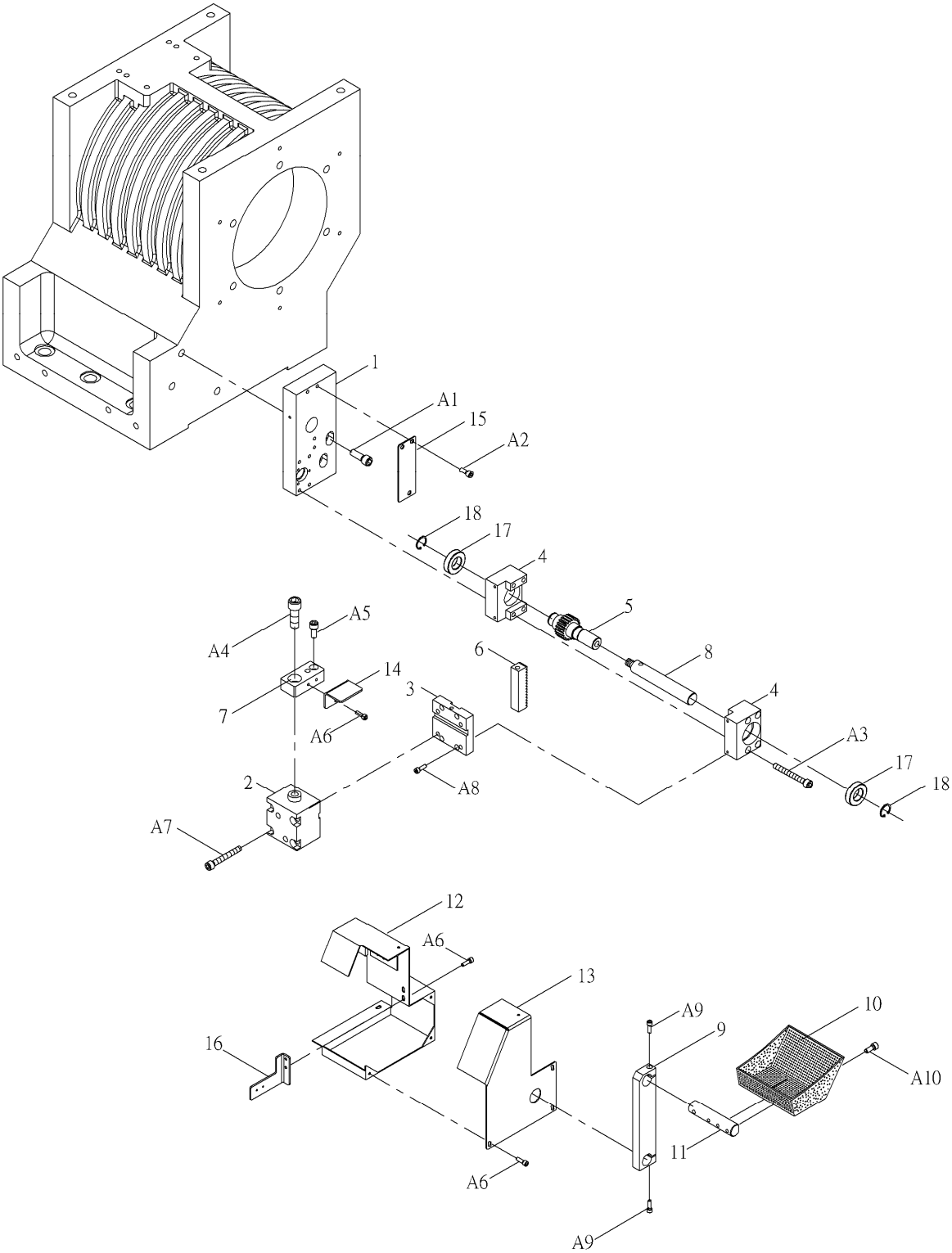




8.21.1 Motor

Item	Part no.	Description	Q'ty	Remark
1		X-motor	1	
2		Z-motor	1	
3		Spindle-motor	1	
4	42042-05004	Adjusting Block	2	
A1		Socket Screw	6	M12X60L
A2		Spring Washer	6	M12
A3		Flat Washer	6	M12
A4		Hex. Head Screw	2	M8X60L
A5		Nut	2	M8
A6		Socket Screw	4	M8X35L
A7		Hex. Head Screw	4	M14X35L
A8		Socket Screw	8	M8X40L

8.22 Parts Catcher





8.22.1 Parts Catcher

Item	Part no.	Description	Q'ty	Remark
1	42042-85010	Block	1	
2	42042-85012	Cylinder	1	
3	42042-85013	Cover	1	
4	42042-85014	Base	2	
5	42042-85015	Gear	1	
6	42042-85016	Rack	1	
7	42042-85017	Block	1	
8	42042-85018	Rod	1	
9	42042-85019	Arm	1	
10	42042-85020	Catcher	1	
11	42042-85021	Rod	1	
12	42042-85022	Chip Cover	1	
13	42042-85023	Cover	1	
14	42042-85024	Dog	1	
15	42042-85026	Plate	1	
16	42042-85031	Dog	1	
17		Bearing	2	6005ZZ
18		C-ring	2	STW-25
A1		Socket Screw	2	M12X35L
A2		Socket Screw	3	M8XP1.25X12L
A3		Socket Screw	4	M8XP1.25X100L
A4		Socket Screw	1	M16XP2.0X25L
A5		Socket Screw	1	
A6		Screw	8	M6XP1.0X10L
A7		Socket Screw	4	M10XP1.5X70L
A8		Socket Screw	2	M8XP1.25X16L
A9		Socket Screw	2	M8XP1.25X16L



9 RISK ASSESSMENT AND SAFETY IMPROVEMENT



- 9 RISK ASSESSMENT AND SAFETY2**
- 9.1 DANGEROUS ZONE OF SPINDLE TRANSMISSION AREA2**
- 9.2 DANGEROUS ZONE OF CHUCK AREA3**
- 9.3 DANGEROUS ZONE OF TURRET TURNING AREA4**
- 9.4 DANGEROUS ZONE OF TAIL STOCK AREA4**
- 9.5 DANGEROUS ZONE OF ELECTRIC CONTROL BOX AREA.....5**



9 RISK ASSESSMENT AND SAFETY

9.1 Dangerous Zone of Spindle Transmission Area

Dangerous Item 1	Rolling in
When risk happen?	The side cover is opened when this area is repaired or cleaned.
Risk conditions:	After the machine is repaired, the operator tests running. When the operator adjusts the belt, his finger or his sleeve with one arm is rolled in due to carelessness, and it causes a wound of cutting off.
Risk Solution	1. Install a magnetic interlock switch on the side door. When the door is opened for repair, the power will be cut off automatically. 2. Stick a warning label inside the door.
Dangerous Item 2	Motor falling down
When risk happen?	When the spindle motor is out of order, the motor needs to be lifted up or down for repair. The motor might fall down.
Risk conditions:	a. When we repair the motor, we need to dismount the motor. When we install the repaired motor, we need to move the motor into the machine. However, the lifter or the hanger cannot reach the inside. The motor is moved in manually. If the motor is not fastened, it might fall down, and cause the danger of hurting hands or feet.
Risk Solution	Clearly describe the moving method of the spindle motor in the operating instructions.

9.2 Dangerous Zone of Chuck Area

Dangerous Item 1	Collision
When risk happen?	During operation or repair
Risk conditions:	If the work piece is not clamped properly, or the jaws of the chuck lose tension, the work piece will spring out in the tangent direction when the spindle is turning. If the operator or the cleaning people within the spring-out area, he might be hit.
Risk Solution	<ol style="list-style-type: none"> 1. Install a magnetic interlock switch on the front guard door. During the processing, the front guard door cannot be opened. 2. When the front guard door is opened, the spindle will not turn. 3. Install a check valve on the cylinder of the hydraulic chuck so that the jaws of the chuck will not open when the power breaks off. 4. Stick a warning label on the front guard door.
Dangerous Item 2	Cut wound
When risk happen?	The machine is repaired or cleaned.
Risk conditions:	The soft jaws have sharp edges after finishing. The operator might be cut due to carelessness when he install, dismount or clean the chuck.
Risk Solution	<ol style="list-style-type: none"> 1. Install a magnetic interlock switch on the front guard door. The door cannot be opened when the work piece is under processing. 2. Stick a warning label on the front guard door. 3. Add the items to be noticed in the operating instructions.
Dangerous Item 3	Falling down or loose
When risk happen?	During operation or repair
Risk conditions:	The sliding type protective guard will become loose or fall down under outside impact. When the guard is dismounted for repair, it might fall down due to carelessness, and hit people's foot.
Risk Solution	Add the transportation method and the items to be noticed in the operating instructions.



9.3 Dangerous Zone of Turret Turning Area

Dangerous Item 1	Crush
When risk happen?	During operation or repair
Risk conditions:	<p>1. When the operator mounts or dismounts the work piece, and if the turret turns by error operation, the operator's hands or fingers might be crushed, or even seriously crushed to cause broken bones.</p> <p>2. When the turret is moving toward the work piece at high speed, if operator's hands are between them, it will cause crush wound.</p> <p>3. When the operator measures the work piece, if the turret turns by error operation, the operator's hands or fingers might be crushed. If it is serious, the bones might be broken.</p>
Risk Solution	<p>1. Add the transportation method and the items to be noticed in the operating & Maintenance Manual.</p> <p>2. Stick a warning label on the front side of the turret</p>

9.4 Dangerous Zone of Tail Stock Area

Dangerous Item 1	Crush
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When risk happen?	During operation or repair
Risk conditions:	When the operator mounts or dismounts the work piece, if the tailstock turns by error operation, the hands or the fingers might be crushed. If the situation is serious, the bones might be broken.
Risk Solution	<ol style="list-style-type: none"> 1. Add the items to be noticed in the operating & Maintenance Manual. 2. Stick a warning label on the front side of the hydraulic tailstock.
Dangerous Item 2	Sticking wound
When risk happen?	During operation or maintenance (cleaning)
Risk conditions:	If the center is in the tailstock, the operator might be stuck and cause sticking wound during the operation or repair, because of the carelessness.
Risk Solution	<ol style="list-style-type: none"> 1 Add the items to be noticed in the operating & Maintenance Manual. 2. Stick a warning label on the front side of the hydraulic tailstock.

9.5 Dangerous Zone of Electric Control Box Area

Dangerous Item 1	Clipping wound
When risk happen?	During operation or maintenance



Risk conditions:	During the process of repair, adjustment, cleaning, or announcement of invalid parts, the door of the electric control box must be opened or closed. If the operator is careless, his hand or finger(s) might be clipped, and is (are) wounded.
Risk Solution	Add the items to be noticed in the operating & Maintenance Manual.
Dangerous Item 2	Cut wound
When risk happen?	During operation or maintenance
Risk conditions:	1. There are rhombic edges and sharp edges on the electric control box and box door. During the process of repair, adjustment, cleaning or the announcement of invalid parts, the hands might be cut due to carelessness. 2. There are rhombic edges and sharp edges on the main circuit and sub circuit. During the process of repair, adjustment or cleaning, the hands might be cut due to carelessness.
Risk Solution	Add the items to be noticed in the operating & Maintenance Manual



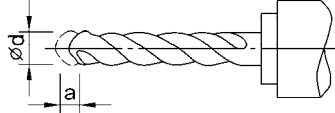
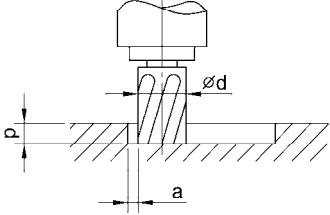
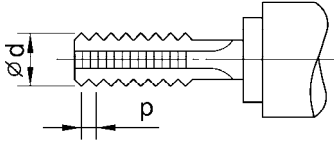
10 ELECTRIC DIAGRAMS



11 ADDITIONAL & REVISE PAGES

2.4.2 Cutting Capacity (with fit motors)

- * Work piece material: 600N/sqre mm steel
- * Cutting tool materials: HSS

	Twist drilling	Slot milling	Tapping
			
	$d \times a$ [mm] x [mm]	$d \times p$ [mm] x [mm]	$d \times p \times a$ [mm] x [mm]
TBMA-120	8 x 0.15	M6 x 1	12 x 8 x 45
TBMA-160	12 x 0.20	M8 x 1.25	20 x 10 x 40
TBMA-200	20 x 0.20	M16 x 2	25 x 14 x 40
TBMA-250	22 x 0.20	M18 x 2	25 x 20 x 40

3.1 Machine Movement and Installation

3.1.1 Foundation plan

