



TW-32Qi
CNC Bed Mill
Operation Manual

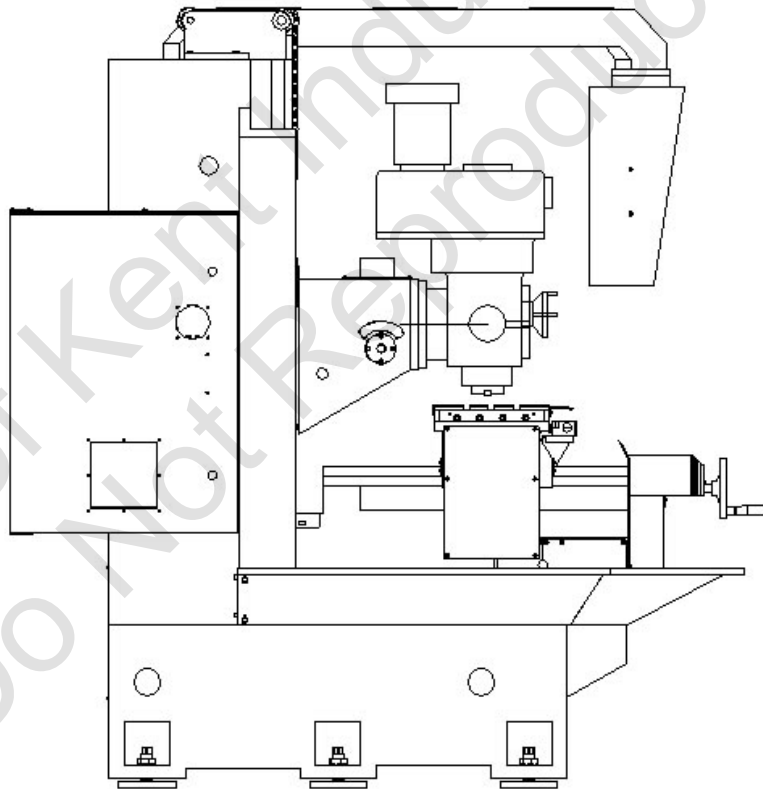


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CNC Bed Milling machine

Model : T W – 32QI

Operation Manual



KENT INDUSTRIAL (USA) INC.

2004/12/20

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【Chapter 1 safety instruction】

1-1 The basic condition of safety performance

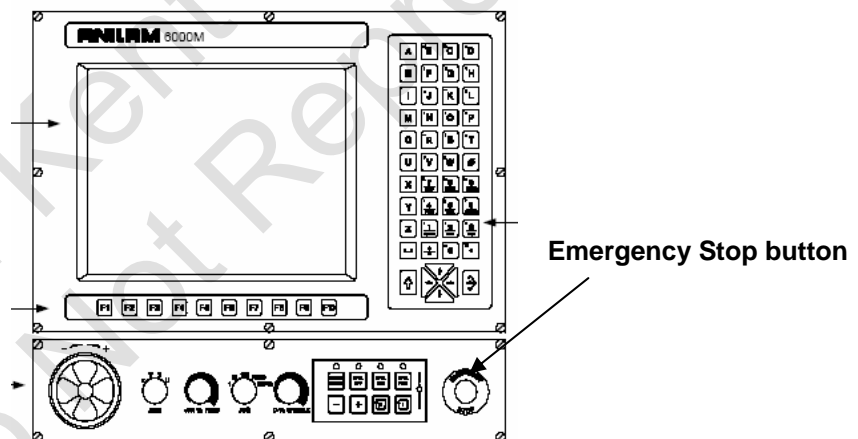
Please obey exactly the five basic conditions below:

1. Only the person whose ability is confirmed or the qualified person can be equipped with the job of operation or maintenance:

The qualified person must accept the suitable training in order to understand the safety precaution and maintenance of the machine, meanwhile, as to the safety control field, his (or her) capability must be qualified. Especially for the electro-maintenance, the charged person has to have the experiences and capable of this job. Meanwhile, he must be familiar with the safety standards and official regulations.

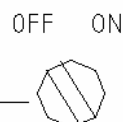
2. Before operating the machine, the person must pay highly attention on the safety instructions in every individual part; it includes the detail procedure of operation, program and maintenance.
3. The machine operator and maintenance person must be familiar with the position and function of the "**Emergency Stop**" button.

Operation panel



Before maintenance, or any emergency situations, please turn this knob to **OFF** position.

Power Switch
(Electric Cabinet)



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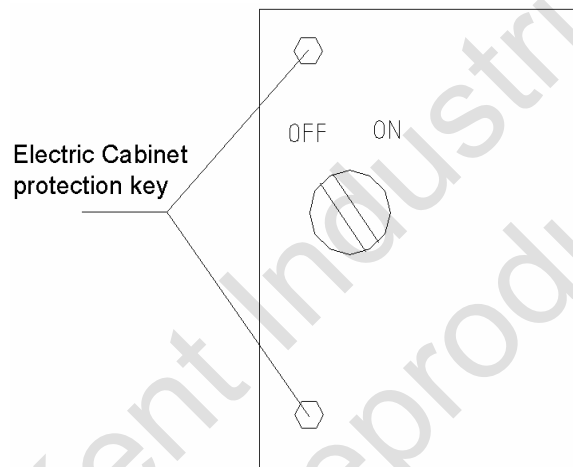
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4. The safety key needs to be stored by pointed person.

This machine is equipped with two safety keys in order to protect the memory in the controller, and prevent the cabinet's door opened without permitting.

(1) Electric cabinet protection key:

This key protects the electric cabinet that could not be opened without authorizing.



5. All of this machine's operation manuals should be kept in a convenience place. If the operation manual's contents or words are too muddy to read, please contact the agent and inform him (or her) the model of yours machine.

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1-2. Safety prevention

Safety prevention instruction:

This machine is equipped with many safety devices in order to prevent the injury of the operator and the damage of machine parts. Therefore, the operator must completely understand the safety prevention instruction below:

1-2-1. The basic operation practice

Our milling machine possess the potential danger as follows: specific control buttons, transformer, motor, circuit combination box, high-voltage connector etc. Please do not touch the dangerous objects.

1. 【 Warning 】

1. Please do not touch the control button with wet hand.
2. The operator must be familiar with the position of Emergency Stop button in case of the emergent situation happens.
3. When replacing the fuse, the main power must be turned off.
4. Please preserve enough working space, and prevent the falling of tool and work-piece.
5. Please keep the cleaning of the working field. The coolant, oil, chips must be cleaned any time in order to prevent the slip.
6. When operating, please make sure the button is what you're going to push.
7. If there are two or more than two people operating the machine in the same time, these people have to be will-trained, and these people have to build good communication before operating the machine in case of the accident happened.

2. 【 Attention 】

1. When the power of this machine is malfunction, please turn off the main power immediately.
2. Please use the recommended lubricating oil.
3. The fuse should be replaced with the general, and common fuse.
4. Preventing the NC unit, control box, electro box ... etc from leak of electricity in case of the malfunction.
5. Do not modify the computer setting, and storage capacity arbitrarily. Please save the original data as a back up file before making a modification.
6. The warning plate must be kept clean, when it is not clear enough, please replace the plate. Remember to make a mark below of the warning plate in order to avoid the wrong installation.

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1-2-2. Before starting the machine

Before starting, make sure the power supply is grounded correctly and exactly.

Hazard objects :

Before operating, please inspect all the ropes, slings, and electric wires are in the correct position in order to prevent the pulling, pushing, or entanglement of wires and the electricity leakage, or any dangers of the machine.

1. 【 Warning 】

1. Please make sure the operator understanding all the instructions, being familiar with every function and working procedure.
2. Please wear the anti-slip boots, and the security clothing.
3. Please make sure all the safety doors and guards that are protected the NC unit, controller, electric cabinet... etc. being closed.

2. 【 Attention 】

1. The electric wires must be fixed on the floor and isolated by insulation sleeves in order to prevent the chips damage the wire's insulation and the shortcut.
2. Before operating the machine that didn't operate for a long time, or a new machine, please make sure the slide ways are well - lubricated.
3. Please fill up all the oil containers in each part.
4. Please lubricate each pointed point, use the recommended lubricating oil and maintain the suitable oil volume in accordance with the instructions on the nameplate.
5. Please inspect each button and handle operating smoothly.
6. Please inspect the coolant volume.
7. Please make sure the power supply switch of the factory, the main power switch of the machine, and main circuit switch are turned to "ON" position.

1-2-3. After the power switch is turned ON

1. 【 Attention 】

When the power switch is turned to **ON** position, the **READY** light will light up. If not, please inspect the malfunction's position.

1-2-4. Routine inspection

1. 【 Warning 】

When inspecting the belt, please do not stretch your hands between belt and belt pulley.

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2. 【 Attention 】

1. Please inspect the pressure gauge; it must be set up correctly.
2. Please pay attention on the motor 、 gear box and other assembly parts to see if there are unusual noise.
3. Please inspect the lubrication unit and lubricating oil level.
4. Please inspect every security equipment, and guard.
5. Please inspect the belt's tightness. If it is necessary, please replace the belt with same tension.
6. Please inspect the oil pressure unit to see if there is oil.

1-2-5. The warming-up before operation the machine

1. 【 Attention 】

1. Using the automatic control to control the feeding of each axis and the rotation of main axis for 10 to 20 minutes, and setting the speed at the half or 1/3 speed of the highest speed.
2. Meanwhile, please inspect the action of others assembly parts with automatic control program.
3. Please pay special attention on the spindle's warming-up when rotation speed is up to 4000 RPM. If operating the machine after it is just started without sufficient lubrication, the machine will be damaged. Meanwhile, due to the thermal expansion of each part, the machine is unstable, and causes the defeat of accuracy.

1-2-6. Preparation

1. 【 Warning 】

1. The tools and cutters have to meet this machine's requested specification.
2. The extreme worn tools will hurt the working piece or the people. Hence it must be replaced in advance.
3. Surrounding the working field, it must have sufficient light for safety and convenience of doing some inspection.
4. The cutters and other parts must be put on suitable and clean box.
5. Do not clamp the cutter on the spindle, and put the cutter on the tool magazine, and the guards.

2. 【 Attention 】

1. Please check the length of the cutter in order to avoid the interference of other tools.
2. Please run the test drive after clamping the cutter.

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1-2-7. When the machine is performing

1. 【 Warning 】

1. The long hair must be tied neat and put under the cap.
2. Please do not push any control button with glove in case of the malfunction.
3. When carrying huge work-piece, it should be more than 2 people to carry it in order to prevent the danger.
4. Only the experienced, and well-trained people could operate the lifter, crane, sling, and other lifting devices.
5. When operating the lifter above (lifter, crane), please do not collide with other devices.
6. When hanging the work piece, please confirm the strength of slings, belts and ropes.
7. Please make sure the work piece is fixed stably.
8. The coolant flux should be adjusted when the machine is stopped.
9. Please do not touch the functioning working piece or spindle.
10. The working piece and the cutter must keep a safety distance, and the working piece only can be carried when the spindle is stopped.
11. When the machine is running, please do not clean the chips with hands or rags.
12. Do not machine on the working piece before installing the safety guards, and splashguards.
13. Please clean the cutter with brush. DO NOT use hands.
14. When machining the magnesium alloy, please wear the protection mask.

2. 【 Attention 】

1. Please do not open the door and window during running.
2. During heavy load machining, please pay highly attention on the jumped-out chips in order to avoid the burning of skin.

1-2-8. End of machining

1. 【 Warning 】

When end of the machining, please turn NFB switch to OFF position.

1-2-9. End of work

1. 【 Attention 】

1. When cleaning the chips on the machine, please wait for the stop of the machine.
2. All of the cutters, tools and parts must be return to its own position.
3. Please inspect the damaged felt wipers, and replace it when necessary.

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4. Please inspect the polluted degree of the coolant, oil inside the oil cylinder, and lubrication oil. Please replace them when necessary.
5. Please inspect the level of the coolant, and oil inside the oil cylinder, and refill them when necessary.
6. Please make sure all switches are turned off before leaving the machine.
7. Please turn off the main power when stopping the machine for a long time.

1-2-10. Safety equipment

1. Enclosure, splashguard, chip pan, and telescope of three axes.
2. Limit switch for program saving. (NC software).
3. Emergency Stop button.

1-2-11. Preparation of maintenance

1. The maintenance personnel have to be authorized by the superior to maintain the machine.
2. Please prepare the accessories, parts and the consuming items previously. (oil-sealing 、 O-ring 、 machine oil, grease)
3. Prepare to record every job, which is or isn't needed to maintain or adjust.

【 Attention 】

1. Please understand every safety precaution procedure firstly.
2. Please use the specified tools to process the maintenance job in order to prevent the damage of the machine.

1-2-12. Maintenance

【 Attention 】

To process the maintenance job after the machine is stopped completely.

【 Hazard 】

1. Only the experienced person or the person who is familiar with it can do the electric cabinet maintenance job. Do not maintain the machine arbitrary. It has to have good communication between the maintenance personnel and the charged person.
2. Please do not move the dogs, limit switch, approaching switch, and other connecting mechanism.
3. Please use the ladder to maintain the devices that are on the high position.
4. Please use the high quality fuses, wires.
5. Please turn off the main power before doing any maintenance job.

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1-2-13. The work before start the machine after the maintenance

【 Warning 】

1. Please keep well of the oil-wipe rag, oil cleaner.... etc for maintaining.
2. Please return the unnecessary tools, parts, and rest oil to its original place.

【 Attention 】

1. The maintenance person has to make sure the machine running safely.
2. Please keep the maintenance record and data for reference.

1- 3 The hazard zone of the machine

1-3-1 Moving parts

Because the spindle is running at high speed, and the actions of each axis, and the automatically tool changing, the area between the table, spindle, and tool magazine is very dangerous. Meanwhile, the inside of the machine will be wet and high temperature due to the splashing chips and coolant when it is machining.

- ※ The full enclosure is an optional accessory; the table guard with plexiglass is the standard specification.

【 Warning 】

1. Under Auto mode, do not open the working door, plexiglass window, and other enclosure.
2. Please pay special attention on the condition of operating or the power of the machine is “ON”. In case ignoring the warning above, it may lead to the death and extremely injury of people, or machine's damage.

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【Chapter 2 Carry and Stock】

2-1. Packing of the machine:

Crate size (L × W × H) : 2185×2000×2350 mm

Net weight : 2000 kgs

Gross weight : 2200 kgs

※The machine packaged in a crate for transportation is a standard transportation method, unless the buyer asks for other method for package.

2-2. The carry of equipment:

2-2-1. The lifter's requirement:

Machine weight : 2,200kgs

Fork Length : 1,300mm

** The forklifter must be capable of lifting at least this weight.

The sling must be capable of lifting at least this weight.

The trailer or the dray must be capable of transporting at least this weight and length

2-2-2. The safety requirement of carry

1. Crane:

- (1) During the carry and unloading, please avoid compression or collision because of the fact this machine is a high precision machine. (The speed must be lower than 25m / min)
- (2) Jog the table to the machine's center, and the head to the bottom. Then fix the head by stationary barrier.
- (3) The counterweight is locked by the stationary barrier.
- (4) Place a pad between the doors, pull them closed, and secure them with two wire ties through the handles.
- (5) The lube unit's exhausting holes must be locked.
- (6) The carry method and the lifter should be totally inspected.
- (7) The crane or forklifter's operator should be well trained or experienced.
- (8) The loose parts should be pulled tight when lifting. And the contact surface of machine should be protected by the rags or woods in case of the scratch.
- (9) In order to prevent the swing of the machine, please tight a strengthened rope on a corner of the machine. The hands are extremely forbidden.

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- (10) Please notice on the air pressure pipes, wires, NC controller, and other devices, when the slings are pulled.
- (11) Please confirm that there are no people on the top of the machine, on the side of the machine, and on the way of move before moving the machine.
- (12) Please remove the objects occupied on the way, and pay highly attention on the control buttons.
- (13) The length of the slings on four corners should be same, and the distance of four corners between the machine and the ground should be kept the same when lifting (50 cm suggested).
- (14) Please notice on the ground when putting down the machine in order to confirm there are no wires, pipes under the machine.

2. Forklifter:

- (1) During the carry and unloading, please avoid compression or collision because of the fact this machine is a high precision machine. (The speed must be lower than 25m / min)
- (2) Jog the table to the machine's center, and the head to the bottom. Then fix the head by stationary barrier.
- (3) The counterweight is locked by the stationary barrier.
- (4) Place a pad between the doors, pull them closed, and secure them with two wire ties through the handles.
- (5) The lube unit's exhausting holes must be locked.
- (6) The carry method and the lifter should be totally inspected.
- (7) The crane or forklifter's operator should be well trained or experienced.
- (8) Please remove the objects occupied on the way, and pay highly attention on the control buttons.
- (9) Please confirm that there are no people on the top of the machine, on the side of the machine, and on the way of move before moving the machine.
- (10) Please notice on the ground when putting down the machine in order to confirm there are no wires, pipes under the machine.

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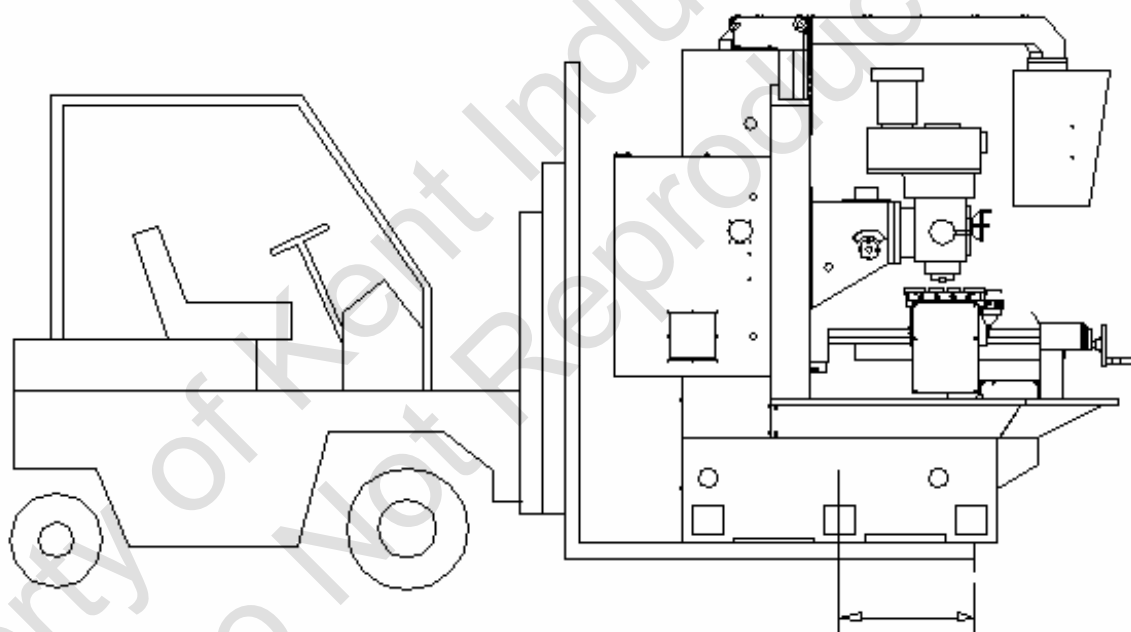
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2-3. fork lift instruction: (As the figure 2-3 shown)

Machine weight : 2,200kgs

Fork Length : 1,300mm



Over 100mm from the center

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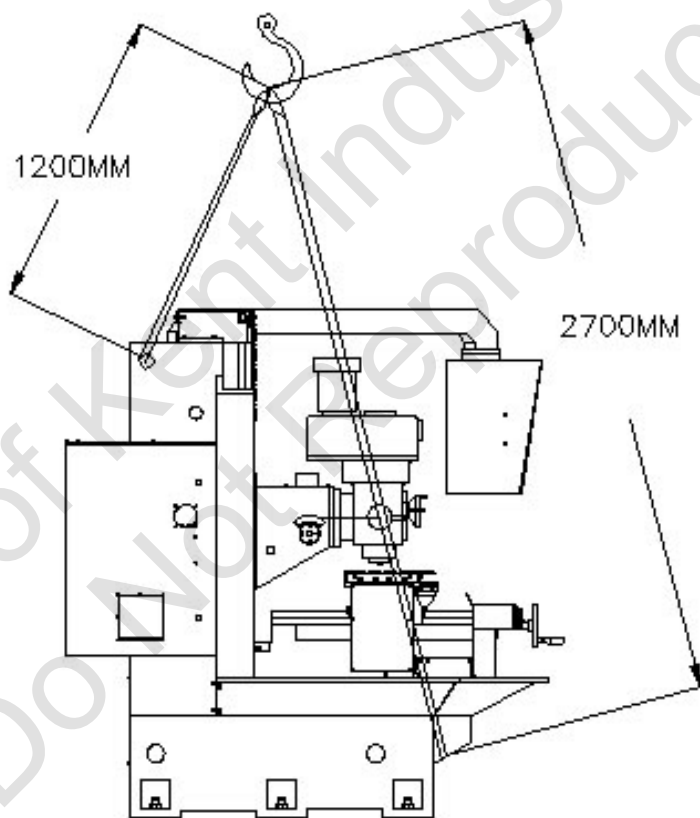
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2-4. Cable lift instruction: (As the figure 2-3 shown)

Max. Load of crane (kg) : 4,000 Kg

Sling specification (D: mm) : 25mm



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2-5. The stock of machine :

1. After the arrival of machine, if it is not installed immediately, please store in the stock in order to prevent the dust and the damp.
2. Storage Temperature Range: -5 °C to 45 °C
3. Ambient Humidity: less than 90 % relative humidity, non-condensing.
4. The machine must be put on the flat place in order to maintain the machine's accuracy
5. The anti-rust oil should be respray when storing the machine because the oil would be wiped off during shipping.
6. Suggested anti-rust oil: (Please keep mind the valid day of storage)
 - (1) The transparent, and clear type: (Brand: COTEC Model :VCI-369G)
The anti rust-oil could prevent the machine from rust for 6 months since the machine leave our company.
 - (2) The brown & grease type : (Brand: model:)
The anti rust-oil could prevent the machine from rust for 6 months since the machine leave our company.

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【Chapter 3 Dismantle and installation instruction】

3-1. Dismantle instruction:

1. Installation tools required:
 - (1) Crane.
 - (2) Scissors
 - (3) Wrench (17 / 19 mm)
 - (4) Adjustable wrench.
 - (5) Ladder.
 - (6) Claw hammer.
 - (7) Air wrench. (21 mm)
 - (8) Hammer.
2. Uncrating:
 - (1) Pry off the clips around the top of the crate with a claw hammer and remove the top panel. Some crates have lag screws which hold the crate walls and roof together. A wrench is necessary to remove these.
 - (2) Pry off the enforcement beam where inside the crate's top. (It should be pried by two people.)
 - (3) Pry off all but one clip at each corner of the crate.
 - (4) Remove plastic cover.
3. Uncrating the pallet:
 - (1) Unbolt the 6 fixed bolts and caps where on the pallet by wrench or adjustable wrench.
 - (2) Cut off the iron plate, which fixed the accessories on the pallet, and remove the accessories by crane.
4. Move the machine without the crate: Move the machine by crane or forklifter.
 - (1) The capability of forklifter is stated as previous chapter, The forks must be over 1800 mm (at least over 100mm from machine's center)
 - (2) When moving by forklifter, it has to move slowly and pay attention on balance.
 - (3) Please use suitable slings and steel frames to lift the machine.
 - (4) Please remove the machine from the pallet by crane or forklifter.
 - (5) The notices are same as Section 2-2.
5. Inspection:

Our machine passes the strict function test and quality test before shipping. The customer shall check the follows items after uncrating:

 - (1) Whether or not the model is correct (coincidence with order)?
 - (2) Whether or not the accessories or parts are complete?
 - (3) Whether or not the machine was damaged due to transportation?
 - (4) Whether or not the machine includes the inspection record?

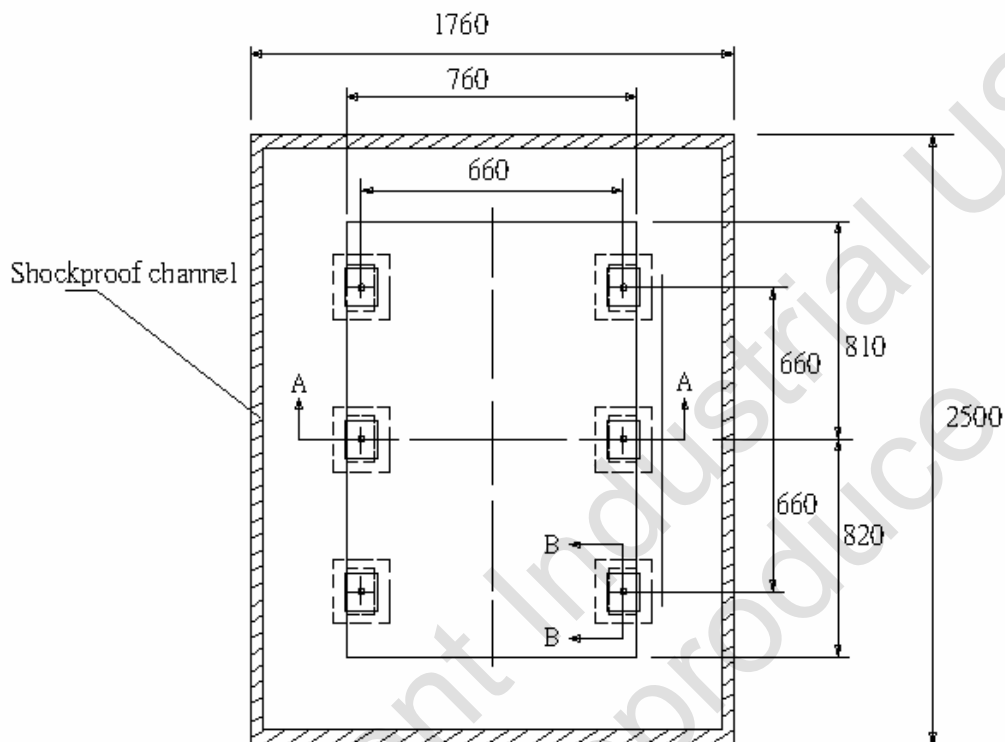
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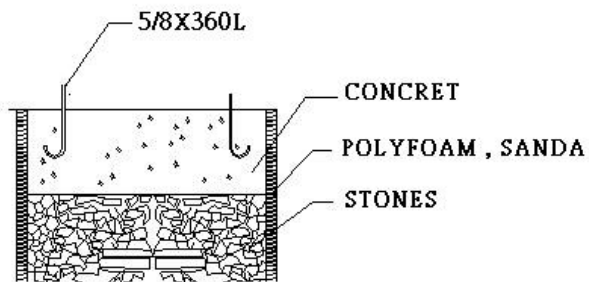
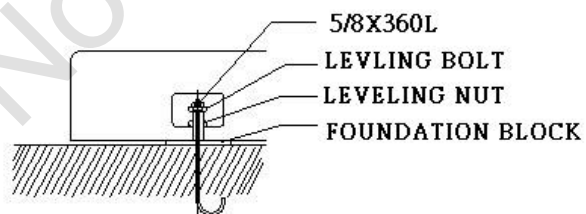
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3-2. Before installing:

1. The machine's foundation's work shown on the drawing below:



The foundation's drawing of machine

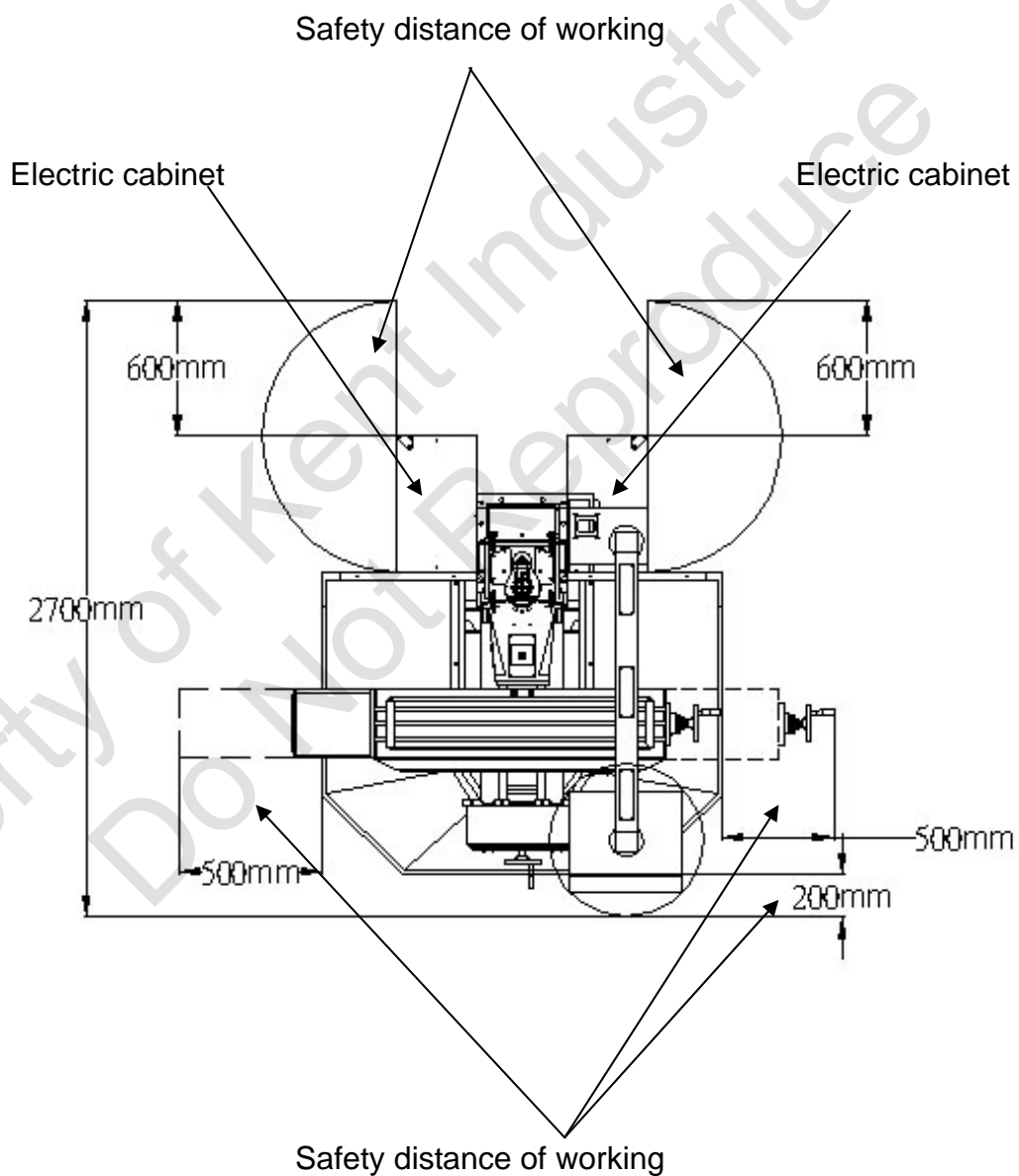


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2. Before the machine is arrived at the buyer's factory, the customer should contact with the riggers or the forklifters for moving the machine in accordance with Chapter 2.
3. Please move the machine in accordance with sections 2-2, 2-3.
4. Please uncrate the crate in terms of section 3-1.
5. In order to make convenience of repair, the machine's location must preserve sufficient space for opening fully of the electric-cabinet and the worker. (Shown on the drawing)



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6. Working environment requirement:
 - (1) Temperature : $0^{\circ}\text{C} \sim 45^{\circ}\text{C}$.
 - (2) Humidity : $40\% \sim 75\%$.
7. When positioning the machine, do not operate the machine under these environments:
 - (1) The location where oil 、 water 、 chip might splash.
 - (2) The location where there are strong electromagnetic devices or electro welding machines nearby.
 - (3) The location where there are vibrational sources, such as punching machine, press machine, shearing machine surrounded.
 - (4) The location where exposed under the sunlight.
 - (5) The location where the ground is inclining or slide.

3-3. Installation instruction:

1. Put the machine on the planned foundation firstly.
2. Put the foundation bolts and foundation brackets beside the foundation holes Temporarily.
3. Lift up the machine, and then put in the foundation bolts, and brackets to the holes of leveling screws, then tight up the nuts to prevent the falling.
4. Lift down the machine on the ground, and then insert the foundation bolts into the foundation holes.
5. Pour a little of the concrete into the foundation hole firstly, please notice that the concrete should use the suitable proportion, and expanding coefficient in order to prevent the shrink effect after adjusting.
6. After the foundation bolts are in the leveling screws, and then please pour the concrete into the foundation holes and fill it. After that please level the machine.
7. After leveling, please screw up the leveling nuts of the leveling screws, foundation bolts and hexogen nut.

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3-4. Electricity Requirement:

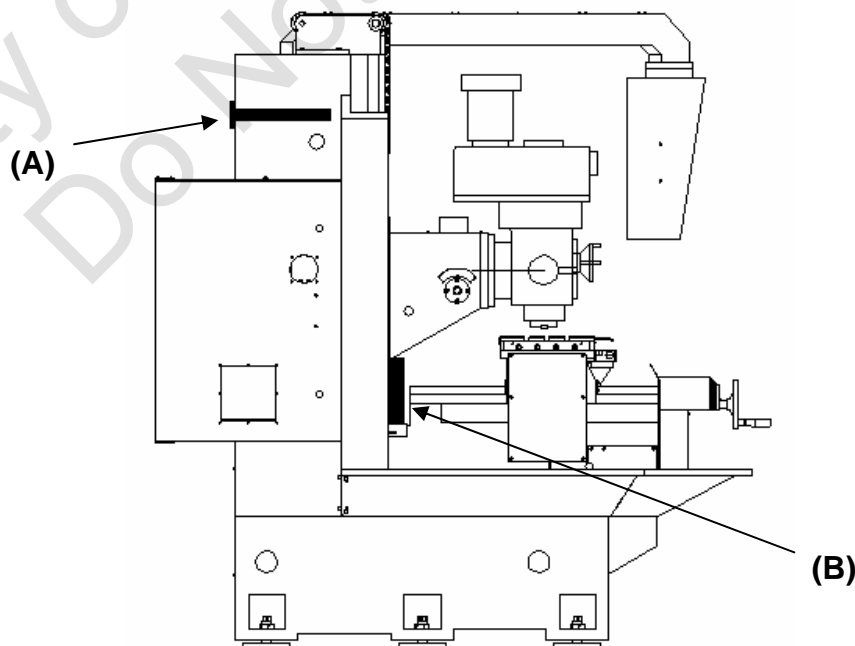
1. Power supply system:

- (1) Voltage: 220V.
- (2) 3 phase power supply: 60 Hz
- (3) Electricity currency: over 50 Amp.

- 2. The diameter of power supply's wire should be 16 to 25 mm, and mount with a 50A's breaker (NFB breaker).
- 3. After inspecting the wiring and connection, please check the voltage that is $220 V \pm 10\%$.
- 4. Confirm the orientation of the motor's phase when running.
- 5. Compressor's specification:
 - Pressure: 6 to 8 KgF / cm
 - Supply capacity: 200 L / min

3-5. Remove the shipping bracket:

- 1. Jog the Z-axis 3 mm toward to the +Z direction, and remove the wood block (A) between spindle and column.
- 2. Jog the Z-axis toward to the -Z direction in order to pull tight the chains where upon the counterweight (B), and take out the fixed rod of the counterweight.
- 3. When the machine is fixed on the ground, please store the shipping bracket well.
- 4. Remove all the driers hanging in the machine including electric cabinet.
- 5. Please DO NOT power on the machine before the shipping bracket is removed exactly.



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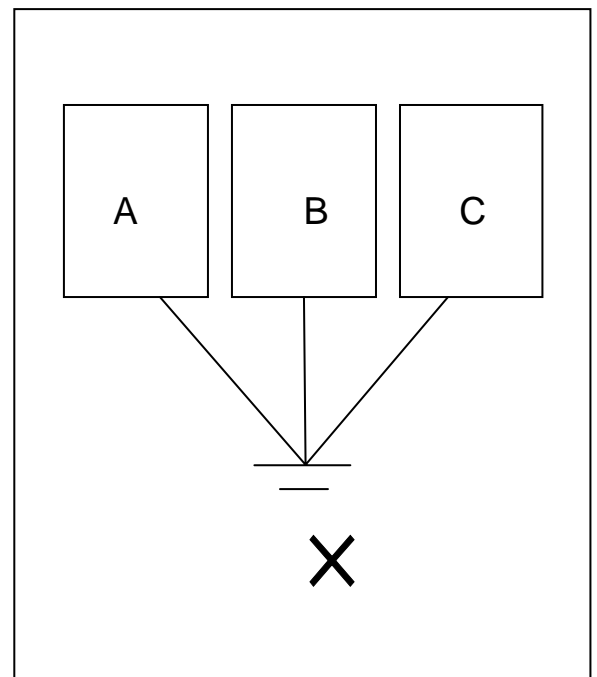
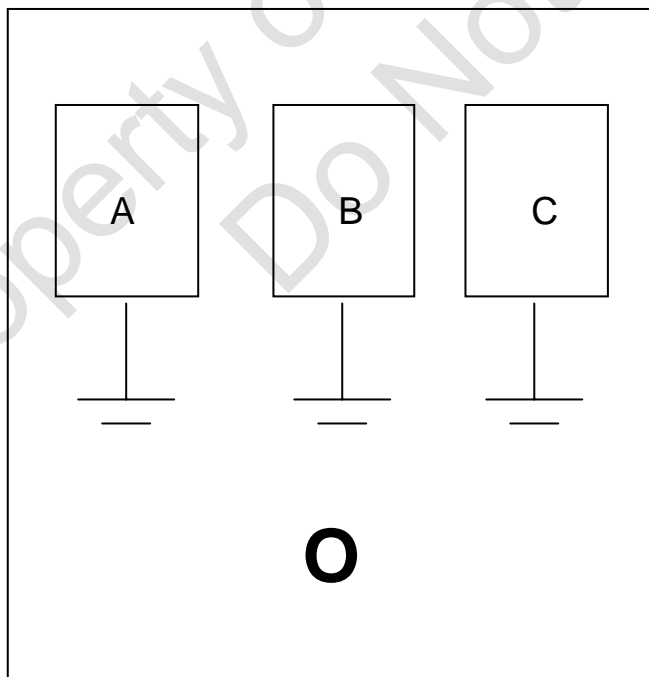
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3-6. Cleaning and lubricating:

1. In order to prevent rust and corrupt, we spray the anti-rust oil on the parts where is not painted. Therefore, after installing, please wipe off the anti-rust oil by soft rags, and kerosene.
2. DO NOT flow the kerosene or other clean agents into the spindle, and three axes. It may void the warranty.
3. After cleaning, the unpainted parts should be sprayed on the lube oil.

3-7. Machine's grounding:

1. It is better to ground the machine's electric elements and factory's power system together. In general, it is connected in series connection, but please notice that DOES NOT connect in parallel method.
2. The grounding wire should be selected with the diameter over 19 mm's insulation wire.
3. The Grounding resistant must be below 100Ω .
4. Use steel rods as grounding pole; the inner diameter should be over 19 mm, The copper rods is a better choice, and its length should over 1 meter.
5. The grounding pole should be buried in the ground over 1 M, if the rod is obstruct by the rock, it can be buried transversely in the ground over 1.5 M depth.

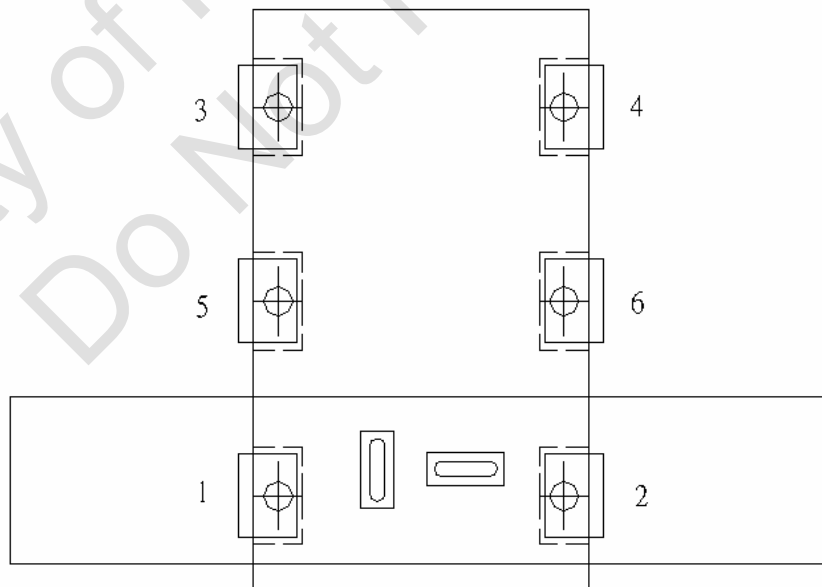


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3-8. Balance of the machine:

1. Prepare two of precision bubble levels (0.02mm per scale).
2. Before adjustment, please check firstly the accuracy of the precision bubble level, the method is as below:
 - (1) Put the level on a fixed position of the table.
 - (2) After the bubble is stable, please record the bubble position, and then rotate it to 180° . When the bubble is stable, please compare with 0's bubble position, the tolerance is allowed within 1/3 scale.
3. Jog the table and saddle to the central.
4. Put the precision bubble level on the center of the table; please adjust the machine's level in accordance with the position of the bubble by adjusting the foundation bolts as shown.
5. Please adjust bolts 1 to 4 firstly, and then adjust 5~ 6 in sequence.
6. The leveling accuracy is within 0.04 mm (about 2 scales). After leveling please tight up the foundation bolts.
7. Please notice that the foundation bolts should be put into the slots of the foundation brackets.
8. Calibrating and adjusting the perpendicular degree between the table and spindle center.
9. After 6 months of installation, please adjust again to make sure the foundation is stable.



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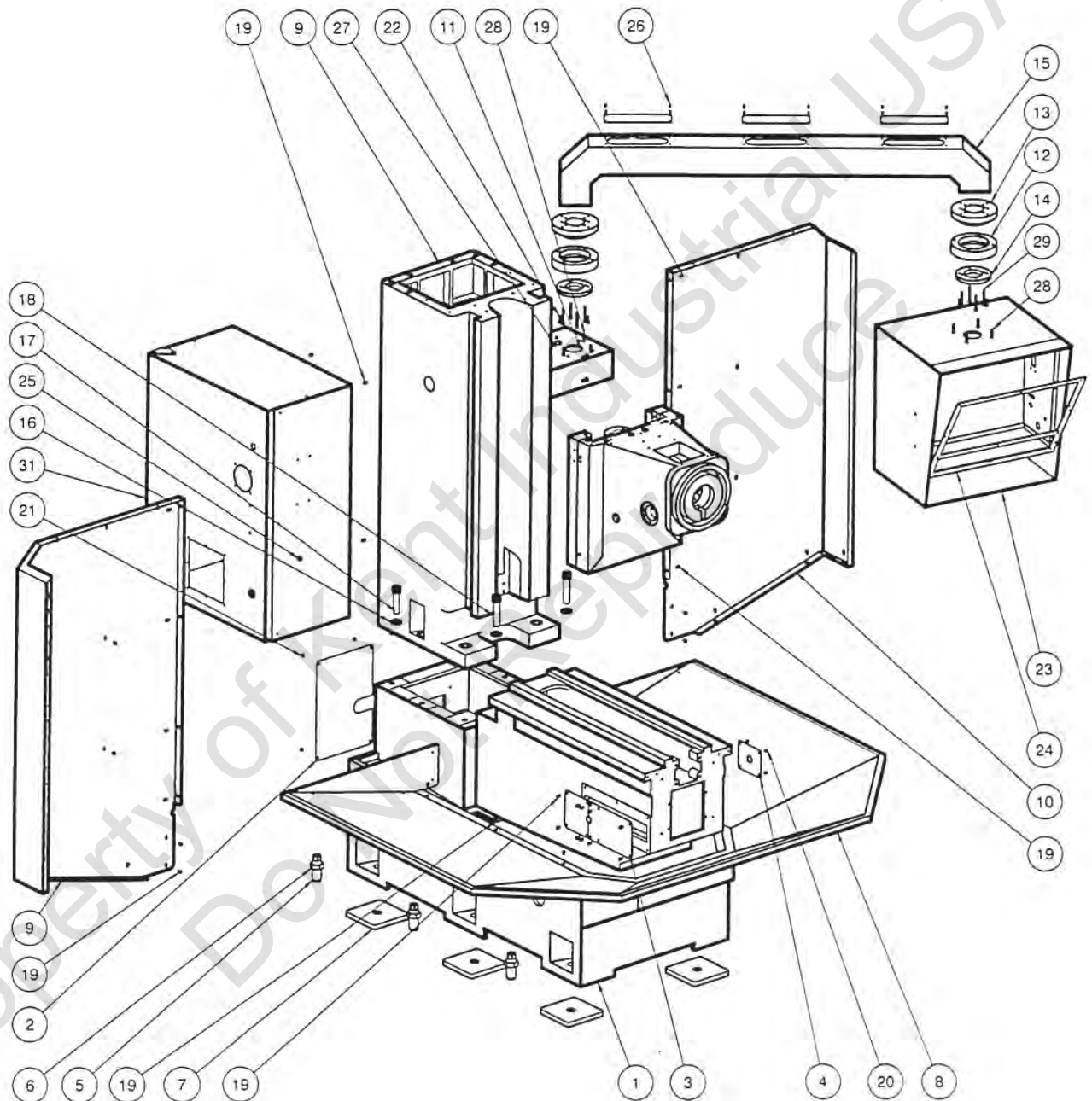
CH 4 Parts List

COLUMN & BASE	4-1
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TW-32QI COLUMN & BASE



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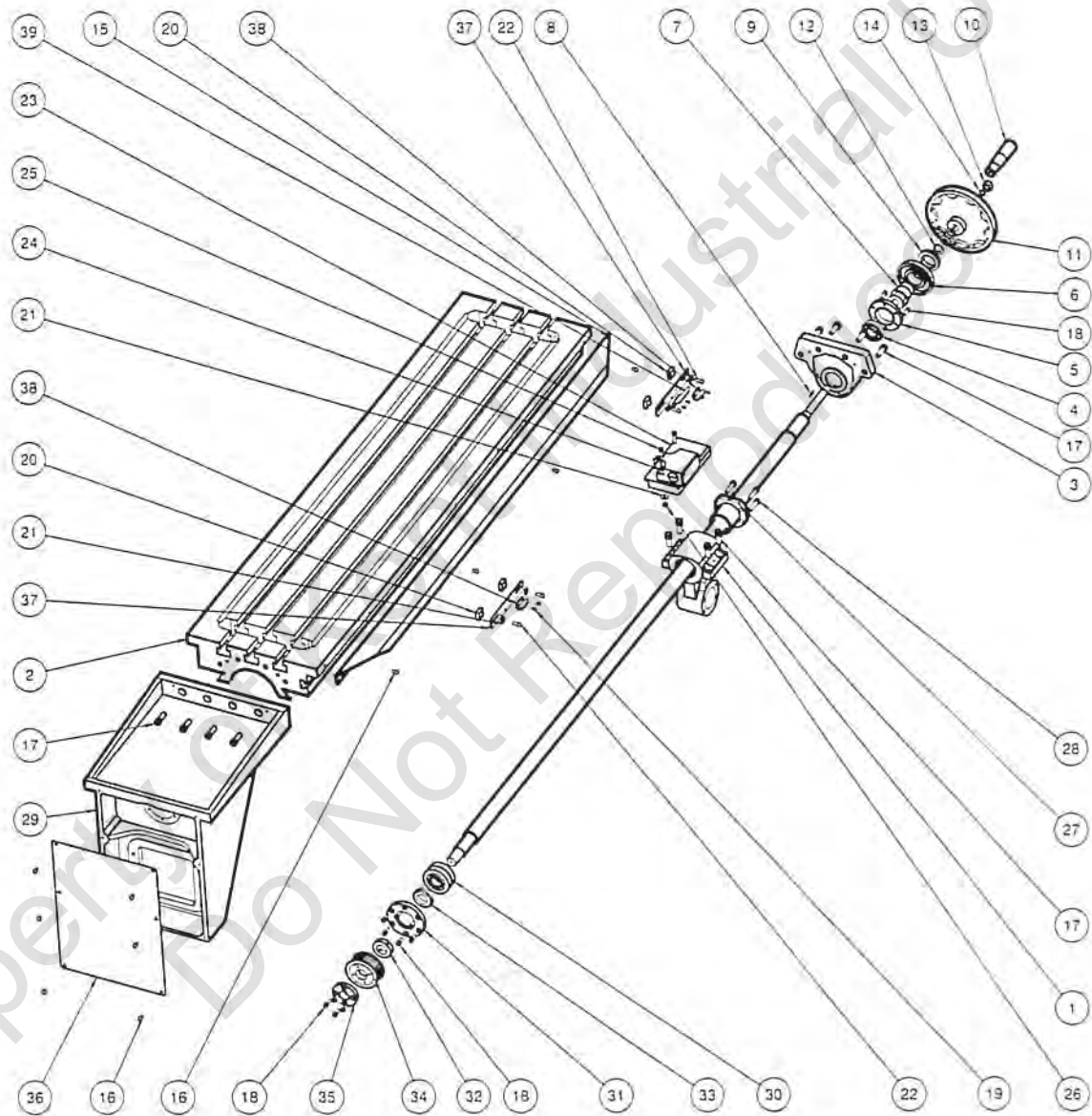
TW-32QI-COLUMN & BASE

ITEM NO	PARTS NO.	DESCRIPTION
1	TF1001	BASE
2	TB-1005	COVER
3	TF-4044A-KENT	COVER
4	5A-4001-1-23	COVER
5	TB-1001-1	ADJ. BALANCE BOLT (6Req)
6	009-M0000030	JAM NUT (6Req)
7	TB-1001-3	ADJ. BALANCE BOLT (6Req)
8	TF-1204	COOLANT TRAY
9	TF-1008	LEFT SPLASH GUARD
10	TF-1009	RIGHT SPLASH GUARD
11	TB-1108-1	HANG ARM
12	TA-1022A	ARM ADAPTER (2Req)
13	TA-1022B	ROTARY DISC (2Req)
14	TA-1022C	RETAINER RING (2 Rep)
15	TA-1020	ARM
16	TB-1012	WASHER (6 Rep)
17	001-M2000090	SOCKET HEAD CAP SCREW (4 Rep)
18	001-M2000120	SOCKET HEAD CAP SCREW (2 Rep)
19	002-M0600016	HEMISPHERE HEAD CAP SCREW (45 Rep)
20	002-M0500008	HEMISPHERE HEAD CAP SCREW (6 Rep)
21	002-M0600008	HEMISPHERE HEAD CAP SCREW (4 Rep)
22	001-M0600060	SOCKET HEAD CAP SCREW (4 Rep)
23	4G-1021	PENDANT BOX
24	4G-1021-1	PENDANT PLATE
25	002-M0400006	HEMISPHERE HEAD CAP SCREW
26	002-M0400008	HEMISPHERE HEAD CAP SCREW (18 Rep)
27	001-M0800025	SOCKET HEAD CAP SCREW (5 Rep)
28	001-M0800025	SOCKET HEAD CAP SCREW (8 Rep)
29	001-M0600035	SOCKET HEAD CAP SCREW (8 Rep)
30	TMV-1108-1	TOOL BOX

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TW-32QI X-AXIS ASSEMBLY



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TW-32QI X-AXIS ASSEMBLY

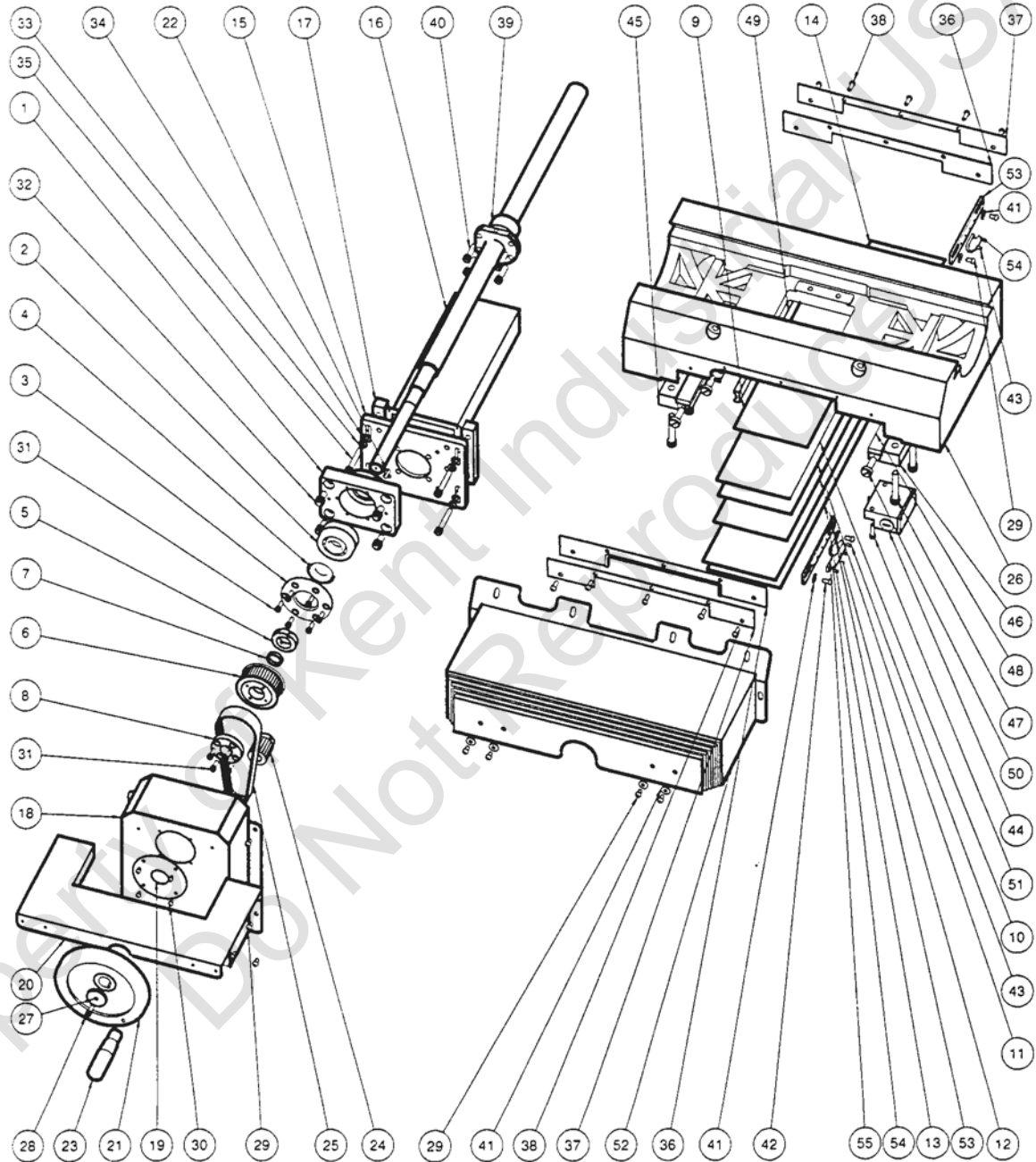
ITEM NO.	PARTS NO.	DESCRIPTION
1	TF-3025	LONGITUDINAL FEED BRACKET
2	5G-2001	TABLE (12"×50 ")
3	2006	BEARING BRACKET
4	020-006204ZZ	PRECISION BALL SCREW BEARING
5	3A-2011	BEARING RETAINER RING
6	2012	DIAL WITH 200 GRADUATIONS
7	2014	DIAL HOLDER
8	013-03030020	KEY
9	2016	DIAL LOCK NUT
10	4G-2018-1	HANDLE
11	4G-2018A	HAND WHEEL
12	034-AL500-011	WASHER (3 Req.)
13	009-10000006	JAM NUT
14	012-M0000008	SPRING WASHER
15	5A-2021-800	TABLE FRONT COVER
16	002-M0600010	HEMISPHERE HEAD CAP SCREW (10 Rep)
17	001-M1000025	SOCKET HEAD CAP SCREW (12 Rep)
18	001-M0600010	SOCKET HEAD CAP SCREW (16 Rep)
19	002-M0400008	HEMISPHERE HEAD CAP SCREW (6 Rep)
20	5A-2043	BLOCKING (4 Rep)
21	011-M0000006	WASHER (8 Rep)
22	002-M0600016	HEMISPHERE HEAD CAP SCREW (4 Rep)
23	4G-2036	LIMIT SWITCH BRACKET
24	3A-2034	LIMIT SWITCH
25	001-M0600025	SOCKET HEAD CAP SCREW (2 Rep)
26	009-M0000006	JAM NUT (2 Rep)
27	TF-2002A	X-AXIS BALL SCREW
28	001-M0800030	SOCKET HEAD CAP SCREW (4 Rep)
29	TF-2006A	X-AXIS MOTOR BRACKET
30	020-0BST2562	PRECISION BALL SCREW BEARING (2 Rep)
31	TA-2011	BEARING RETAINER RING
32	021-0000MR25	LOCK NUT
33	TA-2013	DUST PROOF WASHER
34	5B-2013A	TIMING BELT PULLEY
35	TA-2014A	FIXED BLOCK FOR COME RING KEY
36	TF-2007A	COVER
37	4B-2031	LIMIT SWITCH BRACKET (2 Rep)
38	4B-2029	LIMIT DOG (2 Rep)
39	4B2029H	LIMIT DOG

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TW-32QI Y-AXIS ASSEMBLY



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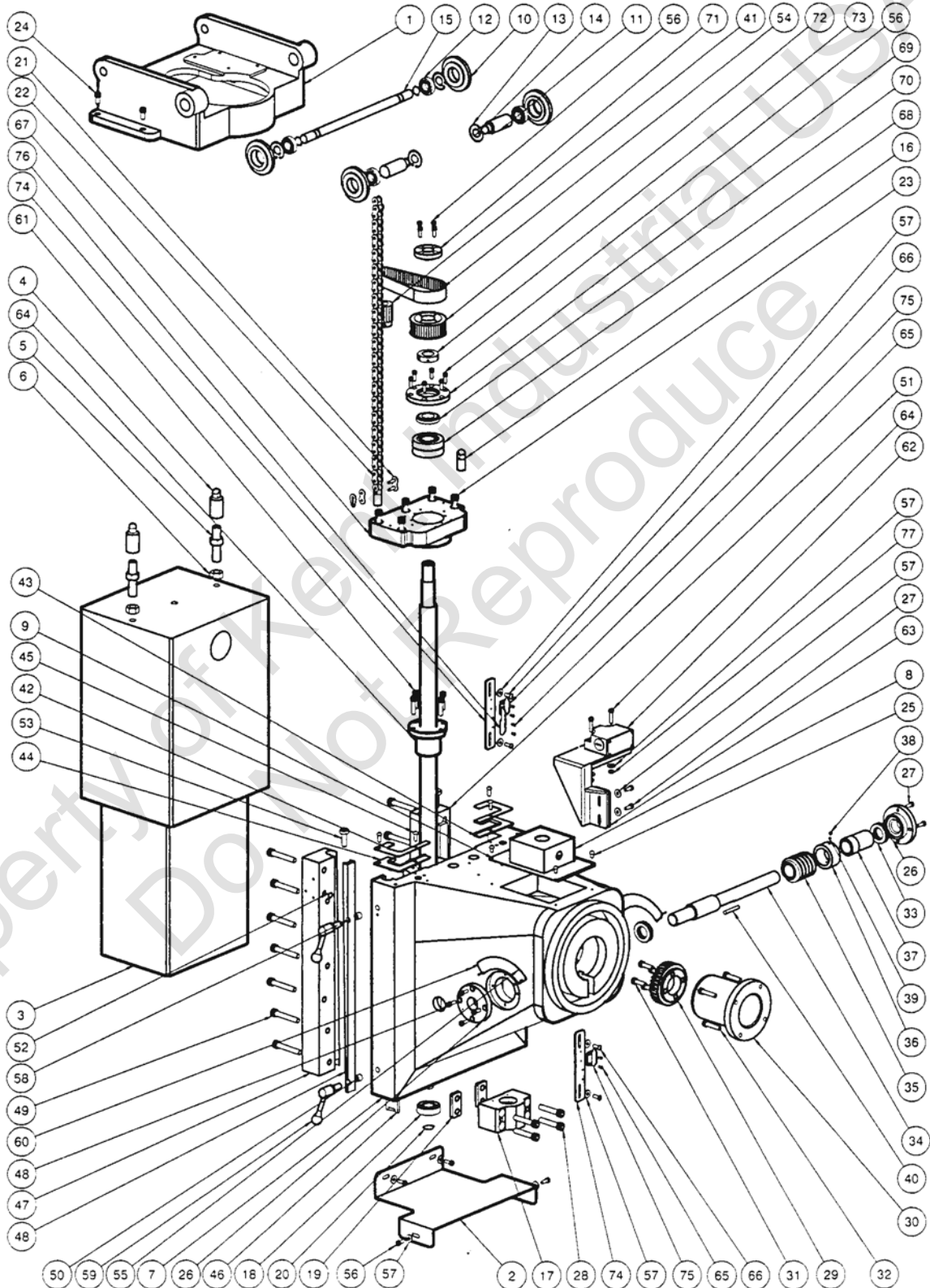
TW-32QI Y-AXIS ASSEMBLY

ITEM NO	PARTS NO.	DESCRIPTION
1	3B-3005	CROSS FEED BEARING BRACKET
2	020-0BST2562	PRECISION BALL SCREW BEARING (2Req)
3	TA-2011	BEARING RETAINER RING
4	TA-2013	DUST PROOF WASHER
5	021-0000MR25	LOCK NUT
6	5B-2013A	TIMING BELT PULLEY
7	032-00022X26	CONE RING KEY
8	TA-2014A	FLED BLOCK FOR CONE RING KEY
9	TF-3011	CHIP GUARDS
10	TF-3012	CHIP GUARDS
11	TF-3013	CHIP GUARDS
12	TF-3014	CHIP GUARDS
13	TF-3015	CHIP GUARDS
14	TF-3016	CHIP GUARDS
15	5B-3006E	MOTOR BRACKET
16	5B-3006E-1	MOTOR SHAFT
17	TB-3020-1	BLOCK (2Req)
18	3B-3004	CROSS FEED PULLEY COVER
19	3B-3004-1	Y-AXIS COVER
20	TF-3037A-1	TELESCOPIC GUARD SUPPORT
21	4G-2018	HAND WHEEL
22	013-05050020	KEY
23	4G-2018-1	HANDLE
24	5B-2018Z	TIMING BELT PULLEY
25	023-05M47525	TIMING BELT
26	5K-3001	SADDLE
27	011-M0000006	WASHER
28	002-M0600016	HEMISPHERE HEAD CAP SCREW
29	002-M0600010	HEMISPHERE HEAD CAP SCREW (14Req)
30	002-M0500008	HEMISPHERE HEAD CAP SCREW (4Req)
31	001-M0600010	SOCKET HEAD CAP SCREW (10Req)
32	001-M1000016	SOCKET HEAD CAP SCREW (4Req)
33	012-M0000008	SPRING WASHER (Req.)
34	011-M0000008	WASHER (4Req)
35	001-M08000050	SOCKET HEAD CAP SCREW (4Req)
36	4H-3037	FELT WIPERS (2Req)
37	4H-3037-1	WIPER HOLDER (2Req)
38	002-M0600016	HEMISPHERE HEAD CAP SCREW (10Req)
39	TF-3002A	Y-AXIS BALL SCREW
40	001-M0800030	SOCKET HEAD CAP SCREW (4Req)
41	011-M0000006	WASHER (8Req)
42	002-M0600012	HEMISPHERE HEAD CAP SCREW (2Req)
43	002-M0400008	HEMISPHERE HEAD CAP SCREW (6Req)
44	3A-2034	LIMIT SWITCH
45	5K-3050	SADDLE/BASE GIB SUPPORT
46	5K-3051	SADDLE/BASE GIB SUPPORT
47	001-M1000060	SOCKET HEAD CAP SCREW (4Req)
48	4H-3027-1	SADDLE/BASE GIB (2Req)
49	4H-3027	SADDLE/BASE GIB
50	3028	GIB ADJ. SCREW (6Req)
51	001-M0600025	SOCKET HEAD CAP SCREW (2Req)
52	TF-3037	TELESCOPIC COVER
53	4B-2031	LIMIT SWITCH BRACKET (2Req)
54	4B-2029	LIMIT DOG (2Req)
55	4B-2029H	LIMIT DOG

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TW-32QI Z-AXIS ASSEMBLY



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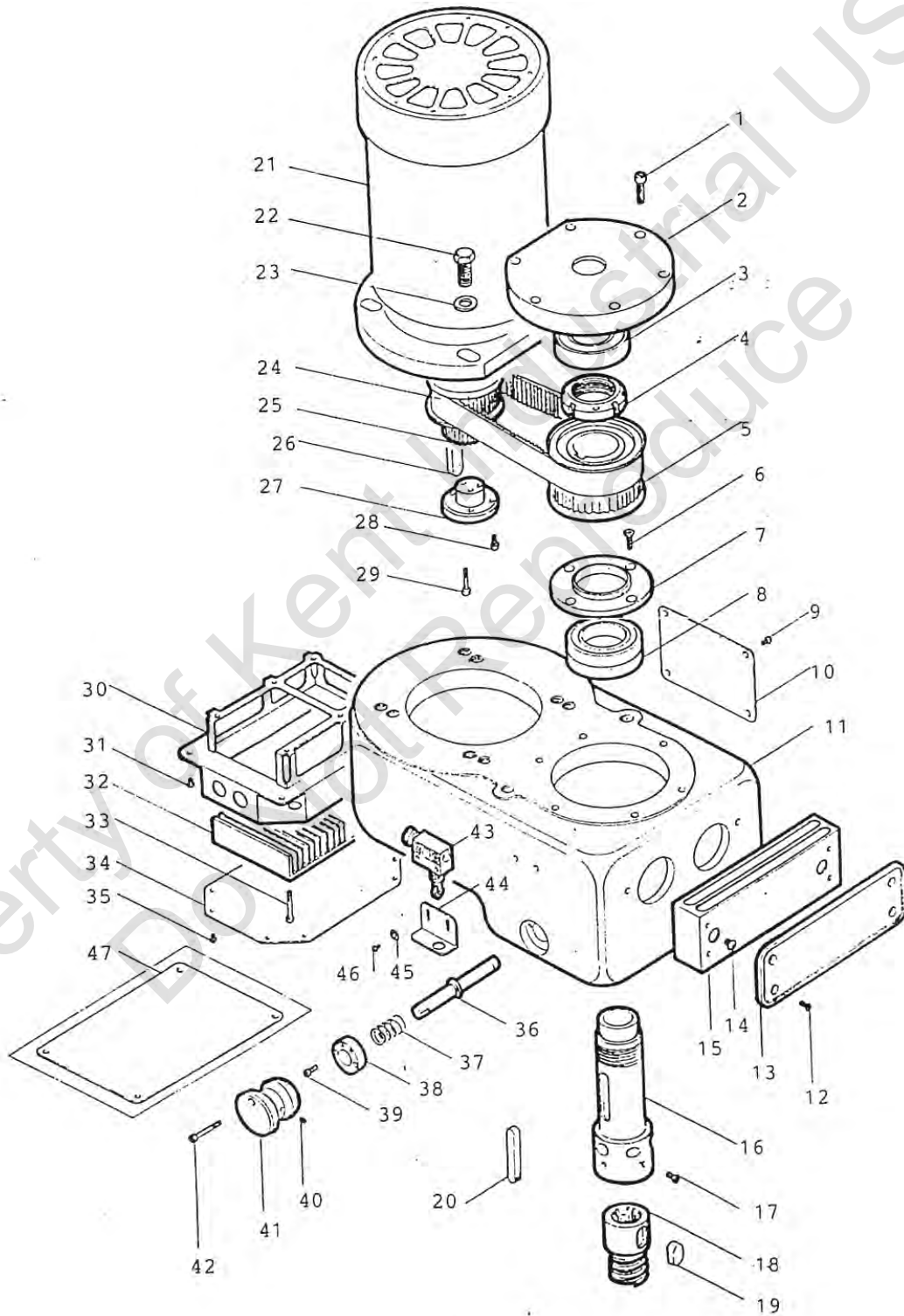
TW-32QI Z-AXIS ASSEMBLY

ITEM NO.	PARTS NO.	DESCRIPTION	ITEM NO.	PARTS NO.	DESCRIPTION
1	TF-5002	CHAIN BRACKET	40	013-060600454	KEY
2	TF-4003	COVER	41	5B-2018Z	MOTOR TIMING BELT PULLEY
3	TF-5026	COUNTER-WEIGHT	42	TB-4011-2	WIPER HOLDER (2 Req.)
4	TP-5010	COUNTERWEIGHT CHAIN JOINT (2 Req.)	43	TB-4011	FELT WIPERS
5	TP-5011	COUNTER-WEIGHT ADJ. SCREW (2 Req.)	44	TB-4011-1	FIGHT WIPERS
6	009-10000009	JAM NUT (2 Req.)	45	002-M0600016	HEMISPHERE HEAD CAP SCREW (4 Req.)
7	TB-4001	HEAD SLED-BLOCK	46	4H-4038	COLUMN/HEAD SLIDE BLOCK GIB
8	TF-4001-1	WIRING BOX	47	TB-4005	GIB SUPPORT
9	TF-4001-2	COVER	48	4H-4053	COLUMN/HEAD SLIDE BLOCK GIB (2 Req.)
10	TP-5018	CHAIN WHEEL (4 Req.)	49	001-M1000060	SOCKET HEAD CAP SCREW (14 Req.)
11	TB-5007	CHAIN WHEEL SHAFT (2 Req.)	50	008-10000004	SET SCREW (2 Req.)
12	020-006003ZZ	PRECISION BALL SCREW BEARING (4 Req.)	51	TB-4006	GIB SUPPORT
13	015-R0000035	SNAP RING (4 Req.)	52	024-0000P009	O RING (2 Req.)
14	015-S0000017	SNAP RING (6 Req.)	53	3028	GIB ADJ. SCREW (2 Req.)
15	TF-5007	CHAIN WHEEL SHAFT	54	023-5M040025	TIMING BELT
16	TP-5016	CHAIN JOINT (2 Rep)	55	5A-5043-1	HEAD SWIVEL PLATE (2 Req.)
17	TP-3035	BALL BEARING HOUSING	56	001-M0600010	SOCKET HEAD CAP SCREW (14 Req.)
18	020-006204ZZ	PRECISION BALL SCREW BEARING	57	011-M0000006	WASHER (12 Req.)
19	TP-3035-1	SPACER (2 Req.)	58	TB-4010	BRASS PLUG (2 Req.)
20	015-S00000020	SNAP RING	59	3030.31	LOCK BOLT HANDLE (2 Req.)
21	018-000000050	CHAIN JOINT	60	033-00000001	DRIVE SCREW (8 Req.)
22	018-0500P0069	CHAIN	61	001-M0800030	SOCKET HEAD CAP SCREW (4 Req.)
23	001-M1000035	SOCKET HEAD CAP SCREW (5 Req.)	62	3A-2034	LIMIT SWITCH
24	001-M0800016	SOCKET HEAD CAP SCREW(4 Req.)	63	4G-2036	LIMIT SWITCH BRACKET
25	002-M0600010	HEMISPHERE HEAD CAP SCREW (4 Req.)	64	001-M0600025	SOCKET HEAD CAP SCREW (6 Req.)
26	5K-5040-2	WORM FIXED COVER (2 Req.)	65	002M-0400008	HEMISPHERE HEAD CAP SCREW (6 Req.)
27	001-M0600016	SOCKET HEAD CAP SCREW (10 Req.)	66	002-M0600016	HEMISPHERE HEAD CAP SCREW (4 Req.)
28	001-M1000050	SOCKET HEAD CAP SCREW (4 Req.)	67	5A-3005A	BEARING BRACKET
29	5K-5033	WORM GEAR	68	020-0BST2562	PRECISION BALL SCREW BEARING (2 Req.)
30	5K-5033-1	WORM SHAFT	69	TA-2011	BEARING RETAINER RING
31	001-M0800025	SOCKET HEAD CAP SCREW (4 Req.)	70	TA-2013	DUST PROOF WASHER
32	001-M0800035	SOCKET HEAD CAP SCREW (4 Req.)	71	TA-2014A	FIXED BLOCK FOR COME RING
33	020-00051105	SINGLE DIRECTION THRUST BALL BEARING (2 Req.)	72	5B-2013A	TIMING BELT PULLEY FLANGE
34	5K-5040	WORM SHAFT	73	021-0000MR25	LOCK NUT
35	5K-5039	WORM	74	4B-2031	LIMIT SWITCH BRACKET (2 Req.)
36	5K-5040-1	ADJ. BUSHING	75	4B-2029	LIMIT DOG (2 Req.)
37	5A-5040-1-1	ADJ. BUSHING	76	4B-2029H	LIMIT DOG
38	008-M0600006	SET SCREW	77	009-M0000006	JAM NUT (2 Req.)
39	TW-6199-1	BRASS PLUG			

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HEAD TOP HOUSING



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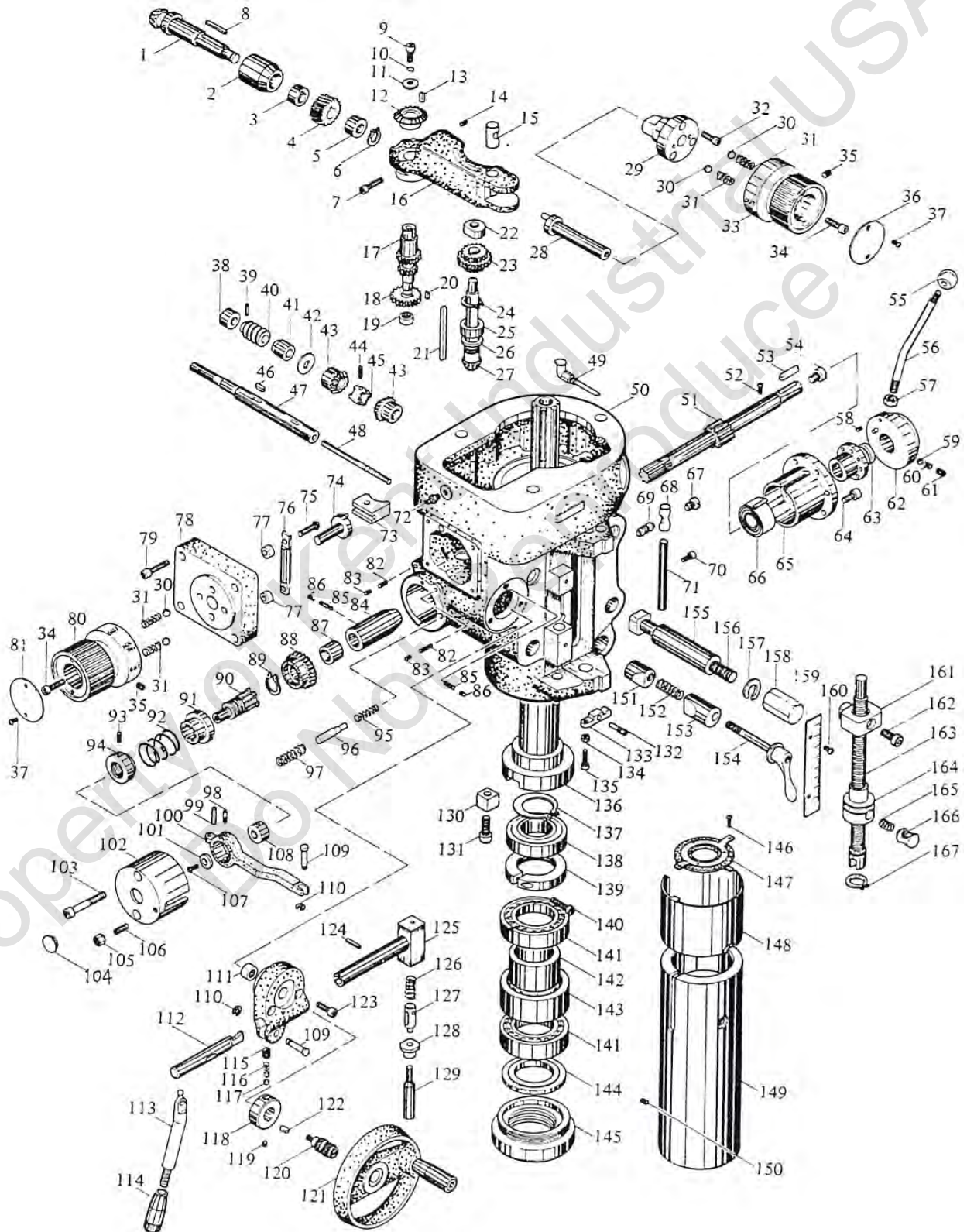
HEAD TOP HOUSING

ITEM NO	PARTS NO.	DESCRIPTION
1	5K-8001	SOCKET HEAD CAP SCREW (M8X40)(6REQ)
2	5K-7013F	TOP BEARING CAP
3	5K-8004	BEARING
4	TRH-8043-2	PRECISION LOCKNUT
5	TRH-6048H	SPINDLE TIMING PULLEY
6	TRH-8053-2	SOCKET HEAD CAP SCREW (M6X20)(4REQ)
7	TRH-8053-1	BEARING RETAINER RING
8	TRH-8054	BEARING (6010 LB) (2REQ)
9	TRH-7015	SOCKET HEAD CAP SCREW (M6X10)(4REQ)
10	60131-1	COVER
11	5K-6013F	BELT HOUSING
12	TL-4068	SOCKET HEAD CAP SCREW (M4X12)(4REQ)
13	TL-4067A	NAME PLATE
14	TRH-6013-3	SOCKET HEAD CAP SCREW (M6X10)(2REQ)
15	TRH-6013-2	VENTILATION HOUSING
16	TRH-8034-	SPINDLE PULLEY HUB
17	TRH-8034-3	SOCKET HEAD CAP SCREW (M6X10)(3REQ)
18	7039Q	SPINDLE-WORM HUB
19	TRH-8034-2	KEY (10X8X35)
20	TRH-8035	KEY (8X7X60)
21	5BI-6001	5HP INVER MOTOR
22	TRH-4044	HEX.HD . SCREW (M12X30)(4REQ)
23	TRH-4044-1	WASHER (M12)(4REQ)
24	TRH-4038	TIMING BELT (5GT-720-30)
25	TRH-6009	MOTOR TIMING PULLEY (5GT-55T/5GT-37T)
26	TRH-4056	KEY (10X8X60)
27	TRH-6009E	PULLEY WASHER
28	TRH-6009E-2	SOCKET HEAD CAP SCREW (M5X12)(3REQ)
29	TRH-6009E-1	SOCKET HEAD CAP SCREW (M5X35)(3REQ)
30	5K-6013F-1A	INVERTER FRAMEWORK
31	5K-6013-F-5	SOCKET HEAD CAP SCREW (M5X10)(4REQ)
32	5K-6013F-4	ALUMINUM RADIATION
33	5K-6013F-2	SOCKET HEAD CAP SCREW (M5X55)(6REQ)
34	5K-6013F-1B	COVER
35	5K-6013F-6	SOCKET HEAD CAP SCREW (M5X10)(8REQ)
36	TR-8074	LOCKING PIN
37	5A-2029	SPRING
38	TR-8074-2	FIXED POSITION HANDLE
39	TR-8074-3	SOCKET HEAD CAP SCREW (M5X16)(2REQ)
40	TR-8074-4	SET SCREW (M6X10)
41	TR-8074-1	FIXD POSITION HANDLE
42	TR-8074-5	SOCKET HEAD CAP SCREW (M5X50)
43	5K-6013F-7	LIMIT SWITCH (D4E-1B20N)
44	3B-7071-1	LIMIT SWITCH RACKET
45	5K-6013F-9	WASHER (M6)
46	5K-6013F-8	SOCKET HEAD CAP SCREW (M6X10)(2REQ)
47	5K-6013F-3	COVER (FOR CNC MODEL)

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TW-32QI HEAD



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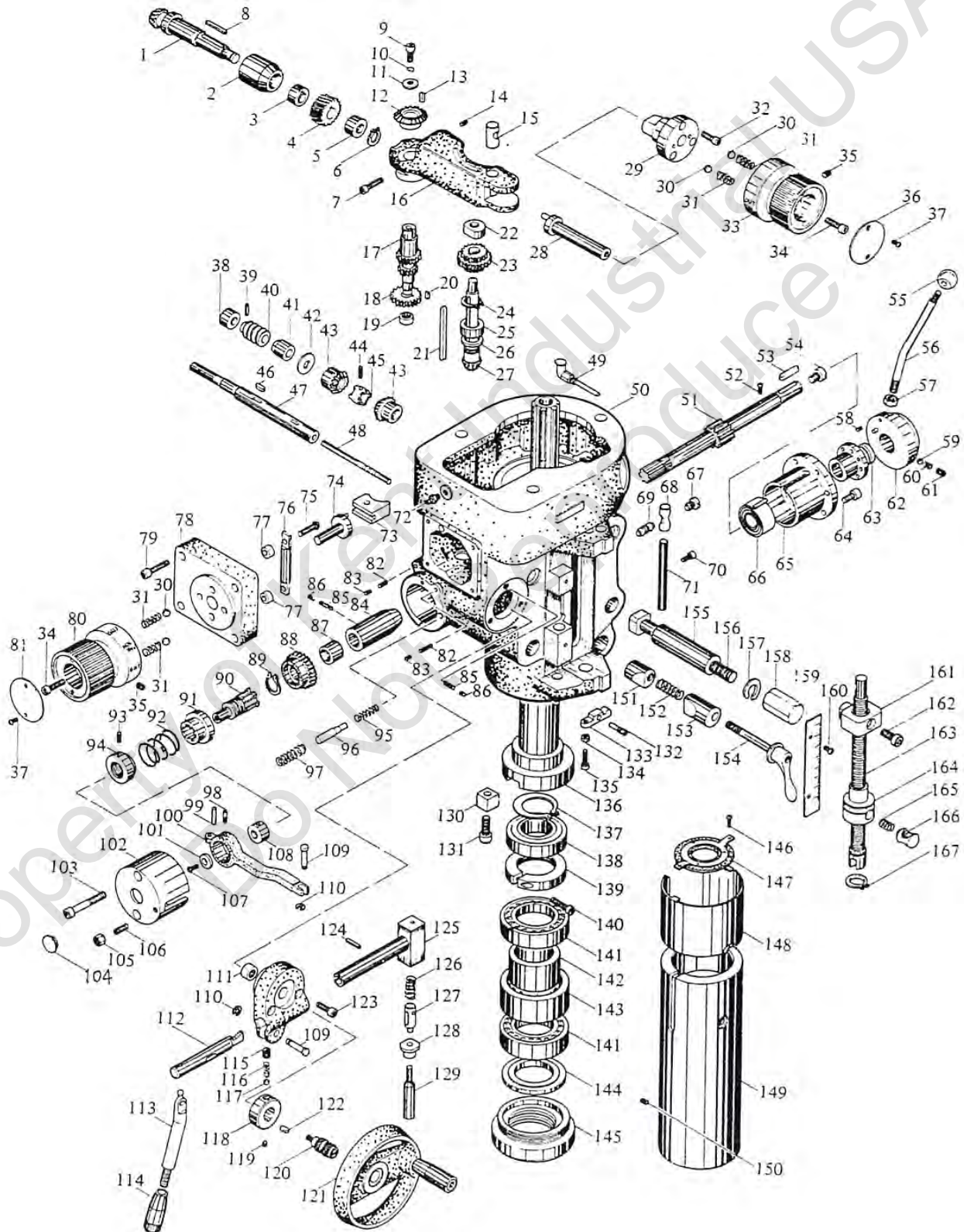
TW-32QI HEAD

ITEM NO	PARTS NO.	DESCRIPTION	ITEM NO	PARTS NO.	DESCRIPTION
1	5K6139	FEED BEVEL PINION	51	5K6172	QUILL PINION SHAFT
2	5K6137	WORM GEAR BUSHING	52	5K6172-1	CAP SCREW (M4X8)
3	5K6136	WORM GEAR SPACER	53	5K6184	KEY (5X5X20)
4	5K6134	FEED DRIVE WORM GEAR	54	5K6183	PINION SHAFT HUB SCREW
5	5K6136-1	WORM GEAR BUSHING	55	5K6173	BLACK PLASTIC BALL HANDLE (3/8)
6	5K6140	SNAP RING (S12)	56	5K6174	PINION SHAFT HUB HANDLE
7	5K6124	CAP SCREW (M6X16)	57	5K6174-1	HEX .NUT (1/2")
8	5K6135	KEY (5X5X25)	58	5K6178-1	SET SCREW (M5X5)
9	5K6150	CAP SCREW	59	5K6176	STEEL BALL(ϕ 1/4")
10	6149-1	SPRING WASHER	60	6175	COMPRESSION SPRING
11	5K6149	WASHER	61	5K6177	SET SCREW (M8X8)
12	5K6148	FEED REVERSE BEVEL GEAR	62	5K6178	RACK FEED HANDLE HUB
13	5K6147	KEY (4X4X10)	63	5K6182	PINION SHAFT HUB SLEEVE
14	5K6123	SET SCREW (M6X6)	64	5K6180-1	CAP SCREW (M6X16)(2REQ)
15	5K6122	FEED ENGAGE PIN	65	5K6180	SPRING COVER
16	5K6121	WORM GEAR CRADLE	66	5K6181	CLOCK SPRING
17	5K6143	FEED DRIVING GEAR	67	5K6114	REVERSE TRIP BALL LEVER SCREW
18	5K6144	FEED DRIVE GEAR	68	5K6109	FEED REVERSE TRIP PLUNGER
19	5K6252	NEEDLE BEARING (#TLA1210)	69	5K6110	REVERSE TRIP BALL LEVER
20	5K6145	KEY (4X4X10)	70	5K6253	CAP SCREW (M6X16)
21	5K6160	CLUSTER GEAR KEY (4X4X45)	71	6251	SET BAR
22	5K6157	CLUSTER GEAR SHIFT UPPER BEARING	72	5K6131	GREASE NIPPLE (PT1/8")
23	5K6153	CLUSTER GEAR ASSEMBLY	73	5K6162	FEED GEAR SHIFT CRANK
24	5K6158	SNAP RING (S18)	74	5K6166	CLUSTER GEAR SHIFT CRANK
25	5K6156	BEVEL GEAR BEARING	75	5K6161-2	CAP SUREW (M5X20)(2REQ)
26	5K6159	BEVEL GEAR THRUST SPACER	76	5K6163	FEED SHIFT ROD
27	5K6151	CLUSTER GEAR SHAFT	77	5K6161-1	WASHER (2REQ)
28	5K6126	WORM GEAR CRADLE THROW-OUT	78	5K6161	CLUSTER GEAR COVER
29	5K6125	SHAFT SLEEVE	79	5K6165	CAP SCREW (M5X25)(4REQ)
30	5K6130	STEEL BALL(ϕ 1/4)(4REQ)	80	5K6168	HANDLE
31	5K7067	SPRING	81	5K8061	COVER
32	5K6132	CAP SCREW (M6X20)(3REQ)	82	5K6228	SET SCREW (M6X12)(2REQ)
33	5K6168A	CLUTCH HANDLE	83	5K6228-1	SET SCREW (M6X6)(2REQ)
34	5K6128	CAP SCREW (M6X16)(2REQ)	84	5K6186	QUILL PINION SHAFT BUSHING
35	5K6169	SET SCREW (M6X8)(2REQ)	85	5K6246	SET SCREW (M6X16)(2REQ)
36	5K8061A	QUILL FEED NAME PLATE	86	5K-6246-1	SET SCREW (M6X6)(2REQ)
37	5K6129	CAP SCREW	87	5K6190	PINION SHAFT WORM GEAR SPACER
38	5K6227	BUSHING	88	5K6187	OVERLOAD CLUTCH WORM GEAR & CLUTCH RING
39	5K6226	ROLL PIN	89	5K6188-1	SNAP RING (S20)
40	5K6225	WORM	90	5K6195	OVERLOAD CLUTCH SLEEVE
41	5K6224	FEED WORM SHAFT BUSHING	91	5K6194	OVERLOAD CLUTCH
42	5K6223	FEED WORM SHAFT THRUST WASHER	92	5K6197	SAFETY CLUTCH SPRING
43	5K6220	FEED REVERSE BEVEL GEAR (2REQ)	93	5K6199	SET SCREW (M6X8)
44	5K6217	ROLL PIN(ϕ 4X22)	94	5K6198	OVERLOAD CLUTCH LOCKNUT
45	5K6222	FEED REVERSE CLUTCH	95	5K6191	COMPRESSION SPRING
46	5K6230	KEY (4X4X15)	96	5K6193	OVERLOAD CLUTCH LEVER SPRING PLUNGER
47	5K6209	FEED WORM SHAFT	97	5K6192	COMPRESSION SPRING
48	5K6216	REVERSE CLUTCH ROD	98	6202	CLUTCH RING PIN (2REQ)
49	5K6133	OIL CAP (PT1/8")	99	5K6204	PIN (ϕ 6X20)
50	5K6101	QUILL HOUSING	100	5K6203	OVERLOAD CLUTCH TRIP LEVER

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TW-32QI HEAD



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ITEM NO.	PARTS NO.	DESCRIPTION	ITEM NO.	PARTS NO.	DESCRIPTION
101	5K6200-1	WASHER	136	5K6084	SPINDLE NT#40
102	5K6205	CLUTCH ARM COVER	137	5K6090	SNAP RING (S40)
103	5K6206	CAP SCREW (M6X50)(2REQ)	138	5K6092	BALL BEARING (#6208)
104	5K6205-1	COVER	139	5K6294	LOCK NUT
105	5K6208	HEX. NUT (M6)	140	5K6094-1	CAP SCREW (M6X25)
106	5K6207	SET SCREW (M6X16)	141	5K6093	SUPER PRECISION SPINDLE BEARINGS (#7210-P4)
107	5K6200-2	CAP SCREW (M5X12)	142	5K6096	BEARING SPACER-SMALL
108	5K6200	CLUTCH RING	143	5K6095	BEARING SPACER-LARGE
109	5K6231-1	DOWEL PIN (2REQ)	144	5K6097	SPINDLE DIRT SHIELD
110	5K6231-2	SNAP RING (E5)(2REQ)	145	5K608	NOSE-PIECE
113	5K6234	TRIP HANDLE	146	6088-1	FELT WASHER SCREW (3/16X3/8)(2REQ)
114	3H7069	PLASTIC HANDLE	147	5K6088	FELT WASHER
115	6219-1	HANDWHEEL CLUTCH SPRING SCREW	148	5K6086	QUILL SKIRT
116	6219-2	COMPRESSION SPRING	149	5K6085	QUILL
117	6255	STEEL BALL(ϕ 3/16)	150	6085-1	SET SCREW (M5X5X0.9)
118	5K6218	HAND WHEEL CLUTCH	151	5K6116B	QUILL LOCK SLEEVE
119	5K6219	SET SCREW (M6X6)	152	5K6116-1	COMPRESSION SPRING
120	5K6213.14	FEED REVERSE KNOB STUD	153	5K6118A	QUILL LOCK SLEEVE TAPPED
121	5K6210	HAND WHEEL	154	5K6117.19	QUILL LOCK BOLT SPACER (2REQ)
122	5K6229	KEY (4X4X10)	155	5K6120	LOWER CLAMPING BOLT SPACER (2REQ)
123	5K6232	CAP SCREW (M8X25)(2REQ)	156	5K5036	T-BOLT ASSY. (4REQ)
124	5K6237	ROLL PIN(ϕ 4X18)	157	5K5037	SPRING WASHER (5/8)(4REQ)
125	5K6236	CAM ROD SLEEVE ASSY.	158	5K5038	LOCKNUT(4REQ)
126	5K6242	COMPRESSION SPRING	159	5K6243	MICROMETER SCALE
127	5K6240	TRIP PLUNGER	160	5K6244	CHEM. BLACKED RD. HD. SCREW (M4X5)(2REQ)
128	5K6118-1	TRIP PLUNGER BUSHING	161	5K6105	QUILL STOP KNOB
129	5K6118	FEED TRIP PLUNGER	162	5K6106	CAP SCREW (M10X20)
130	5K6099	KEEPER KEY (2REQ)	163	5K6104	QUILL STOP MICRO-SCREW
131	5K6100	CAP SCREW (M8X20)(2REQ)	164	5K6107	MICROMETER
132	5K6112	TRIP LEVER PIN	165	5K6108-1	COMPRESSION SPRING
133	5K6111	FEED TRIP LEVER	166	5K6108	QUILL MICRO-SCREW STOP NUT
134	5K6113-1	HEX. NUT (M4)	167	5K6115	SNAP RING(S18)
135	5K6113	CAP SCREW (M4X20)			