

# Operation Manual

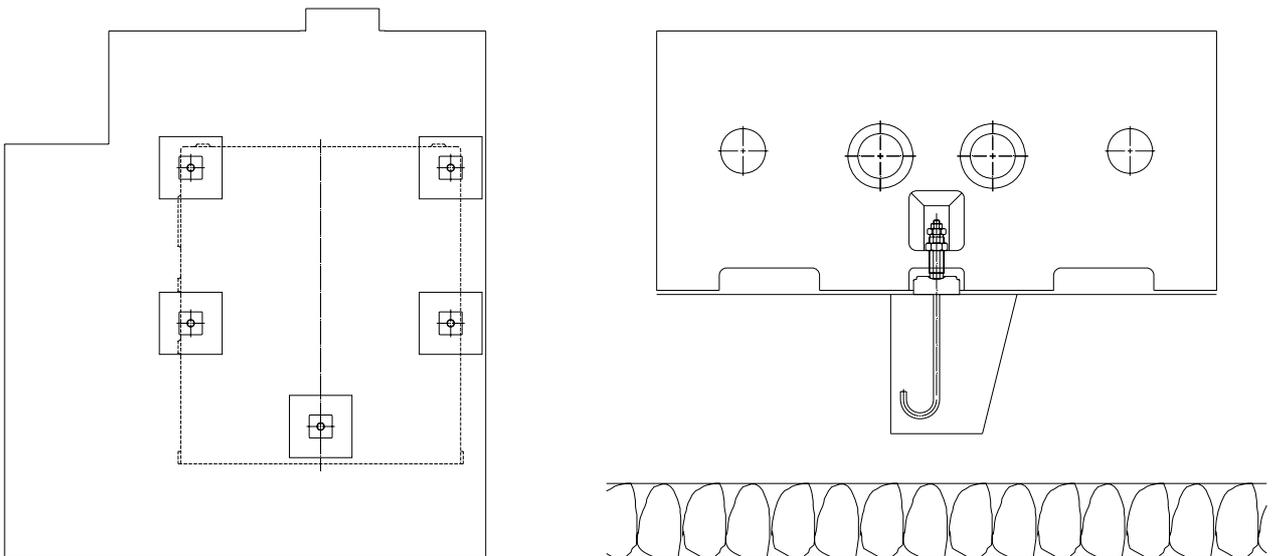
# 1. Moving and Installation

## 1.1 Requirements for Installation Environment

- 1) To maintain the precision and lifespan of the machine, the installation location has to be away from source of vibration, heat and sunlight.
- 2) This machine has to be installed on a solid ground to ensure the precision of the machine and workpiece. Please follow the **ground plot** provided by HELIOSTEC for installation.
- 3) Proper space has to be reserved for future maintenance, repair and inspection.

## 1.2 Ground Requirement

- 1) Ground plot:



- 2) Please note that the deeper the concrete of the ground, the better the stability of the machine. So there should be no cracks on the concrete.
- 3) Reinforcing steel bars of 19mm diameter should be laid down at the bottom of the concrete foundation with a grid interval of 150mm.
- 4) The position of the bolt and adjustment apertures on the ground should be measured and reserved beforehand. Wedge-shaped apertures with rough surface are recommended for best intensity of the ground floor when pouring the concrete foundation later on.
- 5) Grounding apertures should be reserved before the concrete is poured, copper bars of 15mm in diameter and at least 2m in length should be buried for grounding.

- 6) Machine can only be installed 7-10 days after the concrete foundation construction work (depends on actual situation).
- 7) After performing the preliminary leveling adjustment of the machine, bury the foundation bolts and adjustment bolts in the apertures reserved beforehand and pour in fast-drying non-shrink concrete.
- 8) Grounding completes.

### 1.3 Power Requirement

- 1) Power control equipment includes electromagnetic connectors, relays, transformers, loop breakers, dust-proof device, etc. following the guidelines of international electrical safety directives.
- 2) Machinery power supply is 220VAC, 3Phase, 60Hz. External transformer is needed for areas outside of Taiwan.
- 3) Power supply has to be maintained within +10 ~ -15%, with frequency within  $\pm 1$ Hz.
- 4) Power supply requirement for motor:

Spindle motor (30min)	8.5Kw
Three axial motor (X, Y, Z)	1.5,1.5,2.0Kw
Deburring spiral motor	Optional
Water tank pump	0.96Kw
Cam tool changer motor	0.18Kw
Deburring motor	Optional
Main Power	15Kw

Note: The spindle motor listed in the above table is a standard accessory, the optional one has different specifications according to individual orders.

### 1.4 Packing and Unpacking

#### **Packing:**

To safely deliver the machine and prevent damages caused by external factors, the machine has to follow the following standard packing procedures after antirust and fixation processes.

- 1) Pack the parts: the sharp edges of the machine should be protected with corrugated papers and bubble sheets. Edges and fragile portions of accessories such as water tank and cooler should be wrapped with bubble sheets.
- 2) Place the desiccant: place proper amount of desiccant on various places of the machine to control the humidity.
- 3) Put the machine in place: the machine should be placed steadily on the base of the

- case. Machine's center of gravity should be placed at the center of the case bottom.
- 4) Place assembled parts in and fasten them in place: assembled parts, transformer, tool box, foot pad and other components should be placed steadily at the bottom of the case and fastened properly to prevent shifting and swaying.
  - 5) Seal and label the wood case: the machine should be sealed by wood, the top of the wood case should be covered by rainproof canvas, inspection points should be reserved on the sides to examine the machine; plates should be nailed on proper place of the wood case to specify the shipping destination and manufacturing origin; lastly, place labels of caution and mark the suspension location of the overhead traveling crane to conclude the packing procedures.

### **Unpacking:**

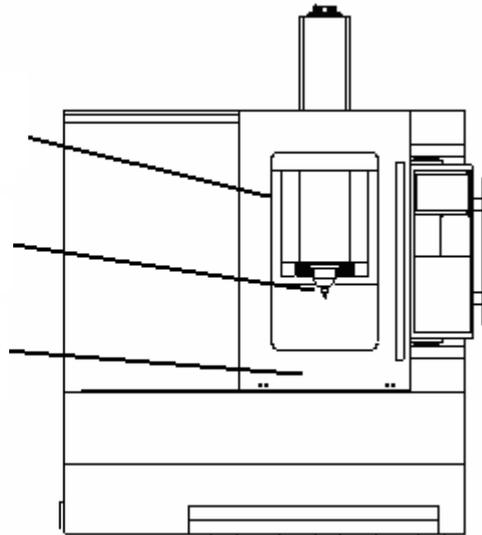
The machine and the auxiliary parts should be taken out of the box after unpacking. In order to prevent damages caused by improper disassembly procedures, detailed procedures to safely disassemble the machine are listed below:

- 1) Disassemble the head workpiece fixing device (refer to Figure 1)
  - a. Disassemble the fastened bolt
  - b. Move Z-axis upward by handwheel to shift the head away
  - c. Move the workpiece fixing device away
- 2) Disassemble the X-axis and Y-axis workpiece fixing devices (refer to Figure 1)
  - a. Disassemble the bolt of the workpiece fixing device
  - b. Move the workpiece fixing device away

**X-axis workpiece fixing device**

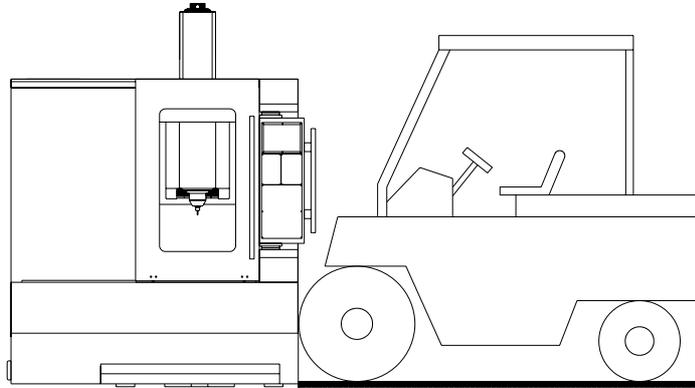
**Head workpiece fixing device**

**Y-axis workpiece fixing device**



## 1.5 Moving

### 1) Fork-lift truck



#### Caution:

- a. The fork-lift truck has to be operated by qualified and skilled operator.
- b. Loading capacity of the fork-lift truck has to be at least 5 tons.
- c. Make sure that no personnel or obstacles blocking the moving route before moving.
- d. Move the machine slowly and maintain the balance of the machine.
- e. Pay special attention to the accessories and sheet metal of the machine to prevent it from damage or deformation.

### 2) Overhead traveling crane

Caution:

- a. The overhead traveling crane has to be operated by qualified and skilled overhead traveling crane operator.
- b. Loading capacity of the overhead traveling crane has to be at least 5 tons.
- c. Make sure that no personnel or obstacles blocking the moving route.
- d. Move unnecessary articles away from the machine and fasten the needed articles at proper positions.
- e. Maintain the balance of the machine during lifting, move slowly and lower the machine's center of gravity whenever possible.

## 1.6 Installation

- 1) Place the foot pad in place before the machine is positioned, and make sure the foot pad is evenly supporting the weight of the machine.
- 2) Use a clean cotton cloth to remove the anti-rust oil at the anti-rust portions mentioned above, and then apply a thin layer of lubricant.
- 3) Make sure voltage, frequency, and electric phase are within specifications and then connect the main power supply and proceed with grounding.
- 4) Adjust pressure source to 6Kg/cm<sup>2</sup> (refer to Section 5).
- 5) Move the workpiece fixing device away.
- 6) Adjust the leveling and double check the precision of the machine.
- 7) Power supply for this machine should be 220V/60HZ, external transformer is needed if the power supply is not within specifications.
- 8) Voltage stabilizer is recommended if the external power supply is not stable to ensure the precision of the workpiece.
- 9) Regions with frequent power outage should install an U.P.S. device to prevent damage to workpiece caused by sudden outage.
- 10) Confirm the rotation direction of the wiring of cutting fluid motor.
- 11) Adjust the temperature of the spindle oil cooler at 20-25°C. Check the switch and electric phase (ignore if no oil cooler involved).
- 12) Refer to Section 5 for proper type of lubricant.

## 1.7 Leveling Adjustment

To decrease the vibration of the machine and maintain the precision, please follow steps listed below to fine-tune the leveling of the machine.

- 1) Put a level gauge at the center of the working table and adjust the leveling adjustment bolts of the base. The leveling has to be performed faithfully to prevent deformation of

the machine.

- 2) Adjust the leveling bolts at the four corners of the machine, X-axis first followed by Y-axis and repeat for several times until the machine is leveled.
- 3) Adjust other bolts. Please note that the machine weight has to be evenly spread across various bolts without influencing the leveling of the machine.
- 4) Leveling of the machine has to be examined and adjusted every half year to maintain the precision of the machine.

## 1.8 Inspection before Power On

The following inspection items have to be performed faithfully before turning the power on to ensure the safety of the operators and precision duration of the machine.

- a. Check whether there is damage to wiring, piping and connectors.
- b. Check if the voltage, frequency and electric phase of the power input are correct.
- c. Make sure there are no obstacles around the machine and the controlling system impacting the normal operation of the machine.
- d. Make sure that all the doors of the controlling system (e.g. electric box and transformer etc.) are properly closed.
- e. Make sure that all the controlling switches can be operated accurately and no obstacles are around to interrupt normal operation.
- f. Note that no personnel are in the danger zone.
- g. Turn the power on and make sure that the cooler fan motor is running normally.
- h. Turn off the main power switch before personnel leave the machine.