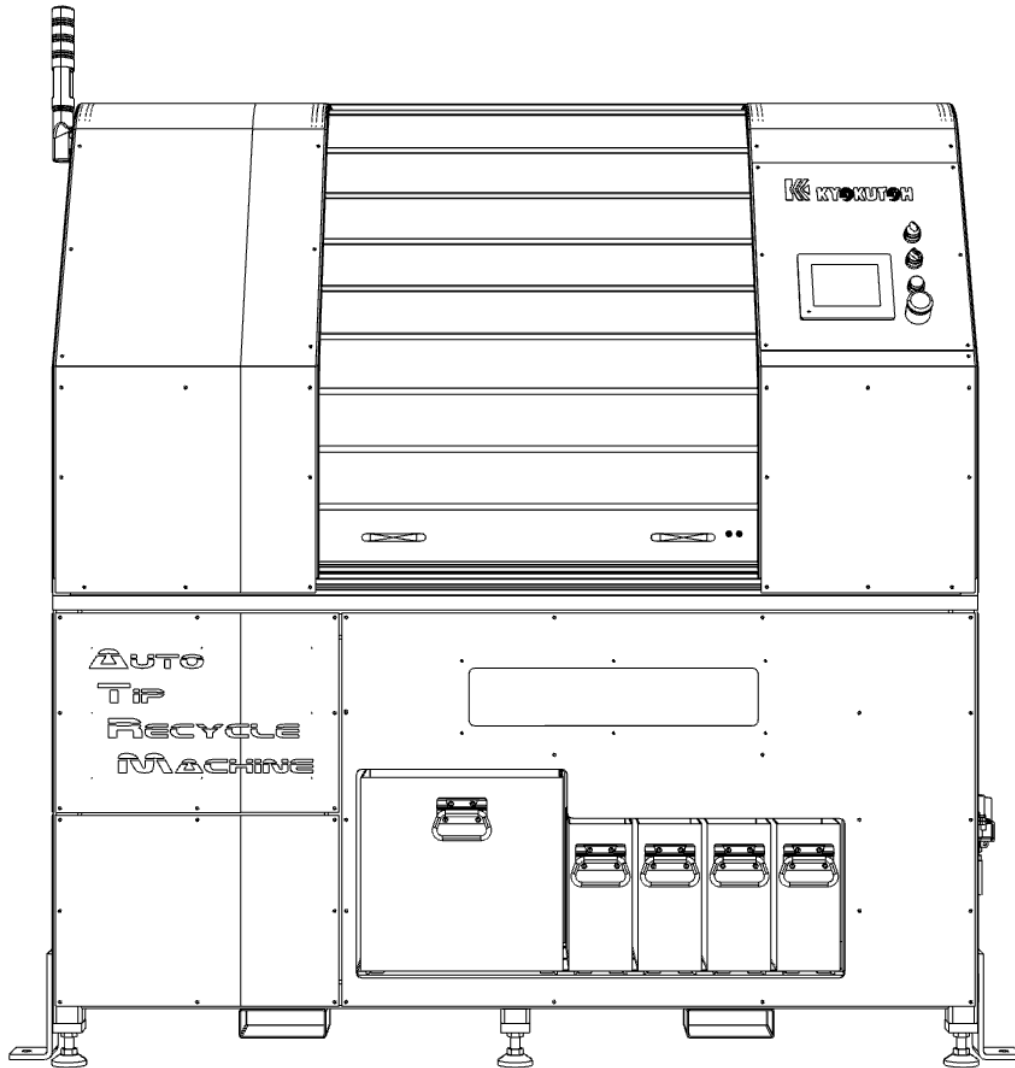




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AUTO TIP RECYCLE MACHINE ATRM-008

Instruction Manual



Kyokutoh Co., Ltd

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INTRODUCTION

Thank you for purchasing our product.

Please read this instruction manual carefully beforehand to use the product properly.

The specifications are subject to change without notice.

INSPECTION AND MAINTENANCE

Please be sure to perform inspection and maintenance work appropriately.

Perform inspection at every specified interval using a daily inspection check list and maintenance list.

Also, be sure to inspect and replace consumables at every certain interval.

GENERAL PRECAUTIONS

● Qualification of the operator

The operator of this machine must contact the manager.

Receive sufficient guidance from a trained personnel or the manager before operating the machine.

● Obligations of the operator

- (1). Read this manual thoroughly and use the machine properly.
- (2). Inspect that the standard numerical values of the machine are within the acceptable range of operation.
- (3). When operating the machine, be sure to wear safety equipment such as safety shoes, cap or helmet, safety goggles, etc.
- (4). Be sure to wear gloves and do not touch cut chips with a bare hand.
- (5). Do not operate the machine with wet hands or oily hands.
- (6). Be sure to check if the machine and its surrounding is in a condition that the machine can be started.
- (7). Do not move away from the work post recklessly or enter into the protected area while the machine is running.
- (8). In the event of a failure, immediately stop the machine, and notify the manager or see the troubleshooting in this manual.
- (9). After finishing work, check if every unit is stopped, and turn off the switch. Perform cleaning, maintenance and inspection after the machine comes to a complete stop.

● Emergency stop circuit

Perform periodic inspection of the circuit, and never adjust or invalidate the following protection devices:

Emergency stop button, safety door switch key, protection cover, and door open/close detection sensor.

When performing inspection or maintenance work, invalidate the device after obtaining a permission. In the event of a failure, post a board saying "Safety function stopped" at a visible location. Check periodically that the above devices function normally.

● Changing the setting values

When making changes to any of the setting values (e.g.: air pressure, speed, etc.), be sure to record them on the drawing or the nameplate. Record the changes on the instruction manual as well, with the permission of the machine's manager. In the event of an error, immediately stop the machine, notify the manager and follow the instruction of the manager.

- **Safety during inspection and maintenance work**

For safety operation, check the following items before starting inspection or maintenance.

- (1). Check if the machine is stopped.
- (2). Turn off the power.
- (3). Turn off the power of the control panel, power open/close panel, operation panel, motor open circuit, etc.
- (4). Close the air valve of the machine and release air inside the device.
- (5). Close the main valve of the air source.
- (6). Use specified parts.
- (7). Use specified overcurrent protection devices (fuse etc.) and spare parts.

- **Emergency stop**

The electrode on the conveyor may drop even after the emergency stop button is pressed.

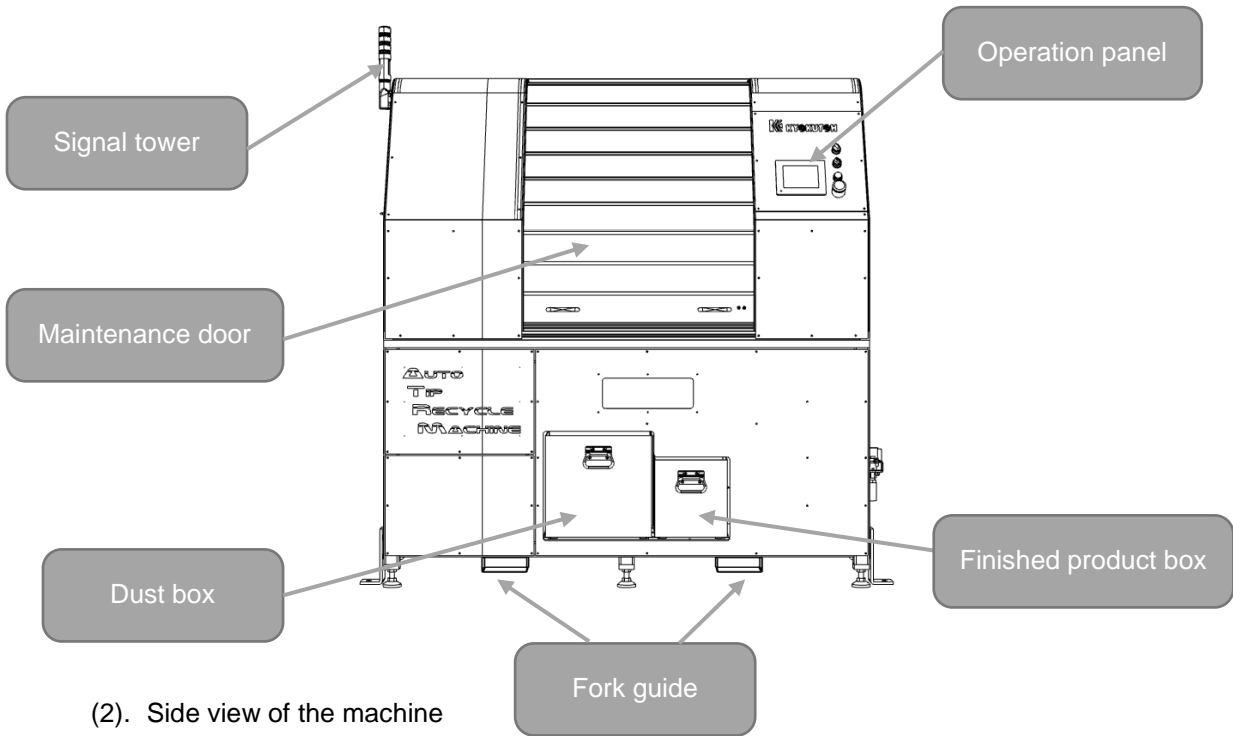
Pay due attention.

- **Caution plate**

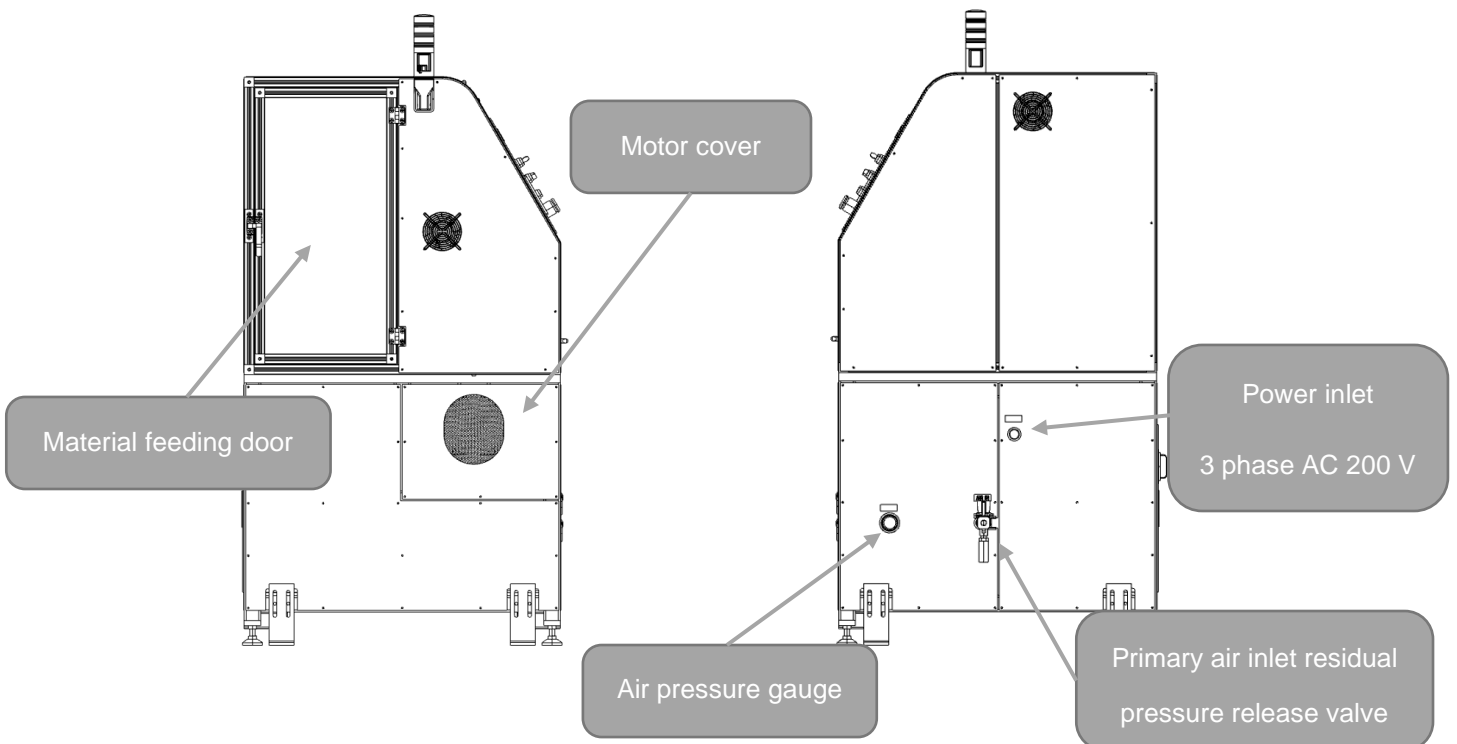
For safe operation of the equipment, do not remove or break the caution plate. If the plate breaks or gets lost, contact the manager.

NAMES OF DEVICE COMPONENTS

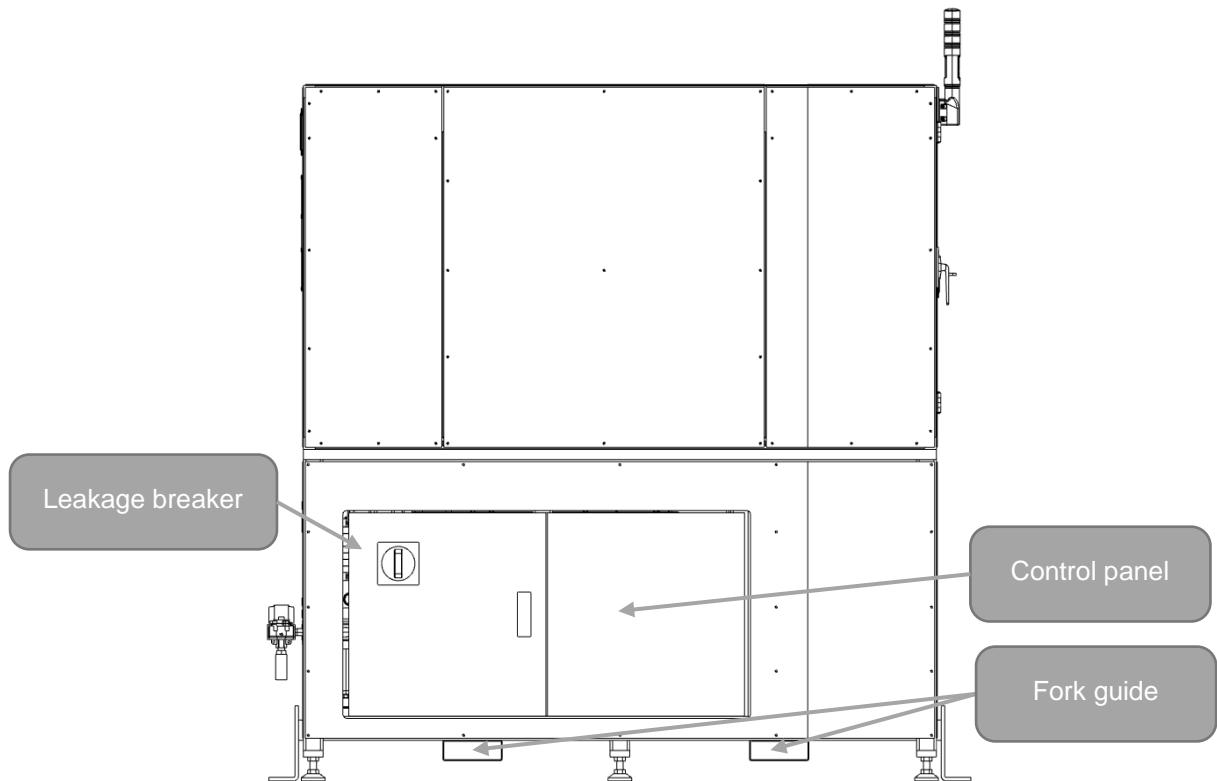
(1). Front view of the machine



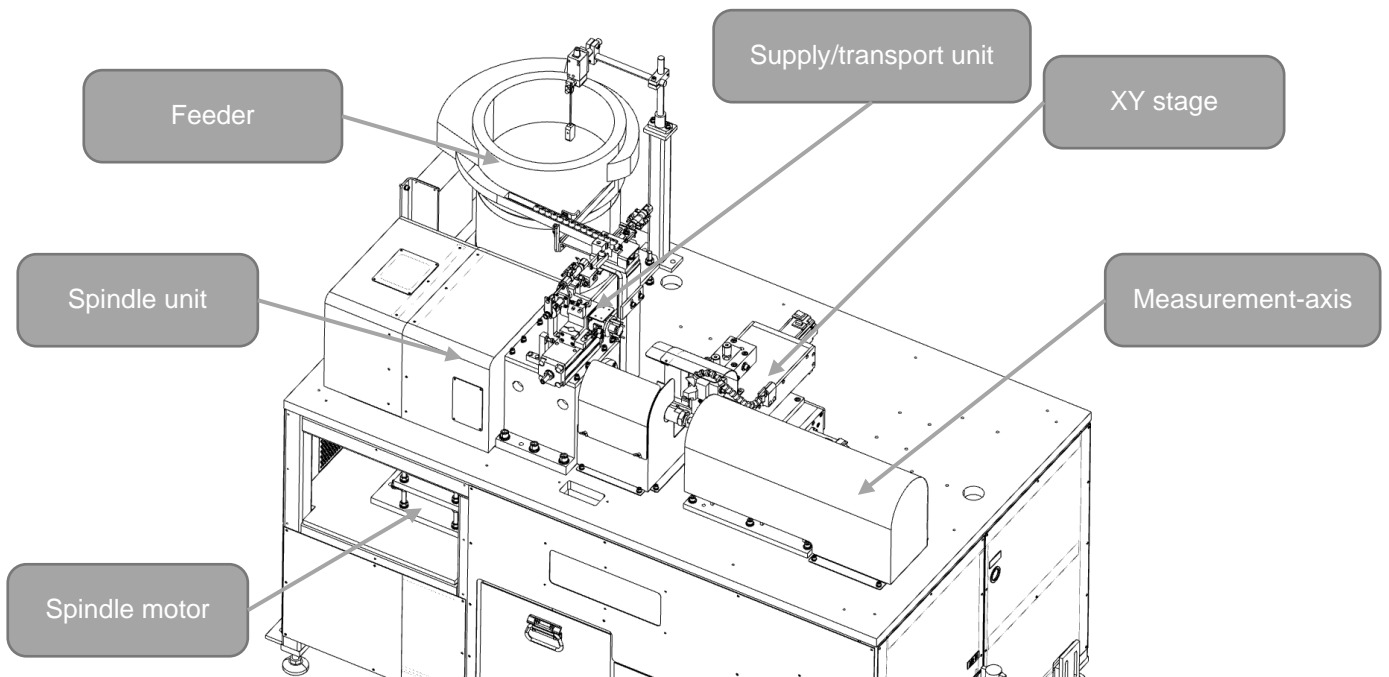
(2). Side view of the machine



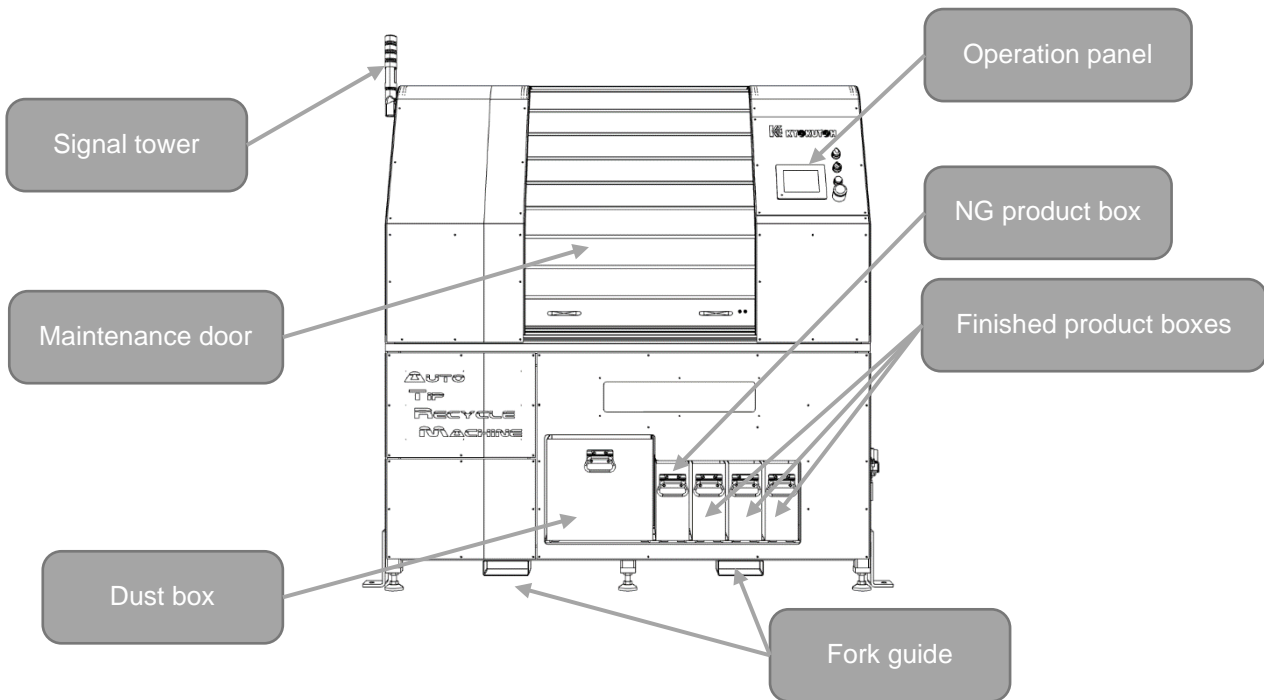
(3). Rear view of the machine



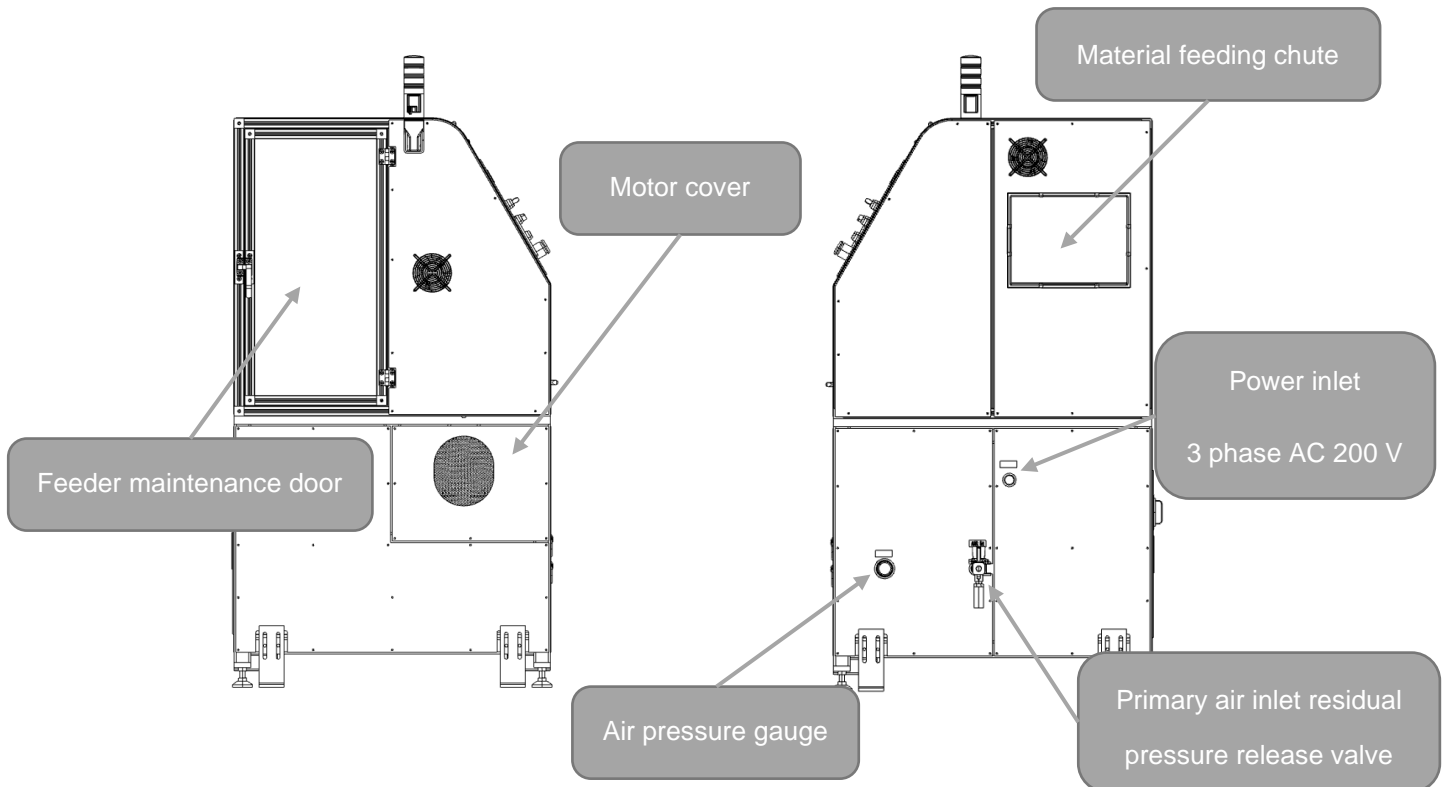
(4). Inside view of the machine



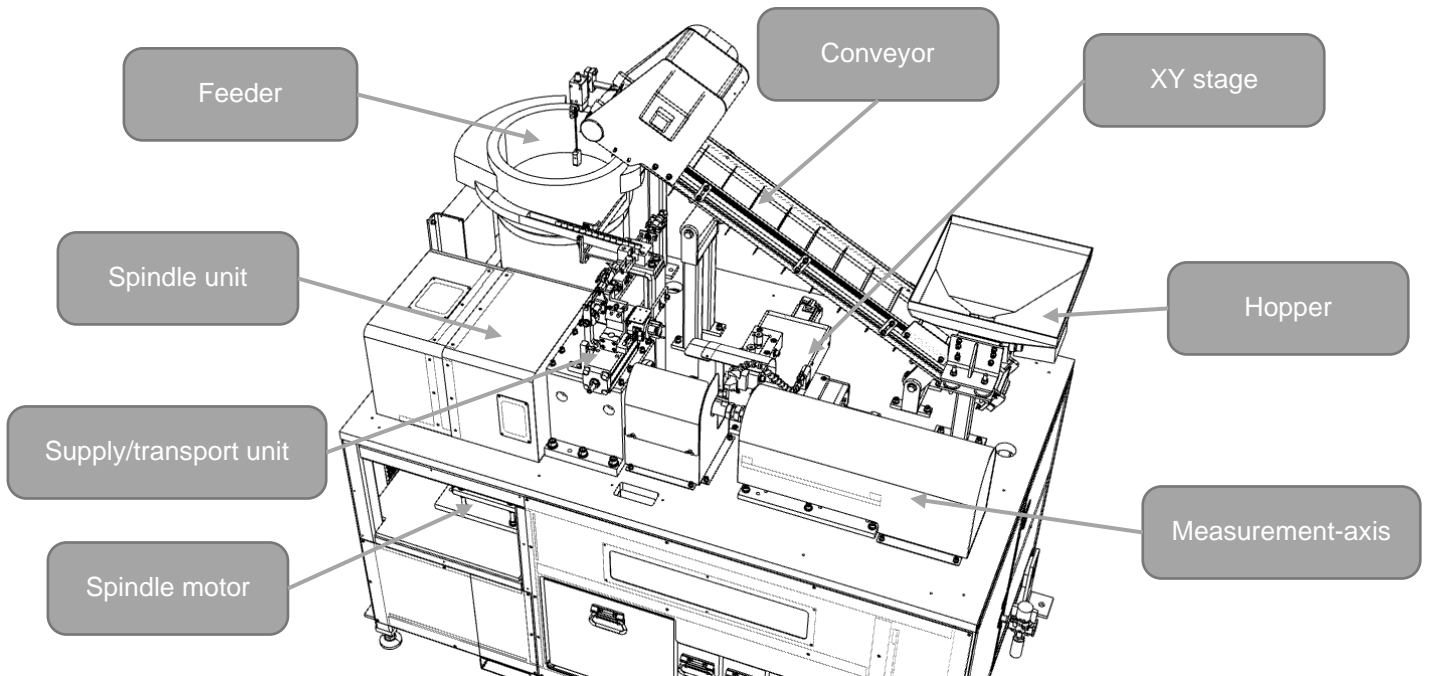
(5). Front view of the machine (with an optional sorter)



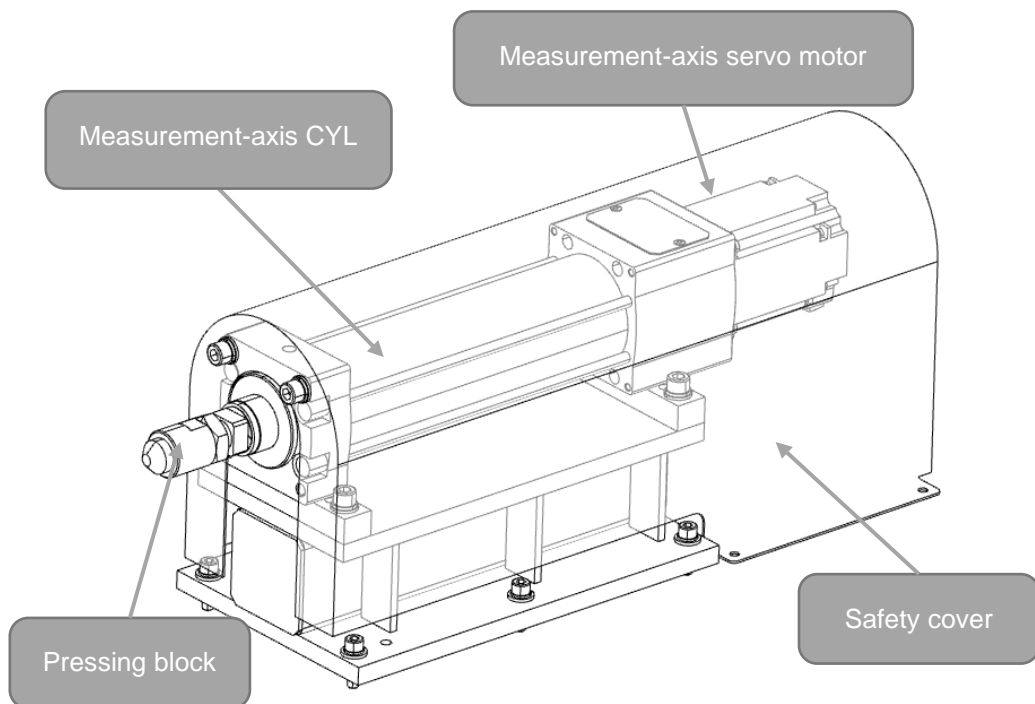
(6). Side view of the equipment (with an optional conveyor)



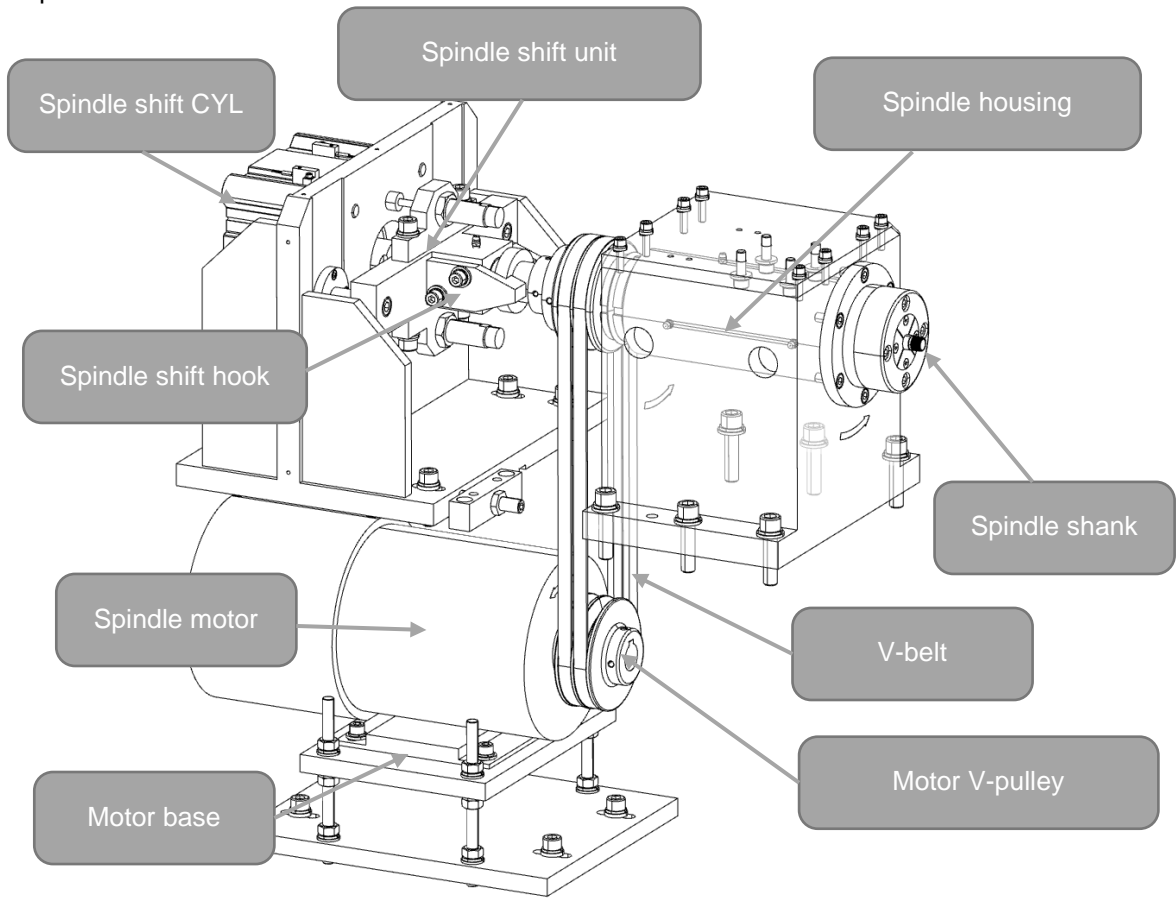
(7). Inside view of the equipment (with an optional conveyor)



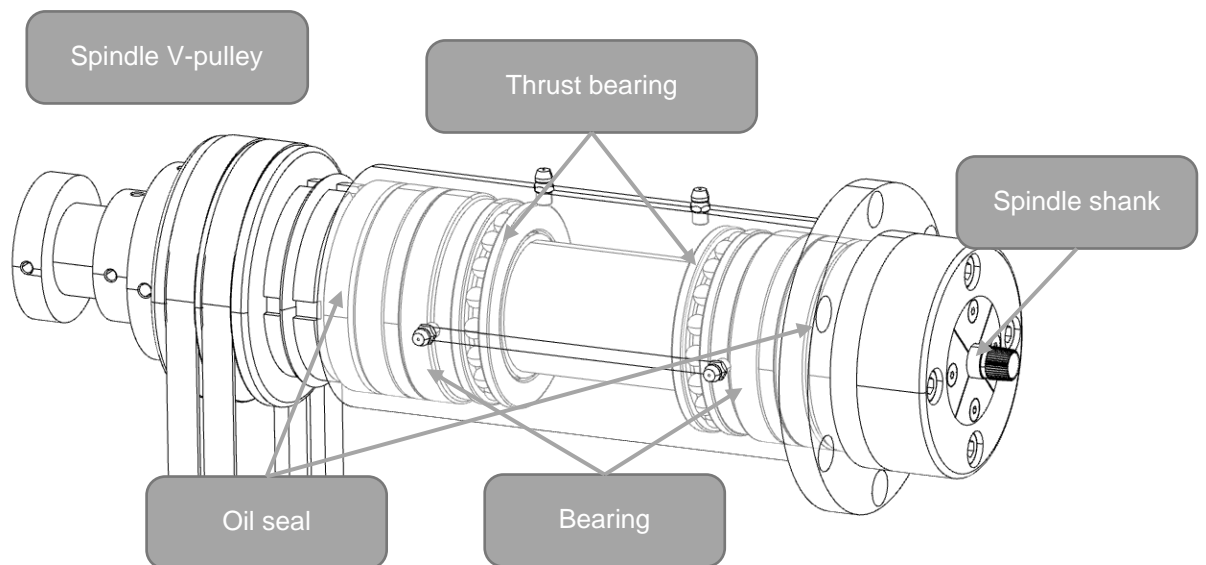
(8). Measurement-axis unit



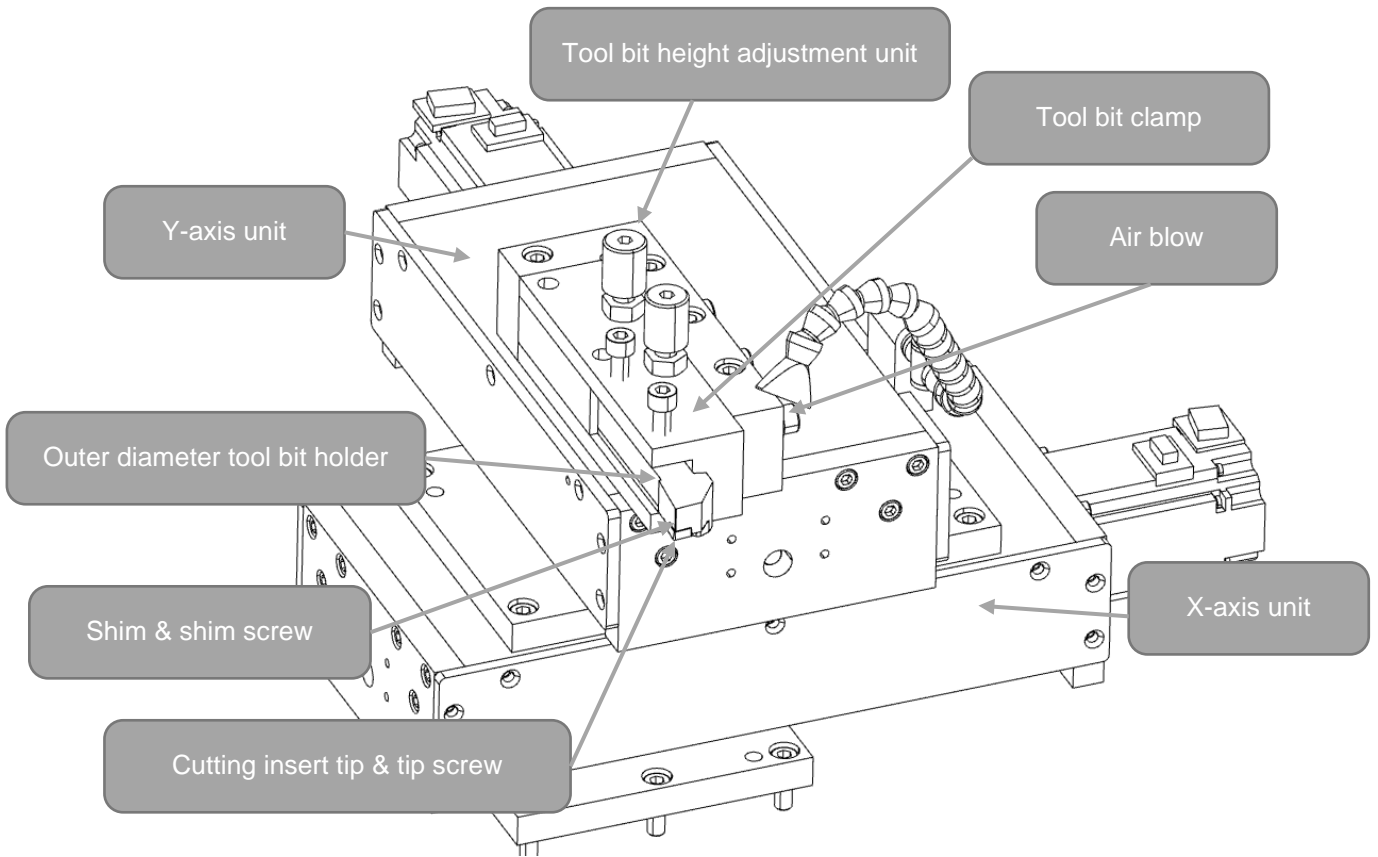
(9). Spindle unit



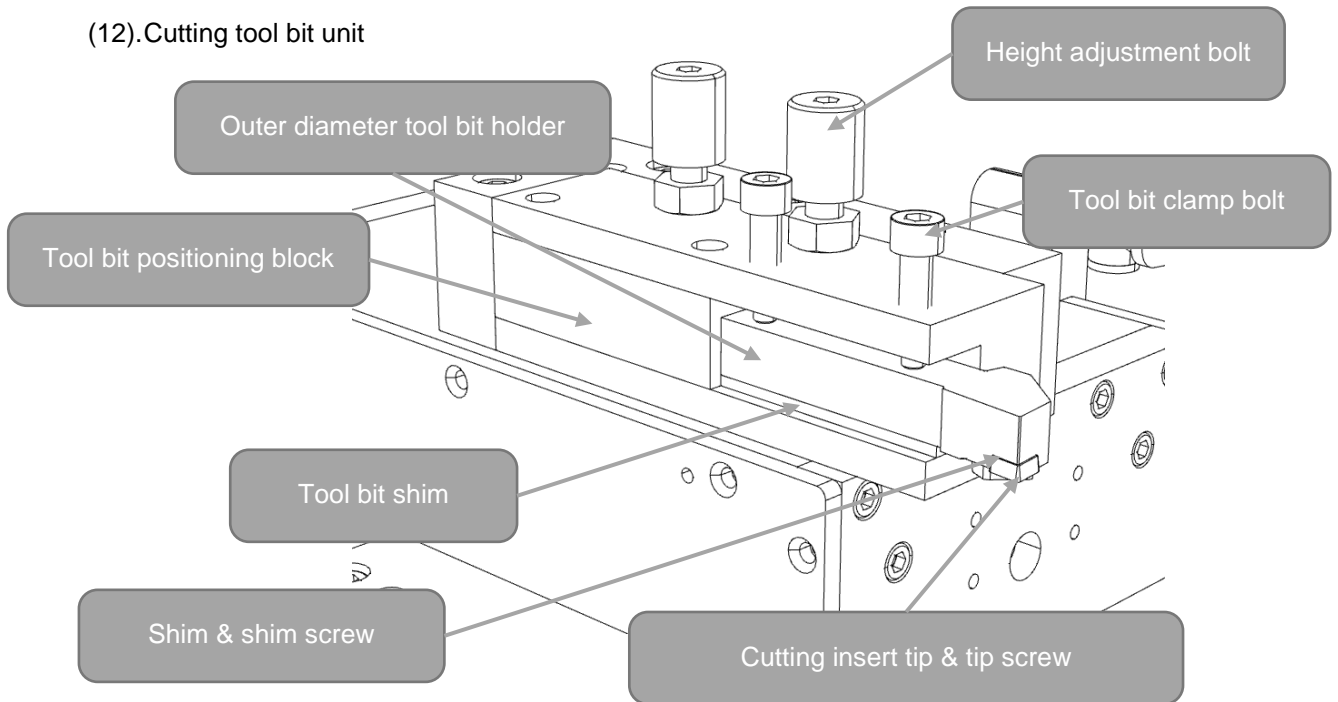
(10). Spindle assy



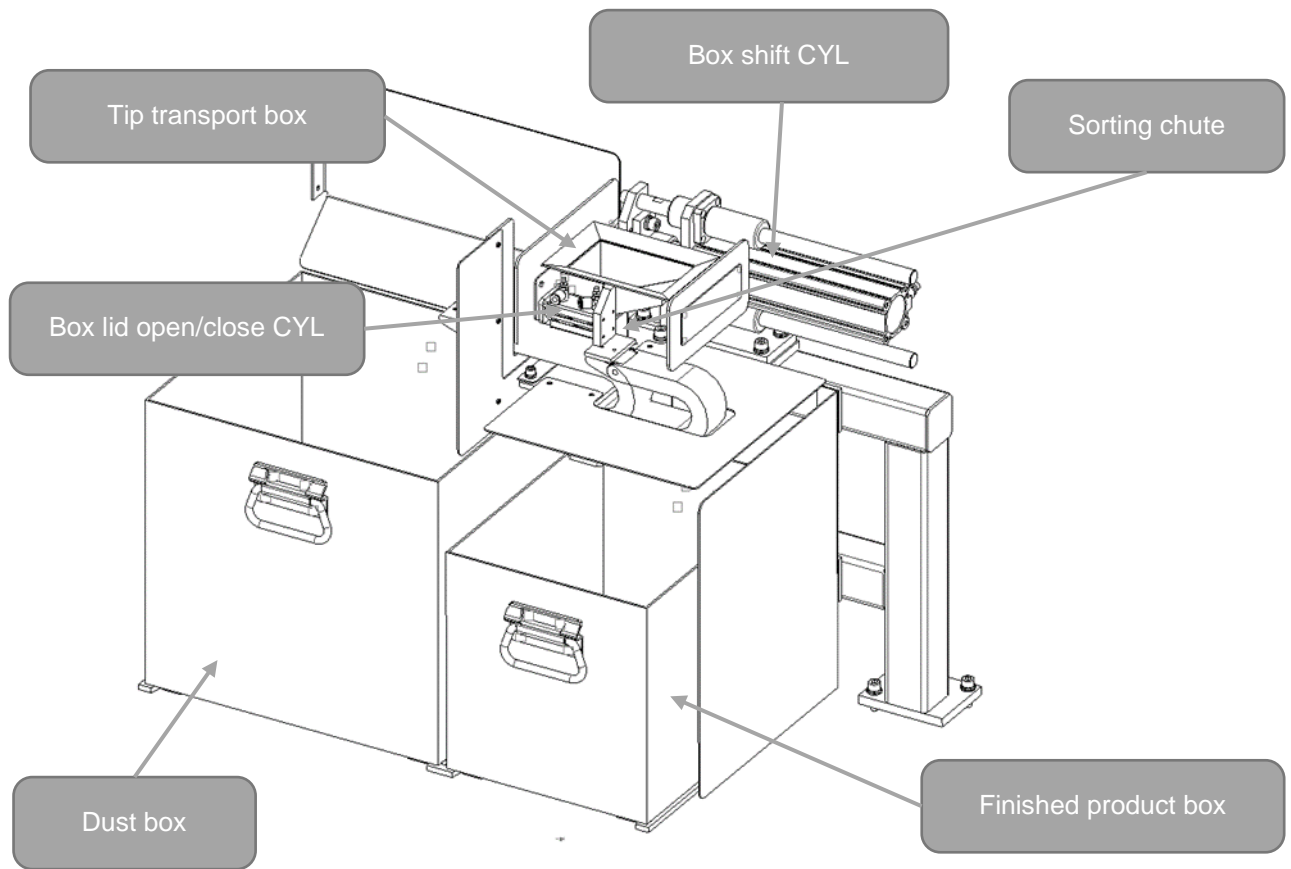
(11).XY stage unit



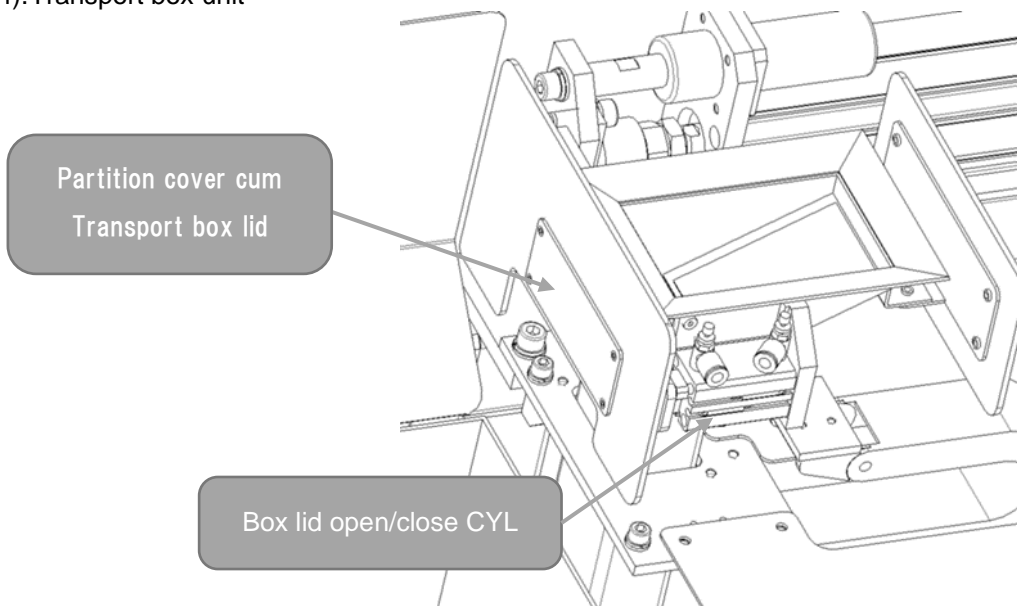
(12).Cutting tool bit unit



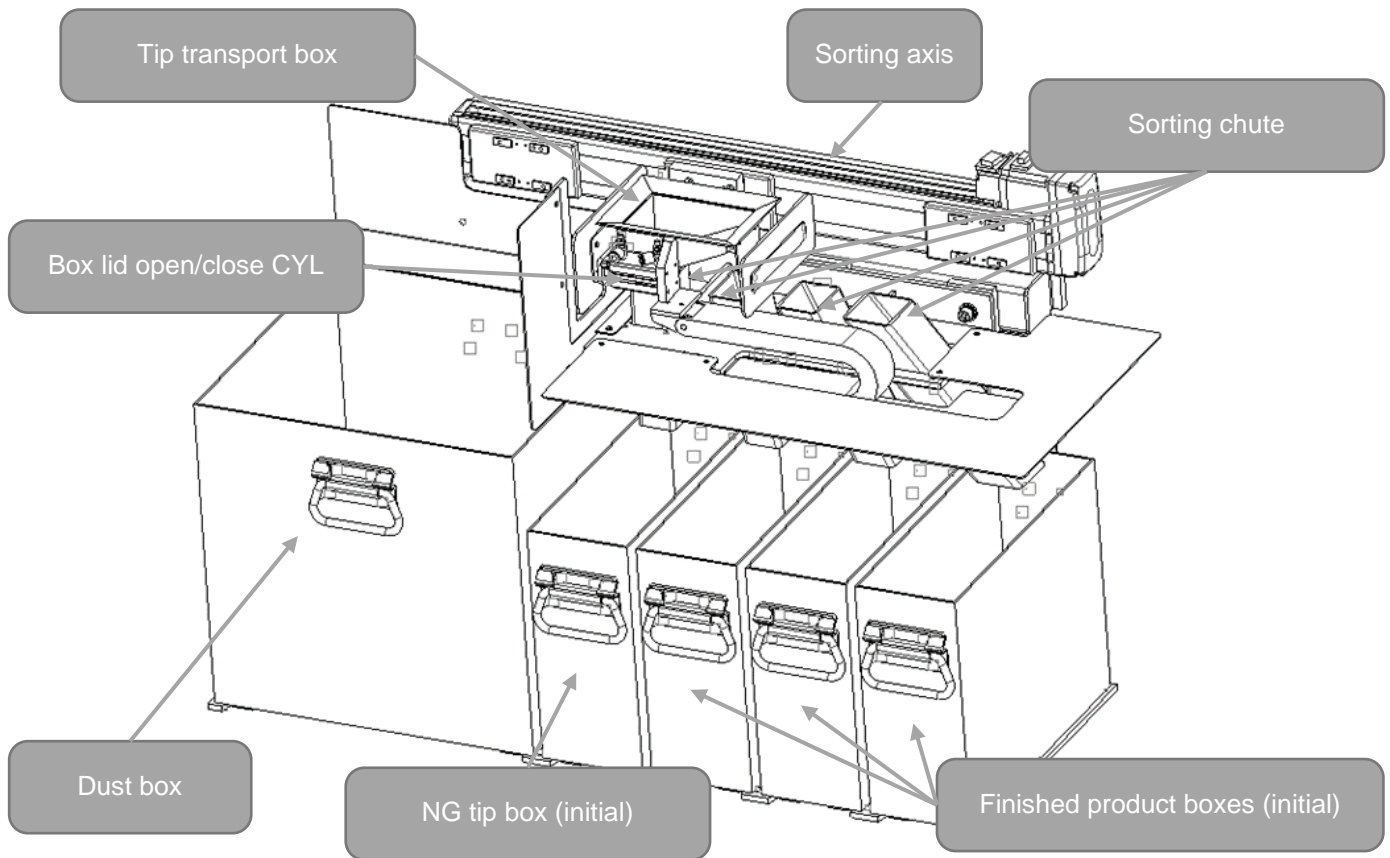
(13).Finished product sorting unit



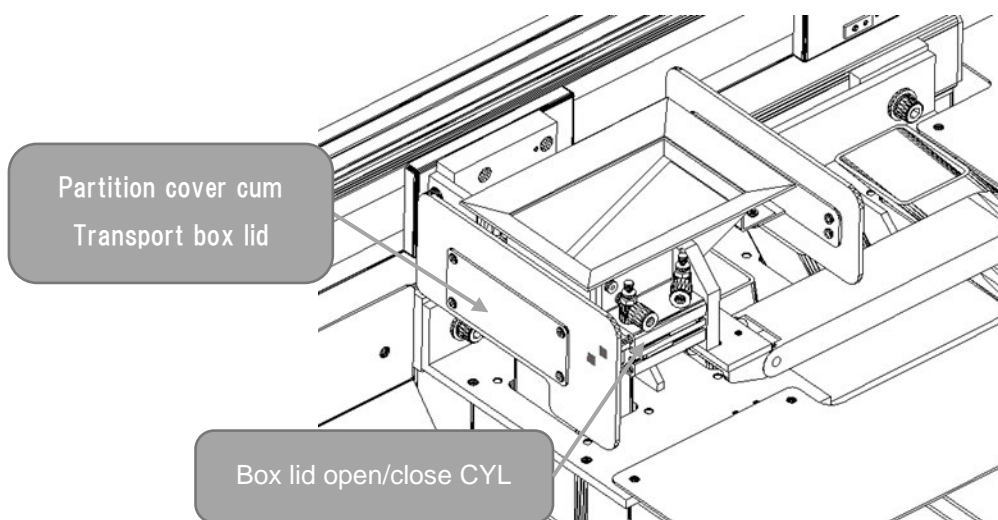
(14).Transport box unit



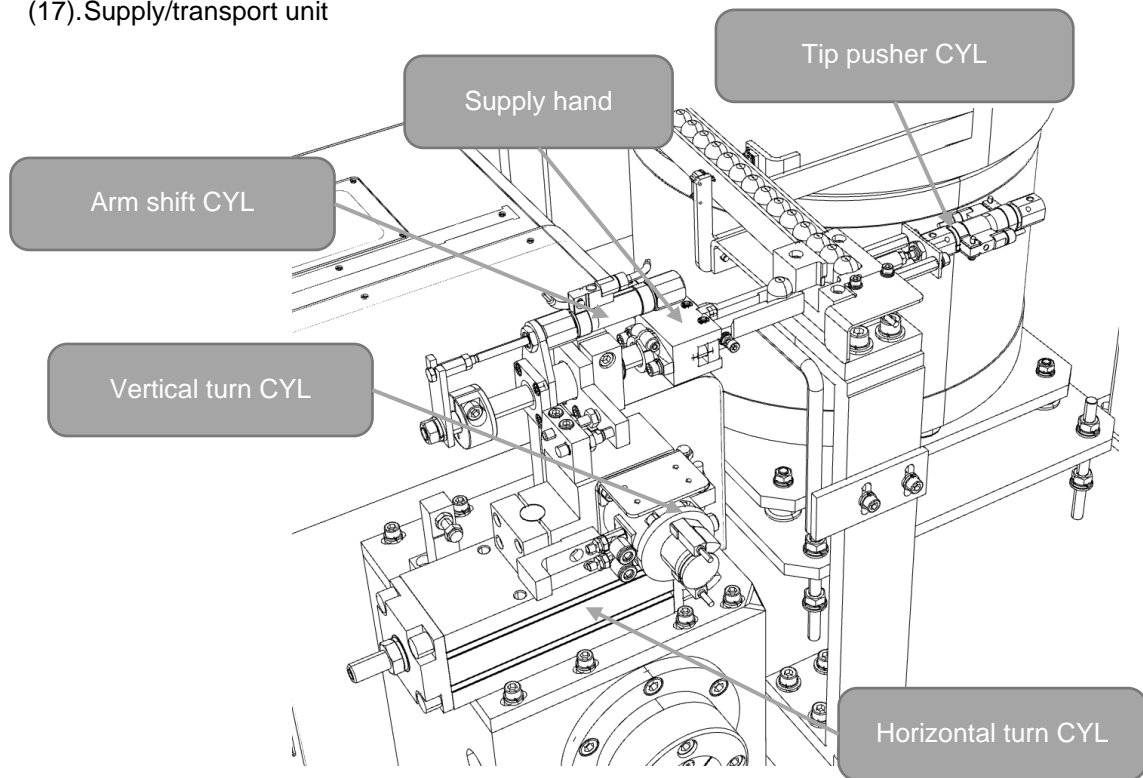
(15).Finished product sorting servo unit (optional)



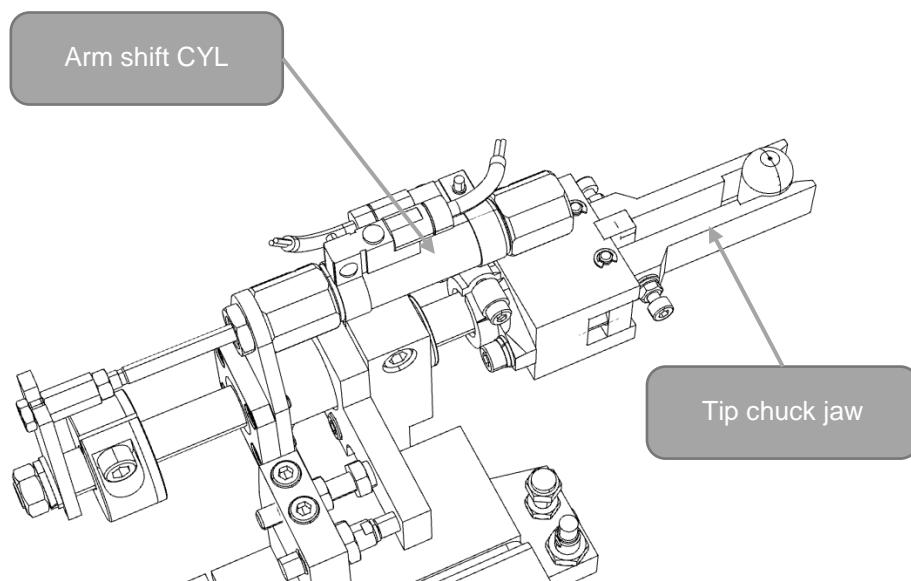
(16).Transport box unit (optional)



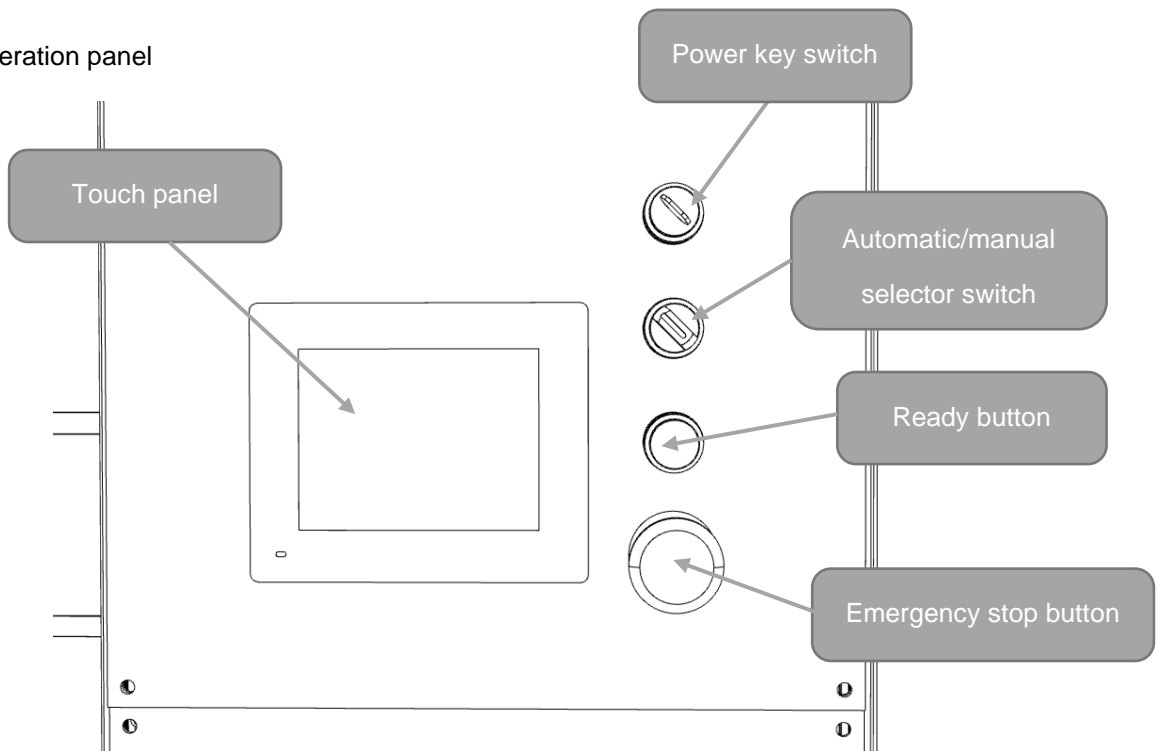
(17).Supply/transport unit



(18).Supply hand



(19).Operation panel



DEFINITION OF TERMS

Terms for this machine are described below.

Inching	Moving by a set value for each press of the button.
Jog move	Moving at a set speed while the button is held down.
Start position	Standby position to start
Mechanical origin	Original position of the machine = Zero position
Zero position	Mechanical origin. Position where the current position on the panel is 0 mm.

PRE-OPERATION PREPARATION

- (1). Check that there is no problem in the equipment or the surrounding.
- (2). Check that the primary air is connected, and open the residual pressure release valve to supply air to the equipment.
- (3). Check if the air pressure is 0.4 MPa (set value).
- (4). Check that the front maintenance door is closed.
- (5). Check that the three-phase 200 V power is connected, and turn ON the power of the control panel.
- (6). Turn ON the power key switch on the operation panel.

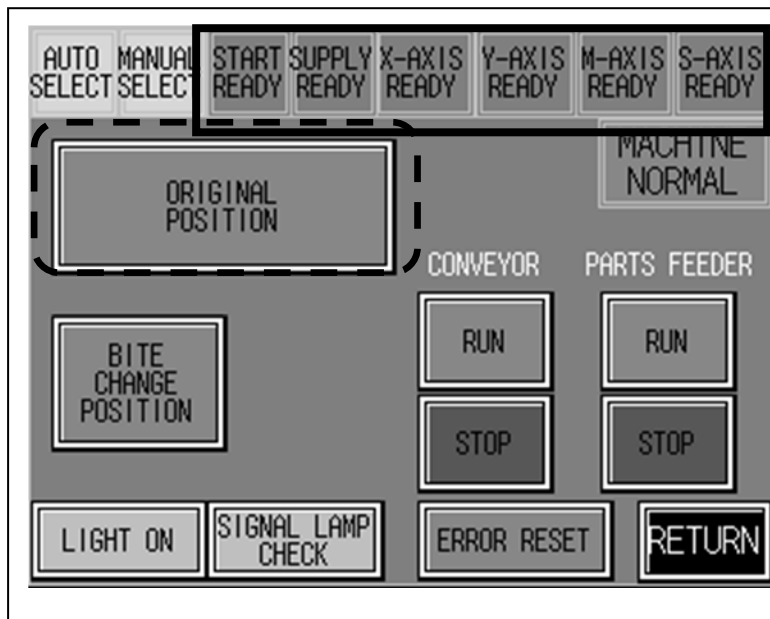
Language selection screen will be displayed when the power is turned ON (Fig. 1). The initial setting is Japanese. Select "English" when using the machine in English.



If a language is selected, there is no need to reselect. Press "Return." The screen returns to the selection screen.

- (7). Press the operation ready button on the operation panel and check that the ready lamp lights up.

- (8). Select "Manual" on the automatic/manual selector switch.
- (9). The manual mode screen (Fig. 2) will appear automatically, so press start position return to return to the original position.

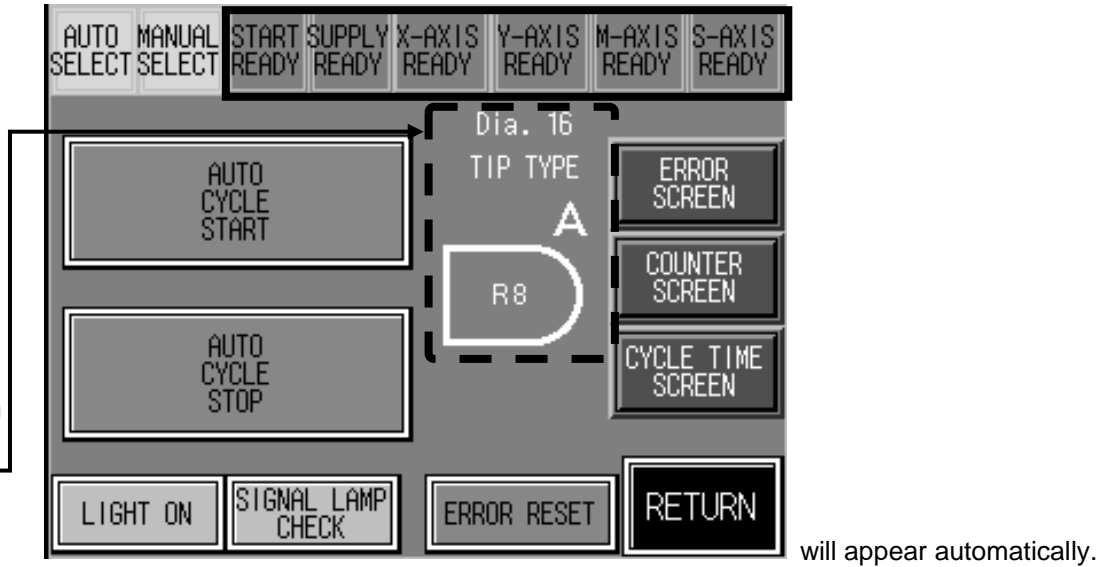


When the OK lamps at the top of the screen light up in green, the machine is ready.

(Only the area inside the solid frame needs to light up in green.)

AUTOMATIC OPERATION MODE

- (1). Change the automatic/manual selector switch from "Manual" to "Auto."
- (2). The automatic operation screen (Fig. 3)



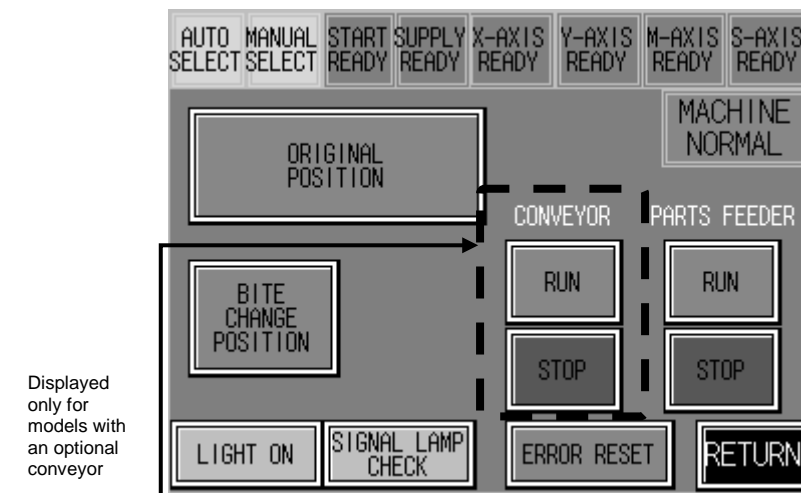
(Fig. 3)

- (3). Check that all items inside the solid frame at the top of the screen are illuminated in green. When the items are not in green, perform return to original position again.
- (4). Check if the tip type selected inside the dotted frame is the type you want to create. If not, the program is not selected correctly. Go to the tip type select screen and reselect. See p. 55.
- (5). When starting continuous automatic operation, press "Automatic cycle start." Automatic operation will start. The green lamp on the signal tower flashes during automatic operation. Press the "Counter screen" (p. 51 -) button to display the production volume, and "Cycle time screen" (p. 57) button to display the cycle time per piece. The corresponding screen will appear.
- (6). To stop automatic operation, press "Automatic cycle stop." When the supply hand is holding a cap tip or when supply movement is in progress, the cycle will stop after turning the cap tip. The cycle will stop after the turning process completes and the cap tip is conveyed to the finished product, so the maintenance door cannot be opened until the processes complete.

- (7). The maintenance door can be opened after the cycle stops. When the maintenance door is open, the machine will not start.
- (8). When "Counter screen" is pressed, the counter screen appears (p.51 -).
 - * The screen differs, depending on the options.
- (9). When the "Cycle time screen" button is pressed, the cycle time screen appears (p.57).
- (10).When the "Error screen" button is pressed, the error screen appears (p. 58).

MANUAL OPERATION MODE

- (1). Change the automatic/manual selector switch from "Auto" to "Manual".
- (2). The manual operation screen (Fig. 4) will appear automatically. This mode allows you to operate manually.



(Fig. 4)

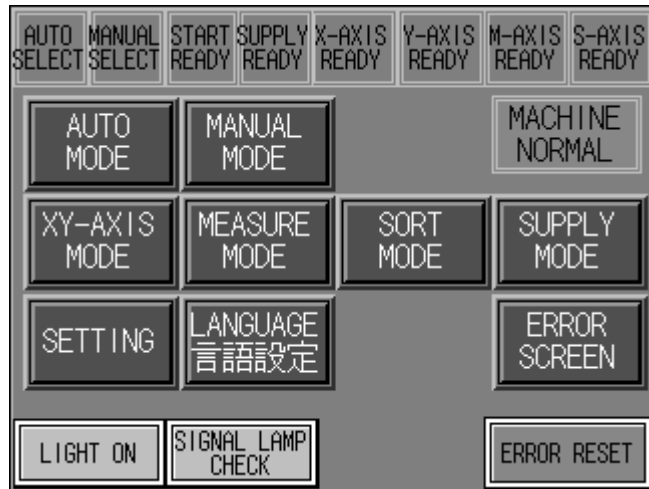
- (3). When the "Start position return" button is pressed with the maintenance door closed, all driving units return to the origin, and cycle start operation will be possible.
 Note) The start OK lamp will not light up when any of the driving units is off the start position, and cycle start will not be possible because it does not meet the conditions to start.
- (4). When "Turning tip exchange start" is pressed, the XY stage moves to a position where it is easy to exchange the cutting tip. After exchanging the tip, press "Start position return" to return to the original position.
- (5). When the "Run" button under conveyor is pressed, the conveyor starts.
 When the "Stop" button below is pressed, the conveyor stops. (Only for models with a conveyor)
- (6). When the "Run" button under parts feeder is pressed, the parts feeder starts.
 When the "Stop" button below is pressed, the parts feeder stops.
- (7). When "Light ON" is pressed, the lights in the machine light up and the button changes to "Light OFF." When it is pressed again, the lights go out.
- (8). When the "Lamp check" button is pressed, all pilot lamps on the machine light up and the buzzer sounds. This button is used for inspection. Please contact us if you find any fault when you press the button.

(9). When the "Error reset" button is pressed in the event of an error, the error can be reset.

However, if the error cannot be restored, such as in the case of an LS error, only the buzzer will stop, so release the error in manual operation before resetting.

(10).When the "Return" button in Fig. 4 is pressed, the selection screen in Fig. 5 appears.

SELECTION OPERATION MODE



(Fig. 5)

Operation

- (1). XY-axis manual mode p. 24

When "XY-axis mode" in Fig. 5 is pressed, the XY-axis manual mode screen (Fig. 6) appears.

- (2). Measurement unit manual mode p. 25

When "Measure mode" in Fig. 5 is pressed, the measurement axis manual mode screen (Fig. 7) appears.

- (3). Sorting unit manual mode p. 26

When "Sort mode" in Fig. 5 is pressed, the sorting unit manual screen (Fig. 8) appears.

- (4). Sorting unit manual mode (optional) p. 27

When you are using a model with an optional finished product sorter, press "Sort mode" in Fig. 5 to go to the sorting unit manual screen (optional) (Fig. 9).

- (5). Supply unit manual mode p. 28

When "Supply mode" in Fig. 5 is pressed, the supply unit manual screen (Fig. 10) appears.

- (6). Supply unit manual mode (optional) p. 29

When you are using a model with an optional feeder conveyor, press "Supply mode" in Fig. 5 to go to the supply unit manual screen (optional) (Fig. 11).

(7). Setting mode p. 30 -

When "Settings" in Fig. 5 is pressed, the settings screen (Fig. 12) appears.

(8). Language setting p. 16

When "Language" in Fig. 5 is pressed, the language setting screen (Fig. 1) appears.

(9). Error screen display p. 58

When "Error screen" in Fig. 5 is pressed, the error display screen (Fig. 36) appears.

(10).LED lighting

When "Light ON" is pressed, the lights in the machine light up and the button changes to "Light OFF." When it is pressed again, the light goes out.

(11).Lamp check

When the "Lamp check" button is pressed, all pilot lamps on the machine light up and the buzzer sounds. This button is used for inspection. Please contact us if you find any fault when you press the button.

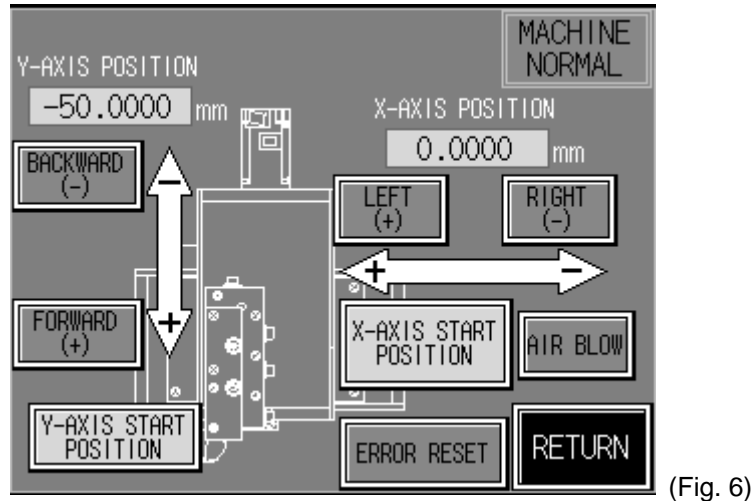
(12).Error reset

When the "Error reset" button is pressed in the event of an error, the error can be reset.

However, if the error cannot be restored, such as in the case of an LS error, only the buzzer will stop, so release the error in manual operation before resetting.

XY-AXIS MANUAL MODE

When "XY-axis mode" in Fig. 5 is pressed, the XY-axis manual mode screen appears (Fig. 6).



This mode moves the X- and Y-axes individually and arbitrarily.

* If the measurement-axis is not at the original position, the interlock prohibits the X- and Y-axes from moving.

Operation

- (1). When the "Back", "Forward", "Left" and "Right" buttons are pressed, the X- and Y-axes move separately.

The distance from the mechanical origin is displayed as the current position of each axis.

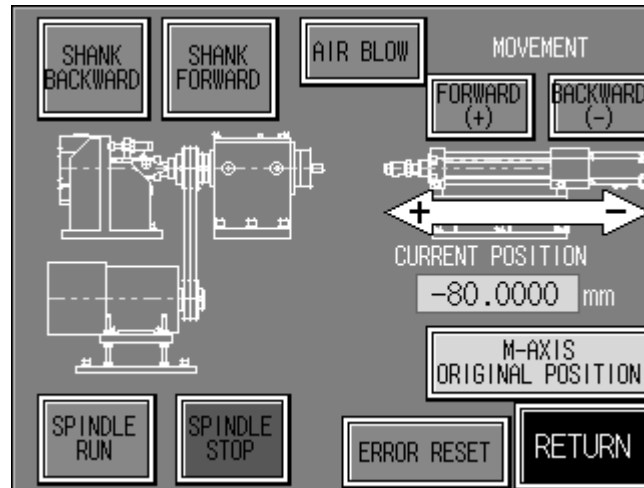
Note that if the travel distance of the X- and Y-axis exceeds a certain value, a machine error will occur as a result of overrun.

- (2). When the "Air blow" button is pressed, air blow starts. When it is pressed again, air blow stops.
- (3). When the "X-axis start position" button is pressed, the X-axis moves automatically to the position where automatic start is possible.
- (4). When the "Y-axis start position" button is pressed, the Y-axis moves automatically to the position where automatic start is possible.

When the "Return" button is pressed, the selection screen (Fig. 5) appears.

MEASUREMENT UNIT MANUAL MODE

When "Measure mode" in Fig. 5 is pressed, the measurement unit manual mode screen appears (Fig. 7).



(Fig. 7)

This mode operates the spindle and measurement-axis separately.

* If the X- and Y-axes are not at the original position, the interlock prohibits X- and Y-axes from moving.

Operation

- (1). When the "Spindle shift return" or "Spindle shift advance" button is pressed, the spindle shank moves.
- (2). Press the "Spindle spin" and "Spindle stop" to spin and stop the spindle.

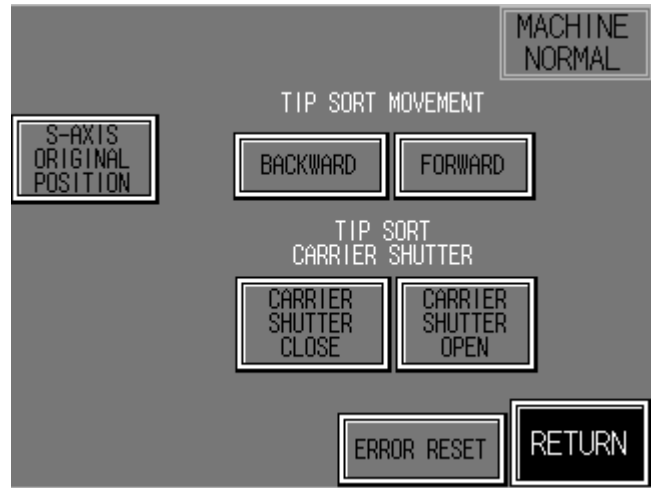
The spindle will not spin even when you press the button if the front maintenance door is not closed.

- (3). Press "Measure-axis start position" to return the measurement-axis to the start position.
- (4). When the "Air blow" button is pressed, air blow starts. When it is pressed again, air blow stops.
- (5). While the "Forward" or "Back" button under jog move is pressed, the measurement-axis moves correspondingly.

When the "Return" button is pressed, the selection screen (Fig. 5) appears.

SORTING UNIT MANUAL MODE

When "Sort mode" in Fig. 5 is pressed, the sorting unit manual mode screen appears (Fig. 8).



(Fig. 8)

This mode operates the sorting unit individually.

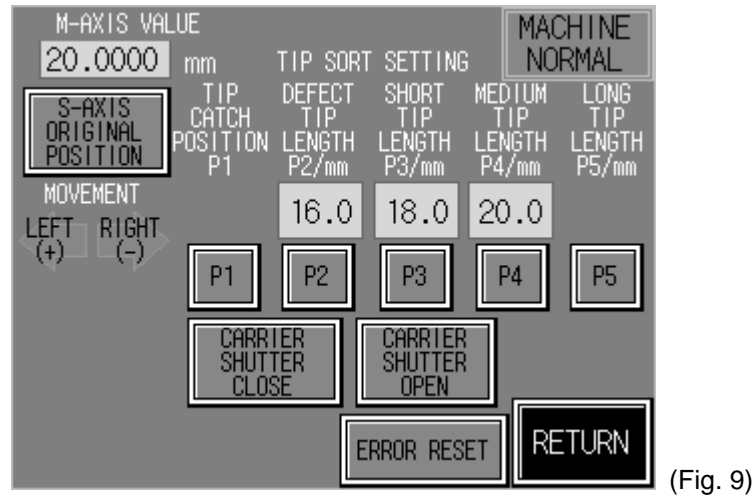
Operation

- (1). When the "Shift advance" or "Shift return" button under transport box shift is pressed, the unit moves to the corresponding position.
- (2). The value measured by the measurement-axis is displayed as the measurement value.
- (3). When the "Bottom lid close" or "Bottom lid open" button is pressed, the lid of the transport box opens/closes.

When the "Return" button is pressed, the selection screen (Fig. 5) appears.

SORTING UNIT MANUAL MODE (WITH AN OPTIONAL SORTER)

When "Sort mode" in Fig. 5 is pressed, the sorting unit manual mode screen (optional) appears (Fig. 9).



This mode operates the sort-axis unit individually.

Operation

- (4). When the "P1", "P2", "P3", "P4" or "P5" button is pressed, the unit moves to the corresponding position.

The values above "P2", "P3" and "P4" are setting values for the sorting length. The setting values can be changed arbitrarily from the sort-axis setting screen (see p. 47).

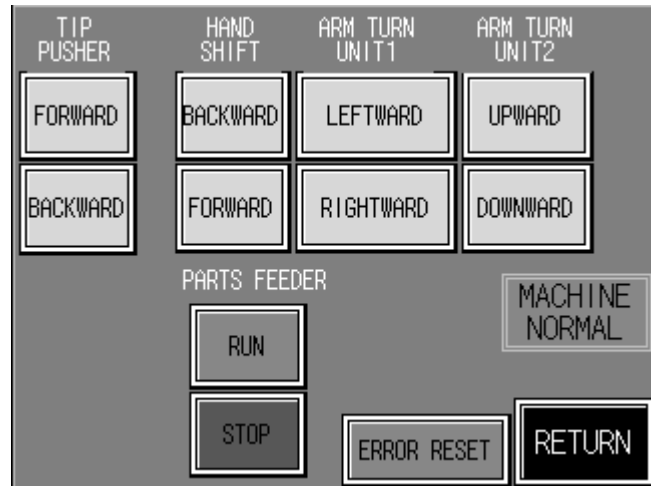
- (5). The value measured by the measurement-axis is displayed as the measurement value.
- (6). When the "Sort-axis start position" button is pressed, the transport box unit returns to the start position.
- (7). When the "Bottom lid close" or "Bottom lid open" button is pressed, the lid of the transport box opens/closes.
- (8). While "Left" or "Right" under jog is pressed, the axis moves in the corresponding direction.

The speed of jog movement can be changed in the speed setting (see p. 35).

When the "Return" button is pressed, the selection screen (Fig. 5) appears.

SUPPLY UNIT MANUAL MODE

When "Supply mode" in Fig. 5 is pressed, the sorting unit manual mode screen appears (Fig. 10).



(Fig. 10)

This mode operates the supplying unit individually.

Operation

- (1). When "Forward" or "Backward" under tip pusher is pressed, the tip pusher moves forward/backward.
- (2). When "Forward" or "Back" under arm shift is pressed, the supply arm moves forward/backward.
- (3). When "Horizontal return" or "Horizontal turn" is pressed, the supply/transport unit turns horizontally.
- (4). When "Vertical return" or "Vertical turn" is pressed, the supply/transport unit turns vertically.

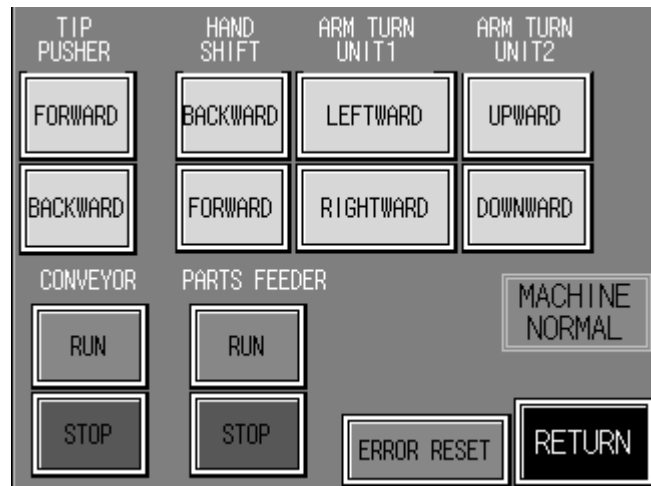
Note) The vertical turn of Arm Unit 2 is interlocked so it does not operate unless the unit is turning horizontally.

- (5). When the "Run" button under parts feeder is pressed, the parts feeder starts, and when the "Stop" button is pressed, it stops.

When the "Return" button is pressed, the selection screen (Fig. 5) appears.

SUPPLY UNIT MANUAL MODE (WITH AN OPTIONAL CONVEYOR)

When "Supply mode" in Fig. 5 is pressed, the sorting unit manual mode screen appears (Fig. 11).



(Fig. 11)

This mode operates the supplying unit individually.

Operation

- (1). When "Forward" or "Backward" under tip pusher is pressed, the tip pusher moves forward/backward.
- (2). When "Forward" or "Back" under arm shift is pressed, the supply arm moves forward/backward.
- (3). When "Horizontal return" or "Horizontal turn" is pressed, the supply/transport unit turns horizontally.
- (4). When "Vertical return" or "Vertical turn" is pressed, the supply/transport unit turns vertically.

Note) The vertical turn of Arm Unit 2 is interlocked so it does not operate unless the unit is turning horizontally.

- (5). When the "Run" button under conveyor is pressed, the tip supplying conveyor (optional) starts, and when the "Stop" button is pressed, it stops.
- (6). When the "Run" button under parts feeder is pressed, the parts feeder starts, and when the "Stop" button is pressed, it stops.

When the "Return" button is pressed, the selection screen (Fig. 5) appears.

SETTING CHANGE MODE

When "Settings" in Fig. 4 is pressed, the setting change mode screen (Fig. 12) appears.

On this screen, you can make changes to various settings and enter settings values. Since the settings cannot be changed without entering a correct password, only the manager can make changes. This reduces the risk of mechanical failure or turning defects due to inappropriate settings.



(Fig. 12)

Operation

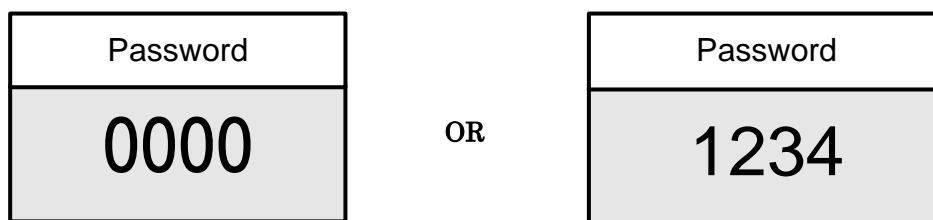
(1). Password entry space

When the correct password is entered in this space, various setting items will become editable. When you touch the area inside the solid frame, a key window (Fig. 13) will appear. Enter the password and press the ENT button. Once the upper display changes to (Fig. 14), you can proceed to various setting screens.

Keep this manual in a safe place, because the password is printed at the bottom.

If you forget the password, you will not be able to make changes to the settings to operate of the device.

* For the initial, recommended and upper/lower limit values of each item, refer to the table (p. 64).





(Fig. 13)



(Fig. 14)

XY-axis settings

p. 33

In this mode, the settings for the mechanical origin of the X- and Y-axis are changed.

When the "XY-axis settings" button is pressed, the XY-axis original position setting screen appears (fig. 15).

(2). Axis settings

p.34

In this mode, the origin of axis is corrected and turning quantity is changed.

When the "Axis settings" button is pressed, the axis correction setting screen appears (fig. 16).

(3). Sort-axis settings (option only)

p. 47 -

In this mode, the original position of the sort-axis is changed, and the sorting length of the tip of the process complete product is set.

When the "Sort-axis settings" button is pressed, the sort-axis setting screen appears (fig. 18).

(4). Turning teach setting

In this mode, the cap tip is turned after the original positions for the X- and Y-axis are set, and the turning status is checked.

When the "Turning teach setting" button is pressed, the turning teach screen appears.

(5). Measure origin settings

p. 46

In this mode, the mechanical origin of the measurement-axis is changed and the jog move speed etc. is set (Fig. 17).

(6). Speed settings

p. 35 - p. 45

In this mode, the speed during manual operation and the change in the cutting speed during automatic operation, etc. are set (Fig. 15).

(7). Tip type select p. 53

In this mode, the tip type program used to turn the tip is selected (Fig.).

(8). All reset p. 54

This mode resets the settings for the speed, turning speed, etc. for the axes to the factory initial values.

Only the speed, turning quantity, movement quantity, etc. are reset. The original positions of the axes are not reset.

(9). Counter settings p. 49 -

In this mode, the production volume and cutting quantity display, full forecast, and tip exchange forecast are set.

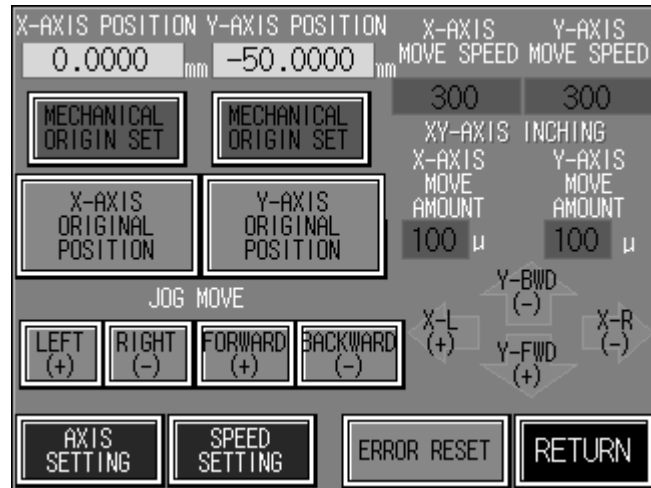
When the "Counter settings" button is pressed, the counter settings screen appears (fig. 19).

When the "Return" button is pressed, the selection screen appears.

* For the initial, recommended and upper/lower limit values of each item, refer to the table (p. 64).

XY-AXIS SETTINGS

When the "XY-axis settings" button in Fig. 12 is pressed after entering the password, the XY-axis settings screen (Fig. 15) appears.



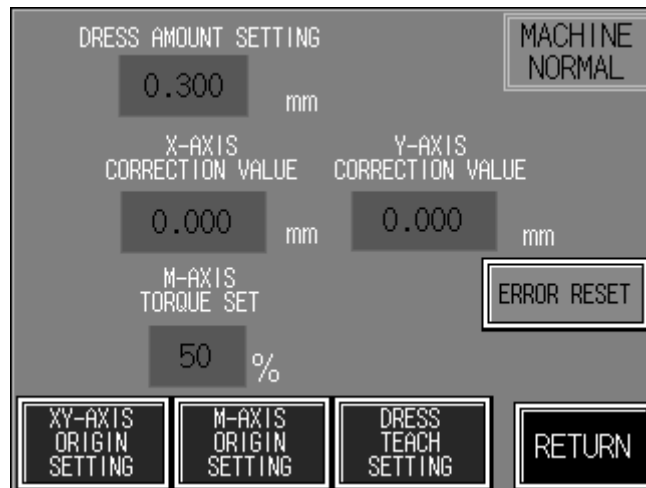
(Fig. 15)

Operation

- (1). When the "Mechanical origin set" button is held down for over 3 seconds, the current position will be set as the mechanical origin. Follow the procedure described below to set the origin properly (see p. 62 -).
- (2). Note) Take due care, as improper setting will cause a mechanical failure.
- (3). When the "Start position return" button for each axis is pressed, the axis moves to the set origin automatically.
- (4). The buttons under jog move are used to move the X- and Y-axis arbitrarily. The axes move at the set jog speed while the button is held down. The moving speed follows the jog speed display for each axis.
- (5). XY-axis inching values indicate the movement quantity in which each axis travels with a press of the arrow button.
 - * The jog speed and the movement quantity are set by entering numbers using the key window which is displayed by touching the display.
 - * For the initial, recommended and upper/lower limit values of each item, refer to the table (p. 64).
- (6). Press the "Return" button to return to the setting change mode (Fig. 12). However, you need to re-enter the password to go to each settings screen.

AXIS SETTINGS

When the "Axis settings" button on the settings screen (Fig. 12) or the "Axis correction" button on the XY-axis settings screen (Fig. 15) is pressed, the axis correction settings screen (Fig. 16) appears. The turning quantity, X- and Y-axis origin correction values, and measurement-axis torque setting (pressing torque) can be set using the key window.



(Fig. 16)

Operation

(1). Turning quantity set

The turning quantity calculated from the measurement value can be set. A value can be set between 0.00 mm and 1.5 mm. Note that the service life of the cutting tip will be shortened proportionally if a large value is set for the turning quantity.

If the turning quantity is set to 0.4 mm or more, turning will be in multiple sections of 0.3 mm. (e.g.: When the tuning quantity is 1.0 mm, three 0.3-mm turnings and one 0.1-mm turning will be performed.)

(2). Axis correction value

Enter the correction values for the mechanical origin. Enter correction values when the dimension of the tip type is not correct after tip exchange. If you have to enter a significantly large correction value to correct the dimension, set the origin (p. 62 -).

(3). Measurement-axis torque setting

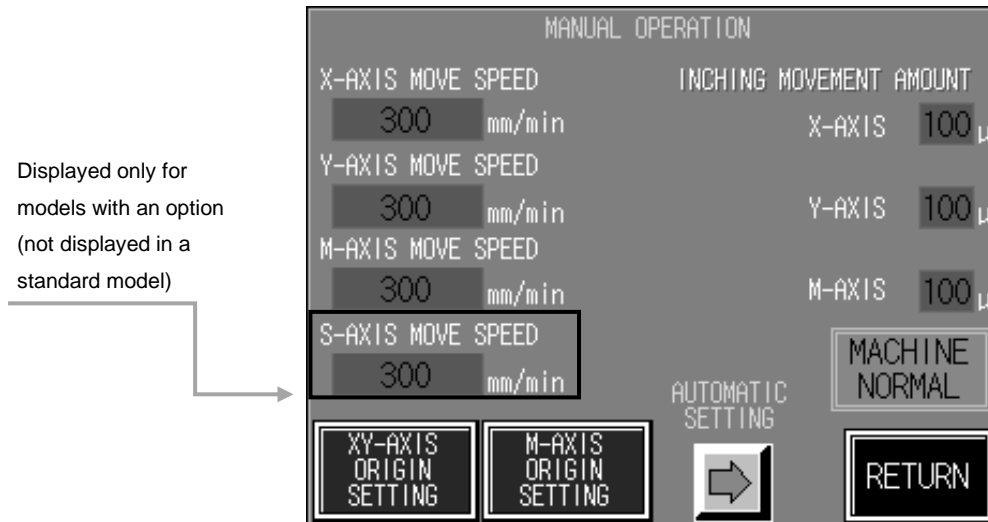
The pressing torque value of the measurement-axis can be set. When a chuck defect occurs frequently, increase the value.

* For the initial, recommended and upper/lower limit values of each item, refer to the table (p. 64).

SPEED SETTINGS

When the "Speed settings" button on the settings screen (Fig. 12) or the "Speed settings" button on the XY-axis settings screen (Fig. 15) is pressed, the speed settings manual operation settings screen (Fig. 17) appears.

- Manual operation settings mode



(Fig. 17)

Operation

- (1). XY-axis jog speed, measurement-axis jog speed, sort-axis jog speed Unit: mm/min

The jog speed for each axis can be set. (The sort-axis jog speed is available only in models with the option)

- (2). Inching movement quantity for X-axis, Y-axis and measurement-axis Unit: μm

The inching movement quantity for each axis can be set.

- * When performing the settings above, touch the value to display the key window, and enter a number.

- (3). When the "XY axis origin correction" or "Measure origin settings" button is pressed on this screen, the XY-axis origin correction screen (p. 33) or the measurement-axis settings screen (p. 46) appears, respectively.

(4). Press the "Return" button to return to the setting change mode (Fig. 12). However, you need to re-enter the password to go to each settings screen.

* For the initial, recommended and upper/lower limit values of each item, refer to the table (p. 64).

- Automatic settings mode

When the arrow button under "Automatic settings" is pressed, the automatic settings screen (Fig. 18) appears.

On this screen, manual settings for cycle start can be set.



(Fig. 18)

Operation

(1). Measurement-axis reduction position Unit: mm

This sets the position to reduce the speed of the measurement-axis from the positioning speed to the measurement torque speed.

The value "0" indicates speed reduction on the mechanical origin, and entering a negative value reduces the speed before the origin. When there is a large variance in measurement, setting a negative value will reduce the variance. However, this will increase the cycle time of the measurement-axis.

(2). Positioning speed Unit: mm/min

This sets the speed to move to the measurement-axis origin. Larger value will shorten the cycle time, but note that a too large value will cause a measurement-axis servo error.

(3). Measurement torque speed Unit: mm/min

This is the moving speed during pressing and measuring. Reduce the speed if the measurement value varies.

Please note that if the speed is too high, it may cause variations in the measurement value or break the spindle shank as a result of overload.

- (4). When the "Turning speed setting" button is pressed, the turning speed setting screen (p. 38 -) appears.

Note that the content of the setting screen will vary depending on the tip type selected on the "Tip type selection screen" (see p. 53).

- (5). When the arrow button under "Manual operation settings" is pressed, the manual operation settings screen (Fig. 17) appears.

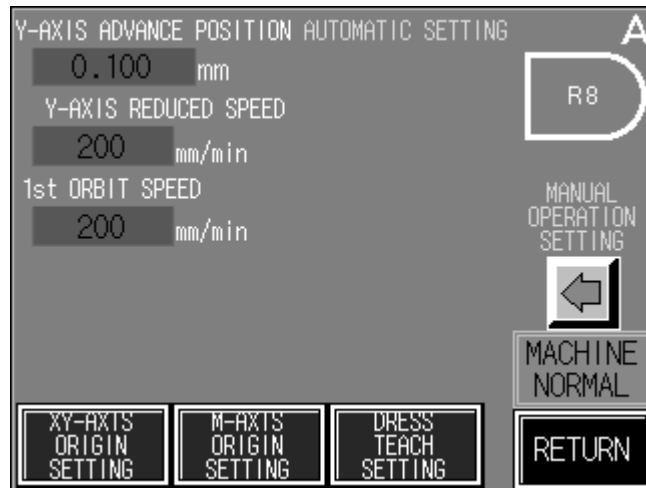
When the "XY axis origin correction" or "Measure origin settings" button is pressed on this screen, the XY-axis origin correction screen (p. 33) or the measurement-axis settings screen (p. 46) appears, respectively.

- (6). Press the "Return" button to return to the setting change mode (Fig. 12). However, you need to re-enter the password to go to each settings screen.

* For the initial, recommended and upper/lower limit values of each item, refer to the table (p. 64).

TURNING SPEED SETTINGS

When the "Turning speed setting" button on the automatic settings screen (Fig. 18) under speed settings is pressed, the turning speed setting screen appears. The content of the setting screen differs depending on the tip type selected on the "Tip type selection screen" (see p. 53).



(Fig. 19)

When shape A is selected on the "Tip type selection screen" (see p. 51), the screen shown as Fig. 19 above appears.

Operation (when tip type A is selected)

- (1). The selected tip type is displayed at the upper right on the screen.
- (2). Y-axis overlap value Unit: mm

The overlap value for the Y-axis during cutting can be set. If the center of the cap tip is not completely cut, increase this value to eliminate the problem.

- (3). Y-axis reduction speed Unit: mm/min

This is the value at which the speed of the Y-axis is reduced to, when it reaches a certain position. This setting reduces the impact of the cutter blade on the cap tip. If the cutting tip breaks frequently, enter a smaller value to reduce the frequency of breakage.

- (4). 1st orbit speed Unit: mm/min

This is the set turning speed for R8 of the cap tip. Larger value will shorten the cycle time, but will make rough surface.

- (5). When the arrow button under "Manual operation settings" is pressed, the manual operation settings screen (Fig. 17) appears.

When the "XY axis origin correction" or "Measure origin settings" button is pressed on this screen, the XY-axis origin correction screen (p. 33) or the measurement-axis settings screen (p. 46) appears, respectively.

- (6). Press the "Return" button to return to the setting change mode (Fig. 12). However, you need to re-enter the password to go to each settings screen.

* For the initial, recommended and upper/lower limit values of each item, refer to the table (p. 64).

Depending on the type B selected on the "Tip type selection screen" (see p. 53), "R8-5-32R" (Fig. 20), "R8-6-40R" (Fig. 21) or "R8-8-50R" (Fig. 22) shown below appears.

All of type B is indicated together, since apart from the tip diameter and R, all of the dimensions are the same.



(Fig. 20)



(Fig.21)



(Fig. 22)

Operation (when tip type B is selected)

- (1). The selected tip type is displayed at the upper right on the screen.
- (2). Y-axis overlap value Unit: mm

The overlap value for the Y-axis during cutting can be set. If the center of the cap tip is not completely cut, increase this value to eliminate the problem.

- (3). Y-axis reduction speed Unit: mm/min

This is the value at which the speed of the Y-axis is reduced to, when it reaches a certain position. This setting reduces the impact of the cutter blade on the cap tip. If the cutting tip breaks frequently, enter a smaller value to reduce the frequency of breakage.

- (4). 1st orbit speed Unit: mm/min

This is the set turning speed for R in the range of the cap tip diameter.

When "R8-5-32R" (Fig. 18) is selected, the tip diameter will be $\phi 5$ R32.

When "R8-6-40R" (Fig. 19) is selected, the tip diameter will be $\phi 6$ R40.

When "R8-8-50R" (Fig. 20) is selected, the tip diameter will be $\phi 8$ R50.

Larger value will shorten the cycle time, but will leave the cutting surface rough.

- (5). 2nd orbit speed Unit: mm/min

This is correction arc connecting the arc of the tip diameter and the recess section.

Normally, set the same speed as the 3rd orbit speed.

- (6). 3rd orbit speed Unit: mm/min

This is the set turning speed for R8 of the cap tip recess. Larger value will shorten the cycle time, but will make rough surface as mentioned above.

- (7). When the arrow button under "Manual operation settings" is pressed, the manual operation settings screen (Fig. 17) appears.

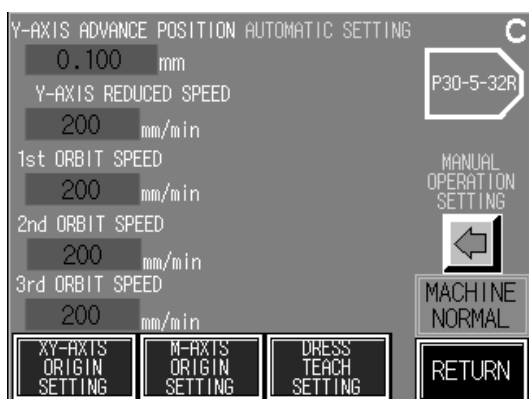
When the "XY axis origin correction" or "Measure origin settings" button is pressed on this screen, the XY-axis origin correction screen (p. 33) or the measurement-axis settings screen (p. 46) appears, respectively.

- (8). Press the "Return" button to return to the setting change mode (Fig. 12). However, you need to re-enter the password to go to the screen for each settings.

* For the initial, recommended and upper/lower limit values of each item, refer to the table (p. 64).

Depending on the type C selected on the "Tip type selection screen" (see p. 53), "P30-5-32R" (Fig. 23), "P30-6-40R" (Fig. 24) or "P30-8-50R" (Fig. 25) shown below appears.

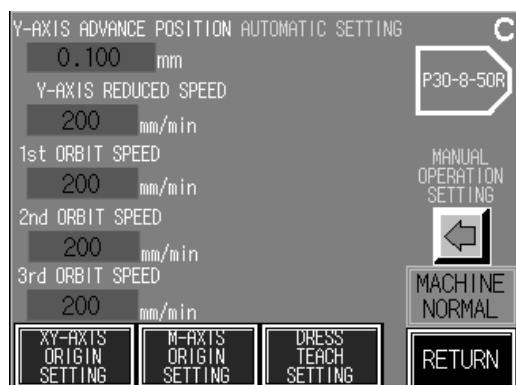
All of type C are described together because all dimensions are same except for the tip diameter and R.



(Fig. 23)



(Fig. 24)



(Fig. 25)

Operation (when tip type C is selected)

- (1). The selected tip type is displayed at the upper right on the screen.
- (2). Y-axis overlap value Unit: mm

The overlap value for the Y-axis during cutting can be set. If the center of the cap tip is not completely cut, increase this value to eliminate the problem.

- (3). Y-axis reduction speed Unit: mm/min

This is the value at which the speed of the Y-axis is reduced to, when it reaches a certain position. This setting reduces the impact of the cutter blade on the cap tip. If the cutting tip breaks frequently, enter a smaller value to reduce the frequency of breakage.

- (4). 1st orbit speed Unit: mm/min

This is the set turning speed for R in the range of the cap tip diameter.

When "P30-5-32R" (Fig. 18) is selected, the tip diameter will be $\phi 5$ R32.

When "P30-6-40R" (Fig. 19) is selected, the tip diameter will be $\phi 6$ R40.

When "P30-8-50R" (Fig. 20) is selected, the tip diameter will be $\phi 8$ R50.

Larger value will shorten the cycle time, but will leave the cutting surface rough.

- (5). 2nd orbit speed Unit: mm/min

This is correction arc connecting the arc of the tip diameter and the taper section.

Normally, set the same speed as the 3rd orbit speed.

- (6). 3rd orbit speed Unit: mm/min

This is the set turning speed for the taper section of the cap tip. Larger value will shorten the cycle time, but will make rough surface as mentioned above.

- (7). When the arrow button under "Manual operation settings" is pressed, the manual operation settings screen (Fig. 17) appears.

When the "XY axis origin correction" or "Measure origin settings" button is pressed on this screen, the XY-axis origin correction screen (p. 33) or the measurement-axis settings screen (p. 46) appears, respectively.

- (8). Press the "Return" button to return to the setting change mode (Fig. 12). However, you need to re-enter the password to go to each settings screen.

* For the initial, recommended and upper/lower limit values of each item, refer to the table (p. 64).

When type D is selected on the "Tip type selection screen" (see p. 53), the screen shown as Fig. 26 appears.



(Fig. 26)

Operation (when tip type D is selected)

- (1). The selected tip type is displayed at the upper right on the screen.
- (2). Y-axis overlap value Unit: mm

The overlap value for the Y-axis during cutting can be set. If the center of the cap tip is not completely cut, increase this value to eliminate the problem.

- (3). Y-axis reduction speed Unit: mm/min

This is the value at which the speed of the Y-axis is reduced to, when it reaches a certain position. This setting reduces the impact of the cutter blade on the cap tip. If the cutting tip breaks frequently, enter a smaller value to reduce the frequency of breakage.

- (4). 1st orbit speed Unit: mm/min

This is the set turning speed for R in the range of the cap tip diameter.

Larger value will shorten the cycle time, but will make rough surface as mentioned above.

- (5). 2nd orbit speed Unit: mm/min

This is correction arc connecting the arc of the tip diameter and the recess section. Normally, set the same speed as the 3rd orbit speed.

- (6). 3rd orbit speed Unit: mm/min

This is the set turning speed for R8 of the cap tip recess. Larger value will shorten the cycle time, but will make rough surface as mentioned above.

- (7). When the arrow button under "Manual operation settings" is pressed, the manual operation settings screen (Fig. 17) appears.

When the "XY axis origin correction" or "Measure origin settings" button is pressed on this screen, the XY-axis origin correction screen (p. 33) or the measurement-axis settings screen (p. 46) appears, respectively.

- (8). Press the "Return" button to return to the setting change mode (Fig. 12). However, you need to re-enter the password to go to each settings screen.

* For the initial, recommended and upper/lower limit values of each item, refer to the table (p. 64).

MEASUREMENT-AXIS SETTINGS

When the "Measure origin settings" button on the settings screen (Fig. 12), axis correction screen, or speed settings screen (Fig. 17, 18) is pressed, the measurement-axis settings screen (Fig. 27) appears. On this screen, the mechanical origin of the measurement-axis can be set.



(Fig. 27)

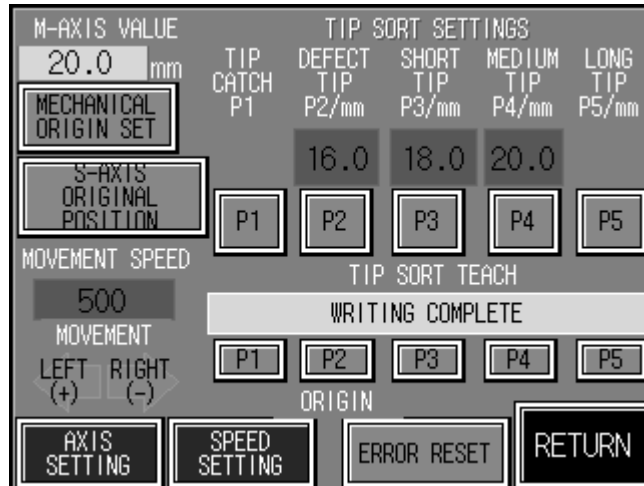
Operation

- (1). When the "Mechanical origin set" button is held down for over 3 seconds, the current value will be set as the mechanical origin. Press "Measure-axis start position" to return to the start position.
- (2). Measurement-axis jog speed Unit: mm/min
The speed for the jog movement can be set by entering a value using the key window.
- (3). Jog move "Forward", "Back"
The axis operates at the speed set above while each button is held down.
- (4). Measurement-axis inching movement quantity Unit: μm
The movement quantity of the inching movement can be set by entering a value using the key window.
- (5). Inching movement "Forward", "Back"
The axis operates at the inching movement quantity set above while each button is held down.

By pressing the "Axis correction" (Fig. 16) button or the "Speed settings" (Fig. 17) button on this screen, you can go to the corresponding screen. When the "Return" button is pressed, the setting change mode screen (Fig. 12) appears.

SORT-AXIS SETTINGS (OPTIONAL)

When the "Sort-axis settings" button is pressed after entering the password on the settings screen (Fig. 12), the sort-axis settings screen (Fig. 28) appears. On this screen, the mechanical origin of the sort-axis (optional) and the rules to sort the finished products can be set.



(Fig. 28)

Operation

(1). Mechanical origin set

When the "Mechanical origin set" button is held down for over 3 seconds, the current position will be set as the mechanical origin. Press the "Sort-axis start position" button to return to the start position.

(2). Sort-axis jog speed Unit: mm/min

The speed for the jog movement can be set by entering a value using the key window.

(3). Jog move "Left", "Right"

The axis operates at the speed set above while each button is held down.

(4). Tip sort settings

The setting for the sorting length can be changed.

Tips with a length that is less than the entered value are added under their respective positions. All tips with the length set for P4 or longer are added under P5. When the button for each position is pressed, it moves to the corresponding setting position. P1 is the tip dropping position.

(5). Tip sorting teach

This is used to make fine adjustment to the discharge position. The location of the position can be changed by moving the sort-axis to the location you want to change the position to, and holding down the button of the corresponding position for over 3 seconds.

The settings can be reviewed when feeding into the product box is unstable, but please note that if it is not set correctly, sorting may not function properly.

By pressing the "Axis correction" (Fig. 16) button or the "Speed settings" (Fig. 17) button on this screen, you can go to the corresponding screen. When the "Return" button is pressed, the setting change mode screen (Fig. 12) appears.

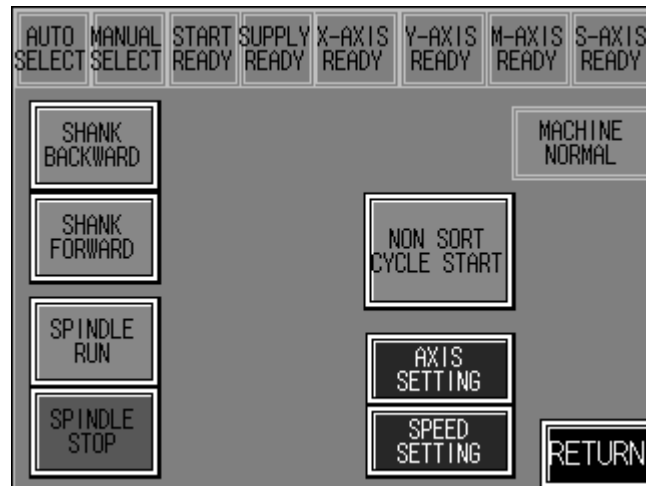
* For the initial, recommended and upper/lower limit values of each item,
refer to the table (p. 64).

TURNING TEACH SETTING

When the "Turning teach screen" button is pressed after entering the password on the setting change mode screen (Fig. 12), the turning teach screen (Fig. 29) appears. This screen is used to turn the cap tip by manual operation, check the turning status, correct the axes and change the turning speed.

In addition, one piece of the cap tip can be turned in automatic operation without running the sorting process. In such case, the cap tip will be chucked in the shank. "Non sort cycle start"

Note) Only those who have received training for mechanical and teaching operations may operate on this screen. Be sure to wear protective equipment. Note that operation by untrained staff may cause mechanical failure or reduction in the turning accuracy.



(Fig. 29)

Operation

- (1). When the "Spindle shift return" or "Spindle shift advance" button is pressed, the spindle shank returns/advances. The origin is at the return end.
- (2). When the "Spindle spin" or "Spindle stop" button is presses, the spindle spins/stops.

Note 1) The spindle will not spin when the front maintenance door is open. Be sure to close it before spinning the spindle. If you open the maintenance door while the spindle is spinning, it stops.

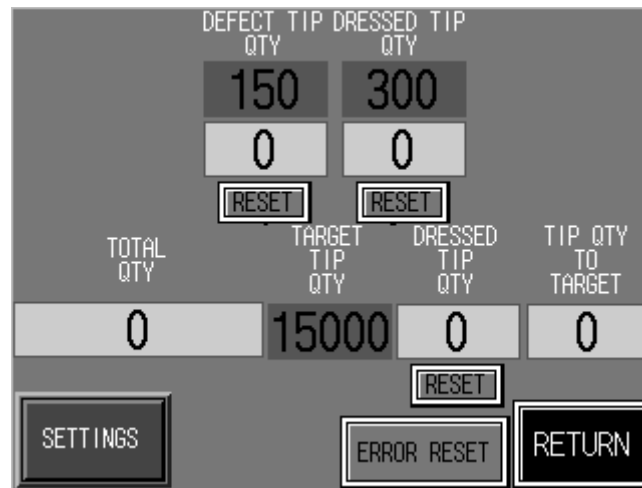
- (3). When "Non sort cycle start" is pressed, the cycle will stop without running the sorting process. Use this button to check the type, in cases such as after exchanging the cutting tip.

Note) It will not operate when the automatic manual selector switch is "Manual." Start operation only after the front maintenance door is closed and the automatic/manual selector switch is changed from "Manual" to "Auto."

- (4). When the "Axis correction" or "Speed settings" button is pressed on this screen, the axis correction screen (p. 34) or the speed settings screen (p. 35) appears, respectively.

COUNTER

When the "Counter" button on the automatic operation screen (Fig. 3) or the "Counter settings" button on the settings screen (Fig. 12) is pressed, the counter screen (Fig. 30) appears. On this screen, the current total production quantity, the number of used cutting chips, etc. can be checked, and the value for exchange forecast can be set.



(Fig. 30)

Operation

(1). Total quantity

The current total of the processed workpieces is displayed. The quantity can be reset by holding down the "Reset" button underneath for over 3 seconds.

(2). Tip counts

The lower box displays the current count for each sorted piece, and the upper box displays the upper limit of full forecast. Using the key window which appears by touching the top numerical boxes, you can set any value. The counts can be reset by holding down the "Reset" button underneath for over 3 seconds. When the count reaches the full forecast volume, the yellow lamp on the signal tower flashes and an error will be displayed on the error screen. The error can be canceled by resetting.

(3). Provisions cutting

This is a value representing the number of cuts to inform you of when to exchange the cutting tip. The value can be changed arbitrarily. As the service life varies depending on the type of the cutting tip and the turning quantity, it is recommended to exchange it periodically.

(4). Cutting quantity

This shows the current number of cut pieces. The counter counts up to the value given under provisions cutting, and the signal tower flashes yellow when the counter reaches the given value. The cutting tip exchange forecast is also displayed on the error screen.

After exchanging the cutting tip, the cutting quantity can be reset by holding down the "Reset" button for over 3 seconds. The cutting tip exchange forecast will also be canceled automatically once you reset.

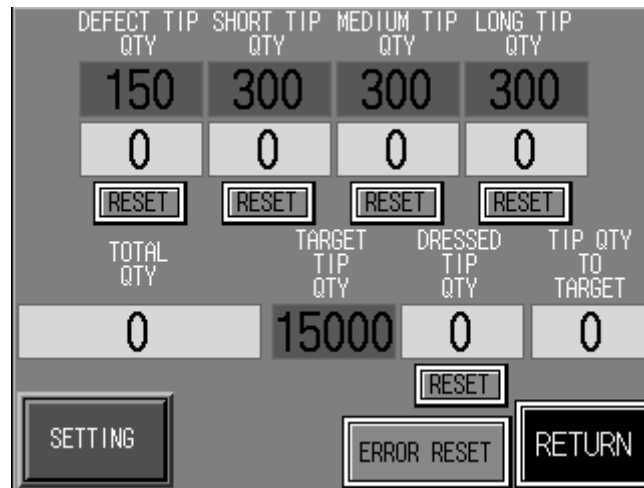
(5). Remaining cutting

Remaining cutting equals to the number extracting Cutting quantity from Provisions cutting. This value is a guidance value for tip exchange. It is recommended to exchange the tip before the value reaches zero.

* For the initial, recommended and upper/lower limit values of each item,
refer to the table (p. 64).

COUNTER (OPTIONAL SORTER)

When the "Counter" button on the automatic operation screen (Fig. 3) or the "Counter settings" button on the settings screen (Fig. 12) is pressed, the counter screen (Fig. 31) appears. On this screen, the current total production quantity, the number of used cutting chips, etc. can be checked, and the value for exchange forecast can be set.



(Fig. 31)

Operation

(1). Total quantity

The current total of the processed workpieces is displayed. The quantity can be reset by holding down the "Reset" button underneath for over 3 seconds.

(2). Tip counts

The lower box displays the current count for each sorted piece, and the upper box displays the upper limit of full forecast. Using the key window which appears by touching the top numerical boxes, you can set any value. The counts can be reset by holding down the "Reset" button underneath for over 3 seconds. When the count reaches the full forecast volume, the yellow lamp on the signal tower flashes and an error will be displayed on the error screen. The error can be canceled by resetting.

(3). Provisions cutting

This is a value representing the number of cuts to inform you of when to exchange the cutting tip. The value can be changed arbitrarily. As the service life varies depending on the type of the cutting tip and the turning quantity, it is recommended to exchange it periodically.

(4). Cutting quantity

This shows the current number of cut pieces. The counter counts up to the value given under provisions cutting, and the signal tower flashes yellow when the counter reaches the given value. The cutting tip exchange forecast is also displayed on the error screen.

After exchanging the cutting tip, the cutting quantity can be reset by holding down the "Reset" button for over 3 seconds. The cutting tip exchange forecast will also be canceled automatically once you reset.

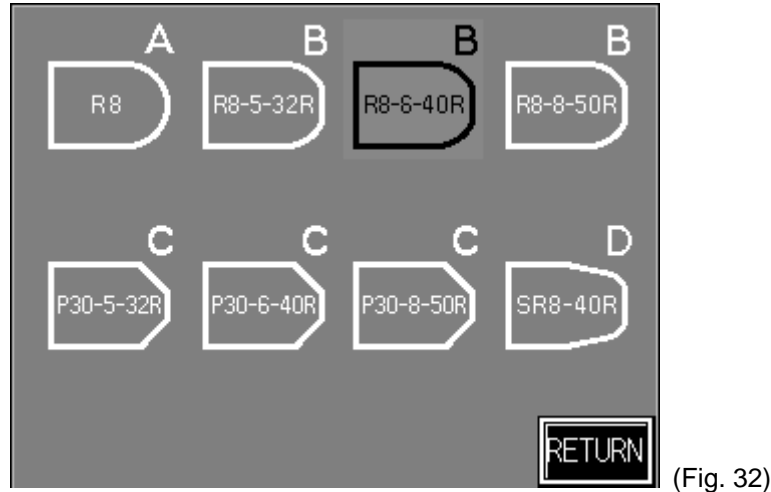
(5). Remaining cutting

Remaining cutting equals to the number extracting Cutting quantity from Provisions cutting. This value is a guidance value for tip exchange. It is recommended to exchange the tip before the value reaches zero.

* For the initial, recommended and upper/lower limit values of each item,
refer to the table (p. 64).

TIP TYPE SELECTION

When the "Tip type selection screen" button on the selection screen (Fig. 12) in p. 30 is pressed, the tip type selection screen (Fig. 32) appears. On this screen, the turning program to create the tip type can be selected.



Operation

- (1). A turning program can be selected by holding down the button for the type to be turned for over 3 seconds. The color of the selected program display will be inverted and "Select" will appear.

Also, the type of the selected turning program will be displayed on the automatic operation screen (Fig. 3) in p. 18.

- (2). Buttons

Type A "R8" Program

Type B "R8-5-32R" tip diameter $\phi 5$, tip R32; "R8-6-40R" tip diameter $\phi 6$, tip R40;

"R8-8-50R" tip diameter $\phi 8$, tip R50. Recess for Type B is R8.

Type C "P30-5-32R" tip diameter $\phi 5$, tip R32; "P30-6-40R" tip diameter $\phi 6$, tip R40;

"P30-8-50R" tip diameter $\phi 8$, tip R50. Recess for Type C is 30° tapered.

Type D "SR8-40R" tip diameter $\phi 6$, tip R40

Type D is slim-shaped, with R8 up to $\phi 12$ of the recess and the rest tapered.

ALL RESET

The values for the jog speed, movement quantity, cutting speed, etc. can be reset to the factory initial values.

The values subject to reset are only those listed on the table (p. 64).

This function can be used to recover the factory setting to correct the defects etc. which are caused by changing the setting values.

* Note that the origin for each servo axis will not be reset.



(Fig. 33)

Display, operation

- (1). Enter the password on the setting change screen (Fig. 34), then hold down the "All reset" button for over 3 seconds.

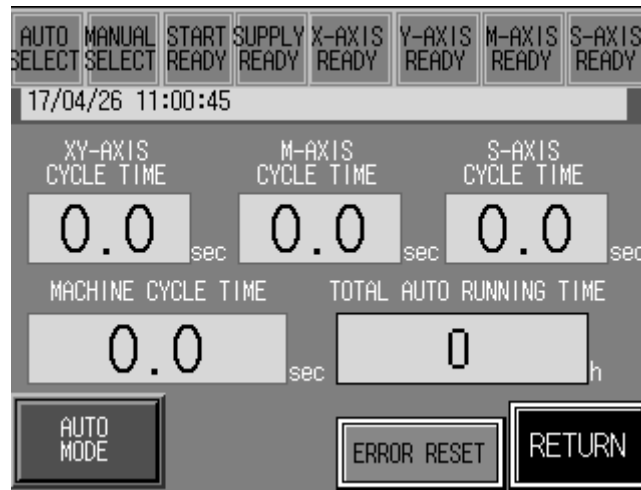


(Fig. 34)

- (2). On the pop-out window, hold down "Yes" for over 3 seconds to perform reset. * The values change to the initial values listed on the table (p. 64) in this manual.

CYCLE TIME

When the "Cycle time" button on the automatic operation screen (Fig. 3) is pressed, the cycle time screen (Fig. 35) appears. This screen displays the cycle time of each axis, the machine cycle time and the total automatic running time. When the "Auto mode" button or "Return" is pressed, the automatic operation screen (Fig. 3) or the selection screen (Fig. 5) appears, respectively.



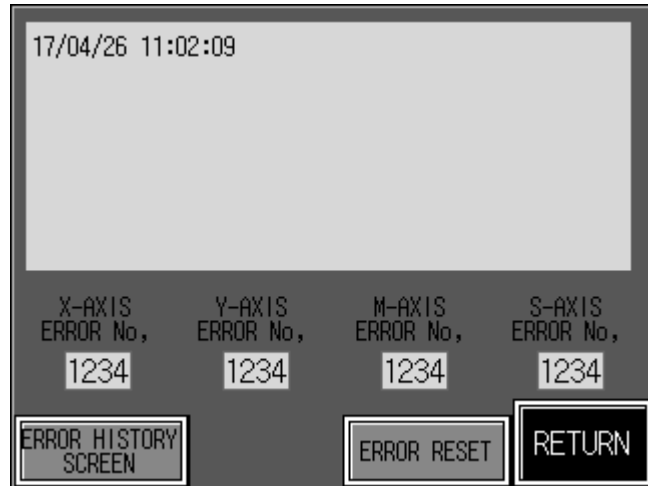
(Fig. 35)

Display

- (1). XY-axis cycle time Unit: sec (seconds)
This indicates the time the XY-stage is running.
The time indicated here is the actual turning time.
- (2). Measurement-axis cycle time Unit: sec (seconds)
This indicates the time the pressing and measurement process is in progress.
- (3). Sorting-axis cycle time Unit: sec (seconds)
This indicates the time the sorting process of the finished tips is in progress.
- (4). Machine cycle time Unit: sec (seconds)
This indicates the time needed to turn one piece of cap tip.
- (5). Total auto' running time Unit: h (hours)
This indicates the total time automatic cycle is in operation.

ERROR DISPLAY SCREEN

This screen appears when you press the "Error screen" button on the automatic operation screen (Fig. 3) or selection screen (Fig. 5), or in the event of a machine error, exchange forecast, etc.



(Fig. 36)

Display, operation

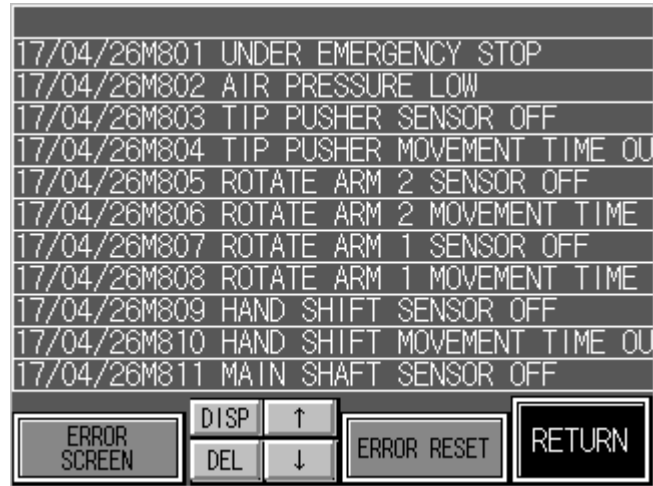
(3). When there is an error or a forecast, the signal tower flashes in red, the buzzer sounds, and the current status will be displayed in the upper frame. When a servo error of the axes occurs, the error code will also be displayed on the bottom row. The content of the error can be understood from error code. When an error or forecast is displayed, it can be reset by pressing the "error reset" button to recover the normal status. In the event of errors which are cannot be reset or forecasts, only the buzzer is reset, so you have to recover the normal status in manual operation.

(4). Error history screen

When the "Error history screen" button is pressed, a screen where you can check the error history appears (Fig. 37).

ERROR HISTORY SCREEN

When the "Error history screen" button is pressed on the error screen (Fig. 36), the error history screen where you can check the error history appears.



(Fig. 37)

Operation

In the upper frame, the history is displayed along with the date, time and the error code.

Press the arrow button to select a history item.

Press "Del" to delete the selected history item.

Press the "Error screen" button to go back to the error screen, and the "Return" button to return to the selection screen.

ERROR CODE TABLE

Code	Error information	Detail
M801	UNDER EMERGENCY STOP	Emergency stop is pressed.
M802	AIR PRESSURE LOW	Air pressure is dropping.
M803	TIP PUSHER SENSOR OFF	Tip pusher LSs are both turned ON or OFF.
M804	TIP PUSHER MOVEMENT TIME OUT	The motion end could not be confirmed even after a certain time.
M805	ROTATE ARM 2 SENSOR OFF	Arm turn 2 LSs are both turned ON or OFF.
M806	ROTATE ARM 2 MOVEMENT TIME OUT	The motion end could not be confirmed even after a certain time.
M807	ROTATE ARM 1 SENSOR OFF	Arm turn 1 LSs are both turned ON or OFF.
M808	ROTATE ARM 1 MOVEMENT TIME OUT	The motion end could not be confirmed even after a certain time.
M809	HAND SHIFT SENSOR OFF	Arm shift LSs are both turned ON or OFF.
M810	HAND SHIFT MOVEMENT TIME OUT	The motion end could not be confirmed even after a certain time.
M811	MAIN SHAFT SENSOR OFF	Spindle LSs are both turned ON or OFF.
M812	MAIN SHAFT GATE TIME OUT	The motion end could not be confirmed even after a certain time.
M813	SORT EJECT SENSOR OFF	Sort discharge LSs are both turned ON or OFF.
M814	SORT EJECT MOVEMENT TIME OUT	The motion end could not be confirmed even after a certain time.
M815	SORT CYLINDER SENSOR OFF	Sort cylinder LSs are both turned ON or OFF.
M816	SORT CYLINDER MOVEMENT TIME OUT	The motion end could not be confirmed even after a certain time.
M817	PARTS SHOOTER SENSOR TIME OUT	A workpiece could not be confirmed even after a certain time.
M818	TIP PUSHER WORKPIECE EMPTY	Work is running out in front of pusher
M839	INVERTER ERROR	An inverter error has occurred.

		Check the display on the inverter for detail.
M840	Y-AXIS SERVO ERROR	X-axis servo error has occurred. Check the X-axis error code for detail.
M841	Y-AXIS SERVO ERROR	Y-axis servo error has occurred. Check the Y-axis error code for detail.
M842	M-AXIS SERVO ERROR	Measurement-axis servo error has occurred. Check the measurement-axis error code for detail.
M843	S-AXIS SERVO ERROR	Sort-axis servo error has occurred. Check the sort-axis error code for detail.

ALARM CODE TABLE

Code	Error information	Detail
M823	WORK OUT IN PARTS FEEDER	There is no workpiece in the parts feeder.
M824	WORK OUT IN HOPPER	There is no workpiece in the hopper.
M831	WORKPIECE FEED DOOR OPEN	The workpiece feeding door is open.
M832	NG TIP CONTAINER FULL	The container for NG tips is full.
M833	SHORT LENGTH TIP CONTAINER FULL	The container for small tips is full.
M834	MIDIUM LENGTH TIP LENGTH CONTAINER FULL	The container for medium tips is full.
M835	LONG LENGTH TIP CONTAINER FULL	The container for large tips is full.
M836	TRAGET NUMBER ACHIEVE	Tip cutting quantity has exceeded the provision quantity.
M837	FRONT DOOR OPEN	The shutter is open.
M838	PLC BATTERY LOW	The CPU battery voltage is low. Replace the battery immediately.
M844	SERVO AMPLIFIER BATTERY LOW	The servo amplifier battery voltage is low. Replace the battery immediately.
M845	TOUCH PANEL BATTERY LOW	The GOT battery voltage is low. Replace the battery immediately.

TABLE FOR INITIAL VALUES AND RECOMMENDED VALUES

Check the table below for the initial, recommended and upper/lower limit values of each item.

See the listed page for the detail on each item.

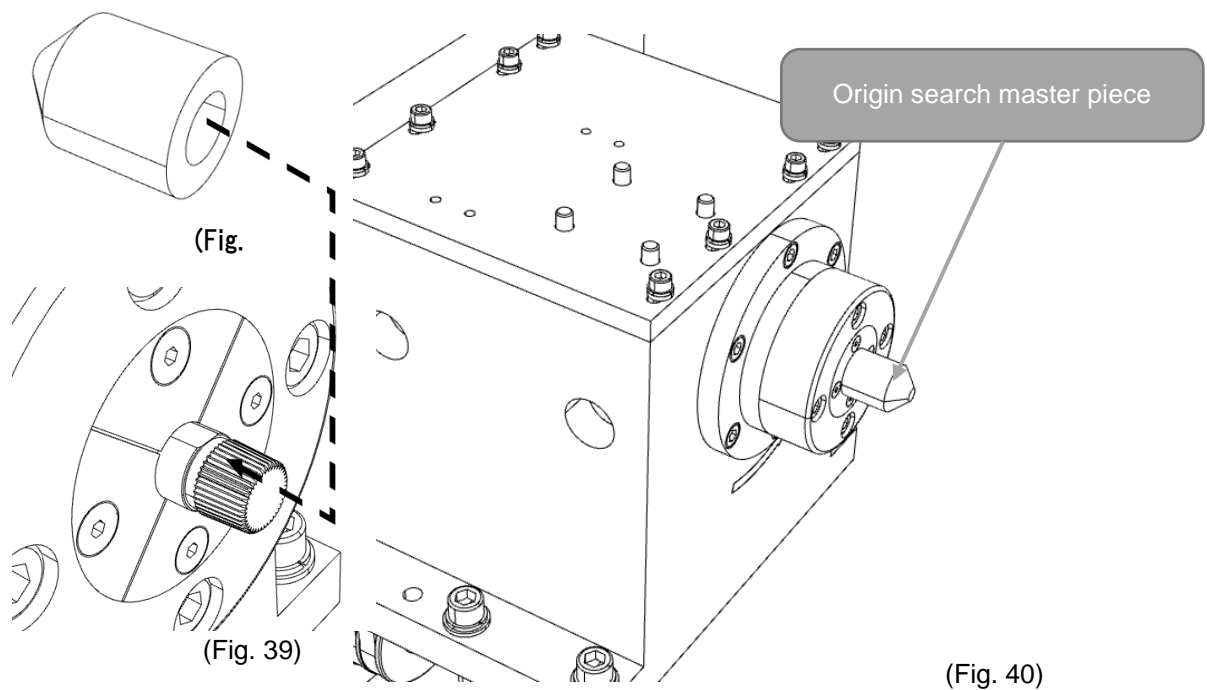
Name	Page	Initial value	Recommended value	Upper limit value	Lower limit value
X-axis jog speed	p. 33/p. 35	300	300	1000	1
X-axis movement quantity	p. 33/p. 35	50	50	100	1
Y-axis jog speed	p. 33/p. 35	300	300	1000	1
Y-axis movement quantity	p. 33/p. 35	50	50	100	1
Turning quantity set	p. 34	0.100	0.200	1.500	0.000
X-axis correction value	p. 34	0.000	0.000	1.000	-1.000
Y-axis correction value	p. 34	0.000	0.000	1.000	-1.000
Measurement-axis torque	p. 34	40	40	100	40
Measurement-axis jog speed	p. 34/p. 46	300	300	1000	1
Measurement-axis movement quantity	p. 34/p. 46	50	50	100	1
Sort-axis jog speed*	p. 35/p. 46	500	500	1000	1
Measurement-axis reduction position	p. 36	-15.000	-15.000	-5.000	-80.000
Positioning speed	p. 36	10000	10000	15000	7500
Measurement-axis torque speed	p. 36	2500	2500	5000	500
Y-axis overlap value	p. 37 -	0.100	0.100	0.500	0.000
Y-axis reduction speed	p. 37 -	200	200	250	1
1st orbit speed	p. 37 -	200	200	500	1
2nd orbit speed	p. 37 -	200	200	500	1
3rd orbit speed	p. 37 -	200	200	500	1
NG tip	p. 47	16.0	16.5	23.0	16.0
Small tip	p. 47	18.0	18.0	23.0	16.0
Medium tip	p. 47	20.0	22.0	23.0	16.0
NG tip count	p. 49	100	150	1000	1
Small tip count	p. 49	200	300	1000	1
Medium tip count	p. 49	200	300	1000	1
Large tip count	p. 49	200	300	1000	1
Provisions cutting	p. 49	10000	15000	25000	500

HOW TO SET THE ORIGIN

When the origins of the axis get out of position for some reason or after you exchange the cutting tool bit, you need to set the origin again. The procedure to set the origin of each axis is as follows.

- How to set the XY-axis

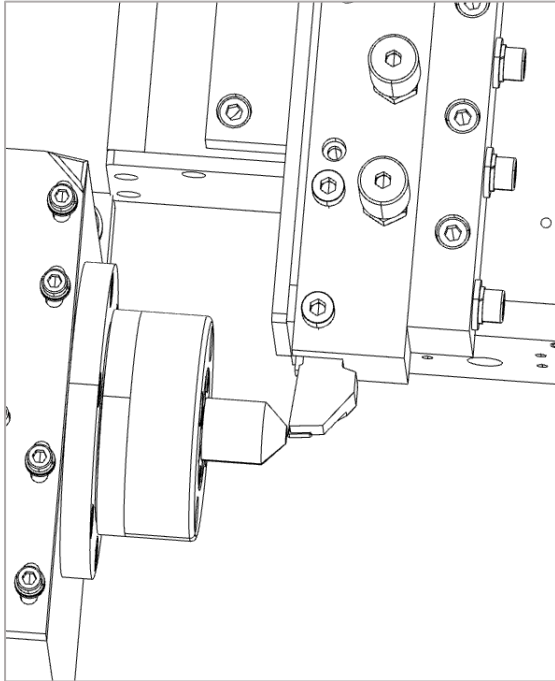
- (1). Select "Manual" on the mode selector switch. The manual mode screen appears automatically (Fig. 4).
- (2). Press the "Spindle shift advance" button on the manual mode screen (Fig. 4) to advance the shank.
- (3). Fit the shank (Fig. 39) into the hole of the origin search master piece (Fig. 38), as shown below.



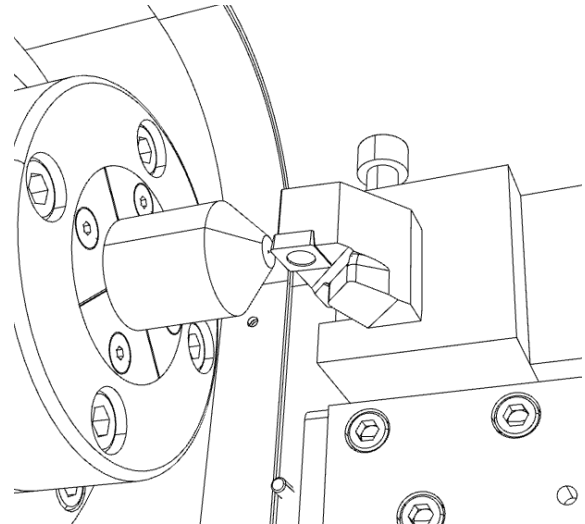
- (4). Return to the selection screen (Fig. 5). After entering the password on the setting screen (Fig. 12), go to the XY-axis settings screen (Fig. 15).

- (5). Using the jog and inching movements, move the tip of the cutting tip on the XY-axis to touch the center of the origin search master piece (Fig. 41, 42).

When making a contact, use the center punch of the origin search master piece as the guide.



(Fig. 41)

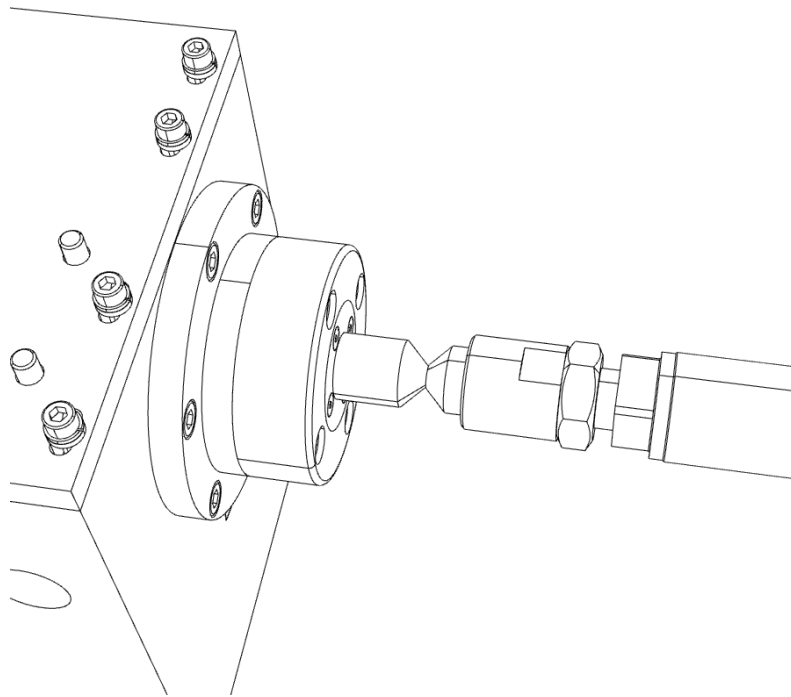


(Fig. 42)

- (6). Hold down the "Mechanical origin set" button for the X- and Y-axis on the XY-axis setting screen (Fig. 15) for over 3 seconds to set the mechanical origin. Setting will complete when the current value for each axis becomes 0.
- (7). Press the "Start position return" button for each axis to return to the origin.
- (8). Remove the origin search master and move the spindle shank backward.
- (9). If there is a problem in cutting, enter a correction value in axis correction.
- (10). If correction cannot be made even a correction value of 1 mm or more is entered, set the origin again.

- How to set the measurement-axis

- (1). Perform steps (1) to (3) under How to set the XY-axis.
- (2). Return to the selection screen (Fig. 5) and from the setting screen (Fig. 12), go to the measurement-axis setting screen (Fig. 27).
- (3). Using jog movement and inching movement, move the tip of the pressing part of the measurement-axis until it touches the tip of the origin search master piece (Fig. 43).



(Fig. 43)

- (4). Hold down the "Mechanical origin set" button on the measurement-axis setting screen (Fig. 27) for over 3 seconds to set the mechanical origin. Setting will complete when the current value for the measurement-axis becomes 0.
- (5). Press the "Measure-axis start position" button to return to the origin.
- (6). Remove the origin search master piece and move the spindle shank backward.
- (7). When the measurement values vary, repeat the above setting change.

- How to set the sort-axis (only for a model with an option)

The start position of the sort-axis is at "P2."

- (1). Select "Manual" on the mode selector switch. The manual mode screen appears automatically (Fig. 4).
- (2). Go to the measurement-axis setting screen (Fig. 28) from the setting screen (Fig. 12).



(Fig. 28)

- (3). Press the "P2" button at the top and move the transport box.
- (4). Using jog movement, move the transport box to a position you want, and hold down the "Mechanical origin set" button or the "P2" button for over 3 seconds to set the origin.
- (5). Press the "Sort-axis start position" button to return to the origin.
- (6). Now the setting is complete. If the sorting position is not set properly, set it again.

MAINTENANCE PARTS

Perform maintenance of the machine periodically to keep a normal operation status.

When performing maintenance, be sure to shut off the power and air completely for safety.

- Maintenance parts in the spindle unit

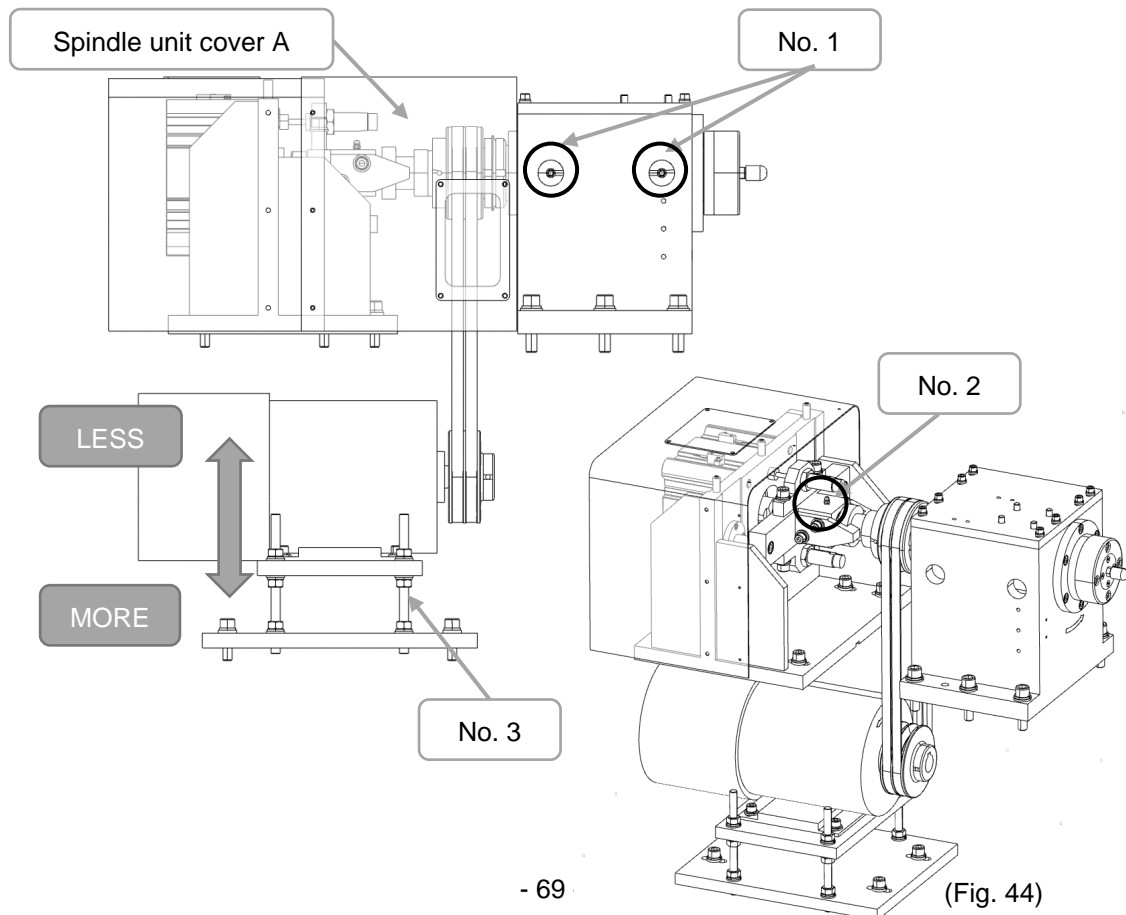
No.	Name	Method	Recommended grease	Interval
1	Spindle bearing	Greasing	Multemp PS No. 2 (Kyodo Yushi Co., Ltd.)	Every 6 months
2	Shift axis bearing	Greasing	Multemp PS No. 2 (Kyodo Yushi Co., Ltd.)	Every 6 months
3	V-belt	Tension adjustment		Every 3 months

(1). Refer to the figure and apply grease to each part.

When greasing the No. 1 spindle bearing, use a grease gun to apply grease from the grease inlet.

When greasing the No. 2 shift bearing, remove the spindle unit cover A and apply grease.

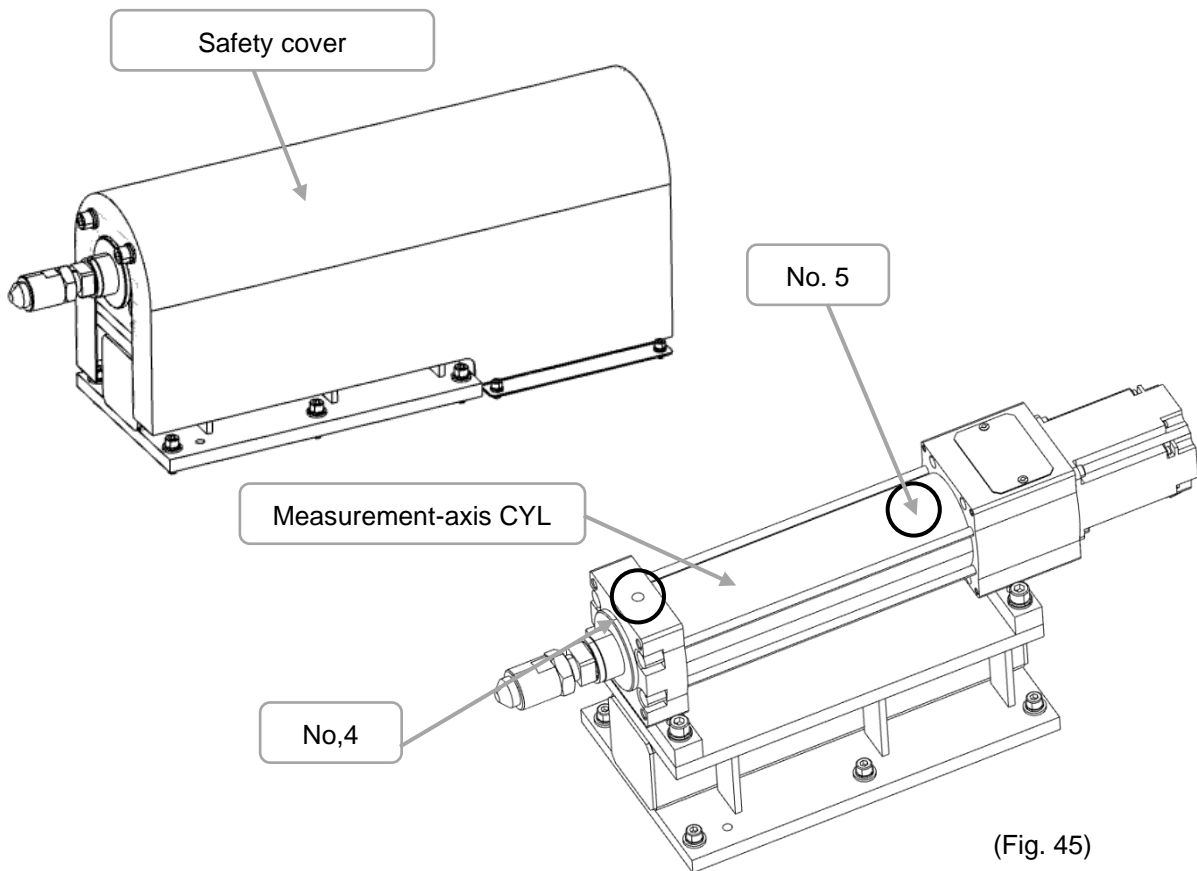
To adjust the tension of the No. 3 V-belt, follow the V-belt exchanging procedure (p. 72) described later.



- Maintenance parts in the measurement-axis

No.	Name	Method	Recommended grease	Interval
4	Measurement-axis CYL	Greasing	Multemp PS No. 2 (Kyodo Yushi Co., Ltd.)	Every 6 months
5	Measurement-axis CYL	Spraying Grease (1 sec per spray)	Spray grease No.161 (WAKO CHEMICAL CO., LTD)	Every 1 month

(1). Refer to the figure and remove the safety cover, then apply grease.

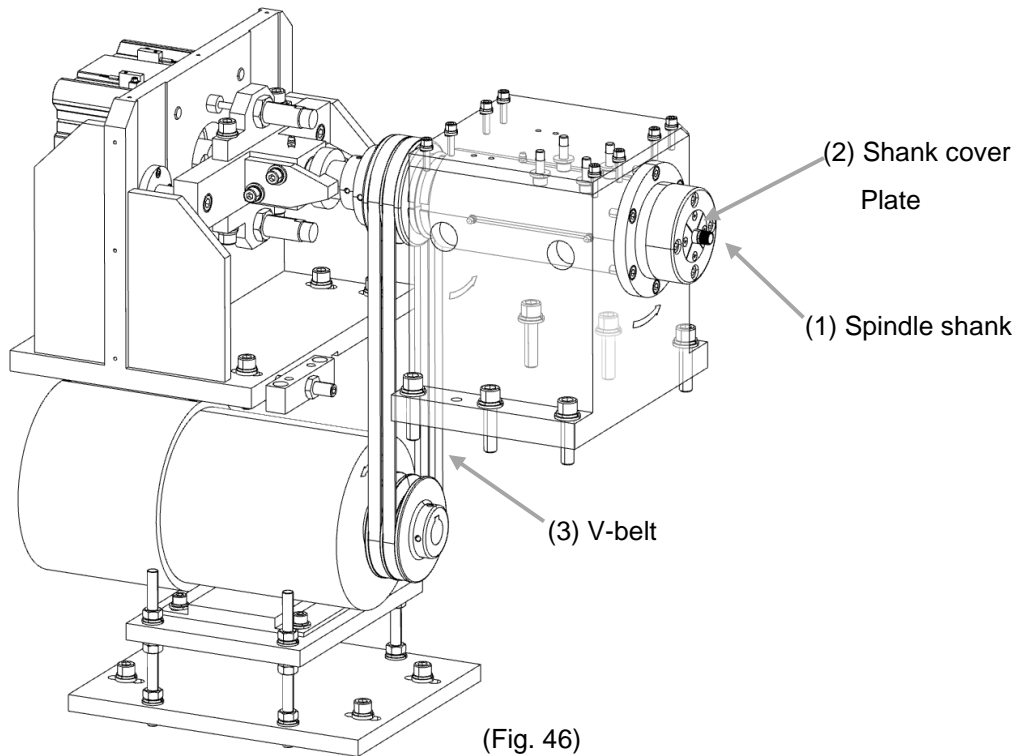


- For other sliding parts, apply grease as appropriate.

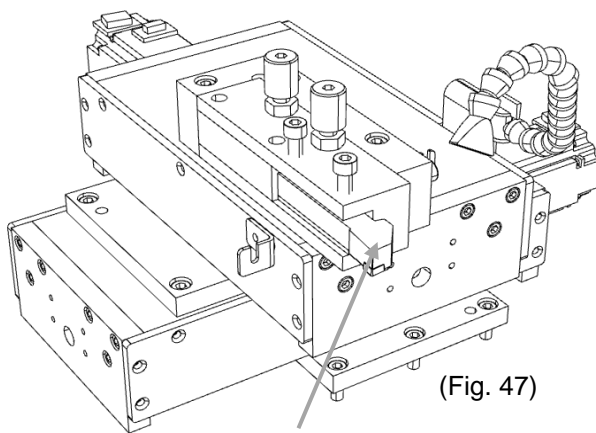
LIST OF CONSUMABLES

The consumables for this machine are shown below. When exchanging consumables, carefully read the procedures described later and replace them properly.

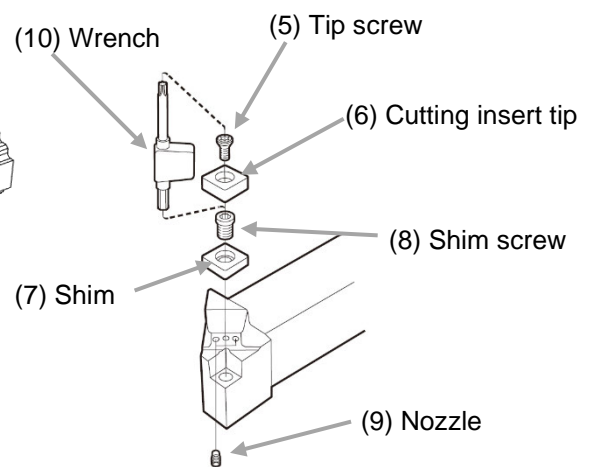
(1). Spindle unit



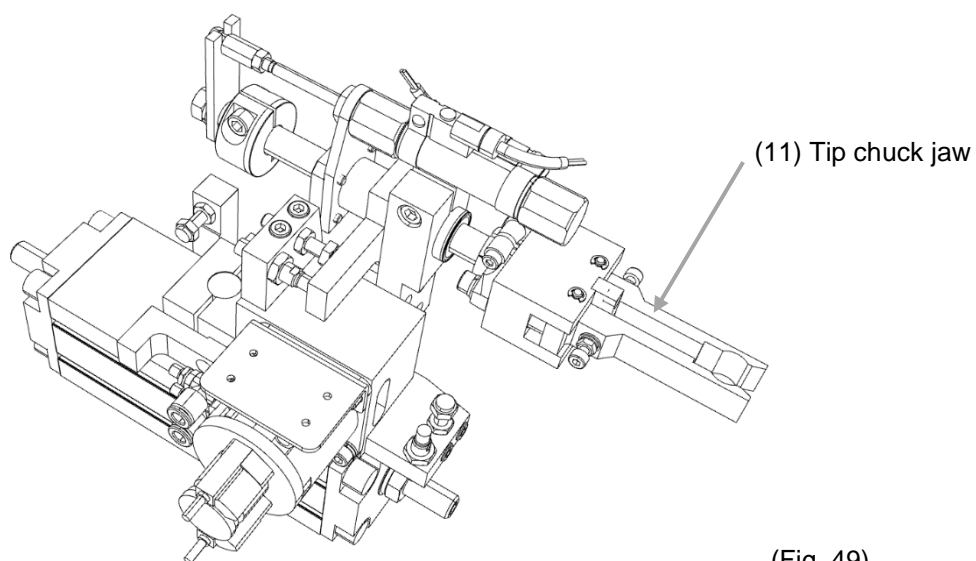
(2). XY stage



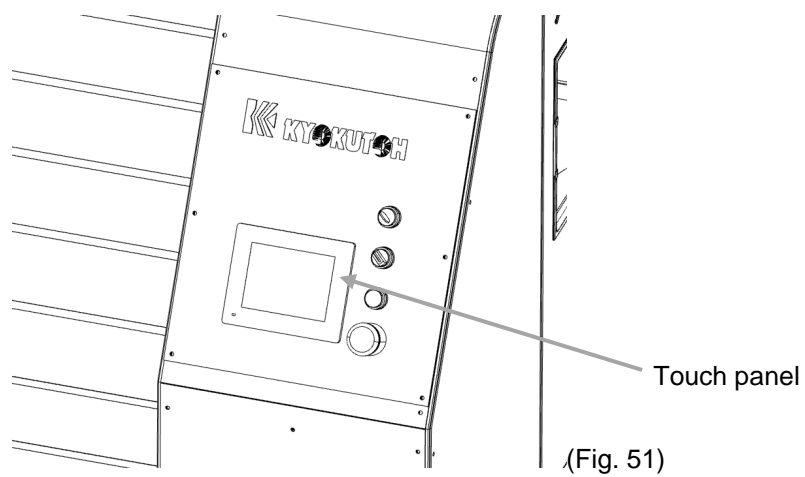
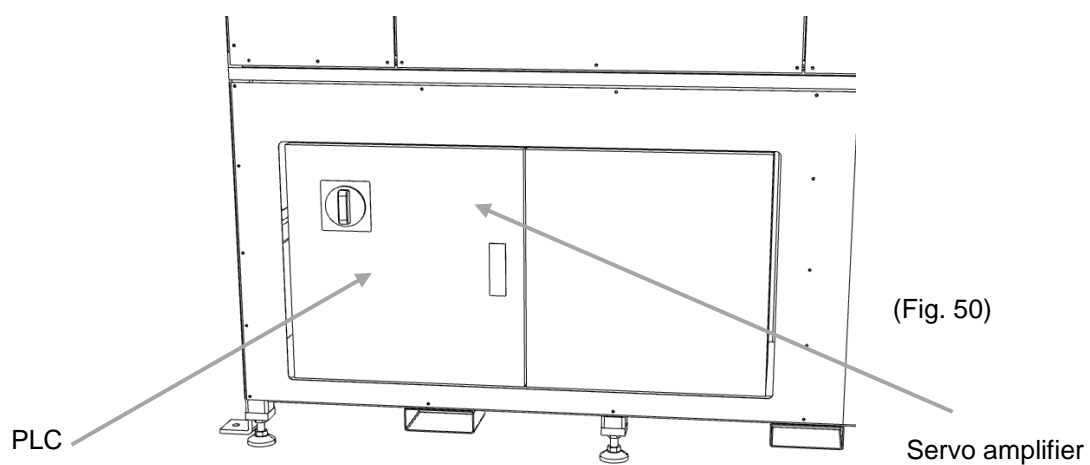
(4) Outer diameter tool bit holder detail



(3). Supply/transport unit

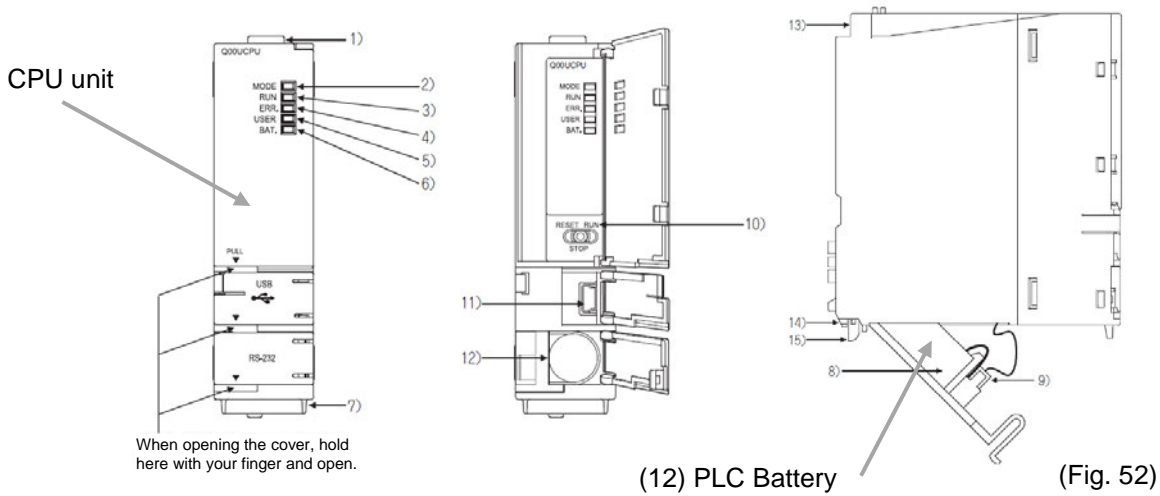


(4). Batteries



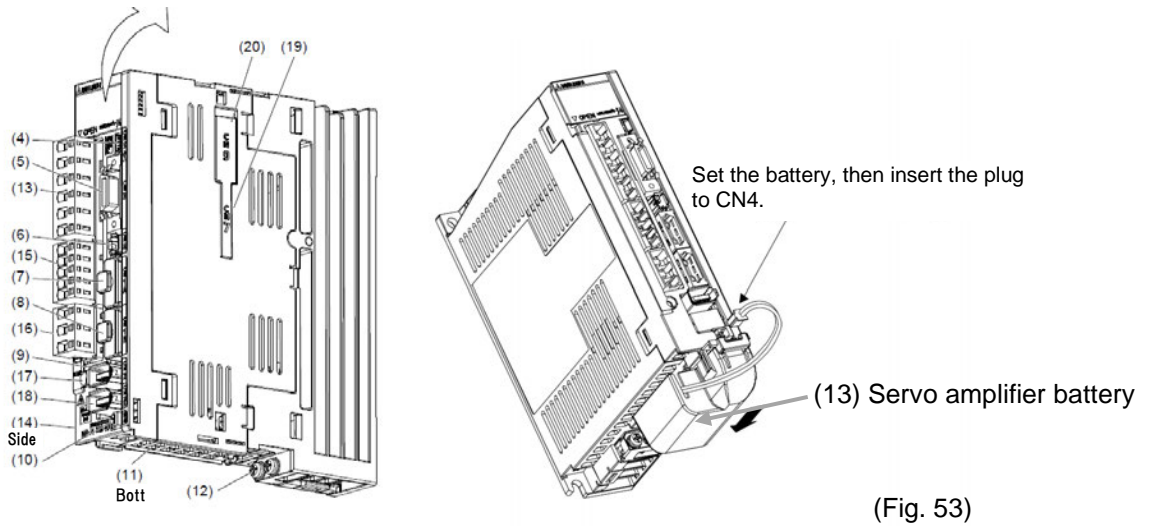
- PLC battery

Estimated replacement interval: approx. 5 years



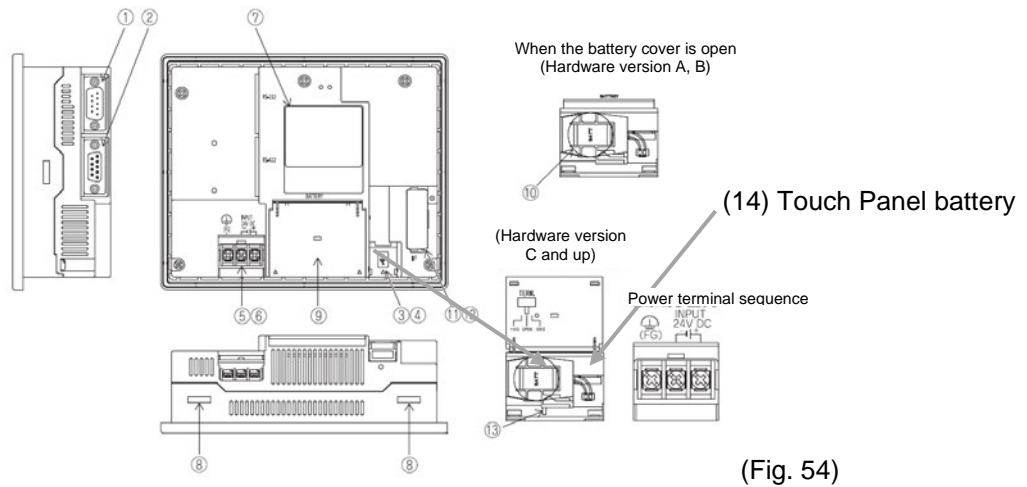
- Servo amplifier battery

Estimated replacement interval: approx. 3 years



- Touch panel battery

Estimated replacement interval: approx. 5 years



- List of consumables

	Name	Model	Qty	Manufacturer	Recommended replacement interval
Spindle unit					
(1)	Spindle shank (for $\phi 16$ tips)	IKK-ATRM-008-020-7	1	Kyokutoh Co., Ltd.	6 months *1
(2)	Shank cover plate	IKK-ATRM-008-020-6	1	Kyokutoh Co., Ltd.	1 year *1
(3)	Red label V-belt	A-37	2	Mitsuboshi Belting Ltd.	2 years
XY stage					
(4)	Outer diameter tool bit holder	SCLCR1616H09HP	1	Sandvik	2 years
(5)	Tip screw	5513 020-01	1	Sandvik	6 months *2
(6)	Cutting insert tip	CCGX09T304-AL	1	Sandvik	1 month *3
(7)	Shim	5322 232-01	1	Sandvik	6 months *2
(8)	Shim screw	5512 090-01	1	Sandvik	6 months *2
(9)	Nozzle	5691 026-13	3	Sandvik	2 years
(10)	Wrench	5680 049-01	1	Sandvik	2 years
Supply/transport unit					
(11)	Tip chuck jaw	IKK-ATRM-008-080-1	2	Kyokutoh Co., Ltd.	3 years
Batteries					
(12)	PLC Battery	Q6BAT	1	Mitsubishi Electric Corporation	5 years
(13)	Servo amplifier battery	MR-BAT6V1	2 *4	Mitsubishi Electric Corporation	3 years
(14)	Touch panel battery	GT11-50BAT	1	Mitsubishi Electric Corporation	5 years

*1 If there is any abrasion, breakage, deformation, etc. on the spindle shank or the shank cover plate, replace immediately, regardless of the replacement interval.

*2 If there is any wobbling, deformation, etc. on the tip screw, shim or shim screw, replace immediately, regardless of the replacement interval.

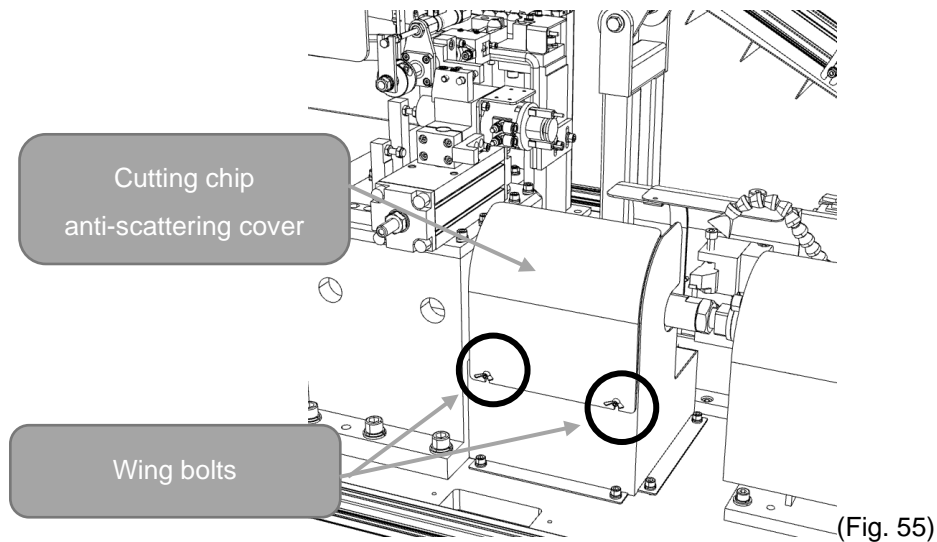
*3 The replacement interval of the cutting insert tip is a guideline calculated for operating conditions where the turning quantity is 0.3 mm and the operating time is 8 hours/day, 20 days/month. Note that the replacement interval may be shorter depending on the turning quantity, cutting speed, cap tip material, etc.

*4 For models with a finished product sorting servo unit (optional), the quantity will be 3.

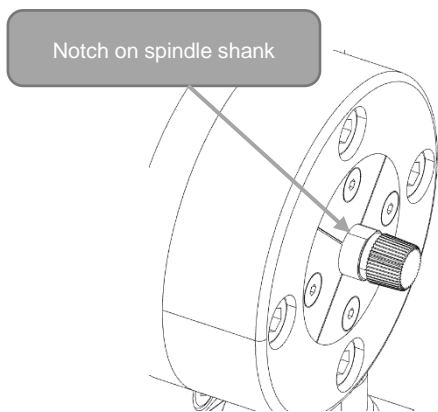
HOW TO REPLACE AND ADJUST THE SPINDLE SHANK AND V-BELT

- How to replace the spindle shank

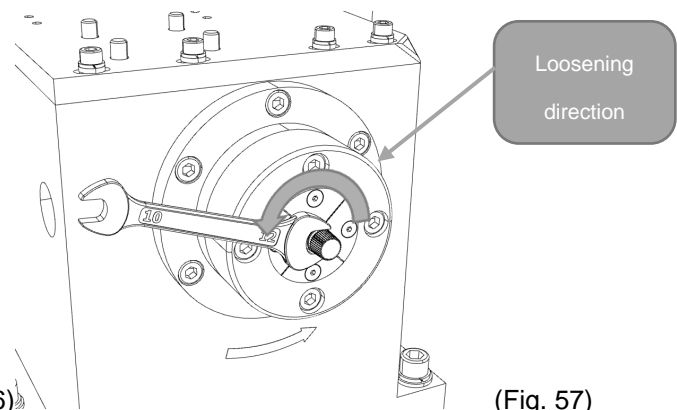
- (1). Select "Manual" on the automatic/manual selector switch. The manual mode screen appears automatically (Fig. 4).
- (2). Press the "Return" button to go to the selection screen (Fig. 5).
- (3). Press the "Spindle shift advance" button to move the spindle shank forward.
- (4). Completely shut off the power of the machine.
- (5). Loosen and remove the wing bolts on the cutting chip anti-scattering cover at the two locations marked with circles (Fig. 55).



- (6). Fit a 12-mm spanner to the notch (Fig. 56) of the spindle shank, and turn the spanner counterclockwise to loosen and remove the spindle shank. (Fig. 57)



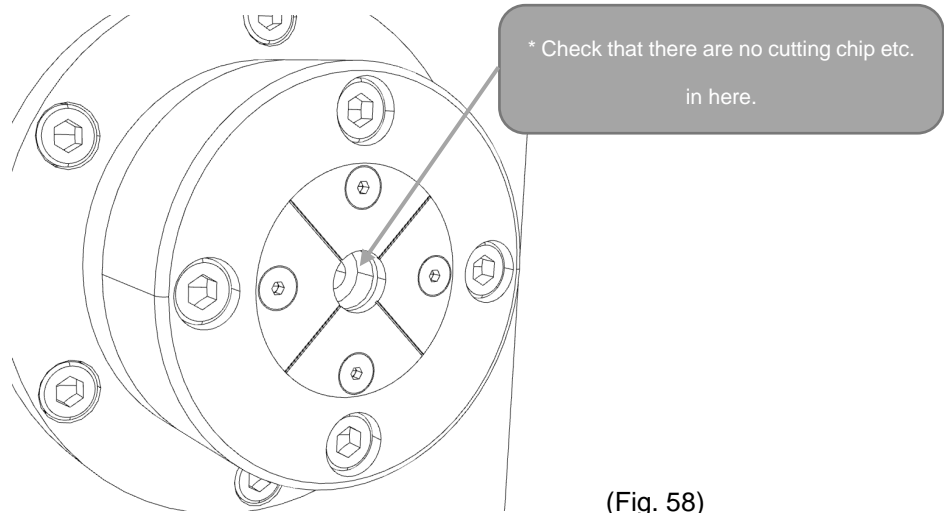
(Fig. 56)



(Fig. 57)

(7). Check that there are no cutting chips inside, and install a new spindle shank.

* Remove any cutting chips etc. inside.



(Fig. 58)

(8). Tighten the spindle shank, following the procedure backward.

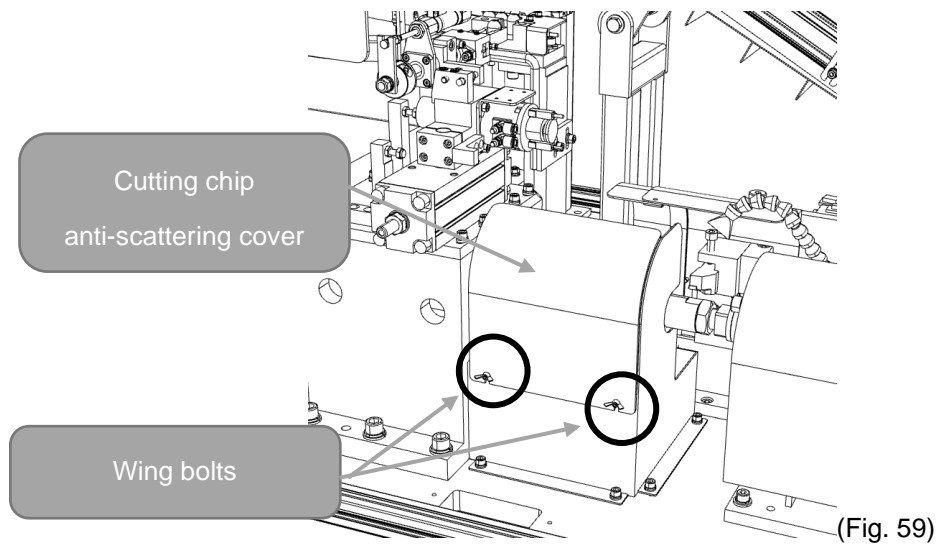
(9). Install the cutting chip anti-scattering cover, turn ON the power and return to the origin.

(10). Change the automatic/manual selector switch from "Manual" to "Auto," and check that chucking and turning are performed properly.

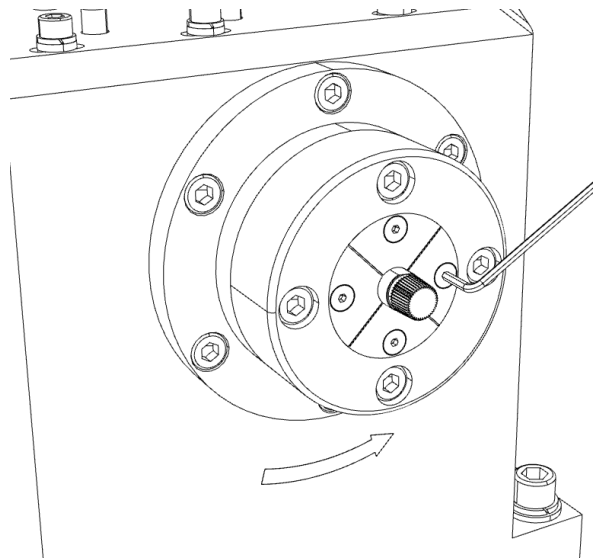
* If chucking or the turning quantity is unstable, re-install the spindle shank. Set the mechanical origin, if needed.

- How to replace the shank cover plate

- (1). Select "Manual" on the automatic/manual selector switch. The manual mode screen appears automatically (Fig. 4).
- (2). Press the "Spindle shift advance" button to move the spindle shank forward.
- (3). Completely shut off the power of the machine.
- (4). Loosen and remove the wing bolts on the cutting chip anti-scattering cover at two locations marked with circles (Fig. 59).

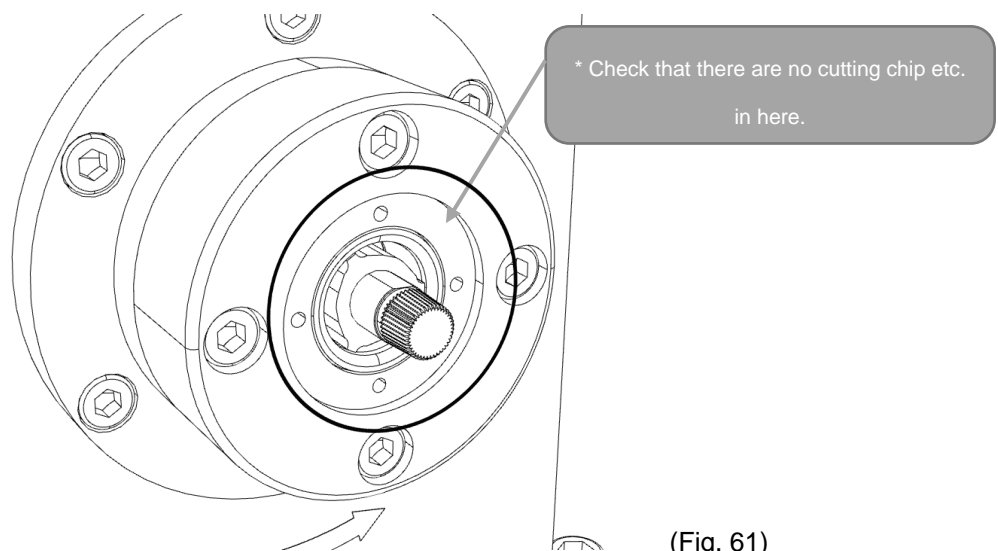


- (5). Loosen four bolts fixing the cover plate, and remove the cover plate (Fig. 60).



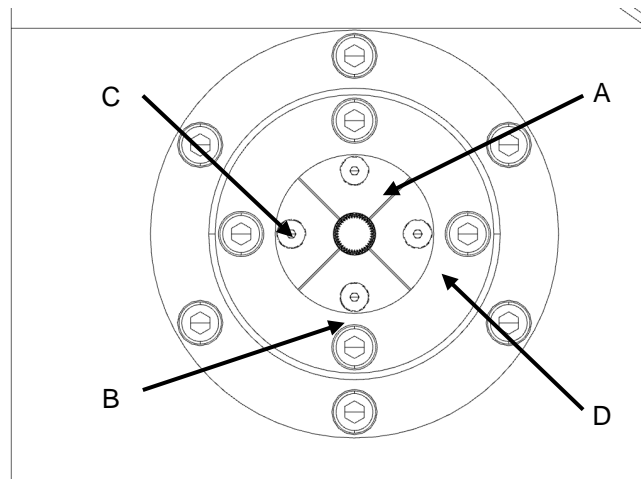
(Fig. 60)

- (6). Check that there are no cutting chips inside, and install a new cover plate (Fig. 61).



(Fig. 61)

- (7). Check that the cover plate is attached securely, and tighten the bolts. Tighten the bolts in a diagonal sequence. (e.g.: A→B→C→D in Fig. 62)



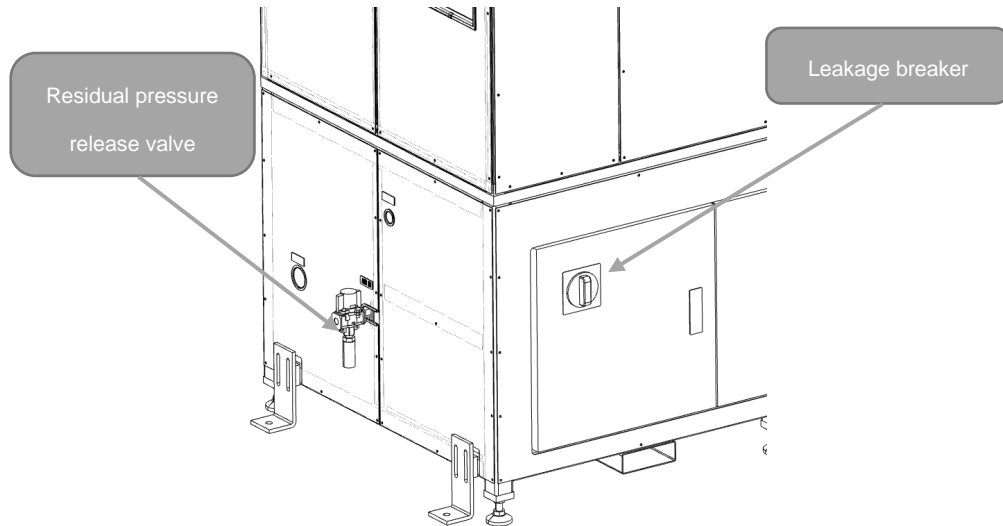
(Fig. 62)

- (8). Install the cutting chip anti-scattering cover, turn ON the power and return to the origin.
- (9). Change the automatic/manual selector switch from "Manual" to "Auto," and check that chucking and turning are performed properly.

- How to replace and adjust the V-belt

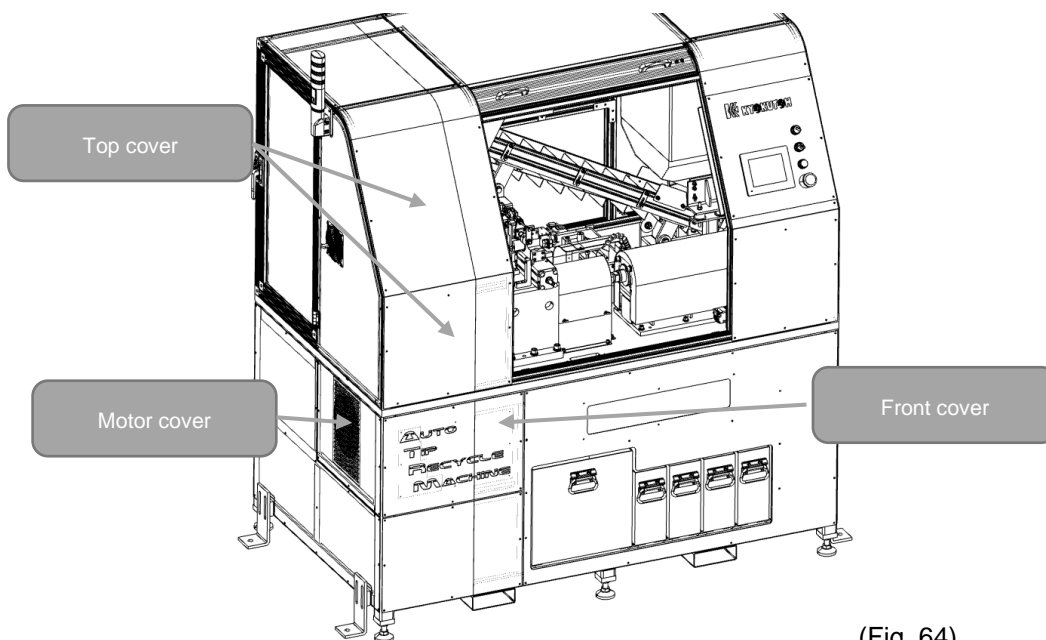
* When adjusting the belt tension only, perform steps (1) to (3) and skip to step (10).

- (1). Turn OFF the leakage breaker on the rear side and completely shut off the power. Open the residual pressure release valve on the right side to completely release the air inside the machine (Fig. 63).



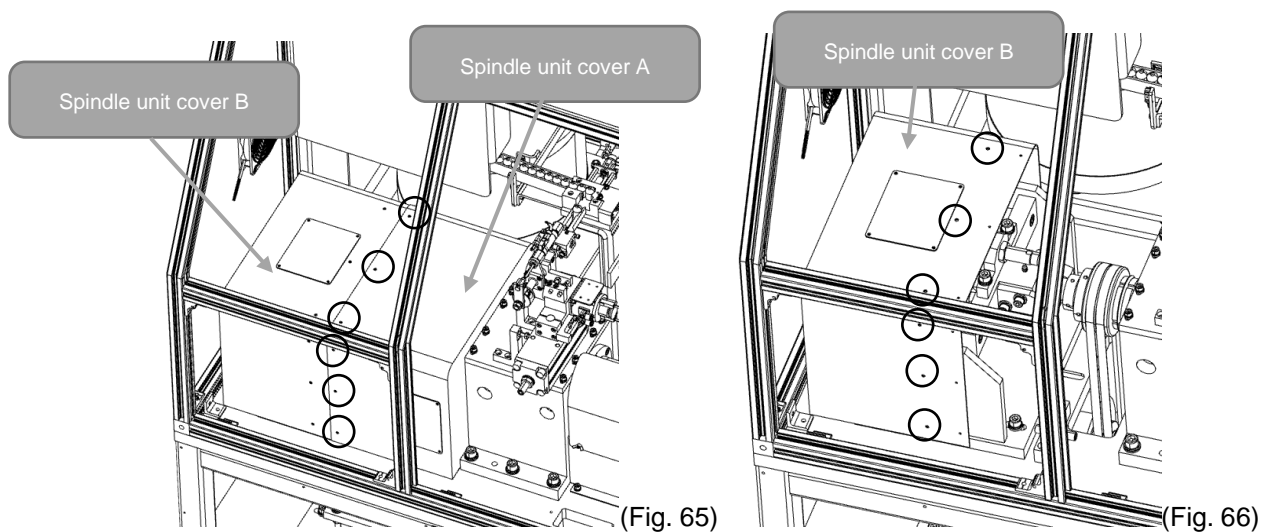
(Fig. 63)

- (2). Remove two top covers, one front cover, and motor cover on the left side, as shown in the figure below (Fig. 64).



(Fig. 64)

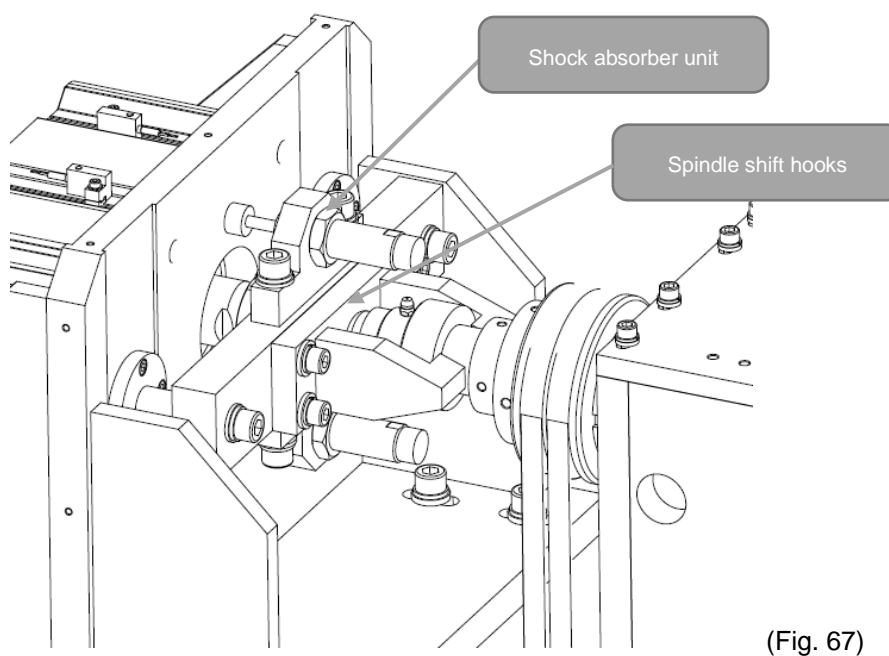
- (3). Remove three bolts on the top surface and three bolts on the side marked with circles, and lift and remove cover A of the spindle unit (Fig. 65).



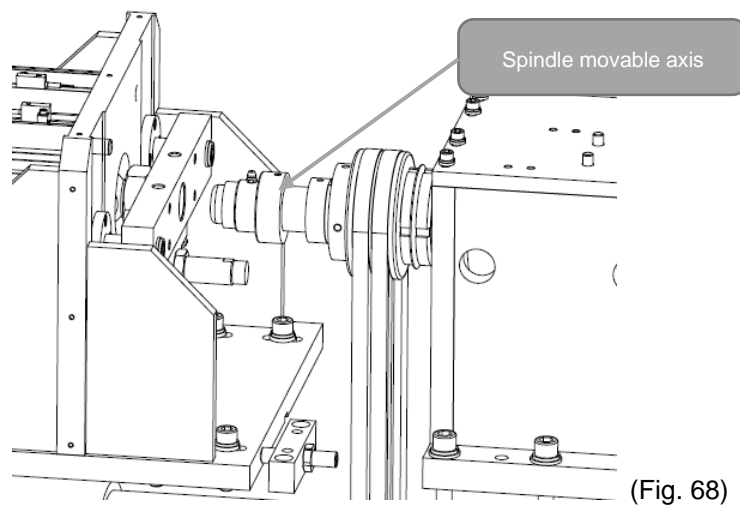
- (4). In a similar manner, remove three bolts on the top surface and three bolts on the side marked with circles, and lift and remove cover B of the spindle unit (Fig. 66).

- (5). Loosen the bolts on the spindle shift hooks and remove both shift hooks (Fig. 67).

Remove a shock absorber unit at same time.



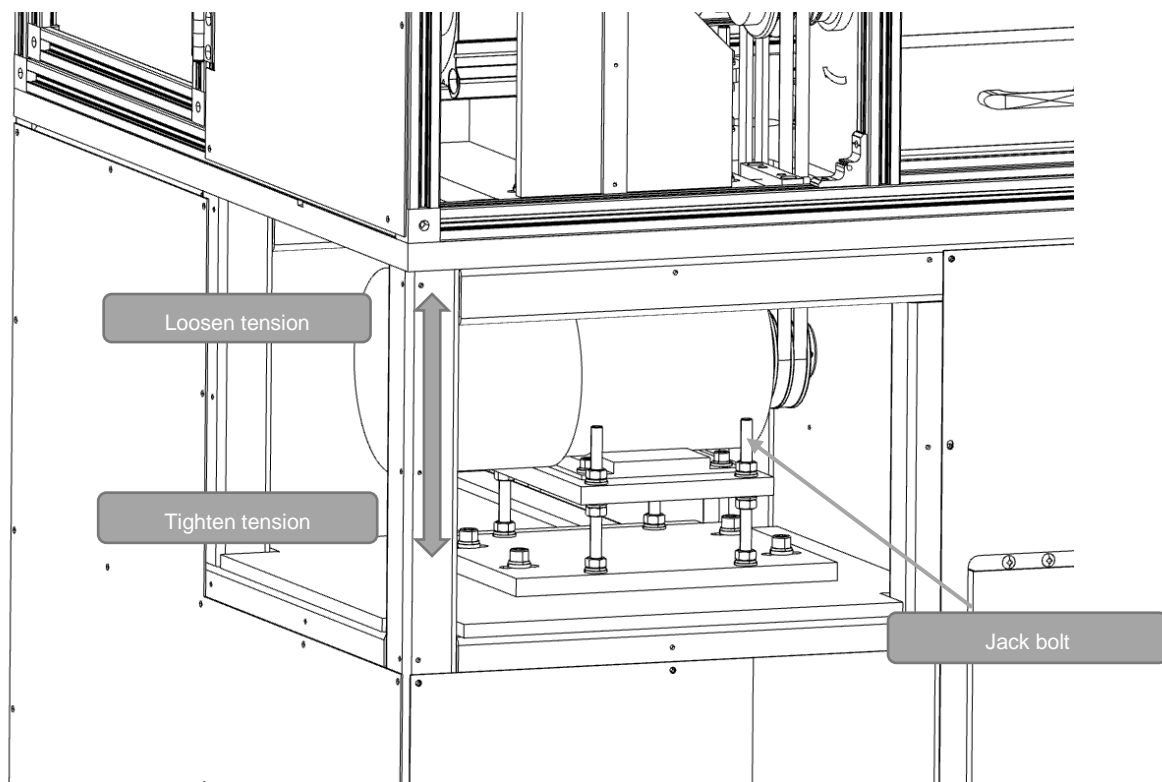
(6). Pushing the spindle movable axis can create a gap between the shift unit (Fig. 68).



(Fig. 68)

(7). Referring to the figure below, adjust the jack bolts of the motor base, raise the motor base and loosen the belt tension (Fig. 69).

* Adjust all four jack bolts and make sure that unnecessary force is not applied.

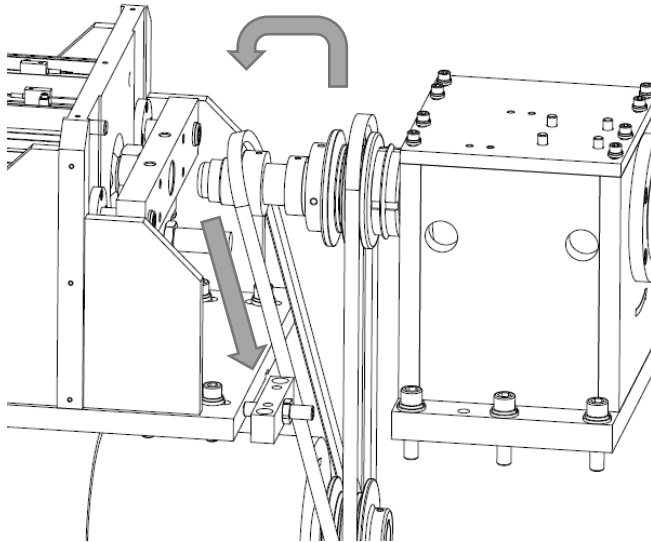


(Fig. 69)

- (8). Remove the loosened bolts from the gap between the shift unit and the spindle movable axis.

It will be easier to remove the belt if you take it off from the pulley on the spindle side and slide it to the motor side (Fig 70).

Remove both belts from the pulley.



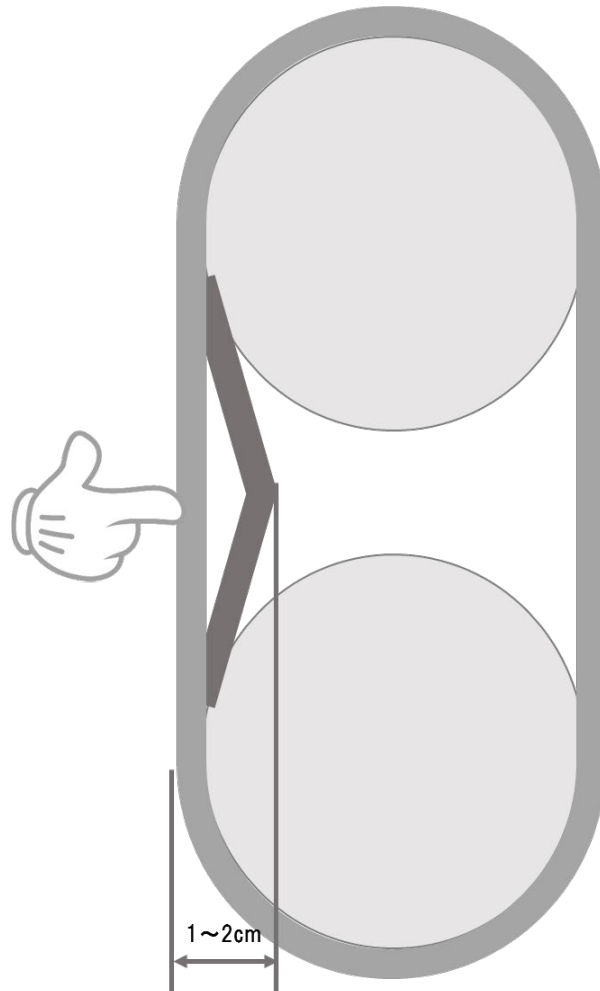
(Fig. 70)

- (9). Install new V-belts by following the procedure backward. It will be easier to install the belt from the pulley on the spindle side. * Install the belts so that the installation positions on the pulleys on the spindle side and the motor side are aligned in a straight line. Never cross the belts, as it may cause the V-belts to tangle, leading to a mechanical failure.
- (10). Adjust the jack bolts of the motor base, lower the motor base and tighten the belt tension (Fig. 69).

* Adjust all four jack bolts and make sure that the motor base is horizontal. Note that if the pulley on the motor side is not horizontal, the belt may easily come off while spinning or the service life of the belt may be reduced significantly.

After you install a new V-belt, check the belt tension in about a month, and make readjustment (to adjust the initial elongation).

(11). Adjust the belt tension so that it sinks for about 1 to 2 cm when pressed with a finger (Fig. 71). Be careful not to tighten the belt tension too much, as it may elongate or even break the belt. Also pay attention not to have it too loose, as it may induce the spindle to slide during turning, and cause the belt to come off. Check periodically to keep an appropriate tension.



(Fig. 71)

(12). Return the removed parts and covers to their original positions.

(13). Turn ON the power and air, and return to the origin. Press "Spindle spin" on the manual mode screen (Fig. 4) and check that there is no abnormal noise, vibration, etc. during spinning. If there is an abnormality, readjust the tension.

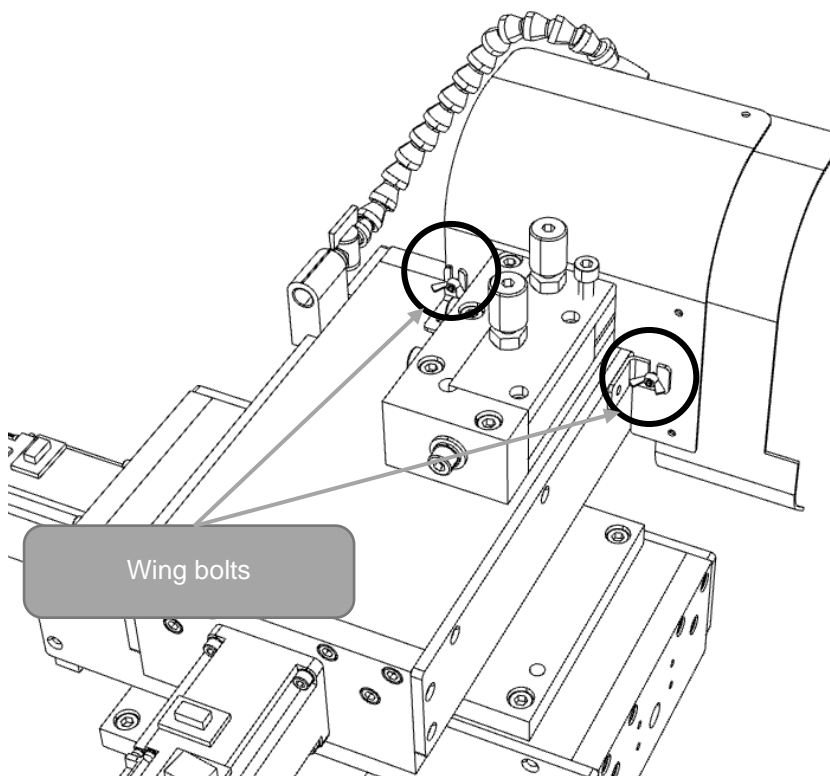
HOW TO EXCHANGE THE CUTTING INSERT TIP

When the number of cuts set on the counter is reached or when the cutting tip breaks, exchange the cutting tip in the following procedure. If it is not exchanged properly, the origin may get off position or the blade may get chipped. Pay due attention, as in the worst case, it may lead to a mechanical failure.

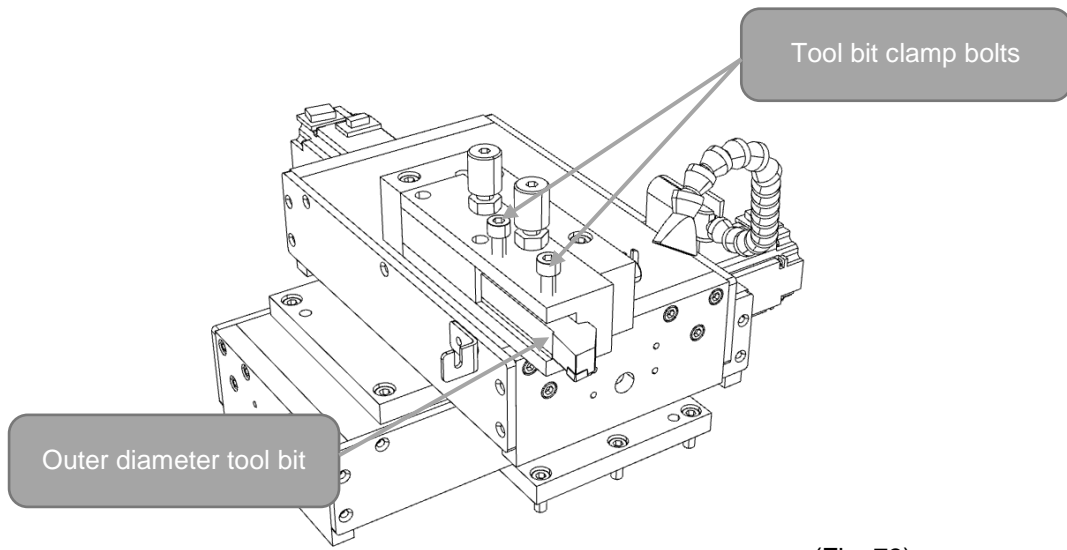
- (1). Select "Manual" on the automatic/manual selector switch. The manual mode screen appears automatically (Fig. 4).
- (2). When the "Turning tip exchange start" button is pressed, the XY stage moves to the exchanging position.
- (3). For safety, be sure to shut off the power by pressing the emergency button or turning OFF the key.

Loosen two wing bolts (marked with circles) fixing the cutting chip anti-scattering cover and remove the cover (Fig. 72).

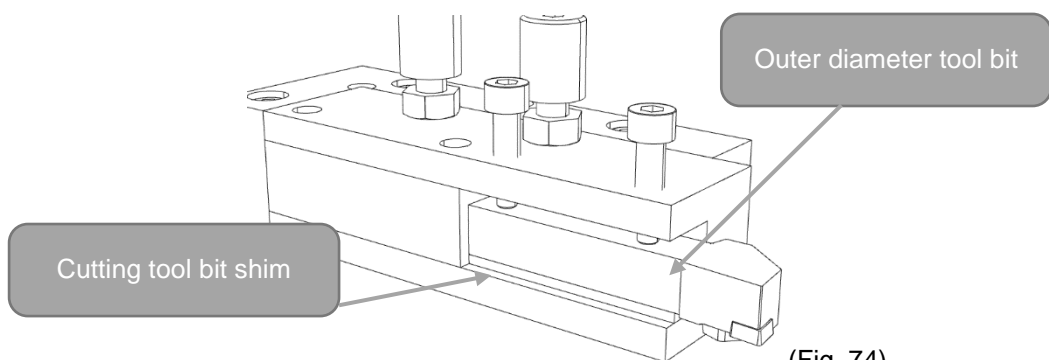
- (4). Loosen two tool bit clamp bolts and remove them together with the outer diameter tool bit holder. Be careful not to lose the cutting tool bit shim (Fig. 73, 74)



(Fig. 72)

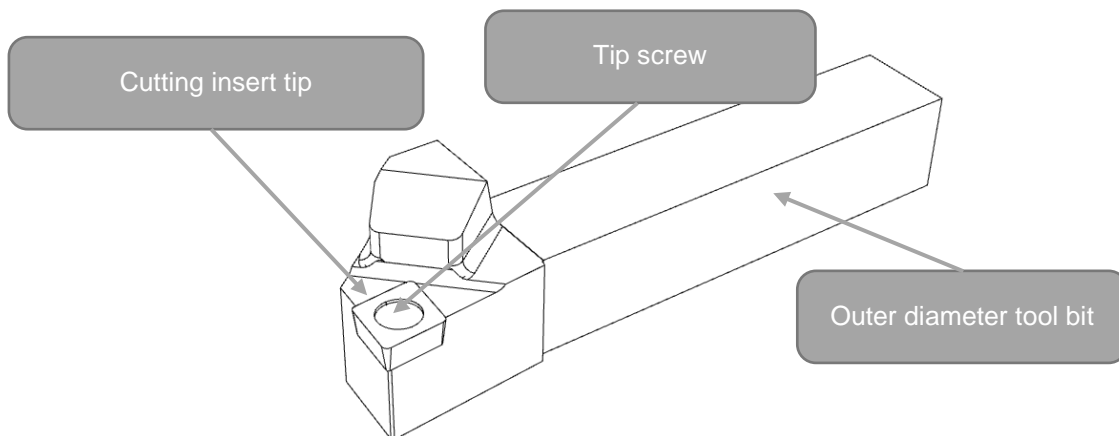


(Fig. 73)



(Fig. 74)

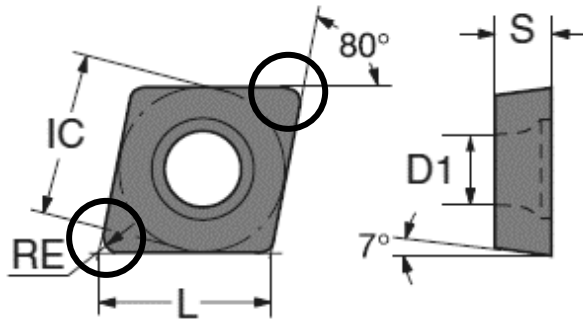
- (5). Loosen the tip screw for the outer diameter tool bit holder (Fig. 75), and remove the cutting insert tip. Be careful not to lose the tip screw.



(Fig. 75)

(6). A positive cutting insert tip is used, so two corners (marked with circles) can be used for cutting.

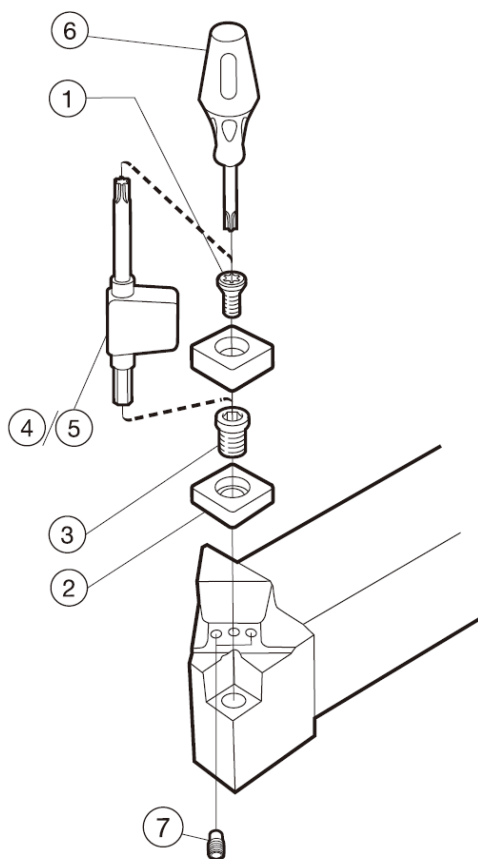
Change the corner or exchange the tip with a new insert tip (Fig. 76).



(Fig. 76)

(7). Tighten the tip screw and fix the tip (Fig. 75).

Refer to the figure below when exchanging the shim or shim screw (Fig. 77).



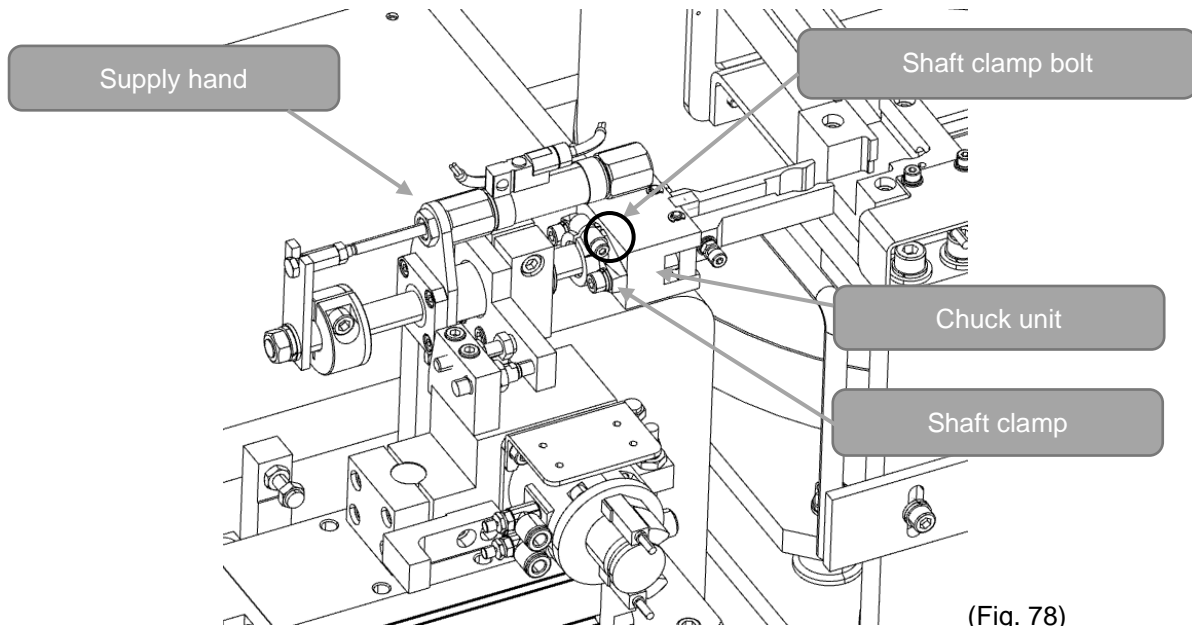
- (1) Tip screw
- (2) Shim
- (3) Shim screw
- (4) / (5) Wrench (upper part for tip screw, lower part for shim screw)
- (6) Wrench (this holder is not applicable)
- (7) Nozzle

(Fig. 77)

- (8). Return the tool bit holder to the tool bit clamp and tighten the tool bit clamp bolt firmly to fix it. Tighten the bolts while keeping it on the fixed surface of the holder. If there is a gap, the origin changes and cutting will not be performed properly.
- (9). Check that it is installed properly, and turn ON the key switch or release emergency stop. Press the ready button and return to the origin.
- (10). Make sure to reset the cutting quantity on the counter.
- (11). Check if cutting is performed properly, and perform XY-axis correction (Fig. 16) as necessary.

SUPPLY/TRANSPORT UNIT: HOW TO EXCHANGE THE TIP CHUCK JAW

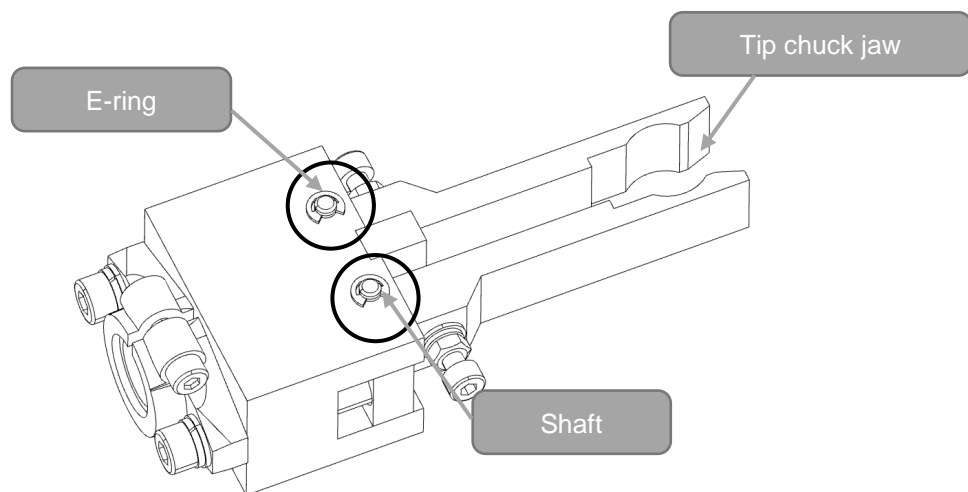
- (1). Completely shut off the power of the machine.
- (2). Loosen the shaft clamp bolt connecting the shaft of the supply hand, and remove the chuck unit at the tip. If you loosen the bolt marked with a circle, it comes off from the shaft (Fig. 78).



(Fig. 78)

- (3). Remove the E-ring of the chuck unit (Fig. 79) marked with a circle, take out the shaft and remove the tip chuck jaw.

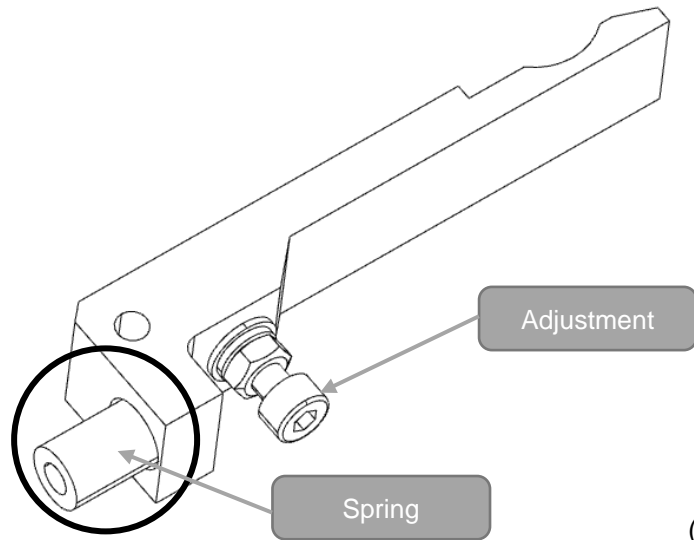
* Be careful not to lose the E-ring. The spring may fall off when removing the tip chuck jaw. Also be careful not to lose the spring (Fig. 80).



(Fig. 79)

- (4). Remove the adjustment bolt on the tip chuck jaw and attach it to the new tip chuck nail (Fig. 80).

* Be careful not to lose the spring when it is left at the location marked with a circle.



(Fig. 80)

- (5). Attach a spring to the cavity on the tip chuck jaw (Fig. 79) and install it to the chuck unit by following the procedure backward. Attach the shaft to the chuck unit and return it.
- (6). Check if the cap tip is chucked properly, and make adjustment using the adjustment bolt on the tip chuck jaw as necessary.

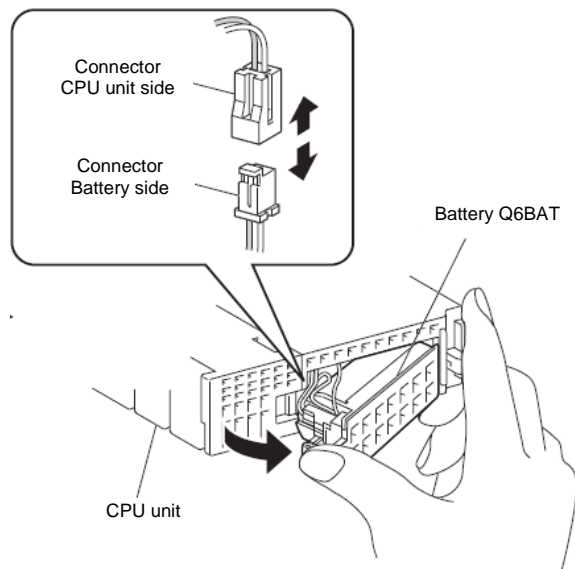
HOW TO REPLACE THE BATTERIES

The PLC, servo motor amplifier and touch panel of this machine are equipped with batteries to retain data. When low battery etc. is detected, an alarm will be displayed on the touch panel. When this occurs, immediately replace the corresponding battery to the alarm by following the procedure below. * If you keep using the machine without replacing the battery or with a non-genuine battery, the machine may not be able to keep the data and stop operation.

(1). PLC battery replacement Power supply for 3 min in power failure

Replace the battery when alarm M838 (PC battery low voltage) is displayed.

1. Completely shut off the power of the machine.
2. Open the cover at the bottom of the CPU unit in the control panel (Fig. 52 on p. 72), disconnect the connector which connects the battery and CPU, and remove the battery from the holder.



(Fig. 81)

3. Return a new battery to the holder by following the installation procedure backward.

* Make sure to replace the battery within 3 minutes. If it exceeds 3 minutes, data may be lost.

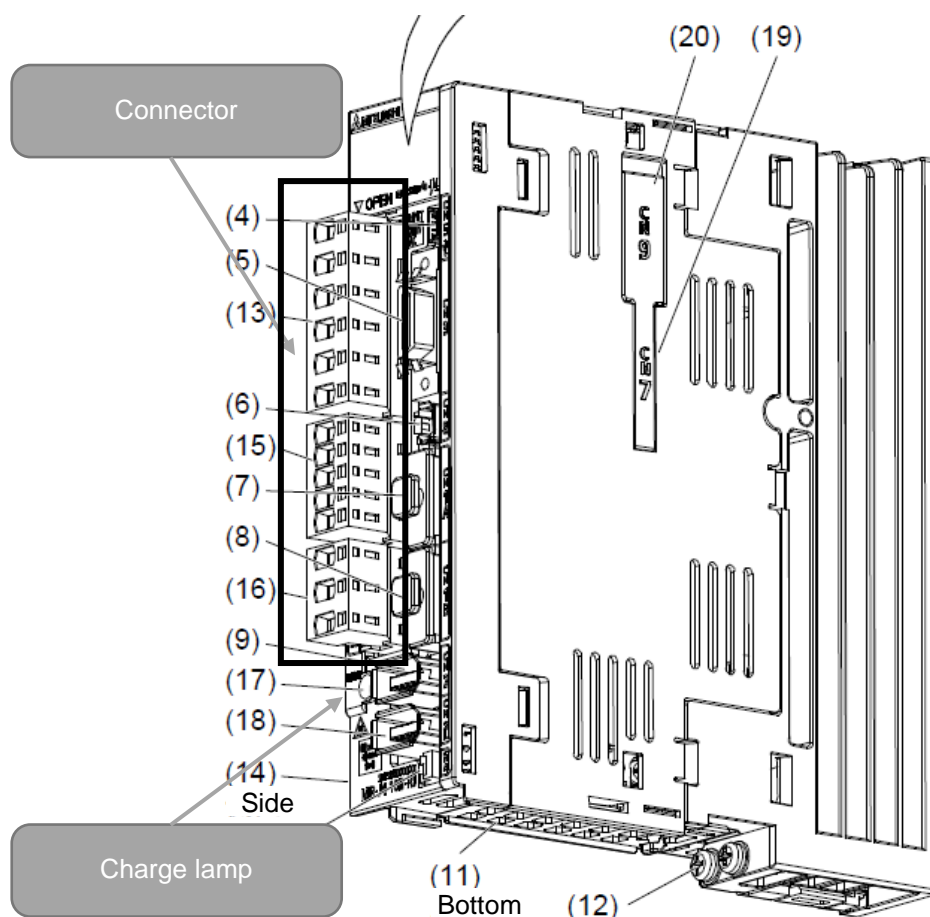
(2). Replacing servo amplifier battery

Replace the battery when alarm M844 (ABS battery low voltage) is displayed.

Since this step is performed with the control circuit power turned ON, not following the procedure may cause an electric shock. Note that if the battery is removed with the control circuit power turned OFF, the data for the absolute position will be lost.

1. Turn OFF the power key switch on the operation panel. Turn OFF the leakage breaker on the control panel, then open the door.
2. Turn ON the leakage breaker.
3. Confirm that the charge lamp on the servo amplifier in the control panel (Fig. 82) is out, and check with a circuit tester etc. that no voltage is applied between "P+" and "N-" of the connector.

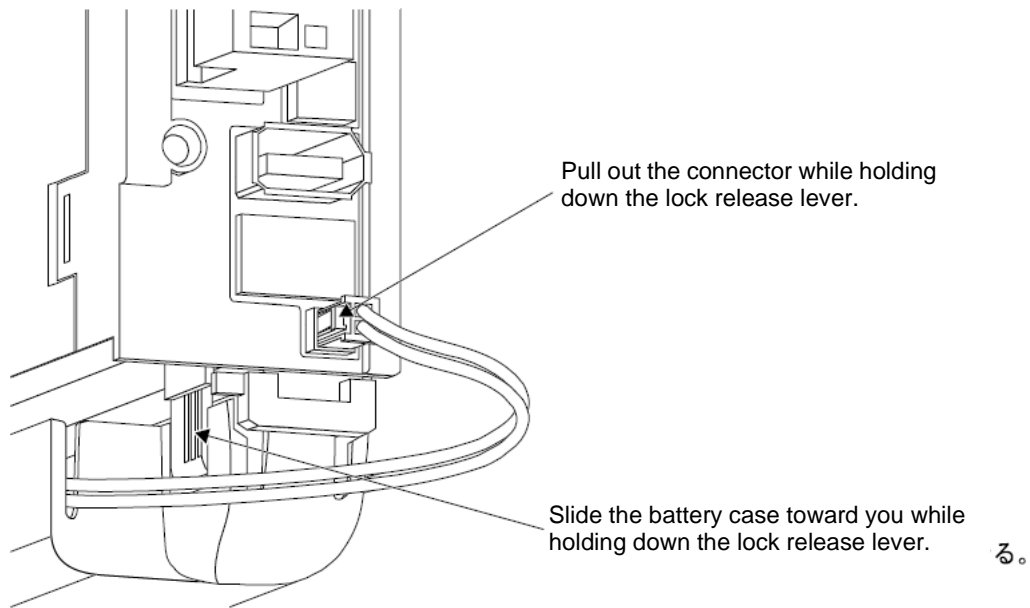
* Be sure to take measures against static electricity before performing the step.



(Fig. 82)

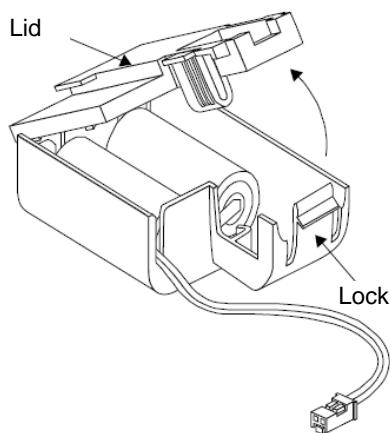
4. As shown in the figure below (Fig. 83), take out the battery connector and remove the battery case installed at the bottom.

Be sure to perform this step while holding down the lock release lever (to prevent breakage).

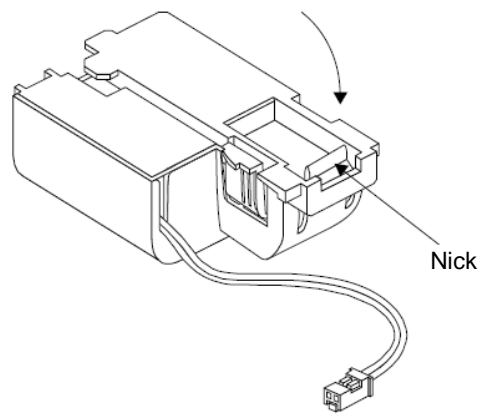


(Fig. 83)

5. Open the lid of the battery case by pressing the lock (Fig. 84), and replace the battery inside with a new MR-BAT6V1 battery. Press the lid until it fits the nick of the lock and close (Fig. 85).

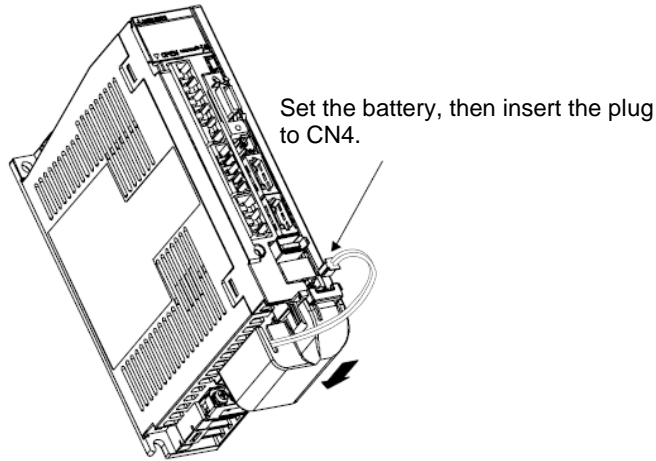


(Fig. 84)



(Fig. 85)

6. Install the case to the bottom of the amplifier and insert the connector (Fig. 86).



(Fig. 86)

(3). Touch panel battery replacement

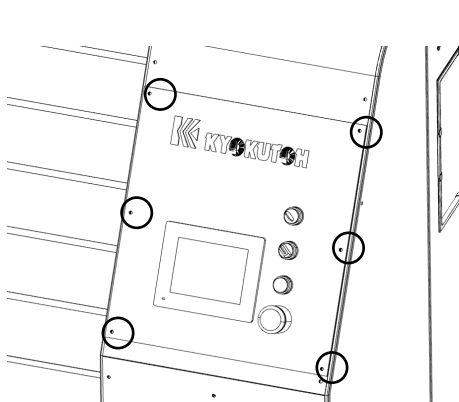
Replace the battery when alarm M845 (GOT battery low voltage) is displayed.

1. Completely shut off both power on the operation panel and control panel of the machine.
2. Remove six cover bolts on the front side of the operation panel (marked with circles in Fig. 87).

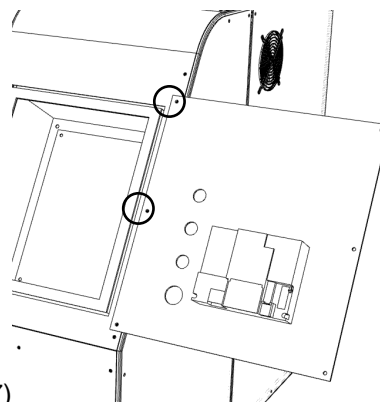
* Be careful not to drop the cover when removing the bolts.

3. Turn over the cover, and fix it temporarily using the panel attachment hole (Fig. 88).

* Be careful not to damage the wires.

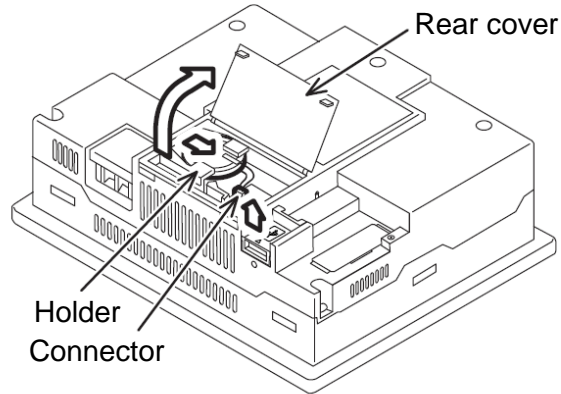


(Fig. 87)



(Fig. 88)

4. Open the rear cover of the touch panel and take out the battery from the holder (Fig. 89).



(Fig. 89)

5. Disconnect the battery connector and insert the connector for the new battery within 30 seconds.
6. Insert the battery into the holder and close the rear cover.
7. Recover the operation panel to the original state by following the procedure backward, and fix it with the bolts. * Be careful not to pinch the wires.
8. Turn ON the power and check if the battery status is normal.

* If there is no alarm, it is normal. If an alarm is still displayed, there may be a battery fault. Please contact us.

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If you find any damage or malfunction in our product, please contact us.



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