

4. Memory operation mode selection



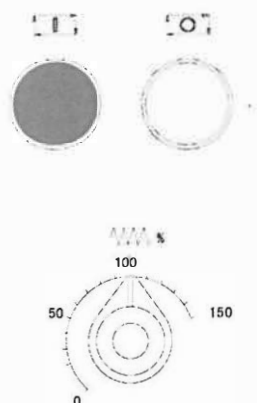
When pressing [Memory mode select switch] of [Mode select switches].

This switch is selected when automatically operating the machine by the program stored in the memory of NC unit.

5. Memory operation start

WARNING

Confirm check the position of [Emergency stop switch] so that the switch can be pressed rapidly even if any unusual situation occurs.
If the switch is not pressed rapidly, damage is increased at the worst.

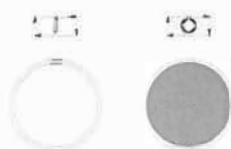


Press [Cycle start switch]. The indicating lamp lights and the program is executed.

Movement of axis, turret indexing and spindle rotation by C-axis (option) are executed by programs, but rotary tool does not rotate.

At this time, the feedrate command value is ignored during program and the speed selected by [Feedrate override select switch] becomes valid.

6. Memory operation hold



When temporarily holding the memory operation, press [Feed hold switch].

At this time, the indicating lamp lights.

3-2 Method by single block switch

- * Tool slide travel: Actuation
- * Tool slide indexing: Actuation
- * Spindle revolution: Actuation
- * Rotary tool (option): Actuation
- * Spindle revolution by C-axis function (option): Actuation

Each above method is executed by pressing [Cycle start switch] every block of the program.

For each operation, refer to paragraph [Chapter D, 4 MEMORY OPERATION] and [Chapter D, 6 SWITCHES USED DURING AUTOMATIC OPERATION].

Check the program without mounting the workpiece.

4 MEMORY OPERATION

The memory operation is for executing the automatically continuous operation by reading out the program of NC unit.

This chapter explains the operation when the previous check is completed and the memory operation can be started after the set up for the programming, tooling and chucking.

Since the automatically continuous operation is executed, take extreme care when the memory operation is performed.

1. Memory operation mode selection



When pressing [Memory mode select switch] of [Mode select switches].

2. Front door close



Close the front door.

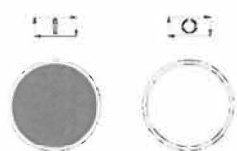
When the front door is closed, [Front door close indicating lamp] lights.

3. Memory operation start

WARNING

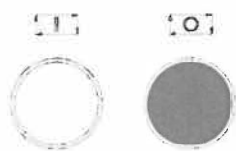
Confirm check the position of [Emergency stop switch] so that the switch can be pressed rapidly even if any unusual situation occurs.

If the switch is not pressed rapidly, damage is increased at the worst.



When pressing [Cycle start switch], the indicating lamp lights and the automatic operation is continuously executed.

4. Memory operation hold



When pressing [Feed hold switch], the indicating lamp lights.

At this time, the tool slide stops and the program is interrupted.

This mode is ignored during the thread cutting.

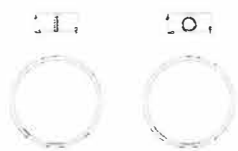
At this time, take care because the spindle (rotary tool) does not stop though the axis stops.

5. Memory operation restart



When restarting the automatic operation, press [Cycle start switch] to start the program.

6. Memory operation finish



When executing the block including [M02] (End of program) or [M30] (End of tape) of the program, [Cycle start switch] goes out and the automatic operation finishes.

5 MDI OPERATION

MDI operation mode features the automatic operation by preparing the simple program on LCD screen with MDI panel.

1. MDI mode selection



When pressing [MDI mode select switch] of [Mode select switches].

2. Program edit

The program is prepared and data is inputted with MDI panel.
For the programming, refer to [PROGRAMMING MANUAL] and the Instruction Manual prepared by NC unit manufacturer.

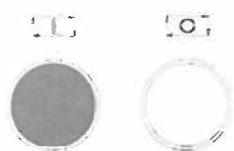
3. Front door close



Close the front door.

When the front door is closed, [Front door close indicating lamp] lights.

4. MDI operation start



When pressing [Cycle start switch], the indicating lamp lights and the automatic operation is continuously executed.

5. MDI operation finish



When executing the block including [M02] (End of program) or [M30] (End of tape) of the program, [Cycle start switch] goes out and MDI operation finishes.

6 SWITCHES USED DURING AUTOMATIC OPERATION

Switches operated during the automatic operation are as follows.

However, [Program check mode select switch] cannot be used during actually machining.

They are used when the test operation is performed with air cut.

WARNING

In the interrupting operation during automatic operation, since the operational condition differs from the program condition, carefully operate the interrupting operation.

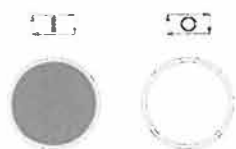
If miss-operated, the machine may be troubled or operator will injure because of collision, etc.

1. Single block switch



This switch executes the program block by block during the automatic operation.

When pressing the switch, the indicating lamp lights.



When executing the next block, press [Cycle start switch].

When performing the continuous operation, press [Single block mode select switch].

The indicating lamp goes off and the machine is continuously operated.

2. Optional block skip mode select switch



This switch selects [EXECUTION] or [IGNORING] have the block having [/] to the top of program during the automatic operation.

When pressing this switch, the indicating lamp lights and the block is ignored.

When the indicating lamp goes out, the block is executed.

3. Optional program stop mode select switch



When pressing [Optional program stop mode select switch] the block including [M01] (optional stop) is executed and the automatic operation stops.

Moreover, the indicating lamp of this switch changes to flickering from lighting.



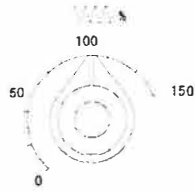
When restarting the operation, press [Cycle start switch].

When the indicating lamp goes out, [M01] is ignored and the operation is continued.

NOTE : (1) Since the miscellaneous function of [M01] allows the spindle (rotary tool) rotation, coolant to stop when restarting the automatic operation, it is necessary to program M-function before stop to the block after [M01] in advance.

(2) [M00] (Program stop) in the program stops similarly with [M01].

4. Feedrate override select switch



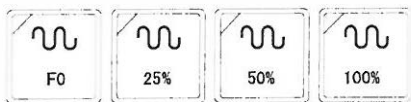
The feedrate is selected with [Feedrate override select switch].

The scale is divided into 16 steps and the scale to 150% per scale 10% can be selected.

Since the switch operation is valid for the command value of the program (feed per revolution/feed per min), set the switch to 100% before starting the machine.

NOTE : When canceling the override function, incorporate [M49] (Override cancel) in the program. At this time, the override cancel mode cancels both [Feedrate override select switch] and [Spindle speed override select dial].

5. Rapid traverse speed override select switch



The rapid traverse override can be selected during the automatic operation.

Since [Rapid traverse speed override select switch] is effectively functioned for the maximum speed of the each axis, select the switch of 100% before starting the automatic operation.

This switch is simultaneously functioned for all axis, the every axis cannot be selected.

TT-2600

(X, Z-axis:mm/min C-axis:deg./min)

Speed Axis	F ₀	25%	50%	100%
X-axis	400	6000	12000	24000
Z-axis	400	6000	12000	24000
C-axis (option)	400	9000	18000	36000

6. Spindle speed override select switch, SPINDLE OVERRIDE [A] (operation panel screen)

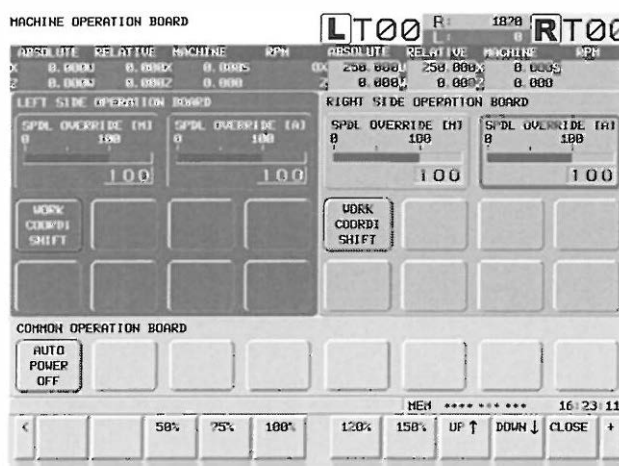


Select a spindle speed is from [Spindle speed override select switch] and the [SPDL OVERRIDE [A]] on the machine operation panel screen.

When [Spindle speed override select switch] is pressed, and the switch indicating lamp lights, speed change by [SPDL OVERRIDE [A]] will be valid.

OPERATION

Press  button on the operation panel to display the machine operation panel screen.



Move a selected cursor to [SPDL OVERRIDE [A]], and set the value of the override with the soft key.



Spindle will accelerate between 50% and 150% of the program commanded value.

When the indicating lamp is off, this function will be invalid, and the speed becomes equal to the program commanded value.

NOTE : At power on, the value of [SPDL OVERRIDE [A]] is set to the default of 100%.

7. Chip conveyor automatic switch



When this switch is pressed before the automatic operation, the indicating lamp only lights and the conveyor does not start.

When pressing [Cycle start switch] for the automatic operation, the conveyor is operated forward, being interlocked with the cycle start mode.



When stopping the conveyor during the automatic operation, press [Chip conveyor stop switch].

At this time, the lamp goes out.

8. Rotary tool : Multi-spindle control (option)

Rotary tool speed override select switch

[MIL OVERRIDE [A]] on the operation panel screen

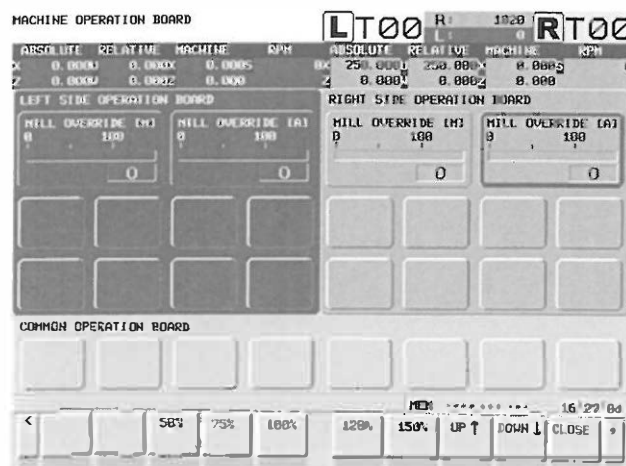


Select a speed of the rotary tool from the [Rotary tool speed override select switch] and [MIL OVERRIDE [A]] on the machine operation panel screen.

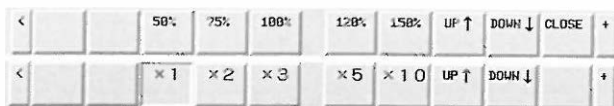
When [Rotary speed override select switch] is pressed, and the switch indicating lamp lights, [MIL OVERRIDE [A]] on the machine operation panel screen will be valid.

OPERATION

Press  button on the operation panel to display the machine operation panel screen. Then, press the page ↓ key to display [MIL OVERRIDE [A]].



Move a selected cursor to [MIL OVERRIDE [A]] to set the override value with the soft key.



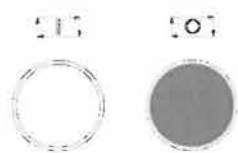
Rotary tool will accelerate between 50% and 150% of the program commanded value.

NOTE : At power on, the value of [MIL OVERRIDE [A]] is set to the default of 100%.

7 MANUAL OPERATION INTERRUPTION DURING AUTOMATIC OPERATION

The following procedure is recommended to manually interrupt during the automatic operation.

1. Automatic operation hold



When pressing [Feed hold switch], the machine stops.

At this time, the indicating lamp lights.

2. Manual operation mode selection



Any mode from among the above modes of the manual operation is selected.

At this time, all manual operations are possible.

However, since the machine is during the automatic operation ([Feed hold switch] lights), the front door cannot be immediately opened.

The condition to open the front door is required.

NOTE : (1) Return the spindle (rotary tool) rotary direction, spindle (rotary tool) speed and axis position to the conditions before interruption.

(2) Rotate the spindle (rotary tool) with the manual interruption mode by pressing [Cycle start switch] even if the spindle (rotary tool) stops before interruption. As a result, the spindle (rotary tool) rotates in the interrupted direction at the spindle (rotary tool) speed of the program command value (previously commanded speed).

REF.: [Chapter B, 4 FRONT DOOR]

3. Continuous automatic operation



When continuing the automatic operating, press [Memory mode select switch] of [Mode select switches].

4. Automatic operation restart



When pressing [Cycle start switch], the indicating lamp lights and the program is executed.

E. ALARM

This chapter explains about alarm on the machine side.

For the alarm NC unit, refer to the Instruction Manual of NC unit manufacturer.

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1 ALARM

1-1 Alarm of electric motor

1. Spindle motor alarm

Watching the alarm indication of the spindle servo unit, process the motor alarm according to the instruction manual of manufacturer.

2. Other motor alarms

(1) Buzzer

If an alarm occurs, the buzzer on the operation panel sounds.

(2) Thermal relay check

Check the thermal relay for the motor in the enclosure.

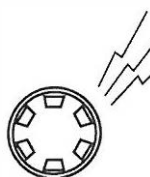
1-2 Alarm release



- * If the [Alarm reset switch] lamp flickers, remove the cause of the alarm and press the [Alarm reset switch] to release the alarm.



However, if the feed hold is applied, remove the cause of the alarm and press the [RESET] key on the MDI panel before pressing the [Alarm reset switch].



- * If the [Buzzer] sounds and the [Alarm indicating lamp] flickers, press the [Alarm reset switch].



At this time, the [Buzzer] stops when repressing this [Alarm reset switch] after removing the cause of alarm, the alarm is released.

1-3 Alarm list (A, B, C type)

Alarm No.	Alarm indication	Cause and countermeasures
1001	DETECTION SW. FOR SPINDLE LOCK	The automatic switches of the fixed spindle end and the unfixed spindle end are simultaneously turned on. * Check and repair the automatic switches.
1002	DETECTION SW. FOR SHUTTER	The automatic switches or proximity switches of the opened shutter end and the closed shutter end are simultaneously turned on. * Check and repair the automatic switches or proximity switches.
1003	DETECT. SW. FOR C-AXIS PRESSURE	When the C-axis is clamped, the clamp confirmation pressure switch is not turned ON. * Check the pressure switch and reset it.
1004	DETECT. SW. FOR C-AXIS PRESSURE	When the C-axis mode is changed to the spindle mode, C-axis clamp confirmation pressure switch is not turned OFF. * Check the pressure switch and reset it.
1005	DETECTION SW. FOR CHUCK	The completion confirmation switches of the opened chuck end and closed chuck end are simultaneously turned on. * Check and repair the completion confirmation switches (proximity and pressure switches).
1006	DETECTION SW. FOR TURRET PIN	The automatic switches at the milling fixed end and unfixed end are simultaneously turned on. * Check and repair the automatic switches.
1015	SHUTTER NOMOVE ALARM	The shutter OPEN/CLOSE has not been actuated. * Check the solenoid valve and air pressure.

Alarm No.	Alarm indication	Cause and countermeasures
1016	SHUTTER NO FINISH ALARM	The shutter open/close has not been completed. * Check if there is no object interfering with the shutter or catching the shutter. * Check and repair the automatic switches or proximity switches.
1020	INPUT M22-SIG FOR PROGRAM START	M22 (Program start M code) is not confirmed at the program head. * Add M22 to the program head. * Since the cursor is not returned to the program head. Return it to the program head to start the program.
1021	CYCLE TIME OVER	The automatic operation time which exceeds the time set by the timer is measured. Right side of the machine : PMC timer 1 Left side of the machine : PMC timer 3 * There is a trouble in the change of the set time or lathe.
1022	S,T,B SIGNALS ARE NOT COMPLETE	The completion signal is not output even if the time set by the timer elapsed after the S, T, B code was executed. Right side of the machine : PMC timer 2 Left side of the machine : PMC timer 4 * Check the S, T, B code and its action.
1023	KEEP SAME COND.AS BEFORE/ SPINDLE	The spindle condition when the program stops differs from that when the [Cycle start switch] is pressed after releasing the program stop. * Return the spindle to the same condition it was when the program stopped.

Alarm No.	Alarm indication	Cause and countermeasures
1024	KEEP SAME COND.AS BEFORE/ CHUCK	The spindle condition when the program stops differs from that when the [Cycle start switch] is pressed after releasing the program stop. * Return the spindle to the same condition it was when the program stopped.
1027	CLOSE SAFETY DOOR	The safety door opens while the memory operation is performed, spindle is rotating, milling is rotating, or spindle is under orientation. * When the door is opened while the memory operation is performed, an emergency stop is caused. Cancel the message, and close the door to return to the reference position. * When the door is opened with the spindle rotating, the machine stops. * Depending on the setting of the keep relay, this alarm occurs.
1030	DOOR INTERLOCK SW/TO EFFECT POS.	The door interlock becomes ineffective when the [Cycle start switch] is pressed in the memory mode. * Select the door interlock to EFFECT. * Depending on the setting of the keep relay, this alarm occurs.

Alarm No.	Alarm indication	Cause and countermeasures
1031	CLOSE THE SAFETY DOOR	The safety door has already been opened when the [Cycle start switch] is pressed in the memory mode. With the safety door interlock effective in the single or MDI mode, when the [Cycle start switch] is pressed, the safety door has already been opened. * Close the safety door. * Depending on the setting of the keep relay, this alarm occurs.
1032	M** IS NOT COMPLETE	The completion single is not output even if the time set by the PMC timer elapsed after the M-code was executed. Machine right side : PMC TIMER 2 Machine left side : PMC TIMER 4 * Check the M-code and its action. * Check the completion confirmation switches or adjust its again or repair its. * M code number that did not complete is entered in**.
1033	TIGHTEN THE CHUCK	The [Cycle start switch] is pressed when the chuck has not been clamped. * Clamp the chuck. * Depending on the setting of the keep relay, this alarm occurs.
1034	TIGHTEN THE CHUCK	The spindle start is commanded when the chuck is unclamped. * Clamp the chuck.
1035	TIGHTEN THE CHUCK	The chuck is unclamped while the spindle is rotated. * Clamp the chuck.
1036	CHUCK OVER TRAVEL	The diameter of the workpiece is different or the workpiece is not clamped. * Clamp the appropriate workpiece.

Alarm No.	Alarm indication	Cause and countermeasures
1037	T-CODE IS TOO LARGE	The number more than the usable tool number is commanded. * Modify the program.
1040	AUTO. REF. RETURN TIME OVER	Even if the time set with timer elapses after automatic reference position. Return is executed, the automatic reference position return is not completed. Right side of the machine : PMC timer 30 Left side of the machine : PMC timer 80 * Check the operation of each axis.
1041	COMMAND T-CODE	Without commanding the T-code, M16 (Turret random select), M17 (Turret forward) or M18 (Turret reverse) are commanded. * Command the T-code.
1042	PUT BACK THE TOOL SETTER	The cycle start, automatic operation, spindle start, coolant discharge ON, etc., are commanded when the tool setter is extended. * Put back the tool setter.
1043	CLOSE DOOR OR ILK SW/TO OFF	When command the spindle rotation, axis or milling, The door was opened with the door interlock enable state. * Close the door. * Disable the door interlock. * Check or repair the ready completion switch of the door interlock. * Depending on the specification, this alarm occurs.
1044	B-CODE IS TOO LARGE	The B code of 360 degree or more is commanded. * Modify the program.
1045	CLOSE SHUTTER	[Cycle start switch] is pressed with the shutter open. * Close the shutter.

Alarm No.	Alarm indication	Cause and countermeasures
1046	SHUTTER CAN'T OPEN IN LOADERRUN	While the loader is operating, [Shutter OPEN switch] is pressed. * Stop the loader operation.
1047	SHUTTER NOT CLOSE	After M25 (shutter CLOSE) is actuated, it is not completed even when the timer-preset time is completed. Right side of the machine : PMC timer 43 Left side of the machine : PMC timer 93 * Check the motion of the shutter.
1050	KEEP SAME COND.AS BEFORE/ MILLING	The rotary tool state in program stop differs from the rotary tool state when pressing [Cycle start switch] after releasing the program stop. * Make the rotary tool state in the same state as in program stop.
1051	TIGHTEN THE CHUCK	The milling start is commanded when the chuck is unclamped. * Clamp the chuck.
1052	TIGHTEN THE CHUCK	The chuck is unclamped while the milling head is rotated. * Clamp the chuck.
1053	STOP MILLING AT ORIENTATION	Spindle start and turret index are commanded when the rotary tool has not stopped at the orientation position. * Stop the rotary tool at the orientation position.
1054	STOP THE SPINDLE & TURRET	Rotary tool start is commanded during spindle rotation and turret index. * Stop the spindle and turret.
1055	STOP MILLING AT ORIENTATION	Spindle start and turret index are commanded when the rotary tool has not stopped at the orientation position. * Stop the rotary tool at the orientation position.
1056	CHANGE SPINDLE MODE	When spindle mode is not set, spindle start is commanded. * Select the spindle mode.

Alarm No.	Alarm indication	Cause and countermeasures
1057	SPINDLE/MILLING PIN NOT UNLOCK	The spindle/milling pin lock function has not been released. * Check the milling pin lock function and release.
1064	M24 INEFFECT WHEN SPDL. RUNNING	M24 (Shutter open) is commanded during spindle or rotary tool rotation. * Stop the spindle and rotary tool before commanding M24.
1066	CHUCK COMMAND ALARM (DOOR ILK.)	In the state of command prohibit, Chuck operations M-code (M68, M69) is commanded. In memory mode, door is opened, door interlock is disabled. In MDI or single-block mode, door is opened. * Depending on the specification, this alarm occurs.
1067	M69 INEFFECT WHEN SPDL. RUNNING	M69 (Chuck unclamp) is commanded during spindle rotation. * Stop the spindle before commanding M69.
1072	B-CODE IS INEFFECTIVE	The B-function of spindle orientation stop is invalid. * Check the PMC parameter and NC parameter.
1076	LOADER PRG. CANNOT BE STARTED	Loader program (O8000 series) tried to start with the machine. * Do not start the loader program with the machine.
1077	REPETITION COMMANDED OF M-CODE	The multiple M-code which cannot be selected to the same block of the program is commanded. REF. : [E1-5 Multiple M-code alarm]
1080	THERMAL DEFECT/HYD./ COOLANT	The thermal relay has tripped due to the hydraulic motor or coolant motor is overloaded. * Check the thermal relay.

Alarm No.	Alarm indication	Cause and countermeasures
1081	MAIN PNEUMATIC FAILS	Pneumatic pressure is reduced. * Set air pressure to specified value.
1082	MAIN HYDRAULIC FAILS	Hydraulic pressure is reduced. Hydraulic pressure is reduced or [Emergency stop switch] is pressed. * Remove cause in which hydraulic pressure is reduced. * Turn the emergency stop switch to right to reset the fault.
1115	CONSTANT SURFACE SPEED CONTROL MODE AND RIGID TAPPING MODE, WHEN FRONT DOOR IS OPEN, ARE DISABLED.	When the door is opened, constant surface speed or rigid tap is commanded. * Close the door. * Depending on the specification, this alarm occurs.
2000	CHIP-CONV. MOTOR OVER LOAD	The thermal relay has tripped due to the the chip conveyor motor is overloaded. * Check the thermal relay. * Check if they are driven normally by manual operation.
2001	LEVEL OF BED LUB. OIL IS TOO LOW	The level of bed lubrication oil is too low. * Replenish the bed lubrication oil.
2002	BED LUBRICATION ALARM	While the bed lubrication motor is being run, the operation confirmation pressure switch is OFF. Or, the wiring breaker for bed lubrication motor power is OFF. * Check the bed lubrication motor.
2003	MACHINE READY FAILS. EMG BUTTON CHECK & PRESS MACHINE READY BUTTON AGAIN	Operation ready time is over. * Check if the [Emergency stop switch] is not pressed. * Press [Operation ready switch] . If [Operation ready switch] is pressed and the same alarm is still given. Contact our service person.

Alarm No.	Alarm indication	Cause and countermeasures
2004	STARTING AUTO REFERENCE RETURN. PRESS AUTO REFERENCE RETURN BUTTON AGAIN	Automatic returning to the reference position is performed. The machine and loader return to the reference position
R : 2100 L : 2300	WORK CLAMP CHECK FAILS	A workpiece is not properly set to the chuck. * Set workpieces properly. Adjust the pressure switch to detect that a workpiece is clamped.
R : 2101 L : 2301	DETECTION SW. FOR WORK CLAMP CHECK	The pressure switch to detect that a workpiece is clamped does not turn off with the chuck loosened. * Clean the cogging of the jig and adjust the pressure switch to detect that a workpiece is clamped.
R : 2102 L : 2302	REPLACE A BATTERY IMMEDIATELY. IT BECOMES RESTART IMPOSSIBILITY.	The voltage of the back-up battery is low. * Replace a battery with the power turned on. * When the power is turned off and the battery is changed, replace a battery immediately. NOTE : When the power is turned off, and the battery is remain taken out, internal data are deleted.
R : 2103 L : 2303	MEASURING MONITOR SETTING ALARM	There are 5 items for the measuring interface. Set the measuring interfaces appropriately.
R : 2104 L : 2304	TOOL LIFE EMPTY	The service life of the tool has been expired. * Replace the tool of the group with the life expired, and reset the counter of the specified group.
R : 2105 L : 2305	ROTARY UNIT LUBRICATION RUNNING	The rotary joint of the spindle is being lubricated * Wait until the lubrication is completed.
R : 2106 L : 2306	COUNTER COUNT UP	The counter has reached the preset value. * Replace the tool or check the quality before resetting the counter.

Alarm No.	Alarm indication	Cause and countermeasures
R : 2107 L : 2307	CHUCK TIGHTEN MOVEMENT ALARM	Chuck tightening is not completed to the end. * Check if there is any object interfering with the chuck or if it is catching the chuck. * Check and repair the proximity, pressure switches.
R : 2108 L : 2308	CHUCK LOOSEN MOVEMENT ALARM	Chuck loosening does not move to the end. * Check if there is any object interfering with the chuck or if it is catching the chuck. * Check and repair the proximity, pressure switches
R : 2109 L : 2309	MESSAGE OCCURS WITH RAKU RAKU MONITOR	Some message is displayed on RAKU RAKU monitor in the machine * Reset counters reaching the preset value.
R : 2110 L : 2310	FUNCTION COMMAND TRANSATC. FAILS	Turn on the power again and press the [Operation ready ON switch]. * If the same alarm occurs, contact our service engineer.
R : 2111 L : 2311	OUTER DATA INPUT ERROR	Turn on the power again and press the [Operation ready ON switch]. * If the same alarm occurs, contact our service engineer.
2290	MUST CLOSE ALL DOOR, SAFETY COVER AND TEST MCC. (PUSH ALARM RESET BUTTON FOR SEVERAL SEC OVER, AND WILL SHIFT MCC TEST MODE)	Power on or a period time passed. Perform the open and close test of the MCC (main magnetic contactor : KM7, KM27). * In the closed state of the doors and safety covers, press and hold for the time is displayed the alarm reset key. * Depending on the specification, this alarm occurs.

Alarm No.	Alarm indication	Cause and countermeasures
2291	PUSH ALARM RESET BUTTON AND START MCC TESTING	The MCC (main magnetic contactor : KM7, KM27) open and close test is become start state. * Press the alarm reset key. * If the test is normal end, this message is reset. * Depending on the specification, this alarm occurs.
2292	MCC TESTING WAS FAILURE. SEE MCC TEST STATUS	The MCC (main magnetic contactor : KM7, KM27) open and close test is failed. * Check, repair or replace the MMC. * Check, repair or replace the drive relay. * Check or repair the disconnection of the wiring, poor contact, a short circuit of the wiring. * If the problem is not solved even after the above-mentioned measures, please contact our service engineer. * Depending on the specification, this alarm occurs.

1-4 Alarm list (D type)

Alarm No.	Alarm indication	Cause and countermeasures
1001	DETECTION SW. FOR SPINDLE LOCK	The automatic switches of the fixed spindle end and the unfixed spindle end are simultaneously turned on. * Check and repair the automatic switches.
1002	DETECTION SW. FOR SHUTTER	The automatic switches or proximity switches of the opened shutter end and the closed shutter end are simultaneously turned on. * Check and repair the automatic switches or proximity switches.
1003	DETECT. SW. FOR C-AXIS PRESSURE	When the C-axis is clamped, the clamp confirmation pressure switch is not turned ON. * Check the pressure switch and reset it.
1004	DETECT. SW. FOR C-AXIS PRESSURE	When the C-axis mode is changed to the spindle mode, C-axis clamp confirmation pressure switch is not turned OFF. * Check the pressure switch and reset it.
1005	DETECTION SW. FOR CHUCK	The completion confirmation switches of the opened chuck end and closed chuck end are simultaneously turned on. * Check and repair the completion confirmation switches (proximity and pressure switches).
1006	DETECTION SW. FOR TURRET PIN	The automatic switches at the milling fixed end and unfixed end are simultaneously turned on. * Check and repair the automatic switches.
1015	SHUTTER NO MOVE ALARM	The shutter OPEN/CLOSE has not been actuated. * Check the solenoid valve and air pressure.

Alarm No.	Alarm indication	Cause and countermeasures
1016	SHUTTER NO FINISH ALARM	The shutter open/close has not been completed. * Check if there is no object interfering with the shutter or catching the shutter. * Check and repair the automatic switches or proximity switches.
1020	INPUT M22-SIG FOR PROGRAM START	M22 (Program start M code) is not confirmed at the program head. * Add M22 to the program head. * Since the cursor is not returned to the program head. Return it to the program head to start the program.
1021	CYCLE TIME OVER	The automatic operation time which exceeds the time set by the timer is measured. Right side of the machine : PMC timer 1 (PMC1 side) Left side of the machine : PMC timer 1 (PMC2 side) * There is a trouble in the change of the set time or lathe.
1022	S,T,B SIGNALS ARE NOT COMPLETE	The completion signal is not output even if the time set by the timer elapsed after the S, T, B code was executed. Right side of the machine : PMC timer 2 (PMC1 side) Left side of the machine : PMC timer 2 (PMC2 side) * Check the S, T, B code and its action.
1023	KEEP SAME COND.AS BEFORE/ SPINDLE	The spindle condition when the program stops differs from that when the [Cycle start switch] is pressed after releasing the program stop. * Return the spindle to the same condition it was when the program stopped.

Alarm No.	Alarm indication	Cause and countermeasures
1024	KEEP SAME COND.AS BEFORE/ CHUCK	The spindle condition when the program stops differs from that when the [Cycle start switch] is pressed after releasing the program stop. * Return the spindle to the same condition it was when the program stopped.
1027	CLOSE SAFETY DOOR	The safety door opens while the memory operation is performed, spindle is rotating, milling is rotating, or spindle is under orientation. * When the door is opened while the memory operation is performed, an emergency stop is caused. Cancel the message, and close the door to return to the reference position. * When the door is opened with the spindle rotating, the machine stops. * Depending on the setting of the keep relay, this alarm occurs.
1030	DOOR INTERLOCK SW/TO EFFECT POS.	The door interlock becomes ineffective when the [Cycle start switch] is pressed in the memory mode. * Select the door interlock to EFFECT. * Depending on the setting of the keep relay, this alarm occurs.

Alarm No.	Alarm indication	Cause and countermeasures
1031	CLOSE THE SAFETY DOOR	The safety door has already been opened when the [Cycle start switch] is pressed in the memory mode. With the safety door interlock effective in the single or MDI mode, when the [Cycle start switch] is pressed, the safety door has already been opened. * Close the safety door. * Depending on the setting of the keep relay, this alarm occurs.
1032	M** IS NOT COMPLETE	The completion signal is not output even if the time set by the PMC timer elapsed after the M-code was executed. Right side of the machine : PMC timer 2 (PMC1 side) Left side of the machine : PMC timer 2 (PMC2 side) * Check the M-code and its action. * Check the completion confirmation switches or adjust its again or repair its. * M code number that did not complete is entered in**.
1033	TIGHTEN THE CHUCK	The [Cycle start switch] is pressed when the chuck has not been clamped. * Clamp the chuck. * Depending on the setting of the keep relay, this alarm occurs.
1034	TIGHTEN THE CHUCK	The spindle start is commanded when the chuck is unclamped. * Clamp the chuck.
1035	TIGHTEN THE CHUCK	The chuck is unclamped while the spindle is rotated. * Clamp the chuck.
1036	CHUCK OVER TRAVEL	The diameter of the workpiece is different or the workpiece is not clamped. * Clamp the appropriate workpiece.

Alarm No.	Alarm indication	Cause and countermeasures
1037	T-CODE IS TOO LARGE	The number more than the usable tool number is commanded. * Modify the program.
1040	AUTO. REF. RETURN TIME OVER	Even if the time set with timer elapses after automatic reference position. Return is executed, the automatic reference position return is not completed. Right side of the machine : PMC timer 30 (PMC1 side) Left side of the machine : PMC timer 30 (PMC2 side) * Check the operation of each axis.
1041	COMMAND T-CODE	Without commanding the T-code, M16 (Turret random select), M17 (Turret forward) or M18 (Turret reverse) are commanded. * Command the T-code.
1042	PUT BACK THE TOOL SETTER	The cycle start, automatic operation, spindle start, coolant discharge ON, etc., are commanded when the tool setter is extended. * Put back the tool setter.
1043	CLOSE DOOR OR ILK SW/TO OFF	When command the spindle rotation, axis or milling, The door was opened with the door interlock enable state. * Close the door. * Disable the door interlock. * Check or repair the ready completion switch of the door interlock. * Depending on the specification, this alarm occurs.
1044	B-CODE IS TOO LARGE	The B code of 360 degree or more is commanded. * Modify the program.
1045	CLOSE SHUTTER	[Cycle start switch] is pressed with the shutter open. * Close the shutter.

Alarm No.	Alarm indication	Cause and countermeasures
1046	SHUTTER CAN'T OPEN IN LOADER RUN	While the loader is operating, [Shutter OPEN switch] is pressed. * Stop the loader operation.
1047	SHUTTER NOT CLOSE	After M25 (shutter CLOSE) is actuated, it is not completed even when the timer-preset time is completed. Right side of the machine : PMC timer 43 (PMC1 side) Left side of the machine : PMC timer 43 (PMC2 side) * Check the motion of the shutter.
1050	KEEP SAME COND. AS BEFORE/ MILLING	The rotary tool state in program stop differs from the rotary tool state when pressing [Cycle start switch] after releasing the program stop. * Make the rotary tool state in the same state as in program stop.
1051	TIGHTEN THE CHUCK	The milling start is commanded when the chuck is unclamped. * Clamp the chuck.
1052	TIGHTEN THE CHUCK	The chuck is unclamped while the milling head is rotated. * Clamp the chuck.
1053	STOP MILLING AT ORIENTATION	Spindle start and turret index are commanded when the rotary tool has not stopped at the orientation position. * Stop the rotary tool at the orientation position.
1054	STOP THE SPINDLE & TURRET	Rotary tool start is commanded during spindle rotation and turret index. * Stop the spindle and turret.
1055	STOP MILLING AT ORIENTATION	Spindle start and turret index are commanded when the rotary tool has not stopped at the orientation position. * Stop the rotary tool at the orientation

Alarm No.	Alarm indication	Cause and countermeasures
1056	CHANGE SPINDLE MODE	When spindle mode is not set, spindle start is commanded. * Select the spindle mode.
1057	SPINDLE/MILLING PIN NOT UNLOCK	The spindle/milling pin lock function has not been released. * Check the milling pin lock function and release.
1064	M24 INEFFECT WHEN SPDL. RUNNING	M24 (Shutter open) is commanded during spindle or rotary tool rotation. * Stop the spindle and rotary tool before commanding M24.
1066	CHUCK COMMAND ALARM (DOOR ILK.)	In the state of command prohibit, Chuck operations M-code (M68, M69) is commanded. In memory mode, door is opened, door interlock is disabled. In MDI or single-block mode, door is opened. * Depending on the specification, this alarm occurs.
1067	M69 INEFFECT WHEN SPDL. RUNNING	M69 (Chuck unclamp) is commanded during spindle rotation. * Stop the spindle before commanding M69.
1072	B-CODE IS INEFFECTIVE	The B-function of spindle orientation stop is invalid. * Check the PMC parameter and NC parameter.
1077	REPETITION COMMANDED OF M-CODE	The multiple M-code which cannot be selected to the same block of the program is commanded. REF. : [E1-5 Multiple M-code alarm]
1080	THERMAL DEFECT/HYD/ COOLANT	The thermal relay has tripped due to the hydraulic motor or coolant motor is overloaded. * Check the thermal relay.
1081	MAIN PNEUMATIC FAILS	Pneumatic pressure is reduced. * Set air pressure to specified value.

Alarm No.	Alarm indication	Cause and countermeasures
1082	MAIN HYDRAULIC FAILS	Hydraulic pressure is reduced. Hydraulic pressure is reduced or [Emergency stop switch] is pressed. * Remove cause in which hydraulic pressure is reduced. * Turn the emergency stop switch to right to reset the fault.
OP1000	CHIP-CONV. MOTOR OVER LOAD	The thermal relay has tripped due to the the chip conveyor motor is overloaded. * Check the thermal relay. * Check if they are driven normally by manual operation.
OP1001	LEVEL OF BED LUB. OIL IS TOO LOW	The level of bed lubrication oil is too low. * Replenish the bed lubrication oil.
OP1002	BED LUBICATION ALARM	While the bed lubrication motor is being run, the operation confirmation pressure switch is OFF. Or, the wiring breaker for bed lubrication motor power is OFF. * Check the bed lubrication motor.
OP1006	MACHINE <u>READYFAILS</u> . EMG BUTTON CHECK & PRESS MACHINE READYBUTTON AGAIN	Operation ready time is over. * Check if the [Emergency stop switch] is not pressed. * Press [Operation ready switch] . If [Operation ready switch] is pressed and the same alarm is still given. Contact our service person.
OP1015	OPERATION I/O UNIT ERROR(GROUP 0)	Rise alarm on the operation I/O unit of group 0. * Check the operation I/O unit of group 0.
OP1016	OPERATION I/O UNIT ERROR(GROUP 1)	Rise alarm on the operation I/O unit of group 1. * Check the operation I/O unit of group 1.
OP1017	OPERATION I/O UNIT ERROR(GROUP 2)	Rise alarm on the operation I/O unit of group 2. * Check the operation I/O unit of group 2.

Alarm No.	Alarm indication	Cause and countermeasures
R : OP1103 L : OP1303	WORK CLAMP CHECK FAILS	A workpiece is not properly set to the chuck. * Set workpieces properly. Adjust the pressure switch to detect that a workpiece is clamped.
R : OP1104 L : OP1304	DETECTION SW. FOR WORK CLAMP CHECK	The pressure switch to detect that a workpiece is clamped does not turn off with the chuck loosened. * Clean the cogging of the jig and adjust the pressure switch to detect that a workpiece is clamped.
R : OP1107 L : OP1307	STARTING AUTO REFERENCE RETURN. PRESS AUTO REFERENCE RETURN BUTTON AGAIN	Automatic returning to the reference position is performed. The machine and loader return to the reference position
R : OP1111 L : OP1311	MEASURING MONITOR SETTING ALARM	There are 5 items for the measuring interface. Set the measuring interfaces appropriately.
R : OP1112 L : OP1312	TOOL LIFE EMPTY	The service life of the tool has been expired. * Replace the tool of the group with the life expired, and reset the counter of the specified group.
R : OP1113 L : OP1313	ROTARY UNIT LUBRICATION RUNNING	The rotary joint of the spindle is being lubricated * Wait until the lubrication is completed.
R : OP1114 L : OP1314	COUNTER COUNT UP	The counter has reached the preset value. * Replace the tool or check the quality before resetting the counter.
R : OP1115 L : OP1315	CONSTANT SURFACE SPEED CONTROL MODE AND RIGID TAPPING MODE, WHEN FRONT DOOR IS OPEN, ARE DISABLED.	When the door is opened, constant surface speed or rigid tap is commanded. * Close the door. * Depending on the specification, this alarm occurs.

Alarm No.	Alarm indication	Cause and countermeasures
R : OP1116 L : OP1316	CHUCK TIGHTEN MOVEMENT ALARM	Chuck tightening is not completed to the end. * Check if there is any object interfering with the chuck or if it is catching the chuck. * Check and repair the, proximity, pressure switches.
R : OP1117 L : OP1317	CHUCK LOOSEN MOVEMENT ALARM	Chuck loosening does not move to the end. * Check if there is any object interfering with the chuck or if it is catching the chuck. * Check and repair the proximity, pressure switches.
R : OP1120 L : OP1320	MESSAGE OCCURS WITH RUKU RUKU MONITOR	Some message is displayed on RAKU RAKU monitor in the machine * Reset counters reaching the preset value.
R : OP1130 L : OP1330	FUNCTION COMMAND TRANSATC. FAILS	Turn on the power again and press the [Operation ready ON switch]. * If the same alarm occurs, contact our service engineer.
R : OP1131 L : OP1331	OUTER DATA INPUT ERROR	Turn on the power again and press the [Operation ready ON switch]. * If the same alarm occurs, contact our service engineer.
R : OP1553 L : OP1753	REPLACE A BATTERY IMMEDIATELY. IT BECOMES RESTART IMPOSSIBILITY.	The voltage of the back-up battery is low. * Replace a battery with the power turned on. * When the power is turned off and the battery is changed, replace a battery immediately. NOTE : When power is turned off, and the battery is remain taken out, internal data are deleted.
OP1290	MUST CLOSE ALL DOOR, SAFETY COVER AND TEST MCC. (PUSH ALARM RESET BUTTON FOR SEVERAL SEC OVER, AND WILL SHIFT MCC TEST MODE)	Power on or a period time passed. Perform the open and close test of the MCC (main magnetic contactor : KM7, KM27). * In the closed state of the doors and safety covers, press and hold for the time is displayed the alarm reset key. * Depending on the specification, this alarm occurs.

Alarm No.	Alarm indication	Cause and countermeasures
OP1291	PUSH ALARM RESET BUTTON AND START MCC TESTING	The MCC (main magnetic contactor : KM7, KM27) open and close test is become start state. * Press the alarm reset key. * If the test is normal end, this message is reset. * Depending on the specification, this alarm occurs.
OP1292	MCC TESTING WAS FAILURE. SEE MCC TEST STATUS	The MCC (main magnetic contactor : KM7, KM27) open and close test is failed. * Check, repair or replace the MMC. * Check, repair or replace the drive relay. * Check or repair the disconnection of the wiring, poor contact, a short circuit of the wiring. * If the problem is not solved even after the above-mentioned measures, please contact our service engineer. * Depending on the specification, this alarm occurs.

1-5 Multiple M-code alarm

Since the following combination becomes multiple M-code alarm, do not command.

Forbidden multiple M-code command	Alarm contents
M00, M01, M02, M22, M30, M98, M99	* Any M-code among M00 (Program stop), M01 (Optional stop), M02 (End of program), M22 (Program start check), M30 (End of tape), M98 (Call the sub program), M99 (End of the sub program) and other M-code are simultaneously commanded.
M03, M04, M05, M19	* M03 (Spindle, rotary tool forward) and M04 (Spindle, rotary tool reverse), M03 and M05 (Spindle, rotary tool stop), M03 and M19 (Spindle, rotary tool orientation) are simultaneously commanded. * M04 and M05, M04 and M19 are simultaneously commanded. * M05 and M19 are simultaneously commanded.
M08, M09	* M08 (Coolant ON) and M09 (Coolant OFF) are simultaneously commanded.
M14, M15	* M14 (Pressure select high) and M15 (Pressure select low) are simultaneously commanded.
M16, M17, M18	* M16 (Turret random select) and M17 (Turret forward), M16 and M18 (Turret reverse) are simultaneously commanded. * M17 and M18 are simultaneously commanded.
M24, M25	* M24 (Door open) and M25 (Door close) are simultaneously commanded.
M26, M27	* M26 (Air blow ON) and M27 (Air blow OFF) are simultaneously commanded.
M31, M32	* M31 (Interlock bypass ON) and M32 (Interlock bypass OFF) are simultaneously commanded.
M33, M34	* M33 (Spindle coolant ON) and M34 (Spindle coolant OFF) are simultaneously commanded.
M35, M36	* M35 (2nd air blow ON) and M36 (2nd air blow OFF) are simultaneously commanded.

Forbidden multiple M-code command	Alarm contents
M48, M49	* M48 (Override cancel OFF) and M49 (Override cancel ON) are simultaneously commanded.
M66, M67	* M66 (Error detect ON) and M67 (Error detect OFF) are simultaneously commanded.
M68, M69	* M68 (Chuck clamp) and M69 (Chuck unclamp) are simultaneously commanded.
M90, M91	* M90 (Chamfering ON) and M91 (Chamfering OFF) are simultaneously commanded.

* Cs-axis only

Forbidden multiple M-code command	Alarm contents
M03, M04, M29, M70, M71, M72, M79, T	* Any M codes or T codes among M70 (Rotary tool forward), M71 (Rotary tool reverse), M03 (Spindle forward), M04 (Spindle reverse), M29 (Rigid tap), M72 (Rotary tool stop), M79 (Rotary tool orientation) are simultaneously commanded. * M70 and M71 are simultaneously commanded. * M72 and M79 are simultaneously commanded.
M03, M04, M29, M79, T	* M03, M04, M29 and M79 are simultaneously commanded.
M75, M76	* M75 (Turning mode) and M76 (C-axis, rotary tool mode) are simultaneously commanded.
M77, M78	* M77 (C-axis brake ON) and M78 (C-axis brake OFF) are simultaneously commanded.
M80, M81	* M80 (C-axis brake HIGH) and M81 (C-axis brake LOW) are simultaneously commanded.

* Loader only

Forbidden multiple M-code command	Alarm contents
M08, M09, M21	* M08 (Coolant ON) and M09 (Coolant OFF), M08 and M21 are simultaneously commanded.
M21, M25	* M21 (Program overlap) and M25 (Shutter CLOSE) are simultaneously commanded.
M21, M29, M70, M71	* M21 and M29, M21 and M70, M21 and M71 are simultaneously commanded.

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NC Lathe

TT-2600

GANTRY LOADER

MACHINE INSTRUCTION MANUAL

XZ04040-101

Please read each manual and
understand contents enough.
Then keep these manuals handy for
answers to any questions you may
have and to check.

MACHINE TOOLS
TAKISAWA

IMPORTANT NOTICE

- Be sure to read each instruction manual before operating the machine.

Be sure to observe the safety precautions in the instruction manuals and the contents of warning labels adhered to the machine. If ignored, an accident resulting in injury or death or machine malfunction may be caused.

There are many [DISABLE] or [MUST NOT DO] conditions.

Unless [ABLE] is written in the instruction manual, consider it [DISABLE].

- Some illustrations in the instruction manual are given without cover or door to illustrate the detailed parts. In actual operation, it is necessary to mount the cover or door.
- Keep instruction manuals handy for ready reference as it will help you operate the machine and equipment to their full advantage.
- When any instruction manual is required again, contact your agent with the number of the instruction manual (or model name, manual name).
- Japanese laws prohibit this machine from being used to develop or manufacture "weapons of mass destruction" or "conventional arms", as well as from being used to process parts for them.
Export of the product may require the permission of governmental authorities of the country from where the product is exported.
Should you wish to resell, transfer or export the product, please notify Takisawa Machine Tool Co., Ltd. or our distributor in advance.
- Observe the laws and regulations established by the national and local governments.
- Observe the laws and regulations established by the national and local government for disposal of machines and waste oil.

- Software copyright is held by us.
- No part of the software is allowed to use, copy, or modify without written permission of us.
- This instruction manual is copyrighted, and all rights are reversed. No part of the drawings and technical descriptions contained in this instruction manual may be disclosed, photocopied, translated to another language or copied to any readable electronic devices and apparatus without the prior written consent.
- The contents in this instruction manual are subject to change without notice.
- All brand names and product name listed in this instruction manual are trademarks or registered trademarks of their respective companies.
- This instruction manual is prepared for native English-speakers. When the machine is operated by non-native English speakers, please provide safety instruction for the operators by customers. In addition, please provide warning labels in their native language.
- Be sure to attach this instruction manual in case of reselling this machine.
- The manual is written for people who have a basic knowledge of machine tools. TAKISAWA disclaims all responsibility for damage or accidents arising due to people with insufficient knowledge or training with machine tools, attempting to operate, maintain or program said tools.
- When replacing the parts, use the parts specified by company. TAKISAWA disclaims all responsibility for damage or problems occurring due to using parts other than those specified.
If the specified parts are not used, not only the machine function is reduced but also safety is compromised, thus possibly causing an accident resulting in injury or death or machine malfunction.

- There are many kinds of coolants.

Though TAKISAWA does not specify the coolant, select the coolant by consulting with maker about the following items.

TAKISAWA disclaims all the responsibility for trouble incurred by the coolant.

- Contact us for requesting an installation, modification, and specification change, and dismantlement of the machine. If the machine is installed, modified, or its specification is changed by customer, not only the performance of the machine may be lost but also the safety of the customer may not be secured.

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1 SPECIFICATION OF GANTRY LOADER

1-1 Loader

Items		Specifications		
Control axis composition		4-axis	(1) Longitudinal moving direction (X) (2) Vertical moving direction (Y) (3) Cross moving direction (Z) (4) Hand swing	
Operation range and speed	8 inch type	X-axis	A : 1755 mm B : 1755 mm C : 3050 mm D (L) : 1345 mm D (R) : 1345 mm	150 m/min
		Y-axis	975 mm	170 m/min
		Z-axis	212 mm	50 m/min
		Hand swing	90°	
	10 inch type	X-axis	A : 1880 mm B : 1880 mm C : 3300 mm D (L) : 1465 mm D (R) : 1465 mm	110 m/min
		Y-axis	1055 mm	125 m/min
		Z-axis	260 mm	35 m/min
		Hand swing	90°	
Driving method		X-axis	Servo motor	
		Y-axis		
		Z-axis		
				Hand swing
Standard accessory		Safety cover, Upper automatic door, Door interlock		

1-2 Work stocker

Items		Specifications	
		8 inch type	10 inch type
Composition		Rotary table type (with lift mechanism)	
Number of table		16 Pallet/3 guide bar	14 Pallet/3 guide bar
Work loader part	Object workpiece outer diameter	φ 20 to φ 160 mm	φ 35 to φ 200 mm
	Object workpiece thickness	10 to 100 mm	10 to 120 mm
	Max, loaded height	450 mm	400 mm
	Max, loaded weight	40 kg/1 pallet	70 kg/1 pallet
Lift drive part	Drive part	Two places	
	Raised position detecting method	Photoelectric switch	

1-3 Hand

1. 8 inch type

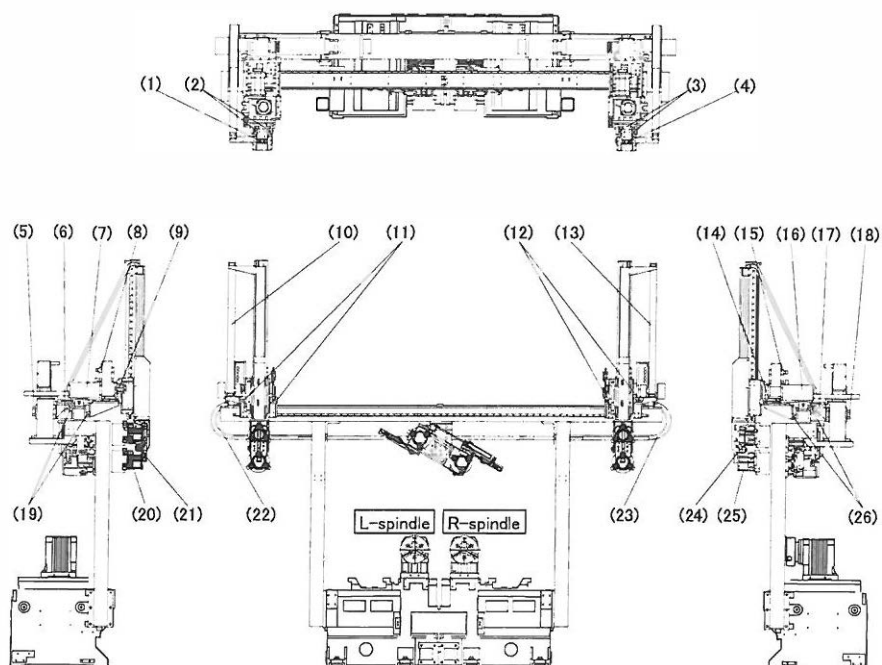
Items		Specifications
Workpiece loading weight		4 kg×2 (Hand tare is excepted)
Hand specification	Gripping method	Three-jaw chuck type double hand
	Object workpiece sizes	Max, ϕ 160×100 mm
	Jaw stroke	ϕ 32 mm (Diameter)
Compressed air supply	0.4 MPa	

2. 10 inch type

Items		Specifications
Workpiece loading weight		8 kg×2 (Hand tare is excepted)
Hand specification	Gripping method	Three-jaw chuck type double hand
	Object workpiece sizes	Max, ϕ 200×120 mm
	Jaw stroke	ϕ 48 mm (Diameter)
Compressed air supply	0.4 MPa	

2 EACH OF COMPONENTS

2-1 Loader



* This figure shows the twin loader.
The loader can be changed to the single loader by specifications.

Fig. 2-1 Each components (Type D Loader)

- (1) L-loader hand turn air cylinder
- (2) L-loader Y-axis (vertical) feed LM guide
- (3) R-loader Y-axis (vertical) feed LM guide
- (4) R-loader hand turn air cylinder
- (5) L-loader X-axis (lateral) feed servo motor
- (6) L-loader X-axis (lateral) reduction gear
- (7) L-loader Y-axis (vertical) feed servo motor
- (8) L-loader Z-axis (cross) feed servo motor
- (9) L-loader Y/Z-axis (vertical/cross) reduction gear
- (10) L-loader Y/Z-axis (vertical/cross) cableveyor
- (11) L-loader Z-axis (cross) feed LM guide
- (12) R-loader Z-axis (cross) feed LM guide
- (13) R-loader Y/Z-axis (vertical/cross) cableveyor
- (14) R-loader Y/Z-axis (vertical/cross) reduction gear
- (15) R-loader Z-axis (cross) feed servo motor
- (16) R-loader Y-axis (vertical) feed servo motor
- (17) R-loader X-axis (lateral) reduction gear
- (18) R-loader X-axis (lateral) feed servo motor
- (19) L-loader X-axis (lateral) feed LM guide
- (20) L-loader unloading hand
- (21) L-loader loading hand
- (22) L-loader X-axis (lateral) cableveyor
- (23) R-loader X-axis (lateral) cableveyor
- (24) R-loader loading hand
- (25) R-loader unloading hand
- (26) R-loader X-axis (lateral) feed LM guide

2-2 Reverse turn equipment

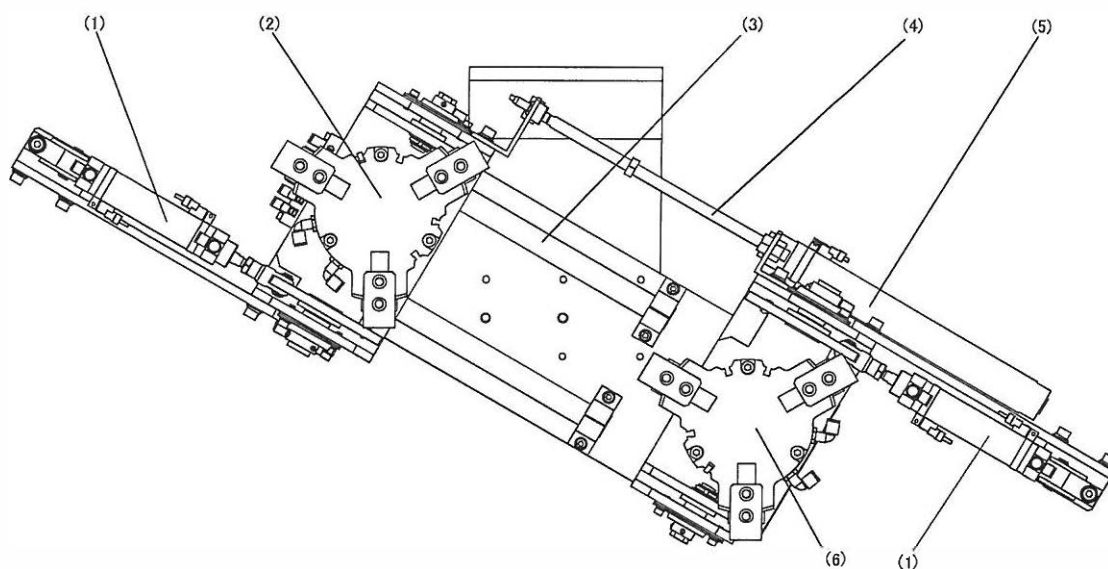


Fig. 2-2 Each components (Reverse turn equipment)

- (1) Air cylinder for reverse turn equipment
- (2) L-reverse turn hand
- (3) Reverse turn hand slide guide
- (4) Workpiece delivery position adjusting bolt
- (5) Reverse turn hand shift air cylinder
- (6) R-reverse turn hand

2-3 Workpiece feeder

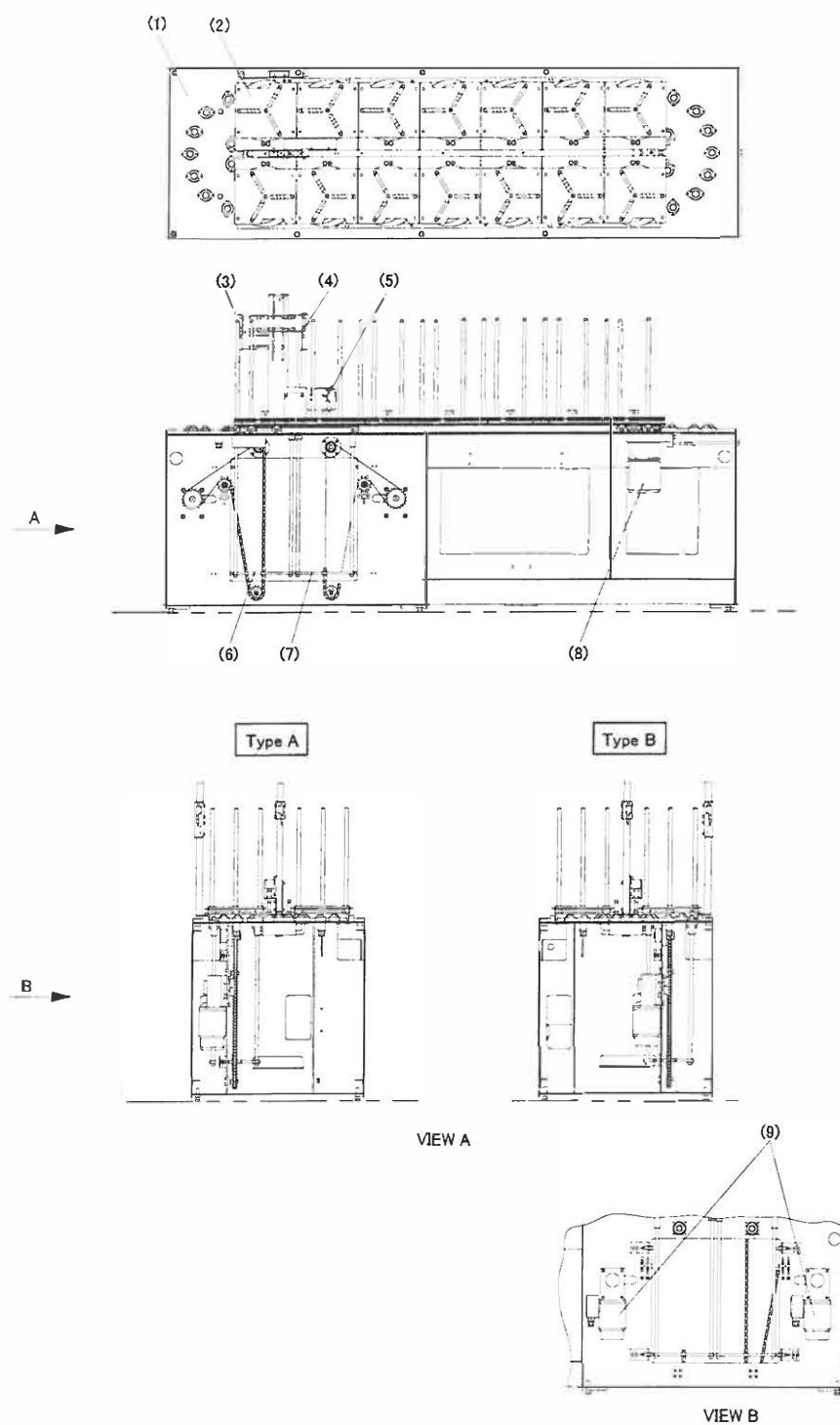


Fig. 2-3 Each components (Workpiece feeder)

- (1) Frame
- (2) Pallet
- (3) Photoelectric switch for checking unloading workpiece
- (4) Photoelectric switch for checking loading workpiece
- (5) Proximity switch for checking pallet stop position
- (6) Unloading lifter
- (7) Loading lifter
- (8) Pallet swing drive motor
- (9) Lifter driving motor

3 ADJUSTMENT OF COMPONENTS

3-1 Reference position of each axis (X, Y, Z-axes)

Since the servo motors for X, Y and Z-axes use the absolute pulse coders, when each reference position is established first, its position is stored so that a high speed reference position return will be possible.

(The stored reference positions have been already adjusted before shipping.)

If any reference position is slipped or eliminated for any reason, it is necessary to establish the reference position once more.

If the machine is operated with the any reference position established to inadequate position, take extreme care because unexpected accidents occur or machine trouble may be caused.

1. Erasing of reference position of each axis

(1) Set the mode to MDI.

(2) Press the function key



(3) Press the soft key [SETTING] to display the setting screen.

Since there are some pages, press page keys several times to display the following screen.



SETTING (HANDY)		O0000	N0000
PARAMETER WRITE	= 1 (0: DISABLE 1: ENABLE)		
TV CHECK	= 0 (0: OFF 1: ON)		
PUNCH CODE	= 1 (0: EIA 1: ISO)		
INPUT UNIT	= 0 (0: MM 1: INCH)		
I/O CHANNEL	= 0 (0-3: CHANNEL NO.)		
SEQUENCE NO.	= 0 (0: OFF 1: ON)		
TAPE FORMAT	= 0 (0: NO CNV 1: F10/11)		
SEQUENCE STOP	= 0 (PROGRAM NO.)		
SEQUENCE STOP	= 1 1 (SEQUENCE NO.)		

>_

MDI **** ** 16:18:18

[OFFSET] **SETTING** [WORK] [(OPRT)]

Set number [1] to PARAMETER WRITE.

When changing parameter No. 1815 (XG, YG, ZG) #4(4-bit) to [0] from [1], [000 Turn off power supply.] appears on LCD screen.

When the power supply is turned on again, the following messages are displayed.

[300 APC alarm: Request of X-axis home position return]

[300 APC alarm: Request of Z-axis home position return]

[300 APC alarm: Request of Y-axis home position return]

The above messages show that the servo motors have lost the reference positions.

2. Reference position return for each axis

Press the switch to feed the desired axis manually close to the reference position. (At this time, take care of feedrate.)

After that, the feedrate is finely adjusted with [Step mode].

*The reference position is set by the distance between the rubber stopper attached to the axis and main axis. In X-axis, the distance from the reference position to the stopper differs by type (Dimension (1)). However the distance for Y and Z-axes are the same.

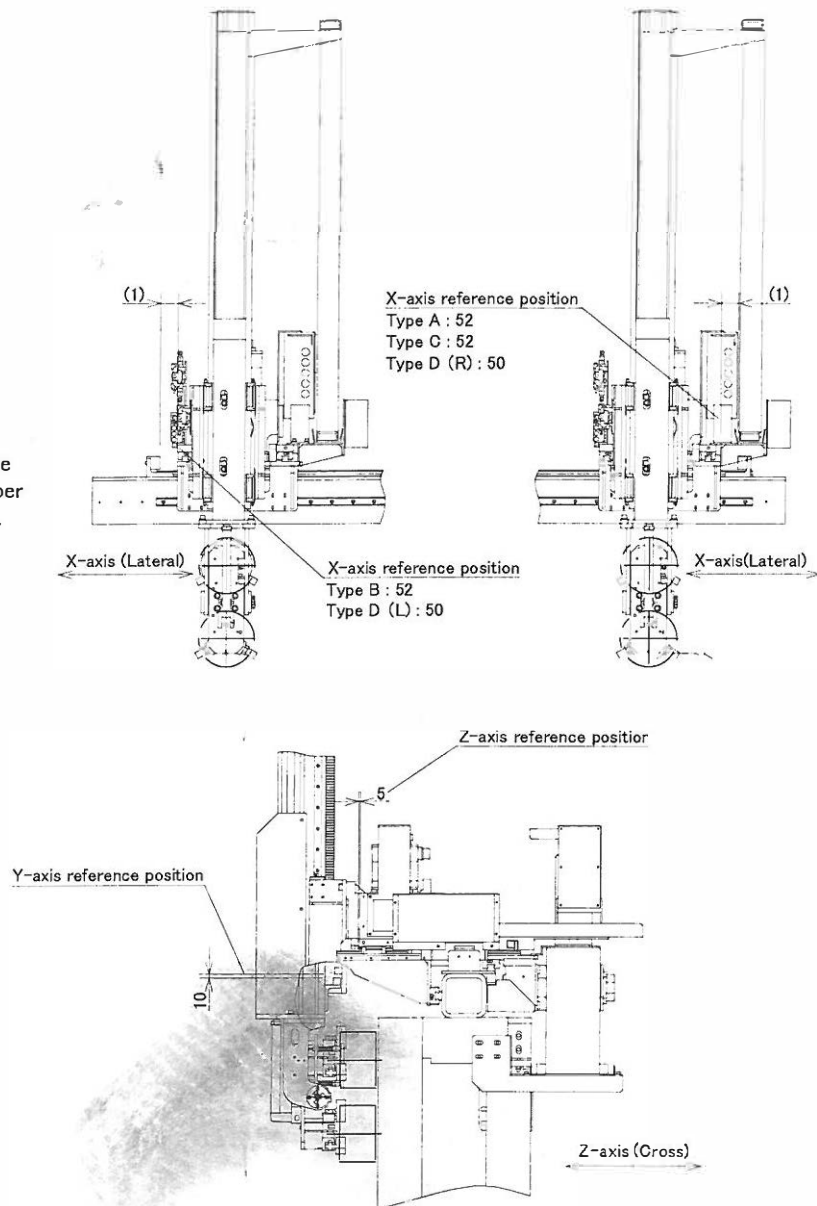


Fig. 3-1 (a) Reference position return for each axis (8 inch type)

*The reference position is set by the distance between the rubber stopper attached to the axis and main axis. In X-axis, the distance from the reference position to the stopper differs by type (Dimension (1)). However the distance for Y and Z-axes are the same.

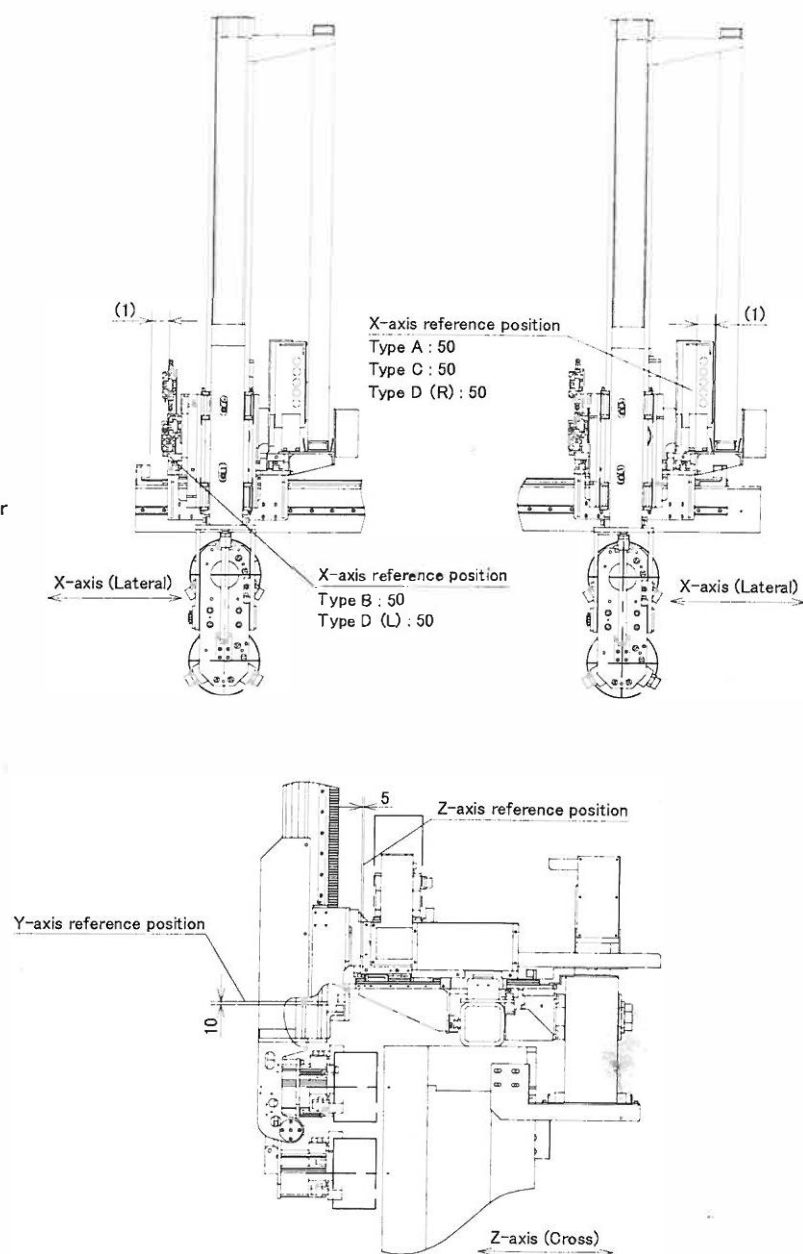


Fig. 3-1 (b) Reference position return for each axis (10 inch type)

When the loader is completely traveled to the reference position as shown in [Fig. 3-1 (a), (b)], change number [0] of parameter No. 1815 (XG, YG, ZG) #4 (4-bit) to number [1].

When repowering, the message for the request of home position return disappears.

At this time, the reference position is established.

However, since the position may be slipped in comparison with the position before shipping, check the operation of each axis and set the program and offset to optimum values.

3-2 Centering adjustment of loader

The centering of the loader has been adjusted before shipping.

However, if the centering is out of order, readjust the center according to the following procedures.

Adjusting	Check item	Adjusting part and No.
Adjust Y-axis of loader with the plumb so as not to (back ad front) loader column.	Check Y-axis of loader is in right angle.	(1) Bolt
Adjust hand inclination. * Move the loader to outside of machine on workpiece feeder side. * Mount the dial gauge to machine side. * Measure the body sides of loading hand and unloading hand, traveling Y-axis.	Check the loading hand and unloading hand are parallel with Y-axis traveling line.	(2) Bolt
Adjust the horizontal line and vertical line of hand. * Mount the dial gauge to machine side. * Measure the end face of test piece in the loading hand, traveling Y-axis and Z-axis.	Check the loader hand face does not touch the chuck workpiece feeder.	(3) Stopper bolt
Adjust the loader hand face to X-axis of loader. * Mount the dial gauge to machine side. * Measure the end face of test piece in the loading hand, traveling X-axis.		(4) Bolt
Align R-reverse turn hand to L-reverse turn hand. * Adjust the center lines of both hand with the test piece held by both hands.	Check the centers of both hands are aligned.	(5) Bolt and stopper
Put both faces of reverse turn hand and loader hand together and hold the test piece between the reverse turn hand and the loader hand.	Check the reverse turn hand face does not slip with the loader hand face.	(6) Stopper bolt/nut (7) Push/pull bolt

Adjusting	Check item	Adjusting part and No.
Fine tuning of workpiece feeder installing position. * Return all loader axes to home positions. * Turn the loader hand. * Move the loader hand near lifter. * Temporarily fix the connecting fitting between the machine and workpiece feeder. * Lift the lifter of workpiece feeder. * Install the workpiece feeder in the front-back direction so that the lifter center will be aligned to the hand center (or perform the teaching again.) * Fix the connecting fitting.	Check the workpiece can be loaded and unloaded simultaneously.	(8) Adjust centers with a steel bar.

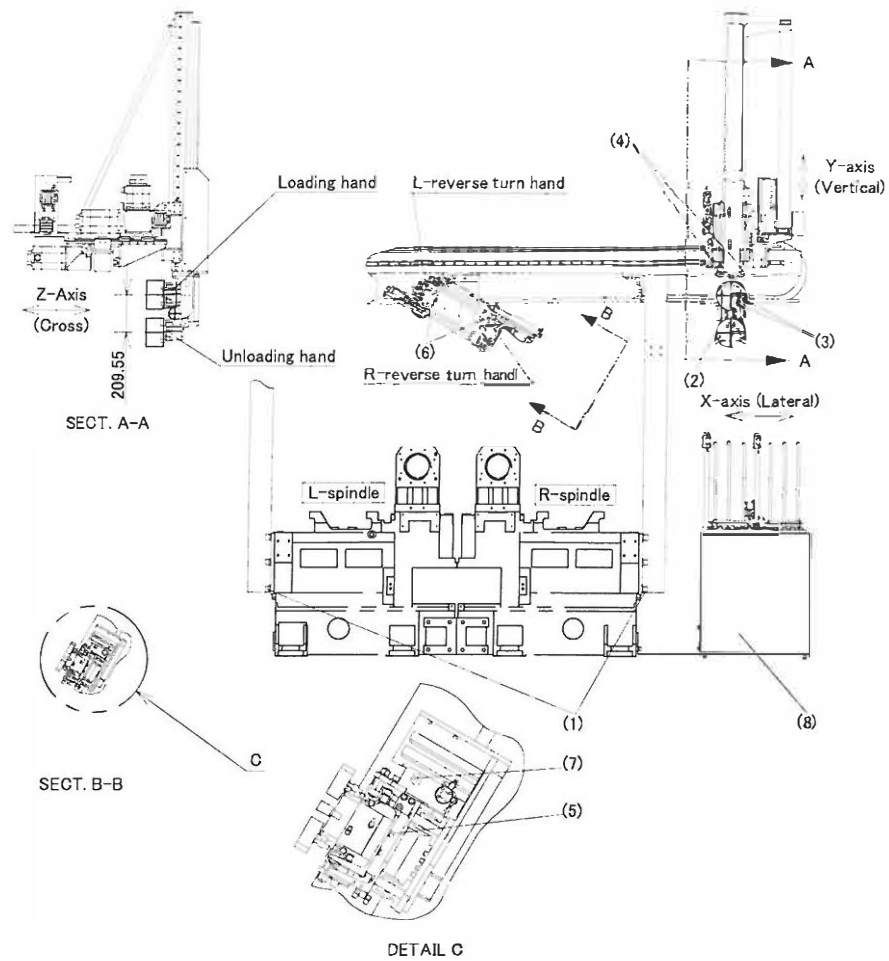


Fig. 3-2 (a) Centering adjustment of loader (8 inch type)

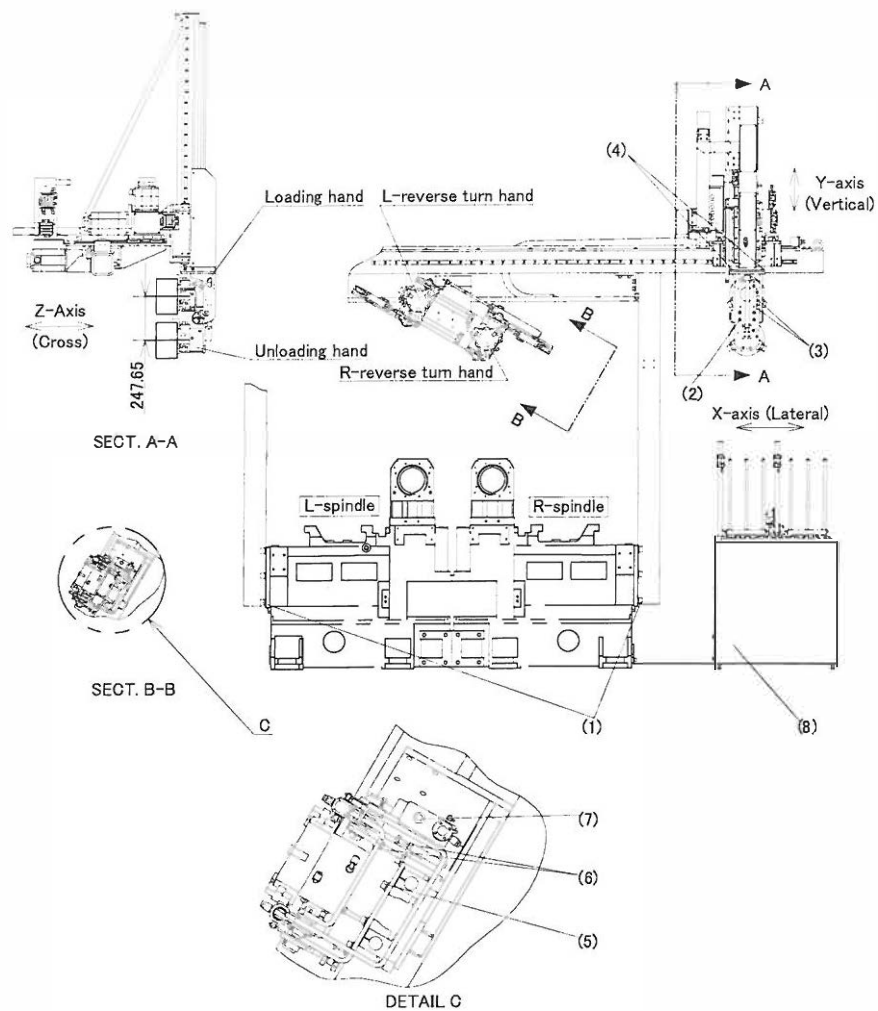


Fig. 3-2 (b) Centering adjustment of loader (10 inch type)

The centering must be correctly adjusted to perform the programming and teaching of loader easily and to reduce mis-operation.

When going in and out the loader to the machine from the shutter, travel only Y-axis (vertical).

When going in and out the loader to the machine from the shutter, return the X-axis of turret to home position, and the Z-axis to home position 2 or its vicinity.

When traveling the loader axis, select the feedrate to be suited for its purpose.

Especially, when operating the loader manually, select a slow speed and slowly increase the speed after checking safety.

The following shows typical dimensions for the reference of adjustment and programming.

* Distance between R-spindle and L-spindle: 450 mm

* Distance between loading hand and unloading hand:

209.55 mm (8 inch type)

247.65 mm (10 inch type)

* Distance between loading pallet and unloading pallet:

209.55 mm (8 inch type)

247.65 mm (10 inch type)

* Distance in Y-axis direction from loading hand to spindle at Y-axis reference position:

970 mm (8 inch type)

1050 mm (10 inch type)

The following shows the stroke of each loader axis every type for the reference of adjustment and programming.

(1)	(2)	(3)	(4)
-END	-SOFT OT.	REF. POINT	+SOFT OT.
			+END

	Axis	Spec.	(1)	(2)	(3)	(4)	Total
8 inch type	X	A	10	1755	10	42	1817
		B	10	1755	10	42	1817
		C	42	3050	10	42	3144
		D (L)	5	1345	10	40	1400
		D (R)	5	1345	10	40	1400
	Y	A, B, C, D	5	975	5	5	990
	Z		3	212	2	3	220
10 inch type	X	A	10	1880	10	40	1940
		B	10	1880	10	40	1940
		C	40	3300	10	40	3390
		D (L)	10	1465	10	40	1525
		D (R)	10	1465	10	40	1525
	Y	A, B, C, D	5	1055	5	5	1070
	Z		3	260	2	3	268

4 LOADER INTERFERENCE DRAWING

4-1 Loader interference drawing (Side view)

The following figure shows where the Z-axis of loader is in the reference position.

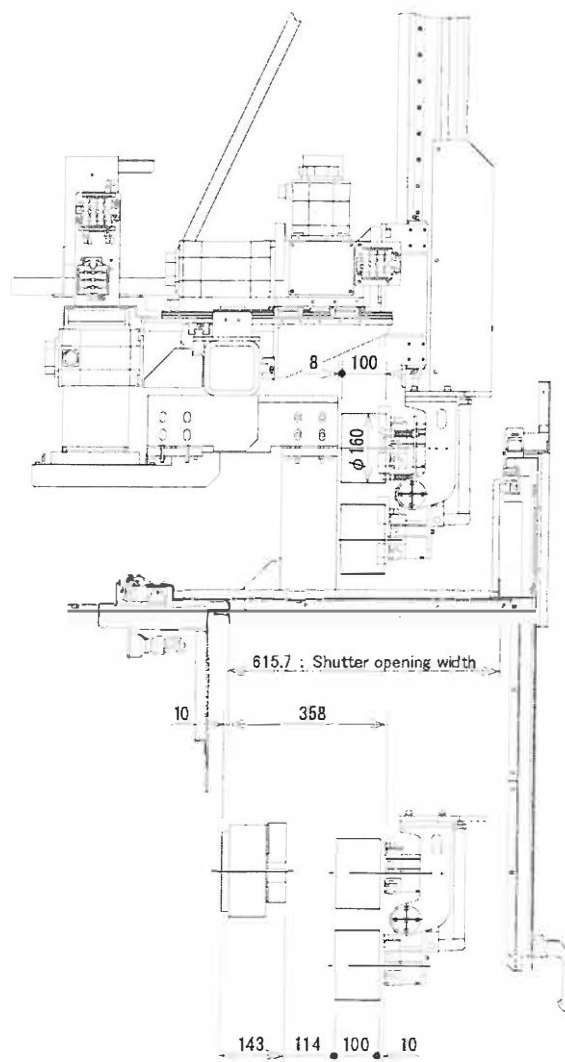


Fig. 4-1 (a) Loader interference drawing (Side view) (8 inch type)

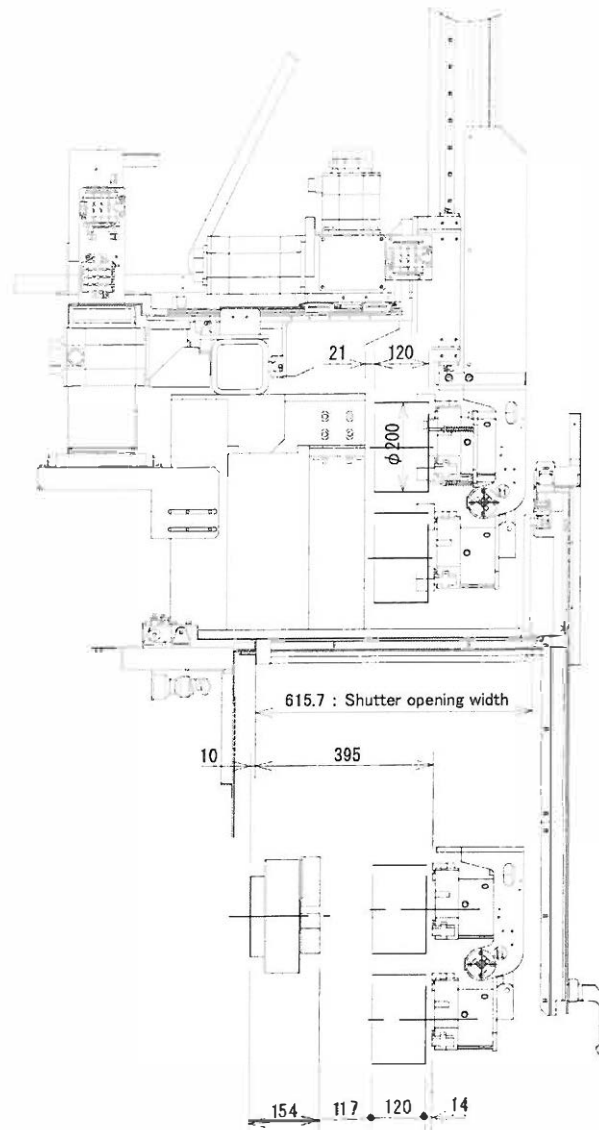


Fig. 4-1 (b) Loader interference drawing (Side view) (10 inch type)

4-2 Loader interference drawing (Top view)

The following figure shows where the Z-axis of loader is in the reference position.

Though L-spindle is faced in opposite direction, since it is a symmetrical pattern, refer to this figure.

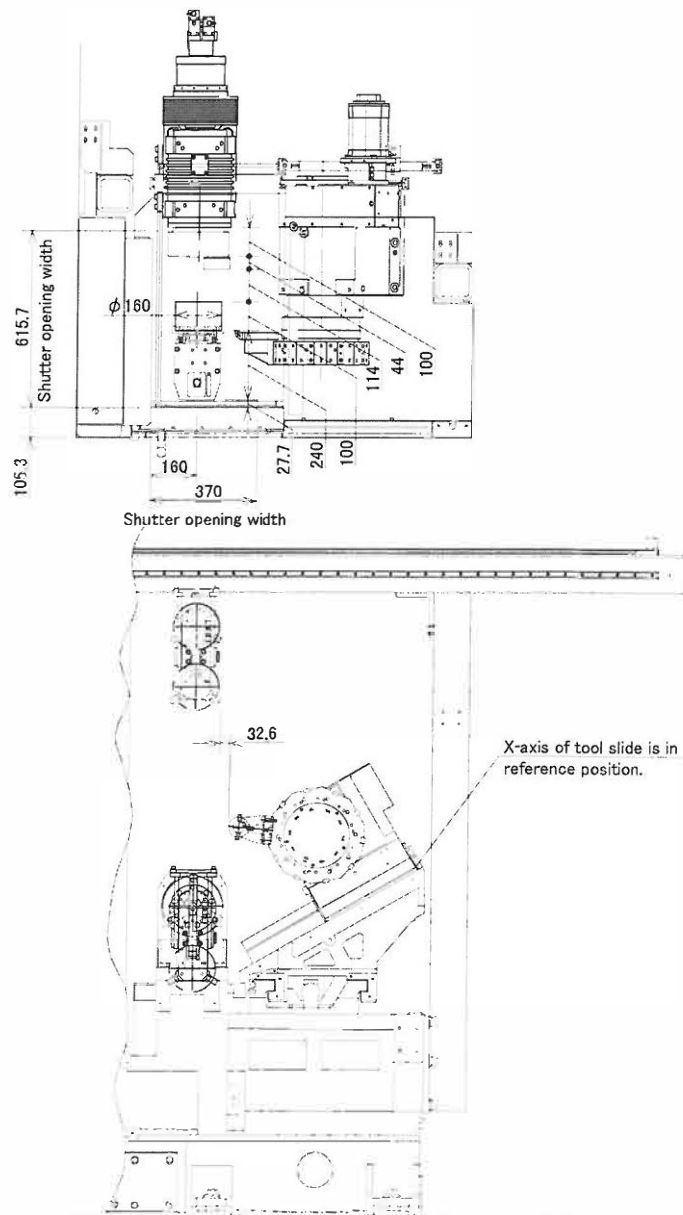


Fig. 4-2 (a) Loader interference drawing (Top view) (8 inch type)

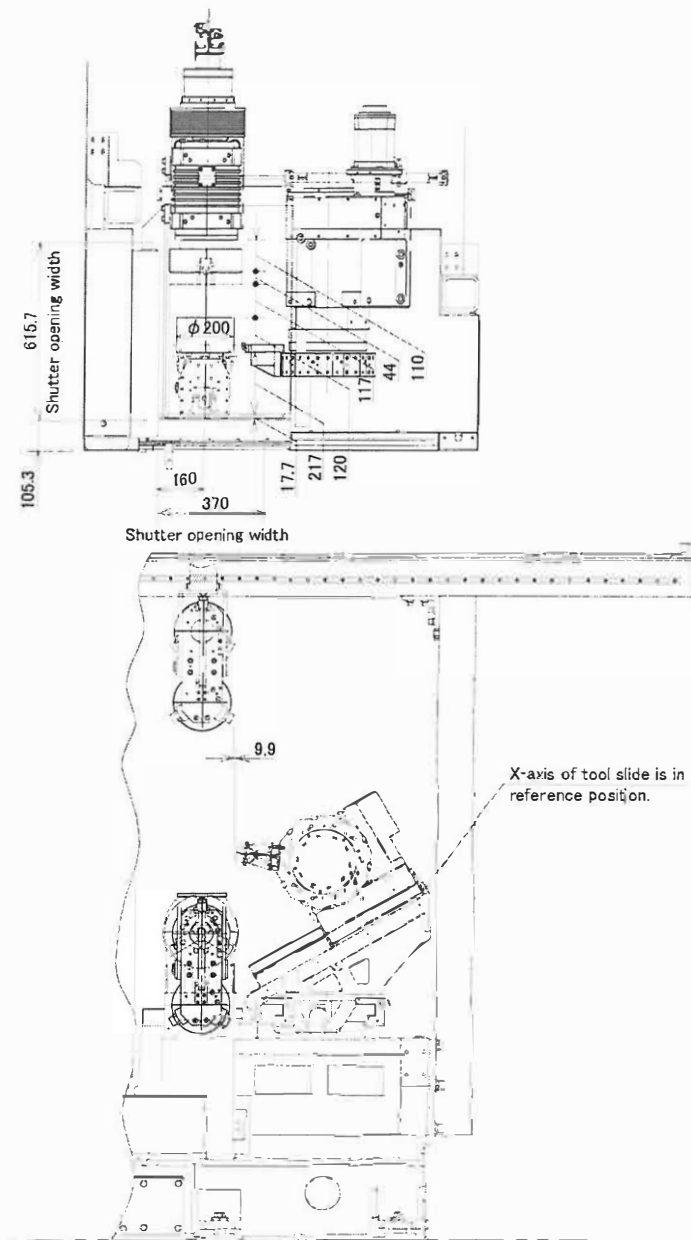


Fig. 4-2 (b) Loader interference drawing (Top view) (10 inch type)

5 LOADER HAND

5-1 Outline drawing of loader hand

Manufacture : SMC

Type : MHSL3-63D-M9BAZS

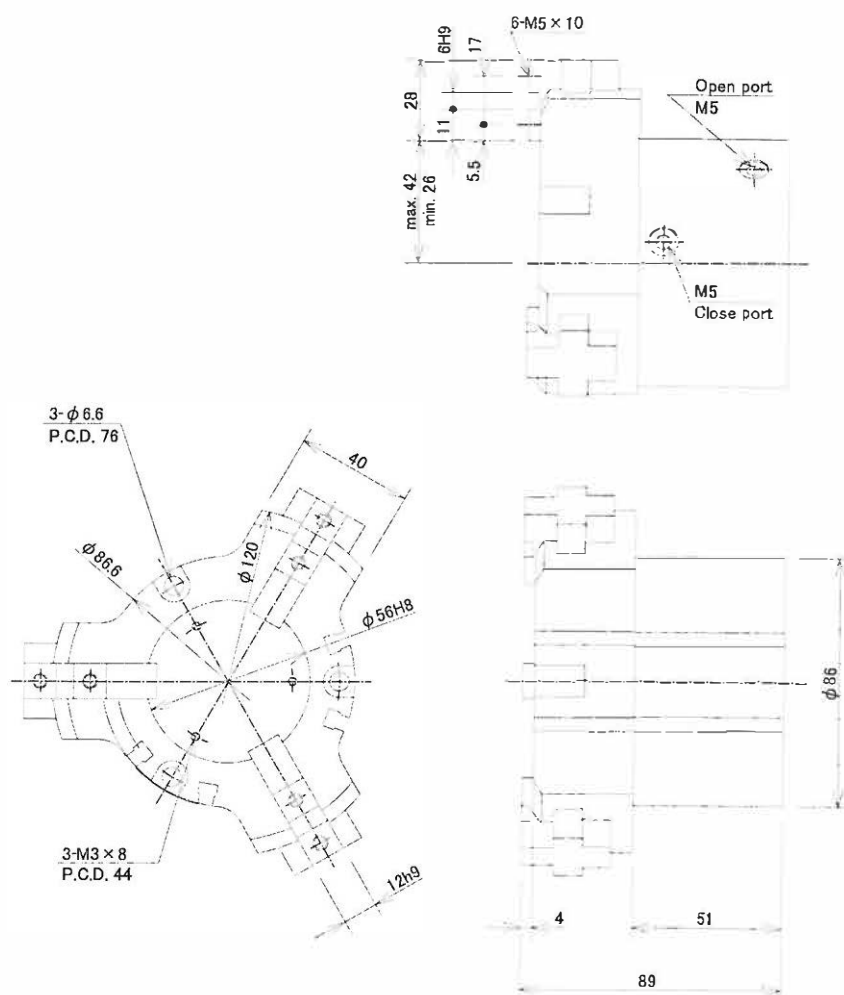


Fig. 5-1 (a) Outline drawing of loader hand (8 inch type)

Manufacture : SMC

Type : MHSL3-100D-M9BAZS

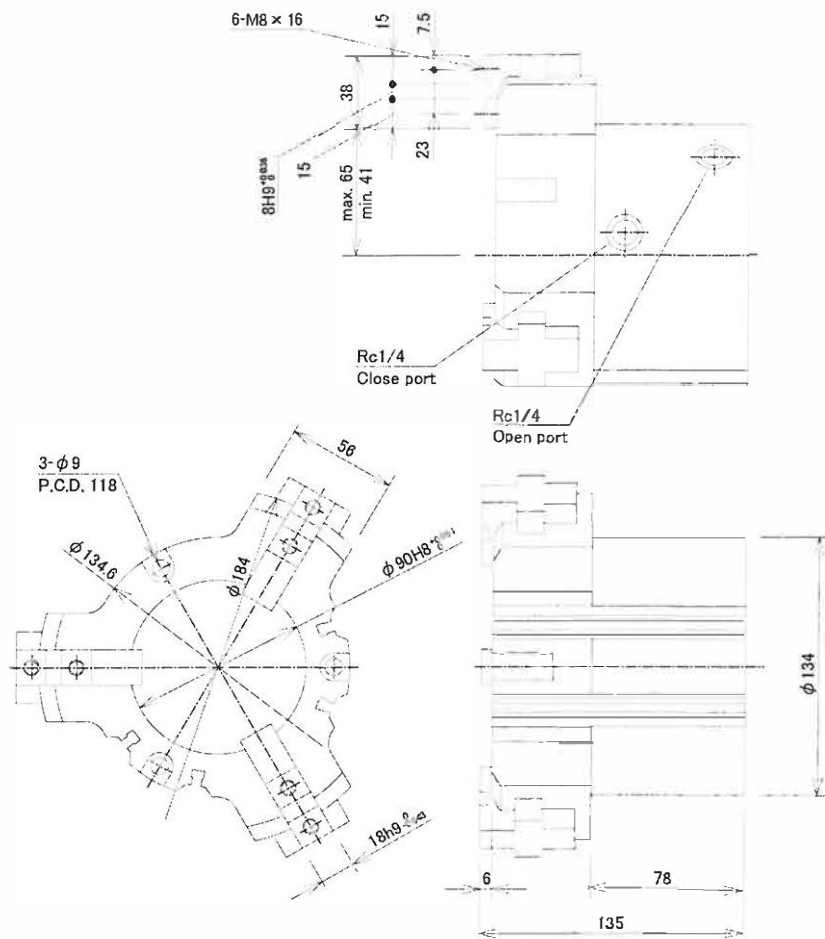
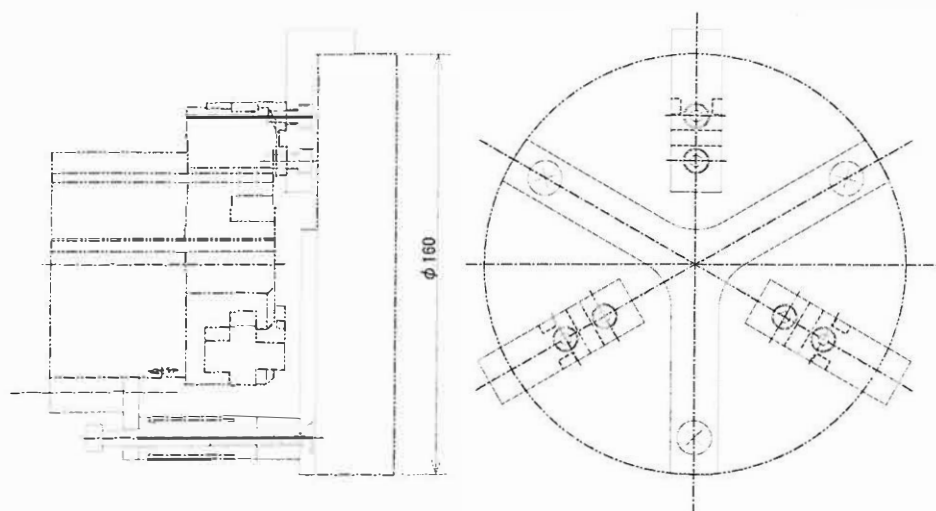


Fig. 5-1 (b) Outline drawing of loader hand (10 inch type)

5-2 Example for hand gripping jaw forming jig

1. 8 inch type

Example for gripping of outer dia. part of hand



Soft jaw machining jig

This jig is used for clamping the jaw at hand stroke center position.

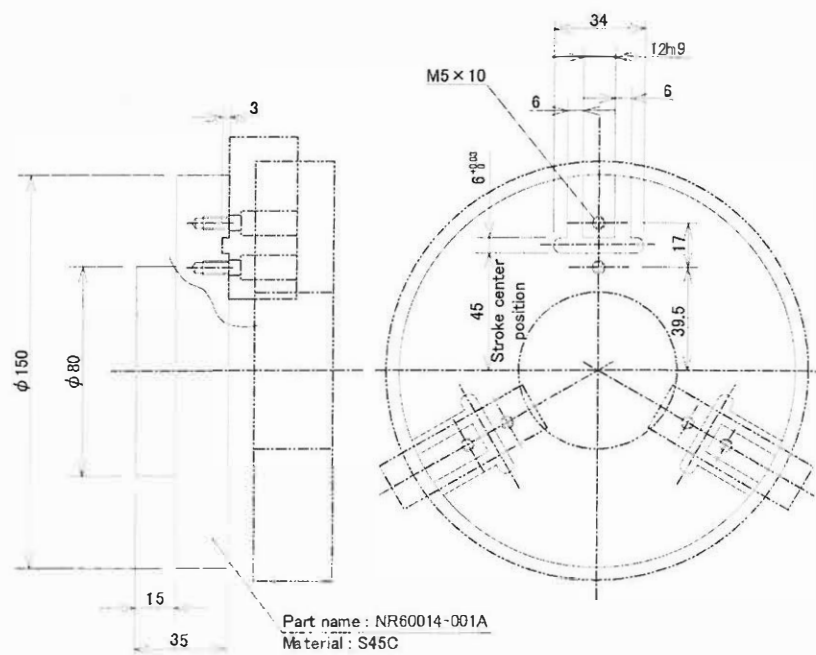
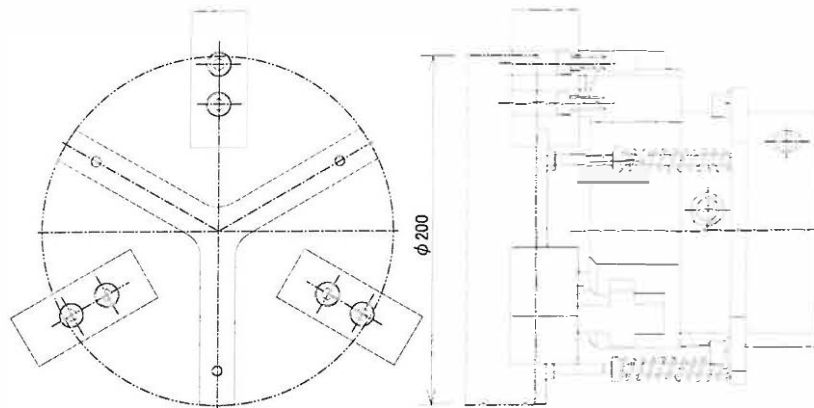


Fig. 5-2 (a) Example for hand gripping jaw forming jig (8 inch type)

2. 10 inch type

Example for gripping of outer dia. part of hand



Soft jaw machining jig

This jig is used for clamping the jaw at hand stroke center position.

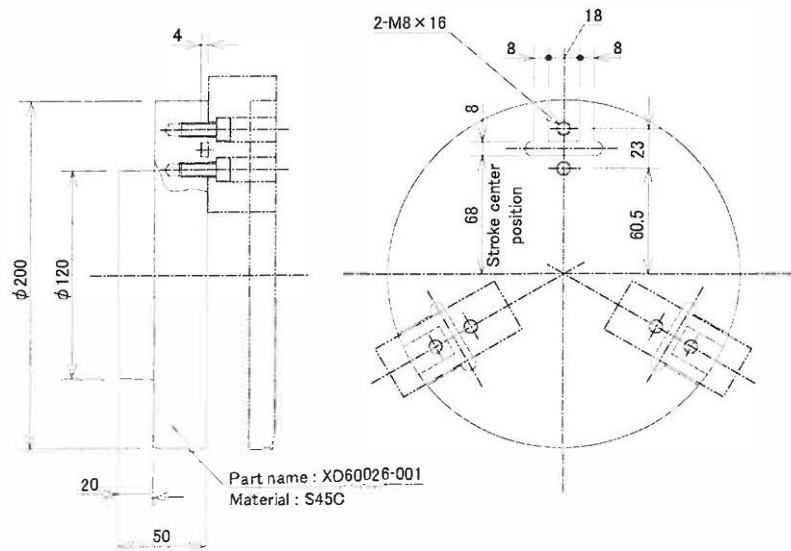
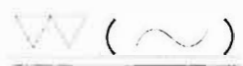


Fig. 5-2 (b) Example for hand gripping jaw forming jig (10 inch type)

5-3 Example for hand soft jaw

1. 8 inch type



Material : 19×32 Polishing flat steel (S45C-D)

1 set at 3 pieces

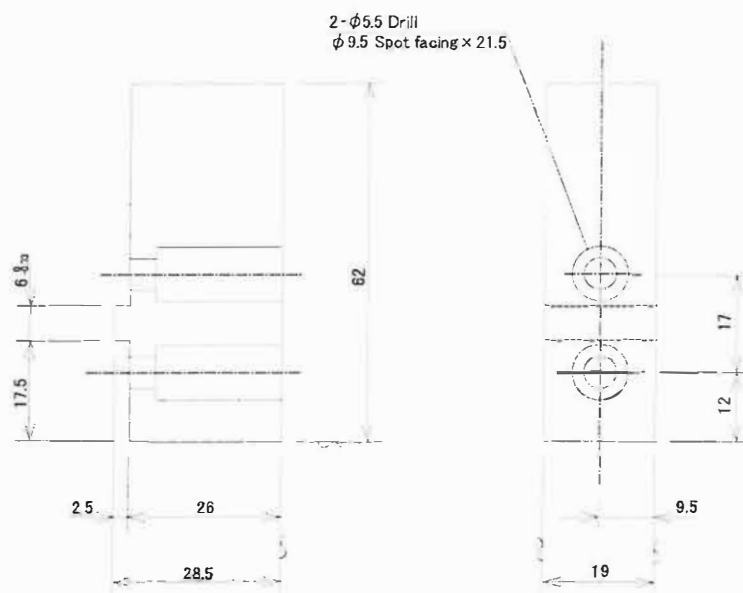
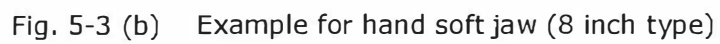
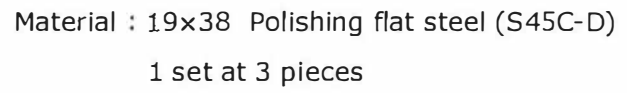


Fig. 5-3 (a) Example for hand soft jaw (8 inch type)



2. 10 inch type



Material : 32×50 Polishing flat steel (S45C-D)

1 set at 3 pieces

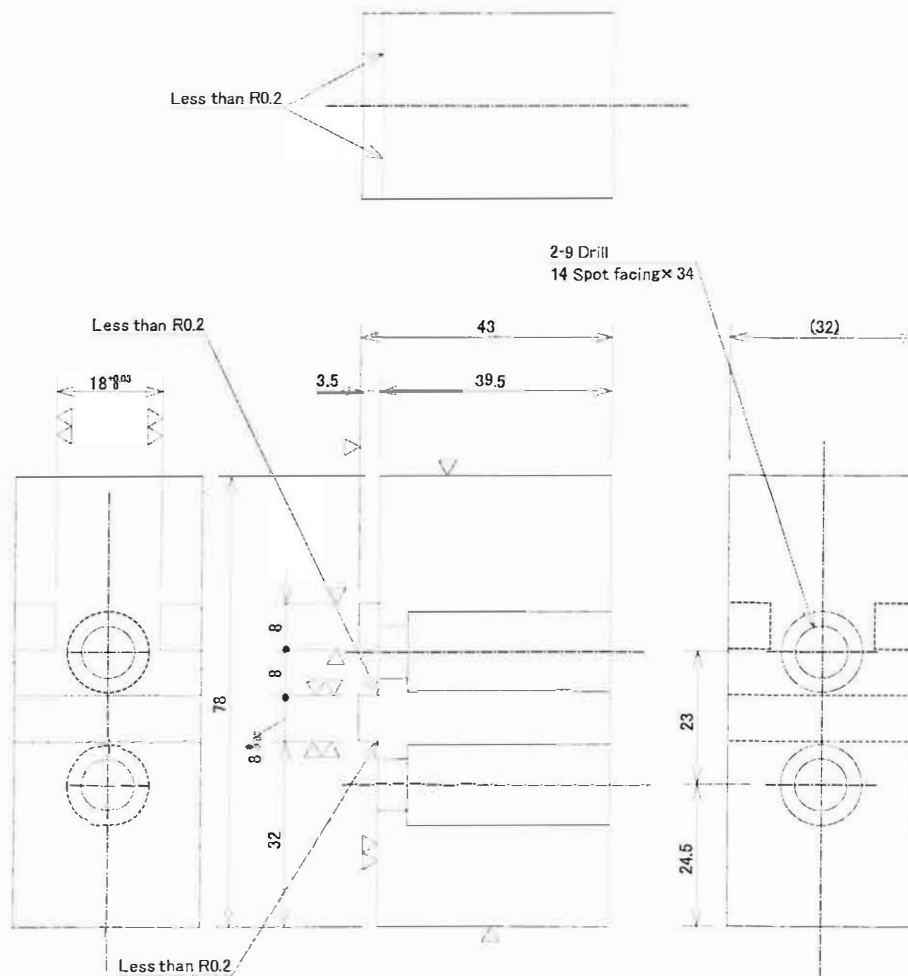


Fig. 5-3 (c) Example for hand soft jaw (10 inch type)



Material : 32×50 Polishing flat steel (S45C-D)

1 set at 3 pieces

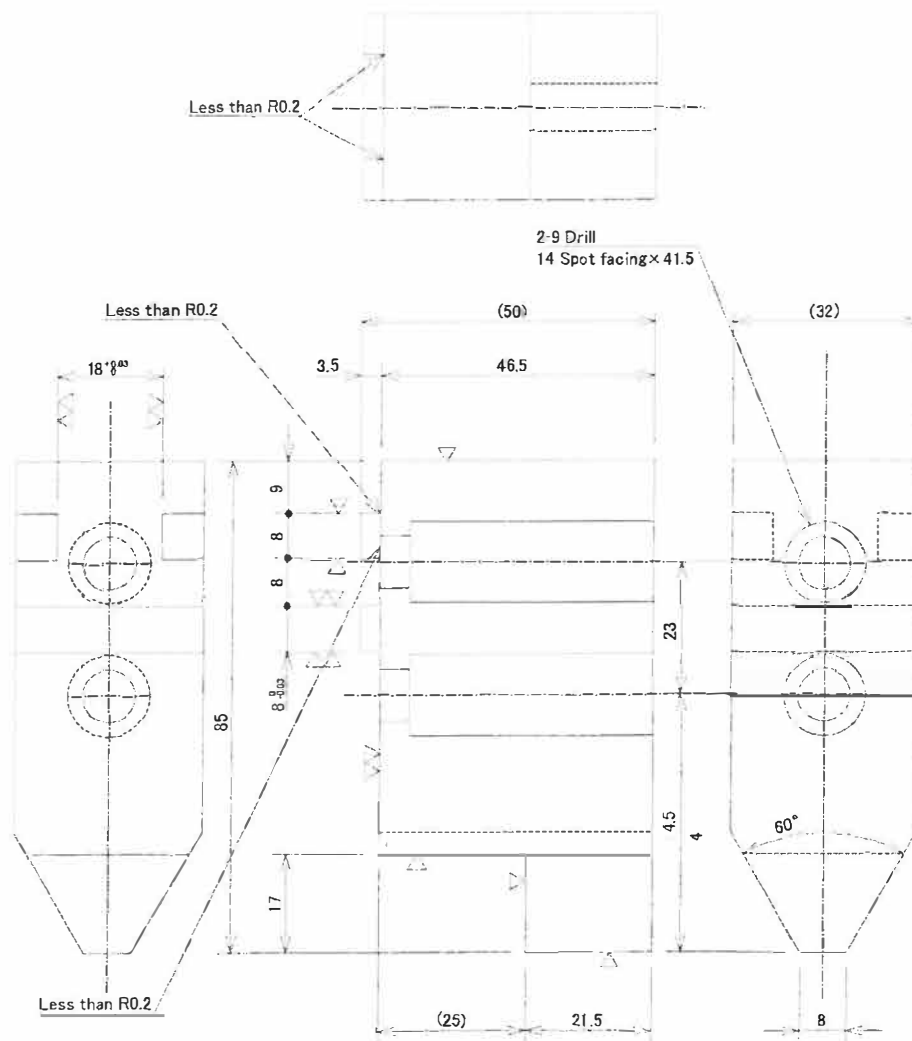
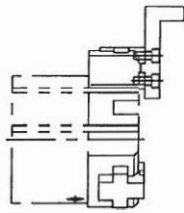


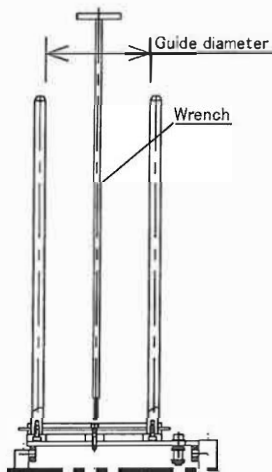
Fig. 5-3 (d) Example for hand soft jaw (10 inch type)

6 STEP-UP CHANGE



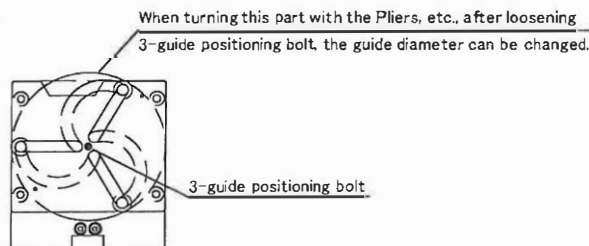
Change the jaws of loader hand and reverse hand to jaws suiting the workpiece.

Machine the soft jaws in the material diameter and the product diameter with the common cutting jig if required.



Change the 3-guide diameter of workpiece feeder pallet with attached T wrench.

- * If the guide diameter is too large in comparison with the material, the jaws may result in mis-chuck of material.
- * If the guide diameter is small, they may result in the failure of workpiece unloading.
- * Set the guide diameter to about material +2 mm (diameter).



Return all axes of loader to reference position.

Start M150 with material on loading pallet.

Turn the loader hand and move it to the place where the material is clamped.

Move the photoelectric switch on loading side vertically where the material is well clamped and fix it. Lower the loading pallet with M11.

With a material on the loading pallet, start M150 and M151 without loading anything on the unloading pallet. Assume that the product has been clamped to the unloading hand, and move the photoelectric switch on unloading side vertically so that the unloading pallet will be in the position where the unloading pallet does not interfere with the product before fixing its switch.

Determine the position of photoelectric switch by issuing the M-signal.

Issue the M-signal several times until the photoelectric switch is determined to the good position.

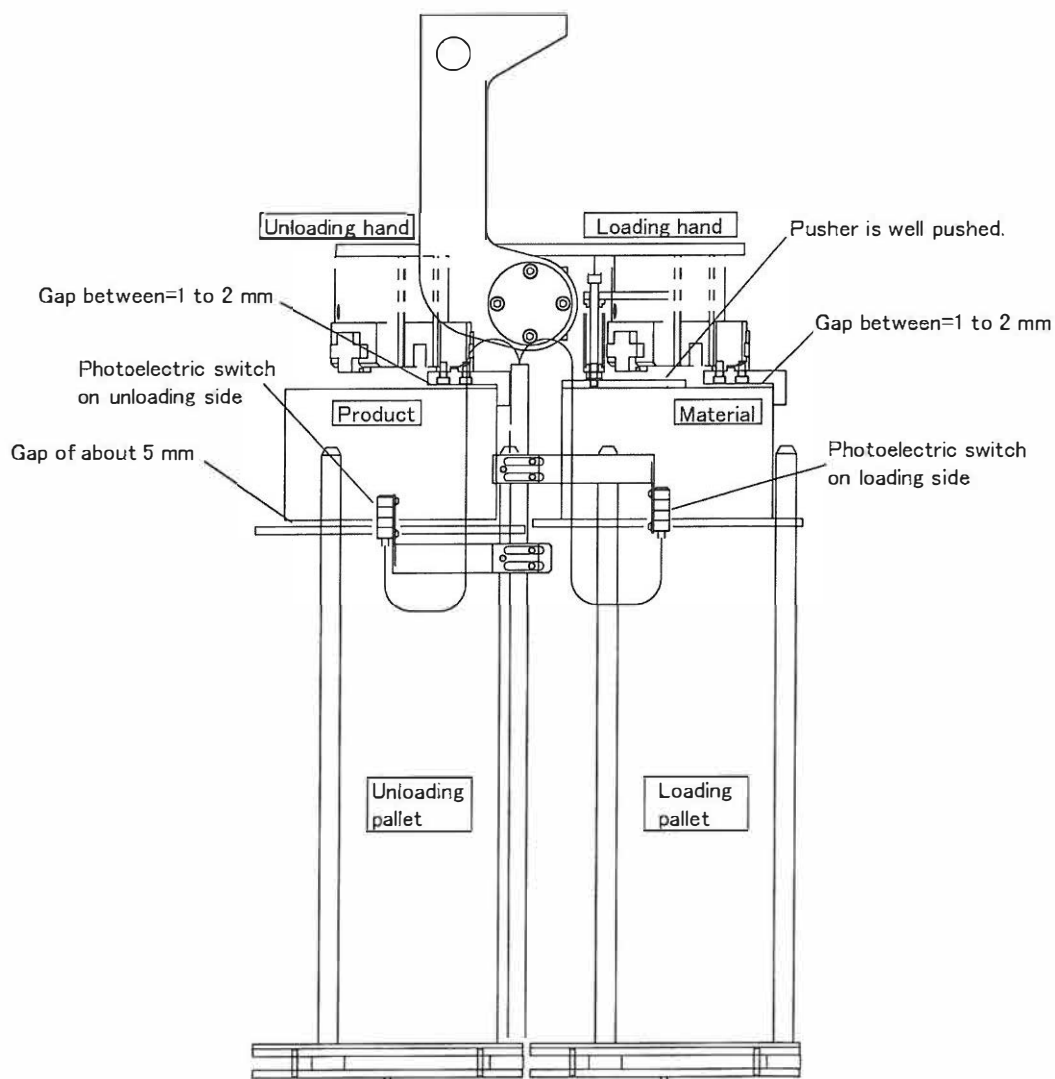
Lower the loading pallet and unloading pallet with M11, and M13.

Travel the Y-axis of loader 200 mm upward and clamp the product to the unloading hand.

With a workpiece on the loading pallet, once more, start M150 and M151 without loading anything on the unloading pallet.

Move the loader hand where the material is clamped.

At this time, check that the photoelectric switch is adjusted as shown in the illustration on next page.



Next, taking care of interference, perform the teaching for the reverse turn equipment and the chuck.

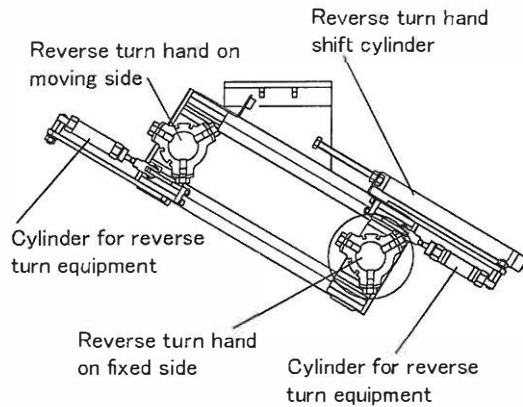
Change the program for the loader and the machine on the basis of the teaching. Deduce the feedrate and check the movement of loader and machine under the single block mode of program.

By the above, the setup change is finished.

For the teaching and the program, refer to Operation Manual (Loader, Machine).

Setup change of reverse turn equipment:

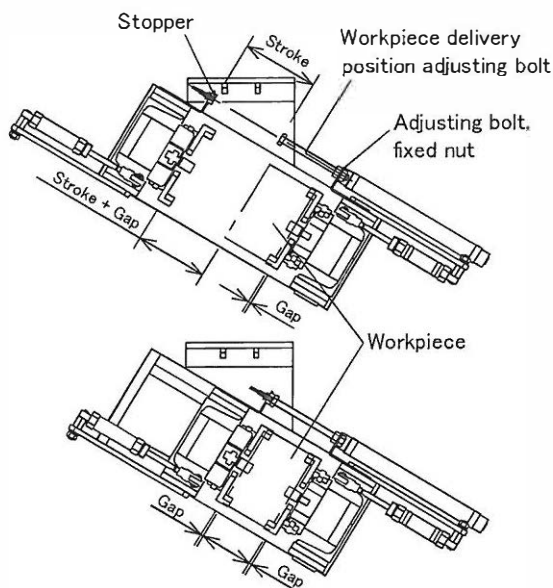
Though there is any type that the layout is in reverse-style as the following figure or horizontal, the set-up change is the same technique. For operation method of each cylinder, refer to the [Operation Manual of Loader].



The reverse turn hand on fixed side is positioned under the reverse turn hand shift cylinder.

Clamp the machine side of workpiece of OP1 the reverse hand on fixed side.

At this time, provide a gap between the workpiece end face and the jaws.



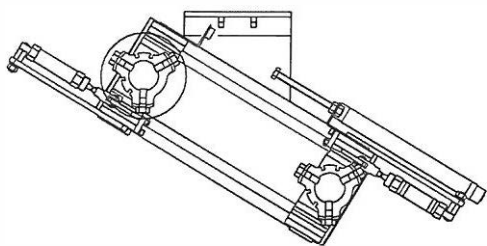
Unclamp the reverse turn hand on moving side. Turn the reverse turn hand.

The distance from the adjusting bolt head to the stopper is the stroke of reverse turn hand shift.

Determine the adjusting bolt so that the distance from the workpiece end face to the jaw face of reverse turn hand on moving side becomes the distance of stroke plus gap before fixing the bolt.

Advance the reverse turn hand on moving side until the stopper touches the adjusting bolt.

Clamp the reverse turn hand on moving side. Check there is gap between the workpiece and each jaw of hand as shown to left.



Unclamp the reverse turn hand on fixed side.
Retract the reverse turn hand before turning.
Check a series of operation is smoothly
performed without interference.
When loading or unloading the material of
workpiece, perform the teaching so as to be
the above procedure.

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NC Lathe

TT-2600

GANTRY LOADER OPERATION MANUAL

XZ04040-102

Please read each manual and
understand contents enough.
Then keep these manuals handy for
answers to any questions you may
have and to check.

MACHINE TOOLS
TAKISAWA

IMPORTANT NOTICE

- Be sure to read each instruction manual before operating the machine.

Be sure to observe the safety precautions in the instruction manuals and the contents of warning labels adhered to the machine. If ignored, an accident resulting in injury or death or machine malfunction may be caused.

There are many [DISABLE] or [MUST NOT DO] conditions.

Unless [ABLE] is written in the instruction manual, consider it [DISABLE].

- Some illustrations in the instruction manual are given without cover or door to illustrate the detailed parts. In actual operation, it is necessary to mount the cover or door.
- Keep instruction manuals handy for ready reference as it will help you operate the machine and equipment to their full advantage.
- When any instruction manual is required again, contact your agent with the number of the instruction manual (or model name, manual name).
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Export of the product may require the permission of governmental authorities of the country from where the product is exported.
Should you wish to resell, transfer or export the product, please notify Takisawa Machine Tool Co., Ltd. or our distributor in advance.
- Observe the laws and regulations established by the national and local governments.
- Observe the laws and regulations established by the national and local government for disposal of machines and waste oil.

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- The manual is written for people who have a basic knowledge of machine tools.
TAKISAWA disclaims all responsibility for damage or accidents arising due to people with insufficient knowledge or training with machine tools, attempting to operate, maintain or program said tools.
- When replacing the parts, use the parts specified by company.
TAKISAWA disclaims all responsibility for damage or problems occurring due to using parts other than those specified.
If the specified parts are not used, not only the machine function is reduced but also safety is compromised, thus possibly causing an accident resulting in injury or death or machine malfunction.

- There are many kinds of coolants.

Though TAKISAWA does not specify the coolant, select the coolant by consulting with maker about the following items.

TAKISAWA disclaims all the responsibility for trouble incurred by the coolant.

- Contact us for requesting an installation, modification, and specification change, and dismantlement of the machine. If the machine is installed, modified, or its specification is changed by customer, not only the performance of the machine may be lost but also the safety of the customer may not be secured.

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