CNC SYSTEMS

OSP-U100M
OSP-U10M

SAFETY DOOR INTERLOCK FUNCTIONS

INSTRUCTION MANUAL (1st Edition)

Pub.No. 4185-E (ME32-078-R1) March 1998

OKUMA

4. Precautions Relating to the ATC

(1) The tool clamps of the magazine, spindle, etc., are designed for reliability, but it is possible that a tool could be released and fall in the event of an unforeseen accident, exposing you to danger: do not touch or approach the ATC mechanism during ATC operation.

(2) Always inspect and change tools in the magazine in the manual magazine interrupt mode.

(3) Remove chips adhering to the magazine at appropriate intervals since they can cause misoperation.

Do not use compressed air to remove these chips since it will only push the chips further in.

(4) If the ATC stops during operation for some reason and it has to be inspected without turning the power off, do not touch the ATC since it may start moving suddenly.

5. On Finishing Work

(1) On finishing work, clean the vicinity of the machine.

(2) Return the ATC, APC and other equipment to the predetermined retraction position.

(3) Always turn off the power to the machine before leaving it.

(4) To turn off the power, turn off the CONTROL ON switch on the operation panel first, then the main power disconnect switch.

6. Precautions during Maintenance Inspection and When Trouble Occurs

In order to prevent unforeseen accidents, damage to the machine, etc., it is essential to observe the following points when performing maintenance inspections or during checking when trouble has occurred.

(1) When trouble occurs, press the emergency stop button on the operation panel to stop the machine.

(2) Consult the person responsible for maintenance to determine what corrective measures need to be taken.

(3) If two or more persons must work together, establish signals so that they can communicate to confirm safety before proceeding to each new step.

(4) Use only the specified replacement parts and fuses.

(5) Always turn the power off before starting inspection or changing parts.

(6) When parts are removed during inspection or repair work, always replace them as they were and secure them properly with their screws, etc.

(7) When carrying out inspections in which measuring instruments are used – for example voltage checks – make sure the instrument is properly calibrated.

(8) Do not keep combustible materials or metals inside the control enclosure or terminal box.

(9) Check that cables and wires are free of damage: damaged cables and wires will cause current leakage and electric shocks.

(10) Maintenance inside the Control Enclosure

a) Switch the main power disconnect switch OFF before opening the control enclosure door.

b) Even when the main power disconnect switch is OFF, there may some residual charge in the servo amplifier and spindle drive unit, and for this reason only service personnel are permitted to perform any work on these units. Even then, they must observe the following precautions.

- Servo amplifier

  Discharge the residual voltage one minute after turning off the breaker inside the unit.

- Spindle drive unit

  Discharge the residual voltage one minute after turning off the main power disconnect switch.

c) The control enclosure contains the NC unit, and the NC unit has a printed circuit board whose memory stores the machining programs, parameters, etc. In order to ensure that the contents of this memory will be retained even when the power is switched off, the memory is supplied with power by a battery. Depending on how the printed circuit boards are handled, the contents of the memory may be destroyed and for this reason only service personnel should handle these boards.

(11) Periodic Inspection of the Control Enclosure

a) Cleaning the cooling unit

The cooling unit in the door of the control enclosure serves to prevent excessive temperature rise inside the control enclosure and increase the reliability of the NC unit. Inspect the following points every three months.

- Is the fan motor inside the cooling unit working?

  The motor is normal if there is a strong draft from the unit.

- Is the external air inlet blocked?

  If it is blocked, clean it with compressed air.

7. General Precautions

(1) Keep the vicinity of the machine clean and tidy.

(2) Wear appropriate clothing while working, and follow the instructions of someone with sufficient training.

(3) Make sure that your clothes and hair cannot become entangled in the machine. Machine operators must wear safety equipment such as safety shoes and safety goggles.

(4) Machine operators must read the instruction manual carefully and make sure of the correct procedure before operating the machine.

(5) Memorize the position of the emergency stop button so that you can press it immediately at any time and from any position.

(6) Do not access the inside of the control panel, transformer, motor, etc., since they contain high-voltage terminals and other components which are extremely dangerous.

(7) If two or more persons must work together, establish signals so that they can communicate to confirm safety before proceeding to each new step.

8. Symbols Used in This Manual

The following warning indications are used in this manual to draw attention to information of particular importance. Read the instructions marked with these symbols carefully and follow them.

⚠DANGER : Indicates an imminent hazard which, if not avoided, will result in death or serious injury.

⚠WARNING : Indicates hazards which, if not avoided, could result in death or serious injury.

⚠CAUTION : Indicates hazards which, if not avoided, could result in minor injuries or damage to devices or equipment.

NOTICE : Indicates precautions relating to operation or use.

INTRODUCTION

This instruction manual contains the operating procedure to be followed for making the most of machine performance and maintaining the accuracy over a long period, and also the maintenance procedure.

You are encouraged to study this instruction manual carefully to use the function correctly.

TABLE OF CONTENTS

PAGE

SECTION 1 OUTLINE 1

SECTION 2 MECHANICAL LOCK TYPE DOOR FUNCTION 2

2-1. Mechanical Lock Type Manual Operator's Door 2
2-2. Mechanical Lock Type Automatic Operator's Door 4

SECTION 3 DOOR CLOSE CHECK INPUT DIAGNOSING FUNCTION 5

3-1. Operator's Door 5

SECTION 4 DOOR INTERLOCK FUNCTION 6

4-1. Door Interlock by Operator's Door 6
4-2. Door Interlock by ATC Magazine Door 10
4-3. Door Interlock by APC Door of 2-pallet APC 10
4-4. APC Safety Barrier Interlock for APC (Double-column Machining Centers) 11
4-5. APC Safety Fence Interlock for APC (Double-column Machining Centers) 11

SECTION 5 RESTART AFTER THE INTERRUPTION OF OPERATION DUE TO DOOR INTERLOCK 12

5-1. Restart after Closing the Operator's Door 12
5-2. Restart after Closing the ATC Magazine Door 12
5-3. Restart after Closing the APC Door of 2-pallet APC 13
5-4. Restart of Interrupted APC Operation due to Interruption of APC Safety Barrier Light Beam for APC (Double-column Machining Centers) 13
5-5. Restart after Closing the APC Safety Fence of APC 13

SECTION 6 ALARM 14

SECTION 1 OUTLINE

The machine has the following built-in safe function to maintain safety of the machine if the machine units get faulty or damaged as well as to minimize hazards and to secure operator's safety even if an operator makes an operation error.

Safe Operation Functions

(1) Mechanical lock type door function

(2) Door interlock function

Objective:

The interlock function is applied to the following items.

(a) Operator's door (chip cover for MC-10V series)

The door to be opened by an operator for carrying out mounting/removal of a workpiece, mounting/removal of a tool in the spindle, removing chips from the workpiece being machined, and other similar work.

(b) ATC magazine door

The door to be opened by an operator for carrying out mounting/removal of tools in the ATC magazine.

(c) APC door (2-pallet APC)

The door to be opened by an operator for carrying out mounting/removal of a workpiece or a pallet of the APC.

(d) Pendant operation panel swing position confirmation

For double-column machining centers, whether the pendant operation panel is outside the safety fence is checked.

(e) Ladder removed confirmation

For double-column machining centers, removal of a ladder is confirmed.

[Supplement] The interlock function is applied to both manual/automatic door only for operator's door.

SECTION 2 MECHANICAL LOCK TYPE DOOR FUNCTION

A mechanical lock switch is installed to the operator's door to lock the door in the closed position electro-magnetically under certain machine operating status to ensure safety of both the operators and the machine.

The door lock switch has the mechanism that is automatically locked mechanically when a key is inserted (when the operator's door is closed, for example) and the lock is released by turning ON or OFF the application of voltage to the solenoid. The door which is equipped with such mechanical lock switch is called the mechanical lock type door.

[Supplement] Whether the lock is released by turning ON or OFF the application of voltage to the solenoid is determined by the machine models.

- Lock release by ON: Other than MX series
- Lock release by OFF: MX series

2-1. Mechanical Lock Type Manual Operator's Door

The lock mechanism is automatically released when the requirements for ensuring operator's safety are all satisfied, allowing the door to be opened.

<Requirements for releasing the lock mechanism>

If all of the following requirements are satisfied, the lock of the operator's door is automatically released.

For example, if the operation mode is "automatic with single block ON" with the door interlock switch set ON, the lock mechanism is released when requirements of ①, ③, ⑤, ⑥, and ⑦ are satisfied.

○ ..... Requirements to be satisfied for releasing the lock

- ..... Conditions not related to releasing the lock.

Door interlock switch

	Operation Mode	① Axis stopped	② Feedrate is slower than the parameter set value	③ Spindle stopped
ON	Manual operation	○	-	○
	MDI operation	○	-	○
	Automatic operation (single block ON)	○	-	○
	Automatic operation (single block OFF)	○	-	○
OFF	Manual operation	-	○	-
	MDI operation	-	○	-
	Automatic operation (single block ON)	-	○	-
	Automatic operation (single block OFF)	○	-	○

Door interlock switch

	Operation Mode	④ Spindle speed is lower than 800 min^{-1}	⑤ Not in ATC cycle	⑥ Not in APC cycle	⑦ NC not running
ON	Manual operation	-	○	○	-
	MDI operation	-	○	○	○
	Automatic operation (single block ON)	-	○	○	○
	Automatic operation (single block OFF)	-	○	○	○
OFF	Manual operation	○	○	○	-
	MDI operation	○	○	○	-
	Automatic operation (single block ON)	○	○	○	-
	Automatic operation (single block OFF)	-	○	○	○

① Axis stopped

② Feedrate is slower than the parameter set value

Feedrates of all axes are slower than the value set for the following parameter.

Contents of Parameter (Unit)	Setting Range	Command	Initial Value
NC optional parameter (word) No. 30 (mm/min) Max. feedrate for opening the operator's door	1 to 2000	SET ADD	2000

③ Spindle stopped

④ Spindle speed is lower than 800 min^{-1}

The spindle speed is lower than 800 min^{-1}.

⑤ Not in ATC cycle

The ATC has completed the cycle and stopped. If the spindle is in the orient stopped state, it is regarded as stopped.

⑥ Not in APC cycle

The ATC has completed the cycle and stopped.

⑦ NC not running

The NC is not in the cycle start state.

2-2. Mechanical Lock Type Automatic Operator's Door

With the mechanical lock type automatic operator's door, the lock is not released automatically. With this type of door, when the operator's door open command is executed while the requirements for ensuring operator's safety are all satisfied, the lock is released and the door is opened.

The requirements necessary for ensuring operator's safety are the same as those indicated in the table in Section 2-1.

(1) Opening the Operator's Door in the Automatic/MDI Mode

To open the door, the operator's door open command (M33) should be executed.

If this M code is executed although the lock release requirements are not satisfied, door open operation is not carried out and the NC enters the STM operation in execution state.

(2) Opening the Operator's Door in the Manual Mode

To open the door, the door open button on the operator's door should be pressed.

If this button is pressed although the lock release requirements are not satisfied, the input from the door open button is ignored and door open operation is not carried out.

SECTION 3 DOOR CLOSE CHECK INPUT DIAGNOSING FUNCTION

The function checks the door open/close confirmation signals input to the NC when the power is turned on and permits succeeding operation only when the correct status is detected.

3-1. Operator's Door

(1) Power ON with Operator's Door Closed

(a) Alarm message "4713 Alarm D Please open door" is displayed on the screen.

The following operation is all prohibited regardless of the selected mode of operation.

- All axis movement
- All spindle rotation
- All ATC operation

  Tool clamp/unclamp operation not related to ATC is permitted.
- All APC operation

(b) In the case of a) above, open the operator's door once.

Then the alarm message "4713 Alarm D Please open door" is cleared from the screen.

(c) To carry out unrestricted operation, close the operator's door.

Unrestricted operation is permitted.

(2) Power ON with Operator's Door Opened

(a) Only restricted operation is permitted.

(b) To carry out unrestricted operation, close the operator's door.

Unrestricted operation is permitted.

[Supplement]

1. For "restricted operation", refer to Section 4.
2. For the doors (ATC magazine door, APC door) other than the operator's door, the function to confirm the door closed state at power ON is not provided. Similarly, the pendant operation panel swing position check and ladder installed position check are not executed at power ON.

WARNING

: If the machine has more than one operator's door, carry out step (1) after turning the power ON with only one operator's door opened and make sure that the alarm message (4713 Alarm D) is cleared by this operation for the individual doors.

Unless step (1) is not carried out for all operator's doors, the door interlock function that should operate when an operator's door is open fails to operate, which could cause serious accidents.

SECTION 4 DOOR INTERLOCK FUNCTION

The door interlock function enables unrestricted normal operation only when the door is closed to protect an operator from movable machine units during machine operation.

4-1. Door Interlock by Operator's Door

In the following cases, machine operation by commands is permitted only under restricted conditions:

- Operator's door is not closed.
- Pendant operation panel is inside the safety fence.
- Ladder is installed.

If a command that calls for an operation not permitted is specified, the following message is displayed.

"4708 Alarm D Safety interlock ????"

If the operator's door is opened while the machine is performing the operation which is not permitted in the operator's door opened state, an alarm occurs and the same alarm message is displayed.

"4708 Alarm D Safety interlock ????"

[Supplement] In the alarm message of "4708 Alarm D", symbol "????" represents any of "DOOR", "ATC", "APC" and "None". This also applies to the alarm messages given belows.

(1) If the door interlock switch is OFF, machine operation is permitted under certain restrictions. If a command that calls for an operation outside the permitted range is specified, such a command is ignored. In this case, neither alarm message "4708 Alarm D Safety interlock ????" is displayed, nor an alarm occurs.

- A program command related to ATC, APC, or spindle rotation is specified, the NC stops in the STM in execution state, the command is retained, and "4708 Alarm D" occurs.
- Manual ATC/APC operation (one cycle, return cycle) is ignored; "4216 Alarm D" does not occur.
- If a program command calling for NC axis movement exceeding the restricted range is specified, the NC enters the slide hold state and "4216 Alarm D" occurs.

(2) If the door interlock switch is ON, the following machine operation commands are all ignored disregarding of the selected operation mode, the commands are not retained, and the specified operation is prohibited.

- All NC axis movements
- All spindle rotation operation
- All ATC operation excluding the ATC magazine rotation
- Operation that requires NC start

  For the machine equipped with automatic operator's door, NC start is permitted.

Under such conditions, the following occurs:

- For NC axis movement commands, "4216 Alarm D Safety interlock" is displayed.
- For ATC or APC operation commands, the operation enabled state indicating lamp on the operation panel is turned off to indicate that operation is not possible.
- For spindle operation, no special indication is given to show that spindle operation is not possible.

[Supplement]

1. The state that "the command is retained" means that the specified command not executable due to the opening of the door is in the waiting state and can be executed by restart operation after closing the door. For the restart operation after closing the door, refer to 5-1.

2. Operations that can be executed by using manual switches such as coolant supply and air blow without starting the NC are executable..

3. For details of the restrictions on machine movements, refer to <Restrictions on Machine Operation Commands> given later.

(3) Since the operator's door cannot be opened unless the lock release requirements stated before are satisfied, the operator's door cannot be usually opened while the machine is operating. However, there is a case that the operator's door is opened after forcibly releasing the lock by using a special release key. If the operator's door is opened while the machine is operating, the machine stops with the "4708 Alarm D Safety interlock ????" message displayed.

Similarly, if the pendant operation panel enters inside the safety fence or if the ladder is installed while the machine is operating, the machine stops with the "4708 Alarm D Safety interlock" message displayed.

WARNING

: Even if machine movements are restricted as indicated in <Restrictions on Machine Operation Commands>, the spindle, feed axes, ATC, etc. can be operated under certain restrictions and touching a part of your body to the movable machine units could cause serious accidents. Therefore, never touch any movable machine unit.

<Restrictions on Machine Operation Commands>

Certain machine movements are restricted as indicated in the table below.

① Feed axes

Pulse handle, jog feed, G codes for cutting feed, manual rapid feed, G codes for rapid feed, return to restart or interruption point by sequence restart button

② Spindle

Spindle rotation

③ ATC

All ATC operation

④ APC

All APC operation

⑤ ATC magazine

ATC magazine rotation

⑥ Chip conveyor

Chip conveyor operation

⑦ NC start

Cycle start of program operation

Door interlock switch

⇩
⇩
⇩
⇩

	Operation Mode	① Feed axes	② Spindle	③ ATC	④ APC	⑤ ATC magazine	⑥ Chip conveyor	⑦ NC start
ON	Manual operation	×	×	×	×	○	×	-
	MDI operation	×	×	×	×	○	×	●
	Automatic operation (single block ON)	×	×	×	×	○	×	●
	Automatic operation (single block OFF)	×	×	×	×	○	×	●
OFF	Manual operation	△	▲	▼	▼	○	×	-
	MDI operation	△	▲	×	○	○	×	○
	Automatic operation (single block ON)	△	▲	×	○	○	×	○
	Automatic operation (single block OFF)	×	×	×	-	○	×	●

× ..... Operation not possible

○ ..... Operation possible

● ..... Operation possible for the machine equipped with automatic operator's door
Operation not possible for the machine equipped with manual operator's door

△ ..... If axis feedrate exceeds the value set for NC optional parameter (long word) No. 30 in the following operation, alarm message "4216 Alarm D" is displayed and succeeding axis movements are made impossible.

- G code controlled cutting feed: Vector sum of individual axis feedrates
- Axis feed in other than G code controlled cutting feed: Feedrate of any axis

In the following operation, alarm message "4216 Alarm D" is displayed, the machine enters the slide hold state, and axis movements are disabled if the status indicated above occurs.

Cutting feed controlled by G codes, rapid feed controlled by G codes, interactive gauging operation, manual home position return

[Supplement] For NC optional parameter (long word) No. 30, refer to 2-1.

NOTICE

: For a numerically controlled rotary axis, the unit of the maximum feedrate is " ° /min". Therefore, if the radius is large, surface speed becomes large accordingly even if the maximum feedrate is small.

▲ ..... If the spindle speed exceeds the value set for "Machine User Parameter 11. Door Interlock", alarm message "4708 Alarm D" is displayed and succeeding spindle rotation is disabled.

No.	Contents of Parameter (Unit)	Setting Range	Command	Initial Value
2	Spindle allowable revolution	* to 800	SET ADD	800

*: Varies according to the machine model.

▼ ..... 1 step advance and 1 step return are possible.

Return cycle and 1 cycle operation are not possible.

4-2. Door Interlock by ATC Magazine Door

If the ATC magazine door is not closed, ATC operation commands cannot be executed.

(1) Commands in a program (M06, T command, etc.)

Alarm message "4708 Alarm D Safety interlock ATC" is displayed and the NC enters the STM in operation status and the command is retained.

(2) Manual 1 cycle, return cycle, and step operation

Although an alarm does not occur, the command is ignored.

(3) Manual magazine rotation

Although an alarm does not occur, the command is ignored.

[Supplement] The state that "the command is retained" means that the specified command not executable due to the opening of the ATC magazine door is in the waiting state and can be executed by restart operation after closing the ATC magazine door. For the restart operation after closing the door, refer to 5-2.

4-3. Door Interlock by APC Door of 2-pallet APC

If the APC magazine door is not closed, APC operation commands cannot be executed.

(1) Commands in a program (M60, etc.)

Alarm message "4708 Alarm D Safety interlock APC" is displayed and the NC enters the STM in operation status and the command is retained.

(2) Manual 1 cycle, return cycle, and step operation

Although an alarm does not occur, the command is ignored.

[Supplement]

1. The state that "the command is retained" means that the specified command not executable due to the opening of the APC door is in the waiting state and can be executed by restart operation after closing the APC door. For the restart operation after closing the door, refer to 5-3.
2. The door interlock by the APC door is optional for the following models.
   - MC-40V/50V/60V
   - MC-400H/500H/600H/800H/1000H

4-4. APC Safety Barrier Interlock for APC (Double-column Machining Centers)

For machining centers not equipped with the whole cover, photoelectric switches (APC safety barrier) are installed between the machine table and the APC. If light beam is interrupted, axis movement commands (X-, Y- and Z-axis) cannot be executed.

(1) Commands in a program

If light beam is interrupted during axis movements, the alarm message "4708 Alarm D Safety Interlock BARRIER" is displayed and the NC enters the slide hold state. The interrupted axis movement commands are retained so that restart is possible when the APC safety barrier is released.

(2) Commands (tapping cycle) in a program

If light beam is interrupted during axis movements, the alarm message "4708 Alarm D Safety Interlock BARRIER" is displayed. In this case, the NC enters the slide hold state after the completion of the tapping cycle. The interrupted axis movement commands are retained so that restart is possible when the APC safety barrier is released.

Note that axis movements are not stopped during the execution of a tapping cycle even if an alarm occurs.

(3) Manual axis movements

If light beam is interrupted during manual axis movements, the alarm message "4708 Alarm D Safety Interlock BARRIER" is displayed and axis movement commands are canceled. The interrupted axis movement commands are not retained.

[Supplement] For details of operation required to restart the interrupted operation after releasing the APC safety barrier, refer to 5-4.

4-5. APC Safety Fence Interlock for APC (Double-column Machining Centers)

The APC of a double-column machining center is enclosed by the fence and chain. If the chain is unlinked after removing the safety plug, APC operation commands cannot be executed.

(1) Commands in a program

If the safety plug is removed during APC operation, the alarm message "4708 Alarm D Safety Interlock APC" is displayed and the NC enters the STM in operation status. The interrupted APC command is retained so that restart is possible when the safety plug is inserted.

(2) Manual 1 cycle, return cycle, and step operation

If the safety plug is removed during manual APC operation, alarm message "4708 Alarm D Safety Interlock APC" is displayed and the NC enters the STM in operation status. The interrupted APC command is retained so that restart is possible when the safety plug is inserted.

[Supplement] For details of operation required to restart the interrupted operation after inserting the safety plug, refer to 5-5.

SECTION 5 RESTART AFTER THE INTERRUPTION OF OPERATION DUE TO DOOR INTERLOCK

If the operation is interrupted due to the opening of the door during operation or if the execution of prohibited operation command is retained due to execution of such a command in the door opened state, restart is possible

5-1. Restart after Closing the Operator's Door

If there is a retained command after the closing of the operator's door, the alarm message "4708 Alarm D Safety interlock ????" remains displayed.

(1) To restart the interrupted operation

Press the operator's door restart button after the operator's door is closed, and alarm message "4708 Alarm D" is cleared. Then, the retained command is executed continuously.

(2) If restart is not necessary

Reset the NC and alarm message "4708 Alarm D" is cleared. The retained command is canceled at the same time.

After following either of the operation indicated above, normal operation can be continued.

[Supplement]

1. When operation indicated in (1) above is carried out after the machine has been stopped during automatic operation with a command retained, the retained command is executed, and after the completion of the command, the program is continuously executed.
2. Normal operation is not possible even if the operator's door is closed, unless the alarm message "4708 Alarm D" is cleared.
3. In the alarm message of "4708 Alarm D", symbol "????" represents any of "DOOR", "ATC", "APC" and "None".

5-2. Restart after Closing the ATC Magazine Door

If there is a retained command after the closing of the ATC magazine door, the alarm message "4708 Alarm D Safety interlock ATC" remains displayed.

(1) To restart the interrupted operation

Press the ATC magazine door restart button after the ATC magazine door is closed, and alarm message "4708 Alarm D" is cleared. Then the retained command is executed continuously.

(2) If restart is not necessary

Reset the NC and alarm message "4708 Alarm D" is cleared. The retained command is canceled at the same time.

After following either of the operation indicated above, normal operation can be continued.

[Supplement] Normal operation is not possible even if the ATC magazine door is closed, unless the alarm message "4708 Alarm D" is cleared.

5-3. Restart after Closing the APC Door of 2-pallet APC

If there is a retained command after the closing of the APC door, the alarm message "4708 Alarm D Safety interlock APC" remains displayed.

(1) To restart the interrupted operation

Press the APC door restart button after the APC door is closed, and alarm message "4708 Alarm D" is cleared. Then the retained command is executed continuously.

(2) If restart is not necessary

Reset the NC and alarm message "4708 Alarm D" is cleared. The retained command is canceled at the same time.

After following either of the operation indicated above, normal operation can be continued.

[Supplement] Normal operation is not possible even if the APC door is closed, unless the alarm message "4708 Alarm D" is cleared.

5-4. Restart of Interrupted APC Operation due to Interruption of APC Safety Barrier Light Beam for APC (Double-column Machining Centers)

If light beam of photoelectric switches used as the APC safety barrier is interrupted during axis movements, the alarm message "4708 Alarm D Safety Interlock BARRIER" is displayed.

To clear this state, press the APC Safety Barrier Release button and the alarm message "4708 Alarm D Safety Interlock BARRIER" is cleared.

(1) To restart the interrupted operation

Press the CYCLE START button, and the slide hold state is cleared and the retained axis movement commands are executed continuously.

(2) If restart is not necessary

Reset the NC and the retained commands are canceled.

5-5. Restart after Closing the APC Safety Fence of APC

If the safety plug is removed during APC operation, the alarm message "4708 Alarm D Safety Interlock APC" is displayed. Even after the insertion of the safety plug, this alarm message remains displayed if there is an APC command not completed and retained.

(1) To restart the interrupted operation

Press the APC restart button and the alarm message "4708 Alarm D Safety Interlock APC" is cleared. Then the retained APC command is executed continuously.

(2) If restart is not necessary

Reset the NC and the alarm message "4708 Alarm D Safety Interlock APC" is cleared. The retained command is canceled at the same time.

SECTION 6 ALARM

4216 Safety interlock

Due to the door interlock conditions, the operation door interlock function was activated (disabling machine operation).

When this interlock function is activated (by opening the operation door during machine operation),this alarm occurs to display DOOR as a character string. This alarm also occurs when the APC safety mat interlock is activated (the APC mat is stepped on during APC operation). In this case, "MAT" appears as a character string.

[Character-string] DOOR, MAT or None (See Code 1 to F)
[Code]

1–> The sequence restart button is pressed.
2–> The start, external start, or PPC start button is pressed.
3–> Pulse handle overlap was attempted.
4–> The program includes cutting feed.
5–> Programmed rapid traverse has exceeded the set feedrate or the program includes rapid traverse.
6–> The manual cutting feed button (+/–) is pressed.
7–> The pulse handle is selected and rotated.
8–> The rapid traverse button (+/–) is pressed.
9–> In the programmed cutting feed, the synthesized feedrate has exceeded the set value.
A–> The JOG feedrate has exceeded the set value.
B–> The pulse handle feedrate has exceeded the set value.
C–> The manual rapid feedrate has exceeded the set value.
D–> The C-axis is fed in jog mode or C-axis jog feedrate has exceeded the set value.

[Measures to Take]

Close the operation door.
Or, specify a required command after fulfilling the operation possible conditions.

4708 Safety interlock

Due to the door interlock conditions, the operator door interlock function is activated (the door is opened during machine operation). With this alarm, the NC displays the character-string "DOOR".

This alarm also occurs when the APC safety mat interlock is activated (the safety mat is stepped on during APC operation). With this alarm, the NC displays the character-string "MAT".

[Index] None
[Character-string] DOOR or MAT
[Code] None

4713 Please open door

When the operator door or the front door open/close confirmation limit switches are at close end with the power ON, the door interlock type S function displays this message, requesting the operator to open the door to check if the limit switches normally function.

[Index] None

LIST OF PUBLICATIONS

Publication No.	Date	Edition
4185-E	March 1998	1st

This manual may be at variance with the actual product due to specification or design changes.
Please also note that specifications are subject to change without notice.
If you require clarification or further explanation of any point in this manual, please contact your OKUMA representative.

OKUMA OFFICES

DOMESTIC OFFICES

REGISTERED OFFICES
1-32 Tsujimachi, Kita-ku
Nagoya 462-0032, Japan

WORLD HEADQUARTERS-OGUCHI PLANT
Okuma Corporation
Oguchi-cho, Niwa-gun Aichi, 480-0193, Japan
Phone (0587) 95-7825 Fax (0587) 95-6074 Telex 4573310 OKUMA J

KANI PLANT
Okuma Corporation
3-6 Himegaoka, Kani-shi, Gifu-ken, 509-0249, Japan
Phone (0574) 63-5611 Fax (0574) 63-5678

OVERSEAS OFFICES
Okuma Corporation ,Melbourne Liaison Office
c/o Atlas CNC Machines Ltd. 3 Tampe Road Rowvill, Victoria 3178 Australia
Phone (03) 9753-2848 Fax (03) 9753-2020

Okuma Corporation Singapore Branch
422 Tagore Avenue Singapore 2678
Phone 4590819 Fax 4598276

OVERSEAS AFFILIATE
Okuma America Corporation
12200 Steele Creek Road, Charlotte, NC 28273, U.S.A.
Phone (704) 588-7000 Fax (704) 588-6503

OVERSEAS SUBSIDIARIES
Okuma Europe GmbH
Europark, Fichtenhain A20
47807 Krefeld , F.R. of Germany
Phone (49) 2151-374-0 Fax (49) 2151-374100

Okuma Service Center TPE
Tatung Co., 22 Chungshan N. Rd.,3rd Sec.Taipei, Taiwan, 10451 R.O.C
Phone (02) 673-6901 Fax (02) 673-6900