

# ***DENSO ROBOT***

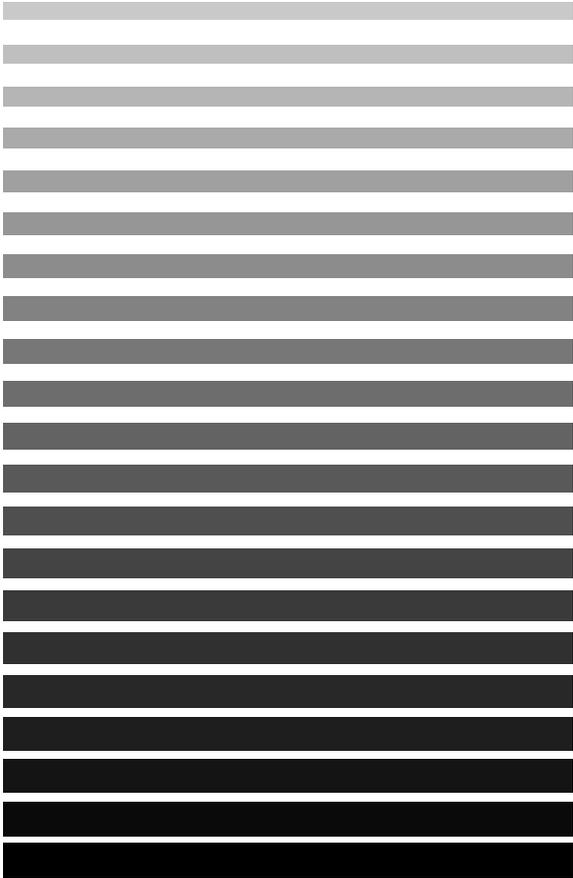
## **SUPPLEMENT**

**Mini Pendant (Ver.1.7 or later)**

**Ver.1.7 or later**

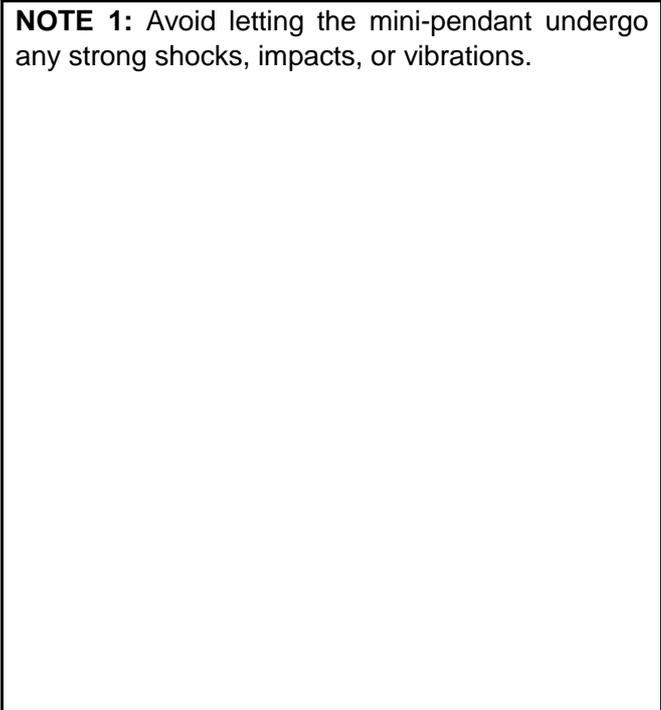


# **Mini Pendant**



This chapter describes how to control the robot using the mini-pendant.

**NOTE 1:** Avoid letting the mini-pendant undergo any strong shocks, impacts, or vibrations.



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# Mini Pendant

The mini pendant is an entry/operation device for operating the robot manually, starting programs, and teaching. It has no programming function.

Using the mini pendant together with WINCAPSII or WINCAPSII Light enables efficient programming and teaching.

## 1 Mini Pendant Functions

For instructions on how to operate the mini pendant, refer to the SETTING-UP MANUAL.

### **Teaching**

This function allows you to store the robot arm position (limited to editing of P variables and J variables). You can check edited programs in running them step by step.

### **Operating the robot**

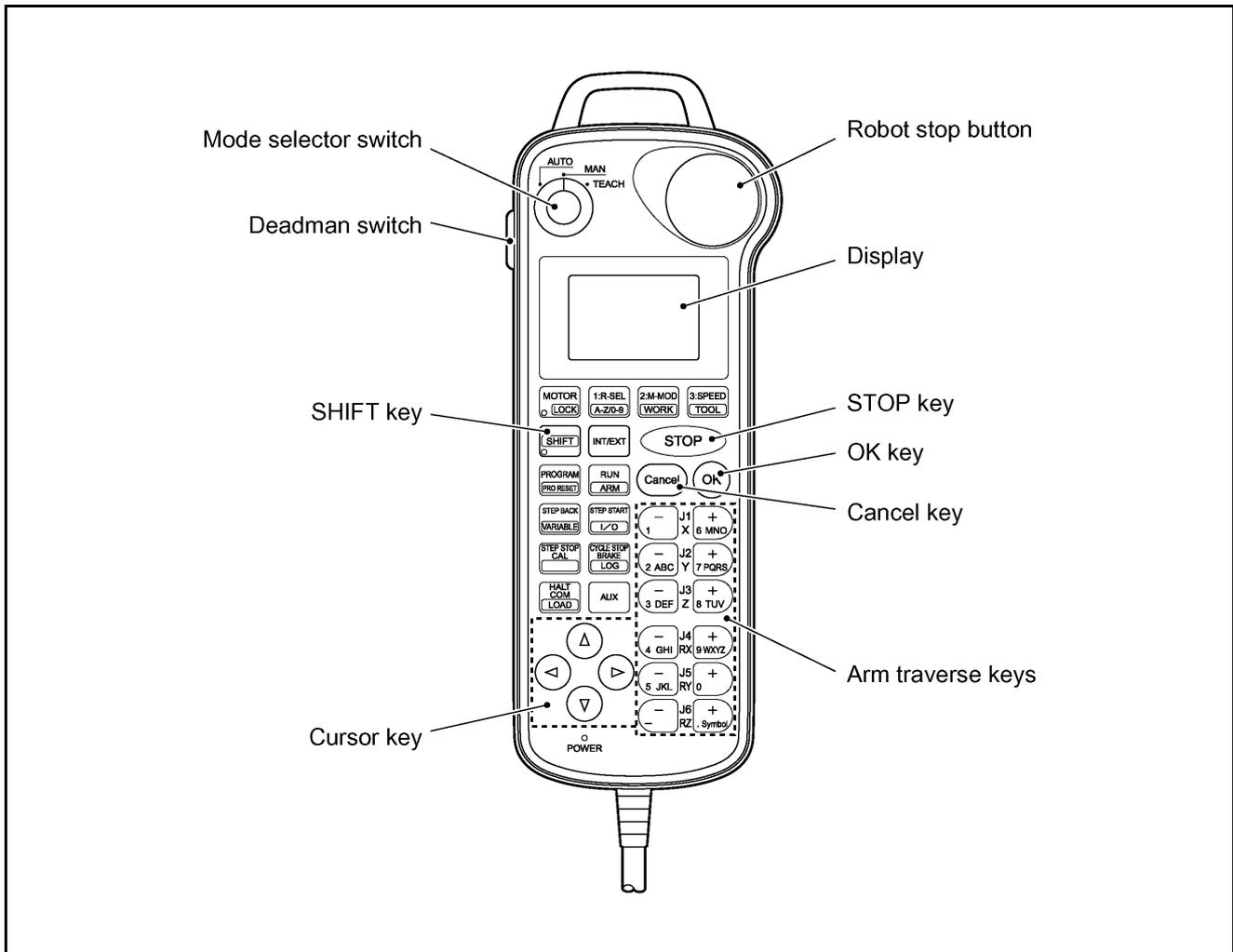
This function turns power to the motor ON/OFF, executes CAL, starts and stops automatic operation, and performs manual operation.

### **Displaying**

This function displays the current robot arm position, running program number, ongoing step number or error codes.

## 2 Name of Mini Pendant Components

The figure below figure shows the names of the mini pendant components.



**Names of Mini Pendant Components**

**NOTE:** On almost all key tops are two (or three) function names printed. The upper and center functions are enabled when the keypad is not shifted; that is, the SHIFT lamp is off. The lower ones boxed are enabled when it is shifted; that is, the lamp is on.

The center functions on key tops take effect in Manual mode.

**NOTE:** The mini-pendant cannot be connected to the controller together with the teach pendant or operating panel. It can be single connected.

## 3 Mini Pendant Specifications

### [ 1 ] Specifications

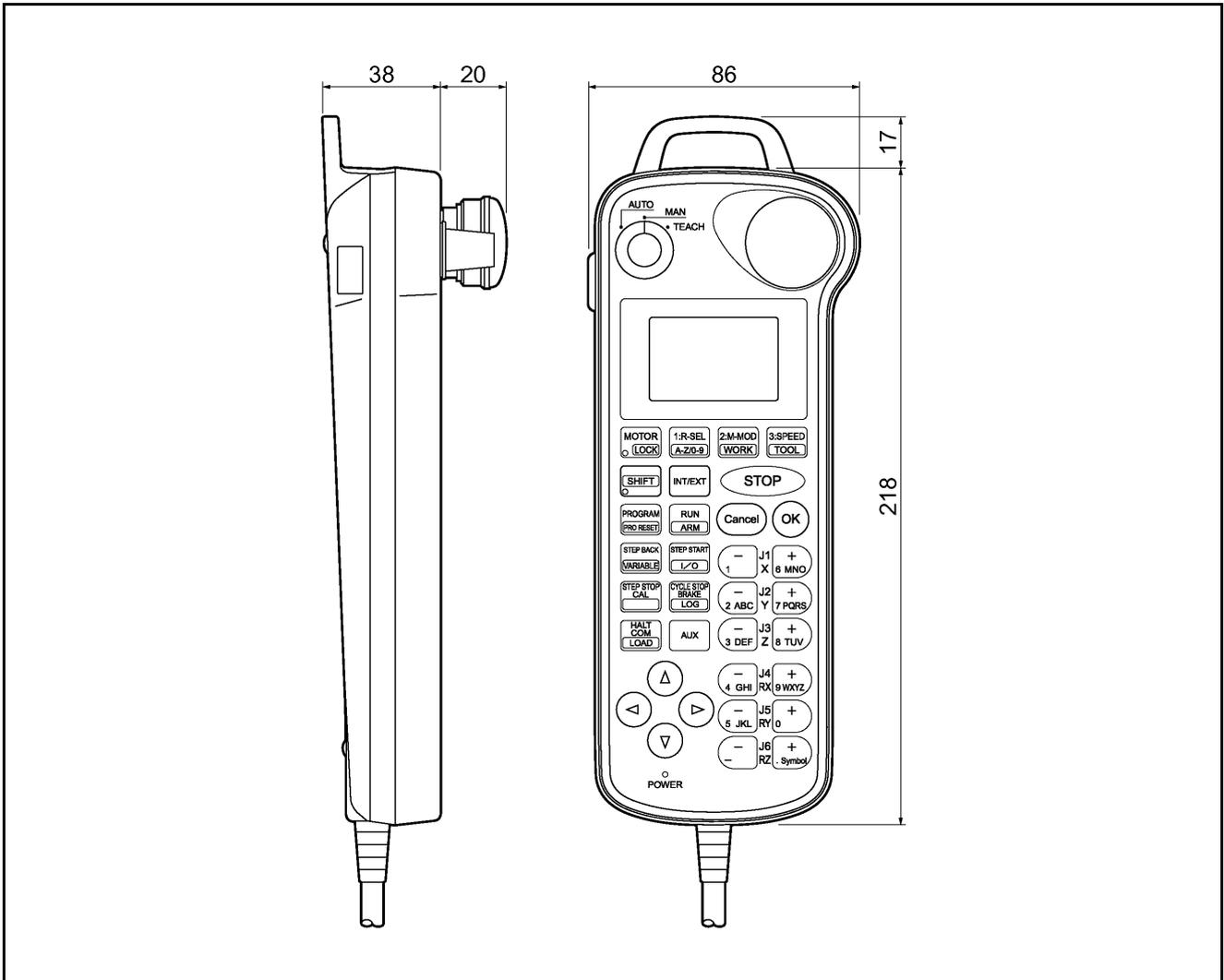
The table below lists the mini pendant specifications.

**Mini Pendant Specifications**

Item	Specifications
Model	MP5J4K (with 4 m cable) MP5J8K (with 8 m cable) MP5J12K (with 12 m cable)
Display	Liquid crystal display, 128 × 64 pixels
Power source	24 VDC (supplied from robot controller)
Operation	33 membrane switches, robot stop button, mode selector switch, deadman switch
Installation conditions	Temperature: 0 to 40°C Humidity: 90% RH or less (Dew condensation shall not be allowed.)
Outside dimensions (W) x (H) x (D)	86 x 218 × 38 mm (excluding projections such as switches)
Weight	Approx. 0.3 kg (excluding cables. See note below.)
Cable length	4 m, 8 m, or 12 m
Accessory	WINCAPSII Light
(Note) Cable weight Approx. 0.2 kg (4 m), 0.4 kg (8 m), 0.6 kg (12 m)	

## [ 2 ] Outer Dimensions

The figure below shows the outer dimensions of the mini pendant.



Outer Dimensions of the Mini Pendant

## [ 3 ] Connecting the Mini Pendant

You may connect the mini pendant to the "pendant" connector on the robot controller. When it is connected, neither the teach pendant nor operating panel can be used concurrently.

## 4 Specifications of WINCAPSII Light

WINCAPSII Light that comes with the mini pendant is PC teaching system software. It is a functionally limited version of WINCAPSII.

Except that WINCAPSII Light is limited to the following functions, it is the same as WINCAPSII. Refer to WINCAPSII given in the next section.

### **Entering and editing robot programs**

In WINCAPSII Light, you may enter or edit robot programs. You may also develop new programs by making use of existing programs.

### **Reading/writing programs and data**

WINCAPSII Light may read programs, variables, coordinate values, CALSET data, log data, and other data from the robot controller and display them on the PC screen or can write them to the robot controller.

**NOTE:** To use this function, the robot controller and the PC must be connected with each other using a communications cable.

### **Saving programs and data**

WINCAPSII Light may store programs, CALSET data, log data, and other data onto the hard disk or floppy disks. It may also read out those stored data and re-edit or write them to the robot controller.

### **Getting a snapshot**

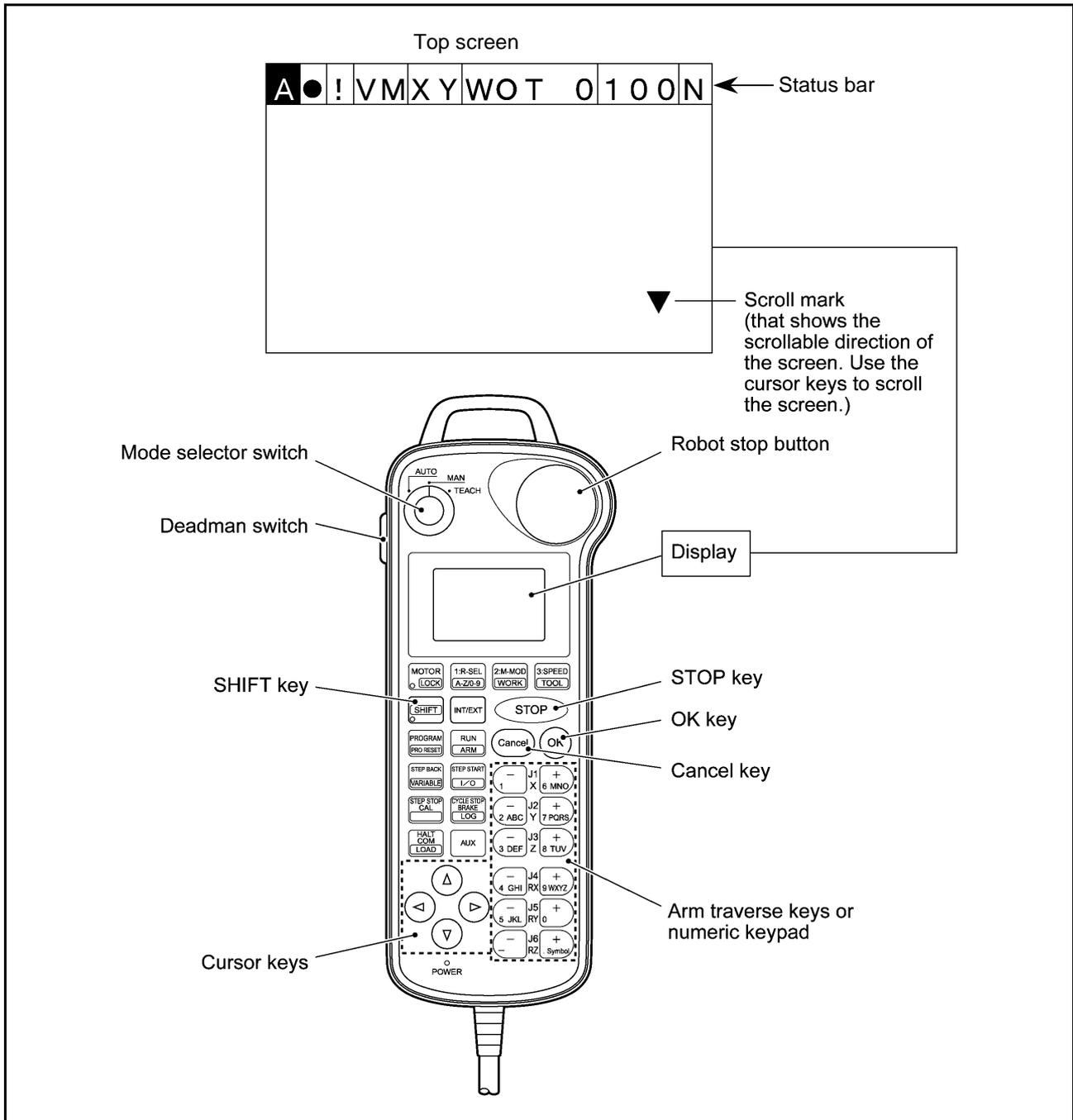
WINCAPSII Light may get a snapshot containing robot motion data from the robot controller and display the robot motion at one particular point in time on the PC screen, enabling you to check it.

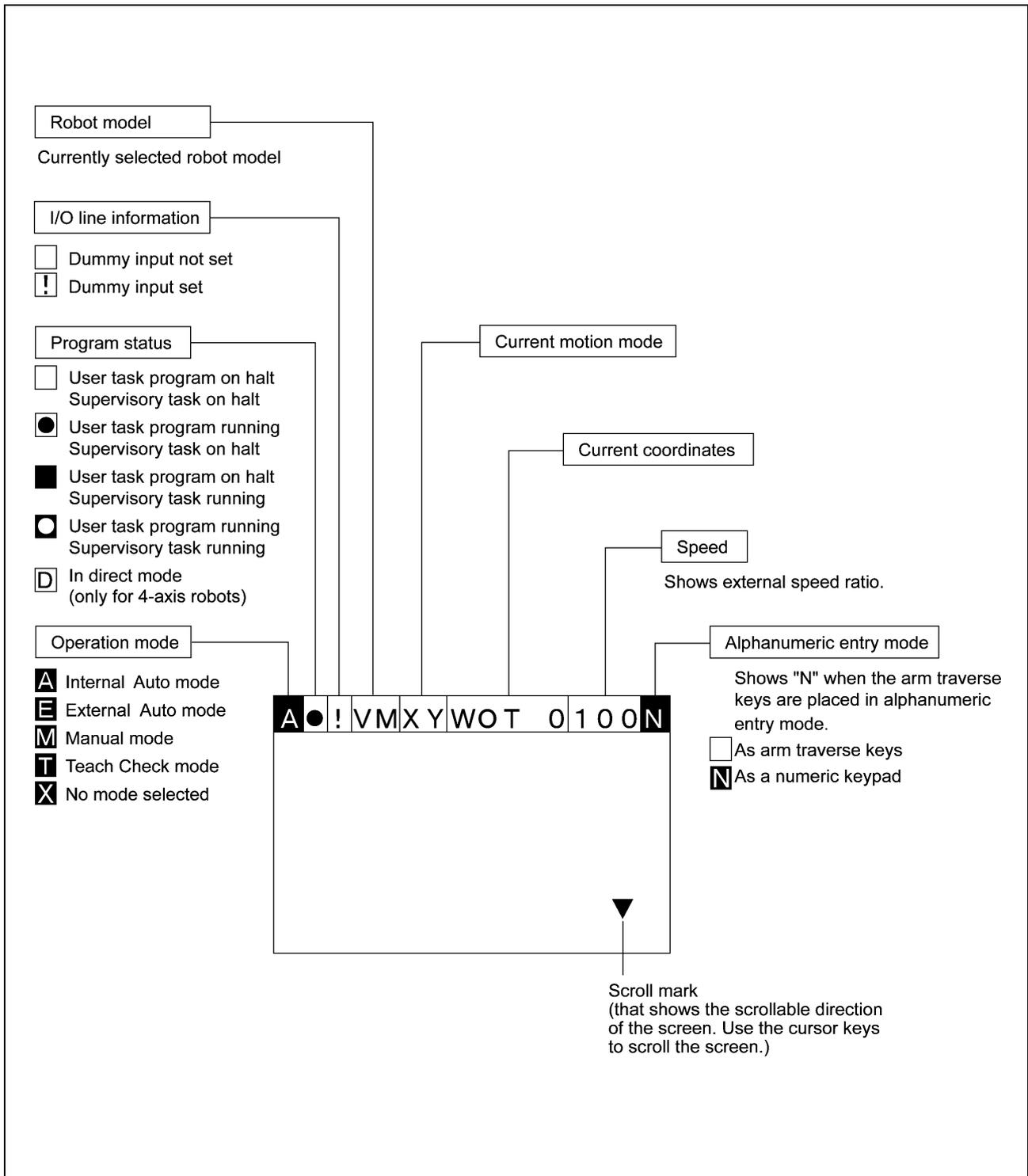
# 5 Commands Menu

Using the keys, buttons, and switches on the mini-pendant allows you to call up a variety of screens on the LCD. This section guides you through the menu tree and then gives you detailed operations.

## 5.1 Keypad and Top Screen

When the power is first applied to the robot controller, the mini-pendant displays the top screen shown below. In the top line of the screen is a status bar which always displays the current operation mode, program status, connected robot model, motion mode, speed, and other information.

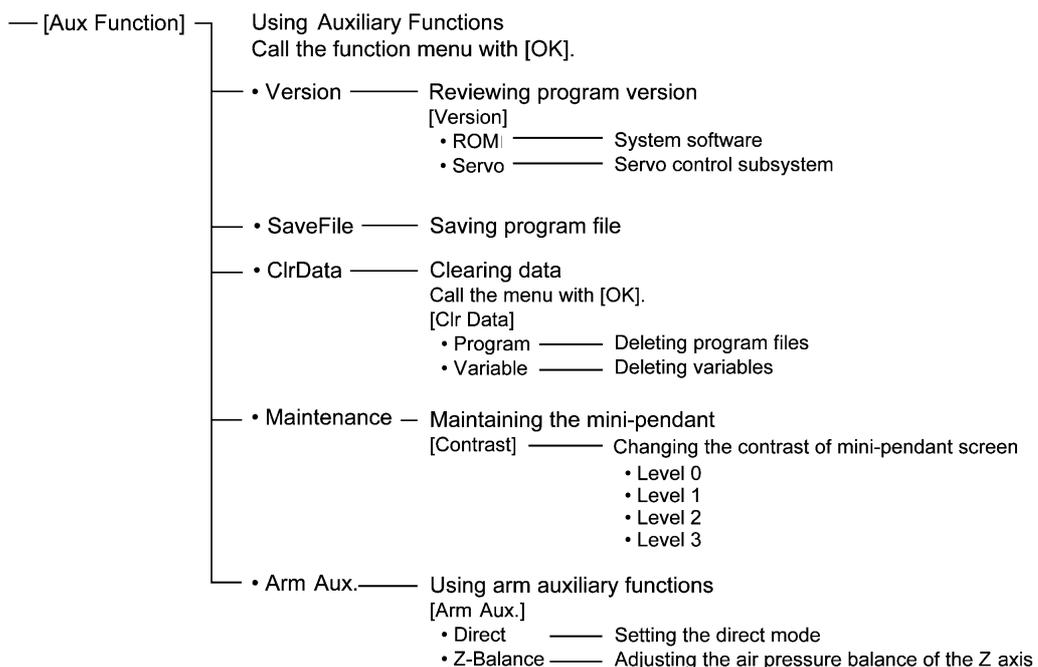
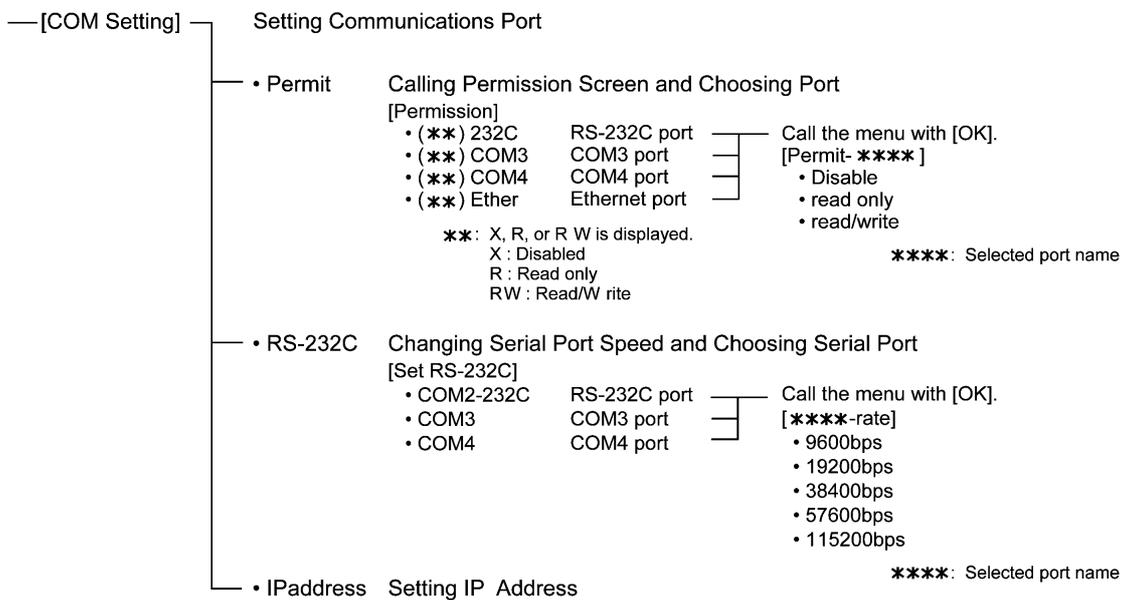




Top Screen of the Mini-Pendant

## 5.2 Menu Tree

	Keys	Applicable Operation Modes	Operation
Top Screen	<b>MOTOR</b>	(MAN/AUTO/TEACH Modes)	<b>Turning the Motor ON/OFF</b>
	<b>LOCK</b>	(MAN/AUTO/TEACH Modes)	<b>Machine Lock and Release</b>
	<b>1:R-SEL</b>	(MAN/AUTO/TEACH Modes)	<b>Choosing the Robot Model</b>
	<b>2:M-MOD</b>	(MAN Mode)	<b>Switching the Motion Modes</b>
	<b>WORK</b>	(MAN Mode)	<b>Changing Work Coordinates</b>
	<b>3:SPEED</b>	(MAN/AUTO/TEACH Modes)	<b>Changing the Robot Speed</b>
	<b>3:SPEED</b>	(MAN Mode)	<b>Changing the Inching Angle and Distance</b>
	<b>TOOL</b>	(MAN Mode)	<b>Changing Tool Coordinates</b>
	<b>INT/EXT</b>	(AUTO/External Modes)	<b>Switching between Internal and External Auto Modes</b>
	<b>PROGRAM</b>	(MAN/AUTO/TEACH Modes)	<b>Handling Programs</b> Call the functions menu with [OK]. [Functions] • SearchPRO List of programs • Display Property of the selected program
	<b>PRO RESET</b>	(MAN/AUTO/TEACH Modes)	<b>Resetting Programs</b> [Reset] • Programs Normal task programs • SupvsrTsk Supervisory tasks
	<b>ARM</b>	(MAN/AUTO/TEACH Modes)	<b>Modifying the Current Robot Arm Position</b> Choose the coordinates type with cursors. [Display Style] • Show P • Show J • Show T
	<b>VARIABLE</b>	(MAN/AUTO/TEACH Modes)	<b>Changing the Variable Value</b> Choose the coordinates type with cursors. I type P type F type J type D type T type V type Call the functions menu with [OK]. [Function] • Jump To Specifying variable by # • Move Allowing you to move the robot arm to the specified position (only for P, T, and J) • Change Changing variable value • GetPos Getting the current coordinates into the specified variable (only for P, T, and J) • Copy Copying variable value
	<b>I/O</b>	(MAN/AUTO/TEACH Modes)	<b>Reconfiguring I/O Signals</b> Call the functions menu with [OK]. [Function] • Jump To Specifying I/O signal by # • ON/OFF I/O ON/OFF
	<b>CAL</b>	(MAN Mode)	<b>Executing CAL</b>
	<b>BRAKE</b>	(MAN Mode)	<b>Releasing and Locking Brakes</b> 6-axis robots • All Axes • Each Axis 4-axis robots • Z-Axis
	<b>LOG</b>	(MAN/AUTO/TEACH Modes)	<b>Logging Data</b> [Log] • ErrorLog • CtrlLog
	<b>COM</b>	(MAN Mode)	
	<b>LOAD</b>	(MAN/AUTO/TEACH Modes)	<b>Loading New Project</b>
	<b>AUX</b>	(MAN Mode)	



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# 6 Operation Using the Mini-Pendant

## 6.1 Turning the Motor ON/OFF

Key: [MOTOR]



### Operation

Pressing [MOTOR] toggles the joint-drive motors on and off.

Pressing this key when the LED is off will turn the motors on and switch the LED on.  
Pressing it when the LED is on will turn the motors off and switch the LED off.

## 6.2 Machine Lock and Release

Key: [LOCK]                      [SHIFT] + [MOTOR]



### Operation

Pressing [LOCK] toggles between the machine lock and release.

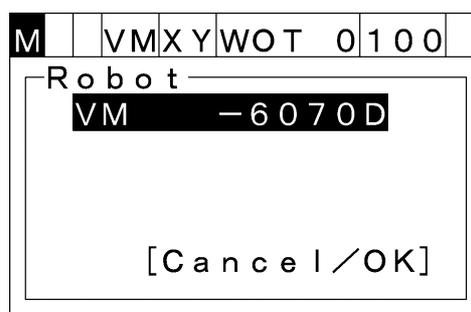
Pressing this key when the LED is off will lock the machine. When the machine is locked, the LED blinks. Pressing this key with the LED blinking will release the lock.

## 6.3 Choosing the Robot Model

Key: [1: R-SEL]

### Operation

- (1) Press [1:R-SEL] to call up the Robot screen as shown below, which lists all robot models you can choose.



- (2) When the power is first applied to the robot controller, the mini-pendant shows robot models preset by default. Use up and down cursor keys to choose the robot model you want to run and then press [OK].  
To discard the new choice, press [CANCEL].

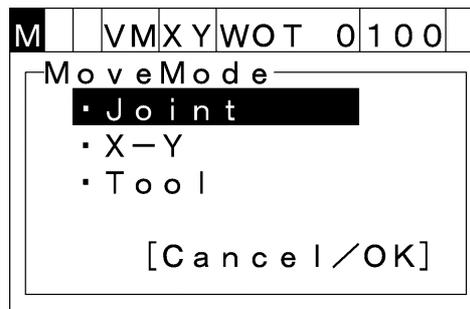
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## 6.4 Switching the Motion Modes

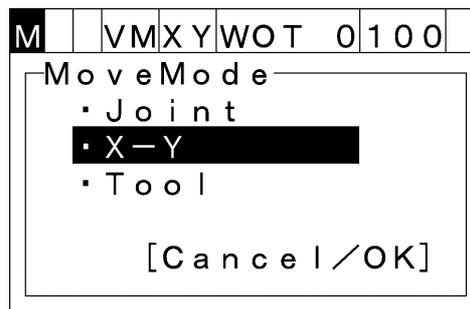
Key: [2: M-MOD]

### Operation

- (1) Press [2:M-MOD] to call up the "MoveMode" screen as shown below, which lists the motion modes you can choose for your robot.



- (2) From the Joint, X-Y, and Tool modes, choose one in which you want to run your robot in Manual operation, by using up and down cursor keys. Then press [OK].  
To discard the new choice, press [Cancel].

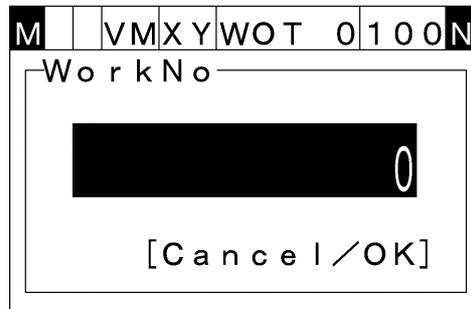


## 6.5 Changing Work Coordinates

Key: [WORK]      [SHIFT] + [2: M-MOD]

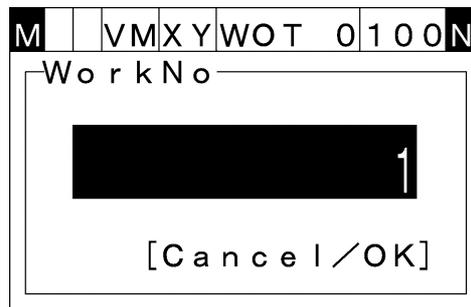
### Operation

- (1) Press [WORK] to call up the "WorkNo" screen as shown below, which shows the current work coordinates number.



- (2) When the power is first applied to the robot controller, the WORK0 (Base coordinate) is set by default. Enter a number indicating the desired work coordinates, and then press [OK].

To discard the new setting, press [CANCEL].



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## 6.6 Changing the Robot Speed

Key: [3: SPEED]

### Operation

- (1) Press [3:SPEED] to call up the speed setting screen shown below where you can change the robot speed.

M		H	M	X	Y	W	O	T	0	1	0	0	N
▶ Speed <input type="text" value="1"/>													
· InchJ 0.0004													
XY 0.01													
[Cancel/OK]													

- (2) Choose "Speed" with the up and down cursor keys, enter the desired speed (from 0.1 to 100) from the numeric keypad, then press [OK].

If you use the right or left cursor key instead of the numeric keypad, the speed will increase or decrease in units of 5, respectively.

To discard the new setting, press [CANCEL].

M		H	M	X	Y	W	O	T	0	1	0	0	N
▶ Speed <input type="text" value="100"/>													
· InchJ 0.0004													
XY 0.01													
[Cancel/OK]													

## 6.7 Changing the Inching Angle and Distance

Key: [3: SPEED]

### Operation

- (1) Press [3:SPEED] to call up the speed setting screen shown below where you can change the inching angle and distance.

M		H	M	X	Y	W	O	T	0	1	0	0	N
<div style="border: 1px solid black; padding: 5px;"> <p>▶ Speed 100</p> <p>• InchJ 0.0004</p> <p>XY 0.01</p> <p>[Cancel/OK]</p> </div>													

- (2) To change the inching angle:

Choose "InchJ" with the up and down cursor keys, enter the desired angle from the numeric keypad, then press [OK].

To discard the new setting, press [CANCEL].

M		H	M	X	Y	W	O	T	0	1	0	0	N
<div style="border: 1px solid black; padding: 5px;"> <p>• Speed 100</p> <p>▶ InchJ 0.0004</p> <p>XY 0.01</p> <p>[Cancel/OK]</p> </div>													

- (3) To change the inching distance:

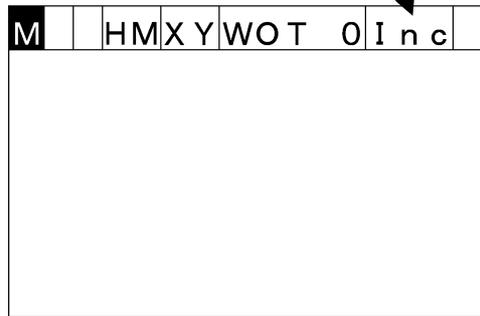
Choose "XY" with the up and down cursor keys, enter the desired distance from the numeric keypad, then press [OK].

To discard the new setting, press [CANCEL].

M		H	M	X	Y	W	O	T	0	1	0	0	N
<div style="border: 1px solid black; padding: 5px;"> <p>• Speed 100</p> <p>▶ InchJ 0.0004</p> <p>XY 0.01</p> <p>[Cancel/OK]</p> </div>													

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If the robot enters the inching mode, the "Inc" will appear in the rightmost area of the status bar.

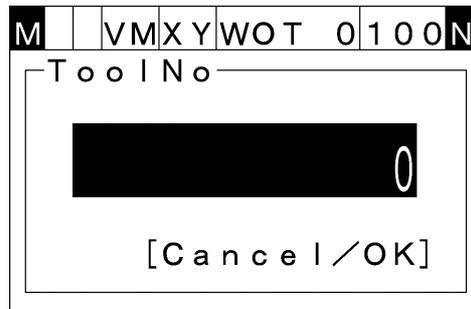


## 6.8 Changing Tool Coordinates

Key: [TOOL]      [SHIFT] + [3: SPEED]

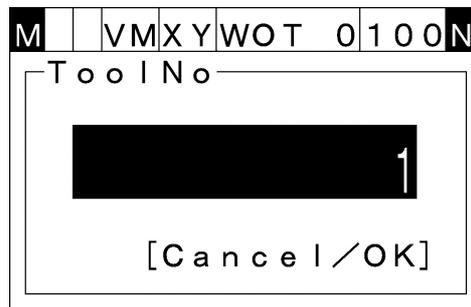
### Operation

- (1) Press [TOOL] to call up the "ToolNo" screen as shown below, which shows the current tool coordinates number.



- (2) When the power is first applied to the robot controller, the TOOL0 (Flange) is set by default. Enter a number indicating the desired tool coordinates. Then press [OK].

To discard the new setting, press [CANCEL].



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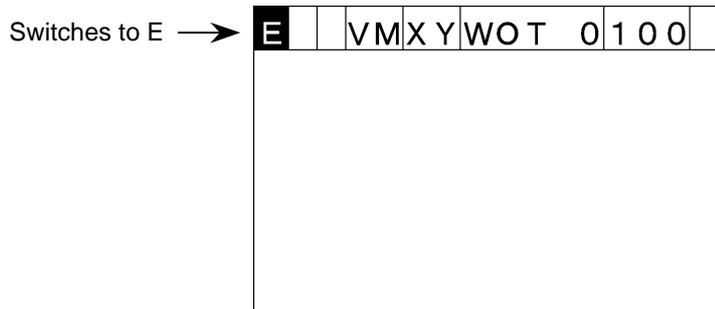
## 6.9 Switching between Internal and External Auto Modes

Key: [INT/EXT]

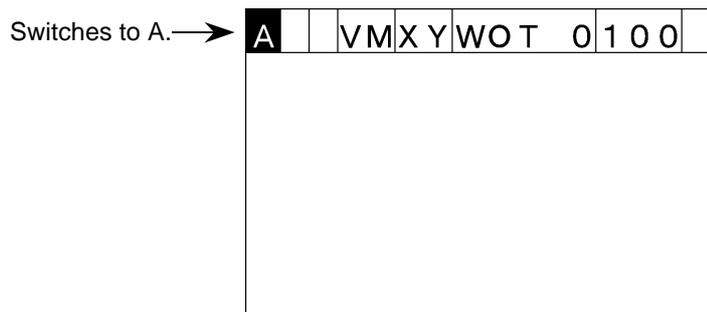


### Operation

- (1) With the top screen displayed, press [INT/EXT] in Internal Auto mode to switch to External Auto mode.



- (2) With the top screen displayed, press [INT/EXT] in External Auto mode to switch to Internal Auto mode



## 6.10 Handling Programs

Key: [PROGRAM]

### Operation

- (1) Press [PROGRAM] to call up the program list as shown below.

A	VMXYWOT	0100
Task [ 2 ] Stat ▶		
PRO1	OnHalt	
PRO2	OnHalt	

- (2) Press [OK] to call up the "Functions" screen that lists program handles.
- SearchPRO: Search program names.
  - Display: Show the property of the selected program.

A	VMXYWOT	0100
Functions		
· SearchPRO		
· Display		
[Cancel/OK]		

- (3) Choose the "Display" handle with the up and down cursor keys and then press [OK]. The property of the selected program appears as shown below, including the program number, title, the number of steps, and others.

A	VMXYWOT	0100
PRO1	:	5
!TITLE "PRO1"		
PROGRAM PRO1		
1 / 20		

Start line

Total number of program lines

- (4) To display other program information, scroll the screen vertically with the up and down cursor keys.

---

## (1) Checking programs in details

On the program list window called up by the [PROGRAM], you may check the program details--execution status, currently running program line, execution time, and execution priority by scrolling the screen horizontally with the right and left cursor keys.

### (1.1) Displaying the program execution status

You can check the execution status of programs currently loaded.

A	VMXY	WOT	0100
Task [ 2 ] Stat ▶			
PRO1	OnHalt		
PRO2	OnHalt		

### (1.2) Displaying the currently running program line

You can check the currently running program line.

A	VMXY	WOT	0100
Task [ 2 ] ◀Line▶			
PRO1			10
PRO2			2

### (1.3) Displaying the program execution time

You can check the execution time (in seconds) of loaded programs.

A	VMXY	WOT	0100
Task [ 2 ] ◀Time▶			
PRO1	6. 17		
PRO2	0. 00		

**(1.4) Displaying the program execution priority**

You can check the execution priority level of each program currently loaded.

A	VMXY	WOT	0100
Task [ 2 ] ◀ Pri			
PRO1			128
PRO2			128

**(2) Starting a program**

- (1) On the program list window called up by the [PROGRAM], you may choose a program to run with the up and down cursor keys.

A	VMXY	WOT	0100
Task [ 2 ] Stat ▶			
PRO1			On Halt
PRO2			On Halt

- (2) Press [RUN] to show the program running mode menu.

- Single: Single-cycle run (Execute the selected program from the beginning to the end once.)
- Cycles: Continuous run (Repeat the selected program.)
- Cont-Exec: Continue start (Start the program whose status is Continue Stop.)

A	VMXY	WOT	0100
PRO1			
▶ Single			
• Cycles			
• Cont-Exec			
[Cancel/OK]			

- (3) Choose a program running mode with the up and down cursor keys, then press [OK]. The selected program will run.

**NOTE:** Make sure that CAL has been completed and the motor power is on before starting any programs.

A	●	V	M	X	Y	W	O	T	0	1	0	0
Task [ 2 ] Stat ▶												
PRO1						De l y e d						
PRO2						O n H a l t						

- (4) If you want to stop the current robot motion immediately, press [STEP STOP], [CYCLE STOP] or [HALT] to halt the currently running program.

### (3) Step Start

- (1) On the program list window called up by the [PROGRAM], you may choose a program to run with the up and down cursor keys.

A		V	M	X	Y	W	O	T	0	1	0	0
Task [ 2 ] Stat ▶												
PRO1						O n H a l t						
PRO2						O n H a l t						

- (2) Press [STEP START] to call up the Step Forward screen as shown below.

A		V	M	X	Y	W	O	T	0	1	0	0
PRO1												
[?] Step Forward												
Running OK?												
[Cancel/OK]												

- (3) Press [OK] to step-start the selected program.

**NOTE:** Make sure that CAL has been completed and the motor power is on before starting any programs.

- (4) If you want to stop the current robot motion immediately, press [STEP STOP], [CYCLE STOP] or [HALT] to halt the currently running program.

A●	VMXY	WOT	0100
Task [ 2 ] Stat ▶			
PRO1		De l y e d	
PRO2		O n H a l t	

#### (4) Teach Check

##### (4.1) Cycle Start

- (1) Turn the mode selector switch to the TEACH position to switch to Teach Check mode.

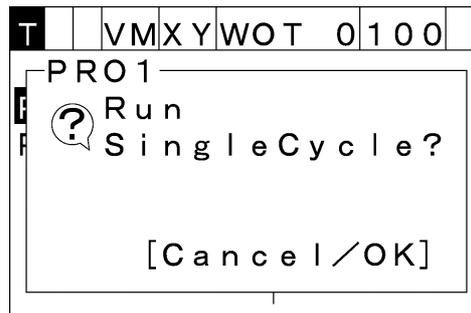
Switches to T. →

T	VMXY	WOT	0100
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- (2) Press [PROGRAM] to call up the program list window as shown below. Choose a program to run with the up and down cursor keys.

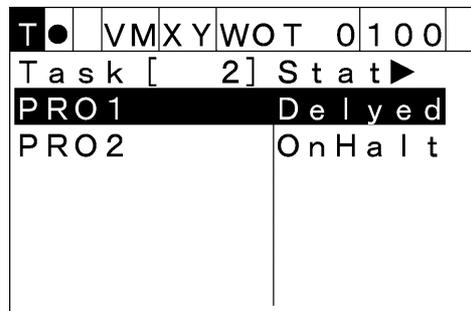
T	VMXY	WOT	0100
Task [ 2 ] Stat ▶			
PRO1		O n H a l t	
PRO2		O n H a l t	

- (3) Press [RUN] to call up the Single Cycle screen.



- (4) While holding down the deadman switch, press [OK]. The program will run a single cycle. Keep holding them down until the program will finish.

**NOTE:** Make sure that CAL has been completed and the motor power is on before starting any programs.

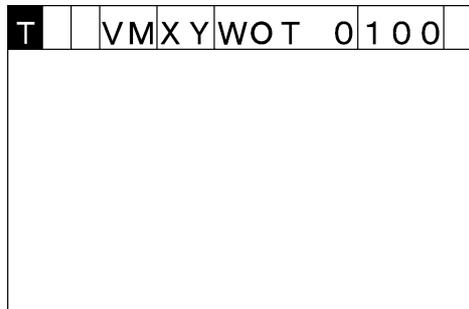


- (5) If you release either one of the deadman switch and [OK], then the robot running by programs will immediately stop.

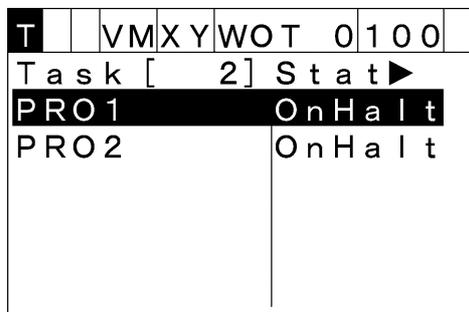
If you want to stop the current robot motion immediately, press [STEP STOP], [CYCLE STOP] or [HALT].

**(4.2) Step Start and Step Back**

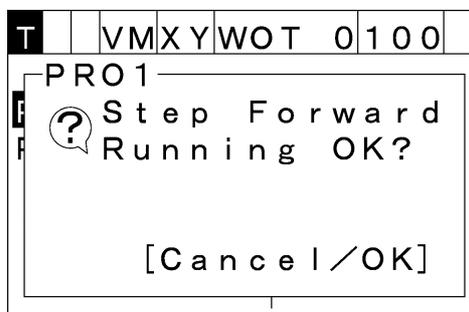
- (1) Turn the mode selector switch to the TEACH position to switch to Teach Check mode.



- (2) Press [PROGRAM] to call up the program list window as shown below. Choose a program to run with the up and down cursor keys.

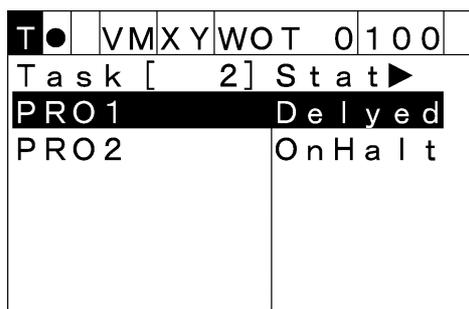


- (3) Press [STEP START] to call up the Step Forward screen.



- (4) While holding down the deadman switch, press [OK]. The program will run a single step. Keep holding them down until the program will finish.

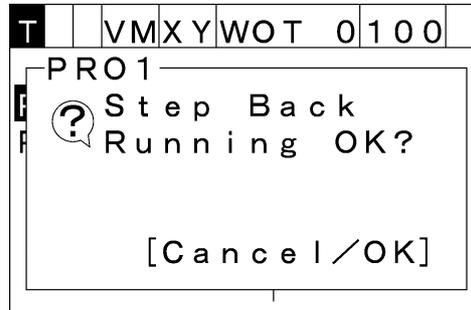
**NOTE:** Make sure that CAL has been completed and the motor power is on before starting any programs.



- (5) If you release either one of the deadman switch and [OK], then the robot running by programs will immediately stop.

If you want to stop the current robot motion immediately, press [STEP STOP], [CYCLE STOP] or [HALT].

- (6) Press [STEP BACK] to call up the Step Back screen.



- (7) While holding down the deadman switch, press [OK]. The program will step backwards. Keep holding them down until the program will finish.

**NOTE:** Make sure that CAL has been completed and the motor power is on before starting any programs.

T	VMXYWOT	0100
Task [ 2 ]	Stat ▶	
PRO1	Running	
PRO2	On Halt	

- (8) If you release either one of the deadman switch and [OK], the robot running by programs will immediately stop.

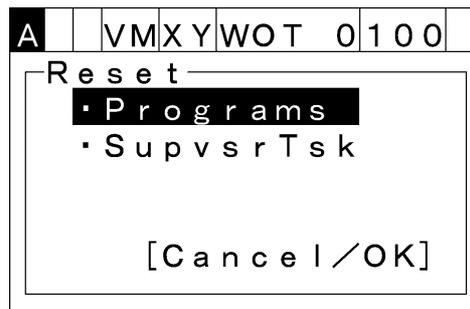
If you want to stop the current robot motion immediately, press [STEP STOP], [CYCLE STOP] or [HALT].

## 6.11 Resetting Programs

**Key:** [PRO RESET]      [SHIFT] + [PROGRAM]

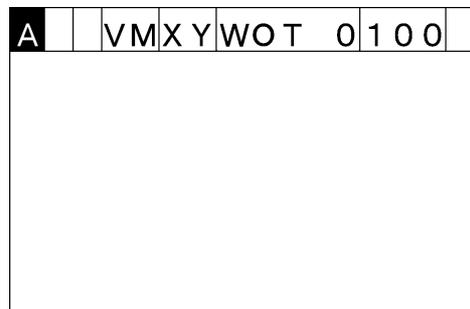
### Operation

- (1) Press [PRO RESET] to call up the "Reset" screen as shown below. Choose one of items listed on the screen by using the up and down cursor keys.
  - Programs: Normal task programs
  - SupvsrTsk: Supervisory task programs



- (2) Press [OK] to reset the selected programs to the beginning. Those programs will become on halt.

To discard the new choice, press [CANCEL]. The display will return to the top screen.





## 6.13 Displaying Variable Values

Key: [VARIABLE]      [SHIFT] + [STEP BACK]

### Operation

- (1) Press [VARIABLE] to call up the screen which lists variables used in your robot controller.

M	H	M	X	Y	W	O	T	0	1	0	0
I	[				0	/		1	0	0	
								0			
I	[				1	/		1	0	0	
								0			
I	[				2	/		1	0	0	
								0			

When the robot controller is turned on, the integer variables are displayed by default as shown above.

- (2) You can cycle through variable types to be displayed by using the right and left cursor keys.

(The screen will cycle through "I → F → D → V → P → J → T → I")

M	H	M	X	Y	W	O	T	0	1	0	0
T	[				0	/		5	0		
X	:				0	.		0	0	0	0
Y	:				0	.		0	0	0	0
Z	:				0	.		0	0	0	0
Ox	:				0	.		0	0	0	0

- (3) With the desired variable type displayed, press [OK] to call up the "Function" screen to handle the selected variable.

To discard the new setting, press [CANCEL].

**NOTE:** There are two types of "Function" screens. For I, F, D, and V variables, three items (JumpTo, Change, and Copy) will display; for P, J, and T variables, five items (JumpTo, Move, Change, GetPos, and Copy) will display.

M	H	M	X	Y	W	O	T	0	1	0	0
Function											
• JumpTo											
• Change											
• Copy											
[Cancel/OK]											

- (4) Choose one of the items with the up and down cursor keys, then press [OK]. To discard the new choice, press [CANCEL].

#### (4.1) JumpTo

If you choose "JumpTo" with the up and down cursor keys and press [OK], then the following JumpTo screen appears. Enter the variable number you want to jump to, into the highlighted line and press [OK].

To discard the new setting and return to the previous screen, press [CANCEL].

M				H	M	X	Y	W	O	T	0	1	0	0	N
Jump To															
[0]															0
[Cancel/OK]															
[Cancel/OK]															

#### (4.2) Change

If you choose "Change" with the up and down cursor keys and press [OK], then the following variable setting window appears. Enter the desired value to be assigned to the variable and press [OK].

To discard the new setting and return to the previous screen, press [CANCEL].

M				H	M	X	Y	W	O	T	0	1	0	0	N
I [0]															
[0]															0
[Cancel/OK]															
[Cancel/OK]															

#### (4.3) Copy

If you choose "Copy" with the up and down cursor keys and press [OK], then the CopyTo window appears. Enter an arbitrary variable number which the value of the variable will be copied to, then press [OK].

To discard the new setting and return to the previous screen, press [CANCEL].

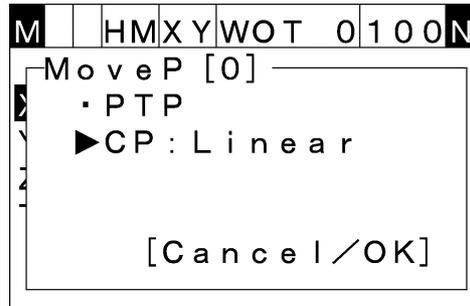
M				H	M	X	Y	W	O	T	0	1	0	0	N
Copy To															
[0]															0
[Cancel/OK]															
[Cancel/OK]															

(4.4) **Move**

If you choose "Move" with the up and down cursor keys and press [OK], then the PTP/CP selection window appears.

To discard the new choice and return to the previous screen, press [CANCEL].

After selecting the PTP or CP motion, press [OK] while holding down the deadman switch. The robot arm will move to the specified position (in Manual mode or Teach Check mode).

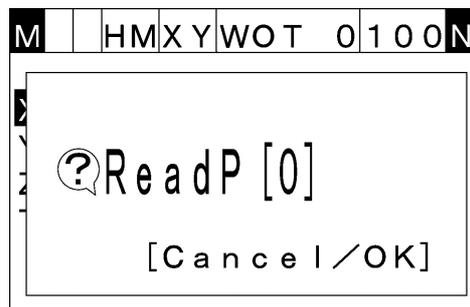


(4.5) **GetPos**

If you choose "GetPos" with the up and down cursor keys and press [OK], then the current position reading window appears as shown below.

To discard the new choice and return to the previous screen, press [CANCEL].

Press [OK] to get the current robot position into the specified variable.



## 6.14 Reconfiguring I/O Signals

Key: [I/O]

[SHIFT] + [STEP START]

### Operation

- (1) Press [I/O] to call up the I/O signal truth table as shown below.

M	V	M	X	Y	W	O	T	0	1	0	0
	0				1			2			3
	<b>0</b>				0			0			0
	4				5			6			7
	0				0			0			0

- (2) To change the truth status assigned to I/O lines, choose the line with the up, down, left, and right cursor keys.

M	V	M	X	Y	W	O	T	0	1	0	0
	0				1			2			3
	0				0			0			0
	4				5			<b>6</b>			7
	0				0			<b>0</b>			0

- (3) Press [OK] call up the "Function" screen that handles I/O signals.  
To return to the I/O signal truth table, press [CANCEL].

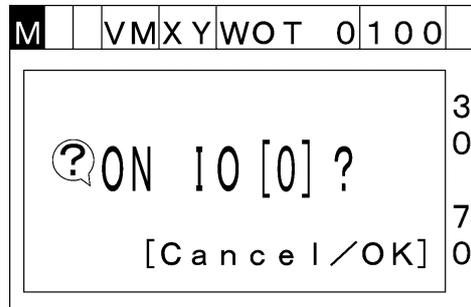
M	V	M	X	Y	W	O	T	0	1	0	0
	Function										
	• Jump To										3
	• ON/OFF										0
	[Cancel/OK]										7
											0

- (4) Choose one of handles with the up and down cursor keys, then press [OK].

(4.1) **ON/OFF**

If you choose "ON/OFF" with the up and down cursor keys and press [OK], then the following screen appears where you may reverse the truth assignment of the line.

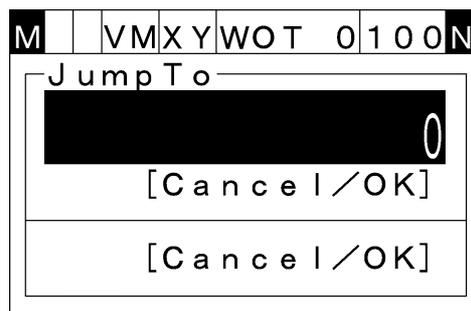
To discard the new setting and return to the I/O signal truth table, press [CANCEL].



(4.2) **JumpTo**

If you choose "JumpTo" with the up and down cursor keys, the JumpTo screen appears. Enter an I/O line number you want to jump to, into the highlighted line and then press [OK].

To discard the new setting and return to the I/O signal truth table, press [CANCEL].



On the I/O signal truth table, using the up, down, right, and left cursor keys with the [SHIFT] held down may shift the screen.

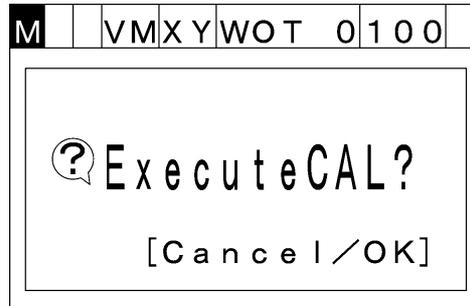
---

## 6.15 Executing CAL

**Key: [CAL]      (Effective in Manual mode)**

### Operation

- (1) Press [CAL] to call up the CAL confirmation window as shown below.



- (2) Check that the motor power is on, then press [OK] to execute CAL.  
To abort it and return to the previous screen, press [CANCEL].

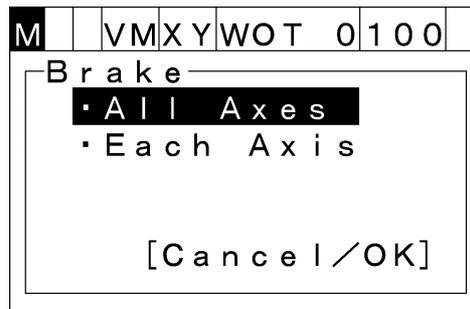
## 6.16 Releasing and Locking Brakes

**Key: [BRAKE] (Effective in Manual mode)**

### Operation

#### For 6-axis robots

- (1) Press [BRAKE] to call up the "Brake" window as shown below.

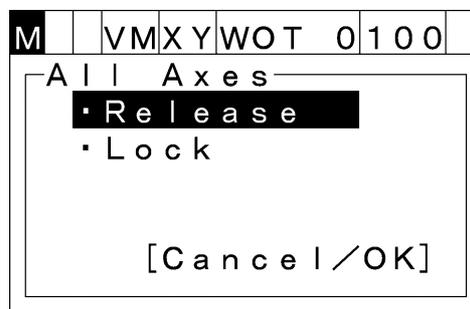


- (2) Choose the All Axes or Each Axis to handle by using the up and down cursor keys, then press [OK]. The display will proceed to the brake control screen.

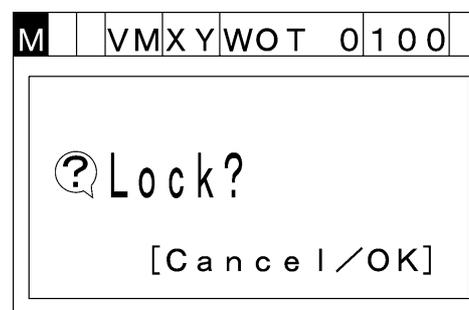
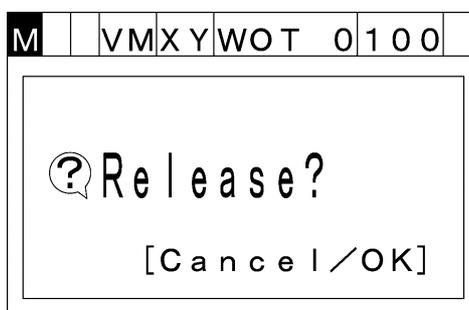
#### (2.1) All Axes

If you choose "All Axes" with the up and down cursor keys and press [OK], then the following All Axes screen will appear where you can control the brakes.

To return to the previous screen, press [CANCEL].



Choose "Release" or "Lock" with the up and down cursor keys, then press [OK]. The following confirmation dialogs will appear, respectively.



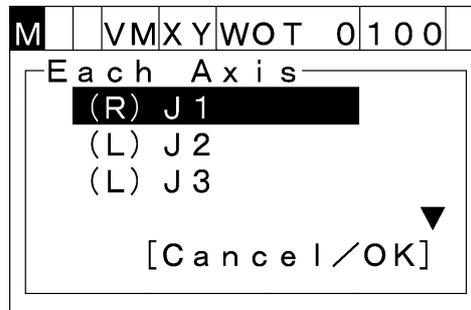
Press [OK] to release or lock all axes.

To abort brake setting and return to the previous screen, press [CANCEL].

## (2.2) Each Axis

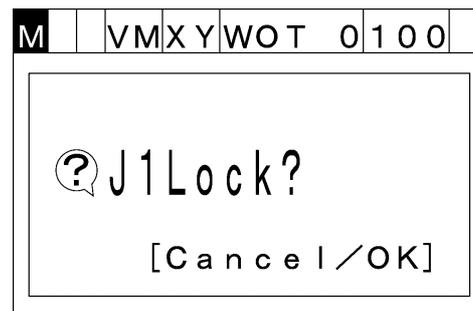
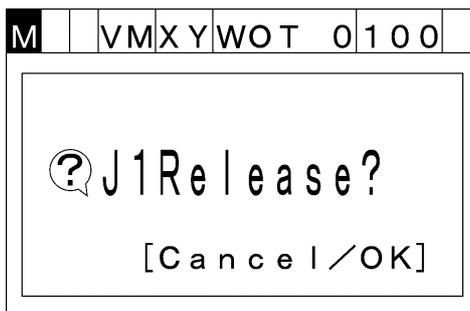
If you choose "Each Axis" with the up and down cursor keys and press [OK], then the following Each Axis screen appears where you can control the brake for each joint. The letters, R and L, stand for current Release and Lock status of each joint brake, respectively.

To abort brake setting and return to the previous screen, press [CANCEL].



Choose an arbitrary joint with the up and down cursor keys. (You may vertically scroll the screen with those keys.)

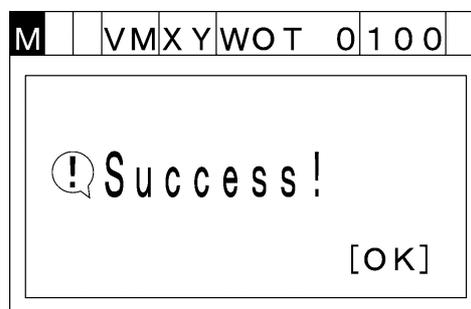
Then press [OK]. Either of the following windows will appear.



To switch the selected joint brake between Release and Lock status, press [OK].

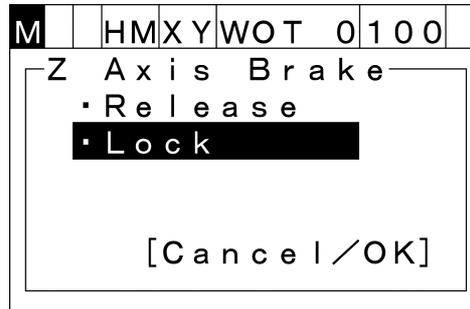
To abort brake setting and return to the previous screen, press [CANCEL].

If the selected brake is released or locked successfully as specified, the following message will display.

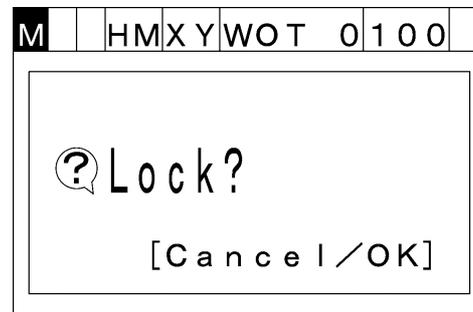
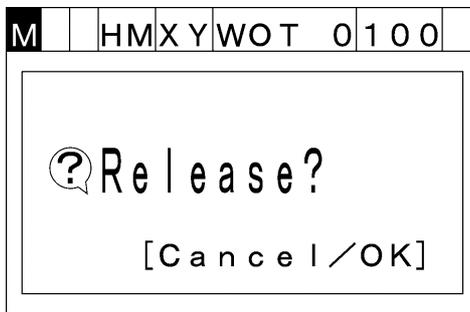


**For 4-axis robots**

(1) Press [BRAKE] to call up the "Z Axis Brake" window as shown below.



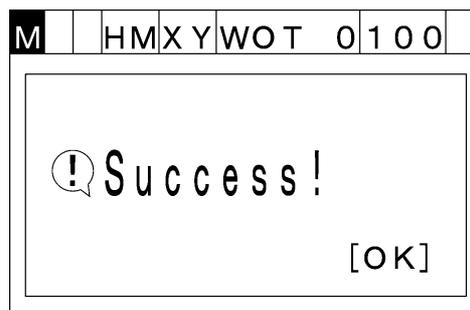
(2) Choose "Release" or "Lock" with the up and down cursor keys, then press [OK]. The following confirmation dialogs will appear, respectively.



(3) Press [OK] to release or lock the Z-axis brake.

To abort brake setting and return to the previous screen, press [CANCEL].

If the Z-axis brake is released or locked successfully as specified, the following message will display.

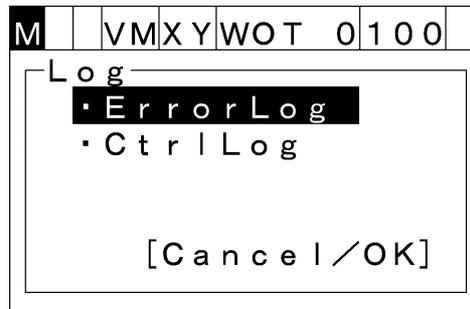


## 6.17 Logging Data

Key: [LOG] [SHIFT] + [BRAKE]

### Operation

Press [LOG] to call up the Log screen as shown below where you can handle the error and control logging.



#### (1) Checking error log

Choose "ErrorLog" with the up and down cursor keys, then press [OK] to call up the error log as shown below. You can check errors in your robot controller.

You may vertically scroll the screen with the up and down cursor keys.

To escape from error logging, press [CANCEL].

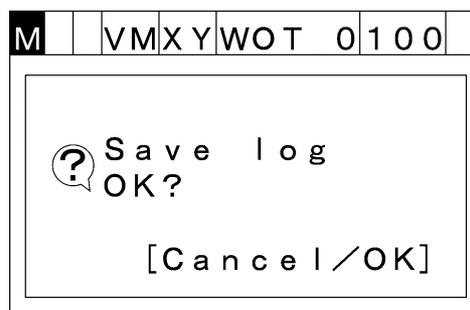
M	VMXYWOT	0100
NumCodeLTime		
1	2187413	15:35
2	600c0	13:15:34
3	21e30	12:13:45
4	21e30	12:13:30
5	600c0	12:11:30

#### (2) Handling control log

Choose "CtrlLog" with the up and down cursor keys, then press [OK] to call up the Save log confirmation dialog as shown below.

Press [OK] to save the control log.

To discard the control log, press [CANCEL].



## 6.18 Setting Communications Port

Key: [COM] (Effective in Manual mode)

### Operation

- (1) Press [COM] to call up the "COM Setting" screen shown below which lists communications settings for the robot controller.

M	V	M	X	Y	W	O	T	0	1	0	0
---	---	---	---	---	---	---	---	---	---	---	---

COM Setting

- Permit
- RS-232C
- IP address

[Cancel/OK]

- (2) Choose "Permit" with the up and down cursor keys and then press [OK]. The Permission screen appears as shown below.

(X): Not permitted, (R): Only read permitted, (RW): Read/write permitted  
To abort setting, press [CANCEL].

M	V	M	X	Y	W	O	T	0	1	0	0
---	---	---	---	---	---	---	---	---	---	---	---

Permission

- (X) 232C
- (X) COM3
- (X) COM4

▼

[Cancel/OK]

- (3) Choose any port whose communications permission should be changed, from the 232C, COM3, COM4 and Ether ports, by using the up and down cursor keys. (You may vertically scroll the screen with those keys.)

Then press [OK] to proceed to the "Permit-COMx" setting as shown below.  
To abort setting, press [CANCEL].

M	V	M	X	Y	W	O	T	0	1	0	0
---	---	---	---	---	---	---	---	---	---	---	---

Permit-COM2

- Disable
- read only
- read/write

[Cancel/OK]

Choose any of "Disable", "read only" and "read/write," and then press [OK] to establish the new setting.

To cancel the new setting, press [CANCEL].

---

## 6.19 Changing Serial Port Speed

Key: [COM]      (Effective in Manual mode)

### Operation

- (1) Press [COM] to call up the "COM Setting" screen shown below which lists communications setting for the robot controller.

M		V	M	X	Y	W	O	T	0	1	0	0
COM Setting												
· Permit												
· RS-232C												
· IP address												
[Cancel/OK]												

- (2) Choose "RS-232C" with the up and down cursor keys, then press [OK]. The communications ports window appears as shown below which lists the communications ports available in your robot controller. (You may vertically scroll the screen with those keys.)

To abort setting and return to the previous screen, press [CANCEL].

M		V	M	X	Y	W	O	T	0	1	0	0
Set RS-232C												
· COM2-232C												
· COM3												
· COM4												
[Cancel/OK]												

- (3) Choose any port whose communications speed should be changed, from the COM2-232C, COM3 and COM4 ports, by using the up and down cursor keys.

Then press [OK] to proceed to the communications rate setting shown below.

To abort setting and return to the previous screen, press [CANCEL].

M		V	M	X	Y	W	O	T	0	1	0	0
COM2-rate												
· 9600bps												
· 19200bps												
· 38400bps												
[Cancel/OK]												

- (4) Choose any of "9600bps", "19200bps", "38400bps", "57600bps" and "115200bps" with the up and down cursor keys, then press [OK] to establish it.

To discard the new setting, press [CANCEL].

## 6.20 Setting IP Address

Key: [COM] (Effective in Manual mode)

### Operation

- (1) Press [COM] to call up the "COM Setting" screen shown below which lists communications setting for the robot controller.

M		V	M	X	Y	W	O	T	0	1	0	0
COM Setting												
· Permit												
· RS-232C												
· IP address												
[Cancel/OK]												

- (2) Choose "IP address" with the up and down cursor keys, then press [OK]. The IP address setting window appears as shown below where you can set the IP address of your robot controller.

To abort setting and return to the previous screen, press [CANCEL].

M		V	M	X	Y	W	O	T	0	1	0	0
· IP address												
10. 8. 109. 86												
· Subnet mask												
255. 255. 255. 0												

- (3) Choose an input field with the up, down, right, and left cursor keys, then enter a new address plus a dot (as a field delimiter).

To discard the new setting, press [CANCEL]. Generally, the "Subnet mask" fields will require no change.

When [8] is entered; →

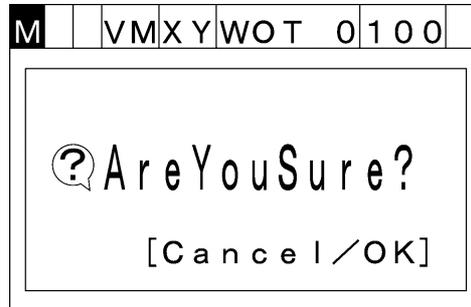
M		V	M	X	Y	W	O	T	0	1	0	0
· IP address												
8. 8. 109. 86												
· Subnet mask												
255. 255. 255. 0												

---

(4) After filling up the field, press [OK]. The following confirmation message will appear.

Press [OK] to establish the new setting.

To discard the new setting, press [CANCEL].

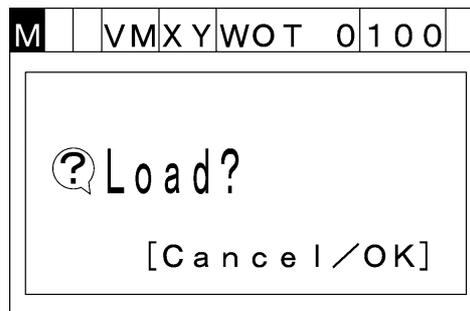


## 6.21 Loading New Project

Key: [LOG]                      [SHIFT] + [COM]

### Operation

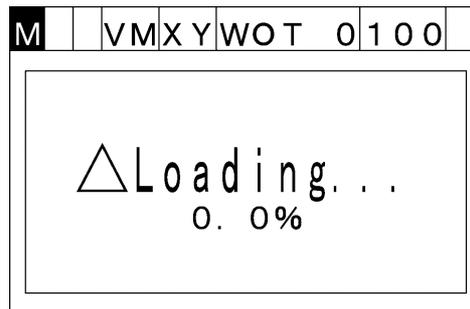
- (1) Press [LOAD] to load a new project into your robot controller. The load confirmation message will appear as shown below.



- (2) Press [OK] to proceed. During loading, the message shown below is displayed.

**NOTE:** Loading a new project may take few minutes.

To abort it, press [CANCEL].



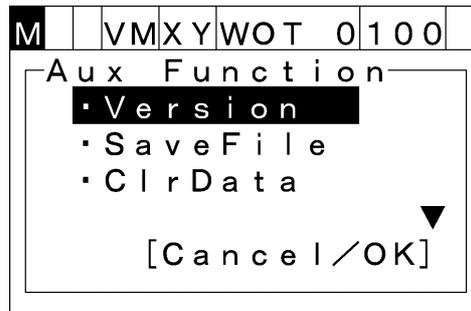
---

## 6.22 Using Auxiliary Functions (Common to 4-axis and 6-axis robots)

**Key:** [AUX]

### Operation

- (1) Press [AUX] to call up the "Aux. Function" menu shown below.

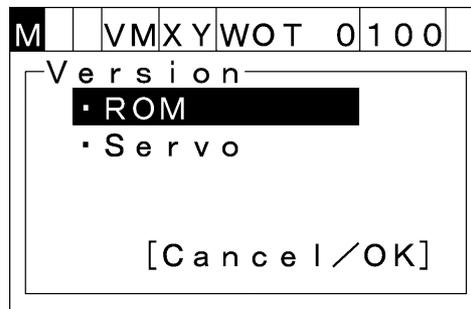


- (2) Choose the desired function with the up and down cursor keys. (You may vertically scroll the screen with those keys.) Then press [OK] to proceed.

#### (2.1) Version

If you choose "Version" in the "Aux Function" menu with the up and down cursor keys and press [OK], then the following Version menu appears.

To abort setting, press [CANCEL].



Choose "ROM" and press [OK], and the version of the system software currently loaded in your controller will appear.

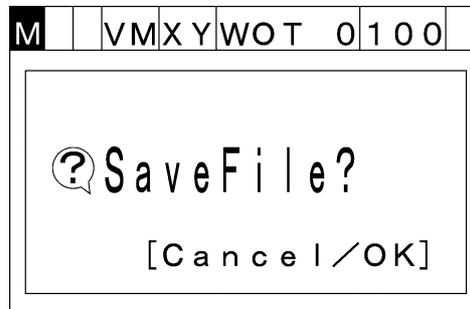
Choose "Servo" and press [OK], and the version of the servo control subsystem will appear.

(2.2) **Save File**

If you choose "SaveFile" in the "Aux Function" menu with the up and down cursor keys and press [OK], then the following confirmation message will appear.

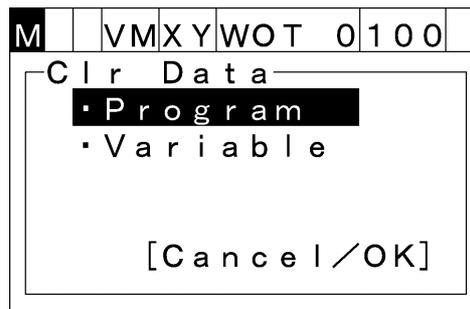
Press [OK] to save the program files that are currently active.

To abort saving, press [CANCEL].



(2.3) **Clear Data**

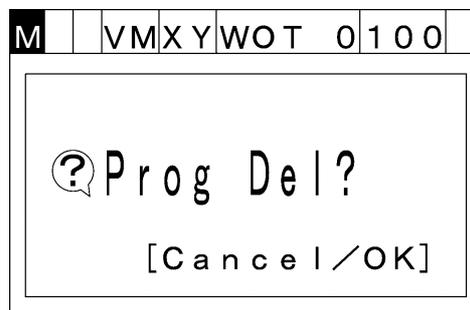
If you choose "ClrData" in the "Aux Function" menu with the up and down cursor keys and press [OK], then the following Clr Data menu appears.



**Deleting program files**

Choose "Program" in the "Clr Data" menu with the up and down cursor keys, and then press [OK]. The following confirmation message will appear.

To abort deleting, press [CANCEL].



Press [OK] to delete all program files currently loaded in your controller.

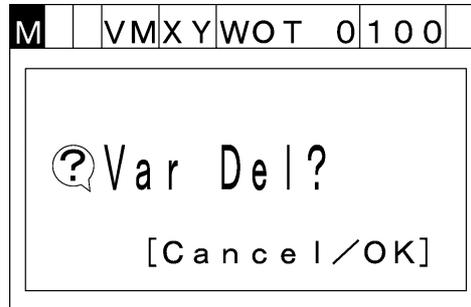
To abort deleting, press [CANCEL].

---

### Deleting variables

Choose "Variable" in the "Clr Data" menu with the up and down cursor keys, and then press [OK]. The following confirmation message will appear.

To abort deleting, press [CANCEL].

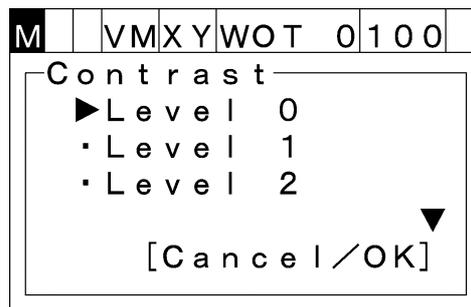


Press [OK] to delete all variables currently loaded in your controller.

To abort deleting, press [CANCEL].

### (2.4) Maintenance

If you choose "Maintenance" in the "Aux Function" menu with the up and down cursor keys and press [OK], then the following Contrast menu will appear.



Choose your favorite contrast level with the up and down cursor keys. (You may vertically scroll the screen with those keys.) Then press [OK] to make the setting effective.

**NOTE:** Making the new level go into effect may take a few minutes.

To discard the new setting, press [CANCEL].

## 6.23 Entering the Direct Teaching Mode (For 4-axis robots)

**Key: [AUX]      (Effective in Manual mode)**

### Operation

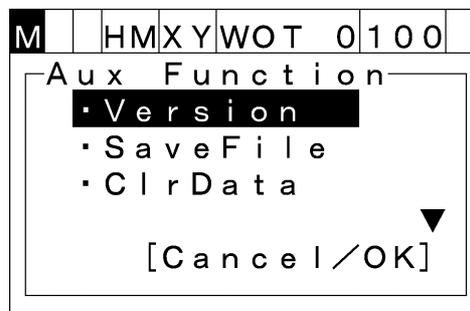
In the direct teaching mode, you may move the robot arm by hand (without using the mini-pendant) with the motor OFF and teach the current position to variables.

Before making the robot enter the direct teaching mode, make sure that the motor power is OFF and the CAL has been completed.

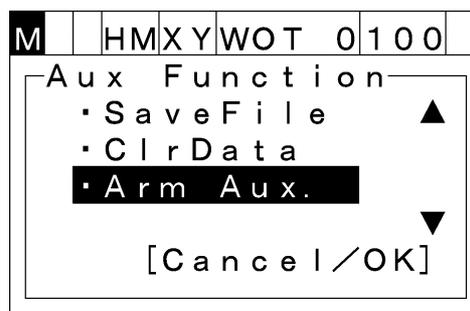
**NOTE:** Only when you make the robot enter the direct teaching mode at the first time after turning the robot controller ON, the air pressure adjustment for Z-axis balance is required so that you need to turn the motor power ON.

### Entering the direct teaching mode

- (1) Press [AUX] to call up the "Aux. Function" menu shown below.

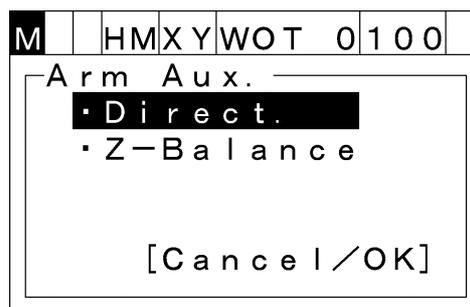


- (2) Vertically scroll the screen with the up and down cursor keys to choose the "Arm Aux."



- (3) Press [OK]. The "Arm Aux." window appears.

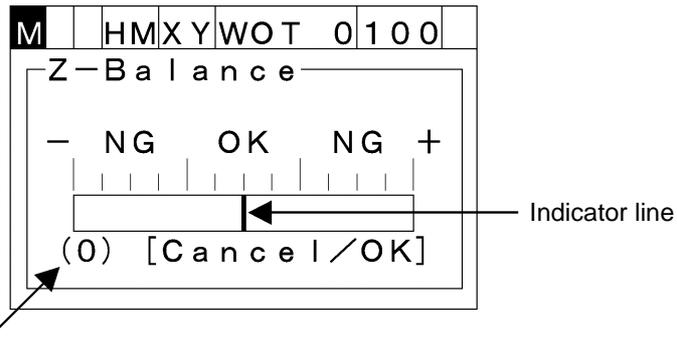
To abort setting and return to the previous screen, press [CANCEL.]



**NOTE:** Steps (4) through (6), which adjust the air pressure balance of the Z-axis, are required only when you make the robot enter the direct teaching mode at the first time after turning the robot controller ON.

- (4) If you choose "Direct" and press [OK], then the "Z-Balance" window appears as shown below.

To abort air balance setting and return to the previous screen, press [CANCEL.]  
Adjust the air pressure so that the indicator line comes within the OK range of the gauge.



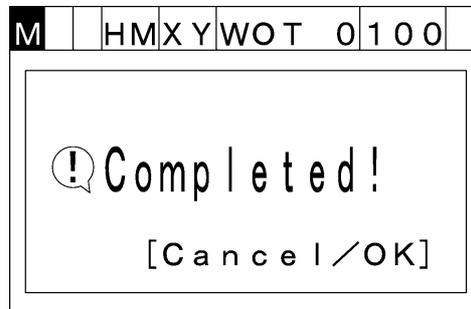
This mark shows the current air balance state.

0: Appropriate

▲: Increase the air pressure

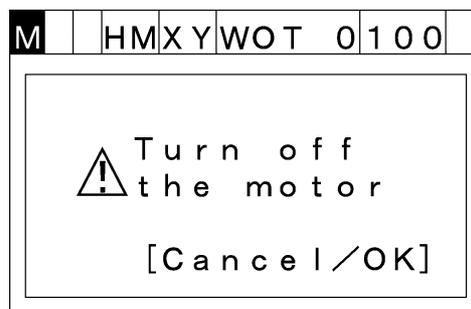
▼: Decrease the air pressure

- (5) Press [OK]. The following screen will appear.

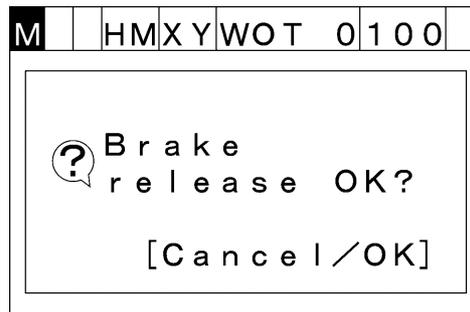


- (6) Press [OK]. The following message appears, prompting you to turn the motor power off.

To abort setting, press [CANCEL].

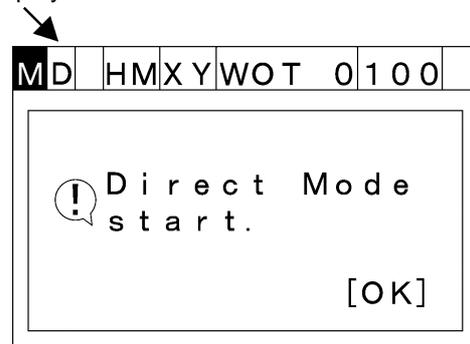


- (7) Turn the motor power off and press [OK]. The Brake release confirmation screen will appear.



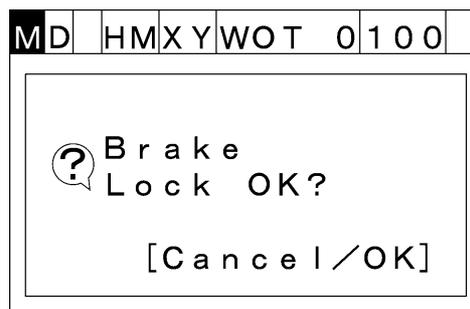
- (8) Press [OK]. The Z-axis brake will be released and the robot will enter the direct teaching mode. In the direct teaching mode, the "D" appears in the status bar.

Displays "D."

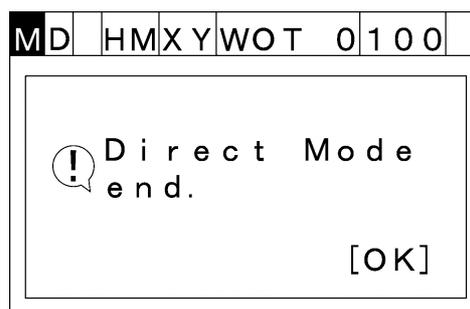


**Escaping from the direct teaching mode**

- (1) Perform steps (1) through (3) in the direct teaching mode entry procedure. In the "Arm Aux." screen, choose "Direct" and then press [OK]. The Brake lock confirmation screen appears as shown below. To abort setting, press [CANCEL].



- (2) Press [OK]. The Z-axis brake will be locked and the robot will escape from the direct teaching mode.



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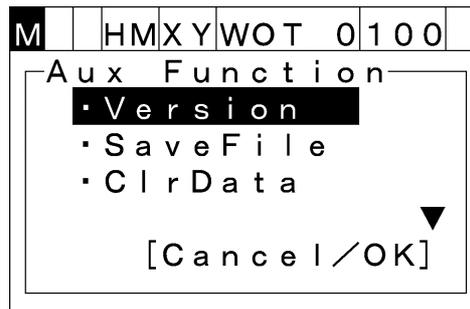
## 6.24 Adjusting the Air Pressure Balance of the Z-Axis (For 4-axis robots)

**Key: [AUX] (Effective in Manual mode)**

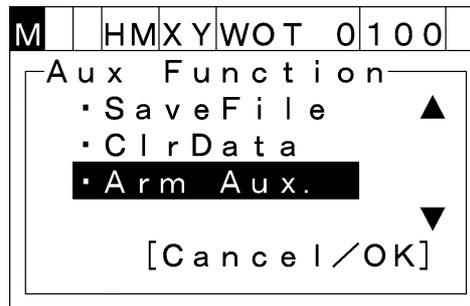
### Operation

To adjust the air pressure balance of the Z-axis, you need to turn the motor power on.

- (1) Press [AUX] to call up the "Aux. Function" menu shown below.

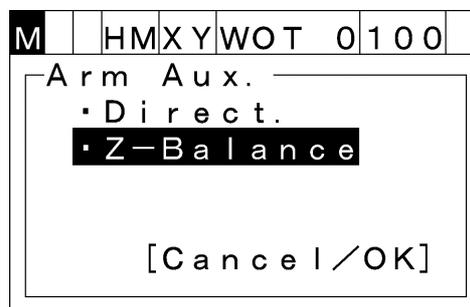


- (2) Vertically scroll the screen with the up and down cursor keys to choose the "Arm Aux."



- (3) Press [OK]. The "Arm Aux." window appears.

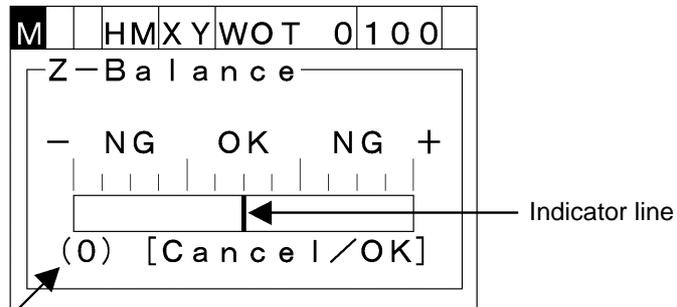
To abort setting and return to the previous screen, press [CANCEL.]



- (4) If you choose "Z-Balance" and press [OK], then the "Z-Balance" window appears as shown below.

To abort air balance setting and return to the previous screen, press [CANCEL].

Adjust the air pressure balance so that the indicator line comes within the OK range of the gauge.



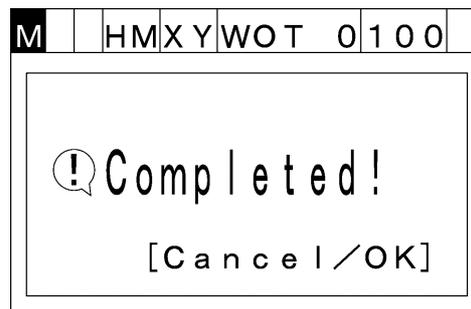
This mark shows the current air balance state.

0: Appropriate

▲: Increase the air pressure

▼: Decrease the air pressure

- (5) Press [OK]. The following screen will appear.



- (6) Press [OK] or [CANCEL] to complete the air balance adjustment procedure.