

JANOME DESKTOP ROBOT

JR3000 Series

JANOME CARTESIAN ROBOT

JC-3 Series

Operation Manual

Quick Start

Thank you for purchasing this Janome Robot.

- Before using your robot, read this manual thoroughly and always make sure you use the robot correctly. In particular, be sure to thoroughly read “For Your Safety” as it contains important safety information.
- After reading this manual, store in a safe place that can be easily accessed at any time by the operator.

Original Instructions

JANOME

PREFACE

This manual covers the JR3200, JR3300, JR3400, JR3500, JR3600, and the JC-3 Series.

There are several manuals pertaining to these robots.

Manual	Details	JR3000	JC-3	JS3
Read This First	<ul style="list-style-type: none"> • For Your Safety Be sure to thoroughly read “For Your Safety” as it contains important safety information. (Refer to the operation manual <i>Special Specifications</i> if you use the special specifications.) • Package Contents (JS3 Series only) Check the items included with your robot. • CD-ROM Contents Explains the CD-ROM contents. 	✓	✓	✓
Setup (JR3000 / JC-3) Installation (JS3)	<p>Explains how to set up the robot. ■ Make sure you read this manual when installing the robot ■ NOTE: This manual is designed for people who have received safety and installation training regarding the robot.</p>	✓	✓	✓
Maintenance	<p>Explains maintenance procedures for the robot. ■ Make sure you read this manual when performing maintenance ■ NOTE: This manual is designed for people who have received safety and maintenance training regarding the robot.</p>	✓	✓	✓
Basic Instructions	Provides part names, data configurations, and the basic knowledge necessary to operate the robot.	✓	(Common) ✓	
Quick Start	Explains the actual operation of the robot by creating and running simple programs.	✓	(Common) ✓	
Teaching Pendant Operation	Explains how to operate the robot via the teaching pendant.	✓	(Common) ✓	
Functions I	Explains point teaching.	✓ (Common)		
Functions II	Explains commands, variables, and functions.	✓ (Common)		
Functions III	Explains functions such as All Program Common Settings and PLC programs.	✓ (Common)		
Functions IV	Explains Customizing Functions.	✓ (Common)		
External Control	Explains I/O and Fieldbus. Refer to this manual if you are using Fieldbus.	✓	✓	✓
Communication Control	Explains COM 1 – 3 and LAN communication control.	✓ (Common)		

Manual	Details	JR3000	JC-3	JS3
Camera & Sensor Functions	Explains the functions of the attachable camera and Z position sensor.	✓ (Common)		
Specifications	Outlines general specifications such as the robot's operating range, mass, etc.	✓	✓	—
Auxiliary Axis Functions	Explains the auxiliary axis functions.	✓ (Common)		
Application Specifications	Explains the specialized functions of the various application specifications.	Standard model: - Application model: ✓		
Special Specifications	Explains installation and maintenance procedures for the robot. ■ Make sure you read this manual when performing installation and maintenance ■ NOTE: This manual is designed for people who have received safety, and installation and maintenance trainings regarding the robot.	—	✓	—

Warning



Do not handle or operate the robot in ways not covered in the manuals listed here. Contact Janome (listed on the back of this manual) for repairs. Failure to do so can cause electric shock or injury.

Caution



To make full use of the machine's functions and capabilities, make sure that you use the robot according to the correct handling/operation procedures that are written in the manuals pertaining to this robot.



If you turn OFF the power after making changes to robot's settings or data without saving, these changes are lost and the robot will revert to its original settings. Make sure that you save any changes to data and/or settings.



Before using this robot for the first time, make sure you back up robot data and save the individual configuration information. Individual configuration information is needed when replacing internal circuit boards.
 For details on how to back up robot data, refer to "3. BACKING UP AND RESTORING ROBOT DATA" in the operation manual *Setup* for the JR3000 Series, "6.1 Backing up and Restoring Robot Data" in the operation manual *Setup* for the JC-3 Series.

- The descriptions within this manual are based on standard specifications. The menu item names etc. may vary depending on the model type.
- Menu items related to the Z axis may appear with 2 axis specifications; however any settings made for these items are not applied.
- For information regarding optional additions for this robot, refer to “24. SPECIFICATIONS” in the operation manual *Specifications* for the JR3000 Series, “14. SPECIFICATIONS” in the operation manual *Specifications* for the JC-3 Series. The notation “optional” is not used in the main text of this manual except for diagrams.
- Machine specifications may be modified without prior notice to improve quality.

Remarks:

- The operation methods described in this manual are indicated as follows:



Operation via the teaching pendant



Operation via the PC (JR C-Points II)

- Click text that appears blue and is underlined to jump to that section.

Example: Refer to [“1. OPERATION FLOW.”](#)

CONTENTS

PREFACE.....	1
FOR YOUR SAFETY.....	6
1. OPERATION FLOW.....	22
2. ROBOT OPERATION (PTP MOVEMENT).....	24
2.1 Initialization.....	26
2.2 Teaching.....	27
2.2.1 Select a Program Number.....	27
2.2.2 Enter the Point Positions.....	28
2.2.3 Work Home Entry.....	32
2.2.4 Point Type.....	34
2.3 Program Test.....	35
2.3.1 Point Run.....	35
2.3.2 Data Check.....	36
2.3.3 Test Run.....	37
2.4 Run.....	38
2.4.1 Changing Modes.....	38
2.4.2 Run Start.....	40
2.4.3 Emergency Stop.....	41
3. ROBOT OPERATION (POINT JOB).....	43
3.1 Preparation.....	44
3.2 Modifying PTP Conditions.....	44
3.3 Teaching: Point Job.....	46
3.3.1 Select the Point Job Data Number.....	47
3.3.2 Output Command.....	48
3.3.3 Wait Condition Command.....	50
3.3.4 Condition Command.....	51
3.4 Modify the Point Data.....	53
3.5 Program Test/Run.....	54
4. ROBOT OPERATION (CP MOVEMENTS).....	55
4.1 Program Number Selection.....	55
4.2 Modify the Work Home.....	55
4.3 Add a Name to the Program.....	56
4.4 Point Data Entry.....	58
4.4.1 Point Position Entry.....	58
4.4.2 Point Type.....	58
4.4.3 Line Speed.....	58

4.5 Program Test/Run	59
5. USEFUL KEY FUNCTIONS	60
6. OPERATION MANUALS TO REFER TO WHEN TEACHING.....	61
7. SAVING DATA	62




FOR YOUR SAFETY

The safety notes outlined below are provided in order to ensure safe and correct usage of the product in addition to preventing injury to the operator, other people and damage to property as well.











• • • • • Be sure to follow the safety guidelines detailed here • • • • •

Symbols are also listed alongside the safety note explanations. Refer to the list below for an explanation of these symbols.

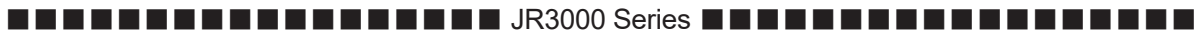
- Symbols that indicate the level of danger and/or damage.
The level of danger or damage that could occur as a result of ignoring these safety guidelines and misusing the robot are classified by the following symbols.

 Danger	This symbol indicates an imminent risk of serious injury or death.
 Warning	This symbol indicates a risk of serious injury or death.
 Caution	This symbol indicates the possibility of serious injury or damage to property.

- The following symbols indicate the nature of the danger and any necessary safety precautions to be taken.

	Indicates caution must be taken
	Take Caution (General Precaution)
	Indicates a forbidden action
	Never do this (General Prohibition)
	Do not disassemble, modify or repair.
	Do not touch (Contact Prohibition)
	Indicates a required action
	Be sure to follow instructions (General Requirement)
	Be sure to unplug the power supply cord
	Make sure the machine is grounded

FOR YOUR SAFETY



If using auxiliary axis functions to operate a motor, such as a servo motor, that produces feedback and/or a motor with high output etc., or when using auxiliary axes in the robot setup etc., we ask that you perform a risk assessment on your side and take any necessary safety measures.

If Using Auxiliary Axis Functions in a Way that Require Safety Measures

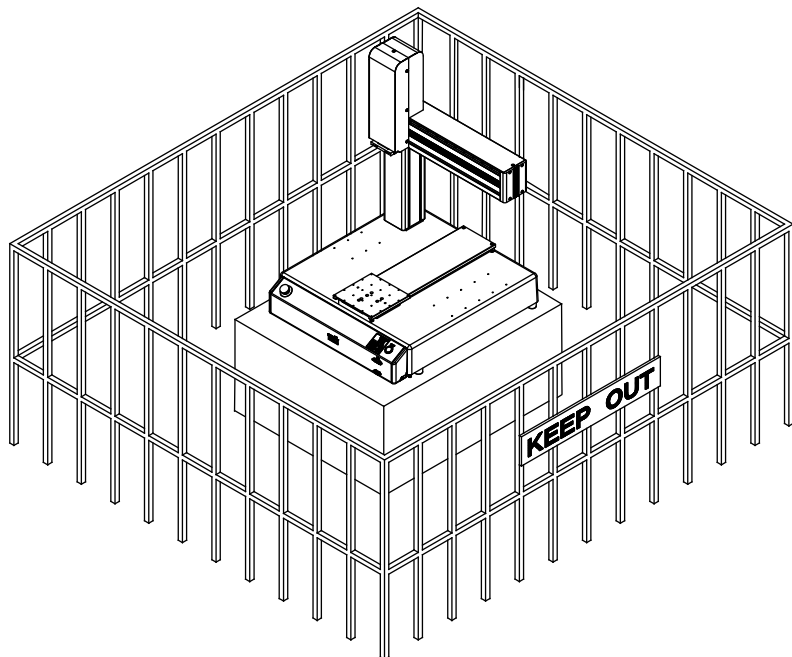
Danger

Always set up safety guards around the robot or the auxiliary axes so the moveable parts cannot be touched.

Anyone within the maximum reach of the robot and the auxiliary axes being controlled by the robot may be injured. Set up an **emergency stop interlock device that cuts OFF the motor power to the auxiliary axes when the entrance to the safety guard is opened** and make sure this entrance is the only way to access the machine.

NOTE: A stop made via a device connected to the I/O-S connector is a category 2 stop. Make sure to perform a separate risk assessment of the interlock device. Furthermore, put up a **“Keep Out”** or **“Do Not Operate”** warning sign in a clearly visible place.

Example:

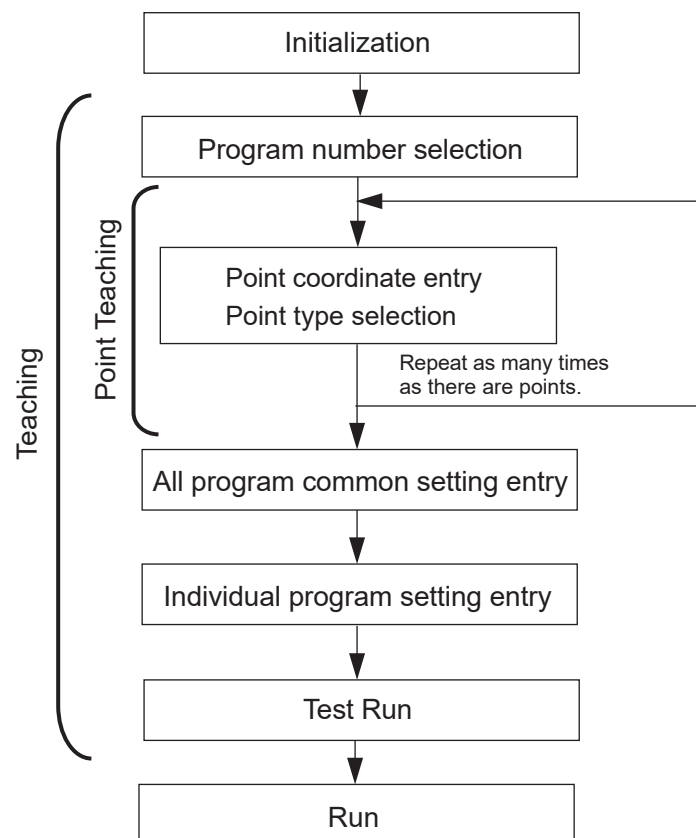


1. OPERATION FLOW

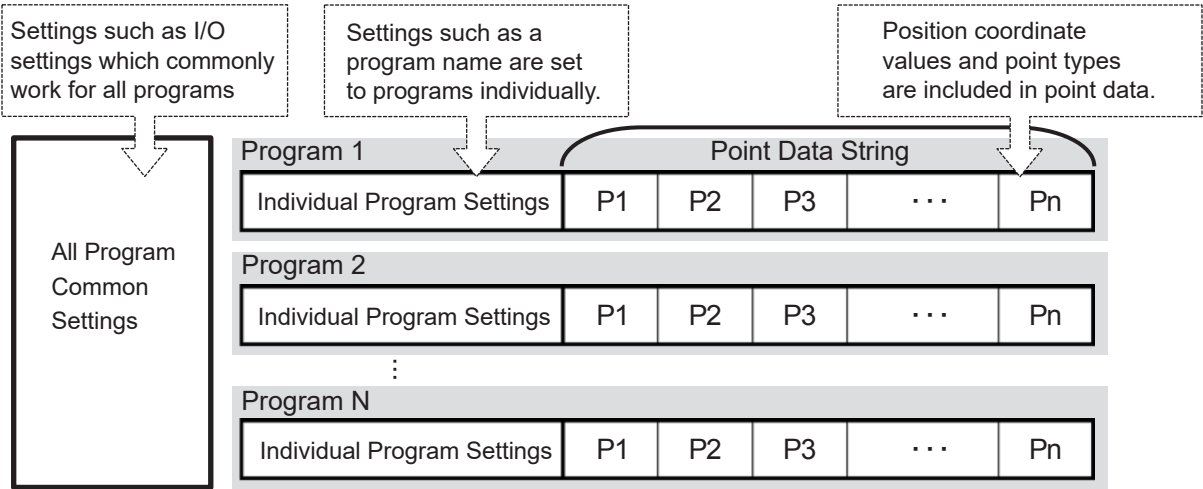
To run a program, the robot goes through various processes. Before anything, a program needs to be created to operate the robot.

The operation flow up until the robot starts running is summarized in the diagram below. The actions of program creation and entering given settings, etc., into the robot are called “teaching”.

The order of entry for point teaching, all program common settings, and individual program settings makes no difference to robot operations.



A program is made up of program individual settings contained in a string of point data. Point data is made up of two elements: various “coordinates” for each individual point and “type”; a method of moving to the next point. Using these as a framework, point job data (command strings used to move the robot) etc., are added to the point data to fill out the program. When a program is run, each robot axis moves to the coordinates for each point in numerical order.



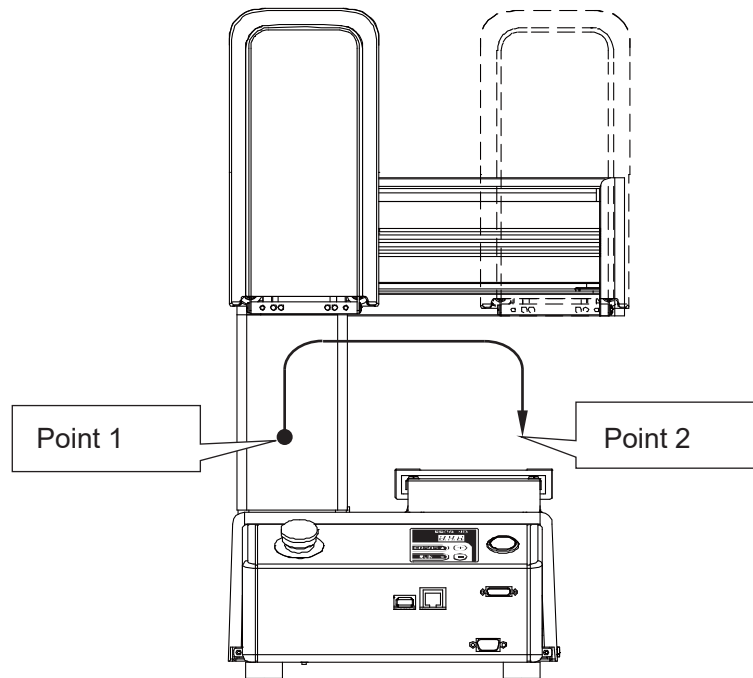
2. ROBOT OPERATION (PTP MOVEMENT)

Here we will first register a simple program and actually move the robot.

Register and run the robot between the following two points:

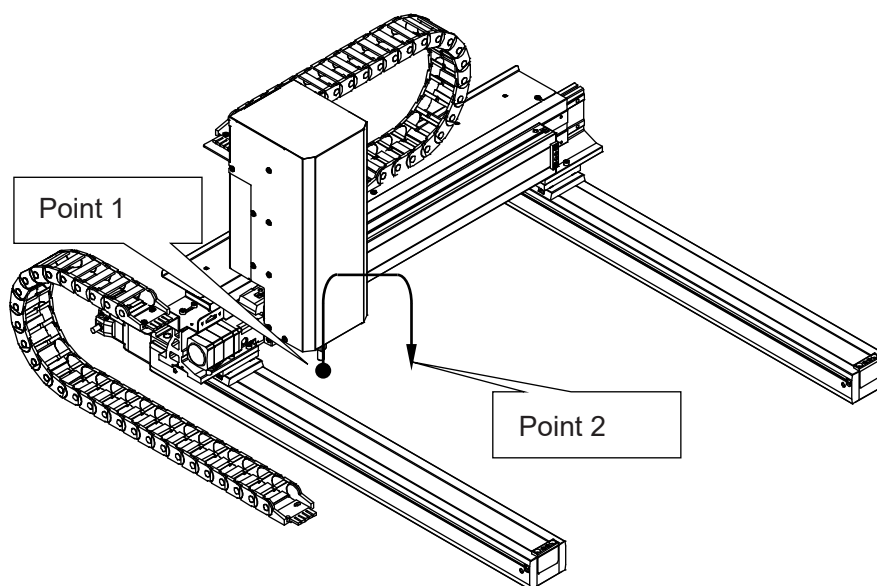
Point Number	Coordinates	Point Type
1	X:20 mm, Y:80 mm, Z:30 mm, R:0 deg	PTP Point
2	X:70 mm, Y:120 mm, Z:30 mm, R:0 deg	PTP Point

■ JR3000 Series



Example: JR3203N-AC

■ JC-3 Series



Example: JC-3B01-0H4

There is a point type for every point, and the method of moving to the next point varies depending on this point type. A PTP (Point to Point) point is a point type by which the robot makes a PTP movement to the next point. PTP movement means the robot ascends vertically from the current point, moves along the X and Y axes, and then vertically descends to the next point.

Also, modify the work home as per the details below.

The work home is the point where after finishing a run the robot waits until the start of the next run. With the factory settings, the work home position is registered to the origin position. However, this can be modified.

Point Number	Coordinates	Point Type
Work Home	X:100 mm, Y:30 mm, Z:30 mm, R:0 deg	PTP Point

2.1 Initialization

1. Thoroughly read the operation manual *Setup* regarding how to install the robot and controller properly and securely.

In this example, there is a teaching pendant is connected to the robot (JR3000 Series) or to the controller (JC-3 Series).

Warning



Always **make sure the machine is grounded through the power cord. Do not use the machine when it is not grounded.** Make sure the protective grounding resistance is 100 Ω or less.

Improper grounding causes electric shocks, fires, malfunction, and unit breakdown.

2. Turn ON the power switch (on the rear of the robot with JR3000 Series, and on the front of the controller with the JC-3 Series).
3. If [Teaching Mode]^{*1} is displayed on the top line of the teaching pendant LCD, refer to step 4. If any other message is displayed, press the **MODE** key.
Also, if the robot has a mode switch, set the mode switch key to TEACH.
Highlight [Teaching Mode] and press the **ENTR** key. Press the **CURSOR ▾** and **CURSOR ▴** keys to move the highlight bar.
4. Press the **F4** key on the teaching pendant.^{*2}
If you have a teaching pendant with an enable switch (optional), press **F4** while holding down the enable switch.
5. Each axis begins moving, and mechanical initialization is performed. ^{*2}
Mechanical initialization allows the robot to recognize the current coordinates of the robot, and is always required after turning the power ON or after releasing the emergency stop.

*1: Teaching Mode is a mode used to create programs and make various settings.

*2: This step is not required for JC-3 absolute encoder models. Continue to ["2.2 Teaching."](#)

2.2 Teaching

2.2.1 Select a Program Number

The following is an example of selecting program number 3 (unregistered).

1. Select a program number for teaching.
If there are no registered programs, the program number entry screen shown to the right appears when Teaching Mode is started up. If the program number entry screen does not appear even after the Teaching Mode starts, press the **PRG.NO** key.

Enter a number.				
Program Number				
DEL	COPY	NEW	LIST	GLIST
F0	F1	F2	F3	F4

Program Number Entry Screen

2. When the program number entry screen is displayed, press the **F2** (NEW) key. The unregistered program number list shown to the right appears.

Press the **CURSOR** key twice to highlight [003] and then press the **ENTR** key.

The highlight bar moves down one line every time the **CURSOR** key is pressed.

Select Item	1/84
001	
002	
003	
004	
005	
006	
007	
008	
009	
010	
011	
012	

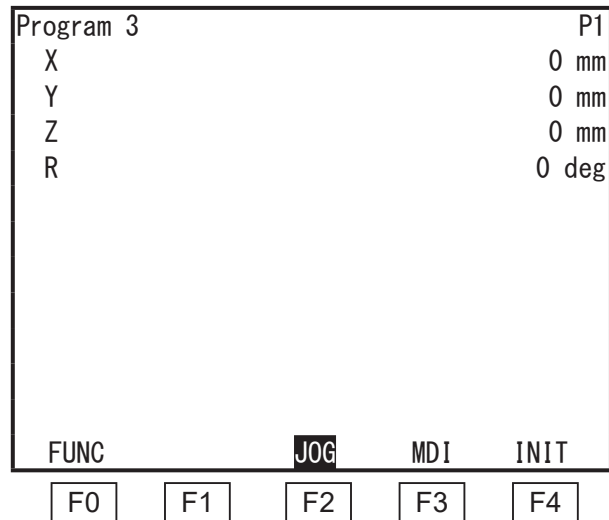
Unregistered Program Number List

NOTE:

- In these operation manuals, highlighting an item and pressing the **ENTR** is referred to as “to select”.
- With the Program Number entry screen displayed, press the **F3** (LIST) key to display the registered program number list.
- You can also numerically enter a program number for teaching directly on the Program Number entry screen.

3. After selecting the program number, the new position entry screen for point number 1, shown to the right, appears.

NOTE: INIT appears as W.HOME for JC-3 absolute encoder models.



New Position Entry Screen

2.2.2 Enter the Point Positions

There two methods for entering positions: JOG Mode and MDI Mode.

To change the position entry mode, press the following keys on the position entry screen:

- JOG Mode: F2 key
- MDI Mode: F3 key

Enter the point coordinates. With this example, the coordinates are entered using JOG Mode.

The currently selected position entry mode, [JOG] or [MDI], is highlighted at the bottom line of the LCD.

If [MDI] is highlighted, press the F2 (JOG) key to switch to the JOG mode.

NOTE:

- Continuously hold down a jog key to move the corresponding axis at low speed. As you continue to hold down the jog key, the axis will gradually increase speed and move at middle speed. When pressing a JOG key to move the axis at a low/middle speed, also hold the SHIFT key to gradually increase to high speed.
- When moving the axes by pressing the SHIFT + JOG key, release the SHIFT key to gradually reduce the axis to medium speed.
- However, when using a teaching pendant equipped with an enable switch, pressing the SHIFT key does not change the axis speed. If using a teaching pendant with an enable switch, press the F1 (SPEED) key to switch from low → middle → high speed. You can change the moving distance (referred to as a step) and the moving speed for each of the axes with the teaching parameter [JOG Function] (UTILITY key).

First, enter the coordinates for point 1.

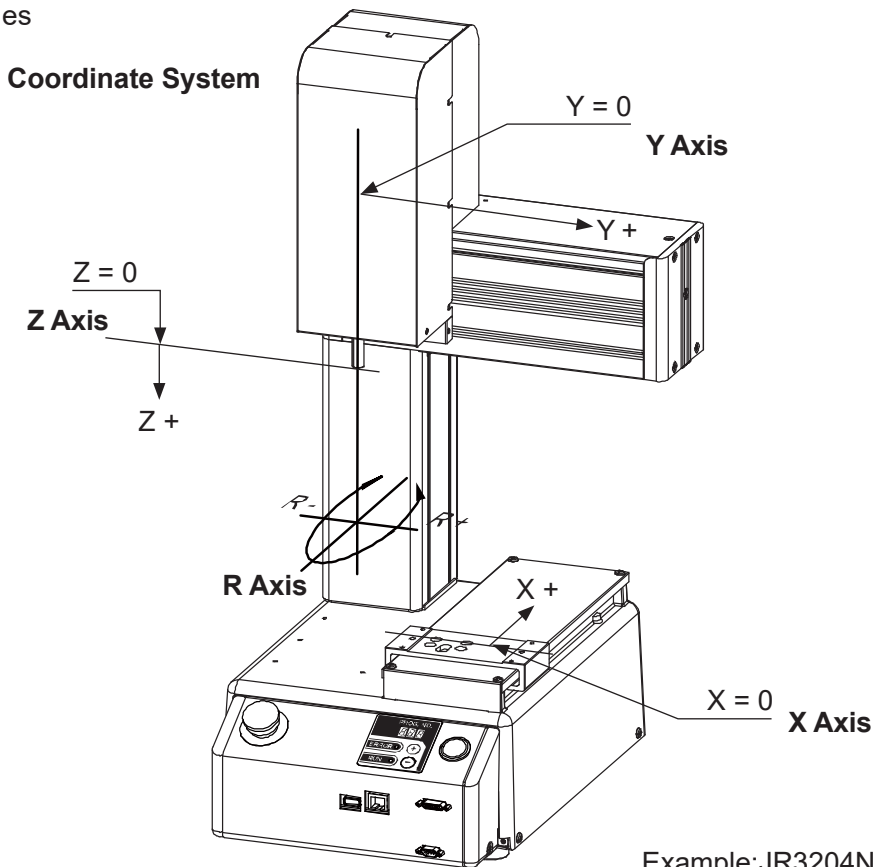
Move each axis using the JOG keys to the desired position (coordinates).

The current tool center point* position (coordinates) is displayed on the LCD.

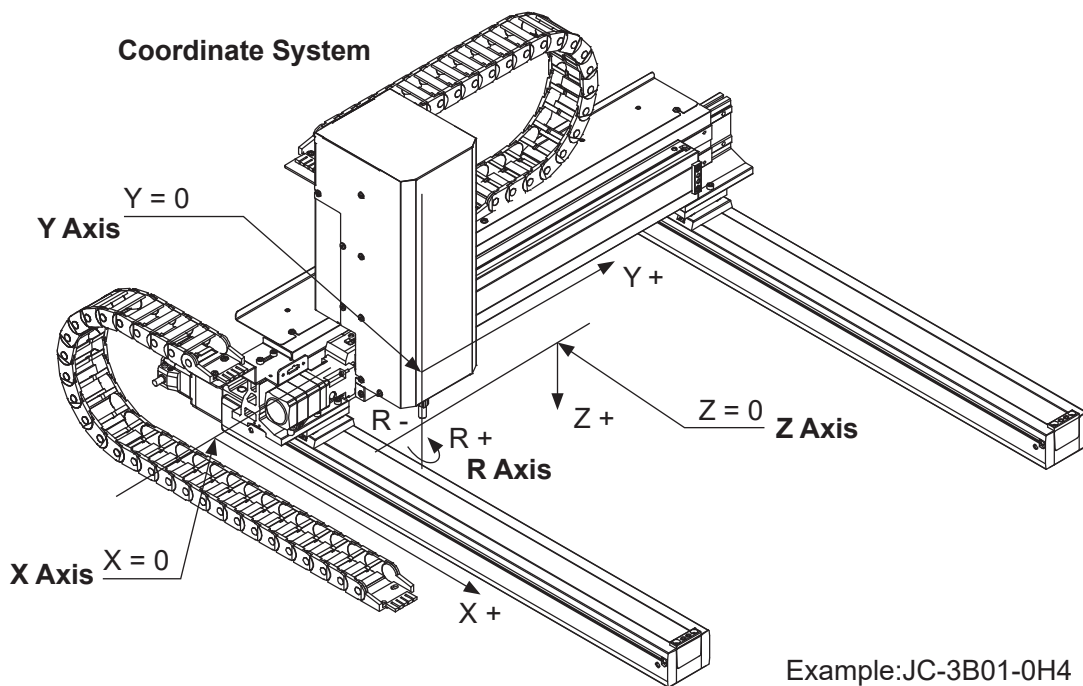
Once the robot moves to the target position, press the ENTR key to set the coordinates.

* The offset value from the tool tip is referred to as the tool center point (TCP).

■ JR3000 Series














■ JC-3 Series








Point Number	Coordinates	Point Type
1	X:20 mm, Y:80 mm, Z:30 mm, R:0 deg	PTP Point

■ Key Specifications during JOG entry

	Moves the X axis in the + direction (JR3000 Series). Moves the X axis in the - direction (JC-3 Series).
	Moves the X axis in the -direction (JR3000 Series). Moves the X axis in the + direction (JC-3 Series).
	Moves the Y axis in the + direction.
	Moves the Y axis in the - direction.
	Moves the Z axis in the - direction.
	Moves the Z axis in the + direction.
	Rotates the R axis in the +R direction. (4-axis specs only)
	Rotates the R axis in the -R direction. (4-axis specs only)

The distance the axes move each time the  -  keys (JOG keys) above are pressed (If using a teaching pendant with an enable switch, also press the enable switch continuously when using the above keys), and the speed the axes move when the keys are continuously pressed, can be set from JOG Function in the teaching environment settings (select from the  key).

	Sets the coordinates. If the position entry is new, the point type selection screen is displayed. If editing an existing point, the screen returns to the point settings screen (the base screen).
	Return to the setting value screen (base screen) only when editing points and programs.
 +JOG Key	Position entry JOG Mode. The axis corresponding to the pressed JOG key will move at high speed.
	If using a teaching pedant with an enable switch, this switches between LOW, MIDDLE, HIGH JOG movement speeds.
	Performs mechanical initialization. With absolute encoder models, the robot returns to the work home. The robot returns to the work home even when the axes are located out of the move area limit.

NOTE: In MDI Mode, if you press one of the JOG keys, the robot switches over to JOG Mode.

Caution



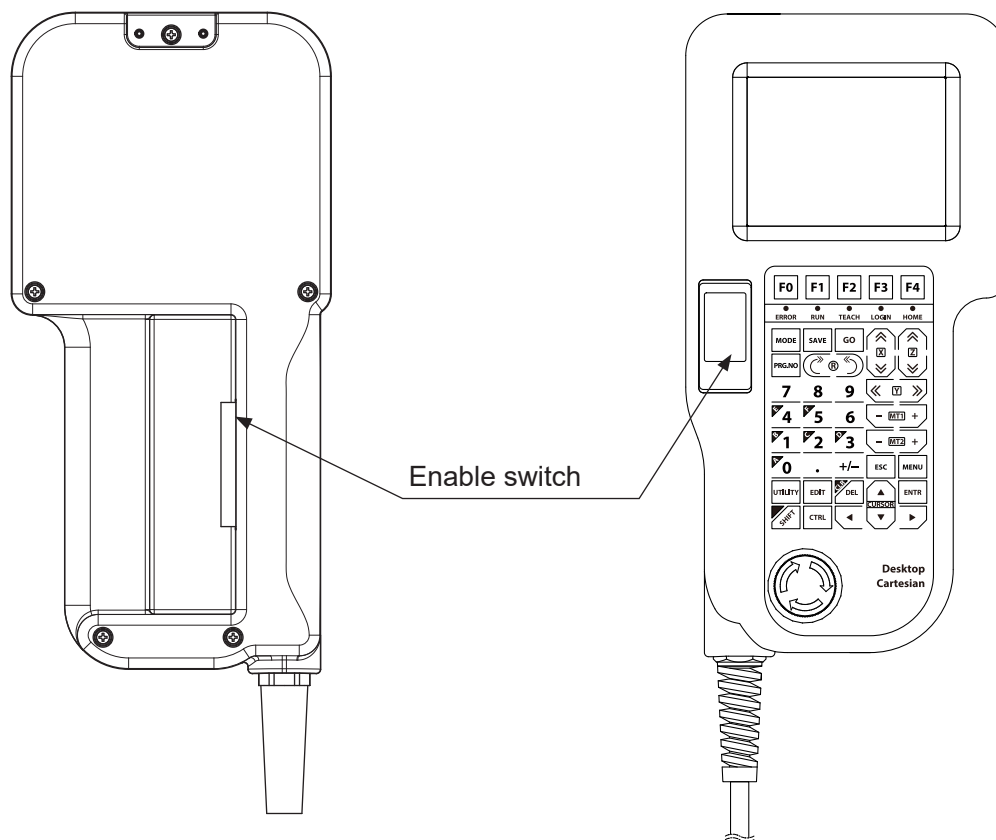
When in Teaching Mode, do not touch the moveable parts of the robot, as the robot can move if the operator uses the JOG keys, the GO keys, or a test run. Coming in contact with moveable parts while the robot is operating can cause injury or unit breakdown.

The range of each axes' movement in JOG mode is limited by the move area limit. If the axes exceed certain coordinates and are not able to operate, check [Move Area Limit] in All Program Common Settings or Individual Program Settings.

If you want to move the axes using one of the corresponding keys on the teaching pendant when using a teaching pendant with an enable switch (optional), do so by pressing the key which moves the axis you want while pressing the enable switch. The enable switch has three states: pressed, pressed-in, and released. To move the axes using the JOG keys, do so while pressing the enable switch. Additionally, you need to keep pressing the enable switch while moving the axes.

If you release or press in the enable switch, the robot stops as a safety measure.

The motor is stopped with power left available to the actuators (category 2 stop).



Teaching Pendant II (New Model)

Teaching Pendant (Conventional Model)


2.2.3 Work Home Entry

A work home can be registered in both individual program settings and program common settings. By specifying the work home as “common/individual”, you can switch between the two and select which one to apply.



Enter the following work home position coordinates:



Point Number	Coordinates
Common Work Home	X:100 mm, Y:30 mm, Z:30 mm, R:0 deg

Register the common work home position. The common work home position is the point where the axes wait after completing a run before the next run starts.

Press the **CURSOR**  key twice on the point value settings screen to the right. The value setting screen for the common work home position appears.

Program 3			P2
X+70	Y+120	Z+30	R+0
Type	PTP Point		
S. MARK		E. MARK	J. EXEC P. EXEC

On the point value settings screen (base screen), pressing the **CURSOR**  key displays the point value settings screen for the previous point and pressing the **CURSOR**  key displays the settings screen for the next point.

Also, pressing the **SHIFT** + **CURSOR**  keys the displays the point 1 screen, and pressing the **SHIFT** + **CURSOR**  keys displays the new point entry screen.

The common work home is the point directly before Point 1.

Select the coordinates from the common work home value settings screen (shown to the right).

Program 3		Common Work Home	
X+0	Y+0	Z+0	R+0
Type	PTP Point		
S. MARK		E. MARK	J. EXEC P. EXEC

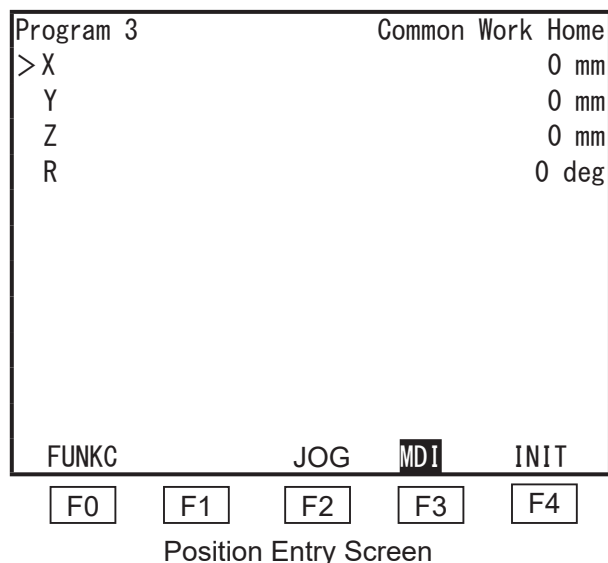
Common Work Home Point Value Settings Screen

The position entry screen shown to the right appears.

In this example, enter the coordinates using MDI Mode.

The highlighted [JOG] or [MDI] in the last line on the screen is the position entry mode currently selected.

If [JOG] is highlighted, press the **F3** (MDI) key.



The [>] symbol to the left of the axes appears next to the item which the cursor is on. Numerically enter the coordinates using the keys on the next page. After entering all the X, Y, Z and R coordinates, press the **ENTR** key to set them.

■ Key Specifications During MDI Input

1 – 0	Overwrites the figure under the cursor with the number pressed. If the cursor is hidden, the numbers move one digit to the left and the number pressed is entered as the last digit.
+/-	Enters symbols.
.	Enters a decimal point; invalid if the figure already contains a decimal point or if no decimal fraction is possible.
SHIFT + DEL/CLR	Clear. The value for the axis the cursor is on becomes 0.
DEL/CLR	Deletes the figure or decimal point under the cursor. The cursor and the figures to the left of the cursor then move one digit to the right. However, the decimal point cannot be deleted if the figure exceeds the entry range without the decimal point. If the cursor is hidden, the lowest figure of the decimal fraction is deleted and the figures move one digit to the right.
F3	Each time this key is pressed, the cursor line (marked with >) switches in the order of X → Y → Z → R → X.
F4	Performs mechanical initialization.
CURSOR △	Moves the cursor one line upward.
CURSOR ▽	Moves the cursor one line downward.
CURSOR ◀	Moves the cursor one space to the left. When on the screen for new point entry, this moves to the base screen of the previous point.
CURSOR ▶	Moves the cursor one space to the right.
GO	Moves each axis to the coordinates displayed on the LCD.

ENTR	Sets the coordinates and returns the screen to the point settings screen.
ESC	Returns to the previous screen or to the base screen only when editing.

NOTE: The **GO** key movements for each axis displayed on the point value settings screen are also valid.

Caution



When in Teaching Mode, do not touch the moveable parts of the robot, as the robot can move if the operator uses the JOG keys, the GO keys, or a test run. Coming in contact with moveable parts while the robot is operating can cause injury or unit breakdown.



After you modify settings or data, if you turn OFF the power without saving, the modified data is lost and the robot data reverts to its previous state. If you have modified settings or data, do not forget to save. Refer to [“7. SAVING DATA”](#) for how to save data.

2.2.4 Point Type

After entering the coordinates, press the **ENTR** key (this sets the coordinates) and the point type selection screen shown to the right appears.

Select the point type [PTP Point].

NOTE: Depending on the robot's specifications, the point types and the point type selection screen (to the right) may be different.

Select Point Type
PTP Point
CP Start Point
CP Passing Point
CP Stop Point
CP Arc Point
CP End Point
PTP Evasion Point
Circle Start Point
Circle Center Point

After fixing the point type, the position entry screen for the next point (current point number + 1) will appear. In the same way you registered point 1, register point 2 with to the following settings:

Point Number	Coordinates	Point Type
2	X:70 mm, Y:120 mm, Z:30 mm, R:0 deg	PTP Point

2.3.2 Data Check

Press the **UTILITY** key. The utility menu appears. Select [Test Menu]. The test menu shown to the right is displayed.

Select [Checking Data].

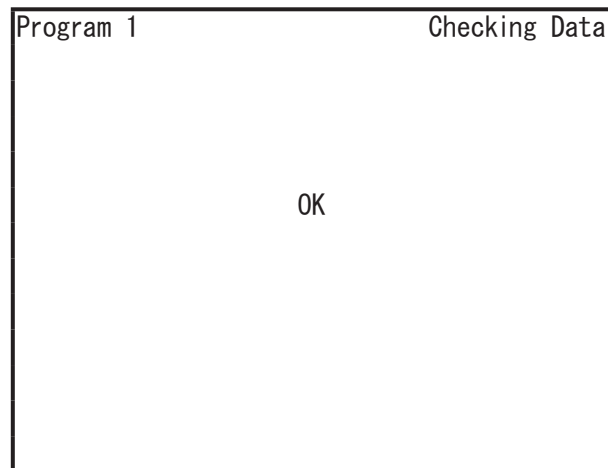
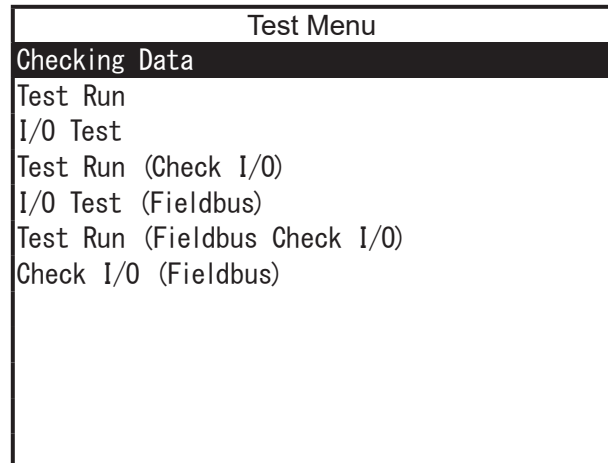
The movement range and point types for the program are checked.

If no error is detected, the screen shown on the right appears.

If any error has been detected, the error type and error point number are displayed. Correct the point with the error.

The error check function detects all the detectable errors which are generated within a program.

If multiple errors are detected, press the **ENTR** key to display the next error message. Once all of the errors have been displayed, the robot returns to the test menu. Also, if you press the **ESC** key in the middle of viewing errors, you are returned to the test menu screen.



2.3.3 Test Run

Select [Test Run] from the Test Menu.

For your safety, the maximum speed is limited to 250 mm/s in the [Test Run]; otherwise, the robot will perform a cycle of operation in exactly the same way as with an actual operation (registered point jobs and additional functions are also executed).

After registering new programs or modifying registered programs, be sure to perform [Checking Data] and [Test Run] before starting operation.

If using a teaching pendant with an enable switch, press the keys on the teaching pendant while pressing the enable switch at the same time.

Caution



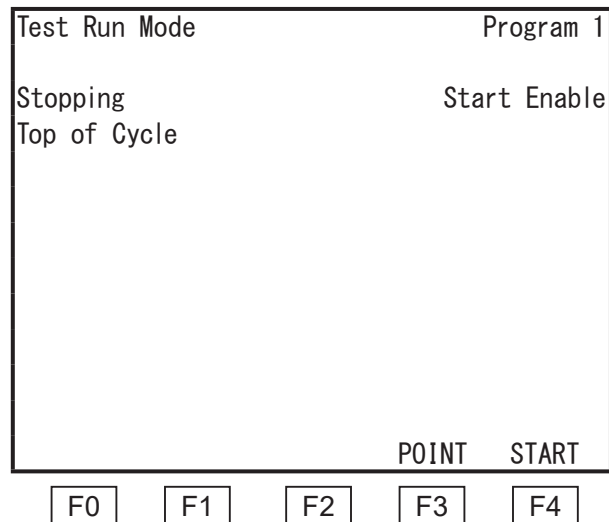
Do not touch any moving parts while the robot is running.
Coming in contact with moving parts can cause injury and unit breakdown.

TP  **UTILITY** [Test Menu]
[Test Run]

Select [Test Run] from the test menu. The test run standby screen appears (as shown to the right).

Press the **F4** (START) key. The test run is started.

Confirm whether or not the robot moves as directed by the information entered for the program.



Test Run Standby Screen

Press the **F3** (POINT) key to perform the point run.

For information regarding point runs, refer to “12.4 Point Run” in the operation manual *Basic Instructions*. You can use the **PRG.NO** and **MENU** keys in the same way as you do for Switch Run Mode or External Run Mode.

Press the **PRG.NO** key to select the program you want to test.

Press the **MENU** key to set up the Run Mode menu.

With the Run Mode menu you can set a PTP speed override. For information regarding PTP speed overrides, refer to “10.5 PTP Speed Override” or “11.5 PTP Speed Override” in the operation manual *Basic Instructions*.

2.4 Run

Actually run the registered program.

2.4.1 Changing Modes

Press the key at any mode base screen to display the mode selection menu.

Select [Switch Run Mode] to enter Switch Run Mode.

- External Run Mode
A mode to run programs (run starts from I/O-SYS, COM1, Fieldbus, or Ethernet)
- Switch Run Mode
A mode to run programs (run starts using the start/stop switch)
- Teaching Mode
A mode to create programs etc.
- Customizing Mode
A mode to create the data which become parts of programs
- Administration Mode
A mode for administration settings and maintenance

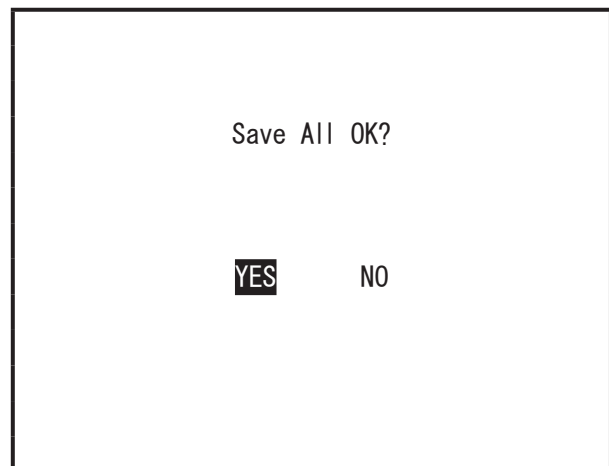
If you are using a switchbox with a mode switch, you can change the mode by turning the key.

- External Run Mode (EXT.RUN)
- Switch Run Mode (RUN)
- Teaching Mode (TEACH)

Also, when in Teaching Mode, you can select the following modes by pressing the key.

- Customizing Mode
- Administration Mode

In Teaching Mode, when you add a new program or modify a program and do not press the key to save the data, the screen to the right appears. Select either "Yes" or "No".



When the teaching pendant is connected, the LED on the teaching pendant lights up according to the current mode.

LED Names	Color	Lamp Condition
ERROR	Red	Lit when an error has occurred.
RUN	Green or Red*	Lit during External Run Mode or Switch Run Mode.
TEACH	Green	Lit during Teaching Mode.
LOGIN	Green	Lit when in Customizing Mode and/or logged in.
HOME	Green	Lit when the return to home operation or mechanical initialization is complete.

* Teaching pendant II : Green LED lights up.

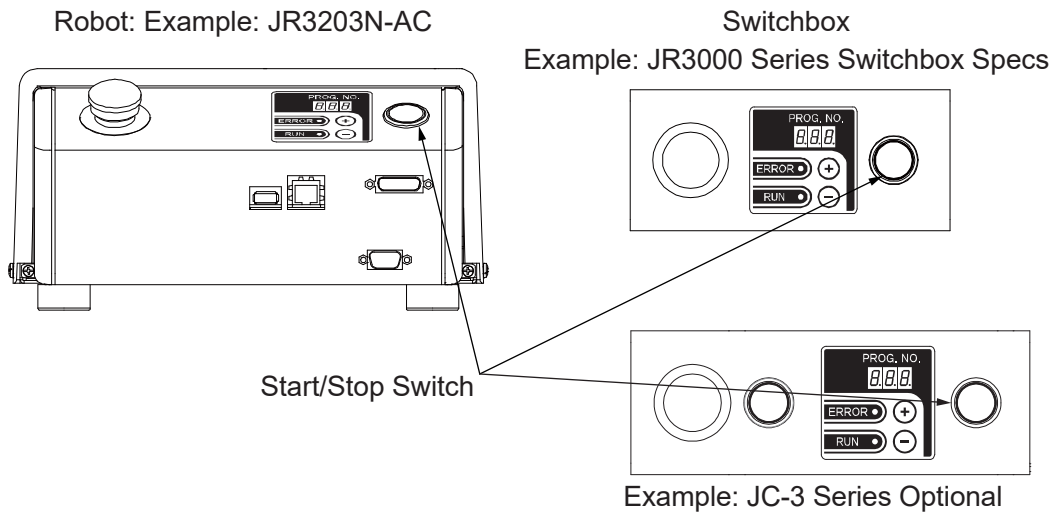
Teaching pendant (conventional model) : Red LED lights up.

If you hold down the **SHIFT** key while pressing the **MODE** key, the modes change in the following order: Switch Run Mode → External Run Mode → Teaching Mode → Switch Run Mode.

NOTE: The robot will not change modes using these keys if the switchbox is equipped with a mode switch.

2.4.2 Run Start

Press the start switch on the robot (JR3000 Series) or switchbox. The robot starts to run the selected program.



Always perform a test run before running a program for the first time.

NOTE: If you press the start/stop switch when a program is running, the robot temporarily stops just before it would make its next PTP movement. Press the switch again and the run restarts. However, if **MENU** → [All Program Common Settings] → [Other Parameters] → [Stop by Start/Stop Switch] in Teaching Mode is set to invalid, the robot does not make a temporary stop.

Caution

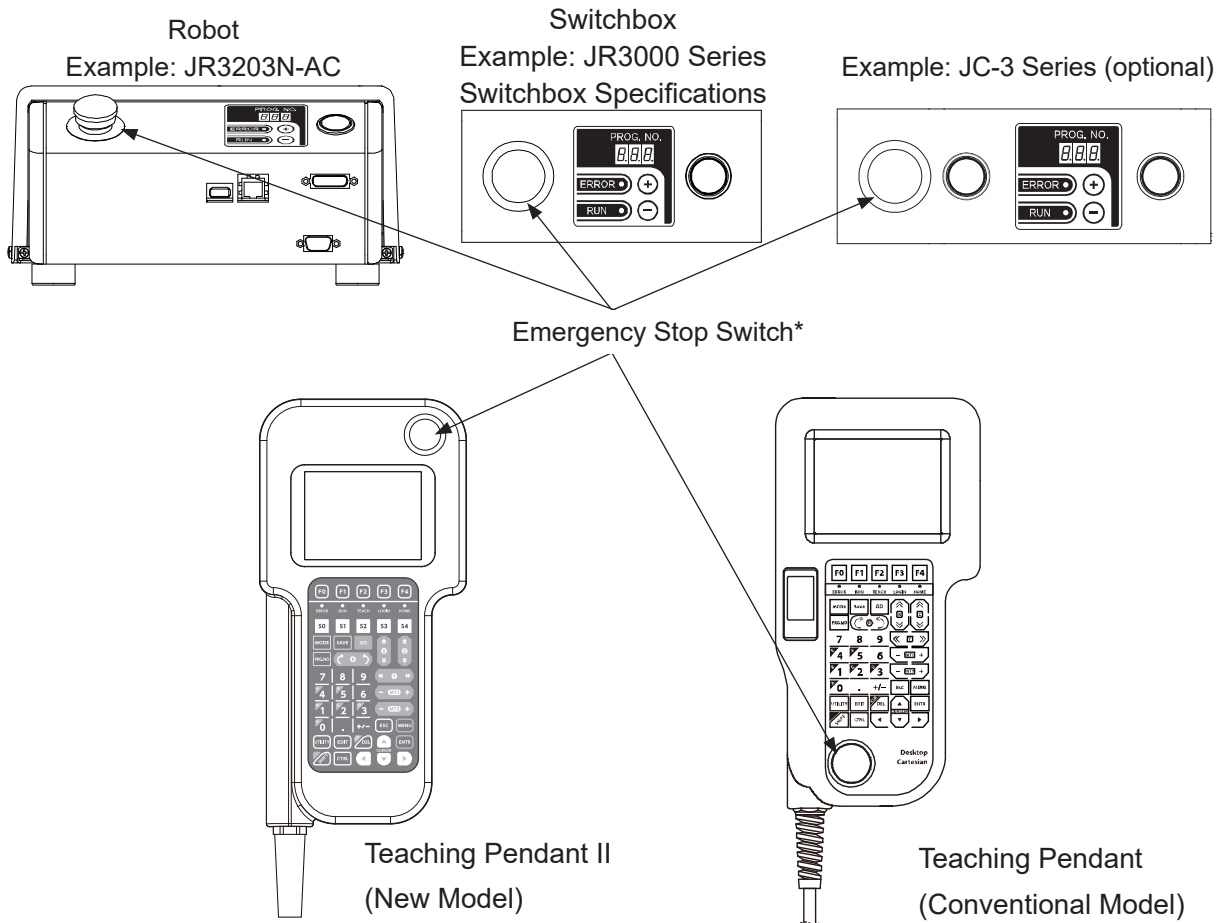


Do not touch any moving parts while the robot is running.
Coming in contact with moving parts can cause injury and unit breakdown.

2.4.3 Emergency Stop

If you want to stop the robot in the middle of running a program due to unexpected circumstances, press the emergency stop switch. The motor power supply (power to drive the motor) is cut OFF and the robot stops running.

- Press the emergency stop switch on the main unit or the emergency stop switch on the switchbox.
- Press the emergency stop switch on the teaching pendant.



* The emergency stop switch on the teaching pendant is optional for the JR3000 Series.

■ Releasing the stop switch

Confirm it is safe to release the emergency stop switch, then turn the pressed down switch in a clockwise direction to release. Next, press the start/stop switch (this varies depending on the mode). After mechanical initialization, the robot will be waiting for a run start (standby).

NOTE:

- If the emergency stop switch is pressed during movement, the robot may stop at a time and position later than when the emergency stop switch was actually pressed due to inertia. Take caution as the robot may exceed its range of movement when stopping.

- With the JC-3 Series, an emergency stop is also activated when the DC 48 V power supply is cut OFF. If this happens, turn the DC 48 V power supply ON and execute mechanical initialization. Note however that if the robot is in Run Mode and the axes are out of the move area limit, a move area limit error occurs.
- With the JC-3 absolute encoder model, the drive unit initializes after the emergency stop is deactivated.

3. ROBOT OPERATION (POINT JOB)

As an example, the explanation here uses a robot doing a pick and place operation with a hand tool connected to it.

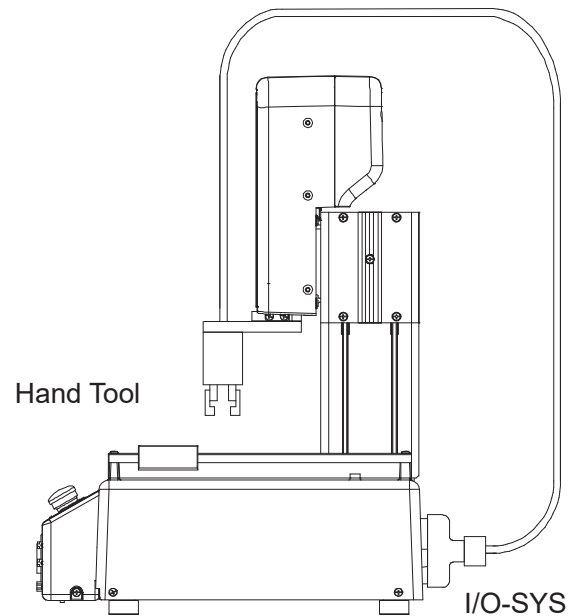
Here the program registered (taught) in the previous chapter, [“2. ROBOT OPERATION \(PTP MOVEMENT\)”](#), is used with the moving speed reduced, and has the robot grasping an object (pick) at point 1 and releasing it (place) at point 2.

To reduce the moving speed, modify [PTP Condition]. PTP Condition sets the moving conditions for PTP movements (speed etc.).

Next, teach Point Job Data to perform an operation at a point. Point Job Data is data that is not directly entered to points, but is taught individually regardless of the program or point. Set a Point Job Data number to a point and then call it up to do that point job at the registered point.

By doing this you can call up and use the same Point Job Data from multiple points and programs.

In this example, a hand tool with the specifications shown below is attached to the robot.



Example: JR3203E-AC

I/O-SYS	
Output	
#sysOut15	#sysOut16
ON Pulse	–
Output	
#sysOut15	#sysOut16
–	ON Pulse

→ Pick... Pick complete →

→ Place... Place Complete →

I/O-SYS	
Input	
#sysIn15	#sysIn16
ON	OFF
Input	
#sysIn15	#sysIn16
OFF	ON

3.1 Preparation

Refer to [“2.1 Initialization”](#) and start the robot in Teaching Mode.

If the program displayed on the screen is different from the one that you created in the previous chapter ([“2. ROBOT OPERATION \(PTP MOVEMENT\)”](#)), press the key and enter the number of the program you created in [“2. ROBOT OPERATION \(PTP MOVEMENT\).”](#)

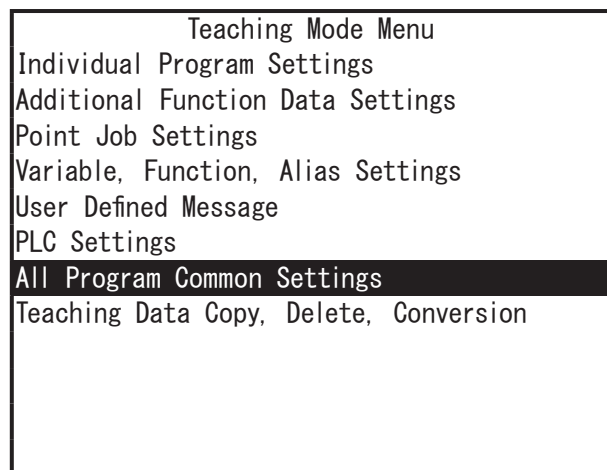
3.2 Modifying PTP Conditions

You can select the settable item PTP Conditions through All Program Common Settings. In this example, set the [PTP Condition]: [PTP Speed] to 20 %. The speed of each axis for movement from point to point is now 20 % of the maximum speed.

Modify the PTP condition, PTP speed.

Press the key. The Teaching Mode menu shown to the right appears.

Select [All Program Common Settings].



NOTE: Depending on the robot specifications, the Teaching Mode menu items may be different or may not appear as shown in the diagram above.

The all program common settings menu shown to the right appears.
Select [PTP Condition].

All Program Common Settings	
I/O Settings	
Job and PLC on Run Mode	
Point Reset Settings	
Other Parameters	
Work Adjustment (XY) on CP	
Work Home	
PTP Condition	
CP Condition	
Move Area Limit	
Workpiece Mass	
Restart Method After Pos. Offset	

Not available for the JC-3 series.

This is fixed at 7 kg for the JR3200

JR3000E only

The PTP condition value settings screen shown to the right appears.
Select [PTP Speed].

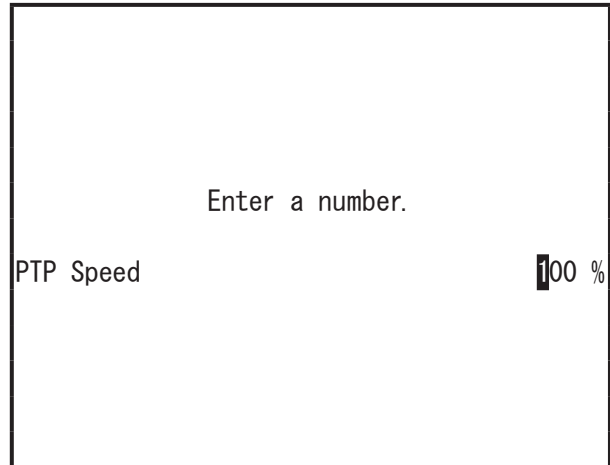
Common Settings	PTP Condition
PTP Speed	100 %
R-Axis Rotate Speed	100 %
R-Axis Acceleration	100 %
	Relative Mode
Z Move Height	100 mm
Z Up Distance	100 mm
Z Down Distance	100 mm

NOTE: Depending on your settings, some menu items on the PTP condition value settings screen are changed as follows:

- [Relative Mode] → [Absolute Mode]
- [Z Move Height] → [Horizontal Move Pos'n]
- [Z Up Distance] → [Start Horizontal]
- [Z Down Distance] → [Start Down Pos'n]

In this case, changing [Absolute Mode] to [Relative Mode] also changes the other three items. You can also switch modes with the key.

In case of contingencies, we recommend starting with the PTP speed setting at 20 % and after seeing how it runs, gradually increase the **DEL/CLR** key to erase the values. Next, enter **2 0** and press **ENTR** 20 % is now entered and the screen returns to the PTP condition value settings screen.



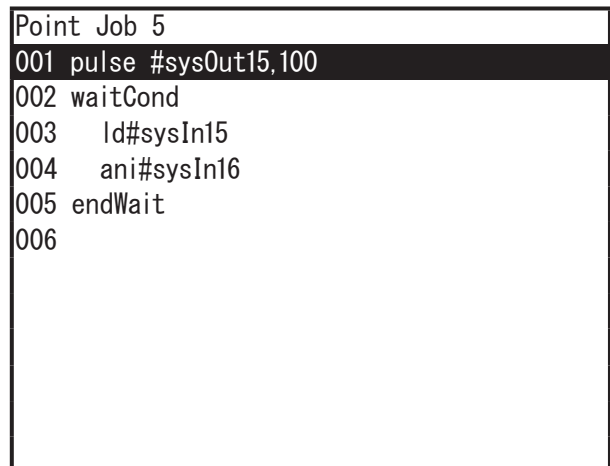
NOTE: In case of contingencies, we recommend starting with the PTP speed setting at 20 % and after seeing how it runs, gradually increase the speed.

3.3 Teaching: Point Job

Register the following point jobs to unregistered point job data (numbers 5 and 6). Executing these commands opens and closes (pick and place) the hand tool connected to the robot. Refer to the I/O-SYS explanations in ["2.2 Teaching,"](#) and ["3. ROBOT OPERATION \(POINT JOB\)."](#)

Point Job Number 5 (Pick: After an ON pulse is output to sysOut15, wait for the inputs of sysIn15 and sysIn16 and finish the operation.)

```
Output ON pulse to sysOut15. (0.1 sec)
Wait (until the following conditions are met.)
  sysIn15 ON input.
  sysIn16 OFF input.
End
```



Point Job Number 6 (Place: After an ON pulse is output to sysOut16, wait for the inputs of sysIn16 and sysIn15 and finish the operation.)

Output ON pulse to sysOut16. (0.1sec)
Wait (until the following condition is met.)
 sysIn16 ON input.
 sysIn15 OFF input.
End

```
Point Job 6
001 pulse #sysOut16,100
002 waitCond
003   Id#sysIn16
004   ani#sysIn15
005 endWait
006
```

3.3.1 Select the Point Job Data Number

Press the **SHIFT** + **ESC** keys to display the base screen (point value settings screen).

Press the **MENU** key to display the Teaching Mode Menu and then select [Point Job Settings].
The point job number entry screen is displayed.

Press the **F2** (NEW) key. A list of unregistered point job numbers appears.

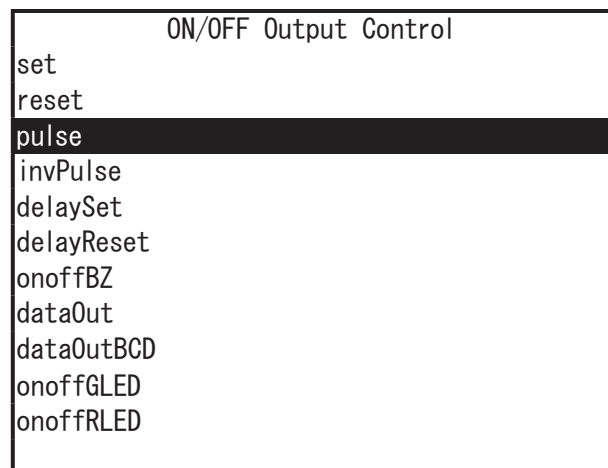
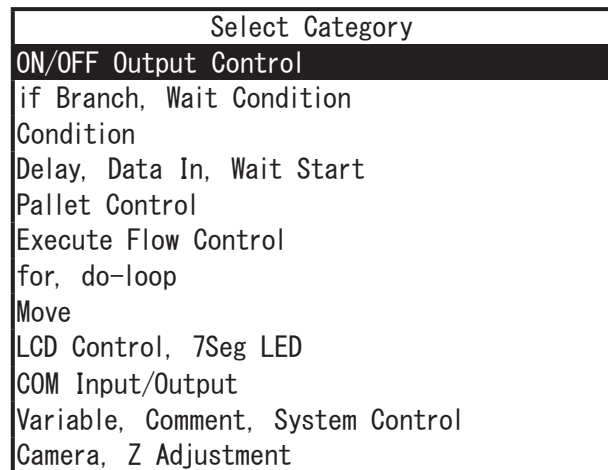
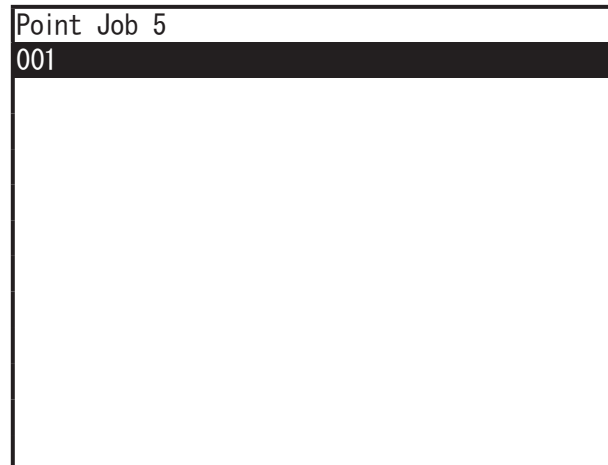
In this example we are teaching job numbers 5 and 6. Select point job number 5 first.

To display a list of registered point job numbers, press the **F3** (LIST) key.

3.3.2 Output Command

Enter a command to output an ON pulse (0.1 sec) to [#sysOut15].

1. After entering or selecting the point job number, the Point Job settings screen shown to the right appears [001] is a command number. Select [001].
2. After selecting the command number, the Point Job Command Category shown to the right appears. Select [ON/OFF Output Control].
3. After selecting [ON/OFF Output Control], the command selection screen shown to the right appears. Select [pulse].



- After selecting the point job command, the parameter (Output Destination) selection screen in this example shown to the right appears. Select [I/O-SYS (sysOut)].

Output Destination
I/O-SYS (sysOut)
I/O-1 (genOut)
I/O-FB (fbOut)
I/O-Alias
Internal Relay (mv)
Keep Relay (mkv)

- After selecting the output destination, the output number entry screen shown to the right appears. Enter 15.

Enter a number

I/O-SYS Output Number 1

- A pulse command requires two parameters (output destination and pulse width). After entering the output number, the Pulse Width entry screen shown to the right appears. Enter 100. (0.1 sec = 100 msec)

Enter a number

Pulse Width 1 msec

EXP

3.3.3 Wait Condition Command

Enter the wait condition command [waitCond]. The robot waits until the condition command between this command and the [endWait] command is met.

After entering all the necessary parameters, the screen returns to the point job value settings screen shown to the right.

The command set to Command Number 001 appears.

Select Command Number 002.

Select the command number and the point job command category selection screen appears.

Select [if Branch, Wait Condition].

```
Point Job 5
001 pulse #sysOut15,100
002
```

After selecting the command category, the Command selection screen shown to the right appears.

Select [waitCond].

This command requires no parameters.

The screen returns to the point job value settings screen.

```
if Branch, Wait Condition
if
then
else
endIf
waitCondTime
timeUp
endWait
waitCond
```

3.3.4 Condition Command

Enter the condition command.

1. Select Command Number 003.
2. Select [Condition] from the point job command category selection screen.
3. Select [Id] from the command selection screen shown to the right.
4. After selecting the point job command, the parameter selection screen shown to the right appears (Input Source in this example). Select [I/O-SYS (sysIn)].
5. After selecting [I/O-SYS (sysIn)], the input source number entry screen appears. Enter 15. The screen returns to the point job value settings screen.

Condition
Id
Idi
and
ani
or
ori
anb
orb

Input Source	1/2
I/O-SYS (sysIn)	
I/O-1 (genIn)	
I/O-FB (fbIn)	
I/O-SYS (sysOut)	
I/O-1 (genOut)	
I/O-FB (fbOut)	
I/O Alias	
System Flag (sysFlag)	
Internal Relay (mv)	
Keep Relay (mkv)	
PLC Timer (seqT)	
PLC Counter (seqC)	

Select command number 004 from the point job value settings screen. Repeat steps 2 – 5 above to register the following settings:

- Point Job Command Category: [Condition]
- Point Job Command: [ani]
- Parameter Selection: [I/O-SYS (sysIn)] and Number 16

Enter the end command [endWait] to terminate the wait condition.

Select Command Number 005.

Select [if Branch, Wait Condition] from the point job command category selection screen and then select [endWait] from the command selection screen.

If the screen display is as shown to the right, the point job data teaching for point job number 5 is complete.

Press the key.

The screen returns to the Teaching Mode Menu.

Refer to the previous steps and using the list to the right as a base, register point job data for Point Job 6.

If the screen display is as shown to the right, the point job data teaching for Point Job Number 6 is complete.

Press the key.

The screen returns to the Teaching Mode Menu.

```
Point Job 5
001 pulse #sysOut15,100
002 waitCond
003 ld #sysIn15
004 ani #sysIn16
005 endWait
006
```

```
Point Job 6
001 pulse #sysOut16,100
002 waitCond
003 ld #sysIn16
004 ani #sysIn15
005 endWait
006
```

3.4 Modify the Point Data

In this example, change the point job numbers created in the previous chapter, [“2. ROBOT OPERATION \(PTP MOVEMENT\),”](#) to the point job data numbers created in the previous section, [“3.3 Teaching: Point Job.”](#)

Point Number	Point Job Number
1	5
2	6

1. Press the **SHIFT** + **ESC** keys.
The point setting value screen appears.
If this is not the point 1 value settings screen, press the **CURSOR ▷** or **CURSOR ◁** key to get to the value settings screen for Point 1 then press the **CURSOR ▾** key twice to move the highlight bar to a blank line under [Type].
The point job data or additional function data settable to this point appears as shown to the right.

Program 3			P1 1/2
X+20	Y+80	Z+30	R+0
Type	PTP Point		
Condition Number			
Job before Moving			
Job while Moving			
Job after Moving			
PTP Condition Number			
Tool Number			
Pallet Routine Number			
Work Adjustment Number			
Execute Condition Number			
S.MARK	E.MARK	J.EXEC P.EXEC	

2. Select [Job After Moving] from the point job/additional function screen. The job after moving number entry screen shown to the right appears. Enter the point job number that you want to set (in this example, enter 5) and press the **ENTR** key. The point job number is set and the screen returns to the value settings screen.

Program 3				P1
Enter a number.				
Job after Moving	0			
DEL	COPY	NEW	LIST	VIEW
F0	F1	F2	F3	F4

On the point job number entry screen, press the **F2** (NEW) key to display a list of unregistered point job data. To display a list of registered point job data, press the **F3** (LIST) key. Press the **F4** (VIEW) key to display the content for the currently displayed point job data. Here, point job data can be modified.

If you press the **F0** (DEL) key, the point job data for the displayed number is deleted. If you press the **F1** (COPY) key, the point job data for the displayed number is copied to another point job number.

3. Display the value settings screen for point 2 and change the point job number to 6 according to the same procedures used for point 1. The program and point data modification is now complete.

3.5 Program Test/Run

After finishing point teaching for all points, perform a point run, data check and test run, in this order, according to the procedures described in [“2.3 Program Test.”](#)

Once the program test is complete you can now perform an actual run. For run procedures refer to [“2.4 Run.”](#)

Caution

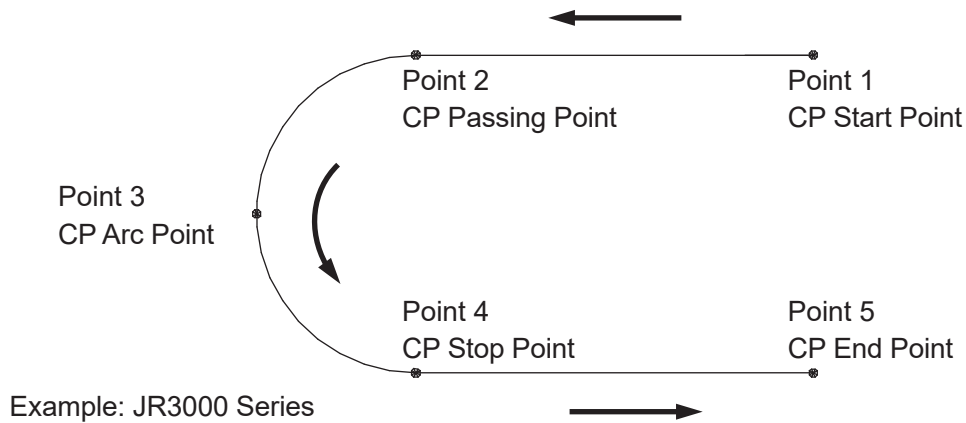


Do not touch any moving parts while the robot is running.
Coming in contact with moving parts can cause injury and unit breakdown.

4. ROBOT OPERATION (CP MOVEMENTS)

Here we will register and run a CP program.

This program goes through the following five points:



Also, add a name to the program.

4.1 Program Number Selection

In this example, teach program number 04 (unregistered). Refer to the procedures described in [“2.2.1 Select a Program Number”](#) and select program number 04.

4.2 Modify the Work Home

The work home is modified here.

First, refer to the procedures described in the [“2.2.3 Work Home Entry”](#) and enter the following coordinates to the work home position.

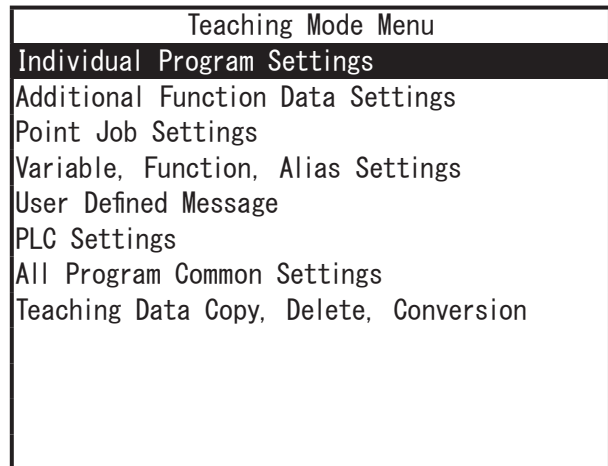
Point Number	Coordinates
Work Home	X:20 mm, Y:20 mm, Z:30 mm, R:0 deg

4.3 Add a Name to the Program

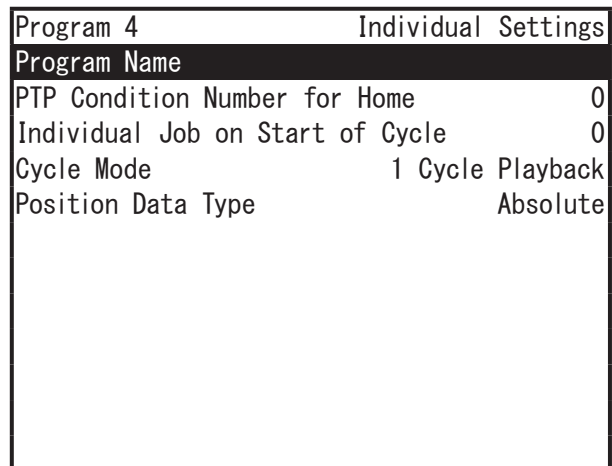
Name the program.

The program name is set in [Program Name] in Individual Program Settings.

1. Select [Individual Program Settings] from the Teaching Mode menu shown to the right.



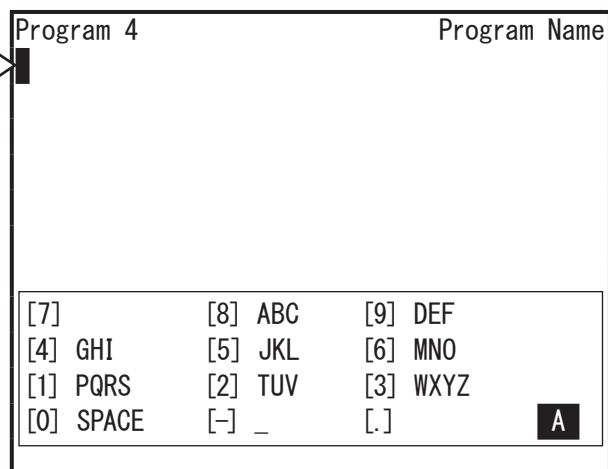
2. The Individual Program Settings menu is displayed (shown to the right). Select [Program Name].



The character entry screen shown below appears.

3. Enter characters using the keys as indicated on the next page. After entering the name, press the **ENTR** key to finish character entry. The entered character string is set as the program name and the screen returns to the individual program settings menu.

Character string display line



Example of the Character Entry Screen

0 – 9 +/- .	The corresponding characters are entered according to the character assignment list on the screen. In the example on the previous page, if you press the 8 key once, the letter A is entered. If you press the key twice, the letter B is entered. If you want to enter the letters AB, enter the letter A first and press the CURSOR ▷ key to move the cursor to the right, and then enter B. Keys with no characters assigned to them, such as [7], [-] above, are disabled.
ESC	Returns to the previous screen (without registering the character string).
ENTR	Press this key to register and end the character string entry. You cannot register the character string if the number of characters entered exceeds the limit. Also, you cannot register a name which includes any invalid characters.
F4	Each time this key is pressed, the character type changes in this order: Roman uppercase → Roman lowercase → numbers → symbols → Roman uppercase
SHIFT + F4	Each time these keys are pressed at the same time, the character type changes in the reverse order: Roman uppercase → symbols → numbers → Roman lowercase → Roman uppercase
CURSOR △	Moves the cursor upward (in the character string).
CURSOR ▽	Moves the cursor downward (in the character string).
CURSOR ◀	Moves the cursor to the left (in the character string).
CURSOR ▶	Moves the cursor to the right (in the character string).
SHIFT + CURSOR △	Moves the cursor to the uppermost line. (Multiple lines)
SHIFT + CURSOR ▽	Moves the cursor to the lowermost line. (Multiple lines)
SHIFT + CURSOR ◀	Moves the cursor to the start of the line.
SHIFT + CURSOR ▶	Shifts the cursor to the end of the line.
DEL/CLR	Deletes the character under the cursor. If the cursor is at the far right of the character string, the last character is deleted.
SHIFT + DEL/CLR	Clears the entire character string.

NOTE: You can use up to 40 – 120 characters to name the program. (Up to 120 characters can be entered when using the teaching pendant. When using a PC, the maximum number of characters is 40, depending on the character type.) However, only 36 characters* are displayed in program lists and 40 characters* (the number of characters per line) are displayed in program names in Run Mode. The rest of the characters are omitted.

* when using characters that can be entered on the teaching pendant

4.4 Point Data Entry

4.4.1 Point Position Entry

Enter the coordinates for Point 1.

Point Number	Coordinates	Point Type	Line Speed [mm/s]
1	X:120 mm, Y:150 mm, Z:30 mm, R:0 deg	CP Start Point	40

4.4.2 Point Type

Enter the coordinates, and press the **ENTR** key (sets the coordinates) to display the point type selection screen shown to the right. Select the point type [CP Start Point].

Select Point Type
PTP Point
CP Start Point
CP Passing Point
CP Stop Point
CP Arc Point
CP End Point
PTP Evasion Point
Circle Start Point
Circle Center Point

4.4.3 Line Speed

If the selected point type is either a [CP Start Point], [CP Passing Point], [CP Stop Point], [CP Arc Point], or a [Circle Start Point] the line speed entry screen shown to the right appears when the point job number is set.

In this example, press the **SHIFT** + **DEL/CLR** **4** and **0** keys to enter 40. Press the **ENTR** key to set the number.

Enter a number
Line Speed <input type="text" value="40"/> mm/s

NOTE: If you select a point type that makes a CP movement to the next point, you need to enter the [Line Speed]. If you select a point type that makes a PTP movement to the next point, the line speed entry screen does not appear, and a new position entry screen for the next point (current point number + 1) appears instead.

After setting the line speed for the next point (current point number + 1) the new position entry screen appears.

Refer to the steps taken to register Point 1, and register Points 2 – 5 according to the following settings:

Point Number	Coordinates	Point Type	Line Speed [mm/s]
2	X:120 mm, Y:80 mm, Z:30 mm, R:0 deg	CP Passing Point	40
3	X:90 mm, Y:50 mm, Z:30 mm, R:0 deg	CP Arc Point	40
4	X:60 mm, Y:80 mm, Z:30 mm, R:0 deg	CP Stop Point	40
5	X:60 mm, Y:150 mm, Z:30 mm, R:0 deg	CP End Point	-

4.5 Program Test/Run

After finishing point teaching for all points, perform a point run, data check and test run, in this order, according to the procedures described in [“2.3 Program Test.”](#)

Once the program test is complete you can now perform an actual run. For run procedures refer to [“2.4 Run.”](#)

NOTE: In a point run the robot runs from a CP start point to a CP end point as one operation. In the example in [“4. ROBOT OPERATION \(CP MOVEMENTS\),”](#) the robot runs from point 1 to point 5 as one operation. During this single operation, the screen display does not change. Also, the CP passing point, CP stop point, and CP arc point, and CP end point cannot be run independently.

Caution



Do not touch any moving parts while the robot is running.
Coming in contact with moving parts can cause injury and unit breakdown.

5. USEFUL KEY FUNCTIONS

Key	Availability	Function
SHIFT + JOG Key	Position entry JOG Mode	Moves the corresponding axis at a high speed.
EDIT	Point setting screen when entering new point positions	You can edit and insert/delete points. You can also delete, move, or copy a string of designated point numbers (point block).
GO	Point setting screen when in MDI mode	If the current tool center point position does not match the coordinates displayed on the LCD, press the GO key to move each axis to the coordinates displayed on the LCD.
SHIFT + GO	Point setting screen	Executes mechanical initialization.
F3 (J.EXEC)	Point setting screen	The robot performs the point job set to the current point. Press this after aligning the cursor with the Job After Moving number.
F4 (P.EXEC)	Point setting screen	The robot runs the current point (not only moves each axis but also performs the point job and additional function set to that point). The screen then changes to the point value settings screen for the next point.
CURSOR ◀ / CURSOR ▶	Point setting screen	The screen respectively changes to the value settings screen for the previous/next point.

Caution



When in Teaching Mode, do not touch the moveable parts of the robot, as the robot can move if the operator uses the JOG keys, the GO keys, or a test run. Coming in contact with moveable parts while the robot is operating can cause injury or unit breakdown.

6. OPERATION MANUALS TO REFER TO WHEN TEACHING

Basic Instructions

This manual explains part names, methods for making emergency stops and other such basic knowledge.

Teaching Pendant Operation

This manual explains the methods for teaching pendant operation.

Functions I (Point Teaching)

This manual explains point job data and additional functions set to points.

Functions II (Variables, Commands, Functions)

This manual explains variables, commands, and functions used in point job data.

Functions III (All Program Common Settings / PLC Programs)

This manual explains robot settings for running programs.

7. SAVING DATA

Save the registered program and point job data.

When saving data, teaching data is saved in combination with customizing data (C&T data). All C&T data is stored in the robot temporarily; however, it is deleted automatically when the power to the robot is turned OFF. Be sure to save every time you modify teaching data or customizing data.

Press the **SHIFT** + **s** keys to display the base screen (shown to the right). Press the **SAVE** key.

Program 4	P5		
X+60	Y+150	Z+30	R+0
Type	CP End Point		
S. MARK	E. MARK	J. EXEC	P. EXEC

Example of the point setting value screen

NOTE:

- If you want to back up data in case of contingencies, send the C & T data from the robot to a PC using the PC software JR C-Points II or JR C-Points II Limited Edition. You can also save C&T data to a USB memory device. Refer to the operation manual *Maintenance* for further details regarding saving data to USB memory.
- If you are using a PC for teaching, send the data from the PC to the robot using the PC software JR C-Points II or JR C-Points II Limited Edition. Data sent from the PC is saved to the robot automatically.

Caution



If the power is turned OFF when saving data, the data may be lost. Never cut OFF the power while the robot is saving data.

Janome Sewing Machine Co., Ltd.
Industrial Equipment Sales Division
1463 Hazama-machi, Hachioji-shi, Tokyo, Japan, 193-0941
Tel: +81-42-661-6301
Fax: +81-42-661-6302
E-mail: j-industry@gm.janome.co.jp

Machine specifications may be modified without prior notice to improve quality.
No part of this manual may be reproduced in any form, including photocopying, reprinting, or translation into another language, without the prior written consent of JANOME.

© 2014–2021 Janome Sewing Machine Co., Ltd.

170807108 / 202101-E1 (202011-J1)