

LOCTITE®

EQUIPMENT OPERATION MANUAL



Cartesian 200, 300, 400 and 500 Series

Features I

Point Teaching

Thank you for purchasing the Loctite® Robot.

***Read this manual thoroughly in order to properly use this robot.**

Be sure to read “For Your Safety” before you use the robot. It will protect you from possible dangers during operation.

***After having read this manual, keep it in a handy place so that you or the operator can refer to it whenever necessary.**

FOR YOUR SAFETY

Safety Precautions

The precautions stated in this manual are provided for the customer to make the best use of this product safely, and to provide preventive measures against injury to the customer or damage to property.

Be sure to follow the instructions

Various symbols are used in this manual. Please read the following explanations to understand what each symbol stands for.

- **Symbols indicating the Degree of Damage or Danger**

The following symbols indicate the degree of damage or danger which may be incurred if you neglect the safety notes.

Warnings	These “Warnings” indicate the possibility of death or serious injury.
Cautions	These “Cautions” indicate the possibility of accidental injury or damage to property.

- **Symbols indicating the type of Danger and Preventive Measures**

The following symbols indicate the type of safety measure that should be taken.

Indicates the type of safety measure that should be taken.	
	Take care. (General caution)
Indicates prohibition.	
	Never do this. (general prohibition)
	Do not disassemble, modify or repair.
	Do not touch. (contact prohibition)
	Indicates necessity
	Be sure to follow instructions.
	Be sure to unplug power supply from wall outlet.
	Be sure to check grounding.

FOR YOUR SAFETY

<CARTESIAN Series>

Warnings



Operators who are involved in the programming, inspection and/or maintenance of this robot must take the “special training course” for industrial robots **specified in Article 59 of the Occupational Health and Safety Law and relevant ministry ordinances.**



Do not leave the unit plugged in (power cord and connectors) when it is not in use for long periods of time. Dust can cause fire.
Be sure to shut off the power supply before removing the power cord.



Change the robot’s battery periodically (approximately every three years) to prevent malfunction or breakdown.



Keep the emergency stop switch within reach of an operator while teaching and running the robot.
Failure to do so may cause danger since the robot cannot be stopped immediately and safely.



Regularly check that the I/O-S circuits and emergency stop switch work properly.
Failure to do so may cause danger since the robot cannot be stopped immediately and safely.

FOR YOUR SAFETY

Warnings



Check the mounting screws regularly so that they are always firmly tightened.

Loose screws may cause injury or defect.



Power the unit only with the rated voltage.

Excessive voltage can cause fire or malfunction of the unit.



Do not sprinkle water or oil on the unit, control box, or its cable.

Contact with water can cause electric shock, fire, or malfunction of the unit.
IP Protection Rating is IP40.

FOR YOUR SAFETY

INSTALLATION

Warnings

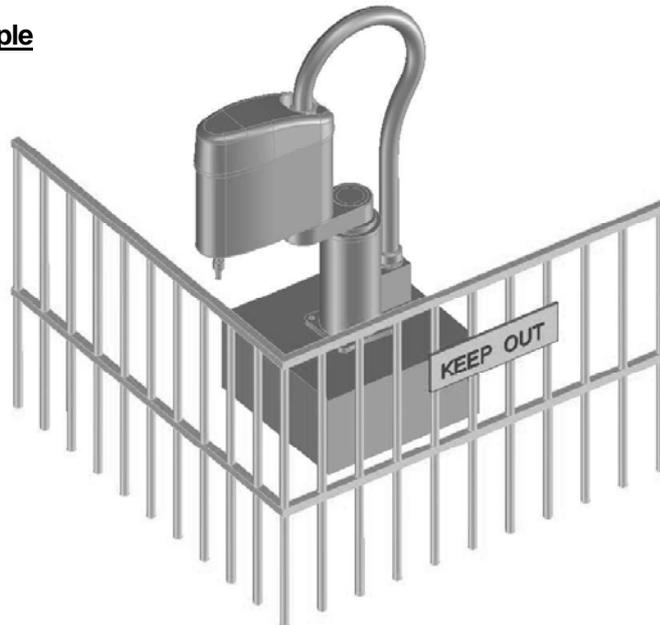


Always use a safety barrier.

A person entering the robot's restricted area may be injured.

At the entry/exit gate of the safety barrier, **install an interlock that triggers an emergency stop when the gate is opened.** Ensure there is no other way of entering the restricted area. Furthermore, **put up a “No Entry” or “No Operating” warning sign** in a clearly visible position.

Example



Install a safety barrier of adequate strength so as to protect the operator from moving tools and flying objects.

Always use protective wear (helmet, protective gloves, protective glasses, and protective footwear) when going inside the safety barrier.



Take adequate precautions against objects the robot is gripping flying or falling off **taking into account the object's size, weight, temperature and chemical composition.**

FOR YOUR SAFETY

Warnings



Confirm that the unit is properly grounded.

Power supply earth should be connected complying with Type D installation. (under 100 Ω of resistance.)

Insufficient grounding can cause electric shock, fire, or malfunction of the unit.



Plug the power cord into the wall outlet firmly.

Incomplete insertion into the wall outlet makes the plug hot and can cause fire.

Check that the plug is not covered with dust.

Be sure to shut off the power supply before connecting the power cord to the control box.



Place the unit on a suitable flat surface that can support its weight.

Be sure to leave a space greater than 30cm between the back of the robot (equipped with a cooling fan) and the wall.

An insufficient or unstable area can cause the unit to fall, overturn, breakdown, or overheat.



Do not attempt to disassemble or modify the machine.

Disassembly or modification may cause electric shocks, fire or malfunction.



Be sure to use within the voltage range indicated on the unit.

Failure to do so may cause electric shock or fire.



Do not use the unit near inflammable or corrosive gas.

If leaked gas accumulates around the unit, it can cause fire.

IP Protection Rating is IP40.



Place the unit in a well-ventilated area for the health and safety of the operator.



Turn off the unit before inserting and removing cables.

Failure to do so may result in electric shock, fire, or malfunction of the unit.

IP Protection Rating is "IP40."

FOR YOUR SAFETY

Warnings



Be sure to confirm that all the air tubes are connected correctly and firmly.



Use the robot in an environment between 0 to 40 degrees centigrade with a humidity of 20 to 95 percent without condensation.

Failure to do so may result in malfunction. IP Protection Rating is "IP40."



Use the robot in an environment where no electric noise is present.

Failure to do so may result in malfunction or defect.



Be sure to secure the movable parts of the robot before transportation.

Failure to do so may result in defect or injury.



Do not bump or jar the machine while it is being transported or installed.

This can cause defects.



Use the machine in an environment where it is not exposed to direct sunlight.

Failure to do so may result in malfunction or defect.



Be sure to confirm that tools such as the electric screwdriver unit, etc. are properly connected.

Failure to do so may result in injury or defect.



Be sure to check the wiring to the main unit.

Improper wiring may cause malfunction or defect.



Keep the emergency stop switch within reach of an operator while teaching and running the robot.

Failure to do so may cause danger since the robot cannot be stopped immediately and safely.



Be sure to shut off the power supply before plugging the power cord.

FOR YOUR SAFETY

Warnings



Be sure to remove the eye bolt after installing the robot so that it does not hit the arm.

Failure to do so may result in injury or breakdown of the unit.

FOR YOUR SAFETY

WORKING ENVIRONMENT

Warnings



When you lubricate or inspect the unit, unplug the power cord from the control box.

Failure to do so may result in electric shock or injury.

Be sure to shut off the power supply before removing the power cord from the control box.



When going inside the safety barrier, **place a “Do Not Operate” sign** on the start switch.



During operation, always have the emergency stop switch within the operator’s reach.

For the operator’s safety, the emergency stop switch is necessary to make a quick and safe stop.



Install a safety barrier of adequate strength so as to protect operators from moving tools and flying objects.

Always use protective wear (helmet, gloves, glasses, and footwear) when going inside the safety barrier.



Be sure to confirm that all the air tubes are connected correctly and firmly.



Always watch out for robot’s movement, even in the teaching mode.

Special attention will protect the operator from injury.

FOR YOUR SAFETY

DURING OPERATION

Warnings



When operations are taking place within the safety barrier, **ensure no one enters the robot's restricted area.**



If you must go inside the safety barrier, be certain to **push the emergency stop switch** and **put a "Do Not Operate" sign** on the start switch.



When starting the robot, check that, **no one is within the safety barrier and no object will interfere with the robot operating.**



Under no circumstances should you go inside the safety barrier or place your hands or head inside the safety barrier while the robot is operating.



If anything unusual (e.g. a burning smell) occurs, stop operation and unplug the cable immediately. Contact your dealer or the office listed on the last page of this manual.

Continuous use without repair can cause electric shock, fire, or breakdown of the unit.



During teaching, tests, and actual operation, always have the Emergency stop switch within the operator's reach.

For the operator's safety, the emergency stop switch is necessary to make a quick and safe stop.

FOR YOUR SAFETY

<CARTESIAN Series>

Warnings



Be sure to check grounding.

Improper grounding can cause electric shock or fire.



Be sure to use within the voltage range indicated on the unit.

Failure to do so may cause electric shock or fire.



Plug the power cord into the wall outlet firmly.

Failure to do so can cause the input to heat up and may result in fire.
Make sure that the power plug is clean.



Be sure to unplug the power cord from the wall outlet when you examine or grease the machine.

Failure to do so may cause electric shock or fire.



Stop operation and unplug immediately whenever you sense any abnormalities, such as a pungent odor. Immediately contact the dealer from which you purchased the product.

Continued operation may result in electric shock, fire or malfunction.



Install the product in a place which can endure it's weight and conditions while running.

Be sure to leave a space greater than 30cm between the back of the robot (equipped with a cooling fan) and the wall. Installation in an insufficient or unstable place can cause the unit to fall, overturn, breakdown, or overheat.



Be sure to take protective measures such as installing an area sensor or enclosure to avoid injury.

Entering the robot's work range during operation could lead to injury.



Do not attempt to disassemble or modify the machine.

Disassembly or modification may cause electric shocks, fire or malfunction.

FOR YOUR SAFETY

Warnings



Use the machine indoors where no flammable or corrosive gas is present.

Emission and accumulation of such gasses could lead to fire.

IP Protection Rating is "IP30." ("IP40" for CE specification)



Be sure to unplug the power cord from the wall outlet if the robot will remain unused for long periods of time.

Gathered dust could lead to fire.



Be sure to use power in the proper voltage range.

Failure to do so may result in fire or malfunction.



Keep the unit and the power cables away from water and oil.

Failure to do so may result in electric shock or fire.



Turn off the unit before inserting and removing cables.

Failure to do so may result in electric shock, fire, or malfunction of the unit.

IP Protection Rating is "IP30." ("IP40" for CE specification)



Keep the emergency stop switch within reach of an operator while teaching and running the robot.

Failure to do so may lead to danger since the robot cannot be stopped immediately and safely.



Regularly check that the emergency stop switch works properly.

For models with I/O-S circuits, also check that they work properly.

Failure to do so may lead to danger since the robot cannot be stopped immediately and safely.

FOR YOUR SAFETY

Cautions



Be sure to check grounding.

Improper grounding may cause malfunction or defect.



Use the Benchtop Robot in an environment between 0 to 40 degrees centigrade with a humidity of 20 to 95 percent without condensation.

Failure to do so may result in malfunction.

IP Protection Rating is "IP30." ("IP40" for CE specification)



Use the machine in an environment where no electric noise is present.

Failure to do so may result in malfunction or defect.



Use the machine in an environment where it is not exposed to direct sunlight. Failure to do so may result in malfunction or defect.



Be sure to confirm that tools such as the electric screwdriver unit, etc. are properly connected.

Failure to do so may result in injury or defect.



Check the mounting screws regularly so that they are always firmly tightened.

Loose screws may cause injury or defect.



Be sure to check the wiring to the main unit.

Improper wiring may cause malfunction or defect.



Be sure to secure the movable parts of the robot before transportation.

Failure to do so may result in defect or injury.



Do not bump or jar the machine while it is being transported or installed.

This can cause defects.

PREFACE

The Loctite® Benchtop Robot CARTESIAN Series is a new low cost, high performance robot. We have succeeded in reducing price while maintaining functionality. Energy and space saving is made possible through the combined use of stepping motors and special micro step driving circuits.

The Loctite® Robot CARTESIAN Series features diverse applications, high speed, rigidity and precision, and can accommodate a wide variety of requirements.

The operation manual consists of the following volumes.

Setup	This volume explains how to set up the robot. * For people who receive safety and installation instructions regarding the robot.
Maintenance	This volume explains how to maintain the robot. * For people who receive safety and installation instructions regarding the robot.
Basic Instructions	This volume provides safety precautions, part names, and the basic knowledge necessary to operate the Benchtop series.
Dispensing	This volume explains dispensing applications for the Benchtop Series robot.
Quick Start	This volume explains the actual operation of the Benchtop series with simple running samples.
Teaching Pendant Operation	This volume explains how to operate the robot via the teaching pendant.
PC Operation	This volume explains how to operate the robot from a computer (LR C-Points.)
Features I	This volume explains point teaching.
Features II	This volume explains commands, variables, and functions.
Specifications	This volume provides comprehensive specifications, including mechanical or electrical requirements.

Note) The contents of this volume may be modified without prior notice to improve its quality. Therefore, it may not be consistent with the specifications of the delivered series.

Please be sure to follow the instructions described in these volumes. Proper use of the robot will ensure continued functionality and high performance.

The contents described in this volume are based on the standard application. Menu items may vary depending on models.



Be sure to shut off the power supply before plugging the power cord.



BE SURE TO MAKE A PROPER GROUNDING WHEN YOU INSTALL THE ROBOT.



Be sure to save data whenever it is added or modified. Otherwise, changes will not be saved if the power to the robot is cut off.

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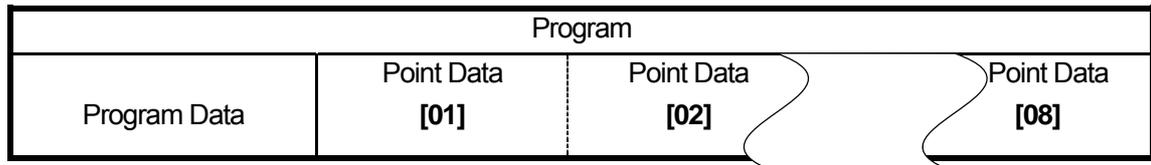
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PROGRAM

A program consists of two items. One is the program data to control programs and the other is the point data, including position coordinates to operate the robot.



Data

Program data consists of the following eight items.

1. Program Name You can use up to forty English letters, numbers, and symbols in combination to name the program.
2. Work Home This is the point (coordinates) where the tool returns to and waits for the next instruction after running the last point in the program in the 1 cycle mode.
3. Cycle Mode Mode of operation consists of [1 Cycle Playback] and [Continuous Playback.]
4. PTP Condition The settings (e. g. speed) for shifting from one point to another (valid for PTP drive only: invalid for CP drive)
5. CP Condition The settings (e. g. speed) for shifting from one point to another (valid for CP drive only: invalid for PTP drive)
6. Tool Data Tool weight, the distance from the standard tool position (R-Axis center) to the tool center point.
7. Move Area Limit The maximum coordinates and angles which can be set for each axis.
8. Position Data Type Three types of coordinates included in point data: [Absolute], [Relative], and [Moving Amount]

Point data consists of the following six items.

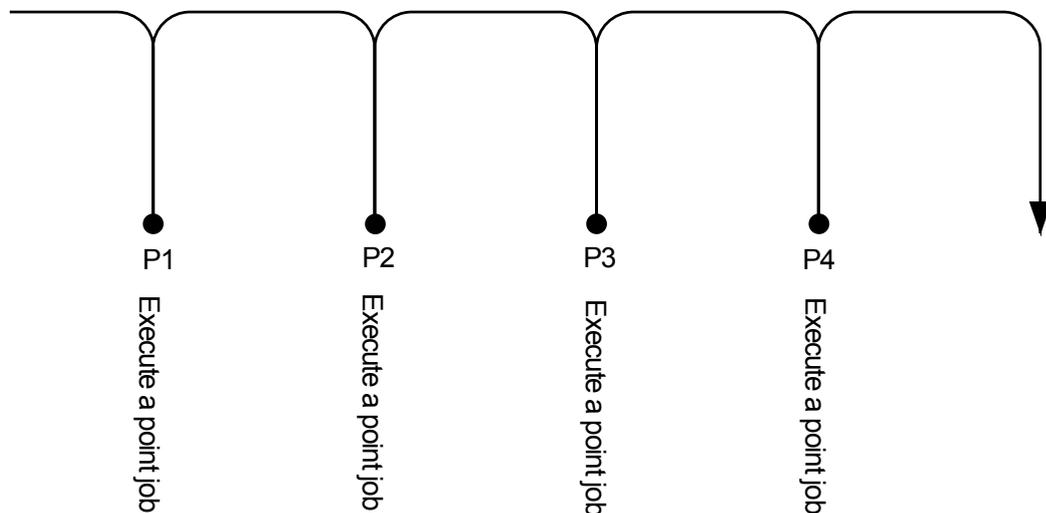
1. Coordinates (R, L) X, (R, L) Y, Z, R Identification of X-Y expression (Left or Right) and point coordinates (X, Y, Z, R) data
(Or identification of J1-J2 Axis coordinates and J1, J2, J3, and J4 Axes coordinates data)

2. Point TypeNine different types of points depending on the shifting method
3. Line Speed.....Shifting speed to the next point in the CP drive: If the tool unit does not shift to the next point in the CP drive, this setting is not necessary.
4. Point Job Number.....Number assigned to the point job data: the robot executes the point job designated by number. Depending on the point type, it may not be possible to select a particular point job.
5. Additional Function Number Number assigned to the additional function data: you can assign an additional function to a point if necessary.
6. Tag CodeValue (tag code) assigned to a point

Running

You can operate the robot in various ways by running programs.

The basic operation is “to shift from Point 1 to the last point in numerical order and execute a point job data set to a point.” (See below.)



Point job data which is executed at a point is independent from programs. Use the point job data by selecting a point data number. Accordingly, you can use the same point job data at multiple points.

You can operate the robot in various ways by setting point job data (number) or additional function data (number) to the point data.

PROGRAM NAME

You can give names to registered programs to identify the contents.

TP  MENU [Program Data Settings]
[Program Name]

PC  [Program] → [Program Data] → [Program Name]

You can use up to 40 English letters, numbers, and symbols in combination.
You can also change already registered program names.

WORK HOME

The work home is the point (coordinates) where the tool returns to and waits for the next instruction after running the last point in the program in the 1 cycle playback mode. This point is not necessary in the continuous playback mode.

You can also set point job data and additional function data to the work home.

TP MENU [Program Data Settings]
[Work Home]

PC [Program] → [Program Data] → [Work Home]

Point Type

You can set either the PTP point or CP start point to the work home.

Depending on the designated point type, settable point job data or additional function data may vary.

Point Job Data, Additional Function Data

[Point Job] on the work home position is executed at the work home position coordinates **only when the tool center point is set on the work home position after one complete operation cycle.**

[Job before Moving] and [Job while Moving] are executed when returning from the last point to the work home position after one complete operation cycle. [Job while CP Moving] is executed repeatedly when shifting from the work home position to the next (first) point.

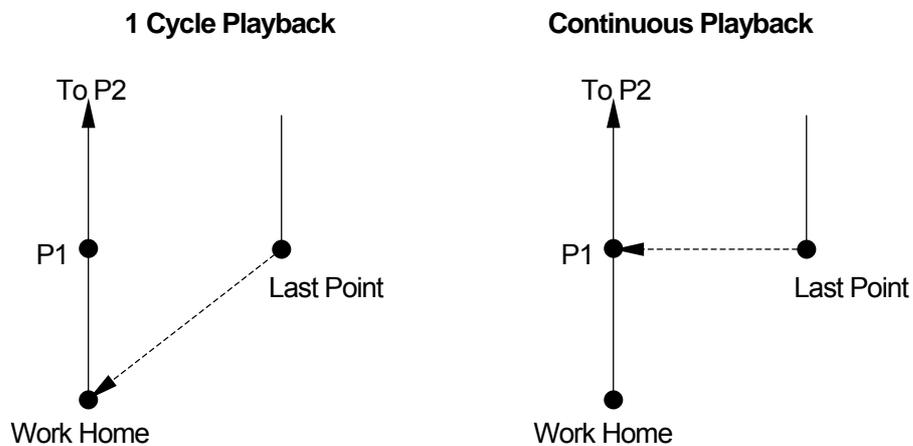
(O: can be set, X: cannot be set)

Point Job Data/ Additional Function Data	Job before Moving	Job while Moving	Job while CP Moving	Point Job	PTP Condition	CP Condition	Tool Data	Pallet Routine	Execute Condition	Work Adjustment	Tag Code
Point Type											
Work Home (PTP Points)	O	O	X	O	O	X	O	O	O	O	O
Work Home (CP Start Point)	O	O	O	O	X	O	O	O	O	O	O

CYCLE MODE SETTING

The cycle mode consists of the following two modes of operation.

- 1 Cycle Playback: The robot shifts to the work home and stops operation after running the selected program to the last point.
- Continuous Playback: The robot repeats operation without returning to the work home until it receives the operation end instructions.



If you select [Continuous Playback], the job before moving, job while moving and point job are executed only when the tool unit returns to the work home by operation end instructions.

TP → [MENU] [Program Data Settings]
[Cycle Mode Setting]

PC → [Program] → [Program Data] → [Cycle Mode Setting]

PTP CONDITION (PROGRAM DATA)

PTP condition (one of the [Program Data Settings] parameters) is the condition setting for all motions between points in a program (in PTP drive.) If you change the program data [PTP Condition], all PTP speeds and arc motions will be changed in a program.

If you want to change speed or motion between certain points, register the additional function data [PTP Condition] and set it to the desired points.

TP  **MENU** [Program Data Settings]
[PTP Condition]

PC  [Program] → [Program Data] → [PTP Condition]

CARTESIAN Series

The PTP condition consists of the following seven items. These settings are valid only when shifting in the PTP drive.

1. PTP Speed

The speed limit in PTP drive that can be designated as a percentage of the maximum speed (1 – 100 %)
The maximum speed (when no tool or workpiece is connected) for the 200 series is 500mm/s and for 300/400 series is 800mm/s (for both X- and Y- Axes.) It may vary depending on the connected tool or workpiece weight.

The [PTP Speed] is the speed limit during operation, not the shifting speed in the PTP drive.

2. R-Axis Rotate Speed (only available for 4-Axis specifications)

The speed limit for the R-Axis in PTP drive that can be designated as a percentage of the maximum speed (1 – 100 %)

The maximum speed (when no tool is connected) is 800mm/s.

If the PTP speed is too high, it will be reduced automatically so that the R-Axis can rotate completely before reaching the next point.

3. R-Axis Acceleration (only available for 4-Axis specifications)

The acceleration/deceleration speed limit for the R-Axis to rotate/stop in PTP drive: it can be designated as a percentage of the maximum acceleration (1 – 100 %.)

4. Relative Mode/Absolute Mode

Setting of the arch motion in the PTP drive: there are two modes.

Relative Mode: Z-move is designated in terms of the distance from a certain point. For example, you can designate the Z-Axis to ascend 10mm from a given point.

Absolute Mode: Z-move is designated in terms of the absolute coordinates. For example, you can designate the Z-Axis to ascend to the coordinate Z=20. The distance from any given point is not considered.

- If you select [Relative Mode], the Z-move options are limited to [Z Move Height], [Z Up Distance], and [Z Down Distance.] If you select [Absolute Mode], the Z-move options are limited to [Horizontal Move Position], [Start Horizontal], and [Start Down Position.]

5. Z Move Height/Horizontal Move Position

Z Move Height: Vertical distance between the Horizontal Move Position and the start or the end point, depending on which is higher

Horizontal Move Position: Z-axis coordinate at which the tool unit shifts horizontally in the PTP drive

6. Z Up Distance/Start Horizontal

Z Up Distance: Ascending distance of the Z-Axis with the X- and Y-Axes constant

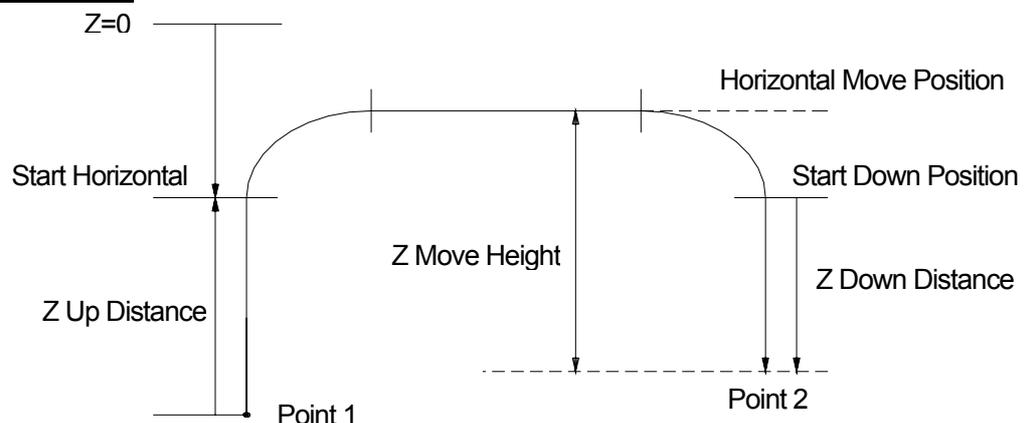
Start Horizontal: Z-axis coordinate at which the tool unit starts to shift in the X or Y direction (horizontally.)

7. Z Down Distance/Start Down Position

Z Down Distance: Descending distance of the Z-Axis with the X- and Y-Axes constant

Start Down Position: Z-axis coordinate at which the Z-Axis starts to descend after the horizontal (X-Y direction) shifting

Arch Motion in PTP Drive



CP CONDITION (PROGRAM DATA)

CP condition (one of the [Program Data Settings] parameters) is the condition setting for all motions between points in a program (in CP drive.) If you change the program data [CP Condition], all CP speeds and accelerations will be changed in a program.

If you want to change speed or acceleration between certain points, register the additional function data [CP Condition] and set it to the desired points.

The CP condition consists of the following three items. CP speed is not included in the [CP Condition.] Set the CP speeds directly to each CP point.

- CP Acceleration: Acceleration when shifting in CP drive that can be designated as a percentage of the maximum acceleration (1 – 100 %)
- R-Axis Rotate Speed: R-Axis rotation speed in CP drive that can be designated as a percentage of the maximum speed (1 – 100 %)
The maximum speed (when no tool is connected) is 800mm/s.
If the CP speed is too high, it will be reduced automatically so that the R-Axis can rotate completely before reaching the next point.
- R-Axis Acceleration: R-Axis acceleration in CP drive that can be designated as a percentage of the maximum acceleration (1 – 100 %)

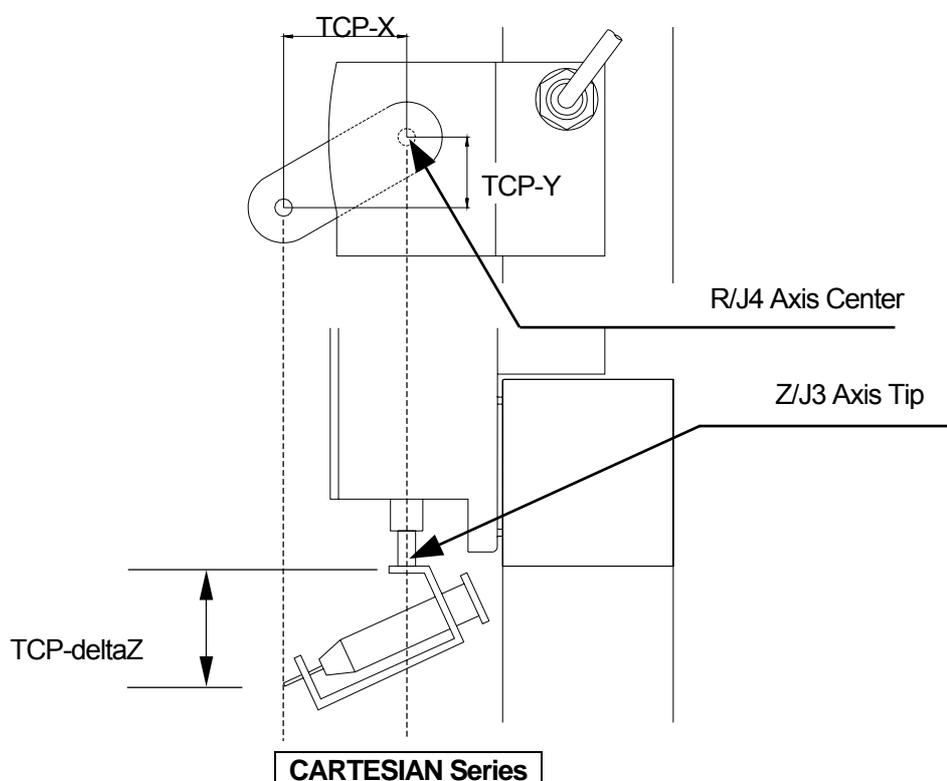
TP  MENU [Program Data settings]
[CP Condition]

PC  [Program] → [Program Data] → [CP Condition]

TOOL DATA

“Tool Data” consists of the following four items.

- Tool Weight
- TCP-X: X-direction distance from the standard tool position (R/J4 Axis center) to the tool center point
- TCP-Y: Y-direction distance from the standard tool position (R/J4 Axis center) to the tool center point
- TCP-deltaZ: Z-direction distance from the standard tool position (Z/J3 Axis tip) to the tool center point



Using [Direct TCP-XY Setting], you can calculate the values of [TCP-X] and [TCP-Y] by pointing the same point twice (from different R/J4 Axis angles) at the tool center point.

Using [Copying to All Programs], you can copy registered tool data to the default program data and the program data in all programs. Also, using the additional function data [Tool Data], you can change the tool data only between certain points.

TP **MENU** [Program Data Settings]
[Tool Data]

PC [Program] → [Program Data] → [Tool Data]

MOVE AREA LIMIT

You can set the moving range for the robot Arm. This limit (coordinates) is called the “move area limit.” You can set the move area limit in each program.

If any Axis exceeds the move area limit during operation, an error will be returned and the robot will stop. Also, JOG shifting in programs (which include the registered move area limit) is restricted by the move area limit, even in the teaching mode.

- In the MDI mode and DIRECT mode, the movement of each Axis is not restricted by the move area limit. In this case, select [Checking Data] from the [Test] menu. The robot will check if there are any coordinates outside the move area limit.

The move area limit consists of the following items.

Cartesian
X Upper Limit
Y Upper Limit
Z Upper Limit
R Upper Limit
R Lower Limit

- You cannot change the X, Y, and Z lower limits in the Cartesian.

Using [Copying to All Programs], you can copy the registered move area limits to the default program data and the program data in all programs.

TP  **MENU** [Program Data Settings]
[Move Area Limit]

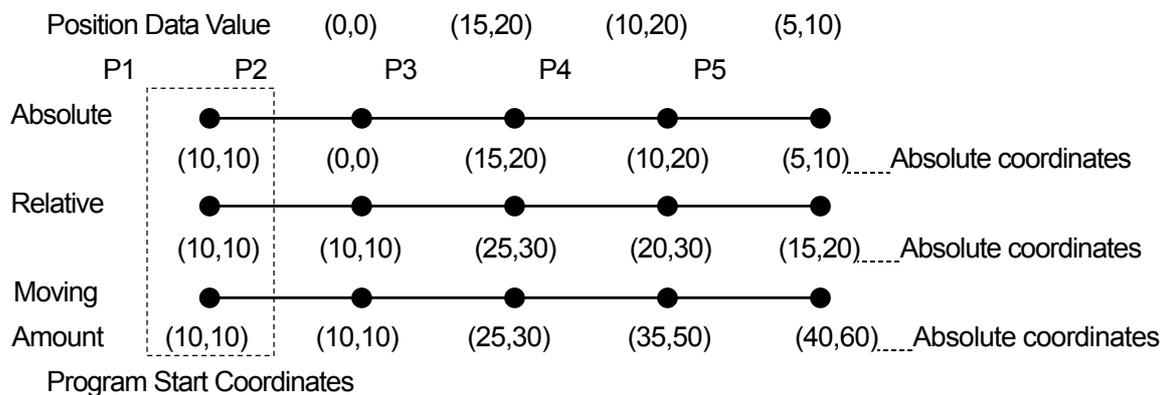
PC  [Program] → [Program Data] → [Move Area Limit]

ABSOLUTE, RELATIVE & MOVING AMOUNT (POSITION DATA SETTING)

You can select the coordinate setting included in the point data (position data) between [Absolute], [Relative], and [Moving Amount.] The default is set to [Absolute.]

- Absolute: Position data value indicates the fixed robot coordinates.
- Relative: Position data value indicates the distance from the coordinate where program starts.
(If the start coordinate is (0,0), the result will be the same as [Absolute].)
- Moving Amount: Position data value indicates the distance to the next point.

Depending on the position data setting, the moving point positions vary if the values are same. Refer to the following examples.



- If you run a program as a subprogram, the tool unit will not return to the work home. If [Relative] or [Moving Amount] is set to the program, the tool unit will not also return to the work home. The tool unit returns to the work home only when the program is set to [Absolute] and executed independently, not by a "Call Program" command.

TP → MENU [Program Data Settings]
[Position Data]

PC → [Program] → [Program Data] → [Position Data]

- You can set [Position Data] as the default program data.
- You can convert the program created in the “absolute coordinates” into the “relative coordinates” (convert the coordinate values from point 1 to the last point into the relative coordinate values.)

TP  EDIT [Transform into Relative]

PC  [EDIT] → [Transform into Relative]

Teaching Operation for Program Set to “Relative”

When registering any point in the JOG mode, the position data setting must be set to “Absolute.”

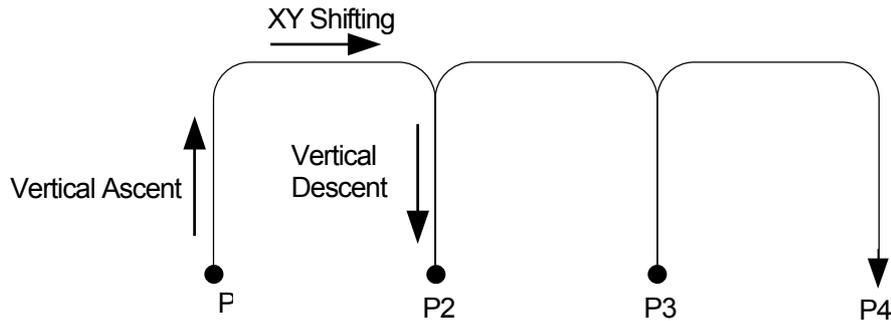
When creating a program which is set to “Relative”, shift all the points (offset) so as to match the coordinates of the first point to the position (0,0,0) after registering the desired point.

Teaching Operation for Program Set to “Moving Amount”

You cannot convert the registered coordinates in to the “moving amount.” Register any points in the MDI mode.

PTP DRIVE

“PTP” is an abbreviation of “Point to Point.” In the PTP drive, the tool unit ascends vertically from a point, shifts in the XY direction (horizontally), and then descends vertically to the next point. (Arc motion)



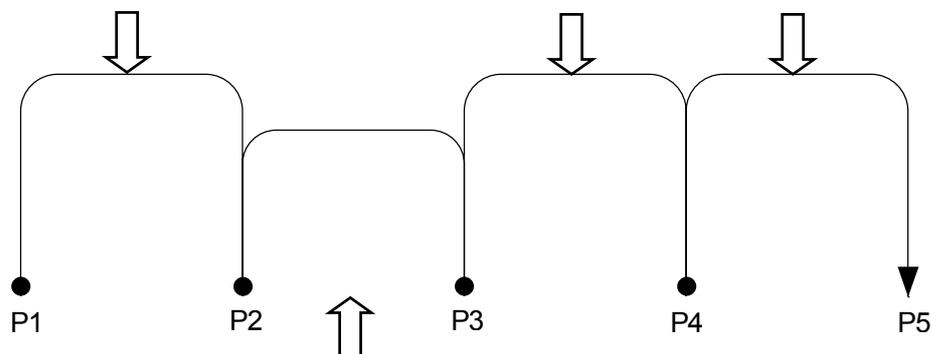
Each Arm shifts either in the “PTP drive” or “CP drive” depending on the point type setting in the point data. It shifts to the next point in the PTP drive if the point type is “PTP Point” or “CP End Point.”

PTP Point

This is a point type to shift to the next point in the PTP drive.

Set the necessary settings, such as the PTP speed or maximum height of arc motion, in the program data parameter [PTP Condition.] Any changes in the program data parameter [PTP Condition] will affect all the PTP drive points in a program, excluding points which the additional function data [PTP Condition] is set to.

PTP drive according to the program data [PTP Condition] setting

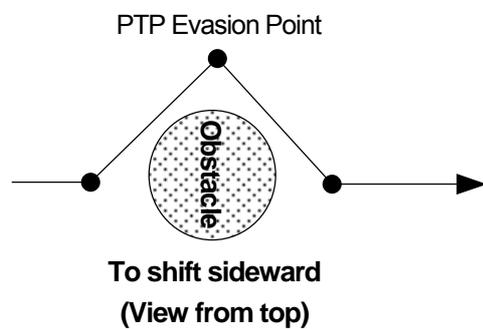
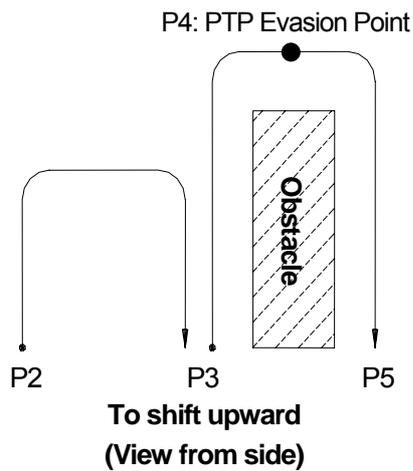


PTP drive according to the additional function data [PTP Condition] setting
(Additional function data [PTP Condition] is set to P2.)

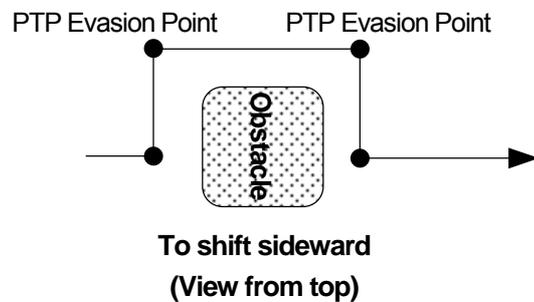
PTP Evasion Point

Register the point type [PTP Evasion Point] to evade any obstacles during shifting to the next point.

- To shift upward (skip over an obstacle), you can register the additional function data [PTP Condition] instead.



You can set several PTP evasion points continuously.



You cannot set any point job data or additional function data, except [Execute Condition], to the PTP evasion point.

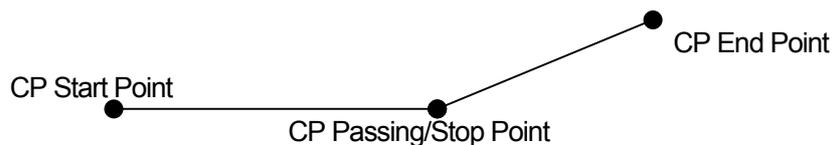
CP DRIVE

“CP” is an abbreviation of “Continuous Path.” In the CP drive, each Arm shifts in linear motion, not in arc motion.

Each Arm shifts either in the “PTP drive” or “CP drive” depending on the point type setting in the point data. It shifts in the CP drive from the “CP start point” to the “CP end point.” (It shifts in the PTP drive from the “CP end point” to the next point.)

Linear Movement

You can bend the straight line as illustrated below if you register either a CP passing point or CP stop point between the CP start point and CP end point.



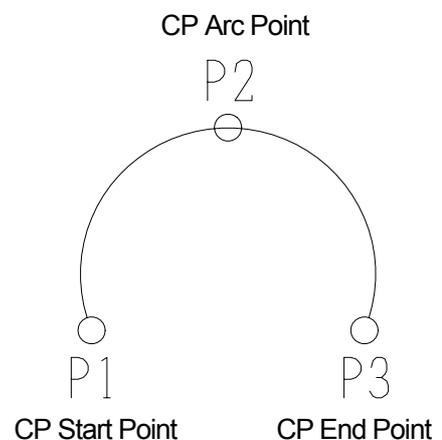
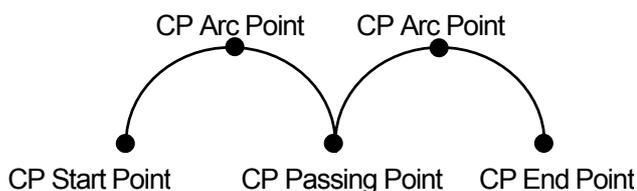
You need to set the CP speed to each CP start point, CP passing point, CP stop point, and CP arc point.

Arc Movement

You can execute the arc movement in the CP drive. Register the [CP Start Point], [CP Arc Point], and [CP End Point] in order.

The tool unit shifts on the arc created by the three points.

You can create multiple arcs or continue the CP drive if you set The [CP Passing Point] or [CP Stop Point] instead of [CP End Point.]



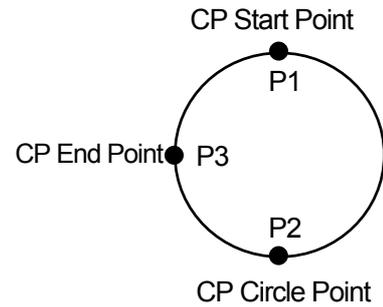
Circular Movement

You can execute the circular movement in the CP drive.

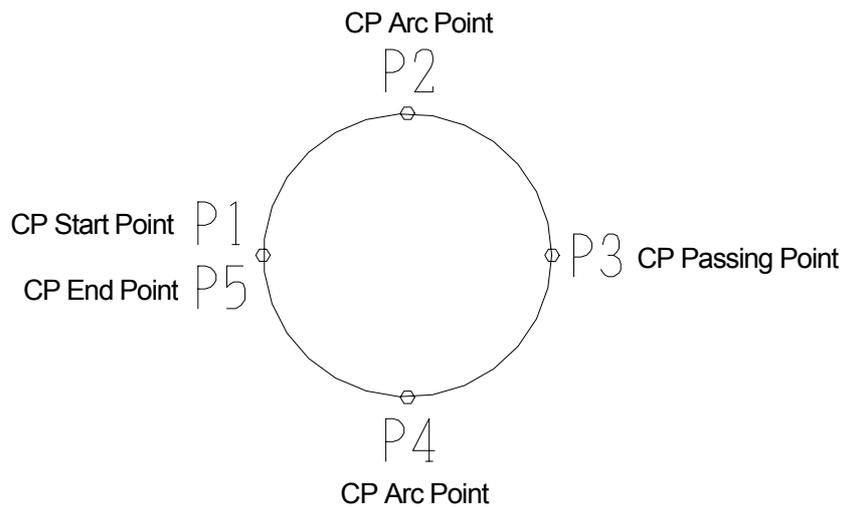
Register the [CP Start Point], [CP Circle Point], and [CP End Point] in order.

The tool unit shifts on the arc created by the three points. In the illustration on the right, the [CP End Point] is set to P3; however, **the tool unit returns to P1 along the circle and ends the CP drive.**

If any data, such as the point job, is set to P3, it will be executed after reaching P1.



When shifting from P3 to P1 after the circular movement, the R-Axis coordinate is equal to the R-Axis coordinate of P1. If you want to change the R-Axis coordinate (angle) between the start position and the end position, execute the arc movement twice to make a circle, instead of using the [CP Circle Point.] (See below)



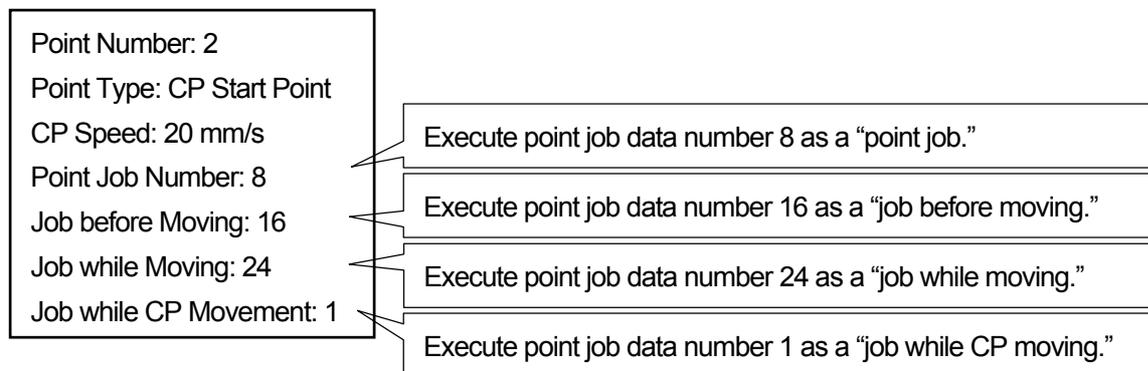
You can continue the CP drive, even after the circular movement, if you set the [CP Passing Point] or [CP Stop Point] instead of the [CP End Point.]

POINT JOB

Point job data is a set of commands and logic operations that is executed at a point.

If you set a point job data number to the point data, the robot will execute the numbered point job data during operation.

You can set up to four point jobs, “job before moving”, “job while moving”, “point job”, and “job while CP moving”, which are executed separately, to one point. However, they may not be able to be set depending on point types.



(O: can be set, X: cannot be set)

Point Type \ Point Job	PTP Point	CP Start Point	CP Passing Point	CP Stop Point	CP Arc Point	CP End Point	PTP Evasion Point	CP Circle Point	Work Home (PTP Point)	Work Home (CP Start Point)
Job before Moving	O	O	X	X	X	X	X	X	O	O
Job while Moving	O	O	X	X	X	X	X	X	O	O
Point Job	O	O	O	O	X	O	X	X	O	O
Job while CP Moving	X	O	X	O	X	X	X	X	X	O

TP → [MENU] [Point Job Settings]

PC → [Data] → [Point Job]

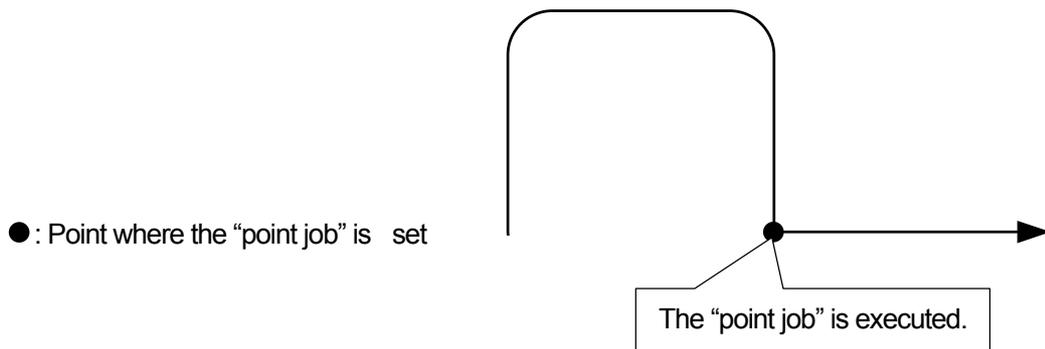
Create point job data and set the point job number to the desired point.

Point Job

If you set the “point job” to a point, the point job is executed after the tool unit reaches the point. After executing the point job, the tool unit shifts to the next point.

If you set the “point job” to the work home, the point job is executed only when the tool center point is on the work home after the cycle of operation.

Example: When the Point Job Is Set to the CP Start Point

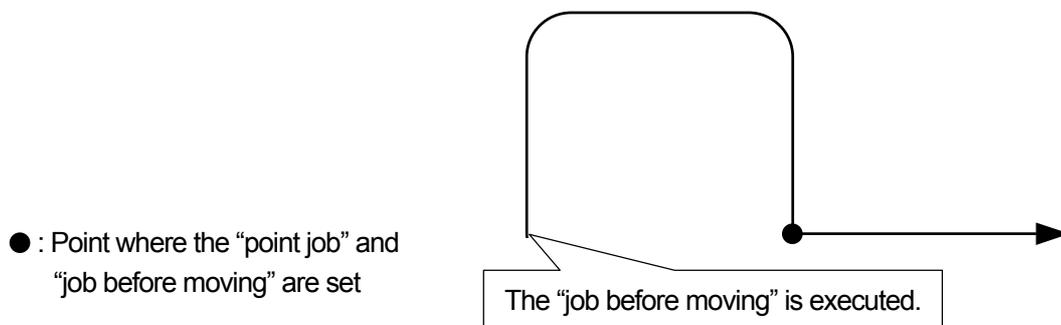


Job before Moving

If you set the “job before moving” to a point, the point job is executed before shifting to the point. After executing the point job at the previous point, the tool unit executes the “job before moving”, and then shifts to the point where the “job before moving” is set. If the previous point is a PTP evasion point, the tool unit executes the point job before shifting to the PTP evasion point.

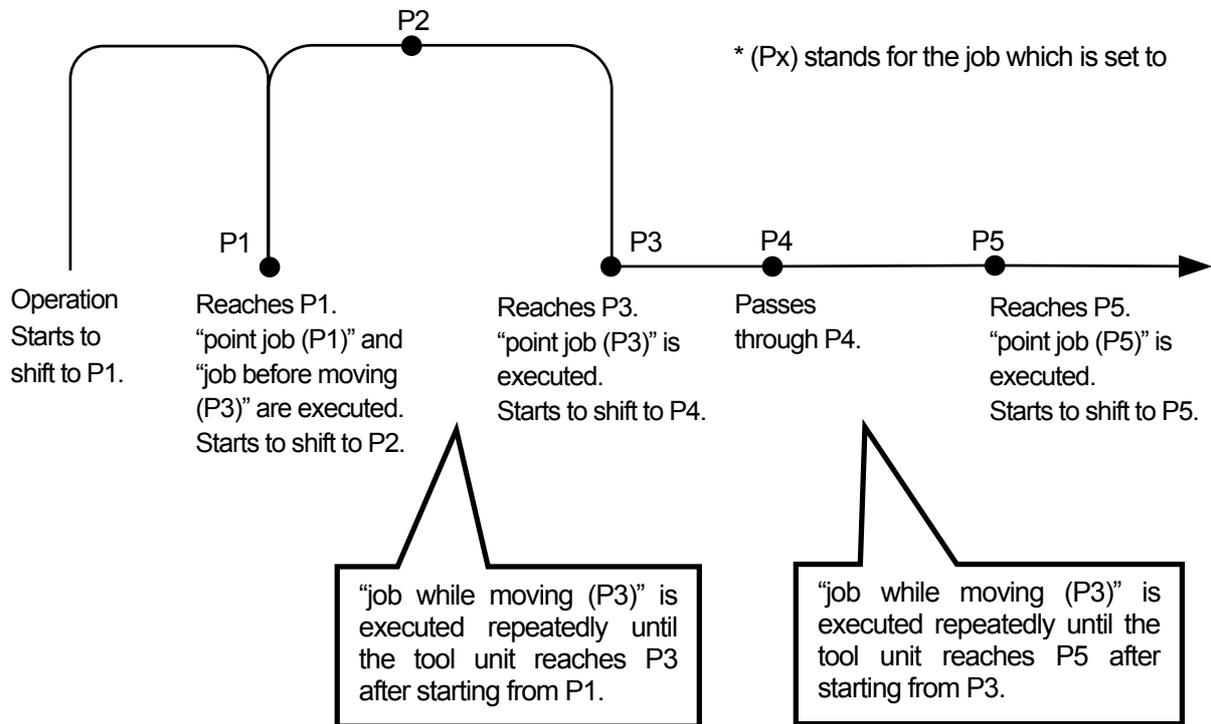
If you set the “job before moving” to the work home, the point job is executed when the tool unit returns to the work home from the last point after the cycle of operation.

Example: When the Job before Moving Is Set to the CP Start Point



If there is the following sequence of point types, each point job is executed as illustrated below.

- P1: PTP Point
- P2: PTP Evasion Point
- P3: CP Start Point
- P4: CP Passing Point
- P5: CP Stop Point

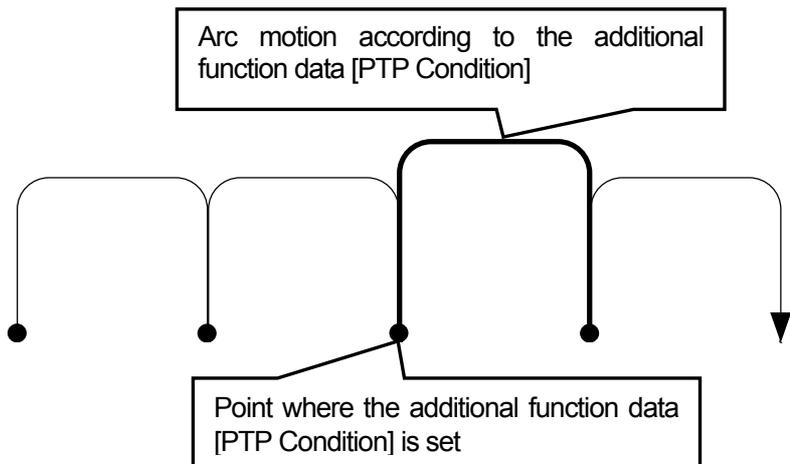


PTP CONDITION (ADDITIONAL FUNCTION DATA)

If you want to change the height of arc motion or speed between certain points in a program, create the additional function data [PTP Condition] and set it to the point where you want to change the condition. The tool unit shifts **from the designated point to the next point** according to the prepared additional function data [PTP Condition] instead of the program data [PTP Condition.]

The contents of the additional function data [PTP Condition] are exactly same as those of the program data [PTP Condition.]

All the PTP drive, except from the point where the additional function data [PTP Condition] is set, are designated based on the program data [PTP Condition.]



Point Type	PTP Point	CP Start Point	CP Passing Point	CP Stop Point	CP Arc Point	CP End Point	PTP Evasion Point	CP Circle Point	Work Home (PTP Point)	Work Home (CP Start Point)
O: can be set, X: cannot be set	O	X	X	X	X	O	X	X	O	X

TP MENU [Additional Function Data Settings]
[PTP Condition]

PC [Data] [Additional Function] [PTP Condition]

Create the additional function data [PTP Condition] and then set the number to the point where you want to change the condition.

- The additional function data [PTP Condition] set to a point in a program will not be changed even if you change the program data [PTP Condition.]

CP CONDITION (ADDITIONAL FUNCTION DATA)

If you want to change acceleration between certain points in a program, create the additional function data [CP Condition] and set it to the point you want to change the condition.

The contents of the additional function data [CP Condition] are exactly same as those of the program data [CP Condition.]

If you set the additional function data [CP Condition] to a CP start point or CP stop point, the tool unit shifts to the next CP end point or CP stop point according to the additional function data [CP Condition.] All the CP drive from any CP start point or CP stop point, except when the additional function data [CP Condition] is set to the point, are designated based on the program data [CP Condition.]

Point Type	PTP Point	CP Start Point	CP Passing Point	CP Stop Point	CP Arc Point	CP End Point	PTP Evasion Point	CP Circle Point	Work Home (PTP Point)	Work Home (CP Start Point)
O: can be set, X: cannot be set	X	O	X	O	X	X	X	X	X	O

TP  [Additional Function Data Settings]
[CP Condition]

PC  [Data] [Additional Function] [CP Condition]

Create the additional function data [CP Condition] and set the number to the point where you want to change the condition.

- The additional function data [CP Condition] set to a point in a program will not be changed even if you change the program data [CP Condition.]

TOOL DATA

If you want to change the tool center position or tool unit between certain points in a program, or when the tool weight will be changed during a pick & place operation, set the additional function [Tool Data] to the first point in the block.

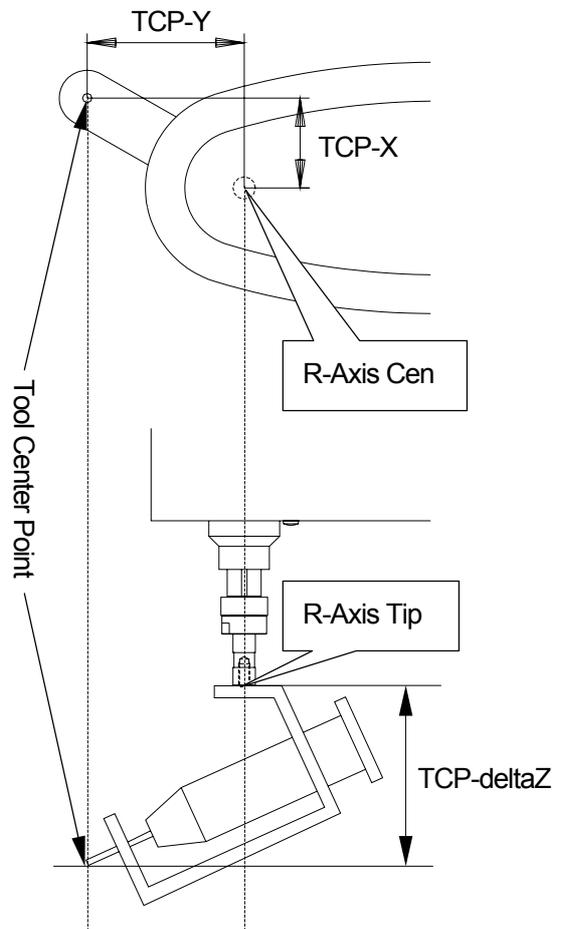
Point Type	PTP Point	CP Start Point	CP Passing Point	CP Stop Point	CP Arc Point	CP End Point	PTP Evasion Point	CP Circle Point	Work Home (PTP Point)	Work Home (CP Start Point)
O: can be set, X: cannot be set	O	O	X	X	X	X	X	X	O	O

The contents of the additional function data [Tool Data] are exactly same as those of the program data [Tool Data.]

The [Tool Weight] consists of the following four items.

- Tool Weight
- TCP-X: Distance in the X direction from the standard tool position (R-Axis center) to the tool center point
- TCP-Y: Distance in the Y direction from the standard tool position (R-Axis center) to the tool center point
- TCP-deltaZ: Distance in the Z direction from the standard tool position (R-Axis center) to the tool center point

Using [Direct TCP-XY Setting], you can calculate the values of [TCP-X] and [TCP-Y] by pointing the same point twice (from different R-Axis angles) at the tool center point.



TP **MENU** [Additional Function Data Settings]
[Tool Data]

PC [Data] [Additional Function] [Tool Data]

Create the additional function data [Tool Data] and set the number to the point you want to change the condition.

PALLET ROUTINE

Create the additional function data [Pallet Routine] and set it to the PTP point(s) if you want to place workpieces at the same point or at regular intervals. If you want to repeat the regular patterns, set the additional function data [Pallet Routine] to the CP start point. The usage of the pallet at the CP start point differs from that at the PTP points.

You can execute the pallet routine using the counter and position offset. The offset changes as the counter proceeds.

Point Type	PTP Point	CP Start Point	CP Passing Point	CP Stop Point	CP Arc Point	CP End Point	PTP Evasion Point	CP Circle Point	Work Home (PTP Point)	Work Home (CP Start Point)
O: can be set, X: cannot be set	O	O	X	X	X	X	X	X	O	O

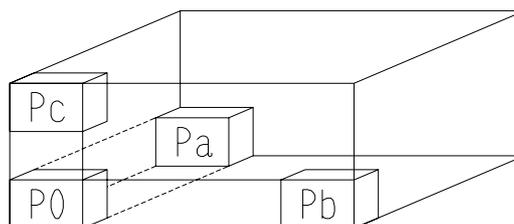
Type

There are six types of pallet routine.

1. Plane Pallet (two-dimensional repetition): 5 Rows, 4 Columns

P0				Pa
Pb				

2. Cubic Pallet (three-dimensional repetition): 4 Rows, 5 Columns, 6 Tiers



3. Row (one-dimensional repetition): 5 Rows

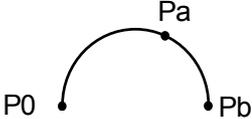


4. 1 Point Repeat (zero-dimensional repetition)

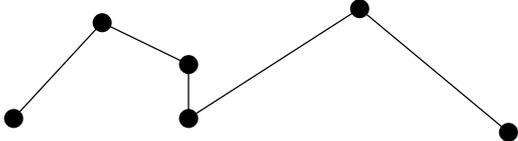


● In "1 Point Repeat", coordinates of the point will be the pallet routine job point.

5. Circle Pallet (two-dimensional repetition): increment angle 180 deg.



6. Free Form Pallet



Parameter

Depending on the pallet type, you may need to enter parameters.

You need to select either [Auto Increment] or [Increment by Point Job] for all the pallet routines.

If you select [Auto Increment], the count of the pallet counter will increase one by one automatically.

If you select [Increment by Point Job], you need to set the command that renews the pallet counter to the point job data.

Pallet Type	Parameter						
Plane Pallet	Row						
Cubic Pallet	Row						
Row	Row	Row	Row	Row	Row	Row	Row
1 Point Repeat	Repeat Number						
Circle Pallet	Repeat Number						
Free Form Pallet	Program Number						

P0, Pa, Pb, and Pc are coordinates to calculate the distance between the job points. Each coordinate in the pallet is the total of offsets (results of the following formulas) and **coordinates of the point**.

$$(Pa - P0) / (\text{Value of Row} - 1) \times \text{Value of Row Counter}$$

$$(Pb - P0) / (\text{Value of Column} - 1) \times \text{Value of Column Counter}$$

$$(Pc - P0) / (\text{Value of Tier} - 1) \times \text{Value of Tier Counter}$$

For example, if you set the following pallet to Point 01 (X: 50, Y: 20, Z: 30),

5 Rows

P0				Pa
X: 10				X: 110
Y: 100				Y: 100
Z: 0				Z: 0

The actual job points will be as follows:

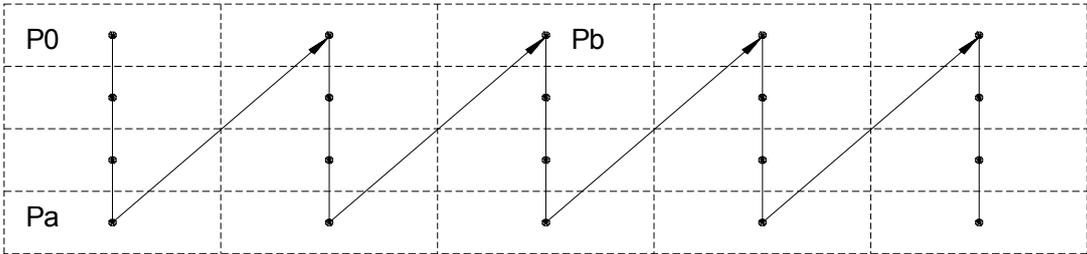
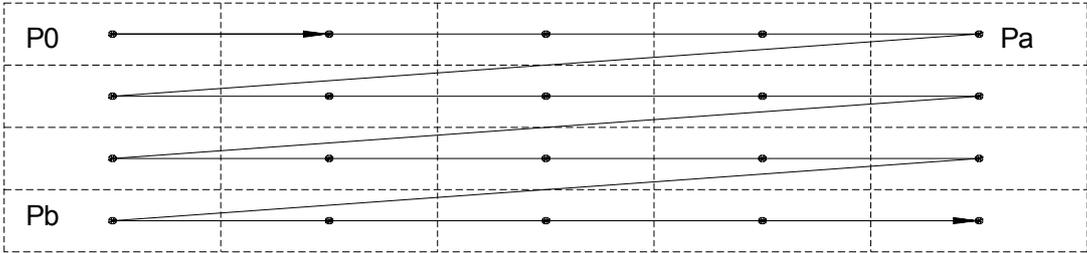
5 Rows

(1)	(2)	(3)	(4)	(5)	
X: 50	X: 75	X: 100	X: 125	X: 150	50+(110-10)/(5-1) x C
Y: 20	Y: 20	Y: 20	Y: 20	Y: 20	20+(100-100)/(5-1) x C
Z: 30	Z: 30	Z: 30	Z: 30	Z: 30	30+(0-0)/(5-1) x C

Points P0, Pa, Pb, and Pc are necessary because the distances between the points are used to calculate coordinates of each job point in the pallet.

Briefly, any numbers can be set to the coordinates of P0, Pa, Pb, and Pc as long as the distances are the same.

Order of job points in the pallet varies according to settings of the coordinates P0, Pa, or Pb as below. You can also set an inclined pallet.



Pallet Command by Point Job

The "Pallet Routine" consists of two functions to renew the pallet counter. One is [Auto Increment] that increases the count automatically. (The tool unit shifts to the next point in the pallet one by one.) The other is [Increment by Point Job] that does not increase the count unless it is set to the point job data to renew the counter. (The tool unit does not shift to the next point in the pallet.) They can be switched with each other.

If you select [Auto Increment], you don't need to set any point job command to control the pallet. The tool unit automatically shifts to the next point one by one and the pallet counter is renewed automatically. When the count reaches maximum, the tool unit shifts to the next point. (If the pallet is set to Point 03, the tool unit shifts to Point 04.)

There are three types of pallet command.

[loopPallet (LOOP)]: Add 1 to the count of the pallet counter.
If the count does not reach maximum, the tool unit shifts to the designated point.
[resPallet (RESET)]: Reset the counter to 0 (zero.)
[incPallet (INCREMENT)]: Add 1 to the count of the pallet counter.

The following commands get the same result with or without LOOP.

Add 1 to the counter of Pallet 10. If the count reaches maximum, shift to the next command.

If not, shift to Point 03.

With LOOP

```
loopPallet 10,3
```

Without LOOP

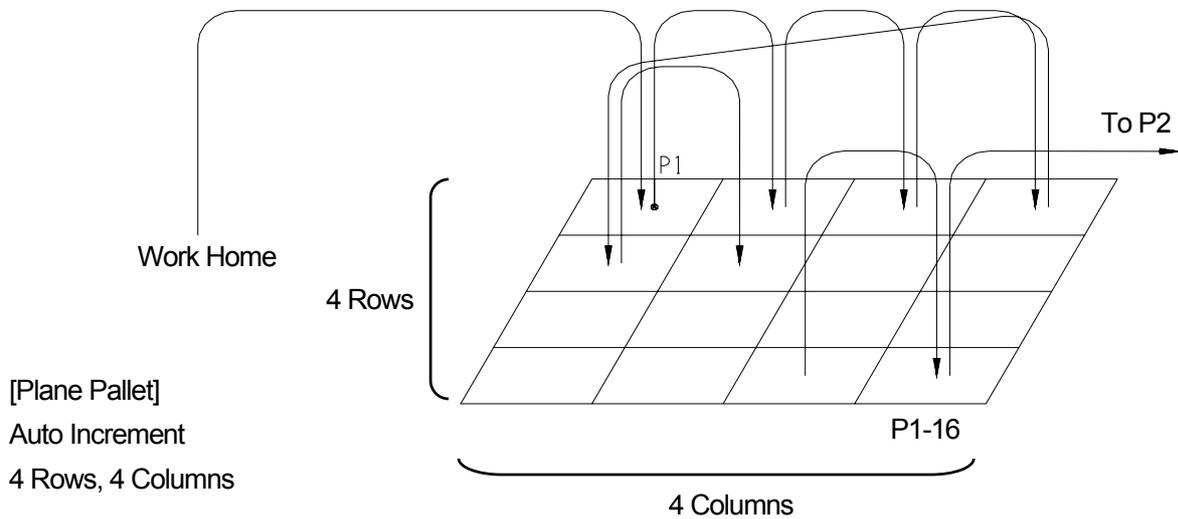
```
incPallet 10  
if  
  Id #palletFlag(10)  
else  
  goPoint PTP0,3  
endif
```

Pallet Routine at PTP Points

Set the additional function data [Pallet Routine] to the PTP point(s) if you want to place workpieces at the same point or at regular intervals.

If you set the “auto increment” pallet to the PTP point(s), the tool unit will shift as illustrated below.
The job flow is as follows:

1. Register the pallet routine.
2. Set the “Pallet Routine” number to the point data.



TP → **MENU** [Additional Function Data Settings]
[Pallet Routine]

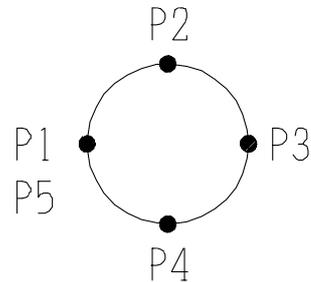
PC → [Data] → [Additional Function Data] → [Pallet Routine]

Create the additional function data [Pallet Routine] and set the number to the desired point.

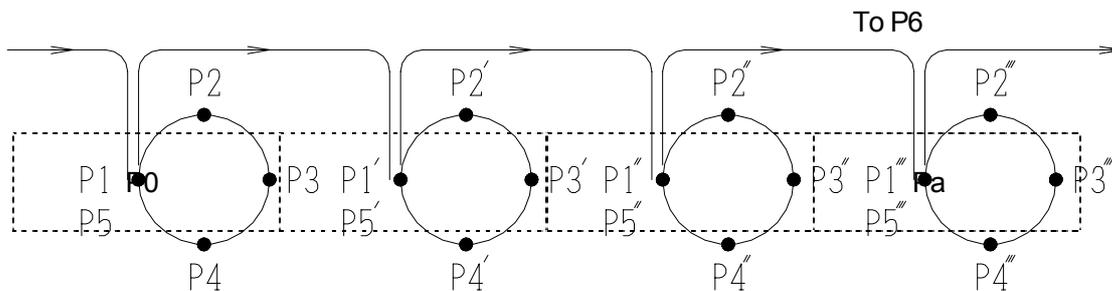
Pallet Routine at CP Start Point

Register the following points from P1 to P5 and set the [Pallet Routine] to P1 (CP start point.)

- P1: CP Start Point (start of dispensing)
- P2: CP Arc Point
- P3: CP Passing Point
- P4: CP Arc Point
- P5: CP End Point (end of dispensing)



If you set the auto increment pallet to a CP start point, the tool unit will shift as illustrated below. The robot recognizes the sequence of points (from P1: CP Start Point to P5: CP End Point) as a pattern and repeats operation as many times as there are pallets.



Pallet Type: Row

Increment: Auto

Row: 4

TP **MENU** [Additional Function Data Settings]
[Pallet Routine]

PC [Data] → [Additional Function Data] → [Pallet Routine]

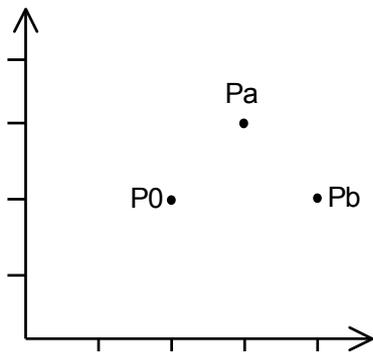
Create the additional function data [Pallet Routine] and set the number to the desired point.

Circle Pallet

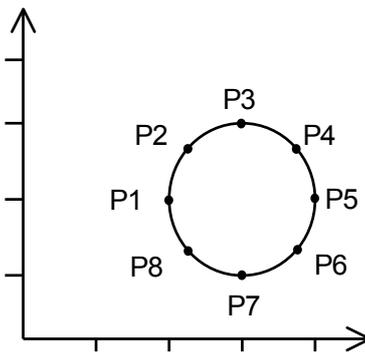
If you select [Circle Pallet] from the additional function data [Pallet Routine] parameters, you can use arc and circle pallets.

Designate any three points to determine the pallet size and execution sequence. You can divide the circle pallet by selecting [Times.]

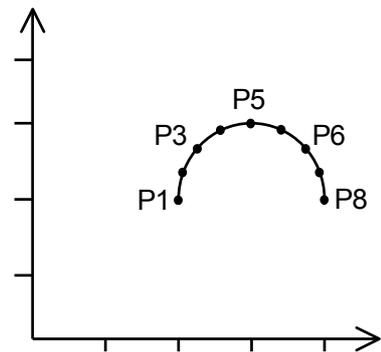
You can make an arc pallet if you change [Step Angle.]



e.g. Sequence: P0→Pa→Pb direction
If P0 and Pb are switched, the sequence is reversed.



e.g. Times: 8 Step
Angle: 45



e.g. Times: 8
Step Angle: 22.5

TP MENU [Additional Function Data Settings]
[Pallet Routine]

PC [Data] → [Additional Function Data] → [Pallet Routine]

Create the additional function data [Pallet Routine] and set the number to the desired point.

Pick & Place at Pallet

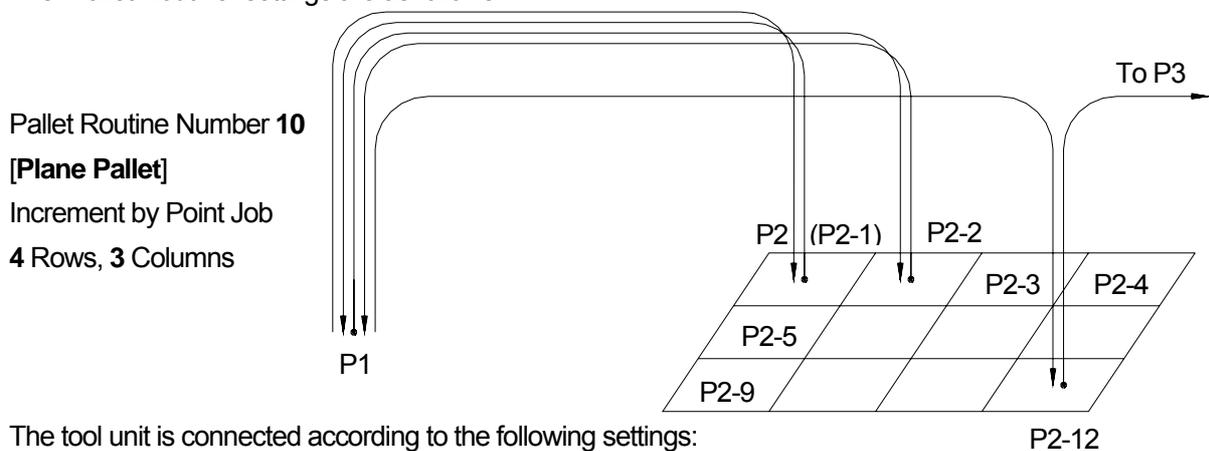
Example: To Place a Workpiece on the Pallet

The tool unit picks up a workpiece at Point 01 (P1) and places it on the pallet (set to Point 02 [P02].)
If the pallet becomes full, the tool unit shifts to the next point (P3.)

The job flow is as follows:

1. Register the pallet routine.
2. Register the point job data.
3. Set the "Pallet Routine" number to the point data.
4. Set the point job number to the point data.

The "Pallet Routine" settings are as follows:



The tool unit is connected according to the following settings:

- Picking up a workpiece: #genOut1 (I/O-1) = ON
- Placing a workpiece: #genOut1 (I/O-1) = OFF

Point Job Data 15

set #genOut1

Pick up a workpiece.

Point Job Data 16

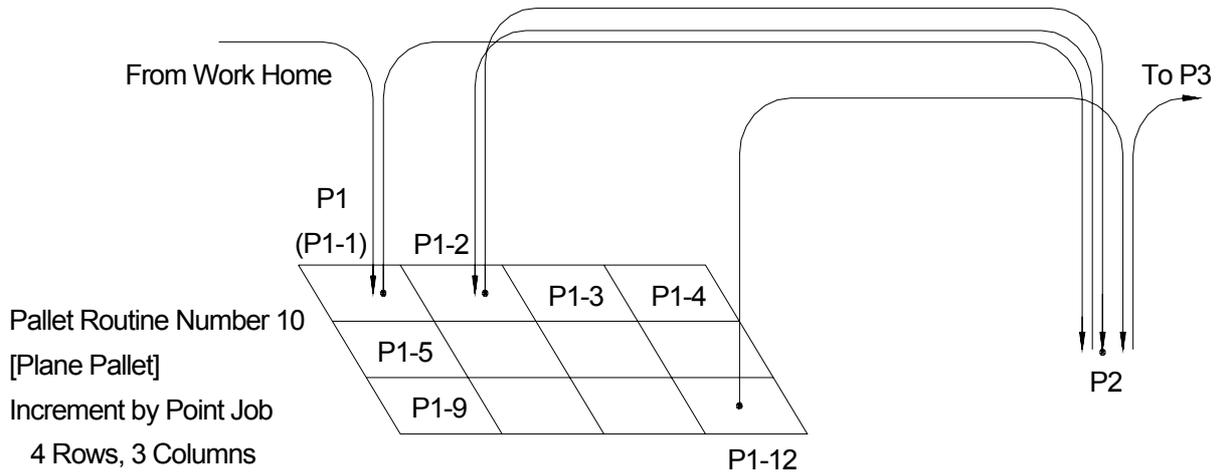
reset #genOut1 loopPallet 10,1

Place (Release) a workpiece.
Add "1" to the counter of Pallet 10.
If the counter reaches maximum, go to the next command.
(In this example, the point job is over because there are no more commands.)
If not, shift to Point 01 (P1).

Job and Additional Function to Be Set	
Point 01 (P1)	Point 02 (P2)
Point Job Data 15	Point Job Data 16 Additional Function Data Pallet Routine No. 10

Example: To Pick up a Workpiece from the Pallet

The tool unit picks up a workpiece on the pallet (set to Point 01 [P01]) and places it on Point 02 (P2.) If all the workpieces are picked up and placed, the tool unit shifts to the next point (P3.)



Point Job 5

set #genOut1	Pick up a workpiece.
--------------	----------------------

Point Job 6

reset #genOut1 loopPallet 10,1	Place (Release) a workpiece. Add "1" to the counter of Pallet 10. If the counter reaches maximum, go to the next command. (In this example, the point job is over because there are no more commands.) If not, shift to Point 01 (P1).
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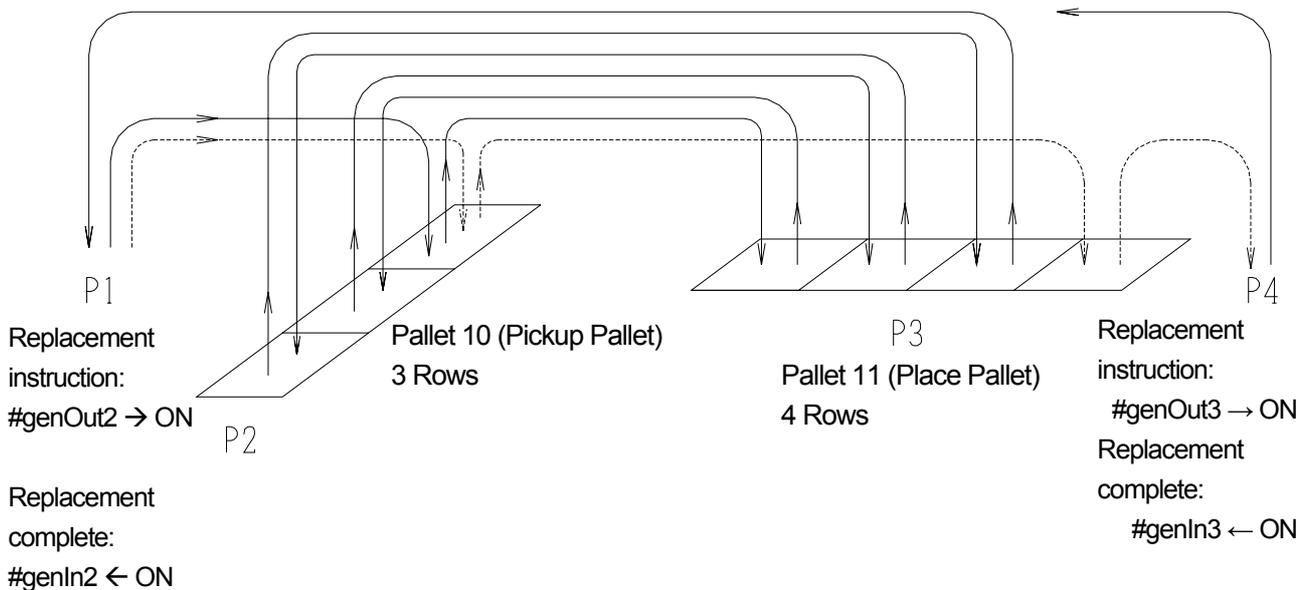
Job and Additional Function to Be Set	
Point 01 (P1)	Point 02 (P2)
Point Job Number 05 Additional Function Data Pallet Routine No. 10	Point Job Number 06

Example: Pick & Place between Pallets

In this example, how to set the point job data for pick and place operation between two pallets of different sizes is explained.

Condition

- Pick up a workpiece from Pallet 10 (set to Point 02 [P2]) and place it on Pallet 11 (set to Point 03 [P3].)
- If the pickup pallet (Pallet 10) becomes empty, return to Point 01 (P1) and wait until the pallet is replaced.
- If the place pallet (Pallet 11) becomes full, shift to Point 04 (P4) and wait until the pallet is replaced.
- Pickup pallet: Pallet Routine No. 10, [Row], 3 Rows, Increment by Point Job
- Place pallet: Pallet Routine No. 11, [Row], 4 Rows, Increment by Point Job
- Picking up a workpiece: #genOut1 = ON
- Placing a workpiece: #genOut1 = OFF
- Pickup pallet replacement instruction: #genOut2 = ON
- Pickup pallet replacement complete: #genIn2 = ON
- Place pallet replacement instruction: #genOut3 = ON
- Place pallet replacement complete: #genIn3 = ON



Point Job 05 (Set to Point 02 [P2])

```
set #genOut1
```

Pick up a workpiece.

Point Job 06 (Set to Point 03 [P3])

```
reset #genOut1  
incPallet 10  
incPallet 11  
if  
  Id #palletFlag(11)  
then  
  goPoint PTP0,4  
endif  
if  
  Id #palletFlag(10)  
then  
  goPoint PTP0,1  
endif  
goPoint PTP0,2
```

Place a workpiece.
Add "1" to the counter of the pickup pallet.
Add "1" to the counter of the place pallet.
If
 the place pallet is full,

 shift to Point 04 (P4.)

If
 the pickup pallet is empty,

 shift to Point 01(P1.)

Shift to Point 02 (P2.)

Point Job 07 (Set to Point 04 [P4])

```
set #genOut3  
waitCond  
  Id #genIn3  
endWait  
reset #genOut3  
if  
  Id #palletFlag(10)  
then  
  goPoint PTP0,1  
endif  
goPoint PTP0,2
```

Place pallet replacement instruction ON

Wait for the place pallet replacement completed signal.

Place pallet replacement instruction OFF
If
 the pickup pallet is empty,

 shift to Point 01(P1.)

Shift to Point 02 (P2.)

Point Job 08 (Set to Point 01 [P1])

```
set #genOut2  
waitCond  
  Id #genIn2  
endWait  
reset #genOut2
```

Pickup pallet replacement instruction ON

Wait for the pickup pallet replacement completed signal.

Pickup pallet replacement instruction OFF

Job and Additional Function to Be Set	
Point 01 (P1)	Point 02 (P2)
Point Job Number 08	Point Job Number 05 Additional Function Data Pallet Routine No. 10 (Row, 3 Rows)

Job and Additional Function to Be Set	
Point 03 (P3)	Point 04 (P4)
Point Job Number 06 Additional Function Data Pallet Routine No. 11 (Row, 4 Rows)	Point Job Number 07

How to Stop Pallet Routine

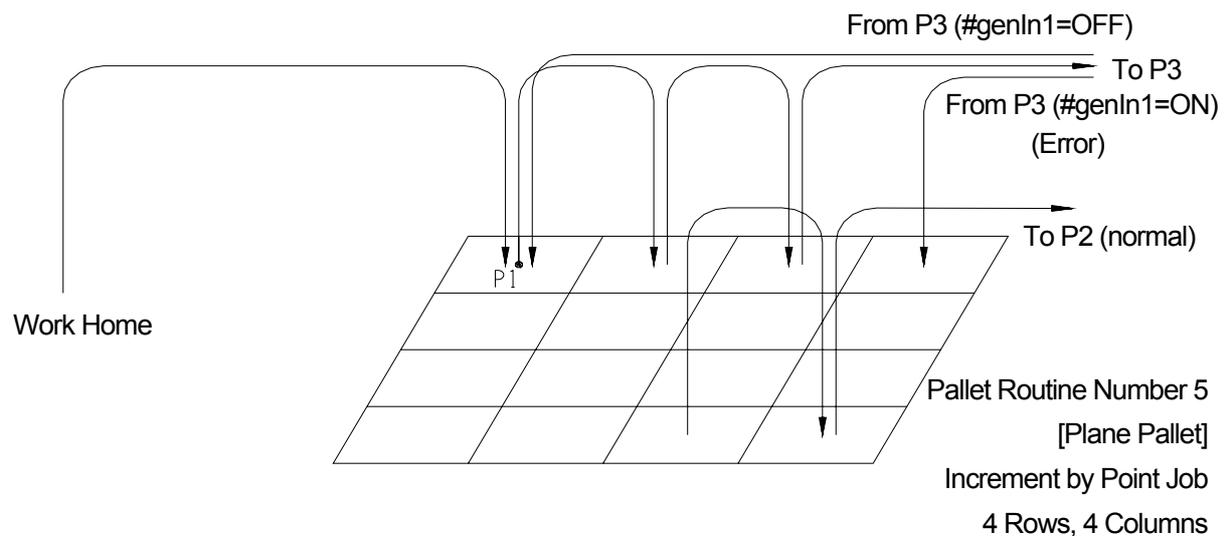
In some cases, you have to stop the pallet routine in the middle of operation. You can stop the pallet routine using the point job data and combination of “if” and “goPoint” commands.

If you want to restart the pallet routine from the beginning, you have to reset the pallet counter. Unless the counter is reset, the robot restarts operation from the point where it stopped the operation.

To reset the pallet counter, set a reset command to the point job data. “reset” is the point job command to reset the pallet counter. If you enter a pallet routine and its number to the “reset” parameters, you can reset the pallet counter designated by number.

e.g.: If an error has occurred (#genIn1=ON) during operation at Pallet 05 (set to Point 01 [P1]), the tool unit shifts to Point 03 (P3).

The robot sounds a buzzer and waits for a start signal at Point 03 (P3.) If the robot receives the start signal and genIn1 is ON, it restarts operation from the next point where the error occurred. If #genIn1 is not ON, the robot restarts the pallet routine from the beginning.



Point Job Data 20

```
set #genOut3
waitCondTime 800
reset #genOut3
if
  Id #genIn1
then
  goPoint PTP2,3
endif
```

ON Output to #genOut3
in 0.8 seconds,
OFF output to #genOut3
(Normal job at Point 01)

If,
#genIn1 is ON (error),
shift to Point 03 (P3.)

Point Job Data 21

```
waitStartBZ
if
  Id #genIn1
then
  goPoint PTP2,1
else
  resPallet 5
  goPoint PTP2,1
endif
```

Sound buzzer and wait for a start signal.

If,

#genIn1 is ON (error),
shift to Point 01 (P1.)

#genIn1 is not ON (not error),
reset Pallet Number 5 counter and
shift to Point 01 (P1.)

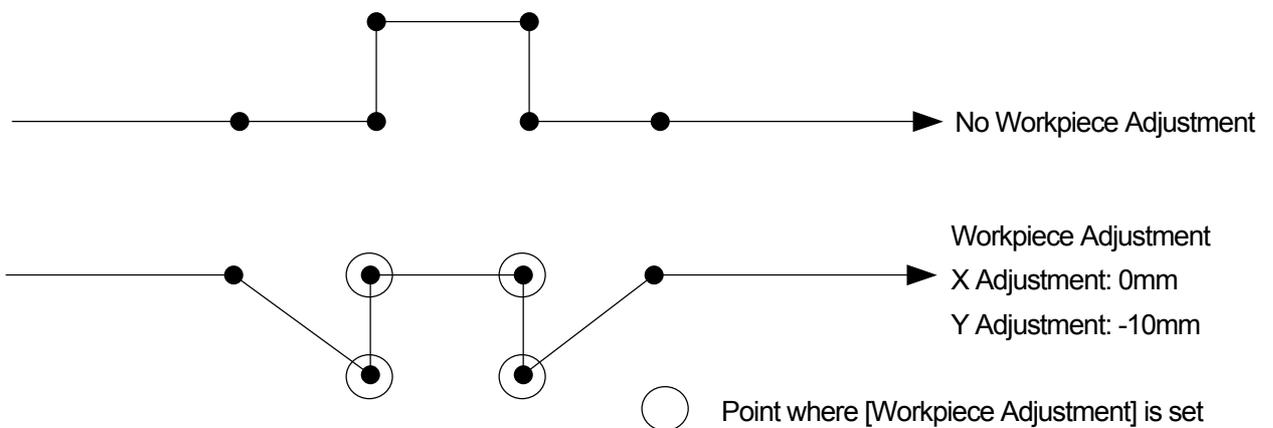
- If #genIn1 is ON (error), the tool unit shifts to the point where it stopped after returning to P1 since the counter pallet is not reset. If genIn1 is not ON (normal: the tool unit shifts from P2 to P3.), the tool unit shifts to the first point in the pallet after returning to P1 since the pallet counter is reset.

Job and Additional Function to Be Set	
Point 01 (P1)	Point 03 (P3)
Point Job Data 20	Point Job Data 21
Additional Function Data Pallet Routine No. 05	

WORKPIECE ADJUSTMENT (NUMERIC ADJUSTMENT)

You can shift the designated point position (coordinates) by entered number.

Create the additional function data [Workpiece Adjustment] and set it to the point which you want to shift.



Settable Points

Point Type	Work Home (PTP Point)	Work Home (CP Start Point)	PTP Points	CP Start Point	CP Passing Point	CP Stop Point	CP Arc Point	CP Circle Point	CP End Point	PTP Evasion Point
Can be set: O, cannot be set: X	O	O	O	O	X	X	X	X	X	X

TP **MENU** [Additional Function Data Settings]
[Workpiece Adjustment]

PC [Data] [Additional Function Data] [Workpiece Adjustment]

Create the additional function data [Workpiece Adjustment] and set the number to the desired point.

- You can set the designated work adjustment number to the designated array (block) of points. If the [Work Adjustment] is already set to a point in the block, it will be replaced by the designated work adjustment number.



EDIT

[Block Editing]

Enter a Block Start Number.

Enter a Block End Number.

[Set Work Adjustment Number]

EXECUTE CONDITION

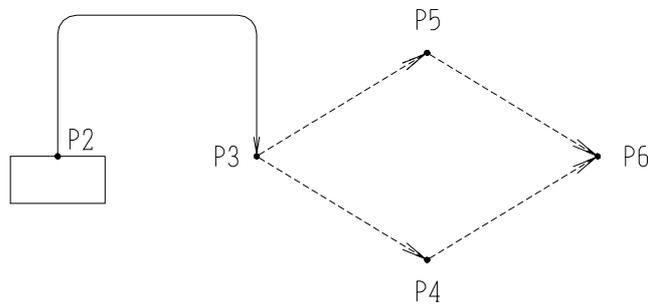
You can change the shifting route of the tool unit according to the designated conditions.

e.g. In this example, a sensor is connected to I/O-1. Set the result of judgement at Point 02 (P2) detected by the sensor to #genIn1 (I/O-1) as ON/OFF and save it in #mv(1) (built-in Boolean variable.) Then set the additional function data [Execute Condition] to Point 04 (P4) to “execute operation if #mv(1) is ON.” and to Point 05 (P5) to “execute operation if #mv(1) is OFF.”

Under the conditions above, the shifting route will be as follows:

#mv(1) = ON: P3→P4→P6

#mv(1) = OFF: P3→P5→P6



Contents of [Execute Condition]

For Point 04 (P4)

Id #mv(1)

For Point 05 (P5)

Idi #mv(1)

Settable Points

Point Type	Work Home (PTP Point)	Work Home (CP Start Point)	PTP Point	CP Start Point	CP Passing point	CP Stop Point	CP Arc Point	CP Circle Point	CP End Point	PTP Evasion Point
O: can be set, X: cannot be set	O	O	O	O	O	O	O	O	O	O

TP MENU [Additional Function Data Settings]
[Execute Condition]

PC [Data] → [Additional Function Data] → [Execute Condition]

Create the additional function data [Execute Condition] and set the number to the desired point.

TAG CODE

You can set a value (tag code) to a point. The tag code can be output to the I/O-SYS, I/O-1, I/O-H (only available for the JS series), and free Boolean variables {#mv(1 – 99), #mkv(1 – 99)} by a “dataOut” command.

For example, if you set different values to multiple points as the tag code, you can output the different values by using the same point job data.

Settable Points

Point Type	Work Home (PTP Point)	Work Home (CP Start Point)	PTP Point	CP Start Point	CP Passing Point	CP Stop Point	CP Arc Point	CP Circle Point	CP End Point	PTP Evasion Point
O: can be set, X: cannot be set	O	O	O	O	O	O	X	X	O	X

TP  (Display a blank line.)
[Tag Code]

PC  [Tag Code] (main screen)

Point Job Data

To output the tag code, use the “dataOut” command.

When registering the point job data, select a command category [ON/OFF Output Control], an output command [dataOut], and [Output Tag Code] in order.

The “dataOut” command requires two parameters: [Output Bit Number] (numbers of I/O to output) and [Output Number] (smallest number in the I/O to output; for example, select “8” if you use from #genOut8 to 10.)

Example:

Designation	Command	Output
Tag Code: 6		6 = 110 (binary sys.)
Output Bit Number: 3	DataOut #point_TagCode,#genOut8,3	#genOut8: 0 (OFF)
Output Number: #genOut8		#genOut9: 1 (ON)
		#genOut10: 1 (ON)

- Be sure to use sequential I/O numbers or free Boolean variables.
- Up to 31 output bit numbers can be set. However, you cannot output to different I/Os. For example, if you set the output bit number 20 to the #genOut14, the excess digits will be omitted (because the maximum #genOut is 22.) If the output value does not fall within the output bit numbers, the excess digits will also be omitted.

Example:

Designation	Command	Output
Tag Code: 14		14 = 1110 (binary sys.)
Output Bit Number: 3	dataOut #point_TagCode,#genOut8,3	#genOut8: 0 (OFF)
Output Number: #genOut8		#genOut9: 1 (ON)
		#genOut10: 1 (ON)

Warranty

Henkel Corporation warrants, to the original Buyer for a period of one (1) year from date of delivery, that the Loctite® Equipment or System sold by it is free from defects in material and workmanship. Henkel will, at its option, replace or repair said defective parts. This warranty is subject to the following exceptions and limitations.

1. Purchaser Responsibilities – The Purchaser shall be responsible for:
 - Maintenance of the equipment as outlined in the Equipment Manual for the product.
 - Inventory of recommended maintenance parts established by Henkel;
 - Notification to Henkel within 6-8 hours of downtime.
 - Any cost of travel or transportation connected with warranty repair.
 - All cost associated with investigating or correcting any failure caused by the purchaser's misuse, neglect or unauthorized alteration or repair.
 - All costs attributed to accident or other factors beyond Henkel's control.

2. A thirty (30) day warranty will be extended on any items subject to normal wear, such as:
 - Pump Seals -Tubing -Wear Surfaces of Wiping Rollers
 - O-Rings -Hoses

Purchased items used in Loctite® dispensing equipment are covered under warranties of their respective manufacturers and are excluded from coverage under this warranty. Typical purchased items are:

- Solenoids -Electrical Relays -Refrigeration Units
- Timers -Fluid Power Cylinders -Electrical Motors

3. No warranty is extended to perishable items, such as:
 - Fuses -Dispensing Needles -Dispensing Nozzles
 - Light Bulbs -Lamps -Product Barrels

Henkel reserves the right to make changes in design and/or improvements to its equipment without obligation to include these changes in any equipment previously manufactured.

Henkel's warranty herein is in lieu of and excludes all other warranties of Henkel and its affiliated and related companies (hereinafter the "seller companies"), express, implied, statutory, or otherwise created under applicable law including, but not limited to, any warranty or merchantability and/or fitness for a particular purpose of use. In no event shall the seller and/or the seller companies be liable for any direct, indirect, special, incidental or consequential damages, including, but not limited to, loss of profits. In addition, this warranty shall not apply to any products, which have been subjected to abuse, misuse, improper installation, improper maintenance or operation, electrical failure or abnormal conditions; and to products, which have been tampered with, altered, modified, repaired or reworked by anyone not approved by seller. Buyer's sole and exclusive remedy under this warranty shall be limited to, at seller's discretion, the replacement or repair of any defective product or part thereof, or a refund of the purchase price paid by for the product in exchange for buyer's return of the product to seller, free and clear of any and all liens and encumbrances of any nature.

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