

# LOCTITE®

## EQUIPMENT OPERATION MANUAL



## Cartesian 200, 300, 400 and 500 Series

# Basic Instructions

Thank you for purchasing a 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

### 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

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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 operation manual consists of the following volumes.

Setup	This volume explains how to set up the robot. <b>You must read this volume before you operate the robot.</b>
Maintenance	This volume explains how to maintain the robot.
Basic Instructions	This volume provides safety precautions, part names, and the basic knowledge necessary to operate the Benchtop Series. <b>You must read this volume before you operate the robot.</b>
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.

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 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.**

# CONTENTS

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## Basic Instructions

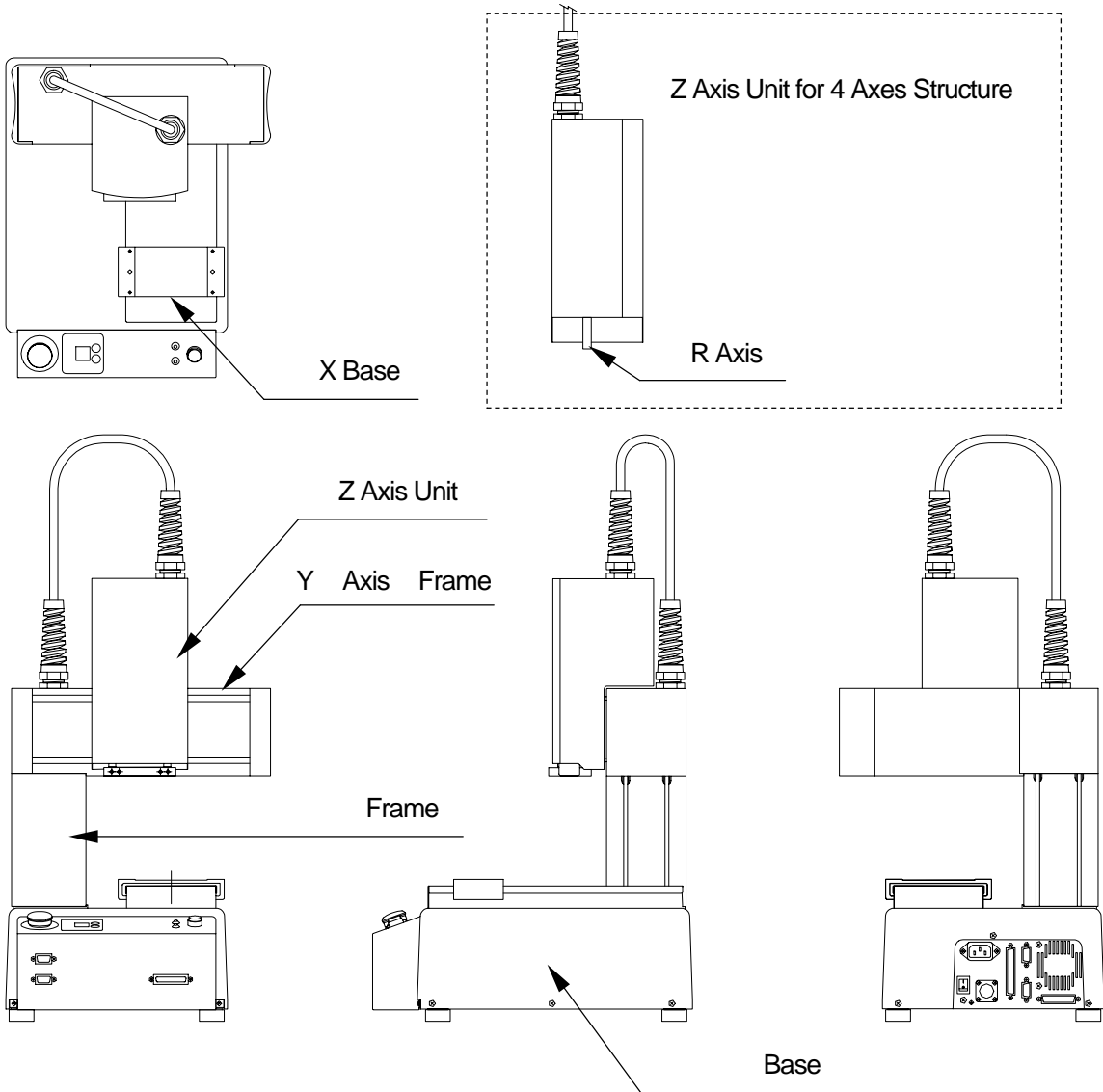
FOR YOUR SAFETY	i
PREFACE	v
CONTENTS	vi
PART NAMES	1
COMPOSITION OF EQUIPMENT	7
COORDINATE SYSTEM	8
PTP/CP Drive	9
MODE CHANGE	10
EXTERNAL RUN MODE	11
Program Start	11
Emergency Stop	12
Program Select	12
RUN MODE	13
Program Start	13
Emergency Stop	14
Program Select	14

TEACHING MODE _____	15
Types of Teaching Data _____	15
Program _____	15
Common Data Settings _____	19
Condition Data Settings _____	19
Point Job Data _____	19
Additional Function Data _____	19
Sequencer Program _____	20
Run Mode Parameter _____	20
Data Save _____	21
Correlation between Teaching Data _____	23
 ADMINISTRATION MODE _____	 24
Administration Settings Mode _____	24
Diagnosis Mode _____	24
Mechanical Adjustment Mode _____	25
Version Information _____	25
 CUSTOMIZING MODE _____	 26
Types of Customizing Data _____	26
Teaching Mode Customizing Data _____	26
Account _____	27
Point Type Definition _____	27
Variable Definition _____	29
User Function Definition _____	29
Sequencer Settings _____	29
Alias Definition _____	30
Point Job Data Setting _____	30
Additional Function Data Setting _____	30
 TEACHING ENVIRONMENTS SETTING _____	 31

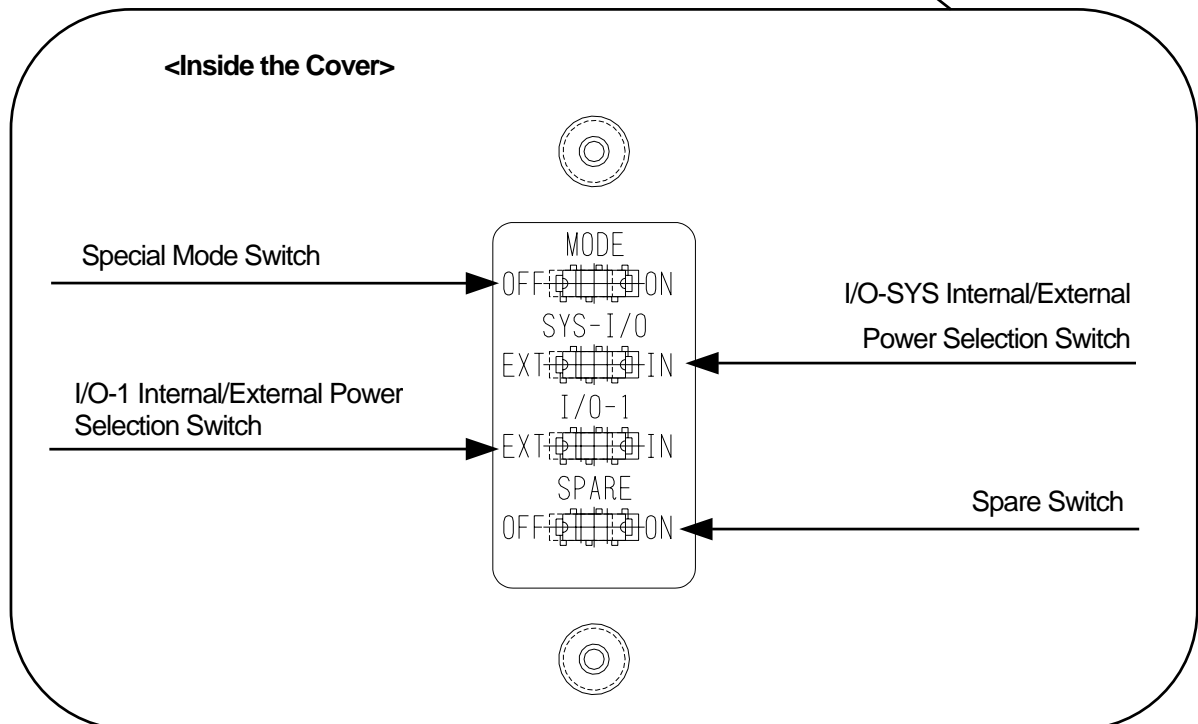
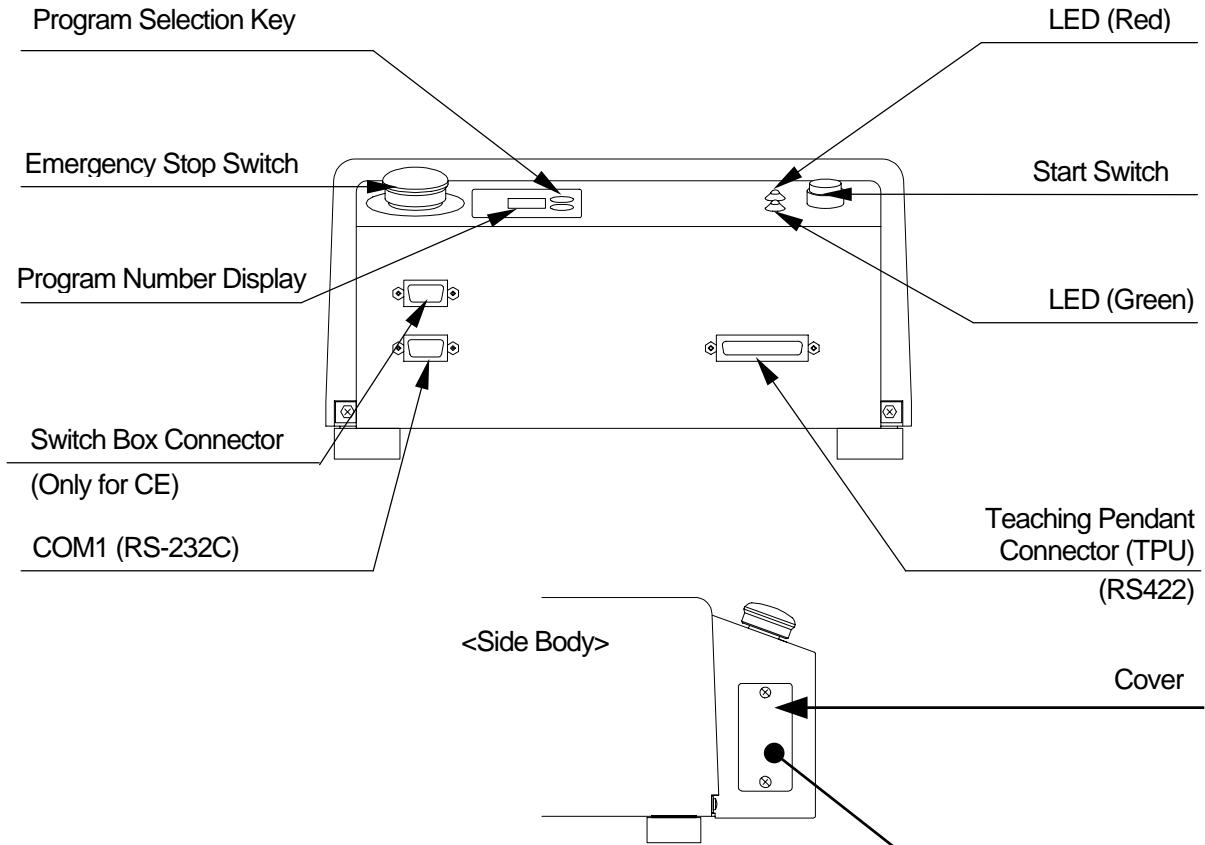


# PART NAMES

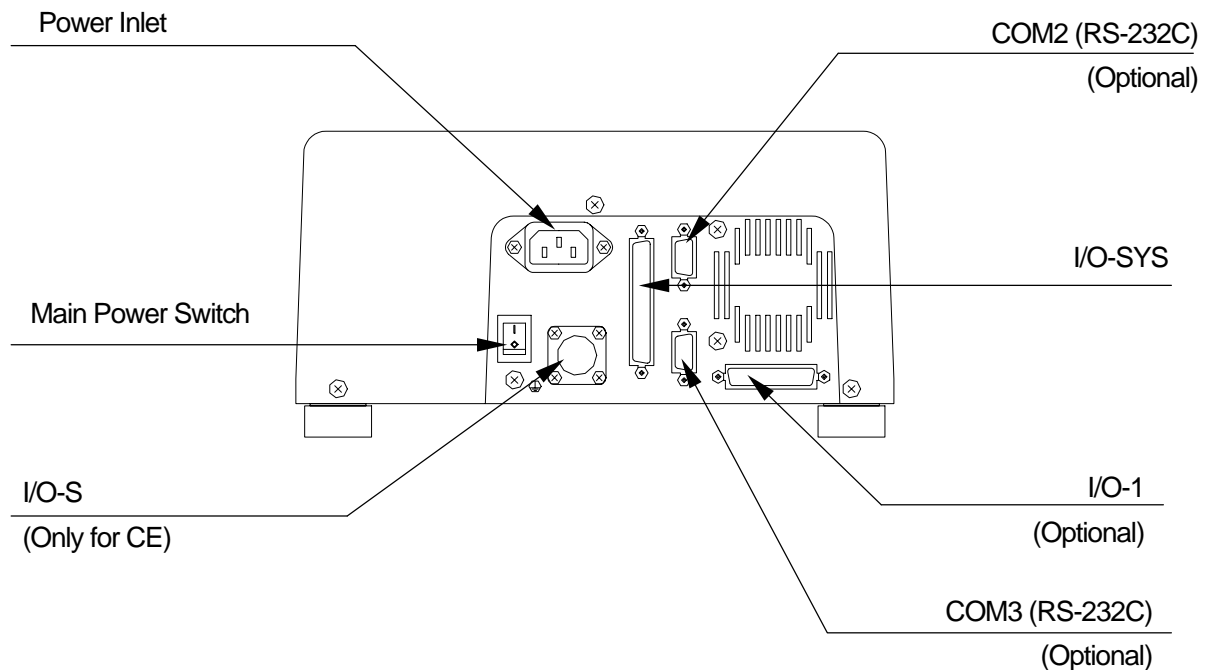
## Body



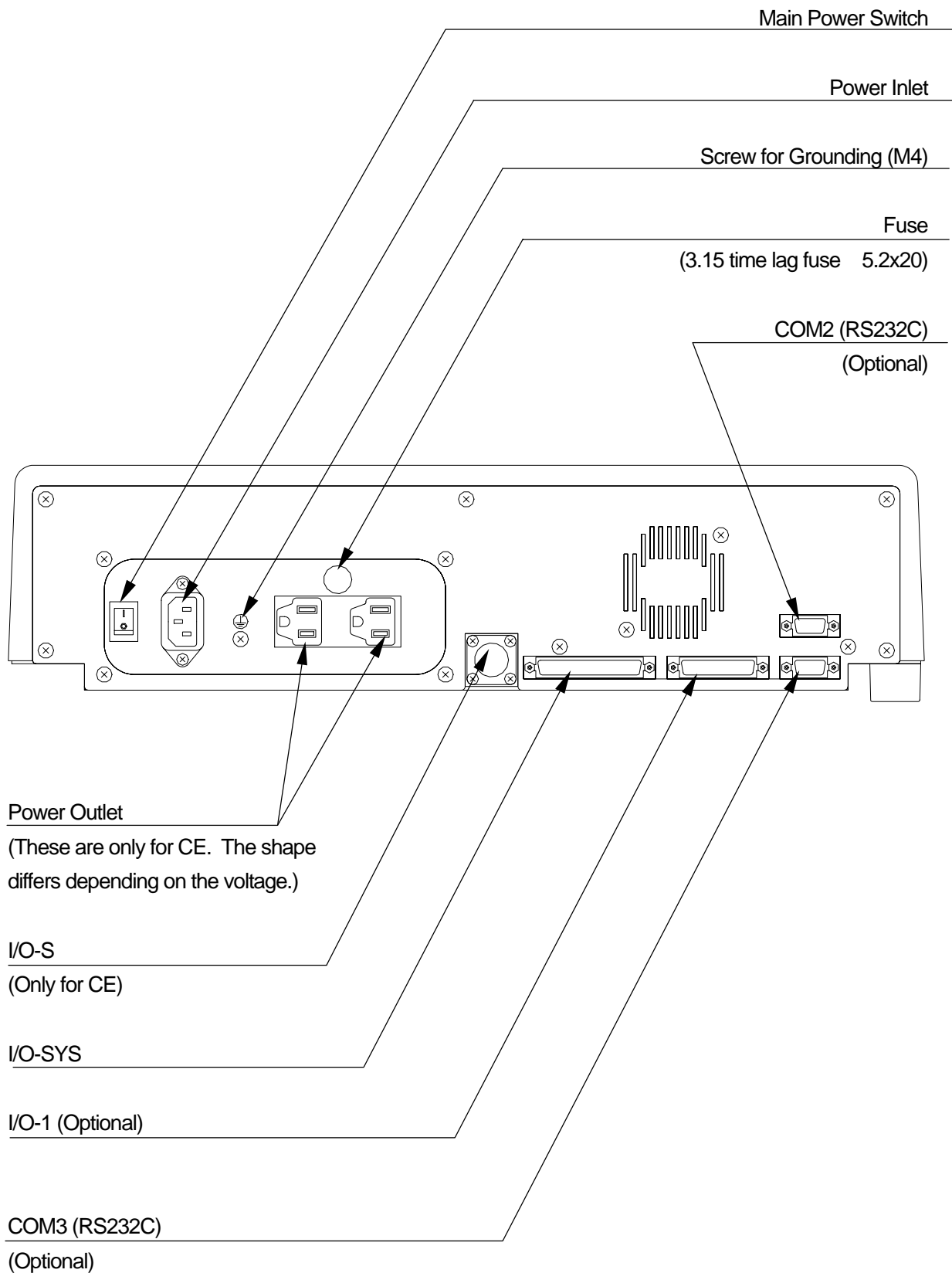
## Front view of the operation part



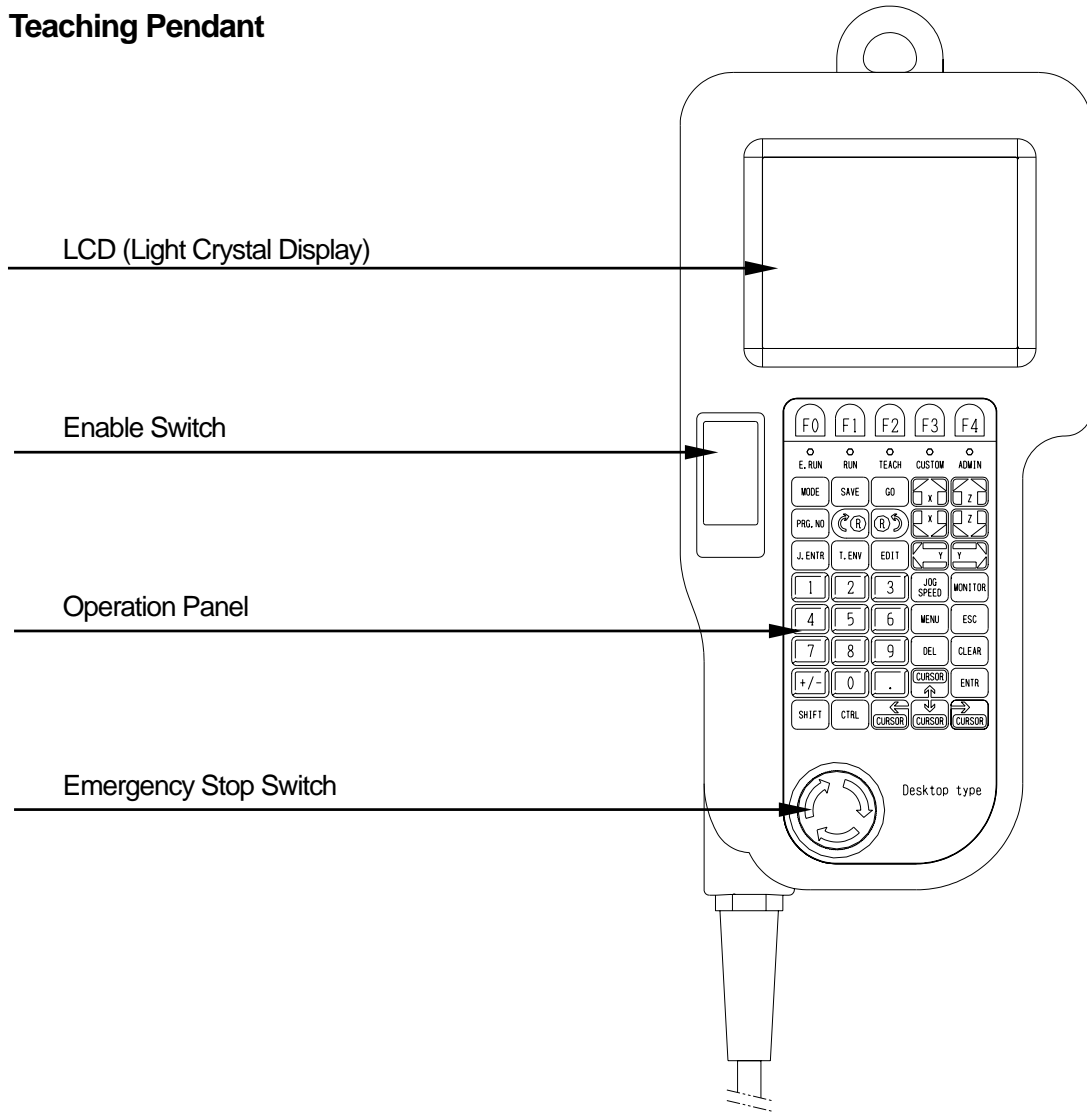
## Back view of the operation part, 200 series



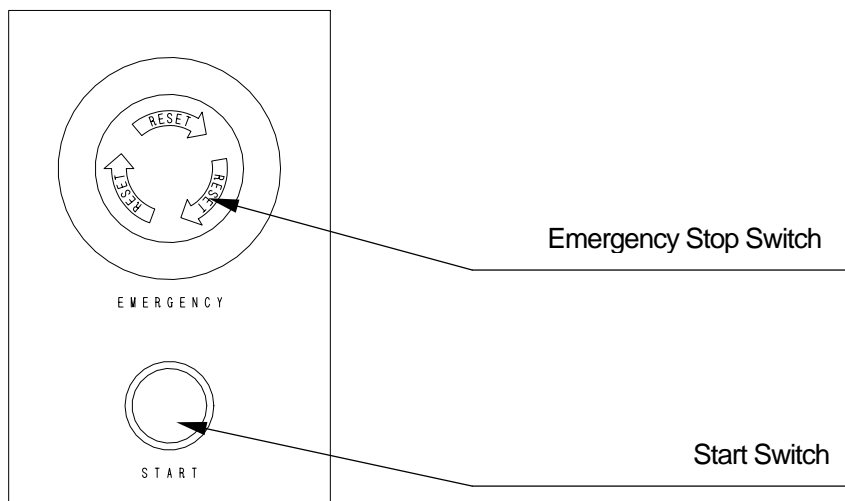
## Back view of the operation part, 300, 400 and 500 series



## Teaching Pendant



## Switch Box (Only for CE)



## Teaching Pendant Keys

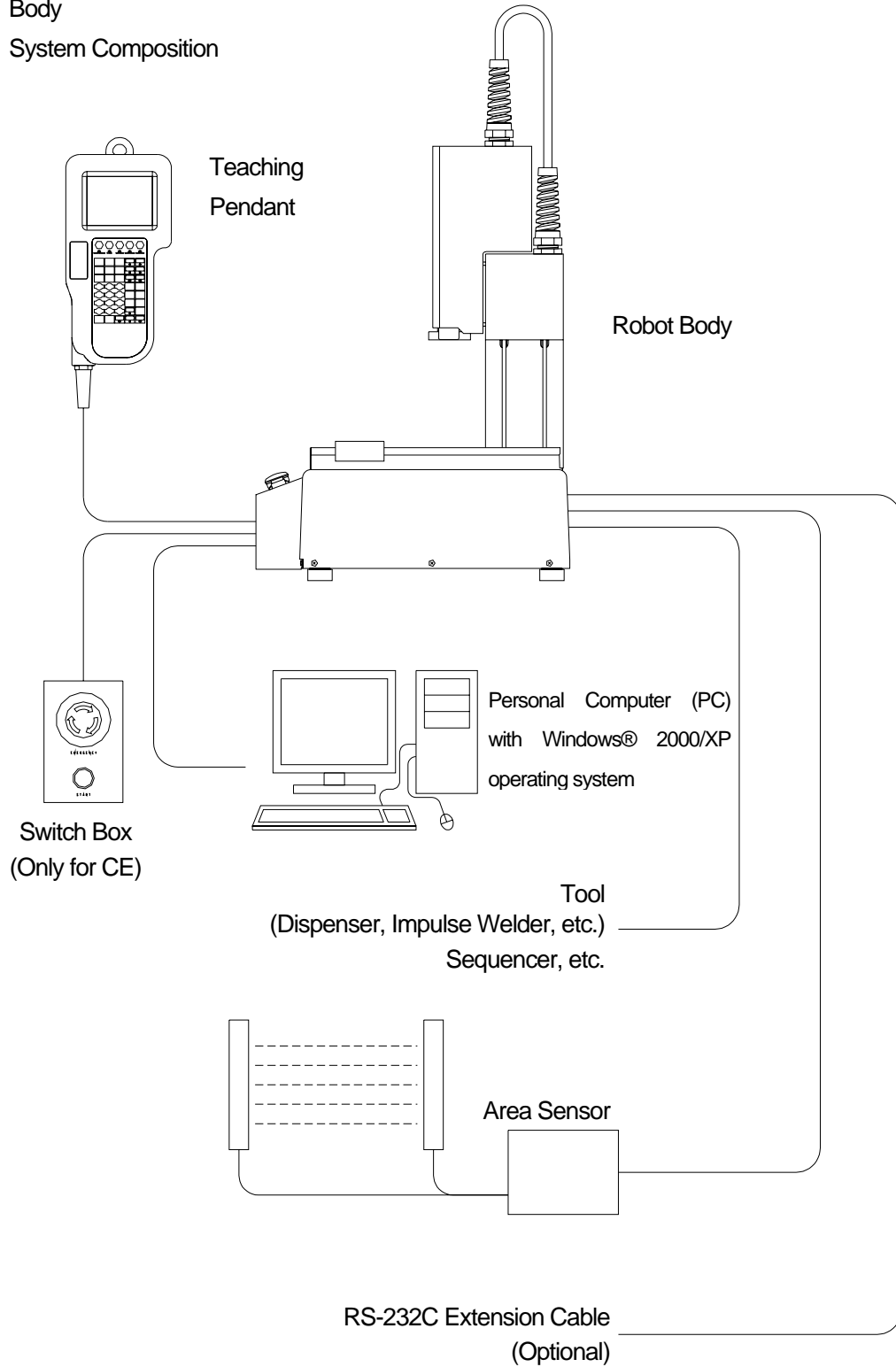
<p><b>F0</b> ----- Function 0 Key</p> <p><b>F1</b> ----- Function 1 Key</p> <p><b>F2</b> ----- Function 2 Key</p> <p><b>F3</b> ----- Function 3 Key</p> <p><b>F4</b> ----- Function 4 Key</p>		<p><b>X+</b> ----- X Plus Key</p> <p><b>X-</b> ----- X Minus Key</p> <p><b>Y-</b> ----- Y Minus Key</p> <p><b>Y+</b> ----- Y Plus Key</p> <p><b>Z↑</b> ----- Z Up Key</p> <p><b>Z↓</b> ----- X Down Key</p> <p><b>R+</b> ----- R Plus Key</p> <p><b>R-</b> ----- R Minus Key</p>	<b>JOG KEYS</b>
<p><b>MODE</b> ----- MODE Key</p> <p><b>SAVE</b> ----- SAVE Key</p> <p><b>GO</b> ----- GO Key</p> <p><b>PROG.NO</b> --- PROGRAM NO Key</p> <p><b>J.ENTR</b> ----- J ENTER Key</p> <p><b>T.ENV</b> ----- T.ENV Key*</p> <p><b>EDIT</b> ----- EDIT Key</p>		<p><b>CURSOR</b> -- CURSOR Left Key</p> <p><b>CURSOR</b> --CURSOR Right Key</p> <p><b>CURSOR</b> --- CURSOR Up Key</p> <p><b>CURSOR</b> --CURSOR Down Key</p>	
<p><b>0 - 9</b> ----- Number Keys</p> <p><b>±</b> ----- Plus/Minus Key</p> <p><b>.</b> ----- Decimal Key</p>	<b>NUMERIC ENTRY KEYS</b>	<p><b>JOG SPEED</b> ---- JOG SPEED Key</p> <p><b>MONITOR</b> ----- MONITOR Key</p> <p><b>MENU</b> ----- MENU Key</p> <p><b>ESC</b> ----- ESCAPE Key</p> <p><b>DEL</b> ----- DELETE Key</p> <p><b>CLEAR</b> ----- CLEAR Key</p> <p><b>ENTR</b> ----- ENTER Key</p>	

- T.ENV Teaching Environment

# COMPOSITION OF EQUIPMENT

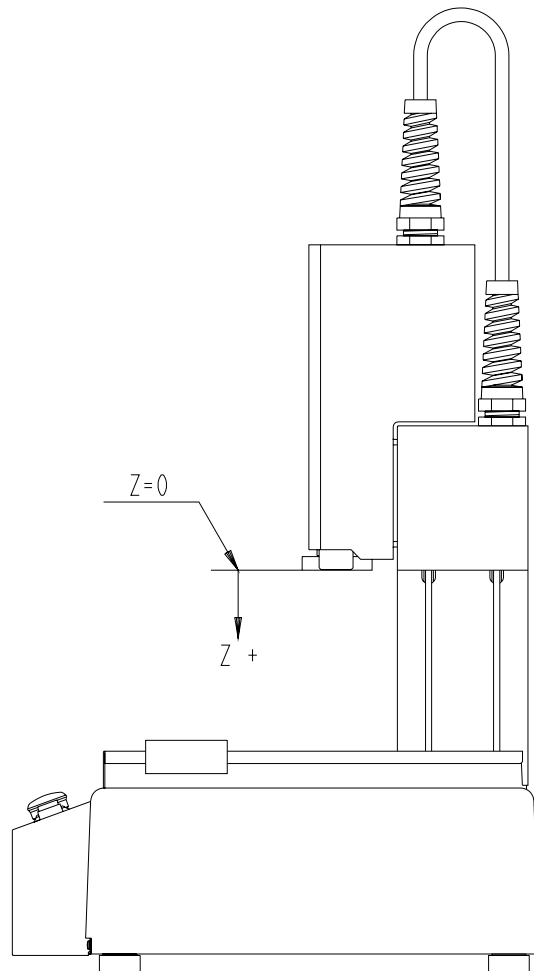
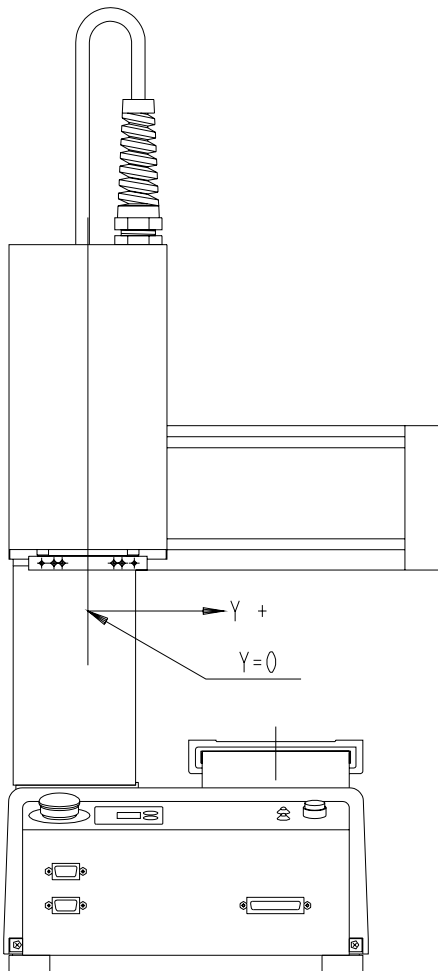
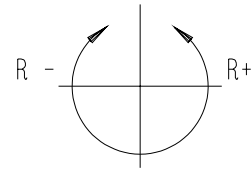
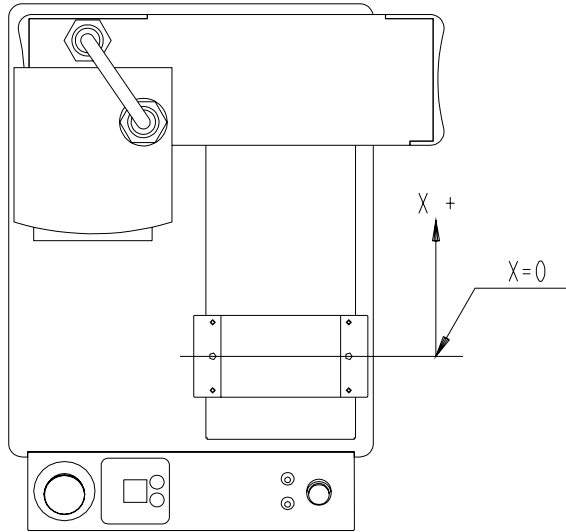
Body

System Composition



Windows 2000/XP is a registered trademark of Microsoft.

# COORDINATE SYSTEM



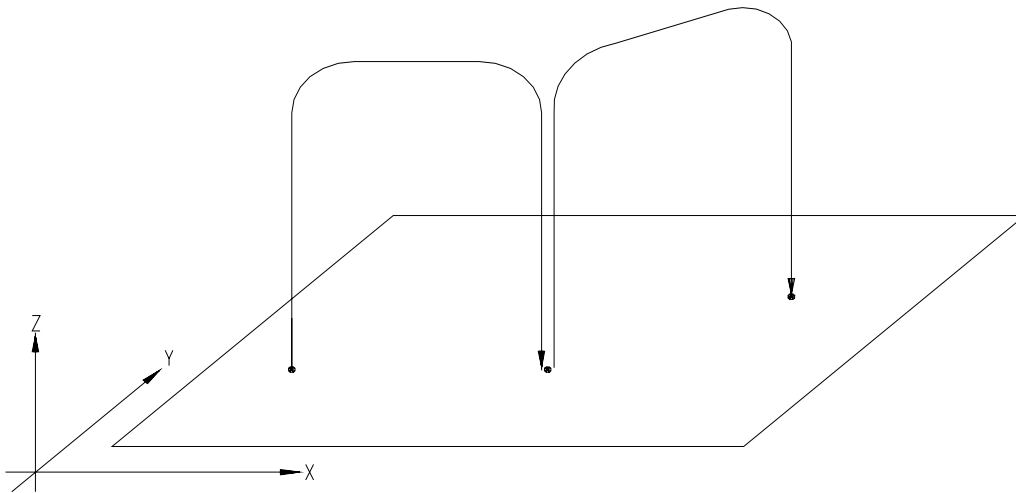


# PTP/CP DRIVE

During operation, each axis shifts either in PTP or CP drive.

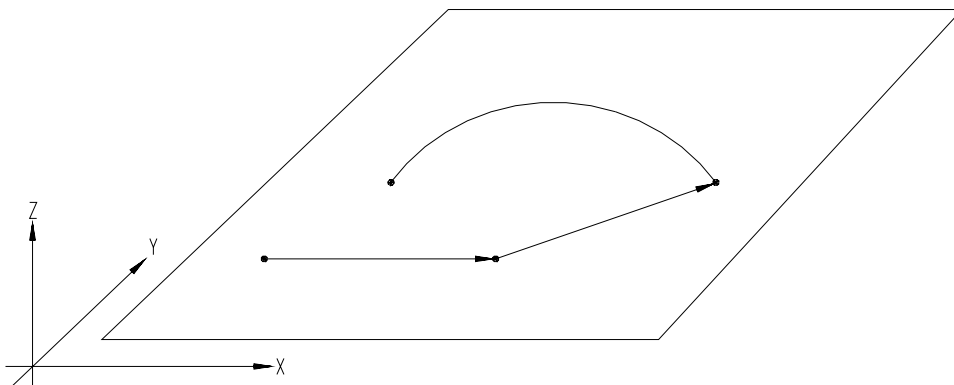
## PTP Drive

“PTP” stands for “Point to Point”. The Tool unit ascends vertically, shifts in the X or Y direction, and descends vertically to the next point.



## CP Drive

“CP” stands for “Continuous Path”. The tool unit shifts in a straight line or in an arc to the designated point at a constant speed. In CP drive it shifts between the CP start point and CP end point.



# MODE CHANGE

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There are the following modes for this robot.

- External Run Mode -----To run programs  
(Start running programs from I/O-SYS or COM1.)
- Run Mode -----To run programs  
(Start running programs by pressing the start switch.)
- Teaching Mode -----To create programs
- Customizing Mode -----To create data to compose programs
- Administration Mode ----- For administration and adjustment

If the teaching pendant is connected, the teaching pendant LED lights indicate the current mode.

- E.RUN: External Run Mode
- RUN: Run Mode
- TEACH: Teaching Mode
- CUSTOM: Customizing Mode
- ADMIN: Administration Mode

To change modes, follow the instructions below.

<Teaching Pendant>

- Press **MODE**. : Displays the Mode Selection Screen.
- Press **SHIFT** + **MODE**. : Changes mode each time you press the keys.

<PC>

Select [Robot] [Changing Mode.]

# EXTERNAL RUN MODE

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In the external run mode, programs start running with a start signal from I/O-SYS or COM1. The “E.RUN” is lit up on the LED of the teaching pendant while running in this mode.



## Caution

Do not enter the robot's work range during operation.

### Program Start

Start running programs using one of the following methods in the external run mode.

#### <Start from I/O-SYS>

Turn ON [#sysIn01] from an external device connected to I/O-SYS

#### <Start from COM1>

Send the communication command “Start” from an external device (PC, etc.) connected to COM1 to the robot.

- Program start instruction is valid only when you select [I/O-SYS] or [COM1.] Be sure to confirm which start instruction is set.

**TP** → **MENU** [Administration Setting Mode] [Start Channel]: Administration Mode

**PC** → [Robot] [External Start]

## Emergency Stop

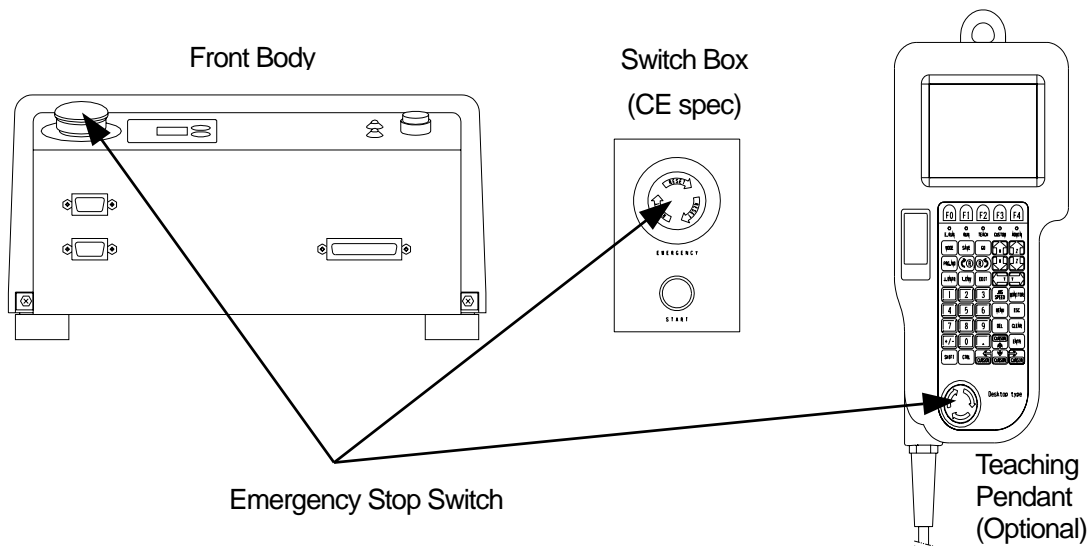
Use this function to stop the robot immediately if an emergency or accident occurs during operation. The motor power (power to the motor) will turn OFF and the robot will stop running if you press the switch. The following methods can be used to stop running.

Press the emergency stop switch on the robot body.

Press the emergency stop switch on the switch box. (CE spec)

Press the emergency stop switch on the teaching pendant (Optional.)

To release the emergency stop, turn the pressed-in emergency stop switch clockwise. Then, send a start instruction from I/O-SYS or COM1. After mechanical initialization, the robot will stand by for program start.



## Program Select

The following methods can be used to select which program to run.

### <Select from Robot Body>

Set the program number display on the front body of the robot to the desired number.

(You can change numbers using the “+” and “-” keys on the side of the number display.)

### <Select from PC>

If an external device (e.g. PC) is connected to COM1, send the communication command “Program Number Selection” to the robot.

### <Select from Teaching Pendant>

Press the **PRG.NO** key on the teaching pendant and enter the desired program number.

# RUN MODE

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In the run mode, programs start running when the start switch is pressed. “RUN” which is one of the LEDs is lit up on the teaching pendant while running in this mode.



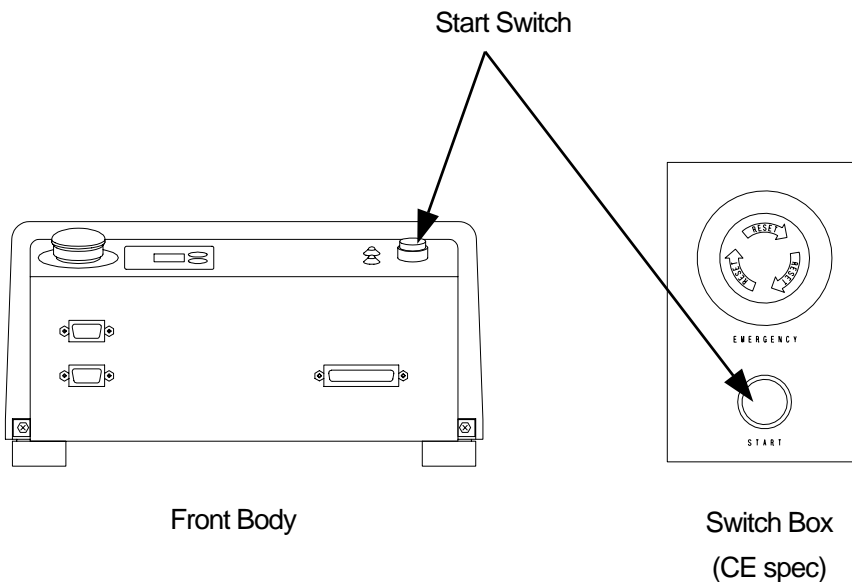
## Caution

Do not enter the robot's work range during operation.

### Program Start

To start running programs, press the start switch while in run mode.

If you press the start switch again while running a program, the robot will stop. Press the switch once more to restart. (Temporary stop using the start switch can be set to invalid.)

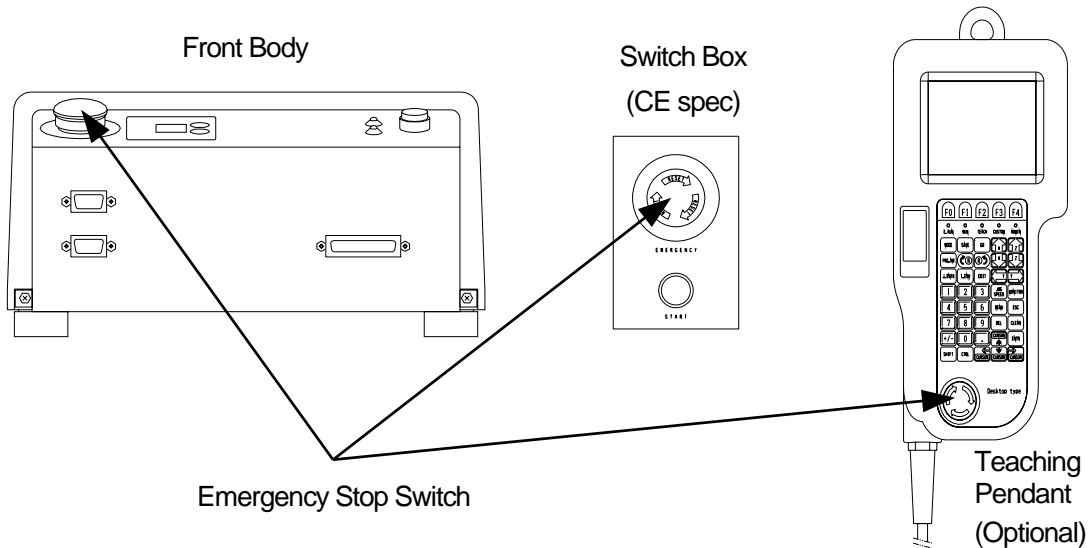


## Emergency Stop

Use this function to stop the robot immediately if an emergency or accident occurs during operation. The motor power (power to the motor) will turn OFF and the robot will stop running if you press this switch. The following methods can be used to stop running.

- Press the emergency stop switch on the robot body.
- Press the emergency stop switch on the switch box. (CE spec)
- Press the emergency stop switch on the teaching pendant (Optional.)

To release the emergency stop, turn the pressed emergency stop switch clockwise. After mechanical initialization, the robot will stand by for program start.



## Program Select

The following methods can be used to select which program to run.

### <Select from Robot Body>

Set the program number display on the front body of the robot to the desired number. (You can change numbers using the “+” and “-” keys on the side of the number display.)

### <Select from PC>

If an external device (e.g. PC) is connected to COM1, send the communication command “Program Number Selection” to the robot.

### <Select from Teaching Pendant>

Press the PRG.NO key on the teaching pendant and enter the desired program number.

# TEACHING MODE

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The teaching mode is used for creating programs.

Teaching data is the information stored in the robot by teaching.

## Types of Teaching Data

Teaching data consists of the following seven items.

- Program
- Common Setting Data
- Condition Setting Data
- Point Job Data (1 to 100)\*
- Additional Function Data (1 to 50)\*
- Sequencer Program (1 to 50)\*
- Run Mode Parameter

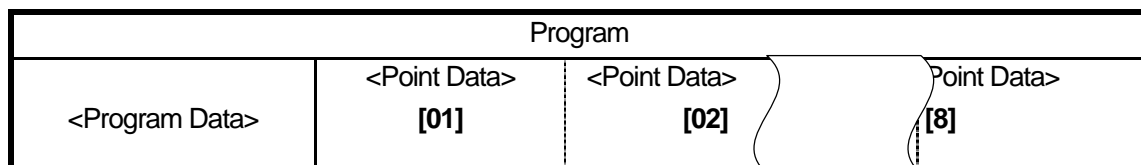
\* The point job data (101 to 200), additional function data (51 to 100) and sequencer program (51 to 100) are included in the customizing data.

## Program

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

Up to 255 programs (Numbers 1 to 255) can be stored in the robot.

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



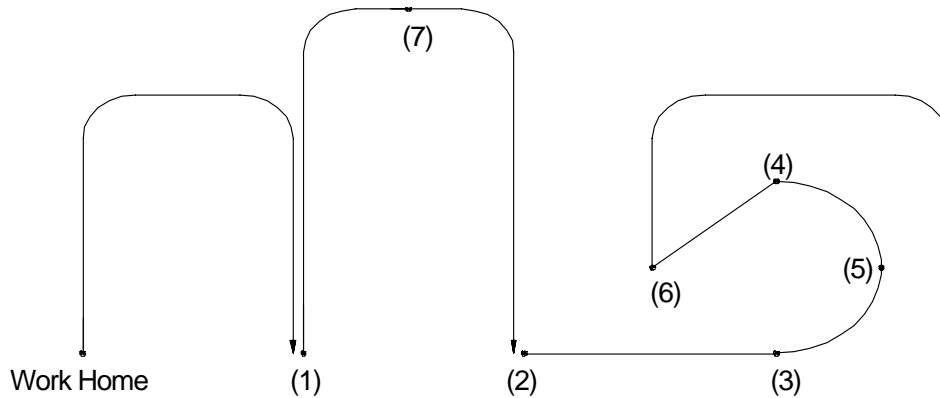
Program data consists of the following eight items.

1. Program Name: You can use up to 40 English letters, numbers and symbols in combination to name the program.
2. Work Home: This is the point (coordinates) where the tool unit returns to and waits for the next instruction after running the last point of 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: Consists of the following three coordinates.
  - 1) Absolute: The Position data value conforms to the robot's fixed coordinates.
  - 2) Relative: The Position data indicates the distance from the program start coordinates.
  - 3) Moving Amount: The Position data value indicates the distance to the next point.



Point data consists of the following six items.

1. Coordinates X, Y, Z, R: The point coordinates (X, Y, Z, R) data.
2. Point Type: Nine different types of points depending on the shifting method.



(1) PTP Point

Point from where the tool unit shifts to the next point in PTP drive

(2) CP Start Point

Point from where the PTP drive changes to the CP drive

(3) CP Passing Point

Point at which the direction of shifting changes during CP drive: the tool unit shifts to the next point at the same speed as it shifted from the previous point.

(4) CP Stop Point

Point where the point job is executed or direction changes during the CP drive: at this point the shifting speed briefly becomes 0 mm/s.

(5) CP Arc Point

This point specifies the arc motion of the tool unit in CP drive.

(6) CP End Point

Point where the tool unit completes the CP drive and starts to shift to the next point in PTP drive.

(7) PTP Evasion Point

Point where the tool unit evades an obstacle in PTP drive

(8) CP Circle Point

This point specifies the circular motion of the tool unit in CP drive.

(9) User Definition Type

You can create point types in the customizing mode. They are called “user-defined point types.” The above point type items 1 to 8 are called “supplied point types.”

When you create a “user defined point type,” it has the same basic contents (way of moving to the next point, etc.) as the “supplied point type” you used to make it.

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. You can select one of four types of point jobs according to your needs. However, depending on the point type, it may not be possible to select a particular point job.

Job before Moving: The robot executes the point job when it starts shifting from the previous point to the designated point.

Job while Moving: The robot executes the point job while it is shifting from the previous point to the designated point in PTP drive.

Job while CP Moving: The robot repeats the point job while it is shifting from the designated point to the next point in CP drive.

Point Job: The robot executes the point job after reaching the designated point.

5. Additional Function Number: The number assigned to the additional function data: you can assign an additional function to a point if necessary.

6. Tag Code: The value (tag code) assigned to a point.

### Common Data Settings

“Common Defined Data” does not appear in the top menu under that name. Common Defined Data is defined in the Customizing Mode and then appears in the top menu under the name given during the defining process. It can then be given a value in the Teaching Mode. Common Defined Data is valid for all programs.

### Condition Data Settings

The item “Condition Data Settings” is not on the menu. The condition setting data is defined in the customizing mode and then appears on the menu under the name given during the defining process. It can then be given a value in the teaching mode and called on at a point.

### Point Job Data

Point job data is a set of commands and logic operations that is executed at a point. It is selected by number from the point data but cannot always be set depending on the point type.

You can create point job data, No. 01 to No. 100, in the teaching mode. From No. 101 to No. 200, you can create the data in the customizing mode.

### Additional Function Data

Additional function data can be selected by number from the point data. The designated additional function is set to the point; however, some additional functions cannot be set depending on the point type. Additional function data consists of the following six items.

You can create additional function data from No. 01 to No. 50 in the teaching mode. From No. 51 up to No. 100, you can create the data in the customizing mode,

1. PTP Condition ..... This has the same contents as the items set in the program data. Use this function to change the settings between designated points only.
2. CP Condition ..... This has the same contents as the items set in the program data. Use this function to change the settings between designated points only.
3. Tool Data ..... This has the same contents as the items set in the program data. Use this function when the tool data differs from that in the program data between designated points only.
4. Pallet Routine ..... The pallet consists of coordinates of the standard points and their offset (with counter.) For details, refer to Functions.

5. Execute Condition .....To determine whether to execute the job or not at a point where the condition is set: If the robot determines “not to execute”, the tool unit skips the point and shifts to the next point.

6. Work Adjustment ..... You can adjust the designated position (coordinates) by entering a value.

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

Point Job/ Additional Function Data  Point Type	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
PTP Point	O	O	X	O	O	X	O	O	O	O	O
CP Start Point	O	O	O	O	X	O	O	O	O	O	O
CP Passing Point	X	X	X	O	X	X	X	X	O	X	O
CP Stop Point	X	X	O	O	X	O	X	X	O	X	O
CP Arc Point	X	X	X	X	X	X	X	X	O	X	X
CP End Point	X	X	X	O	O	X	X	X	O	X	O
PTP Evasion Point	X	X	X	X	X	X	X	X	O	X	X
CP Circle Point	X	X	X	X	X	X	X	X	O	X	X
Work Home (PTP Point)	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

- [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.  
[Job while CP Moving] is executed repeatedly when shifting from the work home position to the next (first) point.  
[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.

### Sequencer Program

A sequencer program is a set of logical operations commands for controlling I/O signals, etc. It operates constantly while a program is running in RAM mode.

You can create sequencer programs from No. 01 to No. 50 in the teaching mode. From No. 51 up to No. 100, you can create the programs in the customizing mode.

### Run Mode Parameter

Settings for the run mode environment and functions such as I/O-SYS function settings and the run mode operation.

## Data Save

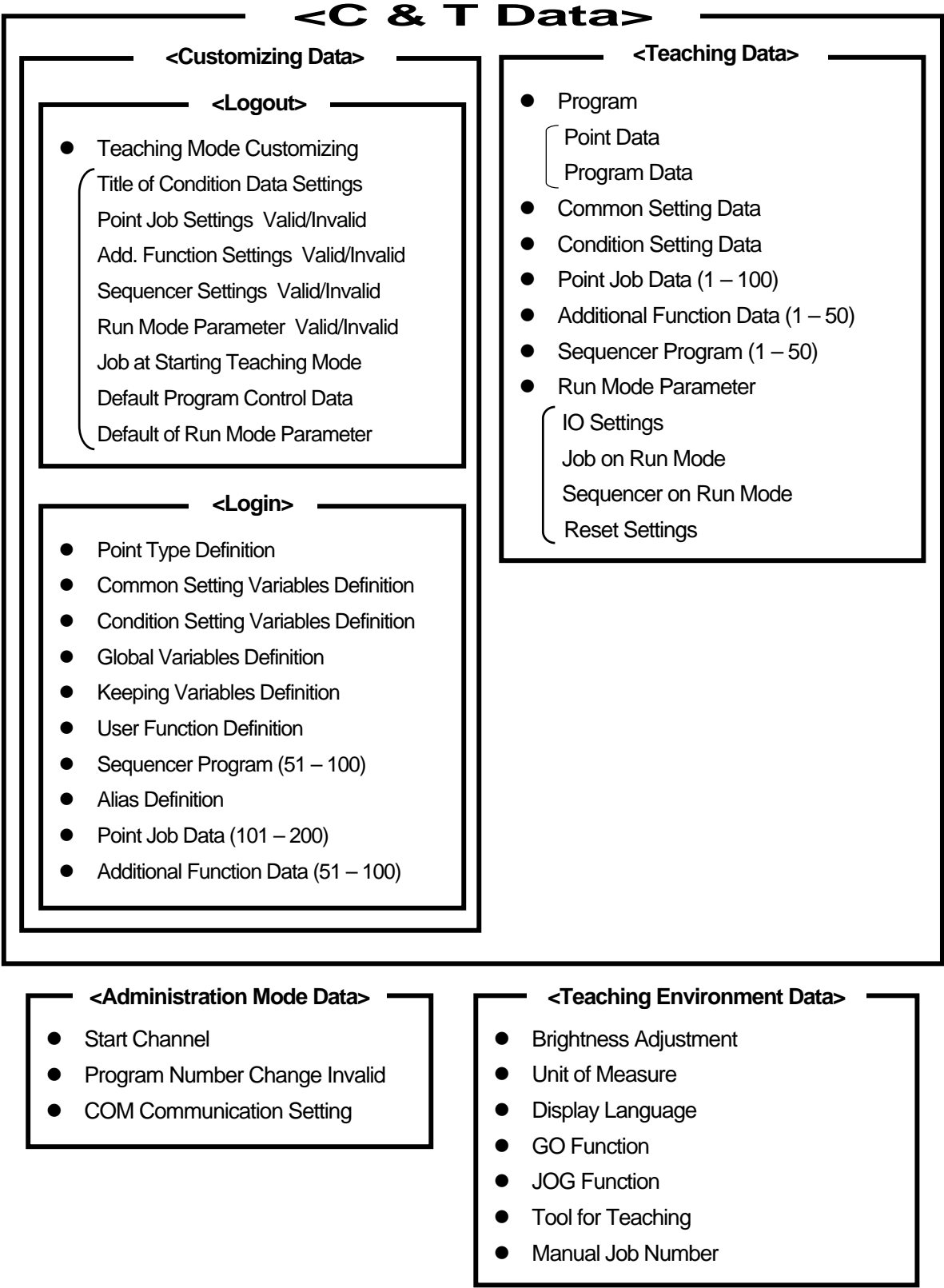
Save teaching data in combination with customizing data. The unit of data is called “C & T data.”

If the teaching pendant is connected, press the SAVE key. If a PC is connected, send the data to the robot using the PC software “LR C-Points.” The data sent from the PC will be saved automatically.

The C & T data created by using the teaching pendant is stored in the robot temporarily; **it will be deleted automatically when the power to the robot is turned OFF.** Be sure to “save” whenever the teaching data or customizing data is modified.

To back up the data, send C & T data from the robot to the PC using the PC software “LR C-Points” or “LR C-Points Limited Edition.”

When saving data or sending and receiving data between the robot and the PC it should be saved as C & T data. The administration mode data and teaching environments setting data will not be deleted if the power to the robot is turned OFF.



**<Administration Mode Data>**

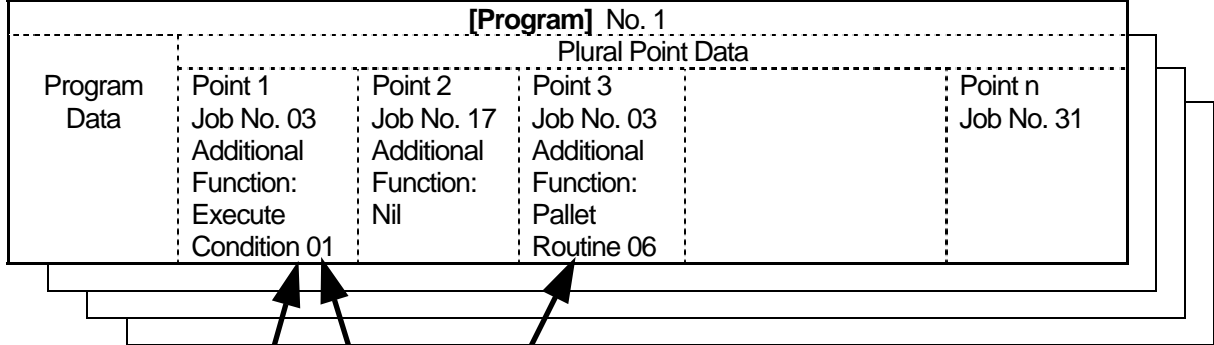
- Start Channel
- Program Number Change Invalid
- COM Communication Setting

**<Teaching Environment Data>**

- Brightness Adjustment
- Unit of Measure
- Display Language
- GO Function
- JOG Function
- Tool for Teaching
- Manual Job Number

## Correlation between Teaching Data

The robot can perform various operations by running the "Program".



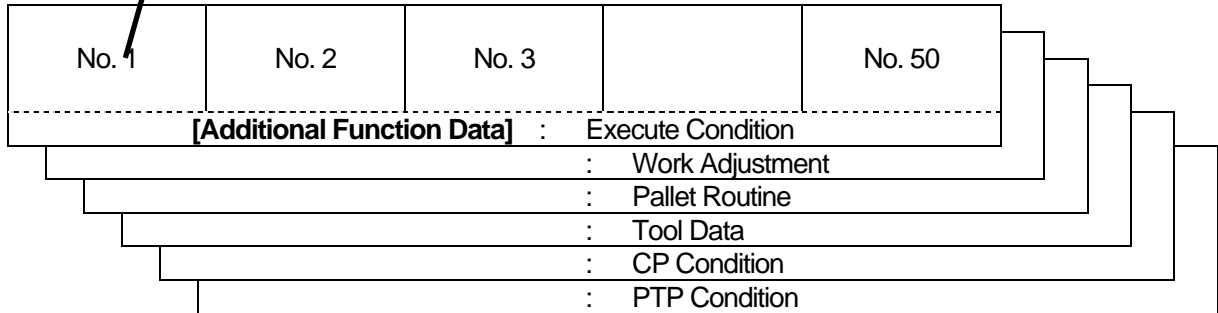
Point job data can be selected by number from the point data. The same point job data can be selected at several points in the same program.

Command to be executed in a point

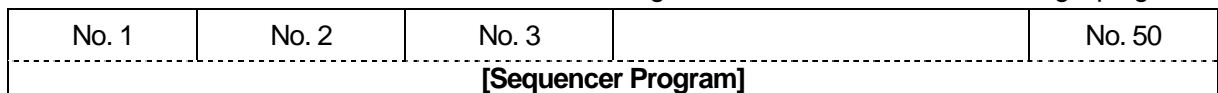


Additional function data can be selected by number from the point data. The same additional function data can be selected at several points in the same program.

Designated functions can be set to a point.



I/O signals can be controlled while running a program.



- Point job data Nos. 101 – 200 and additional function data Nos. 101 – 200, included in the customizing data, have been omitted from this chart. However they can also be selected from the point data.

# ADMINISTRATION MODE

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You can select four items, "Administration Settings Mode", "Diagnosis Mode", "Mechanical Adjustment Mode", and "Version Information", from the Administration menu.

"Customizing Mode" in the Administration menu is explained separately in the next section.

## Administration Settings Mode

The following three items can be set in this mode. These settings cannot be sent or received between robot and PC, however, you can refer to or change the settings using the PC. The settings will not be deleted if the power to the robot is turned OFF.

- Start Channel                      In the external run mode, you can select [I/O-SYS] or [COM1] to receive a start command.
- Program Number Change      You can select the device to use for changing program numbers.
- COM Setting                      Communication Settings for COMs 1 – 3 and TPIF

## Diagnosis Mode

Each part of the robot, teaching pendant, and control box can be diagnosed in this mode.

If there is any trouble with the robot, execute a diagnosis.

No.	Item	No.	Item
1	Teaching Pendant Keys	7	XY Axis Motor
2	Teaching Pendant	8	ZR Axis Motor
3	Switch, etc.	9	Position of Sensor
4	LED, Buzzer	10	External I/O
5	State of Sensor	11	IO-S
6	State of Driver 0-phase	12	COM1 Communication



### **Mechanical Adjustment Mode**

“Sensor Adjustment” and “Aging” can be executed in Mechanical Adjustment Mode.

A sensor adjustment must be carried out in the mechanical adjustment mode when you replace the motor and timing belt.

### **Version Information**

Version information, such as the model type and the robot system software version, is displayed on the teaching pendant LCD.

# CUSTOMIZING MODE

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In the customizing mode, you can set the teaching mode menu and define the point type. Set up an account and then login. You can limit access to the data or definitions set in this mode (excluding the teaching mode customizing data) by other accounts or the teaching mode.

## Types of Customizing Data

Customizing data consists of the following eight items:

- Teaching Mode Customizing Data
  - Point Type Definition
  - Variable Definition
  - User Function Definition
  - Alias Definition
  - Point Job Data (101 – 200)
  - Additional Function Data (51 – 100)
  - Sequencer Program (51 –100)
- 
- Point job data (1 – 100), additional function data (1 – 50), and sequencer programs (1 – 50) are included in the teaching data.
  - Set up an account and then login when defining or creating customizing data. This is not necessary when creating teaching mode customizing data.

## Teaching Mode Customizing Data

This enables you to set the menu display and operation in the teaching mode.

For example, you can hide “Point Job Setting” from the teaching mode menu. These setting data will be applicable to all accounts.

### Account

Set up an **account** and then login when you define or create the customizing data (except when creating teaching mode customizing data.)

If you define or create data after setting up an account and logging in, access to the data will be limited. You can set-up up to 50 accounts.

There are three levels of the access limitation (Protect Mode settings). (See below) The Protect Mode can be set for each data.

<Access Limitation from Other Accounts>:-

Protect Mode	No Limit	Public	Protected	Private
Data use				*
Data reference				
Data change				

\* If you access the data from the teaching mode, you cannot refer to or change it regardless of the Protect Mode setting.

### Point Type Definition

A point type created by setting command lines (similar to the point job data) to a supplied point type (e.g. "PTP Point") is called a "user-defined point type." You can set up to 100 user defined point types.

The following ten items are contained in the point type.

1. Identifier.....Name used to identify the point type (Point types have no numbers)
2. Protect Mode.....Level of access limitation for other accounts
3. Base Type.....You can select from the supplied point types and registered user-defined point types.
4. Point Type Title.....Displayed on the point type selection screen in the teaching mode.
5. Job before Moving.....Command lines to execute "Job before Moving"  
Enter the command lines directly instead of setting point job numbers.

6. Job while Moving.....Command lines to execute “Job while Moving”  
Enter the command lines directly instead of setting point job numbers.
7. Point Job.....Command lines to execute “Point Job”  
Enter the command lines directly instead of setting point job numbers.
8. Job while CP Moving.....Command lines to execute “Job while CP Moving”  
Enter the command lines directly instead of setting point job numbers.
9. Additional Function Number.....The number assigned to additional function data
10. Point Setting Variables Definition....Variable assigned to the point data: you can set up to 5 variables.  
Set necessary parameters such as the input unit or variable title  
when you define the variable.

### Variable Definition

The following four variable types can be defined in the customizing mode. All variables are used in command lines such as the point job data.

1. Common Setting Variables Definition.....Variables common to all programs and points: you can define up to 100 variables.

Set all necessary items such as the identifier, variable type and title, etc. to define a variable. The variable title will appear in the teaching mode menu. Select the title and enter it's value.

2. Condition Setting Variables Definition.....Set of plural variables: you can define up to 100 variables per set. Set all necessary items such as the identifier, variable type and title, etc. to define a variable. The variable title will appear in the teaching mode menu. Select the title and enter it's value. You can enter up to 500 condition numbers per set. The numbers are selected according to point data.

3. Global Variables Definition ..... Variables common to all programs and points: you can define up to 500 variables.

4. Keeping Variables Definition.....Variables common to all programs and points: you can define up to 500 variables. Values will not be deleted if the power to the robot is turned OFF.

### User Function Definition

Functions that can be used in command lines such as the point job data are called "user-defined functions". Functions already built into the robot are called "supplied functions".

Both functions can be used in formulas.

### Sequencer Settings

A sequencer program is a set of logical operations commands for controlling I/O signals, etc. It operates constantly while a program is running in RAM mode. The contents are the same as those created in the teaching mode; however, access to programs created in the customizing mode can be limited using the Protect Mode setting.

You can create Nos. 51 – 100 in the customizing mode.

### **Alias Definition**

I/O-SYS and I/O-1 input/output, including width, is designated. COM ports are designated by identifiers.

### **Point Job Data Setting**

Point job data is a set of commands and logic operations that is executed at a point. It is selected by number from the point data. The contents are the same as those created in the teaching mode, however, access to the data created in the customizing mode can be limited using the Protect Mode setting.

You can create Nos. 101 – 200 in the customizing mode.

### **Additional Function Data Setting**

Additional function data can be selected by number from the point data. The designated additional function is set to the point. The contents are the same as those created in the teaching mode, however, access to the data created in the customizing mode can be limited using the Protect Mode setting.

You can create Nos. 51 – 100 in the customizing mode.

# TEACHING ENVIRONMENTS SETTING

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Press the **T.ENV** key in teaching mode to display the teaching environments setting menu. You can set the teaching mode configuration when entering positions on the screen, including the teaching pendant LCD displays.

These settings cannot be sent or received between robot and PC, however, you can refer to or change the settings using the PC. The settings will not be deleted if the power to the robot is turned OFF.

- Brightness Adjustment\_\_\_\_\_ Brightness adjustment of the teaching pendant LCD
  - Unit of Measure\_\_\_\_\_ Switch between millimeter (MM) and inch (IN.)
  - Display Language\_\_\_\_\_ Switch between English, Japanese, and German.
  - GO Function\_\_\_\_\_ Set Arm Movement Condition (PTP) by pressing the **GO** key while in the JOG mode in Position Entry in the teaching mode
  - JOG Function\_\_\_\_\_ Set Arm Movement Condition (PTP) when using the JOG keys while in the JOG mode in Position Entry in the teaching mode.
  - Tool for Teaching \_\_\_\_\_ Tool setting in the teaching mode when entering a position with a new tool different from one used in operation
  - Manual Job Number\_\_\_\_\_ Point job numbers set in this stage can be executed when entering positions in the teaching mode.
- 
- You can change the display language by pressing the **SHIFT** **T.ENV** keys in every mode.

## **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.

**The specifications of the robot or the contents of this manual may be modified without prior notice to improve its quality.**

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