Warranty period

- This warranty is effective for a period of
- 18 months (one and a half years) after shipment from Taiwan factory, or
- One year after installation or
- 2,500 hours of actual operation whichever comes first.

Exceptions to the warranty

This warranty will not apply in the following cases

- Fatigue arising due to the passage of time, natural wear and tear occurring during operation(natural fading of painted or plated surfaces, deterioration of parts subject to wear).
- Minor natural phenomena which do not effect the capabilities of the robot (noise from computers, motors, etc.).
- Damage due to earthquakes, storms, floods thunderbolt, fire or any other natural or man-made calamities.
- Troubles caused by procedures prohibited in this manual.
- Modifications to the robot not approved by sales representatives.
- Use of any other than genuine parts and specified lubricant and grease.
- Insufficiency or errors in maintenance and inspection.
- Repairs by other than authorized dealers.

In addition, we response for the failure of our own goods repair, but are not responsible for other losses caused due to.

Services coveragte

We provide customers with the following services

- Guide to installation and trial operation.
- Guide to maintenance.
- Guide to wiring technical operation and training.
- Guide to technical programming.

Product safety information

To ensure correct and safe use of industrial robots, carefully read this manual and make yourself well acquainted with the contents. FOLLOW THE WARNINGS, CAUTIONS AND INSTRUCTIONS INCLUDED IN THIS MANUAL. Warning information in this manual is shown classified into the following items.

1. Safety records

Industrial robots are highly mechanical devices that provide a large degree of freedom when performing various manipulative tasks. Failure to take necessary safety measures or mishandling due to not following the instructions in this manual may result in trouble or damage to the robot and injury to personnel (robot operator or service personnel) including fatal accidents.

DANGER

Failure to follow DANGER instructions will result in severe injury or death to the robot operator, bystanders or persons inspecting or repairing the robot.

WARNING

Failure to follow WARNING instructions could result in severe injury or death to the robot operator, bystanders or persons inspecting or repairing the robot.

CAUTION

Failure to follow CAUTION instructions may result in injury to the robot operator, bystanders or persons inspecting or repairing the robot, or damage to the robot and or robot controller.

POINTS

Key points of the sequence of operations of the Electric Slide.

Note

It is not possible to list all safety items in detail within the limited space of this manual. So it is essential that the user have a full knowledge of basic safety rules and also that the operator makes correct judgments on safety procedures during operation. This manual and warning labels supplied with or affixed to the robot are written in English. If the robot operator or service personnel does not understand English, do not permit that person to handle the robot.

2. Essential caution items

Particularly important cautions for handling or operating the robot are described below. In addition, safety information about installation, operation, inspection and maintenance is provided in each chapter. Be sure to comply with these instructions to ensure safe use of the robot.

I. Observe the following cautions during automatic operation

- Install a safeguard (protective enclosure) to keep any person from entering within the movement range of the robot and suffering injury due to being struck by moving parts.
- Install a safety interlock that triggers emergency stop when the door or panel is opened.
- Install safeguards so that no one can enter inside except from doors or panels equipped with safety interlocks.

DANGER

Serious injury or death will result from impact with moving robot.

- Keep outside of guard during operation.
- Lock out power before approaching robot.

II. Attention to hand sandwiched

Use caution to prevent hands or fingers from being pinched or crushed.

WARNING

- Moving parts can pinch or crush.
- Keep hands away from robot arms.

III. Follow the instructions on listed on warning labels and in this manual

- Be sure to read the warning labels and this manual carefully and make sure you thoroughly understand their contents before attempting installation and operation of the robot.
- Before starting robot operation, be sure to reread the procedures and cautions relating to your work as well as descriptions in this chapter (“product Safety Information”).
- Never install, adjust, inspect or service the robot in any manner that does not comply with the instructions in this manual.

WARNING

- Improper installation or operation can result in serious injury or death.
- Read the owner's manual and all warning labels before operation.

IV. Do not use the robot in environments containing inflammable gas, etc.

WARNING

- This robot was not designed for operation in environments where inflammable or explosive substances are present.
- Do not use the robot in environments containing inflammable gas, dust or liquids. Explosions or fire might otherwise result.

V. Do not use the robot in locations possibly subject to electromagnetic interference, etc.

WARNING

- Avoid using the robot in locations subject to electromagnetic interference, electrostatic discharge or radio frequency interference. Malfunctions might otherwise occur.

VI. Use caution when releasing the brake of a vertical use robot

WARNING

The vertical axis will slide down when the brake is released, causing a hazardous situation.

- Press the emergency stop button and prop up the vertical axis with a support stand before releasing the brake.
- Be careful not to let your body get caught between the vertical axis and installation base when releasing the brake to perform direct teach.

VII. Provide safety measures for end effector (gripper, etc)

WARNING

- End effectors must be designed and manufactured so that they create no hazards (for example, a workpiece that comes loose) even if power (electricity, air pressure, etc.) is shut off or power fluctuations occur.
- If there is a possible danger that the object gripped by the end effector may fly off or drop, then provide appropriate safety protection taking into account the object size, weight, temperature and chemical properties.

VIII. Use caution when removing the motor. (Vertical use robots)

WARNING

The vertical axis will slide down when the motor is released, causing a hazardous situation.

- Turn off the robot controller and prop up the vertical axis with a support stand before removing the motor.
- Be careful not to let your body get caught between the vertical axis parts and installation base.

IX. Take the following safety precautions during inspection of controller.

WARNING

- When you need to touch the terminals or connectors on the outside of the controller during inspection, always first turn off the controller power switch and also the power source in order to prevent possible electrical shock.
- Never touch any internal parts of the controller.

X. Consult us for corrective action when the robot is damaged or malfunctions occur.

WARNING

If any part of the robot is damaged or any malfunction occurs, continuing the operation may be very dangerous. Please consult your sales office or dealer for corrective action.

XI. Be careful not to touch the motor or speed reduction gear casing when hot

WARNING

The motor and speed reduction gear casing are extremely hot after automatic operation, so burns may occur if these are touched. Before handling these parts during inspection or servicing, turn off the controller, wait for a while and check that the part has cooled.

XII. Do not remove, alter or stain the warning labels.

WARNING

- Do not remove, alter or stain the warning labels on the robot.
- Do not allow the warning labels to be hidden by devices installed onto the robot by the user.
- Provide proper lighting so that the symbols and instructions on the warning labels can be clearly seen even from outside the safeguard enclosure.

XIII. Protective bonding.

WARNING

Be sure to ground the robot and controller to prevent electrical.

XIV. Be sure to make correct parameter settings.

WARNING

The robot must be operated with correct tolerable moment of inertia and acceleration coefficients according to the manipulator tip mass and moment of inertia. If there are not correct, drive unit service life may end prematurely, and damage to robot parts or residual vibration during positioning may result.

3. Robot safety functions

I. Overload detection

This function detects an overload applied to the motor and shuts off the servo power.

II. Soft limits

Soft limits can be set on each axis to limit the working envelope in manual operation after return-to-origin and during automatic operation. Note: The working envelope is the area limited by soft limits.

III. Mechanical stoppers

If the servo power is suddenly shut off during high-speed operation by emergency stop or safety functions, these mechanical stoppers prevent the axis from exceeding the movement range. No mechanical stopper is provided on the rotating axis.
Note: The movement range is the area limited by mechanical stoppers.

WARNING

Axis movement will not stop immediately after the servo power supply is shut off by emergency stop or other safety functions.

IV. Vertical axis brake

An electromagnetic brake is installed on the vertical use robot to prevent the vertical axis from sliding down when servo power is turned off. This brake is working when the controller is off or the vertical axis servo power is off even when the controller is on. The vertical axis brake can be released by means of the programming unit or by a command in the program when the controller is on.

WARNING

The vertical axis will slide down when the brake is released, creating a hazardous situation.

- Press the emergency stop button and prop the vertical axis with a support stand before releasing the brake.
- Use caution not to let your body get caught between the vertical axis and installation base when releasing the brake to perform direct teach.

4. Safety measures for the system

Since the robot is commonly used in conjunction with an automated system, dangerous situations are more likely to occur from the automated system than from the robot itself. Accordingly, appropriate safety measures must be taken on the part of the system manufacturer according to the individual system. The system manufacturer should provide a proper instruction manual for safe, correct operation and servicing of the system.

5. Trial operation

After making installations, adjustments, inspections, or maintenance or repairs to the robot, make a trial run using the following procedures.

I. If a safeguard enclosure has not yet been provided right after installation of the robot

Rope off or chain off around the movement area of the manipulator in place of the safeguard, and observe the following points.

❶ Use sturdy, stable posts which will not fall over easily.
❷ The rope or chain should be easily visible by everyone around the robot.
❸ Place a sign to keep the operator or other personnel from entering the movement range of the manipulator.

II. Check the following points before turning on the controller

❶ Is the robot securely and correctly installed?
❷ Are the electrical connections to the robot correct?
❸ Are items such as air pressure correctly supplied?
❹ Is the robot correctly connected to peripheral equipment?
❺ Have safety measures (safeguard enclosure, etc.) been taken?
❻ Does the installation environment meet the specified standards.

III. After the controller is turned on, check the following points from outside the safeguard enclosure

❶ Does the robot start and stop as intended? Can the operation mode be selected correctly?
❷ Does each axis move as intended within the soft limits?
❸ Does the end effector move as intended?
❹ Are the signal transmissions to the end effector and peripheral equipment correct?
❺ Does emergency stop work?
❻ Are the teaching and playback functions normal?
❼ Are the safeguard enclosure and interlock working as intended?
❽ Does the robot move correctly during automatic operation?

6. Work within the safeguard enclosure

I. Work within the safeguard enclosure

When work is required inside the safeguard enclosure, always turn off the controller and place a sign indicating that the robot is being adjusted or serviced in order to keep any other person from touching the controller switch or operation panel, except for the following cases.

❶ Soft limit settings
❷ Teaching
For item 1, follow the precautions and procedure for each section.
To perform item 2, refer to the description in II. below.

II. Teaching

When performing teaching within the safeguard enclosure, comply with the instructions listed below.
Check or perform the following points from outside the safeguard enclosure.

❶ Make sure that no hazards are present within the safeguard enclosure by a visual check.
❷ Check that the programming unit MPB or DPB operates correctly.
❸ Check that no failures are found in the robot.
❹ Check that emergency stop works correctly.
❺ Select teaching mode and prohibit automatic operation.

Never enter the movement range of the manipulator while within the safeguard enclosure.

7. Automatic operation

I. Automatic operation described here includes all operations in AUTO mode

Check the following before starting automatic operation.
No one is within the safeguard enclosure.
The programming unit and tools are in their specified locations.
The alarm or error lamps on the robot and peripheral equipment do not flash.
The safeguard enclosure is securely installed with safety interlocks actuated.

II. Observe the following during automatic operation or in cases where an error occurs

❶ After automatic operation has started, check the operation status and warning lamp to ensure that the robot is in automatic operation.
❷ Never enter the safeguard enclosure during automatic operation.
❸ If an error occurs in the robot or peripheral equipment, observe the following procedure before entering the safeguard enclosure.
a. Press the emergency stop button to set the robot to emergency stop.
b. Place a sign on the start switch, indicating that the robot is being inspected in order to keep any other person from touching the start switch and restarting the robot.

8. Adjustment and inspection

Do not attempt any installation, adjustment, inspection or maintenance unless it is described in this manual.

9. Repair and modification

Do not attempt any repair, parts replacement and modification unless described in this manual. These works require technical knowledge and skill, and may also involve work hazards.