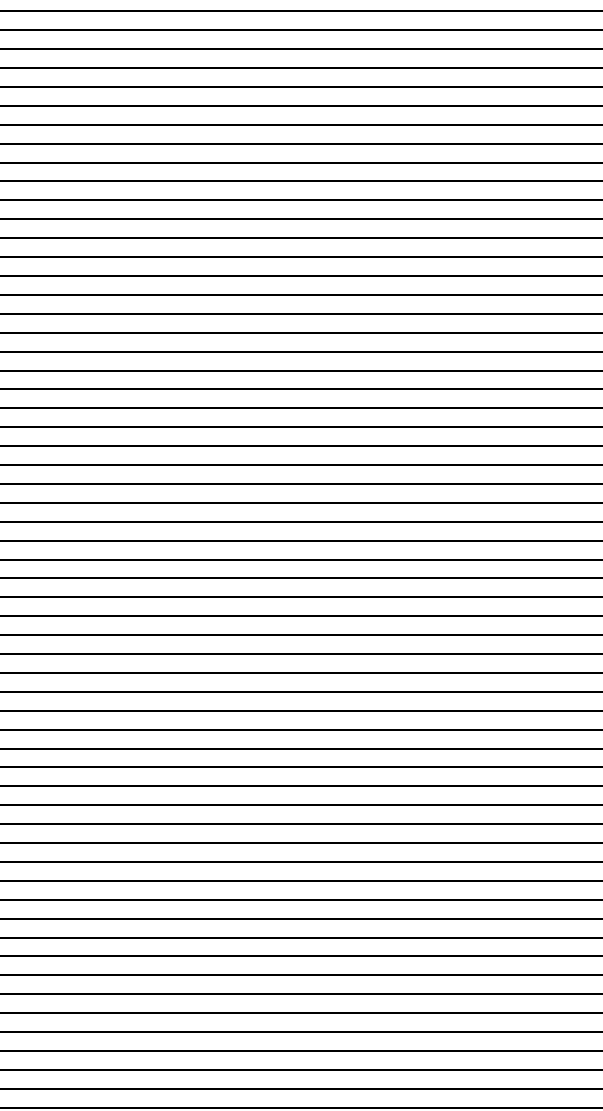


**SCREEN**



Wet Station  
**WS-620/820 series**  
**INSTALLATION MANUAL**

## Introductory Note

Thank you very much for choosing our product. We sincerely hope that you will enjoy using this equipment, and fully utilize all its functions and capabilities.

This equipment is to be utilized solely for the processing of wafers for semiconductor production and should not be employed for any other end. Use of this equipment for any purpose other than that specified above may cause serious injury and is expressly forbidden.

This manual describes the basic instructions and precautions for equipment transport, storage, and installation. Beware that, as noted in this manual, it is the customer's responsibility to obtain or prepare all necessary material safety data sheets (MSDS) for any chemical substances used during the customer's operation of this equipment.

Obey all local laws and ordinances regarding the health and safety of workers using the equipment. Waste chemicals, gasses, by-products, and other substances must be disposed of with proper regard for the natural environment and in accord with all relevant local laws and ordinances.

International transfer of this equipment, any of its parts and/or its software must be carried out in compliance with the relevant laws and ordinances of the country of export and the country of equipment end-use. We do not assume any responsibility or liability for equipment transferred without regard to proper export/import procedures.

Some sections of your equipment may not conform to this manual because of modified specifications or subsequent equipment improvements. For equipment with unique, non-standard specifications, we may later request that the manual delivered to the customer with the equipment be suitably modified or augmented to reflect the new specifications.

We shall not be held responsible for any damage caused by conditions beyond our control such as customer modification, disassembly or misuse of the equipment, programs or software, or their use in a defective or deficient environment.

This manual provides guidelines and warnings for the safe installation of the equipment.

This equipment's transport and installation must always be handled by engineers and contractors assigned by Dainippon Screen. After installation, if any relocation of the equipment is necessary, please contact our nearest office listed at the end of this manual.

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Although this manual was created with the utmost care, if you discover any errors, omissions or unclear sections, please contact our nearest sales office (listed at the end of this manual).

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## **WS-820/MTR series manuals**

The manuals for the WS-820/MTR series are described below.

### **INSTALLATION MANUAL**

This manual describes the basic instructions and precautions for equipment transport, storage, and installation.

### **OPERATION MANUAL**

This manual describes the basic instructions and precautions for operations relating to wafer processing using the specified procedures. It describes the basic design and construction of the equipment, as well as the name and function of each part. It also provides explanations of how to load and unload wafers, how to stop the equipment in case of trouble and also the meanings of alarms or errors that may appear on the monitor display.

### **MAINTENANCE MANUAL**

This manual describes the basic instructions and precautions for startup and shutdown of the equipment, periodic inspections, consumable parts replacement, and other adjustments. Make sure to always follow the instructions in this manual when performing such work.

### **REFERENCE MANUAL**

This manual describes the basic instructions and precautions for wafer processing system control, such as the setting of processing recipes or the modification of these settings.

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## Chapter 1 Before Using – Safety Precautions –

This chapter outlines the general precautions to assure the safest possible operation of the wafer processing equipment and explains about the equipment safety information.

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# 1 For your safety



## 1.1 Thoroughly read the manual first!

Thoroughly read this manual. To prevent any severe injury or unexpected accident, the precautions provided in this manual must be read carefully before turning ON the power to the equipment. Any use of the equipment not complying with the terms of this manual will constitute serious fault by the operator for which we cannot be responsible.

In this manual, section 1 describes the general guidelines and precautions for safe usage of this equipment and section 2 describes the specific information and precautions for the equipment you have purchased. Be sure to thoroughly read and understand this manual before using the equipment in order to ensure safe operation.

## 1.2 Contact

Our address and phone numbers are listed on the back page of this manual. To facilitate and smooth the countermeasures in case of emergency, post this information so that it can be easily referred to.

## 1.3 Training

In addition to the instructions for use and maintenance of the equipment upon delivery, a training program will also be provided if necessary, upon your request or due to modifications of this equipment.

## 1.4 MSDS (Material Safety Data Sheet)

For all chemicals to be used with this equipment, be sure to obtain a copy of the MSDS for each chemical from its supplier and keep it with this manual in an easy to see location. Also, ensure that all operators who use this equipment thoroughly understand the properties and handling method of the chemicals by referring to the MSDSs. Carefully handle the chemicals and gases, as some of them can be extremely dangerous if handled improperly.

## 1.5 Revisions of this manual

Information concerning the new environmental topics, health and safety issues and dangers from the equipment, which are newly determined, will be provided in revised updates to this manual. Be sure to use this information together with this manual.

## 1.6 Storage

This manual should be stored in a place so that you can take it out and read it whenever necessary.

## 1.7 Limitations

The equipment was designed and manufactured with special attention to safety considerations. However, it is impossible either to eliminate all potential sources of danger from such equipment or to anticipate all possible hazards and misuses. Therefore, it is critical that you familiarize yourself and all of your operators and other personnel with all of the noted precautions, and take maximum care when operating the equipment.

## 1.8 Signal words and warning labels

The warning labels and signal words, used for this equipment, are described below.

### 1.8.1 Signal words and alert levels

Signal words used in this manual and on this equipment are classified into three types, DANGER, WARNING and CAUTION, depending upon the degree of potential danger. The meanings for each signal word are as follows.

Alert Level	Description
DANGER	Indicates an imminently hazardous situation, which, if not avoided, could result in death or serious injury.
WARNING	Indicates a potentially hazardous situation, which, if not avoided, could result in death or serious injury.
CAUTION	Indicates a potentially hazardous situation which, if not avoided, may result in minor or moderate injury.

### 1.8.2 Warning indications in the manual

Warning indications, consisting of the warning marks and signal words, are used in this manual. Pay special attention to warning indications as they signify that the information that follows is important in reference to safety matters.

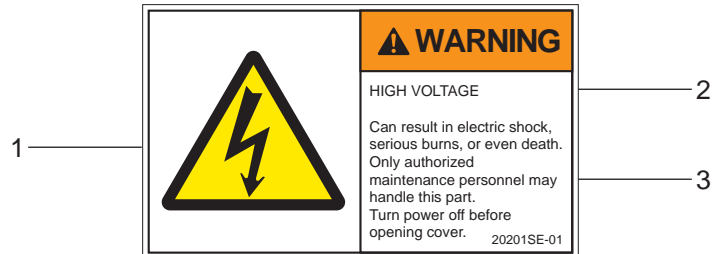
Signal words used in this manual	DANGER WARNING CAUTION
----------------------------------	------------------------------



### 1.8.3 Caution labels on this equipment

Warning labels are affixed to potentially hazardous parts or adjacent areas of the equipment. As the label indicates potential danger in that location, thoroughly read the instructions on it and then strictly follow them.

**Basic configuration of caution labels (Refer to the figure below.)**



Note: Pictographs or signal words may be used for explanation when space is limited.

- 1 Pictograph showing potential danger
- 2 Signal word (indicating a level of danger)
- 3 Description of potential danger and preventative measures

- Details and the location of the caution labels are described in section 2. Carefully read the labels and pay attention to the danger and the area indicated by each label.
- Do not peel or tear off the labels. Also, do not cover them with anything or block their visibility by placing anything in front of them.
- If a label has faded or fallen off, replace it immediately with a new one. It is extremely dangerous to leave potentially hazardous parts and areas unmarked. For new labels, contact the nearest Dainippon Screen dealer or branch office.

## 1.9 Precautions for electricity

When turning the equipment power ON or OFF or if a circuit breaker is tripped, strictly comply with the following precautions.

### 1.9.1 Switching operation of power supply

The equipment incorporates high-voltage circuit. Touching any part of your body to such circuits can cause serious injury and even death. **BE EXTREMELY CAREFUL** not to touch these circuits, especially with wet hands.

Various power supply switches are installed in the equipment. Be sure to turn these switches ON or OFF in the designated order. If the proper order is not followed, unexpected movement of certain parts could cause serious injury. Therefore, allow only authorized personnel to operate these switches.

#### **The “authorized personnel”:**

Refers to, in this manual, persons involved in special tasks for the equipment and/or those who have the authority to make decisions such as electric technicians, chemical technicians, maintenance technicians, and those who are responsible for the equipment control.

### 1.9.2 During the maintenance and service works of the equipment

Never touch the power switch during maintenance and service works of the equipment.

### 1.9.3 When a circuit breaker is tripped

If a circuit breaker is tripped, do not turn ON the power switch until it has been approved by the authorized personnel. Turning ON the power switch without inspecting and repairing the cause of breaker trip could result in severe injury and damage to the equipment.

## **1.10 Interlocks**

This equipment is provided with a variety of interlocking safety devices to ensure safety of operator and engineers. Before operation or maintenance of the equipment, thoroughly understand the following precautions.

### **1.10.1 Safety-related interlocks**

This equipment is provided with a variety of interlocking safety devices to ensure operator safety. When any of these interlocks are activated, the equipment emits a warning beep and a relevant error message is displayed on the indicator.

### **1.10.2 When an interlock is activated**

When an interlock is activated, be sure to report it to the authorized personnel as soon as possible and follow his/her instructions.

### **1.10.3 INTERLOCK IGNORE SWITCH**

The equipment is provided with a variety of safety devices, however, they are disabled when the INTERLOCK IGNORE SWITCH is turned on. Operating the equipment when these safety devices are inactive could result in severe injury and damage to the equipment or wafers. Therefore, never touch the INTERLOCK IGNORE SWITCH.

### **1.10.4 Operation while the INTERLOCK IGNORE SWITCH is turned on!**

This switch must be operated only by authorized personnel.

While this switch is turned on for maintenance or other work, be sure to prevent access to the equipment by unauthorized personnel.

### **1.10.5 Handling interlock sensors**

This equipment is provided with a variety of interlock sensors. Never touch or modify these sensors. This can cause serious accidents or equipment malfunction.

### **1.10.6 For comprehensive safety**

The sensors, which were described in 1.10.5 above, are installed in order to detect equipment errors. To ensure the comprehensive safety of the equipment, we recommend that you install appropriate safety devices including an exhaust system and water/chemical leakage detection sensors in the equipment.

## **1.11 Handling of chemicals**

The following details the precautions for handling chemicals, which are used with this equipment. Please understand the following contents thoroughly, and strictly comply with the precautions.

### **1.11.1 Material Safety Data Sheet (MSDS) for chemical solutions**

Properties of chemical solutions to be used with this equipment are described in section 2 of this manual. The aim of their inclusion in this manual is to draw the user's attention to the safety precautions for chemical solutions.

This information is provided as a reference and you should obtain more detailed correct information from the supplier of each chemical solution. (Refer to the next section.)

### **1.11.2 MSDS acquisition**

Users of this equipment must themselves obtain a copy of the MSDS for each chemical from their suppliers.

Ensure that all personnel involved with this equipment clearly understand the properties, potential dangers and proper handling of chemical solutions being used with the equipment based on the MSDSs obtained from the suppliers.

### **1.11.3 Countermeasures against accident**

When an accident with the chemical solution (i.e., physical contact) occurs, take appropriate measures by following the aid and release measures against chemical accidents noted on respective MSDS.

### **1.11.4 Personnel restriction on the handling of chemical solutions**

Some of the chemical solutions used for wafer processing can be highly toxic and corrosive. Therefore, restrict chemical handling to trained personnel. If necessary, MSDS-specified protective gear should be worn. Improper handling of chemical solutions could result in serious injury of the personnel and damage to the equipment.

### **1.11.5 Countermeasures against chemical leakage**

If any chemical leakage is discovered, be sure to immediately report it to the authorized personnel in order to properly handle the problem. If you leave leaks unattended, pipes as well as metal parts such as joints and fittings can quickly become corroded, which can in turn lead to serious accidents.

## **1.12 Handling of gases**

The following details the precautions for handling gases, which are used with this equipment. Please understand the following contents thoroughly, and strictly comply with the precautions.

### **1.12.1 Material Safety Data Sheet (MSDS) for gases**

Properties of gases to be used with this equipment are described in section 2 of this manual. The aim of their inclusion in the manual is to draw the user's attention to the safety precautions for gases. This information is provided as a reference and you should obtain more detailed correct information from the supplier of each gas. (Refer to the next section.)

### **1.12.2 MSDS acquisition**

Users of this equipment must themselves obtain a copy of the MSDS for each gas from their suppliers.

Ensure that all personnel involved with this equipment clearly understand the properties, potential dangers and proper handling of gases being used with the equipment based on the MSDSs obtained from the suppliers.

### **1.12.3 Countermeasures against accident**

When an accident with the gas (i.e., inhaling) occurs, take appropriate measures by following the aid and release measures against gas accidents noted on respective MSDS.

### **1.12.4 Personnel restriction on the handling of gases**

Strictly restrict gas handling, storage and accident management to trained and authorized personnel. If necessary, MSDS-specified protective gear should be worn.

## **1.13 Before starting operation**

This manual describes information that should be known by all operators before operating the equipment. Do not start operating the equipment until the following information has been fully understood and observed.

### **1.13.1 Read the manual first!**

Never operate the equipment until this manual has been thoroughly read and fully understood.

### **1.13.2 About the work clothing**

All operators must wear appropriate work clothing. Never wear necklaces, scarves or other accessories as these could be caught by moving parts and cause serious accidents.

**1.13.3 When noticing any abnormal functioning or situations**

Whenever you notice of any abnormality occurring with the equipment, report it immediately to the authorized personnel to take appropriate measures.

**1.13.4 Clarification of emergency facilities**

Confirm the locations of the emergency devices and facilities such as fire extinguishers, eye rinsing instruments, etc. The locations of emergency devices and facilities must always be clearly marked.

**1.13.5 Confirmation of covers**

Never open protective covers that require a specialized tool. Opening any of these covers can become extremely dangerous for the operators and other personnel around the equipment, and could cause the equipment malfunctioning.

**1.13.6 Confirmation of no foreign matter**

Be careful not to drop wafers or any other foreign objects such as metal, glass chips, or tools into the equipment. If anything does fall inside, report it immediately to the authorized personnel to take appropriate measures. The areas inside and around the equipment are extremely dangerous.

**1.13.7 No fire**

Never allow open flames, spark sources, etc. in the vicinity of the equipment.

**1.13.8 During bad physical conditions**

Do not operate the equipment if you are in any way bad physical condition (including injury or sickness, etc.)

**1.14 Alarms**

When an alarm is issued, check the message displayed in the indicator. Whenever an error or problem occurs, report it immediately to the authorized personnel to take appropriate measures. Details of the messages appearing on the equipment display are described in the Maintenance Manual.

## **1.15 Emergency stop switches**

The following details functions of the emergency stop switches.

### **1.15.1 In case of emergency**

Pressing an emergency stop switch instantly halted the operation of the equipment.

Immediately press this switch in the emergency situation.

### **1.15.2 Residual hazards**

Carefully note that even after the equipment operation has been halted by an emergency stop switch, potential sources of danger, such as high temperature areas, UPS power discharges, and chemical solutions, still remain.

### **1.15.3 Emergency stop switch locations**

The emergency stop switch locations are described in section 2 of this manual. Confirm their locations on the equipment and ensure that you can operate this switch.

## **1.16 Precautions for hazardous heat**

Even after the equipment power has been turned OFF, some parts and areas in the equipment remain at a high temperature. When working with the equipment, take care of the following precautions.

### **1.16.1 Heat generating areas/parts**

Never detach the protective covers that are installed for the heat generating areas or parts.

### **1.16.2 No touching of high temperature areas**

Never touch parts or areas adjacent to heaters, light sources, power supplies, etc. These parts/areas can become extremely hot and dangerous.

## **1.17 Precautions for hazardous moving parts**

When operating the equipment, take care of the following precautions.

### **1.17.1 No touching of moving parts**

Never touch the moving parts in the equipment. These parts are extremely dangerous.

Failure to do so can result in serious injury.

### **1.17.2 No placing of objects on moving parts**

Do not place or leave any objects near areas containing moving parts. Those objects may be scattered or be a cause of equipment failure.

## 1.18 Caution label locations

Locations of the caution labels (with the signal words, DANGER, WARNING or CAUTION) are described in section 2 of this manual. Check the attachment locations and content of each label, and strictly observe the instructions noted in each label.

## 1.19 Maintenance

When performing maintenance work, strictly comply with the following precautions.

### 1.19.1 Maintenance

Maintenance must be performed by specially trained and authorized maintenance engineers. Do not allow ordinary operators to perform maintenance.

### 1.19.2 Maintenance of the fire extinguisher system

As for the fire extinguisher systems installed on the equipment, ask their manufactures for periodic inspection and strictly follow the instructions provided.

### 1.19.3 During maintenance work

Never turn ON the power switch during service and maintenance works.

## 1.20 Safety locks and tags

To prevent the equipment from operating during maintenance work, lock the power switch and source valves for chemicals, and then attach tags to them so that power, gases, or chemicals are not supplied to the equipment.

### 1.20.1 Locks

Before attempting maintenance work, ensure that the power switch and source valves for gases and chemical solutions are locked and that the key is retained by an authorized employee so that only the authorized employee can operate the equipment.

Quoted from SEMI S19-1102 **What is an “authorized employee”?**

Authorized employees are persons who are trained and proficient in performing a hazardous energy isolation (lockout/tagout) procedure on an energy source ensuring that the energy isolating device and the equipment being controlled cannot be operated until the locking device is removed.

### 1.20.2 Tags

When performing any maintenance work on the equipment, be sure to attach tags to the power switch and supply valves for gases, DI water, chemicals, etc. to alert that the equipment is currently under maintenance. This is to prevent any accidental supply to the equipment.



## 1.21 Other precautions

When operating the equipment, take care of the following precautions.

### 1.21.1 Transfer module functions and safety cautions

Each transfer module is located inside covers that are secured with screws or other parts and automatically performs all the transfer operations necessary for wafer processing. This ensures operator safety as the transfer sections are accessible only when setting and resetting the cassettes.

When an area sensor is installed in a cassette setting or resetting section, transfer in this section will also be halted if you access it carelessly.

Accessing internal transfer modules is extremely dangerous. Therefore, when it is necessary to access the transfer section, such as for maintenance work, be sure to assign only the maintenance service engineers who have complete knowledge of the equipment, to perform the work.

### 1.21.2 Transfer unit

This equipment is provided with transfer units in order to transfer wafers (substrates) for processing. If precautions are not taken carefully, there could be serious danger to the operators. To prevent such hazardous situations, the equipment is provided with a variety of interlocking safety devices for the transfer units. Never operate the equipment while the safety devices are disabled as this is extremely dangerous.

### 1.21.3 Other precautions

Do not use devices that generate a radio frequency of 3 kHz to 300 GHz, such as wireless telephones or transceivers, in the vicinity of the equipment. This could cause equipment malfunction.

Do not approach the equipment if you are using a heart pacemaker. This could cause malfunction of the heart pacemaker.

### 1.21.4 High place operations

When you adjust or cover/uncover devices that are installed in a high place, use a stepladder or stool to perform the procedure safely. Place the stepladder or stool in a horizontally stable location.

### 1.21.5 Laser

This equipment is provided with a laser unit, which is protected by a variety of safety interlocking devices. If the laser used with this equipment is indicated as “Class 2”, “Class 2A”, “Class 3A”, “Class 3B” or “Class 4”, never cancel the safety devices or open the covers before turning OFF the power to the laser unit.

## 2 Equipment safety information

### 2.1 Equipment outline

This section describes the standard specifications for the equipment. Specific information for individual equipment units can be confirmed by referring to the relevant “Specifications for Approval” and/or the electrical capacity plates.

#### 2.1.1 Equipment type

Wet Station

#### 2.1.2 Model

WS-820L

#### 2.1.3 Manufacturer and manufacturing number

TechInTech Co., Ltd.  
170400068A

#### 2.1.4 Intended use

This equipment is a wafer wet rinsing device. It is positioned as one of the semiconductor manufacturing devices and is used during wafer processing. In this equipment, wafers are dipped in the chemical baths in order to rinse (remove) foreign objects such as particles, metal or organic matter from their surfaces.

#### 2.1.5 Capacity plate of the equipment

A capacity plate, which displays the equipment manufacturing number, power supply voltage, overall loaded current, electrical diagram number, etc., is affixed to the equipment. For the location of the plate, refer to Appendix O1.2.1.5.

#### 2.1.6 Rated current of the main breaker

For the rated current of the main breaker used in the equipment, refer to Appendix O1.2.1.6.

### 2.1.7 Valve plates

The following plates are affixed to the valves for chemical solutions and gases. Although the flow rate and pressure of the valves were adjusted to the appropriate values when the equipment was delivered and installed, if required, readjust these values in accordance with the specifications noted on the instruction plates.

## CAUTION

If flowmeters or pressure meters are available, use these meters to adjust the flow rate and pressure to the specified values.

H F
COOLING WATER
COOLING WATER IN
MANUAL VALVE
NORMALLY OPEN

MV00SU4

Below is a basic description of the instruction plates.

Module
Chemical/gas name
Purpose
Instrument name
Setting, condition

Instrument no.

Normally open
---------------

The valve should always be open.

Adjust
--------

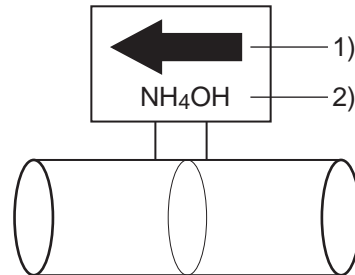
The valve should be adjusted properly.

Normally closed
-----------------

The valve should always be closed.

### 2.1.8 Labels of fluid directions

Arrow labels are affixed to the piping in the chemical delivery source section, the measuring tank section, and so on.



- 1) An arrow indicates the direction of chemical/gas flow. Chemicals and gases are categorized by arrow color.
- 2) Chemical/gas types

Fluid/gas category	Arrow color
Organic or ozonized gas (or water)	Black
Acid	Orange
Alkaline	Magenta
DI water	Green

## 2.2 Caution labels used on the equipment

In this equipment, caution labels are affixed to the locations that require special attention. For the labels used in the equipment, refer to the label list in Appendix O1.2.2.

## 2.3 Caution label locations

For the caution label locations, refer to Appendix O1.2.3.

## 2.4 Emergency stop switches

The following details the functions and locations of the emergency stop switches.

### 2.4.1 In case of emergency

Immediately press an emergency stop switch if an abnormality occurs in the equipment or there is any danger to the operators. This directly shuts off the power supply to all moving parts and terminates operations in all modules. For information on current-carrying parts, refer to Appendix O1.2.4.1.

 **WARNING**

- Even after power to the equipment has been turned OFF, some parts and areas in the equipment remain at a high temperature. Take care to avoid contact with these high temperature parts and areas. Also note that chemical solutions continue to be fed to the chemical processing modules. Be extremely careful not to touch the chemicals or breathe in gas or vapor.
  - Even after the emergency stop switch is activated, some areas continue to carry dangerous electrical current. Never touch the power supply areas.
- 

 **CAUTION**

Be sure to use the emergency stop switches only in an emergency.

---

**2.4.2 Function of emergency stop switches**

This equipment is provided with emergency stop switches that are used to halt the equipment in case of emergency.

Pressing one of the emergency stop switches activates a related magnetic switch and shuts the equipment's power circuit OFF.

For details, refer to Appendix O1.2.4.2.

**2.4.3 Areas where electrical charges remain even after an emergency stop switch is pressed.**

Even after the emergency stop switch is activated, some areas continue to carry dangerous electrical current. Never touch these areas even after the emergency stop switch has been activated.

Whenever you intend to perform electrical work, always be sure to turn OFF the main circuit breaker in the factory.

For details on areas where electrical charges remain even after an emergency stop switch is pressed, refer to Appendix O1.2.4.1.

**2.4.4 Locations**

For the locations of the emergency stop switches, refer to Appendix O1.2.4.4.

**2.4.5 Cancellation of an emergency stop switch**

For the individual cancellation procedures of the emergency stop switches, refer to the manuals for each one and follow the instructions given in the manual. An operator should not cancel an emergency stop switch based on his/her own judgment.

---

 **WARNING**

- This operation must be performed only by authorized personnel. Do not allow ordinary operators to perform this operation.
  - Before canceling an emergency stop switch, correct the cause of the emergency stop, and ensure the safety of the equipment and surrounding area.  
When restarting the operation of the equipment, confirm that the cause of the emergency stop has been resolved.
-

## 2.5 Interlocks

This equipment is provided with a variety of electrical and mechanical interlock functions linking a wide range of sensors and equipment components to ensure operator safety and prevent malfunctions.

### 2.5.1 Interlocks

Interlocks are activated when the equipment is incorrectly operated or an error has occurred. Whenever an interlock is activated, a section or all of the equipment is stopped safely and the operator is alerted with a buzzer and tower lamp light(s).

For information on interlocks relevant to safety matters, refer to the next section  
For details related to other interlocks, refer to Chapter 7 “Troubleshooting” in the Maintenance Manual.

### 2.5.2 Interlock error list

Error description	Possible cause	Stop status
Front cover open	The front cover is open during normal operation of the equipment.	Power supply to transfer and moving sections shuts off. Transfer units and moving parts halt their movements instantly.
Protection cover open	The protection cover is open during normal operation of the equipment.	Chemical temperature control, circulation, drainage, supply, dispense, and replenishing operations in the relevant area stop.
Low N <sub>2</sub> pressure	N <sub>2</sub> supply pressure to the equipment has dropped.	<ul style="list-style-type: none"> <li>• Chemical supply, dispense, replenishing, and drainage operations stop.</li> <li>• Power supply to the circulation pump shuts off.</li> <li>• Delivery of new lots stops.</li> </ul>
Low air pressure	Air supply pressure to the equipment has dropped.	Delivery of new lots stops.
Fluid leakage	Fluid leakage has occurred.	<ul style="list-style-type: none"> <li>• Chemical supply, dispense, replenishing, and drainage operations stop.</li> <li>• Power supply to the circulation pump shuts off.</li> <li>• Delivery of new lots stops.</li> </ul>
Pump leakage	Fluid leakage from the circulation pump has occurred.	<ul style="list-style-type: none"> <li>• Power supply to the circulation pump shuts off.</li> <li>• Power supply to the heater shuts off (when specification includes a heater).</li> </ul>
Heater leakage	Fluid leakage from the heater has occurred.	<ul style="list-style-type: none"> <li>• Power supply to the heater shuts off (when specification includes a heater).</li> <li>• Power supply to the circulation pump shuts off.</li> </ul>
Fluid level upper limit	The fluid level exceeds the upper limit.	<ul style="list-style-type: none"> <li>• Fluid supply, dispense and replenishing operations stop.</li> <li>• Delivery of new lots stops.</li> </ul>
Chemical level lower limit (Heater protection level turned off) * When occurring in the processing bath.	The fluid level sensor for heater protection turns off.	<ul style="list-style-type: none"> <li>• Fluid supply, dispense and replenishing operations stop.</li> <li>• Delivery of new lots stops.</li> <li>• Power supply to the heater shuts off (when specification includes a heater).</li> </ul>

## Equipment safety information

Error description	Possible cause	Stop status
Bath overheated * When occurring in the measuring tank.	The fluid temperature exceeds the specified overheat temperature.	<ul style="list-style-type: none"> <li>Power supply to the heater shuts off (when specification includes a heater).</li> <li>Power supply to the circulation pump shuts off.</li> <li>Delivery of new lots stops.</li> </ul>
Chemical level lower limit (Heater protection level turned off) * When occurring in the measuring tank.	The fluid level sensor for heater protection turns off.	<ul style="list-style-type: none"> <li>Fluid supply, dispense and replenishing operations stop.</li> <li>Delivery of new lots stops.</li> <li>Power supply to the heater shuts off (when specification includes a heater).</li> </ul>
Bath overheated * When occurring in the processing bath.	The fluid temperature exceeds the specified overheat temperature.	<ul style="list-style-type: none"> <li>Power supply to the heater shuts off (when specification includes a heater).</li> <li>Power supply to the circulation pump shuts off.</li> <li>Delivery of new lots stops.</li> </ul>
Drainage fluid overheated	The temperature of drainage fluid exceeds the specified overheat temperature.	<ul style="list-style-type: none"> <li>Drainage stops.</li> <li>Delivery of new lots stops.</li> </ul>
Temperature upper limit	The fluid temperature exceeds the specified upper limit level.	<ul style="list-style-type: none"> <li>Power supply to the heater shuts off (when specification includes a heater).</li> <li>Delivery of new lots stops.</li> </ul>
Low exhaust pressure	The exhaust pressure has dropped.	<ul style="list-style-type: none"> <li>Power supply to the heater shuts off (when specification includes a heater).</li> <li>Delivery of new lots stops.</li> </ul>
Abnormal vibration during rotation (spin dryer)	Abnormal vibration is detected during rotation.	<ul style="list-style-type: none"> <li>The rotor stops.</li> <li>Delivery of new lots stops.</li> </ul>
Retainer (cradle) error during rotation (spin dryer)	The retainer (cradle) position sensor turned off during rotation.	<ul style="list-style-type: none"> <li>The rotor stops.</li> <li>Delivery of new lots stops.</li> </ul>
Low N <sub>2</sub> purge flow rate (IPA dryer)	N <sub>2</sub> pressure has dropped.	<ul style="list-style-type: none"> <li>The heater stops.</li> <li>IPA supply stops.</li> </ul>
Abnormal IPA density (IPA dryer)	The IPA density is not the specified value.	<ul style="list-style-type: none"> <li>The heater stops.</li> <li>IPA supply stops.</li> </ul>
Heater overheated (IPA dryer)	The heater temperature exceeds the specified overheat prevention temperature.	<ul style="list-style-type: none"> <li>Power supply to the heater shuts off.</li> <li>Power supply to the circulation pump shuts off.</li> <li>Delivery of new lots stops.</li> </ul>
Heater temperature upper limit (IPA dryer)	The fluid temperature exceeds the specified upper limit.	<ul style="list-style-type: none"> <li>Power supply to the heater shuts off.</li> <li>Delivery of new lots stops.</li> </ul>
Occurrence of fire	Fire extinguisher installed by the client is activated.	<ul style="list-style-type: none"> <li>Power supply to the heater shuts off.</li> <li>DI water starts showering.</li> <li>Delivery of new lots stops.</li> </ul>

### 2.5.3 Cover interlock

When a safety cover installed in the equipment is opened, an interlock is activated and operation of the equipment is halted.

Cover interlocks are provided for the transfer system and the chemical system.

For details on the cover interlocks, refer to Appendix O1.2.5.3.

## 2.6 Exhaust

Be extremely careful of gases and/or chemical substances harmful to the human body that may be generated during operation of this equipment.

### 2.6.1 Exhaust

Never turn OFF the exhaust system.

If it is turned off or the exhaust pressure is reduced, the chemical gases in the equipment may leak and adversely affect personnel. A similar situation may occur if the butterfly valve or slit in the exhaust section is closed or the exhaust scrubber on the primary side (on the customer's facility side) is stopped.

### 2.6.2 Exhaust damper

Never touch the exhaust damper in the exhaust area.

### 2.6.3 Manostar switch position

For the locations of the manostar switches for measuring exhaust levels, refer to Appendix O1.2.6.4.

#### **Manostar Switch and Lower Limit Setting (for normal operation)**

The exhaust pressure's lower limit detected by the manostar switch has been set to 20 mm H<sub>2</sub>O (200 Pa/0.029 psi).

When an exhaust pressure of 20 mm H<sub>2</sub>O (200 Pa/0.029 psi) or less is detected, an alarm will be issued.

Model: MS-61L-VT 20 Pa to 118 Pa (YAMAMOTO ELECTRIC WORKS)

Set pressure: 20 Pa to 118 Pa

## 2.7 Countermeasures against leakage

The equipment is equipped with sensors to detect leakage from the equipment. When the sensor detects a leakage, an alarm is issued to alert the operator.

If a leakage occurs, stop the equipment and find the location of the leakage. Always attend to leaks immediately.

---

### WARNING

This operation must be performed only by authorized personnel. Do not allow ordinary operators to perform this operation.

If any leakage is found, do not operate the equipment until appropriate measures (i.e., repair) have been taken.

---



## 2.8 Safety locks and tags

Locking brackets are provided for the power switch, chemical valves, and covers of this equipment in order to prevent any accident that may be caused by inadvertent supply of electricity/fluids during maintenance work.

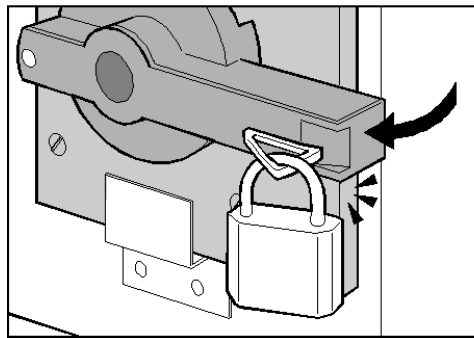
The equipment must not be operated when the brackets are locked or when the equipment has tags affixed that show precautions concerning the locked areas in order to prevent anyone from touching the equipment.

### 2.8.1 Locking the power switch, chemical valves, and covers

The equipment must not be operated when the brackets are locked as illustrated below.

#### **Locking the power switch (This is not provided for some of the equipment.)**

Pull out the bracket to the front, as illustrated below, to lock it.



---

#### **⚠ CAUTION**

There may be several power breakers installed. (The number of breakers is noted on the label affixed to the breaker section.) Be sure to lock all breakers. The lock keys must be retained by the supervisor, and the lock must be opened or closed in accordance with the instructions given by an authorized employee.

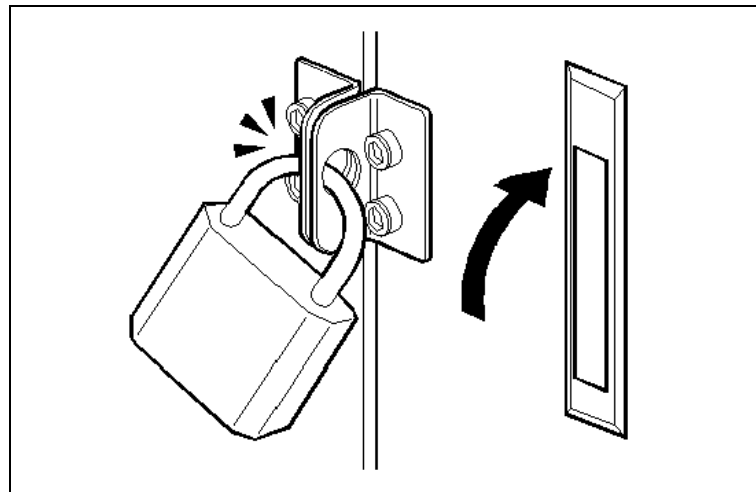
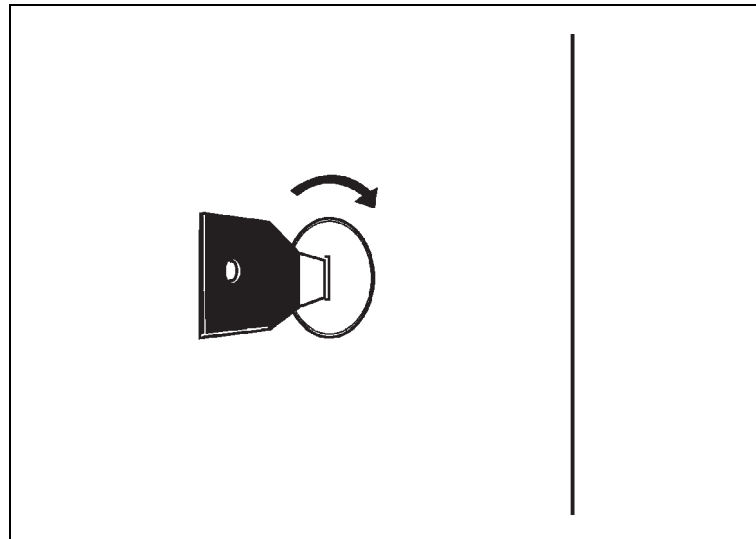
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#### **Locking the chemical valves**

For information on locking of chemical valves, refer to Appendix O1.2.8.1.

**Locking covers (This is not provided for some of the equipment.)**

A lock is provided on the covers as shown below. Be sure to always keep the covers locked except when opening them for maintenance.

**2.8.2 Lock cancellation**

Before unlocking the power switch or the chemical valves, check the equipment and its surroundings for safety. Unlocking operation is allowed only after the safety of the equipment and its surroundings has been ensured.

---

**⚠ WARNING**

This operation must be performed only by an authorized employee. Do not allow ordinary operators to perform this operation.

---

### 2.8.3 Precautions for locking

A tag should be affixed to the locked area or operation switch section showing precautions to prevent anyone from operating the equipment.

Ensure that no one operates the equipment while this type of tag is affixed.

#### (1) Confirmations before maintenance or at the occurrence of an error

Location	Required status	Confirmation	Possible hazard
Switch box door	Closed	Confirm that the door is closed and locked at all times other than during maintenance.	If anyone other than a maintenance engineer opens the door, it is possible that they would receive an electrical shock.
Power source breaker	OFF	Confirm that the power supply is OFF and the breaker lever is locked.	If anyone other than a maintenance engineer touches the breaker, it is possible that they would receive an electrical shock.
Chemical supply section	Closed	Confirm that the supply valve for chemical supply section is closed and locked.	If anyone other than a maintenance engineer opens the valve, it is possible that they would come in contact with the chemical.

#### CAUTION

Maintenance engineers must carefully read the “Handling chemical substances such as processing solutions” section in Chapter 1 in this manual in order to know the possible hazards presented by each chemical.

#### (2) Confirmations during idle or normal operation

Location	Required status	Confirmation	Possible hazard
Switch box door	Open	Confirm that the door is closed and locked.	If anyone other than a maintenance engineer opens the door, it is possible that they would receive an electrical shock.
Power source breaker	ON	Confirm that the power supply is ON and the breaker lever is locked.	If anyone other than a maintenance engineer touches the breaker, it is possible that they would receive an electrical shock.
Chemical supply section	Open	Confirm that the supply valve for chemical supply section is open and locked.	If anyone other than a maintenance engineer closes the valve, a lot being processed could be spoiled.

#### CAUTION

If you must unlock the power source breaker or a chemical supply section valve, confirm that it is possible to supply power or the corresponding chemical.

## 2.9 Utilities

The following are rules to ensure safety use of this equipment.

Be sure to observe these rules and operate the equipment correctly. Do not stop the utilities for the equipment, such as air, N<sub>2</sub>, or hot and cold DI water. Inadvertently stopping a utility may lead to serious equipment/wafer defects and/or serious physical injury.

### 2.9.1 Air and N<sub>2</sub>

- N<sub>2</sub> supply must not be stopped during equipment operation or while the equipment contains chemicals.
- Air supply must not be stopped during equipment operation or while the utilities are connected to the equipment.
- N<sub>2</sub> gas is necessary for pressure sensors and air sensors which detect fluid levels in each bath to operate.
- When stopping the air or N<sub>2</sub> gas, be sure to clean the processing baths and chemical tanks, and empty them.
- Before turning OFF the power supply, be sure to drain and clean the processing baths and chemical tanks.
- Once N<sub>2</sub> gas is stopped, the pressure sensors for fluid level detection do not work.
- If the air is stopped, the pneumatic drive mechanisms (such as pneumatic cylinders and valves) will not function correctly.

## 2.10 Handling of chemicals

### 2.10.1 Chemical mixture

When supplying, replenishing, or draining chemicals, be sure not to mix different types of chemicals.

- A mixture of different types of chemicals may cause production of a base, abnormal temperature increase, and/or generation of gas.
- If different types of chemicals are to be used, be sure not to supply, replenish, or drain those chemicals concurrently.
- After chemical drainage, be sure to run an amount of water which exceeds the amount of chemical through the drain line (this is not relevant to the equipment on which DI water is not supposed to be used).

Potential risks in the case of a chemical mixture with the following combination

	HF		H <sub>2</sub> SO <sub>4</sub>	H <sub>2</sub> O <sub>2</sub>	NH <sub>4</sub> OH
HF		No particular changes	Temperature increase (a few tens of degrees)	Temperature increase (a few degrees)	Sudden exothermic reaction, bumping, and/or whitish smoke
HCL	No particular changes		Temperature increase (a few tens of degrees) and/or color change to yellow	Occurrence of poisonous gas and/or bumping	Sudden exothermic reaction, bumping, and/or whitish smoke
H <sub>2</sub> SO <sub>4</sub>	Temperature increase (a few tens of degrees)	Temperature increase (a few tens of degrees) and/or color change to yellow		Temperature increase (a few tens of degrees)	Sudden exothermic reaction, bumping, and/or whitish smoke
H <sub>2</sub> O <sub>2</sub>	Temperature increase (a few degrees)	Occurrence of poisonous gas and/or bumping	Temperature increase (a few tens of degrees)		Vigorous reaction due to the presence of metal
NH <sub>4</sub> OH	Sudden exothermic reaction, bumping, and/or whitish smoke	Sudden exothermic reaction, bumping, and/or whitish smoke	Sudden exothermic reaction and/or bumping	Vigorous reaction due to the presence of metal	

There are various types of potential risks depending on the combination of chemicals to be used. To avoid serious accidents resulting from the improper handling of chemicals, be sure to fully understand the properties of each chemical to be used as well as the potential risks associated with the mixing of these chemicals.

## 2.11 Resistance

- Pressure resistance

The equipment has been designed and manufactured to resist the following pressures. Please note, however, that the equipment is supposed to be used at pressures within the range shown in the utility list. Therefore, the following pressure ratings are not guaranteed values.

Utility name	Pressure rating
DI water	0.3 MPa
Cooling water	0.2 MPa
City water	0.2 MPa
Chemical	0.2 MPa
N <sub>2</sub>	0.7 MPa
Air	0.7 MPa

- Auto fire extinguisher system

For the automatic fire extinguisher system, refer to “Specifications for Approval”.

## 2.12 Periodic inspection of terminal blocks and fittings

- To prevent heat generation accidents due to loose connection on the terminal block or leakage accidents from loose piping fittings, periodic inspection and retightening must be performed.
- For details of the periodic inspection of terminal blocks and fittings, contact our nearest sales office, listed at the end of this manual.

## 2.13 MSDS

The system manager must obtain the MSDSs for all the chemical substances and gases to be used in the equipment from the suppliers and follow the instructions noted in each MSDS.

The names of the MSDSs obtained must be attached to this manual for quick reference at any time.

### 2.13.1 Reference documents for MSDSs

A sample of an MSDS is provided (Appendix O1.2.11.1). It is the customer’s responsibility to obtain the formal MSDSs from each supplier.

### 2.13.2 MSDS

Obtain all the necessary MSDSs for the chemicals and gases to be used in the equipment from the relevant suppliers. They should be attached to this manual.

## 2.14 Transfer module

### Transfer module functions and safety cautions

- All the transfer modules used in the equipment are conformed to ANSI RIA R15.6 standards.
- The transfer modules transfer the wafers from/into cassettes; or transfer the wafer cassettes among the loading section, the processing module, and the unloading section according to the specified processing programs to perform fully automatic processing.
- Each transfer module is located inside the hard frame with a screw-secured cover and automatically performs all the transfer operations necessary for wafer processing. Operators are not allowed to access the transfer modules except the cassette loading and unloading sections.
- The cassette loading and unloading sections are each provided with an area sensor to stop the transfer system whenever any one approaches either section.
- When an error occurs in the equipment, the alarm is activated and the corresponding message appears on the alarm panel. In such a case, contact a maintenance engineer.
- It is dangerous to access to the interior of the module. If an error requires a repair work for the interior of the module, for instance, such work should be performed only by maintenance engineers who have complete knowledge of the equipment.
- Before approaching the inside of the frame, be sure to turn the equipment power key switch OFF and lock it.
- Before using a remote control, be sure to check that it can properly activate an emergency stop.
- Near the equipment, do not use any device that generates radio frequency energy, such as a transceiver or a portable phone. Using such device causes the equipment malfunction.
- Do not approach the equipment if you are using a heart pacemaker.
- Whenever an error beyond your control occurs, do not hesitate to contact our office listed at the end of this document.

## 3 For environmental protection

### [ISO14001]

There has been a growing interest in global ecological issues as a result of the increase in global environmental problems, such as global warming, destruction or reduction of the ozone layer, contamination of seawater, and ecocide.

These environmental problems are now being addressed on a global scale in order to prevent environmental disruption that may lead to the extinction of the human race and to achieve more harmonious coexistence between human beings and the natural environment.

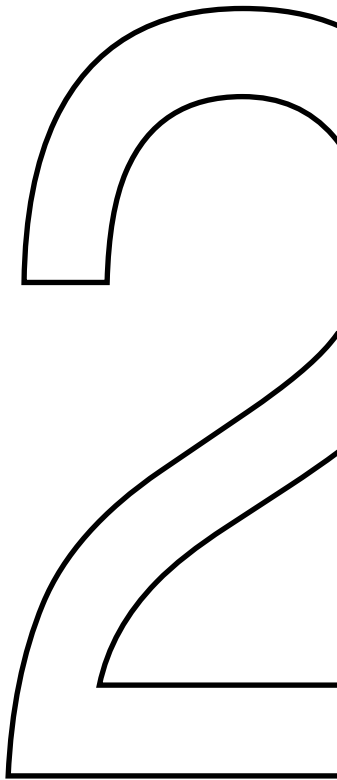
We have obtained ISO 14001 (certification of an environmental management system), a leading international standard for environmental management systems, at all our manufacturing factories. We are continuously striving for the performance of environmentally safe business activities and the production of eco-friendly products.

### 3.1 Waste disposal

#### 3.1.1 Precautions for disposal operations

- 1) For environmental protection purposes, request a professional contractor to perform maximum recycling of the equipment upon disposal.
- 2) As equipment with a UPS (uninterrupted power supply) unit installed uses a secondary battery that contains heavy metals (i.e., Pb, Ni, Cd, etc.), dispose of such equipment in compliance with the relevant laws and ordinances of your country.
- 3) If printed circuit boards are installed in the equipment, dispose of these boards in compliance with the relevant laws and ordinances of your country, in the same manner as 2. above.





## **Chapter 2 Equipment Transfer and Installation Preparation**

This chapter explains the transfer of the equipment and the preparation for equipment installation. Before starting equipment transfer or installation, carefully read this manual and consult with our personnel concerning the work procedures and precautions.

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# 1 Equipment overview

## 1.1 Installation outline

Processing modules and drive systems made of polypropylene (PP), vinyl chloride, or quartz glass are housed inside the equipment's metal frame. In addition, as they contain piping and precision components, use the utmost care when handling the equipment and follow the instructions of our personnel or dealers.

---

### CAUTION

- Cranes and lifts must be operated by specially trained, authorized personnel.
  - Electrical system connection must be performed by electrical engineers qualified in accordance with the relevant laws and ordinances.
  - Do not supply utilities to the equipment before equipment installation is fully completed.
- 

## 1.2 Equipment relocation and transfer

Whenever your equipment must be moved or transferred, please contact our service stations.

## 1.3 Resale

When the contractual undertakings stated in the purchasing contract document are violated, our liabilities will lapse.

## 1.4 Equipment outline

For the configuration of this equipment, refer to Appendix I2.1.4.

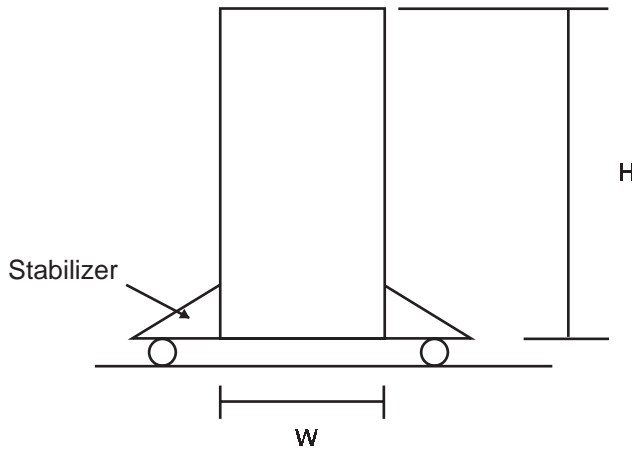
## 2 Precautions

### 2.1 Precautions for equipment transfer

When transferring the equipment, take the following precautions.

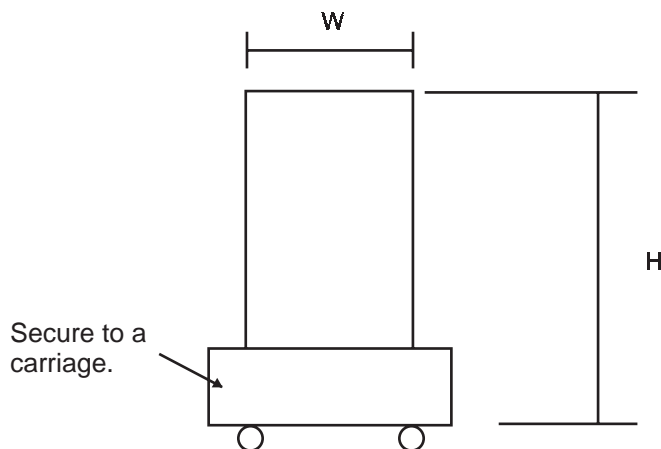
#### WARNING

- A stabilizer must be attached to the unit if it does not meet the stabilization criterion described below.



Stabilization criterion  
 $W:H=1:3$   
 Attach a stabilizer  
 if the height is more  
 than three times the width.

- If a stabilizer is not attached to an unstable unit, the unit must be secured to a carriage before relocation.



Stabilization criterion  
 $W:H=1:3$   
 Attach a stabilizer  
 if the height is more  
 than three times the width.

- Never enter the area from the direction in which the equipment (or the container) is to be moved. When moving the equipment (or the container), a person must be placed at each corner of the equipment to prevent it from falling over.

---

 **CAUTION**

- Never apply force to any area on the container that is not specified as being capable of handling force.  
Doing so may deform or damage that part of the equipment.
  - Handle the equipment with extreme care so as not to damage the packing sheets that seal the equipment. These sheets should only be removed in a clean room.
  - When the equipment needs to be pushed to move it, be sure to only push on the frame section. Pushing on the covers or pipes may damage the equipment.
- 

## 2.2 Relocation using a crane

When a crane is used to move the equipment (or the container), observe the cautions noted below.

---

 **WARNING**

- Never enter the area under the equipment while it is being lifted with a crane.
  - Do not put the equipment in a walkway during the installation work. Never allow the passage to become blocked with any obstacles.
  - Install the equipment in a horizontal position so that it will not tilt or fall over.
- 

- 1) Prepare a gauge or pallets.
- 

 **CAUTION**

When the equipment is being lifted with a crane, prevent the nylon slings from coming into contact with the equipment. Never apply the nylon slings directly to the equipment.

---

- 2) Place the equipment (or the container) on a gauge or pallets and check that the equipment weight is within the allowable range for lifting by the crane. Also check that the equipment remains balanced while being lifted.
- 3) Tightly secure the equipment (or the container) so that it can not shift or be dropped.
- 4) When lifting the equipment (or the container) up or down, take care not to apply any shocks.
- 5) The nylon slings must be positioned at the specified points.

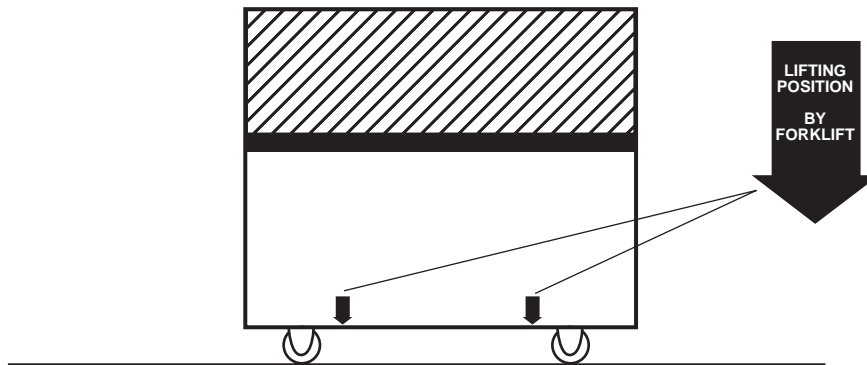
## 2.3 Relocation using a forklift

When a forklift is used to move the equipment (or the container), observe the cautions noted below.

### WARNING

Never transport the equipment in a tilted position, jolt it suddenly, or stop it from moving abruptly. Exercise utmost care not to drop the equipment (or container) during movement.

- 1) Check the weight and dimensions of the equipment (or the container) on the packing list or packing tag.
- 2) See the caution labels to check the positions and direction for setting the forks. The positions are clarified with the UP labels.
- 3) Place the forks under the specified positions indicated by the UP labels.



- 4) Before setting the forks, check the bottom of the equipment (or the container) so that the forks will not damage the equipment. If there are projections, such as piping, inform our personnel that are assisting the installation.
- 5) Advance the forklift to a position where the equipment is almost (but not actually) in contact with the mast of the forklift.
- 6) Operate the forklift carefully so that it will not apply any impact to the equipment.

## 2.4 Caution labels

The following caution labels are attached to the packaging of the equipment. Carefully read these labels to ensure full understanding and also note their application positions. After doing so, carefully follow the instructions given.

---

### WARNING

Handle a crate in accordance with the descriptions on the caution labels. Very serious accidents may occur if the instructions are not observed.

---

#### **UP**

When lifting the equipment with a forklift, be sure to insert its forks only into the areas to which this label is attached. Beware that applying strong force to any other area may deform or damage the equipment.



UP

#### **KEEP DRY**

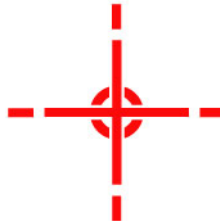
Beware of the environment. If the equipment becomes damp or is stored in a humid place, it may be damaged.



KEEP DRY

#### **CENTER OF GRAVITY**

This mark is a reference point for positioning.



CENTER OF GRAVITY

#### **FRAGILE**

Avoid applying heavy vibration as the crate contains precision mechanical instruments or fragile parts/components.



WITH CARE

**SLING HERE**

When lifting a container, be sure to position the sling at this point.



**2.5 Center of gravity of the equipment**

When moving the equipment, adjust the balance of the equipment at its center of gravity to prevent the equipment from falling over. The center of gravity in each unit is shown below.

### 3 Installation preparation

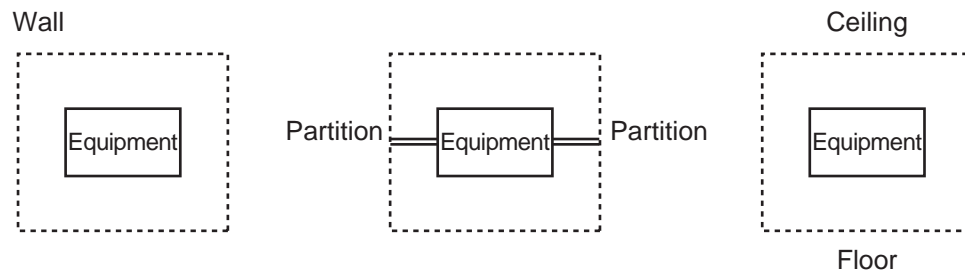
#### 3.1 Pre-installation checks

The equipment must be installed in a clean room. Installing it in the following locations may cause machine damage or malfunctions. Do not install the machine anywhere that it may be exposed or subjected to:

- direct sunlight;
- electrical interference such as voltage fluctuations or line noise;
- sudden, drastic temperature changes;
- a nearby heat source;
- high temperature and humidity;
- strong and/or persistent vibration;
- condensation;
- a nearby flame or spark sources;
- corrosive chemical vapors, mists or gasses;
- flimsy or uneven flooring.

#### 3.2 Installation space

A minimum clearance of 1 meter is required around the equipment to afford adequate space for maintenance and safe passage during emergencies, as shown below. In addition, until the completion of the equipment setup, secure a space for temporary placement of the equipment, tools and jigs.





### 3.3 Power supply

- Prepare a power supply that satisfies all the requirements stipulated in the specifications.
- Installation of the circuit breakers is recommended.
- Prepare a dedicated power supply that does not serve any other machines or devices.
- Prepare input wiring that conforms to the power requirements.
- Confirm the following.
  - \* The power supply connections are tight.
  - \* There are no cracks or flaws in the power wiring.
  - \* The power wiring and connected parts are not overheated.

### 3.4 Grounding connection

Make sure to connect the earth line to either a dedicated plug or distribution board terminal that has been grounded in the specified manner.

### 3.5 Signal line connection

Check that there is an interface between the equipment and each external device, then prepare the required wiring.

### 3.6 Exhaust

Exhaust lines are important utilities. If exhaust operation is stopped, vapor from chemicals used in the equipment may leak, creating a potentially hazardous situation. An exhaust device equipped with a backup function must be installed so that exhaust operation can be maintained, without fail, while the equipment is stopped due to a power failure.

### 3.7 Utilities

The minimum required capacity and pressure of each utility for a single connection port are stated in the Mutually Agreed and Confirmed Specifications.

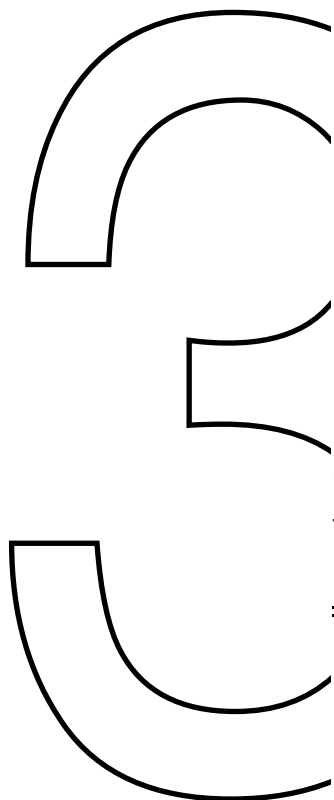
To assure stable operation, please arrange a sufficient capacity for each supply line.

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#### CAUTION

The vat drain piping must be separated from other drain lines. If it is not, abnormal chemical reactions or back flow may occur. To prevent this, always install an independent drain line for the vat drain.

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## **Chapter 3 Equipment Installation**

This chapter explains the precautions for equipment installation.

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# 1 Installation

## 1.1 Checking the installation space

The installation procedure of the equipment is instructed by our engineers. Check, with our engineers regarding, the installation space, the equipment weight, the positions of the securing feet, and the utility delivery section, according to Appendix I3.1.1.

## 1.2 Securing the equipment

For details on the fastening hardware diagram and installation positions, refer to Appendix I3.1.2.

## 1.3 Power line connection

- The power line connection should only be performed by qualified personnel.
- Connect the power line to the circuit breaker's power supply side.
- When connecting a power line cable to the terminal block, use a ring terminal and tighten it with the appropriate torque.
- To prevent an electrical shock, be sure to cap or cover the current-carrying terminals and related components and ensure that no current carrying components are exposed.
- Prevent the cables from coming into contact with the edges of the frame or covers. If there is a possibility of this, attach universal bushes to the edges to avoid short circuits.

## 1.4 Grounding connection

- The grounding connection should only be performed by qualified personnel.
- The earth line provided with this equipment is covered with green insulation on which yellow spiral or stripes are marked.
- The earth line should only be connected to the equipment using a terminal marked with either the GND, E, PE or  $\oplus$  symbol.
- The earth line should be grounded in the specified manner for the wire capacity and the attachment procedure.

## 1.5 Exhaust line connection

To stabilize the equipment running, the exhaust status needs to be checked regularly. When installing the equipment, install the exhaust piping while taking care of the equipment location and accessibility so that the exhaust status can be easily and properly verified.

## 1.6 Piping connection

To prevent any accidental chemical mixture that may occur due to incorrect line connection, labels (onto which the chemical names are described) are attached to the piping joints. When connecting chemical lines to the equipment, check the chemical names indicated on the utility connection diagram in the Mutually Agreed and Confirmed Specification Sheet and that they correspond with those indicated on the labels provided on the equipment. Check the line connections to the factory and to the equipment individually, and confirm that there is no incorrect line connection, chemical leaks or abnormal supply of utilities.

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## 1.7 Cover attachment

When the equipment installation is completed, be sure to attach the cover before supplying utilities to the equipment.

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 **WARNING**

Do not operate the equipment when the cover is unattached.

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Wet Station  
WS-620/820 Series  
INSTALLATION MANUAL

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