Operator's Manual

Laboratory Automation System

IDS-880

Stanford Hillview

First Edition

IDS Co., Ltd.

To our customer

Our system can offer you effective space management, time saving processing power, highly reliable parts selection and peace and quiet in your lab. Our system is designed to meet your specific needs.

Please read this material well in order to use the system safely and properly. Also keep this handy and with care so you can refer to more information at all times.

Please note that matters described in this material can be amended without previous notice.

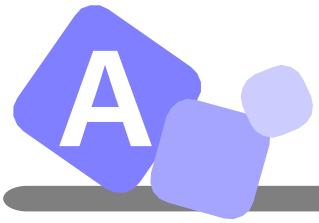
NOTE: This equipment has been tested and found to comply with the limits for a Class A digital device, pursuant to Part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference when the equipment is operated in a commercial environment. This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the instruction manual, may cause harmful interference to radio communications. Operation of this equipment in a residential area is likely to cause harmful interference in which case the user will be required to correct the interference at his own expense.

FCC WARNING: Changes or modifications not expressly approved by the party responsible for compliance could void the user's authority to operate the equipment.

<< Table of Contents >>

A General Information

This section describes the explanation of general outline of IDS Laboratory Automation System, its configuration, safety precautions, safety labels, and markings used throughout this manual.



System Overview

This section describes function and features of Laboratory Automation System.

◆ What does Laboratory Automation System do?

Laboratory Automation System automates sample preparation processes based on the aliquot/sort information from the host computer and through C-CPU (Line Control CPU) that controls each unit.
Automating routine and labor intensive tasks enhances the efficiency of laboratory operation.

◆ Key Features of IDS System

Barcode Control: All samples are managed by barcode, which eliminates human error including taking a wrong sample.

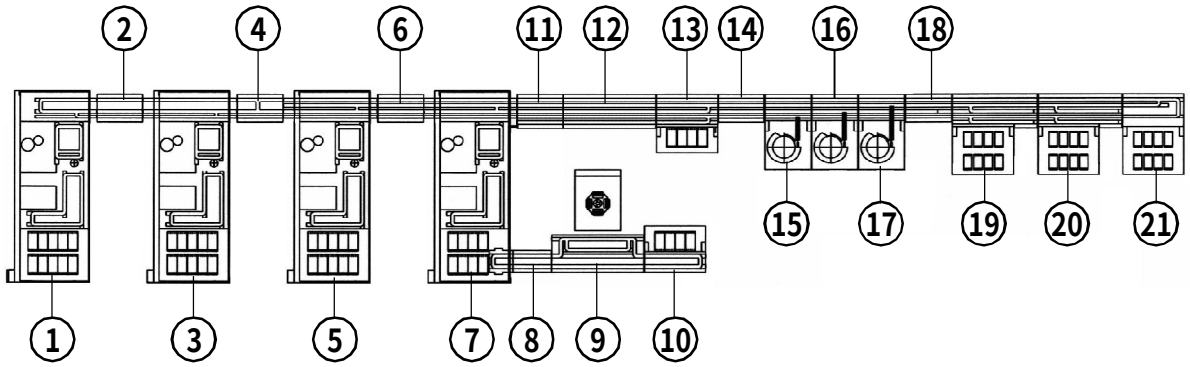
Eliminate hospital infection: By automating sample preparation processes, the risk of hospital infection can be minimized.

Real-time Processing: Single Tube Transport Method provides maximum flexibility to route samples to each own destination and accomplishes real-time processing.

System Configuration

This section shows configuration of the system.

◆ **The system is consisted of units as below.**



1	S-3000	12	I Lane
2	I Lane	13	Inlet
3	S-3000	14	I Lane
4	H Lane	15	Recapper
5	S-3000	16	Recapper
6	I Lane	17	Recapper
7	S-3000	18	I Lane
8	S-3000 Conn. Conveyor	19	Outlet
9	Centrifuge	20	Outlet
10	Inlet	21	Outlet
11	I Lane		

Safety Precautions

This sections describes safety precautiions and meanings of safety indications in order to use the system safely.

◆ In order to use this system safely.....

About Symbols

This manual and system contain indications and symbols in order not only to use the system safely and properly, but also to prevent harm to you and others and damage to properly. Rread the meaning of these symbols and indications and become familiar with their contents before reading this manual.

⚠WARNING	Indicates that there is the risk of death or serious injury if the system is improperly handled contrary to this indication.
⚠CAUTION	Indicates that there is the risk of personal injury or damage to objects if the machines are improperly handled contrary to this indication.

Meaning of Each Symbol

△symbol indicates warning items (including caution). Specific waring contents are drawn inside this symbol
(example: the symbol on the left indicates the possibility of electric shock)

⃠symbol indicates prohibited actions. Prohib ited action is drawn inside or near the symbol.
(example: the symbol on the left indicates that touching is prohibited)

this symbol indicates actions which must be followed.

Safety Precautions (continued)

WARNING

■ DO NOT DISASSEMBLE OR REPAIR BY YOURSELF

to prevent fire or electric shock. Also, you may be injured by the improper action of system.
For any problems or repair, contact IDS Service representative.

■ TURN THE POWER OFF PRIOR TO MAINTENANCE

to prevent fire electric shock, or injury.

■ DO NOT PLACE ANY ITEM ON THE TOP

In case foreign objects such as metal fragments, water or liquid enters the system, it may cause fire or electric shock.

■ DO NOT INSERT OR DROP FOREIGN OBJECT

Do not insert or leave metal material or inflammable inside the unit. It may cause fire or electric shock.

■ AVOID WATER OR LIQUID TO ENTER THE SYSTEM

It may cause fire or electric shock.

Safety Precautions (continued)

WARNING

■ DO NOT REMOVE UNIT COVER DURING OPERATION

If you put your hands or if foregn items come inside of the unit, it may cause fire, electric shock or injury.

■ DO NOT PUT ANY OBJECT IN FRONT OF THE FAN

Blocking fan, warm air is not able to escape from the inside unit and may cause electric shock, ground-fault or short.

CAUTION

■ DO NOT TOUCH CONVEYOR MOTOR OR MOVING PARTS

Do not touch moving parts while the system is running. It may cause injury. Also, do not touch conveyor motor while the system is running or 30 minutes after motor is stopped. It may cause skin burn.

■ KEEP DOORS CLOSED DURING THE SYSTEM OPERATION

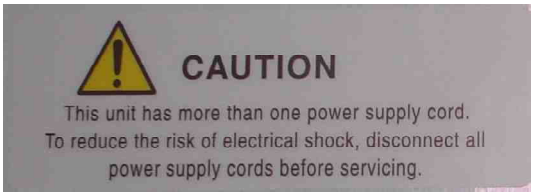
Always make sure the door is closed during the operation. Opening this door or entering hands or foreign object into a unit during operation may cause an injury or system failure.
When necessary to to open the door during the operation for some reason, turn off the power of the unit or pause the unit as pressing “PAUSE/RUN” button, and ensure moving parts are completely stopped.

Labeling

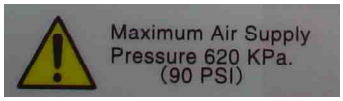
This section shows labels applied on the system.

The label is applied on moving parts (e.g., gripper arm) indicating the risk of injery or breakdown.
Turn off the power or pause the system for safely cleaning the parts.

The lable warns operator of biohazard.



The label is applied on power/arm area cover indicating the risk of electrical shock. The covers shall be removed by service personnel only.



The label is applied near the air regulator.

WEEE label is applied at the back of inlet unit.

Markings

This section shows markings used in this manual.

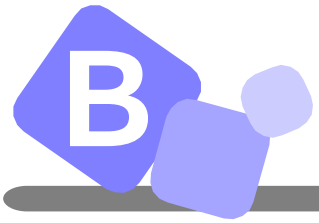
NOTE ! indicates that the special care is required in the process.

Check indicates the items that need to be noted for the certain process or handling.

Ref. indicates the page number or the name of manual that can be used as reference and gives you the related information or procedure in detail.

B Basic Operation

This section explains operating instructions for the control panel and how to startup/shutdown the system.



Startup/Shutdown

This section describes how to startup/shutdown system. The procedures in this page is also included in the manual for IDS-3000.

How to startup system:

Step 1: Turn on air supply.
Step 2: Turn on the system power.

Step 3: Prepare the following for each unit.
Inlet/Outlet Unit for primary samples ··· Set empty racks.
Outlet Unit for secondary samples ···Set empty racks.
Decapper Unit ··· Remove caps from disposal box and clean the chute.
Labeler Unit ··· Refill with tubes and set labels.
Aliquoter Unit ··· Refill with tips. Remove used aliquot tips from disposal box and clean the chute.

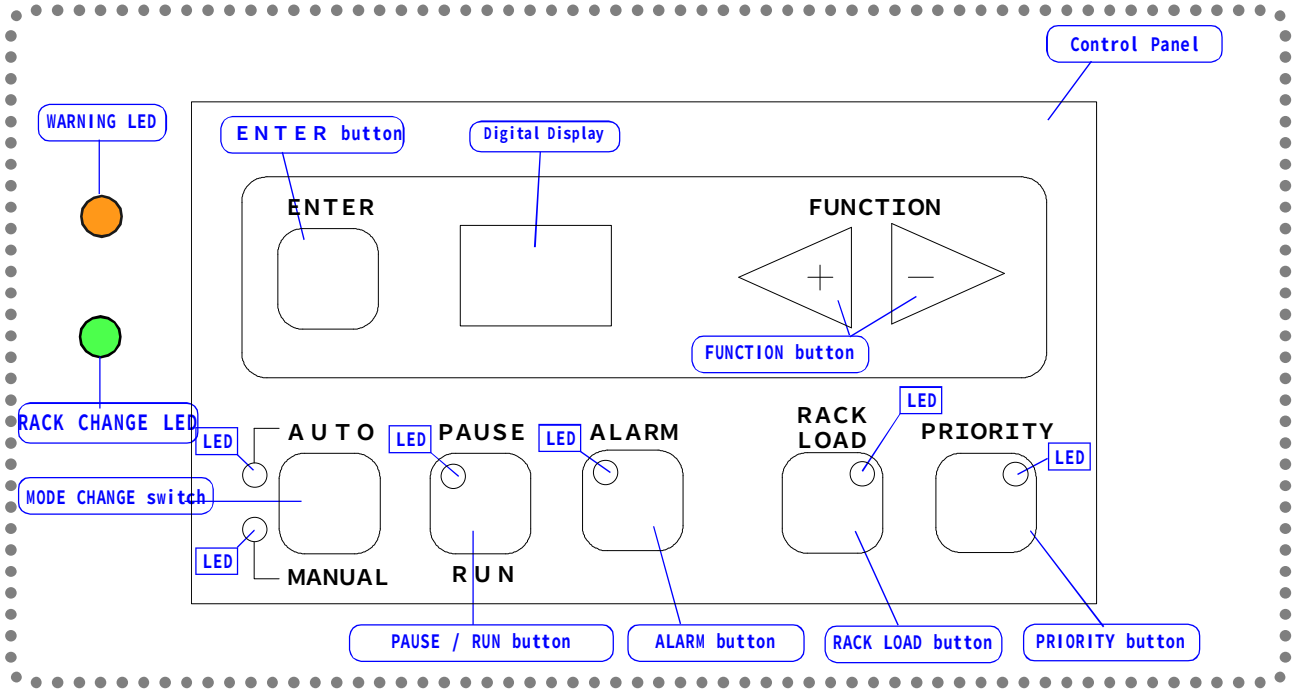
Step 4: Turn on C-CPU power.

How to shutdown system:

Step 1: Turn off C-CPU power.
Step 2: Turn system power.
Step 3: Turn off air supply.

B Control Panel (IDS-880)

This section describes how to use control panel and the functions of each buttons.



◆ General outline of each mode

1) Operation Mode

There are two modes for operation mode; Auto Mode and Manual Mode. By pressing AUTO/MANU button twice, the mode can be switched back and forth between the two modes.

> AUTO MODE

This mode is to make each unit be in operation, and process samples automatically when they arrive on the system or each unit.

> MANUAL MODE/MAINTENANCE MODE

This mode is to make each unit in halt condition. When this mode is selected, "00" is displayed on the LED display. To select MAINTENANCE mode, press FUNCTION button while the system is in MANUAL mode. By pressing ENTER button, the maintenance mode is executed. To switch to Auto Mode, press AUTO/MANU button twice.

NOTE ! To use MANUAL (MAINTENANCE) MODE, call IDS Service representative for the procedure.

Check In the case the operation mode is switched during a process, it will be switched over after completing the process being in action. The LED keeps flashing during this process of mode change. By pressing AUTO/MANU button for or more than 3 seconds, the mode is forcefully switched over.

2) PAUSE/RUN

By pressing PAUSE / RUN button, the system is suspended. To resume operation, press PAUSE / RUN button again.

3) ALARM

When an error occurs during the operation, the system pauses operation, ALARM LED start flashing and error code is displayed on the digital screen. By pressing FUNCTION button, the location of error (i.e., sensor or cylinder number) is displayed on the screen. To stop the alarm, press ALARM button. Refer to Error Code List and recover from the error. Press PAUSE/RUN button to resume operation and yellow LED turns off.

◆ Functions of each button and indications by LED

1) AUTO/MANUAL button

To switch operation mode, press AUTO/MANUAL button to select the mode. The LED blinks for 5 seconds. By pressing the button while LED is flashing, operation mode switches to the other mode.

When power is turned on, the mode is automatically set AUTO.

Check If mode is switched in the process of operation, it will be switched after completing it.

◎ AUTO mode/ LED Display
> Sample are processed automatically.
> LED of AUTO mode turns on.
> If AUTO/MANU button is pressed while the LED of AUTO mode is on, the LED flashes for 5 seconds.

◎ MANUAL mode/ LED Display
> Samples are not processed automatically, and the unit is disconnected from the system.
> LED of MANUAL mode turns on.
> If AUTO/MANU button is pressed while the LED of MANUAL is on, the LED flashes for 5 seconds.

2) PAUSE/RUN button

◎ **When pressed in the process of operation,**
> Unit will pause operation once the process is completed, and will not start the next process.

◎ **When pressed while unit is paused/ LED Display**
> Resume opearation.

3) ALARM button

Press ALARM button and the audible alarm stops.

◎ **ALARM button and WARNING LED**

> LED on ALARM button flashes with alarm sound.
> Press ALARM button, the alarm stops and LED stops flashing.
> Press PAUSE/RUN button to resume the operation, the LED turns off.
> Turn on/off of ALARM LED and WARNING LED are synchronized.

< Sound Patter of Auditable Alarm >

(Sound Pattern)	(Condition)
Continuous sound	Error occurred
Discontinuous sound	Error occurred in sample order monitoring.

4) ENTER button

◎ **Pressed while the system is in MANUAL mode**

> Execute the maintenance mode selected.

◎ **Pressed while the system is in MAINTENANCE mode**

> Complete the ongoing process, switche operation mode to AUTO.

5) RACK LOAD button

This button allows rack change before rack becomes full or empty

> Press RACK LOAD button, rack can be changed after the robotic arm completes the operation in process. LED of RACK LOAD stops flashing when the arm com plete the operation.
> When LED of RACK LOAD is turned on after the arm completes the pro cesses, stop the auditable alarm and change the rack.
> Press PAUSE / RUN button and resume the operation.

6) PRIORITY button

Press PRIOTIRY button and unit start or continue process without waiting for the predetermined number of samples or carriers at a certain position, or waiting predeter mined time period.

7) FUNCTION (+/-) button

The button changes error displays on the panel indicating error type and location. See the TABLE 1 below for the descriptions

Check + By pressing (+) switch, error type is displayed on the panel and error location is displayed by pressing (-).

+ When multiple errors occurs, errors are displayed in the order of their occurrence. After clearing an error, the next error will be dis played.

(TABLE 1)

Error Type	Error Location	Description
0	01 - 99	Barcode read error at position 01-99
1	01 - 99	Error at SN01-99, SN: Sensor
2	01 - 99	Error at SL01-99, SL: Cylinder
3	01 - 99	Error at BR01-99, BR: Barcode Reader
4	01 - 99	Error at PM01-99, PM: Pulse Motor
5	01 - 99	Connection error with Analyzer
7	01 - 99	Error at AS01-99, AS: Auto Switch
9	01 - 99	Other errors

Control Panel (IDS-880) (continued)

>> Lane Through

This function is used when a holder needs to be forced to the next unit.

< Procedure>
(1) Change operation mode of the unit to MANUAL (Maintenance.)

(2) Set ·1 ·using + or -of FUNCTION button, and press ENTER button.

(3) To exit the lane through function, change the operation mode to AUTO.

Check Lane Through function can also be set at C-CPU.
Only from C-CPU, all the units can go into Lane Through.

>> Forced pass for the sample in case of barcode read error (Error Type 0)

This function is used to pass sample tubes (or holder) with barcode read error.

When barcode read error occurs, error type "0" is displayed on the panel.

< Procedure>
(1) Press ALARM button to stop the audible alarm.

(2) Press PAUSE/RUN button with ENTER to move the error sample out of barcode reader.

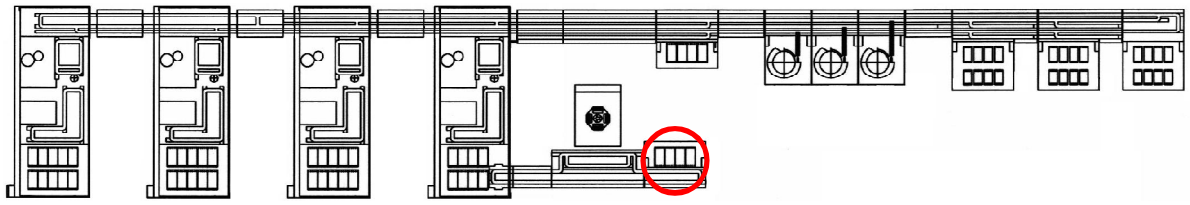
>> Emmergency Stop Switch

If this is pressed in emergency, system power shuts off.

C Unit Function

This section explains functions and features of each unit.

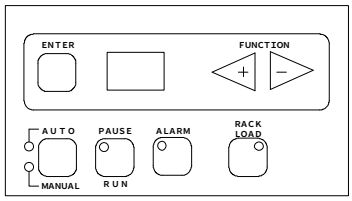
Inlet Unit



◆Inlet Unit

The inlet arm automatically loads a sample into sample carrier on lane. When barcode read error occurs, no sample programming is available or sample barcode is duplicate,the sample tubes sort to error rack marked 4 in the previous page. When they are sorted to the error rack, audible alarm warns operator.

Control Panel



◆Changing Racks

•Before rack becomes full,

1. When inlet trays (see the next page) becomes empty, buzzer sounds to notify operator.

2. Press ALARM button to stop buzzer sound. If the button is not pressed for 5 seconds, the buzzer stops automatically.

3. After confirming that the arm is paused, change the racks. When trays with samples are loaded, PUAUSE/RUN LED starts flashing.

4. Press PAUSE/RUN to resume operation.

Inlet Unit (continued)

◆Changing Racks

•Before rack becomes full,

1. Press RACK LOAD button, the robotic arm pauses operation and buzzer sounds.
2. Press ALARM button to stop the buzzer sound.
3. Unload the rack to be changed.
4. Load empty tray on the rack set position.
5. PAUSE/RUN LED starts flashing. Press PAUSE/RUN button.
6. After changing the rack, reume the operation.

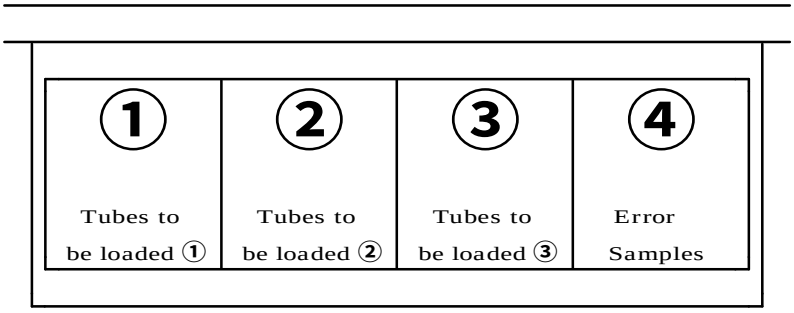
◆ Manual Load of a Sample Tube

1. Press PAUSE/RUN button and confirm that the robotic arm puased operation.
2. Set a sample tube into the empty holder at the loading position.
3. Press PAUSE/RUN button and the sample in the holder will be released from the position.

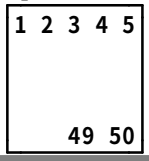
Manually loaded tube as above procedures is prioritized over tubes in rack.

◆Rack Type

◆ Rack Number

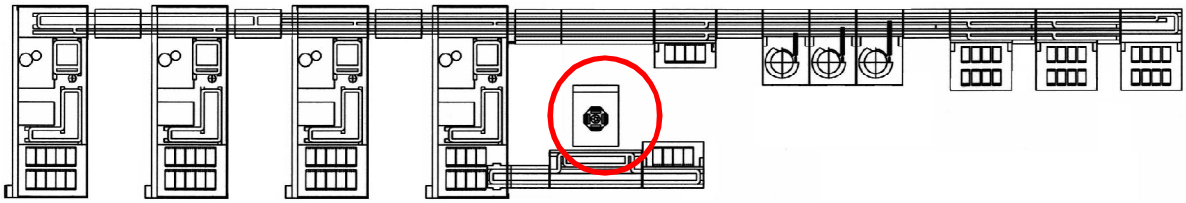


◆ Sample Tube Position



The position of rack is assigned from the left to the right and front to the back.

Auto Centrifuge



◆ **Centrifuge:**

automatically loads sample tubes set in sample rack into the centrifuge rotor and unload to the lane after centrifugation.

◆ **Operationg condition:**

When five sample tubes arrived on the lane, centrifuge arm starts loading samles into the unit. (Centrifuge arm starts loading after predetermined timeout even when there are less than 5 sample tubes on the convyeor. Also, if PRIORITY is pressed, centrifuge arm starts loading.)

◆ **How to change the setup at the control panel on unit side:**

Changing timeout:

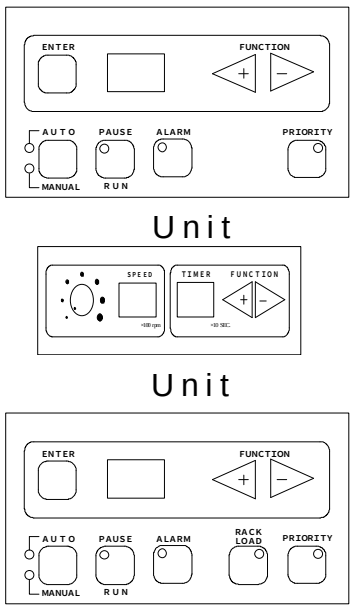
(centrifugation with less than 40 sample tubes.)

1. While in MANUAL (Maintenance) mode, set “82” and press ENTER.

2. Press FUNCTION and enter a number, which will be set as timeout (i.e., period after the first sample arrives at centrifuge and wait for the next tube.)

Note! The display shows 1/10 of the time.

Control Unit



Auto Centrifuge (continued)

Changing spin time:

1. While in MANUAL (Maintenance mode), select "81" and press ENTER.
2. Enter time using FUNCTION, press ENTER.

Note! The display shows 1/10 of the time in seconds.

Changing spin speed:

Turn the volume clockwise for faster speed, and turn it counterclockwise for lower speed.

Note! The display shows the current speed during spin (1/100 in seconds.)

◆ **Opening the centrifuge lid:**

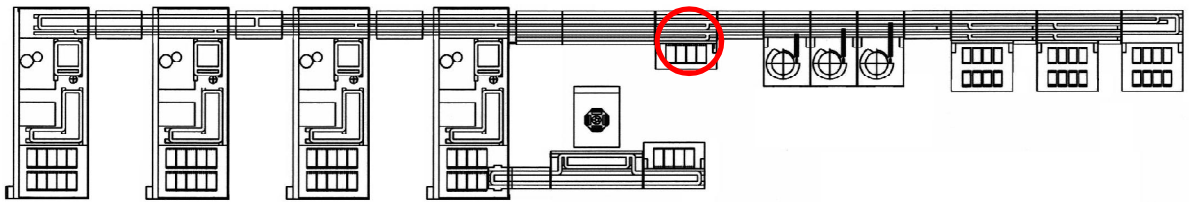
Turn "Releae Door Lock" switch to unlock and open the lid.

◆ **Error display:**

- Errors on unit and conveyor sides are displayed on each control paenel. (i.e., error specific to centrifuge unit will be displayed on the panel of unit side, while lane related error will be displayed on the panel of conveyor side.)
- If the error is related to both, it will be displayed on both of the panels.

Ref. For basic panel operation, refer to B in this document.

Inlet Unit



◆Inlet Unit

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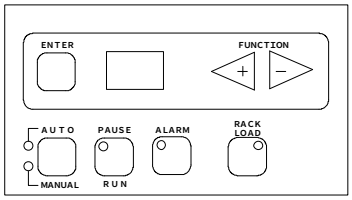
Control Panel



◆Changing Racks

•Before rack becomes full,

1. When inlet trays (see the next page) becomes empty, buzzer sounds to notify operator.

2. Press ALARM button to stop buzzer sound. If the button is not pressed for 5 seconds, the buzzer stops automatically.

3. After confirming that the arm is paused, change the racks. When trays with samples are loaded, PUAUSE/RUN LED starts flashing.

4. Press PAUSE/RUN to resume operation.

Inlet Unit (continued)

◆Changing Racks

•Before rack becomes full,

1. Press RACK LOAD button, the robotic arm pauses operation and buzzer sounds.
2. Press ALARM button to stop the buzzer sound.
3. Unload the rack to be changed.
4. Load empty tray on the rack set position.
5. PAUSE/RUN LED starts flashing. Press PAUSE/RUN button.
6. After changing the rack, reume the operation.

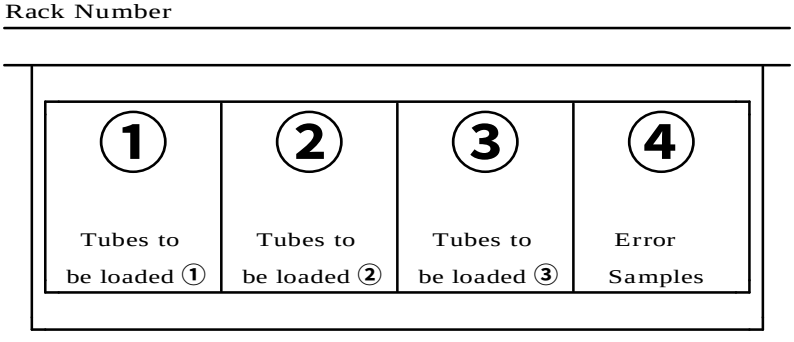
◆ Manual Load of a Sample Tube

1. Press PAUSE/RUN button and confirm that the robotic arm puased operation.
2. Set a sample tube into the empty holder at the loading position.
3. Press PAUSE/RUN button and the sample in the holder will be released from the position.

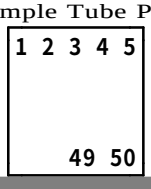
Manually loaded tube as above procedures is prioritized over tubes in rack.

◆Rack Type

◆ Rack Number

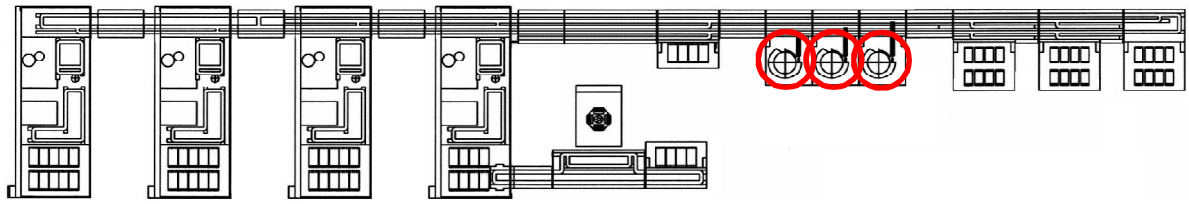


◆ Sample Tube Position



The position of rack is assigned from the left to the right and front to the back.

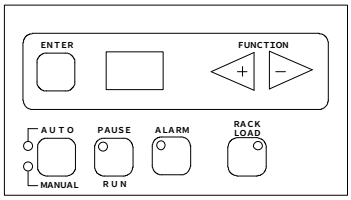
Recapper Unit



◆ **Recaper Unit**

The unit put caps on sample tubes to prevent evapolation of sample.

Control Panel



◆ **Opening the door**

1. Press DOOR button and LED of the button turns off.
   LED of PAUSE/RUN button turns on indicating the unit in puase and operator can open the door.
2. When the door is closed, LED of DOOR button turns on and automatically lock the door.
3. Press PAUSE/RUN button to resume operation.

Note: Rear interlock cover is unlocked at the button located on the rear side. ALARM and PAUSE button on the rear side can also be used.

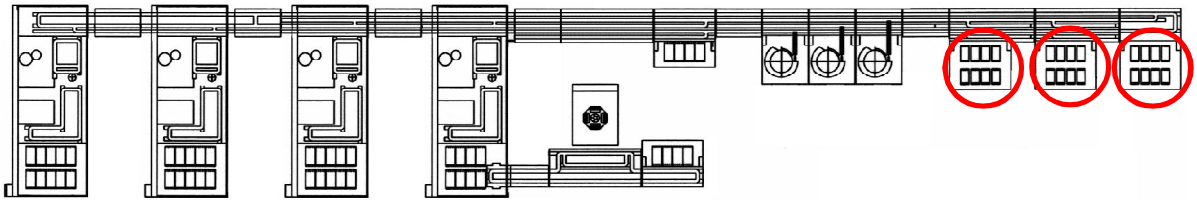
◆ **Supplying caps**

1. Alarm sounds when caps in the feeder requires refill.
2. Press ALARM button and refill caps in the feeder.
3. Press PAUSE/RUN to resume operation.

Note ! Too many caps in the feeder may cause errors. Caps failed to be put on tubes shall be cleaned regularly.

Alarm sounds when cap disposl box becomes full. Press ALARM button and discard caps.

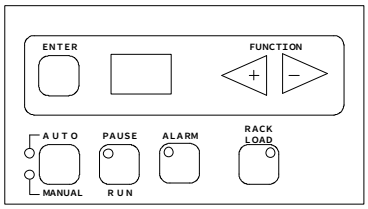
Outlet Unit



◆Outlet Unit

The robotic armunloads coagulation and hematology samples into rack. Information of the samples unloaded at Outlet unit can be checked at C-CPU.

Control Panel



◆Changing Racks

•When rack becomes full,

1. The robotic arm stops operation, buzzer sounds to notify operator.
2. Press ALARM button to stop the buzzer.
3. Rack number that became full is displayed on the panel. Unload the rack.
4. Load empty tray on the rack set position.
5. After PAUSE/RUN LED starts flashing, press PAUSE/RUN button to re sume operation.

Outlet Unit (continued)

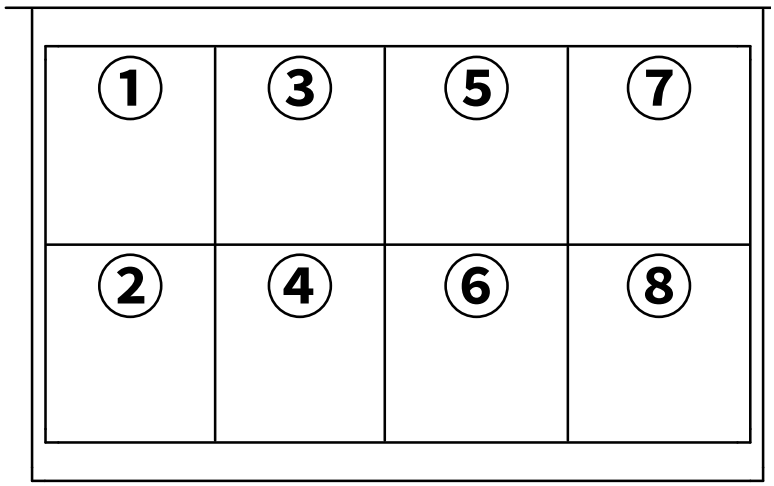
◆Changing Racks

•Before rack becomes full,

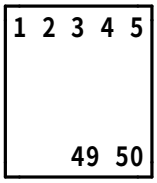
1. Press RACK LOAD button, the robotic arm pauses operation and buzzer sounds.
2. Press ALARM button to stop the buzzer sound.
3. Unload the rack to be changed.
4. Load empty tray on the rack set position.
5. PAUSE/RUN LED starts flashing. Press PAUSE/RUN button.
6. After changing the rack, reume the operation.

◆Rack Type

◆ Rack Number



◆ Sample Tube Position



The position is assigned from the left to the right and front to the back.

Warning: Do not touch the rack area or change rack while the robotic arm is in operation.

D Troubleshooting

This section covers troubleshooting

Troubleshooting

Problem	Cause		Countermeasure
Error occurred on the entire system at power-on.	The compressor is not powered on.		Turn on the power of compressor.
"SL" errors occurred throughout the system.	The air valve for the compressor or air tank is not opened.		Open the air valve.
Cylinder error	Cylinder is not functioning properly.	There is an obstruction within the operating range of the cylinder.	Remove the obstruction.
		The movement of cylinder is too slow.	Check the air pressure.
			Adjust the speed controller.
		The cylinder got damaged.	Replace the cylinder.
	Malfunction of solenoid valve.		Replace the solenoid valve.
	Air duct is damaged.		Replace the air duct.
	Auto-switch is not reacting properly.	There is a break in a auto switch cable.	Replace the cable.
		A connector pin is not connected.	Connect the connector pin.
		The auto-switch is not at the proper position.	Adjust the position of auto-switch.
Conveyor does not move or move smoothly.	Pulley is covered with dust.		Clean the pulley.
	Bearing is damaged.		Replace the bearing.
	Motor is damaged.		Replace the motor.
	Belt is damaged.		Replace the belt.
	Chain is damaged.		Replace the timing belt.
	Connector pin is not connected.		Connect the connector pin.
	Fuse of the control board blew out.		Replace the fuse.
Barcode reader does not read bar-code.	Malfunction of barcode reader.		Replace the barcode reader.
	LED area is not clean.		Clean LED area of barcode reader.
A unit does not work properly.	Sensitivity of fiber amplifier is not appropriate.		Replace or adjust the sensitivity of amplifier.
	fiber head is not clean.		Clean the fiber head.
	Proximity sensor is damaged.		Replace the sensor.
	Motor is damaged.		Replace the motor.
	There is a break in a cable.		Replace the cable.
	Fuse blew out.		Replace the fuse.
	Connector pin came off.		Connect the connector pin.
	Screw is loose.		Tighten the screw.
	Lack of grease.		Grease driving part.
Bar-coder printer does not work properly.	Printer head is damaged.		Replace the printer head.
	Poor print quality (too light)		Clean the printer head
Sample tubes can not be routed to analyzer.	Interface setting at the C-CPU is off.		Turn on the CPU interface setting.

NOTE ! Adjustment or replacement of parts shall be performed by autorized engineers.