FUJITSU

RackCDU (4U Rackmount/80kw)

User Manual

Revision History

Rev	Revision Date	Changed
1	Jun./8th/2023	First edition

Contents

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1 Safety Instructions

Safety Notices

This manual contains Warnings, Cautions and Notices concerning the safe use of this product. See documentation below.

WARNING!

Warning indicates a potential hazardous situation which, if not avoided, could result in death, serious injury or serious equipment damage. It is important not to proceed until all stated conditions are met and clearly understood.

CAUTION!

Caution indicates a potential hazardous situation which, if not avoided, could result in minor to moderate injury or equipment damage. It is important not to proceed until all stated conditions are met and clearly understood.

NOTICE!

Notice indicates instructions that must be followed to avoid damage to the CDU-80R4LL or other equipment

Safety Instructions

All safety and operating instructions must be followed at all time since heat exchanging equipment might cause mechanical and electrical hazards. To use this CDU safely, correct operations and periodical checking shall be requested. Do not operate this CDU before you read and understand safety instructions thoroughly shown in this manual.

Operation and Maintenance

The installation, operation and maintenance of this system should be conducted in accordance with this manual, the CDU-80R4LL Installation Manual and all local regulations, accepted codes and trade practices. The work should be completed by a technically competent and trained person adhering to best engineering practices.

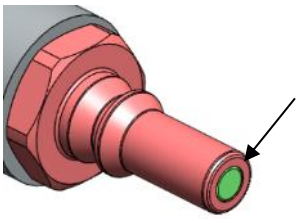
Coolant Hazard

CAUTION!

Coolant causes skin, eye irritation.
Dispose of coolant in accordance with all regulations.

1) Skin irritation
   Avoid contact with skin or clothing during handling. If left on the skin or clothes, it may cause skin irritation and inflammation. If contact or signs of contact, please rinse thoroughly with clean water. If any abnormalities occur, seek medical attention.
2) Eye irritation
   In case of contact with eyes, rinse immediately with clean water for at least 15 minutes. If any abnormality occurs, seek medical attention.
3) Disposal
   Disposal methods must be in compliance with all regulations. This product or used the waste must be entrusted with processing in industrial waste disposer.

Quick Connect Valves



Do NOT press the quick coupling valve at any time.
Coolant is charged to the system and under pressure.
Pressing this part will cause coolant blow off from the system.

Waste Disposal

All waste materials should be disposed of in a responsible manner and in accordance with applicable local regional and national environmental rules and regulations.

2 Introduction

This Liquid cooling system provides 2 kinds of manuals

- Installation Guide : to setup
- User Manual(this manual) : to use for users and servicemen

The CDU-80R4LL from Nidec is a 4U form factor, 19-inch rack-mount appliance which manages the coolant distribution via Coldplate Loop that cools server components within an IT rack. The CDU-80R4LL utilizes Liquid-to-Liquid heat exchanger to dissipate heat from the secondary coolant to the primary coolant.

The CDU-80R4LL fits into standard IT racks and can be inserted at the bottom of the rack. The CDU-80R4LL is paired with a manifold and any number of Coldplate Loops to realize a complete CDU solution.

The User Manual describes product specifications for the CDU-80R4LL including operation, maintenance and troubleshooting techniques.
For Installation Instructions, please refer to the CDU-80R4LL Installation Manual.

3 Terms definition

This section defines important terms before using the CDU-80R4LL.

CDU	The CDU stands for Coolant Distribution Unit. The CDU which consists of heat exchanger, reservoir tank, pumps and electrical valves. ...
Facility From/To	The Facility is a term that means any equipment supplying cooling water, ex) chiller, cooling tower, dry cooler. “Facility From” means liquid flows into CDU. “Facility To” means liquid flow out from CDU.
Server From/To	The Server is a term that means cooling target, ex) server, router, any IT equipment. “Server From” means coolant returned from Server. “Server To” means coolant supplying to Server.
Dew Point	The dew point is the temperature where dew (droplets of water) start to form on objects.
SNMP (Simple Network Management Protocol)	The SNMP stands for Simple Network Management Protocol. SNMP can be used to monitor any equipment on a network. The SNMP managed network consists of SNMP Manager and SNMP Agent, and a SNMP Manager has a feature to receive SNMP trap sent from a SNMP Agent. The CDU-80R4LL is capable of sending the SNMP trap as a SNMP Agent based on the system status.
LCM	LCM stands for は Liquid Cooling Module. It consists of cold plate(for removing hot decvices like CPU), Hose, Quick Connect Valves.

CDM	CDM stands for Coolant Distribution Manifold. CDM devides and provides coolant to LCM which is cooled by CDM. After coolant going through in LCM, coolant will go bach to CDM.

4 Product Specifications

4.1 Product Datasheet

Table 1 Product Datasheet

Item		Specification
Mechanical	Cooling Capacity	80kW @32°C Primary Water 7400L/hr 40kW @32°C Primary Water 5200L/hr 20kW @45°C Primary Water 5200L/hr
	Dimension	W480 x D1160.7 x H177mm (Include Handles/Hoses)
	Weight	<105kg, Including coolant, Hoses
	Thermal Resistance	Shown in Figure 1
	Sound Noise	<78 dBA (@1m)
Power	AC Input	AC100-127, 200-240V (Single Phase) 50-60Hz Connector: IEC60320-C13
	Power Consumption	Max 1000W (@2pumps rotate 100% duty)
	Apparent Power	Max 1000VA (@2pumps rotate 100% duty)
	Power Supply	2N Redundant Power Supplies, Hot-Swappable
Environment	Ambient Temp	5-35°C @In Operation, 0-50°C @PSU Non-operation
	Humidity	8-85%(RH)
	Storage	-25°C – 60°C
	Altitude	0-3000m @In Operation, 0-12000m @Non-operation
	Vibration	Direction: XYZ Acceleration(rms): 0.43G Frequency [Hz] | Power Sp 10-30 | +6dB/oct. 30-200 | 0.000781c 200-500 | -12dB/oct
	Shock	Direction: ±XYZ Parameter | L Shock acceleration | ± Pulse width | 6 Shock form | H
Primary	Connection	ISO Sanitary Ferrule Union 1.5S

Item		Specification
Side	Supply temp	2~45°C(ASHRAE W45) ※No condensation Condensation may occur inside the CDU depending on the cooling water temperature, ambient temperature, and humidity. Please control ambient temperature and humidity, referring to Figure 5.
	Supply flow rate	< 7400 L/hr (<123L/min)
	Allowable pressure	Max allowable to 1MPa (145psi)
	Water Quality	ASHRAE standard Liquid Cooling Guidelines for Datacom Equipment Centers, Second Edition Table 5.3
	Particulates	Facilities water shall be clear of particulates (Requirement: ≦300um filtration)
	Pressure Drop	Shown in Figure 4
Secondary Side	Connection to CDM	ISO Sanitary Ferrule Union 1.5S
	Coolant	Propylene Glycol 25wt% (Factory-filled)
	Pump	2N Redundant, Hot-swappable
	Operating Pressure	Max 0.2MPa (Over pressure valve opens at 0.3MPa)
	P-Q Curve	Shown in Figure 3
	Max Coolant Temp	75°C (Recommendation: <70°C)
Monitoring and Control		Dew Point Control, Liquid level inside the tank, Pump speed, Web interface, Monitoring Item Log
Supported External Leak Sensor		Connectable external leak sensors (Supplier: HW group, Model: WLD Relay 1W-UNI)
Rack Mount		Mountable to EIA-310-D 19" sever rack (using 4U height) Installed by Mount Rail (Included in CDU) (CDU should be installed at bottom of a server rack)
Certification		UL/CSA/IEC/EN 62368-1 Ed.2 EN 55032:2015/A11:2020 ClassA EN 55024:2010/A1:2015 EN 55035-2017/A11:2020 EN IEC 61000-3-2:2019 EN 61000-3-3:2013+A1:2019 FCC Title47 CFR, Part-15 Subpart B, ClassA ICES-003 Issue 7,Class A VCCI CISPR 32 Class A

Item	Specification
	JIS C 61000-3-2 Class A AS / NZS CISPR 32:2015 AMD 1:20202
Attachment Item	Rack mount rail (Left) 1pcs Rack mount rail (Right) 1pcs Rack mount spacer (Left) 1pcs Rack mount spacer (Right) 1pcs Clamp for AC power cable 2pcs Ferrite core 2pcs Cross recessed head screw with washer (M5xL12) 4pcs Cross recessed upset head screw with washer(M5xL12) 4pcs

- In case of using Liquid Cooling System out of above conditions, the customer is responsible for all the failuers and accidens.

4.2Performance

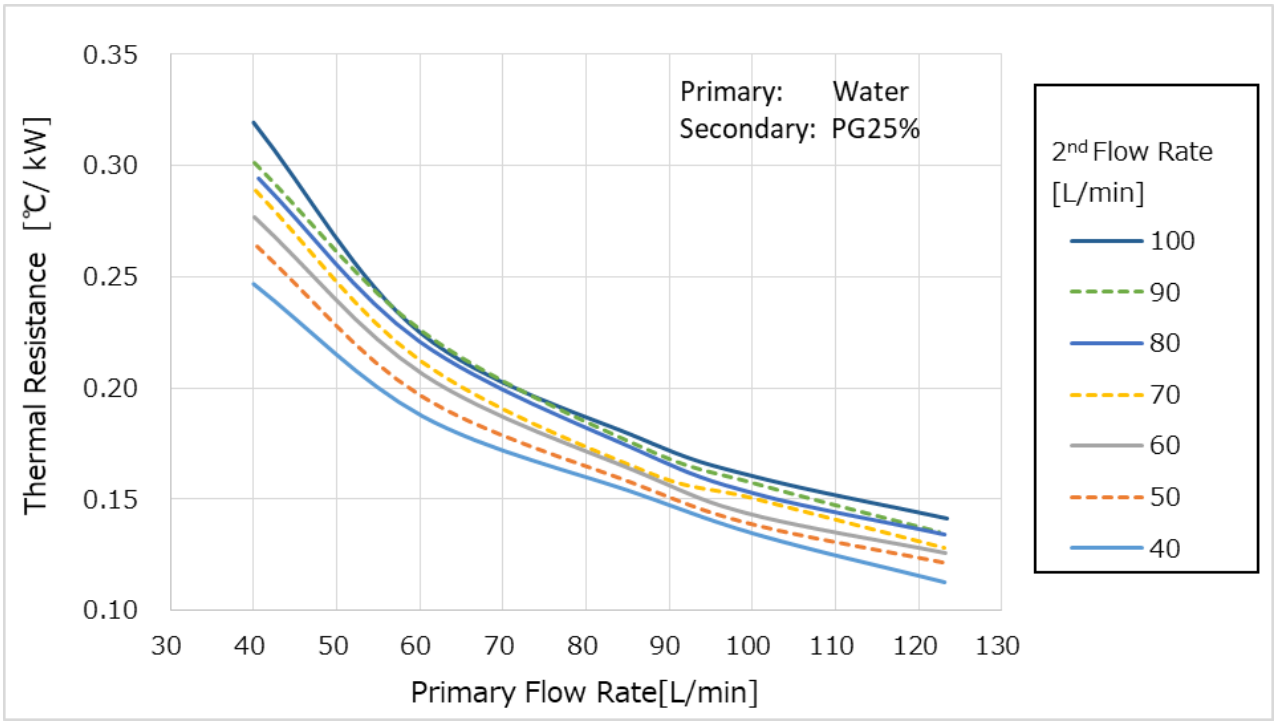


Figure 1 CDU Thermal Resistance

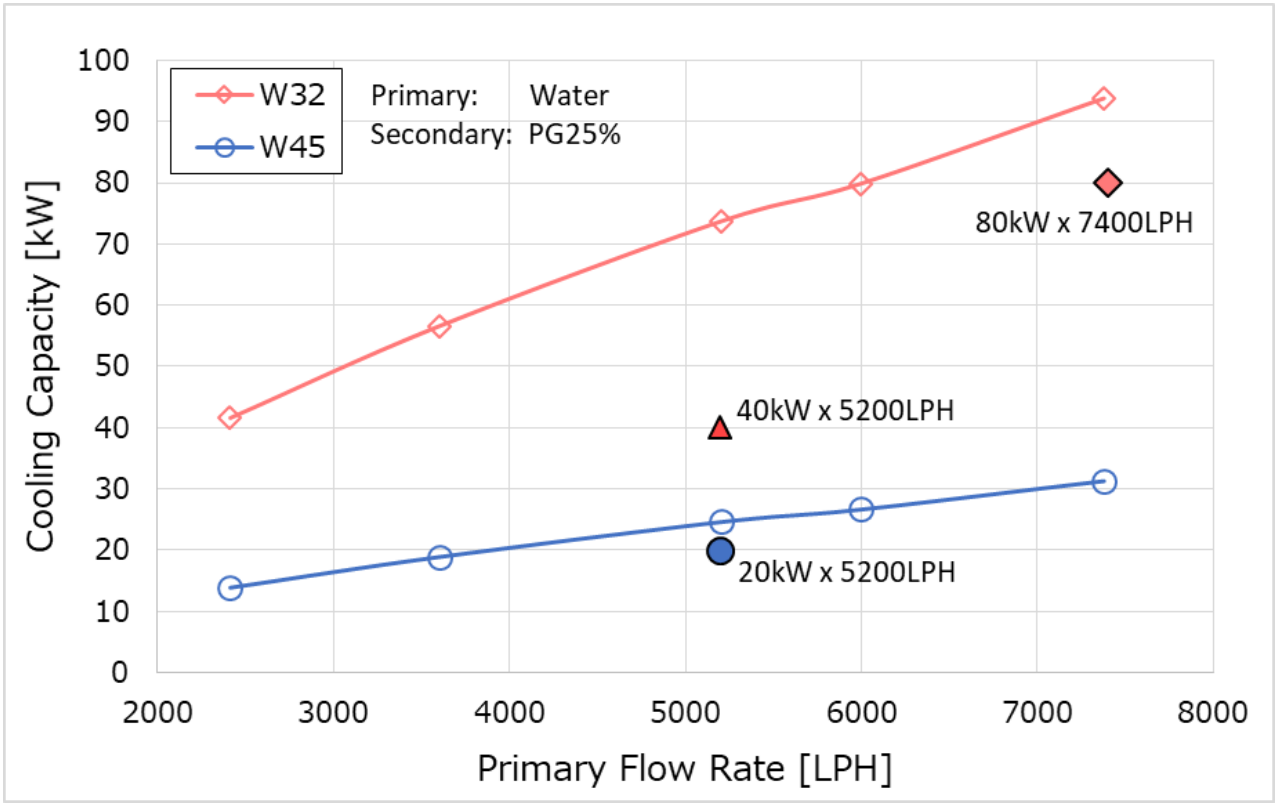


Figure 2 CDU Cooling Capacity

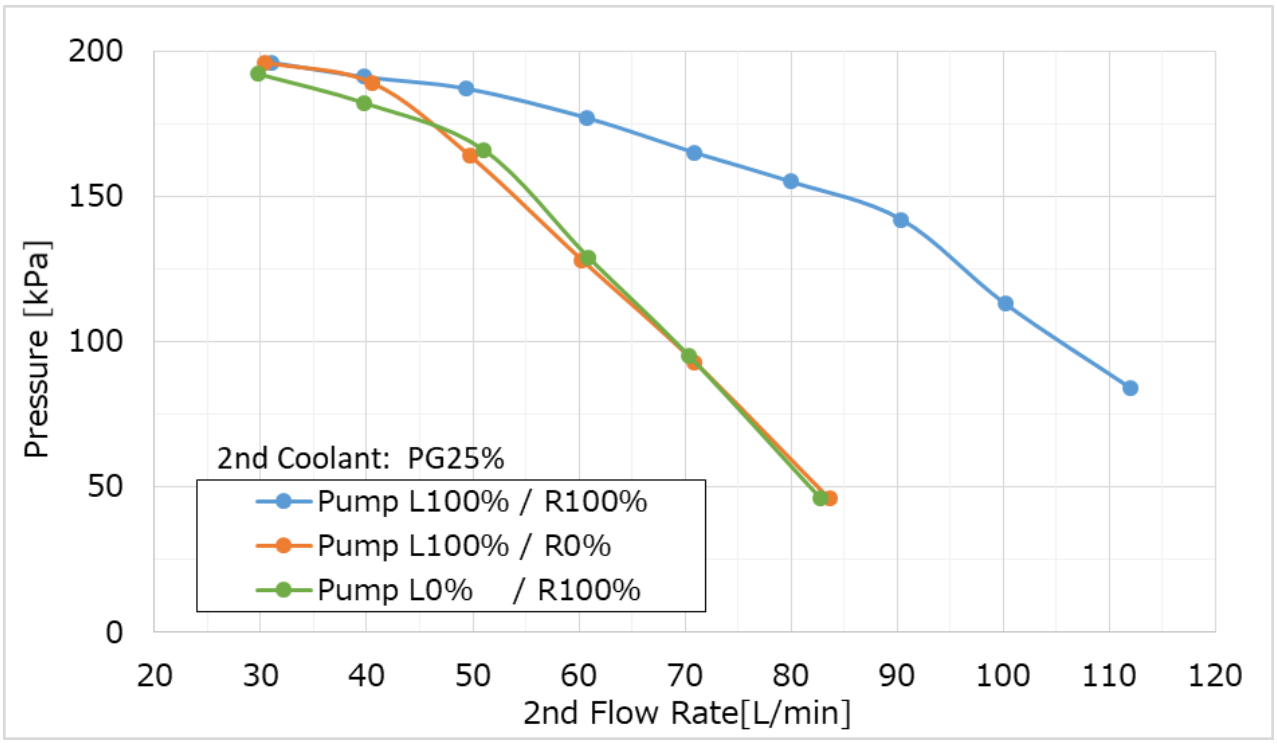


Figure 3 CDU PQ Curve

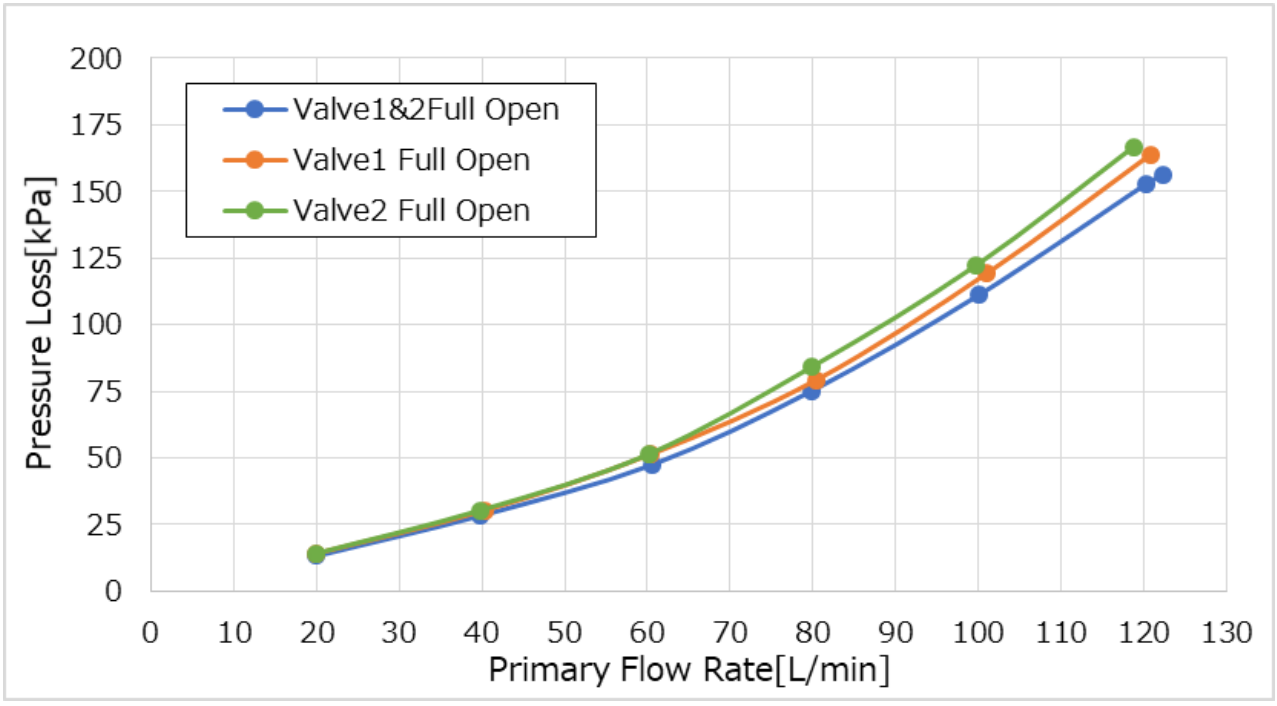


Figure 4 Primary Side Pressure Drop

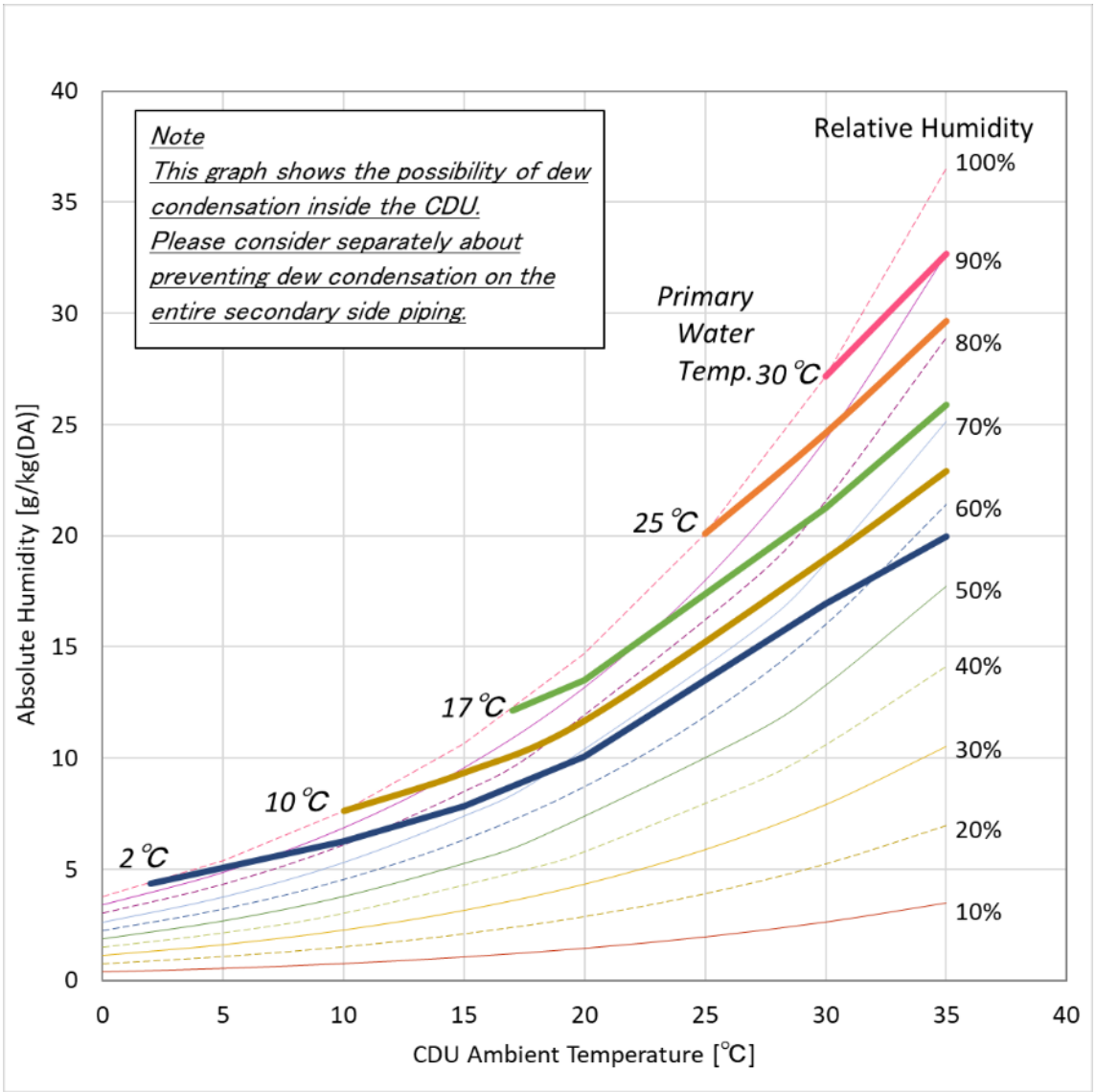


Figure 5 Condition that condensation of dew generates inside CDU

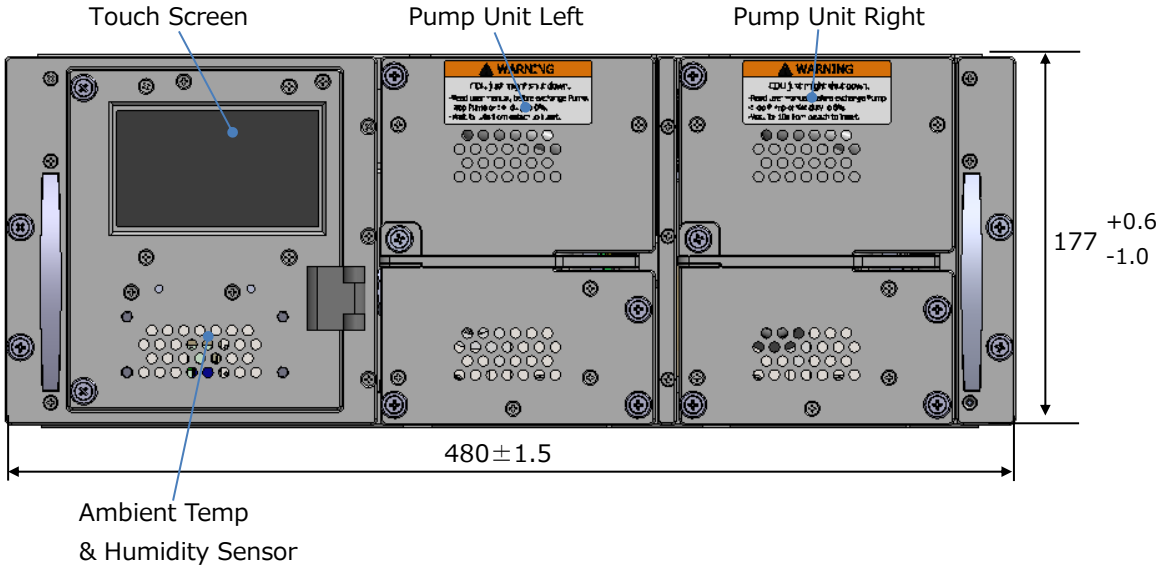
Condensation will occurs in the CDU when the plotted point of the ambient air temperature and absolute humidity is above the curve of the primary water temperature supplied to the CDU. In addition, "Close valves in Stop" function should be used. This function automatically closes the flow control valves on the primary side when the pumps stop in order to prevent the internal condensation of dew. (Details are shown in the user manual.)

CAUTION!

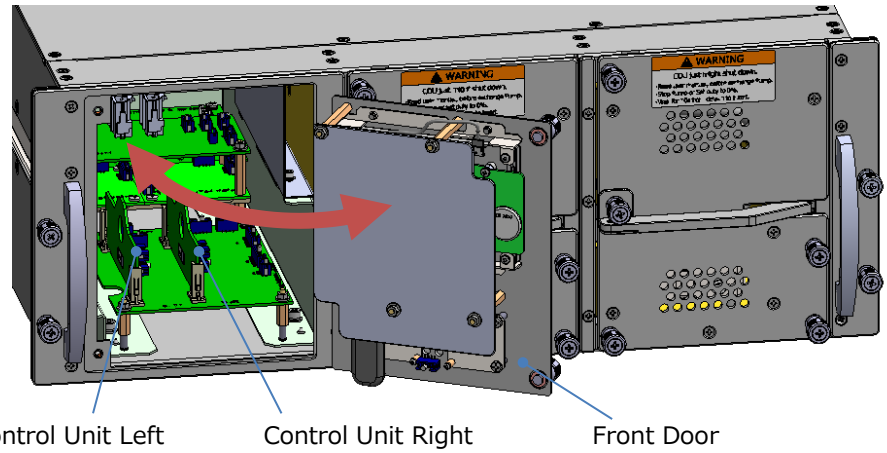
If primary water below the dew point temperature is supplied with a low or no heat load on the secondary side (server side), condensation will occur on the entire secondary side piping (Liquid Cooling Module, Coolant Distribution Manifold, CDU secondary side piping). Condensation on the LCM and CDM might cause damage server equipment.

4.3Mechanical overview

<Front View>



(Front View when the front door opens)



<Rear View> (Hoses for CDM Connection are not shown)

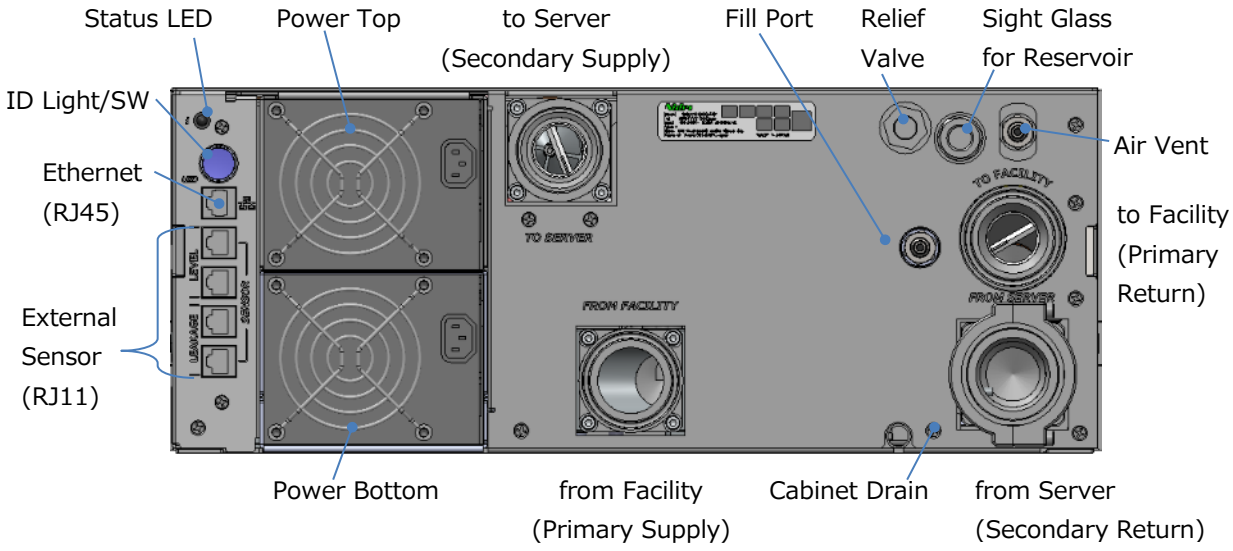


Figure 6 CDU Appearance of Front and Rear

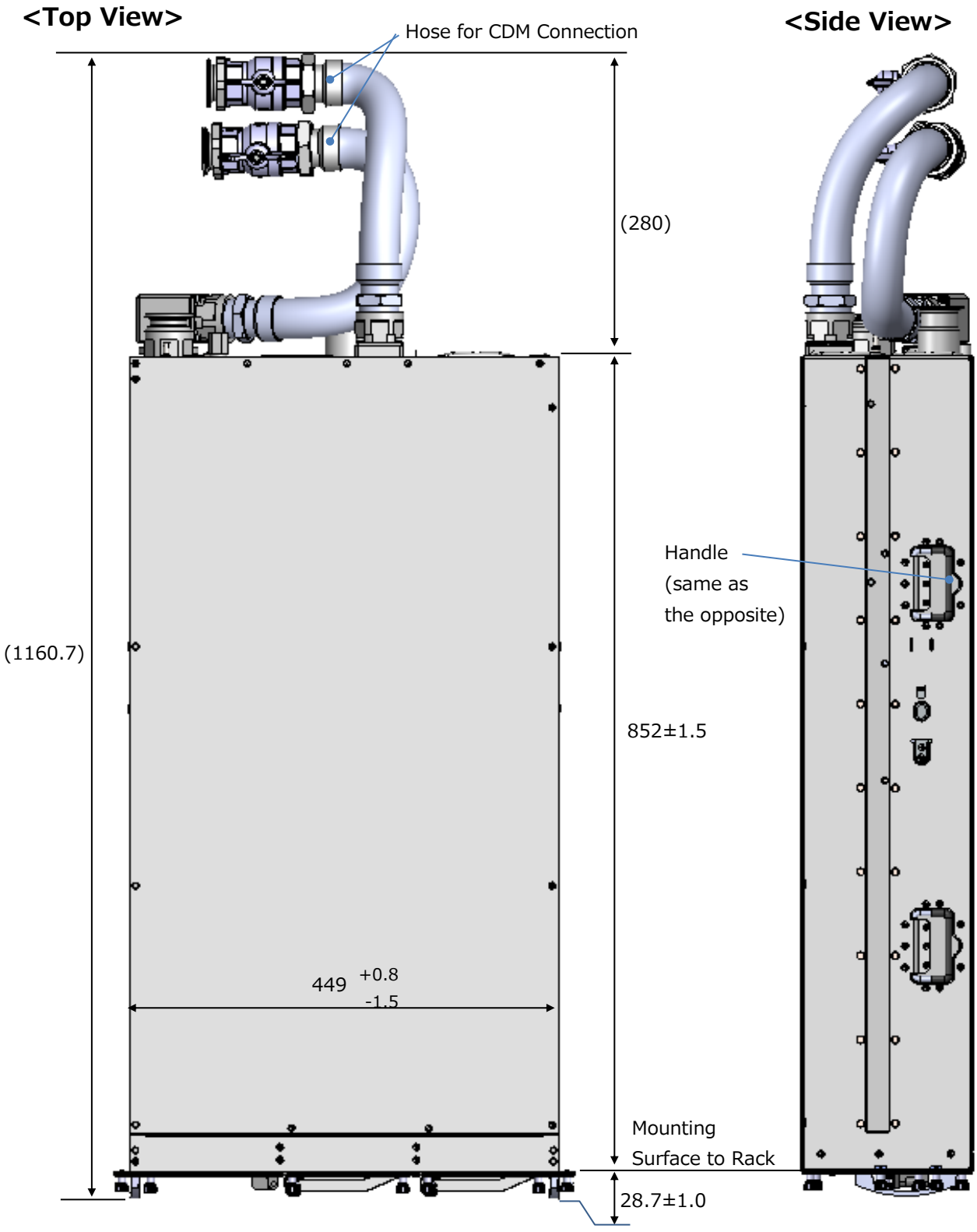


Figure 7 CDU Appearance of Top and Side

4.4Major Components & Functions

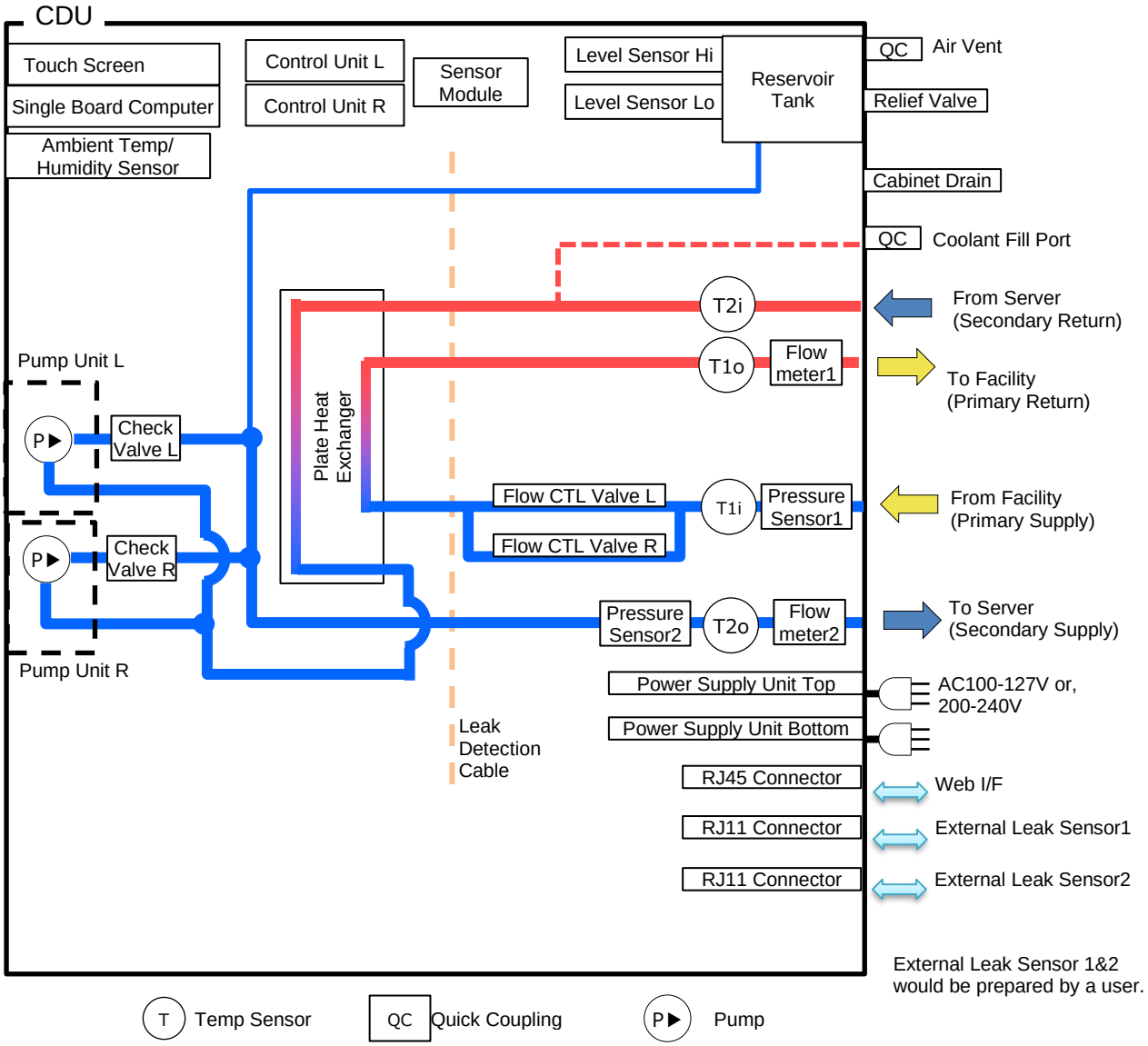


Figure 8 CDU Block Diagram

Table 2 Function of Each Part

Part Name	Function	Hot Swap	Redundancy	Operation @Failure
Touch Screen	Displays reading value of various sensors and performs various settings/operations for CDU.	-	-	B
Single Board Computer (SBC)	Performs input/output control of Touch Screen, controls external device communication, and save log data.	-	-	B
Control Unit L (CU L)	Reads various sensor values and controls Pump Unit L/R、Flow control Valve L/R、SBC. CU L is the main controller. If CU L doesn't work, the main control is taken over by CU R.	✔	1+1	A
Control Unit R (CU R)				
Sensor Module	Reads various sensor values and transmit them to CU L/R.	-	-	B
Ambient Temp /Humidity Sensor	Reads ambient temperature and relative humidity near CDU front side.	-	-	B
Reservoir Tank	Stores the secondary coolant in preparation for permeation and reduction due to quick coupling insertion/ejection.	-	-	B
Level Sensor Hi	Monitors the coolant level of Reservoir Tank and confirm that the tank is full.	-	-	B
Level Sensor Lo	Monitors the coolant level of Reservoir Tank and confirm that the tank is required coolant injection.	-	-	B
Pump Unit L	Circulates secondary side coolant.	✔	1+1	A
Pump Unit R				
Flow CTL Valve1	Controls flow rate of primary side water in order to prevent condensation.	-	1+1	A
Flow CTL Valve2				
Flowmeter1	Measures flow rate of primary side water.	-	-	B
Flowmeter2	Measures flow rate of secondary side coolant.	-	-	B
Pressure Sensor1	Measures pressure of primary side water.	-	-	B
Pressure Sensor2	Measures pressure of secondary side coolant.	-	-	B
Temp Sensor1i	Measures liquid temperature of primary side water from the facility.	-	-	B
Temp Sensor1o	Measures liquid temperature of primary side water to the facility.	-	-	B
Temp Sensor2i	Measures liquid temperature of secondary side coolant from the server.	-	-	B
Temp Sensor2o	Measures liquid temperature of secondary side coolant to the server.	-	-	B
Power Supply Unit Top	Supplies power to the pumps and the electric parts.	✔	1+1	A
Power Supply Unit Bottom				
Leak Detection Cable	Detects condensation water or leaking water in the CDU cabinet.	-	-	B
Air vent	Remove air from the secondary side.	-	-	B
Relief Valve	It is activated when the pressure on the secondary side exceeds 0.3 MPa and protects the device.	-	-	B
Cabinet Drain	Discharge water generated by condensation or leakage in a CDU.	-	-	B
Check Valve L	Prevent backflow of a secondary side refrigerant.	-	-	B
Check Valve R				

A: Operation continues with only one redundancy part.

B: Operation continues although some functions are disable. (Detail influence is shown in another chapter)

4.5Rear Panel Status Indicator

Status LED

Table 3 System Status Indicator

SNMP Trap Setting		CDU: Stop	CDU: Manual / Auto		
Trap switch in SNMP Setting	Warning and Alert/NG Setting (W:Warning, A/N:Alert/NG)		Status		
			Valid/OK	Warning	Alert/NG
Disable	Don't care	Green blink 0.5Hz	Red Blink 0.5Hz		
Enable	W:Disable, A/N:Disable		Green On	Green On	Green On
Enable	W:Enable, A/N:Disable		Green On	Yellow Blink	Yellow Blink
Enable	W:Disable, A/N:Enable		Green On	Green On	Red Blink
Enable	W:Enable, A/N:Enable		Green On	Yellow Blink	Red Blink

Point

Status LED is also flashing red when the SNMP setting is not configured. See 5.5 for more detail.

Power Supply Unit

Table 4 Power Status Indicator

Color	Description
Green Light	DC output has no problem.
Amber Light	AC cord unplugged or AC/DC input power lost; with a second power supply in parallel still with AC input power. Or Power supply critical event causing a shutdown; OCP, OVP, Fan Fail.
Amber Blink 1Hz	Power supply warning events where the power supply continues to operate; high temp, high power, high current, slow fan.
Off	No AC/DC input power to all power supplies

ID Light

The ID Light is a tactile switch with blue LED. It can be activated/deactivated using the User Interface and the switch to identify/notify the CDU from the rest.

Table 5 ID Light Definition

Color	Description
Blue Light	This CDU requires any maintenance. This state can reset by pushing ID Light or web interface operation.
Off	No maintenance is required.

4.6External Leak Sensor Interfaces

This sensor is not supported by Fujitsu.

This CDU support two external leakage sensor with RJ11 connectors. CDU monitors their outputs and saves to the log file.

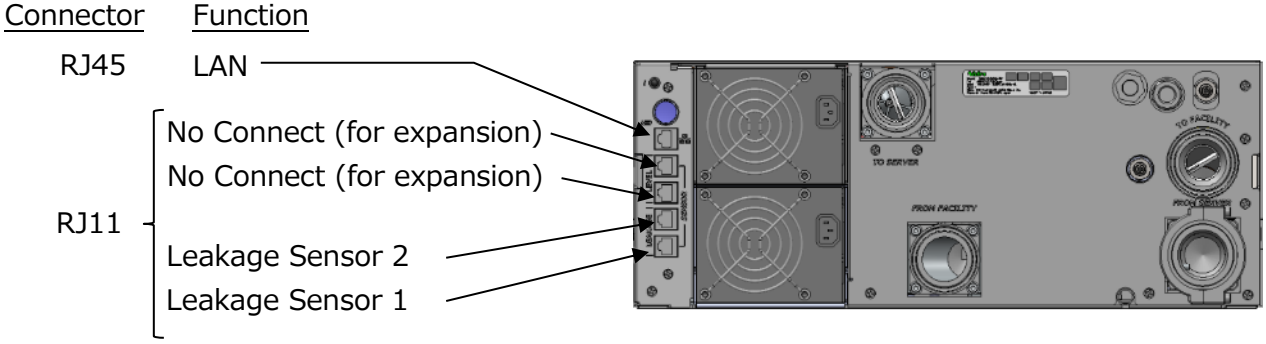


Figure 9 External Sensor Connection

Supported leakage sensor is below.

Supplier: HW group

Model: WLD Relay 1W-UNI

The sensors are connected to the external port 1 or 2 on CDU rear side.

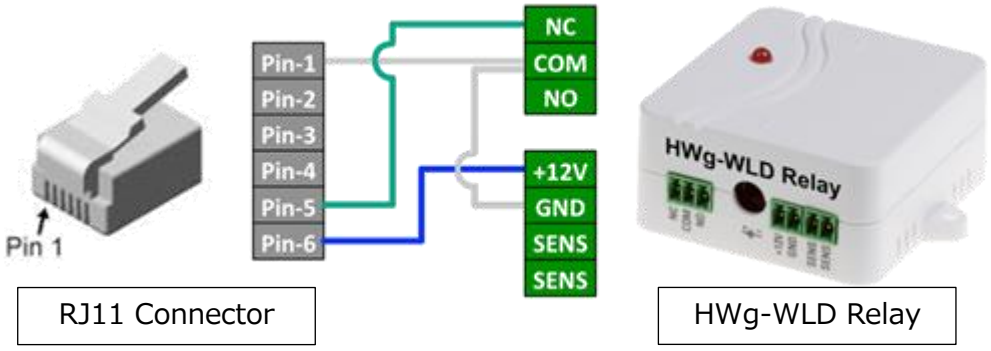


Figure 10 Wiring diagram for cable between CDU and HWg-WLD Relay

4.7 Wetted Material List

Table 6 Wetted Material List

Material	Part	Primary	Secondary
SUS304	Piping, Quick Coupling	x	x
SUS316	Plate Heat Exchanger	x	x
Cu	Plate Heat exchanger	x	x
C3771BE	Ball valve	-	x
PPS	Pump	-	x
PTFE	Control valve, Ball valve, Site glass	x	x
NBR	Control valve	-	x
EPDM	O-ring	x	x
FKM	Control valve	x	-
PA6T	Flowmeter	x	x
Polysulfone	Level sensor	-	x
Glass	Site glass on tank	-	x
Ceramic(Al2O3)	Pump	-	x

5 User Interface Overview

5.1 Screen Overview

The screen of the CDU-80R4LL has the main status/control section and the Navigation Menu on the top of page.

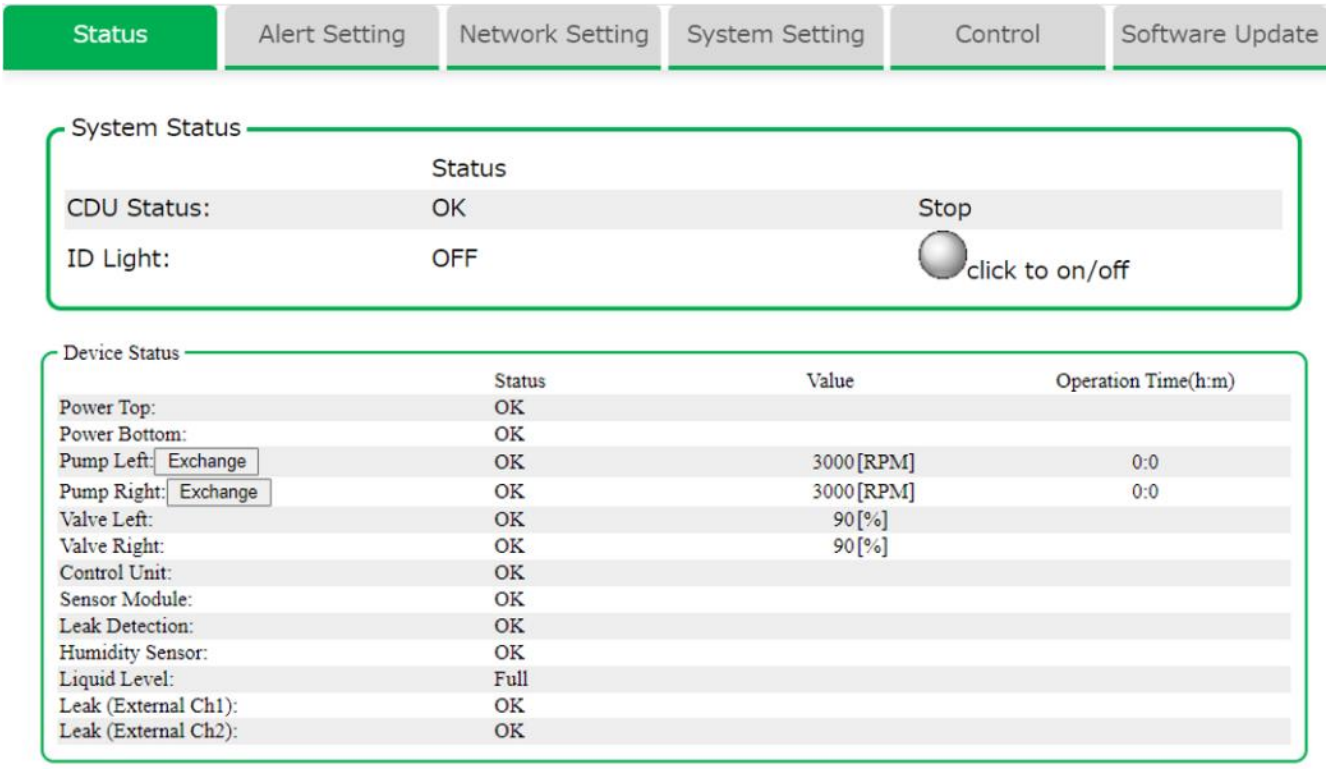


Figure 11 Screen Overview

The screen layout is a common design for the Touch Screen Display on the Front Panel of the CDU-80R4LL and the network access with Web browser.

In order to access via network access with Web browser, open the IP address of the CDU-80R4LL. The IP address of the CDU-80R4LL is “https://192.168.100.10” in default setting.

Point

In order to access via network access with Web browser, you will be required to enter username and password. See 5.6 for more detail.

5.2Navigation Menu

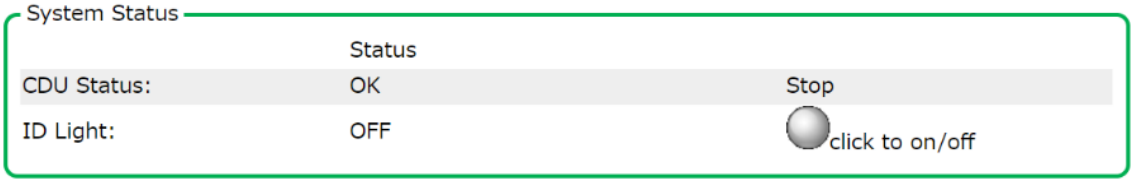
Each tab is described in the following sections for more detail.

Table 7 Navigation Menu

Tab	Description
Status	Status provides a detail system information of the internal components.
Alert Setting	Alert Setting allows you to review and set system parameters for notification of system alerts/warning status.
Network Setting	Network setting allows you to review and set network configuration for remote access to CDU-80R4LL.
System Setting	System Setting allows you to review and set system parameters.
Control	Control allows you to change the operating mode.
Software Update	Software Update allows you to update software of CDU-80R4LL.

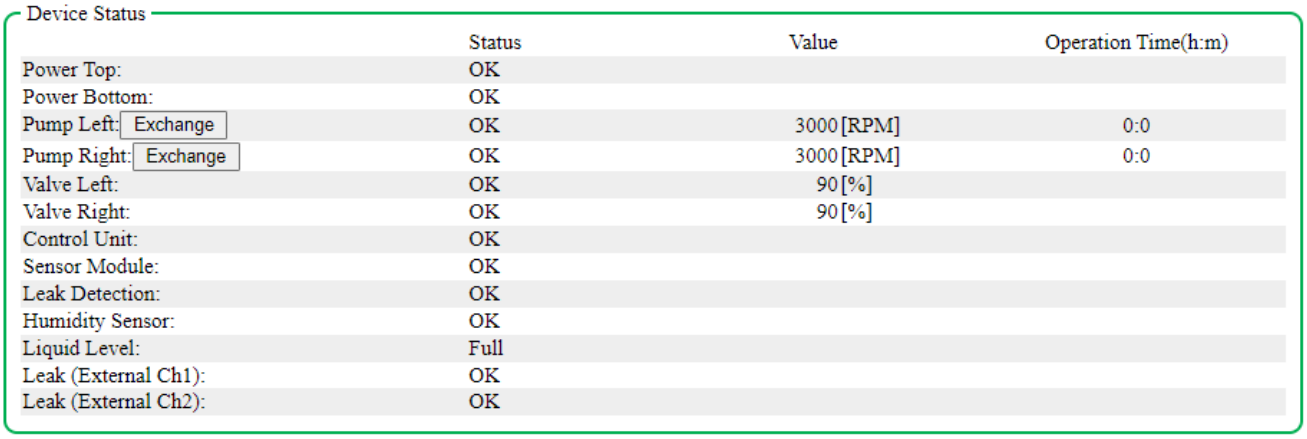
5.3Status tab

The Status tab provides a detail system information of the internal components. It consists of System Status, Device Status and Sensor value. The Information on this tab is updated every one sec approximately.



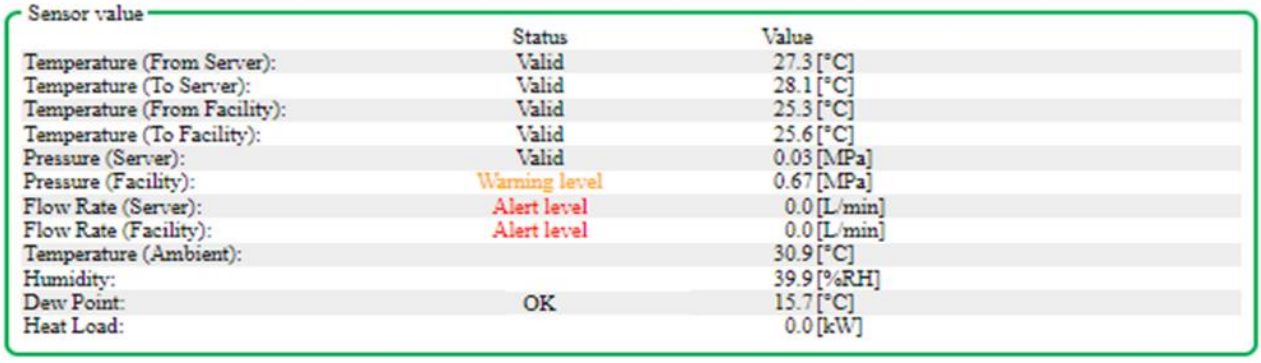
Item	Description
CDU Status	Status of CDU-80R4LL: • OK – Control Unit Primary(CU Left) running • OK: Control Unit Right is running – Control Unit Secondary(CU Right) running • WARNING: Check sensor value – One or more Sensor values are Warning level • ALERT: Control Unit Left is NG – Control Unit Primary(CU Left) doesn't work or isn't inserted • ALERT: Control Unit Right is NG – Control Unit Secondary(CU Right) doesn't work or isn't inserted • ALERT: Check sensor value – One or more Sensor values are Alert level • ALERT: Check device status – One or more Device statuses are NG • ALERT: Check device and sensor – One or more Sensor values are Alert level, and one or more Device statuses are NG • Condensation may occur – Temperature of water from facility is less than dew point temperature, so condensation may occur • Memory Error – Non-volatile memory attached inside of CDU is full or doesn't work properly • Emergency stopped – Emergency stopped pumping due to leak detection during Auto/Manual operation Current Operation: • System initialization – System initialization • Stop – System idle operation • Manual – Manual operation • Auto – Auto operation • Update – Software Update mode • Not system controlled – There is no CU on the CDU-80R4LL
ID Light	Status of ID Light: • OFF – ID Light is OFF • ON – ID Light is ON When clicked the icon, the status will change and ID Light blue LED will turn on/off.

Figure 12 System Status overview



Item	Description	
Power Top/Bottom	Status	**OK**: No error **NG**: The power unit has an error, or not inserted in the CDU
Pump Left/Right	Exchange	The button to stop the pump operation for the hot-swap. This button is available only in the case of operating Manual or Auto mode.
	Status	**OK**: No error **NG**: The pump unit has an error, or not inserted in the CDU
	Value	The current rotation speed in RPM
	Operation Time	Accumulated operation time of Pump unit. The operation time can be reset in Control tab manually.
Valve Left/Right	Status	**OK**: No error **NG**: The valve unit has an error
	Value	The current opening ratio in percentage
Control Unit	Status	**OK**: N+1 redundant control unit is ready **NG**: N+1 redundant control unit is not ready **Not System Controlled**: Both of 2 control units are not ready
Sensor Module	Status	**OK**: No error **NG**: No response from Sensor Module, it indicates that whole information on the Status tab is not updated properly
Leak Detection	Status	**OK**: There is no leak detected **NG**: Leak detected
Humidity Sensor	Status	**OK**: No error **NG**: No response from Humidity Sensor, it indicates that valve control in auto operation will not be controlled properly
Liquid Level	Status	**Full**: Coolant liquid full filled in reservoir tank **OK**: There is a sufficient coolant for operation **Low**: Critical low coolant level for operation **NG**: Inconsistent sensor behavior
Leak (External Ch1/Ch2) (FUJITSU not support)	Status	**OK**: There is no leak detected [In case the SNMP Trap is enabled] **NG**: Leak detected [In case the SNMP Trap is enabled] **N/A**: CDU does not detect Leak(External Ch1/Ch2) even if the external sensors are connected with CDU[In case the SNMP Trap is disabled]

Figure 13 Device Status overview



Item	Description	
Temperature (From Server) **Temperature (To Server)** **Temperature (From Facility)** **Temperature (To Facility)**	Status	**Valid**: Temperature of the coolant is in valid range based on the configuration of the Alert Setting tab **Warning level**: Temperature of the coolant is less than or equal to its lower threshold and more than the Alert level threshold, or more than or equal to its upper threshold and less than the Alert level threshold **Alert level**: Temperature of the coolant is less than or equal to its lower threshold, or more than or equal to its upper threshold
	Value	The current temperature in degree Celsius or Fahrenheit
Pressure (Server) **Pressure (Facility)**	Status	**Valid**: Pressure at the outlet to server or inlet from facility is in valid range based on the configuration of the Alert Setting tab **Warning level**: Pressure at the outlet to server or inlet from facility is less than or equal to its lower threshold and more than the Alert level threshold, or more than or equal to its upper threshold and less than the Alert level threshold **Alert level**: Pressure at the outlet to server or inlet from facility is less than or equal to its lower threshold, or more than or equal to its upper threshold
	Value	The current pressure in MPa or PSI

Flow Rate (Server) **Flow Rate (Facility)**	Status	**Valid**: Flow Rate at the outlet to server/facility is in valid range based on the configuration of the Alert Setting tab **Warning level**: Flow Rate at the outlet to server/facility is less than or equal to its lower threshold and more than the Alert level threshold, or more than or equal to its upper threshold and less than the Alert level threshold **Alert level**: Flow Rate at the outlet to server/facility is less than or equal to its lower threshold, or more than or equal to its upper threshold
	Value	The current flow rate in L/min or GPM
Temperature (Ambient)	Value	The current ambient temperature in degree Celsius or Fahrenheit
Humidity	Value	The current relative humidity in %RH
Dew point	Status	**OK:** Temperature of water from facility is more than dew point **Alert level:** Condensation may occur because temperature of the coolant from facility is less than or equal to dew point temperature
	Value	The current Dew point which is calculated with ambient temperature and relative humidity
Heat Load	Value	The current heat exchange capacity for operation

Figure 14 Sensor value overview

Point

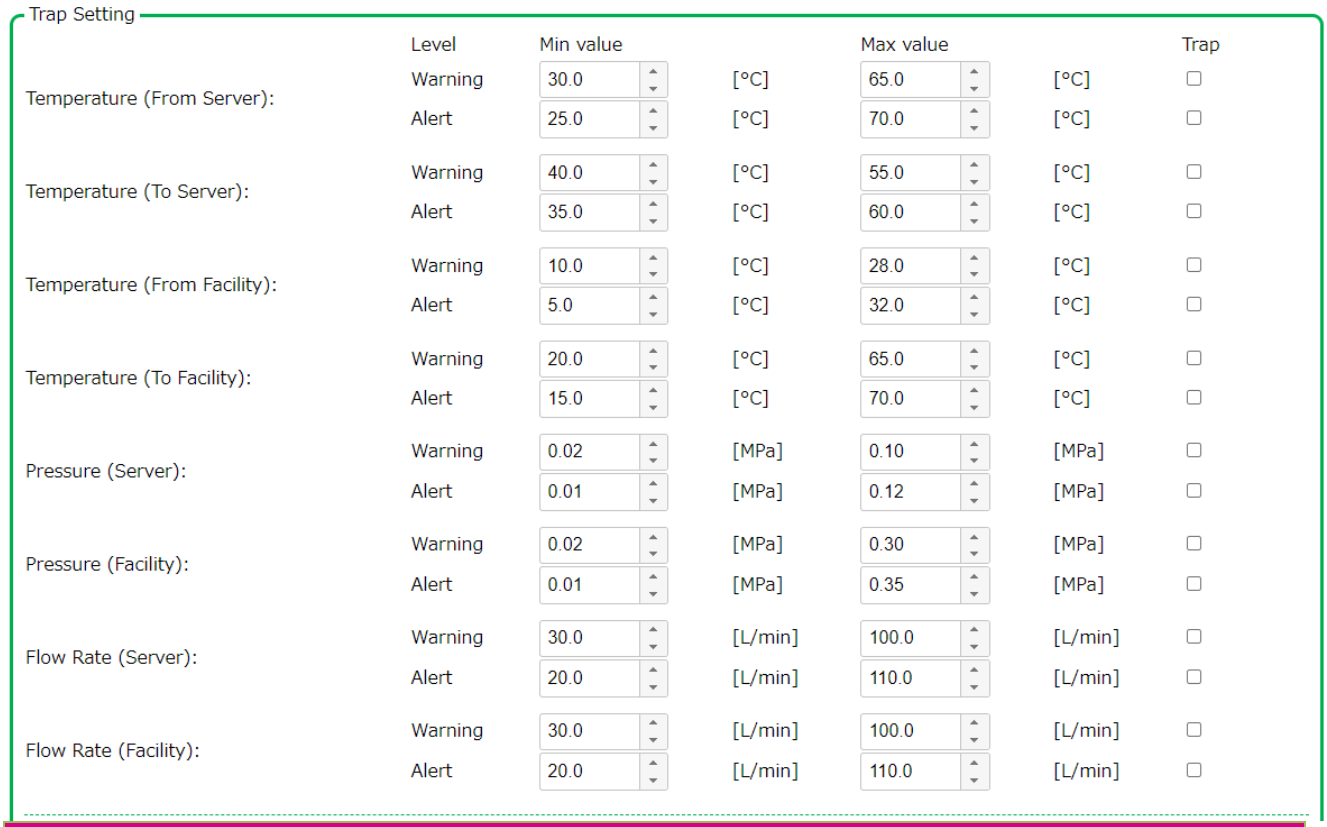
"Value" is a rounded sensor value to a significant digits. On the other hand, "Status" is determined by comparing an original sensor value and a threshold set by alert setting tab. Because the "Status" depends on the original sensor value, not rounded sensor value, there is a possibility that the "Status" change to other status depending on less than significant digits of the sensor value although “Value” keeps same value.

5.4Alert Setting tab

※In order to set the Warning and Alert values, please contact to FUJITSU sales and development teams.

The Alert Setting tab can be used to configure system parameters for notification of system alerts/warning status.
The CDU-80R4LL has a feature to send a SNMP Trap to a remote server which is called SNMP manager. The SNMP setting can be configured in the Network Setting tab.

By setting SNMP Trap to enable in the Alert Setting tab, the CDU-80R4LL will send the SNMP Trap to the SNMP manager, when the condition of Warning level and Alert level which is described in the following table meets. Regarding SNMP Trap feature, see 6.2 for more detail.



Item	Description
Liquid Temperature **From Server** **To Server** **From Facility** **To Facility**	**Min value/Max value**: The temperature threshold to determine the Valid range, Warning level and Alert level by setting Warning Min value and Max value, and Alert Min value and Max value **Trap**: The checkbox to enable/disable the trap transmission when the condition of Warning level and Alert level meet
Pressure (Server) **Pressure (Facility)**	**Min value/Max value**: The pressure threshold to determine the Valid range, Warning level and Alert level by setting Warning Min value and Max value, and Alert Min value and Max value **Trap**: The Checkbox to enable /disable the trap transmission when the condition of Warning level and Alert level meet
Flow Rate (Server) **Flow Rate (Facility)**	**Min value/Max value**: The flow rate threshold to determine the Valid range, Warning level and Alert level by setting Warning Min value and Max value, and Alert Min value and Max value **Trap**: The checkbox to enable/disable the trap transmission when the condition of Warning level and Alert level meet

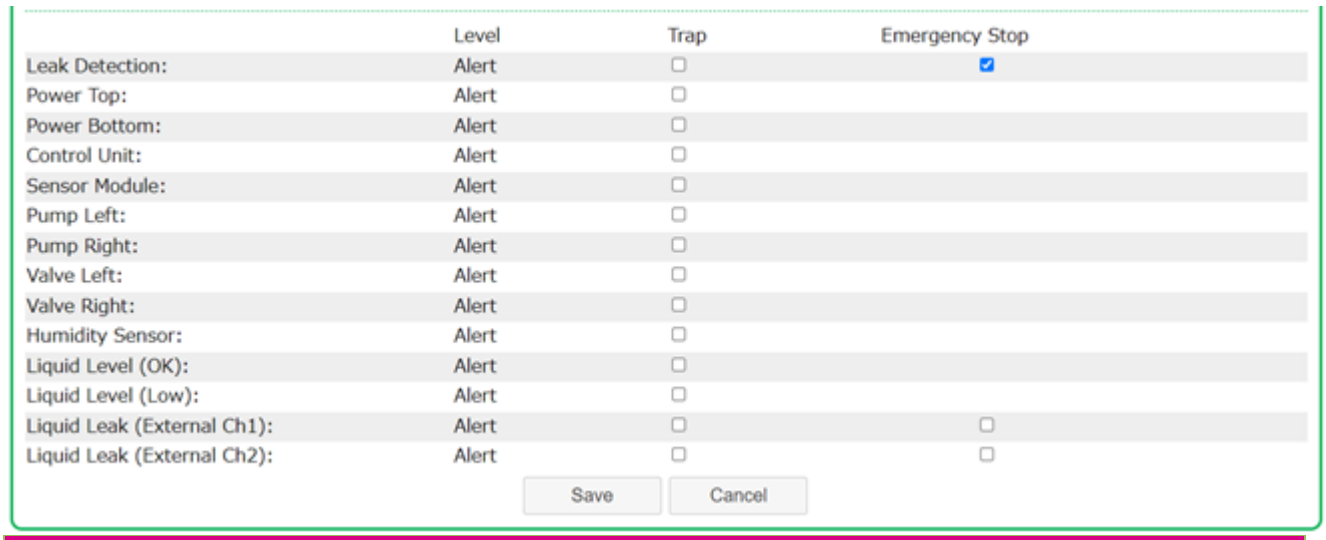
Figure 15 Trap setting screen overview

Note that the threshold above must be set in the following equation:

Alert Min value < Warning Min value < Warning Max value < Alert Max value

Point

If the value does not meet the equation, the error message will pop up and the value is not stored



Item	Description
Leak Detection	**Trap**: The Checkbox to enable/disable the trap transmission when the internal leak sensor in the CDU-80R4LL detects leakage **Emergency Stop**: The Checkbox to enable/disable the emergency stop function when the internal leak sensor in the CDU-80R4LL detects leakage
Power Top **Power Bottom**	**Trap:** The Checkbox to enable/disable the trap transmission when the power status of Power Top/Bottom unit becomes error
Control Unit	**Trap:** The Checkbox to enable/disable the trap transmission when the N+1 redundant control unit is not ready for recovery
Sensor Module	**Trap:** The Checkbox to enable/disable the trap transmission when the Sensor Module becomes error
Pump Left **Pump Right**	**Trap:** The Checkbox to enable/disable the trap transmission when the Pump Left/Right unit becomes error
Valve Left **Valve Right**	**Trap:** The Checkbox to enable/disable the trap transmission when the Flow CTL Valve Left/With unit becomes error
Humidity Sensor	**Trap:** The Checkbox to enable/disable the trap transmission when the Humidity Sensor becomes error
Liquid Level OK **Liquid Level Low**	**Trap:** The Checkbox to enable/disable the trap transmission when the Liquid Level becomes OK/Low
Liquid Leak External Ch1/2	**Trap:** The Checkbox to enable/disable the trap transmission when the external leak sensor detects leakage **Emergency Stop:** The Checkbox to enable/disable the emergency stop function when the external leak sensor detects leakage

Figure 16 Trap and Emergency Stop setting screen overview

Point

"**Memory error.**" and "**Condensation may occur.**" are enabled for the CDU-80R4LL by default. These items cannot be set to disable.

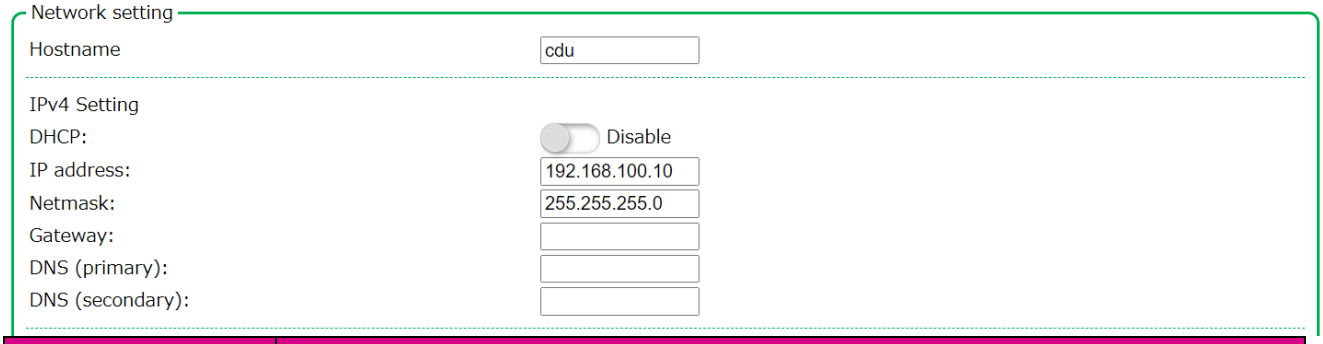
Note that it is necessary to click Save button on the bottom of Alert setting tab in order to save and reflect the configuration.

Point

The saved configuration is stored in the volatile memory of the CDU, so the configuration will be loaded automatically on power-cycle of the CDU.

5.5Network Setting tab

Network Setting tab can be used to review and set network configuration for remote access to the CDU-80R4LL. The Network Setting tab contains Hostname, IPv4/IPv6 network setting and SNMPv1/v2c/v3 setting.



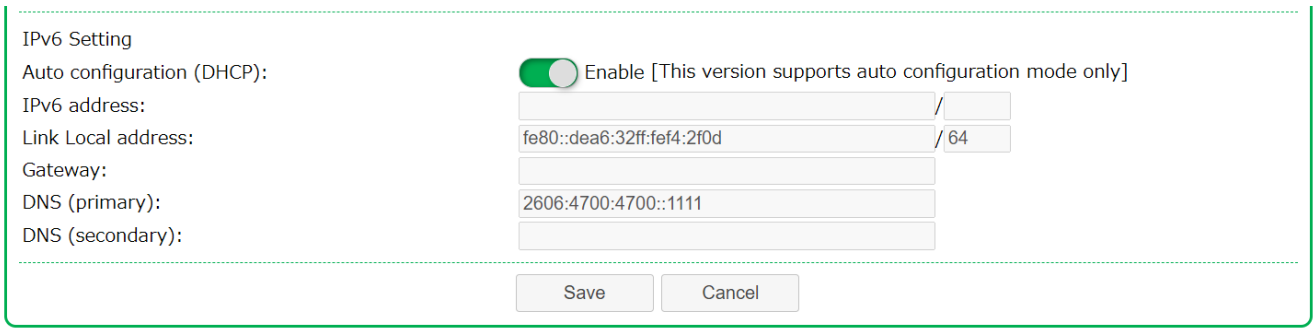
Item	Description
Hostname	Hostname of the CDU, a valid hostname contains only ASCII alphabet, number and hyphen, its total length is less than 63
DHCP	The switch to enable/disable IPv4 DHCP client service on the CDU
IP Address	IPv4 Address, it can be configured manually when the DHCP client service is disable
Netmask	IPv4 Netmask, it can be configured manually when the DHCP client service is disable
Gateway	IPv4 Gateway, it can be configured manually when the DHCP client service is disable
DNS primary /secondary	IPv4 DNS primary/secondary, it can be configured manually when the DHCP client service is disable (*1)

Figure 17 Hostname, IPv4 network setting overview

*1: DNS secondary is not supported in this version

Point

The IPv4 IP Address is set to 192.168.100.10 and the Netmask is set to 255.255.255.0 with the DHCP client disable by default.



Item	Description
Auto configuration (DHCP)	The switch to enable/disable Auto configuration. This version supports auto configuration mode only.
IPv6 Address	IPv6 Address
Link Local address	IPv6 Link Local address
Gateway	IPv6 Gateway
DNS primary/secondary	IPv6 DNS primary/secondary (*1)

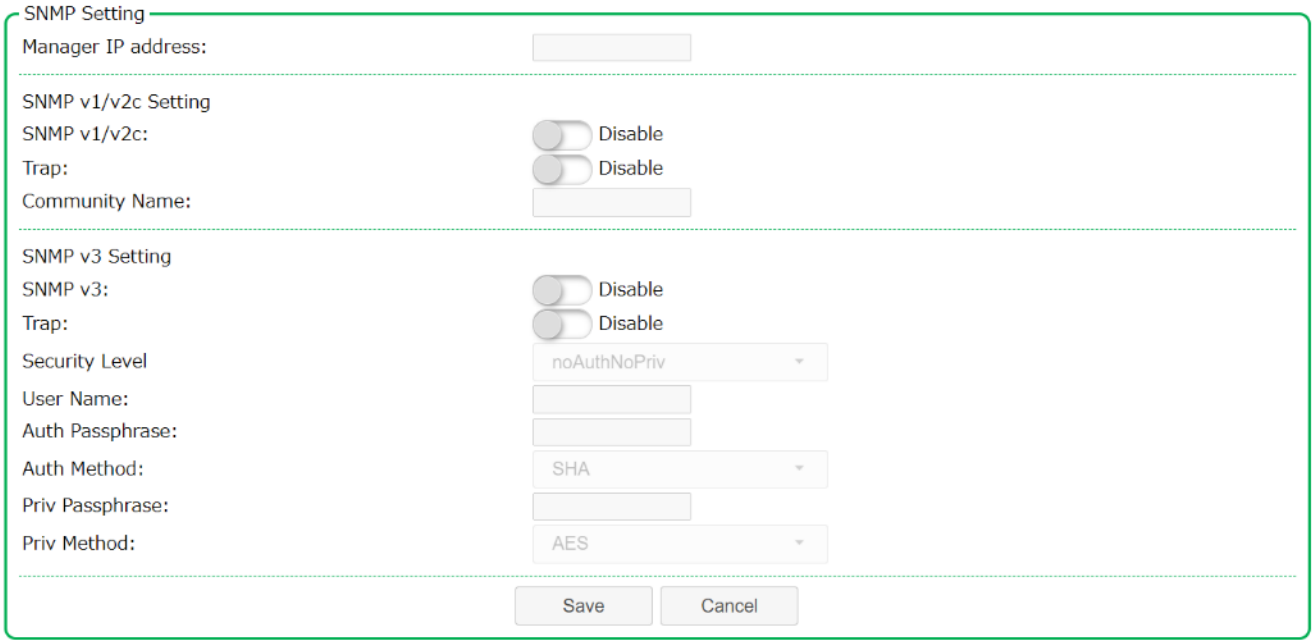
Figure 18 IPv6 network setting overview

*1: DNS secondary is not supported in this version

Note that it is necessary to click Save button on the bottom of Network setting in order to save and reflect the configuration.

Point

When the Network setting is changed from remote with Web browser, the network access from remote may disconnect, depending on the new IP address assigned.



Item	Description
Manager IP address	Manager IP address is a destination address to be sent SNMP trap from the CDU-80R4LL
SNMP v1/v2c	The switch to enable/disable SNMPv1/v2c
SNMP v1/v2cTrap	The switch to enable/disable SNMPv1/v2c trap transmission
Community Name	SNMP Community Name of the CDU-80R4LL, a valid community name contains ASCII alphabet and number, its total length is 8
SNMP v3	The switch to enable/disable SNMPv3
SNMP v3 Trap	The switch to enable/disable SNMPv3 trap transmission
Security Level	The security level configuration when sending SNMPv3 trap • noAuthNoPriv – No authentication and no encryption • authNoPriv – Provide authentication but no encryption • authPriv – Provide authentication and encryption
User Name	The name that identifies the SNMPv3 user
Auth Passphrase	The password for user authentication, a valid password contains ASCII alphabet and number, its total length is 8
Auth Method	The authentication method for an SNMPv3 user • SHA – Secure Hash Algorithm is used for the authentication • MD5 – Message Digest algorithm is used for the authentication
Priv Passphrase	The password for encryption, a valid password contains ASCII alphabet and number, its total length is 8
Priv Method	The encryption method to generate the key used for encryption • AES – Advanced Encryption Standard algorithm is used for the encryption • DES – Data Encryption algorithm is used for the encryption

Figure 19 SNMP setting screen overview

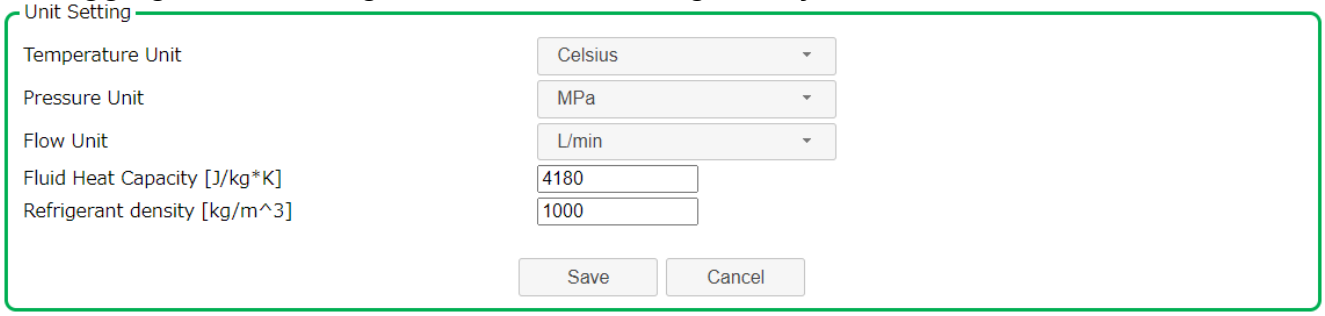
Note that it is necessary to click Save button on the bottom of SNMP Setting in order to save and reflect the configuration.

Point

When both the SNMPv1/v2c and the SNMPv3 is set to enable, SNMPv3 trap is only sent prior to SNMP v1/v2c. In order to send a SNMP trap, it is also necessary to configure which trap to be sent in the Alert setting tab.

5.6System Setting tab

System Setting tab consists of Unit Setting, Password Setting Date/Time Setting, Debugging Mode Setting, Screen Saver Setting and System Status.



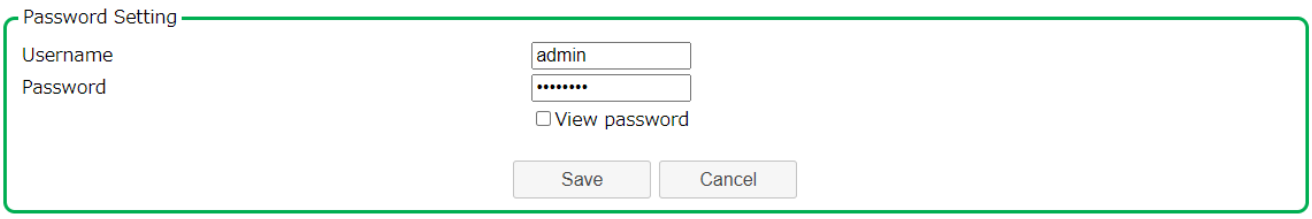
Item	Description
Temperature Unit	Temperature unit to be used in user interface • Celsius • Fahrenheit
Pressure Unit	Pressure unit to be used in user interface • MPa (Mega Pascal) •PSI – Pound per square inch
Flow Unit	Flow rate unit to be used in user interface • L/min (Litter per minute) •GPM – Gallons per minute
Fluid Heat Capacity[J/(kg*K)]	Heat capacity of primary side water to be used in calculation of Heat load. The value can be set from 3000 to 5000, it is set to 4180 by default
Refrigerant Density[kg/m³]	Density of primary side water to be used in calculation of Heat load. The value can be set from 100 to 2000, it is set to 1000 by default

Figure 20 Unit setting screen overview

Note that it is necessary to click Save button on the bottom of Unit Setting in order to save and reflect the configuration.

The current heat load shown in the Status tab is calculated in the following equation:

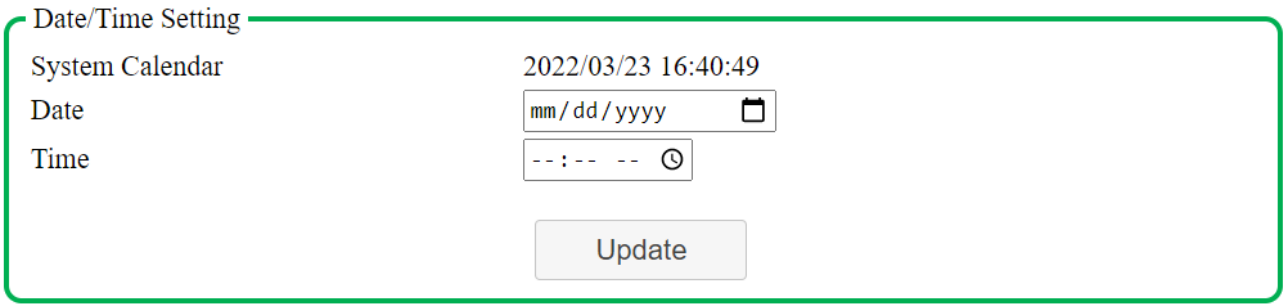
$$\text{Heat load} = \frac{(\text{Temp. to facility} - \text{Temp. from facility}) \times \text{Fluid Heat Capacity} \times \text{Refrigerant density} \times \text{Flow rate})}{1000000/60}$$



Item	Description
Username	User name for network access authentication, a valid user name contains ASCII alphabet and number, its total number is 1 up to 8, the default username is 'admin'
Password	Password for network access authentication, a valid password contains ASCII alphabet and number, its total number is 1 up to 8, the default password is 'password'

Figure 21 Password setting screen overview

Note that it is necessary to click Save button on the bottom of Password Setting in order to save and reflect the configuration.



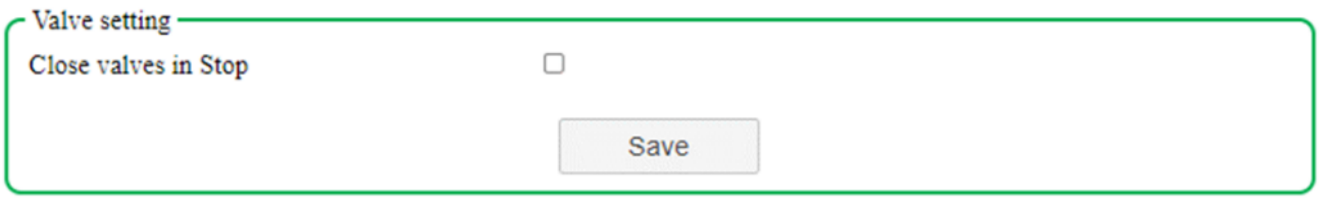
Item	Description
System Calendar	The current system calendar of the CDU-80R4LL
Date	New date to be set of the CDU-80R4LL Date and time can be set for 2000/1/1　2037/12/31
Time	New time to be set of the CDU-80R4LL

Figure 22 Date/Time setting screen overview

Note that it is necessary to click Update button on the bottom of Date/Time Setting in order to set the configuration.

Point

The system calendar is used to store the system status for log feature. See 6.1 for more detail



Item	Description
Close valves in Stop	**Checked:** Valves are completely closed in Stop **Not checked:** Valves are fully opened in Stop This setting is "Not checked" by default.

Figure 23 Valve setting overview

Note that it is necessary to click Save button on the bottom of Flow CTL Valve setting in order to set the configuration of Flow CTL valve behavior in Stop mode or Emergency Stop.

Point

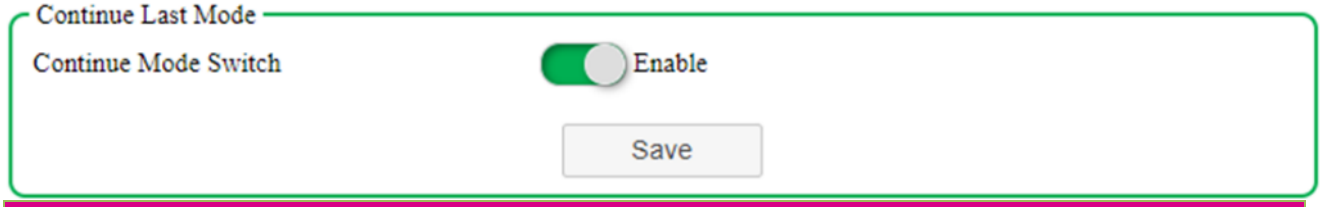
In case the new configuration of valve is set in Stop mode, the new configuration is applied the next time that operating mode of CDU transition to Stop mode.
In case the new configuration of valve is set in Emergency Stop, the new configuration is applied.

CAUTION!

In the case this setting is checked, the primary piping route in the CDU is completely closed. Please prepare the bypass piping in order to protect your facility.

In below cases, Flow CTL valves will be fully opened in stop operation regardless of "Close valves in Stop" setting.

- Startup
  Flow CTL valves will be fully opened in startup and kept it in 10sec approximately. After that, valves will be closed in case operation mode of CDU is Stop and "Close valves in Stop" is checked.
- Update
  Flow CTL valves will be fully opened in "software update".
  specifically "software update" means the period during from the operation that "Stop and scan System" button in Software Update tab is clicked, to the operation that "Exit update and go to the Status Page" button is clicked.



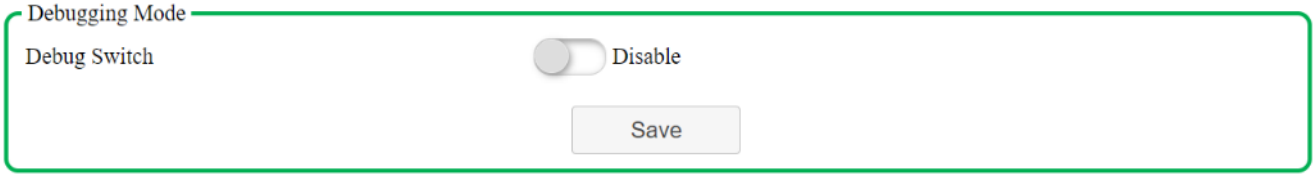
Item	Description
Continue Mode Switch	**Enable**: CDU starts the operation with previous operation setting in power-off. **Disable**: CDU starts operation with Stop mode. This setting is "Enable" by default.

Figure 24 Continue Mode Switch overview

Note that it is necessary to click Save button on the bottom of Continue Last Mode in order to set the configuration of "Continue Last Mode".
In case "Continue Mode Switch" is enabled, CDU starts operation automatically with previous operation setting in power-off.
In case "Continue Mode Switch" is disabled, CDU starts operation with Stop mode.

CAUTION!

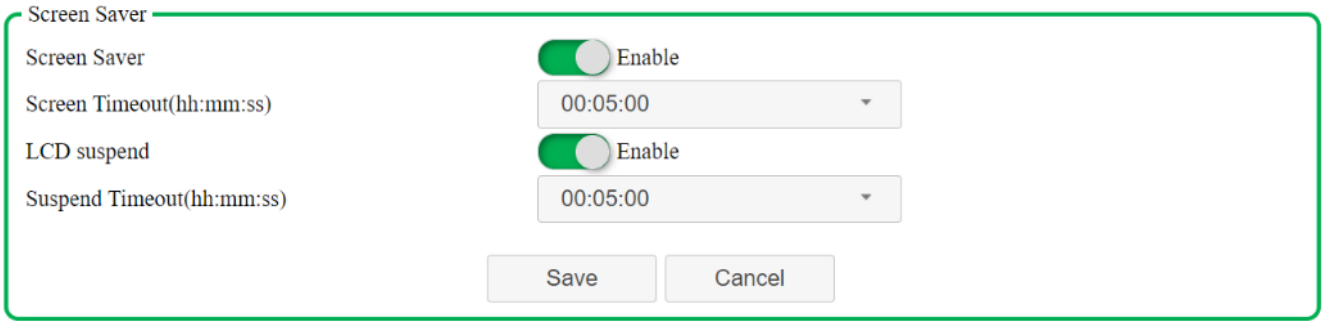
In case "Continue Mode Switch" is enabled, pump operation starts automatically in power-on.
In case it needs to stop pump operation in startup, please stop pump operation with Stop mode or disable "Continue Mode Switch" before power-off.



Item	Description
Debug Switch	The Debug switch to enable/disable Debugging Mode

Figure 25 Debugging Mode overview

Note that it is necessary to click Save button on the bottom of Debugging Mode Setting in order to set the configuration. The Debugging Mode can be used to analyze the system behavior, however it is unnecessary to use it for normal operation.



Item	Description
Screen Saver	The Screen Saver switch to enable/disable screensaver on LCD screen
Screen Timeout	Timeout to start screensaver. This can be set 5 minutes, 10 minutes, 30 minutes and 1 hour
LCD suspend	The LCD suspend switch to enable/disable LCD backlight. This can be set only when it enables screensaver
Suspend Timeout	Timeout to turn off LCD backlight. This can be set 5 minutes, 10 minutes, 30 minutes and 1 hour

Figure 26 Screen Saver setting overview

Point

The screensaver can be used to see the system status at a glance. The green screensaver indicates normal operation without any warning/alert. The white one indicates no operation mode (idle). The yellow one indicates warning status without alert. The red one indicates alert status.
LCD suspend can be used to turn off LCD backlight. Note that it will turn off the backlight only when the configured timeout elapsed in normal operation after starting screensaver.

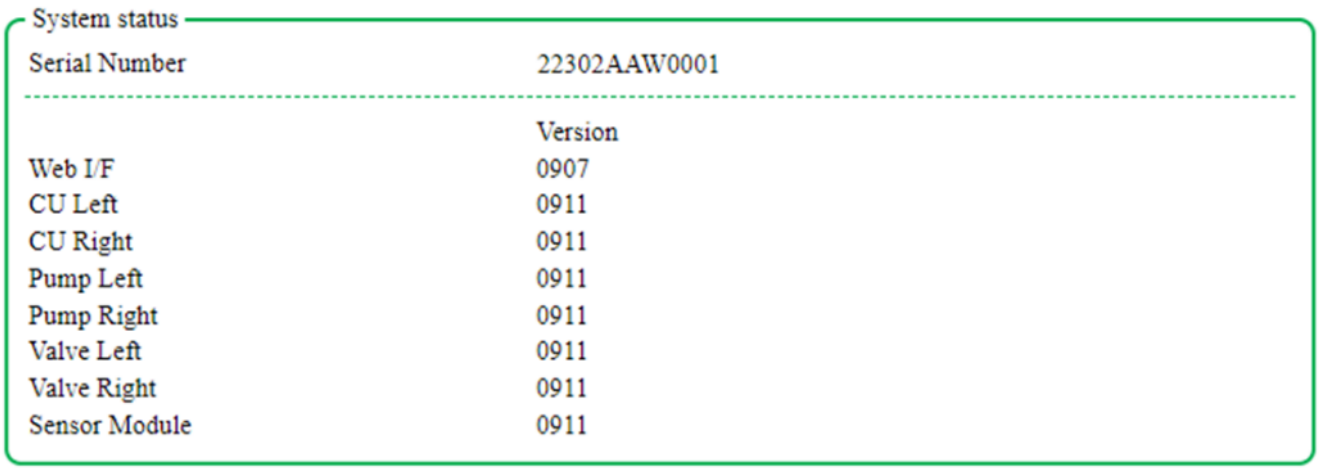
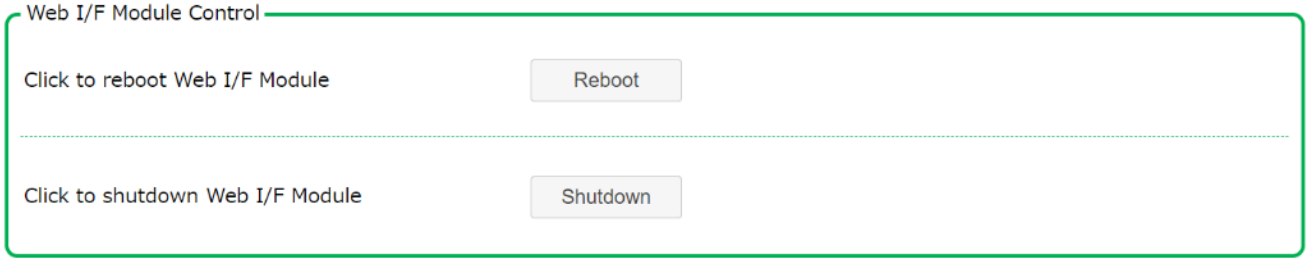


Figure 27 System status overview

The System status shows the serial number of the CDU-80R4LL and Web I/F module version, CU version, Pump version, Flow CTL valve version and Sensor Module version.

5.7 Control tab

The Control tab consists of two pages, the first one is used to control Web I/F Module and the second one is used to control CDU behavior.



Item	Description
Click to reboot Web I/F Module	Web I/F Module is going to reboot 5sec later
Click to shutdown Web I/F Module	Web I/F Module is going to shutdown 5sec later

Figure 28 Web I/F Module Control Overview

CAUTION!

When CDU is shutdown or reboot, Power on of WEBI/F is necessary, so all the servers in rack moust be shutodown before that.

Point

Even for rebooting and shutdown of Web I/F Module, pump can keep running. However, it is necessary to do power-cycle of the CDU-80R4LL to turn on the Web I/F after shutdown. After restart, pump starts operation based on “Continue Mode Switch” setting in System Setting tab. So it is necessary to restart pump operation manually, in case that pump starts operation with Stop mode because of “Continue Mode Switch” disabled.

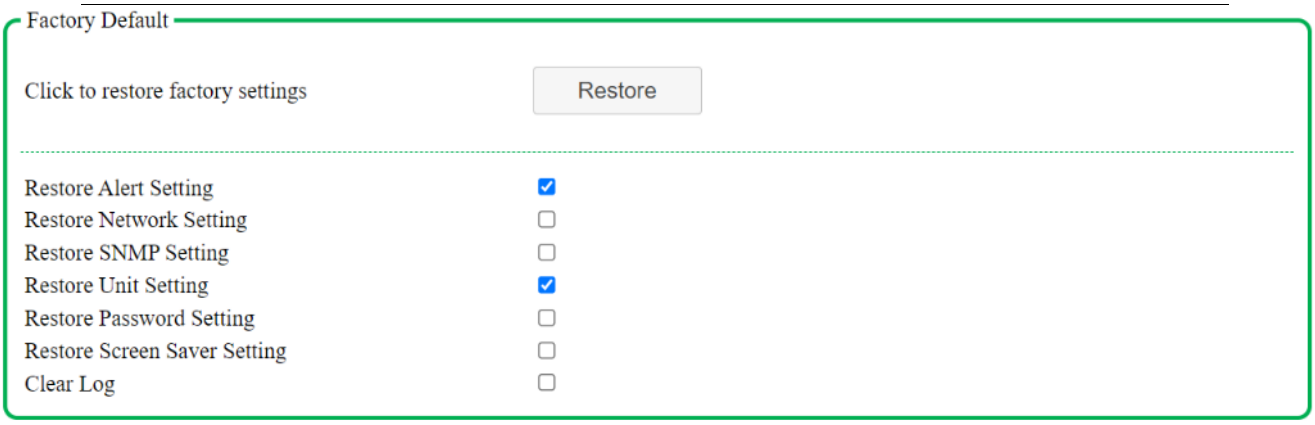


Figure 29 Factory Default control overview

Point

Even for restoring any items, pump can keep running. However, in case Restore Network Setting is checked, network access may disconnect.

The Factory Default control can be used to restore any configuration of the CDU-80R4LL and clear log files by checking a Setting to be restored.

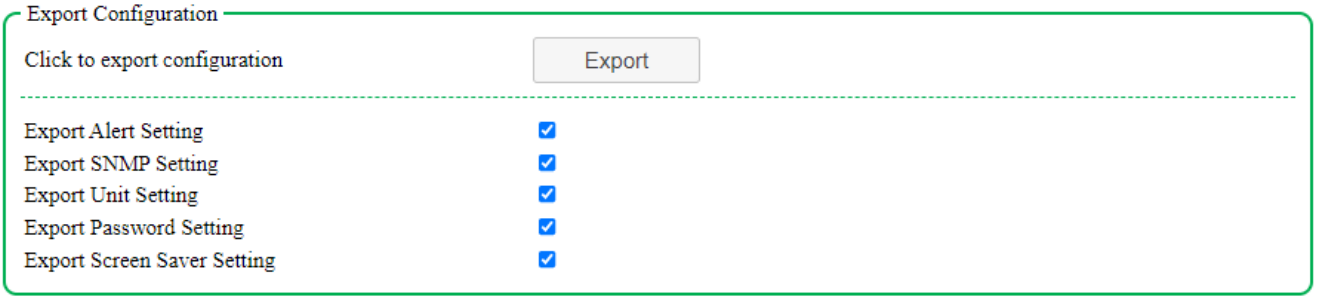


Figure 30 Export Configuration control overview

The Export Configuration control can be used to export the configuration of the CDU-80R4LL for backup. Note that the network configuration is not involved in the

exported file. The exported backup file can be imported using the following Import Configuration control.

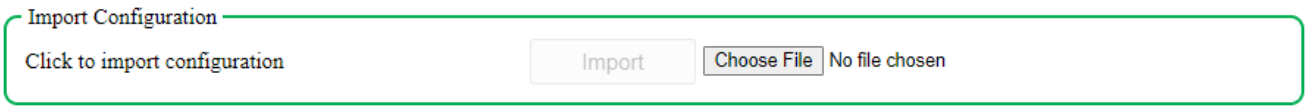


Figure 31 Import Configuration control overview

Note that Web I/F module version of the exported backup file must be matched with the current one.

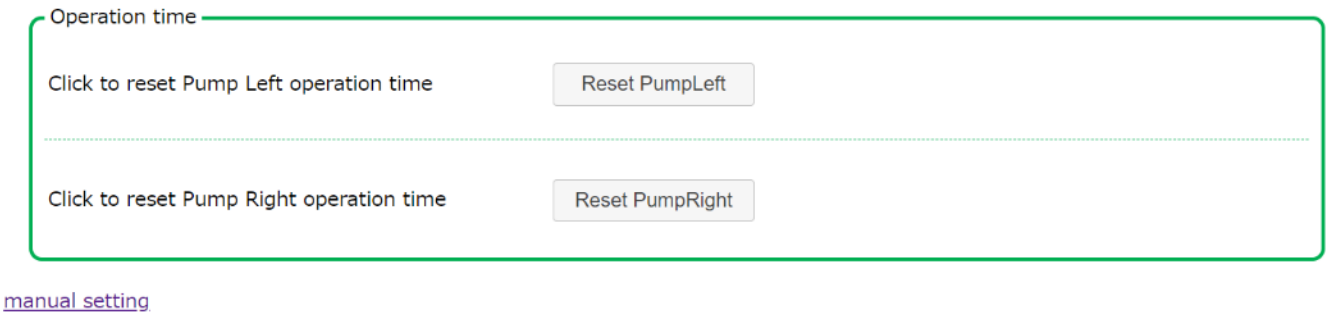


Figure 32 Operation time control overview

The Operation time control can be used to reset the pump's operation time shown in the Status tab.

Point

Even for resetting the operation time, pump can keep running.

There is a link to second page on the bottom of the first page. The second page can be used to control pump and Flow CTL valve by setting in the following control section. There are three operation modes to control the CDU-80R4LL, Manual, Auto and Stop and the valve configuration of behavior in Stop mode as shown below.
Note that the valve configuration can be set with Valve setting in System Setting tab. Please refer to "5.6 System Setting tab" for more details.

Figure 33 Mode Setting screen overview

Note that the pump will start running at 10% duty or more, and stop running at 0% or less than 10% duty. The Flow CTL valve will fully close at 0%, and fully open at 100% duty.

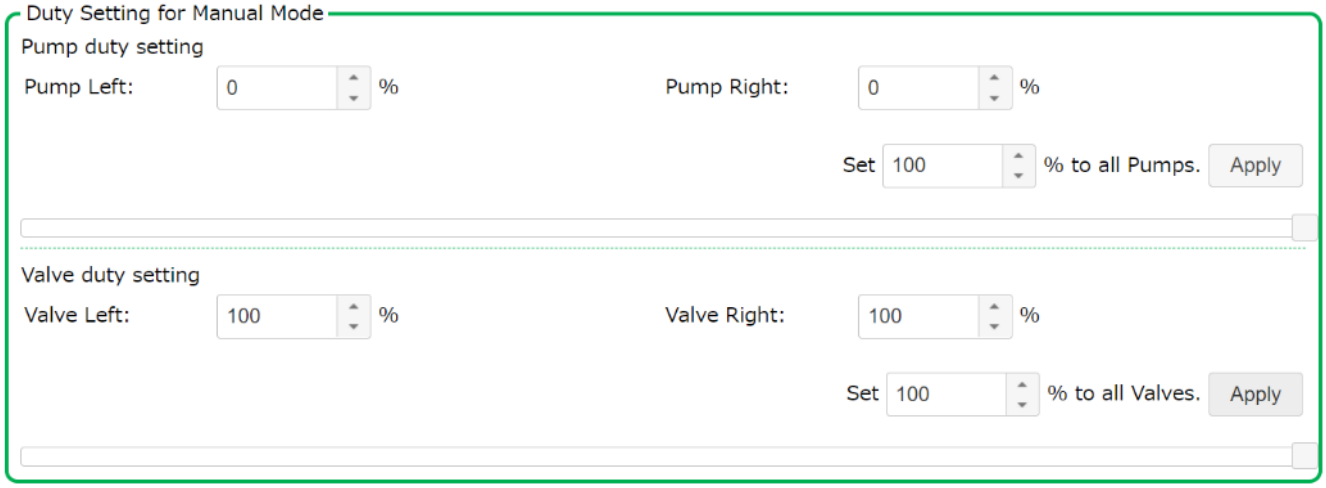


Figure 34 Duty Setting for Manual Mode screen overview

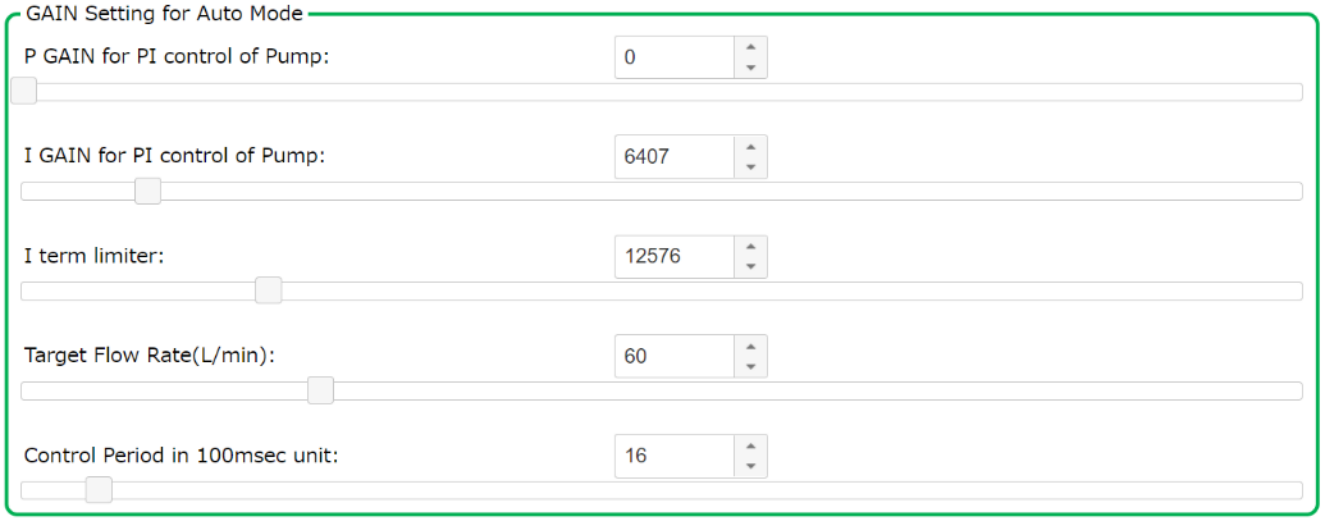


Figure 35 Gain Setting for Auto Mode screen overview

Table 8 Operation mode

Operation Mode	Description
Manual	The pump's duty and Flow CTL valve's duty can be set from 0% to 100% manually
Auto	The pump's duty will be controlled automatically based on the Target Flow Rate. The Flow CTL valve's duty will be controlled automatically based on the current dew point.
Stop	The pump's duty is set to 0% to stop running and the Flow CTL valve's duty is set to 100%.

For Auto operation, there are a couple of PI gain parameters however they are currently reserved for future use. The control period can be set from 1 to 255 for future use, however the value of control period is fixed to 16 in this version.

5.8Software Update tab

The Software Update tab can be used to update software module in the CDU-80R4LL as needed. The Software Update tab can only be used for network access with Web browser. Setting values are not changed by Software Upate. Note that each module can be updated to any version, however the update file for CU, Pump and Flow CTL valve is a common file and the one for Sensor Module and Web I/F Module are the designated files, respectively. It is necessary to reboot to reflect the update only for Web I/F Module, the update for other module will be reflected just after the update done.
The Software Update tab has the following section, which shows each module's version and unique ID.

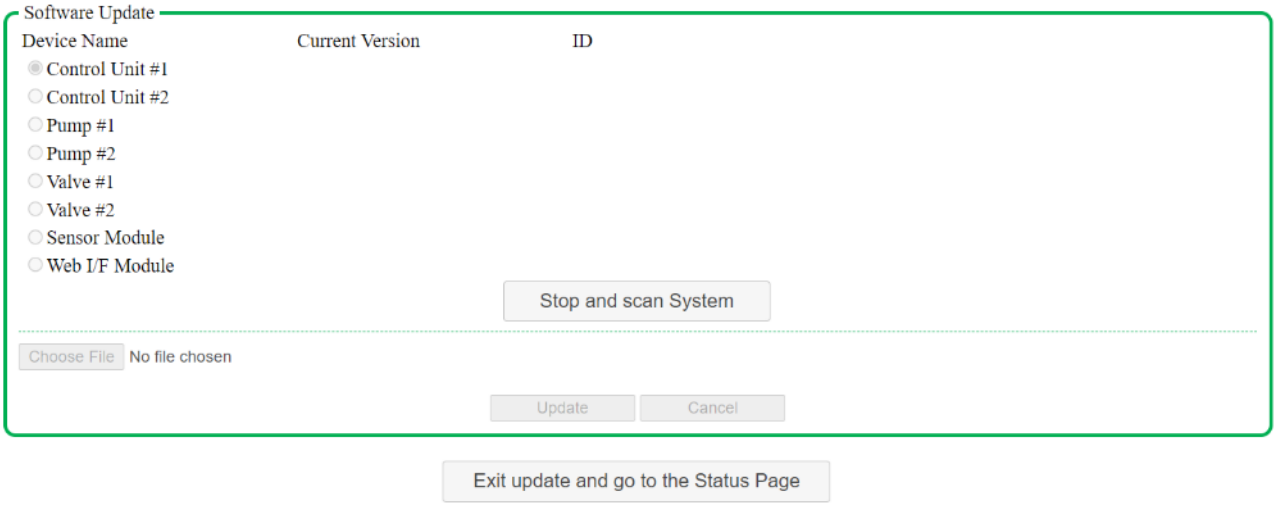


Figure 36 Software Update tab screen overview

NOTICE!

Before starting software update, make sure that Control Unit (Left or Right) operates normally.
If both Control Unit (Left) and Control Unit (Right) don't work or are not inserted, Stop and scan System button will be disabled. And you cannot click the button and start scanning all modules in the CDU-80R4LL.

For software update, the CDU-80R4LL is required to stop the operation so that the server cooled by the CDU-80R4LL may be needed to shut down before initiating the update.

NOTICE!

Make sure that the power supply to the CDU-80R4LL must be kept during the update. If the power supply terminates during the update, it might cause the failure of software update. In that case, rescan the module and retry updating.

By clicking Stop and scan System button, the CDU-80R4LL stops running if the operation mode is Manual or Auto mode. And then all module will be scanned in the CDU-80R4LL. After scanning, all detected module's version and ID will be shown in the following screen.

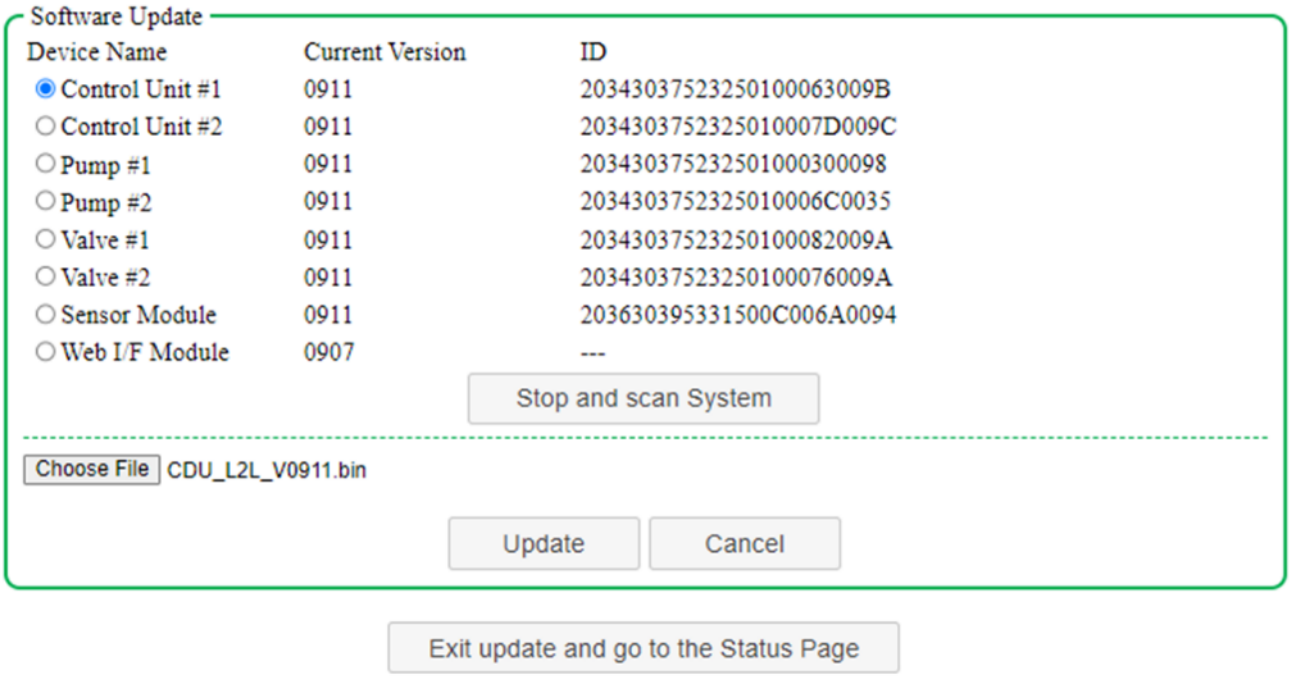
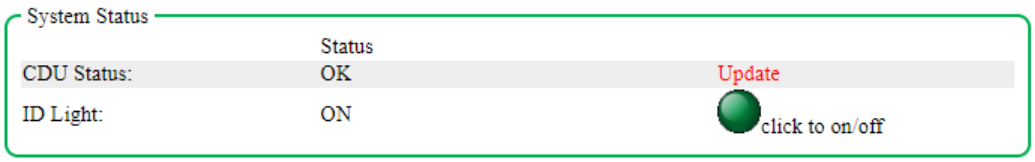


Figure 37 Scan result for update screen overview

By clicking Choose File, an update file, which is provided by technical support, will be loaded as shown Figure 37. And then choose a target module to update and click Update button to start updating with the loaded file.
After the update done, the new software version can be seen by clicking Stop and scan System. To finish software update, make sure to click Exit update and go to the Status Page.

NOTICE!

In case the system control such as reboot or transition to other tab without clicking Exit update and go to the Status Page button, the CDU-80R4LL will be out of control because each module in the system still remain in Update mode.
So you must follow the procedure of software update showed in this section.
The CDU operation mode will be remained “Update” in case that user move to other tab from Software Update tab without clicking the “Exit update and go to the Status Page” button, after clicked the “Stop and scan System” button.



If the CDU operation mode is remained “Update”, please move to Software Update tab and change the CDU operation mode to “Stop”, “Manual” or “Auto” by clicking the “Exit update and go to the Status Page”.
If the CDU-80R4LL is out of control because of not following the procedure, you need to terminate the power supply to the CDU-80R4LL and power on again to recovery from out of control.

6 Maintenance

6.1 Log feature

The CDU-80R4LL has a feature to store several log files in the volatile memory and they can be downloaded via remote access with Web browser. The type of log files stored in the CDU-80R4LL is shown in the following table.

Table 9 Log file type

Log file type	Description
system_log.csv	Whole status information of the CDU-80R4LL with date/time is stored at every 15 sec approximately
trap_log.csv	Sent trap information with date/time is stored when it's triggered. The enabled trap in the Alert Setting tab is only stored in the log file
event_log.csv	Configuration modification is stored when it's changed.
control_log.csv	Auto/Manual control with parameter is stored when it's controlled.
apache_log	Access log to Web I/F Module

Each log file will be rotated every week and they will remain up to two years. They can be removed by Factory restoring. See 5.7 for more detail.
To download the log files, open the IP address of the CDU-80R4LL followed by '/downloads/' using Web browser like "https://192.168.100.10/downloads/" in case the IP address is 192.168.100.10, by right-clicking any files, the log file will be downloaded.

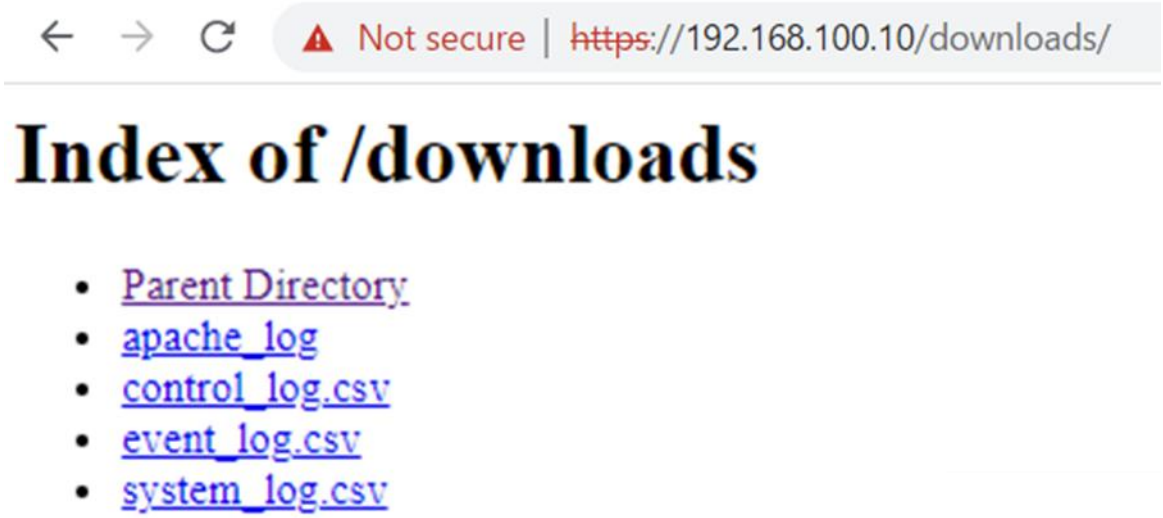


Figure 38 Log download page screen overview

6.2SNMP Trap feature

SNMP Trap can be used to monitor any equipment on the network. The CDU-80R4LL has a feature to send a trap configured in the Alert Setting tab, to UDP Port 162 of a SNMP manager configured in the Network Setting tab. Private Enterprise Number

which is managed by IANA, is needed to provide SNMP equipment and the CDU-80R4LL uses "1.3.6.1.4.1.30628.1234" as the Private Enterprise Number. Warning trap will be sent at the period of 30 sec and Alert trap will be sent at the period of 10 sec. The following tables show the trap information handled by the CDU-80R4LL.

Point

Because the information on status tab is updated every 1 sec approximately, timing of changing "Status" and sending SNMP Alert/Warning trap are different.
Therefore, there is a possibility that "Status" of status tab change to Warning/Alert or NG in spite of no sending Alert/Warning trap.

Table 10 Warning trap

Trap ID	Trap contents
500	[WARNING] Temperature (From Sever) fall under warning level.
501	[WARNING] Temperature (From Server) exceed warning level.
504	[WARNING] Temperature (To Server) fall under waring level.
505	[WARNING] Temperature (To Server) exceed warning level.
508	[WARNING] Temperature (From Facility) fall under warning level.
509	[WARNING] Temperature (From Facility) exceed warning level.
512	[WARNING] Temperature (To Facility) fall under warning level.
513	[WARNING] Temperature (To Facility) exceed warning level.
516	[WARNING] Pressure (Server) fall under warning level.
517	[WARNING] Pressure (Server) exceed warning level.
520	[WARNING] Pressure (Facility) fall under warning level.
521	[WARNING] Pressure (Facility) exceed warning level.
524	[WARNING] Flow Rate (Server) fall under warning level.
525	[WARNING] Flow Rate (Server) exceed warning level.
528	[WARNING] Flow Rate (Facility) fall under warning level.
529	[WARNING] Flow Rate (Facility) exceed warning level.

Table 11 Alert trap

Trap ID	Trap contents
502	[ALERT] Temperature (From Sever) fall under alert level.
503	[ALERT] Temperature (From Server) exceed alert level.
506	[ALERT] Temperature (To Server) fall under alert level.
507	[ALERT] Temperature (To Server) exceed alert level.
510	[ALERT] Temperature (From Facility) fall under alert level.
511	[ALERT] Temperature (From Facility) exceed alert level.
514	[ALERT] Temperature (To Facility) fall under alert level.
515	[ALERT] Temperature (To Facility) exceed alert level.
518	[ALERT] Pressure (Server) fall under alert level.
519	[ALERT] Pressure (Server) exceed alert level.
522	[ALERT] Pressure (Facility) fall under alert level.
523	[ALERT] Pressure (Facility) exceed alert level.
526	[ALERT] Flow Rate (Server) fall under alert level.
527	[ALERT] Flow Rate (Server) exceed alert level.
530	[ALERT] Flow Rate (Facility) fall under alert level.
531	[ALERT] Flow Rate (Facility) exceed alert level.
550	[ALERT] Power Top error.
551	[ALERT] Power Bottom error.
552	[ALERT] Pump Left error.
553	[ALERT] Pump Right error.
571	[ALERT] Flow CTL Valve Left error.
572	[ALERT] Flow CTL Valve Right error.
573	[ALERT] Control Unit error.
574	[ALERT] Sensor Module error.
575	[ALERT] Leak Detection error.
576	[ALERT] Humidity sensor error.
577	[ALERT] Liquid level (OK).
578	[ALERT] Liquid level (Low) error.
579	[ALERT] Liquid leak (External ch1) error.
580	[ALERT] Liquid leak (External ch2) error.
585	[ALERT] Memory error.
586	[ALERT] Condensation may occur.

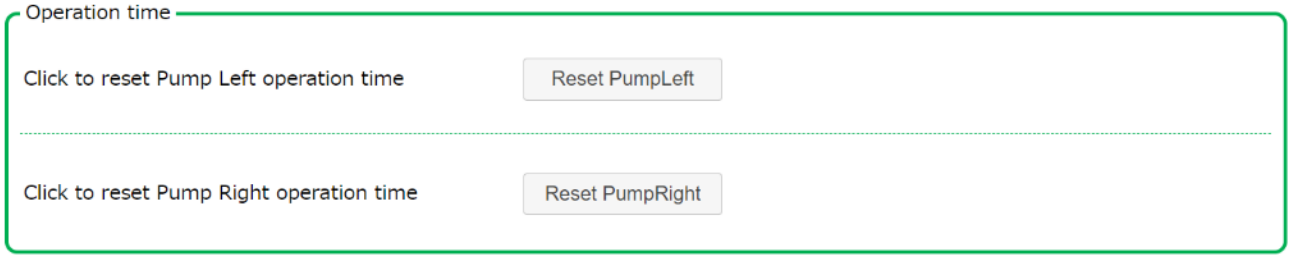
6.3Start up

WARNING!

Before pump operation start, **make sure that all the component are correctly connected.** If there is abnormal connection, that causes water leakage and fatal damages to the server equipment.

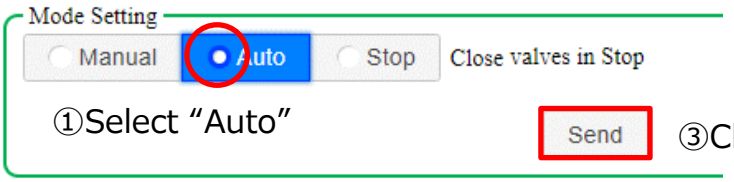
<Start up Procedure>

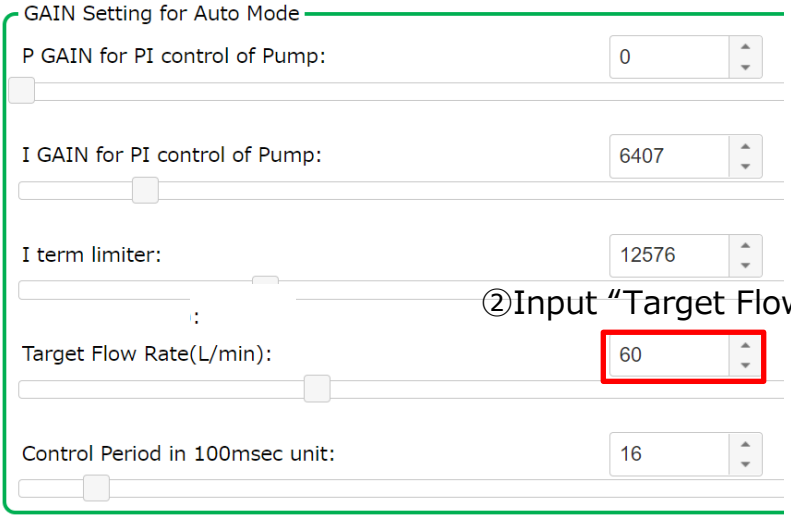
1) Confirm that all the components are correctly connected.
2) Connect the AC cable of the power supply unit to the AC power line and CDU power is on. (At this time, the pumps in CDU starts the operation with previous setting before power-off, in case that "Continue Mode Switch" in "System Setting" is enabled).
3) Confirm that all the settings (warning/alert thresholds, SNMP trap, etc.) are correctly done.
4) Open "Control" tab, scroll the bottom of screen, and click "manual setting".



manual setting

5) If operation mode is Auto,
   ① Select "Auto" on Mode Setting.
   ② Input required "Target Flow Rate"
   ③ Click "Send", then pumps start to move.



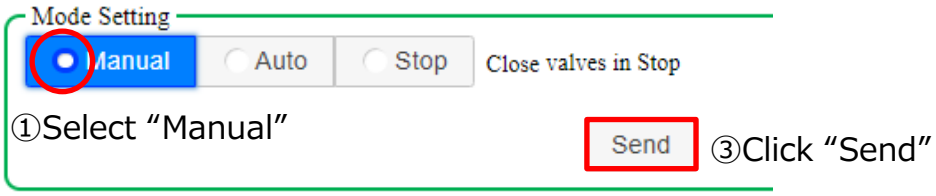


6) If operation mode is Manual

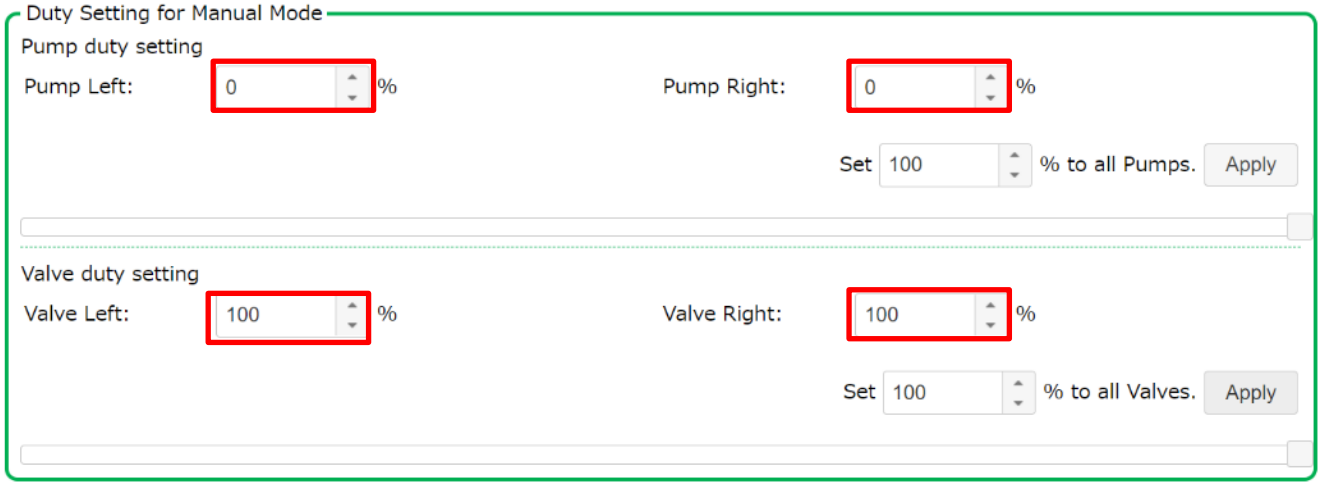
① Select “Manual” on Mode Setting.

② Input required “Pump duty setting” and “Valve duty setting”.

③ Click “Send”, then pumps start to move.



②Input “Pump duty setting” and “Valve duty setting”



6.4Exchange Pump Unit

WARNING!

Before exchange the pump unit, make sure that **the pump which is replaced stops and duty of the pump unit is 0%**, otherwise the power unit might shut down.

Do not detach and insert the same pump within 10 seconds, otherwise the power unit might shut down.

Hold down the handle while loosening the screw of the pump unit because the handle may open suddenly when removing the pump unit. The handle may hit your hand and cause injury.

Please prepare the items listed in **Table 12** before exchange power supply unit.

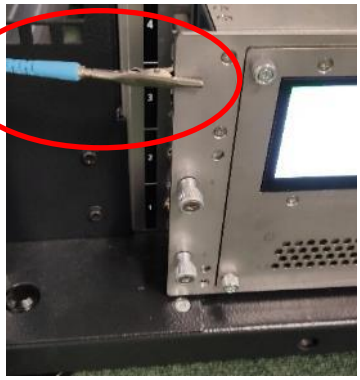
Table 12 Required Tool/Part for Pump Unit

Tool/Part	Specification	Appearance/Remark
LC-Pump-Unit	CA82027-3714	
Screwdriver	Ph#2 (Phillips screwdriver #2)	
Antistatic Wristband	Resistance: 1±0.05MΩ	

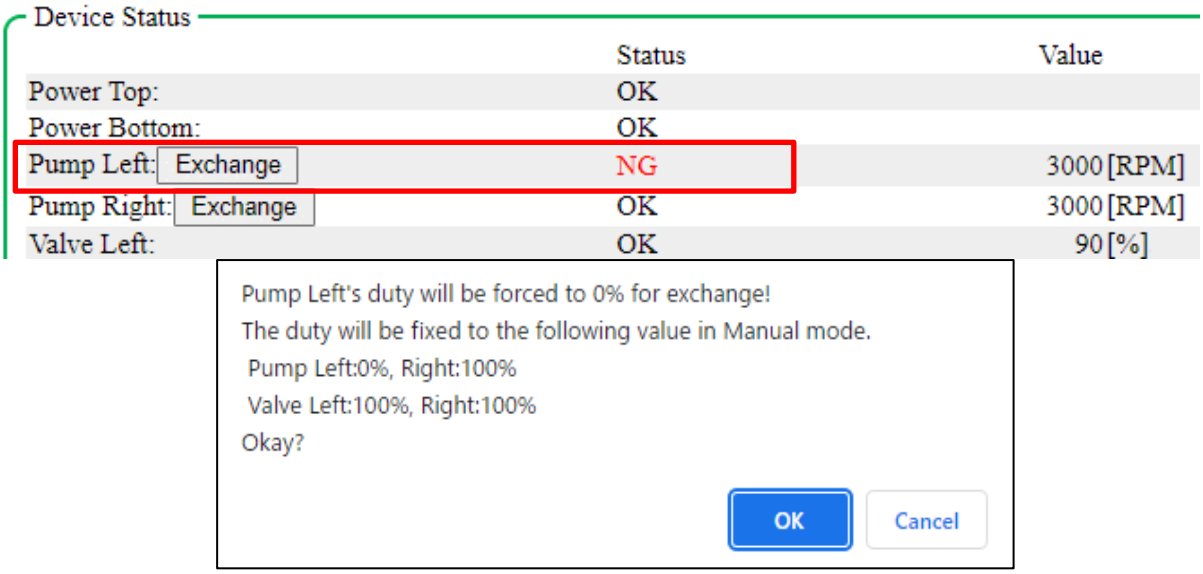
<Exchange Pump Unit Procedure> time: 10 min. to take

1) Wear the antistatic wristband with the metal part touching your skin and attach the crocodile clip to the metal part without paint on CDU front. (for example: CDU flange)

Attach the crocodile clip to the metal part



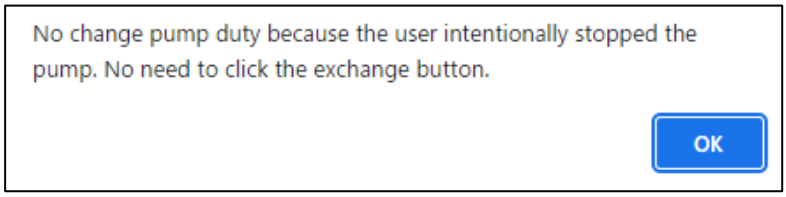
2) Open “Status” tab on Web I/F and confirm the location of the pump unit that needs to be replaced from Web I/F and click the “Exchange” button to make sure that it stops the pump unit operation for exchanging.



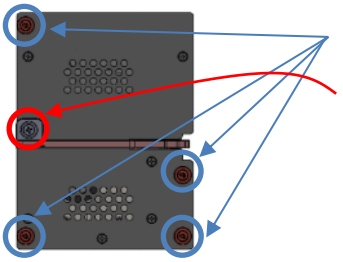
Then, the confirmation dialog above appears to set the fixed duty for the pump unit exchanging, so click “OK”.

NOTICE!

When the pump is already stopped in operating Stop mode, “Exchange” button is not available and the pump is ready for exchange safely.
So skip to procedure No. 3.
It does not need to click “Exchange” button in case that pump is stopped in operating Manual or Auto mode, because the pump is ready for exchange safely.
In this case, the confirmation dialog as below will appear after clicking “Exchange” button.
So skip to procedure No. 3.



3) Loosen the 4 M4 captive screws on the pump unit front in no particular order by the screwdriver. At last, loosen the M5 captive screw on the handle, holding down the handle.



①Loosen the M4 captive screws.
②Loosen the M5 captive screws, holding down the handle.

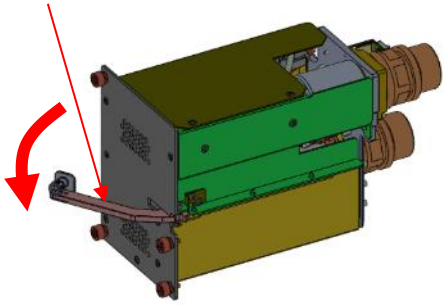
4) Pull the handle of the pump unit. After pulling out the unit approx. 100mm, hold the pump unit case by your handle and pull out it. Once the pump unit is pulled out, **DON’T re-insert within 10sec** because CDU might shutdown.

Pull the handle

Hold the unit and pull out

5) Open the hand of the new pump unit and Insert it to CDU, holding the case.

Open the handle

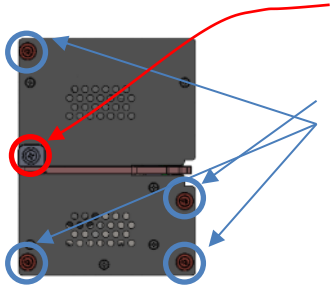


Hold the case and insert

6) When the distance between CDU and the panel of the pump unit become approx. 10 mm, push the lever while pushing the unit body.

Push the pump unit and push the lever.

7) Tighten the M5 captive screw on the handle, holding down the handle. At last, tighten the 4 M4 captive screws in no particular order.



① Tighten the M5 captive screw, holding down the handle.

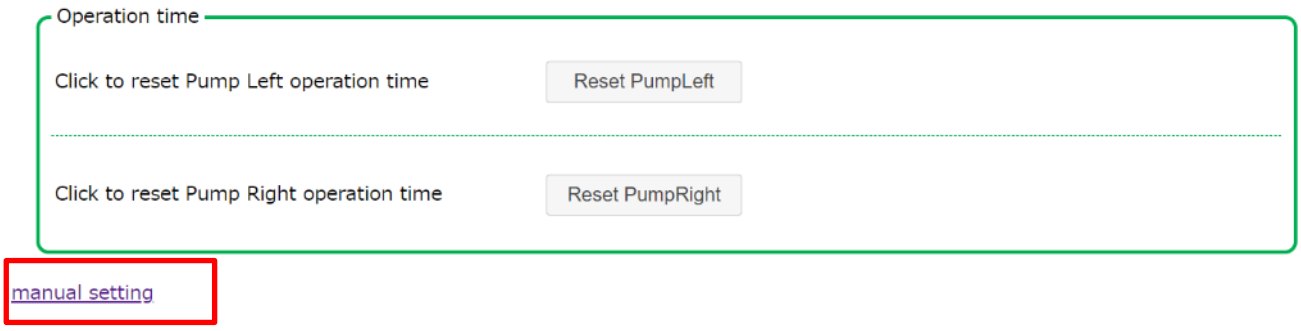
②Tighten the M4 captive screws.

8) Open “Status” tab on Web I/F and confirm that the replaced pump status is “OK”.

Device Status

	Status
Power Top:	OK
Power Bottom:	OK
Pump Left: Exchange	OK
Pump Right: Exchange	OK
Valve Left:	OK

9) Open “Control” tab and click “manual setting” on the bottom of the screen.



If Auto mode required,

① Select “Auto”

② Click “Send”.

If Manual mode is required,

① Select “Manual”

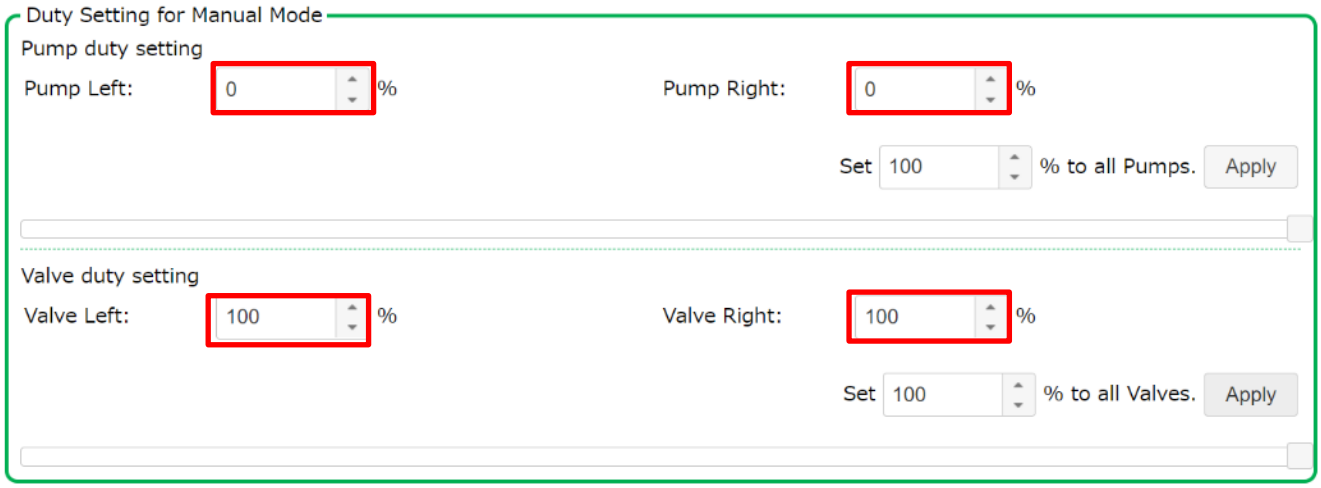
② Input “Pump duty setting” and “Valve duty setting”

③ Click “Send”.

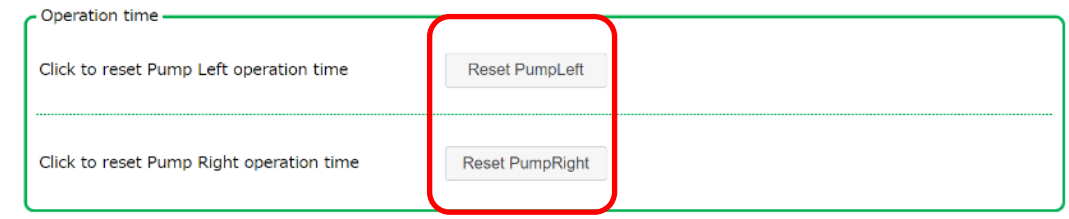
Case: Auto Mode

Case: Manual Mode

②Input “Pump duty setting” and “Valve duty setting”



10) Open “Control” tab and click “Reset PumpLeft” or “Reset PumpRight” which you exchanged. Then, the operation time is reset to zero. (The pump will keep the operation during clicking the button.)



manual setting

6.5Exchange Power Supply Unit

Please prepare the items listed in **Table 13** before exchange power supply unit.

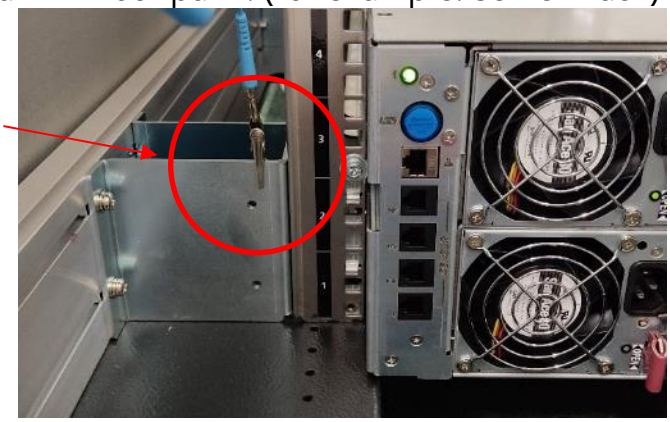
Table 13 Required Tool/Part for Power Supply Unit Exchange

Tool/Part	Specification	Appearance/Remark
LC-PS-Unit	CA82027-3710	
Antistatic Wristband	Resistance: 1±0.05MΩ	

<Exchange Power Supply Unit Procedure> time: 5 min. to take

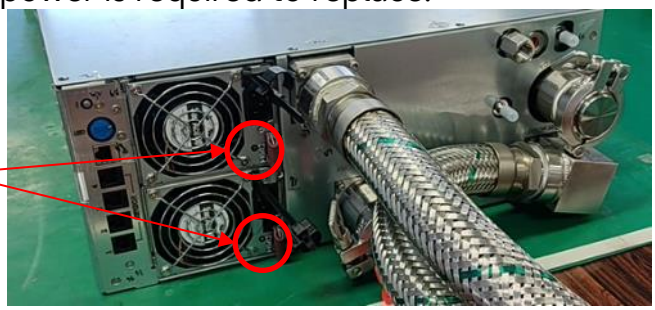
1) Wear the antistatic wristband with the metal part touching your skin and attach the crocodile clip to the metal part without paint. (for example: Server Rack)

Attach the crocodile clip to the metal part



2) Confirm the LED color of the power on CDU rear. If color is green, it shows the power works normally and exchange is not required. If color is amber (light/blink) or grey (light off), the power is required to replace.

Power LED



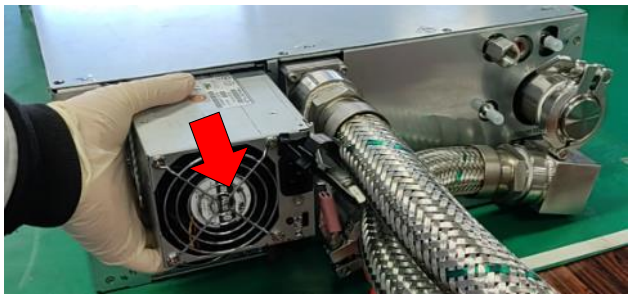
Amber or grey (light off) shows replacement is required.

3) Unclamp the AC cable and disconnect the AC cable.

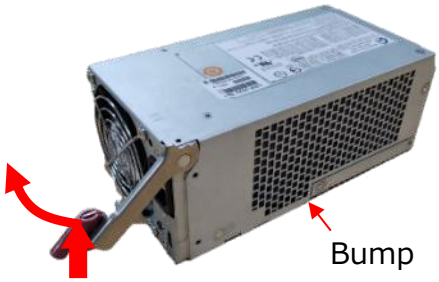
4) Pull up the lock at the tip of the lever and pull up the lever, holding the lock.

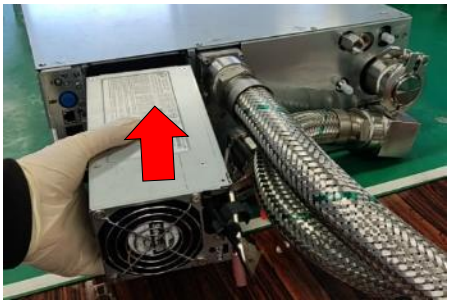
Lift the lock and pull up the lever, holding the lock.

5) Pull out the power by half (approx. 100mm), holding the lever, then hold the case with your hand and pull out the Power.

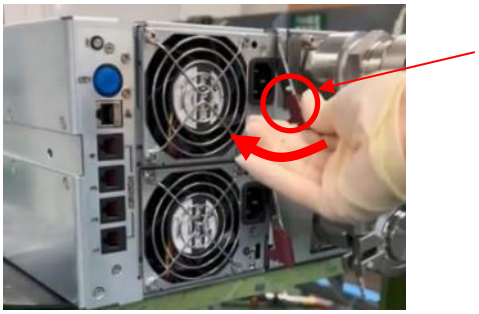


6) Pull up the lever of the new power before insertion. Then, insert it, holding the case with you hand. (The power has the bump on the bottom. If the bump gets caught, lift it up and insert it.)





7) Push the lock until the latch clicks.



8) Insert the AC cable and clamp the cable.
9) Confirm that the power LED lights green.

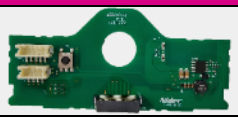
6.6Exchange CU (Control Unit)

CAUTION!

Exchange CU should be carried out by a person who understands the structure of the CDU since access the electronic devices is necessary. Mishandling may result in the CDU failure or electric shock.

Please prepare the items listed in **Table 14** before exchange CU.

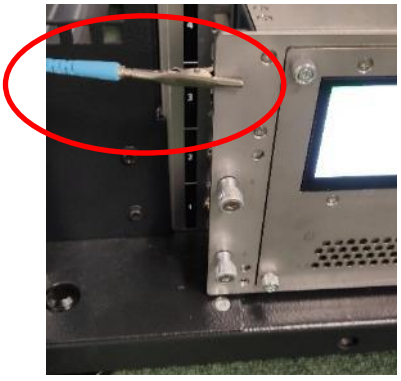
Table 14 Required Tool/Part for Exchange CU Exchange

Tool/Part	Specification	Appearance/Remark
LC-Control-Unit	CA82027-3711	
Screwdriver	Ph#2 (Phillips screwdriver #2)	
Antistatic Wristband	Resistance: 1±0.05MΩ	

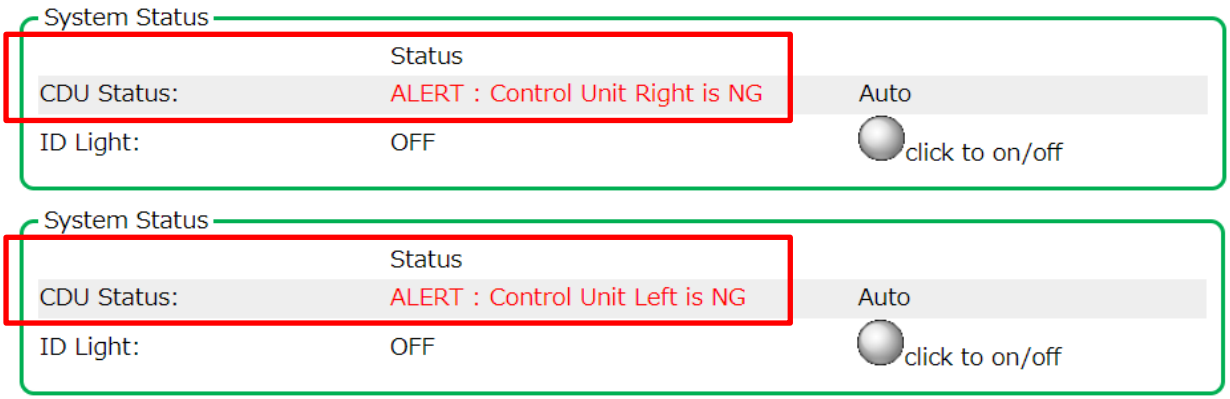
<Exchange CU Procedure> time: 5 min. to take

1) Wear the antistatic wristband with the metal part touching your skin and attach the crocodile clip to the metal part without paint on CDU front. (for example: CDU flange)

Attach the crocodile clip to the metal part

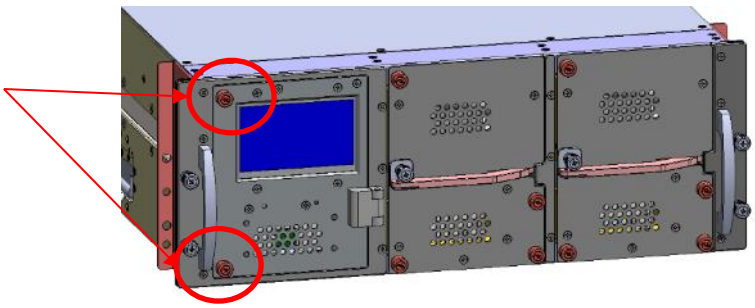


2) Confirm the location of CU that needs to be replaced from “System Status” of “Status” tab on Web I/F.
If “CDU Status” shows “ALERT: Control Unit Right is NG”, CU Right doesn’t work.
If “CDU Status” shows “ALERT: Control Unit Left is NG”, CU Left doesn’t work.

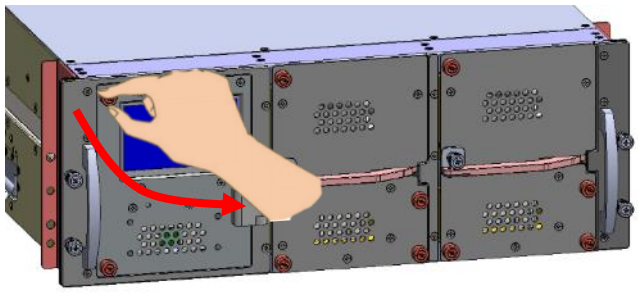


3) Loosen 2 captive screws on the CDU front by the screwdriver.

Loosen 2 screws

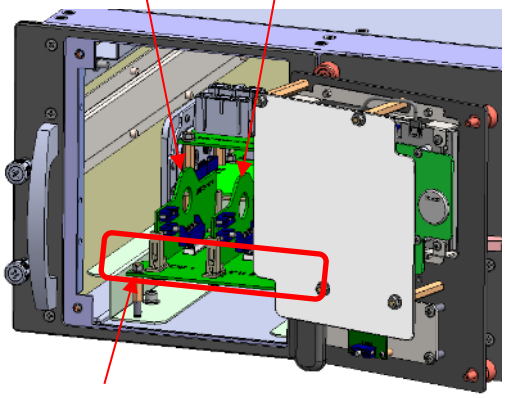


4) Open the door, pulling off the captive screw.

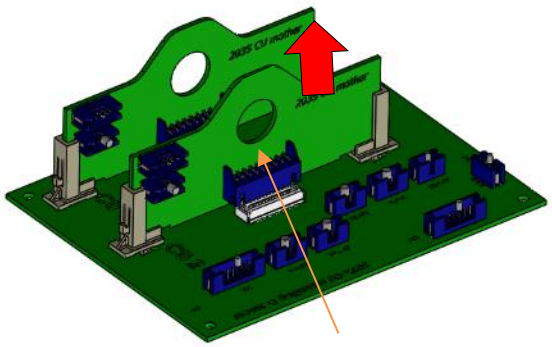


5) Hold the center hole of CU that needs to be replaced according to the PCB indication and pull it up.

CU L (Left) CU R (Right)

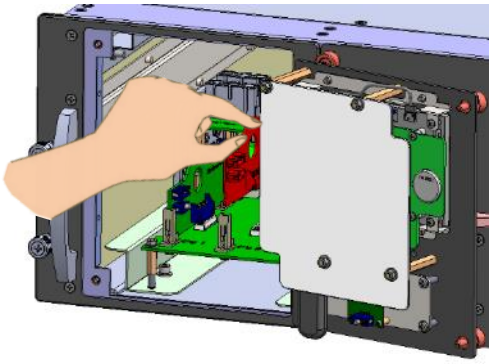


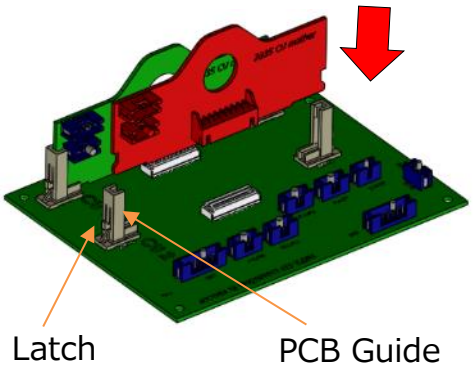
Position of CU (L/R) is indicated here.



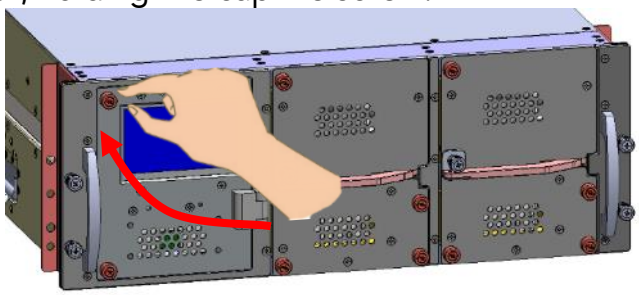
Center Hole of CU

6) Insert new CU along the guide until the latch on PCB guides click, holding the center hole of CU.





6) Close the door, holding the captive screw.

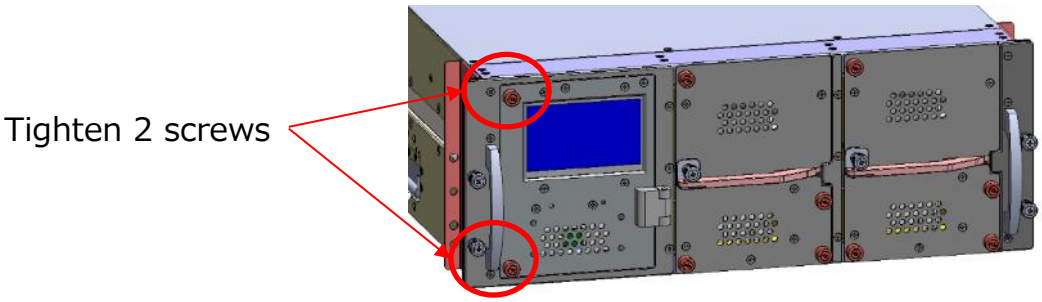


7) Open “Status” tab from Web I/F and confirm the status of Control Unit is OK. If the status is NG yet, CU might is not firmly inserted. In that case, open the door and insert CU again.

Device Status

	Operation Time(h:m)	Status	Value
Power Top:		OK	
Power Bottom:		OK	
Pump Left:	0:0	OK	3000 [RPM]
Pump Right:	0:0	OK	3000 [RPM]
Valve Left:		OK	90 [%]
Valve Right:		OK	90 [%]
Control Unit:		OK	

8) Tighten the screws ~~with~~ the screwdriver.



6.7 Safe Shutdown Procedure

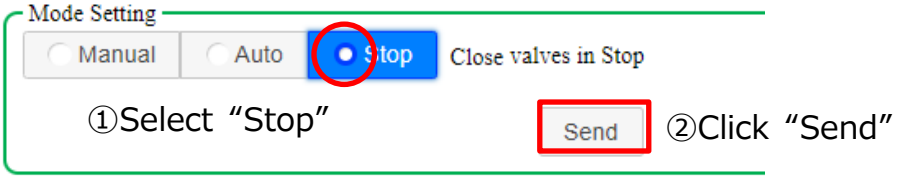
No tool required for shutdown the CDU.

WARNING!

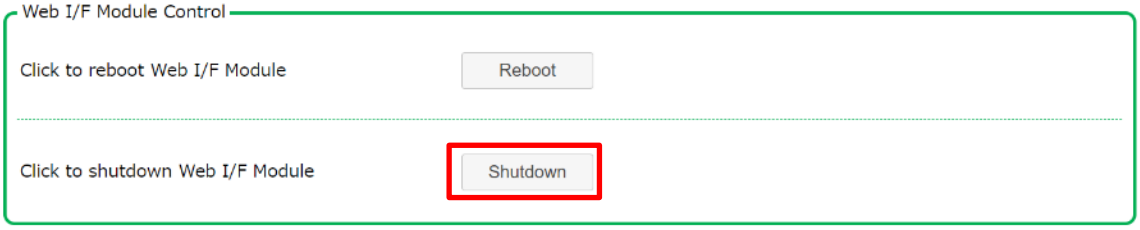
Be sure to stop the server before shutting down the CDU. There are risks of leakage due to abnormal rise in liquid temperature and the server failure due to overheating.

<Safe Shutdown Procedure>

1) Shutdown the IT equipment and make sure that there is no heat load.
2) Open "Control" tab from Web I/F. Select "Stop" and click "Send".



3) Open "Control" tab from Web I/F again and click "Shutdown".



4) The LCD turns off 5sec later.
5) After LCD turned off, remove the AC cable from PSU. Then each module of CDU is shut down safely.

6.8Coolant Injection

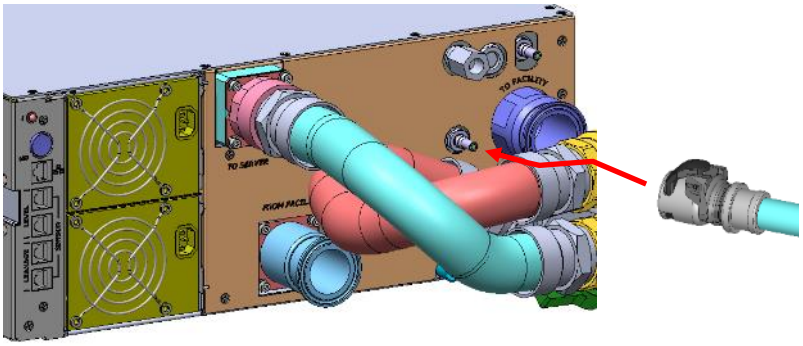
Please prepare the items listed in **Table 15** before coolant injection.

Table 15 Required Tool/Part for coolant injection

Tool/Part	Specification	Appearance/Remark
LC-Coolant	CA82027-3713	
~~Injection~~ Fixture	CA82027-3712	
Towel		

<Coolant Injection Procedure>

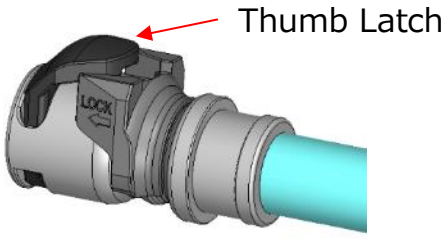
1) Connect the quick coupling of Injection fixture to Fill port on the CDU rear.



2) Immerse the suction port of Injection fixture to the coolant tank.
3) Step on the diaphragm part with your foot, the coolant is supplied from the fixture to the CDU. Even if you stop stepping on the diaphragm, reverse flow doesn't occur because the fixture has the check valve (non-return valve).

4) Repeat stepping on the diaphragm until color of Status LED change to green. (Injection is sufficient even if the LED is green blinking. Blinking indicate the CDU doesn't operate.)

5) Remove the quick coupling by pushing the thumb latch.



6) If there is a coolant spillage by any handling the fixture and the coolant tank, wipe it off with a towel immediately.
7) Confirm that Liquid level (Low) error is cleared from Web I/F.

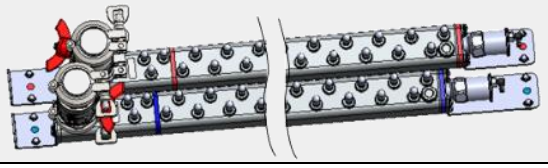
6.9Exchange CDM

※FUJITSU does not support to exchange CDM. In case of that exchanging CDM innecessary, please contact to FUJITSU sales and development teams.

WARNING!

The servers and CDU must be stopped before exchanging CDM. There are risks of leakage due to abnormal rise in liquid temperature and the server failure due to overheating.
CDM is heavy (approx. 20kg). Work with two or more people to prevent injury during handling CDM.
If the coolant spill out except the drain, wipe it out immediately by a towel.

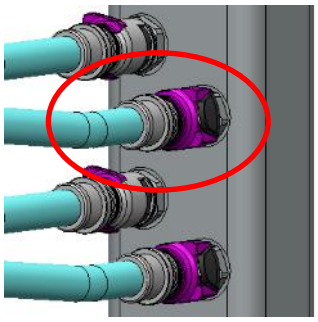
Table 16 Required Tool/Part for exchanging CDM

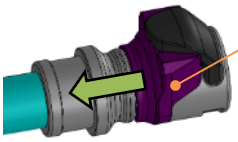
Tool/Part	Specification	Appearance/Remark
CDM	CA82027-3701	
Pan		
LC-Coolant	CA82027-3713	
Injection Fixture	CA82027-3702	
Towel		
Screwdriver	Ph#2 (Phillips screwdriver #2)	
Torque Wrench	For sanitary clamp	

<Exchange CDM Procedure>

1) Shutdown all the servers, then, shutdown CDU following the chapter 6.7.

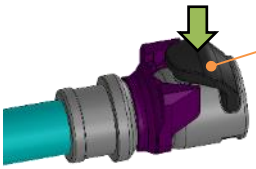
2) Detach all the tubes from CDM with no particular order by unlocking the coupling stopper and pushing the thumb latch.





Stopper

① Slide the stopper for unlocking.

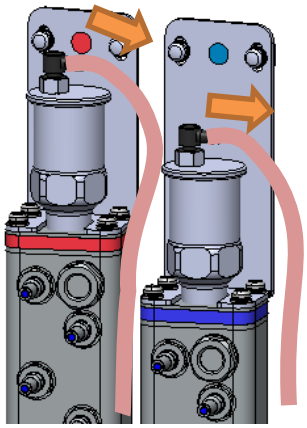


Thumb Latch

② Push the thumb latch and detach the tube, pulling out the coupling.

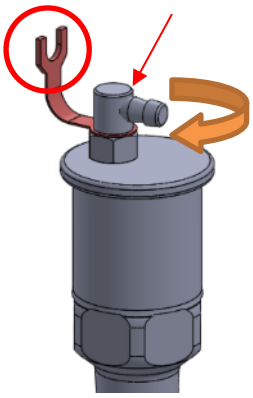
3) Remove the drain tubes of air vent on CDM. Hand-tighten the caps until the cap is seated, without inserting spacer between the cap and the air vent body in order to close the valve on the air vent. The excessive torque causes the cap damage because the cap is made by the resin.

Remove the tubes.

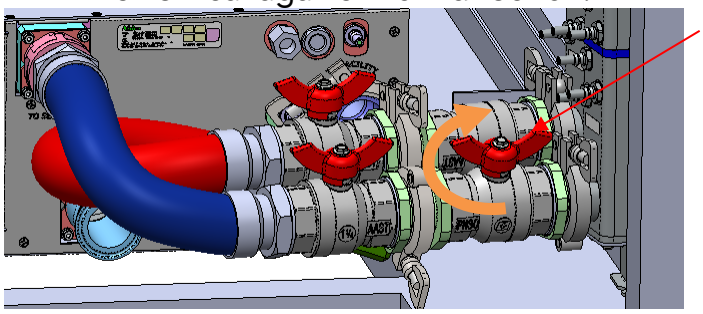


Spacer

Hand-tighten the cap without inserting spacer.

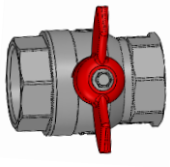


4) Close the 4 ball valves mounted on CDU hose and CDM, rotate the handle until it cannot be turned by hand. When the valve correctly closes, the handle direction is vertical against flow direction.



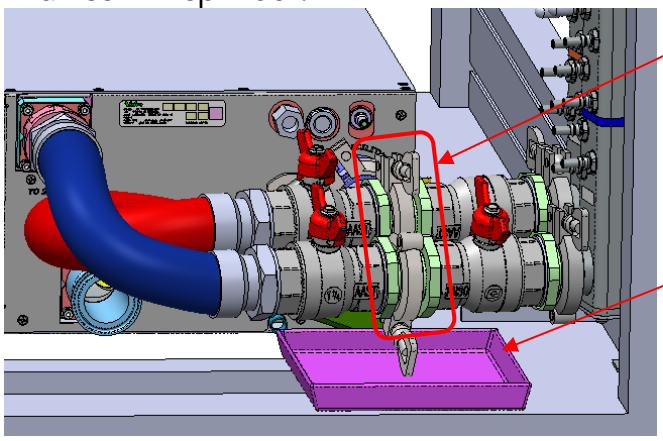
Close 4 ball valves.

Valve Open

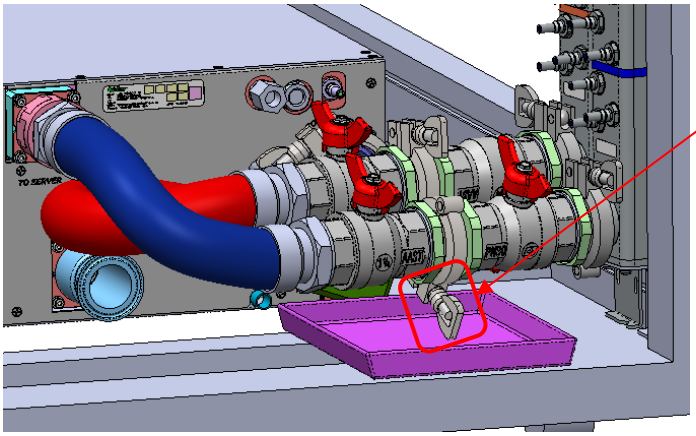


Valve Close

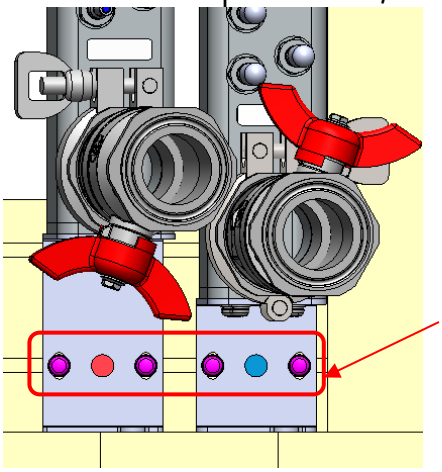
5) Put the pan under the sanitary clamps because the coolant accumulated in the ball valves will spill out.

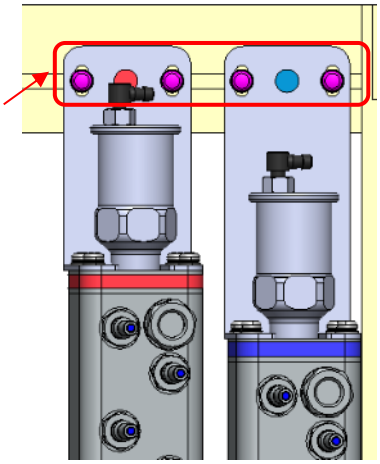


6) Loosen the screw of the sanitary clamps slowly and drain the spilled coolant into the pan until spillage stops. After that, remove the clamp and dethatch the hoses of CDU.

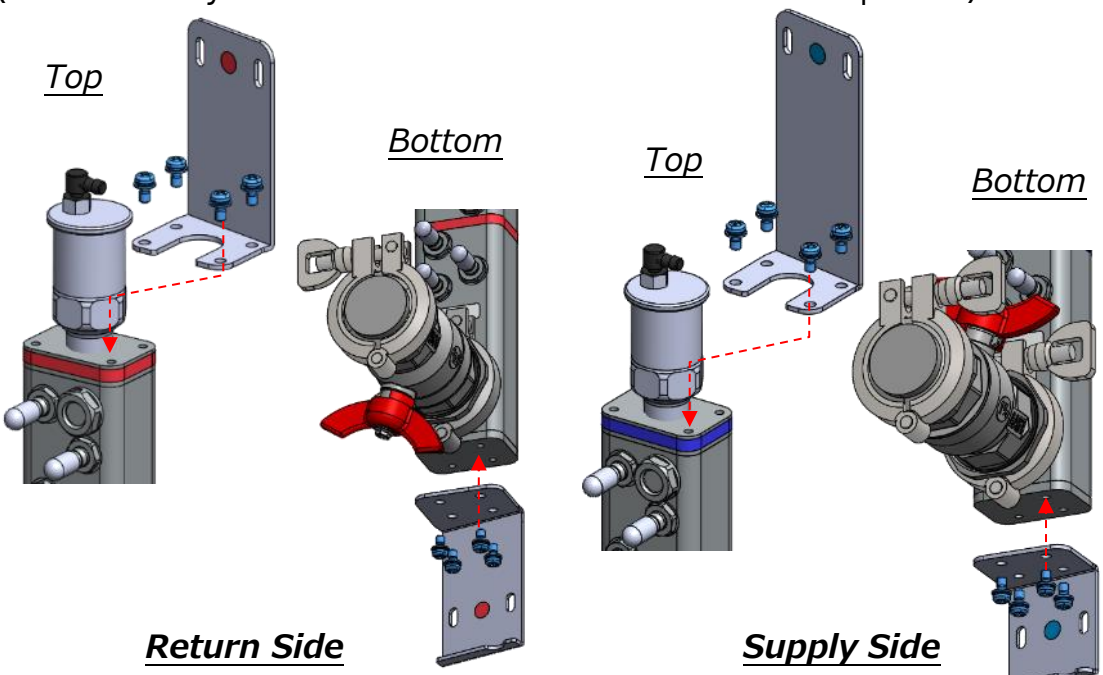


7) Hold down CDM in order to prevent falling down and loosen the screws on bottom and top brackets, and remove CDM.



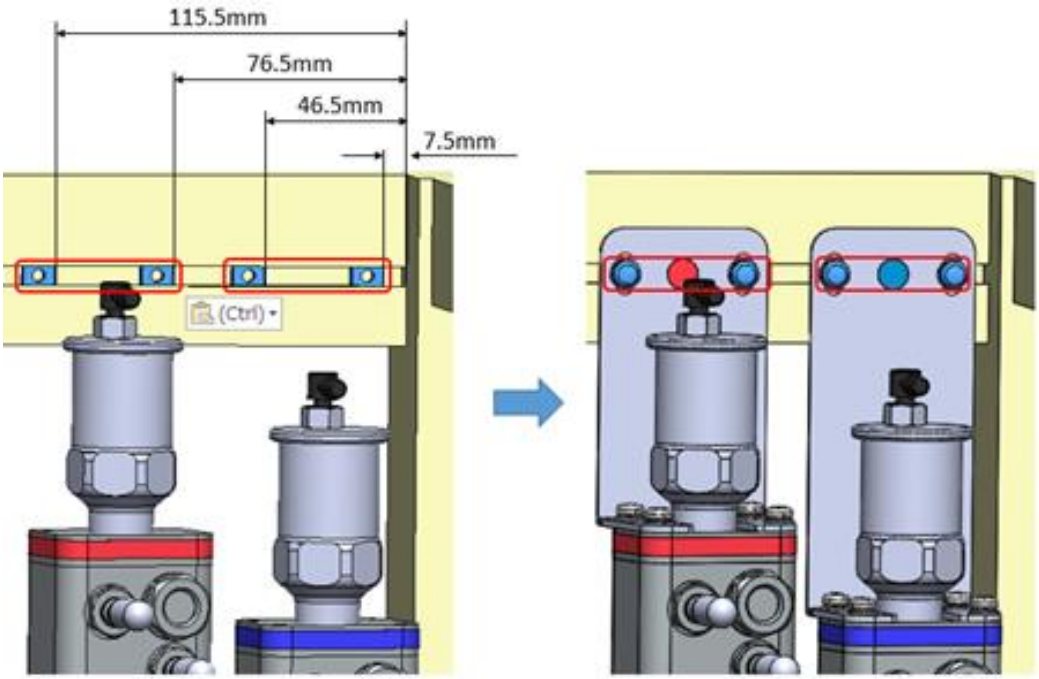


8) Install the new bracket to the new manifold body based on the following figure. (Manifold body and the brackets are not assembled at shipment.)

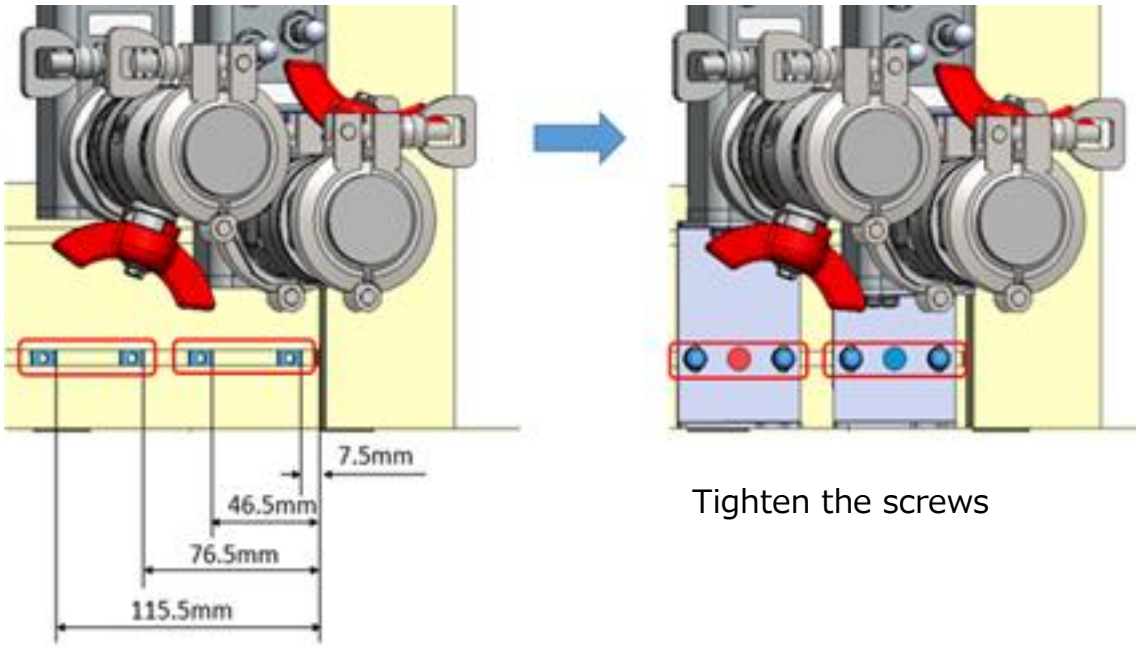


Screws(M5xL10) are packed in the CDM package.

9) Adjust the frame nuts position based on the figure below. Install the new CDM with blue labels and tightening the screws at first. After that, install the CDM with red labels. (Screws are NOT packed in the CDM package.)



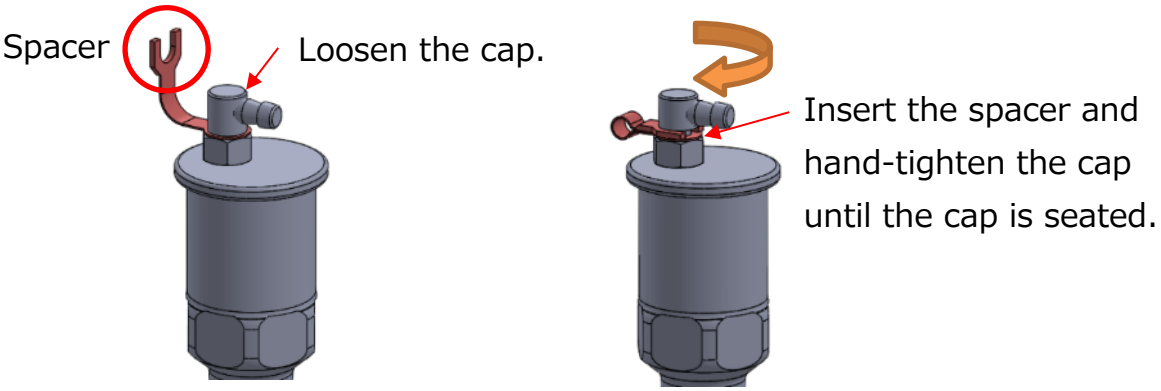
Locate the frame nuts. Tighten the screws.



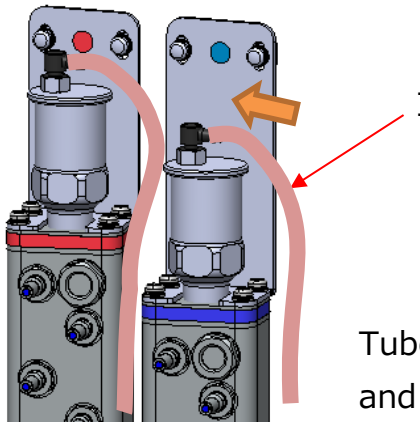
Locate the frame nuts.

Tighten the screws

10) Loosen the caps on the air vents once. Insert the spacer between the cap and the air vent body and hand-tighten the cap until the cap is seated in order to keep the adequate space which the air vent works well. The excessive torque causes the cap damage because the cap is made by the resin.

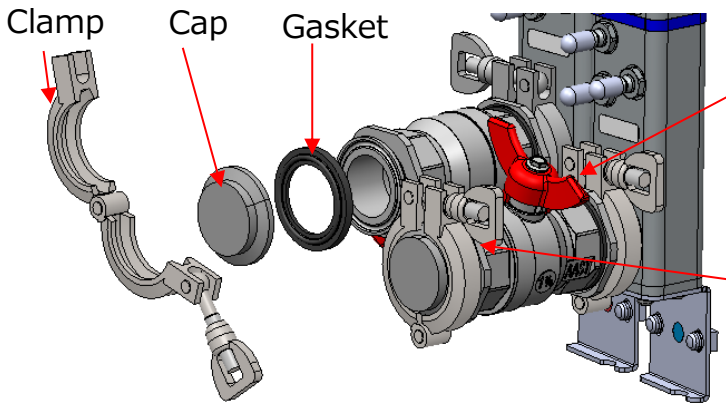


11) Insert the drain tube to the air vent because the coolant will blow off from air vent. The drain tube should be fixed anywhere and connected to the drain.



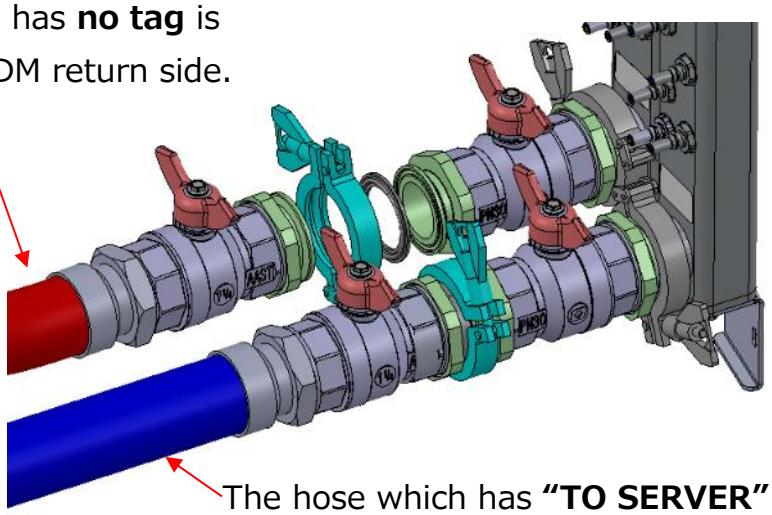
12) Confirm that the ball valve is closed. If the ball valve is not firmly closed, close the valve and prepare the pan because the coolant might spill when the cap is removed. Detach the sanitary cap and gasket by loosening the screw of sanitary

clamp.



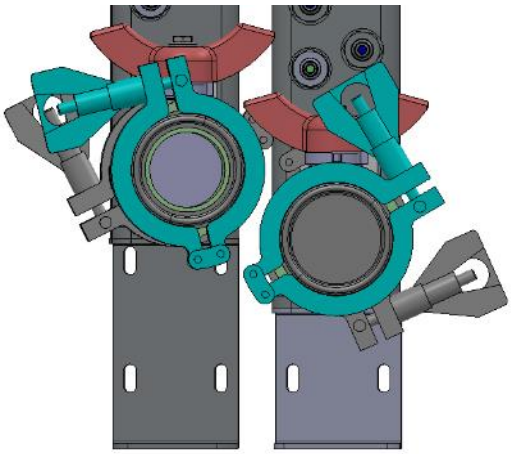
13) Connect CDM and CDU hoses with the gasket and hand-tighten the wing nut on the sanitary clamp. (Tightening torque: approx. 3N・m)

The hose which has **no tag** is connected to CDM return side.

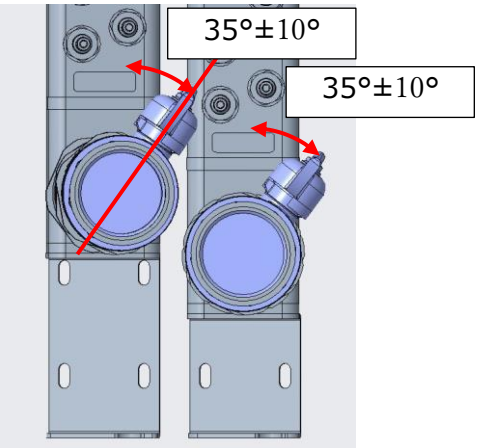


The hose which has **“TO SERVER” tag** is connected to CDM supply side.

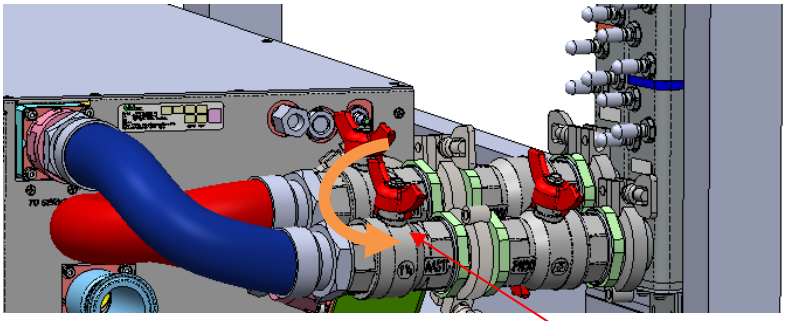
Recommended orientation of the clamps is like as the right figure.



Recommended orientation of the CDU hose valve is like as the right figure.
To check no interference of valve with server or rack door.

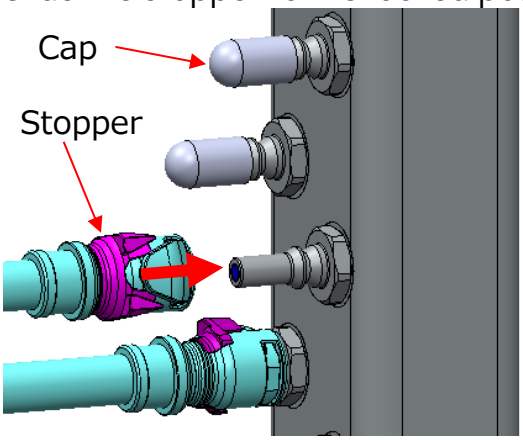


14) Open the ball valves on CDU and CDM.



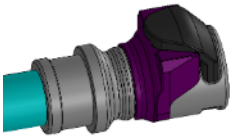
Open 4 ball valves.

15) Remove the caps on the quick coupling plugs in order from the bottom and connect the tubes until the latch on the quick coupling click.
Slide the stopper to the locked position.



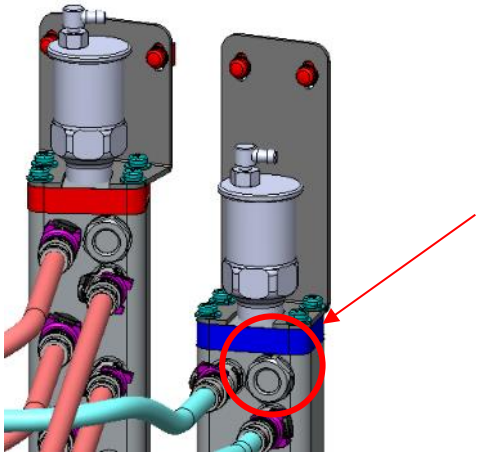
Remove the cap.
Connect the tube.
Slide the stopper to the locked position.

Stopper
Unlock Position



Stopper
Lock Position

16) Fill the coolant following the chapter 6.8 until the sight glass on CDM supply is filled by the coolant.



17) Power on CDU and confirm that there is no error, then CDU is available.

7 Troubleshooting

This section describes troubleshooting of CDU in operation as follows.

7.1 Troubleshooting in case of receiving SNMP Trap

This part is troubleshooting in case of receiving SNMP Trap. If SNMP Trap is sent from the CDU, please check the Trap ID and notification in trap massage. Then please check the user action of receiving Trap ID as follows. If the SNMP Trap cannot be received regardless of the proper network setting of the CDU, please check the network setting such as firewall. If the error cannot be resolved, please contact your seller.

7.1.1 Warning Trap

Trap ID	**500**	Notification	Temperature (From Sever) fall under warning level.
User Action	Check whether there are the following abnormalities. 1) Liquid temperature of primary supply is too low. 2) Liquid flow rate of primary side is too high. 3) Check the valve works normally. (If temperature difference of liquid temp. to server and dew point is under 5°C, the duty should be under 100%.) If operation mode is “Manual”, check that the Flow CTL valve duty is correctly set.		

Trap ID	**501**	Notification	Temperature (From Server) exceeded warning level.
User Action	Check whether there are the following abnormalities. 1) Liquid temperature of primary supply is too high. 2) Liquid flow rate of primary side is too low. 3) Liquid flow rate of secondary side is too low. 4) Heat load from the cooling target is too high.		

Trap ID	**504**	Notification	Temperature (To Server) fall under warning level.
User Action	Check whether there are the following abnormalities. 1) Liquid temperature of primary supply is too low. 2) Liquid flow rate of primary side is too high. 3) Check the Flow CTL valve works normally. (If temperature difference of liquid temp. to server and dew point is under 5°C, the duty should be under 100%.) If operation mode is “Manual”, check that the valve duty is correctly set.		

Trap ID	**505**	Notification	Temperature (To Server) exceeded warning level.
User Action	Check whether there are the following abnormalities. 1) Liquid temperature of primary supply is too high. 2) Liquid flow rate of primary side is too low. 3) Liquid flow rate of secondary side is too low. 4) Heat load from the cooling target is too high.		

Trap ID	508	Notification	Temperature (From Facility) fall under warning level.
User Action	Check whether liquid temperature of primary supply is too low.		

Trap ID	509	Notification	Temperature (From Facility) exceeded warning level.
User Action	Check whether liquid temperature of primary supply is too high.		

Trap ID	512	Notification	Temperature (To Facility) fall under warning level.
User Action	Check whether there are the following abnormalities. 1) Liquid flow rate of primary side is too high. 2) Heat load from the cooling target is too low.		

Trap ID	513	Notification	Temperature (To Facility) exceeded warning level.
User Action	Check whether there are the following abnormalities. 1) Liquid flow rate of primary side is too low. 2) Heat load from the cooling target is too high.		

Trap ID	516	Notification	Pressure (Server) fall under warning level.
User Action	1) Check whether the Pump setting (target flow rate or duty) is correct. 2) If the liquid level is low, inject the coolant. 3) If the Pump has any error, exchange the Pump Unit.		

Trap ID	517	Notification	Pressure (Server) exceeded warning level.
User Action	1) Check that the secondary plumbing is correctly connected. (The ball valves fully open, there is no kink in the hoses.) 2) If the liquid temperature (from server / to server) is too high (>70°C), check the flow rate (server) and primary side condition are adequate.		

Trap ID	520	Notification	Pressure (Facility) fall under warning level.
User Action	1) Check whether the primary facility operate correctly. 2) Check that the primary plumbing is correctly connected. (The any valves fully open, there is no kink in the hoses and no clogging of a strainer.)		

Trap ID	521	Notification	Pressure (Facility) exceeded warning level.
User Action	1) Check whether the primary facility operate correctly. 2) Check whether the primary plumbing is correctly connected. (The any valves fully open, there are no kink in the hoses and no clogging of a strainer.)		

Trap ID	524	Notification	Flow Rate (Server) fall under warning level.
User Action	1) Check whether the secondary plumbing is correctly connected. (The any Valves fully open, there is no kink in the hoses.) 2) If the Pump status is NG, exchange the Pump Unit. 3) If the Control Unit status is NG, exchange the Control Unit.		

Trap ID	525	Notification	Flow Rate (Server) exceeded warning level.
User Action	1) Check whether the secondary plumbing is correctly connected. 2) Check that the pump setting is set to the target flow rate.		

Trap ID	528	Notification	Flow Rate (Facility) fall under warning level.
User Action	1) Check whether the primary facility operate correctly. 2) If operation mode is Manual, check whether flow control Valve duty is correct.		

Trap ID	529	Notification	Flow Rate (Facility) exceeded warning level.
User Action	1) Check whether the primary facility operate correctly.		

7.1.2 Alert Trap

Trap ID	502	Notification	Temperature (From Server) fall under alert level.
User Action	Check whether there are the following abnormalities. 1) Liquid temperature of primary supply is too low. 2) Liquid flow rate of primary side is too high. 3) Check the Flow CTL Valve works normally. (If temperature difference of liquid temp. to server and dew point is under 5°C, the duty should be under 100%.) If operation mode is “Manual”, check that the Valve duty is correctly set.		

Trap ID	503	Notification	Temperature (From Server) exceeded alert level.
User Action	Check whether there are the following abnormalities. 1) Liquid temperature of Primary supply is too high. 2) Liquid flow rate of Primary side is too low. 3) Liquid flow rate of secondary side is too low. 4) Heat load from the cooling target is too high.		

Trap ID	506	Notification	Temperature (To Server) fall under alert level.
User Action	Check whether there are the following abnormalities. 1) Liquid temperature of primary supply is too low. 2) Liquid flow rate of primary side is too high. 3) Check the Flow CTL Valve works normally. (If temperature difference of liquid temp. to server and dew point is under 5°C, the duty should be under 100%.) If operation mode is “Manual”, check that the Valve duty is correctly set.		

Trap ID	507	Notification	Temperature (To Server) exceeded alert level.
User Action	Check whether there are the following abnormalities. 1) Liquid temperature of primary supply is too high. 2) Liquid flow rate of primary side is too low. 3) Liquid flow rate of secondary side is too low. 4) Heat load from the cooling target is too high.		

Trap ID	510	Notification	Temperature (From Facility) fall under alert level.
User Action	Check whether liquid temperature of primary supply is too low.		

Trap ID	511	Notification	Temperature (From Facility) exceeded alert level.
User Action	Check whether liquid temperature of primary supply is too high.		

Trap ID	514	Notification	Temperature (To Facility) fall under alert level.
User Action	Check whether there are the following abnormalities. 1) Liquid flow rate of Primary side is too high. 2) Heat load from the cooling target is too low.		

Trap ID	515	Notification	Temperature (To Facility) exceeded alert level.
User Action	Check whether there are the following abnormalities. 1) Liquid flow rate of Primary side is too low. 2) Heat load from the cooling target is too high.		

Trap ID	518	Notification	Pressure (Server) fall under alert level.
User Action	1) Check whether the Pump setting (target flow rate or duty) is correct. 2) If the liquid level is low, inject the coolant. 3) If the Pump has any error, exchange the Pump Unit.		

Trap ID	519	Notification	Pressure (Server) exceeded alert level.
User Action	1) Check that the secondary plumbing is correctly connected. (The ball valves fully open, there is no kink in the hoses.) 2) If the liquid temperature (from server / to server) is too high (>70°C), check the flow rate (server) and primary side condition are adequate.		

Trap ID	522	Notification	Pressure (Facility) fall under alert level.
User Action	1) Check whether the primary facility operate correctly. 2) Check that the primary plumbing is correctly connected. (The any Valves fully open, there is no kink in the hoses and no clogging of a strainer.)		

Trap ID	523	Notification	Pressure (Facility) exceeded alert level.
User Action	1) Check whether the primary facility operate correctly. 2) Check whether the primary plumbing is correctly connected. (The any Valves fully open, there are no kink in the hoses and no clogging of a strainer.)		

Trap ID	526	Notification	Flow Rate (Server) fall under alert level.
User Action	1) Check whether the secondary plumbing is correctly connected. (The any Valves fully open, there is no kink in the hoses.) 2) If the Pump status is NG, exchange the Pump Unit. 3) If the Control Unit status is NG, exchange the Control Unit.		

Trap ID	527	Notification	Flow Rate (Server) exceeded alert level.
User Action	1) Check whether the secondary plumbing is correctly connected. 2) Check whether the Pump setting (target flow rate or duty) is correct.		

Trap ID	530	Notification	Flow Rate (Facility) fall under alert level.
User Action	1) Check whether the primary facility operate correctly. 2) If operation mode is Manual, check whether flow control Valve duty is correct.		

Trap ID	531	Notification	Flow Rate (Facility) exceeded alert level.
User Action	Check whether the primary facility operate correctly.		

Trap ID	550	Notification	Power Top error.
User Action	1) Check whether the AC power cable is correctly inserted. 2) Check whether the Power Supply Unit is correctly inserted to CDU. 3) Exchange the Power Supply Unit in case the Power Supply Unit doesn't work properly.		

Trap ID	551	Notification	Power Bottom error.
User Action	1) Check whether the AC power cable is correctly inserted. 2) Check whether the Power Supply Unit is correctly inserted to CDU. 3) Exchange the Power Supply Unit in case the Power Supply Unit doesn't work properly.		

Trap ID	552	Notification	Pump Left error.
User Action	1) Stop operation of Pump that is "NG" and restart operation with PWM Duty 10% in Manual mode. 2) If the liquid level is low, inject the coolant. (The Pump will automatically stop if coolant doesn't sufficiently exist in the Pump) 3) Exchange the Pump Unit.		

Trap ID	553	Notification	Pump Right error.
User Action	1) Stop operation of Pump that is "NG" and restart operation with PWM Duty 10% in Manual mode. 2) If the liquid level is low, inject the coolant. (The Pump will automatically stop if coolant doesn't sufficiently exist in the Pump) 3) Exchange the Pump Unit.		

Trap ID	571	Notification	Flow CTL Valve Left error.
User Action	If the servers are in operation, stop the operation of the servers. Then shut down the CDU safely and remove AC power supply. After that, connect AC power supply again after LED of Power Supply Unit turned off.		

Trap ID	572	Notification	Flow CTL Valve Right error.
User Action	If the servers are in operation, stop the operation of the servers. Then shut down the CDU safely and remove AC power supply. After that, connect AC power supply again after LED of Power Supply Unit turned off.		

Trap ID	573	Notification	Control Unit error.
User Action	1) Check Control Unit that is “NG” is inserted to CDU properly. 2) Exchange the Control Unit.		

Trap ID	574	Notification	Sensor Module error.
User Action	If the servers are in operation, stop the operation of the servers. Then shut down the CDU safely and remove AC power supply. After that, connect AC power supply again after LED of Power Supply Unit turned off.		

Trap ID	575	Notification	Leak Detection error.
User Action	Liquid leakage or dew condensation is detected in the CDU cabinet. 1) If liquid temperature from facility is lower than dew point, improve the facility equipment condition. 2) If the servers are in operation, stop the operation of the servers. Then stop operation of the CDU the case the CDU keeps operation, and please contact your seller.		

Trap ID	576	Notification	Humidity sensor error.
User Action	If the servers are in operation, stop the operation of the servers. Then shut down the CDU safely and remove AC power supply. After that, connect AC power supply again after LED of Power Supply Unit turned off. To check the place of sensor in 7.2.8		

Trap ID	577	Notification	Liquid level (OK) error.
User Action	The coolant level on the server side in the reservoir tank is slightly low. This is within the allowable range for the CDU operation. This error is cleared by coolant injection although CDU can be normally running until liquid level become “Low”.		

Trap ID	578	Notification	Liquid level (low) error.
User Action	1) The coolant level on the server side in the reservoir tank is below the limit value. Inject the coolant immediately until liquid level become full. 2) If the servers are in operation, stop the operation of the servers. Then shut down the CDU safely and remove AC power supply. After that, connect AC power supply again after LED of Power Supply Unit turned off.		

Trap ID	579	Notification	Liquid leak (External ch1) error.
User Action	Leakage detection sensor # 1 outside the CDU detects water leakage. Check the leakage condition around the external leak sensor. If the servers are running, stop the servers. After that, stop CDU. The user setting determine whether the pump operation continues or stops when this error occurs.		

Trap ID	580	Notification	Liquid leak (External ch2) error.
User Action	Leakage detection sensor #2 outside the CDU detects water leakage. Check the leakage condition around the external leak sensor. If the servers are running, stop the servers. After that, stop CDU. The user setting determine whether the pump operation continues or stops when this error occurs.		

Trap ID	585	Notification	Memory error.
User Action	1) Download log files as needed. Then try to clear log files saved in the CDU. 2) If the servers are operating, stop the operation of the servers. Then shut down the CDU safely and remove AC power supply. After that, connect AC power supply again after LED of Power Supply Unit turned off.		

Trap ID	586	Notification	Condensation may occur.
User Action	Improve the facility equipment condition.		

7.2 Troubleshooting in case detected faulty incident in operation

This part is the troubleshooting in case the CDU is detected faulty incidents in operation.
Please check the user action of faulty incident the CDU is detected as follows.
If the error cannot be resolved, please contact your seller.

7.2.1 User Interface

Incident	Indicated CDU Status is “Memory Error” (Also CDU will send Trap ID: 585)
User Action	1) Download log files as needed. Then try to clear log files saved in the CDU. 2) If the servers are in operation, stop the operation of the servers. Then shut down the CDU safely and remove AC power supply. After that, connect AC power supply again after LED of Power Supply Unit turned off.

Incident	LCD of the touch screen does not work (Not displayed anything)
User Action	If the servers are in operation, stop the operation of the servers. Then shut down the CDU safely and remove AC power supply. After that, connect AC power supply again after LED of Power Supply Unit turned off. *In case Web I/F can be accessed via LAN, the CDU can be operated from Web I/F continuously.

Incident	Touch screen does not work properly (You can’t swipe tab or push any button)
User Action	If the servers are in operation, stop the operation of the servers. Then shut down the CDU safely and remove AC power supply. After that, connect AC power supply again after LED of Power Supply Unit turned off.

Incident	User interface does not display properly
User Action	1) Reload the current tab by clicking tab menu. 2) If the servers are in operation, stop the operation of the servers. Then shut down the CDU safely and remove AC power supply. After that, connect AC power supply again after LED of Power Supply Unit turned off.

7.2.2 Power Supply Unit

Incident	Indicated CDU Status: “ALERT: Check device status” or “ALERT: Check device and sensor” And indicated Power Top or bottom is “NG” (In case SNMP Trap is enable, also CDU will send Trap ID: 550 or 551)
User Action	1) Check whether the AC power cable is correctly inserted. 2) Check whether the power is correctly inserted to CDU. 3) Exchange the Power Supply Unit when the Power Supply Unit doesn’t work properly.

Incident	LED of Power Supply Unit is yellow
User Action	1) Check the condition of Power Supply Unit such as ambient temperature and the blockage of PSU exhaust. 2) Exchange the Power Supply Unit when the Power Supply Unit doesn’t work properly.

7.2.3 Pump Unit

Incident	Indicated CDU Status is “ALERT: Check device status” or “Check device and sensor”. And indicated Pump Left or Right is “NG” (In case SNMP Trap is enable, also CDU will send Trap ID: 552 or 553)
User Action	2) If the liquid level is low, inject the coolant. (The pump will automatically stop if coolant doesn’t sufficiently exist in the pump) 3) Exchange the Pump Unit.

Incident	Pump operating with heavy noise
User Action	**The case Pump Left and Right are both “OK”** Keep current operation. (*) *Sound noise will increase when some air bubbles are contained in coolant. If the pump continues to run for a while, the noise will return to normal. But if Liquid level is “Low”, it needs to inject the coolant. **The case either Pump Left or Right is “NG”** 1) Stop operation of Pump that is “NG” and restart operation with PWM Duty 10% in Manual mode. 2) If the liquid level is low, inject the coolant. (The pump will automatically stop if coolant doesn’t sufficiently exist in the pump) 3) Exchange the Pump Unit.

7.2.4 Valve Unit

Incident	Indicated CDU Status is “ALERT: Check device status” or “ALERT: Check device and sensor” And indicated Flow CTL Valve Left or Right is “NG” (In case SNMP Trap is enable, also CDU will send Trap ID: 572 or 573)
User Action	If the servers are in operation, stop the operation of the servers. Then shut down the CDU safely and remove AC power supply. After that, connect AC power supply again after LED of Power Supply Unit turned off.

7.2.5 Control Unit

Incident	Indicated CDU Status is “ALERT: Control Unit Left is NG” or “ALERT: Control Unit Right is NG” And indicated Control Unit is “NG” (In case SNMP Trap is enable, also CDU will send Trap ID: 573)
User Action	1) Check Control Unit that is “NG” is inserted to CDU properly. 2) Exchange the Control Unit.

7.2.6 Sensor Module

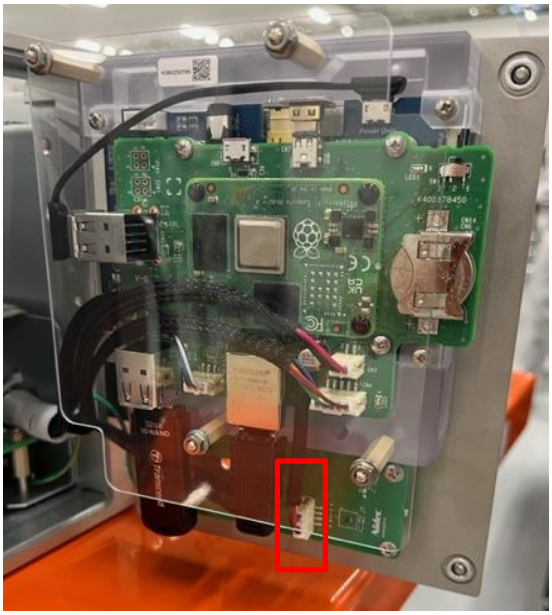
Incident	Indicated CDU Status is “ALERT: Check device status” or “ALERT: Check device and sensor” And indicated Sensor Module is “NG” (In case SNMP Trap is enable, also CDU will send Trap ID: 574)
User Action	If the servers are in operation, stop the operation of the servers. Then shut down the CDU safely and remove AC power supply. After that, connect AC power supply again after LED of Power Supply Unit turned off.

7.2.7 Leak Detection

Incident	Indicated CDU Status is “ALERT: Check device status” or “ALERT: Check device and sensor” (In case Emergency Stop is disable) “Emergency Stopped” (In case Emergency Stop is enable) And indicated Leak Detection is “NG” (In case SNMP Trap is enable, also CDU will send Trap ID: 575)
User Action	Liquid leakage or dew condensation is detected in the CDU cabinet. 1) If liquid temperature from facility is lower than dew point, modify the facility equipment condition. 2) If the servers are in operation, stop the operation of the servers. Then shut down the CDU, and please contact your seller.

7.2.8 Humidity Sensor

Incident	Indicated CDU Status is “ALERT: Check device status” or “ALERT: Check device and sensor” And indicated Humidity Sensor is “NG” (In case SNMP Trap is enable, also CDU will send Trap ID: 576)
User Action	1) Open the touch screen door and check the cable is connected to Humidity Sensor properly. 2) If the servers are in operation, stop the operation of the servers. Then shut down the CDU safely and remove AC power supply. After that, connect AC power supply again after LED of Power Supply Unit turned off.



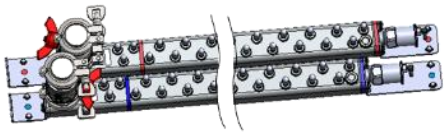
7.2.9 Liquid Level Sensor

Incident	Indicated CDU Status is “ALERT: Check device status” or “ALERT: Check device and sensor” And indicated Liquid Level Sensor is “NG” (In case SNMP Trap is enable, also CDU will send Trap ID: 578)
User Action	1) Check liquid level of reservoir tank from the sight glass on CDU back. If liquid level of reservoir tank is low, inject the coolant into reservoir tank immediately. 2) If the servers are in operation, stop the operation of the servers. Then shut down the CDU safely and remove AC power supply. After that, connect AC power supply again after LED of Power Supply Unit turned off.

8 FRU (Field Repair Unit) List

※If any part other than the following is damaged, all CDU/CDM will be replaced.
Please contact the buyer.

Table 17 FRU (Field Repair Unit) List

Part Number	Description	Appearance/Remark	Hot-swap
CA82027-3714	Pump Unit		OK
CA82027-3710	Power supply Unit		OK
CA82027-3711	Control Unit		OK
CA82027-3712	Injection Fixture	 In case of using, please ask customer (this part is attached to CDU)	OK
CA82027-3713	Coolant		OK
CA82027-3701	CDM (Coolant Distribution Manifold)	 *Not applicable to maintenance parts	NG
CA82027-3704	LCM (Liquid Cooling Module)	 *This is a node-side maintenance part.	NG
CA82027-3705	Tube Assy L300mm	Red・Female-Female x1 Blue・Female-Female x1 *This is a node-side maintenance part.	NG
CA82027-3706	Tube Assy L400mm	Red・Female-Female x1 Blue・Female-Female x1 *This is a node-side maintenance part.	NG

CA82027-3707	Tube Assy L560mm	Red・Female-Female x1 Blue・Female-Female x1 *This is a node-side maintenance part.	NG
CA82027-3708	Tube Assy L500mm	Red・Female-Female x2 *This is a node-side maintenance part.	NG
CA82027-3709	Tube Assy L300mm	Blue・Female-Female x2 *This is a node-side maintenance part.	NG