# User Manual

NovaCool Rear Door Heat Exchanger

# Content

# Part I. Introduction

## Scope of Application

This manual provides comprehensive guidance on the installation, operation, maintenance, and troubleshooting of the **NovaCool RDHx**. It is intended for use by qualified technicians, data center operators, and maintenance personnel. Following this manual ensures optimal performance, reliability, and safety of the equipment.

This product is designed for **indoor** use in data centers and IT environments. It provides **efficient cooling** for rack-mounted IT equipment, helping to maintain optimal operating conditions.

## Copyright & Disclaimer



This document is proprietary information of INOVA DC LLC. and is intended for authorized use only.



Specifications and information in this manual are subject to change without prior notice.

INOVA DC LLC. is not responsible for damages resulting from improper use, modification, or non-compliance with this manual.

## Quality Management & Certifications

The **NovaCool RDHx** is designed and manufactured in compliance with international quality and safety standards:

- **Quality Certification**: ISO 9001
- **Safety Compliance**: UL62368-1
- **Environmental Compliance**: RoHS, REACH
- **Electrical Safety**: CE, FCC Part 15

## Contact Information

For technical support, warranty claims, or general inquiries, please contact:

INOVA DC LLC.

- **Website**: www.inovadc.com
- **Email**: sales@inovadc.com
- **Address**: 8 The Green, Suite R in the City of Dover. Delware. Zip code 19901.

# Part II. Safety Information

## General Safety Warnings

Read this manual thoroughly before installation, operation, or maintenance.

This equipment must be installed and serviced only by trained and qualified personnel.

Failure to follow safety precautions may result in serious **injury, electric shock, or equipment damage**.

Keep this manual **accessible** for future reference.

This equipment is intended for industrial environments only and must not be used in areas **accessible** to children.

The addition of this symbol to a Danger or Warning safety label indicates that an electrical hazard exists which will result in personal injury if the instructions are not followed.

This symbol alerts users to potential personal injury hazards.

Obey all safety messages that follow this symbol to avoid possible injury or death.

The following blocks will appear again in the following chapters. Please pay special attention to those safety notices.

**DANGER**

Danger indicates an imminently hazardous situation which, if not avoided, **will result in** death or serious injury, or equipment damage.

**WARNING**

Warning indicates a potentially hazardous situation which, if not avoided, **can result in** death or serious injury, or equipment damage.

**CAUTION**

Caution indicates a potentially hazardous situation which, if not avoided, **can result in** minor or moderate injury, or equipment damage.

**NOTICE**

Notice addresses practices not related to physical injury including certain environmental hazards, potential damage, or loss of data.

## Electrical Safety Precautions

- This product **must be properly grounded** before operation.
- The unit uses a plug-type disconnect device. Ensure the output sockets remain easily accessible at all times.
- **Disconnect all power sources** before performing power control box maintenance.
- Do not operate the unit with damaged power cords, loose connections, or exposed wiring.
- Power cables should be routed safely to avoid **tripping hazards or mechanical damage**.
- Fuses must only be replaced by qualified personnel using the specified ratings for detailed instructions, please refer to the maintenance guide.
- If dual power inputs are provided, ensure that both inputs are **properly isolated** before servicing.
- This unit should be installed according to local electrical regulations.

## Handling & Installation Safety

- **Heavy Equipment**: This unit may weigh over **200 kg/440 lbs**. Use proper lifting equipment or a team of at least **four trained people** for handling.
- **Positioning**: The unit must be installed **vertically** on a stable, level floor.
- **Tipping hazards**: In handling or removal, ensure the equipment is lifted from the bottom to avoid toppling. When the NovaCool RDHx is installed in an empty rack, the counterweight should be appropriately adjusted to prevent tipping due to an unstable center of gravity.
- Avoid water exposure: The unit must not be exposed to excessive humidity, condensation, or liquid spills.
- **Shock & Vibration**: Avoid installation in high-vibration areas to **prevent structural damage**.

## Operational & Maintenance Safety

- This product is intended for use in data centers. The door cover is not designed to be opened by non-professional personnel and should only be accessed by qualified staff using a dedicated key for maintenance work
- **Moving Parts**: The unit contains **fans and other moving components**—keep hands, clothing, and tools clear during operation.
- **Temperature Hazards**: Some parts may become hot during operation—avoid direct contact.
- Cooling System Precautions:
- Always check for leaks or abnormal pressure fluctuations in the water-cooling system.
  - Use only **manufacturer-approved hoses and fittings**.
  - Do not exceed the **maximum water pressure** of 64.3 psi/ 4.5 bar.
- Emergency Shutdown:

- In case of system failure, immediately power off and disconnect the unit.
- Do not attempt repairs without proper authorization and tools.

✧ Personal Protective Equipment (PPE): Always wear appropriate gloves, eye protection, and safety shoes when handling components.

# Part III. Product Overview

## Product Specifications

The **NovaCool RDHx** is a high-efficiency RDHx designed to provide superior cooling for data centers and high-density IT environments. The following are the key specifications:

- **Maximum Cooling Capacity**: Up to 85kW @ 20°C inlet water temperature, 24°C air supply**.**
- **Available Sizes**: 42U, 48U, 52U, with widths of 600mm and 800mm.
- **Power Supply**: Dual power feed with built-in Automatic Transfer Switch (ATS).
- **Fan Type**: Hot-swappable EC fans, N+1 redundant.
- **Monitoring**: Real-time power supply health, cooling capacity, water temperature, pressure, and flow rate monitoring.
- **Connectivity**: Ethernet, Web Interface, Modbus TCP/IP, BACnet**.**
- **Leak Detection**: Standard leakage sensor with automatic shutoff to prevent water damage.

## Features and Capabilities

The **NovaCool RDHx** incorporates state-of-the-art cooling technology, offering superior thermal management and operational efficiency. The key features include:

- **High-Efficiency Heat Exchange**r: Designed with a proprietary heat exchanger for optimal thermal transfer and maximum cooling efficiency.
- **Optimized Energy Efficiency**: Capable of utilizing high-temperature inlet water to enhance free cooling capabilities, significantly reducing energy consumption and operational costs.
- **Intelligent Fan and Valve Control**: Automatic dynamic adjustment based on real-time load conditions to ensure precise cooling regulation**.**
- **Seamless Maintenance and Serviceability**: Tool-free, hot-swappable fans and controllers allow for effortless servicing without disrupting operations.
- **Enhanced Safety Mechanisms**: Integrated leakage detection and dual power supply redundancy improve system reliability and prevent unexpected failures.
- **Flexible and Modular Design**: Compatible with multiple rack sizes, enabling seamless integration into diverse data center environments.

# Product Part Number Matrix

The complete series of products consists of the door and frame, piping kit, valve kit, commissioning tools, and sensors. Table 1 is a list of standard products that can meet the requirements of most application scenarios. Customers should first select the appropriate model of the door. Then, based on the water and electrical connection points, choose the corresponding water pipes and electrical cables. Depending on performance requirements and regional considerations, different valves and actuators can be selected. Additionally, commissioning tools and other accessories can be configured as needed.

**Table 1. Standard Product List**

| Part Number | Short Description |
|---|---|
| NC1-642WL | 42UX600 Standard Rear Door, Left-hand open. Including Package |
| NC1-648WL | 48UX600 Standard Rear Door, Left-hand open. Including Package |
| NC1-842WL | 42UX800 Standard Rear Door, Left-hand open. Including Package |
| NC1-848WL | 48UX800 Standard Rear Door, Left-hand open. Including Package |
| NC1-642WR | 42UX600 Standard Rear Door, Right-hand open |
| NC1-648WR | 48UX600 Standard Rear Door, Right-hand open |
| NC1-842WR | 42UX800 Standard Rear Door, Right-hand open |
| NC1-848WR | 48UX800 Standard Rear Door, Right-hand open |
| NC1-P38BSPT | Pair of Bottom entry pipes with BSP connector |
| NC1-P38NPT | Pair of Bottom entry pipes with NPT connector |
| NC1-P20BSPT | Pair of Top entry pipes with BSP connector |
| NC1-P20NPT | Pair of Top entry pipes with NPT connector |
| NC1-C19C20UL35 | Feed A and B power cord, top feed. US Region |
| NC1-C19C20UL60 | Feed A and B power cord, bottom feed. US Region |
| NC1-C19C20VDE35 | Feed A and B power cord, top feed. EU Region |
| NC1-C19C20VDE60 | Feed A and B power cord, bottom feed. EU Region |
| NC1-ACTZTU | Actuator Commissioning Tool |
| NC1-ACT | Actuator |
| NC1-VLV63NPT | Valve 6.3m³/h, with 1" NPT |
| NC1-VLV100NPT | Valve 10m³/h, with 1" NPT |
| NC1-VLV63BSPT | Valve 6.3m³/h, with 1" BSP |
| NC1-VLV100BSPT | Valve 10m³/h, with 1" BSP |
| NC1-3VLV63NPT | Valve 6.3m³/h, with 1" NPT |
| NC1-3VLV63BSPT | Valve 6.3m³/h, with 1" BSP |
| NC1-652HW | 600mmX52U Adaptor |
| NC1-852HW | 800mmX52U Adaptor |
| NC1-OPHMI | HMI, commissioning tool. |
| NC1-SEALANT | Sealant |
| NC1-VFSN | VFS kits |
| NC1-VFSB | VFS kits |
| NC1-RPSN | RPS kits with NPT connector |
| NC1-RPSB | RPS kits with BSP connector |

If none of the products in the above table are suitable, please contact sales to confirm compatibility and feasibility. And below is the part number matrix for customized parts.

**Table 2. Customized Door Part Matrix**

| NC1 | - | W | HH | C | A | BB* | CC* |
|---|---|---|---|---|---|---|---|
| NovaCool RDHx | - | Width | Height | Color | Open Direction | Preserved Configuration | |
| | | 6-600mm | 42-42U | B-Black | L-Left Hinge | For software customization | |
| | | ... | 45-45U | W-White | R-Right Hinge | Two digits could be number or characters | |
| | | 8-800mm | 48-48U | G-Gray | | | |
| | | | | S-Steel | | | |
| | | | | M-Mix | | | |
| | | | | … | | | |

Note:

For most of cases, BB, and CC are not included in the PN.

BB is preserved for various software versions. Like changing some factory setting of customize the firmware for some particular customer.

CC is preserved for hardware various versions. Like changing the lock style. etc.

BB will be 00 if CC with particular character.

**Table 3. Customized Component Number Matrix**

| NCC | - | X | #####* |
|---|---|---|---|
| Product Line-Customized Components | - | M-Metal | 00001~99999 |
| | | P-Pipes | 00001~99999 |
| | | D-Special Doors | 00001~99999 |
| | | T-Others | 00001~99999 |

Note:

*Since the product needs to be compatible with the customer's on-site environment and equipment, there are often requirements for additional custom-made parts such as sheet metal covers, piping, and other special structural components. These custom parts will be numbered sequentially, starting from 00001 and continuing up to 99999.

# Label Information

Below is the product label information, which includes the common information of product description in short, rated voltage and current, and cooling capacity. And on top of it is the product part number and product serial number, which is different for each unit.

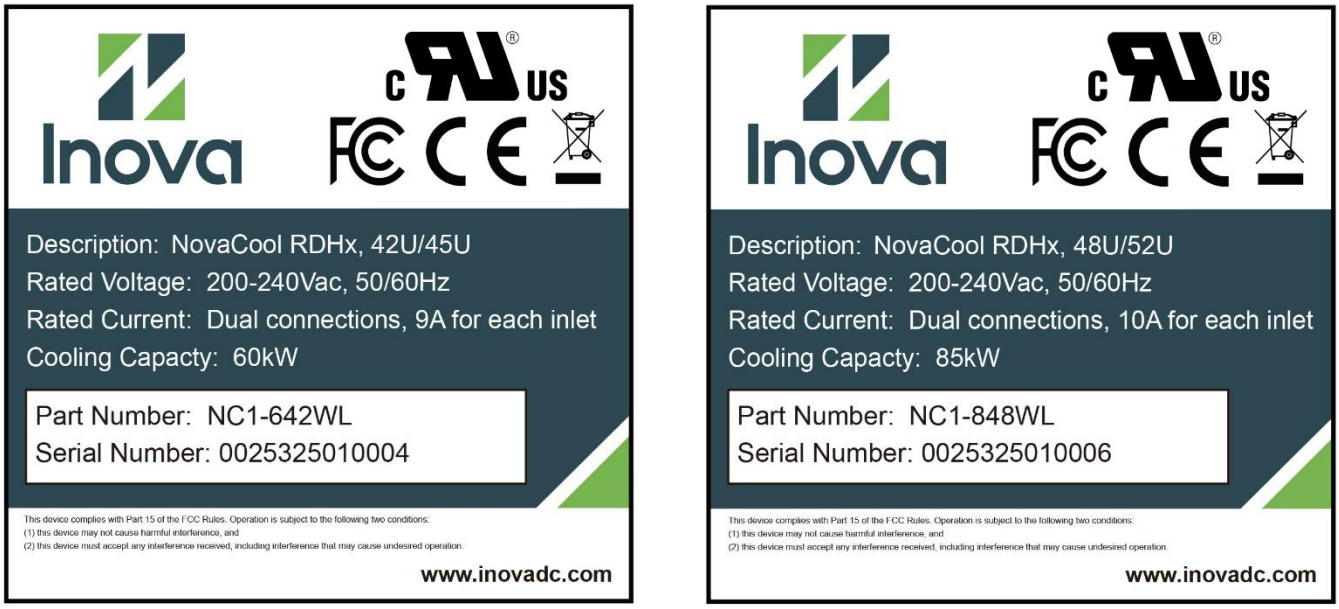



**Figure 1. Typical Product Label**

# Product Dimensions

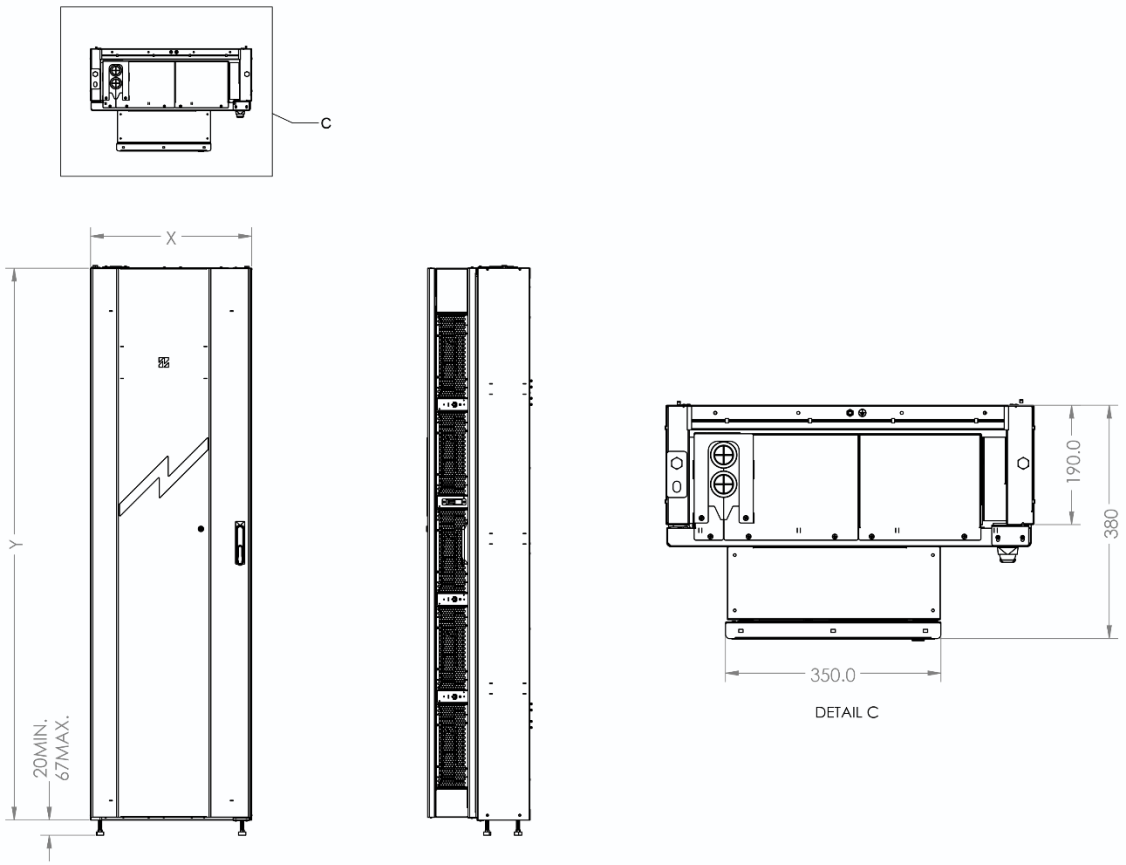



**Figure 2. Schematic Diagram**

**Table 4. Product Dimensions Table**

| Model | | Height (Y) mm(") | Width (X) mm(") | Depth mm(") | Number of Fans | Dry Weight kg(lbs) | Wet Weight kg(lbs) |
|---|---|---|---|---|---|---|---|
| 42U/45U | 600W | 2050(80.7) | 598(23.5) | 380(14.96) | 5 | 152(334) | 165(363) |
| | 700W | | 698(27.5) | 380(14.96) | 5 | 154(339) | 167(368) |
| | 800W | | 798(31.4) | 380(14.96) | 5 | 156(343) | 169(372) |
| 48U/52U | 600W | 2330(91.7) | 598(23.5) | 380(14.96) | 6 | 170(374) | 185(407) |
| | 700W | | 698(27.5) | 380(14.96) | 6 | 178(392) | 193(425) |
| | 800W | | 798(31.4) | 380(14.96) | 6 | 186(410) | 204(449) |

(All models are available in both left- and right-hinged configurations.)

# Components Layout

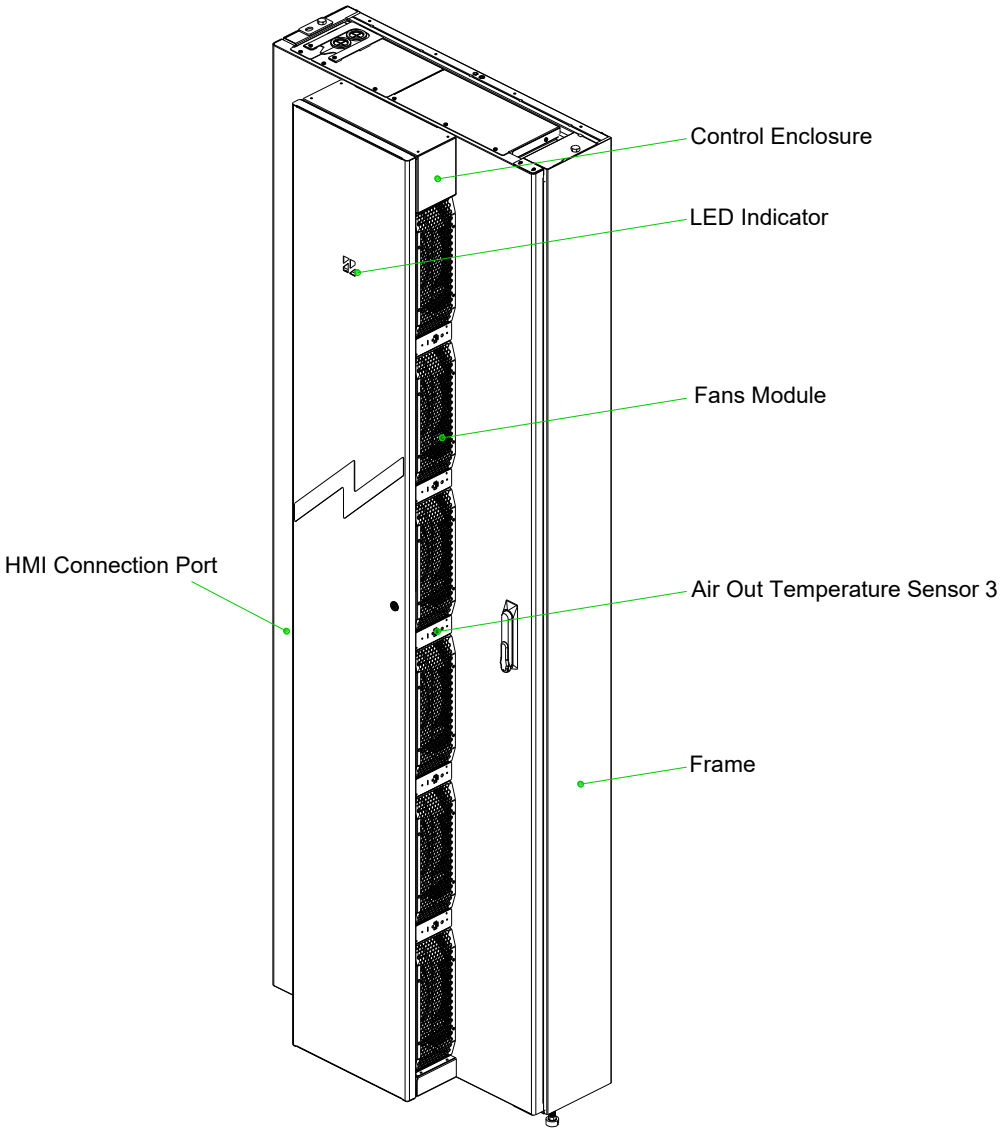



**Figure 3. Components Layout (Front)**

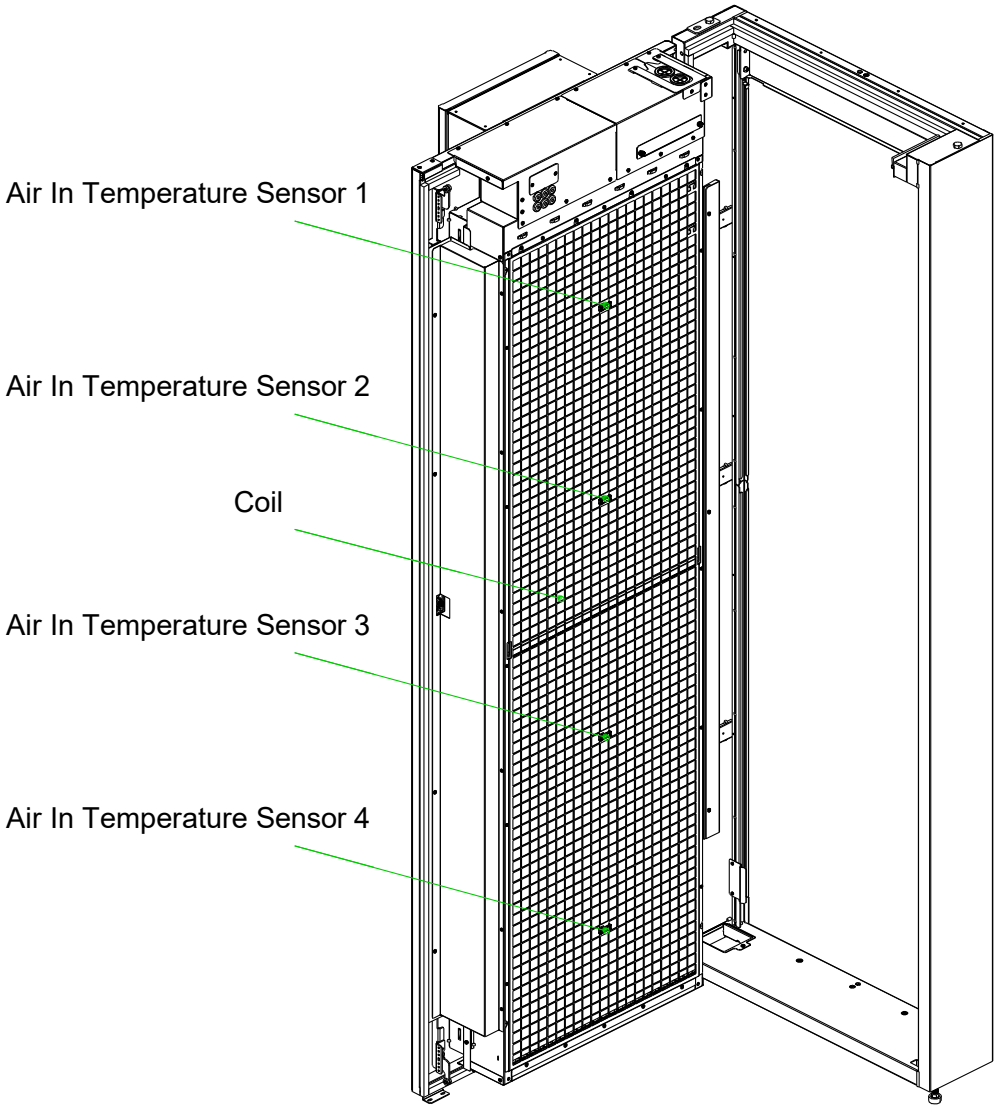



**Figure 4. Component Layout (Rear)**

# Typical Capacity

The cooling capacity of **NovaCool RDHx** varies depending on environmental parameters, inlet water temperature, and IT load conditions. The following table presents typical performance benchmarks:

**Table 5. Capacity Under Typical Working Conditions**

| Inlet water temp | Air temp in cabinet | Cooling capacity | | |
|---|---|---|---|---|
| | | 48U 800W | 48U 600W | 42U 600W/800W |
| ℃ | ℃ | kW | | |
| 20/14 | 55 | 86/100 | 84/98 | 82/97 |
| | 50 | 73/90 | 71/87 | 69/85 |
| | 45 | 60/77 | 58/74 | 56/72 |
| | 40 | 45/63 | 44/61 | 42/59 |

(Performance values are based on laboratory testing and may vary under real-world conditions.)

# Part IV. Tools, Unpacking and Installation

## Tool list

*Tools are not provided.

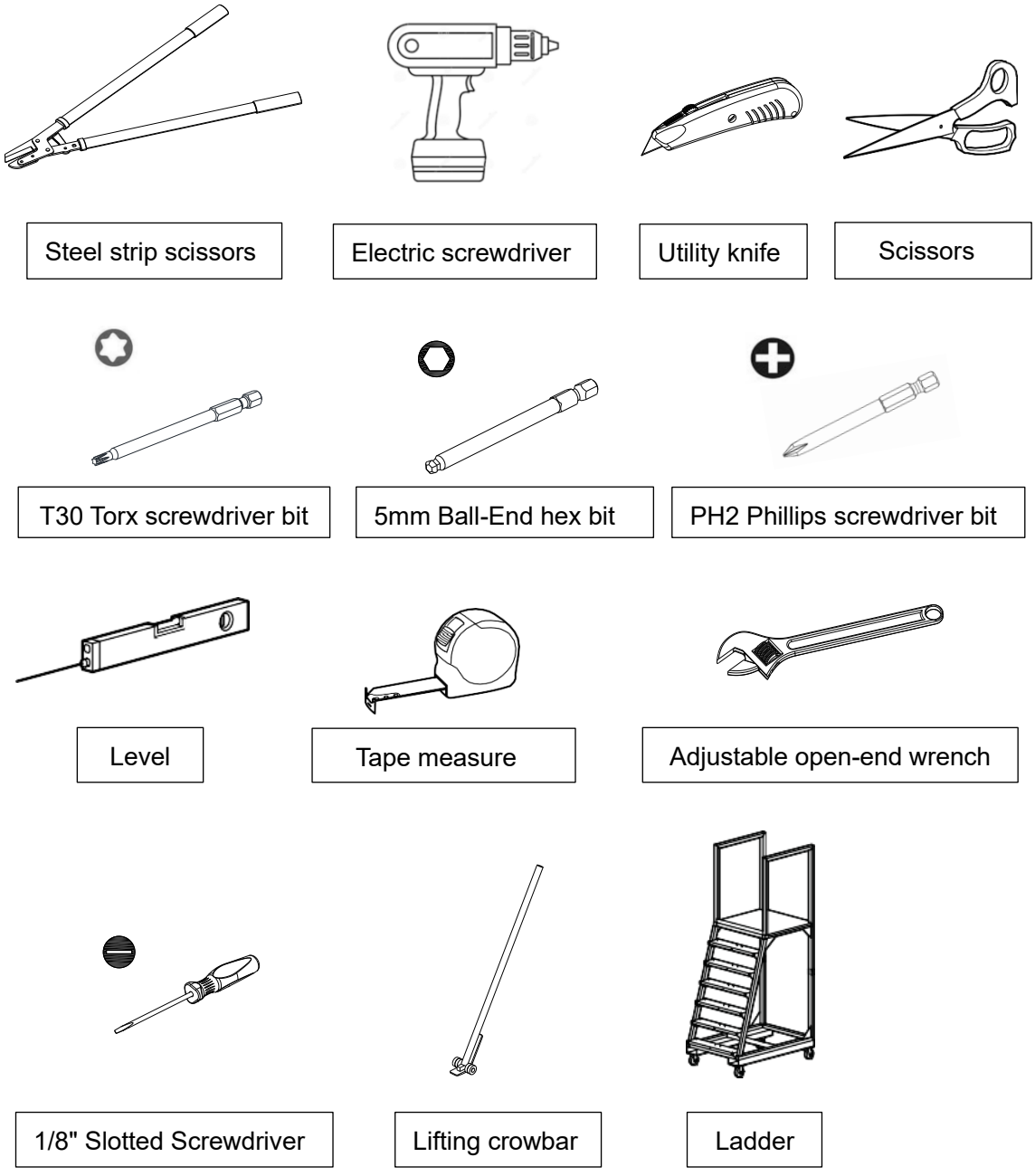



**Figure 5. Tool List**

# Unpacking

**⚠ WARNING**

This product is heavy. Follow all local safety regulations to ensure personnel safety during disassembly, installation, and transportation. If lifting equipment is not available, a minimum of six people is required for manual handling.

***Failure to follow these instructions can result in serious injury, death or equipment damage.***

- Remove the steel strapping and all metal fixing brackets.

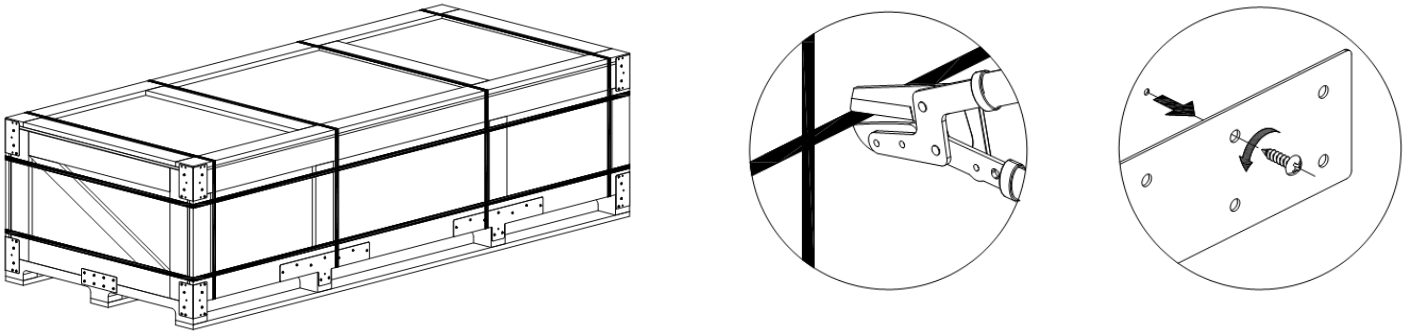


**Figure 6. Unpacking**

- Dismantle wooden box.

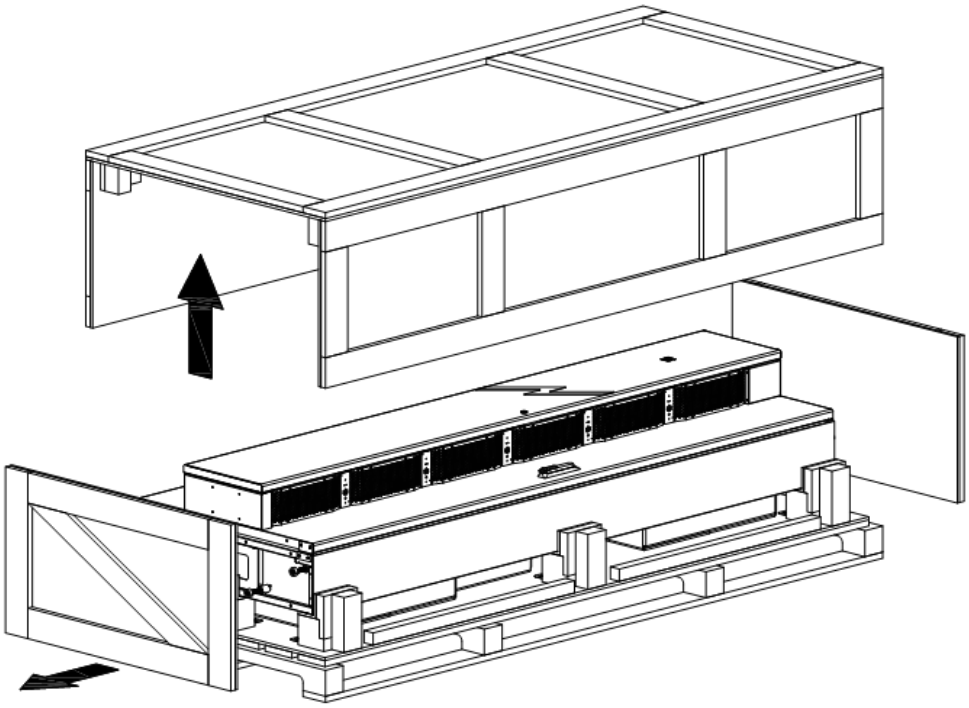


**Figure 7. Unpacking**

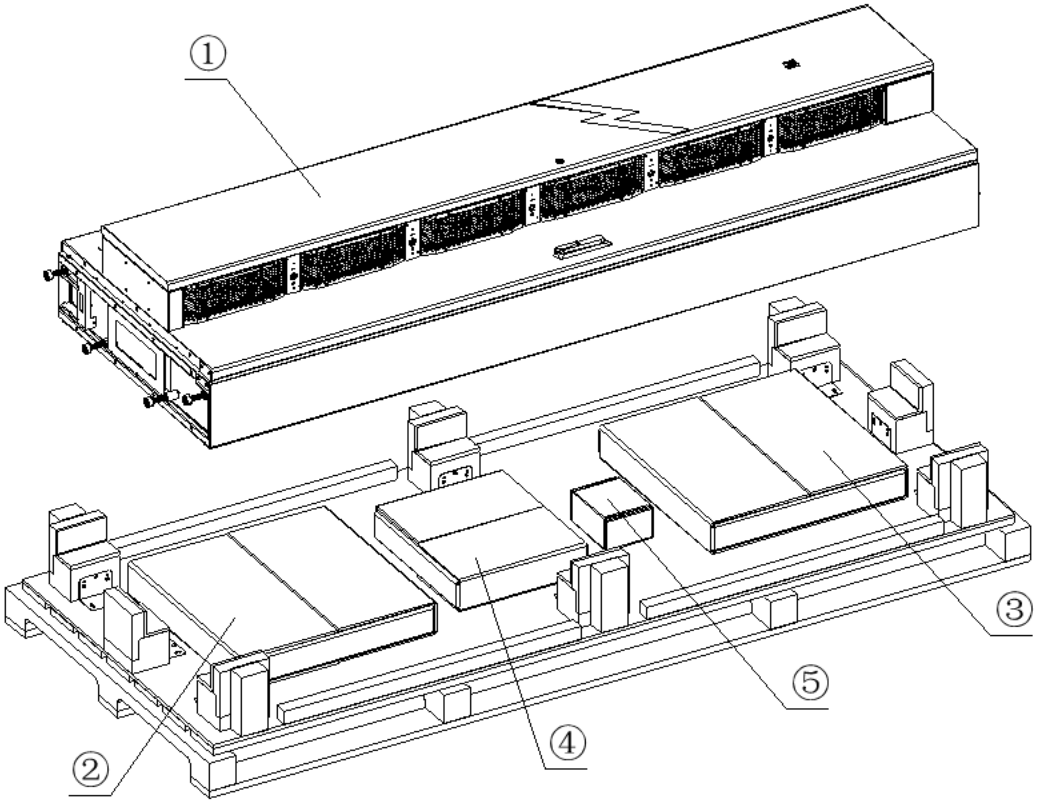



**Table 6. Material List**

| ITEM | Name | Comments | QTY. |
|---|---|---|---|
| 1 | RDHx | / | 1 |
| 2 | Blue Pipe Kit | / | 1 |
| 3 | Red Pipe Kit | / | 1 |
| 4 | Mounting Accessories Kit | Includes:<br>1. Mounting accessories<br>2. Power Cords<br>3. Belimo Ball Valve<br>4. VFS Sensor (Optional)<br>5. RPS Sensor (Optional)<br>6. Fernox LS-X Sealant (Optional) | 1 |
| 5 | Commissioning Tool | Optional | 1 |

## Pre-Installation Checks

- Ensure that the floor can take the weight of the unit.
- Ensure any MAP tiles or grommets are installed, or that any floor tiles are cut as appropriate.
- Check that the working area is free of hazards.
- The rack front door should be correctly closed to avoid damage when tipping.

## Floor Cut-Outs

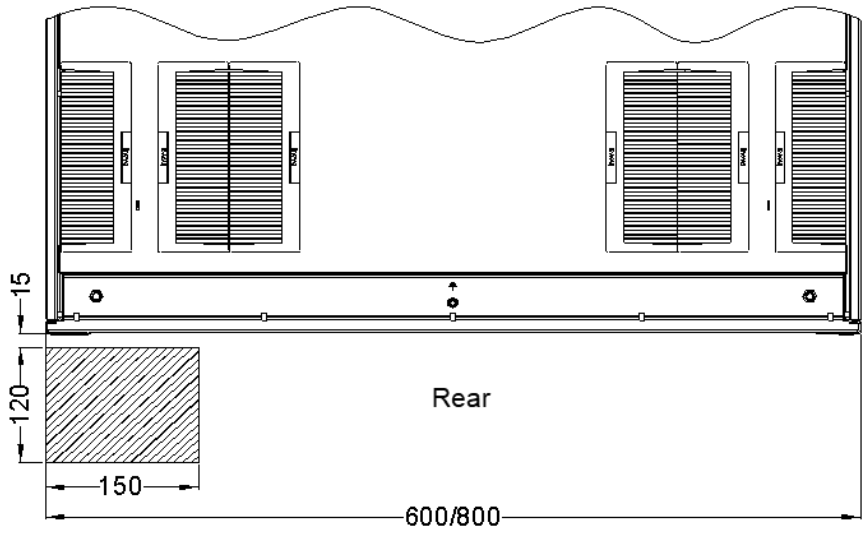



**Figure 8. Floor Cut-Outs**

- When using bottom-fed RDHx hoses, they must pass through designated openings on the floor.
- A **150mm × 120mm** slot should be cut on the floor accommodate the hoses.
- The hoses may move vertically within the slot as the RDHx unit is opened and closed. Ensure that all cut edges are smooth and free of sharp surfaces to prevent potential damage to the hoses.
- Additional holes may also be cut within the rack footprint to allow network cables etc. to pass through. Reference should be made to the positions of cable trays within the rack when cutting access holes.

# Installation

| NOTICE |
| --- |
| • Never place the front cover (fan side) on the ground.<br>• Ensure the door lock is engaged during transport.<br>• If fan removal is necessary to reduce door weight during transportation, retain the fan module that includes the door lock.<br>• When the RDHx is ready to stand up, the door frame must touch the ground first (if the fan touches the ground first, it will cause deformation). |

➢ Install the fixing brackets with the Torx Screws. Torque is 10 N·m.

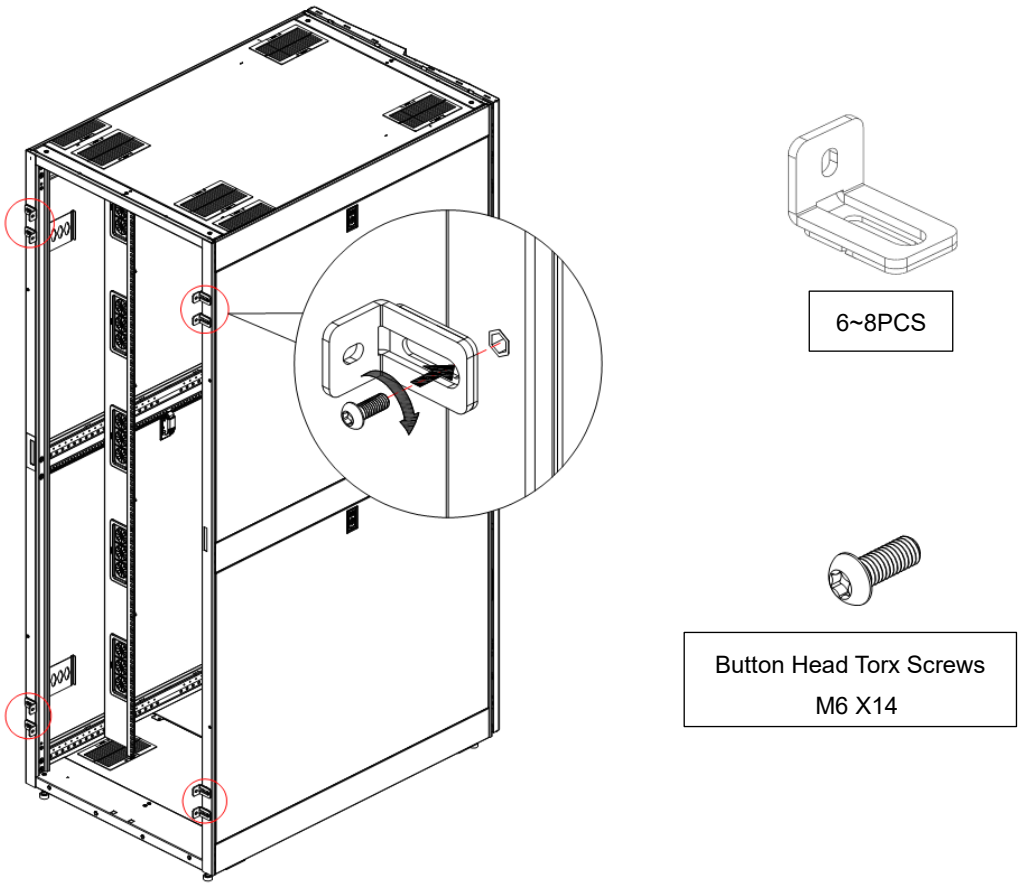



**Figure 9. Fix Bracket Installation**

- Use a tape measure to ensure dimensions are correct.

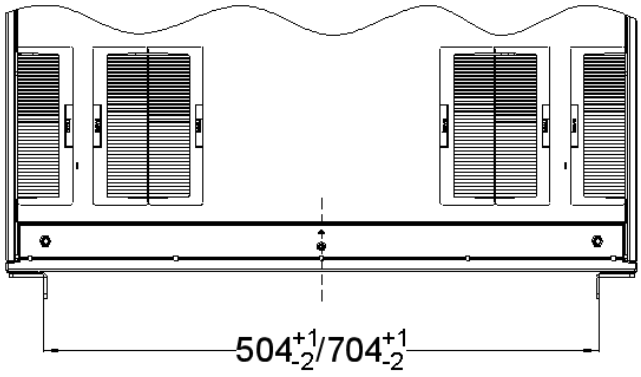



**Figure 10. Fix Bracket Position**

- Apply the sealing strip.

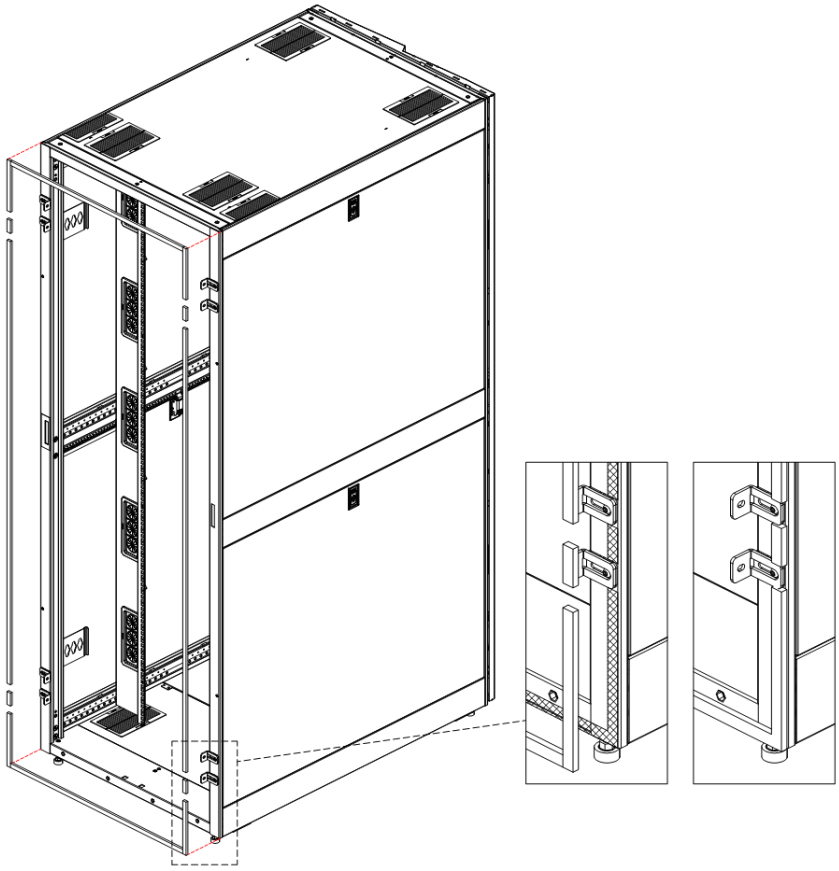


**Figure 11. Sealing Strip Paste**

- Remove the top and bottom RDHx brackets.

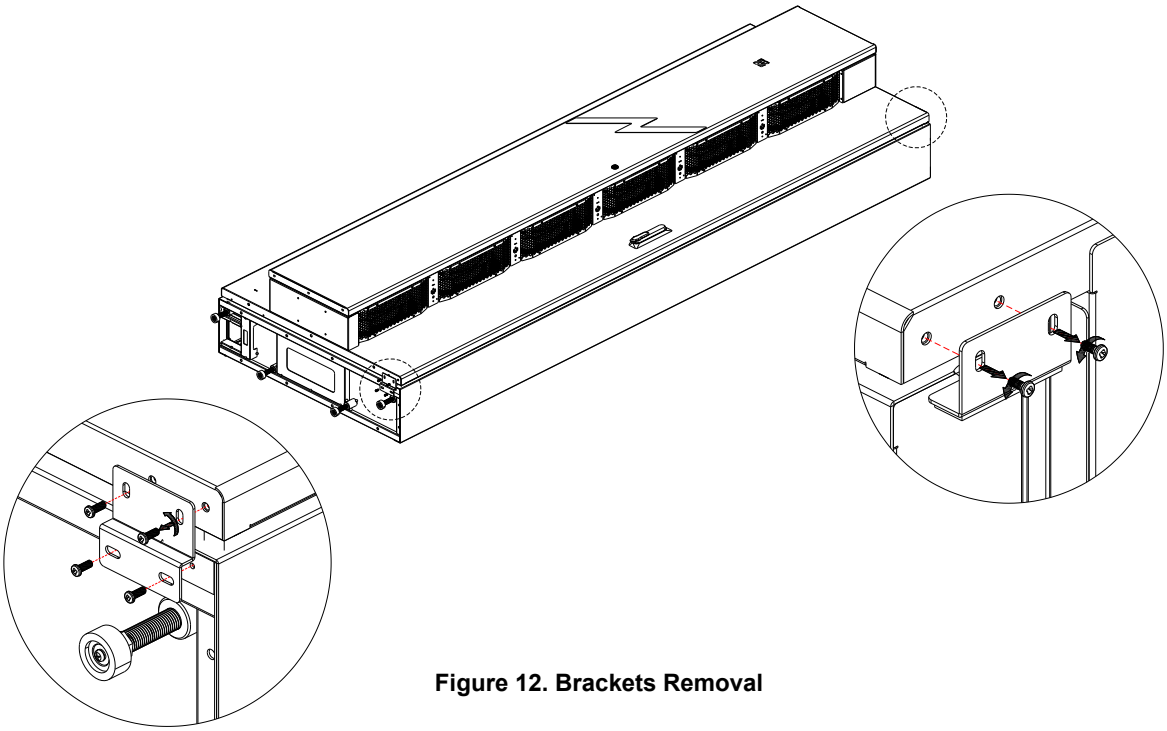


**Figure 12. Brackets Removal**

- A team of four people is required for transportation and lifting from this side.

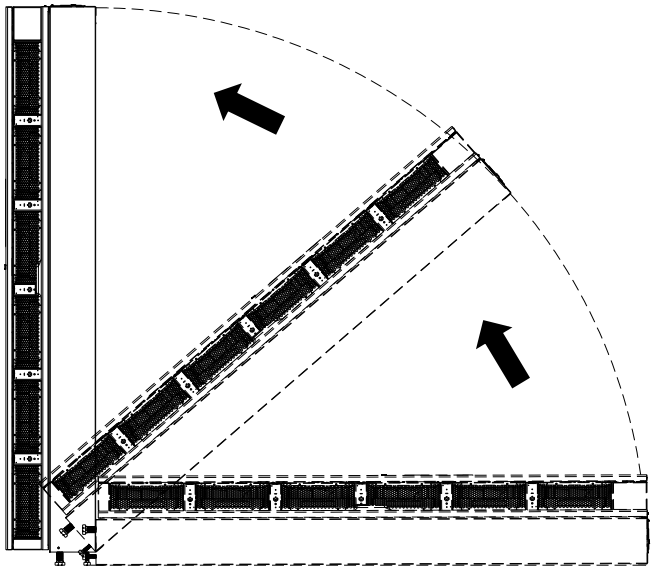
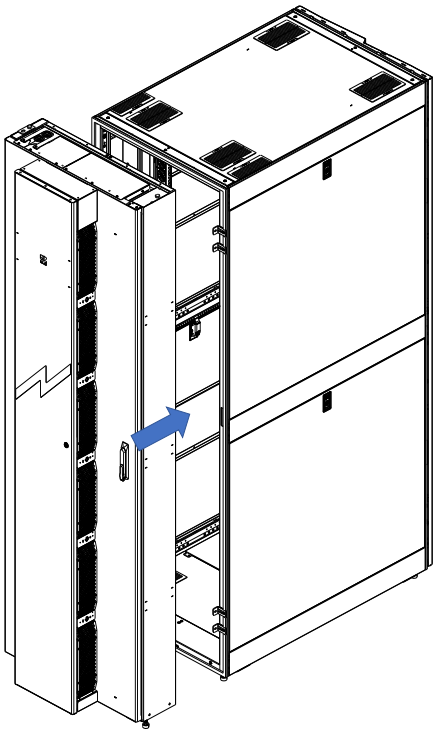


**Figure 13. Door Lift-up**

- Position the door close to the cabinet and ensure proper alignment. Use a lifting crowbar if necessary.



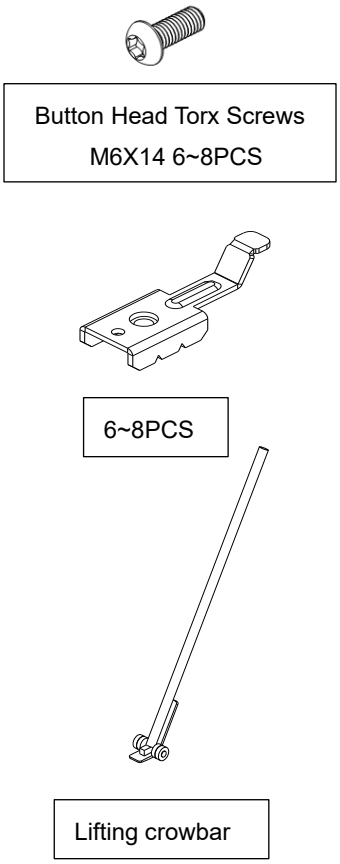



**Figure 14. Door Against to Cabinet**

- **For Empty Cabinet.** Stand inside the cabinet, insert the Scorpio Bracket into the slot of RDHx and slide to align with the L bracket, then pre-tighten all screws.

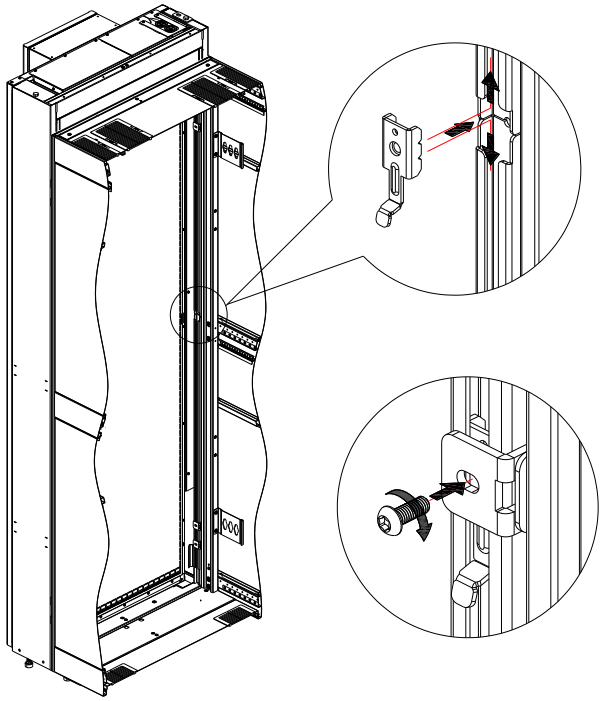


**Figure 15. Door Pre-Tighten from Inside**

- **For Occupied Cabinet.** Place the RDHx against the cabinet and slowly open the cabinet door (four people are required to assist: two people to hold the door frame, one person to open the cabinet door, and one person to fix the RDHx to the cabinet).

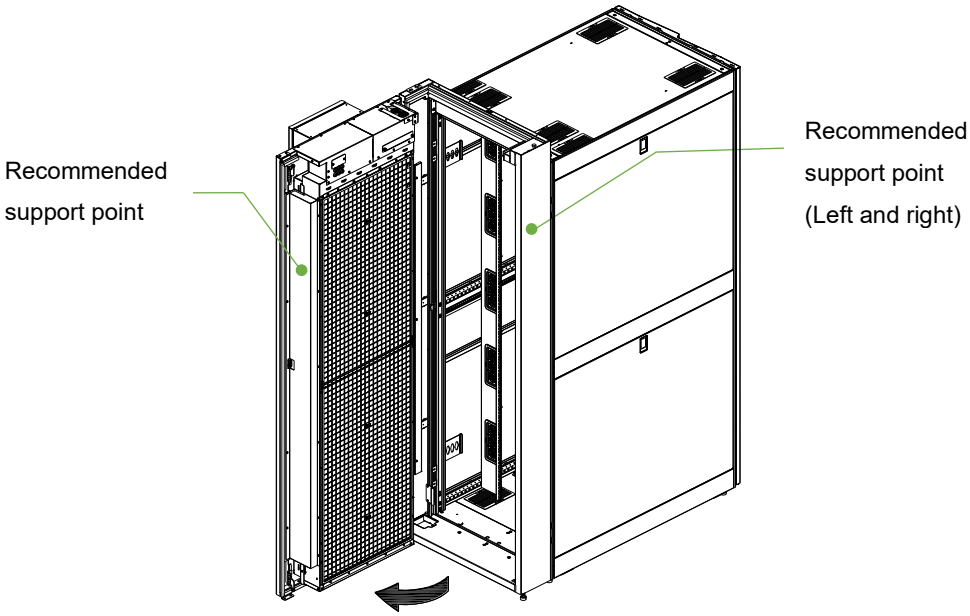



**Figure 16. Door open**

- **For Occupied Cabinet.** Stand outside of the cabinet. insert the Scorpio Bracket into the slot of RDHx and slide to align with the L bracket, then pre-tighten all screws.

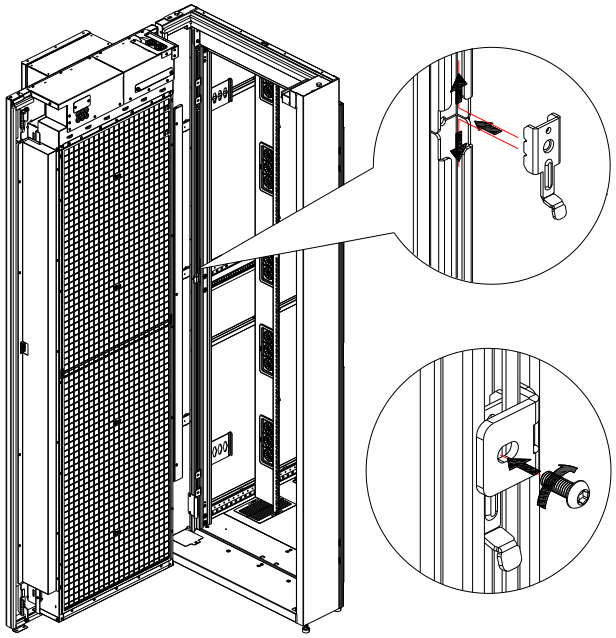


**Figure 17. Door Pre-Tighten from Outside**

- Use a spirit level to check and adjust the RDHx leveling feet.

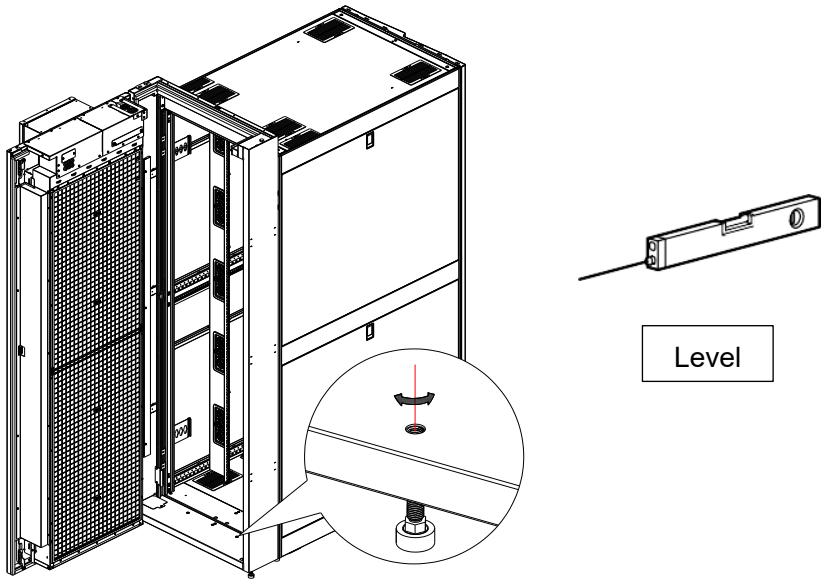



**Figure 18. RDHx Leveling**

- Tighten all the fixing screws (Torque: 10 N·m).

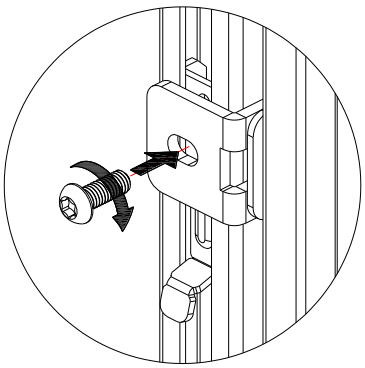


**Figure 19. Tighten**

- Bay together the RDHx from top.

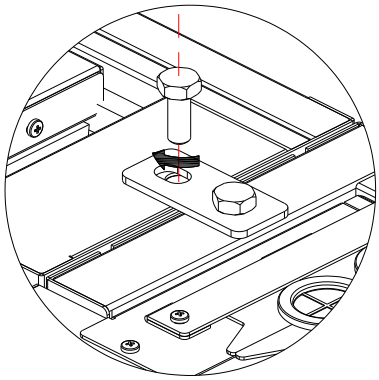


**Figure 20. Baying**

- Place the bracket and secure it with M4×8 (Torque: 2.0 N·m).

  **NOTE**: To ensure proper sealing, an extra bracket must be used when installing a 48U RDHx on a 52U AI Ready Rack or other brand higher cabinet.

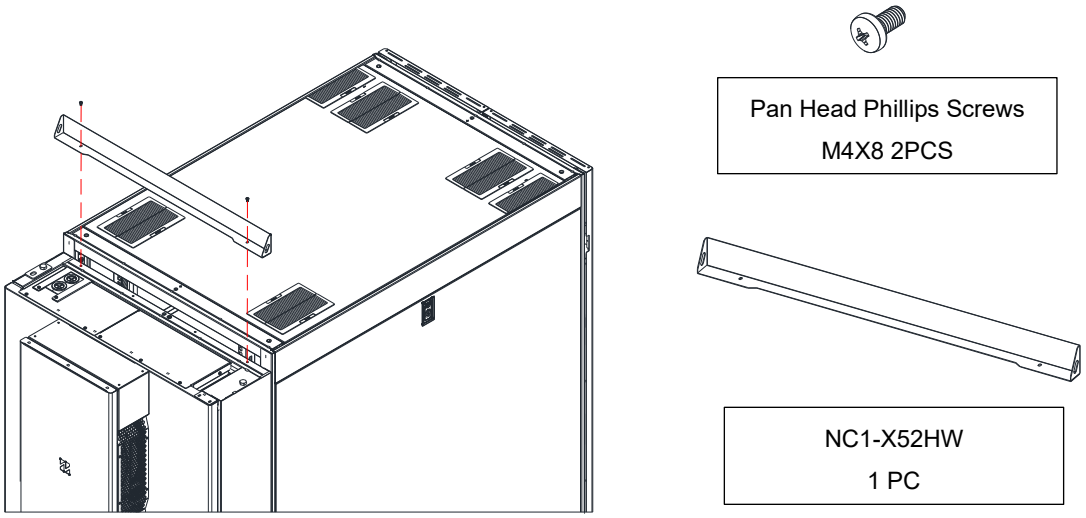



**Figure 21. Extra Bracket Installation**

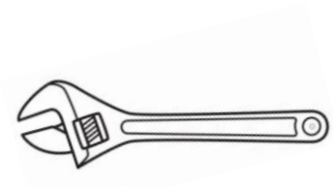
# Liquid Circuit Connections

## Bottom Feed Instruction

### Tool & Material List

1x Electric screwdriver

1x PH2 Phillips screwdriver bit



2x Adjustable Spanner (Opening size ≥38mm)

2xSilicone hose, 2xAdapter


Fernox Sealant

3M Sealing Strip

**Figure 22. Tool List**

> **⚠ WARNING**
>
> ***TIP HAZARD***
>
> • For safety, make sure RDHx and the cabinet are securely fastened and the cabinet bolted to floor or baying together to prevent tipping over.
>
> ***Failure to follow these instructions can result in serious injury, death, or equipment damage.***

- Open the Rear heat door exchanger.

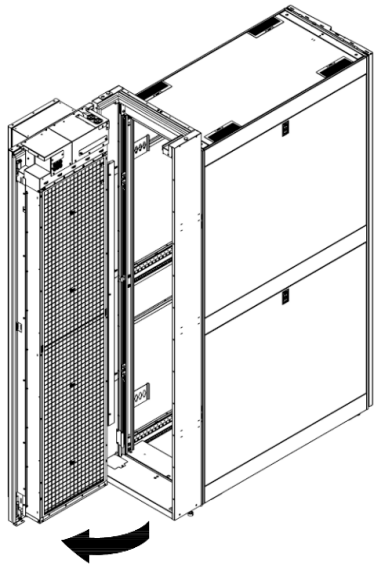


**Figure 23. Door Open**

- Remove the screws and take the hose cover away.

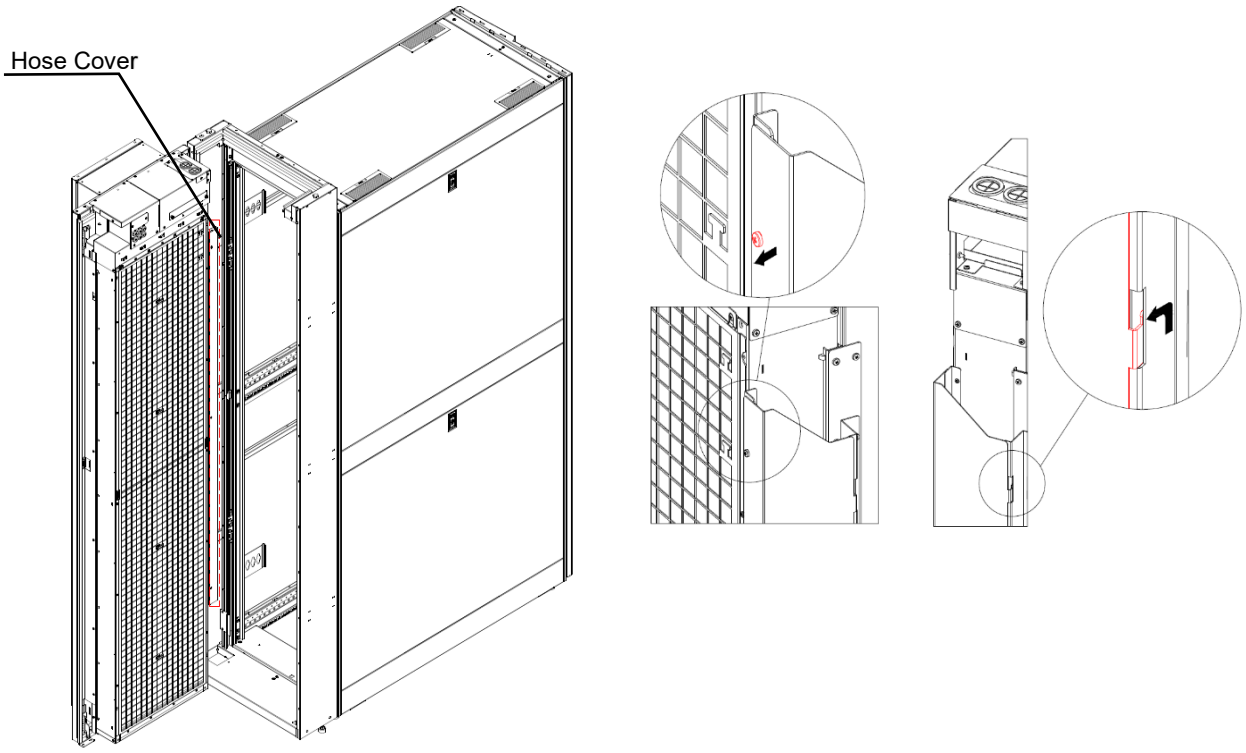



**Figure 24. Hose Cover Removal**

- Remove the screws and take the Liquid Circuit Protection Module away.

  Note: Pull it out first, otherwise the water tray will get stuck.

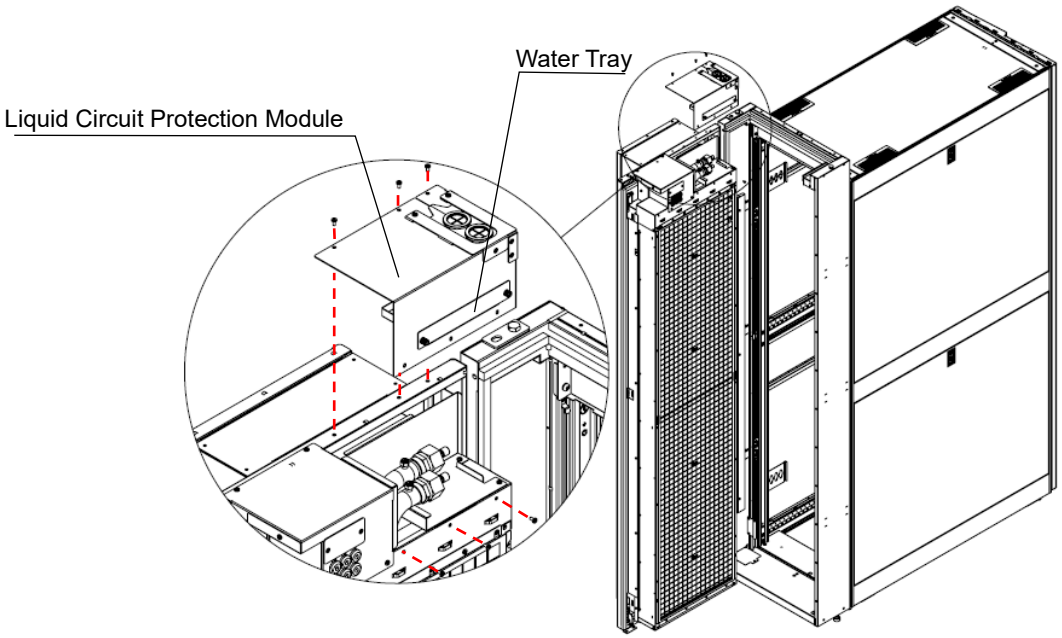



**Figure 25. Liquid Circuit Protection Module Operation**

- Remove the coil end cap with 2 adjustable spanners to avoid twisting coil cropper elbow.

> **⚠ WARNING**
>
> • For safety, do not remove the end cap directly. Loosen it a little and wait for the air pressure to be released before removing it completely.
>
> ***Failure to follow these instructions can result in serious injury, death, or equipment damage.***

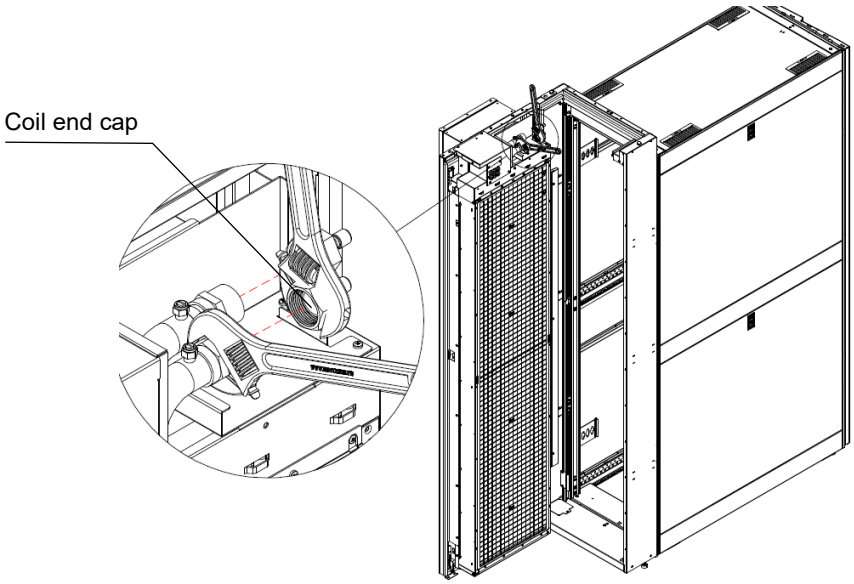



**Figure 26. Coil End Cap Removal**

- Remove the cover plate in the interface frame.

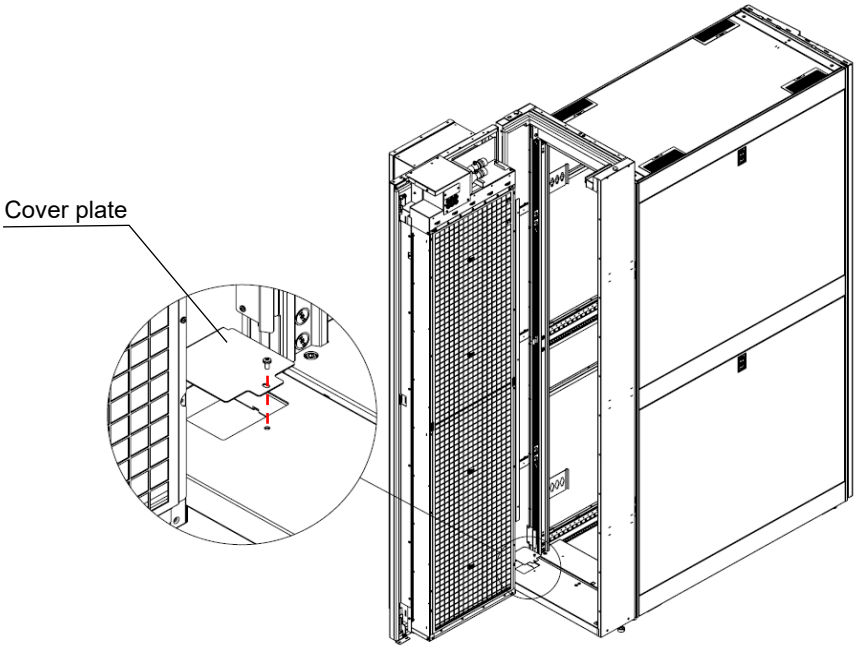


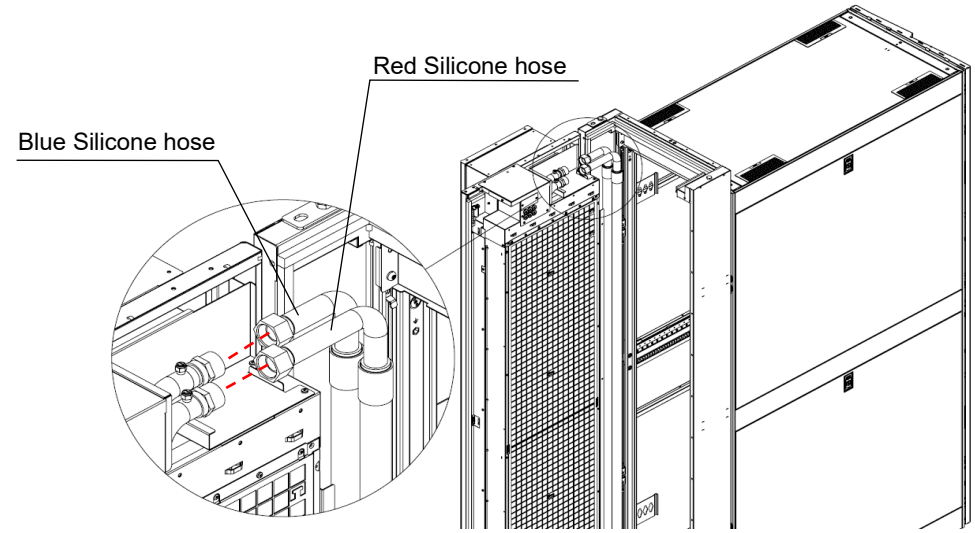

**Figure 27. Cover Plate Removal**

- Connect the silicone hose end with elbow to coil, pass another end through interface frame cutting and the floor cutting. If there are any gaps between interface frame cutting edge and hose, warp the hose with the 3M sealing strips and seal the gap.

  Note:

  - First install the blue silicone hose, with reference to the blue label on the coil elbow.
  - Ensure the hose elbow is as vertical as possible.
  - The installation torque requirement is between 65-75 N·m.

| NOTICE |
| --- |
| • Smear a pea sized amount of sealant on the coned face of the coil tail.<br>***Failure to follow these instructions can result in water leakage, or equipment damage.***   |



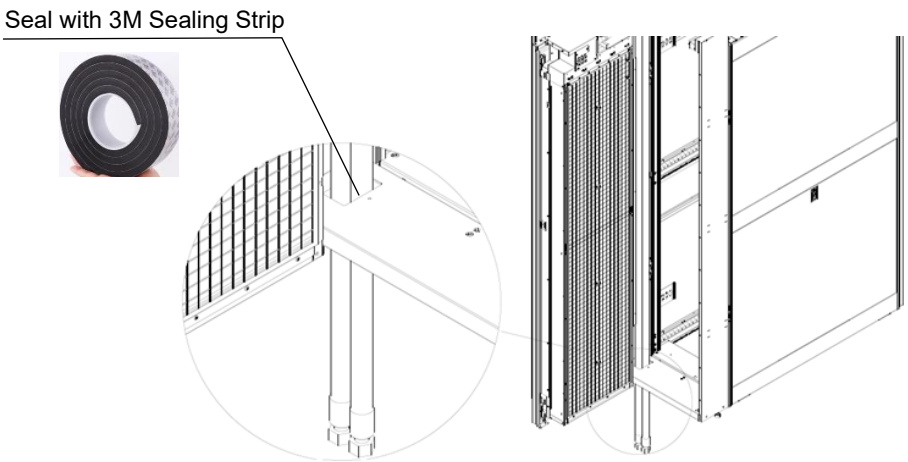




**Figure 28. Hose Connection**

- Connect the other end of the silicone hose to the primary side water circuit with sealant.

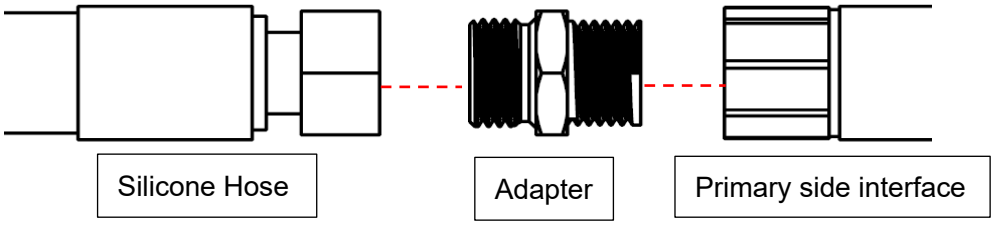



**Figure 29. Hose Connection (Facility Side)**

- According to the disassembly steps, install Liquid Circuit Protection Module and hose cover to the RDHx. Tighten the screws and then close the Rear Door Heat Exchanger.

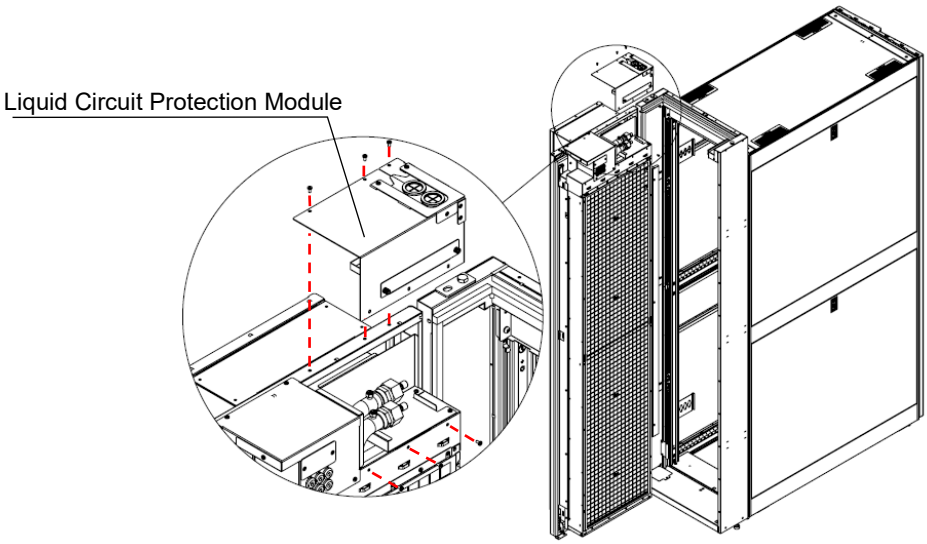



**Figure 30. Liquid Circuit Protection Module Installation**

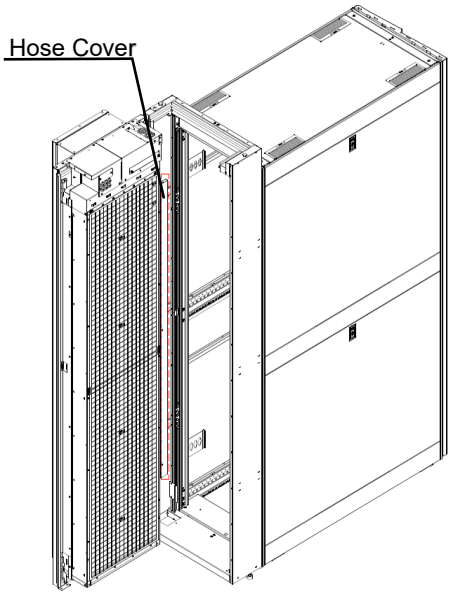


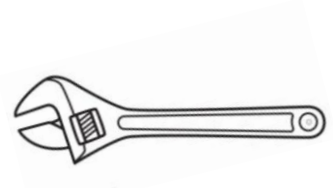

**Figure 31. Hose Cover Installation**

# Top Feed Instruction

## Tool & Material List

1x Electric screwdriver

1x PH2 Phillips screwdriver bit



2x Adjustable Spanner (Opening size ≥38mm)

2xSilicone hose, 2xAdapter


Fernox Sealant

3M Sealing Strip

**Figure 32. Tool List**

> **⚠ WARNING**
>
> ***TIP HAZARD***
>
> • For safety, make sure RDHx and the cabinet are securely fastened and the cabinet bolted to floor or baying together to prevent tipping over.
>
> ***Failure to follow these instructions can result in serious injury, death, or equipment damage.***

➢ Open the RDHx.

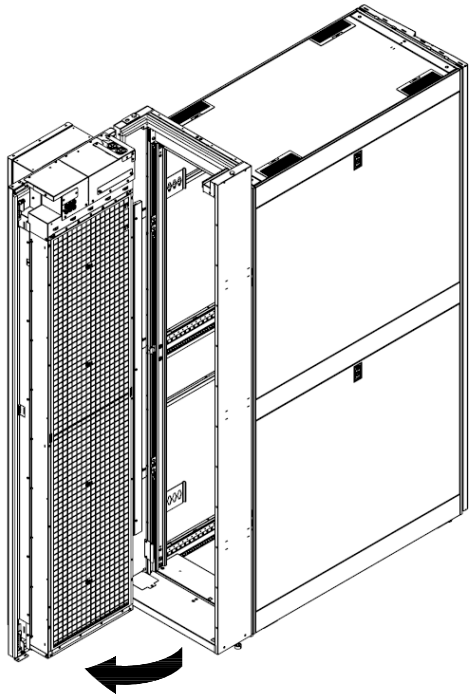


**Figure 33. Door Open**

- Remove those screws and detach Liquid Circuit Protection Module away.

  Note: Pull it out first, otherwise the water tray will get stuck.

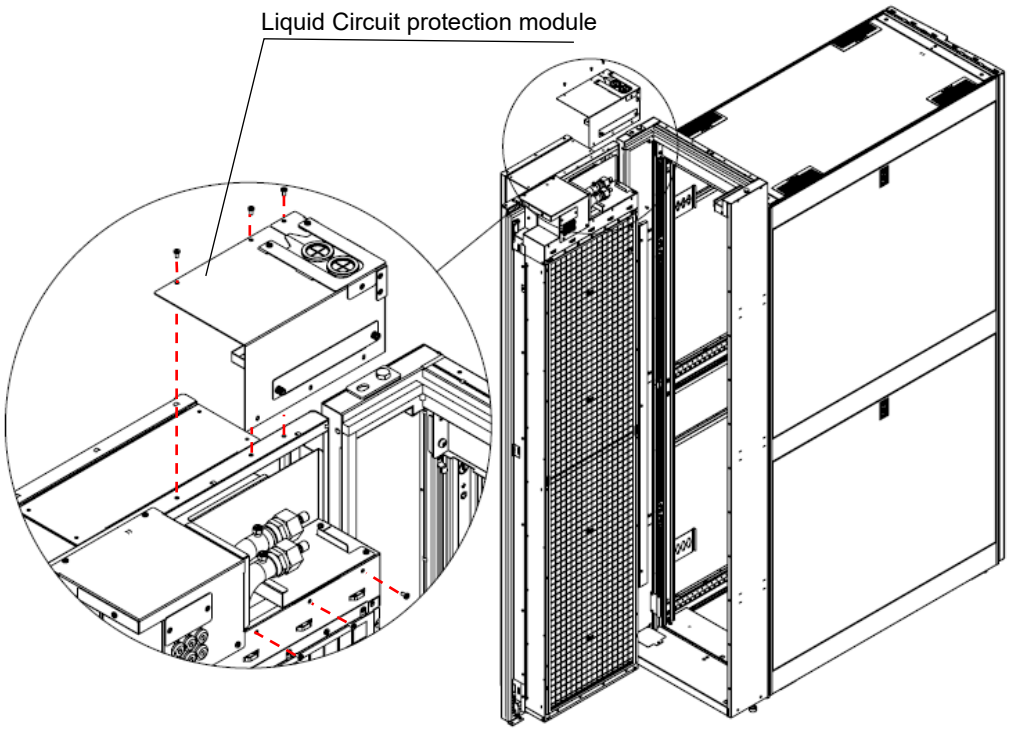



**Figure 34. Liquid Circuit Protection Module Removal**

- Disassemble the Liquid Circuit Protection Module.

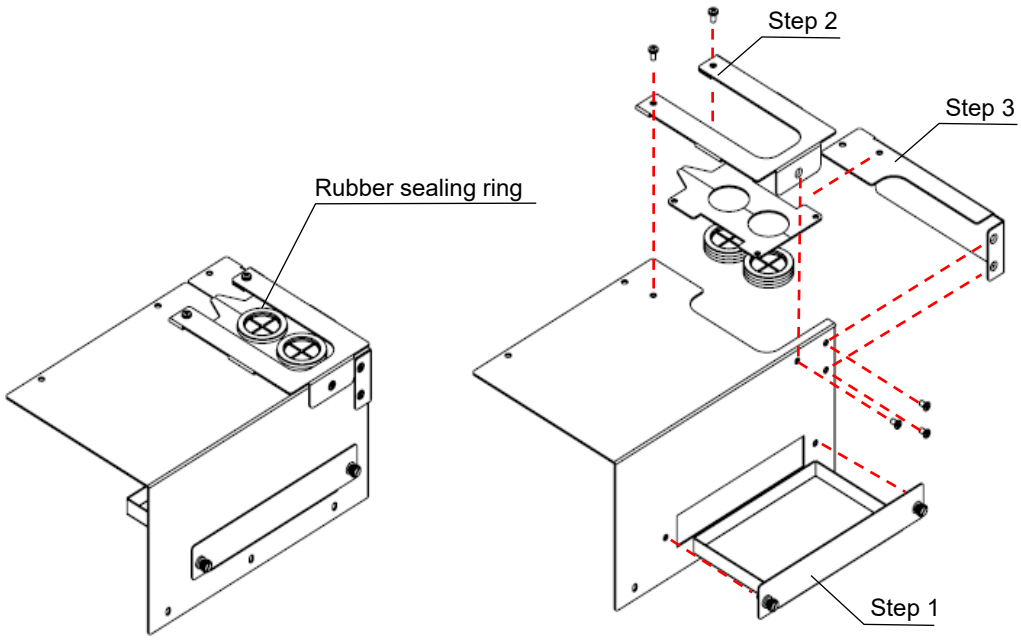



**Figure 35. Liquid Circuit Protection Module Exploded**

➢ Remove the coil end cap with 2 adjustable spanners to avoid twisting coil cropper elbow.

| ⚠ WARNING |
| --- |
| • For safety, do not directly unscrew the end cap. Unscrew it slightly to release the pressure in the coil before removing it completely.<br>***Failure to follow these instructions can result in serious injury, death, or equipment damage.*** |

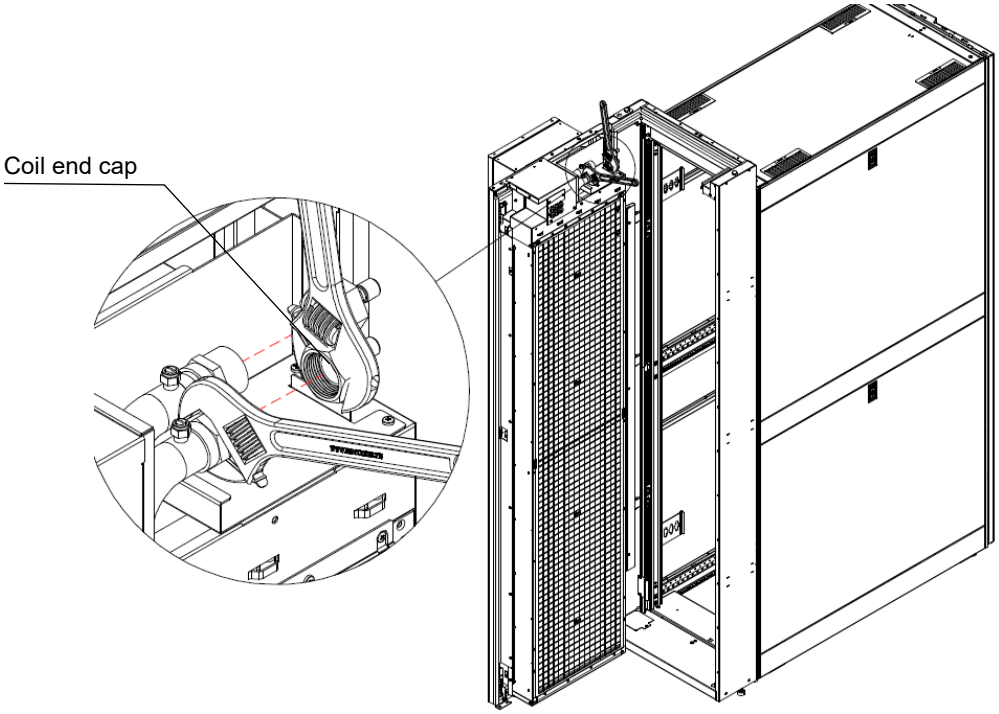



**Figure 36. Coil End Cap Removal**

➢ Connect the silicone hose end with elbow to coil tail.

Note:

- First install the blue silicone tube, with reference to the blue label on the coil elbow.
- Ensure the hose elbow is as vertical as possible.
- The installation torque requirement is between 65-75 N·m.

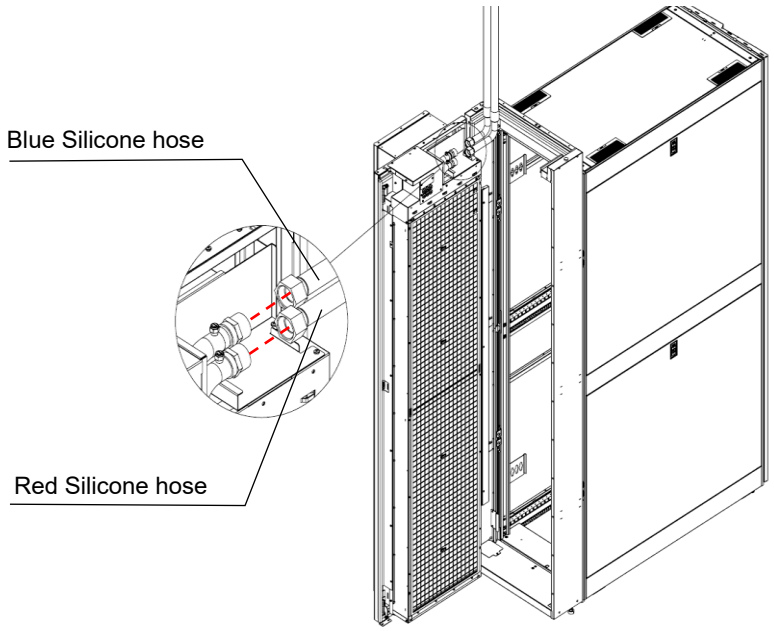



**Figure 37. Hose Connection**

- Assemble the Liquid Circuit protection module as shown below. If there are any gaps, seal them with 3M sealing strips.

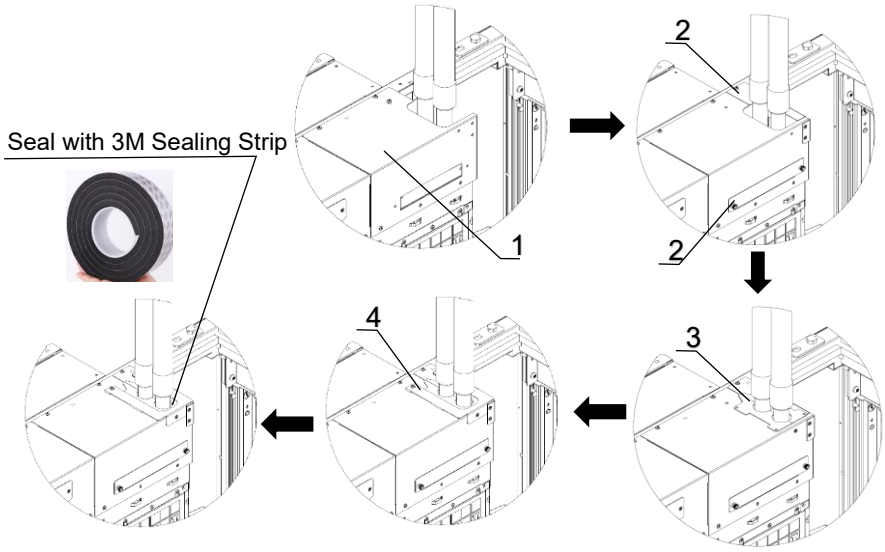



**Figure 38. Hose Sealing**

- Connect the other end of the silicone hose to the primary side water circuit with sealant. (Figure 37)

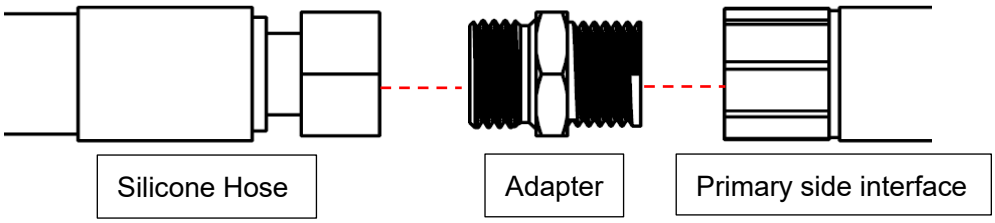
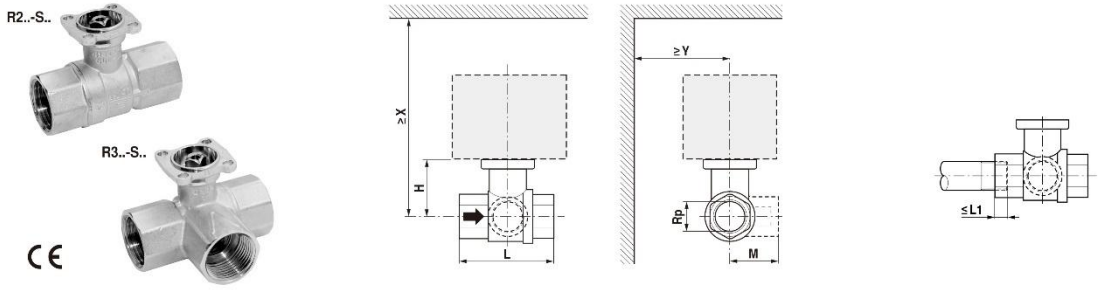


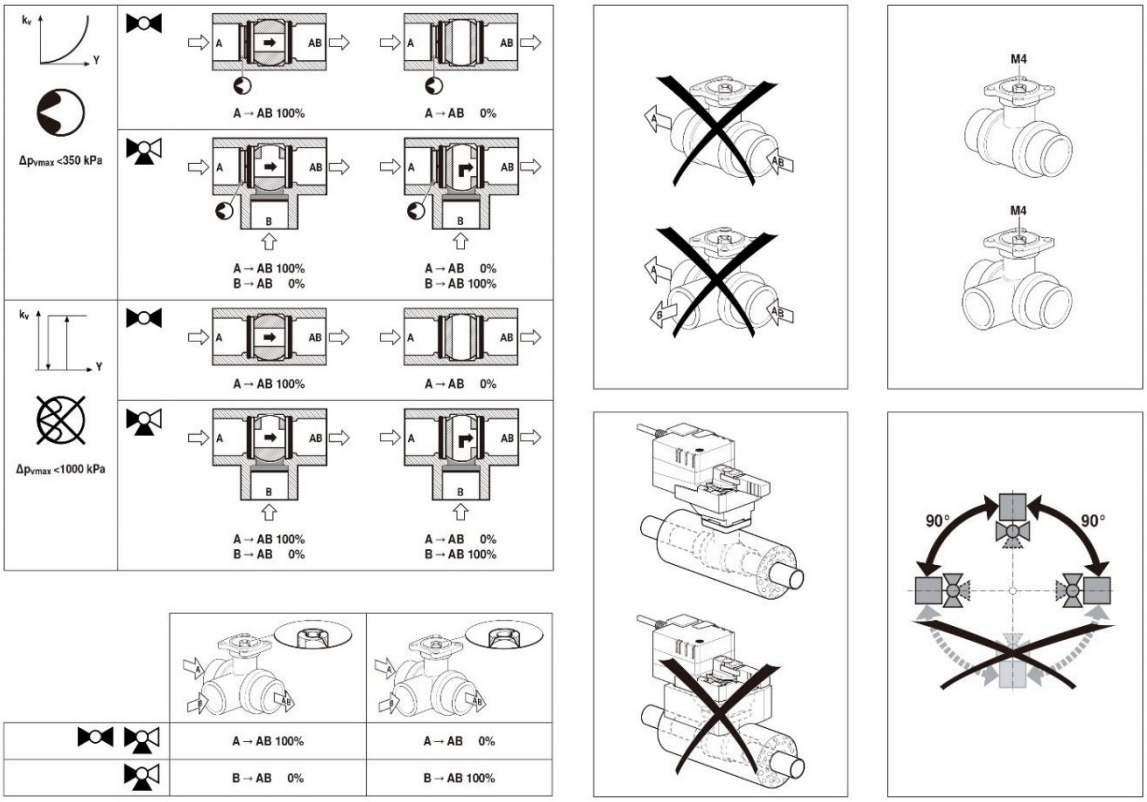

**Figure 39. Hose Connection (Facility Side)**

- Close the rear heat door exchanger.

# Valve Installation




| t –10...120°C<br>$p_s$ 1600 kPa | | DN | Rp | mm | | | | 80°C | | 100°C | | 120°C | | | | | | 100°C | | 120°C | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | | KR.. | | TR.. | | LR..A | | NR..A | | SR..A | | TRF.. | | LRF.. | | NRF..A | | SRF..A | |
| | | mm | " | L | H | M | L1 | X | Y | X | Y | X | Y | X | Y | X | Y | X | Y | X | Y | X | Y | X | Y |
| R2015-P..-S1<br>R2015-1..-S1 | R3015-P..-S1<br>R3015-1..-S1 | 15 | ½" | 67 | 35 | 36 | 13 | 141 | 75 | 176 | 75 | 186 | 75 | 221 | 80 | 221 | 80 | 181 | 80 | 191 | 90 | 211 | 90 | 211 | 90 |
| R2015-2P5-S1<br>R2015-4-S1<br>R2015-6P3-S1 | R3015-2P5-S1<br>R2015-4-S1 | 15 | ½" | 67 | 44 | 36 | 13 | 150 | 75 | 185 | 75 | 195 | 75 | 230 | 80 | 230 | 80 | 190 | 80 | 200 | 90 | 220 | 90 | 220 | 90 |
| R2020..-S2 | R3020..-S2 | 20 | ¾" | 78 | 46 | 41.5 | 14 | | | | | 200 | 75 | 235 | 80 | 235 | 80 | | | 205 | 90 | 225 | 90 | 225 | 90 |
| R2025..-S2 | R3025..-S2 | 25 | 1" | 87 | 46 | 45 | 16 | | | | | 200 | 75 | 235 | 80 | 235 | 80 | | | 205 | 90 | 225 | 90 | 225 | 90 |
| R2032..-S3 | R3032..-S3 | 32 | 1¼" | 105 | 50.5 | 55.5 | 19 | | | | | | | 240 | 80 | 240 | 80 | | | | | 230 | 90 | 230 | 90 |
| R2040..-S3 | R3040..-S3 | 40 | 1½" | 111 | 50.5 | 56 | 19 | | | | | | | 240 | 80 | 240 | 80 | | | | | 230 | 90 | 230 | 90 |
| | R3040-25-S4 | 40 | 1½" | 122 | 62 | 66.5 | 19 | | | | | | | | | 250 | 80 | | | | | | | 240 | 90 |
| R2050..-S4 | R3050..-S4 | 50 | 2" | 125 | 56 | 68 | 22 | | | | | | | | | 245 | 80 | | | | | | | 235 | 90 |
| | R3050-40-S4<br>R3050-58-S4 | 50 | 2" | 142 | 68 | 79 | 22 | | | | | | | | | 262 | 80 | | | | | | | 252 | 90 |




| | | |
|---|---|---|
| | A → AB 100% | A → AB 0% |
| | B → AB 0% | B → AB 100% |

**Figure 40. Valve Installation**

## Actuator Installation

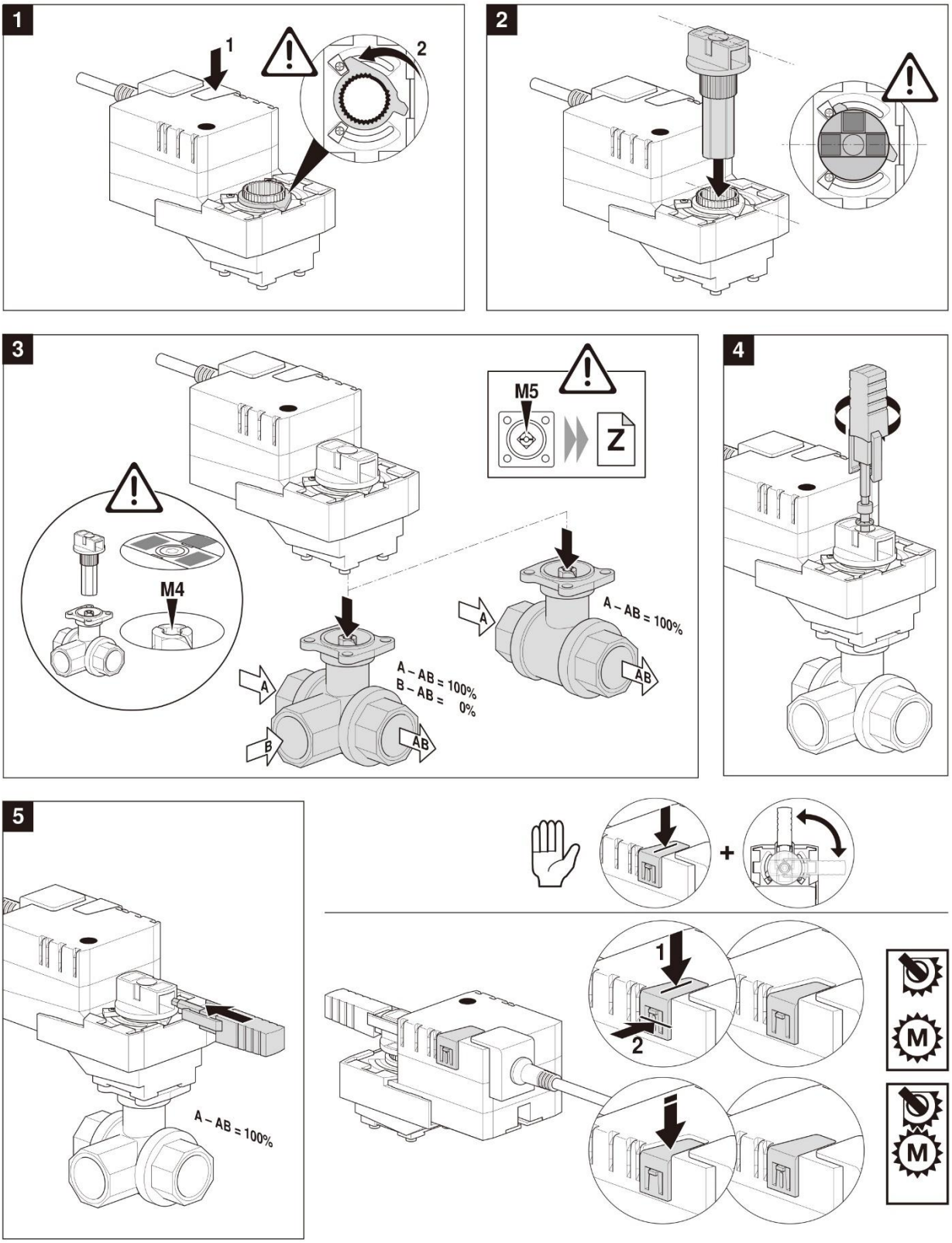



**Figure 41. Actuator Installation**

# Electrical Connections

**⚠ ⚠ WARNING**

***SHOCK HAZARD***

- CAUTION: Double pole, neutral fusing. Disconnect mains before servicing.

(ATTENTION. Double pôle/fusible sur le neutre. Débrancher l'alimentation avant l'entretien.）

- Arc flash and electric shock hazard. Can cause serious injury or death. Disconnect all local and remote electric power supplies before connecting.
- Installation, service, and maintenance work must be performed only by qualified personnel.
- Disconnect the device of the RDHx is the plug, and the output socket is easily accessible.

***Failure to follow these instructions can result in serious injury, death, or equipment damage.***

## Power Panel Overview

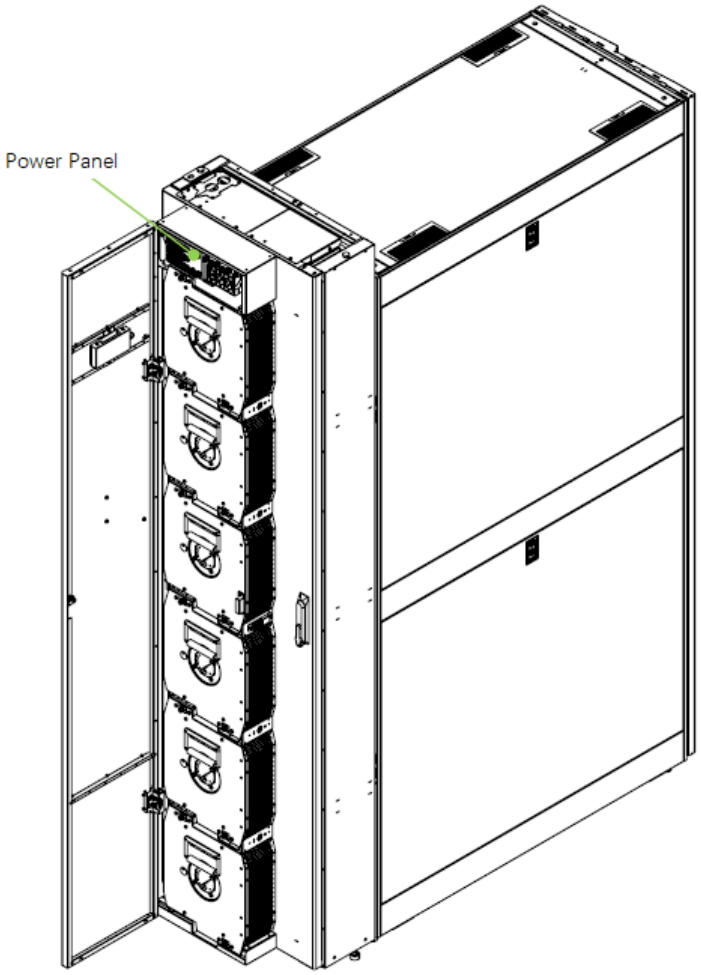



**Figure 42. Fan Cover Open Overview**

Open the front fan cover to find the RDHx Power Panel above the fans.

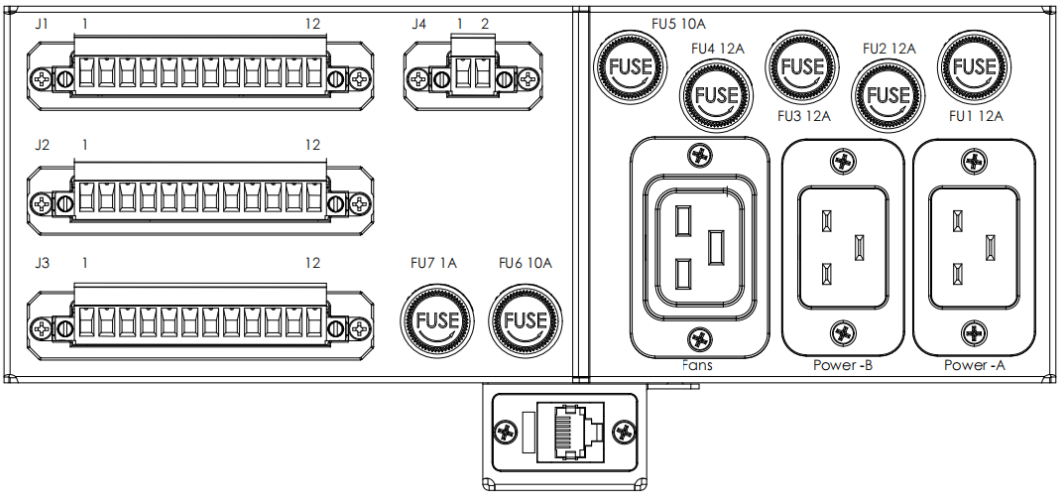



**Figure 43. Power Panel Overview**

## Port Definition

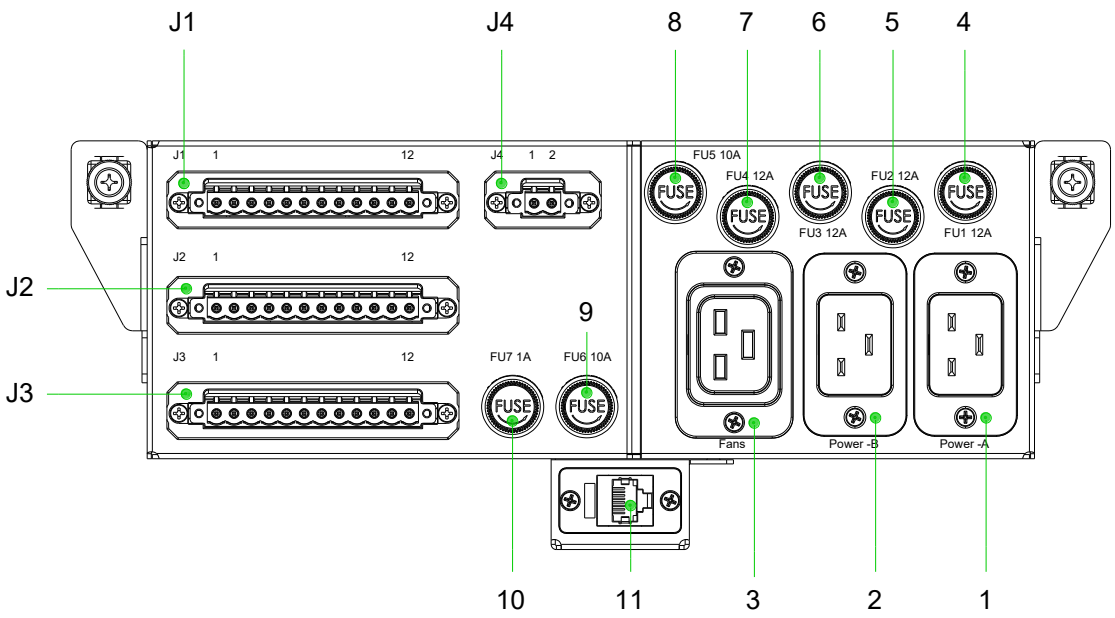



**Figure 44. Port Definition**

**Table 7. Port Definition Table**

| Port | | Function Description |
|---|---|---|
| Power-A | | Power supply input A |
| Power-B | | Power supply input B |
| Fans | | Power supply for fans |
| FU 1 | | Fuse for power A |
| FU 2 | | |
| FU 3 | | Fuse for power B |
| FU 4 | | |
| FU 5 | | Fuse for fans |
| FU 6 | | |
| FU 7 | | Fuse for actuator (DC24V) |
| Network port | | Network communication |
| J1 | Pin 1_V- | DC24V output for HMI and water leakage device |
| | Pin 2_V+ | |
| | Pin 3_DI | Water leakage signal digital input |
| | Pin 4_GR | Multi-color LED indicator |
| | Pin 5_RD | |
| | Pin 6_COM | |
| | Pin 7_D1+ | RS485_1 communication for HMI |
| | Pin 8_D1- | |
| | Pin 9_G1 | |
| | Pin 10_D2+ | RS485_2 communication for fans and actuator |
| | Pin 11_D2- | |

| | | |
|---|---|---|
| | Pin 12_G2 | |
| J2 | Pin 1 | N/A |
| | Pin 2 | N/A |
| | Pin 3 | N/A |
| | Pin 4 | N/A |
| | Pin 5_AI6 | Room temp sensor 6 |
| | Pin 6_COM | |
| | Pin 7_AI1 | Air input temp sensor 1 |
| | Pin 8_AI2 | Air input temp sensor 2 |
| | Pin 9_AI3 | Air input temp sensor 3 |
| | Pin 10_AI4 | Air input temp sensor 4 |
| | Pin 11_AI5 | Air out temp sensor 5 |
| | Pin12_COM | Temp sensors COM ports 1 to 5 |
| J3 | Pin 1_Temp. | Water flow sensor |
| | Pin 2_Flow | |
| | Pin 3_GND | |
| | Pin 4_5V | |
| | Pin 5_Temp. | Water pressure sensor |
| | Pin6_Press | |
| | Pin 7_GND | |
| | Pin 8_5V | |
| | Pin 9 | N/A |
| | Pin 10 | Alarm out dry contact: common |
| | Pin 11 | Alarm out dry contact: Normally closed |
| | Pin 12 | Alarm out dry contact: Normally open |
| J4 | Pin 1_V- | DC24V output for actuator |
| | Pin 2_V+ | |

## Fuse Rating

**⚠ ⚠ WARNING**

***SHOCK HAZARD***

- CAUTION: Double pole, neutral fusing. Disconnect mains before servicing.

(ATTENTION. Double pôle/fusible sur le neutre. Débrancher l'alimentation avant l'entretien.）

- Any parts replaced during maintenance must be the same specification as those being replaced.
- Replaced any parts should only be replaced by qualified personnel or contact INOVA.

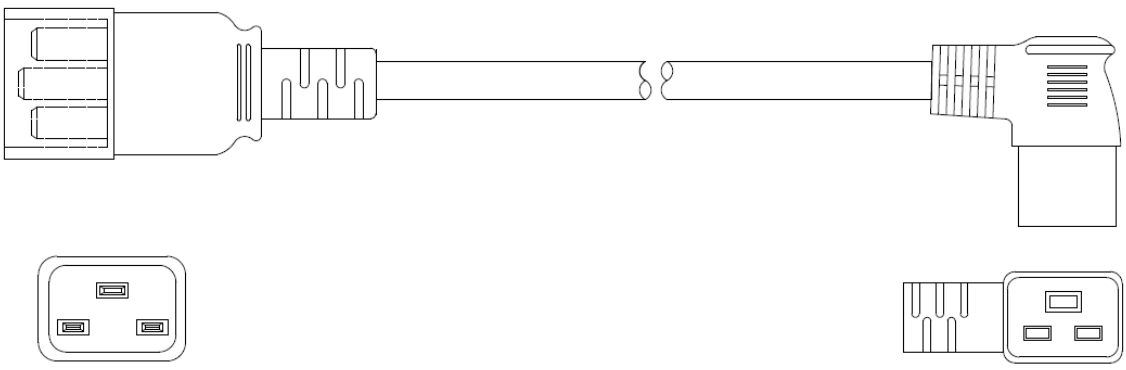
***Failure to follow these instructions can result in serious injury, death, or equipment damage.***

**Table 8. Fuse Rating Table**

| Fuse Number | Fuse type | Fuse Rating | Function Description |
|---|---|---|---|
| FU 1 | Fast fuse, Ø6.3×32mm` | 12A/250V | Fuse for power A |
| FU 2 | Fast fuse, Ø6.3×32mm | 12A/250V | |
| FU 3 | Fast fuse, Ø6.3×32mm | 12A/250V | Fuse for power B |
| FU 4 | Fast fuse, Ø6.3×32mm | 12A/250V | |
| FU 5 | Fast fuse, Ø6.3×32mm | 10A/250V | Fuse for fans |
| FU 6 | Fast fuse, Ø6.3×32mm | 10A/250V | |
| FU 7 | Fast fuse, Ø6.3×32mm | 1A/250V | Fuse for actuator (DC 24V) |

## Input Power Cord Connection

The IEC 320 C19/C20 power cord is provided with the unit.



IEC 320 C20
Male Plug

IEC 320 C19
Female Socket

**Figure 45. Power Cord Overview**

The **Nova Cool RDHx** has dual power input ports, allowing for the use of two independent power sources: Power-A and Power-B. If one of the power sources fails, the device will automatically switch to the other power source. Power-A is the preferred source, and the system will only switch to Power-B if Power-A is unavailable. If Power-A is restored, the system will automatically revert to Power-A.

- Loosen the screws on the cover plate and remove it.

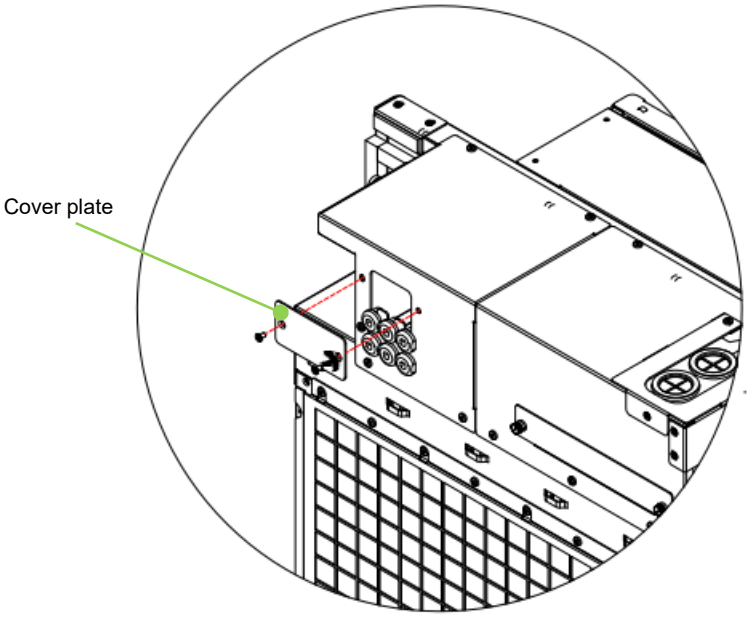



**Figure 46. Cover Plate Removal**

- Insert the power cord through the hole.
- Connect the C19 end of the power cord to the Power-A and Power-B ports on the Power Panel according to the labels, ensuring they are securely installed with no looseness.


**Figure 47. Power Cord Connection**

- Route the power cord as below reference. Along the route, there are bridges that can assist to fix the cable by ties.

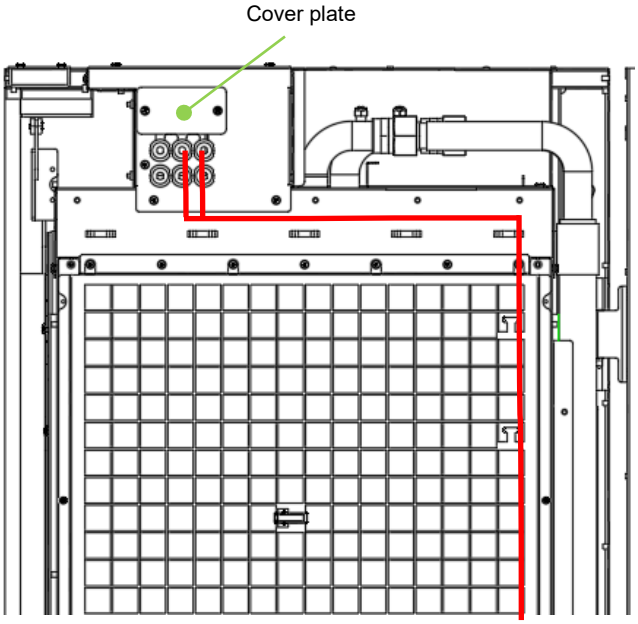



**Figure 48. Cover Plate Reinstall and Cable Routing**

- Connect the C20 end of the Power-A and Power-B power cords to the power supply.
- Fix the cover plate with screws.

## Network cable Connection

It's suggested to use network cables with wire diameter of 22 AWG or larger.

Connect the control box's network interface to a switch for communication with the master system. Use the network cable provided to establish the connection.

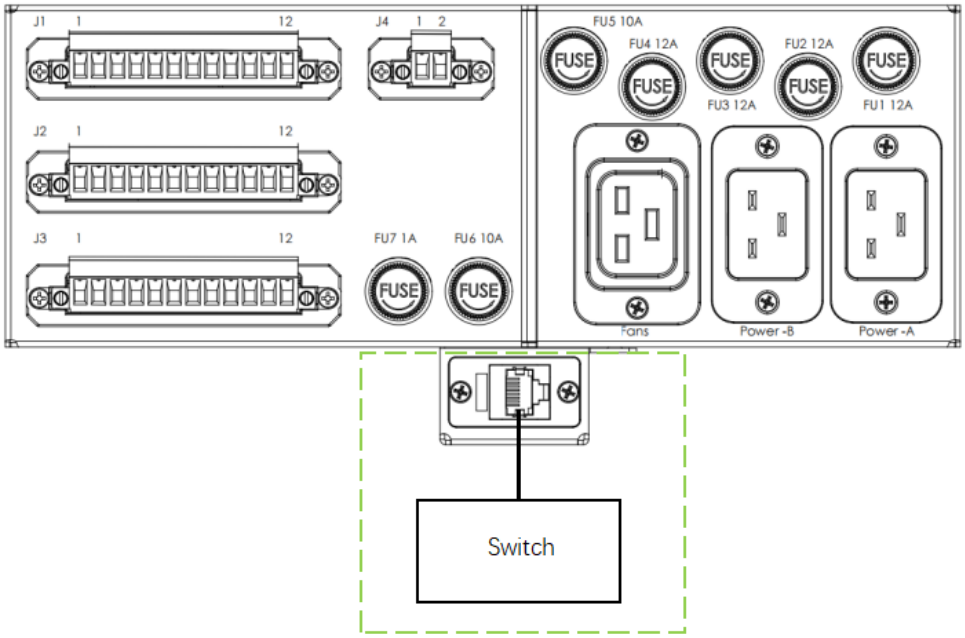



**Figure 49. Network Cable Connection**

## Commissioning Tool Connection

When configuring the parameters, use the provided wire harness to connect the RDHx communication port to the commissioning tool.

Before use, insert the disk into the HMI USB port.

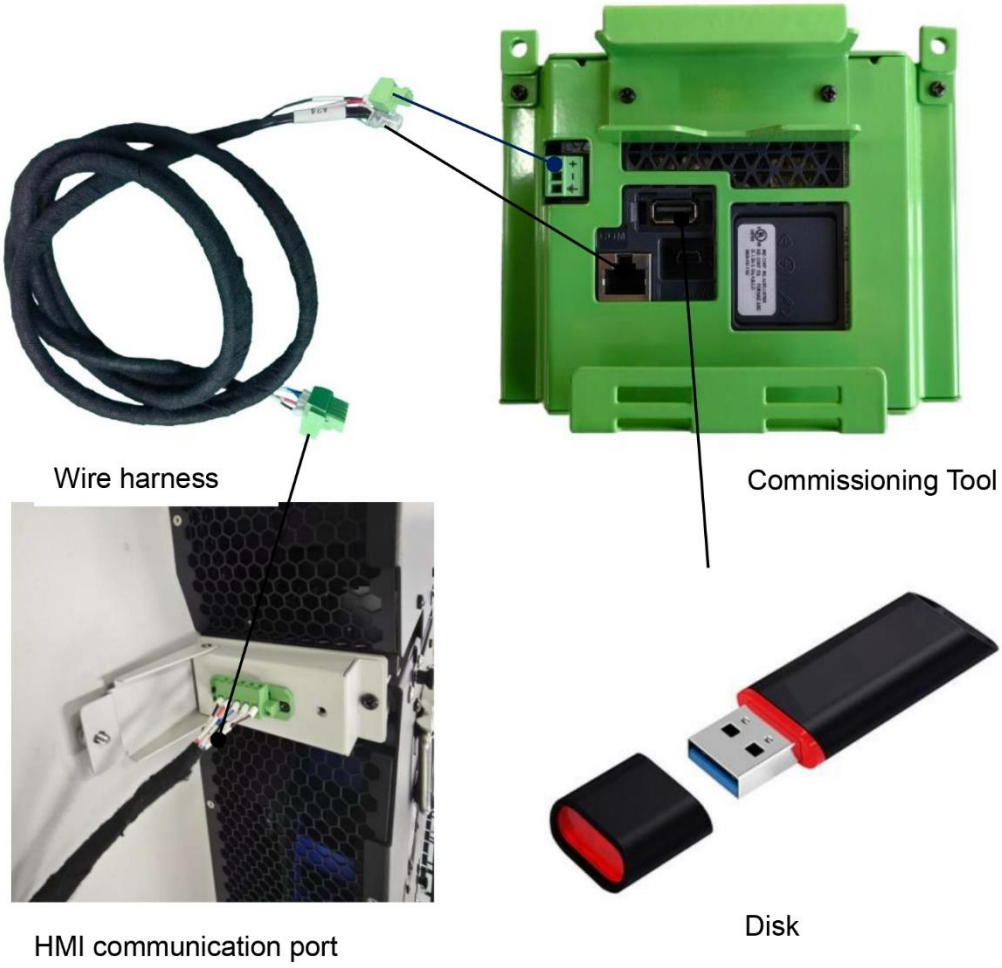



**Figure 50. Commissioning Tool Connection**

## Actuator Cable Connection

Plug the female connector of the A17 harness into the actuator's male connector and secure the nut.

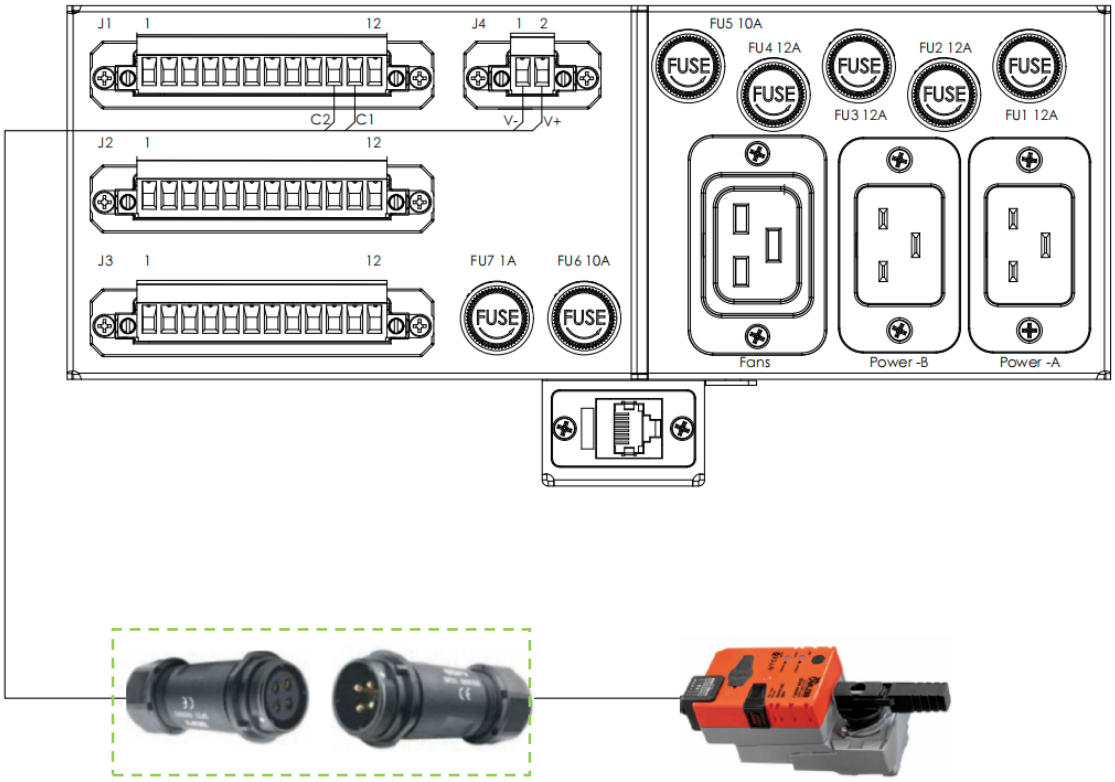



**Figure 51. Actuator Cable Connection**

## Leak Detection Cable Wiring

- Connect the lead to the leak detection cable connector.

**Figure 52. Leak Detection Cable Connection**

- Wrap the leakage detection cable in a spiral pattern around the return pipe and supply pipes, securing it with tie wraps every 200mm.

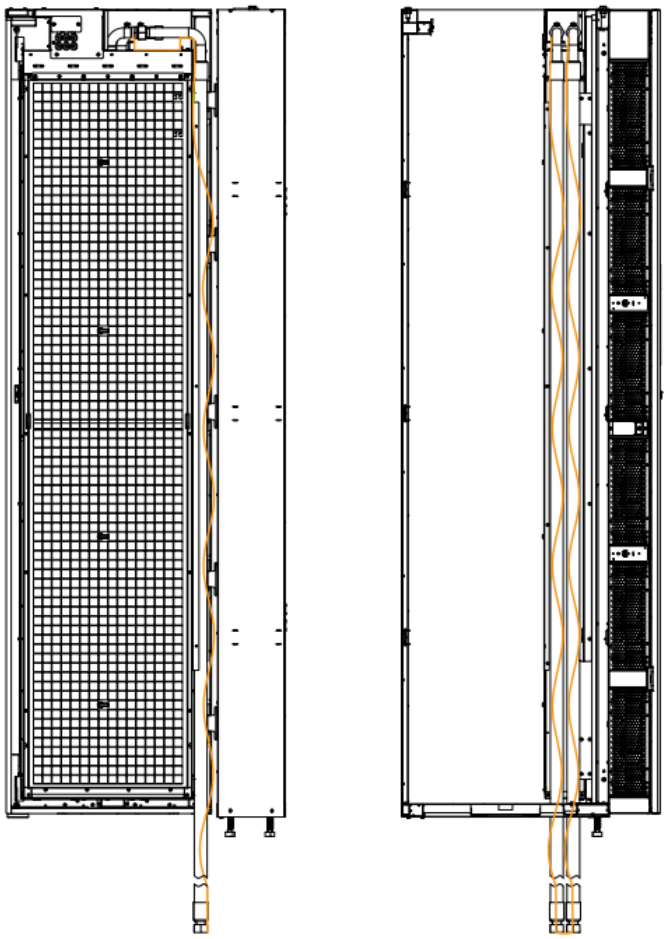


**Figure 53. Leakage Rope Routing**

## Room Temperature Sensor Installation

The room temperature sensor monitors the server's air intake temperature to support accurate thermal management.

- Locate the room temperature sensor on the RDHx. And remove it.
- Route the cable toward the front of the cabinet.

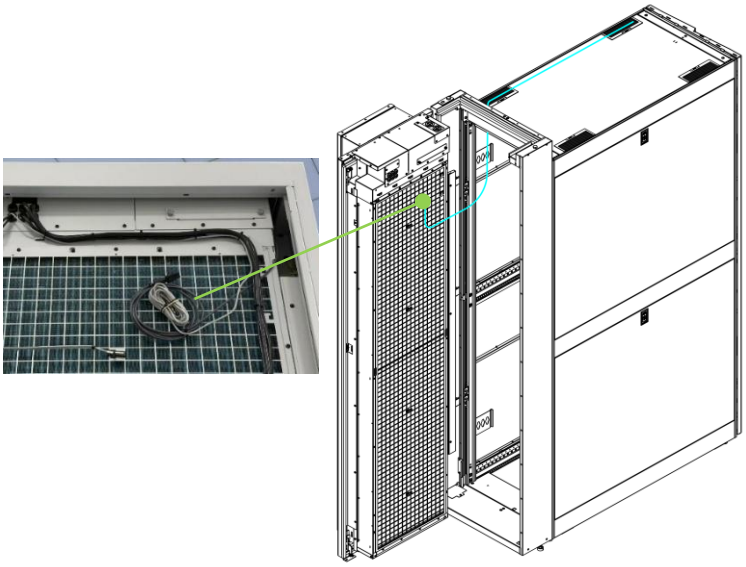


**Figure 54. Room Temperature Sensor Cable Routing**

- Secure the room temperature sensor to the front door using cable ties.

  **CAUTION**: Do not let the temperature sensor touch metal directly. Insert it into the provided holder and secure the holder to the front door.

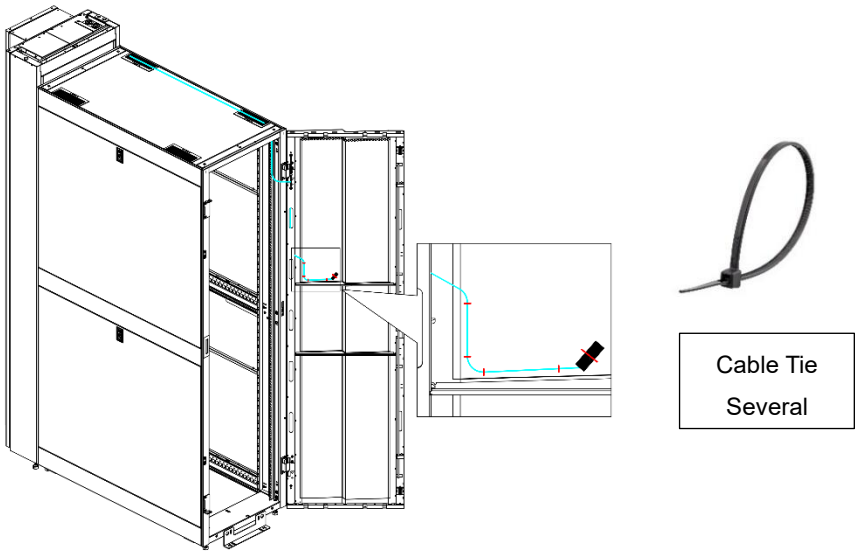



**Figure 55. Room Temperature Sensor Mounted**

# Capacity Sensor Installation

## Flow and Temp Sensor VFS Installation


**Figure 56. Installation Diagram**

*Suggest installing the VFS on the entering water (supply) side.

### Power Cable Connection

A20 harness | Sensor Wire Harness | VFS kit

**Figure 57. Material List**

- Connect the sensor wire harness to the VFS sensor.

**Figure 58. Pre-connection**

- Connect the A20 harness to the control box J3 terminal ports.
- Connect the female connector of the A20 harness to the male connector of the VFS wire and secure them.

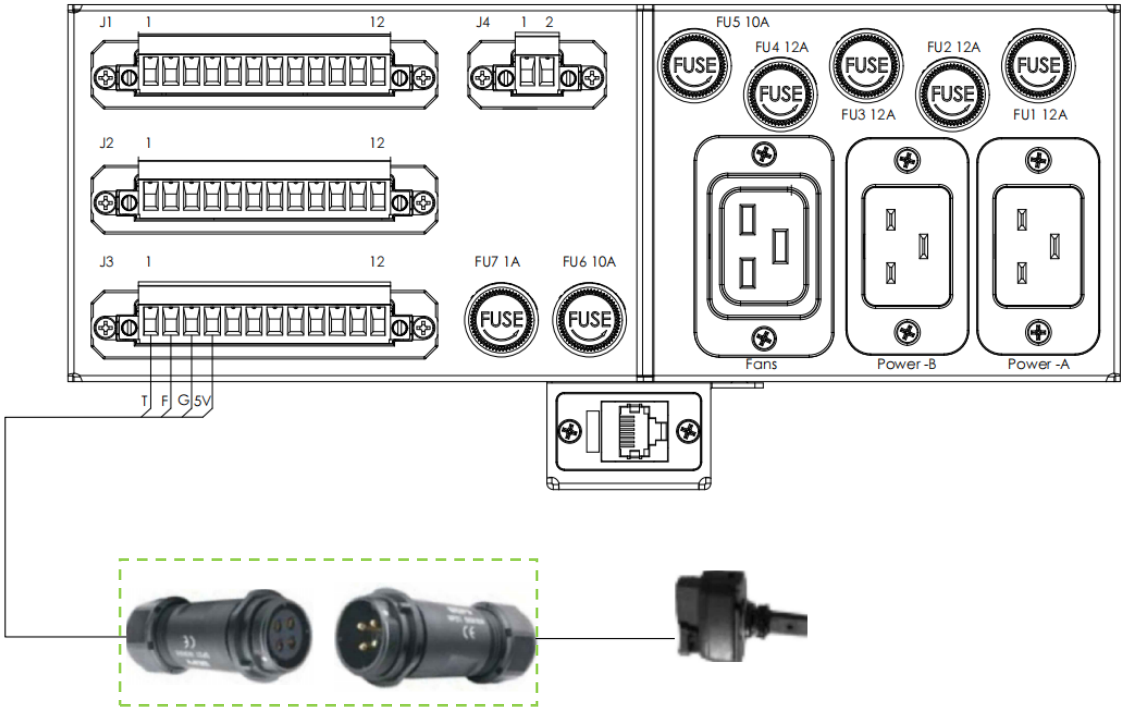



**Figure 59. A20 Harness Connection**

**Table 9. J3 Terminal Ports**

| Terminal | | Wire Number | Description |
|---|---|---|---|
| J3 | Pin 1 | T | Temperature signal of VFS |
| | Pin 2 | F | Flow signal of VFS |
| | Pin 3 | GND | Power supply GND of VFS |
| | Pin 4 | 5V | Power supply 5V of VFS |

## Pressure and Temp Sensor RPS Installation

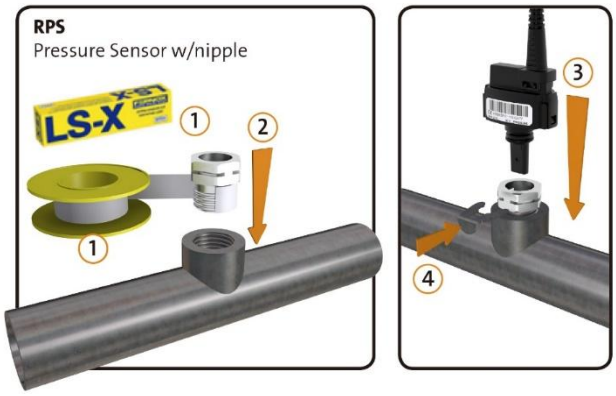



**Figure 60. Installation Diagram**

*Suggest installing the RPS on the leaving water (return) side.

### Power Cable Connection

A21 harness

Sensor Wire Harness

RPS sensor

**Figure 61. Material List**

- Insert the Sensor Wire Harness to the RPS sensor.

**Figure 62. Pre-connection**

- Connect the A21 harness to the corresponding ports on the control box J3 terminal.

- Connect the female connector of the A21 harness to the male connector of the RPS harness, then secure them.

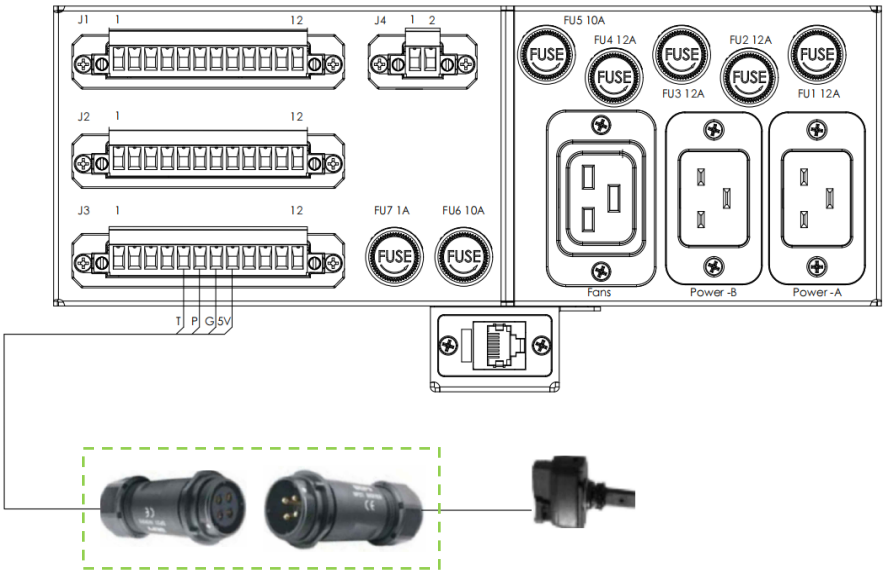



**Figure 63. A21 Harness Connection**

**Table 10. J3 Terminal Ports**

| Terminal | | Wire Number | Description |
|---|---|---|---|
| J3 | Pin 5 | T | Temperature signal of RPS |
| | Pin 6 | P | Pressure signal of RPS |
| | Pin 7 | GND | Power supply GND of RPS |
| | Pin 8 | 5V | Power supply 5V of RPS |

# Part Ⅴ. System Setup and Start-up

## Pre-Activation Checklist

### Physical Inspection

- Ensure the unit is securely mounted and aligned with the designated rack.
- Confirm that all mechanical fasteners and support structures are properly tightened.
- Verify that the cooling unit is free of any physical damage or obstructions.

### Liquid Circuit Checks

- Inspect all flexible hoses and fittings for secure connections and potential leaks.
- Ensure the water inlet and outlet connections comply with specified pressure and temperature requirements.
- Confirm that the isolation valves and pressure-independent control valves (if applicable) are correctly positioned.
- Verify the presence of a properly functioning leakage detection sensor.

### Electrical and Control System Verification

- Ensure both A & B power feeds are correctly connected and securely fastened.
- Confirm that the Automatic Transfer Switch (ATS) is operational (if applicable).
- Verify the integrity of all power and signal cables.
- Check that all network communication lines are correctly wired and terminated.
- Ensure that the control panel and monitoring system are properly mounted and responsive.

## Power-On Procedures

### Power Supply Activation

- Turn on both A & B power sources to supply power to the NovaCool RDHx.
- Verify that the LED status indicators on the control panel illuminate correctly.

### System Initialization

- The unit will conduct a self-diagnostic check to ensure all components are functioning correctly.
- The controller will verify the status of fans and temperature sensors.

### Liquid Circuit Activation

- Open the necessary isolation valves to allow coolant flow through the system.
- Gradually pressurize the system to prevent water hammer effects.

- Ensure that the water temperature and flow rate sensors register stable values.

### Fan and Valve Operation Check

- Initiate a test run of the EC fans and verify that all units are operational.
- If applicable, check that the motorized control valves respond correctly to system commands.
- Confirm System Readiness
- Closely monitor the system for any error messages or warning codes before proceeding.
- Validate that all real-time monitoring parameters (temperature, pressure, flow rate) are within acceptable limits.

## Initial Setup

### Control Panel Configuration

- Access the control panel and navigate to the main menu.
- Verify and adjust the following operational parameters as needed:
  - Target supply air temperature
  - Fan speed settings (Auto/Manual mode)
  - Water flow rate thresholds
  - Leak detection sensitivity
- Network and Communication Setup
- Configure the MODBUS settings for remote monitoring.
- Assign a unique IP address if integrated with a Data Center Infrastructure Management (DCIM) system.
- System Performance Validation
- Conduct a final operational test by running the unit under a simulated load condition.
- Confirm that the cooling capacity meets expected performance levels.
- Record baseline operating data for future maintenance and troubleshooting reference.

# Part VI. Commission Tool Configuration

## Hardware Display

HMI stands for Human-Machine Interface and refers to a dashboard that enables a user to communicate with a machine, computer program or system. Technically, the term HMI can be applied to any screen that someone uses to interact with a device, but it's typically used to describe such screens used in industrial settings. HMIs display real-time data and allow a user to control machinery using a graphical user interface.

The HMI used in this **NovaCool RDHx** is the which features 4.3 wide TFT touchscreen display and packed with an Enclosure.

## Parts Identification

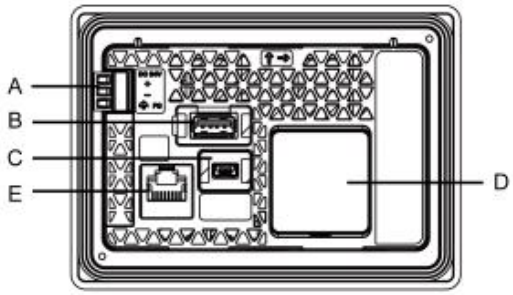



**Figure 64. Parts Diagram**

**Table 11. Parts Identification**

| | |
|---|---|
| A | Power Contactor |
| B | USB (Type-A) Interface |
| C | USB (Mini-B) Interface |
| D | RTC Battery Cover |
| E | Ethernet Interface |
| F | Serial Interface |

# System Status

When the HMI is powered On RDHx System Status is generally displayed.

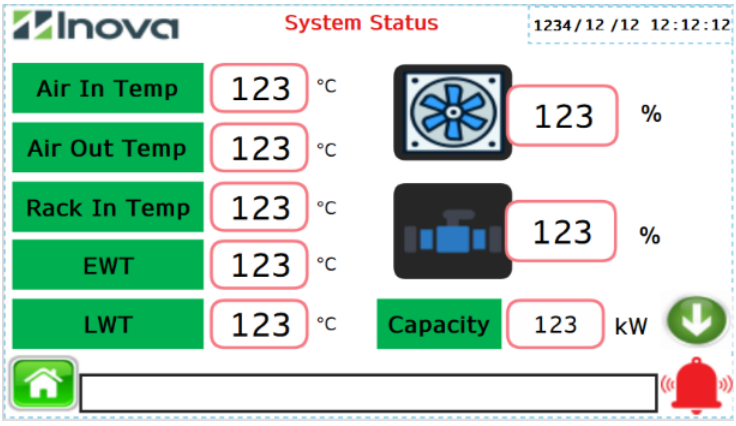



**Figure 65. System Status_1**

- The “Air In Temp” displays the temperature of air entering the coil. This value controls the fan speed.
- The “Air Out Temp” shows the Air off temperature which is controls the Valve Open/Close
- The “Rack in Temp” displays the rack’s front temperature and is used for monitoring only—it does not control any system functions.
- The “EWT” shows the entering water temperature. This value is available only if the VFS sensor is installed.
- The “LWT” shows the Leaving Water (Return Water) temperature from the unit, this value will be available only the RPS sensor is available.
-  symbol is Fan Running Speed,  symbol is Valve Open position.

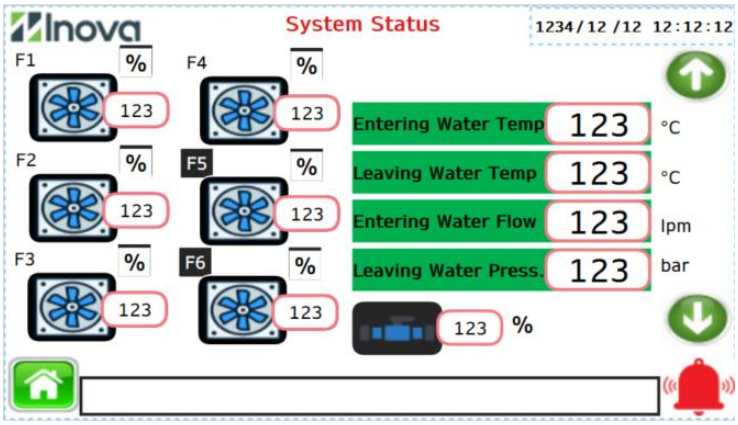



**Figure 66. System Status_2**

- F1 to F6 shows the individual Fan running speed.  symbol is Valve Open Command .
- The “EWT” shows the Entering Water temperature to the unit, this value will be available only the VFS sensor is available.

- The “LWT” shows the Leaving Water temperature from the unit, this value will be available only the RPS sensor is available.
- The “EWF” shows the Entering Water flow to the unit, this value will be available only the VFS sensor is available.
- The “LWP shows the Leaving Water pressure (Return Water) from the unit, this value will be available only the RPS sensor is available.

## Power Status

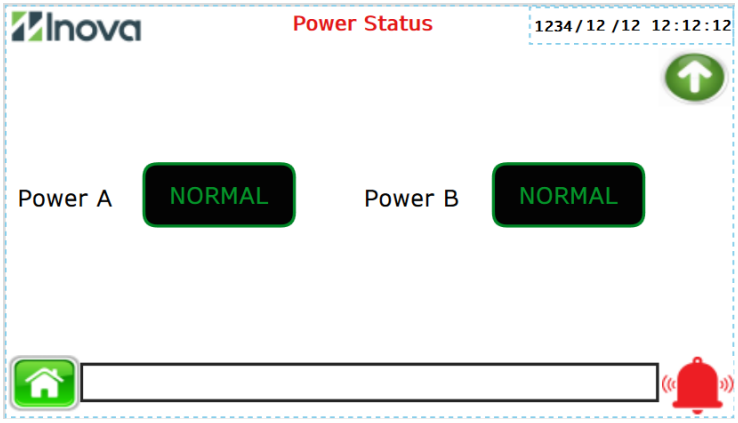



**Figure 67. Power Status**

There are Two Power sources are available in the system POWER A and POWER B.

- IF the Power is available, display shows as Normal.
- IF the Power is not available, display shows as Failure.

## Selection Menu

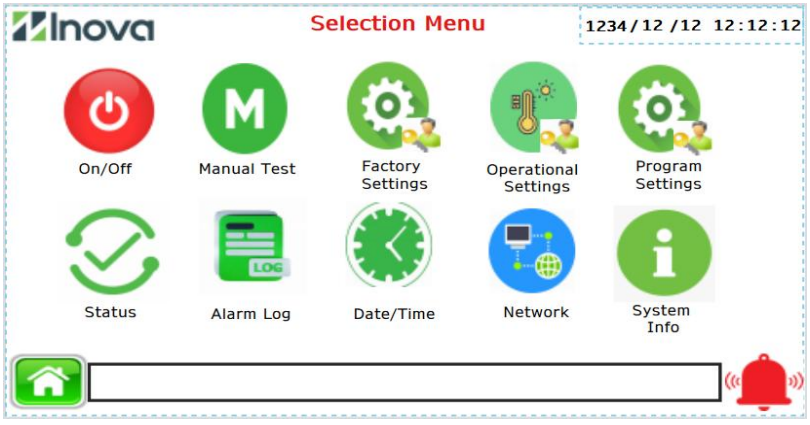



**Figure 68. Selection Menu**

: Unit Turned On/Off here. When the unit is turned off, no alarms will be generated, the fans will not run, and the valve will close except for communication alarms.

: This Symbol navigates to perform a Manual testing of Fan & Valve individually

: This Symbol navigates to set up a factory setting of RDHx, these default values can be editable by end user. Password protected. User: Main; Password :9090

: This Symbol navigates to set up an operator setting of RDHx, these default values can be editable by end user. Password protected. User: Oper; Password :8080

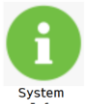
: This Symbol navigates setting up a programmer setting of RDHx, these default values can be editable by Manufacturer Only. Password protected.

: This Symbol navigates to system status; it shows various readings of RDHx.

: This Symbol navigates to an Alarm Log, it shows acknowledged alarms of RDHx.

: This Symbol navigates to Date and Time, adjustable if it's wrong here.

: This Symbol navigates to Network setting, for Web UI or Any other Integration.



: This Symbol navigates to Device information like Model No., Contact detail etc...


: This Symbol navigates to Menu; this will be in all the screens for immediate action.


: This Symbol navigates to Active alarms; this will be on all the screens for immediate action.

: This shows the Active alarms or Un-acknowledged alarm in red background color; this will be in all the screens for immediate action.

## Temperature Settings

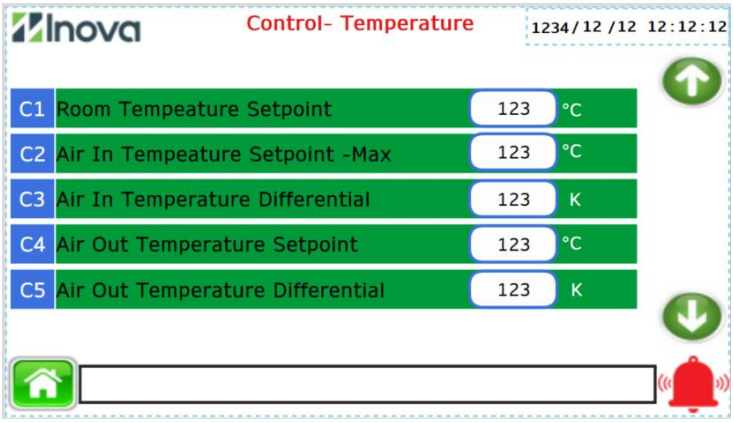



**Figure 69. Temperature Settings**


: This Icon take into the Operational settings screen, password protected.

- The Room & Air in Temperature parameters are used to control the fan speed.
- The difference between Room temperature and Air in Temperature setpoint range over which fan will go from minimum speed and maximum speed.
- The Air Out Temperature parameters are used to control the Valve open/close.
- The differential values are used to calculate the minimum and maximum temperature values that unit has to be operated.

## Control – Fan

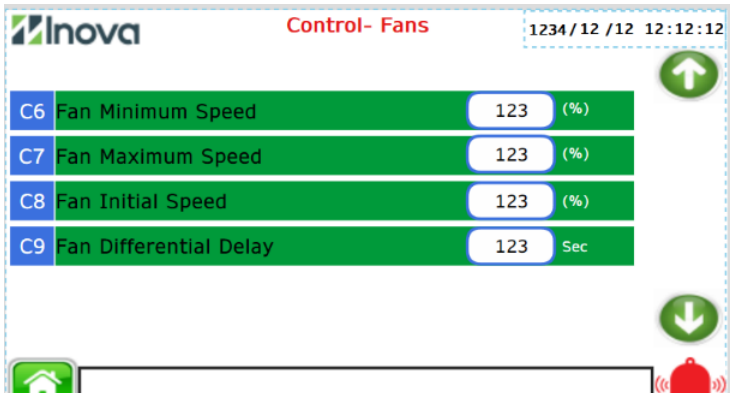



**Figure 70. Control Fans (C6~C9)**

- The fans are controlled by the temperature on the front of RDHx and back side of IT Equipment.
- The fan parameters can be varied depending on equipment and operation parameters.
- The Fan Minimum speed(C6) is the speed a fan operates at when Air in temperature below the Room temperature setpoint.
- In startup all the fans operate at Initial speed(C8).
- The Fan Maximum speed(C7) will have been set at site based on expected maximum speed that unit transfers the heat from the RDHx.
- Fan Differential Delay(C9) is ensuring the fan speed modulation on periodically to avoid the false results.

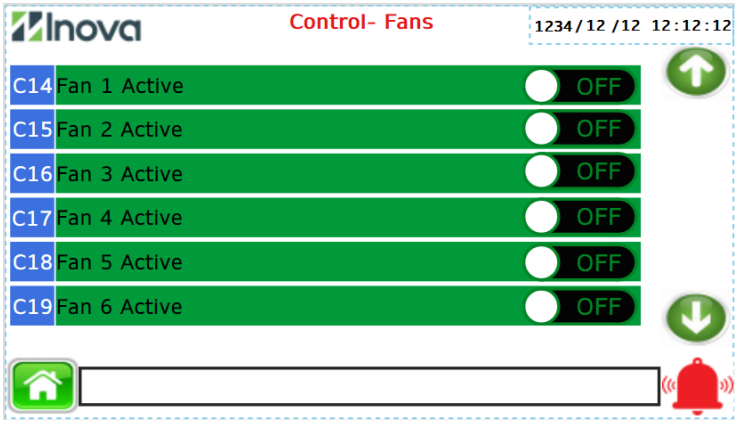



**Figure 71. Control – Fans (C14~C19)**

- No of Fans (C14…C19) can be enabled based on-Site requirements, by default all the fans are active.
- If Fan is not activated, alarms of the corresponding fan also do not activate.

## Control – Valve

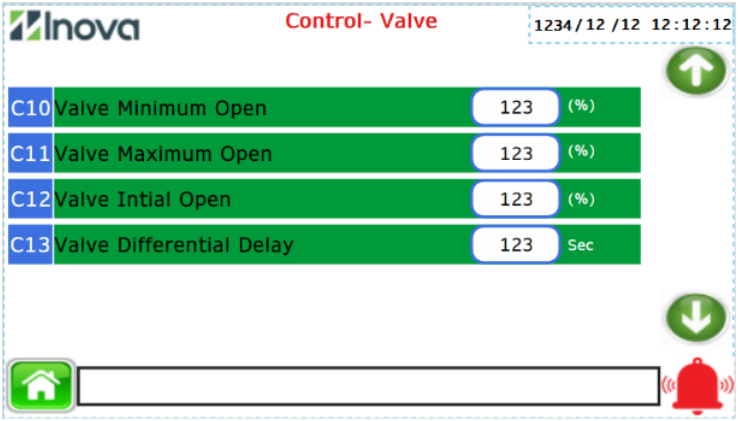



**Figure 72. Control – Valve**

- The valve is controlled purely by the Air Out temperature
- The Valve Minimum Open(C10) is the position when Air Out temperature is below the setpoint.
- In startup all the valve opens at Initial Open position(C12), this can adjust at site conditions.

- The Valve Maximum open(C11) will have been set at site based on the expected maximum speed that unit to transfer the heat from the RDHx.
- Valve differential delay(C13) is ensuring the valve opening periodically to avoid the false results.

## Water Sensor Settings

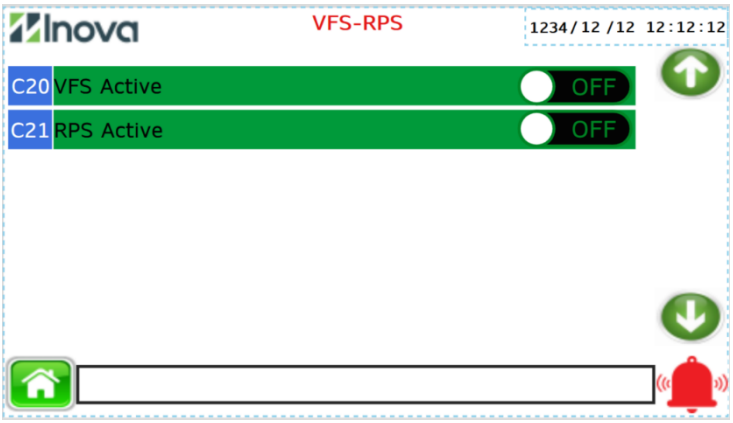



**Figure 73. VFS - RPS**

- VFS is a sensor used to monitor the Supply Water (Entering Water) Temperature and Flow rate.
- RPS is a sensor used to monitor the Return Water (Leaving Water) Temperature and Pressure.
- If these C20, C21 are not On, the functions of the sensor are not activated.

## Alarm Settings

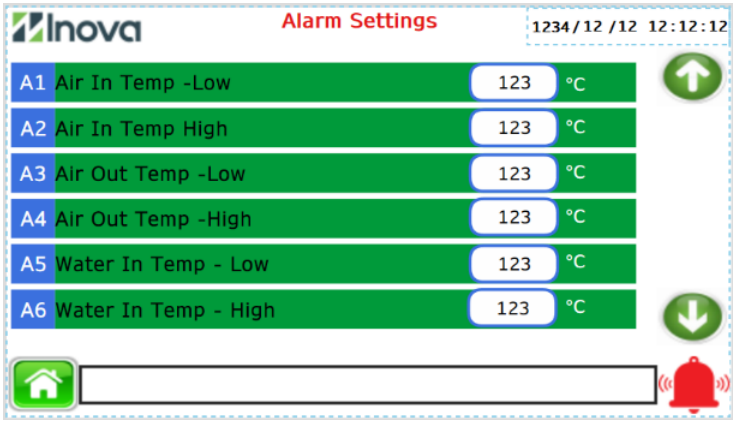



**Figure 74. Alarm Settings (A1~A6)**

- A1 & A2 Setup an Alarm to indicate the Air In temperature at the front of the unit that reaches preset temperature.
- A3 & A4 Setup an Alarm to indicate the Air Out temperature at the back of the rack reaches preset temperature.
- A5 & A6 Setup an Alarm to indicate the Water In temperature to the unit that reaches preset temperature. (Only applicable for VFS sensor availability).

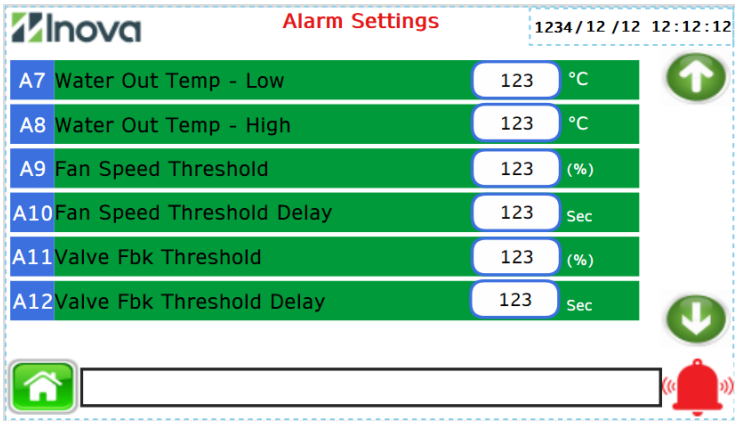



**Figure 75. Alarm Settings (A7~A12)**

- A7 & A8 Setup an Alarm to indicate the Return Water temperature from the unit that reaches preset temperature. (Only applicable for RPSS sensor availability).
- A9 is a Fan threshold value, when the fan run command and actual running feedback are not in the range of threshold % then the fan threshold not in range alarm will appear. A10 is a delay that waits for a time to monitor Fan modulation.
- A11 is a Valve threshold value, when the valve opening command and actual opened feedback are not in the range of threshold % then the valve threshold not in range alarm will appear. A12 is a delay that waits for a time to monitor valve modulation.

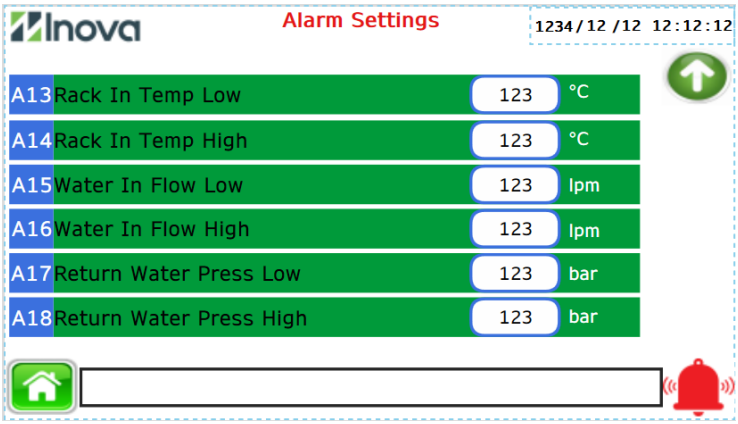



**Figure 76. Alarm Settings (A13~A18)**

- A13 & A14 Setup an Alarm to indicate the Room temperature at the front of the rack reaches preset temperature.
- A15 & A16 Setup an Alarm to indicate the Water In flow rate to the unit that reaches preset value. (Only applicable for VFS sensor availability).
- A17 & A18 Setup an Alarm to indicate the Return Water pressure from the unit that reaches preset value. (Only applicable for RPS sensor availability).

# Factory Settings

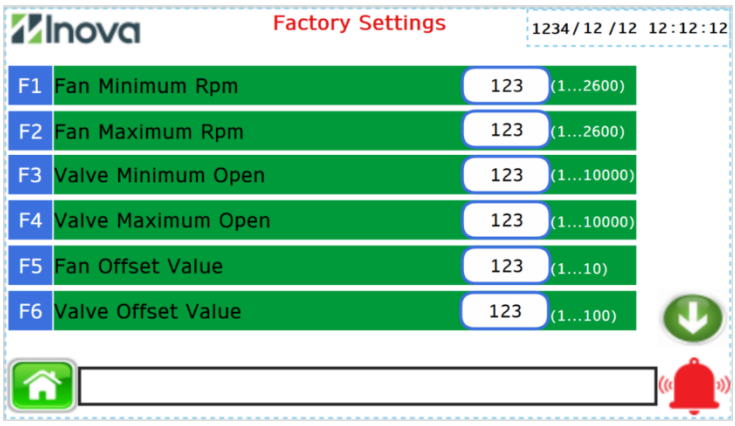



**Figure 77. Factory Settings**


This Icon takes into the factory settings Screen (Maintenance purpose, Password protected.

- F1 & F2 are the parameters of fan, it can be modified at site operations, so that modulation will happen with in this set values.
- F3 & F4 are the parameters of valve, it can be modified at site operations, so that valve position modulation will happen with in this set values.
- F5 & F6 are the Offset parameters to decide the ratio of fan speed and valve opening modulations.

# Leakage Sensor Settings

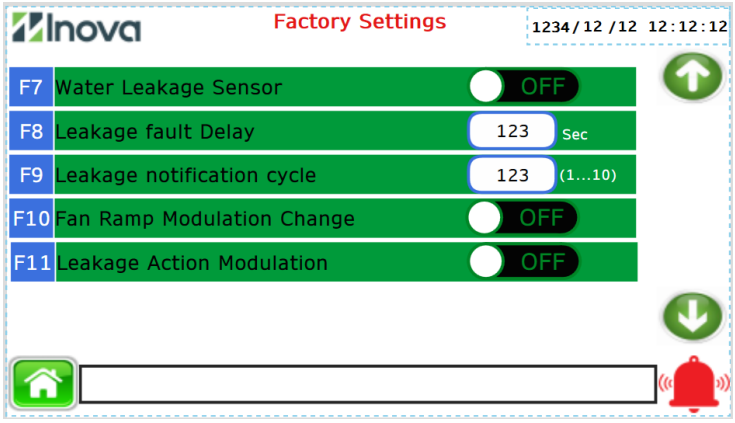



**Figure 78. Leakage Sensor Settings**

- F7 parameter used to activate the leakage sensor function normally it is an optional sensor.
- F8 is delay and F9 is count that decides if the leakage happens during the operation and creates an alarm as leakage fault.
- F10 is an Option to change fan modulation (Optional)
- F11 is start the action due to the leakage fault, if this is parameter is enabled and the leakage fault

happens more than the notify cycle value(F9), then all the fans will be running in maximum speed, and the valve will close completely.

## Preventive Maintenance Settings

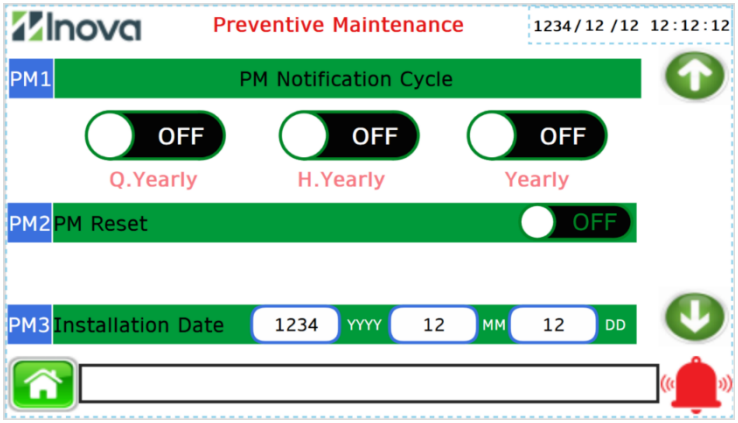



**Figure 79. Preventive Maintenance Settings**

- PM1 Parameter enables the preventive maintenance warning notification from the date of selection (Q. Yearly or H. Yearly or Yearly). It's mandatory to select period to enable PM warning of unit.
- Q. Yearly: Every 3 Months from the date of selection warning  icon will be displayed.
- H. Yearly: Every 6 Months from the date of selection warning icon  will be displayed.
- Yearly: Every 12 Months from the date of selection warning icon  will be displayed.
- PM2 is reset the current period of PM setting, if necessary, only for Maintenance purpose of unit.
- After the PM activity, need to again enable the PM1parameter for next cycle.
- PM3 is an option to enter the Installation date for calculate the number of days from the installation date.

# IO - Status Analog

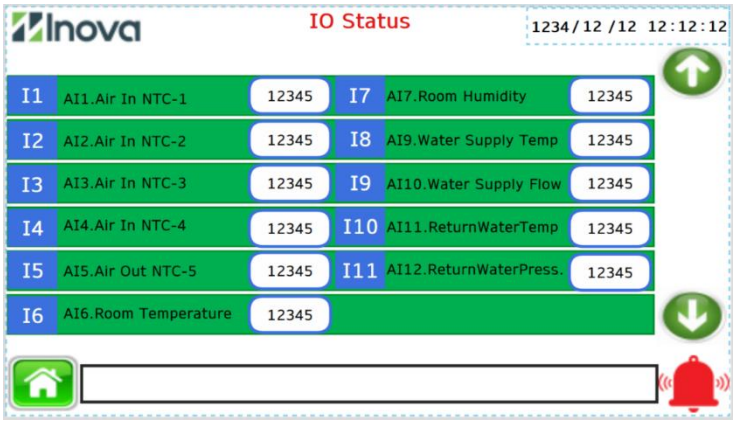



**Figure 80. IO Status Analog**

# IO - Status Digital

- The IO status of Analog & Digital is used to monitor the healthy and working conditions of hardware devices which are used in RDHx.

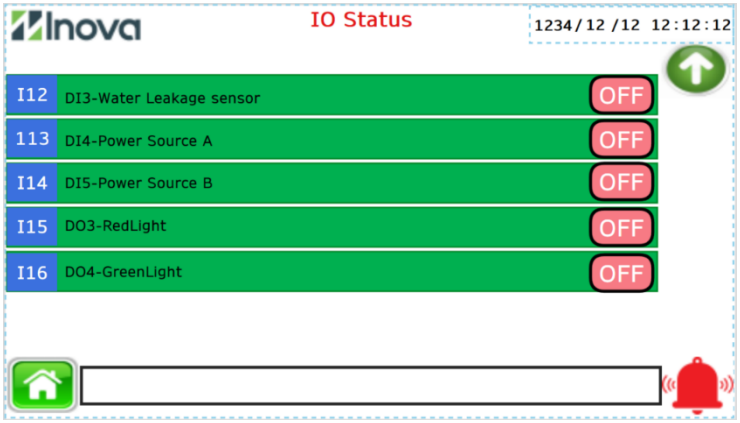



**Figure 81. IO Status Digital**

# Program Settings

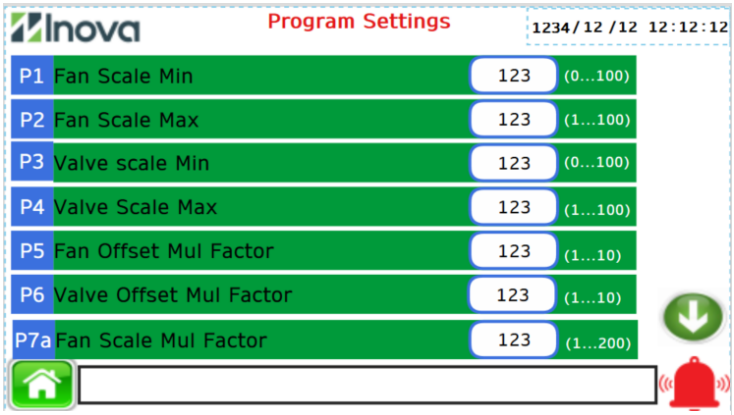



**Figure 82. Program Settings**


This Icon takes into program settings, password protected.

## Alarm Bypass Screen

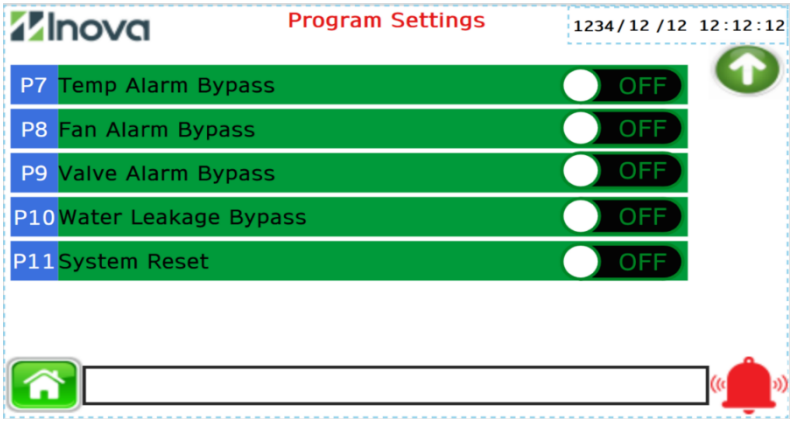



**Figure 83. Alarm Bypass Screen**

Basically, program settings are applicable for Manufacturers, Password protected.

## Network Settings

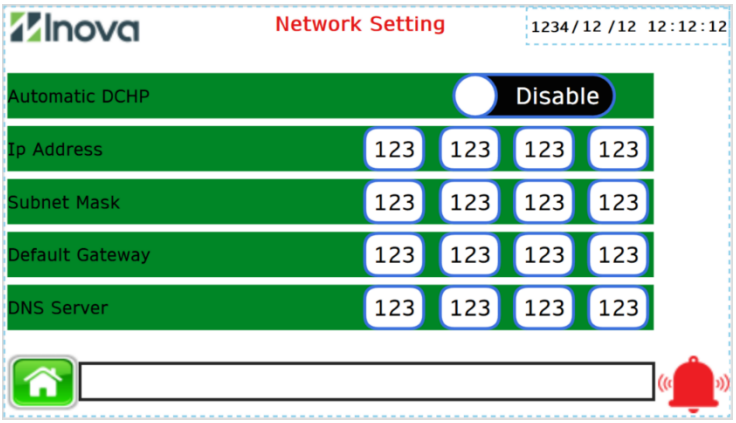



**Figure 84. Network Setting**


This Icon take into Network Settings screen.

- The RDHx is delivered with default Ip Address of 10.0.0.100 or 192.168.0.100 and sub net is 255.255.255.0.
- Ip address and other network details can be edited as per the site network requirement.
- The other method of assigning Ip details is enable the Automatic DCHP method, once the DCHP option is enabled automatically Ip details will assign as per the network connection so the same can use for other integrations.

# Date/Time Settings

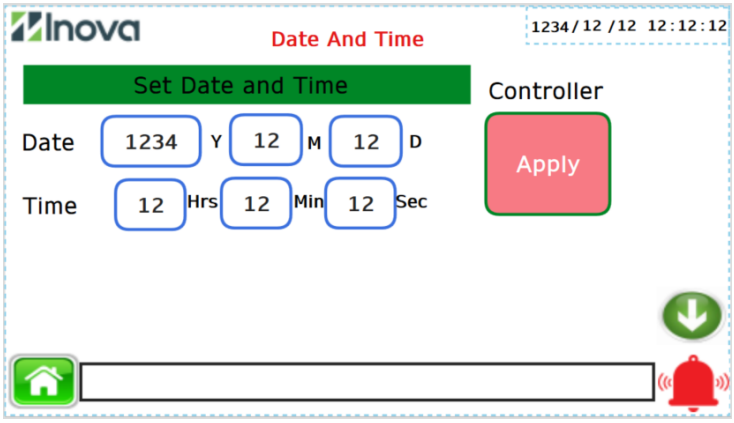



**Figure 85. Data And Time**

Date/Time This Icon takes into Date/Time Adjust screen.

- The RDHx controller has internal date/time memorizing capabilities, but sometimes it necessary to adjust Date/ Time based on region/Zone changes.
- Enter the present Date/Time if it necessary and press the Controller Apply button in the above screen so that actual Date/Time will update to controller, the same timing will follow.
- If the HMI display shows the incorrect Date/Time, then press the Display apply button to adjust the actual Date/Time to Display.

# Manual Testing

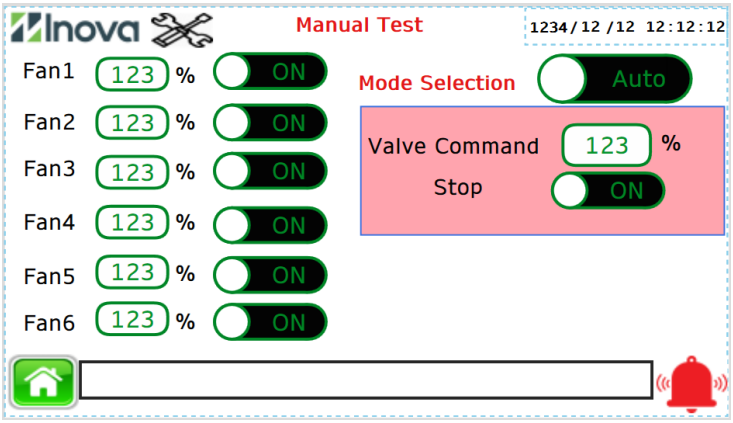



**Figure 86. Manual Test**

Note:

Manual Mode operates only when the unit is “OFF” condition. After testing completes its mandatory to select “Auto” so that system will function in “Auto Mode”

- Select the Manual Mode to test the RDHx in Manual Mode.
- Manual fan test possible here, Set the required speed (10 % to 100%) the fan will start running in manual mode.
- Select the button to “OFF” to stop the fan in manual mode.
- Select the button to “ON” and enter “0” to stop the fan in manual mode. So that fan will not be running.
- Manual Valve test possible here, Set the required opening command (10 % to 100%) the valve will start opening in manual mode.
- Select the Valve stop to “OFF” to stop the valve in manual mode.
- Select the valve stop to “ON” and enter “0” in valve command. So that valve will be fully closed.

# Alarms

## Active Alarm - View

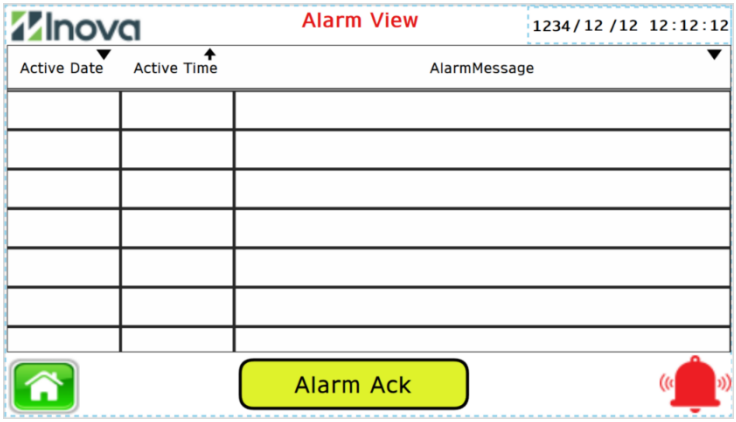



**Figure 87. Alarm View**


This Icon takes into alarm view screen,

- Here we can see all the recent alarms
- If any severe alarm appears it needs to be acknowledged (Press Alarm Ack Button), then it will reset otherwise the alarm state will be in set condition.
- The active alarms display in red background, and acknowledged alarms displayed in white background.

## Active History

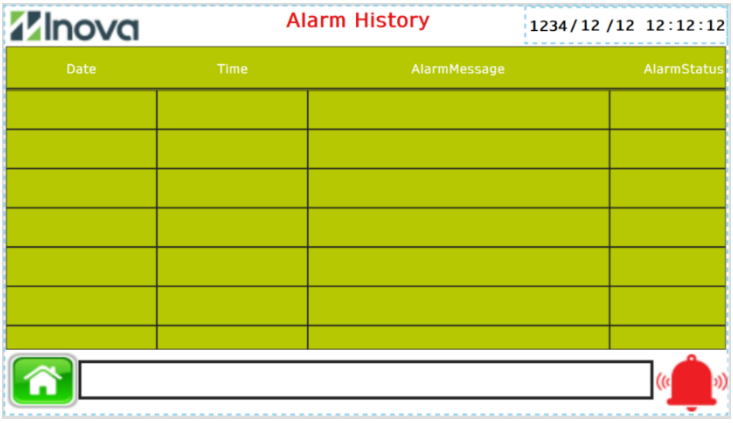



**Figure 88. Alarm History**


This Icon takes into Alarm History screen

- Here we can find the recent logged alarms.
- This will help for maintenance or service engineers to identify the faults and analyze the root cause.

# System Information

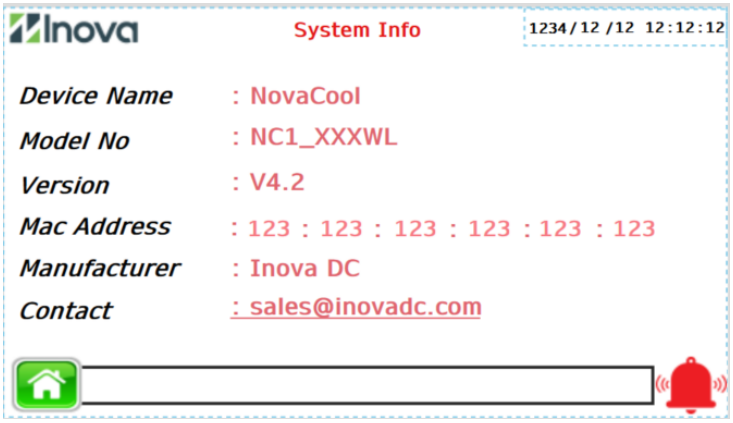



**Figure 89. System Information**


This Icon takes into system information screen.

- THE RDHx unit details has been attached to the above screen, in case of any support client can contact through the above mail is sales@inovadc.com.

# Setting Parameter List

**Table 12. Setting parameter List**

| Parameter Code | Data Type | Address | Name | Available Set values | Factory Set Values | Units |
|---|---|---|---|---|---|---|
| | Bool | 9068 | Unit On/Off | ON/OFF | OFF | |
| **Manual Test** | | | | | | |
| | Bool | 9049 | Fan1_TurnOff | ON/OFF | ON | |
| | Bool | 9050 | Fan2_TurnOff | ON/OFF | ON | |
| | Bool | 9051 | Fan3_TurnOff | ON/OFF | ON | |
| | Bool | 9052 | Fan4_TurnOff | ON/OFF | ON | |
| | Bool | 9053 | Fan5_TurnOff | ON/OFF | ON | |
| | Bool | 9054 | Fan6_TurnOff | ON/OFF | ON | |
| | Bool | 9075 | Mode Selection | Manual/Auto | Auto | |
| | Int | 9076 | Fan1Speed | 0 | 0 | % |
| | Int | 9077 | Fan2Speed | 0 | 0 | % |
| | Int | 9078 | Fan3Speed | 0 | 0 | % |
| | Int | 9079 | Fan4Speed | 0 | 0 | % |
| | Int | 9080 | Fan5Speed | 0 | 0 | % |
| | Int | 9081 | Fan6Speed | 0 | 0 | % |
| | Int | 9082 | Valve Command | 40 | 40 | % |
| | Bool | 9086 | Stop | ON/OFF | ON | |
| **Factory Settings** | | | | | | |
| F1 | Int | 16407 | Fan Minimum Rpm | 0 | 0 | |
| F2 | Int | 16408 | Fan_MaxRpm | 2600 | 2600 | |
| F3 | Int | 16409 | Valve Minimum Open | 0 | 0 | |
| F4 | Int | 16410 | Valve Maximum Open | 10000 | 10000 | |
| F5 | Int | 16411 | Fan Offset Value | 20 | 20 | |
| F6 | Int | 16412 | Valve Offset Value | 20 | 20 | |
| F7 | Bool | 16413 | Water Leakage Sensor | ON/OFF | OFF | |
| F8 | Int | 16414 | Leakage fault Delay | 25 | 25 | Sec |
| F9 | Int | 16415 | Leakage notification cycle | 3 | 3 | |
| F10 | Bool | 16468 | Fan Ramp Modulation Change | ON/OFF | OFF | |
| F11 | Bool | 16480 | Leakage Action Modulation | ON/OFF | OFF | |
| **Preventive Maintenance** | | | | | | |
| PM1 | | | PM Notification Cycle | | | |
| | Int | 16425 | Q. Yearly | ON/OFF | OFF | |
| | Int | 16426 | H. Yearly | ON/OFF | OFF | |
| | Int | 16427 | Yearly | ON/OFF | OFF | |
| PM2 | Bool | 9133 | PM Reset | ON/OFF | OFF | |
| PM3 | | | Installation Date | | | |
| | Int | 16457 | YYYY | | 0 | |

| | | | | | | |
|---|---|---|---|---|---|---|
| | Int | 16458 | MM | | 0 | |
| | Int | 16459 | DD | | 0 | |
| **Fan Replace** | | | | | | |
| PM4 | Int | 9083 | Fan Node Address | 0 | 0 | |
| PM5 | Bool | 9085 | Fan Address Confirm | NO/Confirm | NO | |
| PM6 | Int | 9153 | Reset Fan address to default | 0 | 0 | |
| PM7 | Bool | 9155 | Fan Address Reset | NO/Confirm | NO | |
| **IO Status (No settings required these are actual values)** | | | | | | |
| I1 | Int | 9097 | AI1.Air In NTC-1 | 0 | 0 | |
| I2 | Int | 9098 | AI2.Air In NTC-2 | 0 | 0 | |
| I3 | Int | 9099 | AI3.Air In NTC-3 | 0 | 0 | |
| I4 | Int | 9100 | AI4.Air In NTC-4 | 0 | 0 | |
| I5 | Int | 9101 | AI5.Air Out NTC-5 | 0 | 0 | |
| I6 | Int | 9102 | AI6.Room Temperature | 0 | 0 | |
| I7 | Int | 9103 | AI7.Humidity (Optional) | 0 | 0 | |
| I8 | Int | 9105 | AI9.Water Supply Temp | 0 | 0 | |
| I9 | Int | 9106 | AI10.Water Supply Flow | 0 | 0 | |
| I10 | Int | 9107 | AI11.ReturnWaterTemp | 0 | 0 | |
| I11 | Int | 9108 | AI12.ReturnWaterPress. | 0 | 0 | |
| I12 | Bool | 9109 | DI3-Water Leakage sensor | ON/OFF | OFF | |
| I13 | Bool | 9110 | DI4-Power Source A | ON/OFF | ON | |
| I14 | Bool | 9111 | DI5-Power Source B | ON/OFF | ON | |
| I15 | Bool | 9112 | DO3-RedLight | ON/OFF | OFF | |
| I16 | Bool | 9113 | DO4-GreenLight | ON/OFF | OFF | |
| **Metric Selection** | | | | | | |
| | Bool | 16428 | Celsius/Fahrenheit | C/F | C | |
| | Bool | 16447 | Bar/Psi | Bar/Psi | Bar | |
| | Bool | 16448 | Lpm/Gpm | Lpm/Gpm | Lpm | |
| **Control - Temperature** | | | | | | |
| C1 | Real | 16384 | Room Temperature Setpoint | 24 | 24 | °C |
| C2 | Real | 16388 | Air In Temperature Setpoint -Max | 45 | 45 | °C |
| C3 | Real | 16390 | Air In Temperature Differential | 1 | 1 | K |
| C4 | Real | 16392 | Air Out Temperature Setpoint | 23 | 23 | °C |
| C5 | Real | 16398 | Air Out Temperature Differential | 1 | 1 | K |
| **Control - Fans** | | | | | | |
| C6 | Int | 16400 | Fan Minimum Speed | 30 | 30 | % |
| C7 | Int | 16445 | Fan Maximum Speed | 100 | 100 | % |
| C8 | Int | 16405 | Fan Initial Speed | 30 | 30 | % |
| C9 | Int | 16402 | Fan Differential Delay | 30 | 30 | Sec |
| **Control - Valve** | | | | | | |
| C10 | Real | 16396 | Valve Minimum Open | 15 | 15 | % |
| C11 | Real | 16394 | Valve Maximum Open | 70 | 70 | % |
| C12 | Int | 16446 | Valve Initial Open | 30 | 30 | % |
| C13 | Int | 16401 | Valve Differential Delay | 180 | 180 | Sec |

| | | | | | | |
|---|---|---|---|---|---|---|
| **Control - Fans** | | | | | | |
| C14 | Bool | 16472 | Fan 1 Active | ON/OFF | ON | |
| C15 | Bool | 16473 | Fan 2 Active | ON/OFF | ON | |
| C16 | Bool | 16474 | Fan 3 Active | ON/OFF | ON | |
| C17 | Bool | 16475 | Fan 4 Active | ON/OFF | ON | |
| C18 | Bool | 16476 | Fan 5 Active | ON/OFF | ON | |
| C19 | Bool | 16477 | Fan 6 Active | ON/OFF | ON | |
| **VFS - RPS** | | | | | | |
| C20 | Bool | 16478 | VFS Active | ON/OFF | OFF | |
| C21 | Bool | 16479 | RPS Active | ON/OFF | OFF | |
| **Alarm Settings** | | | | | | |
| A1 | Real | 16449 | Air In Temp -Low | 20 | 20 | °C |
| A2 | Real | 16451 | Air In Temp High | 60 | 60 | °C |
| A3 | Real | 16429 | Air Out Temp -Low | 17 | 17 | °C |
| A4 | Real | 16431 | Air Out Temp -High | 27.3 | 27.3 | °C |
| A5 | Real | 16433 | Water In Temp - Low | 15 | 15 | °C |
| A6 | Real | 16435 | Water In Temp - High | 25 | 25 | °C |
| A7 | Real | 16437 | Water Out Temp - Low | 15 | 15 | °C |
| A8 | Real | 16439 | Water Out Temp - High | 40 | 40 | °C |
| A9 | Int | 16441 | Fan Speed Threshold | 2 | 2 | % |
| A10 | Int | 16442 | Fan Speed Threshold Delay | 30 | 30 | Sec |
| A11 | Int | 16443 | Valve Fbk Threshold | 2 | 2 | % |
| A12 | Int | 16445 | Valve Fbk Threshold Delay | 30 | 30 | Sec |
| A13 | Real | 16386 | Rack In Temp Low | 17 | 17 | °C |
| A14 | Real | 16453 | Rack In Temp High | 27 | 27 | °C |
| A15 | Real | 16460 | Water In Flow Low | 10 | 10 | Lpm |
| A16 | Real | 16462 | Water In Flow High | 140 | 140 | Lpm |
| A17 | Real | 16464 | Return Water Press Low | 2 | 2 | Bar |
| A18 | Real | 16466 | Return Water Press High | 6 | 6 | Bar |
| **Program Settings (No Access Manufacture only)** | | | | | | |
| **Date/Time** | | | | | | |
| Date | Int | 8750, 8749, 8748 | Enter the present date/Time and press to apply to controller | YYYY:MM:DD | | |
| Time | Int | 8746, 8745, 8744 | | HH:MM: SS | | |
| Display | Bool | 8751 | HMI device actual time displays here, Press apply to update actual date/time to display | Apply | | |
| **Hardware Configuration:** - Shows HMI hardware settings (Not Required to change) | | | | | | |
| **Network Setting** | | | | | | |

| | | | | | | |
|---|---|---|---|---|---|---|
| Enable DHCP | Bool | 5818 | Automatic DHCP: If this option enable's Controller will assign its own network IP address and below static IP settings will be disabled | Enable/Disable | Disable | |
| | Int | 5798..5801 | IP address | 10.0.0.100 | 10.0.0.100 | |
| | Int | 5806..5809 | Subnet Mask | 255.255.255.0 | 255.255.255.0 | |
| | Int | 5802..5805 | Default Gateway | 10.0.0.1 | 10.0.0.1 | |
| | Int | 5810..5813 | DNS Server | 8.8.8.8 | 8.8.8.8 | |
| | | | | | | |

# Modbus Register List

**Table 13. Modbus Register List**

| Parameter Code | Data Type | Address | Name | Available set values | Factory Set Values | Units |
|---|---|---|---|---|---|---|
| **Status** | | | | | | |
| | Real | 9064 | Air In Temp | | Actual | °C |
| | Real | 9002 | Air Out Temp | | Actual | °C |
| | Real | 9004 | Rack In Temp | | Actual | °C |
| | Real | 9008 | EWT(Enter Water Temperature) | | Actual | °C |
| | Real | 9012 | LWT(Leaving Water Temperature) | | Actual | °C |
| | Int | 9096 | Fan Speed Command | | Actual | % |
| | Real | 8966 | Valve Open | | Actual | % |
| | Real | 9073 | Capacity | | Actual | Kw |
| | Int | 8960 | F1 Speed | | Actual | % |
| | Int | 8961 | F2 Speed | | Actual | % |
| | Int | 8962 | F3 Speed | | Actual | % |
| | Int | 8963 | F4 Speed | | Actual | % |
| | Int | 8964 | F5 Speed | | Actual | % |
| | Int | 8965 | F6 Speed | | Actual | % |
| | Real | 9008 | Enter Water Temperature | | Actual | °C |
| | Real | 9012 | Leaving Water Temperature | | Actual | °C |
| | Real | 9010 | Entering Water Flow | | Actual | Lpm |
| | Real | 9014 | Leaving Water Press. | | Actual | Bar |
| | Int | 9063 | Valve command | | Actual | % |
| **Power Status** | | | | | | |
| | Bool | 9066 | Power A | Normal/Failure | ON : Normal OFF: Failure | |

| | | | | | | |
|---|---|---|---|---|---|---|
| | Bool | 9067 | Power B | Normal/Failure | ON : Normal OFF: Failure | |

| RS 485 Communication Settings | |
|---|---|
| HMI Display | |
| SIO Type | RS 485 |
| Speed | 38400 |
| Data Length | 8 Bits |
| Parity Bit | Even |
| Stop Bits | 1 Bit |
| Flow Control | None |
| | |
| PLC Configuration (RS 485) | |
| Mode | Modbus Master |
| Baud Rate | 38400 |
| Serial Parity | No Parity |
| Serial Databit | 8 Data bits |
| Serial Stopbit | 2 Stop Bit |
| | |

# Web User Interface Configuration

## Web Configuration

The supported Web browsers are Google Chrome (mobile and desktop), Mozilla Firefox, Microsoft Edge.

## Web Access

Default controller Ip address; 10.0.0.100

Default controller Subnet: 255.255.255.0

Laptop Network Ip should be in this series 10.0.0.XXX

## Log on Web UI

- Step 1: Connect the Lan cable between Controller and Laptop.
- Step 2: Enter the controller Ip address in network browser (10.0.0.100)

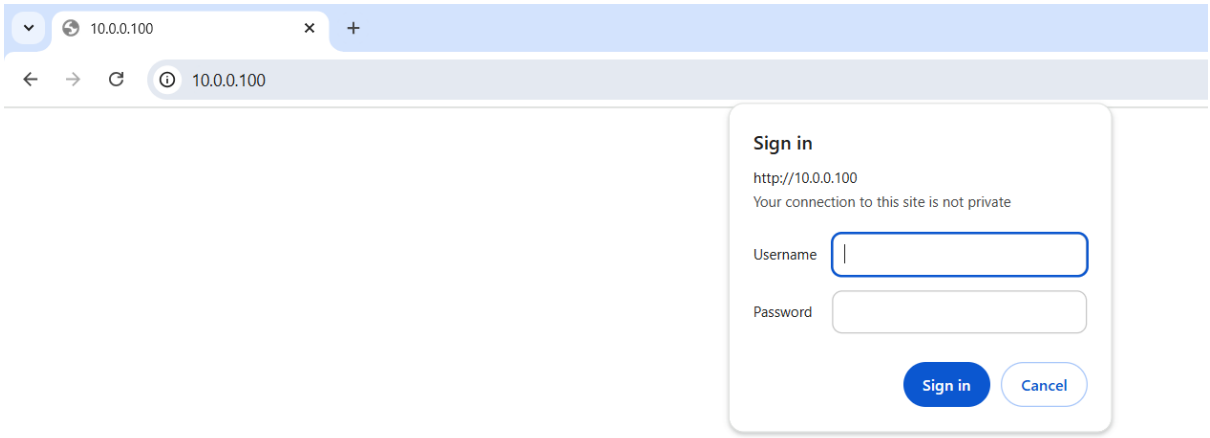



**Figure 90. Sign in**

- Step :3 Enter Username: “administrator”, Default Password: “123456”, then Sign in. The screen below will be displayed.

## Change Password

After successful login, you are required to change the default password. Input the current password and new password twice to confirm. Press “Apply” to complete set up new password.

After successful login below tabs will be displayed.


**Figure 91. Login Tabs**

# Home

**Unit On/Off**

| Address | Name | Value | Um |
|---|---|---|---|
| 9068 | UNIT ON | False | |

**Figure 92. Unit On/Off**

Unit Turned On/Off here. When the unit is turned off, no alarms will be generated, the fans will not run, and the valve will close except for communication alarms.

- Select “true” Unit On and “False” for Off

**Control Status**

| Address | Name | Value | Um |
|---|---|---|---|
| 9064 | Air In Temp (C) | 31 | |
| 9002 | Air Out Temp (C) | 31 | |
| 9004 | Rack In Temp (C) | 31 | |
| 9096 | Fan Speed (%) | 0 | |
| 8966 | Valve Open (%) | 100 | |
| 9073 | Capacity (Kw) | 0 | |

**Figure 93. Control Status**

- The “Air in Temp” shows the Air on into Coil temperature which is controls the Fan speed
- The “Air Out Temp” shows the Air off temperature which is controls the Valve Open/Close
- The “Rack in Temp” shows the Rack front temperature, this has no control function.
- The “Fan speed” shows the fan running speed.
- The “Valve Open” shows position of valve open condition
- The “Capacity” shows the actual running capacity of unit.

**Fan Feedbacks**

| Address | Name | Value | Um |
|---|---|---|---|
| 8960 | Fan1 Speed (%) | | |
| 8961 | Fan2 Speed (%) | | |
| 8962 | Fan3 Speed (%) | | |
| 8963 | Fan4 Speed (%) | | |
| 8964 | Fan5 Speed (%) | | |
| 8965 | Fan6 Speed (%) | | |
| 9063 | Valve Command | | |

**Figure 94. Fan Feedbacks**

- Fan feedback shows the F1 to F6 individual Fan running speed.
- The “EWT” shows the Entering Water temperature to the unit, this value will be available only the VFS sensor is available.
- The “LWT” shows the Leaving Water temperature from the unit, this value will be available only the RPS sensor is available.

- The “EWF” shows the Entering Water flow to the unit, this value will be available only the VFS sensor is available.

**Water Status**

| Address | Name | Value | Um |
|---|---|---|---|
| 9008 | Entering Water Temp (C) | 0 | |
| 9012 | Leaving Water Temp (C) | 0 | |
| 9010 | Entering Water Flow (Lpm) | 0 | |
| 9014 | Leaving Water Press (bar) | 0 | |

**Figure 95. Water Status**

- The “LWP shows the Leaving Water pressure (Return Water) from the unit, this value will be available only the RPS sensor is available.

**Power Status**

| Address | Name | Value | Um |
|---|---|---|---|
| 9066 | Power A Status | 0 | |
| 9067 | Power B Status | 0 | |

**Figure 96. Power Status**

There are Two Power sources are available in the system POWER A and POWER B

- IF the Power is available, display shows as One.

IF the Power is not available, display shows as Zero.

## Control settings

The control page is protected by password, when pressing the Control tab below pop will be displayed.

The password is 8080.

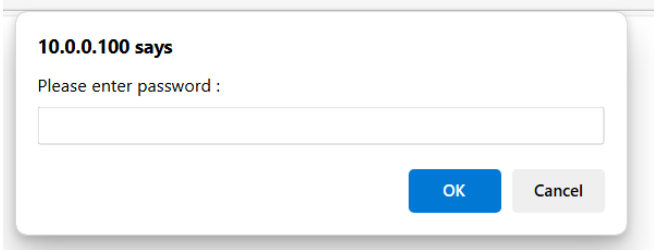



**Figure 97. Sign In**

**Control - Temperature**

| Address | Name | Value | Um |
|---|---|---|---|
| 16384 | Air In Tempeature Setpoint -Min (C) | | |
| 16388 | Air In Tempeature Setpoint -Max (C) | | |
| 16390 | Air In Temperature Differential (k) | | |
| 16392 | Air Out Temperature Setpoint (C) | | |
| 16398 | Air Out Temperature Differential (k) | | |

**Figure 98. Control - Temperature**

- The Room & Air in Temperature parameters are used to control the fan speed.
- The difference between Room temperature and Air in Temperature setpoint range over which fan will go from minimum speed and maximum speed.

- The Air Out Temperature parameters are used to control the Valve open/close.
- The differential values are used to calculate the minimum and maximum temperature values that unit must be operated.

**Control - Fan**

| Address | Name | Value | Um |
|---|---|---|---|
| 16400 | Fan Minimum Speed (%) | 30 | |
| 16445 | Fan Maximum Speed (%) | 100 | |
| 16405 | Fan Initial Speed (%) | 30 | |
| 16402 | Fan Differential Delay (Sec) | 30 | |
| 16472 | Fan 1 Active | True | |
| 16473 | Fan 2 Active | True | |
| 16474 | Fan 3 Active | True | |
| 16475 | Fan 4 Active | True | |
| 16476 | Fan 5 Active | True | |
| 16477 | Fan 6 Active | True | |

**Figure 99. Control - Fan**

- The fans are controlled by the temperature on the front of RDHx and back side of IT Equipment.
- The fan parameters can be varied depending on equipment and operation parameters.
- The Fan Minimum speed is the speed a fan operates at when Air in temperature below the Room temperature setpoint.
- In startup all the fans operate at Initial speed.
- The Fan Maximum speed will have been set at site based on the expected maximum speed that unit transfers the heat from the RDHx.
- Fan differential delay is ensuring the fan speed modulation periodically to avoid the false results.
- Number of Fans can be enabled based on-Site requirements, by default all the fans are active(true).
- If Fan is not activated, the alarms of the corresponding fan also do not activate.

**Control-Valve**

| Address | Name | Value | Um |
|---|---|---|---|
| 16396 | Valve Minimum Open (%) | 15 | |
| 16394 | Valve Maximum Open (%) | 70 | |
| 16446 | Valve Intial Open (%) | 50 | |
| 16401 | Valve Differential Delay (Sec) | 180 | |

**Figure 100. Control - Valve**

- The valve is controlled purely by the Air Out temperature
- The Valve Minimum Open is the position when Air Out temperature is below the setpoint.
- In startup all the valve opens at Initial Open position, this can adjust at site conditions.
- The Valve Maximum open will have been set at site based on the expected maximum speed that unit transfers the heat from the RDHx.
- Valve differential delay is ensuring the valve opening periodically to avoid the false results.

## Factory setting

The control page is protected by password, when pressing the Factory tab below pop will be displayed.

The password is 9090.

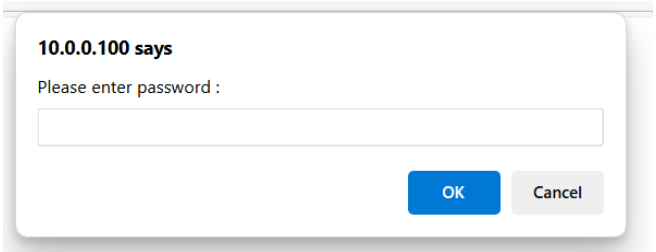



**Figure 101. Password Interface**

Factory Setting

| Address | Name | Value | Um |
|---|---|---|---|
| 16407 | Fan Minimum Rpm | 0 | |
| 16408 | Fan Maximum Rpm | 2600 | |
| 16409 | Valve Minimum Open | 0 | |
| 16410 | Valve Maximum Open | 10000 | |
| 16411 | Fan Offset Value | 20 | |
| 16412 | Valve Offset Value | 20 | |

**Figure 102. Factory Setting**

- Fan minimum Rpm & Fan Maximum Rpm are the parameters of fan, it can be modified at site operations, so that modulation will happen within this set values.
- Valve minimum Open & Valve Maximum Open are the parameters of valve, it can be modified at site operations, so that valve position modulation will happen with in this set values.
- Fan offset & Valve offset are the Offset parameters to decide the ratio of fan speed and valve opening modulations.

## Leakage sensor settings

| | | |
|---|---|---|
| 16413 | Water Leakage Sensor | False |
| 16414 | Leakage fault Delay (Sec) | |
| 16415 | Leakage notification cycle | |
| 9133 | PM Reset | False |
| 16468 | Fan Ramp Modulation Change | False |
| 16480 | Leakage Action Modulation | False |

**Figure 103. Leakage Sensor Setting**

- Water Leakage sensor to activate the leakage sensor function normally is an optional sensor.
- The delay and notification count that decides if the leakage happens during the operation and creates an alarm as leakage fault.
- PM Reset is preventive maintenance setting reset option if necessary for Maintenance purpose of unit.

- Fan Ramp Modulation is an Option to change fan modulation (Optional)

| | | |
|---|---|---|
| 16478 | VFS Active | False |
| 16479 | RPS Active | False |

**Figure 104. Leakage Sensor Setting_2**

- VFS is a sensor used to monitor the Water In supply (Entering Water) Temperature and Flow rate.
- RPS is a sensor used to monitor the Return water (Leaving Water) Temperature and Pressure.
- If the above options are not enabled, the functions of sensor will not be functioned.

## Program Control settings

### Program Control

| Address | Name | Value | Um |
|---|---|---|---|
| 16416 | Fan Scale Min (%) | 0 | |
| 16417 | Fan Scale Max (%) | 100 | |
| 16418 | Valve scale Min (%) | 0 | |
| 16419 | Valve Scale Max (%) | 100 | |
| 16456 | Fan Offset Mul Factor (%) | 4 | |
| 16455 | Valve Offset Mul Factor (%) | 4 | |
| 16420 | Temp Alarm Bypass | False | |
| 16421 | Fan Alarm Bypass | False | |
| 16422 | Valve Alarm Bypass | False | |
| 16423 | Water Leakage Bypass | False | |
| 16424 | System Reset | False | |

**Figure 105. Program Control**

Basically, program settings are applicable for Manufacturers, Password protected.

## Common settings

**Metric Selection**

| Address | Name | Value | Um |
|---|---|---|---|
| 16428 | Celsius / Fahrenheit | False | |
| 16447 | Bar/Psi | False | |
| 16448 | Lpm/Gpm | False | |

**Figure 106. Metric Selection**

Metric selection provides the options to change the units

By default, temperature units are Celsius °C, this can change to Fahrenheit by changing the mode to True.

By default, pressure units are Bar, this can change to Psi by changing the mode to True.

By default, Water flow units are Lpm, this can change to Gpm by changing the mode to True.

## Network Settings

| Address | Name | Value | Um |
|---|---|---|---|
| 15818 | Automatic DCHP | False | flag |
| 8764 | Ip_1_Current | 10 | num |
| 8765 | Ip_2_Current | 0 | num |
| 8766 | Ip_3_Current | 0 | num |
| 8767 | Ip_4_Current | 100 | num |
| 8909 | SubMask_1_Current | 255 | num |
| 8910 | SubMask_2_Current | 255 | num |
| 8911 | SubMask_3_Current | 255 | num |
| 8912 | SubMask_4_Current | 0 | num |
| 8905 | Gateway_1_Current | 10 | num |
| 8906 | Gateway_2_Current | 0 | num |
| 8907 | Gateway_3_Current | 0 | num |
| 8908 | Gateway_4_Current | 1 | num |
| 8913 | DNS_1_Current | 8 | num |
| 8914 | DNS_2_Current | 8 | num |
| 8915 | DNS_3_Current | 8 | num |
| 8916 | DNS_4_Current | 8 | num |

**Figure 107. Network Settings**

- The RDHx is delivered with default Ip Address of 10.0.0.100 or 192.168.0.100 and sub net is 255.255.255.0.
- Ip address and other network details can be edited as per the site network requirement.
- The other method of assigning Ip details is enabled the Automatic DCHP method, once the DCHP option is enabled automatically Ip details will assign as per the network connection so the same can be used for other integrations.

## Date & Time settings

Date&Time

**Date & Time**

| Address | Name | Value | Um |
|---|---|---|---|
| 8742 | YEAR | 25 | num |
| 8741 | MONTH | 3 | num |
| 8740 | DATE | 5 | num |
| 8738 | Hours | 22 | hours |
| 8737 | Minutes | 34 | min |
| 8736 | Seconds | 23 | sec |
| 8751 | Apply | False | flag |

**Figure 108. Date & Time**

- The RDHx controller has internal date/time memorizing capabilities, but sometimes it necessary to adjust Date/ Time based on region/Zone changes.
- Enter the present Date/Time if it necessary and press the Controller Apply button in the above screen so that actual Date/Time will update to controller, the same timing will follow.

- If the HMI display shows the incorrect Date/Time, then press the Display apply button to adjust the actual Date/Time to Display.
- Parameter enables the preventive maintenance warning notification from the date of selection (Q. Yearly or H. Yearly or Yearly). It's mandatory to select a period to enable PM warning of unit.

**PM Settings**

| Address | Name | Value | Um |
|---|---|---|---|
| 16425 | Q.Yearly | False | |
| 16426 | H.Yearly | False | |
| 16427 | Yearly | False | |
| 9133 | SV_PM_Reset | False | |

**Figure 109. PM Settings**

- Q. Yearly: Every 3 Months from the date of selection warning will be displayed.
- H. Yearly: Every 6 Months from the date of selection warning will be displayed.
- Yearly: Every 12 Months from the date of selection warning will be displayed.
- PM Reset is reset the current period of PM setting, if necessary, only for Maintenance purpose of unit.
- After the PM activity, need to again enable the PM1parameter for next cycle.

**Installation Details**

| Address | Name | Value | Um |
|---|---|---|---|
| 16471 | Installation Year | 0 | |
| 16470 | Installation Month | 0 | |
| 16469 | Installation Date | 0 | |

**Figure 110. Installation Details**

Installation details are an option to enter the Installation date for calculate the number of days from the installation date.

## Manual Testing

### Manual

**Mode Selection**

| Address | Name | Value | Um |
|---|---|---|---|
| 9075 | Manual Mode | False True | |

**Figure 111. Mode Selection**

Note: Manual Mode operates only when the unit is "OFF" condition. After testing completes its mandatory to select "false" so that system will function in "Auto Mode"

- Press “True” to Enable the Manual Mode.

**Fan Test**

| Address | Name | Value | Um |
|---|---|---|---|
| 9076 | Fan 1 Speed (%) | 0 | |
| 9049 | Fan 1 TurnOff | False True | |
| 9077 | Fan 2 Speed (%) | 0 | |
| 9050 | Fan 2 TurnOff | False True | |
| 9078 | Fan 3 Speed (%) | 0 | |
| 9051 | Fan 3 TurnOff | False True | |
| 9079 | Fan 4 Speed (%) | 0 | |
| 9052 | Fan 4 TurnOff | False True | |
| 9080 | Fan 5 Speed (%) | 0 | |
| 9053 | Fan 5 TurnOff | False True | |
| 9081 | Fan 6 Speed (%) | 0 | |
| 9054 | Fan 6 TurnOff | False True | |

**Figure 112. Fan Test**

- Manual fan test possible here, Set the required speed (10 % to 100%) the fan will start running in manual mode.
- Select the Fan turn off to “True” to stop the fan in manual mode.
- Select the Fan turn off to “False” and enter “0” in fan speed Field. So that fan will not be running.

**Valve Test**

| Address | Name | Value | Um |
|---|---|---|---|
| 9082 | Valve Command (%) | 40 | |
| 9086 | Valve Stop | False True | |

**Figure 113. Valve Test**

- Manual Valve test possible here, Set the required opening command (10 % to 100%) the valve will start opening in manual mode.
- Select the Valve stop to “True” to stop the valve in manual mode.
- Select the valve stop to “False” and enter “0” in valve command. So that valve will be fully closed.

## IO Status

- The IO status of Analog & Digital is used to monitor the healthy and working conditions of hardware devices which are used in RDHx.

**IO Status-Digital**

| Address | Name | Value | Um |
|---|---|---|---|
| 8194 | DI3-Water Leakage Sensor | 0 | flag |
| 8195 | DI4-Power Source A | 0 | flag |
| 8196 | DI5-Power Source B | 0 | flag |
| 8530 | DO3 - RedLight | 1 | flag |
| 8531 | DO4-GreenLight | 1 | flag |

**Figure 114. IO Status - Digital**

IO

**IO Status-Analog**

| Address | Name | Value | Um |
|---|---|---|---|
| 9097 | AI1. Air In NTC-1 | 306 | |
| 9098 | AI1. Air In NTC-2 | 310 | |
| 9099 | AI1. Air In NTC-3 | 319 | |
| 9100 | AI1. Air In NTC-4 | 306 | |
| 9101 | AI1. Air Out NTC-5 | 304 | |
| 9102 | 6. Room Temperature | 315 | |
| 9105 | 9. Water Supply Temp | ----- | |
| 9106 | 10. Water Supply Flow | ----- | |
| 9107 | 11. ReturnWaterTemp | ----- | |
| 9108 | 12. ReturnWaterPress. | ----- | |

**Figure 115. IO Status - Analog**

## Alarm Settings

Alarm Setting

| Address | Name | Value | Um |
|---|---|---|---|
| 16449 | A1 : Air In Temp Low | 15 | |
| 16451 | A2 : Air In Temp High | 60 | |
| 16429 | A3 : Air Out Temp Low | 15 | |
| 16431 | A4 : Air Out Temp High | 60 | |
| 16433 | A5 : Water In Temp Low | 15 | |
| 16435 | A6 : Water In Temp High | 60 | |

**Figure 116. Alarm Setting (A1~A6)**

- A1 & A2 Setup an Alarm to indicate the Air In temperature at the front of the unit that reaches preset temperature.
- A3 & A4 Setup an Alarm to indicate the Air Out temperature at the back of the rack reaches preset temperature.

- A5 & A6 Setup an Alarm to indicate the Water In temperature to the unit that reaches preset temperature. (Only applicable for VFS sensor availability).

| | | |
|---|---|---|
| 16437 | A7 : Water Out Temp Low | 15 |
| 16439 | A8 : Water Out Temp High | 60 |
| 16441 | A9 : Fan speed Threshold | 2 |
| 16442 | A10 : Fan speed Threshold Delay | 10 |
| 16443 | A11 : Valve Fbk Threshold | 2 |
| 16444 | A12 : Valve Fbk Threshold Delay | 10 |

**Figure 117. Alarm Setting (A7~A12)**

- A7 & A8 Setup an Alarm to indicate the Return Water temperature from the unit that reaches preset temperature. (Only applicable for RPSS sensor availability)
- A9 is a Fan threshold value, when the fan run command and actual running feedback are not in the range of threshold % then the fan threshold not in range alarm will appear. A10 is a delay that waits for a time to monitor Fan modulation.
- A11 is a Valve threshold value, when the valve opening command and actual opened feedback are not in the range of threshold % then the valve threshold not in range alarm will appear. A12 is a delay that waits for a time to monitor valve modulation.

| | | |
|---|---|---|
| 16386 | A13 : Rack In Temp Low | 10 |
| 16453 | A14 : Rack In Temp High | 20 |
| 16460 | A15 : Water In Flow Low | 10 |
| 16462 | A16 : Water In Flow High | 40 |
| 16464 | A17 : Return Water Pressure Low | 2 |
| 16466 | A18 : Return Water Pressure High | 10 |

**Figure 118. Alarm Setting (A13~A18)**

- A13 & A14 Setup an Alarm to indicate the Room temperature at the front of the rack reaches preset temperature.
- A15 & A16 Setup an Alarm to indicate the Water In flow rate to the unit that reaches preset value. (Only applicable for VFS sensor availability).
- A17 & A18 Setup an Alarm to indicate the Return Water pressure from the unit that reaches preset value. (Only applicable for RPS sensor availability).

# Part Ⅶ. Maintenance and Troubleshooting

## Weekly Checks

- Visual Inspection: Inspect the unit for any visible signs of wear, leaks, or corrosion.
- Leak Detection Sensor: Verify the operation of the leakage detection sensor. Ensure that it is free of obstructions and that the signal response is functioning correctly.
- Cooling System Status: Check the coolant flow rate and water pressure to ensure they are within the recommended operating range.

## Monthly Maintenance

- Fan Operation Check: Inspect and test the EC fans to ensure smooth operation. Check for unusual vibrations or noise that may indicate wear or imbalance.
- Control Panel Functionality: Verify the response of the control panel buttons and the accuracy of displayed readings. Ensure all LED indicators and status alarms are functioning correctly.
- Piping and Connections: Inspect all water pipes, hoses, and fittings for signs of wear, corrosion, or leaks. Ensure that connections are tight and that there are no blockages.

## Quarterly Checks

- Internal Components Inspection: Open the unit (if safe to do so) and inspect internal components such as the heat exchanger and fans for dust accumulation or damage.
- Electrical Connections: Check all electrical connections for proper tightness and insulation. Ensure that power feeds (A & B) are connected securely and show no signs of wear or deterioration.
- Calibration and Adjustment: Calibrate the temperature sensors, flow rate sensors, and other monitoring devices to ensure accurate performance readings.

## Annual Maintenance

- Comprehensive System Check: Perform a comprehensive review of the entire system, ensuring that all components are in good working condition and have no potential points of failure.
- Fan and Valve Maintenance: Conduct a thorough inspection of the fans, motors, and valves, replacing any parts that are worn or damaged.
- System Software Update: Ensure that the unit's firmware and software are up to date with the latest improvements and security patches.

# Cleaning and Water Quality Management

## Cleaning Guidelines

- Fan Cleaning: Periodically clean the EC fans using a soft brush or compressed air to remove any dust or debris that may obstruct airflow. Ensure that fans are powered off before cleaning.
- Heat Exchanger Cleaning: Use appropriate cleaning solutions (non-corrosive) to clean the heat exchanger surface. Ensure the solution does not damage the fins or interfere with heat transfer efficiency.
- Control Panel Cleaning: Clean the control panel and surrounding areas using a dry cloth. Avoid using abrasive materials that may scratch or damage the display.
- Exterior Surface Cleaning: Wipe down the unit's exterior with a soft cloth dampened with water and mild detergent. Avoid harsh chemicals that may degrade the unit's finish.

## Water Quality Management

- Water Quality Monitoring: Regularly test the water quality in the cooling system. Check for pH levels, conductivity, and contaminant concentrations. Ensure that water is free from minerals that can cause scaling or corrosion.
- Water Treatment: If necessary, treat the water with a suitable cooling water additive to prevent corrosion, scaling, and microbiological growth.
- Water Filter Maintenance: If the system is equipped with filters, inspect and clean or replace them at regular intervals as recommended by the manufacturer.
- Water Chemistry Adjustment: Regularly adjust the water chemistry to maintain proper water hardness and alkalinity. This will ensure the longevity of internal components and improve overall system efficiency.

# Alarms & Trouble shooting

**Table 12. Alarm & Trouble shooting**

| Code | Description | Causes | Solution |
|---|---|---|---|
| A01 | Valve Communication Fault | 1.NO communication between Controller & Valve.<br>2.RS 485 Communication Lost | 1.Make sure the Valve power 24V DC cable “A 17” connected correct way in “J1” Connector.<br>2.Make sure the Communication cable “A17” connected correct way in “J1” Connector. |
| A02 | Fan1 Communication Fault | 1.NO communication between controller & Fan 1.<br>2.RS 485 Communication Lost | 1.Make sure the Fan 1 single phase power connection cable “A11” in “J21” Connector.<br>2.Make sure the Communication cable “A05_1” connected correct way in “J21” Connector. |
| A03 | Fan2 Communication Fault | 1.NO communication between controller & Fan 2.<br>2.RS 485 Communication Lost | 1.Make sure the Fan 2 single phase power connection cable “A12” in “J22” Connector. 2.Make sure the Communication cable “A05_2” connected correct way in “J22” Connector. |
| A04 | Fan3 Communication Fault | 1.NO communication between controller & Fan 3.<br>2.RS 485 Communication Lost | 1.Make sure the Fan 3 single phase power connection cable “A13” in “J23” Connector.<br>2.Make sure the Communication cable “A05_3” connected correct way in “J23” Connector. |
| A05 | Fan4 Communication Fault | 1.NO communication between controller & Fan 4.<br>2.RS 485 Communication Lost | 1.Make sure the Fan 4 single phase power connection cable “A14” in “J24” Connector.<br>2.Make sure the Communication cable “A05_4” connected correct way in “J24” Connector. |
| A06 | Fan5 Communication Fault | 1.NO communication between controller & Fan 5.<br>2.RS 485 Communication Lost | 1.Make sure the Fan 5 single phase power connection cable “A15” in “J25” Connector.<br>2.Make sure the Communication cable “A05_5” connected correct way in “J25” Connector. |
| A07 | Fan6 Communication Fault | 1.NO communication between controller & Fan 6.<br>2.RS 485 Communication Lost | 1.Make sure the Fan 6 single phase power connection cable “A16” in “J26” Connector.<br>2.Make sure the Communication cable “A05_6” connected correct way in “J26” Connector. |
| A08 | Power Source A fault | 1.NO incoming power source 200V – | 1. Make sure the power |

| | | | |
|---|---|---|---|
| | | 240V AC in C19/20 connector | source is available in power A connector<br>2. Make sure FU1, FU2 is healthy .<br>3.Make sure relay KA1 is healthy |
| A10 | In Temp Sensor 1 failed | 1.Air In temperature sensor 1 failed to send the values | 1.Make sure the temperature sensor “U1-TS1” physically not damaged.<br>2. Make sure the “U1-TS1” cable connected correct way in “J2” connector.<br>3. Make sure the “CAN 5” connector connected properly in controller. |
| A11 | In Temp Sensor 2 failed | 1.Air In temperature sensor 2 failed to send the values | 1.Make sure the temperature sensor “U2-TS2” physically not damaged.<br>2. Make sure the “U2-TS2” cable connected correct way in “J2” connector.<br>3. Make sure the “CAN 5” connector connected properly in controller. |
| A12 | In Temp Sensor 3 failed | 1.Air In temperature sensor 3 failed to send the values | 1.Make sure the temperature sensor “B1-TS3” physically not damaged.<br>2. Make sure the “B1-TS3” cable connected correct way in “J2” connector.<br>3. Make sure the “CAN 5” connector connected properly in controller. |
| A13 | In Temp Sensor 4 failed | 1.Air In temperature sensor 4 failed to send the values | 1.Make sure the temperature sensor “B2-TS4” physically not damaged.<br>2. Make sure the “B2-TS4” cable connected correct way in “J2” connector.<br>3. Make sure the “CAN 5” connector connected properly in controller. |
| A14 | Room Temperature sensor Failed | 1.Room temperature sensor failed to send the values | 1.Make sure the Room temperature sensor “TS6” physically not damaged.<br>2. Make sure the “TS6” cable connected correct way in “J2” connector.<br>3. Make sure the “CAN 5” connector connected properly in controller. |
| A15 | Room Humidity Sensor Failed<br>(Spare) | 1.Room humidity sensor failed to send the values | 1.Make sure the Room humidity sensor “TS7” physically not damaged.<br>2. Make sure the “TS7” cable connected correct way in “J2” connector.<br>3. Make sure the “CAN 5” connector connected |

| | | | |
|---|---|---|---|
| | | | properly in controller. |
| A16 | Air Out Temperature Sensor Failed | 1.Air Outlet temperature sensor failed to send the values | 1.Make sure the outlet temperature sensor “TS5” physically not damaged.<br>2. Make sure the “TS5” cable connected correct way in “J2” connector.<br>3. Make sure the “CAN 5” connector connected properly in controller. |
| A17 | In Water Flow Sensor Failed | 1.The VFS sensor failed to send the values. | 1. Make sure the VFS sensor is physically not damaged.<br>2. Make sure the 5V dc cable “A20” connected correct way in “J3” connector.<br>3. Make sure the signal transmission cable “A20” connected correct way in “J3” connector.<br>4. Make sure the “CAN 13” connector connected properly in controller. |
| A18 | In Water Temperature Sensor Failed | 1.The VFS sensor failed to send the values. | 1. Make sure the VFS sensor is physically not damaged.<br>2. Make sure the 5V dc cable “A20” connected correct way in “J3” connector.<br>3. Make sure the signal transmission cable “A20” connected correct way in “J3” connector.<br>4. Make sure the “CAN 13” connector connected properly in controller. |
| A19 | Return Water Temperature Sensor Failed | 1.The RPS sensor failed to send the values. | 1. Make sure the RPS sensor is not damaged physically.<br>2. Make sure the 5V dc cable “A21” connected correct way in “J3” connector.<br>3. Make sure the signal transmission cable “A21” connected correct way in “J3” connector.<br>4. Make sure the “CAN 13” connector connected properly in controller. |
| A21 | Air In Temperature is High | 1.Actual Air in temperature is higher than the set value. | 1. Make sure the correct parameter set value in Alarm settings screen in HMI or Web UI.<br>2. Make sure all the fans are running as per the values which are displayed on the status screen. Not below the displayed values.<br>3.If above points are ok then press the Alarm Ack button in HMI. |

| | | | |
|---|---|---|---|
| A22 | Air In Temperature is Low | 1.Actual Air in temperature is lower than the set value. | 1. Make sure the correct parameter set value in Alarm settings screen in HMI or Web UI.<br>2. Make sure all the fans are running as per the values which are displayed on the status screen. Not maximum the displayed values.<br>3.If above points are ok then press the Alarm Ack button in HMI. |
| A23 | Air Out Temperature is High | 1.Actual Air out temperature is higher than the set value. | 1. Make sure the correct parameter set value in Alarm settings screen in HMI or Web UI.<br>2. Make sure the valve is running as per the values which are displayed on the status screen.<br>3. Make sure proper water flow is available.<br>4. If above points are ok then press the Alarm Ack button in HMI. |
| A24 | Air Out Temperature is Low | 1.Actual Air out temperature is lower than the set value. | 1. Make sure the correct parameter set value in Alarm settings screen in HMI or Web UI.<br>2. Make sure the valve is running as per the values which are displayed on the status screen.<br>3. Make sure proper water flow is available.<br>4. If above points are ok then press the Alarm Ack button in HMI. |
| A25 | Room Temperature is High | 1.Actual room temperature (Rack In) is higher than the set value. | 1. Make sure the correct parameter set value in Alarm settings screen in HMI or Web UI.<br>2. Make sure room infra temperature like AC or centralizing system.<br>3.If above points are ok then press the Alarm Ack button in HMI. |
| A26 | Room Temperature is Low | 1.Actual room temperature (Rack In) is lower than the set value. | 1. Make sure the correct parameter set value in Alarm settings screen in HMI or Web UI.<br>2. Make sure room infra temperature like AC or centralizing system.<br>3.If above points are ok then press the Alarm Ack button in HMI. |
| A27 | Air In Process Temperature High | If fan is running at high speed still actual air in temperature is higher than the set value, then this fault occurs. | 1.Make sure all the fans are running as per the command<br>2.Make sure the temperature sensors are functioning properly.<br>3.If server is running as higher temperature then |

| | | | |
|---|---|---|---|
| | | | adjust the “Room temperature setpoint “in control-temperature screen.<br>4. If above points are ok then press the Alarm Ack button in HMI. |
| A28 | Air In Process Temperature Low | If fan is running at minimum speed still actual air in value is lower than the set value, then this fault occurs. | 1.Make sure all the fans are running as per the command<br>2.Make sure the temperature sensors are functioning properly.<br>3.If server is running as lower temperature then adjust the “Room temperature setpoint” in control-temperature screen.<br>4. If above points are ok then press the Alarm Ack button in HMI. |
| A29 | Air Out Process Temperature High | If valve is maximum open still actual air outlet temperature is higher than the set value, then this fault occurs. | 1.Make sure the valve is open as per the command.<br>2. Make sure the outlet temperature sensor is functioning properly.<br>3. Make sure there is enough water supplied to the unit. If it requires adjust the “Air out temperature set point” in Control – Temperature Screen<br>4. If above points are ok then press the Alarm Ack button in HMI. |
| A30 | Air Out Process Temperature Low | If valve is minimum open and the actual air outlet temperature is lower than the set value, then this fault occurs. | 1.Make sure the valve is open as per the command<br>2. Make sure the outlet temperature sensor is functioning properly.<br>3. Make sure there is enough water supplied to the unit. If it requires adjust the “Air out temperature set point” in Control – Temperature Screen<br>4. If above points are ok then press the Alarm Ack button in HMI. |
| A31 | Water Leakage Fault (Need Action) | Leakage sensor detects the water leak | 1.Water leakage fault is optional; it detects the fault when leakage sensor enabled<br>2. Make sure there is not any water leakage.<br>3.Is there any leakage found fixed it.<br>4.If it requires adjusting the leakage fault delay or notifications cycle in factory settings screen.<br>5.If above points are ok then press the Alarm Ack button in HMI. |
| A32 | Fan1 Threshold Value Not in | If the fan1 run command and actual running feedback is not in the threshold set value, then this fault | 1. Make sure the fan1 is in running condition.<br>2.Make sure the fan1 |

| | | | |
|---|---|---|---|
| | Range | occurs | running feedback and run command are within threshold setting range.<br>3.If it requires adjusting the fan speed threshold value in alarm settings screen.<br>4. If above points are ok then press the Alarm Ack button in HMI. |
| A33 | Fan2 Threshold Value Not in Range | If the fan2 run command and actual running feedback is not in the threshold set value, then this fault occurs | 1. Make sure the fan2 is in running condition.<br>2. Make sure the fan2 running feedback and run command are within threshold setting range.<br>3.If it requires adjusting the fan speed threshold value in alarm settings screen.<br>4. If above points are ok then press the Alarm Ack button in HMI. |
| A34 | Fan3 Threshold Value Not in Range | If the fan3 run command and actual running feedback is not in the threshold set value, then this fault occurs | 1. Make sure the fan3 is in running condition.<br>2. Make sure the fan3 running feedback and run command are within threshold setting range.<br>3.If it requires adjusting the fan speed threshold value in alarm settings screen.<br>4. If above points are ok then press the Alarm Ack button in HMI. |
| A35 | Fan4 Threshold Value Not in Range | If the fan4 run command and actual running feedback is not in the threshold set value, then this fault occurs | 1. Make sure the fan4 is in running condition.<br>2. Make sure the fan4 running feedback and run command are within threshold setting range.<br>3.If it requires adjusting the fan speed threshold value in alarm settings screen.<br>4. If above points are ok then press the Alarm Ack button in HMI. |
| A36 | Fan5 Threshold Value Not in Range | If the fan5 run command and actual running feedback is not in the threshold set value, then this fault occurs | 1.Make sure the fan5 is in running condition.<br>2. Make sure the fan5 running feedback and run command are within threshold setting range.<br>3.If it requires adjusting the fan speed threshold value in alarm settings screen.4. If above points are ok then press the Alarm Ack button in HMI. |
| A37 | Fan6 Threshold Value Not in Range | If the fan6 run command and actual running feedback is not in the threshold set value, then this fault occurs | 1.Make sure the fan6 is in running condition.<br>2. Make sure the fan6 running feedback and run command are within threshold setting range.<br>3.If it requires adjusting the fan speed threshold value in |

| | | | |
|---|---|---|---|
| | | | alarm settings screen.<br>4. If above points are ok then press the Alarm Ack button in HMI. |
| A38 | Valve Threshold Value Not in Range | If the valve open command and actual opening feedback is not in the threshold set value, then this fault occurs | 1.Make sure the valve is in healthy condition.<br>2. Make sure the valve running feedback and running command are within threshold setting range.<br>3 .If it requires adjusting the valve fbk threshold value in alarm settings screen.<br>4. If above points are ok then press the Alarm Ack button in HMI. |
| A39 | In Water Temperature is High | 1.Actual In water temperature is higher than the set value. | 1. Make sure the correct parameter set value in Alarm settings screen in HMI or Web UI.<br>2. Make sure proper water flow is available.<br>3.If above points are ok then press the Alarm Ack button in HMI. |
| A40 | In Water Temperature is Low | 1.Actual In water temperature is lower than the set value. | 1. Make sure the correct parameter set value in Alarm settings screen in HMI or Web UI.<br>2. Make sure proper water flow is available.<br>3.If above points are ok then press the Alarm Ack button in HMI. |
| A41 | Out Water Temperature is Low | 1.Actual Out water temperature is lower than the set value. | 1. Make sure the correct parameter set value in Alarm settings screen in HMI or Web UI.<br>2. Make sure proper water flow is available.<br>3.If above points are ok then press the Alarm Ack button in HMI. |
| A42 | Out Water Temperature is High | 1.Actual Outlet water temperature is higher than the set value. | 1. Make sure the correct parameter set value in Alarm settings screen in HMI or Web UI.<br>2. Make sure proper water flow is available.<br>3.If above points are ok then press the Alarm Ack button in HMI. |
| A43 | Entering Water Flow High | 1.Actual inlet water flow is higher than the set value. | 1. Make sure the correct parameter set value in Alarm settings screen in HMI or Web UI.<br>2. Make sure proper water flow is available.<br>3.If above points are ok then press the Alarm Ack button in HMI. |
| A44 | Entering Water Flow Low | 1.Actual inlet water flow is lower than the set value. | 1. Make sure the correct parameter set value in Alarm settings screen in HMI or |

| | | | |
|---|---|---|---|
| | | | Web UI.<br>2. Make sure proper water flow is available.<br>3.If above points are ok then press the Alarm Ack button in HMI. |
| A45 | Leaving Water Pressure High | 1.Actual outlet water pressure is higher than the set value. | 1. Make sure the correct parameter set value in Alarm settings screen in HMI or Web UI.<br>2. Make sure proper water flow is available.<br>3.If above points are ok then press the Alarm Ack button in HMI. |
| A46 | Leaving Water Pressure Low | 1.Actual outlet water pressure is lower than the set value. | 1. Make sure the correct parameter set value in Alarm settings screen in HMI or Web UI.<br>2. Make sure proper water flow is available.<br>3.If above points are ok then press the Alarm Ack button in HMI. |
| A47 | Water Leakage Fault | 1. Leakage sensor detects the water leak in unit | 1.Water leakage fault is optional; it detects the fault when leakage sensor enabled<br>2. Make sure there is not any water leakage.<br>3.Is there any leakage found fixed it.<br>4.If it requires adjusting the leakage fault delay or notifications cycle in factory settings screen. |
| A48 | Water Leakage Fault (Critical) | 1. Leakage sensor detects the water leak in unit continuously | 1. Make sure there is not any water leakage.<br>2.Is there any leakage found fixed it.<br>3.If it requires adjusting the leakage fault delay or notifications cycle in factory settings screen. |
| A49 | Water Leakage Fault (Very Critical) | 1. Leakage sensor detects the water leak in unit continuously final Warning. | 1. Make sure there is not any water leakage.<br>2.Is there any leakage found fixed it.<br>3.If it requires adjusting the leakage fault delay or notifications cycle in factory settings screen. |
| A50..A55 | Fan “X” Node Address:” X” Conflict | 1.While replacing the Repaired fan when the running fan address is overlapping with new fan address. | 1. Make sure the fan node address should not overlap<br>2.If it same address disconnect the running fan until the new fan gets new address then re connect it |

# Faulty Modular Replacement

## Fan Modular Replacement

- Rotate the fixing buckle to the left, pull the handle, and remove the fan module from the door.

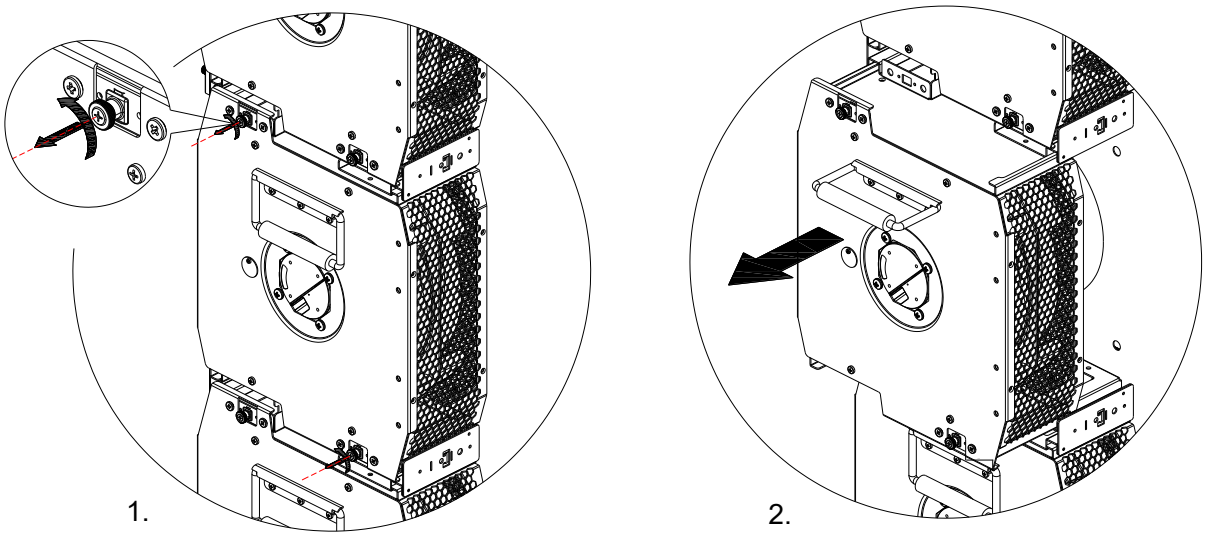



**Figure 119. Fan Module Removal**

**⚠ ⚠ WARNING**

***SHOCK HAZARD***

• CAUTION: Double pole, neutral fusing. Disconnect mains before servicing.

(ATTENTION. Double pôle/fusible sur le neutre. Débrancher l'alimentation avant l'entretien.）

• Arc flash and electric shock hazard. Can cause serious injury or death. Disconnect all local and remote electric power supplies before connecting.

• Installation, service, and maintenance work must be performed only by qualified personnel.

• Disconnect the device of the RDHx is the plug, and the output socket is easily accessible.

***Failure to follow these instructions can result in serious injury, death, or equipment damage.***

- The module supports hot swapping without power off, but please do not touch the contact interface.

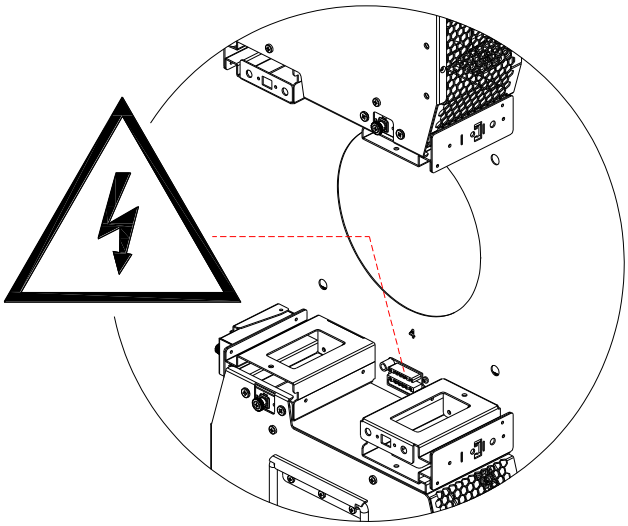


**Figure 120. Shock Attention**

- Push the new fan module into the slot, observe the positioning circular hole at the buckle, and when they are concentric, press the buckle to fix the fan module. (Figure 116)

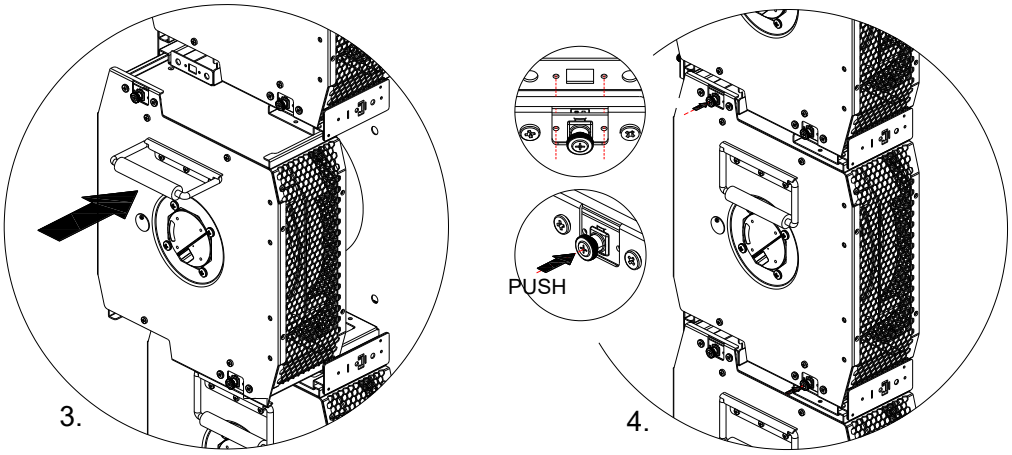



**Figure 121. New Fan Module Installation**

- Rewrite the address of the fan.

  Each time you insert only one replacement fan, by HMI to modify the fan address.

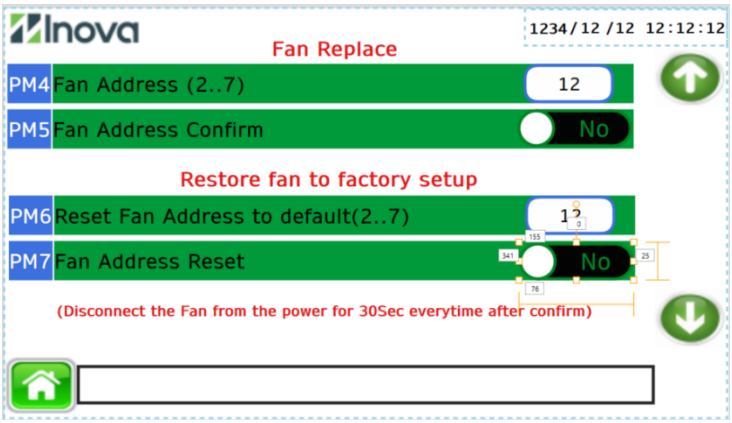



**Figure 122. Fan Node Address Rewrite**

- In case of any failure or modification on the fan, this screen helps to enable communication between the fan and controller.
- Generally, fan communication node starts from 2 to 7 from top to bottom.

If it is a new fan (Default address is 247) follow the following Steps

- 1.Place the fan into the unit
- 2.Enter the required fan address (PM4)
- 3.Press the Fan address confirm button (PM5) once the fan address updates the confirmation button will become initial position (No)
- 4.Disconnect the fan from the power for 30 seconds, LED on the fan will become off then connect the fan to the power

If the fan is old one and it's having the existing address of (2…7) any, follow below steps

- Place the fan into the unit.
- Enter the fan address (PM6) that needs to be restore default settings.
- Press the Fan address confirms button (PM7) once the fan address updates the confirmation button will become initial position (No)
- Disconnect the fan from the power for 30 seconds, LED on the fan will become off then connect the fan to the power
- Now the fan goes to default settings.
- Follow Method 1.

## Control Box Replacement Guide

- Use a small flathead screwdriver to remove the fixing screws on the green sockets and unplug all sockets. Unplug the 3 power cords.

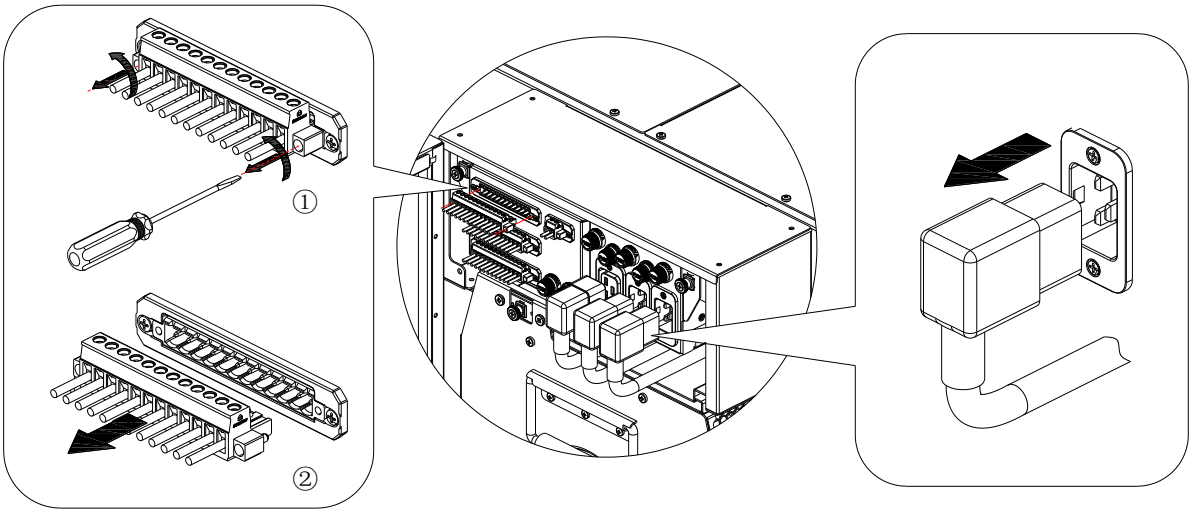



**Figure 123. Screws and Plugs Removal**

- Loose the Thumb screws and pull out the control box.

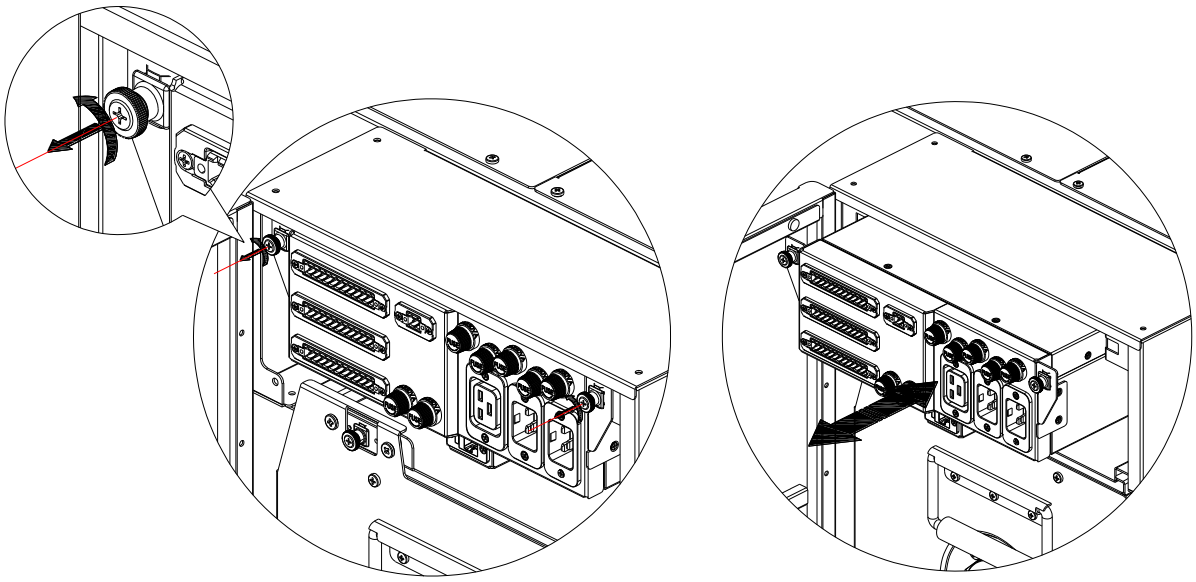


**Figure 124. Control Box Removal**

- Push the new control box in and tighten the Thumb screw to fix the control box. And reconnect all the sockets. (Figure 120)

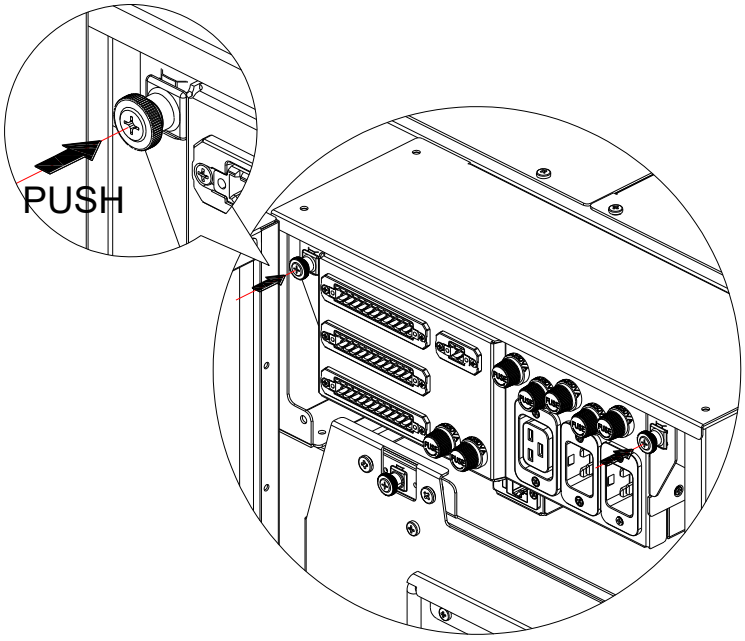



**Figure 125. New Control Box Installation**

## Temperature Sensor Replacement Guide

The **RDHx** must be powered off before replacing a faulty temperature sensor.

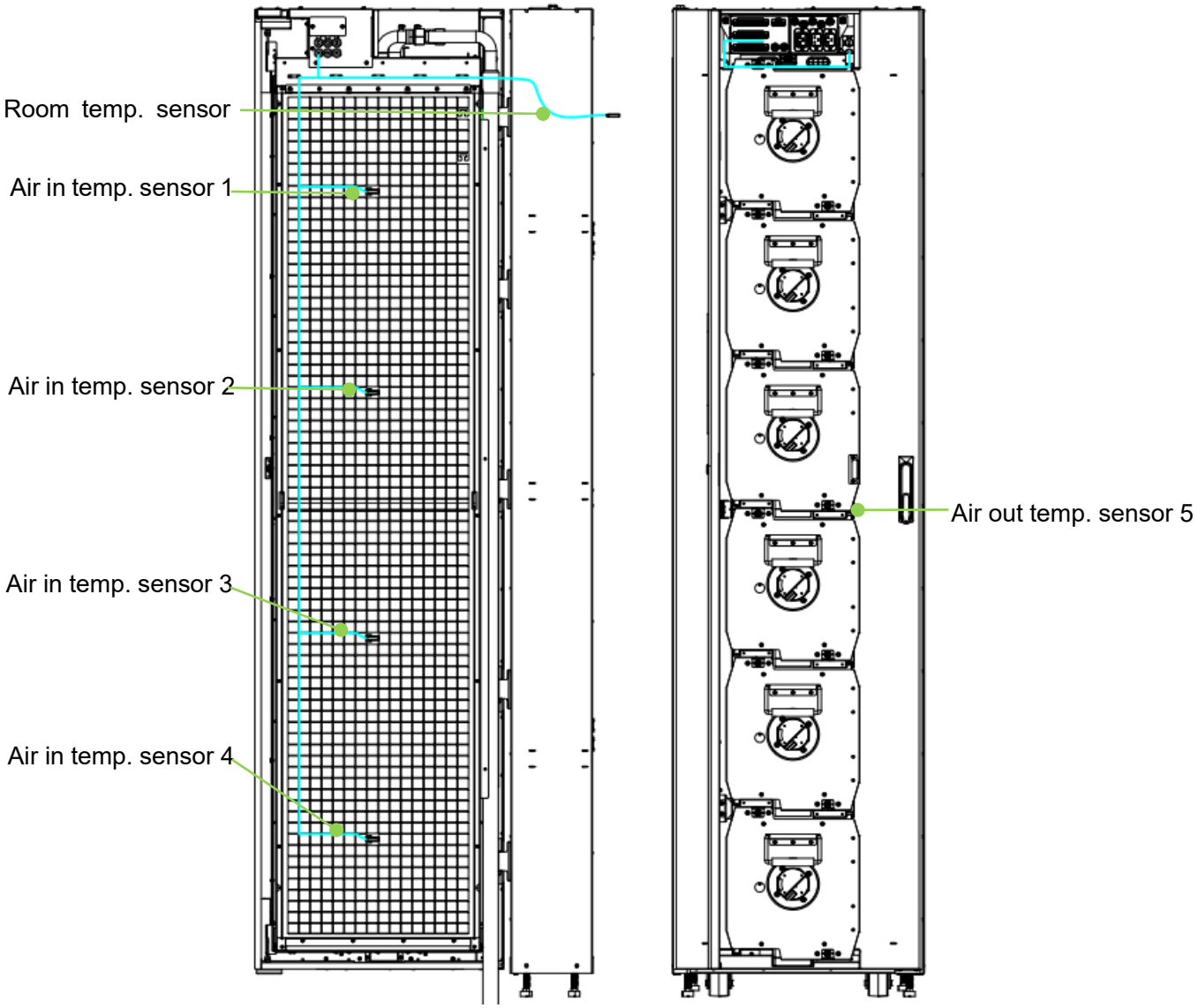



**Figure 126. Air in Temperature Sensor Diagram**

**Table 13. Control Box Temperature Sensor Connection Ports**

| Terminal | | Wire Core Colour | Description |
|---|---|---|---|
| J2 | Pin 5 | White | Signal out for room temp sensor 6 |
| | Pin 6 | Black | Signal COM for room temp sensor 6 |
| | Pin 7 | White | Signal out for Air in temp sensor 1 |
| | Pin 8 | White | Signal out for Air in temp sensor 2 |
| | Pin 9 | White | Signal out for Air in temp sensor 3 |
| | Pin 10 | White | Signal out for Air in temp sensor 4 |
| | Pin 11 | White | Signal out for Air out temp sensor 5 |
| | Pin 12 | Black | Signal COM for temp sensor 1 to 5 |

1) Replacement air in temperature or room temperature sensors steps.

- Use a small flathead screwdriver to remove the fixing screws on the green sockets of the J2 terminal from the power panel and pull out it. (Figure 123)

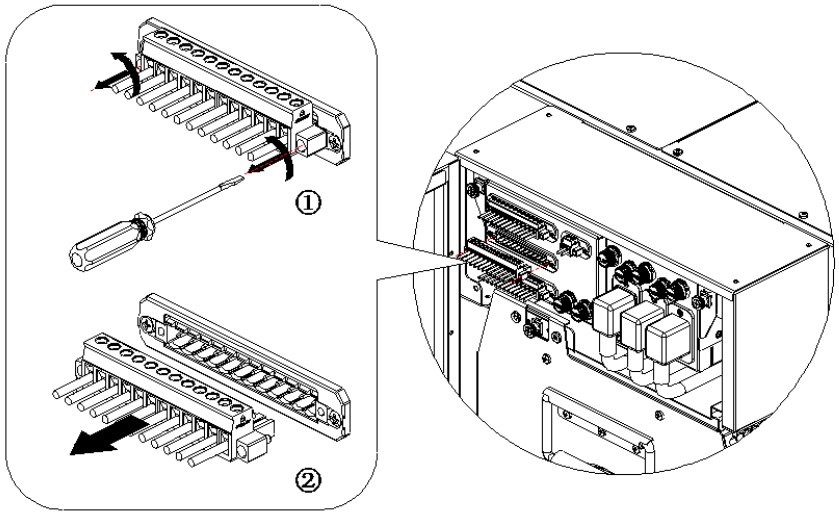



**Figure 127. J2 Terminal Removal**

- Remove the faulty air in temperature or room temperature sensors cable from the J2 terminal ports.
- Replace the new temperature sensor connection to the J2 terminal ports.
- Secure the sensor cable with ties.

2) Replacement air out temperature sensor seps.

- Use a small flathead screwdriver to remove the fixing screws on the green sockets of the J2 terminal from the power panel and pull out it. (Figure 123)
- Replace the new temperature sensor connection to the J2 terminal ports.
- Move the rubber base to the left location and use the tie to fix the temperature probe.
- Use screws to fix the protective cover.
- Use diagonal pliers to cut the tie wrap of the faulty temperature sensor.
- Disconnect the faulty temperature sensor from the control box J2 connector.
- Connect the replacement temperature sensor to the corresponding position on the control box J2 connector and secure it with a tie wrap.

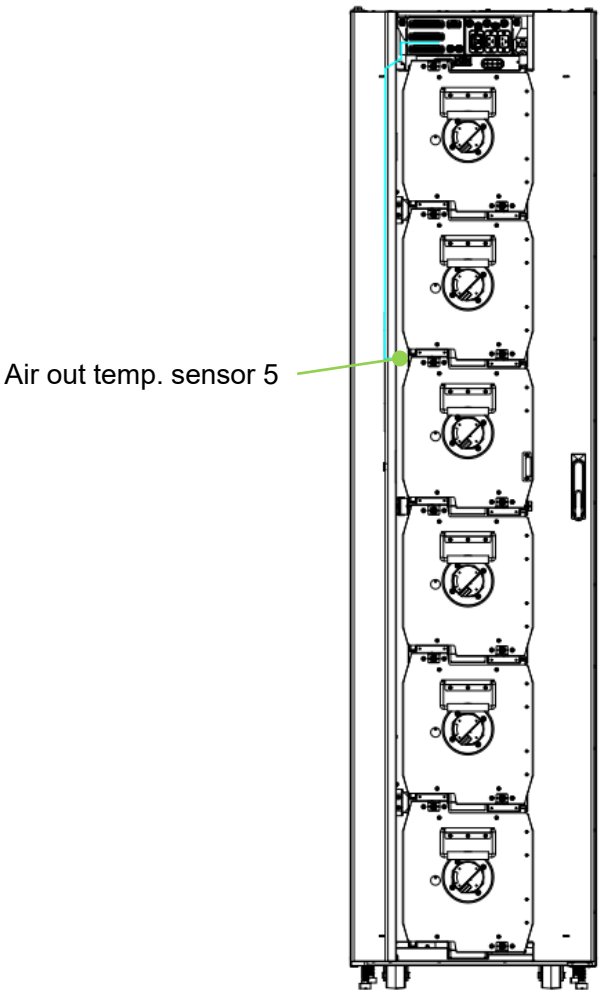


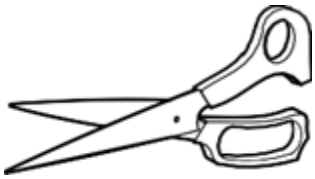

**Figure 128. Air Out Temperature Sensor Diagram**

# LED Light Replacement Guide

## Tool & Material List

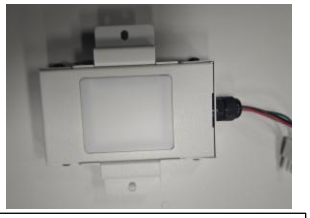
Electric screwdriver

PH2 Phillips screwdriver bit



Scissors

Cable tie



New Led light module

**Figure 129. Tool List**

- Open the fan cover.

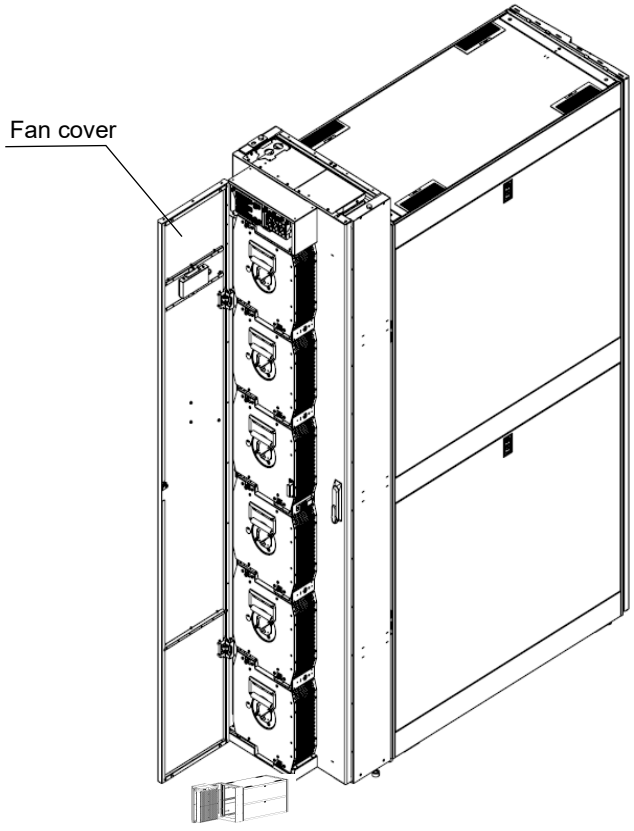



**Figure 130. Fan Cover Open**

- Use the scissor to shear the cable tie, unplug the male and female connectors.

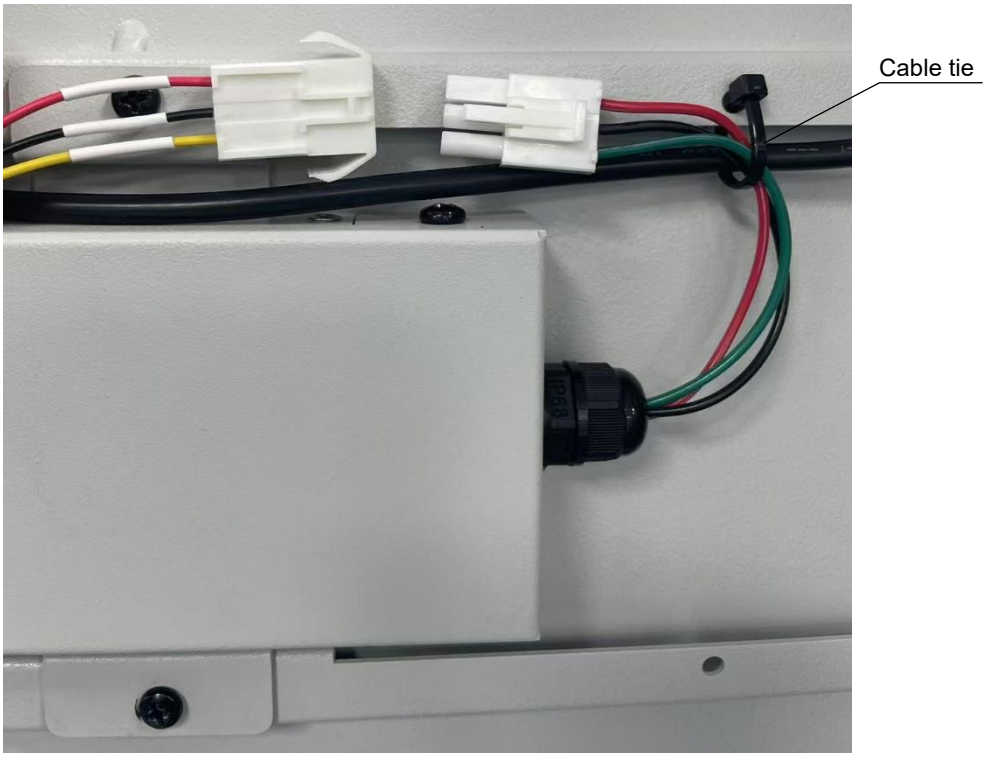



**Figure 131. Unplug Connectors**

- Remove the two screws and take off the Led light module.

**Figure 132. LED Light Module Removal**

- Plug the new Led light module male connector into the female connector, tighten the two screws to install the new Led light module, use the cable tie to fix the connector. Close the fan cover.

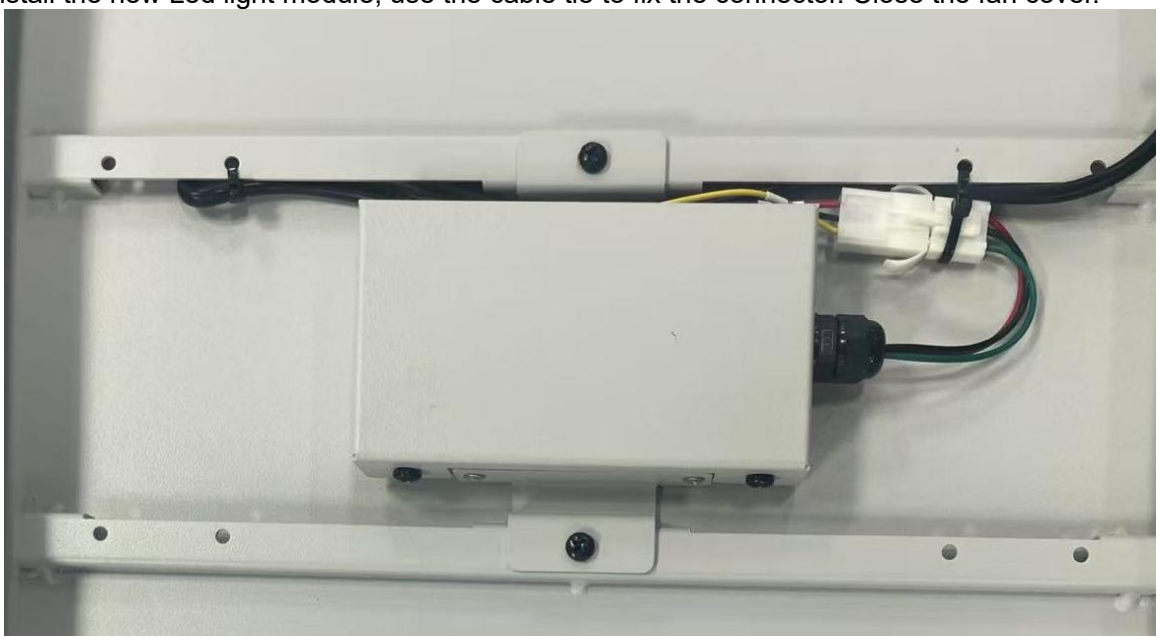
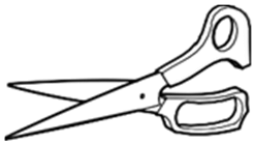


**Figure 133. New LED Light Module Installation**

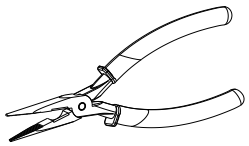
# Fan Cover Replacement Guide

## Tool & Material List



Scissors

Cable tie



Needle Nose Pliers

New Fan Cover

**Figure 134. Tool List**

- Open the fan cover.

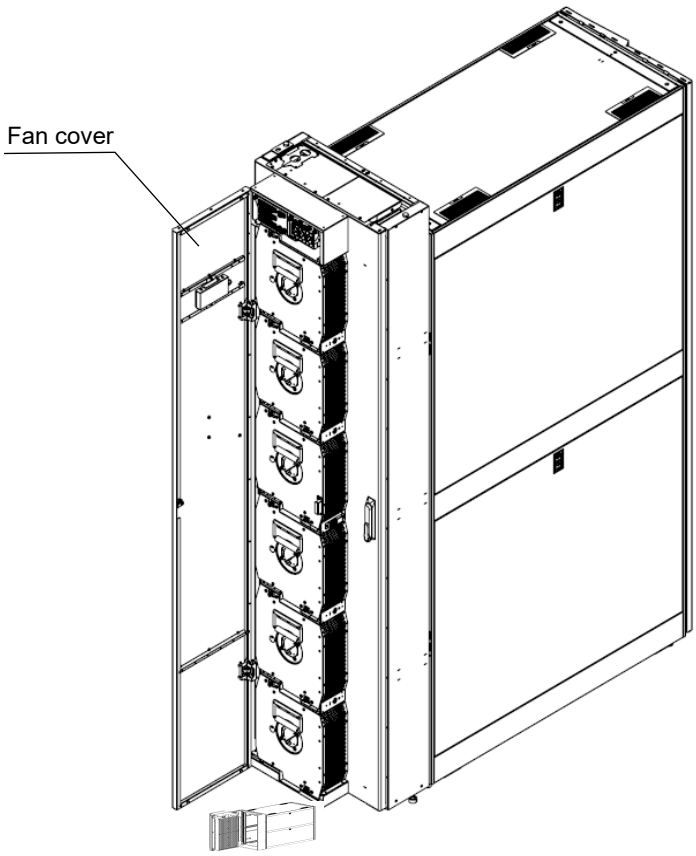



**Figure 135. Fan Cover Open**

- Use the scissors to shear the cable ties.

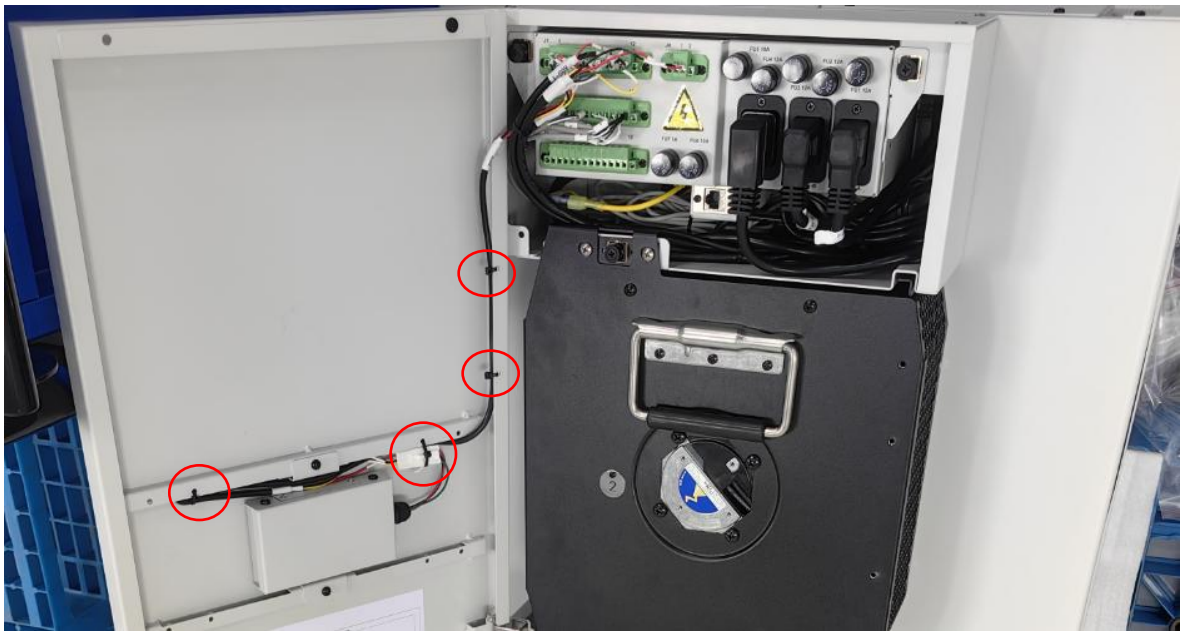


**Figure 136. Cable Ties Shearing**

- Unplug the male and female connector. Refer to the last chapter to remove the LED modular and keep the LED modular.

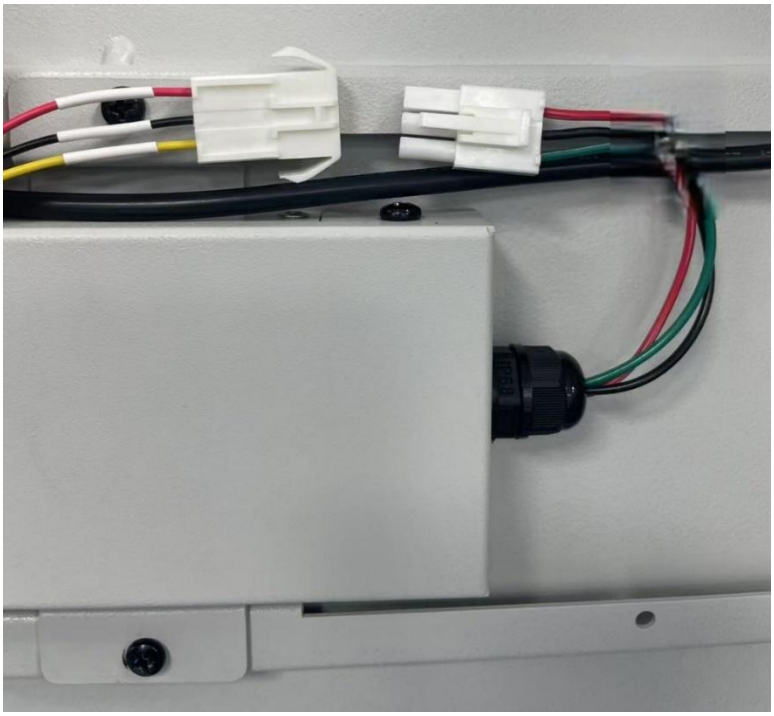


**Figure 137. Unplug Connectors**

- Use the needle nose pilers to uninstall the circlip, then pull out both top and bottom the hinge pin. Remove the fan cover.

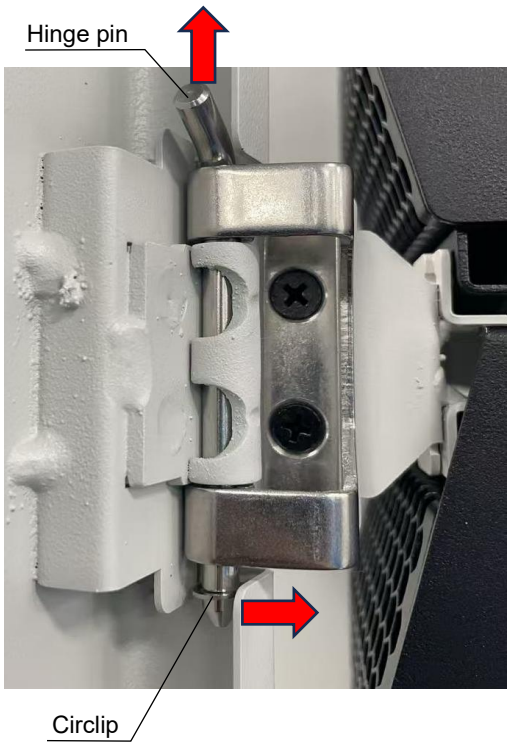



**Figure 138. Fan Cover Removal**

- According to the disassembly steps, install the LED modular and install the new fan cover. Then close it.

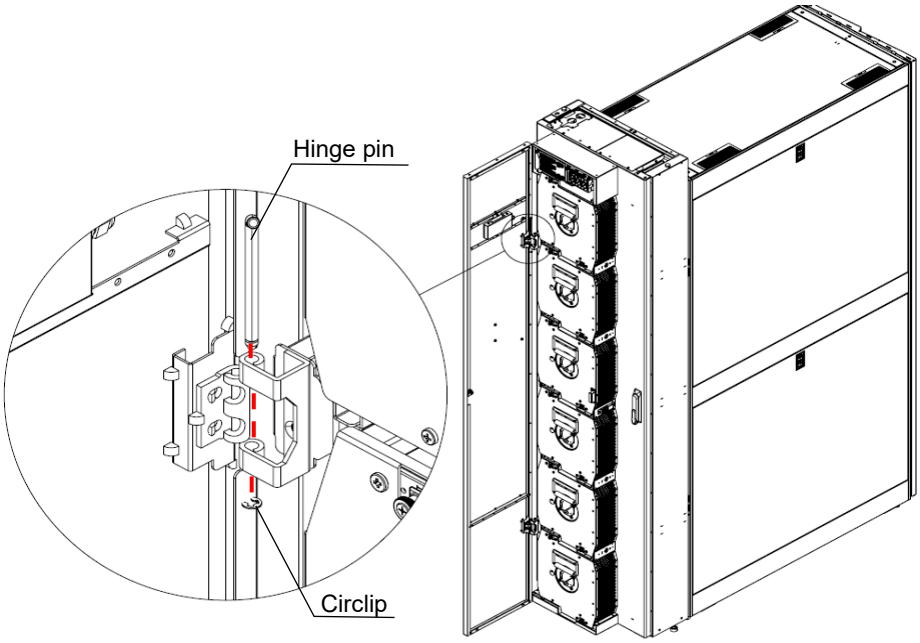
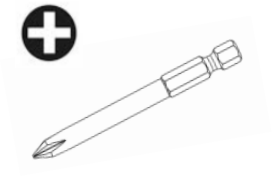



**Figure 139. LED Modular and Fan Cover Installation**

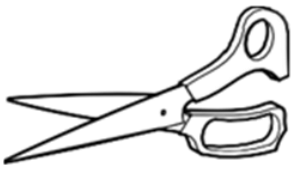
## Coil Replacement Guide

### Tool & Material List

Electric Screwdriver

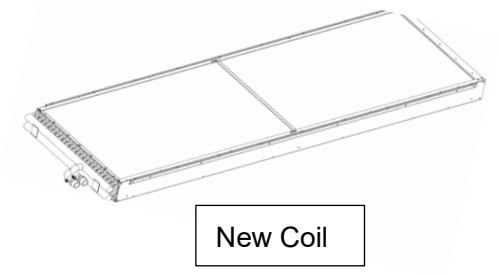


PH2 Phillips Screwdriver Bit



Scissor

Cable Tie



New Coil

**Figure 140. Tool List**

- Place the RDHx on the ground.

| NOTICE |
| --- |
| • Make sure EPE or other materials have been used as a cushion to protect the fan cover surface.<br>***Failure to follow these instructions can result in equipment damage.*** |

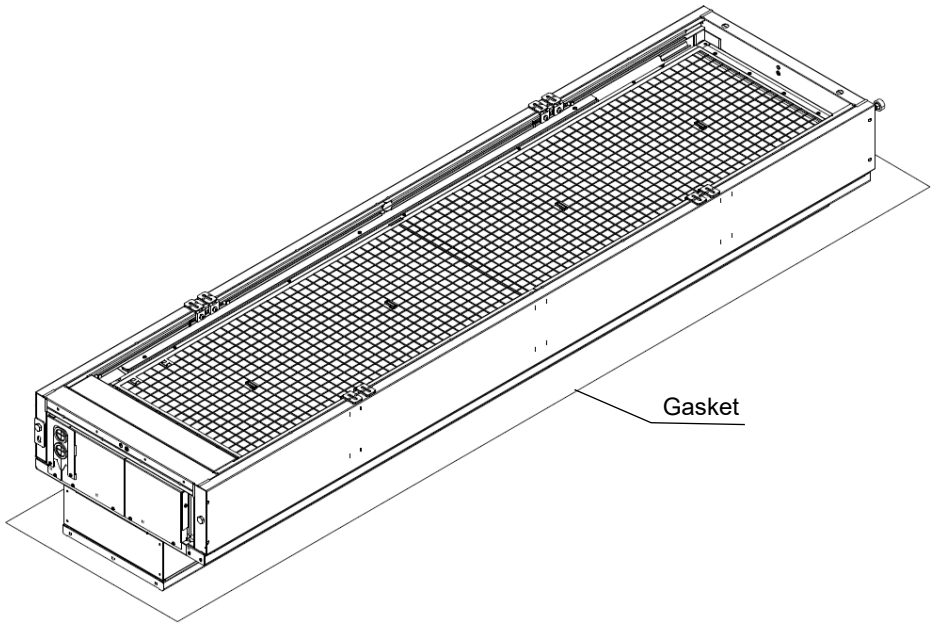



**Figure 141. RDHx Placement**

- Open the interface frame and disconnect the male hinge pin (on the frame) and female hinge (on the door), then remove the interface frame.

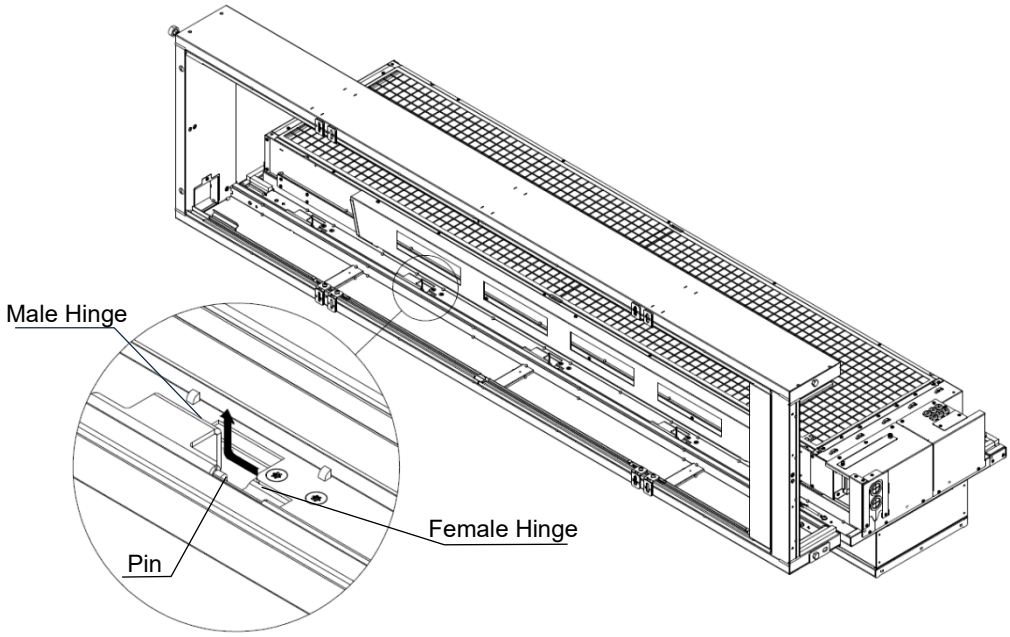



**Figure 142. Interface Frame Removal**

- Remove the temperature sensor, power cord, water leakage cord and actuator LR24A-MOD connection cable.

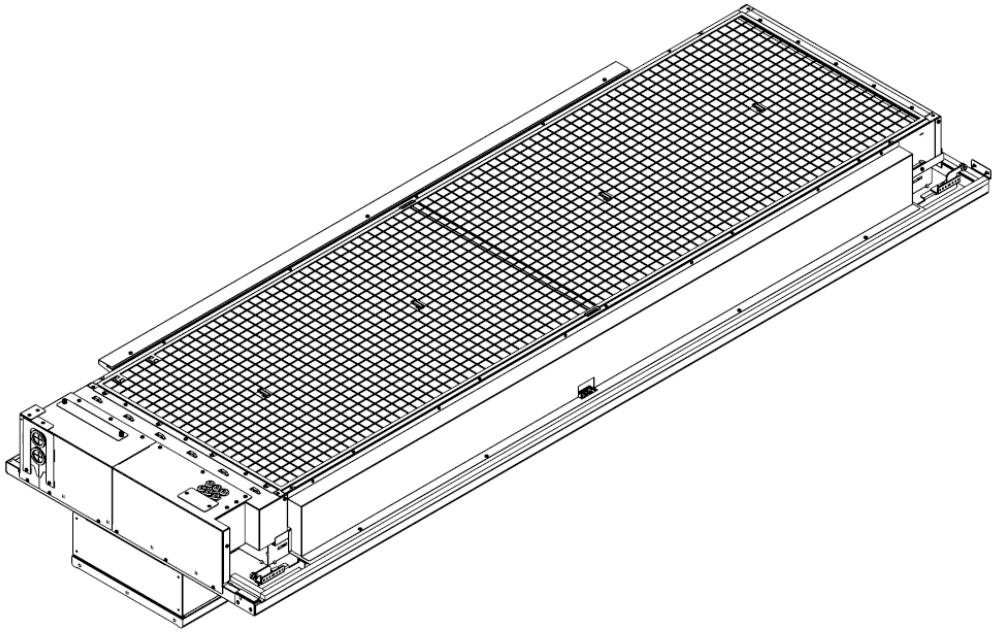


**Figure 143. Accessories Removal**

- Remove the Liquid Circuit Protection module and electric cable protection module.

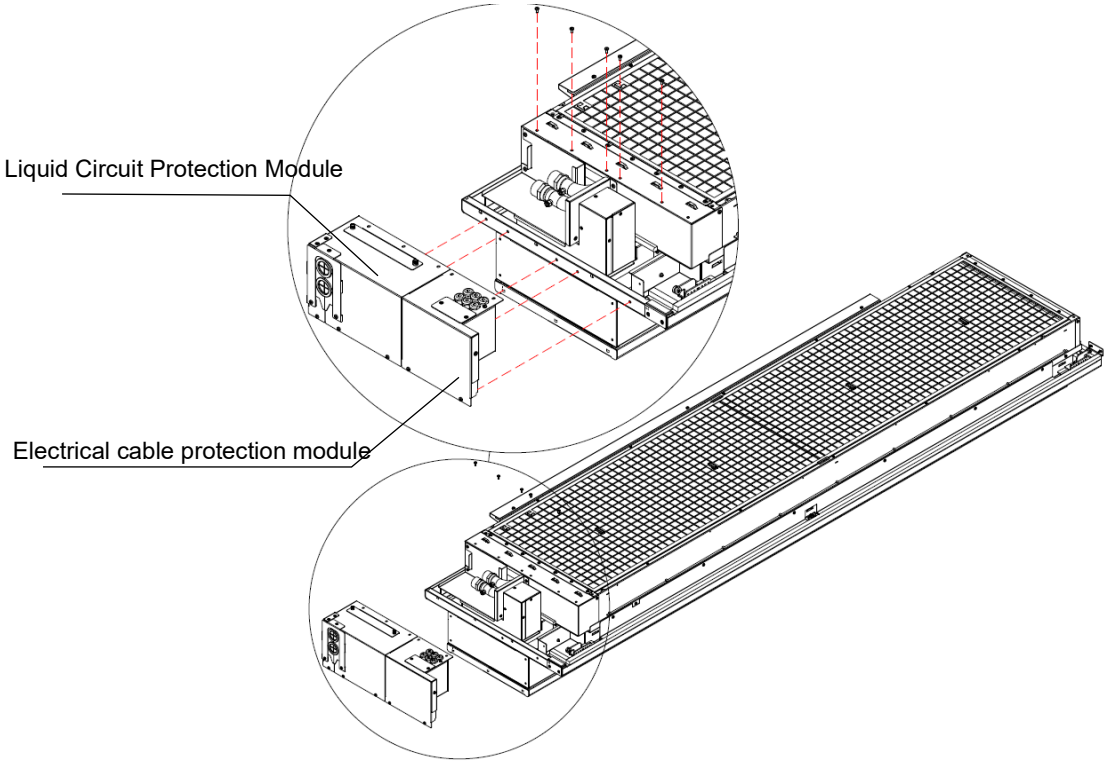



**Figure 144. Protection Modules Removal**

- Remove the bottom fixing bracket.

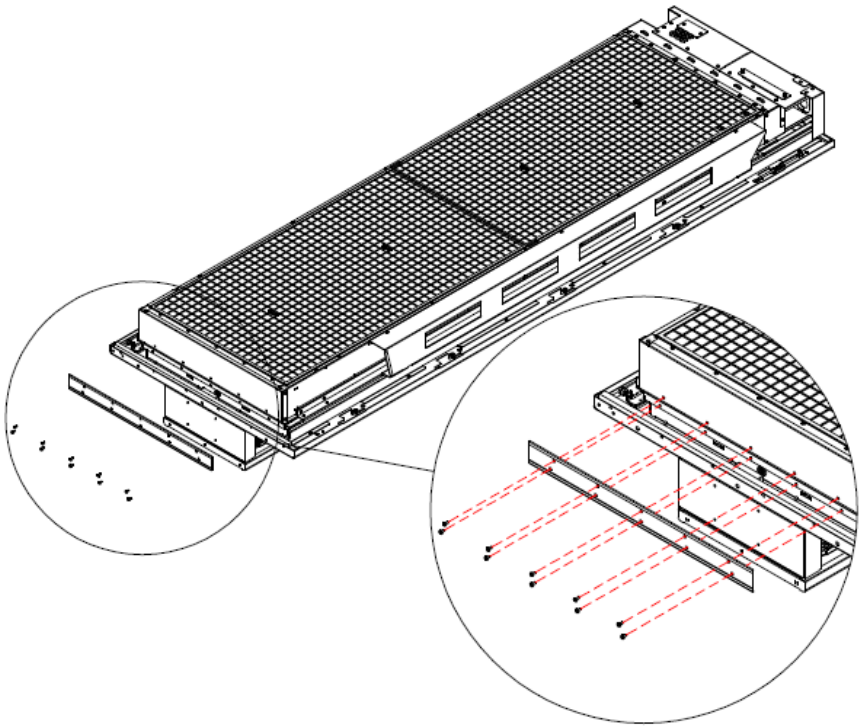


**Figure 145. Bottom Fixing Bracket Removal**

- Remove the screws, then take coil left windshield off. (skip this step if there is no windshield).

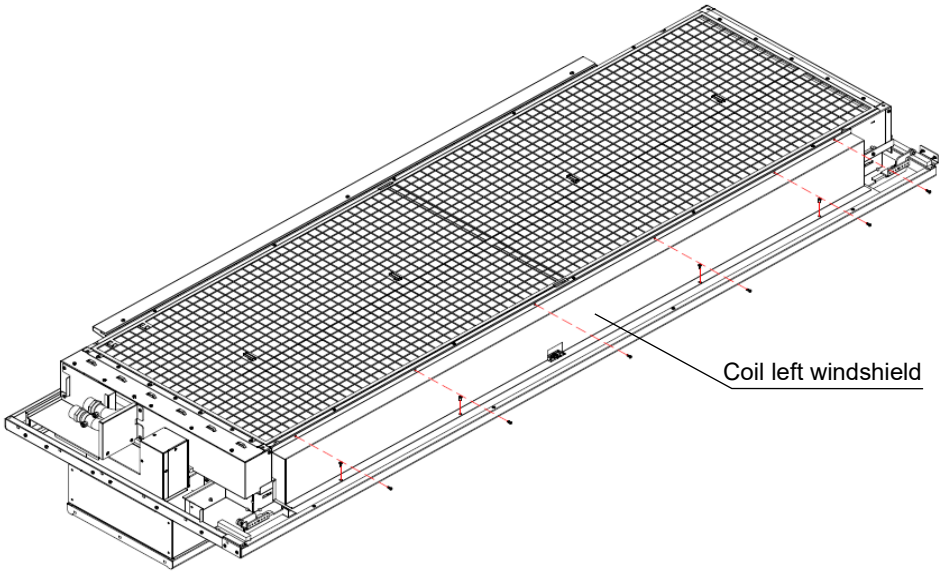



**Figure 146. Coil Left Windshield Removal**

- Remove the left fixing screws.

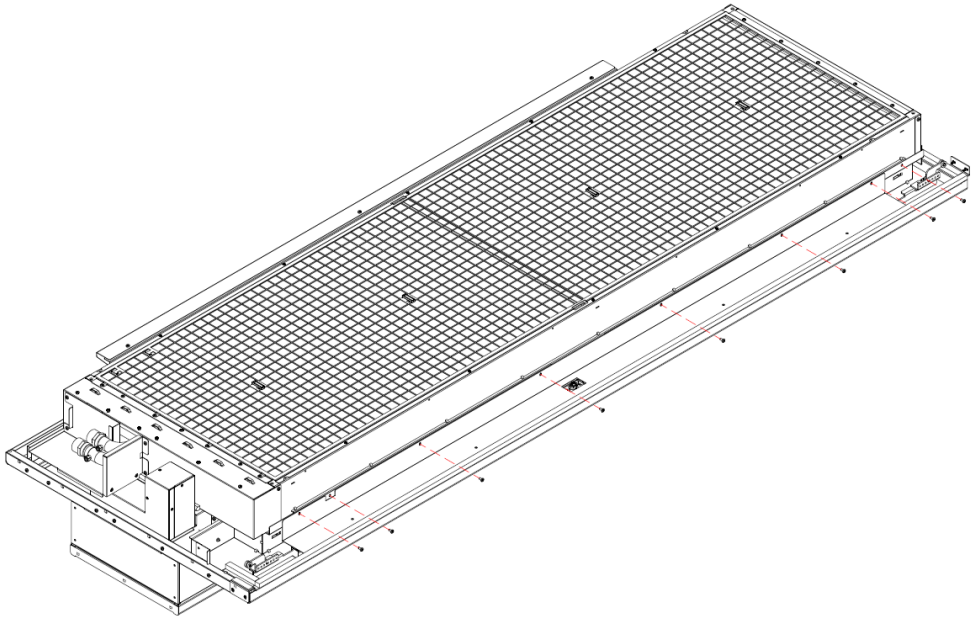


**Figure 147. Left Fixing Screws Removal**

- Remove the hose cover.

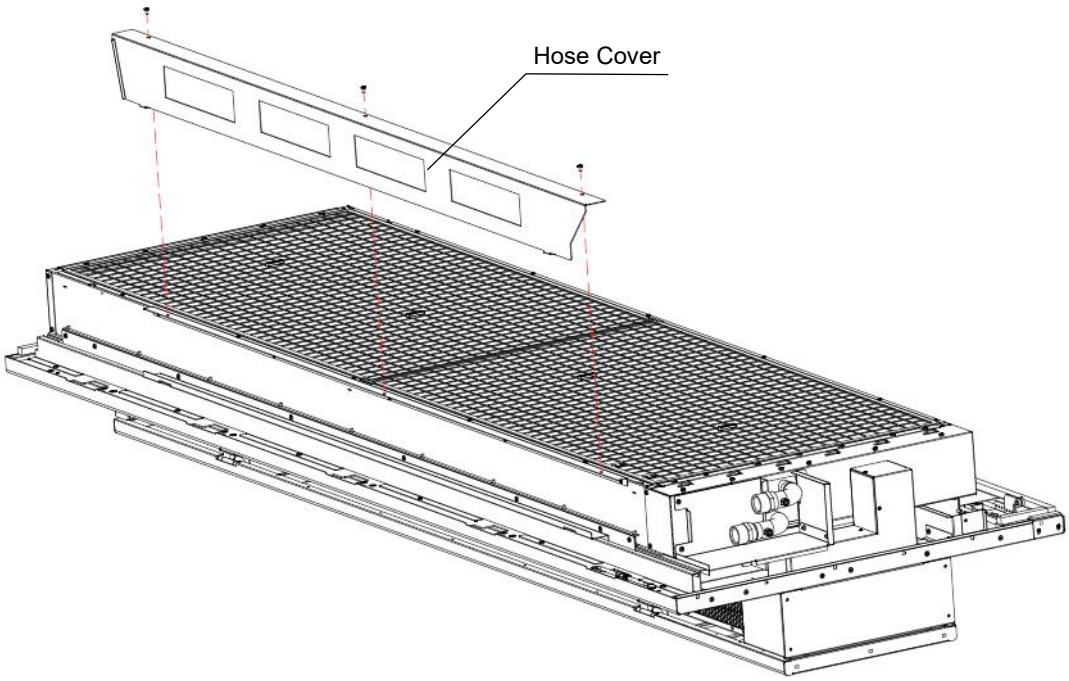



**Figure 148. Hose Cover Removal**

- Remove the right L bracket.

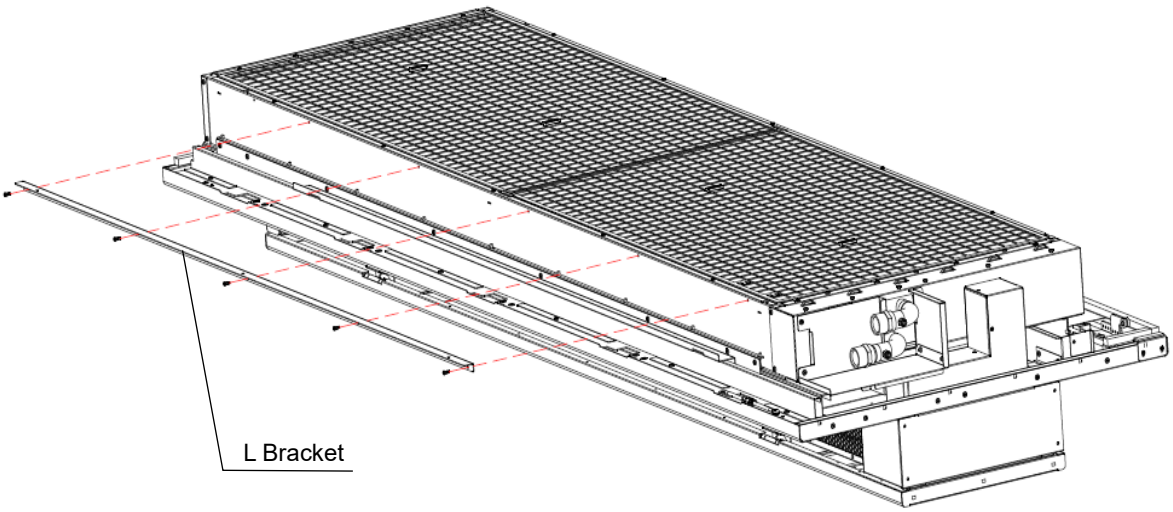



**Figure 149. Right L Bracket Removal**

- Remove the right cover bracket.

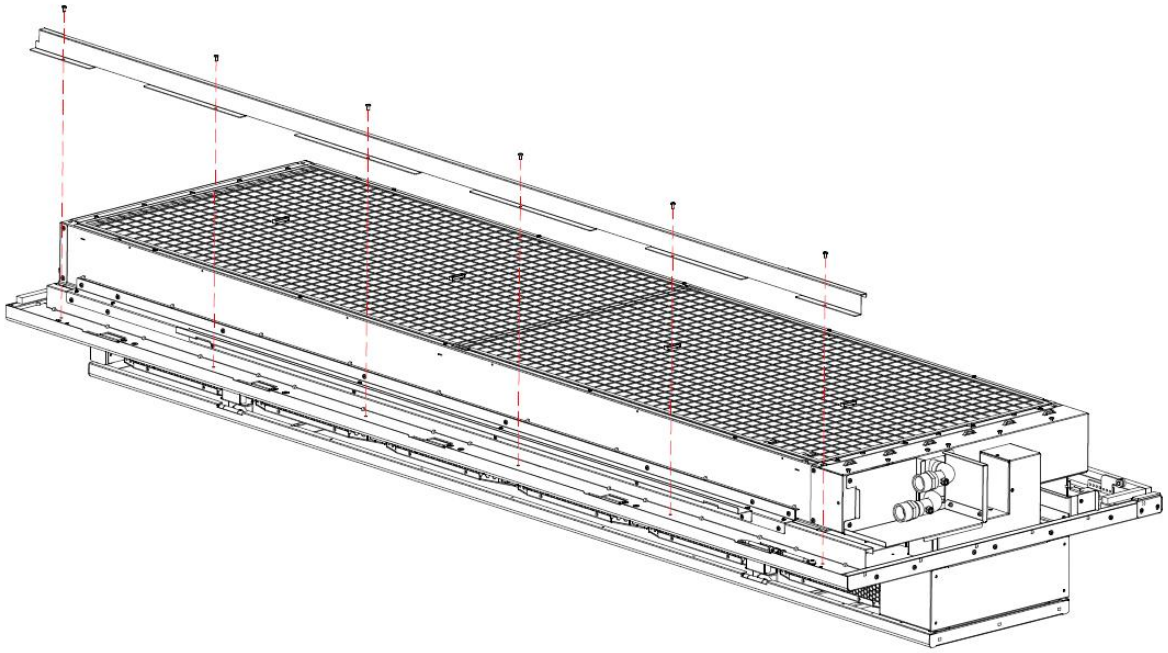


**Figure 150. Right Cover Bracket Removal**

- Remove the right Z bracket.

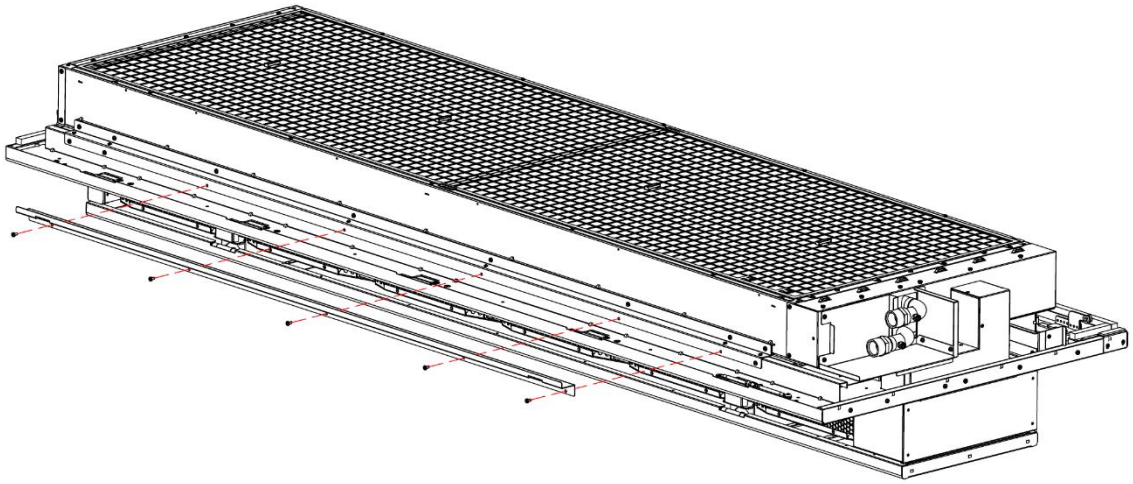


**Figure 151. Right Z Bracket Removal**

- Remove the right fixing bracket.

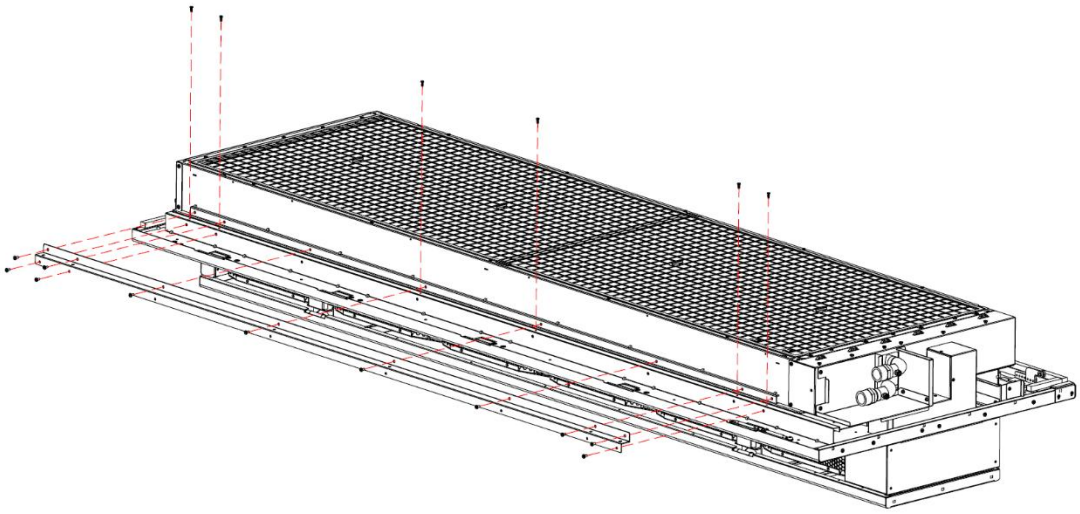


**Figure 152. Right Fixing Bracket Removal**

- Remove the coil from the door.

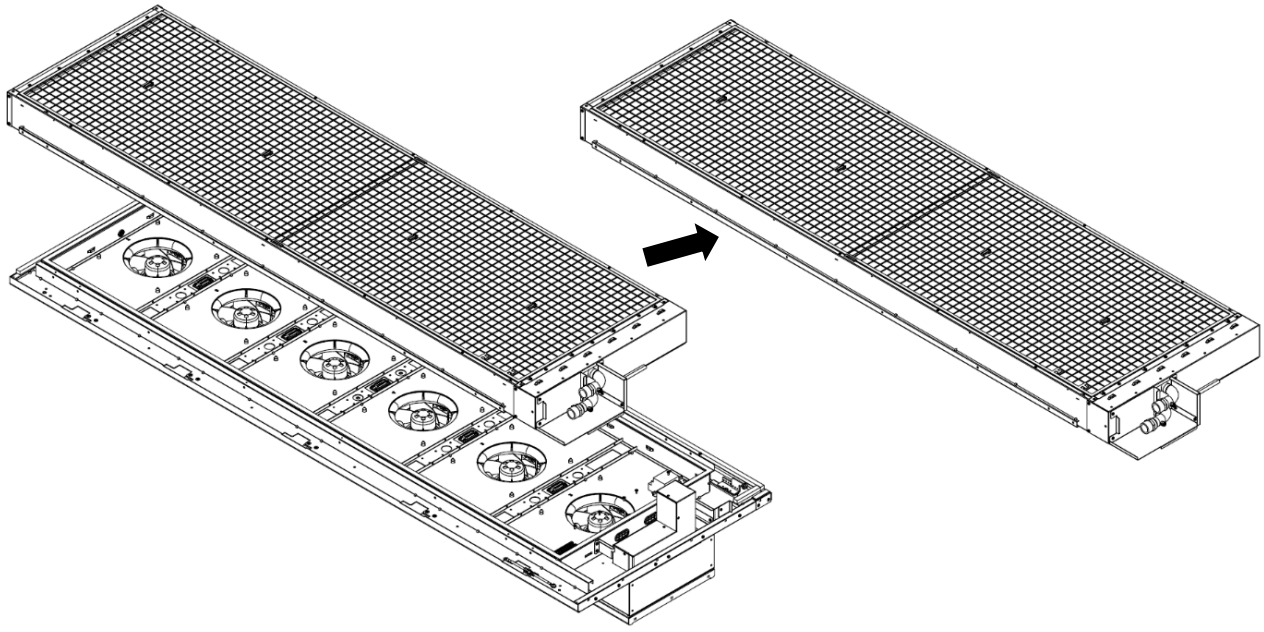


**Figure 153. Coil Removal**

- Remove the coil protection grating and coil elbow protection plates.

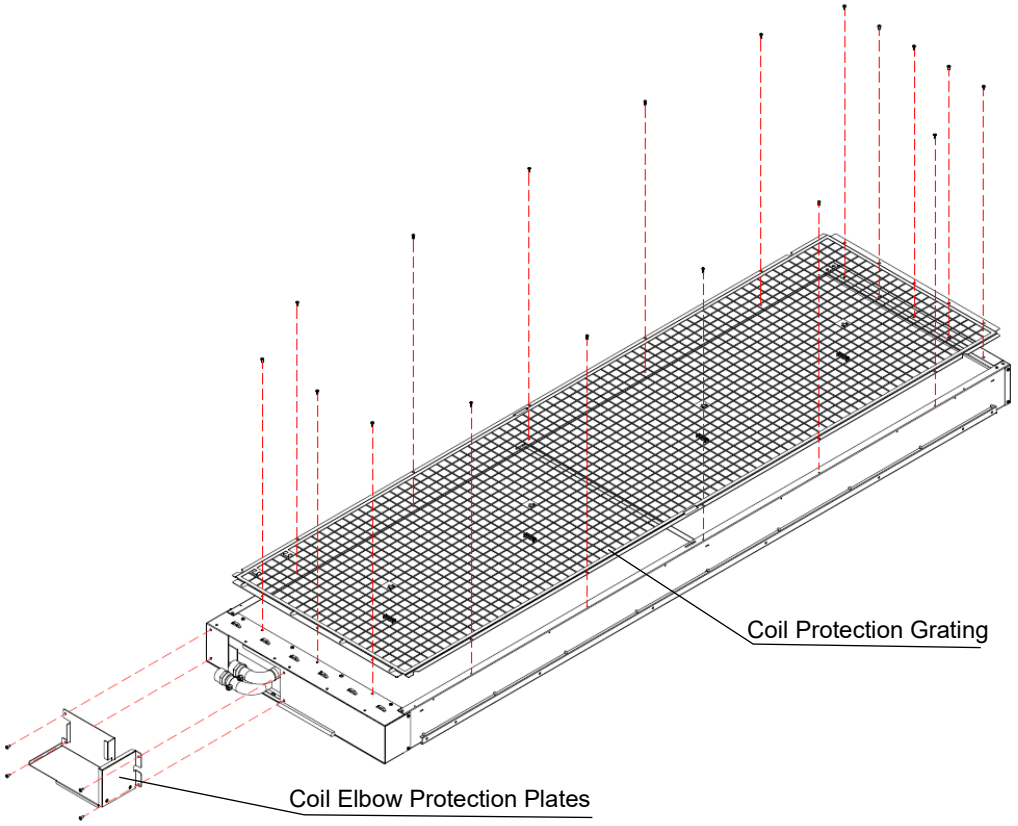



**Figure 154. Protection Plates and Protection Grating Removal**

- Remove the screws.

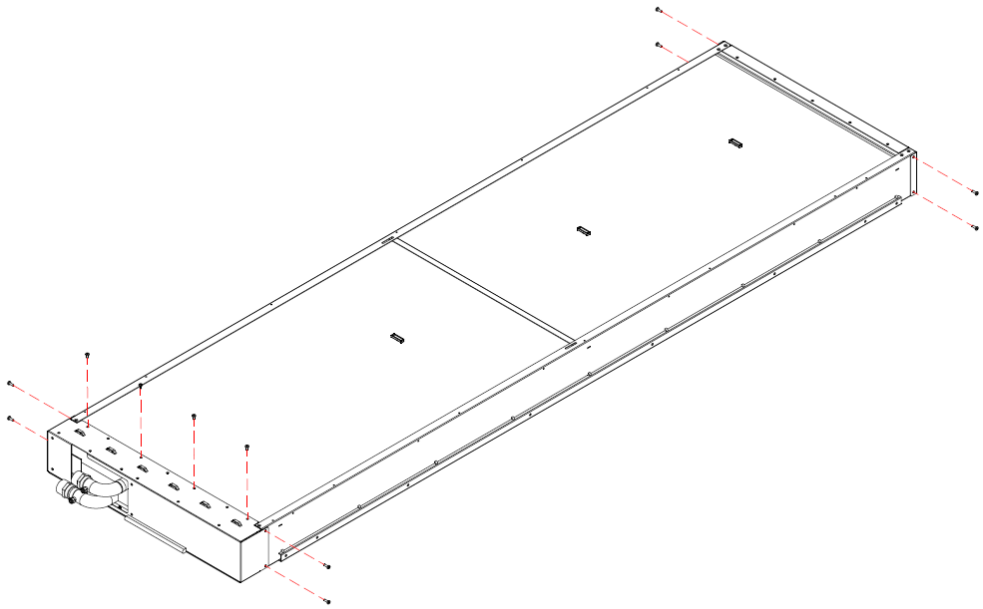


**Figure 155. Screw Removal**

- Position the heat exchanger vertically on its side and remove its bottom and top cover plates.

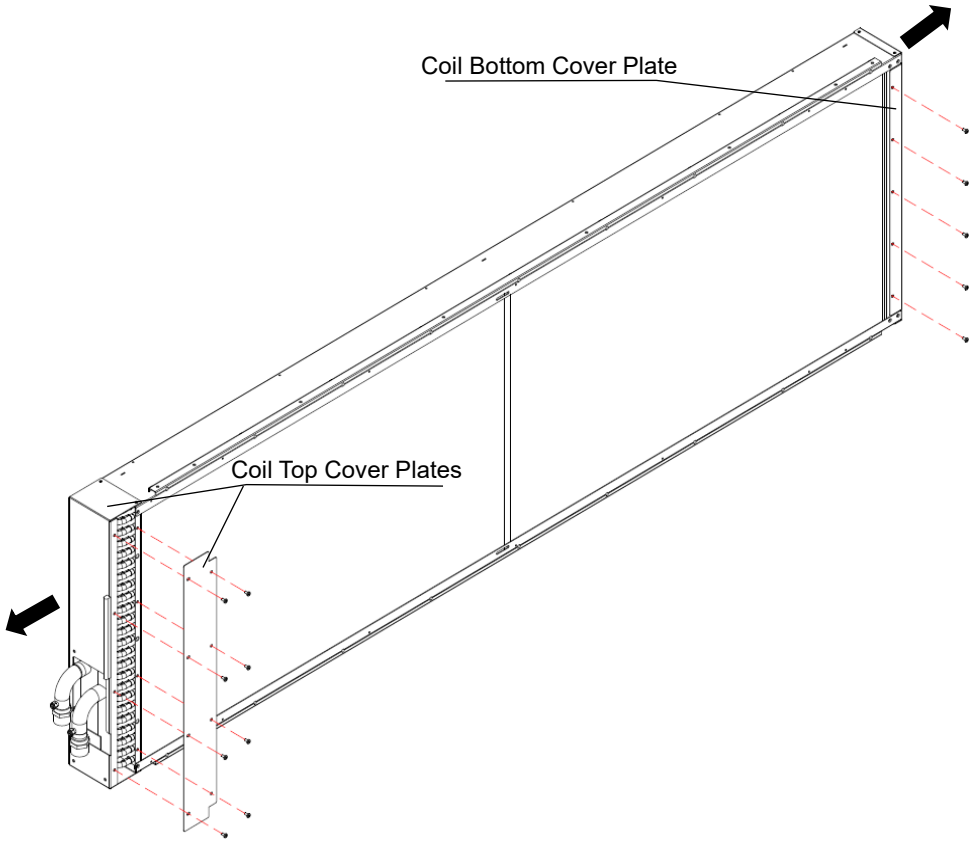
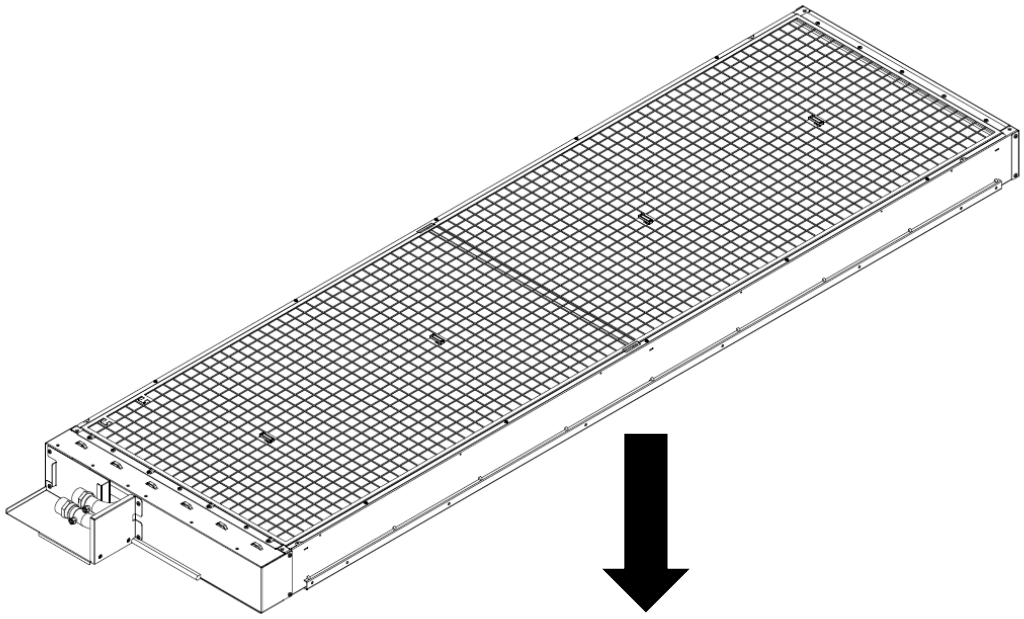
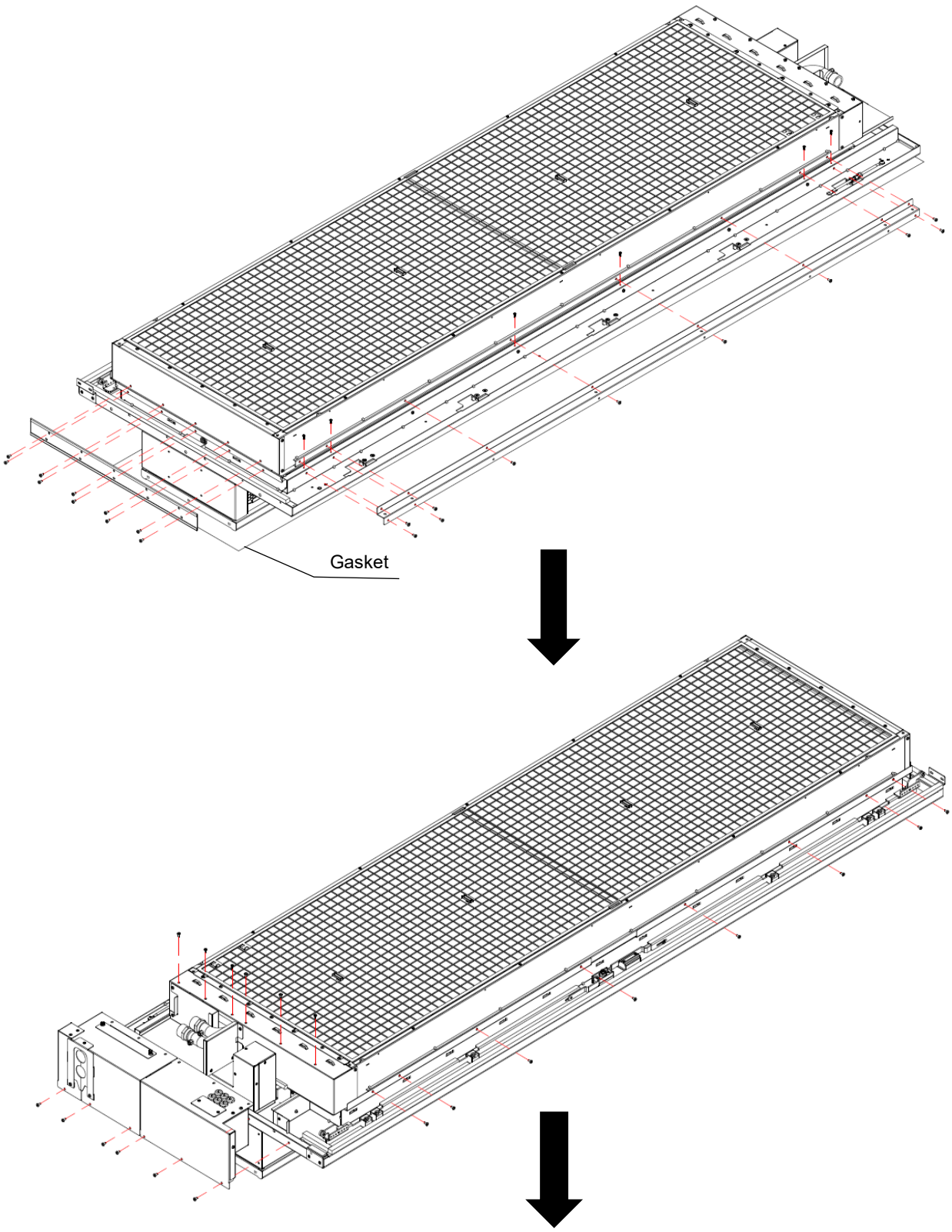
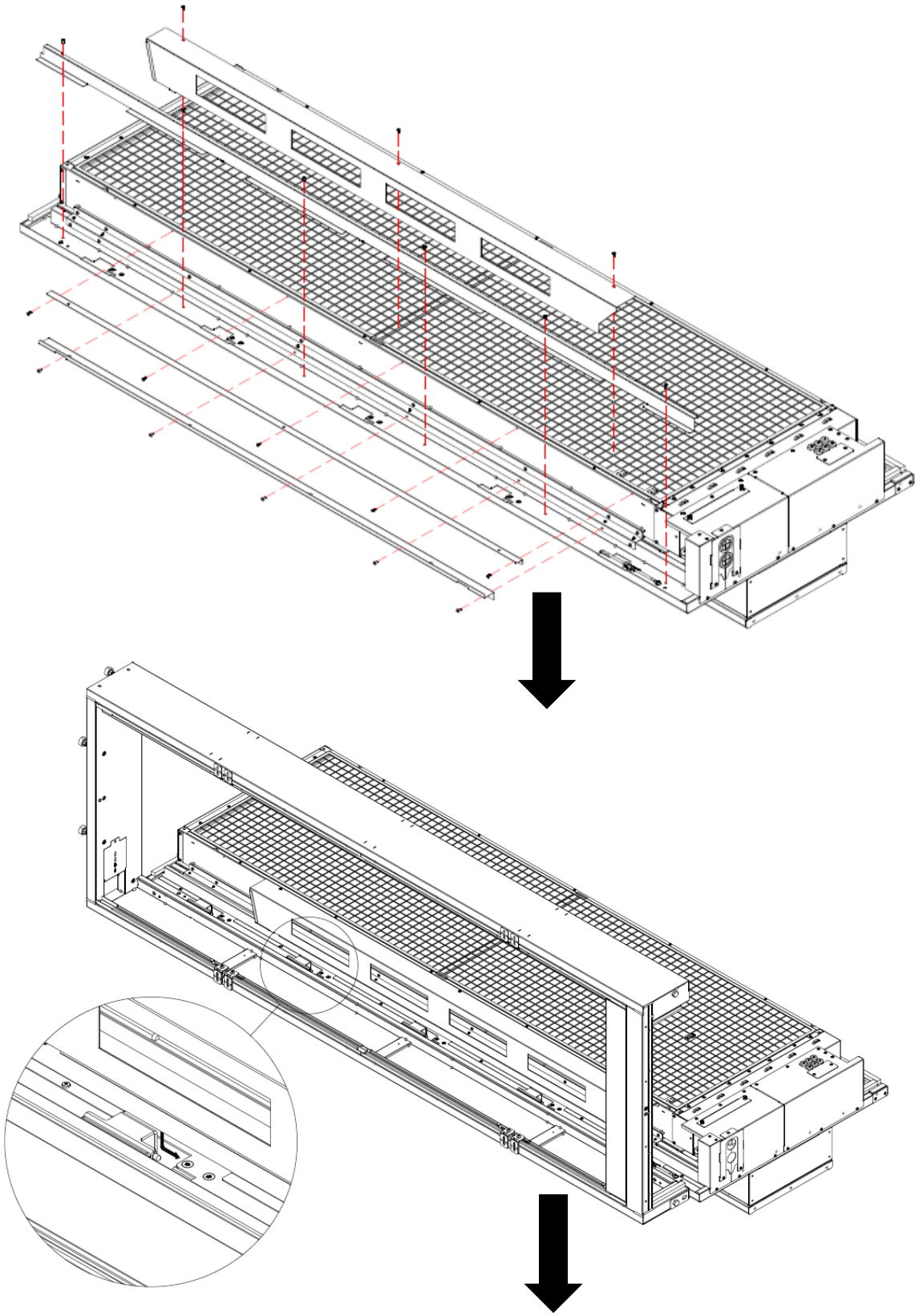



**Figure 156. Cover Plates Removal**

- According to the disassembly steps, install the coil back to the RDHx.




Gasket



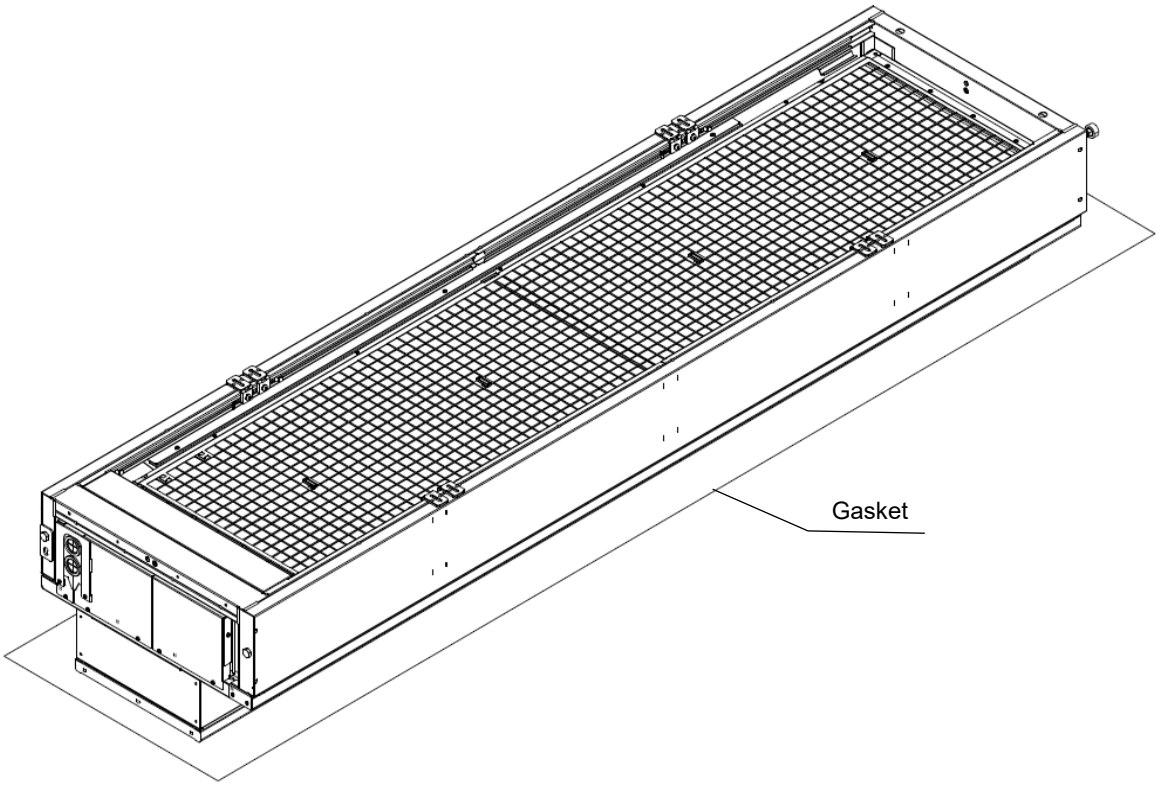



**Figure 157. Coil Back Installation Process**


## Choose Us, Choose More Options

Selecting our containment solutions means choosing a partner dedicated to providing a wide array of options for your data center needs. Enjoy the benefits of efficient cooling, energy savings, and a tailored solution that evolves with your infrastructure.

For inquiries and consultation, contact sales@inovadc.com.