



**Liebert® SRC-G**

**Precision Air Conditioning**

**User Manual**

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## Purpose of the Document

This document applies to the series of precision air conditioners and cooling solutions which maintain optimal environmental control of technological ecosystems at minimal operating costs. This document gives an overview of the specifications, installation, commissioning, and maintenance procedures with troubleshooting from the user's perspective. The figures used in this document are for reference only.

Please read this manual carefully before installing, maintaining, and troubleshooting.

Vertiv™ Liebert® SRC-G Precision AC is a professional device, only professionals are permitted to access the unit, and is kept in a place where access is restricted to common people.

## Styling used in this Guide

The styles used in the manual are defined as mentioned in the following table:

Situation	Description
<p><u>Warning/Danger/Caution</u></p> 	<ul style="list-style-type: none"> <li>The Warning/Danger/Caution note indicates a hazardous or potentially harmful situation that can result in death or injury. It also indicates instructions that need to be adhered to, failing which may result in danger and safety issues thereby having an adverse effect on the reliability of the device and security. Even for practices not related to physical injury, to avoid equipment damage, performance degradation, or interruption in service, follow the warning instruction carefully.</li> </ul>
<p><u>Note</u></p> 	<ul style="list-style-type: none"> <li>The Note section indicates additional and useful information. It also calls attention to best practices and industry-best protocols that are standardized and help make maximum utilization of the resources at hand. Helpful information related to the product also comes under the Note heading, helping the users with the definitions, concepts, and terminologies used in the manual.</li> </ul>

## Version History

Version	Date
V1	09.03.2022
V2	19.06.2023

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## Safety Precautions and Measures

The important safety precautions and measures that should be followed during the installation and maintenance are described in the following sections.

Read the manual prior to installation and operation of the unit. Only qualified personnel should move, install, or service this equipment.

Before working on the equipment, the user reads and considers all precautions, compliance and safety measures. The unit control must be used exclusively for the purpose which it is intended for; the manufacturer takes no liability for incorrect use or a modification to the unit control.

Adhere to all the Warnings and Cautionary measures included in the manual.



*Please read this manual carefully before installing, maintaining and troubleshooting; especially the Warning/Danger/Caution information in the User Guide. Apart from the User Guide, also pay attention to the warning labels on the unit and its components.*

This manual is retained for the entire service life of the unit. The user must read all the precautions, danger, warnings, and cautionary measures mentioned in the manual prior to carrying out any operations on the unit. Each unit is equipped with an electric insulation which allows the users to work in safe conditions. The main switch is positioned in terminal box of the indoor unit. Before any maintenance operation, switch off the unit with this electrical insulation switch to eliminate risks such as electrical shocks, burns, automatic restarting, moving parts, and remote control. The protective covers plate on terminal box shall be removed only after the electric power has been cut off by isolation switch.

In the following sections, notice the various cautionary measures and warnings that need to be read carefully prior to installing or operating the system.

Disconnect the local and remote power supplies prior to working with the unit.

Prior to the installation process, read all the instructions, verify if all the parts are in place, and check the nameplate to ensure the voltage matches the available utility power for the unit.

The controller doesn't isolate power from the unit even in the Off mode, and some internal components still require and receive power during the Off mode.

Another aspect is the presence of small objects in the fans bay that can result in object ejection during the fan start-up and there is a probable risk of being hit by these objects resulting in grievous injury and causing equipment damage.

The unit contains fluids and gases under high pressure. Therefore, the pressure should be relieved before working with the piping.

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Various components such as compressors, refrigerant discharge lines, and humidifiers are extremely hot during the unit operation (if applicable). Therefore, allow sufficient time for the unit to cool down before working with the unit cabinet. Handle the unit with extreme caution and wear safety equipment such as protective gloves, safety shoes, and arm protection while working with the hot compressors, discharge lines, and reheats.

There is a risk of water leaking that can damage both the equipment and the building. Effective water drain connection and facilities should be available. Installation should be precise. Implementation of the application and service practices should be appropriate and fault-free. Failure to comply with these norms will result in water leakage from the unit. Water leakage can lead to massive damage and loss of critical equipment in the hosting ecosystem. Therefore, care should be taken to ensure that the unit is not located directly above any equipment that could sustain damage due to water and excessive moisture. Use of a leak detection system for the unit and system supply lines are recommended by Vertiv.



*Arc flash and electric shock hazard. Open all local and remote electric power supply disconnect switches, verify with a voltmeter that power is Off and wear appropriate, OSHA approved personal protective equipment (PPE) per NFPA 70E before working within the electric control enclosure. Failure to comply can cause serious injury or death. Customer must provide earth ground to unit and local codes, as applicable. Before proceeding with installation, read all instructions, verify that all the parts are included and check the nameplate to be sure the voltage matches available utility power. The Liebert controller does not isolate power from the unit, even in the Unit Off mode. Some internal components require and receive power even during the Unit Off mode of the controller. The only way to ensure that there is No voltage inside the unit is to install and open a remote disconnect switch. Refer to unit electrical schematic. Follow all local codes.*

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## Chapter 1: Overview

This chapter introduces the model description, product introduction, basic parameters, main components, optional components, and ambient requirements of Vertiv™ Liebert® SRC-G Precision air conditioner (hereafter Liebert SRC-G).

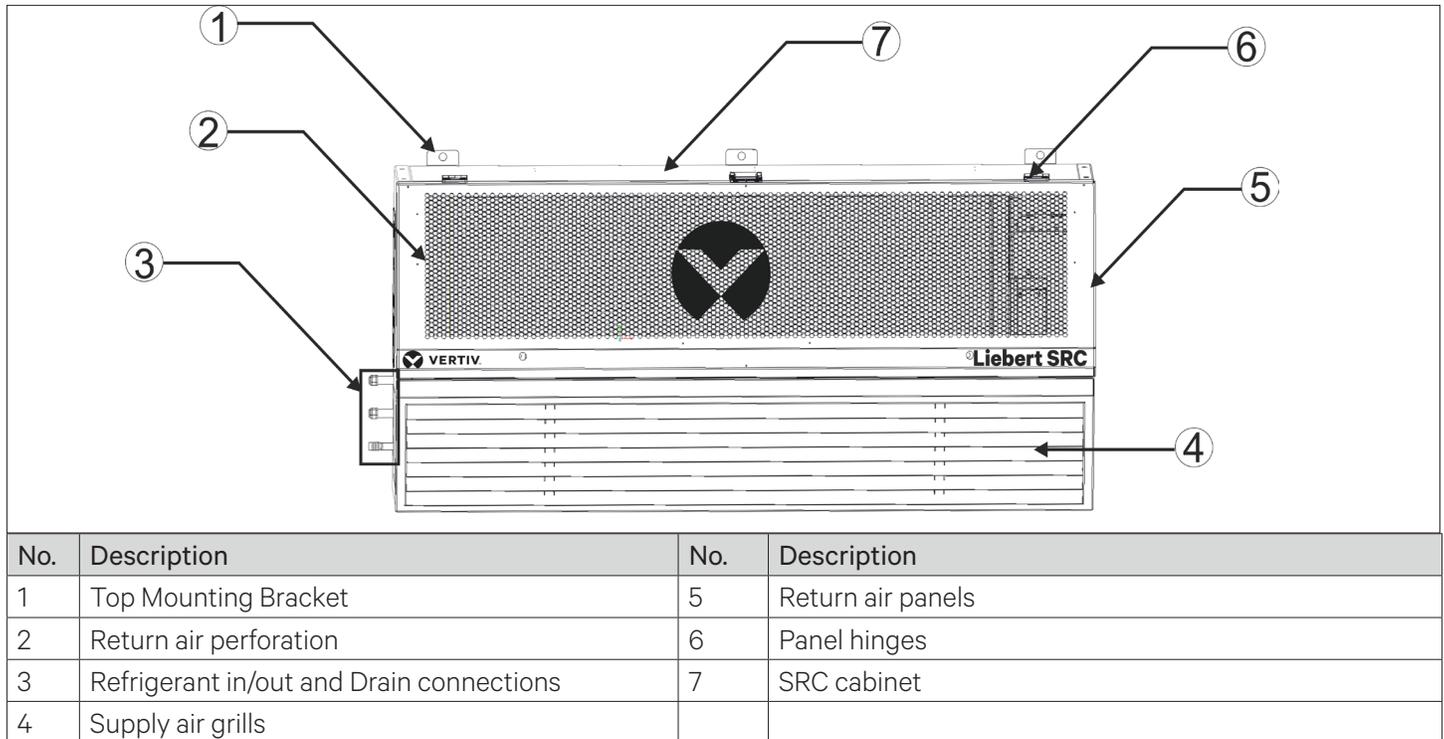
### 1.1. Product Introduction

The Liebert SRC-G is first of its kind innovative product with ‘zero’ footprint due to its wall mounted configuration. The Liebert SRC-G is a small precise environment control system, specially designed for cooling the equipment rooms. It is applicable in equipment rooms, computer rooms and similar eco-system. Featuring high reliability, it can maintain a favorable environment for critical equipment such as sensitive equipment, industrial processing equipment, communication equipment, and computers.

Liebert SRC-G is dedicatedly design to fit into small technological rooms. It is a wall mounted type unit, which has maximum cooling capacity with nearly no footprint that helps in saving maximum space within equipment rooms. It is specifically designed for easy serviceability from the front and sides of the unit. The unit design ensures even air distribution in the small critical infrastructures.

#### 1.1.1. Indoor Unit

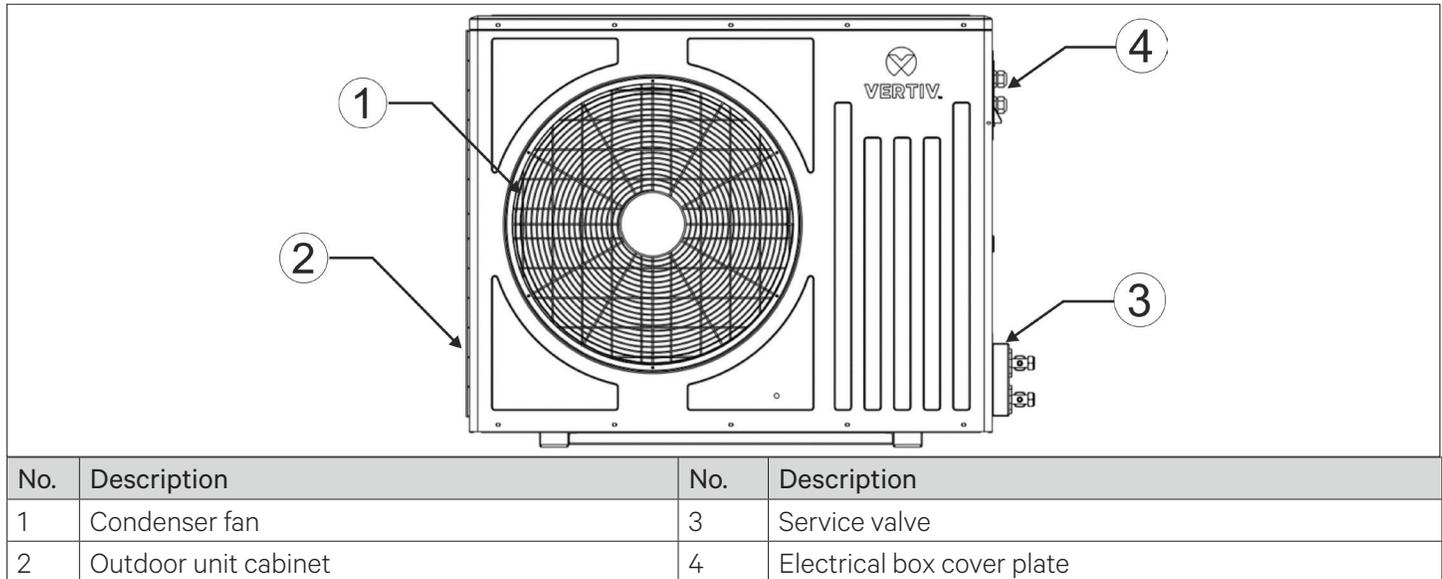
Liebert® SRC-G has three models, Liebert® SRC03GES with 3 kW (0.9 TR), Liebert SRC07GES, Liebert SRC07GET with 7 kW (2 TR), and Liebert SRC11GET with 11 kW (3.1 TR) cooling capacity respectively. Customers can flexibly select the options according to the actual requirement of the equipment room.



**Figure 1-1 Liebert® SRC-G Indoor Unit**

### 1.1.2. Outdoor Unit

The outdoor unit is specifically designed for Vertiv™ Liebert® SRC-G Indoor unit, which comprises compressor as an integral part of outdoor assembly.



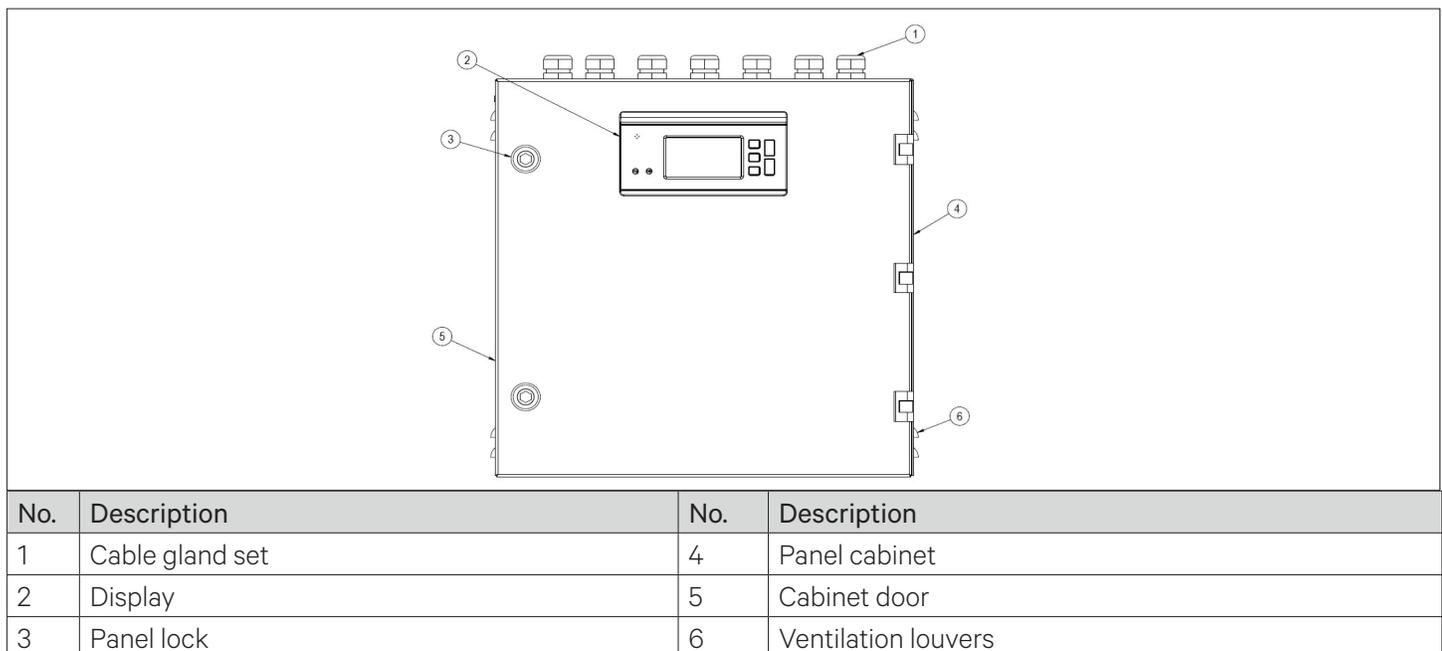
**Figure 1-2 Liebert® SRC-G Outdoor Unit**



Liebert SRC series is a comprehensive solution of indoor and outdoor units, Liebert SRC-G outdoor unit is a integral part of Liebert SRC-G unit.

### 1.1.3. Control Panel

The control panel is designed for Liebert SRC-G unit, comprised of controller, display and switchgear set.



**Figure 1-3 Microprocessor Controller Interface**

## 1.2. Model Description

Vertiv™ Liebert® SRC-G series is fully defined by 18 digits, as represented in [Table 1-1](#).

**Table 1-1 Liebert® SRC-G Model Nomenclature**

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18		
S	R	C	0	7	G	E	S	A	S	0	S	A	B	D	0	0	0		
<b>Digit 1, 2, 3 Product Model</b>										<b>Digit 12 Compressor</b>									
<b>SRC</b>		<b>Small Room Cooling</b>								<b>S</b>		<b>Scroll</b>							
<b>Digit 4,5 Net Cooling Capacity kW</b>										R	Rotary								
<b>03, 07, and 11</b>		<b>Nominal Net Cooling Capacity - kW</b>								E	Digital Scroll								
<b>Digit 6 Features</b>										<b>Digit 13 Refrigerant</b>									
<b>G</b>		<b>Global</b>								<b>A</b>		<b>R410A</b>							
<b>Digit 7 Fan</b>										C	R407C								
<b>E</b>		<b>EC Fan</b>								<b>Digit 13 System Type</b>									
A	AC Fan									<b>A</b>		<b>Air-cooled Condenser</b>							
<b>Digit 8 Power Supply</b>										<b>Digit 14 Enclosure Color</b>									
<b>S</b>		<b>230 V, 50 Hz</b>								<b>B</b>		<b>RAL9005</b>							
T	400 V, 50 Hz									<b>Digit 15 Packaging</b>									
<b>Digit 9 Frequency</b>										<b>D</b>		<b>Domestic</b>							
<b>A</b>		<b>50 Hz</b>								E	Export								
<b>Digit 10 Controller</b>										<b>Digit 16 Order Identifier</b>									
S	Standard									0-9	Factory Code								
<b>P</b>		<b>PACC</b>								<b>Digit 17 Order Identifier</b>									
<b>Digit 11 Monitoring</b>										0-9	Factory Code								
<b>0</b>		<b>Monitoring</b>								<b>Digit 18 Order Identifier</b>									
1	No Monitoring									0-9	Factory Code								

The standard components are represented in **'Bold Italic'** font in [Table 1-1](#).

## 1.3. Basic Performance Parameters

The basic performance parameters of the Vertiv™ Liebert® SRC-G are shown in [Table 1-2](#).

**Table 1-2 Basic Performance Parameters of Liebert® SRC Units**

Model	Nominal Cooling Capacity*	Power*
SRC03GES	3.270 kW	1.03 kW
SRC07GES	7.490 kW	2.27 kW
SRC07GET	8.018 kW	2.45 kW
SRC11GET	10.902 kW	3.10 kW



\*Above mentioned capacity and power consumption are calculated at Indoor conditions of 24 °C/50% RH and 35 °C Outside ambient temperature.



Due to continuous upgrade of the unit, the technical parameter are subject to change without prior notice, therefore for the details of the parameters refer to the respective nameplate of the unit.

## 1.4. Main Components

### 1.4.1. Indoor Unit

Liebert SRC-G indoor unit consists of an evaporator, EC fan, thermal expansion valve, and filter dryer. For optional component details, refer to [Section 1.5](#).

- **Cabinet**

The cabinet of the unit is prepared by a steel sheet of 1.2 mm thickness, which is custom powder coated to protect against corrosion with the air-stream insulation thickness of 10 mm; the color code of the unit is RAL9005.

- **Evaporator Coil**

The evaporator is a hydrophilic-coated fin-tube heat exchanger with a high sensible heat factor (>0.9). The distributor is designed and verified accordingly to ensure that the refrigerant (R410A) is distributed evenly in each loop, improving the efficiency of the heat exchanger to a great extent.

- **EC Fan**

The unit is fitted with one/two direct-driven, high efficiency, single inlet, backward curved, centrifugal 'plug' type fan (s), with aluminum nozzle (s) and PA Plastic impeller (s). The fan motors are Electronically Commutated (EC), IP54, with internal protection and speed regulation via controller signal. The fans are statically and dynamically balanced.



**Figure 1-4 EC Fan**

- Thermal Expansion Valve (TXV)

Vertiv™ Liebert® SRC-G unit has an external equalizer type Thermal Expansion Valve (TXV) that collects temperature and pressure signals simultaneously to accurately regulate the refrigerant flow into the evaporator.



**Figure 1-5 Thermal Expansion Valve (TXV)**

- Filter Dryer

The moisture can adversely affect the operations and service life of a system in the refrigeration life-cycle. In order to rectify this condition the unit is equipped with a filter dryer that can filter out, remove, hold, and prevent the moisture particles from circulating through the system.



**Figure 1-6 Filter Dryer**

- **Air Filtration**

The unit is equipped with a G4/MERV8 nylon filter with 90% down to 10 micron particle arrester efficiency. It features a compact structure and easy maintenance. It can be washed repeatedly.

- **Return Air Temperature Sensor (PEX1142)**

Vertiv™ Liebert® SRC-G unit is provided with a return air temperature sensor which not only reads the inlet air temperature returning from the room but also provides the value of the relative humidity of the returning air. It is used to modulate the cooling effect of the unit by controlling the return air temperature, and also maintains the humidity by eliminating the excess moisture in the room.

Temperature limits are field adjustable via display interface. The cooling or dehumidification warning activates when the temperature or humidity exceeds the threshold values respectively.

- **Supply Air Temperature Sensor**

Liebert SRC-G series is equipped with a Negative Temperature Coefficient (NTC) type supply air temperature sensor which helps in monitoring supply air temperature of the unit.

## 1.4.2. Outdoor Unit

The Liebert SRC outdoor unit consists of compressor, condenser coil, and fan.

- **Compressor**

The Liebert SRC-G series outdoor unit consists of the rotary compressor for Liebert® SRC03GES and the scroll compressor for Liebert® SRC07GES, Liebert® SRC07GET, and Liebert® SRC11GET models with high efficiency. It uses environment-friendly refrigerant (R410A) and features low vibration, low noise, and high reliability.



**Figure 1-7 Scroll Compressor**

- **Condenser Coil**

The unit is equipped with a uniquely designed hydrophilic fin-tube heat exchanger (condenser) with the wavy fin on the surface, which facilitate a high heat transfer rate. The condenser also has an easy cleaning feature thereby enabling easy maintenance of outdoor unit.

- Fan

The Liebert SRC-G outdoor unit fan has axial flow blades with low noise. It also has a high-performance single-phase motor which enables airflow modulation based on compressor pressure reading as per set parameters.



**Figure 1-8 Axial Flow Blade**

### 1.4.3. Control Panel

- Microprocessor Controller

The Liebert® SRC-G unit is configured with the graphics color screen display with simple user-friendly interface operation. The multi-level password protection feature can effectively prevent unauthorized operation. It also provides self-recovery up on power failure; high and low voltage protection functions; phase loss protection; and automatic phase-sequence switching upon anti-phase. The operation status of the components is available on the respective menus.



No.	Description	No.	Description
1	LCD screen	3	Alarm indicator
2	Run state indicator	4	Control buttons

**Figure 1-9 Microprocessor Controller Screen**

## 1.5. Additional Components (Optional)

### 1.5.1. Remote Monitoring

Vertiv™ Liebert® SRC-G series adopts the SNMP communication protocol; through the configured LAN port. The Liebert SRC-G can communicate with the host computer and receives the control instructions of the host software.

### 1.5.2. Installation Accessories

The Liebert SRC-G unit is recommended to be installed with accessories as per [Table 1-3](#).

**Table 1-3 Accessories for Different Models**

Name of Item	SRC03GES	SRC07GES	SRC07GET	SRC11GET
Gas (Suction) pipe	pipe 1/2" with insulation	5/8" with insulation	5/8" with insulation	7/8" with insulation
Liquid (Discharge) pipe	3/8" with insulation	3/8" with insulation	3/8" with insulation	3/8" with insulation
Indoor power cable	3C x 1.5 mm <sup>2</sup>	3C x 1.5 mm <sup>2</sup>	3C x 1.5 mm <sup>2</sup>	3C x 1.5 mm <sup>2</sup>
Fan control cable	3C x 0.5 mm <sup>2</sup>	4C x 0.5 mm <sup>2</sup>	4C x 0.5 mm <sup>2</sup>	5C x 0.5 mm <sup>2</sup>
Outdoor power cable*	2C x 2.5 mm <sup>2</sup>	2C x 2.5 mm <sup>2</sup>	4C x 2.5 mm <sup>2</sup>	4C x 2.5 mm <sup>2</sup>
Fan and contactor	4C x 0.5mm <sup>2</sup>			
Outdoor HP and LP cable	3C x 0.5 mm <sup>2</sup>			
Outdoor pressure sensor cable	3C x 0.5mm <sup>2</sup>			

All field cables are recommended as armored cables in order to avoid external influences such as rat bites etc.

## 1.6. Environmental Conditions Requirements

### 1.6.1. Operating Environment Requirements

The operating environment requirements for Liebert® SRC-G are given in [Table 1-4](#).

**Table 1-4 Operation Environment Requirements**

Item	Requirements
Installation position	The maximum equivalent horizontal distance between indoor and outdoor units <sup>[1]</sup> : 60 m; Vertical distance $\Delta H$ <sup>[2]</sup> : $-5 \text{ m} \leq \Delta H \leq 30 \text{ m}$
Installation mode	Indoor unit: horizontal airflow mode (Wall mounted); Outdoor unit: horizontal airflow mode
Ambient condition range	Indoor: 21 °C to 30 °C/45% RH to 55% RH Outdoor: -15 °C to +45 °C (standard model) (it can sustain up to 48 °C outside ambient temperature)
Altitude	< 1000 m, derating is required when location altitude is above 1000 m
Operating Power range	SRC03GES: 1P, 230 V $\pm$ 10%, 50 Hz $\pm$ 5% SRC07GES: 1P, 230 V $\pm$ 10%, 50 Hz $\pm$ 5% SRC07GET: 3P, 400 V $\pm$ 10%, 50 Hz $\pm$ 5% SRC11GET: 3P, 400 V $\pm$ 10%, 50 Hz $\pm$ 5%



1. For the equivalent lengths of components, refer to [Table 2-9](#).
2. The value of  $\Delta H$  is positive if the outdoor unit is installed above the indoor unit;  $\Delta H$  is negative if the indoor unit is installed above the outdoor unit.

### 1.6.2. Storage Environment Requirements

The storage environment meets the requirements of GB/T 4798.1-2005 and the requirements are listed in [Table 1-5](#).

**Table 1-5 Storage Environment Requirements**

Item	Requirements
Storage environment	Clean indoor without dust
Ambient humidity	5% RH to 95% RH
Ambient temperature	-25 °C to +55 °C (transport environment temperature: -40 °C to +70 °C)
Storage time	Total transportation and storage time should not exceed six months, otherwise, the performance of the system needs to be re-calibrated.

## 1.7. Refrigerant Charging Requirement

Vertiv™ Liebert® SRC-G is specifically designed for environment-friendly refrigerant (R410A) and the unit is supplied with factory-charged refrigerant suitable for 10 m piping distances to deliver optimum design condition and efficiency. If the piping distance of the outdoor unit is more than 10 m, refer to [Section 2.8](#) for the details on the quantity of refrigerant to be charged inside the system.



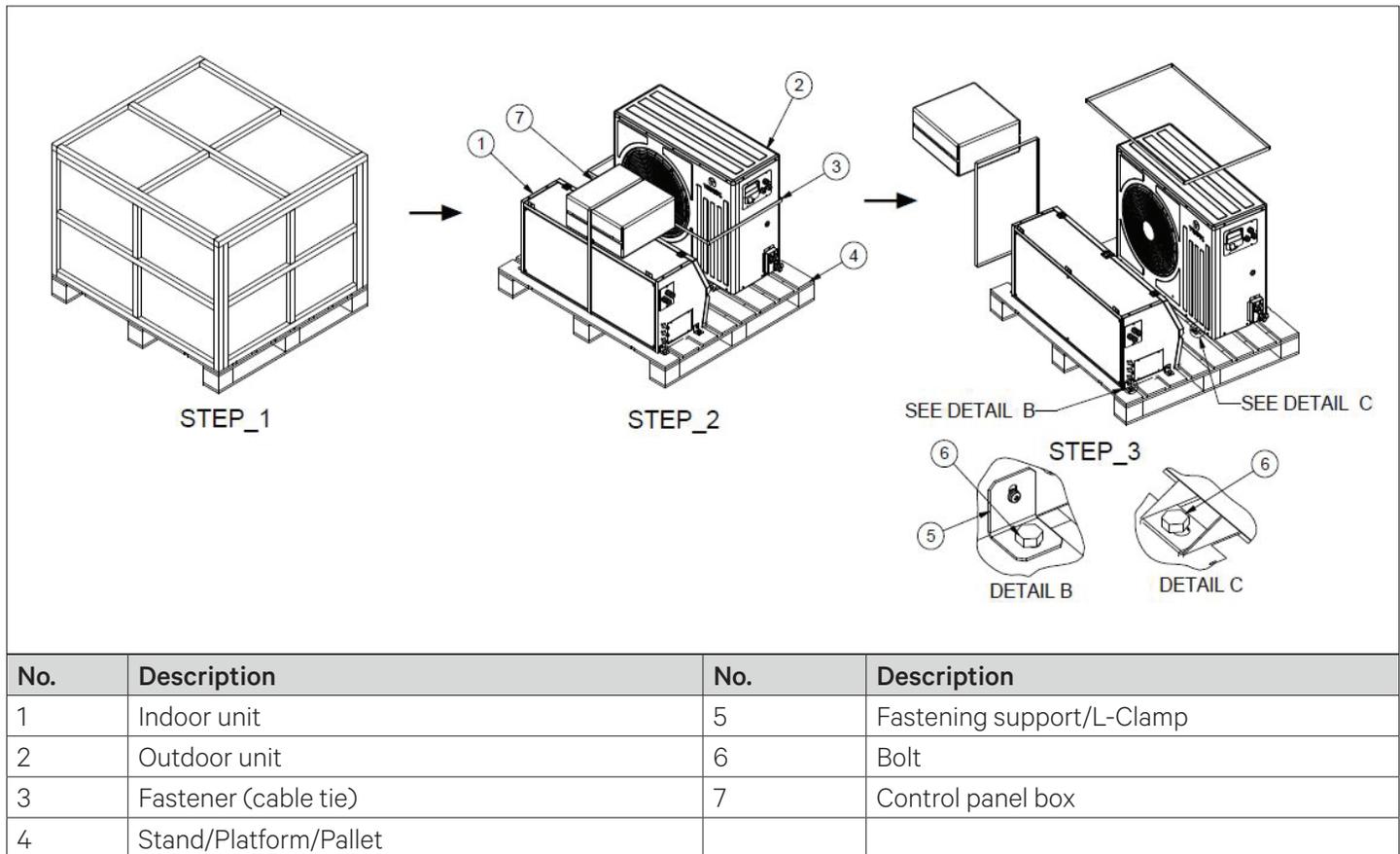
*Do not use sub-standard quality refrigerant as it may cause extensive damage to the system. Vertiv does not undertake any responsibility for all the related consequences that result from using low-quality or inferior refrigerant.*

## Chapter 2: Mechanical Installation

This chapter describes the mechanical installation of Vertiv™ Liebert® SRC-G, including unpacking and inspection, installation notes, system installation arrangement, installing indoor and outdoor units, piping, removing transportation fasteners and adding refrigerant for long pipe systems, and inspection items.

### 2.1. Unpacking and Inspection

Move the unit to the location near to the final installation site and then unpack the packaging and de-palletize the pallet of Liebert SRC-G unit as illustrated in [Figure 2-1](#).



**Figure 2-1 Unpacking and De-palletized of Liebert® SRC-G Unit**

Check that the fittings are complete and the components are intact against the packing list. If any parts are found missing or damaged, report immediately to the local office of the carrier and the Vertiv representative. Do not accept a damaged unit.



*Liebert® SRC-G indoor unit is factory charged with Nitrogen at 0.2 MPa (2 bar) pressure. After unpacking, check the unit and if the Nitrogen pressure is less, then consult Vertiv representative.*

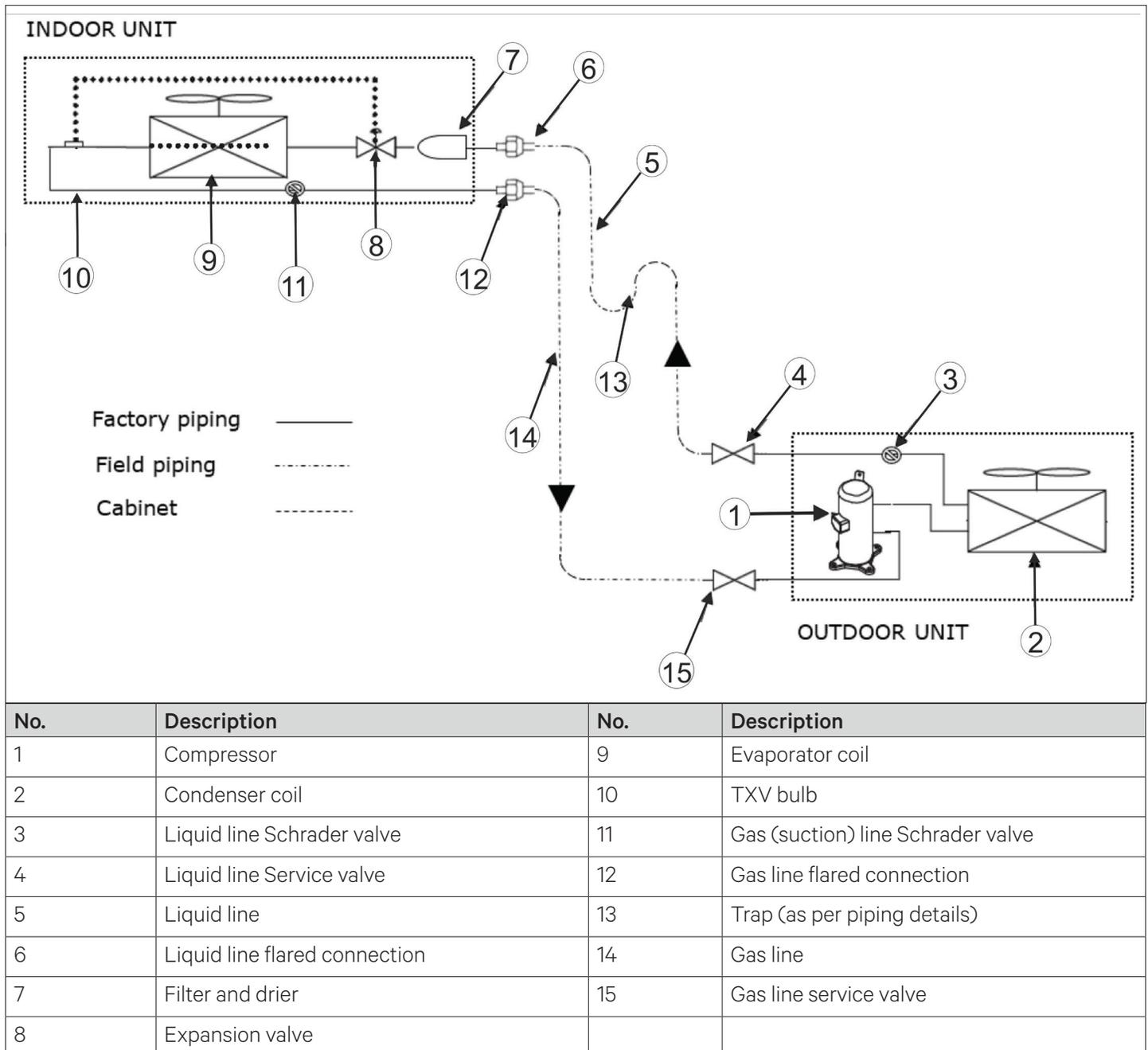
## 2.2. Installation Notes

- Vertiv™ Liebert® SRC-G indoor unit is wall mounted and the outdoor unit is installed outside of equipment/ computer room or on the floor of other rooms, still it is recommended to provide adequate maintenance space for indoor (refer to [Figure 2-5](#)) and outdoor units while installation.
- Vertiv recommends that the site preparation is defined as per the requirements. However, if these requirements are not met, Vertiv recommends that rectifications should be made on the site in order to comply with the specified requirements and conditions.
- However, if the rectifications or modifications are not implemented as per instruction, then Vertiv does not guarantee the accuracy and precision of the temperature and humidity provided by the unit.
- The Liebert SRC-G indoor unit is charged in the factory with nitrogen at 0.34 MPa (3.4 bar) pressure for shipping; before installation release the internal nitrogen of the unit.
- The installers must strictly follow the design drawings for installation and reserve the space for maintenance. The manufacturer's engineering dimension drawings can serve as a reference.
- The Liebert SRC-G outdoor unit is pre-charged in the factory with R410a gas equivalent of 10 m piping. For further piping lengths contact Vertiv local technical representatives.

## 2.3. System Installation Arrangement

### 2.3.1. System Arrangement during Installation

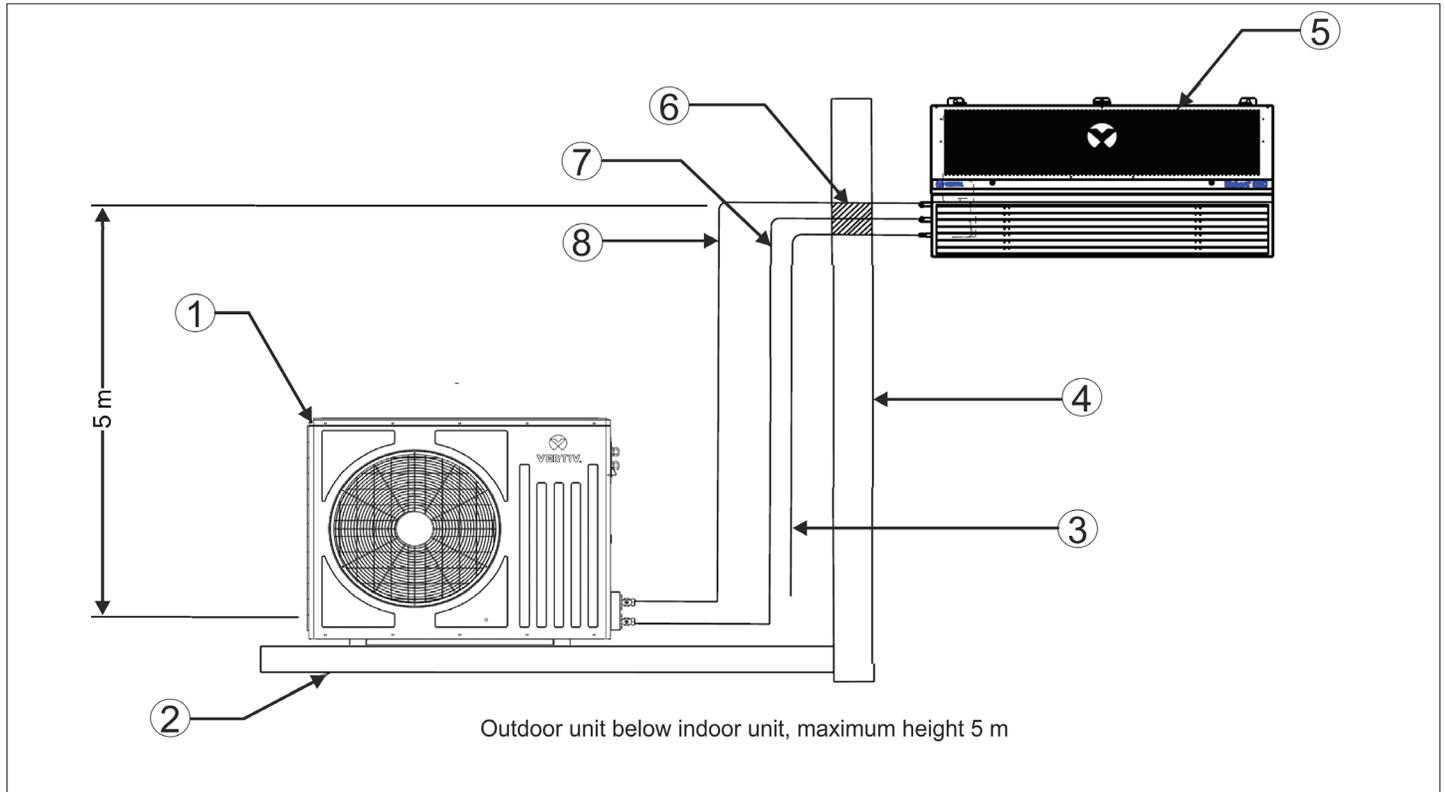
The refrigerant piping is required to connect the indoor and the outdoor units of the air-cooled system. The system arrangement diagram of the refrigeration system is shown in [Figure 2-2](#).



**Figure 2-2 System Arrangement Diagram**

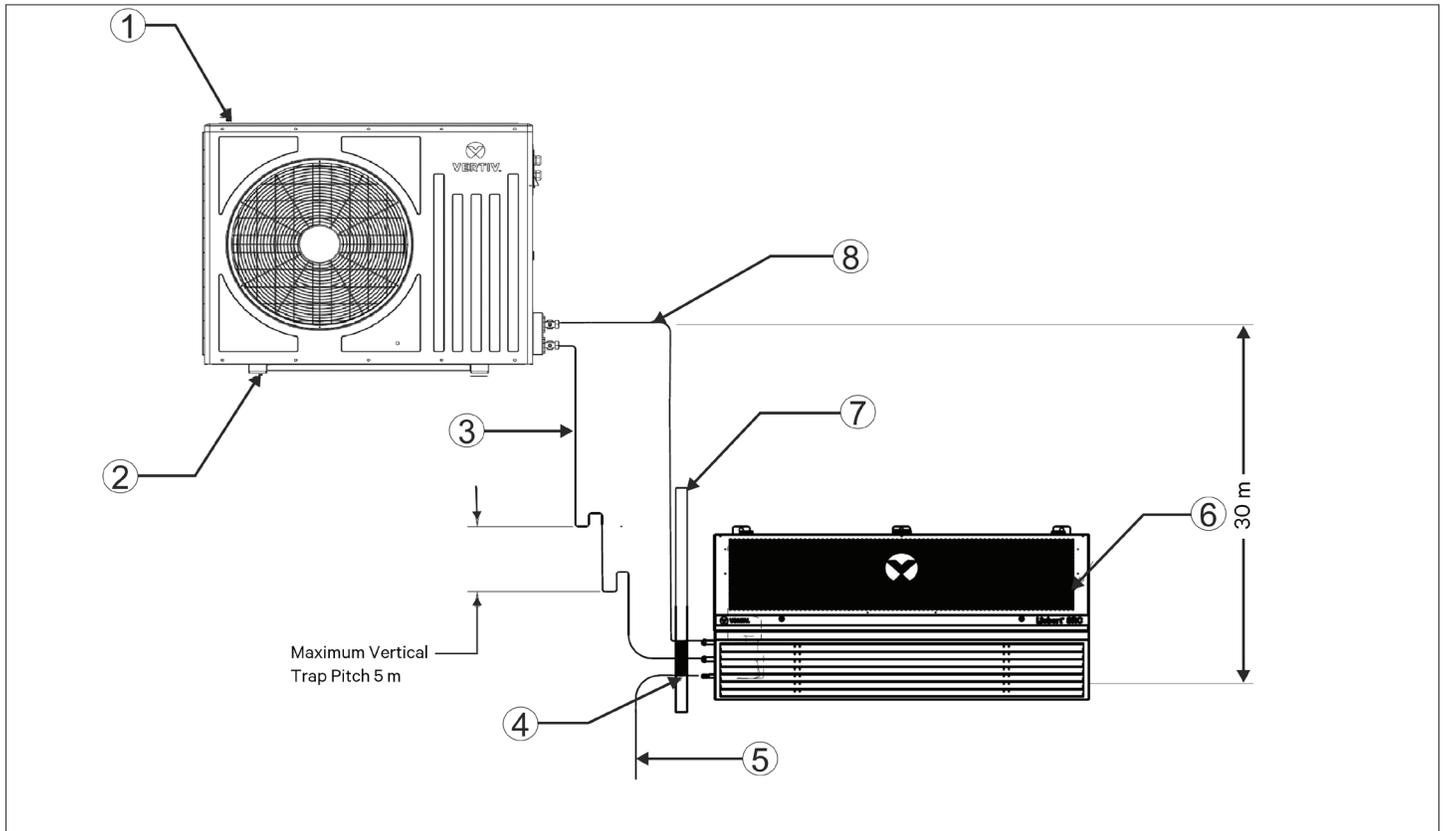
### 2.3.2. System Installation Mode

The system installation schematic diagram explains the process of installation of the outdoor unit.



No.	Description	No.	Description
1	Outdoor Unit	5	Indoor Unit
2	Mounting floor	6	Seal for pipe protection through wall
3	Condensate drain pipe	7	Liquid line
4	Wall	8	Gas line (1:100)

**Figure 2-3 Indoor Unit is Placed Higher than Outdoor Unit during Installation**



No.	Description	No.	Description
1	Outdoor unit	5	Condensate drain pipe
2	Stand/Platform/Raised Platform	6	Indoor Unit
3	Liquid (Discharge) line	7	Wall
4	Seal for pipe protection through wall	8	Gas (Suction) line (1:100)

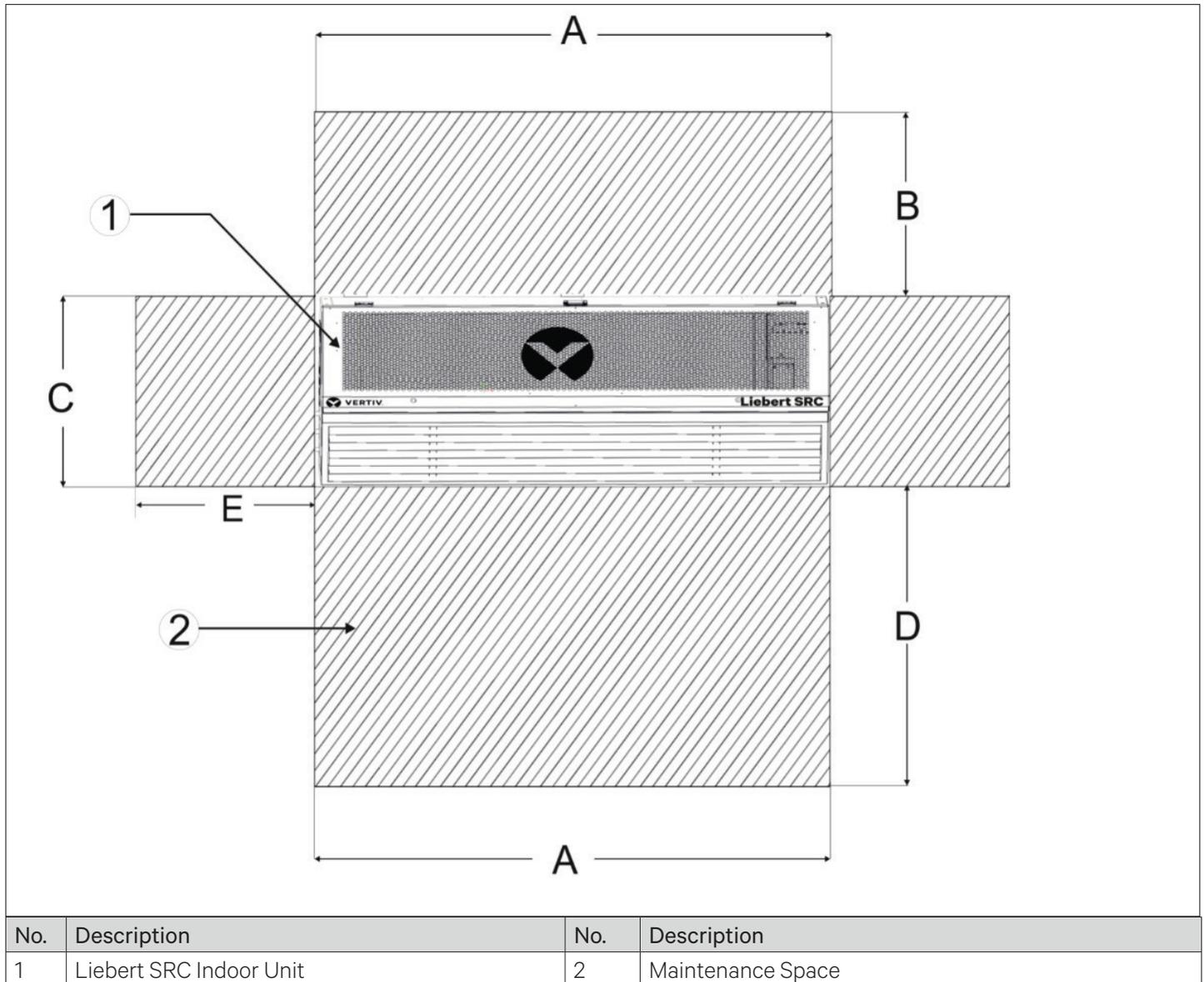
**Figure 2-4 Indoor Unit is Placed Lower than Outdoor Unit during Installation**

The illustration in [Figure 2-3](#) depicts the schematic diagram of system installation when the indoor unit is installed at a lower level than the outdoor unit. The maximum height difference allowed in this case is 5 m. When the indoor unit is installed at a higher level than the outdoor unit, the maximum allowed height difference is 30 m (refer to [Figure 2-4](#)). The maximum allowed equivalent piping length is 60 m.

## 2.4. Mechanical Installation

### 2.4.1. Dimension and Weight of the Indoor Unit (Product Dimension)

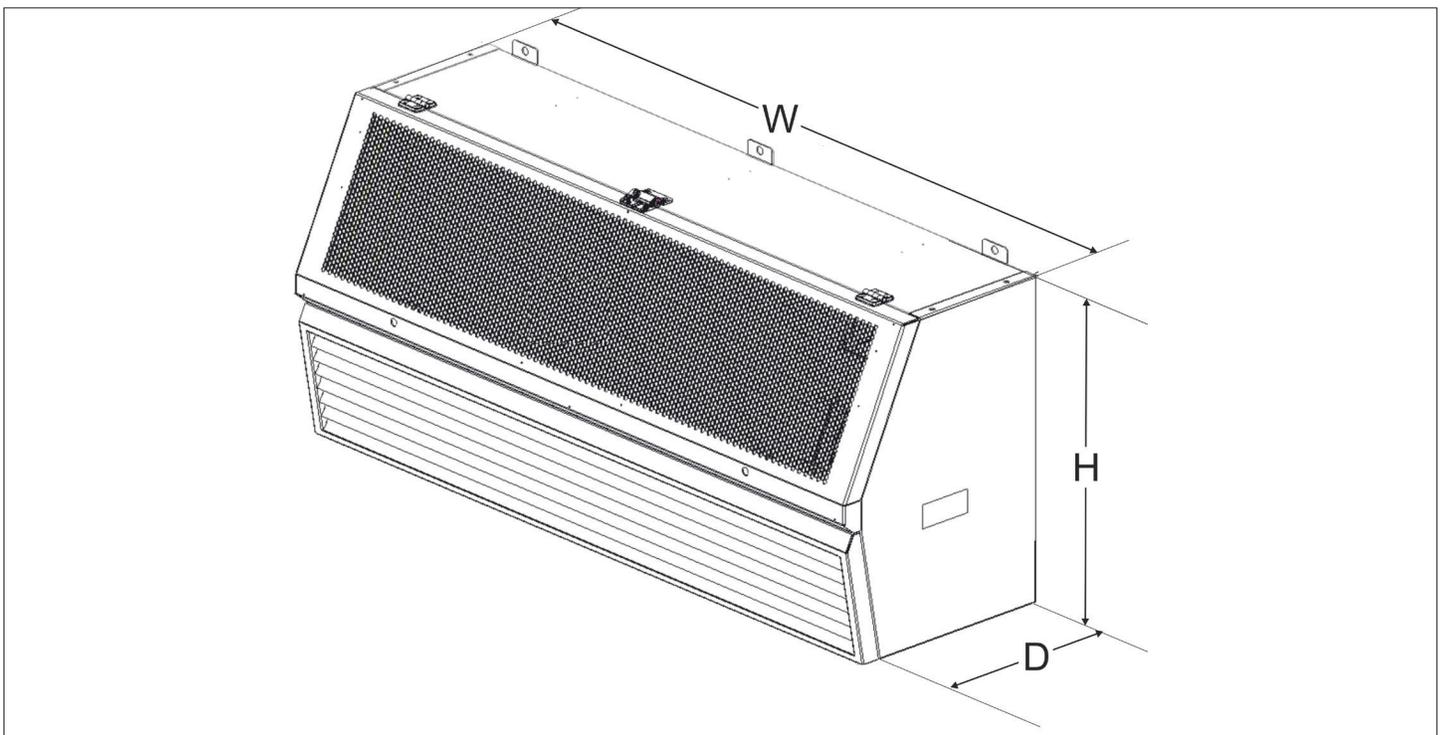
The maintenance space of Liebert® SRC-G models is given in [Figure 2-5](#) and the dimensions of models SRC03GES, SRC07GES, SRC07GET, and SRC11GET are depicted in [Figure 2-6](#). [Table 2-1](#) represents the maintenance space of all the indoor units and [Table 2-2](#) represents the dimension and operational weight of all the indoor units.



**Figure 2-5 Maintenance Space of Liebert SRC-G Model**

**Table 2-1 Maintenance Space of Liebert SRC-G Indoor Unit Models**

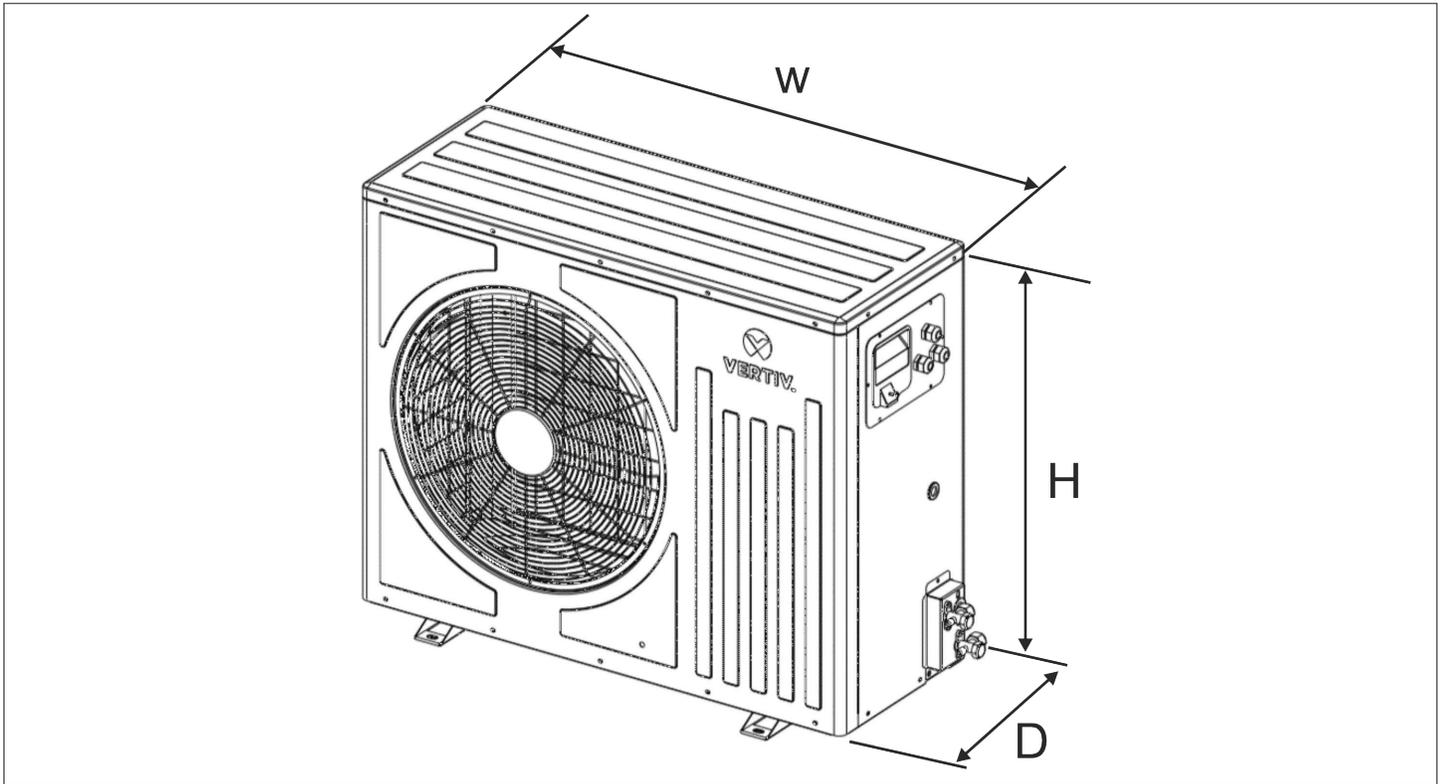
Model	A (mm)	B (mm)	C (mm)	D (mm)	E (mm)
SRC03GES	710	200	520	500	500
SRC07GES	1150	200	520	500	500
SRC07GET	1150	200	520	500	500
SRC11GET	1450	200	520	500	500


**Figure 2-6 Liebert SRC-G Indoor Unit Model**
**Table 2-2 Mechanical Parameters of Indoor Units**

Model	Dimensions (W × D × H)	Operational Weight (kg)
	mm	
SRC03GES	649 × 424 × 490	40
SRC07GES	1109 × 424 × 490	50
SRC07GET	1109 × 424 × 490	50
SRC11GET	1409 × 424 × 490	60

## 2.5. Dimension and Weight of the Outdoor Unit

The dimensions of outdoor unit models SRC03GES, SRC07GES, SRC07GET, and SRC11GET are depicted in [Figure 2-7](#) and [Table 2-3](#) represents the dimensions and weight of all the outdoor units.



**Figure 2-7 Liebert SRC-G Outdoor Unit Model**

**Table 2-3 Mechanical Parameters of Outdoor Units**

Model	Dimensions (W × D × H)	Operational Weight (kg)
	mm	
SRC03GES	970 × 410 × 610	70
SRC07GES	970 × 410 × 800	85
SRC07GET	970 × 410 × 800	85
SRC11GET	970 × 410 × 1170	95

## 2.6. Indoor Unit Installation Procedure

### 2.6.1. Equipment Room Requirements

The equipment room must be prepared before installation to ensure a smooth operating flow and to achieve the expected results. The data center must meet the standards to be properly ventilated and heated. The design specifications for the air conditioners must be ideal and should correspond to energy-efficient design standards.

Following are the requirements to maintain a favorable room environment prior to the installation.

- The equipment room should have suitable and effective heat insulation. The equipment room should have a sealed and damp-proof layer. Polyethylene film should be used for the damp-proof layer of the ceiling and walls. Alternatively, a moisture-proof paint can be used to simulate the same effect as that of Polyethylene. It is important to ensure that the coating on the concrete wall and floor is damp-proof.
- Outdoor air significantly increases the load of cooling and dehumidification. Therefore, all the doors and windows must be closed. Gaps and seams must be very narrow to prevent the outdoor air from entering the equipment room. It is an industry best practice to keep the infiltration of the outdoor air below 5% of the total indoor airflow. Apply appropriate thermal insulation and antifreeze measures for outdoor water pipes to avoid poor drainage and insufficient water supply caused by freezing.
- As indoor units are wall mounted, ensure that the mounting wall strength should be rigid enough to support static and dynamic forces induced during the ideal and working conditions of indoor unit respectively.



- *Vertiv recommends that the site preparation is defined as per the requirements. However, if these requirements are not met, Vertiv recommends that rectifications be made on the site in order to comply with the specified requirements and conditions.*
- *However, if the rectifications or modifications are not implemented, then Vertiv does not guarantee the accuracy and precision of the temperature and humidity provided by the unit.*

### 2.6.2. Installation Space Requirements

Adequate installation space for the indoor unit must be provided. The indoor unit of the air-cooled product must be installed on the wall of an equipment room or computer room and the outdoor unit must be installed outside of the data center, open to external ambient. [Figure 2-8](#) indicates the installation location of the indoor unit.

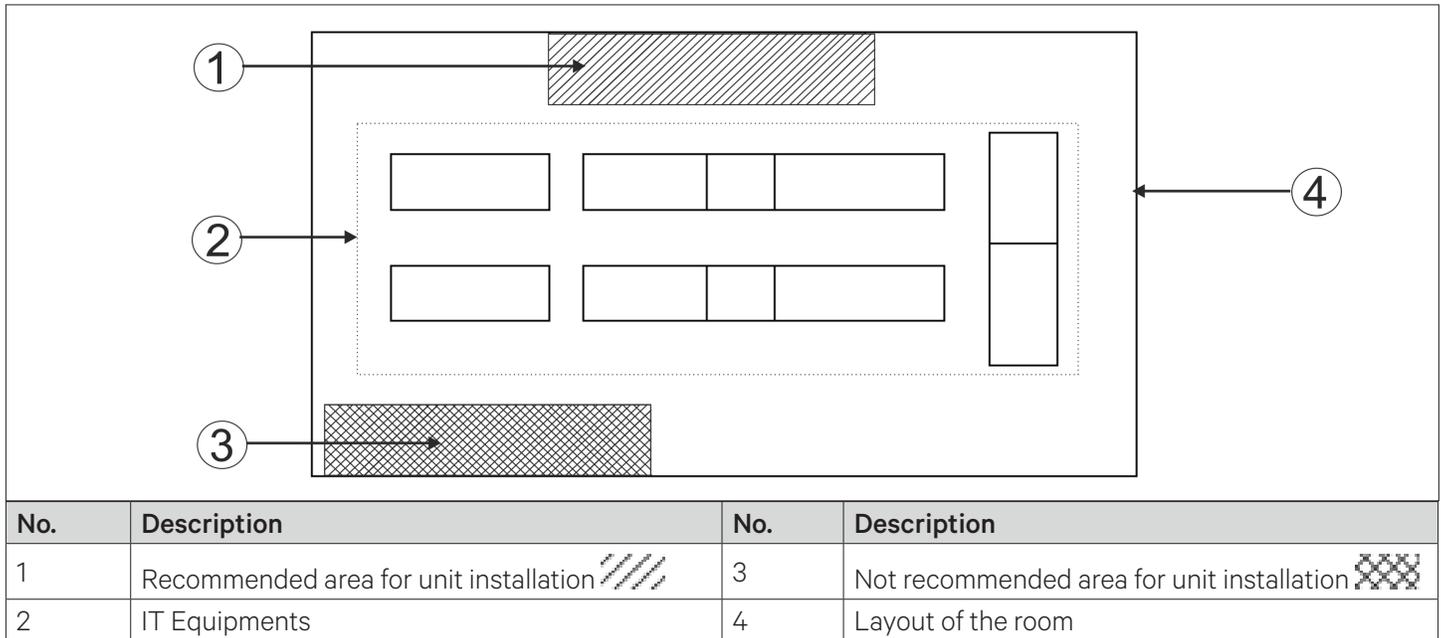


Figure 2-8 Installation Location of the Indoor Unit



- Do not use the indoor unit in the open and severe outdoor environment.
- Avoid locating the indoor unit in concave or narrow areas, which can obstruct the airflow, shorten the cooling cycle and result in air return short cycle and air noise.
- Avoid locating multiple indoor units close to each other which can result in the short cycle of air and create the load imbalance. The minimum distance between adjacent units is 600 mm.
- Do not install the unit within the vicinity of any other precision cooling equipment to avoid the leakage of condensed water produced due to imbalance load conditions.
- Do not install other devices (such as smoke detectorx) over the indoor cabinet.



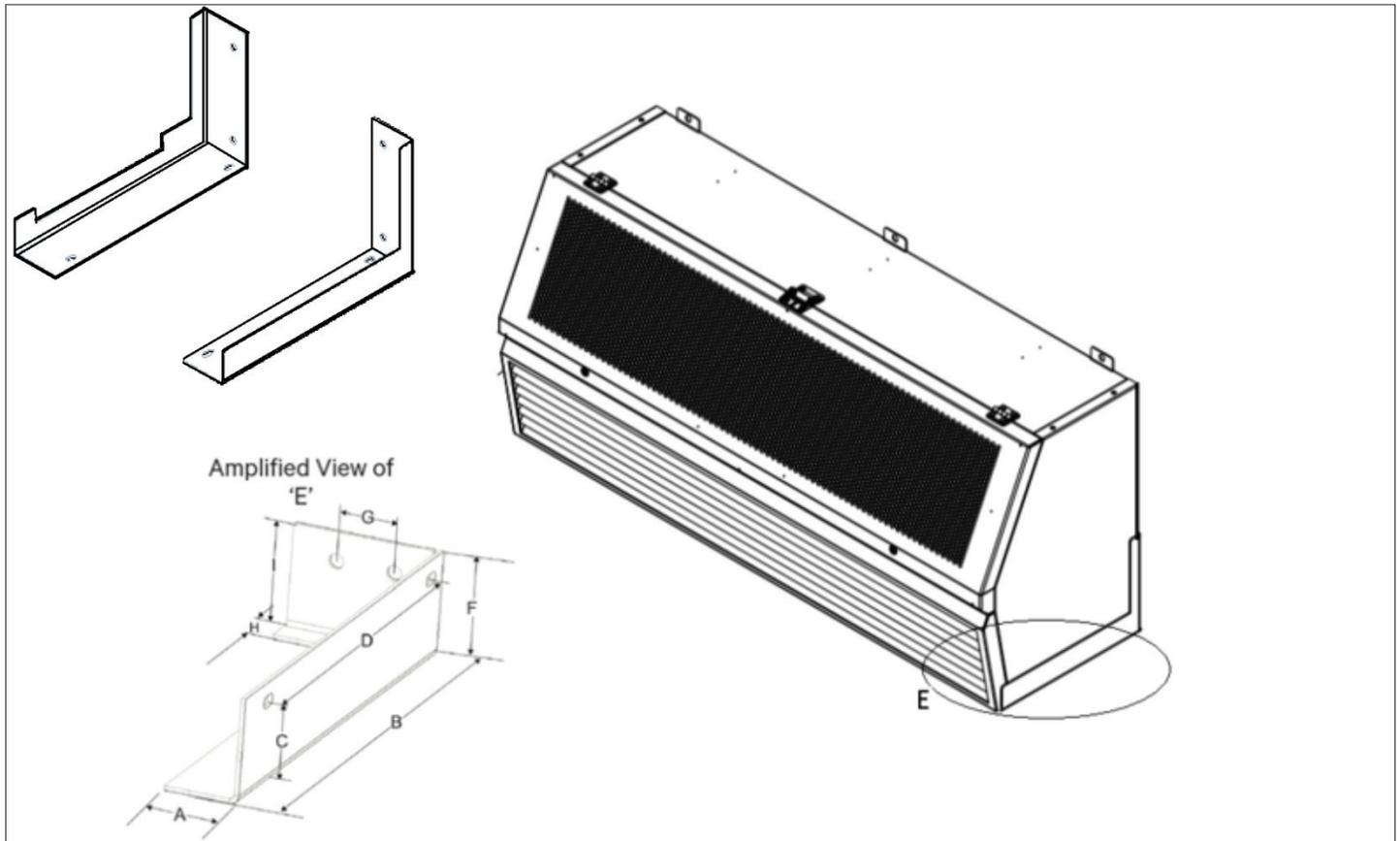
Vertiv™ Liebert® SRC-G can generate condensate water. Water leakage can cause damage to other equipment nearby. Do not install the units in the vicinity of any precision equipment. The installation site must have the facility of drainage piping.

### 2.6.3. Indoor Unit Installation

Two mounting brackets are supplied in the installation kit of the unit, these brackets are sized according to the dimensions, weight, and height of the indoor unit models. [Figure 2-9](#) and [Table 2-4](#) provide the dimensional details of the indoor unit.



Liebert SRC-G indoor unit contains a set of two installation brackets Left and Right-Hand brackets as shown in the [Figure 2-9](#), installation team must ensure to use of the respective bracket as per its suitable orientation.



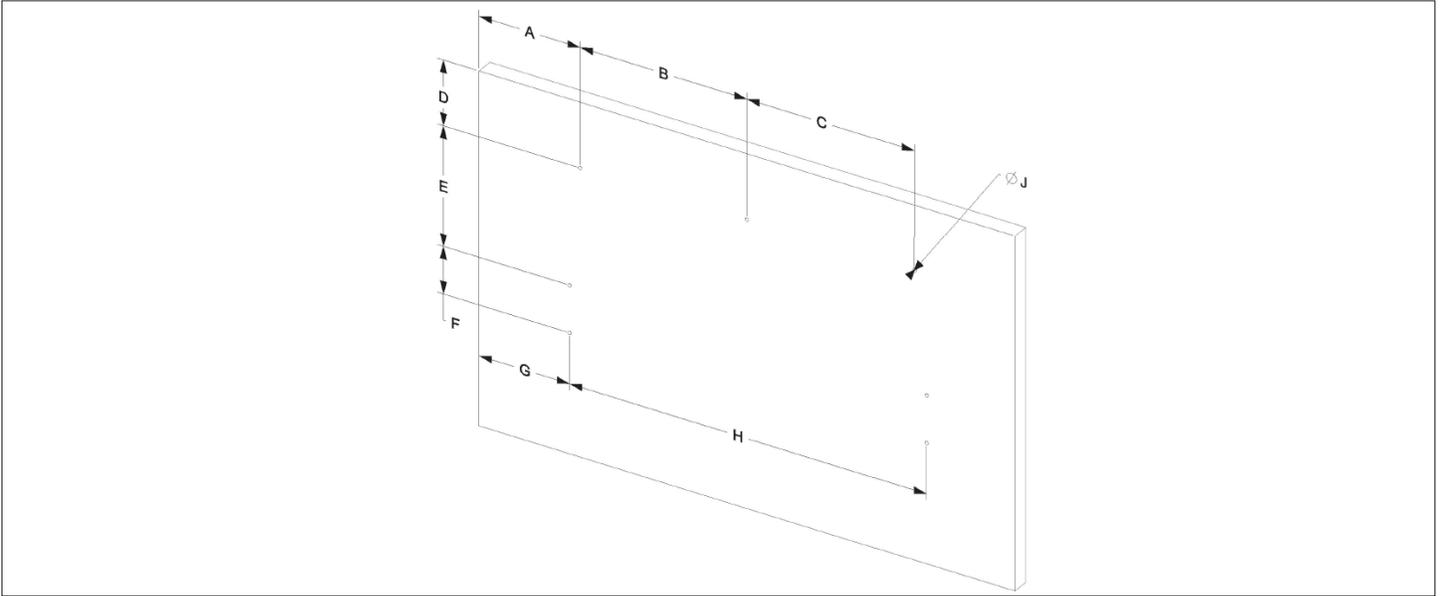
**Figure 2-9 Mounting Frame for Indoor Unit**

**Table 2-4 Mounting Bracket Dimension of the Indoor Units**

Model	A	B	C	D	F	G	H	I
SRC03GES	50	320	58	272	70	134	25	70
SRC07GES	50	320	58	272	70	134	25	70
SRC07GET	50	320	58	272	70	134	25	70
SRC11GET	50	320	58	272	70	134	25	70

Follow the step by step procedure to install the Liebert® SRC-G Indoor unit.

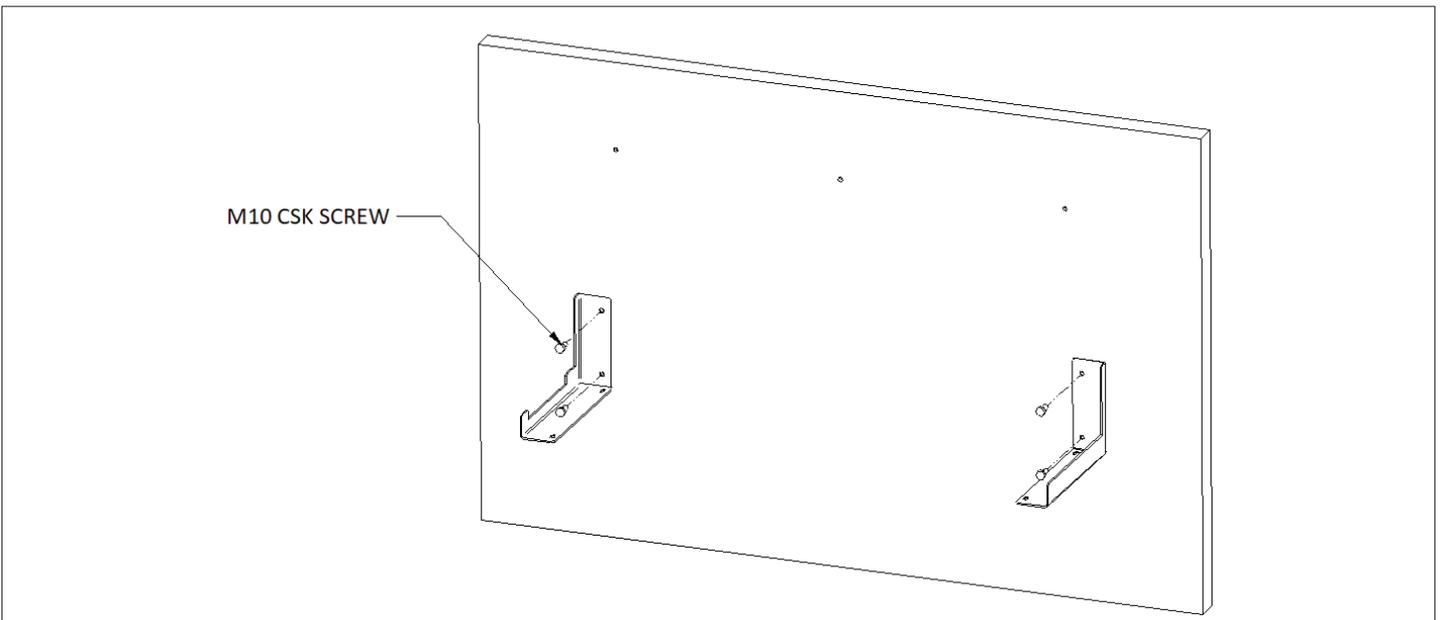
Step 1: [Figure 2-10](#) illustrates the drill holes of dimension  $\varnothing 10$  mm for expansion bolts and their locations for SRC03GES, SRC07GES, SRC07GET, and SRC11GET models.



**Figure 2-10 Location of the Expansion Bolt Holes**

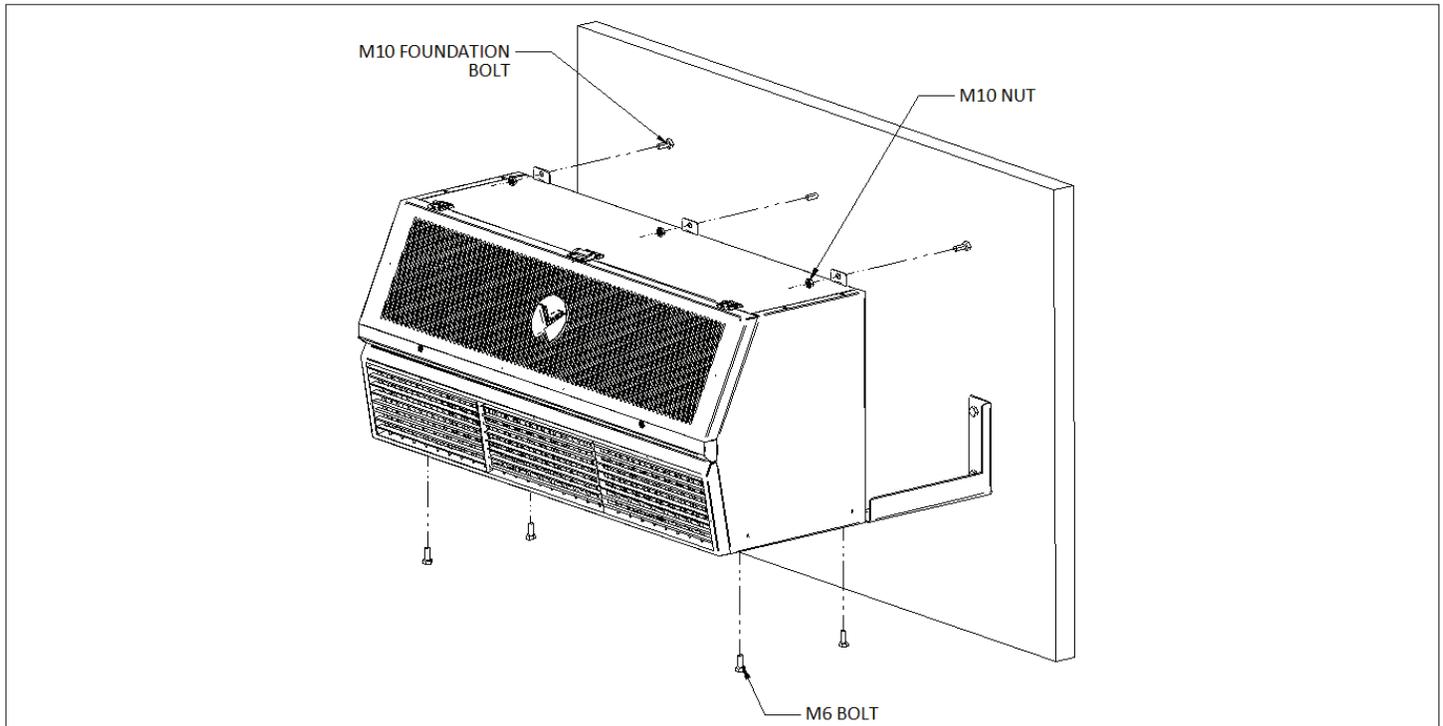
**Table 2-5 Dimension of the Expansion Bolt Holes**

Model	A	B	C	D	E	F	G	H	J
SRC03GES	288.6	531	NA	185	342	134	258	605	10
SRC07GES	288.6	475	475	185	342	134	258	1014	10
SRC07GET	288.6	475	475	185	342	134	258	1014	10
SRC11GET	288.6	625	625	185	342	134	258	1315	10



**Figure 2-11 Location of the Expansion Bolt Holes**

Step 2: Rigidly mount the mounting brackets with reference to the expansion bolts, refer to [Figure 2-12](#) for better understanding.



**Figure 2-12 Placement of Bottom Mounting Bracket**

Step 3: After successfully mounting all the supporting brackets, check the mounting is rigid to sustain the load of the indoor unit; then place the indoor unit with the standard lifting tools for example a 'forklift'. It is recommended installation should be carried out only by trained professionals.



*All the illustrations are for reference only, the actual site mounting may differ as per requirement, consult Vertiv professional before installation.*

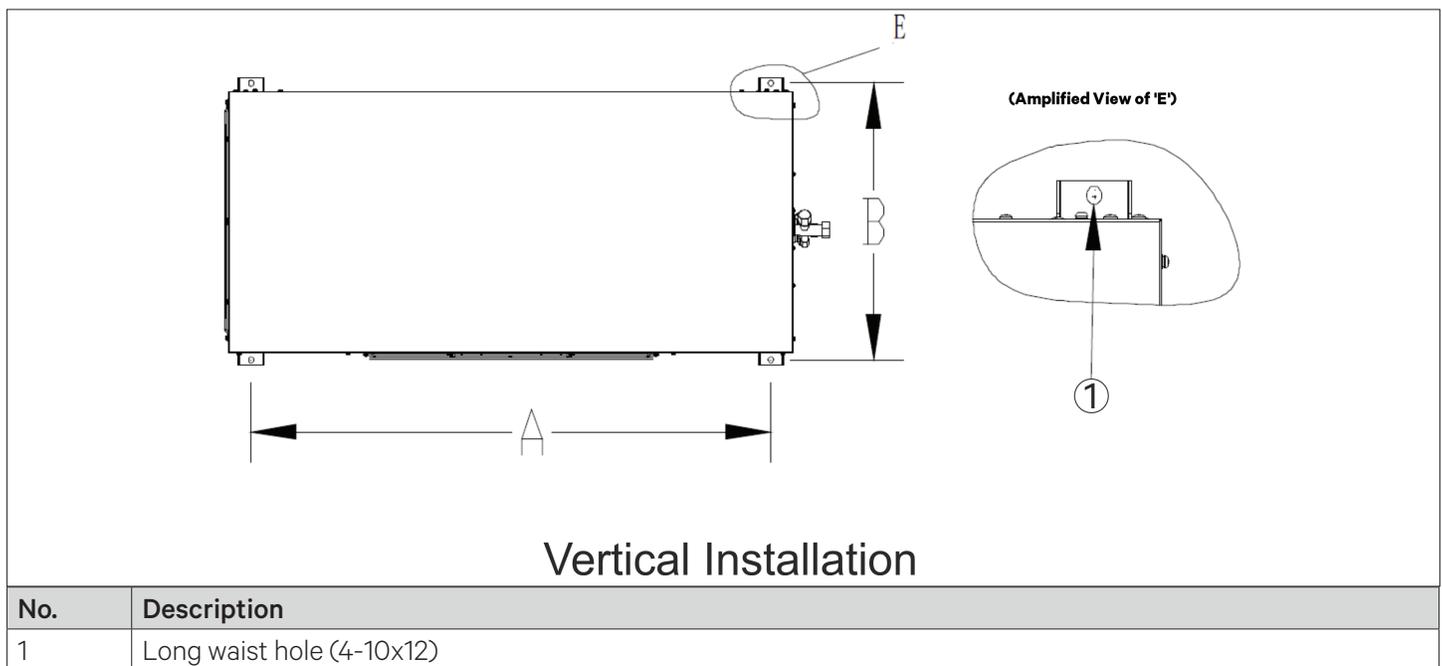
## 2.7. Installation of Outdoor Unit

### 2.7.1. Installation Notes

- Install the outdoor unit for better security and maintenance accessibility. Do not install it on ground-level sites where the public can access it easily.
- The outdoor unit should be installed away from the residential area. Do not locate it directly in an environment that requires low noise.
- To ensure the cooling performance of the unit, install the outdoor unit in the outdoor with sufficient airflow. Do not install where dust or snow can obstruct the condensing coil.
- Ensure that there is no steam around the unit, waste heat, and so on.

### 2.7.2. Holes Dimension of the Outdoor Unit Base

Fix the outdoor unit onto the base with expansion bolts, refer to [Figure 2-13](#) for the vertical installations of the outdoor unit. The hole dimension of the base for vertical installations is given in [Table 2-6](#).



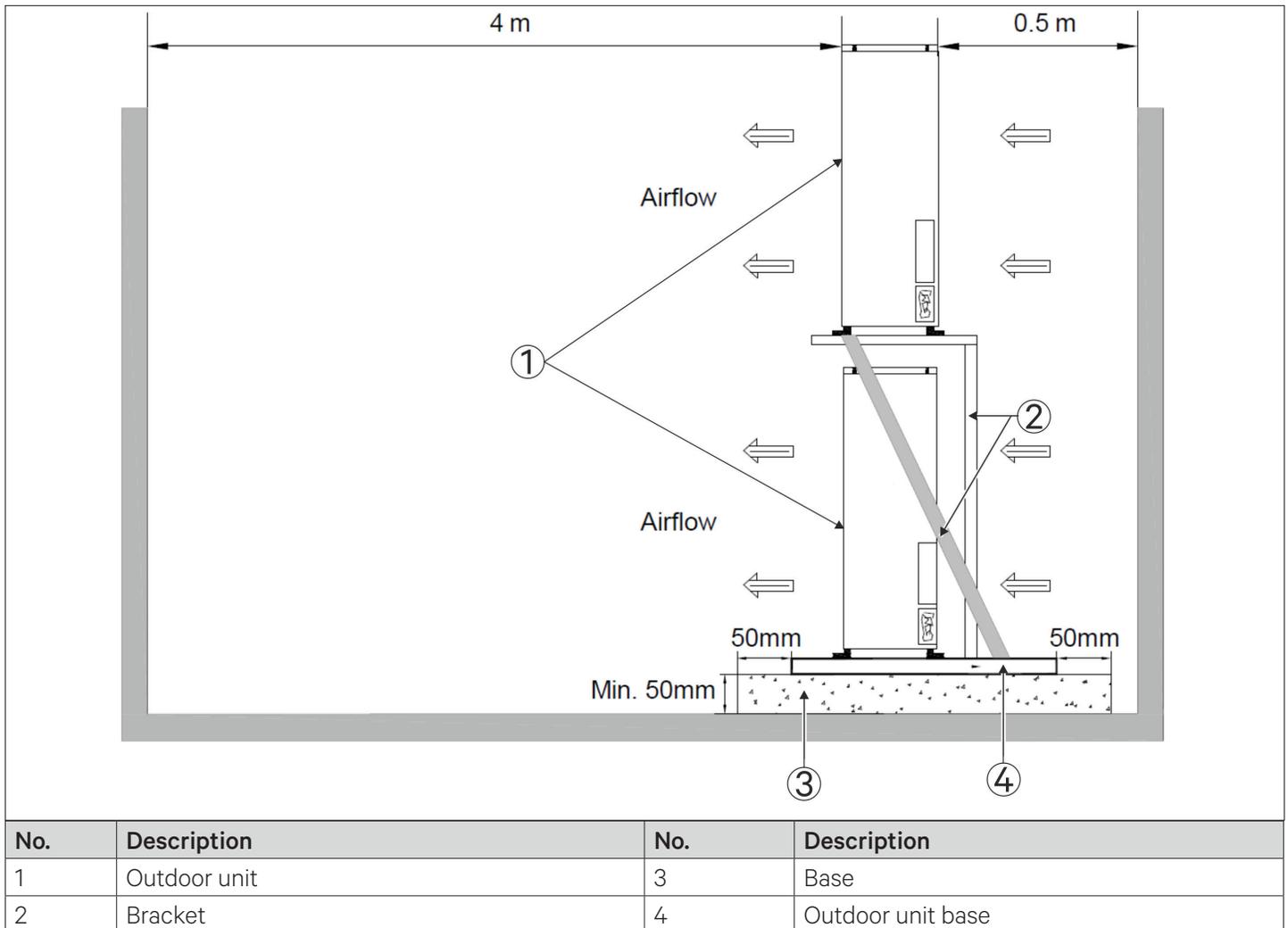
**Figure 2-13 Hole Dimension of Outdoor Unit Base (Vertical Installation)**



For vertical installation, first fix the bracket frame to the installation floor, then install the outdoor unit on the base frame.

**Table 2-6 Outdoor Unit Mounting Hole Size**

Installation Mode	Model	A (mm)	B (mm)
Vertical installation	SRC03GES	656	410
	SRC07GES	656	410
	SRC07GET	656	410
	SRC11GET	656	410


**Figure 2-14 Vertical Installation of Multiple Outdoor Units with One above the Other**


- Use 5# angle iron for the bracket, when two units are installed with one above the other.
- Use 6.5# channel steel for the bracket, when three units are installed with one above the other.

## 2.8. Refrigeration Piping Connection General Principles

1. Copper pipes with quick thread connectors are used to connect the indoor and the outdoor units. If the pipe length exceeds the standard pipe length given in the [Table 2-7](#) and straight copper pipe is used, then each joint of the piping must be brazed properly. Charge the copper piping with nitrogen gas during the brazing process to prevent it from oxidation.
2. The selection, placement, and fixing of piping, evacuating the refrigerant from the system and refrigerant charging are required to operate according to industry standards.
3. The parameters such as pipeline pressure drop, compressor return oil, noise reduction, and vibration should be considered when designing and constructing process.
4. If the equivalent length exceeds 60 m, or the vertical height difference between the indoor and the outdoor units exceeds the values given in [Table 2-8](#), consult Vertiv local representative for technical support before installation and if any modification is required.
5. The equivalent lengths of the components are shown in [Table 2-9](#), and the resistance losses caused by the elbows and valves have been taken into account. Consult Vertiv representative to confirm the suitability as per the site conditions.

**Table 2-7 Standard Piping Dimensions**

Model	Pipe Length	Gas Pipe OD		Liquid Pipe OD	
	m	inch	mm	inch	mm
SRC03GES	10	1/2"	13	3/8"	10
SRC07GES	10	5/8"	16	3/8"	10
SRC07GET	10	5/8"	16	3/8"	10
SRC11GET	10	7/8"	22	3/8"	10

**Table 2-8 Vertical Distance between the Indoor and the Outdoor Units**

Relative Position	Distance
Outdoor unit installed higher than indoor unit	Maximum: 30 m
Outdoor unit installed lower than indoor unit	Maximum: 5 m

**Table 2-9 Equivalent Length of Each Local Component**

Liquid Pipe OD (inch)	Equivalent Length (m)		
	90° Elbow	45° Elbow	T-type Three Way
5/8	0.27	0.15	0.76
3/4	0.3	0.18	0.76
7/8	0.44	0.24	1.1
1-1/8	0.56	0.3	1.4

## 2.8.1. Quick Thread Connector Installation Notes

Refer to the following procedure when connecting the quick thread connector:

1. Remove dust-proof caps
2. Carefully clean the coupling seats and threaded surface of the connector with a clean cloth
3. Lubricate the male thread with lubricant oil
4. Thread the coupling halves together by hand to ensure that the threads mate properly
5. Tighten the coupling body's hexagon nut and union valve until a definite resistance is felt
6. Use a marking pen to draw a line lengthwise from the coupling union nut to the bulkhead. Tighten the nuts an additional quarter turn with two wrenches
7. The misalignment of the lines shows how much the coupling has been tightened



- Care must be taken while performing this operation to avoid any damage to the connector threading.
- Two wrenches must be used to cooperate with each other during connection because one wrench can damage the coupling copper lines easily.

The recommended torque values are listed in [Table 2-10](#).

**Table 2-10 Recommended Torque Value**

Coupling Size	Torque Value (N.m)
5/8"	7 to 8
1/2"	15 to 18
3/4", 7/8"	25 to 32

## 2.8.2. Piping Connection Requirements

Refer to [Figure 2-2](#) and [Figure 2-3](#); the required piping connections are as follows:

- Refrigerant piping between the indoor and the outdoor units (gas and liquid piping).
- Drain piping connections of the indoor unit.



*Prior to the start-up, ensure that all the piping connections have been completed and there is no leakage in the system.*

### 2.8.3. Connecting Refrigerant Piping

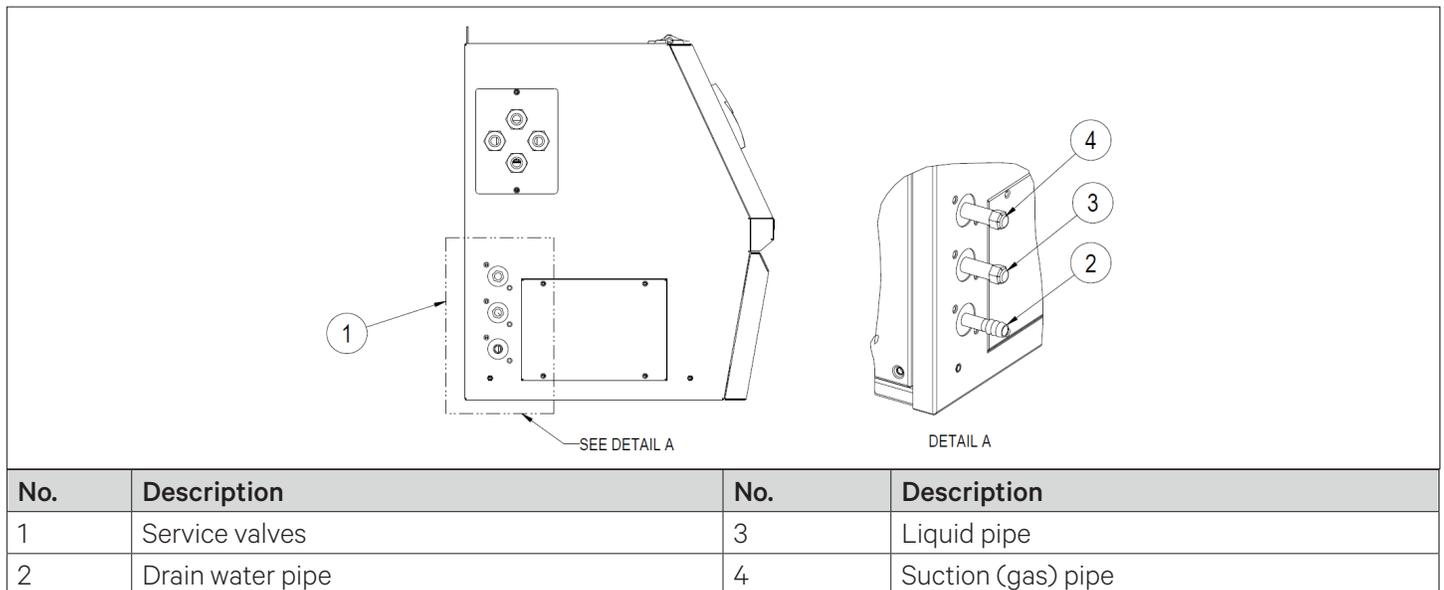
- The pipe should be installed and removed with care so that it will not get damaged. Use tube benders and make all bends before connecting the refrigerant piping of the indoor and the outdoor units.
- If brazing is required, all refrigerant piping should be connected with silver-brazed joints. The copper pipe is filled with nitrogen gas during the brazing process to prevent oxidation of the copper piping.
- Prior to use, check piping supports, leakage testing, dehydration of refrigerant pipes, and evacuation. Use vibration isolating support to isolate the refrigeration piping from the building.
- Use a soft and flexible material to pack around the piping to protect them when sealing openings in walls and to reduce vibration transmission.
- When installing the outdoor unit 5 m higher than the indoor unit, the trap should be installed on the gas pipe (Oil trap). This trap will retain lubricant oil in the off-cycle of the compressor. When the compressor starts, oil in the trap will be carried up the vertical riser and return to the compressor immediately.



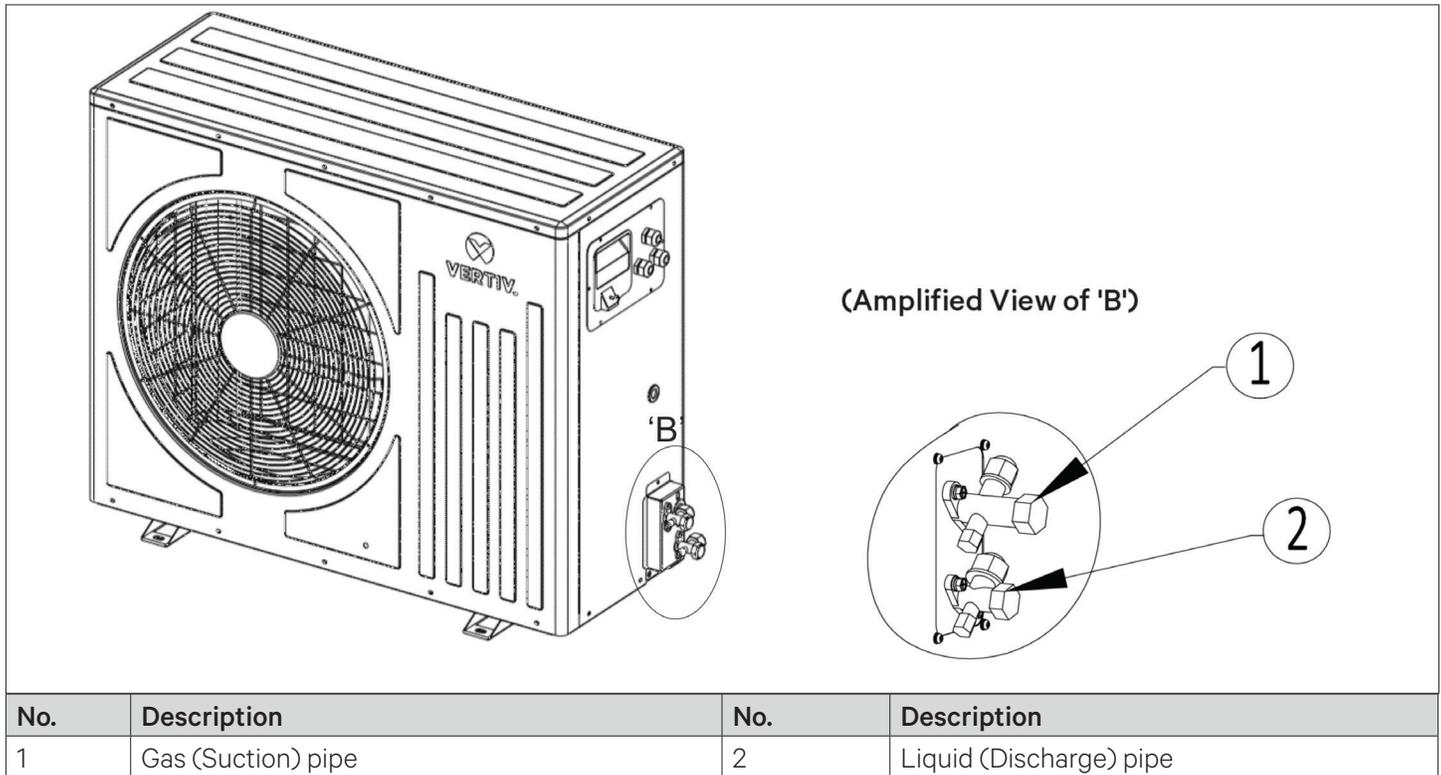
- *If the piping equivalent length exceeds 30 m then the 'Long piping kit' should be added.*
- *If the equivalent pipe length exceeds 60 m, please consult Vertiv local representative for details.*
- *Copper pipe with outer diameter of 16/13 mm, wall thickness requirement is 0.8 mm; copper pipe with outer diameter of 10 mm, wall thickness requirement is 0.6 mm.*

### 2.8.4. Pipe Connector Position

Figure 2-15 shows the pipe connector cutout locations of the indoor unit for indoor and outdoor units respectively.



**Figure 2-15 Pipeline Connector Interface (Indoor Unit)**



**Figure 2-16 Pipeline Connector Interface (Outdoor Unit)**

- **Connecting Gas (Suction) pipe**

Connect one end of the gas pipe connector of the indoor unit shown in [Figure 2-15](#) to the other end of the gas pipe connector of the outdoor unit shown in [Figure 2-16](#).



*The gas pipe is the pipe at the compressor discharging side. Horizontal sections of the liquid pipe should be sloped down from the compressor with a slope of at least 1:100 (10 mm down for each 1 m run). The gas pipes should be insulated where they are routed in the conditioned space.*



*As indoor unit is charged with Nitrogen 0.34 MPa (3.4 bar) pressure, release the Nitrogen safely in the atmosphere.*

- **Connecting Liquid (Discharge) pipe**

Connect one end of the liquid pipe connector of the indoor unit shown in [Figure 2-15](#) to the other end of the liquid pipe connector of the outdoor unit shown in [Figure 2-16](#).



*Ensure service valve of outdoor unit are firmly close during piping connection, as the outdoor unit is pre-charged with refrigerant equivalent to 10 m piping, refer [Figure 2-11](#) for pre-charged details.*

### 2.8.5. Connecting Drain Piping Of Indoor Unit

Connect one end of the drain pipe to the connector of condensate water drain pipe shown in [Figure 2-15](#). The drain pipe of the indoor unit has reserved a copper pipe with 1/2" nozzle to connect to the drain pipe, and use a 1/2" inch braided hose provided along with unit. The hose could be tightened with the help of worm clip.

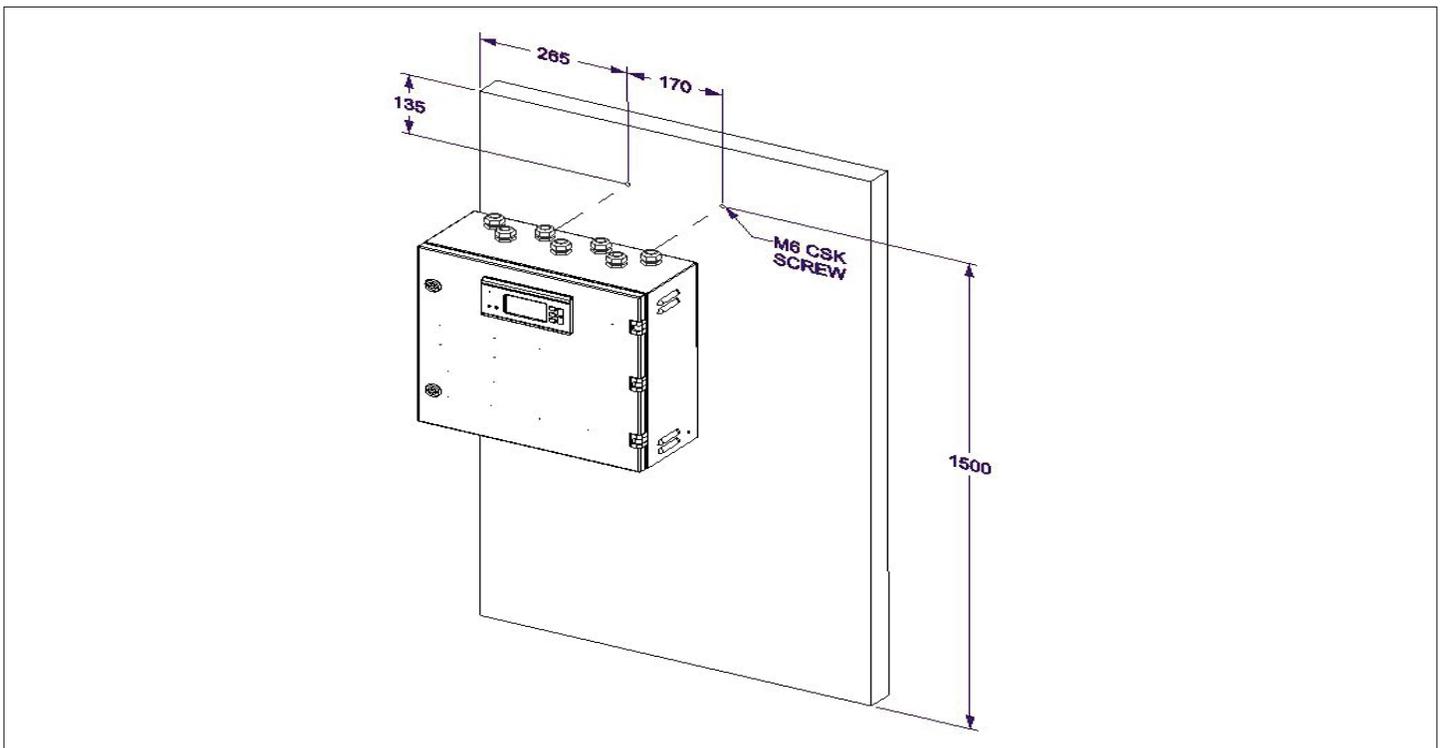


*In case outside weather is freezing, drain pipe should be provided with sufficient insulation in order to avoid freezing inside pipe.*

## 2.9. Installation of Display Screen

Liebert® SRC-G unit is provided with a control panel which can be simply mounted on the wall with the help of screw arrangement. Refer the following procedure to mount the control panel.

1. [Figure 2-17](#) shows the mounting arrangement of control panel. Surrounding clear spacing shall be in accordance with [Figure 2-5](#). Put two screws (M6 CSK) into the wall at the location as depicted in the illustration.



**Figure 2-17 Mounting Arrangement of Display Screen**

2. Once the screws are rigidly placed, anchor the control panel by matching the screws to their respective holes. Ensure that the screws are firmly fixed and can sustain weight of the control panel.
3. Ensure the cables connecting to the control panel to indoor unit and outdoor unit are properly routed and

carefully insulated. Contact Vertiv technical personnel before selecting the location for control pane.

- Its recommended terminate incoming power in control panel via external isolation in proximity of control panel (refer [Figure 2-7](#)). This isolation in case of isolation switch shall comply to IEC60204-1 (black -white color scheme). Incase of rotary switch, same shall comply to IEC60947-3 utilization AC-23 or DC23B. Following table provides rating for this isolation.

Unit	Isolation rating
SRC03GES	3Pole, 16A
SRC07GES	3Pole, 25A
SRC07GET	5Pole, 16A
SRC11GET	5Pole, 32A

## 2.10. Charging Refrigerant

- System Vacuuming

- After the refrigeration piping are installed and connected, ensure the service valves of outdoor unit are firmly closed.
- Then connect the high and low pressure composite pressure gauge (Manifold) to the Schrader valve at the liquid piping of indoor unit that can be easily accessed from a front service window.
- Evacuate system twice to 1500 microns and then finally to 500 microns. Break vacuum each time with 50 gm of clean and dry R410A refrigerant.
- Open service valve of outdoor units.



- Ensure to remove all the pressure gauges (manifold) from the indoor unit after vacuuming is completed.
- Ensure to open the service valve of the condensing unit.
- After the mechanical installation, electrical installation, and pre-commissioning inspection of the unit is completed, then only turned on the unit.

### 2.10.1. Base Charging of Refrigerant

The indoor unit is factory charged and the recommended standard refrigerant amount (kg) of the unit is shown in [Table 2-11](#).

**Table 2-11 Recommended Standard Refrigerant Amount of the Unit (unit: kg)**

Unit Model	SRC03GES	SRC07GES	SRC07GET	SRC11GET
Standard charge (standard pipe length within 10 m)	1.5	2.5	2.4	3.3

## 2.10.2. Adding Refrigerant for Long Piping System

Under the condition of the standard pipe length (within 10 m) there is no need to charge the refrigerant in the indoor unit. If the pipe length exceeds 10 m then Liebert® SRC-G series can be charged with reference to the recommended refrigerant charging amount. Add refrigerant to the system in order to ensure normal system operation according to the following formula:

$$\text{Adding refrigerant amount (kg)} = \text{Adding refrigerant amount per meter of liquid pipe (kg/m)} \times \text{Total length of extended liquid pipe (m)}.$$



- *The air in the hose connected to the composite pressure gauge is vacuumed.*
- *If the pipe length exceed 10 m, then refrigerant cylinder is kept up-side-down (depending on the size of the cylinder, consult Vertiv local representative for details) during the charging of the refrigerant to ensure that the refrigerant is charged into the refrigeration system in a liquid state.*
- *After the mechanical installation, electrical installation, and pre-commissioning inspection of the unit is completed, the unit is turned on and the unit system is charged with liquid refrigerant.*
- *For your personal health, please wear earmuffs or earplugs and other equipment to protect your hearing after entering the computer room.*
- *Observe the compressor suction line to ensure that the piping and compressor housing are free of condensation to eliminate potential liquid impact hazards.*
- *On successful charging of gas, suction superheat will be 10 K and condenser sub-cooling is 5 K.*

The adding refrigerant amount per meter of liquid pipe is given as

$$\text{Total length of extended liquid pipe (m)} = \text{Total length of liquid pipe} - 10 \text{ m}$$



*The amount of refrigerant required for SRC03GES is 50 g/m per meter length of pipe, for SRC07GES and SRC07GET is 55 g/m per meter length of pipe and SRC11GET 60 g/m.*

## 2.10.3. Long Connecting Pipe System with Lubricant Oil

The charging of refrigerant can dilute the lubricant oil in the system and affects the lubricating and cooling properties of the lubricant oil. Therefore, the lubricant oil should be added in the beginning. The lubricant oil used in the Liebert® SRC-G units for SRC03GES is HAF68D1C, and for SRC07GES, SRC07GET and SRC11GET is POE RL 32-3MAF:

The adding lubricant oil amount for the liquid piping length more than 10 m.

$$\text{Amount of additional lubricant oil (ml)} = \text{Adding refrigerant amount (kg)} \times 22.6$$



- A certain type of POE lubricant that is directly supplied by Vertiv must be used, otherwise the compressor may get damaged. When charging the refrigeration system with oil, consult Vertiv representative for more details on adding the lubricant oil.
- Adding inferior or incorrect type of lubricant oil will damage the system, so the problems caused due to quality are not covered by the warranty.



- Do not use inferior quality refrigerant.
- For any consequences resulting from inferior quality refrigerant, Vertiv does not assume warranty responsibility. Select the type of lubricant oil in accordance with the compressor manufacturer's specification.

## 2.11. Mechanical Installation Checklist

Following are the particulars in the checklist (refer [Table 2-12](#)) that need to be verified and confirmed to ensure that the mechanical installation is implemented successfully.

**Table 2-12 Installation Inspection Checklist**

Particulars	Results
Leave enough space around the unit for maintenance.	
Ensure the installation fasteners have been fixed firmly.	
The pipes between the indoor and outdoor units have been connected, and the service valves of the indoor and outdoor units have been opened completely.	
The drain pipe has been connected.	
All pipe joints tightened.	
Irrelevant things (such as transportation material, structure material, and tools) inside or around the unit have been cleared after the unit is installed.	

## Chapter 3: Electrical Installation

In this chapter, the electrical installation of Vertiv™ Liebert® SRC-G unit is explained in-depth to help users with the various activities, which include work introduction and installation notes, connecting power cables of the indoor and outdoor units, connecting the control cables, and the installation inspection.



- *Liebert SRC-G is a range of sophisticated units used in industrial, commercial, or other professional ecosystem. It is not tailored for the general public. The total rating power is larger than 1 kW and is in accordance with the IEC61000-3-12 standards. Hence, the short-circuit ratio between the user's power supply and the power grid needs to be greater than or equal to 250 interfaces.*
- *The user needs to obtain permission from the utility power department to ensure that the unit connection to the power supply with the short-circuit ratio is greater than or equal to 250.*

### 3.1. Task Introduction

#### 3.1.1. Cables to Connect On-site

Table 3-1 tabulates the various copper cables recommended for cabling of indoor and outdoor units with control panel. Table 3-2 provides a list of the copper cables to be arranged by customer.

**Table 3-1 Recommended cables for different models**

Name of Items	SRC03GES	SRC07GES	SRC07GET	SRC11GET
Gas (Suction) pipe	pipe 1/2" with insulation	5/8" with insulation	5/8" with insulation	7/8" with insulation
Liquid (Discharge) pipe	3/8" with insulation	3/8" with insulation	3/8" with insulation	3/8" with insulation
Indoor power cable	3C x 1.5 mm <sup>2</sup>	3C x 1.5 mm <sup>2</sup>	3C x 1.5 mm <sup>2</sup>	3C x 1.5 mm <sup>2</sup>
Fan control cable	3C x 0.5 mm <sup>2</sup>	4C x 0.5 mm <sup>2</sup>	4C x 0.5 mm <sup>2</sup>	5C x 0.5 mm <sup>2</sup>
Outdoor power cable*	2C x 2.5 mm <sup>2</sup>	2C x 2.5 mm <sup>2</sup>	4C x 2.5 mm <sup>2</sup>	4C x 2.5 mm <sup>2</sup>
Fan and contactor	4C x 0.5mm <sup>2</sup>			
Outdoor HP and LP cable	3C x 0.5mm <sup>2</sup>			
Outdoor pressure sensor cable	3C x 0.5mm <sup>2</sup>			

All field cables are recommended as armored cables to avoid external influence such as rat bite etc.

**Table 3-2 Required Cables from Customer End**

Cable	SRC03GES	SRC07GES	SRC07GET	SRC11GET
Incoming power cable	3C x 4 mm <sup>2</sup> (L + N + PE)		5C x 4 mm <sup>2</sup> (3L + N + PE)	
Customer in 1	2C x 0.5 mm <sup>2</sup>			
Customer in 2	2C x 0.5 mm <sup>2</sup>			
Remote shut	2C x 0.5 mm <sup>2</sup>			
Fire alarm	2C x 0.5 mm <sup>2</sup>			
Common alarm	2C x 0.5 mm <sup>2</sup>			
Sequencing high	2C x 0.5 mm <sup>2</sup>			
Sequencing low	2C x 0.5 mm <sup>2</sup>			
Communication	LAN cable with male connector			

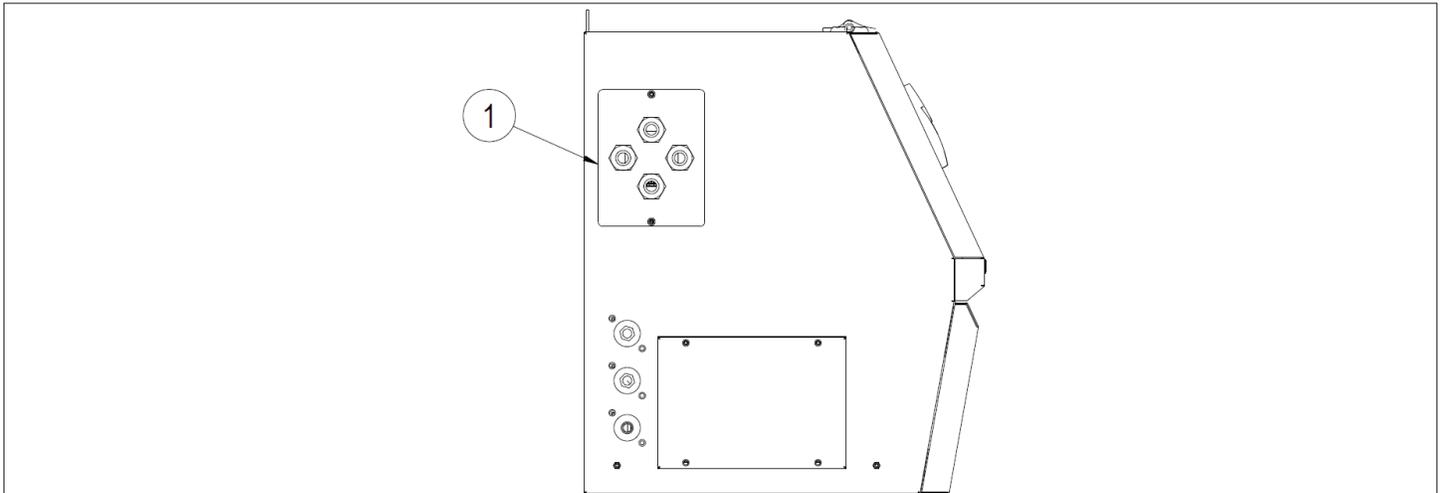
## 3.2. Installation Notes



All power and control cabling and ground connections must be in accordance with the respective national and local electrical regulations. The power cables should not be lighter than the ordinary PVC sheathed cord GB5023.1 (idt IEC60277) line 53.

1. The connections of all the power cables, control cables, and ground cables should be in compliance with the respective local and national electrical regulations.
2. Observe the unit name-plate for the full load current. The cables sizes must meet the conditions as specified in the respective local cabling protocols and rules.
3. If the power cable connection is damaged, it has to be replaced immediately to eliminate the danger. The replacement procedure must be carried out by an authorized professional or experienced service personnel.
4. The electrical installation and maintenance must be carried out by some authorized personnel or a trained engineer well-versed with the inner workings of the electrical connection (for example, a service engineer from the manufacturer's side).
5. Prior to the cabling, a voltmeter must be used to measure the power supply voltage and ensure that the power supply has been switched Off.
6. The front end of the unit needs to be equipped with a power-disconnection device to ensure safe operation.
7. Use screws, guide rails, or other modes to fix the device firmly during the installation process to avoid movement or shaking during the start-up or operation mode.

### 3.3. Indoor Unit Connection

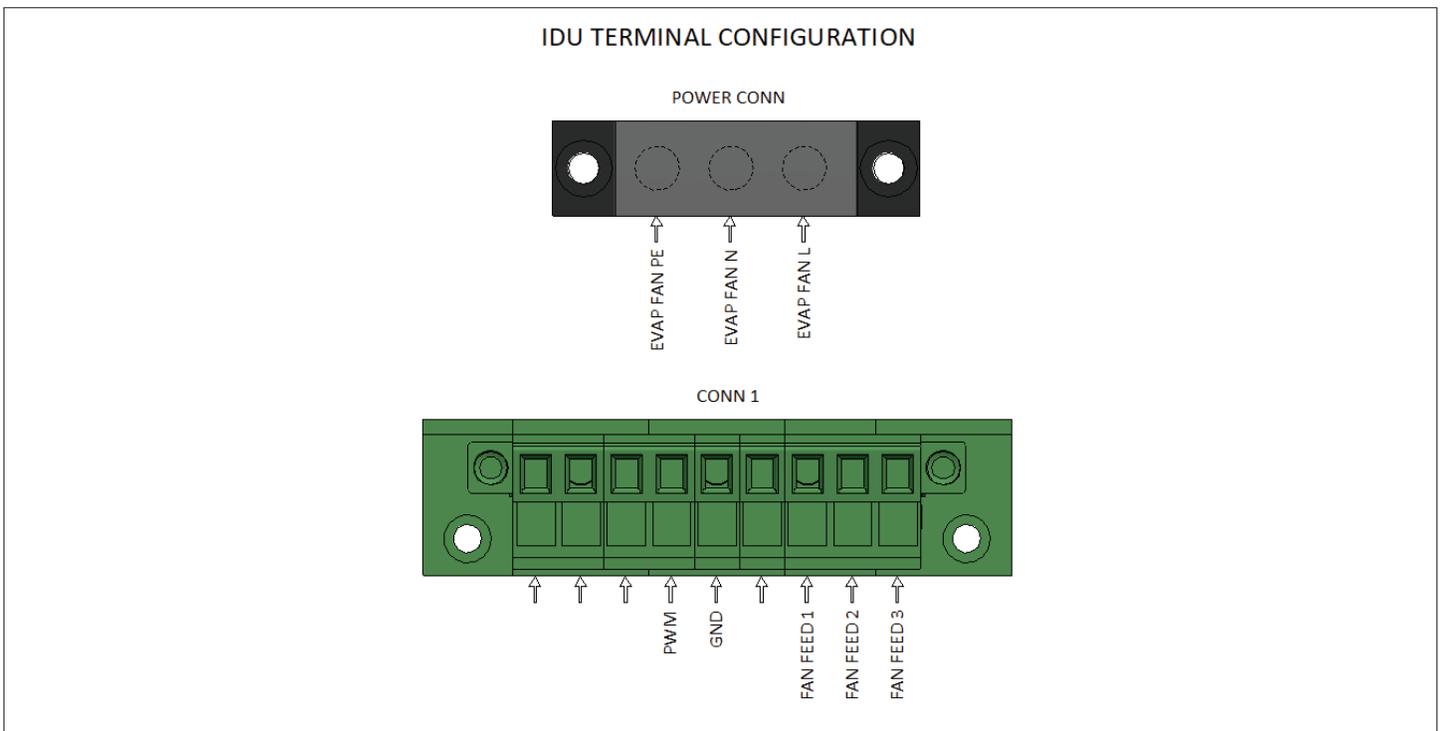


No.	Description
1	Indoor terminal cover plate

**Figure 3-1 Indoor Cable Terminal Location**

Refer the following procedure to connect the power supply cables and control cable of unit:

1. Refer [Table 3-1](#) for indoor power cable and fan control cable
2. Open the cover plate and access barrier terminal block (multi-pin connector).
3. Route the power cable through the cover plate wire hole and connect it to the barrier terminal lock, refer [Figure 3-2](#) for terminal connection.



**Figure 3-2 Control Field Connection Terminals for Single Phase**

**Table 3-3 Indoor Unit Feed Terminal**

Model	PWM	GND	FAN FEED 1	FAN FEED 2	FAN FEED 3
SRC03GES	Y	Y	Y	NA	NA
SRC07GES	Y	Y	Y	Y	NA
SRC07GET	Y	Y	Y	Y	NA
SRC11GET	Y	Y	Y	Y	Y

The Full Load Current (FLA) of the indoor unit is given in [Table 3-4](#).

**Table 3-4 Full load current of the indoor + outdoor unit**

Model	Full Load Current (FLA)
SRC03GES	8 A
SRC07GES	20 A
SRC07GET	13 A
SRC11GET	17 A



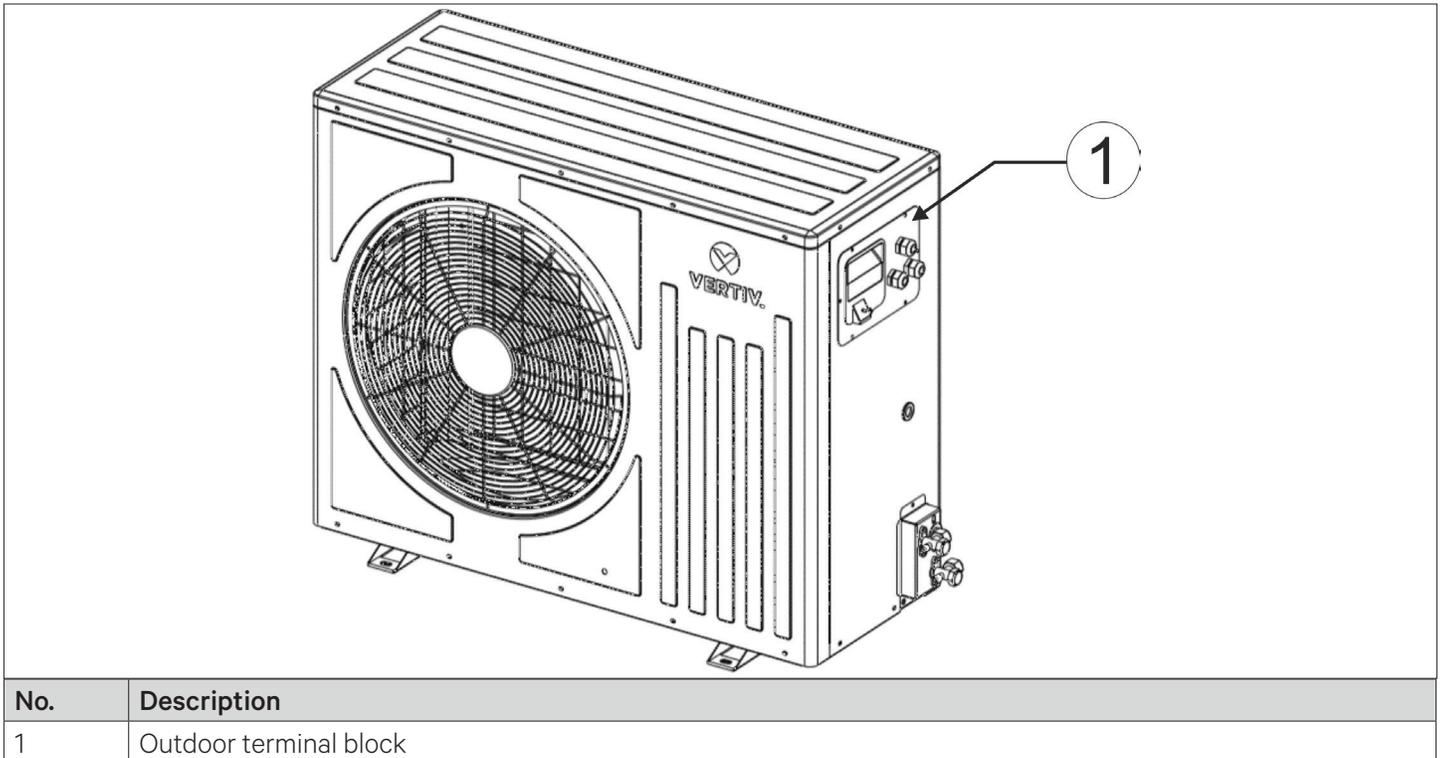
*Cut Off the power supply to the unit prior to the maintenance, because the unit contains high voltage.*



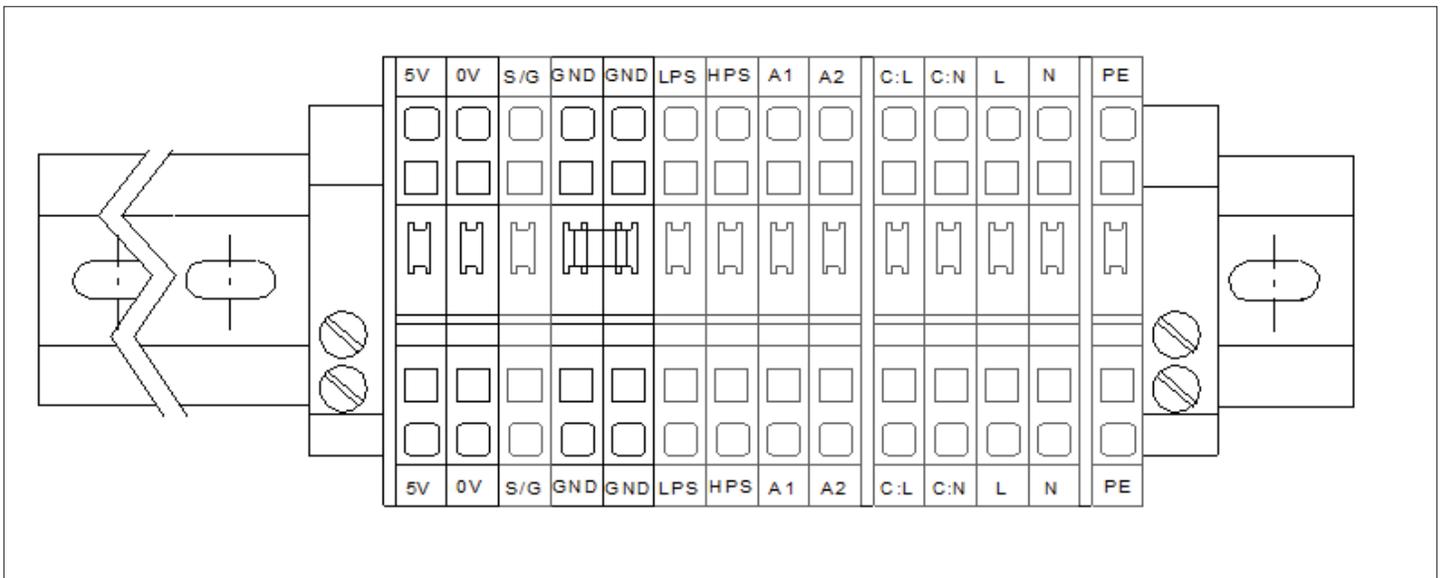
- *Use copper cables only and ensure that all cables are firmly connected.*
- *Ensure that the power supply voltage is as per the voltage specified on the unit nameplate.*
- *Install a MCB switch before the power supply input of the indoor unit to easily isolate the unit for the maintenance. Connect the power cable to the MCB switch and then to the unit.*
- *A RCCB should be installed before the indoor unit power supply input.*

### 3.4. Outdoor Unit Connection

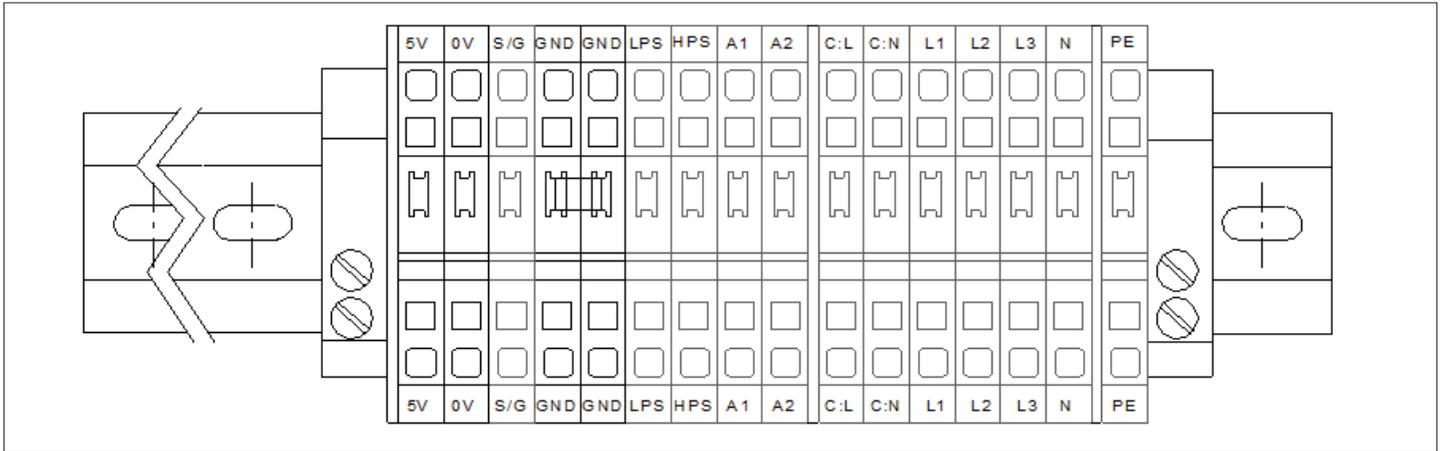
Figure 3-3 shows the location of outdoor cable connection terminal. Figure 3-4 and Figure 3-5 show the amplified connection terminals for SRC07GES and SRC07GET respectively.



**Figure 3-3 Outdoor Cable Terminal Location**



**Figure 3-4 Cable Connector Terminals (SRC07GES, SRC03GES)**

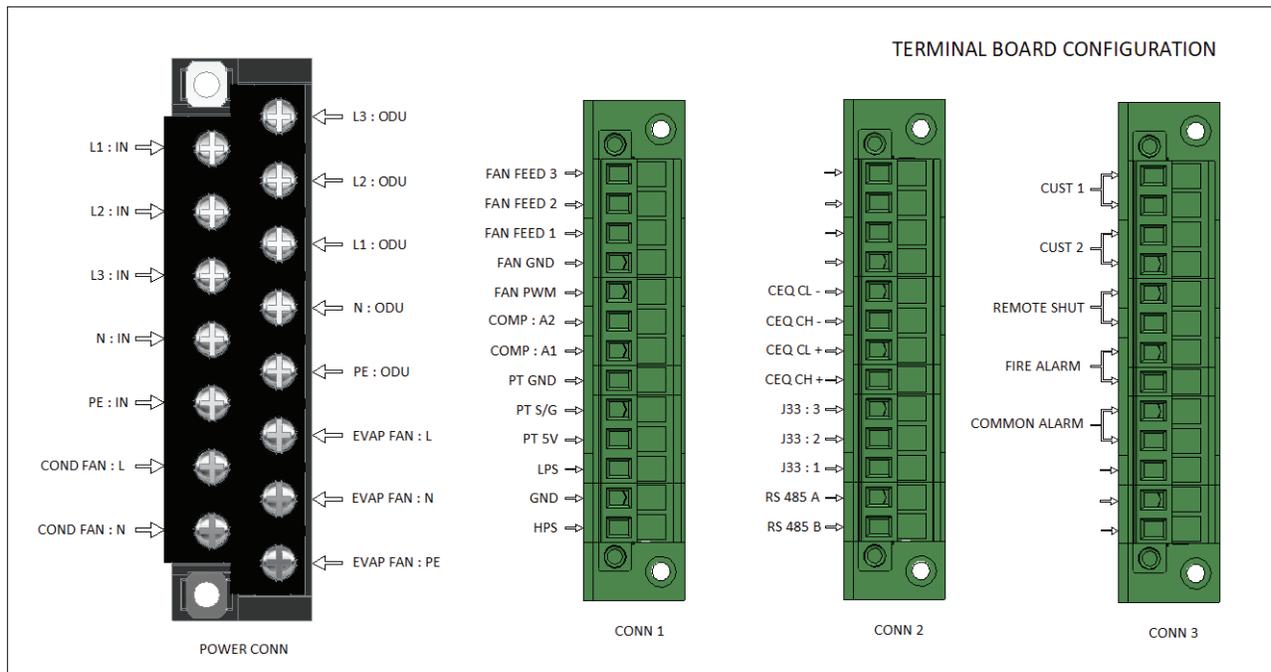


**Figure 3-5 Cable Connector Terminals (SRC07GET, SRC11GET)**

Refer [Figure 3-4](#) and [Figure 3-5](#) for cable connection between indoor and outdoor units.

### 3.4.1. Control Panel Connection

Control panel is provided with power connector and control connector (CONN1, CONN2, and CONN3). Refer following figure for description



**Figure 3-6 Cable Connector Terminals**

[Figure 3-6](#) shows a generalized picture of terminal connection. Following table shows applicability of pins. During installation refer sticker pasted on machine for actual connection. Pins other than presented in below table are applicable for all machines.

**Table 3-5 Indoor Unit Feed Terminal**

Model	L1:IN	L2:IN	L3:IN	L1: ODU	L2: ODU	L3: ODU	FAN FEED 1	FAN FEED 2	FAN FEED 3
SRC03GES	Y	NA	NA	Y	NA	NA	Y	NA	NA
SRC07GES	Y	NA	NA	Y	NA	NA	Y	Y	NA
SRC07GET	Y	Y	Y	Y	Y	Y	Y	Y	NA
SRC11GET	Y	Y	Y	Y	Y	Y	Y	Y	Y

- **Fire/smoke alarm feed**

These pins are provided for connecting inputs from fire and smoke alarm sensor. In case of 'On alarm', AC unit status sets to OFF mode.

- **Customer feed**

These pins are used to record any customer alert signals and then it can be displayed on LCD screen.

- **Remote On/Off**

The remote On/Off terminal can be used to remotely control the unit ON/OFF status and to stop the unit operation upon special moment. If the inputs of remote On/Off terminals are shorted and the AC unit power supply is switched On, then AC unit outputs are normal.

If the terminal is open, the AC unit will stop giving outputs. The terminals have been shorted before delivery.

If the control cables need to be connected at site, remove the short cables and connect the outer controller to the remote On/Off terminals respectively.



- *The customer terminal (control terminal) can connect with any alarm signal except for the AC system.*
- *Any outer alarm signal with NO dry contact can be connected with customer terminal. After the outer alarm signal is connected, user should set the corresponding customer alarm information in microprocessor controller.*
- *If no alarm signal is connected, the input state of the customer terminal is the same as that of setting. If an outer alarm is generated, the input state is different from the setting.*
- *The AC system will generate an audible alarm and LCD screen on microprocessor controller will display the corresponding alarm information. If a computer using Vertiv host monitoring software is connected, the alarm will be displayed on it too.*

- **Common alarms**

The common alarm relay, connected with the terminal block, has a set of Normally Open (NO) dry contact, and it can also be set to (Normally Closed) NC through software. When a major alarm is generated, the contact is closed. This can be used to send a remote alarm, sending signals to the Building Management System (BMS) or dialing the paging system automatically.

- **Communication**

LAN connection is provided on terminal block for communicating with RDU unit.

Multiple Vertiv™ Liebert® SRC-G can simultaneously monitor multiple units through the Vertiv RDU-A/SIC monitoring.

Figure 3-7 shows the networking of the two Liebert SRC-G units monitored through the Vertiv RDU-A/ SIC monitoring.

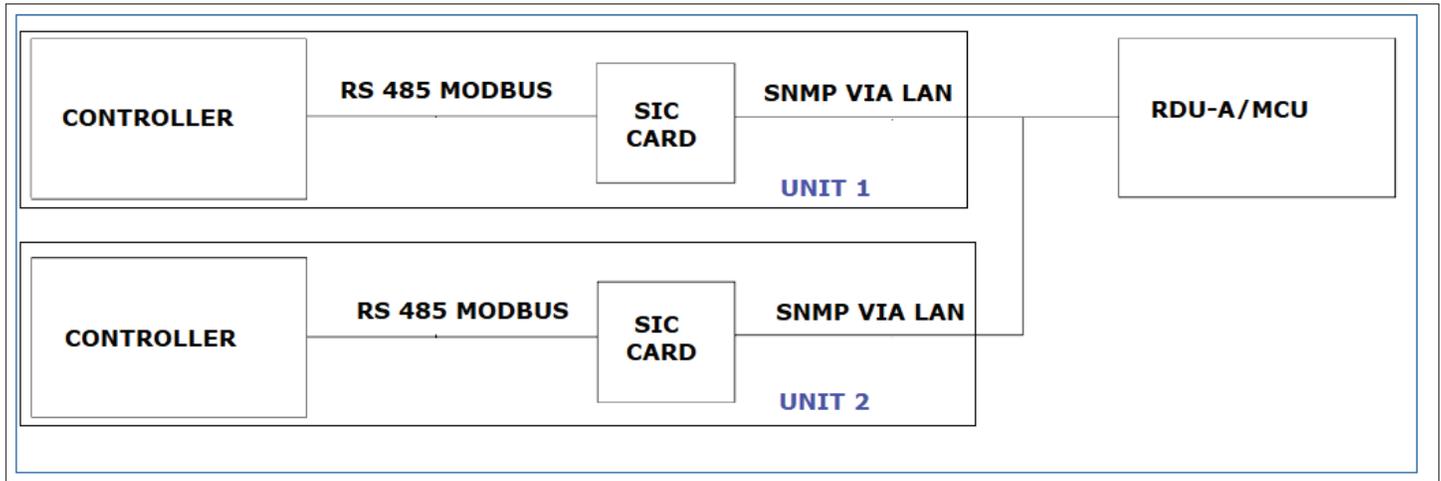


Figure 3-7 Monitoring the Networking of Two Liebert® SRC Units.

- Teamwork/Sequencing connection

Vertiv™ Liebert® SRC-G units support the teamwork control function of up to 8 units. If user needs to use the teamwork control function, then connect the teamwork control terminals SEQ CH+, SEQ CL+, SEQ CH- and SEQ CL- between the units in series.

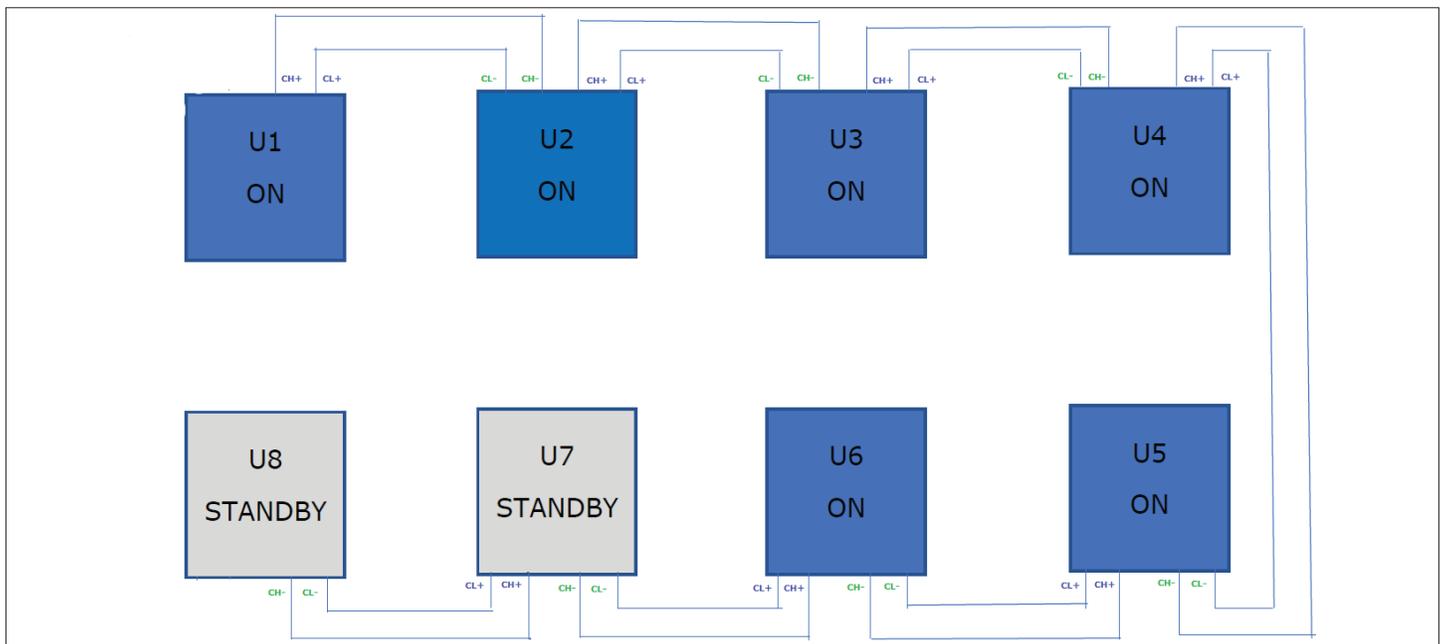


Figure 3-8 Connection Diagram of Teamwork Control Terminal

Refer Figure 3-8 for cabling the units, after the teamwork control unit is cabled, set jumper on CONN 2 connector in control panel between J33: 1 and J33: 2 for first and last unit and set between J33: 2 and J33: 3 for rest of the units. The maximum allowed network cable length of 400 m.

### 3.5. Electrical Installation Checklist

After the system electrical installation is completed, the following requirements should be met.

**Table 3-6 Electrical Inspection Checklist**

Particulars	Results
The system electrical loop has no open-circuit or short-circuit exists in the electrical connection.	
The power supply voltage meets the rated voltage on the nameplate of the unit.	
Confirm, if the power cables and ground cables are connected to the breaker switches, indoor unit, and outdoor unit correctly as per the norms.	
The ratings of the MCBs and fuses are correct.	
The control cables are configured and subsequently, fixed properly.	
All the cables and connector connections, including the fixing blocks, are firmly and appropriately fixed.	

After confirming the preceding points, user can replace the electrical plate and start start-up inspection and functional testing.

## Chapter 4: Start-up Commissioning

This chapter introduces the start-up inspection and function testing of Vertiv™ Liebert® SRC-G units.

### 4.1. Start-up Inspection

Before commissioning the unit, inspect the status of components of the unit. Refer [Table 4-1](#) for the list of inspection requirements.

**Table 4-1 Component Inspection Checklist before Commissioning**

Components	Inspection Requirements
Panel	<ul style="list-style-type: none"> <li>Check if there are any damage to the top, bottom, side, front and rear panels of the unit.</li> <li>Check if the panels are well insulated and clean.</li> </ul>
Filter	<ul style="list-style-type: none"> <li>Check if there is any damage to the filter, and clogging.</li> <li>Check if the filter is reliably fixed.</li> </ul>
Power supply	<ul style="list-style-type: none"> <li>Measure and record the voltage before the system is powered On.</li> <li>Check if the power cables are firmly connected.</li> </ul>
Outdoor unit	<ul style="list-style-type: none"> <li>Check if the outdoor unit is installed properly, the piping are rigidly supported, and pipings are sloped down properly.</li> <li>Check the trap is installed at an appropriate location.</li> </ul>
Fan	Check if there is any obstacle at inlet and outlet areas of the fan.
Microprocessor Controller	Check if the connection cables are firmly connected.

After inspecting and confirming the above particulates go ahead with commissioning procedure.



*Prior to powering On the indoor unit, ensure that the outdoor unit power and signal cables are connected and the outdoor unit MCB is closed.*

The inspection requirements after starting-up are listed in [Table 4-2](#).

**Table 4-2 Component Inspection after Starting-up**

Components	Inspection Requirements
Fan	<ul style="list-style-type: none"> <li>• Check if the rotation direction of the blades is correct.</li> <li>• Check and record the rated full load current and actual current of the fan motor.</li> </ul>
Outdoor fan	<ul style="list-style-type: none"> <li>• Check if the rotation direction of the blades is correct.</li> <li>• Check and record the rated full load current and actual current of the fan motor.</li> </ul>
Refrigerant charge amount	<ul style="list-style-type: none"> <li>• Check after the compressor is turned On, if the refrigerant (R410A) is dynamically charged, and check if the condensation and sub-cooling temperature reach to 5 K or more, while the suction superheat temperature reaches 10 K or more.</li> <li>• Observe the compressor suction line to ensure that the piping and compressor housing are free of condensation to avoid potential damages caused due to liquid presence.</li> <li>• Check if the unit exhaust superheat is in the range of 25 °C to 50 °C.</li> </ul>
Others	Record user setpoint values, return air temperature, suction pressure, exhaust pressure, compressor current, and outlet air temperature.

## 4.2. Function Testing



*The lethal voltage may be present in the unit which can be fatal, therefore cut Off the power supply prior to functional testing. All notes, warnings, and cautions marked on the unit as well as the ones mentioned in the manual must be considered, otherwise, it may leads to injury and fatality.*



*Only qualified service and maintenance personnel can perform system operation and maintenance.*

### 4.2.1. Cooling

Adjust the temperature setpoint to 5 °C (10 °F) lower than the indoor temperature. Then the control system triggers the cooling demand signal and the compressor starts to work. After at least 3mins of cooling, adjust the temperature setpoint to 5°C (10°F) higher than the indoor temperature. If the compressor stops working, it means that the cooling function is normal.



*Restore the temperature setpoint to the default or the original value after the test.*

### 4.2.2. Dehumidifying

Adjust the humidity setpoint to 10% lower than the indoor relative humidity. Then the control system triggers the dehumidification demand. Note that during the testing process, if the indoor temperature is 3 °C higher than the temperature setpoint, the system may enter in 'Forced Cooling Mode' and the dehumidification demand will not be responded.



*Restore the humidity setpoint to the default or the original value after the test.*

## Chapter 5: Controller Operation Instructions

This chapter provides a detailed description on feature, appearance, color screen, control buttons, control interface and menu structure of Vertiv™ Liebert® SRC-G units.

### 5.1. Feature

The microprocessor controller has the following features

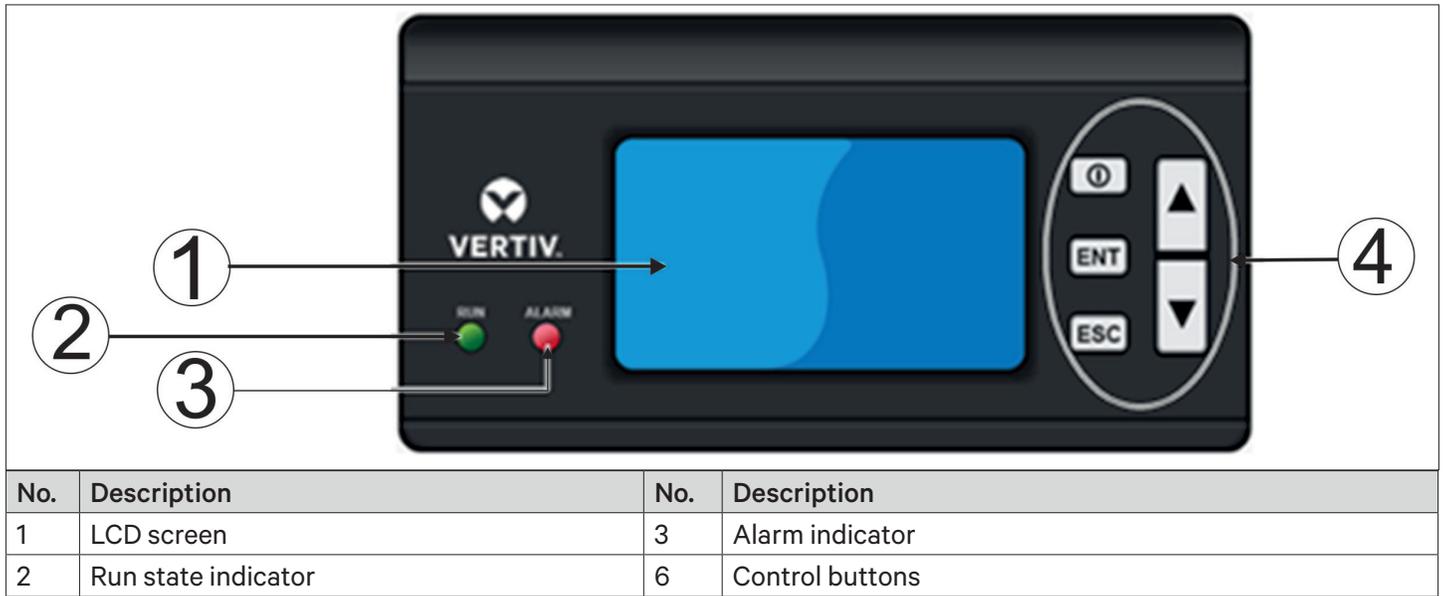
- It can monitor and display the operation status of Liebert SRC-G unit to maintain the environment within the range of setpoints.
- Equipped with a 128×64 dot graphics color screen with white back-light with a user-friendly interface.
- Provides a two-level password protection to prevent unauthorized operation.
- Provides multiple functions, including self-recovery upon power failure, high and low voltage protection, phase loss protection and protection against phase-reversal.
- Accurately record the run-time of important components through menu operation.
- Stores up to 99 historical alarm records.
- Configured with an RS485, using MODBUS-RTU communication protocol.



*In case if the customer requires RS485, then remove SIC Card Communication Cable from the Controller.*

### 5.2. Graphic Screen Appearance

The microprocessor controller interface is shown in [Figure 5-1](#). The graphic color screen displays English menus with white back-light. More detailed operating status of certain component and alarm information are available from the Main Menu screen. The selected menu option will be highlighted while browsing. The digit to be changed will be highlighted while scrolling through the settings menu.

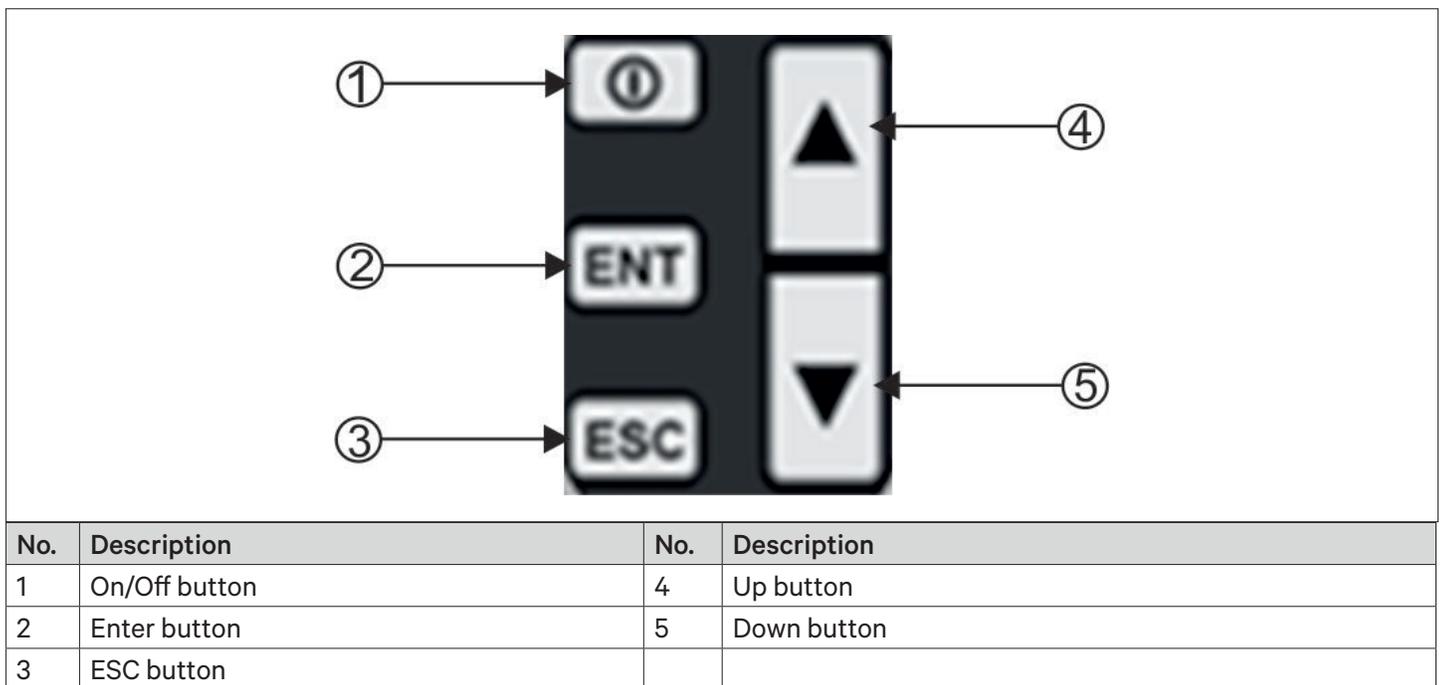


**Figure 5-1 Microprocessor Controller Interface**

## 5.3. Control Interface

### 5.3.1. Function Buttons

The microprocessor controller has five control buttons, as shown in [Figure 5-2](#). The functions of these control buttons are described in [Table 5-1](#).



**Figure 5-2 Control Buttons**

**Table 5-1 Function Descriptions of Control Buttons**

Button	Function description
On/Off 	Switch On/Off the controller by pressing for 3s.
Enter button 	Enter the selected menu screen. Validate the parameter setting value.
Escape button 	Exit the current menu and return to the normal screen or previous menu screen. Abort parameter change; silence the audible alarm.
Up button 	Move the cursor up or increase the parameter value. For a toggle selection: scroll through the options. For a multi-screen menu: scroll up the screen.
Down button 	Move the cursor down or decrease the parameter value. For a toggle selection: scroll through the options. For a multi-screen menu: scroll down the screen.

## Operation Example

### Example 1: Enter the password to access the Main Menu

After the unit is powered on, user can enter the Main Menu by accessing the following operations on the Normal screen.

1. Press the Enter button to enter the Password screen.
2. Press the Enter button to highlight the input data field in the Password screen.
3. Press the Up or Down button to change the current password number.
4. Press the Enter button to confirm the password and enter the Main Menu screen.

### Example 2: Modify parameters

To set the high temperature alarm of the airflow in the alarm setting menu, perform the following steps:

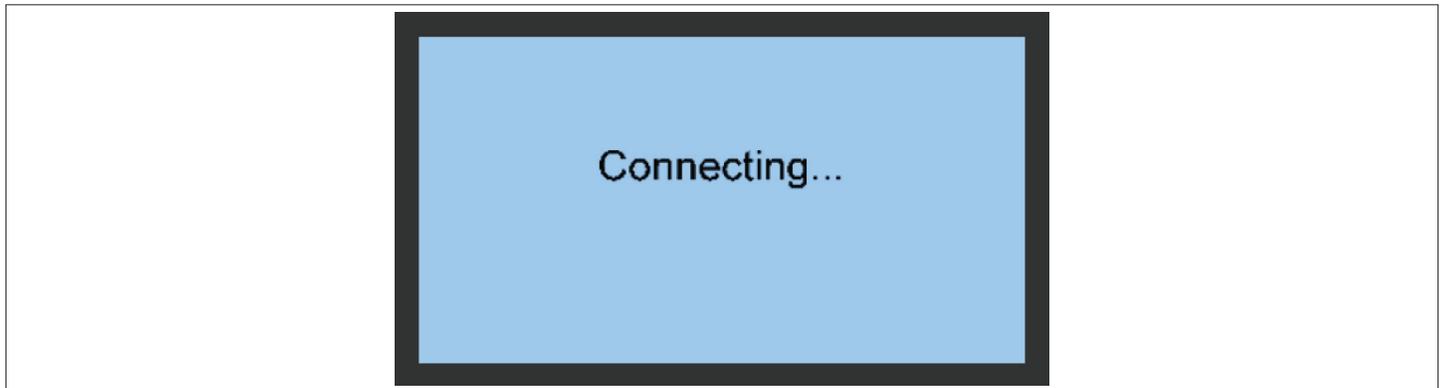
1. In the Main menu, move the cursor up or down to point it to the Alarm Menu.
2. Press Enter to access the Alarm Menu screen.
3. In the Alarm Menu, move the cursor up or down to point it to the Alarm Settings.
4. Press Enter to access the Alarm Settings screen.
5. In the Alarm Settings screen, move the cursor up or down to point it to the alarm value settings.
6. Press Enter to access the alarm value settings screen.
7. Press the Enter button to highlight the parameter field of Hi Temp of Supply Air.
8. Press the Up or Down button to select the parameter option.
9. After selecting, press the Enter button to confirm. The parameter will take effect.
10. Press the Esc button to return to the previous menu screen.



If user does not press the Enter button to validate the changed parameter after changing the parameter, the change of Hi Temp to Supply Air is invalid.

### 5.3.2. Power ON Screen

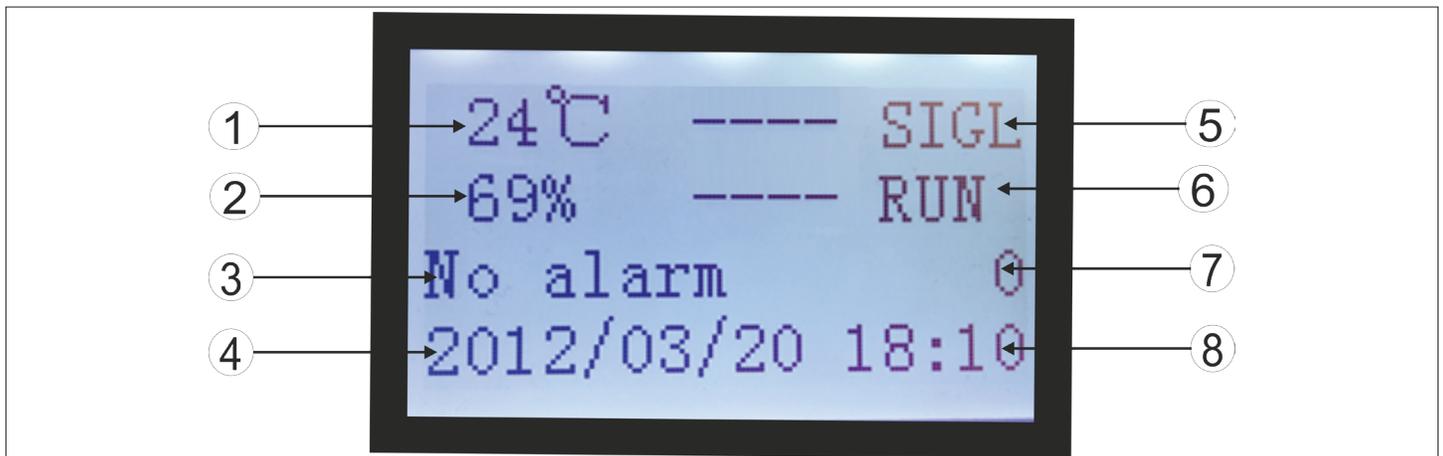
After the Liebert® SRC-G unit is powered On, the LCD screen will display the ON screen, as shown in [Figure 5-3](#).



**Figure 5-3 ON Screen**

### 5.3.3. Summary Screen

After the unit is powered On, the Main Menu screen will be displayed after 10 seconds. Refer [Figure 5-4](#) for better understanding.

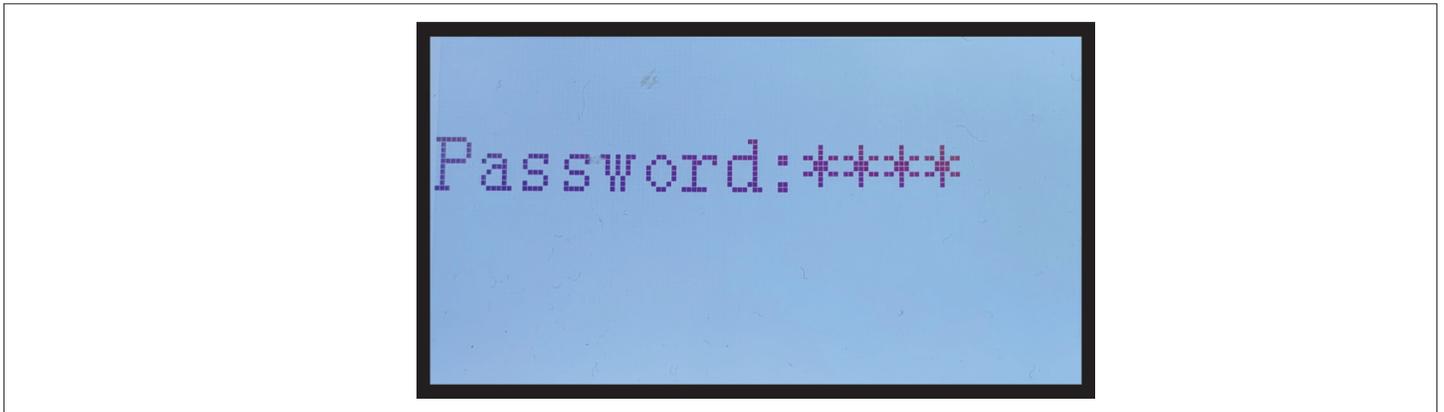


No.	Description	No.	Description
1	Return air temperature	5	Sequencing (teamwork) status
2	Return air humidity	6	Machine working status
3	Current alarm status	7	Unit ID
4	Current date	8	Time

**Figure 5-4 Summary Screen**

### 5.3.4. Password Screen

Press the Enter button on the Normal screen and the Password screen will appear, as shown in [Figure 5-5](#).



**Figure 5-5 Password Screen**

Two levels of menu access are provided to access the menus. The detailed descriptions are given in [Table 5-2](#).

**Table 5-2 Access Level**

Access Level	User	Remark
Level 1	General operator	Browse all menus information. Only set temperature and humidity setpoints and cannot be able to changed the values and settings
Level 2	Factory technician	Browse all menu information. Set all parameters

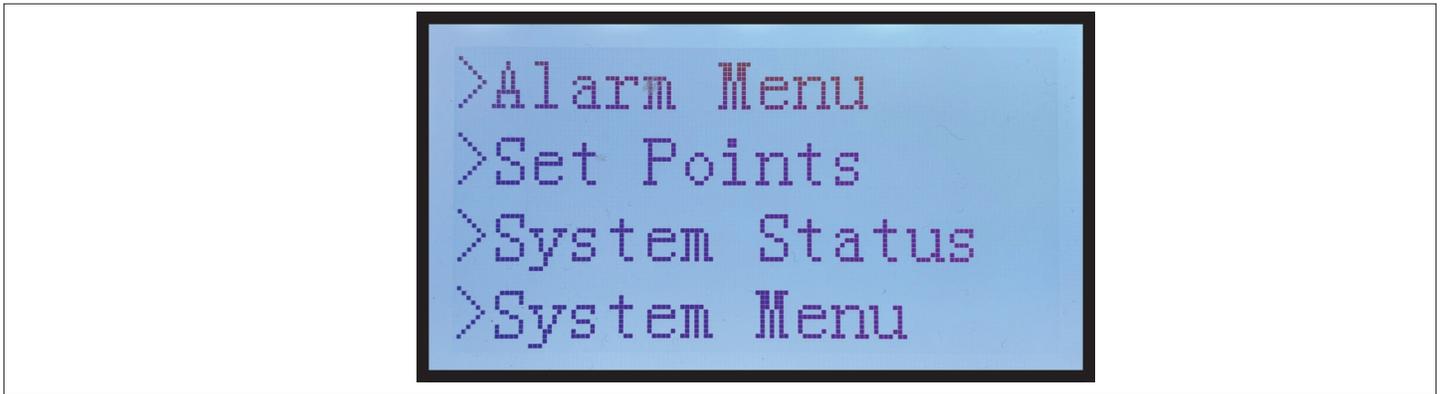
For detailed operation on entering the password, refer to [Section 5.3.1](#) Operation Example. If incorrect password is entered in the controller, the menu options can only be viewed, but the parameter settings cannot be changed. In this case, to return to the Normal screen, you can press the Esc button and then press the Enter button to again access the Password screen.



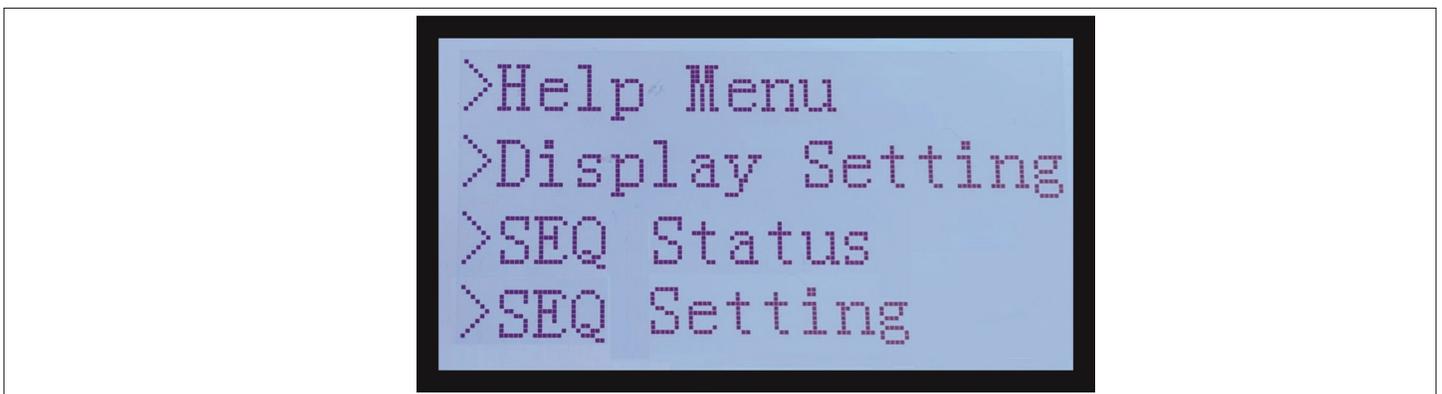
*If you press the Enter button on the Password screen instead of entering a password, the menu settings can only be viewed, but no parameters can be changed.*

### 5.3.5. Main Menu Screen

Main Menu screen can be accessed after password screen. The Main Menu screen includes total eight options, four options are shown in the first half of the screen and for other remaining options scroll the option list down. Refer [Figure 5-6](#) and [Figure 5-7](#) for better understanding.



**Figure 5-6 Main Menu Options 1**



**Figure 5-7 Main Menu Options 2**



*In case of sequencing or unit is connected in a network with other units then lowest ID unit is a Host and others are spares.*

The icons and their descriptions are listed in [Table 5-3](#).

**Table 5-3 Description of Icons**

Icon	Description
Alarm Menu	This menu presents various option available related to system alarms
Setpoint	This menu provides list of setpoints for machine operation
System Status	This menu provides status of system parameters
System Menu	This menu allows editing of various system parameters
Help Menu	This menu provides help menu option
Display Setting	This menu provides display setting option
SEQ Status	This menu provides sequencing Status of machines connected for teamwork
SEQ Setting	This menu allows editing of control parameters in team mode working

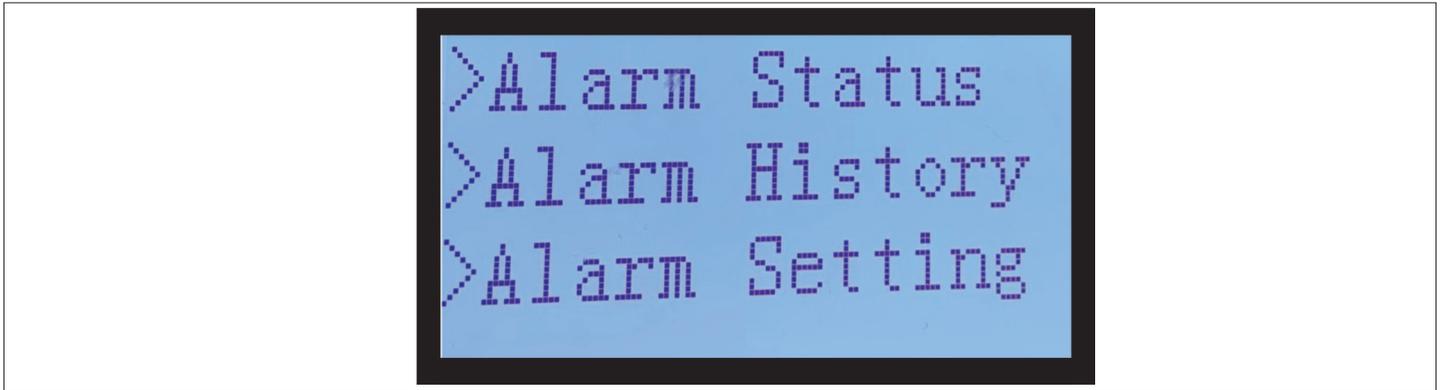
## 5.4. Menu Structure

### 5.4.1. Alarm Menu and Options

In the Main Menu select 'Alarm Menu' to access the alarm menu option as shown in [Figure 5-8](#). In the Alarm Menu option, user can access Alarm Status option, Alarm History option and Alarm Setting as shown in [Figure 5-9](#).



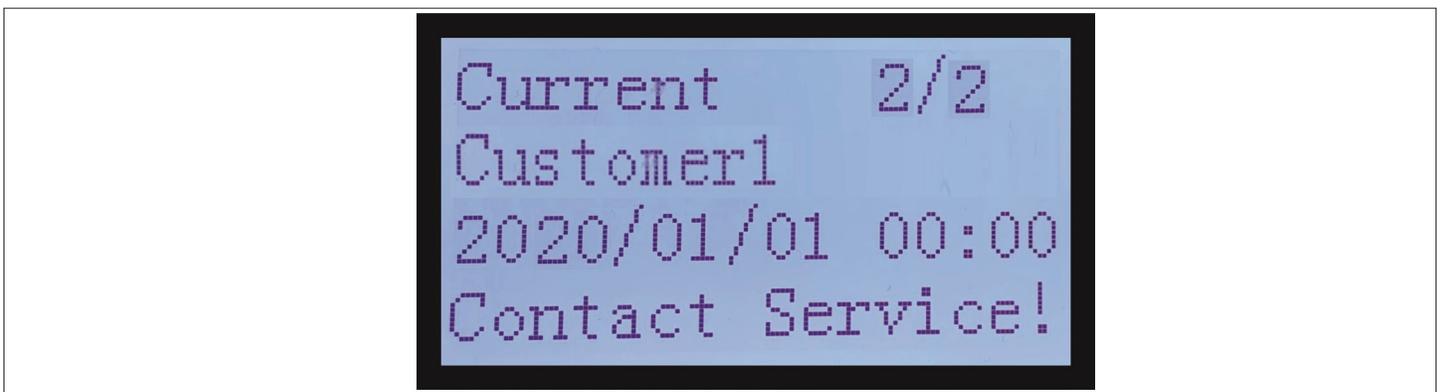
**Figure 5-8 Alarm Menu in Menu Window**



*Figure 5-9 Options in Alarm Menu*

### 5.4.2. Alarm Status

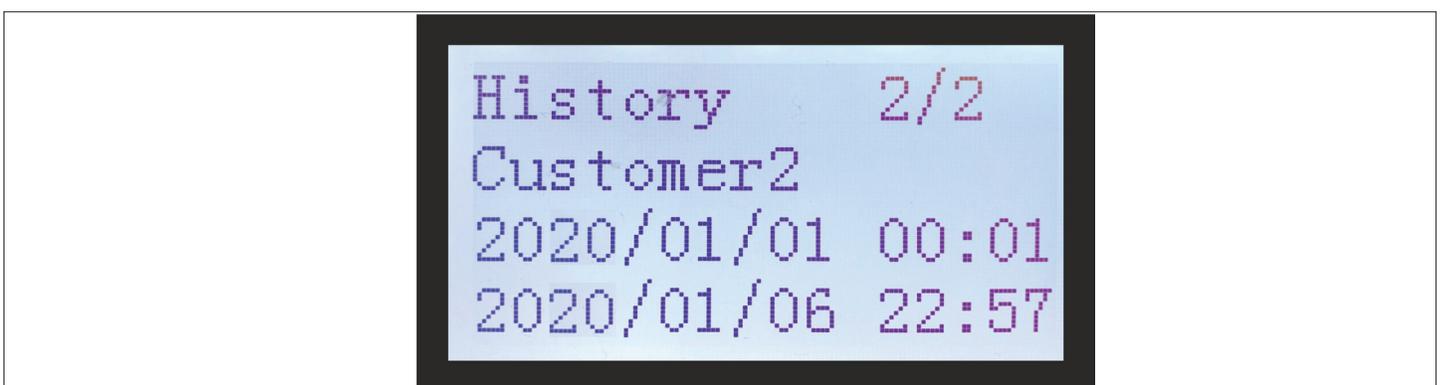
Select 'Alarm Status' to access the current alarm status of the unit as shown in [Figure 5-10](#).



*Figure 5-10 Alarm Status Screen*

### 5.4.3. Alarm History

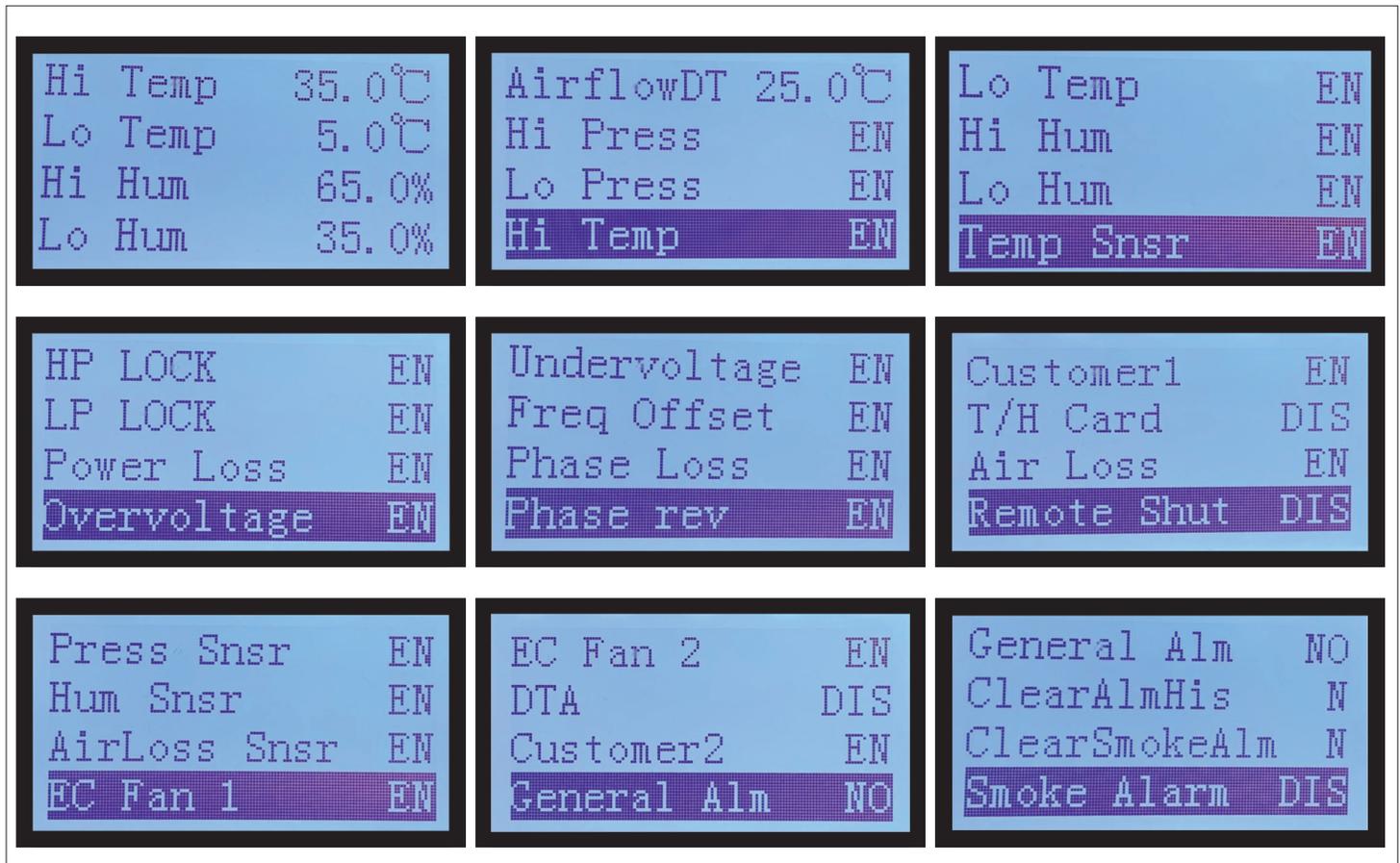
In the Alarm Menu select 'Alarm History' to access the alarm history details as shown in [Figure 5-11](#).



*Figure 5-11 Alarm History Screen*

### 5.4.4. Alarm Setting

In the Alarm Menu select 'Alarm Setting' to access the alarm setting options, user can press up and down buttons to scroll through all alarm setting option as shown from Figure 5-12.



**Figure 5-12 Alarm Setting Options**

Following are the available setting types

- Alarms trigger threshold

For example, Parameter “Hi Temp”. This parameter represents temperature above which “high temperature alarm” will be triggered

- Alarm enable/disable options

For example, parameter “Hi press”. This parameter is available as EN/DIS. “Hi pressure alarm” could be enabled or disabled using this parameter.

- Control pin status (for client) in case alarm is triggered

For example, “General alarm”. In case of common alarm case, the pin status during alarm is defined in this parameter. This status could be NO/NC.

- Miscellaneous

For example, “Clear alarm history” which clears alarm history.

## 5.5. Setpoint Menu

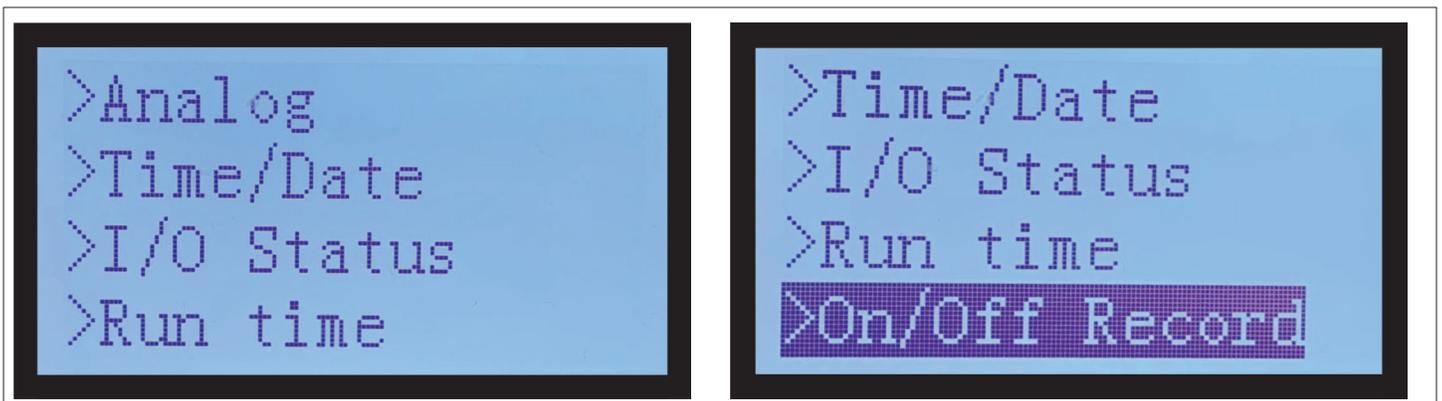
In the Main Menu option, select 'Setpoint Menu' option to access the setpoint setting details of the unit as shown in [Figure 5-13](#).



*Figure 5-13 Setpoint Option*

## 5.6. System Status Menu

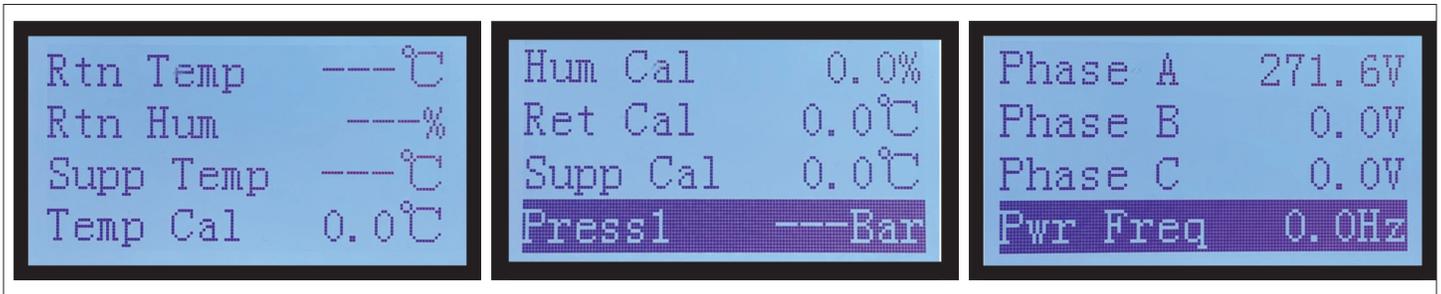
In the Main Menu option, select 'System Status Menu' option to access the system status details of the unit and scroll down for On/off Record as shown in [Figure 5-14](#).



*Figure 5-14 System Status Options*

### 5.6.1. Analog Status Options

In the System Menu option, select 'Analog Setting' option to access the following setting option shown in [Figure 5-15](#).



**Figure 5-15 Return Temperature Setting Screen**

### 5.6.2. Input/Output Status Options

In the System Menu option, select 'I/O Status' option to access the following status options as shown in Figure 5-16.



**Figure 5-16 I/O Status Options**

### 5.6.3. Time/Date Options

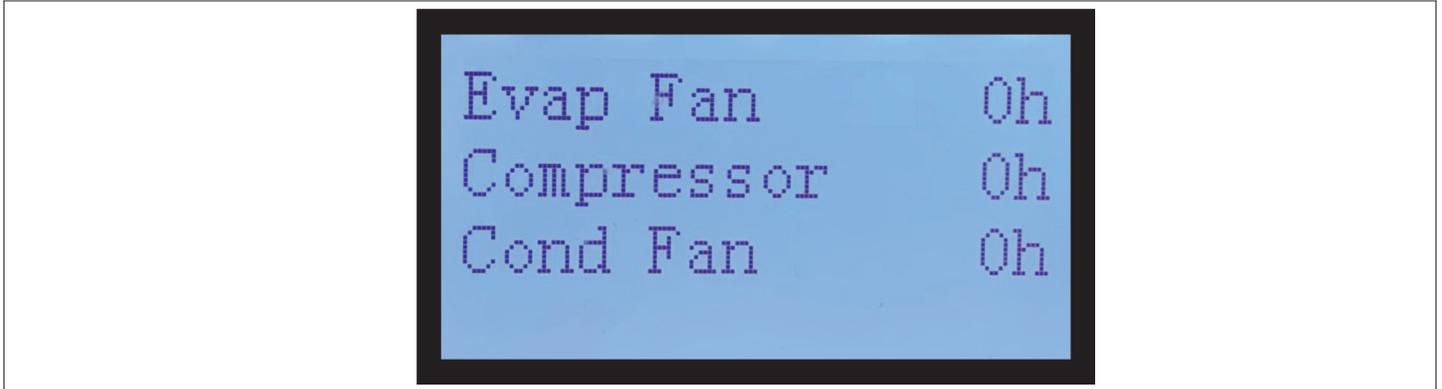
In the System Menu option, select 'Time/date' option to access the following setting option shown in Figure 5-17.



**Figure 5-17 Time/Date Screen**

### 5.6.4. Run Time Options

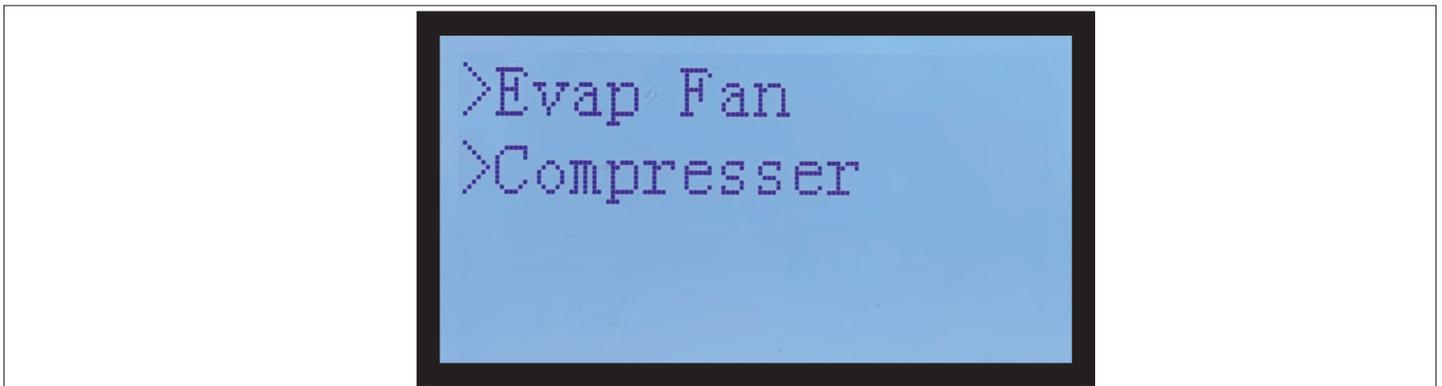
In the System Menu option, select 'Run Time' option to access Evaporate Fan, Compressor and Fan run time the following setting option shown in [Figure 5-18](#).



**Figure 5-18 Run Time Screen**

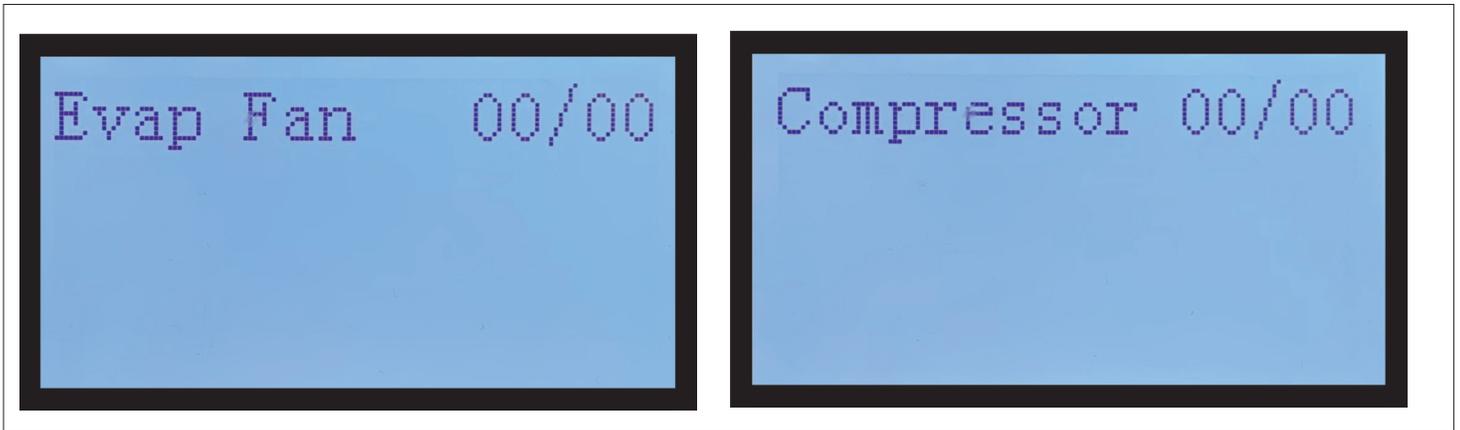
### 5.6.5. On/Off Record Options

In the System Status menu option, select 'On/OFF Record' option to access Evaporate, Fan Compressor and Fan run time the following setting option shown in [Figure 5-19](#).



**Figure 5-19 On/Off Record Screen**

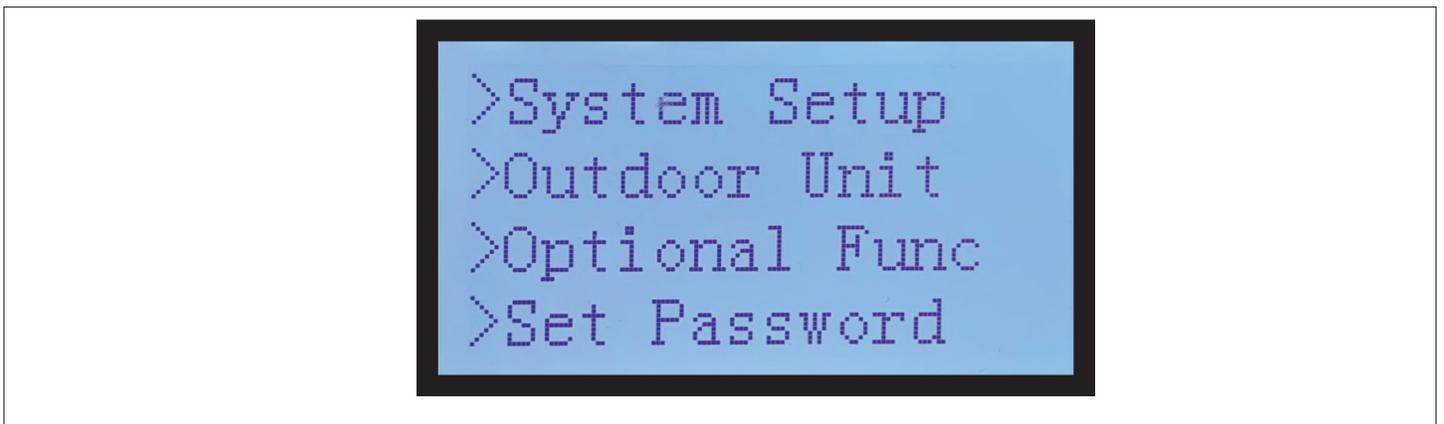
Further click on the individual option to access evaporator fan and Compressor Settings and shown in [Figure 5-20](#).



**Figure 5-20 Evap Fan and Compressor Screen**

## 5.7. System Menu

In the Main Menu select 'System Menu' to access System Setup, Outdoor unit, Optional Func. and Set Password options of the unit as shown in [Figure 5-21](#).



**Figure 5-21 System Menu Option**

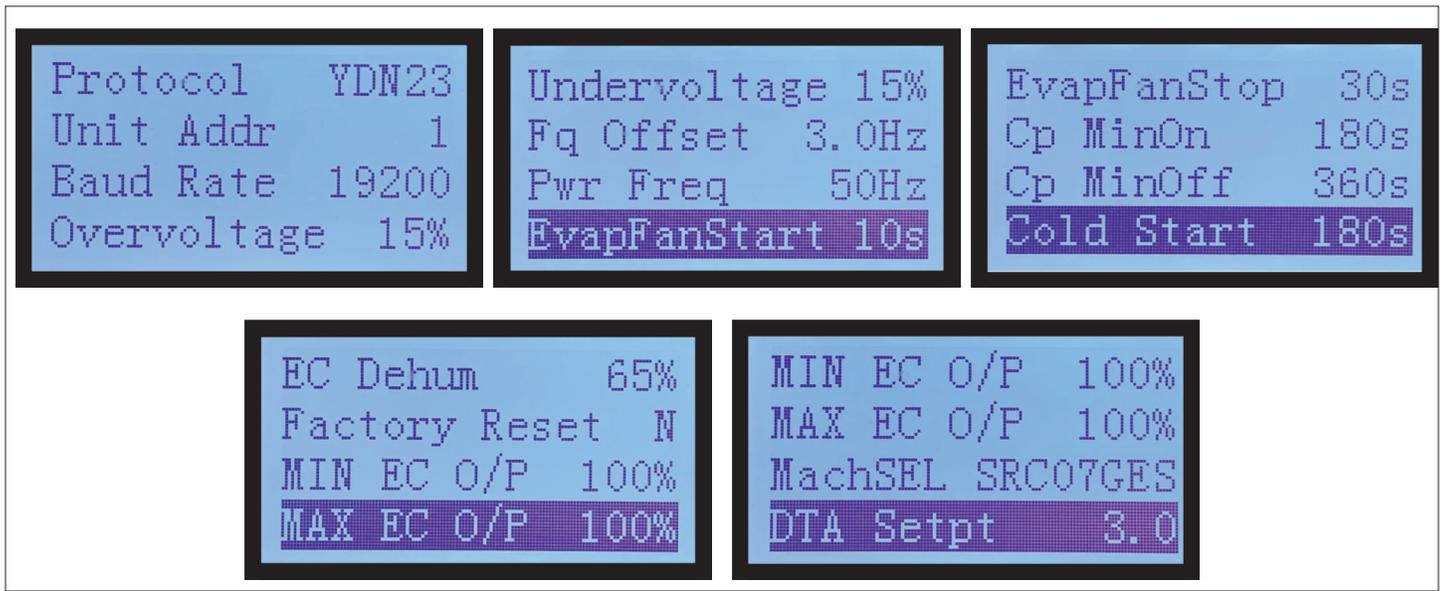
### 5.7.1. System Setup Options

In the System Menu option, select 'System Setup' option to access the following setting option shown from [Figure 5-22](#).

Following are options available in system setup sub-menu

- Communication setting parameters such as Protocol, Unit addr, Baud rate.
- Supply power monitoring parameters such as over-voltage, under voltage frequency offset and Pwr frequency.
- To safeguard compressor and fan during normal operation, Operation delay parameters such as EvapFanStart, EvapFanStop, Cp minOn, Cp minOff, cold Start defines various.

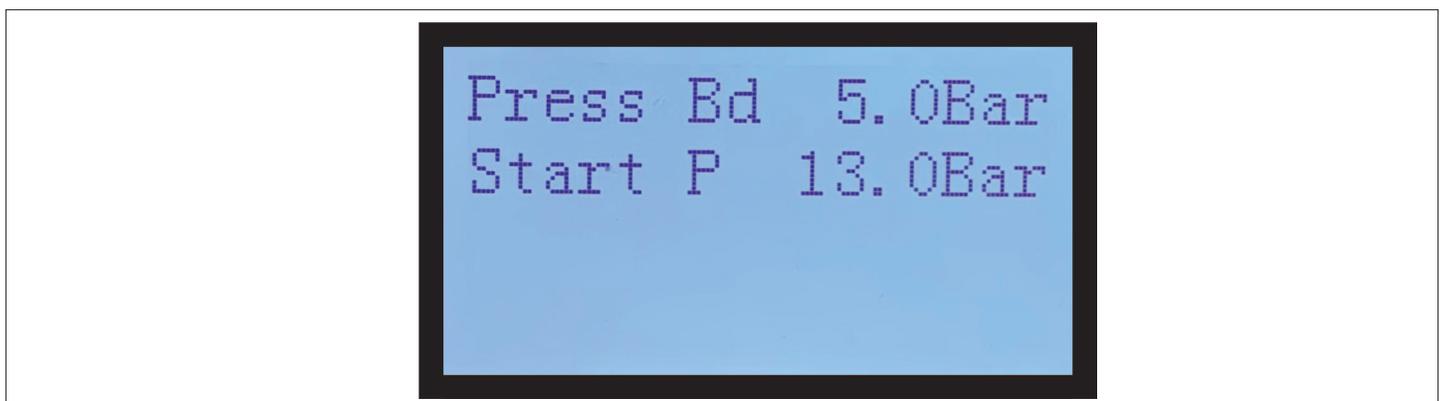
- EC Dehum parameter to control fan speed for dehumidification.
- Min EC O/P and Max EC O/P are for minimum and maximum fan speed options, in case of variable fan speed is selected.
- MachSEL parameter option for selection of Unit model for operation.
- DTA setup parameter for temperature difference below which DTA alarm is triggered.



**Figure 5-22 Protocol Setup Screen**

## 5.7.2. Outdoor Unit Options

In the System Menu option, select 'Outdoor Unit' option to access the outdoor unit option shown in Figure 5-23.



**Figure 5-23 Pressure Setting Screen**

### 5.7.3. Optional Function Options

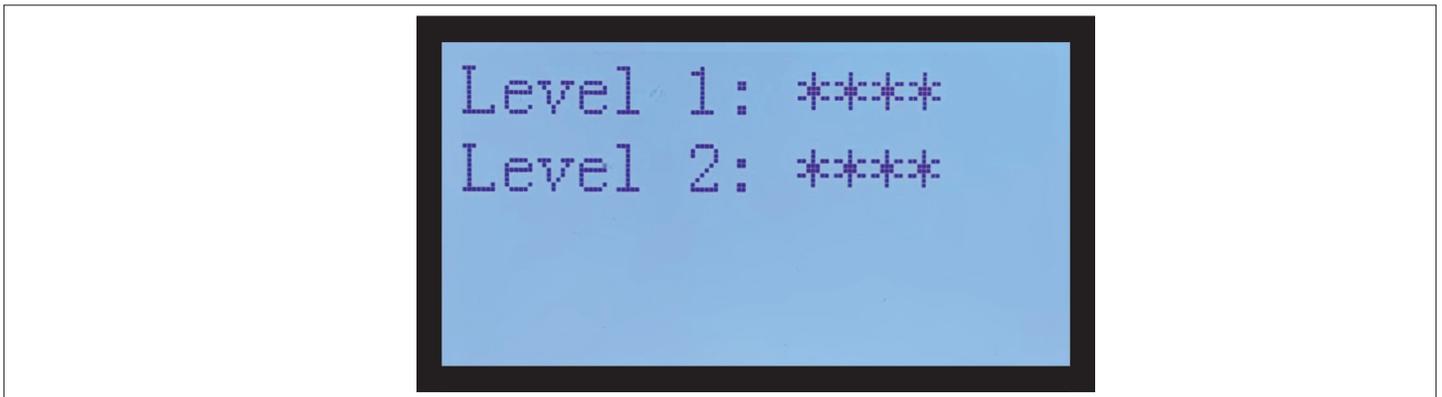
In the System Menu option, select 'set password' option to access the following setting option shown in [Figure 5-24](#). "Silent mode cooling" and "Silent mode dehumidification" allow access to fan speed at which evaporator fan operates during silent mode of operation.



**Figure 5-24 Silent Mode Setting Screen**

### 5.7.4. Set Password Options

In the System Menu option, select 'set password' option to access the following setting option shown in [Figure 5-25](#). Refer [Section 5.3.4](#) for example of password access.



**Figure 5-25 Password Setting Screen**



*The default passwords are factory set for more details contact Vertiv local representative.*

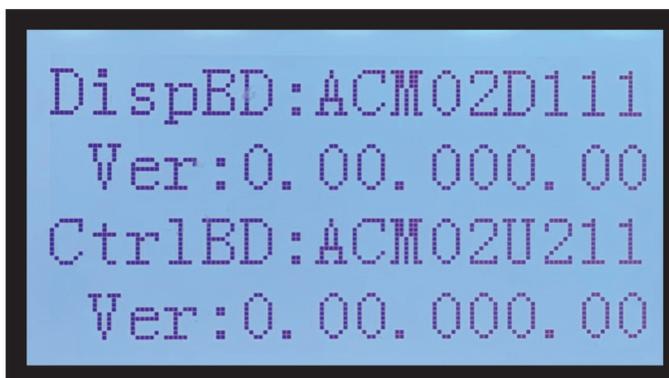
## 5.8. Help Menu

In the main menu select 'Help Menu' option to view detail of the unit as shown from Figure 5-26 to Figure 5-28



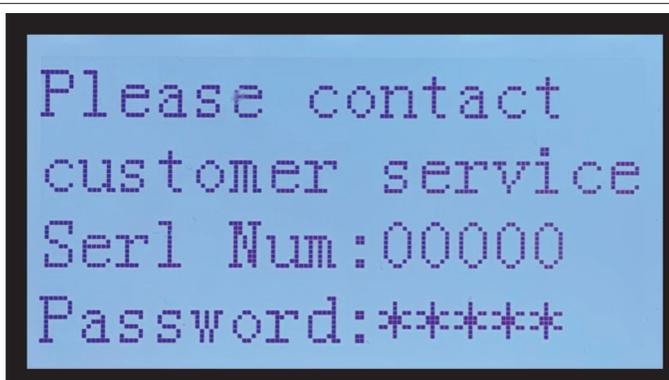
```
>Version Info  
>En Activation
```

*Figure 5-26 Version Info Screen*



```
DispED:ACM02D111  
Ver:0.00.000.00  
CtrlED:ACM02U211  
Ver:0.00.000.00
```

*Figure 5-27 Controller Info Screen*

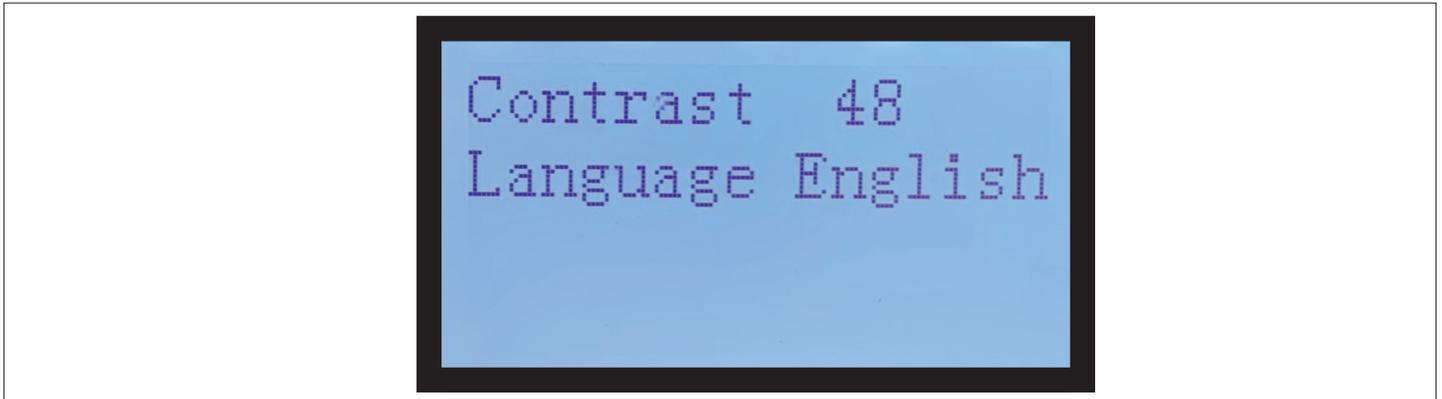


```
Please contact  
customer service  
Serl Num:00000  
Password:*****
```

*Figure 5-28 Contact Info Screen*

## 5.9. Display Settings

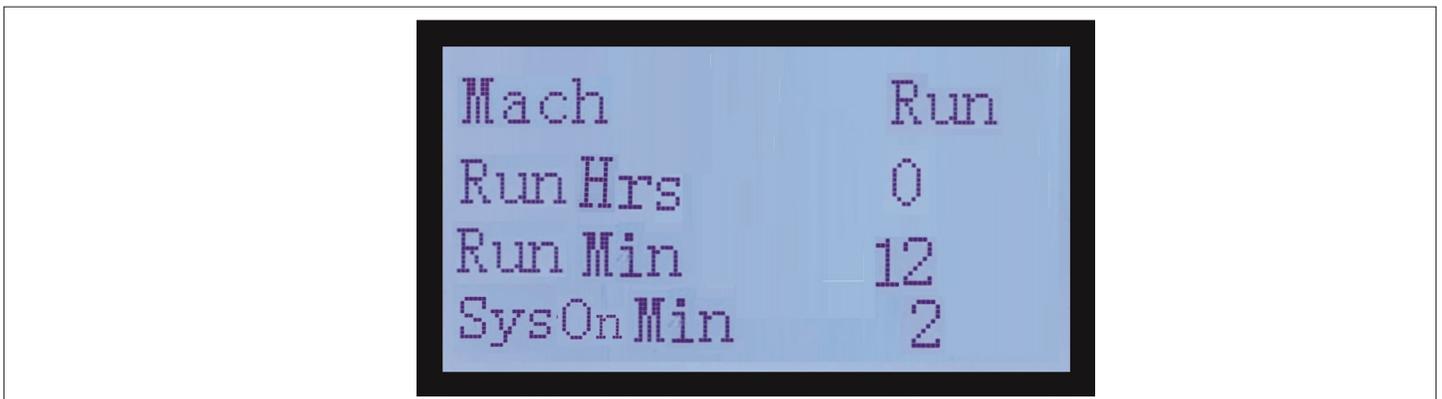
In the Main Menu select 'Display Menu' option to access display and Language settings option as shown in [Figure 5-29](#).



*Figure 5-29 Display Settings Screen*

## 5.10. Sequencing Status

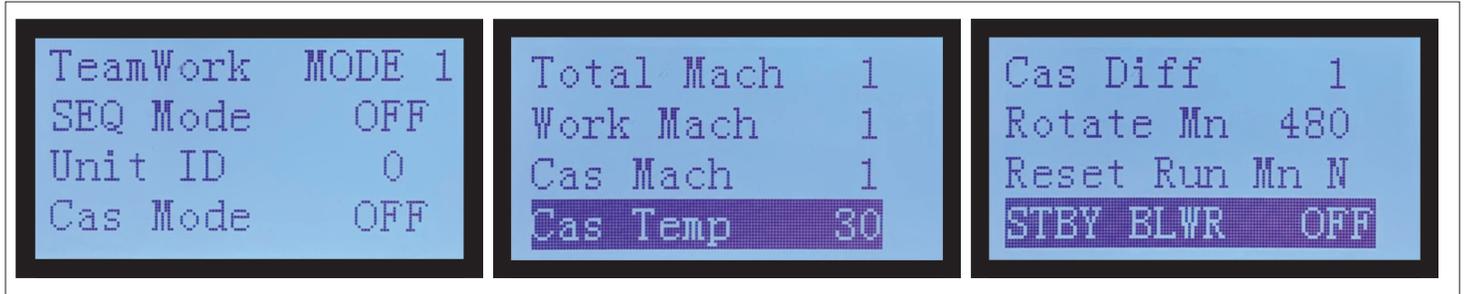
In the Main Menu select 'Sequencing Status' to access the sequencing details as shown from [Figure 5-30](#).



*Figure 5-30 Sequencing Status Screen*

## 5.11. Sequencing Setting

In the Main Menu select 'Sequencing Setting' option to access sequencing setting details as shown from Figure 5-31.



**Figure 5-31 Sequencing Setting Screen**

### Sequencing/TeamWork option

Liebert® SRC units have teamwork function, which allow multiple units (maximum 8) to connect in a network. This feature is applicable in following operation modes.

- **Scheduling**

In this mode, some of the units in network can be set off as a standby and rest of the units regulate temperature and humidity of the room. Once rotation time is over, next set of units start operation, and previously operating units switch to rest.

- **Contingency**

In this mode, if there is an alarm in the operating unit then standby unit takes over automatically and faulty unit is set out of operation for maintenance. Once the faulty is removed, it can set back to operation based on schedule.

- **Cascading**

In this mode, if rise in the steep temperature is detect, all units start operating together, to control temperature as per the setpoints.

### Sequencing mode

All units in the network should be connected as given in Chapter 3, [Connection Section 3.4.1](#).

To establish the network, all units are designated with independent Unit ID starting from 0 to 7. Unit with ID '0' is assigned as a master and rest of the units are slave. In case of fault with master unit, next lowest ID unit is promoted as a master. Once the unit is out of fault it can again resume as a master.

### Total Mach

This option represents total units in the network.

**Work Mach**

This option represents total number of working units in the batch. Rest of the units are considered as standby.

**Rotate Mn and Reset Run Mn**

Scheduling is achieved by setting rotation min using parameter “Rotate Mn”. This parameter is factory set using “Reset Run Mn”.

**Cas Mode**

Cas Mode is selected by “ON”. Cascading mode is activated when Cas Temp is reached. This mode is auto turned Off when once Cas Diff is achieve.

**STBY BLWR**

The status of evaporator fans of standby units can be selected using “STBY BLWR”.

## Chapter 6: System Operation and Maintenance

This chapter explains the system maintenance of Vertiv™ Liebert® SRC-G units, including electrical inspection, indoor unit maintenance, outdoor unit maintenance and maintenance inspection checklist.



- *Switch Off the circuit breaker and cut-off the unit power supply before maintenance unless the power is necessary for commissioning the unit.*
- *Prior to operation and maintenance, the lethal voltage may be present in the unit which can be fatal. All notes, warnings, and cautions marked on the unit as well as the ones mentioned in the manual must be considered, otherwise, it may lead to injury and fatality.*

### 6.1. Electrical Inspection

Visually inspect the control board, power detection board, outdoor fan speed controller board, display panel, temperature and humidity sensor, infrared humidification leak detection board on a semi-annual basis for any loose electrical connection and circuit corrosion.

The microprocessor controller has six circuit boards, which jointly complete the system fault diagnosis process.

Inspect the boards one by one according to the procedures below:

1. Conduct overall electrical insulation test: Find out the unqualified contacts and handle them carefully.
2. Statically check and test the contactors before power On and ensure that contactors can act freely without any obstruction.
3. Clean the electrical and control components with a brush or compressed dry air.
4. Check the end of contactors for arcs or signs of burning. Replace the contactor if necessary.
5. Fasten all the electrical connection terminals.
6. Check if the temperature of all MCBs and contactor terminals become higher.

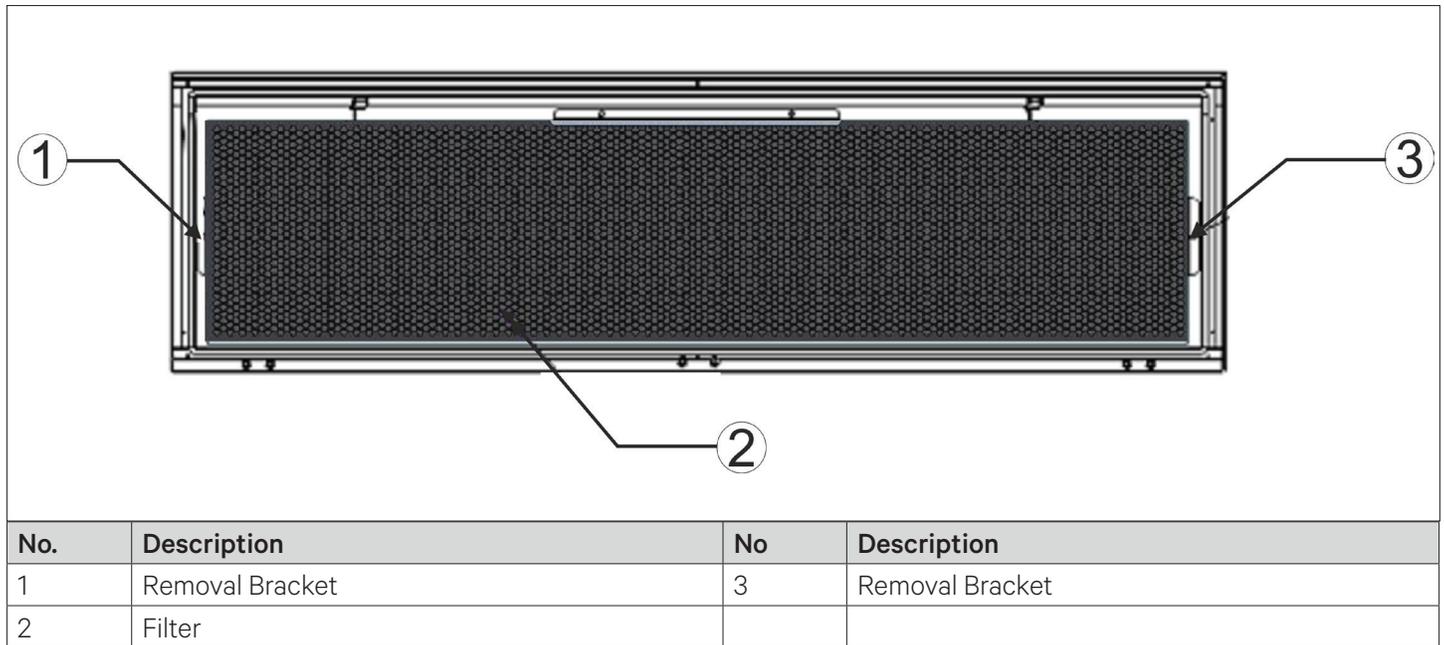


- *All circuit boards are not hot-pluggable. Big instant current will be produced when the board is plugged or unplugged with powering On and it may lead to unrepairable damage to the circuit.*
- *All control boards can only be maintained after the micro-processing controller is powered Off.*

## 6.2. Indoor Unit Maintenance

### 6.2.1. Filter

The filter is a consumable components and Its replacement interval is directly related to the seal and cleanness status of the equipment room. In order to maintain efficient operation, the filter should be checked monthly and be replaced or washed if it is damaged or clogged.

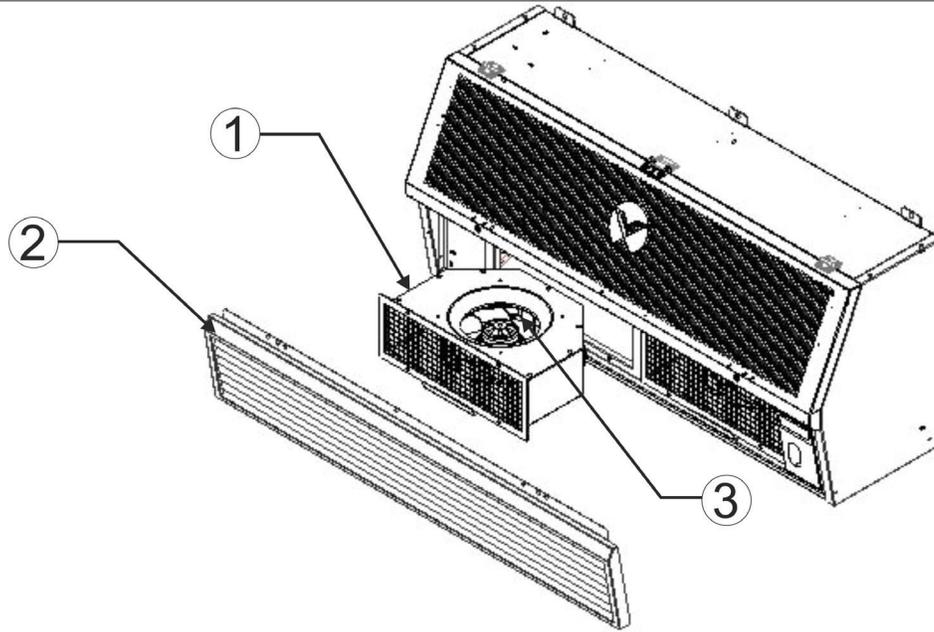


**Figure 6-1 Liebert® SRC-G Filter**

### 6.2.2. Fan

The monthly inspection particulars of the fan kit include: fan status, fan kit fixation, and clearance between fan impeller and inlet nozzle. Inspect the motor bearings and impeller monthly; and replace it if any damaged found in impeller. Check the impeller is tightly mounted on the rotor of the motor and does not obstruct against its neighboring metal components during rotation.

Since the fan kit operates 24hours every day continuously, any unusual airflow obstruction must be cleared in time to avoid the damage to the cooling system. This unusual airflow obstruction can also affect to the other system components due to reduction in air volume. Refer [Figure 6-2](#) for better understanding.

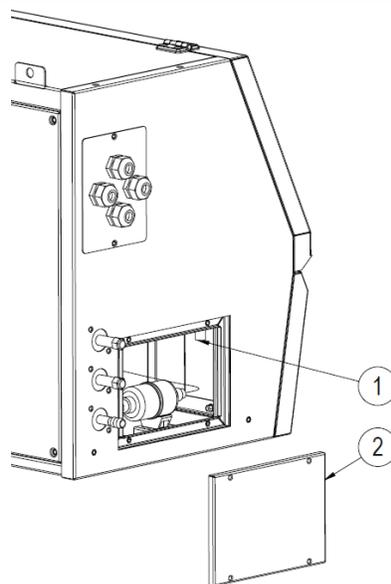


No.	Description	No	Description
1	Fan Box	3	EC Fan
2	Front Panel		

**Figure 6-2 Vertiv™ Liebert® SRC-G EC Fan Location**

### 6.2.3. Drain Pipe

Figure 6-3 shows drain pipe connection; inspect water pan periodically for normal operation of the drain pipe. Ensure that no foreign matter or leakage exists in the drain pipe.



No.	Description	No	Description
1	Drain connection	2	Cover plate

**Figure 6-3 Liebert® SRC-G Drain Pipe Connection**

#### **6.2.4. Thermal Expansion Valve (TXV)**

The Thermal Expansion Valve keeps the evaporator supplied with enough refrigerant to satisfy load conditions. Its proper operation can be determined by measuring the superheat level. The correct superheat setting is 5.6 °C to 8.3 °C (10 °F to 15 °F).

## 6.3. Outdoor Unit Maintenance

### 6.3.1. Refrigeration System

The components of the refrigerant system should be inspected monthly to find out any abnormal operation phenomenon. Refrigerant piping must be properly fixed and not allowed to vibrate against wall, floor or the unit frame. Inspect all refrigerant piping every six months for signs of wear.

### 6.3.2. Air-cooled Condenser

- When the airflow through the outdoor unit is restricted or blocked, use compressed air or fin cleaner (alkalinescence) to clean the condenser off the dust and debris that reduce airflow.
- The compressed air should be blown at the reversed airflow direction. In winter, do not let snow to accumulate around the side or underneath the condenser.
- Check for bent or damaged fins and simply repair them if necessary.
- Check all refrigerant pipes and capillaries for vibration and support them if necessary.
- Carefully inspect all refrigerant piping for signs of oil leakage, determine the leakage position and fixed them immediately.

### 6.3.3. High-Pressure Switch and Low-Pressure Switch

The discharge and suction pressures will vary greatly with the unit load, ambient condition and used refrigerant, refer [Table 6-1](#) for details of normal operation. When the discharge pressure rises to the high-pressure setpoint, the high-pressure switch gets activated and the control system shuts down the compressor after ensuring that an abnormal input signal of the high-pressure switch is triggered.

When the suction pressure is lower than the low-pressure setting, the low-pressure switch gets activated and the control system shuts down the cooling system after confirmation.

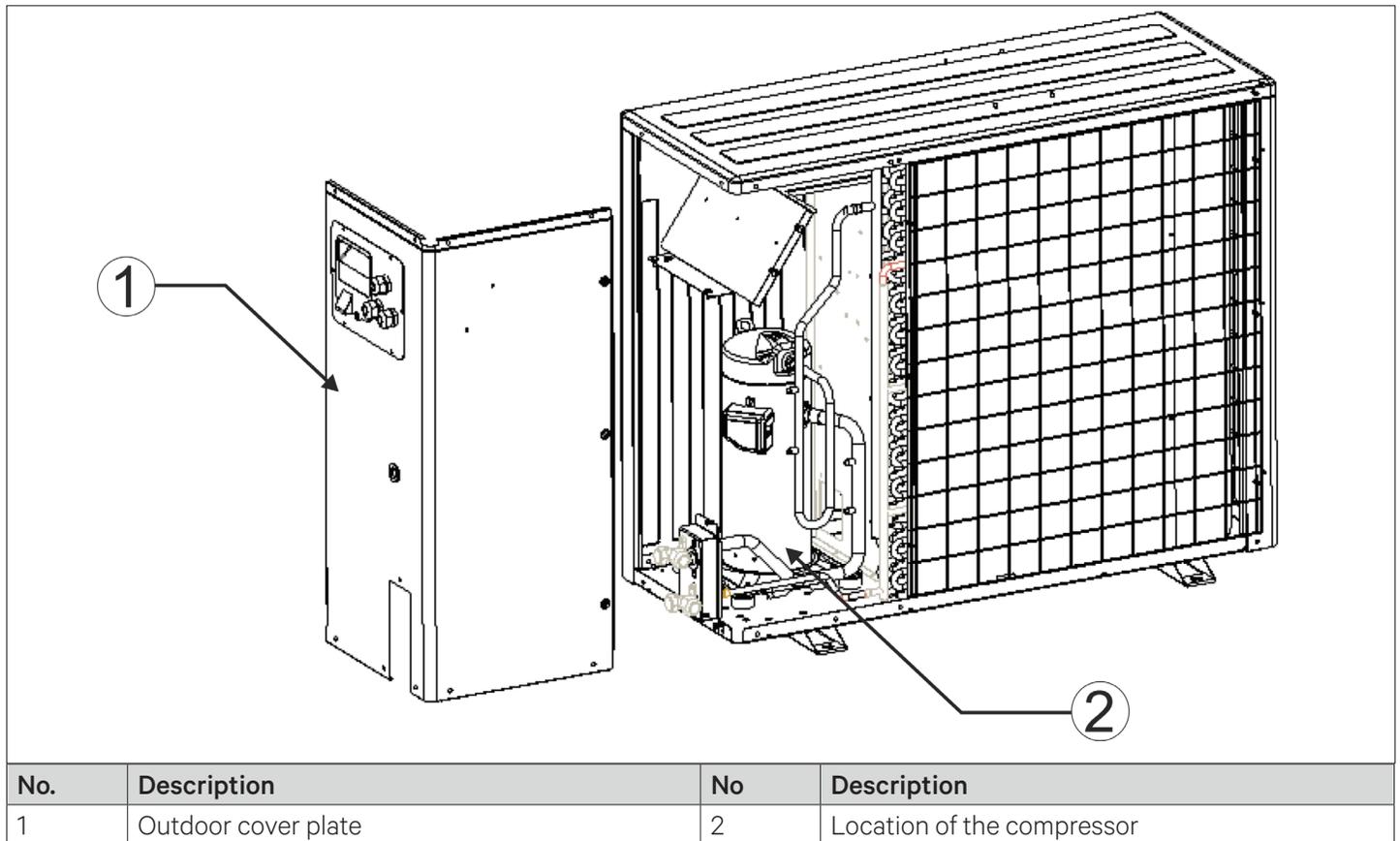
**Table 6-1 Typical Liquid (Discharge) Pressure and Gas (Suction) Pressure**

Items	psig	MPa
Low pressure	100 to 159	0.7 to 1.12
Low-pressure setting	53	0.37
Low-pressure recovery point	80	0.56
High pressure	284 to 526	2.0 to 3.7
High-pressure setting	583	4.1
High-pressure recovery point	469	3.3

### 6.3.4. Compressor

The compressor fault is generally classified into two types:

1. Motor failure (such as winding burnout, insulation failure, short-circuit between coils and so on)
2. Mechanical failure (such as compressing failure, relief valve fault, therm-o-disc fault and so on)



**Figure 6-4 Location of Compressor**

If the sufficient operating pressure is not established, it is an indication of the compressor has failed. It can be confirmed - if the suction pressure and discharge pressure are balanced, and the motor does not rotate reversely.

The controller of the unit has a powerful alarm and protection functions to ensure safe operation of the compressor. The maintenance personnel should record the high pressure and the low pressure, and find out the cause of an alarm protection during periodical maintenance and inspection.



*Avoid touching or contacting the residual gas and oils in compressor with exposed skin. Wear long rubber gloves to handle contaminated components.*

Check the following particulars before replacing the compressor

1. Check that all fuses and circuit breakers are normal
2. Check the working status of the high and low pressure switches
3. Check the relative historical alarm information
4. Check the compressor operation record
5. Check the motor electrical characteristic



*System contains refrigerant. Recover refrigerant using standard recovery equipment before maintenance.*

Refer the following procedure to remove and replace the failed compressor

1. Cut off the power supply
2. Attach suction and discharge gauges to compressor access fitting
3. Recover the residual refrigerant by using standard recovery procedures
4. Remove the failed compressor
5. Follow manufacturer's instructions to clean out piping kit
6. Install replaced compressor and make all connections, perform pressurization, and leakage tests of the system at approximately 150 psig (1034 kPa)
7. Evacuate the system twice to 1500 microns and the third time to 500 microns. Break the vacuum each time with clean and dry refrigerant to 2 psig (13.8 kPa)
8. Charge the system with refrigerant based on the requirements of the evaporator, condenser and piping
9. Apply power and operate the AC unit. To check the proper operation, refer the circulation suction pressure and discharge pressure are in normal operation ranges, and if necessary add some more refrigerant



*Release of refrigerant to the atmosphere is harmful to the environment. Refrigerant must be recycled in accordance with state and local regulations.*

## 6.4. Monthly Routine Maintenance

Check the components of the system monthly, focusing on whether the system function is normal and whether the parts are showing signs of wear. Refer [Table 6-2](#) for monthly routine maintenance inspection items.



*To ensure proper operation of the equipment, routine maintenance checks must be performed on a regular basis.*

**Table 6-2 Routine Maintenance Checklist (Monthly)**

Component	Inspection Particulars	Remark
Filter	Check for clogging or damage	
	Check the filter clogging switch	
	Clean the filter	
Indoor unit fan	Impellers free of debris and distortion, and move freely	
Compressor	Check for any signs of oil leaks	
	Listen to running sounds and observe operation vibrations	
Drain system	Check and clean out unit drain piping; humidifier and water pan; condensate pump and building drain piping.	
Refrigerant system	Check if refrigerant piping is reliably supported	
	Check system circulation and moisture content (observed through sight glass)	
	Check Thermal Expansion Valve (TXV) is firmly connected	

## 6.5. Routine Maintenance and Inspection (Semi-annually)

Table 6-3 for the semi-annual routine maintenance inspection items.

**Table 6-3 Routine Maintenance Checklist (Semi-annually)**

Components	Inspection Particular	Remark
Compressor	Check for any signs of oil leaks	
	Listen to running sounds and observe operation vibrations	
Refrigeration cycle system	Check suction pressure, exhaust pressure and suction superheat are as per setpoints	
	Check if the evaporator is functioning normally	
	Check system circulation and moisture content (observed through sight)	
	Check whether there is an obvious temperature difference before and after drying the filter	
	Check Thermal Expansion Valve (TXV) is firmly connected	
	Check the refrigerant piping. The refrigerant line must have a suitable bracket and must not be placed against the wall, floor or fixed frame	
Air-cooled condenser	Check if the condenser coil is clogged, clean immediately if it is blocked	
	Check if the motor is firmly mounted	
	Check if there is any distortions in impeller rotation, also check bearings if they are in good condition	
	Check if the refrigerant piping are properly supported	
Electrical board	Check all electrical connections are firmly tightened	
	Check the surface of the circuit board for signs of corrosion	

## Chapter 7: Troubleshooting

Troubleshooting is to be performed by the trained and qualified service personnel. However, the checklists have been provided just for reference purpose.



- *Certain circuits carry lethal voltages. Only professional technicians are allowed to maintain the unit. Extreme care and caution is required while troubleshooting the unit online.*
- *If jumpers are used for troubleshooting, remember to remove the jumpers after the troubleshooting, if not removed the connected jumpers may bypass certain control functions and increase the risk to the unit.*

Table 7-1 represents the troubleshooting of the indoor unit of Liebert® SRC-G units.

**Table 7-1 Troubleshooting of the Indoor Unit**

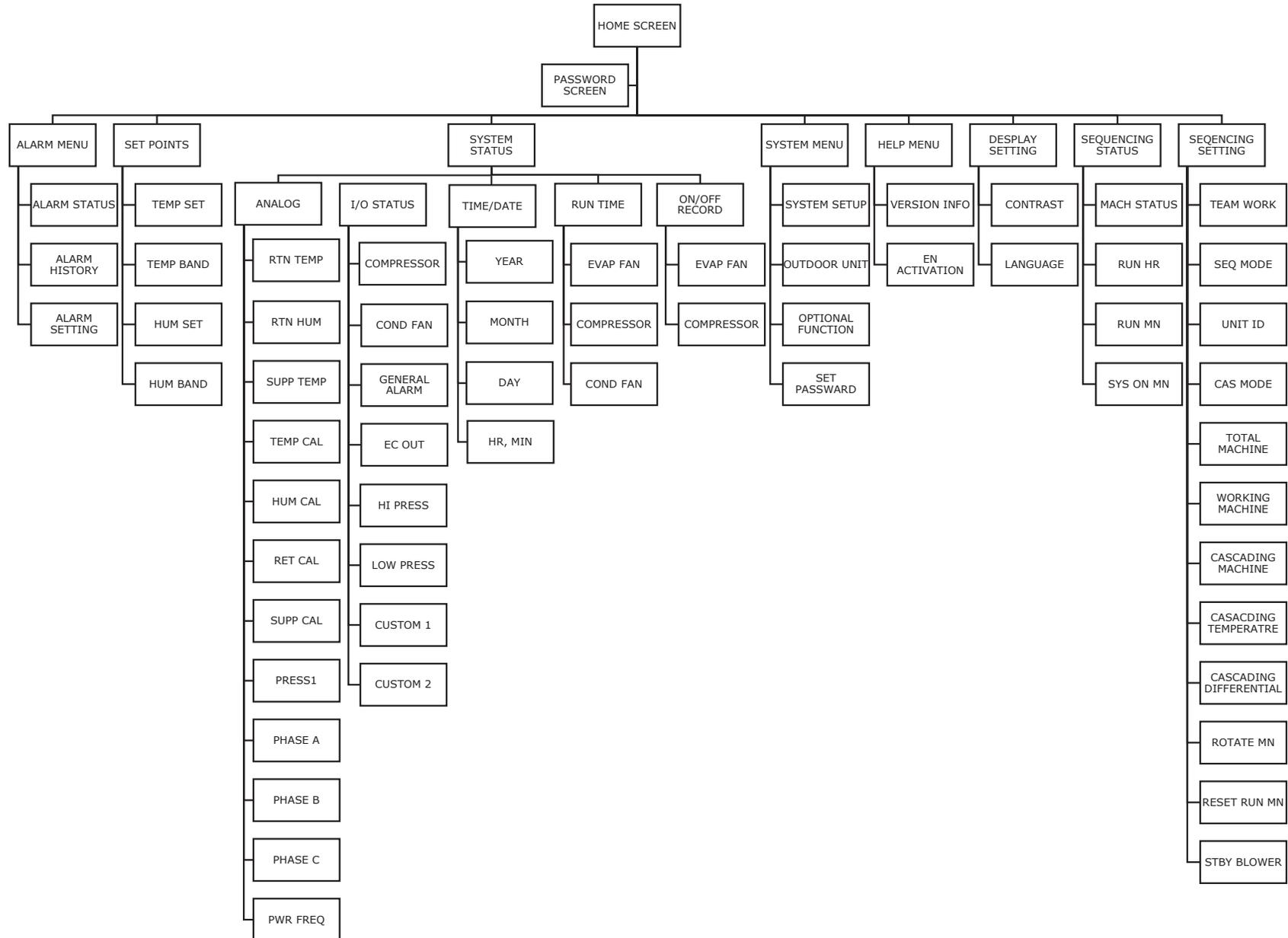
Symptom	Possible Cause	User Needs to Check Particulars or Processing Method
The unit does not start	No power supply to the unit	Check unit input voltage
	Circuit breaker of controller voltage is open	Locate short circuit and reset circuit breaker
	Low power supply voltage	Check for power supply voltage at SPD (if available)
No cooling	Compressor contactor not engaging (not connecting) in	Check for 220 Vdc of coil. If the voltage is right, check if the contactor is connected properly
	High compressor discharge pressure	See if there is “High pressure alarm” and follow the maintenance descriptions
	Plugged strainer	Check if strainer is clogged or damaged, if it is then clean or replace the strainer accordingly
	Low refrigerant charge	Use suction and discharge pressure gauge to check if pressure is as per requirement. Also, see if there any evident of bubbles exists in the sight glass
Display abnormal	Static discharge	Disconnect the system power supply, and then restart
	Loose connection between keypad and control board	Check the connections are firmly fixed after powering Off, the unit and then restart the unit

Symptom	Possible Cause	User Needs to Check Particulars or Processing Method
No display, control buttons do not respond, and unit operates normally	Disconnection between keypad and control board	Check if the connections between keypad and control board are firmly connected
The screen display is normal, the button does not respond, the device is running normally	The display board setting is faulty	Contact Vertiv representative for maintenance support or engineering assistance
No display, control buttons do not respond and unit has no output	Low power supply voltage	Check for power supply voltage
	Communication between control board and control board interrupted	Check if the connections between control board and control board are firmly connected
High pressure alarm	Insufficient airflow across condenser	Remove debris from coil and airflow inlet, and check the fan speed function of the control board
	Condenser fan is not operating	Check that the connections of the control board to the outdoor unit terminals are firmly connected, and check that the condensate pressure sensor works normally
	High pressure switch failure	Check the connection of the high-pressure switch and the on-off condition when the power is turned Off. If necessary, replace it with the high-pressure switch of the same specification
Low pressure alarm	Refrigerant leakage	Check for leaking point and fix it immediately and then re-charge the system with adequate amount of refrigerant
	Outdoor ambient temperature is too low	Contact Vertiv representative for maintenance support or engineering assistance
	Outdoor unit fan running at full speed upon low outdoor ambient temperature	Check if the outdoor unit cabling is correct; and check whether the condensate pressure sensor works normally

Symptom	Possible Cause	User Needs to Check Particulars or Processing Method
High temperature alarm	High temperature setpoint is unreasonable	Reset the setpoint
	Room load exceeding unit design ability	Check for room sealing or make capacity expansion
Low temperature alarm	Low temperature setpoint is unreasonable	Reset the setpoint
High humidity alarm	High humidity setpoint is unreasonable	Reset the setpoint
	Vapor barrier is not done in the room	Check for the vapor barrier
Low humidity alarm	Setpoint is unreasonable	Reset the setpoint
Remote shutdown	Remote control shutdown	Adjust remote control parameters
Airflow loss alarm	Return air volume is small	Remove the obstruction at the return air outlet of the unit, clean the return air filter, or contact Vertiv representative for maintenance support or engineering assistance
Return air temperature sensor fault alarm	Return air temperature and humidity sensor failure	Replace the return air temperature and humidity sensor
Return air humidity sensor fault alarm		
Airflow loss sensor failure alarm		
Pressure sensor failure	Pressure sensor failure	Check if the condensing pressure sensor cabling is firmly connected or contact Vertiv representative for maintenance support or engineering assistance

Symptom	Possible Cause	User Needs to Check Particulars or Processing Method
Power loss alarm	The unit is in operation and the power is lost and then restored	Check if the power input line is in good condition
Power supply over-voltage alarm	Power supply voltage deviates from set value	Check if the power input line voltage is in good condition
Power supply under-voltage alarm	Power supply voltage deviates from set value	Check if the power input line voltage is in good condition
Power supply frequency offset	Power supply frequency deviates from set value	Check if the power input line frequency is in good condition
Power supply phase loss alarm	Power supply phase loss	Check if the power input line cabling are in good condition
Power supply reverse phase rotation alarm	Power supply reverse phase rotation	Check if the power input line cabling are in good condition
Controller not starting	Check fuse on transformer	Replace fuse with new fuse (3 Amps fast blow)

# Appendix I: Menu Structure





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