FSCURTIS

OPERATING MANUAL

RNHI15-100 SERIES HIGH INLET TEMPERATURE REFRIGERATED AIR DRYERS

15-100 SCFM

IMPORTANT

Make a permanent record of the Model and Serial numbers of your machine here. You will save time and expenses by including this reference identification on replacement parts.

MODEL #: _____ **SERIAL #:** _____

DANGER

Air used for breathing or food processing must meet OSHA 29CFR 1910.134 or FDA 21CFR 178.3570 Regulations. Failure to do so may cause severe injury or death.

FOREWORD

INFORMATION ON THE OPERATING INSTRUCTIONS

These instructions enable you to use the machine safely and efficiently. The instructions are a component part of the machine and must always be accessible to staff.

Staff must have carefully read and understood these instructions before starting all the work. The basic prerequisite for safe working is compliance with all the safety instructions and instruction for actions included in these operating instructions.

The local occupational health and safety regulations and general safety rules for the operational area of the machine also apply.

The instructions for the machine do not cover the operation of the controller. Therefore, the instructions and content of the instructions for the controller in question must also be taken into account.

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LIMITATION OF LIABILITY

All information and instructions in this manual have been compiled taking account of the applicable standards and regulations, state-of-the-art technology and our years of knowledge and experience.

The manufacturer assumes no liability for damage caused by:

- Failure to follow the operating instructions
- Improper use
- Operation by unqualified employees
- Unauthorized modification of the machine
- Technical modifications
- Use of unapproved spare parts

The actual scope of supply may differ from the descriptions and illustrations in these instructions in the case of special designs, the inclusion of additional ordering options or as a result of the latest technical modifications.

The obligations agreed in the contract of supply, the manufacturer's general terms and conditions of business and delivery and the legal regulations valid at the time of completion of the contract apply.

TECHNICAL SERVICE

Our Technical Service department is available to provide technical information.

In addition, our employees are always interested in receiving new information and hearing of your experiences of usage, which could be valuable for the improvement of our products.

SAFETY

It is assumed that your safety department will have established a program of safety based upon a thorough analysis of industrial hazards. Before installing and operating or performing maintenance on the equipment described in this instruction book, it is suggested that you again review this program to be certain that it covers the hazards arising from high-speed rotating machinery.

It is also important that due consideration be given to those hazards which arise from the presence of electrical power, hot oil, high pressure and temperature, steam, toxic gases and flammable liquids and gases. Proper installation and care of protective guards, shutdown devices and over-pressure protection should also be considered essential parts of any safety program.

NOTE

- Unless otherwise specified, the pressure referred to in this manual is gauge pressure.
- When contacting the company regarding maintenance, service and other matters concerning the blower, please indicate the model, pressure rating and serial number, which can be found on the nameplate of the machine and warranty card.

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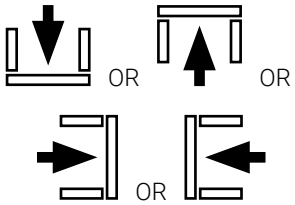
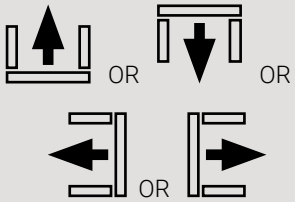
01. INTRODUCTION

This manual is an integral part of the dryer you bought and must remain with the machine even if it is resold.

It is highly recommended that the qualified* personnel for installation maintenance and/or control will fully comply with the contents of this manual and the prevention and safety rules in force in the country where the system will be used. In this way, not only the usage of the machine will be rational, but also the service will be cost effective.

In case your dryer has any kind of problem, please contact your local authorized distributor. Please note that, when necessary, the use of original spare parts will ensure efficiency and a long duration for your dryer.

Due to the continuous technological evolution, manufacturers reserve the right to modify the specifications contained in this manual without giving previous notice.

Symbol	Description	Symbol	Description
	Air Inlet		Pay particular attention to components or systems under pressure.
	Air Outlet		Pay particular attention to hot surfaces.
	Read the Operators manual before attempt to start up the machine and to perform any service operation on the dryer.		Pay particular attention to the risk of electric shock.
	Pay particular attention to the indications preceded by these symbols.		Rotation direction of the fan.
	Installation, maintenance, and/or control operations preceded by these symbols must be performed exclusively by qualified personnel. ***Qualified personnel must be trained and certified in accordance with local laws and regulations.***		Explosion risk.
	Condensate drain point.		Lifting point.
	Pay particular attention to the risk of moving parts.		Don't lift from this point.

WARNING!
Before performing any maintenance operation on this machine, do not forget to disconnect the electric supply, to completely discharge air pressure, and to refer to the Operators Manual.

WARNING!
Risk of electric shock. Disconnect from supply source before servicing.

CAUTION!
Moving parts. Do not operate with panel removed.

WARNING!
Hot parts. Do not operate with panel removed.

CAUTION!
The condenser must be cleaned by blowing out with air.

02. GENERAL INFORMATION

2.1 - FUNCTIONAL DESCRIPTION

Manufacturers refrigerated air dryers remove moisture from compressed air. Moisture is detrimental to pneumatically operated appliances, controls, instruments, machinery and tools.

High temperature compressed air enters the dryer and is cooled down by the internal integrated air/air aftercooler. Then a filter/separator removes solid particles and condensate liquid before entering the aluminum heat exchanger where the air is cooled down to the dew point temperature in two different stages: In the first air/air sector, compressed inlet air is cooled as a result of the colder compressed air exiting counterflow from the condensate separator. In the second refrigerant / air sector, compressed air temperature is further lowered to the dew point temperature. During these two stages almost all the oil and water vapours contained in the compressed air are condensed to liquid and successively separated from the compressed air in the condensate separator and drained out by the automatic drain. At this point the cold air re-enters counterflow the initial air/air exchanger and is reheated by the hot inlet air before exiting the dryer.

This dryer can be easily installed into various pneumatic systems in which dry air is required or desired. Please refer to Start up chapter for complete operating details.

- The dryer comes provided with all the control, safety and adjustment devices; therefore, no auxiliary devices are needed.
- A system overload not exceeding the maximum operative limits can worsen the operational performance of the dryer (high dew point), but it will not affect its safety.
- The electric diagram (attachment B) shows the minimum protection degree IP 42. Improper grounding can result in electrical shock and can cause severe injury or death.
- This product must be connected to a grounded, metallic, permanent wiring system or an equipment-grounding terminal or lead on the product.
- All grounding must be performed by a qualified electrician and comply with national and local electrical codes. In the event of an electrical short circuit, grounding reduces the risk of electric shock by providing an escape wire for the electric current.
- Ground must be established with a bare grounding wire sized according to the voltage and minimum branch circuit requirements.
- Ensure good bare metal contact at all grounding connection points, and ensure all connections are clean and tight.
- Check grounding connections after initial installation and periodically thereafter to ensure good contact and continuity has been maintained.
- Check with a qualified electrician or service technician if the grounding instructions are not completely understood, or if in doubt as to whether the product is properly grounded.

2.2 - USE OF THE MACHINE IN SAFE CONDITIONS

This system has been designed and manufactured in compliance with the UL/ULC, therefore any installation, use and maintenance operations must be performed respecting the instructions contained in this manual.

Because an air dryer is pressurized and contains rotating parts, the same precautions should be observed as with any piece of machinery of this type where carelessness in operation or maintenance could be hazardous to personnel. In addition to obvious safety rules that should be followed with this type of machinery, safety precautions as listed below must be observed.d.

1. Only qualified personnel shall be permitted to adjust, perform maintenance or repair this air dryer
2. Read all instructions completely before operating unit.
3. Pull the main electrical disconnect switch and disconnect any separate control lines, if used, before attempting to work or perform maintenance on the unit.
4. Do not attempt to service any part while machine is in an operational mode.
5. Do not attempt to remove any parts without first relieving the entire air system of pressure.
6. Do not attempt to remove any part of the refrigeration system without removing and containing refrigerants in accordance with the EPA and local regulations.
7. Do not exceed maximum operating pressure as shown on equipment serial number tag.
8. Do not operate the dryer without guards, shields and screen in place.
9. Inspect the unit daily to observe and correct any unsafe operating conditions.
10. If the SUPPLY CORD is damaged, it must be replaced by the manufacturer, its service agent or similarly qualified persons to avoid a hazard.
11. That the appliance shall be installed in accordance with national wiring regulations.

03. INSTALLATION

3.1 - ACCEPTANCE, UNPACKING, AND HANDLING

Upon receiving your air dryer, please inspect the unit closely. If rough handling is detected, please note it on your delivery receipt, especially if the dryer will not be uncrated immediately. Obtaining the delivery person's signed agreement to any noted damage will facilitate any insurance claims by the customer.

It is mandatory to keep the dryer always in vertical position, as indicated by the symbols present on the packaging. For handling, use devices that have sufficient capacity for the weight of the machine.
Remove the packaging after having positioned the dryer in the installation site. Dispose the various packaging materials in compliance with the relevant rules locally in force.

If not in use, the dryer can be stored in its packaging in a dust free and protected site between 32°F (0°C) and 120 °F (50°C), and a specific humidity not exceeding 90 %. Should the stocking time exceed 12 months, please contact your local authorized distributor.

Under no circumstances should any person attempt to lift heavy objects without proper lifting equipment (i.e., crane, hoist, slings or fork trucks). Lifting any unit without proper lifting equipment may cause serious injury. Use forklift channels where provided.

3.2 - INSTALLATION SITE

While preparing a proper site for the installation of the dryer, please consider the following requirements.

- The machine must be protected from atmospheric agents and not directly exposed to sunlight.
- A seating base flat and capable of holding the weight of the machine.
- Ambient temperature complying with the nominal data of the dryer.
- The dryer should be in a clean area, without a forced air draft that can affect the fan control system.
- Make sure to leave sufficient clearance (20 inches, 500 mm) around the dryer to allow adequate cooling of the machine and for maintenance and/or control operations.
- For Installation Only in Locations Not Accessible to the General Public.

The incoming air must be free from smoke or flammable vapors which could lead to explosion or fire risks.

3.3 - INSTALLATION

Before attempting any installation operation, make sure that:

- No parts of the air system are under pressure.
- No parts of the system are electrically powered.
- Tubing to be connected to the dryer are free of impurities.
- The pipes to be connected to the dryer does not weigh on the device.
- All interconnecting piping has been tightened.

After having verified the points listed above, you can proceed to the installation of the machine.

1. Connect the dryer to the compressed air lines. If it is not already existing, we suggest installing a bypass allowing us to isolate the machine from the plant, thus, facilitating eventual maintenance operations.
2. Perform the electrical connection in accordance with any local laws and regulations after reviewing the dryer electrical specifications and wiring diagram.
3. Check the condensate drainage assembly and connect the flexible drain hose to the draining line, keeping in mind that **the condensate separated by the dryer may contain oil, therefore, to dispose of it in compliance with the local rules in force, we suggest installing a water-oil separator having adequate capacity**.
4. Power the dryer after having checked that the nominal voltage and line frequency are constant and match the nominal values of the machine. **The user must provide the installation with adequate line protection and a ground terminal complying with the electrical rules locally in force.**

To optimize the use of the dryer, we suggest placing it in such a way that all the control instruments of the machine will become easily visible.

A suitably sized prefilter must be installed before the dryer. Failure to install and maintain a proper prefilter will void the dryer warranty. The rating for this filter must be at least 10 microns.

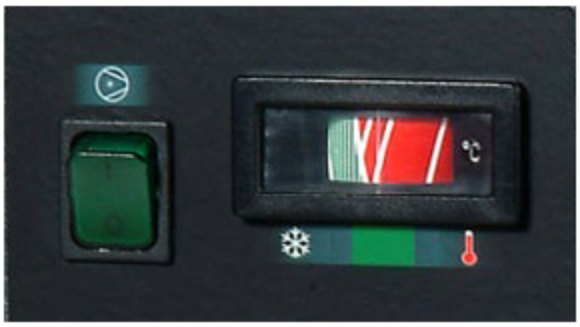
It is necessary for the user to install a protective device (a safety accessory) to protect the equipment under pressure from the risk of exceeding the maximum allowable pressure (PS); it is necessary to install a protective device to protect the equipment at high temperature from the risk of exceeding the maximum allowable temperature.

04. START-UP

4.1 - MODELS RNHI15A TO RNHI35A

4.1.1 - Instrumentation

ON/Off Switch and Dew Point Indicator



ON/OFF Switch
The dryer is equipped with an ON/OFF switch on the front panel. A light signals when the dryer is on.

Dew Point Indicator
All dryers are equipped with a dew point indicator which indicates dryer conditions as follows:

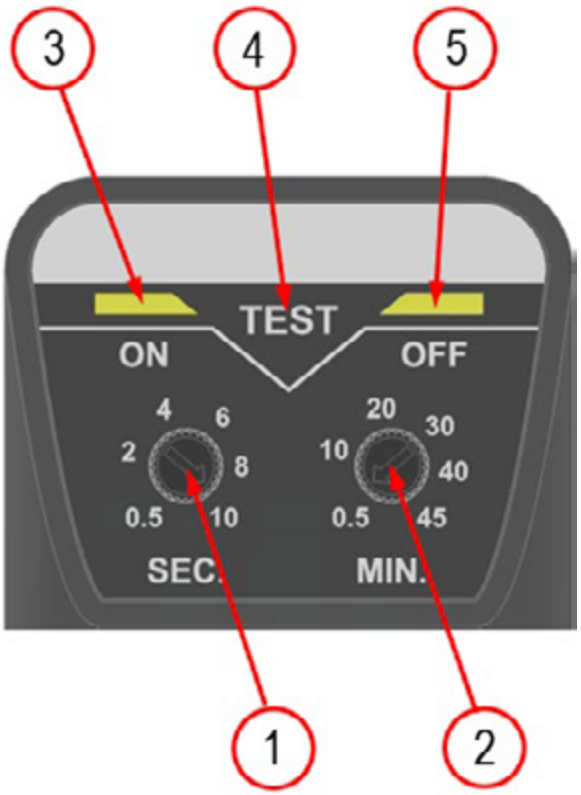
It is normal for the dew point indicator to be in the red zone when the dryer is first turned on and then move to the green zone when the dryer reaches its normal operating temperature. If this indicator is in the red zone during normal operation, turn the dryer off to avoid compressor damage. Refer to the Field Service Guide for additional information or call your local distributor.

Automatic Drain Valve
All models are equipped with an electronic drain valve that automatically discharges condensate from the dryer. Drain valve operation is controlled by a drain valve timer. The timer is mounted directly on the drain valve. The drain opening can be set from 0.5 seconds to 10 seconds. The drain cycle can be set from 0.5 minutes to 45 minutes.

Electronic Drain Valve Adjustment
To minimize air losses, the drain valve control time should be adjusted to open the drain port just long enough to discharge accumulated condensate. Set the drain valve operating time so that only air discharges at the end of the open period. Recommended initial settings are a 1 to 2 second drain opening and 30 seconds drain closed time. If liquid still discharges as the port is closing, set the timer for a shorter cycle or a longer opening.

NOTE
The amount of condensate will vary as ambient conditions and inlet flow rates change.

1. Adjustment knob for the drain valve open time. The values on the dial correspond to the time in seconds that the valve is open in each drain cycle.
2. Adjustment knob for the drain valve closed time. The values on the dial correspond to the time in minutes that the valve is closed in each drain cycle.
3. LED to indicate when the drain valve is open.
4. Drain test button. When the button is pressed, the drain valve opens for the time corresponding to the setting on item 1.
5. LED to indicate when the drain valve is closed.



Drain Timer

4.1.2 - Start-Up / Operation

Follow the procedure below to start your dryer. Failure to follow the prescribed start-up procedure will invalidate the warranty. If problems arise during start-up, call your distributor.

Refer to Serial Number Tag for dryer operating capacity. Do not exceed recommended capacity.

Drain connections must be made before the dryer can be operated. The dryers are fully automatic and require no auxiliary controls.

1. Turn the dryer ON/OFF switch to OFF.
2. Check that the main electrical supply voltage matches the voltage specified on the dryer data plate.
3. Check proper connection and support of compressed air lines to the dryer; check bypass valve system, if installed.
4. SLOWLY pressurize the dryer. The outlet valves of the dryer should be closed to prevent flow through the dryer.
5. Turn on the main electrical power to the dryer.
6. Ensure adequate ventilation.

To Start Dryer:

1. Turn the power switch to ON. The refrigerant compressor will turn on.
2. Allow the dryer to run 15 minutes. Confirm that the temperature indicators are in the green zone.
3. SLOWLY open the dryer outlet valves permitting flow through the dryer.
4. Confirm that condensate is discharging from the drain valve by pressing the "TEST" button.
5. Check drain valve timing. See Electronic Drain Valve Adjustment section for adjustment procedure.
6. Confirm that the inlet air temperature, pressure and airflow to the dryer meet the specified requirements (see Engineering Data section).
7. Confirm that the condensate lines from the drain valve discharge into the customer condensate drainage system or collection tank.

The dryer is designed to run continuously. Let the dryer run even when the demand for compressed air is interrupted; the dryer will not freeze up.

4.2 - MODELS RNHI60A TO RNHI100A

Ensure that the dryer is bypassed, or there is no load on the cooler.

Switch on the main electrical isolation switch (if present). The control panel will show the message OFF, indicating that the line and control voltages are available.

Start Sequence

The dryer will initially start by pressing the local ON/OFF button for 1 second. The start sequence will progress only if there are no active alarms. The compressor motor will start AFTER 120 SECONDS. The fan motor will start 30 seconds after the compressor.

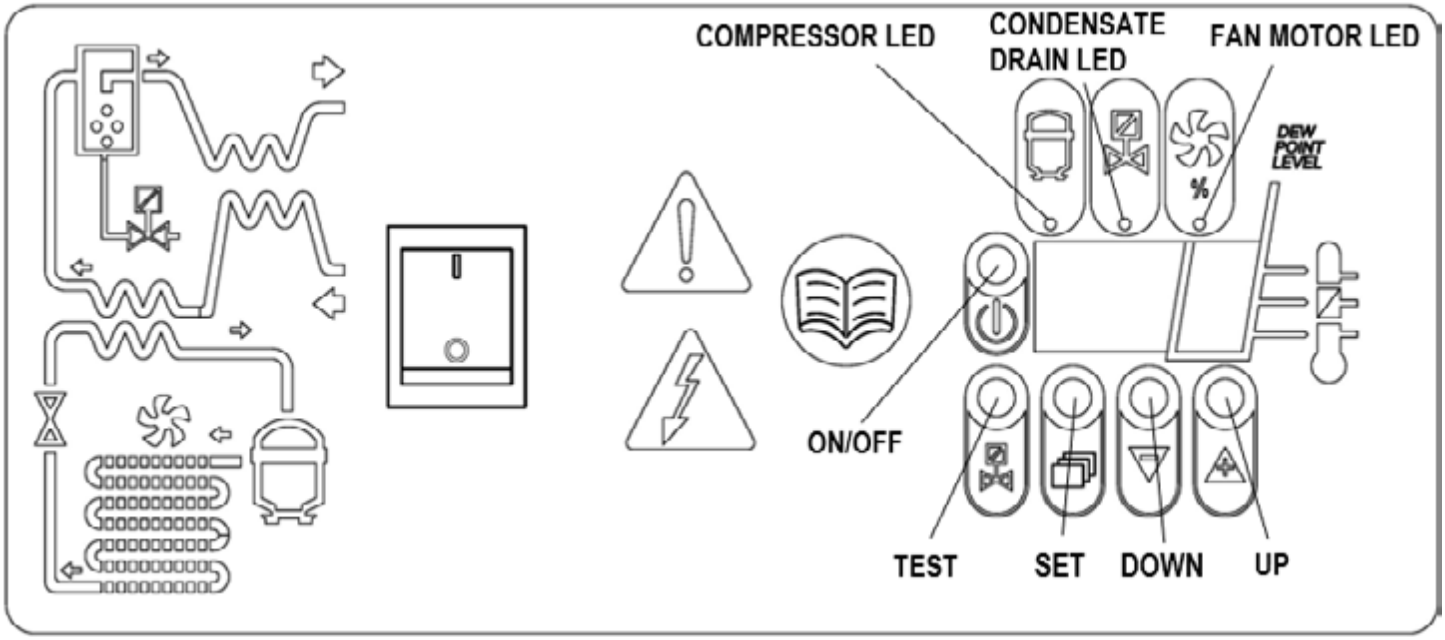
Stop Sequence

The dryer can be stopped locally from the control panel. After having pressed the ON/OFF switch for 1 second, the compressor and the fan motor keep on running for a further 10 seconds to re-balance the internal pressures. The dryer can be also stopped due to an alarm or energy saving condition (ESA or ES2). Any alarm will de−energize the compressor, fan motor can still run, it depends on the type of alarm (see Display indications chapter). If the shutdown is due to an alarm, a message will blink on display indicating the reason for the shutdown. Energy saving condition (ESA or ES2) occurs when the dew point stands below the set value for a long time to save energy and avoid heat exchanger freezing. This situation can happen when ambient temperature is low and there is no compressed air load.

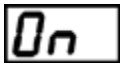
Variable Speed Fan Control
A patented microprocessor allows to adjust dryer's cooling capacity by changing the fan motor speed. If the dew point is greater than the set value, the fan speed is increased, if the dew point is smaller than the set value, the fan velocity is decreased. The range can be from 0 to 100% and the higher the fan speed, the faster the fan LED blinks, you can read the exact value by pressing the UP button. If the velocity is 100% you will read FL (Full Load). Under load standard condition the fan speed is usually at 100%, if there is no load the fan velocity can oscillate between 0 and 20%.

4.2.1 - Control Panel

The dryers are provided with an electronic control system. All adjustments and resets can be performed by means of the digital panel located on the front of the dryer. The control panel is composed of 5 keys (ON/OFF, TEST, SET, DOWN and UP) and a 3-digit display, with three signaling LEDs indicated by icons.



Display Visualization and Signalling LEDs

Display Visualization And Signalling Leds	
Display	Description
	The unit is ON with low load
	The unit is ON with normal load
	The unit is ON with normal-high load
	The unit is ON with high load

LED	Status	Description
	ON	Compressor energized
	Blinking	Programming mode activated
	ON	Condensate drain energized
	ON	Speed of the fan = 100%
	Blinking	Speed of the fan < 100%
	OFF	Fan not running

Keys Function

TEST: When pushed for 3 sec. during normal operation, it activates the condensate drain.

SET: When pushed and released during normal operation, it displays the dew point set value (decimal). When pushed for 10 seconds, it allows you to enter the C8 and C9 condensate drain parameters programming menu (see relevant table). When pushed after having set new configuration values, it stores the applied modifications.

DOWN: When pushed while setting the drain set point, it decreases the displayed value of one unit per second,

during the first 10 seconds, then of one unit every 0,1 sec. When pushed for 10 seconds during normal operation, it starts an automatic test cycle of the controller.

UP: When pushed while setting the drain set point, it increases the displayed value of one unit per second, during the first 10 seconds, then of one unit every 0,1 sec.

ON / OFF: Pushed for 1 second, it activates or deactivates the dryer. When the dryer is deactivated, the display shows OFF.

NOTE
When the controller is in the OFF position, some parts of the dryer may still be energized. Therefore, for safety purposes, disconnect the electrical power before performing any operation on the machine.

4.2.2 - Condensate Discharge Parameters Programming

Push the SET key for 10 seconds to enter the parameters configuration menu: the display will show in sequence the set point value, the code of the first modifiable parameter (C8) and its value).

Only if strictly necessary, use the UP and/or DOWN keys to change the displayed parameter value.

Press the SET key to store the previously changed parameter value or to browse the parameters without changing them.

15 seconds after the last performed operation, the controller will return automatically to the normal operation mode.

Parameter	Description	Range	Default Set Value
C8	Delay between condensate discharges	1 ÷ 999 (min)	1
C9	Time required for condensate discharge	1 ÷ 999 (sec)	3

NOTE
Changes entered for timing values will be effective only after exiting the programming, while changes to other variables will be immediately effective.

Please remember that eventual changes to the configuration parameters of the machine could negatively affect its efficiency. Thus, changes must be made by a person familiar with the operation of the dryer.

WARNING!
It is forbidden to attempt to modify the other configuration parameters of the electronic controller without authorization and collaboration of manufacturer authorized distributor.

4.2.3 - Display Indications

The controller can recognize certain types of anomalies in the drying circuit. In such cases, a message will blink on the display, alternating to the current dew point value.

Message (Blinking)	Cause	Outputs	Actions
HtA	High dew point value (delayed alarm)	Alarm output ON Refrig. Compressor output OFF Fan output ON Drain cycle standard	Resettable by switching off the dryer. If a problem persists, call your local distributor.
Ht2	Very high dew point value (immediate alarm)		
LtA	Low dew point value	Alarm output ON Refrig. Compressor output OFF Fan output OFF Drain cycle standard	Automatic reset when dew point returns to preset range. If a problem persists, call your local distributor.
PF1	Interruption or short circuit on the PTC probe input line	Alarm output ON Refrig. Compressor output OFF Fan output OFF Drain cycle standard	Resettable by switching off the dryer. May require replacing the faulty probe. If a problem persists, call your local distributor.
ESA	The automatic Energy saving mode activated due to low load	Alarm output OFF Refrig. Compressor output OFF Fan output OFF Drain cycle standard	No action necessary. Automatic Reset.
ES2			
ASt	Activated after repeated alarms	Alarm output ON Refrig. Compressor output OFF Fan output ON Drain cycle standard	Call your local distributor.

Note: PF1 has priority on all other messages.

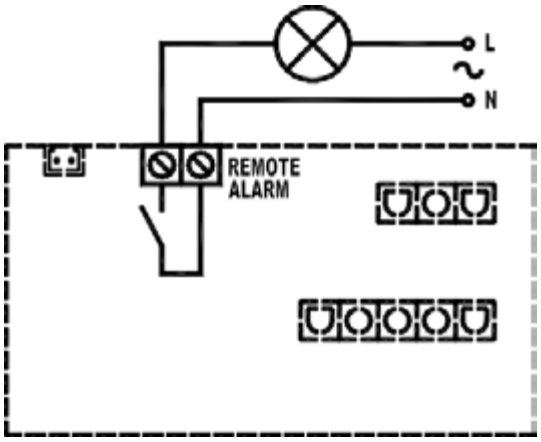
4.2.4 - Remote Signaling Alarm

The dryer control board is equipped with a dry contact for a remote alarm signal. This is normally open contact: when an alarm is detected, this contact is closed.

Proceed as follows to activate a remote alarm output:

1. The User must review the diagram below.
2. Disconnect the dryer from electrical power supply, remove cover and left side panel.
3. Connect the alarm circuit to the terminal blocks (See below).
4. Replace cover, left side panel and reconnect power.

Alarm Output relays electric features:
Max. 250VAC / 3A – AC 15 (Amp. Inductive)



WARNING!
The activation of the above function is at the User's discretion. The User will purchase all necessary installation material. Any operation which needs access to the dryer must be carried out by qualified personnel.

4.3 - BEFORE START-UP

Before starting the machine, make sure that all operating parameters correspond to the nominal data.
The dryer is supplied already tested and preset for normal operation, and it doesn't require any calibration.
Nevertheless, it's necessary to check the operating performance during the first working hours.

4.4 - START-UP

The operations specified below must be performed after the first start up and at each start up after a prolonged inactive period due to maintenance operations, or any other reason.

1. Make sure that all instructions contained in chapters INSTALLATION SITE and INSTALLATION have been observed.
2. Ensure the dryer bypass is open and air inlet/outlet valves closed. (if existing).
3. Activate power supply and press the ON/OFF switch on the control panel for at least 1 second. (note there is a 2-minute delay before the dryer will start after the dryer is turned on).
4. Wait 5 to 10 minutes until the machine has achieved its standard operating parameters.
5. Slowly open the air outlet valve and successively open the air inlet valve.
6. If existent, close the air bypass valve.
7. Check if the condensate drain is working properly.
8. Check if all connecting pipes are properly tightened and fixed.

WARNING!
Before disconnecting the dryer from electrical power supply, use ON/OFF switch to stop the dryer. Otherwise wait 10 minutes before switching the dryer on again, to allow freon pressure to rebalance.

If you repeatedly turn the dryer ON and OFF within a short period of time, a high-pressure trip may occur. In that case, manually press the high-pressure switch and wait 10 minutes before restarting.

05. MAINTENANCE, TROUBLESHOOTING, AND DECOMMISSIONING

5.1 - MODELS RNHI15A TO RNHI35A

5.1.1 - Shut Down

When the dryer must be shutdown for maintenance or other reasons, use the following procedure. If electrical repairs must be made:

1. Turn off the power switch.
2. Disconnect the main power supply.
3. Lock out and tag the power supply in accordance with OSHA requirements.

If mechanical repairs are to be made or service is performed, vent the internal pressure of the dryer to atmospheric pressure. Restart the dryer according to the start-up instructions.

Disconnect power supply and depressurize dryer before servicing. Dismantling or working on any component of the compressed air system under pressure may cause equipment failure and serious personal injury.

5.1.2 - Maintenance

The dryers require little maintenance for satisfactory operation. Good dryer performance can be expected if the following routine maintenance steps are taken.

Dismantling or working on any component of the compressed air system under pressure may cause equipment failure and serious personal injury. Before dismantling any part of the dryer or compressed air system, completely vent the internal pressure to the atmosphere.

NOTE

Before corrective maintenance is done during the warranty period, call your local distributor and proceed according to instructions. Refer to the warranty for limits of your coverage.

WARNING!

This appliance is not intended for use by people (including children) with reduced physical, sensory or mental capabilities, or lack of experience and knowledge, unless they have been given supervision or instruction concerning use of the appliance by a person responsible for their safety. Children should be supervised to ensure that they do not play with the appliance.

Daily Maintenance
Check the operation of the automatic drain valve at least once daily. See the Field Service Guide for remedies to drain valve malfunctions. See the Electronic Drain Valve Adjustment section for drain valve adjustment.

Monthly Maintenance

1. Clean condenser from dust and dirt with dry compressed air at suitable distance.
2. Do not adjust the expansion valve.

Electronic Drain Valve Disassembly and Servicing
Do not disassemble drain valve timer or attempt to repair electrical parts. Replace drain assembly if defective. The drain valve discharges condensate through a full-port drain opening. The valve body may need to be cleaned under conditions of gross particulate contamination.

To disassemble the drain valve body for cleaning and other maintenance:

1. Turn power switch off.
2. Disconnect main power supply to dryer.
3. Depressurize unit.
4. Lock out and tag power supply in accordance with OSHA requirements.

If power supply is not connected and unit is not depressurized before disassembly, serious personal injury and valve damage may result.

5. Removes hoses that connect the drain valve to the drain discharge fitting and remove the valve from the drain valve strainer.
6. Remove screw and washer from front of the drain valve.
7. Remove the power supply connector and gasket (with the timer assembly if attached) from the solenoid coil housing. Do not damage or lose the gasket.
8. Remove coil fixing nut from top of solenoid coil housing.
9. Lift solenoid coil housing off solenoid core in valve body.
10. Unscrew solenoid core from valve body.

Once the drain valve is disassembled, the following maintenance can be performed.

1. Inspect internal parts of valve body; clean or replace as required.

NOTE
Replace drain assembly if component damage is observed.

2. Remove debris from valve body.
3. Wipe solenoid core components with a clean cloth or blow out debris with compressed air from an OSHA-approved air nozzle that limits its discharge pressure to 30 psig.
4. Check that the plunger assembly is clean and moves freely in housing.
5. If timer is attached to valve body, check electrical continuity across timer assembly.

To reassemble the drain valve, reverse the sequence of the preceding steps. After the drain valve is reassembled, connect the main power supply to the dryer.

When the dryer is returned to service, check the drain valve for air or condensate leaks; tighten connections as required to correct leaks. Check the drain cycle; adjust the timer according to the procedure in the drain valve adjustment section.

Returns to Manufacturer
If the dryer or a component of the dryer must be returned to the manufacturer, first call your local distributor for a return authorization number and shipping address. Your distributor will inform you whether the dryer or only a component must be returned. Mark the package with the return authorization number and ship freight prepaid as directed by your local distributor.

5.1.3 - Field Service Guide

Problems most frequently encountered with refrigerated dryers are water downstream of the dryer and excessive pressure drop. Most causes can be identified and remedied by following this guide.

Closed refrigeration systems are potentially dangerous. Work on the refrigeration system must be done only by a competent licensed refrigeration mechanic. Do not release fluorocarbon refrigerants to the atmosphere. Do not discharge liquid refrigerants into floor drains. Refrigerant vapors may accumulate in low places. Inhalation of high concentrations may be fatal. All refrigerants must be recovered per EPA requirements.

Do not smoke when a refrigeration leak is suspected. Burning materials may decompose refrigerants, forming a toxic gas or acids that may cause serious injury and property damage.

Before dismantling any part of the dryer or compressed air system, completely vent the internal pressure to the atmosphere.

Troubleshooting Table			
Problem	**Symptom**	**Possible Cause**	**Remedy**
Water Downstream of Dryer	Refrigerant compressor not running.	Loss of power to dryer.	Check power supply, fuses and/or breakers. Check for loose connections.
		Dryer turned off.	Check On/Off switch position.
		Dryer overloaded.	Confirm that inlet flow, inlet temperature and inlet pressure are within acceptable range of dryer.
		Condenser clogged with debris.	Check/clean ambient air filter and condenser.
		Fan motor inoperative.	Check fan motor operation. Replace if necessary.
		Ambient temperature too high.	Verify ambient temperature throughout day.
		High pressure switch activated.	Press manual reset button.
		Compressor overheated.	Turn dryer off. Contact local distributor.
		Compressor defective.	Turn dryer off. Contact local distributor.
	No condensate discharging from drain line.	Drain strainer clogged.	Clean drain strainer.
		Drain valve inoperative.	Check/replace drain valve assembly.
		Drain timer inoperative.	Confirm there is power to the timer. Replace drain valve assembly, if necessary.
		Drain solenoid inoperative.	Confirm there is power to the coil. Replace drain valve assembly, if necessary.
	Condensate not fully discharging from dryer.	Incorrect drain timer setting.	Adjust drain timer - increase open time and/or decrease closed time.
	Liquid water entering dryer.	Aftercooler drain valve malfunction.	Check, repair aftercooler drain valve.
Excessive Pressure Drop Across Dryer	Frozen condensate in evaporator.	Do not adjust the expansion valve.	Contact local distributor.
	Inlet air pressure low.	Upstream restriction in air system.	Check all upstream air system components (valves, regulators, etc.)
	Dryer undersized.	Excessive compressed air flow.	Resize dryer.

Dew Point Indicator Out of Green Zone	Dew point indicator out of green zone.	Dryer overloaded.	Confirm that inlet flow, inlet temperature and inlet pressure are within acceptable range of dryer.
		Condenser clogged with debris.	Check/clean ambient air filter and condenser.
		Loose sensor connection.	Confirm gauge or temperature sensor is tightly connected to dryer tubing.
		Defective temperature sensor.	Replace temperature sensor.

5.2 - MODELS RNHI60A TO RNHI100A

5.2.1 - Maintenance

CAUTION!
Perform pressure test with inert gases only (helium, nitrogen).

Before attempting any maintenance operation, make sure that:

1. No parts of the system are under pressure.
2. No parts of the system are electrically powered.

Weekly or Every 40 Hours of Operation

- Verifying the temperature on the control panel display is acceptable.
- Visually check if the condensate is drained regularly.

Monthly or Every 200 Hours of Operation

- Clean the condenser with compressed air, taking care not to damage the condenser fins.
- At the end of the above-mentioned operations, check if the dryer is working properly.
- Check the condition of any filters installed with the dryer. Replace elements as needed.

Yearly or Every 2000 Hours of Operation

- Check if the flexible tube used for condensate drainage is damaged and replace it if necessary.
- Check if all connecting pipes are properly tightened and fixed.
- At the end of the above-mentioned operations, check if the dryer is working properly.

IMPORTANT!
This appliance is not intended for use by people (including children) with reduced physical, sensory or mental capabilities, or lack of experience and knowledge, unless they have been given supervision or instruction concerning use of the appliance by a person responsible for their safety. Children should be supervised to ensure that they do not play with the appliance.

5.2.2 - Troubleshooting

NOTE
Following behaviors are normal characteristic of operation and not troubles.

- Variable speed of the fan.
- Display of message ESA and ES2 in case of operation without load or low load.
- A 2-minute delay for dryer to start after pressing the on/off switch.

WARNING!
Troubleshooting and eventual control and/or maintenance operations must be performed by qualified personnel. For maintaining the refrigerating circuit of the machine, contact a refrigeration engineer.

Troubleshooting Table

Issue: Water in the System

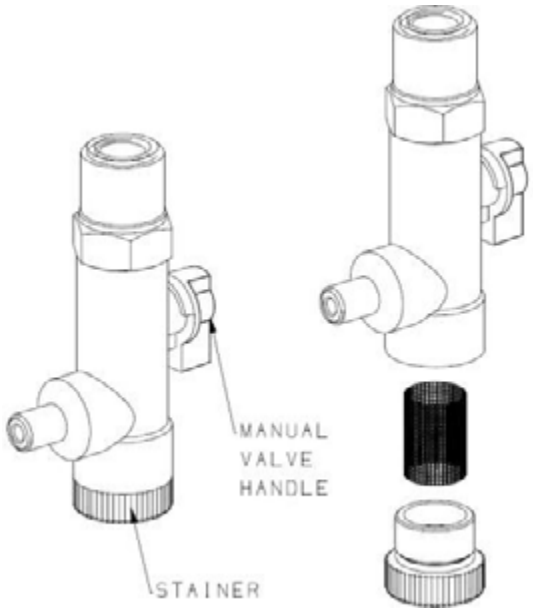
Display	Possible Cause	Remedy
Control panel display is blank	No power in the line.	Restore the power in the line.
	Problems with cabling.	Check cabling: if the trouble persists, replace it.
	Problems with the electronic control board.	Check the electronic control board; if the trouble persists, replace it.
OFF	The dryer is off.	Turn it on by pressing the ON/OFF switch for 1 second.
	Dryer in stand-by.	Wait 2 minutes after the dryer is switched on.
	Compressed air inlet/outlet inverted.	Check if the compressed air inlet/outlet is connected properly.
	The flow rate and/or temperature of the air entering the dryer is higher than the nominal values.	Restore the nominal conditions.
	The ambient temperature is higher than the nominal values.	Restore the nominal conditions.
	The condenser is dirty.	Clean the condenser.
On:	Condensate drain is not functioning.	Clean the condensate drainage system pre-filter. (see image below)
		Replace the coil of the drainage solenoid valve if burned.
		Clean or replace the drainage solenoid valve if clogged/ jammed.
		Check the C8 and C9 parameters of the electronic control board; if the trouble persists, replace it.
	The temperature control probe is positioned improperly or faulty.	Check the probe; if the trouble persists, replace it.

	Problems with cabling or with the electronic control board.	Check the cabling and the electronic control board, if the trouble persists, replace them.
	Activation of compressor's internal thermal protection.	Wait one hour and check again. If the fault persists, stop the dryer and call your local distributor.
	Problems with the electrical of the compressor.	Check the electrical components of the compressor.
	Defective compressor.	Replace the compressor.
	The flow rate and/or temperature of the air entering the dryer is higher than the nominal values.	Restore the nominal conditions.
	The ambient temperature is higher than the nominal values.	Restore the nominal conditions.
HtA	The condenser is dirty.	Clean the condenser.
Ht2	The temperature control probe is positioned improperly or faulty.	Check the probe; if the trouble persists, replace it.
	Fan pressure switches defective or out (if present).	Turn off the dryer and call your local distributor.
	High pressure switches defective or out (if present).	Turn off the dryer and call your local distributor.
	Gas leakage in the refrigerating circuit.	Turn off the dryer and call your local distributor.
	Defective fan.	Replace the fan.
	Protection fuse burned out (if present).	Replace the fuse.
	Improper adjustment of the expansion valve.	Remove the cap from the expansion valve and slowly turn the screw clockwise until the On_ inscription appears on the PCB board
	Expansion valve failure.	Replace the Expansion valve.
LtA	The temperature control probe is positioned improperly or faulty.	Check the probe; if the trouble persists, replace it.
ESA ES2	Gas leakage in the refrigerating circuit without load.	Turn off the dryer and call your local distributor.
PF1	The temperature control probe is positioned improperly or faulty.	Check the probe; if the trouble persists, replace it.
ASt	Series of alarms very close to each other.	Call your local distributor.

Issue: Low Pressure in the Line		
Display	**Possible Cause**	**Remedy**
E5A	Ice formation in the evaporator.	Check the probe; if the trouble persists, replace it.
E52		Check the electronic control board; if the trouble persists, replace it.
On		Contact our Service Center to check the gas charge.
On_	Clog.	Check if the compressed air inlet/outlet is connected properly.
		Check if the connecting tubing is clogged; in case proceed accordingly.
		Check if any valves are closed.
		Check the condition of any filter.
On_	Air flows continuously through the condensate drainage.	Drainage solenoid valve jammed, clean or replace it.
		Verify the condensate drainage times set on the electronic control board (C8 and C9).
		Check the signal from the control board: if it is continuous, replace the control board.

IMPORTANT!
The temperature control probe is extremely delicate. Do not remove the probe from its position. In case of any kind of problem, please contact your local distributor.

Shut off the pressure using the manual valve handle and clean the strainer periodically



5.3 - DECOMMISSIONING

All work on the dryer may only be carried out by specialist personnel! Follow this procedure if you need to shut down the dryer:

- • Stop the device and permanently isolate it from the electricity mains;
- • Disconnect the power cable;
- • Take pressure off the air circuit;
- • Empty the tank and the internal cooling medium circuits;
- • If the device has to be dispatched, use the original or similar packaging and keep the device in an upright position.

Before carrying out any work on the electrical parts, make sure that the main switch interrupts the electricity supply to the dryer and then affix appropriate warning signs to avoid the machine being reconnected to the electricity mains.

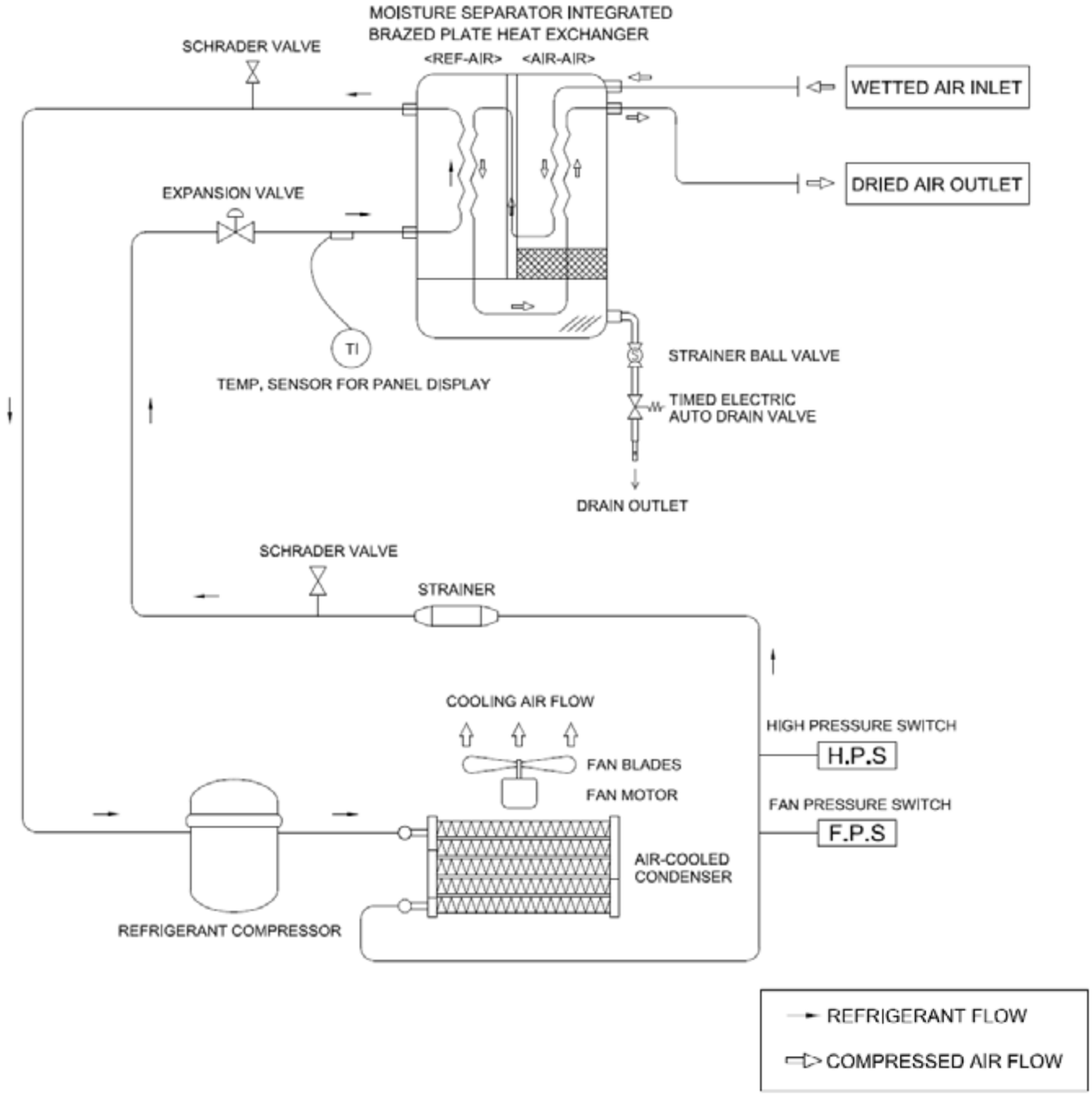
Please consult the contents and the safety instructions in the relevant sections of these instructions for details of the correct handling and storage of the chiller. Remove any residual cooling medium from the dryer in a manner appropriate to its properties and in accordance with the legislation in force.

If the device has to be demolished: Never open the sealed cooling assembly (compressor, evaporator and condenser) if there may be any refrigerant or lubricating oil present.

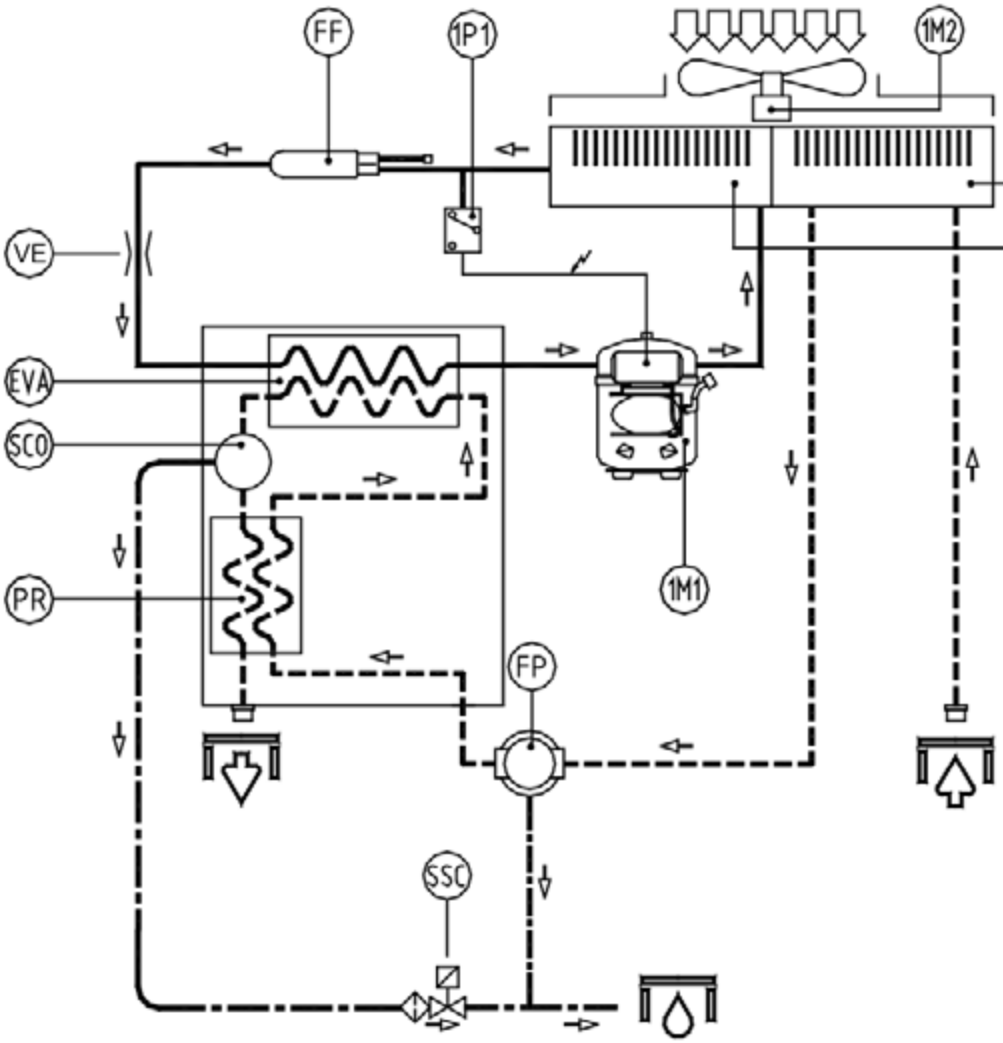
Send the chiller to an approved waste disposal company in accordance with current environmental protection legislation. The other materials/waste constituents must be treated in line with the provisions of the valid legislation.

06. REFRIGERANT CIRCUIT

Models RNHI15A to RNHI35A (115V/1Ph/60Hz)



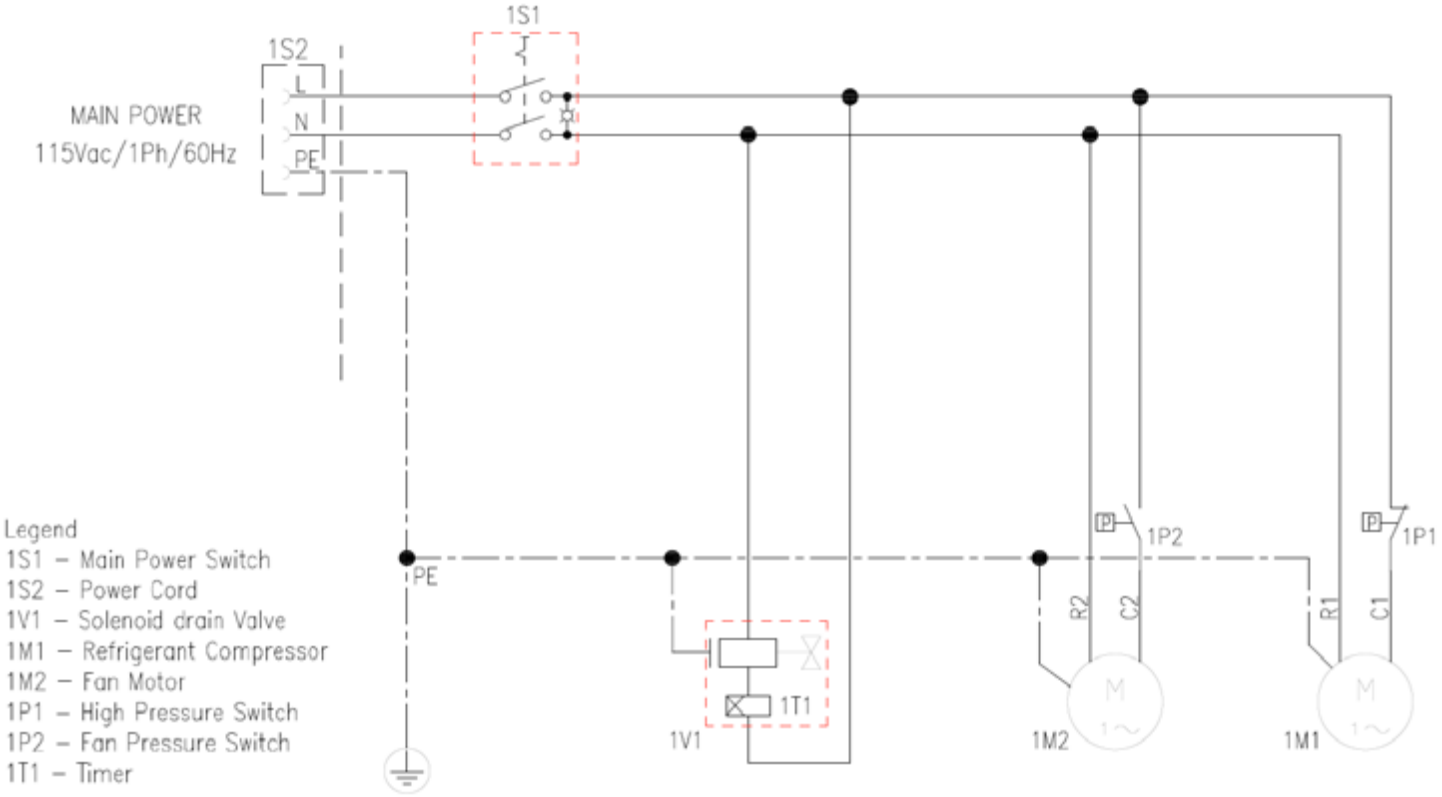
Models RNHI60A to RNHI100A (115V/1Ph/60Hz)



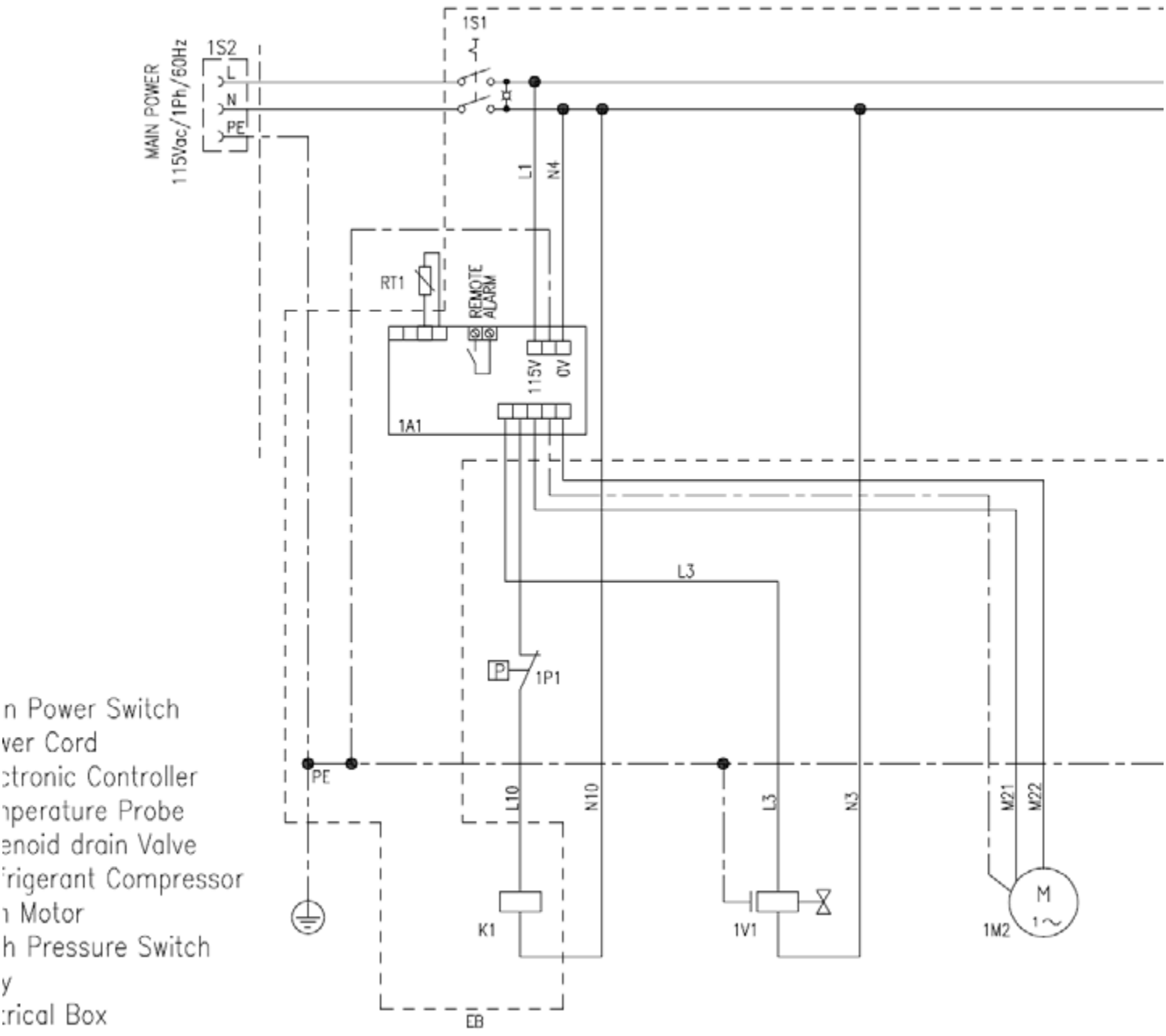
Icon	Description
	Condensate drain
	Air inlet
	Air outlet
	Refrigerant line
	Compressed air line
	Condensate drain line
	Equalization line

07. WIRING DIAGRAM

Models RNHI15A to RNHI35A (115V/1Ph/60Hz)



Models RNHI15A to RNHI35A (115V/1Ph/60Hz)



n Power Switch
ver Cord
ctronic Controller
nperature Probe
enoid drain Valve
rigerant Compressor
n Motor
h Pressure Switch
y
trical Box

08. DATA SHEET

	Unit	RNHI15A	RNHI25A	RNHI35A	RNHI60A	RNHI80A	RNHI100A
Air Flow Rate*	CFM	15	25	35	60	80	100
	M^3/h	25	42	60	102	136	170
Power Supply	V/Ph/Hz	115/1/60	115/1/60	115/1/60	115/1/60	115/1/60	115/1/60
Compressor	HP	1/3	1/3	1/3+	1/3	1/3+	1/2
	kW	0.47	0.47	0.61	0.47	0.61	0.90
	RLA	5.3	5.3	6.8	5.3	6.8	9.4
	LRA	35	35	43	35	43	50
Fan	QTY	1	1	1	1	1	1
	HP	1/10	1/10	1/10	1/5	1/5	1/4
	RLA	0.7	0.7	0.7	1.26	1.26	1.97
Total A	A	5.5	5.7	6.9	6.3	7.9	11.5
Connection	NPT	3/4"	3/4"	3/4"	3/4"	3/4"	1"
Rated Air Temperature	°F (°C)	150 (66)	150 (66)	150 (66)	150 (66)	150 (66)	150 (66)
Air Temperature Max	°F (°C)	200 (94)	200 (94)	200 (94)	200 (94)	200 (94)	200 (94)
Rated Ambient Temperature	°F (°C)	95 (35)	95 (35)	95 (35)	95 (35)	95 (35)	95 (35)
Ambient Temperature Min-Max	°F (°C)	36-122 (2-50)	36-122 (2-50)	36-122 (2-50)	36-122 (2-50)	36-122 (2-50)	36-122 (2-50)
Air Pressure	psi (bar)	100 (7)	100 (7)	100 (7)	100 (7)	100 (7)	100 (7)
Air Pressure Max	psi (bar)	203 (14)	203 (14)	203 (14)	203 (14)	203 (14)	203 (14)
Dew Point*	°F	< 50 (ISO CLASS 6)					
	°C	< 10 (ISO CLASS 6)					
Ref. Refrigerant	type	R513a	R513a	R513a	R513a	R513a	R513a
	lb	0.40	0.51	0.62	0.64	0.75	0.79
	oz	6.35	8.11	9.88	10.2	12.0	12.7
	kg	0.18	0.23	0.28	0.29	0.34	0.36
Weight	lb (kg)	103 (46.7)	103 (46.7)	110 (49.9)	139 (63.0)	141 (64.0)	150 (68.0)
HP Switch Setting	psig (bar)	299 (20.6)	299 (20.6)	299 (20.6)	299 (20.6)	299 (20.6)	299 (20.6)

**Rating conditions: 38°C (100°F) and 100 psig Air Inlet, 38°C (100°F) Ambient Performance and specifications: + / - 5%*

09. LEGEND

Pos.	Description	Pos.	Description
AR	Air flow rate	AMB T MIN- MAX	Min-Max. ambient temperature
POW SUPPLY	Power supply	AIR W PRESS	Air working pressure
HP	Nominal power	AIR PRESS MAX	Max. air pressure
kW	Nominal consumption	DEWP	Pressure dew point
Max kW	Full load consumption	REF	Refrigerant
RLA	Nominal current	MAX FUSE	Max fuse size
FLA	Full load current	MIN CIRCUIT AMPACITY	Minimum circuit ampacity
LRA	Locked rotor current	W	Weight
TOTAL A	Total current	EVAP. TEMP	Evaporation temperature
CONNECTION	Air connections	SUCTION TEMP	Suction temperature
AIR T	Air inlet temperature	DISCH. PRESS.	Discharge pressure
AIR T MAX	Max. air inlet temperature	HP SWITCH SETTING	High pressure switch setting
AMB T	Ambient temperature		

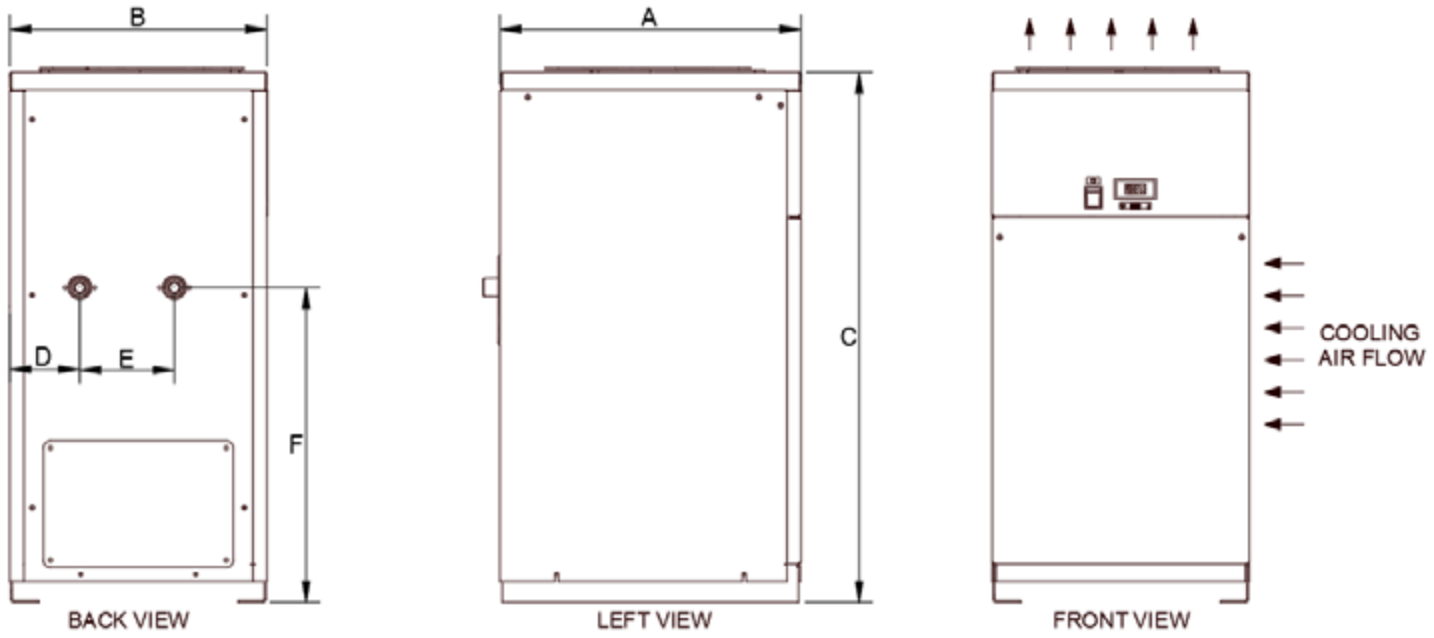
10. CORRECTION FACTORS

	Unit										
Correction factor for working pressure	PSI	73	87	102	116	131	145	160	174	188.5	203
	Bar	5	6	7	8	9	10	11	12	13	14
	FC1	0.85	0.93	1	1.06	1.11	1.15	1.18	1.2	1.22	1.24
Correction Factor for Inlet Air Temperature	°F	120	140	150	160	170	180	200			
	°C	49	60	66	71	76.5	82	93.3			
	FC3	1.25	1.1	1	0.93	0.83	0.75	0.5			
Correction Factor for Ambient Temperature	°F	80	90	95	105	110	120				
	°C	26.5	32	35	40.5	43.5	49				
	FC2	1.22	1.07	1	0.75	0.6	0.47				

**Calculation of the dryer REAL FLOW RATE = nominal dryer flow rate x FC1 x FC2 x FC3*
***Calculation of the GIVEN FLOW RATE to select a suitable dryer = given flow rate ÷ FC1 ÷ FC2 ÷FC3*

11. DRYER DIMENSIONS

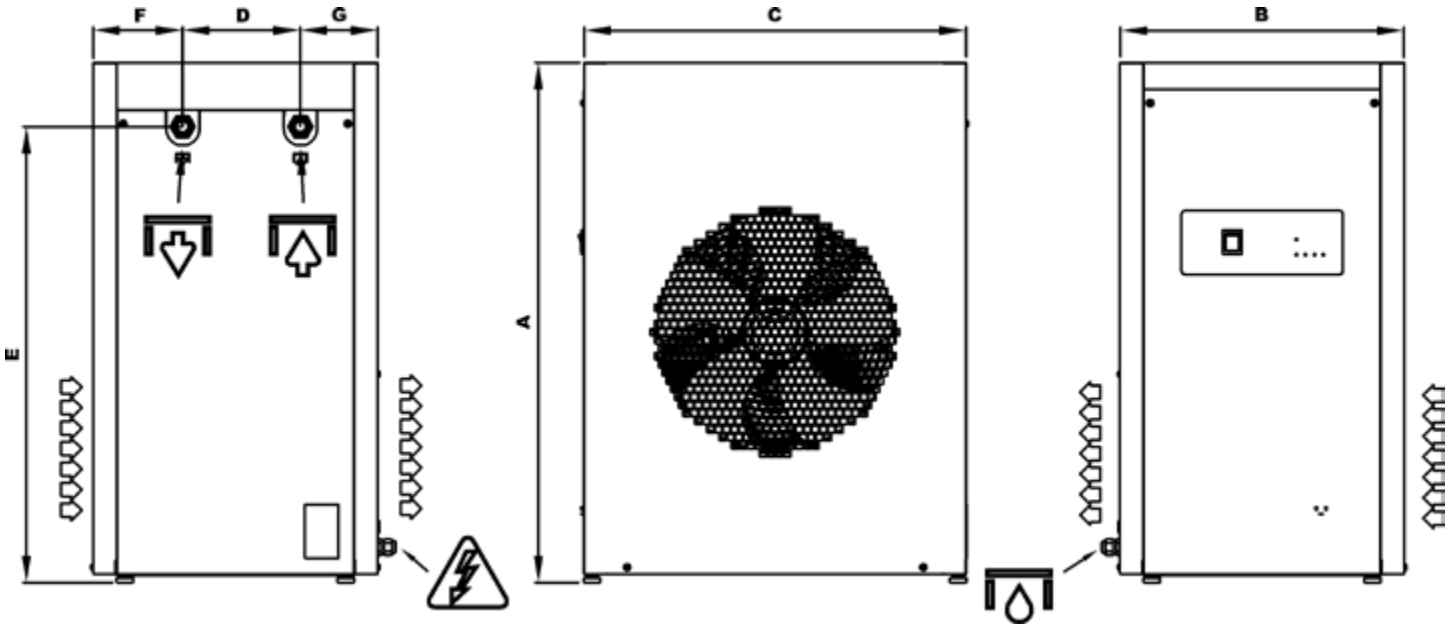
Models RNHI15A to RNHI35A (115V/1Ph/60Hz)



Model	Unit	A	B	C	D	E	F
RNHI15A to RNHI35A	mm	430	370	755	100	135	449
	inches	16.9	14.6	29.7	3.9	5.3	7.7

Inlet	Outlet	Drain	Power
3/4" NPT	3/4" NPT(M)	1/8" NPT(F)	115/1/60 V/ph/Hz

Models RNHI60A to RNHI100A (115V/1Ph/60Hz)



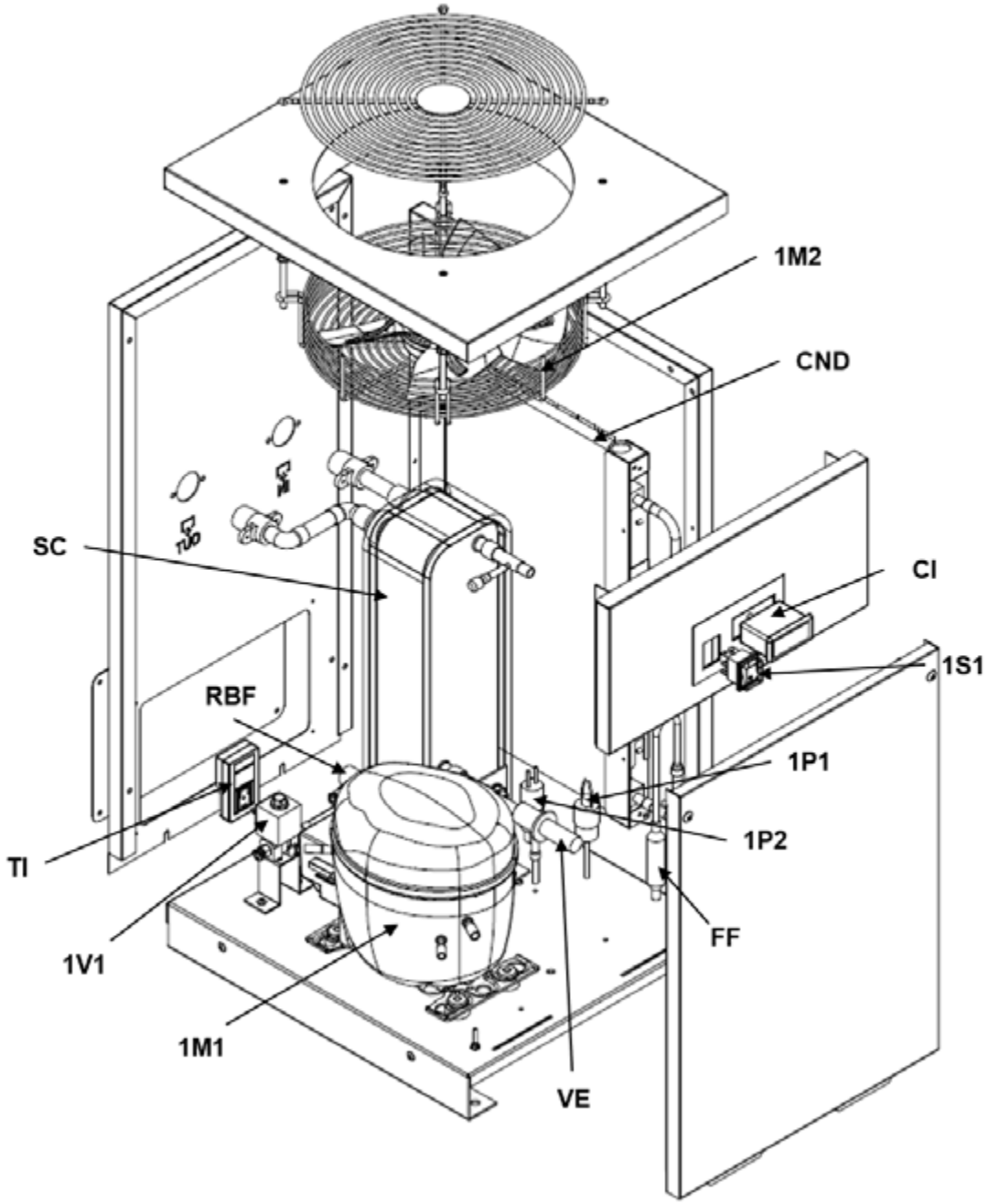
Model	Unit	A	B	C	D	E	F	F
RNHI60A to RNHI80A	mm	430	370	755	100	135	449	449
	inches	16.9	14.6	29.7	3.9	5.3	7.7	7.7
RNHI100A	mm	761	421	568	175	667	132	114
	inches	30.0	16.6	22.4	6.9	26.3	5.2	4.5

Inlet	Outlet	Drain	Power
3/4" NPT(F)	3/4" NPT(F)	1/8" NPT(F)	115/1/60 V/ph/Hz
1" NPT(F)	1" NPT(F)	1/8" NPT(F)	115/1/60 V/ph/Hz

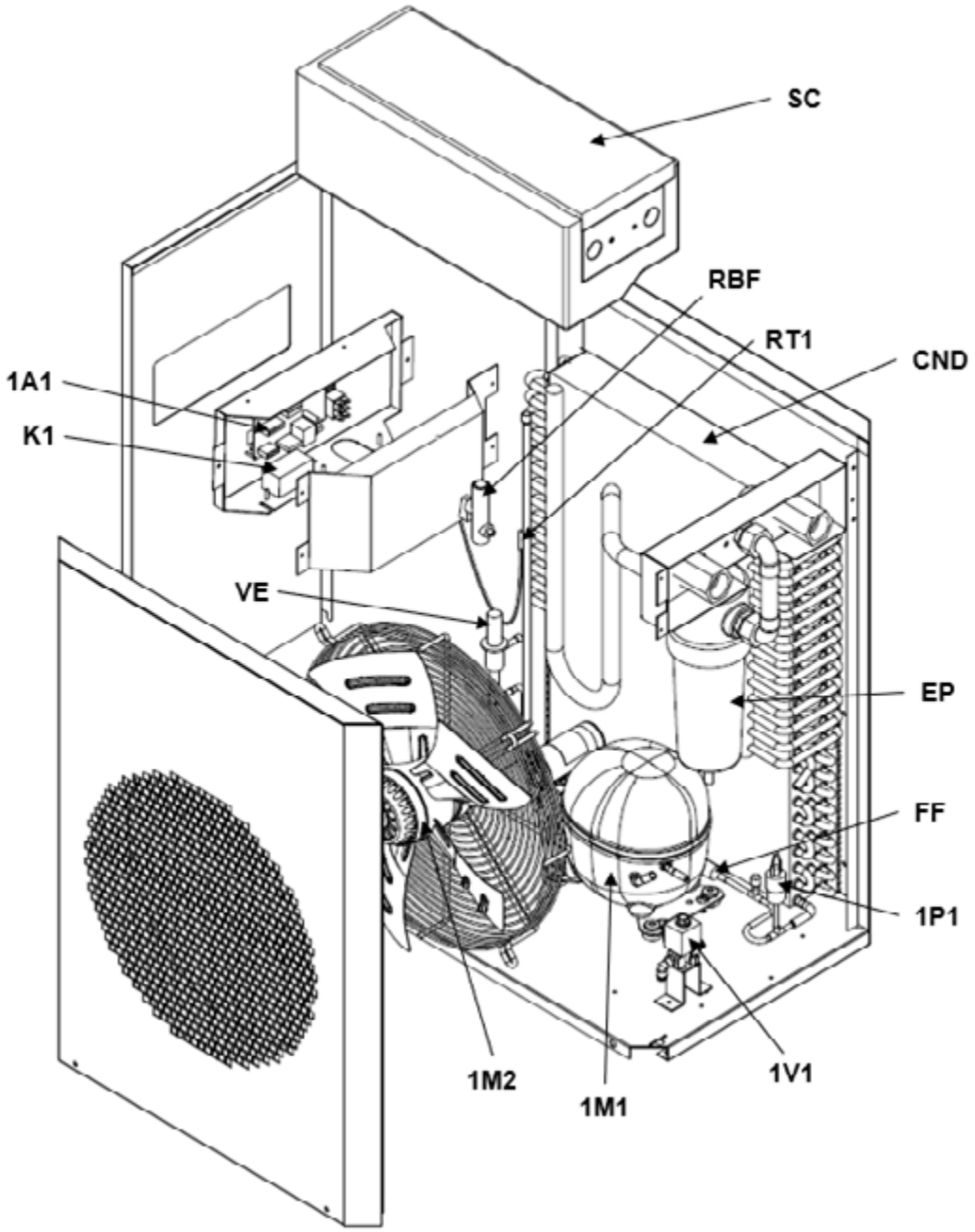
12. BASIC SPARE PARTS

Pos	Element	RNHI15A	RNHI25A	RNHI35A	RNHI60A	RNHI80A	RNHI100A
1A1	Electronic Controller	-	-	-	47919695001	47919695001	47919695001
RT1	Temperature Probe	-	-	-	47908306001	47908306001	47908306001
CI	Color Indicator	7426023	7426023	7426023	-	-	-
1M1	Refrigerant Compressor	47919689001	47919689001	47919692001	47919689001	47919692001	47919699001
1M2	Fan Motor Assembly	47919690001	47919690001	47919690001	47919693001	47919693001	47919700001
CND	Condenser	7483424	7483424	7483424	47919721001	47919721001	47919721001
VE	Expansion Valve	7483425	7483425	7483425	7483425	7483425	7483425
FF	Strainer	7483436	7483436	7483436	7483436	7483436	7483436
SC	Heat Exchanger Assembly	7483426	7483426	47919725001	47919694001	47919698001	47919698001
1P1	High Pressure Switch	47908302001	47908302001	47908302001	47908302001	47908302001	47908302001
1P2	Fan Pressure Switch	47919715001	47919715001	47919715001	-	-	-
EP	Filter Element	-	-	-	47928159001	47928159001	47928159001
1V1	Complete Solenoid Drain Valve	47908303001	47908303001	47908303001	47908303001	47908303001	47908303001
RBF	Strainer Ball Valve	47908304001	47908304001	47908304001	47908304001	47908304001	47908304001
TI	Timer	47919716001	47919716001	47919716001	-	-	-
1S1	Main Power Switch (Green)	3245021	3245021	3245021	3245021	3245021	3245021
	Main Power Switch (Red)	47919696001	47919696001	47919696001	47919696001	47919696001	47919696001
K1	Contactor Switch	-	-	-	47919697001	47919697001	47919697001

Models RNHI15A to RNHI35A (115V/1Ph/60Hz)



Models RNHI60A to RNHI100A (115V/1Ph/60Hz)



13. MAINTENANCE KITS

Kit Components	RNHI15A	RNHI25A	RNHI35A	RNHI60A	RNHI80A	RNHI100A
Drain Valve	F47908303001	F47908303001	F47908303001	F47908303001	F47908303001	F47908303001
Filter Element	-	-	-	F47928159001	F47928159001	F47928159001
Drain Valve Filter Element	-	-	-	RNHIMK4	RNHIMK4	RNHIMK4

NOTES

NOTES

CONTINUED COMMITMENT

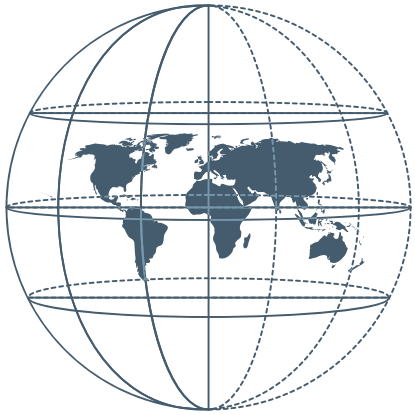
A company history that dates 170 years is a company history that, to us, is just the beginning. FS-Curtis is committed to offering a world-class portfolio of products. Through the dependability of our people and our quality-focused manufacturing, FS-Curtis will continue to be the most trusted and dependable name in compressed air serving even more markets through our ever-growing global presence.

You can count on **FS-Curtis** to approach the next 170 years by staying true to the values and strengths that are appreciated by our customers today.

A WORLD OF DIFFERENCE

The FS-Curtis headquarters in St. Louis, Missouri, U.S.A. is the anchor of a larger global network. FS-Curtis builds quality products — and a quality reputation — at locations around the world.

In addition to our manufacturing and packaging locations, a large global network of sales agents and distributors ensures that sales and service support is available around the world, day in and day out.



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bsi ISO 9001 Quality Management Systems CERTIFIED

CAGI Compressed Air & Gas Institute PERFORMANCE VERIFICATION PROGRAM

COMPRESSED AIR CHALLENGE SPONSOR

CORPLITERATURE: RNHI15A-100A Operating Manual 20260219-REVA
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