ORION

Operating Manual

Precision Air Processor

ORION Precision Air Processor

PAP03C-KJ

CAUTION

- This product is for Industrial Use only. Please take all necessary precautions during installation and handling.
- Read this Operating Manual thoroughly before operating this product.
- Be sure to retain the Operating Manual for future reference.

The product warranty is printed at the end of this manual.
Be sure to keep it in a safe place.

This Operating Manual is divided into the following 2 main sections:

03113668010

Thank you for purchasing this ORION Product.

Thank you for your purchase of this ORION product. To ensure proper and safer operation of this product, be sure to carefully read and follow the directions in this Operating Manual.

Safety Precautions

Before using the product, be sure to read the section, "Important Safety Guidelines" and operate the product according to those guidelines. The purpose of this safety information is to help insure proper installation and operation of the product in order to avoid personal injury to you or others, and also to avoid property damage.

Important safety precautions are classified into two categories, ⚠ **WARNINGS** and ⚠ **CAUTIONS**.

⚠ **WARNINGS** — **Failure to follow instructions contained in these WARNINGS may result in death or serious injury.**

⚠ **CAUTIONS** — **Failure to follow instructions contained in a CAUTION may result in personal injury or damage to property.**

Please note that items noted in ⚠ CAUTIONS can result in very serious consequences depending on the particular situation. Both CAUTIONS and WARNINGS must be heeded to ensure adequate safety.

- After reading this Operation Manual, be sure to keep it in a place where anyone who needs to refer to it may find it easily.
- When either transferring or loaning out this product, keep the Operation Manual affixed to it in a clearly visible place so that the new user can refer to it to ensure safe and proper operation.

■Warning Symbols

	△ symbols indicate a WARNING or CAUTION to observe. The illustration within, or indications near the triangle shows the nature of the precaution and the action to be avoided. (For example, the symbol at the left indicates possible danger from hands being drawn into rotating fan blades.)
	⃠ symbols indicate prohibited actions. The illustration within the circle shows the nature of the action which is prohibited. (The example to the left indicates that user disassembly is prohibited.)
	● symbols indicate actions which must be taken. The illustration within the black circle indicates the necessary action. (The example to the left indicates that the product must be properly grounded.)
IMPORTANT	[redacted] symbols indicate important points other than cautions or warnings.

Operating Instructions

Table of Contents

Always Follow These Safety Guidelines

Operating Guidelines

⚠ WARNINGS

Failure to follow instructions contained in a WARNING may result in death or serious injury.

	**Do not modify this product.** Improper modifications to wiring or piping within the product can lead to electric shock or fire. Modifying the product will void the product warranty.
	**All disassembly or repairs must be performed by your dealer or other qualified persons.** Improper disassembly or repair work can lead to abnormal operation, which in turn may lead to personal injury, electric shock, or fire. **Do not operate switches or buttons with wet or damp hands.** Also, do not touch electrical components. Failure to follow this warning can lead to electric shock.
	**Do not operate with the cabinet open.** Touching components inside the product may lead to injury or electric shock. **Do not use water directly on the product or in the product component area.** Do not wash the product with water. Failure to follow this warning may lead to electric shock or fire. **Do not damage or modify the power cord.** Placing heavy objects on the cord, exposing it to heat, pulling, or pinching it can result in damage to the cord and possible lead to electric shock or fire. **When moving the product, please consult with your dealer or other qualified professional.** Improper handling during installation can lead to fluid leakage, electrical shock, or fire.
	**Remove the power source before performing cleaning, maintenance, or inspections.** Failure to do so can lead to electric shock, injury, or burns. **If abnormal operation is observed, stop operation of the product and consult with your dealer or a qualified repair person.** Continued operation when the product is performing abnormally can lead to electric shock or fire. **If the earth leakage breaker is tripping, please consult with your dealer or a qualified repair person.** Operation by continued power recovery can lead to electric shock or fire.
	**Never use this product in the testing of explosive or combustible materials.** Also, do not use in tests involving "carbide in gaseous suspension", "biological targets", or tests involving pressure. Failure to follow this warning can lead to explosion or fire.

Always Follow These Safety Guidelines

Operating Guidelines

⚠ CAUTIONS

Failure to follow instructions contained in a CAUTION may result in personal injury or damage to property.

Only use with designated fluids.
Use conditioned water (with an electrical conductivity of 0.1 to 10μS/cm) for humidification water. Operation with water outside the designated range can lead to product breakdown, water leakage, electrical shock, electrical shorts, or fire.

Regularly maintain the humidifier.
The water in the humidifier must be changed on a regular basis and maintenance of inside of the humidifier is also required. If such maintenance is not carried out, foreign matter inside the humidification supply water will cause scaling to form inside the humidification unit, corrosion to form inside the humidifier and heater, and could result in water leaks, electric shock, or fire.

Do not climb on nor place things on the product.
Doing so can lead to injuries from the product tipping over or may cause water leakage resulting in an electric short.

Do not use combustible sprays near the product.
Also, do not place combustible items near the product. A spark from a switch or other operations could ignite combustibles, causing a fire.

Do not use fuses over the rated amperage.
Using metal objects instead of fuses can lead to product breakdown or fire.

Do not touch internal components during operation or just after the power has been cut off.
Areas around the compressor will be very hot and could cause burns.

When cleaning the heat exchanger do not touch the fins directly with hands.
Doing so can lead to injury.

Do not stick fingers or objects into the air intake or outlet vents.
An internal fan is running at high speed and contacting it could lead to injury.

Regularly test the earth leakage breaker to confirm it is working properly.
Operating with a faulty earth leakage breaker can result in an electric shock if the breaker fails to activate during electrical trouble.

When transferring this product, be sure to also include this operating manual.
When either transferring or loaning out this product, keep the operation manual affixed to it in a clearly visible place so that the new owner can refer to it to ensure safe and proper operation.

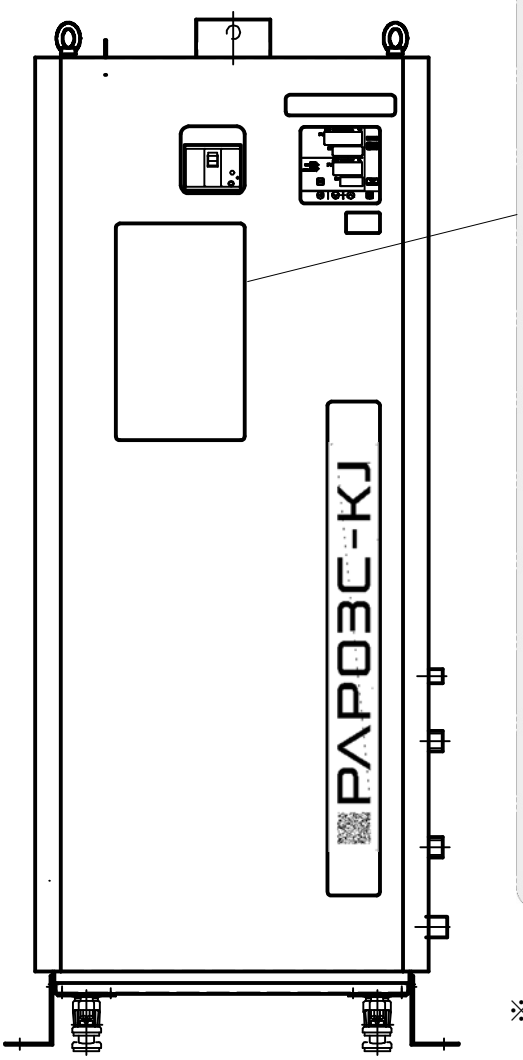
Contact your dealer for installation of items purchased separately.
Failure to follow this warning can lead to injury or electric shock.

Always Follow These Safety Guidelines

Product Warning Label Locations

⚠ Product Warning Label Locations

The following warning labels are particularly important warnings which are attached to the Air Processor. Be sure to carefully read the label before operating the product. If any labels become so dirty or damaged that they are not clearly readable, please see your dealer about obtaining new ones.



⚠ご使用前に必ず取扱説明書をお読みください。 プレシジョンエアープロセッサ(PAP mini)

⚠ 警 告

感電注意

危険な電圧のため、感電や火傷を起こし、死亡することもあります。
点検、清掃時は必ず元電源を切ってください。
必ずアースを接地してください。

⚠ 注 意

巻き込まれ注意

ファンなどの回転部分に巻き込まれると裂傷などの傷害を起こす恐れがあります。
回転部分に手や指、棒などを入れないでください。
点検、清掃時は必ず元電源を切ってください。

ご使用前にぜひお読みください。

1. 設置

(1)腐食性ガスの影響を受けない場所に設置してください。
装置の故障の原因となります。
(2)規定容量の配線コードを使用し、アースを必ず接地してください。
(3)本機は屋内仕様です。風や雨のあたる場所および直接日光のあたる場所への設置は避けてください。

2. 運転

(1)使用温湿度範囲および、保管・使用時周囲温湿度範囲を守ってください。
(2)電源電圧は、定格の±10%の範囲内で使用してください。
(3)寒冷時運転を停止する場合は、取扱説明書に従い、本機を保管してください。

3. 日常点検と異常時の処置方法

(1)吸込口フィルタにゴミ・ホコリが付着している場合は取り除いてください。
汚れが除去できない場合やフィルタが破損している場合は新品に交換してください。
(2)安全装置が作動して運転が停止した場合には、購入先に連絡してください。

詳細は取扱説明書を参照してください。

エラー表示一覧表

※記載のないエラーの内容、および各エラーの解除方法など詳細は取扱説明書を参照してください。
※症状が改善しない場合は、販売店に連絡してください。

エラー表示	内容	症状・対策（対策実施時は元電源を切ってください）
E002	高圧圧力警報	・高圧圧力スイッチが作動しました。 ・取扱説明書に従って原因を取り除いてください。
E003	圧縮機過熱警報	・圧縮機用サーマルプロテクタが作動しました。 ・取扱説明書に従って原因を取り除いてください。
E004	圧縮機過負荷警報	・圧縮機用サーマルリレーが作動しました。 ・周囲環境、電源電圧が仕様範囲を外れていないか確認してください。
E005	送風機(制御空気側)過負荷警報	・送風機(制御空気側)用サーマルリレーが作動しました。 ・風量、電源電圧が仕様範囲を外れていないか確認してください。
C006	その他の注意	・取扱説明書を参照してください。
E006	その他の警報	
E009	電源欠相警報	・電源が欠相しています。 ・接続を確認し電源を再投入してください。
E010	電源逆相警報	・電源が逆相です。電源の3相のうち2相の接続を入替えて電源を再投入してください。
E011	制御出口空気	・制御出口空気温度センサが断線又は短絡、
E012	温度センサ警報	もしくは測定値が測定範囲を外れました。
E013	制御基板メモリ警報	・電源を再投入してください。
E014	停電復帰警報	・運転中に停電が発生しました。
E015	制御基板その他の警報	・ノイズ・金属片等の導電性異物が無いか確認してください。 ・電源電圧が規定通りか確認してください。
C031	その他の注意	・取扱説明書を参照してください。
E031	その他の警報	
E045	過熱度低下警報	・風量、周囲環境が仕様範囲を外れていないか確認してください。
E049	圧縮機吸入	・圧縮機吸入温度センサが断線又は短絡、
E050	温度センサ警報	もしくは測定値が測定範囲を外れました。
E058	制御基板ディップスイッチ設定警報	・制御基板のディップスイッチの設定が異常です。
C064	圧縮機再起動注意	・圧縮機の運転準備中です。 ・準備が完了すると自動的に表示が消え、圧縮機が運転します。
C065	停止操作注意	・運転開始操作後3分以内にSTOPスイッチが押されました。 ・3分以上運転するように注意してください。
E100	冷却側蒸発器入口	・冷却側蒸発器入口冷媒温度センサが断線
E101	冷媒温度センサ警報	又は短絡、もしくは測定値が測定範囲を外れました。
E102	加熱側蒸発器入口	・加熱側蒸発器入口冷媒温度センサが断線
E103	冷媒温度センサ警報	又は短絡、もしくは測定値が測定範囲を外れました。
E132	結露水ドレン排水警報	・結露水ドレンが排水しているか確認してください。

エラー表示	内容	症状・対策（対策実施時は元電源を切ってください）
C140	制御出口空気温度制御精度注意1	・温度制御精度が設定範囲から外れました。 ・運転状態およびパラメータ設定を確認してください。
E140	制御出口空気温度制御精度警報1	
C141	制御出口空気温度制御精度注意2	
E141	制御出口空気温度制御精度警報2	
E142	制御出口空気温度上限警報	・制御範囲上限値を超えたか、あるいは下限値を下回りました。 ・運転状態およびパラメータ設定を確認してください。
E143	制御出口空気温度下限警報	
C160	高圧圧力注意	・高圧圧力が上昇しています。 ・取扱説明書に従って原因を取り除いてください。
C161		
E161	圧縮機吐出圧力センサ警報	・圧縮機吐出圧力センサが断線又は短絡、 もしくは測定値が測定範囲を外れました。
E162		
C170	温度オートチューニング時間経過注意	・温度PIDオートチューニングが規定時間内に完了しませんでした。 ・運転状態を確認してください。
E505	加湿ヒータ過昇防止警報	・加湿用ヒータが異常過熱しました。 ・使用を中止し、販売店に連絡してください。
C516	加湿水槽メンテナンス時期経過注意	・加湿水槽のメンテナンス時期になりました。 ・加湿水槽内の点検清掃や加湿水の入れ替えを行ってください。 【解除方法】 ・操作盤のスイッチを1,2,3の順に同時に5秒間押し続けてください。 1 RESET + 2 SET + 3 <
E611	制御出口空気湿度センサ警報	・制御出口空気湿度センサの異常です。
C630	加湿水湯水注意	・加湿水が不足しています。 ・給水圧力を確認してください。
E630	加湿水湯水警報	
C640	制御出口空気温度制御精度注意1	・湿度制御精度が設定範囲から外れました。 ・運転状態およびパラメータ設定を確認してください。
E640	制御出口空気温度制御精度警報1	
C641	制御出口空気温度制御精度注意2	
E641	制御出口空気温度制御精度警報2	
E642	制御出口空気温度上限警報	・制御範囲上限値を超えました。 ・運転状態およびパラメータ設定を確認してください。
C670	湿度オートチューニング時間経過注意	・湿度PIDオートチューニングが規定時間内に完了しませんでした。 ・運転状態を確認してください。

フロン排出抑制法 第一種特定製品

フロンの見える化

3ヶ月に1回以上の簡易点検が必要です。
・工場出荷時のフロン類の数量は製品の仕様銘板に記載しております。

種類 HFC | 冷媒番号 R410A | 地球温暖化係数 2090

法にもとづくフロン類の
・みだり大気放出禁止
・冷媒回収業者への依頼実施
・未回収機器の引渡禁止

02104558010

Warning Label

※For details, please read the full contents of the warning labels attached to the product.

Ensuring the Product Performs to Specifications

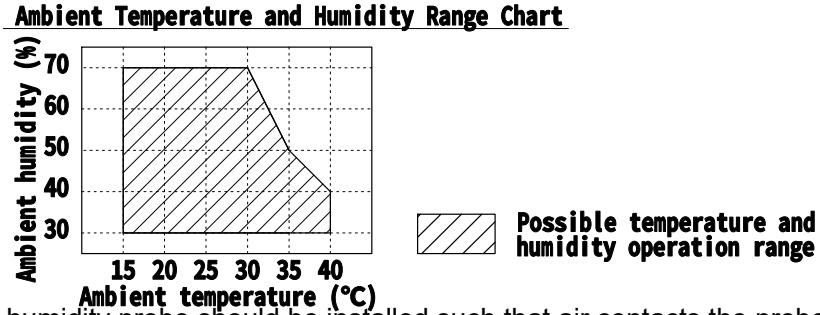
Failure to follow these guidelines can result in the denial of warranty-covered service

WARNING

●**When opening the product cabinet, please follow the instructions detailed in the operating manual. Never operate the product when cabinet panels are open or removed. Touching components inside the product may lead to injury or electric shock.**

1. Note the specified operating ranges and always operate the product within these ranges. Operating the product outside the designated operating ranges can cause temperature and humidity control to fail and can also lead to product breakdown. The configurable temperature range and configurable humidity range noted below chart does not necessarily indicate the actual controllable range possible. The actual controllable temperature and humidity range will depend on the temperature and humidity of the intake air.

Configurable temperature range	(°C)	18 to 30
Configurable humidity range	(%)	45 to 75
Ambient temperature range	(°C)	15 to 40 (See the chart below)
Temperature gradient at intake	(°C/h)	Max ±1
Ambient humidity range	(%)	30 to 70 (See the chart below)
Humidity gradient at intake	(%/h)	Max ±5
Rated processing air volume (controlled air flow rate)	(m^3/min)	2.0 to 4.0
Power source	(V・Hz)	Three-phase 200±10% • 50／60



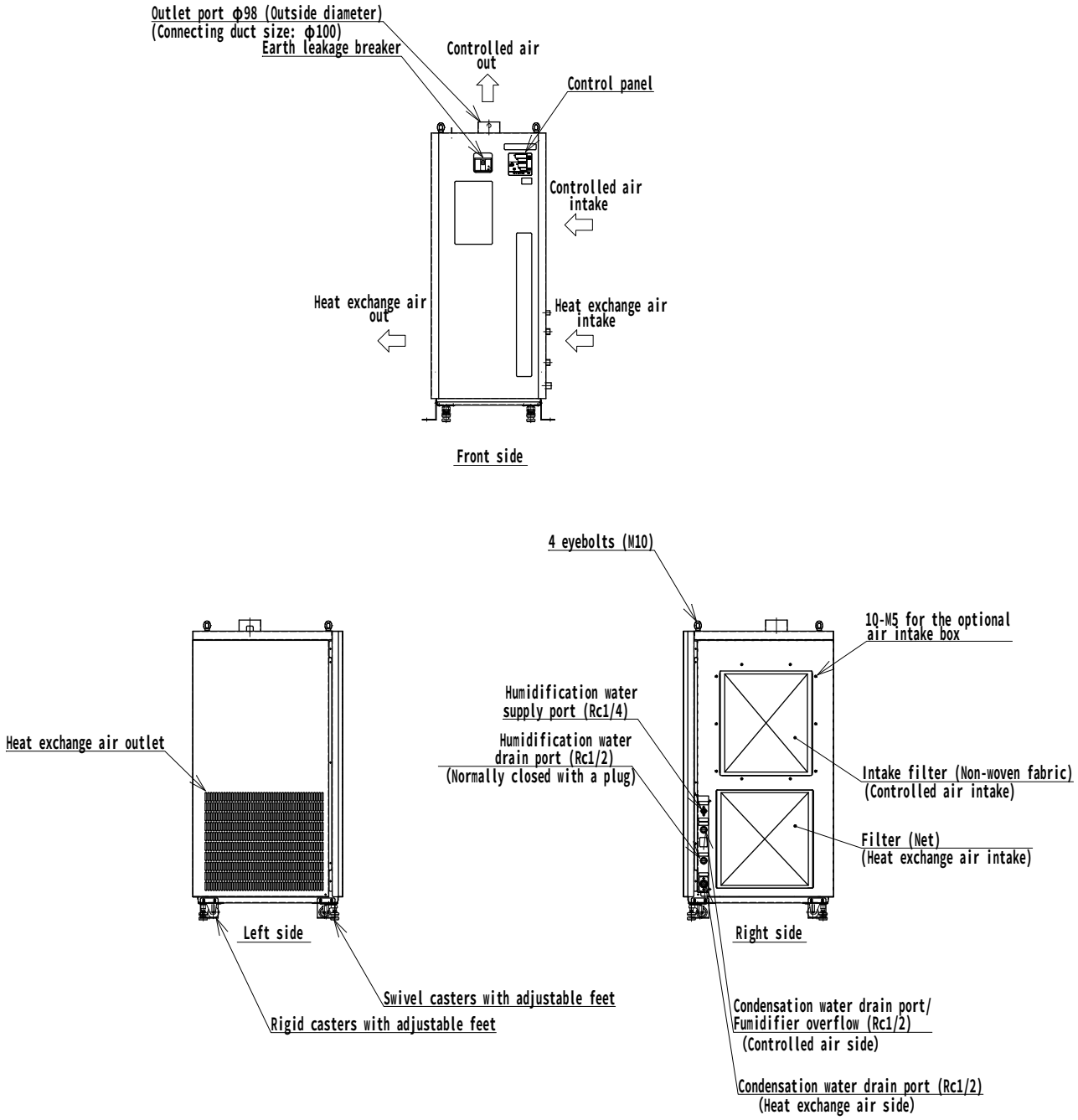
2. The temperature and humidity probe should be installed such that air contacts the probe from the side, and ensure that it is electrically isolated. Handle the sensor carefully during installation to ensure it is not damaged from undue shock.
3. Install the product in a location free of corrosive gases. Contact with corrosive gases can cause holes to form in copper refrigerant piping which could lead to refrigerant leakage and could also cause general breakdown from damaged compressor gas piping.
4. Frequent switching ON and OFF of the product can lead to product breakdown. After stopping the product, wait at least 3 minutes before starting again. Starting the product less than 3 minutes after stopping will cause built-in safety functions to activate and can cause damage to the compressor.
5. All ducting should be insulated and ducting length should be kept as short as possible. (Recommended maximum length: 3m.)Installing ducting that is longer than necessary can cause the product to fail to perform to specified performance levels and could also cause built-in safety devices to activate, which could result in product shutdown.
6. Clean the intake filter regularly. A clogged intake filter can reduce the performance of the product and cause built-in safety devices to activate, possibly resulting in product to shut down. (See page 58, "Inspection and Maintenance".)
7. If the product stops due to activation of a built-in safety device, please consult with your dealer or a qualified repair person.
8. This product is not calibrated to a traceable public standard. On an as-needed-basis, a temperature correction can be entered using the PV Bias function (See page 24, "Parameter Functions") in order to calibrate the temperature measured by the product with the user's standard temperature measuring device.
9. Operating with an open power phase can lead to product breakdown.
10. The specification of the water for humidification for this product is conditioned water with an electrical conductivity of 0.01 to 1mS/m (0.1 to 10μS/m). If unclean water is used, it can result in scaling to form on the inside of the humidifier and other components, a drop in heat exchange efficiency, and corrosion formation on the heater and other components.

Main Parts of the Product

External

Outside Illustration

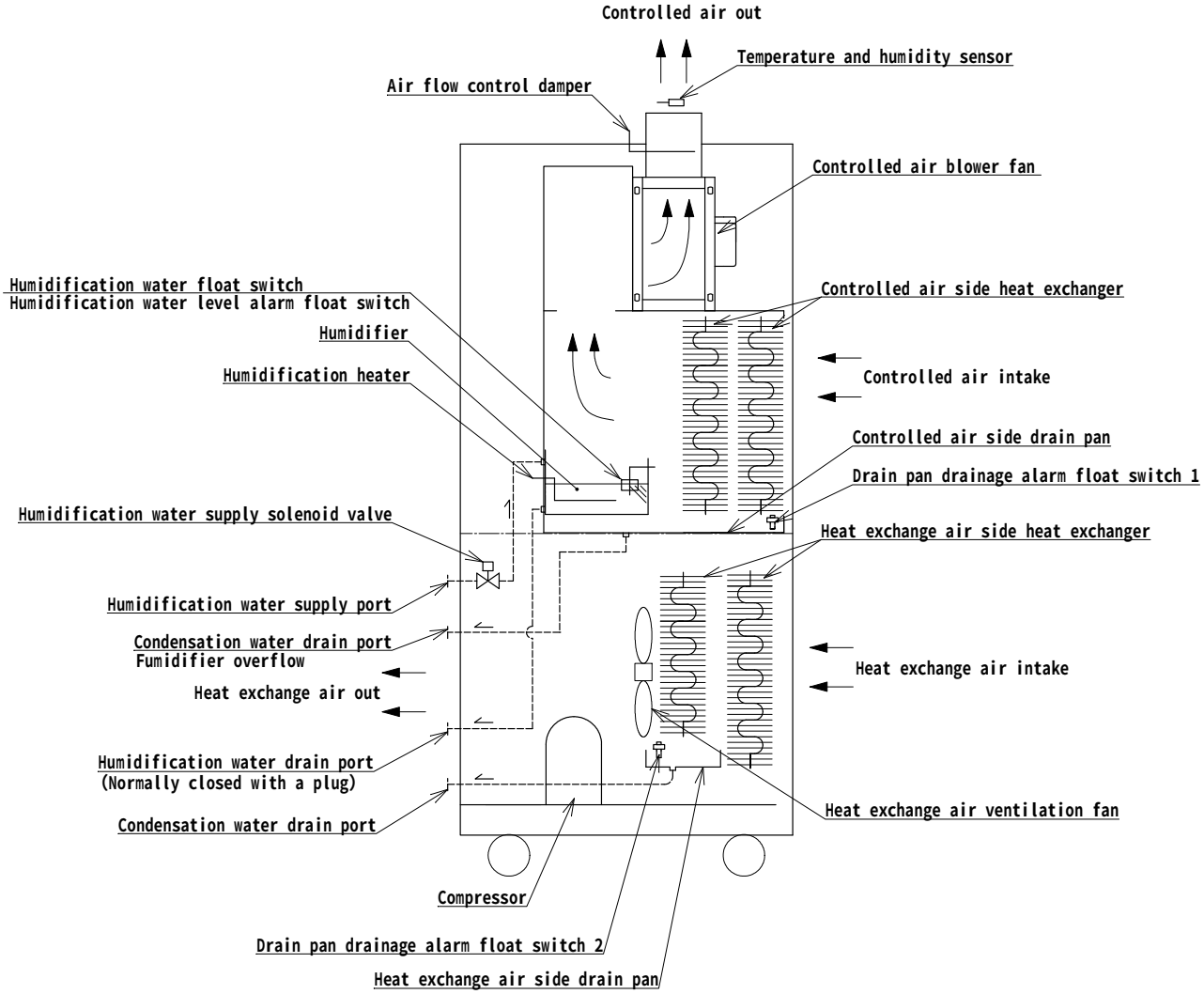
■Outside Illustration



Main Parts of the Product

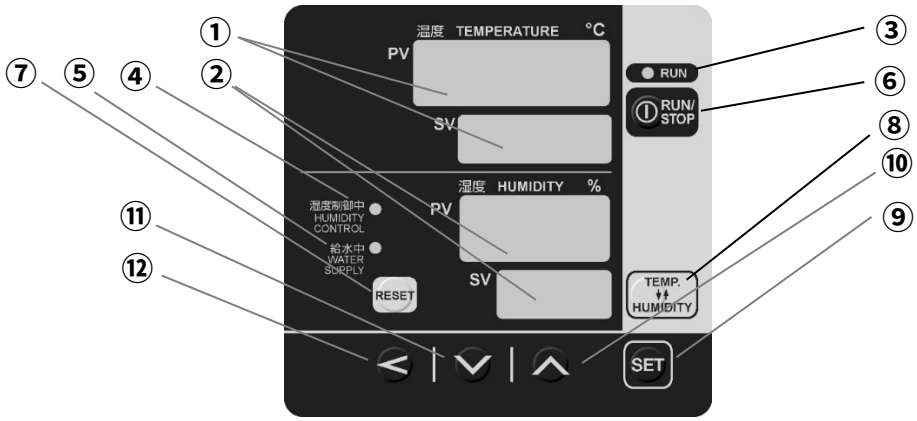
Product Configuration

■Product Configuration



Control Panel Controls and Functions

Control Panel Controls and Functions



1. Display Functions

①Digital temperature display	20.00	PV Measured temperature display
		SV Temperature setting display
	E002	Error and warning cord display
②Digital Humidity display	65.0	PV Measured humidity display
		SV Humidity setting display
③Operation lamp	ON: Operating, Flashing: Controlled air blower fan only operation, OFF: Product off	
④Humidity control display	ON: During humidity control OFF: Humidity control off	
⑤Water supply display	ON: During water supply OFF: Water supply off	

2. Operation Control Functions

Control buttons	Time※	Function
⑥ RUN/ STOP	—	Air processor run/ stop Cancel controlled air blower fan-only operation.
⑦ RESET	—	Cancel alarm (error) and audio alarms.
	—	Returns from displaying various functions to the normal measured temperature/ humidity display mode.
⑧ TEMP. HUMIDITY	—	Change between temperature and humidity input modes.
⑨ SET	—	Finalize change in value of temperature/ humidity or parameter setting.
	2 sec	Change to set controlled outlet air temperature/ humidity setting mode.
	7 sec	Change to display operating conditions mode.
⑩ ∧	—	Increase temperature/ humidity setting value, etc. when changing temperature/ humidity settings.
⑪ ∨	—	Decrease temperature/ humidity setting value, etc. when changing temperature/ humidity settings.
⑫ <	—	Move to other digit when changing values or change between operating condition monitor screens.
∧ + RUN/ STOP	—	Start controlled air blower fan-only operation.
∧ + ∨	—	Change to parameter setting/ change
< + ∨	5 sec	Change to remote operation lockout setting mode.
RESET + SET + <	5 sec	Clear the “C516” warning sign.
< + SET	2 sec	Start of forced supply and drainage of humidification water.

※Time: Indicates how long to hold down button. “—” indicates button does noy have to be held down continuously.

Operation

Preparing for Operation

WARNING

●**Do not operate controls with damp hands. Also, do not touch power cables or electronic components. Failure to follow this warning can lead to electric shock.**

WARNINGS

●**Never operate the product when cabinet panels are open or removed. Touching components inside the product may lead to injury or electric shock.**

●**Do not allow water to contact the product component area directly, and do not wash the product with water. Failure to follow this warning may lead to electric shock or fire.**

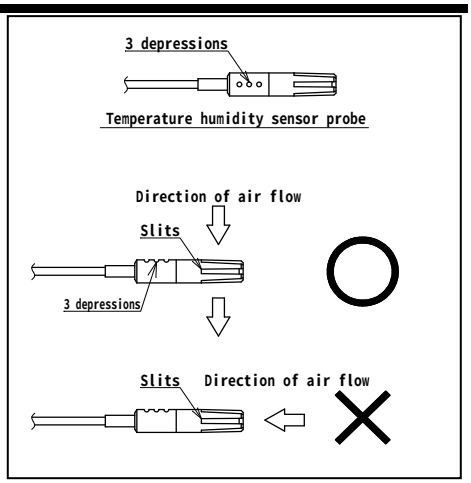
WARNING

●**If operation is abnormal, shut down the product, cut off the power source, and then consult with your dealer or a qualified repair person. Continued operation when the product is performing abnormally can lead to electric shock or fire.**

Preparing for Operation

■ **Set Up the Temperature and Humidity Sensor.**

1. Attach the temperature and humidity sensor amp unit to a flat surface using 4 M3 screws or other suitable method.
2. Install the temperature and humidity sensor probe in a location and orientation such that the depressions in the probe are perpendicular to the flow of controlled air, and that the flow of air blows across the side of the probe. (Refer to the illustration at the right.)



IMPORTANT

●**Handle the probe carefully during installation to ensure it is not damaged from undue shock.**

●**Install the temperature and humidity sensor probe such that it comes into contact with controlled air and that the depressions and slits on the probe are in the proper orientation. Failure to install the probe with depressions and slits in the proper orientation can result in unstable temperature and humidity.**

●**Install the temperature and humidity sensor probe where enough controlled air can pass through it. A good place to install the probe is in the duct between the air-outlet of the product and the air-conditioned area air-outlet. If the probe is to be placed outside the duct, install it just after the air outlet of the air-conditioned area. If the probe does not receive a sufficient flow of controlled air, the product may not be able to achieve stable temperature and humidity control**

●**Install the temperature and humidity sensor probe away from power lines so that it is free from the effects of electrical noise. Influence from electrical noise can result in malfunction.**

Operation

Preparing for Operation

■Ensure Adequate Water Supply and Drainage Piping.

See page 99, "Water Supply and Drainage Piping Construction" in the Installation section of this manual.

1. Water supply and drainage piping ports

Condensation water drain (Controlled air side)/ Humidifier overflow port	Condensation drain release: 1.7 L/h (during temperature and humidity control operation)
	Connection port: Rc1/2
	※Volume of water drained during hot water cool down operation or during forced supply of humidification water: 15L
Humidification water supply port	Maximum humidification water flow rate: 2.3 L/h
	Connection port: Rc1/4
	Supply temperature range: 10 to 40℃
	Supply working pressure range: 0.03 to 0.2 MPa
	Water quality: Conditioned water (with an electrical conductivity 0.01 to 1mS/m (0.1 to 10 μS/cm))
Humidification water drain port	Normally closed
	Connection port: Rc1/2
Condensation water drain port (Heat exchange air side)	Normally open
	Connection port: Rc1/2

※Reference value, when each operation is for 7 minutes (factory default setting) at a water supply pressure of 0.1 MPa. Each operating time can be changed. For details, see “■Cool Down Operation” on page 19, and “■Forced Supply and Drainage of Humidification Water” on page 20.

IMPORTANT

- **Periodically confirm the water quality of the humidification water supply water. Continued operation with water outside the specified quality will result in product breakdown. See “Information Regarding Humidification Water” on page 67 for details.**
- **Condensation drain piping is open to atmospheric pressure and should not have vertical rises or U-traps. It should have a downward slope. If drainage does not properly occur, built-in safety devices may activate.**
- **Just after the product is stopped, boiling water of around 100℃ will be held in the humidifier. Before draining the humidification water for inspection or storage of the product, always stop the product and wait until product cool down operation has completed before proceeding. (See page 19.)**
- **See from page 87, "Installation", for further details.**

Operation

Temperature and Humidity Control Settings

Set the Desired Temperature and Humidity Settings

■Set the Desired Temperature and Humidity Settings

1. Turn on the product.

The product will show, "HELLO AI rPrOCESSOr 8.8.8.8." for a few seconds in the digital temperature display and will then show the measured temperature and humidity. (The product will operate under its default-setting pre-operation for approx. 30 seconds after power is applied.)

※ If operation is started within 30 seconds of applying power, then blower-fan-only operation will start and continue until the product completes the initialization operation, at which point the product will change to the normal operating mode.

2. Set the desired temperature and humidity.

(1) Press and hold the [SET] button for 2 seconds.

The current temperature setting will be flashing.

(2) Press the [TEMP. HUMIDITY] button to choose the setting you wish to change.

Each time the [TEMP. HUMIDITY] button is pushed, the flashing value will switch between the digital temperature display and the digital humidity display.

(3) Change to the desired temperature/ humidity setting by pressing the [∧ ∨ <] buttons.

The temperature setting range is 18 to 30°C. The humidity setting range is 40 to 65%.

(4) Press the [SET] button.

The newly set temperature/ humidity will change from flashing to constantly on, indicating that the setting procedure is complete.

※ The temperature and humidity settings are stored so it is not necessary to change them each time the product is used.

IMPORTANT

●Note that the above mentioned cannot be used to change the outlet air temperature setting if product parameter "F099" (Settings Lock) is set to "1", or if parameter "F008" (Settings Change Control Option) is set to "100". In such cases, either change parameter "F099" to "0", or change parameter "F008" to "001" or "101" before attempting to change the outlet air temperature setting. For details on how to change parameter settings, see page 24, "How to Change Parameter Settings"

Operation

Controlled Air Flow Rate Adjustment

Controlled Air Flow Rate Adjustment

■How to adjust the Controlled Air Flow Rate

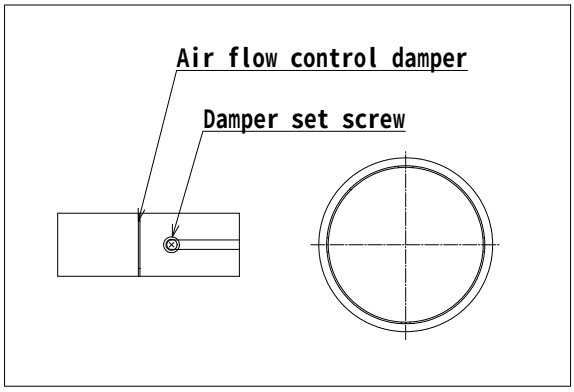
When adjusting the controlled air flow rate, measure the duct outlet wind speed with an anemometer and apply the following formula to compute the flow rate. Adjust the air flow control damper in order to attain the necessary air flow volume within the rated processing range.

≪ Formula: air flow [m³/min] = air outlet wind speed [m/s] × air outlet cross section [m²] × 60 ≫

Example: The outlet duct diameter is φ100 and the wind speed at the outlet air port is approx. 6.4 m/s. Therefore the controlled air flow is 3.0 m³/min.

Ducting attached to the outlet should be insulated, flexible ducting and be 3m or less in length.

※ Use the controlled air blower fan-only operation, when adjusting the controlled air flow rate. See the following section, "■Controlled Air Blower Fan-Only Operation".



IMPORTANT

●Do not turn the product on and off by directly switching on and off the earth leakage breaker. Doing so may damage the product.

●Keep the controlled air within the rated range of air flow. Operating outside the rated range of air flow can reduce unit performance and/or control accuracy, and could also cause built-in safety devices to activate.

■Controlled Air Blower Fan-Only Operation

1. While holding the [∧] button down, press the [RUN/STOP] button.

The RUN lamp will flash, the digital temperature display will show [FAn], and the product will be operating in the control air blower fan operation mode.

2. To stop, press the [RUN/STOP] button again.

The RUN lamp will go out and the product will be OFF.

※To change from controlled air blower fan-only operation to normal operation, first stop the product and then start normal operation. The product cannot be changed directly from control air blower fan independent operation to normal operation.

IMPORTANT

●If the controlled air blower fan-only operation continues for an extended period of time, the blower fan will get hot and will cause a rise in temperature in the air coming from the controlled air outlet. Afterwards, if normal controlled air operation is to resume, it may take some time until the controlled air output stabilizes. This is normal.

Local Operation Mode (Operation via the Product Control Panel)

The product can be controlled locally if parameter "F002" is set to "01".**
(The factory default setting is "1101".)

■Starting the Product

Press the [RUN/STOP] button.

The green RUN lamp will light and the product will be running.

※Humidity control will automatically occur if the supply of water in the humidifier is at a normal level.

■Stopping the Product

Press the [RUN/STOP] button.

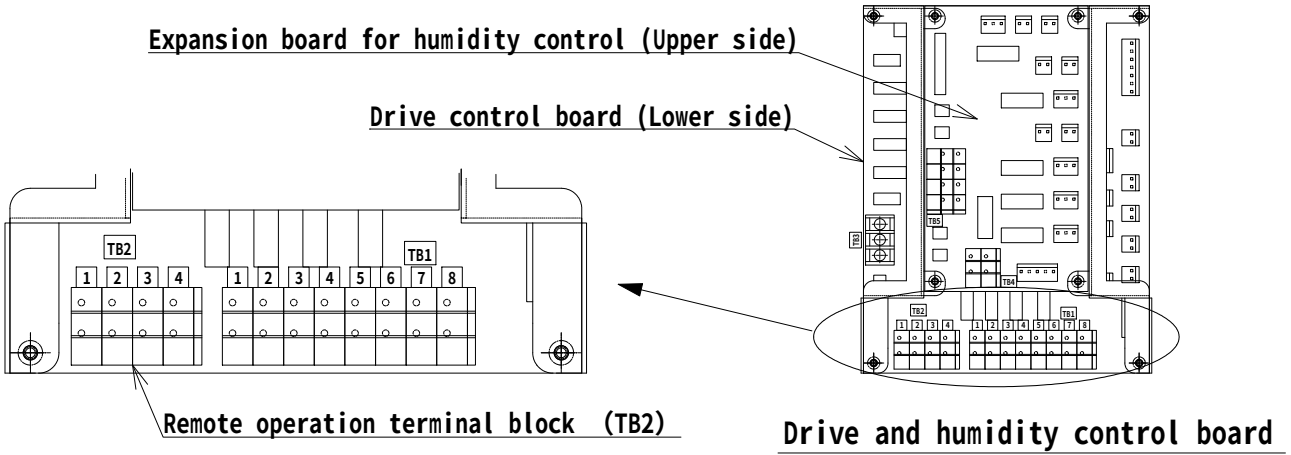
The RUN lamp (green) will go out, and after cool down operation is complete (see page 17), the product will automatically shut down.

IMPORTANT

- **If parameter "F002" (Local/remote operation priority) is set to "**00" (remote operation only), then the product cannot be operated from the local control panel. (The factory default setting is "1101".) See page 24 "How to Change Parameter Settings", for details on how to change parameter settings.**
- **When applying power to the product, a clicking sound can be heard from the component area of the product. This is the sound of the refrigeration shunt valve or other electronic valve operating and is part of normal operation.**
- **Frequent starting and stopping can lead to product breakdown. Allow at least 3 minutes between starting and stopping the product. Failure to allow at least 3 minutes between starting and stopping will cause a warning to be generated (C064 or C065).**
- **An oil-return process will occur for 2 minutes just after the product starts up. The control temperature will fluctuate up and down during this time, but this does not indicate abnormal operation.**

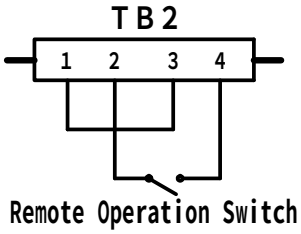
Remote Operation Switch Operation Mode

The following can be carried out when parameter "F002" is set to "1*".**
The position of the remote operation terminal block is shown in the illustration below.



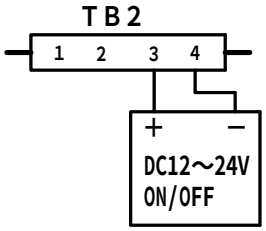
■**Switch Input Specification**(See illustration to the right.)
Short remote operation terminals 1 — 3

1. To Start Operation
   Short remote operation terminals 2 — 4 to switch ON.
2. To Stop Operation
   Open remote operation terminals 2 — 4 to switch OFF.



■**Voltage Input Specification** (See illustration to the right.)

1. To Start Operation
   Apply 12 to 24 Vdc to remote operation terminals 3 — 4 to switch ON.
2. To Stop Operation
   Open remote operations terminals 3 — 4 to switch OFF.



IMPORTANT

●When employing remote switch operation, please have the required wiring performed by a qualified service person.

●If parameter "F002" (Run/Stop Operation Select) is set to "0*0*" (remote operation switch control disabled), then the product cannot be started/stopped via the remote operation switch. (Factory default setting: 1101".) Also, if remote operation is disabled (rOFF is displayed) then the product cannot be started/stopped via remote operation.

Combined Operation Mode (Local Control Panel and Remote Switch Operation)

The following can be carried out when parameter "F002" is set to "1*01" (factory default setting is "1101").

■Starting the Product

1.When the remote switch is OFF (terminals 2 4 are open), and the product is not running:
Press the [RUN/STOP] button or turn ON remote operation switch (by shorting terminals 2 4) to start the product.

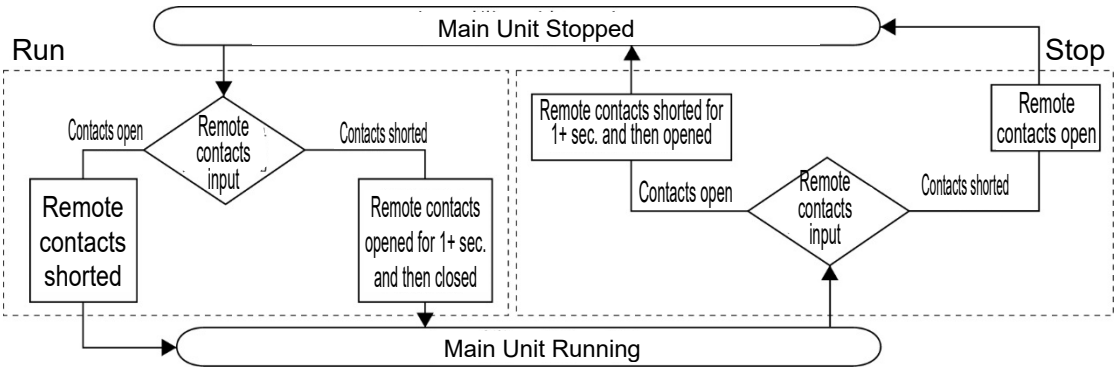
2.When the remote switch is ON (terminals 2 4 are shorted), and the product is not running:
Either press the [RUN/STOP] switch or temporarily turn OFF remote operation switch 1 (open contacts 2 4 for at least 1 second) and then turn back ON remote operation switch 1 (short contacts 2 4) to start the product.

■Stopping the Product

1.When the remote switch is ON (terminals 2 4 are shorted), and the product is running:
Press the [RUN/STOP] button or turn OFF the remote operation switch 1 (by opening terminals 2 4) to stop the product.

2.When the remote switch is OFF (terminals 2 4 are open), and the product is running:
Either press the [RUN/STOP] switch or temporarily turn ON the remote operation switch 1 (short contacts 2 4 for at least 1 second) and then turn back OFF remote operation switch 1 (open contacts 2 4) to stop the product.

Remote Control Operation Flow Chart



※The above instructions refer to contact terminal connections, but similar actions will occur when using the voltage input specification.

Remote Operation Lockout Mode

Remote operation and operation via communications functions should be disabled in order to prevent unexpected operation during times of maintenance, etc.

Setting of the remote operation lockout mode gets priority over the "F002" parameter setting.

※1. In this mode, if parameter "F001" is either "1" or "2", then automatic recovery after a power outage will not occur.

※2 In this mode, product operation via the local operation panel is possible even if parameter "F002" is set to "**00". Similarly, blower-fan-only operation is possible via the local control panel, even if "F007" is set to "**00", and setting changes can be performed via the local control panel, even if "F008" is set to "*00".

1. Setting the remote operation lockout mode

(1) While holding the [<] button down, press the [∨] button for about 5 seconds.
(2) [rOFF] will flash in the digital temperature display for about 5 seconds.
(3) Press the [SET] button while [rOFF] is flashing in the digital temperature display.
(4) The digital temperature display will alternate between [rOFF] and the measured temperature, and the remote operation lockout mode will be enabled.

※1 If the [SET] button is not pressed, the display will return to show the "measured temperature", and the setting to invalidate remote control will no be saved.

※2 This mode will remain even if power is cut off and then restored to the product. Carry out the following operations.

2. Disabling the remote operation lockout mode (when it has been previously enabled.)

(1) While holding the [<] button down, press the [∨] button for 5 seconds.
(2) The digital temperature display will show the measured value, and the remote operation lockout mode will be disabled. (Remote operation possible.)

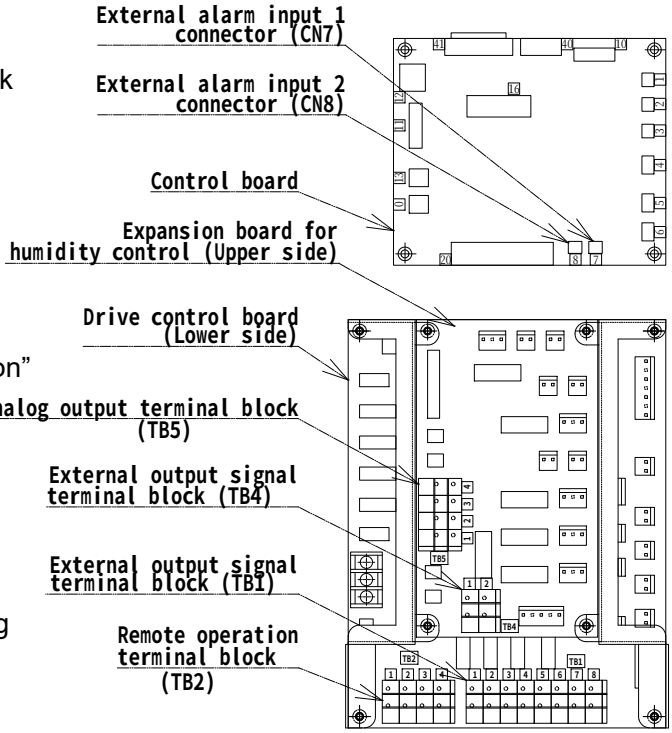
Other

■External Output Signals

The position of the external signal terminal block is shown in the illustration to the right.

1. Operation Signal
This signal is output when the blower fan and compressor are operating (during temperature control operation).
The signal will not be output during cool down operation occurring after a stop action has been initiated. (See "■Cool Down Operation" on page 19 for details.)

2.Alarm Signals
In case there is a problem with the product, an error code will be displayed on the digital temperature display. In addition to this display, the relevant alarm signals will be generated. (See page 68, "Diagnosing and Troubleshooting Product Failure or Abnormalities" for further information.)



Control boards location in the distribution panel

Terminal No.	Output type	Parameter setting	Terminal contact state		
			During operation	When stopped	During an alarm condition
External output signal terminal block [TB1] 1 2	Operation signal	—	Shorted	Open	Open ※1
External output signal terminal block [TB1] 3 4	Alarm signal	F003 setting:"0"	Open	Open	Shorted (Open) ※2
		F003 setting:"1"	Shorted	Shorted	Open (Shorted) ※2
External output signal terminal block [TB1] 5 6	Temperature alarm signal	F120 setting: "0"	Open	Open	Shorted (Open) ※3
		F120 setting: "1"	Shorted	Shorted	Open (Shorted) ※3
External output signal terminal block [TB4] 1 2	Humidity alarm signal	F607 setting:"0"	Open	Open	Shorted (Open) ※4
		F607 setting:"1"	Shorted	Shorted	Open (Shorted) ※4

※1 Terminal contact state during a warning (C***) condition will depend on operating conditions.
※2 Contact states inside ( ) indicate the state when alarms other than "C***" numbered alarms occur.
The contact state when "C006" and "C031" alarms occur will depend on parameters "F081" and "F086".
※3 The value inside the ( ) indicates the contact state for alarm signals other than [C140], [C141], [E142], and [E143].
※4 The value inside the ( ) indicates the contact state of for alarm signals other than [C640], [E640], [C641], [E641], and [E642].

■External Alarm Inputs 1 and 2

The position of the external alarm input connector is shown in above illustration.
Remove the wire from the connector and connect the desired signal wire.
Use parameters "F080" to "F088" to choose how alarm conditions should be processed, etc. See from page 29, "■Parameter Functions and Settings" for details.

Operation

Other

■Analog Output 1, 2 (Measured temperature/ humidity, setting temperature/ humidity)

The position of the analog output terminal block (Expansion board for humidity control TB5) is shown in the illustration of previous page.

Use parameters “F700” to “F708” to select data output format and data type, etc. See from page 41, “■Parameter Functions and Types" for details.

※Only voltage output is available for data output format. When current output is needed for data output format, consult with your dealer to exchange the control board.

※It is possible that the displayed values on the product control panel will be different from the output values. In this case, use parameters “F113” and “F614” (PV bias) to adjust the values.

■Product Pre-operation

For a short time when the product is just started or after the temperature setting is changed, the controlled outlet air temperature upper/lower limit warnings (alarms) 1 and 2 will be canceled. This is what is meant by "pre-operation". During pre-operation, the conditions in the following chart will take place

Type	Parameter No.	Pre-operation condition	Canceled alarm ※1	Cancellation time ※2	Terminal state ※3
When starting	F107	The digital temperature display (SV) will alternate between [rEdY] and “ON” at operating conditions mode.	C140, C141, E140, E141, E142, E143, C640, C641, E640, E641, E642	60min	During product pre-operation: shorted (External output signal terminal block「TB1」7-8)
When changing setting value	F109				

※1 See page 68, "Diagnosing and Troubleshooting Product Failure or Abnormalities" for further information on respective alarm codes.

※2 Factory default time setting. The "F107" setting determines the period in which related alarms warnings will be suspended (no alarm generated) after starting operation in order to give the product time to stabilize. Similarly, the F109 setting determines the period in which related alarms/warnings will be suspended after performing a temperature setting change. For further details on how to change these and other parameters, See page 24, "How to Change Parameter Settings".

※3 Factory default setting. The state of the contacts during pre-operation can be changed by changing the [F122] parameter. (See page 24, "How to Change Parameter Settings".)

Operation

Other

■Cool Down Operation

1. If the product is to be stopped even after having run in humidification operation even one time, "cool down operation" will commence in order to prevent condensation forming within the product, ductwork, or piping, due to hot water remaining within the humidifier.

●Cool Down Operation Flow

1. Press the [RUN/STOP] button.	→	〈Shown on the digital display panel〉 RUN lamp (green) is off. The digital temperature display is alternating between [COOL] and the setting temperature.
↓		
2. Compressor and controlled air blower fan stop-delay operation ※1 3. Water is supplied to the humidifier for 7 minutes to cool the hot water. (called “Hot water cool down operation”)	→	Overflow water will drain from the condensation water drain (humidifier overflow) port.
↓		
4.The product will automatically shut down after 1 minute, when the hot water cool down operation completes. (After 8 minutes from product-stop operation)	→	〈Shown on the digital display panel〉 [COOL] will stop being displayed and only the setting temperature will be displayed.

※1 Compressor and controlled air blower fan stop-delay time can be changed by the [F161] parameter.

※2 Hot water cool down operation time can be changed by the [F662] parameter.

2. Cool down operation when a warning condition occurs will differ depending on the alarm processing pattern of the specific alarm or warning. (See page 68.)

Alarm processing pattern	Description of alarm processing	Description of cool down operation
0，1	Operation continues	After product-stop operation, normal cool down operation will commence.
2	Compressor operation and humidity control stop. (Controlled air blower fan operation continues. Hot water cool down operation starts.)	After compressor operation and humidity control stop, hot water cool down operation and controlled air blower fan operation will commence without compressor operation.
3	All stopped	The product all stops without cool down operation.
4	Humidity control stops. (Compressor operation and controlled air blower fan operation continue.)	After humidity control stops, hot water cool down operation will commence. Temperature control continues.
5	Compressor operation and humidity control stop. (Controlled air blower fan operation continues without hot water cool down operation.)	After compressor operation and humidity control stop, only controlled air blower fan operation will commence without hot water cool down operation.

IMPORTANT

●Do not force product shutdown during cool down operation by cutting off power to the product. Doing so can lead to condensation forming within the product and possible product breakdown.

Operation

Other

■Forced Supply and Drainage of Humidification Water

Forced supply and drainage of humidification water occurs while the product is operating. It's purpose is to change the water in the humidifier by supplying water to the humidifier to overflow it and thus flush out the old water. Doing so can reduce the amount of scaling deposits inside the humidifier.

1. How to start of forced supply and drainage of humidification water.

(1) Manual operation

1. While pressing and holding down the [<] button, press and hold the [SET] button for 2 seconds.	→	Forced supply and drainage of humidification water operation will start. Doing so switches to the operating conditions mode. 〈Shown on the digital temperature display panel〉 The digital temperature display (SV) will alternate between [FcSU] and [****]. ※1
↓		
2. Press the [RESET] button.	→	〈Shown on the digital display panels〉 The digital displays will return to the measured temperature and humidity display mode.

※1. [The remaining time of forced supply and drainage of humidification water] and [FcSU] will be displayed alternately. (units: seconds)
The operating time of the forced supply and drainage of humidification water can be changed by the "F664" parameter.

※2. If “F653” is set to “0” (Humidification control: OFF) or [oFF] (Humidification control stops on the alarm) is displayed on the digital humidity display (SV), then the water will not be supplied even if the above operation is performed.

(2) Automatic operation

The automatic operation setting is convenient when the operation is to be done at regular intervals.

In order to run in automatic operation, the following parameters must be set: “F531”, “F664”, and “F665”.

”F664”: The time for one forced supply and drainage cycle. (units: seconds)

”F665”: Set to “ON” for automatic operation.

“F666”: Time interval between starting of the forced supply and drainage cycle. (units: minutes) ※1, 2

※When the accumulated operating time reaches the preset time setting, the forced supply and drainage operation will start automatically.

“F667”: Time to the first forced supply and drainage operation. (units: minutes) ※1, 2, 3

※1 There may be a slight drifting in the time setting. Please confirm it periodically.

※2 Note that “F666” and “F667” will have to be set again after the earth leakage breaker gas been switched off.

※3 Forced supply and drainage of humidification water operation will be in effect even when the product is stopped. Do not cut off the primary power supply or the water supply.

※ Forced supply and drainage of humidification water will not occur if “F653” is set to “0” (Humidification control disabled), or during an alarm condition or during hot water cool down operation. It will occur again when the next start time come up.

【Setting Example】

When the current time is 13:00, and the automatic operation setting is set for every night at 0:00 (midnight)

“F666”: “1440”・・・ 24 h x 60 min/h = 1440 min

“F667”: “660”・・・ (24h-13h) x 60 min/h = 660 min

IMPORTANT

●Note that the control accuracy of the humidity and temperature of the controlled air may vary greatly during forced supply and drainage of humidification water.

●When forced supply and drainage of humidification water is initiated, the product will enter a pre-operation mode.

●If a optional high temperature type drain pump (max. 100℃) is to be used, do not perform humidification water cool down operation or forced supply and drainage of the humidification water. Doing so can cause water leakage due to lack of performance of the drain pump. If there is a drop in the humidification water supply pressure then the volume of drainage may be reduced. In such cases, please make sufficient adjustments and confirmation well in advance.

●In case of continued operation, the humidification water must be changed out at least every 2000 hours. With regard to regular humidifier maintenance, if foreign matter is found to be adhering to surfaces, then the water should be changed out more frequently.

●The same effect is true when it comes to hot water cool down operation after a stop action has been initiated. If a stop action (leading to hot water cool down operation) is to occur periodically, then please set product parameter “F665” to “0”.

Operation

Other

2.Procedure to cut off or change the remaining time during the forced supply and drainage of humidification water cycle.

Example: Cut off the forced supply and drainage of humidification water when there is 300 seconds remaining on the cycle.

1. Display [FcSb]. (※ See page 22, “Monitor Functions”.)	→	〈Shown on the digital temperature display panel〉 The digital temperature display (SV) will alternate between [FcSb] and “300”.
↓		
2. Press and hold the [SET] button for 5 seconds.	→	〈Shown on the digital temperature display panel〉 “300” will be continuously displayed on the digital temperature display (SV).
↓		
3. Press either the [∧]or [∨] button to change “300” to “0”.	→	〈Shown on the digital temperature display panel〉 “0” will be continuously be displayed on the digital temperature display (SV).
↓		
4. Press the [SET] button. The forced supply and drainage of humidification water operation will be cut off.	→	〈Shown on the digital temperature display panel〉 The digital temperature display (SV) will alternate between [FcSb] and [oFF].
↓		
5. Press the [RESET] button.	→	〈Shown on the digital display panels〉 The digital displays will return to the measured temperature and humidity display mode.

※1 The remaining time can be extended by performing the above procedure.

※2 The above procedure will not be reflected during the next humidification water forced supply and drainage cycle. “F664” must be changed.

※3 Unless the [SET (apply)] button is pressed on the above 4th procedure, the display will not change and the forced supply and drainage cycle will continue.

※4 If the [RESET] button is pressed, the display returns to the measured temperature and humidity display mode continuing the forced supply and drainage of humidification water operation. When the forced supply and drainage of humidification water need to be stopped, perform the above procedure again.

■How to Stop Only Humidification Operation (i.e. how to operate with temperature control operation only)

Any of the following operations may be performed.

1. Change the humidity set value, changing the value in the digital humidity display to “----“. For further information, see page 43, “Temperature and Humidity Control Value Tuning Functions” .

2. Set the parameter “F653” (Humidification control ON/ OFF select) to “0”.
   For further information, see page 24, “How to Change Parameter Settings”.
   ※ Alarms connected with humidification will occur even if “----” is displayed. Alarms connected with humidification will be disabled if “F653” is set to “0”.

■ Important Notes Regarding Operation

1. In the event that a built-in safety device activates, and the product shuts down, be sure to note the displayed error code before cutting off power to the product. Refer to the section, "Diagnosing and Troubleshooting Product Failure or Abnormalities" on page 68 in order to resolve the issue causing the warning or alarm. After the cause of the trouble has been resolved, operation can resume.
2. An intake filter or filter clogged with dust or dirt will reduce ventilation performance. As a general rule, the intake filter and filter should be inspected about once a month. In case either of the intake filter or filter are excessively dirty, remove the filter and wash it with water. (See from page 58, "Inspection and Maintenance".)
3. Do not attempt to switch the product on and off by switching on and off the main power source. Doing so may damage the product.

Monitor Functions

Displaying the Measured Data and Operating Conditions

Displaying the Measured Data and Operating Conditions

The product can display operating condition, alarm history and accumulated running time.

1. Pressing and holding down the [SET] button for 7 seconds will cause the digital temperature display (SV) to alternate between the display item and the operating condition.
2. Press [∧] or [∨] button to change the desired item.
3. While displaying any of the display items, pressing the [<] button will cause the alarm history and accumulated running time group to be displayed. Pressing the [<] button again will cause the display to switch between the display groups.
4. "Operating Conditions" and "Alarm History and Accumulated Running Time" on the digital temperature display.

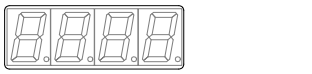
Operating condition group		Alarm history and accumulated running time group
(1) [H.EVI] Heating-side evaporator inlet temperature (Units: ℃) (2) [C.EVI] Cooling-side evaporator inlet temperature (Units: ℃) (3) [rS] Compressor intake temperature (Units: ℃) (4) [H.SH] Heating-side degree of superheat (Units: ℃) (5) [C.SH] Cooling-side degree of superheat (Units: ℃) (6) [Pdc] Compressor discharge pressure (Units: MPa) (7) [EEV] EEV heating output (Units: %) (8) [H.EEV] Heating-side expansion valve divergence (Units: Pulses) (9) [C.EEV] Cooling-side expansion valve divergence (Units: Pulses) (10) [dPSV] Dew point set value (Units: ℃) (11) [dPPV] Dew point calculated value (Units: ℃) (12) [HEAT] Humidification heater output (Units: %) (13) [FcSV] Water supply solenoid valve (ON/ OFF) (14) [FLT] Float position of float switch ※1 (15) 「rEdY」 Pre-operation state (ON/ OFF) (16) 「COOL」 State of cool down operation(Processing pattern: 0 to 4) ※2	⇔	(1) [AL 1] Latest alarm ※3 (2) [AL 2] 2nd alarm to (20) [AL20] 19th Latest alarm (21) [Hr] Accumulated running time (unit : hours) ※4

5.Press the [RESET] button to return to the set temperature (SV) display.

Monitor Functions

Displaying the Measured Data and Operating Conditions

※1 Description of [FLT]



Humidification water level alarm float switch (H/ L)

Humidification water float switch (H/ L)

Drain pan drainage alarm float switch ※ (H/ L)

※

L: When both the drain pan drainage alarm float switch (controlled air side) and the drain pan drainage alarm float switch (heat exchange air side) have a low position, “L” will be displayed.

H: When either the drain pan drainage alarm float switch (controlled air side) or the drain pan drainage alarm float switch (heat exchange air side) has a high position, “H” is displayed.

※2 Description of [COOL]

0：Conditions except for cool down operation

1：During cool down operation (Temperature control continues and hot water cool down operation is performing.)

2：During cool down operation (Controlled air blower fan-only operation and hot water cool down operation are performing.)

3：During cool down operation (Temperature control continues without hot water cool down operation.)

4：During cool down operation (Controlled air blower fan-only operation is performing without hot water cool down operation.)

※3 Alarm history

PV-side display: Item name [AL **]※5

SV-side display: The digital temperature display (SV) alternates between [AL **] and accumulated running time (only 4 digits) when the alarm occurred.

※4 Accumulated running time

PV-side display: Item name [Hr] ※5

SV -side display: Accumulated running time (only 4 digits)

※5 When accumulated running time exceeds 1000 hours, the digital temperature display (PV) alternates between the first five digits and [Hr].

How to Change Parameter Settings

Various functions of the product can be selected by changing parameter settings.

■Parameter Setting Overview

"F005" (Audible alarm: ON/OFF select) setting display and update example.
(This example will show how to change the audible alarm warning from the factory default setting of "01" (audible alarm warning ON) to "0" (audible alarm warning OFF.)

1. While holding the [∧] button down, press the [∨] button.	→	Doing so switches to the parameter display mode 〈Shown on the digital temperature display panel〉 PV: "F001", SV: "F001 set value"
↓		
2. Press the [∧] or [∨] buttons until "F005" is displayed.	→	〈Shown on the digital temperature display panel〉 PV: "F005", SV: "1".
↓		
3. Press and hold the [SET] button for 5 seconds.	→	〈Shown on the digital temperature display panel〉 SV: "1" (Flashing)
↓		
4. Push the [∧] or [∨] buttons to change the "01" to "00".	→	〈Shown on the digital temperature display panel〉 SV: "0" (Flashing)
↓		
5. Press the [SET] button. The setting will be locked in.	→	〈Shown on the digital temperature display panel〉 PV: "F005", SV: "0".
↓		
6. Press the [RESET] button.	→	〈Shown on the digital temperature display panel〉 Return to measured temperature and set temperature display.

※ Other parameters settings can be changed by selecting the appropriate parameter as in step 2. above, and then continuing from step 3.

IMPORTANT

●Note that the above-mentioned cannot be used to change parameters if product parameter "F099" (Settings lock) is set to "1", or if parameter "F008" (Settings change control select) is set to "100". In such cases, change "F099" to "0" and "F008" to either "001" or "101" before changing other parameter settings.

Parameter Functions and Settings

■Parameter List (1/2)(Settings can be changed while the product is running.)

Parameter No.	Description		Setting Range	Units	Minimum set value	Factory default setting
F001	Power-cutoff recovery setting		0,1,2	—	1	1
F002	Run/Stop operation select		0001 to 1101	—	—	1101
F003	Alarm signal output: Open or closed select		0, 1	—	—	0
F004	Product operation during alarm conditions		0, 1	—	—	1
F005	Audible alarm: ON/OFF select		0, 1	—	—	1
F006	Audible warning: ON/OFF select		0, 1	—	—	1
F007	Run/Stop operation select of controlled air blower fan		001,101	—	—	101
F008	Settings change control select		001,101	—	—	101
F080	External alarm signal input 1	Signal type select	0 to 2	—	1	0
F081		Alarm action select	0 to 5	—	1	0
F082		Alarm delay time setting	1 to 60	seconds	1	4
F083		Judgement conditions select	0 to 3	—	1	1
F085	External alarm signal input 2	Signal type select	0 to 2	—	1	0
F086		Alarm action select	0 to 5	—	1	0
F087		Alarm delay time setting	1 to 60	seconds	1	4
F088		Judgement conditions select	0 to 3	—	1	1
F090	Communications device address		0 to 31	—	1	0
F091	External communications baud rate		0, 1	—	—	1
F099	Settings lock/ Release select		0, 1	—	—	0
F100	Controlled outlet air temperature	Control accuracy warning 1 select	0, 1, 2	—	—	0
F101		Control accuracy warning 1 setting	0.01 to 10.00	℃	0.01	1.00
F102		Control accuracy warning 2 select	0, 1, 2	—	—	0
F103		Control accuracy warning 2 setting	0.01 to 10.00	℃	0.01	0.50
F104		Upper and lower limit alarm select	0, 1	—	—	1
F105		Upper limit alarm setting	F106+2 to 45.00	℃	0.01	35.00
F106		Lower limit alarm setting	8.00 to F105-2	℃	0.01	8.00
F107	Pre-operation time when starting		30 to 120	minutes	1	60
F109	Pre-operation time when changing setting value		0 to F107	minutes	1	60
F110	Heating and cooling control: P value		0.0 to 100.0	℃	0.1	※1
F111	Heating and cooling control: I value		0 to 3600	seconds	1	※1
F112	Heating and cooling control: D value		0 to 3600	seconds	1	※1
F113	Controlled outlet air measured temperature offset (PV bias)		-2.00 to 2.00	℃	0.01	0.00
F119	Controlled outlet air temperature digital filter setting		0 to 30	seconds	1	0
F120	Temperature alarm signal output: Open or closed select		0, 1	—	—	1
F122	Pre-operation signal: Open or closed select		0, 1	—	—	0
F136	Controlled air Temperature display digits select		0, 1, 2	—	—	2
F161	Controlled air blower fan shutdown delay time setting		F662+1 to 60	minutes	1	8

※1 The factory default setting is determined and set at the time of inspection when the product is shipped.

Parameter Functions

Parameter Functions and Settings

■Parameter List (2/2)(Settings can be changed while the product is running.)

Parameter No.	Description		Setting Range	Units	Minimum set value	Factory default setting
F531	Humidifier maintenance period time setting		0 to 9999	Hours	1	2000
F600	Controlled outlet air humidity	Control accuracy warning 1 select	0, 1, 2	—	—	0
F601		Control accuracy warning 1 setting	0.1 to 10.0	%	0.1	5.0
F602		Control accuracy warning 2 select	0, 1, 2	—	—	0
F603		Control accuracy warning 2 setting	0.1 to 10.0	%	—	1.0
F604		Upper limit alarm select	0, 1	—	—	1
F605		Upper limit alarm setting	80.0 to 100.0	%	0.1	95.0
F606		Upper limit alarm evaluation time setting	30 to 600	Seconds	1	180
F607	Humidity warning (alarm) signal output: Open or closed select		0, 1	—	—	1
F614	Controlled outlet air measured humidity offset (PV bias)		-10.0 to 10.0	%	—	0
F619	Controlled outlet air humidity digital filter setting		0 to 30	Seconds	1	0
F630	Humidification water shortage alarm evaluation time		0 to 60	Seconds	1	60
F631	Humidification water shortage warning evaluation time		0 to F630	Seconds	1	0
F636	Controlled air humidity display digits select		0, 1	—	—	1
F640	Humidification heater control	P value	0.0 to 100.0	℃	0.1	※2
F641		I value	0 to 3600	Seconds	1	※2
F642		D value	0 to 3600	Seconds	1	※2
F653	Humidification control: ON/OFF select		0, 1	—	—	1
F660	Intermittent supply control of humidification water	Water supply OFF time	0.0 to 60.0	Seconds	0.1	4.0
F661		Water supply ON time	0.1 to 60.0	Seconds	0.1	0.5
F662	Cool down operation	Hot water cool down operation time	0 to 59	Minutes	1	7
F663		Compressor ON/ OFF select	0, 1	—	—	1
F664	Forced supply and drainage of humidification water	The time for one operation cycle	1 to 9999	Seconds	1	420
F665		Automatic start: ON/ OFF select	0, 1	—	—	0
F666		Time interval between starting ※3	1 to 999999	Minutes	1	1440
F667		Time to the first operation	0 to 9999	Minutes	1	0
F668		Water supply OFF time	0.0 to 60.0	Seconds	0.1	0
F669		Water supply ON time	0.1 to 60.0	Seconds	0.1	0.1
F700	Analog output 1	Data output format select	0 to 3	—	—	0
F701		Data select	0 to 3	—	—	0
F702		Output data upper limit	F703 to 100.0	℃、%	0.1	50.0
F703		Output data lower limit	0.0 to F702	℃、%	0.1	0.0
F705	Analog output 2	Data output format select	0 to 3	—	—	0
F706		Data select	0 to 3	—	—	1
F707		Output data upper limit	F708 to100.0	℃、%	0.1	100.0
F708		Output data lower limit	0.0 to F707	℃、%	0.1	0.0

※2 The factory default setting is determined and set at the time of inspection when the product is shipped.

※3 When the setting values is over 10,000 minutes, the digital temperature display (PV) alternates between “F666” and the first 2 digits of the setting value.

Parameter Functions

Parameter Functions and Settings

■Parameter Function Details

●"F001" Power-cutoff recovery setting (Relevant parameter: "F002")

Selects recovery pattern after power outage.

"F001" setting	Description	Operation status before power outage	Operation status after power recovery	Display after power recovery
0	Manual recovery	Product running	All stopped	E014
		All stopped	All stopped	None
1	Automatic recovery	Product running	Automatic product restart	None
		All stopped	All stopped	None
2	Remote operation switch priority	Product running	When the remote switch is ON: automatic product restart	None
			When the remote switch is OFF: all stopped	None
		All stopped	When the remote switch is ON: automatic product start	None
			When the remote switch is OFF: all stopped	None

※ Factory default setting: 1

〈Setting restrictions〉

Possible settings for "F001" will be limited depending on the settings of "F002".

"F002" setting	"F001" possible settings
0*0*	0,1 ※2
1*0*	0,1,2

※1 *：indicates 0 or 1 value

※2 Note that even if "F001" is set to "2", changing "F002" settings will also automatically change the "F001" setting to "1". The "F001" setting can be changed after changing "F002".

●"F002" Run/Stop operation select (Relevant parameter: "F001")

This option can be used to select which of the main control panel, remote control, communications device, and/or the remote operation switch 1, can be used to run or stop the product.

"F002" setting				Description
*	*	0	*	
			0	Local (main control panel) control disabled
			1	Local (main control panel) control enabled
		-	-	-
		-		-
	0			Communication device control disabled
	1			Communication device control enabled
0				Remote operation switch 1 control disabled
1				Remote operation switch 1 control enabled

※The factory default setting is 1101 (Local control, communications device control, and remote operation switch 1 control all enabled.)

※1 Multiple control options may be enabled simultaneously.

※2 *：indicates 0 or 1 value.

※3 1*01 value would indicate that the product can be run or stopped by either the local main control panel or the remote switch. The local main control panel switch can turn ON or OFF the product regardless of the ON/OFF setting of the remote operation switch 1.

※4 For control of the product via the communications device, select ” *10*” value.

Parameter Functions

Parameter Functions and Settings

●"F003" Alarm signal output: Open or closed select

Determines the state of contacts (external output signal terminal block [TB1] 3, 4) when an alarm signal is generated. For further information, see page17, “■External output signals”.

"F003" setting	Description
0	During an alarm condition: contacts shorted (closed)
1	During an alarm condition: contacts open

※Factory default setting: 0

※1 Regardless of this setting, the contacts will be open when the main power is removed.

●"F004" Product operation during alarm conditions

In cases where an alarm signal has been generated, this setting determines whether the product will completely shut down or components that are able to operate will continue operating.

"F004" setting	Description
0	All stopped
1	Components that are able to operate will continue operating.

※Factory default setting: 1

※1 For details on specific alarms and consequences to the product operation, see page 68, "■Alarm and Warning Processing".

●"F005" Audible alarm: ON/OFF select (Relevant parameter: "F006")

This setting determines if an audible alarm will sound when an alarm condition occurs.

"F005" setting	Description
0	Audible alarm disabled
1	Audible alarm enabled

※Factory default setting: 1 (audible alarm enabled.)

〈Setting restrictions〉

Possible settings for "F006" will depend on the setting of "F005".

"F005" setting	"F006" possible setting
0	0
1	0
	1

※1 If this setting is set to "0" then parameter "F006" will automatically change to "0" (audible alarm OFF).

※2 Regardless of this setting, there will be no audible alarm for warning conditions "C064" and "C065".

●"F006" Audible warning: ON/OFF select (Relevant parameter: "F005").

This setting determines if an audible warning will sound when a warning condition occurs. (For all warnings except “C064”and “C065”.)

“F006” setting	Description
0	Audible warning disabled
1	Audible warning enabled

※Factory default setting: 1 (audible warning enabled.)

※1 Only applicable to "C***" type warning conditions. Note that no audible warning will sound for "C064" or "C065" regardless of the audible warning settings.

※2 If “F005” is set to “0 , "F006" will automatically change to "0" (audible warning OFF).

※3 "F006" can be changed only if "F005" is set to "1" (audible alarm ON).

Parameter Functions

Parameter Functions and Settings

●"F007" Run/ Stop operation select of controlled air blower fan (Relevant parameter: "F001")
This option can be used to select which of the control panel and/or communications device, can be used to run or stop the controlled air blower fan.

"F007" setting			Description
*	0	*	
		0	Local (control panel) control disabled
		1	Local (control panel) control enabled
	-	-	-
	-		-
0			Communications device control disabled
1			Communications device control enabled

※The factory default setting: 101 (Local control and communications device control enabled.)
※1 Multiple control options may be enabled simultaneously.
※2 *：indicates "0" or "1" value.

●"F008" Settings change control select
Use this setting to determine from where changes to parameter settings can be made: the control panel, or via a communications device.

"F008" setting			Description
*	0	*	
		0	Local (control panel) control disabled
		1	Local (control panel) control enabled
	-	-	-
	-		-
0			Communications device control disabled
1			Communications device control enabled

※Factory default setting: 101 (changes can be made from the control panel and via a communications device.)
※1 Multiple control options may be enabled simultaneously.
※2 *：indicates "0" or "1" value.

●"F080" External alarm signal input 1: Signal type select
An external alarm signal can be input onto CN7 on the control board.

"F080" setting	Signal input enable/ disable	Contact specification
0	Input signal disabled	—
I	Input signal enabled	Alarm when terminals "Closed
2		Alarm when terminals "Open"

※Factory default setting: 0

Parameter Functions

Parameter Functions and Settings

●"F081" External Alarm Signal Input 1: Alarm action select

”F081” setting	Action when alarm occurs	Hot water cool down operation※1	Alarm code	Alarm output	Alarm processing pattern ※2
0	Product operation continues	–	C006	Without	0
1	Product operation continues	–	C006	With	1
2	Compressor stops Controlled air blower fan only operations	With	E006	With	2
3	All stopped	Without	E006	With	3
4	Humidity control stops Compressor operation and controlled air blower fan operation continue	With	E006	With	4
5	Compressor stops Controlled air blower fan only operations	Without	E006	With	5

※Factory default setting: 0

※1 See page 19, “■Cool Down Operation” for information on hot water cool down operation.

※2 See page 69, "■Product Operation Under Alarm Conditions" for information on alarm processing patterns.

●"F082" External alarm signal input 1: Alarm delay time setting

"F082" Setting	Description	
Delay time setting	Lower Limit	Upper Limit
	1 second	60 seconds

※Factory default setting: 4 seconds

●"F083" External alarm signal input 1: Judgment conditions select

Determines alarm-processing operating condition of the product when an alarm signal is received on the external alarm input.

"F083" Setting	Description
0	All the time (Including stopped condition, excluding when unpowered)
1	All conditions other than "all stopped"
2	When temperature control is working with/ without humidity control.
3	When temperature control is working with humidity control.

※ Factory default setting: 1

●"F085" External alarm signal input 2: Signal type select

An external alarm signal can be input onto CN8 on the control board.

"F085" Setting	Signal input enable/ disable	Contact specification
0	Input signal disabled	–
1	Input signal enabled	Alarm when terminals " Closed "
2		Alarm when terminals " Open "

※ Factory default setting: 0

Parameter Functions

Parameter Functions and Settings

●"F086" External alarm signal input 2: Alarm action select

”F086” setting	Action when alarm occurs	Hot water cool down operation※1	Alarm code	Alarm output	Alarm processing pattern ※2
0	Product operation continues	—	C006	Without	0
1	Product operation continues	—	C006	With	1
2	Compressor stops Controlled air blower fan only operations	With	E006	With	2
3	All stopped	Without	E006	With	3
4	Humidity control stops Compressor operation and controlled air blower fan operation continue	With	E006	With	4
5	Compressor stops Controlled air blower fan only operations	Without	E006	With	5

※ Factory default setting: 0

※1 See page 19, “■Cool Down Operation” for information on hot water cool down operation.

※2 See page 69, "■Product Operation Under Alarm Conditions" for information on alarm processing patterns.

●"F087" External alarm signal input 2: Alarm delay time setting

"F087" Setting	Description	
Delay time setting	Lower Limit	Upper Limit
	1 second	60 seconds

※ Factory default setting: 4 seconds

●"F088" External alarm signal input 2: Judgment conditions select

Determines alarm-processing operating condition of the product when an alarm signal is received on the external alarm input.

"F083" Setting	Description
0	All the time (Including stopped condition, excluding when unpowered)
1	All conditions other than "all stopped"
2	When temperature control is working with/ without humidity control.
3	When temperature control is working with humidity control.

※ Factory default setting: 1

●"F090" Communications device address

Using communications functions, selects the address number of the product when multiple products are connected together. Any address from 0 to 31 can be freely chosen for a maximum of 32 products.

※Factory default setting: 0

※1 See page 45, "Communications Functions" for further details regarding communications functions.

Parameter Functions

Parameter Functions and Settings

●"F091" External communications baud rate

Baud rate for when communications functions are used to control multiple connected units.

"F091" Setting	Description
0	38400 bps
1	9600 bps

※ Factory default setting: 1

●"F099" Settings lock/ Release select

This parameter locks out or enables changes to temperature, humidity and parameter settings.

"F099" setting	Description
0	Settings lock disabled (Release)
1	Settings lock enabled (Lock)

※Factory default setting: 0

●"F100" Controlled outlet air temperature control accuracy warning 1 select

This setting allows for control accuracy management of the controlled outlet air temperature.

"F100" setting	Description		Alarm
0	No detection		None
1	Detection ON	Operation continues	C140
2	Detection ON	All stopped	E140

※Factory default setting: 0

※1 If set to "1", the alarm display will alternate between "C140" and the measured temperature, and operation will continue.

※2 The alarm will not be detected when the product is stopped.

※3 This alarm will not be output during the pre-operation period. (See page 18, "■Product Pre-operation".)

●"F101" Controlled outlet air temperature control accuracy warning 1 setting: relative value

"F101" setting	Description	
Relative temperature setting	Lower limit	Upper limit
	±0.01℃	±5.00℃

※Factory default setting: ±1.00℃

※1 Disabled if "F100" is set to "0"

●"F102" Controlled outlet air temperature control accuracy warning 2 select

This setting allows for control accuracy management of the controlled outlet air temperature.

"F102" setting	Description		Alarm
0	No detection		None
1	Detection ON	Operation continues	C141
2	Detection ON	All stopped	E141

※Factory default setting: 0

※1 If set to "1", the alarm display will alternate between "C141" and the measured temperature, and operation will continue.

※2 The alarm will not be detected when the product is stopped.

※3 This alarm will not be output during the pre-operation period. (See page 18, "■Product Pre-operation".)

Parameter Functions

Parameter Functions and Settings

●"F103" Controlled outlet air temperature control accuracy warning 2 setting : relative value

"F103" setting	Description	
Relative temperature setting	Lower limit	Upper limit
	±0.01℃	±5.00℃

※Factory default setting: ±0.50℃

※1 Disabled if "F102" is set to "0"

●"F104" Controlled outlet air temperature upper and lower limit alarm select

"F104" setting	Description		Alarm
0	No detection		None
1	Detection ON	All stopped	E142／E143

※Factory default setting: 1

※1 This alarm will not be output during the pre-operation period. (See page 18, "■Product Pre-operation".)

●"F105" Controlled outlet air temperature upper limit alarm setting: absolute value

"F105" setting	Description	
Absolute value (including startup standby)	Lower limit	Upper limit
	「F106」+2℃	45.00℃

※Factory default setting: 35.00 ℃

※1 If set to "1", the alarm display will alternate between "E142" and the measured temperature, and operation will stop.

※2 The alarm will not be detected when the product is stopped.

※3 Disabled if "F104" is set to "0"

●"F106" Controlled outlet air temperature lower limit alarm setting: absolute value

"F106" setting	内容	
Absolute value (including startup standby)	Lower limit	Upper limit
	8.00℃	「F105」-2℃

※Factory default setting: 8.00 ℃

※1 If set to "1", the alarm display will alternate between "E143" and the measured temperature, and operation will stop.

※2 The alarm will not be detected when the product is stopped.

※3 Disabled if "F104" is set to "0"

●"F107" Pre-operation time when starting

"F107" settings	Description	
Setting of time (how long alarms/ warnings will be suppressed)	Lower limit	Upper limit
	30 minutes	120 minutes

※Factory default setting: 60 minutes

※1 This setting indicates the time when alarms (or warnings) connected with "F100", "F102", "F104", “F600”, “F602” and “F604” will be suppressed after the product starts in order to allow the temperature to stabilized.

●"F109" Pre-operation time when changing setting value

"F109" setting	Description	
Setting of time (how long alarms/ warnings will be suppressed)	Lower limit	Upper limit
	0 minute	F107

※Factory default setting: 60 minutes

※1 This setting indicates the time when alarms (or warnings) connected with "F100", "F102", "F104", “F600”, “F602” and “F604” will be suppressed after temperature/ humidity settings are changed or after auto-tuning takes place or after forced supply and drainage of humidification water takes place, in order to allow the temperature/ humidity to stabilize.

※2 If the time set in "F107" is shorter than the time set in "F109" then "F109" will automatically get the time setting from "F107".

●"F110" Heating and cooling control: P value

"F110" setting	Description	
P value setting	Lower limit	Upper limit
	0.0℃	100.0℃

※The factory default setting is determined and set at the time of inspection when the product is shipped.

●"F111" Heating and cooling control: I value

"F111" setting	Description	
I value setting	Lower limit	Upper limit
	0 second	3600 seconds

※The factory default setting is determined and set at the time of inspection when the product is shipped.

●"F112" Heating and cooling control: D value

"F112" setting	Description	
D value setting	Lower limit	Upper limit
	0 seconds	3600 seconds

※The factory default setting is determined and set at the time of inspection when the product is shipped.

●"F113" Controlled outlet air measured temperature offset (PV bias)

Performs sensor correction; adjusts measured value by the offset setting. Used to adjust the value when there is a discrepancy between the product's measured value and another sensor.

"F113" setting	Description	
Temperature offset	Lower limit	Upper limit
	-2.00℃	2.00℃

※Factory default setting: 0.00 ℃

●"F119" Controlled outlet air temperature digital filter setting

Sets a filter on the temperature display value in order to mitigate sudden changes in the displayed value. A setting of "0 sec." will cause the filter to be disabled. The higher the setting, the more effect the filter will have.

"F119" setting	Description	
Time interval	Lower limit	Upper limit
	0 second	30 seconds

※Factory default setting: 0 second

Parameter Functions

Parameter Functions and Settings

●"F120" Temperature alarm signal output: Open or closed select

Determines the state of contacts (external output signal terminal block [TB1] 5, 6) when a temperature warning (alarm) signal is generated. For further information, see page 17, "■External Output Signals".

"F120" setting	Description
0	During an alarm condition: contacts shorted (closed)
1	During an alarm condition: contacts open

※Factory default setting: 1

※1.Regardless of this setting, the contacts will be open when the main power is removed.

●"F122" Pre-operation signal: Open or closed select

Determines the state of contacts (external output signal terminal block [TB1] 7, 8) when a signal is generated during pre-operation.

For further information, see page 18, "■Product Pre-operation".

"F122" setting	Description
0	During pre-operation: contacts shorted (closed)
1	During pre-operation: contacts open

※Factory default setting: 0

※1.Regardless of this setting, the contacts will be open when the main power is removed.

●"F136" Controlled air temperature display digits select

"F136" setting	Description
0	No digits displayed after decimal point.
1	One digit displayed after decimal point.
2	Two digits displayed after decimal point.

※Factory default setting: 2

●"F161" Controlled air blower fan shutdown delay time setting

After performing stop operation, operations of the controlled air blower fan and the compressor will continue as for the shutdown delay operation. (See page 19, " ■Cool Down Operation") The digital temperature display will also show [COOL] during shutdown delay operation.

"F161" setting	Description	
Shutdown delay time setting	Lower limit	Upper limit
	"F662" + 1 minute	60 minutes

※Factory default setting: 8 minutes

●"F531" Humidifier maintenance period time setting

Sets the accumulated humidification operating time until "C516", the humidifier maintenance period warning, occurs.

"F531" settings	Description	
Maintenance period time setting	Lower limit	Upper limit
	0 hour	9999 hours

※ Factory default setting: 2,000 hours

※1. If "F531" is set to "0", then warning "C516" will not be generated.

Parameter Functions

Parameter Functions and Settings

●"F600" Controlled outlet air humidity control accuracy warning 1 select

"F600" setting	Description		Alarm
0	No detection	ー	None
1	Detection ON	Operation continues	C640
2	Detection ON	Humidity control operation stops (All stopped) ※2	E640

※Factory default setting: 0

※1 When using a setting of “1”, the alarm display will alternate between [C640] and measured humidity. And the product operation continues.

※2 When using a setting of "2", also take into consideration the setting of parameter "F004" and adjust it as required. If "F004" is set to "0", then the product will completely shut down.

※3 The alarm will not be detected when the product is stopped.

※4 The alarm will not be detected during pre-operation. (See page 18, “■Product Pre-operation”.)

●"F601" Controlled outlet air humidity control accuracy warning 1 setting: relative value

"F601" setting	Description	
Relative humidity setting	Lower limit	Upper limit
	±0.1%	±10.0%

※Factory default setting: ±5.0%

※1 "F601" can be changed if "F600" is set to either "1" or "2".

●"F602" Controlled outlet air humidity control accuracy warning 2 select

"F602" setting	Description		Alarm
0	No detection	-	None
1	Detection ON	Operation continues	C641
2	Detection ON	Humidity control operation stops (All stopped) ※2	E641

※Factory default setting: 0

※1 When using a setting of “1”, the alarm display will alternate between [C641] and measured humidity. And the product operation continues.

※2 When using a setting of "2", also take into consideration the setting of parameter "F004" and adjust it as required. If "F004" is set to "0", then the product will completely shut down.

※3 The alarm will not be detected when the product is stopped.

※4 The alarm will not be detected during pre-operation. (See page 18, “■Product Pre-operation”.)

●"F603" Controlled outlet air humidity control accuracy warning 2 setting: relative value

"F603" setting	Description	
Relative humidity setting	Lower limit	Upper limit
	±0.1%	±10.0%

※Factory default setting: ±1.0%

※1 "F603" can be changed if "F600" is set to either "1" or "2".

●"F604" Controlled outlet air humidity control upper limit alarm select

"F604" setting	Description		Alarm
0	No detection	-	None
1	Detection ON	Humidity control operation stops (All stopped) ※2	E642

※Factory default setting: 1

※1 The alarm will not be detected during pre-operation. (See page 18, “■Product Pre-operation”.)

※2 When using a setting of "2", also take into consideration the setting of parameter "F004" and adjust it as required. If "F004" is set to "0", then the product will completely shut down.

●"F605" Controlled outlet air humidity control upper limit alarm setting: absolute value

"F605" setting	Description	
Humidity upper limit setting	Lower limit	Upper limit
	80%	100%

※Factory default setting: 95.0%

※1. If "F604" is set to "0", then warning "E642" will not be generated.

●"F606" Controlled outlet air humidity control upper limit alarm evaluation time setting

"F606" setting	Description	
Evaluation time	Lower limit	Upper limit
	30 seconds	600 seconds

※Factory default setting: 180 seconds

※1. If "F604" is set to "0", then warning "E642" will not be generated.

●"F607" Humidity warning (alarm) signal output: Open or closed select

Determines the state of contacts (external output signal terminal block [TB4] 1, 2) when a humidity warning (alarm) signal is generated. For further information, see page 17, "■External Output Signals".

"F607" setting	Description
0	During an alarm condition: contacts shorted (closed)
1	During an alarm condition: contacts open

※Factory default setting: 1

※1Regardless of this setting, the contacts will be open when the main power is removed.

●"F614" Controlled outlet air measured humidity offset (PV bias)

Performs sensor correction; adjusts measured value by the offset setting. Used to adjust the value when there is a discrepancy between the product's measured value and another sensor.

"F614" setting	Description	
Humidity offset	Lower limit	Humidity offset
	-10.0%	10.0%

※Factory default setting: 0.0%

●"F619" Controlled outlet air humidity digital filter setting

This setting softens the change of the measured humidity display by the digital filter.

When "F619" setting is "0", the filter is disabled. An effect of the filter is larger as the setting value is larger.

"F619" setting	Description	
Time setting	Lower limit	Upper limit
	0 second	30 seconds

※Factory default setting: 0 second

●"F630" Humidification water shortage alarm evaluation time

"F630" setting	Description	
Evaluation time setting	Lower limit	Upper limit
	0 second	60 seconds

※Factory default setting: 60 seconds

Parameter Functions

Parameter Functions and Settings

●"F631" Humidification water shortage warning evaluation time

“F631” setting	Description	
Evaluation time setting	Lower limit	Upper limit
	0 second	“F630” seconds

※Factory default setting: 0 second

●"F636" Controlled air humidity display digits select

"F136" setting	Description
0	No digits displayed after decimal point.
1	One digit displayed after decimal point.

※Factory default setting: 1

●"F640" Humidification heater control: P value

"F640" setting	Description	
P value setting	Lower limit	P value setting
	0.0%	100.0%

※The factory default setting is determined and set at the time of inspection when the product is shipped.

●"F641" Humidification heater control: I value

"F641" setting	Description	
I value setting	Lower limit	I value setting
	0 seconds	3600 seconds

※The factory default setting is determined and set at the time of inspection when the product is shipped.

●F642" Humidification heater control: D value

"F642" setting	Description	
D value setting	Lower limit	D value setting
	0 seconds	3600 seconds

※The factory default setting is determined and set at the time of inspection when the product is shipped.

●"F653" Humidification control: ON/ OFF select

"F653" setting	Description
0	Humidification control: OFF
1	Humidification control: ON

※Factory default setting: 1.

Parameter Functions

Parameter Functions and Settings

●”F660” Intermittent supply control of humidification water: Water supply OFF time
Determines the time that the supply of humidification water is stopped during intermittent supply of humidification water. A setting of 0 second means that the supply of water will not be intermittent. (Water will be supplied continuously. "F661" will not be displayed.) If water is to be supplied via a gravity flow supply using the water tank, then, if there is a drop in the water pressure, either the "C630" Humidification water shortage warning or the "E630" Humidification water shortage alarm may occur. In such cases, either change this parameter to stop the intermittent supply of water, or shorten the water supply OFF time.

“F660” setting	Description	
OFF time setting	Lower limit	Upper limit
	0.0 seconds	60.0 seconds

※Factory default setting: 4.0 seconds

●”F661” Intermittent supply control of humidification water: Water supply ON time
Determines the time that the supply of humidification water will occur during the intermittent supply of humidification water. If water is to be supplied via a gravity flow supply using the water tank, then, if there is a drop in the water pressure, either "C630" Humidification water shortage warning or "E630" Humidification water shortage alarm may occur. In such cases, either set "F660" to stop the intermittent supply of water, or set this parameter to lengthen the water supply ON time.

“F661” setting	Description	
ON time setting	Lower limit	Upper limit
	0.1 seconds	60.0 seconds

※Factory default setting: 0.5 seconds
※1 If “F660” is set to “0”, this setting is disabled.

●”F662” Cool down operation: Hot water cool down operation time
Determines the hot water cool down time after stopping operation (by continuing the supply of humidification water to lower the temperature of the hot water in the humidifier.) If there is no cool down operation (setting of 0 minute) at times when water is being supplied via the water tank or when using the drain pump or when using the drain tank, then set "F161" Controlled air blower fan stop delay time setting to at least 30 minutes.

“F662” setting	Description	
Cool down operation time setting	Lower limit	Upper limit
	0 minute	59 minutes

※Factory default setting: 7 minutes

●"F663" Cool down operation: Compressor ON/ OFF select

“F663” setting	Description
0	Controlled air blower fan is operated without compressor
1	Controlled air blower fan is operated with compressor

※Factory default setting: 1
※1 Compressor is operated with controlled air blower fan during fan stop delay time if “F161” is set to “1”.

●"F664" Forced supply and drainage of humidification water: The time for one operation cycle
Sets the forced supply and drainage of humidification water operation time.

"F664" setting	Description	
Operation time setting	Lower limit	Upper limit
	0 second	9999 seconds

※ Factory default setting: 420 seconds

Parameter Functions

Parameter Functions and Settings

●"F665" Forced supply and drainage of humidification water: Automatic start ON/ OFF select

If “F665” is set to “1”, the forced supply and drainage of humidification water will start automatically when the accumulated electricity energizing time to the product reaches the preset time setting of “F666” or “F667”

"F665" setting	Description
0	Operation will not automatically start.
1	Operation will automatically start.

※ Factory default setting: 0

●"F666" Forced supply and drainage of humidification water: Time interval between starting

"F666" setting	Description	
Interval time setting	Lower limit	Upper limit
	1 Minute	999999 Minutes

※ Factory default setting: 1440 minutes

※1 If the setting time exceeds 10,000 minutes, the digital temperature display (PV) alternates between “F666” and the first two digits.

※2 See the following section, “ Important notes for setting “F666” and “F667“ for further information.

●"F667" Forced supply and drainage of humidification water: Time to the first operation

"F667" setting	Description	
Interval time setting	Lower limit	Upper limit
	1 Minute	9999 Minutes

※ Factory default setting: 0 minute

※1 See below, “ Important notes for setting “F666” and “F667“ for further information.

※2 Once automatic start is performed, this setting will be change to “0” automatically.

【Setting example】

When the current time is 13:00, and the automatic operation setting is set for every night at 0:00 (midnight).

”F666”: “1440”・・・ 24h x 60 min/h =1440 min

”F667”: “660”・・・ (24h-13h) x 60 min/h =660 min

【F666 and F667 Setting Considerations】

- Elapsed time is accumulated even when product operation has stopped. However, time will not be accumulated when power is not applied to the product (when the product breaker is OFF), so the power should not be removed if automatic starting is enabled.
- This action will automatically start even when the product is not currently operating. Do not cut off power or the supply of water.
- Automatic starting will not occur if an alarm condition is present during the automatic start time period. It will resume from the next automatic start time period (“F667”).

●"F668" Forced supply and drainage of humidification water: Water supply OFF time

“F668” setting	Description	
OFF time setting	Lower limit	Upper limit
	0.0 second	60.0 seconds

※Factory default setting: 0.0 second

●"F669" Forced supply and drainage of humidification water: Water supply ON time

“F669” setting	Description	
ON time setting	Lower limit	Upper limit
	0.1 seconds	60.0 seconds

※Factory default setting: 0.1 seconds

※1 If “F668” is set to “0.0”, this setting is disabled.

Parameter Functions

Parameter Functions and Settings

●"F700" Analog output 1: Data output format select

Determine the data output format of the external output signal terminal block [TB5] 1, 2 (See page 18, "■Analog Output 1, 2").

"F700" setting	Description
0	No output
1	Output 0－5V
2	Not available
3	Not available

※Factory default setting: 0

●"F701" Analog output 1: Data select

"F701" setting	Description	Output range
0	Controlled output measured temperature	0 to 100℃
1	Controlled outlet setting temperature	0 to 100℃
2	Controlled outlet measured humidity	0 to 100%
3	Controlled outlet setting humidity	0 to 100%

※Factory default setting: 0

●"F702" Analog output 1: Output data upper limit

"F702" setting	Description	
Upper limit setting	Lower limit	Upper limit
	"F703" ℃ or %	100.0 ℃ or %

※Factory default setting: 50.0

※1 The wider the range is, the lower the resolution will be. Therefore, determine the range as narrower as possible.

●"F703" Analog output 1: Output data lower limit

"F703" setting	Description	
Lower limit setting	Lower limit	Upper limit
	0.0 ℃ or %	"F702" ℃ or %

※Factory default setting: 0.0

※1 The wider the range is, the lower the resolution will be. Therefore, determine the range as narrower as possible.

●"F705" Analog output 2: Data output format select

Determine the data output format of the external output signal terminal block [TB5] 3, 4 (See page 18, "■Analog Output 1, 2").

"F700" setting	Description
0	No output
1	Output 0－5V
2	Not available
3	Not available

※Factory default setting: 0

Parameter Functions

Parameter Functions and Settings

●"F706" Analog output 2: Data select

“F706” setting	Descriptipon	Output range
0	Controlled output measured temperature	0 to 100℃
1	Controlled outlet setting temperature	0 to 100℃
2	Controlled outlet measured humidity	0 to 100%
3	Controlled outlet setting humidity	0 to 100%

※Factory default setting: 1

●"F707" Analog output 2: Output data upper limit

“F707” setting	Description	
Upper limit setting	Lower limit	Upper limit
	“F708” ℃ or %	100.0 ℃ or %

※Factory default setting: 100.0

※1 The wider the range is, the lower the resolution will be. Therefore, determine the range as narrower as possible.

●"F708" Analog output 2: Output data lower limit

“F708” setting	Description	
Lower limit setting	Lower limit	Upper limit
	0.0 ℃ or %	“F707” ℃ or %

※Factory default setting: 0.0

※1 The wider the range is, the lower the resolution will be. Therefore, determine the range as narrower as possible.

Temperature and Humidity Control Value Tuning Functions

PID Auto-tuning

How to Perform Temperature and Humidity Control PID Auto-tuning

Temperature control values (PID values) must be adjusted according to where the outlet air temperature and humidity sensor is installed, air flow, and the type and load of conditioned air required. PID values are set as according to the following conditions at the time the product is shipped. If the product is to be used under different conditions, the PID values must be adjusted using the following method in order to meet the particular temperature and humidity control conditions.

1. Factory default PID setting conditions

(1) Temperature sensor installation location: Controlled air outlet
(2) Airflow : Rated airflow
(3) Load : No load

※ If even under the above conditions, temperature/ humidity cannot be controlled, PID auto-tuning should be carried out as detailed below.

2. Before performing auto-tuning, please confirm and write down the current PID values.

(1) First push the [^] button, then push the [v] button in order to show the parameter in the digital temperature display.
(For further information, see page 24, "How to Change Parameter Settings".)

(2) Push the [^] or [v] buttons to confirm the temperature control value.
Temperature control value
① "F110" = Temperature P value ② "F111" = Temperature I value
③ "F112" = Temperature D value

(3) Then push the [^] or [v] buttons to confirm the humidity control value.
Humidity control value
① "F640" = Humidity P value ② "F641" = Humidity I value
③ "F642" = Humidity D value

(4) The display will return to showing the set temperature after either pushing the [RESET] button, or if a key hasn't been pressed for a few seconds.

3. Setting the product to run only with temperature control (without humidity control) for 30 minutes or longer.

■How to Turn Off Humidity Control Operation

(1) Press and hold the [SET] button for 2 seconds.
The digital humidity display (SV) will be flashing and changed to the humidity input mode.
※If the digital temperature display (SV) will be flashing and changed to the temperature input mode, press the [TEMP. ↔ HUMIDITY] button to change input position from the temperature to the humidity.

(2) Press the [v] button to lower the set humidity below the lower limit value. (The humidity lower limit value is 30%.) If the set humidity goes below the lower limit value, [----] will show in the digital humidity display (SV).

(3) Press the [SET] button. Humidity control operation will stop, and the product will operate with temperature control only.

※If auto-tuning is performed immediately after the product is started or during humidity control operation, it is possible that the resulting PID values might not be suitable.

Temperature and Humidity Control Value Tuning Functions

PID Auto-tuning

4. Carry out temperature control side auto-tuning

(1) Have the digital temperature display on the control panel show "EEV heating output [EEV]" and measured data. (For further details, see page 22, "Monitor Functions".)

① Press and hold the [SET] button for 7 seconds.

② Push the [∧] and [∨] buttons until [EEV] is displayed.

(2) Start temperature control side auto-tuning.

① While [EEV] is being displayed, press and hold the [SET] button for 5 seconds.

② [STAT] will show in the digital display.

③ While the display is showing [STAT], push the [SET] button again. [AT-C] will show flashing in the digital display, and auto-tuning will start.

④ Press the [RESET] button to cancel auto-tuning before it has finished. The PID values will return to what they were before the auto-tuning was initiated.

⑤ The auto-tuning will automatically stop. ([EEV] will show in the display again.)

※ If auto-tuning cannot complete successfully, "C170" warning will be output and temperature control side auto-tuning will stop after continuing the auto-tuning for 30 minutes.

5. Operate the product under temperature and humidity control for at least 30 minutes.

※Note that if humidity control side auto-tuning is carried out immediately after the product is turned on, the resulting PID values may not be suitable.

6. Carry out humidity control side auto-tuning

(1) Have the digital temperature display on the control panel show "Humidification heater output [HEAT]" and measured data. (For further details, see page 22, "Monitor Functions".)

①Press and hold the [SET] button for 7 seconds.

②Push the [∧] and [∨] buttons until [HEAT] is displayed.

(2) Start humidity control side auto-tuning.

①While [HEAT] is being displayed, press and hold the [SET] button for 5 seconds.

②[STAT] will show in the digital display.

③While the display is showing [STAT], push the [SET] button again. [AT-H] will show flashing in the digital display, and auto-tuning will start.

④Press the [RESET] button to cancel auto-tuning before it has finished. The PID values will return to what they were before the auto-tuning was initiated.

⑤The auto-tuning will automatically stop. ([HEAT] will show in the display again.)

※If auto-tuning cannot complete successfully within 30 minutes, the "C670" warning will be output and humidity control side auto-tuning will stop after continuing the auto-tuning for 30 minutes.

7.**After performing auto-tuning, please confirm and write down the current PID values.**

Date	Intake air temp.	Intake air humid.	Setting temp.	Intake air flow	Temperature PID values			Humidity PID values		
	℃	%	℃	m^3/min	P	I	D	P	I	D

This completes the auto-tuning procedure. Operate the product under true temperature and humidity control conditions and confirm the controlled state. If operation is not stable, PID settings can be changed manually or the sensing (sensor) position should be changed.

Communications Functions

Overview of Communication Functions

Overview of Communications Functions

Following the guidelines outlined in the following section, "Communications specifications", communications functions can be made to work with a user's specialized control program in order to best suit the requirements of the application at hand.

IMPORTANT

- **If parameter "F002" (Run/Stop operation select") is set to "*00*", then the product cannot be run or stopped via communications devices. Please use settings of "*10*".**
- **Note that the air temperature and humidity settings cannot be changed using communications functions if parameter "F099" (Settings lock) is set to "1" or, or if parameter "F008" (Settings change control select) is set to "000" or "001".**
- **For further information on how to change settings, see page 24, "How to Change Parameter Settings".**
- **Keep communications lines separated from control lines and power cords. Bundling these cables or passing them through the same conduit can lead to noise and communications errors.**

■Communications protocols

1. USB Port: USB 2.0
2. EIA standard RS-422A/485 based (※1)
3. EIA standard RS-232C based (※1)

■Communications method

1. USB, half-duplex point-to-point connection
2. RS-422A 4 line, half duplex, multi-drop connection (※1)
3. RS-485 2 line, half duplex, multi-drop connection (※1)
4. RS-232C half duplex point-to-point connection (※1)

■Communications rate

38400 bps or 9600 bps (according to parameter "F091" setting)

■Data format

1 start bit, 8 data bits
no parity, 1 stop bit

■Error detection and correction

LRC

■Number of the products that can be connected

1. USB: 1 units
2. RS-422A: 32 units
3. RS-485: 32 units
4. RS-232C: 1 unit

※1. If RS-422A, RS-485, or RS-232C are used, then the "Communications Board Interface Kit", Part No. 04107613010 (sold separately) is required. Note that USB cannot be used together with RS-422A, RS-485, or RS-232C.

※2. Even if RS-232C is used on the host computer, by connecting to the RS-422A (or RS-485) connectors on the PAP units, up to 32 units can be connected. (See page 56, "■Communications cables and connectors" for further details.)

Communications Functions

Overview of Communication Functions

■Data types

1. Text: JIS (ASCII) 7 bit encoding
2. Control codes

Signal name	Signal code (16 bit)	Comments
STX	02h	Start of Text
ETX	03h	End of Text
EOT	04h	End of Transmission
ENQ	05h	Enquiry
ACK	06h	Acknowledge
NAK	15h	Negative Acknowledge

■Connector pin descriptions

1. USB (Shown as "USB" on the connector in the distribution panel.)

No.	Signal Name	Comments
1	VBUS	USB Power
2	D–	Data (–)
3	D＋	Data (+)
4	GND	Power Ground
5	GND	Power Ground

2. RS-422A/485 (Shown as “RS422A/485” on the connector in the distribution panel.)

Pin No.	Signal name	Comments
1	SG	Signal ground
2	RDB(+)	Receive data
3	RDA(-)	Receive data
4	SDB(+)	Send data
5	SDA(-)	Send data

※For RS-485 hookups, connect the RDA(-) and SDA(-) lines together, and also connect the RDB(+) and SDB(+) lines together.

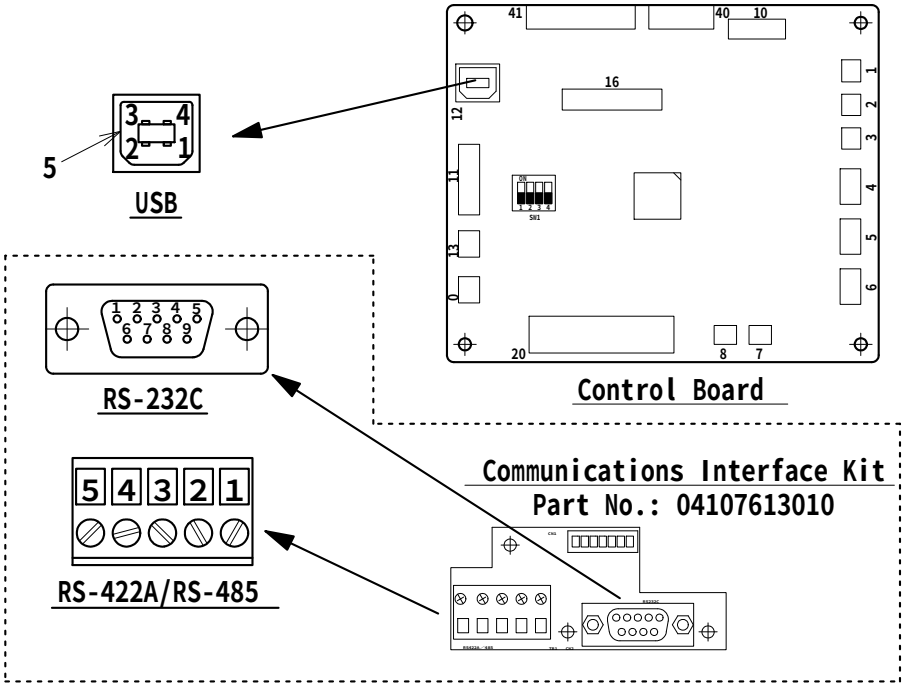
3. RS-232C (Shown as “RS232C” on the connector in the distribution panel.)

Pin No.	Signal name	Comments
1		
2	TXD	Transmit data
3	RXD	Receive data
4		
5	SG	Signal ground
6		
7	CTS	Clear to send
8	RTS	Ready to send
9		

Communications Functions

Overview of Communication Functions

■Connector and pin layout in the distribution panel



※ The connectors and circuit board outlined in the dotted-line are optional parts.
※ Numbers indicate pin numbers on the connector.
※ USB cannot be used together with RS-422A, RS-485, or RS-232C.
※ See page 70 for a full layout of the inside of the distribution panel.

Communications Functions

Overview of Communications Functions

■Communications logic

1. USB

Signal voltage	Logic
(D–) - (D+) > 200 mV, and D– > VIH (min)	0 (space)
(D+) - (D–) > 200 mV, and D+ > VIH (min)	1 (mark)

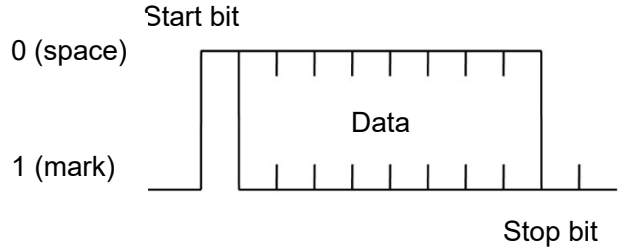
2. RS-422A／485

Signal voltage	Logic
V(A) ＞ V(B)	0 (space)
V(A) ＜ V(B)	1 (mark)

3. RS-232C

Signal voltage	Logic
+3V or higher	0 (space)
-3V or lower	1 (mark)

■Data configuration

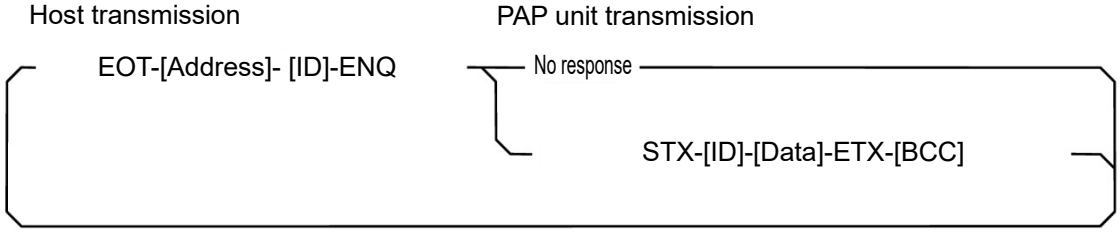


■Communications protocol

This product employs the polling/selecting method to establish a data link.

1. Polling

The host computer requests a connected product to transmit data to.



(1) Polling procedure

①Data link initialization

The host computer will send an EOT signal to the PAP unit controller in order to initiate a data link before the polling sequence.

②Polling sequence

[Address] - [ID] - ENQ

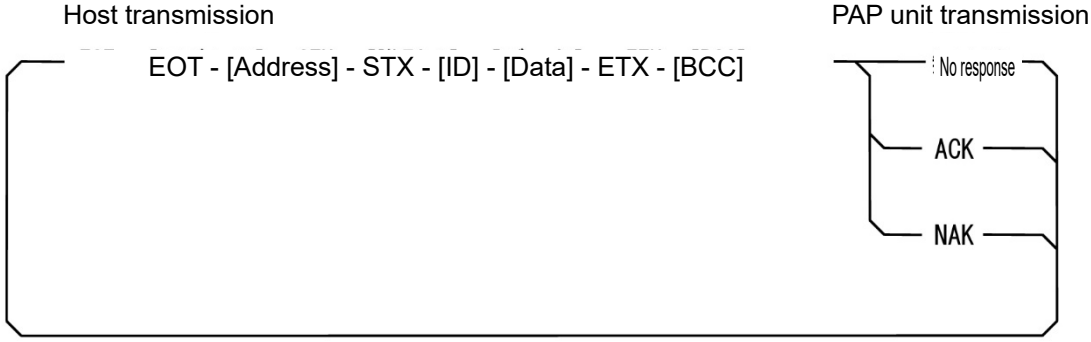
・[Address] : Address of polled device (PAP unit)

2 digit, base 10, JIS character number (00-31)

・[ID] : Code to identify data type
2 digit, English JIS character
See page 50, "Communications ID codes" for further details.
・ENQ : Control character that indicates the end of the polling sequence.
After this, the host computer will wait for a response from the PAP unit.

③PAP unit data transmission
STX - [ID] - [Data] - ETX - [BCC]
・STX : STX is the control character that indicates the start of the text transmission.
・[ID] : Identifies the type of data to be sent.
See page 50, "Communications ID codes" for further details on the 2 digit, English JIS characters.
・[Data] : Indicates the data intended for the PAP unit of the previously sent ID number.
8 bit JIS character
・ETX : The control character that indicates the end of the text transmission.
・[BCC] : A block check character used to detect any errors by using horizontal parity. It is calculated by performing an exclusive-OR on all characters after STX until ETX.

2. Selecting
The host computer requests one of the connected PAP units to send data to.



(1) Selecting procedure
①Data link initialization
The host computer will send an EOT signal to the PAP unit controller in order to initiate a data link before the selecting sequence.
②Selecting sequence
[Address] - STX - [ID] - [Data] - ETX - [BCC]
・[Address] : Address of polled device (PAP unit)
2 digit, base 10, JIS character number (00-31)
・STX : STX is the control character that indicates the start of the text transmission.
・[ID] : Code to identify data type
2 digit, English JIS character
See page 50, "Communications ID codes" for further details.
・[Data] : Data for the indicated ID (same as in the polling process).
8 bit JIS character
・ETX : The control character that indicates the end of the text transmission.
・[BCC] : A block check character used to detect any errors by using horizontal parity.
It is calculated by performing an exclusive-OR on all characters after STX until ETX.
・Response from PAP unit
・ACK : Acknowledge (Response from the PAP unit indicating that the received data is correct.)
・NAK : Negative acknowledge (Response from the PAP unit indicating that the received data is incorrect.)

Communications Functions

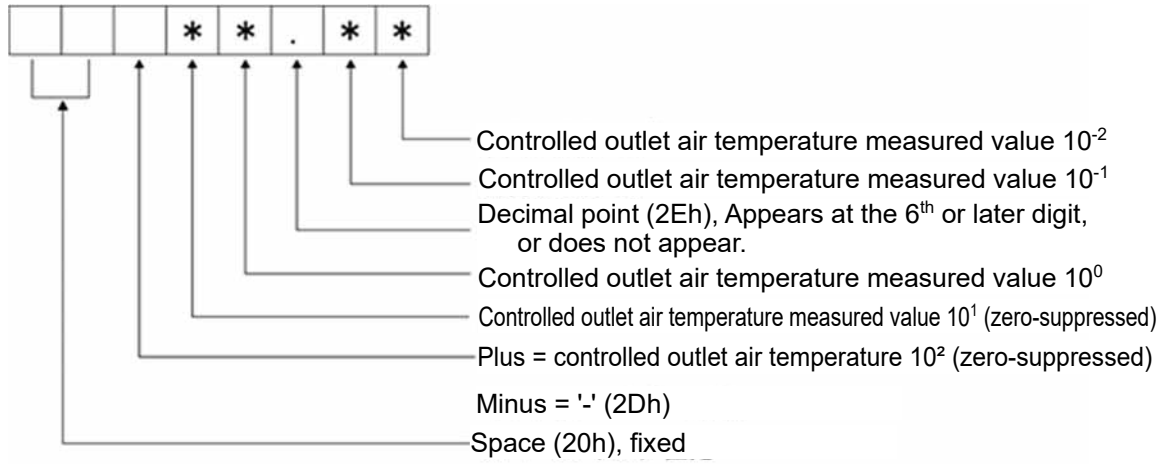
Overview of Communications Functions

■Communications ID codes

ID	Description	Data range	Polling	Selecting
M1	Controlled outlet air temperature measured value	-99.99 to 99.99	○	×
M5	Controlled outlet air humidity measured value	-99.99 to 99.99、0.0 to 100.0	○	×
S1	Controlled outlet air temperature setting value	18 to 30 (minimum increment：0.01)	○	○
S5	Controlled outlet air humidity setting value	18 to 30、45 to 75 (minimum increment：0.1)	○	○
JŌ	Operation state	0: Stopped	○	○
		1: Pre-operation	○	×
		2: Operating	○	○
		3: Controlled air blower fan-only operation	○	○
ER	Alarm signal	Alarm code shown in display	○	×

■Communications data configuration

1. M1:Controlled outlet air temperature measured value, S1:Controlled outlet air temperature setting value



Example: 25.38℃

			2	5	.	3	8
20h	20h	20h	32h	35h	2Eh	33h	38h

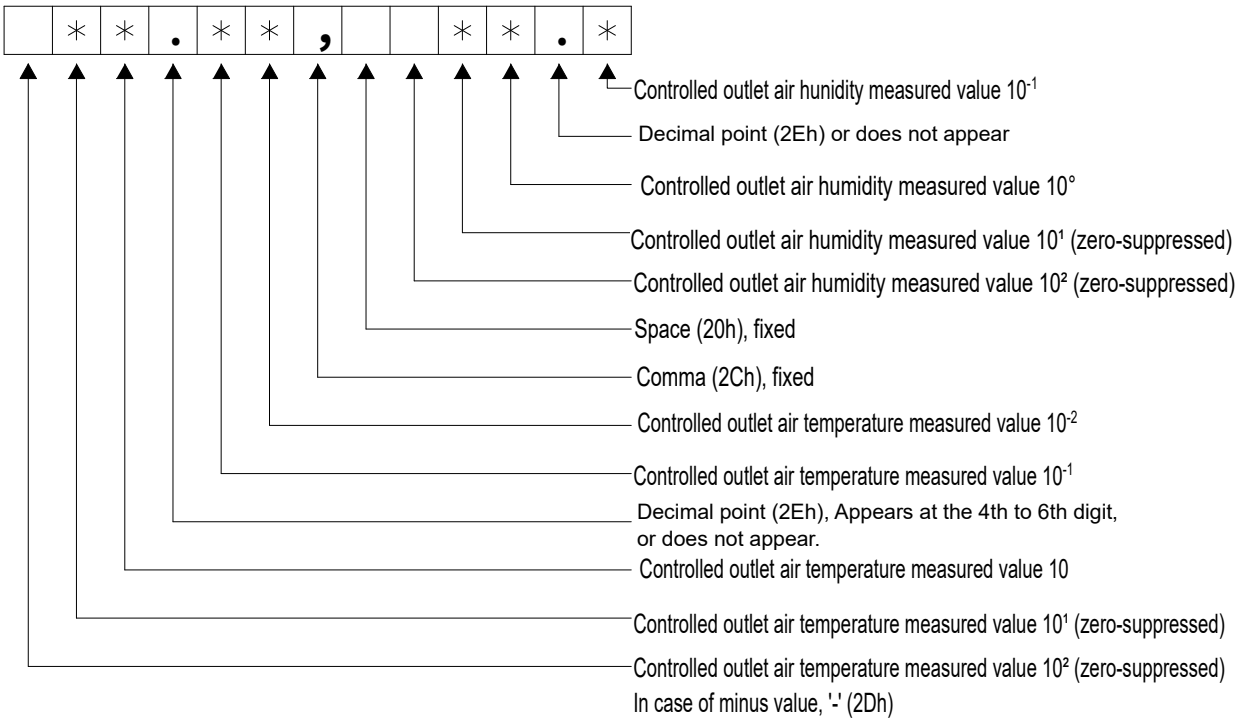
Example: 5.00℃

				5	.	0	0
20h	20h	20h	20h	35h	2Eh	30h	30h

Example: -3.45℃

		—		3	.	4	5
20h	20h	2Dh	20h	33h	2Eh	34h	35h

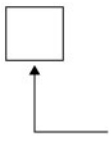
2. M5: Controlled outlet air temperature and humidity measured values, S5: Controlled outlet air temperature and humidity setting values



Example: 25.38℃ 42.3%

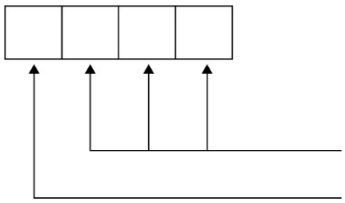
	2	5	.	3	8	,			4	2	.	3
20h	32h	35h	2Eh	33h	38h	2Ch	20h	20h	34h	32h	2Eh	33h

3. JÕ Operation state



Stop = '0' (30h) Unit pre-operation = '1' (31h) Operating = '2' (32h)
Blower fan (controlled air side) only operation = '3' (33h)

4. ER Alarm code



Example: C064

C	0	6	4
43h	30h	36h	34h

Example: E005

E	0	0	5
45h	30h	30h	35h

Example: No alarm

20h	20h	20h	20h

Example: C103

C	1	0	3
45h	31h	30h	33h

■Communications procedure example

1. Polling

(1) The host computer sends a request to the PAP unit (device address = 05) for the measured temperature, and the PAP unit responds with the temperature (12.34**℃**).

Host computer transmission

EOT	Address		ID		ENQ
	0	5	M	1	
04h	30h	35h	4Dh	31h	05h

PAP unit transmission

STX	ID		Address								ETX	BCC
	M	1				1	2	.	3	4		
02h	4Dh	31h	20h	20h	20h	31h	32h	2Eh	33h	34h	03h	75h

(2) The host computer sends a request to the PAP unit (device address = 27) for the temperature setting, and the PAP unit responds with that setting (20.00℃).

Host computer transmission

EOT	Address		ID		ENQ
	2	7	S	1	
04h	32h	37h	53h	31h	05h

PAP unit transmission

STX	ID		Data								ETX	BCC
	S	1				2	0	.	0	0		
02h	53h	31h	20h	20h	20h	32h	30h	2Eh	30h	30h	03h	6Dh

(3) The host computer sends a request to the PAP unit (device address = 00) for current operating state, and the PAP unit responds with the current state (controlled air blower fan-only operation).

Host computer transmission

EOT	Address		ID		ENQ
	0	0	J	$\overline{0}$	
04h	30h	30h	4Ah	4Fh	05h

PAP unit transmission

STX	ID		Data	ETX	BCC
	J	$\overline{0}$	3		
02h	4Ah	4Fh	33h	03h	35h

(4) The host computer sends a request to the PAP unit (device address = 01) for the alarm code, and the PAP unit responds with the current code (E005).

Host computer transmission

EOT	Address		ID		ENQ
	0	1	E	R	
04h	30h	31h	45h	52h	05h

PAP unit transmission

STX	ID		Data				ETX	BCC
	E	R	E	0	0	5		
02h	45h	52h	45h	30h	30h	35h	03h	64h

2. Selecting

(1) S1: Controlled outlet air temperature setting

The host computer selects the PAP unit (device address = 27) and sends the new temperature setting (20.05℃) to that unit, and the temperature setting of the unit is changed.

Host computer transmission

EOT	Address		STX	ID		Data								ETX	BCC
	2	7		S	1				2	0	.	0	5		
04h	32h	37h	02h	53h	31h	20h	20h	20h	32h	30h	2Eh	30h	35h	03h	68h

PAP unit transmission

ACK
06h

In case of a data error, the host computer will reply with the 'NAK' (15h) character.

Examples:

- Incorrect data length
- BCC error
- Incorrect decimal point position
- Data out of range

(2) JO : Operation state

The host computer selects the PAP unit (device address = 01) and sends the run command (“2”), then the PAP unit receives the command and starts operating.

Host computer transmission

EOT	Address		STX	ID		Data	ETX	BCC
	0	1		J	$\overline{0}$	2		
04h	30h	31h	02h	4Ah	4Fh	32h	03h	34h

PAP unit transmission

ACK
06h

- Selecting operations should be done after confirming the operating state and alarm conditions of the unit through polling operations.

  Example: If the PAP unit is currently operating in the controlled air blower fan-only mode ('3') and code ('2') is sent via a selecting operation, the unit will respond with 'NAK'. Selecting operations might not be possible when the unit is operating under an alarm condition or during the controlled air blower fan-only mode.

Communications Functions

Overview of Communications Functions

■Possible unit communications control operations based on the current unit operating state

Product operation states	All stopped				Product pre-operation		Refrigeration system operating		Controlled air blower fan-only operation	
Product operation state (JŌ)	0				1		2		3	
Alarm code (ER)	none	E*** or C***	E***	E***	none	E*** or C***	none	E*** or C***	none	E*** or C***
Alarm processing pattern	-	0or1or4	2or5	3	-	0or1or4	-	0or1or4	-	1to5
Run lamp	Off				On		On		Flashing	
Controlled air blower fan-only operation starts JŌ=3	○ ACK	○ ACK	○ ACK	× NAK	× NAK	× NAK	× NAK	× NAK	× ACK	× ACK
Refrigeration unit operation starts JŌ=2	○ ACK	○ ACK	× NAK	× NAK	× ACK	× ACK	× ACK	× ACK	× NAK	× NAK
Pre-operation JŌ=1	× NAK	× NAK	× NAK	× NAK	× NAK	× NAK	× NAK	× NAK	× NAK	× NAK
Operation stopped JŌ=0	○ ACK	× ACK	× ACK	× ACK	○ ACK	○ ACK	○ ACK	○ ACK	○ ACK	○ ACK

○ : Communication device control enabled.
× : Communication device control disabled.

※1 Regarding an ACK condition

・The PAP unit could perform the operation it was commanded to do. (Shown by: ○ ACK)

・The PAP unit was already in the state commanded by the host computer. (Shown by: × ACK)

※2 Regarding an NAK condition

・The PAP unit could not perform the operation it was commanded to do.

■Setting the device address

Set parameter "F090" on the PAP unit. For further details on how to change this parameter, refer to page 24, "How to Change Parameter Setting".

■Communications (logic) timing

1. Response time after the device receives the request

(1) Polling: approx. 125 ms

(2) Selecting: approx. 170 ms

2. Time from the time after the data transmission is complete until the output achieves high impedance

(1) Polling: approx. 8 ms

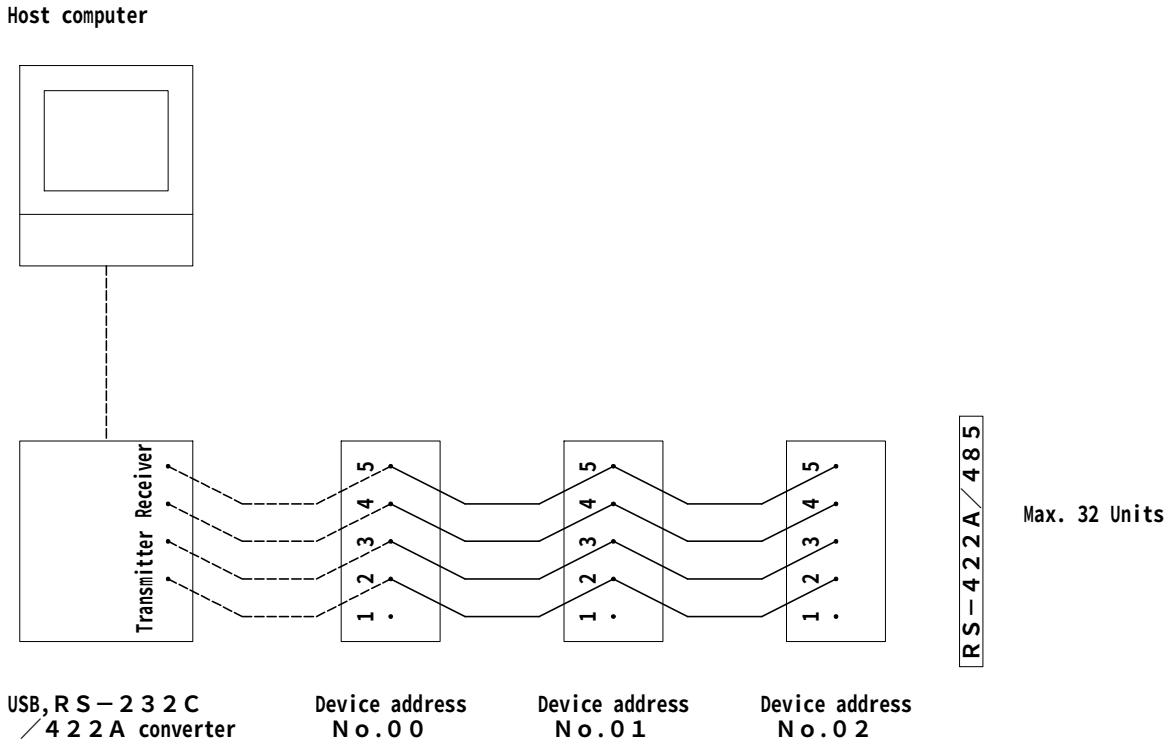
(2) Selecting: approx. 8 ms

Communications Functions

Overview of Communications Functions

■Communications cables and connectors

1. USB
   ①Possible Connector
   Type B (male) connector
   ② Maximum Cable Length
   3 m or less..... May be shorter depending on actual operating conditions.
2. RS-232C(When used with the optional Communications Interface Kit)
   ①Connector
   D sub 9 pin (male) connector
   ②Maximum cable length
   15m or less..... May be shorter depending on actual operating conditions
   ③Connection cable (example)
   Elecom Co., LTD: RS-232C Cable (straight) C232N-930
3. RS-422A (RS-485) (When used with the optional Communications Interface Kit)
   ①Connector
   Terminal block
   ②Cable gauge
   AWG16 to 24 (If wiring 2 lines to a single terminal block, use AWG18 to 24 gauge wire)
   ③Length of insulation to remove from cable
   10mm
   ④Attaching the cables
   Attach the stripped wires as is. And when performing hookups, be careful not to allow frayed wires to contact with nearby wiring or components which could lead to shorts.
   ⑤Maximum cable length
   100m or less..... May be shorter depending on actual operating conditions
   ⑥Connection example



※ When RS-422A or RS-485 is used, RS-232C/ 422A converter or USB/ 422A (485) converter on the market is needed.

Built-in Safety Devices

Overview of Built-in Safety Devices

WARNING

●**Do not change the settings of built-in safety devices. Changing these settings can cause an explosion within the product or fire.**

Overview of Built-in Safety Devices

Name of safety device	Function	Error code	State of the product (Alarm processing pattern) ※1	What to do when a safety device is activated
Earth leakage breaker	If there is a short or an overcurrent in the electric circuit, the power will be cut off and product operation will stop.	None	-	Refer to page 68, "Diagnosing and Troubleshooting Product Failure or Abnormalities" for further information.
High pressure switch	This device will activate and stop the product when the ambient temperature is high, the intake filter or filter is clogged, or when there is an abnormal rise in refrigerant pressure.	E002	2 (3)	
Compressor thermal protector	If there is an overheat condition in the compressor due to a refrigerant leak or overload in the compressor, this device will cut off the electrical circuit and product operation will stop.	E003	2 (3)	
Compressor overcurrent relay	If there is trouble with the compressor resulting in an overcurrent condition, this device will cut off the electrical circuit and product operation will stop.	E004	2 (3)	
Controlled air blower fan over current relay	This device will activate and stop the product in case of an overcurrent condition or an abnormal condition with the controlled air blower fan motor.	E005	3	
Fuse	In order to protect the control board, the fuse will blow if there is an overcurrent condition on the control board.	E009	3	
Drain pan drainage alarm float switch 1,2	This device will activate and stop the product if condensation is not discharged normally from the product.	E132	5 (3)	
Overheating prevention thermostat	If there is an abnormal rise in the humidification heater temperature, the product will shut down.	E505	2	
Humidification water level alarm float switch	This device will activate and cut off the power to the humidification heater when humidification water is not supplied normally and the water level in the humidifier has gone below the lower limit.	E530	4 (3)	

※1 See page 69, "■Product Operation Under Alarm Conditions" for further information regarding the product operating state (error processing pattern) numbers. Product operating states (alarm processing patterns) indicated in parentheses are when parameter "F004" is set to "0".

IMPORTANT

●**See page 68, " Diagnosing and Troubleshooting Product Failure or Abnormalities " in the event that a built-in safety device is activated.**

Inspection and Maintenance

Regular Inspections

WARNINGS

- **If cabinet panels are removed during inspection, be sure to replace them when finished. Operating the product with open or removed cabinet panels can lead to injury or electric shock from contact with internal components.**
- **Do not allow water to contact the product component area directly, and do not wash the product with water. Failure to follow this warning may lead to electric shock or fire.**

CAUTION

- **Before undergoing regular inspections, be sure to turn off the power source. Failure to do so may result in electric shock, injury, or burns.**
- **Test the earth leakage breaker periodically to ensure it is working properly. Operating the product with a faulty earth leakage breaker can result in an electric shock if the breaker fails to activate if there is an electrical short.**

Regular Inspections

Item to be inspected	How often to inspect (estimate)
Confirm proper condensation drain flow	Daily
Y-strainer for humidification water inspection	Pre-operation or out of operation
Check for the electrical conductivity and the pressure of humidification water	Weekly
Intake filter inspection (controlled air intake)	Monthly
Filter inspection (heat exchange air intake)	Monthly
Confirm the earth leakage breaker is functioning.	Monthly
Heat exchanger and drain pan cleaning	Monthly
Humidification water replacing	Every 3 months ※
Check for vibration or unusual noise from the controlled air blower fan.	Every 3 months
Humidifier inspection and cleaning	Every 6 months

※Inspection times given are estimates and may vary depending on the operating environment. It is possible that the formation and adhesion of foreign matter occurs in the humidifier even though using the specified humidification water. In this case, replace humidification water in the humidifier more frequently. (See page 67.)

Inspection and Maintenance

Daily Inspection/ Pre-operation or Out of Operation Inspection/ Weekly Inspection

Daily Inspection

■Confirm Proper Condensation Drain Flow

Confirm that the condensation water is properly draining from the condensation water drain ports . Ensure that there are no U-traps or vertical rises in the piping, and that the drain water can drain at atmospheric pressure.

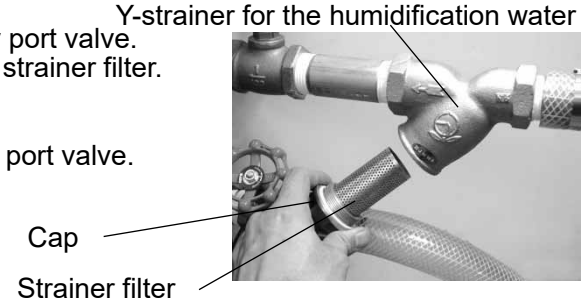
IMPORTANT

●When the condensation drainage does not drain properly, code "E132" will be displayed and the product will stop.
In the event of this alarm condition, see page 68, "Diagnosing and Troubleshooting Product Failure or Abnormalities" for information on how to resolve the trouble.

Pre-operation or Out of Operation Inspection

■Y-strainer for the Humidification Water Inspection

①Close the (user supplied) humidification water supply port valve.
②Remove the cap from the Y-strainer and take out the strainer filter.
③Wash off any dirt from the strainer filter.
④Replace the strainer filter into the Y-strainer.
⑤Open the (user supplied) humidification water supply port valve.



IMPORTANT

●Be sure to open the (user installed) humidification water supply port valve before operating the product. Operating with the valves closed can also cause built-in safety devices to activate which may result in the product shut-down.

Weekly Inspection

■Check for the Electrical Conductivity and the Pressure of Humidification Water

1. Make sure that the product is having the stable humidity control.
2. Confirm that the electrical conductivity of the humidification water is within the specified range (0.01 to 1mS/m (0.1 to 10μS/cm)) with the electrical conductivity meter of the (user supplied) deionizer. If the value exceeds 1mS/m, it is needed to regenerate the deionizer. For the details of regeneration, read the manual or contact your dealer of the deionizer.

IMPORTNT

●Be sure to maintain and periodically confirm the electrical conductivity of the humidification supply water. See page 67, "Information Regarding Humidification Water", for information about water quality of the humidification supply water.
●Confirm the electrical conductivity of the humidification supply water during humidity control conditions. Measurement cannot be exact in conditions where the humidification supply water is stopped for a period of time.

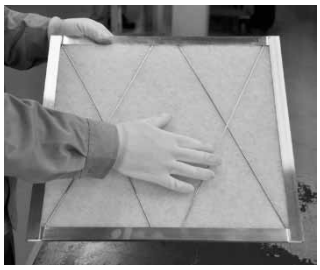
3. Confirm that the humidification supply water pressure at the inlet of the humidifier is 0.03 to 0.2 MPa. If the supply pressure is over 0.2 MPa, then use a pressure reducing valve or other means in order to lower the water supply pressure. Furthermore, even when in the specified range of pressure, the water supply pressure should be reduced in cases where there is abnormal noise coming from the water supply piping.

IMPORTANT

●Operating under high-pressure conditions can considerably shorten the lifespan of built-in parts.

Monthly Inspections

If the intake filter (controlled air side) and the filter (heat exchange air side) are dirty or dusty, clean them.



■Intake Filter (Controlled Air Side) Inspection

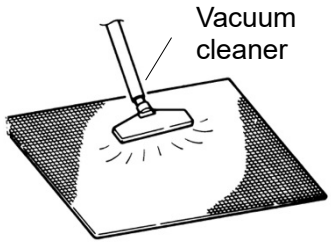
(1) If the intake filter is very dirty, clean with water and detergent solution and dry well in a shady place.

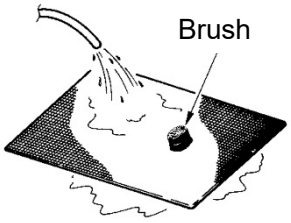
(2) Replace the intake filter if it cannot be cleaned or is damaged. (See page 83)

■Filter (Heat Exchange Air Side) Inspection

(1) Remove the filter and vacuum off the dust with a vacuum cleaner.

(2) If the filter is particularly dirty, wash it with water and allow it to dry well in a shady place.





Clean following the lines of the mesh

IMPORTANT

●The intake filter and the filter clogged with dirt or dust will not only reduce product performance but in severe cases can also cause built-in safety devices to activate which may result in the product shut down.

●Do not attempt to clean with hot water or any sort of flame.

●Be sure to replace the intake filter and the filter before operating. Allowing dust or dirt to enter the product can result the product breakdown.

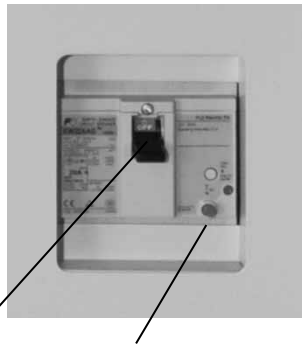
●Do not operate the product with the intake filter and filter damaged. The intake filter and the filter are available as consumable replacement parts. (See page 83.) Replace filters as necessary.

■Confirm the Earth Leakage Breaker is Functioning.

①When power is applied to the product and the breaker lever is in the "ON" position, press the test button.

②If the breaker switch flips down, it indicates that the breaker is operating normally. If the breaker switch does not flip down after performing the above action (①), then the breaker must be replaced. Contact your dealer.

③The lever will be positioned between “ON” and “OFF”. Reset the breaker by fist switching it to “OFF” and then “ON”.



Inspection and Maintenance

Monthly Inspections

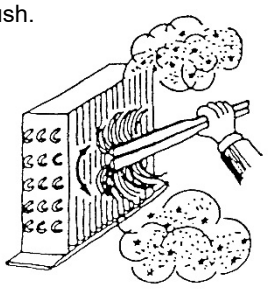
■Controlled Air Side Heat Exchanger and Heat Exchange Air Side Heat Exchanger Cleaning

Make sure there is no dust or dirt on the heat exchangers. Dust and dirt on the heat exchangers will reduce the heat-exchange performance and therefore should be cleaned off when present.

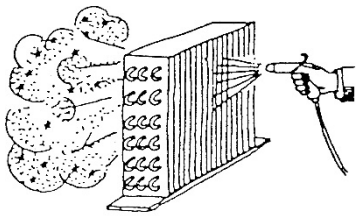
①Remove the intake filter and the filter.

②Clean the fins with a long bristle brush or with a compressed air gun.

Clean the heat exchanger with a soft brush.



Clean the heat exchanger with a compressed air gun.



※The above illustration is image. The condenser cannot actually be removed.

IMPORTANT

●If the heat exchangers clogged with dust or dirt will not only reduce product performance, but in severe cases can cause built-in safety devices to activate which can result in product shut-down.

●Do not attempt to clean with hot water or any sort of flame.

●Be sure to replace the intake filter and the filter before operating. Allowing dust or dirt to enter the product can result the product breakdown.

■Cleaning of the Condensation Drain Pan for Controlled Air and the Condensation Drain Pan for Heat Absorber

Make sure there is no foreign matter in the condensation drain pans and the product condensation drain ports. The condensation drain pans and the product condensation drain ports clogged with foreign matter can cause built-in safety devices to activate which may result in the product shut down due to abnormal discharge of condensation and therefore should be cleaned off when present.

Every 3 Months Inspections

■Check for Vibration or Unusual Noise from the Controlled Air Blower Fan

①Confirm that there is no abnormal vibration or noise coming from the controlled air blower fan while the product is operating.

②If anything is out of the ordinary, contact your dealer.

■Humidification water replacing

After the product has been completely shut down, drain the water from inside the humidifier. The product will automatically operate to resupply water. If the product cannot be shut down, then conduct a humidification water forced supply and drainage operation. (See page 20.)

IMPORTANT

●Just after the product is stopped, boiling water of around 100℃ will be held in the humidifier. Before draining the humidification water, wear protective gloves, etc. in order to avoid injuries or burns, and then release the water little by little confirming that the temperature is not too high.

●If an optional high temperature type drain pump (max. 100℃) is to be used, do not release the water in large quantities all at once. Doing so can cause water leakage. Therefore, release the water little by little.

●Continued operation without humidification water replacing for an extended period time can lead to the product break down, electric shock and contamination of foreign matter to the controlled air due to concentration of foreign matter in the humidifier.

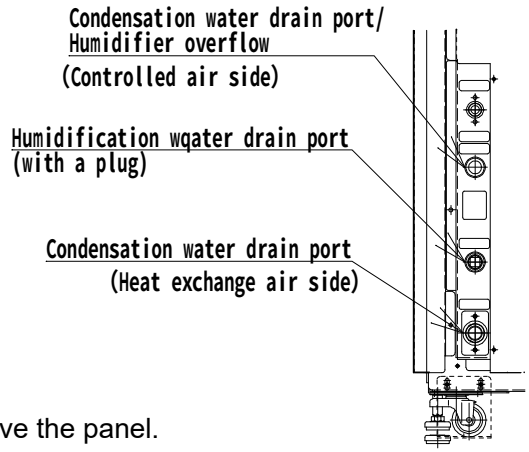
It is possible that the formation and adhesion of foreign matter occurs in the humidifier even though using the specified humidification water. In this case, replace humidification water in the humidifier more frequently.

Every 6 Months Inspections

WARNING

●Just after the product is stopped, boiling water of around 100℃ will be held in the humidifier. Before draining the humidification water, always stop the product and wait until product cool down operation has completed, and then release the water little by little confirming that the temperature is not too high.

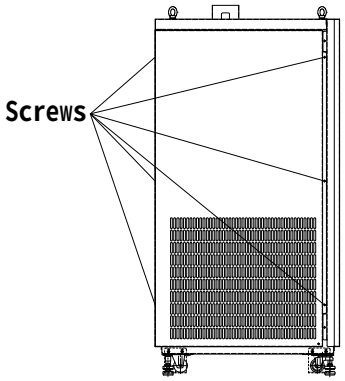
●Wear protective gloves, etc. in order to avoid injuries or burns.



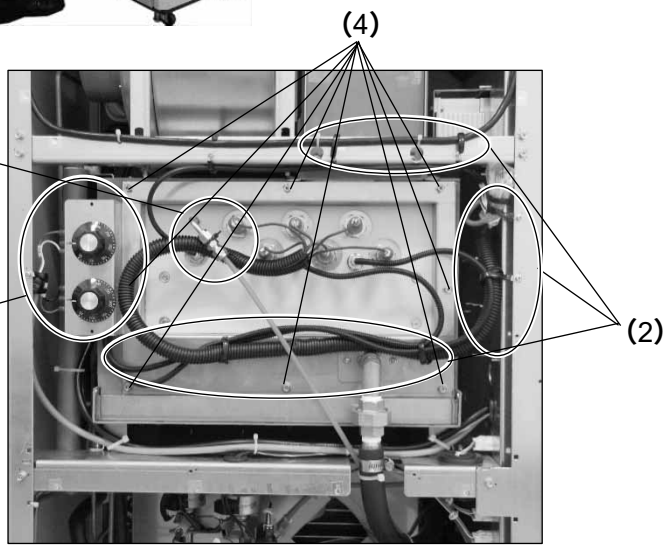
■Humidifier Inspection

Ensure there is no grime within the humidifier.

1. Drain the humidifier.
   (1) Prepare a container to collect the drain water. Remove the humidification water drain plug and drain the water (approx. 5 liters).
   (2) After the water has drained, replace the removed plug and tighten it on the humidifier drain port.
   ※ Use sealing tape on the plug to prevent water leakage.
2. Remove the 6 screws holding the left cabinet panel and remove the panel.



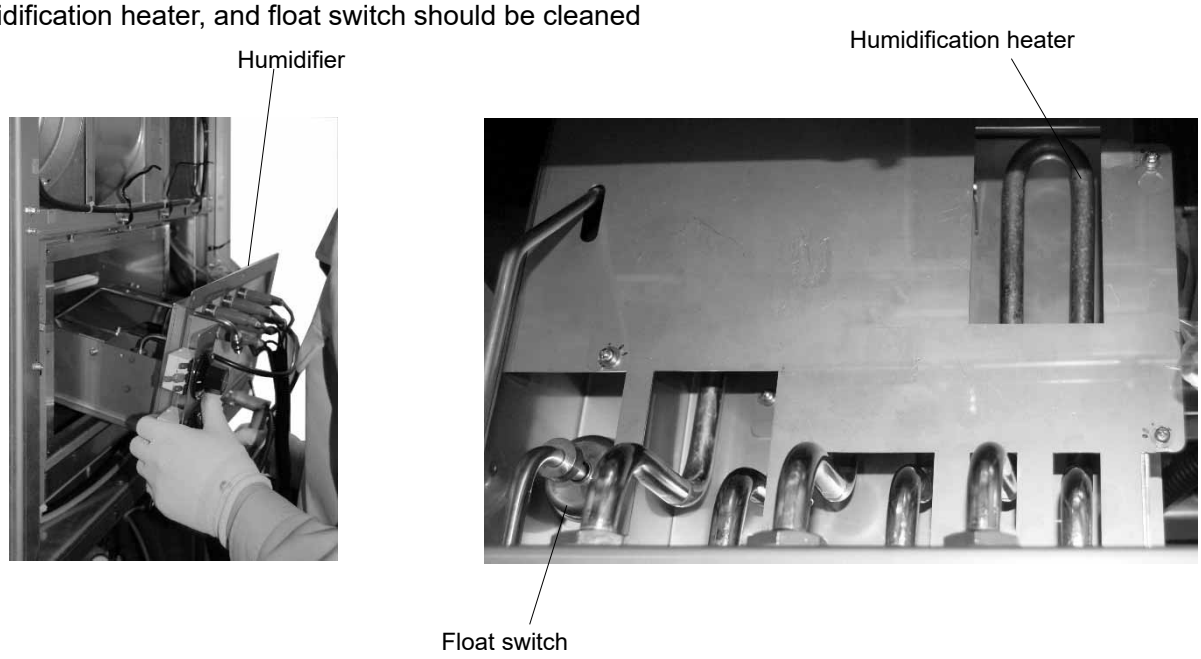
3. Remove the cords, cord hangers and beads bands.
   (1) Overheating prevention thermostat connectors (ST2、ST3)
   (2) 6 cord hangers
   (3) 1 beads band
4. Remove the 8 screws holding the humidifier.
   (4) 8 screws



Inspection and Maintenance

Every 6 Months Inspections

5. After pulling the humidifier toward you, perform the humidifier inspection. If the inside of the humidifier is very dirty or if the float switch does not move smoothly, then the inside of the humidifier, the humidification heater, and float switch should be cleaned



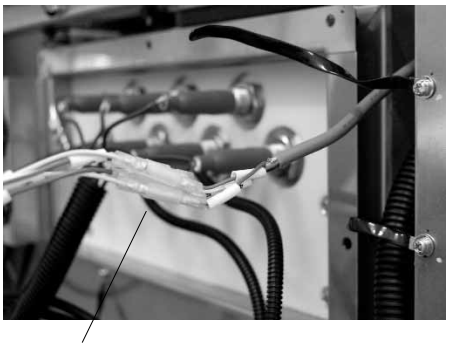
■Humidifier Cleaning

Cleaning the inside of the humidifier.

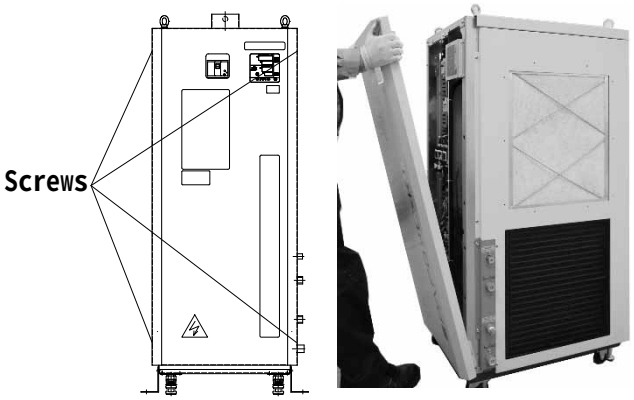
※Before performing below procedures, perform "■Humidifier Inspection". (See page 63.)

1. Remove the humidifier.

(1) After remove the beads band and the plastic bag, remove the cords from the float switch (pin terminals).



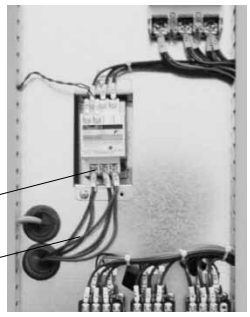
(2) Remove the 4 screws holding the front cabinet panel and remove the panel.



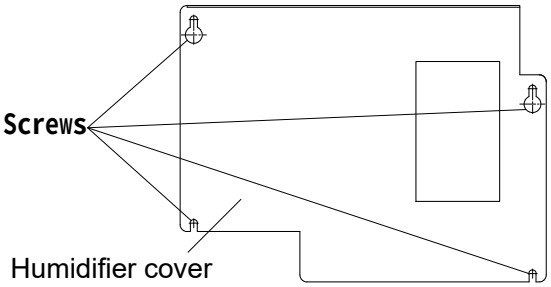
Inspections and Maintenance

Every 6 Months Inspections

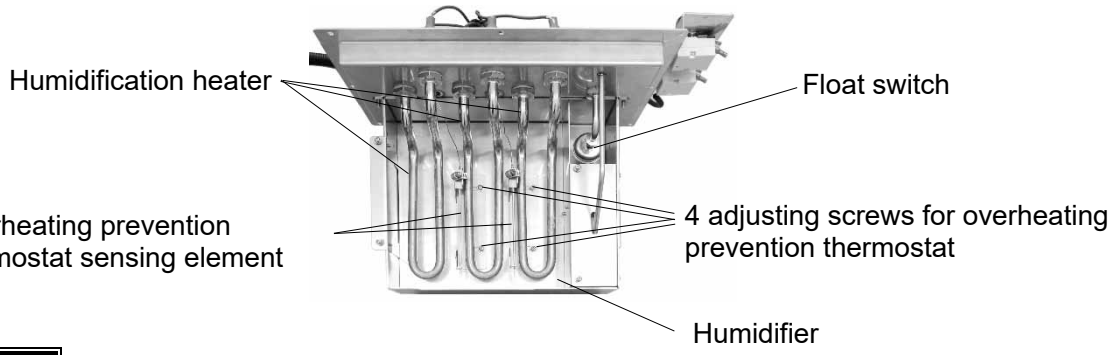
(3) Remove the humidification heater cords from the secondary terminal block on the solid state contactor.



2. After pulling out the humidifier, loosen the 4 screws holding the humidifier cover and remove the cover.

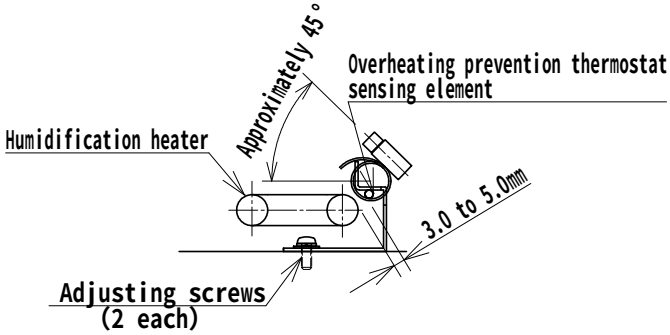


3. Clean off any dirt and grime from the inside of the humidifier, the humidification heater, and the float switch. Clean using a resin made brush. Be careful not to apply too much pressure while cleaning as doing so can result in damage (especially to the thermostat sensing element.)



IMPORTANT

- **If sticky substance on the walls of the humidification heater cannot be removed, or if the surface of the heater has changed color, then the humidification heater needs to be replaced.**
  ※Humidification Heater Replacement Set (1 set per unit) Part No.: 03110415010
- **If the location of the overheating prevention thermostat sensing element or humidification heater changes due to a cleaning procedure or from being replaced, then install the overheating prevention thermostat sensing element so that there is a 3.0 to 5.0 mm gap between it and the humidification heater pipe as shown in the illustration above. To adjust the position of the overheating prevention thermostat, first loosen the adjusting screws as shown in the above illustration.**



The gap between overheating prevention thermostat sensing element and the humidification heaters.

Inspection and Maintenance

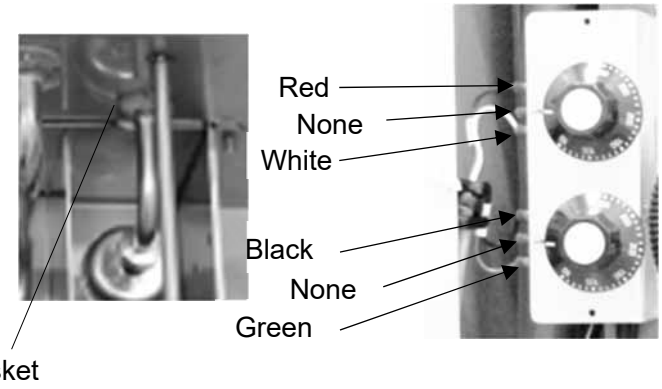
Every 6 Months Inspections

4.Clean off any dirt and grime from the inside of the controlled air box using a wire brush or a stainless steel scrubber.

Inside of the controlled air box

5. Replace the gasket on the float switch if it is cracked or otherwise damaged.

6. After the various components are cleaned, reassemble the parts by doing the reverse of the above procedure.
As for the wiring of the overheating prevention thermostat connectors, refer to the right figure.



IMPORTANT

- **Operating the product with foreign substances on the humidification heater and float switch can result in reduced product performance or may result in safety devices operating, thus shutting down the product.**
- **If the product is particularly dirty or grimy, please contact your dealer. Component replacement may be necessary depending on the type and amount of grime present.**

Information Regarding Humidification Water

■Water Quality Management and Important Points

Conditioned water (with an electrical conductivity of 0.01 to 1 mS/m (0.1 to 10 μS/cm)) is specified for use with humidifier of the product in question. Operating with dirty water can cause scaling to form on the inner walls of the humidifier and on the heater surfaces, and will result not only in reduced heat-exchange efficiency, but can also be a factor in causing corrosion of the heater and other components. Trouble resulting from water quality affected by corrosion is complicated and it is not easy to pinpoint all factors. Depending on the severity when such cases arises, it may be too late for repairs, rendering the device inoperable, or repairs may become expensive. The following is an outline of water quality management points intended to reduce water related breakdown of air processors.

(1) Water Quality Standard

Conditioned water (with an electrical conductivity of 0.01 to 1 mS/m (0.1 to 10 μS/cm)) is specified for use with the humidifier of the product in question.

(2) Water Quality and Obstruction

Corrosion and scaling that occur due to foreign matter inside water have various mutual relationships which makes it difficult to pinpoint the exact cause. However, generally, a rise in concentration of foreign matter inside the humidifier will lead to scaling sticking to surfaces and corrosion that can considerably shorten the lifespan of components.

(3) Water Quality Management

Water quality management of the water supply used for humidification is extremely important in the prevention of accidents. Furthermore, this product has a forced supply and drainage of humidification water operation function. (See page 20.) By changing the water in the humidifier, this function is effective at preventing rises in concentrations of foreign matter in the water such as chloride ion ※1, etc. However, if a forced supply and drainage of humidification water operation is conducted, then the temperature of the humidification water will drop, causing a temporary drift in control humidity, and will require some time to stabilize. Therefore, this operation should be carried out when precise control management is not required.

※1 Corrosion constituents such as chloride ion do not become dilute when water evaporators. If the water is not changed, then the concentration level will continue to increase.

Diagnosing and Troubleshooting Product Failure or Abnormalities

Alarm Types and Product Operation under These Conditions

WARNING

●If operation is abnormal, shut down the product, cut off the power source, and then consult with your dealer or a qualified repair person. Continued operation when the product is performing abnormally can lead to electric shock or fire.
●Remove power before performing any of these measures. Failure to do so can lead to electric shock.
●After performing necessary measures and clearing alarm conditions, be sure to replace the cabinet panels. Operating the product without first replacing cabinet panels can lead to electric shock or other injuries.

IMPORTANT

In case of an open phase, usually "E009" will be displayed. However, the error might not be displayed in some cases depending on the location of the open phase. In such a case, the following symptoms may occur:
①When power is applied to the product, either nothing will appear on the display of the operation panel or "*H*" will be displayed (or in some cases, possibly flashing). (Under normal circumstances, after power is applied, HELLO AI -PrOCESSO- 8.8.8.8. will be displayed for a few seconds, and then the measured temperature will be shown.)
②The display on the operation panel will go out while the product is operating.
In case any of the above symptoms occur, it may indicate that there is a reversed power phase. In such cases, please take the measures indicated for "E009" in order to remedy the problem. Please contact your dealer if symptoms persist even after taking such measures.

Alarm Types and Product Operation under These Conditions

■Alarm and Warning Processing (1/2)

Alarm Code	Description	Alarm processing pattern	Operation signal	Alarm signal	Temp. alarm signal	Humid. Alarm signal	Display	Resetting the alarm
E002	High-pressure pressure alarm	2 (3)	×	○	×	×	Display alternates	Manual
E003	Compressor overheat alarm	2 (3)	×	○	×	×	Display alternates	Manual
E004	Compressor overload alarm	2 (3)	×	○	×	×	Display alternates	Manual
E005	Blower fan (controlled air side) overload alarm	3	×	○	×	×	Display alternates	Manual
C006	Other warning	「F081」	○	「F081」	×	×	Display alternates	Manual
E006	Other alarm	「F081」	×	○	×	×	Display alternates	Manual
E009	Power supply open phase alarm	3	×	○	×	×	Display alternates	Re-apply power
E010	Power supply reversed phase alarm	3	×	○	×	×	Display alternates	Re-apply power
E011	Controlled outlet air temperature sensor alarm	3	×	○	×	×	Flashing	Manual
E012	Controlled outlet air temperature sensor alarm	3	×	○	×	×	Flashing	Manual
E013	Control board memory alarm	3	×	○	×	×	Flashing	Re-apply power
E014	Power cutoff recovery alarm	3	×	○	×	×	Display alternates	Manual
E015	Other control board problem alarm	3	×	○	×	×	Flashing	Manual
C031	Other warning	「F086」	○	「F086」	×	×	Display alternates	Manual
E031	Other alarm	「F086」	×	○	×	×	Display alternates	Manual
E045	Drop in degree of superheat alarm	2 (3)	×	○	×	×	Display alternates	Manual
E049	Compressor inlet temperature sensor alarm	2 (3)	×	○	×	×	Display alternates	Manual
E050	Compressor inlet temperature sensor alarm	2 (3)	×	○	×	×	Display alternates	Manual
E058	Control board dip switch setting alarm	3	×	○	×	×	Flashing	Re-apply power
C064	Compressor restart warning	0	○	×	×	×	Display alternates	Automatic
C065	Compressor user-stop warning	0	×	×	×	×	Display alternates	Automatic
E100	Cooling side evaporator inlet refrigerant temperature sensor alarm	2 (3)	×	○	×	×	Display alternates	Manual
E101	Cooling side evaporator inlet refrigerant temperature sensor alarm	2 (3)	×	○	×	×	Display alternates	Manual
E102	Heating side evaporator inlet refrigerant temperature sensor alarm	2 (3)	×	○	×	×	Display alternates	Manual
E103	Heating side evaporator inlet refrigerant temperature sensor alarm	2 (3)	×	○	×	×	Display alternates	Manual
E132	Condensation drainage alarm	5 (3)	×	○	×	×	Display alternates	Manual
C140	Controlled outlet air temperature control precision warning 1	1	○	×	○	×	Display alternates	Automatic
E140	Controlled outlet air temperature control precision alarm 1	2 (3)	×	○	○	×	Display alternates	Manual
C141	Controlled outlet air temperature control precision warning 2	1	○	×	○	×	Display alternates	Automatic
E141	Controlled outlet air temperature control precision alarm 2	2 (3)	×	○	○	×	Display alternates	Manual

Diagnosing and Troubleshooting Product Failure or Abnormalities

Alarm Types and Product Operation under These Conditions

■Alarm and Warning Processing (2/2)

Alarm Code	Description	Alarm processing pattern	Operation signal	Alarm signal	Temp. alarm signal	Humid. Alarm signal	Display	Resetting the alarm
E142	Controlled outlet air temperature upper limit alarm	3	×	○	○	×	Display alternates	Manual
E143	Controlled outlet air temperature lower limit alarm	3	×	○	○	×	Display alternates	Manual
C160	High-pressure pressure warning (When under cooling control)	0	○	×	×	×	Display alternates	Manual
C161	High-pressure pressure warning (When under heating control)	0	○	×	×	×	Display alternates	Manual
E161	Compressor discharge pressure sensor alarm	2 (3)	×	○	×	×	Display alternates	Manual
E162	Compressor discharge pressure sensor alarm	2 (3)	×	○	×	×	Display alternates	Manual
C170	Temperature auto-tuning time elapsed warning	0	○	×	×	×	Display alternates	Manual
E505	Humidification heater over-rise prevention	2	×	○	×	×	Display alternates	Manual
C516	Humidifier maintenance period elapsed warning	0	○	×	×	×	Display alternates	Manual
E611	Controlled outlet air humidity sensor alarm	3	×	○	×	×	Display alternates	Manual
C630	Humidification water shortage warning	0	○	×	×	×	Display alternates	Automatic
E630	Humidification water shortage alarm	4 (3)	×	○	×	×	Display alternates	Manual
C640	Controlled outlet air humidity control precision warning 1	1	○	×	×	○	Display alternates	Automatic
E640	Controlled outlet air humidity control precision alarm 1	4 (3)	×	○	×	○	Display alternates	Manual
C641	Controlled outlet air humidity control precision warning 2	1	○	×	×	○	Display alternates	Automatic
E641	Controlled outlet air humidity control precision alarm 2	4 (3)	×	○	×	○	Display alternates	Manual
E642	Controlled outlet air humidity upper limit alarm	3	×	○	×	○	Display alternates	Manual
C670	Humidity auto-tuning time elapsed warning	0	○	×	×	×	Display alternates	Manual

- Alarm processing patterns in parentheses () are for when parameter "F004" is set to "0".
- A signal will be output in cases where the ○ mark is present. × indicates that no signal will be output.
- Alarm signals will be generated individually for each respective alarm condition.
- Even if an error condition occurs such that the operation signal is continuously output, if another error also occurs that would shut down the compressor, then the operation signal will be cut off even if the initial error (indicating continued operation) continues.
- The display will alternate between the measured temperature and the alarm code. A flashing display indicates the alarm code.
- E014" will only be output if parameter "F001" is set to "0" .

■Product Operation Under Alarm Conditions

Alarm processing pattern	Description of alarm processing	Humidity control	Temperature control	Controlled air blower fan	Hot water cool down operation
0	Product operation continues (no alarm signal output)	○	○	○	---
1	Product operation continues (alarm signal output)	○	○	○	---
2	Compressor operation stops and controlled air blower fan operation continues.	×	×	○	○
3	All stopped	×	×	×	×
4	Humidity control stops and temperature control continues.	×	○	○	○
5	Compressor operation stops and controlled air blower fan operation continues.	×	×	○	×

- ○ indicates operation continues. × indicates operation stops.
- In the event of conflicting alarm processing patterns, the × pattern gets priority.
  Example: If both alarm patterns 2 and 3 are generated, the product will go to all stop.

IMPORTANT

●After an alarm processing pattern of "4" is generated, even if the alarm is cleared by pressing the [RESET] button, the digital humidity display panel will show [SrO] to indicate that humidity control operation has stopped. In order to restart humidity control operation, momentarily turn the product off and then turn it on again. In case an abnormal operating condition is resolved, the product can resume humidity control operation by performing the following procedure.

•While the display shows [SrO], while holding down the [RESET] button, press the [<] button.

Recovery After a Built-in Safety Devices is Activated

WARNINGS

- **After performing necessary measures and clearing alarm conditions, be sure to replace the cabinet panels. Operating the product while the cabinet is opened or removed can lead to injuries or electric shock.**
- **If operation is abnormal, shut down the product, cut off the power source, and then consult with your dealer or a qualified repair person. Continued operation when the product is performing abnormally can lead to electric shock or fire.**
- **Remove power to the product before undertaking measures to resolve cases where a safety device has been activated. Failure to do so can lead to injury from electric shock.**

■How to Remove and Reinstall the Front Cabinet Panel

(1) Shut down the product and remove power to the product before removing the front cabinet panel.
(2) Loosen the 4 screws securing the front cabinet panel. (See Fig. 1)
(3) Remove the front cabinet panel by pulling it toward you and off. (See Fig.2)
(4) To re-assemble the front cabinet panel, do the reverse of the above steps.

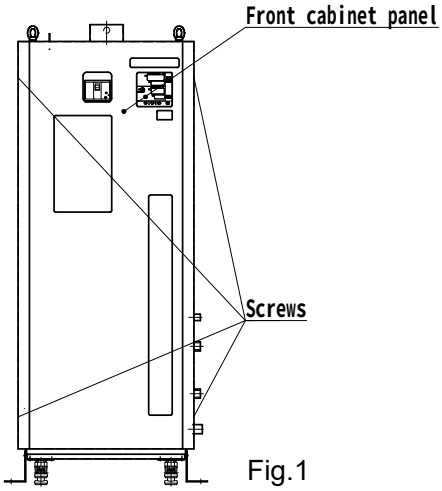
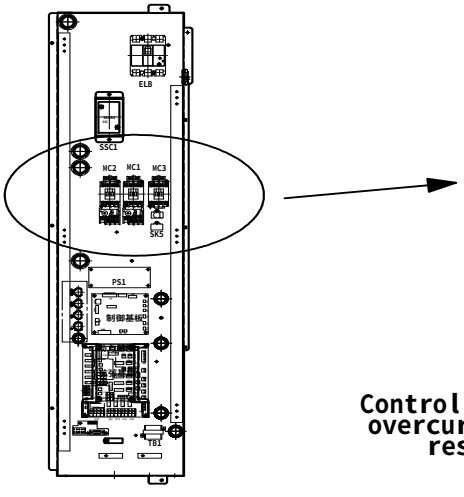


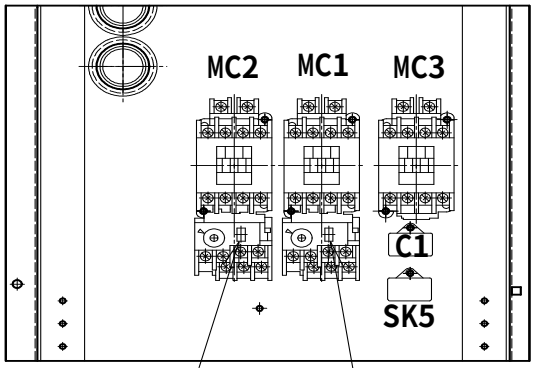
Fig.1


Fig.2

■Location of Built-in Safety Devices



Distribution panel
(Inside the front cabinet panel)



Controlled air blower fan overcurrent relay (THR2) reset button

Compressor overcurrent relay (THR1) reset button

Alarm Causes and Measures to Take

IMPORTANT

●About the [RESET] button

After the trouble causing the alarm has been resolved, pressing the [RESET] button one time will turn off the audible alarm and clear the alarm condition.

If the trouble causing the alarm is not resolved, pressing the [RESET] button one time will turn off the audible alarm but the alarm condition will remain. In order to clear the alarm condition, press the [RESET] button once again after performing necessary measures and clearing alarm conditions.

■"E002" High-pressure pressure alarm

＜Cause＞

There is an abnormal rise in refrigerant pressure, and the high pressure switch (HPRS) has been activated. (4.15 MPa or higher)

＜Measures to take＞

The high pressure switch (HPRS) has been activated.

(1) Confirm that the ambient temperature and controlled air flow are within their specified ranges.

(2) Make sure the intake filter and the filter are not clogged. If the filters are found to be clogged, clean them. (See page 58, "Inspection and Maintenance".)

(3) Ensure that there is not a decrease in contact of controlled air with the temperature/humidity sensor and that there is no decrease in responsiveness. Move the temperature/humidity sensor to a location just after the product controlled air discharge such that the sensor comes into sufficient contact with the controlled air.

(4) Confirm that the heat exchange air ventilation fan is operating properly. Contact your dealer if anything abnormal is detected.

(5) If no abnormalities can be found in points (1) to (4) above, then the refrigerant distribution control valve (for temperature control) may be faulty. Please contact your dealer.

＜Clearing the alarm＞

Either press the [RESET] button or cut off and then re-apply power to the product.

(The alarm cannot be canceled unless the high pressure goes down to 3.2 MPa or lower.)

■"E003" Compressor overheat alarm

＜Cause＞

The compressor thermal protector (ST1) has been activated.

＜Measures to take＞

(1) Make sure that the power source voltage is correct.

(2) Make sure that the ambient temperature and the controlled air flow rate are within their specified ranges.

(3) If points (1) and (2) above are not abnormal, then it's possible that the expansion valve is faulty or that there is a refrigerant leak. Please contact your dealer.

＜Clearing the alarm＞

Either press the [RESET] button or cut off and then re-apply power to the product.

(The alarm cannot be canceled until the compressor cools sufficiently.)

■"E004" Compressor overload alarm

＜Cause＞

The compressor overcurrent relay (THR1) has activated.

＜Measures to take＞

(1) Make sure that the power source voltage is correct.

(2) Make sure that the ambient temperature and the controlled air flow rate are within their specified ranges.

＜Clearing the alarm＞

Clear the alarm by cutting off power to the product and pressing the reset button on the compressor overcurrent relay (THR1) located on the distribution panel. Then re-apply power.

■"E005" Blower fan (controlled air side) overload alarm

＜Cause＞

The controlled air blower fan overcurrent relay (THR2) has activated.

＜Measures to take＞

(1) Make sure that the power source voltage is correct.
(2) Make sure that the ambient temperature and the controlled air flow rate are within their specified ranges.

＜Clearing the alarm＞

Clear the alarm by cutting off power to the product and pressing the reset button on the compressor overcurrent relay (THR2) located on the distribution panel. Then re-apply power.

■"C006" and "E006" Other warning or alarm

＜Cause＞

There was an input signal on external alarm signal 1.

＜Measures to take＞

Confirm the settings of "F080", "F081", "F082" and "F083", and clear the external alarm accordingly.

＜Clearing the alarm＞

Either press the [RESET] button or cut off and then re-apply power to the product.

■"E009" Power supply open phase alarm

＜Cause＞

There is an open in the power supplied to the product or one of the control board fuses (R, S or T phase fuse) has blown.

＜Measures to take＞

(1) Cut off the power supply and check the wiring.
(2) If a fuse has blown, consult with your dealer and replace the fuse.

＜Clearing the alarm＞

Restore power to the product.

■"E010" Power supply reverse phase alarm

＜Cause＞

The power supply to the product has a reversed phase.

＜Measures to take＞

Cut off the primary side power to the product and reverse the connection of 2 of the 3 phases. (See page 96, “Electrical Wiring”.)

＜Clearing the alarm＞

Restore power to the product.

■"E011"and "E012" Controlled outlet air temperature sensor alarm

＜Cause＞

(1) There is either a short or open circuit on the temperature sensor side of the outlet air temperature and humidity sensor.
(2) The measured temperature is beyond the measurable temperature range of the outlet air temperature and humidity sensor.

＜Measures to take＞

Repair of the outlet air temperature and humidity sensor cable or replacement of the outlet air temperature and humidity sensor is required. Please contact your dealer.

＜Clearing the alarm＞

Cut off power to the product. After either repairing the cable or replacing the sensor, the alarm will be cleared when power is reapplied.

Diagnosing and Troubleshooting Product Failure or Abnormalities

Alarm Causes and Measures to Take

■"E013" Control board memory alarm

＜Cause＞

There is a problem with the memory on the control board.

＜Measures to take＞

Cut off power to the product and then re-apply power.

＜Clearing the alarm＞

If the problem was resolved by cutting off and re-applying power, the alarm condition will be cleared automatically. Contact your dealer if the alarm cannot be cleared.

■"E014" Power cutoff recovery alarm

＜Cause＞

Power was interrupted while the product was operating. This alarm will only occur when the product parameter "F001" is set to "0" (the factory default setting is "1").

＜Measures to take＞

If automatic resumption of operation after restoration of power is desired, change parameter "F001". (See page 27 for further information.)

＜Clearing the alarm＞

Press the [RESET] button to clear the alarm.

Press the [RUN/STOP] button to resume operation.

■"E015" Other control board problem alarm

＜Cause＞

(1) There may be electrical noise or bits of conductive foreign substance affecting the control board.

(2) The power supply is unstable.

＜Measures to take＞

(1) Check for electrical noise near the product or the presence of conductive material on the control board.

(2) Ensure there are not momentary losses of power and that the voltage is not dropping below the minimum specified level.

＜Clearing the alarm＞

After the problem has been resolved, either press the [RESET] button or cut off and then re-apply power to the product. Contact your dealer if the alarm cannot be cleared or occurs repeatedly.

■"C031" and "E031" Other warning or alarm

＜Cause＞

There was an input signal on external alarm signal 2.

＜Measures to take＞

Confirm the settings of "F085", "F086", "F087" and "F088", and clear the external alarm accordingly.

＜Clearing the alarm＞

Either press the [RESET] button or cut off and then re-apply power to the product.

■"E045" Drop in degree of superheat alarm

＜Cause＞

(1) Proper heat exchange is not occurring in the evaporator.

(2) The electronic expansion valve control is faulty.

＜Measures to take＞

(1) Confirm that the controlled air flow rate, controlled air temperature and ambient temperature are within their specified ranges.

(2) Confirm that the electronic expansion valve is moving/operating when power is applied to the product. If there is no movement in the electronic expansion valve, then it is faulty. Please contact your dealer.

＜Clearing the alarm＞

Either press the [RESET] button or cut off and then re-apply power to the product.

Diagnosing and Troubleshooting Product Failure or Abnormalities

Alarm Causes and Measures to Take

■"E049" Compressor inlet temperature sensor alarm

＜Cause＞

(1) The measured temperature is abnormally low.
(2) The compressor inlet temperature sensor (STS) is disconnected.

＜Measures to take＞

(1) Confirm that the controlled air temperature and humidity, controlled air flow rate, ambient temperature and humidity are within their specified ranges.
(2) If there are no operational and environmental issues, then the relevant sensor is faulty. Please contact your dealer.

＜Clearing the alarm＞

Cut off power to the product, replace the temperature sensor with a new one, and re-apply power to the product to clear the alarm.

■"E050" Compressor inlet temperature sensor alarm

＜Cause＞

(1) The measured temperature is abnormally high.
(2) The compressor inlet temperature sensor (STS) is shorted.

＜Measures to take＞

(1) Confirm that the controlled air temperature and humidity, controlled air flow rate, ambient temperature and humidity are within their specified ranges.
(2) If there are no operational and environmental issues, then the relevant sensor is faulty. Please contact your dealer.

＜Clearing the alarm＞

Cut off power to the product, replace the temperature sensor with a new one, and re-apply power to the product to clear the alarm.

■"E058" Control board dip switch setting alarm

＜Cause＞

(1) The dip switch settings cannot be read due to noise or other problem on the control board.
(2) The dip switch settings are wrong.

＜Measures to take＞

Cut off power to the product and then re-apply power. Contact your dealer if the alarm occurs repeatedly.

＜Clearing the alarm＞

When the problem is resolved and power is re-applied to the product, the alarm condition will automatically be cleared.

■"C064" Compressor restart warning

＜Cause＞

(1) The compressor is in the process of starting up.
(2) The product was restarted within 3 minutes of last being stopped.

＜Measures to take＞

Wait at least 3 minutes after stopping the product before re-starting.

＜Clearing the alarm＞

After the compressor startup procedure is completed, the product will start operating automatically. Once the product starts operating again, the warning will be cleared automatically.

■"C065" Compressor user-stop warning

＜Cause＞

The product was stopped less than 3 minutes after starting.

＜Measures to take＞

Wait at least 3 minutes after stopping the product before re-starting.

＜Clearing the alarm＞

The warning will be cleared automatically after "C065" flashes in the display for about 5 seconds.

IMPORTANT

●Allow at least 3 minutes between starting and stopping operations. Frequent starting and stopping operations may result in trouble.

Diagnosing and Troubleshooting Product Failure or Abnormalities

Alarm Causes and Measures to Take

■"E100" Cooling side evaporator inlet refrigerant temperature sensor alarm

＜Cause＞

(1) The measured temperature is abnormally low.
(2) The cooling side evaporator inlet refrigerant temperature sensor is disconnected.

＜Measures to take＞

(1) Confirm that the controlled air temperature and humidity, controlled air flow rate, ambient temperature and humidity are within their specified ranges.
(2) Confirm that there is a clicking sound coming from the electronic expansion valve when power is applied to the product. If there is no such sound, the cooling side electronic expansion valve is faulty. Please contact your dealer.
(3) If points (1) and (2) above are not abnormal, then the relevant sensor is faulty. Please contact your dealer.

＜Clearing the alarm＞

Cut off power to the product, replace the temperature sensor with a new one, and re-apply power to the product to clear the alarm.

■"E101" Cooling side evaporator inlet refrigerant temperature sensor alarm

＜Cause＞

(1) The measured temperature is abnormally high.
(2) The cooling side evaporator inlet refrigerant temperature sensor is shorted.

＜Measures to take＞

(1) Confirm that the controlled air temperature and humidity, controlled air flow rate, ambient temperature and humidity are within their specified ranges.
(2) If there are no operational and environmental issues, then the relevant sensor is faulty. Please contact your dealer.

＜Clearing the alarm＞

Cut off power to the product, replace the temperature sensor with a new one, and re-apply power to the product to clear the alarm.

■"E102" Heating side evaporator inlet refrigerant temperature sensor alarm

＜Cause＞

(1) The measured temperature is abnormally low.
(2) The heating side evaporator inlet refrigerant temperature sensor is disconnected.

＜Measures to take＞

(1) Confirm that the controlled air temperature and humidity, controlled air flow rate, ambient temperature and humidity are within their specified ranges.
(2) Confirm that the electronic expansion valve is moving/operating when power is applied to the product. If there is no movement in the electronic expansion valve, then it is faulty. Please contact your dealer.
(3) If points (1) and (2) above are not abnormal, then the relevant sensor is faulty. Please contact your dealer.

＜Clearing the alarm＞

Cut off power to the product, replace the temperature sensor with a new one, and re-apply power to the product to clear the alarm.

Diagnosing and Troubleshooting Product Failure or Abnormalities

Alarm Causes and Measures to Take

■"E103" Heating side evaporator inlet refrigerant temperature sensor alarm

＜Cause＞

(1) The measured temperature is abnormally high.
(2) The heating side evaporator inlet refrigerant temperature sensor is shorted.

＜Measures to take＞

(1) Confirm that the controlled air temperature and humidity, controlled air flow rate, ambient temperature and humidity are within their specified ranges.
(2) If there are no operational and environmental issues, then the relevant sensor is faulty. Please contact your dealer.

＜Clearing the alarm＞

Cut off power to the product, replace the temperature sensor with a new one, and re-apply power to the product to clear the alarm.

■"E132" Condensation drainage alarm

＜Cause＞

(1) Drainage is collecting in the condensation drain pans. (The drainage is not being discharged.)
(2) The condensation drain alarm float switches (for controlled air side or for heat exchange air side) is faulty.

＜Measures to take＞

(1) Make sure there are no U-traps or vertically rising pipes. Make sure drainage piping is open to atmospheric pressure.
(2) The drain pan drainage alarm float switch 1 or the drain pan drainage alarm float switch 2 needs to be replaced. Please contact your dealer.
※This alarm will also occur if there is a problem with overflow drainage of the humidifier when forced supply and drainage of humidification water (See page 20.) or hot water cool down operation (See page 19.) occurs. In such case, confirm that the supply water pressure is within the specified range.

＜Clearing the alarm＞

After resolving the problem, either press the [RESET] button or cut off and then re-apply power to the product to clear the alarm.

■"C140"and"E140" Controlled outlet air temperature control precision warning (alarm) 1

＜Cause＞

(1) The product is unable to control the controlled outlet air temperature.
(2) The setting of parameter "F101" is too low.

＜Measures to take＞

(1) Bring the ambient temperature, controlled air flow rate and intake air temperature gradient to within their specified ranges. Alternatively, try adjusting the PID values.
(2) Ensure that there is not a decrease in contact of controlled air with the outlet air temperature and humidity sensor and that there is no decrease in responsiveness. Move the outlet temperature and humidity sensor to a location just after the product controlled air discharge such that the sensor comes into sufficient contact with the controlled air.
(3) Increase the value of the parameter "F101" setting.
(4) If there are no operational and environmental issues, then the refrigerant distribution control valve (for temperature control) may be faulty. Please contact your dealer.

＜Clearing the alarm＞

In case of "C140", the warning will automatically clear once the product operation returns to being inside the control range.

In case of "E140", clear the alarm by either pressing the **[RESET]** button, or by temporarily cutting off and then restoring power to the product.

※ The factory default setting is "No detection". (See page 32, "F100" for further information.)

■"C141"and"E141" Controlled outlet air temperature control precision warning (alarm) 2

＜Cause＞

(1) The product is unable to control the controlled outlet air temperature.
(2) The setting of parameter "F103" is too low.

＜Measures to take＞

(1) Bring the ambient temperature, controlled air flow rate and intake air temperature gradient to within their specified ranges. Alternatively, try adjusting the PID values.
(2) Ensure that there is not a decrease in contact of controlled air with the outlet air temperature and humidity sensor and that there is no decrease in responsiveness. Move the outlet air temperature and humidity sensor to a location just after the product controlled air discharge such that the sensor comes into sufficient contact with the controlled air.
(3) Increase the value of the parameter "F103" setting.
(4) If there are no operational and environmental issues, then the refrigerant distribution control valve (for temperature control) may be faulty. Please contact your dealer.

＜Clearing the alarm＞

In case of "C141", the warning will automatically clear once the product operation returns to being inside the control range.

In case of "E141", clear the alarm by either pressing the **[RESET]** button, or by temporarily cutting off and then restoring power to the product.

※ The factory default setting is "no alarm".(See page 32, "F102" for further information.)

■"E142" Controlled outlet air temperature upper limit alarm

＜Cause＞

(1) The temperature has exceeded the upper limit value.
(2) The setting of parameter "F105" is too low.

＜Measures to take＞

(1) The ambient temperature is too high. Bring the ambient temperature to within the specified range.
(2) Ensure that there is not a decrease in contact of controlled air with the outlet air temperature and humidity sensor and that there is no decrease in responsiveness. Move the outlet air temperature and humidity sensor to a location just after the product controlled air discharge such that the sensor comes into sufficient contact with the controlled air.
(3) Increase the value of the parameter "F105" setting.

＜Clearing the alarm＞

After resolving the problem, either press the [RESET] button or cut off and then re-apply power to the product to clear the alarm.

■"E143" Controlled outlet air temperature lower limit alarm

＜Cause＞

(1) The temperature has gone below the lower limit value.
(2) The setting of parameter "F106" is too high

＜Measures to take＞

(1) The ambient temperature is too low. Bring the ambient temperature to within the specified range.
(2) Ensure that there is not a decrease in contact of controlled air with the outlet air temperature and humidity sensor and that there is no decrease in responsiveness. Move the outlet air temperature and humidity sensor to a location just after the product controlled air discharge such that the sensor comes into sufficient contact with the controlled air.
(3) Decrease the value of the parameter "F106" setting.

＜Clearing the alarm＞

After resolving the problem, either press the [RESET] button or cut off and then re-apply power to the product to clear the alarm.

■"C160" High-pressure pressure warning (When under cooling control)

＜Cause＞

There is a rise in the refrigerant pressure due to cooling side control conditions.(4.0 MPa or higher)

＜Measures to take＞

(1) Confirm that the controlled air temperature and humidity, controlled air flow rate, ambient temperature and humidity are within their specified ranges.
(2) Make sure the intake filter and the filter are not clogged. If the filters are found to be clogged, clean them. (See page 58, "Inspection and Maintenance".)
(3) Ensure that there is not a decrease in contact of controlled air with the outlet air temperature and humidity sensor and that there is no decrease in responsiveness. Move the outlet air temperature and humidity sensor to a location just after the product controlled air discharge such that the sensor comes into sufficient contact with the controlled air.
(4) Confirm that the heat exchange air ventilation fan is operating properly. Contact your dealer if anything abnormal is detected.
(5) If no abnormalities can be found in points (1) to (4) above, then the refrigerant distribution control valve (for temperature control) may be faulty. Please contact your dealer.

＜Clearing the alarm＞

Either press the [RESET] button or cut off and then re-apply power to the product.
(The alarm cannot be canceled unless the high pressure goes down to 4.0 MPa or lower.)

■"C161" High-pressure pressure warning (When under heating control)

＜Cause＞

There is a rise in the refrigerant pressure due to heating side control conditions.(4.0 MPa or higher)

＜Measures to take＞

(1) Confirm that the controlled air temperature and humidity, controlled air flow rate, ambient temperature and humidity are within their specified ranges.
(2) Make sure the intake filter and the filter are not clogged. If the filters are found to be clogged, clean them. (See page 58, "Inspection and Maintenance".)
(3) Ensure that there is not a decrease in contact of controlled air with the outlet air temperature and humidity sensor and that there is no decrease in responsiveness. Move the outlet air temperature and humidity sensor to a location just after the product controlled air discharge such that the sensor comes into sufficient contact with the controlled air.
(4) If no abnormalities can be found in points (1) to (3) above, then the refrigerant distribution control valve (for temperature control) may be faulty. Please contact your dealer.

＜Clearing the alarm＞

Either press the [RESET] button or cut off and then re-apply power to the product.
(The alarm cannot be canceled unless the high pressure goes down to 4.0 MPa or lower.)

■"E161"and"E162" Compressor discharge pressure sensor alarms

＜Cause＞

The measured refrigerant high-pressure pressure value (PDC) is abnormal.

＜Measures to take＞

(1) Confirm that the controlled air temperature and humidity, controlled air flow rate, ambient temperature and humidity are within their specified ranges.
(2) Confirm that there is a clicking sound coming from the electronic expansion valve when power is applied to the product. If there is no such sound, the electronic expansion valve is faulty. Please contact your dealer.
(3) If points (1) and (2) above are not abnormal, then the sensor or cable is faulty. Please contact your dealer.

＜Clearing the alarm＞

Either press the [RESET] button or cut off and then re-apply power to the product.

Diagnosing and Troubleshooting Product Failure or Abnormalities

Alarm Causes and Measures to Take

■"C170" Temperature auto-tuning time elapsed warning

＜Cause＞

The temperature auto-tuning could not finish within the allotted time.

＜Measures to take＞

(1) Confirm that the controlled air temperature and humidity, controlled air flow rate, ambient temperature and humidity are within their specified ranges.
(2) Move the outlet air temperature and humidity sensor to a location just after the product controlled air discharge port such that the sensor comes into sufficient contact with the controlled air.
(3) Ensure the controlled air outlet temperature setting is within the specified range.

＜Clearing the alarm＞

To clear the warning, press the **[**RESET**]** button. After taking the above measures, perform auto-tuning again.

■"E505" Humidification heater over-rise prevention

＜Cause＞

There is an abnormal rise in temperature of the humidification heater due to a drop in the water level in the humidifier.
(1) There is a drop in the level of the humidification water supply.
(2) Sticky residue is present on the humidifier float switch, on the overheat prevention thermostat, or in the humidifier.
(3) The humidifier float switch or the overheat prevention thermostat is faulty.

＜Measures to take＞

(1) Check that there is not a drop in the water flow rate due to a drop in the water supply pressure of the humidification water supply, etc. If there is a drop in the water supply pressure, then increase the water supply volume by changing the intermittent water supply control parameters "F660" and "F661", as seen on page 39.
(2) Inspect the humidifier according to the "Inspection and Maintenance" section on page 58 and check for foreign matter and perform a cleaning.
(3) If the above measures do not solve the problem, then part replacement is required. Please consult your dealer.

＜Clearing the alarm＞

After taking appropriate measures, reapply power to the product.

IMPORTANT

●If this error occurs for reason such as poor action of the humidifier float switch, then please contact your dealer as deterioration can occur due to overheating of the humidification heater.

■"C516" Humidifier maintenance period elapsed warning

＜Cause＞

(1) The accumulated humidification operating time as set in “F531” has elapsed.
(2) This regular periodic warning indicates that it is time to inspect the inside of the humidifier and to perform a cleaning or change the water.

＜Measures to take＞

Stop operation and drain the water in the humidifier through the humidification water drain port. Water will automatically be supplied when the product is restarted. If product operation cannot be stopped, then manually conduct a “forced supply and drainage of humidification water”. Please inspect and clean the inside of the humidifier on a regular basis. (See page 64, “Humidifier Cleaning”.)

＜Clearing the alarm＞

After appropriate measures have been taken, carry out the following procedure to clear the “C516” warning.

IMPORTANT

●Carry out the following procedure in order to clear the "C516" warning.

① Press and hold the [RESET] button and,
② also press and hold down the [SET] button and,
③ also press the [＜] button.
④ Hold these 3 buttons down for 5 seconds. (If the warning doesn’t clear after holding the buttons down for 5 seconds, then try again from step ① above.)

● Continued operation while foreign matter is sticking to surfaces of the humidifier or humidification heater could lead to corrosion of various components, water leaks, electric shock, or fire.

Alarm Causes and Measures to Take

■"E611" Controlled outlet air humidity sensor alarm

＜Cause＞

The humidity sensor side of the outlet air temperature and humidity sensor or the sensor cable is faulty.

＜Measures to take＞

(1) Confirm that the controlled air temperature and humidity, controlled air flow rate, ambient temperature and humidity are within their specified ranges.
(2) If there are no operational and environmental issues, then the relevant sensor is faulty. Please contact your dealer.

＜Clearing the alarm＞

Cut off power to the product. After replacing the sensor, the alarm will be cleared when power is reapplied.

■"C630" Humidification water shortage warning

＜Cause＞

(1) The level of water in the humidifier is dropping.
(2) The humidification water drain port is not closing or water is leaking from drain piping.
(3) Foreign substance is sticking to the surface of the humidifier float switch.

＜Measures to take＞

(1) Inspect the humidifier water supply piping and water supply pressure, and confirm that water is being supplied properly. If there is a drop in the water supply pressure, then increase the water supply volume by changing the intermittent water supply control parameters “F660” and “F661”, as seen on page 39.
(2) Confirm that the humidification water drain port is closed, and that there are no drain piping leaks.
(3) Inspect the humidifier float switch and clean it as required.

＜Clearing the alarm＞

The warning will automatically clear when the level of humidification water is normal. Contact your dealer if this situation occurs frequently.

■"E630" Humidification water shortage alarm

＜Cause＞

(1) Either the water is not being supplied to the humidifier or the amount of water is too little.
(2) The humidification water drain port is not closing or water is leaking from drain piping.
(3) Foreign substance is sticking to the surface of the humidifier float switch.
(4) The humidifier float switch or solenoid valve is faulty, or there is a leak in the humidifier.

＜Measures to take＞

(1) Inspect the humidifier water supply piping and water supply pressure, and confirm that water is being supplied properly. If there is a drop in the water supply pressure, then increase the water supply volume by changing the intermittent water supply control parameters "F660" and "F661", as seen on page 39.
(2) Confirm that the humidification water drain port is closed, and that there are no drain piping leaks.
(3) Inspect the humidifier float switch and clean it as required.
(4) If the above mentioned items (1) to (3) are not the case, then parts replacement is required. Please consult your dealer.

＜Clearing the alarm＞

After taking prescribed measures, press the [RESET] button. Consult your dealer if the alarm cannot be cleared or occurs repeatedly. (See "Important Points" on page 69.)

Diagnosing and Troubleshooting Product Failure or Abnormalities

Alarm Causes and Measures to Take

■"C640" and “E640” Controlled outlet air humidity control precision warning (alarm) 1

＜Cause＞

(1) The controlled outlet air temperature is not being controlled.
(2) The load on the controlled air side heat exchanger is too high.
(3) There is a problem with the drainage of the humidification water.
(4) There are fluctuations in the controlled humidity resulting from the timing of the supply of humidification water.
(5) The value of parameter "F601" is too low.

＜Measures to take＞

(1) Bring the ambient temperature and humidity, the controlled air flow, and the intake air temperature and humidity gradient within their specified ranges. Also, adjust the PID values. Ensure that there is not a decrease in contact of controlled air with the outlet air temperature and humidity sensor and that there is no decrease in responsiveness.
Move the outlet air temperature and humidity sensor to a location just after the product controlled air discharge so that the sensor comes into sufficient contact with the controlled air.
(2) The operating load is greater than the cooling capacity of the product. Lower the temperature and humidity of the intake controlled air.
(3) Confirm that the humidification water drain port is closed, and that there are no drain piping leaks.
(4) Check the water supply pressure, and if it is high, lower the pressure until it is within the specified range. Also, even if it is within the specified range, if there is a fluctuation in the timing of the water supply, then parameters “F660” and “F661” can be changed in order to reduce the water supply volume. (See page 39 for information regarding these parameters and intermittent water supply control.)
(5) Increase the value of parameter "F601".

＜Clearing the alarm＞

In case of "C640", the warning will automatically clear when conditions return to be within the control range defined by the parameter settings.
In case of "E640", clear the alarm by either pressing the [RESET] button, or by temporarily cutting off and then restoring power to the product.

※ The setting when shipped is "No detection". (See "F600" on page 36 for further information.)

■"C641" and "E641" Controlled outlet air humidity control precision warning (alarm) 2

＜Cause＞

(1) The controlled outlet air humidity is not being controlled.
(2) The load on the controlled air side heat exchanger is too high.
(3) There is a problem with the drainage of the humidification water.
(4) There are fluctuations in the controlled humidity resulting from the timing of the supply of humidification water.
(5) The value of parameter "F603" is too low.

＜Measures to take＞

(1) Bring the ambient temperature and humidity, the controlled air flow, and the intake air temperature and humidity gradient within their specified ranges. Also, adjust the PID values. Ensure that there is not a decrease in contact of controlled air with the outlet air temperature and humidity sensor and that there is no decrease in responsiveness. Move the outlet air temperature and humidity sensor to a location just after the product controlled-air discharge so that the sensor comes into sufficient contact with the controlled air.
(2) The operating load is greater than the cooling capacity of the product. Lower the temperature and humidity of the intake controlled air.
(3) Confirm that the humidification water drain port is closed, and that there are no drain piping leaks.
(4) Check the water supply pressure, and if it is high, lower the pressure until it is within the specified range. Also, even if it is within the specified range, if there is a fluctuation in the timing of the water supply, then parameters "F660" and "F661" can be changed in order to reduce the water supply volume. (See page 39 for information regarding these parameters and intermittent water supply control.)
(5) Increase the value of parameter "F603".

＜Clearing the alarm＞

In case of "C641", the warning will automatically clear when conditions return to be within the control range defined by the parameter settings.
In case of "E641", clear the alarm by either pressing the [RESET] button, or by temporarily cutting off and then restoring power to the product.
※ The setting when shipped is "No detection". (See "F602" on page 36 for further information.)

■"E642" Controlled outlet air humidity upper limit alarm

＜Cause＞

(1) The humidity has exceeded the upper limit of humidity control range.
(2) The setting of parameter "F605" is too low.

＜Measures to take＞

(1) Ensure the ambient temperature and humidity are not too high.
(2) Increase the value of the parameter "F605" setting.

＜Clearing the alarm＞

Press the [RESET] button. Contact your dealer if the alarm cannot be cleared or occurs repeatedly.

■"C670" Humidity auto-tuning time elapsed warning

＜Cause＞

The humidity auto-tuning could not finish within the allotted time.

＜Measures to take＞

(1) Confirm that the controlled air temperature and humidity, controlled air flow rate, ambient temperature and humidity are within their specified ranges.
(2) Move the outlet air temperature and humidity sensor to a location just after the product controlled air discharge port such that the sensor comes into sufficient contact with the controlled air.
(3) Ensure the controlled air outlet humidity setting is within the specified range.

＜Clearing the alarm＞

To clear the warning, press the **[**RESET**]** button. After taking the above measures, perform auto-tuning again.

Maintenance Cycle of Consumables and Main Components

Consumables

●Inspection and Replacement Parts List (Parts to be inspected and replaced as required depending on part wear)

No.	Part Name	Part Number	Qty. Per Product	When to Check	When to Replace
1	Intake filter (nonwoven fabric) (controlled air side)	0A004347000	1	Monthly	Presence of dirt or damage
2	Filter (saran net) (heat exchange air side)	03110187010	1	Monthly	Presence of dirt or damage

※Times indicated are rough estimates: actual inspection times should take into consideration conditions of the specific application (including ambient temperature and humidity and the operating environment.)

Maintenance Cycle of Main Components

●Maintenance Cycle of Main Parts (An estimated indication of when part replacement might be necessary. Actual part lifetime will depend on specific operating conditions.)

No.	Part Name	Part Number	Qty. Per Product	When to check ※2
1	Compressor	0A003076000	1	20,000Hr
2	Blower fan (controlled air side)	0A005202000	1	10,000Hr
3	Ventilation fan (heat exchange air side)	0A001492010	1	10,000Hr
4 ※1	Refrigerant distribution control valve (main unit : No coil included)	03110410010	1set	10,000Hr
5	Refrigerant distribution control valve (coil)	0A001997000	2	10,000Hr
6	Cooling side expansion valve (main unit : No coil included)	0A004330000	1	20,000Hr
7	Cooling side expansion valve (coil)	0A004103000	1	20,000Hr
8	Heating side expansion valve (main unit : No coil included)	0A004330000	1	20,000Hr
9	Heating side expansion valve (coil)	0A004103000	1	20,000Hr
10	Humidification heater	03110415010	1set	10,000Hr
11	Outlet air temperature and humidity sensor	0A004355010	1	10,000Hr

※1 We also offer Refrigerant distribution control valve that comes with a coil (Part Number : 03110410020)

※2 Times listed indicate the time when the chance of failure due to wear increases These times will depend on the operating environment and therefore components might not require replacement at the exact listed times but should be replaced when any abnormality arises.

Storage (Long Periods of Disuse)

1. Shut off power.

Switch OFF the earth leakage breaker of the product.

Cut off power to the product

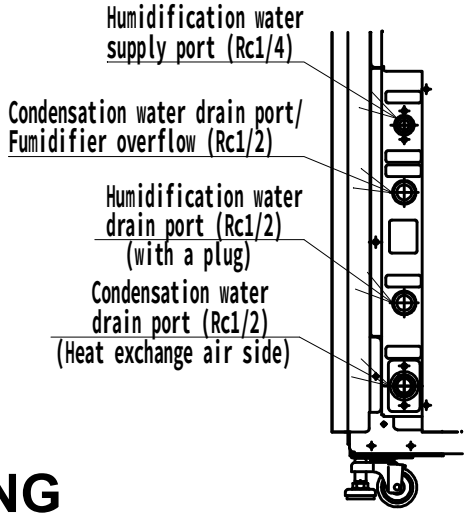
2. Drain the condensation water from the drain ports.

3.Drain the humidification water in the humidifier.

(1) Prepare a container to collect the drain water. Remove the plug and drain the water (approx. 5 liters).

(2) After the water has drained, replace and tighten the plug on the humidification water drain port.
※Use a sealing tape on the plug to prevent leakage

(3) While the water supply piping is removed, manually conduct a forced supply and drainage of humidification water (see page 20), to drain the humidification water remaining in the device by opening the product's solenoid valve.



WARNING

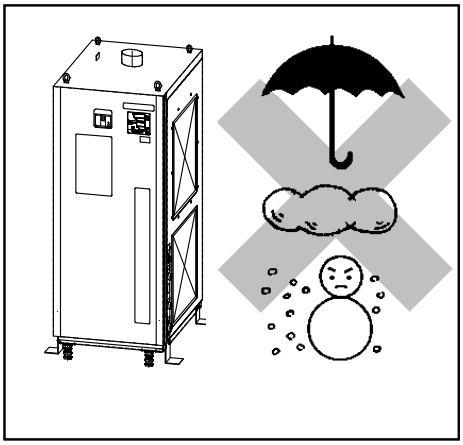
●Just after the product is stopped, boiling water of around 100℃ will be held in the humidifier. Before draining the humidification water and condensation drain for storage of the product, always stop the product and wait until product cool down operation has completed before proceeding.
In addition, wear protective gloves and release the water little by little, confirming that the temperature is not too high. Failure to do so can result in burns.

IMPORTANT

●Do not store the product with the humidifier inside the product remaining water under cold air conditions of 2 °C or lower. Doing so will result in damage due to freezing. Take measures to prevent external pipes from freezing.

4. Store the product.

Before storing, cover the product with a vinyl or other type of cover in order to keep out dust and dirt.



5. When using the product again

Inspect all the product components. Operate the product according to the instructions in the operating manual on page 9, "Operation".

Disposing of the Product

Disposing of the Product

Disposing of the Product

When disposing of this product, always follow local disposal regulations and employ a professional industrial waste company for proper disposal.

After-Sales Service

■Warranty

- ●The product guarantee certificate is attached to the end of this manual. Have it in your safekeeping.
- ●Note that the user may have to pay for consumable parts even during the warranty period. Please read the Warranty carefully.
- ●The customer will be responsible for charges incurred for repairs conducted after the warranty period has expired. Depending on the particular item in need of repair and the number of years in service, we may recommend that a part be replaced. Please consult with your dealer for further information.

■Before requesting inspection or service.

- ●Refer to page 68, "Diagnosing and Troubleshooting Product Failure or Abnormalities".
- ●If the problem cannot be remedied by taking the noted suggestions, do not attempt to fix the problem yourself; please consult with the dealer where the product was purchased.

■Spare parts

- ●Spare parts are items necessary to maintain the proper function of the product.
- ●Spare parts for this product will be made available for a period of 7 years from the last day of production of the product.

■Requesting after-sales service

- ●When requesting inspection or repairs, please provide the following information to the dealer where the product was purchased.
  - (1) Product name
  - (2) Model name (shown on product nameplate)
  - (3) Condition (Please be as specific as possible.)
  - (4) Directions to your location
- ●When ordering replacement parts, please give the following information.
  - (1) Product name
  - (2) Model designation
  - (3) Part name, number and quantity required

Installation

For proper installation, ask your dealer or a qualified specialist. Improper installation due to self-installation of such product can lead to water leakage and electric shock or fire.

Table of Contents

Always Follow These Safety Guidelines

Installation Guidelines (WARNING)

⚠ WARNINGS

Failure to follow instructions contained in a WARNING may result in death or serious injury.

	**Carefully follow the directions in this Operating Manual when installing this product.** Improper handling during installation can lead to water leakage, electrical shock, or fire. **For proper installation, ask your dealer or a qualified specialist.** Improper installation due to self-installation of such product can lead to water leakage, fire, or other problems. **Be certain that all electrical wiring is done in accordance with relevant electrical construction and internal wiring regulations and also follows the contents of this Operating Manual.** This product should be installed on its own electrical circuit. Installation with an insufficient power supply or improper installation can result in electric shock or fire. **Use only the prescribed cables when wiring this product.** Also, when attaching cables to the product, fix cables so there will be no external forces exerted on the contacts. Improperly made cable connections or failure to properly secure cables may lead to electric shock, overheating of the contacts, or fire.
	**Do not modify this product.** Improper modifications to wiring or piping within the product can lead to electric shock or fire. Furthermore, modifying this product will void the product warranty.
	**Do not modify settings of safety devices of this product.** Modifying such settings can lead to an explosion or fire. **Do not install outside.** Installation outside where the product can come into contact with direct sunlight or rain can result in trouble from overheating, electric shorts, and rust. **Do not install this product in places where flammable gases may be present or could leak out.** If by some chance such gas were to leak and collect near this product, a fire could break out. **Do not install this product where corrosive gases, organic solvents, or chemical solutions, etc. are present in the air or where such gases or liquids could come into contact with the product.** Doing so can cause corrosion of the product, which could lead to electric shock, or fire.
	**Never use this product in the testing of explosive or combustible materials.** Also, do not use in tests involving "carbide in gaseous suspension", "biological targets", or tests involving pressure. Failure to follow this warning can lead to explosion or fire.
	**Always properly ground this product.** Do not attach the grounding wire to gas pipes, water pipes, lightning rods, etc. Improper grounding of this product can lead to electric shock. (Installation of a Class-D ground hookup must be performed by a qualified electrician.)

Always Follow These Safety Guidelines

Installation Guidelines (CAUTION)

⚠ CAUTIONS

Failure to follow instructions contained in a CAUTION may result in personal injury or damage to property.

	**Be sure to install this product in a place that can fully withstand the load of its weight.** Also, be sure to install on a level surface and provide adequate safety measures to ensure that the product will not tip over. Improper handling during installation can lead to fluid leaks or injury from the product tipping over or dropping. **Install in an adequately wide space.** Ensure there is adequate space for ventilation and heat exhaust, as well as sufficient space for maintenance and inspection of the product. **Ensure a reliable drainage system.** Failure to do so can result in drainage flooding the room causing the surrounding area and items in the room to become wet.
	**Do not install this product where freezing may occur.** Pipes freezing during operation can result in burst pipes and flooding, which can cause damage to items in the surrounding area. **Do not climb on nor place things on the product.** Doing so can cause the product to tip or fall and may lead to injury.

Unloading

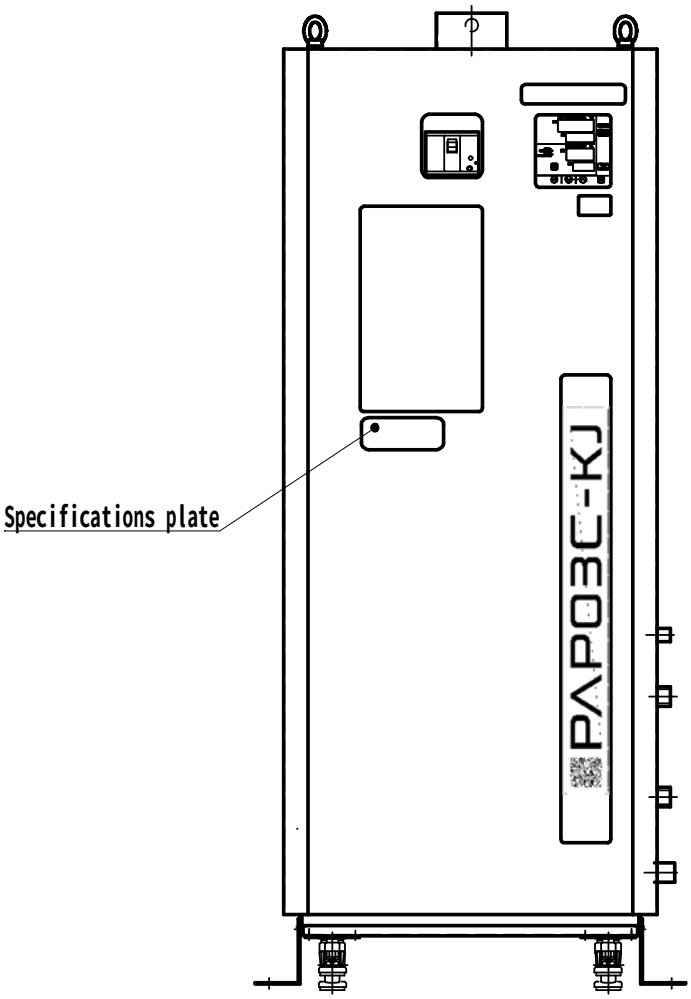
Before Unloading

Before Unloading

After unpacking, confirm the following points

1. Make sure that the product specification on the specifications plate matches the product ordered.

Specifications plate location



2. Confirm that the following items are included.

■ List of included parts

No.	Part name	Qty.	Comments
1	Y-strainer for humidification water 1/4B	1	Equivalent to 100 mesh
2	Nipple 1/4B	1	For the Y-strainer

3. Confirm that the product is not damaged and that there are no deformities.

4. If by some chance something abnormal is noticed, please contact the dealer where the product was purchased.

Unloading

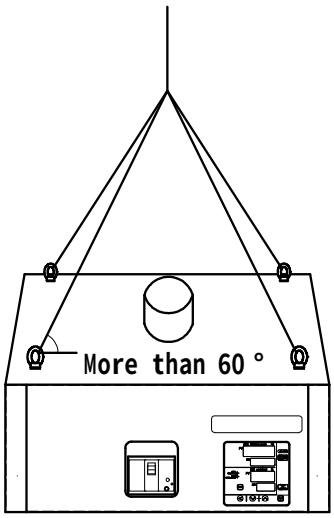
Unloading Procedure

Unloading Procedure

1. The product is heavy; please be careful when transporting it.
2. The suspension eyebolts or a forklift should be used when moving the product during unloading or placement.

WARNINGS

●**When unloading and moving the product by suspending it, always use all 4 eyebolts and make sure the angle between the top face of the product and the suspension cables is at least 60°. Improper suspension may lead to the product tipping over or falling, which could result in injury.**



3. This product is equipped with casters and therefore, if on a level surface, and if the adjusters are lifted, the product can be rolled into position. If the product is to be pushed into place, watch your step and move it gently so the product does not tip over.

Product mass	135 **kg**

●**Always use at least 2 people when unloading or moving the product. If moved by only one person, the product may tip over, which could result in injury, etc.**

IMPORTANT

●**Do not allow the product to be turned on its side nor upside-down. Doing so may damage the product.**

Installation

Product Placement

WARNING

- **Installation of this product should be performed by your dealer or other qualified personnel. Improper installation due to self-installation of such product can lead to water leakage and electric shock or fire.**

Product Placement

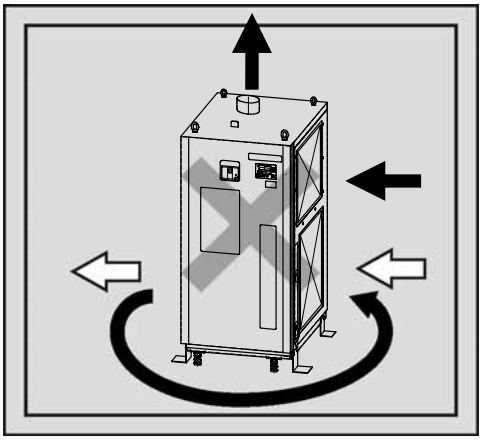
WARNINGS

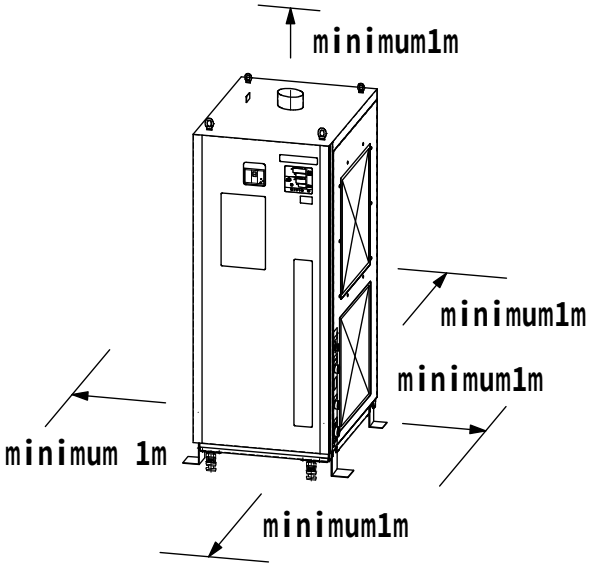
- **Do not install this product in places where flammable gases may be present or could leak out. If by some chance such gas were to leak and collect near this product, a fire could break out.**
- **Do not install this product where corrosive gases, organic solvents, or chemical solutions, etc. are present in the air or where such gases or liquids could come into contact with the product. Doing so can cause corrosion of the product, which could lead to electric shock, or fire. (refer to page 94, "Preventing Corrosion Related Breakdown" for further information.)**

CAUTION

- **Install on a level surface that can adequately support the weight of the product and fix the product down with anchor bolts to prevent it from moving around.**
  Not properly installing the product as indicated can result in water leaks or injury etc. from the product tipping over or falling.

1. Ensure there is adequate space for heat exhaust, as well as sufficient space for maintenance and inspection of the product. Furthermore, if the product is in an enclosed space, exhaust from the product can re-enter at the heat exchange air intake port which will cause the refrigerant high-pressure to increase and could lead to the product shut-down.

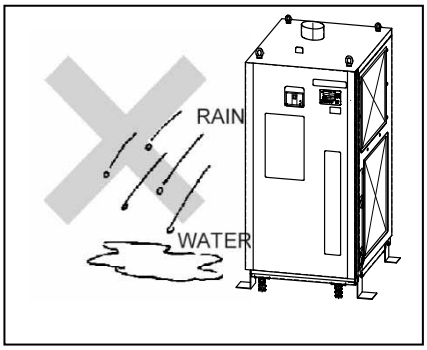




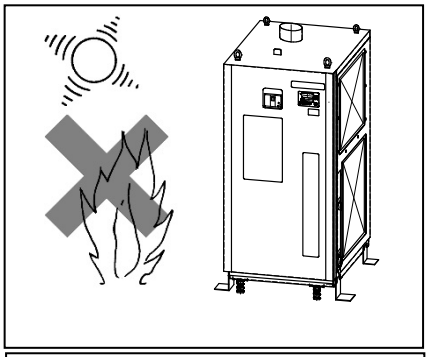
Installation

Product Placement

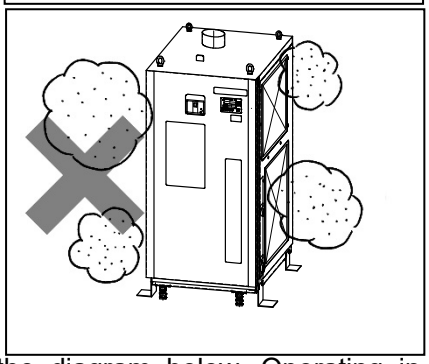
2. Do not install outside.
   Rain falling on the product can lead to electric shock or fire.



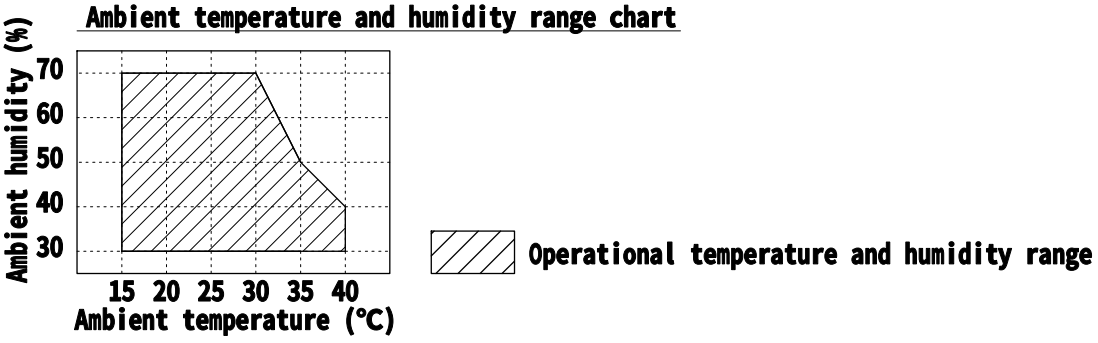
3. Install the product in an inside space where it will be protected from direct sunlight or the effects of exhaust air (cold or hot) from other product or heat. The effects of heat from other hot or heat generating product, or from the product being in direct sunlight cannot only reduce product performance, but can also greatly increase the load on the product



4. Install in a place that isn't too dirty or dusty.



5. The operable temperature and humidity ranges are shown in the diagram below. Operating in temperatures less than 15℃ can damage the product. And operating in temperatures over 40℃ can result in the product performing below specified performance levels and may also cause built-in safety devices to activate, which could cause the product to shut down. Similarly, if the ambient humidity is high, condensation can form inside the product, resulting in water leaks and electric shorts.
   ※The product may be operated in temperatures that exceed 35 °C, however there will be a drop in performance, and the product might not be able to achieve temperature and humidity control. It is recommended that the product is installed in a location that will normally be below 35 °C.



Preventing Corrosion Related Breakdown

■Breakdown due to product corrosion

Breakdown due to corrosion is not covered by the warranty.

This product uses copper piping (phosphorous-deoxidized copper piping) for refrigerant piping and piping within the heat exchanger. In particular, if holes form in copper piping due to corrosion, refrigerant leakage could occur, temperature and humidity control could fail, and general breakdown of the compressor refrigerant piping could also occur. Furthermore, copper is also used as a conductor in the product wiring, and corrosion in the wiring could lead to shorting and possibly compromise the safety of the product.

Accordingly, in order to prevent breakdowns due to copper corrosion, it becomes necessary to avoid environments that tend to encourage such corrosion. In particular, if there is repeated condensation and drying, and the presence of corrosive substances within the heat exchanger, there will be the tendency for such substances to concentrate on the walls of the pipes, leading to a condition where corrosion tends to occur easily.

■Precautions regarding the area surrounding the product

If NOx (nitrogen oxide), SOx (sulphur oxide), CO_2 (carbon dioxide), or other corrosion promoting compounds are present within the workplace, the product should be installed in a place such that it is not affected by such substances. In particular, when these corrosive substances are present in the working environment, enough care must be taken to ensure that the product is not exposed or affected. Also, in the rare event that chlorine-based organic solvents (trichloroethylene etc.), aldehydes (from degassing of building materials such as formaldehyde) or alcohols (medicinal methanol etc.) enter the air intake of the product and hydrolysis occurs, it can lead to corrosion of copper piping (formicary corrosion, also known as ants-nest corrosion) and so care must be taken to ensure that this does not happen.

■Examples of corrosive substances

Examples 1 and 2 of the most corrosive substances taken from copper pipe chemical resistance data are listed below. Aniline, aniline dyes, ammonia (wet), sulfur (molten), ammonium chloride, zinc chloride, hydrochloric acid (hydrogen chloride), ferric chloride, copper chloride, chlorine (wet), sodium peroxide, chromic acid, iron acetate solution, potassium cyanide, sodium cyanide, sodium hypochlorite, hydrobromic acid, nitric acid, ammonium nitrate, copper nitrate, silver chloride, mercury, mercury salts, lime sulfur, sodium thiosulfate, potassium dichromate (acid), sodium dichromate, hydrofluoric acid, hydrogen sulfide (wet), sodium sulfide, barium sulfide, ammonium sulfate, ferric sulfate

※1 Reference: "Shindohin Data Book ", Japan Copper and Brass Association

※2 The items listed above are only a sample of substances known to be corrosive to copper and by no means represents a complete list of such substances.

Electrical Wiring

WARNINGS

- **Ensure that all electrical wiring is done in accordance with relevant electrical construction as well as the directions outlined in this manual. Furthermore, the product must be powered on its own electrical circuit. Installation with an insufficient power supply or improper installation can result in electric shock or fire.**
- **Be sure to connect the prescribed cables in a reliable manner, ensuring that there are no external forces exerted on the contact connectors. Improperly made cable connections or failure to properly secure cables may lead to electric shock, overheating of the contacts, or fire.**
- **Make sure the power cord does not come into contact with the motor or refrigerant piping within the product. Contact with hot surfaces could cause the cord to melt, resulting in an electrical short.**

WARNING

- **Do not modify this product in any way. Improper modifications to wiring or piping within the product can lead to electric shock or fire. Furthermore, modifying this product will void the product warranty.**

WARNING

- **Never change the settings of built-in safety devices. Modifying such settings can lead to an explosion or fire.**

WARNING

- **Always properly ground this product. Do not attach the grounding wire to gas pipes, water pipes, lightning rods, etc. Improper grounding can lead to electric shock. (Installation of a Class-D ground hookup must be performed by a qualified electrician.)**

IMPORTANT

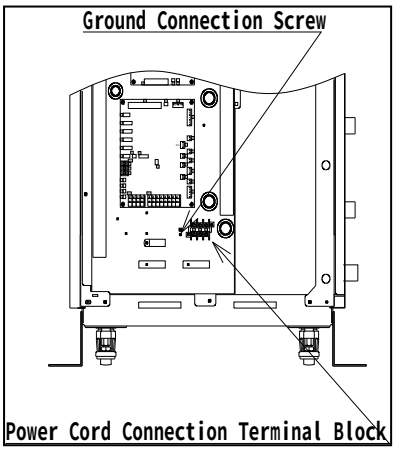
- **Connect the product to a commercial power source. (Connection to the secondary side of the inverter will damage the product.)**
- **Route the outlet air temperature and humidity sensor cable away from power lines in order to avoid any effects from electrical noise. Influence from electrical noise can result in malfunction.**

Installation

Electrical Wiring

1. The power capacity of the power cord to the product must meet the maximum operating current specifications listed in the chart below.
   Hook up the ground wire to the earth (ground) terminal located in the distribution panel.

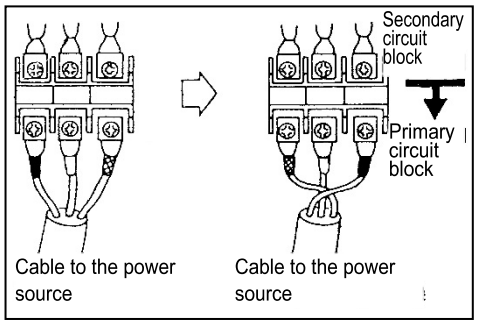
Power source (V･Hz)	Three phase 200V, 50/60Hz
Earth leakage breaker capacity	20A／30mA
Maximum operating current (A)	12



2. Remove the front cabinet panel. (For information on removal, see page 70, "Recovery After a Built-in Safety Device is Activated".)
3. Route the power cord through the distribution hole, located on the lower-left part of the product, to the inside of the distribution panel. (Use 1 of the 2 available distribution holes.
   The other can be used for remote control connections, etc.)
   Attach the power cord to terminals L1, L2, and L3 in the distribution panel. Secure the power cord with a cable tie.
4. The product must be properly grounded. Connect the ground wire to a proper earth/ground point that has been installed by a qualified electrician. Furthermore, the gauge of the grounding wire must be more than the gauge of the power cord.
5. Use wiring terminals according to the sizes listed in the chart below.

	Power source wiring terminals	Ground terminal
Terminal screw	M4	M4
Width of terminal block (inside dimension)	10mm	—

6. Ensure the source voltage is within ±10% of the specified voltage.
   Also make sure the source voltage phase unbalance※ is within ±3%.
   ※Phase unbalance (%) = (Maximum voltage [V] - Minimum voltage [V]) ÷ Average voltage of 3 phases (V) × 67. (Based on IEC61800-3.)
7. The product uses three-phase power; always ensure that there are no reversed power phases.
   If the product is started and there are reversed power phases, "E010" will be shown on the display panel. If such a case arises, always cut off the power and reverse the power cord connections, L1 and L3. In addition, never push the electromagnetic switch in order to force start the product, nor reverse the secondary circuit wiring.



8. If remote operation and signal outputs are to be used, then perform the electrical work after confirming the relevant specifications. Use 0.75 mm or smaller wire to connect to the terminal blocks in the distribution panel located inside the cabinet panel on the front of the product. See "Remote Operation Switch Operation Mode" on page 14, and "■ External Output Signals" on page 17 for information on how to use these input and output signals.

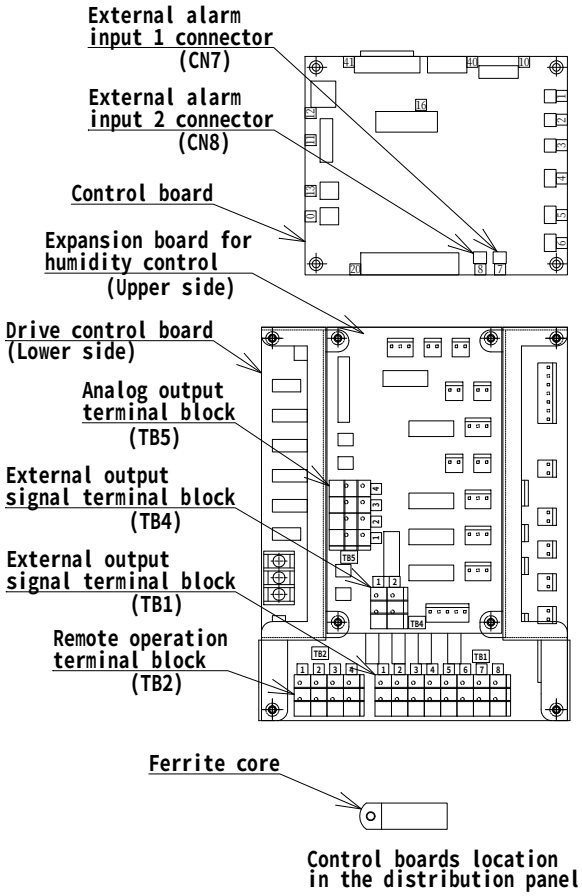
Installation

Electrical Wiring

■Electrical Specifications and Locations of Terminal Blocks and Connectors

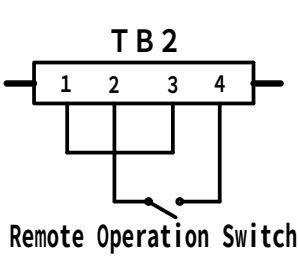
Remote operation input (Drive control board TB2)	・No-voltage contacts input ・Maximum cable length: 20 m ・Input resistance: 1200 Ω ・Open circuit voltage: 12 Vdc ・Short circuit current: 10 mA
	・Voltage input specifications ・Rated voltage: 12 to 24 Vdc ・Input resistance: 1200 Ω
Signal output (Drive control board TB1, Expansion board for humidity control TB2)	・Relay output: A-contacts (normally OFF) ・250 Vac / 30 Vdc, 3A (Resistive load) ・Minimum operating current (for reference only): 5 Vdc, 100 mA
External alarm input ※1 (Control board CN7 and CN8)	・Input resistance: 1 KΩ ・Short circuit current: 12 mA ・Wire included with connector UL1061 22 AWG, Length: 80 mm
Analog output (Expansion board for humidity control TB5)	・Allowable resistive load: minimum 100Ω ・Output impedance: maximum 0.1 Ω

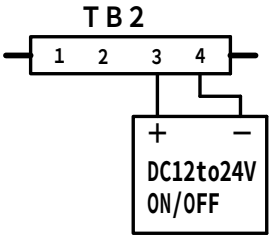
※1 Remove the wire from the connector and connect the desired signal wire.



■Remote Operation Input Terminal Block

Remote operation terminal block	No-Voltage contacts input specification Short 1-3, and connect to terminals 2-4	Voltage input specification Apply voltage input to terminals 3-4





IMPORTANT

- When making wiring connections, do so such that no strain is placed on the terminal blocks or connectors.
- Wind DC circuit signal cabling 1 or 2 times through the ferrite core located below the external signal terminal block (TB1).

Installation

Electrical Wiring

9. If communications functions are to be used, then confirm the following specifications before making connections.

USB	• Maximum data cable length: 3 m (from host to the end machine)
RS-232C	• Maximum data cable length: 15 m (from host to the end machine)
RS-422A (RS-485)	• Attach the stripped wires and make connections as is. • Data cable size: AWG 16 to 24 • Maximum data cable length: 100 m (from host to the end machine)

※See page 45, "Communications Functions" for further details regarding communications functions.

※May differ depending on specific operating conditions.

※If RS-422A, RS-485, or RS-232C are used, then the "Communications Board Interface Kit", Part No. 04107613010 (sold separately) is required. USB cannot be used together with RS-422A, RS-485, or RS-232C.

IMPORTANT

●Make sure the power cord does not come into contact with the refrigerant piping or motor within the product. Contact with hot surfaces could cause the cord to melt, resulting in an electrical short. (Secure the power cord with the distribution panel cable tie.)

●After powering up the product, be sure to follow the guidelines described under the "Operation" (page 9).

●Do not attempt to perform withstand voltage tests or insulation resistance tests. Doing so can damage the control board. If the tests are deemed necessary, please consult with your dealer.

Water Supply and Drainage Piping Constructions

CAUTIONS

●**Carefully conduct water piping construction. Failure to do so can result in flooding the room causing the surrounding area and items in the room to become wet.**

●**When installing water piping, make sure dirt or other foreign matter does not get into the pipes.**

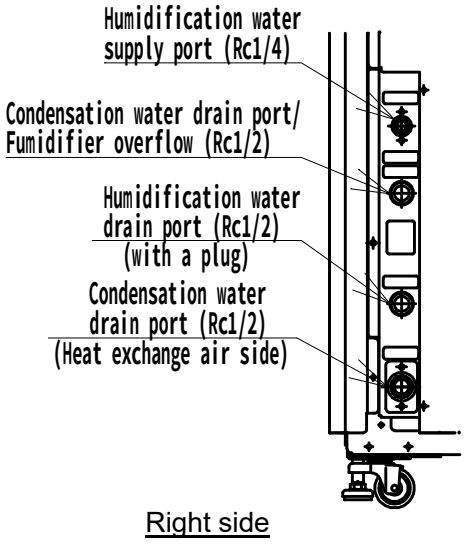
CAUTIONS

●**Do not install this product where freezing may occur. Pipes freezing during operation can result in burst pipes and flooding, which can cause damage to items in the surrounding area.**

●**Suitable water for humidification is conditioned water (with an electrical conductivity 0.01 to 1mS/m (0.1 to 10μS/cm). Operation with water outside the designated range can lead to product breakdown, water leakage, electrical shock, electrical shorts, or fire.**

■Specifications/ Connecting Ports

Humidification water supply port	Port size: Rc1/4
	Maximum moisture output: 2.3L/h (During the normal operation)
	Supply water temperature range: 10 to 40℃
	Supply water pressure range: 0.03 to 0.2MPa
	Water quality: Conditioned water (with an electrical conductivity 0.01 to 1mS/m (0.1 to 10μS/cm))
Condensation water drain port (Controlled air side)/ Fumidifier overflow	Port size: Rc1/2
	Maximum drain flow: 1.7L/h (During the normal operation)
	Drain flow during the hot water cool down operation and forced supply and drainage of humidification water: 15L ※1
Humidification water drain port	Port size: Rc1/2
	With a plug (Normally closed)
Condensation water drain port (Heat exchange air side)	Port size: Rc1/2
	Maximum drain flow: 1.7L/h



Right side

※1 Reference value, when each operation is for 7 minutes (factory default setting) at a water supply pressure of 0.1 MPa. Each operating time can be changed. For details, see "■Cool Down Operation" on page 19, and "■Forced Supply and Drainage of Humidification Water" on page 20.

■Piping Methods (Confirm the Important points listed on the next page.)

1.The condensation drain port is open to atmospheric pressure and should not have vertical rises and U-traps. It should have a downward slope. If drainage does not properly occur, built-in safety devices may activate.

2. Install a pressure reducing valve if there is a chance the humidification water supply pressure will exceed 0.2 MPa. If symptoms of water hammering occur, then install countermeasure components along the water supply piping.

3.Be sure to install the Y-strainer included in the product on the humidification water supply port.

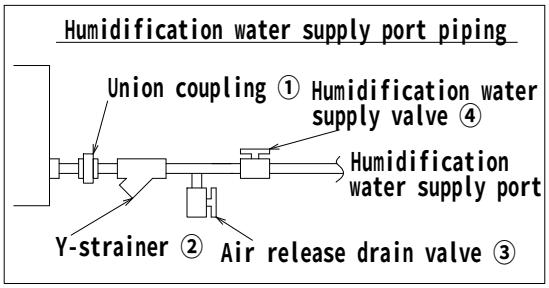
4.Humidification water drain port is used to drain the water from inside the humidifier for inspection or storage. This port is not used during the normal operation and therefore must be closed with the plug. (already closed in time of factory shipment) If piping is to be attached to the port, then be sure to also install a valve on the piping and keep the circuit closed.

Installation

Water Supply and Drainage Piping Constructions

■Humidification Water Supply Port Piping Method (Example)

(1) Install a union coupling ①.
Consider ways to allow for easy separation of the product and humidification water piping.
(2) Install the included Y-strainer ② onto the humidification water supply port.
(3) Install an air release drain valve ③.
(4) Install a humidification water supply valve ④.



IMPORTANT

- Be sure to connect drain piping from the condensation water drain (on the controlled air side) / humidifier overflow port, and condensation water drain port (on the heat exchange air side) because drainage of condensation water will occur while the product is in operation.
  ※ Note that drain release might not occur depending on the environmental ambient temperature and humidity and operating conditions.
- Piping for each of the two condensation water drain ports must be installed open to atmospheric pressure with a downward slope and without vertical rises or U-traps. If drainage does not properly occur, built-in safety devices may activate and leaks may occur.
- Drainage will occur for a fixed time from the condensation drain (on the controlled air side) / humidifier overflow port when operation is stopped as part of cool down operation. (See "■Cool Down Operation" on page 19 for details.) Similarly, humidification water will be drained out during forced supply and drainage of humidification water operation. (See page 20). Drained water will be hot, and therefore such water piping should be insulated or otherwise protected.
- If piping for the condensation drain (on the controlled air side) / humidifier overflow port and piping for the condensation water drain port (on the heat exchange air side) are merged outside of the product, then it could result in a back flow of water from the humidifier to the condensation drain pan for heat absorber and water leakage during cool down operation or during humidification water supply and drainage operation. Therefore, install each drain piping system separately such that each is released to atmospheric pressure, and if they are to be merged, be sure to perform such piping construction with sufficient caution.
- It is recommended that independent piping be installed for the two condensation drains. If use of drain tanks or other such means of collecting drain is unavoidable, then be sure to carry out and confirm the following points.
  1. Make setting changes to disable hot water cool down operation (see "■Cool Down Operation" on page 19) and forced supply and drainage of humidification water operation (see "■Forced Supply and Drainage of Humidification Water Operation" on page 20). (Parameter change example: "F662": “0”, "F665": “0”.) And do not manually perform forced drainage and supply of humidification water operation.
  2. Before stopping the operation, first ensure that there is sufficient space remaining in the drain tank and only stop after this is confirmed. Be aware that despite having a large volume drain tank, overflow is possible from previous drainage operations.

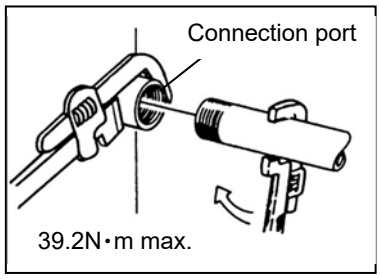
Installation

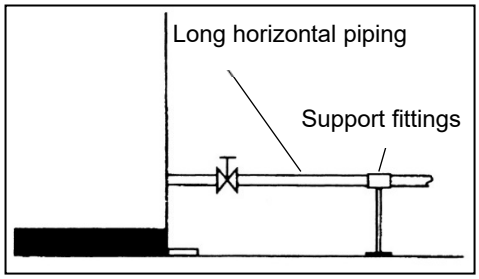
Water Supply and Drainage Piping Constructions

●**Always use a second pipe wrench to support the connection port while tightening piping.**

1.Tighten the piping to the connection port to a torque not exceeding 39.2 N･m.

2. Install piping such that the weight and vibration of the piping is not applied directly to the product itself. Longer lengths of horizontal piping should be supported with additional support hardware or by other means to ensure unreasonable forces are not applied directly to the product's connection port. Failure to properly support piping can lead to product damage.





●When installing piping, make sure that foreign matter does not get into the humidification drain water piping. Failure to do so could prevent electric valves from opening and closing properly

●Always install the included Y-strainer at the humidification water supply port. Foreign matter entering pipes could prevent electric valves from opening and closing properly.

●Always install a (user-supplied) valve at the humidification water supply port. This is required in order to stop the supply of water before cleaning the Y-strainer filter.

Installation

Duct Work

Duct Work

■**Ducting connections**

Connect ducting to the controlled air outlet using flexible ducting.

■**The duct connecting to the product must be insulated ducting.**

If insulated ducting is not used, condensation may form on the ducting and, due to thermal losses in the ducting, performance will be decreased.

■**Make ducting lengths as short as possible.**

Installing ducting that is longer than necessary can cause the product to fail to perform to specified performance levels and could also cause built-in safety devices to activate, which could cause the product shutdown.

Specifications

PAP03C-KJ

Model			PAP03C-KJ	
Performance specifications	Configurable temperature/ humidity	℃/%	※1	18 to 30/ 45 to 75
	Temperature and humidity control accuracy	**℃/%**	※2	±0.1／±1.0
	Cooling + heating output (50/60Hz) (Maximum cooling output)	kW	※3	1.80/ 2.12 (1.20/ 1.42)
	Rated processing air volume	m^3/min	※1	2 to 4
	Max. external static pressure (50/60Hz)	Pa	※4	110/ 150
Environmental conditions	Ambient temperature and humidity range (Intake air)	**℃/%**	※1, ※5	15 to 40/ 30 to 70
	Temperature gradient at intake	**℃**/h.		Max. 1
	Humidity gradient at intake	**%**/h.		Max. 5
Outside dimensions (H x D x W)		mm	※6	1350×680×520
Mass		kg		135
Controlled air discharge port		mm		Φ98
Humidification water	Water quality			Conditioned water (with an electrical conductivity 0.01 to 1mS/m (0.1 to10 μS/cm))
	Maximum moisture output	kg/h	※7	2.3
	Supply water temperature range	**℃**		10 to 40
	Supply water pressure range	MPa		0.03 to 0.2
	Connection port size			Rc1/4
Power specifications	Power source		※8	Three phase 200V ±10% 50/60Hz
	Power consumption (50/60Hz)	kW	※9	2.7/ 3.1
	Current (50/60Hz)	A	※10	11/ 12
	Power source capacity	kVA	※11	4.0
Noise level (50/ 60Hz)		dB		65/ 66
Operation control method				Heat pump balance control, PID humidification control
Component specifications	Compressor	W		Hermetically sealed rotary type 850
	Heat exchange air side heat exchanger			Finned tube
	Controlled air side heat exchanger			Finned tube
	Heat exchange air ventilation fan	W		Propeller fan 30
	Controlled air blower fan	W		Sirocco fan 200
	Humidifier	W		Pan type sheath heater 1800
	Refrigerant control method			Electronic proportional control valve
	Refrigerant	g		R410A 480
	Temperature and humidity control method			Digital electronic temperature and humidity control system
	Temperature sensor			Platinum resistance thermometer
	Humidity sensor			Capacitive polymer sensor
Communications	Communications protocol		※12	USB2.0
	Number of units that can be connected		※12	1 unit, Max. cable length: 3m (TYPE B)
Protective devices	Primary circuit			Earth leakage breaker (capacity: 20A - 30mA)
	Compressor			Overcurrent relay, Thermal protector
	Heat exchange air ventilation fan			Thermal protector (Built-in)
	Controlled air blower fan			Overcurrent relay
	Refrigeration circuit			High pressure switch
	Humidifier			Overheating prevention thermostat
External finish				Light grey (Munsell No. N8.0), Medium grey (Munsell No. N5.5)
Accessories	Y-strainer for humidification water 1/4B (Equivalent to 100 mesh), Nipple 1/4B (For the Y-strainer)			

Remarks

※1 The temperature and humidity control range noted does not necessarily indicate the actual controllable range possible. The actual controllable temperature and humidity ranges will depend on the temperature and humidity of the intake air as well as the processing air flow. Adjust the processing air flow to suit the environment where the product is used.

※2 The value indicated for when the intake air temperature and humidity are stable. Noted accuracy is based on measurement by the internal controller at a single air outlet point. When operating at the rated processing air flow (3 m^3 /min). There will be temporary fluctuations in temperature for approx. 2 minutes after the product is started due to the oil-return process at that time. If the target humidity is high, and depending on the timing of the supply of the humidification water, the precision previously noted may not be able to be maintained. In such cases, the amount of fluctuation can be reduced by adjusting parameters related to supply water.

※3 When the intake (ambient) air temperature and humidity are 30 °C and 70%, at a processing flow rate of 3 m^3 /min.

※4 When the processing flow rate is 3 m^3 /min.

※5 See the range chart on page 5 for details regarding the ambient temperature and humidity range.

※6 Height includes discharge port.

※7 The figure noted is when the product is operating at the highest humidification capacity of its normal operating range.

※8 Source voltage phase unbalance should be less than±3%.

※9 When the intake (ambient) air temperature and humidity are 30**℃** and 70%, at a processing flow rate of 3 m^3 /min, with a power supply voltage of 200V.

※10 Maximum value within the range of this product specifications.

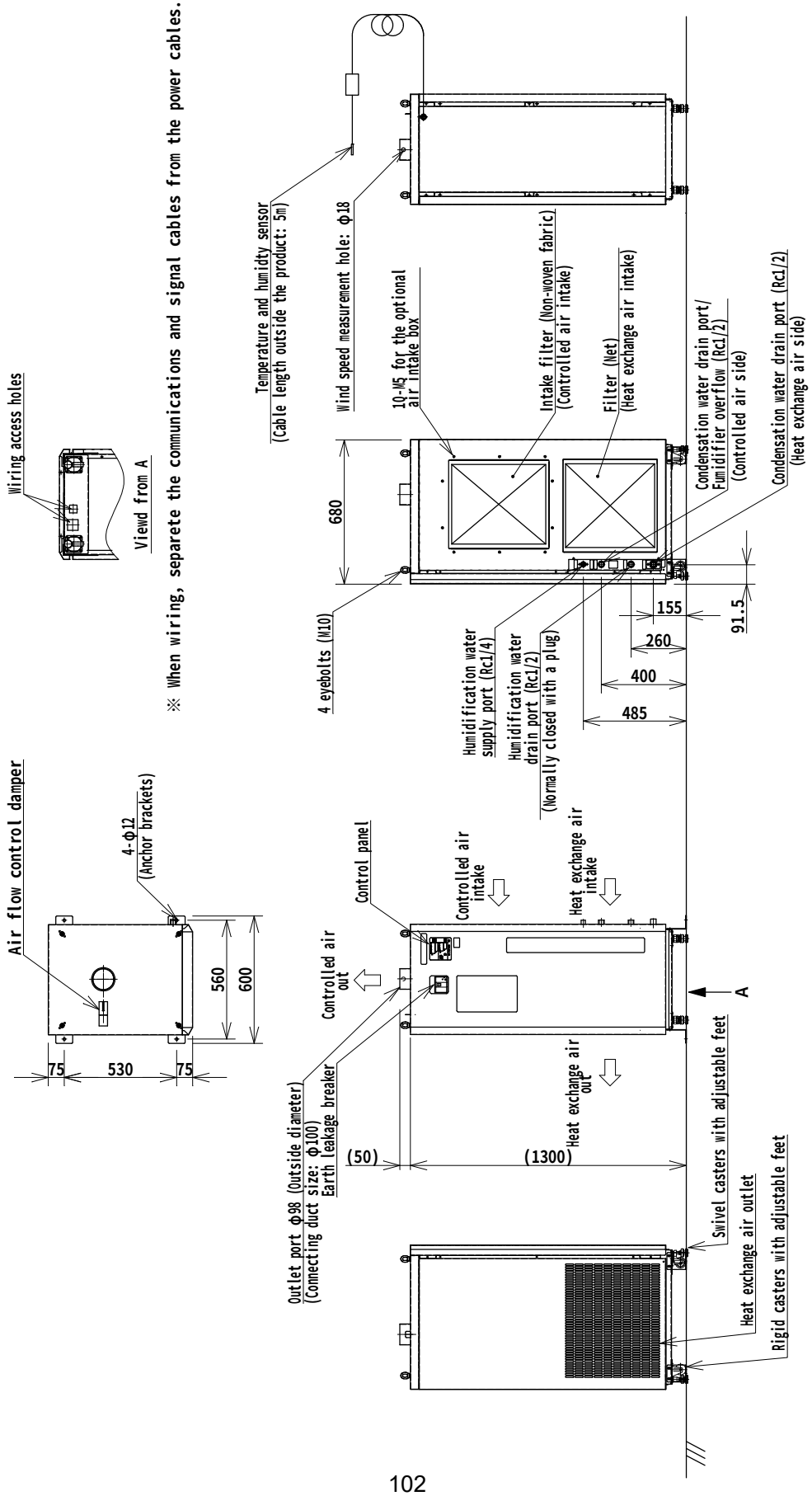
※11 The value is when this product is operating at the highest current of this product specifications.

※12 If EIA standard RS-422A, RS-485, or RS-232C are used, then the (optional) "Communications Board Interface Kit", Part No. 04107613010 is required. Maximum number of connected units: RS-422A/485: 32 units, RS-232C: 1 unit.

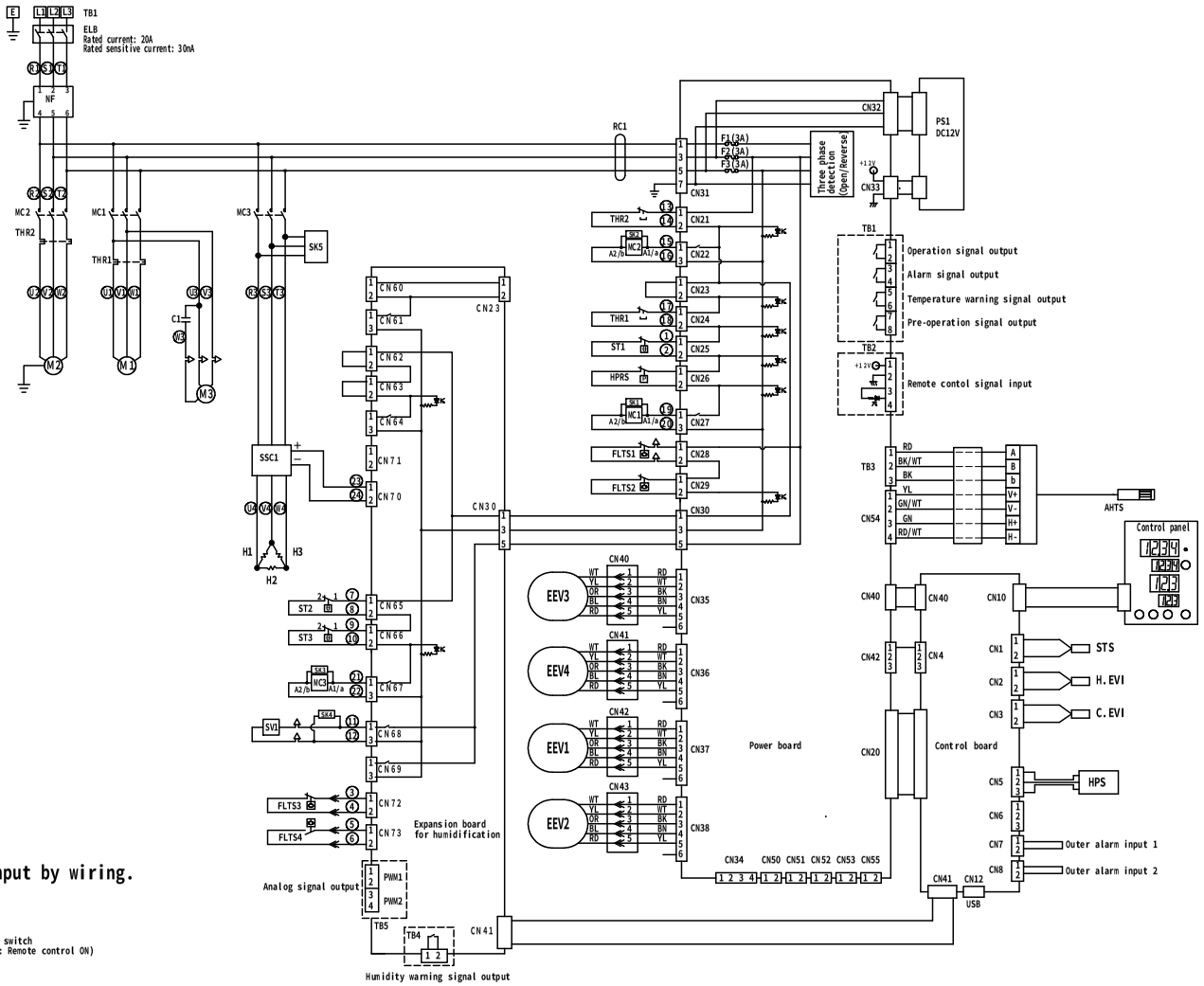
External Dimensions

PAP03C-KJ

(unit: mm)



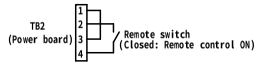
Symbol	Description
ELB	Earth leakage breaker
M1	Motor (Compressor)
M2	Motor (Controlled air blowr fan)
M3	Motor (Heat exchange air ventilation fan)
MC1	Electromagnetic contactor for M1
MC2	Electromagnetic contactor for M2
MC3	Electromagnetic contactor for H
THR1	Overcurrent relay for M1
THR2	Overcurrent relay for M2
F	Fuse
ST1	Thermal protector for M1
HPRS	High pressure switch
PS1	Switching power supply (DC12V)
EEV1	Refrigerant distribution control valve for cooling
EEV2	Refrigerant distribution control valve for heating
EEV3	Cooling side electronic expansion valve
EEV4	Heating side electronic expansion valve
AHTS	Temperature and humidity sensor
STS	Compressor inlet temperature sensor
H.EVI	Heating side evaporator inlet refrigerant temperature sensor
C.EVI	Cooling side evaporator inlet refrigerant remperature sensor
HPS	High pressure switch
FLTS1	Drain pan drainage alarm float switch (Controlled air side)
FLTS2	Drain pan drainage alarm float switch (Heat exchange air side)
FLTS3	Humidification water float switch
FLTS4	Humidification water level alarm float switch
SV1	Humidification water supply solenoid valve
H1～3	Humidification heater
SSC1	Solid state contactor
ST2,3	Overheating prevention thermostat
TB	Terminal block
SK1～5	Spark quencher
C1	Capacitor for M3
NF	Noise filter
RC1	Ferrite ring core



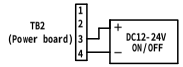
1.Signal output specifications
- Relay output: A contacts
- AC250V/DC30V 3A (resistance load)
- Minimum operating current (for reference only): DC5V 100mA

2.Remote operation input specifications
- Internal contact: alternate
- Maximum cable length: 20m
- Allow to select either Cotact input or Voltage input by wiring.

(1) Contact input specifications
- Input resistance: 1200Ω
- Open circuit voltage : DC12V
- Short circuit current: 10mA



(2) Voltage input specifications
- Rated voltage : DC12-24V
- Input resistance : 1200Ω



Applied DC voltage (12 - 24Vdc): Remote conrol ON

※1 □ indicate terminal numbers.
※2 When wiring, keep communications lines and power lines separated.
※3 See the product's manual for details regarding analog signal output and outer alarm input.

Checklist of Important Installation Point

※Do not fail to record (write down) these items.

Model		Serial No.	

Check item		Criteria	Check	Rep.
Unloading and Installation	1. Installation Details			
	①Level Installation	Not installed on a slope.		
	②Floor Strength	The floor sufficiently support the weight of the product.		
	③Surrounding Environment	There are no combustible or explosive gases nearby.		
	④Service Space	There is sufficient space cleared around the product.		
	2. Product			
	①Damage or Deformities	No damage or deformities.		
	②Duct Connections	There are no air leaks and flexible material is used.		
	③Sensors	There is no damage or deformity, and there is sufficient flow of controlled air to the side of the sensor.		
	④Heat Output	The product is not affected by heat output of nearby equipment, and ventilation air of the product is not obstructed.		
Electrical Work	1. Power Supply Wiring	The cable used can sufficiently carry the maximum specified current, and phase connections are correct.		
	2. Grounding	The grounding wire should be reliably grounded.		
	3. Communications Cables	The cable meets the specifications noted in this document.		
Water Piping Construction	1. Condensation Drain (The upper drainage port also carries the humidification water overflow)			
	①Piping Configuration	Piping for the 2 drain pipe system are independent of each other. In case they are to be merged, measures are taken to prevent back flow into the lower drain pan (Condensation drain pan for heat absorber).		
	2. Humidification Water Supply Piping			
	①Strainer	The Y-strainer is installed.		
	②Electrical Conductivity	An electrical conductivity meter is set up and the measured value is 0.01 to 1 mS/m.		
	③Water Supply Pressure	The pressure is within the specified range.		
Others	1. Power Supply Voltage	The voltage is 200V ±10%		
	2. Controlled Air Flow Rate	The air flow rate is within the specified range.		
	3. PID Control Values	Respective PID values for temperature and humidity control have been adjusted.		
	4. Water and Vapor Leakage	There is no leakage from water piping or vapor piping.		
	5. Humidification Water Supply Management	Explanation about management of water quality of humidification water and the related main points documented have been carried out. (See page 58, “Inspection and Maintenance”)		

MEMO

Product Warranty

This product shall be warranted as follows. For warranty repairs, please contact the dealer where the product was sold after confirming the product model and serial number.

1. Warranty Period

(1) Refrigerant circuits：Two years from the date of purchase, or 10,000 operating hours, whichever comes first.
(2) Others ：One year from the date of purchase.

2. What Is Covered by this Warranty

(1) If breakdown occurs within the above warranty period and the cause of the breakdown lies with ORION, then the damaged part(s) will be replaced or repaired by ORION free of charge. Note that depending on the country/region where the product is being used, repairs may take more time or be impossible. Please consult with your dealer in advance regarding service and repair options for products to be operated outside of Japan.
(2) In principle, the owner of the product will confirm diagnosis of the breakdown according to the operating manual. However, there might be cases where this work may be carried out instead by a member of ORION's service network. In such cases, there will be no charge where the cause of the breakdown lies with ORION.
(3) Note that even during the warranty period, there will be costs incurred by the user (outside the warranty) in the following cases:
① Breakdown resulting from operating under unsuitable operating conditions, environment, handling, use, or method of operation outside those written in the specifications or operating manual of the product, or as a result of carelessness or negligence on the part of the user.
② Breakdown resulting from non-ORION equipment (user's own equipment or software design, etc.).
③ Breakdown resulting from repairs or modifications conducted by non-ORION designated contractors.
④ Breakdown which could be recognized as being avoidable in cases where an ORION product is used in conjunction with the user's equipment where the user's equipment is legally regulated to have a safety device whereby inclusion of the safety device could have averted breakdown, or in cases where the addition of function, structure, etc., could have, according to common knowledge of the industry, averted breakdown.
⑤ Any breakdown which is recognized as being avoidable had normal fixed term inspections, and/or normal maintenance and replacement of consumables, been performed as indicated in the operating manual, etc.
⑥ Replacement of consumables (parts to be replaced at fixed terms or based on inspection).
⑦ Breakdown due to external factors beyond human control such as fire etc., or breakdown resulting from natural disaster such as earthquake, lightning, storm and flood damage, etc.
⑧ Breakdown due to reasons unforeseeable due to the technological standard at the time the product was shipped from ORION.
⑨ Any breakdown resulting from corrosion caused by operating the product in an atmosphere that contains corrosive gases, organic solvents, chemical solutions, etc., or in an environment where such substances could come into contact with the product.
(4) In cases where a separate contract, etc. has been established, that contract will take priority.

3. Warranty Obligation Exclusions

Regardless of the warranty period, compensation for any of the following will not fall under the obligations of this warranty: any hindrance or accident compensation resulting from reasons not under ORION's obligations; any lost opportunities, lost profit, secondary losses, damages to non-ORION equipment incurred by users resulting from the breakdown of ORION products; and any replacement work, readjustment of on-site machinery and equipment, and operating work by users.

4.Product Use Limitations

(1) When using ORION products in connection with important facilities, be sure to establish backup and/or failsafe measures so that even in the event of breakdown of such products, such breakdown will not lead to serious accidents or losses.
(2) ORION products are designed and produced as general purpose equipment to be used in general industrial applications. Therefore, this warranty will not apply when used in the following applications: However, in cases where the customer/user takes full responsibility and confirms the performance of the product in advance, and takes necessary safety precautions, please consult with ORION and we will consider if use of the product in the desired application is appropriate.
① Atomic energy, aviation, aerospace, railway works, shipping, vehicles (cars and trucks), medical applications, transportation applications, and/or any applications where it might have a great effect on human life or property.
② Electricity, gas, or water supply systems, etc. where high levels of reliability and safety are demanded.

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