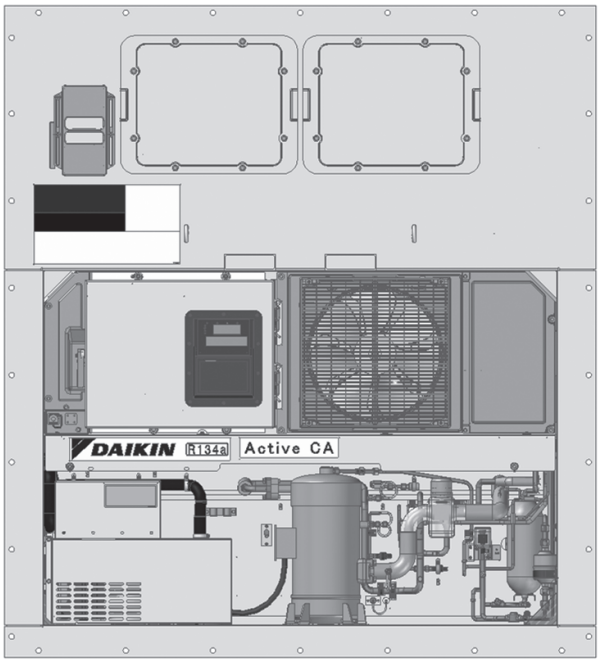
https://daikin-p.ru

DAIKIN

DAIKIN
CA DEVICE FOR MARINE TYPE CONTAINER REFRIGERATION UNIT

Service Manual



DAIKIN Active CA
LXCA04-6

DAIKIN INDUSTRIES,LTD.

TR 17-02

https://daikin-p.ru

Contents

https://daikin-p.ru

Remarks
Quick Handling Manual

This Service Manual provides latest information as of September 2017, and is subject to change for improvement without notice.

https://daikin-p.ru

Precautions for Handling

☆ Carefully read through the "Safety precautions" on the following pages before handling/operating/inspecting this device.

☆ Alert symbols in the text are categorized by the level of safety hazard as listed below.

⚠ **DANGER**	Wrong handling means imminent danger that results in death, critical condition, or other grave consequences.
⚠ **WARNING**	Wrong handling is likely to result in death, critical condition, or other grave consequences.
⚠ **CAUTION**	Wrong handling may result in potential injury or physical damage. Grave consequences may result depending on the circumstances.

Be sure to read before operation or work

This document describes the names of operating parts, how to power on, how to change settings, product functions, maintenance operations, pre-shipping inspection, and precautions for cargo unloading, pertaining to the operation of a container reefer equipped with a CA device (LXCA04-6).

In addition to this document, please also read:

- Marine type Container Refrigeration Unit: Service Manual (DECOSIIIh and later),
- Parts List (DECOSIIIh and later), and
- PC Software Operation Guide (TR08-04).

https://daikin-p.ru

⚠ DANGER Safety precautions

A CA device adjusts air composition in two ways described in 1) and 2) below.
1) Control oxygen level in the container box at 21% or lower
2) Control carbon dioxide level at an atmosphere level (0.036%) or higher, through cargo breathing and carbon dioxide filling

(Air composition in the atmosphere consists of oxygen at approx. 21%, nitrogen at approx. 79%, and carbon dioxide at approx. 0.036%)

In low-oxygen air, a life cannot be sustained.
Low-oxygen air cannot be perceived by sight or smell.
Even if oxygen level is high, high carbon dioxide level threatens human life.

Before entering a container box equipped with a CA device or opening the access panel, adjust the oxygen level to the normal atmosphere level (21%) and the carbon dioxide level to 1000 ppm or lower (0.1% or lower) through ventilation.

Before entering a container box or opening the access panel, be sure to perform the operation indicated in this manual and/or the warning plate.

For a reefer equipped with a CA device, warning plates must be attached in the following locations.

1. Reefer body
2. Container rear door
3. Container curtain to prevent gas leak from the container rear door

https://daikin-p.ru

⚠ DANGER Safety precautions

< Reference: Impact on human body caused by different air composition levels >

Impact of low-oxygen air on human body

Oxigen level	Impact on human body
21%	Atmospheric level
18%	Suffocating, needs continuous ventilation
16%	Raised respiration/pulse rate, headache/nausea, loss of concentration
12%	Dizziness/nausea, loss of muscle strength, raised body temperature, fall because of inability to sustain body weight
10%	Pale complexion / loss of consciousness, blue-violet skin and mucous membrane, vomit
8%	Fainting/coma, death in seven to eight minutes
4%	Immediate fainting, respiratory arrest, convulsion, death in one minute

Impact of high carbon dioxide level on human body

Carbon dioxide level	Impact on human body
360ppm (0.036%)	Atmospheric level
30,000ppm (3%)	Resulting in shortness of breath; Causing headache, nausea and weak narcotic effect; Weakened eyesight, raised blood pressure and pulse rate
40,000ppm (4%)	Keener headache
50,000ppm (5%)	Signs of toxicity manifest in 30 minutes; perspiration occurs in addition to headache and dizziness
100,000ppm (10%)	Fainting/coma, death in one minute

https://daikin-p.ru

⚠ DANGER Safety precautions

Preparations for entering a container equipped with a CA device

Entry into a container equipped with a CA device must be made by **two or more operators**. One of them should be a supervisor, and the other(s) should be an operator or operators. Be sure to effectively perform ventilation in accordance with the specified procedure.

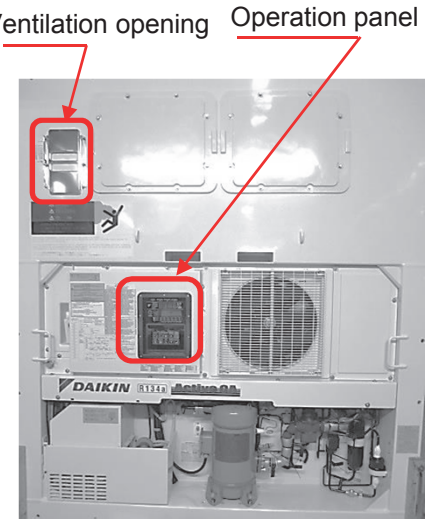
1. The supervisor must confirm that the ventilation procedure before entering a container (see below) has been performed, and that the specified waiting time (60 minutes) has elapsed. Authorize the entry of operators into the container box after the confirmation above.
2. All operators must carefully read and understand the "Safety precautions" and warning plates attached to the reefer, before starting operation.

This procedure must be performed before each entry.

Procedure for ventilation before entering a container (while power is supplied)

Turn off the operation of the CA device. Perform ventilation in accordance with the procedure, and confirm that air composition inside is safe before entering the container box.

1. Confirm the approximate present O_2 level and CO_2 level in the container box.
   On the operation panel, switch the CA mode setting to "DSP" (Display Mode).
   When the CA mode setting is switched to "DSP", the present O_2 level and CO_2 level in the container box can be confirmed while the CA device is turned off. (Operation methods for the CA mode setting are described in 2.2.2 (3) "Mode operations".)
   Note in advance that the indicated O_2 level and CO_2 level are only for reference, and the following operation must be performed.
2. Fully open (100%) the ventilation opening.
   Perform this operation from the side face of the container, in order to avoid directly inhaling hazardous gas exhausted through the ventilation opening.
   (See the next page)



Note) In an environment as indicated below, (warehouse) operators may be suffocated or poisoned by carbon dioxide. Never carelessly open the ventilation opening.
   1) Cargo loading/unloading platform
   2) A shelter from rain, or an intake opening for air conditioning, located near the ventilation opening
   3) Small space

3. The supervisor should confirm that **at least 60 minutes** have elapsed after turning off the operation of the reefer, and that the atmospheric air composition has been achieved inside the container. Authorize the entry of operators into the container box after the confirmation above. If the atmospheric air composition has not been achieved after the specified time, extend the waiting time.

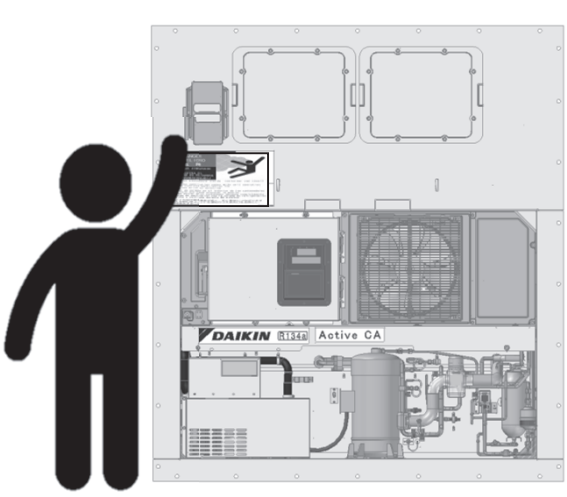
https://daikin-p.ru

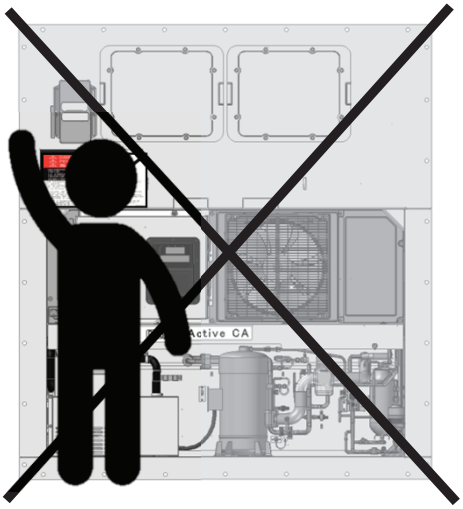
DANGER Safety precautions

Procedure for ventilation before entering a container (When power supply is stopped, and the operation panel cannot be confirmed)

1. Turn OFF the circuit breaker.
   This is to prevent the CA device from starting when power supply is recovered.

2. Fully open (100%) the ventilation opening.
   Perform this operation from the side face of the container, in order to avoid directly inhaling hazardous gas exhausted through the ventilation opening.





3. Fully open the container rear door. There is a risk that the curtain has been damaged through a hit by cargo during transportation. After fully opening the door, promptly take a distance from the door.

4. Break the container curtain with a tool. In this process, take a distance from the container promptly after breaking the curtain, in order to avoid directly inhaling air inside the container box.

5. When 60 minutes have elapsed after fully opening the container rear door, confirm the air composition levels with a densitometer, while approaching the entrance to the container box. Wait until the oxygen level becomes 21%, and the carbon dioxide level becomes 1000 ppm or lower (0.1% or lower).
   The supervisor should authorize the entry of operators after confirming the air composition levels. If the atmospheric air composition has not been achieved after the specified time, extend the waiting time.

6. The supervisor should supervise the entry of operators with an adequate distance from the container rear door.

Note) If a person collapses inside the container, only rescue staff trained on safety protocol may enter the container for rescue operation. (This is to prevent a secondary disaster)

https://daikin-p.ru

⚠ DANGER Precautions before entry

Before entering a container equipped with a CA device, be sure to confirm that all the ventilation procedure has been performed, and that the specified waiting time has elapsed.

Low oxygen atmosphere inside container can result in death.
Fully open ventilation cover with unit operation, and then continue ventilation for 60 minutes prior to entering.

El nivel de oxígeno en el interior del contenedor es tan bajo que puede provocarla muerte.
Antes de ingresar al contenedor abra completamente las bocas de ventilación manteniendo la unidad de refrigeración en funcionamiento y continúe ventilando por un periodo de 60 minutos antes de ingresar al contenedor.

因集装箱内部氧气浓度低，人员直接进入可能引发死亡事故。
进入前必须将冷冻机运转起来，同时将换气口打开至全开状态。
换气60分钟以上，方可进入。

コンテナ内部は酸素濃度が低く、死亡事故につながります。
中に入る前に換気口を全開にして冷凍装置を運転し、
60分間換気すること。

2P397531-1E

https://daikin-p.ru

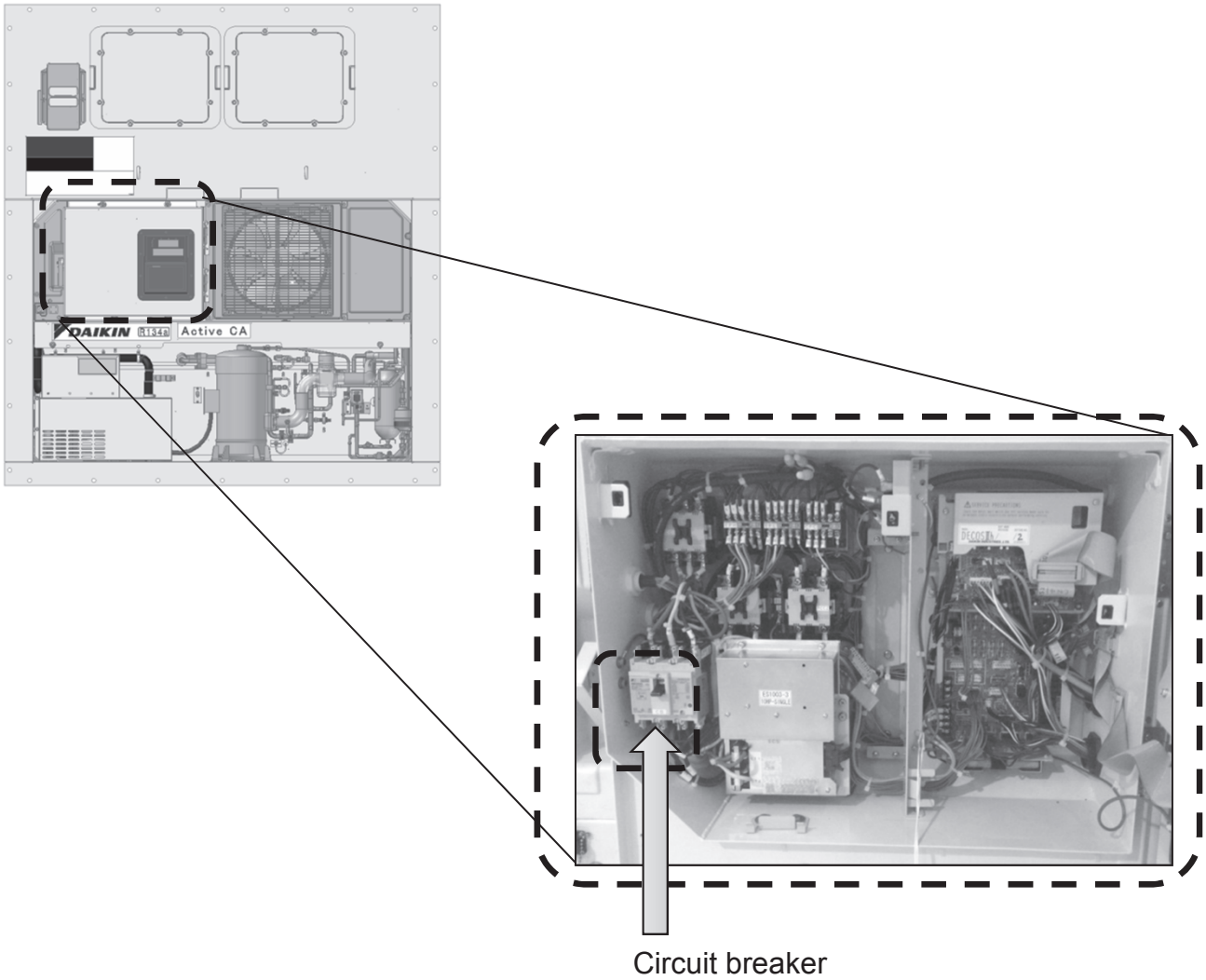
DANGER

Precautions for the inspection of the CA device and the reefer

Before performing inspection, be sure to:

- Shut down power supply on the equipment side, and pull off the power plug.
- Turn OFF the circuit breaker in the control box.

- Even after turning OFF the circuit breaker in the control box, source voltage is applied to the primary-side terminals of the circuit breaker, and may cause electric shock. Take care to avoid contact.
- Even when the fan is stopped, the condenser fan may be automatically turned on or off depending on the operating state, and may cause danger, unless the circuit breaker is turned OFF. During air-cooling operation, the condenser fan is automatically turned on or off in order to control high pressure.



https://daikin-p.ru

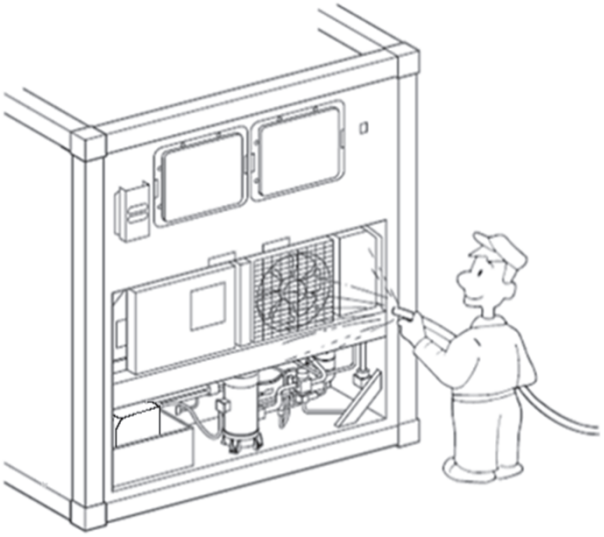
⚠ CAUTION Precautions before operation

- Before operating the reefer, turn on the power generator.
  (Otherwise, startup failure may be caused.)
- The door of the control box should be securely closed.
  (This is to prevent failure in electric components caused by water entry.)

⚠ CAUTION Cleaning precautions

At the time of PTI (Pre-Trip Inspection), the reefer must be cleaned with clean water.

1. Do not use a high-pressure cleaner for cleaning the reefer.
2. Carefully clean the outside condenser in order to wash off the adhered salt.



⚠ CAUTION Precautions for use

1. The copper pipes, aluminum fins and other parts of the inside evaporator may be corroded by corrosive gas generated from cargo. Such cargo should be adequately wrapped. Typical corrosive gases include chlorine, ammonium, sulfuric acid, acetic acid, and sulfurous acid gas.

2. During fish transportation, etc., mixture with a corrosive gas may cause a detection error or degradation of the O_2 sensor and the CO_2 sensor. Typical corrosive gases include ammonium, sulfuric acid, sulfurous acid gas, hydrogen sulfide, ozone gas, hydrogen chloride, and benzene.

https://daikin-p.ru

1. CA device: Overview of functions

- This manual provides description of the CA device.
- LXCA04-6 is a CA device that controls the oxygen level and the carbon dioxide level inside the container box of a marine reefer.
- Adjustment of the oxygen level
  Atmosphere is taken in with an air pump, and nitrogen is adsorbed/removed with an built-in adsorption cylinder, thereby generating low-level oxygen gas that is supplied to inside the container box for adjustment. (VPSA method*)
- Adjustment of the carbon dioxide level
  Adjustment is performed by taking in atmosphere through ventilation, combined with the breathing effect of cargo, while controlling the oxygen level.

  * "VPSA" stands for "Vacuum Pressure Swing Adsorption", a method where adsorption is performed under atmospheric pressure, and removal under vacuum, using two adsorption cylinders.

1.1 Range of operable conditions

A reefer equipped with a CA device should be used within the range of operable conditions listed in the table below. (Use outside the indicated range may result in the failure of the device or damage to the loaded cargo.)

Item	Range of operable conditions
Outside air temperature	-20°C to +50°C (-4°F to +122°F)
Inside setting temperature	-5°C to +20°C (-23°F to +68°F)
Working voltage	50Hz: 380/400/415V; 60Hz: 440/460V Power supply variation: ±10%
Vibration/shock	Up to 5G horizontally; Up to 2G vertically

1.2 CA device: Product specifications

Item \ Model		LXCA04-6	
Range of setting concentration	O_2	1% to 21%	
	CO_2	1% to 19%	
Sensors	O_2 sensor	Zirconia current method	Sensor module
	CO_2 sensor	NDIR (Non Dispersive Infrared Gas Analyzer)	
	Temperature sensor	Thermistor	Air pump module
	Pressure sensor	Pressure sensor	
Air pump motor		Three-phase electric motor: 160W, three phase, AC380-460V, 50/60Hz	
Adsorbent		Zeolite	
Air discharge valve		Operating method: switching control	

https://daikin-p.ru

1.3 Part composition

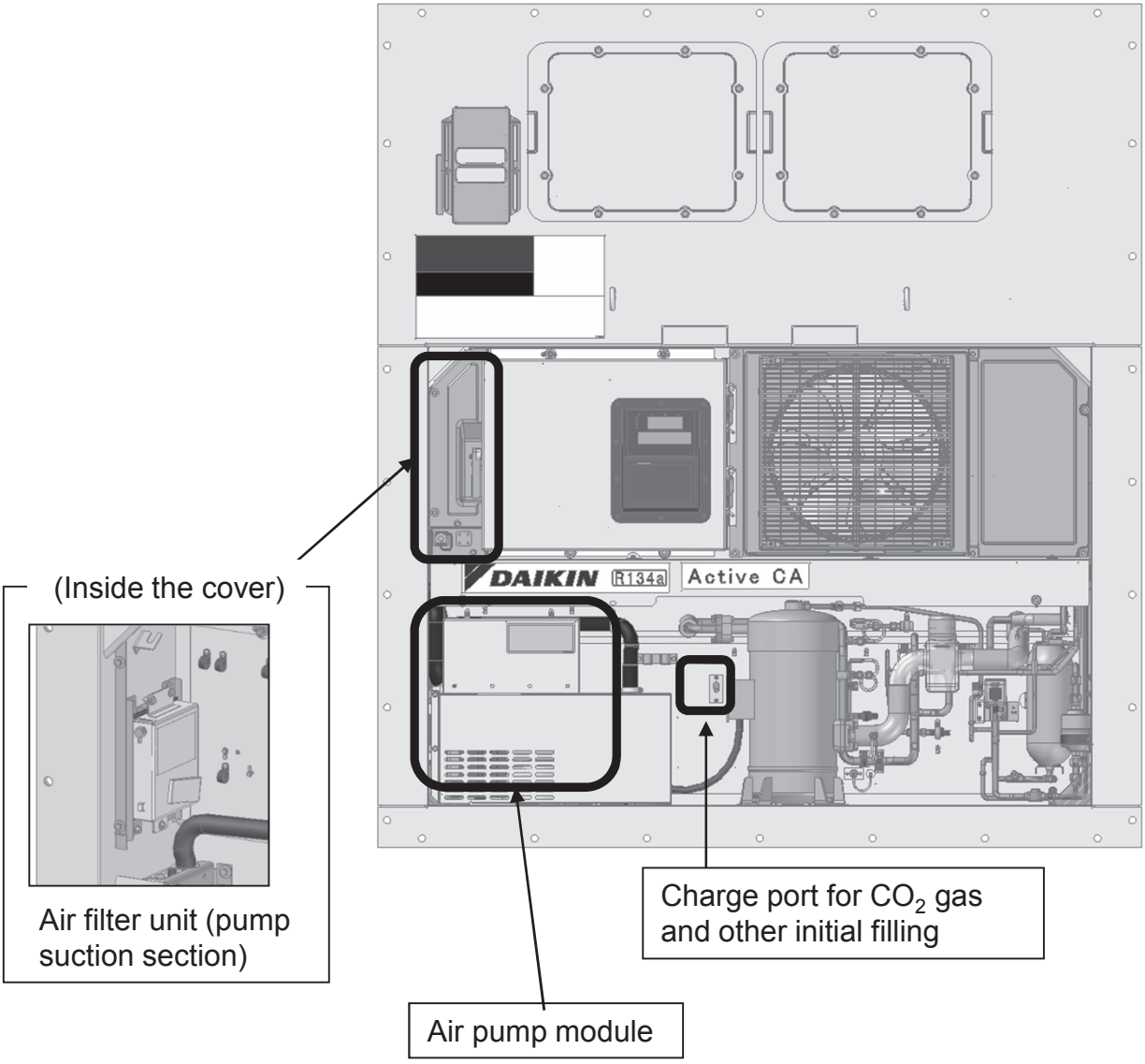
The part composition of the CA device is as follows.

■ Outside
- Air pump module ★
- Air filter unit
- Charge port for CO_2 gas and other initial filling

■ Inside
- Sensor module ★
- Air discharge valve (ADV)

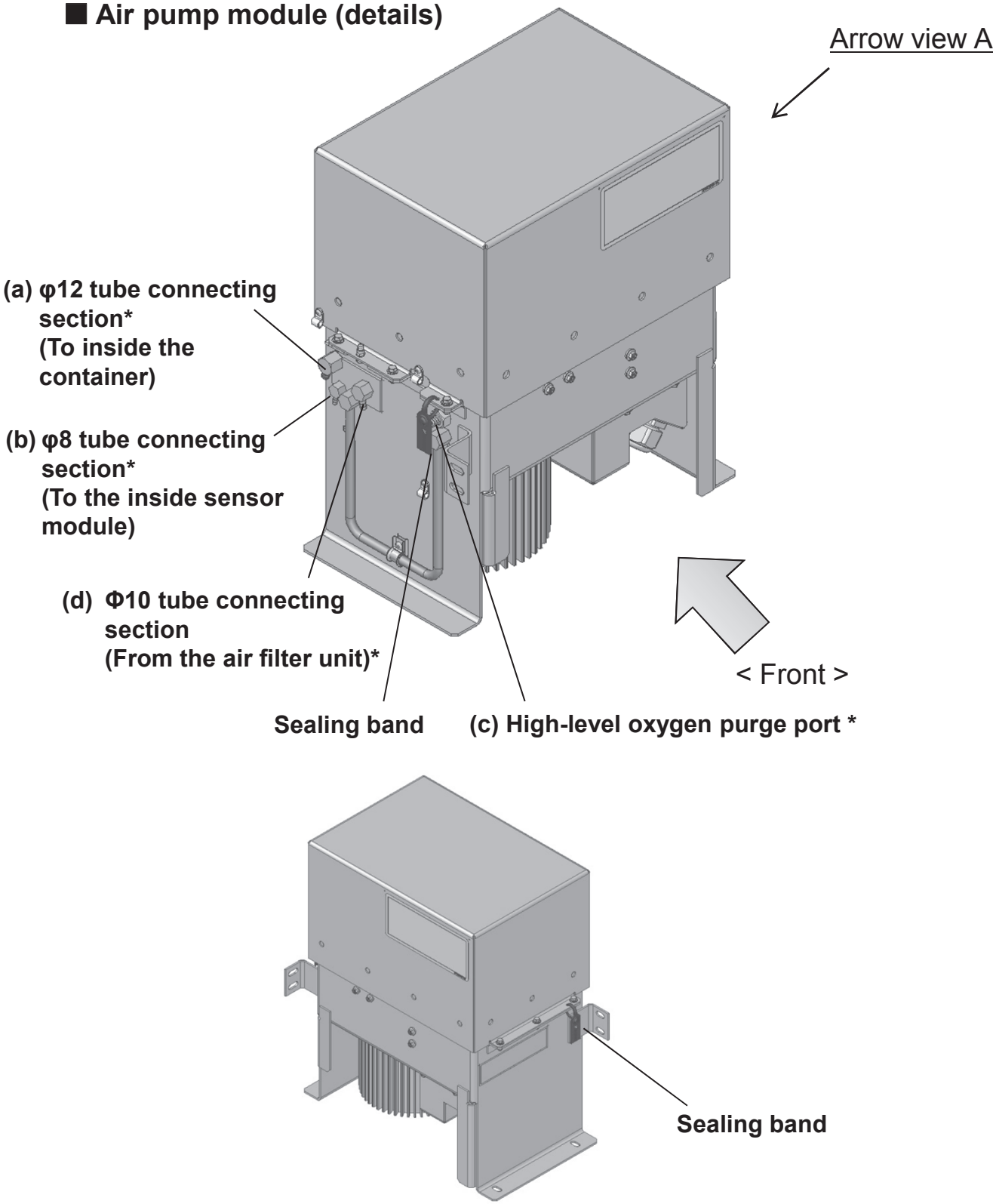
*** The parts indicated with ★ are outside the warranty, unless the attached sealing band is presented.**

1.3.1 Layout of outside parts (details)



https://daikin-p.ru

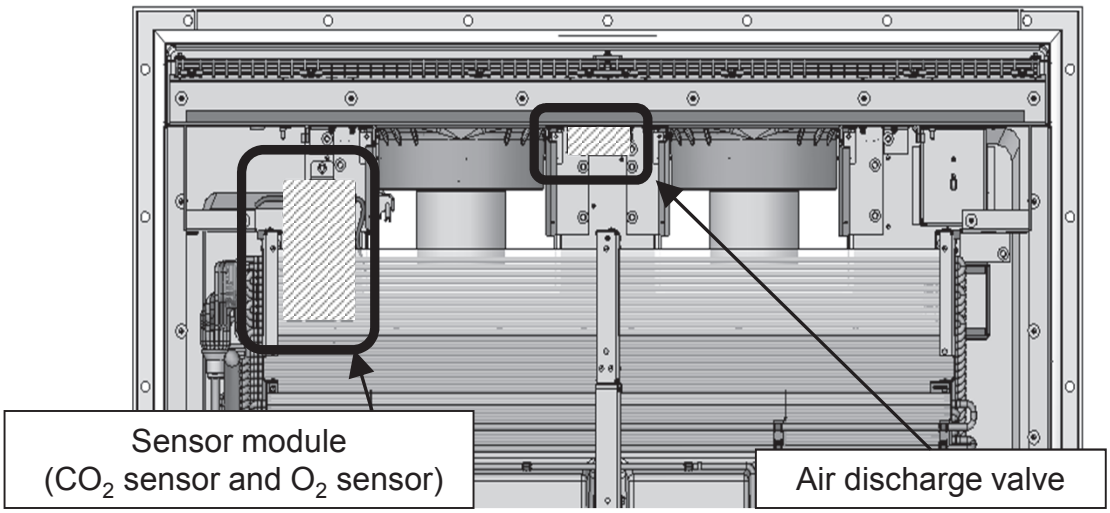
■ Air pump module (details)



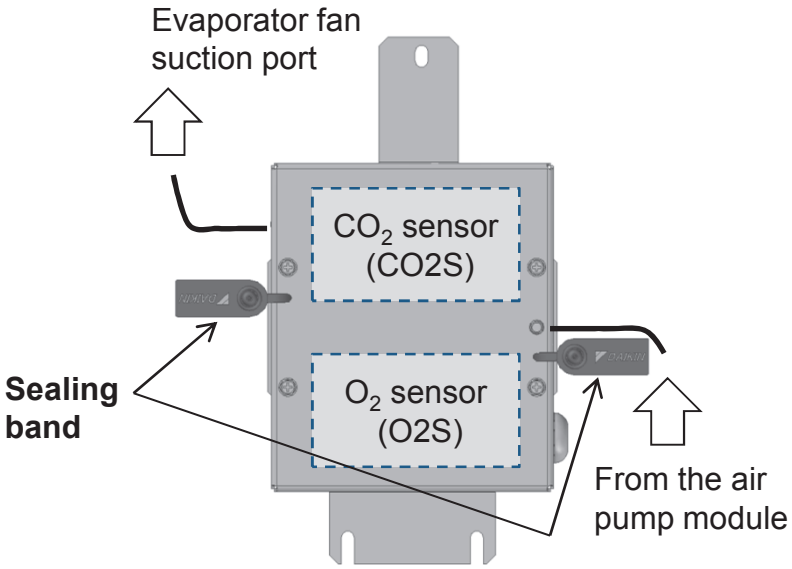
*1 For (a), (b), (c) and (d), see page 1-5 "1.4.1 Air circuit flowchart".

https://daikin-p.ru

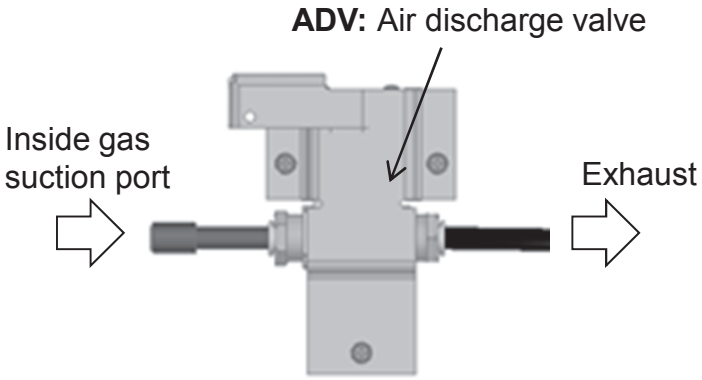
1.3.2 Layout of inside parts (details)



■ Sensor module (details)



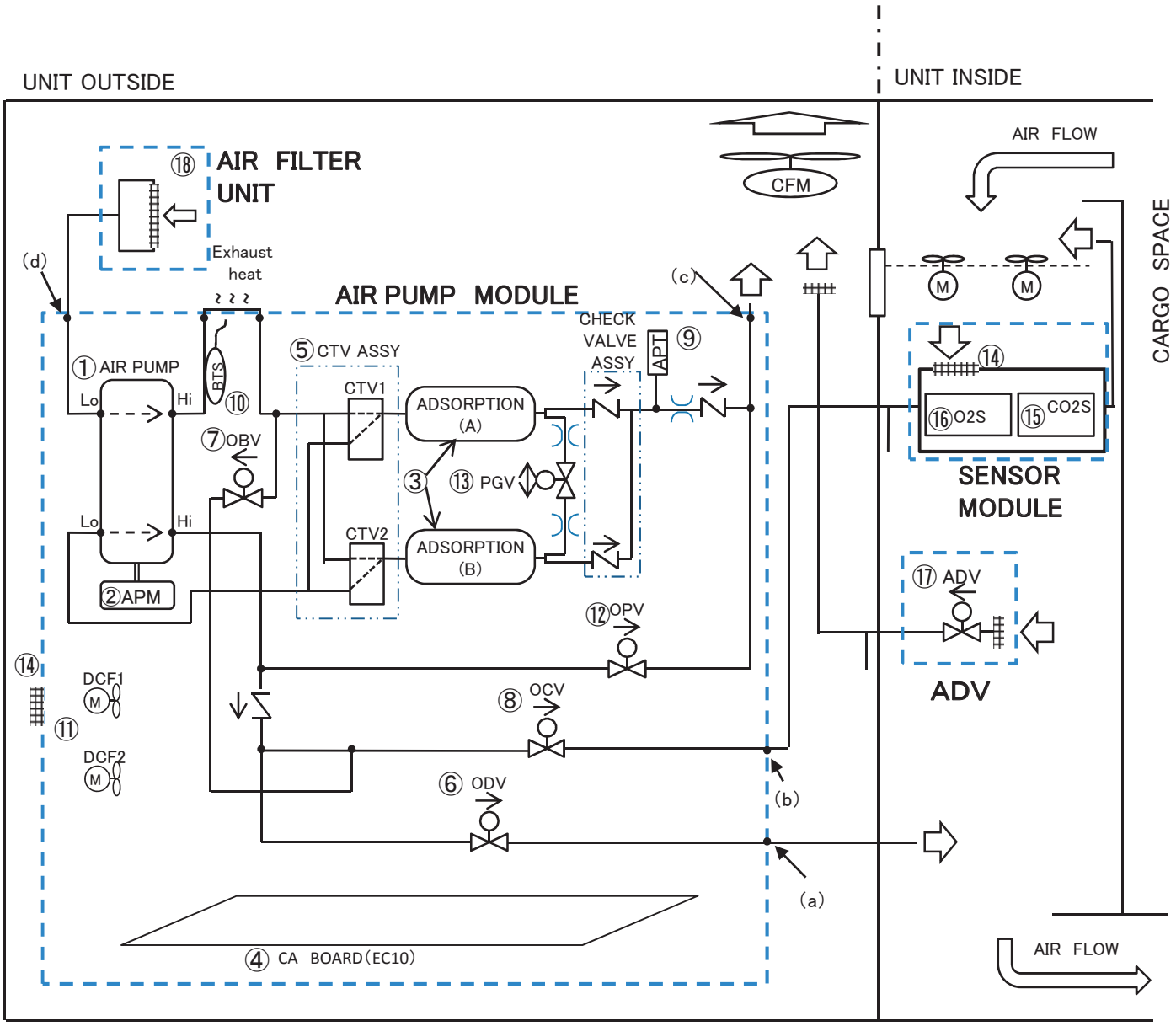
■ Air discharge valve (details)



https://daikin-p.ru

1.4 CA device parts: Overview

1.4.1 Air circuit flowchart



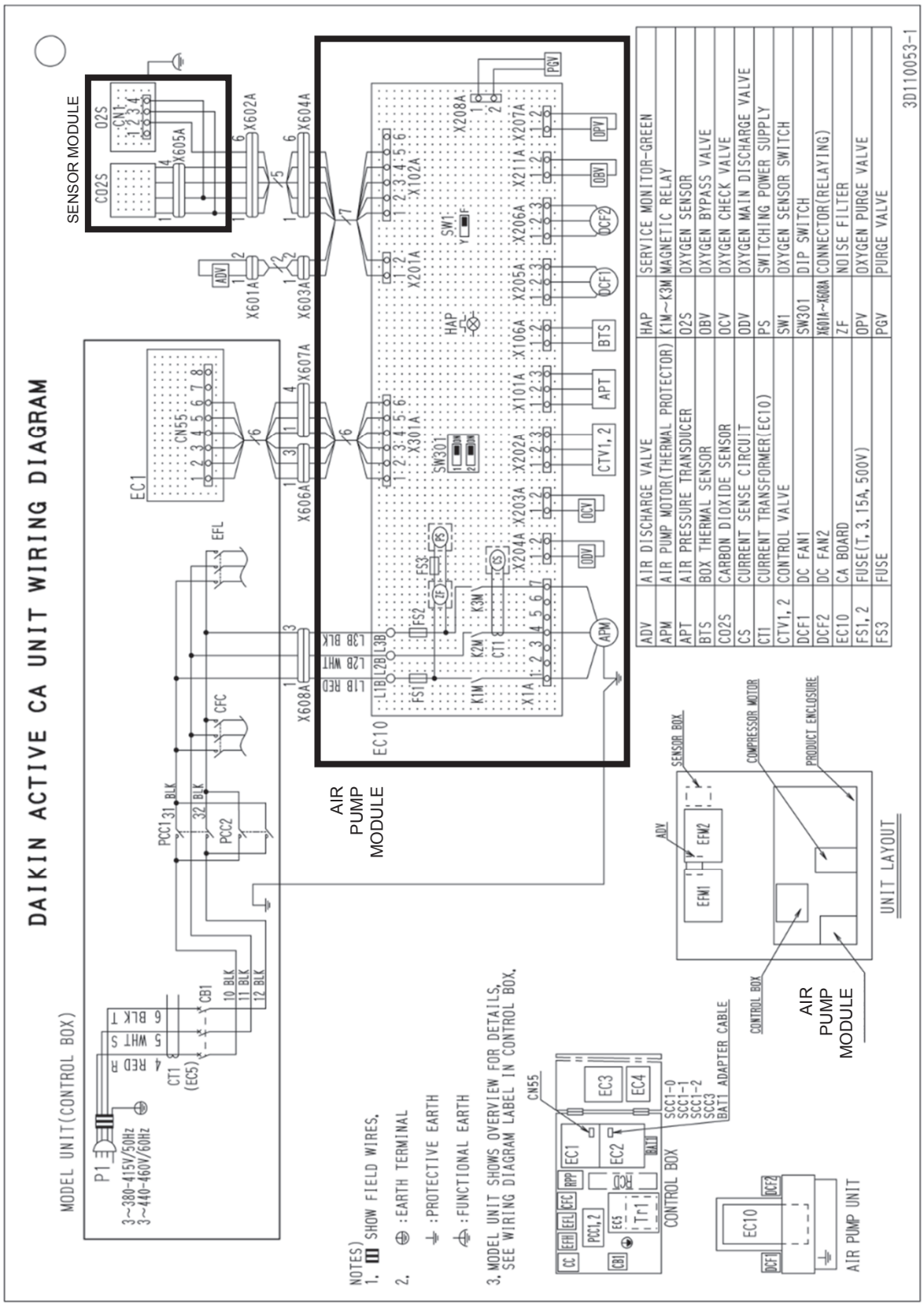
https://daikin-p.ru

1.4.2 CA device parts: Description of functions

Category	No.	Code	Name	Description
Air pump module	①	AIR PUMP	Air pump	Compresses outside air and supplies it to inside the container
	②	APM	Air pump motor	Drives the air pump
	③	ADSORPTION (T1)	Adsorption cylinder 1	Adsorbs/removes nitrogen in the atmosphere
		ADSORPTION (T2)	Adsorption cylinder 2	
	④	CA BOARD (EC10)	CA control board	Controls the CA device, linked with the CPU board of the reefer
	⑤	CTV1	Control valve 1	Switches air flow to Adsorption cylinder 1 and to Adsorption cylinder 2
		CTV2	Control valve 2	
	⑥	ODV	O_2 Main discharge valve	Supplies low-level O_2 gas to inside the container
	⑦	OBV	O_2 bypass valve	Supplies outside air to inside the container, and adjusts the inside O_2 level
	⑧	OCV	O_2 check valve	Switches and supplies gas to the O_2 sensor (⑯O2S) and to the CO_2 sensor (⑮CO2S) during CA TEST
	⑨	APT	Air pressure sensor	Measures exhaust pressure on the high-pressure side of the air pump module
	⑩	BTS	Box thermal sensor	Measures temperature inside the air pump module
	⑪	DCF1 DCF2	DC Fan1 DC Fan2	Cools air inside the air pump module Is turned ON while the CA device is turned ON (May be turned ON and OFF) Is turned OFF while the CA device is turned OFF
	⑫	OPV	O_2 purge valve	Switches and exhausts O_2 gas in the adsorption cylinder to outside the container
	⑬	PGV	Purge valve	Switches and purges O_2 gas in the adsorption cylinder to the other adsorption cylinder
	⑭	Membrane filter	-	Prevents the entry of foreign matters (e.g. sea water and exhaust gas) into the system • Air pump cooling section • O_2 sensor section
Sensor module	⑮	CO2S	CO_2 sensor	Measures the CO_2 level inside the container
	⑯	O2S	O_2 sensor	Measures the O_2 level inside the container
Air discharge valve	⑰	ADV	Air discharge valve	Switches and exhausts gas inside the container
Air filter unit	⑱	Air filter unit	-	Prevents the entry of foreign matters (e.g. sea water and exhaust gas) into the system - Air pump suction section

https://daikin-p.ru

1.4.3 CA device: Electric circuit



https://daikin-p.ru

1.5 Protective device

■ CA device

Instrument	Setting value
Air pump built-in relief valve	250kPa ± 15% opening
Air pump motor built-in protective thermo	OFF: 145 ± 5°C (293 ± 9°F) ON: 95 ± 15°C (203 ± 27°F)

■ Current protective fuse (built in the air pump module)

Part code	Model	Purpose
FS1, FS2	3.15A 500V	Main circuit protection (Phase R, Phase T)
FS3	1.0A 500V	Control circuit protection

https://daikin-p.ru

1.6 CA device: operation control

1.6.1 Preparations for CA operation

The CA functions of a reefer equipped with a CA device are started by switching to "UNIT ON" on the reefer in the following steps.

1) Under 2.2.2 (6) "Optional functions setting mode", switch the CA Unit Y/N setting to "Y:1".
2) Under 2.2.2 (3) "Mode operations", switch the CA mode setting to "ON".
   Set the O_2 level.
   Set the CO_2 level.
3) Perform “CA TEST”, and confirm that the TEST results are “GOOD”.
   For the procedure to perform “CA TEST”, see 2.4.1.1 "Automatic PTI (Pre-Trip Inspection) selection mode". The range of operable setting temperature for a CA device is -5 to 20°C.

1.6.2 CA mode operations

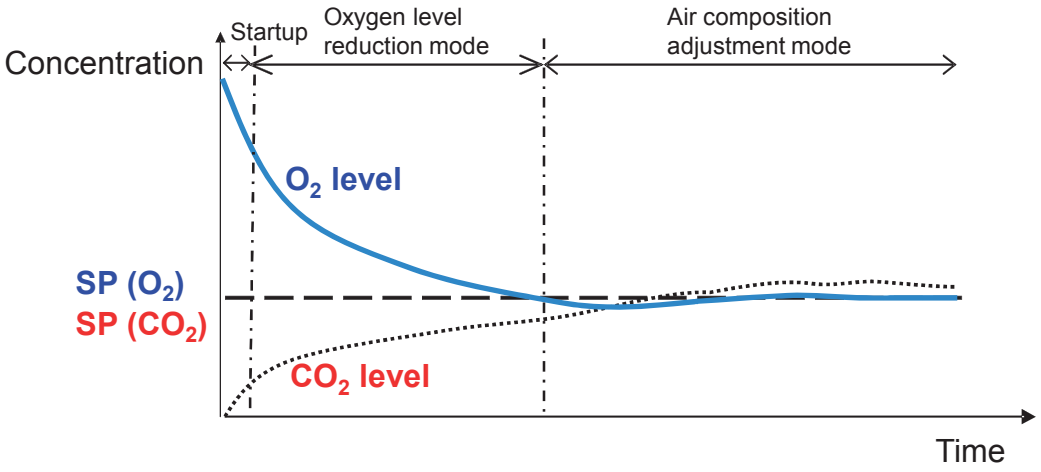
The CA device controls air composition in two operation modes.

1) Oxygen level reduction mode
   In this operation mode, the setting O_2 level is achieved by supplying low-level oxygen gas, combined with the breathing of cargo. (After startup operation, the device is automatically switched to the "oxygen level reduction mode".)

2) Air composition adjustment mode
   In this operation mode, the O_2 level and the CO_2 level are adjusted by supplying low-level oxygen gas, combined with ventilation by supplying outside air, and the breathing of cargo. (When the setting O_2 level is achieved, the device is automatically switched to the "air composition adjustment mode".)

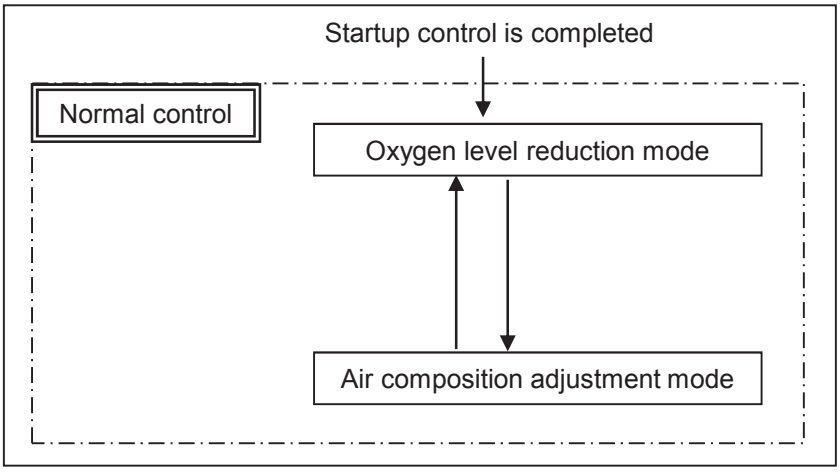
	Range of setting temperature	Range of setting concentration (*1)	Control sensor
CA mode	-5 to 20°C (23.0 to 68.0°F)	O_2 level: 1 to 21%	O_2 sensor
		CO_2 level: 1 to 19%	CO_2 sensor

(*1) The concentration setting can be made in the scale of 1%.



https://daikin-p.ru

■ Switching between the oxygen level reduction mode and the air composition adjustment mode



■ Overview of control operation until the setting O_2 level / setting CO_2 level is achieved

(Pattern A) Setting O_2 level < 5%

1) Until the O_2 level reaches 5%, the device operates in the oxygen level reduction mode. (Low-level oxygen gas is supplied to inside the container, in order to reduce the oxygen level.) While the CO_2 level is not controlled, the CO_2 level is reduced through ventilation.

2) When the O_2 level reaches 5%, the CA system is stopped in the oxygen level reduction mode. (Breathing of cargo reduces the O_2 level, while raising the CO_2 level.)

3) When the setting O_2 level is achieved, the device is automatically switched to the air composition adjustment mode. (Breathing of cargo, combined with ventilation, achieves the setting CO_2 level.)

   When the O_2 level drops below the setting O_2 level, outside air is supplied to raise the oxygen level. When the CO_2 level becomes higher than the setting CO_2 level, low-level O_2 gas is supplied, or outside air is supplied for ventilation, thereby reducing the CO_2 level.

(Pattern B) Setting O_2 level ≥ 5%

1) Until the O_2 level reaches 5%, the device operates in the oxygen level reduction mode. (Low-level oxygen gas is supplied to inside the container, in order to reduce the oxygen level.)
   While the CO_2 level is not controlled, the CO_2 level is reduced through ventilation.

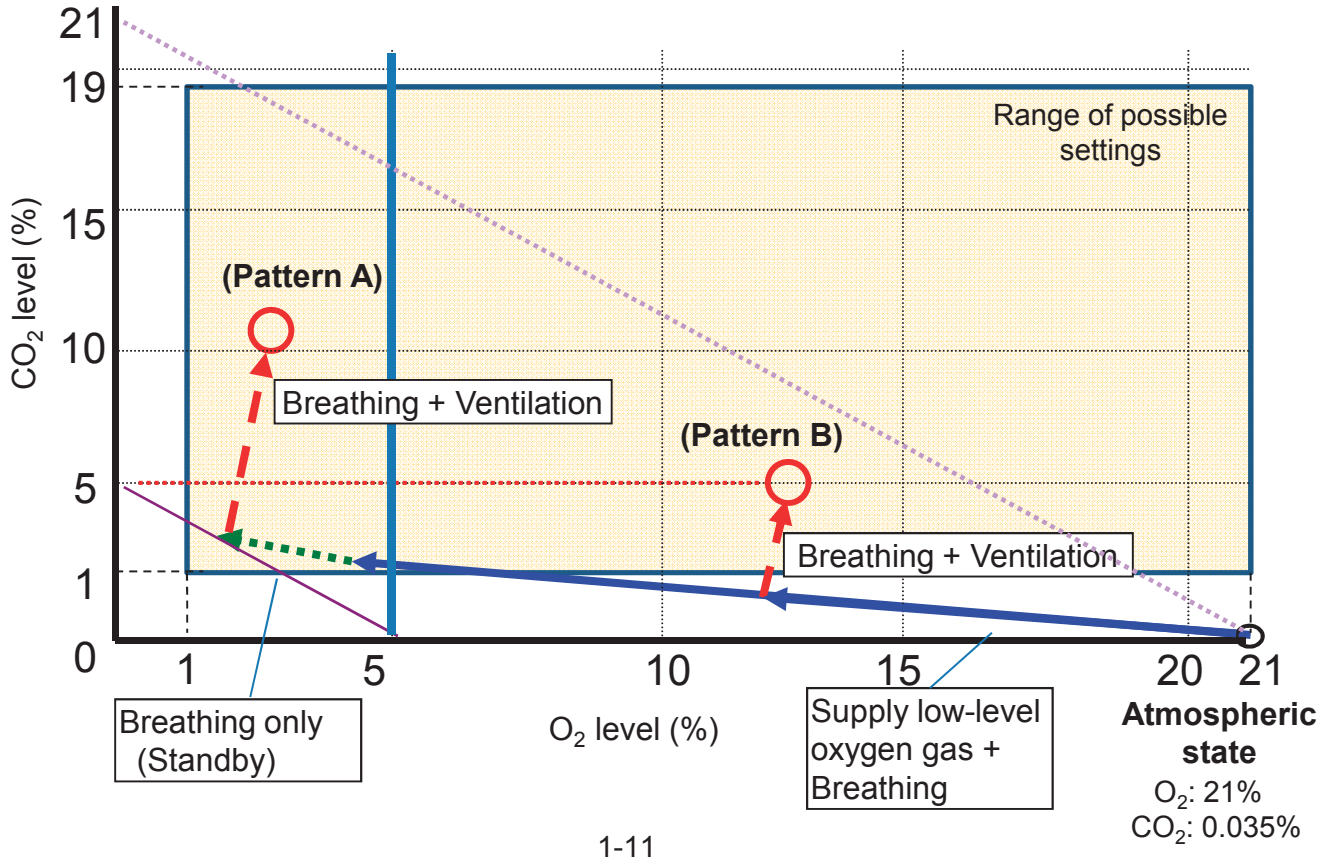
2) When the setting O_2 level is achieved, the device is switched to the air composition adjustment mode.
   (Breathing of cargo, combined with ventilation, achieves the setting CO_2 level.)

   When the O_2 level drops below the setting O_2 level, outside air is supplied to raise the oxygen level. When the CO_2 level becomes higher than the setting CO_2 level, low-level O_2 gas is supplied, or outside air is supplied for ventilation, thereby reducing the CO_2 level.

https://daikin-p.ru

	Control of the oxygen level	Control of the carbon dioxide level
(Pattern A) When the setting O_2 level < 5%	○ When lowering the oxygen level (Until 5% oxygen level is achieved) • Supply low-level oxygen gas + • Cargo breathing (After 5% oxygen level is achieved) • Cargo breathing ○ When raising the oxygen level • Supply outside air	○ When lowering the carbon dioxide level • Supply low-level oxygen gas or • Supply outside air ○ When raising the carbon dioxide level • Cargo breathing
(Pattern B) When the setting O_2 level ≥ 5%	○ When lowering the oxygen level • Supply low-level oxygen gas + • Cargo breathing ○ When raising the oxygen level • Supply outside air	○ When lowering the carbon dioxide level • Supply low-level oxygen gas or • Supply outside air ○ When raising the carbon dioxide level • Cargo breathing

■ Image of concentration change



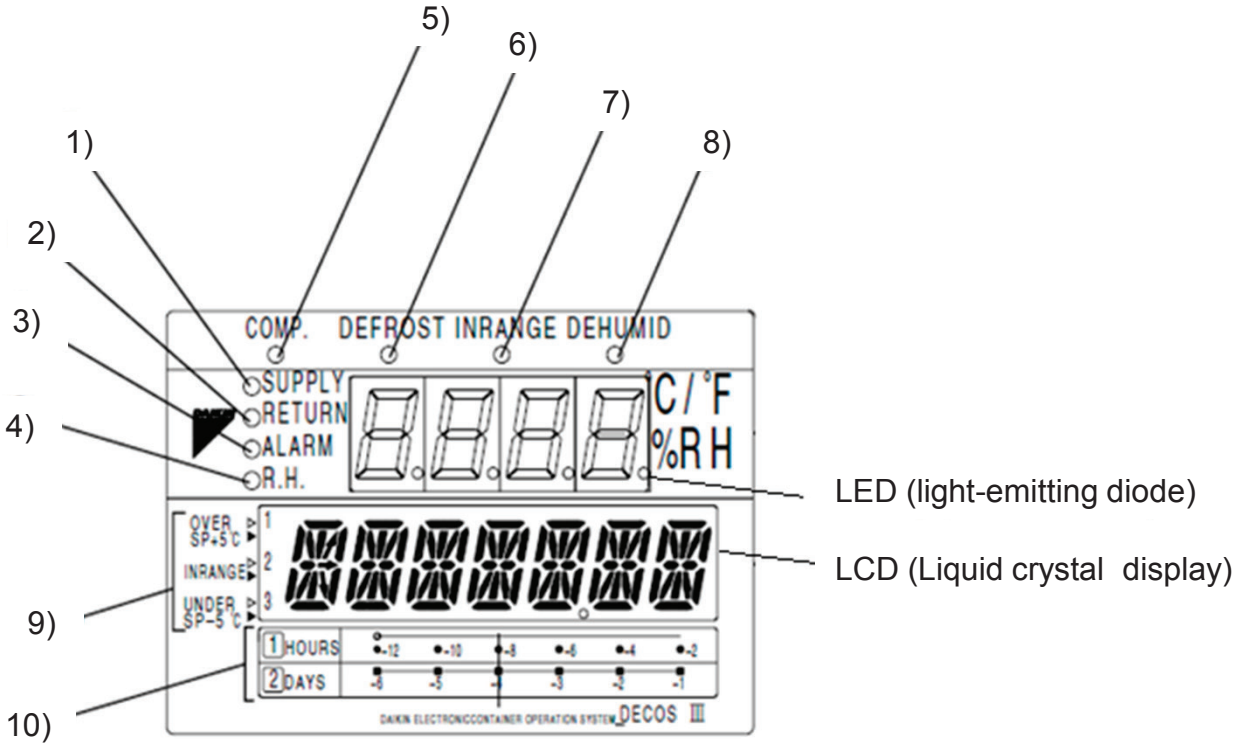
https://daikin-p.ru

2. How to use

Operations of the CA device are performed on the operation panel in the control box of the reefer.

2.1 Basic operations of the controller

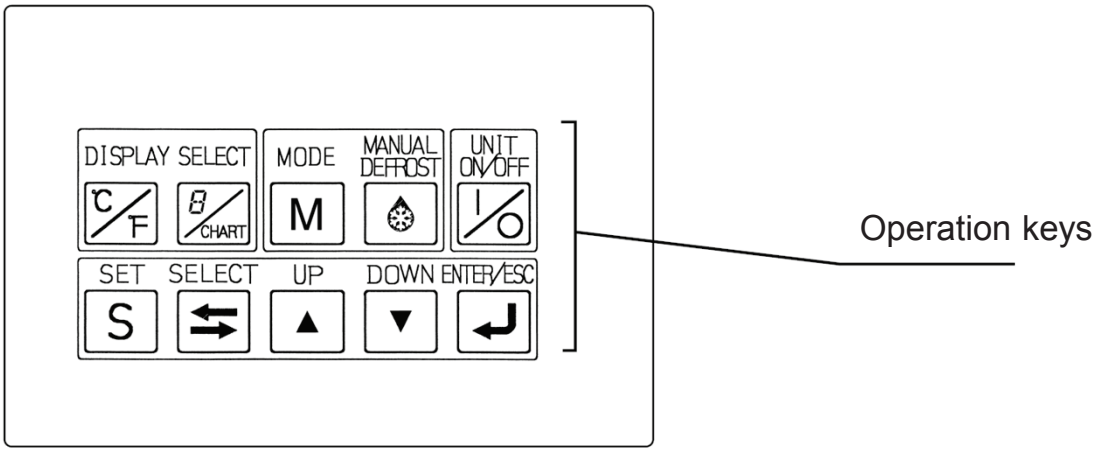
2.1.1 Names and functions on the control panel



No.	Name	Description
1)	SUPPLY LED	Turns on when the blowing air temperature is indicated
2)	RETURN LED	Turns on when the suction air temperature is indicated
3)	ALARM LED	Flashes when an alarm is issued
4)	R.H.LED	Turns on when the humidity is indicated
5)	COMP.LED	Turns on during compressor operation
6)	DEFROST LED	Turns on during defrost operation
7)	IN RANGE LED	Turns on while control temperature is within the range
8)	DE-HUMID.LED	Turns on during dehumidification control (Optional)
9)	Temperature axis range	Used for chart display on the LCD screen
10)	Time axis range	Used for chart display on the LCD screen

https://daikin-p.ru

2.1.2 Names and functions of operation keys



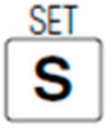
- UNIT ON/OFF key
  Turns on and off the unit;
  The controller memorizes Unit ON/OFF state when power supply is turned OFF. When power supply is turned OFF during Unit ON, the unit automatically starts operation when power supply is turned ON next time, without turning ON the unit. When power supply is turned OFF during Unit OFF, operation is not started until the unit is turned ON.

- UP key
  Used for selecting display items

- DOWN key
  Used for selecting display items

- ENTER/ESCAPE key
  Used for finalizing a setting/display item

- MODE key
  Performs the following controls:
  1) G-set setting (= power consumption reduction control)
  2) Automatic pump down
  3) Dehumidification setting / CA mode setting

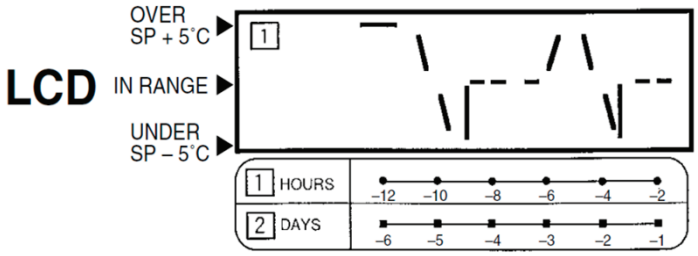


- SET key
  During Power ON:
  1) Switches from the current display mode to the operation setting mode
  2) Toggles setting items in the operation setting mode
  During Power OFF:
  1) Switches from the Power OFF mode to the Battery mode

- SELECT key
  Not used in basic operations;
  Used for maintenance operation

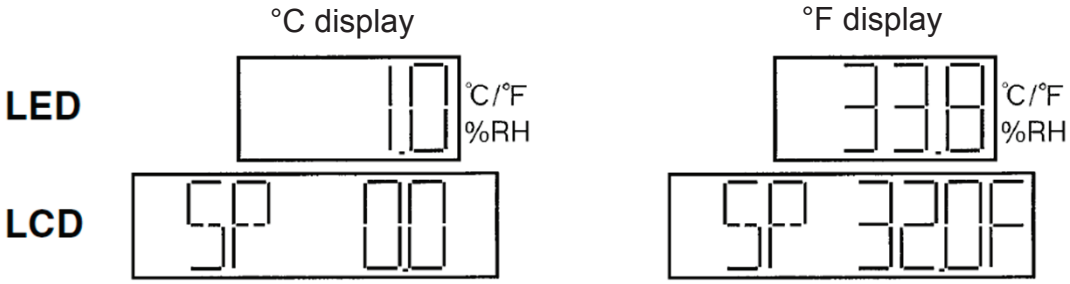
https://daikin-p.ru

- CHART key (display select key)
  When this key is pressed while setting temperature, etc. is displayed, a simplified graph of the recorded temperature data is displayed on the LCD screen. Press this key again to return to the setting temperature, etc.

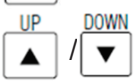


- Temperature unit switch key

1) Display the temperature data to be indicated in "°F" on the LED screen / LCD screen.
2) When  is pressed, the temperature data indication is switched from "°C" to "°F" for one minute.
   * When another key is pressed during "°F" indication, the indication is returned to "°C".



- MANUAL DEFROST key
  Manual defrost operation method

1) Press  MANUAL DEFROST key.
2) Using  , display "ON" on the LED screen, and press  key.

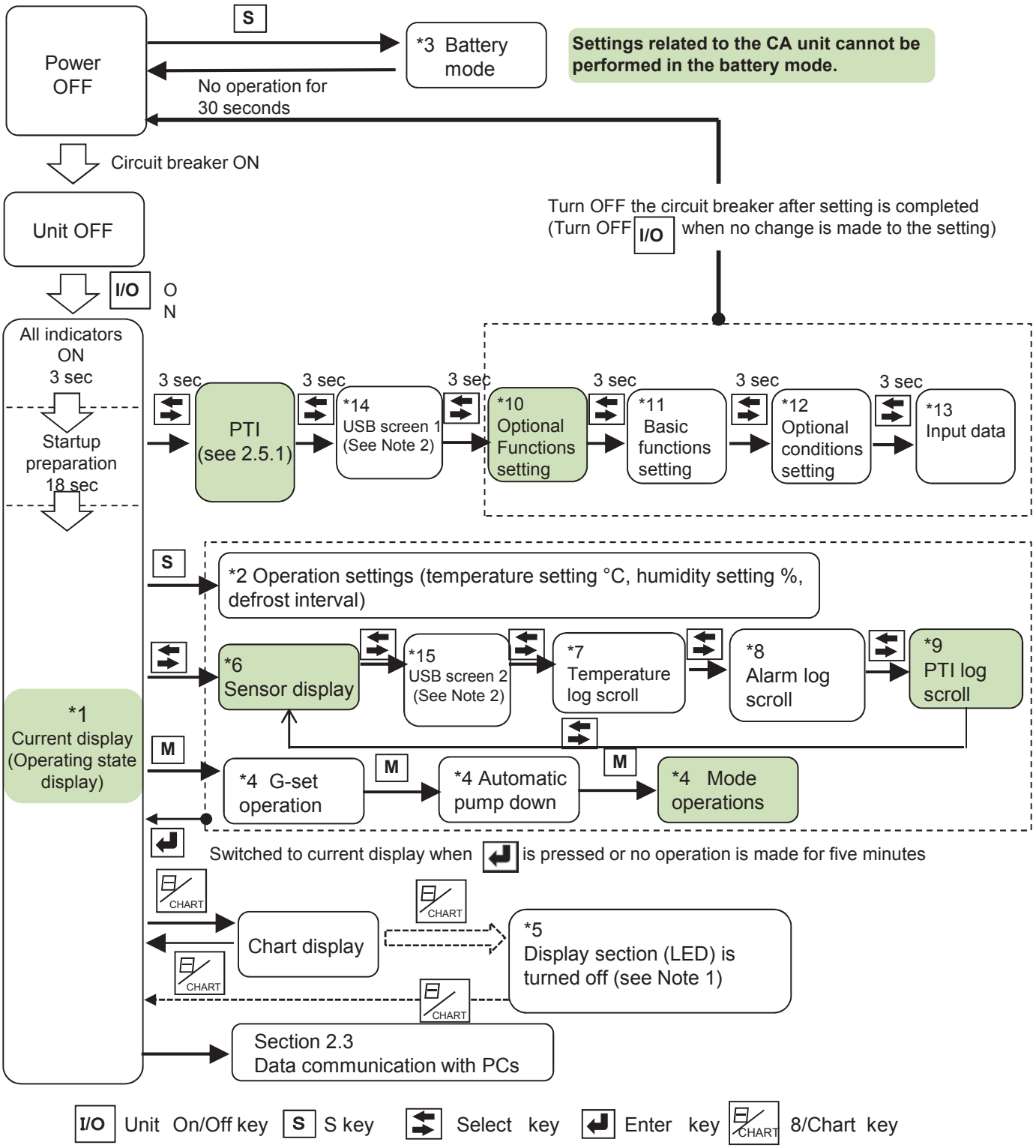
(Defrost operation is started.)

https://daikin-p.ru

2.2 How to operate

2.2.1 Operation method flowchart

: parts related to CA functions



I/O Unit On/Off key S S key Select key Enter key CHART 8/Chart key

Note 1) *5 is activated when "dISP" is set to "ON" in "Marine type Container Refrigeration Unit: Service Manual" in the initial setting of the controller (*11).
Note 2) *14 and *15 are displayed in the controller of DECOSIIIj and after.

https://daikin-p.ru

: parts related to CA functions

*1. Current display mode (operating state display)

Indicates the unit operating state

- Blowing air temperature (SS)
- Suction air temperature (RS)
- Defrost interval
- Alarm
- Setting humidity and present humidity (Optional)
- Setting O_2 level and present O_2 level
- Setting CO_2 level and present CO_2 level

2.2.2 (1)

*2 Operation setting mode

Performs settings for cargo transportation

- Temperature setting
- Defrost interval
- Humidity setting (Optional)

2.2.2 (2)

*3. Battery mode (setting for operating conditions in the battery mode)

Operations are possible in the Power OFF state.
< Attention >
In a low-outside air environment, a chargeable battery may be discharged, disabling startup in the battery mode.
☐ Only when a USB memory is used, software upload and data download are possible.

- Temperature setting
- Humidity setting
- Defrost interval setting
- Unit ON/OFF setting
- Software upload
- Data download

See the "Marine type Container Refrigeration Unit: Service Manual".

*4. Mode operations

1) G-set operation: Set the maximum power consumption for operation with a power generator.
2) Automatic pump down: Pump down is automatically performed by controller operation.
3) Mode operations: Dehumidification mode can be set. [Optional]
CA mode can be set. (OFF/ON/DSP)

2.2.2 (3)

*5. Display (LED) OFF mode

The LED part in the controller display section can be kept OFF.

- LED OFF

See the "Marine type Container Refrigeration Unit: Service Manual".

https://daikin-p.ru

: parts related to CA functions

*6. Sensor display mode

Sensor values are displayed.

- High pressure (HPT)
- Low pressure (LPT)
- Total current (CT1)
- Compressor current (CT2)
- Voltage (PT1)
- Voltage (PT2)
- Outside air temperature (AMBS)
- Evaporator inlet temperature (EIS)
- Evaporator outlet temperature (EOS)
- Discharge gas temperature (DCHS)
- Suction gas temperature (SGS)
- Suction proportional control valve opening (SMV)
- Electronic expansion valve opening (EV)
- Blowing air temperature (SS)
- Suction air temperature (RS)
- Core temperature (USDA#1, #2, #3) (Optional)
- Cargo temperature (CTS) (Optional)
- Blowing air temperature for data recorder (DSS)
- Suction air temperature for data recorder (DRS)
- Battery voltage (BAT)
- Software version (SOFTVER)
- Present O_2 level
- Present CO_2 level

2.2.2 (4)

*7. Temperature log scroll mode

The control sensor log is displayed by scroll from the latest data to older.

- Chilled: Blowing air temperature
- Frozen: Suction air temperature

(Up to seven days)

See the "Marine type Container Refrigeration Unit: Service Manual".

*8. Alarm log scroll mode

The alarm log is displayed by scroll from the latest data to older.

- Alarm indication

(Up to seven days)

See the "Marine type Container Refrigeration Unit: Service Manual".

*9. PTI log scroll mode

PTI results are displayed.

- Full PTI
- Custom Chilled PTI
- Short PTI
- Custom Frozen PTI
- CA TEST

2.2.2 (5)

*10. Optional functions setting mode

Optional functions can be set when the controller is replaced.

- USDA sensor Y/N
- Dehumidification control Y/N
- CA unit Setting Y: 1/N: OFF
- CA automatic OFF setting
- C-EFL setting ON/OFF

2.2.2 (6)

*11. Basic functions setting mode

Basic functions can be set when the controller is replaced.

- Controller type
- Compressor unload
- Reheat coil
- Logging interval
- Data recorder sensor Y/N
- Power supply
- Compressor / horsepower
- Display (LED) OFF function Y/N

See the "Marine type Container Refrigeration Unit: Service Manual".

https://daikin-p.ru

*12. Optional conditions setting mode

- d Code and H Code for the chartless function can be set.
- USDA sensor type
- °C/°F setting

- H001
- H002
- H003
- H004
- H005
- H006

- d1--
- d2--
- d3--
- d1--1--
- d1--2--

See the "Marine type Container Refrigeration Unit: Service Manual".

*13. Input data mode

Controller ID and Controller time can be set.

- Container ID (No.)
- Controller time

See the "Marine type Container Refrigeration Unit: Service Manual".

*14. USB screen 1

When a USB memory is used, operations become possible. This function is displayed in the controller of DECOSIIIj and after.

- Software upload
- Data download

See the "Marine type Container Refrigeration Unit: Service Manual".

*15. USB screen 2

When a USB memory is used, operations become possible. This function is displayed in the controller of DECOSIIIj and after.

- Data download
- Monitoring log

See the Marine type Container Refrigeration Unit: Service Manual".

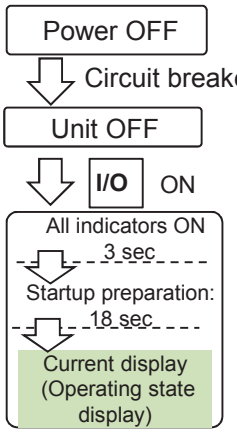
https://daikin-p.ru

2.2.2 How to operate in different display modes

(1) Current display mode (operating state display)

: parts related to CA functions

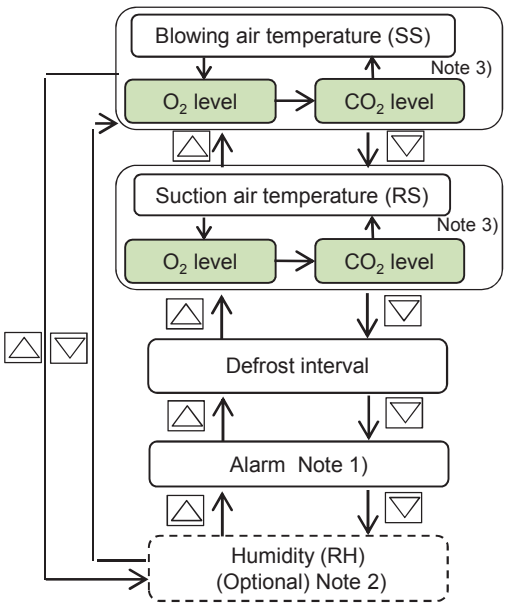
Blowing air temperature (SS), suction air temperature (RS), defrost interval, present alarms, setting humidity, and present humidity are displayed.
When the CA mode setting is "ON" and the inside setting temperature is -5 to 20°C, "Setting O_2 level" and "Present O_2 level", "Setting CO_2 level" and "Present CO_2 level" are displayed.



When power supply is turned on, and the circuit breaker and the UNIT ON/OFF key are set to ON, the display panel is set to the current display mode at first. (It takes approx. 21 seconds after the UNIT ON/OFF key is pressed until the unit becomes operable.)

In the current display mode, blowing air temperature, suction air temperature, defrost interval, present alarms, and humidity (Optional) are displayed.

Select display items using △ and ▽. The selected item is turned on and indicated on the LED lamp, LED screen, and LCD screen.



Display item	LED lamp that is turned on	LED screen	LCD screen
Blowing air temperature (SS) Note 3)	SUPPLY	C Blowing air temperature Note 4)	Setting temperature
O_2 level	-	C Present O_2 level Note 4) Note 5)	Setting O_2 level Note 4)
CO_2 level	-	C Present CO_2 level Note 4) Note 6)	Setting CO_2 level Note 4)
Suction air temperature (RS) Note 3)	RETURN	C Suction air temperature Note 4)	Setting temperature
O_2 level	-	C Present O_2 level Note 4) Note 5)	Setting O_2 level Note 4)
CO_2 level	-	C Present CO_2 level Note 4) Note 6)	Setting CO_2 level Note 4)
Defrost interval	During "Chilled" control: SUPPLY During "Frozen" control: RETURN	During "Chilled" control: Blowing air temperature During "Frozen" control: Suction air temperature	Present setting defrost interval
Alarm Note 1)	ALARM	Using ▽, all alarms that are issued at present can be toggled (when no alarm is issued, "good" is displayed).	Number of alarms that are issued at present (Numerator: selected alarm Denominator: total alarms)
Humidity (RH) (Optional) Note 2)	R.H.	Humidity sensor value	Setting humidity

Note 1) When the indication of the last alarm is ended, the display switches to the next item.
Note 2) Humidity is only displayed when "Dehumidification control ON/OFF" (see 2.2.2 (3) "Mode setting") is set to ON.

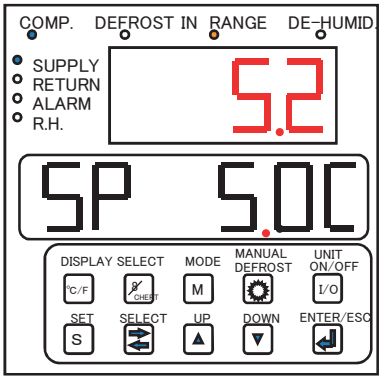
Note 3) As for the O_2 level and CO_2 level indication, when the CA unit is set to "Y: 1", and the CA mode is set to "ON" or "DSP", automatic scroll is enabled.
When the CA mode is set to "OFF", only temperature display is enabled.
Note 4) When the CA mode is set to "ON": "C" is indicated at the left end of the LED screen. On the LCD screen, the setting O_2 level and the setting CO_2 level are displayed.
When the CA mode is set to "DSP": No "C" is indicated at the left end of the LED screen. On the LCD screen, the setting O_2 level and the setting CO_2 level are not displayed.
(For more details, see the next page.)
Note 5) Unitl the O_2 sensor output is stabilized (for approx. 150 seconds after power supply is turned ON), "----" is displayed.
Note 6) Unitl the CO_2 sensor output is stabilized (for approx. 60 seconds after power supply is turned ON), "----" is displayed.

https://daikin-p.ru

■Current display screen

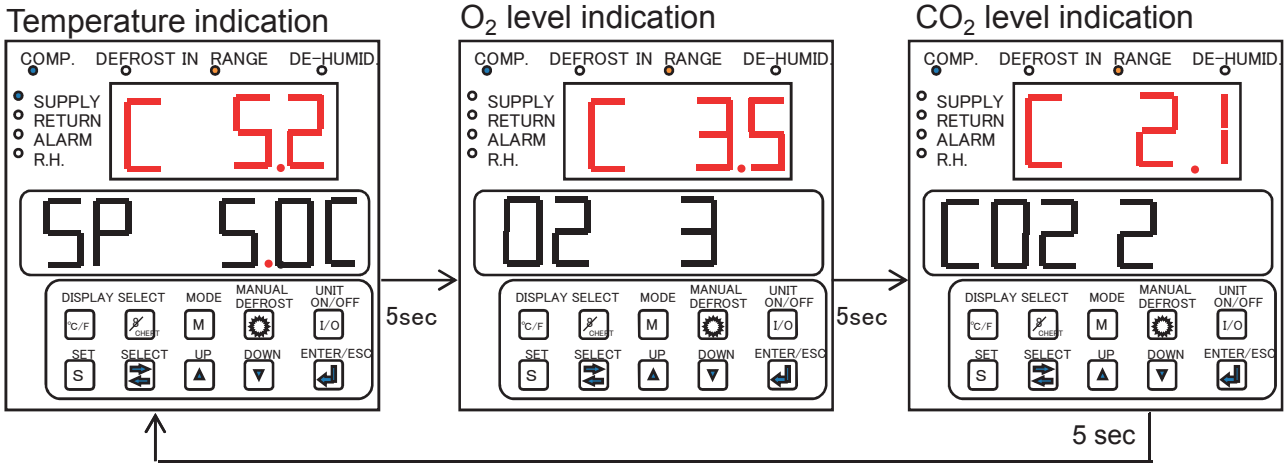
Upper LED display: Present value; and
Lower LCD display: Setting value are displayed.

1): When CA mode setting = OFF



2): When CA mode setting = ON

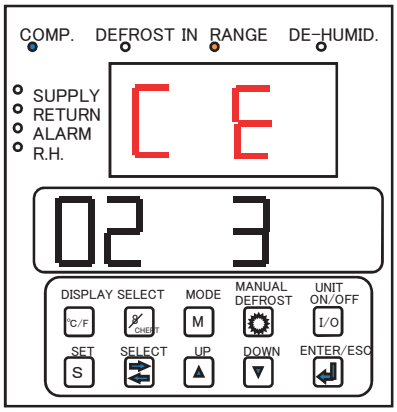
Temperature - O_2 level - CO_2 level are displayed by automatic scroll (toggled in every 5 seconds) (When the temperature is -10.0°C or lower, the decimal points are not displayed.)



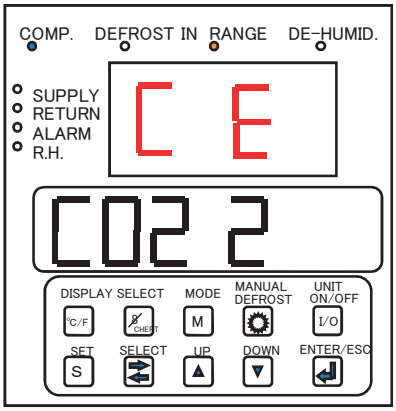
- **Sensor errors**

"E" is indicated in the upper LED.

Error in the O2 sensor



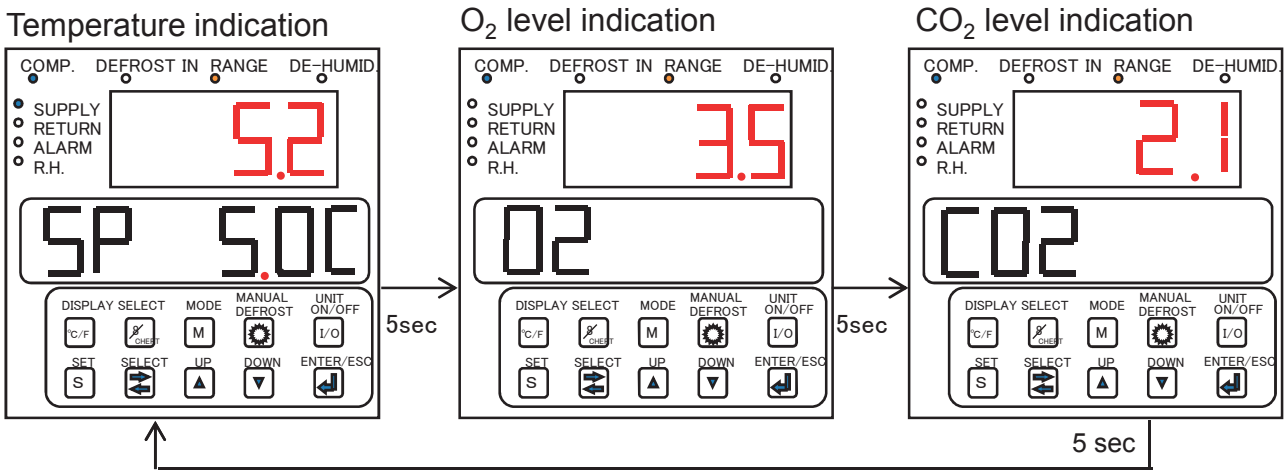
Error in the CO2 sensor



https://daikin-p.ru

3) When the CA mode setting = DSP

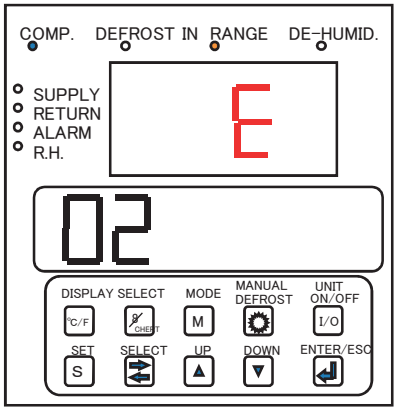
Temperature - O_2 level - CO_2 level are displayed by automatic scroll (toggled in every 5 seconds)
The present O_2 level and CO_2 level can be confirmed without operating the CA unit.
Note that the O_2 level and CO_2 level are only for reference when the CA mode is set to "DSP".



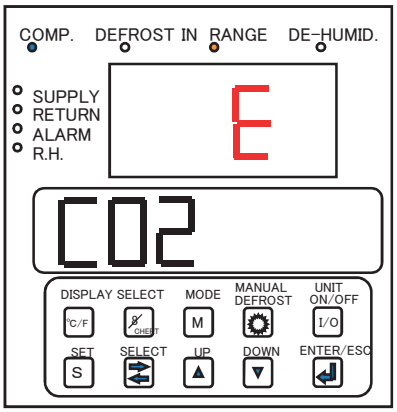
- **Sensor errors**

"E" is indicated in the upper LED.

Error in the O2 sensor



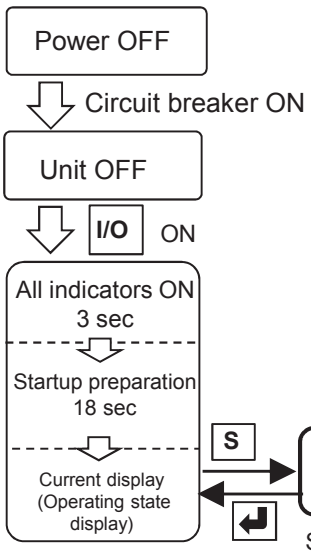
Error in the CO2 sensor



https://daikin-p.ru

(2) Operation setting mode

Control temperature, defrost interval, and control humidity (Optional) can be set.
The O_2 level and the CO_2 level cannot be set in the CA operation.
Perform the setting in 2.2.2 (3) "Mode operations".



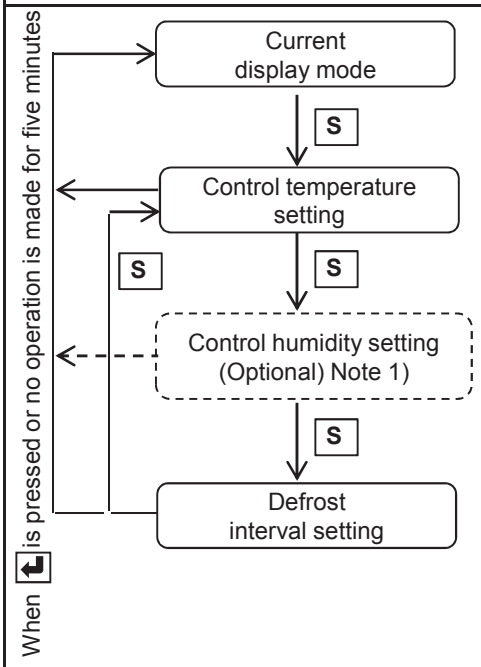
When S is pressed in the current display mode, the unit is switched to the operation setting mode.

In the operation setting mode, control temperature, control humidity (Optional), and defrost interval can be set.

*2 Operation settings (temperature setting [°C], humidity setting [%], defrost interval)

Switched to current display when ↵ is pressed or no operation is made for five minutes

Select setting items using S. The selected item is displayed on the LED screen and the LCD screen.

Setting item	LED screen	LCD screen	Setting method
	-	-	-
	Present setting temperature Note 2)	"SET-SPC" or "SET-SPF"	Change the setting temperature using △ / ▽, and confirm it using ↵. Range of temperature setting: -30 to +30°C
	Present setting humidity	"SET-SHU"	Change the setting temperature using △ / ▽, and confirm it using ↵. Range of humidity setting: 60 to 95%RH
	Present defrost interval	"SET-dEF"	Using △ / ▽, select the defrost interval from 99, 24h, 12h, 9h, 6h and 3h, and confirm it using ↵. When 99 is selected, defrosting is performed on an on-demand basis.

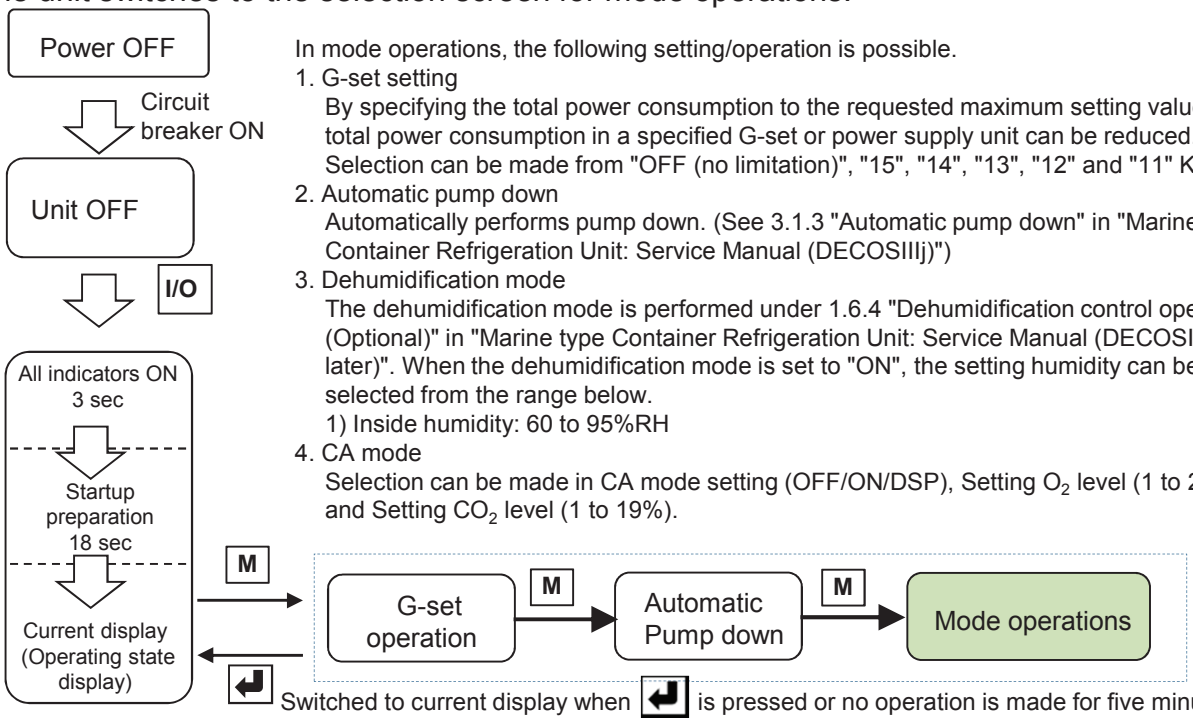
Note 1) When no setting is performed for dehumidification control operation, this item is not displayed.
Note 2) In °C display, temperature can be set in the scale of the first decimal point. In °F display, the temperature is set based on a value converted from °C (the second decimal point is rounded to the nearest first decimal point).

https://daikin-p.ru

(3) Mode operations

When [M] is pressed in the current display mode, the unit switches to the selection screen for mode operations.

: parts related to CA functions



In mode operations, the following setting/operation is possible.

1. G-set setting
   By specifying the total power consumption to the requested maximum setting value, the total power consumption in a specified G-set or power supply unit can be reduced.
   Selection can be made from "OFF (no limitation)", "15", "14", "13", "12" and "11" KVA.
2. Automatic pump down
   Automatically performs pump down. (See 3.1.3 "Automatic pump down" in "Marine type Container Refrigeration Unit: Service Manual (DECOSIIIj)")
3. Dehumidification mode
   The dehumidification mode is performed under 1.6.4 "Dehumidification control operation (Optional)" in "Marine type Container Refrigeration Unit: Service Manual (DECOSIIIh or later)". When the dehumidification mode is set to "ON", the setting humidity can be selected from the range below.
   1) Inside humidity: 60 to 95%RH
4. CA mode
   Selection can be made in CA mode setting (OFF/ON/DSP), Setting O_2 level (1 to 21%), and Setting CO_2 level (1 to 19%).

Setting item	LED screen	LCD screen	Setting method
Current (operating state) display mode	-	-	-
G-set operation *1	Upper limit of setting value for power consumption OFF, 15, 14, 13, 12, 11 Unit: KVA	G-SET	Select the upper limit of setting value for power consumption using △ / ▽, and confirm it using ↵.
Automatic pump down operation	ON, OFF	P down	Select ON using △ / ▽, and confirm it using ↵.
Dehumidification	ON, OFF	dHu	Select a setting with △ / ▽, and press ↵.
Target humidity setting	60 to 95%RH	SET-Shu	Select a setting with △ / ▽, and press ↵.
CA mode setting *2, *3, *4	OFF, ON, DSP	CA	Select a setting with △ / ▽, and press ↵.
Specify the setting O_2 level	1 to 21% (By the scale of 1%; Initial value: 21%)	SET-O2	Select a setting with △ / ▽, and press ↵.
Specify the setting CO_2 level	1 to 19% (By the scale of 1%; Initial value: 1%)	SET-CO2	Select a setting with △ / ▽, and press ↵.

*1 When power supply is turned OFF, G-set operation is automatically turned OFF.

*2 Displayed in DECOSIIIh or later, when the CA unit is set to "Y: 1", and the setting temperature (SP) is between -5 to 20°C.

*3 When the CA mode setting is switched to "DSP", the present O_2 level and CO_2 level in the container box can be confirmed while the CA device is turned off.

https://daikin-p.ru

(3) Mode operations (continued)

: parts related to CA functions

*4 Notes concerning the CA mode setting

1) Influence of changing the CA mode setting from "OFF"

How the CA mode setting is changed	Influence
Changed from OFF to ON to DSP	The following functions may be automatically turned "OFF". • ASC setting • ACT setting • QUEST setting • USDA setting *
Changed from OFF to ON	The DTMS setting remains "ON", but DTMS is not activated.

2) Conditions for the automatic changing of the CA mode setting

Setting conditions	How the CA mode setting is changed
DECOS III setting : "g or earlier"	• Automatically turned "OFF". • The setting O_2 and CO_2 levels are returned to initial values.
CA unit setting : "N: OFF"	
SP: "-5.1°C or lower or +20.1°C or higher"	
Valve mode setting: "ON"	
During ASC operation	• May be automatically turned "OFF". • Cannot be changed to "ON"or "DSP".
During ACT operation	
During QUEST operation	

* The combined use of the USDA function and the CA mode setting is as follows. Check the presence/absence of USB connectors.

Controller of refrigeration unit	Combined use of the USDA function and the CA mode setting
DECOS III j , V , Va	Possible
DECOS III h or earlier	Not possible

https://daikin-p.ru

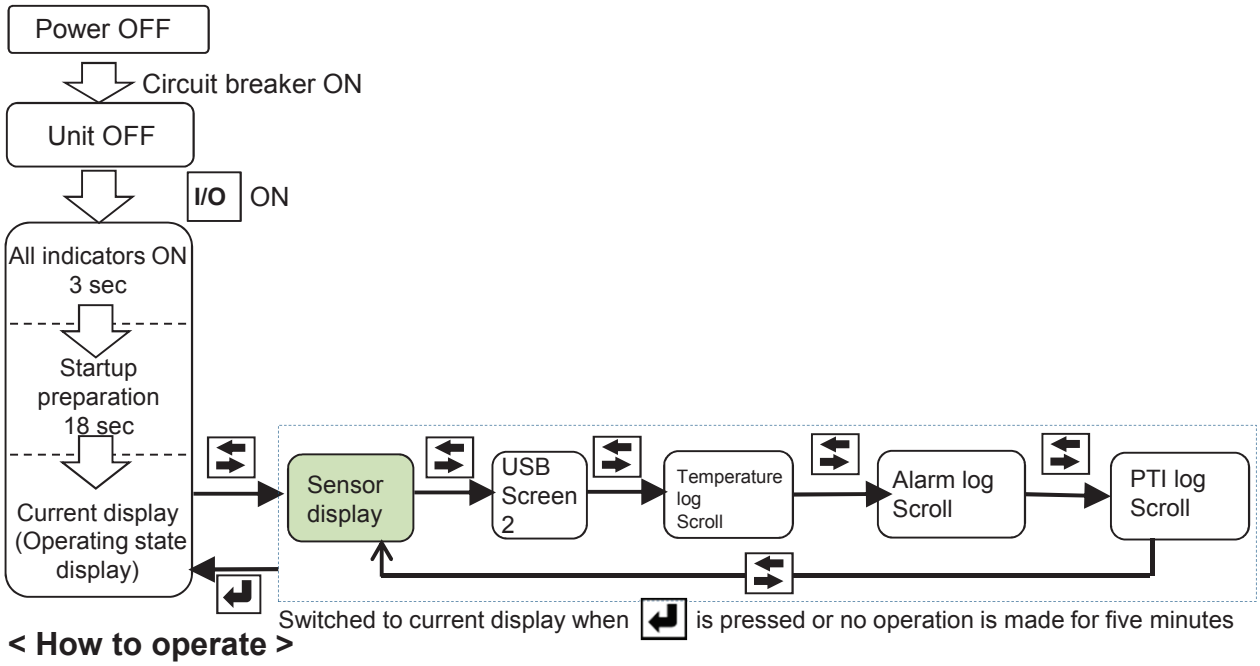
(4) Sensor display mode

: parts related to CA functions

The following items are displayed.

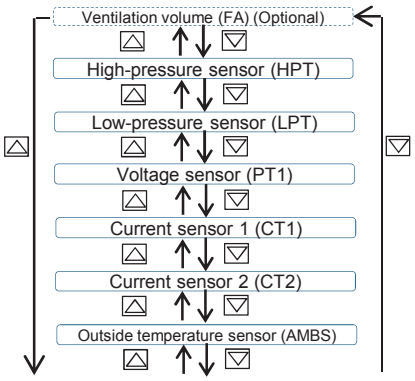
High pressure (HPT)	Evaporator inlet temperature (EIS)	Blowing air temperature (SS) (only during PTI)	O_2 level (O_2)
Low pressure (LPT)	Evaporator outlet temperature (EOS)	Suction air temperature (RS) (only during PTI)	CO_2 level (CO_2)
Voltage (PT1)	Discharge gas temperature (DCHS)	Core temperature (USDA#1, USDA#2, USDA#3) (Optional)	Residual voltage
Total current (CT1)	Suction gas temperature (SGS)	Cargo temperature (CTS) (Optional)	Year/DayMonth/Time
Compressor current (CT2)	Suction proportional control valve opening (SMV)	Blowing air temperature for data recorder (DSS)	Container ID
Outside air temperature (AMBS)	Electronic expansion valve opening (EV)	Suction air temperature for data recorder (DRS) (Optional)	

< How to toggle display modes >



< How to operate >

Press △ or ▽ to toggle the display.

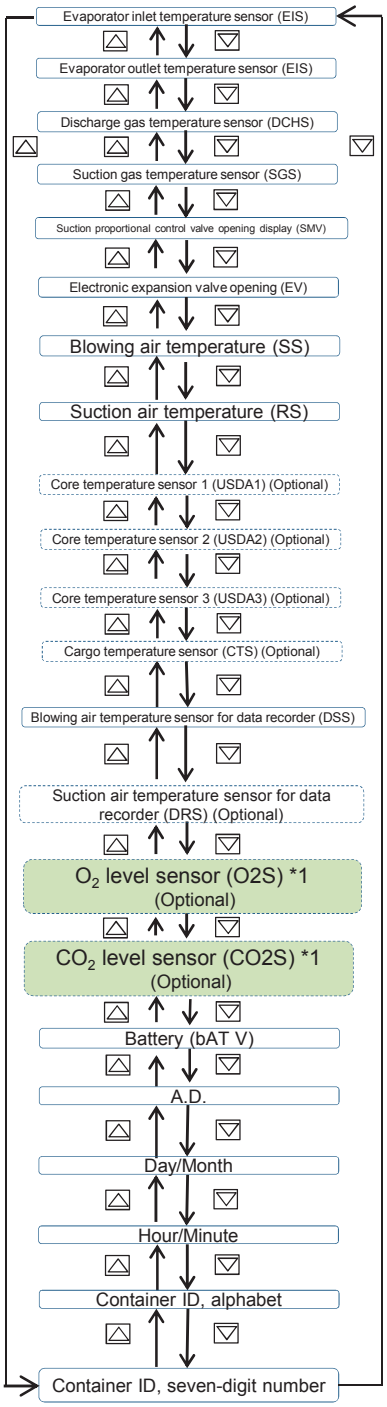


LED screen	LCD screen	
Control temperature	Ventilation volume	"FA"
Control temperature	High-pressure sensor value	"HPT" (Unit: kPa)
Control temperature	Low-pressure sensor value	"LPT" (Unit: kPa)
Control temperature	Voltage value	"PT V" (Unit: V)
Control temperature	Total operating current value	"CT A" (Unit: A)
Control temperature	Compressor operating current value	"CT A" (Unit: A)
Control temperature	Outside temperature	"Ab C" (Unit: °C or °F)

https://daikin-p.ru

(4) Sensor display mode (continued)

: parts related to CA functions



LED screen	LCD screen	
Control temperature	Evaporator inlet temperature	"EI C" (°C or °F)
Control temperature	Evaporator outlet temperature	"EO C" (°C or °F)
Control temperature	Discharge gas temperature	"dC C" (°C or °F)
Control temperature	Suction gas temperature	"SG C" (°C or °F)
Control temperature	Controlled opening	"SMV" (Unit: %; 0 to 100%)
Control temperature	Controlled opening	"EV" (Unit: %; 0 to 100%)
(displayed only during PTI) Type and Step No. of PTI	Blowing air temperature	"SS C" (°C or °F)
(displayed only during PTI) Type and Step No. of PTI	Suction air temperature	"RS C" (°C or °F)
Control temperature	Core temperature	" 1 US C" (°C or °F)
Control temperature	Core temperature	" 2 US C" (°C or °F)
Control temperature	Core temperature	" 3 US C" (°C or °F)
Control temperature	Core temperature	"CS C" (°C or °F)
Control temperature	Blowing air temperature for data recorder	"dS C" (°C or °F)
Control temperature	Suction air temperature for data recorder	"dR C" (°C or °F)
Control temperature	Present O_2 level	"O2" (Unit: %) *2
Control temperature	Present CO_2 level	"CO2" (Unit: %) *3
Control temperature	Residual voltage	"bAT V" (Unit: V)
(Not displayed during PTI) A.D.	Year	"YEAR"
(Not displayed during PTI) Day/Month	Day/Month	"dAY/MON"
(Not displayed during PTI) Hour/Minute	Time	"TIME"
(Not displayed during PTI) I. D_C	ID	"******" (ex/dilu)
(Not displayed during PTI) I. d_N	Seven-digit ID number	"********" (ex.1234567)

*1 When the CA mode is set to "OFF", this is not displayed.
*2 Until the O_2 sensor output is stabilized (for approx. 150 seconds after power supply is turned ON), "---" is displayed.
*3 Until the CO_2 sensor output is stabilized (for approx. 60 seconds after power supply is turned ON), "---" is displayed.

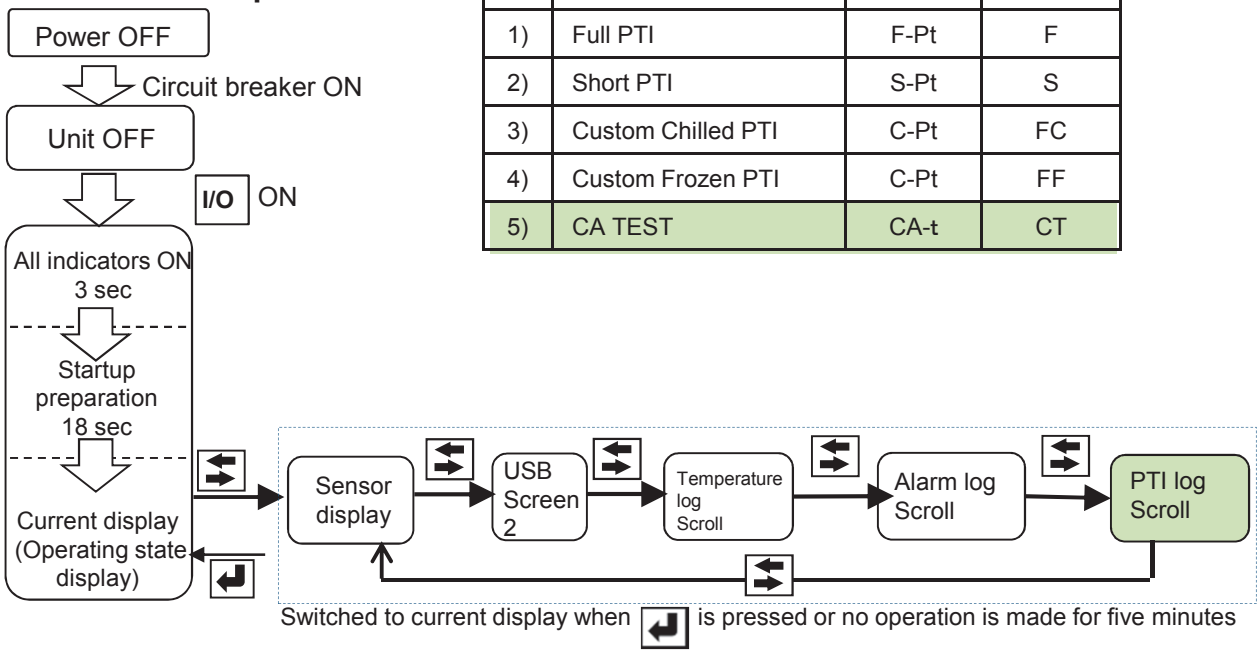
https://daikin-p.ru

(5) PTI log scroll mode

: parts related to CA functions

The log is displayed by scroll from the latest data to older.

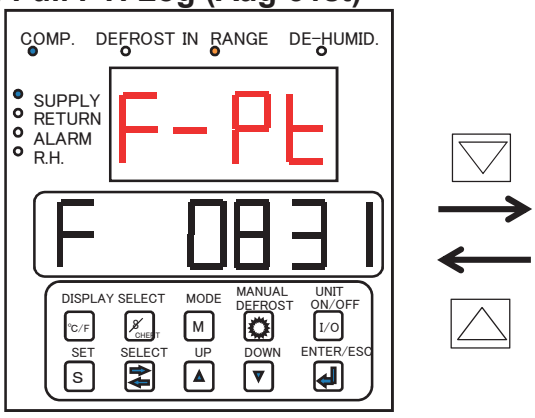
< Mode selection procedure >



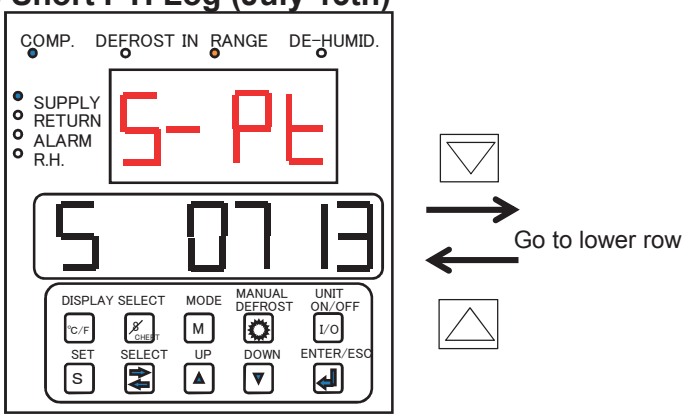
	PTI type	LED screen	LCD screen
1)	Full PTI	F-Pt	F
2)	Short PTI	S-Pt	S
3)	Custom Chilled PTI	C-Pt	FC
4)	Custom Frozen PTI	C-Pt	FF
5)	CA TEST	CA-t	CT

The controller displays "Date and time" and PTI Type as follows.

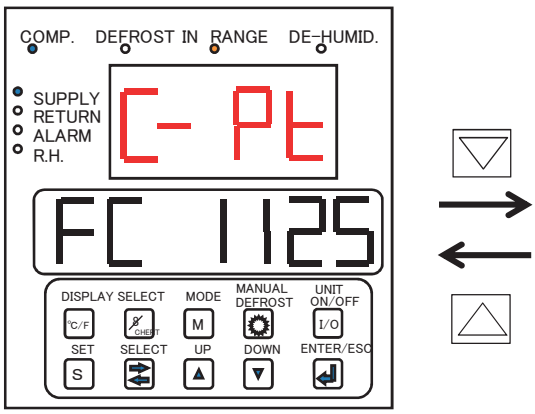
1) Full PTI Log (Aug 31st)



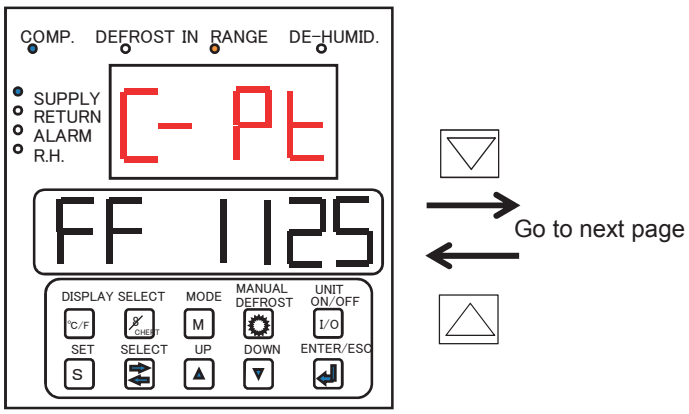
2) Short PTI Log (July 13th)



3) Custom Chilled PTI Log (Nov 25th)



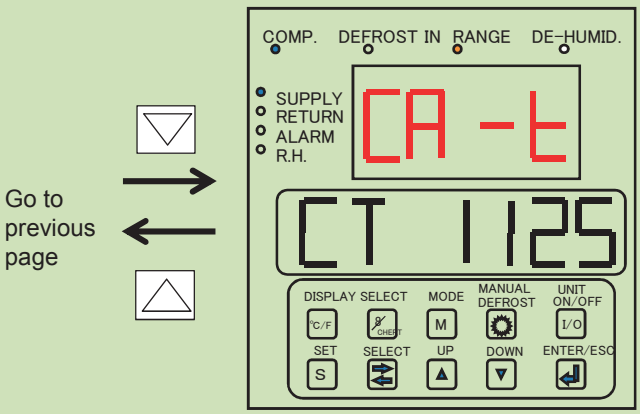
4) Custom Frozen PTI Log (Nov 25th)



https://daikin-p.ru

: parts related to CA functions

5) CA TEST Log (Nov 25th)



When there is no PTI data, the LCD display is as follows.
(Common to the scroll mode and the battery mode)

1) Full PTI: F ----

2) Short PTI: S ----

3) Custom Chilled PTI: FC ----

4) Custom Frozen PTI: FF ----

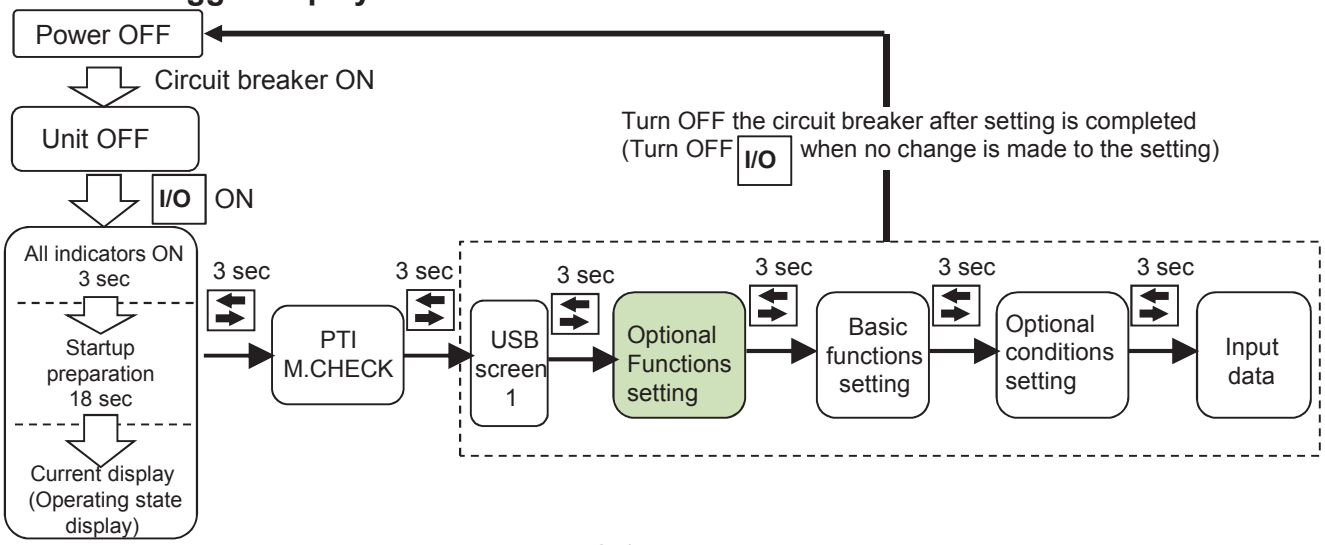
5) CA TEST: CT ----

(6) Optional functions setting mode

The following items can be set.

- USDA sensor or cargo temperature sensor Y/N
- Dehumidification control ON/OFF
- CA unit setting Y: 1 /N: OFF
- Chilled EFL setting ON/OFF

< How to toggle display modes >

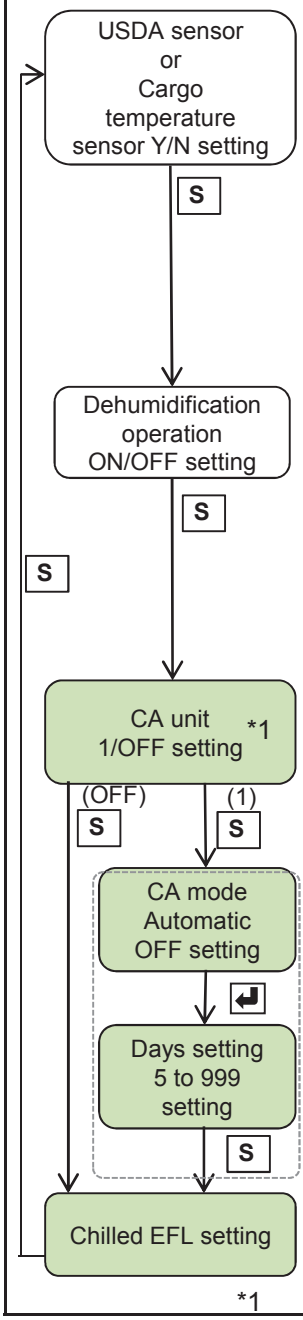


https://daikin-p.ru

< How to operate >

Press [S] to toggle the display.

: parts related to CA functions

Display / setting item	LED screen	LCD screen	Setting method
	OFF: With no USDA sensor 3: With three USDA sensors 4: With three USDA sensors and one cargo temperature sensor Au: To measure inside temperature or cargo temperature for purposes other than cold-processed transportation, temperature can be recorded in the range from -38 to +40°C, using a USDA sensor. Note that this does not conform to the USDA specifications, and therefore should not be used for cold-processed transportation.	USdA	Make selection using △ / ▽. Press ↵ to confirm the selection. Note) When two USDA sensors are connected, the display is automatically set to "3".
	ON: When dehumidification operation is performed with a dehumidification sensor installed OFF: No dehumidification operation is performed Note) See the dehumidification coil Y/N setting in "Marine type Container Refrigeration Unit: Service Manual".	dHU	Make selection with △ / ▽. Press ↵ to confirm the selection. Note) The dehumidification operation ON/OFF setting can also be performed in 2.2.2 (3) "Mode operations".
	1: When the CA device is operated with a CA device installed OFF: No CA device is installed, or a CA device is installed but not operated	CA UNIT	Make selection with △ / ▽. Press ↵ to confirm the selection.
	ON: When the circuit breaker is turned ON specified days after turning OFF the circuit breaker, the CA mode setting is automatically turned OFF.	CA-OFF	When ↵ is pressed, the display is switched to the screen for setting days to automatic OFF.
	5 to 999: Days to automatic OFF	dAYS	Make selection with △ / ▽. Press ↵ to confirm the selection.
	ON: When a CA device is operated on a 20-feet container box (the evaporator fan is operated at low speed in the Chilled mode) OFF: Conventional control	C-EFL	Make selection with △ / ▽. Press ↵ to confirm the selection.

<u>* To confirm the setting change, turn OFF the circuit breaker after changing the setting.</u>

*1 When DECOSIII is set to "g or earlier",

- The CA unit setting is automatically changed to "OFF".
- The Chilled EFL setting is automatically changed to "OFF".

The above changes are not a failure. When the functions above are required, change the DECOSIII setting to "h or later", and perform the setting again.

https://daikin-p.ru

2.3 Data communication with PCs

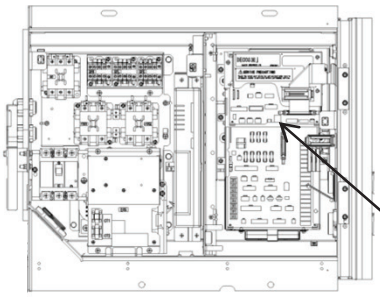
: parts related to CA functions

The controller has a memory inside, which records normal operation control, as well as setting temperature, temperature inside the container, operation modes, alarms issued and other data during transportation, and/or the results of automatic PTI.

The record data can be downloaded by connecting to a PC port receptacle.
In DECOSIIIj and later models, all record data in the controller can be downloaded by inserting a USB memory into the USB connection port on the controller.
→ See "PC Software Operation Guide".

Software in the controller can be uploaded using a PC or a USB memory.
It is also possible to send information (e.g. container ID, cargo name, destination) from a PC to the controller, and memorize it.
→ See "PC Software Operation Guide".

Connect a PC to the communication port



Connect a USB memory to the controller

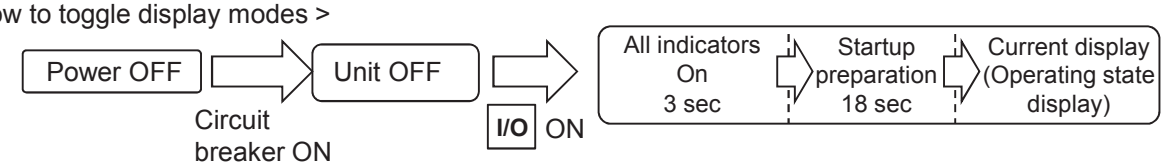
Description			PC connection	USB memory connection
Download	Trip report	FULL TRIP	✓	✓
		LAST ONE TRIP	✓	
		TRIP BY DATE	✓	
		TRIP BY TRIP	✓	All data are downloaded in a package.
	PTI report		✓	
	USDA report		✓	
	Monitoring report		✓	✓
Upload	Software upload		✓	✓
	Container No., etc. upload		✓	

2.3.1 Data download

For the operation of PCs, see "PC Software Operation Guide".

■ Preparations
1. PC (OS: Windows 7)
2. PC software DCCS
3. USB memory
4. Communication cable

■ Operation methods on the control panel
< How to toggle display modes >



https://daikin-p.ru

2.3.2 Installation of software

2.3.2.1 Installation of the latest software (version upgrading)

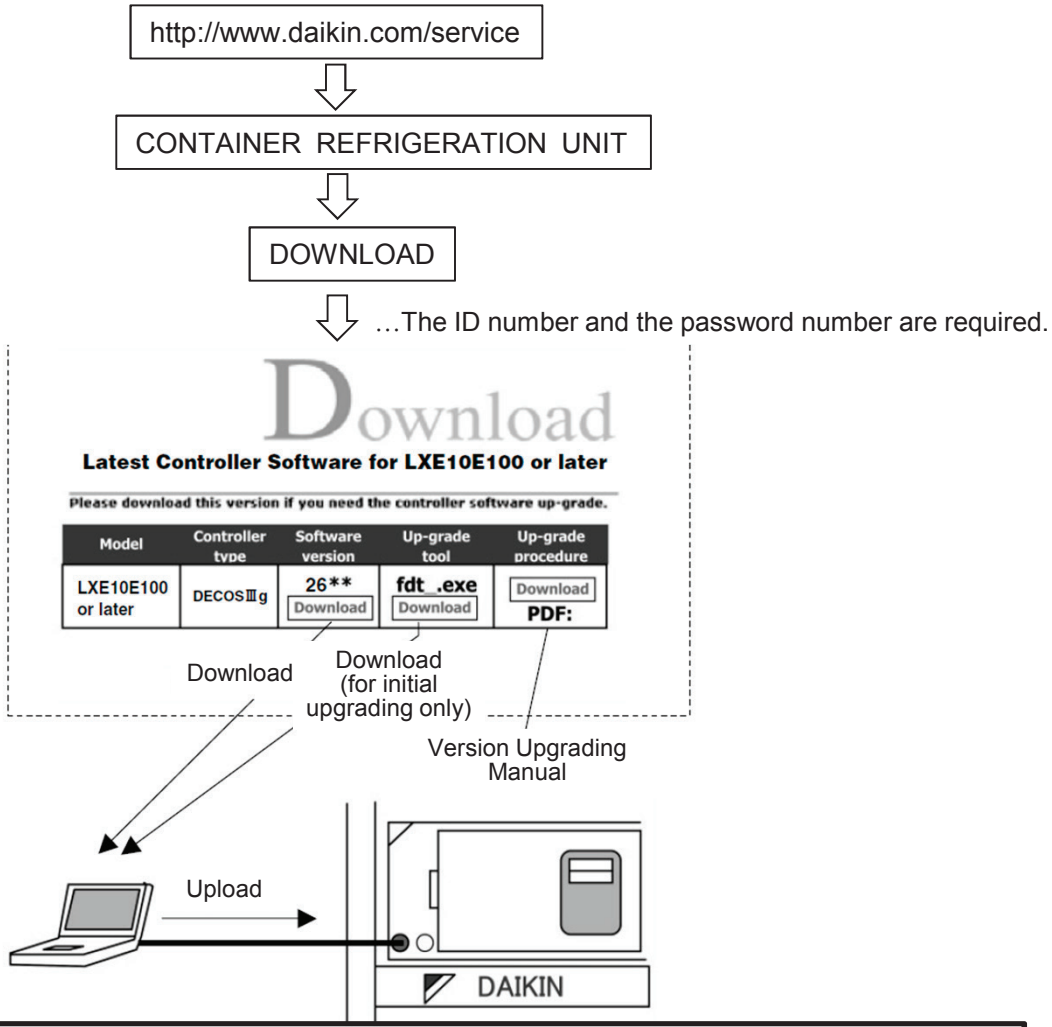
■ When the controller is DECOS IIIh

● Preparations

1. PC (OS: Windows 7)
2. Communication cable
3. Software version upgrading tool
4. Software for the controller DECOS IIIh (Ver. 2670 or later)

After replacing the spare part controller, version upgrading to the latest software is required. Download the latest software and a version upgrading tool (required in the initial upgrading only) from the DAIKIN HOME PAGE in the following procedure.

Note) The reefer is operated using software that is pre-installed in the controller. Upgrade the software to the latest version in order to ensure the optimal operation.



CAUTION **Never power OFF the unit or remove the battery connector during software version upgrading. It disables correct software upgrading. If such a situation results accidentally, perform the version upgrading process again.**

https://daikin-p.ru

2.3.2.1 Installation of the latest software (version upgrading) (continued)

■ When the controller is DECOS IIIj

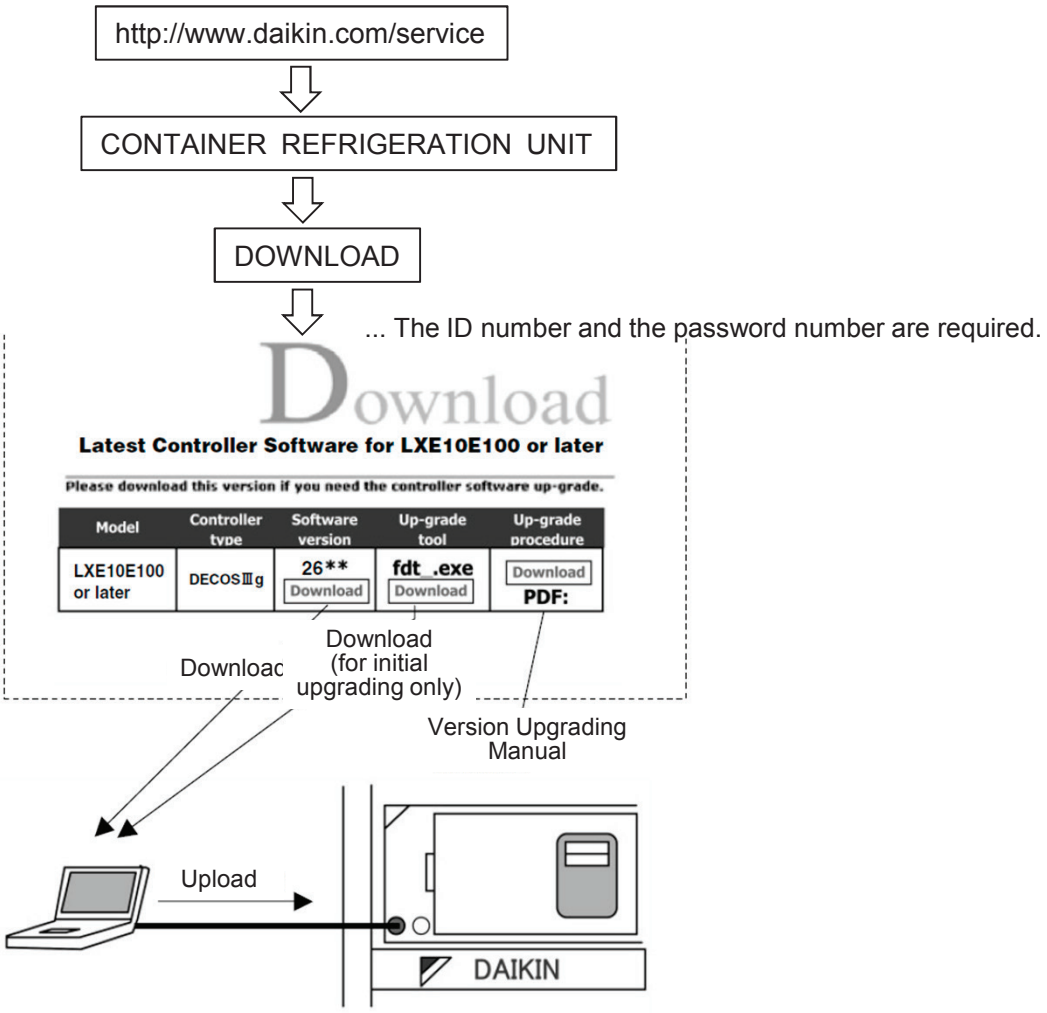
● Preparations

1. PC (OS: Windows 7)
2. Software for the controller DECOS IIIj
3. USB memory

After replacing the spare part controller, version upgrading to the latest software is required.
Note) The reefer is operated using software that is pre-installed in the controller. Upgrade the software to the latest version in order to ensure the optimal operation.

● How to install the latest software

Download the latest software and a version upgrading tool (required in the initial upgrading only) from the DAIKIN HOME PAGE in the following procedure.



CAUTION **Never power OFF the unit or remove the battery connector during software version upgrading. It disables correct software upgrading. If such a situation results accidentally, perform the version upgrading process again.**

https://daikin-p.ru

2.4 PTI (Pre-Trip Inspection)

To ensure the normal operation of the reefer and the CA device, perform the inspection of each section prior to use, and adjust or repair the necessary sections. Listed below are items required in PTI (Pre-Trip Inspection). The items in the bold frame can be checked in automatic PTI. When a CA device is used, airtightness inspection of the container box is required prior to use. For airtightness inspection, see the Quick Handling Manual.

(1) Appearance inspection of the reefer and the CA device

1) Presence/absence of damage
2) Penetration inside and outside the container
3) Drain hose (dust/clogging)
4) Damage in the power cable/plug
5) Fixing state of the refrigerant piping
6) Attaching state of each sensor
7) Dirt on filters
8) Presence/absence of burnout in the magnetic switch joints
9) Looseness in the attaching section
   - Bolts and nuts: reefer, compressor, fan motor, control box, air pump module, sensor module
   - Cable gland: control box
10) Looseness/damage in the heat relieving hose
11) State of the control box cover (water-proof) packing
12) Connection state of the earth wire

(2) PTI (Pre-Trip Inspection) of the reefer and the CA device

1) Gas leak inspection
2) Electrical part inspection: damage inspection of the power supply cable and the plug
3) Power supply voltage inspection

(Range of automated PTI)

(3) Startup and safety device control instruments: operating inspection

1) Safety devices
2) Control instruments

HPS:operating point pressure measurement by stopping the condenser fan motor
Solenoid valves: inspection of opening operation, closing operation, and leak
EFM: speed switching and rotating direction
EV and SMV: inspection of opening operation, closing operation, and leak
Inspection of the CA device: sensor check, functional parts check, system performance check

(4) Operation of each mode

1)Pull-down →	0ºC	Pull-down time, voltage, current
2) Chilled control	0ºC	Suction-blowing air temperature difference, voltage, current
3) Defrost		Defrost time
4) Pull-down →	-18ºC	Pull-down time, evaporator fan motor speed switching
5) Frozen control	-18ºC	(temperature difference, rotating direction)
		ON-OFF, voltage/current
		Inspection of residual frost

(5) Preparation of a PTI report

■ Consumables for the CA device

- Air pump and adsorption cylinder:inspected during PTI;
  "E688" is issued when the specified maintenance time comes (after 10,000 hours of operation).
  (How to check the present operation time: See 2.4.1.3 "M.CHECK")
- Air filter (pump suction section): inspected during PTI;
  (If an alarm is issued during CA TEST, replace the air filter and perform CA TEST again.)

https://daikin-p.ru

2.4.1 Automatic PTI (Pre-Trip Inspection)

: parts related to CA functions

■ When the CA unit is set to "Y: 1",
'CA TEST' is added to automatic PTI.
PTI of the reefer: Short PTI, Full PTI, Custom PTI (Chilled PTI, Frozen PTI)
PTI of the CA device: CA TEST

* Precautions for performing CA TEST

Outside air: Perform the test between -10.0ºC and 43.0ºC.
(Correct assessment may be impossible when outside air temperature is lower than -10.0ºC or higher than +43.0ºC.)

Perform the test after adjusting temperature inside the container (RS) to approx. 20～30ºC.
("J443" is issued and CA TEST cannot be completed when temperature inside the container (RS) is lower than -5ºC or higher than +30ºC.)

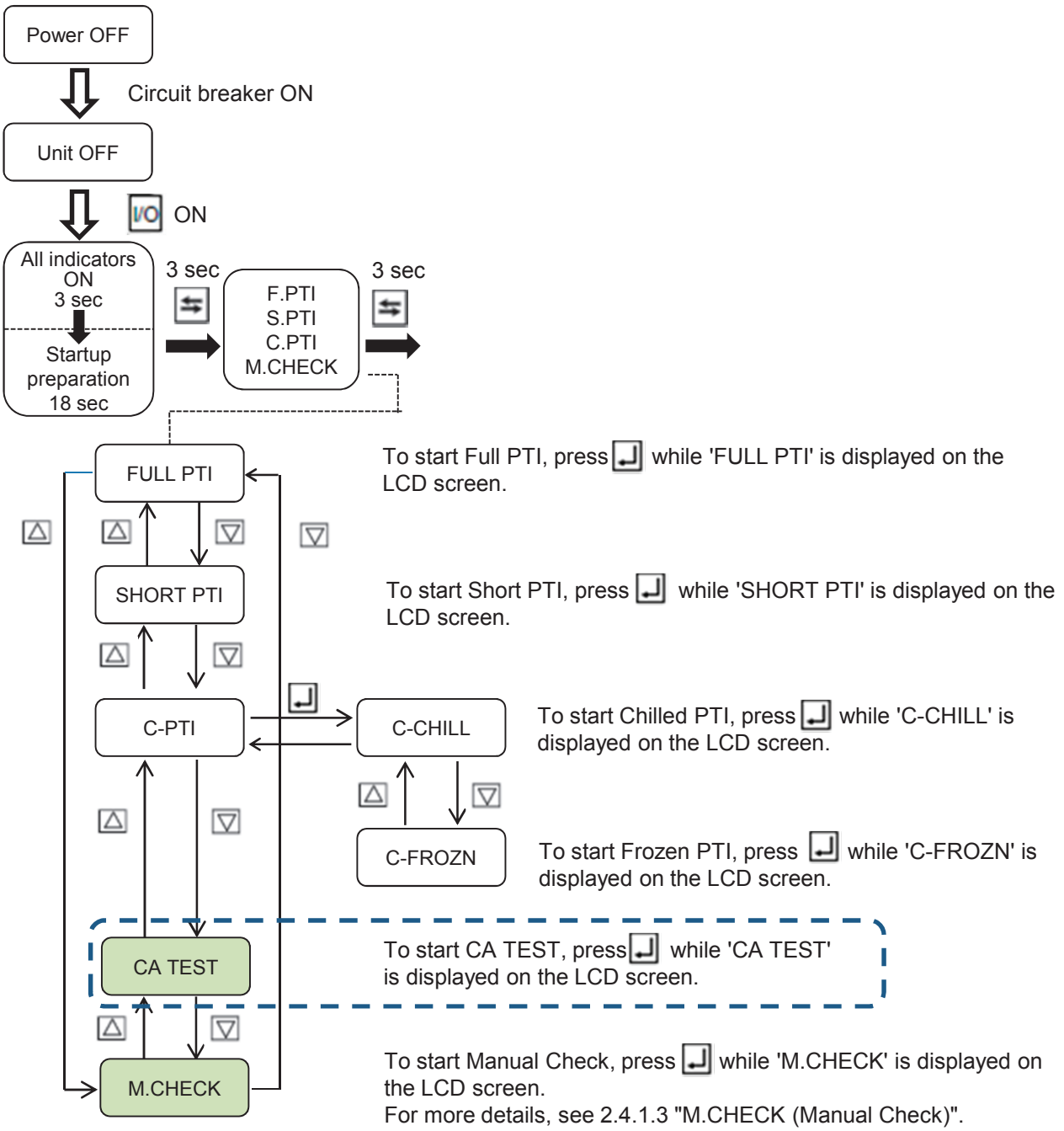
PTI		Target	Description
Short PTI		Reefer	Conducted to check for a part error; Even if a part error is identified during PTI, the PTI process is continued. If a compressor defect is detected, or if the evaporator fan locking is detected, the process is terminated at that point.
Full PTI			Short PTI, Chilled PTI and Frozen PTI are performed. If an error is identified after the completion of Short PTI, the process is terminated at that point.
Custom PTI	Chilled PTI		Short PTI and Chilled PTI are performed. If an error is identified after the completion of Short PTI, the process is terminated at that point.
	Frozen PTI		Short PTI and Frozen PTI are performed. If an error is identified after the completion of Short PTI, the process is terminated at that point.
CA TEST		CA device	Conducted to check for a part error in the CA device;

https://daikin-p.ru

: parts related to CA functions

2.4.1.1 Automatic PTI (Pre-Trip Inspection) selection mode

■ When the CA unit is set to "Y: 1",
functions in the area below are automatically added.



https://daikin-p.ru

2.4.1.2 Automatic PTI (Pre-Trip Inspection) step indication and description

✓: inspection item

Step*3	Description	Short PTI	Full PTI	Custom PTI		CA TEST
				Chilled PTI	Frozen PTI	
P00	Recording of basic data (Container No., date, time, compressor cumulative operation time, outside air temperature)	✓	✓	✓	✓	✓
P02	Alarm check of all sensors; PCC welding/disconnection check; Evaporator fan motor locking check	✓	✓	✓	✓	✓ *4
P04	Power supply state (voltage/frequency) check	✓	✓	✓	✓	
P05	Startup check	✓	✓	✓	✓	
P06	High pressure switch (HPS) OFF/ON value check	✓	✓	✓	✓	
P08	Pump down check	✓	✓	✓	✓	
P10	Valve leak check • Liquid solenoid valve (LSV) • Injection solenoid valve (ISV) • Hot gas solenoid valve (HSV) • Discharge gas bypass solenoid valve (BSV) • Economizer solenoid valve (ESV)	✓	✓	✓	✓	
P12	Accuracy check of the air sensors (SS/RS) and the evaporator temperature sensors (EIS/EOS)	✓	✓	✓	✓	
P14	Accuracy check of the pressure sensors (HPT/LPT)	✓	✓	✓	✓	
P16	Check of high-/low-speed operation of the evaporator fan	✓	✓	✓	✓	
P18	Startup	✓	✓	✓	✓	
P20	Opening/closing check of the economizer solenoid valve (ESV) *1,*2	✓	✓	✓	✓	
P22	Opening/closing check of the discharge gas bypass solenoid valve (BSV) *2	✓	✓	✓	✓	
P24	Standard pull-down operation	✓	✓	✓	✓	
P26	Standard pull-down operation	✓	✓	✓	✓	
P28	Operation check of the suction proportional control valve (SMV)	✓	✓	✓	✓	
P29	Operation check of the electronic expansion valve (EV)	✓	✓	✓	✓	
P30	Opening/closing check of the injection solenoid valve (ISV) *2	✓	✓	✓	✓	
P32	Opening/closing check of the hot gas solenoid valve (HSV); Accuracy check of the suction gas temperature sensor (SGS); Opening/closing check of the reheat coil solenoid valve (RSV, optional)	✓	✓	✓	✓	
P40	Check of the temperature sensor and pressure sensor inside the air pump module					✓
P42	Check of the fan, current sensor, air pump motor, air pump, O_2 gas bypass valve, control valve, purge valve, main valve, O_2 level measurement valve, and O_2 gas purge valve inside the box					✓
P44	Check of the O_2 sensor and the CO_2 sensor					✓
P46	Check of the O_2 level measurement valve and the system abilities					✓
P50	Chilled pull-down check		✓	✓		
P60	Controllability check of Chilled operation		✓	✓		
P70	Defrost check		✓	✓	✓	
P80	Frozen pull-down check		✓		✓	
P90	Controllability check of Frozen operation		✓		✓	

https://daikin-p.ru

: parts related to CA functions

2.4.1.2 Automatic PTI (Pre-Trip Inspection) step indication and description (continued)

*1. Solenoid valve functions check cannot be normally performed when outside air temperature is -10ºC or lower. In this case, short-circuit 121 and 102 on the terminal block board for operation check.
*2. When the difference between outside air temperature and suction air temperature is 15ºC or larger, this step is skipped.
*3. The Step No. is displayed on the LED screen.

	Short PTI	Full PTI	Custom PTI Chilled PTI	Custom PTI Frozen PTI
Example: Step No. 10	SP 10	FP 10	ChP 10	FrP 10

	CA TEST
Example: Step No. 40	Ct 40

*4. In the case of CA TEST, only the PCC welding check is conducted.
*5 "J443" is issued and PTI is forced to termination if suction air temperature is lower than -5ºC or higher than 30ºC, and if the suction temperature sensor is normal, at the start of CA TEST, at the start of P42, or at the start of P44. In this case, adjust the suction air temperature to approx. 20ºC, and perform CA TEST again.
*6 For alarms during CA TEST, see "4.1 CA TEST (Pre-Trip Inspection) alarm list and check points".

https://daikin-p.ru

2.4.1.3 M.CHECK (Manual Check)

Functional parts are inspected during M.CHECK.

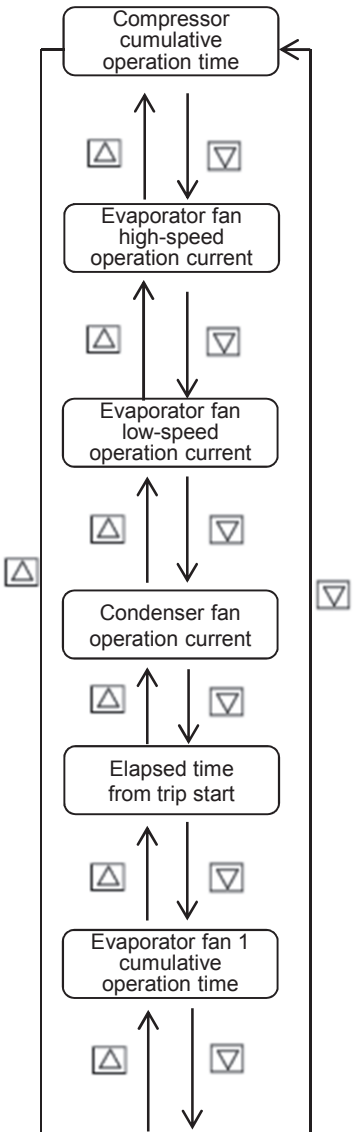
: parts related to CA functions

< Inspection items >

Compressor operation time, evaporator fan high-speed operating current, evaporator fan low-speed operating current, evaporator fan operating current, battery service life (years/months), horsepower indication, elapsed time from trip start, operation time of evaporator fans 1 and 2, condenser fan operation time, software version

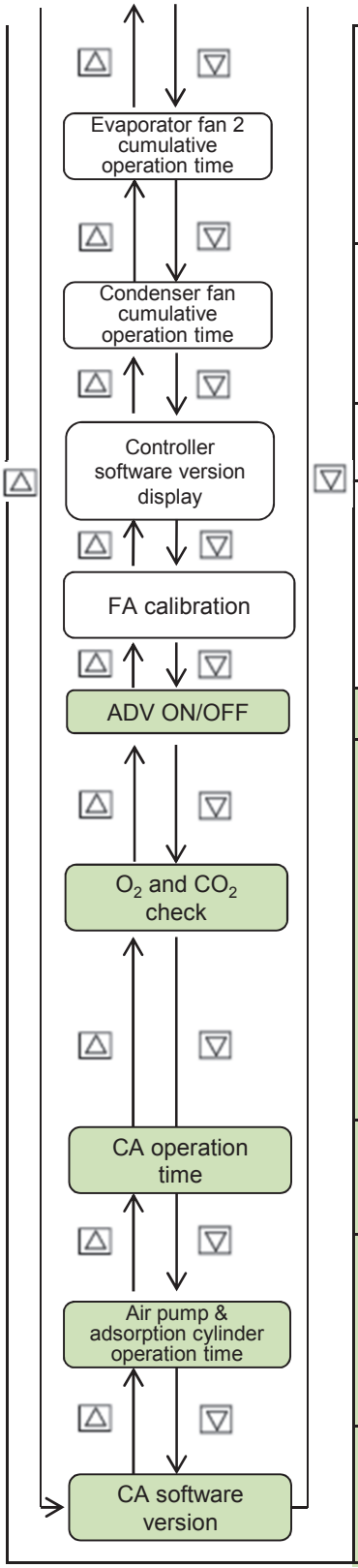
Air discharge valve (ADV) opening/closing, O_2 sensor & CO_2 sensor check, CA operation time, air pump & adsorption cylinder operation time, CA software version

< How to operate >

Setting item	LED screen	LCD screen	Setting method & description
	Compressor cumulative operation time	CC × 10H	Press ↵ to show, on the LED screen, the value that represents the compressor cumulative operation time (value on LED x 10 (hours)). Hold down ↵ for 3 seconds to reset the cumulative operation time to 0.
	Evaporator fan high-speed operating current	EFH A	Press ↵ to operate the evaporator fan at high speed. The operating current of the fan is displayed on the LED screen. Unit: A
	Evaporator fan low-speed operating current	EFL A	Press ↵ to operate the evaporator fan at low speed. The operating current of the fan is displayed on the LED screen. Unit: A
	Condenser fan operating current	CF A	Press ↵ to operate the condenser fan. The operating current of the fan is displayed on the LED screen. Unit: A
	Elapsed time from trip start	TS H	Press ↵ to show, on the LED screen, elapsed time from trip start (unit: hours). Hold down ↵ for three seconds to trigger trip start. Elapsed time is reset to 0 (hours).
	Evaporator fan 1 cumulative operation time	EF1 × 10 H	Press ↵ to show, on the LED screen, the evaporator fan 1 cumulative operation time (value on LED x 10 (hours)). Hold down ↵ for 3 seconds to reset the cumulative operation time to 0. Evaporator fan 1 is the fan to the right when seen from inside the container.

https://daikin-p.ru

: parts related to CA functions



Evaporator fan 2 cumulative operation time	EF2 × 10H	Press ↵ to show, on the LED screen, the evaporator fan 2 cumulative operation time (value on LED x 10 (hours)). Hold down ↵ for 3 seconds to reset the cumulative operation time to 0. Evaporator fan 2 is the fan to the left when seen from inside the container.
Condenser fan cumulative operation time	CF × 10H	Press ↵ to show, on the LED screen, the condenser fan cumulative operation time (value on LED x 10 (hours)). Hold down ↵ for 3 seconds to reset the cumulative operation time to 0.
Software version	SOFTVER	Press ↵ to display the software version on the LED screen.
Ventilation volume (FA)	FA CAL	Press ↵ to display the ventilation volume (FA) on the LED screen. If the ventilation volume remains displayed after fully closing the ventilation opening, hold down ↵ for 3 seconds to calibrate the ventilation volume to '0'.
ON/OFF	AdV	Press ↵ to turn ON the air discharge valve.
Indication during check & results	O2-CO2	Press ↵ to display "ON" on the LED screen. Hold down ↵ for 3 seconds while 'ON' is displayed to start the check process. Approx. 660 seconds are counted down. When successful, "good" is displayed on the LED screen. In the case of failure, an alarm code is displayed. For alarm codes, see Chapter 4. After the check process is completed, pressing △ / ▽ does not toggle the items. To select another item, turn the circuit breaker from OFF to ON.
CA cumulative operation time	CA X10H	Press ↵ to show, on the LED screen, the CA device cumulative operation time (value on LED x 10 (hours)).
Air pump cumulative operation time	APMX10H	Press ↵ to show, on the LED screen, the air pump cumulative operation time (value on LED x 10 (hours)). Hold down ↵ for 3 seconds to reset the cumulative operation time to 0.
CA software version	CA VER	Press ↵ to display the software version on the LED screen.

*5 "J443" is issued and O_2/CO_2 check is terminated if suction air temperature is lower than -5ºC or higher than 30ºC, and if the suction temperature sensor is normal, at the start of O_2/CO_2 check. In this case, adjust the suction air temperature to approx. 20 to 30ºC, and perform O_2/CO_2 check again.

https://daikin-p.ru

3. Service and maintenance

3.1 Overview of maintenance

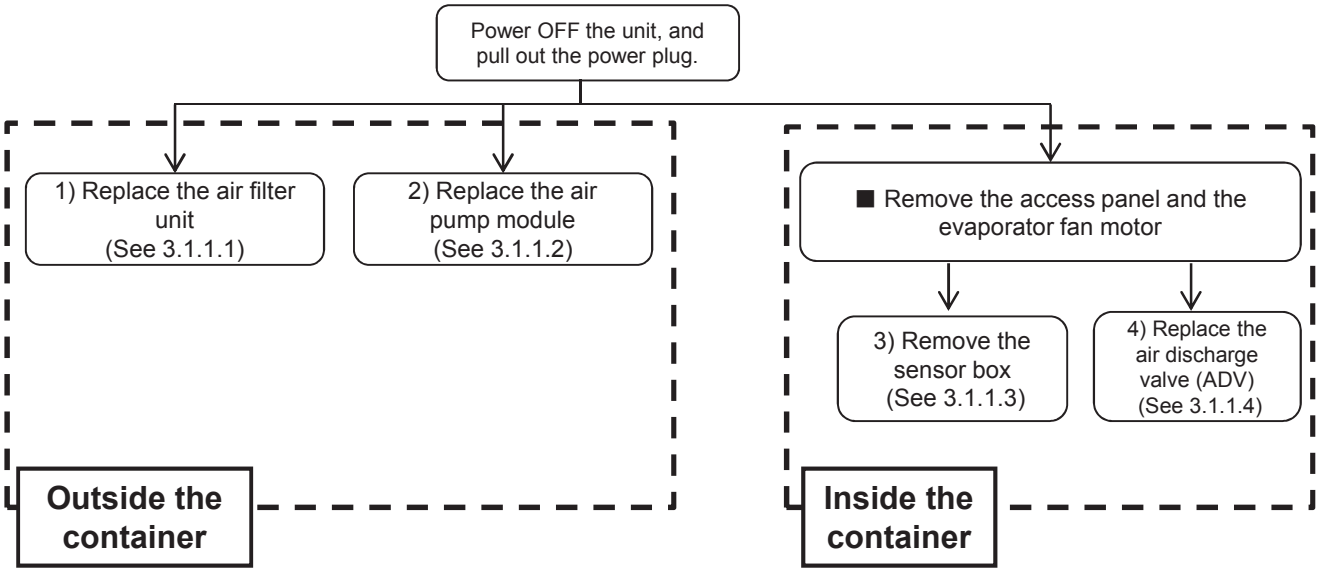
Maintenance parts for the CA device are categorized into those used inside and those used outside the container. The respective category includes the following maintenance parts.

- Outside the container: Air pump module and air filter unit
- Inside the container: Sensor module and air discharge valve

* For maintenance parts used in the reefer, see "Marine type Container Refrigeration Unit: Service Manual".

■ Replacement flow of maintenance parts

The replacement flow of maintenance parts is indicated below.
The maintenance procedure is detailed in the following pages.



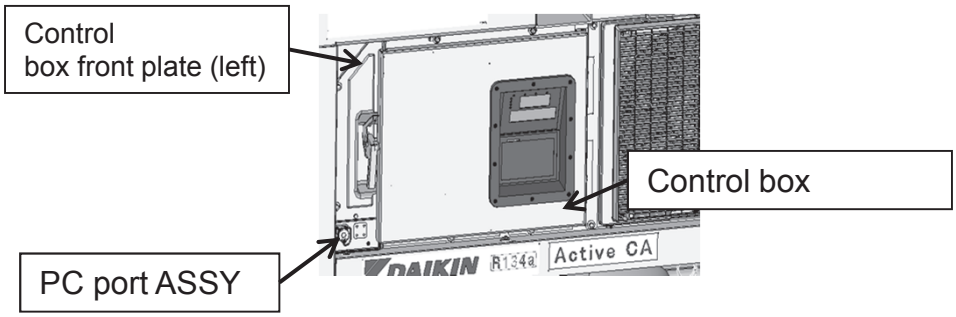
https://daikin-p.ru

3.1.1 Maintenance procedure for CA device parts

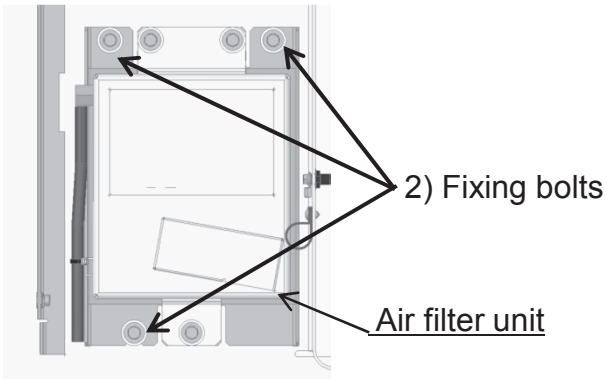
This provides further details for 3.1 "Overview of maintenance".

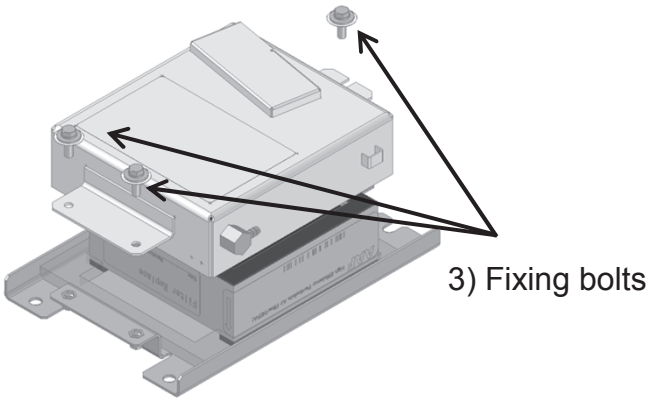
3.1.1.1 Replacement procedure for the air filter unit

1) Remove the four fixing bolts of the control box front plate (left) and the PC port ASSY. Detach the control box front plate (left), the PC port ASSY, and the reinforcing plate.



2) Remove the three fixing bolts of the air filter unit at the back of the control box front plate (left), and detach the air filter unit from the casing.
3) Remove the three screws of the air filter unit, and detach the air filter unit cover.

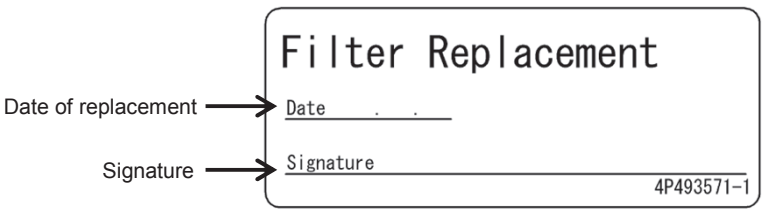


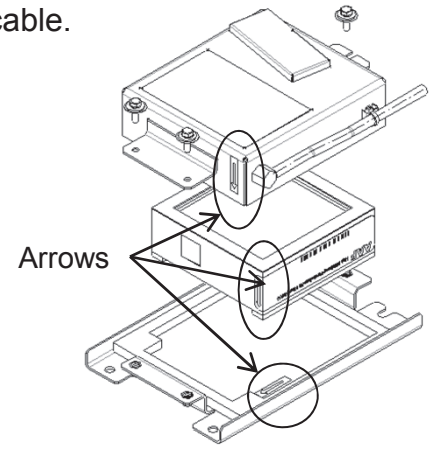


4) Replace the air filter.

■ Attach a new air filter

1) Attach a new part in the reverse procedure of the above. The removed bolts should be tightened at the specified torque (5.15±0.77cN・m).
2) Align the arrows of the air filter unit in the attaching process.
3) Indicate the date and signature on the new filter.
   * If no date/signature is indicated, warranty is not applicable.

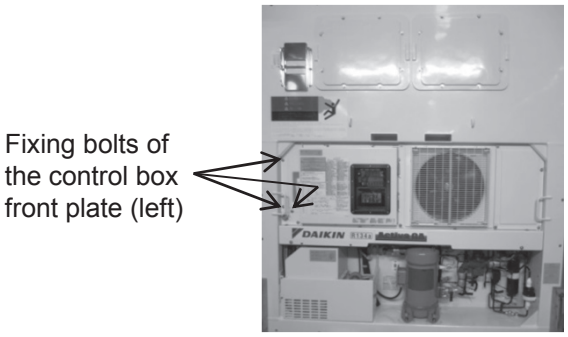




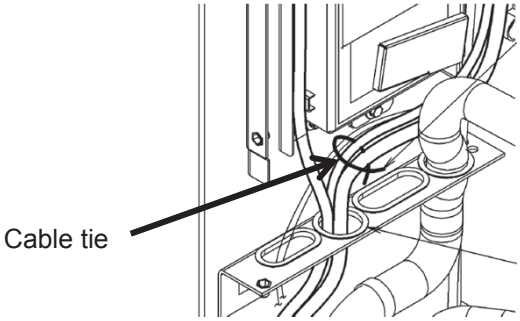
https://daikin-p.ru

3.1.1.2 Replacement procedure for the air pump module

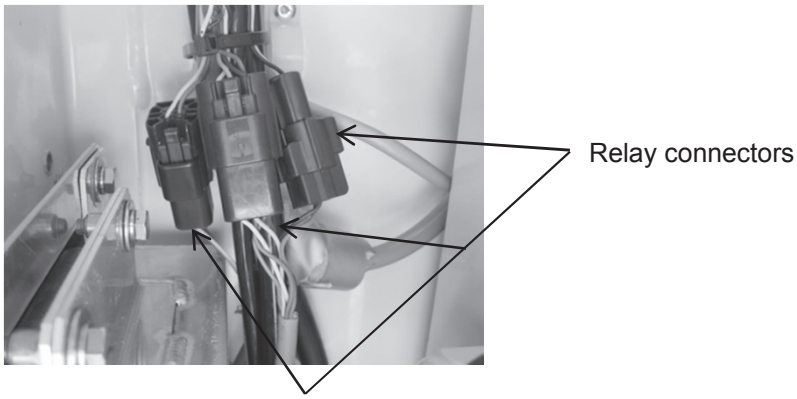
1) Remove the three fixing bolts of the control box front plate (left), and detach the control box front plate (left).



2) Cut one cable tie that fixes the CA harness.



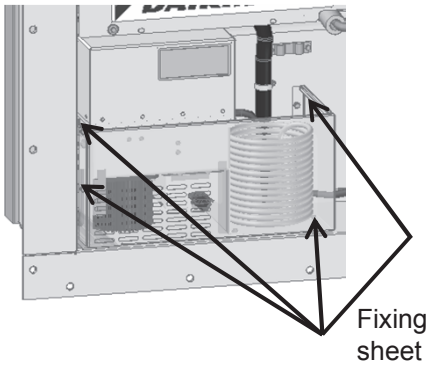
3) Detach the three relay connectors (for the air discharge valve, sensor module, and communication line) that are fixed on the side of the control box.



4) Detach one relay connector (for the power line) that runs out of the control box.

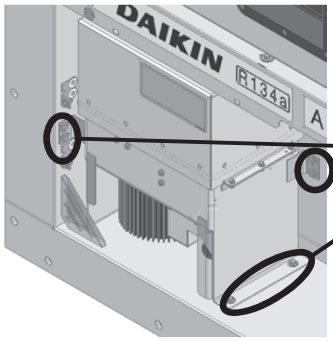
https://daikin-p.ru

5) Remove the four fixing bolts of the cable housing sheet metal, and detach the cable housing sheet metal.



Fixing bolts of the cable housing sheet metal

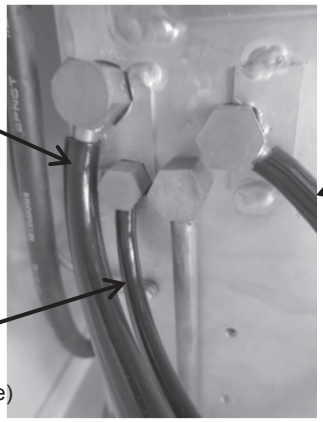
6) Remove the six fixing bolts of the air pump module, and slide the air pump module.



Fixing bolts of the air pump module

7) Remove the three tubes (φ12, φ10, φ8) that are connected to the air pump module.

(a)φ12 tube connecting section
(To inside the container)

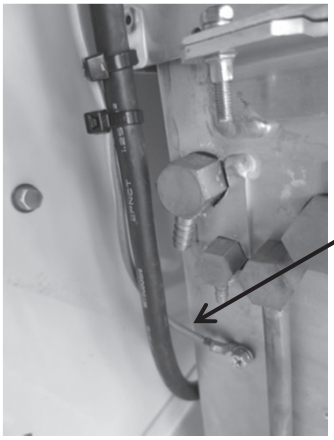


(d)Φ10 tube connecting section
(From the air filter unit)

<u>To ensure airtightness, please seal here with tape etc.</u>

(b)φ8 tube connecting section
(To the inside sensor module)

8) Remove the earth wire that is attached to the air pump module.



Earth wire

https://daikin-p.ru

9) Remove the air pump module.

■ Attach a new air pump module

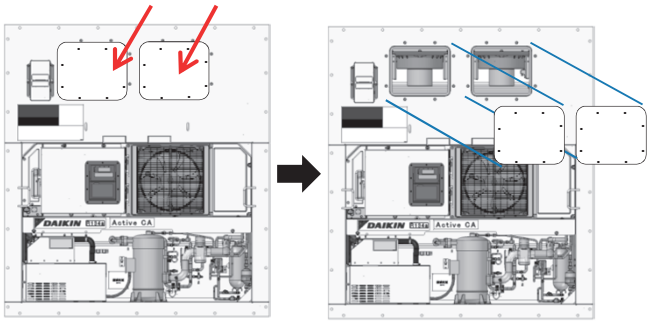
1) Attach a new part in the reverse procedure of the above.
   The removed bolts should be tightened at the specified torque (229±34cN･m).
   For the specified torque, see "6.1 Standard tightening torques for bolts and screws".
2) Connect the removed tube to the hose nipple. Connect the tube all the way to its root.
3) Securely connect the connector and fix the harness.
4) After removing, the earth wire must be re-attached.

https://daikin-p.ru

3.1.1.3 Replacement procedure for the sensor module

■ Remove the access panel and the evaporator fan motor

(1) Remove the left and right access panels.

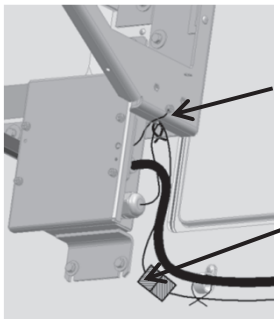


(2) Detach the evaporator fan motor.
For the detachment method, see the "Marine type Container Refrigeration Unit: Service Manual".

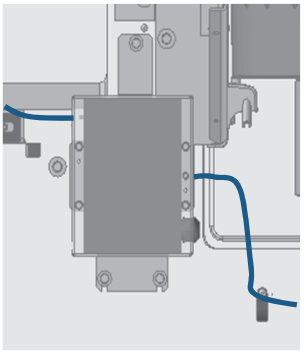
■ Replace the sensor module

(1) Cut and remove the following.
1) Cut one cable tie that fixes the harness.
Remove the water-proof connector.
2) Cut the two tubes connected to the sensor module.
3) Remove one earth wire.

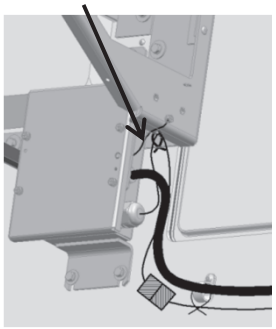
1) Cut one cable tie. (Note)
Remove the water-proof connector.



2) Cut the tube.

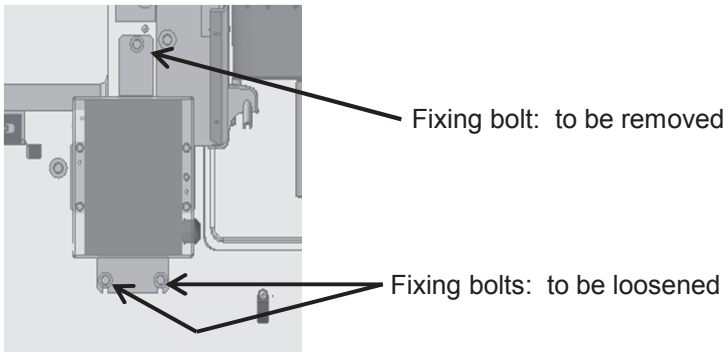


3) Remove the earth wire.



Note) Take care not to cut the earth wire when cutting the cable tie.

(2) Remove the three fixing bolts.



(3) Pull up and remove the sensor module.

https://daikin-p.ru

■ Attach a new sensor module

1) Attach a new part in the reverse procedure of the above.
   The removed bolts should be tightened at the specified torque (229±34cN･m).
   For the specified torque, see "6.1 Standard tightening torques for bolts and screws".
2) Securely connect the connector and fix the harness as before replacement.
3) Connect the removed tube to the hose nipple.
   Connect the tube all the way to its root.
4) After removing, the earth wire must be re-attached.
   Otherwise, noise may enter the sensor output and cause an abnormal value.
5) Conduct sensor calibration for O_2 and CO_2.
   *1) See 2.4.1.3 "M.CHECK (Manual Check)"
   *2) If calibration is not conducted, O_2 and CO_2 levels may not be properly controlled.

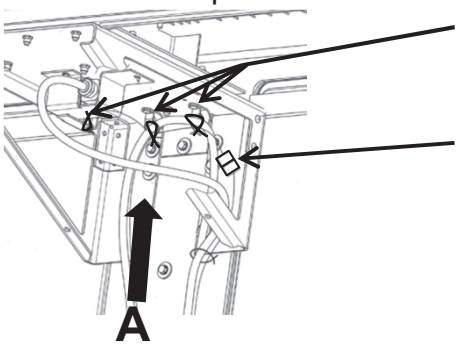
https://daikin-p.ru

3.1.1.4 Replacement procedure for the air discharge valve (ADV)

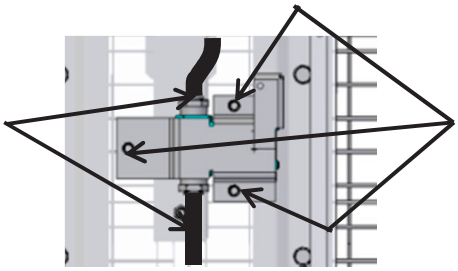
■ Remove the access panel and the evaporator fan motor
(Same as in 3.1.1.3 "Replacement procedure for the sensor box")

■ Replacement of the air discharge valve (ADV)

1) Cut three cable ties that fix the harness of the air discharge valve.
2) Remove the water-proof connector.



3) Remove the tube connected to the air discharge valve joint.
4) Remove the three fixing bolts.



Arrow view A

5) Replace the air discharge valve.

■ Attach a new air discharge valve

1) Attach a new part in the reverse procedure of the above.
The removed bolts should be tightened at the specified torque (229±34cN･m). For the specified torque, see "7.1 Standard tightening torques for bolts and screws".
2) Connect the removed tube to the hose nipple.
Connect the tube all the way to its root.
3) Securely fix the harness with the cable ties, in order to avoid contact with the evaporator fin. (In the case of inadequate fixing, harness wearing may be caused, resulting in disconnection.)

https://daikin-p.ru

3.2 Periodic inspection items

To ensure the efficient use of the CA device, periodic inspection and maintenance are required on the following points, in addition to PTI (Pre-Trip Inspection).

The recommended frequency and items of periodic inspection plan are listed in the table below.

	No.	Inspection item	Inspection point	Recommended inspection frequency	
				Every trip	Every year after Year 2
CA functions	1	Air filter*	Appearance inspection (for dirt)	✓	
	2	Pump module	Appearance inspection		✓
			Bolt looseness		✓
			Tube looseness		✓
			Harness wearing		✓
	3	Sensor module	Bolt looseness		✓
			Harness wearing		✓
			Tube looseness		✓
	4	Air discharge valve (ADV)	Bolt looseness		✓
			Harness wearing		✓
			Tube looseness		✓

* Do not wash the air filter for cleaning.
It may cause a failure in the adsorption cylinder.

https://daikin-p.ru

4. Failure diagnosis

4.1 CA TEST (Pre-Trip Inspection) alarm list and check points

- ● in CA TEST alarm list is J or T, depending on the type of Marine type Container Refrigeration Unit.
- When an alarm is issued during CA TEST:
  1) Replace the air filter unit, and perform CA TEST again.
  2) If alarms are issued again, check the errors for each alarm that is issued.
  In the case of a part failure, the air pump module or the sensor module should be replaced, rather than replacing individual parts.
  (For replacement methods, see "3. Service and maintenance".)

Check No. (LED display)	Check point		Alarm indication (LED display)	Description of error	Module to be replaced	
					Air pump	Sensors
P40	Failure of the box thermal sensor (⑩BTS)		E672	Open/short circuit	✓	
	Failure of the air pressure sensor (⑨APT)		E678	Open/short circuit	✓	
P42	DC fan operation inside the air pump module	⑪DCF1	E679	ON signal from ⑪DCF1 is not detected	✓	
		⑪DCF2	E680	ON signal from ⑪DCF2 is not detected	✓	
	Failure of the current transformer (CT1)		●421	Pressure is raised & no current is detected	✓	
	Air pump operation		●422	Pressure does not rise & no current is detected	✓	
	Air pump motor (②APM) operation		●423	Pressure does not rise & locked current detected	✓	
	O_2 check valve (⑧OCV) operation		●424	Although the O_2 check valve (⑧OCV) was opened, the O_2 level does not change.	✓	
	O_2 purge valve (⑫OPV) operation		●425	Although the O_2 purge valve (⑫OPV) was opened, the O_2 level does not go up.	✓	
	Control valve operation	⑤CTV1	●426	Although the control valve (⑤CTV1) was opened, pressure does not change.	✓	
		⑤CTV2	●427	Although the control valve (⑤CTV2) was opened, pressure does not change.	✓	
	O_2 main discharge valve (⑥ODV) operation		●428	Although the O_2 main discharge valve (⑥ODV) was opened, pressure does not change.	✓	
	O_2 bypass valve (⑦OBV) operation		●429	Although the O_2 bypass valve (⑦OBV) was opened, pressure does not change.	✓	
	Purge valve (⑬PGV) operation		●42A	Although the purge valve (⑬PGV) was opened, pressure does not change.	✓	
P44	Failure of the O_2 sensor circuit (CA control board (④EC10))		●441	The output voltage is larger than the proper range	✓	
	End of life / failure of the O_2 sensor(⑯O2S)		●442	The output voltage is outside the proper range		✓
	Assessable temperature range		●443	Suction air temperature is outside the assessable temperature range	*1	
	Failure of the CO_2 sensor (⑮CO2S)		●444	The output voltage is outside the proper range		✓
	Failure of the CO_2 sensor (⑮CO2S) calibration		●445	Failure of calibration (calibration cannot be saved)	✓	
P46	O_2 check valve (⑧OCV) operation		●461	O_2 level reduction: less than 5%	✓	
	System capabilities		●462	O_2 level cannot be reduced to 8% or lower	✓	

*1 Adjust the suction air temperature to approx. -5 to +30ºC, and perform CA TEST again.

https://daikin-p.ru

4.2 CA-related alarm codes

If an alarm is issued, identify the causes of the failure and perform troubleshooting in accordance with the table below.

* For alarms on the reefer, see "Marine type Container Refrigeration Unit: Service Manual".

Alarm	Controller action
F6xx	The CA device is stopped
E6xx	The CA device continues operation. (After operation stop, operation is continued in automatic recovery, backup operation, or error display only.)

● F alarms

Diagnosis	Page	Alarm	Description of error	Action following the error
001	4-3	F643	Air pump module operating current is too large	The CA device is stopped
002	4-3	F644	"Air pump motor error (E644)" has been issued multiple times	
003	4-3	F679	"Error in DC fan 1(⑪DCF1) (E679) " & "Error in DC fan 2(⑪DCF2) (E680)"	

● E alarms

Diagnosis	Page	Alarm	Description of error	Action following the error
004	4-4	E643	Air pump motor(②APM) cannot be operated (low temperature)	Automatic recovery after operation stop
005	4-4	E644	Air pump motor(②APM) error	
006	4-5	E651	O_2 sensor(⑯O2S) error	Backup operation
007	4-5	E652	CO_2 sensor(⑮CO2S) error	
008	4-6	E653	O_2 level lowering error	
009	4-6	E654	CO_2 level raising error	Error display only (continued operation)
010	4-7	E655	Communication error between the reefer CPU and the CA control board	Automatic recovery after operation stop
011	4-7	E656	Air pump motor relay welding	Backup operation
012	4-8	E661	High temperature error in the air pump module	Automatic recovery after operation stop
013	4-8	E671	Exhaust pressure error on the high pressure side of the air pump module	Error display only (continued operation)
014	4-9	E672	Box thermal sensor(⑩BTS) error inside the air pump module	
015	4-9	E675	Extremely low exhaust pressure on the high pressure side of the air pump module	Backup operation
016	4-10	E677	Current transformer(CT10) error	Error display only (continued operation)
017	4-10	E678	Air pressure transducer(⑨APT) error	
018	4-10	E679	Error in DC Fan1(⑪DCF1)	
019	4-11	E680	Error in DC Fan2(⑪DCF2)	
020	4-11	E688	Air pump module maintenance time	Error display only (continued operation)

https://daikin-p.ru

001	F643
Alarm logic	The operating current of the air pump is abnormally high.
Possible causes	The air pump power supply route is short-circuited.
Troubleshooting	• Check that the voltage and frequency are not outside the range of use. • Replace the air pump module.
Controller actions	• All CA functions are stopped. • Alarm "F643" is displayed.

002	F644
Alarm logic	"E644 Air pump motor error" has been issued multiple times.
Possible causes	• The air pump motor has been continuously overloaded. • The air pump motor has been continuously disconnected.
Troubleshooting	• Check that the voltage and frequency are not outside the range of use. • Replace the air pump module.
Controller actions	• All CA functions are stopped. • Alarm "F644" is displayed.

003	F679
Alarm logic	• Malfunction of Fan 1 (DCF1) and Fan 2 (DCF2) inside the air pump module
Possible causes	• Fan 1 (DCF1) / Fan 2 (DCF2) inside the air pump module is locked • Fan 1 (DCF1) / Fan 2 (DCF2) inside the air pump module is disconnected
Troubleshooting	• Replace the air pump module.
Controller actions	• All CA functions are stopped. • Alarm "F679" is displayed.

https://daikin-p.ru

004	E643
Alarm logic	The operating current of the air pump motor is abnormally high.
Possible causes	• The air pump motor is locked in a low-temperature environment. • The power supply route in the air pump module is short-circuited.
Troubleshooting	• Confirm that the outside air temperature is -20°C or higher. • Check that the voltage and frequency are not outside the range of use. • Replace the air pump module.
Controller actions	• CA functions are temporarily stopped. • Alarm "E643" is displayed. • The unit is automatically turned back on two hours after operation stop. The alarm is cleared after the unit is turned back on.

005	E644
Alarm logic	Overload current is detected in the air pump motor. The operating current of the air pump motor is not detected.
Possible causes	• The air pump motor has been continuously overloaded. • The air pump motor has been continuously disconnected.
Troubleshooting	• Check that the voltage and frequency are not outside the range of use. • Replace the air pump module.
Controller actions	• All CA functions are stopped. • Alarm "E644" is displayed. • The unit is automatically turned back on after waiting for 3 minutes. The alarm is cleared after the unit is turned back on.

https://daikin-p.ru

006	E651
Alarm logic	O_2 sensor error
Possible causes	• End of life / failure of the O_2 sensor • The O_2 sensor receiving circuit of the CA control board (CA BOARD (EC10)) has a failure.
Troubleshooting	• Replace the sensor module. • Replace the air pump module.
Controller actions	• Ventilation is performed through backup operation. • Alarm "E651" is displayed.

007	E652
Alarm logic	CO_2 sensor error Failure of the CO_2 sensor calibration
Possible causes	• Failure of the CO_2 sensor calibration • The CO_2 sensor receiving circuit of the CA control board (CA BOARD (EC10)) has a failure. • The CO_2 sensor is disconnected or short-circuited. • The CO_2 sensor has a failure.
Troubleshooting	• Adjust the suction air temperature to approx. 20 to 30°C, and perform calibration again. • Replace the air pump module. • Replace the sensor module.
Controller actions	• Only O_2 control operation is performed through backup operation. • Alarm "E652" is displayed.

https://daikin-p.ru

008	E653
Alarm logic	The O_2 level is abnormally low.
Possible causes	1) Mechanical causes • The tube that is connected to the air pump module has come off. • The air pump module is not letting out gas. 2) Other causes • Cargo breathing is too large.
Troubleshooting	• Confirm that the tube connected to the air pump module has not come off. • Keep the ventilation opening open until the alarm is cleared. (This raises the O_2 level and lowers the CO_2 level.) (The O_2 level inside the container is too low. Cargo damage may be caused.) • Replace the air pump module.
Controller actions	• Alarm "E653" is displayed. • When the O_2 level reaches [Setting O_2 level -1.0%] or higher, the alarm is cleared.

009	E654
Alarm logic	The CO_2 level is abnormally high.
Possible causes	1) Mechanical causes • The tube that is connected to the air pump module has come off. • The air pump module is not letting out gas. 2) Other causes • Cargo breathing is too large.
Troubleshooting	• Confirm that the tube connected to the air pump module has not come off. • Keep the ventilation opening open until the alarm is cleared. (This raises the O_2 level and lowers the CO_2 level.) (The CO_2 level inside the container is too high. Cargo damage may be caused.) • Replace the air pump module.
Controller actions	• Alarm "E654" is displayed. • When the CO_2 level reaches [Setting CO_2 level +1.0%] or higher, the alarm is cleared.

https://daikin-p.ru

010	E655
Alarm logic	Communication error between the unit CPU and the CA control board (CA BOARD (EC10))
Possible causes	• Power is not supplied to the air pump module. • Noise • The communication cable between the unit CPU and the CA control board (CA BOARD (EC10)) is disconnected or short-circuited. • The CA control board (CA BOARD (EC10)) has a failure.
Troubleshooting	• Turn "OFF" the unit switch and reboot the unit. If normal operation is possible, it is a temporary error, and operation can be continued. • Replace the communication cable. • Replace the air pump module.
Controller actions	Operation is restarted when communication is recovered three minutes after operation stop.

011	E656
Alarm logic	Air pump motor relay welding error
Possible causes	The miniature relay for driving the air pump motor is welded on the CA control board (CA BOARD (EC10)).
Troubleshooting	Replace the air pump module.
Controller actions	• Outside air feeding operation is performed through backup operation. • Alarm "E656" is displayed.

https://daikin-p.ru

012	E661
Alarm logic	Temperature inside the air pump module is abnormally high.

Possible causes	• Power supply voltage is rising.
	• Power supply frequency is rising.
	• The following parts inside the air pump module are in an abnormal state.
	  • Control valves (CTV1 and CTV2)
	  • O_2 gas bypass valve (OBV)
	  • Main discharge valve (ODV)
	  • Fans (DCF1/DCF2) inside the air pump module
	  • O_2 gas purge valve (OPV)

Troubleshooting	• Check the power supply (voltage and frequency). • Replace the air pump module.
Controller actions	• CA functions are temporarily stopped. • Alarm "E661" is displayed. • The unit is automatically turned back on when temperature inside the air pump module is lowered three minutes after operation stop. • The alarm is cleared after the unit is turned back on.

013	E671
Alarm logic	Abnormally high discharge pressure on the high pressure side of the air pump

Possible causes	• Power supply voltage has been raised.
	• Power supply frequency has been raised.
	• The following parts inside the air pump module are in an abnormal state.
	  • Air pump
	  • Control valves (CTV1 and CTV2)
	  • O_2 gas bypass valve (OBV)
	  • Clogging in the orifice

Troubleshooting	• Check the power supply (power supply and frequency). • Replace the air pump module.
Controller actions	• Operation is continued. • Alarm "E671" is displayed.

https://daikin-p.ru

014	E672
Alarm logic	Error in the temperature sensor (BTS) inside the air pump module
Possible causes	The temperature sensor (BTS) inside the air pump module is disconnected or short-circuited.
Troubleshooting	Replace the air pump module.
Controller actions	• Operation is continued. • Alarm "E672" is displayed.

015	E675
Alarm logic	Abnormally low discharge pressure on the high pressure side of the air pump

Possible causes	• Power supply voltage has been lowered.
	• Power supply frequency has been lowered.
	• The air filter is clogged.
	• The following parts inside the air pump module are in an abnormal state.
	  • Control valve (CTV1 or CTV2)
	  • Leak from the air circuit (air tube)
	  • Clogging in the upstream air circuit of the pressure sensor
	  • Air pump

Troubleshooting	• Check the power supply voltage.
	  → If the power supply voltage is short in G-set, etc., raise the voltage.
	• Check the power supply frequency.
	  → If the power supply frequency is short in G-set, etc., raise the frequency.
	• Replace the air filter.
	• Replace the air pump module.

Controller actions	• Only O_2 control operation is performed through backup operation. • Alarm "E675" is displayed. • The unit is automatically turned back on two hours after operation stop. • The alarm is cleared after the unit is turned back on.

https://daikin-p.ru

016	E677
Alarm logic	Current sensor (CT1) error
Possible causes	The current sensor (CT1) is disconnected.
Troubleshooting	Replace the air pump module.
Controller actions	• Operation is continued. • Alarm "E677" is displayed.

017	E678
Alarm logic	Pressure sensor (APT) error
Possible causes	• The pressure sensor (APT) is disconnected. • The pressure sensor (APT) has a failure.
Troubleshooting	Replace the air pump module.
Controller actions	• Operation is continued. • Alarm "E678" is displayed.

018	E679
Alarm logic	Malfunction of Fan 1 (DCF1) inside the air pump module
Possible causes	• Fan 1 (DCF1) inside the air pump module is locked. • Fan 1 (DCF1) inside the air pump module is disconnected.
Troubleshooting	Replace the air pump module.
Controller actions	• Operation is continued. • Alarm "E679" is displayed.

https://daikin-p.ru

019	E680
Alarm logic	Malfunction of Fan 2 (DCF2) inside the air pump module
Possible causes	• Fan 2 (DCF2) inside the air pump module is locked. • Fan 2 (DCF2) inside the air pump module is disconnected.
Troubleshooting	Replace the air pump module.
Controller actions	• Operation is continued. • Alarm "E680" is displayed.

020	E688 (maintenance alarm)
Alarm logic	The cumulative operation time of the air pump has exceeded the service life threshold.
Possible causes	The specified maintenance time has come for the air pump.
Troubleshooting	• Reset the cumulative time under 2.5.4.1.3 "M.CHECK (Manual Check)". • Replace the air pump module.
Controller actions	• Operation is continued. • Alarm "E688" is displayed.

https://daikin-p.ru

5. PTI (Pre-Trip Inspection)

5.1 Inspection before cargo loading

When a CA device is used, insulation (airtightness) is required between outside air and air inside the container.
To ensure the above, **an airtightness test must be conducted before loading cargo.**

■ Procedure

1) Attach an air curtain, and achieve airtightness inside the container.
2) Enclosure of airtight gas

Retain the pressure of N_2 gas or air at 50 to 51 mmH_2O (490 to 500 Pa) for 10 minutes. Subsequently, close the packless valve, and confirm that it takes 105 seconds or longer before the pressure declines from 50 mmH_2O (490 Pa) to 25 mmH_2O (245 Pa).

- The pressure cannot be retained for 105 seconds: Correct the leakage point.
- The pressure is retained for 105 seconds or longer: Release the enclosed gas, and perform PTI.

5.2 Precautions for cargo loading

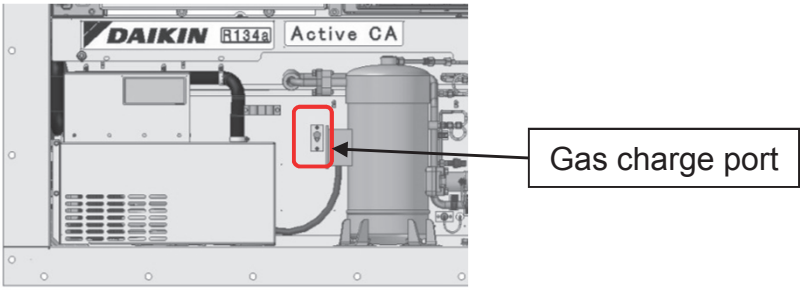
1) Confirm that PTI of the reefer and PTI of the CA device have been normally completed.
   Note) For how to implement PTI of the reefer and the CA device, see 2.5.1 "Automatic PTI (Pre-Trip Inspection)".
   To check the past PTI log, see 2.2.2 (5) "PTI log scroll mode".

2) Attach an air curtain, and achieve airtightness inside the container.
3) Switch the CA mode setting to "ON", and specify the O_2 level and the CO_2 level.
   For the setting method, see 2.2.2 (3) "Mode operations".
   3-1) When no gas is enclosed
   • Operate the reefer.
   3-2) When CO_2 gas or N_2 gas is enclosed
   1) Fill a specified amount of CO_2 gas or N_2 gas through the charge port.
   For the implementation method, see 5.3 "Filling the reefer and the CA device with gas".
   2) Operate the reefer.

*** When CO_2 gas is to be filled, contact us.**

5.3 Filling the reefer and the CA device with gas

When the unit has a gas charge port: See 5.3.1 "Gas filling method (using a charge port)"
When the unit has no gas charge port: See 5.3.2 "Gas filling method (using a charge kit)"

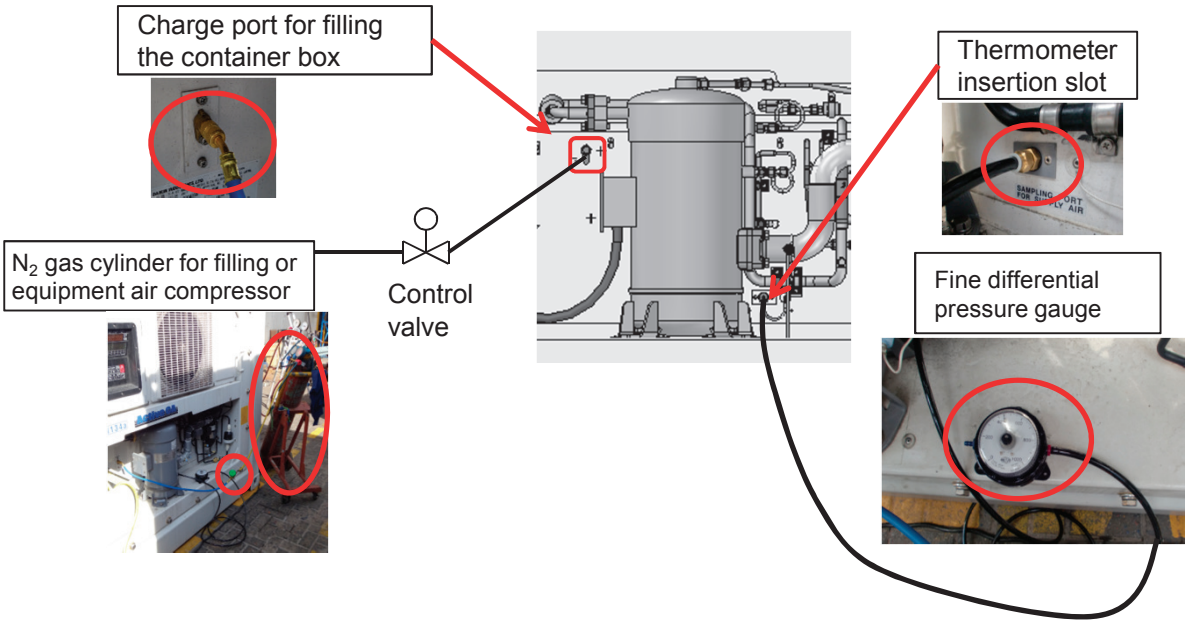


https://daikin-p.ru

5.3.1 Gas filling method (using a charge port)

When CO_2 gas, etc. is to be filled, observe the following procedure.
* The reefer charge port for initial gas filling is optional.

1. Connect parts as indicated below.
   Gas cylinder for filling: Connect to the reefer charge port for filling
2. Open the gas cylinder for filling, and open the control valve located before the reefer charge port for filling.
3. Perform gas filling. Loosen the wing bolt at the ventilation opening. The container box should be gradually filled with gas while ventilating inside the container and operating the reefer.
   The excessive filling of the container box may cause damage to the container box.
   (Maximum pressure in container box : up to 50mmH_2O(490Pa))



⚠ CAUTION

- **To prevent staining inside the reefer box, do not use a charge hose for filling CO_2 or other gases that has been used for refrigerant.**
- **As a charge port for filling, only a charge hose equipped with a 4/16 (screw size: 7/16-20 UNF) push rod can be connected.**

⚠ DANGER

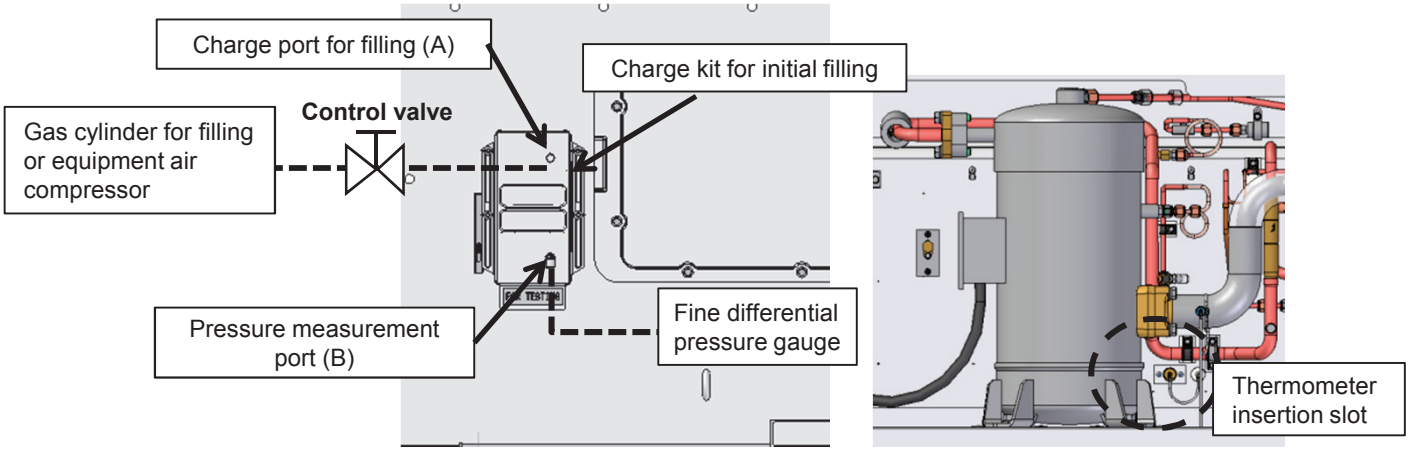
Perform post-filling operation from the side face of the container, in order to avoid directly inhaling high-concentration gas discharged from the container.

https://daikin-p.ru

5.3.2 Gas filling method (using a charge kit)

When CO_2 gas, etc. is to be filled, observe the following procedure.
* A charge kit "LXCA-T001" for the initial filling of a reefer is separately sold.

1. Remove the ventilation opening cover, and attach the charge kit for initial filling.
2. Connect to the charge kit for initial filling in the following procedure.
   • Thermometer insertion slot: Open the slot.
   • Connect a gas cylinder for filling or equipment air compressor to the charge port for filling (A), and fill the container box with gas.
   • Connect a fine differential pressure gauge to the pressure measurement port (B), and measure pressure inside the container box.
3. Open the gas cylinder for filling, and open the control valve located before the reefer charge port for filling.
4. Perform gas filling.
   The container box should be gradually filled with gas while operating the reefer.
   The excessive filling of the container box may cause damage to the container box.
   (Maximum pressure in container box : up to 50mmH_2O(490Pa))
5. After filling, remove the charge kit for initial filling, and attach the ventilation opening cover.



⚠ CAUTION

- **To prevent staining inside the reefer box, do not use a charge hose for filling CO_2 or other gases that has been used for refrigerant.**
- **As a charge port for filling, only a charge hose equipped with a 4/16 (screw size: 7/16-20 UNF) push rod can be connected.**

⚠ DANGER

Perform post-filling operation from the side face of the container, in order to avoid directly inhaling high-concentration gas discharged from the container.

https://daikin-p.ru

5.4 Precautions for cargo unloading

5.4.1 Procedures for cargo unloading

1) Check points before cargo unloading (when the unit can be powered on)

1. Operation in a container equipped with a CA device must be performed by **two or more persons**. One of them should be a supervisor, and the other(s) should be an operator or operators.
2. All of them must carefully read and understand the "Safety precautions" and warning plates attached to the reefer.
3. Change the CA mode setting to "DSP" on the operation panel. When the CA mode setting is switched to "DSP", the present O_2 level and CO_2 level in the container box can be confirmed while the CA device is turned off. **Note that the O_2 level and CO_2 level above are only approximate values.**
   For CA mode setting, see 2.2.2 (3) "Mode operations".
4. Fully open (100%) the ventilation opening, in order to avoid directly inhaling gas discharged through the ventilation opening.
   Note) In Locations 1) through 3) below, (warehouse) operators may be suffocated. Never open the ventilation opening.
   1) Cargo loading/unloading platform
   2) A shelter from rain, or an intake opening for air conditioning, located near the ventilation opening
   3) Small space
5. Operate the reefer.
6. Before entering the container, it should be confirmed that **at least 60 minutes** have elapsed after operating the reefer, and that the atmospheric air composition has been achieved inside the container. If the atmospheric air composition has not been achieved after the specified time, extend the waiting time.
7. Unload cargo.

2) Check points before cargo unloading (when the unit cannot be powered on)

1. Operation in a container equipped with a CA device must be performed by **two or more persons**. One of them should be a supervisor, and the other(s) should be an operator or operators.
2. Turn OFF the circuit breaker. This is to prevent the CA device from starting when power supply is recovered.
3. Fully open (100%) the ventilation opening on the side face, in order to avoid directly inhaling gas discharged through the ventilation opening.
4. Fully open the container rear door.
5. Break the container curtain. In this process, take care not to directly inhale air inside the container box.
6. Take a distance from the container while leaving the container rear door fully open. Confirm the air composition levels inside the container box using a densitometer, and wait until the O_2 level reaches 21% and the CO_2 level becomes 1000 ppm or lower (0.1% or lower).
7. The supervisor should supervise the entry of operators with an adequate distance from the container rear door. Confirm that the O_2 level inside the container box reaches 21% and that the CO_2 level becomes 1000 ppm or lower (0.1% or lower), before authorizing entry into the container box.
8. Unload cargo.

https://daikin-p.ru

6. Attached diagrams

6.1 Standard tightening torques for bolts and screws

■ Standard tightening torque for bolts

	Bolt size	Tightening torque		
		cN·m	kgf·cm	Lbf·ft
Stainless steel	M4	122	12.4	0.90
	M5	229	23.3	1.69
	M6	393	40.0	2.90
	M8	938	95.6	6.92

Note) Allowable tightening torque range: ±15%

■ Standard tightening torque for screws

	Screw size	Tightening torque		
		cN·m	kgf·cm	lbf·ft
Stainless steel	M3	540	5.50	0.39
	M4	131	13.3	11.5
	M5	265	27.0	1.95

Note) Allowable tightening torque range: ±10%

https://daikin-p.ru

DAIKIN INDUSTRIES,LTD.

Head Office. Umeda Center Bldg., 4-12, Nakazaki-Nishi 2-chome, Kita-ku, Osaka, 530-8323 Japan.
Tel: 06-6373-4338
Fax: 06-6373-7297
Tokyo Office. JR Shinagawa East Bldg., 11F 18-1, Konan 2-chome, Minato-ku Tokyo, 108-0075 Japan.
Tel: 03-6716-0420
Fax: 03-6716-0230
DAIKIN REFRIGERATION OFFICE Fascinatio Boulevard 562, 2909 VA Capelle aan den IJssel, The Netherlands

TR17-02
(2017.10.00050)NK