

OPERATION MANUAL

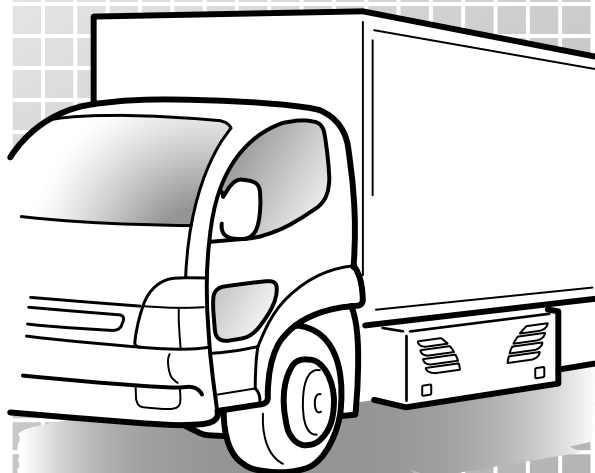
MITSUBISHI TRANSPORT REFRIGERATION UNIT

TU1250SAE
TU1250SAEM
TU1100SAE
TU900SAE

This operation manual is intended to provide users with a good knowledge to use Mitsubishi Refrigeration Unit safely.


Operate or service the refrigeration unit only after you have read this manual and understand its contents.

Carefully store this manual in a fixed place so that it is immediately available for your reference when you need it.



Original Instructions



TSJ012A181B 
YEAR:2023

Thank you for your purchase of Mitsubishi Transport Refrigeration Unit.

Purpose of use and application

This Refrigeration Unit is intended to carry the cargo (with the exception of volatile, inflammable, hazardous and corrosive matters) on a transportation vehicle, keeping the inside container temperature at a certain degree. If the Refrigeration Unit is used for any purposes other than this purpose, it may cause accidents or damages.

Important information

For questions or information, contact your nearest dealer.

- Be sure to follow the contents described in this manual in order to protect yourself and other people from potential risks of this refrigeration unit and to prevent it from getting damaged.
- We are not able to foresee all potential risks of this refrigeration unit or dangers due to mishandling by the customers. Therefore, it is necessary to take measures for safety in addition to the items described in this manual or on warning labels.
- For the following works, contact your nearest dealer. If those works were carried out by customer, the refrigeration unit may lose its performance and we may not be able to ensure the safety of the customer.
 - (a) Installation, modification, specification change and disposal for the refrigeration unit
 - (b) Maintenance of electric appliances
 - (c) Abnormal treatments which are not described in this manual
- This product contains fluorinated greenhouse gases.
 - Refrigerant : R452A (GWP (Global Warming Potential)=2141)
Refer to a label on unit about weight of fluorinated greenhouse gases and CO₂ equivalent. (☞ Refer to pages 7.)

Operation manual

- This operation manual is prepared for people who speaks English. In case that person whose native language is not English handles this refrigeration unit, he or she must be instructed on safety by the customer. Furthermore, the warning labels described in their native language must be prepared and stuck on the proper places.
- This operation manual is copyrighted and all rights are reserved by our company. The drawings and technical information described in this manual may not, in whole or part, be published, copied, translated for the purposes other than above-mentioned and reduced to any electronic medium or machine-readable form without prior written consent with our company.
- This manual also contains the explanation of optional specification.
- The contents of this operation manual may differ from that of the refrigeration unit used by a customer due to specification change.
- The contents described in this operation manual may be changed without a prior notice.
- When transferring or lending the refrigeration unit, attach this operation manual together with the unit so that the operators should be able to have a good knowledge on safety.
- Keep this operation manual in the vehicle so that it is available for your reference when you need it.
- Unless otherwise noted, "right" and "left" directions are given as viewed from the front of the refrigeration unit.

For disposal

Contact your nearest dealer when disposing the refrigeration unit. Observe the applicable laws and regulations in your country to dispose refrigerants and cooling water.

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1 Function of Refrigeration Unit

This refrigeration unit has following functions.

(1) Drive switching function

This is the function to switch the drive (engine/motor) depending on whether the commercial power supply is connected or not.

☞ Refer to page 41 for how to switch the drive.

(2) Operation pattern selection function

This is the function to switch operation pattern (automatic start/stop operation/continuous operation).

☞ For the switching of operation pattern, refer to pages 42 and 43.

(3) Defrosting operation function

This is the function to protect evaporator from frosting during cooling operation and to prevent refrigerating power from decreasing.

There are following 2 methods to start defrosting operation.

1) Automatic defrosting operation

Defrosting starts automatically by the timer setting.

☞ Refer to page 35 for defrosting timer setting.

2) Manual defrosting operation

Defrosting starts forcibly by pressing the switch of controller.

☞ Refer to page 52 for how to operate.

As the defrosting operation is completed, the refrigeration unit returns to the cooling operation.

Defrosting operation will not start when the evaporator temperature is high even during the cooling operation

(4) Whisper operation function

This is the function to lower the operation sound with fixing the engine at slow speed forcibly during engine driving.

☞ Refer to page 51 for how to operate.

(5) Timer operation function

This is the function to set starting time and stopping time of the operation.

☞ Refer to pages from 53 to 56 for how to set.

(6) Self diagnosis operation function [PTI (Pre Trip Inspection) operation]

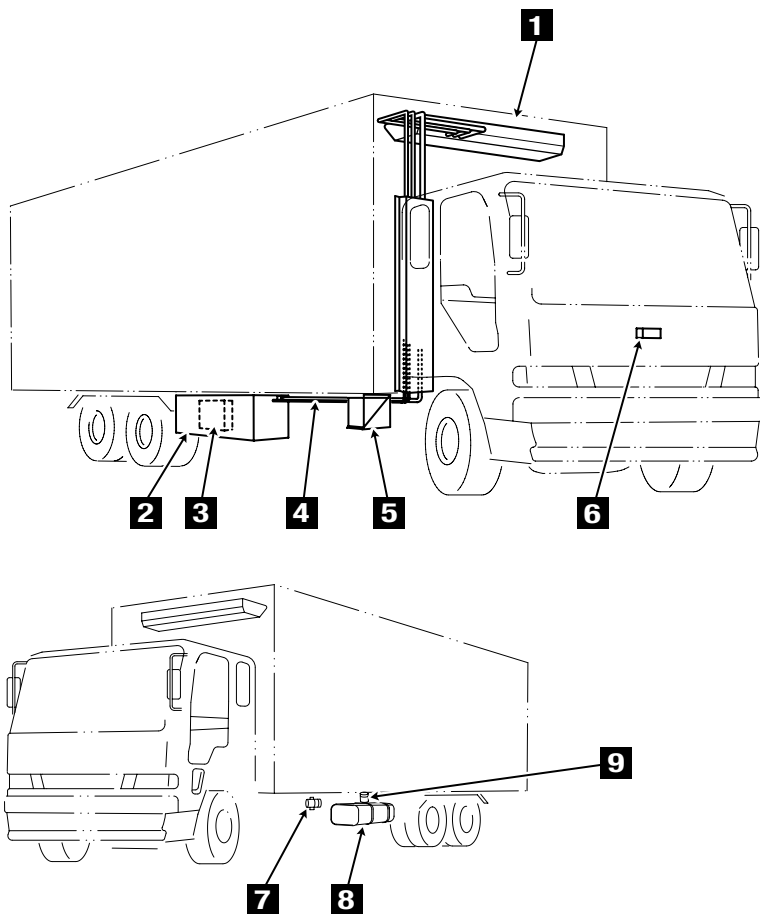
This is the function to diagnose the refrigeration unit automatically if it has any trouble or not.

☞ Refer to pages from 57 to 58 for how to operate.

2 Name of each part

Arrangement plan for main parts

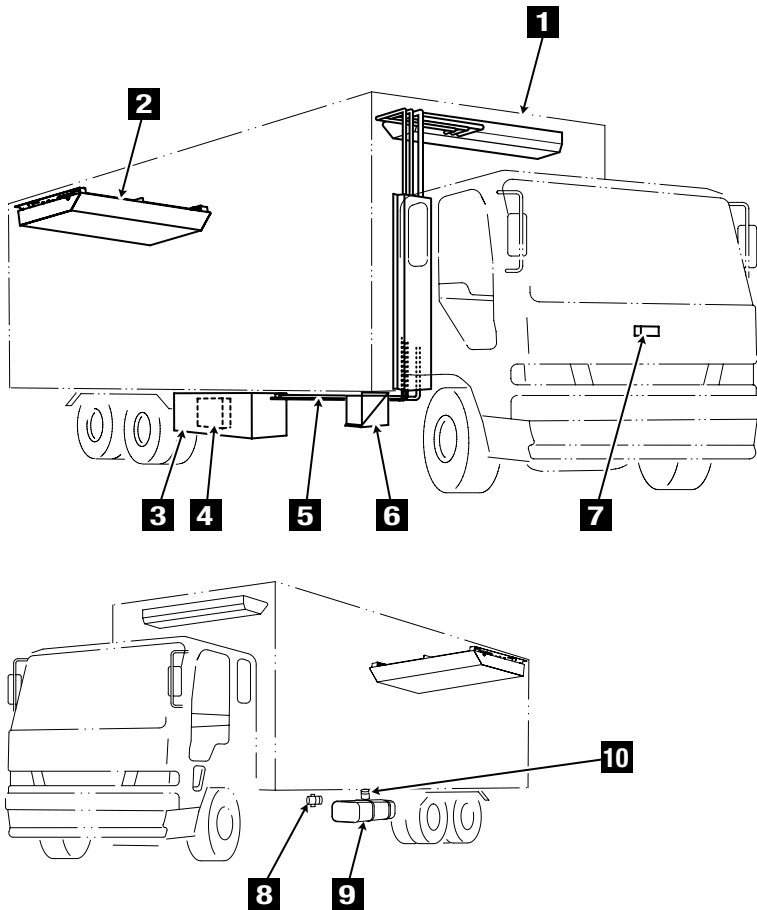
■Single specification (TU1250SAE, TU1100SAE, TU900SAE)



1	Evaporator unit	6	Cabin controller
2	Condensing unit	7	Fuel pump
3	Control box	8	Fuel tank
4	Refrigerant piping	9	Water separator
5	Battery		

Actual locations of above units, etc. should be checked beforehand because they could vary depending on vehicle models, or other.

■ Multiple specification (TU1250SAEM)



1	Front room evaporator unit	6	Battery
2	Rear room evaporator unit	7	Cabin controller
3	Condensing unit	8	Fuel pump
4	Control box	9	Fuel tank
5	Refrigerant piping	10	Water separator

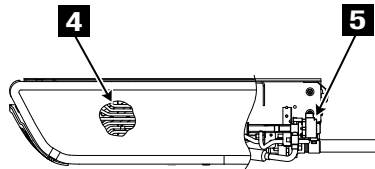
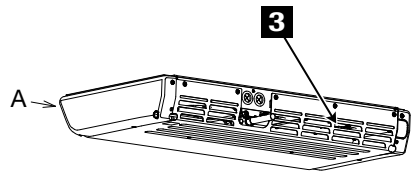
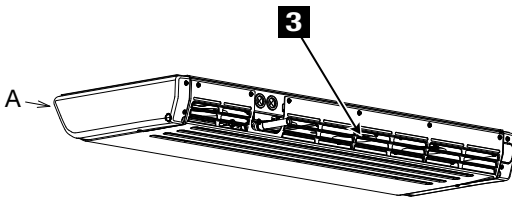
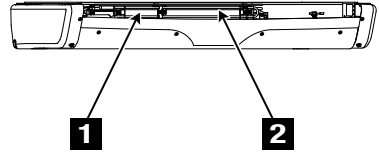
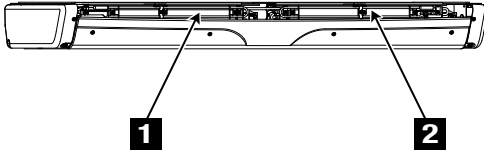
Actual locations of above units, etc. should be checked beforehand because they could vary depending on vehicle models, or other.

Evaporator unit

■Single specification (TU1250SAE, TU1100SAE, TU900SAE)

•Thin type : TU100SAE-EVX
(TU1250SAE, TU1100SAE)

•Thin type : TU100SAE-EVMX
(TU900SAE)

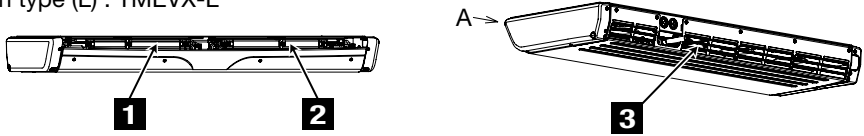


Inside of view "A"

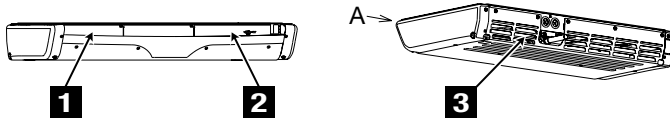
1	Supply air outlet for evaporator	4	Evaporator coil
2	Electric heater (Optional)	5	Electronic expansion valve
3	Evaporator fan motor		

■ Multiple specification (TU1250SAEM)

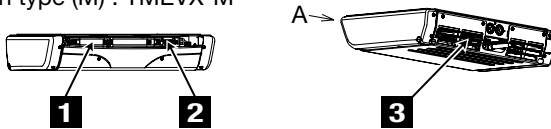
- Thin type (L) : TMEVX-L



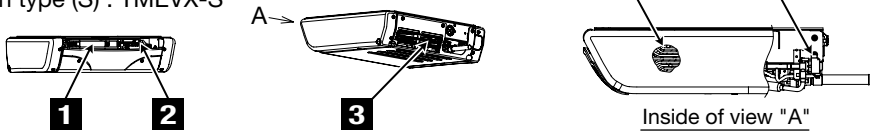
- Thin type (MW) : TMEVX-MW



- Thin type (M) : TMEVX-M



- Thin type (S) : TMEVX-S

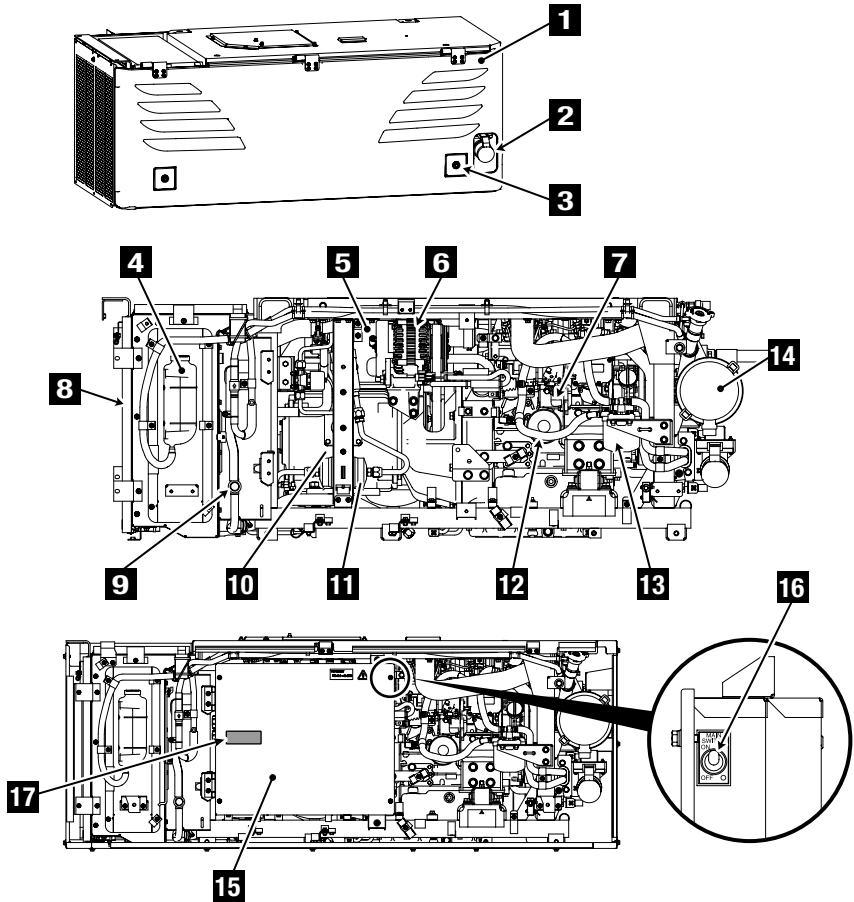


1	Supply air outlet for evaporator	4	Evaporator coil
2	Electric heater (Optional)	5	Electronic expansion valve
3	Evaporator fan motor		

Condensing unit

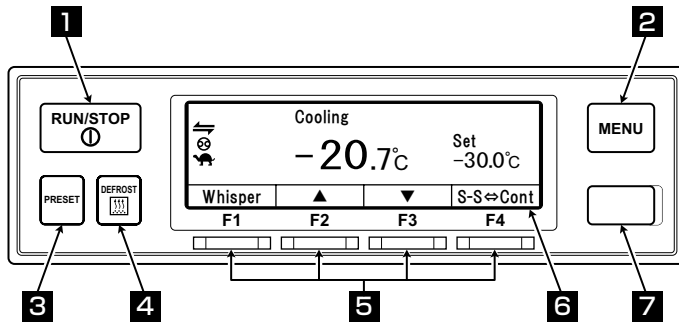
■ Single specification (TU1250SAE, TU1100SAE, TU900SAE)

Multiple specification (TU1250SAEM)



1	Front panel	10	Motor
2	Commercial power socket	11	Dryer
3	Bolt	12	Oil filter
4	Reservoir tank	13	Fuel filter
5	Compressor	14	Air cleaner
6	Alternator	15	Control box
7	Engine	16	Main switch
8	Radiator & condenser	17	Label (F-Gas)
9	Sight glass		

Cabin controller



■ 2-compartment model

	A	Cooling	B	Heating
Set	-30.0°C		20.0°C	
Ret	-20.7°C		10.6°C	
Whisper	A setting	B setting	S-S⇌Cont	

6

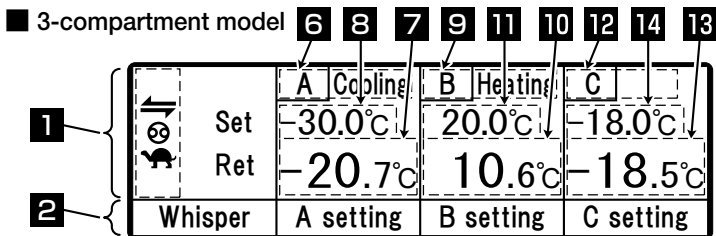
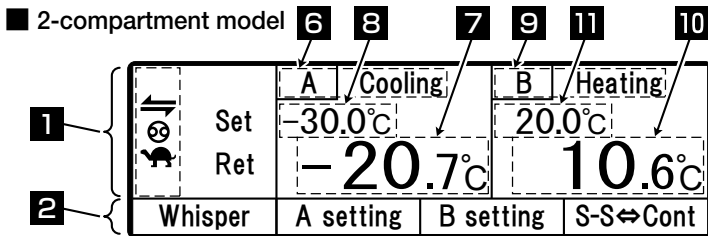
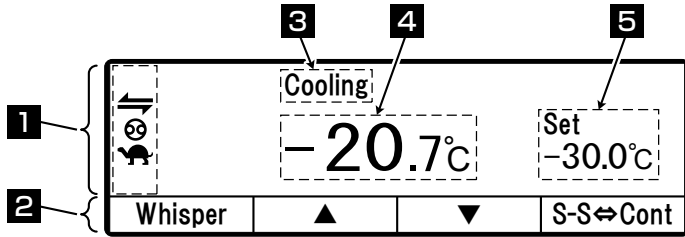
■ 3-compartment model

	A	Cooling	B	Heating	C
Set	-30.0°C		20.0°C		-18.0°C
Ret	-20.7°C		10.6°C		-18.5°C
Whisper	A setting	B setting	C setting		

6









- | | | |
|----------|----------------------------|--|
| 1 | RUN/STOP switch | Starts and stops the refrigeration unit. |
| 2 | MENU switch | Selects the normal display screen or the menu display screen. Displays the screen while the refrigeration unit is stopped. |
| 3 | PRESET switch | Selects the normal display screen or the preset display screen. |
| 4 | DEFROST switch | Starts the manual defrost. |
| 5 | FUNCTION switches
1 – 4 | Functions corresponding to respective setting screens are allocated. |
| 6 | LCD | Displays the inside compartment temperature, setting temperature, state of operation, etc. |
| 7 | USB terminal (Type B) | Used to read/write data. |

Digital display area



Description of monitor display item

- 1** Monitor displays following items corresponding to respective setting states.
The display items light or blink depending on the operation of respective functions.

-  Abnormal display.
Lights or blinks when any error occurs.
-  Display for the state of external communication.
Lights when the operation administration input, such as the remote monitor device, etc., is turned ON.
-  Displays for ON/OFF timer.
Lights when the ON timer and the OFF timer are set simultaneously.
-  Displays the ON timer.
Lights when the ON timer operation is set.
-  Displays for OFF timer.
Lights when the OFF timer operation is set.
-  Display for automatic operation start/stop.
Lights when the automatic operation start/stop is selected.
-  Display for commercial power supply.
Lights when the unit is connected to the commercial power supply.
-  Display for Whisper operation.
Lights when Whisper operation is selected.

2 Displays the allocation of function switch corresponding to the screen.

3 Displays the operation modes.

<Display contents> Cooling, Heating, Defrost, Sleep, Stop and Fan.

* There is no display when Thermostat is OFF with evaporator fan motor OFF.

Fan is displayed when Thermostat is OFF with evaporator fan motor ON.

If temperature is out of adequate range, the Cooling or Heating display blinks.

4 Displays the inside compartment temperature.

5 Displays the setting temperature.

In case of 2- (3-) compartment model

6 Displays "A" (compartment) and the operation mode of compartment A.

7 Displays the inside compartment temperature at compartment A.

8 Displays the setting temperature at compartment A.

9 Displays "B" (compartment) and the operation mode of compartment B.

10 Displays the inside compartment temperature at compartment B.

11 Displays the setting temperature at compartment B.

12 Displays "C" (compartment) and the operation mode of compartment C. (3-compartment)

13 Displays the inside compartment temperature at compartment C. (3-compartment)

14 Displays the setting temperature at compartment C. (3-compartment)

Protective devices

This refrigeration unit is provided with the following protective devices to ensure the safety of the operators.

(a) Main switch

If the engine or motor starts during the work such as inspection, it may cause an accident. In such a case, set this switch to "OFF" so that the safety is secured.

(b) Buzzer before start

Buzzer sounds 5 seconds before the start of engine or motor to announce the start of operation to people working nearby.

(c) Front panel

The cover prevents operators from contacting with the rotating part during operation.

(d) Front panel opening detection switch

When the front panel is opened for inspection, for example, this switch detects it and stops the start of engine or motor.

(☞ Refer to page 64.)

People who handle this refrigeration unit are requested to understand the functions of these protective devices completely to use it safely. Do not deactivate these protective devices or do not operate the refrigeration unit in the situation that the devices are inactivated. It is most important for safety ensuring to keep functions of the protective devices in normal status continuously.




3 Precaution for safety

In this section, necessary safety precautions are provided to prevent accidents resulting in injuries or death, property damages and environment pollution. Read and understand contents of the cautions before starting to use this Refrigeration Unit.






Signs on safety

Signs and Symbols on safety in this operation manual and the warning labels call the attention of the people who handle this refrigeration unit.

Signs on safety


Kinds	Description
 DANGER	Indicates high and imminent potentially dangerous situation, which if mis-handle, will result in death, injury, or serious accident such as damage of the refrigeration unit.
 WARNING	Indicates dangerous situation, which if mis-handled, will result in death, serious injury, and serious accident such as damage of the refrigeration unit.
 CAUTION	Indicates potentially dangerous situation, which if mis-handled, will result in minor injury or moderate property damage.

Symbols

Symbols	Description	Symbols	Description
	Never perform.		Always observe the instructions.
	Disconnect power supply plug from socket.		Never touch.
	Repairs and disassembly must be done only by qualified personnel		

Other symbol

Other advice for the refrigeration unit is described with the following symbol.

Kind	Description
 NOTE	Useful information for function or performance of equipment

Precautions

General precautions

DANGER



Do not modify or perform specification change for the refrigeration and vehicle. (This will make refrigeration unit out of warranty.)

- It may cause a serious accident if customer modify the refrigeration unit or change the specification by himself/herself.

Do not paint on resinic design panel. (This will make refrigeration unit out of warranty.)

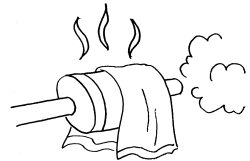
- Cracking occurs in design panel, which cause a risk of falling down of panel while the vehicle is running.

WARNING



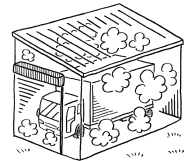
Do not place combustibile materials in the vicinity of muffler and exhaust pipe. Do not park on the area where combustibles such as falling leaves accumulate on.

- Otherwise, it may cause a fire because muffler and exhaust pipe will be hot.



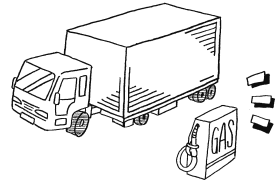
Do not start the engine in poorly ventilated places such as an indoor parking lot.

- Otherwise, it may cause carbon monoxide poisoning due to exhaust gas.



Do not use the refrigeration unit in the atmosphere which could cause explosion at such place like gas station.

- Otherwise, it may cause an explosion or a fire.



Make sure that no one left inside the container before closing the door.

- He or she might be frozen to death if the refrigeration unit is operated with someone inside.



! WARNING



Be sure to carry out the periodic inspections.

- Otherwise, it may cause troubles of the refrigeration unit or accidents.



! CAUTION



Do not insert sticks or fingers into cold air outlet or inlet.

- Otherwise, it may cause damage of the equipment or injury due to a fan.



Do not climb up, hang down or put your leg onto the refrigeration unit.

- Otherwise, it may cause damage of the equipment or injury.



Use the refrigeration unit as the equipment for transport refrigeration.

- Otherwise, it may deteriorate quality of the cargo if it is used for any other purpose.

Use specified fuel, engine oil, compressor oil and cooling water. (→ Refer to page 73.)

- Otherwise, it may cause troubles if any other materials are used.

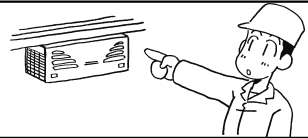
During and after the operation

! WARNING



Make sure that the front panel of condensing unit is closed before starting operation.

- Otherwise, it may cause accidents.



! CAUTION



Do not touch the muffler, exhaust pipe and refrigerant pipe during operation or immediately after the operation.

- Otherwise it may cause burns, as the muffler, exhaust pipe and refrigerant pipe will get hot.

Do not open the radiator cap during operation or immediately after the operation.

- High temperature steam may blowout and cause burns.

CAUTION



Do not operate the refrigeration unit when it is flooded up to the bottom face of condensing unit

- It could cause trouble.

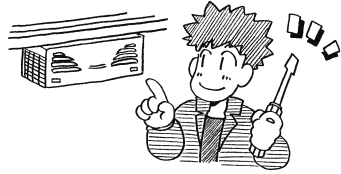
Inspection/Cleaning/Repair

WARNING



Do not disassemble and repair by yourself.

- Otherwise, it may cause damages or an electric shock.



CAUTION



When refrigerant and compressor oil leak out or when you handle antifreeze coolant or engine oil, be careful not to have them get in your eyes, not to have them contact with your skin, not to inhale them or not to drink them by mistake.

- Otherwise, it may cause health disorders such as frostbite, loss of eyesight and pneumonia.

Do not wash the refrigeration unit with a steam washer or a high pressure washer.

- Otherwise, it may cause a rupture due to pressure rise in the refrigeration unit or distortions of the condenser fin.



When inspecting or cleaning the refrigeration unit, stop the unit by turning the "Main switch" to "OFF" and disconnect the battery terminals and power supply cord plug.

- Otherwise, it may cause injury or an electric shock due to unexpected start.



When inspecting or cleaning the refrigeration unit, apply the parking brake and put chocks under wheels.

- Otherwise, the vehicle may start to move, causing injury or accident.

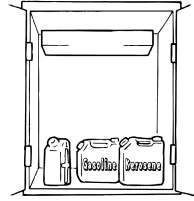
Loading

WARNING



Do not load the volatile or inflammable cargos in the container.

- Otherwise, it may cause an explosion or a fire.



CAUTION



Cool down or heat up the cargos to the designated temperature in advance with other refrigerating device.

- If the cargos are not kept in the designated temperature, it may deteriorate quality of the cargos due to inside container temperature rise.

Waterproof the cargos if they need to be.

- Water may drip or splash from the evaporator unit.

Handling of electric equipment and power cords

WARNING

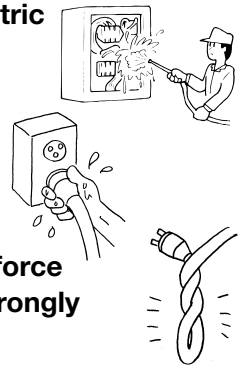


• **Do not directly splash water on the electric equipment or wash them with water.**

• **Never touch the electric equipment such as power plug and so on or operate the switches with wet hands.**

• **Do not modify the power cord or apply force on it, by bending it by force, pulling it strongly or twisting it, or do not put cargos on it.**

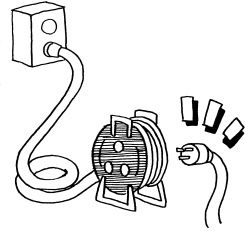
• **Otherwise, it may cause troubles of electric circuit, damages of power cord or an electric shock.**



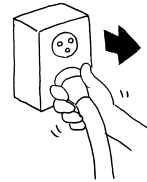
⚠ WARNING



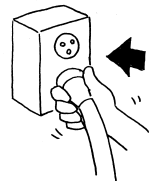
- Use 4-core cabtyre cables (conductor cross section with 5mm² or more) for power cable. Do not connect it to extension cord.
(☞ Refer to page 41.)
- Use MENNEKES Part no.6 (400V 32A) for power supply plug.



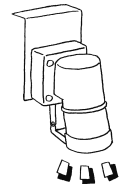
- Pull out the power cord by holding the plug part at the end of the cord.



- Check the plug of the power cord for dust. If there is no dust, insert it firmly.



- Surely protect the power socket with a cover when it is not used. When the cover is damaged, repair it immediately.



- Otherwise, it may cause an electric shock or a fire due to the heat, breaking of wire and leaking of water, etc.

⚠ CAUTION



Do not start and stop the operation with pulling out or inserting the power supply breaker or power cord.

- Otherwise, it may cause troubles of electric circuit, damages of power supply cord or an electric shock.

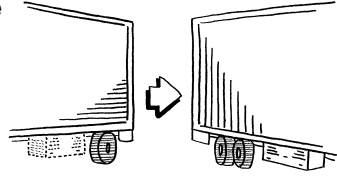
Reinstallation of the refrigeration unit

WARNING



User should not attempt to move the refrigeration unit to another vehicle. When it is necessary, consult your nearest dealer.

- The refrigeration unit may fall down and cause a serious accident due to improper installation or insufficient strength if the work is performed by the customer.



Modification of refrigeration unit and specification change

WARNING



Do not modify the refrigeration unit or change the specification.

- It may cause a serious accident if customer modify the refrigeration unit or change the specification by himself/herself.



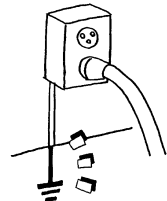
Power supply equipment

WARNING



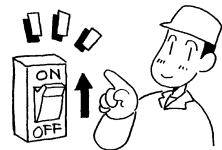
Be sure to earth the power supply equipment to supply the electricity to the refrigeration unit.

- It may cause an electric shock if the earthing work is not carried out properly.



Be sure to provide a dedicated circuit and an earth leakage breaker.

- It may cause an electric shock or a fire if there is capacity shortage of electric circuit.



Emergency measure

(1) Refrigerant

- **When refrigerant got in your eye**

Wash your eye with lots of clean running water for more than 15 minutes immediately. Wash rear side of the eyelid as well. Then, consult a physician as soon as possible.

- **When refrigerant comes in contact with your skin**

Take off wet clothes, shoes and socks immediately, as it may cause frostbite if you touch the refrigerant. Wash the part well with lots of water. If you still have irritation, consult a physician as soon as possible.

- **When inhaling evaporated gas**

When someone inhaled high level of gas, move to the place with fresh air immediately holding him/her with a blanket or the like to keep warm. Then consult a physician as soon as possible. When he/she does not breathe or hardly breathe, loosen his/her clothes and practice artificial respiration after securing the air passage. Depending on the circumstance, have him/her inhale oxygen and take him/her to a physician as soon as possible.

- **When swallowing refrigerant**

Do not throw up by force and consult a physician as soon as possible.

- * **Precautions for physician**

Use of Catecholamine system medicine such as adrenaline and so on may cause heart arrhythmia. Therefore it is required to use only for the emergency life-sustaining treatment with special consideration.

(2) Compressor oil

- **When compressor oil got in your eye**

Wash your eye with lots of clean running water for more than 15 minutes immediately. Wash rear side of the eyelid as well. If you still have irritation, consult a physician as soon as possible.

- **When compressor oil comes in contact with your skin**

Wash the part with lots of water and soap well and apply conditioning cream on it.

- **When inhaling evaporated gas**

Move to the place with fresh air immediately holding him/her with a blanket or the like to keep warm. Then consult a physician if it is necessary. When he/she does not breathe or hardly breathe, loosen his/her clothes and practice artificial respiration after securing the air passage. Depending on the circumstance, have him/her inhale oxygen and take him/her to a physician as soon as possible.

- **When swallowing compressor oil**

Do not throw up the oil by force and consult a physician as soon as possible. When inside the mouth is contaminated, wash it well with water. (When throwing up the oil by force, it easily gets into air passage and causes high fever if it gets into lung. It may cause hardly incurable hemorrhagic pneumonia accordingly.)

(3) Antifreeze coolant

- **When antifreeze coolant got in your eye**

Wash your eye with lots of clean running water for more than 15 minutes immediately. Wash rear side of the eyelid as well. Then, consult a physician as soon as possible.

- **When antifreeze coolant comes in contact with your skin**

Wipe the antifreeze coolant off his/her skins with a piece of paper or cloth. Wash the part well with lots of water and soap. If any visual changes or pain are observed, consult a physician as soon as possible.

- **When inhaling evaporated gas**

When someone inhaled the gas a lot, move to the place with fresh air immediately holding him/her with a blanket or the like to keep warm. Then consult a physician if it is necessary. When he/she breathes irregularly or feels sick, consult a physician immediately.

- **When swallowing antifreeze coolant**

Throw it up immediately and consult a physician as soon as possible. When inside the mouth is contaminated, wash it well with water.

(4) Engine oil

- **When engine oil got in your eye**

Wash your eye with lots of clean running water for more than 15 minutes immediately. Wash rear side of the eyelid as well. If you still have irritation, consult a physician as soon as possible.

- **When engine oil comes in contact with your skin**

Wash the part well with lots of water and soap.

- **When inhaling evaporated gas**

Move to the place with fresh air immediately holding him/her with a blanket or the like to keep warm. Then consult a physician if it is necessary.

- **When swallowing engine oil**

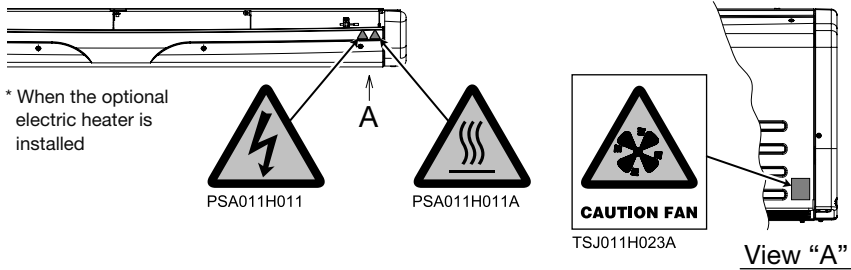
Do not throw up the oil by force and consult a physician as soon as possible. When inside the mouth is contaminated, wash it well with water.

Handling of warning labels

- (a) Important precautions are stated on the warning labels. Never operate the refrigeration unit unless fully understanding the meanings of the warning labels. When you found some difficulties to understand, contact your nearest dealer.
- (b) Always keep the labels in good condition to read. Do not peel off, tear off or damage the labels or do not wipe with solvent or paint them.
- (c) When the labels become illegible, purchase them from your nearest dealer and change them.

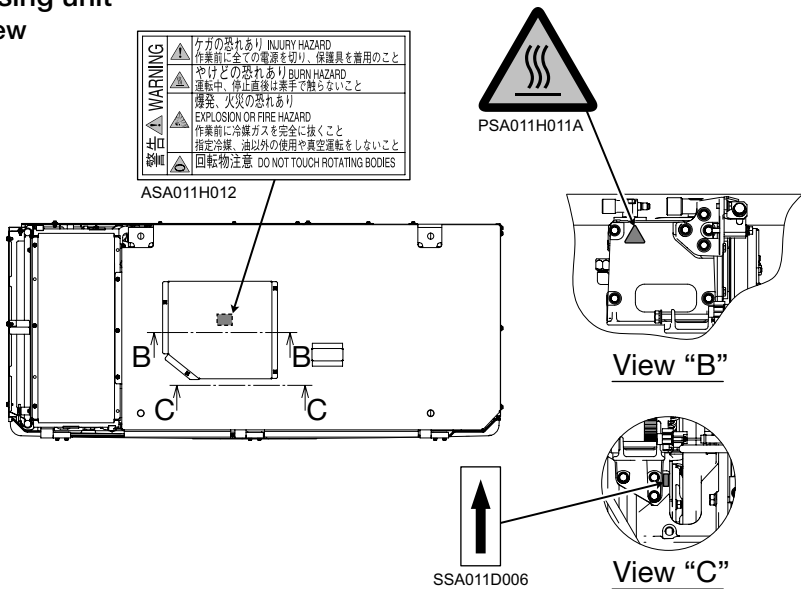
Evaporator unit

■ Front view

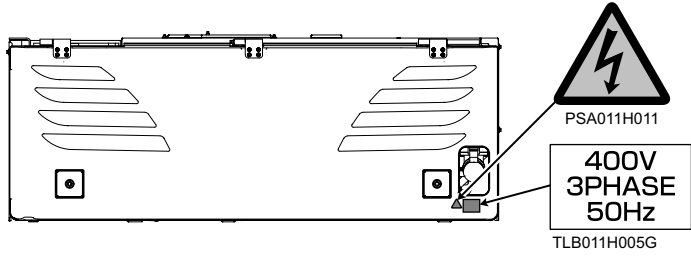


Condensing unit

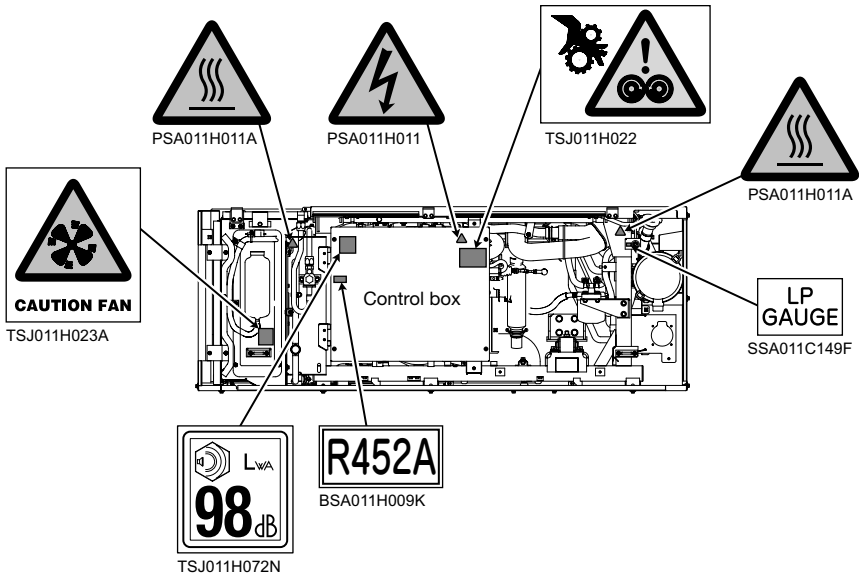
■ Top view



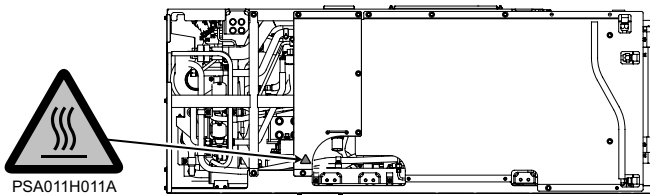
■ Front view



■ Front view inside



■ Back view



Prevention of start during inspection work

When several people are working simultaneously for inspection, it is necessary to protect them from getting injured by accidental start of operation.

In such occasion, place a tag stating "WORKING" on the cabin controller.

Clothing and protective equipment

Wear proper clothing and protective equipment to prevent from getting injured.

- Wear the clothing such as long sleeves, long pants, gloves and eye protections.
 - Do not wear accessories such as necklaces or a necktie to prevent it from getting rolled in. Fasten the cuffs firmly.
-

Handling of grease and oil

As for the measure how to handle or dispose the fuel, engine oil and antifreeze coolant and so on to be used for this refrigeration unit, follow the precautions stated on each product.

These are harmful to human body or environment when mishandling them.

When abnormal conditions are detected

Refer to "9 For emergency" when abnormal conditions are detected. Please contact your nearest dealer when it is too difficult to handle.

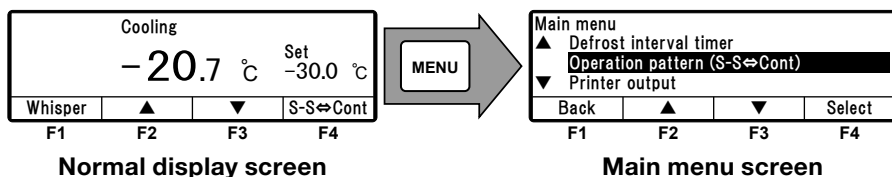
For emergency

Contact the public agencies such as the police or the fire department immediately when an accident could result in serious injury, death, serious property damage or environmental damage occurred. Contact your nearest dealer to prevent second accident.

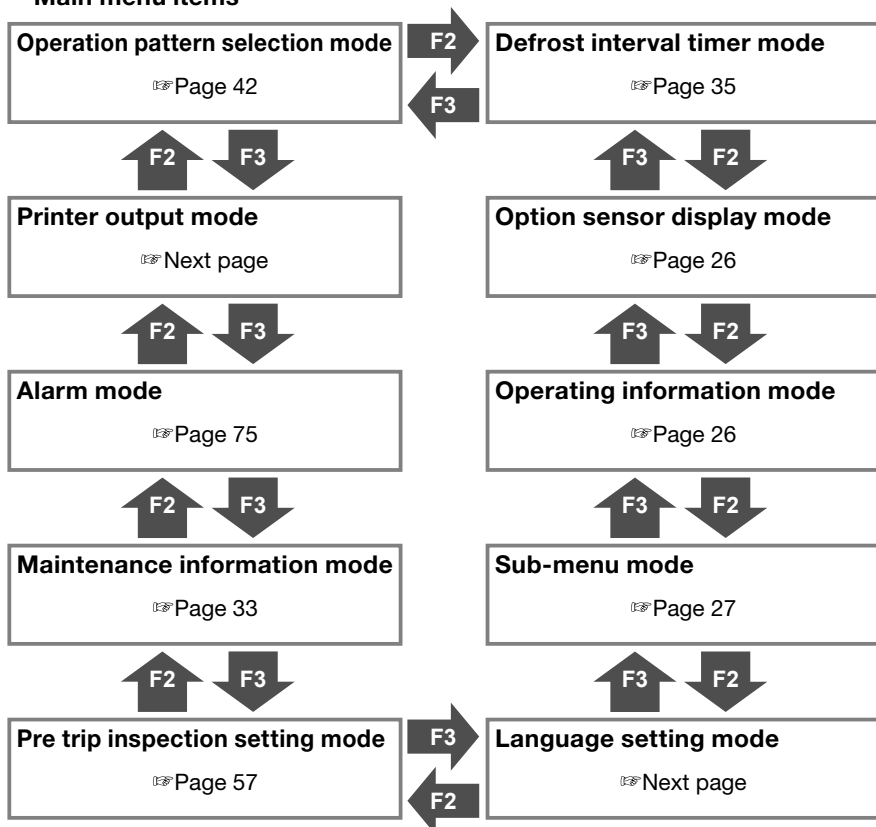
4 Initial setting

Display and function of main menu

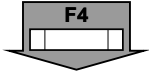
If you press the “MENU” switch once on the “Normal display screen” which is displayed when the refrigeration unit is stopped or operating, the display changes to the “Main menu” screen. Each push on “F2 (▲)” or “F3 (▼)” switch changes the display so that various settings can be made. In the following figure, “F2” switch changes sequence clockwise while “F3” switch changes counter clockwise.



• Main menu items



4 Initial setting



If you press “F4 (Select)” switch on each MAIN menu screen on previous page, the display changes to the following screens.

Current setting			
Start-Stop operation			⊗
Back	Start-Stop	Continuous	Set

Operation pattern selection mode

Mode to select the operation mode start/stop or continuous operation
(☞ Page 42)

Printer output			
Printout period	12Hr		
Temp range	±30°C		
Center temp	0°C		
Back		Change	Start

Printer output setting mode

The temperature graph is printed in this mode. Provide a printer to print the graph.
(Option)

Alarm1			
E010	16 Jan 2022 07:10		
E016	15 Jan 2021 08:15		
E013	30 Nov 2020 10:30		
Back		Clear	Next

Alarm display mode

Up to 5 error codes and dates/times of alarm occurred are displayed. These are cleared by pressing “F3 (Clear)” switch.
(☞ Page 75)

Maintenance information			
Engine operation time 1/1520Hr			
Back	Reset		Next

Maintenance information display mode

Operation time and number of operations of each device are displayed in this mode.
(☞ Page 31)

Current setting			
Pre trip inspection(Basic)			
Back	Basic (Min)	Detail (Max)	PTI Start

Pre trip inspection (PTI) setting mode

Mode to set the self diagnosis operation (PTI)
(☞ Page 57)

Language setting			
▲	German		
	English		
▼	French		
Back	▲	▼	Set
F1	F2	F3	F4

Language setting mode

Selects a language (English, French, Italian, Swedish or German). Press “F2 (▲)” or “F3 (▼)” switch to select a language, and finalize the selection by pressing “F4 (Set)” switch.

Sub-menu			
▲	Out of adequate range temp. setting		
	Calendar and clock setting		
▼	Set ON timer		
Back	▲	▼	Select

Sub-menu selection mode

Functions of the controller operability, or other, are displayed and set in this mode.
(☞ Page 27)

Operating information1 C003			
HP	2560kPa	TD	125°C
LP	150kPa	REV	2150/H
AT	38°C		
Back	Unlock	Lock	Next



[Back]

[Next]



Operating information2			
State	Cooling		
EVT	-24°C		
Back	Unlock	Lock	

* 2-compartment model

Operating information2			
State	A	Cooling	B Heating
EVT		-24°C	16°C
Back	Unlock	Lock	

* 3-compartment model

Operating information2			
State	A	Cooling	B Heating C Fan
EVT		-24°C	16°C 9°C
Back	Unlock	Lock	

Operation information display mode

State of operation is displayed in this mode. State of engine operation (High speed; H, low speed; L) is indicated at the end of “Speed (rpm)”.

Option sensor display			
-20.0 °C			
Back			

Option sensor temperature display mode

When the optional sensor is installed, the sensor temperature is displayed in this mode. If no option sensor is installed, it displays “Lo”.

Current setting			
6.0Hr			
Back	▲	▼	Set

Defrost interval timer setting mode

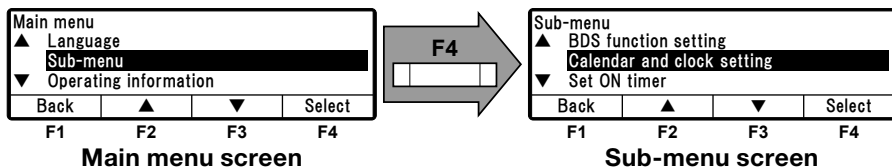
The defrost interval is displayed and set in this mode. Factory default is set at “6.0Hr”. The interval can be changed in steps of 1.0Hr. (☞ Page 35)

Display and function of Sub-menu

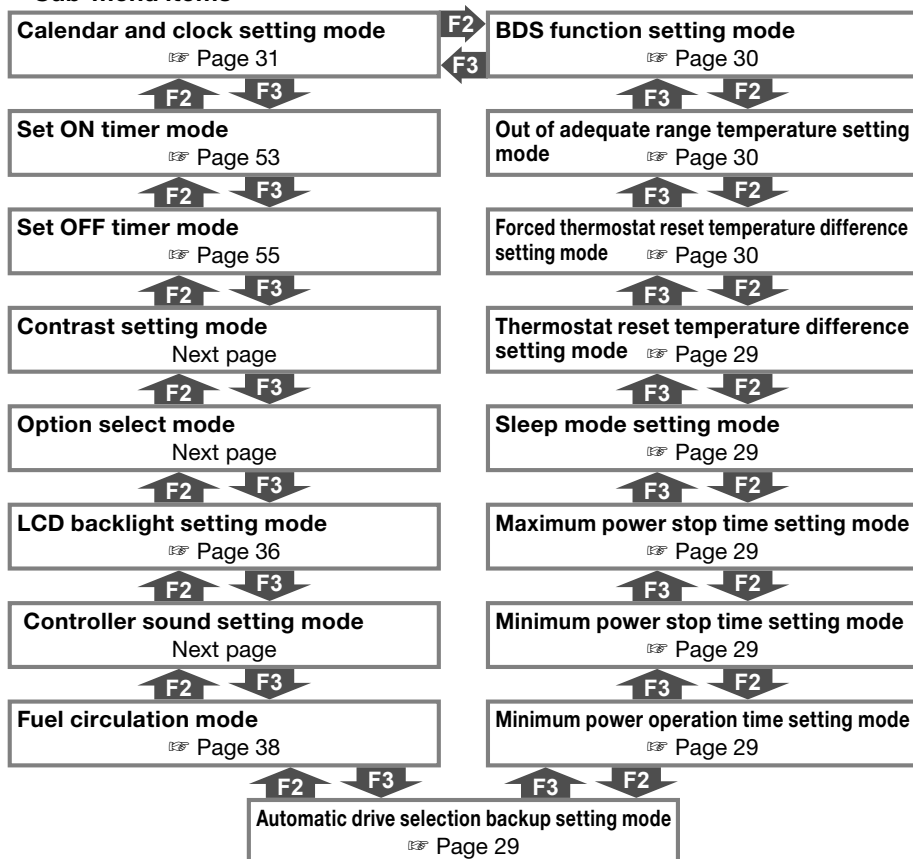
On the “Sub-menu”, the screen changes in the following order at each push on “F2 (▲)” or “F3 (▼)” switch. In the following figure, “F2” switch changes sequence clockwise while “F3” switch changes counter clockwise.

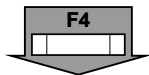
 **NOTE**

- If “MENU” switch is pressed for more than 1 second on the way of changing setting, the display returns to the normal display screen, and the change content is not reflected. The change content will be lost also when the setting change is aborted on the way.



• **Sub-menu items**





If “F4 (Select)” switch is pressed on each Sub-menu screen on previous page, the display changes to following screens.

Calendar and clock setting			
01 Jan 2022 00:00			
Back	▲	▼	Next

Calendar and clock setting mode

Date, Month, Year and current time are set in this mode. (☞ Page 31)

Set ON timer			
ON timer disable			
Back	Enable	Disable	Set

Set ON timer mode

Date and time to start the refrigeration unit automatically is set in this mode. (☞ Page 53)

Set OFF timer			
OFF timer disable			
Back	Enable	Disable	Set

Set OFF timer mode

Date and time to stop the refrigeration unit automatically is set in this mode. (☞ Page 55)

Contrast setting			
Back	▲High	▼Low	Set
F1	F2	F3	F4

Contrast setting mode

Screen contrast is adjusted in this mode. Use “F2 (▲)” switch to intensify the contrast or “F3 (▼)” switch to diminish the contrast.

Option select			
Option1 setting		OFF	
Back	Previous	Next	Select

Option select/set mode

Press “F2 (Previous)” or “F3 (Next)” switch to select options 1 to 8.

Press then “F4 (Select)” switch to change to Option1 (~ 8) setting mode. Press then “F2 (ON)” or “F3 (OFF)” switch to select ON or OFF, and press “F4 (Set)” switch to finalize the selection.

Option1 setting			
OFF			
Back	ON	OFF	Set
F1	F2	F3	F4

LCD backlight setting			
▲ Always ON			
Light SW linked			
▼ Lit at key operation only(20sec)			
Back	▲	▼	Select

LCD backlight setting mode

LCD backlight is set in this mode. (☞ Page 36)

Controller sound setting			
ON			
Back	ON	OFF	Set
F1	F2	F3	F4

Controller sound setting mode

Whether the switch operating sound is turned on or off is set in this mode. Select ON or OFF by pressing “F2 (ON)” or “F3 (OFF)” switch, and finalize the selection by pressing “F4 (Set)” switch.

Fuel circulation mode			
ON		Remaining time 10 min	
		OFF	

Fuel circulation mode

Mode to circulate fuel forcibly in order to supply fuel to the engine and also to purge air trapped in the fuel system. (☞ Page 38)

4 Initial setting

Automatic drive selection backup setting			
Disable			
Back	Enable	Disable	Set

Automatic drive selection backup setting mode

Setting automatic switching from motor drive to engine drive when power failure happens.

(Setting option)

OFF: Disable (Default)

ON : Enable

Minimum power operation time setting			
4min			
Back	▲	▼	Set

Minimum power operation time setting mode

Setting minimum power operation continue time even if all-room thermostat OFF is commanded after starting power operation, to secure battery charge level. (Automatic start/stop operation)

(Setting option)

4-30 minutes, which can be changed minute by minute.

(Default: 4 minutes)

Minimum power stop time setting			
8min			
Back	▲	▼	Set

Minimum power stop time setting mode

Setting minimum time before starting operation after thermostat OFF to improve fuel consumption by reducing frequent starting actions.

(Setting option)

1~30 minutes, which can be changed minute by minute.

(Default: 8 minutes)

Maximum power stop time setting			
OFF			
Back	▲	▼	Set

Maximum power stop time setting mode

Setting maximum time to restart unit forcibly after thermostat OFF to prevent no start trouble due to sensor failure or the like.

(Setting option)

OFF, 10~240 minutes which can be changed minute by minute.

(Default: OFF)

Sleep mode setting			
Disable			
Back	Enable	Disable	Set

Sleep mode setting mode

Starting the refrigeration unit automatically by commercial power connection is set in this mode. Select enable or disable by pressing "F2 (Enable)" or "F3 (Disale)" switch, and finalize the selection by pressing "F4 (Set)" switch.

Thermostat reset temp. diff. setting			
2.0°C			
Back	▲	▼	Set

Thermostat reset temperature difference setting mode

Setting temperature difference from target temperature to be used as thermostat resetting condition.

(Setting option)

1~6°C which can be changed in the unit of 0.5°C.

(Default: 2°C)

Forced thermostat reset temp. diff. setting 4.0°C			
Back	▲	▼	Set

Forced thermostat reset temperature difference setting mode

Setting temperature difference from target temperature to be used as forced thermostat restarting condition after thermostat OFF.

(Setting option)

2~10°C which can be changed in the unit of 0.5°C.
(Default: 4°C)

Out of adequate range temp. setting 4.0°C			
Back	▲	▼	Set

Out of adequate range temperature setting mode

Setting allowable temperature range which can be recognized as adequate around the target temperature.

(Setting option)

2~6°C which can be changed in the unit of 0.5°C.
(Default: 4°C)

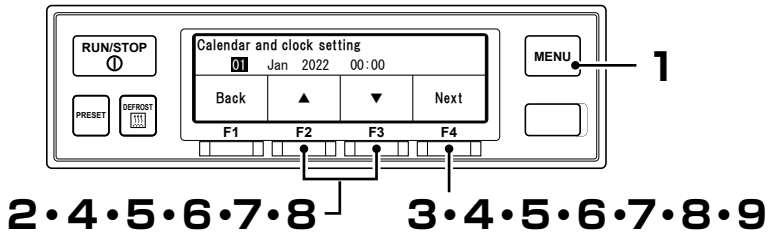
BDS function setting OFF			
Back	ON	OFF	Set
F1	F2	F3	F4

BDS function setting mode (Option)

Whether the BDS function is turned on or off is set in this mode.

Select ON or OFF by pressing “F2 (ON)” or “F3 (OFF)” switch, and finalize the selection by pressing “F4 (Set)” switch.

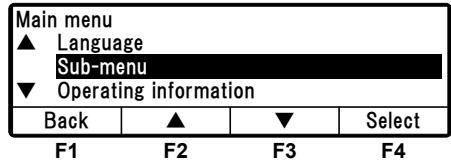
Setting the calendar and clock (Date, Month, Year)



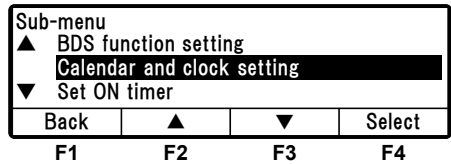
1 Press “MENU” switch.

⇒ The display changes to “Main menu” screen.

2 Press “F2 (▲)” or “F3 (▼)” switch till “Sub-menu” screen is displayed.

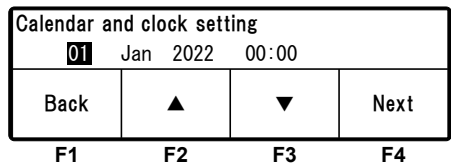


3 Press “F4 (Select)” switch to change to “Sub-menu” screen (Right figure).



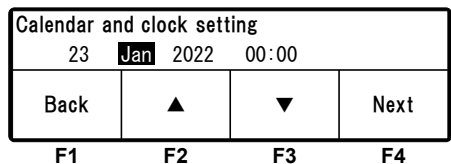
4 Press “F4 (Select)” switch to change to “Calendar and clock setting” mode (Right figure).

⇒ Press “F2 (▲)” or “F3 (▼)” switch to adjust at current date.



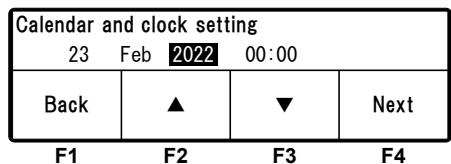
5 Press “F4 (Next)” switch.

⇒ Press “F2 (▲)” or “F3 (▼)” switch to adjust at current month.



6 Press “F4 (Next)” switch.


⇒ Press “F2 (▲)” or “F3 (▼)” switch to adjust at current year.



7 Press “F4 (Next)” switch.

⇒ Press “F2 (▲)” or “F3 (▼)” switch to adjust at current time (Hour).

Calendar and clock setting			
23 Feb 2022 00:00			
Back	▲	▼	Next
F1	F2	F3	F4

 **NOTE**

- Time is displayed in the 24-hour scale. If it is “7 PM”, set as “19:00”.

8 Press “F4 (Next)”.

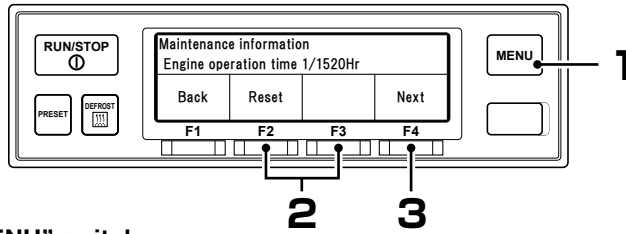
⇒ Press “F2 (▲)” or “F3 (▼)” switch to adjust at current time (Minute).

Calendar and clock setting			
23 Feb 2022 09:00			
Back	▲	▼	Set
F1	F2	F3	F4

9 Press “F4 (Set)” switch.

⇒ The setting is completed, and the display returns to the screen of Step 3, “Sub-menu”.

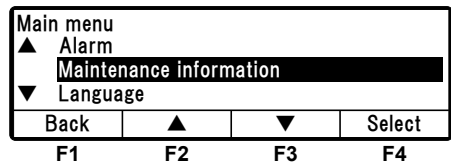
Displaying the maintenance information



1 Press “MENU” switch.

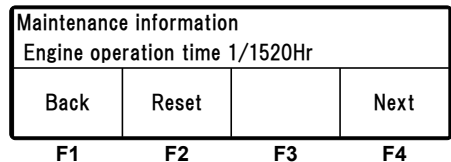
⇒ The display changes to the “Main menu” screen.

2 Press “F2 (▲)” or “F3 (▼)” switch till the display changes to the “Maintenance information” mode.



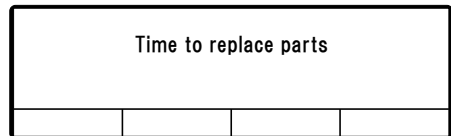
3 Press “F4 (Select)” switch.

⇒ “Engine operation time 1” is displayed.

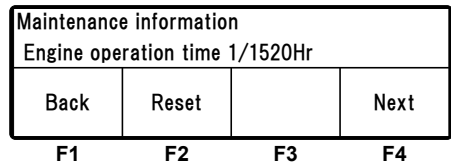


Display of Time to replace parts

- If the operation time or number of operations reaches the “Maintenance required time” on each device, this screen (Right figure) is displayed for 10 seconds after the start of operation of the refrigeration unit. In case of oil replacement interval, “Time to change oil” is displayed.



- If you press “F4 (Next)” switch, the display changes to each parts in the table next page. In case part other than listed in the table is displayed when pressing “F4 (Next)”, it is the maintenance required part. The replacement of part that is listed in the table should be done based on the interval of the table.



[At engine oil replacement]

⇒ Hold down F2 switch (Reset) for 3 seconds to reset the operation time.

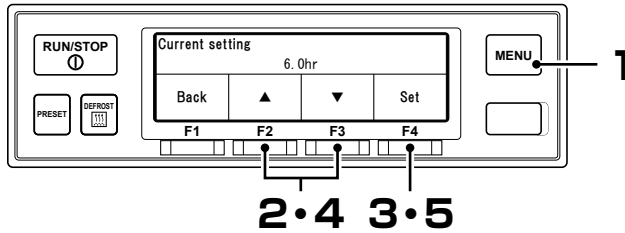
**NOTE**

- Reset after replacing engine oil.
- When “Time to replace parts” is displayed in other items, contact your nearest dealer.

•Parts replacement time/cycle.

	Display item	Replacement interval
1	Engine operation time 1 (Engine oil inspection)	1,000 hours or more
2	Engine operation time 2	—
3	Motor operation time	—
4	Water pump belt operation time	3,000 hours or more
5	Main belt operation time	9,000 hours or more
6	Alternator turn on time	9,000 hours or more
7	Engine operation time 3 (Engine overhaul)	9,000 hours or more
8	Stater start-stop cycles	30,000 cycles or more
9	Comp clutch on-off cycles	30,000 cycles or more
10	Evaporator fan1 operation time	30,000 hours or more
11	Evaporator fan2 operation time	30,000 hours or more
12	Evaporator fan3 operation time	30,000 hours or more
13	Evaporator fan4 operation time	30,000 hours or more
14	Evaporator fan5 operation time	30,000 hours or more
15	Evaporator fan6 operation time	30,000 hours or more
16	Evaporator fan7 operation time	30,000 hours or more
17	Evaporator fan8 operation time	30,000 hours or more

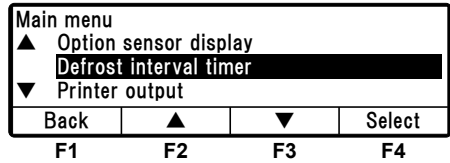
Setting the defrost interval



1 Press “MENU” switch.

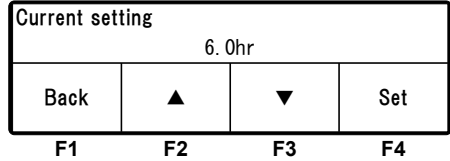
⇒ The display changes to “Main menu” screen.

2 Press “F2 (▲)” or “F3 (▼)” switch till the display changes to “Defrost interval timer”.

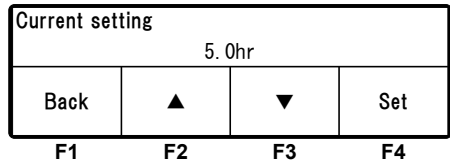


3 Press “F4 (Select)” switch.

⇒ Current setting of “Defrost interval timer” is displayed.



4 Press “F2 (▲)” or “F3 (▼)” switch to select a setting time.



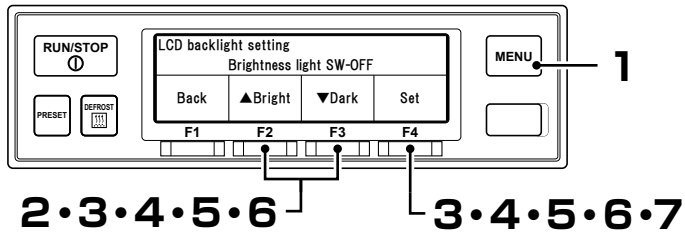
NOTE

- The defrosting can be set at every 1 hour in the range of from 1 hour to 12 hours.

5 Press “F4 (Set)” switch.

⇒ The setting completes, and the display returns to the screen of Step 2, “Main menu”.

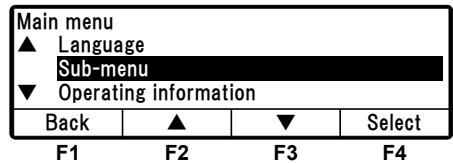
Setting LCD backlight



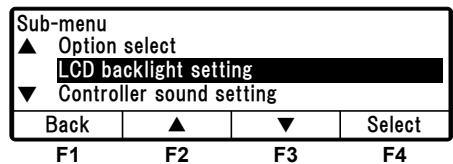
1 Press "MENU" switch.

⇒ The display changes to "Main menu" screen.

2 Press "F2 (▲)" or "F3 (▼)" switch till the display changes to "Sub-menu" screen (Right figure).

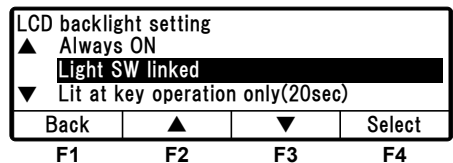


3 Press "F4 (Select)" switch to change to "Sub-menu" screen. Press "F2 (▲)" or "F3 (▼)" switch till the display changes to "LCD backlight setting" screen (Right figure).



4 Press "F4 (Select)" switch.

⇒ Press "F2 (▲)" or "F3 (▼)" switch to select the following LCD backlight setting.



- [Light SW linked]** : Lights interlocked with the lighting of vehicle's light.
- [Lit at key operation only(20sec)]** : Lights for 20 seconds only when the switch is operated.
- [Always OFF]** : Always turning off the light.
- [Always ON]** : Always lighting.

4 Initial setting

5 Press “F4 (Select)” switch. 【Light SW linked】

- ⇒ Adjust the brightness of the LCD backlight, when the vehicle’s light is OFF, pressing “F2 (▲Bright)” or “F3 (▼Dark)” switch.
⇒ Step 6

【Lit at key operation only(20sec)】

- ⇒ Step 7

【Always OFF】

- ⇒ Step 7

【Always ON】

- ⇒ Adjust the brightness of the LCD backlight for Always ON by pressing “F2 (▲Bright)” or “F3 (▼Dark)” switch. ⇒ Step 7

LCD backlight setting			
Brightness of light SW-OFF			
Back	▲Bright	▼Dark	Next
F1	F2	F3	F4

LCD backlight setting			
Lit at key operation only(20sec)			
Back			Set
F1	F2	F3	F4

LCD backlight setting			
Always OFF			
Back			Set
F1	F2	F3	F4

LCD backlight setting			
Brightness of always ON			
Back	▲Bright	▼Dark	Set
F1	F2	F3	F4

6 Press “F4 (Next)” switch. 【Light SW linked】

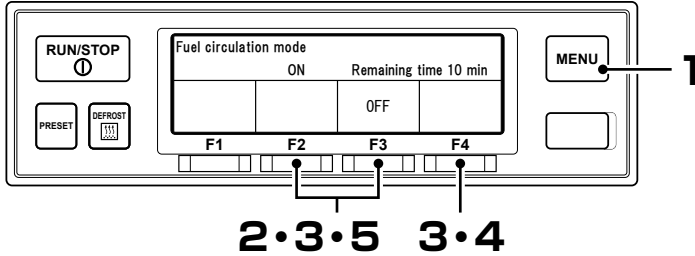
- ⇒ Adjust the brightness of the LCD backlight, when the vehicle’s light is ON, pressing “F2 (▲Bright)” or “F3 (▼Dark)” switch. ⇒ Step 7

LCD backlight setting			
Brightness of light SW-OFF			
Back	▲Bright	▼Dark	Set
F1	F2	F3	F4

7 Press “F4 (Set)” switch.

- ⇒ The setting completes, and the display returns to “Sub-menu” screen of Step 3.

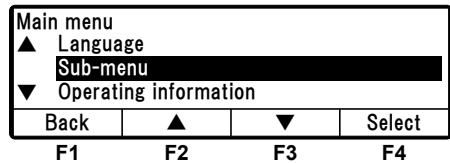
Fuel circulation mode setting



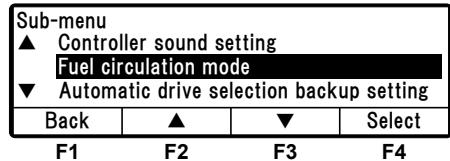
1 Press “MENU” switch.

⇒ The display changes to “Main menu” screen.

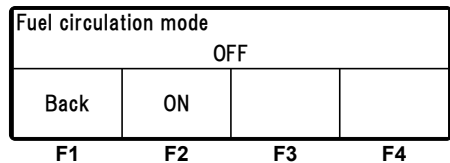
2 Press “F2 (▲)” or “F3 (▼)” switch till the display changes to “Sub-menu” screen (Right figure).



3 Press “F4 (Select)” switch to change to “Sub-menu” screen. Press “F2 (▲)” or “F3 (▼)” switch till the display changes to “Fuel circulation mode” screen (Right figure).

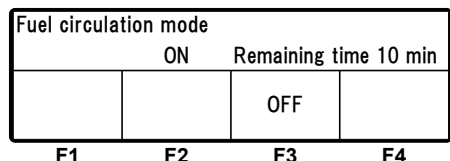


4 Press “F4 (Select)” switch to change to “Fuel circulation mode” screen (Right figure).



5 Press “F2 (ON)” switch.

⇒ The remaining time (in minute) is displayed. Fuel circulation is completed 10 minutes later and the display returns to the normal display screen. To interrupt the fuel circulation, press “F3 (OFF)” switch to return to “Fuel circulation mode” screen of Step 4.



NOTE

- If fuel is used up, air may intrude in the fuel system such as the fuel hose, etc, so that the engine may become unable to start. In such occasion, purge air in the fuel circulation mode before starting engine.

5 Operation

WARNING



Do not operate the refrigeration unit in the place where there is a risk of combustible gas leakage.

- Otherwise, it may cause a fire.

Do not touch the electric devices such as power plug and so on with wet hands.

- Otherwise, it may cause an electric shock.



Operate the refrigeration unit with motor drive when operating it indoor. The place must be well ventilated when operating it with engine drive.

- Otherwise, it may cause oxygen deficiency due to exhaust gas.

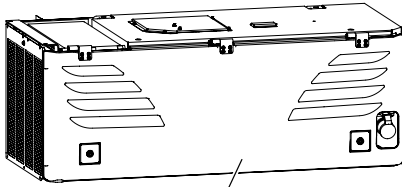


NOTE

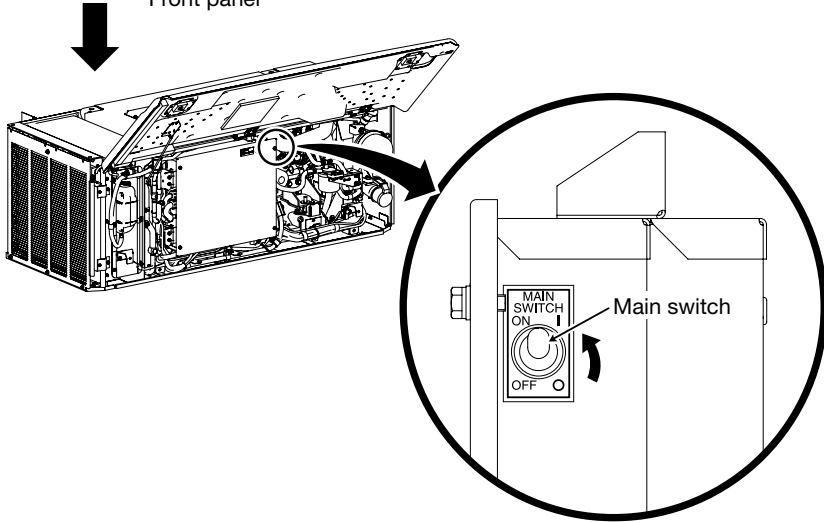
- Be sure to carry out the self diagnosis operation (PTI operation) before the operation.

Power on

Condensing unit



Front panel




- 1 Open the front panel of condensing unit. (☞ Refer to page 64.)
- 2 Turn the "Main switch", which is located at the right side of control box, to "ON".
- 3 Close the front panel. (☞ Refer to page 64.)

Switching the drive

The refrigeration unit switches between the engine drive and the motor drive by detecting automatically, at the start of operation, whether it is connected to the commercial power supply or not.

Operating with the engine

- 1 Make sure that the commercial power supply is not connected to the refrigeration unit.

 **NOTE**

- Engine will not start if the commercial power supply is connected to the refrigeration unit. The unit is operated with the motor.

Operating with the motor

WARNING



Use 4-core cabtyre cables (conductor cross section with 5 mm² or more) for power cable. Do not connect it to extension cord. Use MENNEKES Part no.6 (400V 32A) for power supply plug.


- Otherwise, it may cause an electric shock or a fire due to the heat and breaking of wire.

CAUTION

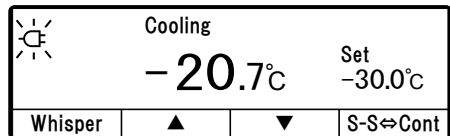


Use 3-phase AC400V 50Hz for power supply.

- It may cause damage of the refrigeration unit or a fire if any other power supply is used.

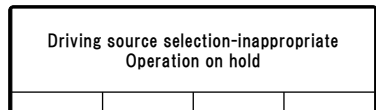
- 1 Connect the socket of the refrigeration unit to the commercial power supply. (For the specification of power supply system,  refer to page 73.)

⇒ Commercial power supply icon lights.

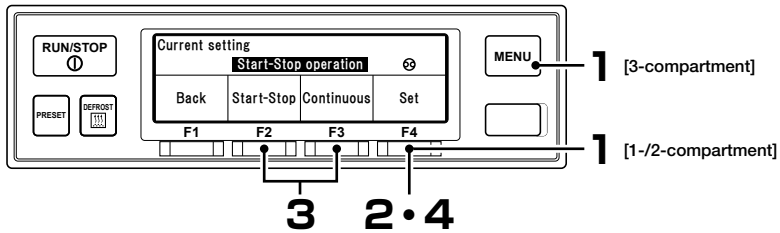


Operation on hold display

When the commercial power supply is connected while the engine drives, the refrigeration unit holds its operation (figure shown on the right). Use either power supply described above for the refrigeration drive source.



Selecting the operation pattern



1 [1-/2-compartment model]

- On the normal display screen (Below figure), press “F4 (S-S⇔Cont)” switch.
 ⇒ The display changed to the mode screen of Step 2 below. Further steps are same for 1-/2-/3-compartment specifications.

[1-compartment model]

Cooling		Set
-20.7°C		-30.0°C
Whisper	▲	▼
F1	F2	F3
		S-S⇔Cont
		F4

[2-compartment model]

	A	Cooling	B	Heating
Set	-30.0°C		20.0°C	
Ret	-20.7°C		10.6°C	
Whisper	A setting	B setting	S-S⇔Cont	
F1	F2	F3	F4	

1 [In case of 3-compartment specifications] (* It is OK with 1-/2-compartment specifications as well.)

Press “MENU” switch.

- ⇒ The display changes to “Main menu” screen.

Main menu			
▲	Defrost interval timer		
	Operation pattern(S-S⇔Cont)		
▼	Printer output		
Back	▲	▼	Select
F1	F2	F3	F4

2 Press “F4 (Select)” switch to change to “Operation pattern selection” screen (Right figure).

Current setting			
Continuous operation			
Back	Start-Stop	Continuous	Set
F1	F2	F3	F4

3 Press “F2 (Start-Stop)” or “F3 (Continuous)” switch to select the automatic Start/Stop operation or the continuous operation.

- ⇒ Start/Stop display lights when the Start/Stop operation is set.

Current setting			
Start-Stop operation			☀
Back	Start-Stop	Continuous	Set
F1	F2	F3	F4

4 Press “F4 (Set)” switch.

- ⇒ The setting completes, and the display returns to the normal display screen.

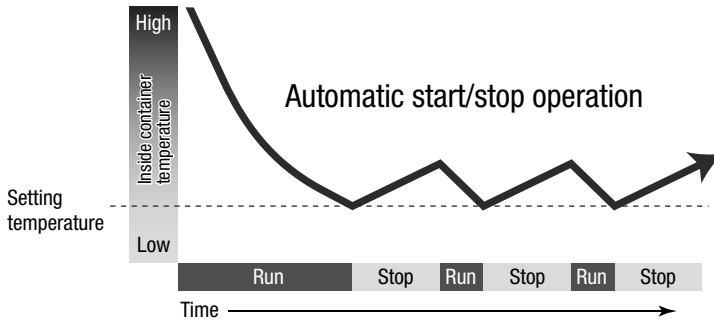
NOTE

● What is the automatic start/stop operation?

Inside container temperature is maintained at around the setting temperature by turning thermostat ON or OFF* for the engine during engine drive, or turning thermostat ON or OFF for the motor during motor drive. Automatic start/stop operation consumes less fuel (electricity) than the continuous operation but has a large deviation on the inside container temperature. This pattern of operation is suitable for cargoes with a larger allowance in the control temperature.

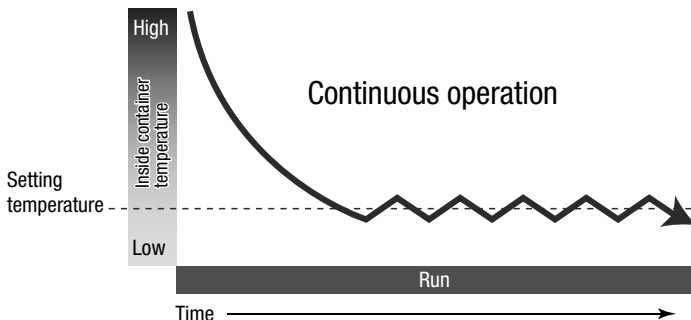
* Thermostat OFF: The action that the engine (motor) stops automatically after inside container temperature reached to the setting temperature. (As the controller is active, it re-starts automatically.)

Thermostat ON: The action that the operation re-starts automatically when the inside container temperature goes beyond the designated range of the setting temperature during thermostat OFF.

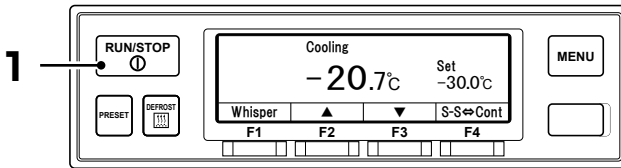


● What is the continuous operation?

The refrigeration unit operates without turning the thermostat ON or OFF, in which inside container temperature is maintained at around the setting temperature by adjusting the refrigerating capacities automatically and by turning on/off the electromagnetic clutch of the compressor. Since this operation can maintain the inside container temperature very close to the setting temperature, it is suitable for cases such as chilled transportation, which require strict quality control.



Starting the operation



WARNING



Confirm that the front panel of condensing unit is closed before starting operation.

- It may cause accidents if the operation is attempted with the panel opened.

1 Press the [RUN/STOP] switch.
(Refrigeration unit is turned "ON".)

⇒ Inside container temperature and setting temperature are displayed on the LCD display.

Commercial power supply icon lights when the unit is driven by the motor.

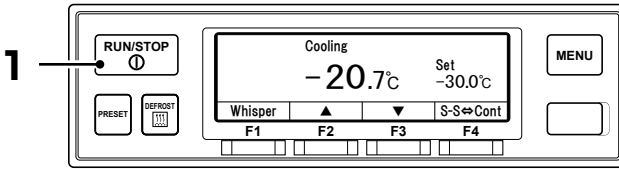
⇒ Warning buzzer sounds before the engine or motor starts to run.

Operation starts with the selected drive (engine or motor) and operation pattern (automatic start/stop operation or continuous operation).

NOTE

- The refrigeration unit will not start while the front panel of condensing unit is open, because the safety device is tripped. (Error code E030 is displayed. If you close the front panel, the unit starts to operate automatically.)
- Operation may not start if the inside container temperature is close to the setting temperature when the automatic start/stop operation is selected.

Stopping the operation

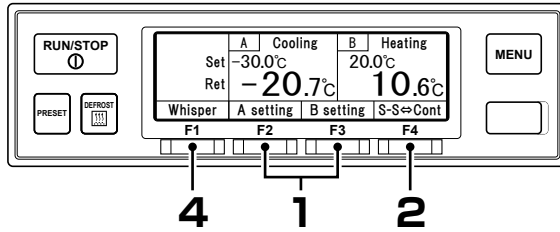


Normal stop procedure

- 1 Press the [RUN/STOP] switch.
(Refrigeration unit is turned "OFF".)
 - ⇒ The refrigeration unit stops the operation automatically after performing the device protecting operation for 10 to 20 seconds. (During the device protecting operation, "Stopping process ..." is displayed on the LCD display.)
 - ⇒ If all steps of operation stop are completed, the controller is turned off automatically.

NOTE

- When the motor operation stops, the buzzer sounds and "Remove the power plug" is displayed on the LCD display in order to prevent failure to disconnect the power plug from the AC power socket.



Suspending (sleep) the compartment operation (2-/3-compartment model)

- 1** On the normal display screen (Right figure), press “F2 (A Setting)” or “F3 (B Setting)” switch to select the compartment of which operation is suspended. [3-compartment model]

On the normal display screen (Right figure), press “F2 (A Setting)” or “F3 (B Setting)” or “F4 (C Setting)” switch to select the compartment of which operation is suspended.

	A	Cooling	B	Heating
Set	-30.0°C		20.0°C	
Ret	-20.7°C		10.6°C	
Whisper	A setting		B setting	
	F1	F2	F3	F4

	A	Cooling	B	Heating	C
Set	-30.0°C		20.0°C		-18.0°C
Ret	-20.7°C		10.6°C		-18.5°C
Whisper	A setting		B setting		C setting
	F1	F2	F3	F4	

- 2** Press “F4 (Sleep)” switch.

⇒ When the operation is suspended at the selected compartment (the screen of Step 3), press “F4 (Operate)” switch.

Set point			
-30.0°C			
Back	▲	▼	Sleep
F1	F2	F3	F4

- 3** “Sleep” is displayed.

⇒ If “F4 (Operate)” switch is pressed, the display of “Sleep” extinguishes. (the screen of Step 2)

Set point			
-30.0°C			Sleep
Back			Operate
F1	F2	F3	F4

- 4** Press “F1 (Back)” switch.

⇒ Operation/Suspension is completed at the selected compartment, and the display returns to the normal display screen.

	A	Sleep	B	Heating
Set			20.0°C	
Ret			10.6°C	
Whisper	A setting		B setting	
	F1	F2	F3	F4

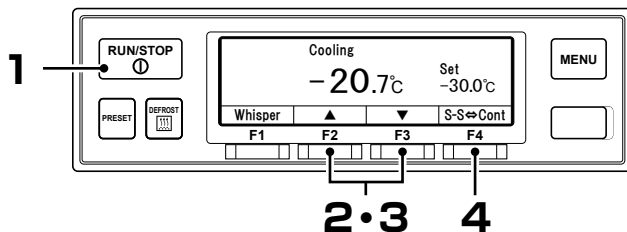
[3-compartment]

	A	Sleep	B	Heating	C
Set			20.0°C		-18.0°C
Ret			10.6°C		-18.5°C
Whisper	A setting		B setting		C setting
	F1	F2	F3	F4	

NOTE

- It is impossible to suspend operation at all compartments.

Setting the temperature



1 Start the operation of refrigeration unit. (☞ Page 44)

2 [In case of 2-compartment model]
On the normal display screen (Right figure), press “F2 (A Setting)” or “F3 (B Setting)” switch.

	A	Cooling	B	Heating
Set	-30.0°C		20.0°C	
Ret	-20.7°C		10.6°C	
Whisper	A setting	B setting	S-S⇔Cont	
	F1	F2	F3	F4

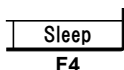
[In case of 3-compartment model]
On the normal display screen (Right figure), press “F2 (A Setting)” or “F3 (B Setting)” or “F4 (C Setting)” switch.

	A	Cooling	B	Heating	C
Set	-30.0°C		20.0°C		-18.0°C
Ret	-20.7°C		10.6°C		-18.5°C
Whisper	A setting	B setting	C setting		
	F1	F2	F3	F4	

3 Press “F2 (▲)” or “F3 (▼)” switch, and set a temperature.

[2-/3-compartment]

“F4 (Sleep)” is displayed.



Set point			
-30.0°C			
Back	▲	▼	
F1	F2	F3	F4

NOTE

- Each push on “F2” switch increases the value by 0.5 while the value decreases by 0.5 at each push on “F3” switch. If the switch is held down, the value changes continuously.

4 Press “F4 (Set)” switch.

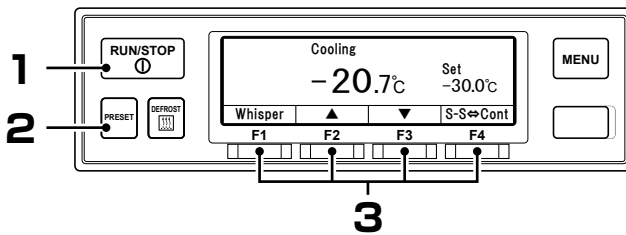
⇒ The setting completes, and the display returns to the normal display screen.

Set point			
-25.5°C			
Back	▲	▼	Set
F1	F2	F3	F4

NOTE

- The “Preset” function is provided, with which it can be selected from 4 setting temperatures which you have registered in advance. (☞ Pages 48 to 50)

Setting the preset operation pattern, defrost interval and set point



1 Start the refrigeration unit. (☞ Page 44)

2 Press the “PRESET” switch.

⇒ The display changes to the preset setting screen. Each figures shows the setting values at the shipping from factory.

[1-compartment model]

Start-stop Def 6.0Hr	Start-stop Def 6.0Hr	Start-stop Def 6.0Hr	Start-stop Def 6.0Hr
Set temp. -25.0°C	Set temp. -18.0°C	Set temp. -5.0°C	Set temp. 5.0°C
F1	F2	F3	F4

[2-compartment model]

Start-stop Def 6.0Hr	Start-stop Def 6.0Hr	Start-stop Def 6.0Hr	Start-stop Def 6.0Hr
A: 0.0°C	A: 0.0°C	A: 0.0°C	A: 0.0°C
B: 0.0°C	B: 0.0°C	B: 0.0°C	B: 0.0°C
F1	F2	F3	F4

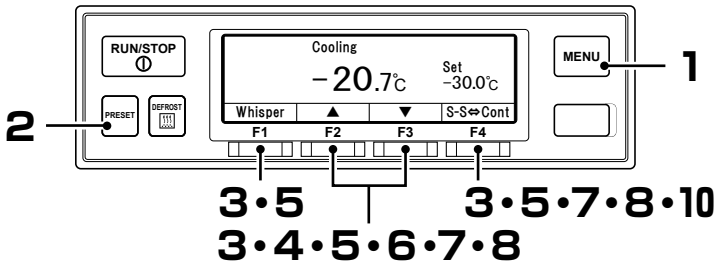
[3-compartment model]

Start-stop Def 6.0Hr	Start-stop Def 6.0Hr	Start-stop Def 6.0Hr	Start-stop Def 6.0Hr
A: 0.0°C	A: 0.0°C	A: 0.0°C	A: 0.0°C
B: 0.0°C	B: 0.0°C	B: 0.0°C	B: 0.0°C
C: 0.0°C	C: 0.0°C	C: 0.0°C	C: 0.0°C
F1	F2	F3	F4

3 Press “F1 (~ F4)” switch.

⇒ Desired preset operation pattern, defrost interval and temperature are set, and the display returns to the normal display screen.

5 Operation



Changing the registered preset operation pattern, defrost interval and set point

1 Press the “MENU” switch when the refrigeration unit is stopped.
 ⇒ The cabin controller becomes activated and the display changes to the “Normal display screen”.

2 Press the “PRESET” switch.
[2-/3-compartment model]
 Set temp. of Zone A, B and C (3-compartment model) are displayed.

A: -25.0°C
B: -5.0°C
C: 20.0°C

Start-stop Def 6.0Hr Set temp. -25.0°C	Start-stop Def 6.0Hr Set temp. -18.0°C	Start-stop Def 6.0Hr Set temp. -5.0°C	Start-stop Def 6.0Hr Set temp. 5.0°C
F1	F2	F3	F4

⇒ Step 5

3 Hold down “F1 (~ F4)” switch for 3 seconds.
 ⇒ Registered preset of “Operation pattern setting” is displayed.

Operation pattern setting			
Start-Stop operation			
Back	Start-Stop	Continuous	Next
F1	F2	F3	F4

4 Press “F2 (Start-Stop)” or “F3 (Continuous)” switch to select the automatic Start-Stop operation or the Continuous operation (Right figure).

Operation pattern setting			
Continuous operation			
Back	Start-Stop	Continuous	Next
F1	F2	F3	F4

5 Press “F4 (Next)” switch.
 ⇒ Registered preset of “Defrost interval timer” is displayed.

Defrost interval timer setting			
6.0Hr			
Back	▲	▼	Next
F1	F2	F3	F4

6 Press “F2 (▲)” or “F3 (▼)” switch to select a setting time.

Defrost interval timer setting			
5.0Hr			
Back	▲	▼	Next
F1	F2	F3	F4

NOTE

- The defrosting can be set at every 1 hour in the range of from 1 hour to 12 hours.

7 Press “F4 (Next)” switch.

⇒ Registered preset of “Set point” is displayed.

Set point			
-25.0 °C			
Back	▲	▼	Set
F1	F2	F3	F4

[2-/3-compartment model]

Set point of Zone A is displayed.
Also, press “F2” or “F3” switch to select Operate / Sleep for each zone.

“F2 (Change)” or “F2 (Operate)” switch

⇒ Step 8

“F3 (Sleep)” switch

⇒ Press “F4 (Next)” switch to Step 9

“F4 (Next)” switch

⇒ Step 9

Set point (Zone A)			
-25.0 °C			
Back	Change	Sleep	Next

[Operate] **F2** [Sleep]

Set point (Zone A)			
Sleep			
Back	Operate		Next
F1	F2	F3	F4

8 Press “F2 (▲)” or “F3 (▼)” switch, and set a temperature.**[1-compartment model]**

⇒ Step 10

[2-/3-compartment model]

After setting Zone A

“F4 (Next)” switch

⇒ Step 9

Set point			
-20.0 °C			
Back	▲	▼	Set
F1	F2	F3	F4

Set point (Zone A)			
-20.0 °C			
Back	▲	▲	Next
F1	F2	F3	F4

NOTE

- Each push on “F2” switch increases the value by 0.5 while the value decreases by 0.5 at each push on “F3” switch. If the switch is held down, the value changes continuously.

9 [2-/3-compartment model]

Set point of Zone B is displayed.
Set in the same way as Zone A.
Same for Zone C. (3-compartment model)

Set point (Zone B)			
-5.0 °C			
Back	Change	Sleep	Set
F1	F2	F3	F4

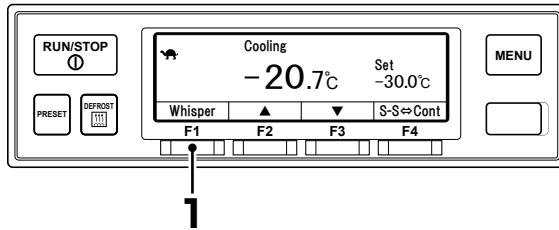
[3-compartment model]

Next
F4

10 Press “F4 (Set)” switch.


⇒ The setting completes, and the display returns to the normal display screen.

Whisper operation (Only for engine drive)



1 Press the “F1 (Whisper)” switch.

⇒ It changes to the whisper operation and one more press on the switch returns it to the normal operation.

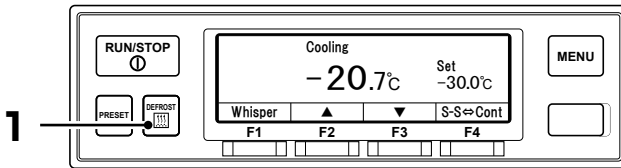
When the whisper operation is enabled, the  (whisper operation icon) lights on the LCD display.

If the operation is stopped when the whisper operation is selected, the setting is reset. If you need the whisper operation, you have to press the “F1 (Whisper)” switch at each time when the operation is started.

NOTE

- The whisper operation is the function to run the engine at the slow speed revolution only. Use this function when it is necessary to suppress the sound of unit operation temporarily during stopping time of the vehicle and so on.
- The setting can be changed so that the whisper operation setting will not be reset even if the refrigeration unit stopped the operation. When you need this setting, contact your nearest dealer.

Manual defrost operation



Starting the manual defrost operation

- 1 Press the “DEFROST” switch once during cooling operation.

⇒ The defrost operation starts.

NOTE

- The defrost operation may not start when the inside container temperature is higher.

Ending the manual defrost operation

If the defrost operation completes, it returns to the cooling operation.

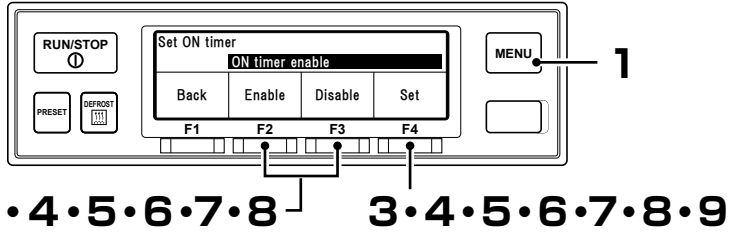
If it is necessary to interrupt the defrost operation and to return to the cooling operation, press the “DEFROST” switch once more.

If the “RUN/STOP” switch is turned “OFF”, it interrupts the defrost operation and stops the operation of refrigeration unit.

NOTE

- The manual defrost operation can be made also during the thermostat OFF stop.
- The manual defrost operation cannot be made during the operation stop and the heating operation.
- During automatic defrosting operation, it cannot interrupt even if “Defrost switch” is pressed.

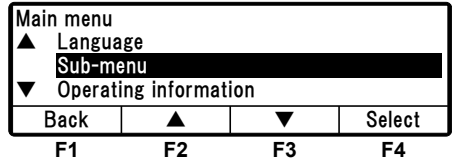
Setting the ON timer



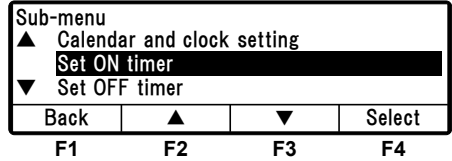
1 Press “MENU” switch.

⇒ The display changes to “Main menu” screen.

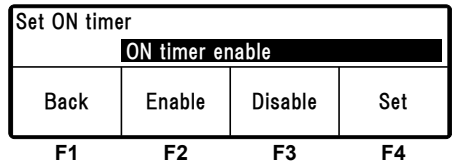
2 Press “F2 (▲)” or “F3 (▼)” switch till the display changes to “Sub-menu” screen (Right figure).



3 Press “F4 (Select)” switch to change to “Sub-menu” screen. Press “F2 (▲)” or “F3 (▼)” switch till the display changes to “Set ON timer” screen (Right figure).



4 Press “F4 (Select)” switch to change to “ON timer enable” mode (Right figure).

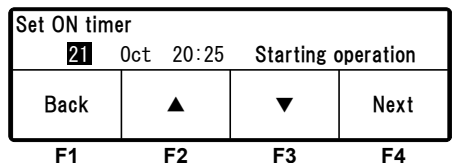


⇒ If Enable is selected by pressing “F2 (Enable)” switch, go to Step 5.

⇒ When Disable has been selected by pressing “F3 (Disable)” switch, if “F4 (Set)” switch is pressed, the display returns to the screen of Step 3.

5 Press “F4 (Set)” switch.

⇒ Press “F2 (▲)” or “F3 (▼)” switch, and set the time (Date) of Set ON timer.



6 Press “F4 (Next)” switch.


⇒ Press “F2 (▲)” or “F3 (▼)” switch, and set the time (Month) of Set ON timer.

Set ON timer			
22	Oct	20:25	Starting operation
Back	▲	▼	Next
F1	F2	F3	F4

7 Press “F4 (Next)” switch.

⇒ Press “F2 (▲)” or “F3 (▼)” switch, and adjust the time (Hour) of Set ON timer.

Set ON timer			
22	Oct	23:25	Starting operation
Back	▲	▼	Next
F1	F2	F3	F4

 **NOTE**

- Time is displayed in the 24-hour scale. If it is “7 PM”, set as “19:00”.


8 Press “F4 (Next)” switch.

⇒ Press “F2 (▲)” or “F3 (▼)” switch, and adjust the time (Minute) of Set ON timer.

Set ON timer			
22	Oct	23:30	Starting operation
Back	▲	▼	Set
F1	F2	F3	F4

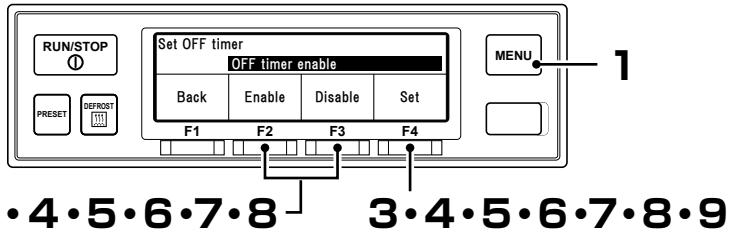
9 Press “F4 (Set)” switch.

⇒ The setting completes, and the display returns to the screen of Step 3, “Sub-menu”.

 **NOTE**

- When operating the unit with the ON timer using commercial power supply, confirm that the commercial power supply is connected to the refrigeration unit.
- Take note that the refrigeration unit starts the operation automatically at the setting time when the ON timer is set.

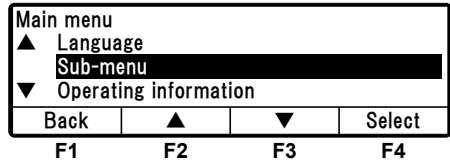
Setting the OFF timer



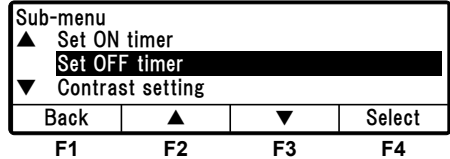
1 Press “MENU” switch.

⇒ The display changes to “Main menu” screen.

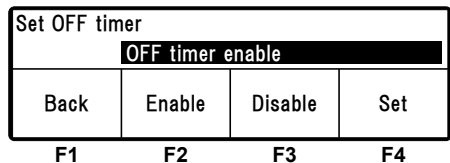
2 Press “F2 (▲)” or “F3 (▼)” switch till the display changes to “Sub-menu” screen (Right figure).



3 Press “F4 (Select)” switch to change to “Sub-menu” screen. Press “F2 (▲)” or “F3 (▼)” switch till the display changes to “Set OFF timer” screen (Right figure).



4 Press “F4 (Select)” switch to change to “Set OFF timer” mode (Right figure).

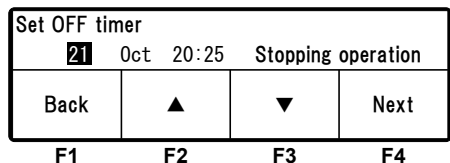


⇒ If Enable is selected by pressing “F2 (Enable)” switch, go to Step 5.

⇒ When Disable has been selected by pressing “F3 (Disable)” switch, if “F4 (Set)” switch is pressed, the display returns to the screen of Step 3.

5 Press “F4 (Set)” switch.

⇒ Press “F2 (▲)” or “F3 (▼)” switch, and set the time (Date) of Set OFF timer.



6 Press “F4 (Next)” switch.

⇒ Press “F2 (▲)” or “F3 (▼)” switch, and set the time (Month) of Set OFF timer.

Set OFF timer			
22	Oct	20:25	Stopping operation
Back	▲	▼	Next
F1	F2	F3	F4

7 Press “F4 (Next)” switch.

⇒ Press “F2 (▲)” or “F3 (▼)” switch, and adjust the time (Hour) of Set OFF timer.

Set OFF timer			
22	Oct	23:25	Stopping operation
Back	▲	▼	Next
F1	F2	F3	F4

 **NOTE**

- Time is displayed in the 24-hpur scale. If it is “7 PM”, set as “19:00”.


8 Press “F4 (Next)” switch.

⇒ Press “F2 (▲)” or “F3 (▼)” switch, and adjust the time (Minute) of Set OFF timer.

Set OFF timer			
22	Oct	23:30	Stopping operation
Back	▲	▼	Set
F1	F2	F3	F4

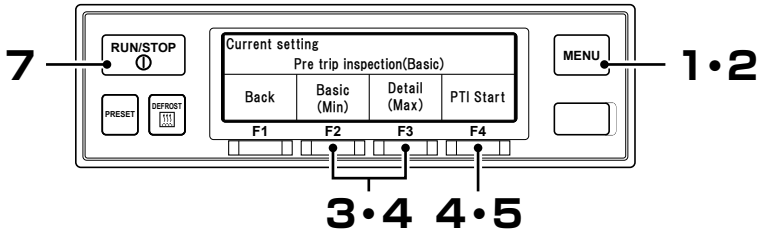
9 Press “F4 (Set)” switch.

⇒ The setting completes, and the display returns to the screen of Step 3, “Sub-menu”.

 **NOTE**

- Take note that the refrigeration unit stops the operation automatically at the setting time when the OFF timer is set.

Self diagnosis operation (PTI operation)



NOTE

- Perform the self diagnosis operation without fail before the operation.
- The inspection of the commercial power supply is skipped when the power supply is not connected.

Starting the operation

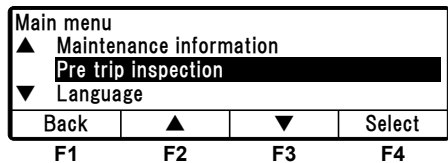
- 1 Press the “MENU” switch when the refrigeration unit is stopped.**
 ⇒ The cabin controller becomes activated and the display changes to the "Normal display screen".

NOTE

- Go to the procedure 2 while the refrigeration unit is operating.

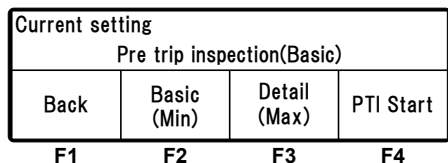
- 2 Press the “MENU” switch.**
 ⇒ The display changes to the "Main menu".

- 3 Press “F2 (▲)” or “F3 (▼)” switch till “Pre trip inspection” screen display.**




- 4 Press “F4 (Select)” switch to change to “PTI selection” mode (Right figure).**

⇒ Press “F2 [Basic (Main)]” or “F3 [Detail (Main)]” switch to select the pre trip inspection.



- [Basic (Min)] Basic self diagnosis operation**
[Detail (Max)] Detail self diagnosis operation
 (With the cooling and defrost operations)

 **NOTE**

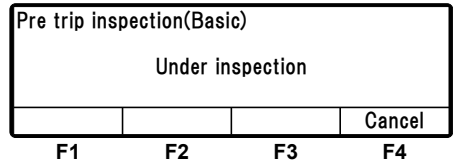
- Self diagnosis operation takes approx. 5 minutes for "Basic (Min)" or 30 minutes (It may take a little longer depending on the setting temperature and the outdoor air temperature.) for "Detail (Max)" from start to end.

5 Press the "F4 (PTI Start)" switch.

⇒ If the "F4 (PTI Start)" switch is pressed during operation, the refrigeration unit stops temporarily.

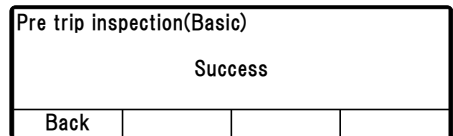
⇒ To interrupt PTI operation, press "F4 (Cancel)" switch.

⇒ When the diagnosis is completed, the engine stops and the result of diagnosis will be displayed.



Finishing the operation when no defects are detected

6 When no abnormal condition has been detected, "Success" is displayed.



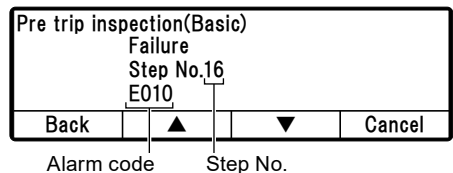
7 Press the "RUN/STOP" switch to turn it "OFF".

⇒ The controller will stop.

Perform the same procedures when stopping the PTI operation during the inspection.

When abnormal conditions are detected

"Failure", "Step No." and the error code corresponding to the abnormal condition are displayed. When multiple abnormalities occur, display contents are switched and displayed every 2 seconds. Check the alarm code (👉 Refer to pages from 79 to 81) and perform proper treatment or contact your nearest dealer.



6 Loading

Preparation before loading

CAUTION



Before loading, cool down or heat up inside of the container to the appropriate setting temperature for the transportation of cargoes. Cargoes must be cooled down or heated up to the designated temperature with other refrigeration device in advance.

- Otherwise, it may cause damages of the cargoes or deterioration of the quality. Or it may cause emergency stop of the refrigeration unit.

- 1 Cargoes must be cooled down or heated up to the designated temperature with other refrigeration device in advance.
- 2 Clean inside of the container.
- 3 Perform the inspection of the refrigeration unit and the body*.
(👉 Refer to page 62.)
* Check with the body manufacturer for the items to be inspected.
- 4 Set the right temperature for transportation of the cargo and cool down or heat up inside of the container to the setting temperature.
(👉 Refer to page 47.)

NOTE

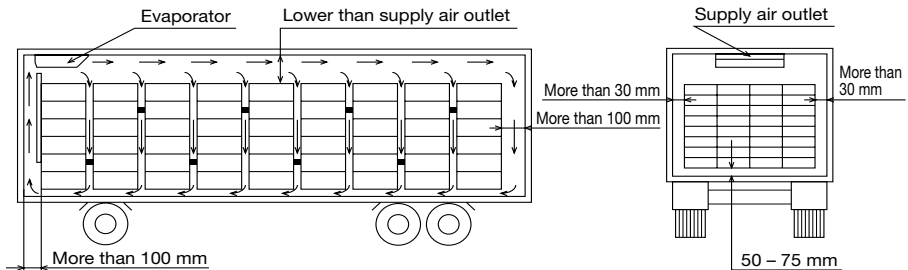
- The temperature inside of the closed container may reach 60°C under a blazing sun. Loading in such a container causes damages or deterioration of the quality. Be sure to cool down inside of the container to the setting temperature before loading.
- When it is hardly cooled down, contact your nearest dealer before loading.

Loading and unloading

Loading procedure

- 1 Stop the cooling operation. (☞ Refer to page 45.)
- 2 Load the cargoes in the container.

Leave a space between the cargo and inner wall of the container as shown in the following figure in order to circulate cool air.



- 3 Keep the top layer of the cargo as flat as possible.

⚠ CAUTION



Waterproof the cargoes if they need to be.


- Water may drip or splash from the evaporator unit.

- 4 When transporting any cargo to be protected from water damage, cover the cargo placed under the evaporator unit or near its outlet with waterproof sheet.
- 5 After completing loading, start the operation of the refrigeration unit. (☞ Refer to page 44.)

Unloading

1 Stop the cooling operation. (👉 Refer to page 45.)

2 Unload the cargoes.

 **NOTE**

- Frost forms and accumulates on the evaporator coil while the refrigeration unit is operated during loading or unloading.
 - Since the inside container temperature rises (or falls during cold winter) while the door is kept opened, load or unload as quickly as possible.
 - A curtain helps to prevent ambient air from entering or inside air from escaping during loading or unloading.
-

7 Inspection

Precautions for inspection

Always carry out the following inspections before the operation to prevent any damages of the refrigeration unit before happening.

WARNING



Do not perform the inspection in the place where the combustible gas leakage may happen.

- Otherwise, if the gas might leak out, it stays around the refrigeration unit and may catch a fire.



Do not modify or remove the protective device installed on the front panel of condensing unit.

- It may cause injury if the refrigeration unit is operated with the front panel of condensing unit opened.



Be sure to perform daily and periodic inspections.

- Otherwise, it may cause troubles of the refrigeration unit or accidents.

The area must be well ventilated when performing the inspection indoors.

- Otherwise, it may cause oxygen deficiency due to the exhaust gas.

 **CAUTION**



Use 3-phase AC400V 50Hz for power supply.

- It may cause damage of the refrigeration unit or a fire if any other power supply was used.

Sufficient care must be taken for foothold when working at a higher place on a stepladder.

- If you step off, you may fall down and get injured.

When leakage of the refrigerant is detected, contact your nearest dealer immediately.

- Otherwise, it may cause blindness or frostbite.



Stop the operation and wait until engine and others are cooled down before performing the inspection.

- Since the engine, exhaust pipe, refrigerant pipe, or the like, become very hot, it may cause burns if you touch them.



Set the "Main switch" to "OFF" to stop the refrigeration unit and disconnect battery terminals and the power cord plug during inspection.

- Otherwise, it may cause injury or an electric shock due to unexpected start.



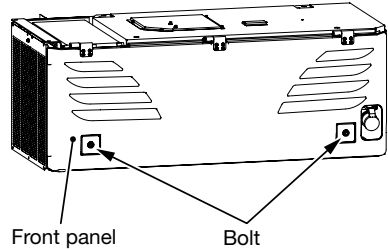
Apply the parking brake and put chocks under wheels during inspection.

- If the vehicle moves, it could cause injury or accident.

Opening the front panel of condensing unit

Front panel of condensing unit, which is opened and closed for inspection, can be opened and closed with tool.

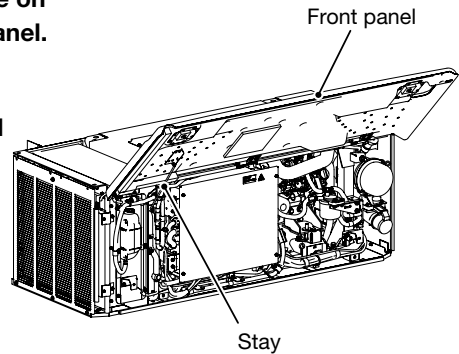
- 1 Remove a pair of bolts at the bottom of front panel.



- 2 Open the front panel by hand.

- 3 Insert the stay in the mounting hole on the back of front panel to fix the panel.

⇒ Fixing angle of front panel can be selected from 2 steps (90° and 135°).



Closing the front panel of condensing unit

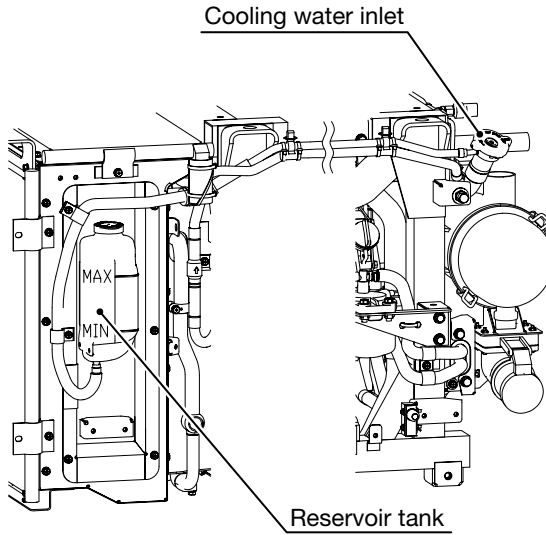
- 1 Remove the stay and close the front panel.
- 2 Tighten the pair of bolts at the bottom of front panel.
⇒ It is locked.
- 3 Confirm that the front panel is locked completely.

NOTE

- If the front panel is not fixed sufficiently, it could open during driving. Fix it securely.

Daily inspection

Inspection of cooling water quantity



CAUTION



Do not perform inspection of the cooling water or refill it immediately after the engine stopped.

- High temperature steam may blow out and it may cause heat injury.



Use the designated antifreeze coolant.

- Otherwise, it may cause troubles.

1

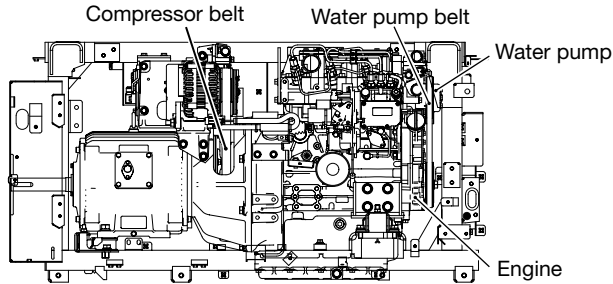
Check that the fluid level is between "MAX" and "MIN" in the reservoir tank.

2

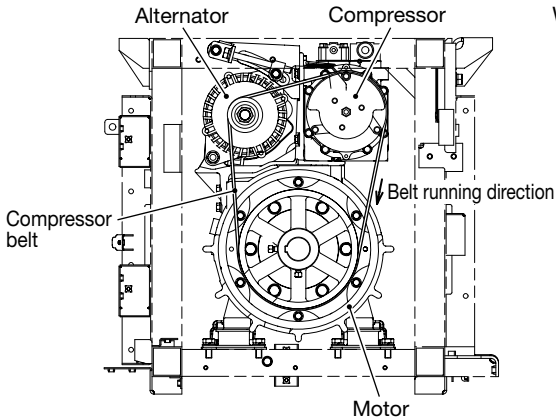
When the fluid level is lower than "MIN", refill the designated antifreeze coolant to the level of "MAX".

(☞ Refer to page 73 for the designated antifreeze coolant.)

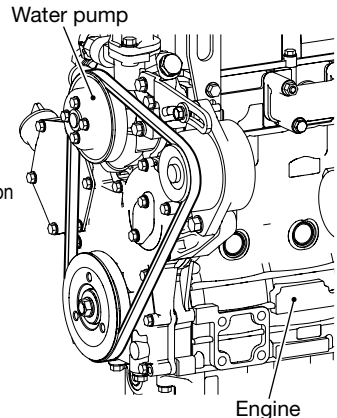
Inspection of moving sections



● Detail of compressor belt



● Detail of water pump belt



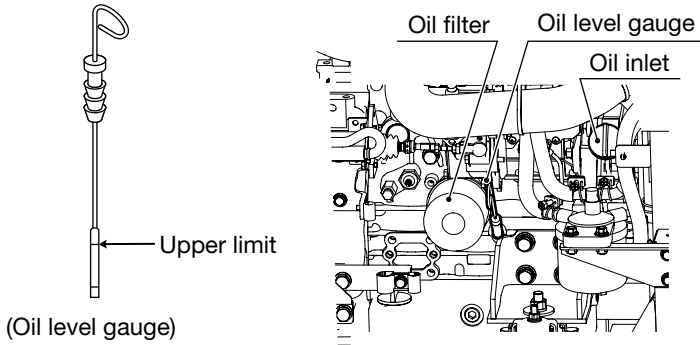
1 Visually inspect the compressor belt and the water pump belt for defects such as scratch, crack or one-sided wear, etc.

2 Check the moving sections for interference with other parts.

NOTE

- When there is any abnormal condition or any slack of the belts, surely contact your nearest dealer.

Inspection of engine oil quantity



CAUTION



Do not perform inspection of the engine oil or refill it immediately after the engine stopped.

- Since the engine oil becomes very hot, it may cause heat injury.

Do not refill the engine oil excessively.

- Engine may not be stopped due to abnormal combustion of the oil, or white smoke or oil may come up from the exhaust pipe.



Use the designated engine oil.

- Otherwise, it may cause troubles.

Surely wipe off spilled engine oil during refilling.

- If the oil is heated up, it may cause a fire.


1 Check if the fluid level of engine oil is in the vicinity of the upper limit of the oil level gauge.

- * Tighten the screw of oil level gauge firmly to check.

2 When the quantity of engine oil is not enough, supply the designated engine oil from the oil inlet to the level not to exceed the upper limit.

[ Refer to page 73 for the designated engine oil.]

NOTE

- If "Time to replace parts" is displayed on the cabin controller at the start of operation and "Engine operation time 1" exceeds 1,000 hrs in the maintenance information mode, it is the time to change engine oil. Contact your nearest dealer and request them to change the oil and the oil filter. Reset the cumulative time after changing the engine oil. ( Refer to pages from 33 to 34.)

Inspection of engine fuel quantity

CAUTION



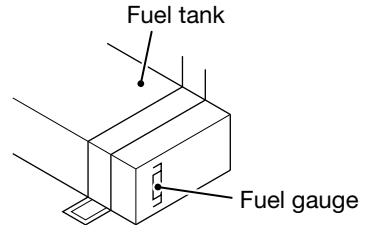
Use the designated engine fuel.

- Otherwise, it may cause damage of the engine.


1 Always check the fuel quantity with the fuel level gauge to avoid running short of fuel during transportation.

2 If there is not enough fuel left in the tank, refuel it.

[ Refer to page 73 for designated fuel.]



NOTE

- Stop the operation with the "Operation switch" when refueling.
- When fuel has run out, select the fuel circulation mode ( Refer to 38 page) to supply fuel to the engine and also to purge air from the fuel system before starting operation.

Inspection of leakage and wiring condition

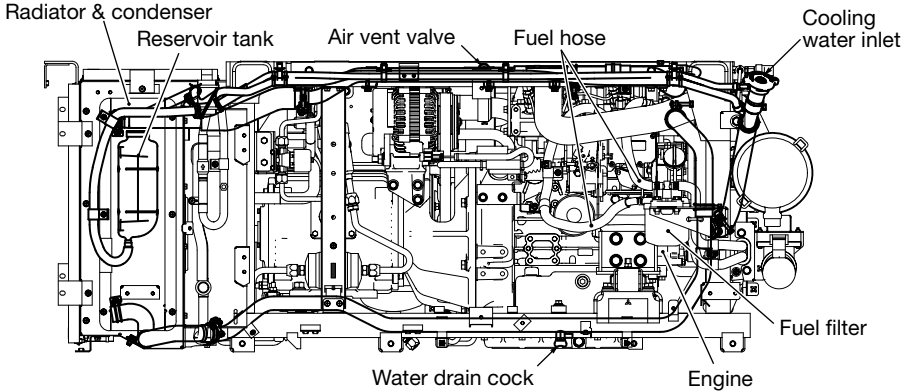
1 Check if there is no leakage of cooling water, engine oil or engine fuel from the tanks, pipes or connecting parts.

2 Check if there is no damage on the wire connected to the battery.

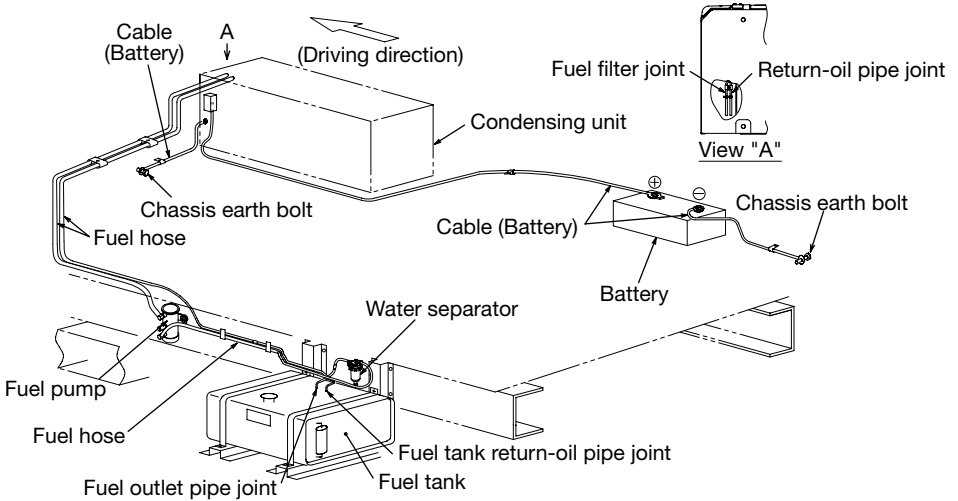
3 If any abnormal conditions are detected, contact your nearest dealer.

7 Inspection

■ Cooling water piping and engine fuel piping in the condensing unit



■ Engine fuel piping and battery wiring



Inspection of condenser coil

- 1 Check the coil for fouling with dust.
- 2 When the coil is fouled, wash it with a soft brush and water.

NOTE

- Dirty coil could deteriorate the refrigeration capacity or cause malfunction of protective devices, which may disable the operation of refrigeration unit. Clean the coil at regular intervals.

Periodic inspection

Please ask your nearest dealer to perform periodic inspection to ensure to use the refrigeration unit in the best condition all the time.

Periodic inspection consists of the following items.

1. Inspection at every 1000 hours
2. Inspection at every 3000 hours
3. Inspection at every 9000 hours

Check the contents of inspection with the check sheet submitted after the periodic inspection.

Periodic inspection check sheet

Customer name							Customer's signature	
Inspection interval				Refrigeration Unit	Evaporator unit model		Delivery date	
					Condensing unit model		Inspection date	
At every 9000 hours	At every 3000 hours	At every 1000 hours	Daily inspection	Vehicle	Model	Inspection company		
					Serial No.	Inspector		
				Inspection item			Inspection result	Remarks
			<input type="radio"/>	Engine oil quantity (Replenish up to upper level of gauge marking.)				
			<input type="radio"/>	Fuel quantity				
			<input type="radio"/>	Leakage of engine oil, fuel				
			<input type="radio"/>	Interference with moving sections				
			<input type="radio"/>	Washing of condenser coil, whole condensing unit				
			<input type="radio"/>	Quantity and leakage of cooling water (Water hose, radiator, water pump)				
			<input type="radio"/>	Engine speed				
			<input type="radio"/>	Color, degree of flush in refrigerant sight glass				
			<input type="radio"/>	Replacement of air cleaner				
			<input type="radio"/>	Replacement of engine oil (100 hours at initial inspection only)				
			<input type="radio"/>	Replacement of oil filter (100 hours at initial inspection only)				
			<input type="radio"/>	Refil of cooling water				
			<input type="radio"/>	Governor lever link and related parts of engine				
			<input type="radio"/>	Cleaning of fuel tank				
			<input type="radio"/>	Cleaning of fuel pump				
			<input type="radio"/>	Replacement of fuel filter				
			<input type="radio"/>	Starter				
			<input type="radio"/>	Retightening of mounting bolts for condensing unit				
			<input type="radio"/>	Retightening of mounting bolts (Engine, etc)				
			<input type="radio"/>	Looseness, scratches on belts (Compressor, water pump) Pulley belt groove (Rust, wear)				
			<input type="radio"/>	Fuel hose, water hose				
			<input type="radio"/>	Stop solenoid				
			<input type="radio"/>	Operation of motor drive				
			<input type="radio"/>	Cooling (Temperature indicated on display, high-/low-pressure)				
			<input type="radio"/>	Defrost operation				
			<input type="radio"/>	Battery				
			<input type="radio"/>	Operation of open front panel detection switch				

Inspection interval				Inspection item	Inspection result	Remarks
At every 9000 hours	At every 3000 hours	At every 1000 hours	Daily Inspection			
	<input type="radio"/>			Replacement of water pump belt		
	<input type="radio"/>			Looseness on electric wiring terminals, damage on wire cover		
	<input type="radio"/>			Insulation resistance of motor		
	<input type="radio"/>			Alternator		
	<input type="radio"/>			Cleaning of condenser coil		
	<input type="radio"/>			Cleaning of evaporator coil		
	<input type="radio"/>			Cleaning of water drain port		
	<input type="radio"/>			Damage on rubber cushion		
	<input type="radio"/>			Replacement of cooling water (Or for 2 years)		
<input type="radio"/>				Replacement of centrifugal clutch shoe		
<input type="radio"/>				Valve clearance		
<input type="radio"/>				Replacement of glow plug (Or 30000 cycles)		
<input type="radio"/>				Replacement of starter (Or 30000 cycles)		
<input type="radio"/>				Replacement of stop solenoid (Or 30000 cycles)		
<input type="radio"/>				Overhaul of engine (Injection nozzle, injection pump)		
<input type="radio"/>				Replacement of compressor belt		
<input type="radio"/>				Replacement of electric wiring terminals, wires		
<input type="radio"/>				Replacement of alternator		
<input type="radio"/>				Replacement of magnet clutch		
<input type="radio"/>				Replacement of throttle solenoid		
<input type="radio"/>				Replacement of fuel hose, water hose		

Climate class

The climate class of this refrigeration unit is as follows.

- Climate class 4 (ambient of $32\pm 2^{\circ}\text{C}$ with 55%RH)

Details of applicable oils and cooling water

		Type / Name	Capacity
Engine fuel		Diesel fuel (Intense cold season: cold weather diesel fuel)	—
Engine oil		Type API Class CE or higher 10W-30	9.5L
Compressor oil		Diamond Freeze MA32R	1.25L [Single Specification (TU1250/1100/900SAE)] 1.40L [Multiple Specification (TU1250SAEM)]
Cooling water	Antifreeze coolant *	Fuso Diesel Long Life Coolant	4.6L (including reservoir)
	Water	Soft water with fewer impurities	

*Use the antifreeze coolant with the following concentrations according to the lowest ambient temperature of the region.

Antifreeze coolant concentration (%wt)	30	35	40	45	50	55	60
Antifreeze coolant quantity (L)	1.4	1.6	1.8	2.1	2.3	2.5	2.8
Lowerst ambient temperature (°C)	-10	-15	-20	-25	-30	-35	-40

*Initial setting: Antifreeze coolant concentration: 50%wt



NOTE

- Adjust antifreeze coolant concentration according to the expected lowest ambient temperature.
If it is not appropriate, the cooling water may be frozen and cause the damage of the radiator or engine.
- As the cooling water is an industrial waste, observe the applicable laws and regulations in your country to dispose it.

Power supply system

(50Hz)

Specification of power supply (for Motor drive)					
Capacity of power supply (kVA)	Switch		Voltage fluctuation	Voltage drop at start-up	Interphase imbalance
	Molded-case circuit breaker				
	Capacity of switch (A)	Rated capacity of over-current breaker (A)			
20	50	50	Within 10% of rated voltage	Within 15% of rated voltage	Within 3%

8 Operation or stop for long period of time

When operating at a low inside container temperature for a long period of time:

If the refrigeration unit is operated for a long period time with the inside container temperature below 10°C, ice will grow on the drain pan, etc. Stop the operation of refrigeration unit once or twice every week and open up the door on the vehicle body to return the inside of container to ordinary temperature and melt grown ice.

CAUTION



Park the vehicle at a flat place and operate the refrigeration unit.


- Otherwise, the evaporator becomes unable to drain and water overflows in the container, damaging cargoes with water.

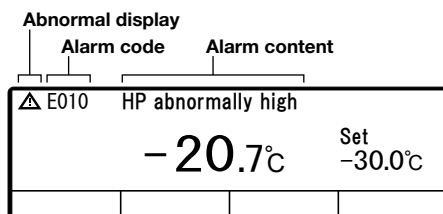
When stopping the refrigeration unit for a long period of time:

To prevent troubles by stopping for prolonged time, operate the refrigeration unit for 15 minutes once every 3 to 4 days.

9 For emergency

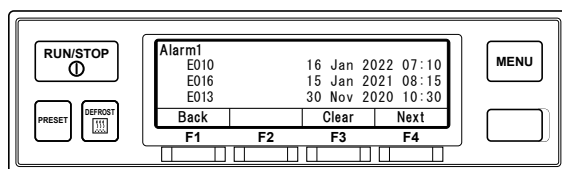
Alarm display

- If any error occurs, the abnormal display  lights or blinks on the LCD (the backlight lights or blinks).
- Check the alarm code displayed at the right-hand side of the abnormal display. (If it is a light error, the alarm content at the right-hand side of the alarm code is not displayed.)



When no error code is displayed at the LCD, change to the alarm display as described below, and check the alarm content.

Switching "Normal display" and "Alarm display"



Switching from "Normal display screen" to "Alarm display mode"

Press once each on the [MENU] switch, [F3(▼)] switch and [F4(Select)] switch. (The display returns to the "Normal display screen" 20 seconds later.)

Switching from "Alarm display mode" to "Normal display screen"

Press the [F1(Back)] switch 2 times on the extended display of "Alarm display mode". (The screen changes to "Normal display screen" in 20 seconds in case of 1 press.) or hold down [MENU] switch.

Countermeasures

Refer to "List of alarm codes" for the contents of each alarm code and its countermeasure.

(☞ Refer to pages 79 to 81)

⚠ CAUTION



Surely follow the instructions of this operation manual for the countermeasures of the troubles.

- Otherwise, it may cause injury or an electric shock due to unexpected start.

Changing the fuse

⚠ CAUTION



Use the designated fuse.

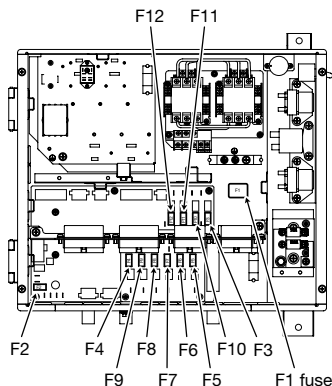
- If any other fuses are used, it may cause a fire or an electric shock.

Surely stop the operation of refrigeration unit with the "Operation switch" and set the "Main switch" to "OFF", then disconnect the battery terminal and plug for power cord to change the fuse.

- Otherwise, it may cause injury or an electric shock due to unexpected start.

Fuses are mounted in the control box of condensing unit.

■ Single specification (TU1250SAE, TU1100SAE, TU900SAE)

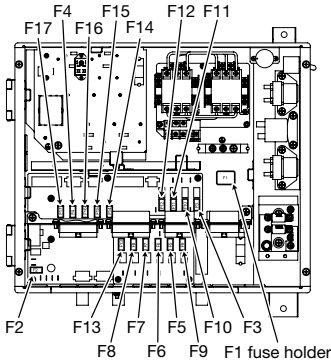


- F1 : 20 A (operation circuit) is fixed with the fuse holder.
- F2 : 15 A (Relay circuit)
- F3 : 10 A (Compressor electromagnetic clutch)
- F4 : 10 A (Drain hose heater A)
- F5 : 15 A (Evaporator fan motor 1)
- F6 : 15 A (Evaporator fan motor 2)
- F7 : 15 A (Evaporator fan motor 3)
- F8 : 15 A (Evaporator fan motor 4)
- F9 : 30 A (Throttle solenoid)
- F10 : 10 A (Output during operation)
- F11 : 10 A (Output at error occurrence)
- F12 : 10 A (Output at deviation from adequate temperature)

F2 F4 F8 F6 F10 F3
F9 F7 F5 F1 fuse holder

9 For emergency

■ Multiple specification (TU1250SAEM)



- F1 : 20 A (operation circuit) is fixed with the fuse holder.
- F2 : 15 A (Relay circuit)
- F3 : 10 A (Compressor electromagnetic clutch)
- F4 : 10 A (Drain hose heater A)
- F5-8 : 15 A (Evaporator fan motor 1-4)
- F9 : 30 A (Throttle solenoid)
- F10 : 10 A (Output during operation)
- F11 : 10 A (Output at error occurrence)
- F12 : 10 A (Output at deviation from adequate temperature)
- F13-15: 15 A (Evaporator fan motor 5-7)
- F16 : 15 A (Evaporator fan motor 8) * 2-room specification
- F16 : 10 A (Drain hose heater C) * 3-room specification
- F17 : 10 A (Drain hose heater B)

When you contact your nearest dealer

When you contact your nearest dealer for the trouble occurred during operation of the refrigeration unit, give them the following information.

- Company name
- Customer's name
- Company telephone number
- Number of the plate
- Type of the refrigeration unit
- Present location of the vehicle
- Destination
- Kind of cargo
- Setting temperature
- Present inside container temperature
- Specific condition of trouble
- Alarm code displayed in the digital display area.

Resuming operation after an emergency stop

If a remark "Automatic operation resume" is written in the column for the Unit Condition in the list of alarm codes, the operation will resume as soon as required conditions are satisfied. If a remark "Unit stops" is written in the same column, start the operation in usual procedure after removing causes of the troubles.

Resuming operation after an emergency stop
--

- Press the [RUN/STOP] switch on the cabin controller to stop the unit.
(Confirm that the LCD display is turned off.)
- Press the [RUN/STOP] switch once more to resume the operation of unit.

CAUTION



If the unit stops by the same trouble immediately after the operation is resumed, stop the operation and contact your nearest dealer.

- Otherwise, it may cause serious damages or accidents.
-

List of alarm codes

Alarm Code	Trouble	Countermeasure	Alarm Lamp	Unit Condition
E003	Magnet clutch fuse break	Fuse F3 has blown. Replace fuse F3 (10 A) in the control box. If trouble persists after replacement, ask a dealer for inspection.	On	Unit stops.
E004	Throttle solenoid fuse break	Fuse F9 has blown. Replace fuse F9 (30 A) in the control box. If trouble persists after replacement, ask a dealer for inspection.	Blinking	Unit operation continues. (Emergency operation with low engine speed only)
E006	Load drive circuit fuse break	Fuse F2 has blown. Replace fuse F2 (15 A) in the control box. If trouble persists after replacement, ask a dealer for inspection.	On	Unit stops.
E009	Commercial power supply defective	Commercial power supply is in failure or disconnected. Check the power supply.	Blinking	Unit stops. (Automatic operation resume)
E010	HP abnormally high	High-pressure switch has tripped. (1) Open the front panel and inspect the condenser fan drive system for any abnormality. (2) Check to see if the condenser coil is fouled heavily. If so, cleanse it with water. (High-pressure cleansing is prohibited.)	On	Unit stops.
E013	Td abnormally high	Refrigerant temperature at the compressor discharge side has reached the protective temperature. Consult a dealer.	Blinking	Unit stops. (Automatic operation resume)
E014	Refrigerant shortage	Refrigerant quantity is extremely low. Ask a dealer for inspection.	On	Unit stops.
E016	LPT failure	Refrigerant pressure at compressor suction side has dropped to the protective pressure, or low-pressure sensor is in failure. Ask a dealer for inspection.	On	Unit stops.
E017	HPT failure	High-pressure sensor is in failure. Ask a dealer for inspection.	Blinking	Unit stops.
E021	Engine coolant temperature high	Engine water temperature switch has tripped. Inspect the water quantity in the reservoir tank and replenish if necessary. Also inspect and clean the radiator (heat exchanger placed at right as seen facing the refrigerationnit).	On	Unit stops.
E023	Engine speed abnormally low	Engine speed is extremely low. Ask a dealer for inspection	On	Unit stops. (Automatic operation resume repeats up to 9 times.)
E024	Engine start failure	Inspect the fuel tank to see if fuel is reserved. If fuel is reserved, inspect the battery.	On	Unit stops.
E027	Engine speed abnormally high	Engine speed has increased far beyond the setting value. Ask a dealer for inspection.	On	Unit stops.
E030	Unit panel not close	Front panel of condensing unit is open. Close the panel completely.	Blinking	Unit stops. (Automatic operation resume)
E031	OCR tripped	Motor over-current protection device has tripped. Ask a dealer for inspection.	On	Unit stops. (Automatic operation resume repeats up to 2 times.)
E032	Alternator generation not enough	Power generation signal from the alternator is not detected. When the unit operation has been stopped due to this error, ask a dealer for inspection.	Blinking (or On with battery voltage drop)	Unit operation continues. (Unit stops if battery voltage is low.)
E033	HTS tripped (Option)	Electric heater protection device has tripped. Ask a dealer for inspection.	Blinking	Unit stops. (Automatic operation resume)
E036	ECS abnormally high	Engine clutch overheat prevention device has tripped. Ask a dealer for inspection.	On	Unit* stops.

*This alarm cannot be reset because it could result in a fire. When this alarm has occurred, contact a dealer.

Alarm Code	Trouble	Countermeasure	Alarm Lamp	Unit Condition
E050	TH sensor failure	Return air temperature sensor A (A, B or C for the multiple specification) is disconnected or shorted. Ask a dealer for inspection.	Blinking	Unit operation continues.
E054	Throttle solenoid failure	Engine cannot operate at high speed due to failure on throttle solenoid. Ask a dealer for inspection.	Blinking	Unit operation continues.
E060	HPS failure	High-pressure switch has failed. Ask a dealer for inspection.	Blinking	Unit stops. (Automatic operation resume)
E063	Td sensor failure	Discharge gas temperature sensor is disconnected or shorted. Ask a dealer for inspection.	Blinking	Unit operation continues.
E066	Liquid line clogging	Strainer or other liquid line is clogged. Ask a dealer for inspection.	On	Unit stops. (Automatic operation resume repeats up to 4 times.)
E070	OPS failure	Engine oil pressure switch has failed. Ask a dealer for inspection.	On	Unit stops.
E081	OCR failure	Motor over-current protection device has failed. Ask a dealer for inspection.	On	Unit stops.
E099	Controller communication failure	Controller cannot communicate properly. Ask a dealer for inspection.	On	Unit stops. (Automatic operation resume repeats up to 9 times.)
E202	R/L1 phase loss (Standby)	L1-phase of commercial 3-phase power supply is open-phased (no current). (When L2 or L3 phase has open-phased, no error occurs but the motor does not rotate.) Ask for inspection on electric power supply.	Blinking	Unit operation continues.
E204	DCS fuse break	Fuse F10, 11 or 12 has blown. Replace the fuse F10, 11 or 12 (10 A) in the control box. If the same trouble persists after replacement, ask a dealer for inspection.	Blinking	Unit operation continues.
E205	Drain hose heater fuse break	Fuse F4 (F4, F16 or F17 for the multiple specification) is blown. Replace the blown fuse (10 A) in the control box. If it persists even after replacement, ask your service agent to inspect.	Blinking	Unit operation continues.
E210	Pump down failure	Pump down error has been detected during self diagnosis operation (PTI operation).	On	Unit stops.
E221	Engine low speed failure	Engine low speed is extensively deviated from the rated speed. Ask a dealer for inspection.	Blinking	Unit operation continues.
E222	Engine high speed failure	Engine high speed is extensively deviated from the rated speed. Ask a dealer for inspection.	Blinking	Unit operation continues.
E223	Engine stall	Engine stalls frequently. Check if fuel exists in the fuel tank. If fuel exists, ask a dealer for inspection.	On	Unit stops.
E250	EVT sensor failure	Evaporator outlet temperature sensor A (A, B or C for the multiple specification) is disconnected or shorted. Ask a dealer for inspection	Blinking	Unit operation continues.
E252	THD sensor failure	Supply air temperature sensor A (A, B or C for the multiple specification) is disconnected or shorted. Ask a dealer for inspection	Blinking	Unit operation continues.
E256	ATS sensor failure	Ambient air temperature sensor is disconnected or shorted. Ask a dealer for inspection.	Blinking	Unit operation continues.

9 For emergency

Alarm Code	Trouble	Countermeasure	Alarm Lamp	Unit Condition
E260	Defrost SV failure	Defrost solenoid valve SV2 (SV2-M for the multiple specification) has failed. Ask a dealer for inspection.	On	Unit stops.
E261	Defrost SV failure (Zone X) (Multiple specification)	Defrost solenoid valve (SV2-A, -B or -C) has failed. Ask your service agent to inspect.	On	Unit stops.
E264	Condenser inlet SV failure	Condenser inlet solenoid valve (SV4) has failed. Ask a dealer for inspection.	On	Unit stops.
E265	Liquid bypass SV failure	Liquid bypass solenoid valve (SV5) has failed. Ask a dealer for inspection.	On or blinking	Unit operation continues. (Operation stops at PTI.)
E266	EEV failure	Electronic expansion valve EEV-A (EEV-A, B or C for the multiple specification) has failed. Ask a dealer for inspection.	On	Unit stops.
E267	Receiver pressurizing SV failure	Receiver pressurizing solenoid valve (SV7) has failed. Ask your service agent to inspect.	Blinking	Unit operation continues.
E268	Buzzer failure	External buzzer circuit is shorted. Ask a dealer for inspection.	On or blinking	Unit stops. (Operation continues partially.)
E269	Stop solenoid& relay failure	Stop solenoid circuit is disconnected or shorted. Ask a dealer for inspection.	On	Unit stops.
E270	Starter relay circuit failure	Drive coil circuit of starter relay (SR) is disconnected or shorted. Ask a dealer for inspection.	On	Unit stops.
E271	ARMO circuit failure	Drive coil circuit of motor relay (ARMO) is disconnected or shorted. Ask a dealer for inspection.	On	Unit stops.
E272	Pre-heater relay circuit failure	Drive coil circuit of pre-heater relay (ARPH) is disconnected or shorted. Ask a dealer for inspection.	On	Unit stops.
E273	Electric heater relay failure (Option)	Drive coil circuit of evaporator electric heater relay A (A, B or C for the multiple specification) is disconnected or shorted. Ask a dealer for inspection.	Blinking	Unit operation continues.
E274	Fuel pump failure	Fuel pump has failed. Ask a dealer for inspection.	On	Unit stops.
E275	ECS failure	Engine clutch temperature sensor is disconnected or shorted. Ask a dealer for inspection.	Blinking	Unit operation continues.
E280	Battery voltage low	Battery voltage has dropped. Replace the battery if aged.	On or blinking	Unit stops. (Operation continues partially.)
E281	Evaporator fan motor fuse break	One of fuses F5, 6, 7 and 8 (or 13, 14, 15 and 16) is blown. Replace the blown fuse (15 A) in the control box. If the trouble persists after replacement, ask a dealer for inspection.	Blinking	Unit operation continues.
E282	Economizer SV failure	Economizer solenoid valve (SV8) has failed. Ask a dealer for inspection.	Blinking	Unit operation continues.
E283	Engine hot water SV failure (Option)	Hot water solenoid valve WSV-A (WSV-A, -B or -C for the multiple specification) has failed. Ask your service agent to repair.	Blinking	Unit operation continues.
E284	WP failure	Hot water pump relay has failed. Ask your service agent to inspect.	Blinking	Unit operation continues.

10 Specification

Item		Model	TU1250SAE	
Refrigeration capacity	Conditions	°C	Ambient temperature 30	
	Engine drive	W	Return air temperature -20	Return air temperature 0
	Motor drive		6741	11601
			5070	9243
Working environment	Inside container temperature	°C	-35~30	
	Ambient temperature		-20~40	
Unit dimensions	Condensing unit	W×H×D	1589×609×695	
	Evaporator unit		2000×200×744	
Unit weight	Condensing unit	kg	425	
	Evaporator unit		54	
Drive system			Dedicated engine (diesel) and motor	
Operating system			Automatic start/stop and continuous operation selection	
Engine	Model		3TNV76 (4-cycle water-cooled vertical diesel)	
	Displacement	cm ³	1116	
	Continuous operation fuel consumption	ℓ/h	2.8 (Outdoor 30°C/inside container 0°C, high speed, at shipment)	
	Oil capacity	ℓ	9.5 (Oil type: Class CE or higher of API classification, 10W-30)	
	Fuel		Diesel fuel (Intense cold season: cold weather diesel fuel)	
	Rated output / speed	kW/min	High speed: 12.5/2100, low speed: 9.0/1650 or more	
Compressor	Model		CSA130E (Open, 3D scroll type)	
	Speed	min ⁻¹	High speed: 3650, low speed: 2850, Motor : 2550	
	Compressor oil charge volume	ℓ	1.25 (ENEOS MA32R, ester series)	
Evaporator	Type		Aluminum fin & copper tubes	
	Fan		ø222 mm turbo fan & DC brush-less motor×4 pcs.	
Condenser	Type		Aluminum multi-flow	
	Fan		ø440 mm propeller fan×1 pc.	
Standby motor	Power supply		3-phase AC 400V 50Hz	
	Output	kW	5.5	
Sound power level		dB	98	
Refrigerant charge volume		kg	4.6 (R452A)	
Inside container temperature control			Electronic thermostat	
Operation control			Microcomputer controller	
Defrosting device			Hot gas defrost type (Automatic timer and manual)	
Safety device			High pressure switch, engine oil pressure switch, engine water temperature switch, fusible plug, motor over-current relay, DC circuit fuse, DC circuit fusible link, front panel open detection switch, automatic power supply anti-phase reversal switching and engine clutch temperature sensor	

10 Specification

Item		Model	TU1250SAEM				
Evaporator unit model			TMEVX				
			-L	-MW	-M	-S	
Refrigeration capacity	Ambient temperature		30				
	Engine drive	Return air temperature 0°C	11080	9635	8638	7392	
		Return air temperature -20°C	6624	5628	5290	4700	
Working environment	Inside container temperature		-35~30				
	Ambient temperature		-20~40				
Unit dimensions	Condensing unit	W×H×D	mm	1589×609×695			
	Evaporator unit			2000×	1450×	1000×	760×
				200×	200×	200×	200×
Unit weight	Condensing unit	kg	435				
	Evaporator unit		50	37	31	25	
Drive system			Dedicated sub-engine (diesel) and motor				
Operating system			Automatic start/stop and continuous operation selection				
Engine	Model		3TNV76 (4-cycle water-cooled vertical diesel)				
	Displacement		cm ³	1116			
	Continuous operation fuel consumption		ℓ/h	2.8 (Outdoor 30°C/inside container 0°C, high speed, at shipment)			
	Oil capacity		ℓ	9.5 (Oil type: Class CE or higher of API classification, 10W-30)			
	Fuel			Diesel fuel (Intense cold season: cold weather diesel fuel)			
	Rated output / speed		kW/min	High speed: 12.5/2100, low speed: 9.0/1650 or more			
Compressor	Model		CSA130E (Open, 3D scroll type)				
	Speed		min ⁻¹	High speed: 3650, low speed: 2850, Motor : 2550			
	Compressor oil charge volume		ℓ	1.40 (ENEOS MA32R, ester series)			
Evaporator	Type		Aluminum fin & copper tubes				
	Fan	Type	Turbo				
		O.D.	mm	222			
		Quantity		4	3	3	2
Fan motor			DC brush-less				
Condenser	Type		Aluminum multi-flow				
	Fan		ø440 mm propeller fan×1 pc.				
Standby motor	Power supply		3-phase AC 400V 50Hz				
	Output		kW	5.5			

Item	Model	TU1250SAEM
Sound power level	dB	98
Refrigerant charge volume	kg	4.6~6.0 (R452A)
Inside container temperature control		Electronic thermostat
Operation control		Microcomputer controller
Defrosting device		Hot gas defrost type (Automatic timer and manual)
Safety device		High pressure switch, engine oil pressure switch, engine water temperature switch, fusible plug, motor over-current relay, DC circuit fuse, DC circuit fusible link, front panel open detection switch, automatic power supply anti-phase reversal switching and engine clutch temperature sensor

(1) Freezing capacity is for the single operation.

(2) Charge amount of refrigerant varies depending on the combination of evaporator

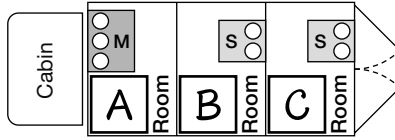
10 Specification

Item		Model	TU1100SAE		
Refrigeration capacity	Conditions		°C	Ambient temperature 30	
	Engine drive		W	Return air temperature -20	Return air temperature 0
	Motor drive			5647	10421
Working environment	Inside container temperature		°C	-30~30	
	Ambient temperature			-20~40	
Unit dimensions	Condensing unit	W×H×D	mm	1589×609×695	
	Evaporator unit			2000×200×744	
Unit weight	Condensing unit		kg	420	
	Evaporator unit			54	
Drive system			Dedicated engine (diesel) and motor		
Operating system			Automatic start/stop and continuous operation selection		
Engine	Model		3TNV76 (4-cycle water-cooled vertical diesel)		
	Displacement		cm ³	1116	
	Continuous operation fuel consumption		ℓ/h	2.8 (Outdoor 30°C/inside container 0°C, high speed, at shipment)	
	Oil capacity		ℓ	9.5 (Oil type: Class CE or higher of API classification, 10W-30)	
	Fuel		Diesel fuel (Intense cold season: cold weather diesel fuel)		
	Rated output / speed		kW/min	High speed: 12.5/2100, low speed: 9.0/1650 or more	
Compressor	Model		CSA130 (Open, 3D scroll type)		
	Speed		min ⁻¹	High speed: 3650, low speed: 2850, Motor : 2550	
	Compressor oil charge volume		ℓ	1.25 (ENEOS MA32R, ester series)	
Evaporator	Type		Aluminum fin & copper tubes		
	Fan		ø222 mm turbo fan & DC brush-less motor×4 pcs.		
Condenser	Type		Aluminum multi-flow		
	Fan		ø440 mm propeller fan×1 pc.		
Standby motor	Power supply		3-phase AC 400V 50Hz		
	Output		kW	5.5	
Sound power level			dB	98	
Refrigerant charge volume			kg	3.9 (R452A)	
Inside container temperature control			Electronic thermostat		
Operation control			Microcomputer controller		
Defrosting device			Hot gas defrost type (Automatic timer and manual)		
Safety device			High pressure switch, engine oil pressure switch, engine water temperature switch, fusible plug, motor over-current relay, DC circuit fuse, DC circuit fusible link, front panel open detection switch, automatic power supply anti-phase reversal switching and engine clutch temperature sensor		

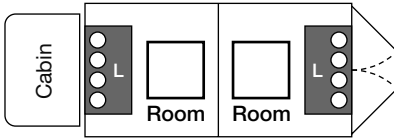
Item		Model	TU900SAE	
Refrigeration capacity	Conditions	°C	Ambient temperature 30	
	Engine drive	W	Return air temperature -20	Return air temperature 0
	Motor drive		5478	9683
Working environment	Inside container temperature	°C	-30~30	
	Ambient temperature		-20~40	
Unit dimensions	Condensing unit	W×H×D	1589×609×695	
	Evaporator unit		1450×200×744	
Unit weight	Condensing unit	kg	420	
	Evaporator unit		41	
Drive system			Dedicated engine (diesel) and motor	
Operating system			Automatic start/stop and continuous operation selection	
Engine	Model		3TNV76 (4-cycle water-cooled vertical diesel)	
	Displacement	cm ³	1116	
	Continuous operation fuel consumption	ℓ/h	2.8 (Outdoor 30°C/inside container 0°C, high speed, at shipment)	
	Oil capacity	ℓ	9.5 (Oil type: Class CE or higher of API classification, 10W-30)	
	Fuel		Diesel fuel (Intense cold season: cold weather diesel fuel)	
	Rated output / speed	kW/min	High speed: 12.5/2100, low speed: 9.0/1650 or more	
Compressor	Model		CSA130 (Open, 3D scroll type)	
	Speed	min ⁻¹	High speed: 3650, low speed: 2850, Motor : 2550	
	Compressor oil charge volume	ℓ	1.25 (ENEOS MA32R, ester series)	
Evaporator	Type		Aluminum fin & copper tubes	
	Fan		ø222 mm turbo fan & DC brush-less motor×3 pcs.	
Condenser	Type		Aluminum multi-flow	
	Fan		ø440 mm propeller fan×1 pc.	
Standby motor	Power supply		3-phase AC 400V 50Hz	
	Output	kW	5.5	
Sound power level		dB	98	
Refrigerant charge volume		kg	3.9 (R452A)	
Inside container temperature control			Electronic thermostat	
Operation control			Microcomputer controller	
Defrosting device			Hot gas defrost type (Automatic timer and manual)	
Safety device			High pressure switch, engine oil pressure switch, engine water temperature switch, fusible plug, motor over-current relay, DC circuit fuse, DC circuit fusible link, front panel open detection switch, automatic power supply anti-phase reversal switching and engine clutch temperature sensor	

Layout of A, B and C rooms

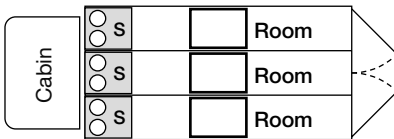
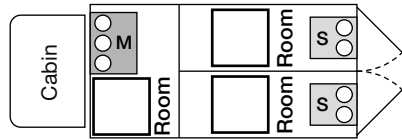
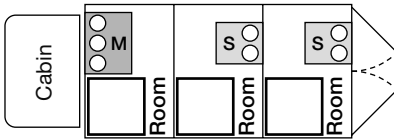
Entry example



When divided to 2 rooms

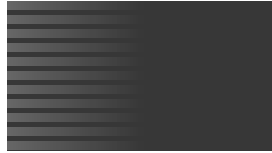


When divided to 3 rooms



When your division of rooms is other than the above, please divide the space and indicate the rooms A, B and C.





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