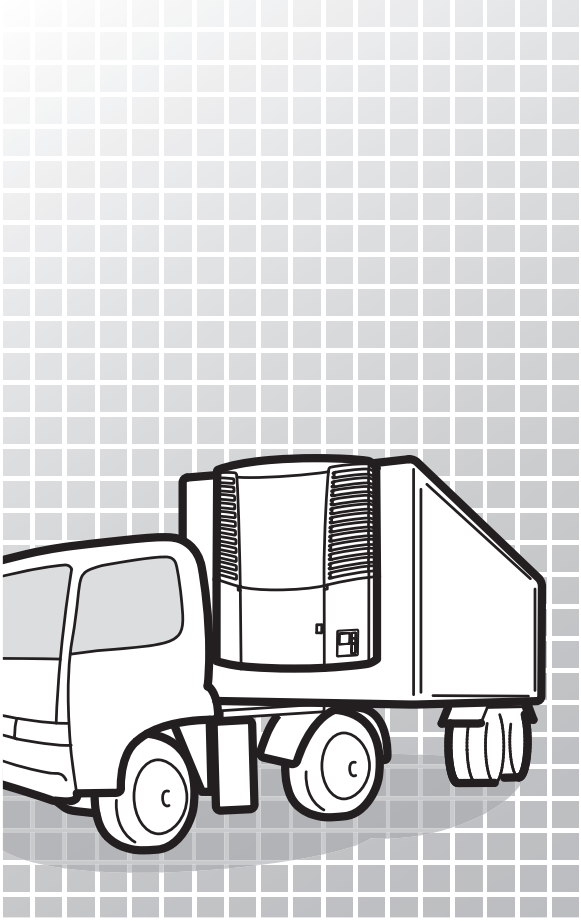
OPERATION MANUAL

MITSUBISHI TRANSPORT REFRIGERATION UNIT

TFV2000DM-E

PEGASUS
MULTI TEMP

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.



CE

TSJ012A193A
YEAR:2016

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 : R404A (GWP (Global Warming Potential)=3922)
    Refer to a label on unit about weight of fluorinated greenhouse gases and CO_2 equivalent. (☞ Refer to pages 4.)
  - Form blown with fluorinated greenhouse gases : R134a.
    (GWP (Global Warming Potential)=1430)

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.

Contents

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 40 for how to switch the drive.

Regarding the function to switch from the motor drive operation to the engine drive after a power failure, contact your nearest dealer.

(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 41 and 42.

(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 33 for defrosting timer setting.
2) **Manual defrosting operation**
   Defrosting starts forcibly by pressing the switch of controller.
   ☞ Refer to page 48 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 47 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 49 to 52 for how to set.

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

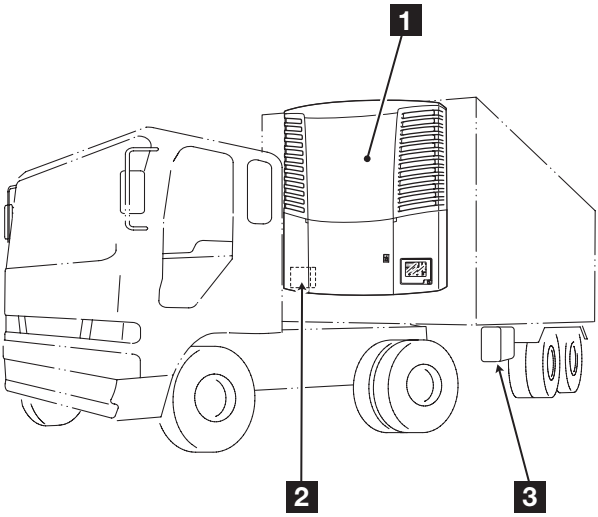
This is the function to diagnose the refrigeration unit automatically if it has any trouble or not.

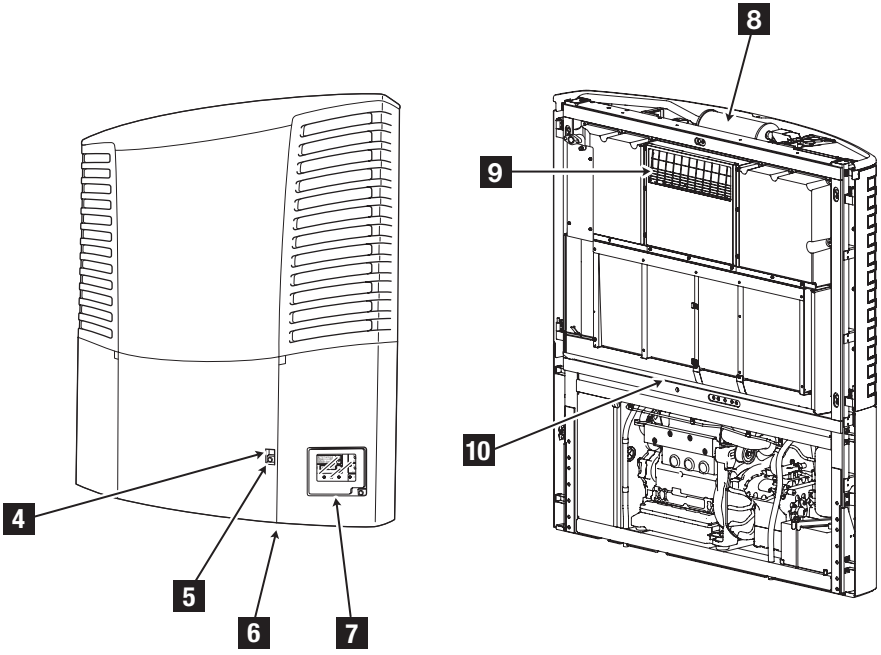
☞ Refer to pages from 53 to 55 for how to operate.

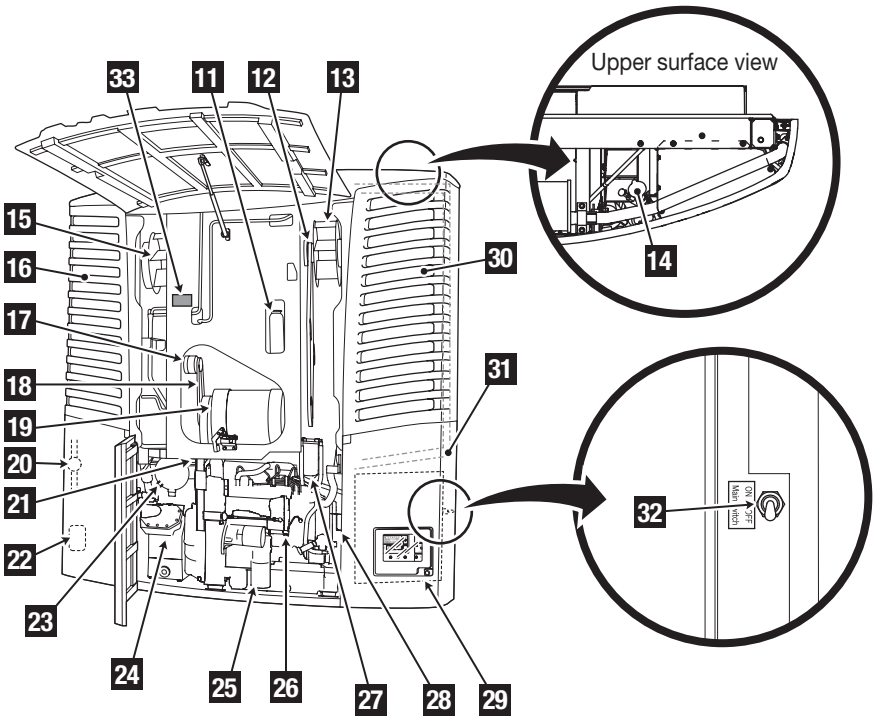
2 Name of each part

Arrangement plan for main parts

■Host unit



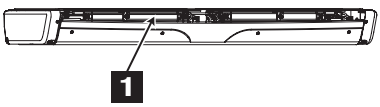


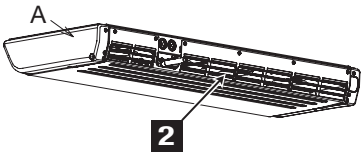


1	Refrigeration unit	18	Alternator belt (Ribbed belt – 6 ribs)
2	Battery	19	Standby motor
3	Fuel tank	20	Sight glass
4	Panel opening lever	21	Compressor belt (Ribbed belt – 10 ribs)
5	Panel lock key	22	Fuel filter (for water separation)
6	Receptacle for connection to commercial power (Bottom face)	23	Air cleaner
7	Control panel	24	Compressor
8	Muffler	25	Oil filter
9	Evaporator supply air outlet	26	Sub-engine
10	Drain pan	27	Fuel filter
11	Reservoir tank	28	Water pump belt (V belt)
12	Fan belt (Ribbed belt – 6 ribs)	29	Control box
13	Right condenser fan	30	Right condenser
14	Radiator cap	31	Exhaust pipe
15	Left condenser fan	32	Main switch
16	Left condenser	33	Label (F-Gas)
17	Alternator		

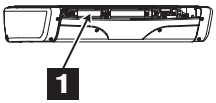
Evaporator unit

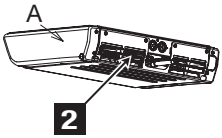
•Thin type (Large): TMEVX-L



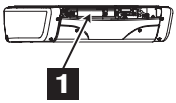


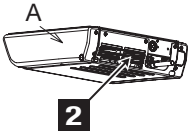
•Thin type (Middle): TMEVX-M

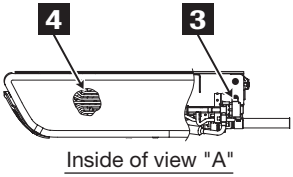




•Thin type (Small): TMEVX-S

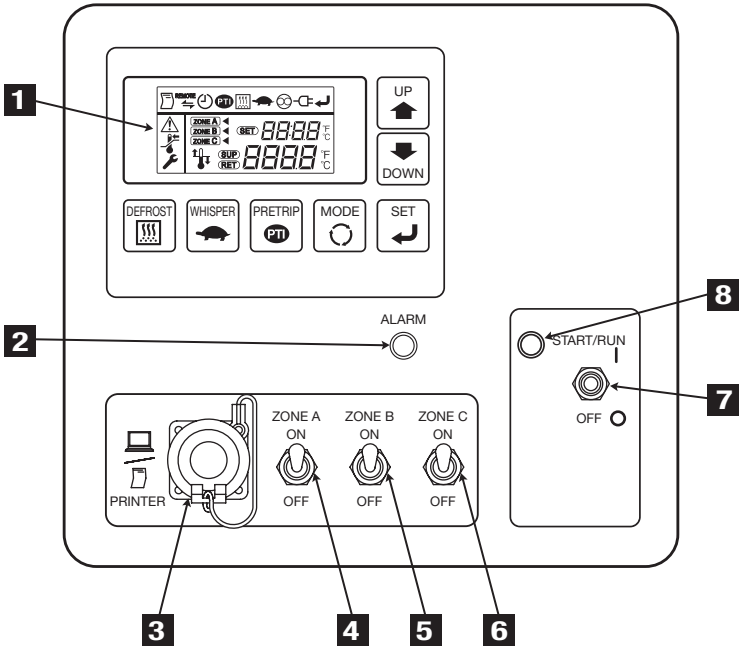






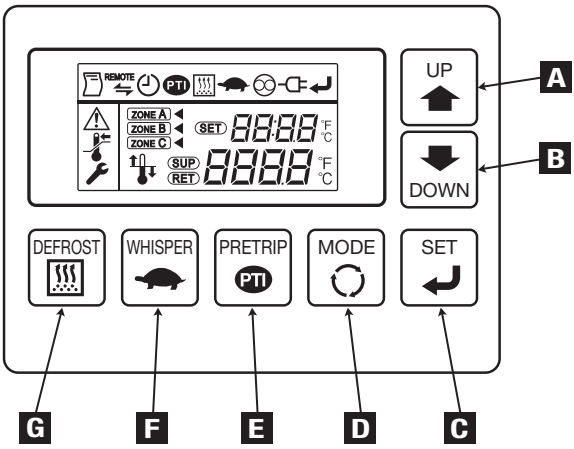
1	Supply air outlet for evaporator	3	Electronic expansion valve
2	Evaporator fan motor	4	Evaporator coil

Control panel



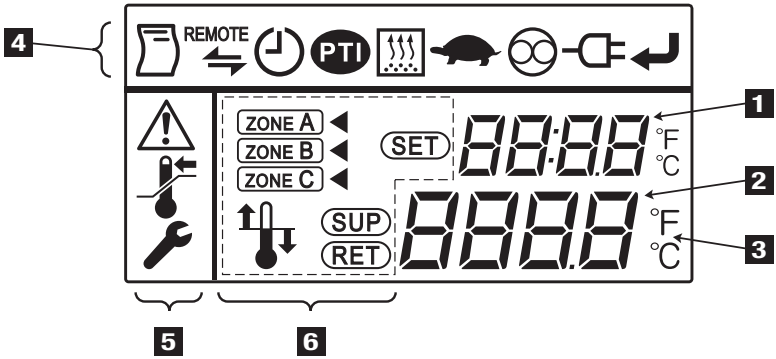
1	Digital display area (LCD)	Displays inside container temperature, setting temperature, operation conditions, etc.
2	Alarm indicator lamp (Red)	Lights or blinks when abnormal condition happens.
3	External device · printer connector	Connector to connect with external device · printer.
4	Zone A on/off setting switch	Sets start/stop of operation at compartment (zone) A.
5	Zone B on/off setting switch	Sets start/stop of operation at compartment (zone) B.
6	Zone C on/off setting switch	Sets start/stop of operation at compartment (zone) C.
7	Operation switch	Starts or stops the operation of refrigeration unit.
8	Run indicator lamp (Green)	Lights when refrigeration unit operates.

Touch switch



A	UP switch	Changes the setting temperature and various setting screens.
B	DOWN switch	Changes the setting temperature and various setting screens.
C	SET switch	Registers a setting.
D	MODE switch	Selects the normal display screen or the setting change screen. Activates the controller.
E	PRETRIP switch	Starts/stops the self diagnosis operation (PTIL). (See page 53 for details.)
F	WHISPER switch	Selects the normal operation or the whisper operation.
G	DEFROST switch	Performs the manual defrost operation.

Digital display area (LCD)



Explanation of display

1	Upper digital display	Displays the setting temperature during operation.
2	Lower digital display	Displays the inside container temperature during operation.
3	Temperature symbol	°C is lit when Celsius is selected or °F when Fahrenheit is selected. (Celsius is selected at the shipment.)
4	Function icons	Either one of these lights or blinks when corresponding function is selected.
		Display for printer. The lamp lights or blinks when outputting data to a printer.
		Display for external communication status. The lamp lights when the operation control input is turned on for a remote control device, etc.
		Display for timer. The lamp lights or blinks when the display or setting for timer operation is made.
		Display for self diagnosis operation (PTI) (☞ Refer to page 53.) The lamp lights during self diagnosis operation.
		Display for defrosting The lamp lights or blinks when the display or setting for defrosting operation is made.
		Display for Whisper operation The lamp lights when Whisper operation is selected.
		Display for automatic operation start/stop The lamp lights when the automatic operation start/stop is selected.
		Display for commercial power supply The lamp lights when the unit is connected to the commercial power supply. It blinks if the unit is connected to the commercial power supply while the engine is running or if the power supply is interrupted while the motor is running.
		Display for registration The lamp lights when registration is required.

5 Warning/Inspection icons — These lamps light when there are any warnings to user.

 ..... Display for warning
The lamp lights (backlight blinks) or blinks when any error occurs.

 ..... Display for out of adequate temperature range.
The lamp lights when the inside container temperature runs out the adequate range.

 ..... Display for need of maintenance.
The lamp lights when the operation time or number of start/stop cycles is displayed.

6 Operation status icons — These lamps light depending on the status of operation or setting.

 ..... Display for operation
The lamp lights during operation (including during thermostat OFF).

 ..... Display for heating operation
The lamp lights during the heating operation.

 ..... Display for cooling operation
The lamp lights during the cooling operation.

(SET) ..... Display for setting temperature
The lamp lights when displaying the setting temperature.

(SUP) ..... Display for inside container temperature
The lamp lights when displaying the supply air temperature of evaporator unit.

(RET) ..... Display for inside container temperature
The lamp lights when displaying the return air temperature of evaporator unit.

Multiple specification only

(ZONE A) .... Display for compartment A operation. The lamp lights during operation at compartment (or zone) A. When the setting item for compartment (or zone) A is selected, it displays like (ZONE A) ◀ .

(ZONE B) .... Display for compartment B operation. The lamp lights during operation at compartment (or zone) B. When the setting item for compartment (or zone) B is selected, it displays like (ZONE B) ◀ .

(ZONE C) .... Display for compartment C operation. The lamp lights during operation at compartment (or zone) C. When the setting item for compartment (or zone) C is selected, it displays like (ZONE C) ◀ .

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) Panel
The panel prevents operators from contacting with the rotating part during operation.

(d) Panel 1 opening detection switch
When the panel 1 is opened for inspection or another, this switch detects it and stops the start of engine or motor.
(☞ Refer to page 61.)

(e) Panel lock key
Keys are provided on panel 1 and panel 5 to prevent un-intentional start of the unit or setting change.
(☞ Refer to page 61 and 62.)

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

Signs	Description
⚠ WARNING	Indicates dangerous situation, which if miss-handled, will result in death, serious injury, and serious accident such as damage of the refrigeration unit.
⚠ CAUTION	Indicates potentially dangerous situation, which if miss-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.

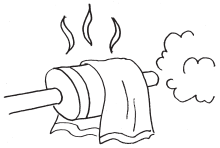
Kind	Description
Notice	Useful information for function or performance of equipment

Precautions

General precautions

⚠ WARNING

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

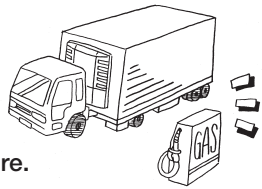


- Otherwise, it may cause a fire because muffler and exhaust pipe will be hot.

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.

Contact your nearest dealer when injecting or recovering the refrigerant or refrigeration machine oil.

- It may cause a serious accident if a customer performs injection or recovery by himself/herself.

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.

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 72.)

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

During and after the operation

⚠ WARNING

Make sure that all the panels of the unit are 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.

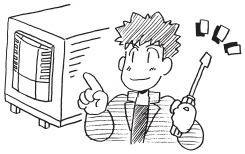
- High temperature steam may blowout and cause burns.

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.

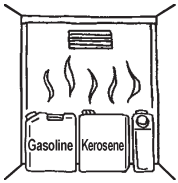
- Otherwise, the vehicle may start to move, causing injury or accident.

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.

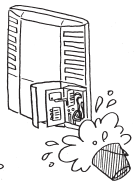
Waterproof the cargos if they need to be.

- Water may drip or splash from the evaporator unit.

Handling of electric equipment and power codes

⚠ WARNING

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



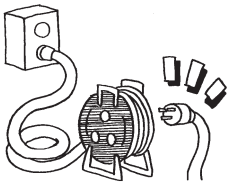
- **Never touch the electric equipment such as power plug and so on or operate the switches with wet hands.**

- **Do not modify the power code 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 codes or an electric shock.

⚠ WARNING

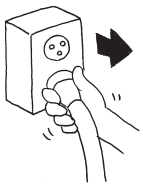
- **Use 4-core cabtyre cables (conductor cross section with 8mm^2 or more) for power cable. Do not connect it to extension code.**
  (☞ Refer to page 40.)
- **Use MENNEKES Part no.6 (400V 32A) for power supply plug.**



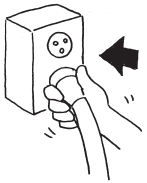
- Otherwise, it may cause an electric shock or a fire due to the heat, breaking of wire and leaking of water, etc.

⚠ WARNING

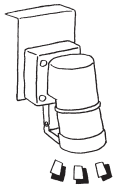
- **Pull out the power code by holding the plug part at the end of the code.**



- **Check the plug of the power code 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

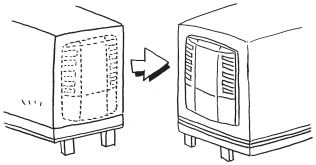
Do not start and stop the operation with pulling out or inserting the power supply breaker or power code.

- Otherwise, it may cause troubles of electric circuit, damages of power supply code 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.



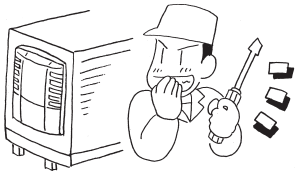
- The refrigeration unit may fall down and cause a serious accident due to improper installation or insufficient strength if the work is performed by the customer.

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 modifies the refrigeration unit or changes the specification by himself/herself.



Do not use any refrigerant or refrigerating machine oil other than those specified. (☞ Refer to page 72.)

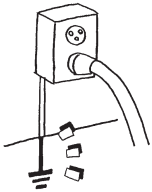
- Otherwise, it may cause explosion or fire.

Power supply equipment

⚠ WARNING

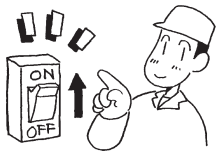
Be sure to ground the power supply equipment to supply the electricity to the refrigeration unit.

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



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

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



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. Then, 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.

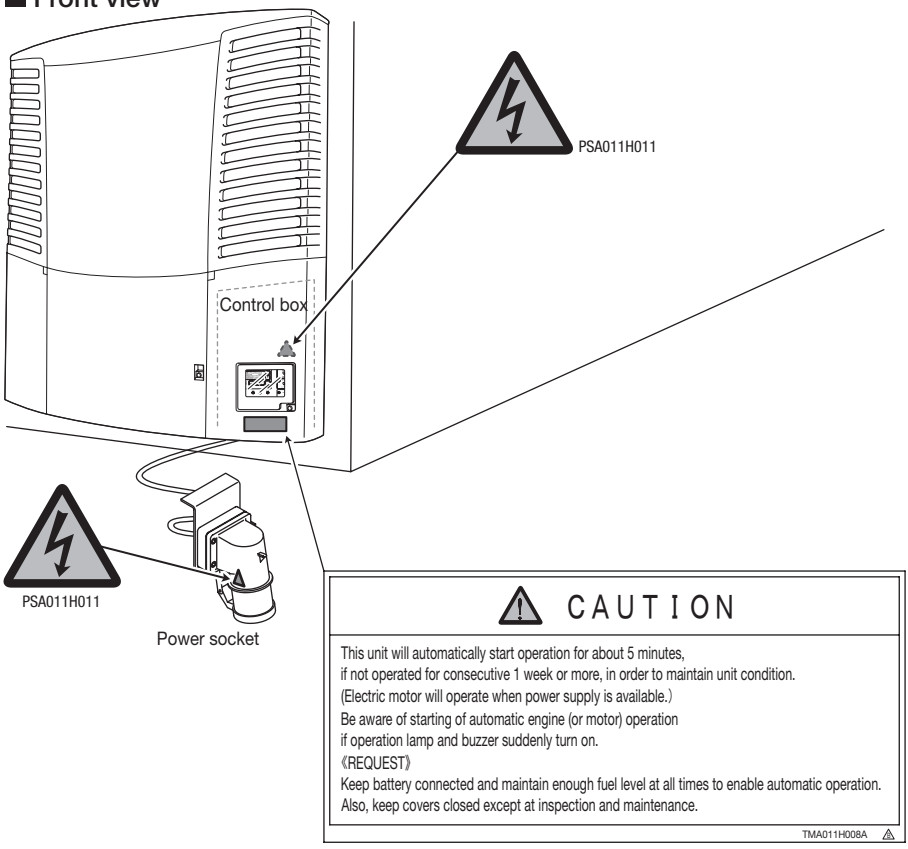
Handling of warning labels

(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.

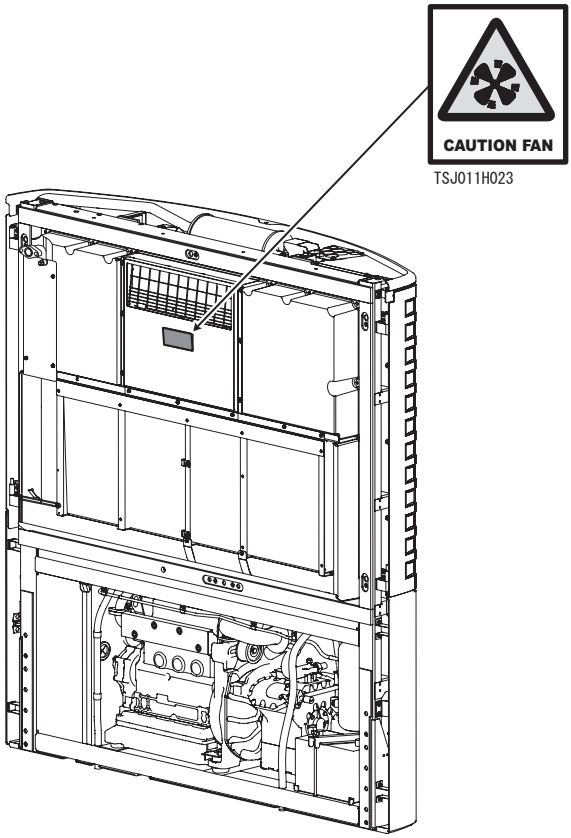
(c) When the labels become illegible, purchase them from your nearest dealer and change them.

■ Front view

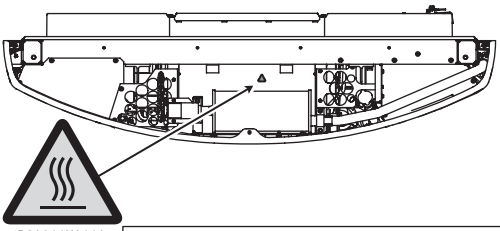


TMA011H008A

■ Rear view



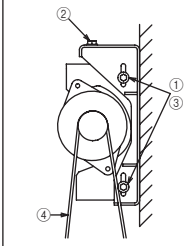
■ Top view



PSA011H011A

《Method of adjusting tension of Alternator Belt》

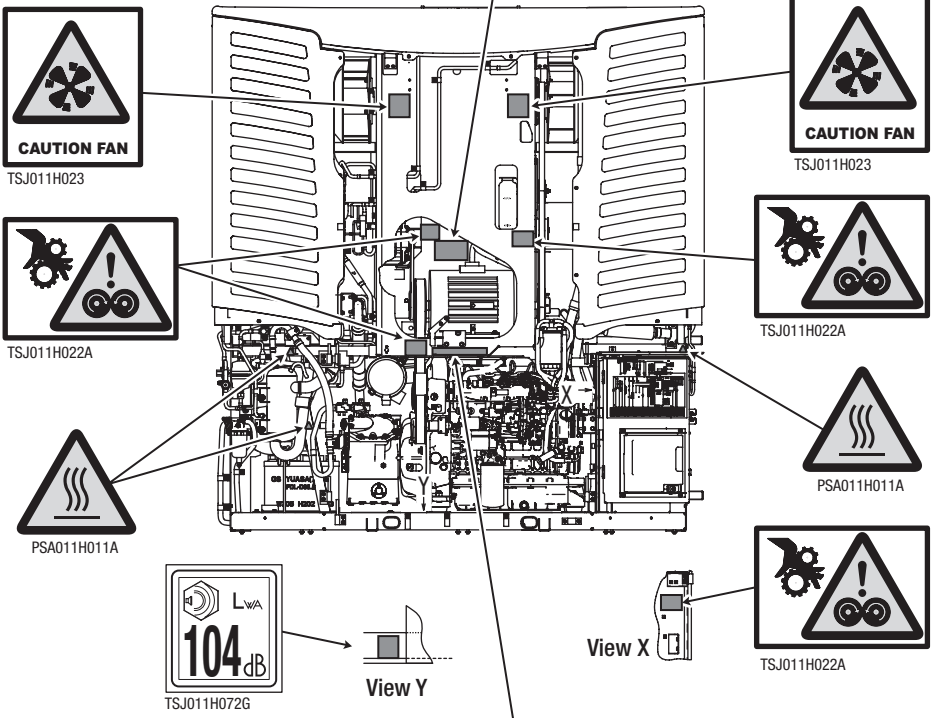
WARNING
Turn off unit operation switch before starting adjustment



〈STEP〉
① Loosen two bolts.
② Turn tension bolt clockwise to apply nominal tension on the belt.
③ Tighten two bolts.
(Tightening torque: 24N·m)
④ Check tension of the belt.
<Nominal tension>
In case of new belt :750~850N
In case of re-tensioning :500~600N

TMA011H005C

■ Front view inside



TSJ011H023
TSJ011H023
TSJ011H022A
TSJ011H022A
PSA011H011A
PSA011H011A
TSJ011H072G
TSJ011H022A

⚠ 警 告	ドアリミットスイッチの改造、取外しをしないこと。ドア開のままユニットが起動しケガをする恐れ有。
⚠ WARNING	Never modify or remove the door limit switch. Otherwise,you may be injured by accidental start of the unit with the door opening.

TSJ011H078

Prevention of start during inspection work

When several people are working simultaneously for inspection and so on, it is necessary to protect them from getting injured by accidental start of operation.
Lock control panel to prevent other people than the worker from starting operation. Remove the key and keep it in a safe place during the work. Place a cautionary tag stating “WORKING! STARTING UNIT PROHIBITED.” on the control panel.

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 Section 9 “For emergency" (pages from 75 to 82) when abnormal conditions are detected. Please contact your nearest dealer when it is too difficult to handle.

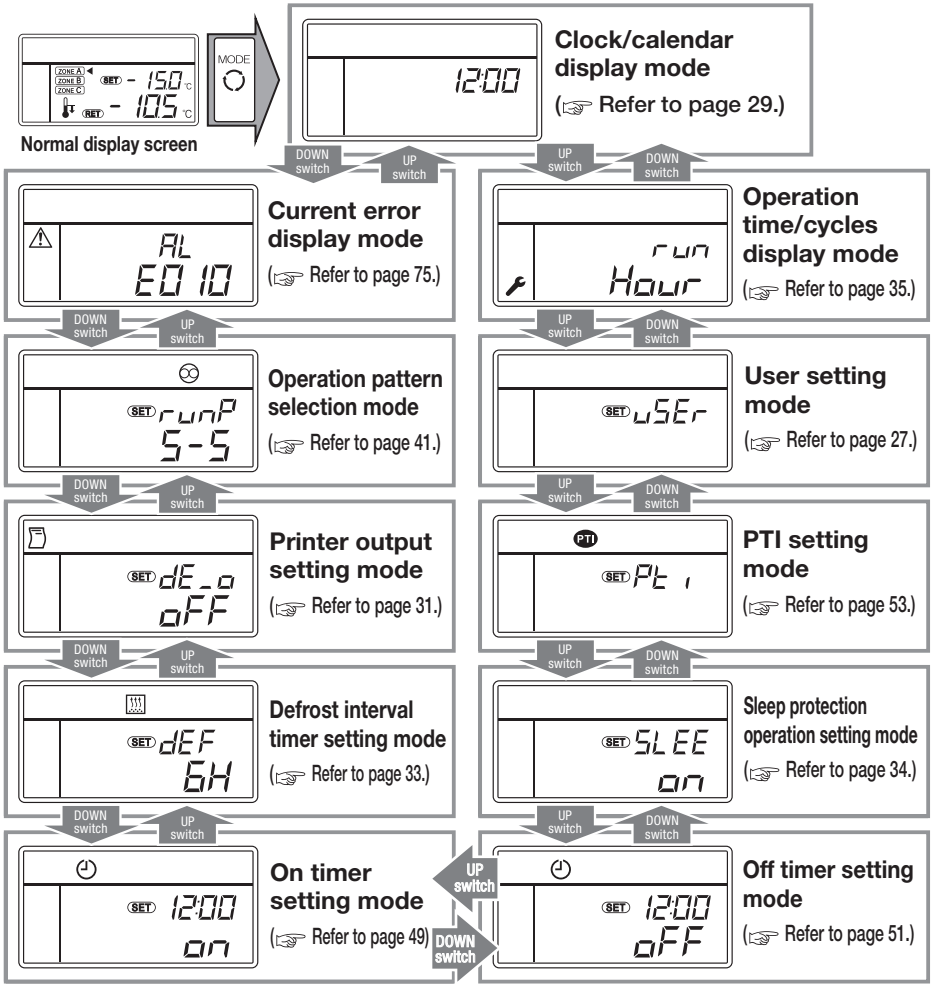
For emergency

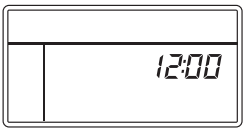
Contact the public agencies such as the police or the fire department immediately when an accident that could result in serious injury, death, serious property damage or environmental damage occurred. Contact your nearest dealer as well to prevent derivative disaster.

4 Initial setting

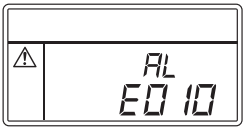
Mode displays and functions

Pressing the [MODE] switch once on the "Normal display screen" while the refrigeration unit is stopped or operating, the display changes to the "Clock/calendar display mode". Each press on the [UP] or [DOWN] switch changes the display, allowing doing different settings. In the flowing figure, the [DOWN] switch progresses the changes counterclockwise while the [UP] switch reverses the sequence clockwise.



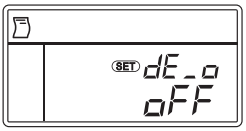


Clock/calendar display mode
Mode to display or set current time and date
(☞ Refer to page 29.)

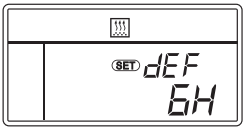


Current error display mode
Error code for currently detected error is displayed.
(☞ Refer to page 75.)

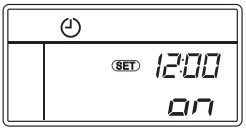
Operation pattern selection mode
Mode to select the automatic operation start/stop or continuous operation
(☞ Refer to page 41.)



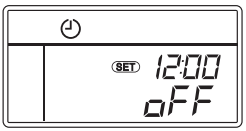
Printer output setting mode
Mode to print temperature history data.
An optional printer is necessary to print graphic data.
(☞ Refer to page 31.)



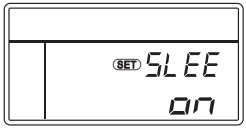
Defrost interval timer setting mode
Mode to display and set the defrost interval timer
The time is displayed in hour. Initial setting at shipment is "6 hours".
(☞ Refer to page 33.)



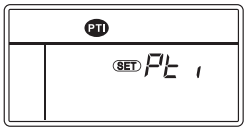
ON timer setting mode
Mode to set the time to start the operation of the refrigeration unit automatically
(☞ Refer to page 49.)



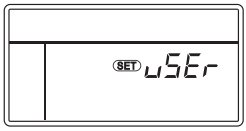
ON timer setting mode
Mode to set the time to start the operation of the refrigeration unit automatically
(☞ Refer to page 51.)



Sleep protection operation setting mode
Mode to set the long period stopping protection operation to be automatically performed when the continuous operation stop of the unit exceeds 1 week.
Initial setting at shipment is "ON".
(☞ Refer to page 34.)



PTI setting mode
Mode to set the self diagnosis operation (PTI)
(☞ Refer to page 53.)



User setting mode
Mode to display and set the functions related to the controller operability and others.
(☞ Refer to page 27.)

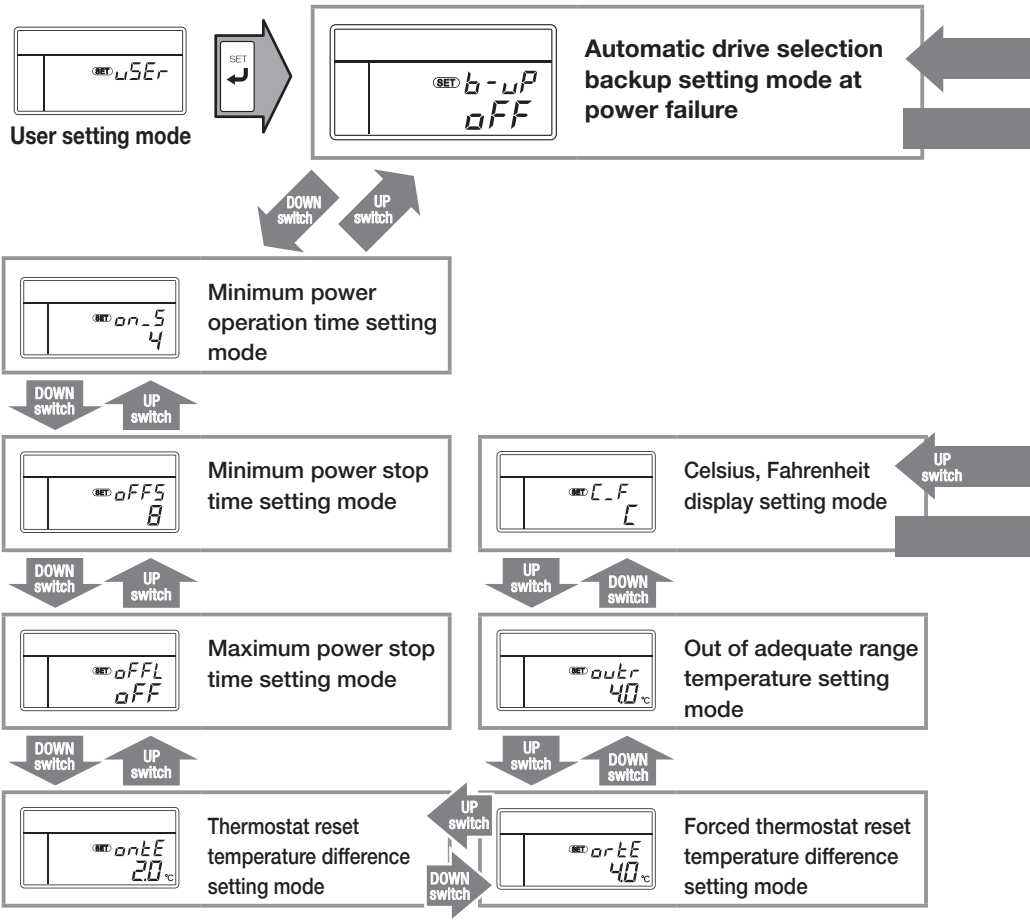
Operation time/start-stop cycles display mode
Mode to display the operation time or number of start/stop cycles of each device
(☞ Refer to page 35.)

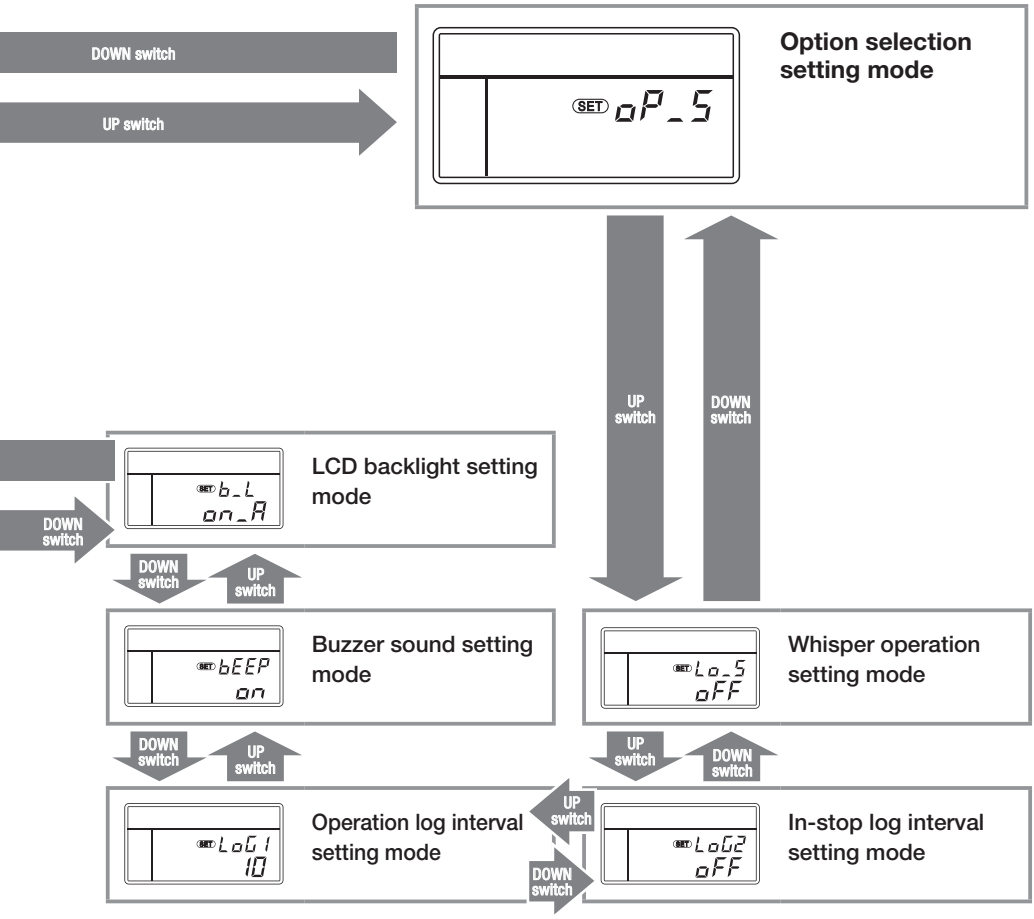
Outline of the user setting mode

"User setting mode" display changes in the order as shown in the following figure at each press on the [UP] or [DOWN] switch. The [DOWN] switch progresses the changes counterclockwise while the [UP] switch reverses the sequence clockwise.

Notice

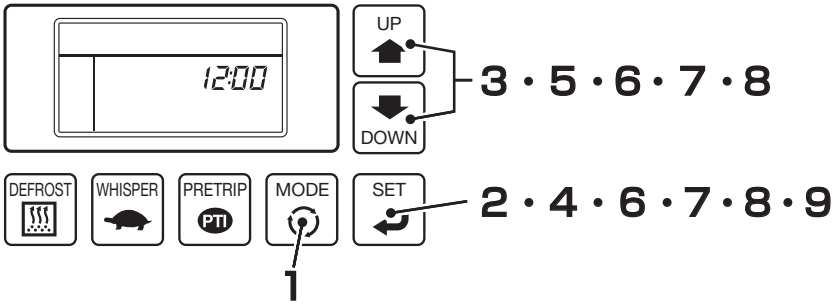
- If the [MODE] switch is pressed during the setting change operation, the display changes to the previous screen, and the change is not registered. The same occurs also when the setting change is aborted on the way.





- When it is necessary to change the setting of LCD backlight, buzzer sound or logging interval, consult your nearest dealer.

Setting the clock/calendar

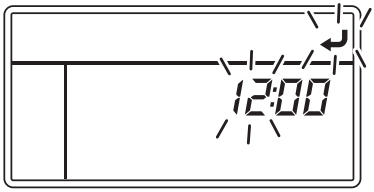


1 **Press the [MODE] switch.**

⇒ The display changes to the "Clock/calendar display mode".

2 **Press the [SET] switch.**

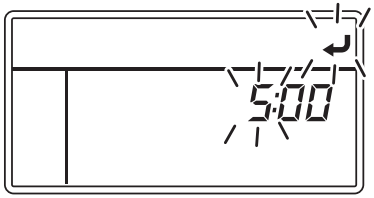
⇒ Time (hour) starts to blink on the upper digital display.
Icon ↵ blinks.



3 **Press the [UP] or [DOWN] switch to adjust to the current time (Hour).**

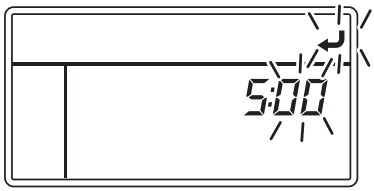
Notice

- The clock shows the time up to 24 hours.
  Set "19:00" if it is 7 o'clock PM.



4 **Press the [SET] switch.**

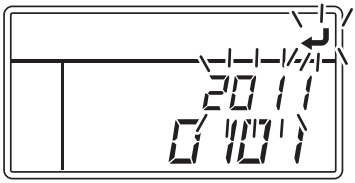
⇒ The time (minute) in the digital display area starts to blink.



5 **Press the [UP] or [DOWN] switch to adjust to the current time (minute).**

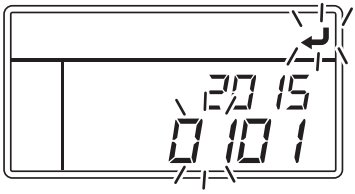
6 **Press the [SET] switch.**

⇒ Calendar (year) blinks on the digital display.
Pressing the [UP] or [DOWN] switch, adjust the calendar to the current year.



7 **Press the [SET] switch.**

⇒ Calendar (month) blinks on the digital display.
Pressing the [UP] or [DOWN] switch, adjust the calendar to the current month.



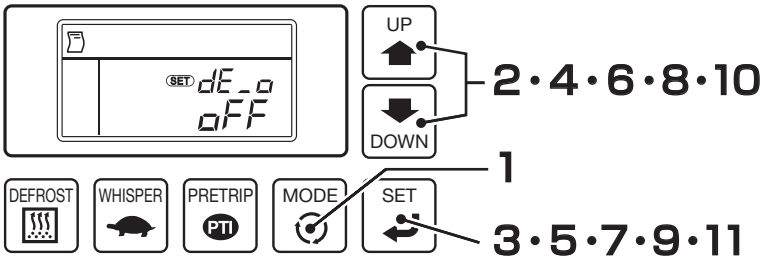
8 **Press the [SET] switch.**

⇒ Calendar (date) blinks on the digital display.
Pressing the [UP] or [DOWN] switch, adjust the calendar to the current date.

9 **Press the [SET] switch.**

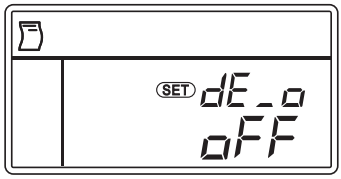
⇒ Setting is completed, and the display returns to the "Clock/calendar display mode".

Setting the printer (option) output



1 **Press the [MODE] switch.**
⇒ The display changes to the "Clock/calendar display mode".

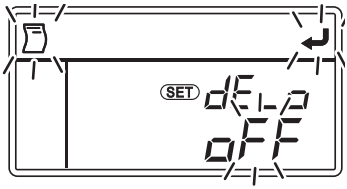
2 **Press the [UP] or [DOWN] switch until the display changes to the "Printer output setting mode". (Right figure)**



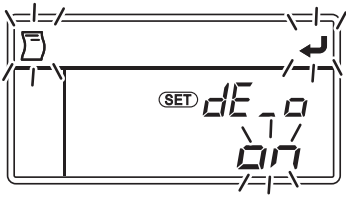
Notice

- Refer to the operation manual attached to the printer for the details of the printer operation.

3 **Press the [SET] switch.**
⇒ " on " or " oFF " starts blinking on the lower digital display.
and start blinking.



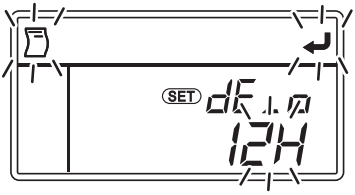
4 **Press the [UP] or [DOWN] switch to select " on ".**



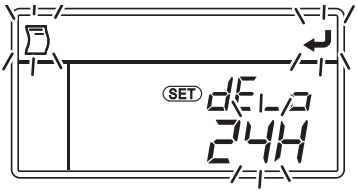
Notice

- " on "and " oFF " will be displayed alternately when pressing the [UP] and [DOWN] switches.
- Select " oFF " if printer output is not required or is to be cancelled.

5 **Press the [SET] switch.**
⇒ Hour blinks on the digital display.



6 **Press the [UP] or [DOWN] switch to select how many hours earlier from the present time the data to be printed was recorded.**

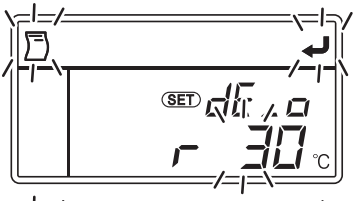


Notice

- Time can be selected from 10 steps such as 12H (12 hours earlier, and so forth), 24H, 36H, 2day (2 days earlier, and so forth), 3day, 4day, 5day, 6day, 7day and 1run (1 operation trip, from the start of operation until present).

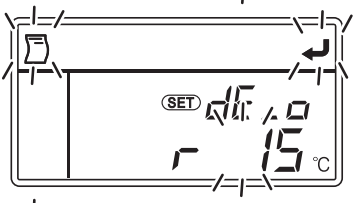
7 **Press the [SET] switch.**

⇒ It is switched to the printer output temperature range setting.



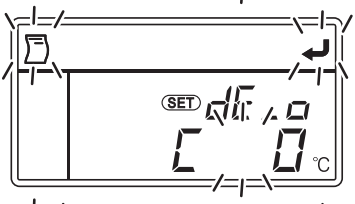
8 **Select a temperature range to be printed, by pressing [UP] or [DOWN] switch.**

⇒ • 30: Temperature range of ±30°C
• 15: Temperature range of ±15°C



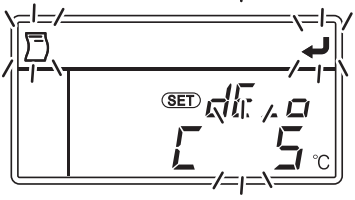
9 **Press the [SET] switch.**

⇒ It is switched to the setting of the center temperature in the temperature range to be printed.



10 **Select the center temperature in the temperature range to be printed (5°C intervals), by pressing [UP] or [DOWN] switch.**

⇒ • When the temperature range is ±30°C
Center temperature: -15°C ~ 15°C
• When the temperature range is ±15°C
Center temperature: -30°C ~ 30°C



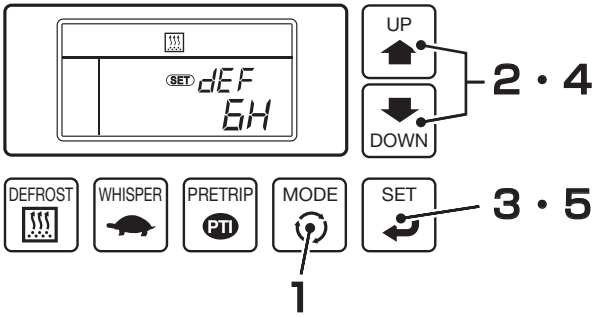
11 **Press the [SET] switch.**

⇒ Start to print out.
The display changes to the "Printer output setting mode", after completing the print. (☞ Refer to page 24.)

Notice

- If you press PRINT button on the printer, you can print with the last previous setting. Even when “OFF” is selected on the printer, you can print with the previous setting.

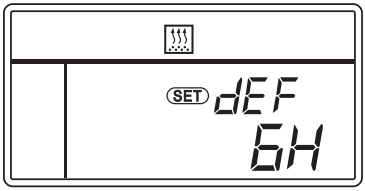
Setting the defrost interval timer



1 **Press the [MODE] switch.**

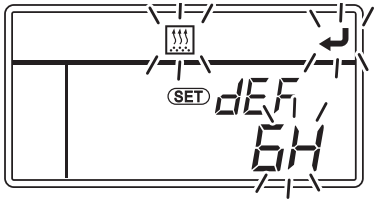
⇒ The display changes to the "Clock/calendar display mode".

2 **Press the [UP] or [DOWN] switch until the display changes to the "Defrost interval timer setting mode". (Right figure)**



3 **Press the [SET] switch.**

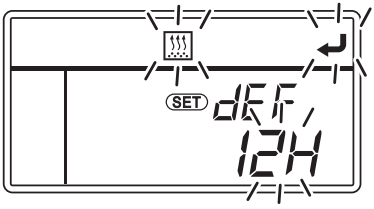
⇒ Time (hour) starts to blink on the lower digital display.
Icons and start to blink.



4 **Press the [UP] or [DOWN] switch to select the setting time.**

Notice

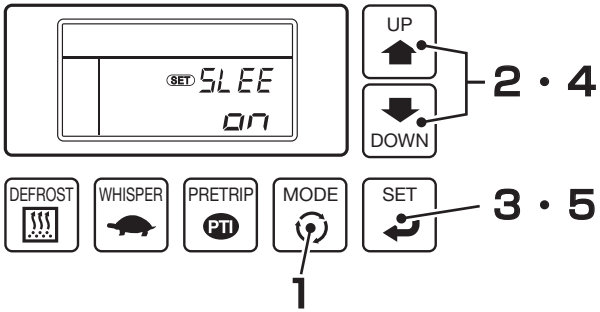
- The defrost interval time can be selected from 12 steps ranging from 1H (1 hour) at the minimum to 12H (12 hours) at the maximum.



5 **Press the [SET] switch.**

⇒ Setting is completed, and the display returns to the "Defrost interval timer setting mode".

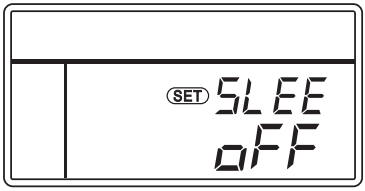
Setting the sleep operation



1 **Press the [MODE] switch.**

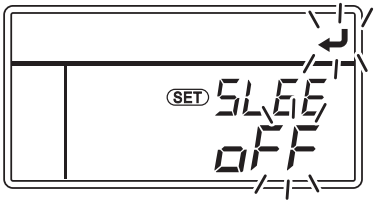
⇒ The display changes to the "Clock/calendar display mode".

2 **Press the [UP] or [DOWN] switch until the display changes to the "Sleep protection operation setting mode ". (Right figure)**

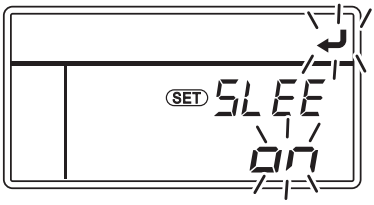


3 **Press the [SET] switch.**

⇒ " on " or " oFF " starts blinking on the lower digital display.
Icon ↵ starts blinking too.



4 **Press the [UP] or [DOWN] switch to select " on ".**



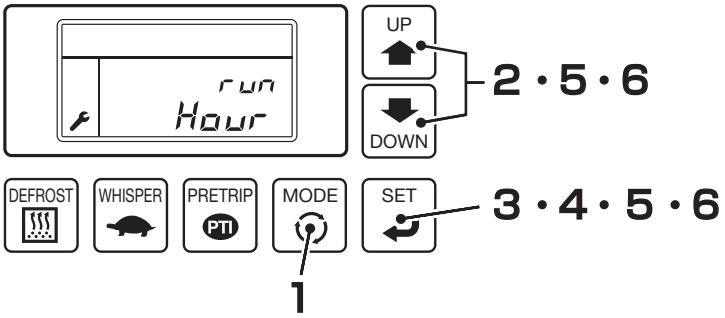
Notice

- " on "and " oFF " will be displayed alternately when pressing the [UP] and [DOWN] switches.
- Select " oFF " if the long period stopping protection operation is not required or is to be cancelled.

5 **Press the [SET] switch.**

⇒ Setting is completed, and the display returns to the "Normal display screen". (See page 24.)

Displaying the operation time/cycles



1 **Press the [MODE] switch.**

⇒ The display changes to the "Clock/calendar display mode".

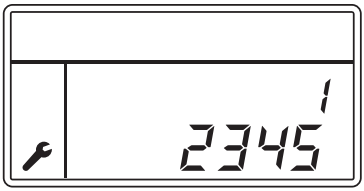
2 **Press the [UP] or [DOWN] switch until the display changes to the "Operation time/cycles display mode". (Right figure)**

3 **Press the [SET] switch.**

⇒ The digital display changes to the engine operation time (for engine oil inspection) mode.
Icon 🔧 lights if the maintenance request time has been reached.

4 **Hold down the [SET] switch.**
(If you release hand, it returns to the original display.)

⇒ The current engine operation time (for engine oil inspection) is displayed on the digital display. The lower digital display is up to 4 digits while the upper digital display shows the number of the fifth digit.



5 To clear the operation time, hold down the [SET] and [DOWN] switches for 3 seconds. (If you release hand, it returns to the display at Step 3.)

⇒ Icon 🔧 goes out.

Notice

- Clear the operation time after replacing engine oil.
- When the icon 🔧 has lighted in any other mode, contact your dealer.

6 Press the [UP] or [DOWN] switch.

⇒ The display changes to each of following modes.
While the [SET] switch is held down, the operation time or start/stop cycles in each mode is displayed.
User is allowed to clear EnG 1 only.

No.	Digital display		Mode	No.	Digital display		Mode
	Upper section	Lower section			Upper section	Lower section	
1	Hour	EnG 1	Engine operation time (Engine oil inspection)	15	Cnt	SV3	SV3 solenoid start/stop cycles
2	Hour	EnG2	Engine operation time	16	Cnt	SV4	SV4 solenoid start/stop cycles
3	Hour	Moto	Motor operation time	17	Cnt	SV5	SV5 solenoid start/stop cycles
4	Hour	C-b	Cooling water belt operation time	18	Cnt	EEVA	EEV-A on/off cycles
5	Hour	CW	Cooling water working time	19	Cnt	SV2M	SV2-M solenoid start/stop cycles
6	Hour	M-b	Main belt operation time	20	Cnt	SV7	SV7 solenoid start/stop cycles
7	Hour	Gu	Alternator operation time	21	Cnt	SV2b	SV2-B solenoid start/stop cycles
8	Hour	EnG3	Engine operation time (Overhaul)	22	Cnt	EEVb	EEV-B on/off cycles
9	Cnt	Sr	Starter start/stop cycles	23	Hour	dH-b	DH-B operation time
10	Hour	MCL	Fan magnet clutch operation time	24	Hour	FM 1	Evaporator fan 1 operation time
11	Cnt	MCL	Fan magnet clutch start/stop cycles	25	Hour	FM2	Evaporator fan 2 operation time
12	Cnt	HS	Throttle solenoid start/stop cycles	26	Hour	FM3	Evaporator fan 3 operation time
13	Cnt	SV2 1	SV2-A1 solenoid start/stop cycles	27	Hour	FM4	Evaporator fan 4 operation time
14	Cnt	SV22	SV2-A2 solenoid start/stop cycles				

⇒ No.28 and subsequent codes are displayed only on the unit with 3-compartment mode.

No.	Digital display		Mode	No.	Digital display		Mode
	Upper section	Lower section			Upper section	Lower section	
28	CnE	SU2C	SV2-C solenoid start/stop cycles	32	Hour	FN6	Evaporator fan 6 operation time
29	CnE	EEUC	EEV-C on/off cycles	33	Hour	FN7	Evaporator fan 7 operation time
30	Hour	dH-C	DH-C operation time	34	Hour	FN8	Evaporator fan 8 operation time
31	Hour	FN5	Evaporator fan 5 operation time				

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.

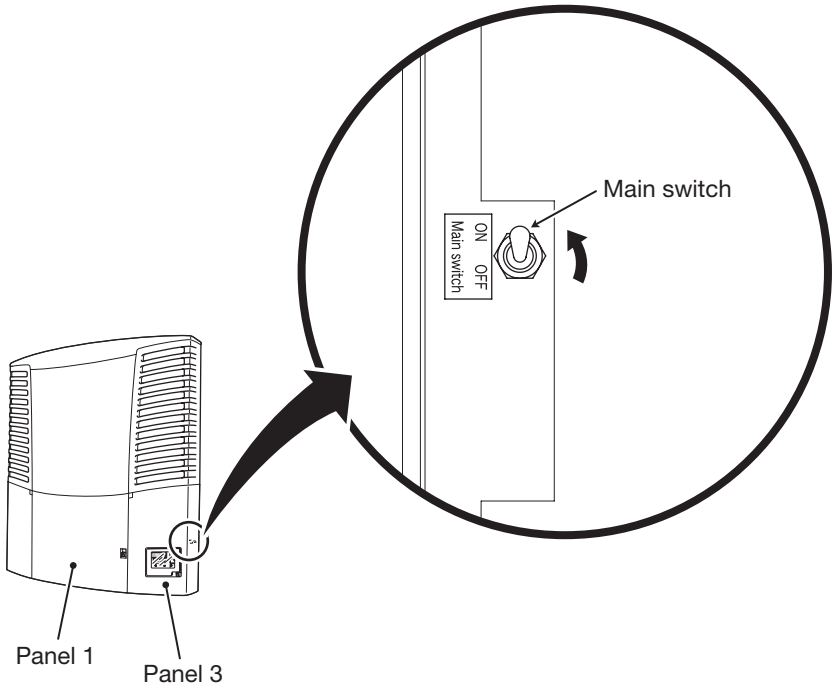
Operate the refrigeration unit with motor drive when operating it indoor. The place must be well ventilated when operating it with engine drive.

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

Notice

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

Power on



1 **Open the panel 1 (☞ Refer to page 61.)**

Notice

- Panel 3 cannot be opened unless opening panel 1.

2 **Open the panel 3 (☞ Refer to page 62.)**

3 **Turn the "Main switch", which is located at the right side of control box, to "ON".**

4 **Close all the panels. (☞ Refer to page 63.)**

Switching the drive

Operating with the engine

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

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

Notice

- 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 8 mm² or more) for power cable. Do not connect it to extension code. Use MENNEKES Part no.6 (400V 32A) for power supply plug.

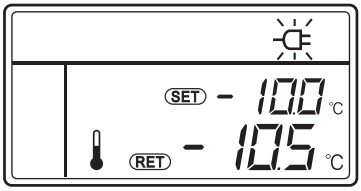
- Otherwise, it may cause an electric shock or a fire due to the heat and breaking of wire.

⚠ CAUTION

Use 3-phase AC400V 50Hz for power supply.

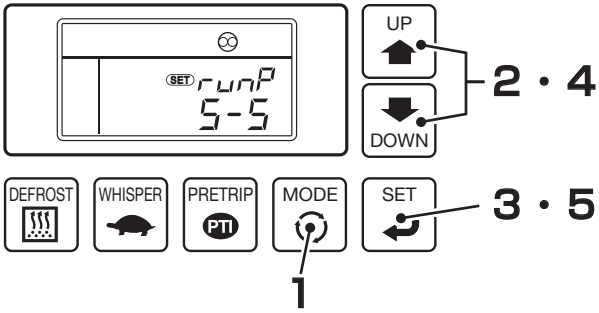
- It may cause damage of the refrigeration unit or a fire if any other power supply is used.

Connect the commercial power supply.
Commercial power supply icon lights.



1 **Connect the commercial power supply to the socket of the refrigeration unit.**

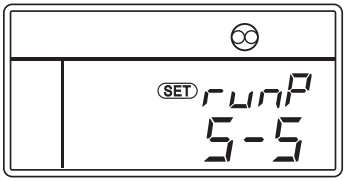
Selecting the operation pattern



1 **Press the [MODE] switch.**

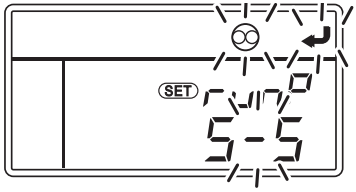
⇒ The display changes to the "Clock/calendar display mode".

2 **Press the [UP] or [DOWN] switch until the display changes to the "Operation pattern selection mode". (Right figure)**



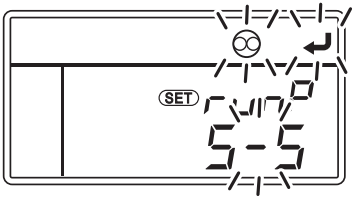
3 **Press the [SET] switch.**

⇒ The LCD display changes to the operation pattern selection setting screen.



4 **Press the [UP] or [DOWN] switch to select the automatic start/stop operation or the continuous operation.**

⇒ S-S : Automatic start/stop operation (At the shipment)
Cont : Continuous operation



5 **Press the [SET] switch.**

⇒ Selection is completed, and the display returns to the "Operation pattern selection mode".

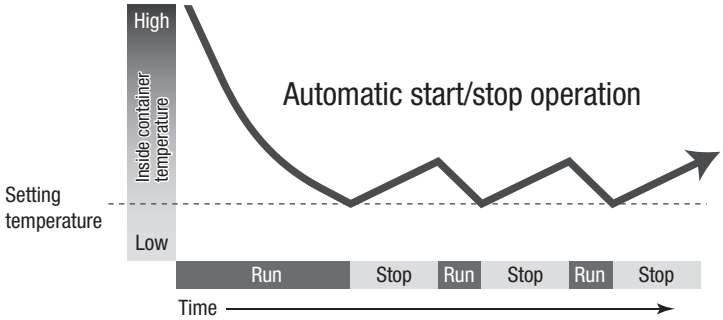
Notice

● 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.

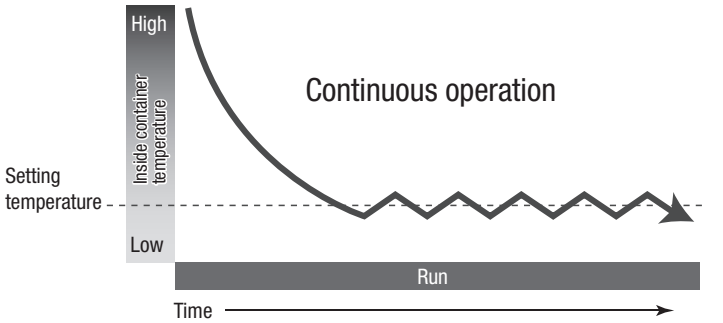
* Thermostat OFF: The action that the engine (motor) stops automatically after inside container temperature reached to the setting temperature. (As the controller is active, it re-starts automatically.)

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.

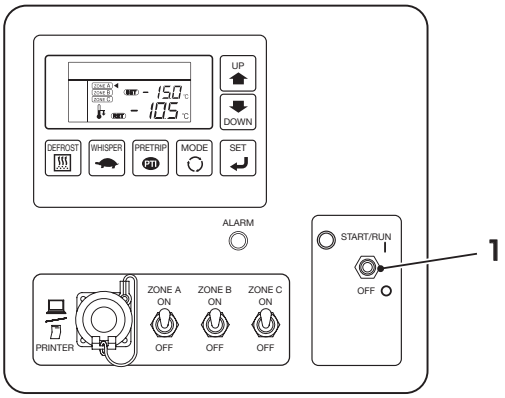


● What is the continuous operation?

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. 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 of temperature.



Starting the operation



⚠ WARNING

Confirm that all the panels of the refrigeration unit are closed before starting operation.

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

1 **Turn the operation switch to “START/RUN” till a click is heard. (The switch returns to its center position if the finger is released.)**

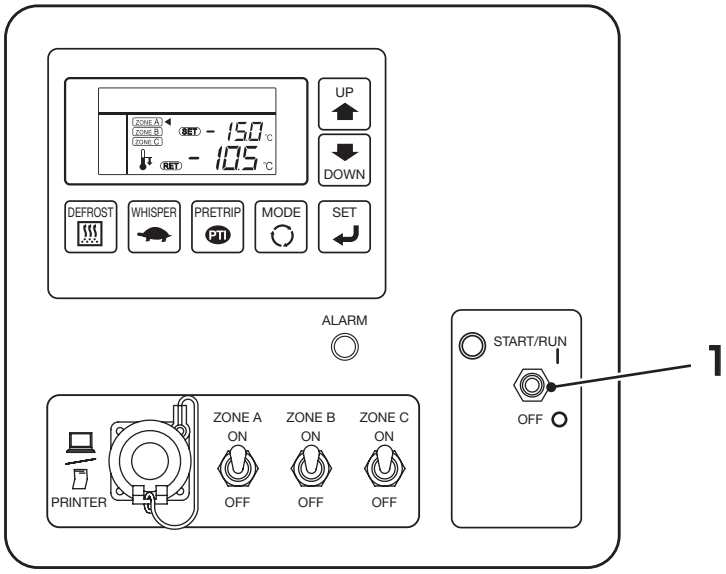
⇒ Run indicator lamp (green) lights and inside container temperature and setting temperature are displayed on the LCD display. Commercial power supply icon lights when the unit is driven by the motor.

⇒ 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).

Notice

- The refrigeration unit will not start while the panel 1 is open, because the safety device is tripped. (Error code E030 is displayed. If you close the panel 1, 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.
- Warning buzzer may be turned off. If you need to change the setting, consult your dealer.

Stopping the operation



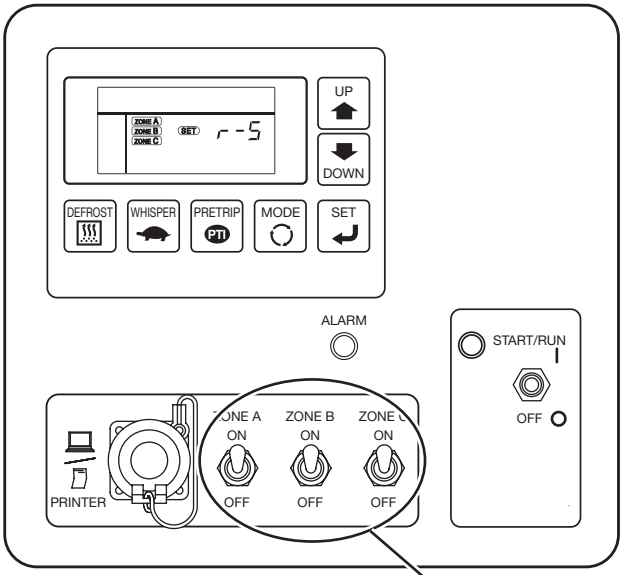
1 **Turn the operation switch to “OFF” till a click is heard.**
(The refrigeration unit is turned “OFF”.)

⇒ The refrigeration unit stops the operation automatically after performing the device protecting operation for 10 to 20 seconds. (During the device protecting operation, " Pu_d " flickers on the upper digital display while " StoP " flickers on the lower digital display.)

⇒ If all sequence for the operation stop is completed, the controller is turned off automatically.

Notice

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



* Above figure applies to the 3-compartment model. ZONE C is not displayed in case of 2-compartment model.

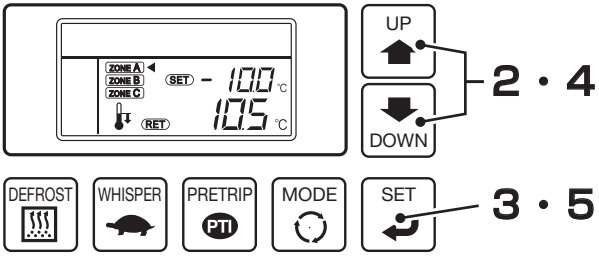
Method to start/stop operation at each compartment

1 **Turn the “ZONE X on/off setting switch” of the compartment (zone) “X” to be operated to the “ON” side. Turn the “ZONE Y on/off setting switch” of the compartment (zone) “Y” not to be operated to the “OFF” side. (In case of 2-compartment model, operation of “ZONE C on/off setting switch” is invalid.)**

Notice

- The unit cannot be operated if all the three switches for zones A, B, and C are turned to the “OFF” side.

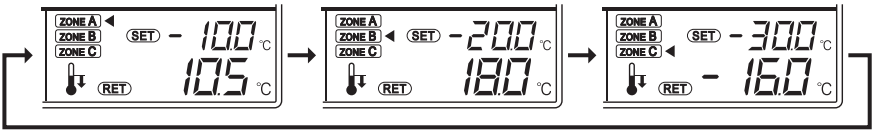
Setting temperature



* Above figure applies to the 3-compartment model.
ZONE C is not displayed in case of 2-compartment model.

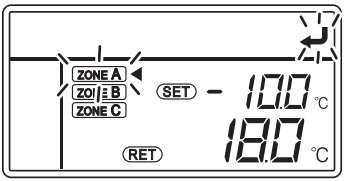
1 Start to operate the refrigeration unit. (☞ Refer to page 43.)

⇒ Display changes at every 4-seconds to show the setting temperature/inside container temperature at each compartment.



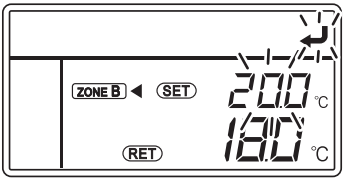
2 Press the [UP] or [DOWN] switch.

⇒ Select the compartment (zone) to set the temperature. Selected compartment (zone) starts to blink with ◀ mark displayed on the right side.

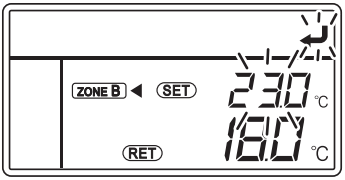


3 Press the [SET] switch.

⇒ Current setting temperature on the upper digital display starts to blink.



4 Press the [UP] or [DOWN] switch to change the temperature.



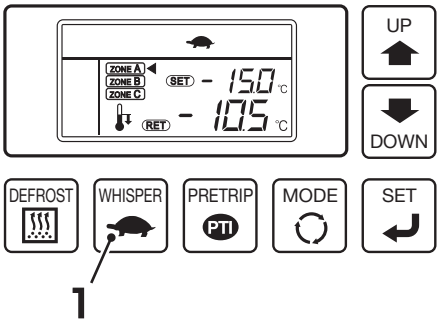
Notice

- Each press on the [UP] switch increases the value by 0.5 (°C) while each press on the [DOWN] switch decreases the value by 0.5 (°C)). (In case of Fahrenheit by 1)
- Keeping pressing either switch changes the value continuously.

5 Press the [SET] switch.

⇒ The setting is completed and the screen returns to the "Normal display screen". (☞ Refer to page 24.)

Whisper operation (Only for engine drive)



1 **Press the [WHISPER] switch.**

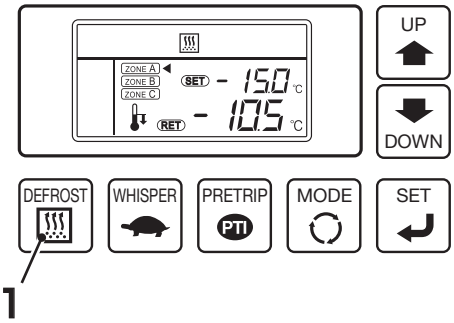
⇒ It changes to the whisper operation and one more press on the switch returns it to the normal operation.
When the whisper operation is enabled, the whisper operation icon lights on the icon bar.

Even when the whisper operation is selected, the setting is reset as the unit operation is stopped. Press the [WHISPER] switch to reset the whisper operation, if needed, at each time when the operation is started.

Notice

- 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 the vehicle is stopping and so on.
(The whisper operation can be set only when the controller is operating and the engine drive is enabled.)
- The setting can be changed so that the whisper operation will not be reset even if the unit operation stops. If you need this setting, contact your nearest dealer.

Manual defrost operation



Starting

1 **Press the [DEFROST] switch once during the cooling operation.**

⇒ "Defrost operation icon [❄]" lights and the defrost operation starts.

Notice

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

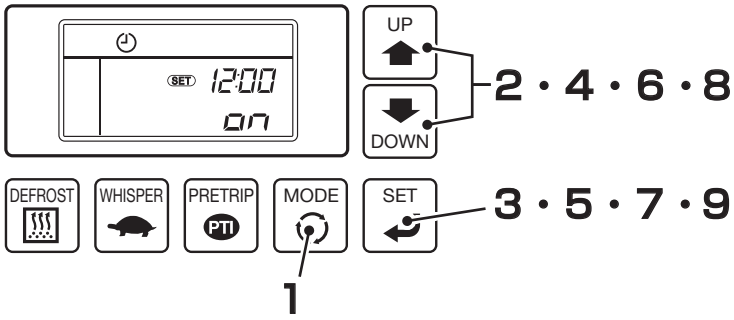
Stopping

As the defrost operation completes, the refrigeration unit returns to the cooling operation.
If you need to interrupt the defrost operation and return to the cooling operation, press the [DEFROST] switch once more.
If the operation switch is turned to "OFF", the defrost operation is interrupted and the refrigeration unit stops.

Notice

- Manual defrost operation can be started even during the unit stop by thermostat off.
- Manual defrost operation can not be started during the unit operation stop or during the heating operation.

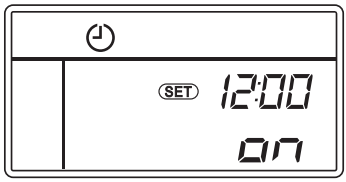
Setting the ON timer



1 **Press the [MODE] switch.**

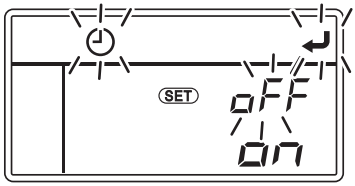
⇒ The display changes to the "Clock/calendar display mode".

2 **Press the [UP] or [DOWN] switch until the display changes to the "ON timer setting mode". (Right figure)**

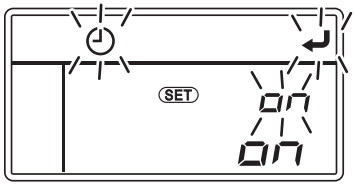


3 **Press the [SET] switch.**

⇒ "on" or "oFF" starts to blink on the upper digital display.
Icons and start to blink.



4 **Press the [UP] or [Down] switch to select "on".**

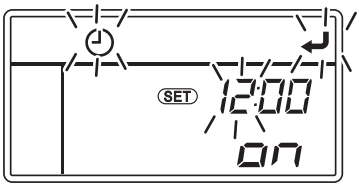


Notice

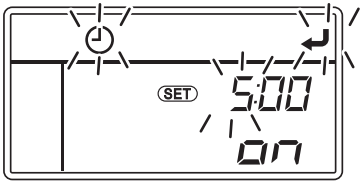
- "on" or "oFF" is displayed alternately by pressing the [UP] and [DOWN] switches.
- When ON timer setting is not to be set or to be cancelled, select "oFF".

5 **Press the [SET] switch.**

⇒ The setting time (hour) starts to blink.



6 **Press the [UP] or [DOWN] switch to adjust the time to the ON timer setting time (hour).**

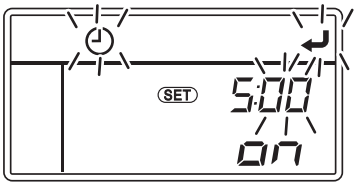


Notice

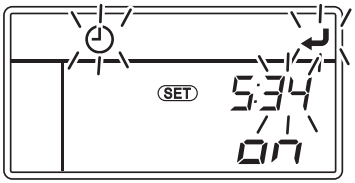
- The clock shows the time up to 24 hours.
  Set "19:00" if it is 7 o'clock PM.

7 **Press the [SET] switch.**

⇒ The setting time (minute) starts to blink.



8 **Press the [UP] or [DOWN] switch to adjust the time to the ON timer setting time (minute).**



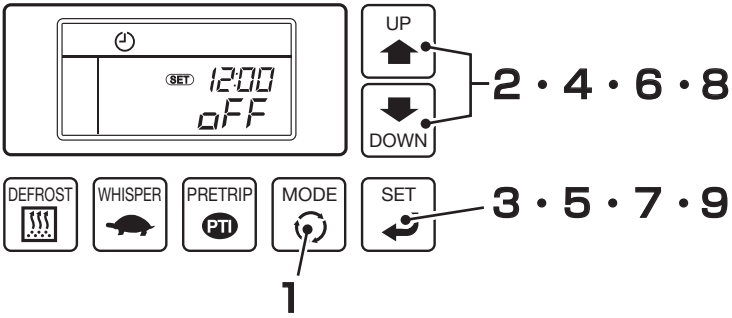
9 **Press the [SET] switch.**

⇒ The setting is completed and the display returns to the "ON timer setting mode".

Notice

- When performing the timer operation with the motor drive, confirm that the commercial power supply is connected to the refrigeration unit.
- When the ON timer operation is selected, take note that the refrigeration unit starts the operation automatically at the setting time.
- Set beforehand the operation pattern to be turned on at the timer startup.
- ON timer setting will be reset once the timer start is activated.

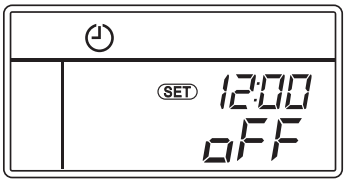
Setting the OFF timer



1 **Press the [MODE] switch.**

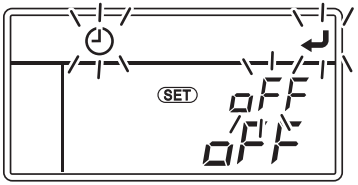
⇒ The display changes to the "Clock/calendar display mode".

2 **Press the [UP] or [DOWN] switch until the display changes to the "OFF timer setting mode". (Right figure)**

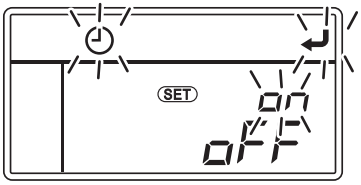


3 **Press the [SET] switch.**

⇒ "on" or "oFF" starts to blink on the upper digital display.
Icons and start to blink.



4 **Press the [UP] or [Down] switch to select "on".**

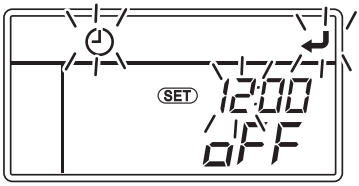


Notice

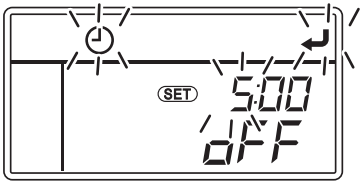
- "on" or "oFF" is displayed alternately by pressing the [UP] and [DOWN] switches.
- When OFF timer setting is not to be set or to be cancelled, select "oFF".

5 **Press the [SET] switch.**

⇒ The setting time (hour) starts to blink.



6 **Press the [UP] or [DOWN] switch to adjust the time to the OFF timer setting time (hour).**

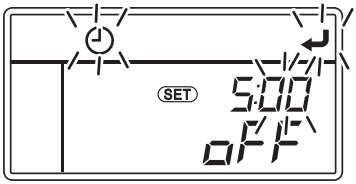


Notice

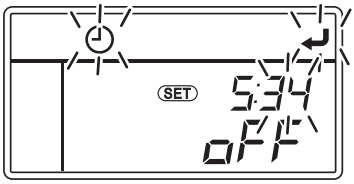
- The clock shows the time up to 24 hours.
  Set "19:00" if it is 7 o'clock PM.

7 **Press the [SET] switch.**

⇒ The setting time (minute) starts to blink.



8 **Press the [UP] or [DOWN] switch to adjust the time to the OFF timer setting time (minute).**



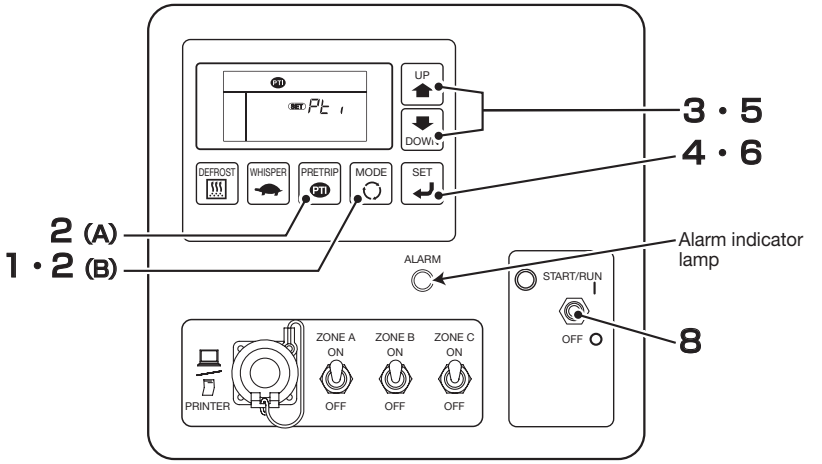
9 **Press the [SET] switch.**

⇒ The setting is completed and the display returns to the "OFF timer setting mode".

Notice

- When the OFF timer operation is selected, take note that the refrigeration unit stops the operation automatically at the setting time.
- OFF timer setting will be reset once the timer stop is activated.

Self diagnosis operation (PTI operation)



Notice

- Perform the self diagnosis operation without fail before the operation.
- Close the partition or door between the compartments before the self diagnosis operation.
- Self diagnosis operation consists of two types of operation as follows.

  PTIL : Self-diagnose operation of functional parts check only
  PTIH : Self-diagnose operation including cooling and defrosting operations
- Self diagnosis operation takes approximately 5 minutes for “L” or approximately 30 minutes for “H” from start to end. (It may take a little longer depending on the setting temperature and the ambient temperature.)
- The inspection of the motor drive is skipped when the power supply is not connected.

Starting the operation

A: Using touch switches (PTIL)

1 **Press the [MODE] switch when the refrigeration unit is stopped.**

⇒ The controller becomes activated and the display changes to the "Normal display screen".

Notice

- Proceed to the procedure 2 when the refrigeration unit is operating.

2 Press the [PRETRIP] switch.

⇒ If the [PRETRIP] switch is pressed during operation, the refrigeration unit stops temporarily.

⇒ The self diagnosis operation starts, and the step numbers are shown on the lower digital display.

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

B: Using PTI setting mode (selecting PTIL or PTIH)

1 Press the [MODE] switch when the refrigeration unit is stopped.

⇒ The controller becomes activated and the display changes to the "Normal display screen".

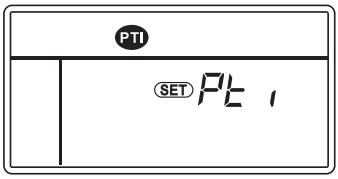
Notice

- Proceed to the procedure 2 when the refrigeration unit is operating.

2 Press the [MODE] switch.

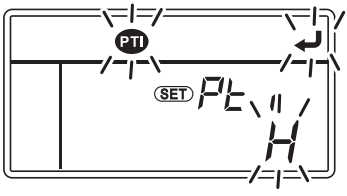
⇒ The display changes to the "Clock/calendar display mode".

3 Press the [UP] or [DOWN] switch until the display changes to the "PTI setting mode".

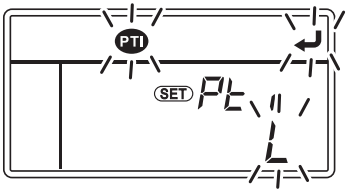


4 Press the [SET] switch.

⇒ The LCD display changes to show the PTI selection setting mode.

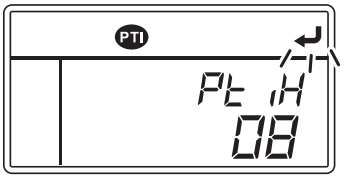


5 **Press the [UP] or [DOWN] switch to select the type of self diagnosis operation.**



⇒ L : Self diagnosis operation of functional parts check only
H : Self diagnosis operation including cooling and defrosting operations

6 **Press the [SET] switch.**



⇒ If the [SET] switch is pressed during operation, the refrigeration unit stops temporarily.

⇒ The self diagnosis operation starts, and the step numbers are shown on the lower digital display.

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

Finishing the operation when no defects are detected

7 **When no abnormal condition has been detected, " End " is displayed on the lower digital display.**

8 **Turn the operation switch to “OFF” till a click is heard.**

⇒ The controller will stop.

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

When abnormal conditions are detected

" End " and the error code corresponding to the abnormal condition are displayed alternately on the lower digital display. Check the alarm code (☞ Refer to pages from 79 to 82) and perform proper treatment or contact your nearest dealer.

6 Loading and unloading

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 59.)
*** Consult with your body manufacturer for the contents of inspection.**

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 46.)

Notice

- 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.

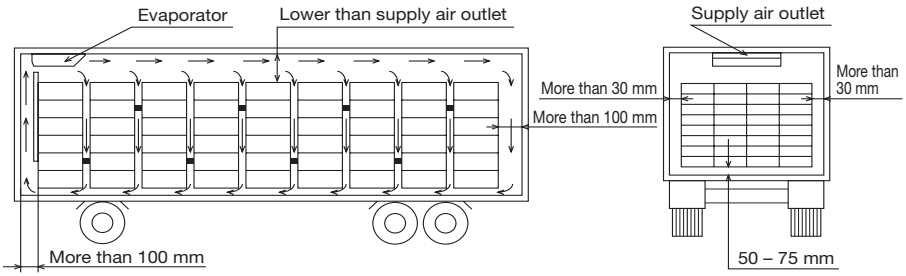
Loading and unloading

Loading procedure

1 **Stop the cooling operation. (☞ Refer to page 44.)**

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 43.)**

Unloading procedure

1 **Stop the cooling operation. (☞ Refer to page 44.)**

2 **Unload the cargoes.**

Notice

- 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 panel.

- It may cause injury if the refrigeration unit is operated with the panel 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 panels

The panels on the refrigeration unit can be opened and closed without using tools to facilitate the inspection.

Notice

- Open the panel 1 at first.

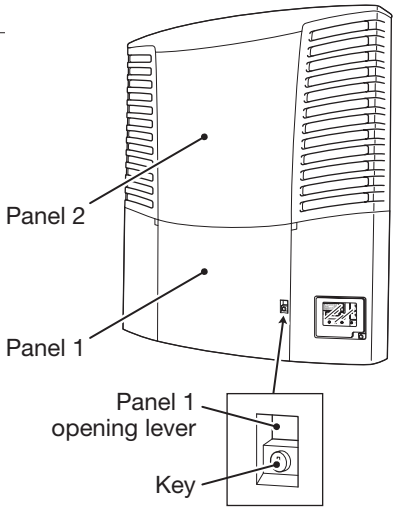
Opening the panel 1

1 **Unlock the key below the “Panel 1 opening lever” on the panel 1.**

2 **Push in the “Panel 1 opening lever”.**

⇒ The lock is released and the panel 1 will come out a little.

3 **Open the panel 1 by hand.**

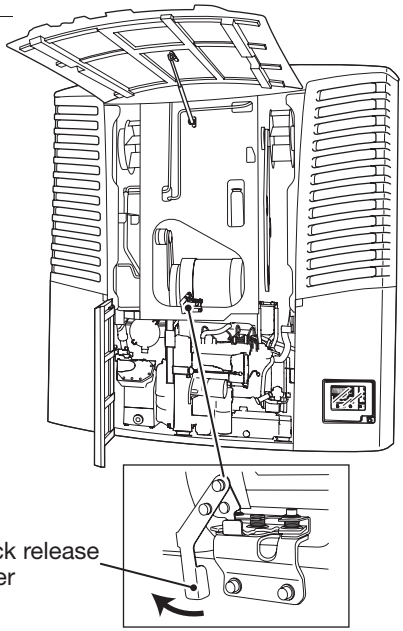


Opening the panel 2

1 **When the panel 1 is fully opened, push in to the left the “Lock release lever” located at the bottom center of the panel 2.**

⇒ The lock is released and the panel 2 will come out a little.

2 **Pull up the lower end of the panel 2 to open. The panel will open upward by the force of gas spring from halfway.**



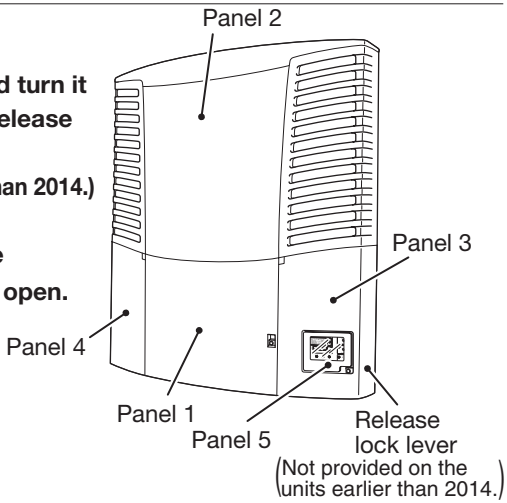
Opening the panel 3

1 **Raise the release lock lever, and turn it by 90° to counterclockwise to release the lock.**
(Not provided on the units earlier than 2014.)

2 **Pull the wire loop located at the position A while the panel 1 is open.**

⇒ The lock is released and the panel 3 will come out a little.

3 **Open the panel 3 by hand.**



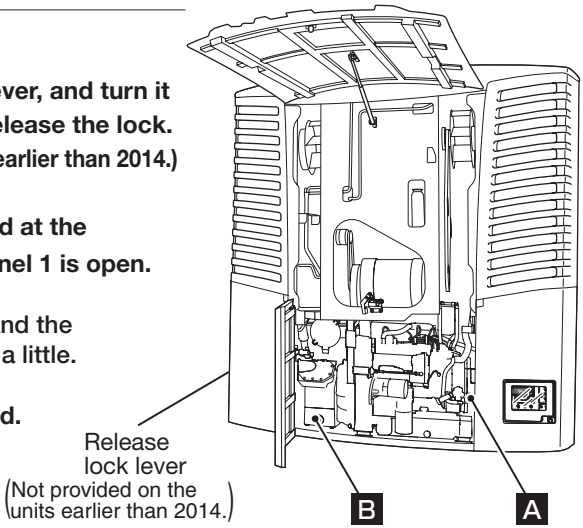
Opening the panel 4

1 **Raise the release lock lever, and turn it by 90° to clockwise to release the lock.**
(Not provided on the units earlier than 2014.)

2 **Pull the wire loop located at the position B while the panel 1 is open.**

⇒ The lock is released and the panel 4 will come out a little.

3 **Open the panel 4 by hand.**

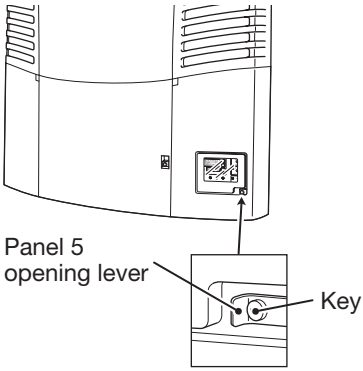


Opening the panel 5

1 **Unlock the key at the “Panel 5 opening lever” on the panel 5.**

2 **Pull the “Panel 5 opening lever” to this side.**

⇒ The lock is released and the panel 5 will open by spring force.



Closing the panels

When closing the panels, from a safety standpoint, firstly close the panels 2, 3 and 4 and then close the panel 1 having protective device in the end.

1 **Fully open the panel 1.**

Notice

- The panel 2 cannot be closed unless the panel 1 is fully opened.

2 **Pull the panel 2 down by hooking the metal fitting on the panel using the pull-down bar provided at the center of the unit. Close the panel 2 by pushing in the ● position indicated in the figure at right.**

⇒ The panel is locked.

3 **Close the panels 3 and 4 by pushing in the ● (PUSH label) positions of each panel.**

⇒ The panels are locked.

4 **Turn the release lock levers on the panels 3 and 4 by 90°to return to the original position, and hold down them to lock. (Not provided on the units earlier than 2014.)**

5 **Close the panel 1 by pushing in the ● (PUSH label) position of the panel 1.**

⇒ The panel is locked.

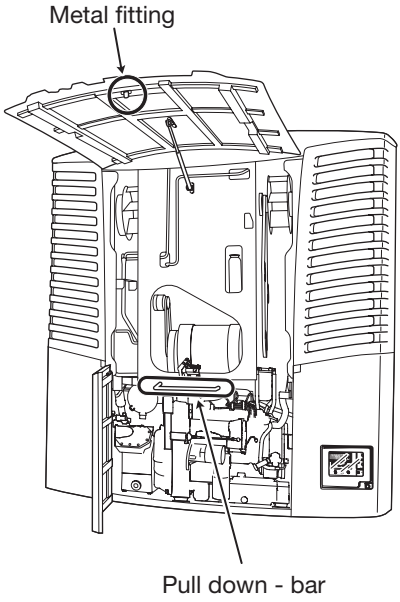
6 **Check if panels 1 through 4 are fully locked.**

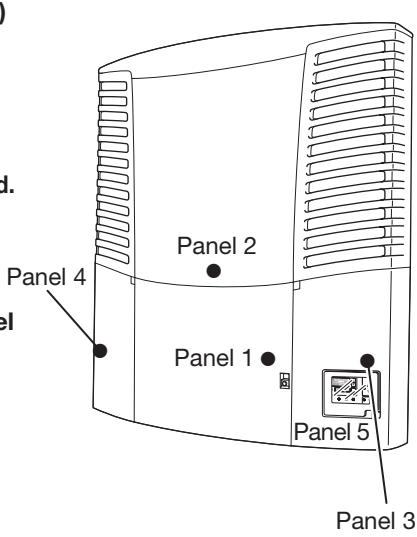
7 **Close the panel 5.**

8 **Apply the lock on the keys on the panel 1 and the panel 5.**

Notice

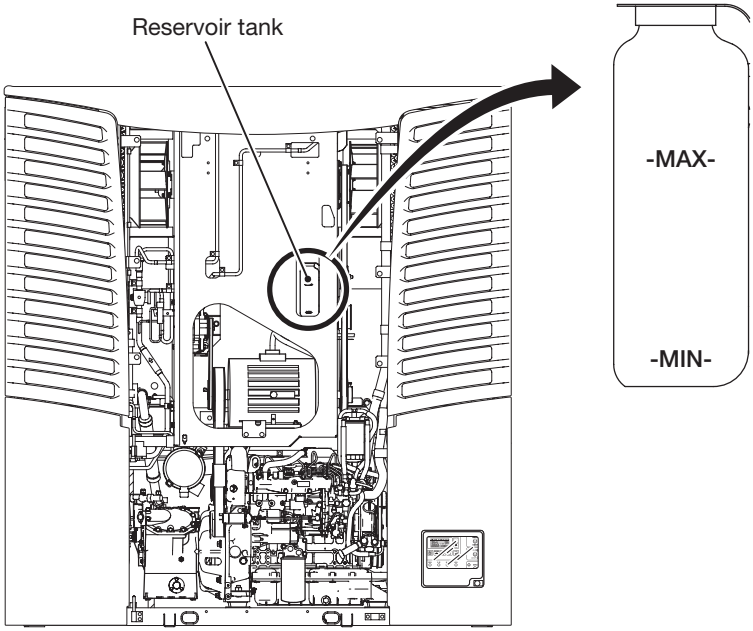
- Unless the panel is pushed in firmly, the lock will not catch properly. In such occasion, the panel may be opened during driving. Make sure to lock the panel securely.





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.

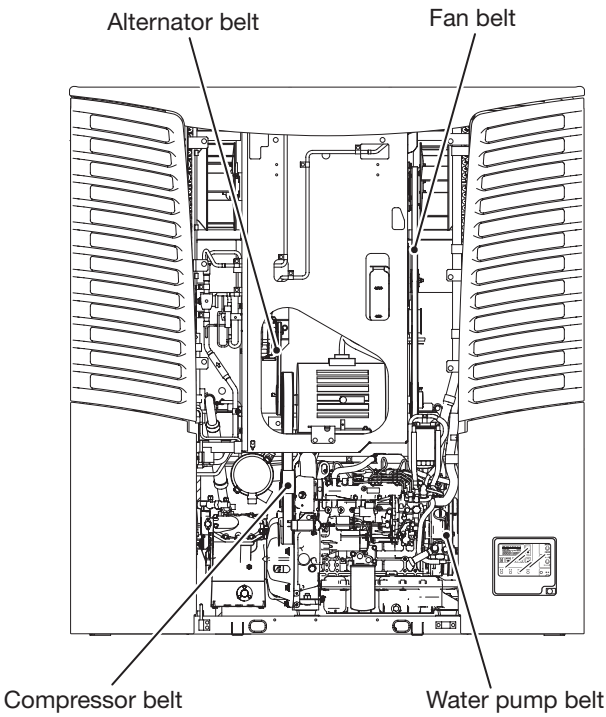
Use the designated antifreeze coolant.

- 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 72 for the designated antifreeze coolant.)

Inspection of belt



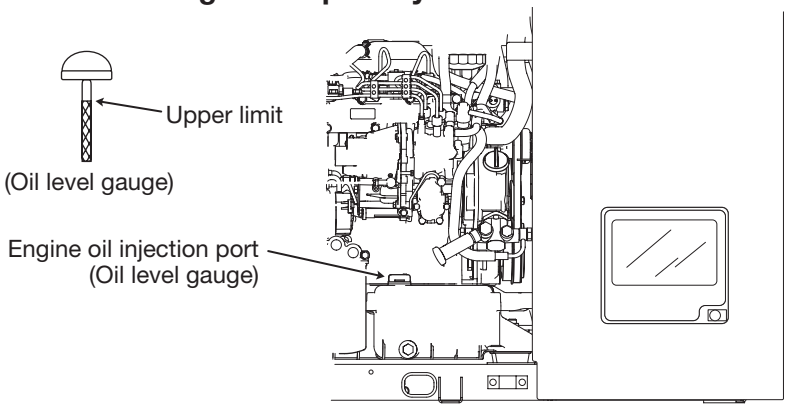
1 **Visually inspect 4 kinds of belt for defects such as scratch, crack or one-sided wear, etc.**

2 **Check the moving sections for interference with other parts.**

Notice

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

Inspection of sub-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 injection port to the level not to excess the upper limit.**
[☞ Refer to page 72 for the designated engine oil.]

Notice

- If the icon 🔧 has lighted when the refrigeration unit is operating and 🔧 has been displayed on EnG 1 screen in the operation time/cycles display 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 35 to 37.)

Inspection of sub-engine fuel quantity

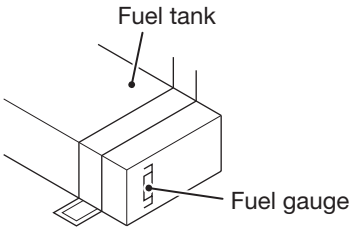
⚠ CAUTION

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 72 for designated fuel.]



Notice

- Stop the operation with the “Operation switch” when refueling during unit operation.
- When fuel has run out, purge air from the fuel hose by the manual pump of the engine after refueling 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.**

Inspection with sight glass

1 **Operate the refrigeration unit for 10 minutes.**

2 **Check if the check-color is green.**

Notice

- If the check-color is yellow, contact your nearest dealer.

When continuously operating the refrigeration unit with low temperature

When operating the refrigeration unit continuously for a long time at 10°C or below, stop the unit operation once or twice a week to remove the ice in the drain pan, etc. Open up the van door to completely melt the ice in the drain pan and discharge it outside of the van.

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 500 hours
2. Inspection at every 1000 hours
3. Inspection at every 1500 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	Model	TFV2000DM-E #/No. BL	Delivery date	
					Ops hour	H1:[ ], H2:[ ], H3:[ ]	Inspection date	
Every 1500 hrs	Every 1000 hrs	Every 500 hrs	Daily inspection	Vehicle	Model		Inspection company	
					Serial No.		Inspector	
				Inspection item			Inspection result	Remarks
			○	Sub-engine oil quantity- Inspection / Replenish				
			○	Fuel quantity- Inspection / Replenish				
			○	Cooling water- Inspection / Replenish				
			○	Sub-engine oil leakage check				
			○	Fuel leakage check				
			○	Cooling water leakage check				
			○	Fuel filter (for water separation) - Inspection / Drainage				
			○	Inspection of damage on belt, interference with moving sections				
			○	Battery check (fluid quantity, specific gravity, loose/corroded terminals, wiring)				
			○	Cleaning of condenser coil, radiator coil, entire refrigeration unit				
			○	Inspection of refrigerant sight glass color, refrigerant quantity, degree of flashing				
			○	Inspection of abnormal sound, abnormal vibration from refrigeration unit				
				Cleaning of air cleaner (at every 250hrs.)				
		○		Sub-engine revolution speed check, revolution sensor check, cleaning				
		○		Replacement of air cleaner				
		○		Inspection of fuel filter				
		○		Greasing of door latch, hinge, etc.				
		○		Inspection of slackened belt, damage on belt				
		○		Inspection of pulley belt groove (rust, abrasion)				
	○			Replacement of cooling water				
	○			Cleaning of evaporator coil, drain port				
	○			Inspection, retouch of painting on main unit				
	○			Inspection of damage (crack, split) on rubber cushion				
	○			Inspection of electromagnetic clutch (noise, vibration)				
	○			Inspection of sub-engine governor lever link and solenoid link related parts				
	○			Operation check of solenoid relays				
	○			Inspection of noise from centrifugal clutch				

Customer							Customer's signature	
Inspection interval				Refrigeration Unit	Model	TFV2000DM-E #/No. BL	Delivery date	
					Ops hour	H1:[ ], H2:[ ], H3:[ ]	Inspection date	
				Vehicle	Model		Inspection company	
					Serial No.		Inspector	
Every 1500 hrs	Every 1000 hrs	Every 500 hrs	Daily inspection	Inspection item			Inspection result	Remarks
	○			Inspection of alternator (noise), measurement of charge amount (high speed, low speed)				
	○			Inspection, retightening of refrigeration unit mounting bolts				
	○			Inspection, retightening of mounting bolts (sub-engine, compressor, compressor head, motor, alternator, rubber cushion, pulley, electromagnetic clutch, fan, solenoid, fan shaft bearing, cover, etc.)				
	○			Inspection of gas leakage from refrigerant system, function test of valves (solenoid, expansion, DPR)				
	○			Inspection of cooling (inspection of temperature display on the display, high/low pressure, thermostat operation)				
	○			Inspection of defrost operation				
	○			Check of motor-driven movements, insulation resistance (deterioration of cables, damage on power plug)				
	○			Inspection of slackened electronic wiring terminals, damage on wire cover (battery harness, starter harness)				
	○			Motion check of high pressure switch, door switch				
	○			Inspection of dirty compressor oil				
○				Replacement of sub-engine oil (including inspection of oil leakage: at 100 hours at initial inspection only)				
○				Replacement of oil filter (at 100 hours at initial inspection only)				
○				Inspection of starter (operation, abnormal noise, vibration)				
○				Water draining from fuel tank				
○				Inspection of idling pulley bearing, tension pulley bearing, fan shaft bearing, electromagnetic clutch bearing (noise)				
				Replacement of belts, alternator, idling pulley bearing, tension pulley bearing, electromagnetic clutch bearing, fan shaft bearing, fan shaft seal (at every 4000 hrs.)				
				Inspection of wear on centrifugal clutch shoe (at every 4000 hrs.)				
				Replacement of engine stop solenoid, pre-heater, standby motor bearing, fuel hose, cooling water hose (at every 6000 hrs.)				
				Replacement of starter, engine high solenoid (at every 10000 hrs.)				
				Overhaul of sub-engine (at every 10000 hrs.)				

Details of applicable oils and cooling water

		Type / Name	Capacity
Engine fuel		Diesel fuel *1	-
Engine oil		Type API Class CE or higher 10W-30	13.5L (including engine oil filter)
Compressor oil		Diamond Freeze MA32R	2.4L
Cooling water	Antifreeze coolant *2	Fuso Diesel Long Life Coolant	7.8L (including reservoir)
	Water	Soft water with fewer impurities	

*1 At a cold region, use a type of kerosene adapted to the cold weather. Otherwise, the fuel could freeze and damage the engine.

*2 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)	2.34	2.73	3.12	3.51	3.90	4.29	4.68
Lowerst ambient temperature (°C)	-10	-15	-20	-25	-30	-35	-40

*Initial setting: Antifreeze coolant concentration: 50%wt

Notice

- 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.

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 of 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 to 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.
A protective operation for extended interruption of operation will be automatically conducted if the duration of operation stop continues for one week. (☞ Refer to page 74)

Notice

- When the unit is stopped for a long period of time, the protective operation will be conducted automatically. Follow the instruction of section 3 “Precaution for safety”.
- When the unit is to be stopped with a situation unable to operate for a long period of time due to trouble and so on, contact with your nearest dealer to take measures for long-term stopping.

Sleep operation (Long-term stop protection)

If the refrigeration unit is left over without operating for one week, protective operation (long-term stop protection operation) is conducted automatically.
☞ Refer to page 34 for setting the sleep operation.

- Protective operation is conducted between 10:00 and 16:00 hours.
- The operation time is approximately 5 minutes including the time for start and stop of sub-engine.
- When the unit is connected to the commercial power supply, the unit operates with the motor drive irrespective of the position of the drive selector switch.
- In case of the sub-engine drive, the unit operates with the sub-engine slow speed.
- There is no air supply in the container. (Evaporator fan does not operate.)
- During the protective operation, " Auto Prot "is displayed on the LCD.

Pre-operation preparation

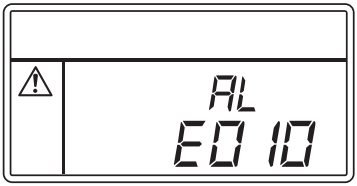
Set the refrigeration unit in the following conditions to conduct long-term protection operation.

- Turn the main switch to “ON” side.
- Leave the battery terminals be connected.
- Close all the panels of the refrigeration unit.
- Fill the fuel tank. (Or, leave the power cable be connected to the commercial power supply.)

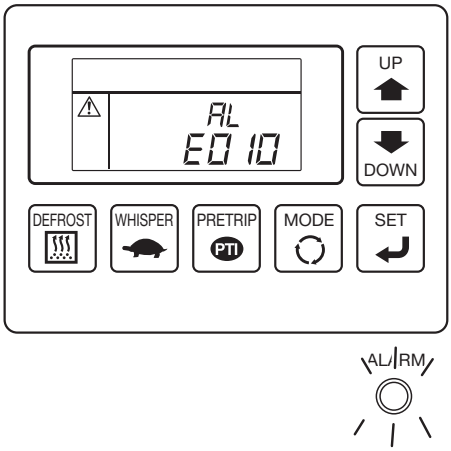
9 For emergency

Alarm display

- When any trouble occurs, the warning icon ⚠ lights (backlight blinks) or blinks.
- Check the alarm code displayed in the digital display area.
  When no alarm codes are displayed in the digital display area, switch the screen to the "Current alarm display" manually in the following procedure, and check the contents.



Switching "Normal display" and "Current alarm display"



Switching from "Normal display screen" to "Current alarm display mode"

Press once on the [MODE] switch. (The display returns to the "Normal display screen" 10 seconds later.))

Extending "Current alarm display mode"

Press the [SET] switch on the "Current alarm display mode" screen.

Switching from "Current alarm display mode" to "Normal display screen"

Press the [MODE] switch 2 times on the extended display of "Current alarm display mode".
(The screen changes to "Normal display screen" in 10 seconds in case of 1 press.)

Countermeasures

Refer to "List of alarm codes" for the contents of each alarm code and its countermeasure.
(☞ Refer to pages 79 to 82)

⚠ 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 fuse with designated capacity and specification.

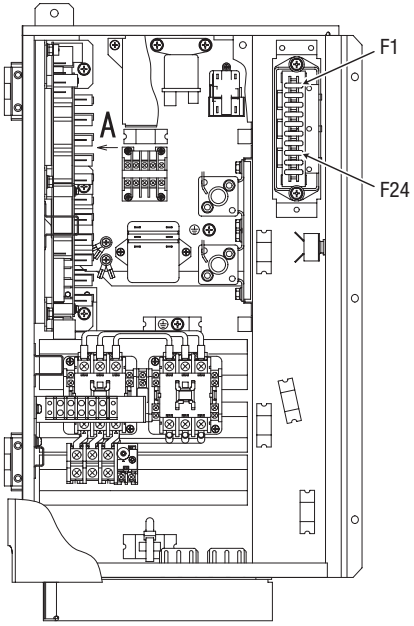
- If any other fuses or other substitutes are used, it may cause a fire or an electric shock.

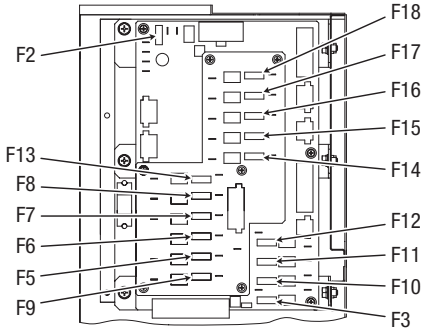
Surely stop the operation of refrigeration unit with the "Operation switch" and set the "Main switch" to "OFF", then disconnect the battery terminal and plug for power code to change the fuse.

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

9 For emergency

Fuses are mounted in the control box of condensing unit.





View A

F1 : 15 A (operation circuit)
F2 : 15 A (Relay circuit)
F3 : 10 A (Fan electromagnetic clutch
F5 : 15 A (Evaporator fan motor B1)
F6 : 15 A (Evaporator fan motor B2)
F7 : 15 A (Evaporator fan motor B3)
F8 : 15 A (Evaporator fan motor B4)
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 A (Evaporator fan motor C1)
F14 : 15 A (Evaporator fan motor C2)
F15 : 15 A (Evaporator fan motor C3)
F16 : 15 A (Evaporator fan motor C4)
F17 : 10 A (Drain hose heater B)
F18 : 10 A (Drain hose heater C)
F24 : 5 A (Remote monitoring (Option))

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

- Turn the operation switch on the cabin controller to the "OFF" side to stop the unit. (Confirm that the LCD display is turned off.)
- Turn the operation switch to the "START/RUN" side to resume the operation of the 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
E004	Throttle solenoid fuse has blown.	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 has blown.	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 is defective.	Commercial power supply is in failure or disconnected. Check the power supply.	Blinking	Unit stops. (Automatic operation resume)
E010	High pressure protection device tripped.	High-pressure switch has tripped. (1) Open the panel 1 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	Discharge gas temperature is abnormally high.	Refrigerant temperature at the compressor discharge side has reached the protective temperature. Consult a dealer.	Blinking	Unit stops. (Automatic operation resume)
			On	Unit stops.
E016	Low-pressure is abnormally low or abnormal low-pressure sensor .	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	Abnormal high-pressure sensor.	High-pressure sensor is in failure. Ask a dealer for inspection.	Blinking	Unit stops.
E020	Engine oil is short. (Only when optional oil level switch is installed.)	Engine oil level switch has tripped. Replenish engine oil (Diesel, 10W30, CE or above) until oil level comes to the upper limit of oil level gauge.	On	Unit stops.
E021	Engine cooling water temperature is abnormally high.	Engine cooling 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 refrigeration unit).	On	Unit stops.
E023	Engine speed is 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 is abnormally high.	Engine speed has increased far beyond the setting value. Ask a dealer for inspection.	On	Unit stops.
E030	Unit panel open.	Unit panel is open. Close all the panels completely.	Blinking	Unit stops. (Automatic operation resume)
E031	Motor over-current protection device tripped.	Motor over-current protection device has tripped. Ask a dealer for inspection.	Blinking (lights after 1 blinking)	Unit stops. (Automatic operation resume repeats up to 1 times.)
E032	Poor alternator generation.	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 (On when battery voltage is low.)	Unit operation continues. (Unit stops when battery voltage is low.)
E050	Abnormal return air temperature sensor.	Return air temperature sensor A or B or C is disconnected or shorted. Ask a dealer for inspection.	Blinking	Unit operation continues.
E054	Abnormal throttle solenoid.	Engine cannot operate at high speed due to failure on throttle solenoid. Ask a dealer for inspection.	Blinking	Unit operation continues.

Alarm Code	Trouble	Countermeasure	Alarm Lamp	Unit Condition
E060	Abnormal high-pressure switch.	High-pressure switch has failed. Ask a dealer for inspection.	Blinking	Unit stops. (Automatic operation resume)
E063	Abnormal discharge gas temperature sensor.	Discharge gas temperature sensor is disconnected or shorted. Ask a dealer for inspection.	Blinking	Unit operation continues.
E070	Abnormal engine oil pressure switch.	Engine oil pressure switch has failed. Ask a dealer for inspection.	On	Unit stops.
E081	Abnormal motor over-current protection device.	Motor over-current protection device has failed. Ask a dealer for inspection.	On	Unit stops.
E099	Controller communication error	Controller cannot communicate properly. Ask a dealer for inspection.	On	Unit stops. (Automatic operation resume repeats up to 9 times.)
E201	Contactor failed to operate properly.	Motor contactor has failed to operate properly. Ask a dealer for inspection.	On	Unit stops.
E202	Open-phase at L1-phase.	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.
E203	Fan clutch fuse has blown.	Fuse F4 has blown. Replace the fuse F4 (10A) in the control box with a spare fuse. If the same trouble repeats after the replacement, ask a dealer for inspection.	On	Unit stops.
E204	External equipment power supply fuse has blown.	Fuse F10, F11 or F12 has blown. Replace the blown fuse (10A) in the control box. If the same trouble repeats after the replacement, ask a dealer for inspection.	Blinking	Unit operation continues.
E205	Drain hose heater fuse has blown.	Fuse F17 or F18 has blown. Replace the blown fuse (10A) in the control box. If the same trouble repeats after the replacement, ask a dealer for inspection.	Blinking	Unit operation continues.
E210	Pump down is abnormal.	Pump down error has been detected during self diagnosis operation (PTI operation).	On	Unit stops.
E220	Engine oil supply is demanded. (Only when optional oil level switch is installed.)	Engine oil reserved scarcely. Replenish engine oil (Diesel, 10W30, CE or above) until oil level comes to the upper limit of oil level gauge.	Blinking	Unit operation continues.
E221	Poor control of engine low speed.	Engine low speed is extensively deviated from the rated speed. Ask a dealer for inspection.	Blinking	Unit operation continues.
E222	Poor control of engine high speed.	Engine high speed is extensively deviated from the rated speed. Ask a dealer for inspection.	Blinking	Unit operation continues.
E223	Engine stalls frequently.	Engine stalls frequently. Check if fuel exists in the fuel tank. If fuel exists, ask a dealer for inspection.	On	Unit stops.
E250	Abnormal evaporator outlet temperature sensor.	Evaporator outlet temperature sensor A or B or C is disconnected or shorted. Ask a dealer for inspection.	Blinking	Unit operation continues.
E252	Abnormal supply air temperature sensor.	Supply air temperature sensor A or B or C is disconnected or shorted. Ask a dealer for inspection.	Blinking	Unit operation continues.
E256	Abnormal ambient air temperature sensor.	Ambient air temperature sensor is disconnected or shorted. Ask a dealer for inspection.	Blinking	Unit operation continues.
E260	Abnormal defrost solenoid valve.	Defrost solenoid valve (SV2-A1 or SV2-M) has failed. Ask a dealer for inspection.	On	Unit stops.

Alarm Code	Trouble	Countermeasure	Alarm Lamp	Unit Condition
E261	Abnormal defrost solenoid valve.	Defrost solenoid valve (SV2-A2 or SV2-B or SV2-C) has failed. Ask a dealer for inspection.	On	Unit stops.
E263	Unloader solenoid valve has failed.	Compressor unloader solenoid valve has failed. Ask a dealer for inspection.	Blinking	Unit operation continues.
E264	Abnormal condenser inlet solenoid valve.	Condenser inlet solenoid valve (SV4) has failed. Ask a dealer for inspection.	On	Unit stops.
E265	Abnormal liquid bypass solenoid valve.	Liquid bypass solenoid valve (SV5) has failed. Ask a dealer for inspection.	On or blinking	Unit operation continues. (Operation stops at PTI.)
E266	Abnormal electronic expansion valve.	Electronic expansion valve (EEV-A or -B or -C) has failed. Ask a dealer for inspection.	On	Unit stops.
E267	Abnormal receiver pressurizing solenoid valve.	Receiver pressurizing solenoid valve (SV7) has failed. Ask a dealer for inspection.	Blinking	Unit operation continues.
E268	Abnormal buzzer circuit.	Buzzer circuit is shorted. Ask a dealer for inspection.	On or blinking	Unit stops. (Operation continues partially.)
E269	Abnormal stop solenoid circuit.	Stop solenoid circuit is disconnected or shorted. Ask a dealer for inspection.	On	Unit stops.
E270	Abnormal starter relay circuit.	Drive coil circuit of starter relay (SR) is disconnected or shorted. Ask a dealer for inspection.	On	Unit stops.
E271	Abnormal motor relay circuit.	Drive coil circuit of motor relay (ARMO) is disconnected or shorted. Ask a dealer for inspection.	On	Unit stops.
E272	Abnormal pre-heater relay circuit.	Drive coil circuit of pre-heater relay (ARPH) is disconnected or shorted. Ask a dealer for inspection.	On	Unit stops.
E280	Battery voltage drop	Battery voltage has dropped. Replace the battery if aged.	On or blinking	Unit stops. (Operation continues partially.)
E281	Evaporator fan motor fuse has blown.	One or more of evaporator fan motor fuses F5, F6, F7, F8, F13, F14, F15 and F16 have blown. Replace the blown fuse (15A) in the control box. If the same trouble repeats after the replacement, ask a dealer for inspection.	Blinking	Unit operation continues.

10 Specification

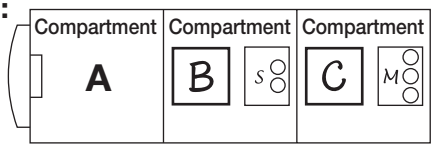
Item \ Model				TFV2000DM-E			
Evaporator unit type				Host evaporator	TMEVX		
					-L	-M	-S
Freezing capacity *1	Ambient temperature		℃	30	30	30	30
	Inside container temperature	0℃	W	18059	11285	9122	7842
		-20℃		9654	5939	5414	4820
Function				Refrigeration/heating			
Working environment	Inside container temperature		℃	-30~+25			
	Ambient temperature			-20~+40			
Unit dimensions	W×H×D	Outer side	mm	2000 × 2138 × 430			
		Evaporator		1659 × 1150 × 100	2000× 200× 743	1000× 200× 743	760× 200× 743
Unit weight			kg	920 (Excluding battery)	50	31	25
Drive system				Dedicated engine (diesel) and motor			
Operating system				Automatic start/stop and continuous operation selection			
Engine	Model			4TNV88-SMRE			
	Displacement		cm^3	2189			
	Bore × Stroke × Cylinders		mm	ø88 × 90 × 4			
	Continuous operation fuel consumption		ℓ/h	5.2 (Ambient temperature 30°C, Inside container 0°C)			
	Oil capacity		ℓ	13.5 (Diesel oil 10W30, CE (API) or above)			
	Fuel			Diesel fuel			
	Rated output / speed		kW/min^{-1}	High speed: 25.7/2100, Low speed: 17.7/1450			
Compressor	Model			CR2453LVR-A			
	Working speed		min^{-1}	High speed: 2100, Low speed: 1450			
	Bore × Stroke × Cylinders		mm	ø55 × 55.6 × 4			
	Refrigeration machine oil charge volume		ℓ	2.4 (Diamond Freeze MA32R)			
Evaporator	Type			Aluminum fin & copper tubes			
	Fan	Type		Double suction turbo fan with casing	Turbo fan		
		Outer diameter	mm	310	222		
		Quantity		1	4	3	2
Condenser	Type			Aluminum fin & copper tubes			
	Fan			ø440 Turbo fan × 2			
Motor	Type			Totally-enclosed fan-cooled outdoor type			
	Power supply			3-phase AC 400V 50Hz			
	Number of poles			4			

Item \ Model		TFV2000DM-E
Refrigerant charge volume	kg	R404A, 10.5
Inside container temperature control		Electronic thermostat
Operation control		Microcomputer controller
Defrosting device		Automatic (with defrost timer) and manual
Safety device		High-pressure switch, engine oil pressure switch, engine water temperature switch, fusible plug, motor over-current relay

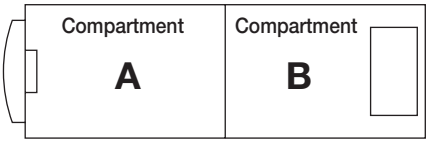
Note *1: Freezing capacity shows the value in case of single evaporator operation.

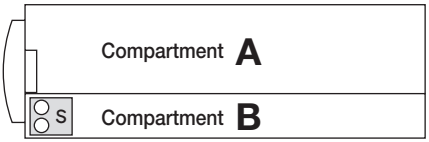
Arrangement of compartments A, B and C

Entry example:

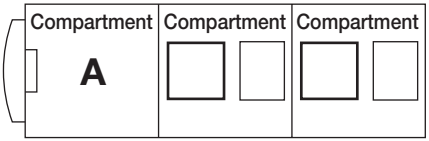


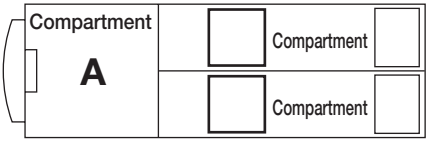
In case of 2-compartment layout:





In case of 3-compartment layout:





Draw the partitions and designation of compartments A, B and C on the figure below if any other layout than above is expected.

MITSUBISHI HEAVY INDUSTRIES
THERMAL SYSTEMS, LTD.

TRANSPORTATION REFRIGERATION DEPARTMENT
3-1, ASAHI, NISHIBIWAJIMA-CHO, KIYOSU, AICHI, 452-8561, JAPAN
Phone : 052-503-9312