

OPERATION MANUAL

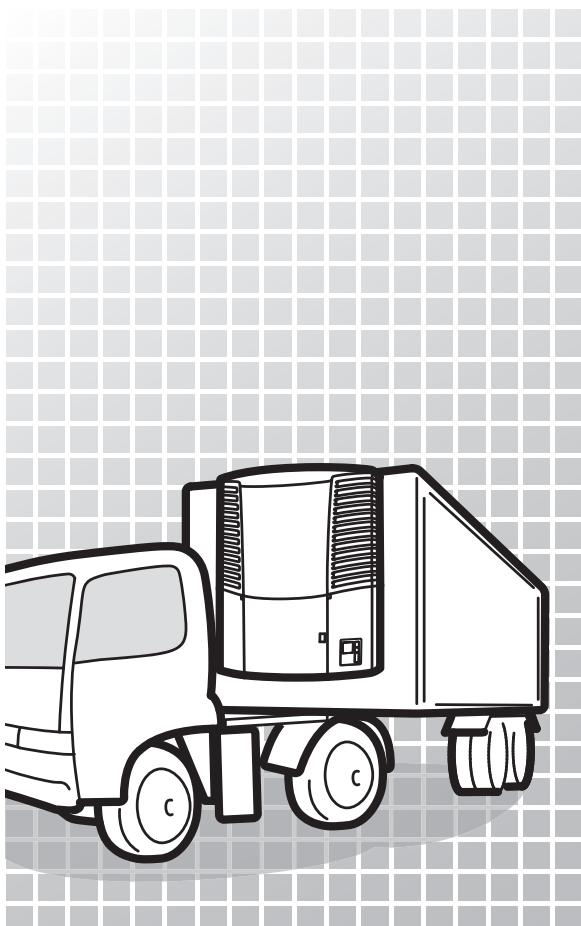
MITSUBISHI TRANSPORT REFRIGERATION UNIT

TFV2000D-E PEGASUS

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.



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 matter) keeping 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 CO₂ 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

| | | | |
|---|----------|--|-----------|
| Purpose of use and application ----- | I | Handling of grease and oil----- | 21 |
| Important information ----- | I | When abnormal conditions are detected | 21 |
| Operation manual----- | II | For emergency ----- | 21 |
| For disposal ----- | II | | |
| Contents ----- | III | | |
| 1 Function of Refrigeration Unit | 1 | 4 Initial setting----- | 22 |
| 2 Name of each part----- | 3 | Mode displays and functions----- | 22 |
| Arrangement plan for main parts ---- | 3 | Outline of the user setting mode----- | 25 |
| Control panel----- | 5 | Setting the printer (Optional)----- | 27 |
| Switches ----- | 6 | Setting the defrost interval timer ---- | 29 |
| Digital display area ----- | 7 | Sleep operation setting----- | 30 |
| Protective devices ----- | 8 | Resetting the cumulative time 1----- | 31 |
| 3 Precaution for safety----- | 9 | Setting the clock ----- | 33 |
| Signs on safety----- | 9 | 5 Operation ----- | 35 |
| Precautions----- | 10 | Power on----- | 36 |
| General precautions----- | 10 | Switching the drive ----- | 37 |
| During and after the operation ----- | 11 | Operating with the sub-engine----- | 37 |
| Inspection/Cleaning/Repair ----- | 12 | Operating with the motor ----- | 38 |
| Loading ----- | 12 | Switching the operation pattern ----- | 39 |
| Handling of electric equipment and power codes | 13 | Selecting the auto start/stop operation -- | 39 |
| Reinstallation of refrigeration unit ----- | 14 | Selecting the continuous operation ----- | 39 |
| Modification of the refrigeration unit and specification change----- | 15 | Operation ----- | 41 |
| Power supply equipment ----- | 15 | Stopping the operation ----- | 43 |
| Emergency measure ----- | 16 | Setting temperature ----- | 44 |
| Handling of warning labels ----- | 18 | Whisper operation (Only for of sub-engine drive)----- | 45 |
| Prevention of start during inspection work-- | 21 | Manual defrost operation ----- | 46 |
| Clothing and protective equipment-- | 21 | Starting ----- | 46 |
| | | Stopping ----- | 47 |
| | | Setting the ON timer ----- | 48 |
| | | Setting the OFF timer----- | 50 |

| | | | |
|---|-----------|--|-----------|
| Self diagnosis operation (PTI operation) ----- | 52 | When operating the refrigeration unit with low inside container temperature continuously for a long period.----- | 66 |
| Starting the operation ----- | 53 | Periodic inspection ----- | 67 |
| Finishing the operation when no defects are detected ----- | 53 | Periodic inspection check sheet ----- | 68 |
| When abnormal conditions are detected ----- | 53 | Details of applicable oils and cooling water ----- | 70 |
| | | | |
| 6 Loading ----- | 54 | 8 Sleep operation ----- | 71 |
| Preparation before loading ----- | 54 | Sleep operation ----- | 71 |
| Loading and unloading ----- | 55 | Preparation for the sleep operation----- | 71 |
| Loading procedure ----- | 55 | | |
| Unloading ----- | 56 | 9 For emergency ----- | 72 |
| | | Error display----- | 72 |
| 7 Inspection----- | 57 | Switching the "Normal display" and "Current error display"----- | 73 |
| Precautions for inspection----- | 57 | Switching from "Normal display screen" to "Current error display mode"----- | 73 |
| Opening of the covers ----- | 59 | Keeping "Current error display mode" continuously ----- | 73 |
| Cover 1 ----- | 59 | Switching from "Current error display mode" to "Normal display screen" ----- | 73 |
| Cover 2 ----- | 59 | Countermeasures----- | 74 |
| Cover 3 ----- | 60 | Changing the fuse ----- | 74 |
| Cover 4 ----- | 60 | When you contact your nearest dealer -- | 75 |
| Cover 5 ----- | 60 | Resuming operation after an error stop-- | 75 |
| Closing the cover ----- | 61 | List of error codes ----- | 76 |
| Daily inspection ----- | 62 | | |
| Inspection of the cooling water quantity- | 62 | | |
| Inspection of the belts----- | 63 | | |
| Inspection of sub-engine oil quantity----- | 64 | | |
| Inspection of sub-engine fuel quantity --- | 65 | | |
| Inspection of leakage and wiring condition ----- | 66 | | |
| Inspection with the sight glass ----- | 66 | | |
| | | 10 Specification ----- | 79 |

1 Function of Refrigeration Unit

This refrigeration unit has following functions.

(1) Drive switching function

This is the function to switch the drive (motor/sub-engine) manually.

☞ Refer to pages 37 and 38 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 switching function

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

☞ Refer to pages 39 and 40 for how to switch operation pattern.

(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 29 for defrosting timer setting.

2) Manual defrosting operation

Defrosting starts forcibly by pressing the switch of controller.

☞ Refer to pages 46 and 47 for how to operate.

After the defrosting operation completes, the refrigeration unit stops once and restarts automatically to return to cooling operation.

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

(4) Whisper operation function

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

☞ Refer to page 45 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 48 to 51 for how to set.

(6) Self diagnosis operation function (PTI operation)

This is the function to diagnose the refrigeration unit automatically if it has any trouble or not. ☞ Refer to page 52 for how to operate.

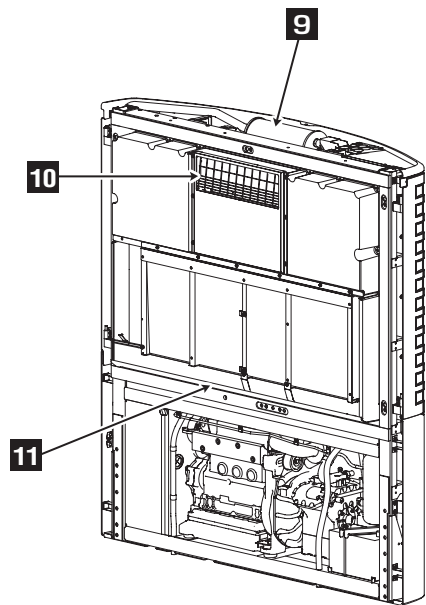
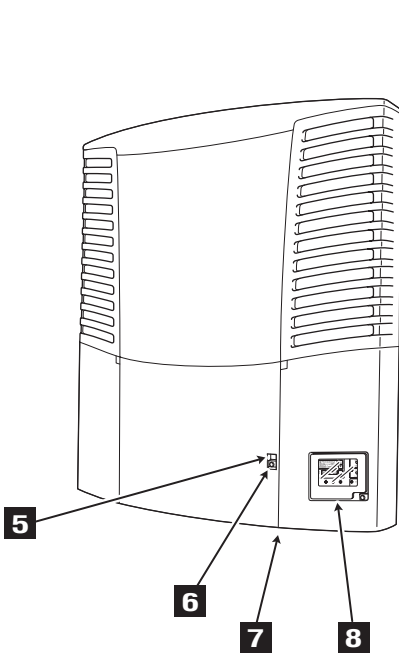
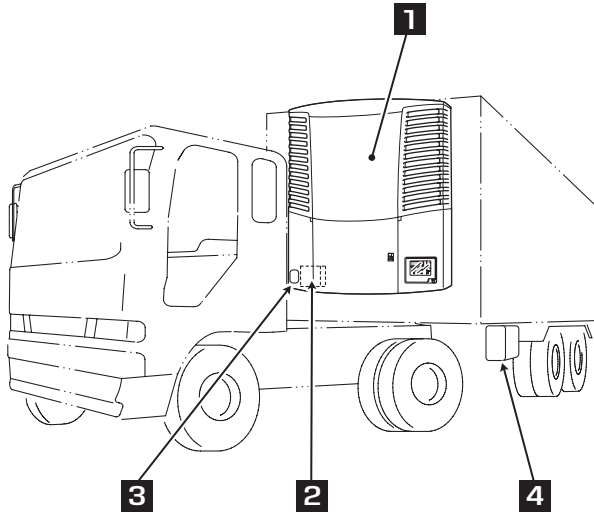
(7) Sleep operation function

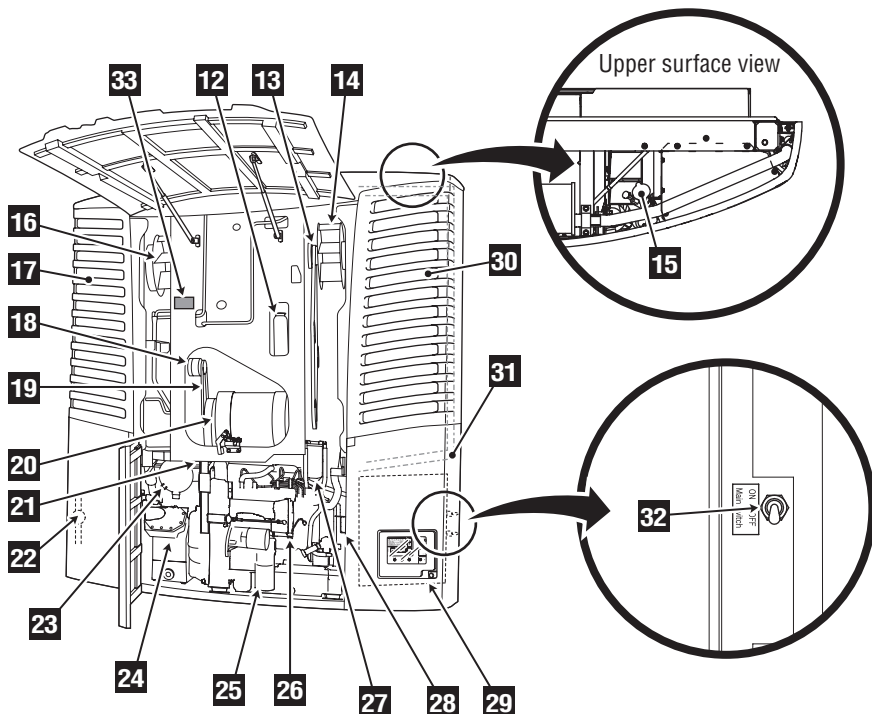
When the refrigeration unit is not used for 1 week, the unit starts and runs for 5 minutes automatically so that battery and compressor could be protected.

☞ Refer to page 30 for how to operate.

2 Name of each part

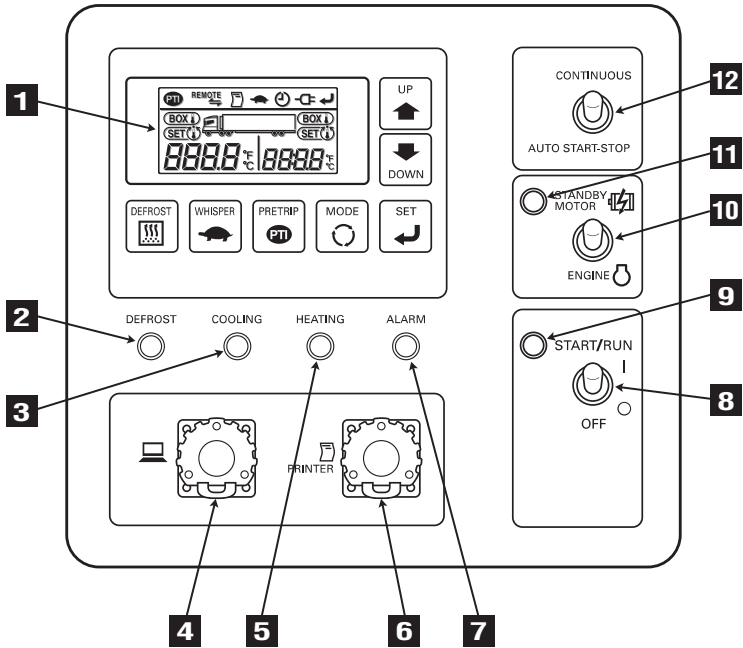
Arrangement plan for main parts





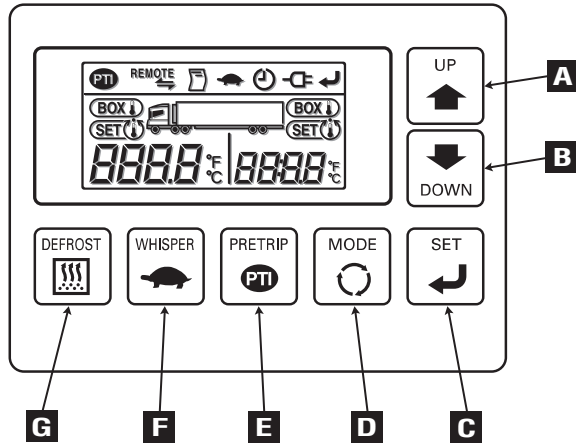
| | | | |
|-----------|--|-----------|----------------------------------|
| 1 | Refrigeration Unit | 18 | Alternator |
| 2 | Battery | 19 | Alternator belt (V belt) |
| 3 | Fuel filter (for water separation) | 20 | Standby motor |
| 4 | Fuel tank | 21 | Compressor belt (10-ribbed belt) |
| 5 | Opening and closing lever for the cover | 22 | Sight glass |
| 6 | Lock for front cover | 23 | Air cleaner |
| 7 | Commercial power socket (Bottom surface) | 24 | Compressor |
| 8 | Control panel | 25 | Oil filter |
| 9 | Muffler | 26 | Sub-engine |
| 10 | Supply air outlet for evaporator | 27 | Fuel filter |
| 11 | Drain pan | 28 | Water pump belt (V belt) |
| 12 | Reservoir tank | 29 | Control box |
| 13 | Fan belt (6-ribbed belt) | 30 | Right condenser |
| 14 | Right condenser fan | 31 | Exhaust pipe |
| 15 | Radiator cap | 32 | Main switch |
| 16 | Left condenser fan | 33 | Label (F-Gas) |
| 17 | Left condenser | | |

Control panel



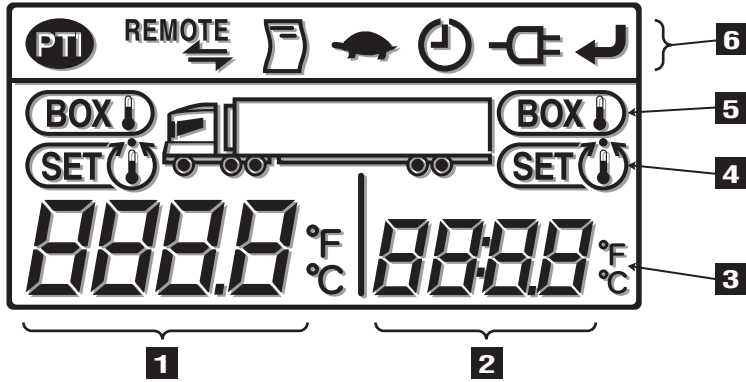
| | | |
|-----------|--------------------------------------|---|
| 1 | Digital display area | Inside container temperature, setting temperature and operation status will be displayed. |
| 2 | Defrost indicator lamp (Orange) | This lamp will light during defrosting operation. |
| 3 | Cooling operation lamp (Green) | This lamp will light during cooling operation. |
| 4 | External device connector | This is the connector to connect to the external devices. |
| 5 | Heating operation lamp (Orange) | This lamp will light during heating operation. |
| 6 | Printer connector | This is the connector with a printer. |
| 7 | Alarm indicator lamp (Red) | This lamp will light or blink when something abnormal occurred. |
| 8 | Operation switch | The refrigeration unit will start or stop with this switch. |
| 9 | Run indicator lamp (Green) | This lamp will light while the refrigeration unit is running. |
| 10 | Drive selector switch | Drive can be switched from motor to sub-engine or vice versa. |
| 11 | Motor select indicator lamp (Orange) | This lamp will light when drive is switched to "STANDBY MOTOR". |
| 12 | CONT./AUTO changeover switch | Operation pattern can be changed with this switch. |

Switches



| | | |
|----------|---------------|---|
| A | UP | Changes the setting temperature and setting screen. |
| B | DOWN | Changes the setting temperature and setting screen. |
| C | SET | Registers the setting. |
| D | MODE | Selects the normal display screen or the setting change screen. Starts the controller. |
| E | PRETRIP (PTI) | Starts/stops the self diagnosis operation. |
| F | WHISPER | Selects the normal operation or whisper operation. |
| G | DEFROST | Starts the manual defrost operation. |

Digital display area



Explanation of display

| | | |
|----------|-----------------------------------|---|
| 1 | Left side of digital display | Inside container temperature during operation will be displayed. Name of setting mode (code) will be displayed when setting is changed. |
| 2 | Right side of digital display | Setting temperature will be displayed during operation. Setting contents will be displayed when setting is changed. |
| 3 | Temperature symbol | °C will light in case of centigrade and °F will light in case of Fahrenheit. (Initial setting is in centigrade.) |
| 4 | Setting temperature icon | This icon will light when the display shows setting temperature. |
| 5 | Inside container temperature icon | This icon will light when the display shows inside container temperature. |
| 6 | Function icons | Either one of these icons will light when corresponding function is selected. |

PTI -----

Display for self diagnosis operation (PTI) (Refer to page 52.)
This will light during self diagnosis operation.

REMOTE

Display for communication status with externals.
This will light while communicating with external devices like remote monitoring device.



Display for printer (Option)
This will light while sending data to the printer.



Display for Whisper operation
This will light when Whisper operation is selected.



Display for timer
This will light when the timer operation is selected.



Display for commercial power supply
This will light when the refrigeration unit is connected to commercial power supply.



Display for registration
This will light when registration is required.

Protective devices

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

- (a) Main switch
If sub-engine 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 sub-engine or the motor starts to announce the start of operation to the surrounding people.
- (c) Cover
The cover prevents operators from contacting with the rotating part during operation.
- (d) Detector for opening of cover 1
Opening of the cover 1 for the work such as inspection is detected to prevent sub-engine from starting. (☞ Refer to page 59.)
- (e) Cover key
Locks are provided to the cover 1 and 5 in order to prevent unintended sub-engine start or setting change. (☞ Refer to pages 59 and 60.)

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



3 Precaution for safety

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






Signs on safety

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

Signs on safety


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

Symbols

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

Other symbol

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

| Kind | Description |
|--|---|
|  NOTE | Useful information for function or performance of equipment |

Precautions

General precautions

WARNING



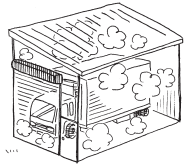
Do not place combustible materials in the vicinity of muffler and exhaust pipe. Do not park on the area where combustibles such as falling leaves accumulate on.

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



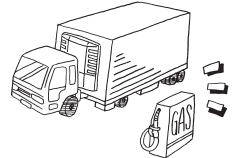
Do not start the engine in poorly ventilated places such as an indoor parking lot.

- 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.



When it is necessary to charge or retrieve the refrigerant or refrigerating machine oil, be sure to consult the nearest service center.

- Customer should refrain from attempting to do these on their own. Otherwise, it could result in serious accident.



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, sub-engine oil, compressor oil and cooling water. (☞ Refer to page 70.)

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

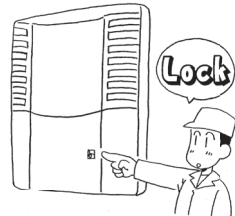
During and after the operation

WARNING



Make sure that the cover of the refrigeration unit is closed before starting the operation.

- Otherwise, it may cause accidents.



CAUTION



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

- Otherwise, it may cause burns, as the muffler and 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.

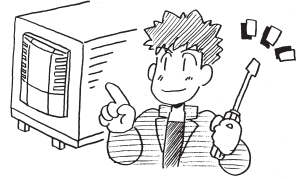
Inspection/Cleaning/Repair

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 sub-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.



Set the "Main switch" to "OFF" to stop the refrigeration unit and remove the battery terminal and plug for power code during the inspection and cleaning.

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

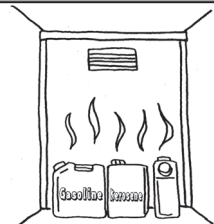
Loading

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.

- Otherwise, it may deteriorate quality of the cargos due to the spattering water from defrosting.

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.

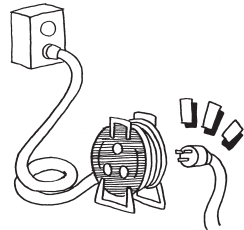


• **Use 4-core cabtyre cables (conductor cross section with 8mm² or more) for power cable. Do not connect it to extension code.**

( Refer to page 38.)

• **Use MENNEKES Part no.6 (400V 32A) for power supply plug.**

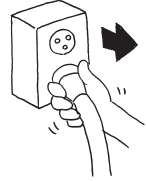
- Otherwise, it may cause an electric shock or a fire due to the heat and breaking of wire.



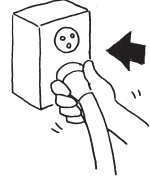
⚠ WARNING



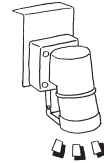
- Pull out the power code by holding the plug part at the end of the code.



- 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.

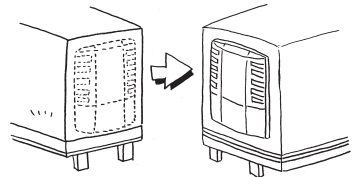
Reinstallation of the refrigeration unit

⚠ WARNING



Do not reinstall this refrigeration unit on other container by yourself. Contact your nearest dealer in that case.

- 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.



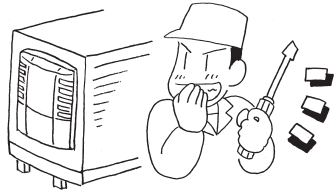
Modification of the refrigeration unit and specification change

WARNING



Do not modify the refrigeration unit or change the specification.

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



Do not use any refrigerant or refrigerating machine oil other than those specified. (☞ Refer to page 79.)

- Otherwise, it may cause explosion or fire.

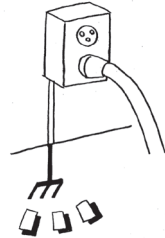
Power supply equipment

WARNING



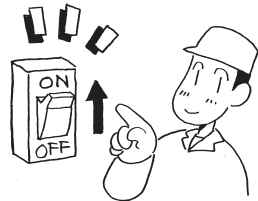
Be sure to earth the power supply equipment to supply the electricity to the refrigeration unit.

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



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

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



Emergency measure

(1) Refrigerant

- **When refrigerant got in your eye**

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

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

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

- **When inhaling the 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 the 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 the 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) Sub-engine oil

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

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

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

Wash the part well with lots of water and soap.

● **When inhaling the 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.

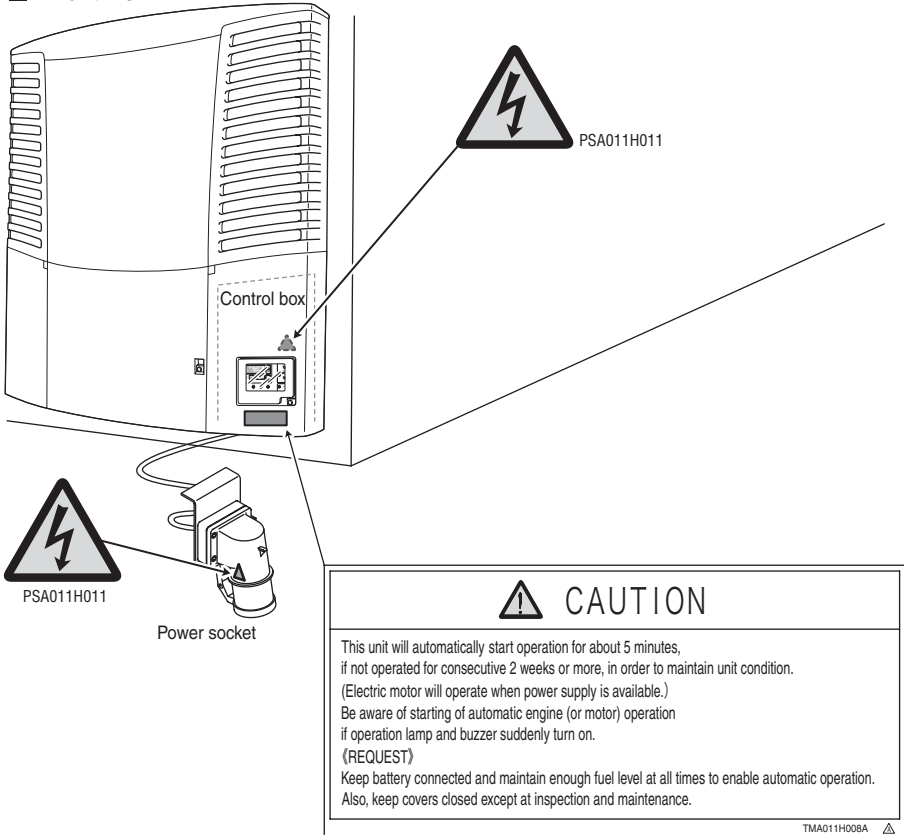
● **When swallowing sub-engine oil**

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

- 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.
- 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.
- When the labels become illegible, purchase them from your nearest dealer and change them.

■ Front view



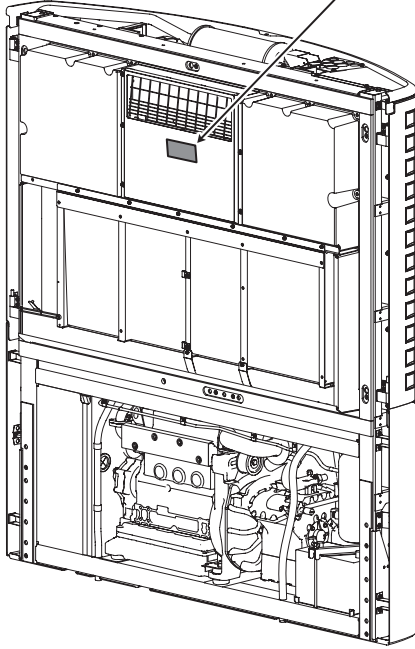
TMA011H008A

3 Precaution for safety

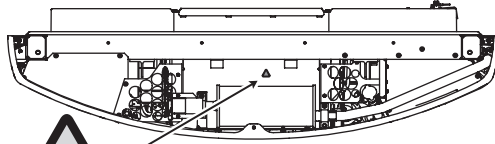
■ Back view



TSJ011H023



■ Top view



《Method of adjusting tension of Alternator Belt》

WARNING
Turn off unit operation switch before starting adjustment

<STEP>

- ① Loosen two bolts.
- ② Apply tool as shown and give tension to the belt by using the tool as a lever.
- ③ Tighten two bolts while applying the tension. (Tighting torque:24N·m)
- ④ Check tension of the belt. (Nominal tension:300~350N)

■ Front view inside

TMA011H005A



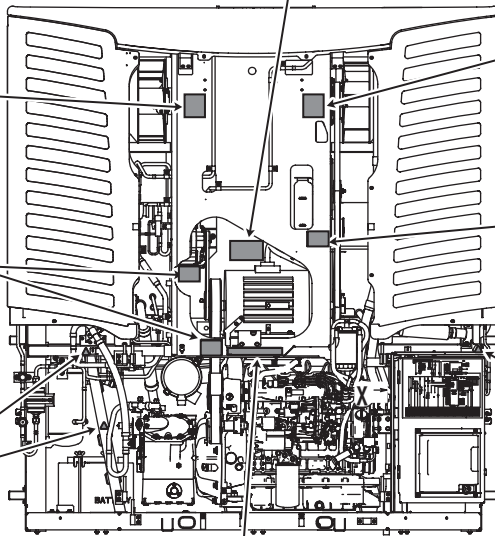
TSJ011H023



TSJ011H022A



PSA011H011A



TSJ011H023



TSJ011H022A



PSA011H011A

View X



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

While several people are working together for inspection and so on at the same time, it is required to prevent other workers from getting injured by miss-start of operation.

Lock the control panel. The worker must keep the key so that other workers can not operate the refrigeration unit. Prepare a tag which states "WORKING" and hang it 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, sub-engine oil and antifreeze coolant and so on to be used for this refrigeration unit, follow the precautions stated on each product.

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

When abnormal conditions are detected

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

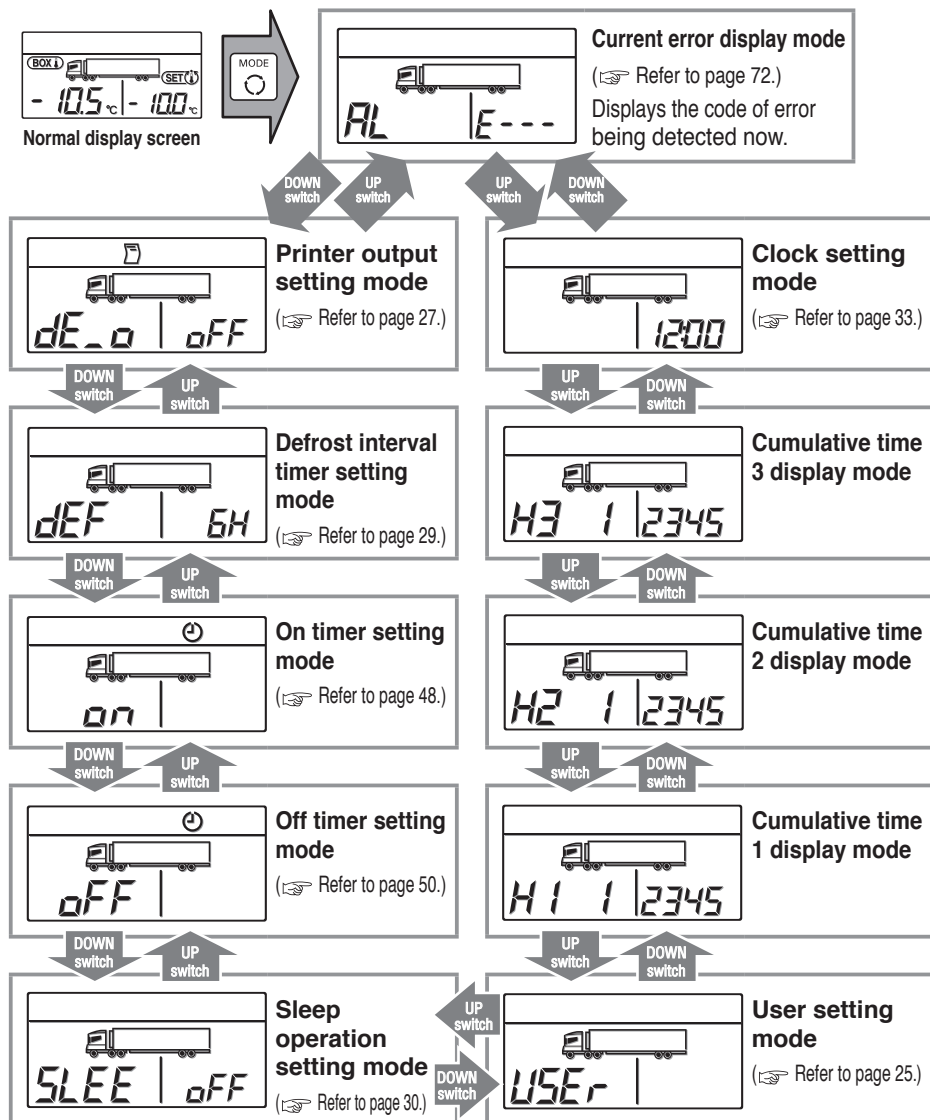
For emergency

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

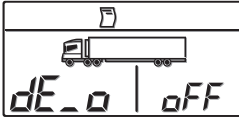
4 Initial setting

Mode displays and functions

Press the [MODE] switch once on the "Normal display screen" to select the "Current error display mode". Each press on the [UP] or [DOWN] switch changes the display. In the following figure, the [DOWN] switch progresses the changes while the [UP] switch reverses the sequence.



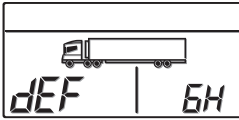
4 Initial setting



Printer output setting mode

Mode to print temperature history data
An optional printer is necessary to print graphic data.

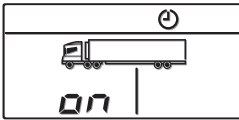
(☞ Refer to page 27.)



Defrost interval timer setting mode

Mode to display and set the defrost interval timer
The time is displayed in hour. Initial setting before shipment is "6 hours".

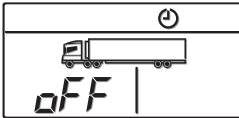
(☞ Refer to page 29.)



ON timer setting mode

Mode to set the time to start the operation of the refrigeration unit automatically

(☞ Refer to page 48.)



OFF timer setting mode

Mode to set the time to stop the operation of the refrigeration unit automatically

(☞ Refer to page 50.)



Sleep operation setting mode

Mode to set the protective operation to start the operation automatically when the refrigeration unit stopped for more than 1 week
Initial setting before shipment is "ON".

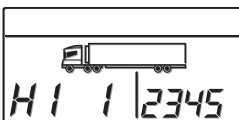
(☞ Refer to page 30.)



User setting mode

Mode to display and set the functions related to the controller operability and others.

(☞ Refer to page 25.)



Cumulative time 1 display mode

Mode to display the cumulative sub-engine operation time 1 recorded on the controller
Time can be reset.

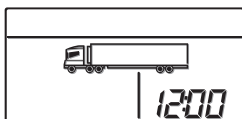
(☞ Refer to page 31.)

**Cumulative time 2 display mode**

Mode to display the cumulative sub-engine operation time 2 recorded on the controller

**Cumulative time 3 display mode**

Mode to display the cumulative motor operation time recorded on the controller

**Clock setting mode**

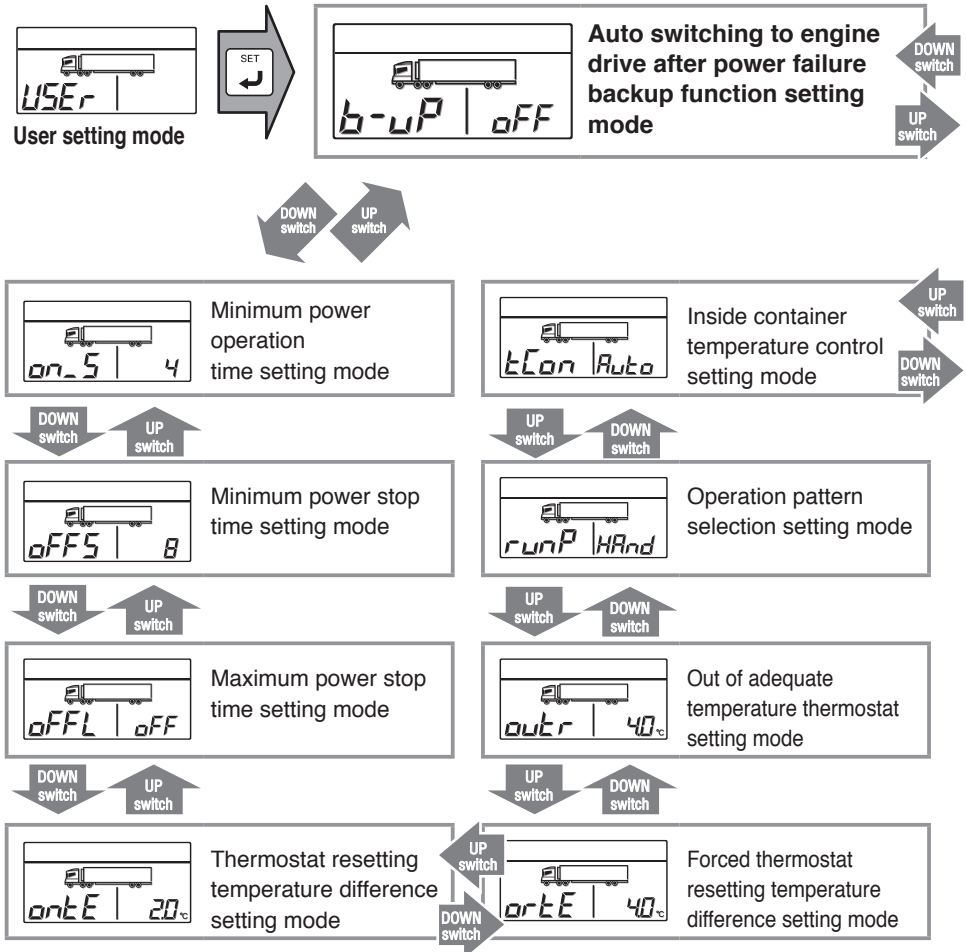
Mode to display and set the current time
(☞ Refer to page 33.)

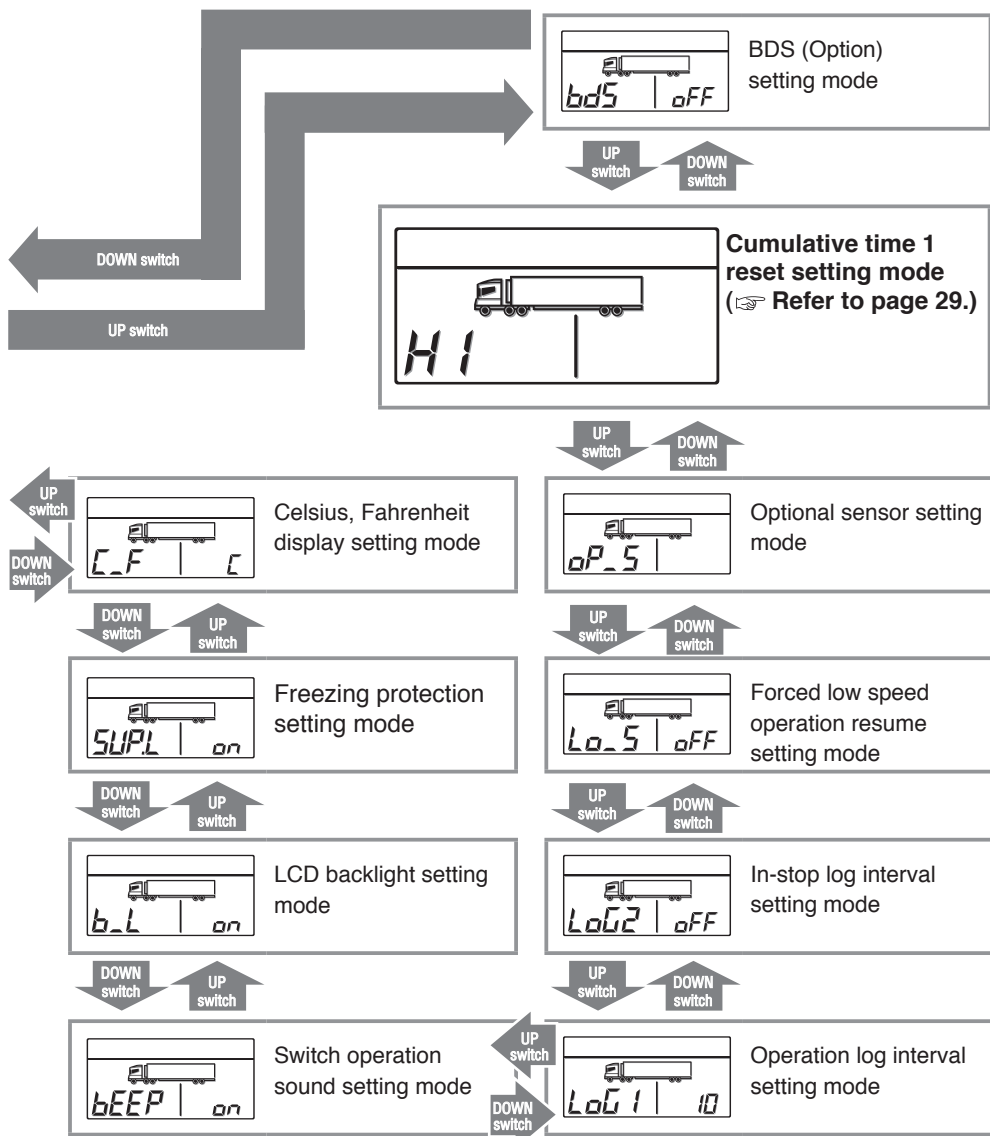
Outline of the user setting mode

"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 while the [UP] switch reverses the sequence.

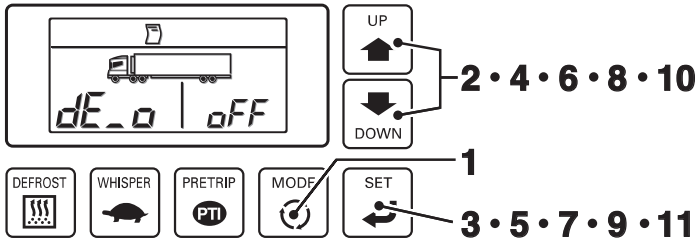
NOTE

- The items other than "Cumulative time 1 reset" are set by the dealer to prevent mis-operation. Customer must not operate.
- When pressing the [MODE] switch during setting change operation, the screen scrolls back to the last previous step and the change is not reflected. If the setting change operation is aborted on the way, foregoing change is not reflected.



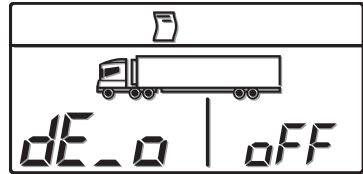




Setting the printer (Optional)

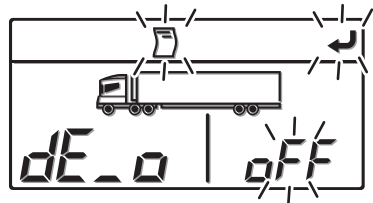


1 Press the [MODE] switch.
 ⇒ The display changes to the "Current error display mode".

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



3 Press the [SET] switch.
 ⇒ "on" or "oFF" starts to blink in the right side of the digital display area. Icons  and  start to blink.



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




NOTE

- "on" or "oFF" is displayed alternately by pressing the [UP] and [DOWN] switch.
- Select "oFF" when the "Printing" is not necessary or cancelled.

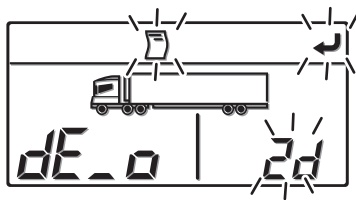
5 Press the [SET] switch.
 ⇒ The time starts to blink.



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

 **NOTE**

- The time can be selected from 10 steps ranging from 12H (12 hours earlier) at the minimum to 7d (7 days earlier) at the maximum or 1 operation trip.



- 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.**

⇒ • r 30: Temperature range of $\pm 30^{\circ}\text{C}$
 • r 15: Temperature range of $\pm 15^{\circ}\text{C}$



- 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 $\pm 30^{\circ}\text{C}$
 Center temperature: $-15^{\circ}\text{C} \sim 15^{\circ}\text{C}$
 • When the temperature range is $\pm 15^{\circ}\text{C}$
 Center temperature: $-30^{\circ}\text{C} \sim 30^{\circ}\text{C}$



- 11 Press the [SET] switch.**

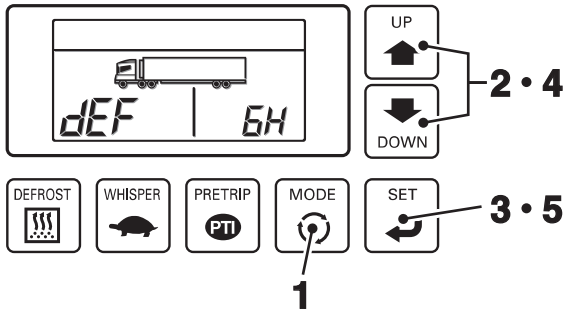
⇒ Start to print out.

The display changes to the "Printer output setting mode", after completing the print. (☞ Refer to page 22.)

 **NOTE**

- 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.

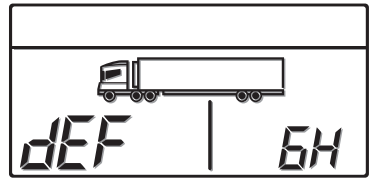
Setting the defrost interval timer




1 Press the [MODE] switch.

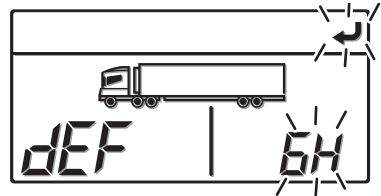
⇒ The display changes to the "Current error display mode".

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.

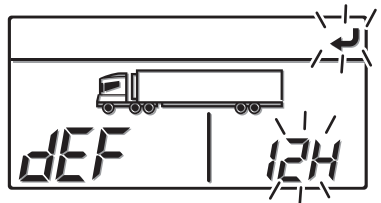
⇒ The time starts to blink in the right side of the digital display area. Icon  starts to blink.



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

NOTE

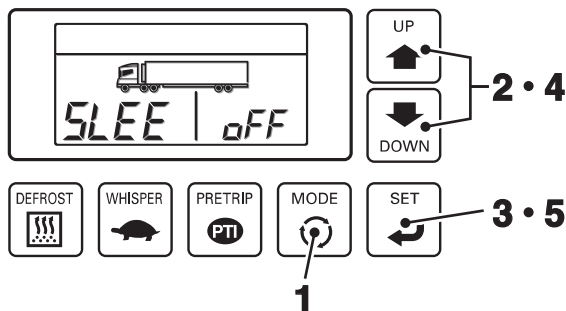
- The defrost interval time can be selected from 12 steps ranging from 1H (1 hour) at the minimum to 12H (12 hours) at the maximum.



5 Press the [SET] switch.

⇒ The setting is completed and the display changes to the "Normal display screen" (☞ Refer to page 22.)

Sleep operation setting




1 Press the [MODE] switch.

⇒ The display changes to the "Current error display mode".

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



3 Press the [SET] switch.

⇒ "on" or "off" starts to blink in the right side of the digital display area. Icon  starts to blink.



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

NOTE

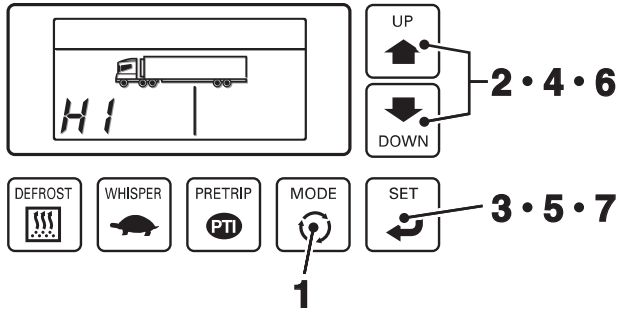
- "on" or "off" is displayed alternately by pressing the [UP] and [DOWN] switch.
- Select "off" when the "Sleep operation" is not necessary or cancelled.



5 Press the [SET] switch.

⇒ The setting is completed and the display changes to the "Normal display screen" (👉 Refer to page 22.)

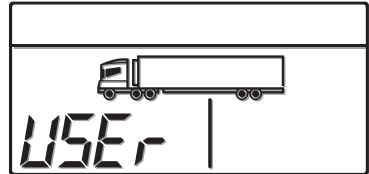
Resetting the cumulative time 1



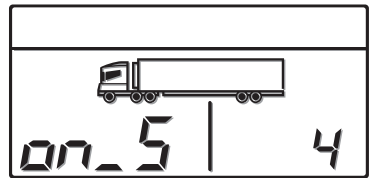
1 Press the [MODE] switch.

⇒ The display changes to the "Current error display mode".

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

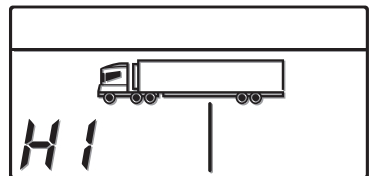


3 Press the [SET] switch.



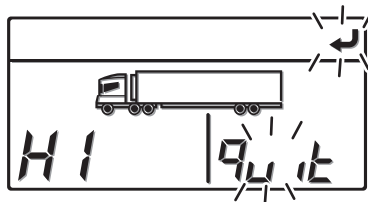
4 Press the [DOWN] switch once.

⇒ "HI" is displayed in the left side of the digital display area.

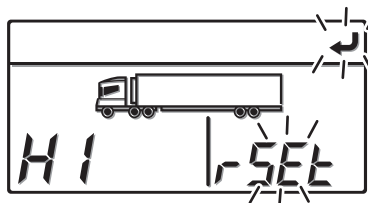


5 Press the [SET] switch.

⇒ "9.4 t" starts to blink in the right side of the digital display area.
Icon ↶ starts to blink.



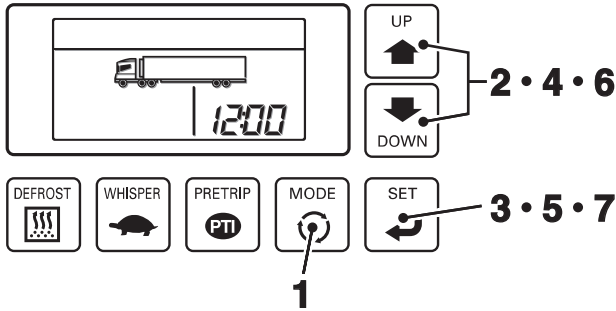
6 Press the [UP] or [DOWN] switch to change to "rSET".



7 Press the [SET] switch.

⇒ The cumulative time is reset and the display changes to the "Normal display screen". (☞ Refer to page 22.)

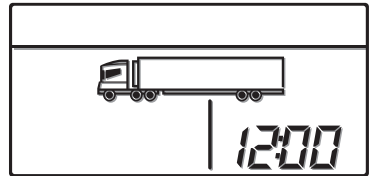
Setting the clock



1 Press the [MODE] switch

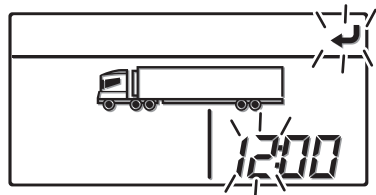
⇒ The display changes to the "Current error display mode".

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

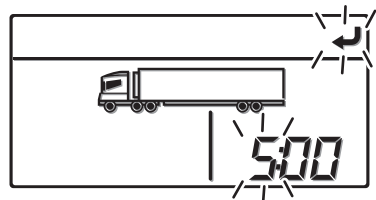


3 Press the [SET] switch.

⇒ The time (hour) in the right side of the digital display area starts to blink.
Icon ↶ starts to blink.



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

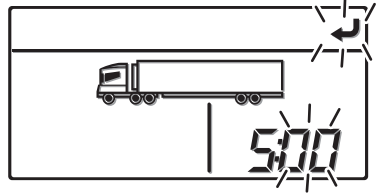
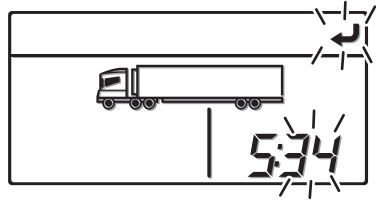


NOTE

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

5 Press the [SET] switch.

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

**6 Press the [UP] or [DOWN] switch to adjust to the current time (minute).****7 Press the [SET] switch.**

⇒ The setting is completed and the display changes to the "Normal display screen". (☞ Refer to page 22.)

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 sub-engine drive.

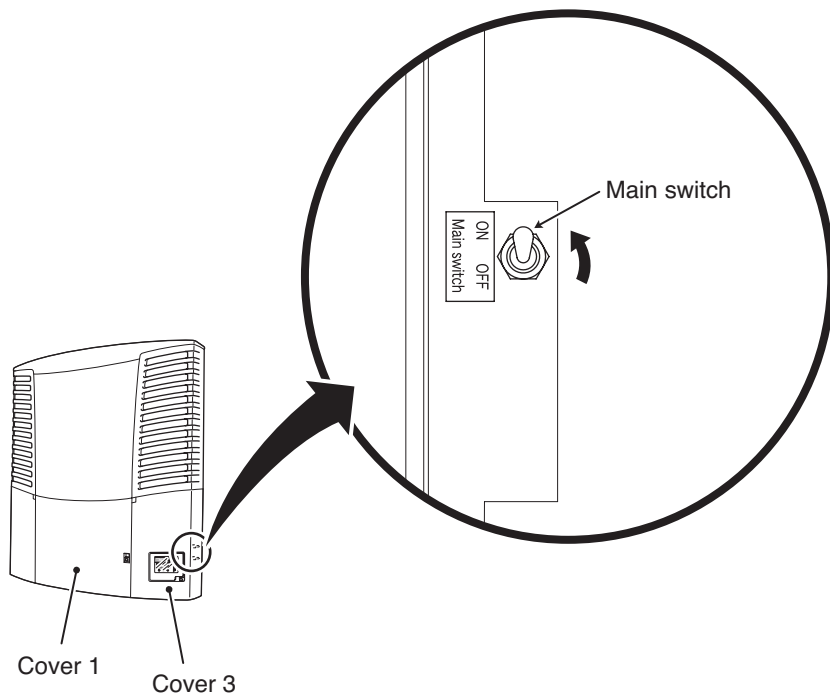
- Otherwise, it may cause oxygen deficiency due to exhaust gas.



NOTE

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

Power on



- 1 Open the cover 1. (☞ Refer to page 59.)

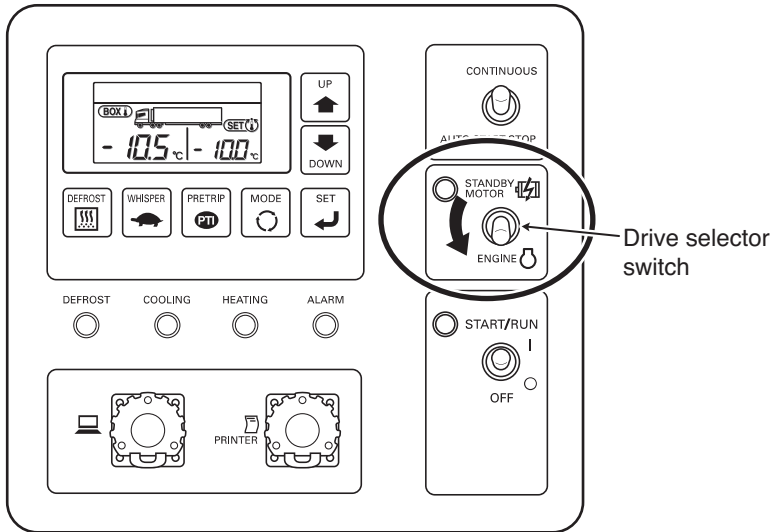
NOTE

- The cover 3 can be opened only after the cover 1 is opened.

- 2 Open the cover 3. (☞ Refer to page 60.)
- 3 Set the "Main switch" to "ON" side.
- 4 Close all the covers. (☞ Refer to page 61.)

Switching the drive

Operating with the sub-engine




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

 **NOTE**

- When the refrigeration unit is connected to the commercial power supply, the sub-engine can not drive even if the drive selector switch is set to "ENGINE". As the "AC PLUG" starts to blink in the digital display area, turn off the commercial power supply.

- 2 Set the "Drive selector switch" to "ENGINE".

 **NOTE**

- During the sub-engine drive, the sub-engine revolution speed is switched automatically to the high or low speed depending on the load.

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.

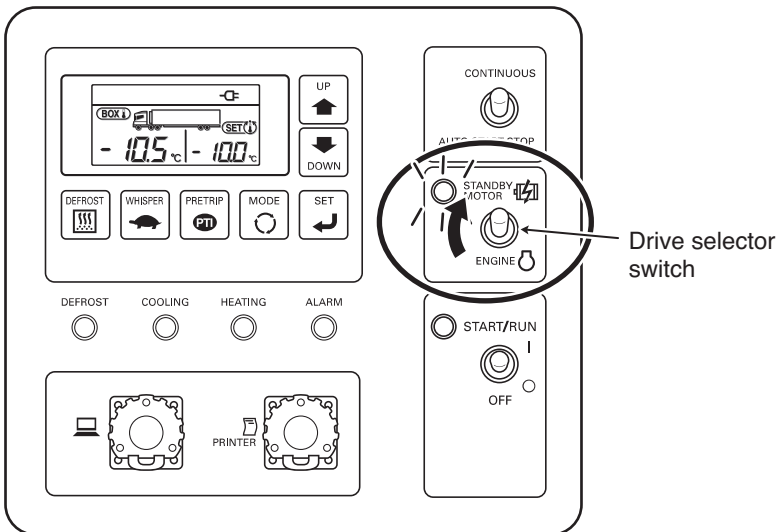
- Otherwise, it may cause an electric shock or a fire due to the heat and breaking of wire.

! 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.

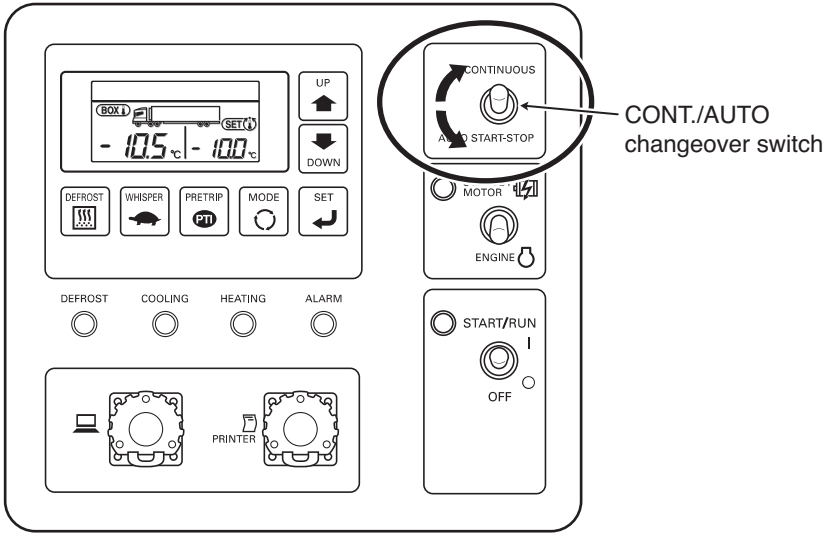


1 Connect the socket of the refrigeration unit to the commercial power supply.

| Specification of power supply (for Motor drive) (50Hz) | | | | | |
|--|-----------------------------|--|-----------------------------|-----------------------------|----------------------|
| Capacity of power supply (kVA) | Switch | | Voltage fluctuation | Voltage drop at start-up | Interphase imbalance |
| | Molded-case circuit breaker | | | | |
| | Capacity of switch (A) | Rated capacity of over-current breaker (A) | | | |
| 30 | 50 | 50 | Within 10% of rated voltage | Within 15% of rated voltage | Within 3% |

2 Set the "Drive selector switch" to "STANDBY MOTOR".

Switching the operation pattern




Selecting the auto start/stop operation

- 1 Set the "CONT./AUTO changeover switch" to "AUTO START-STOP".

Selecting the continuous operation

- 1 Set the "CONT./AUTO changeover switch" to "CONTINUOUS".

 **NOTE**

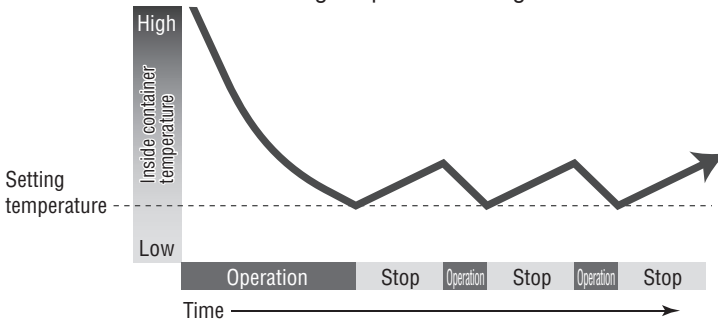
● What is the automatic start/stop operation?

Inside container temperature is maintained at around the setting temperature by turning thermostat ON or OFF* for the sub-engine during sub-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 cargos with a larger allowance in the control temperature.

* Thermostat OFF: The action that the sub-engine (motor) stops automatically after inside container temperature reached to the setting temperature.

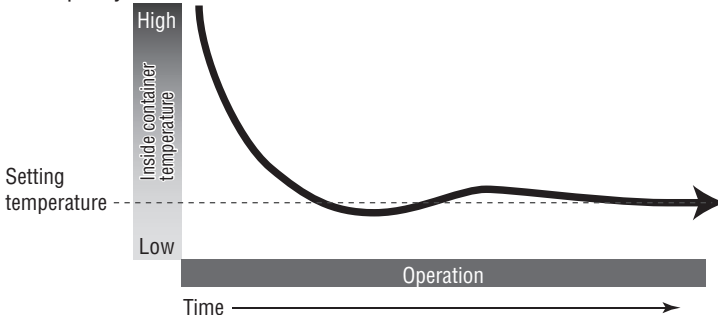
(As the controller is active, it re-starts automatically.)

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

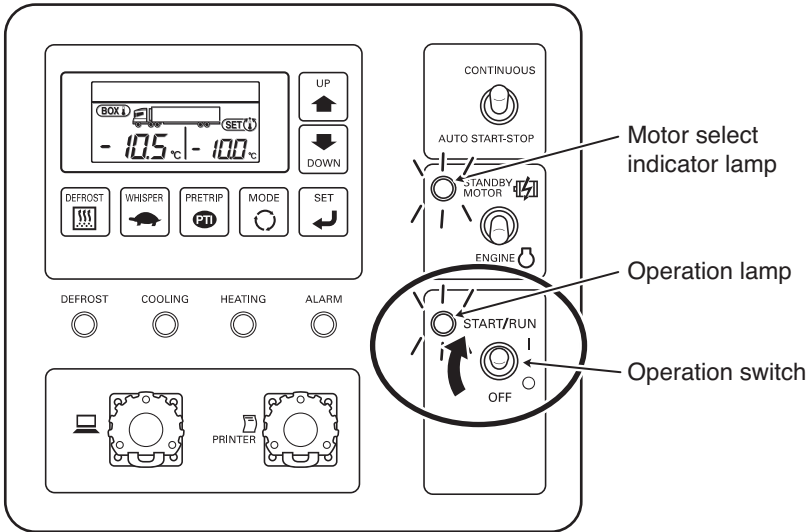


● What is the continuous operation?

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 and heating 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.



Operation



⚠ WARNING




Start the operation after making sure that all covers for the refrigeration unit are closed.

- It may cause accidents if the operation is started with the covers opened.

1 Set the "Operation switch" to "START/RUN".
(The switch returns to its original position if the finger is released.)

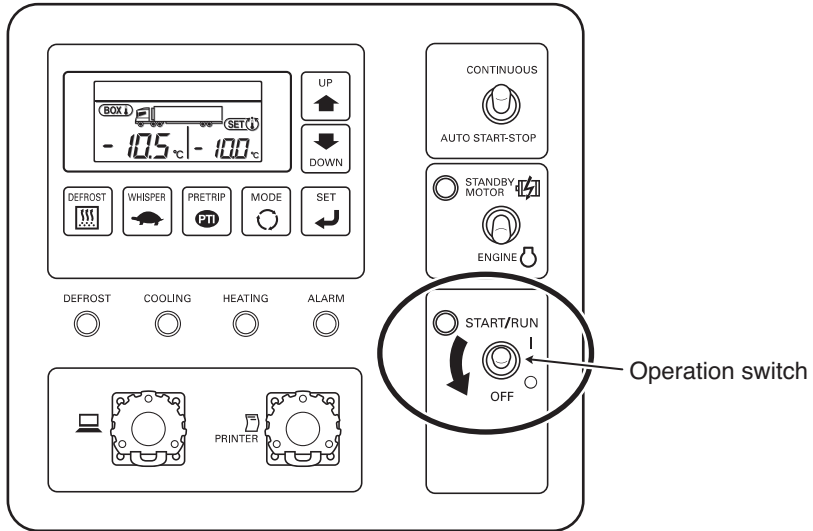
⇒ The operation lamp (Green) lights and the inside container temperature and setting temperature are displayed in the digital display area.
 The motor select indicator lamp (Orange) lights during motor drive.

⇒ After the alarm buzzer sounds for 5 seconds before the start of sub-engine or motor operation, the operation starts with the selected drive (sub-engine/motor) and operation pattern (automatic start/stop, continuous operation).

 **NOTE**

- While the cover 1 is opened, the refrigeration unit will not start to operate because the safety device will be activated.
(Error code "E030" is displayed in the digital display area.)
Close the cover 1, then the unit starts to operate automatically.
(☞ Refer to page 61.)
 - When the refrigeration unit is connected to the commercial power supply, the sub-engine can not drive even if the "drive selector switch" is set to "ENGINE".
Since "AL PLUG" starts to blink in the digital display area, turn off the commercial power supply.
 - When the refrigeration unit is not connected to the commercial power supply, the motor cannot drive even if the "drive selector switch" is set to "STANDBY MOTOR".
Since "AL PLUG" starts to blink in the digital display area, turn on the commercial power supply.
 - When the automatic start/stop is selected and the inside container temperature is close to the setting temperature, the refrigeration unit sometimes does not start.
-

Stopping the operation



- 1 Set the "Operation switch" to "OFF" and release your hand after you hear operating sound of the switch.

⇒ The refrigeration unit stops the operation automatically after performing the device protecting operation for 10 to 20 seconds. (During the device protecting operation, "F_u_d" is displayed in the left side of the digital display area and "StoP" is displayed in the right side of the digital display area.)

NOTE

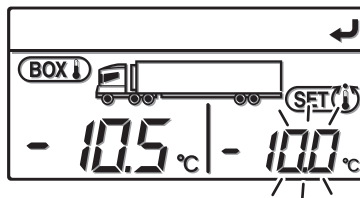
- When the motor drive operation was stopped, the buzzer sounds (3 times) and "AC PLUG" is displayed in the digital display area in order to prevent failure to disconnect the power plug from the AC power socket.

Setting temperature


1 Start to operate the refrigeration unit. (☞ Refer to page 41.)

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

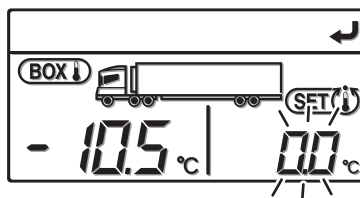
⇒ The current setting temperature displayed in the right side of the digital display area started to blink.



3 Press the [UP] or [DOWN] switch to set the temperature.

 **NOTE**

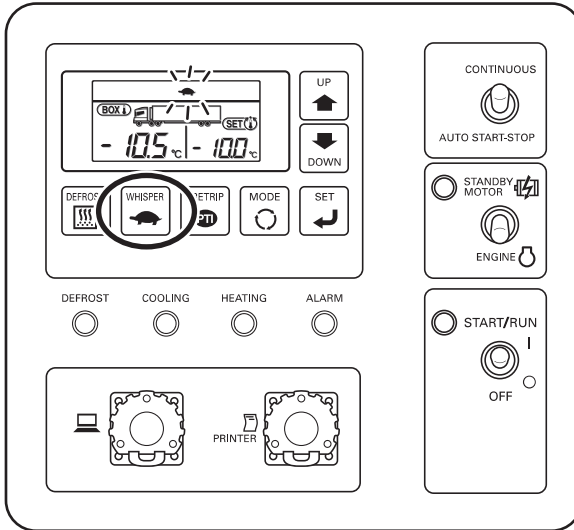
- Each press on the [UP] switch increases the value by 0.5 while each press on the [DOWN] switch decreases the value by 0.5.
Keeping pressing either switch changes the value continuously.




4 Press the [SET] switch.

⇒ The setting is completed and the screen returns to the "Normal display screen". (☞ Refer to page 22.)

Whisper operation (Only for sub-engine drive)



Pressing the [WHISPER] switch enables the whisper operation and one more press on the switch returns it to the normal operation.

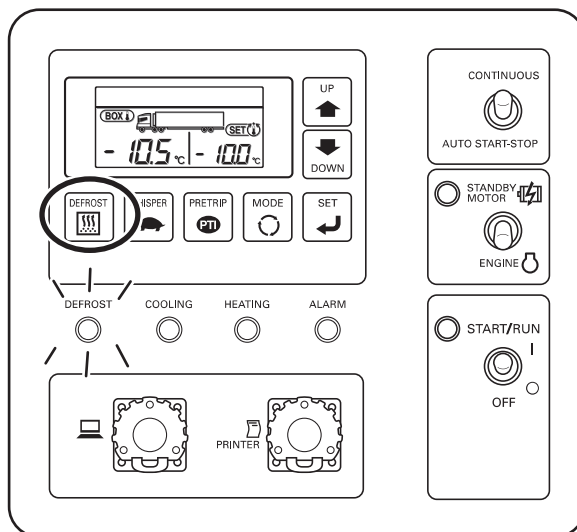
When the whisper operation is enabled, the  (whisper operation icon) lights on the icon bar.

Even when the whisper operation is enabled, the setting is reset as the unit operation is stopped. Press the [WHISPER] switch and set the whisper operation at every time when the whisper operation is necessary.

NOTE

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

Manual defrost operation



Starting

- 1 Press the [DEFROST] switch once during the cooling operation. (When the cooling operation lamp is ON.)

⇒ The "Defrost operation lamp" (Orange) lights and starts the defrost operation.

NOTE

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

Stopping

As the defrost operation completes, the refrigeration unit stops once and restarts automatically to return to the cooling operation.

Press the [DEFROST] switch again when it is required to stop the defrosting operation and return to the cooling operation.

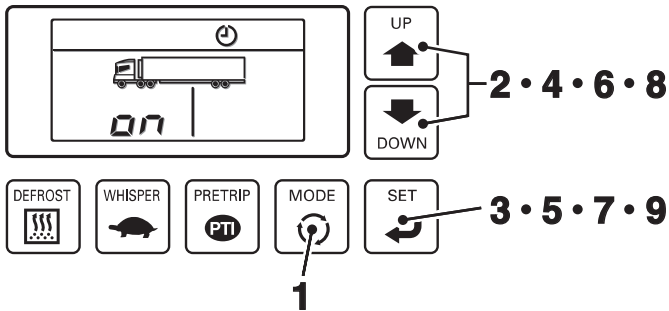
Set the "Operation switch" to "OFF", and the defrost operation discontinues and the operation stops.



NOTE

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

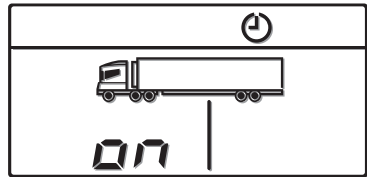
Setting the ON timer



1 Press the [MODE] switch.

⇒ The display changes to the "Current error display mode".

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

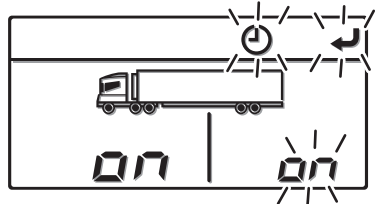


3 Press the [SET] switch.

⇒ "ON" or "OFF" starts to blink in the right side of the digital display area. Icons ⏰ and ↶ start to blink.



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

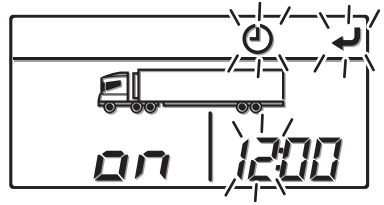


NOTE

- Press the [UP] and [DOWN] switch, and either of "ON" or "OFF" is displayed alternately.
- When ON timer setting is not to be set or to be cancelled, select "OFF".

5 Press the [SET] switch.

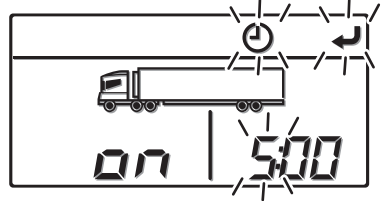
⇒ The setting time (hour) starts to blink.



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

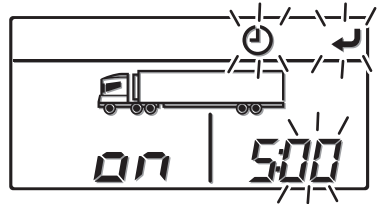
NOTE

- 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 to the ON timer setting time (minute).



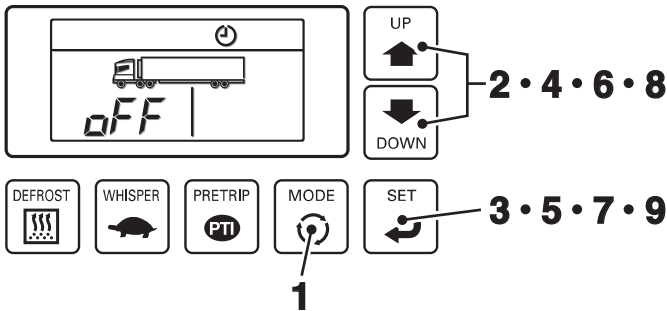
9 Press the [SET] switch.

⇒ The setting is completed and the display returns to the "Normal display screen". (☞ Refer to page 22.)

NOTE

- When performing the timer operation with motor drive, check that the power supply is connected to the commercial power supply. When the refrigeration unit is not connected to the commercial power supply, the motor will not drive even if the "Drive selector switch" is set to "STANDBY MOTOR".
- ON timer setting will be reset if the timer starts once.
- Set the operation pattern in advance to the setting to be performed when the timer starts.

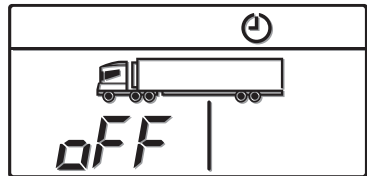
Setting the OFF timer



1 Press the [MODE] switch.

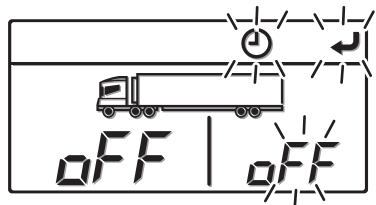
⇒ The display changes to the "Current error display mode".

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

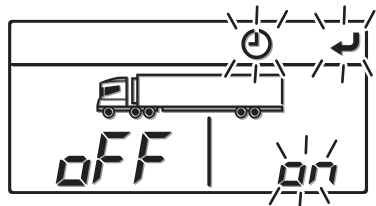


3 Press the [SET] switch.

⇒ "on" or "OFF" starts to blink in the right side of the digital display area. Icons ⏻ and ↶ start to blink.



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

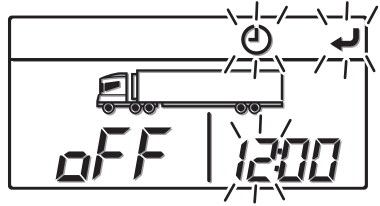


NOTE

- Press the [UP] and [DOWN] switch, and either of "on" or "OFF" is displayed alternately.
- When OFF timer setting is not to be set or to be cancelled, select "OFF".

5 Press the [SET] switch.

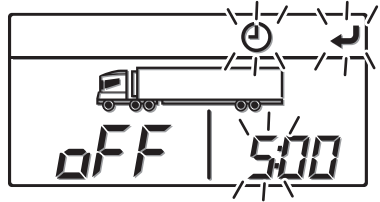
⇒ The setting time (hour) starts to blink.



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

 **NOTE**

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

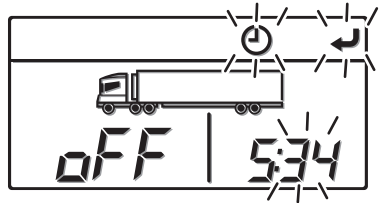


7 Press the [SET] switch.

⇒ The setting time (minute) starts to blink.




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



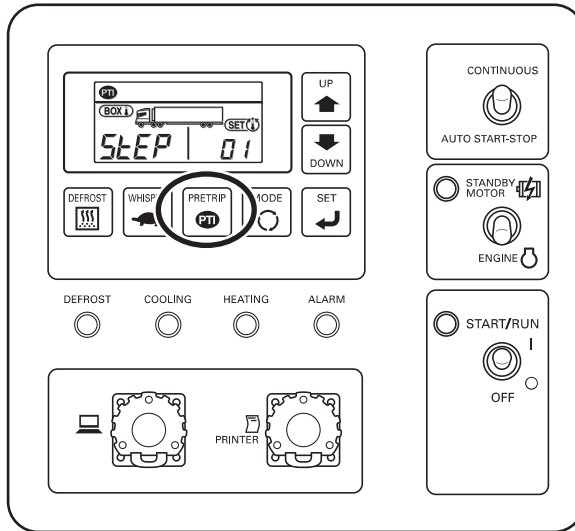
9 Press the [SET] switch.

⇒ The setting is completed and the display returns to the "Normal display screen". (☞ Refer to page 22.)

 **NOTE**

- OFF timer setting will be reset when the timer stops once.

Self diagnosis operation (PTI operation)



NOTE

- Perform the self diagnosis operation without fail before the operation.
- It takes about 10 minutes from start to finish.
- The self diagnosis operation is available with sub-engine or motor drive regardless of the setting with the "Drive selector switch".
- The inspection of the motor drive is skipped when the power supply is not connected.

Starting the operation

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

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

 **NOTE**

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

2 Press the [PRETRIP] switch.

⇒ If this switch is pressed during the operation, the refrigeration unit stops once.

⇒ The self diagnosis operation starts and "SELF **" is displayed in the digital display area. (**: Figures from 01 to 24 will be displayed.)

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

Finishing the operation when no defects are detected

1 When no defects are detected, "PL End" will be displayed in the digital display area.

2 Press the [PRETRIP] switch, or set the "Operation switch" to "OFF".

⇒ The controller will stop.

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

When abnormal conditions are detected

The corresponding codes for the abnormality and "PL End" will be alternately displayed in the digital display area and the "Alarm indicator lamp (Red)" will light or blink. Check the alarm code (☞ Refer to pages from 76 to 78) and perform proper treatment or contact your nearest dealer.

6 Loading

Preparation before loading

CAUTION



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

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

1 Cargos 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 57.)

*** Check with the body manufacturer for the items to be inspected.**

4 Set the right temperature for transportation of the cargo and cool down or heat up inside of the container to the setting temperature.

(👉 Refer to page 44.)

NOTE

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

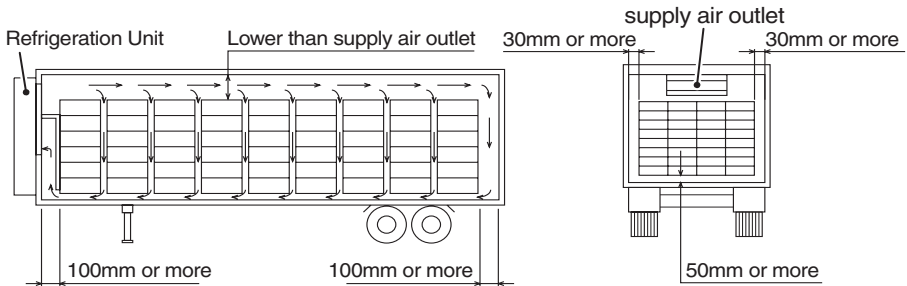
Loading and unloading

Loading procedure

1 Stop the cooling operation. (☞ Refer to page 43.)

2 Load the cargos 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 cold air.



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

⚠ CAUTION



Waterproof the cargos if they need to be.


- Otherwise, it may deteriorate quality of the cargos due to the spattering water from defrosting.

4 When loading the cargos which need to be protected from water, cover the cargos in the vicinity of evaporator outlet with waterproof sheet.

5 After completing loading, start the operation of the refrigeration unit. (☞ Refer to page 41.)

Unloading

- 1 Stop the cooling operation. (👉 Refer to page 43.)
- 2 Unload the cargos.

 **NOTE**

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

7 Inspection

Precautions for inspection

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

WARNING



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

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



Do not modify or remove the protective device mounted to the cover.

- It may cause injury if the refrigeration unit is operated with the cover 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.

Watch your step when climbing up on the trailer for opening and closing the cover or inspection.

- 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.
-

 **CAUTION****Stop the operation and wait until sub-engine and others are cooled down before performing the inspection.**


- Since sub-engine, exhaust pipe and high pressure pipe and so on become very hot, it may cause burns if you touch them.

**Set the "Main switch" to "OFF" to stop the refrigeration unit and remove the battery terminal and plug for power code during the inspection and cleaning.**

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

Opening of the covers

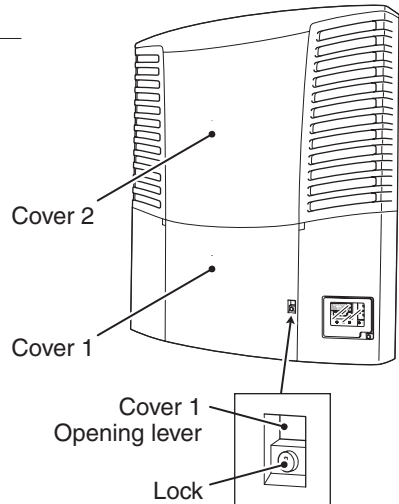
The covers can be opened without using tools when performing the inspection.

 **NOTE**

- Open the cover 1 at first.

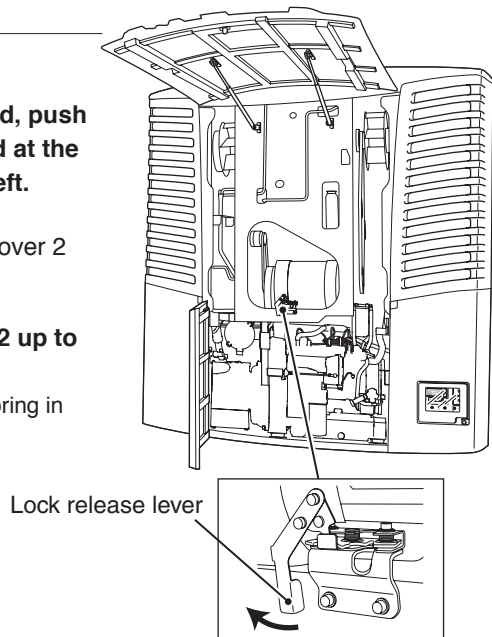
Cover 1

- 1 Release the lock located under the "Cover 1 opening lever".**
- 2 Push in the "Cover-opening lever for the cover 1".**
⇒ The lock is released and the cover 1 opens a little.
- 3 Open the cover 1 by hand.**



Cover 2

- 1 While the cover 1 is fully opened, push the "Lock release lever" located at the center of the lower part to the left.**
⇒ The lock is released and the cover 2 opens a little.
- 2 Pull the lower end of the cover 2 up to open it.**
It will open upward by the force of spring in the middle.



Cover 3

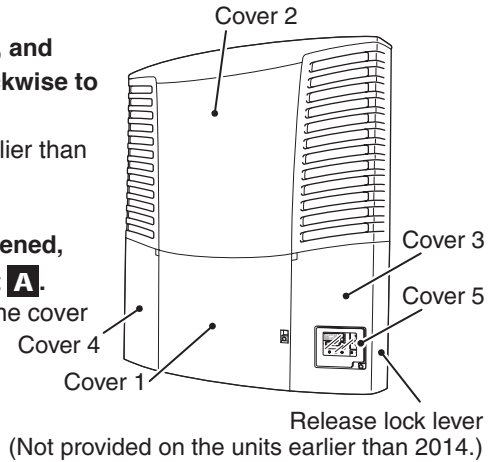
- 1** Raise the release lock lever, and turn it by 90° to counterclockwise to release the lock.

(Not provided on the units earlier than 2014.)

- 2** While the cover 1 is fully opened, pull the wire-loop located at **A**.

⇒ The lock is released and the cover 3 opens a little.

- 3** Open the cover 3 by hand.



Cover 4

- 1** Raise the release lock lever, and turn it by 90° to clockwise to release the lock.

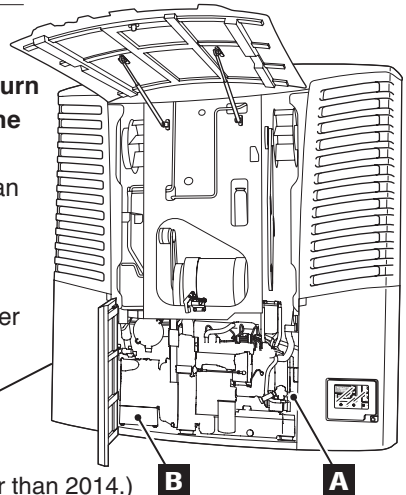
(Not provided on the units earlier than 2014.)

- 2** While the cover 1 is fully opened, pull the wire-loop located at **B**.

⇒ The lock is released and the cover 4 opens a little.

- 3** Open cover 4 by hand.

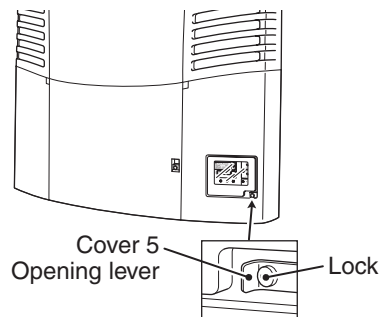
Release lock lever
(Not provided on the units earlier than 2014.)



Cover 5

- 1** Release the lock mounted on the "Cover 5 opening lever".

- 2** Pull the "Cover 5 opening lever".
⇒ The lock is released and the cover 5 opens by the force of spring.



Closing the cover

When closing the covers, close the covers 2, 3 and 4 first and the cover 1 which has protective device with it at last for a safety purpose.

1 Keep the cover 1 fully opened.

 **NOTE**

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

2 Push the part marked with ● on the cover 2 to close it.

When closing the cover 2, pull it down using the pull-down bar located at the center of the refrigeration unit hooked to the tag on the cover.

⇒ The cover is locked.

3 Push the parts marked with ● (PUSH label) on the cover 3 and 4 to close them.

⇒ The covers are locked.

4 Turn the release lock levers on the covers 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 Push the part marked with ● (PUSH label) on the cover 1 to close it.

⇒ The cover is locked.

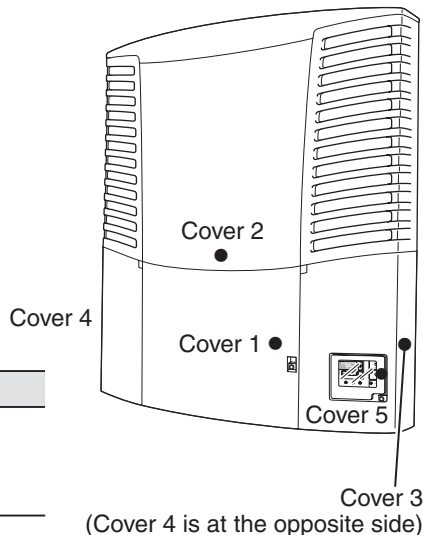
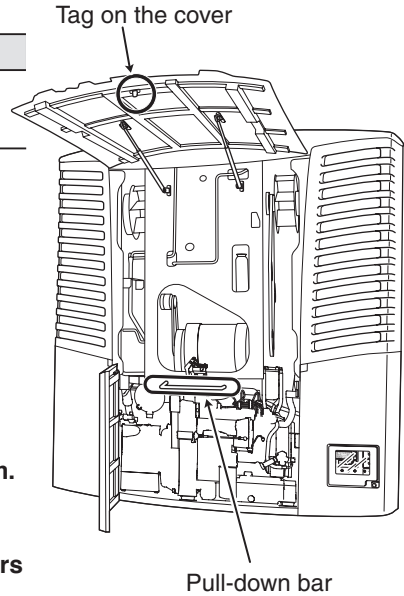
6 Check that the covers from 1 to 4 are locked.

7 Close the cover 5.

8 Lock the cover 1 and 5.

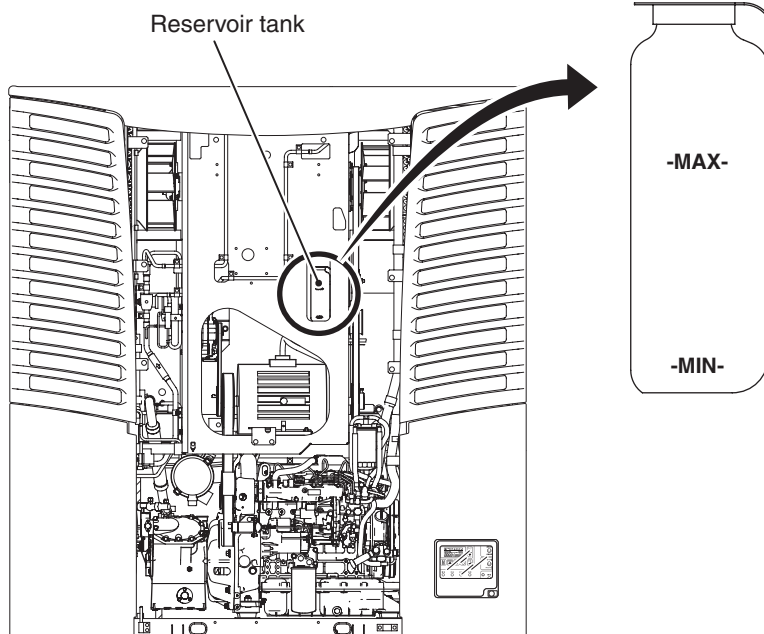
 **NOTE**

- If the covers are not pushed enough to lock, it may open while the vehicle is moving. Lock the covers securely.



Daily inspection

Inspection of the cooling water quantity



CAUTION



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

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

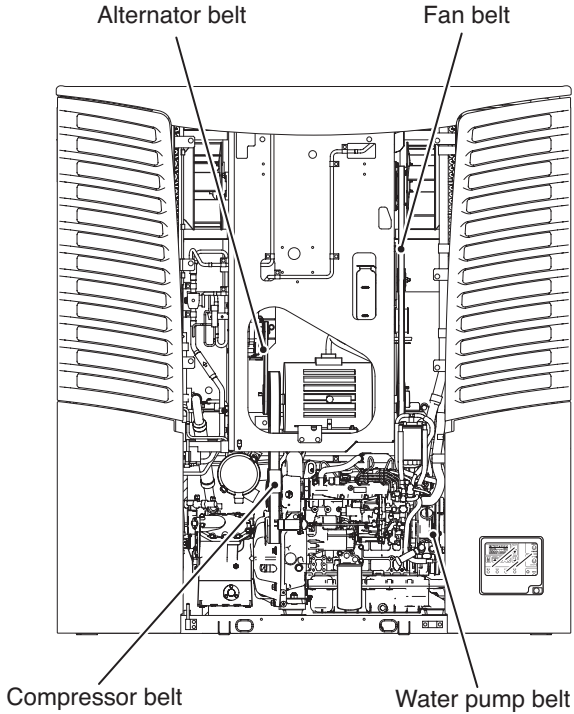


Use the designated antifreeze coolant.


- 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 70 for the designated antifreeze coolant.)

Inspection of the belts

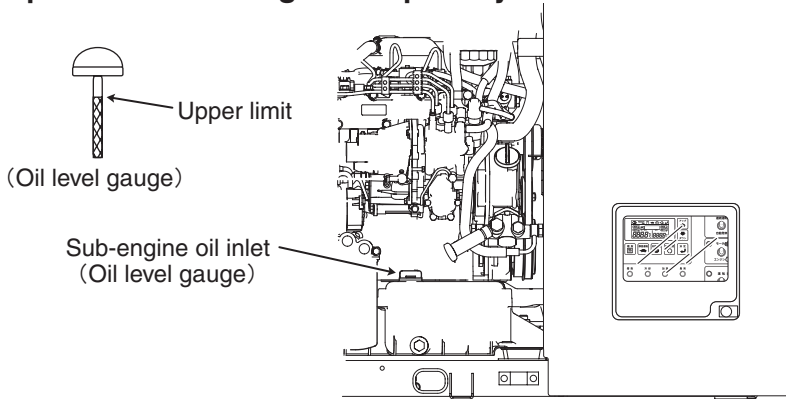


- 1** Visually inspect 4 kinds of belts for any abnormality such as damages, cracks or wears.
- 2** Inspect interference with moving sections.

 **NOTE**

- 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 sub-engine oil or refill it immediately after the sub-engine stopped.

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

Do not refill the sub-engine oil excessively.

- Sub-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 sub-engine oil.

- Otherwise, it may cause troubles.

Surely wipe off spilled sub-engine oil during refilling.


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

1 Check if the fluid level of sub-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 sub-engine oil is not enough, supply the designated sub-engine oil from the oil inlet to the level not to exceed the upper limit.

[👉 Refer to page 70 for the designated sub-engine oil.]

 **NOTE**

- When the error code "EOT5" is displayed during the refrigeration unit operation, it is the time to change sub-engine oil. Please contact your nearest dealer and request them to change the oil and the oil filter. Perform "cumulative time 1 reset" after changing them.

Inspection of sub-engine fuel quantity

CAUTION



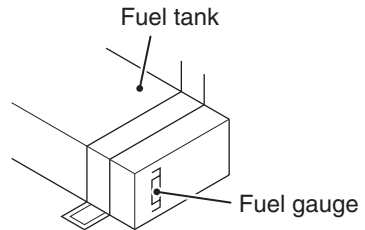
Use the designated sub-engine fuel.

- Otherwise, it may cause damage of the sub-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 70 for designated fuel.]



 **NOTE**

- Stop the operation with the "Operation switch" when refueling.

Inspection of leakage and wiring condition

- 1 Check if there is no leakage of cooling water, sub-engine oil or sub-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 the sight glass

- 1 Run the refrigeration unit for 10 minutes.
- 2 Check if the check color appears in green.



 **ADVICE**

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

When operating the refrigeration unit with low inside container temperature continuously for a long period

When operating the refrigeration unit continuously for a long period at 10°C or lower, ice adheres to the drain pan and so on. Stop the unit operation once or twice a week, and keep the door open to return the inside temperature to normal so that the ice in the drain pan is melted.

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 | | | | | | | Customer's signature | | |
|---------------------|-----------------|----------------|-----------------------|---|------------------------|-------------------|----------------------|--------------------|--|
| Inspection interval | | | | Refrigeration Unit | Model Serial No. | TFV2000D- , #/No. | BL | Delivery date | |
| | | | | Operation time | H1:[], H2:[], H3:[] | | | Inspection date | |
| Every 1500 hrs. | Every 1000 hrs. | Every 500 hrs. | Daily inspection | Vehicle | | Registered No. | | Inspection company | |
| | | | | Model Serial No. | | Inspector | | | |
| | | | | Inspection items | | | Inspection result | Remarks | |
| | | | <input type="radio"/> | Sub-engine oil quantity/Refilling | | | | | |
| | | | <input type="radio"/> | Fuel quantity/Refilling | | | | | |
| | | | <input type="radio"/> | Cooling water quantity/Refilling | | | | | |
| | | | <input type="radio"/> | Sub-engine oil leakage check | | | | | |
| | | | <input type="radio"/> | Fuel leakage check | | | | | |
| | | | <input type="radio"/> | Cooling water leakage check | | | | | |
| | | | <input type="radio"/> | Fuel filter (for water separation) check/drain | | | | | |
| | | | <input type="radio"/> | Inspection of interference with moving sections, damage on belts | | | | | |
| | | | <input type="radio"/> | Battery check (fluid quantity, specific gravity, terminal looseness, corrosion, wiring) | | | | | |
| | | | <input type="radio"/> | Cleaning of condenser coil, radiator coil and entire refrigeration unit | | | | | |
| | | | <input type="radio"/> | Inspection of refrigerant sight glass color, refrigerant quantity, or flush level | | | | | |
| | | | <input type="radio"/> | Noise from the refrigeration unit, abnormal vibration | | | | | |
| | | | | Cleaning of air cleaner (at every 250hrs.) | | | | | |
| | | | <input type="radio"/> | Sub-engine revolution speed check, revolution sensor check, cleaning | | | | | |
| | | | <input type="radio"/> | Replacement of air cleaner | | | | | |
| | | | <input type="radio"/> | Fuel filter check | | | | | |
| | | | <input type="radio"/> | Greasing of door latch, hinge, etc. | | | | | |
| | | | <input type="radio"/> | Inspection of slackened belt, damage on belt | | | | | |
| | | | <input type="radio"/> | Inspection of grooves of pulley belt (rust, wear) | | | | | |
| | | | <input type="radio"/> | Replacement of cooling water | | | | | |
| | | | <input type="radio"/> | Cleaning of evaporator coil, drain port | | | | | |
| | | | <input type="radio"/> | Inspection, retouch of painting on main unit | | | | | |
| | | | <input type="radio"/> | Inspection for damage on rubber vibration isolator (cracks, splits) | | | | | |
| | | | <input type="radio"/> | Inspection of electromagnetic clutch (noise, vibration) | | | | | |
| | | | <input type="radio"/> | Inspection of sub-engine governor lever, solenoid link and related parts | | | | | |
| | | | <input type="radio"/> | Inspection of relays | | | | | |

* Figures in () are rough standard.

7 Inspection

| Customer | | | | Customer's signature | |
|--|-----------------------|------------------|--|----------------------|---------|
| Inspection interval | Refrigeration Unit | Model Serial No. | TFV2000D- , #/No. BL | Delivery date | |
| | | Operation time | H1:[], H2:[], H3:[] | Inspection date | |
| Every 1500 hrs. Every 1000 hrs. Every 500 hrs. Daily inspection | Vehicle | Registered No. | | Inspection company | |
| | | Model Serial No. | | Inspector | |
| Inspection items | | | | Inspection result | Remarks |
| | <input type="radio"/> | | Inspection of centrifugal clutch noise | | |
| | <input type="radio"/> | | Inspection of alternator (noise), measurement of charging amount (high, low speed) | | |
| | <input type="radio"/> | | Inspection and retightening of unit mounting bolts | | |
| | <input type="radio"/> | | Inspection, retightening of mounting bolts (sub-engine, compressor, compressor head, motor, alternator, rubber vibration isolator, pulley, electromagnetic clutch, fan, solenoid, fan shaft bearing, outer cover etc.) | | |
| | <input type="radio"/> | | Inspection of refrigerant line, gas leakage, valves (solenoid valve, expansion valve, DPR) | | |
| | <input type="radio"/> | | Inspection of cooling (inspection of temperature display on the display, high/low pressure, thermostat operation) | | |
| | <input type="radio"/> | | Inspection of defrosting operation | | |
| | <input type="radio"/> | | Check of motor-driven movements, insulation resistance (deterioration of cables, damage of power plug) | | |
| | <input type="radio"/> | | Inspection of slackened electronic wiring terminals, damage on wire cover (especially battery and starter cable) | | |
| | <input type="radio"/> | | Motion check of high-pressure switch, door switch | | |
| | <input type="radio"/> | | Inspection of dirty compressor oil | | |
| | <input type="radio"/> | | Replacement of sub-engine oil (including inspection of oil leakage: at 100 hrs. at initial inspection only) | | |
| | <input type="radio"/> | | Replacement of oil filter (at about 100 hrs. at initial inspection only) | | |
| | <input type="radio"/> | | Inspection of starter (operation, noise, vibration) | | |
| | <input type="radio"/> | | Water draining from fuel tank | | |
| | <input type="radio"/> | | Inspection of idle pulley bearing, tension pulley bearing, fan shaft bearing, electromagnetic clutch bearing (noise) | | |
| | <input type="radio"/> | | Replacement of belt (alternator) | | |
| | | | Replacement of belts (except alternator), alternator, idle pulley bearing, tension pulley bearing, electromagnetic clutch bearing, fan shaft bearing, fan shaft seal (at every 4000 hours) | | |
| | | | Inspection of wear on centrifugal clutch shoe (at every 4000 hrs.) | | |
| | | | Replacement of engine stop solenoid, pre-heater, motor bearing, fuel hose, cooling water hose. (every 6000 hours) | | |
| | | | Change of starter, engine high speed solenoid (every 10000 hours) | | |
| | | | Overhaul of sub-engine (at every 10000 hrs.) | | |

* Figures in () are rough standard.

Details of applicable oils and cooling water

| | | Kind / Name | Volume |
|-----------------|-----------------------|---------------------------------------|--|
| Sub-engine fuel | | Diesel fuel *1 | - |
| Sub-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 |
| Mixed antifreeze coolant quantity (L) | 2.34 | 2.73 | 3.12 | 3.51 | 3.9 | 4.29 | 4.68 |
| Lowest ambient temperature (°C) | -10 | -15 | -20 | -25 | -30 | -35 | -40 |

*Initial setting: Antifreeze coolant concentration: 50%wt

NOTE

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

8 Sleep operation

Run the refrigeration unit for 15 minutes once every 3 or 4 days to prevent the trouble when the unit is not used for a long time.


Sleep operation starts automatically when the refrigeration unit has stopped for more than 1 week.

NOTE

- Sleep operation starts automatically when parking the vehicle for a long time. Please follow the contents of "3. Precautions on safety".
- When the refrigeration unit is required to stop for a long time because of the trouble and so on, contact your nearest dealer and ask them for the proper treatment.

Sleep operation

Protective operation (sleep operation) starts automatically when the refrigeration unit has not been used for more than 1 week.

 Refer to page 30 for the setting.

- Protective operation is performed sometime between 10:00 to 16:00.
- Operating time is for about 5 minutes. (From engine start to stop)
- The refrigeration unit operates with motor drive when it is connected to commercial power supply regardless of the setting with "Drive selector switch".
- In case of sub-engine drive, the refrigeration unit operates at low speed revolution.
- There is no air supply in the container. (Evaporator fan does not operate.)
- "Auto Prot" is displayed in the digital display area.

Preparation for the sleep operation

Keep the following condition so that the refrigeration unit can perform sleep operation.

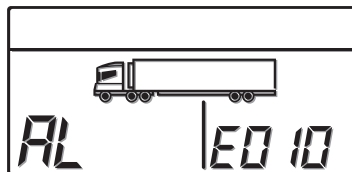
- Keep the main switch set to "ON".
- Keep the battery connected.
- Keep the unit cover closed.
- Leave the fuel in the tank. (Or keep the power supply connected.)

9 For emergency

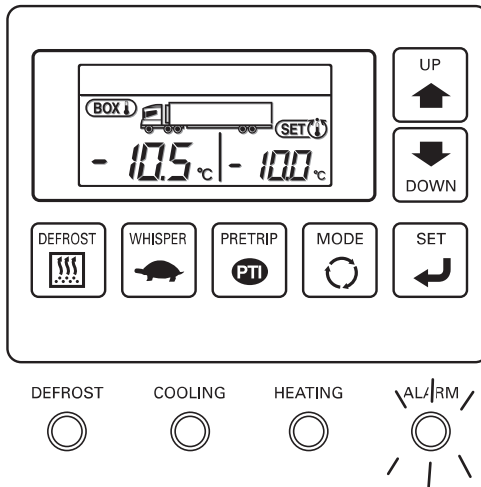
Error display

- When any error occurs, the error lamp (red) lights or blinks.
- Check the error code displayed in the digital display area.

When no error codes are displayed in the digital display area, switch the screen to the "Current error display" manually in the following procedure, and check the contents.



Switching the "Normal display" and "Current error display"



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

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

Keeping "Current error display mode" continuously

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

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

Press the [MODE] switch 2 times on the continuous display of "Current error display mode".

(The screen changes to "Normal display screen" in 10 seconds in case of 1 press.)

Countermeasures

Refer to "Error code table" for the contents of each error code and its countermeasure.

(☞ Refer to pages 76 to 78)

⚠ CAUTION



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

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

Changing the fuse

⚠ CAUTION



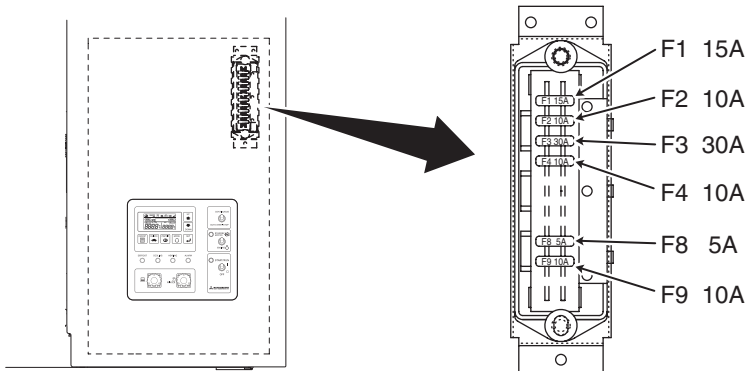
Use the designated fuse.

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

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

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

Fuse is mounted in the control box.



When you contact your nearest dealer

When you contact your nearest dealer for the error 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
- Error code displayed in the digital display area.

Resuming operation after an error stop

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

CAUTION



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

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

List of error codes

| Error Code | Error Contents | Remedy | Error lamp | State of Refrigeration Unit |
|--------------|--|--|-------------------------------------|--|
| <i>E004</i> | Throttle solenoid fuse is blown. | Fuse F3 has blown. Replace the fuse F3 (30A) in the control box with a spare fuse 30A. If the same error repeats after the replacement, ask a dealer for inspection. | blinking | Unit operation continues. |
| <i>E006</i> | Load drive circuit fuse is blown. | Fuse F2 has blown. Replace the fuse 2 (10A) in the control box with a spare fuse 10A. If the same error repeats after the replacement, ask a dealer for inspection. | lighting | Unit operation stops. |
| <i>E009</i> | Commercial power supply is faulty. | Commercial power supply is interrupted or the power plug is not connected to the power socket. Check the power supply. | blinking | Unit operation stops. (Automatic operation reset) |
| <i>ED 10</i> | High-pressure protection device tripped. | High-pressure switch has tripped. (1) Open the panel and inspect the condenser fan drive belts (ribbed belt, 2 pcs.) 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.) | lighting | Unit operation stops. |
| <i>ED 13</i> | Discharge gas temperature is abnormally high. | Refrigerant temperature at the compressor discharge side has reached the protective temperature. Consult a dealer. | blinking | Unit operation stops. (Automatic operation reset) |
| | | | lighting | Unit operation stops. |
| <i>ED 14</i> | Insufficient refrigerant quantity | Refrigerant quantity is extremely low. Ask a dealer for inspection. | lighting | Unit operation stops. |
| <i>ED 16</i> | Low-pressure is abnormally low. | Refrigerant pressure at the compressor suction side has dropped to the protective pressure. Ask a dealer for inspection. | lighting | Unit operation stops. |
| <i>ED 17</i> | High-pressure sensor failed. | High-pressure sensor is not operating normally. Ask a dealer for inspection. | lighting | Unit operation stops. |
| <i>E020</i> | Sub-engine oil depleted. | Sub-engine hydraulic switch has tripped. Replenish engine oil (for diesel) till the oil level rises to upper limit of level gauge. | lighting | Unit operation stops |
| <i>E021</i> | Sub-engine cooling water temperature is abnormally high. | Sub-engine water temperature switch has tripped. Inspect the water quantity in the reservoir tank and replenish if necessary. (Antifreeze coolant density 50%wt) Also inspect and clean the radiator (heat exchanger placed at right as seen facing the refrigeration unit). | lighting | Unit operation stops. |
| <i>E023</i> | Sub-engine speed is abnormally low. | Sub-engine speed is extremely low. Ask a dealer for inspection. | blinking (lights after 9 blinkings) | Unit operation stops. (Automatic operation reset repeats up to 9 times.) |
| <i>E024</i> | Sub-engine starting failed. | Inspect the fuel tank to see if fuel is reserved. If fuel is reserved, inspect the battery. | lighting | Unit operation stops |
| <i>E027</i> | Sub-engine overrun. | Sub-engine speed has increased far beyond the setting value. Ask a dealer for inspection. | lighting | Unit operation stops |

9 For emergency

| Error Code | Error Contents | Remedy | Error lamp | State of Refrigeration Unit |
|-------------|---|---|--|---|
| <i>E030</i> | Front door is not closed. | Front door is open or not closed completely. Close the door completely. | blinking | Unit operation stops. (Automatic operation reset) |
| <i>E031</i> | Motor over-current protection device tripped. | Motor over-current protection device has tripped. Ask a dealer for inspection. | blinking (lights after 1 blinking) | Unit operation stops. (Automatic operation reset repeats up to 1 time.) |
| <i>E032</i> | Alternator failed to generate power. | 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 (lights when battery voltage has dropped) | Unit operation continues. (Operation stops when the battery voltage has dropped.) |
| <i>E050</i> | Inside container temperature sensor failed. | Inside container temperature sensor coil has blown or short-circuited. Ask a dealer for inspection. | blinking | Unit operation continues. |
| <i>E054</i> | Throttle solenoid failed. | Sub-engine cannot operate at the high speed due to the failure of throttle solenoid. Ask a dealer for inspection. | blinking | Unit operation continues. |
| <i>E060</i> | High-pressure switch failed. | High-pressure switch has failed. Ask a dealer for inspection. | blinking | Unit operation stops. (Automatic operation reset) |
| <i>E063</i> | Discharge gas temperature sensor failed. | Discharge gas temperature sensor coil has blown or short-circuited. Ask a dealer for inspection. | blinking | Unit operation continues. |
| <i>E070</i> | Sub-engine hydraulic switch failed. | Sub-engine hydraulic switch has failed. Ask a dealer for inspection. | lighting (blinking) | Unit operation stops. (Operation continues partially.) |
| <i>E073</i> | Sub-engine speed sensor is abnormal. | Some error has occurred on the sub-engine speed sensor. Ask a dealer for inspection. | lighting | Unit operation stops |
| <i>E075</i> | Sub-engine maintenance is demanded. | It is time to change the engine oil or engine oil filter. Ask a dealer for inspection. | blinking | Unit operation continues. |
| <i>E081</i> | Motor over-current protection device failed. | Motor over-current protection device has failed. Ask a dealer for inspection. | lighting | Unit operation stops |
| <i>E099</i> | Controller communication error | Controller cannot communicate properly. Ask a dealer for inspection. | blinking (lights after 9 blinkings) | Unit operation stops. (Automatic operation reset repeats up to 9 times.) |
| <i>E201</i> | Contacter failed to operate properly. | Motor switch has failed to operate properly. Ask a dealer for inspection. | lighting | Unit operation stops |
| <i>E202</i> | R phase is interrupted. | R phase of commercial 3-phase power supply is interrupted (current does not flow). (When S or T phase has interrupted, no error occurs but the motor does not run.) Ask for inspection on electric equipment. | blinking | Unit operation continues. |
| <i>E203</i> | Fan clutch fuse is 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. | lighting | Unit operation stops |
| <i>E204</i> | External device power supply fuse is blown. | Fuse F8 has blown. Replace the fuse F8 (5A) in the control box with a spare fuse. If the same trouble repeats after the replacement, ask a dealer for inspection. | blinking | Unit operation continues. |

| Error Code | Error Contents | Remedy | Error lamp | State of Refrigeration Unit |
|-------------|---|--|---------------------|--|
| <i>E210</i> | Pump down is abnormal. | Pump down error has occurred. Ask a dealer for inspection. | lighting | Unit operation stops |
| <i>E220</i> | Engine oil supply is demanded. | Engine oil level has become low. Supply engine oil (for diesel) till the oil level rises to upper limit of level gauge. | blinking | Unit operation continues |
| <i>E221</i> | Sub-engine low speed is not adjusted properly. | Sub-engine at the low speed operation runs off largely from the rated speed. Ask a dealer for adjustment. | blinking | Unit operation continues. |
| <i>E222</i> | Sub-engine high speed is not adjusted properly. | Sub-engine at the high speed operation runs off largely from the rated speed. Ask a dealer for adjustment. | blinking | Unit operation continues. |
| <i>E223</i> | Sub-engine stalls frequently. | Sub-engine stalls frequently. Check to see if sufficient fuel is in the fuel tank. If fuel is sufficient, ask a dealer for inspection. | lighting | Unit operation stops |
| <i>E250</i> | Evaporator outlet temperature sensor failed. | Evaporator outlet temperature sensor coil has blown or short-circuited. Ask a dealer for inspection. | blinking | Unit operation continues. |
| <i>E252</i> | Supply air temperature sensor 1 failed. | Supply air temperature sensor coil has blown or short-circuited. Ask a dealer for inspection. | blinking (lighting) | Unit operation continues. (Operation stops if both have failed simultaneously with the inside container temperature sensor.) |
| <i>E253</i> | Supply air temperature sensor 2 failed. | | | |
| <i>E256</i> | Ambient temperature sensor failed. | Ambient temperature sensor coil has blown or short-circuited. Ask a dealer for inspection. | blinking | Unit operation continues. |
| <i>E260</i> | Defrost solenoid valve 1 failed. | Defrost solenoid valve 1 (SV2-1) has failed. Ask a dealer for inspection. | blinking | Unit operation continues. |
| <i>E261</i> | Defrost solenoid valve 2 failed. | Defrost solenoid valve 2 (SV2-2) has failed. Ask a dealer for inspection. | blinking | Unit operation continues. |
| <i>E263</i> | Unloader solenoid valve failed. | Compressor unloader solenoid valve (SV3) has failed. Ask a dealer for inspection. | blinking | Unit operation continues. |
| <i>E264</i> | Condenser inlet solenoid valve failed. | Condenser inlet solenoid valve (SV4) has failed. Ask a dealer for inspection. | lighting (blinking) | Unit operation stops (Operation continues partially.) |
| <i>E265</i> | Fluid bypass solenoid valve failed. | Fluid bypass solenoid valve (SV5) has failed. Ask a dealer for inspection. | blinking | Unit operation continues. |
| <i>E266</i> | Electronic expansion valve failed. | Electronic expansion valve (EEV1) has failed. Ask a dealer for inspection. | lighting | Unit operation stops |
| <i>E268</i> | Buzzer circuit failed. | External buzzer circuit has short-circuited. Ask a dealer for inspection. | blinking | Unit operation continues. |
| <i>E269</i> | Stop solenoid circuit failed. | Stop solenoid circuit has short-circuited. Ask a dealer for inspection. | lighting | Unit operation stops |
| <i>E270</i> | Starter relay failed. | Starter relay (SR) drive coil circuit has failed. Ask a dealer for inspection. | lighting | Unit operation stops |
| <i>E271</i> | Motor relay circuit failed. | Motor relay (ARMO) drive coil circuit has short-circuited. Ask a dealer for inspection. | lighting | Unit operation stops |
| <i>E272</i> | Pre-heater relay failed. | Pre-heater relay (ARPH) drive coil circuit has short-circuited. Ask a dealer for inspection. | lighting | Unit operation stops |
| <i>E280</i> | Battery voltage dropped. | Battery voltage has dropped. Replace the battery if it is aged. | blinking (lighting) | Unit operation continues. (Operation stops if abnormal is detected during PTI.) |

10 Specification

| Item | | Type | TFV2000D-E | | |
|--------------------------------------|---------------------------------------|----------------------|---|---|--------------------------|
| Freezing capacity | Conditions (Ambient temperature 30°C) | | °C | Return air temperature -20 | Return air temperature 0 |
| | Motor drive (50Hz) | | W | 6970 | 12490 |
| | Sub-engine drive | | | 9770 | 19060 |
| Functions | | | Cooling/heating | | |
| Working environment | Inside container temperature | | °C | -30 to +25 | |
| | Ambient temperature | | | -20 to +40 | |
| Unit dimensions | W×H×D | Outside | mm | 2000×2138×430 | |
| | | Inside | | 1659×1150×100 | |
| Unit weight | | | kg | 860 (Excluding battery) | |
| Drive system | | | Exclusive sub-engine and motor | | |
| Operating system | | | Automatic start/stop and continuous operation selection | | |
| Sub-engine | Model | | 4TNV88-SMRE | | |
| | Displacement | | cm ³ | 2189 | |
| | Bore×Stroke×Cylinders | | mm | φ88×90×4 | |
| | 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)) | |
| | 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 | φ55×55.6×4 | |
| | Compressor oil charge volume | | L | 2.4 (Diamond Freeze MA32R) | |
| Evaporator | Type | | Aluminum fin & copper tubes | | |
| | Fan | | Double suction turbo fan with casing | | |
| | Fan speed | | min ⁻¹ | Sub-engine drive: high speed 2550, low speed 1760, standby motor drive (50Hz): 1333 | |
| Condenser | Type | | Aluminum fin & copper tubes | | |
| | Fan | | Turbo fan × 2 | | |
| | Fan speed | | min ⁻¹ | Sub-engine drive: high speed 2550, low speed 1760, standby motor drive (50Hz): 1333 | |
| Standby motor | Type | | Totally-enclosed fan-cooled outdoor type | | |
| | Power supply | | 3-phase AC 400V 50Hz | | |
| | Number of poles | | 4 | | |
| Refrigerant charge volume | | kg | R404A, 8.0 | | |
| Design pressure | High pressure side | | MPa | 3.24 | |
| | Low pressure side | | | 2.26 | |
| Sound power level | | dB | 104 | | |
| 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, limit switch | | |



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