MITSUBISHI TRANSPORT REFRIGERATION UNIT

OPERATION MANUAL

TNW4E
TNW5E
TNW6E
TNW7E

CE

TSJ012A149A
YEAR:2016

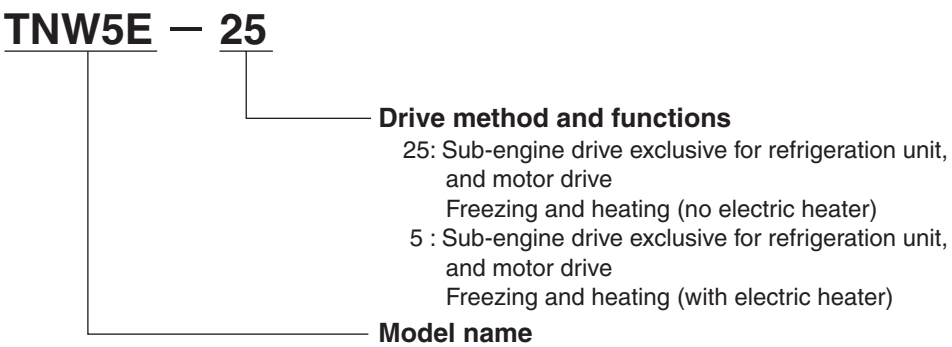
Thank you for your purchase of the Mitsubishi Transport Refrigeration Unit.

Please read this operation manual carefully in order to ensure that the refrigeration unit is used in a safe and proper manner. This manual explains the operation procedures and includes a brief troubleshooting section.

This product contains fluorinated greenhouse gases.

- Refrigerant :R404A (GWP(Global Warming Potential)=3922)
  Refer to a label on unit about weight of fluorinated greenhouse gases and CO_2 equivalent. (Refer to page 6.)

• How to read the type



Contents

1. Items to Observe (Safety Precautions)

■ Please read this section "Items to Observe (Safety Precautions)" before using, to ensure that the unit is used correctly.

■ The precautions given here describe important information related safety, and must always be observed.

• The signs and meanings are as follow.

⚠ **DANGER**	**Indicates high and imminent potentially dangerous situation, which if mis-handle, will result in death, injury, or serious accident such as damage of the refrigeration unit.**
⚠ **WARNING**	**If mishandled, may result to serious injuries or fatalities.**
⚠ **CAUTION**	**If mishandled, serious results could occur depending on the situation.**

• The meanings of the "signs" used in this manual are as follows.

	Never perform.		**Always carry out according to the instructions.**
	Always ground.		**Always disconnect power supply plug from socket.**
	Never touch.		**Repairs and disassembly must be done by qualified personnel.**
ADVICE	**Things you should know.**		

• Store the operation manual in a place that is easy to access for future reference after reading it.
• If the ownership of the product is transferred, or if the product is lent out, always hand this operation manual to the new user so that the safe and correct usage methods can be understood.

⚠ DANGER

Do not modify or perform specification change for refrigeration and vehicle. (This will make refrigeration unit out of warranty.)
It may cause a serious accident if customer modify the refrigeration unit or change the specification by himself/herself.

Do not paint on resinic design panel. (This will make refrigeration unit out of warranty.)
Cracking occurs in design panel, which cause a risk of falling down of panel while the vehicle is running.

Precautions for installation

⚠ WARNING

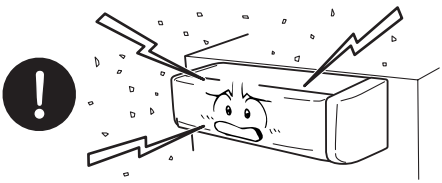
Always ground
Incomplete grounding could lead to electric shocks.

Always use a dedicated circuit and leakage breaker for the electric work.
Insufficient electric circuit capacity or incorrect work could lead to electric shocks or fires.

Precautions for usage

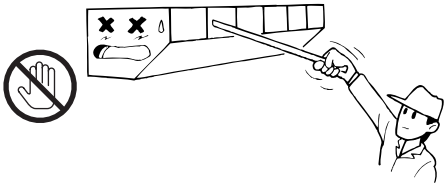
⚠ WARNING

Always stop operation in an abnormal state.



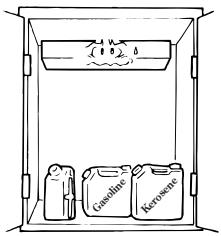
Continuing operation in an abnormal state could lead to electric shocks or fires, etc.

Do not insert fingers, rod, etc., in the air intake or outlet ports.



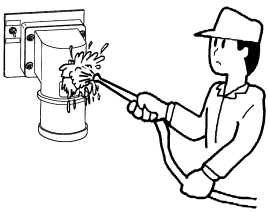
Since the fan is rotating at a high speed inside, it could lead to injuries or troubles.

Do not place volatile or flammable matters in the room.



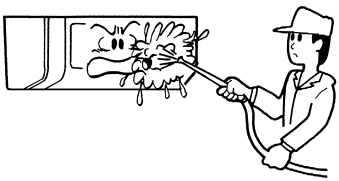
Failure to observe this could lead to explosions or fires.

Do not directly splash water on the electric parts, or wash them with water.



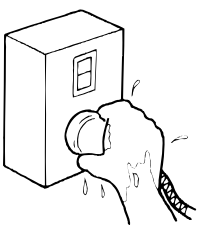
It could lead to short circuits or electric shocks.

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



Washing with high-pressure fluids could cause the condenser fins to damage. Washing with steam could cause the internal pressure to rise abnormally and lead to ruptures.

Never touch the electric parts such as the power supply plug with wet hands. Never operate the switches with wet hands.



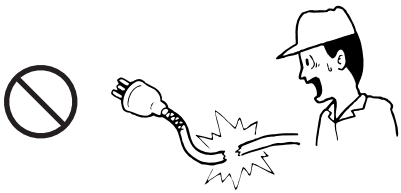
Failure to observe this could lead to electric shocks.

⚠ WARNING

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

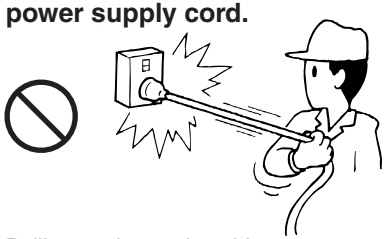
Use of a power supply cord other than a dedicated cord and plug, a relay or extension cord could lead to electric shocks, overheat or fires.

Do not modify, apply undue force by, for example, bending forcibly, pulling hard, twisting, etc., place under a cargo or pinch the power cord.



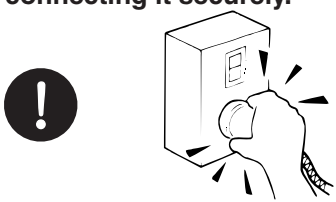
It could damage the power cord and result in fires or electric shocks.

Always hold the power supply plug when disconnecting the power supply cord.



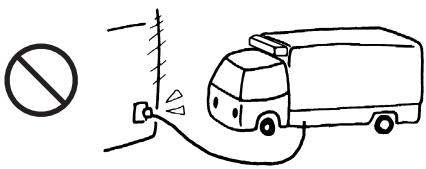
Pulling on the cord could cause some wires to break and lead to overheat or fires.

Confirm that there is no dust on the power supply plug, and that the plug is not loose before connecting it securely.



Adherence of dust or incomplete connection could lead to electric shocks or fires.

Do not move the vehicle while the commercial power supply is connected.



Moving the vehicle while the power supply is connected could lead to damage of the devices, electric shocks or fires, etc.

Protect the power supply socket with the cover when it is not used. If the cover is damaged, repair it immediately.

Failure to use the cover or use of damaged cover could lead to electric shocks or fires.

⚠ WARNING

Do not use the cabin controller when driving the vehicle.
It could cause trouble.

Do not leave combustible objects around the exaust pipe.
These could catch fire.

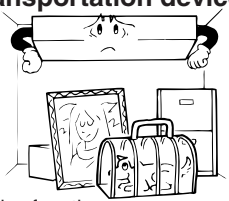
It is prohibited standing on, hanging down from, holding on or stepping on the refrigeration unit, or other similar acts.
It could cause injury or trouble.

Do not use the refrigeration unit in explosive atmosphere.
It could cause explosion, fire, or other accident.

Do not touch the high-temperature sections such as the exhaust pipe or high pressure pipes during operation of the refrigeration unit.
Doing so could cause burns.

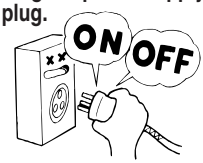
⚠ CAUTION

Use the transportation device as intended.



Use of this device for other purposes could deteriorate the quality of cargo or other troubles.

Do not start and stop operation by connecting and disconnecting the power supply breaker or power supply plug.

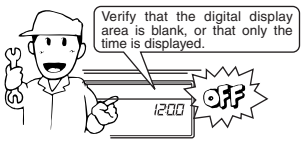


Failure to observe this could lead to faults in the electrical circuit or to electric shocks.

Periodically confirm the operation of the leakage breaker.

Use of the leakage breaker in a fault state could impair operation in the event of a current leakage or could lead to electric shocks.

Always press the [RUN/STOP] switch and disconnect the power supply plug before starting cleaning, maintenance or inspection. (Turn OFF the power supply circuit.)



Failure to observe this could lead to electric shocks or injuries from the fan.

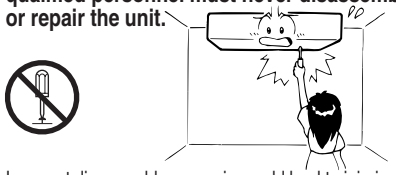
Do not discharge a refrigerant in the atmosphere.
It could cause environmental disruption.

Items to Observe

Precautions for inspections

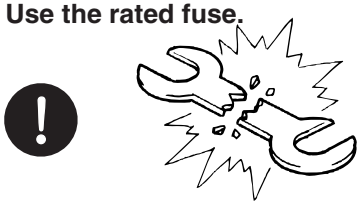
⚠ WARNING

Persons other than repair technicians or qualified personnel must never disassemble or repair the unit.



Incorrect disassembly or repairs could lead to injuries from abnormal operations or to electric shocks or fires, etc.

Use the rated fuse.



Use of an incorrectly rated fuse (wire or copper wire) could lead to fires or electric shocks, etc.

Do not use brands of refrigerant, refrigerating machine oil, sub-engine oil, sub-engine fuel, coolant (antifreeze) other than those designated.
Doing so could lead to faults in the refrigeration unit.

Put on protective eyeglasses and groves when handling the refrigerant.
Direct contact with the refrigerant could freeze the skin. If it enters in the eye, it could lead to loss eyesight.

Do not run the motor at an incorrect voltage.
Doing so could lead to faults in the refrigeration unit or to fires.

Do not touch the rotary section (each pulley, drive belt, condenser fan sub-engine cooling fan) in the condensing unit.
It could lead to injuries.

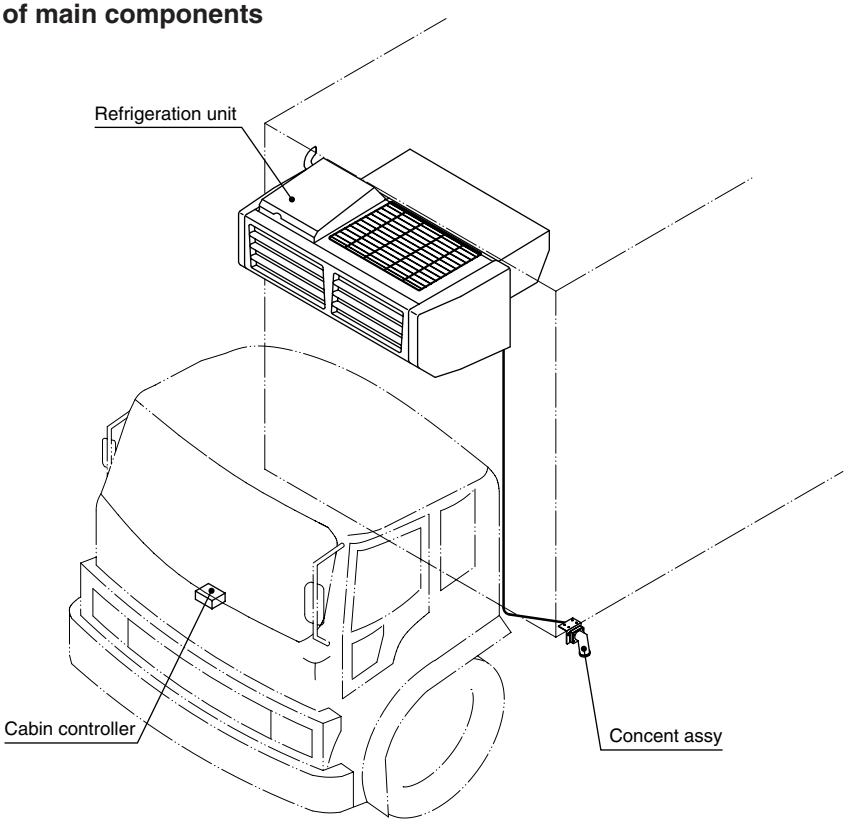
Never make modifications.
Making modifications could lead to ruptures, electric shocks, fires or injuries, etc.

When a fault occurs

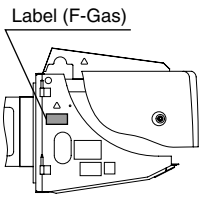
If a fault occurs, stop the refrigeration unit, contact your nearest dealer, and maintain the load temperature.

2 Parts

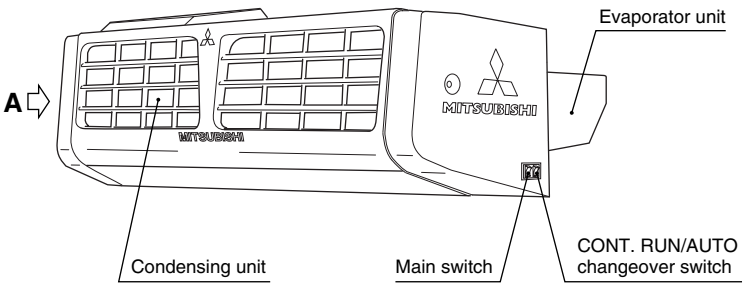
Layout of main components



(1) Refrigeration unit

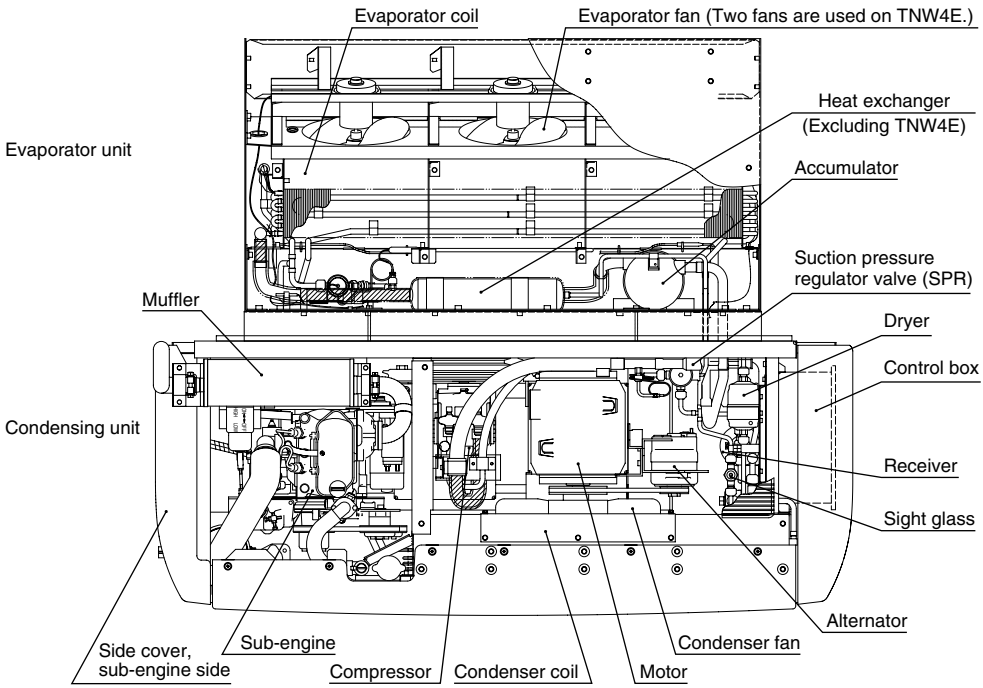


Inside of view "A"

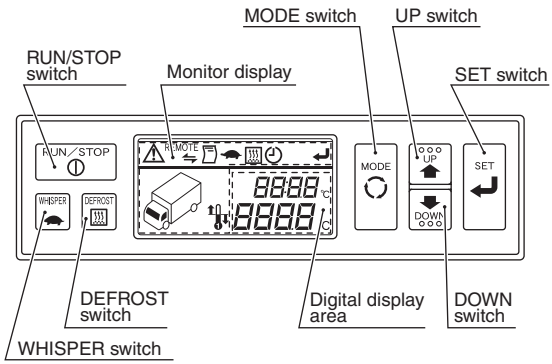


Parts

(2) Inner details of refrigeration unit

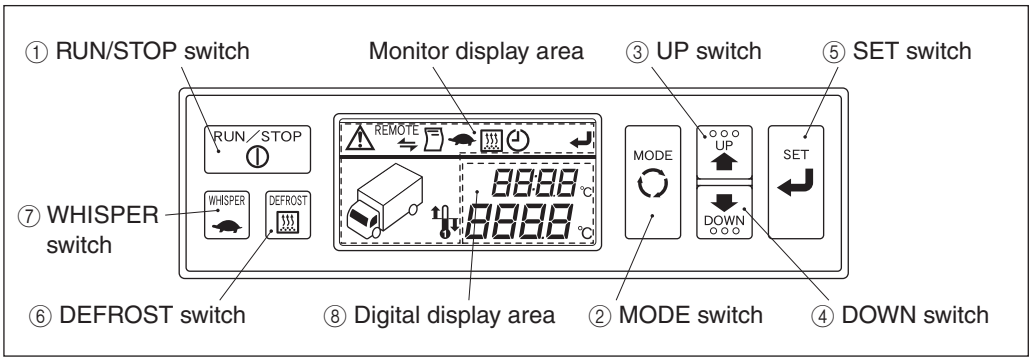


(3) Cabin controller



3 Mode Display

(1) Switch names and functions



① RUN/STOP switch ····· Turns the refrigeration unit RUN and STOP.
② MODE switch ····· Changes the screen display mode, etc.
③ UP switch ····· Changes the setting value of the temperature and time, etc.
④ DOWN switch ····· Changes the setting value of the temperature and time, etc.
⑤ SET switch ····· Registers a setting.
⑥ DEFROST switch ····· Performs a manual defrost operation.
⑦ WHISPER switch ····· Operates the sub-engine forcibly at a slow speed to suppress noises. (This function is not equipped on TNW4E.)
⑧ Digital display area ····· Displays the setting temperature at the top, and the room temperature at the bottom.

(2) Explanation of monitor display items

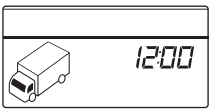
- ⚠ ····· This is the alarm indication. When trouble occurs, this symbol lights up (the backlight blinks) and blinks.
- REMOTE ····· This is the external communications status indicator. It lights up and blinks at the time of external communication.
- ····· This is the printer indicator. It lights up and blinks when data are being output to the printer, etc.
- ····· Slow speed operation display. The lamp turns on when the WHISPER switch is turned on.
- ····· This is the defrost indicator. It lights up during a defrost operation.
- ····· This is the timer indicator. It lights up and blinks when there is a display or setting related to timer operation.
- ····· This is the fix setting indicator. It lights up and blinks when prompting you to finalize a setting.
- ····· This is the heating operation indicator. It lights up during a heating operation.
- ····· This is the cooling operation indicator. It lights up during a cooling operation.
- ····· This is the room temperature indicator. It lights up when the room temperature is being displayed in the bottom row of the digital display. It also blinks when the room temperature deviates from the setting temperature.

Mode Display

(3) Mode displays and functions

- Each time the [MODE] switch is pressed, the mode changes in the sequence shown below.
- Refer to the reference page number for details of each mode's settings.
- Following a mode change, the item ② "Setting temperature / room temperature" display appears when the [SET] switch is pressed, or after a 10-second period without a switch input.

① Clock

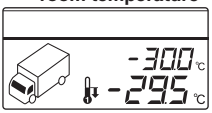


- This mode is used to set and display the current time.
- This display displays when the refrigeration unit is stopped.
- This display does not display when the clock display setting is OFF.

MODE

See page 11

② Setting temperature / room temperature

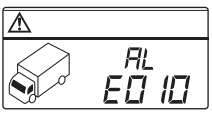


- This mode is used to display and specify the setting temperature & room temperature.
- This display displays when the refrigeration unit is running.

MODE

See page 19

③ Alarm occurrence

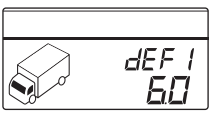


- This mode indicates the currently active alarm.
- Up to 10 alarms display sequentially at 2-second intervals.

MODE

See page 28

④ Defrost timer

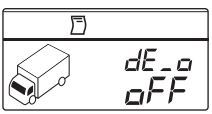


- This mode is used to set and display the defrost timer.
- The timer setting is indicated in hour units.

MODE

See page 24

⑤ Printer output

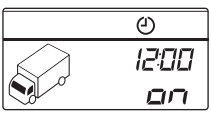


- This mode is used to print out the room temperature and the setting temperature.
- Use of this function requires an optional printer.

MODE

See page 15

⑥ ON timer

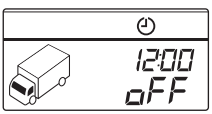


- This mode is used to set the refrigeration unit's automatic ON timer (for one startup only).
- If a timer setting already exists, it displays at the top of the digital display area.

MODE

See page 25

⑦ OFF timer



- This mode is used to set the refrigeration unit's automatic STOP timer (for one stop only).
- If a timer setting already exists, it displays at the top of the digital display area.

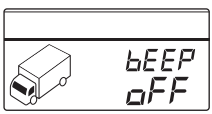
See page 26

MODE When Stopped

MODE During operation

MODE

⑧ User settings

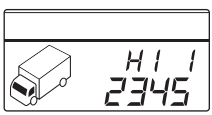


- This mode is used to set and display the cabin controller functions.
- Setting items display at 2-second intervals.

See page 10

MODE

⑨ Cumulative engine operating time 1

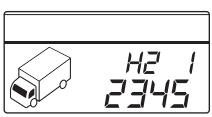


- Displays cumulative engine operating time 1 for the engine registered by the cabin controller.
- A reset function is included.
- Display units are hours.

See page 12

MODE

⑩ Cumulative engine operating time 2

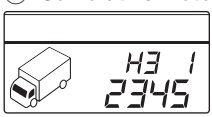


- Displays cumulative engine operating time 2 for the engine registered in the cabin controller.
- Display units are hours.

See page 12

MODE

⑪ Cumulative motor operation time

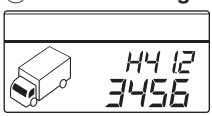


- Displays the cumulative operating time for the motor registered in the cabin controller.
- Display units are hours.

See page 13

MODE

⑫ Number of engine run/stop

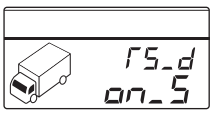


- Displays number of engine run/stop registered in the cabin controller.
- Display units are times.

See page 16

MODE

⑬ Temperature deviation

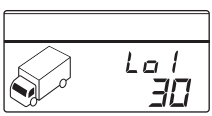


- This mode is used to set and display the permissible range of temperature deviation between the setting temperature and the actual room temperature.

See page 13

MODE

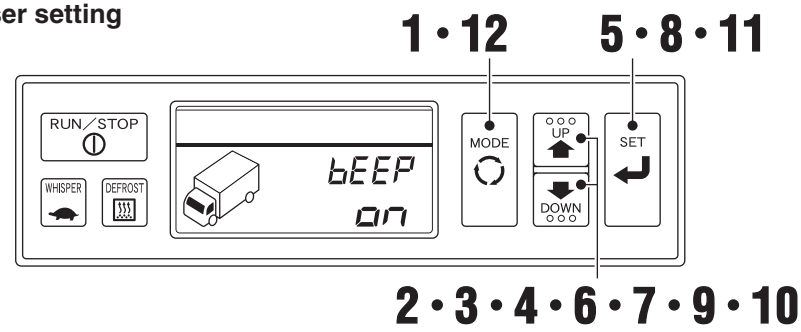
⑭ Log setting



- This mode is used to set and display the log interval, etc., used for recording log data.

See page 14

(4) Set the user setting



1 **Set the user setting display**

Press the [MODE] switch (8 times, when the refrigeration unit is stopped, or 7 times when running) to change the display to the user settings display at the digital display area.

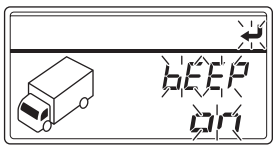
2 **Setting the buzzer**

Press the [UP] or [DOWN] switch to change the display to the buzzer setting display.

3 Press the [UP] or [DOWN] switch again to enable a setting change operation (digital display begins blinking).

4 Press the [UP] switch for a "buzzer ON" setting, or the [DOWN] switch for a "buzzer OFF" setting.

5 Press the [SET] switch to register the setting. The display will change to then displays.



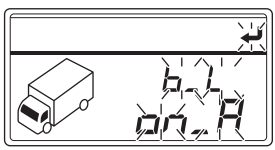
Buzzer setting display

6 **Setting the backlight**

Press the [UP] or [DOWN] switch to display the backlight setting display. The digital display begins blinking, and the setting step display displays.

7 The [UP] and [DOWN] switches can be used to select the following setting items.

- on_A Light switch interlock
- on_H Always bright
- on_L Always dim
- on_r ON only when panel is pressed (bright)
- oFF OFF



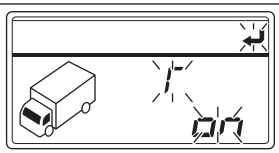
Backlight setting display

8 Press the [SET] switch to register the setting. The display will change to clock ON/OFF setting display.

9 **Setting the clock ON/OFF**

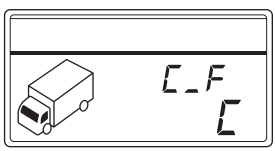
Press the [UP] or [DOWN] switch to start the digital display blinking, and to change the display to the setting steps.

10 Press the [UP] switch to specify an ON setting, or the [DOWN] switch to specify an OFF setting.



Clock ON/OFF setting display

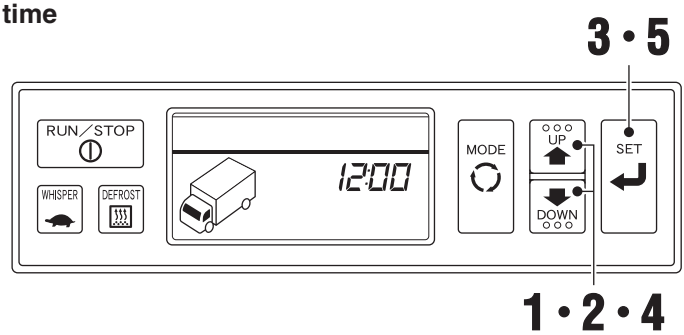
11・12 Press the [SET] switch to register the setting. The next step (centigrade) then displays. After moving through the steps, press the [MODE] switch to change the display to the user settings display.



Centigrade / Fahrenheit setting display

Mode Display

(5) Setting the time



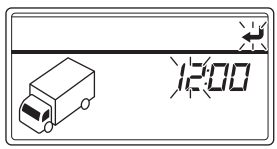
⚠ CAUTION

Before setting the time, be sure to specify an "ON" setting at the clock ON/OFF setting item in the user setting mode.

1 Stop the refrigeration unit and verify that the current time setting displays. In this condition, press the [UP] or [DOWN] switch continuously for 3 seconds to change the display to the time setting display (Hour).

2 Verify that the "Hour" portion of the time display is blinking at the top of the digital display area, then press the [UP] or [DOWN] switch to specify the current time's "Hour" setting.

ADVICE Each time the [UP] or [DOWN] switch is pressed, the time value increases or decreases by 1, respectively. If the switch is pressed continuously, the time value changes in a continuous manner.

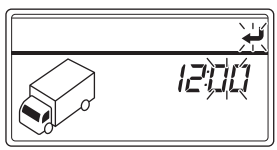


Time setting display (Hour)

3 Press the [SET] switch to register the setting. The display will change to "Minute" setting display.

4 Verify that the "Minute" portion of the time display is blinking at the top of the digital display area, then press the [UP] or [DOWN] switch to specify the current time's "Minute" setting.

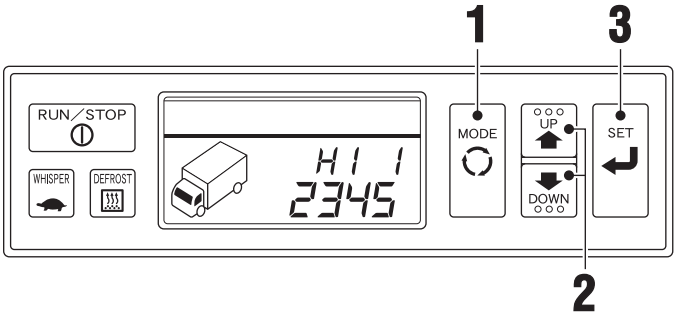
ADVICE Each time the [UP] or [DOWN] switch is pressed, the time value increases or decreases by 1, respectively. If the switch is pressed continuously, the time value changes in a continuous manner.



Time setting display (Minute)

5 Press the [SET] switch to register the setting. The current time then displays.

(6) Displaying cumulative engine operating time 1 (with reset function)

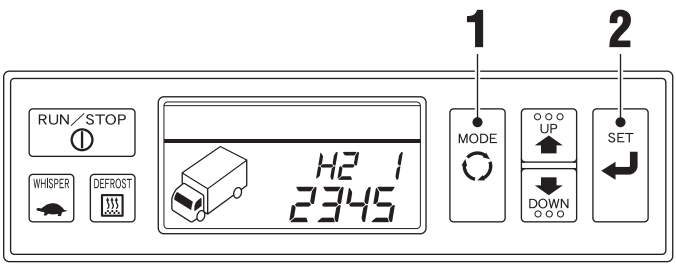


1 **Displaying cumulative engine operating time 1**
Press the [MODE] switch (9 times if the refrigeration unit is stopped and 8 times if it is running) to change the digital display to Cumulative Engine Operating Time 1 display.

2 Press both the [UP] and [DOWN] switches simultaneously 3 seconds or longer to reset the cumulative engine operating time display.

3 Press the [SET] switch. If the refrigeration unit is running, the digital display will display the setting temperature/room temperature. If the refrigeration unit is stopped, the display will change to the time display.

(7) Displaying cumulative engine operating time 2

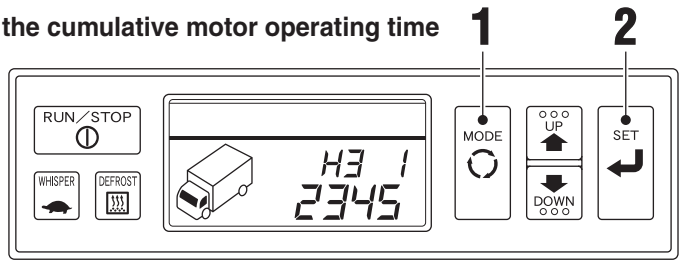


1 **Displaying cumulative engine operating time 2**
Press the [MODE] switch (10 times if the refrigeration unit is stopped and 9 times if it is running) to change the digital display to Cumulative Engine Operating Time 2 display.

2 Press the [SET] switch. If the refrigeration unit is running, the digital display will display the setting temperature/room temperature. If the refrigeration unit is stopped, the display will change to the time display.

Mode Display

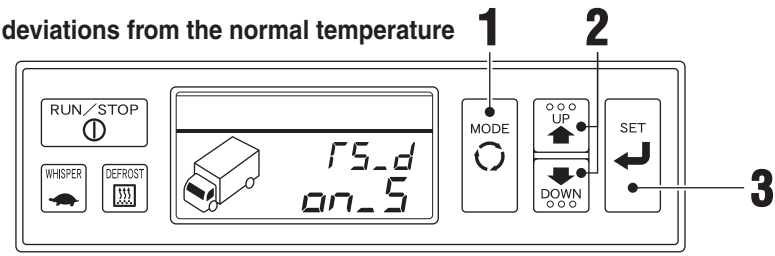
(8) Displaying the cumulative motor operating time



1 **Displaying the cumulative motor operating time**
Press the [MODE] switch (11 times if the refrigeration unit is stopped and 10 times if it is running) to change the digital display to the Cumulative Engine Operating Time 1 display.

2 Press the [SET] switch. If the refrigeration unit is running, the digital display will display the setting temperature/room temperature. If the refrigeration unit is stopped, the display will change to the time display.

(9) Displaying deviations from the normal temperature



1 **Displaying deviations from the normal temperature**
Press the [MODE] switch (12 times if the refrigeration unit is stopped and 11 times if it is running) to change the digital display to the deviation from normal temperature range display.

2 • 3 **Setting the deviation from normal temperature range setting**

①Press either the [UP] switch or the [DOWN] switch. The deviation temperature range shown in the digital display will blink and the mode will change to the deviation from normal temperature range setting mode. Press the switch again to change the setting temperature range and turn this function OFF.

- Each time the [UP] switch is pressed, the setting changes from oFF to on_5.
- Each time the [DOWN] switch is pressed, the setting changes from on_5 to oFF.

(oFF : OFF, on_1: ± 1ºC, on_2: ± 2ºC, on_3: ± 3ºC, on_3: ± 3ºC, on_4: ± 4ºC, on_5: ± 5ºC)

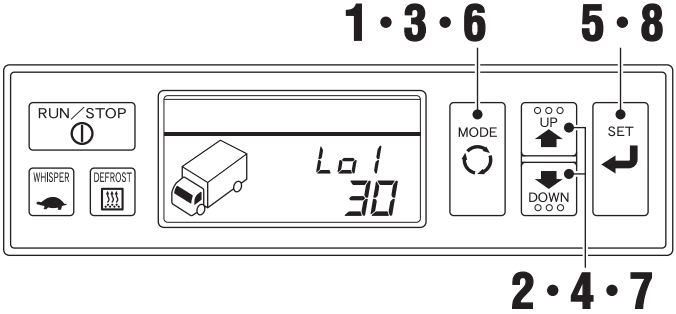
ADVICE If you continue to press the [UP] switch or [DOWN] switch, the setting will change continuously.

②When the display in the bottom of the digital display shows the desired temperature deviation range, press the [SET] switch to finalize the deviation from normal temperature range setting. After the setting is finalized, the digital display will display the setting temperature/room temperature. If the refrigeration unit is stopped, the display will change to the time display.

ADVICE This cabin controller is equipped with a function to store the setting temperature from the time the refrigeration unit was used previously (memory function), but for reference purposes, be sure to confirm the setting in the bottom row of the digital display.

(10) Displaying the log setting

The log setting display mode displays the fixed time interval (in minutes) when the log of the refrigeration unit's data are recorded while it is running and while it is stopped. In the setting mode, the interval can be changed. If the optional printer is connected, the recorded log can be printed out.



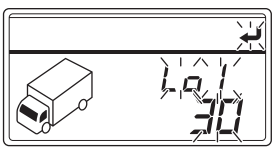
1 **Displaying the log setting**
Press the [MODE] switch (13 times if the refrigeration unit is stopped and 12 times if it is running) to change the digital display to the log setting display.

2 Press the [UP] switch or [DOWN] switch. The display will change to the running log interval display.

3 If the [MODE] switch is pressed, the digital display will blink and it will be possible to change the setting.

4 Set the desired interval (in minutes) displayed in the bottom row of the digital display by pressing the [UP] switch or [DOWN] switch.

ADVICE The log setting time interval can be set at 1 ~ 60 min.



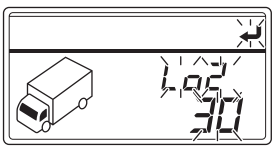
Running log interval setting display

5 Finalize the setting by pressing the [SET] switch. The display will change to the Stopped log interval display.

6 If the [MODE] switch is pressed, the digital display will blink and it will be possible to change the setting.

7 Set the desired interval (in minutes) displayed in the bottom row of the digital display by pressing the [UP] switch or [DOWN] switch.

ADVICE The log setting time interval can be set at 1 ~ 60 min.



Stopped log interval setting display

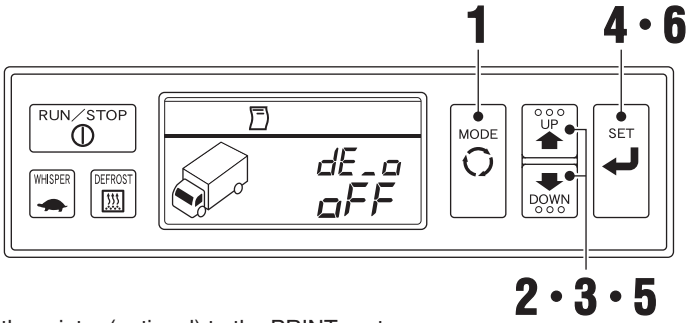
8 Finalize the setting by pressing the [SET] switch. After the setting is finalized, the digital display will display the setting temperature/room temperature. If the refrigeration unit is stopped, the display will change to the time display.

⚠ CAUTION

The log is stored in the cabin controller's flash memory, but if the memory's capacity is exceeded, the log will be overwritten, so exercise caution. It is possible to record the log for a period of 2 months when in the default setting.

Mode Display

(11) Printer output operation



- Connect the printer (optional) to the PRINT port.
- Turn ON the vehicle's ignition key to supply power to the printer.

1 **Displaying the printer output ON/OFF display**

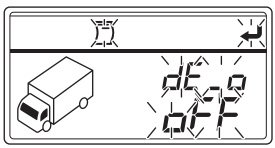
Press the [MODE] switch (5 times when the refrigeration unit is stopped, or 4 times when running) to change the printer output ON/OFF display.

2 **Printer output operation**

Press the [UP] or [DOWN] switch to change the display to the printer output ON/OFF setting display.

3 Press the [UP] switch to specify ON settings.

4 Press the [SET] switch to register the setting. If set to "ON", the display will change to the printer output time setting display.

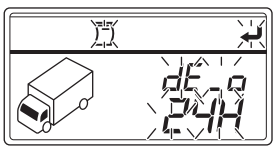


Printer output ON/OFF setting display

5 **Setting the printer output time**

Use the [UP] and [DOWN] switch, select which data do you like to output depending on how many hours earlier from now it was recorded, and press the [SET] switch.

ADVICE There 9 available printer output time settings in a range from 12H (past 12 hours) to 7d (past 7 days).



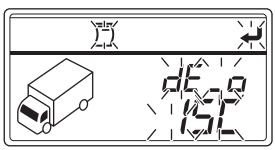
Printer output time setting display

6 **Setting the printer's printing range**

Use the [UP] and [DOWN] switch, select the range of thermal printing for the graph.

a. 30C Range within ±30˚C
b. 15C Range within ±15˚C

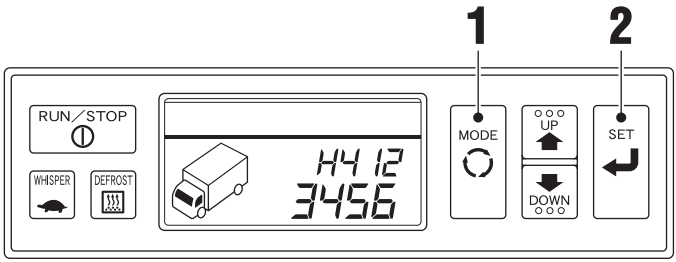
ADVICE If you press the PRINT button the printer main unit, you can print with the previous setting.



Printer's printing range setting display

7 Press the [SET] switch to register the setting. The log information for the specified time period is then printed out. At this time, the display will change to the printer output ON/OFF display at the digital display area.

(12) Displaying number of engine run/stop



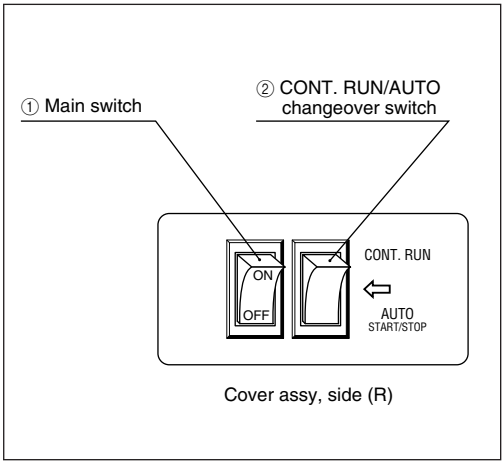
1 **Displaying number of engine run/stop**

Press the [MODE] switch (12 times if the refrigeration unit is stopped, or 11 times if it is running) to change the digital display to the number of engine run/stop display.

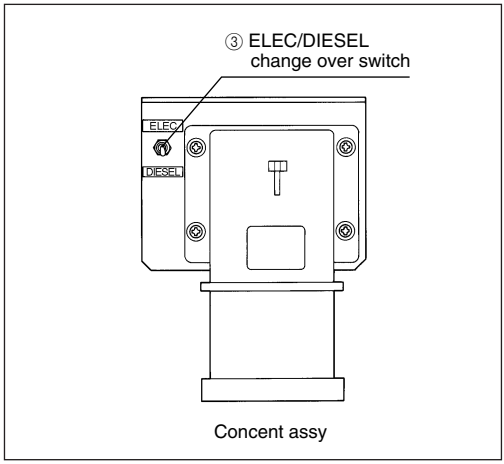
2 If you press the [SET] switch when the refrigeration unit is running, the digital display will change to the setting temperature/room temperature display. If the refrigeration unit is stopped, the display will change to the time display.

4 Each Switch Operation

(1) Usage of each switch

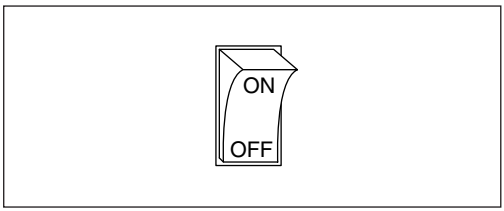


Cover assy, side (R)



Concent assy

① Main switch



This switch supplies power to the circuits in the unit.

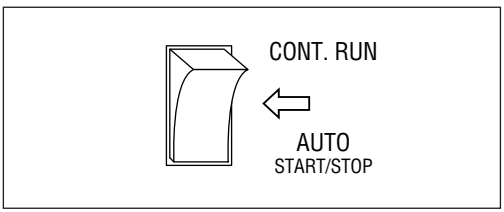
ON position ····· This switch energizes the electrical system for the unit.

OFF position ····· This switch deenergizes the electrical system and the unit will not operate.

ADVICE

The refrigeration unit will not run unless the main switch and RUN/STOP switch on the cabin controller are set to "ON". Normally, turn the main switch to "ON", and operate the refrigeration unit with the RUN/STOP switch on the cabin controller. If the main switch has been turned off, turn the RUN switch on the cabin controller to "ON" to resume operation.

② CONT. RUN/AUTO changeover switch



This switch is used to select automatic start/stop or continuous operation.

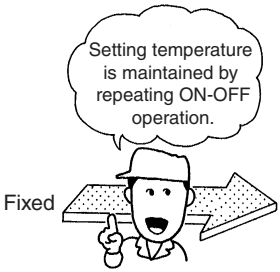
Switch upward	CONT. RUN (Continuous operation)
Switch downward	AUTO START/STOP (Automatic start/stop)

ADVICE

When cargo is frozen products
Selecting AUTO to save fuel costs is recommended.

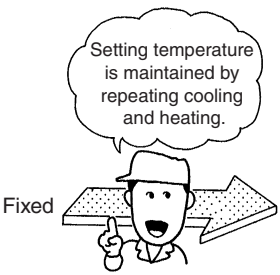
When cargo is refrigerated products
Selecting AUTO is recom-mended when fuel costs need to be saved, and selecting CONT. RUN is recommend-ed when distribution of the room temperature is important.

• When AUTO START/STOP is selected



The sub-engine runs at two speeds. It starts by pressing the cabin controller's [RUN/STOP] switch and when the room temperature is higher than the temperature set on the thermostat, it runs at high speed cooling, then changes to low speed cooling when the room temperature nears the setting temperature and stops automatically when the temperature drops to 1ºC lower than the setting temperature. When the room temperature is lower than the temperature set on the thermostat, it changes to high speed heating, then when the temperature nears the setting temperature, it changes to low speed heating, then stops automatically when the temperature becomes 1ºC lower than the setting temperature.

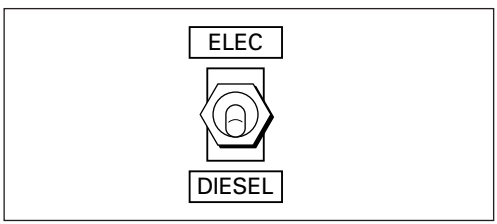
• When CONT. RUN is selected



ADVICE **Select this only for refrigerated products, and do not select for frozen products.**

It starts by pressing the cabin controller's [RUN/STOP] switch and when the room temperature is higher than the temperature set on the thermostat, it begins a cooling operation. When the room temperature is below the setting temperature, it carries out a heating operation automatically.
Furthermore, it runs continuously, changing back and forth continuously between low speed cooling when the temperature is higher than the setting temperature and low speed heating when the temperature is lower than the setting temperature.

⑤ ELEC/DIESEL changeover switch

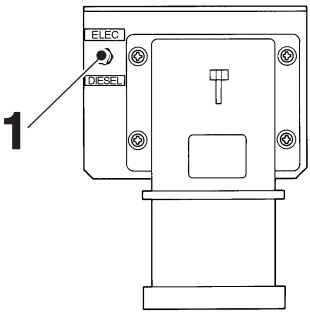


Selector switch for sub-engine driving or motor drive.

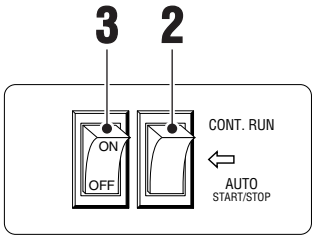
5 Operation

(1) Operation procedure

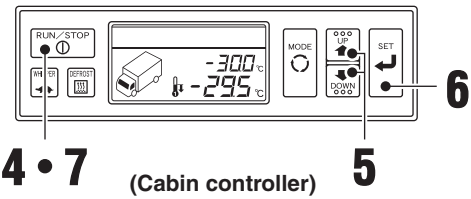
(a) For sub-engine drive



(Concent assy)



(Cover assy, side R)



(Cabin controller)

1 Set the ELEC/DIESEL changeover switch on the concent assy in the “DIESEL” position.

2 Turn the CONT. RUN/AUTO changeover switch to one of the settings.

> ADVICE Set to the CONT.RUN switch only when loading refrigerated products. Do not load frozen products.

3 Turn the main switch to “ON”.

4 Press the cabin controller’s [RUN/STOP] switch to turn the refrigeration unit “RUN”.
When the refrigeration unit is in the “RUN” state, the digital display changes to the setting temperature/ room temperature display.

5 • 6

Setting the setting temperature/ room temperature

①Press the [UP] switch or the [DOWN] switch. The setting temperature display in the top row of the digital display will blink. Pressing the switch again enables you to change the setting temperature.

- Each time the [UP] switch is pressed, the setting temperature is raised by 0.5ºC.
- Each time the [DOWN] switch is pressed, the setting temperature is lowered by 0.5ºC.

> ADVICE If the [UP] or [DOWN] switch is pressed continuously, the setting temperature will change continuously.

②Set the setting temperature displayed in the top row of the digital display to the desired temperature, then press the [SET] switch. The setting temperature will be finalized and the setting operation will end.

> ADVICE This cabin controller is equipped with a function that stores the setting temperature in memory from the previous time the refrigeration unit was used (memory function). However, to be sure, please check the setting temperature in the top row of the digital display.

⚠ CAUTION

If the room temperature is – 29ºC or lower, or 32ºC or higher, the room temperature display may not show the temperature in 0.5ºC units, but there is no problem with operation.

7 Stopping the refrigeration unit

If you press the cabin controller's [RUN/STOP] switch a second time, the refrigeration unit will go OFF and cooling will stop. When the refrigeration unit goes "STOP", the time is displayed in the digital display.

ADVICE

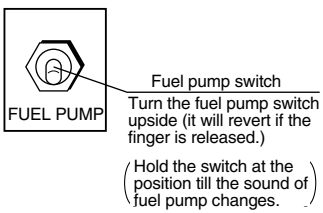
①If the main switch is turned ON/OFF instantly, the unit may stop abnormally due to malfunctioning.

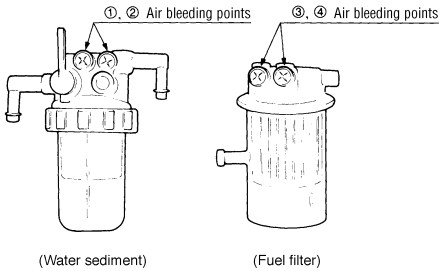
②The sub-engine will run at 2nd speed (only single type is applied to TNW4E.).

③The sub-engine will automatically preheat the glow plug for six seconds, and will start within 20 seconds after the starter starts rotating. If the sub-engine does not start within 20 seconds, press the [RUN/STOP] switch of cabin controller "STOP", and then press the [RUN/STOP] switch "RUN" again. The sub-engine will restart auto-matically. **If the sub-engine does not start with one attempt, wait at least two minutes before attemp-ting to start it again. The starter and solenoid could be burnt if starting is attempted continuously.**

④**Air bleeding**

When fuel runs out, turn the FUEL PUMP switch upside on the condensing unit so that the fuel pump operates. Bleed air from the water sediment and fuel filler.





[Bleed air in the order of ①, ②, ③ and ④.]

⑤If any noise is annoying at night or at the residential area since the sub-engine runs at a high speed, press LOW NOISE switch, and it will be forced to run at a low speed, thus suppressing the running noise. <This function is not equipped on TNW4E.>

Note: The running noise is sup-pressed but the refrigerating capacity also drops. Therefore, it will take more time until the room temperature reaches the set temperature.

Operation

Operation

- **When AUTO START/STOP is selected**

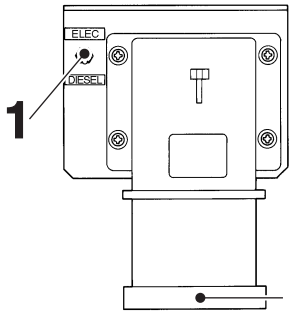
Cooling operation will be carried out automatically if the room temperature is higher than the setting temperature, and heating operation will be carried out automatically if the room temperature is lower than the setting temperature. When the room temperature reaches -1°C of the setting temperature, the sub-engine will automatically stop, and the compressor, condenser fan and evaporator fan will stop. Note that if -1°C of the setting temperature is reached within 3.5 minutes after starting sub-engine operation, the operation will automatically change to continuous operation (repetition of cooling/heating operation), to prevent the battery from dying. If cooling after 3.5 minutes have passed, the unit will stop when the temperature reaches -2°C of the setting temperature, and when heating, the unit will stop when the setting temperature is reached. Heating will not take place if the temperature is "-7°C" or less below the setting temperature.

If the room temperature reaches the setting temperature within 3.5 minutes, the battery failure prevention circuit will activate, allowing heating operation to be entered even during cooling operation. The temperature width recorded on the recorder mounted in the refrigeration vehicle may increase at time, but this is not a problem unless it increases greatly.

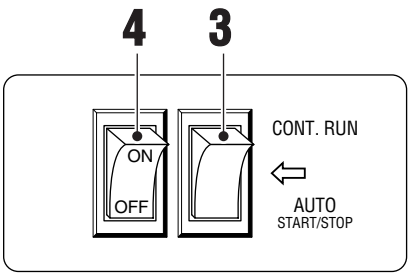
- **When CONT.RUN is selected**

If the room temperature is higher than the setting temperature, the cooling operation will take place, and if lower, the heating operation will take place. Continuous operation will take place by repeating cooling and heating.

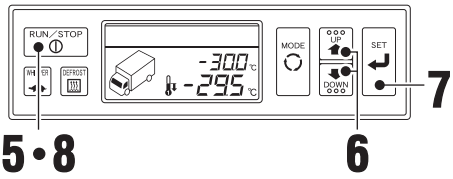
(b) For motor drive



(Concent assy)



(Cover assy, side (R))



(Cabin controller)

1 Turn the ELEC/DIESEL changeover switch to the "ELEC." position.

2 Connect the power supply for motor drive.

ADVICE Always press the [RUN/STOP] switch OFF and confirm that the unit is stopped before connecting the power supply. (Main switch and cabin controller)

3 Turn the CONT. RUN/AUTO changeover switch to one of the settings.

ADVICE Set to the CONT. RUN switch only when loading refrigerated products. Do not load frozen products.

4 Turn the main switch to the "ON" position.

5 **Starting operation**

Press the cabin controller's [RUN/STOP] switch to turn the refrigeration unit "RUN".
When the refrigeration unit is in the "RUN" state, the digital display changes to the setting temperature/room temperature display.

6 • 7 **Setting the setting temperature/room temperature**

①Press the [UP] switch or the [DOWN] switch. The setting temperature display in the top row of the digital display will blink. Pressing the switch again enables you to change the setting temperature. (During continuous operation, a setting of –5 ~ +10ºC becomes the discharge temperature setting.)

- Each time the [UP] switch is pressed, the setting temperature is raised by 0.5ºC.
- Each time the [DOWN] switch is pressed, the setting temperature is lowered by 0.5ºC.

ADVICE If the [UP] or [DOWN] switch is pressed continuously, the setting temperature will change continuously.

②Set the desired temperature for the setting temperature in the top row of the digital display, then press the [SET] switch. The setting temperature will be finalized and the setting operation will end.

ADVICE This cabin controller is equipped with a function that stores the setting temperature in memory from the previous time the refrigeration unit was used (memory function). However, to be sure, please check the setting temperature in the top row of the digital display.

⚠ CAUTION

If the room temperature is – 29ºC or lower, or 32ºC or higher, the room temperature display may not show the temperature in 0.5ºC units, but there is no problem with operation.

8 Stopping the refrigeration unit

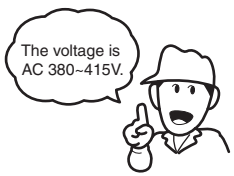
If you press the cabin controller's [RUN/STOP] switch a second time, the refrigeration unit will go "STOP" and cooling will stop. When the refrigeration unit goes "STOP", the time is displayed in the digital display.

⚠ CAUTION

- Do not run and stop the refrigeration unit by turning the power supply circuit breaker on and off or by unplugging or plugging in the power plug. If this is done, the power supply circuit could break down or it could cause an electric shock.
- Do not let rain or water get in the power supply box's receptacle. If it does, it could cause an electric shock during motor operation or unit operation.

ADVICE (1) Unit operation
①The unit will start operation approximately 20 seconds after the cabin controller's [RUN/STOP] switch is set to "RUN".
②The unit will stop for approximately five seconds when the ELEC./DIESEL changeover switch setting is changed.
(2) During motor drive operation, the unit will run at 1st speed, and will either cool or heat.

Notes (1) Power voltage and capacity
Prepare a power supply in which the rush voltage on the refrigeration unit side can be secured to 340 to 380 V or 370 to 415V when the motor starts.
(2) Motor power supply
3-phase AC 380V-415V 50Hz



Operation

- **When AUTO START/STOP is selected**

Cooling operation will be carried out automatically if the room temperature is higher than the setting temperature, and heating operation will be carried out automatically if the room temperature is lower than the setting temperature. When the room temperature reaches -1°C of the setting temperature, the motor will automatically stop, and the compressor, condenser fan and evaporator fan will stop. Heating will not take place if the temperature is "-7°C" or less below the setting temperature.

ADVICE The battery failure circuit will not function during motor drive.

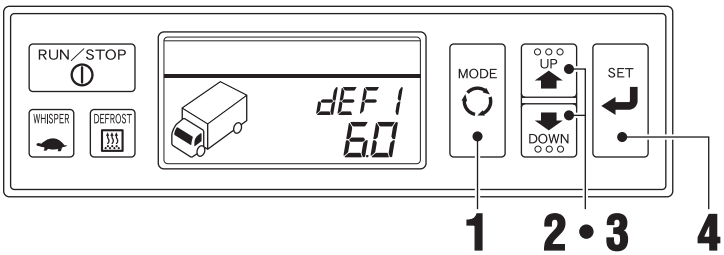
- **When CONT.RUN is selected**

If the room temperature is higher than the setting temperature, the cooling operation will take place, and if lower, the heating operation will take place. Continuous operation will take place by repeating cooling and heating.

(2) Defrost operation and manual defrost operation

In order to prevent frost from building up in the evaporator, causing the cooling effect to deteriorate, the defrost timer (set at 6 hours when the unit is shipped from the factory) runs and carries out defrosting automatically. When defrosting ends, the unit switches to cooling automatically. The evaporator fan also stops during defrosting and warm air is not blown into compartment.

(a) Setting the defrost timer



1 **Displaying the defrost timer**

Press the [MODE] switch (3 times if the refrigeration unit is stopped and 2 times if it is running) to change the display to the defrost timer display.

2 • 3 • 4 **Setting the defrost timer**

①The setting temperature displayed in the digital display will blink if the [UP] switch or [DOWN] switch is pressed, then the mode will change to the defrost timer setting mode. Pressing the switch again changes the display to the setting time display.

- Each time the [UP] switch is pressed, 1 hour is added to the displayed time.
- Each time the [DOWN] switch is pressed, 1 hour is subtracted from the displayed time.

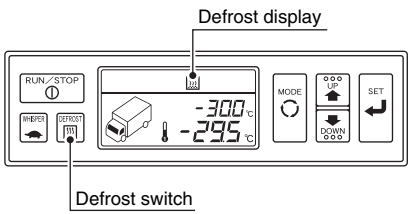
> ADVICE The defrost timer setting can be set at between 1 and 6 hours.

②Set the desired time in the digital display, then press the [SET] switch. The defrost timer's time setting will be finalized and the setting operation will close.

(b) Manual defrost operation

If frost is forming on the evaporator and cooling of the compartment is becoming difficult, you can defrost it manually.

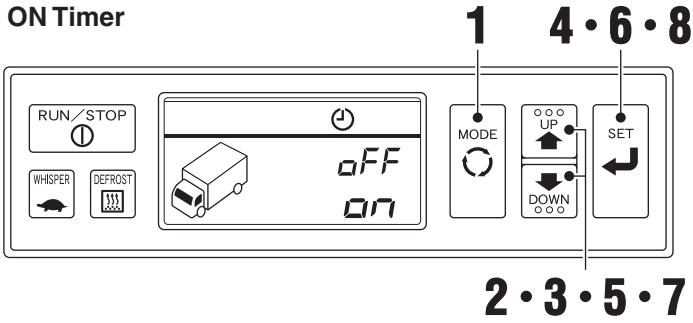
- When you desire to defrost manually, press the Defrost switch during a cooling operation. (During a defrost operation, the defrost display is shown in the display.)
- When defrosting is completed, the unit automatically returns to the cooling operation. (You cannot stop operation by carrying out manual defrosting.)



> ADVICE Using the (built-in) forced defrost end timer, the unit changes to the cooling operation automatically after 60 minutes.

Operation

(3) Setting the ON Timer

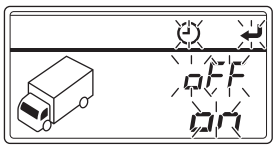


1 **Displaying the ON Timer**

Press the [MODE] switch (6 times when the refrigeration unit is stopped, or 5 times when running) to change the display to the ON timer display.

2 **Setting the ON Timer ON and OFF**

Press the [UP] or [DOWN] switch to change the display to the ON timer ON/OFF setting display.



ON timer ON/OFF setting display

3 • **4** Press the [UP] switch to specify an ON setting at the top of the digital display area, then press the [SET] switch to register the setting. The display will change to the ON timer time setting display (Hour).

ADVICE

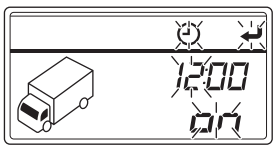
To cancel a timer setting, press the [DOWN] switch. Press the [SET] switch to register the new time setting. The display will change to the ON timer display.

5 **Setting the ON Timer Time (hour)**

Specify the desired time (Hour) when operation is to begin. The displayed "hour" value increases by 1 hour each time the [UP] switch is pressed, and decreases by 1 hour each time the [DOWN] switch is pressed.

ADVICE

If the [UP] or [DOWN] switch is pressed continuously, the time value changes in a continuous manner.



ON timer time (Hour) setting display

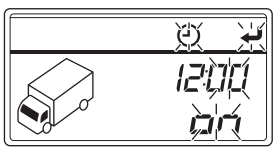
6 Press the [SET] switch to register the setting. The display will change to the ON timer time (Minute) display.

7 **Setting the ON Timer Time (minute)**

Specify the desired time (Minutes) when operation is to begin. The displayed "minutes" value increases by 1 minute each time the [UP] switch is pressed, and decreases by 1 minute each time the [DOWN] switch is pressed.

ADVICE

If the [UP] or [DOWN] switch is pressed continuously, the time value changes in a continuous manner.



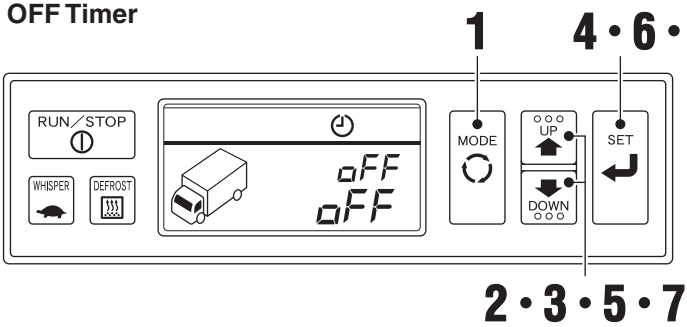
ON timer time (Minute) setting display

8 Press the [SET] switch to register the setting. The display will change to the ON timer display. Press the [SET] switch again, and verify that the timer setting is indicated.

⚠ CAUTION

- At motor-drive timer operations, verify that the power supply cord is plugged in.
- As operation begins automatically when the time specified by the timer is reached, stay clear of the unit at this time.

(4) Setting the OFF Timer

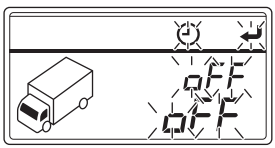


1 **Displaying the OFF Timer**

Press the [MODE] switch (7 times when the refrigeration unit is stopped, or 6 times when running) to display the OFF timer display.

2 **Setting the OFF Timer ON/OFF**

Press the [UP] or [DOWN] switch to change the display to the OFF timer ON/OFF setting display.



OFF timer ON/OFF setting display

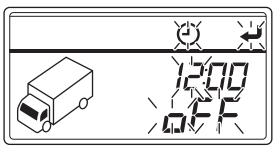
3 • **4** Press the [UP] switch to specify an OFF setting at the top of the digital display area, then press the [SET] switch to register the setting. The display will change to the OFF timer time setting display (Hour).

ADVICE To cancel a timer setting, press the [DOWN] switch. Press the [SET] switch to register the new time setting. The display will change to the OFF timer display.

5 **Setting the OFF Timer Time (Hour)**

Specify the desired time (Hour) when operation is to begin. The displayed "hour" value increases by 1 hour each time the [UP] switch is pressed, and decreases by 1 hour each time the [DOWN] switch is pressed.

ADVICE If the [UP] or [DOWN] switch is pressed continuously, the time value changes in a continuous manner.



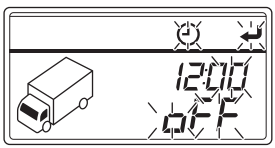
OFF timer time (Hour) setting display

6 Press the [SET] switch to register the setting. The display will change to the OFF timer time (Minute) display.

7 **Setting the OFF Timer Time (Minute)**

Specify the desired time (Minutes) when operation is to begin. The displayed "minutes" value increases by 1 minute each time the [UP] switch is pressed, and decreases by 1 minute each time the [DOWN] switch is pressed.

ADVICE If the [UP] or [DOWN] switch is pressed continuously, the time value changes in a continuous manner.



OFF timer time (Minute) setting display

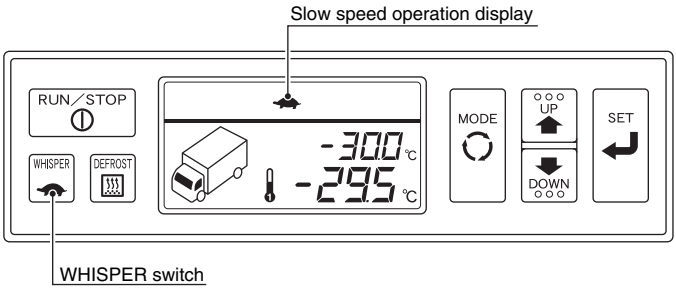
8 Press the [SET] switch to register the setting. The OFF timer display then displays. Press the [SET] switch again, and verify that the timer setting is indicated.

⚠ CAUTION

• At motor-drive timer operations, verify that the power supply cord is plugged in.

Operation

(5) WHISPER switch operation



If any noise is annoying at night or at the residential area since the sub-engine runs at a high speed, press this switch, and it will be forced to run at a low speed, thus suppressing the running noise. It will return, if it press once again. <This function is not equipped on TNW4E.>

Note: The running noise is suppressed but the refrigerating capacity also drops. Therefore, it will take more time until the room temperature reaches the set temperature.

(6) Cautions during operation

(a) Periodically confirm with the cabin controller that the room temperature is maintained at the setting temperature.
(b) When running the freezing unit while the vehicle is parked, select a well-ventilated place that is not subject to direct sunlight.
(c) The monitor display and digital display of the cabin controller may flicker due to illegal radio noise output from vehicles. In this case, stop the refrigeration unit once, restart operation, and confirm the state.
(d) Do not allow water, coffee or juice, etc., contact the cabin controller. The controller could be damaged.

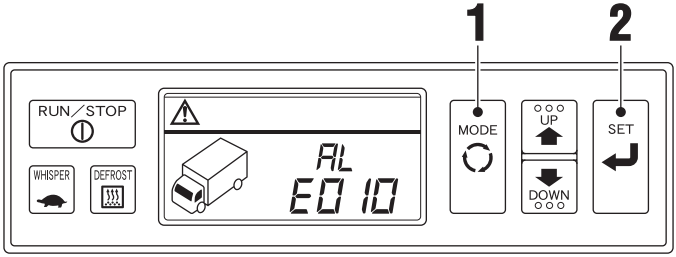
⚠ WARNING

Stop operation if an abnormal state occurs. Continuing operation in an abnormal state could lead to electric shocks or fires, etc.

6 Troubleshooting

(1) Identifying the detail of trouble with the cabin controller

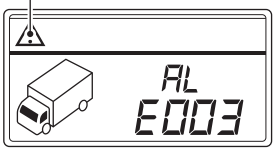
When the alarm symbol "⚠" has turned on (the backlight blinks) or blinked at the monitor display area, check the detail of trouble on the refrigeration unit.



1 **Displaying the active alarm display**

When the alarm symbol "⚠" has turned on (the backlight blinks) or blinked at the monitor display area, press the [MODE] switch (twice if the refrigeration unit is stopped, or once if the unit is operating) to change the screen to the active alarm display. The alarm code displays at the bottom of the digital display area, with up to 10 codes being displayed sequentially at 2-second intervals. If there are no active alarms, "E - - - " displays.

Alarm symbol display



Active alarm display

2 Press the [SET] switch to display the setting temperature / room temperature (when refrigeration unit is running), or the clock (when refrigeration is unit is stopped).

List of alarm codes (If the alarm display ⚠ lights up continuously)

Alarm Code	Error Contents	Measures	Refrigeration Unit State
E001	Evaporator fan motor fuse is blown.	Two or more of the fuses for the evaporator fan motor have blown. Inspect and replace the fuses F2 to F4 (TNW4E: F2 to F3) in the control box.	Refrigeration unit operation stops.
E004	Sub-engine run solenoid fuse is blown.	The run solenoid fuse for the sub-engine has blown. Inspect and replace the fuses F5 in the control box.	Refrigeration unit operation stops.
E006	Output relay fuse is blown.	The output relay fuse has blown. Inspect and replace the fuse F7 in the control box.	Refrigeration unit operation stops.
E009	Commercial power supply is faulty.	The commercial power supply has failed, or the power supply is disconnected. Check the power supply. When carrying out operation with the sub-engine, close the power supply plug cover.	Refrigeration unit operation stops.
E010 *1	High-pressure switch is operating.	The high-pressure switch has functioned. Check whether the condenser coils are dirty, and clean them if they are. Check the condenser fan or belt for breakage. If any abnormality is found, contact your dealer.	Refrigeration unit operation stops. (Auto recovery)
E011	Low-pressure switch is operating.	The low-pressure switch at the high-pressure side has functioned. Contact your dealer or nearest service shop.	Refrigeration unit operation stops.
E015	Defrost solenoid valve is faulty.	The defrost solenoid valve operation is faulty. Contact your dealer. ADVICE If loading or unloading work is carried out while the refrigeration unit is running, the alarm "E015" will display, and the refrigeration unit may stop with a fault. In this case, the defrost solenoid valve is not faulty. Press the "STOP" switch, and then turn the RUN/STOP switch "RUN" again to resume operation.	Refrigeration unit operation stops.

Troubleshooting

Alarm Code	Error Contents	Measures	Refrigeration Unit State
E020 *1	Sub-engine oil pressure switch is operating.	The sub-engine oil pressure switch has functioned. Contact your dealer.	Refrigeration unit operation stops
E021	Sub-engine water temperature switch is operating.	The sub-engine water temperature switch has functioned. (Overheat) Check the cooling water level, and replenish if low. Check whether the radiator is dirty, and clean it if it is.	Refrigeration unit operation stops
E023 *2	Sub-engine speed is abnormally low.	The sub-engine speed has dropped abnormally. Contact your dealer.	Refrigeration unit operation stops
E024 *2	Sub-engine starting failed.	The sub-engine starting failed. Check the fuel level, and replenish if low. Purge the air at the fuel filter section.	Refrigeration unit operation stops
E027	Sub-engine speed is abnormally high.	The sub-engine speed has risen abnormally. Contact your dealer.	Refrigeration unit operation stops
E029 *2	Sub-engine rising failed.	The sub-engine rising failed. Contact your dealer.	Refrigeration unit operation stops
E030	Side cover at the sub-engine side is not closed.	The side cover at the sub-engine side is open. Close the side cover before starting operation.	Refrigeration unit operation stops
E031 *1	Motor protective device operated.	The motor's protective device has functioned. Contact your dealer.	Refrigeration unit operation stops
E033	Heater protective device operated.	The heater's protective device has functioned. (Excluding Type 25) Contact your dealer.	Refrigeration unit operation stops
E050	Room temperature sensor is abnormal.	The room temperature sensor has a broken connection or short circuit, or the connector's connection is faulty. Check the leads and connector. If they are faulty, contact your dealer or the nearest service shop. The room temperature display shows " -60 " when there is a broken connection, and shows " 60 " or higher if there is a short circuit.	Refrigeration unit operation stops
E073 *2	Sub-engine speed sensor is abnormal.	• The sub-engine speed sensor has a broken wire, has short circuited, or there is a contactor contact defect. Inspect the lead wire and connector. If an abnormal state is found, contact your dealer. • The self-starting motor start failed. If the self-starting motor does not start when the unit is restarted, the battery is dead or the self-starting motor is faulty. Charge the battery if it is dead. If the self-starting motor is faulty, contact your dealer. (The self-starting motor starts six seconds after the RUN/STOP switch is turned "RUN".)	Refrigeration unit operation stops
E099	Controller communications are abnormal.	• The wiring harness connection to terminal No. 7 (#10B) of connector CN3 inside the control box is faulty. • Cabin controller communications are faulty. In this case, the room temperature display shows " -60 " Contact your dealer or the nearest service shop.	Refrigeration unit operation stops

If a display does not appear, or if a sign other than the above 19 types appears, contact your dealer.

List of alarm codes (If the alarm display ⚠ blinks)

Alarm Code	Error Contents	Measures	Refrigeration Unit State
E001	Evaporator fan motor fuse is blown.	One of the fuses for the evaporator fan motor has blown. Inspect and replace the fuses F2 to F4 (TNW4E: F2 to F3) in the control box.	Refrigeration unit operation stops
E004	Sub-engine high-speed solenoid fuse is blown.	The high-speed solenoid fuse for the sub-engine has blown. Inspect and replace the fuses F6 in the control box.	Refrigeration unit operation continues
E013	Discharge refrigerant gas temperature is abnormal.	The discharge refigerant gas temperature is abnormal. Inspect the sight glass. If bubbles are apparent, the refrigerant gas is low. Contact your dealer.	Refrigeration unit operation stops
E032	Alternator charge is abnormal.	The alternator's charge is faulty. Contact your dealer or the nearest service shop.	Refrigeration unit operation stops
E087	Defrost sensor is faulty.	The defrost sensor has a broken wire, has short circuited, or there is a contactor contact defect. Inspect the lead wire and connector. If an abnormal state is found, contact your dealer.	Refrigeration unit operation stops

If a display does not appear, or if a sign other than the above 5 types appears, contact your dealer.

List of alarm codes (If there is no alarm display ⚠)

Alarm Code	Error Contents	Measures	Refrigeration Unit State
E---	Normal display	The refrigeration unit is normal.	Refrigeration unit operation stops

ADVICE

(1) Always use genuine fuses, and always replace fuses with a fuse of equal capacity.
(2) Alarm codes are displayed repeatedly at 2-second intervals beginning with the most recent alarm and continuing in order of occurrence.
(3) If the code in *1 is abnormal, the unit stops and the alarm display blinks, but if the unit fails to return to normal by auto recovery (restarting), the code lights up continuously and stops blinking.
(4) If the code in *2 is abnormal, the unit stops and the alarm display blinks. Then after 10 seconds, an attempt is made to start the unit up to 2 times. If it does not return to normal, the code lights up continuously and stops blinking.
(5) After taking the necessary measures to get the refrigeration unit running again, turn the RUN/STOP switch to the “RUN” position.

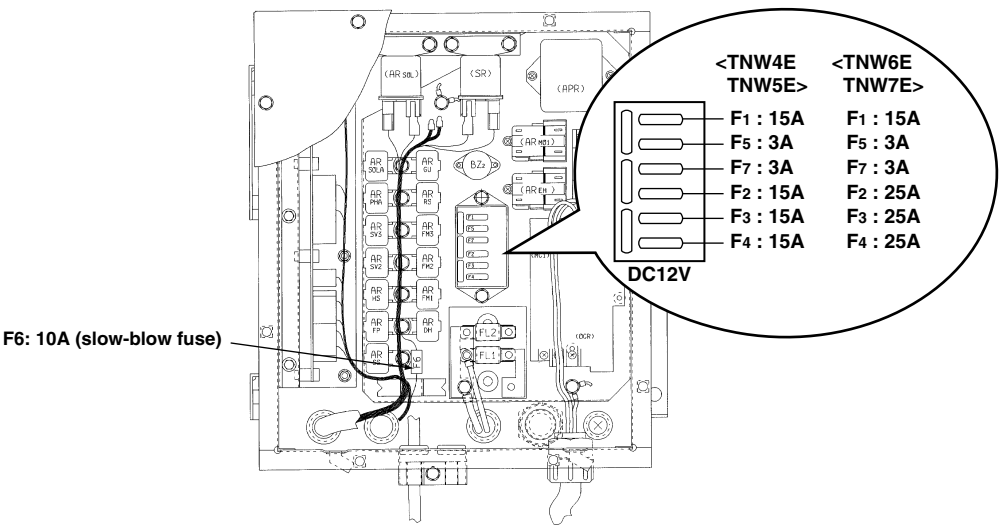
Troubleshooting

(2) Other troubleshooting

Trouble	Remedy
Cooling performance is poor	(1) Frost has built up on the evaporator. If frost has built up, carry out manual defrosting. (2) The door of the cooling van is not tight, causing outdoor air to enter. Inspect and repair so that there are not clearances. (3) Check whether there is any dirt or mud on the condenser coils. If there is, wash it off with water and a brush. (4) Compressor revolution is low as Its belt loosens and slips. If it slips, tense the belt again. (5) Check whether the cold air passage is blocked. Load the cargo so that the cold air can circulate to all corners of the room. (Refer to page 33.) (6) Check the sight glass for bubbling and the check color during operation. If there are many bubbles or if the check color is yellow, contact your dealer.
An abnormal noise is heard.	(1) Inspect whether any of the installation bolts are loose. Tighten if they are loose.

Fuse installation position

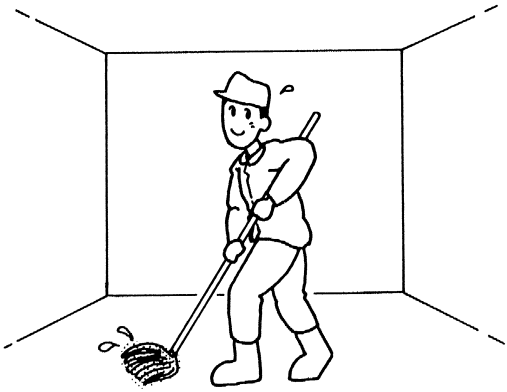
The fuses are installed in the control box of the condensing unit.



7 Loading

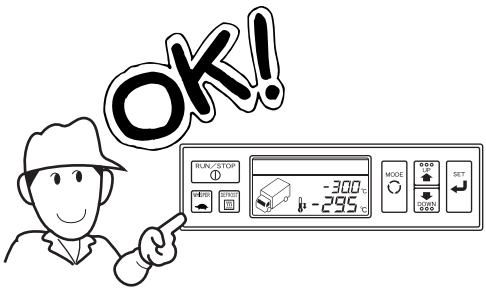
(1) Preparation before loading

(a) Clean the room.



(b) Inspect the vehicle and the refrigeration unit.

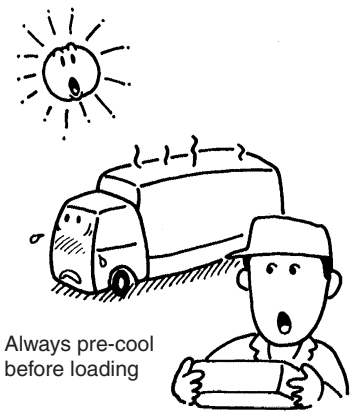
(c) Set the room temperature with the cabin controller.



Note Pre-cool the room to the setting temperature before loading the cargo.

The room temperature may reach 60°C in the direct sun during summer. If products are placed in the room in this state, a temperature fault will occur during transportation.

If the cooling performance is poor during the pre-cooling, contact your nearest dealer before starting loading.

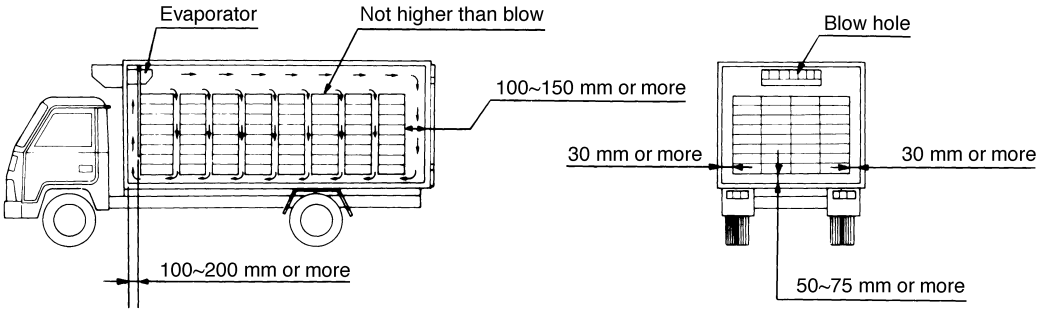


Always pre-cool before loading

Loading

(2) Loading procedure

(a) Load the cargo so that the cold air can circulate to all corners of the room.
Leave a space between the cargo and the inner room wall as shown below.

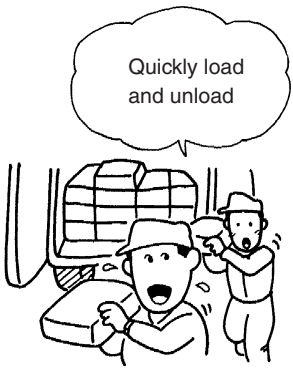


(b) Keep the top layer of the cargo as flat as possible.

(c) Run the refrigeration unit after loading.

⚠ WARNING

Load cargo that has been cooled to the specified temperature by another cooling unit before loading it. If high-temperature products are loaded, the room temperature will not drop, and can cause the other cargo to melt and be damaged. This may also cause the freezing unit to stop abnormally.



⚠ CAUTION

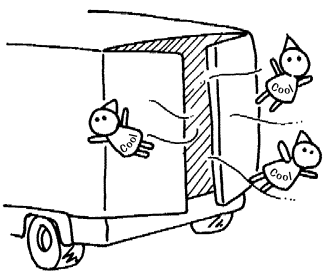
- Secure the cargoes to prevent collapse during transportation.
- Pack fragile cargoes to protect from damage.

Note Stop the refrigeration unit during loading, and load the cargo as quickly as possible.

(3) Unloading

(a) The room temperature will rise instantly each time the door is opened and closed. Open and close the door quickly to limit the amount of cold air that escapes.

(b) Always use a curtain to prevent outdoor air from entering and cold air from escaping during the loading and unloading work.



Note Stop the refrigeration unit during unloading.

8 Inspection

(1) Daily inspection

Always carry out the following inspections before loading the cargo to prevent any unforseen accidents with the refrigeration unit, and to use the refrigeration unit safely.

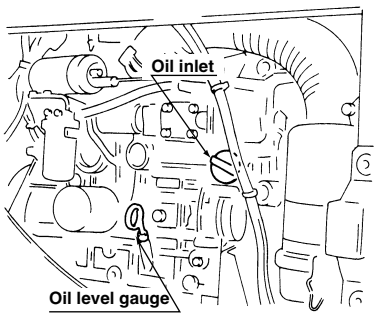
⚠ CAUTION

Before starting inspection, make sure to turn "OFF" the main switch to put the refrigeration unit in the stopped condition, disconnect connections to battery terminals and the power supply plug and confirm that there is no dangerous condition.

(a) Inspection of sub-engine oil level

If the oil level drops below the tolerable level during operation, the sub-engine could burn. Always make sure that the level is within the range of the mark on the oil level gauge.

If the oil level is low, pour a specified amount (to within the range of the mark on the oil level gauge) of the designated oil from the oil inlet.



⚠ CAUTION

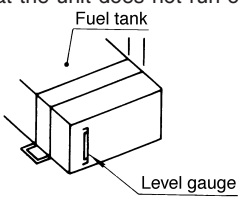
Sub-engine oil could become very hot. Wait till the oil temperature drops sufficiently before starting inspection or replenishment of oil.

Note Make sure that the oil does not spill onto the wiring and centrifugal clutch when pouring it. If the oil does get on the wiring, etc., always completely wipe it off with a rag, etc.

Designated engine oil	Type API Class CD or higher Summer: SAE30 Winter: SAE10 Intense cold season: SAE10W

(b) Inspection of sub-engine fuel level

Check the fuel level with the level gauge, and fill with the specified fuel so that the unit does not run out of fuel during operation.



Designated fuel	Diesel fuel (Intense cold season: Cold weather diesel fuel)

(c) Inspection of sub-engine oil fuel leakage

Fuel tank — **Fuel pump** — **Fuel filter** — **Sub-engine**

Inspect that there is no fuel leaking from the above devices or fuel pipes connecting the devices.

⚠ CAUTION

Never operate the refrigeration unit if there are leaks. Doing so could cause a fire and extremely hazardous state. Always contact your dealer if a leak is found.

(d) Inspect whether anything is in contact with the movable sections.

Condensing unit's moving sections (belt, sub-engine, compressor, motor, fan)
Evaporator unit's moving sections (fan and fan motor)

Continuing operation while wires, etc., are in contact with the above parts, could cause faults or fires, etc. If anything is in contact with the above parts, fix them with a clamp, etc., to prevent contact with the moving sections.

⚠ CAUTION

Before starting adjustment, make sure to turn "OFF" the main switch to put the refrigeration unit in the stopped condition, disconnect connections to battery terminals and the power supply plug and confirm that there is no dangerous condition. Before inspecting moving sections on the evaporator unit, make sure to disconnect the fan motor connector. When you cannot straighten the matter by yourself, consult your dealer or nearest service shop.

(e) Washing of condenser coils and radiator coils

Inspect whether any dirt or mud is adhered on the coils. If the coils are dirty, wash them with water and a soft brush.

⚠ WARNING

(1) Never wash the condenser fins with a high-pressure washing machine, as they will be damaged.
(2) Never use steam washing, as the pressure in the unit will rise abnormally creating a hazardous situation.

ADVICE

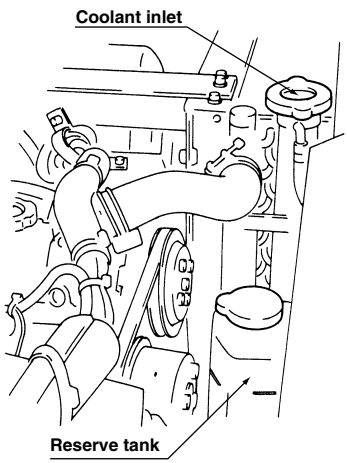
If the coils are dirty, the cooling performance could drop and the protective device could function causing operation to be inhibited. Clean the coils often.

(f) Inspection of coolant level and leaks

Inspect whether there is any coolant in the radiator and reserve tank, and whether there are any leaks.

⚠ WARNING

Always inspect and replenish the coolant while the water temperature is low. Failure to observe this could lead to burns.



(g) Check of sub-engine speed

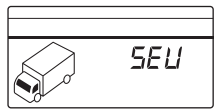
If the sub-engine speed drops, faults could occur in the centrifugal clutch. Periodically check the sub-engine speed on the cabin controller.

Checking of sub-engine speed

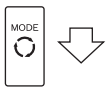
If the mode switch and set switch are pressed simultaneously for 5 seconds while the refrigeration unit is running (while the setting temperature and room temperature are displayed on the cabin controller's digital display), the cabin controller changes to the service maintenance mode. When the mode changes, select the sub-engine speed display using the following procedure and check the sub-engine speed.

①When you enter the service maintenance mode, press the mode switch 2 times.

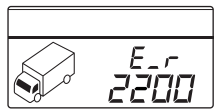
②The cabin controller's digital display will display the sub-engine's speed. The speed will be displayed on the bottom row of the digital display in min^{-1} units. If there is no operation for 10 seconds, the cabin controller will change back to the setting temperature/room temperature display.



Service maintenance display



Press the mode switch 2 times.



Sub-engine speed display (2200 min^{-1})

If there is no operation for 10 seconds, the display returns to the setting temperature/ room temperature display.

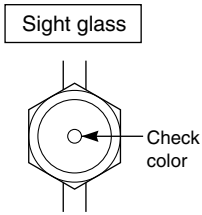
If the sub-engine speed display's fluctuation is great, contact your dealer.

Inspection

(h) Inspection with sight glass

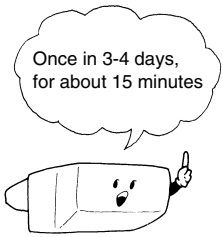
Run the refrigeration unit, and after ten minutes have passed, inspect the state of the refrigerant with the sight glass.

If the check color is yellow, contact your dealer.



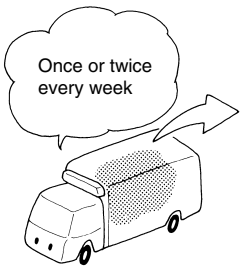
(i) When not using the refrigeration unit for a long time

When not using the refrigeration unit for a long time, run the unit for approximately 15 minutes every three to four days.



(j) When continuously operating the refrigeration unit with low room temperature

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



(2) Periodic inspection

Carry out periodic inspections of the refrigeration unit following the Periodic Inspection Check Sheet given on the following page to ensure that the refrigeration unit is always used in its best state.
The following types of periodic inspections are carried out.

1. **Inspection at every 500 hours**
2. **Inspection at every 1000 hours or yearly inspection**
3. **Inspection at every 2000 hours or yearly inspection**
4. **Inspection at every 5000 hours or yearly inspection**

(3) Periodic inspection check sheet

Customer							Customer's signature	
Inspection interval					Refrigeration Model	Model	Delivery date	
						Serial No.	Inspection date	
					Vehicle	Model	Inspection company	
						Serial No.	Inspector	
Every 5000 hrs. or yearly	Every 2000 hrs. or yearly	Every 1000 hrs. or yearly	Every 500 hrs.	Daily inspection	Inspection items		Inspection result	Remarks
				○	Engine oil quantity check			
				○	Fuel oil quantity			
				○	Engine oil, fuel leakage check			
				○	Inspection of interference of moving sections			
				○	Inspection of cooling water quantity, leakage (water hose, radiator, water pump)			
				○	Engine revolution speed check			
				○	Refrigerant sight glass color			
			○		Air cleaner filter cleaning			
			○		Oil filter replacement (after 200 hrs. for first time)			
			○		Belt inspection for looseness, damage			
			○		Battery check (fluid quantity, specific gravity, terminals, wires)			
			○		Injection nozzle check			
			○		Engine oil renewal (and oil leakage check) (after 200 hrs. for first time)			
			○		Inspection around solenoids			
			○		Inspection of watertight throttle ring valve cover			
			○		Inspection of governor level link and related parts			
			○		Glow plug check			
			○		Starter, alternator check			
			○		Valve clearance check			
		○			Air cleaner filter replacement			
		○			Retightening of lock bolts (refrigeration unit)			
		○			Cooling inspection (check of temperature display on temperature controller, high/low pressure)			
		○			Inspection of defrost operation			
		○			Fuel filter replacement			
		○			Retightening of lock bolts (sub-engine, compressor, compressor head, motor, rubber cushion, fan, V-belt pulley, dryer, solenoid, fan motor)			
		○			Inspection of loose wire terminals, wire coating damage on wire cover			
		○			Inspection of relay contacts			
		○			Cleaning of condenser coil, evaporator coil, radiator coil, drain hole			
		○			Inspection of refrigerant line, gas leakage			
		○			Exchange of belt			
	○				Exchange of cooling water			
	○				Inspection of damage on rubber cushion			
	○				Cleaning of fuel tank, drain holes, fuel pump, strainer			
	○				Motion check of high pressure switch			
	○				Motion check of motor drive, check of insulation resistance			
	○				Painting on main unit			
○					Inspection of evaporator fan motor brush			
○					Inspection of centrifugal clutch shoe			

Inspection

(4) Details of applicable oils and coolant

	Applicable oil and antifreeze	Volume
Sub-engine fuel	Diesel fuel (Intense cold season: cold water diesel fuel)	———
Sub-engine oil	Type API Class CD or higher 10W–30 Summer:SAE30 Winter:SAE10 Intense cold season:SAE10W	<TNW4E, TNW5E: 5500cm^3> <TNW6E, TNW7E: 9500cm^3>
Refrigerating machine oil	Diamond freeze MA32R	<TNW4E, TNW5E, TNW6E: 900cm^3> <TNW7E: 1200cm^3>
* Antifreeze	Fuso Diesel Long Life Coolant	Standard concentration 50% 2900cm^3
Coolant	Soft water with few impurities	Full volume (including antifreeze) <TNW4E, TNW5E: 5800cm^3> <TNW6E, TNW7E: 5900cm^3>

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

Antifreeze concentration (%)	30	35	40	45	50	55	60
Mixed antifreeze amount (cm^3)	1800	2000	2300	2600	2900	3200	3500
Lowest outdoor temperature (°C)	-10	-15	-20	-25	-30	-35	-40

(1) If the antifreeze concentration is inadequate, the coolant could freeze and lead to bursting or damage of the radiator or cylinder block.

(2) When using the brand of antifreeze given in the table with a concentration of 30%, rust preventing agents do not need to be added.

(3) After replacing the coolant, operate the refrigeration unit (run the sub-engine), replenish the coolant again from the coolant filler opening. Replenish the coolant up to the “MAX” position mark on the reserve tank.

9 Specifications

TNW4E

Item			Type	TNW4E-25		TNW4E-5	
Freezing capacity	Conditions		°C	Ambient temperature 30			
				Return air temperature -20	Return air temperature 0	Return air temperature -20	Return air temperature 0
	Sub-engine drive		W	2973	5291	2973	5291
	Motor drive			2188	3776	2188	3776
Functions				Cooling/heating			
Working environment	Room temperature		°C	-30~25			
	Outdoor temperature			-20~40			
Unit dimensions	Condensing unit	W x H x D	mm	1650 ×637 ×650 (Excluding exhaust pipe)			
	Evaporator unit			1220 ×292 ×720			
Unit weight			kg	376		377	
Drive method				Dedicated engine and motor			
Operation method				Automatic start/stop and continuous operation changeover			
Sub-engine	Type			4-cycle water-cooled, vertical diesel engine L2E-31NCE			
	Displacement		cm^3	635			
	Oil volume		cm^3	5500			
	Fuel			Diesel fuel (Intense cold season : cold weather fuel)			
	Working speed		min^{-1}	2200			
Compressor	Type			CR2318LWL-J			
	Working speed		min^{-1}	1905 (1200, <50Hz> for motor)			
	Refrigeration unit oil charging amount		cm^3	Diamond freeze MA32R, 900			
Evaporator	Type			Aluminum fin & copper tubes			
	Fan			Axial flow fan motor coupling ×2 pcs.			
Condenser	Type			Aluminum fin & copper tubes			
	Fan			Axial flow fan, belt drive			
Motor	Power supply			3-phase AC 380V-415V 50Hz			
	Output		kw	3.7			
Refrigerant charging amount			kg	R404A, 2.5			
Sound power level			dB	102			
Room temperature control				Electronic thermostat			
Operation control				Microcomputer controller			
Defrosting device				Automatic defrost, defrost timer method			
Safety device				High pressure switch, fusible plug, sub-engine oil pressure switch, heater protection thermostat (TNW4E-5 only), sub-engine water temperature switch, motor overcurrent relay, current fuse, power supply automatic reverse phase changeover, side cover limit switch			

Note: The TNW4E-25 has a heating function, but do not set a temperature that will cause heating operation during motor drive.

Specifications

TNW5E

Item \ Type				TNW5E-25		TNW5E-5	
Freezing capacity	Conditions		°C	Ambient temperature 30			
				Return air temperature -20	Return air temperature 0	Return air temperature -20	Return air temperature 0
	Sub-engine drive		W	3238	6235	3238	6235
	Motor drive			2588	4832	2588	4832
Functions				Cooling/heating			
Working environment	Room temperature		°C	-30~25			
	Outdoor temperature			-20~40			
Unit dimensions	Condensing unit	W x H x D	mm	1650 ×637 ×650 (Excluding exhaust pipe)			
	Evaporator unit			1220 ×292 ×720			
Unit weight			kg	386		387	
Drive method				Dedicated engine and motor			
Operation method				Automatic start/stop and continuous operation changeover			
Sub-engine	Type			4-cycle water-cooled, vertical diesel engine L2E-31NCD			
	Displacement		cm^3	635			
	Oil volume		cm^3	5500			
	Fuel			Diesel fuel (Intense cold season : cold weather fuel)			
	Working speed		min^{-1}	<High speed> 2200 <Low speed> 1600			
Compressor	Type			CR2318LWL-J			
	Working speed		min^{-1}	<High speed> 1905 <Low speed>1385 (1200, <50 Hz> for motor)			
	Refrigeration unit oil charging amount		cm^3	Diamond freeze MA32R, 900			
Evaporator	Type			Aluminum fin & copper tubes			
	Fan			Axial flow fan motor coupling ×3 pcs.			
Condenser	Type			Aluminum fin & copper tubes			
	Fan			Axial flow fan, belt drive			
Motor	Power supply			3-phase AC 380V-415V 50Hz			
	Output		kw	3.7			
Refrigerant charging amount			kg	R404A, 2.5			
Sound power level			dB	102			
Room temperature control				Electronic thermostat			
Operation control				Microcomputer controller			
Defrosting device				Automatic defrost, defrost timer method			
Safety device				High pressure switch, fusible plug, sub-engine oil pressure switch,heater protection thermostat (TNW5E-5 only), sub-engine watertemperature switch, motor overcurrent relay, current fuse, powersupply automatic reverse phase changeover, side cover limit switch			

Note: The TNW5E-25 has a heating function, but do not set a temperature that will cause heating operation during motor drive.

TNW6E

Item \ Type				TNW6E-25		TNW6E-5	
Freezing capacity	Conditions		°C	Ambient temperature 30			
				Return air temperature -20	Return air temperature 0	Return air temperature -20	Return air temperature 0
	Sub-engine drive		W	4398	7228	4398	7228
	Motor drive			3201	5254	3201	5254
Functions				Cooling/heating			
Working environment	Room temperature		°C	-30~25			
	Outdoor temperature			-20~40			
Unit dimensions	Condensing unit	W x H x D	mm	1770 ×705 ×780 (Excluding exhaust pipe)			
	Evaporator unit			1220 ×329 ×740			
Unit weight			kg	515		516	
Drive method				Dedicated engine and motor			
Operation method				Automatic start/stop and continuous operation changeover			
Sub-engine	Type			4-cycle water-cooled, vertical diesel engine L3E2-33NCC			
	Displacement		cm^3	952			
	Oil volume		cm^3	9500			
	Fuel			Diesel fuel (Intense cold season : cold weather fuel)			
	Working speed		min^{-1}	<High speed> 2200 <Low speed> 1700			
Compressor	Type			CR2318LWL-J			
	Working speed		min^{-1}	<High speed> 2420 <Low speed>1870 (1500, <50 Hz> for motor)			
	Refrigeration unit oil charging amount		cm^3	Diamond freeze MA32R, 900			
Evaporator	Type			Aluminum fin & copper tubes			
	Fan			Axial flow fan motor coupling ×3 pcs.			
Condenser	Type			Aluminum fin & copper tubes			
	Fan			Axial flow fan, belt drive			
Motor	Power supply			3-phase AC 380V-415V 50Hz			
	Output		kw	5.5			
Refrigerant charging amount			kg	R404A, 3.4			
Sound power level			dB	103			
Room temperature control				Electronic thermostat			
Operation control				Microcomputer controller			
Defrosting device				Automatic defrost, defrost timer method			
Safety device				High pressure switch, fusible plug, sub-engine oil pressure switch,heater protection thermostat (TNW6E-5 only), sub-engine watertemperature switch, motor overcurrent relay, current fuse, powersupply automatic reverse phase changeover, side cover limit switch			

Note: The TNW6E-25 has a heating function, but do not set a temperature that will cause heating operation during motor drive.

Specifications

TNW7E

Item			Type	TNW7E-25		TNW7E-5	
Freezing capacity	Conditions		°C	Ambient temperature 30			
				Return air temperature -20	Return air temperature 0	Return air temperature -20	Return air temperature 0
	Sub-engine drive		W	5042	7918	5042	7918
	Motor drive			3679	6341	3679	6341
Functions				Cooling/heating			
Working environment	Room temperature		°C	-30~25			
	Outdoor temperature			-20~40			
Unit dimensions	Condensing unit	W x H x D	mm	1770 ×705 ×780 (Excluding exhaust pipe)			
	Evaporator unit			1220 ×329 ×740			
Unit weight			kg	517		518	
Drive method				Dedicated engine and motor			
Operation method				Automatic start/stop and continuous operation changeover			
Sub-engine	Type			4-cycle water-cooled, vertical diesel engine L3E2-33NCC			
	Displacement		cm^3	952			
	Oil volume		cm^3	9500			
	Fuel			Diesel fuel (Intense cold season : cold weather fuel)			
	Working speed		min^{-1}	<High speed> 2200 <Low speed> 1700			
Compressor	Type			CR2323LL-F			
	Working speed		min^{-1}	<High speed> 2420 <Low speed>1870 (1500, <50 Hz> for motor)			
	Refrigeration unit oil charging amount		cm^3	Diamond freeze MA32R, 1200			
Evaporator	Type			Aluminum fin & copper tubes			
	Fan			Axial flow fan motor coupling ×3 pcs.			
Condenser	Type			Aluminum fin & copper tubes			
	Fan			Axial flow fan, belt drive			
Motor	Power supply			3-phase AC 380V-415V 50Hz			
	Output		kw	5.5			
Refrigerant charging amount			kg	R404A, 3.6			
Sound power level			dB	103			
Room temperature control				Electronic thermostat			
Operation control				Microcomputer controller			
Defrosting device				Automatic defrost, defrost timer method			
Safety device				High pressure switch, fusible plug, sub-engine oil pressure switch,heater protection thermostat (TNW7E-5 only), sub-engine watertemperature switch, motor overcurrent relay, current fuse, powersupply automatic reverse phase changeover, side cover limit switch			

Note: The TNW7E-25 has a heating function, but do not set a temperature that will cause heating operation during motor drive.

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