

mitsubishi transport refrigeration unit

OPERATION MANUAL

TSJ450SA
TSJ500SA
TSJ800SA



TSJ012A271

YEAR:2025



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)

Contents

1	Items to Observe	1
2	Parts	6
3	Initial Setting	10
4	Each Switch Operation	21
5	Operation	23
6	Troubleshooting	35
7	Loading	40
8	Inspection	42
9	Specifications	47

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.
 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.

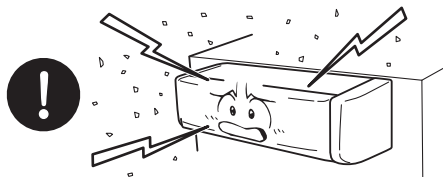
 **Always use a dedicated circuit and leakage breaker for the electric work.**
Insufficient electric circuit capacity or incorrect work could lead to electric shocks or fires.

Precautions for usage



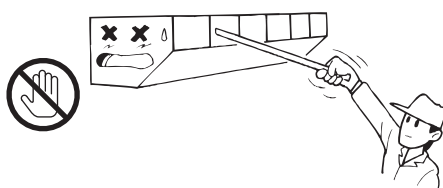
WARNING

Always stop operation in an abnormal state.



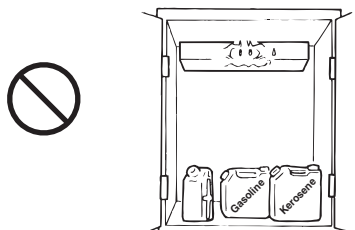
Continuing operation in an abnormal state could lead to electric shocks or fires, etc.

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



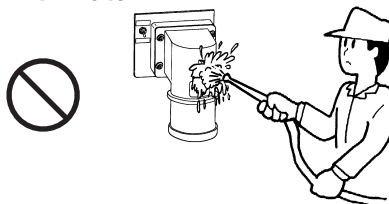
Since the fan is rotating at a high speed inside, it could lead to injuries or troubles.

Do not place volatile or flammable matters in the room.



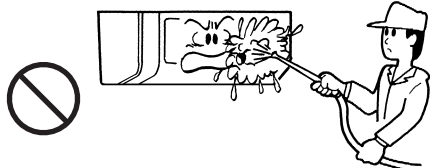
Failure to observe this could lead to explosions or fires.

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



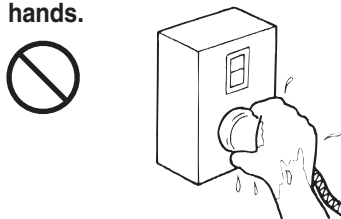
It could lead to short circuits or electric shocks.

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.

1 Items to Observe



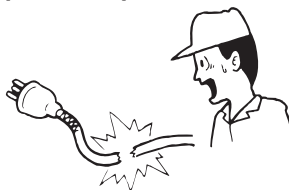
WARNING

- Use 4-core cable 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.



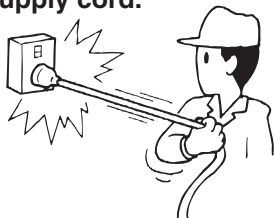
Use of a power supply cord other than a dedicated cord and plug, a relay or extension cord could lead to electric shocks, overheat or fires.

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



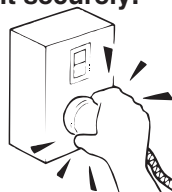
It could damage the power cord and result in fires or electric shocks.

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



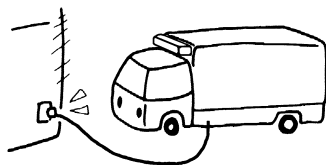
Pulling on the cord could cause some wires to break and lead to overheat or fires.

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



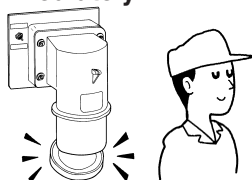
Adherence of dust or incomplete connection could lead to electric shocks or fires.

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 exhaust 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.

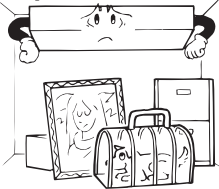


Do not touch the high-temperature sections such as the exhaust pipe or high pressure pipes during operation of the refrigeration unit.
Doing so could cause burns.



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.



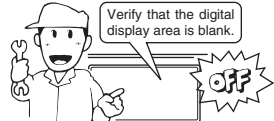
Failure to observe this could lead to faults in the electrical circuit or to electric shocks.

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.

1 Items to Observe

Precautions for inspections



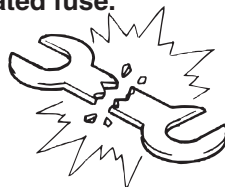
WARNING

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.



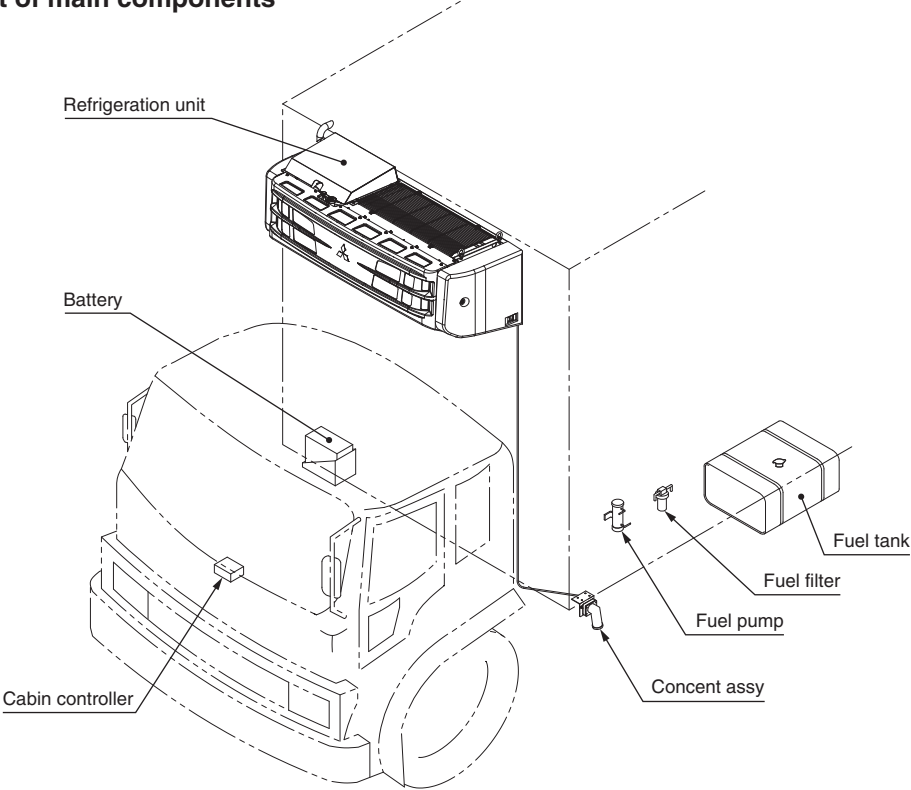
Never make modifications.
Making modifications could lead to ruptures, electric shocks, fires or injuries, etc.

When a fault occurs

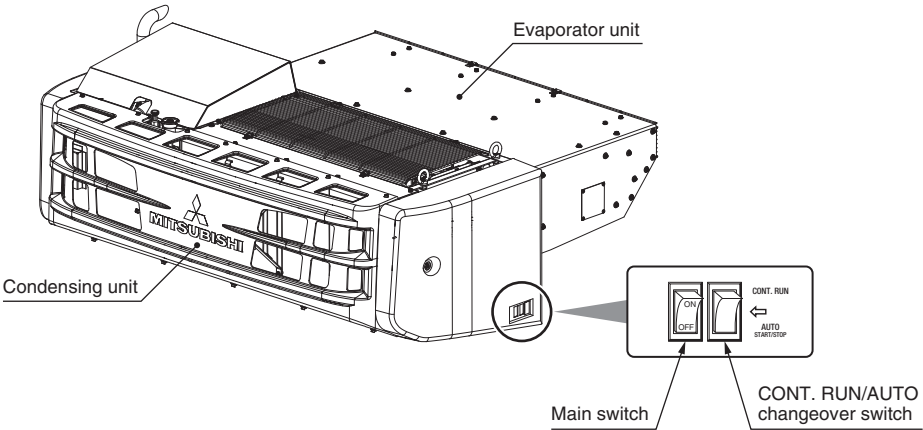
If a fault occurs, stop the refrigeration unit, contact your nearest dealer, and maintain the load temperature.

2 Parts

Layout of main components

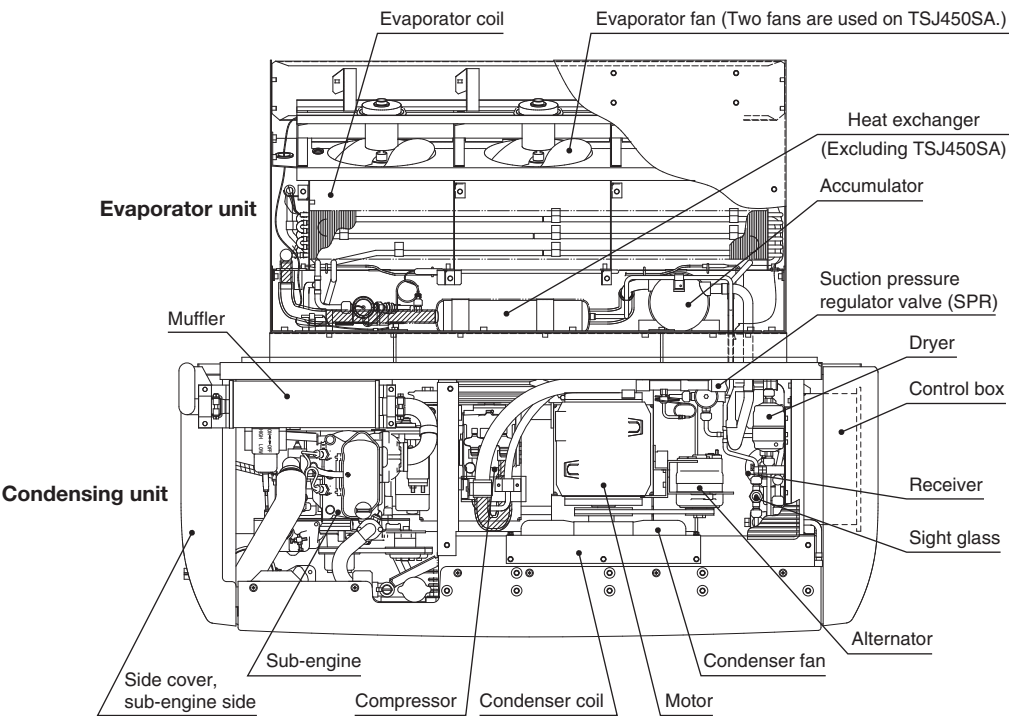


(1) Refrigeration unit

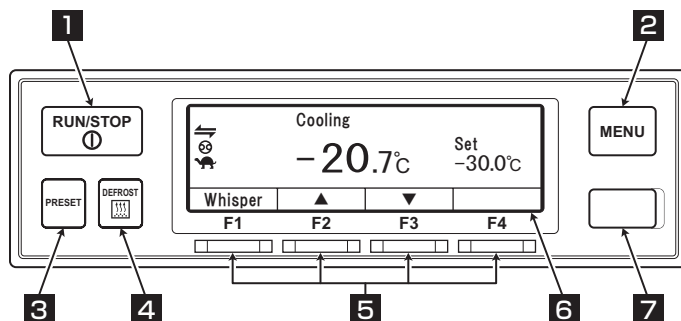


2 Parts

(2) Inner details of refrigeration unit



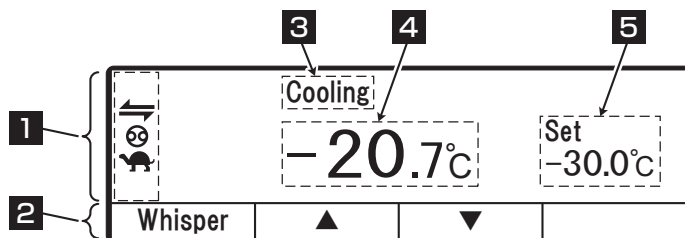
(3) Cabin controller



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

2 Parts

(4) Digital display area



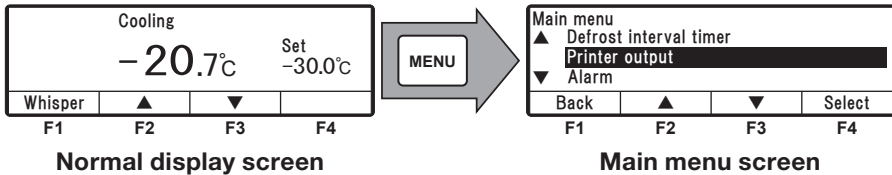
Description of monitor display item

- 1** Monitor displays following items corresponding to respective setting states.
 The display items light or blink depending on the operation of respective functions.
 - Abnormal display.
 Lights or blinks when any error occurs.
 - Display for the state of external communication.
 Lights when the operation administration input, such as the remote monitor device, etc., is turned ON.
 - Displays for ON/OFF timer.
 Lights when the ON timer and the OFF timer are set simultaneously.
 - Displays the ON timer.
 Lights when the ON timer operation is set.
 - Displays for OFF timer.
 Lights when the OFF timer operation is set.
 - Display for automatic operation start/stop.
 Lights when the automatic operation start/stop is selected.
 - Display for Whisper operation.
 Lights when Whisper operation is selected.
- 2** Displays the allocation of function switch corresponding to the screen.
- 3** Displays the operation modes.
 <Display contents> Cooling, Heating, Defrost, Sleep, Stop and Fan.
 * There is no display when Thermostat is OFF with evaporator fan motor OFF.
 Fan is displayed when Thermostat is OFF with evaporator fan motor ON.
 If temperature is out of adequate range, the Cooling or Heating display blinks.
- 4** Displays the inside compartment temperature.
- 5** Displays the setting temperature.

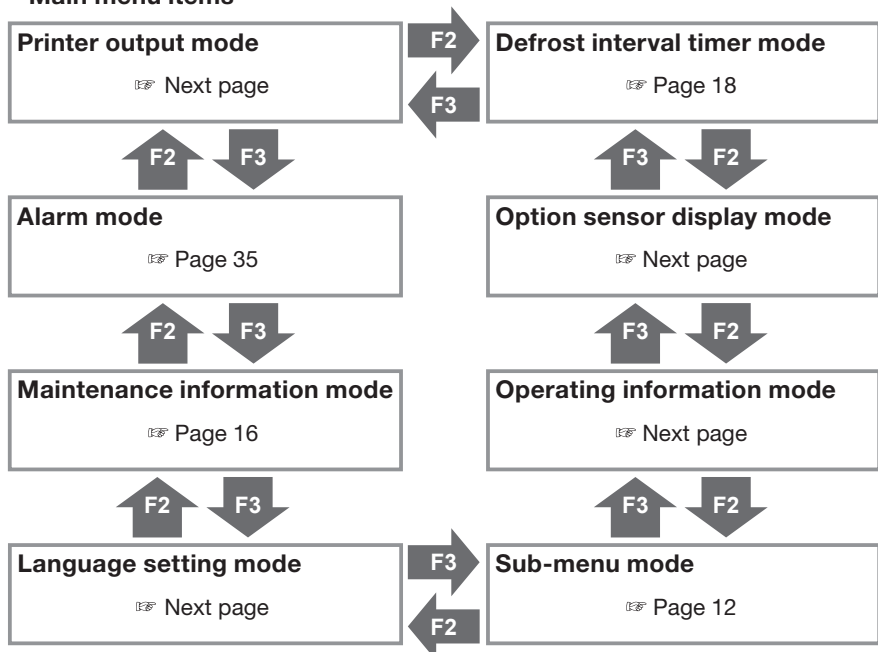
3 Initial Setting

(1) Display and function of main menu

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



• Main menu items



3 Initial Setting



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

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

Printer output setting mode

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

Alarm			
E010	16 Jan 2026 07:10		
E016	15 Jan 2025 08:15		
E013	30 Nov 2024 10:30		
Back		Clear	Next

Alarm display mode

Up to 5 error codes and dates/times of alarm occurred are displayed. These are cleared by pressing “F3 (Clear)” switch. (Page 35)

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

Maintenance information display mode

Operation time and number of operations of each device are displayed in this mode. (Page 16)

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

Language setting mode

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

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

Sub-menu selection mode

Functions of the controller operability, or other, are displayed and set in this mode. (Page 12)

Operating information1 C---			
HP	----	TD	----
LP	----	REV	2150/H
AT	----		
Back			Next

Operation information display mode

State of operation is displayed in this mode. State of engine operation (High speed; H, low speed; L) is indicated at the end of “Speed (rpm)”. In the next page, operation mode such as cooling and EVT is displayed.

Option sensor display			
-20.0°C			
Back			

Option sensor temperature display mode

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

Current setting			
6.0Hr			
Back	▲	▼	Set

Defrost interval timer setting mode

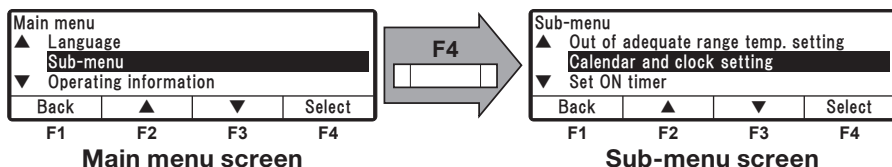
The defrost interval is displayed and set in this mode. Factory default is set at “6.0Hr”. The interval can be changed in steps of 1.0Hr. (Page 18)

(2) Display and function of Sub-menu

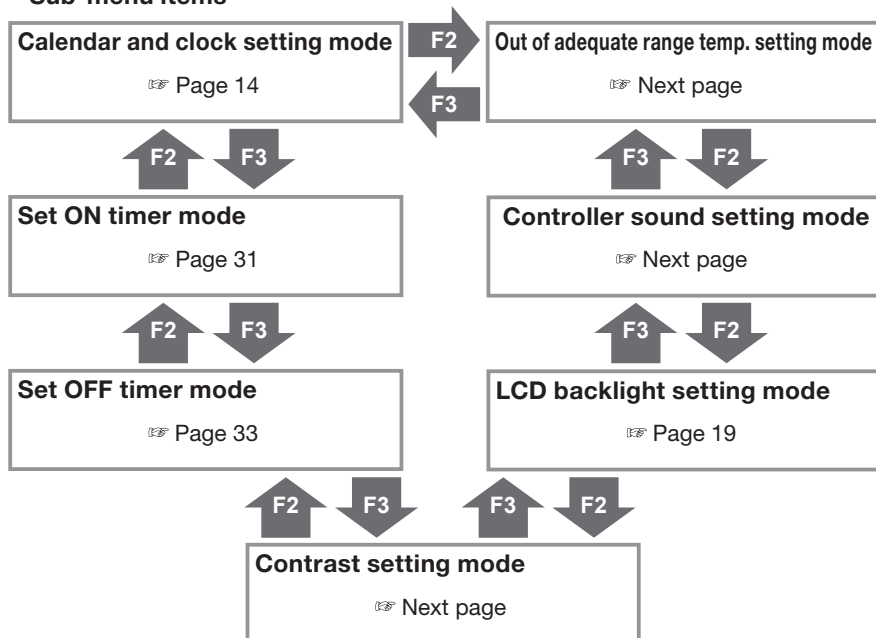
On the “Sub-menu”, the screen changes in the following order at each push on “F2 (▲)” or “F3 (▼)” switch. In the following figure, “F2” switch changes sequence clockwise while “F3” switch changes counter clockwise.

NOTE

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



• Sub-menu items



3 Initial Setting



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

Calendar and clock setting			
01 Jan 2024 00:00			
Back	▲	▼	Next

Calendar and clock setting mode

Date, Month, Year and current time are set in this mode. (☞ Page 14)

Set ON timer			
ON timer disable			
Back	Enable	Disable	Set

Set ON timer mode

Date and time to start the refrigeration unit automatically is set in this mode. (☞ Page 31)

Set OFF timer			
OFF timer disable			
Back	Enable	Disable	Set

Set OFF timer mode

Date and time to stop the refrigeration unit automatically is set in this mode. (☞ Page 33)

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

Contrast setting mode

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

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

LCD backlight setting mode

LCD backlight is set in this mode. (☞ Page 19)

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

Controller sound setting mode

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

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

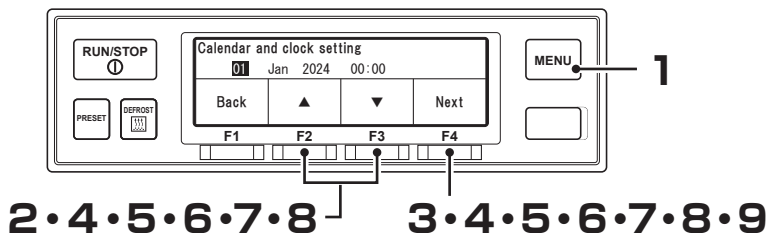
Out of adequate range temp. setting mode

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

(Setting option)

1~5°C which can be changed in the unit of 0.5°C. (4°C at shipping and OFF is selectable)

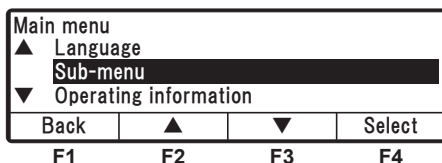
(3) Setting the calendar and clock (Date, Month, Year)



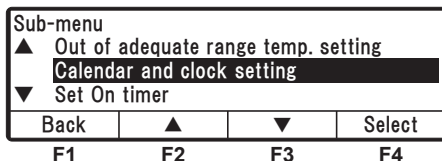
1 Press “MENU” switch.

⇒ The display changes to “Main menu” screen.

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

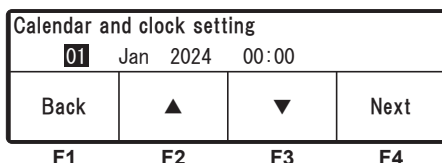


3 Press “F4 (Select)” switch to change to “Sub-menu” screen (Right figure).



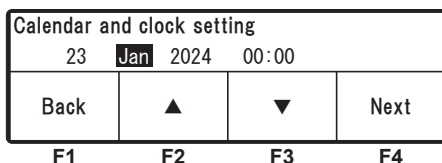
4 Press “F4 (Select)” switch to change to “Calendar and clock setting” mode (Right figure).

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



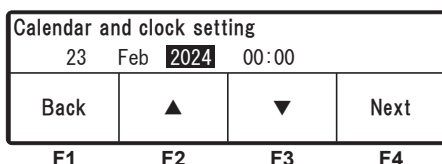
5 Press “F4 (Next)” switch.

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



6 Press “F4 (Next)” switch.

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



3 Initial Setting

7 Press “F4 (Next)” switch.

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

Calendar and clock setting			
23	Feb	2024	00:00
Back	▲	▼	Next
F1	F2	F3	F4

NOTE

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

8 Press “F4 (Next)”.

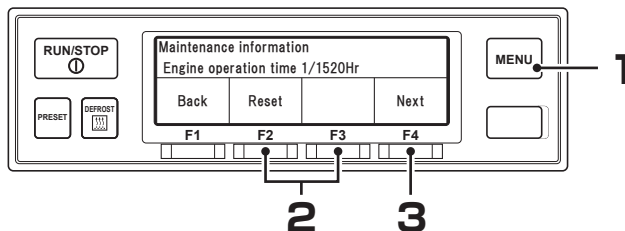
⇒ Press “F2 (▲)” or “F3 (▼)” switch to adjust at current time (Minute).

Calendar and clock setting			
23	Feb	2024	09:00
Back	▲	▼	Set
F1	F2	F3	F4

9 Press “F4 (Set)” switch.

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

(4) Displaying the maintenance information



1 Press “MENU” switch.

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

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

Main menu			
▲	Alarm		
	Maintenance information		
▼	Language		
Back	▲	▼	Select
F1	F2	F3	F4

3 Press “F4 (Select)” switch.

⇒ “Engine operation time 1” is displayed.

Maintenance information			
Engine operation time 1/1520Hr			
Back	Reset		Next
F1	F2	F3	F4

Display of Time to replace parts.

- If the operation time or number of operations reaches the “Maintenance required time” on each device, this screen (Right figure) is displayed for 10 seconds after the start of operation of the refrigeration unit. In case of oil replacement interval, “Time to change oil” is displayed.
- If you press “F4 (Next)” switch, the display changes to each parts in the table next page. In case part other than listed in the table is displayed when pressing “F4 (Next)”, it is the maintenance required part. The replacement of part that is listed in the table should be done based on the interval of the table.
- If you press “F2 (Reset)” switch after replacing the part, the operation time and the number of START/STOP cycles are reset.

Time to replace parts.			

Maintenance information			
Engine operation time 1/1520Hr			
Back	Reset		Next
F1	F2	F3	F4

3 Initial Setting

[At engine oil replacement]

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



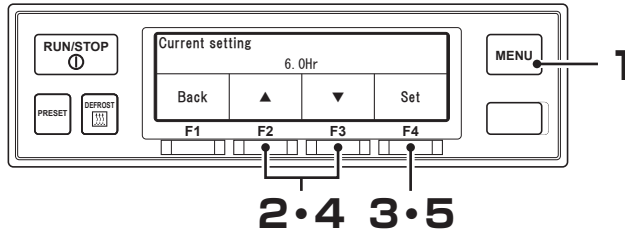
NOTE

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

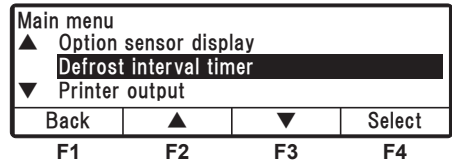
- If you press “F4 (Next)” switch, the display changes to each display item in the table below.

	Display item
1	Engine operation time 1 (Inspection of engine oil)
2	Engine operation time 2
3	Motor operation time

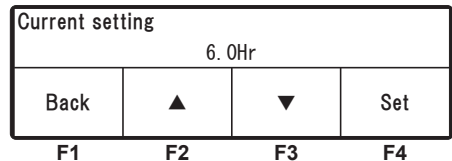
(5) Setting the defrost interval

**1 Press “MENU” switch.**

⇒ The display changes to “Main menu” screen.

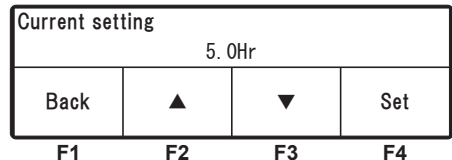
2 Press “F2 (▲)” or “F3 (▼)” switch till the display changes to “Defrost interval timer”.**3 Press “F4 (Select)” switch.**

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

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

 NOTE

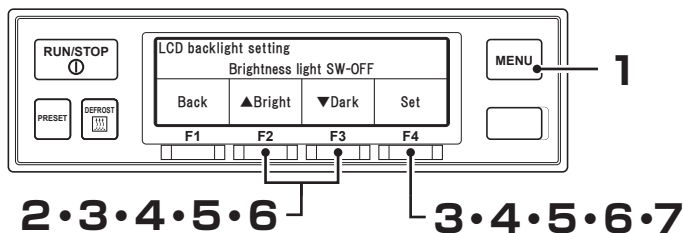
- The defrosting can be set at OFF, or at every 1 hour in the range of from 1 hour to 6 hours.

**5 Press “F4 (Set)” switch.**

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

3 Initial Setting

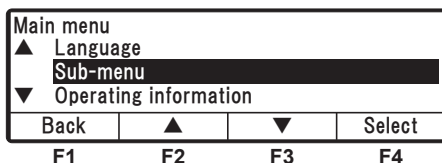
(6) Setting LCD backlight



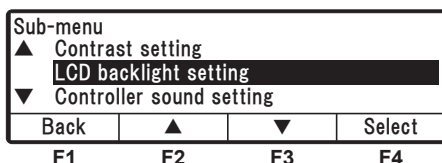
1 Press “MENU” switch.

⇒ The display changes to “Main menu” screen.

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

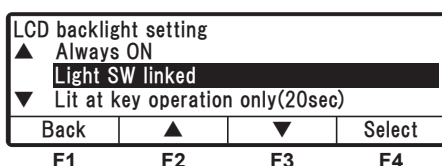


3 Press “F4 (Select)” switch to change to “Sub-menu” screen. Press “F2 (▲)” or “F3 (▼)” switch till the display changes to “LCD backlight setting” screen (Right figure).



4 Press “F4 (Select)” switch.

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



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

5 Press “F4 (Select)” switch.

【Light SW linked】

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

【Lit at key operation only(20sec)】

- ⇒ Step 7

【Always OFF】

- ⇒ Step 7

【Always ON】

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

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

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

LCD backlight setting			
Always OFF			
Back			Set
F1	F2	F3	F4

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

6 Press “F4 (Next)” switch.

【Light SW linked】

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

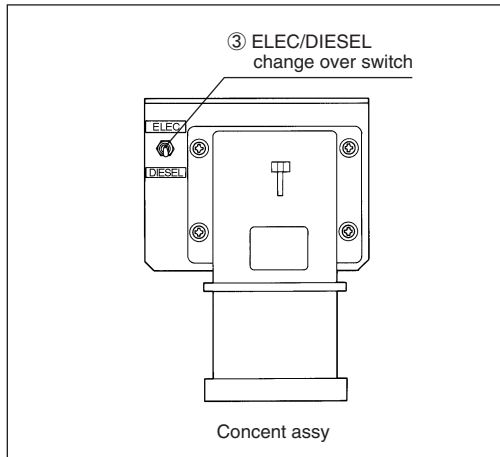
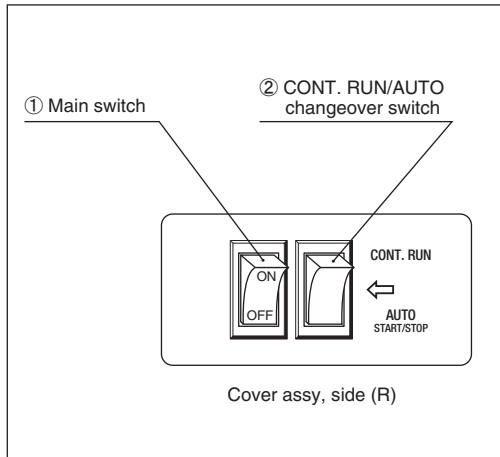
LCD backlight setting			
Brightness of light SW-OFF			
Back	▲Bright	▼Dark	Set
F1	F2	F3	F4

7 Press “F4 (Set)” switch.

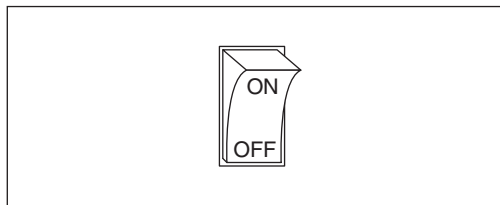
- ⇒ The setting completes, and the display returns to “Sub-menu” screen of Step 3.

4 Each Switch Operation

(1) Usage of each switch



① Main switch

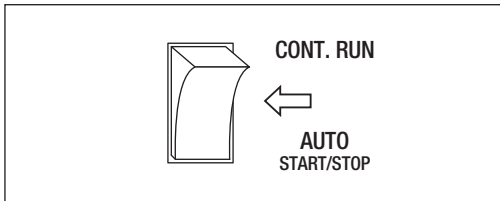


This switch supplies power to the circuits in the unit.
ON position This switch energizes the electrical system for the unit.
OFF position This switch deenergizes the electrical system and the unit will not operate.



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)



When cargo is frozen products

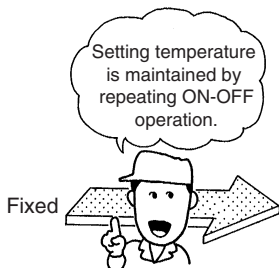
Selecting AUTO to save fuel costs is recommended.

When cargo is refrigerated products

Selecting AUTO is recommended when fuel costs need to be saved, and selecting CONT. RUN is recommended when distribution of the room temperature is important.

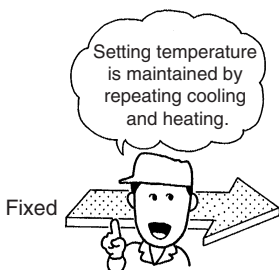
4 Each switch Operation

• 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 1°C 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 1°C lower than the setting temperature.

• When CONT. RUN is selected

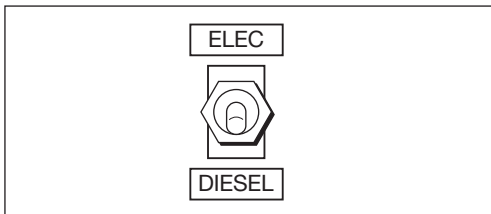


Select this only for refrigerated products, and do not select for frozen products.

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.

③ ELEC/DIESEL changeover switch

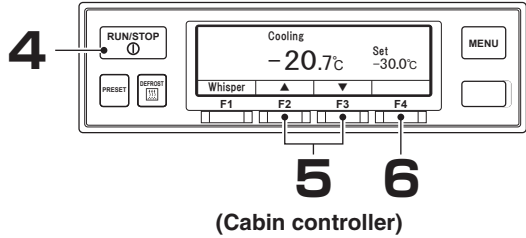
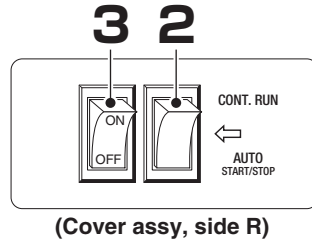
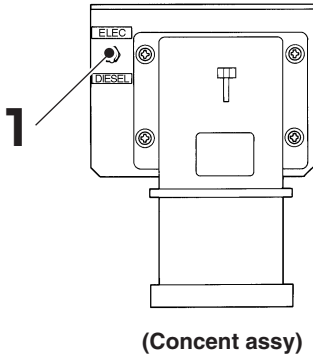


Selector switch for sub-engine driving or motor drive.

5 Operation

(1) Operation procedure

(a) For sub-engine drive



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.

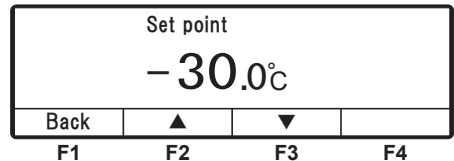


ADVICE Set to the CONT.RUN switch only when loading refrigerated products. Do not load frozen products.

3 Turn the main switch to “ON”.

4 Press the [RUN/STOP] switch. (Refrigeration unit is turned “ON”).

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

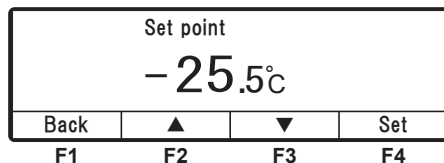


NOTE

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

6 Press "F4 (set)" switch.

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



NOTE

- The "Preset" function is provided, with which it can be selected from 4 setting temperatures which have already been registered. (☞ Page 28)



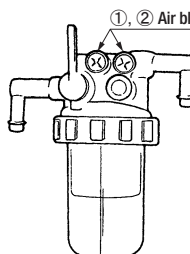
- ① If the main switch is turned ON/OFF instantly, the unit may stop abnormally due to malfunctioning.
- ② The sub-engine will run at 2nd speed (only single type is applied to TSJ450SA.).
- ③ The sub-engine will automatically preheat the glow plug for six seconds, and will start within 20 seconds after 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 attempting to start it again. The starter and solenoid could be burnt if starting is attempted continuously.**

④ Air bleeding

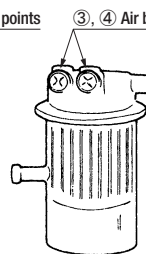
When fuel runs out, turn the FUEL PUMP switch upside on the condensing unit so that the fuel pump operates. Bleed air from the water sediment and fuel filter.



Fuel pump switch
Turn the fuel pump switch upside (it will revert if the finger is released.)
(Hold the switch at the position till the sound of fuel pump changes.)



(Water sediment)



(Fuel filter)

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

5 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.

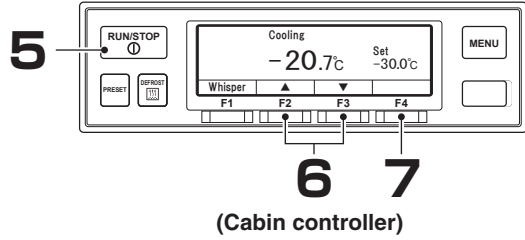
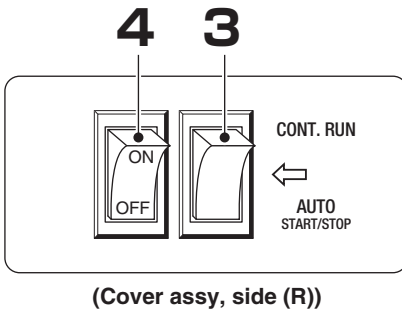
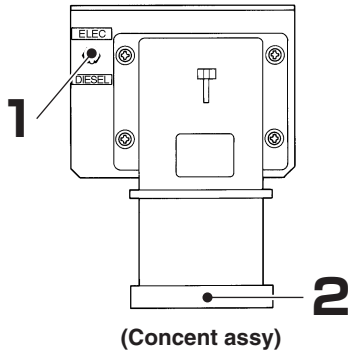


If the room temperature reaches the setting temperature within 3.5 minutes, the battery failure prevention circuit will activate, allowing heating operation to be entered even during cooling operation. The temperature width recorded on the recorder mounted in the refrigeration vehicle may increase at 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



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

2 Connect the power supply for motor drive.



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.

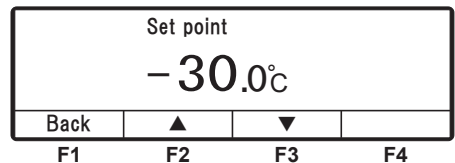


Set to the CONT. RUN switch only when loading refrigerated products. Do not load frozen products.

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

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

6 Press "F2 (▲)" or "F3 (▼)" switch, and set a temperature.



NOTE

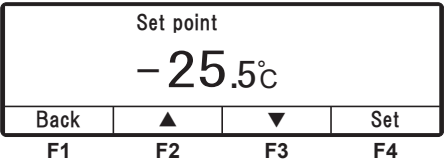
- Each push on "F2" switch increases the value by 0.5 while the value decreases by 0.5 at each push on "F3" switch. If the switch is held down, the value changes continuously.

5 Operation

7

Press “F4 (set)” switch.

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



NOTE

- The “Preset” function is provided, with which it can be selected from 4 setting temperatures which have already been registered. (☞ Page 28)

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.

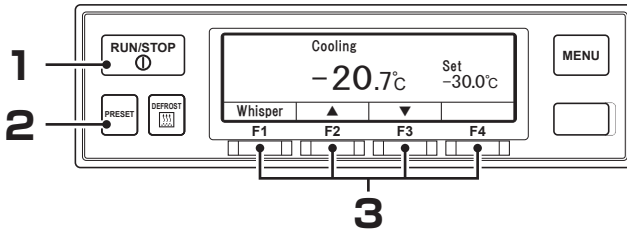


The battery failure circuit will not function during motor drive.

• 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) Setting the preset temperature



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

2 Press the "Preset" switch.

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

Current setting			
-30.0°C			
-18.0°C	-5.0°C	5.0°C	20.0°C
F1	F2	F3	F4

3 Press "F1 (~ F4)" switch.

⇒ Desired preset temperature is set, and the display returns to the normal display screen.

Current setting			
-18.0°C			
-18.0°C	-5.0°C	5.0°C	20.0°C
F1	F2	F3	F4

The table shows the 'Set' button being pressed on the F1 column, which now displays -18.0°C .

3 [Preset registration of current setting temperature]
Hold down "F1 (~ F4)" switch for 3 seconds.

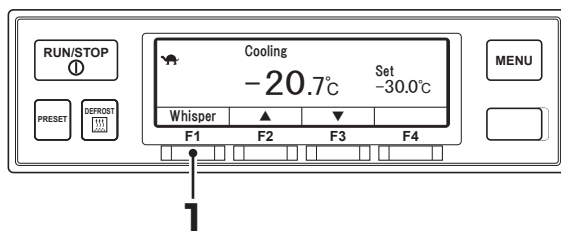
⇒ The preset temperature is registered, and the display returns to the normal display screen.

Current setting			
-30.0°C			
-30.0°C	-5.0°C	5.0°C	20.0°C
F1	F2	F3	F4

The table shows the 'Register' button being pressed on the F1 column, which now displays -30.0°C .

5 Operation

(3) Whisper operation (Only for engine drive)



1 Press the “F1 (Whisper)” switch.

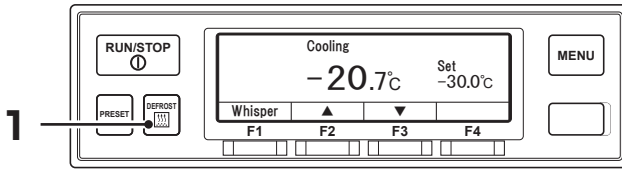
⇒ It changes to the whisper operation and one more press on the switch returns it to the normal operation.

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

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

NOTE

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

(4) Manual defrost operation**Starting the manual defrost operation**

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

⇒ The defrost operation starts.

**NOTE**

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

Ending the manual defrost operation

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

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

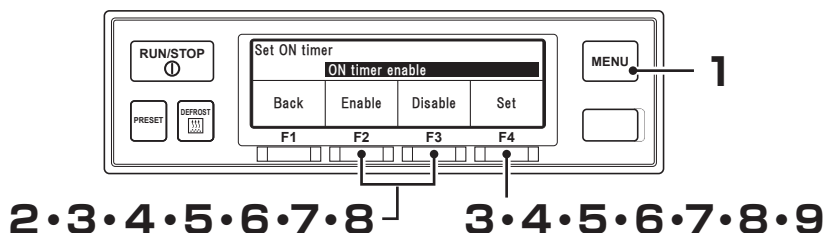
If the “RUN/STOP” switch is turned “OFF”, it interrupts the defrost operation and stops the operation of refrigeration unit.

**NOTE**

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

5 Operation

(5) Setting the ON timer



1 Press “MENU” switch.

⇒ The display changes to “Main menu” screen.

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

Main menu			
▲ Language			
Sub-menu			
▼ Operating information			
Back	▲	▼	Select
F1	F2	F3	F4

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

Sub-menu			
▲ Calendar and clock setting			
Set ON timer			
▼ Set OFF timer			
Back	▲	▼	Select
F1	F2	F3	F4

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

Set ON timer			
ON timer enable			
Back	Enable	Disable	Set
F1	F2	F3	F4

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

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

5 Press “F4 (Set)” switch.

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

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

6 Press “F4 (Next)” switch.

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

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

7 Press “F4 (Next)” switch.

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

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

 NOTE

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

8 Press “F4 (Next)” switch.

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

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

9 Press “F4 (Set)” switch.

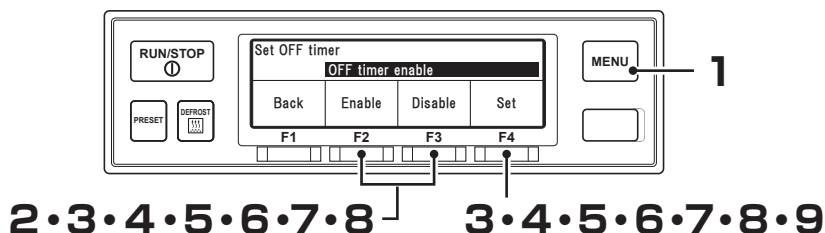
⇒ The setting completes, and the display returns to the screen of Step 3, “Sub-menu”.

 NOTE

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

5 Operation

(6) Setting the OFF timer



1 Press “MENU” switch.

⇒ The display changes to “Main menu” screen.

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

Main menu			
▲ Language			
Sub-menu			
▼ Operating information			
Back	▲	▼	Select
F1	F2	F3	F4

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

Sub-menu			
▲ Set ON timer			
Set OFF timer			
▼ Contrast setting			
Back	▲	▼	Select
F1	F2	F3	F4

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

Set OFF timer			
OFF timer enable			
Back	Enable	Disable	Set
F1	F2	F3	F4

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

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

5 Press “F4 (Set)” switch.

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

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

6 Press “F4 (Next)” switch.

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

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

7 Press “F4 (Next)” switch.

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

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

 NOTE

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

8 Press “F4 (Next)” switch.

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

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

9 Press “F4 (Set)” switch.

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

 NOTE

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

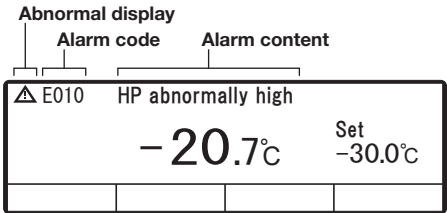
6 Troubleshooting

(1) For emergency

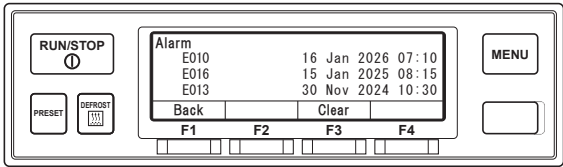
Alarm display

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

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



Switching “Normal display” and “Alarm display”



Switching from “Normal display screen” to “Alarm display mode”

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

Switching from “Alarm display mode” to “Normal display screen”

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

Resuming operation after an emergency stop

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

Resuming operation after an emergency stop

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



CAUTION



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

- Otherwise, it may cause serious damages or accidents.

List of alarm codes (If the alarm content is displayed)

Alarm Code	Trouble	Countermeasure	Unit Condition
E001	Evaporator fan motor fuse break	Two or more of the fuses for the evaporator fan motor have blown. Inspect and replace the fuses F2 to F4 (TSJ450SA: F2 to F3) in the control box.	Unit stops.
E004	Throttle solenoid fuse break	The run solenoid fuse for the sub-engine has blown. Inspect and replace the fuse F5 in the control box.	Unit stops.
E006	Load drive circuit fuse break	The output relay fuse has blown. Inspect and replace the fuse F7 in the control box.	Unit stops.
E009	Commercial power supply defective	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.	Unit stops. (Auto recovery)
E010	HP abnormally high	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.	Unit stops.

6 Troubleshooting

Alarm Code	Trouble	Countermeasure	Unit Condition
E013	Td abnormally high	The discharge refrigerant gas temperature is abnormal. Inspect the sight glass. If bubbles are apparent, the refrigerant gas is low. Contact your dealer.	Unit stops. (Auto recovery)
E015	Defrost solenoid valve is failure	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.	Unit stops.
E017	HPT failure	The low-pressure switch at the high-pressure side has functioned. Contact your dealer or nearest service shop.	Unit stops.
E020	Engine oil depleted	The sub-engine oil pressure switch has functioned. Contact your dealer.	Unit stops.
E021	Engine coolant temperature high	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.	Unit stops.
E023	Engine speed abnormally low	The sub-engine speed has dropped abnormally. Contact your dealer.	Unit stops.
E024	Engine start failure	The sub-engine starting failed. Check the fuel level, and replenish if low. Purge the air at the fuel filter section.	Unit stops.
E027	Engine speed abnormally high	The sub-engine speed has risen abnormally. Contact your dealer.	Unit stops.
E029	Engine speed rising failure	The sub-engine rising failed. Contact your dealer.  ADVICE - The refrigeration unit can be operated with electric meter drive. (Turn the ELEC/DIESEL changeover switch to "ELEC") - The setting temperature can only be changed by the preset temperature setting mode.	Unit* stops.
E030	Unit panel not close	The side cover at the sub-engine side is open. Close the side cover before starting operation.	Unit stops.
E031	OCR tripped	The motor's protective device has functioned. Contact your dealer.	Unit stops.
E033	HTS tripped	The heater's protective device has functioned. (Excluding Type 25) Contact your dealer.	Unit stops.
E050	TH sensor failure	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°C" when there is a broken connection, and shows "60°C" or higher if there is a short circuit.	Unit stops.

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

Alarm Code	Trouble	Countermeasure	Unit Condition
E063	Td sensor failure	Discharge gas temperature sensor is disconnected or shorted. Contact your dealer.	Unit stops. (Auto recovery)
E073	Engine speed sensor failure	- 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".)	Unit stops.
E099	Controller communication failure	- 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°C". Contact your dealer or the nearest service shop.	Unit 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 content is not displayed)

Alarm Code	Trouble	Countermeasure	Unit Condition
E001	Evaporator fan motor fuse break	One of the fuses for the evaporator fan motor has blown. Inspect and replace the fuses F2 to F4 (TSJ450SA: F2 to F3) in the control box.	Unit operation continues.
E004	Throttle solenoid fuse break	The high-speed solenoid fuse for the sub-engine has blown. Inspect and replace the fuse F6 in the control box.	Unit operation continues.
E032	Alternator generation not enough	The alternator's charge is faulty. Contact your dealer or the nearest service shop.	Unit operation continues.
E087	DTS failure	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.	Unit operation continues.

If a display does not appear, or if a sign other than the above 4 types appears, contact your dealer.

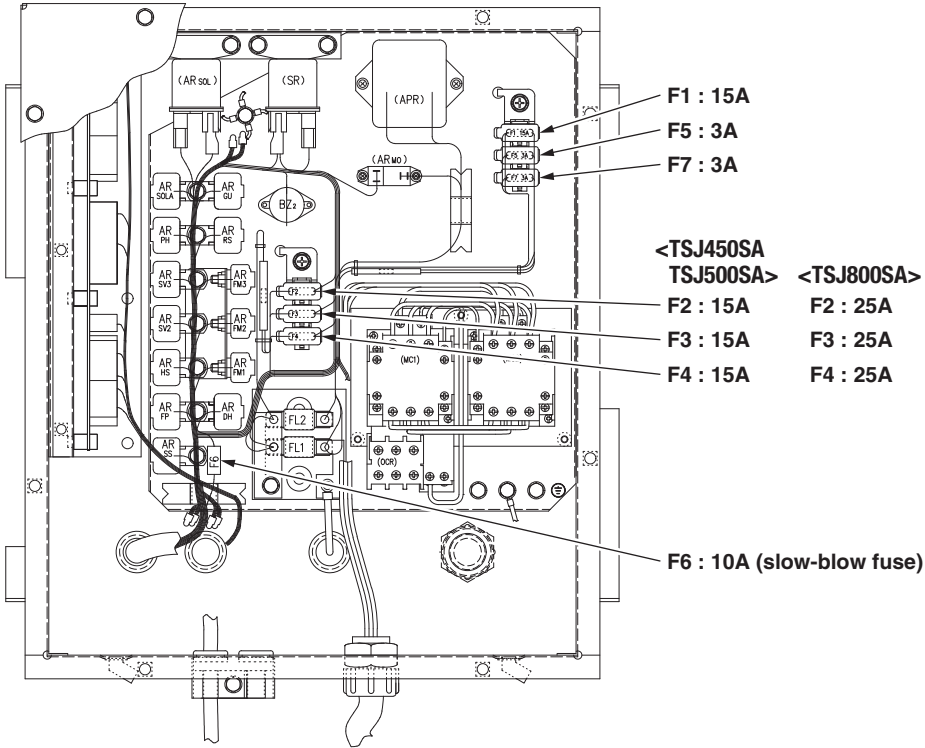
6 Troubleshooting

(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 41.) (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

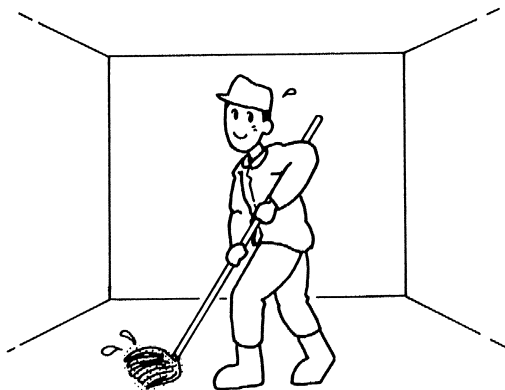
The fuses are installed in the control box of the condensing unit.



7 Loading

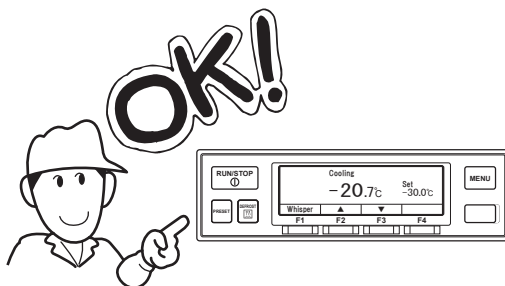
(1) Preparation before loading

(a) Clean the room.



(b) Inspect the vehicle and the refrigeration unit.

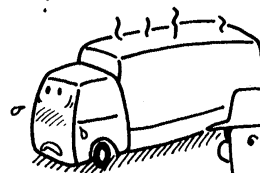
(c) Set the room temperature with the cabin controller.



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

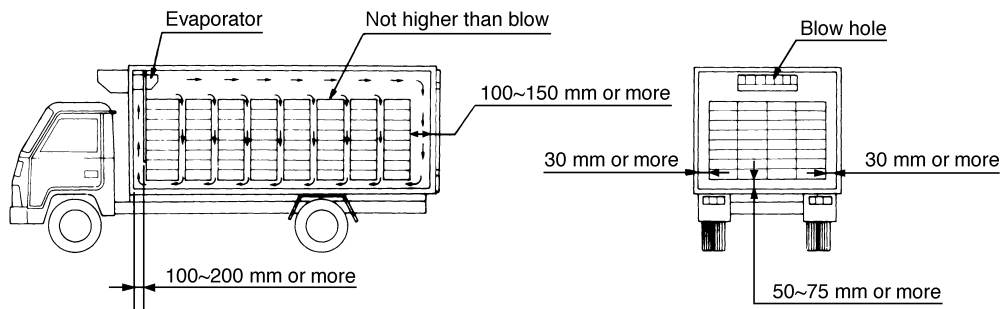


7 Loading

(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.

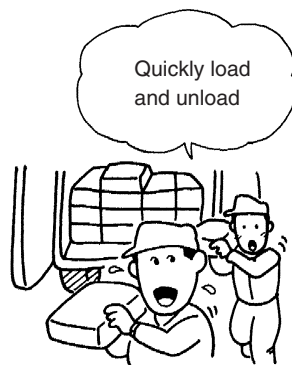
WARNING

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.

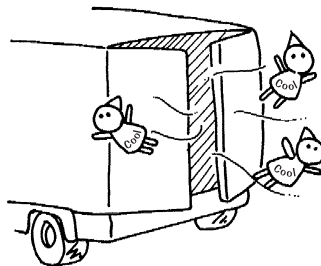


(3) Unloading

(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 unforeseen accidents with the refrigeration unit, and to use the refrigeration unit safely.

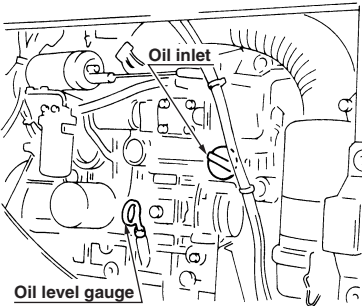
CAUTION

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

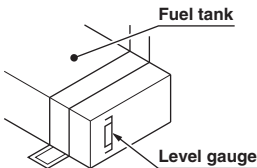
Sub-engine oil could become very hot. Wait till the oil temperature drops sufficiently before starting inspection or replenishment of oil.

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

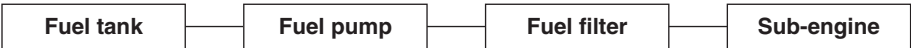
(b) Inspection of sub-engine fuel level

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



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.

8 Inspection

(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.



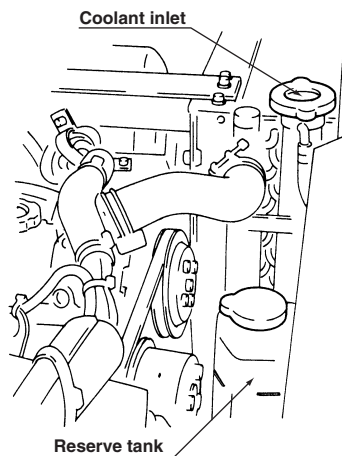
If the coils are dirty, the cooling performance could drop and the protective device could function causing operation to be inhibited. Clean the coils often.

(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

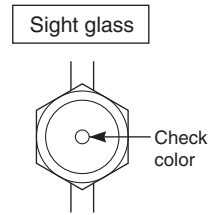
Always inspect and replenish the coolant while the water temperature is low. Failure to observe this could lead to burns.



(g) Inspection with sight glass

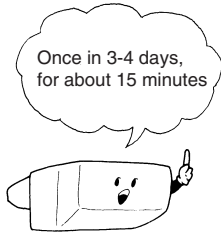
Run the refrigeration unit, and after ten minutes have passed, inspect the state of the refrigerant with the sight glass.

If the check color is yellow, contact your dealer.



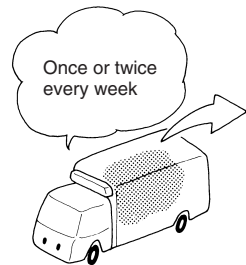
(h) When not using the refrigeration unit for a long time

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



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

When operating the refrigeration unit continuously for a long time at 10C 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.



8 Inspection

(2) Daily inspection check sheet

Customer			Customer's signature	
Refrigeration Model	Model		Delivery date	
	Serial No.		Inspection date	
Vehicle	Model		Inspection company	
	Serial No.		Inspector	
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				

(3) 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	<TSJ450SA, TSJ500SA: 5500cm ³ > <TSJ800SA: 9500cm ³ >
Refrigerating machine oil	Diamond freeze MA32R	<TSJ450SA, TSJ500SA: 900cm ³ > <TSJ800SA: 1200cm ³ >
* Antifreeze	Fuso Diesel Long Life Coolant	Standard concentration 30% 1800cm ³
Coolant	Soft water with few impurities	Full volume (including antifreeze) <TSJ450SA, TSJ500SA: 5800cm ³ > <TSJ800SA: 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

TSJ450SA

Item		Type	TSJ450SA	
Freezing capacity	Conditions	°C	Outdoor temperature 30	
			Room -20	Room 0
	Sub engine drive	W	2400	4500
	Motor drive	W	1900	3500
Functions			Cooling / Heating	
Working environment	Room temperature	°C	-30 ~ 25	
	Outdoor temperature		-20 ~ 40	
Unit dimensions W×H×D	Condensing unit	mm	1650×637×710 (without exhaust pipe)	
	Evaporator unit		1220×292×720	
Unit weight		kg	378	
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	L	5.5	
	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	L	0.9 (Diamond freeze MA32)	
Evaporator	Type		Aluminum fin & copper tubes	
	Fan		Axial flow fan motor coupling ×2pcs.	
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	2.5 (R404A)	
Room temperature control			Electronic thermostat	
Operation control			Microcomputer controller	
Defrosting device			Automatic defrost, defrost timer method	
Safety device			High pressure switch Cut out: 3.2MPa, Cut in: 2.2MPa Engine oil pressure switch Cut out: 0.05MPa Engine water temperature switch Cut out: 111°C Fusible plug: 95°C Motor over current relay: 9A	

Note: The TSJ450SA has a heating function, but do not set a temperature that will cause heating operation during motor drive.

TSJ500SA

Item		Type	TSJ500SA	
Freezing capacity	Conditions	°C	Outdoor temperature 30	
			Room -20	Room 0
	Sub engine drive	W	2800	4700
	Motor drive	W	2200	3650
Functions			Cooling / Heating	
Working environment	Room temperature	°C	-30 ~ 25	
	Outdoor temperature		-20 ~ 40	
Unit dimensions W×H×D	Condensing unit	mm	1650×637×710 (without exhaust pipe)	
	Evaporator unit		1220×292×720	
Unit weight		kg	388	
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	L	5.5	
	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, <50Hz> for motor)	
	Refrigeration unit oil charging amount	L	0.9 (Diamond freeze MA32)	
Evaporator	Type		Aluminum fin & copper tubes	
	Fan		Axial flow fan motor coupling ×3pcs.	
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	2.5 (R404A)	
Room temperature control			Electronic thermostat	
Operation control			Microcomputer controller	
Defrosting device			Automatic defrost, defrost timer method	
Safety device			High pressure switch Cut out: 3.2MPa, Cut in: 2.2MPa Engine oil pressure switch Cut out: 0.05MPa Engine water temperature switch Cut out: 111°C Fusible plug: 95°C Motor over current relay: 9A	

Note: The TSJ500SA has a heating function, but do not set a temperature that will cause heating operation during motor drive.

9 Specifications

TSJ800SA

Item		Type	TSJ800SA	
Freezing capacity	Conditions	°C	Outdoor temperature 30	
			Room -20	Room 0
	Sub engine drive	W	4300	7600
	Motor drive	W	3350	6000
Functions			Cooling / Heating	
Working environment	Room temperature	°C	-30 ~ 25	
	Outdoor temperature		-20 ~ 40	
Unit dimensions W×H×D	Condensing unit	mm	1770×705×857 (without exhaust pipe)	
	Evaporator unit		1220×292×720	
Unit weight		kg	519	
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	L	9.5	
	Fuel		Diesel fuel (Intense cold season: cold weather fuel)	
	Working speed	min ⁻¹	<High speed> 2200, <Low speed> 1700	
Compressor	Type		CR2323LL-L	
	Working speed	min ⁻¹	<High speed> 2420 <Low speed> 1870 (1500, <50Hz> for motor)	
	Refrigeration unit oil charging amount	L	1.2 (Diamond freeze MA32)	
Evaporator	Type		Aluminum fin & copper tubes	
	Fan		Axial flow fan motor coupling ×3pcs.	
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	3.6 (R404A)	
Room temperature control			Electronic thermostat	
Operation control			Microcomputer controller	
Defrosting device			Automatic defrost, defrost timer method	
Safety device			High pressure switch Cut out: 3.2MPa, Cut in: 2.2MPa Engine oil pressure switch Cut out: 0.05MPa Engine water temperature switch Cut out: 111°C Fusible plug: 95°C Motor over current relay: 13A	

Note: The TSJ800SA has a heating function, but do not set a temperature that will cause heating operation during motor drive.



**MITSUBISHI HEAVY INDUSTRIES
THERMAL SYSTEMS, LTD.**

TRANSPORTATION REFRIGERATION DEPARTMENT

3-1, ASAHI, NISHIBIWAJIMA-CHO, KIYOSU, AICHI, 452-8561, JAPAN

Phone : +81-70-2685-4046