OPERATING INSTRUCTIONS **ENGLISH**
CITIMAX 280 / 350 / 400 / 500 / 700

INSTRUCTION

This guide has been prepared for the operator of Carrier Transicold refrigeration units. It contains basic instructions for the daily operation of the refrigeration unit as well as safety information troubleshooting tips, and other information that will help you to deliver the load in the best possible condition.

Please take the time to read the information contained in this booklet and refer to it whenever you have a question about the operation of your Carrier Transicold unit. This manual refers to the standard model. Some options may not appear in it, and in such cases you are requested to consult our Technical Services.

Your refrigeration unit has been engineered to provide long, trouble-free performance when it is properly operated and maintained. The checks outlined in this guide will help to minimize on the road problems. In addition, a comprehensive maintenance program will help to insure that the unit continues to operate reliably. Such a maintenance program will also help to control operating costs, increase the unit's working life, and improve performance.

When having your unit serviced, be sure to specify genuine Carrier Transicold replacement parts for the highest quality and best reliability.

At Carrier Transicold, we are continually working to improve the products that we build for our customers. As a result, specifications may change without notice.

CONTENTS

1. DESCRIPTION AND IDENTIFICATION

Keep the fold out sheet while reading the instructions.

1.1. Description

CITIMAX series units are simple, tried and tested design; low-cost purchase and operation to equip large, middle and small size delivery vehicles.
It is manufactured as a split system, enabling it to adapt to any vehicle and any configuration.

a. Flat evaporator
b. Condenser
c. Cab control
d. Main road fuse
e. Compressor of mounting kit

CITIMAX series are available in next versions:

Model	Refrigeration	Fan motor		Units
CITIMAX 280	R404A	12V	24V	Frozen
CITIMAX 350	R404A	12V	24V	Frozen
CITIMAX 400	R404A	12V	24V	Frozen
CITIMAX 500	R134a	12V	24V	Fresh
	R404A	12V	24V	Frozen
CITIMAX 700	R404A	12V	24V	Frozen

■Our large range of kits enables these units to be adapted for use with most vehicles.

1.2. Nameplate

Each unit is identified by a nameplate attached to the frame of the unit. The nameplate identifies the complete model number of the unit, the serial number and some other information.

If a problem occurs, please refer to the information on this plate, and make a note of the model and serial number before calling for assistance. This information will be needed when you contact a technician so that he may properly assist you.

The complete nameplate (1a) is fixed on the frame and the additional serial number is fixed on unit side (1b): easily readable.

1.3. Noise level sticker

This sticker indicates the noise level in Lwa (sound power level).

2. SAFETY

This manual contains safety and service instructions to follow in order to prevent any accident. Some of following stickers have been placed on the product for your SAFETY.

BEFORE USING THIS REFRIGERANT UNIT, read carefully all safety information explained in this manual and indicated on the product. Be sure that everybody who will use this refrigeration unit has been trained to use it in a safe way.
DURING THE USE OR MAINTENANCE OF THIS REFRIGERATION UNIT, THE NOTES ON SAFTY ARE BE TO CONSIDERED.

Personal protective equipment:

• Always use adequate Personal Protective Equipment before doing anything on this refrigerant unit, as explained in this manual.
• Hearing protection is recommended when unit is running.

Working at height:

Take all necessary safety precautions when accessing this refrigeration unit: use safe ladders, working platforms with appropriate guards.

Automatic start :

This refrigeration unit is equipped with Auto-Start/Stop, a valuable fuel saving feature.
That is, when reaching the desired temperature, the unit will Auto-stop; while out of the desired temperature, the unit will Auto-start. Before servicing refrigeration unit, make sure the unit is shut down through the cab command. Ensure the unit will

not restart.

Lock-out / Tag-out can be performed by disconnecting and enclosing:
- the negative battery cable in road mode

Electricity :
When this refrigeration unit is running in electrical operation, some devices are powered up especially in the electrical control box.
• Always use adequate tools and Personal Protective Equipment when working on electrical devices: safety gloves and safety glasses.

Before servicing refrigeration unit, make sure the unit is shut down through the cab command.

Ensure this refrigeration unit is disconnected from the local electrical network. Lock-out / Tag-out can be performed as described above. Before working in the electrical control box, it is required to control the absence of tension.
Ensure that all condensers are discharged before service to avoid electric shock.
WHEN IT IS NECESSARY TO WORK IN THE ELECTRICAL CONTROL BOX UNDER TENSION, PEOPLE MUST BE QUALIFIED FOR WORKS UNDER LOW OR HIGH VOLTAGE.

Cooling oil :
- avoid prolonged or repeated contact with the skin.
- wash carefully after handling.

Belts and fans :
This refrigeration unit is equipped with Auto-start/stop, it may start at any time and without warning.

When the unit is running beware of belts and fans that are moving. Before servicing refrigeration unit, make sure the unit is shut down through the cab command. Ensure the unit will not restart. Lock-out / Tag-out can be performed as described above.
When there is protective structure (fan grid or guard for example) make sure they are in place. Never removed them when the refrigeration unit is running. Always keep your hands, body parts, clothes, hairs and tools far from moving parts.

Refrigerant: The refrigerant contained in this refrigeration unit can cause frostbite, severe burns or blindness in case of projection and direct contact with the skin or eyes.

In contact with flame or heat, refrigerant generates toxic gas: keep any flame, any lighted object or any source of sparks away from the refrigerant unit.

Always use Personal Protective Equipment when handling refrigerant: safety clothes, safety gloves and safety glasses.

Refrigerant handling must be done by qualified people.

Refrigerant Use & Handling

•Combustibility - HCFC refrigerants can become combustible when mixed with high concentrations of air at elevated pressures including R-134a & R404A.

•Therefore, these refrigerants should not be mixed with air under pressure for leak testing or other purposes.

•Inhalation Hazards – All refrigerants are hazardous if inhaled in concentrations exceeding the recommended safe limits. The symptoms include:
headaches, nausea, sleepiness, lethargy, dizziness and loss of coordination. It can result in irregular heartbeat, unconsciousness and even death. The proper remedies should be taken to eliminate or reduce the exposures.

•Flame Enhancement – If you see a change in the color or size of the torch flame while welding or soldering in the presence of refrigerant vapors, stop work immediately and ventilate the area. This flame effect only occurs at dangerously high concentrations of refrigerant vapors. This could create the inhalation hazards noted above.

Skin & Eye Protection – Contact with "liquid" refrigerants can result in immediate freezing of the tissues, and permanent damage or blindness can result. DO NOT handle liquid refrigerants without proper personal protective equipment. DO NOT cut into any refrigerant lines under pressure. DO NOT open valves or vent equipment where you may be sprayed with liquid refrigerant.

Burning with hot and cold :

When this refrigeration unit is running or even after, different components can be very cold or hot (exhaust pipe, tubes, coils, receiver, accumulator or engine for example)

Beware when operating closed from cold or hot components.

Always use adequate safety gloves when doing any maintenance on this refrigeration unit.

Cuttings :

Beware when handling or operating closed from parts that could be harmful(coils,evaporators, clamps for example).

Always use adequate safety gloves when doing any maintenance on this refrigeration unit.

Battery :

This refrigeration unit may be equipped with a lead-acid type battery. When charging the battery normally vents small amounts of flammable and explosive hydrogen gas.
Projections of acids on the skin or eyes can cause severe burns.

Keep any flame, any lighted object or any source of sparks away from the battery elements.

Always use Personal Protective Equipment when handling and charging battery: safety clothes, safety gloves and safety glasses.

Respect polarity when connecting a battery.

CAUTION

Under no circumstances should anyone attempt to repair the Logic or Display Boards. Should a problem develop with these components, contact your nearest Carrier Transicold dealer for replacement.

Under no circumstances should a technician electrically probe the processor at any point, other than the connector terminals where the harness attaches. Microprocessor components operate at different voltage levels and at extremely low current levels. Improper use of voltmeters, jumper wires, continuity testers, etc. could permanently damage the processor.
Most electronic components are susceptible to damage caused by electrical static discharge (ESD). In certain cases, the human body can have enough static electricity to cause resultant damage to the components by touch. This is especially true of the integrated circuits found on the truck/trailer microprocessor.

Environment :

Think about protection of environment during all the life of this refrigeration unit.
To prevent environmental damages NEVER release refrigerant in the atmosphere, NEVER throw coolant, oil, battery and chemicals in the nature. It must be recuperate and recycle according to current regulations.
When disposing this refrigerant unit do it in an environmentally sound way and in accordance with current regulations.

2.1. Warning stickers maintenances

a. Keep the warning pictograms clean and without any obstruction material.

b. Clean the pictograms with water and soap and wipe them with soft fabric.

c. Replace damaged or missing pictograms with new

pictograms available in Carrier network.

d. If a component having a pictogram is replaced by a new one, be sure that the new component has the right pictogram.

e. Place a warning pictogram by applying it on a dry surface. Press to external sides to eliminate air bubbles.

3. PRODUCT LOADING

Proper air circulation in the insulated box, air that can move around and through the load, is a critical element in maintaining product quality during transport. If air cannot circulate completely around the load: hot spots or top-freeze can occur.

The use of pallets is highly recommended. Pallets, when loaded so air can flow freely through the pallets to return to the evaporator, help protect the product from heat passing through the floor of the truck. When using pallets, it is important to refrain from stacking extra boxes on the floor at the rear of the truck, because this will cut off the airflow.

Product stacking is another important factor in protecting the product. Products that generate heat, fruits and vegetables for example, should be stacked so the air can flow through the product to remove the heat; this is called "air stacking" the product. Products that do not create heat, meats and frozen products, should be stacked tightly in the centre of the box.

All products should be kept away from the sidewalls of the body, allowing air to flow between the body and the load; this prevents heat filtering through the walls from affecting the product.

It is important to check the temperature of the product being loaded to ensure that it is at the correct temperature for transport. The refrigeration unit is designed to maintain the temperature of the product at the temperature at which it was loaded; it was not designed to cool a warm product.

SOME ADVICE

Before loading

• Pre-cool the inside of the insulated body by lowering the temperature for about 15 minutes.

• Evacuate the humidity existing inside the box by carrying out a manual defrost. For CITIMAX500/700 units, the defrost mode can only take place when the box temperature lower than 4 ℃.

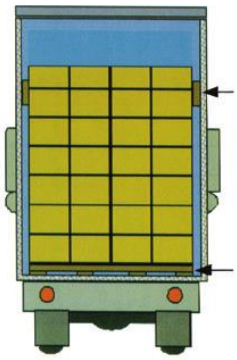
• Evaporator fans are protected by safety grills. In the event of heavy duty use of the unit, ice can accumulate on the grills. It is therefore recommended to clean them regularly by means of a small brush. The operation MUST be done when the unit has been SHUT DOWN.

When loading

• To be carried out with the unit stopped.

• It is recommended to open doors as little as possible to avoid the intake of hot air and humidity.

• Select the temperature by means of the thermostat, according to the transported goods.



• Check the internal temperature of the goods being loaded (using a probe thermometer).

• Take care not to obstruct the air intakes on the evaporator section and the ventilation ducts.

Load spacers

Load on pallets
• Leave a free space of about :
- 6 to 8 cm between load and front wall,
- 20 cm between the top of the load and the roof,
- between the floor and the load (gratings, pallets).

• Do not forget to close the doors.
• Before closing the doors, check your load once more and see that nobody is shut inside the box.

NOTE :
For stationary utilization, we recommend to place the body in the shade.

IMPORTANT
Never leave your unit more than a month without running.

4. RECOMMENDED TRANSPORT TEMPERATURES

Below are some general recommendations on product transport temperatures and operating modes for the unit. These are included for reference only and should not be considered pre-emptive of the set-point required by the shipper or receiver.

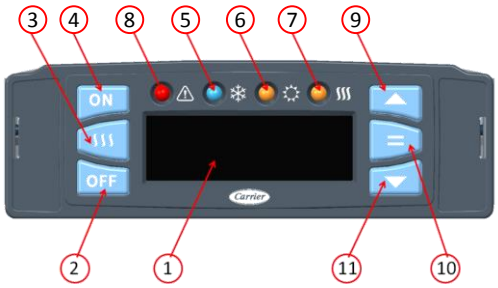
More detailed information can be obtained from your Carrier Transicold dealer.

Product	Set point range
Bananas	15 ℃ (60 ℉)
Fresh fruits and Vegetables	+4 ℃ ~ +6 ℃ (+39 ℉ ~ +43 ℉)
Fresh meats and seafood	+2 ℃ (+36 ℉)
Dairy products	+2 ℃ ~ +6 ℃ (+36 ℉ ~ +43 ℉)
Ice	-20 ℃ (-4 ℉)
Frozen fruits and vegetables	-18 ℃ (0 ℉)
Frozen meats and seafood	-20 ℃ (-4 ℉)
Ice cream	-25 ℃ (-13 ℉)

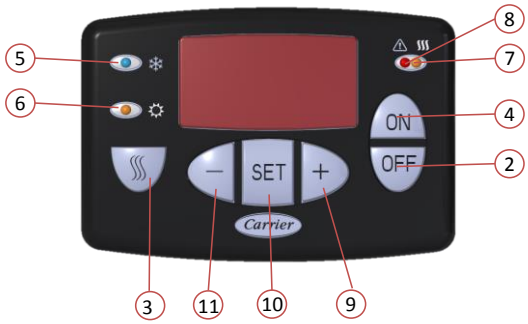
It is essential to shut down the compartment during the periods when the doors are open, in order to maintain the temperature of the cargo in the other compartments and keep the unit operating correctly.

5. DISPLAY BOARD

CITIMAX series provides two different display boards, DIN display board and SMART display board, as the following pictures show:



DIN Display



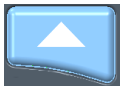
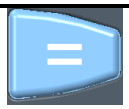
SMART Display

5.1. Cab control description

Keep the fold out sheet while reading the instructions.

This functional accessory simplifies all control operations. From your seat, you can carry out all the control operations: shut-down, automatic start-up, adjusting the set point, defrost, program to customize unit operation to your own requirements, manage error messages in event of malfunction.

You can display the box temperature and see whether the set point is being maintained by checking the blue or orange indicator. The malfunction indicator lights up red in the event of malfunction. When the battery voltage is too low, a fail-save safety system shuts down the unit. Unit restart is automatic and time-delayed if the voltage rises to the normal level.

	DIN	SMART
1. Display	4 digits	4 digits
2. OFF key		
3. Manual defrost key		
4. ON key		
5. Cooling operation LED		
6. Heating operation LED		
7. Defrosting operation LED		
8. Malfunction LED		
9. + key		
10. SET key		
11. - key		

6. OPERATION

CITIMAX series are powered on Road mode by the vehicle battery (alternator).
In this chapter, we will state the operation principle respectively.

6.1 DIN Operation principle

For its big volume, we should install the DIN display board in the fixed place of the cab cage.

After starting up, the refrigeration unit by pressing the 

key, unit start-up and shut-down are automatic.

An open-type compressor is driven by the engine of the vehicle. The vehicle battery (alternator) powers the evaporator and condenser fans. The unit automatically shuts down when the engine is switched off with the ignition key.

The unit can be completely shut down manually by pressing the 

key on the cab command.

Temperature control

As soon as the set-point temperature has been reached, temperature control is obtained by shut down and start-up of the electro-magnetic clutch.

Condenser fan is controlled by the microprocessor and evaporator fan(s) cut out during regulation. When transporting fragile loads such as fresh meat, vegetables and cheese, it is possible to program the microprocessor to obtain continuous ventilation by the evaporator during regulation.

Defrost – Frozen unit only

Defrost operation is fully automatic but can be manually controlled.
- Defrost cycles are fully controlled by the integrated microprocessor.

- During the defrost cycle, the evaporator fan shuts down. The condenser fan is controlled by the microprocessor.

- Defrost cycle termination is controlled by a timer or defrost temperature sensor (DTS).

- During the defrost cycle, the cab command display indicates "d F".

Heating - For frozen unit with heating function option

Heating is provided by hot gas system.

The evaporator fan operates, the condenser fan is controlled by the microprocessor.

6.1.1 To start the unit

1. Start the vehicle engine.

2. Start the unit by pressing the 

key. Start-up is time-delayed for 50 seconds.

3. The digital display of the cab control displays the box temperature.

4. Check the temperature setpoint is correct by pressing the 
key. The setpoint temperature is highlighted on the digital display.

5. Enter a new setpoint if necessary (See To change setpoint temperature– paragraph 6.4)

In the event of difficulty on start-up, check that:
- The main road fuse has not blown. If it is ok, contact your Carrier Service centre.
- The temperature selected by the cab control has not been affected.

6.1.2 To stop the unit

- For a short stop (ex. delivery): switch off by the vehicle ignition key.
- For a long stop: press the 

key in the cab command.

6.1.3 To change setpoint temperature

Important
If, when settings are adjusted, no key is activated within 5 sec. the system reverts to displaying the box temperature. All changes made are recorded.

If the cab command is built into the vehicle control panel, the command unit must be located as far as possible from the heating ducts. Maximum temperature of exposure : 85 ℃.

1. Press the 
key to display setpoint temperature.

2. Press the 
or 
key to change the setpoint.

3. Press the 
key to return to box temperature display.

6.1.4 To change defrost parameters

Important
If, when settings are adjusted, no key is activated within 5 seconds, the unit will be turned off automatically. All changes made are recorded.

1. Press the 

key to shut-down the unit.

2. Press **simultaneously** the  and 

keys during 5 seconds to display last selected defrost interval.

3. Press the  or  key to change the defrost time:
5 to 45 min :increase or decrease time (5, 10, 15, 20, 25, 30 and 45) (default value 10 min)

4. Press the  key to display defrost interval:

0: inhibit defrost function.

1 h, 1.5h, 2 h, 2.5h, 3h, 4h, 5h and 6 h (default value 2h)

5. Press the  key to return to turn off the unit.

6.1.5 To display other data (alarms, software version, operation time, box T°)

1. Press the  key during 5 seconds to enable access to malfunction codes (see "Fault alarm display"– paragraph 6.8).

2. Press  or  key to display alarms.

3. Press the  key to display controller software version.

4. Press the  key to display cab command software version.

5. Press the  key to display the total operation time.

6. Press the  key to return to box temperature display.

6.1.6 To change default parameters

1. Press simultaneously the  ,  and  keys to display minimum setpoint.

2. Press the  or  key to change minimum setpoint : 0 ℃, -20 ℃ or -29 ℃ (default value -29 ℃).

3. Press the  key to display differential parameter.

4. Press the  or  key to adjust the differential value : Dif1 (1 ℃), Dif2 (2 ℃), Dif3 (3 ℃) (default value Dif2).

5. Press the  key to display evaporator fan operating mode during off-cycle.

6. Press the  or  key to change the evaporator fan operating mode: OFF or On (default value OFF).

7. Press the  key，to display the unit ℃ and ℉.

8. Press the  or  key to change the unit ℃ or ℉ (default value ℃).

9. Press the  key，to return to box temperature display.

6.1.7 Fault alarm display

a. Access by the  key

1. Press the  key during 5 seconds to access to malfunction codes.

2. Press  or  key to display alarms.

3. To scroll through the alarm list, use the  key.

- ACTIVE malfunctions – AXX
An alarm is active when a problem occurs on the unit, the red LED is flashing speedily.

MALFUNCTION CODE – Red LED flashes			
Code	**Description**	**Unit shutdown**	**Checking**
A00	No malfunction – Unit in operation	- -	Contact your Service Center
A01	Low pressure switch open	**Yes**	
A02	High pressure switch open		
A04	Clutch open circuit	**No**	
A06	Condenser fan short circuit		
A07	Evaporator fan short circuit		

A09	Defrost valve (HGV) short circuit		
A10	Liquid injection valve (INV) short circuit		
A11	Main hot gas valve (MHV) short circuit		
A21	Clutch short circuit		
A22	Condenser fan open circuit		
A23	Evaporator fan open circuit		
A24	Defrost valve (HGV) open circuit		
A25	Liquid injection valve (INV) open circuit		
A26	Main hot gas valve (MHV) open circuit		
E2P	Wrong read/write data from EEPROM Setpoint adjusted out of range -29℃/+30℃ Lose of set parameters		

b. Direct display

Note

Direct display malfunction messages are displayed instead of temperature read-out as soon as the malfunction is detected, and remain displayed as long as malfunction persists.

The unit does not run until the malfunction has disappeared or been corrected.

Code	Description	**Unit shutdown**	Checking	Mode
EE	Evaporator temperature probe (open/short circuit)	**Yes**	－Evaporator probe and connections	280/350/400/500/700
EEE	Defrost terminal temperature probe (open/shot circuit)	**No**	-Defrost probe and connections	280/350/400
bAt	Battery low voltage alarm	**YES**	－Battery voltage －Alternator connections	280/350//500/700
con	Communication malfunction	**No**	- Communication line	280/350/400/500/700
Err	Programming mistake of the maximum setpoint by user Setpoint lower than minimum setpoint but in the range -29℃/+30℃	**No**	－Setpoint	280/350/400/500/700

6.2 SMART Operation principle

For its small volume, we can install the SMART display board anywhere of the cab cage.

After starting up, the refrigeration unit by pressing the ON key, unit start-up and shut-down are automatic.

An open-type compressor is driven by the engine of the vehicle. The vehicle battery (alternator) powers the evaporator and condenser fans. The unit automatically shuts down when the engine is switched off with the ignition key.

The unit can be completely shut down manually by pressing the OFF key on the cab command.

Temperature control

As soon as the set-point temperature has been reached, temperature control is obtained by shut down and start-up of the electro-magnetic clutch.

Condenser fan is controlled by the microprocessor and evaporator fan(s) cut out during regulation. When transporting fragile loads such as fresh meat, vegetables and cheese, it is possible to program the microprocessor to obtain continuous ventilation by the evaporator during regulation.

Defrost － Frozen unit only

Defrost operation is fully automatic but can be manually controlled.
- Defrost cycles are fully controlled by the integrated microprocessor.

- During the defrost cycle, the evaporator fan shuts down. The condenser fan is controlled by the microprocessor.

- Defrost cycle termination is controlled by a timer or defrost temperature sensor(DTS)..

- During the defrost cycle, the cab command display indicates "d F".

Heating - For frozen unit with heating function option

Heating is provided by hot gas system.

The evaporator fan operates, the condenser fan is controlled by the microprocessor.

6.2.1 To start the unit

1. Start the vehicle engine.

2. Start the unit by pressing the ON key. Start-up is time-delayed for 50 seconds.

3. The digital display of the cab control displays the box temperature.

4. Check the temperature setpoint is correct by pressing the SET key. The setpoint temperature is highlighted on the digital display.

5. Enter a new setpoint if necessary (See To change setpoint temperature– paragraph 6.4)

In the event of difficulty on start-up, check that:
- The main road fuse has not blown. If it is ok, contact your Carrier Service centre.
- The temperature selected by the cab control has not been affected.

6.2.2 To stop the unit

- For a short stop (ex. delivery): switch off by the vehicle ignition key.
- For a long stop: press the OFF key in the cab command.

6.2.3 To change setpoint temperature

Important
If, when settings are adjusted, no key is activated within 5 sec. the system reverts to displaying the box temperature. All changes made are recorded.

If the cab command is built into the vehicle control panel, the command unit must be located as far as possible from the heating ducts. Maximum temperature of exposure : 85 ℃.

1. Press the SET key to display setpoint temperature.
2. Press the − or + key to change the setpoint.
3. Press the SET key to return to box temperature display.

6.2.4 To change defrost parameters

Important
If, when settings are adjusted, no key is activated within 5 seconds, the unit will be turned off automatically. All changes made are recorded.

1. Press the OFF key to shut-down the unit.
2. Press **simultaneously** the ❄ and ON keys during 5 seconds to display last selected defrost interval.
3. Press the − or + key to change the defrost time:
5 to 45 min :increase or decrease time (5, 10, 15, 20, 25, 30 and 45) (default value 10 min)
4. Press the SET key to display defrost interval:

0: inhibit defrost function.

1 h, 1.5h, 2 h, 2.5h, 3h, 4h, 5h and 6 h (default value 2h)

5. Press the SET key to return to turn off the unit.

6.2.5 To display other data (alarms, software version, operation time, box T°)

1. Press the SET key during 5 seconds to enable access to malfunction codes (see "Fault alarm display"– paragraph 6.8).
2. Press − or + key to display alarms.
3. Press the SET key to display controller software version.
4. Press the SET key to display cab command software version.

5. Press the SET key to display the total operation time.

6. Press the SET key to return to box temperature display.

6.2.6 To change default parameters

1. Press simultaneously the (-), (+) and (defrost) keys to display minimum setpoint.

2. Press the (-) or (+) key to change minimum setpoint : 0 ℃, -20 ℃ or -29 ℃ (default value -29 ℃).

3. Press the SET key to display differential parameter.

4. Press the (-) or (+) key to adjust the differential value : Dif1 (1 ℃), Dif2 (2 ℃), Dif3 (3 ℃) (default value Dif2).

5. Press the SET key to display evaporator fan operating mode during off-cycle.

6. Press the (-) or (+) key to change the evaporator fan operating mode: OFF or On (default value OFF).

7. Press the SET key，to display the unit ℃ and ℉.

8. Press the (-) or (+) key to change the unit ℃ or ℉ (default value ℃).

9. Press the SET key，to return to box temperature display.

6.2.7 Fault alarm display

a. Access by the SET key

1. Press the SET key during 5 seconds to access to malfunction codes.

2. Press (-) or (+) key to display alarms.

3. To scroll through the alarm list, use the (+) key.

- ACTIVE malfunctions – AXX
An alarm is active when a problem occurs on the unit, the red LED is flashing speedily.

MALFUNCTION CODE – Red LED flashes			
Code	**Description**	**Unit shutdown**	**Checking**
A00	No malfunction – Unit in operation	- -	Contact your Service Center
A01	Low pressure switch open	**Yes**	
A02	High pressure switch open		
A04	Clutch open circuit	**No**	
A06	Condenser fan short circuit		
A07	Evaporator fan short circuit		
A09	Defrost valve (HGV) short circuit		
A10	Liquid injection valve (INV) short circuit		
A11	Main hot gas valve (MHV) short circuit		
A21	Clutch short circuit		
A22	Condenser fan open circuit		
A23	Evaporator fan open circuit		
A24	Defrost valve (HGV) open circuit		
A25	Liquid injection valve (INV) open circuit		
A26	Main hot gas valve (MHV) open circuit		
E2P	Wrong read/write data from EEPROM Setpoint adjusted out of range -29 ℃ /+30 ℃ Lose of set parameters		

b. Direct display

Note

Direct display malfunction messages are displayed instead of temperature read-out as soon as the malfunction is detected, and remain displayed as long as malfunction persists.

The unit does not run until the malfunction has disappeared or been corrected.

Code	Description	**Unit shutdown**	Checking	Mode
EE	Evaporator temperature probe (open/short circuit)	**Yes**	－Evaporator probe and connections	280/350/400/500/700
EEE	Defrost terminal temperature probe (open/shot circuit)	**No**	- Defrost probe and connections	280/350/400
bAt	Battery low voltage alarm	**YES**	－Battery voltage －Alternator connections	280/350/400/500/700
con	Communication malfunction	**No**	- Communication line	280/350/400/500/700
Err	Programming mistake of the maximum setpoint by user Setpoint lower than minimum setpoint but in the range -29℃/+30℃	**No**	－Setpoint	280/350/400/500/700

7. MAINTENANCE

A comprehensive maintenance program will help to insure that the unit continues to operate reliably. Such a maintenance program will also help to control operating costs, increase the unit's working life, and improve performance.

NOTE

All maintenance services must be done by a technician trained on Carrier products respecting all safety and quality standards of Carrier.

Before any operation requiring an intervention on the unit, check that:
- The unit (cab command) is OFF
- It is impossible for the unit to automatically start up during maintenance.

7.1. Maintenance schedule

km	Mile	Initial service	Service A	Service B
5000	3000	■		
30000	18000		■	
60000	36000		■	■
90000	54000		■	
120000	72000		■	■
150000	90000		■	
180000	108000		■	■
210000	126000		■	

7.2. Service description

Initial service	•Check the tightness of bolts and screws and that the unit is correctly fastened onto the box. •Check pressure leak. •Check that the road compressor RPM •Check compressor belt tension.
Service A	•Clean up battery and battery clamps •Check belt compressor tension •Replace compressor belt every 3000 hours •Check refrigerant leak •Check all electrical connections •Check the cooling mode •Check the defrost operation •Check the operation of the cab control •Clean up condenser coil
Service B	•Replace idler pulley bearings if any.
Every year	•Replace filter drier. •Clean up the expansion valve orifice filter.
Every TWO years	•Replace compressor oil - only use Polyolester oil (POE) approved by Carrier Transicold. •Replace refrigerant. •Replace orifice expansion valve

Warning: Battery clamps must be well positioned and tightened after cleaning up.

Refrigerant: type R134a / R404A
Road compressor oil type: The road compressors are supplied with CARRIER POLYOLESTER (POE) oil. The presence of a sticker indicates that oil-change has been correctly carried out in our Carrier Transicold

plant.

Oils of PAG type are strictly incompatible with the operation of our unit: never use an oil other than that approved by Carrier.

Oil analysis: on request, we can analyze your compressor oil.
To do this, we send a small drum with a label on which you should indicate: the type of compressor, the lapse time or mileage since the last oil change, the type of Carrier equipment, the date of initial operation.

8. A.T.P. EUROPE REGULATION EXTRACT

(Date: November 2014)

Approval of vehicles intended for the carriage of perishable goods.

Before putting a refrigerated vehicle into service, it is necessary to have it approved by the Regional Health Department.

Characteristics of vehicles used for carrying perishable goods; mechanically refrigerated equipment.

The mechanically refrigerated equipment is an insulated unit with a cooling system which makes it possible, with a mean outside temperature of +30 °C, to lower the temperature inside the empty body and to maintain this low temperature in the following way:

Class A: Mechanically refrigerated equipment furnished with a cooling system whereby a temperature between +12 °C and 0 °C inclusive can be chosen.
Class B: Mechanically refrigerated equipment furnished with a cooling system whereby a temperature between +12 °C and–10 °C inclusive can be chosen.
Class C: Mechanically refrigerated equipment furnished with a cooling system whereby a temperature between +12 °C and–20 °C inclusive can be chosen.
Class D: Mechanically refrigerated equipment fitted with a refrigerating appliance such that t_i is equal to or less than 0^o C.
Class E: Mechanically refrigerated equipment fitted with a refrigerating appliance such that t_i is equal to or less than -10^o C.
Class F: Mechanically refrigerated equipment fitted with a refrigerating appliance such that t_i is equal to or less than -20^o C.
The cooling capacity of a unit is determined by a test carried out in one of the approved testing stations and ratified by an official report.
Note: The "K" coefficient of equipment of classes B, C, E and F shall in every case be equal to or less than 0.4 W/m2. °C.

Signs, identification marks and plates to be attached to mechanically refrigerated equipment.

Refrigeration Plate

This heavy insulation must be followed by identification marks according to the following list:

Class A mechanically refrigerated equipment with normal insulation FNA
Class A mechanically refrigerated equipment with heavy insulation FRA
Class B mechanically refrigerated equipment with heavy insulation FRB
Class C mechanically refrigerated equipment with heavy insulation FRC
Class D mechanically refrigerated equipment with heavy insulation FRD
Class E mechanically refrigerated equipment with heavy insulation FRE
Class F mechanically refrigerated equipment with heavy insulation FRF

In addition to the above identification marks, the date (month and year) of expiry of the approval certificate must be indicated.
Example:
FRC 06 - 2006
(06 = month (June) 2006 = year)

Very important

Regularly check the expiry date of the approval certificate. During transport, the approval certificate or provisional certificate should be shown on request of qualified agents. To have an insulated unit approved as a refrigeration unit, an application to modify the approval certificate should be sent to the regional health office.

9. 24H ASSISTANCE

At Carrier Transicold we're working hard to give you complete service when and where you need it. That implies a worldwide network of dealers and available an emergency service. These service centres are manned by factory-trained service personnel and backed by extensive parts inventories that will assure you of prompt repair.

Should you encounter a unit problem with your refrigeration unit during transit, follow your company's emergency procedure or contact the nearest Carrier Transicold service centre. Consult the directory to locate the service centre nearest you. This directory may be obtained from your Carrier

Transicold dealer.

If you are unable to reach a service center, call Carrier Transicold's 24Hour Assistance:

In China, please use the below free phone numbers:

CN	CHINA	4008 204909

In Europe, please use the following free phone numbers from :

A	AUSTRIA	0800 291039
B	BELGIUM	0800 99310
CH	SWITZERLAND	0800 838839
D	GERMANY	0800 1808180
DK	DENMARK	808 81832
E	SPAIN	99 993213
F	FRANCE	0800 913148
FIN	FINLAND	0800 113221
GB	GREAT BRITAIN	0800 9179067
GR	GREECE	00800 3222523
H	HUNGARY	06800 13526
I	ITALY	800 791033
IRL	IRELAND	1800 553286
L	LUXEMBURG	800 3581
RUS	RUSSIA	810 800 200 31032
N	NORWAY	800 11435
NL	THE NETHERLANDS	0800 0224894
P	PORTUGAL	8008 32283
PL	POLAND	00800 3211238
S	SWEDEN	020 790470

From other countries / Direct : +32 9 255 67 89
In Canada or United States, call 1 – 800 – 448 1661

When calling, please have the following information ready for fastest service:

- Your name, the name of your company, and your location
- A telephone number where you can be called back
- Refrigeration unit model and serial number
- Box temperature, setpoint and product
- Brief description for the problem you are having and what you have already done to correct the problem.

We will do everything we can to get your problem taken care of and get you back on the road.

操作说明书 中文
CITIMAX 280/350/400/500/700

前言

本说明书是针对开利运输冷冻设备有限公司制冷机组的操作人员而编写的。本说明书除了包含制冷机组的日常操作方面的基本步骤以外，还包含安全信息、故障排除的技巧以及其它信息等，而这些信息可以帮助您确保运输货物的最佳新鲜度。

请仔细阅读本说明书所述的全部内容，当您对所购买的开利运输冷冻设备产品在操作方面有不解之处时，请随时参考本说明书。本说明书适用于标准型号的产品。本说明书或许没有包含部分备选件；对这些备选件的信息，请向本公司的技术服务部咨询。

只要对所购买的本公司的制冷机组产品进行正确的操作和保养，此机组可以长期、无故障运行。本说明书中所概述的检查方法会帮助您将问题减小到最低程度。此外，综合保养程序会帮助您保证机组的持续、可靠的运行。此保养程序还可以帮助控制此机组的运行费用，延长机组的使用寿命，并提高其性能。

对机组进行维修的时候，请务必使用指定的开利运输冷冻设备公司的原装备用零件，以保障其最佳质量和可靠性。

开利运输冷冻设备有限公司的全体员工正不断地提高产品性能，以满足客户的需要。因此，产品规格如发生变更，恕不另行通知。

目录

1. 产品说明和产品标识

阅读说明书时请保存好折页部分，免得不小心被撕掉。

1.1. 产品说明

CITIMAX 系列机组设计简单、可靠而且已经过各种试验；运行费用低，可装在大、中和小型货车上。

此机组为分体式系统，可以适用于任何型号的车辆以及任何结构。

a. 蒸发器
b. 冷凝器
c. 驾驶室控制装置
d. 与汽车相接部分所使用的保险丝
e. 成套的系列安装配件包

CITIMAX 系列机组选型时请注意：

	制冷剂	风机		类型
CITIMAX 280	R404A	12V	24V	Frozen
CITIMAX 350	R404A	12V	24V	Frozen
CITIMAX 400	R404A	12V	24V	Frozen
CITIMAX 500	R134a	12V	24V	Fresh
	R404A	12V	24V	Frozen
CITIMAX 700	R404A	12V	24V	Frozen

■我公司提供的种类丰富的成套配件使得这些机组适用于大部分的车辆。

1.2. 产品标识牌

各机组通过贴在机框架上的标识牌进行识别。标识牌上有机组完整的型号、系列号以及其它一些信息。如果机组出现故障，请查看标识牌上的信息并把型号和系列号记下，然后打电话寻求帮助。联系技术人员之后请提供这些信息，好让他们提供正确帮助。很容易在机组架上找到完整的标识牌(1a)，也很容易在机组的侧面找到附加的系列号(1b)。

1.3. 噪声等级标签

噪声等级标签显示噪声等级(单位Lwa(声功率级))。

2. 安全说明

本说明书包含安全以及维修方面的操作步骤，用户须遵守这些步骤以免事故发生。以下标签中的一些标签已贴在产品上，以提示安全信息。

使用本制冷机组之前，先仔细阅读本说明书中所述的以及产品上标有的全部的安全信息。使用本制冷机组的任何人员必须提前接受培训，然后才可以安全地使用本机组。

使用或保养本制冷机组的过程中，须留意安全方面的注意事项。

个人防护装备：

如本说明书中所述，对本制冷机组进行任何操作之前，需穿戴适当的个人防护装备。

●机组运转时建议戴上听力保护装置。

高空作业：

接近本制冷机组时，须采取所有的安全预防措施。使用配有适当的防护装置的安全梯和工作台。

自动起动：

本制冷机组设有自动起动/停止功能，能有效节约燃料。即：当厢体达到设定温度时，机组自动停止运行；当厢体偏离设定温度时，机组又会自动起动运行。

对制冷机组**进行维修之前，先确认机组处于关机状态，** 确

保机组不会重新起动。

断开或封闭以下部位，进行断电上锁并标记。

✧ 发动机驱动模式下蓄电池负极电缆并上锁

电气：

本制冷机组在电力运行状态下运转时，一些部件，尤其是电控箱会带电。
对电气装置进行操作时，必须使用适当的工具而且穿戴合适的个人防护装备：安全手套以及防护眼镜。
对制冷机组进行维修之前，先确认机组处于关机状态。
确保本制冷机组与任何供电设备断开连接。如上述，对机组的电源处进行上锁并标识(Lock out/tag out)。对控制箱内部进行操作之前，必须确认控制箱不带电(absence of tension)。
对电容器进行维修之前，先将所有的电容器放电以免发生电击。

对不得不在控制箱带电状态下进行操作时，操作人员必须具备允许在低电压/高电压环境中进行作业的资格证。

冷冻油：

- ➢ 避免长时间或多次的皮肤接触。
- ➢ 处理后应仔细地洗干净。

皮带与风扇：

本制冷机组设有自动起动/停止功能，会随时起动，不发出任何警告。

当机组正在运转时，当心转动的皮带及风扇。 对制冷机组进行维修之前，先确认机组处于关机状态。

确保机组不会重新起动。 如上述，对机组的电源处进行上锁并标识（Lock out/tag out）。

如有防护结构（例如，风扇格栅或防护装置等），确认它们是否装在适当的位置。制冷机组正在运转时，千万不要拆卸这些防护结构。

操作人员的手、身体部位、衣服、头发以及工具等必须远离转动部件。

制冷剂：

本制冷机组内的制冷剂如果喷到或直接触到皮肤或眼睛，会导致冻伤、严重烧伤或失明。

制冷剂如果接触到火焰或热，会产生有毒气体： 任何火焰、被点燃物或火苗都要远离制冷机组。

处理制冷剂时，必须穿戴个人防护装备： 防护服、防护手套以及防护眼镜。

有资格的人员才能进行制冷剂的处理作业。

制冷剂的使用与处理方法

•可燃性：HCFC 制冷剂与压力升高时的高浓度空气进行混合便变成可燃物；此制冷剂包括R-134a 和R404A。

• 因此，在泄漏检查或其它用途上，这些制冷剂不可与压力状态下的空气进行混合。

• 呼吸危害性： 如果吸入的制冷剂浓度超过安全限量（推荐），任何制冷剂都会对身体有危害。 出现的症状如下：
头痛、作呕、困倦、嗜睡、头晕以及共济失调等。 此外，可以导致心律不齐、意识不清，甚至死亡。 应采取正确的方法，使自己尽量减少与制冷剂环境接触。

• 火焰变大：在有制冷剂蒸汽的情况下进行熔接或焊接时，如果发现火焰的颜色或大小发生变化，立即停止作业并对该区域进行通风。只有在制冷剂蒸汽的浓度达到危险值的时候，火焰才会发生这种变化。火焰的这种变化会导致上述窒息等现象。

皮肤/眼睛的保护：接触到“液状”制冷剂会使身体

组织立刻凝固起来，相继会导致永久性损伤或失明。进行液状制冷剂的处理作业时，一定要穿戴适当的个人防护装备。 不要切割压力状态下的制冷剂管道。 不要打开阀门或换气设备，否则，液状制冷剂会喷到操作人员的身上。

烧伤及冻伤：

本制冷机组正在运转的过程中或甚至运转之后，各种部件的温度仍会非常低或非常高（例如，排气管、管道、盘管、贮液器、汽液分离器或发动机等）。

在低温或高温部件的周围进行操作时要多加小心。

对本制冷机组进行保养作业时，必须戴上适当的防护手套。

切边：

在可能导致受伤的部件（例如，盘管、蒸发器、套管夹等）的周围进行处理或操作作业时要多加小心。

对本制冷机组进行保养作业时，必须戴上适当的防护手套。

蓄电池：

本制冷机组可能装有铅酸蓄电池。 对蓄电池进行充电时一般会放出少量的易燃、易爆的氢气。酸喷射到皮肤或眼睛会引起严重的烧伤。

任何火焰、被点燃物或火苗都要远离蓄电池元件。

对蓄电池进行处理及充电时，必须穿戴个人防护装备： 防护服、防护手套以及防护眼镜。

蓄电池极性的连接须正确。

当心

任何人在任何情况下都不允许试图维修逻辑板或显示板。如果这些部件发生问题，请与当地的开利运输冷冻设备经销商取得联系并更换部件。

技术人员决不能对处理器的任何部位进行电路方面的检查，他只能对接线端子（即线束连接的地方）进行检查。微处理器元件在不同的电压以及超低电流状态下正常运行。 电压表、跳线、断路探查试验器等装置的不正确使用会导致微处理器永久性损坏。

大部分电子元件容易遭受由静电释放（ESD）引起的损坏。

有时，人体本身也可以携带充分的静电，以致人体一接触电子元件就会对其造成损坏。这种现象在卡车/拖车微处理器的集成电路上特别明显。

环境：

本制冷机组的整个使用寿命期间都要考虑环保问题。

为了预防环境污染，不要将制冷剂排放到大气中，不要将冷却液、油、蓄电池以及化学物质丢弃到大自然中。须按照现有的法规对其进行回收、再生处理。

废弃本制冷机组时，要采用环境保护型方法而且要遵守现有的法规。

2.1. 警告标签的保养

a. 将警告图保持干净并保证警告图标不被任何物体遮挡。

b. 用水和肥皂清洗警告图，然后用软布擦干。
c. 以开利产品经销网所提供的新警告图替换已被损坏或缺少的警告图。
d. 如果带有警告图的部件被新部件所替换，须确认新部件是否与警告图一致。
e. 将警告图贴在干燥的表面。 用力按下外侧以消除气泡。

3. 货物装载说明

保持车箱内适当的空气流通，即围绕或通过货物(食品)进行流动的空气是运输过程中维护产品质量的关键因素。如果围绕着货物(食品)进行循环的空气量不够充分，则货物(食品)会产生过热区或顶部冻结现象。

强烈推荐使用托盘。如果使用托盘，空气会自由地流通过这些托盘并回到蒸发器，因此这些托盘可以保护货物免受来自卡车底板的热量影响。使用托盘时，须注意的一点是不要将额外的箱子堆在卡车后方的底板上，因为这会阻止空气的流通。

正确的货物堆积方法是保护产品的另外一种重要的因素。例如水果、蔬菜之类的能产生热量的食品，堆积的方式应使得空气可以在食品之间进行流通以达到除热效果；这种堆积方法叫做“货物空堆(AIR STACKING)”。然而，肉、冷冻食品之类的非产生热量的货物应该相互紧密地堆积在箱子中央。

所有的产品距车厢的侧壁须保持一定的距离，使空气可以在箱壁和货物之间循环，避免由于车厢壁渗透的热量损坏货物。
对被装载的货物进行测温是非常重要的，这样可以保证货物运输中合适的温度。请注意制冷机组的设计目的是将货物的温度维持在货物被装载时的温度水平，而不是将高温货物进行冷却。

一些建议事项

装货前

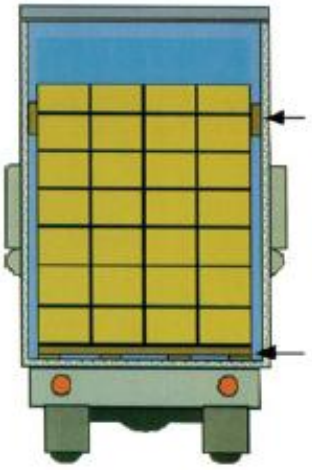
• 通过大约15分钟的降温对车厢箱体的内部进行预冷。

•用手动除霜模式可对车厢进行除湿。对于CITIMAX500/700机型，化霜模式的启动需要车厢温度达到一定值(9° C)以下。

• 蒸发器风扇受防护格栅的保护。机组处于重载使用状态时，格栅会结冰。因此，推荐用小毛刷定期对格栅进行清洗。停机后方可进行清洗作业。

装货时

• 停机后，进行装货。
• 建议尽量把门打开到最小，避免热气和水分进入车箱内。
• 根据运输货物的种类，通过操作面板设定适当的温度。
• 对装载货物的内部进行测温（使用探针式温度计）。
• 注意蒸发器进风口和排气口不能被任何物体阻挡。



货物间隔块

货物装在托盘上

• 留下以下自由空间：
✧ 装载货物和车厢前壁之间留有6~8厘米的空间
✧ 装载货物顶部和车厢箱顶之间留有20厘米的空间
✧ 车厢底板和装载货物（格栅、托盘）之间。
• 切勿忘记把门关闭。
• 关门之前，再次检查货物并确认无人关在车厢里面。

备注:

当汽车停止时，建议将车厢放置于阴凉处。

重要：

不要使冷冻机组闲置一个月以上而不使用。

4. 运输温度（推荐）

货物运输温度以及机组运行模式一般推荐值如下。这些推荐值只供参考，应优先选择发货或收货方要求的设定温度。

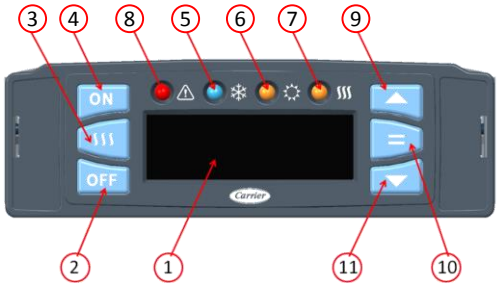
用户所在地的开利运输冷冻设备经销商可提供更加详细的信息。

货物	设定值范围
香蕉	15 ℃ (60 ℉)
新鲜水果和蔬菜	+4 ℃ ~ +6 ℃ (+39 ℉ ~ +43 ℉)
鲜肉与海鲜	+2 ℃ (+36 ℉)
乳制品	+2 ℃ ~ +6 ℃ (+36 ℉ ~ +43 ℉)
冰	-20 ℃ (-4 ℉)
冷冻水果与蔬菜	-18 ℃ (0 ℉)
冷冻肉类与海鲜	-20 ℃ (-4 ℉)
冰淇淋	-25 ℃ (-13 ℉)

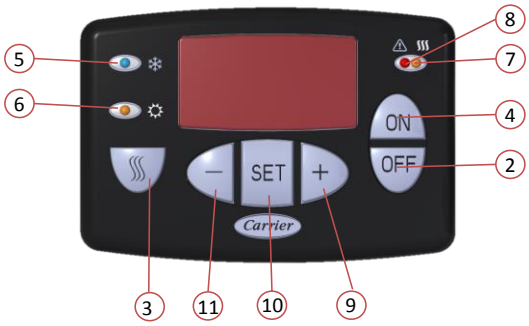
重要：车箱门被打开期间将隔间关闭，以便维持其它隔间里面货物的温度并保持制冷机组的正确运行。

5. 显示板

CITIMAX 系列提供两种不同形式的显示板，分别为DIN 显示器和SMART 显示器，如下图所示：



DIN控制器



SMART控制器

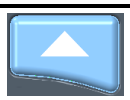
5.1. 操作面板说明

阅读说明书时请保存好折页部分，免得不小心被撕掉。

使用此功能会使所有的控制操作程序简单化。驾驶员在座位上就可以执行所有的控制操作程序：停机、自动起动、调节设定值、化霜，按照自己的要求对机组的操作进行自定义设置，而且出现故障时可处理错误信息等。

驾驶员还可以通过显示面板将车厢箱体的温度显示出来,然后通过检查蓝色或橙色指示灯来确认温度是否维持在设定值。如出现故障，红色故障指示灯会亮起。如果蓄电池电压太低，自防故障安全系统将关闭机组。当蓄电池电压回升至正常电压值时，机组将自动延时重新启动。

	DIN显示器	SMART显示器
1. 显示	4 位	4 位
2. 关机键		
3. 手动化霜键		
4. 开机键		
5. 制冷运行指示灯		
6. 制热运行指示灯		
7. 化霜运行指示灯		

8. 故障指示灯		
9. + 键		
10. 设置键		
11. - 键		

6. 操作说明

CITIMAX 系列的路用模式（ROAD MODE）由汽车的蓄电池（发电机）提供电力。

本节分别就DIN显示器和SMART显示器的操作模式分别说明。

6.1 DIN 显示器操作原理

DIN显示器，因其体积较大，需固定安装在驾驶室指定位置。

按下  键将制冷机组起动之后，机组的起动与停机都会自动进行。

开启式压缩机由汽车的发动机驱动，而蒸发器和冷凝器的风扇则由汽车的蓄电池（发电机）提供电力。

按下驾驶室控制装置上的  键，可以用手动方式使机组完全停下来。

温度控制

温度一达到设定值，就可以通过电磁离合器供电/断电来进行温度控制。

冷凝器风扇由微处理器来控制，而蒸发器风扇则在调节过程会被断开。

当运输鲜肉、蔬菜以及干酪之类的易腐货物的时候，可以对微处理器进行编程使蒸发器风扇连续运转。

化霜 - 仅适用于Frozen机组

化霜操作为全自动过程，但也可以用手动方式进行控制。

- 化霜周期由集成微处理器全面控制。
- 在化霜期间蒸发器风扇将停止运转，而冷凝器风扇则由微处理器控制。
- 计时器或化霜温度传感器控制化霜周期的终止时间。
- 在化霜周期内，驾驶室控制显示器显示“dF”。

制热 -仅适用于有制热功能的Frozen机组

制热过程由热气旁通系统提供。

在制热过程中，蒸发器风扇转动，而冷凝器风扇则由微处理器控制。

6.1.1 机组的起动步骤

1、 起动汽车发动机。

2、 按下  键，起动制冷机组。 延时50秒后机组会运转。

3、 驾驶室控制板的数字显示器显示车厢的温度。

4、 按下  键，检查温度设定值是否正确。 在数字显示器上温度设定值以加亮的形式显示。

5、 必要时，输入新的设定值（参考“温度设定值的修改步骤”——第6.4段）。

如果起动困难，检查有无以下现象：

- ✧ 与汽车相接部分所使用的保险丝是否熔断。如保险丝正常，请与当地的开利服务中心取得联系。
- ✧ 驾驶室控制板所选择的温度变化。

6.1.2 停机

- ✧ 短时间停机：如果是短时间停机，关闭车内的点火开关，拔出钥匙即可。
- ✧ 长时间停机：如果是长时间停机，则需要按下控制器上的  键。

6.1.3 温度设定值的修改步骤

重要

调节设定状态时，如果5秒钟内不按任何键，系统会自动回到车箱温度的显示状态。 所

有的修改都会被存下来。

如果驾驶室操作面板装在汽车控制面板里面，操作面板的安装须尽量远离高温管道。最高暴露温度：85° C。

1、 按下  键，显示温度设定值。

2、 按下  键或  键，改变设定值。

3、 按下  键，回到车厢温度的显示状态。

6.1.4 化霜参数的修改步骤

重要

调节设定状态时，如果5秒钟内不按任何键，系统会自动关机。所有的修改都会被存下来。

1、 按下 

键，停止机组。

2、 将  键和 

键同时按下5秒钟，显示上一次选择的化霜时间。

3、 按下  键或  键，改变化霜时间：

5～45min：增加或减少时间（5，10, 15, 20, 25, 30 以及 45min）(默认设定值 10min)

4、 按下  键，显示化霜间隔时间：

0：禁止使用化霜功能。

1h, 1.5h, 2h, 2.5h, 3h, 4h, 5h 以及 6h。(默认设定值 2h)

5、 按下  键，机组进入关机状态。

6.1.5 其它参数的显示步骤（报警,软件版本,运行时间，箱体温度等）

1、按下  键5秒钟，启用故障代码的显示功能（参考“故障报警显示功能”— 第6.8段）。

2、 按下  键或  键，显示报警功能。

3、 按下  键，显示控制器软件版本。

4、 按下  键，显示操作面板软件版本。

5、 按下  键，显示总运行时间。

6、 按下  键，回到车厢温度的显示状态。

6.1.6 系统设定参数的修改步骤

1、 将  键、  键和  键同时按下，显示最低设定温度值。

2、 按下  键或  键，改变最低设定温度值： 0 ℃, -20 ℃ 或 -29 ℃ (默认设定值 -29 ℃)。

3、 按下  键，显示启动温差范围参数。

4、 按下  键或  键，调整变化范围： Dif1 (1 ℃), Dif2 (2 ℃), Dif3 (3 ℃) (默认设定值 Dif2).

5、 按下  键，显示停机状态下蒸发器风机的运行模式。

6、 按下  键或  键，改变蒸发器风扇的运行模式： OFF 或 ON (默认设定值 OFF).

7、 按下  键，显示单位选择 ℃和 ℉。

8、 按下  键或  键，选择所需的单位： ℃或 ℉ (默认设定值 ℃).

9、 按下  键，回到车厢温度的显示状态。

6.1.7 故障报警显示功能

a. 通过“  ”键进入报警显示

1. 5秒之内按下  键5秒种，显示故障代码。

2. 按下  键或  键，显示报警功能。

3. 用  键来滚动报警功能列表。

■ **故障显示功能的启用（ACTIVE） — A××**

如果机组出现问题，报警功能会被启用，红色 LED 指示灯会快速闪亮。

故障代码（MALFUNCTION CODE）— 红色LED指示灯闪亮			
代码	**说明**	**是否停机**	**检查**
A00	无故障 – 机组正常运行	--	与用户当地的服务中心取得联系
A01	低压开关断开	**是**	
A02	高压开关断开		
A04	压缩机离合器开路	**否**	
A06	冷凝器电机短路		
A07	蒸发器电机短路		
A09	化霜阀（HGV）短路		
A10	液体喷射阀(INV) 短路		
A11	热气阀（MHV）短路		
A21	压缩机离合器短路		
A22	冷凝器电机开路		
A23	蒸发器电机开路		
A24	化霜阀（HGV）开路		
A25	液体喷射阀(INV) 开路		
A26	热气阀（MHV）开路		
E2P	EEPROM错误的读写数据 温度设定值超出范围 -29℃ / +30℃ 参数丢失		

b. 直接显示

备注

故障一被检测到，温度显示值就会消失，取而代之的是直接显示故障信息，而且此信息在故障现象的持续期间一直会显示。

故障消失或被排除之后，制冷机组方可开始运转。

代码	**说明**	**是否停机**	**检查**	**机型**
EE	蒸发器温度探头 (断路、短路)	**是**	蒸发器温度探头以及接插头	280/350/400/500/700
EEE	化霜退出温度探头（断路、短路）	**否**	化霜温度探头以及接插头	280/350/400
bAt	蓄电池低电压报警	**是**	蓄电池电压/12VDC，24VDC交流发电机/接插头	280/350/400/500/700
con	通讯错误	**否**	通讯线接口是否正常/通讯线是否正常	280/350/400/500/700
Err	用户在对最高或最低设定值进行设置时出现错误	**否**	设定值	280/350/400/500/700

6.2 SMART 操作原理

SMART显示器，因其体积小，可自由安装。

按下 ON 键将制冷机组起动之后，机组的起动与停机都会自动进行。

开启式压缩机由汽车的发动机驱动，而蒸发器和冷凝器的风扇则由汽车的蓄电池（发电机）提供电力。

按下驾驶室控制装置上的 OFF 键，可以用手动方式使机组完全停下来。

温度控制

温度一达到设定值，就可以通过电磁离合器供电/断电来进行温度控制。

冷凝器风扇由微处理器来控制，而蒸发器风扇则在调节过程会被断开。

当运输鲜肉、蔬菜以及干酪之类的易腐货物的时候，可以对微处理器进行编程使蒸发器风扇连续运转。

化霜 - 仅适用于Frozen机组

化霜操作为全自动过程，但也可以用手动方式进行控制。

- 化霜周期由集成微处理器全面控制。
- 在化霜期间蒸发器风扇将停止运转，而冷凝器风扇则由微处理器控制。
- 计时器或化霜温度传感器控制化霜周期的终止时间。
- 在化霜周期内，驾驶室控制显示器显示“dF”。

制热 -仅适用于有制热功能的Frozen机组

制热过程由热气旁通系统提供。

在制热过程中，蒸发器风扇转动，而冷凝器风扇则由微处理器控制。

6.2.1 机组的起动步骤

1、 起动汽车发动机。

2、 按下 ON 键，起动制冷机组。 延时50秒后机组会运转。

3、 驾驶室控制板的数字显示器显示车厢的温度。

4、 按下 SET 键，检查温度设定值是否正确。 在数字显示器上温度设定值以加亮的形式显示。

5、 必要时，输入新的设定值（参考“温度设定值的修改步骤”——第6.4段）。

如果起动困难，检查有无以下现象：

- ✧ 与汽车相接部分所使用的保险丝是否熔断。如保险丝正常，请与当地的开利服务中心取得联系。
- ✧ 驾驶室控制板所选择的温度变化。

6.2.2 停机

- ✧ 短时间停机：如果是短时间停机，关闭车内的点火开关，拔出钥匙即可。
- ✧ 长时间停机：如果是长时间停机，则需要按下控制器上的 OFF 键。

6.2.3 温度设定值的修改步骤

重要

调节设定状态时，如果5秒钟内不按任何键，系统会自动回到车箱温度的显示状态。 所有的修改都会被存下来。

如果驾驶室操作面板装在汽车控制面板里面，操作面板的安装须尽量远离高温管道。最高暴露温度：85° C。

1、 按下 SET 键，显示温度设定值。

2、 按下 (-) 键或 (+) 键，改变设定值。

3、 按下 SET 键，回到车厢温度的显示状态。

6.2.4 化霜参数的修改步骤

重要

调节设定状态时，如果5秒钟内不按任何键，系统会自动关机。所有的修改都会被存下来。

1、 按下 OFF 键，停止机组。

2、 将 键和 ON 键同时按下5秒钟，显示上一次选择的化霜时间。

3、按下 (-) 键或 (+) 键，改变化霜时间：5～45min，增加或减少时间（5，10, 15, 20, 25, 30 以及 45min） (默认设定值 10min)

4、 按下 SET 键，显示化霜间隔时间：
0：禁止使用化霜功能。
1h, 1.5h, 2h, 2.5h, 3h, 4h, 5h 以及 6h。(默认设定值 2h)

5、 按下 SET 键，机组进入关机状态。

6.2.5 其它参数的显示步骤(报警, 软件版本, 运行时间，箱体温度等）

1、按下 SET 键5秒钟，启用故障代码的显示功能（参考“故障报警显示功能”— 第6.8段）。

2、按下 ⊖ 键或 ⊕ 键，显示报警功能。

3、 按下 SET 键，显示控制器软件版本。

4、 按下 SET 键，显示操作面板软件版本。

5、 按下 SET 键，显示总运行时间。

6、 按下 SET 键，回到车厢温度的显示状态。

6.2.6 系统设定参数的修改步骤

1、将 ⊖ 键、⊕ 键和 ♨ 键同时按下，显示最低设定温度值。

2、 按下 ⊖ 键或 ⊕ 键，改变最低设定温度值： 0℃, -20℃ 或 -29℃ (默认设定值 -29℃)。

3、 按下 SET 键，显示启动温差范围参数。

4、 按下 ⊖ 键或 ⊕ 键，调整变化范围：Dif1 (1℃), Dif2 (2℃), Dif3 (3℃) (默认设定值 Dif2).

5、 按下 SET 键，显示停机状态下蒸发器风机的运行模式。

6、 按下 ⊖ 键或 ⊕ 键，改变蒸发器风扇的运行模式： OFF 或 ON (默认设定值 OFF).

7、 按下 SET 键，显示单位选择℃和℉。

8、 按下 ⊖ 键或 ⊕ 键，选择所需的单位：℃或℉ (默认设定值℃).

9、 按下 SET 键，回到车厢温度的显示状态。

6.2.7 故障报警显示功能

a. 通过“ SET ”键进入报警显示

1. 5秒之内按下 SET 键5秒种，显示故障代码。

2. 按下 ⊖ 键或 ⊕ 键，显示报警功能。

3. 用 ⊕ 键来滚动报警功能列表。

■ **故障显示功能的启用（ACTIVE） — A××**

如果机组出现问题，报警功能会被启用，红色LED指示灯会快速闪亮。

故障代码（MALFUNCTION CODE）— 红色LED指示灯闪亮			
代码	**说明**	**是否停机**	**检查**
A00	无故障 – 机组正常运行	- -	与用户当地的服务中心取得联系
A01	低压开关断开	**是**	
A02	高压开关断开		
A04	压缩机离合器开路	**否**	
A06	冷凝器电机短路		
A07	蒸发器电机短路		
A09	化霜阀（HGV）短路		
A10	液体喷射阀(INV) 短路		
A11	热气阀（MHV）短路		
A21	压缩机离合器短路		
A22	冷凝器电机开路		
A23	蒸发器电机开路		
A24	化霜阀（HGV）开路		
A25	液体喷射阀(INV) 开路		
A26	热气阀（MHV）开路		
E2P	EEPROM错误的读写数据 温度设定值超出范围 -29℃ / +30℃		

	参数丢失		

b. 直接显示

备注

故障一被检测到，温度显示值就会消失，取而代之的是直接显示故障信息，而且此信息在故障现象的持续期间一直会显示。

故障消失或被排除之后，制冷机组方可开始运转。

代码	说明	是否停机	检查	机型
EE	蒸发器温度探头 (断路、短路)	是	蒸发器温度探头以及接插头	280/350/400/500/700
EEE	化霜退出温度探头（断路、短路）	否	化霜温度探头以及接插头	280/350/400
bAt	蓄电池低电压报警	是	蓄电池电压/12VDC，24VDC交流发电机/接插头	280/350/400/500/700
con	通讯错误	否	通讯线接口是否正常/通讯线是否正常	280/350/400/500/700
Err	用户在对最高或最低设定值进行设置时出现错误	否	设定值	280/350/400/500/700

7. 保养说明

综合保养程序会帮助用户保障机组持续、可靠的运行。

此保养程序还可以帮助控制运行费用，延长机组的使用寿命，并提高其性能。

备注

一切保养作业必须由完成开利产品安全以及质量方面所有标准培训的技术人员进行。

需要对机组进行应急作业时，检查以下情况：

✧ 停机（驾驶室控制装置）。

✧ 在保养期间，机组不能自动起动。

7.1. 保养计划

公里	英里	第一次保养	保养A	保养B
5000	3000	■		
30000	18000		■	
60000	36000		■	■
90000	54000		■	
120000	72000		■	■
150000	90000		■	
180000	108000		■	■
210000	126000		■	

7.2. 维修说明

第一次保养	• 检查螺栓与螺丝的松紧度，并检查机组是否正确地固定在车箱上。 • 检查有无泄漏现象。 • 检查压缩机每分钟转数（RPM）的高低转数是否正确。 • 检查压缩机皮带的张力。
保养 A	• 清洁蓄电池以及电池夹。 • 检查压缩机皮带的张力。 • 每3000小时更换压缩机皮带。 • 检查有无制冷剂泄漏现象。 • 检查所有的电器连接。 • 检查制冷模式。 • 检查化霜模式。 • 检查驾驶室控制装置的操作状态。 • 清洁冷凝器盘管。
保养 B	• 如果有的话，更换张紧轮的轴承。

每年	• 更换过滤干燥器。 • 清洗膨胀阀孔口的过滤网。
每隔两年	• 更换压缩机油 — 只使用开利运输冷冻设备有限公司认可的多元醇脂油（POE）。 • 更换制冷剂。 • 更换膨胀阀。

警告：在清洁电瓶柱和电瓶夹以后，电瓶夹必须复位并锁紧。

制冷剂： R134a / R404A

压缩机（Road compressor）油的种类：

压缩机使用开利公司认可的多元醇脂油(POE)。贴在上面的不干胶标签表示已在开利运输冷冻设备公司的车间里进行过正确的换油作业。

该类型制冷机组严禁使用PAG型压缩机油：千万不要使用其它种类的压缩机油(除了开利公司认可的压缩机油以外)。

压缩机油分析：根据用户的要求，本公司可以对用户的压缩机油进行分析。

为了进行分析，我公司会寄送一个小圆桶，上面贴有标签，用户需要在标签上面记录以下内容：压缩机型号、上一次换油之后已经过的时间或已行使的英里数、开利设备的型号以及第一次运行日期等。

8. A.T.P. 欧洲法规摘要

(日期: 2014年11月)

允许搬运易腐货物的车辆批准书。

使用冷藏车之前需要取得地区卫生部门的批准。

搬运易腐货物车辆的特点；机械制冷设备。

机械制冷设备为一种带有制冷系统的封闭单元；外面平均温度为+30 ℃的环境下，此机组可以将空车厢内部的温度降下来并通过以下方式维持其低温状态。

A级： 机械制冷设备配有制冷系统，因此可以在+12 ℃ ～ 0 ℃的温度范围内（+12 ℃和0 ℃包括在内）进行选择。

B级： 机械制冷设备配有制冷系统，因此可以在+12 ℃ ～ -10 ℃的温度范围内（+12 ℃和 -10 ℃包括在内）进行选择。

C级： 机械制冷设备配有制冷系统，因此可以在+12 ℃ ～ -20 ℃的温度范围内（+12 ℃和 -20 ℃包括在内）进行选择。

D级：对于配有冷冻装置的机械制冷设备，t_i小于或等于0° C。

E级：对于配有冷冻装置的机械制冷设备，t_i小于或等于-10° C。

F级：对于配有冷冻装置的机械制冷设备，t_i小于或等于-20° C。

机组能力由认证机构进行测试后决定，而且通过发放正式报告书给予批准。

备注：B级、C级、E级和F级设备的K系数在任何情况都应小于或等于0.40 W/m^2 . ℃。

机械制冷设备的记号、识别标志以及标识牌将贴在制冷机组上。

制冷标志牌

此参考信息后面必须贴有相应的识别标志，具体参照以下规定：

标准型机械制冷设备A级	FNA
强化型机械制冷设备A级	FRA
强化型机械制冷设备B级	FRB
强化型机械制冷设备C级	FRC
强化型机械制冷设备D级	FRD
强化型机械制冷设备E级	FRE
强化型机械制冷设备F级	FRF

上述识别标志以外，批准证书的有效日期（年、月）也必须标出来。

例如：

FRC 06-2005

(06 =月 2005 =年)

非常重要：

定期对批准证书的有效期限进行核对。运输过程中，必须按有关部门要求提供批准证书或临时证书。 对于已经取得冷藏车使

用的证书，如果要变更已经认可的使用证书，须向地区卫生部门提交批准证书的修改申请表。

9. 24 小时服务热线

在开利运输冷冻设备有限公司，我们努力工作以便给客户随时提供全方位服务；例如，全球范围的经销商网络以及应急服务会满足在任何时候、任何地方客户提出的各种要求。这些维修中心拥有经验丰富的技术人员而且备有大量的配件，因此可以保证迅速的维修服务。

如果在运输过程中制冷机组出现问题，遵照用户自身的应急措施或与最近的开利运输冷冻设备服务中心取得联系。查看工商名录，找到最近的服务中心。从当地开利运输冷冻设备经销商处可以拿到此工商名录。

如果无法与服务中心取得联系，请拨打开利运输冷冻设备公司的24小时服务热线。

在中国，请使用免费电话：4008 204909

在欧洲，请使用以下免费电话号码：

A	奥地利	0800 291039
B	比利时	0800 99310
CH	瑞士	0800 838839
D	德国	0800 1808180
DK	丹麦	808 81832
E	西班牙	99 993213
F	法国	0800 913148
FIN	芬兰	0800 113221
GB	英国	0800 9179067
GR	希腊	00800 3222523
H	匈牙利	06800 13526
I	意大利	800 791033
IRL	爱尔兰	1800 553286
L	卢森堡	800 3581
RUS	俄罗斯	810 800 200 31032
N	挪威	800 11435
NL	荷兰	0800 0224894
P	葡萄牙	8008 32283
PL	波兰	00800 3211238
S	瑞典	020 790470

从其它国家/直拨： +32 9 255 67 89

在加拿大或美国，拨1-800 - 448 1661

打电话时，请准备以下信息以便接受快速服务：

- 您的姓名，公司名称及地点
- 留下您的电话号码，以便服务中心可以给您回电话
- 制冷机组的型号以及系列号
- 车厢温度、设定值以及货物名
- 对您所遇到问题以及您为了解决问题而采取的措施作简要说明。

我们会竭尽全力去解决您所遇到的问题而且尽早使问题得以圆满解决。