

INSTALLATION, USER AND MAINTENANCE MANUAL

SKIMO



Product code : 320B27 – SKIMO AIR CONDITIONING 48V / 12V

 320B28 – SKIMO AIR CONDITIONING 48V / 24V



Read this manual carefully until you understand it before unpacking,
installing or using the Skimo unit.
Keep this manual for further reference.





The 2 years warranty only applies under normal operation of the SKIMO A/C unit.

*** Limited warranty**

The warranty doesn't cover damages resulting from an incorrect operation of the SKIMO A/C unit, particularly for the following cases:

- /// Operating in an environment with high salinity
- /// Operating in an environment with high acidity
- /// Cleaning with a pressure washer and/or with detergents
- /// Consumable parts (filters) or considered as wear parts are also excluded from warranty.

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If you have any question regarding the installation and use of the Skimo A/C unit, please contact our quality service:
+33 (0)5 34 480 480






1. INTRODUCTION












The unit described in this manual, called unit, Skimo unit, A/C unit, Skimo A/C unit or Skimo, is designed to be installed on the roof of agricultural, construction works, road works, or industrial vehicles, machines or vans. The Skimo unit air-conditions the cabin of the machine or vehicle. The Skimo A/C unit is a monobloc unit pre-charged with R134a refrigerant gas and containing all the parts of the A/C circuit. It only needs to be connected electrically to the machine or vehicle. (See electrical requirements).

2. SAFETY INSTRUCTIONS AND WARNINGS

 You must read and understand this manual before proceeding to the installation, set-up, use and maintenance of the Skimo A/C unit.

List of pictograms used in this manual or on the Skimo unit:

Pictogram	Meaning	Pictogram	Meaning
	Conform to CE standard		General danger
	Read and understand the manual		Physical danger
	Important information		

-  The Skimo A/C unit must be installed by a person qualified and adequately equipped. All alteration of the unit or incorrect installation are strictly forbidden and can be dangerous. SNDC SAS cannot be held responsible in the case of physical or material damages due to an alteration, installation or use that is different to that described in this manual.
-  The Skimo A/C unit weights approximately 30 kg. Take necessary precautions when handling, installing and using the unit to avoid any risk of injury, fall or damage. Do not handle or install the Skimo unit on your own.
-  Do not store, install or use the Skimo A/C unit close by flammable liquids, gas or solids, or close by a heat source or in a place presenting risks of explosion or fire.
-  If the Skimo A/C unit is damaged, it must not be used or turned on. It must be repaired or replaced first.
-  If repairs or maintenance operations are required on the Skimo A/C unit, use a qualified company using qualified personnel to perform the operations. Any repair or maintenance operation that is not done properly can create risks of danger. Do not try to repair the Skimo unit by your own means if you are not qualified. For the charge or maintenance of the A/C refrigerant circuit, use a qualified company that is equipped with appropriate tools and security equipment and that uses original spare parts.
-  This monobloc Skimo unit must not be used for vehicles or machines that work with inclinations steeper than 25° for the pitch angle and 45° for the roll angle. Do not use on vehicles or machines that go faster than 110km/h. Do not alter cabins that are certified « FOPS-ROPS »
-  In case of fire, do not open the unit cover. Extinguish the fire with an appropriate fire extinguisher for electrical and A/C units.
-  Contact the vehicle or machine supplier to enquire of the necessary changes regarding the papers (height of vehicle, weight...). Perform any necessary changes.
-  Always turn the Skimo unit and the vehicle or machine off before an operation of maintenance on the Skimo.
-  Disconnect all the electrical connections of the Skimo unit to the machine before fixing, or repairing the Skimo unit or before any operation that could involve getting in contact with the electrical circuit.
-  Do not introduce foreign objects inside the Skimo A/C unit.

The Skimo A/C unit contains moving parts that represent a danger. Do not disable the security features. Switch the Skimo unit and the machine or vehicle off before opening the unit or taking the cabin panel off.

The A/C refrigerant circuit is under pressure. Do not open the A/C refrigerant circuit. This would create a loss of refrigerant gas that is colourless and odourless. It could create serious burns. The person performing the repair or maintenance of the A/C refrigerant circuit must be qualified to manipulate such systems and must use appropriate tools, equipment and protection equipment. Wear protection goggles and gloves when you maintain the Skimo unit. Rejecting refrigerant gas in the atmosphere is strictly forbidden.

The Skimo A/C unit must be maintained and cleaned up regularly from dust, vegetal or other wastes or combustibles to avoid risks of fire.

Use only original spare parts.

3. TECHNICAL CHARACTERISTICS OF THE SKIMO A/C UNIT

The technical specifications or characteristics of the Skimo A/C unit, as they are described in this manual, are subject to change without notice.

SKIMO is a self contained air conditioning with: air conditioning components (condenser, evaporator, drying filter, compressor ...), electrical components (electrical motor, fan, blower, harness, fuses), and a ceiling panel with controls and air outlets.

The Skimo A/C unit is pre-charged with R134a refrigerant gas.



- External dimensions (+ or - 2cm): length 72 cm, width 48 cm, height 25 cm
- Cabin ceiling panel dimensions (+ or - 2cm): length 29 cm width 39 cm thickness 6 cm
- Weight: 30 kg (+ or - 3 kg)
- Evaporator cooling capacity: 2900 W with +31°C air intake and 50% air humidity.
- Maximal consumption:
 - 912W (19Amps @ 48VD) for the compressor motor
 - 144W (12Amps @ 12VDC or 6Amps @ 24VDC) for the accessories (control, blower and fan)
- Refrigerant HFC R134a quantity (+ or - 10g): 480g
- Oil: PAG 150 46 (SNDC Ref 430A08)

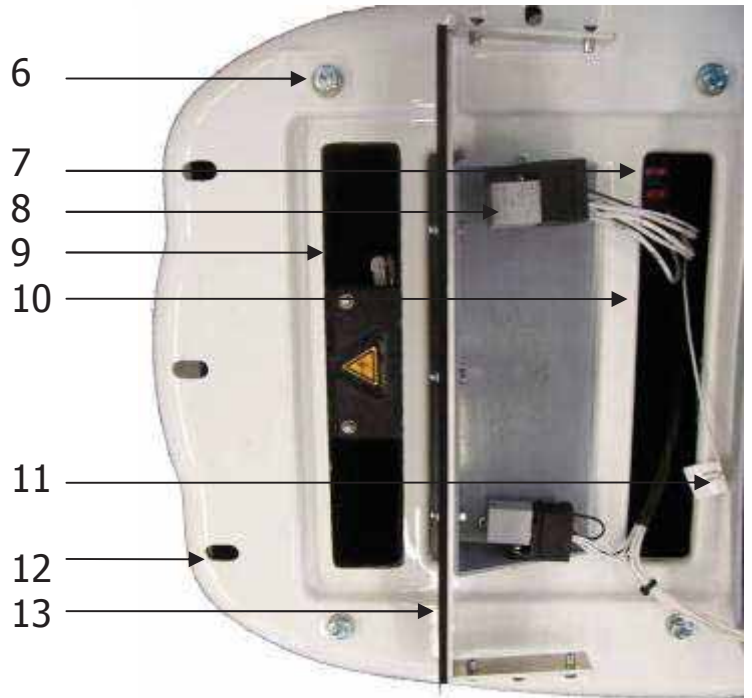
With its CE label, Skimo meets the main health and safety requirements of the 2006/42/CE directive. See CE statement in appendix.

The Skimo A/C unit can be mounted on ant vibration studs. In this case, there must be a sufficient number ant vibration studs, they must be distributed evenly to offer proper and even support to the unit. All the instructions contained in this manual must be followed, including the instructions about cantilevered positioning. The water tightness between the roof and the unit must be kept.

4. SKIMO A/C UNIT DESCRIPTION

N° DESCRIPTION

1. Condenser ventilator
2. Skimo unit cover
3. Outside air intake grids
4. Unit cover fastening screws
5. Skimo unit casing
6. M8 unit fastening screws
7. Fuses
8. Relays
9. Blower
10. Cabin air intake
11. Wire to connect to alternator D+ signal
12. Water drain holes
13. Cabin panel adjustable bracket
14. Cabin panel
15. Air filter access grid
16. Grid fastening screws
17. Control panel
18. Adjustable air louvers
19. Default signal light
20. A/C and ventilation speed selector switch



5. BEFORE FITTING THE SKIMO A/C UNIT

Prior to fitting and using the Skimo A/C unit, check the following points:

Cabin volume: Ideally the volume of the cabin is approximately 2m³ but if it is over 3m³ the performances of the Skimo A/C unit will decrease.

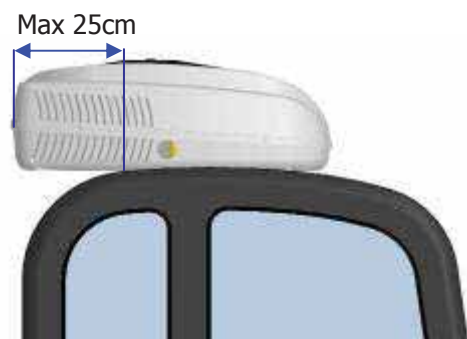
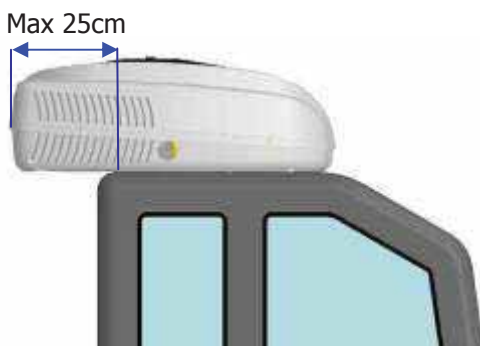
Cabin insulation: The cabin walls must be properly insulated, especially from important heat sources (engine, exhaust pipe, hydraulic system ...). SNDC SAS cannot be held responsible in the case of poor performances of the Skimo A/C unit caused by poor cabin insulation.

Ceiling thickness: The ceiling thickness must be between 3mm and 60mm. If it is over 60mm, an additional plate can be fitted to fasten the cabin panel. In this case, the four M8 screws used to fasten the Skimo A/C unit on the roof must be replaced by M8 screws adapted regarding their length and mechanical characteristics.

⚠ Electrical power:
 The machine or vehicle engine must be equipped with a 48V DC voltage source (battery) able to supply the electrical power required from the Skimo A/C unit. The Skimo A/C unit maximal consumption is 912W (19Amps @ 48V) for the compressor power and 144W (12A @ 12VDC or 6A @ 24VDC) for the accessories (blower, condenser fan).

⚠ Roof and ceiling:
 Do not alter or make a hole in the cabin of vehicles that are certified « FOPS-ROPS »
 The roof must be stiff and strong enough for the Skimo A/C unit to be installed on. If it is not the case, the roof must be reinforced.
 The Skimo A/C unit must not be installed if it would affect the stability of the vehicle or machine it is installed on, or if it would create excessive strains on its structure.
 Make sure using the drawing showing the dimensions of the unit and the cut-out area that there is enough space to fit the unit on the roof and the cabin panel inside the cabin.
 The surface on which the Skimo A/C unit is installed must be flat and horizontal (± 5°).
 The cabin panel must be installed inside the cabin, and the user must be able to access the controls from his driving position while using the vehicle or machine.

⚠ Cantilevered installation:
 The Skimo A/C unit can be mounted in a cantilevered position. In this case, the maximum cantilever distance is 25cm (See pictures below).



6. FURNITURE REQUIRED TO INSTALL SKIMO

- ×4 cables of 2 mm² section each to connect SKIMO to the vehicle's battery: a black one for the ground and a red one for the positive power supply of accessories (12VDC or 24VDC) and two for the power supply (48V) (a matt black one and a grey one) of the compressor motor. These cables must be ended by a 4 contacts Deutsch sealed connector, as following:

- 1 → GND (relative to accessories power source) (black cable)
- 2 → +12V or +24V (accessories power source) (red cable)
- 3 → GND (relative to +48VDC) (matt Black cable)
- 4 → +48VDC (grey or white cable)



Caution: Maximum cable length: 5 m

- One 1 mm² diameter cable (white cable) to connect SKIMO to the +12V/+24V ENABLE signal (contact, auto-off system...), with a 2 ways FASTON connector (male housing, female contact).
- A fuse holder and a 30 Amps fuse for the 48V power source.

*The above mentioned components are available as a connection optional set, reference **274C19***

- A silicone tube to seal the Skimo A/C unit on the vehicle's roof

7. PREPARATION OF THE SKIMO A/C UNIT



Remove the 4 unit fastening screws circled in blue



Caution! Do not unscrew the 4 screws at the back of the unit

8. CABIN ROOF PREPARATION



1. Place the template on the roof. (See cut-out drawing below and template in appendix)

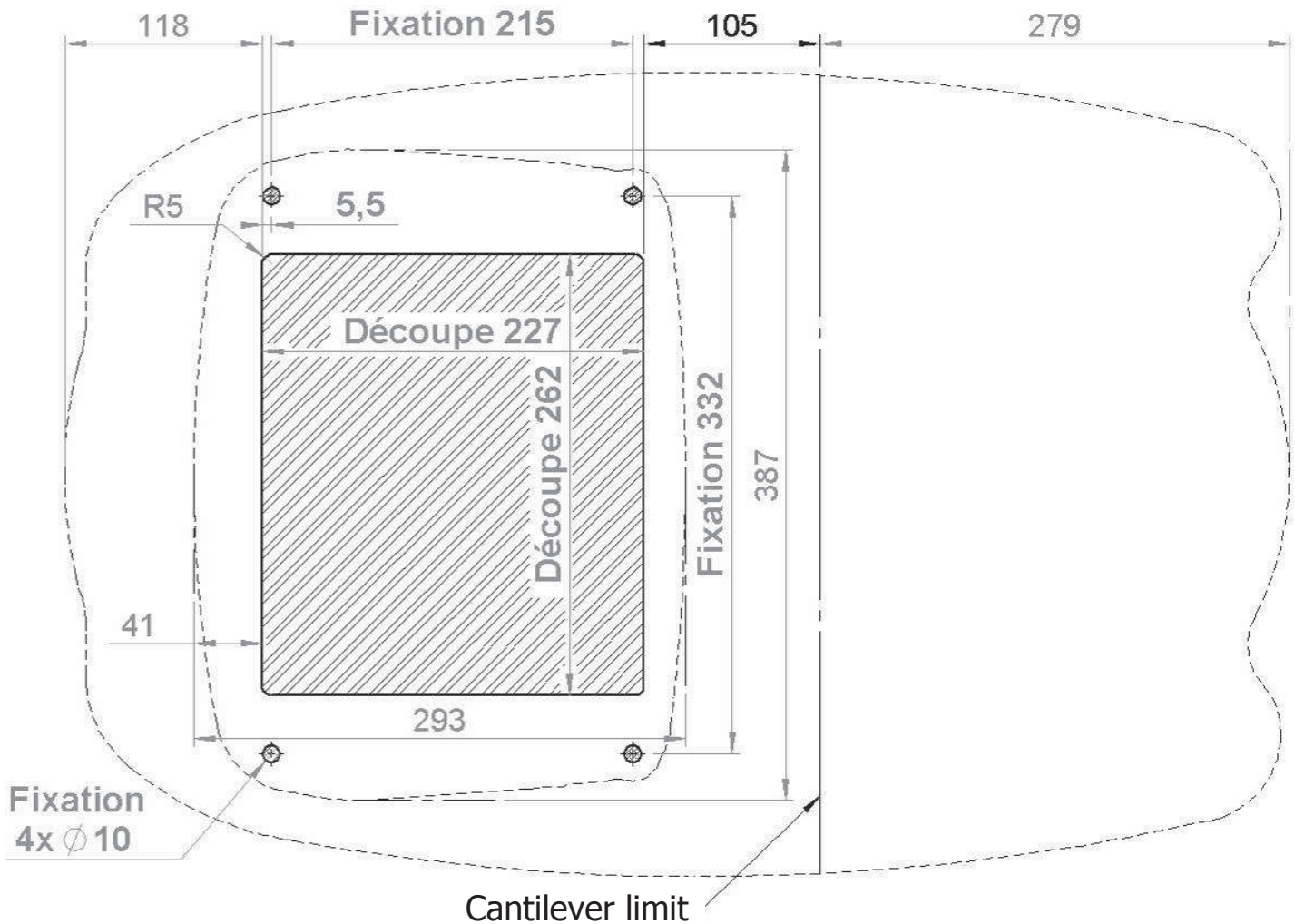


2. Cut out and drill the roof following the template



Caution: Wear appropriate protection according to the method and tools used to cut-out and drill the roof (Protective gloves, glasses, ear plugs...)

Dimensions in millimetres (mm)



- The cut-out is 227mm long by 262 mm wide with 4 Ø10 mm holes for the fastening screws.
- The required foot-print inside the cabin to install the cabin panel is represented by the dimensions 293 x 387 mm.

9. FITTING THE SKIMO A/C UNIT ON THE ROOF

⚠ The Skimo A/C unit is heavy (approximately 30 kg). Take necessary precautions to avoid hurting yourself or damaging the unit. Never install the Skimo A/C unit on your own.



1. Apply silicone on the 15x15mm foam seal and around the 4 fastening points (in red). Add some between the fastening points (in yellow) to complete the waterproofness



2. Place the Skimo A/C unit on the roof. Fasten it from the inside of the cabin with the 4 M8 screws and their washers removed in section 7.3- preparation of the Skimo A/C unit



3. Remove Skimo A/C unit cover: remove its 6 fastening screws and unplug the ventilator connector.

10. ELECTRICAL CONNECTION

There are two possible ways to lay out the electrical cables:

- Inside the cabin (recommended), through one of the cabin frame post for example.
- Outside the cabin.

⚠ In both cases the installer must make sure that the cables are insulated and protected from any risk of deterioration or tear-up (from branches for example) and that they do not present any risk for people or appliances.

10.a Case of the cables being laid out inside the cabin:



1. Remove the grommet at the bottom of the black evaporator casing



2. make a hole in the grommet and insert the cables through it.



3. Insert the cables in the hole from which you removed the grommet, ease them out inside the cabin through the unit air intake cut out, and set the grommet back in place. Make sure the grommet is waterproof

10.b Case of the cables being laid out outside the cabin:

Make a hole on the white outer Skimo casing (the lower part), lay the cable out through this hole with a grommet.

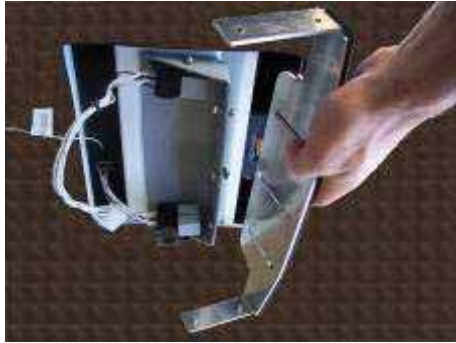
⚠ Do not lay the cables out near the motor and compressor belt located at the back of the unit.

1. Once the cables laid out, plug the 4 ways Deutsch connector.
2. Connect the 48V cables to the battery, and the accessories power cables to the suitable voltage source (+12V / +24V).

⚠ Caution: The 48V positive (+) cable MUST be protected by a 25Amps fuse located as close as possible to the power source.

3. Connect the 2-ways FASTON located inside the cabin to the enable signal from the vehicle (12/24V signal allowing the A/C system to run) with a 1mm² section cable (only way #1 is used).
4. Plug the ventilator connector back and fasten the Skimo A/C unit cover back on with its 6 screws and plastic washers.

11. FITTING THE CABIN PANEL



1. Adjust and screw the cabin panel bracket back on. Make sure of the airtightness across this bracket.

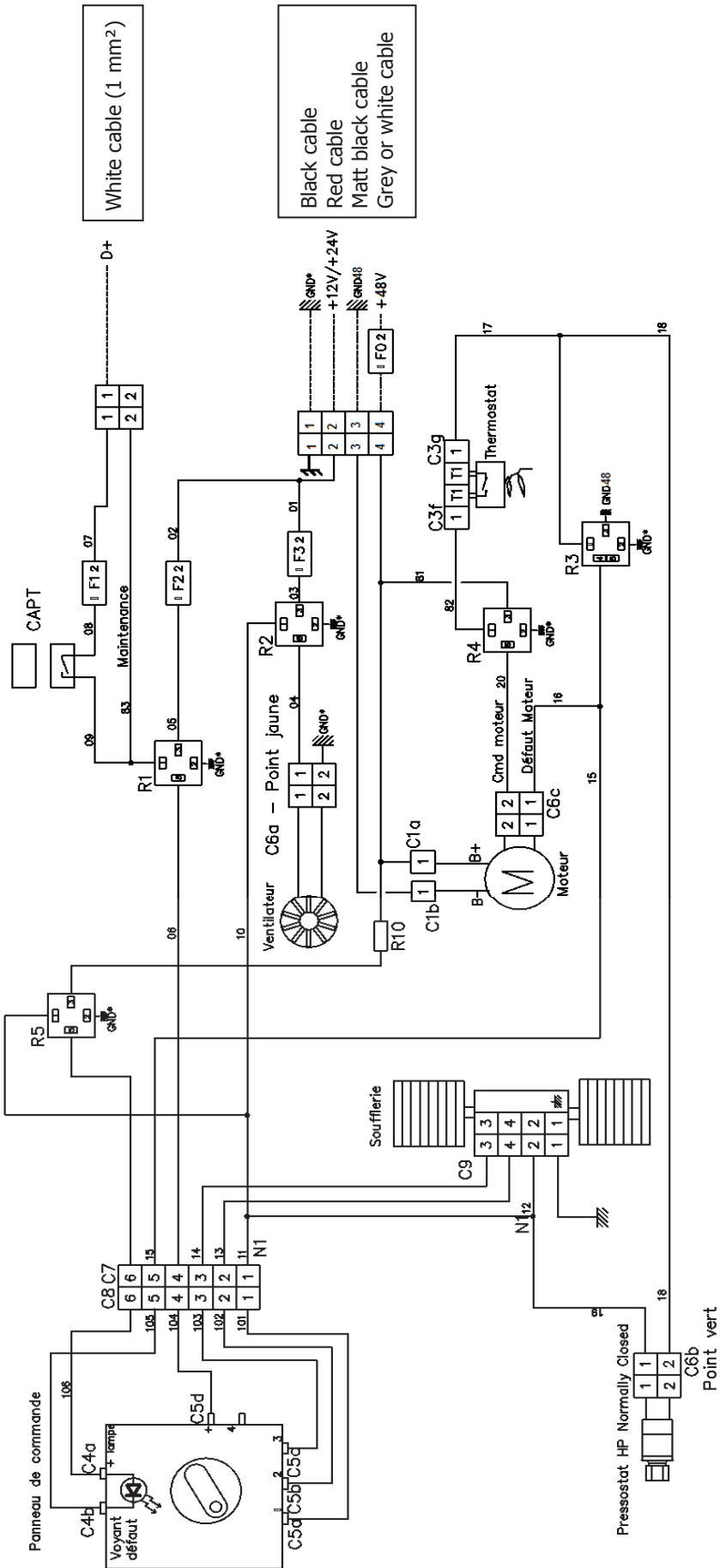


2. Plug the control panel connector back on, put the cabin panel back into place and fasten it with its 4 screws.





3. The Skimo A/C unit is ready to be used !

12. ELECTRICAL DRAWING



13 SKIMO A/C UNIT USE


 **The Skimo A/C unit is designed to run only when there is a +12V on 320B27 or +24V on 320B28 voltage on the D+ (ENABLE) contact. This can be for example used with a battery discharge protection system (driver presence, battery charge level, timer, ...).**


 The ability of the Skimo A/C unit to maintain the required temperature inside the cabin depends on the amount of heat that penetrates inside the cabin. Some preventive measures are necessary to lower the amount of heat that enters the cabin and to improve the performances of the Skimo A/C unit:


- Park the machine or the vehicle in the shade.
- Drive for a few minutes with the windows opened to lower the temperature inside the cabin before turning the A/C unit on.
- Keep the doors and windows closed while using the A/C unit.
- Avoid using devices that produce heat.

Operating modes:


- Once the Skimo A/C unit is installed and the vehicle's engine is running, turn the control panel ventilation speed selector switch to first speed to turn the unit on. The first ventilation speed and the air conditioning are turned on.
- Adjust the ventilation speed to 1, 2 or 3 according to your requirement with the ventilation speed selector switch.
- To switch the unit off, turn the ventilation speed selector switch to 0.


 Switch the Skimo A/C unit off if the vehicle's or machine's engine runs on low speed for an extended amount of time (for over 15 minutes). If not, there is a potential risk of battery discharge due to the fact that the alternator might not supply enough power when the engine runs at low speed. The Skimo A/C unit would turn to security mode. If that happens, refer to section 14.

 It is normal for the internal thermostat to regulate the A/C unit if the blowing temperature is too low, in which case the blowers still run but the air conditioning is turned off for a while.

 SNDC SAS cannot be held responsible for condensation appearing on the cabin's surfaces. The air contains moisture that tends to condensates on cold surfaces. Appropriate cabin insulation can prevent or lower the risks of condensation.

14 REPAIRS

 If the A/C circuit hasn't got the correct amount of gas, the performances of the A/C system will lower. If it seems that your Skimo A/C unit doesn't work properly, you should take it to an A/C specialist.

 **Never try to repair faults by your own means. Repair and recharge of an A/C circuit must be carried out by a specialist that is qualified, certified, equipped with necessary tools and that will use original spare parts.**

If one of the security systems is activated, the air conditioning system is turned off (no more cold production) and the default light is switched on on the control panel. To reset the Skimo A/C unit after a security cut off, turn it off and on again. A security cut off should not be a recurring feature. In the case of repeated cut offs, contact your qualified specialist.



Error codes:

Error code	Failure	Repair required
1 blink	Overheating of the electrical motor. The temperature of the motor went over 113°C. The unit can be reset by switching it off and on again only once the motor's temperature is lower than 109°C	Check that the air way cooling the electrical motor is not clogged up. To be done by an A/C specialist: Check that the A/C circuit hasn't got too much gas R134a.
2 blink	The battery is flat. The tension of the battery went lower than 36V.	Check that the battery works properly and is charged up.
3 blink	Over consumption of the electrical motor. (>40A)	Check the power consumption of the Skimo A/C unit. To be done by an A/C specialist: Check that the A/C circuit hasn't got too much gas R134a.
5 blink	High voltage. The tension of the battery went over 62V.	Check that the alternator supplies its nominal voltage, and that the nominal tensions of the alternator, of the battery and of the Skimo are identical.
6 blink	Low voltage. The tension of the battery went lower than 42V.	Check that the battery works properly and is charged up.
Light on continuously	A/C system gas low pressure. The pressure switch is activated for a pressure lower than 2 bars in the high pressure part of the circuit in case of the quantity of gas being too low (caused by a leak for example).	To be done by an A/C specialist: Check the airtightness of the A/C circuit and recharge with R134a gas.
Light AND electrical motor on and off	A/C system gas high pressure. The pressure switch is activated for a pressure higher than 20 bars in the high pressure part of the circuit.	Check that the condenser is not clogged up. To be done by an A/C specialist: Check that the A/C circuit hasn't got too much gas R134a.
Light not on but unit not working	The Skimo A/C is not working properly but the default light is not switched on. This can be due to an electrical problem.	Check that the default LED light works properly. Check the fuses, the relays, the electrical harness, the connectors and the electrical connection between the Skimo unit and the vehicle or the machine.

There are two other security systems on the Skimo A/C unit:


Compressor security: The compressor is equipped with a security pressure valve to protect the system in case of a pressure switch failure.


Machine security: The Skimo A/C unit is equipped with a sensor that stops the Skimo A/C unit if the cover is opened.



Use only original spare parts.

15 MAINTENANCE

 The Skimo A/C unit must be maintained and cleaned up regularly from dust, vegetal or other wastes or combustibles to avoid risks of fire.
The frequencies listed below are for reference only. The maintenance must be done more frequently if the working environment can lead to clogging up, premature wear or deterioration of some parts.

 The SKIMO A/C unit contains parts that are moving that can present a danger. Never disable the security features. Always turn the unit and the vehicle off before opening the cover or taking the cabin panel off.

 Switch the unit off before any maintenance.

Every 50 hours:

Clean the dust filter
Check the condenser, the ventilator, the main casing. Clean if necessary

In winter:

Turn the Skimo A/C unit on once a week even for a short time (1 minute) to guarantee the lubrication of the seals inside the A/C circuit.

Every 200 hours:

Check the motor-compressor belt tension:
Tension too high: Risk of premature wear of the compressor bearings.
Tension too low: Risk of premature belt wear.
Replace the air filter (SNDC Ref 700A70).
Check that the water drain holes in the main casing and in the evaporator casing are not clogged up.

Every two years: (To be done by an A/C specialist)

Clean the condenser and the evaporator coils. Clean the water drain holes in the main casing and in the evaporator casing.
Recover the A/C circuit gas and replace the receiver dryer (SNDC Ref 225A13).
Replace the evaporator foam (SNDC Ref 281G46)
Check the A/C circuit air tightness.
Recharge the circuit and check the thermostat and the pressure switch.
Check the oil level.
Check the cover fastening screws and clip nuts

Every five years or 2000 hours: (To be done by an A/C specialist)

Check and tighten all the screws and nuts.
Replace the motor-compressor belt.
Replace the cover fastening clip nuts.

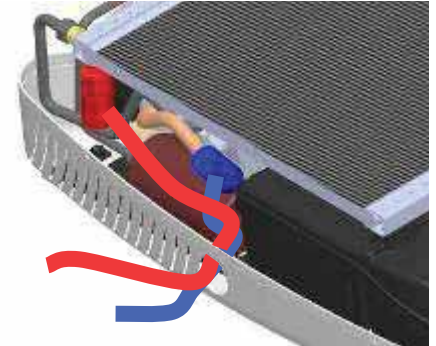
15.a To plug the service centre hoses (to check pressures, recover the gas, charge the A/C system...):



1. Remove the 6 fastening screws of the unit cover, lift the cover and unplug the ventilator connector.



2. Remove the maintenance access plug circled in blue.



3. Unscrew the A/C service centre hoses couplers, pull the hoses through the maintenance access hole, and screw the couplers back on. Connect the couplers on the pressure ports.



4. Plug the ventilator connector back on and put the cover back into place. The unit can be turned on to check the pressures.

5. Once the pressure check completed, remove the service centre hoses, put the maintenance access plug back into place, plug the ventilator connector back on and screw the cover back on.

15.b To access the evaporator casing without recovering the gas of the A/C unit:



1. Remove the 6 fastening screws of the unit cover, lift the cover and unplug the ventilator connector. Remove the 4 condenser fastening screws (circled in blue)



2. Remove the 6 fastening screws of the evaporator casing cover. Lift slightly the front of the condenser, bring the cover forward to free the condenser supports (circled in green), and slide the cover to the side

3. You can access to the thermostat (circled in red), to the blower and to the evaporator.

4. Once the repair is completed, assemble and screw all the parts back on.

15.c To replace the receiver dryer and the evaporator foam:



1. Remove the cover and recover the A/C unit gas (see section 15.a).



2. Remove the 4 condenser fastening screws, disconnect the 2 A/C pipes connected to the condenser, and remove the condenser.



3. Remove the 6 fastening screws of the evaporator casing cover and remove the cover.



4. Take the receiver dryer fastening screw off (circled in blue), and disconnect the receiver drier connector on the expansion valve side (circled in red). Remove the compressor flange and the compressor-condenser pipe, and remove the receiver dryer.



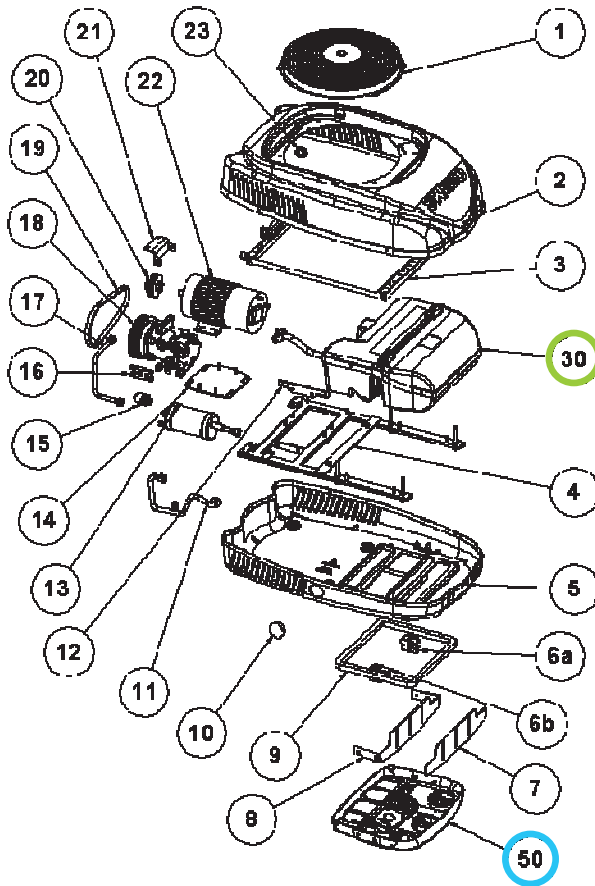
5. Remove the receiver dryer-condenser pipe and the pressure switch from the used receiver dryer and fit them to the new receiver dryer.



6. Lift the evaporator and change the evaporator foam. Put the evaporator back into place.

7. Assemble all the parts back in reverse order (steps 4 to 2). Charge the A/C system and test it (section 15.a)

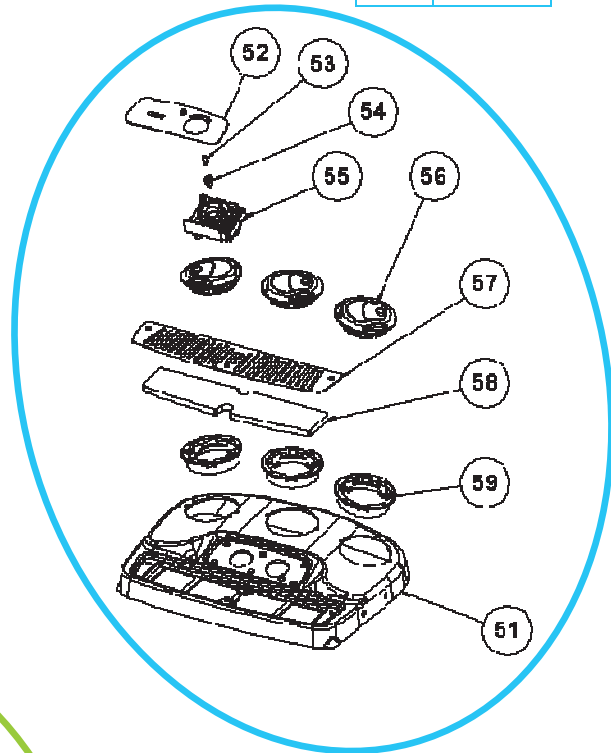
16 EXPLODED VIEW AND SPARE PARTS LIST



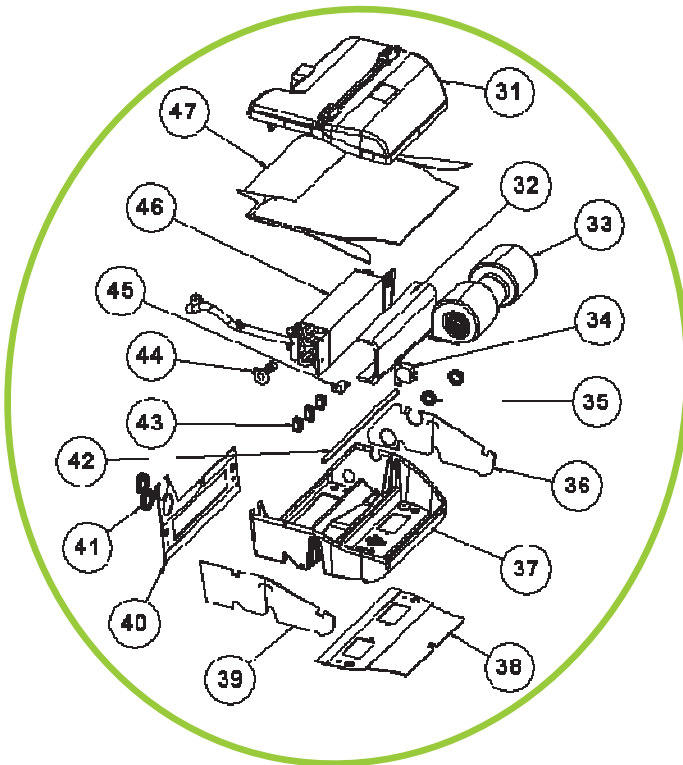
Rep.	Réf.
1	260A21
	260A24
2	560C11
3	296A34
4	560C15
5	560C10
6a	267A23
	267A02
6b	267A07
	267A06
7	281G31
8	560C22
9	540C46
10	370D57
11	560C09
12	560C26
13	225A13
14	560C16
15	264A60
16	242C38
17	560C08
18	200H05
19	219B81
	219B69
20a	560C28
20b	620A82
21	560C17
22	540F85
23	273A25

12V (320B12)
24V (320B17)

Rep.	Réf.
50	540G05
51	560C14
52	370D43
53	273D23
54	273D24
55	370F11
56	370C44
57a	560C19
57b	690A86
58	700A70
59	370B32




Rep.	Réf.
30	
31	560C13
32a	281G46
32b	540A59
33	261A25
	261A26
34	265A37
35	273A25
36	281G22
37	560C12
38	281G19
39	281G21
40	281G20
41	273D10
42	281D75
43	268A22
	268A23
	268A26
	268A22
	268A01
44	250A16
45	560C20
46	294C74
47	281G23



17 APPENDIX

Conformity statement:

 **SNDC - Société Nouvelle De Climatisation**
274 chemin des Agriès 31860 LABARTHE sur LEZE - FRANCE

Phone : +33(0)534.480.480 - Fax : +33(0)534.480.481 - E.mail : sndc@sndc.fr

Déclaration de conformité CE

DUPLICATA 

La société SNDC s.a.s. Société nouvelle de climatisation sise 274 chemins des Agriès 31860 Labarthe sur Léze (France) enregistré au registre du commerce sous le numéro B335061248 déclare :

Que le climatiseur électrique basse tension monobloc de toiture de marque Skimo référence 320A96 pour la tension 12 volts et référence 320A98 pour la tension 24 est conforme aux exigences de la directive 2006/42.

Spécifications techniques :


- Puissance frigorifique : 2,9 kW à +31°C de température extérieure
- Consommation électrique : 0,8 kW à +31°C de température extérieure
- Fluide frigorigène R134a
- Dimensions : 73 x 47 x 25 cm
- Poids : 30 Kg

CEM : Le climatiseur Skimo a fait l'objet de tests de compatibilité électro magnétique par l'organisme agréé GERAC Electromagnétisme du Groupe Thalès) conformément aux normes en vigueur.

Tête de série :

- Numéro de série 29260001
- Date de mise en service : Juin 2009

Établi par Jean Marc GUITTARD Directeur Technique le 3 Juillet 2009 à Labarthe sur Léze

 
274, chemin des Agriès
31860 LABARTHE sur LEZE
Tél. 05 34 480 480 - Fax 05 34 480 481
RC B 335 061 248 88 B 335

Cut-out template:

