

SCU 3rd generation instructions

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1 INTRODUCTION

The documentation hereby constitutes the fitting instructions for the 3rd generation Self Contained Units (SCU).

It is essential that you read the whole document before fitting or using an SCU unit. This manual provides commissioning, using and maintenance procedures.

The unit fitting must be carried out by a person duly qualified and authorized. This person must respect the air conditioning fitting regulations. In case of any doubt or for any further information, please contact your supplier.

2 UNIT DESCRIPTIONS

3rd generation SCU units have a cooling capacity from 5 to 40 kW, depending on the size, the fluid and the electrical supply of the unit. The following chart describes the units more precisely:

Ordering code			SCU	-	E 10	-	2	-	2	F	C	N	0	1	3
Cooler type	E models	SCU-E05 SCU-E10 SCU-E17 SCU-E20 SCU-E27 SCU-E32 SCU-E41			↑										
	G models	SCU-G10 SCU-G17 SCU-G25													
Main voltage	3x400V/50Hz	1													
	3x440/60Hz	2													
Control V	230	2													
Cooling water	Sea water	S													
	Fresh water	F													
Refrigerant	R404A	C													
	R407C	F													
Plenum w.grill	No	N													
	Yes	Y													
Heat	No	0													
	Electrical 1 step	1													
HP/LP pressure gauges	Included	1													
Unit revision	Mark 03	3													

« Cooler type » determines the unit type (E or G) as well as the size of the unit.

«Main voltage » gives the unit's electrical supply characteristics.

«Control voltage » gives the unit's electrical control characteristics

« Cooling water » determines the type of water used to cool the condenser (sea water or fresh water).

« Refrigerant » gives the reference of the refrigerant used in the refrigerating circuit.

« Plenum » determines whether the unit is ducted (blowing through a duct), or with plenum (blowing in the room).

«Heat » Tells if the unit is equipped with electrical heaters.

« HP/LP Pressure gauges » As standard.

"Unit Revision" determines the unit's generation.

3 CAUTION REMINDER

The unit includes a circuit with fluids under pressure, an electrical circuit with live non insulated items, rotating items, very hot areas and sharp pieces. Any person having to intervene on the unit will therefore have to be entitled to do so, have the right competences and wear all required safety protections. This person will have to take extra care with the following instructions:

- Have his/her hair tied up and not wear any loose clothing.
- Wear gloves and clothing covering up all the body (including the forearms) in order to protect himself/herself from burns and cuts.
- Wear a mask to protect him/her from spatters.
- Wear ear protections.

The refrigerating fluid is either R404A or R407C, which are not toxic, nor flammable, explosive or corrosive in normal using conditions. If the refrigerant is heated up to 300°C or above, it can become irritant and aggressive to the skin, eyes and to the nasal cavities. Security leaflets are available on request

The unit must not be used for cooling food.

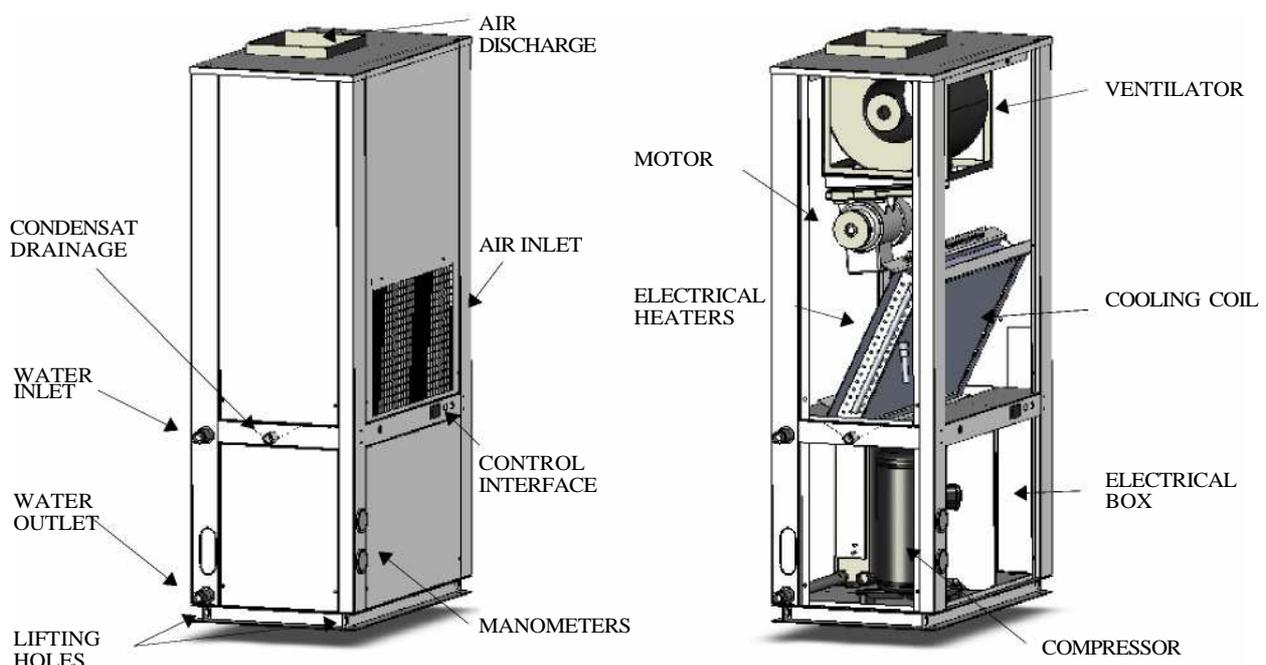
The air conditioned room must be regularly ventilated, particularly when combustions occur (risk of lack of oxygen).

The air must not be blown directly on a person or an animal during a long period. The room must not be cooled too much if it has animals or people in it.

Any modification made without the manufacturer's approval cancels the guarantee and no further responsibility shall be accepted.

4 UNIT DESCRIPTIONS

The drawings below are for your information. Depending on the unit type and size, the placement and shape may change.



5 RECEIPTS OF THE GOOD

Each unit is delivered with a protecting film and wooden sidings. It is important to inspect the state of the goods at reception. If the unit is damaged or knocked, functioning problems can occur which are not covered by the guarantee. In case of any doubt, reservation must be made to the transported and the supplier must be informed.

Each unit is delivered with the following items:

- An envelope containing the fitting instructions, a commissioning form and 2 electrical drawings.
- A replacement filter.
- A replacement V-belt. A blue name plate recaps the unit type, serial number and its main characteristics.

6 UNIT HANDLING

Each unit is delivered screwed to a pallet. It is possible to move the unit in 2 ways:

- Pallet truck: the pallet must be lifted through the front or the side making sure both forks are well placed in the pallet.
- Lifting: the lifting must be done using the four lifting holes situated on the four corners of the unit's base. It is possible to use two lifting bars. Beware of using the maximum authorized weight and to protect the unit accordingly.

The unit must never be laid down.

The unit is not designed to resist a fall. It is therefore important to handle it with caution.

7 UNIT FITTING

The units must be fitted in a non hazardous area (no acid vapours).

The area where the unit is fitted must be solid. The unit must be placed and fitted on a straight floor. All precautions must be taken to prevent vibration transmissions.

Minimum maintenance spaces must be respected for:

- Easy access to the unit.
- Easy access to water connections.

A space must also be left for fitting some options (pressostatic valve, water flow controller, water filter, 100% fresh air intake ...).

8 Water connections

The unit must be connected to the water network making sure the connections are watertight.

The material used for piping must not cause galvanic corrosion. Raw steel or galvanized steel for example are therefore to be avoided.

The hydraulic system will have to be built, so it does not empty the exchanger. The exchanger must therefore not be at a high point of the piping.

If a pressostatic valve is fitted, it has to be preferably situated on the exchanger's outlet. The piping must be protected against frost.

9 ELECTRICAL CONNECTION

The installation must be made by a person with the right competences and entitled to do so. The current must be turned off before any intervention on the unit.

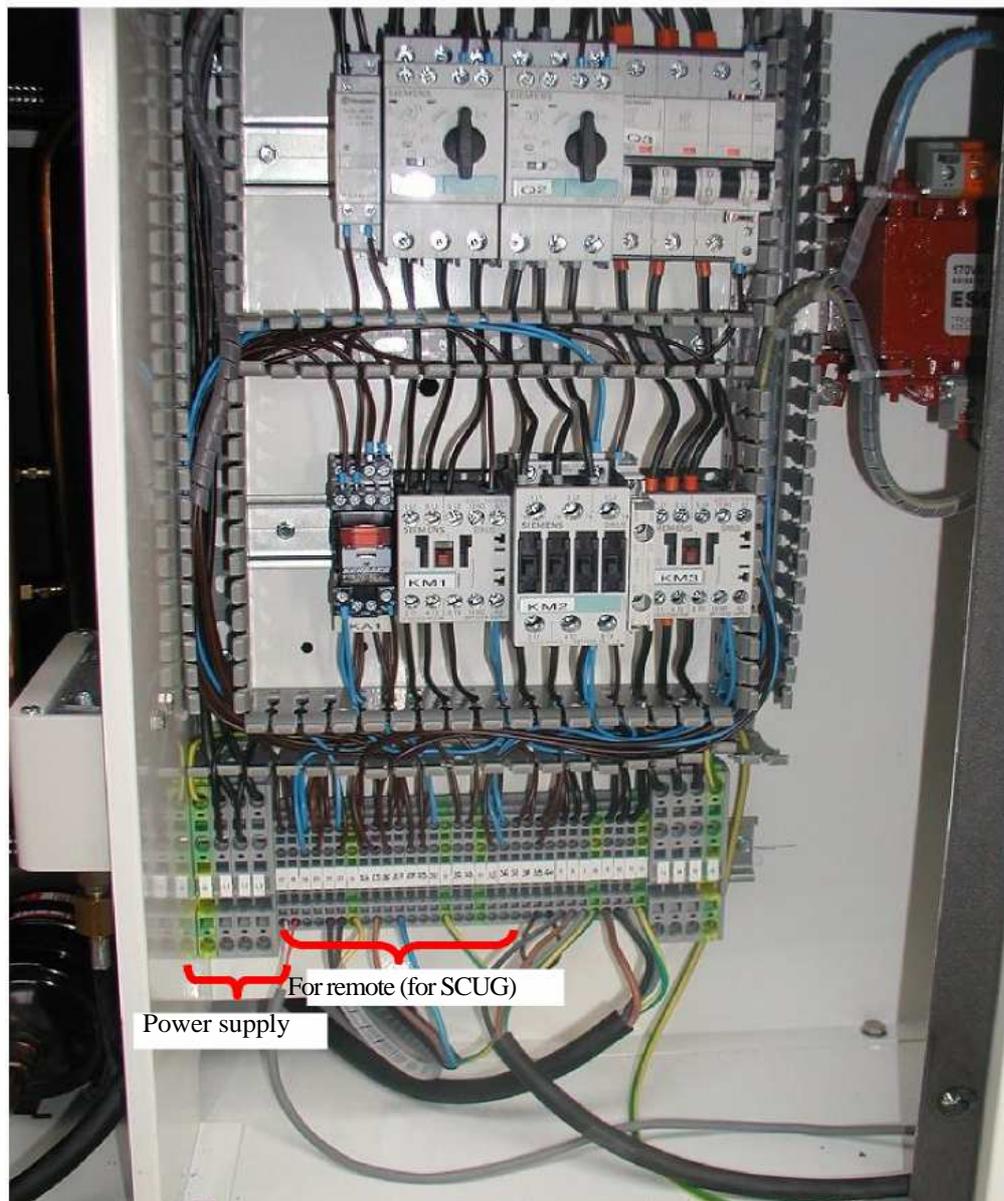
The unit must be connected according to the electrical drawing delivered with the unit's fitting instructions. A device which cuts the current must be used for the unit's electricity to be turned off, before each intervention.

The fitter will have to check that the current and frequency supplying the unit are in accordance with the current and frequency indicated on the unit's name plate.

The choice of the cables (type, section, and length), must be done by the fitter, in accordance with the regulations and norms in force when the unit is being fitted, taking into account the capacities and currents written on the unit's name plate.

The electrical supply connection must be done on the terminal situated at the bottom of the electrical box. The wired remote control (for the SCUG) must be connected to the terminals according to drawings for electrical wiring.

Supply:



10 UNIT STARTING

Wait 8 hours after having fitted the unit before starting it.

Before starting the unit the following checks must be carried out:

- Pre commissioning check list completed
- Electrical connections are well tightened.
- Unit is mounted level.
- Electrical supply is correct and phases are mounted in correct order.
- Liquid indicator is green.
- Filter inserted
- The inside of the unit and its environment are clean.
- Auxiliary components (pump ...) function properly.
- During the first 48 hours frequently check belt tension.

The unit must be started by a person with the right competences and who is entitled to do so. After the first start, the compressor respects a 3 minute time-lag.

Beware of any abnormal noises.

The commissioning form must be filled in, for the guarantee to be valid.

11 UNIT UTILIZATION

For the unit to function, it must be turned « 0 » (« 0 / I » button) and the regulator set point must be adjusted.

To start the unit, the « 0 / I » button must be set to « 0 ».

To stop the unit, the « 0 / I » button must be set on « I ».

To adjust the set point, press « set ». « CP » will then appear. Then press the « down » button once, and « set » once more. The set point value appears. The « up » and « down » buttons must then be pushed in order to set the temperature accordingly. Press « set » once more to confirm the chosen temperature.

If a defect occurs, the defect light turns on and the unit has to be reset manually for the defect indication to disappear, even if the defect has been corrected (« 0 / I » button, first press « 0 » then press « I »).

11.1 Information available

The regulator indicates the air intake temperature for the SCUE and the room temperature for the SCUG.

The unit is equipped with an LP manometer and a HP manometer on the front which indicates the inlet and discharge pressure.

The unit is equipped with a liquid indicator on the front, the indicator enables us to see the refrigeration circuit's humidity (green: no humidity, yellow: humid).

The unit is equipped with a defect indicator (red lamp) at the front of the SCUE and on the remote control box for the SCUG.

The unit has a free volt contact for running signal (on the terminal on the electrical box's level).

The unit offers the possibility of being turned on and off remotely (on the terminal at the electrical box's level).

11.2 Contactor safety

The compressor, ventilator and the electrical heaters, each have their own circuit-breaker. The circuit-breaker's setting must forbid a current above the maximum current allowed for each component.

If one of the circuit-breakers is set-off (it has detected a current above allowed), the unit will put itself into failure. You have to reset the circuit-breaker manually, and then reset the unit for it to start again.

11.3 HP safety

The HP pressurestat measures the pressure at the compressor's discharge. When it detects an abnormally high pressure (water flow loss, temperature too high..), the unit puts itself in defect mode.

The cutting value of the pressurestat is adjustable. The recommended setting is:

- Cutting at 26 bar.
- Reset at 22 bar.

This means that the unit puts itself in defect mode, when the pressure is above 26 bar and that the unit can start again as soon as the pressure drops under 22 bar.

The unit has to be reset in order to restart the unit.

11.4 LP safety

The LP pressurestat measures the pressure at compressor inlet. When it detects an abnormally low pressure (lack of air flow, lack of gas ...), the unit puts itself in defect mode.

The pressurestat cutting value is adjustable. The recommended setting is:

- Cutting at 2 bar.
- Reset at 2, 7 bar.

This means the unit puts itself in defect mode when the pressure is below 2 bar and the unit can restart as soon as the pressure sets back to a pressure above 2, 7 bar.

You have to reset the unit for it to start again.

11.5 Hot air safety

When the unit is equipped with electrical heaters, a safety thermostat which measures the unit's air blowing temperature is also fitted. The recommended setting is of 90°C. This means that if the unit's blowing temperature is above the set temperature, then the electrical heaters stop working. You have to reset the thermostat manually, and then reset the unit for it to start again.

12 TROUBLESHOOTING

The chart below describes:

- The most frequent problems.
- The most frequent causes of these problems.
- The most frequent solutions for these causes.

Defect	Possible cause	Solution
The unit doesn't start	NO electrical supply	Check that the unit is properly connected to the electrical supply. Check there is voltage on the unit's terminals.
	« 0 / I » button on « 0 »	Turn the button to "0".
	Voltage supply too weak	Check the electrical installation where the unit is fitted.
	Electrical protection released	Check the fuses aren't burnt. Check there is no short-circuiting.
	Unit protection activated	Reset the unit after having identified the cause of the activation.
	Damaged compressor	Replace the compressor after having identified the damage cause.
The unit starts but often stops	Abnormal regulation	Check the state of the temperature sensor Check the regulator's parameters.
	Lack of gas	Check that there is no gas leakage. Reload with gas.
	Damaged compressor	Replace the compressor after having identified the cause of the damage.
The unit cuts down in LP	Lack of gas	Check that there is no gas leakage. Reload with gas.
	Defective pressurestat	Replace the pressurestat
	LP pressurestat badly set	Check the pressurestat settings.
	Lack of air flow	Put into action the ventilation maintenance procedure

The unit cuts in HP	Defective pressurestat	Replace the pressurestat
	Bad HP pressurestat setting	Check the pressurestat settings.
	Expansion valve blocked	Clean the expansion valve or replace it.
	Filter drier blocked	Replace the filter drier.
	Not enough water flow	Check the water flow
	Temperature too high	Check the water temperature
The unit is noisy	The tubes vibrate	Check the tubes are well fixed
	The compressor is abnormally noisy	Check the compressor's functioning. Replace the compressor after having identified the breakage cause.
	The panels aren't properly closed.	Tighten the fastening screws.
	The ventilation is abnormally noisy.	Put into action the ventilation maintenance procedure
Oil is leaking from the circuit	The refrigerating circuit is leaking	Repair the leak and reload the gas
Oozing water	The water network is leaking	Check tightening.

13 MAINTENANCE

13.1 *Fresh water exchangers*

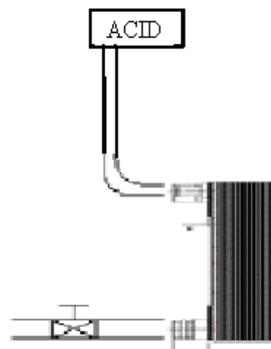
The fresh water exchangers must be regularly cleaned according to the quality of the water. A dirty exchanger will degrade the unit's performances.

Protection gloves, glasses and clothing must be worn to perform the exchanger's cleaning with fresh water. The cleaning acids cause burns to the skin, to clothes, and damages many materials. The exchanger's environment must therefore also be protected.

Fresh water exchangers must be chemically cleaned using a product compatible with copper and stainless steel, such as phosphoric, citric or oxalic acid at 5%. Two methods are available: through gravity or forced circulation.

Cleaning through gravity:

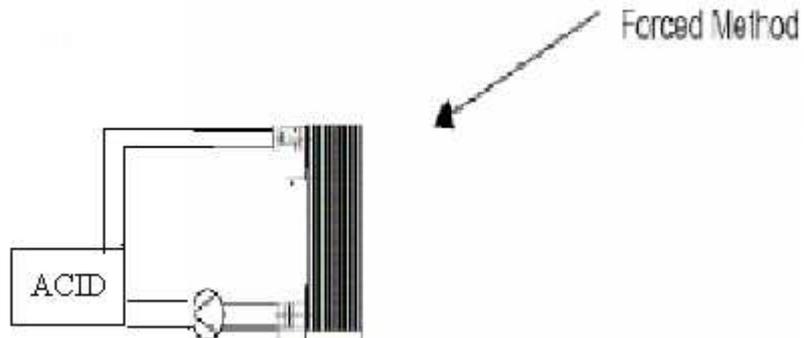
1. Disconnect condenser's inlet and discharge.
2. Hermetically bloc the entrance of the condenser using a manual valve.
3. Connect the condenser's discharge to a reservoir containing the cleaning solution, and place it above the condenser.
4. When the condenser is filled with the solution let the installation rest for approximately 10 hours (according to the cleaning solution supplier's recommendations).
5. Empty the condenser and clean it with fresh water.



Cleaning through forced circulation:

1. Disconnect the condenser's inlet and discharge.
2. Connect the condenser's inlet to the discharge of a circulator pump (with membrane if possible).
3. Connect the circulator pump's inlet to a reservoir containing the cleaning solution and placed it above the condenser.
4. Connect the condenser's discharge to the same reservoir.

5. Let the pump function during 10 hours (according to the cleaning solution supplier's recommendations).
6. Empty the condenser and clean it with fresh water.



Warning: the cleaning solution must be recycled according to the supplier's recommendations.

13.2 Sea water exchanger

Sea water exchangers must be regularly cleaned depending on the water temperature. A dirty condenser will degrade the unit's performances. We recommend a quarterly clean.

1. Shut the valve situated at the condenser's inlet.
2. Disconnect the condenser's discharge.
3. Dismantle the panel situated on the opposite side of the water connection.
4. Use a brush to clean each tube.

13.3 Filter

The filter must be regularly cleaned. The frequency must be adapted to the unit's environment. We recommend a monthly clean for a slightly dusty environment.

To clean the filter, you must:

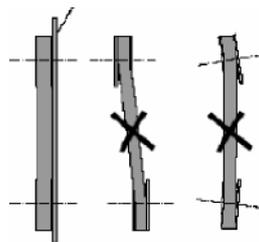
- Dismantle the front panel.
- Unscrew the filter support.
- Remove the dust from the filter by blowing on it (beware of the air pressure which must not damage the filter).
- Place the filter and screw it to its support.
- Replace the front panel.

13.4 Ventilation

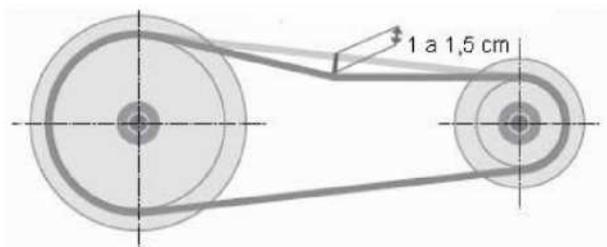
The ventilation must be regularly checked. We recommend for it to be checked 2 weeks after the first commissioning and every month if no particular problem has been noticed during the first check.

Check the ventilation:

- Check the V-belt's parallelism:



- Check the V-belt's state and tension :



- Check the motor and ventilator's fastening.

13.5 Refrigerating circuit

The refrigerating circuit's function must be checked regularly. We recommend a monthly check if no particular problem has been noticed during maintenance.

Check:

- That the HP and LP pressures given by the unit's manometers indicate coherent values.
- That there are no excessive vibrations which could damage the tubing.
- The compressors fixing.
- The filter drier's good function (The liquid indicator must be green).

If a particular problem occurs (HP or LP cut, abnormal capacity ...), you must connect the manometers on the compressor's inlet and discharge for the data to be more precise.

If an intervention is necessary (change of compressor for example), the unit must then be unloaded and reloaded with refrigerating gas. During this operation:

- Inject the vapour gas in the compressor's inlet (never inject liquid gas in the compressor's inlet)
- Inject the quantity of gas indicated on the name plate.
- Not use the compressor as a vacuum pump.
- Check the water is circulating in the exchanger.

13.6 Electrical circuit

The electrical circuit must be regularly checked. We recommend a monthly check if no particular problem has been noticed during maintenance.

Check:

- Electrical connections tightening.
- There is no abnormal browning or temperature rise on the cables, lugs and connections.
- The safety items are fitted and well set (fuse, circuit-breakers).

14 Changing the Pulley and air pressure

The proportion between the electric motors RPM and the fans RPM is given by:

$$N_{fan}/N_{motor} = D_{motor}/D_{fan}$$

N is the RPM and D is the diameter of the pulley

