



Dossier E3754 rev.3

**Deshydrator and Air Conditionner
for Marine VSAT stabilized station**

June 10th, 2010

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1 PREAMBLE

Marine VSAT antenna systems, because of the extreme weather and environmental conditions in which they operate, are generally contained within an almost air tight radome.

Whilst this affords protection from the outside elements it causes problems of its own. Two of the more serious problems are detailed here and possible solutions offered.

2 CONDENSATION.

Condensation can cause serious problems to both the electronics and the mechanical equipment inside the radome. If left unchecked the results can cause catastrophic failure of the equipment with the consequence of increased system outage time. Condensation in electrical equipment can cause short circuits and, in mechanical equipment, the possibility of rust and increased incidence of metal fatigue.

LCDC Telecom has surveyed the market for appropriate equipments to include with their overall VSAT package and have established that the LAB 2E Dehydrator is well suited to the task.

THE DEHYDRATOR

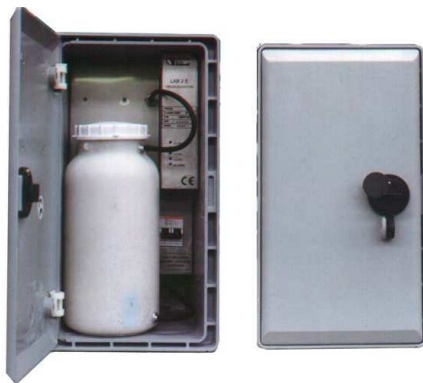


Figure 1

The dehydrator is designed for automatic and continuous duty operation capable of supplying dry air up to 70 nl/h with a dew point better than -40°C, at a pressure of 2kPa.

The dehydrator is housed inside a fibreglass reinforced plastic container with a door. It is designed for wall mounting or pole mounting by using the brackets provided.

The air is dried through chemical absorption by granular substances contained in a disposable cartridge directly accessible by opening the door. This cartridge is made of plastic material and is easily accessible at the door opening. The cartridge lifetime depends on the plant requirement. Inside the cartridge there is an apposite detector which turns from blue to pink when the cartridge is exhausted.

It is powered by direct current voltage in the range **18Vdc - 72Vdc**. The equipment is protected against polarity inversion.

The dehydrator operation is managed by a HCMOS microprocessor. It manages the pump drive (Pulse Width Modulation), by constantly feeding information to the power supply thus adapting the output pressure.

The dehydrator operation is disabled if the power supply voltage decreases below 17 Vdc (under voltage alarm) or if it exceeds 73 Vdc (over voltage alarm). The low pressure/no power off alarm, (activated for pressure below 0.5 kPa), is disabled in the first 20 sec. operation.

An active, SW protection for high pressure is automatically activated if the pressure exceeds 4 kPa. In this case the dehydrator stops the air supply to the unit until the pressure falls below the operating pressure (2 kPa). Additionally the equipment has a safety valve.



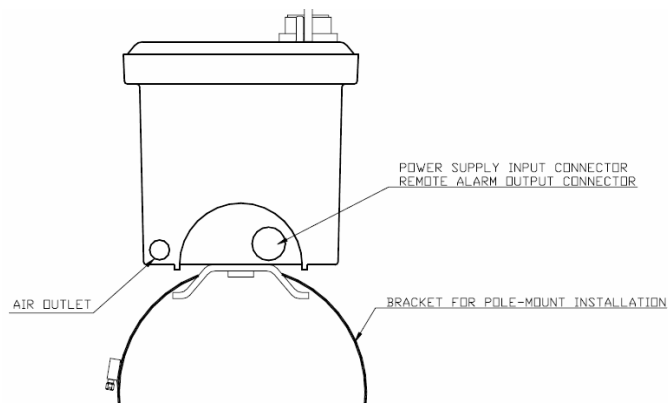
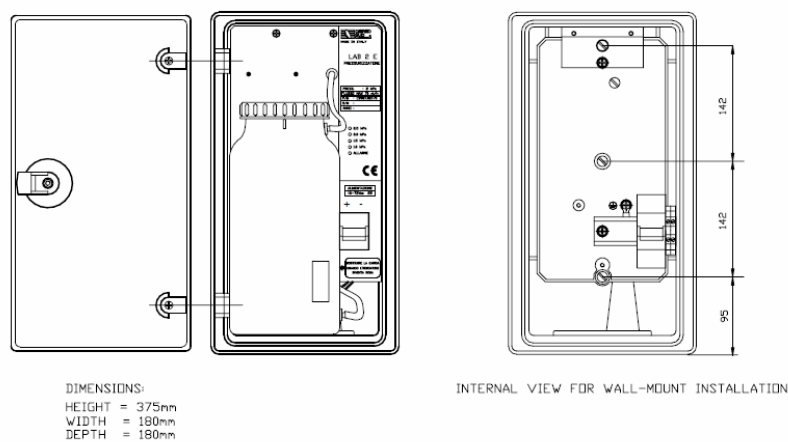
A column with 5 indicating LED's is available. The red LED is for the alarm indication, the four LED's allow indication of the pressure level. Only one LED at a time can be lit. The pressure values associated with the LED's are the following: 0.5 (Red), 1.0 (Green), 1.5 (Green), 2.0 (Green), ≥ 2.5 (Green); pressure indications are in kPa. The red LED is permanently ON when any alarm is present, i.e. over voltage, under voltage, low pressure/no power and high-pressure alarms. The low pressure/no power alarm is available for remote monitoring purposes via a voltage free relay contact.

Electrical Characteristics

Output pressure	:	2 kPa
Maximum flow rate	:	Up to 70 l/h
Safety valve	:	Built in and factory set
Output air dew point	:	Better than -40°C at 20° C amb. Temp and 80% R.H.
Regeneration	:	Disposable desiccant cartridge
Desiccant cartridge exhaustion control	:	Visual indicator on the cartridge front
Alarms	:	Power off, over voltage, under voltage, low pressure, high pressure
Remote alarms	:	Power off and low pressure (through a relay)
Indications	:	Alarm led, led pressure scale
MTBF	:	Higher than 180.000h calculated according to MIL HDBK 217F, at Ground Base conditions, 25°C amb. Temp. 50% flow rate
European Community safety and health directives	:	89/336/CEE and 73/23/CEE
Safety Norms	:	EN 60215
Quality assurance standard	:	ISO 9001
Power supply	:	18 – 72 Vdc
Consumption	:	<2 Watt (Typical)

Mechanical and Environmental Characteristics

Acoustic noise	:	≤ 52 dBA at 1 m far and 1.5 m high
Operating temperature	:	-10 to + 50°C
Storage temperature	:	-30 to + 60°C
Dimensions (w x h x d)	:	180 x 375 x 180 mm.
Weight (w/desiccant cartridge)	:	□ 9,2 kg
Desiccant cartridge charge	:	□ 2,7 kg
Outlets with ON/OFF valve	:	2
Standard output pneumatic connector	:	Rapid for semi rigid pipe 8 x 10 (others on request)

**Figure 2 Mounting arrangements****Figure 3 General layout**

3 TEMPERATURE VARIATIONS.

Extreme temperature variations are not only a major cause of condensation but are very harmful to both the mechanical and electronic systems inside the radome. High temperatures are often experienced in vessels when travelling through the tropics and also when the vessel is stationary in many areas of the globe– in port, loading or unloading cargo in their normal operating duties.

The addition of air conditioning units inside the radome maintain a constant temperature to allow the equipment to operate within the specified tolerance range and also remove excess humidity thus reducing (or even eliminating) condensation and the resulting problems of metal fatigue.

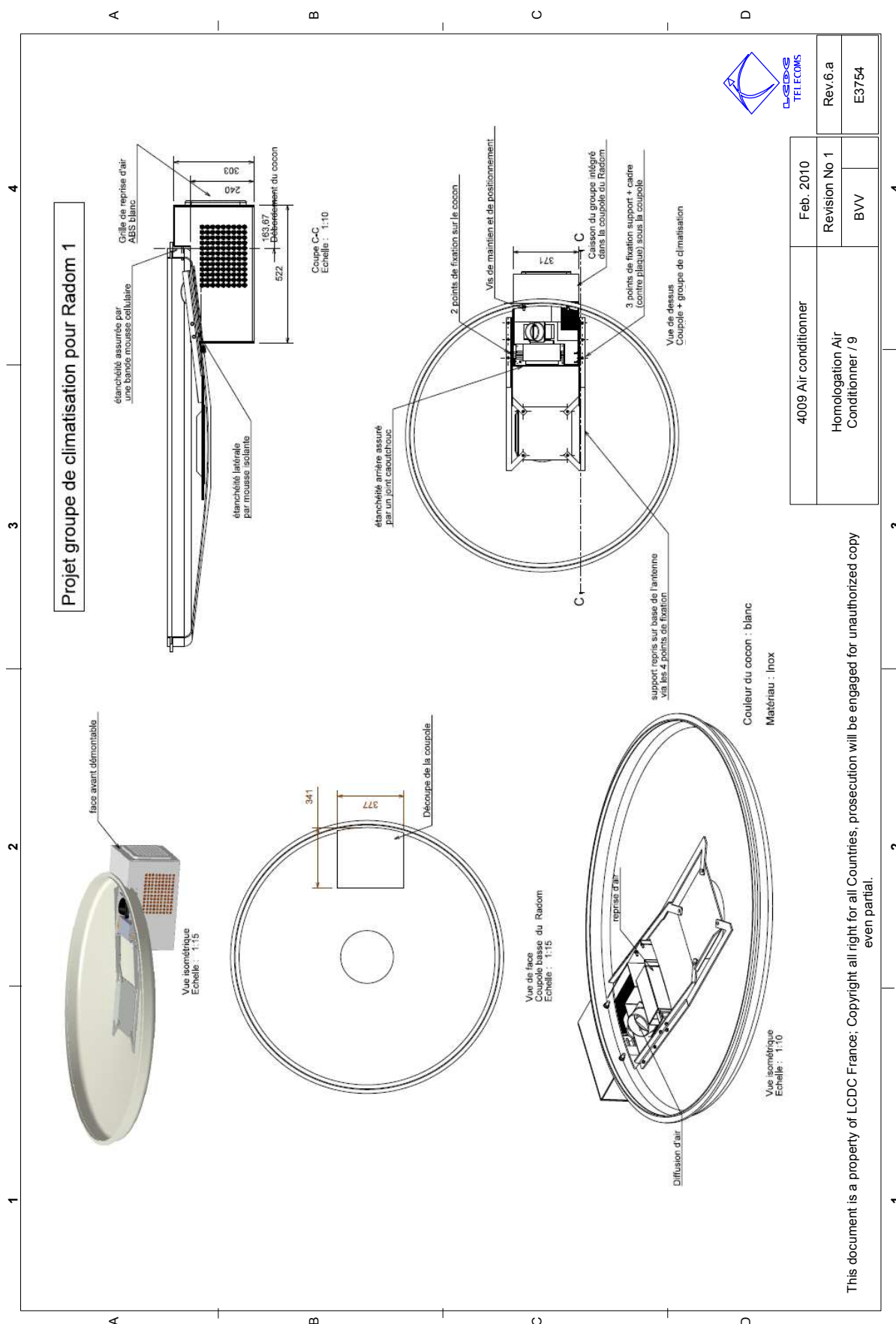
Although most of the marine Stabilized stations are specified to work at a high temperature range (45-55°C), the problem of condensation could appear when the ship is stopped for several days for maintenance or work over in tropical region.

There are various air conditioning solutions available on the market but these are generally quite expensive and not always the most suitable for ship mounted equipment. Very often the output Btu of these units is far above that required in a confined space inside a radome.

LCDC Telecom has designed a unit to house a more realistic unit operating at 5000 Btu with a direct input to the radome.

The unit mounted on a Sea Tel VSAT stabilized antenna is pictured below.





Typical performance specifications are as follows:

Model	Type 5
Cooling capacity Btu kW	5,000 1.5
Supply voltage	230 -110 VAC, 50Hz/60 Hz
Ave. power consumption (110VAC - 230 V)	490 VA
Weight (kg)	32
L x W x H (mm)	415x285x295

4 PRICING

4.1 DEHYDRATORS FOR 4009-9707

Item	Description	Min qty per order	Unit Price (en € HT)
1	Min quantity delivered per year	10-20	2610
2	Min quantity delivered per year	100-150	2064

Delivery: 3 weeks

4.2 AIR CONDITIONNER FOR 4006 OR 4009

Item	Description	Min qty per order	Unit Price (en € HT)
1	Air Conditionner for Seatel 4009	10-20	4720
2	Qty over one year	20-50	4560

Delivery : 9 weeks