

Power supply unit

User's manual

NH78339



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The information given in this manual is accurate to the best of our knowledge.

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1. About this manual

1.1 OBJECTIVE OF THE MANUAL

This manual refers specifically to the 220V AC/24V AC power supply unit. It describes its appearance, the stages of mechanical installation and electrical connection and connections to the equipment that it supplies.

1.2 WHO THIS MANUAL IS FOR

The manual is addressed to all professionals having *L'Air Liquide* cryogenic equipment that requires a power supply suitable for the installed control equipment.

1.3 STRUCTURE OF THE MANUAL

For ease of consultation, the structure of this manual follows the steps normally taken by the user, as described below:

Topic	Page
Description of the power supply unit	9
Mechanical and electrical installation	17
Use	19
Datasheet	21
CE conformity certification	25

1.4 THE ACCOMPANYING CD

The accompanying CD contains:

- Notices issued by L'air Liquide – DMC.
- This manual in electronic (pdf) format.

Note: you will need to have Acrobat Reader installed on your computer to be able to read or print from the manual in pdf format.

1.5 TRADE NAMES QUOTED IN THE MANUAL

Adobe and Adobe Acrobat Reader are trademarks of Adobe Systems Incorporated.

2. Safety

2.1 SYMBOLS



This symbol means:
Important information about using the equipment. Failure to follow the instructions given for this point does not result in danger for the user.



This symbol means:
Warning: danger. In this manual, failure to observe or implement the instructions preceded by this symbol may cause bodily harm or damage to the apparatus and installations.



This symbol means:
Instructions must be followed.



This symbol means:
Name and address of manufacturer.



This symbol means:
You **must** read the instructions for use.



This symbol means:
You **must** wear the appropriate hand protection gear.



This symbol means:
Warning: low temperature.

2.2 OPERATOR SAFETY

This apparatus conforms to standard NF EN ISO 60601-1-1 applicable in the medical sector. It has been manufactured and tested in accordance with the IEC standards on the safety of medical electrical systems and leaves the factory in a condition of perfect technical integrity. To keep the apparatus in perfect condition and ensure that it is used safely, you must follow the instructions and take note of the symbols given in this manual.

Before installing the apparatus, check that the voltage shown on the casing and the power supply voltage are the same.

When the device cannot be used in conditions of total safety, the apparatus should be withdrawn from service and protected against accidental usage.

Full safety cannot be guaranteed in the following cases:

- The apparatus is visibly damaged.
- The apparatus no longer works.
- After prolonged storage in unsuitable conditions.
- After severe damage sustained during transit.

2.2.1 General safety precautions

Only personnel who have fully read this manual and the safety recommendations (see NH78380) are authorized to handle and use the apparatus described in this document.

Like all similar devices, this apparatus is susceptible to electrical, electronic and mechanical failure. The manufacturer cannot be held liable for any products placed in storage subsequent to defective operation of the kind described above, even during the warranty period.

The apparatus described in this manual is designed exclusively for use by qualified personnel. Maintenance operations should only be carried out by qualified and authorized personnel. To ensure the safe and correct use of the apparatus during service and maintenance, it is essential that all personnel observe standard safety procedures.

Safety

2.2.2 Safe use of liquid nitrogen

The temperature of liquid nitrogen is $-196\text{ }^{\circ}\text{C}$. Therefore:



You must never touch objects which have been in contact with liquid nitrogen with your bare hands. Always wear special gloves and visors when handling liquid nitrogen.



Liquid nitrogen used in storage tanks evaporates into the air; 1 litre of liquid nitrogen releases around 700 litres of nitrogen in the gaseous state. Nitrogen is an inert, non-toxic gas, but displaces oxygen when released into the atmosphere. Once the atmospheric oxygen content falls below 19% the human organism is at risk.

All rooms and areas housing tanks containing liquid nitrogen should be well ventilated at all times and equipped with at least one oxygen gauge. All personnel should be informed of the risks associated with the use of nitrogen.

2.2.3 The CE mark

The power supply unit bears a **CE** mark on one of its sides (Figure 4-6: Side panels of the 4-output and 2-output power supplies

on page 14). The **CE** declaration is dealt with in section 9 on page 25.

2.3 PRECAUTIONS IN THE EVENT OF FAILURE

If you suspect that the integrity of the apparatus has been compromised (for example as a result of damage sustained during transit or during use), it should be withdrawn from service. Make sure that the withdrawn apparatus cannot be accidentally used by others. The defective apparatus should be handed over to authorized technicians for inspection.

2.4 DESTRUCTION OF THE UNIT



Under directive WEEE 2002/96/EC, this device may contain electronic components which are hazardous to the environment. Owners are requested to contact the manufacturer or vendor to find out the procedure to be followed for safe disposal. The manufacturer cannot be held liable for the consequences of failure to follow the prescribed recycling procedure.

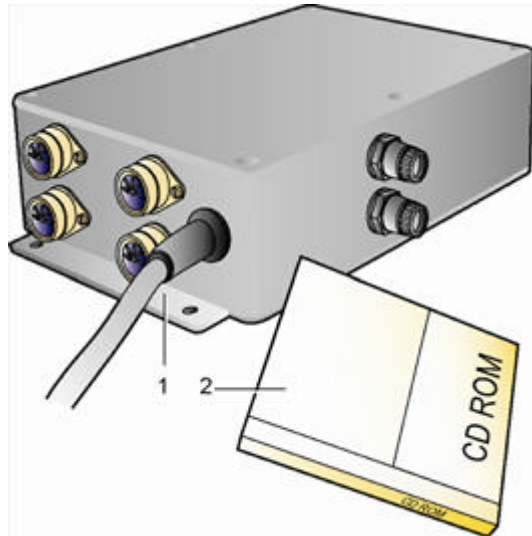
3. Articles supplied

The product is delivered complete with:

Table 1: Articles supplied.

No.	Designation	Quantity
1.	Power supply unit with 2 outputs, fitted with mains supply cable (ref. NH102767). or Power supply unit with 4 outputs, fitted with mains supply cable (ref. ACC-GNL-19).	1
2.	This manual on CD-ROM.	1

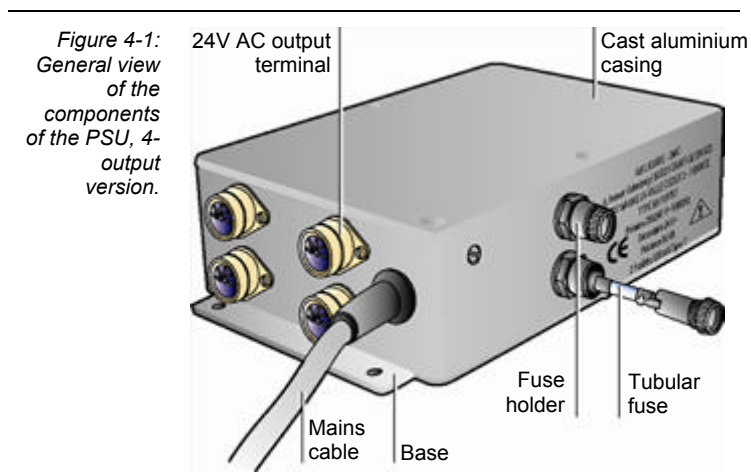
Figure 3-1:
Articles
supplied.



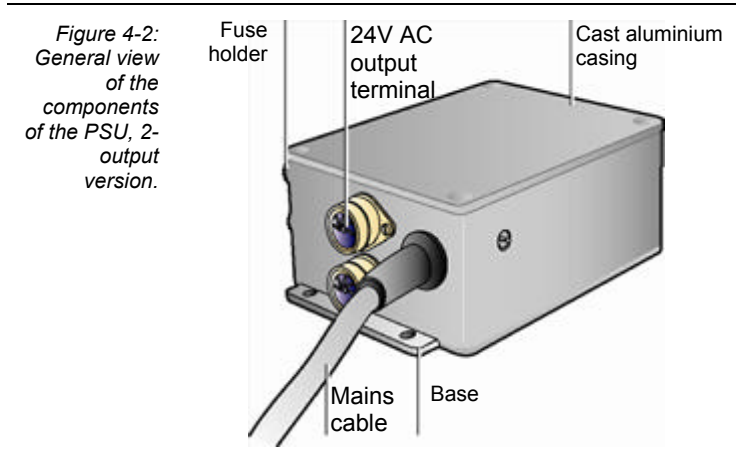
4. Description

4.1 GUIDE TO COMPONENTS

This illustration shows the part of a PSU (power supply unit) with 4 outputs. These are described in greater detail in the following paragraphs and pages.



This illustration shows the part of a PSU (power supply unit) with 2 outputs. These are described in greater detail in the following paragraphs and pages.



4.2 FUNCTION

This is an item of electronic equipment to be used exclusively for providing a 24V AC supply to the apparatus mounted on the cryogenic storage tanks sold by *L'Air Liquide*, namely:

- Temperature indicator.
- Level indicator.
- Level regulation unit.
- Remote monitoring unit.

Description

The power supply unit, available in 2 versions, is supplied from the mains and provides a 24V alternating current at 2 or 4 outputs, depending on the version. The main specifications are summarized in the following table.

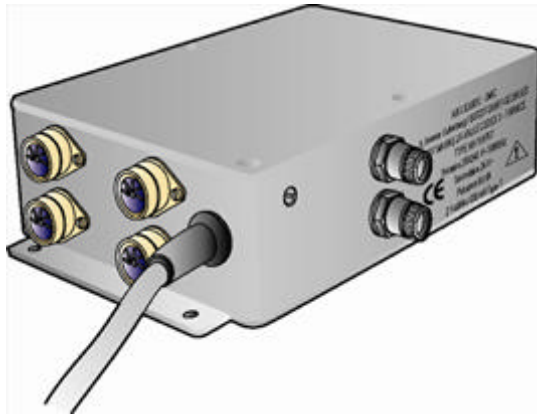
	Unit	2-output version	4-output version
Primary	(V AC)	230-240	230-240
Frequency	(Hz)	50-60	50-60
Secondary	(V AC)	24	24
Secondary volt-amperes	(VA)	35 (1)	80 (2)
Number of outputs		2	4
Mains protection		2 fuses	2 fuses
Temperature protection		Internal	Internal

(1) total for both outputs

(2) total for all 4 outputs.

The detailed specifications are given in section 7 on page 21.

*Figure 4-3:
The PSU. 4-
output version*



4.2.1 Place of use

The power supply unit is designed for indoor use only, sheltered from rain and exposure to the elements.

It must be mounted on a wall at a height that conforms to the standards for electrical installations, with the DIN sockets pointing downwards.

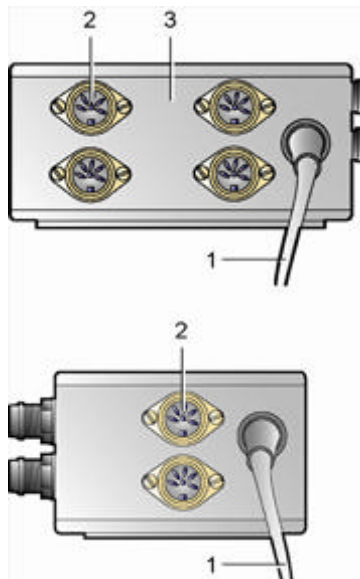


The power supply unit must never be mounted on the storage tank.

4.3 FRONT PANEL

The following items are located on the front of the power supply unit:

*Figure 4-4:
Front of the
PSU (2-output
and 4-output
versions)*



No.	Function
1.	Mains supply cable
2.	Electrical connectors

No.	Function
3.	Casing

Description

4.3.1 Mains supply cable

This cable (Figure 4-4: Front of the PSU (2-output and 4-output versions)

, no. 1) type H05WF, with 3 standard 1 mm² conductors, approx. length 2.20m, is fitted with an approved earthed plug. It must be connected to a 230/240V AC, 50/60 Hz, 10/16 A mains socket.



The power supply unit does not have an On/Off switch.

4.3.2 Thermal fuse

The power supply is additionally protected by a thermal fuse set to 128°C and integral with the internal transformer. Once disconnection has occurred due to overheating, the thermal fuse automatically reconnects when the transformer temperature has dropped below 128°C. Even so, it is advisable to find out why overheating occurred before using the power supply again.

4.3.3 Electrical connectors

The DIN terminals (Figure 4-4: Front of the PSU (2-output and 4-output versions)

, no. 2), supply 24V AC to the connected equipment. Depending on the model, 2 or 4 outputs are available. The electrical specifications of the terminals are as follows:

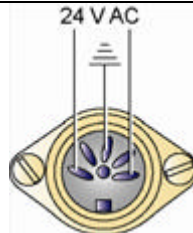
	Unit	2-output version	4-output version
Voltage	(V AC)	24	24
Volt-amperes	(VA)	35 (1)	80 (2)

(1) total for both outputs

(2) total for all 4 outputs.

The outputs are wired using special plugs available from *L'Air Liquide*. This prevents any risk of error. The illustration below specifies the wiring of a terminal on the casing.

Figure 4-5:
Detail of
terminal
wiring



4.3.4 The casing

This is made of cast aluminium and consists essentially of a cover held in place by 4 cross-head screws and a baseplate with four 5 mm mounting holes.

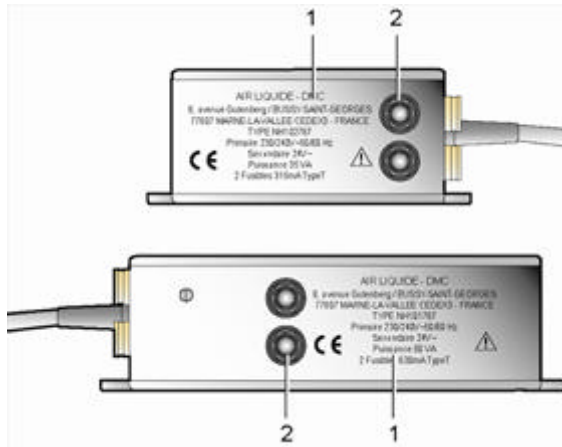


Only the manufacturer or his representative may open the casing. The manufacturer shall not be held liable if it is opened and/or its internal components are replaced by a person or body other than the manufacturer or his representative.

4.4 SIDE PANEL

View of the side panel:

*Figure 4-6:
Side panels of
the 4-output
and 2-output
power
supplies*



No.	Function
1.	CE label.

No.	Function
2.	Mains fuses

Description

4.4.1 Mains fuses

Each phase of the mains supply to the PSU has a 5x20 mm time-delay glass tube fuse (Figure 4-6: Side panels of the 4-output and 2-output power supplies



, no. 2) to protect it. The fuse ratings are:

- 315 mA for the 2-output version. The full description of these 2 fuses is: fuse 5x20, 0.315 A T.
- 630 mA for the 4-output version. The full description of these 2 fuses is: fuse 5x20, 0.630 A T.

4.4.2 CE label

See (Figure 4-6: Side panels of the 4-output and 2-output power supplies

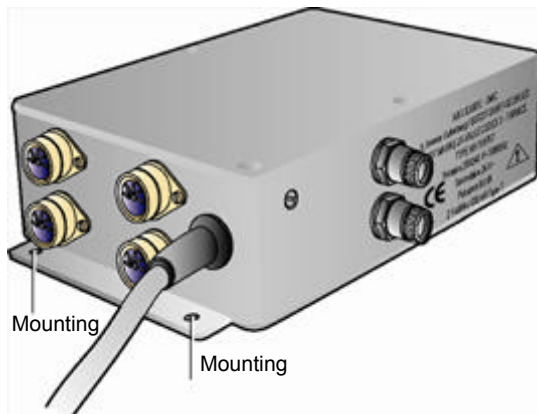
, no. 1). This specifies the manufacturer's name and address, the type of equipment, its principal electrical properties and the electrical properties of the fuses protecting it.

The  and  (information) marks are also shown.

4.5 BOTTOM OF THE CASING

This consists of the two mounting lugs; each lug having two 5 mm mounting holes.

Figure 4-7:
Base and
mounting
holes



5. Electrical and mechanical installation

The power supply unit must be mounted close to the equipment that it supplies.

5.1 MECHANICAL INSTALLATION

Procedure:

1. Locate the power supply unit on the wall with the DIN sockets facing downwards.

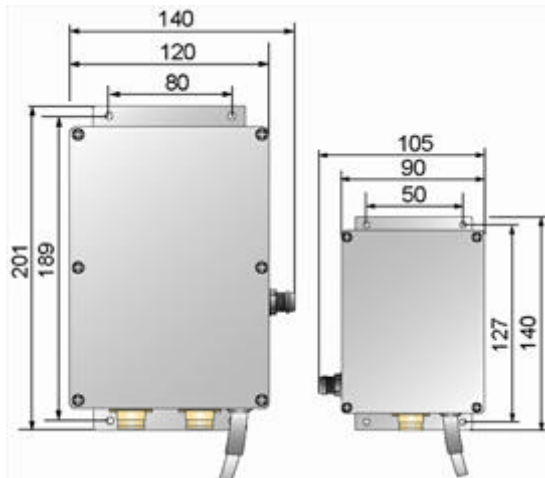


Do not mount it lower than the minimum height above floor level specified by the electrical installation standards. Take into account any splashing caused by washing the floor.

Never mount the power supply unit on the storage tank.

2. Secure with 4 dowels and screws max. dia. 5 mm.

Figure 5-1:
Dimensions for
installation



5.2 WIRING

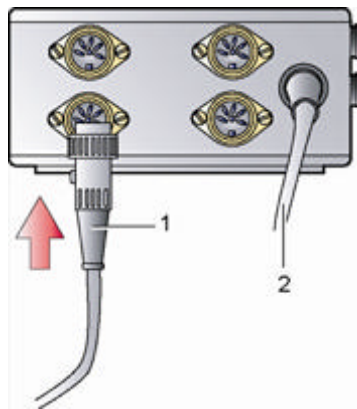
5.2.1 Mains connection



The power supply unit does not have an *On/Off* switch.

Simply plug the mains connector (no. 2) of the PSU to the mains. The terminals are shown below (Figure 5-2):

*Figure 5-2:
Connecting the
mains cable
and the
outputs*



No.	Connecting cable
1.	Connection to 24V AC peripherals
2.	Mains cable

5.2.2 Connections to equipment

The equipment is connected to the 2 or 4 outlets of the PSU by means of DIN connectors (Figure 5-2: Connecting the mains cable and the outputs

, no. 1).

The electrical specifications of the terminals are given in section 0 on page 13.

6. Using the power supply unit

6.1 USING THE PSU

The 24V AC current is available at each of the output terminals as soon as the unit is connected to the mains.

6.2 FAULTS



Before undertaking any work on the power supply unit it must be disconnected from the mains following the correct procedure.

We would remind you that only a representative of *L'Air Liquide* is authorised to open the casing.

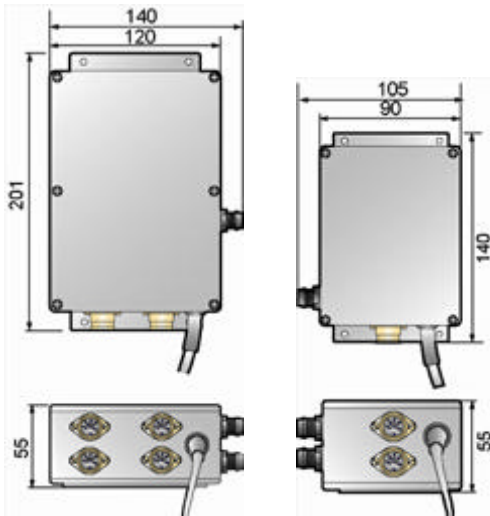
Fault observed	Cause	Corrective action
No output voltage	No mains supply	Check that the mains cable is plugged in and that there is a 220V AC supply.
	Mains fuse	Check the 2 mains fuses.
	Time-delay fuse.	Disconnect the equipment. Wait for the internal thermal fuse to reset. Determine the cause of the disconnection before reconnecting the equipment.

7. Data sheet

7.1 MECHANICAL SPECIFICATIONS

Datum	Principal characteristics
Dimensions	See Figure 7-1.
Weight	1.1 kg (2-output version); 1.8 kg (4-output version).
Casing	Cast aluminium
Environment	Operating temperature: +5 °C to +25 °C. Storage temperature: 0°C to +50 °C. Relative humidity (operating): 5 to 80 % non-condensed. Relative humidity (storage): 10 to 90 % non-condensed. For use at altitudes below 2,000 m.

Figure 7-1:
Dimensions
(mm)



7.2 ELECTRICAL SPECIFICATIONS

Datum	Principal characteristics
Mains:	230-240V AC. 50-60 Hz. Maximum supply voltage: 250V AC
Cable	Mains cable fitted with a European plug H05WF, with 3 standard 1 mm ² conductors. Maximum current 10/16A.
Protection	Mains protection: one tubular fuse 5x20, rating 0.30 mA time delay. Thermal protection: resetting fuse set to 128 °C protects against overheating of the transformer.
Consumption:	Primary (less than 240V AC): 15 mA for the 2-output version and 35 mA for the 4-output version.
Outputs	24V AC, 60/60 Hz, 35VA or 80VA (depending on the type of casing), for all outputs.

8. Accessories available

Item	Code
Time-delay fuse 0.315A	
Time-delay fuse 0.630A	
Power supply 220/24 volts complete – Two outputs	NH102767
Power supply 220/24 volts complete – Four outputs	ACC-GNL-19


9. European Union Declaration of Conformity

Manufacturer
L'air liquide – DMC
Parc Gustave Eiffel
8 Avenue Gutenberg
Bussy Saint Georges
77607 Marne la vallée Cedex 3 - France



Declares that the **Power supply unit**

to which the present declaration refers is in conformity with the basic requirements on electromagnetic compatibility in effect in the medical field.

The equipment bears the  mark indicating that it conforms to current European Union regulations.

To ensure that it observes good practice requirements as indicated in the directive, it has been manufactured in accordance with the following standard:

NF EN 60601-1-1: Safety requirements for medical electrical equipment.

10 September 2005

T. Bardon

Director

10. Guarantee and limit of liability

10.1 GUARANTEE

The guarantee period takes effect on the date of issue of the delivery note and has a duration of one year.

Goods are delivered at the vendor's risk where delivered by a carrier appointed by AIR LIQUIDE DMC. In other cases delivery is at the buyer's risk.

The vendor guarantees the equipment against all design faults and defects of manufacture and construction affecting the storage tanks.

The guarantee offered by the vendor is strictly limited, at the vendor's discretion, to the repair or the replacement of parts which it acknowledges as defective and to the cost of labour, not including packaging and shipping costs.

Replaced defective parts become the property of the vendor.

The repair, modification or replacement of parts during the guarantee period does not extend the duration of the guarantee.

To qualify for the guarantee, the user must submit a claim to the vendor within 15 days of receipt of the equipment, accompanied by the delivery note.

Repairs, modifications or replacements necessary as a consequence of normal wear and tear, of damage and accidents consequent upon incorrect handling, faulty monitoring or maintenance, negligence, overloading, failure to observe the instructions for use, and shock, falls, or damage caused by exposure to the elements are not covered by the guarantee (see technical notes on use).

This guarantee immediately loses effect in the event of the replacement or repair of original parts by persons not duly authorized by AIR LIQUIDE DMC.

Within the limits imposed by applicable legislation, it is expressly agreed that the guarantee awarded in this article is the only guarantee implicitly, explicitly or lawfully granted by the vendor with regard to the materials sold, and that, except where stated to the contrary in writing, the buyer renounces entitlement to any legal action which the buyer (or its employees, affiliate companies, successors or concession holders) might move against the vendor, its employees, affiliate companies, successors or concession holders, in connection with the materials sold; this provision includes without limitation actions concerning personal injury,

damage to goods not covered by the agreement, indirect or immaterial losses or damage and particularly loss of use or of profit, loss of cryogenic liquid or of products in storage etc. Within the limits imposed by applicable legislation, the buyer undertakes to compensate the vendor, its employees, affiliate companies, successors and concession holders, for all claims, complaints, demands, court orders, convictions or liabilities of any nature, as well as all costs and expenses incurred by or imposed on the vendor in connection with the materials sold.

Replacement parts must be used in the conditions of service originally defined by the vendor. In particular, safety devices sold as replacement parts must be installed as replacements for the original safety devices in conditions of service (pressure, temperature, gas, valve diameter etc.) identical to the original.

Application of this guarantee takes place in accordance with the vendor's general terms and conditions of sale.

10.2 LIMIT OF LIABILITY

Neither *L'AIR LIQUIDE-DMC* nor any company associated thereto can be held liable under any circumstances for any damage, including and without limitation to damages incurred as a result of loss of manufacture, interruption of manufacture, loss of information failure of the power supply or of its accessories, bodily injury, loss of time, financial or material loss or any indirect or ancillary consequences of loss arising from the use, or impossibility of use of, the product, even in cases where *L'AIR LIQUIDE-DMC* has been notified of such damage.

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