

**Operating Manual
DC-AD-12 automatic
degasser**

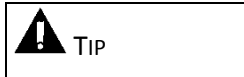
Table of contents

I.	STRUCTURE OF THE MANUAL / CLARIFICATION	3
II.	SAFETY AND HEALTH CONCERNS	4
1	INTRODUCTION	5
1.1	Use of the DC-AD-12 Automatic degasser	5
2	INSTALLATION OF A DC-AD-12 AUTOMATIC DEGASSER.....	7
2.1	Inlet / Outlet connection liquid	7
2.2	Discharge connection gas.....	7
2.3	Pump valve	8
3	START UP / SHUT DOWN	8
4	DISCONNECTING THE DC-AD-12 AUTOMATIC DEGASSER.....	9
5	STORAGE OF THE DC-AD-12 AUTOMATIC DEGASSER	9
6	MAINTENANCE OF THE DC-AD-12 AUTOMATIC DEGASSER	9
7	SURVEY SPARE PARTS.....	10

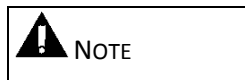
Operating Manual DC-AD-12 Automatic degasser

I. STRUCTURE OF THE MANUAL / CLARIFICATION

The various aspects of this manual are clearly listed here. Points of attention are marked throughout the entire manual in the following way (the interpretation is also given):



Offers suggestions and/or advice to the operator to perform specific tasks more easily.



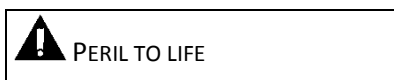
Points out possible problems to the operator.



Indicates damage to the application or directly linked equipment when the operator does not carefully adhere to the procedures.



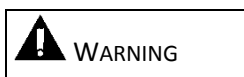
Warns the operator of possible injuries if the procedures are not adhered properly.



The life of the operator is directly threatened.

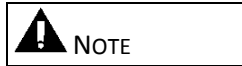
Demaco Holland bv considers the operator to be:

The one who operates the machine or equipment supplied by Demaco Holland bv.



The operator is responsible for the safety of any assisting employee. The operator must ensure, before starting the machine or installation, that no dangerous situation could occur for the assisting employee.

II. SAFETY AND HEALTH CONCERNS



This user manual must be read by the operator as soon as possible in order for him to become familiar with the operation of this equipment.

From the point of view of injuries to the operator, specific attention is given to the dangers that can occur when using liquid nitrogen. On Demaco Holland bv equipment, where the operator may come into contact with liquid nitrogen, you can find the label as shown below. It warns the operator of the presence of coldness and it is indicated that safety glasses and gloves with wrist protection should be worn.



Figure 1; Safety label on Demaco Holland bv products

This user manual should at least be available for consultation at the head of the department. We recommend that a copy be made of this manual inserted in plastic folders, or bound, and put on view at location with the DC-AD-12 Automatic degasser.

We also recommend to carefully read the Demaco safety instruction "Safety guidelines for working with cold media". Extensive information is provided in this manual about working with cryogenic media. A copy of the "safety instruction" is shipped with this delivery. Should you require more copies of this instruction in order to create a safe working environment for your operator(s), additional copies can be requested from Demaco Holland bv. Contact our sales department.

Operating Manual DC-AD-12 Automatic degasser

1 INTRODUCTION

1.1 Use of the DC-AD-12 Automatic degasser

The DC-AD-12 Automatic degasser is designed to release gas from a cryogen line containing a mixture of liquid and gas during static and dynamic flows. This means that during stand still and during consumption gas is separated creating an increase of quality of the liquid gas. This DC-AD-12 Automatic degasser is an ideal solution for small consumptions up to 250 ltr/h. Please note that the gas inside a high velocity two phase flow may not always be completely vented.

The mixture of liquid and gas may be formed by heat leak from the environment, pressure losses by friction or increased static height. Using a DC-AD-12 Automatic degasser prevents a cryogenic line from running dry and warming up in case no liquid is used for some time. As a result, liquid will be immediately available for use.

Inside the DC-AD-12 Automatic degasser a small vessel and a float type valve are combined. Gas buffered in the small vessel will rise and will open and close the vent line. When gas evolves the liquid level inside the DC-AD-12 Automatic degasser will descend and the float type valve opens, gas will be vented. The liquid level will rise again and the float type valve closes. The liquid level at which the float type valve will close is fixed and can not be adjusted.

The DC-AD-12 Automatic degasser interfaces:

Design pressure	12 bar(g)
LN ₂ supply/outlet	Demaco Johnston Coupling DN25 (Ø28x1)
GN ₂ discharge	½" BSP female
Weight empty	appr. 28 kg

Working area

For safe operation of the DC-AD-12 Automatic degasser the following points must be taken into consideration :

- Easy to access.
- Safe area because ice chunks of the DC-AD-12 Automatic degasser discharge can drop down.
- Adequate space to operate and maintain the DC-AD-12 Automatic degasser.
- In case of direct blow-off a safe and ventilated area.

Transport and lifting

In case of transport or lifting of the DC-AD-12 Automatic degasser the following points should be taken into consideration:

- Use a proper casing to protect the DC-AD-12 Automatic degasser from damage.
- Only lift the DC-AD-12 Automatic degasser when its empty.

Operating Manual DC-AD-12 Automatic degasser

Mounting

- The DC-AD-12 Automatic degasser is designed for outside air temperature between – 20°C and + 50°C.
- The DC-AD-12 Automatic degasser must be properly supported because the weight can significantly increase by ice accretion on the discharge.

Identification

- Information about the DC-AD-12 Automatic degasser is given on the dataplate which is affixed to it.

Demaco Order nummer


Referentie

NoBo number
(alleen voor cat. II/H, III/H, IV/H1)

PE
97/3/EC

CE

0038



▶	P140060	
	ORDER NUMBER	
▶	Phase Separator 02	
	REFERENCE ON ISO; SPOOL 33	Vessel / Jacket
▶	Volume (ltr): V=	40 / 65
▶	Design pressure PS (bar(g)):	16 / -1
▶	Max.allowable pressure (bar(g)):	16 / -1
▶	Safety valve pressure (bar(g)):	6
▶	Working pressure (bar(g)):	1,4 / -1
▶	Test pressure without vacuum (bar(g)):	25
▶	Medium:	Nitrogen
▶	Min./Max. temperature TS (°C):	-196 / 38
▶	Date of pressure test (m/y):	04 / 2014

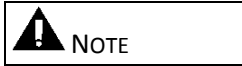
ISO 9001 - ISO 3834-2 - PED H/H1 - VCA **

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▶	PED cat./mod.	II / Mod. H
▶	Empty weight (Tare weight) (kg):	75
▶	Filling weight (kg):	32.8
▶	Year of construction:	2014

Example of a dataplate

2 INSTALLATION OF A DC-AD-12 AUTOMATIC DEGASSER



Inside Holland users of pressure equipment must perform an examination before bringing into use, Dutch term; “Keuring Voor Ingebruikname” (KVI), the user must select which equipment must have this examination. The rules are according the Dutch “Waren Wet Besluit Drukapparatuur” (WWBD).



When filling a DC-AD-12 Automatic degasser with liquid nitrogen, one has to realise that the DC-AD-12 Automatic degasser first has to be cooled down from room temperature to $-196\text{ }^{\circ}\text{C}$. This means that the first quantity of nitrogen will evaporate.

2.1 Inlet / Outlet connection liquid



Always make sure that a safety-relief valve is installed between two shut-off valves when liquid is contained, otherwise it can result in the excessive increase of pressure, pressure above the allowable pressure of the DC-AD-12 Automatic degasser. This can result in cracking of the DC-AD-12 Automatic degasser. The DC-AD-12 Automatic degasser is not a replacement of a safety-relief valve.

The DC-AD-12 Automatic degasser should be vertically installed on a DN25 Demaco Johnston Coupling. Before installation, check the O-rings and the sealing surfaces for damage. For details about installing Demaco Johnston couplings, we refer to the instruction manual ‘Johnston Coupling’.

2.2 Discharge connection gas

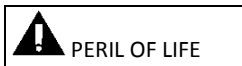
On the gas discharge of the DC-AD-12 Automatic degasser, a non-return valve is mounted as a standard. This non-return valve prevents atmospheric moisture entering into the DC-AD-12 Automatic degasser and should not be removed.

A degas line may be installed to release the gas to a safe area. This line may be connected onto the non-return valve of the discharge line and should have an internal diameter of at least the size of the non return valve. If the degas line is longer than 5 meter the non-return valve may be omitted.

Operating Manual DC-AD-12 Automatic degasser



The temperature of the gas blowing out of the DC-AD-12 Automatic degasser may be as low as -196°C . The position of the outlet and the direction of the gas flow should be chosen in such a way that there is no danger for people or vulnerable equipment. Secondly large ice build-ups are possible without proper insulation.



When the outlet of the DC-AD-12 Automatic degasser is exhausting in a confined space, danger of suffocation exists. This being because the amount of nitrogen from the DC-AD-12 Automatic degasser can displace the air (oxygen) from the space. In this case exhausting the gas to a safe remote atmosphere is necessary.

2.3 Pump valve

On the front side of the DC-AD-12 Automatic degasser, a pump valve is located. This is used for evacuation and as a safety device for the vacuum jacket. It is sealed by a plug and protected from dust by a plastic cap. A security pin prevents the plug from causing danger or damage. Do not remove the cap, the safety pin or the plug, except for re-evacuation. For this, a dedicated pump-out tool is required and the re-evacuation should be carried out by authorized (Demaco Holland bv) personnel. It is not used in any way for the operation of the DC-AD-12 Automatic degasser.

3 START UP / SHUT DOWN

After installation the DC-AD-12 Automatic degasser is immediately ready for use. When cooling down the VIP line the created gas is automatically blown-off until the float type valve will close the venting line due to a rising liquid level. Please note that during the first filling of the line, this may take some time, because a considerable amount of gas may be formed by cooling down the pipes.

The DC-AD-12 Automatic degasser can produce some noises when blowing off gas. Don't let this frighten you. As soon as the DC-AD-12 Automatic degasser is cold, the gas flow will reduce, and the noise will cease.



When the DC-AD-12 Automatic degasser is installed without exhaust piping, cold gas with a temperature as low as -196°C will flow out of the DC-AD-12 Automatic degasser.

Ensure that persons or vulnerable equipment cannot be injured/damaged by this cold gas flow.

Operating Manual DC-AD-12 Automatic degasser

4 DISCONNECTING THE DC-AD-12 AUTOMATIC DEGASSER

Disconnection of the DC-AD-12 Automatic degasser is only possible when a part of the connecting VIP line is dismantled as well. You need at least 500 mm extraction length before you are able to disconnect the Demaco Johnston couplings. The VIP line should be warmed up to room temperature. This heating takes place unforced and under normal circumstances 24 hours. The heating process can be accelerated by purging the VIP line with gas at room temperature.



When disconnecting the DC-AD-12 Automatic degasser, always make sure that there is no liquid left inside the line. The line has to be discharged of the internal pressure by closing the valves at the tank and opening the release valves.

5 STORAGE OF THE DC-AD-12 AUTOMATIC DEGASSER

Store the DC-AD-12 Automatic degasser dry and in packaging. Prevent water and other pollutants from entering the pipes. Minimum storage temperature is 5°C. Maximum storage humidity is 70%.



Be careful that the protection cover, on the end of the Johnston Coupling, remains undamaged during handling and storage.

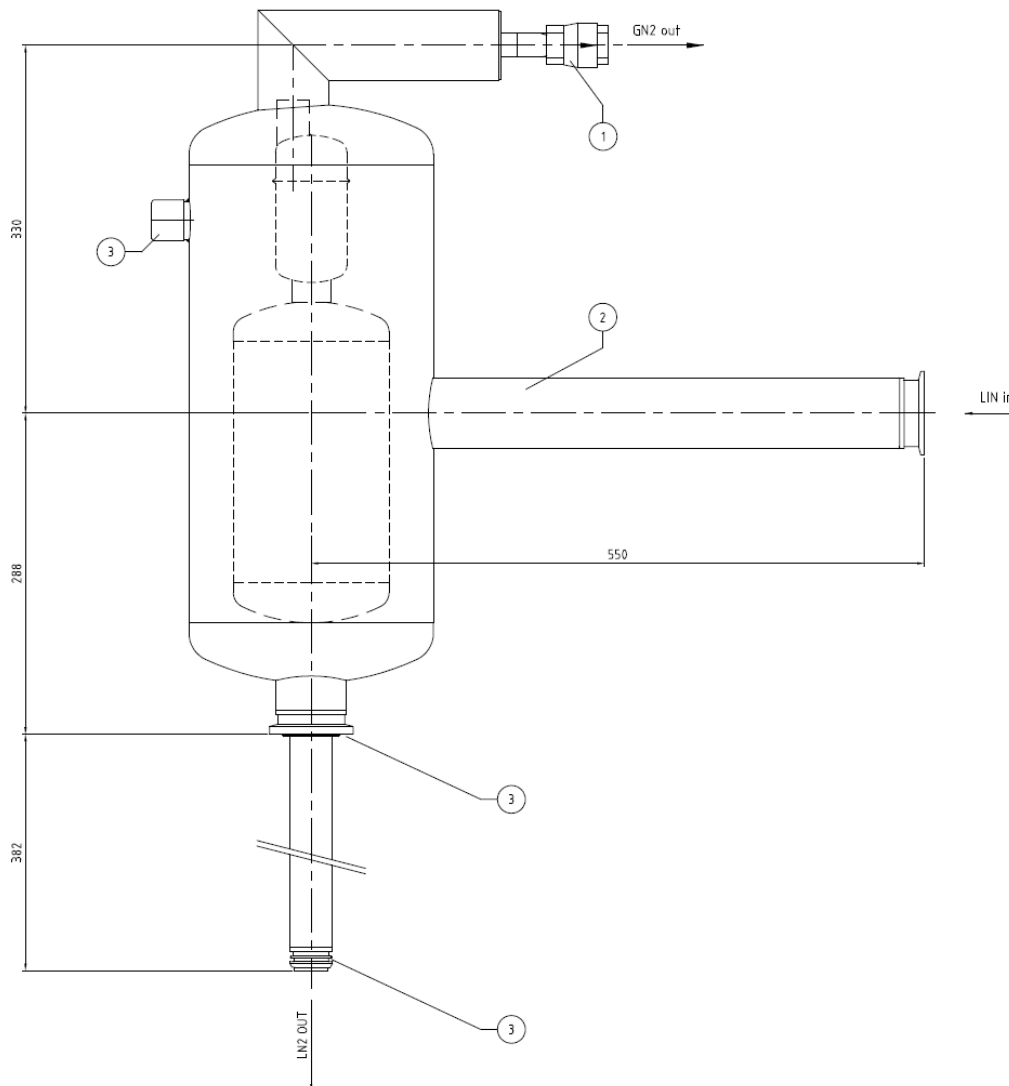
6 MAINTENANCE OF THE DC-AD-12 AUTOMATIC DEGASSER

A DC-AD-12 Automatic degasser is a maintenance free product. However, we recommend to periodically check a number of points in order to eliminate possible wear in the earliest possible stage.

We recommend thorough checking of the following points monthly:

1. If the outer jacket of the DC-AD-12 Automatic degasser shows severe condensation, it may indicate a high degree of humidity in the building. When you have checked this, then possibly the insulation vacuum in the DC-AD-12 Automatic degasser is reduced. Please contact Demaco Holland bv. Uninsulated parts of course always show condensation or ice forming.
2. Check if the opening of the gas discharge is free of any ice or obstacles.

7 SURVEY SPARE PARTS



1. Check valve ½" BSP
2. DC-AD-12 Automatic degasser
3. Pump valve
4. O-ring \varnothing 55x5
5. O-ring \varnothing 30x4