

**tedisel**medical

# ICARUS

## INSTALLATION MANUAL



CE 0197

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# ICARUS

## Installation manual

## 1. Manufacturer

Manufacturer: TEDISEL IBÉRICA S.L.

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## 2. Security information

Important notes in these operating instructions are marked with graphic symbols and signal words.

### 2.1. Injury risk warnings

Signal words such as DANGER, WARNING or CAUTION describe the degree of risk of injury. The different triangular symbols visually emphasise the degree of danger.



WARNING

Refers to a potentially hazardous situation which, if not avoided, could result in death or serious injury.



CAUTION

Refers to a potential hazard which, if not avoided, may result in minor or slight injury.



DANGER

Refers to an immediate danger which, if not avoided, will result in death or serious injury.



Risk of finger entrapment

### 2.2. Warnings of risk of damage

The signal word WARNING describes the degree of risk of material damage. The triangular symbol visually emphasises the degree of danger.



Damage to surfaces: warns of damage to surfaces due to unsuitable cleaning agents and disinfectants.



NOTICE

Refers to a potential hazard that if not avoided can cause damage to equipment.

### 2.3. Additional symbols used in the safety instructions



Fire hazard



Explosion hazard: warns of ignition of explosive gas mixtures.



Dangerous voltage: warns about electric shocks that can cause serious injury or death.

### 2.4. Indication of additional information

NOTA

A NOTE provides additional information and useful tips for safe and efficient use of the device.

### 2.5. Proper use of oxygen.

#### 2.5.1. Oxygen explosion



Oxygen becomes explosive when it comes into contact with oils, greases and lubricants.

Compressed oxygen presents an explosion hazard:

- Make sure that oxygen and gas outlets are free of oil, greasy materials and lubricants!
- Do not use cleaning agents containing oil, grease or lubricants.

#### 2.5.2. Fire hazard



**DANGER:** Escaping oxygen is combustible:

- Open fire, red-hot objects and open light are not allowed when working with oxygen!
- Don't smoke!

## 3. Risks

### 3.1. Gas explosion



Oxygen becomes explosive when it comes into contact with oils, greases and lubricants.

When in contact with oxygen in the air, medical gases may form an explosive or easily flammable gas mixture. The equipment is not suitable for use in environments containing flammable mixtures of anaesthetics with high concentrations of oxygen or nitrous oxide.

If such high concentrations of flammable mixtures of anaesthetics with oxygen or nitrous oxide occur in the environment of the device, there is a risk of ignition under certain conditions.

### 3.2. Risk of device malfunction



CAUTION: If a device is connected to the equipment and trips the protection mechanism of the corresponding circuit in the health care facility, other devices connected to the equipment will also be de-energised.

### 3.3. Fire risk



Plug-in connections for the supply of medical gases must not come into contact with oil, grease or flammable liquids.

### 3.4. Danger of electric shock



Signal cables (network, audio, video, etc.) must be electrically isolated from equipment and the ends of building connections to prevent contact with currents that can cause serious injury or death.

### 3.5. Risk of equipment falling into the anchorage



WARNING: If during the operation of anchoring the equipment to the mounting surface there is no element to support the equipment, it may fall on the person/s performing the installation of the equipment.

### 3.6. Risk of burns

During the gas connection operation, the operator may suffer burns due to the welding process, as well as damage to the equipment or other surrounding equipment.



WARNING: Personal injury and material damage may occur.

### 3.7. Fire risk

If the working atmosphere is not sufficiently ventilated, volatile substances (e.g. oxygen) may have concentrated in the working atmosphere and could cause a fire when in contact with the heat source used for welding.



**FIRE HAZARD:** Failure to comply with this point can cause serious damage.

### 3.8. Risk of electrical contact

During assembly of the equipment, it may come into contact with any live wiring in the installation, which may cause the metal parts of the equipment to become live and therefore reach the operator.



**DANGEROUS VOLTAGE:** Failure to comply with this point may result in personal injury.

## 4. Symbols used



Applicable part B



Earth (mass)



Equipotentiality



Protective earth (ground)















Connection point for neutral conductor



Nurse call button



Direct lighting

	Indirect lighting
	Operating instructions
	Health Product
	Waste electrical equipment
	CE symbol
	Product code
	Unique identification code
	Serial number
	Manufacturer
	Date of manufacture
	Reference to the instruction manual
	Damage to surfaces





Fire hazard



Danger of explosion



Dangerous tension



NOTICE

Notice



Risk of finger entrapment



WARNING

Warning



CAUTION

Caution



DANGER

Danger

## 5. Installation requirements

### 5.1. Anchoring on the mounting surface. Minimum requirements



DANGER: Failure to comply with this point may result in personal injury.

Hardware for mounting the equipment is not included, the method of anchoring will depend on the surface.

ICARUS	
Maximum weight [kg]:	12.5
Maximum torque [Nm]:	-

Maximum weight: Maximum weight per metre of equipment length.

Maximum torque: Only for DIN rail equipment. Not available for ICARUS

## 5.2. Training

Personnel performing the installation must be properly trained and qualified by the customer. Persons who:

1. have received the training and are duly registered (at those levels where legal provisions make such registration necessary).
2. have been instructed in the installation of this device by means of this instruction manual as a basis.
3. are able to assess the tasks they perform on the basis of their own professional experience and training in relevant safety standards and can recognise the potential hazards involved in the work.

## 6. Installation and connection

This section of the manual shows how to install and connect the Icarus units. It should be borne in mind that to carry out these operations it will be necessary to remove parts of the enclosure.

Before proceeding with the installation, the installation drawings must be checked in order to locate the inputs arranged on the equipment to supply the different medical gas distribution systems and the different electrical, nurse call and voice and data circuits.

The connections for the supplies ① of the ICARUS systems enter through the side walls as shown in Figure 1.

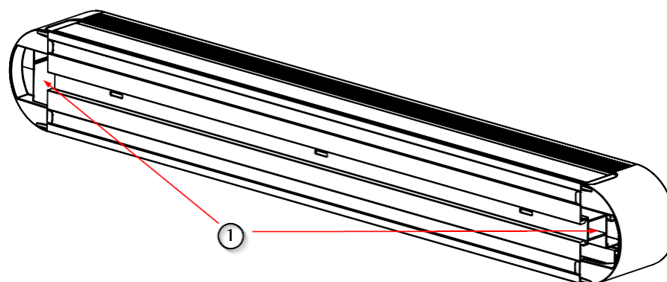


Fig. 1 Equipment supply connections

## 6.1. Removal and installation of covers

For maintenance of the equipment, the outer covers must be removed.

### 6.1.1. Removal of diffusers

- Using a flat-nosed tool, remove the light diffusers ① as shown in figure 2, taking care not to scratch the paintwork on the top and bottom covers ②.
- Put the diffusers back on the equipment and press them into position until the clipping sound is heard.

### 6.1.2. Removal of top and bottom covers

- Using a flat-nosed tool, remove the top and bottom covers ② as shown in figure 1, taking care not to scratch other areas of the enclosure, and leave them in a safe place.
- Place the upper and lower covers ② back on the device by pushing them into position and pressing them together until the clipping sound is heard.

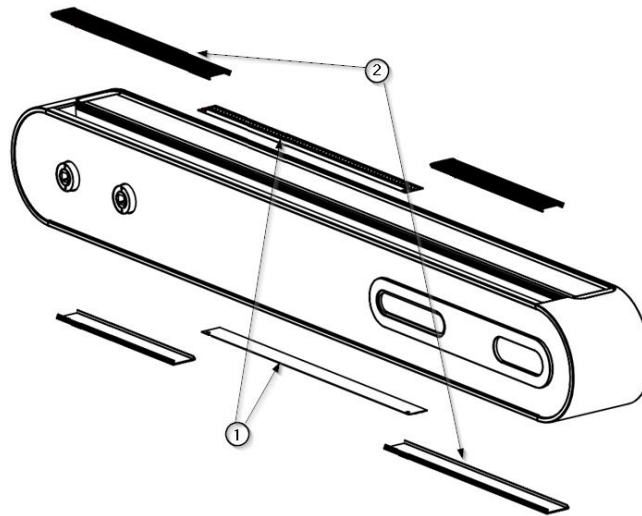


Fig. 2 Removal of diffusers and top and bottom covers

### 6.1.3. Removal of the front

- Remove the top covers as described in the previous point.

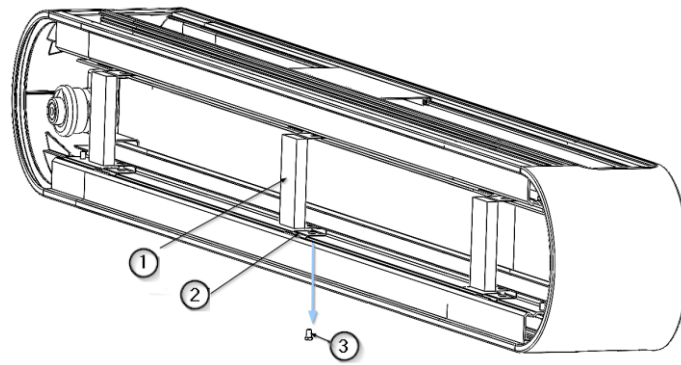


Fig. 3 Removing the front panel hardware

- Remove the M4 x 8 DIN 7505 screws (3) securing the front panel clamping tabs (2). The bracket (1) is fixed to the front panel.
- Remove the front cover (5) using two suction cups (4) as shown in Figure 4 to reveal the pre-installed gas inlets on the device.

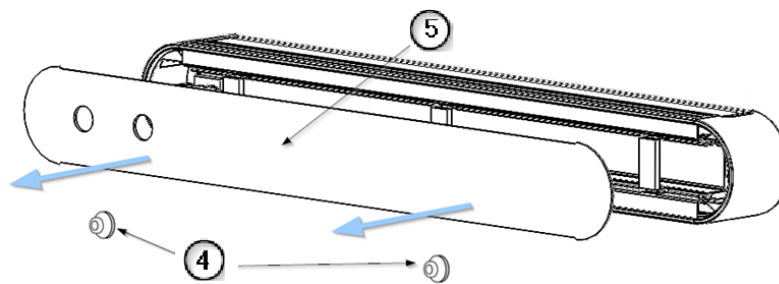


Fig. 4 Removal of the front panel

- To put the central cover back on the device, move it into position and press it in until you hear the clipping sound.

#### 6.1.4. Removal of side walls

- Remove the top covers as described in section 6.1.2 of this manual. The screw (2) that fixes the end cap will be visible.

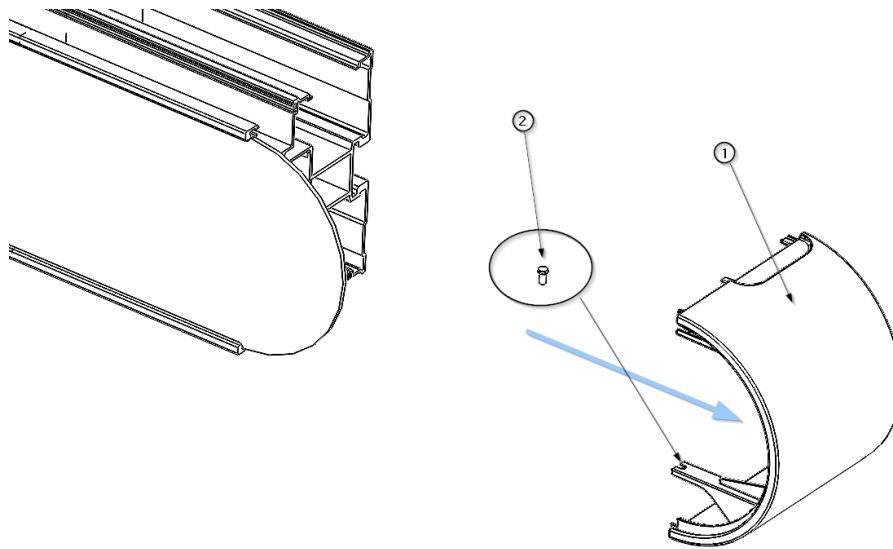


Fig. 5 Removal of side walls

- Remove the M4 x 10 screw (2) DIN 7505 and slide the end cap (1) in the direction of the equipment chassis to remove it as shown in figure 5.
- To refit the end cap (1) simply push it into position in the direction of the chassis until the end cap stops and fit the fixing screw (2).

## 6.2. Installation on a masonry wall

- Locate the equipment anchor points (1) indicated on the accompanying installation drawing (see Fig. 6).

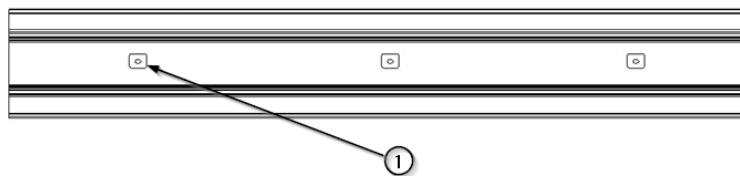


Fig.6 ICARUS equipment anchor points



See installation drawing of the equipment.

- Fix the wall brackets (3) on which the equipment is to be suspended by matching the screw housing that will fix the equipment (2) with the positions indicated in figure 6 for the anchorage points (1) as shown in figure 7.

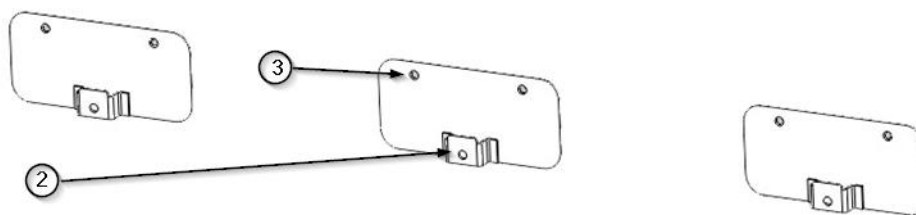
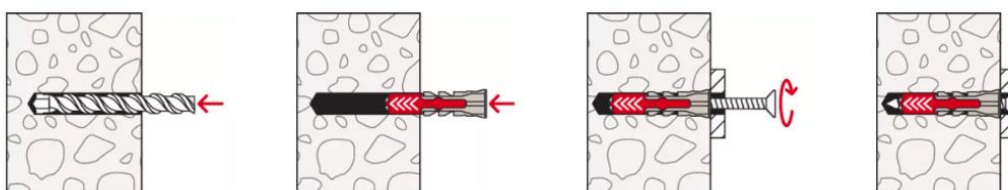


Fig.7 Positioning of the ICARUS equipment anchoring brackets

- Fasten the wall brackets ③ as shown in figure 7 without tightening them definitively, only in order to secure the device to the mounting surface with the appropriate screws.
- Check that the brackets are level and in the correct position according to the installation drawing.
- Make the rest of the joints and do the final tightening of all of them once they are all in place.

The connecting elements to be used when installing N270 on a conventional masonry surface are as follows (see Fig. 8).

Position	Description
①	Wall bracket for ICARUS
②	Screw DIN 571 for 8 mm socket, hexagon head, zinc plated
③	Wide washer DIN 9021 M6 zinc plated
④	Fischer DuoPower Bicomponent Cue
⑤	Socket head cap screw M6 x 20 Din 912
⑥	Wide washer 6.4 DIN 9021



Loads											
DuoPower											
Highest recommended loads <sup>1)</sup> for a single anchor.											
The given loads are valid for wood screws with the specified diameter.											
Type		5 x 25	6 x 30	6 x 50	8 x 40	8 x 65	10 x 50	10 x 80	12 x 60	14 x 70	
Wood screw diameter	[mm]	4	5	5	6	6	8	8	10	12	
Min. edge distance concrete <sup>c<sub>min</sub></sup>	[mm]	30	35	35	50	50	65	65	80	100	
Recommended loads in the respective base material F... <sup>2)</sup>											
Concrete	≥ C20/25	[kN]	0,40	0,95	1,65	1,10	2,30	2,15	4,20	3,30	5,30
Solid brick	≥ Mz 12	[kN]	0,30	0,50	0,55	0,62	0,69	1,20	1,45	1,30	1,35
Solid sand-lime brick	≥ KS 12	[kN]	0,50	1,00	1,60	1,25	2,25	2,20	3,85	2,80	4,50
Aerated concrete	≥ AAC 2 (G2)	[kN]	0,05	0,10	0,15	0,10	0,16	0,20	0,30	0,24	0,35
Aerated concrete	≥ AAC 4 (G4)	[kN]	0,25	0,38	0,55	0,42	0,60	0,60	1,10	1,00	1,45
Vertically perforated brick	≥ Hlz 12 (ρ ≥ 0,9 kg/dm <sup>3</sup> )	[kN]	0,13	0,15	0,17	0,25	0,40	0,25	0,40	0,35	0,40
Perforated sand-lime brick	≥ KSL 12 (ρ ≥ 1,6 kg/dm <sup>3</sup> )	[kN]	0,40	0,60	0,60	0,70	1,00	0,70	2,00	0,75	1,50
Gypsum block	(ρ ≥ 0,9 kg/dm <sup>3</sup> )	[kN]	0,10	0,18	0,37	0,25	0,50	0,35	0,65	0,50	0,50
Gypsum fibreboard	12,5 mm	[kN]	0,24	0,33	0,35	0,35	-	0,50	-	-	-
Gypsum plasterboard	12,5 mm	[kN]	0,12	0,15	0,15	0,15	-	0,15	-	-	-
Gypsum plasterboard	2 x 12,5 mm	[kN]	0,13	0,15	0,24	0,20	0,32	0,30	-	-	-
Mattoni Forato Typ F8		[kN]	0,30	0,30	-	0,25	-	0,25	-	-	-
Tramezza Doppio UNI 19		[kN]	0,15	0,15	0,23	0,15	0,30	0,20	0,52	0,35	0,35
Sepa Parpaing		[kN]	0,30	0,45	0,25 <sup>3)</sup>	0,45	0,45 <sup>3)</sup>	0,45	0,45 <sup>3)</sup>	0,60 <sup>3)</sup>	0,60 <sup>3)</sup>

<sup>1)</sup> Required safety factors are considered.

<sup>2)</sup> Valid for tensile load, shear load and oblique load under any angle.

<sup>3)</sup> Load determination on plastered wall.

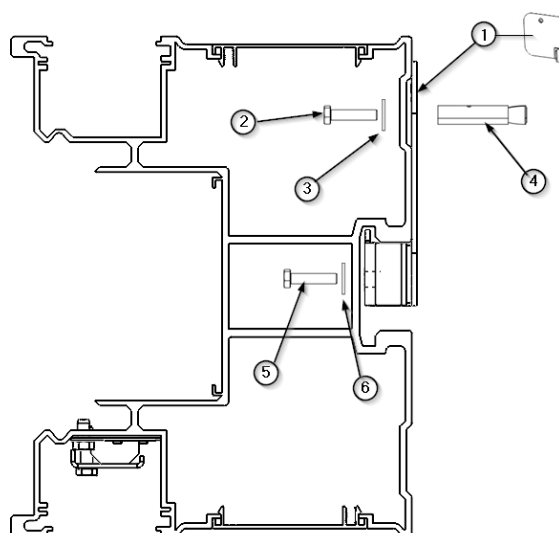


Fig. 8 Fixing the equipment to a conventional masonry wall

### 6.3. Mounting on plasterboard panels.

- Locate the equipment anchor points ① indicated on the accompanying installation drawing (see Fig. 6).



See installation drawing of the equipment.

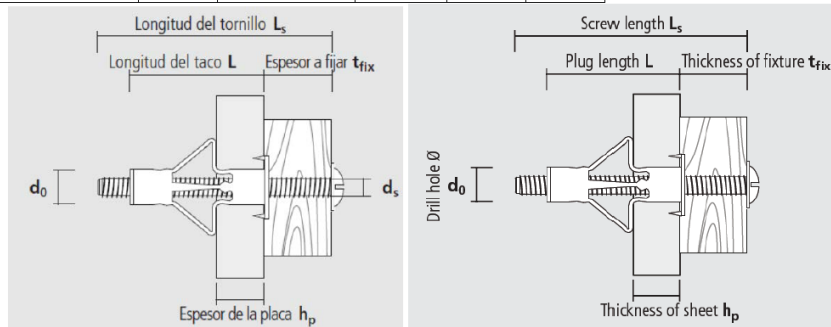
- Fix the wall brackets ③ on which the equipment is to be suspended by matching the screw housing that will fix the equipment ② with the positions indicated in figure 6 for the anchor points ① as shown in figure 7.

- Fasten the wall brackets ③ as shown in figure 7 without tightening them definitively, only in order to secure the device to the mounting surface with the appropriate screws.
- Check that the brackets are level and in the correct position according to the installation drawing.
- Make the rest of the joints and do the final tightening of all of them once they are all in place.

The recommended connecting elements when installing Icarus on a conventional masonry surface are as follows (see Fig. 9).

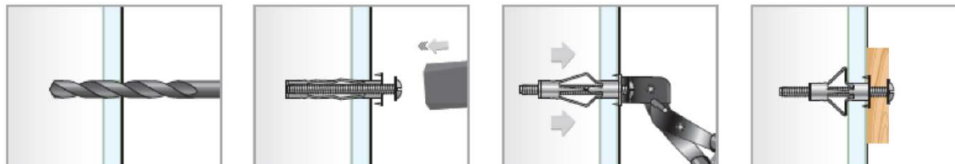
Position	Description
①	Wall bracket for ICARUS
②	Metal expansion plug for gypsum plasterboard (incl. screw)
③	Wide washer DIN 9021 M6 zinc plated
④	Socket head cap screw M6 x 20 Din 912

REF	do [mm]	h <sub>p</sub> min-max [mm]	Rosca- thread	Ls [mm]	L [mm]
HRM 4-20	8	3-18	M4	52	46
HRM 4-24	8	18-24	M4	58	52
HRM 4-38	8	32-38	M4	72	66
HRM 5-16	11	3-16	M5	58	52
HRM 5-32	11	14-32	M5	71	65
HRM 5-45	11	32-45	M5	88	80
HRM 6-16	13	3-16	M6	58	52
HRM 6-32	13	14-32	M6	71	65
HRM 6-45	13	32-45	M6	88	80
HRM 8-16	13	3-16	M8	61	53
HRM 8-32	13	16-32	M8	73	66



#### PROCEDIMIENTO DE INSTALACIÓN / **INSTALLATION PROCEDURE**

Instalación con pinza / **Mounting with installation pliers**





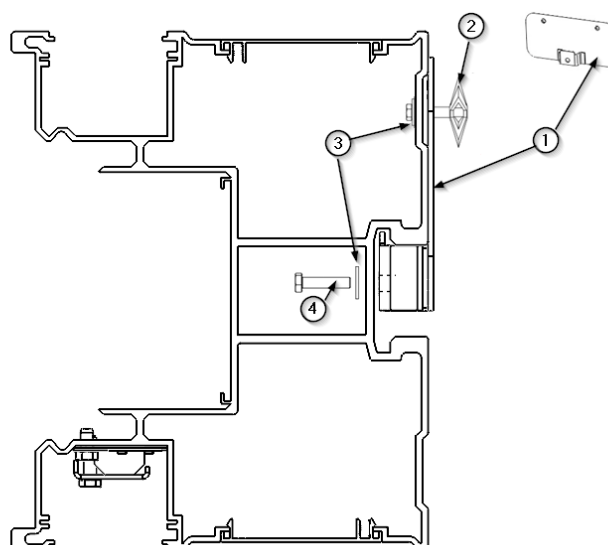


Fig.9 Fixing the equipment to a plasterboard wall

#### 6.4. Electrical and voice/data connection:

- Remove the side walls. The electrical, voice and data connections are exposed.



See section 6.1.4 of this manual.

The electrical, voice and data circuits enter the equipment through a window (1) located next to one of the side walls. The electrical circuits terminate in a common terminal block (2), except for voice and data, which are connected directly to the corresponding mechanism. See figure 10.

The equipment must be installed by qualified personnel taking into account national regulations.



To avoid the risk of electric shock, the equipment must be connected to a protective earth. Failure to do so may result in personal injury.

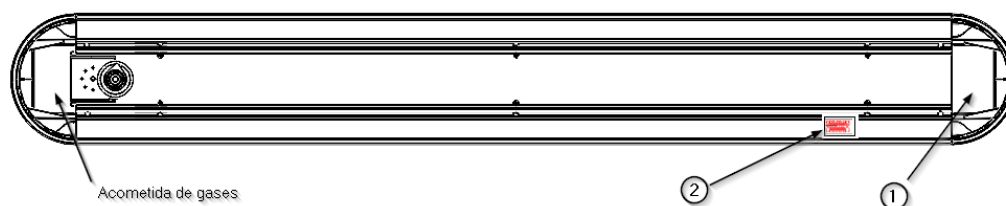


Fig.10 Detail of the electrical connection points at N270



See installation drawing of the equipment.

NOTA

In installations with continuous Bead Head units designed for multiple beds, there are two possible options:

1. Equipping each bed with its own terminal block.
2. Using a single terminal block with overhead connections between sections.

### 6.5. Gas connection:

The medical gas circuits enter the equipment through a window located next to one of the side walls of the equipment. The connection of the medical gas circuits shall be carried out in accordance with the applicable standards, UNE EN ISO 7396-1\_2016 and UNE EN ISO 7396-2\_2007 by qualified personnel.

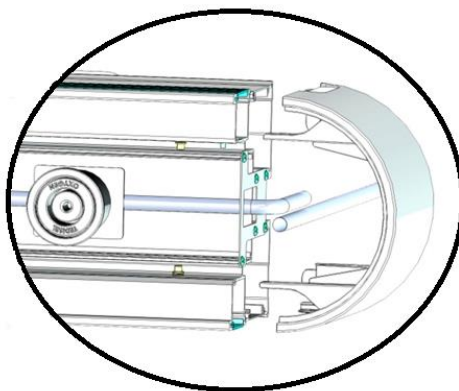


Fig.11 Medical gas and vacuum supply inlet

The gas circuits shall be connected in the inlet area of the installation pipes ② and the installation plan shall be checked before starting the operation.

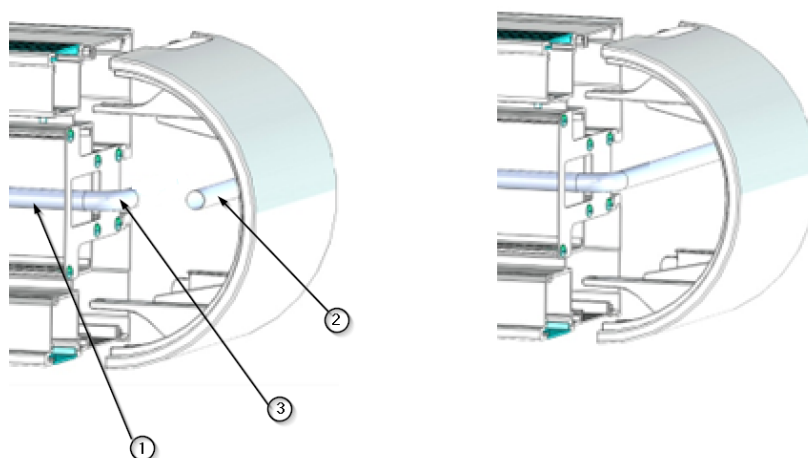
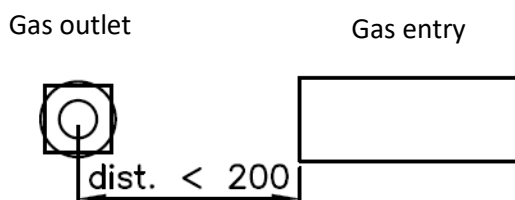


Fig.12 Cutting of pipes and fitting of copper fittings

- Cut off the pipe ① from the equipment piping and the pipe ② corresponding to the gas circuit in question coming from the installation.
- Place the copper fitting (elbow) ③ in position joining the two pipes.
- Solder the 3 components as shown in the picture on the right in figure 11.
- Replace the central protective cap for the medical gas piping rail as described in chapter 6.1.4 of this manual.



**WARNING:** If the distance between the gas outlet and the beginning of the gas entry is less than 200 mm, the valve must be removed from the gas outlet prior to the welding process.



*Fig.13 Minimum gas welding distance to the installation*

## 6.6. External power protection requirements

For installations in critical hospital areas (operating rooms, ICUs, etc.), the power supply to the equipment must include upstream protections that meet the following requirements:

- Power supply lines for electrical sockets: 16 A Type II MCB.
- Lighting or brake lines: 16 A Type II MCB + 25 A / 30 mA Type II RCD.

## 7. Installation checks

When making adjustments to the equipment, it is necessary:

- verify that the relevant medical gas shut-off valves are properly closed and ensure that the system cannot be reopened.
- verify that the system is electrically disconnected and take measures to ensure that the system cannot be reconnected.



**CAUTION:** Failure to comply with this point will result in serious damage.

### 7.1. Mechanical test

It must be checked that each of the anchorage points is properly fixed to the mounting surface and that there is no displacement of the equipment.



**WARNING:** Personal injury may result from dropping the equipment.

## 7.2. Electrical circuit tests.

In accordance with IEC 60601-1, the following tests shall be performed to ensure the proper functioning of the equipment:

1. Voltage verification at power sockets
2. Lighting module operation check
3. Protective earth connection verification
4. Equipotential bonding verification

Power must be supplied to each of the circuits provided and a test must be carried out to check that all the mechanisms provided in the circuit in question, and only these, are supplied with voltage.

- Check continuity of protective earth wiring.



**DANGEROUS VOLTAGE:** To avoid risk of electric shock, equipment must be connected to a protective earth. Failure to do so may result in personal injury.

## 7.3. Gas circuit test.

To verify the correct installation of the medical gas pipelines, the following tests are carried out:

1. Tightness test, according to Annex C UNE-EN ISO 7396-1.
2. Mechanical integrity, according to Annex C UNE-EN ISO 7396-1.
3. Verification of mechanical operation and identification for medical gas outlets, according to Annex C UNE-EN ISO 7396-1.
4. Absence of cross-connections, according to Annex C UNE-EN ISO 7396-1.

These tests shall be carried out at operating pressure.



**CAUTION:** Danger of metallic element impact due to faulty disconnection, can cause serious personal injury.

## 7.4. Check envelope.

Check that each of the enclosure elements that have been removed to carry out the installation operations described in this manual are properly fixed and secured in their intended position.

- Checking of openings, closings, foldings, displacements.



WARNING: The use of gloves is recommended as minor personal injury may occur.

## 8. Regulations

### 8.1. Team ranking

According to the new MDD regulation 93/42/EEC on medical devices, this product family is classified as:

- Class IIb, by Annex II, excluding section 4, regulation 11.
- Protection level IP20 according to IEC 60529

Equipment intended for continuous operation.

### 8.2. Reference standards

The device complies with the safety requirements of the following standards and directives:

ISO11197: Medical supply units

IEC 60601-1: Medical electrical equipment. General requirements for basic safety and essential performance.

IEC 60601-1-2: Medical electrical equipment. Part 1-2. General requirements for basic safety and essential performance. Collateral standard. Electromagnetic disturbances.