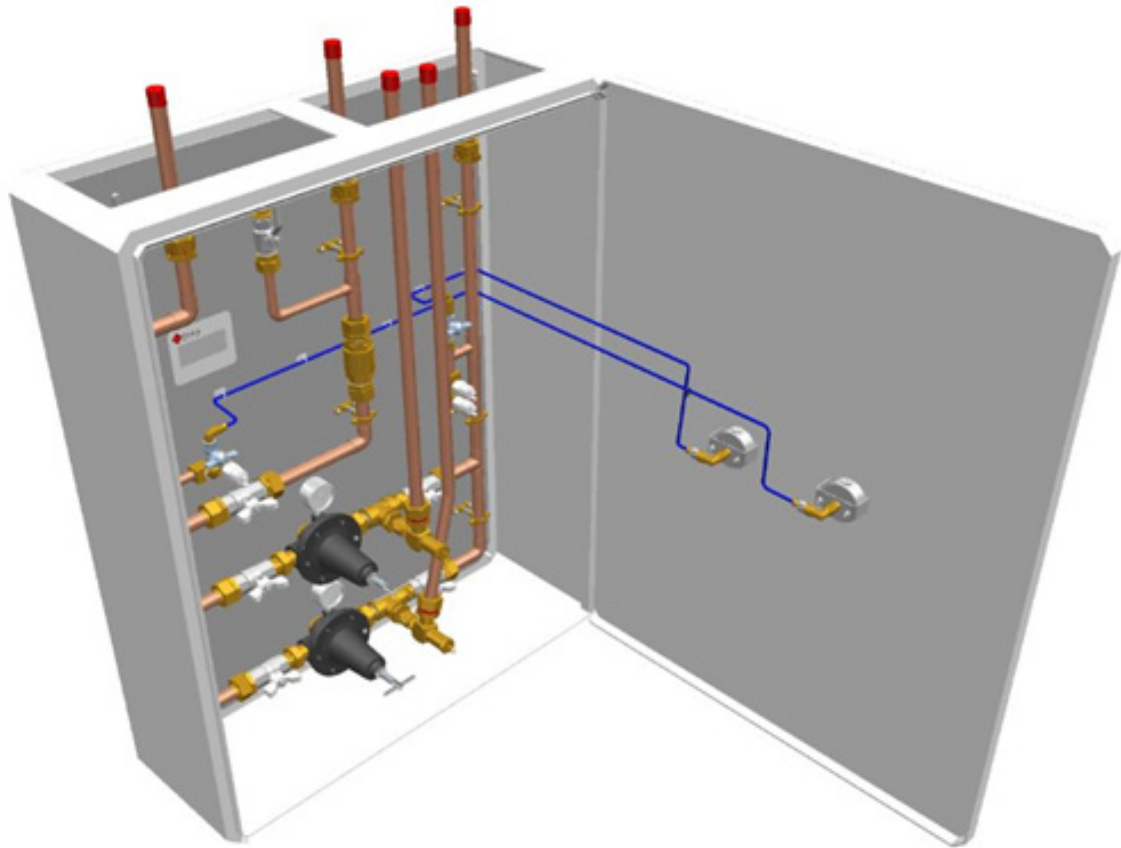


Operation and Maintenance Instructions



Vacuum Insulated Evaporator (VIE) Control Panel

Part number 4233500362

Revision 02



BEACONMEDAES[®]

Operation and Maintenance Manual

Vacuum Insulated Evaporator (VIE) Control Panel

This unit is purchased from:

Date purchased:

Model number:

Serial number:

Option(s) included:

Any information, service or spare parts requests should include the serial number and be directed to:

BeaconMedaes Limited
Greaves Close, Markham Vale,
Chesterfield, S44 5FB, UK

Telephone: +44 (0) 1246 474242
Email: gbn.info@beaconmedaes.com
Website Contacts: www.beaconmedaes.com

BeaconMedæs reserves the right to make changes and improvements to update products sold previously without notice or obligation.



BeaconMedaes Limited, Greaves Close, Markham Vale,
Chesterfield, S44 5FB, UK



Personnel must make themselves familiar with the contents of this manual and the function of the unit before installing, operating or maintaining.

Abbreviations

Abbreviation	Full Description	Abbreviation	Full Description
BS	British Standard	kPa	Kilo pascals
BSP	British Standard Pipe	Max	Maximum
CO2	Carbon dioxide	Med	Medical
°C	Degree Celsius	m	Meter
∅	Diameter	mm	Millimetres
ERM	Emergency reserve manifold	Min	Minimum
EN	European Standards	N2	Nitrogen
1st	First	N2O	Nitrous oxide
HTM	Health Technical Memorandum	NRV	Non-return valve
ID	Identification	OD	Outside Diameter
"	Inch	O2	Oxygen
ISO	International Standard Organisation	%	Percentage
Kg	Kilograms	2nd	Second

Issue Record

Document No	Revision No.	Details of Changes	Date
4233500362	02	IAR 10516: Project to transition from MDD to MDR	15-FEB-2024

Introduction

This manual contains information needed to install, operate and maintain the BeaconMedaes Vacuum Insulator Evaporator (VIE) Control Panel.

The contents of this manual are intended to be read and used by suitably qualified personnel.

WARNINGS, CAUTIONS and NOTES

The following Warnings, Cautions, and Notes must be read and understood before using the Vacuum Insulator Evaporator (VIE) Control Panel.

Warnings!

Warnings tell you about dangerous conditions that could lead to death or serious injury to the user that can occur if you do not obey all of the instructions in this manual.

1. *Read through this entire instruction manual before using or showing others how to use this equipment. As with all medical equipment, attempting to use this device without a thorough understanding of its operation may result in patient or user injury.*
2. *Do not attempt to modify this device in any way not strictly described within this manual.*
3. *Vacuum Insulated Evaporator (VIE) Control Panels must be protected from access by unauthorised personnel.*
4. *Risk of fire or explosion: Do not lubricate this product with oil or grease. Safe and compatible lubricants can be obtained from BeaconMedaes if necessary.*
5. *Do not use this product if it is damaged in any way or if there is evidence of contamination internally or on any of gas wetted connections (e.g. debris, particles, oil, lubricant or grease).*
6. *Keep all components dry and clean during storage and installation.*
7. *BeaconMedaes vacuum plant can be safely handled and stored under normal working and environmental conditions.*

8. *Adverse environmental conditions and harsh abrasives or chemicals may cause damage to the unit.*
9. *Install the system as directed by the site engineer, for the optimum position. Check that the specified pressure safety valves, non-return valves and line valves have been fitted and verify the valves are certified to operate in accordance with the contract specification and conform to BS 6759: part 2 1984.*

Cautions!

Cautions tell you about dangerous conditions that can occur and cause damage to the equipment if you do not obey all of the instructions in this manual.

1. *Use of sub-standard or inappropriate parts and materials may damage the product and invalidate the warranty. Only use genuine BeaconMedaes spare parts.*
2. *Always wash leak detection fluids off with clean water immediately after use.*
3. *Always open valves slowly.*
4. *Be careful not to over-torque face seal fittings.*
5. *Only use leak detection fluids that are compatible with BS 14291 and our recommended product is Teepol. Always wash leak detection fluids off with clean water immediately after use.*
6. *If the "VIE control panel" is received with damaged packaging the product maybe compromised. Before putting into use check for any visible signs of damage to the product, with special attention to components that will be in contact with the medical gas with regard to ruptures or compromised cleanliness. Contact [BeaconMedaes] for guidance regarding repair or replacement if needed.*

Notes:

1. *A notice to the user and/or patient that any serious incident that has occurred in relation to the device should be reported to the manufacturer and the*

competent authority of the Member State in which the user and/or patient is established.

2. All information, specifications and illustrations within this manual are those in effect at the time of printing.

3. The manufacturer reserves the right to change or make improvements without notice and without incurring any obligation to make changes or add improvements to products previously provided.

4. Due regard must be paid to the safety of personnel. Testing should not create a hazard, particular attention being given to foreign matter located in discharge outlets.

5. Take care when brazing into the gas pipeline, to prevent damage to the regulator due to heat transfer.

6. BeaconMedaes will not accept responsibility for damage caused during installation.

7. It is possible to test the correct lift pressure of the regulator output safety valve by isolating ONLY the output of the standby line pressure regulator (clockwise to increase pressure).

8. Pressure regulators are supplied Oxygen clean. If necessary, only Oxygen safe lubricants should be used. Contact the BeaconMedaes Service Department for further information.

9. Failure through misuse or abuse is usually not repairable, and is not covered by the manufacturer's warranty.

Scope of this manual

This manual describes the Operation Service, Repair and Testing of the Vacuum Insulator Evaporator (VIE).

BeaconMedaes service contact

In the event of any queries or problems that cannot be resolved using information in this manual, please call:

+44 (0) 1246 474 242

Quote if possible, the:

4233500362.02

- Product part number
- Lot/ Batch number
- Approximate date of purchase
- Apparent fault

Abbreviations used

The following abbreviations are used in this manual:

Abbreviation	Full Name
MGS	Medical Gas Solutions
VIE	Vacuum Insulator Evaporator
GMDN	Global Medical Device Nomenclature
EC MDD	European Commission Medical Devices Directive
GHTF	Global Harmonization Task Force
°C	Degrees Centigrade
R.H.	Relative Humidity
kPa	kilopascal
IP4X	Ingress Protection Standard
l/min	Litres per Minute

Scope of this manual

This manual describes the Operation Service, Repair and Testing of the BeaconMedaes Vacuum Insulator Evaporator (VIE) Control Panel.

BeaconMedaes service contact

In the event of any queries or problems that cannot be resolved using information in this manual, please call:

+44 (0) 1235 463051

Quote if possible, the:

- Product part number
- Lot/ Batch number
- Approximate date of purchase
- Apparent fault

Storage and Handling

All products are separately packaged and stored in under controlled conditions. Adverse environmental conditions and harsh abrasives or chemicals may cause damage.

Identification

BeaconMedaes VIE control panels can be identified by the label fixed to the metal backplate and is visible through the cover window.

Environmental Conditions

VIE's can be safely handled and stored under normal working and environmental conditions. Adverse environmental conditions and harsh abrasives or chemical may cause damage to the unit.

Environmental Transport and Storage Conditions

All products are separately packaged and stored in controlled conditions.

Minimum storage temperature: 0°C

Maximum storage temperature: +40°C

Environmental Operating Conditions

Adverse environmental conditions and harsh abrasives or chemicals may cause damage to the unit.

Minimum working temperature: -5°C

Maximum working temperature: +60°C

Table of Contents	
Issue Record	3
Introduction	3
WARNINGS, CAUTIONS and NOTES	3
Abbreviations used	4
Storage and Handling	4
Identification	4
Environmental Conditions	5
1 Description	7
1.1 Intended Use	7
1.2 Features	7
1.3 General Description	7
1.3.1 Modular Unit with Local Alarm Panel	7
1.3.2 Single Unit - Flush or Surface Mounted	7
1.3.3 Gas/ vacuum Identification	7
1.3.4 Access to Valve	7
2 Technical Specification	9
2.1 Technical Specification Table	9
3 User Responsibility	9
4 Description of Symbols	10
5 Installation	10
5.1 Environmental Conditions - Installation	12
5.2 Mounting	12
5.3 Dimensions	12
6 Commissioning	12
6.1 Introduction	10
6.2 Pre-use Test	10
7 Operating Instructions	13
8 Maintenance	14
8.1 Introduction	14
8.2 Tools and equipment	14
8.3.1 Cleaning	14
8.3.2 Minimum Requirements	14
8.3.3 Safety Relief Valves	14
9 Fault Diagnosis	15
10 Recommended Spares	16

1 Description

Vacuum Insulated Evaporator (VIE) Control Panel is intended to supply oxygen pipeline installations complying with UK DoH Health Technical Memorandum No. 2022 or 02-01, ISO 7396-1, NFPA 99, AS 2986 or similar guidelines or standards

Vacuum Insulated Evaporator (VIE) Control Panels are available in a duplex configuration, with one 'Standby' and one 'Duty' regulator set. The BeaconMedaes MGS VIE control panel is designed to accept a supply of gaseous oxygen from the VIE at 10.5 bar or from the standby manifold at 850 kPa (8.5 bar) and to reduce this to a nominal 420 kPa (4.2 bar) pipeline distribution system pressure.

1.1 Features

- Pressure relief valves are fitted as standard
- VIE Control Panels are supplied in a duplex configuration, with one 'Standby' and one 'Duty' regulator set.

1.1.1 Ball Valves

Ball valves are constructed from a satin nickel plated body.

The ball plug and valve stem are machined to a high

surface finish and electrolytically coated with chrome to resist wear and chemical attack. The valve stem has an integral ball sealed by both nitrile seats and O-ring seals.

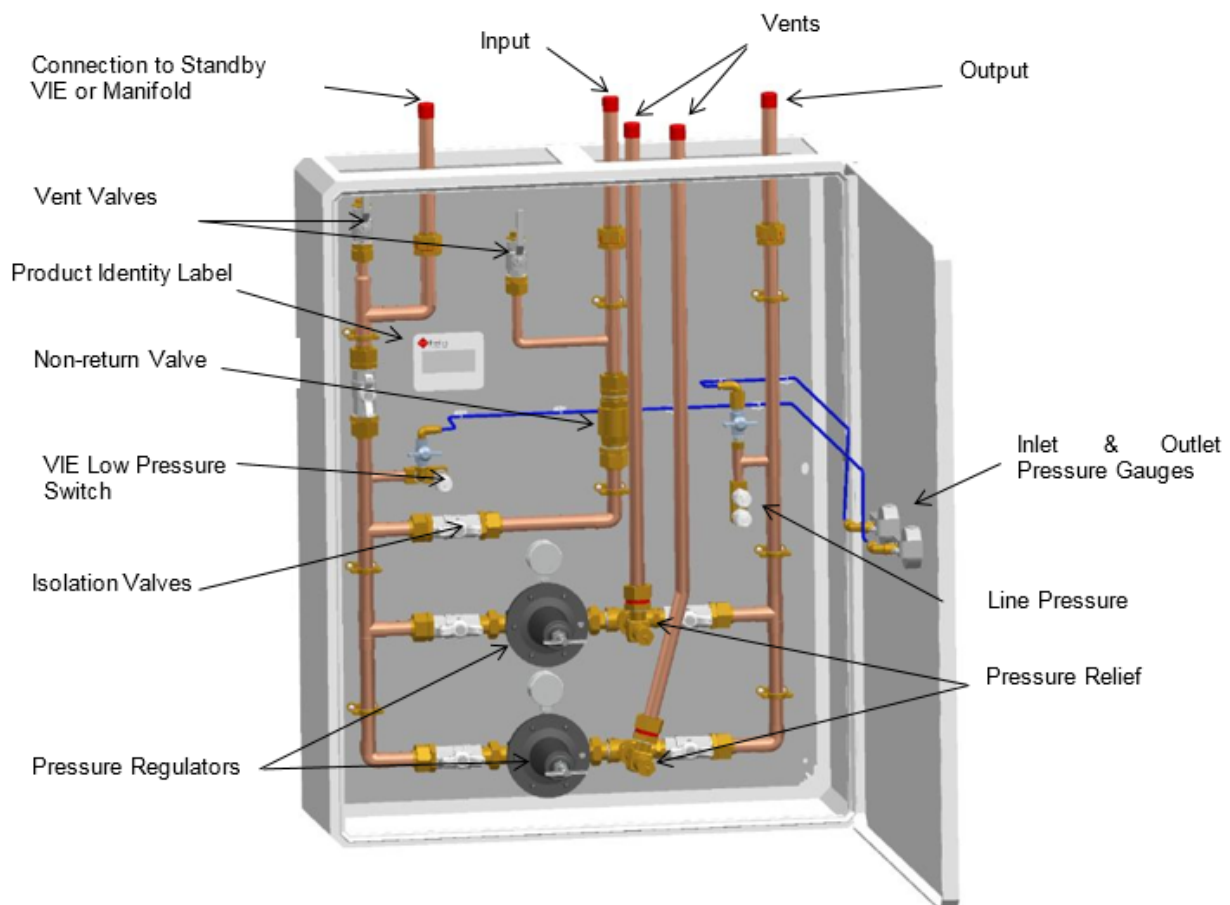
1.1.2 Safety Relief Valves

Safety relief valves are the high lift, atmospheric discharge type, suitable for medical air and oxygen applications. The flow is de-rated and measured in accordance with BS6759 Part 2: 1984. The valve re-seats by minus 10% of the set pressure.

1.1.3 Pressure Regulators

Pressure regulators, supplied as part of a VIE control panel, are modified by BeaconMedaes MGS personnel to include pressure gauges and blanking plugs to improve their performance and service life.

Note: Pressure regulators are supplied Oxygen clean. If necessary, only Oxygen safe lubricants should be used. Contact the BeaconMedaes MGS Service Department for further information.



General Information

The device shall operate in a manner that complies to both HTM 02-01 and ISO 7396-1 requirements.

This device is defined within ISO 7396-1 as one or more source of supply which assists with maintaining continuity of supply to the medical gas pipeline.

The device group scope covers the following types of source equipment.

- Supply systems with cylinders
- Supply systems with cryogenic vessels

Note – medical cylinders and cryogenic vessels are not within the scope of the device.

Intended Use

The device is intended to work in conjunction with other devices within the medical gas pipeline system (MGPS) to assist with maintaining continuity of medical gas supply throughout the hospital to local connection points for eventual introduction into the human body.

The device controls the gas pressure within the specification as required by the MGPS. In all cases other devices outside of this scope are connected downstream of the MGPS are required to control the final gas pressure and flow requirements for safe supply to the patient. Therefore, this device is not intended to control supply parameter hazards directly to the patient, only to the MGPS.

Intended patient population

The device is intended to be used in conjunction with other medical gas pipeline equipment in hospitals and have no direct contact with patients. Medical Gas Pipeline Systems supply medical gases to medical equipment which can be used across any populations & all age groups.

Intended user profile

VIE Control Panels are intended for use by appropriately qualified and trained personnel only who have undergone relevant 'HTM 02-01 Authorised Person' (AP) training regarding the safe use of medical gas supply systems.

The device should only be installed, commissioned, operated, and maintained by technicians who are suitably trained with medical gas systems, such as Competent or Authorised Persons as defined in UK Department of Health Technical Memorandum No. 02-01 (HTM 02-01 Part B: Operational Management). The device is intended for use by appropri-

ately qualified technical personnel only. This condition is emphasised in the IFUs.

Reference: HTM 02-01 Medical gas pipeline systems – Part B: Operational Management

Authorised Person (MGPS)

4.21 The Authorised Person (MGPS) is defined as that person designated by the Executive Manager to be responsible for the day-to-day management of the MGPS at a particular site or sites. This includes the issue of permits in accordance with the permit-to-work procedure. The principal responsibilities of the Authorised Person (MGPS) in respect of the permit-to-work procedure are set out in paragraph 6.91. The Authorised Person (MGPS) also has specific duties with regard to VIE installations (see Appendix E).

Competent Person (MGPS)

4.40 The Competent Person (MGPS) is the person who carries out the installation and/or maintenance work on the MGPS. A list of his/her responsibilities and duties is set out in paragraph 6.92. The Competent Person (MGPS) should have received appropriate training and should be on a list of Competent Persons (MGPS). In the case of directly employed labour, this list should be held by the Authorised Person (MGPS); in the case of contracted labour, it should be held by the contractor's Authorised Person (MGPS) or project manager.

Indications

VIE Control Panels are used as part of medical gas pipeline systems where an uninterrupted supply of medical gas is required. The medical device works in conjunction with other medical devices for the immediate and reliable delivery of medical gas to terminal units used for respiratory use in health-care facilities. In all cases there are medical devices installed between this device and the patient that controls the flow and pressure to safe levels to the patient. This device therefore only delivers medical air within specification to the medical gas pipeline system, not directly to the patient.

Contraindications

If the device sustains any damage or malfunctioning, the assembly or faulty part should be replaced completely. This ensures all damaged components are replaced.

Contraindications for use, warnings and precautions related to the safe use of the devices are detailed in the IFU supplied with the devices. These sections shall be read by the intended user before installing the device and starting to use it.

2 Technical Specification

AVSU Singal Units & Modules	
Physical Characteristics:	
Height	1000mm (Enclosure) 1170mm Approx with Pipes
Width	800mm
Depth	270mm
Weight	30 kg
Environmental Transport, Storage and Operating Conditions:	
Storage Temperature Limit	0 to +40°C
Operating Temperature Limit	-5 to +60°C
Humidity	10 to 95% R.H Non-condensing
Air pressure	Operating: 90 to 110 kPa
Mode of operation	Continuous (may be left on indefinitely)
Ingress Protection Class	IP4X – for indoor installation only
Degree of mobility	Permanently installed
Performance:	
Operating pressure range (operating)	Refer to table 2-2
Volumetric Flow Rate	Refer to table 2-2

Table 2-1 Technical Specification

Part Number	Inlet / Outlet Pressure	Flow Rate	Connection Size
4233300199	10-4 bar	3000 L/min	22mm
4233300200	10-4 bar	3000 L/min	28mm

Table 2-2 Operating Pressure Range and Flow Rates

3 User Responsibility

This device has been built to conform to the specification and operating procedures stated in this manual and/ or accompanying labels and notices when checked, operated, maintained and serviced in accordance with these instructions.

To ensure the safety of this device it must be checked and serviced to at least the minimum standards laid out in this manual. A defective or suspected defective product must not be used under any circumstances.






The user must accept responsibility for any malfunction which results from non-compliance with the servicing requirements detailed in this manual. Additionally, the user must accept responsibility for any malfunction which may result from misuse of any kind, or non-compliance with other requirements detailed in this manual.

Worn, broken, distorted, contaminated or missing components must be replaced immediately. Should such a repair be necessary, it is recommended that a request for service advice be made to the nearest BeaconMedaes Service Centre.

This device and any of its constituent parts must be repaired only in accordance with written instructions issued by BeaconMedaes and must not be altered or modified in any way without the written approval or BeaconMedaes.

The user of this equipment shall have the sole responsibility for any malfunction which results from improper use, maintenance, repair, damage or alteration by anyone other than BeaconMedaes or their appointed agents.

4 Description of Symbols

Symbol	Meaning
	Atmospheric pressure limitations
	Humidity limitation
	Temperature limit
	Consult instructions for use
	The number 2460 identifies the notifying body
L	Connection for the live conductor on permanently installed equipment.
N	Connection for the neutral conductor on permanently installed equipment.
E	Connection for the earth conductor on permanently installed equipment.

5 Installation

BeaconMedaes VIE control panels should only be installed, commissioned, and maintained by technicians who are suitably trained with piped medical gas systems, and who are fully conversant with the contract specifications and safety procedures.

WARNING! Keep all components dry and clean during storage and installation.

WARNING! BeaconMedaes vacuum plant can be safely handled and stored under normal working and environmental conditions.

WARNING! Adverse environmental conditions and harsh abrasives or chemicals may cause damage to the unit.

Install the system as directed by the site engineer, for the optimum position. Check that the specified pressure safety valves, non-return valves and line valves have been fitted and verify the valves are certified to operate in accordance with the contract specification and conform to BS 6759: part 2 1984.

Notes:

1. Take care when brazing into the gas pipeline, to prevent damage to the regulator due to heat transfer.
2. BeaconMedaes will not accept responsibility for damage caused during installation.

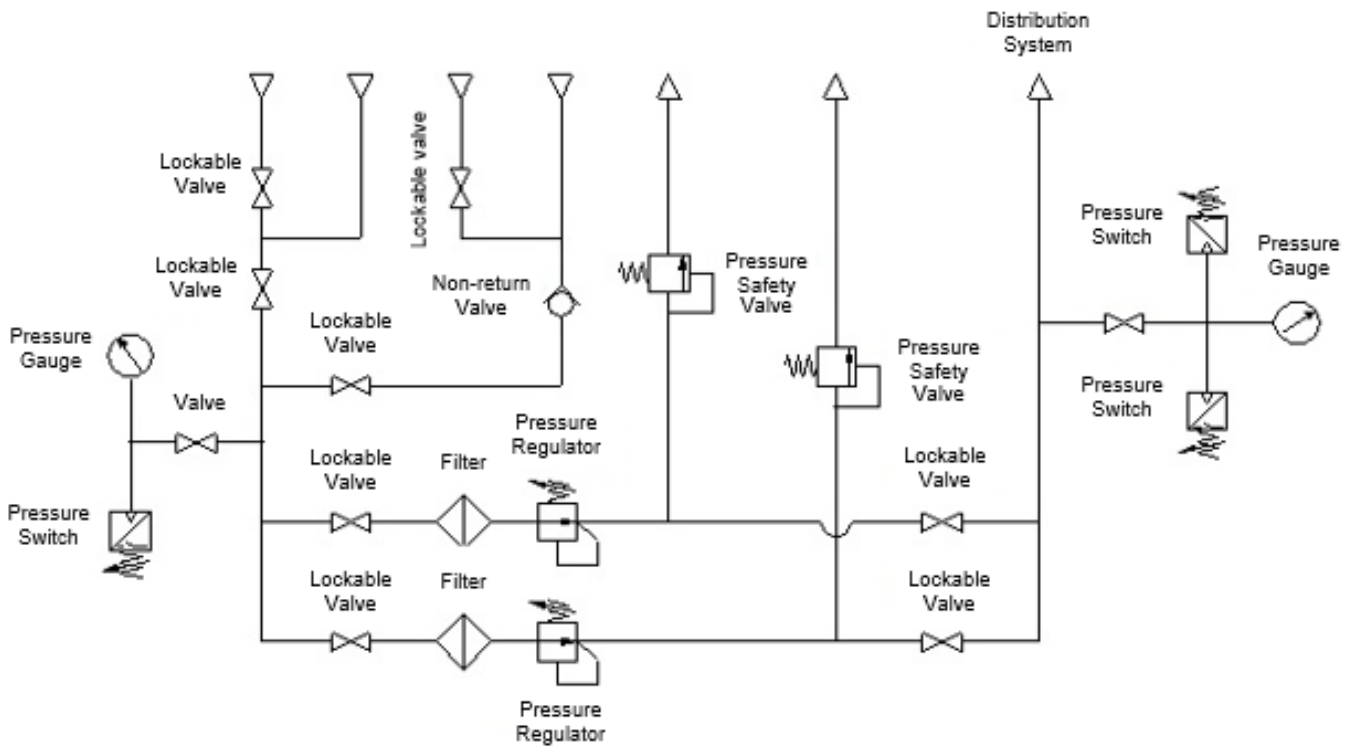


Figure 5-1 VIE Control Panel Schematic Diagram

5.1 Installation Dimensions

All dimensions are common to 22mm and 28mm VIE Control Panels

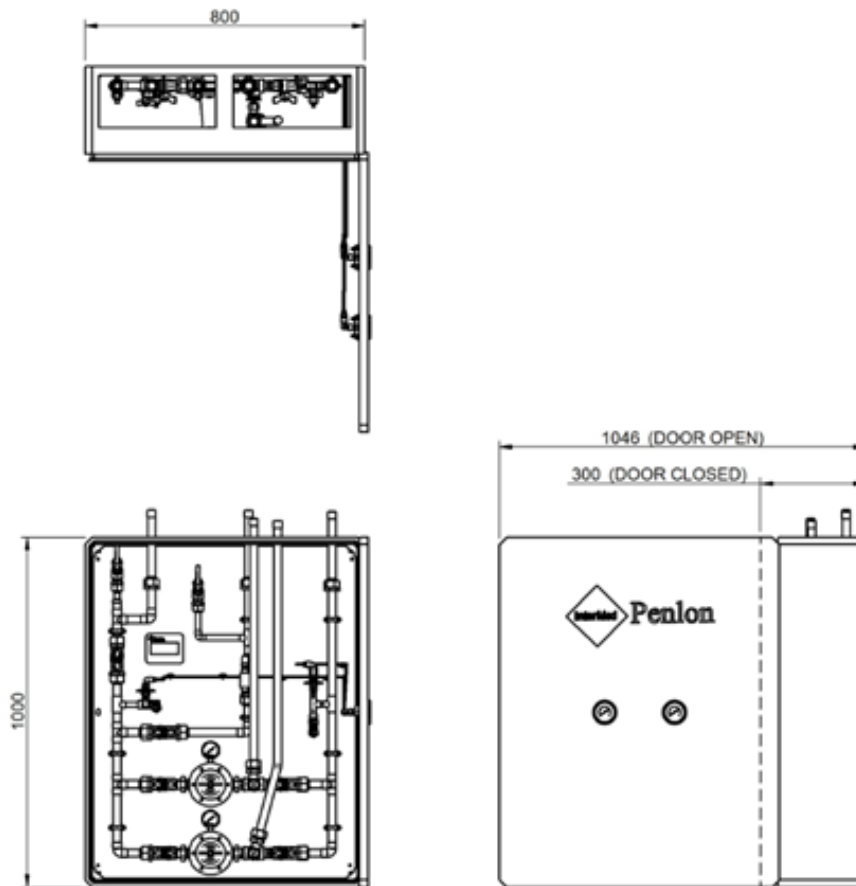


Figure 5-2 VIE Control Panel Dimensions

5.2 Mounting Dimensions

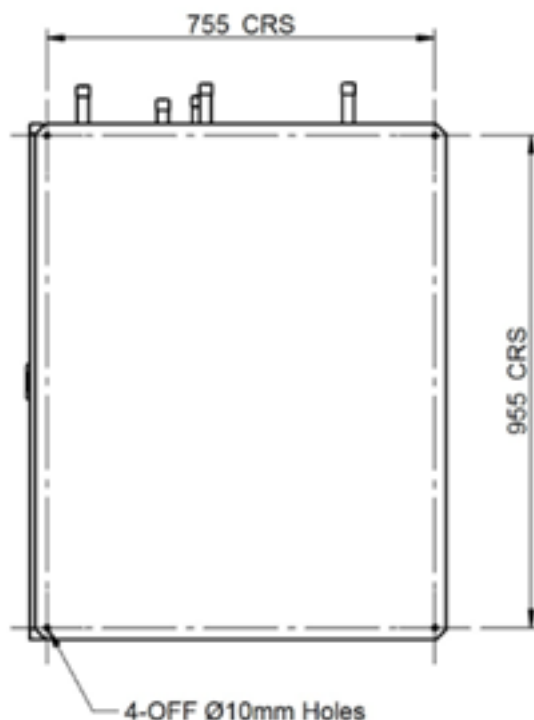


Figure 5-3 VIE Control Panel Mounting Dimensions

6 Commissioning

6.1 Introduction

Commissioning is carried out in full after initial installation, after a major component change, and as part of a planned preventative maintenance programme. The object of commissioning is to ensure that all components are serviceable. Personnel carrying out the following commissioning procedure must be qualified and fully conversant with the information contained in this manual.

Commissioning consists of alternately checking the gas flow through each side of the VIE control panel, and ensuring the pressure is reduced to the required level.

BeaconMedaes VIE control panels are tested and certified prior to despatch from the manufacturing plant, there should be no need to make adjustments during commissioning.

Pressure Switch	Setting (bar)
VIE Low pressure	8.4
Low Line Pressure	3.75
High Line Pressure	4.9

6.2 Pre-use Test

Note: Due regard must be paid to the safety of personnel. Testing should not create a hazard, particular attention being given to foreign matter located in discharge outlets.

BeaconMedaes VIE panels are subjected to a series of tests including visual inspections and pressure tests, which includes the following:

Pressure testing the copper pipework to 11 bar.

Checking the operation of the pressure relief valves.
Subjecting regulators to creep test.

Checking the accuracy of the pressure gauges.
Setting the regulator pressures.
Leak test.

Inspecting the overall finish of the assembly.

7 Operating Instructions

Figure 7.1 shows a VIE Control Panel. All isolating valves are shown open, although in normal operation only one regulator would be in use. To isolate the 'Standby' regulator, turn off the inlet and outlet ball valves to that regulator.

The VIE Control Panel is normally operated with one of the pressure regulators as the Duty regulator and the other regulator as the Standby regulator. This is achieved by turning the isolating valves to the 'inline' open position each side of the Duty regulator. To isolate the Standby regulator, the isolation valves must be turned to the closed position each side of the Standby regulator.

Note: Either regulator can be Duty or Standby. All isolation valves are shown open, although in normal operation only one regulator would be in use.

To change from one regulator to the other, first open the isolation valve upstream of the Standby regulator. Check the static pressure reading on the Standby pressure gauge. Adjust, if necessary using the tee bar on the top of the regulator, these are factory set and locked. They should not require adjustment on installation; however periodic adjustment during service may be necessary.

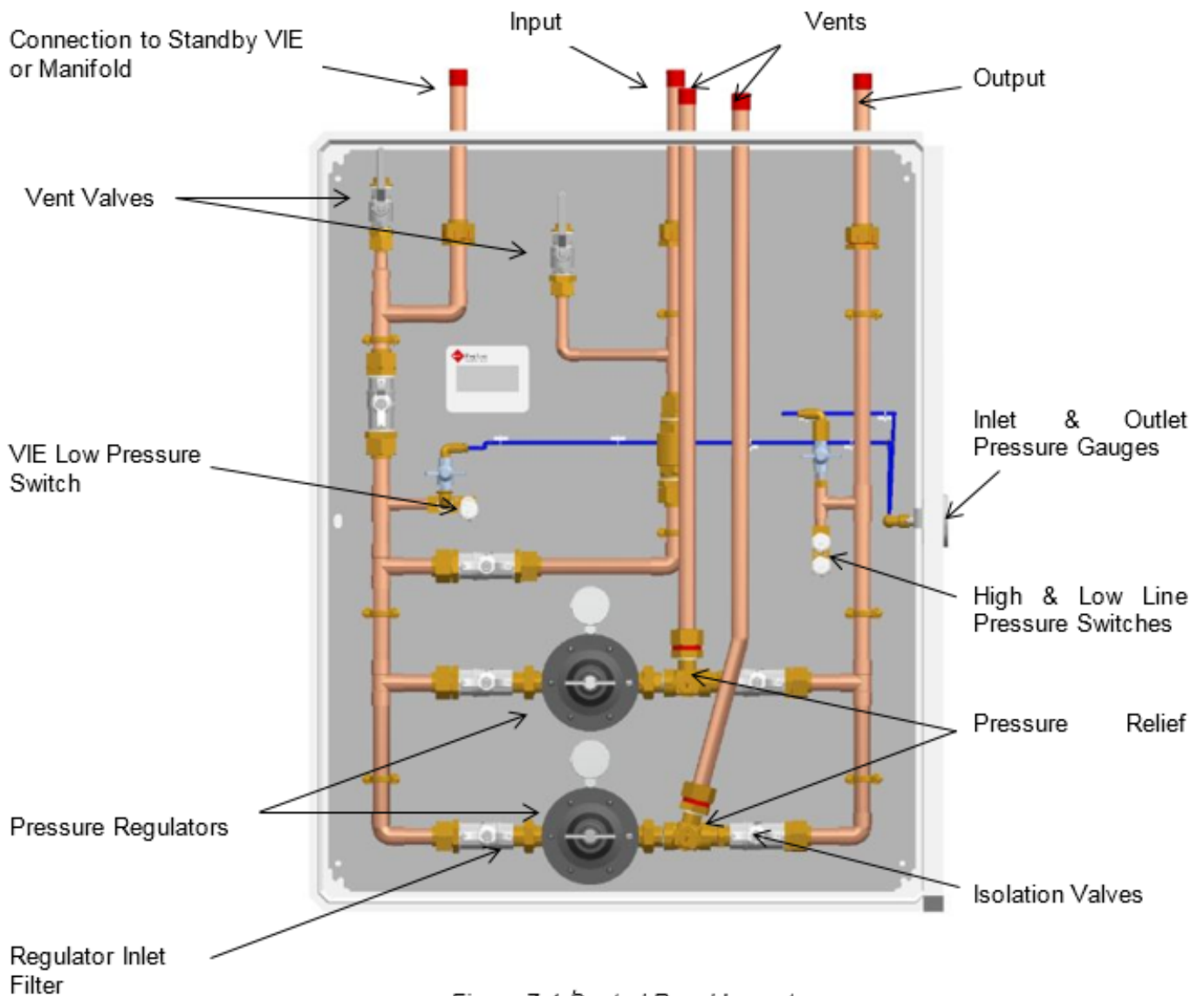


Figure 7-1 Control Panel Layout

8 Maintenance

WARNING! Use of sub-standard or inappropriate parts and materials may damage the line valve and invalidate the warranty. Only use genuine BeaconMedaes spare parts.

WARNING! Obtain a work permit before commencing any work on medical gas equipment.

8.1 Introduction

BeaconMedaes VIE Control panels are designed to operate with the minimum of maintenance, however regular routine minor maintenance operations are recommended to prove the system integrity.

Maintenance operations are carried out in accordance with the planned preventative maintenance contract purchased by the customer. Maintenance engineers must fully understand the operation of VIE control panels and must be conversant with the information contained in this manual.

Service and Maintenance is limited to replacement of worn or damaged components.

8.2 Tools and Equipment

No special tools are required, however all common hand tools used must be clean, completely free of oil and grease and checked for serviceability before commencing maintenance procedures.

All necessary spare parts must be obtained before commencing work.

8.3 Routine Inspection, Checks and Maintenance

8.3.1 Cleaning

The use of abrasive or solvent based cleaning solutions is not recommended.

Cleaning external surfaces - use a damp cloth only. Mild soap solution may be used but detergent/ surfactant solutions are not recommended.

Do not use any phenol or halogen based disinfectants or agents that release chlorine or oxygen.

8.3.2 Minimum Requirements

Minimum requirements for routine inspections, checks and maintenance are given in Table 8-1 and must be observed in full to ensure continued safe operation of the line valve system.

8.3.3 Safety Relief Valves

All BeaconMedaes VIE Control Panels include safety relief valves with easing gear.

The correct procedure, once installed is:

Every Six Months-

Ensure free movement of all parts, using the easing gear, when the valve is under pressure of not less than 75% of the set pressure.

Every Twelve Months -

Safety relief valves should be checked for correct function, as above, and for correct lift pressure.

Remove the valve from the station and test for correct lift pressure using the external test rig.

Under no circumstances increase the operating pressure of the station in an attempt to test safety relief valves.

NOTE: It is possible to test the correct lift pressure of the regulator output safety valve by isolating ONLY the output of the standby line pressure regulator (clockwise to increase pressure).

Actions	Inspection, Checks and Tests						
	5 Yearly	Annually	6 Monthly	Quarterly	Monthly	Commissioning	
	Ambient temperature	◆					
	Suitability of location		◆				
	Adequate room ventilation			◆			
	Adequate access for maintenance		◆				
	Visually inspect the unit for damage		◆				
Ensure free movement of all parts		◆					
Line Pressure Switch Operation		◆					
Relief Valve Exhaust Clearance and Free from Debris		◆					
Planned Preventative Maintenance:							
Complete Commissioning Procedure		◆					
Check regulator; adjust if necessary.		◆					
Safety Relief Valve - see 9.3.3			◆				
Component Replacement							
Regulator Inlet Filter		◆					
Pressure Safety Valves				◆			
Pressure Regulator Service Kit						◆	

9 Fault Diagnosis

There are a number of faults that can be diagnosed on BeaconMedaes VIE Control Panels.

These are relatively simple to remedy, without replacing expensive regulator assemblies.

The majority of faults can be avoided by undertaking a regular planned maintenance routine, carried out by a competent person.

NOTE: Failure through misuse or abuse is usually not repairable, and is not covered by the manufacturer’s warranty.

Table 9-1 Leaking from Bonnet Vent Hole

Possible Cause	Remarks/rectification action
Diaphragm split or punctured	Replace diaphragm.

Table 9-2 Leak from Back Knurled Nut

Possible Cause	Remarks/rectification action
O-ring split or perished	Replace O-rings

Table 9-3 Regulator Setting Erratic or Creeping

Possible Cause	Remarks/rectification action
Valve seat or plunger seal damaged or perished	Replace seat or plunger seals and ‘O’ rings

10 Recommended Spares

Description	22mm	28mm
	Part Number	
Regulator Gauge	2935-850	
Pressure Relief Valve – 5.5bar	3261480	5003690
Non Relieving Regulator	3260751	3260765
Low Pressure Switch	3260149	
Low Line Pressure Switch	3260149	
High Line Pressure Switch	3260150	
Inlet Pressure Gauge 0-20 bar	340031	
Outlet Pressure Gauge 0-10 bar	340030	
Regulator Inlet Filter	5002095	5002096

For all Service Spares enquiries, contact the BeaconMedaes Spares Department, giving as much of the following information as possible:

Product Part Number:

Lot / Batch Number:

Approximate date of purchase:

This information can be found on the plant rating label which is affixed to the Plant Control Unit.

Spares Department:

T: +44 (0) 1246 474242

acm.spares@beaconmedaes.com



Tel: +44 (0) 1246 474242
www.beaconmedaes.com



Atlas Copco Airpower n.v.
Boomsesteenweg 957
2610 Wilrijk - Belgium



BeaconMedaes Limited, Greaves Close, Markham Vale,
Chesterfield, S44 5FB, UK

