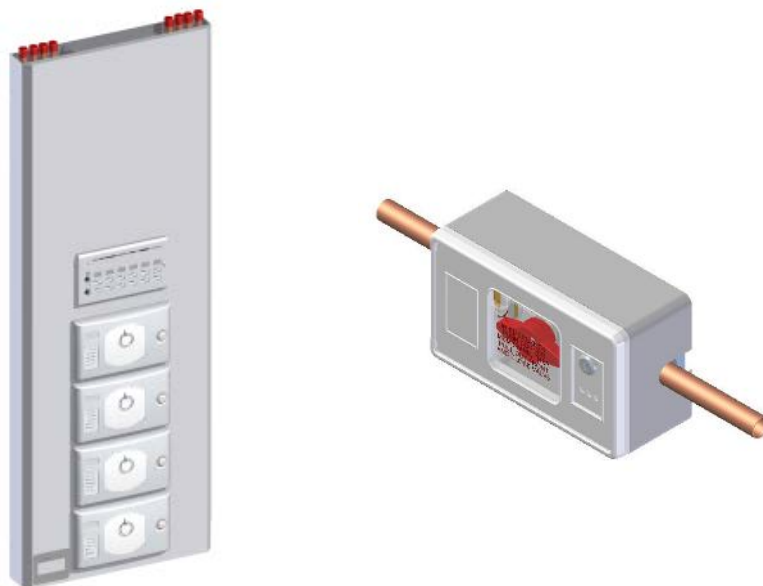


Zeus Area Valve Service Unit (AVSU) and AVSU Module

Installation, Operation and Maintenance Manual



Published by Pneumatech Medical Gas Solutions

All possible care has been taken in the preparation of this publication, but Pneumatech Medical Gas Solutions accepts no liability for any inaccuracies that may be found.

Pneumatech Medical Gas Solutions reserves the right to make changes without notice both to this publication and to the product which it describes.

Copyright © 2015 Atlas Copco All rights reserved.

No part of this publication may be reproduced, transmitted, transcribed, or stored in a retrieval system or translated into any human or computer language in any form or by any means without the prior permission of Pneumatech Medical Gas Solutions.

Important



Personnel must make themselves familiar with the contents of this manual and the function of the unit before installing, operating or maintaining any East SP and Zeus SP Terminal Units.

Information contained in this manual is correct at the date of publication. The policy of Pneumatech Medical Gas Solutions is one of continuous product improvement. Pneumatech Medical Gas Solutions reserves the right to make changes that may affect instructions in this manual without prior notice.

For any enquiry regarding the servicing or repair of this device, contact the nearest accredited Pneumatech Medical Gas Solutions agent, or communicate directly with:



Pneumatech Medical Gas Solutions
Unit 18 Nuffield Centrum
Nuffield Way
Abingdon
Oxfordshire
OX14 1RL
UK

<http://www.p-mgs.com>

Sales

Tel: + 44 (0) 1235 463010
Fax: +44 (0) 1235 463011
sales@p-mgs.com

Spares

Tel: +44 (0) 1235 463053
Fax: +44 (0) 1235 463011
spares@p-mgs.com

Service

Tel: +44 (0) 1235 463051
Fax: +44 (0) 1235 463011
service@p-mgs.com

Any complaints about the products or services provided by Pneumatech Medical Gas Solutions, please give as much of the following information as possible:

- Product Part Number
- Lot/ Batch Number
- Approximate date of purchase
- Apparent fault.

Complaints

T: +44 (0) 1235 463010
F: +44 (0) 1235 463011
complaints@p-mgs.com

Issue Record

Issue No.	Reason for Change	Pages affected	Date
1	Rebranding	All	October 2015

Introduction

This manual contains information needed to install, operate and maintain the Pneumatech Medical Gas Solutions (Pneumatech MGS) Zeus Area Valve Service Units (AVSUs) and AVSU Modules.

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 East SP and Zeus SP Terminal Units.

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. **AVSUs with a breakable pull out window should be accessed with great care.**
3. **Do not attempt to modify this device in any way not strictly described within this manual.**
4. **AVSUs and modules must be protected from access by unauthorised personnel.**
5. **Risk of fire or explosion: Do not lubricate this product with oil or grease. Safe and compatible lubricants can be obtained from Pneumatech Medical Gas Solutions if necessary.**
6. **Do not use this product if there is evidence of contamination internally or on any of gas wetted connections (e.g. debris, particles, oil, lubricant or grease).**
7. **Keep all components dry and clean during installation.**
8. **Pneumatech Medical Gas Solutions AVSUs can be safely handled and stored under normal working and environmental conditions.**
9. **Adverse environmental conditions and harsh abrasives or chemicals may cause damage to the unit.**

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.

10. **Use of sub-standard or inappropriate parts and materials may damage the product and invalidate the warranty. Only use genuine Pneumatech Medical Gas Solutions spare parts.**
11. **Always wash leak detection fluids off with clean water immediately after use.**
12. **Always open valves slowly.**
13. **Be careful not to over-torque face seal fittings.**
14. **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..**

Notes:

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

Abbreviations used

The following abbreviations are used in this manual:

Abbreviation	Full name
HTM	Health Technical Memoranda
BS	British Standard
MGS	Pneumatech Medical Gas Solutions
MGPS	Medical Gas Pipeline Systems
NIST	Non-Interchangeable Screw Thread
AVSU	Area Valve Service Unit

Scope of this manual

This manual describes the Operation Service, Repair and Testing of the Pneumatech MGS Medical Zeus Area Valve Service Units (AVSUs) and AVSU Modules.

Pneumatech Medical Gas Solutions 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

Contents

Zeus Area Valve Service Unit (AVSU) and AVSU Module	1
Issue Record.....	ii
Introduction	ii
WARNINGS, CAUTIONS and NOTES	ii
Warnings!.....	ii
Cautions!.....	ii
Notes:	iii
Abbreviations used.....	iv
Scope of this manual.....	iv
Pneumatech Medical Gas Solutions service contact	iv
Storage and Handling	vii
Identification.....	vii
Environmental Conditions	vii
1 Description	1
1.1 Intended Use.....	1
1.2 Features.....	1
1.3 General Description.....	1
1.3.1 Modular Unit with Local Alarm Panel.....	1
1.3.2 Single Unit - Flush or Surface Mounted.....	2
1.3.3 Gas/ vacuum Identification	2
1.3.4 Access to Valve	2
2 Technical Specification	3
3 User Responsibility	3
4 Description of Symbols	4
5 Installation	4
5.1 Environmental Conditions - Installation.....	4
5.2 Mounting	4
5.3 Dimensions	5
5.3.1 Zeus Surface Mounted Single Unit.....	5
5.3.2 Zeus Flush Mounted Single Unit.....	5
5.3.3 Zeus AVSU Module	6
5.3.4 Zeus Surface Mounted AVSU Modules	6
5.3.5 Zeus Semi-Flush Mounted AVSU Module.....	7
6 Commissioning	7
6.1 Introduction	7
6.2 Pre-use Test.....	7
6.2.1 AVSU Single Unit.....	7
6.2.2 AVSU Module	7
6.2.3 Pressure Test.....	7
6.2.4 Pressure Switch Settings.....	7
6.2.5 Pressure Switch Fitting – AVSU module	7
6.2.6 Fitting the door Modular units only.....	8
7 Operating Instructions	9
7.1 General Information.....	9
7.2 Isolation procedure.....	9
7.3 Emergency Access.....	9
7.3.1 Emergency Access – Breakable Pull Out window.....	9
7.3.2 Fire Situation.....	10
8 Maintenance	10

8.1 Introduction	10
8.2 Tools and equipment.....	10
8.3 Routine Inspection, Checks and Maintenance.....	10
8.3.1 Cleaning.....	10
8.3.2 Minimum Requirements.....	10
8.4 Repair	11
9 Fault Diagnosis	12
10 Recommended Spares	12
11 Declaration of Conformity	14

Storage and Handling

All products are separately packaged and stored in under controlled conditions.

Identification

The Pneumatech MGS Medical Zeus Area Valve Service Units (AVSUs) and AVSU Modules is identified by a label on the back plate of the Modular unit back plate, or a label on the pipe for the Single units.

Environmental Conditions

AVSUs can be safely handled and stored under normal working and environmental conditions. Adverse environmental conditions and harsh abrasives or chemicals may cause damage to the unit.

1 Description

1.1 Intended Use

Pneumatech MGS Area Valve Service Units are designed to provide local isolation of individual parts of the central gas and vacuum piping system in the hospital, clinic, or laboratory facility. Isolation may be required for installation, maintenance, or in the event of an emergency.

1.2 Features

1. The inlet and outlet pipes are connected by an isolation valve with two 'through' plates, a blank plate is supplied loose for maintenance/ future works.
2. Forward facing NIST connectors with 'check' valves (not vacuum) plugs and caps, are also fitted.
3. The AVSU Module, greatly reduces installation times, with its local alarm pressure switches allows the ward staff to get immediate information on the actual state of the gas supply system.
4. For maintenance and repair work, individual parts of the system can be shut-off without interrupting the whole gas supply.
5. Pressure monitoring of the distribution system is done by pressure sensors, which trigger emergency alarm panels or alarm masters. The pressure statuses are indicated on the alarm panel.
6. During normal operation the shut-off valve is accessed via a key. In case of emergency, the valve can be accessed by pulling out the window and opening the door.
7. Within the module there is also access to NIST connectors up and downstream of the valve.
8. Ventilation slots in the unit prevent any build-up of gas in the event of a leak.

1.3 General Description

1.3.1 Modular Unit with Local Alarm Panel



Figure 1-1 Modular Unit with local alarm panel

Pneumatech MGS AVSU modules can be supplied with any combination of gases, (with or without an alarm unit), incorporating up to six isolating valves per panel

1.3.2 Single Unit - Flush or Surface Mounted

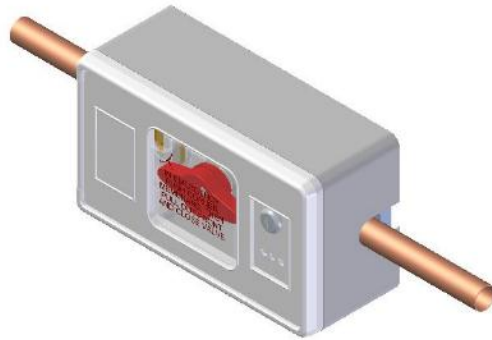


Figure 1-2 Single Unit – Flush or surface mounted

Single units are supplied with pre-drilled fixing holes in the back box for mounting purposes. The installer is provided with a plaster shield and an option of surface or flush mounting.

1.3.3 Gas/ vacuum Identification

Each AVSU is gas specific, the valve flanges of each unit are etched with the relevant gas type. All have a gas specific colour identification on the valve fascia:

White:	Oxygen
Blue:	Nitrous Oxide
White/Blue	50% Oxygen/ 50% Nitrous Oxide
White/Black	Medical Air and Surgical Air
Yellow:	Vacuum

1.3.4 Access to Valve

WARNING! AVSUs with a breakable pull out window should be accessed with great care (see Section 7).

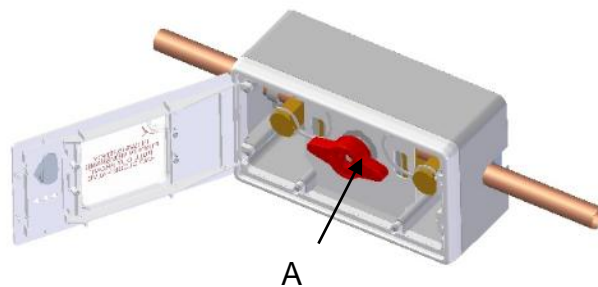


Figure 1-3 Valve access

During normal operation the shut-off valve is accessed via a key.

In case of emergency, the valve handle (**A**) can be accessed by breaking the window away from its securing tabs or operating the quick release mechanism and opening the door.

2 Technical Specification

Table 2-1 Technical Specification

AVSU single units and modules	
Physical Characteristics:	
Height	Varies with model
Width	Varies with model
Depth	Varies with model
Weight	Varies with model
Environmental Transport, Storage and Operating Conditions:	
Temperature	10 to 40°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)	Compressed gas: 0 – 8.5 bar Vacuum: -0.7 – 0 bar
Regulatory Classification:	
GMDN Code (Term)	36271 (Medical gas and vacuum supply systems)
EC MDD Classification	Class IIb
GHTF Classification	Class C

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.

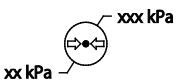
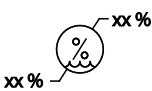
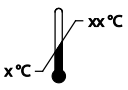




The user must accept responsibility for any malfunction which results from non-compliance with the servicing requirements detailed in this manual. Additionally, the user must accept responsibility for any malfunction which may result from misuse of any kind, or non-compliance with other requirements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

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

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 Pneumatech Medical Gas Solutions or their appointed agents.

4 Description of Symbols

WARNING!	Indicates a potentially hazardous situation which, if not avoided, could result in personal injury to the user or others.
CAUTION!	Indicates a potentially hazardous situation which, if not avoided, could result in damage to the device or property.
Note:	Emphasises points to achieve more convenient or efficient use of the device.
	Ambient pressure range
	Ambient humidity range
	Ambient temperature range
	Consult accompanying documents
	Service due date
	The number 0088 identifies the notifying body under which the Quality Systems operated within Pneumatech MGS.
	Protective earth connection

5 Installation

Pneumatech MGS AVSUs 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.

5.1 Environmental Conditions - Installation

WARNING! Keep all components dry and clean during installation.

WARNING! Pneumatech Medical Gas Solutions AVSUs 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.

5.2 Mounting

Pneumatech MGS AVSUs must be wall-mounted.

Units are supplied with pre-drilled fixing holes in the back box for mounting purposes. The installer is provided with a plaster shield and an option of surface or flush mounting.

Single units

Installation consists of mounting the unit using the back-plate/box provided and making the mechanical connections as required. The units are pressure tested prior to dispatch to save time during installation on site.

5.3 Dimensions

5.3.1 Zeus Surface Mounted Single Unit

Rear view shown with typical fixing hole centres.

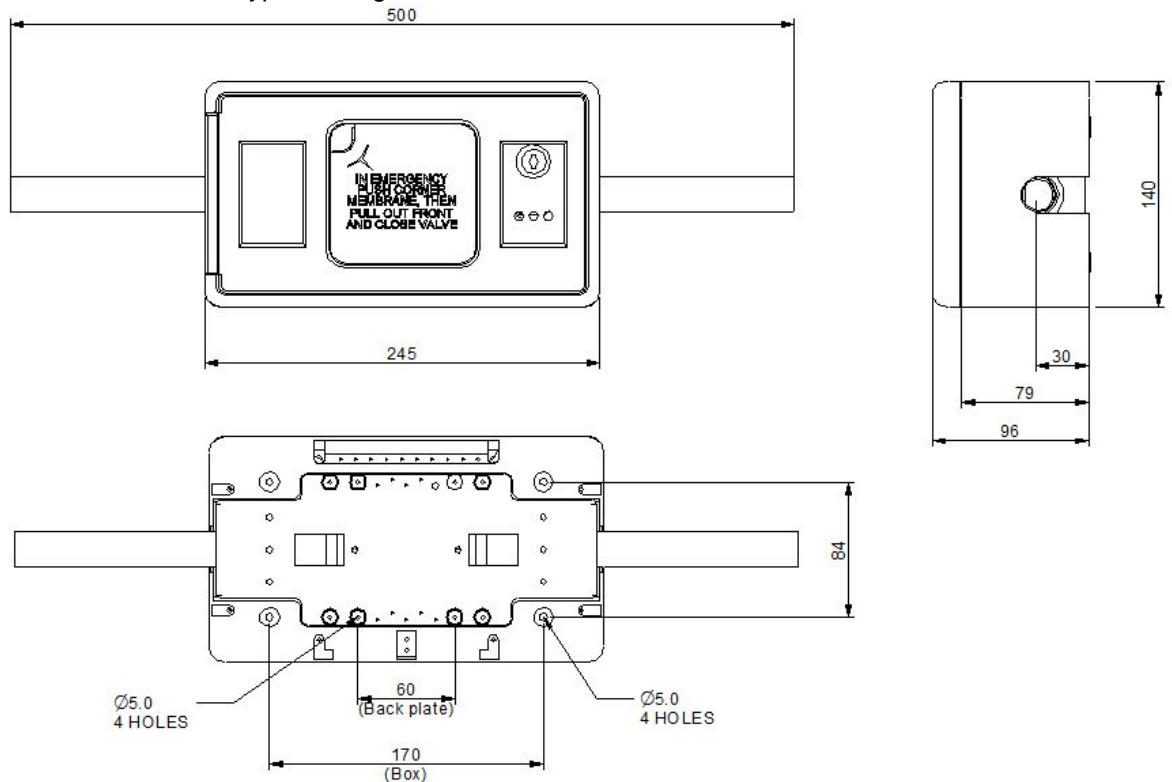


Figure 5-1 Zeus surface mounted single unit

5.3.2 Zeus Flush Mounted Single Unit

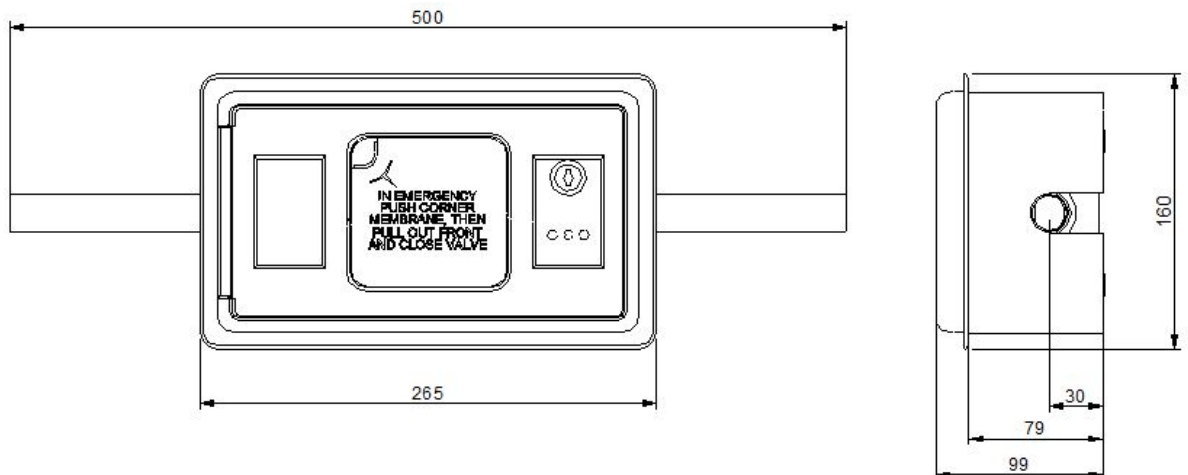


Figure 5-2 Zeus flush mounted single unit

5.3.3 Zeus AVSU Module

AVSU modules are usually installed so that the top of the unit is flush with the false ceiling, which enables all the connections to be made out of sight. Installation consists of mounting the unit using the back-plate provided and making the mechanical and electrical connections as required, then fitting the cover.

Note: The alarm panel, if fitted, will be 200 mm lower on a four-gas module than on a five-gas module.

5.3.4 Zeus Surface Mounted AVSU Modules

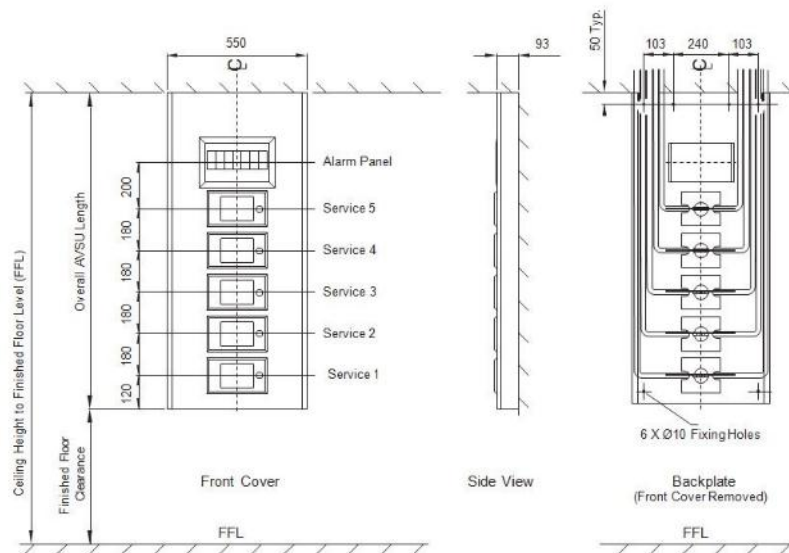


Figure 5-3 Zeus surface mounted AVSU module

5.3.5 Zeus Semi-Flush Mounted AVSU Module

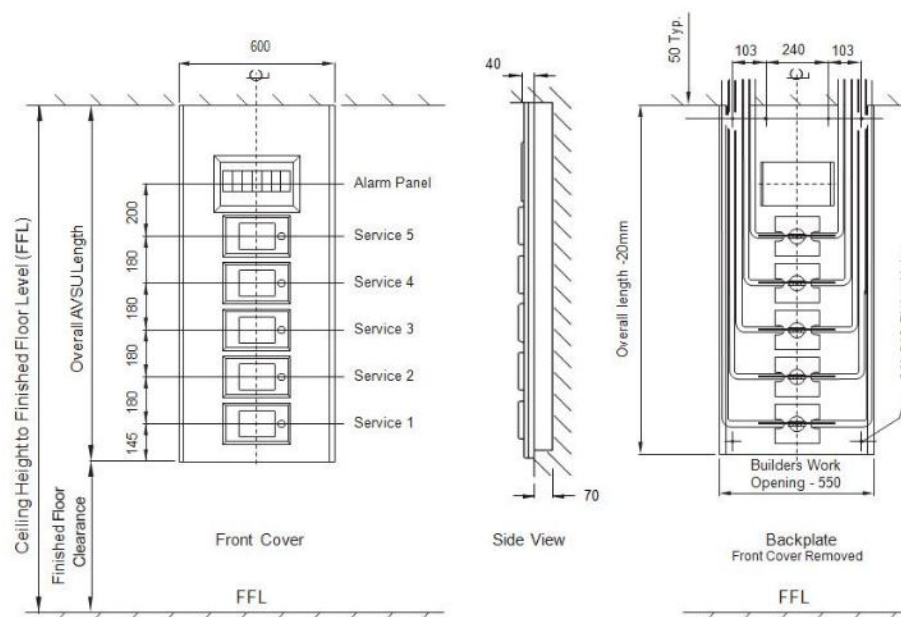


Figure 5-4 Zeus semi-flush mounted AVSU module

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.

6.2 Pre-use Test

6.2.1 AVSU Single Unit

Pneumatech MGS AVSUs are subjected to a series of tests including visual inspections and pressure tests, which includes the following:

- Check NIST is correct for gas type specified.
- Pressure test gas line.
- Check locks and visually inspect the general finish.

6.2.2 AVSU Module

- Check NIST is correct for gas type specified.
- Pressure test each gas line.
- Set up pressure sensors and test audible alarm operation.
- Check locks and visually inspect the general finish.

6.2.3 Pressure Test

Pressure test to HTM 2022/ HTM02-01.

- Remove all pressure switches from the gas line before testing the system.

6.2.4 Pressure Switch Settings

Pressure switches are factory set to HTM2022/ HTM 02-01, however due to the nature of pressure switches these settings may need to be checked at commissioning and adjusted as necessary.

6.2.5 Pressure Switch Fitting – AVSU module

Pressure switches can be connected either to the left or right side of the valve as required.

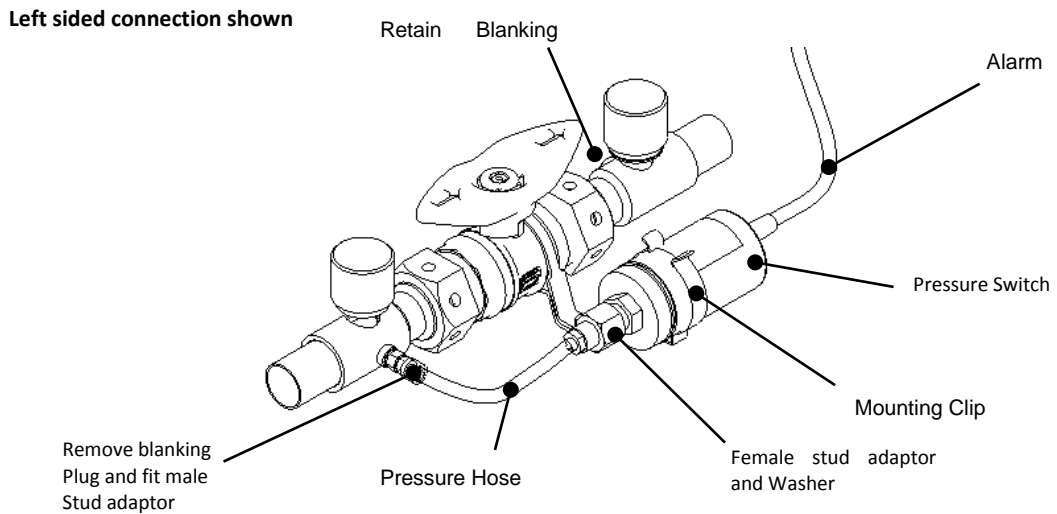


Figure 6-1 Pressure switch fitting

- Unpack the pressure switches and connect to the alarm leads (ref. Pressure Switch Installation Manual, Figure 2).
- Fit the correct pressure switch into the retaining clip.
- Remove the blanking plug from the pipeline and connect the switch and pipeline with tubing and connectors supplied.

Note: The pressure switch should be fitted downstream of the valve.

6.2.6 Fitting the door Modular units only

Note: To ensure the doors are not damaged during transportation they are supplied separately with 4 off M4 screws which fit directly into the threaded connections on the front cover.

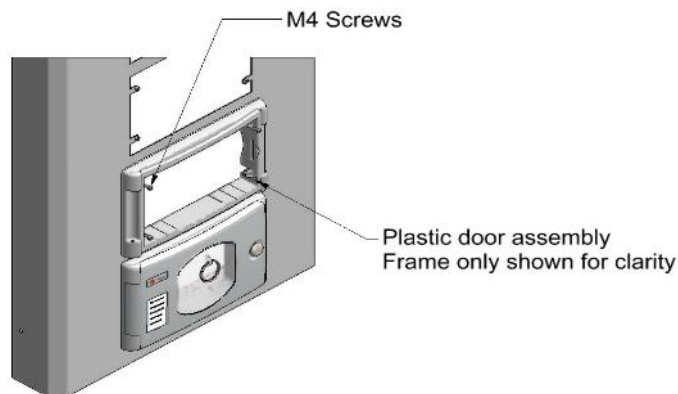


Figure 6-2 Modular unit door

7 Operating Instructions

7.1 General Information

When the unit has been installed and commissioned and the gas distribution system is in use, the AVSU door can be locked and the key/ keys placed in the control of an 'Authorised Person' as defined in HTM 2022 and HTM 02-01.

AVSUs are normally positioned at the entrance of the ward/ department. Staff in areas that have medical gas pipeline systems must ensure that they are aware of the location of each AVSU.

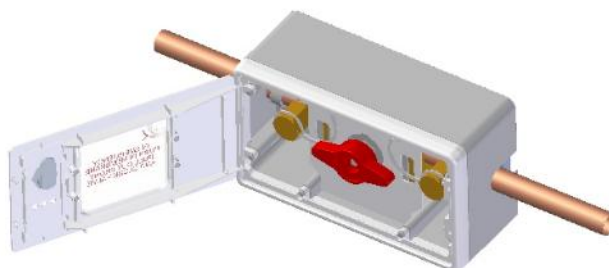


Figure 7-1 Valve fascia plate (open)

- The valve fascia plate is marked **OPEN** and **CLOSED**.
- The valve is fully closed when the handle is at 90° to the pipeline and fully open when the handle is parallel to the pipeline. The valve handle takes only a quarter turn from fully open to fully closed.

7.2 Isolation procedure

1. Confirm the areas to be isolated by the label adjacent to Area Valve Service Unit.
2. Check that patients connected to the system are provided with alternative gas supplies.
3. Inform the Authorised Person (MGPS) at the earliest opportunity after the emergency valve has been closed.

7.3 Emergency Access

7.3.1 Emergency Access – Breakable Pull Out window

The window is screen printed with **IN EMERGENCY PUSH CORNER MEMBRANE, THEN PULL OUT FRONT AND CLOSE VALVE**.

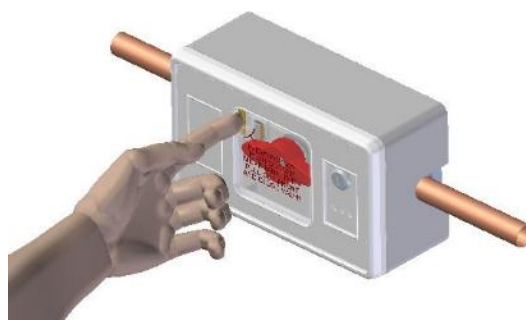


Figure 7-2 Emergency access – Single unit

Remove the window: the valve can be shut off whilst the door remains locked.

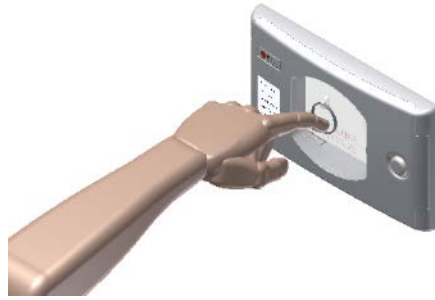


Figure 7-3 Emergency access – Modular unit

Remove the window: the valve can be shut off whilst the door remains locked.

WARNING! AVSUs with a breakable pull out window should be accessed with great care.

7.3.2 Fire Situation

In the event of a fire involving, or likely to involve, the MGPS or in the event of a fire situation which necessitates the area being evacuated, the Designated Nursing Officer/ Designated Medical Officer must be satisfied that the welfare of patients is not compromised before they perform the emergency isolation of the medical gas supply.

8 Maintenance

8.1 Introduction

Pneumatech MGS AVSU single units and modules 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 the AVSU and must be conversant with the information contained in this manual.

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

WARNINGS! Use of sub-standard or inappropriate parts and materials may damage the AVSU and invalidate the warranty. Only use genuine Pneumatech Medical Gas Solutions spare parts. WARNINGS! Obtain a work permit before commencing any work on medical gas equipment.

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.

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 AVSUs.

Table 8-1 Inspection and Maintenance Schedule

s	Action	5 Yearly	Annually	Quarterly	Monthly	Weekly	Daily	Commissioning
		Inspection, Checks and Tests:						
	Visually inspect the unit for damage or defects	■	■	■	■	■	■	■
	Check security of the glass/door	■	■	■	■	■	■	■
	Check the door is locked	■	■	■	■	■	■	■
	Check integrity of breakable window	■	■	■	■	■	■	■
	Check that the valve operates freely	■	■					
	Clean box internally using vacuum cleaner	■	■					
	Check blanking plate is in the box for future use	■	■					
	Check valve is correctly labelled re- area served	■		■				
	Check security of fixings/mountings	■	■					
	Check correct gas identification labelling and colour coding	■	■					
	Check NIST gas specificity using test probes	■		■				
	Electrical connection and supply integrity	■	■					
	Line Pressure Alarm Settings	■	■	■				

8.4 Repair

For maintenance and repair:

1. Unlock the door to gain access to the valve, NIST connector, and blanking plate.
2. Gas specific NIST hoses may be connected to either side of the valve whilst maintaining working pressure.
3. If it is necessary to remove a blanking/ through plate, the system must be de-pressurized on the side of the valve the plate is to be changed.

9 Fault Diagnosis

These mechanisms are extremely robust and if a unit fails to operate, it is probably mechanically damaged and should be replaced.

Gas leaks should be assessed and O-ring seals replaced as required.

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

10 Recommended Spares

For all Service Spares enquiries, contact the Pneumatech Medical Gas Solutions Spares Department, giving as much of the following information as possible:

Product Part Number:

Lot / Batch Number:

Approximate date of purchase:

Pneumatech MGS Terminal Units are expected to provide trouble-free service without the need for a large holding of spare parts.

The only recommended holding of spares is detailed *Table 10-1*.

Table 10-1 Minimum Recommended Spares Schedule
Spare parts for Modular units

Description	Part Number
Internal ball valve	2003911
"Through" plate (white)	2003924
"Blank" plate (red)	2003923
O ring	2000152
Lock and key assembly	2003938
Bezel, Door and window assembly (without lock, ring or label)	2003916A
Window ring 2004023	
Pneumatech MGS door label	6070000489
Pneumatech MGS door label	6070000654

Spare parts for Single unit

Description	Part Number
Internal ball valve	350122
"Through" plate (white)	3260166
"Blank" plate (red)	3260027
O ring	6001450
Lock and key assembly	3263339
Window	6000354

Full door assembly (with lock and window)

6000606

Spares Department:

T: +44 (0) 1235 463053

F: +44 (0) 1235 463011

spares@p-mgs.com

11 Declaration of Conformity

Declaration of Conformity

Manufacturer	Atlas Copco Ltd. trading as Atlas Copco Medical 18 Nuffield Centrum, Nuffield Way, Abingdon, OX14 1RL, UK
Product	Zeus Area Valve Service Units
Classification	Ila
Conformity Route	Annex II
Quality Management System	EN ISO 13485:2012
GMDN Code	36271
GMDN Term	Medical gas and vacuum supply systems
Standards Applied	EN 980, EN ISO 5359, EN ISO 7396-1, EN ISO 13348, EN ISO 15001, EN ISO 14971, EN 1041, EN ISO 10993-1, EN 15908
Notified Body	Lloyd's Register Quality Assurance Limited, 71 Fenchurch Street, London EC3M 4BS United Kingdom (LRQA Notified Body Number 0088)
MDD Certificate(s)	LRQ 4007749/C
Start of CE Marking	3 rd April 2013
Place and Date of Issue	Abingdon, 3 rd September 2015

We hereby declare that the above mentioned products meet the provisions of the Council Directive 93/42/EEC concerning Medical Devices, as amended by Directive 2007/47/EC. All supporting documentation is retained under the premises of the manufacturer.

Endorsing Signature
Turgay Ozan (General Manager)



Document ref.: RDOC0010v5.docx

Pneumatech Medical Gas Solutions
Unit 18 Nuffield Way
Abingdon
Oxfordshire
OX14 1RL UK

Sales
T: +44 (0) 1235 463010
F: +44 (0) 1235 463011
sales@p-mgs.com

Spares
T: +44 (0) 1235 463053
F: +44 (0) 1235 463011
spares@p-mgs.com

Service
T: +44 (0) 1235 463051
F: +44 (0) 1235 463011
service@p-mgs.com

Document Ref. 8102341051 Rev. 1
Revision issue date: 09 2015

© Atlas Copco 2015. All rights reserved.

Company Reg. Office: Swallowdale Lane, Hemel Hempstead, Hertfordshire HP2 7EA, UK

