AGSS Plant - Simplex and Duplex
Anaesthetic Gas Scavenging Systems
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.

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

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

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<th>Reason for Change</th>
<th>Pages affected</th>
<th>Date</th>
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<td>00</td>
<td>First release</td>
<td>All</td>
<td>2015</td>
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Introduction

This manual contains information needed to install, operate and maintain the Pneumatech Medical Gas Solutions (Pneumatech MGS) Simplex and Duplex Anaesthetic Gas Scavenging Systems. The contents of this manual are intended to be read and used by suitably qualified personnel.

AC input power connection

The three-phase plus Neutral and Earth AC input power is internally connected through the base of the control box. A remote supply is also internally connected for operating/ testing/ commissioning.

WARNINGS, CAUTIONS and NOTES

The following Warnings, Cautions, and Notes must be read and understood before using the AGSS Systems.

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.

**WARNING!** Read through this entire instruction manual before using or showing others how to use this equipment. Attempting to use this device without a thorough understanding of its operation may result in patient or user injury or death.

**WARNING!** Pump starter panels are supplied with dangerous voltages. The mains supply must be isolated (switched off) and locked in the off position before attempting to access live components in the pump starter panel.

**WARNING!** Do not attempt to modify this device. Failure to observe this may result patient or user injury or death.

**WARNING!** Do not use this product if it appears damaged in any way.

**WARNING!** Motors are remotely controlled and may start automatically at any time.

**WARNING!** The surfaces of the pumps and components connected to them reach high temperatures when operating for long periods.

**WARNING!** AGSS plant must be protected from access by unauthorised personnel.

**WARNING!** This equipment 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).

**WARNING!** Use of sub-standard or inappropriate parts and materials may damage the AGSS and invalidate the warranty. Only use genuine Pneumatech Medical Gas Solutions spare parts.

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

CAUTION! Use of sub-standard or inappropriate parts and materials may damage the Manifold System and invalidate the warranty. Only use genuine Pneumatech Medical Gas Solutions spare parts.

CAUTION! Any work involving alteration, extension or maintenance work to an existing system should be subject to the ‘Permit to Work’ procedure detailed in HTM 02-01.

CAUTION! Do not over-torque O-ring and face seal connections.

CAUTION! Only use leak detection fluids that are compatible with the materials being tested.

CAUTION! Always wash leak detection fluids off with clean water immediately after use.

Notes:
1. A blown fuse or tripped circuit breaker is often a symptom of a problem, rather than the root cause.
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.

Abbreviations used
The following abbreviations are used in this manual:

<table>
<thead>
<tr>
<th>Abbreviation</th>
<th>Full name</th>
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<tbody>
<tr>
<td>MGS</td>
<td>Medical Gas Solutions</td>
</tr>
<tr>
<td>AGSS</td>
<td>Anaesthetic Gas Scavenging System</td>
</tr>
<tr>
<td>mbar</td>
<td>millibar</td>
</tr>
<tr>
<td>kPA</td>
<td>Kilopascal</td>
</tr>
<tr>
<td>l/min</td>
<td>Litres per minute</td>
</tr>
<tr>
<td>V</td>
<td>Volts</td>
</tr>
<tr>
<td>BS</td>
<td>British Standard</td>
</tr>
<tr>
<td>HTM</td>
<td>Health Technical Memorandum</td>
</tr>
<tr>
<td>GMDN</td>
<td>Global Medical Device Nomenclature</td>
</tr>
<tr>
<td>EC MDD</td>
<td>European Commission Medical Device Directive</td>
</tr>
<tr>
<td>GHTF</td>
<td>Global Harmonisation Task Force</td>
</tr>
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Scope of this manual
This manual describes the Operation Service, Repair and Testing of the Pneumatech MGS Anaesthetic Gas Scavenging Systems.

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

<table>
<thead>
<tr>
<th>Section</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>Issue Record</td>
<td>ii</td>
</tr>
<tr>
<td>Introduction</td>
<td>ii</td>
</tr>
<tr>
<td>AC input power connection</td>
<td>ii</td>
</tr>
<tr>
<td><strong>WARNINGS, CAUTIONS and NOTES</strong></td>
<td>ii</td>
</tr>
<tr>
<td>Warnings!</td>
<td>ii</td>
</tr>
<tr>
<td>Cautions!</td>
<td>iii</td>
</tr>
<tr>
<td>Notes:</td>
<td>iii</td>
</tr>
<tr>
<td>Abbreviations used</td>
<td>iii</td>
</tr>
<tr>
<td>Scope of this manual</td>
<td>iii</td>
</tr>
<tr>
<td>Pneumatech Medical Gas Solutions service contact</td>
<td>iii</td>
</tr>
<tr>
<td><strong>Safety, Storage and Handling</strong></td>
<td>vii</td>
</tr>
<tr>
<td>Safety Features</td>
<td>vii</td>
</tr>
<tr>
<td>Other Essential Features</td>
<td>vii</td>
</tr>
<tr>
<td>Storage</td>
<td>vii</td>
</tr>
<tr>
<td>Identification</td>
<td>vii</td>
</tr>
<tr>
<td>Environmental Conditions</td>
<td>vii</td>
</tr>
<tr>
<td><strong>1 Introduction</strong></td>
<td>1</td>
</tr>
<tr>
<td><strong>2 Technical Specification</strong></td>
<td>3</td>
</tr>
<tr>
<td><strong>3 User Responsibility</strong></td>
<td>4</td>
</tr>
<tr>
<td><strong>4 Description of Symbols</strong></td>
<td>4</td>
</tr>
<tr>
<td><strong>5 Technical Information</strong></td>
<td>5</td>
</tr>
<tr>
<td>5.1 Principle of Operation</td>
<td>5</td>
</tr>
<tr>
<td>5.2 Performance</td>
<td>5</td>
</tr>
<tr>
<td><strong>6 Installation and Commissioning</strong></td>
<td>6</td>
</tr>
<tr>
<td>6.1 Introduction</td>
<td>6</td>
</tr>
<tr>
<td>6.2 Simplex plant</td>
<td>6</td>
</tr>
<tr>
<td>6.2.1 Simplex Installation Testing</td>
<td>8</td>
</tr>
<tr>
<td>6.3 Duplex plant</td>
<td>9</td>
</tr>
<tr>
<td>6.3.1 Duplex Installation testing</td>
<td>10</td>
</tr>
<tr>
<td>6.4 Check the alarms</td>
<td>12</td>
</tr>
<tr>
<td><strong>7 Operating Instructions</strong></td>
<td>13</td>
</tr>
<tr>
<td>7.1 Simplex AGSS Operation</td>
<td>13</td>
</tr>
<tr>
<td>7.2 Duplex AGSS Operation</td>
<td>13</td>
</tr>
<tr>
<td>7.2.1 Initial Starting</td>
<td>13</td>
</tr>
<tr>
<td>7.2.2 Operation instructions</td>
<td>13</td>
</tr>
<tr>
<td><strong>8 Maintenance</strong></td>
<td>14</td>
</tr>
<tr>
<td>8.1 Introduction</td>
<td>14</td>
</tr>
<tr>
<td>8.2 Tools and equipment</td>
<td>14</td>
</tr>
<tr>
<td>8.3 Routine Inspection, Checks and Maintenance</td>
<td>14</td>
</tr>
<tr>
<td>8.4 Maintenance</td>
<td>14</td>
</tr>
<tr>
<td>8.5 Cleaning</td>
<td>14</td>
</tr>
<tr>
<td><strong>9 Fault Diagnosis</strong></td>
<td>16</td>
</tr>
<tr>
<td>9.1 General</td>
<td>16</td>
</tr>
<tr>
<td>9.2 PUMP FAILED lamp illuminates (red)</td>
<td>16</td>
</tr>
<tr>
<td><strong>10 Wiring Diagrams</strong></td>
<td>17</td>
</tr>
<tr>
<td><strong>11 Recommended Spares</strong></td>
<td>20</td>
</tr>
</tbody>
</table>
Figures

Figure i: Identification Label AGSS ................................................................. vii
Figure 1-1; Pneumatech MGS AGSS – General views ........................................ 1
Figure 1-2; Control Panel (clear) - Simplex ....................................................... 2
Figure 1-3; Control Panel - Duplex ..................................................................... 2
Figure 6-1; Simplex AGSS ................................................................................. 7
Figure 6-2; Duplex AGSS Installation data .......................................................... 9
Figure 6-3; Duplex control panel, internal view ................................................ 10
Figure 10-1; AGSS – Simplex 3-phase and remote BMS ..................................... 17
Figure 10-2; AGSS – Duplex 3-phase circuit diagram ......................................... 18
Figure 10-3; AGSS – Duplex Simplified wiring diagram ...................................... 19

Tables

Table 2-1; Technical Specification ....................................................................... 3
Table 6-1; Simplex AGSS Installation data .......................................................... 7
Table 6-2; Duplex AGSS Installation data ............................................................ 9
Table 8-1; Inspection and Maintenance Schedule .............................................. 15
Safety, Storage and Handling

Safety Features

- Low plant noise.
- Vacuum relief valve, pre-set to 125 mbar.
- Flow/ Vacuum sensor, pre-set to 65 mbar (falling).
- Automatic regulating valve, controls the vacuum level to pre-set minimum.
- Facilities available for remote alarm indication.

Other Essential Features

The Pneumatech MGS AGSS plant's compact design saves plant room space. It is designed to be activated from any number of remote locations via wall mounted switches, complete with running lights.

Standard plant includes:
1. Anti-vibration mountings.
2. Exhaust silencer (optional).
3. Wall mounted models available.

Storage

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

Identification

The Pneumatech MGS AGSS plant is identified by the machine number, printed onto a label fixed to the side of the control box. Each pump on the Duplex AGSS is numbered.

![Identification Label AGSS](image)

Environmental Conditions

Pneumatech MGS AGSS plant 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 Introduction

Pneumatech MGS AGSS Plant are designed to remove exhaled anaesthetic gas mixtures from operating theatres, anaesthetic rooms and recovery areas. The Pneumatech MGS AGSS plant is the vacuum source for this active system removal. The plant consists of either a Simplex (single) or Duplex (double) lateral channel exhauster, with its impellor directly mounted on the motor shaft. The unit is driven by either a single or three phase motor. The plant size is determined by the number of terminal units to be serviced by the plant.

The AGSS connects to the patients breathing circuit through an AGSS receiving system and removes expired anaesthetic gas from its source. Pneumatech MGS AGSS is designed to comply with HTM 2022, HTM 02-01, BS 6834 and BS EN 7396-2.

The Pneumatech MGS AGSS consists of:
- exhauster(s)
- starter
- vacuum regulating valve (installed downstream of the plant to ensure the system performs safely and efficiently)
- exhaust condensation trap (provided with all interconnecting pipe-work, wiring and an operating and indicating system)

Waste anaesthetic gas, diluted by room air within the receiving system, is transmitted by vacuum generated in the exhauster system. The vacuum levels in the pipeline installation and flow rates at the terminal units are controlled by flow regulating valves. Waste gas is discharged to atmosphere via the pipeline installation.
The Simplex plant consists of an exhauster unit (which is controlled remotely) and a flow regulator valve.
The Duplex plant incorporates two pumps that can operate on either a **Duty** or **Standby** basis. During periods of high demand, the Standby pump operates and assists the Duty pump. If the Duty pump fails, the Standby pump automatically takes over as the Duty pump.

A Duplex plant ensures increased reliability and confidence in the system, prolonging the pump life.

*Figure 1-2; Control Panel (clear) - Simplex*

*Figure 1-3; Control Panel - Duplex*
## 2 Technical Specification

### Table 2-1: Technical Specification

<table>
<thead>
<tr>
<th>Anaesthetic Gas Scavenging Systems</th>
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</thead>
<tbody>
<tr>
<td><strong>Physical Characteristics:</strong></td>
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<tr>
<td>Height:</td>
<td>Refer to Table 6-1 or 6-2</td>
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<tr>
<td>Width:</td>
<td>Refer to Table 6-1 or 6-2</td>
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<tr>
<td>Depth:</td>
<td>Refer to Table 6-1 or 6-2</td>
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<tr>
<td>Weight:</td>
<td>Refer to Table 6-1 or 6-2</td>
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<tr>
<td><strong>Environmental Transport, Storage and Operating Conditions:</strong></td>
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<tr>
<td>Temperature:</td>
<td>10 to 40°C</td>
</tr>
<tr>
<td>Humidity:</td>
<td>10 to 95% R.H. Non-condensing</td>
</tr>
<tr>
<td>Air Pressure:</td>
<td>70 to 110 kPa</td>
</tr>
<tr>
<td><strong>Performance:</strong></td>
<td></td>
</tr>
<tr>
<td>Working Pressure:</td>
<td>AGSS Plant are designed to give a constant flow rate between a maximum of 130l/min with a 1 kPa resistance to flow to a minimum of 80l/min with 4 kPa resistance at each terminal unit.</td>
</tr>
<tr>
<td><strong>Regulatory Classification:</strong></td>
<td></td>
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<tr>
<td>GMDN Code (Term)</td>
<td>36271 (Medical gas and vacuum supply systems)</td>
</tr>
<tr>
<td>EC MDD Classification</td>
<td>Ila</td>
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<tr>
<td>GHTF Classification</td>
<td>Class C</td>
</tr>
</tbody>
</table>
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 replacement 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 MGS and must not be altered or modified in any way without the written approval or Pneumatech MGS.

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 MGS 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.

**Warning!** Motor starts automatically

**Warning!** Surfaces may be hot and should not be touched

**Warning!** Dangerous voltage

**Protective earth connection**

**Consult accompanying documents**

**Service due date**

The number 0088 identifies the notifying body under which the Quality Systems operated within Pneumatech MGS.
5 Technical Information

5.1 Principle of Operation

Assuming the pump has been correctly sized, it will continuously maintain 125 mbar, irrespective of the number of outlets in use. If the pump is overloaded, the vacuum falls and triggers the red PUMP FAILED indication at 65 mbar. Should the pump fail mechanically, for any reason, the PUMP FAILED indication will illuminate.

The Side Channel Compressor is normally used to create vacuum on an AGSS system. As the compressor impellor rotates, centrifugal force moves air from the root of the vanes into the body channel. This air flows around the contour of the body channel back to the root of the succeeding blade. This process is repeated several times and similar to multi-stage compression.

5.2 Performance

Pneumatech MGS AGSS plants are designed in accordance with BS 6834: 1987 and are required to give a constant flow rate to between a maximum of 130 l/min with a 1 kPa resistance to flow and a minimum of 80 l/min with 4 kPa resistance flow at each terminal unit irrespective of the number of terminal units.

The Pneumatech MGS AGSS plant must be carefully matched to the system design to ensure that the parameters given are not exceeded.
6 Installation and Commissioning

6.1 Introduction

The Pneumatech MGS AGSS Plant is normally positioned in the plant room where the connections are made for the electrical supply, system and exhaust pipe-work.

The system must be balanced after the factory pre-set regulating valve has been installed, to ensure that the performance meets the requirements of BS 6834: 1987. HTM 2022 recommends that no more than four terminal units shall be regulated by one valve. Consequently larger systems will require several regulating valves which may be arranged in a manifold configuration at the plant or designed into the distribution pipe-work to achieve a balanced system.

6.2 Simplex plant

The pump is intended to be used with AGSS outlets with a maximum resistance to flow of 70 bar @ 130 l/min. The pipe-work installation must be sized to minimise pressure drop, the maximum pressure drop with all outlets in use is 50 mbar. The exhaust should be kept as short as possible, using large diameter pipe to minimise back pressure.

Before attempting to start the plant, check the installation of the following:

1. All pipes are connected/ unions made and general mechanical security of the plant.
2. Check that the electrical connections have been made correctly.
3. Check that the exhaust pipeline from the exhauster unit is routed to discharge the waste gas in a safe area outside the building. Ensure that the AGSS Warning Notice part no. 25031 is permanently displayed at the discharge point.

Pneumatech MGS AGSS Plants are subjected to a series of tests in accordance with HTM 2022/02-01, British Standards and CE regulations, including visual inspections and pressure tests.
(See Table 6-1 for dimensions A, B and C)

**Table 6-1; Simplex AGSS Installation data**

<table>
<thead>
<tr>
<th>Model</th>
<th>Part No.</th>
<th>No of Phases</th>
<th>Nett Plant Output (l/min)</th>
<th>Dimensions</th>
<th>Weight Kg</th>
<th>Electrical Details</th>
<th>Start Type</th>
<th>Fuse</th>
</tr>
</thead>
<tbody>
<tr>
<td>260/1</td>
<td>3265103-24V</td>
<td>1</td>
<td>260</td>
<td>600 400 1100</td>
<td>21</td>
<td>0.37 3.6</td>
<td>DOL</td>
<td>10 A</td>
</tr>
<tr>
<td>260/3</td>
<td>3265104-24V</td>
<td>3</td>
<td>260</td>
<td>600 400 1100</td>
<td>21</td>
<td>0.37 2.1</td>
<td>DOL</td>
<td>6 A</td>
</tr>
<tr>
<td>520/1</td>
<td>3265107-24V</td>
<td>1</td>
<td>570</td>
<td>600 400 1100</td>
<td>27</td>
<td>0.75 4.8</td>
<td>DOL</td>
<td>16 A</td>
</tr>
<tr>
<td>520/3</td>
<td>3265108-24V</td>
<td>3</td>
<td>570</td>
<td>600 400 1100</td>
<td>27</td>
<td>0.75 3.1</td>
<td>DOL</td>
<td>6 A</td>
</tr>
<tr>
<td>1040/3</td>
<td>3265112-24V</td>
<td>3</td>
<td>1040</td>
<td>600 400 1100</td>
<td>33</td>
<td>1.1 5.2</td>
<td>DOL</td>
<td>10 A</td>
</tr>
<tr>
<td>1430/3</td>
<td>3265113-24V</td>
<td>3</td>
<td>1450</td>
<td>600 400 1100</td>
<td>33</td>
<td>1.5 5.8</td>
<td>DOL</td>
<td>10 A</td>
</tr>
</tbody>
</table>
6.2.1 Simplex Installation Testing

**NOTE:** If any of the tests fail, shut down the plant and report the failure to the Pneumatech MGS service contact.

1. Ensure that the power, typically 3-phase 415v, neutral and earth is connected and the remote green **PUMP RUNNING** lamp is illuminated.
2. Release the front cover panel using the isolator switch. Connect the remote switch to terminals 1, N, 2, 3, and 4. Close and lock the front panel.
3. Set the low vacuum pressure gauge to 65 mbar.
4. Check that the motor rotates in the direction shown by the arrow on the impellor casting.
5. When vacuum reaches 65 mbar, ensure that the pump stops.
6. Simulate normal running of the plant by relieving the vacuum and observe the cut-in and out points.
7. Inspect the overall finish, all connections are tight and the drain flask is fitted.
8. Test the Low Vacuum as follows: (refer to Figure 10-1 AGSS – Simplex 3-Phase circuit diagram)
   - Trip both overloads.
   - Open system pipe-work to free flow (below 65 mbar) and check that after 10 seconds, the **PUMP FAIL** lamp illuminates.
6.3 Duplex plant

Before attempting to start the plant, check the installation of the following:
1. All pipes are connected / unions made and general mechanical security of the plant.
2. Check that the electrical connections have been made correctly.

Figure 6-2: Duplex AGSS Installation data

Table 6-2: Duplex AGSS Installation data

<table>
<thead>
<tr>
<th>Model</th>
<th>Part No.</th>
<th>No of Phases</th>
<th>Net Plant Output (l/min)</th>
<th>Dimension A</th>
<th>Dimension B</th>
<th>Dimension C</th>
<th>Weight Kg</th>
<th>Electrical Detail kW</th>
<th>Run Current</th>
<th>Start Type</th>
<th>Fuse</th>
</tr>
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<tr>
<td>260/3</td>
<td>3265152-24V</td>
<td>3</td>
<td>260</td>
<td>1000</td>
<td>850</td>
<td>1200</td>
<td>65</td>
<td>0.37x2</td>
<td>2.1Ax2</td>
<td>DOL</td>
<td>6A</td>
</tr>
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<td>3265154-24V</td>
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<td>5.2Ax2</td>
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<td>16A</td>
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<td>1450</td>
<td>1000</td>
<td>850</td>
<td>1200</td>
<td>98</td>
<td>1.5x2</td>
<td>5.8Ax2</td>
<td>DOL</td>
<td>16A</td>
</tr>
</tbody>
</table>
### 6.3.1 Duplex Installation testing

**NOTE:** If any of the tests fail, shut down the plant and report the failure to the Pneumatech MGS service contact.

1. Ensure that the power, 3-phase 415v, neutral and earth is connected and the green **POWER ON** lamp is illuminated.
2. Release the front cover panel using the isolator switch, ensure that the **POWER ON** lamp is out and lower the panel. Connect the remote switch to terminals 1, 0, 2, 3, and 4. Do not use terminals 5 and 6. Close and lock the front panel. The green **POWER ON** lamp illuminates.
3. Set the **DUTY SELECT** control to 1 and the left hand **MODE SELECT** control to **HAND**. Check that the motor rotates in the direction shown by the arrow on the impellor casting.
4. Set the low vacuum pressure gauge to 65 mbar.
5. Set the **DUTY SELECT** control to 2 and the right hand **MODE SELECT** control to **HAND**. Check that the motor rotates in the direction shown by the arrow on the impellor casting.
6. Fit a dead head and when vacuum reaches 65 mbar, check that the orange **STANDBY / RUN** light illuminates and that after 10 seconds the red **PUMP FAIL** light illuminates. If necessary, adjust the timers. Open the dead head and check that the red **PUMP FAIL** light goes out and ensure that the standby pump runs for 30 minutes. Assuming the duty pump maintains the vacuum, check that the pump stops. If the duty pump trips the overload, the standby pump will maintain system vacuum.
7. Inspect the overall finish ensuring that all connections are tight and the drain flask is fitted.
8. Test the Low Vacuum as follows
   a. Open the system pipe-work to free flow (below 65 mbar) and check that after 10 seconds, the **PUMP FAIL** lamp illuminates.
6.4 Check the alarms

(Refer to Figure 10-2; AGSS – Duplex 3-Phase circuit diagram)

Use an Ohmmeter to check outgoing alarm signals:

- Terminal 1 and 2 on the AGSS Control Board = Pump Failed
- Terminal 3 and 4 on the AGSS Control Board = Low Vacuum

1. Connect the Ohmmeter to terminal 1 and 2.
2. Run the plant as normal.
3. Trip either pump overload by pulling out the test button.
4. Contacts 1 and 2 should ‘open circuit’.
5. Reset that overload and trip the other.
6. Again, contact 1 and 2 should ‘open circuit’.
7. Connect the Ohmmeter to terminal 3 and 4.
8. Run the plant as normal.
9. Free flow plant for approximately 10 seconds (below 65 mbar with both pumps running).
10. Contacts 3 and 4 should ‘open circuit’

Close the system and check that the alarm contacts close circuit.
7 Operating Instructions

7.1 Simplex AGSS Operation

Switch on the main isolator in the plant room, the system will run from the remote switch in the designated departmental facility.

7.2 Duplex AGSS Operation

7.2.1 Initial Starting

Switch on the main isolator and check that the rotation pump is turning in the direction shown on the impellor cover casting.

If the rotation is incorrect, isolate the plant at the distribution board and get a qualified electrician to check that the phases are connected in the correct sequence. If necessary change L1 (red) and L2 (blue).

7.2.2 Operation instructions

1. Ensure that:
   - the main isolator in the plant room is on (green POWER ON light illuminated),
   - the drain bottle is in place, and
   - the valves are open

2. Select the duty pump to build-up vacuum (MODE SELECT to 1 or 2 as required).

3. Ensure that both MODE SELECT switches are set to AUTO (Standby should not start).
8 Maintenance

8.1 Introduction

Pneumatech MGS AGSS 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 AGSS system and must be conversant with the information contained in this manual.

Warning! Use of sub-standard or inappropriate parts and materials may damage the AGSS and invalidate the warranty. Only use genuine Pneumatech Medical Gas Solutions spare parts.

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

NOTE: The pump should not require any more maintenance than an induction motor. If this type of pump is abused it is usually not repairable. This is not covered by the Manufacturer’s warranty. We recommend that Pneumatech MGS AGSS Plant is part of a planned maintenance programme, carried out by trained, ‘Medical Gas Competent Persons’.

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

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 system.

1. Check the exhausts and drain them for any condensation.
2. Check pump for cleanliness, in particular, check suction relief valve is clear of debris.

8.4 Maintenance

1. Check system vacuum is correctly set at 125 mbar.
2. Check system failure, by disconnecting the inlet flexible hose such that vacuum falls below 65mbar should close circuit. The PUMP FAILED light should illuminate.

8.5 Cleaning

The use of abrasive or solvent based cleaning solutions is not recommended. Should the external surface of the unit require cleaning we recommend the use of a damp cloth or mild soap solution, for the stainless steel plates use Alco-wipes ONLY. Do not use any phenol or halogen based disinfectants or agents that release chlorine or oxygen.
### Table 8-1: Inspection and Maintenance Schedule

<table>
<thead>
<tr>
<th>Actions</th>
<th>Commissioning</th>
<th>Daily</th>
<th>Weekly</th>
<th>Quarterly</th>
<th>Annually</th>
<th>5 Yearly</th>
</tr>
</thead>
<tbody>
<tr>
<td>Inspections, Checks and Tests:</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Suitability of location</td>
<td>✓</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Adequate access for maintenance</td>
<td></td>
<td>✓</td>
<td></td>
<td></td>
<td>✓</td>
<td>✓</td>
</tr>
<tr>
<td>Electrical connection and supply integrity</td>
<td></td>
<td></td>
<td>✓</td>
<td></td>
<td>✓</td>
<td></td>
</tr>
<tr>
<td>Delivered Line Pressure/System performance</td>
<td></td>
<td>✓</td>
<td>✓</td>
<td></td>
<td>✓</td>
<td>✓</td>
</tr>
<tr>
<td>Flow regulating valve (inspected for damage only after commissioning)</td>
<td></td>
<td></td>
<td>✓</td>
<td></td>
<td>✓</td>
<td></td>
</tr>
<tr>
<td>Planned Preventative Maintenance:</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Complete Commissioning Procedure</td>
<td></td>
<td></td>
<td>✓</td>
<td></td>
<td>✓</td>
<td></td>
</tr>
<tr>
<td>Visually inspect the exhauster unit, ensure a smooth operation</td>
<td></td>
<td></td>
<td>✓</td>
<td></td>
<td>✓</td>
<td></td>
</tr>
<tr>
<td>Control checks – all switches and indicator lights</td>
<td></td>
<td></td>
<td>✓</td>
<td></td>
<td>✓</td>
<td></td>
</tr>
<tr>
<td>Check the drain assembly</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>✓</td>
<td></td>
</tr>
<tr>
<td>Check security of fixings/ mountings</td>
<td></td>
<td></td>
<td>✓</td>
<td></td>
<td>✓</td>
<td></td>
</tr>
<tr>
<td>Inspect the hose assembly for any defects</td>
<td></td>
<td></td>
<td>✓</td>
<td></td>
<td>✓</td>
<td></td>
</tr>
<tr>
<td>Exhauster unit filters</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>✓</td>
<td></td>
</tr>
</tbody>
</table>
9 Fault Diagnosis

9.1 General
Overheating or ingress of dirt are the main causes of failure:

Overheating due to:
1. Restricted ventilation or dirt and fluff accumulating on the pump.
2. The relief valve having been reset to overcome a restriction elsewhere in the system.
3. Restricted exhaust pipework causing back pressure.

Ingress
1. Dirt and rubble to the pump inlet during installation.
2. Liquid, due to terminal units being incorrectly utilised.

NOTE: Failure through misuse or abuse may not be repairable and is not covered by the Manufacturer's warranty.

9.2 PUMP FAILED lamp illuminates (red)
If the red PUMP FAILED lamp illuminates, check that:
1. Both overloads have not tripped, and
2. There are no leaks in the pipe-work.

NOTE: In the event that the Plant Emergency, All of the indicators on the Remote will be illuminated, with the fault indicators taking priority.
Figure 10-1; AGSS – Simplex 3-phase and remote BMS
Figure 10-2; AGSS – Duplex 3-phase circuit diagram
Figure 10-3: AGSS – Duplex Simplified wiring diagram
11 Recommended Spares

For all Service Spares enquiries, contact the Pneumatech Medical Gas Solutions Spares Department, giving as much of the following information as possible (see Figure i).

- Product Part Number:
- Lot / Batch Number:
- Approximate date of purchase:

Contact details:

Spares Department:
T: 44 (0) 1235 463053
F: 44 (0) 1235 463011

spares@p-mgs.com