



EMERGENCY STANDBY MANIFOLDS



ISO 9001 / EN 46001

CE 0473

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Phoenix Pipeline Products Limited

Installation, Operation and Maintenance Manual

Contents Page

Section	Page
Product Description	
General	3
Operation	
General	3
Pneumatic	3
ESM Layout	4
Pressure Settings	4
Safety	
General	5
Installation	
General	5
Mechanical	5
Electrical	5
Installation Drawings	6
Electrical Schematic	7
Testing	
General	7
Testing	7
Commissioning	7
Maintenance	
General	7
Preventative Maintenance	8
Spare Parts	
General	8

1. Product Description**1.1 General**

Emergency Standby Manifolds (ESM) comprise a pressure regulator, 2 x 1 manifold header & rack, tailpipes, a cylinder contents pressure switch, an isolation valve and a pressure relief valve.

The ESM is for use with a manifold installation to provide a back-up supply whilst maintenance is being carried out to, or failure of, the main supply manifold.

Manifolds are available for oxygen, nitrous oxide, 50% oxygen/50% nitrous oxide mixture and compressed air.

An isolation and pressure relief valve assembly is provided with copper stub pipes for on site copper to copper joints to the hospital distribution pipeline and exhaust pipeline.

A non return valve is incorporated into each point where the tailpipe connects into the header to prevent a whole bank of cylinders becoming depleted in the event of a cylinder being disconnected or a tailpipe rupture.

Tailpipes are available with pin-index or bull nose cylinder connections.

2. Operation**2.1 General**

The ESM is not automatic and must be operated manually when required.

The ESM should be kept in the following state when not in use, i.e. in standby mode;

(a) Both cylinders should be full of gas and connected to the tailpipes.

(b) One cylinder should be closed and the other cylinder open, supplying pressure to the regulator.

(c) The isolation valve to the distribution pipeline should be closed.

When the ESM is required, i.e. during maintenance or in an emergency, the isolation valve should be opened to supply the distribution pipeline. When the cylinder supplying gas becomes exhausted, the cylinder valve on the other full cylinder should be opened and the empty cylinder valve closed. The empty cylinder should then be disconnected from the tailpipe and replaced with a new full cylinder.

When the fault with the main supply manifold has been rectified, the isolation valve on the ESM should be closed and the ESM left in the standby mode.

2.2 Pneumatic Operation

The gas from the left hand (LH) cylinder is connected to the header via the LH tailpipe. This is connected to the contents pressure switch, contents pressure gauge and passes through regulator to the outlet pressure gauge. Similarly, the gas from the right hand (RH) cylinder is connected to the header via the RH tailpipe. This is connected to the contents pressure switch, contents pressure gauge and passes through regulator to the outlet pressure gauge.

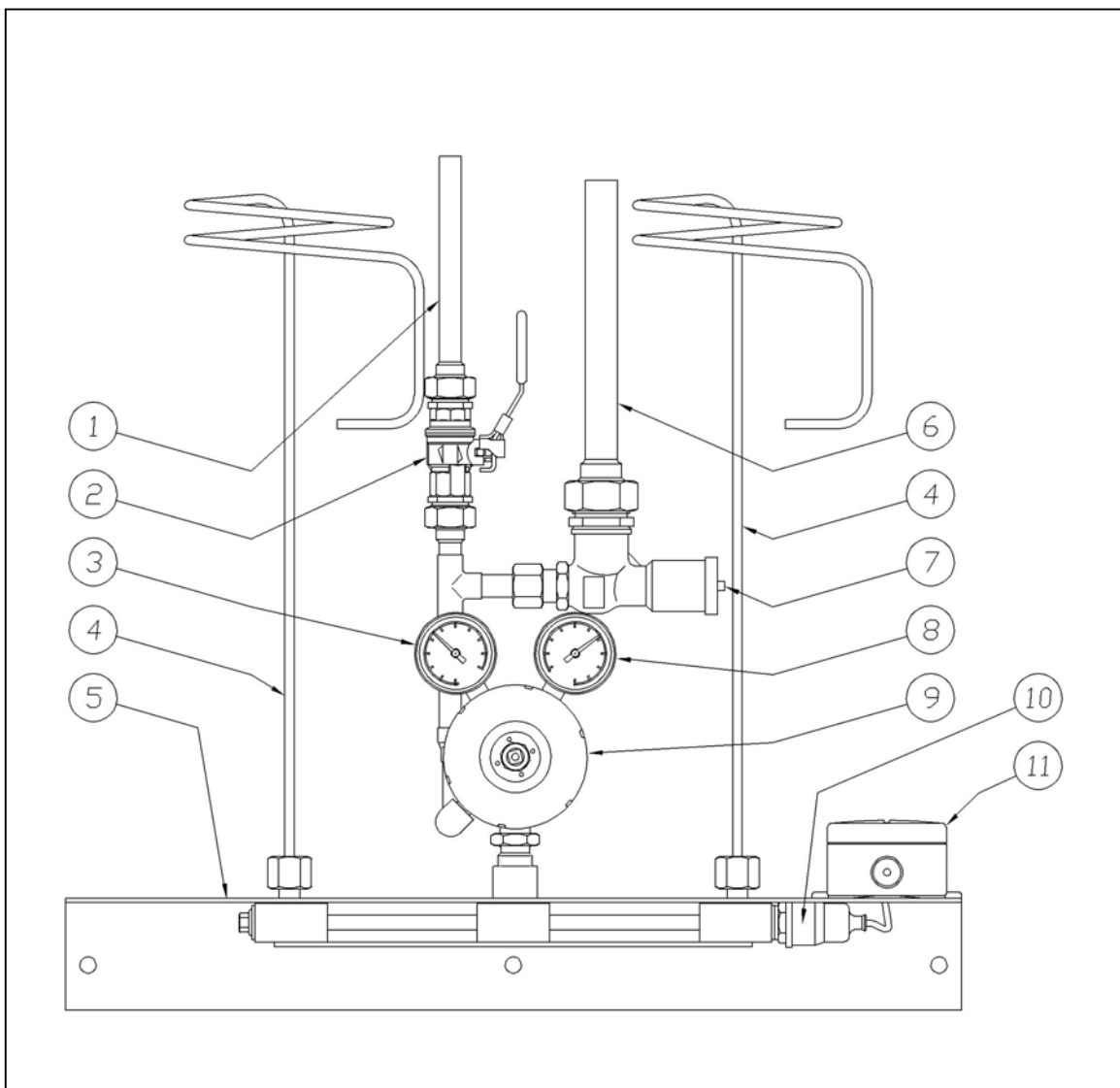
The contents pressure gauge indicates the cylinder contents pressure in the LH and RH cylinders respectively, depending on which cylinder is open. The outlet pressure gauge indicates the outlet pressure from the regulator.

When the pressure in the header falls below the setting of the pressure switch, the other cylinder is opened thus allowing the ESM to continue with the gas supply. The empty cylinder should now be replaced with a full cylinder. This sequence will continue.

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Installation, Operation and Maintenance Manual

2.3 ESM Layout



ID	Description	Qty
1	Outlet Stub Pipe	1
2	Isolation Valve	1
3	Contents Pressure Gauge	1
4	Tailpipe (Gas Specific)	2
5	Header Rack	1
6	Relief Valve Stub Pipe	1

ID	Description	Qty
7	Pressure Relief Valve	1
8	Outlet Pressure Gauge	1
9	Regulator	1
10	Contents Pressure Switch	1
11	Termination Box	1

2.4 Pressure Settings

Component	O ₂	N ₂ O	O ₂ /N ₂ O	Medical Air (400 kPa)	Surgical Air (700 kPa)
Regulators (static)	4.0 bar	4.0 bar	4.0 bar	4.0 bar	7.0 bar
Pressure Relief Valve	5.5 bar	5.5 bar	5.5 bar	5.5 bar	9.0 bar
Cylinder Pressure, Low	68 bar	14 bar	68 bar	68 bar	68 bar

3. Safety

3.1 General

This equipment should be installed, operated and maintained by personnel who are suitably trained, are fully conversant with HTM 2022 and are familiar with this product.



This equipment should be kept clean and be free from oil and grease at all times. Oxygen will ignite spontaneously in the presence of oil and grease. If you suspect that any equipment is contaminated, do not use it.

No attempt should be made to use or modify this equipment for use with a gas other than as identified.

This equipment should not be operated at pressures exceeding those stated in HTM 2022 and this manual.

Care should be taken when drawing conclusions about the contents of cylinders from their pressures. In the case of compressed gases, such as oxygen and medical air, the cylinder pressure is a good indication of the cylinder contents, for example, if the cylinder is half full, it will show half pressure. Liquefied gases, such as nitrous oxide, show full cylinder pressure as long as there is liquid in the cylinder. This may represent a small percentage of the full cylinder contents. It should not be assumed that a cylinder of nitrous oxide is full simply because the gauge shows full pressure.

4. Installation

4.1 General

The ESM is supplied with all internal electrical connections pre-wired. The only external wiring required for the installation is the connection of the ESM pressure switch (if required) to the automatic manifold.

All regulators and pressure sensors are preset and no further adjustment of these settings should be required.

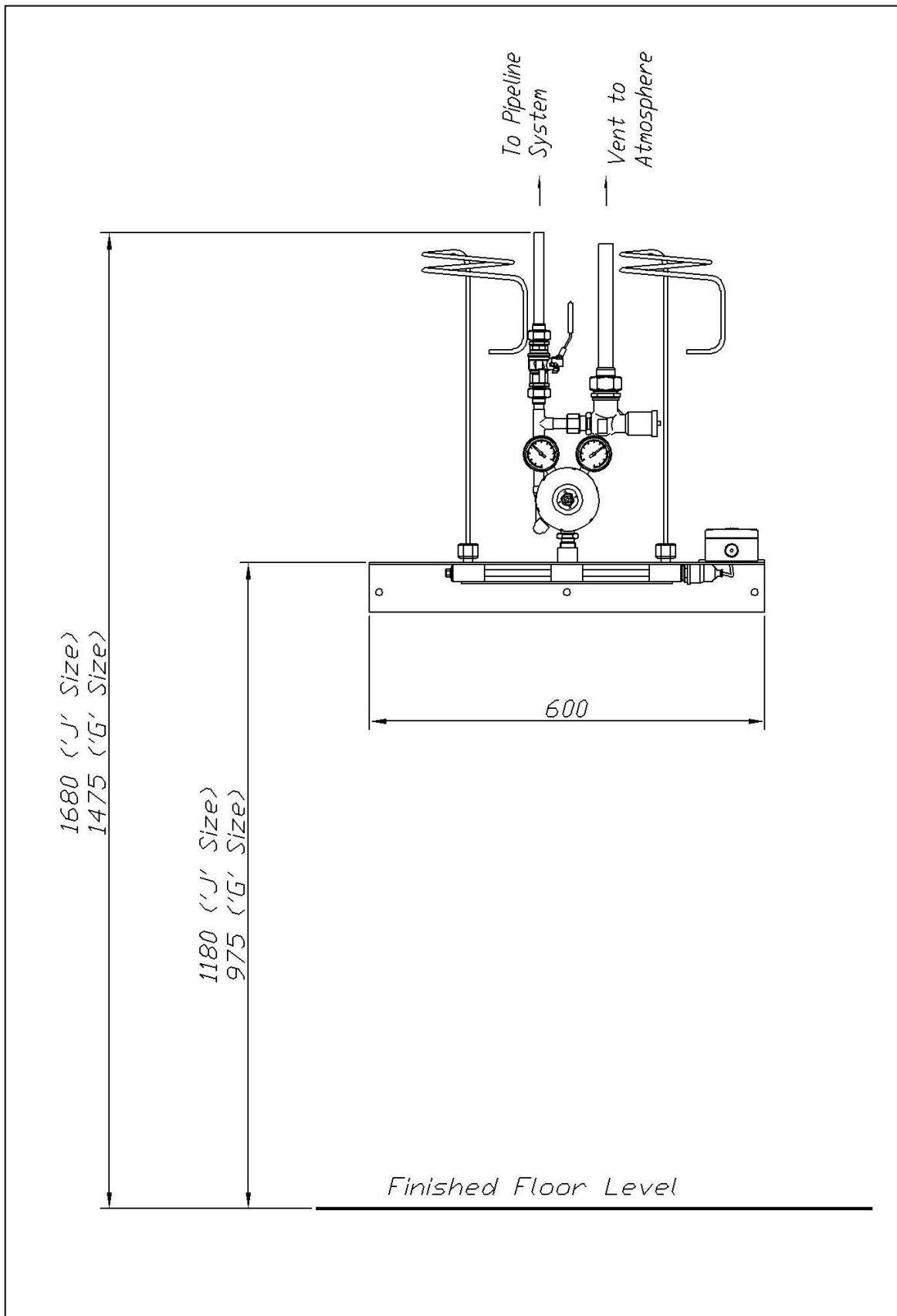
4.2 Mechanical

- (a) Secure the ESM header rack to the wall using suitable fixings at the height indicated in figure 4.4.
- (b) Install the outlet stub pipe, pressure relief valve and isolation valve.
- (c) Install the exhaust pipeline from the pressure relief valve to a safe external location.
- (d) Install all tailpipes onto the manifold headers.
- (e) Check and tighten all mechanical joints.
- (f) Connect cylinders, pressurise the manifold and check for leaks. Make sure that the isolation valve is closed if the connection to the distribution pipeline has been made.

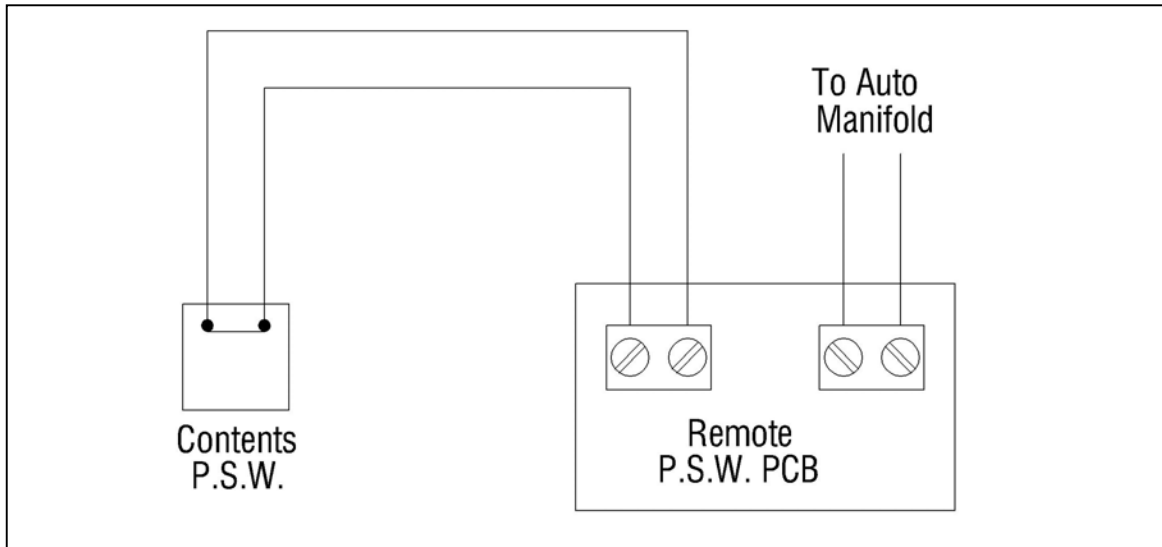
4.3 Electrical

- (a) Remove the fascia from the termination box mounted on the header rack.
- (b) Connect the emergency standby manifold (ESM) pressure switch into terminals 1 and 2 of CON1 on the monitoring and status panel PCB. Refer to figure 4.5.

4.4 Installation Drawings



4.5 Electrical Schematic Diagram



5. Testing

5.1 General

Prior to testing the manifold installation, please check the following.

- (a) All components have been installed and are tightened.**
- (b) The mains power supply has been installed and power is available.**
- (c) The isolation valves on the automatic manifold and ESM are closed.**
- (d) Full cylinders have been fitted to all tailpipes.**

5.2 Testing

- (a) Slowly open one cylinder on each bank and allow the system to pressurise.**
- (b) Check all tailpipes and joints for leaks.**
- (c) Close the cylinders. Create a leak between the regulator and the distribution pipeline and very slowly depressurise the system.**
- (d) At the setting of the ESM pressure switch, the RESERVE LOW indicator on the automatic manifold control panel will illuminate.**
- (e) If any pressure settings differ from those as stated in table 2.5, adjust as necessary.**

5.3 Commissioning

Demonstrate the manifold installation to the client by repeating the above-mentioned test procedure.

It is advisable to confirm that a central alarm system (if available) is operating correctly at the same time.

The manifold must not be used until all testing & commissioning procedures for the pipeline system as detailed in HTM 2022 have been satisfactorily completed and accepted.

6. Maintenance

6.1 General

Maintenance of the manifold should be restricted to periodic checking and adjustment and if necessary the replacement of faulty components. It should be noted that although many of the components appear to be standard items, many

have been selected and treated to make them suitable for the gases carried and the pressures involved.

6.2 Preventative Maintenance

Regular inspections and maintenance of the manifold will prolong its life and reduce the possibility of sudden, inconvenient component failures.

Manifolds should be subjected to regular inspection and testing as detailed below.

- **Monthly;**

- (a) **Visually inspect the manifold for signs of damage.**

- (b) **Check all mechanical joints for leaks.**

- (c) **Check that cylinders connected are full.**

- **Annually;**

- (a) **Visually inspect the manifold system for signs of damage.**

- (b) **Check that one bank of cylinders on the ESM is open ready for use.**

- (c) **Check all mechanical joints for leaks.**

- (d) **Test the manifold system as detailed in section 5.2 to confirm correct operation.**

- (e) **Observe that all indicators are working correctly.**

6.3 All maintenance should be carried out with the knowledge of the hospital engineer and in accordance with the Permit-to-Work system.

7. Spare Parts Lists

When ordering spare parts, please quote the batch number of the equipment and a description of the component required to ensure that you receive the component that you require!

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