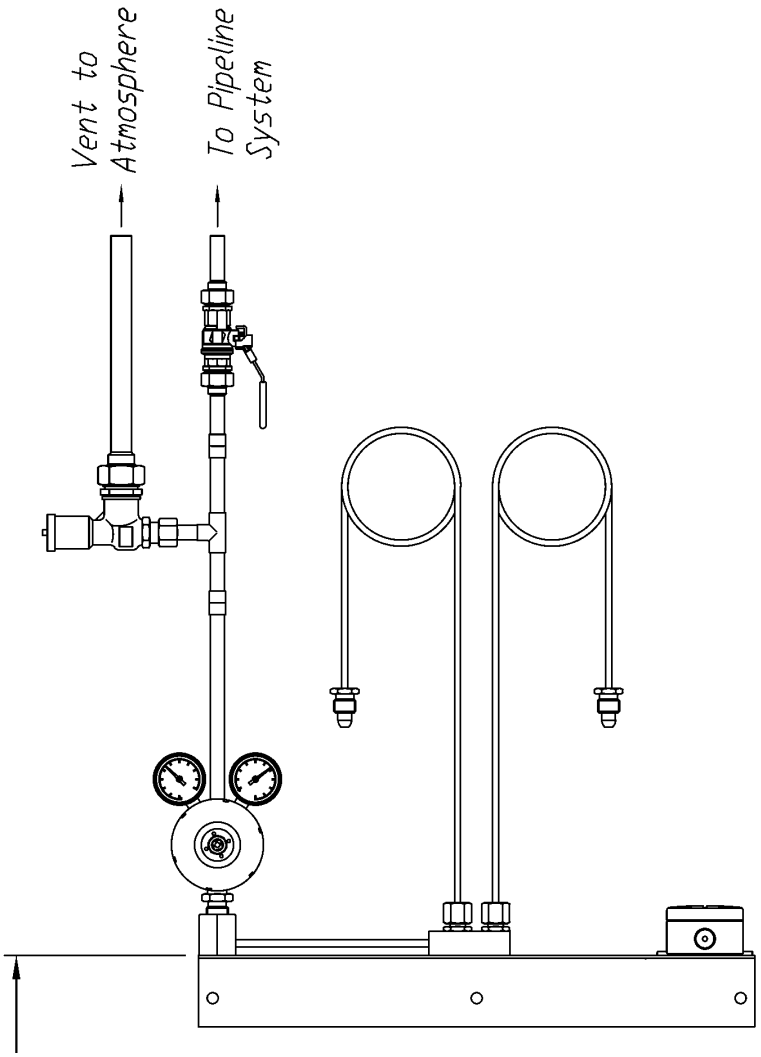
PRECISION UK Ltd

Specialists in HTM02-01 Medical Gas Pipeline Equipment

CPX EMERGENCY STANDBY MANIFOLD

INSTALLATION, OPERATIONS & MAINTENANCE MANUAL



VERSION HISTORY

Version #	Implemented By	Revision Date	Approved By	Approval Date	Reason
1.0	*Kevin Pugh*	*11/09/2013*	*Rob Parry*		*1st Issue*

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1 INTRODUCTION

- The CPX Precision UK emergency Standby manifold shall fully comply with the requirements of the UK DoH Health Technical Memorandum 02-01 (HTM 02-01).
- The emergency standby manifold ESM shall be manufactured under an ISO 13485:2003 quality management system. A copy of the certificate of registration shall be provided for review.
- The ESM shall be designed and certified for use with oxygen at 300 bar and 60°C.
- The ESM shall provide a backup supply of medical gas from a high pressure cylinder bank via a suitable arrangement of pressure regulators, providing a constant downstream nominal pipeline gauge pressure of 400 kPa. (SA7-700 Kpa)

1.1 KEY FEATURES

Emergency Standby Manifolds (ESM) comprise a pressure regulator, 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.

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1.2 SYSTEM OPERATIONS

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 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.

1.3 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.

1.4 SAFETY

- The CPX ESM must be fixed in consultation with the construction manager during installation procedure.
- The methods described for the fixation, gases and power supply are general recommendations and there implementation is to be planned and designed for each individual case by qualified experts.
- **Precision UK ESM's are not suitable for use in potentially explosive areas.**
- CPX ESM's are suitable for continuous duty.
- CPX ESM's are pre wired in accordance with BS EN 7671 wiring regulations.

This equipment should be kept clean and be free from oil and grease at all times. Oil and grease will ignite spontaneously in the presence of oxygen. 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 gas other than the gas identified.

2 INSTALLATION

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.

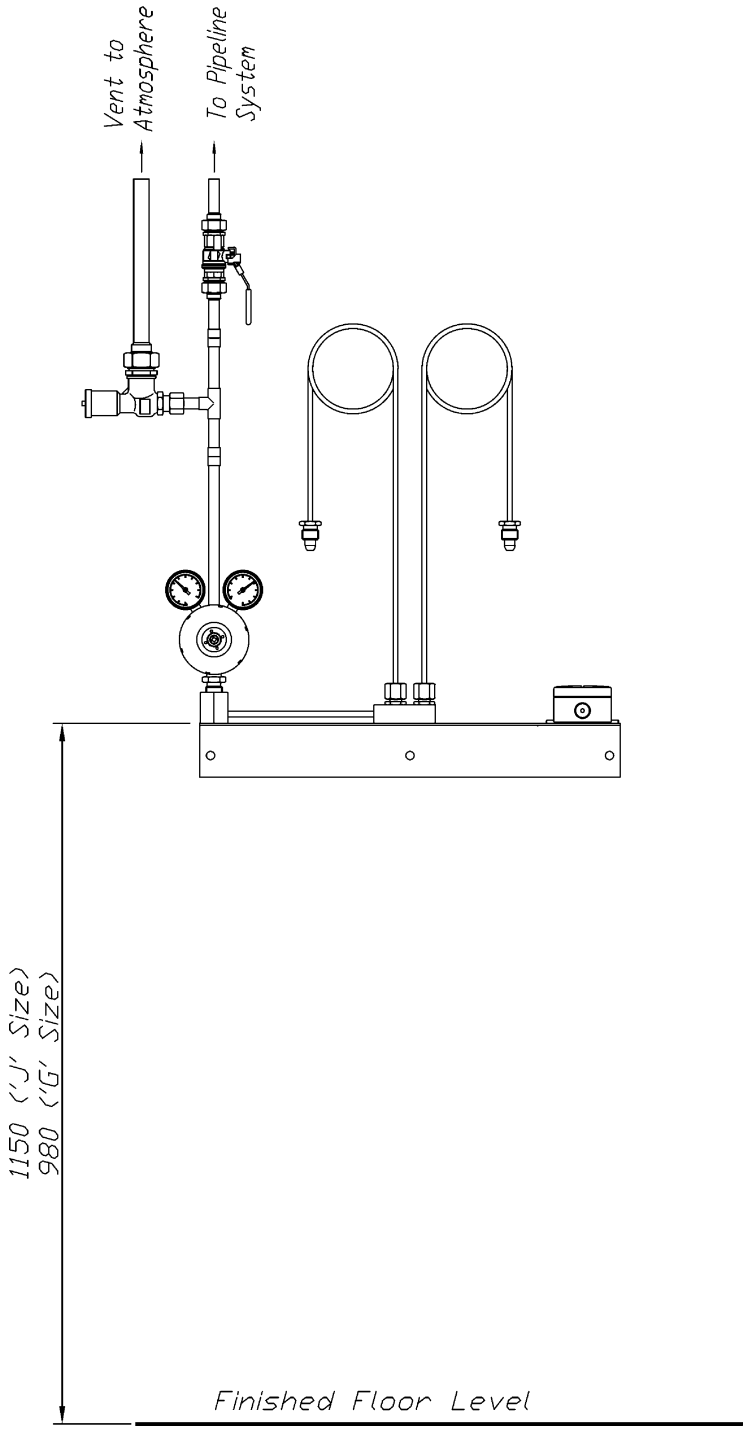
2.1 Mechanical

(a) Secure the ESM header rack to the wall using suitable fixings at the height indicated in figure 2.3.
(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.

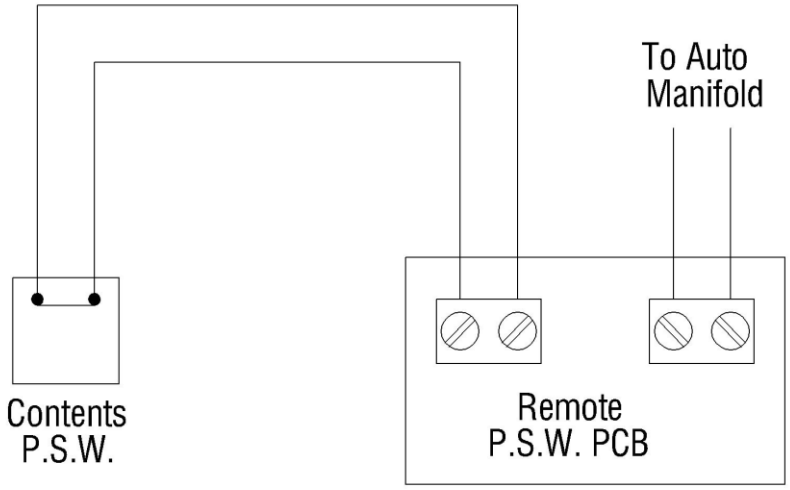
2.2 Electrical

(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 on the auto gas manifold. Refer to figure 2.4.

2.3 Installation Drawing



2.4 Electrical Schematic Diagram



3 TESTING

3.1 GENERAL

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

(a) All components have been installed 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.

3.2 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.

3.3 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.

4 MAINTENANCE

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.

5 PREVENTATIVE MAINTENANCE

Regular inspections and maintenance of the manifold will prolong it's 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.

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- 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.

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

6 SPARE PARTS

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!

7 WARRANTY

The CPX Emergency Standby manifolds comes with a 12 month warranty from day if shipment. Within this period Precision UK will repair, replace any part on site, or at the factory, which is proven defective at Precision UK's cost.

Furthermore, Precision UK will warrant its materials to be free from defects for an additional period of four (4) years (five (5) in total from date of shipment).Within this period Precision UK will replace any part, at no charge, which is proven to be defective. Shipping cost after the first twelve (12) months will be borne by the customer.

This warranty is valid when the product has been properly installed according to Precision UK's specifications, used in a normal manner and serviced according to the factory recommendations. It does not cover failure due to damage which occurs in shipments or failures which resulted from accidents, misuse, abuse, neglect, mishandling, alteration, misapplication or damage that may be attributable to acts of god.

Precision UK shall not be liable for incidental or consequential damages resulting from the use of this equipment.

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8 CONTACT US

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9 REGULATORY REQUIREMENTS

The following British, European and International Standards have been consulted during the design, manufacture and testing of the bed head unit.

√	BS EN 1441:1998	Medical Devices. Risk Analysis.
√	BS EN 13348:2001	Copper and copper alloys. Seamless round copper tubes for medical gases or vacuum.
√	BS EN 1044:1999	Brazing. Filler metals.
√	BS EN 980:1997	Graphical symbols for use in the labelling of medical devices.
√	BS EN 1089:3:1997	Transportable gas cylinders. Gas cylinder identification (excluding LPG). Colour coding.
√	ISO 7396-1	Medical gas pipeline systems. Pipeline systems for compressed medical gases and vacuum.
√	ISO 7396-2	Medical gas pipeline systems. Anaesthetic gas scavenging disposal systems.
√	ISO 11197:2004	Medical Supply Units.
√	BS EN 60601-1	Medical electrical equipment general requirements for basic safety and essential performance.
√	BS EN 60601-1-2	Medical electrical equipment general requirements for basic safety and essential performance collateral standards electromagnetic compatibility.
√	ISO 32	Gas cylinders for medical use. Marking for identification of content.
√	ISO 554	Standard atmospheres for conditioning and/or testing. Specifications.
√	SS 01 91 02	Colour atlas.
√	HTM08-03	Health Technical Memorandum Bedhead Services
√	HTM 2022	Medical gas pipeline systems. Design, installation, validation and verification.
√	HTM 02-01	Medical gas pipeline systems. Design, installation, validation and verification
√	C11	NHS model engineering specification – medical gases.

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Appendix A: Operations & Maintenance Manual Approval

The undersigned acknowledge they have reviewed the automatic manifold **Installation, Operations & Maintenance Manual** and agree with the approach it presents. Changes to this **Operations & Maintenance Manual** will be coordinated with and approved by the undersigned or their designated representatives.

Signature: _____ Date: _____
Print Name: _____
Title: _____
Role: _____

Signature: _____ Date: _____
Print Name: _____
Title: _____
Role: _____

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Title: _____
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