

Specialists in HTM 02-01 Medical Gas Pipeline Equipment
Simplex AGSS Plant Operating and Maintenance Instructions



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Medical Vacuum Plant Operating and Maintenance Instructions

Contents Page

Section	Page
Product Description	
General	3
AGSS Plant	3
AGSS Remote Switch	3
Specifications	3
Operation	
General	4
Safety	
General	4
Installation	
General	4
Mechanical	5
Electrical	5
Electrical Schematic (Single Phase)	6
Electrical Schematic (Three Phase)	7
Testing	
General	8
Testing	8
Commissioning	8
Maintenance	
General	9
Preventative Maintenance	9
Fault Diagnosis	10
Spare Parts Lists	
General	10

Medical Vacuum Plant Operating and Maintenance Instructions

1. Product Description

1.1 General

Anaesthetic gas scavenging system (AGSS) plants are designed to provide a safer working environment for the medical personnel by the removal of the waste gases that are produced during anaesthesia and from the surrounding environment.

1.2 AGSS Plant

Simplex AGSS Plants consist of an internally coupled electric motor and die cast aluminium side channel vacuum pump, mounted on a powder coated steel base plate with anti-vibration pump mountings and is complete with control equipment and vacuum relief valve.

The plant control equipment is housed in a separate enclosure mounted onto the base plate adjacent to the pump. The enclosure incorporates an isolating switch, motor contactor, thermal overload relay and a vacuum switch to monitor the plant pressure.

The inlet and exhaust connections are suitable for brazing directly to the distribution pipeline and incorporate flexible couplings. A condensate drain flask is fitted on the exhaust.

The plant is operated via Remote Switches, which are located in the various departments served by the plant.

AGSS plants are available with single phase or three phase motors as required and as detailed below.

1.3 AGSS Remote Switch

AGSS Remote Switches consist of an ON/OFF switch, a green RUNNING indicator and a red PUMP FAILED indicator suitable for mounting into a British Standard deep drawn twin gang back box.

The plant can be controlled from various different locations by connecting separate AGSS Remote Switches in parallel.

1.4 Specifications

Configuration	No. of Terminal Units	Flow @ vacuum		Electrical Details					
		L/min	mbar	Hz	kW	Start (A)	Run (A)	Starter Type	Fuse
Simplex (1-ph)	5	850	125	50Hz	0.75	33.0	5.5	D.O.L.	16A
Simplex (3-ph)	5	850	125	50Hz	0.75	10.8	1.8	D.O.L.	6A
Simplex (3-ph)	11	1500	125	60Hz	1.75	24.0	4.0	D.O.L.	16A

Specialists in HTM 02-01 Medical Gas Pipeline Equipment
Medical Vacuum Plant Operating and Maintenance Instructions

2. Operation

2.1 General

Ensure that all AGSS Remote Switches are switched to OFF before powering up for the first time or after the completion of any maintenance work.

Turn on the isolator switch on the AGSS Plant control box to enable the unit to run when called for via a Remote Switch.

When any of the Remote Switches connected to the AGSS Plant is switched ON, the vacuum pump will run and the green RUNNING indicator will illuminate on the Remote Switch.

If subsequent Remote Switches are switched ON in other departments, the green RUNNING indicator will illuminate on those Remote Switches.

The AGSS Plant will continue to run until all Remote Switches connected to the plant have been switched OFF.

If at any time whilst the AGSS Plant is running, the vacuum switch does not detect the correct level of vacuum, the red PUMP FAILED indicator will illuminate on all Remote Switches that are turned ON.

The red PUMP FAILED indicator will also illuminate should the thermal overload relay trip. This relay is reset manually. The cause of this fault should be investigated.

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.

Medical Vacuum Plant Operating and Maintenance Instructions

Installation

4.1 General

The AGSS Plant should be floor mounted in an adequately ventilated area. Avoid obstructing the flow of cooling air to the fan end of the motor. The equipment should not be operated in ambient temperatures exceeding 40°C.

It is advisable to keep pipe runs as short as possible avoiding unnecessary pipe fittings. Where long or tortuous pipe runs are unavoidable, consideration should be given to increasing the pipe diameters.

The AGSS Plant requires either a single phase or three phase supply. This should be supplied via a local distribution board and be suitable for the rating of the pump.

The AGSS Plant is supplied pre-wired. The only connections required during installation are for the mains power supply and for the remote switches.

A vacuum switch is mounted in the electrical enclosure and is factory set at 85 mbar and pre-wired. No further adjustment will be required.

The vacuum relief valve is factory set to 125 mbar and should require no further adjustment. Operating the pump at vacuum levels in excess of this could result in serious damage to the pump.

The AGSS Plant is intended for use with terminal units complying with BS 6834 which have a maximum resistance to flow of 70 mbar at 130 l/min.

4.2 Mechanical

(a) Secure the base plate to the floor using suitable fixings. The mounting holes provided in the base plate are Ø12mm. Where possible, mount the AGSS Plant on a plinth.

(b) Connect the inlet pipework and exhaust pipework to the connections provided.

(c) The exhaust should be run as directly as possible to atmosphere and terminate in an elbow pointing downwards to protect against water ingress. Avoid air intakes for air conditioning & ventilation systems and windows.

(d) Check that the condensate drain flask is fitted.

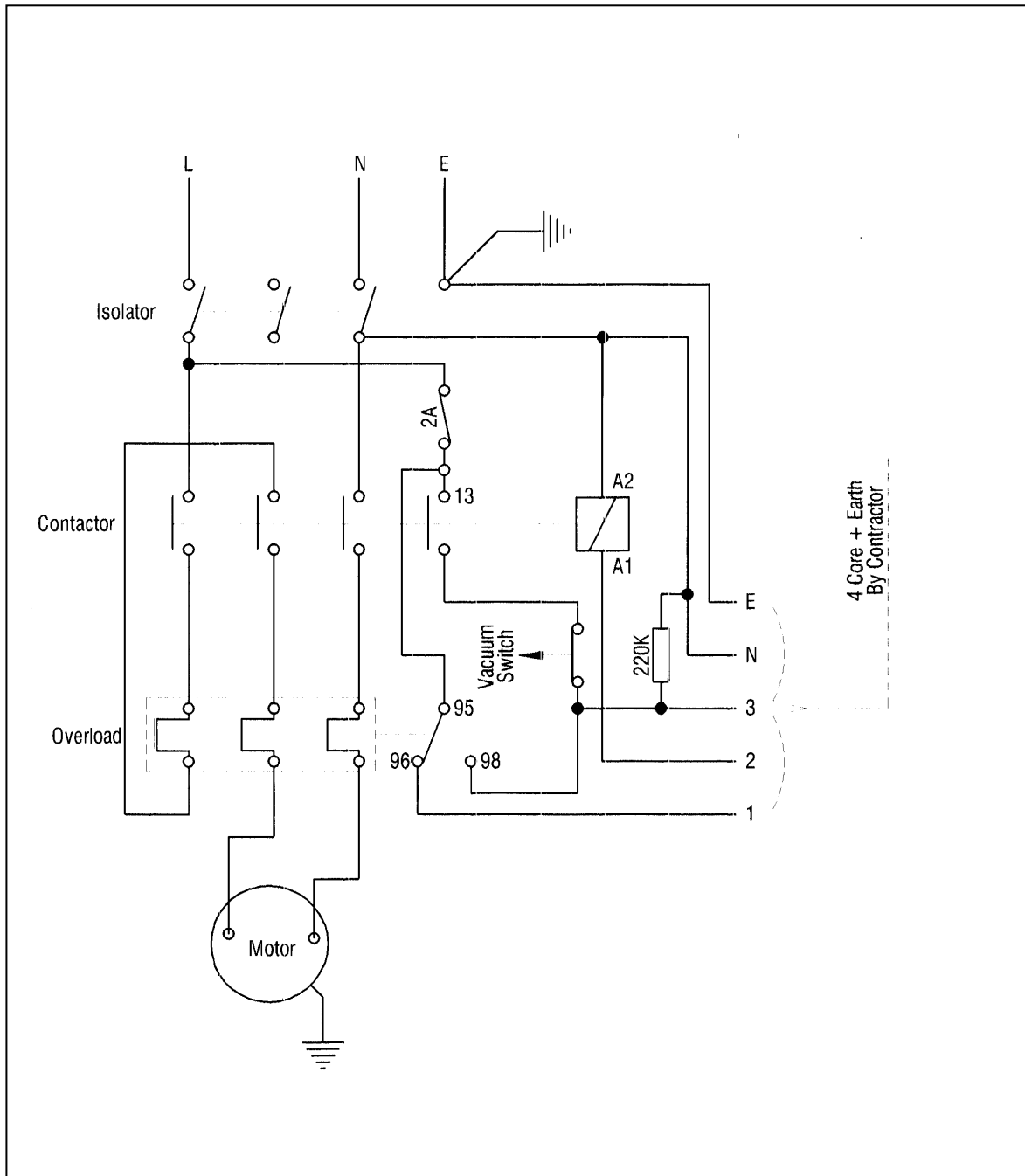
4.4 Electrical

(a) Connect the electrical power supply into the contactor mounted in the AGSS Plant control box. Refer to the following electrical schematic diagrams.

Medical Vacuum Plant Operating and Maintenance Instructions

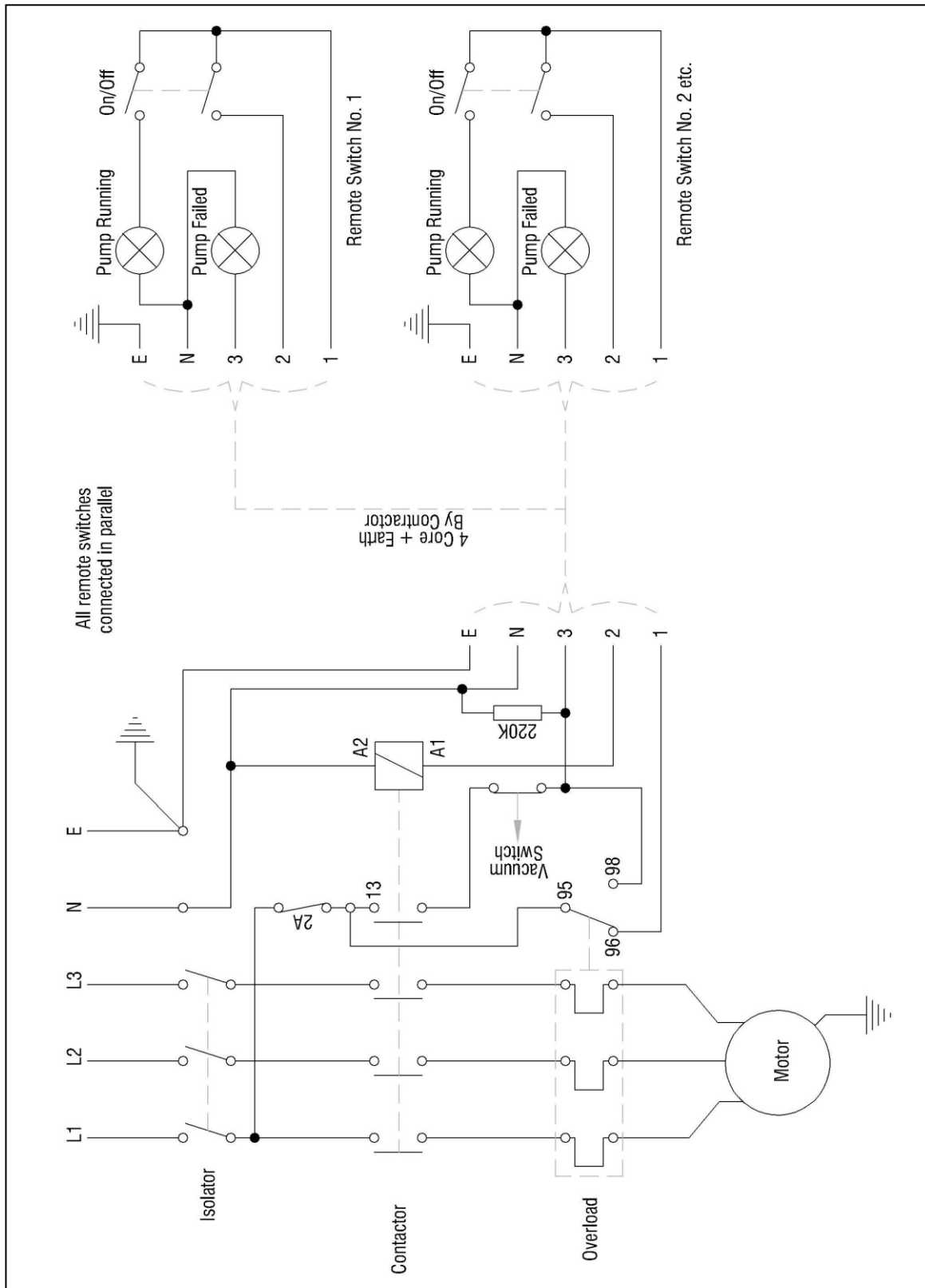
- (b) Connect the wiring for the AGSS Remote Switch(es) into the terminal block located in the AGSS Plant control box. Refer to the following electrical schematic diagrams.**
- (c) Connect the wiring to the terminal block provided on the AGSS Remote Switch and fit the fascia. Where the installation requires multiple AGSS Remote Switches, these shall be connected in parallel.**

4.5 Electrical Schematic Diagram (Single Phase)



Specialists in HTM 02-01 Medical Gas Pipeline Equipment
Medical Vacuum Plant Operating and Maintenance Instructions

4.6 Electrical Schematic Diagram (Three Phase)



Specialists in HTM 02-01 Medical Gas Pipeline Equipment
Medical Vacuum Plant Operating and Maintenance Instructions

4. Testing

5.1 General

Prior to testing the 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) All remote switches are connected and installed.**
- (d) All terminal units are installed.**

5.2 Testing

- (a) Turn on the isolator switch on the AGSS Plant control box. The plant is now ready to run.**
- (b) Switch ON an AGSS Remote Switch. Observe that the green RUNNING indicator illuminates. Switch OFF the AGSS Remote Switch. Observe that the green RUNNING indicator extinguishes.**
- (c) Repeat the above at all AGSS Remote Switches.**
- (d) Disconnect the vacuum switch in the AGSS Plant control box.**
- (e) Switch ON an AGSS Remote Switch. Observe that the red PUMP FAILED indicator illuminates. Switch OFF the AGSS Remote Switch and observe that the red PUMP FAILED indicator extinguishes.**
- (f) Repeat the above at all AGSS Remote Switches.**
- (g) Re-connect the vacuum switch in the AGSS Plant control box.**
- (h) Switch ON all AGSS Remote Switches. Observe that the green RUNNING indicator illuminates on all AGSS Remote Switches.**
- (i) In turn switch OFF the AGSS Remote Switches. Observe that the green RUNNING indicator only extinguishes on the switch that is turned OFF.**
- (j) Check the flow rates at all AGSS terminal units in accordance with HTM 2022 and BS 6834.**

5.3 Commissioning

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

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

Specialists in HTM 02-01 Medical Gas Pipeline Equipment
Medical Vacuum Plant Operating and Maintenance Instructions

5. Maintenance

6.1 General

Maintenance of the equipment 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.

The pump requires no lubrication. In the event of a breakdown due to mechanical failure, replace the complete unit.

6.2 Preventative Maintenance

Regular inspections and maintenance of the equipment will prolong it's life and reduce the possibility of sudden, inconvenient component failures.

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

- **Monthly;**
 - (a) **Visually inspect the equipment for signs of damage.**
 - (b) **Check all mechanical joints for leaks.**
 - (c) **Check the operation of all remote switches.**
- **Annually;**
 - (a) **Visually inspect the equipment for signs of damage.**
 - (b) **Check all mechanical joints for leaks.**
 - (c) **Check that the relief valve setting has not been disturbed and reset if necessary.**
 - (d) **Test the system as detailed in section 5.2 to correct operation.**
 - (e) **Observe that all indicators are working correctly.**

Specialists in HTM 02-01 Medical Gas Pipeline Equipment
Medical Vacuum Plant Operating and Maintenance Instructions

6.3 Fault Diagnosis

Symptom	Fault	Action
Motor will not start		Fuse Blown Check all electrical connections, switchgear, cable and motor. Replace fuse as necessary.
	Motor burnt out	Replace complete unit.
	Overload tripped	Isolate power supply. Reset overload.
Motor overheats	Vacuum relief valve	Check relief valve setting.
	Inlet to motor fan is covered	Ensure that the plant is not obstructed, and that airflow is available to the motor.
Flow at terminal units falls below normal	Leaks in flexible hose connections.	Inspect flexible hose and Replace if damaged.
Pump Failed light permanently illuminated	Vacuum failure	Check that motor is running.
		Check vacuum switch operation.
		Check electrical connections on control circuit. Check flexible hoses and connections. Replace if damaged.

6.4 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!