



PRECISION UK Ltd



DUPLEX AGSS PLANT



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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

Duplex AGSS Plants consist of two die cast aluminium side channel vacuum pumps with internally coupled electric motor, mounted on a powder coated steel base plate with anti-vibration pump mountings and are complete with control equipment and vacuum relief valves.

The plant control equipment is housed in plastic enclosure mounted onto the base plate adjacent to the pumps. The enclosure incorporates, motor starter units, and a PLC.

The inlet and exhaust connections are suitable for brazing directly to the distribution pipeline and incorporate flexible couplings. Condensate drain flasks are fitted on the exhausts.

The plant is operated via 240Vac Remote Switches, which are located in the various departments served by the plant.

AGSS plants are available with three phase motors as detailed below.

1.3 AGSS 240Vac Remote Switch

AGSS 240Vac Remote Switches consist of ON/OFF Switch, a green NORMAL indicator, amber PLANT FAULT indicator and a red PLANT EMERGENCY 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.



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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 Local isolator switch to enable the unit to run when called for via a Remote Switch. The green POWER ON indicator will illuminate.

Duty Selection and indication is via the 2 position rotary switch on the front of the control panel labeled DUTY SELECT.

When any of the Remote Switches connected to the AGSS Plant is switched ON, the duty pump will run. The green RUNNING indicator on the remote and the appropriate PUMP RUNNING indicator on the plant control unit will illuminate.

If subsequent Remote Switches are switched ON in other departments, the green NORMAL 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 duty pump is running, the vacuum switch does not detect the correct level of vacuum for more than ten seconds due to a pump fault or high demand, the standby pump will automatically start, the corresponding green PUMP RUNNING indicator illuminates, the amber PLANT FAULT indicator illuminates and the amber FAULT indicator will illuminate on all energized Remote Switches. All fault indicators will extinguish when the vacuum level in the pipeline returns to normal although the standby pump will continue to run for 5 minutes.

If the standby pump cannot maintain the correct level of vacuum for more than 30 seconds, the red PLANT EMERGENCY indicator will illuminate on the plant control panel and all energized Remote Switches.

The appropriate yellow PUMP MOTOR TRIP indicator on the plant will illuminate should the thermal overload trip for either pump. Should the thermal overload trip for both pumps then both yellow PUMP MOTOR TRIP indicators will illuminate. The thermal overload is reset manually, the cause of this fault should be investigated.



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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.

4. Installation

4.1 General

The AGSS Plant should be floor mounted in an adequately ventilated area at least 250mm away from any wall to ease any future maintenance (check for adequate space using the Plant overall dimensions drawing). 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 a 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 Suitably sized wall mounted isolator and fuses should be supplied by the electrical contractor local to the pump.

A vacuum switch is mounted on the back plate within the electrical enclosure above the remote switch connection terminals and is factory set. No further adjustment will be required.

The vacuum relief valve is factory set 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.

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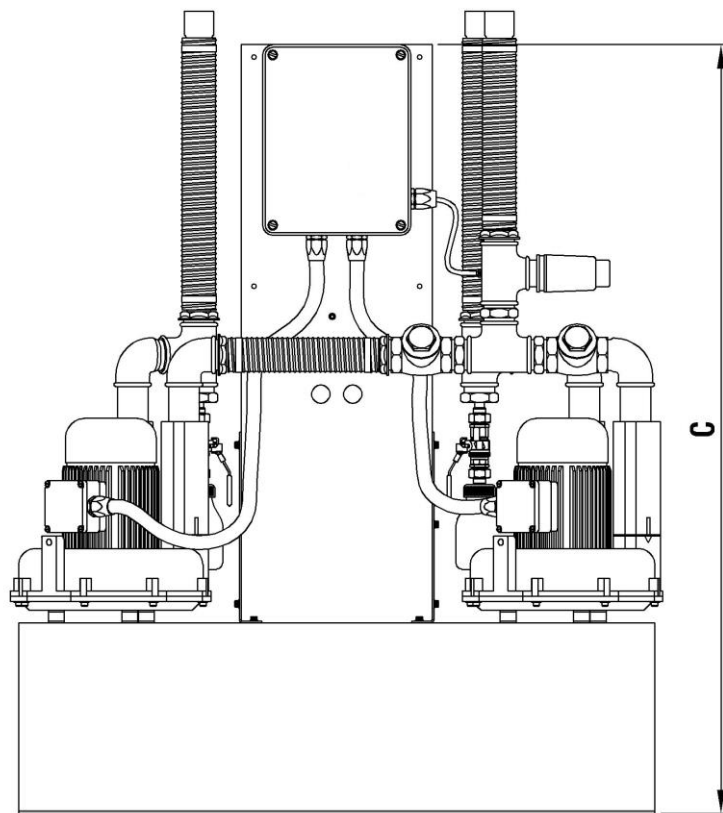
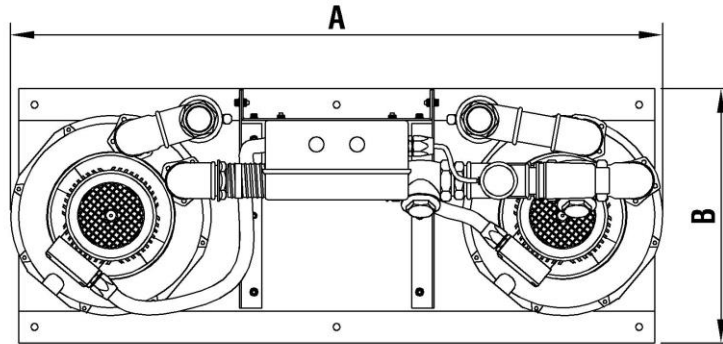
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4.1a

Plant Overall dimensions



Plant kW	Plant Capacity	Dim A mm	Dim B mm	Dim C mm	Weight kg
2x0.4 kW	130 l/min	1000	400	1200	75
2x0.75 kW	520 l/min	1000	400	1200	80
2x1.75 kW	1050 l/min	1050	400	1200	90
2x2.2 kW	2500 l/min	1100	400	1200	110

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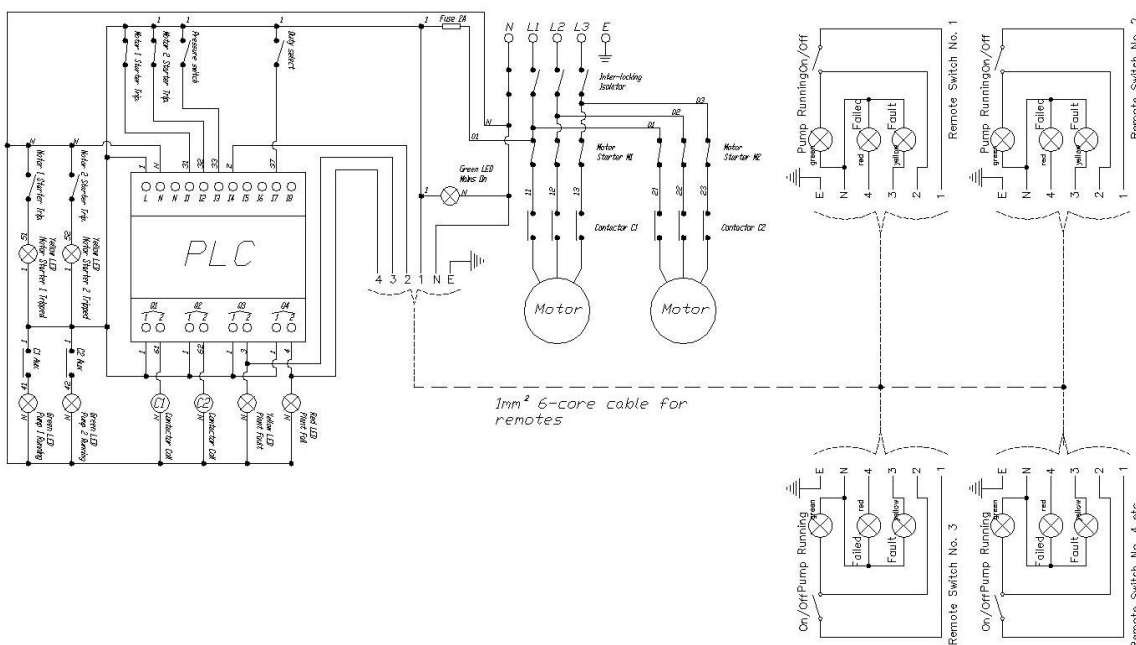
4.2 Mechanical

- Secure the base plate to the floor using suitable fixings. The mounting holes provided in the base plate are $\varnothing 12\text{mm}$. Where possible, mount the AGSS Plant on a plinth.
- Connect the inlet pipework and exhaust pipework to the connections provided.
- 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.
- Check that the condensate drain flasks are fitted.

4.4 Electrical

- Connect the electrical power supply from the wall mounted isolator onto the Control panel isolator (3 phase only) Neutral connects to a Grey din rail mounted terminal mounted in the AGSS Plant control box. Refer to Control panel layout drawing and electrical schematic.
- Connect the wiring for the AGSS Remote Switch(es) into the terminal block located in the AGSS Plant control box. Refer to the Remote switch connection diagram.
- Connect the wiring to the terminal blocks provided on the AGSS Remote Switch and fit the fascia. Where the installation requires multiple AGSS Remote Switches, these shall be Daisy chained.

4.5 Wiring Details



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5. 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. Observe that the green POWER ON indicator illuminates. The plant is now ready to run.
- (b) Select Pump No.1 as the duty pump. Switch on an AGSS Remote Switch. Observe that the green PUMP 1 RUNNING indicator illuminates and Pump No.1 runs in the correct direction. Switch off the AGSS Remote switch
- (c) Select Pump No.2 as the duty pump. Switch on an AGSS Remote Switch. Observe that the green PUMP 2 RUNNING indicator illuminates and Pump No.1 runs in the correct direction.
- (d) Disconnect the vacuum switch by removing the sensing tubing. Observe that the standby pump (No.1) starts and the yellow PLANT FAULT indicator illuminates after 10 seconds.
- (e) After a further 30 seconds the PLANT EMERGENCY indicator illuminates.
- (f) Reconnect the sensing tubing on the vacuum switches and observe that the PLANT EMERGENCY indicator extinguishes. The standby pump will run on for 10 minutes after which the PLANT Fault indicator will extinguish.
- (g) Turn off the isolator. Select Pump No.1 as the duty pump and repeat steps (d) to (f) inclusive.
- (h) 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.
- (i) Repeat the above at all AGSS Remote Switches.
- (j) Isolate the power, open the panel and switch off one of the pump starter units, close the panel. Switch power back on.
- (k) Switch ON an AGSS Remote Switch wait 10 seconds
- (l) Observe that the amber PLANT FAULT indicator illuminates on the AGSS Remote Switch and that the appropriate Amber PUMP MOTOR TRIP indicator on the plant is illuminated.

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- (m) Isolate the power, open the panel and switch off both of the pump starter units, close the panel. Switch power back on.
- (n) Switch ON an AGSS Remote Switch wait 30 seconds
- (o) Observe that the red PLANT EMERGENCY indicator illuminates on the AGSS Remote Switch's and that the both Amber PUMP MOTOR TRIP indicators on the plant are illuminated.
- (p) Isolate the power, open the panel and switch on both of the pump starter units, close the panel. Switch power back on.
- (q) Switch ON all AGSS Remote Switches. Observe that the green Running indicator illuminates on all AGSS Remote Switches.

- (r) In turn switch OFF the AGSS Remote Switches. Observe that the green NORMAL indicator only extinguishes on the switch that is turned OFF.
- (s) 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.

6. 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 its 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.

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- **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) **Replace the air inlet filter.**
 - (e) **Test the system as detailed in section 5.2 to confirm correct operation.**
 - (f) **Observe that all indicators are working correctly.**

6.3 Fault Diagnosis

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 is set to high	Check relief valve setting.
	motor cooling fan is obstructed	Ensure that the plant is not covered and ensure there is sufficient airflow around the motor
Flow at terminal units falls below normal	Leaks in flexible hose	Inspect flexible hose 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.

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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