

# Central Medical Gas Supply Pipeline System



**MEDITEK® Central Medical Gas Pipeline Systems** [CMGPS] are offered Srishty Medical Private Limited, a member of the

leading **SNG** group, engaged in healthcare solutions since 1953. Historically, the group has been engaged in providing MGPS Solutions to some over 1200 hospitals. In the recent years, has provided the MGPS Solutions in hundreds of Operating Rooms, ICUs & ERs and to turnkey hospital projects to some of the leading healthcare providers in India and South Asia.

With complete in-house design team **SNG** is competently placed to provide the most aptly designed bespoke solutions to its customers considering their architectural, structural, logistical & budgetary requirements. **SNG** has experienced, strong & expert in-house design, project's management & customer support teams, to ensure unmatched support to its clients, right from design to commissioning and after sales support, with a dedicated & centralized **SNG** Customer Care Centre.

Our customer support teams are located in Delhi, Mumbai, Chennai, Kolkata, Bangaluru, Hyderabad, Pune, Amdavad, Coimbatore, Vizag, Manipal, Kochi & Kathmandu, etc.; with reach to all the corners of India & beyond to ensure quick response.

Apart from the customer support, regular training sessions are also accorded to end users and their engineers for system's applications, operations, day-to-day trouble shooting & maintenance.





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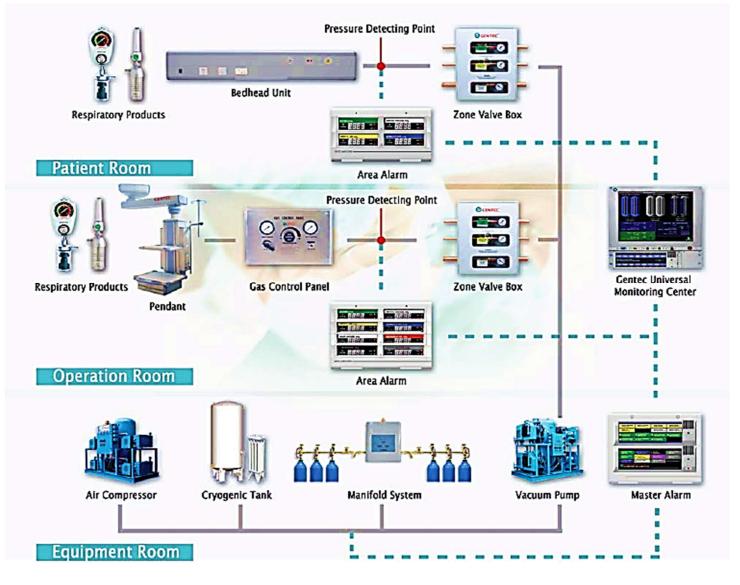


# Design Principals

The basic design principals followed by our team for MGPS solution is to provide a safe and effective method of delivering the required gas from the source through a Pipeline distribution system to the patient via self-locking and self-sealing terminal units – the outlets.

Each gas must be supplied or generated from a separate independent system and it is essential that that gas should be tapped through a dedicated terminal gas unit and all the parts of each unit are gas specific and ensure that there is no possibility of cross connection between the gases.

During the design & implementation stage, all specifications, volumetric flow requirements, line pressure losses and sizing of pipes are important criteria which are planned by our teams based on each facility's bed strength and requirements.





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### **Complete Solution**

**SNG** offers complete Medical Gas Supply solutions covering the entire medical & healthcare facility. The medical gases are used in hospitals for life-support that directly influence the maintenance of life of the patients. The gases supplied must be pure, clean and supplied under controlled and stable pressure.

**MEDITEK**<sup>™</sup> medical gases supply solutions and equipment conform to the best international regulations and standards. The solution is with colour coordinated copper fittings & pipeline according to types gas, audio-visual monitoring & alarm systems, gases isolation valves & area service modules, gas manifolds & storage tanks, and gas outlets - whether it's HTM 02-01[UK] / EN 737 [UK] or DIN EN ISO 7396-1 / DIN EN 737-1 [EU] or NFPA 99 [US].





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# Copper Pipeline

Only Medical Grade Copper pipes and fittings are used, which are Phosphorous, deoxidizes, non-arsenical, degreased seamless round copper tube [Grade: CW024A/Cu-DHP] conforming to EN 13348 with incorporation of amendment A1:2005 or as per BS 2871, are used, seamless pipes with fluxless silver brazing are used which should be as per ASTM standard and certification. All pipelines are color coded with paint or colored bands put at intervals of every 3m. Medical Grade Copper pipes are with internal residue not exceeding 0.02mg/dm2 as per HTM 02 01/ EN 13348 / ISO 7396-1.



Tests	Procedures		
Blowdown	Lines are blown clear using oil-free dry nitrogen		
Initial press test	System is subjected to 1.5 times working pressure to check leaks		
Standing press test	System is subjected to 20% higher pressure for 24 h		
Piping purge	Purging of each outlet until there is no discoloration of the white cloth held over it		
Cross-connection test	One gas system at a time using O2 analyzer		
Final tie-in test	Active vacuum pipeline joints are tested usir		

Active vacuum pipeline joints are tested using an ultrasonic leak detector Dimensions

Copper Pipe 12 mm OD x 0.7/0.9 mm Thk Copper Pipe 15 mm OD x 0.9 mm Thk Copper Pipe 22 mm OD x 0.9 mm Thk Copper Pipe 28 mm OD x 0.9 mm Thk Copper Pipe 35 mm OD x 1.2 mm Thk Copper Pipe 42 mm OD x 1.2 mm Thk Copper Pipe 54 mm OD x 1.2 mm Thk

\*other sizes also available on request

#### Standards

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BS:864 Copper fittings standards suitable for brazed socket connections BS EN 13348:2016 Copper & copper alloys – seamless, round copper tubes for medical gasses or vacuum ASTRM B819-00 Seamless Copper tubes for Medical Gas Systems



India

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#### Pipeline Installation Guideline

Brazing is carrired out using oxy-acetylene [DA] flame source capable of achiveing brazing temperatures of over 600 dgerees abd vekiw nelting point of the metal.

Brazed pipeline joints (copper to copper) are made using silver-copperphosphorous brazing alloy CP105 (5% Silver brazing filler metals rod] in accordance to BS EN 1044-1999, no flux is used. Copper to brass/bronze/Gun metal is carried out as per EN 1044.

Brazing is done using Oxygen free Nitrogen as internal intern gas shiled to prebent format of oxides inside the tubings and fittings.













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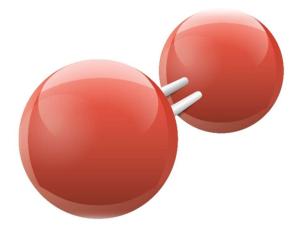


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# Manifold & Source

Oxygen



Continuous supply of oxygen is the primary requisite of any medical unit. According to BS EN 737-3:2000, there should be three independent supply sources: primary, secondary, and a reserve source adequate to meet the demand in the event of primary and secondary supply failure. The manifold room should have 2 banks of D-type cylinders, each holding a minimum of 2 days consumption, attached to a changeover control panel. Three-day consumption should be kept in reserve, as a contingency plan. Primary source of oxygen should be liquid oxygen, besides oxygen generators as emergency-back up.





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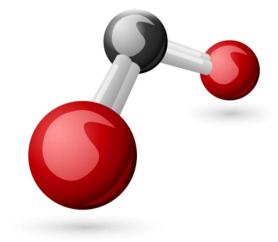




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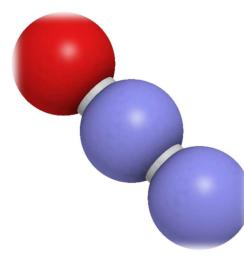
#### Carbon Dioxide



Continuous supply of Carbon Oxide is also required for Operating Rooms for certain procedures. The manifold room is designed with 1 or 2 banks of D-type cylinders, attached to a changeover control panel.



#### Nitrous Oxide



Continuous supply of Nitrous Oxide is required for Operating Rooms. The manifold should have two sources: primary & secondary to meet the demand. The manifold room is designed with 2 banks of D-type cylinders, attached to a changeover control panel.





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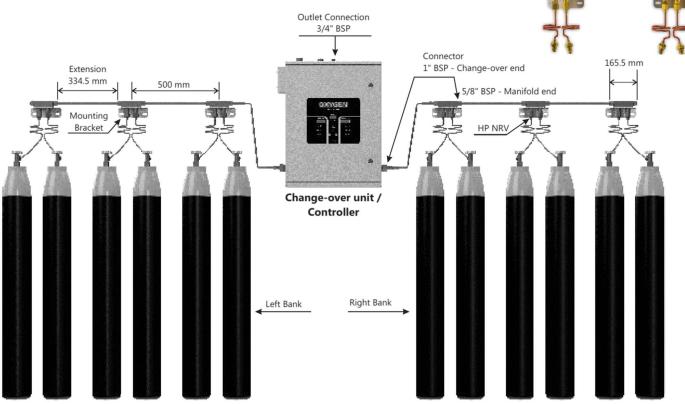
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# Modular Manifold Systems

Conforms to : IS / ISO 7396 - 1 : 2016 + A1 : 2017, HTM 02-01 Part A : 2006



#### Conforms to : IS / ISO 7396 - 1 : 2016 + A1 : 2017, HTM 02-01 Part A : 2006

Manifold header with HP NRV	Brass			
Extension Connection 5/8" BSP				
Mounting Bracket	SS 304 angle of 176 × 55 mm with slot for M10 fa	stener		
End Blocker	5/8" BSP cap with Copper washer			
Copper Washer	Ø 18.50 × Ø 12.50 × 2.0 mm			
Test Pressure	1.5 times of max. working pressure (150 bar)			
Modular manifold (including 2 Block assem assemblies, 2 End Blockers 5/8" BSP and 4 0	blies, 4 high pressure NRVs, 4 Copper Tail Pipe Copper washers)	2+2		
	blies, 8 high pressure NRVs, 8 Copper Tail Pipe necting Tube assemblies and 8 Copper washers)	4+4		
	blies, 12 high pressure NRVs, 12 Copper Tail Pipe necting Tube assemblies and 12 Copper washers)	6+6		
	blies, 16 high pressure NRVs, 16 Copper Tail Pipe necting Tube assemblies and 16 Copper washers)	8+8		
	nblies, 20 high pressure NRVs, 20 Copper Tail Pipe necting Tube assemblies and 20 Copper washers)	10+10		
Note . Contact us for sustamized configure				

Note : Contact us for customized configuration



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n G **MEDITEK**<sup>®</sup> Central Medical gas Pipeline System

Change	over Un	nits			
OXYGEN Margos	•	Logic-controlled auto change-ov Constant uninterrupted supply High flow output - 2100 lpm @ 4 Stable discharge pressure & flow Visual & audible signal	.2 bar	R	
	•	Pressure unit display options - ba Optimization of residual gas in cy onforms to: IS / ISO 7396 - 1 : 2016 + / IS / ISO 10524 - 2 : 2018, IS HTM 02-01 Part A : 2006 ertifications: ISO 13485:2016 – Medical	Vinders A1 : 2017 5 / ISO 10524 - 4 : 2008	ems	
		ISO 9001:2015 - Quality M	anagement Systems		
MEDITE Fully Automatic M Base 2100LPM	Vicro-Processor ed	MEDITEK AD Fully Automatic Pneumatic 1350LPM @ 4.2bar	MEDITEK A Fully Automatic Pneuma 1350LPM @ 4.2bar	atic	MEDITEK SA Semi-Automatic Pneumatic 450LPM @ 4.2bar
Fully Automatic N controlled Change		Fully Automatic Pneumatic- Changeover unit	Pneumatic- Changeover uni	t	Pneumatic- Changeover unit
Automatically reso next cycle when d replenished. No m resetting required	epleted bank is nanual	Automatically resets itself for next cycle when depleted bank is replenished. No manual resetting required	Automatically resets itself for next cycle when depleted by replenished. No manual resetting required		Manual resetting required for next cycle of changeover
Digital pressure in accurate reading Pressure unit opti		Digital pressure indicator for accurate reading Pressure unit options: bar, psi &	Analog pressure gauges for accuracy		Analog contact pressure gauges for accuracy and customized audio alarm settings
kg/cm		kg/cm			
Status indicators Pressure Stabilizer discharge pressure		Status indicators Pressure Stabilizer for stable discharge pressure & flow	Status indicators Pressure Stabilizer for stable discharge pressure & flow	e	Status indicators Stable discharge pressure
Audio-Visual Signa	al	Audio-Visual Signal	Audio-Visual Signal		Audio-Visual Signal
Designed to suit a for gas specific us		Designed to suit all medical gases for gas specific usage	Designed to suit all medical for gas specific usage	gases	Designed to suit all medical gases for gas specific usage
Optimized residua	al gas	Optimized residual gas	Optimized residual gas		Optimized residual gas
Conforms to	IS / ISO 10524 - 2 IS / ISO 10524 - 2	4:2008	Manifold Header Connection Modular Manifold Connection Relief Valve Setting (Line Safety)	1/2" B 5/8" B 5.17 b	
Inlet Connection	HTM 02-01 Part / 1" BSP, 3/4" BSP*		Relief Valve Setting		
Outlet Connection	1/2" BSP, 3/4" BS		(High Pressure Regulator)	15.5 ba	ar (225 psi)



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#### Compressed Air

It is used both as a driving force for equipment such as pneumatic drills [surgical air] or as an inhalational gas [medical air]. The plant must ensure a flow of 3 KL/min at 8 bar, reduced thereafter as per requirement. Medical air needs a flow rate of 80 L/min at 4 bar and surgical airflow at the rate of 350 L/min at 7 bar. The medical air quality should meet the standards laid by the European Pharmacopoeia, restricting the carbon monoxide level to 5 ml/m3. Integral dryers, filters, and dew point monitor control the humidity to its allowable limit of 67 ml/m3.





#### Vacuum System

Vacuum pressure of -300 mmHg is required at the terminal unit with a flow of 40 L/min. The Vacuum pipeline runs to the Operation threatres, ICUs and Wards for suction of fluids etc. during medical procedures and treatment. A robut Vacuum System with adquate design of the pipeline system is required in the hospitals.







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# **Terminal Outlets**

**MEDITEK**<sup>®</sup> DIN Gas Outlets

Other Standards



**Ohmeda Standard** 

**Mounting Options** 



Console



Installation Bracket



Flush Mount

**A** 



Surface Mount



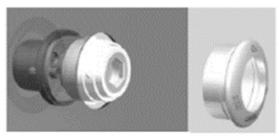
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# Design Schematic – Terminal Outlets

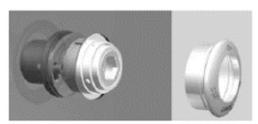


1. Pull the pressure lid off



3. Pull out the body at an angle

### Probes / Connectors



2. Loosen the two retaining bolts 2-3 mm



 Replace the sealing ring without disassembling the panel mount



DIN

British



Ohmeda



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# Isolation Valves / Areas Valve Service

# Units

Copper seamless pipes are intercepted by the Area Valve Service Units [AVSUs] and Area Alarm Panels [AAPs]. AVSUs are placed in each clinical sector, to cutoff the gas delivery to the area beyond it during maintenance or to handle emergency. AAPs display the line pressures and have audiovisual alerts.



- Fully isolate area in emergency, maintenance, extension etc
- Valves housed in secured metallic box
- Full bore ball valves are medical compatible and comply with Pressure Equipment Directive 97/23/EC
- Flared tube ends for easy insertion of connecting tube
- Stub ends covered for dust protection
- Acrylic window for clear visibility of in-line pressure reading
- Window breakable in case of emergency

IS / ISO 7396 - 1 : 2016 + A1 : 2017 Certifications: ISO 13485:2016 - Medical devices - Quality Management Systems ISO 9001:2015 - Quality Management Systems

Conforms to: BS EN 331 : 2015

Conforms to	BS EN 331 : 2015, IS / ISO 7396 : 2016 + A1 : 2017						
Flow rate @ 4.2 bar (max.)	1500 LPM	1500 LPM					
Maximum Pressure	30 bar						
OD of Stub end	15 mm (22 mm fo	or Vacuum)					
Length of Stub end	75 mm each side						
Tighten proof	50 bar	50 bar					
Closing / Opening of Valve	90° (1/4th turn)						
Working Temperature	-20 °C to 60 °C [-4 °F to 140 °F]						
Gases	O <sub>2</sub> , N <sub>2</sub> O, AIR 4, AIR 7, CO <sub>2</sub> , Mixed Gases & Vacuum						
Regulatory Status	Complies with Medical Devices Directive 93/42/EEC and Pressure Equipment Directive 97/23/EC						
Overall dimensions (in mm)	2 Gas	3 Gas	4 Gas	5 Gas	6 Gas		
$(L \times H \times W)$	375 × 270 × 142	375 × 360 × 142	375 × 450 × 142	375 × 540 × 142	375 × 630 × 142		

Valve box with side entry for 2 Gases - Oxygen / Vacuum	
Valve box with side entry for 3 Gases - Oxygen / AIR 4 / Vacuum	
Valve box with side entry for 4 Gases $$ - Oxygen / N <sub>2</sub> O / AIR 4 / Vacuum	
Valve box with side entry for 5 Gases $$ - Oxygen / N <sub>2</sub> O / AIR 4 / AIR 7 / Vacuum	
Valve box with side entry for 6 Gases $$ - Oxygen / N_2O / AIR 4 / AIR 7 / CO_2 / Vacuum	

NOTE : Contact for customization



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Medical Gas Alarm

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ALARM TEST

Medical Gas Alarm

ALARM IEST

Medical Gas Alarm ISO: 9001 C€: 2125

ALARM TEST

ISO: 9001 (€: 2125

SNG

SNG

ISO: 9001 €: 2125

SIG

# Alarm Modules

02

High Alarm

High Warning

O Normal

O Low Warning

O Low Alarm

**O**<sub>2</sub>

High Alarm

High Warning

O Normal

O Low Warning

Cow Alarm

**O**<sub>2</sub>

High Alarm

High Warning

O Normal

O Low Warning

C Low Alarm

VAC

O Low Alarm

O Normal

Air

High Alarm

High Warning

O Normal

O Low Warning

O Low Alarm

Air4

High Alarm

O High Warning

O Normal

😑 Low Warning

O Low Alarm

Air

High Alarm

O High Warning

O Normal

O Low Warning

O Low Alarm

VAC

Cow Alarm

O Normal

N<sub>2</sub>O

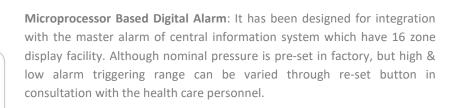
High Alarm

😑 High Warning

O Normal

O Low Warning

O Low Alarm



External power adapter that accepts 240 V AC (50 Hz) as the input voltage and delivers output voltage of 12V DC, required only for auditory & Visual signals.

Features:

- Gas specific temperature compensated silicon pressure sensor.
- Operating temperature range °C [°F]: -40 [-40] to 85 [185]
- Humidity: (Dry gases): 0% to 95% RH, non-condensing
- Accuracy: ± 0.25% full scale span
- Total error band: ± 2% full scale span
- High/Low set points- Set points shall be adjustable by two on board push buttons.

**Analogue Alarm**: Analogue Alarm which sense the set pressure deviations through pressure switch.





Modular Area Valve Service Unit (AVSU) with integrated Local Area Alarm

- Microprocessor based module
- Highly accurate "Heavy Duty" pressure transducer
- Designed to serve 2, 3, 4 & 5 gas module

VAC

O Low Alarm

O Normal

- Digital & illuminated LED display of "Normal", "High" & "Low"
- Digital pressure unit display options psi / bar or kg/cm
- Adjustment & parameter setting by touch button
- Operational parameters can be set in-situ
- Audio mute option
- Reusable lock assembly
- Powder coated aesthetically designed enclosure
- Enclosure separable from the base for ease of installation
- Front door opens up vertically for comfortable access
- PED: 2014/68/EU certified full port Ball Valve (PN 30)
- Long extension copper pipes to connect MGPS network



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### Alarm Module – Touch Panel



#### Microprocessor Based Digital LCD Touch Screen Alarm:

Highly visible 7" (178 mm) LCD screen

Alarms can be monitored audio-visual

Comprehensive monitoring of all the medical gas alarm panels Alarm status will be visible through ethernet port on master alarm Programmable pressure unit display (bar, kg/cm & mmHg) Designed to serve 2, 3, 4, 5 & 6 gases including Vacuum Powered by 220V AC to 24V DC external adapter Operational parameters i.e., high and low level can be set "in-situ" to suit requirement in an area

#### Conforms to:

IS / ISO 7396 - 1: 2016 + A1: 2017 HTM 02-01 Part A, IS / ISO IEC 60601 - 1: 2015 + A1: 2020 Pressure Equipment Directive 2014/68/EU

Pressure sensing through piezoresistive sensing technology Touch screen operation

Data display at a central monitoring station

Real time updating of status

Audio mute option

NIST connection for Gas input

Conforms to	IS / ISO 7396 - 1 : 2016 + A1 : 2017, HTM 02-01 Part A & IS / ISO IEC 60601 - 1 : 2015 +A1 : 2020
Body	Fire retardant dust-proof CRCA 18 SWG steel enclosure (NEMA 1 Enclosure)
Finish	Powder coating - Enclosure RAL 7035 grain finish
Mounting type	Horizontal - Surface mountable (Cover opens up horizontally)
Enclosure dimensions	330 × 250 × 100 (L × H × T in mm)
Gas services	2, 3, 4, 5 & 6 Gas including Vacuum
Gas & Vacuum connection	NIST connection for gas input
Power connection	External 220V AC (50 Hz) to 24V DC adapter for audio visual display
Warning system	Microprocessor based warning module should be adjustable in-situ to set operational parameters and digital pressure unit in psi / bar or kg/cm <sup>2</sup>
Touch Screen Display	Digital & illuminated touchscreen display for "Normal", "High" & "Low" with High/low alarm set- point for each gas (Low only for Vacuum) service
	Visible display coupled with audio warning in case of preset with the provision of "Mute" audio signal for 15 minutes max
Sensors	Fully calibrated and temperature compensated application specific Integrated Circuit signal conditioning (in a brass housing) Pressure Sensors a. Total Error Band: ± 10% FSS (Full Scale Span) from -20 °C to 85 °C [-4 °F to 185 °F] b. Sensing pressure span : 60 robar to 10 bar [1 psi to 150 psi] Digital Output c. Temperature span : 30 °C to 50 °C + 22 °F to 122 °F]
Information & Control	The information of alarm, current status & test conditions through "Touch Screen"
Display & Audio blocker	Provision to block display & audio signal of a particular supply line for long service period is built-in
Earthing	Protective earth
Protection	Class II & IP54



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## **AGSS Units**





#### Anesthetic Gas Scavenging

Anesthetic gases are considered to be substances hazardous to health as per the Control of Substances Hazardous to Health Regulations 2002 except where they are administered to a patient in the course of treatment. Exhaust of both the systems should be carefully positioned away from the windows and intake of air compressors and ventilators. To control the greenhouse effect of the anesthetic gases, the anesthetic gas scavenging systems should incorporate a canister system which captures the unused gases, filters, and recycles them. The evacuation process is intended to reduce the exposure of healthcare personnel and provide a safe, healthy workspace by controlling occupational exposure to waste anesthetic gases. AGS units are available in Single Blower (MONO) and Double Blower (DUO) configurations. These are dedicated low velocity evacuation and disposal system for collection of excess gases from one or more Operation Rooms and discharged to the outdoor atmosphere.

The powerful side channel exhaust blower makes the unit very compact, reliable and creates sufficient negative pressure, so that cross-contamination does not occur in a dedicated pipeline where multiple ORs are connected.

#### **Special Features**

Robust & Compact design Compliance: MDR 2017 / 745

User friendly controller Low 110V Remote Switches Choice of Single or Double Blower Unit

High performance side channel blowers

Optional Simple & Durable remote start switches

Optional Remote operation from multiple OTs available

Optional Receiving unit with Transfer & Evacuation Hose recommended for each OT to AGS

MONO or DUO are part of active evacuation and disposal system which can produce high capture levels and removal at the source eliminates the possible long term health hazards for the exposed medical staff in hospitals, stand-alone operating rooms, recovery rooms, dental operations etc. These are most suitable onsite disposal systems for health care facilities that have multiple operating suites. AGS unit "DUO" is a double unit set-up wherein, one unit is in operational mode while other unit is in stand-by mode but DUO has additional advantage of automatically supporting the operating unit in case of higher demand and remains operational till restoration of normalcy. It also offers a choice to pre-select operative & stand-by mode.

Note: Suction capacity measured at intake of the unit at -125mbar (-1.5psig approx.)

DOUBLE BLOWER UNIT

Power

0.85 kW

1.3 kW

1.6 kW

0.85 kW

13 kW

1.6 kW

**Electrical Input** 

3 Phase, 345-415V

50Hz

3 Phase, 345-415V

50Hz



Туре

Mono

Mono

Mono

Duo

Duo

Duo

System Capacity

650 LPM

1300 LPM

2080 LPM

650 LPM

1300 LPM

2080 LPM

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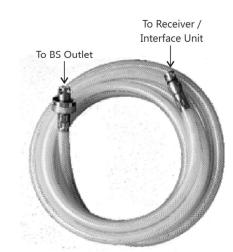


## **AGSS / WAGD Accessories**

Anaesthetic Gas Scavenging Unit i.e. vacuum source plant (AGS MONO & AGS DUO) require accessories to make the system work effectively. Other than the vacuum source, accessories associated with the unit are optional. (Pipework excluded)



Harmony-Receiver / Interface Unit Conforming to IS/ISO 80601-2-13:2011+A2:2018



3m BS Compatible AGSS Evacuation Hose Assembly (5m on request)



Kink-resistance transfer hose with a pair of 30 mm conical (ISO). Male & Female connector.



Harmony-Receiver / Interface Unit with Transfer & Evacuation Hose assembly (3m) conforming to IS / ISO : 80601-2-13:2011+A2:2018



Remote Control Switch



Scavenging Connector for Transfer Hose - 30 mm ISO Conical Male & Female (Pair)



AGSS Outlet - DISS



AGSS Outlet - BS



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# Other Accessories

#### Suction Jars



Capacit	y (Litre)	Dimensions				
Jar	Fill	А	В	с	D	
1	0.8	127	105	168	195	
1	0.8	127	105	168	217	
1.75	1.0	160	140	150	181	
1.75	1.0	160	140	150	203	
2.25	1.75	160	140	214	244	
2.25	1.75	160	140	214	266	
4	3.5	160	140	363	394	
4	3.5	160	140	363	416	

#### Humidifier Bottle



- A passive process to humidify dry therapeutic gas (Category 3 Humidification)
- Micro bubbles through humidifier for efficient humidification
- Optimal RH achievable at various flow settings
- Autoclavable at 121°C (249.8°F) for 5 minutes (Minimum 5 autoclave cycles)
- Over pressure safety valve
- Flow: Up to 15 lpm @ 4 bar (58 psi) Construction material: Polycarbonate
- Capacity 240ml at max water level (Jar 450ml)
  Patient connection port: Tapered hose barb
- suitable for 6 mm inner diameter plastic tubing
  Inlet connection port: DISS female adapter with chrome plated Brass nut embedded in ABS for hand-tightening

#### Suction Regulators



Description	Controllable Range (mmHg)	Gauge Range (mmHg)	Free Flow (lpm)
Adult regulator with analog gauge and trap bottle + filter	0-300	0-760	0-60
Pediatric regulator with analog gauge	0-100	0-300	0-40

#### Suction Trolley



#### Ward Vacuum Unit

Oxygen Flowmeters



- High flow (HFOV) to improve oxygenation
- Stand-alone use
- Compatible to Air-oxy blender
- Precise flow
- Mount options
  - Direct onto the Outlet with choice of probes
- Pole Wall, Medical Rail, Pendant, Floor stand

#### HP & LP Hose Tubes







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# **Bed Head Units**





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