



# Central Medical Gas Supply Pipeline System





## ABOUT US

Shreya Medical Systems [SMS] 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.

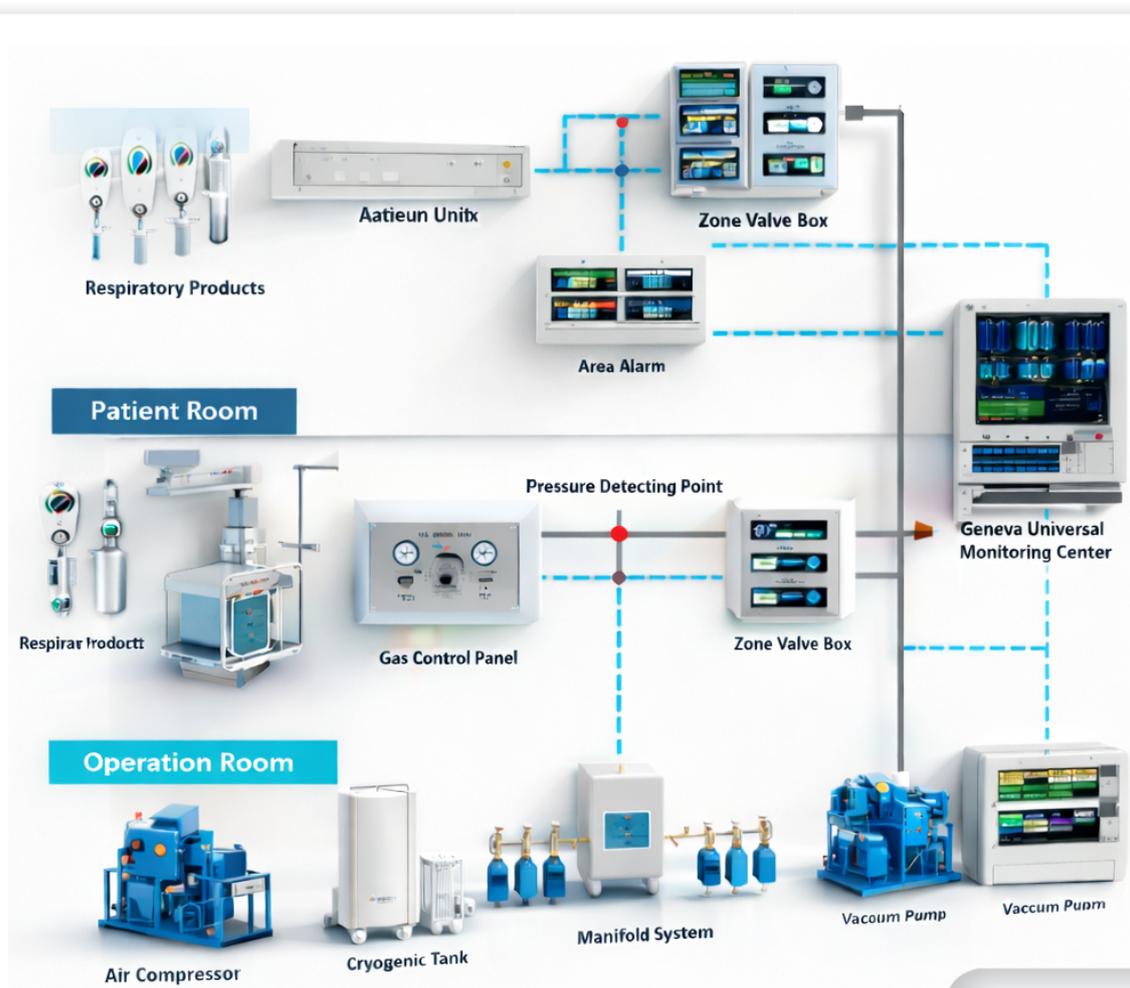
**Our customer support teams are located in Delhi Mumbai, Chennai, Kolkata, Bangalore, Hyderabad, Pune, Amdavad, Coimbatore, Vizag, Manipal, Kochi, Kathmandu, Colombo & Dhaka, with reach to all the corners of India & beyond to ensure quick response.**

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.



## Design Principals

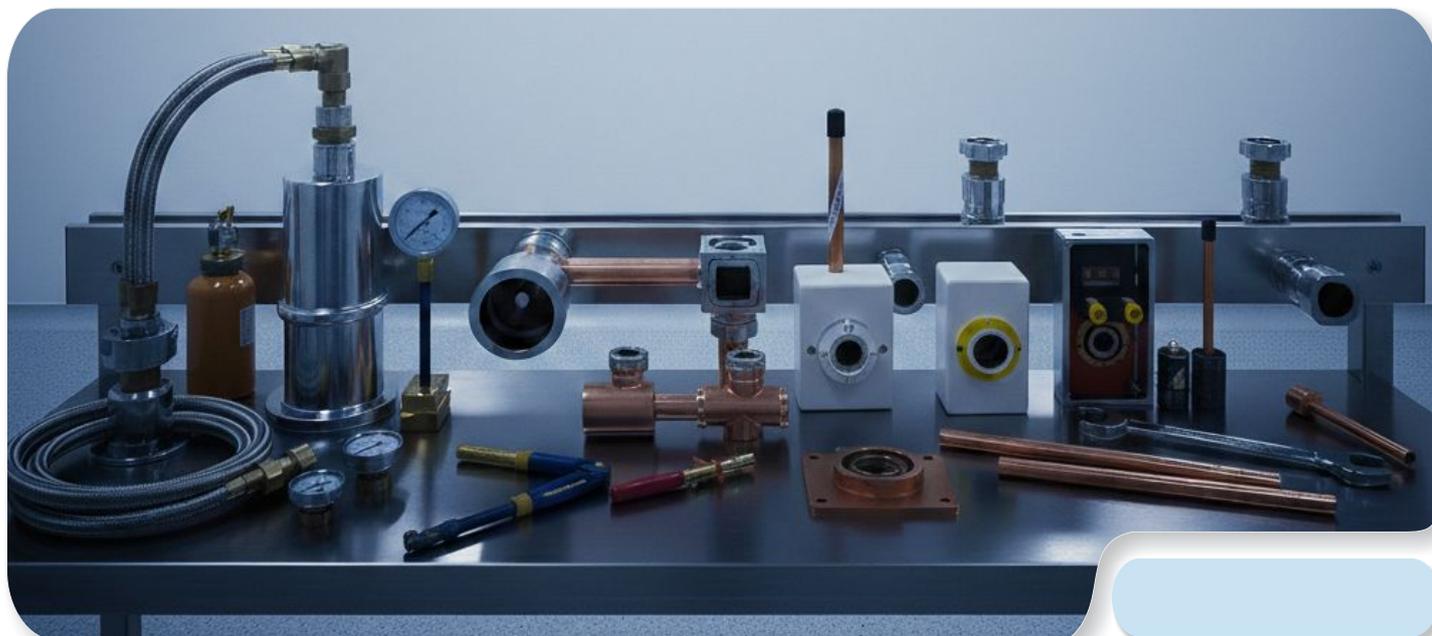
The basic design principals followed by our team for MGPS solution is to provide a safe and effective method of delivering the required gas from the source through a Pipeline distribution system to the patient via self-locking and self-sealing terminal units - the outlets. Each gas must be supplied or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



## 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**' 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].



### Legend

### Medical Gas Supply & Equipment in Hospital

01. Oxygen Supply	07. Medical Gas Alarm Box	13. Anesthesia Pendant (Drop Down/Single/Double Arm)
02. Nitrous Oxide Supply	08. Patient Trolley	14. Operation Table
03. Carbon Dioxide Supply	09. Bed Head Panel (Horizontal)	15. Surgical Pendant (Drop Down/Single/Double Arm)
04. Compressed Air Supply	10. Column Pendant	16. Recovery Bed
05. Medical Air Supply	11. Medical Gas Distribution Box	17. General Bed
06. OT Light	12. Bed Head Panel (Vertical)	18. Medical Gas Wall Outlet

## 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/dm<sup>2</sup> 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 O <sub>2</sub> analyzer
Final tie-in test	Active vacuum pipeline joints are tested using an ultrasonic leak detector



### Dimensions

Copper Pipe 12 mm OD: 0.7/0.9 mm Thk  
 Copper Pipe 15 mm OD: 0.9 mm Thk  
 Copper Pipe 22 mm OD: 0.9 mm Thk  
 Copper Pipe 28 mm OD: 0.9 mm Thk  
 Copper Pipe 35 mm OD: 1.2 mm Thk  
 Copper Pipe 42 mm OD: 1.2 mm Thk  
 Copper Pipe 54 mm OD: 1.2 mm Thk  
 Copper Pipe 76 mm OD: 1.5 mm Thk

\*other sizes also available on request



## Pipeline Installation Guideline

Brazing is carried out using oxy-acetylene [DA] flame source capable of achieving brazing temperatures of over 600 degrees and well above melting point of the metal

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



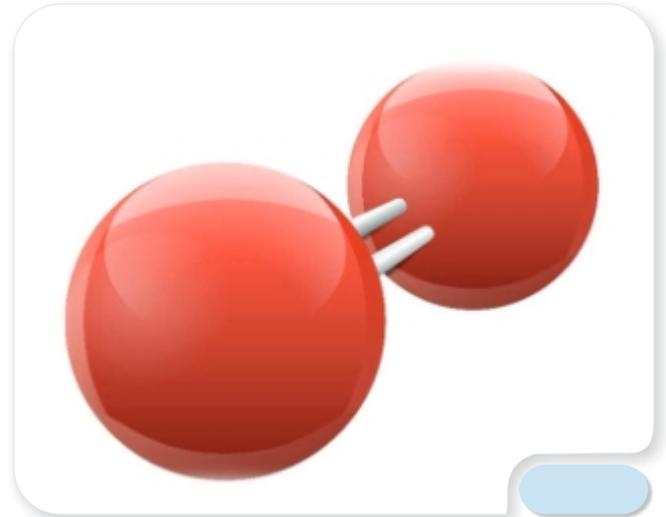
Brazing is done using Oxygen free Nitrogen as internal inert gas shielded to prevent formation of oxides inside the tubings and fittings.



## Manifold & Source

### Oxygen

Continuous supply of oxygen is the primary requisite of any medical unit. According to B S E N 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.



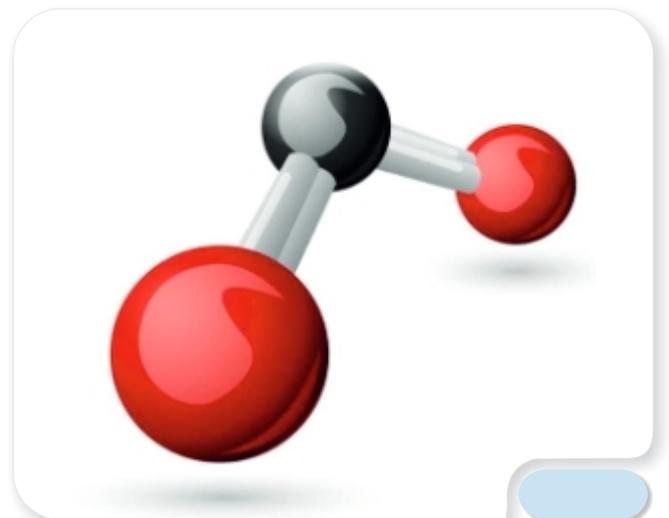
Three-day consumption should be kept in reserve, as a contingency plan. Besides oxygen generators, liquid oxygen storage tank is an economical and convenient form of oxygen storage.



## Manifold & Source

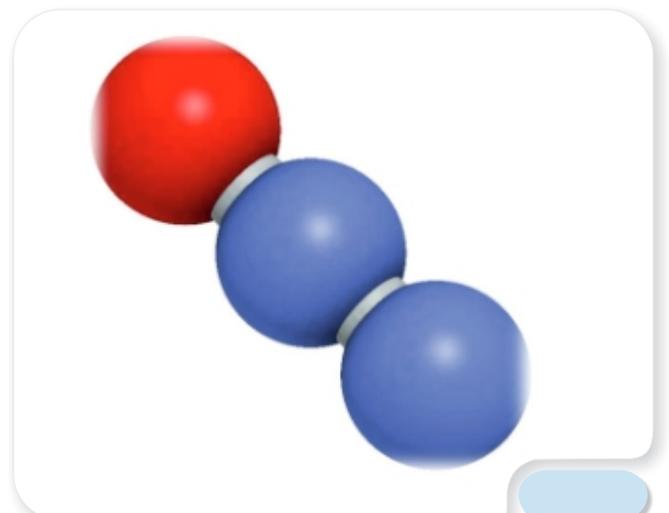
### Carbon Dioxide

Continuous supply of carbon dioxide 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.



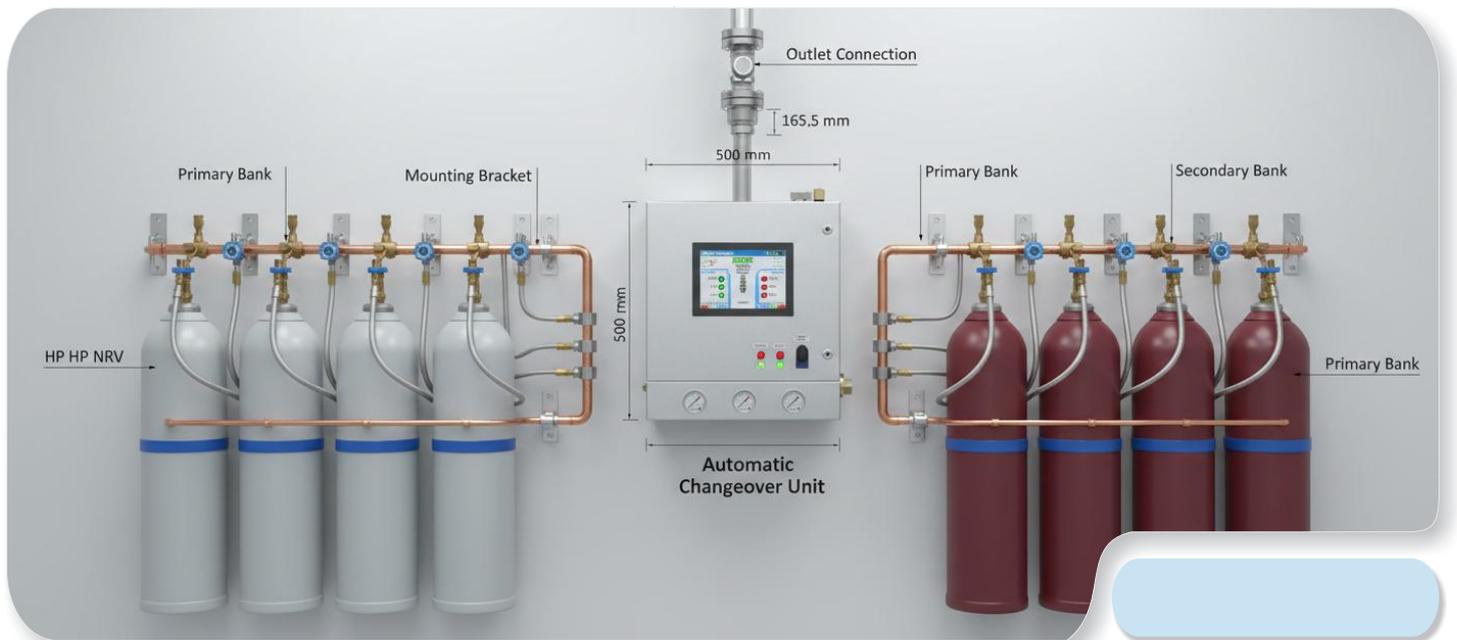
### Nitrous Oxide

Continuous supply of nitrous oxide is required for operating rooms. The manifold should have 2 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.



## Modular Manifold System

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 176x55 mm with slot for M10 fastener
End Blocker	5/8' BSP cap with Copper washer
Copper Washer	Ø 18.50 x Ø 12.50 x 3.0 mm
Test Pressure	1.5 times of max. working pressure (150 bar)

Modular manifold ( including 2 block assemblies , 4 high pressure NRVs, 4 copper tail pipe assemblies, 2 end blockers 5/8' BSP and 4 copper washers)	2+2
Modular manifold ( including 4 block assemblies , 8 high pressure NRVs, 8 copper tail pipe assemblies, 2 end blockers 5/8' BSP, 2 connecting tube assemblies & 8 copper washers)	4+4
Modular manifold ( including 6 block assemblies, 12 high pressure NRVs, 12 copper tail pipe assemblies, 2 end blockers 5/8' BSP, 4 connecting tube assemblies & 12 copper washers)	6+6
Modular manifold ( including 8 block assemblies, 16 high pressure NRVs, 16 copper tail pipe assemblies, 2 end blockers 5/8' BSP, 6 connecting tube assemblies & 16 copper washers)	8+8
Modular manifold ( including 10 block assemblies, 20 high pressure NRVs, 20 copper tail pipe assemblies, 2 end blockers 5/8' BSP, 8 connecting tube assemblies & 20 copper washers)	10+10

**Note:** Contact us for customized configuration

# Changeover Units



MEDITEK ADS	MEDITEK AD	MEDITEK A	MEDITEK SA
Fully Automatic Micro-Processor Based 2100LPM @ 4.2bar	Fully Automatic Pneumatic 1350LPM @ 4.2bar	Fully Automatic Pneumatic 1350LPM @ 4.2bar	Semi-Automatic Pneumatic 450LPM @ 4.2bar



<p>Fully Automatic Micro-Processor controlled changeover unit</p> <p>Automatically resets itself for next cycle when depleted bank is replenished. No manual resetting required</p> <p>Digital pressure indicator for accurate reading</p> <p>Pressure unit options; bar, psi &amp; kg/cm</p> <p>Status indicators</p> <p>Pressure stabilizer for stable discharge pressure &amp; flow</p> <p>Audio-visual signal</p> <p>Designed to suit all medical gases for gas specific usage</p> <p>Optimized residual gas</p>	<p>Fully Automatic Pneumatic changeover unit</p> <p>Automatically resets itself for next cycle when depleted bank is replenished. No manual resetting required</p> <p>Digital pressure indicator for accurate reading</p> <p>Pressure unit options; bar, psi &amp; kg/cm</p> <p>Status indicators</p> <p>Pressure stabilizer for stable discharge pressure &amp; flow</p> <p>Audio-visual signal</p> <p>Designed to suit all medical gases for gas specific usage</p> <p>Optimized residual gas</p>	<p>Pneumatic changeover unit</p> <p>Automatically resets itself for next cycle when depleted bank is replenished. No manual resetting required</p> <p>Analog pressure gauges for accuracy</p> <p>Status indicators</p> <p>Pressure stabilizer for stable discharge pressure &amp; flow</p> <p>Audio-visual signal</p> <p>Designed to suit all medical gases for gas specific usage</p> <p>Optimized residual gas</p>	<p>Pneumatic changeover unit</p> <p>Manual resetting required for next cycle of changeover</p> <p>Analog contact pressure gauges for accuracy and customized audio alarm settings</p> <p>Status indicators</p> <p>Stable discharge pressure</p> <p>Audio-visual signal</p> <p>Designed to suit all medical gases for gas specific usage</p> <p>Optimized residual gas</p>
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**Conforms to;** IS/ISO 7396-1:2016+A1:2017  
IS/ISO 10524-2:2018, IS/ISO-4:2008  
HTM 02-01 Part A:2006

**Certifications;** ISO 13485:2016- Medical devices- Quality Managements Systems,  
ISO 9001:2015- Quality Managements Systems

## 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 there after 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/m<sup>3</sup>. Integral dryers, filters, and dew point monitor control the humidity to its allowable limit of 67 ml/m<sup>3</sup>.



## 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 theatres, ICUs and Wards for suction of fluids etc. during medical procedures and treatment. A robust Vacuum System with adequate design of the pipeline system is required in the hospitals.



# Terminal Outlets

## Other Standards



German Standard



British Standard



Ohmeda Standard



## Mounting Options



Console



Installation Bracket



Flush Mount



Surface Mount

## Design Schematic - Terminal Outlets

### Probes / Connectors



DIN



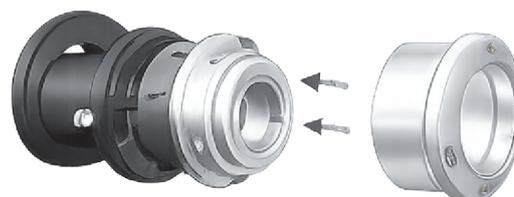
British



Ohmeda



1. Pull the pressure lid off



2. Loosen the two retaining bolts 2.3 mm



3. Pull out the body at an angle



4. Replace the sealing ring without disassembling the panel mount

## Isolation Valves/Area 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.



**Certifications;** ISO 13485:2016- Medical devices- Quality Managements Systems,  
 ISO 9001:2015- Quality Managements Systems

**Conforms to;** BS EN 331: 2015  
 IS/ISO 7396 - 1; 2016+ A1 ; 2017

Conforms to	BS EN 331; 2015,IS/ISO 7396; 2016+A1; 2017				
Flow rate @ 4.2bar(max)	1500 LPM				
Maximum pressure	30 bar				
OD of stub end	15 mm (22mm for vacuum)				
Length of stub end	75 mm each side				
Tighten proof	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 Direction 93/42/EEC and pressure equipment device 97/23/EC				
Overall dimension (in mm) (L x H x W)	2 Gas	3 Gas	4 Gas	5 Gas	6 Gas
	375 x 270 x 142	375 x 360 x 142	375 x 450 x 142	375 x 540 x 142	375 x 630 x 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 O AIR 4 Vacuum
Valve box with side entry for 5 Gases - Oxygen / N O AIR 4 AIR 7 / Vacuum
Valve box with side entry for 6 Gases - Oxygen / N O / AIR 4 / AIR 7 / Co / Vacuum

## Alarm Modules

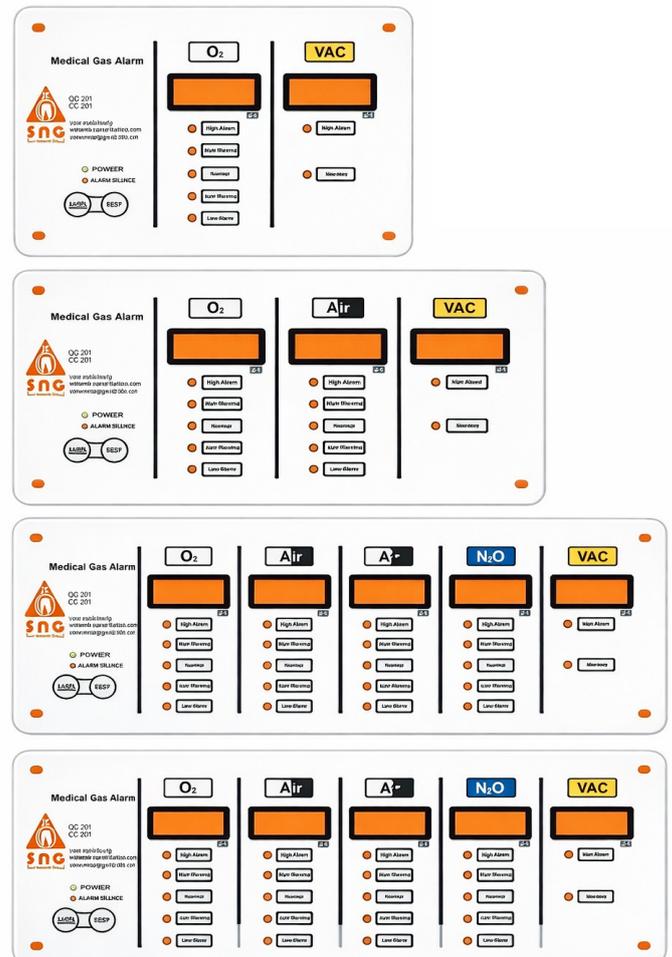
### Microprocessor Based Digital Alarm:

It has been designed for integration with the master alarm of central information system which have 16 zone display facility. Although nominal pressure is pre-set in factory, but high & low alarm triggering range can be varied through re-set button in consultation with the health care personnel. 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.

### Analogue Alarm:

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

### Alarm Modules



### 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
- Digital & illuminated LED display of "Normal", "High" & "Low"
- Digital pressure unit display options - psi/bar or kg/cm
- Adjustment & parameter setting by touch button

## 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 A C 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,

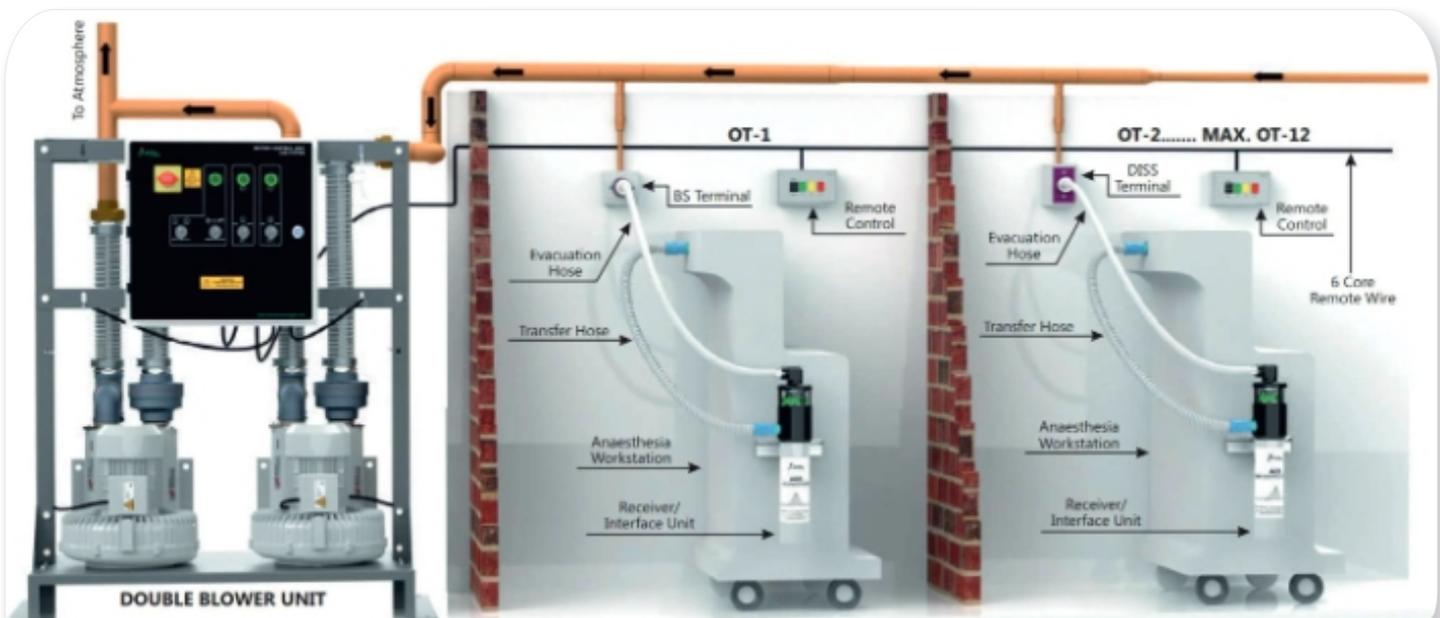
IS / ISO IEC 60601 - 1: 2015 + A1:

2020 Pressure Equipment Directive 2014/68/EU|

## AGSS Units

Anesthetic Gas Scavenging Anesthetic cases 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 (MUNU), and Double blower DUU configurations.

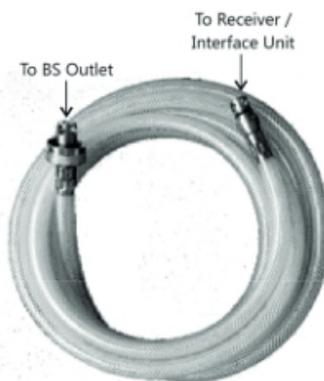


## AGSS / WAGD Accessories

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



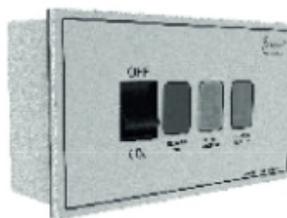
3m BS Compatible AGSS Evacuation  
Hose Assembly (5m on request)



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

## Other Accessories

Suction Jars



Capacity (Litre)		Dimensions			
Jar	Fill	A	B	C	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

Suction Regulators



Oxygen Flowmeters



Suction Trolley



Ward Vacuum



HP & LP Hose Tubes



## Bed Head Units



## Ceiling Supply Pendants & Bridges

