

OPERATION AND MAINTANENCE MANUAL

FOR

OXYGEN CHARGING & DISTRIBUTION VEHICLE (UGSS-O₂)

CLIENT: INDIAN AIR FORCE



Document Prepared and Published By

NEOMETRIX ENGINEERING (P) LIMITED.

E-148, SECTOR-63, NOIDA, UP, INDIA - 201301

PHONE: 0120-4500 800, FAX: 0120-4500 888

contact@neometrix.in, www.neometrix.in

**Please Note: High Pressure Oxygen Systems require special care in handling.
User is advised to study this document in detail before operating UGSS-O₂.**

TABLE OF CONTENTS

CHAPTER	Subject	Page No.
1	Brief Introduction of UGSS-O ₂	3-4
2	Do &Do Not's	5-7
3	General Specification &Equipment List of UGSS-O ₂	8-11
4	User Panels	12-18
5	Fire Fighting System (CO ₂ Flooding System)	19-23
6	Standard Operating Procedure (SOP)	24-32
7	Safety Features&Safety Interlocking	33
8	Indicators & Instrumentation on Compressor & UGSS-O ₂	34
9	Service& Maintenance Instructions (Daily/ Weekly/Monthly/Yearly)	35-38
10	List of Tools & Accessories	39
11	Trouble shooting Chart	40-43
12	List of Drawings (Appendix)	
	• UGSS-O ₂ Pneumatic Circuit Diagram	01
	• UGSS-O ₂ GA Drawing	01
	• Electrical Circuit Diagram	01
	• CO ₂ Flooding System Circuit Diagram	01

BRIEF INTRODUCTION OF UGSS-O₂**CHAPTER - 1**

UGSS-O₂ is OXYGEN CHARGING & DISTRIBUTION VEHICLE. UGSS-O₂ is used as Oxygen charger for charging the Oxygen bottles of the SU-30MKI aircraft. It consists of **TWO MAJOR UNITS** as follows:

1. Main Oxygen Charging Vehicle (Tata Truck with special Canopy housing the Oxygen Storage, Oxygen Gas Boosters & Oxygen Distribution Panel).
2. Engine Driven Towable Compressor Trolley.

Main Oxygen Charging Vehicle carries the special canopy. The canopy houses the following sub systems:

- I. **High Pressure Oxygen Storage SKID** housing 4 CYLINDER BANKS, each having 3 High Pressure Oxygen Cylinders. Each cylinder is of 40 Liters and can have Oxygen at 350 Kg/cm².
- II. **Oxygen Gas Boosting SKID** having Air Driven Oxygen Booster-I & Booster-II. The user may use One-Booster at a time and keep the other as a standby or may use both the Boosters together in case faster boosting operation is desired.
- III. **User Panel** (at the Back of the Canopy) housing Two PANELS. The user will operate these Panels while using UGSSO₂:
 - a. **Oxygen Booster/ Storage Station** (Left Side): This is used for Filling the high Pressure Oxygen Storage cylinders using external oxygen Bottles.
 - b. **Oxygen Distribution Station** (Right Side): This is used for charging the UNITS from the high pressure Oxygen Storage cylinders.
- IV. **Electrical Control Panel:** The Panel has set of switches which need to be PUT ON/OFF before start of any operation on UGSSO₂.
- V. **CO₂ Flooding System:** The CO₂ Flooding system is installed inside the Canopy for firefighting in case of any FIRE.
- VI. **Oxygen Purity Controller Panel:** The Oxygen Inlet (External Cylinder) gas purity is continuously monitored and displayed. In case the Oxygen purity goes below the SET level the Oxygen Gas Boosting operation shall stop with an alarm.
- VII. **Internal boosting Panel:** The Oxygen Inlet Cylinder (storage bank cylinder) having stored pressure becomes the source of external cylinder from which the filling is to be made. In fact, this is an interesting feature being accommodated in the system to enhance the efficiency of the system. Independent isolation valve is mounted on the panel so as to make it available for filling to the next internal cylinder having

inadequate pressure for charging the aircraft , to cope that up that requirement of high pressure through the internal boosting application

- VIII. **Oxygen Hose Storage Basket:** Oxygen hoses come with end covers and need to be always capped. Inside the Canopy, a Basket is provided to store the Oxygen hoses. Additional provision for keeping the Oxygen Hoses in a Tray welded around the Canopy is also provided for ease of carrying Oxygen Hoses. Please make sure that Oxygen Hoses are not BENT. **The MINIMUM BEND Radius allowed is 155 mm.**
- IX. Oxygen Port Connection PANELS:
- a. **Inlet Oxygen Cylinder & Drive Air Port Panel:** These Ports are provided with a Door. The user will connect the oxygen cylinder (external) to the designated Port and the Compressed Air Hose from the compressor. This Panel comes on the Right side of the User Panel.
 - b. **Oxygen Outlet Connection Ports Panel:** Four Ports are provided on this Panel for charging the Units. The user will connect the suitable port to the Unit with Oxygen hose for charging the UNIT. The Oxygen stored in the High Pressure oxygen Cylinders on the SKID inside the canopy shall be in use here. The FOUR PORTS on this PANEL (On the Right side of the User Panel) are as follows:
 - I. **1 to 5.5Kg/cm².**
 - II. **150 to 230Kg/cm².**
 - III. **230 to 350Kg/cm².**
 - IV. **350Kg/cm².**

Engine Driven Towable Compressor Trolley has the Compressed Air Hose housed in a Basket mounted on the Trolley. This is TOWED with the MAIN Oxygen Charging Vehicle from the BACK. Special provision is provided in the vehicle for this purpose.

To summarize, the Oxygen charging and the distribution system **UGSS-O₂** is a self-propelled vehicle. The Air Driven Gas (Oxygen) boosters (I & II) boost the pressure of the oxygen (From external inlet cylinders) and store the oxygen at high pressure up to 350Kg/cm² in the Oxygen cylinder SKID. Subsequently, this high pressure oxygen storage is used for charging the SU-30 MKI aircraft units with Oxygen at different pressures.

Two Oxygen Gas Boosters are provided. The user may operate both Gas Boosters together for FASTER Boosting operation. User may also opt to RUN only one Gas Booster at a time. The other Booster may be kept as Stand-By. The Stand-By shall allow the UGSS-O₂ to remain operational while the Oxygen Gas Booster goes under routine repair/ seal change etc.

UGSS-O₂ : DO'S & DO NOT'S**CHAPTER 2****OXYGEN CHARGING & DISTRIBUTION VEHICLE UGSS-O₂
LIST of DO'S**

1. High Pressure Oxygen Systems are serious FIRE HAZARDS. These systems require HANDLING by TRAINED PERSONNEL only. Please STUDY the Operation & Maintenance manual carefully before operating the UGSS-O₂.
2. Do acquire proper training before attempting to operate the UGSS-O₂.
3. Do wash your hands with soap water to remove the oil contamination, if any. Oil & Grease are BIG NO for Oxygen Systems as they may cause fire.
4. Before doing any operation on UGSS-O₂, please ensure that the Electrical Control Panel is PUT ON, Please ensure that the CO₂ flooding system & Oxygen Purity Controller is engaged as per the requirements.
5. Please ensure that Isolation Valves, Cylinder Valves, Vent Valves, Supply Valves are always closed.
6. Do ensure that DAILY CHECK on Compressor Trolley & on UGSS-O₂ is successfully carried out before operating it.
7. Do open the cylinders valves as well as panel mounted valve slowly. There should be NO HURRY in doing any operation on UGSS-O₂.
8. Do VENT (release) the Oxygen gas slowly.
9. Do GRAVITY filling of the Aircraft components SLOWLY.
10. Do PURGE the Oxygen INLET HOSE before starting the Gas Booster to ensure ATMOSPHERIC AIR/ Moisture in HOSE is PURGED OUT.
11. Do PURGE the Oxygen OUTLET HOSE before connecting it to AIRCRAFT to ensure ATMOSPHERIC AIR/ Moisture in HOSE is PURGED OUT.
12. DO Keep the HOSE ENDS always properly CAPPED. Any DIRT/DUST in the HOSE ADAPTER may be a potential FIRE HAZARD.
13. Before CONENCTING the HOSE to Aircraft please CLEAN the Aircraft ADAPTER and the Hose ADAPTER using CLEAN LINT FREE CLOTH.
14. Do RELEASE (VENT) pressure in the CIRCUIT after completing the TASK.
15. Do ENSURE all Pressure Gauges READ "ZERO" PRESSURE after every operation.
16. Do "VENT" HOSES using Vent Valve before opening the same.
17. Do use CLEAN (preferably NEW) GLOVES while handling Oxygen components. Any OPENING in the circuit should be done in a CLEAN environment. Hydrocarbon deposits, DIRTS, Particulate matter deposits on circuit components (internally) & inside oxygen handling pipe surface can cause fire.

18. Do use tools and tackles that have been properly cleaned before using these for Oxygen; if in doubt always clean all the tools using solvents like ACETONE & DRY it using CLEAN & DRY Nitrogen?
19. Do clean the tubing and plugged /capped whenever an associated component is removed for maintenance / inspection.
20. Do check the condition of Oxygen hose before every use for any damage.
21. Do flush the interconnecting hoses for 1-2 minutes to remove the contaminants.
22. Do consult an expert if in doubt.
23. Ensure that open HOSE ENDS do not touch the GROUND as they may GET DIRTY. Keep the ENDS always capped.
24. Keep the HOSES in the BASKET inside the UGSS-O₂ when not in USE.
25. Do use lint free clothes for wiping /cleaning.
26. Do check the leak tightness of all filling /valves /stem, gauge connectors. Any leakage must be arrested immediately using proper safety precautions.
27. Do VENT (release) the Oxygen gas slowly.
28. Apply HAND BRAKE before starting operation on UGSS-O₂.
29. Keep the Compressor Trolley away (at least 10 meters) from the UGSS-O₂ while filling the High Pressure Storage Cylinders.
30. Operate the UGSS-O₂ in CLEAN & OPEN environment. Ensure that Dry Leaves, fire catching items are not in the vicinity.
31. In case you operate for INTERNAL BOOSTING, ENSURE that Internal Boosting Valves are fully closed after operation is completed.
32. After completing operation on UGSS-O₂, please ensure that the Electrical Control Panel is PUT OFF; please ensure that the CO₂ flooding system & Oxygen Purity Controller is also PUT OFF.
33. Keep the doors closed while moving the UGSS-O₂.
34. In case of any problem please report to the matter to NEOMETRIX immediately on support@neometrix.in. Please do not undertake repairs as OXYGEN SYSTEM require very specialized handling for repairs/maintenance.
35. ENSURE proper EARTHING to release STATIC CHARGE generated during operation. Oxygen Hoses supplied with UGSS-O₂ are electrically conducting.

OXYGEN CHARGING & DISTRIBUTION VEHICLE UGSS-O₂
LIST of DONT'S

1. High Pressure Oxygen Systems are serious FIRE HAZARDS. These systems require HANDLING by TRAINED PERSONNEL only. Do not operate UGSS-O₂ if you are not trained on the system.
2. Do not store combustible matter that may support or initiate the combustion (Lubricating Oil, Grease, Diesel etc.) in close vicinity of High Pressure Oxygen System, UGSS-O₂.
3. Do Not Smoke.
4. Do not allow the Oxygen Hose END FITTING to TOUGH GROUND and get DIRTY.
5. Do NOT KEEP the PORTS of the UGSS-O₂ OPEN. Keep them CAPPED always, when not in USE.
6. Do not attempt to repair without proper authorization & proper procedure in proper clean environment.
7. Do not use Welding/ Grinding or any other electrical tools in pressurized Oxygen System.
8. Do not allow NAKED FIRE within 50 meters range.
9. Do not attempt to fill the Oxygen Cylinder with gas other the Medical grade Oxygen.
10. Do not handle Oxygen Components with bare hands, Normal hands also have oil deposits and can lead to fire hazards.
11. Do not use cotton waste/ cotton rags for cleaning. Only LINT FREE clean cloth should be used.
12. Don't use lubricants oil /grease, sealants unless it has been specifically for oxygen service.
13. Do not attempt to start the unit after a fire accident unless a thorough inspection is carried out.
14. Please do not hurry while operating UGSS-O₂.
15. Never change the relief valve / Pilot valve settings.
16. Never RUN the truck engine while operating UGSS-O₂.
17. Leaking Oxygen is Hazardous. Do not operate the UGSS-O₂ in case of leakage.
18. As per standard practice, do not face the valve of the cylinder while opening and closing the Storage cylinder valve.
19. Do not operate the system in unclean or fire hazardous area
20. Do not allow people to assemble near UGSS-O₂ while in operation. Always operate the system in open.

GENERAL SPECIFICATION & EQUIPMENTS LIST

CHAPTER 3

OXYGEN STORAGE AND DISTRIBUTION VEHICLE

Operation	Outdoor.
Fuel Tank Capacity	60Liters.
Tire Pressure	94PSI.
Rear Axle Weight (RAW)	3025 Kg (Actual Measurement DATED 11/01/2012)
Front Axle Weight (FAW)	1925 Kg. (Actual Measurement DATED 11/01/2012)
Gross Vehicle Weight (GVW)	4895 Kg. (Actual Measurement DATED 11/01/2012)

OXYGEN STORAGE CYLINDER & SKID SPECIFICATION

Working Pressure	350Kg/cm ²
Water Capacity (Volume)	40Liters
Height	1135mm (With the Angle valve)
Diameter	Ø232mm
Weight of Cylinder	90Kgs
Color of Cylinder	Black
No. of Cylinders	12
No. of Banks	4
No. of Cylinders in EACH BANK	3

COMPRESSOR TROLLEY SPECIFICATION

Working Pressure	100PSI/7Kg/cm ²
Free Air Delivery	300CFM (8.49m ³ /min)
Unloading Pressure	107PSI/7.5 Kg/cm ²
Fuel Tank capacity (Diesel)	100Ltrs
Tire Pressure	65PSI/4.5Kg/cm ²
Weight of the Compressor Trolley	1890Kgs
Max. Towing Speed	30Km/hrs.
Lubricating Oil	ISO VG 68 or equivalent grade oil for screw compressor.
Fuel Oil	High Speed Diesel

LIST OF MAJOR EQUIPMENTS**(Pneumatic Circuit Reference: T-PED-A0884-PDWG DATED 11th March 2012)**

Oxygen Charging and Distribution Vehicle (UGSS-O₂)					
IAF Supply Order No. AIR HQ/SO-4946/IPW/PUR DATED 29TH MARCH 2011					
Document submitted with DGAQA-NEW DELHI (Part of User Manual DATED 19th DEC 2011)					
S. No	NMX Part Code	Circuit Code	ITEM DESCRIPTION	ITEM SPECIFICATIONS	QTY
1	2A0884P0001	1.0	Drive Air & Oxygen INLET PORT Panel	<i>One PORT for Plant Air INLET & One Port for Oxygen INLET</i>	1
2	2A0884P0002	2.0	Oxygen Outlet PORTS PANEL	<i>4 Ports for Oxygen Outlet</i>	1
3	2A0884P0003	3.0	Internal Boosting PANEL	<i>Panel has four Needle Valves for INTERNAL Boosting</i>	1
4	2A0884P0004	4.0	Oxygen Pressure Gauge	<i>Range : 0 to 400 Kg/cm²,</i>	2
5	2A0884P0005	5.0	Air Compressor on Towable trolley with Hour Meter	<i>Capacity: 300 CFM, Working Pressure: 7.0 Kg/cm² / 100 psig.</i>	1
6	2A0884P0006	6.0	Air Pressure Regulator	<i>Range:0-8 Kg/cm²</i>	1
7	2A0884P0007	7.0	Oxygen Gas Filter	<i>0.01 Micron</i>	2
8	2A0884P0008	8.0	Oxygen Gas Booster	<i>Working Pressure (MAX): 5000 PSI</i>	2
9	2A0884P0009	9.0	Compressed Air Hose	<i>Length: 7.5 Meter, Line Size: 3/4"</i>	2
10	2A0884P0010	10.0	Oxygen Pressure Switch	<i>Range: 25to250 Kg/cm²</i>	1
11	2A0884P0011	11.0	Drive Air Pressure Gauge	<i>0 to 10 Kg/cm²</i>	1
12	2A0884P0012	12.0	Ball Valve with Hand Lever	<i>Range : 0-8 Kg/cm², Line Size: 1/2"</i>	2
13	2A0884P0013	13.0	High Pressure Relief Valve with	<i>Set Range: 340 to 413 Kg/cm²</i>	1

			Spring Kit		
14	2A0884P0014	14.0	Remotest Air Pilot Switch	<i>Set range: 340 to 450 Kg/cm²</i>	1
15	2A0884P0015	15.0	Oxygen Pressure Gauge	<i>Range : 0 to 600 Kg/cm²</i>	7
16	2A0884P0016	16.0	Needle Valve with Tube Stub	<i>W.P(max)=5000PSI</i>	13
17	2A0884P0017	17.0	Seamless Cylinder	<i>Capacity:40 Liters, Working Pressure: 350 Kg/cm²</i>	12
18	2A0884P0018	18.0	Oxygen Sensor	<i>O₂ PURITY ANALYSER with Alarm Output</i>	1
19	2A0884P0019	20A.0	Pressure Regulator	<i>Inlet Pressure : 6000PSIG, Outlet Pressure : 0-1500PSIG</i>	1
20	2A0884P0020	20.0	Pressure Regulator	<i>Input Pressure:3500PSIG, Output Pressure:0-100PSIG</i>	1
21	2A0884P0021	21.0	Pressure Regulator	<i>Inlet Pressure:6000PSIG, Outlet Pressure:25-4000PSIG</i>	1
22	2A0884P0022	22.0	Pressure Regulator	<i>Inlet Pressure:6000PSI, Outlet Pressure :50-6000PSIG</i>	1
23	2A0884P0023	23.0	Oxygen Pressure Gauge	<i>Range : 0 to 10 Kg/cm²</i>	1
24	2A0884P0024	24.0	Relief Valve with Spring Kit	<i>Pressure Set Range =0.7-15Kg/cm²</i>	1
25	2A0884P0025	25.0	Relief Valve with Spring Kit	<i>Pressure Set Range = 206-275Kg/cm²</i>	1
26	2A0884P0026	26.0	Oxygen Hose	<i>Color: Black, One side: M24 x 1.5 (M), other side : M24 x 1.5 (F)</i>	12
27	2A0884P0027	27.0	Needle Valve	<i>SS-316,Oxygen Service ,1/2"OD Tube Connection</i>	1
28	2A0884P0028	28.0	Check Valve	<i>SS-316,Oxygen Service ,1/2"OD Tube Connection</i>	1
29	2A0884P0029	29.0	Cylinder Skid	<i>Special Structure for12 Cylinder in 4 Racks with proper Clamping</i>	1
30	2A0884P0030	30.0	Air Line Pressure Switch	<i>Pressure Set Range :0.6 to6Kg/cm²</i>	1

31	2A0884P0031	31.0	Solenoid Valve, NC with Solenoid Coil & Socket Connector Cable	<i>2/2way valve ,12V DC., Range 0-8Kg/cm2</i>	1
32	2A0884P0032	32.0	Internal Boosting Bank Isolation Valve	<i>SS-316,Oxygen Service ,1/4"OD Tube Connection</i>	4
33	2A0884P0033	33.0	Internal Boosting Manifold	<i>As per Drawing</i>	1
34	2A0884P0034	34.0	Truck	<i>FAW=2150Kg,RAW=3550Kg,G VW=5700Kg</i>	1
35	2A0884P0035	35.0	Fire Fighting system	<i>CO2 Flooding system, 22.5 Kg CO2 Cylinder & Fire Alarm Panel</i>	1
36	2A0884P0036	36.0	Canopy	<i>As per Drawing</i>	1
37	2A0884P0037	37.0	Vent Manifold	<i>As per Drawing</i>	1
38	2A0884P0038	38.0	Oxygen Hose Basket	<i>As per Drawing</i>	1
39	2A0884P0039	39.0	Air Hose Basket	<i>As per Drawing</i>	1

USER PANELS**CHAPTER 4**

The UGSS-O₂ has the following USER PANELS for operation:

- 1- Oxygen Booster Storage Station (The LEFT half of the Panel on the BACK of the vehicle)
- 2- Oxygen Distribution Station (The RIGHT half of the Panel on the BACK of the vehicle)
- 3- Electrical Control Panel
- 4- Oxygen Purity Controller Panel
- 5- Internal Oxygen Pressure Boosting Panel

1-Oxygen Booster Storage Station (The LEFT half of the Panel on the BACK of the vehicle)

This PANEL is used for charging of the storage cylinders on the vehicle using the EXTERNAL Oxygen Cylinders. The USER should make sure the followings before starting this operation:

- The Oxygen Hose used to connect the external cylinder to the Vehicle should be CAPPED properly before use. In case it is not capped, its cleaning should be done before using the same.
- The Oxygen Cylinder PORTS are cleaned & covered (SEALED). Make sure that the SEAL is not broken. Before connecting the Oxygen Hose to the Oxygen Cylinder make sure that the Cylinder PORT is clean.
- Before Starting the Oxygen Booster, PURGE the Oxygen Inlet Hose line using the Vent valve (Valve No. 16.13) on the PANEL to ensure that the AIR/ moisture inside the Hose is flushed out.

VERY IMPORTANT

Before Starting the Oxygen Booster, PURGE the Oxygen Inlet Hose line using the Vent valve (Valve No. 16.13) on the PANEL to ensure that the AIR/ moisture inside the Hose is flushed out.

The **Oxygen Booster Storage Station (The LEFT half of the Panel)** has the following Pressure Gauges & Control Valves for operation:

Pressure Gauges:

Pressure Gauge Details	Pneumatic Circuit Code
Air Drive Pressure Gauge	(11.0)
Booster Inlet Pressure Gauge	(4.1)
Booster Outlet Pressure Gauge	(15.1)
Independent Cylinder Bank Pressure Gauges	(15.2), (15.3), (15.4), (15.5)

Control valve for the opening and closing of the oxygen/ Air Line is as follows:

Control Valves

Valve Details	Pneumatic Circuit Code
Oxygen Inlet Valve	(27.0)
Oxygen INLET Vent Valve	(16.13)
Oxygen Cylinder Bank Isolation Valves	(16.1), (16.2), (16.3), (16.4)
Drive Air Inlet Booster-I	(12.1)
Drive Air Inlet Booster-II	(12.2)

2-Oxygen Distribution Station (The RIGHT half of the Panel on the BACK of the vehicle)

This PANEL is used for charging the Aircraft UNITS with High Pressure Oxygen as per requirements. Pressure Gauges, Supply Valves Pressure Reducing Valves & Vent valve are provided for this purpose. There are 4 PORTS provided on the RIGHT side of the vehicle (When looking at this PANEL from the back of the vehicle) for charging the aircraft at particular Pressure as mentioned below:

- I. 1 to 5.5Kg/cm².
- II. 150 to 230Kg/cm².
- III. 230 to 350Kg/cm².
- IV. 350Kg/cm².

All these (Gauges & Control valves) are on single panel for the ease of operation and the minimum movement of the operator, so that the operator can observe the pressure in the

system from a single place. The USER should make sure the followings before starting this operation:

- The Oxygen Hose used to connect the Aircraft and the Vehicle should be CAPPED properly before use. In case it is not capped, its cleaning should be done before using the same.
- Check for the Aircraft UNIT connection PORTS to be cleaned & covered. Make sure that the connection is CLEANED. Before connecting the Oxygen Hose to the Aircraft Charging Point make sure that the Charging POINT connector is clean.
- **Before connecting the Oxygen Hose to the Aircraft Charging Point, FLUSH the HOSE using the Oxygen in the storage cylinders on the UGSS-O₂ vehicle. This operation is to ensure that the AIR/ moisture inside the Hose are flushed out.**

VERY IMPORTANT

Before connecting the Oxygen Hose to the Aircraft Charging Point, FLUSH the HOSE using the Oxygen in the storage cylinders on the UGSS-O₂ vehicle. This operation is to ensure that the AIR/ moisture inside the Hose are flushed out.

The **Oxygen Distribution Station**(The **RIGHT** half of the Panel on the **BACK** of the **vehicle**)has the following Pressure Gauges & Control Valves for operation.

Pressure Gauges:

Pressure Gauge Details	Pneumatic Circuit Code
Pressure Gauge for Supply Pressure (PORT-I)	(23.0)
Pressure Gauge for Supply Pressure (PORT-II)	(4.2)
Pressure Gauge for Supply Pressure (PORT-III)	(15.6)
Pressure Gauge for Supply Pressure (PORT-IV)	(15.7)

Control Valve for the opening and closing of the Oxygen Charging Lines is as follows:

Control Valves

Valve Details	Pneumatic Circuit Code
Oxygen Supply Valves	(16.5),(16.7),(16.9),(16.11)
Oxygen Supply Line VentValves	(16.6),(16.8),(16.10),(16.12)
Pressure Reducing Valves	(20.0), (21.0), (22.0)

3-Electrical Control Panel

The Electrical Control Panel is centralized panel for all electrical operations & safety interlocks. The Electrical Control panel is as follows:

The OPERATOR will operate the following switches:

- **Power on Switch:** The OPERATOR shall PUT on this SWITCH. The Power shall go to the Safety Interlock Valves.
- **Lights ON/OFF:** The LIGHTS inside the vehicle will be switch ON with this Switch. This may be required for NIGHT operation.
- **Flooding Panel On:** The OPERATOR shall PUT on this SWITCH. The Power shall go to the Fire Alarm Panel. The Fire Fighting Panel shall be TURNED ON after switching on this Switch.
- **Inlet Oxygen Pressure LOW ALARM:** In case this SWITCH is ON, the ALARM will be there in case the Oxygen Inlet Pressure is less than 32 Kg/cm².



Fire Alarm Panel

Electrical Control Panel

ELECTRICAL CONTROL PANEL & FIRE ALAM PANEL AS A WHOLE

The OPERATOR will observe the following INDICATORS:

- **Power ON/OFF:** The Light should be “ON” for any operation on UGSS-O₂.
- **Air Pressure HIGH:** The Light should be “ON” for GAS BOOSTERS on UGSS-O₂ to operate.
- **Battery Charging Voltage & Current Indicators:** The Battery Charging status can be seen on these Gauges.

4- Oxygen Purity Controller Panel

This PANEL houses the Oxygen Purity Controller. The Oxygen PURITY in the INLET line is continuously monitored and is compared with the SET VALUE. In case the Actual PURITY value goes below the SET Value the Oxygen Booster shall STOP working. The Oxygen Purity Controller ensures that LOW PURITY Oxygen does not go into High Pressure Oxygen Cylinders. The PURITY Value is USER SETTABLE. The Factory Set Value is **92.0%**.



OXYGEN PURITY CONTROLLER PANEL

5- Internal Oxygen Pressure Boosting Panel

In case there is NO External Oxygen Cylinder available for filling into High Pressure Oxygen Cylinder Bank, the USER may use any of the storage cylinders as INPUT and may fill any cylinder in some other BANK to a high pressure using GAS BOOSTER.

Internal Boosting Panel has **4 Valves**(One each for each Cylinder Bank).

The user shall select a cylinder in specific Bank to act as INPUT cylinder for internal Boosting. The subject Bank valve on the Panel shall be opened.

During INTERNAL Boosting operation, the Oxygen Purity Controller Switch shall be in "OFF" condition.

Also the Isolation Valve on the Panel for the selected INPUT BANK will be closed.

The OPERATOR may see the Circuit Diagram for more clarity on operation.

Control Valves

Valve Details	Pneumatic Circuit Code
Oxygen Supply Valves	(32.1),(32.2),(32.3),(32.4)

CO₂ Flooding System Automation:

The detection system having the set of smoke and heat detectors detects any fire /smoke (if any) in the any of the zones of the UGSS-O₂ and transfers the signal to Fire Alarm Panel which generates the HOOTER ALARM and allows the opening of the CO₂ gas stored in the cylinder through the dispensing nozzles inside the canopy for extinguishing the fire. To make the Fire System operational the Power to the Panel should be switched ON from the electrical control panel.

Manual& Automatic Release Unit

The release and the subsequent Discharge of the CO₂gas can be affected either manually and or automatically

- **Manual actuation :**

The manual release actuation is effected by just pulling the handle at the cylinder valve.

- **Automatic Actuation**

Automatic release occurs according to the fire hazards detected in the room to be protected as in total flooding or within the immediate vicinity of the system to the protected. It can be mechanical, pneumatic, electrical or electro-pneumatic valve on the 22.5 kg of CO₂ cylinder

- **Mechanical Release Unit:**



In case of the fire hazard, if the automatic actuation do not come into active role with flooding the CO₂ for suppressing the fire occurred with immediate effect, in the case of fire is detected in any of the zone so the operator is supposed to break the glass of the mechanical release unit to actuate the fire suppression system TO AVOID ANY FURTHER MAJOR ACCIDENT TO OCCUR allowing the system to flood the CO₂ as and when required.

FIRE FIGHTING OPERATION MANUAL

INDICATORS & INSTRUMENTS	INDICATION	PURPOSE
<u>CONTROLS</u>		
<ul style="list-style-type: none"> LAMP TEST 	TO AUTO TEST ALL INDICATION ALL INDICATION GLOW	Push button to auto test the working of LEDs on PANEL. On pressing all LEDs should glow.
<ul style="list-style-type: none"> SILENCE 	TO STOP THE BUZZER AND HOOTER ALARM.	Push button to stop alarm Hooter.
<ul style="list-style-type: none"> RESET 	TO RESTART THE SYSTEM TO NORMAL CONDITION	Push button to RESET the system to normal condition.
<u>LED DISPLAY : SYSTEM</u>		
<ul style="list-style-type: none"> MAINS ON 	BLUE LED GLOW	MAINS supply is on (Panel is getting DC Power supply).
<ul style="list-style-type: none"> BATTERY MODE 	WHITE LED GLOW	System Battery IS CHARGING backup.
<ul style="list-style-type: none"> BATTERY LOW 	YELLOW LED BUZZER ALARM	Battery Discharged.
<ul style="list-style-type: none"> FAULT 	RED LED BUZZER AND HOOTER ALARM	LED Indicator-Any Panel Fault or Fire.
<u>LED DISPLAY : ZONE</u>		
<ul style="list-style-type: none"> NORMAL 	GREEN LED	ZONE IS ACTIVE & OK.
<ul style="list-style-type: none"> OPEN 	BLUE LED BUZZER AND HOOTER ALARM	ZONE IS OPEN in case of ANY DETECTORS is MISSING (BUZZER will be ON)
<ul style="list-style-type: none"> SHORT 	YELLOW LED BUZZER ALARM	WILL BE ON in case FIRE in MULTIPLE ZONES or in case WIRING is SHORT.
<ul style="list-style-type: none"> FIRE 	RED LED BUZZER AND HOOTER ALARM	FIRE DETECTED IN THE ZONES (HOOTER ALARM)

ZONE DESCRIPTION AND CLASSIFICATION

The UGSS-O2 CANOPY is divided in TWO ZONES for placement of Fire Sensors & CO₂ nozzles

ZONE1

UNDER THE FIRE ZONE 1 COMES THE FOLLOWING SUBSYSTEMS:

HIGH PRESSURE OXYGEN STORAGE SYSTEM.

- 1- Stack of 4 CYLINDER BANKS, each having 3 High Pressure Oxygen Cylinders and tubing to Panel Control Valves & Monitoring Gauges.
- 2- Electrical Control Panel and the Wiring.

ZONE2

UNDER THE FIRE ZONE 2 COMES THE FOLLOWING SUBSYSTEMS:

FILLING AND DISTRIBUTION SYSTEM.

- 1- Boosting Station with 2 Oxygen Boosters.
- 2- User Panel.
- 3- Oxygen Purity Controller Panel.
- 4- Internal Boosting Panel.
- 5- Oxygen Inlet Panel.
- 6- Oxygen Distribution Panel.
- 7- User Panel

For Filling the Storage Cylinder Banks using

EXTERNAL OXYGEN CYLINDER:

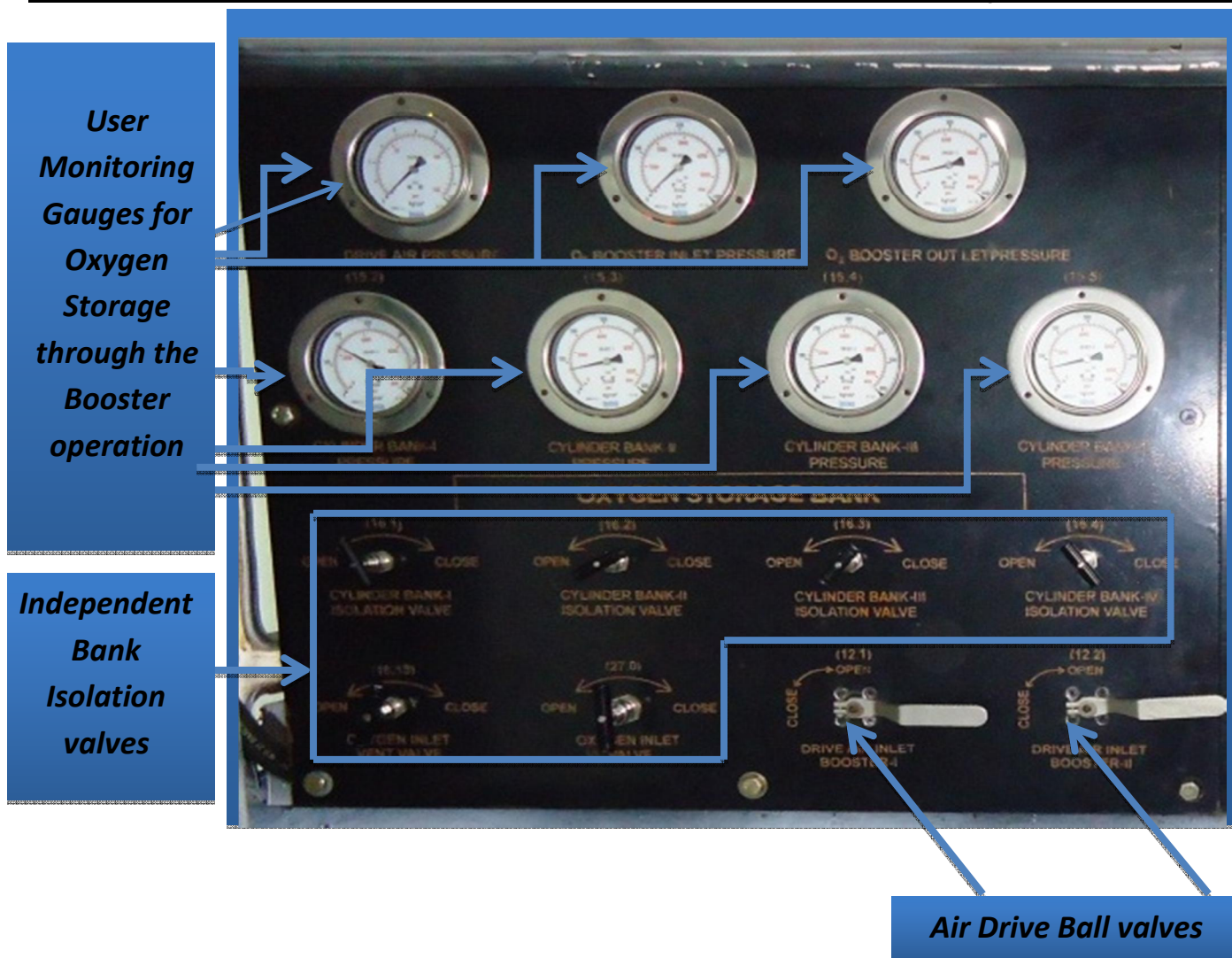
STEP-I

- 1- Switch on the Electrical Control Panel & Fire Alarm Panel. Please keep the “Inlet Oxygen Pressure Low Alarm” Switch in OFF condition.
- 2- Engage the selection of the Oxygen Purity Controller Panel to the EXTERNAL BOOSTING SIDE.
- 3- Connect EARTHING wire to drain the Static Charge generated during operation.
- 4- Remove the Plug from the Oxygen Inlet Port (F5.0: For Oxygen Inlet Hose).
- 5- Connect the flexible Oxygen Hose at the Inlet port (F5.0) (Left side of the User Panel, when looking at the Panel).
- 6- Before making Hose Connections please make sure that the PORTS are CLEAN.
- 7- Open the Vent Valve (16.13) to vent the Oxygen inside the Oxygen Hose.
- 8- Open the Inlet Oxygen Cylinder and Vent the Oxygen so that the Air/Moisture inside the Hose is removed.
- 9- Close the VENT Valve and monitor the pressure in the Pressure Gauge (4.1). It will show the External cylinder pressure.
- 10- Now switch ON the “Inlet Oxygen Pressure Low Alarm” switch on Electrical Control Panel.
- 11- Also monitor the Oxygen Purity on Oxygen Purity Controller. Please Vent the Oxygen till you get Oxygen Purity higher than 90%. Once the Oxygen PURITY is better than 90% the SYSTEM is ready for Boosting & Storage.

12- Remove the Plug from the Drive Air Inlet Port (F5A.0: For Compressor AIR) respectively.

13- Connect the Drive Air Hose from the Compressor to the Drive Air Inlet Port (F5A.0)(Left side of the control panel, when looking at the panel).

Please OPERATE from the left side of the USER PANEL (shown below):



STEP-II: Select the Cylinder to be filled:

- ✈ The Bank Pressure is available on the Panel on Gauges 15.2, 15.3, 15.4, 15.5. To see the Pressure in specific Cylinder operator needs to open the cylinder needle valve (on top of the cylinder).
- ✈ Decide on the specific Bank & Cylinder in that Bank to be filled.
- ✈ Open the CylinderValve on the Cylinder and then the respective Bank Isolation Valve on the Panel (16.1, 16.2, 16.3, and 16.4).
- ✈ Allow Pressure to equalize with external cylinder from the supply side.
- ✈ For further CLARITY, please refer to the attached Pneumatic Circuit Diagram.

Step-III: Check for the Compressor Hose connection with the Air Drive Inlet Port & Start the Air Compressor.

- ✈ Install the compressor on a leveled surface.
- ✈ Switch “ON “the power supply to the compressor. The Switch is provided on the user Instrument panel.
- ✈ Turn the ignition key and Press the override button simultaneously for up to 5 seconds.
- ✈ Release the ignition key and override button as soon as the engine starts.

Step-IV: Start the Oxygen Gas Booster

- ✈ Open the Drive Air Valve for Gas Boosters. Decide to run one or both Boosters.
- ✈ Monitor the Inlet Pressure on Gauge 4.1 & Outlet pressure on 15.1 & the Cylinder Bank Pressure on specific Bank Cylinder Gauge (as selected). Please note the Ambient Temperature and Max Pressure to be filled as per the Temp vs Filling Pressure Chart.


- ✈ As per the safety consideration, system will automatically stop @ filling pressure against the ambient temperature as per the Standard Temperature vs Filling Pressure Chart.
- ✈ Close the Drive Air Inlet Valve for the Oxygen Gas Boosters.
- ✈ In case the Inlet Pressure shown on the gauge (4.1)(Pressure of the External Oxygen Cylinder) goes below 32 Bars the Booster shall automatically stop and alarm for the cylinder change rings as soon as it happens .Switch off the alarm & change the new external cylinder. Make sure to vent the Hose before opening it from cylinder till the Purity is achieved.
- ✈ Again switch on the alarm on Electric control Panel for the filling with next external oxygen operation.

CHARGING of Oxygen into Aircraft systems from the Oxygen Bank available on UGSSO2 by Gravity.

Please go to the right side of the USER Panel (shown below):




Step-I: Make the Outlet Hose Connection.

 Connect the outlet oxygen Hose with the equipment to be charged. Connect to the Port depending on charging pressure requirement as mentioned on Ports.

 But BEFORE making the Hose connection, please ENSURE the followings:

- The Hose ENDS should be PLUGGED always. If they are not PLUGGED, the Hose is taken as contaminated and needs to be cleaned.
- The PORTS should also be cleaned properly before connecting the hose as the contamination if any may go inside.
- Before Connecting the HOSE to the Charging POINT, it should be PURGED with Oxygen. This is done to ensure that Air/Moisture if any in the HOSE is VENTED out in the atmosphere.

Step-II: Select the Cylinder from which the Charging is to be done:

 Open the Cylinder Bank isolation Valve & the cylinder valve for that specific cylinder.

Step-III: Switch on the Electrical Control Panel to ensure that Fire Alarm Panel is ON.

Step-IV: Open the Supply Valve and control the fill pressure from the Pressure regulator.

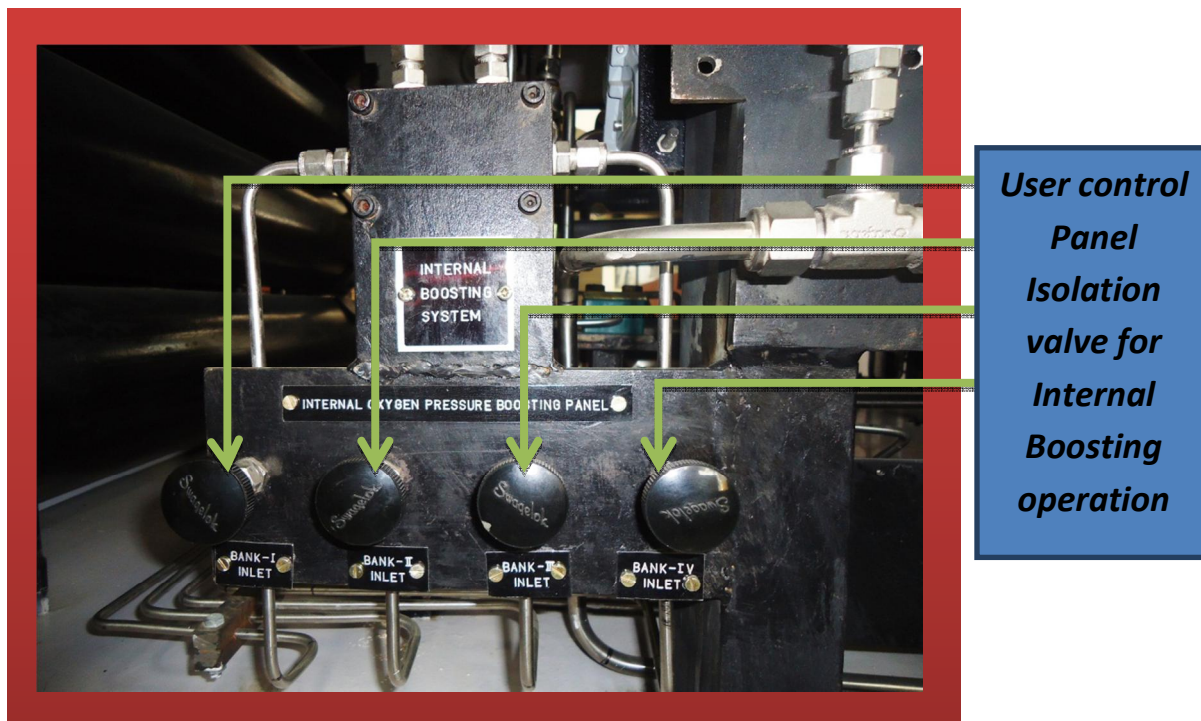
Monitor the fill pressure &Cylinder Bank Pressure on the Panel.

For Filling the Storage Cylinder Banks using

INTERNAL OXYGEN CYLINDER :

- 1- Switch on the Electrical Control Panel & Fire Alarm Panel. Please keep the “Inlet Oxygen Pressure Low Alarm” Switch in OFF condition.
- 2- Engage the selection of the Oxygen Purity Controller Panel to the Internal Boosting Side.
- 3- Connect EARTHING wire to release the Static Charge generated during operation.
- 4- Open the respective Inlet Oxygen Cylinder on the internal boosting Panel (32.1/32.2/32.3/32.4) through which the filling is to be done.
- 5- Now switch ON the “Inlet Oxygen Pressure Low Alarm” switch on Electrical Control Panel.
- 6- Remove the Plug from the Drive Air Inlet Port (F5A.0: For Compressor AIR).
- 7- Connect the Drive Air Hose from the Compressor to the Inlet Port (Left side of the control panel).

User Control Panel for Internal Boosting operation



STEP-II: Select the Cylinder Bank to be filled:

- ✈ The Bank Pressure is available on the Panel on Gauges 15.2, 15.3, 15.4, 15.5. To see the Pressure in specific Cylinder operator needs to open the cylinder needle valve (on top of the cylinder).
- ✈ Decide on the specific Bank & Cylinder in that Bank to be filled and the Bank Cylinder valve from it has to be filled.
- ✈ Open the Cylinder Valve on the Cylinder and then the Bank Isolation Valve from which and to which it has to be filled.
- ✈ Allow Pressure to equalize with external cylinder from the supply side.
- ✈ For further CLARITY, please refer to the attached Pneumatic Circuit Diagram.




Step-III: Check for the Compressor Hose connection with the Air Drive Inlet Port & Start the Air Compressor.

- ✈ Install the compressor on a leveled surface.
- ✈ Switch “ON” the power supply to the compressor. The Switch is provided on the user instrument panel.
- ✈ Turn the ignition key and Press the override button simultaneously for up to 5 seconds.
- ✈ Release the ignition key and override button as soon as the engine starts.



Step-IV: Start the Oxygen Gas Booster

- ✈ Open the Drive Air Valves for Gas Boosters .Decide to run one or both Boosters.
- ✈ Monitor the Inlet Pressure on Gauge 4.1 & Outlet pressure on 15.1 & the Cylinder Bank Pressure on specific Bank Cylinder Gauge (as selected).Please note that the Ambient Temperature and Max. Pressure to be filled is as per the Temp vs Filling Pressure Chart.
- ✈ As per the safety considerations, system will automatically stop @ filling pressure against the ambient temperature as per the standard Temperature vs Filling Pressure Chart.
- ✈ Close the Drive air Inlet Valve for the Oxygen Boosters.
- ✈ In case the Inlet Pressure shown on gauge (4.1)(Pressure of the Internal Oxygen Cylinder from which the filling is to be done) goes below 32 Bars the Booster shall automatically stop and alarm for the cylinder change rings as soon as it happens. Switch off the alarm & change the new internal cylinder.
- ✈ Again switch on the alarm on Electric control Panel for the filling with next EXternal oxygen filling operation.



SAFETY MEASURES & SAFETY INTERLOCKING**CHAPTER 7****Safety for the Operators for Compressor Trolley**

-  Fan Guard provided to avoid injury from the rotating fan
-  Search Lights FRONT SPOT LIGHTS & BACK SPOT LIGHTS mounted for the night operation is provided.
-  Detailed Catalog of ELGI compressor & Ashok Leyland Engine is available with this Manual.




Safety Measures for the Compressor AS A UNIT:

 Engine Oil temperature switch	High engine oil temperature	Set at 120°C
 Discharge Temperature switch	Air Oil Mixture Temperature	Set at 100+/-5°C

Safety Measures for the Diesel Engine AS A UNIT:

 Temperature switch-	High temperature of the Engine oil	Set 120°C
 Pressure Switch	Low lube Oil pressure of engine	Set 1.5kg/cm ² .

Safety Measures for the Oxygen Storage & Distribution**System AS A UNIT:**

 Oxygen Purity Controller	Safety Interlocking is provided through the Online Indicator cum monitor to monitor the contamination in Oxygen at inlet via external cylinder.	Set at 99.5 %.
 Oxygen Line Pressure Switch	Safety Interlocking is provided through the Online Cum Indicator cum monitor to monitor drop in the pressure.	Set at 32Kg/cm ² .
 Remotest Pilot switch	Safety Interlocking to ensure the pressure at the storage cylinder does not go beyond 342 kg/cm ² .(5000 PSI)	Set at 342 kg/cm ² .(5000 PSI)

























INDICATORS & INSTRUMENTATION on Compressor





















INDICATORS & INSTRUMENTATION	Location & Purpose	CHAPTER 8CHAPTER 8.1
<ul style="list-style-type: none"> • DELIVERY AIR TEMP. • DISCHARGE AIR TEMP. • ENGINE OIL PRESSURE • HOURMETER • ENGINE WATER TEMP. • AIR LINE PRESSURE 	<p>Air end temperature. Air and oil mixture Temperature.Pressure of the Engine oil. Running hours of the Booster and the Engine. Temperature of the Engine water. Pressure of the Compressed air at the Delivery end.</p>	
<p>GAUGE</p> <ul style="list-style-type: none"> • VOLTMETER • AMMETER • MAINS ON /OFF • DIGITAL RPM METER • BACK SPOT LIGHT 	<p>Indicator showing Voltage of the Battery. Indicator showing the Battery Charging Current. Power supply to the Mobile Compressor Trolley for Electricals. Indication the Engine speed. Lights for the Night operation. Lights for the Night operation. Indicates oil level in the sump before starting the unit.</p>	
<ul style="list-style-type: none"> • FRONT SPOT LIGHT • OIL LEVEL INDICATOR OF SEPERATOR TANK • AIR FILTER INDICATOR 	<p>Indicator is fitted on the Compressor & engine on the entry of air to the filter assembly.</p>	

INDICATORS & INSTRUMENTATION on UGSS-O₂

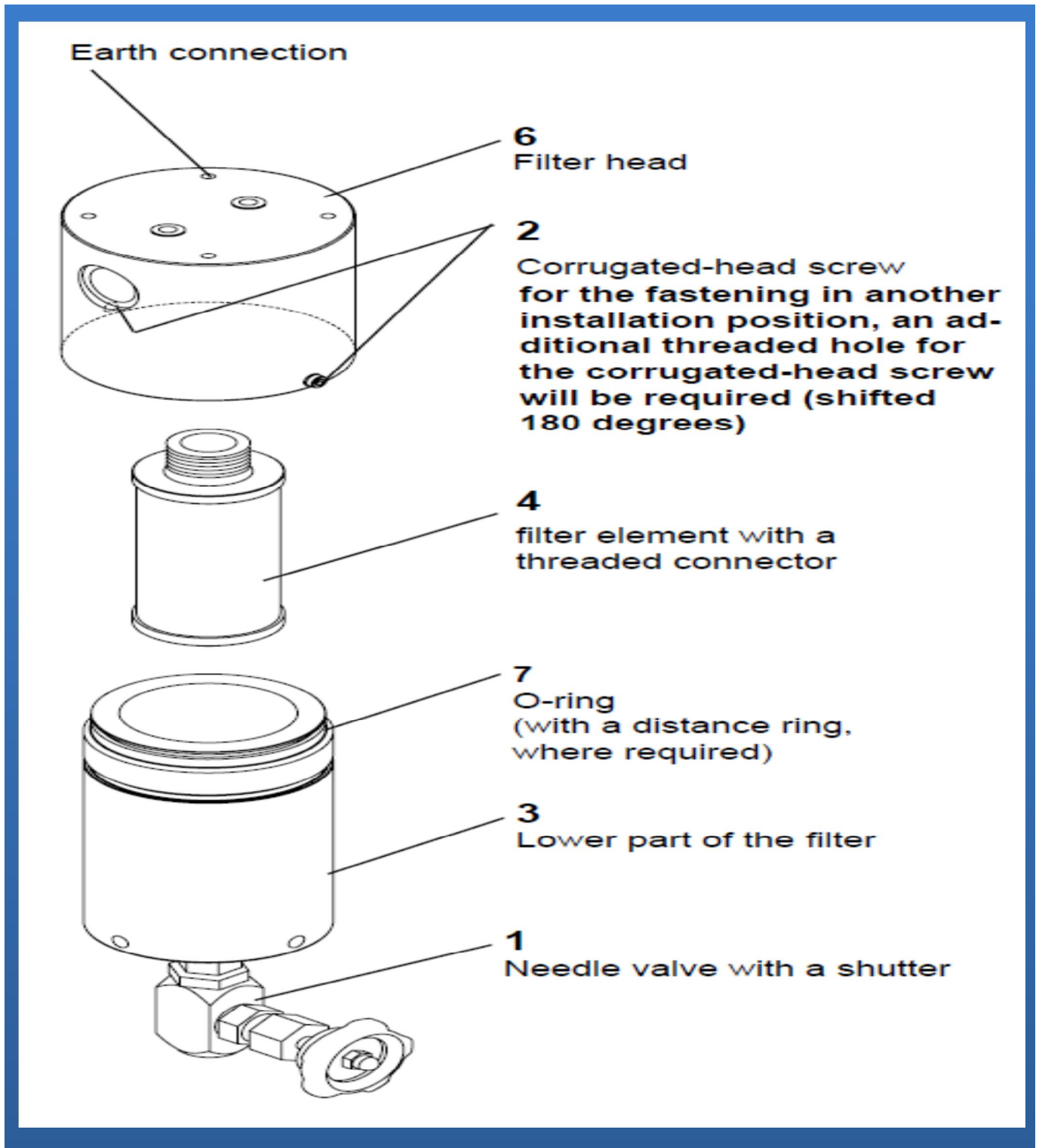
INDICATORS & INSTRUMENTATION	Location & Purpose	CHAPTER 8 CHAPTER 8.2
<ul style="list-style-type: none"> • POWER ON/OFF • AIR PRESSURE HIGH • OXYGEN PRESSURE HIGH 	<p>Power Supply of Electrical Control Panel. Indicator showing air pressure required is high (preset value). External cylinder for filling is connected having inlet pressure above 320Bars.</p>	
<ul style="list-style-type: none"> • LIGHTS • FLOODING PANEL • INLET OXYGEN LOW 	<p>Canopy Lights for Night Operation. CO₂ FireSuppression system. External /Internal cylinder for filling is having low pressure.</p>	
<p>PRESSURE ALARM</p> <ul style="list-style-type: none"> • BATTERY CHARGING CURRENT • BATTERY VOLTMETER 	<p>Showing the Battery charging current. Showing the Battery Voltage.</p>	

SERVICE AND MAINTANENCE INSTRUCTIONS-UGSS-O₂**CHAPTER 9****FOR COMPRESSOR TROLLEY****CHAPTER 9.1**

FREQUENCY		COMPRESSOR TROLLEY (SERVICE & MAINTANENCE ACTION)
Before /After each use		Perform the visual check of the complete system.
		Check the Engine Oil LEVEL through the Dip stick.
		Check the Radiator Water Level.
		Check the Compressor Oil level through the Sight level glass available on the side of the Compressor Tank. (Oil fill capacity 18Liters)
		Check the Diesel Level in the Diesel tank. (Capacity: 100 Liters)
		Close the service line ball valve after USE
		Drain the Airline Filters (2 Nos.) & Moisture Separator (1 No.), Fuel water separator before starting the Trolley,.
		Switch Off the ELECTRICAL PANEL after USE.
		Battery connections tightness.
Every Month		Check for Loosening of any component.
		Check for Tire Pressure.
		Check for Panel Gauges/Lamp Indications.
		Check & clean the Engine Air cleaner elements.
		Engine bed bolts tightening.
		RPM Indication meter check.
Every 3 Month		Engine oil change.
		Clean the Fuel filter.
		Radiator & oil cooler cleaning.
		Oil leak in the Engine.
Every 12 months		Check and tightened trolley rim bolts.
		Fan guards & its fasteners
		Check the Engine Pump belt, Engine main fan belt, Alternator Belt condition.
		Check for the Engine shut down settings.
		Check for the Water/Oil/Oil pressure.




SERVICE AND MAINTANENCE INSTRUCTIONS-UGSS-O ₂		CHAPTER 9
FOR UGSS-O ₂ (TRUCK MOUNTED)		CHAPTER 9.2
FREQUENCY		UGSS-O ₂ VEHICLE (SERVICE & MAINTANENCE ACTION)
Before /After each use		Perform the visual check of the complete system.
		Clean oxygen hoses end connections& cap them.
		During Operation observe leakage, if any.
		Release Pressure from All Pressure Gauges on the Panel. Each gauge on the Panel should READ ZERO Pressure after completion of operation.
		Switch “OFF” the Electrical Control Panel after every use.
		CAP all PORTS after USE. Ensure Dirt Free Ports.
		Disengage the Oxygen Purity Controller selector switch to neutral position.
		Visually check the Oxygen Hoses for any damage/ cut mark.
Every Month		Check for the Leakage of the tubing and fittings, if any. Clean the complete system to ensure Dust & Dirt Free system.
Every 3 months		Check booster for oxygen leaking from vents, external leakage, & overall performance.
		Clean the Oxygen Filter Elements.
		Check for loosening ofHex Nuts. Re-torque if needed.
Every 12 months		Inspect piping at full system pressure for leakage using pressure drop.
		Test & calibrate all pressure gauges.
		Replace oxygen & air filter ELEMENTS.
		Test relief valve & Pilot Switch and Pressure switches, Drive Air Pressure regulator reset as needed.
		Change the Oxygen Gas Booster SEALS.
		Change the Oxygen Purity Controller Sensor Probe
		Get all Control Valves, Pressure Reducing valves in the UGSS-O ₂ checked for performance (In-SITU).
Every 5 Years		Get the Gas Cylinders HYDRO TESTED & certified.

SERVICE AND MAINTANENCE OF HIGH PRESSURE OXYGEN FILTERS (HP350S040)



As the cleanliness in the system is the point of major concern so it is to be ensured by trained personnel that the filter elements are either replaced or cleaned in accord with ASTM G93 standards. Cleanliness standards

Caution: Filter elements for High Pressure Oxygen filters FHP261 and 371 have a metallic contact with the housing when provided with a thread.

-  All works on the filters should be carried out in a Dust Proof environment in accord with the ASTM G93 standard for (mounting, installation, all maintenance works or test out in the absence of an explosive environment).
-  Purge the system prior and subsequent to maintenance by means of inert gas (including condensate discharge ducts where available)
-  Depressurize the housing : open needle valve

LIST OF TOOLS & ACCESSORIES**CHAPTER 10****LIST OF TOOLS (IN A TOOL BOX)**

TOOLS	PURPOSE
Spanner Set	6-7, 8-9, 10-11, 12-13, 14-15, 18-19, 20-22, 25-28, 30-32- (9 Nos.)
Screw Driver	(+/-): For Electrical Maintenance (01 No.)
Cylinder Key	FOR External Cylinder VALVE opening and closing (01 No.)

LIST OF ACCESSORIES

Flexible Hoses for Oxygen (12 Nos. each 2.5 meter) & Compressed Air Hoses (2 Hoses each of 7.5 meter length).

External Oxygen Cylinder Adapter – 01 No.

Hose Adapter for Aircraft – 01 No.

Canopy door Keys.

Compressor Key - For starting the Compressor.

TROUBLE SHOOTING CHART

CHAPTER 11

S.NO	PROBLEMS	POSSIBLE CAUSE
1	AIR INLET PRESSURE NOT COMING ON THE GAUGE.	<ul style="list-style-type: none"> • Look for Oxygen Pressure High LED. If it is not GLOWING then change the External Oxygen Inlet Cylinder. This pressure should be more than 35 Kg/cm². For LOWER Oxygen INLET Pressure the Air Valve gets automatically closed. • Also check for the Ball Valve on Compressor Trolley to be OPEN. • Track the circuit using the circuit diagram provided to look for a cause.
2	OXYGEN INLET PRESSURE NOT SHOWING ON THE GAUGE (4.1)	<ul style="list-style-type: none"> • Check and open the Valve on the External Cylinder, if close which is connected at the Oxygen inlet port (26.5) on the Input panel (Left side of the Truck) is not open.
3	BOOSTER IS NOT WORKING WHILE PERFORMING EXTERNAL BOOSTING OPERATION	<ul style="list-style-type: none"> • Drive Air pressure (11.0) LOW. If so look for causes as per S.No.1. • Purity is not enough. Look for Oxygen PURITY reading & ALARM. In the case the External boosting is done • Check the filter elements of the Oxygen filters if needed replace the element as per the service manual of the filters attached.
4	BANK PRESSURE GAUGE NOT(15.2/15.3/15.4/15.5) SHOWING PRESSURE WHILE FILLING THE BANK CYLINDER THROUGH THE EXTERNAL BOOSTING OPERATION	<ul style="list-style-type: none"> • Check the Bank Isolation valve on the Oxygen Storage & Boosting Panel, if close (15.2/15.3/15.4/15.5) opens it & also open valve on the cylinder in that bank whose cylinder filling is being done.
5	BOOSTER DOES NOT STOP AT	<ul style="list-style-type: none"> • Once the Pressure reaches 5000

	342Kg/cm² SET PRESSURE	<i>PSI(342Kg/cm²) close the Drive Air Supply Valve on the Oxygen Storage & Boosting Panel marked (12.1 &12.2) manually. Otherwise the booster may restart to replenish pressure decay due to temperature drop in the Storage BANK cylinder in whose the filling is operable).</i>
6	PRESSURE REGULATOR (21.0/22.0) NOT WORKING	<ul style="list-style-type: none"> • <i>Check & close if the vent valve is open (16.8/16.1)for the particular pressure range from which pressure regulation is need to be done.</i> • <i>Check & open Bank Cylinder Valve, if close and also open Bank Isolation Valve on the Oxygen Storage & Boosting Panel (16.1/16.2/16.3/16.4) to allow the pressure to the Distribution Station subsequently.</i> • <i>Check&open the Supply valve(16.7/16.9) on the Distribution Panel, for that particular pressure range from which the pressure is need to be regulated and monitor it on the Pressure gauge (4.2/15.6).</i>
7	PRESSURE REGULATOR (20.0) NOT WORKING	<ul style="list-style-type: none"> • <i>Check & Close, if the vent valve (16.6), is open.</i> • <i>Check&Open Bank cylinder valve, if close and also open the Bank Isolation Valve (16.1/16.2/16.3/16.4) to allow the pressure to the Distribution Panel subsequently.</i> • <i>Check & tightened the Pressure regulator (19.0) if found lose.</i> • <i>Check & Open the Supply Valve (16.5), if open.</i> • <i>Regulate the Pressure as per the requirement monitoring the Pressure on the gauge (23.0)</i>
8	AIR COMPRESSOR NOT WORKING	<ul style="list-style-type: none"> • <i>CHECK&switch on the Electrical Panel.</i>

		<ul style="list-style-type: none"> • Push the stop button, if kept pulled in case. • Look for Cause in the ELGI MANUAL SECTION-13 provided with this MANUAL.
9	PRESSURE DROP AT INLET PRESSURE GAUGE (4.1) WHILE THE EXTERNAL CYLINDER IS CONNECTED AT OXYGEN INLET PORT	<ul style="list-style-type: none"> • Check & Close the Oxygen Inlet valve at the User Panel (Boosting /Storage Panel). • Check &close the vent valve (16.13), if open.
10	PRESSURE GAUGE (15.2/15.3/15.4/15.5) ON STORAGE CYLINDER SHOWS RAPID GROWTH WHILE FILLING STORAGE CYLINDER THROUGH BOOSTING OPERATION	<ul style="list-style-type: none"> • CHECK & Open Bank Cylinder valvefor the specific bank which is selected, if close. • CHECK & Open Bank isolation valve for that specific bank which is selected, if close.
11	PROBLEM DURING THE CHARGING OF AIRCRAFT	<ul style="list-style-type: none"> • CHECK & Close the VENT VALVE. • CHECK & Open the Cylinder valve, for the specific bank which is selected& having sufficient pressure for Aircraft charging&monitoring the Pressure on Bank Gauge. • CHECK & Open the Bank Isolation valve (16.1/16.2/16.3/16.4) for the above selected cylinder in that bank. • CHECK & Open the Supply valve from the four given pressure range on the Distribution panel, allowing the pressure to the aircraft. • Regulate Pressure regulator accordingly monitoring the pressure on the gauge(23.0/4.2/15.6/15.7 as per selection) on the distribution panel

12	FIRE ALARM PANEL (EMERGENCY OPERATION) IF INCASE THE FIRE ALARM PANEL RINGS AND DO NOT FLOOD THE FIRE SUPPRESSION SYSTEM WITH IMMEDIATE EFFECT	<ul style="list-style-type: none"> • <i>Operate manually Fire Alarm Panel BREAKING THE GLASS of the MANUAL RELEASE BOX MCB.</i>
13	PRESSURE ON THE GAUGE (15.7)DO NOT READS / DECAYS WHILE THE CHARGING OF THE AIRCRAFT IS DONE THROUGH THE DISTRIBUTION PANEL THROUGH GRAVITY FILLING	<ul style="list-style-type: none"> • <i>CHECK & Close the VENT VALVE (16.12), if open.</i> • <i>CHECK & Open the Bank cylinder valve and the Bank Isolation valve, if close (16.1/16.2/16.3/16.4) to allow the pressure to come to the Distribution Panel subsequently.</i> • <i>CHECK & VERY SLOWLY open the supply valve on the Distribution Panel(16.11) to allow the gravity filling monitoring the gauge(15.7) as per the pressure requirement for charging of the aircraft.</i>
14	PRESSURE REGULATOR (20.0) IS REGULATING THE PRESSURE ABOVE THE PRESET VALUE 7.0 BAR	<ul style="list-style-type: none"> • <i>CHECK the Relief valve setting (24.0).if the relief valve is not locked wire sealed.</i> • <i>Consult us for the support</i>
15	PRESSURE REGULATOR (21.0) IS REGULATING THE PRESSURE ABOVE THE PRESET VALUE 240BAR	<ul style="list-style-type: none"> • <i>CHECK the Relief valve setting (25.0).if the relief valve is not locked wire sealed.</i> • <i>Consult us for the support</i>
16	PRESSURE DROP CONTINUOUSLY ON THE INLET GAUGE (4.1) AS THE VALVE (32.1/32.2/32.3/32.4) IS OPEN TO START THE INTERNAL BOOSTING	<ul style="list-style-type: none"> • <i>CHECK & Close the SUPPLY VALVE(16.11) & VENT VALVE on the Distribution Panel, if open(16.12)</i>